STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	C-5224B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
45437.1.1		PE
45437.3.2	CMS-0918(94)	CONST

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED IMPROVEMENTS

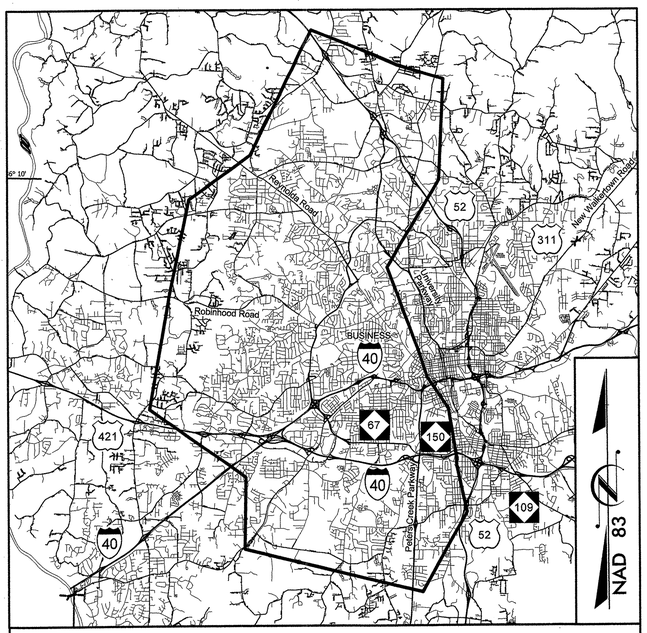
CITY OF WINSTON-SALEM

COMPUTERIZED TRAFFIC SIGNAL SYSTEM

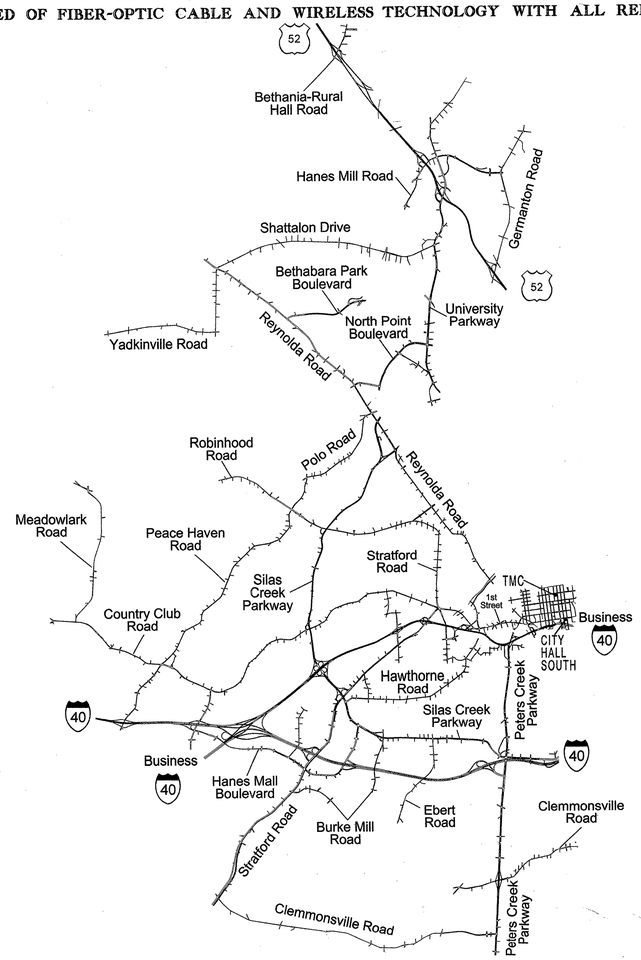
PHASE B: WESTERN SECTION

Part 2 of 2

REPLACEMENT & EXPANSION OF THE COMPUTERIZED TRAFFIC SIGNAL SYSTEM.
RELATED WORK INCLUDES:
UPGRADING LOCAL INTERSECTION CONTROLLERS, CABINETS, AND SYSTEM DETECTORS WITH LIMITED SIGNAL WIRING AND SIGNAL HEAD UPGRADES WHEN NECESSARY; EXPANSION OF CCTV MONITORING NETWORK; AND INSTALLATION OF A ETHERNET COMMUNICATIONS NETWORK COMPRISED OF FIBER-OPTIC CABLE AND WIRELESS TECHNOLOGY WITH ALL RELATED EQUIPMENT.



VICINITY MAP



Phase B

Volume III of III
Traffic Signal Designs

TIP PROJECT: C-5224B

CONTRACT: C203195

2012 STANDARD SPECIFICATIONS

LETTING DATE: JULY 16, 2013

PROJECT LENGTH = 75 MILES

750 Greenfield Parkway, Garner, NC 27529

NCDOT CONTACTS:
TRANSPORTATION MOBILITY & SAFETY DIVISION
INTELLIGENT TRANSPORTATION SYSTEMS SECTION
GREG A FULLER, PE - STATE ITS & SIGNALS ENGINEER

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

J. TODD BROOKS, PE - ATKINS PROJECT MANAGER
LISA M. MOON, PE - ATKINS SENIOR PROJECT ENGINEER
H. ALFRED BADGETT, PE - ATKINS SENIOR PROJECT ENGINEER

Winston-Salem

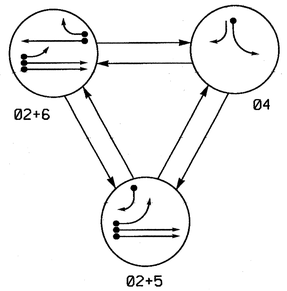
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M. Moon 3-22-13
SIGNATURE *DATE*

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 174

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

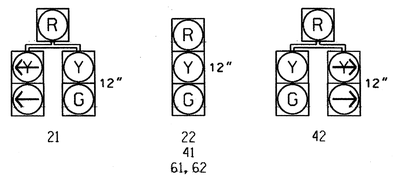
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21	G	G	R	Y
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



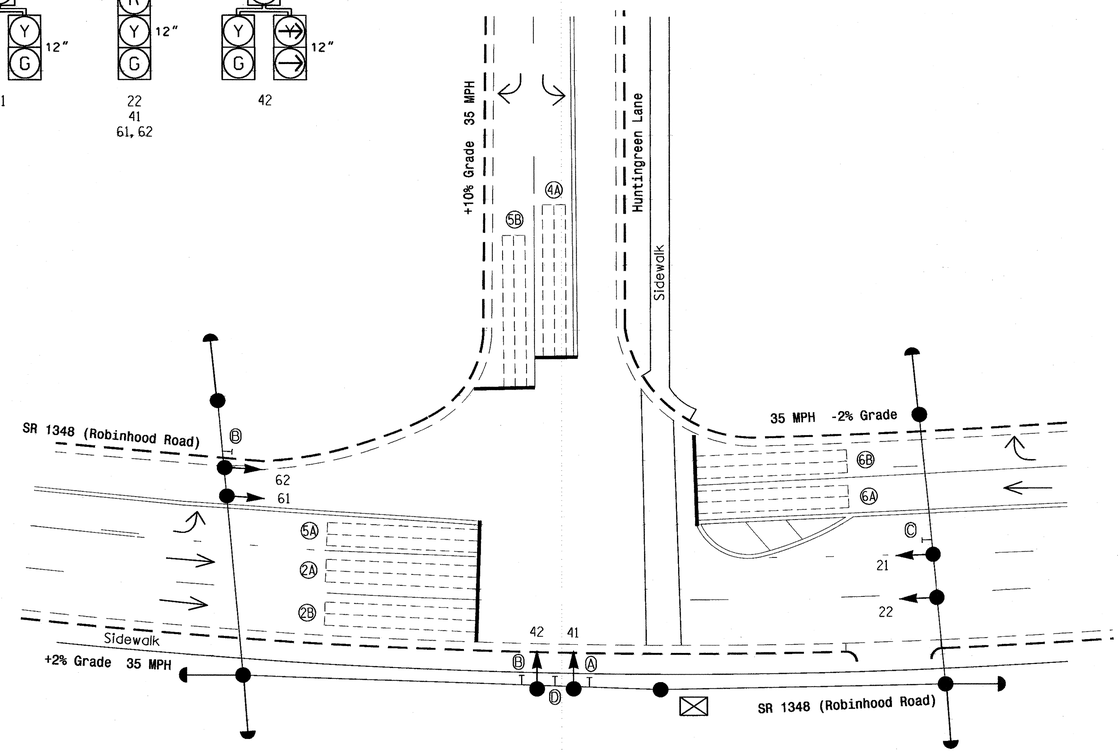
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6X40	0	2-4-2	-	6	Y	Y	Y	-	10	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 5 may be lagged.
4. Rewire existing loop 4B as 5B.
5. Set all detector units to presence mode.
6. The cabinet should be designed to include an Auxiliary Output file for future use.
7. Existing lane control signs on Huntingreen Lane and/or "Left Turn Yield on Green" (R10-12) sign may be removed at the direction of the Engineer.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	C
D	Street Name Sign (D3-1)	D

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	45	25	20	45
Yellow Clearance	3.7	3.0	3.0	4.0
Red Clearance	1.0	1.9	1.6	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 20 1"=20'

SR 1348 (Robinhood Road)
at
Huntingreen Lane

Division 9 Forsyth County Winston-Salem

PLAN DATE: January 2012 REVIEWED BY:
PREPARED BY: M. Bazzarie REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TEMPA
SIGNATURE 9/18/12 DATE
SIG. INVENTORY NO. 09-0841

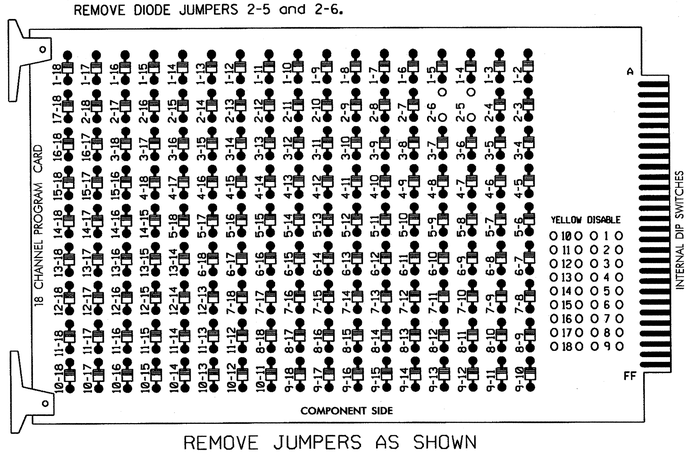
18-SEP-2012 11:13
S:\TSS\Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-0841\090841_sig_dsn_20120918.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.175

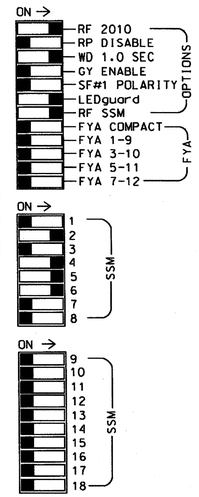
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5 and 2-6.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2.S5.S7.S8
PHASES USED.....2.4.5.6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21,42	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101		*	134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW							133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

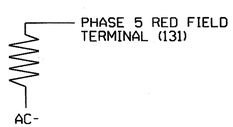
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			15
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y	Y		10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of this resistor is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0841
DESIGNED: January 2012
SEALED: 9-18-12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1348 (Robinhood Road) at Huntingreen Lane

Division 09 Forsyth County Winston-Salem

PLAN DATE: 9-12-12 REVIEWED BY: T. Yn
PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 9/18/12
SIG. INVENTORY NO. 09-0841

18-SEP-2012 12:04
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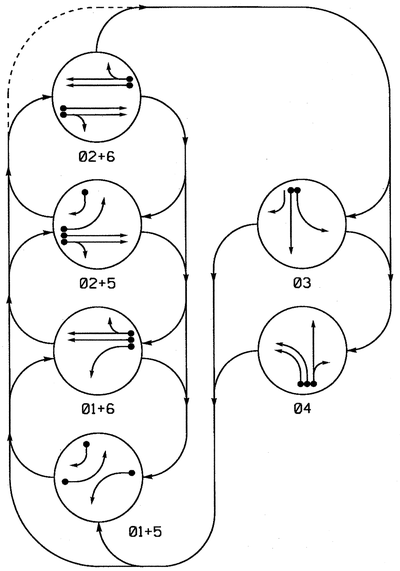
dgspaulding

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 176

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

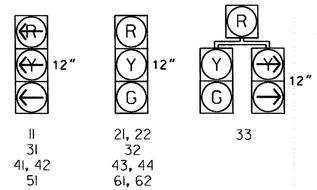
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	~~R~~
32	R	R	R	R	G	R	R
33	R/←	R	R/←	R	G	R	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~
43, 44	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

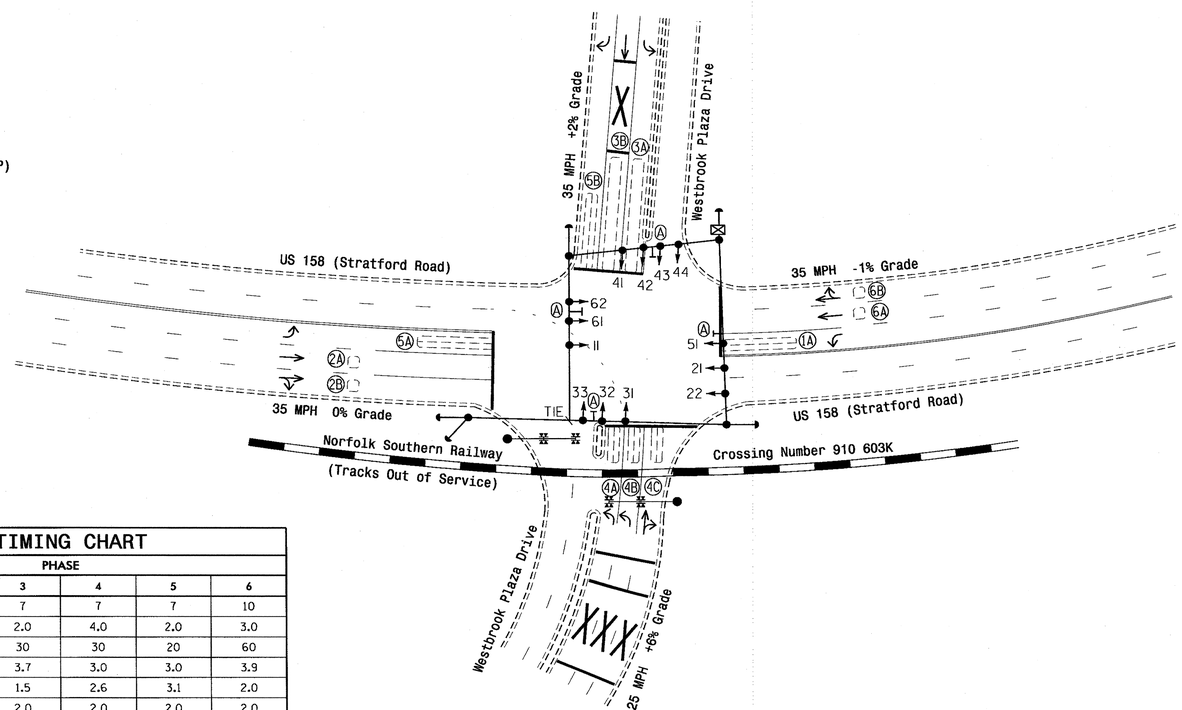
SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	3	-	Y
2A	6X6	70	Existing	-	2	Y	Y	-	-	-	-	Y
2B	6X6	70	Existing	-	2	Y	Y	-	-	-	-	Y
3A, 3B	6X60	0	Existing	-	3	Y	Y	-	-	-	-	Y
4A, 4B	6X18	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4C	6X18	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	3	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	70	Existing	-	6	Y	Y	-	-	-	-	Y
6B	6X6	70	Existing	-	6	Y	Y	-	-	-	-	Y



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1	2.0	3.0	2.0	4.0	2.0	3.0
Max Green 1 *	20	60	30	30	20	60
Yellow Clearance	3.0	3.8	3.7	3.0	3.0	3.9
Red Clearance	2.8	2.0	1.5	2.6	3.1	2.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. The cabinet should be designed to include an Auxiliary Output file for future use.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Railroad Crossing 910 603K is currently out of service and protected by a "Stop and Flag" order, as issued by Norfolk Southern Railway. This signal operates as shown without Railroad Preemption. If the tracks are returned to service and the "Stop and Flag" order is removed, this signal shall be redesigned to operate with Railroad Preemption. The Railroad Preemption shall be in operation before the "Stop and Flag" order is removed.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Cantilever	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 158 (Stratford Road) at Westbrook Plaza Drive

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: February 2013 | REVIEWED BY: CE Carter

PREPARED BY: Sterling | REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

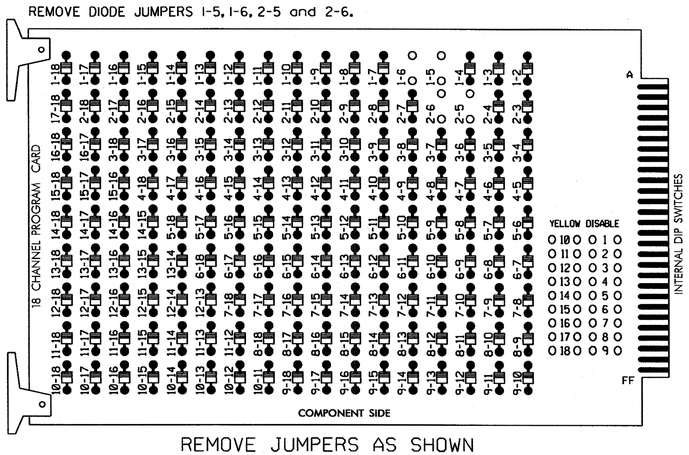
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE | DATE 2/21/13
SIG. INVENTORY NO. 09-0846

21-FEB-2013 17:52
S:\TSAS\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-0846\090846_sig_dsn_20130221.dgn
rziemba

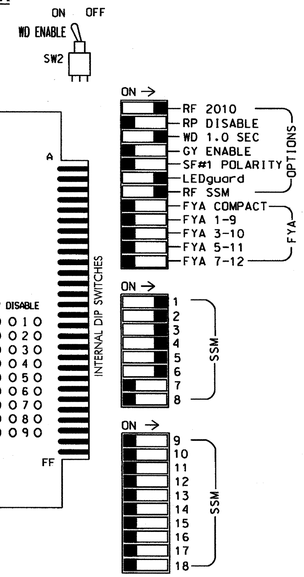
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.177

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	32,33	41,42	43,44	NU	33	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			116		101				134										
YELLOW		129			117		102				135										
GREEN		130			118		103				136										
RED ARROW	125			116		101				131											
YELLOW ARROW	126			117		102			132	132											
GREEN ARROW	127			118		103			133	133											

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	Ø 3 3A,3B	Ø 4 4A,4B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 2 2B			NOT USED	Ø 4 4C								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 5 5B	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø 6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A,3B	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			
4C	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0846
DESIGNED: February 2013
SEALED: 2/21/13
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 158 (Stratford Road)
at
Westbrook Plaza Drive

Division 9 Forsyth County Winston-Salem

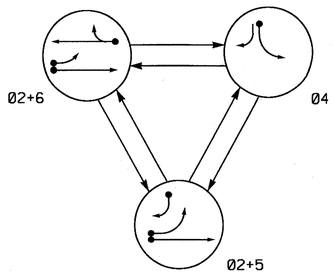
PLAN DATE: February 2013	REVIEWED BY: T. Jam		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 2/26/13 DATE
SIG. INVENTORY NO. 09-0846

26-FEB-2013 12:04
S:\TSG\MTS Signals\WorkGroups\Sig Mgmt\Strickland\09-0846_sample_xxx.dgn
$$$$USERNAME

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 178

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

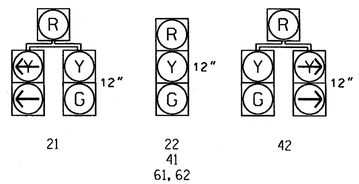
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

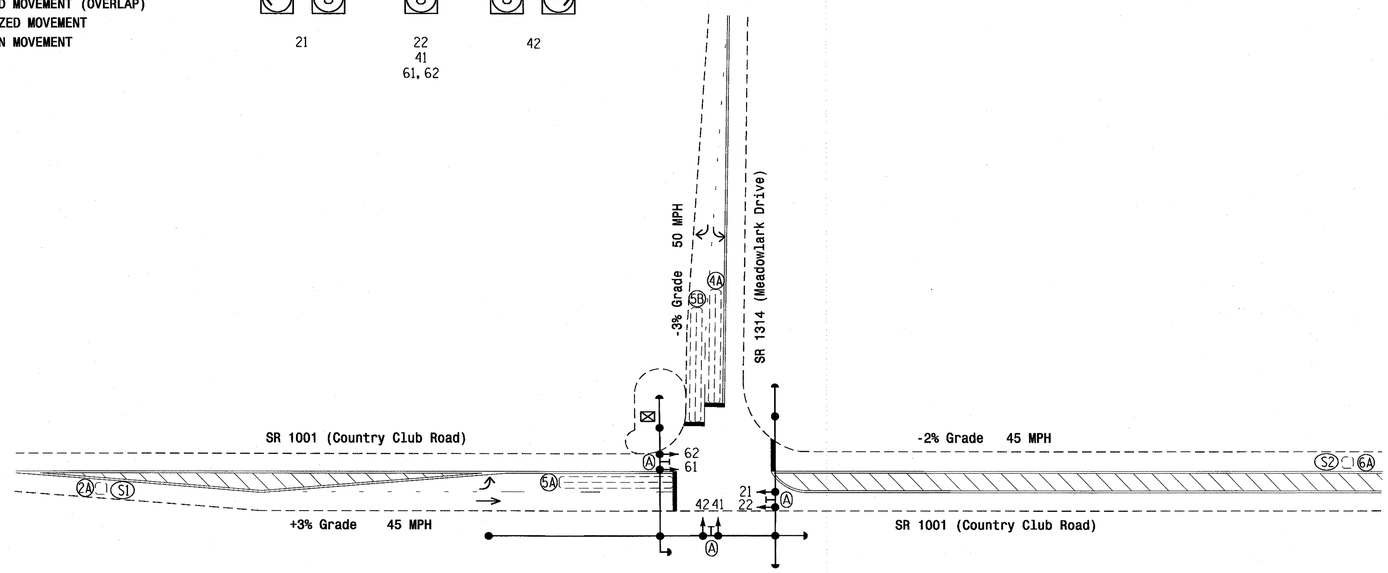
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21	G	G	R	Y
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
61, 62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S1	6X6	295	4	-	2	Y	Y	-	-	-	Y	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A/S2	6X6	300	4	-	6	Y	Y	-	-	-	Y	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 5 may be lagged.
4. Rewire existing loop 4B as 5B.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	1.0	1.0	6.0
Max Green 1 *	120	30	15	120
Yellow Clearance	4.3	3.0	3.0	4.7
Red Clearance	1.0	2.1	1.2	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40
1"=40'

SR 1001 (Country Club Road) at SR 1314 (Meadowlark Drive)

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/19/12 DATE
SIG. INVENTORY NO. 09-0873

19-JUN-2012 10:26
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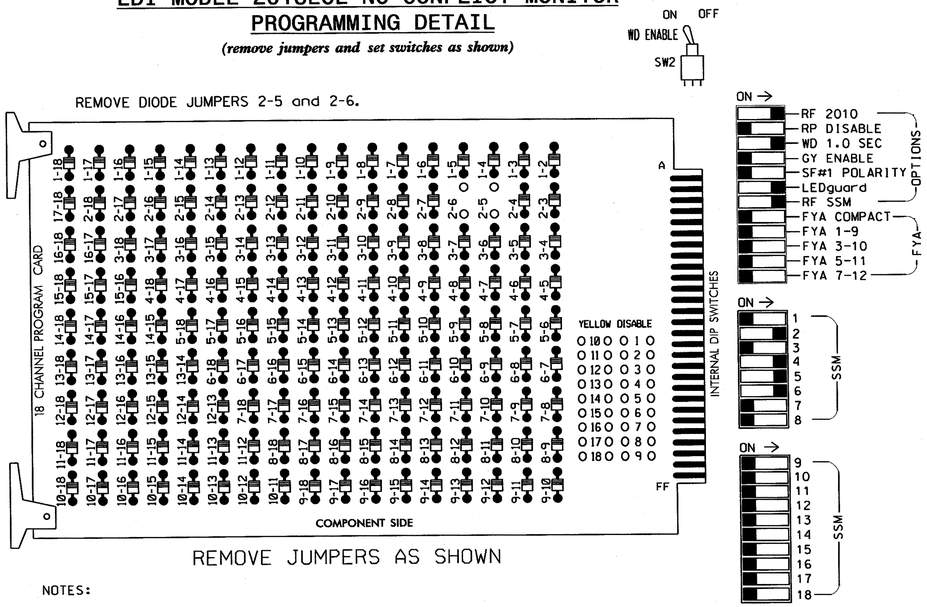
rziembo

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 179

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21,42	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101		*	134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW							133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2/SYS 2A/S1	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6/SYS 6A/S2	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø5 5B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED							NOT USED					

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
6A/S2	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
5B	TB7-9,10	J9U	59	21	15	5	Y	Y			15

[1] Add jumper from J1-W to I4-W, on rear of input file.

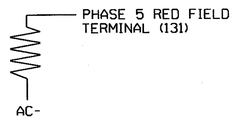
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0873
DESIGNED: February 2012
SEALED: 6-19-12
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of this resistor is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1001 (Country Club Road) at SR 1314 (Meadowlark Drive)

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 6-15-12 | REVIEWED BY: T.Vaje
PREPARED BY: D.H. Spaulding | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 6/19/12
SIG. INVENTORY NO. 09-0873

19-JUN-2012 11:52
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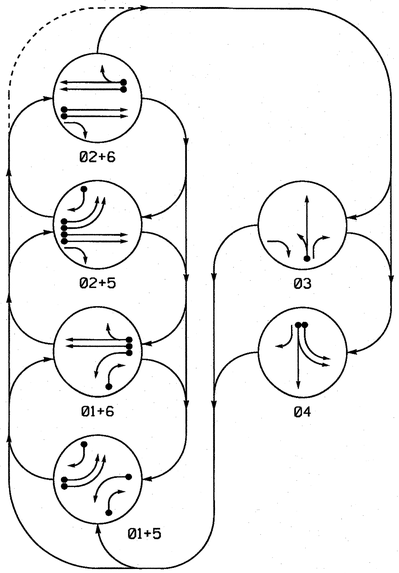
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 180

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

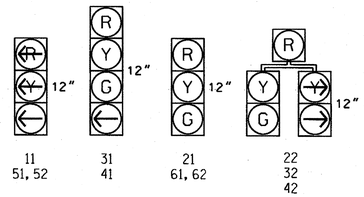
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/←	R	Y
31	R	R	R	R	G/←	R	R
32	R/←	R/←	R	R	G	R	R
41	R	R	R	R	R	G/←	R
42	R/←	R	R/←	R	R	G	R
51, 52	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

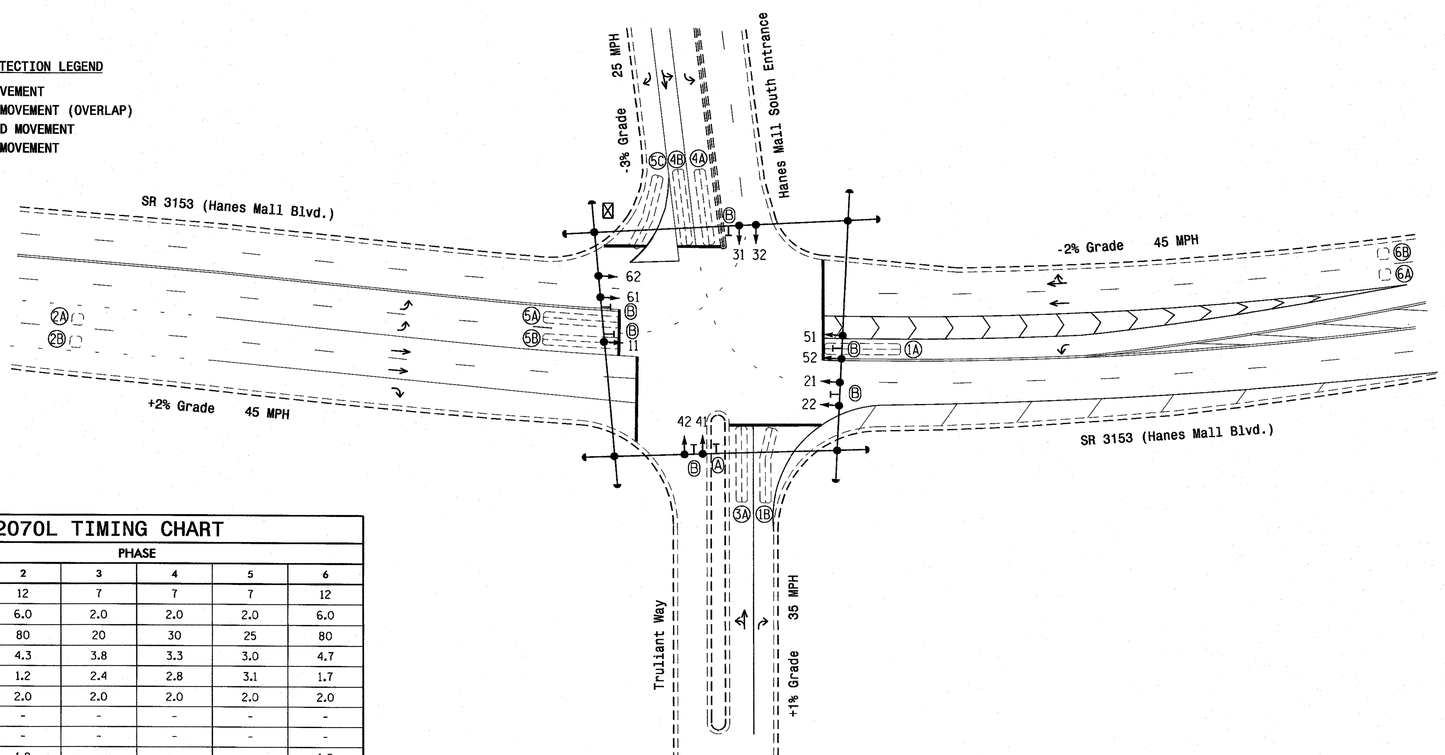


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	3	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A, 2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A, 4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A, 5B	6X40	0	2-4-2	-	5	Y	Y	-	-	3	-	Y
5C	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Existing Left Arrow "ONLY" sign (R3-5L) may be removed at the direction of the Engineer.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	20	80	20	30	25	80
Yellow Clearance	3.0	4.3	3.8	3.3	3.0	4.7
Red Clearance	2.6	1.2	2.4	2.8	3.1	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.8	-	-	-	1.8
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Hanes Mall (South) Entrance and Truliant Way

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

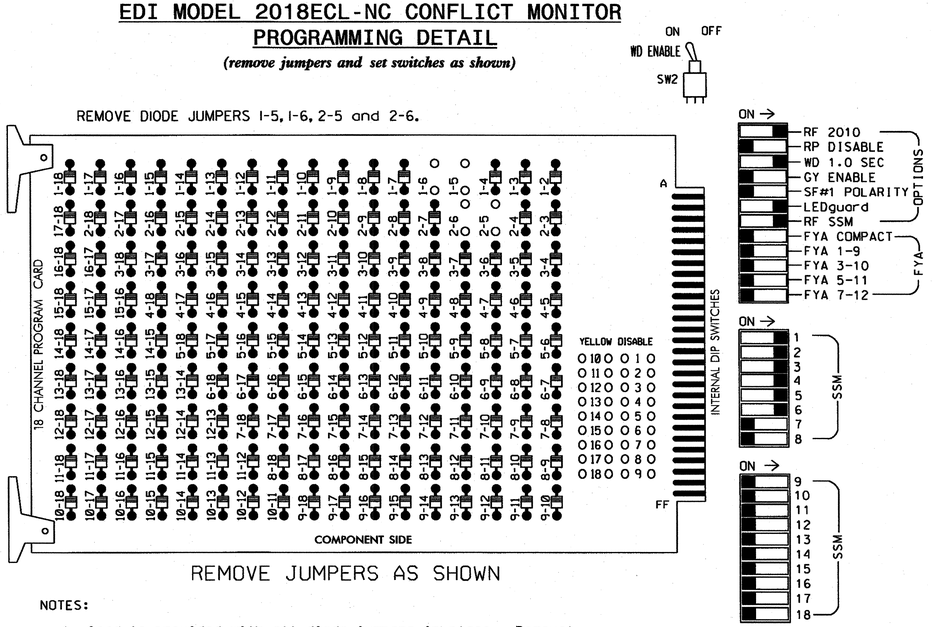
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TIEMA
SIGNATURE DATE 3/5/13
SIG. INVENTORY NO. 09-0902

05-MAR-2013 14:47
S:\TSA&SU\TS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-0902\09090902_sig_dsn_20130305.dgn
P2:Tembo

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 181

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4			S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3			4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3			4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	32	21,22	NU	22	31	32	41	42	NU	42	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED			128			116	116	101	101				134										
YELLOW			129			117	117	102	102				135										
GREEN			130			118	118	103	103				136										
RED ARROW	125											131											
YELLOW ARROW	126	126			117						132	132											
GREEN ARROW	127	127			118	118		103			133	133											

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	SLOT	SLOT	Ø3 3A	Ø4 4A,4B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	Ø2 2A,2B	EMPTY	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A,5B	Ø5 5C	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	Ø6 6B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A,5B	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5C	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0902
DESIGNED: February 2012
SEALED: 3/5/13
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Hanes Mall (South) Entrance and Truliant Way

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: March 2013 | REVIEWED BY: T.V.R.
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

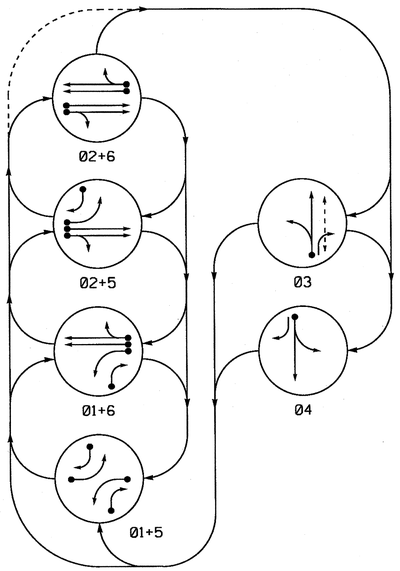
SIGNATURE | DATE 3/6/13

SIG. INVENTORY NO. 09-0902

06-MAR-2013 12:12
s:\traffic\Signals\Workgroups\Sig Mgmt\Strickland\09902_smu_ela_xxx.dgn
cbstrickland

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 182

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

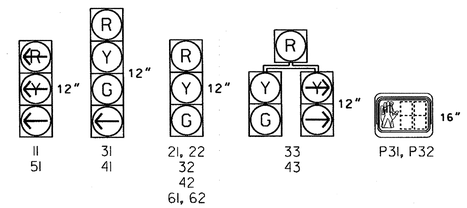
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
33	R/←	R/←	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
43	R/←	R	R/←	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y
P31, P32	DW	DW	DW	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



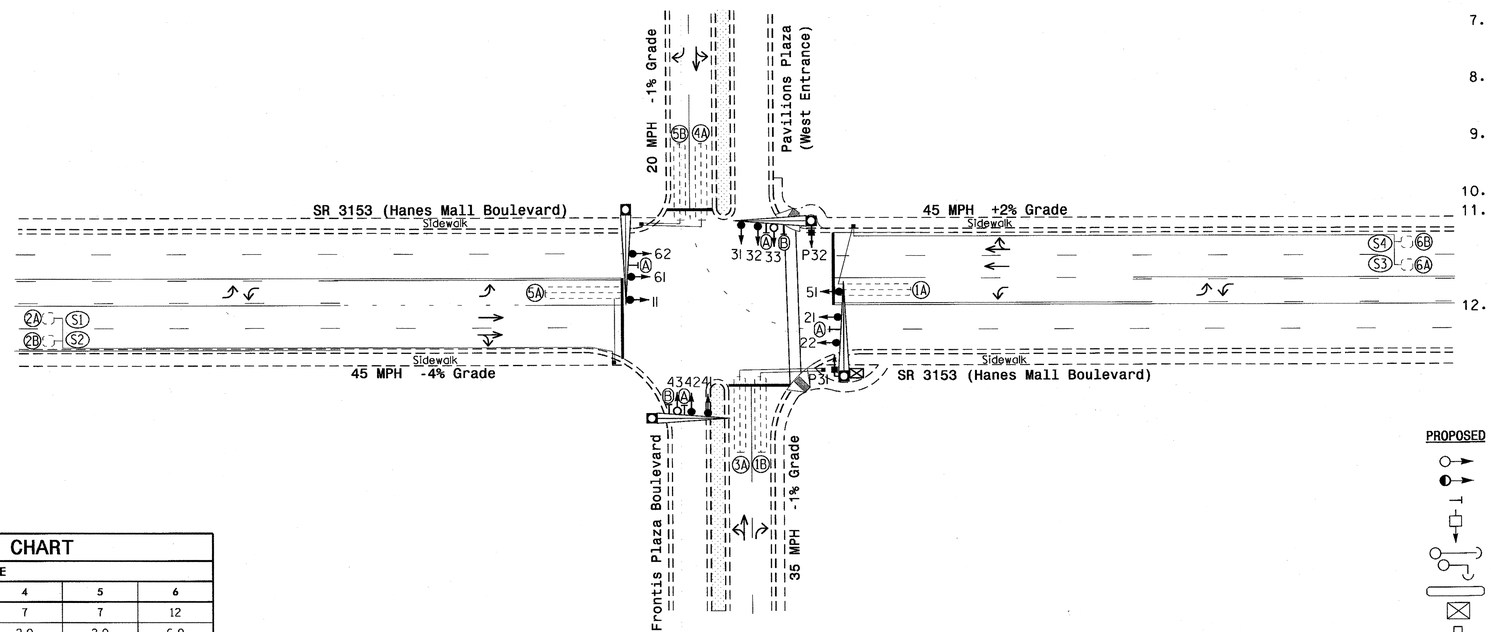
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	3	-	Y
1B	6X40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A/S1	6X6	300	EXISTING	-	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	300	EXISTING	-	2	Y	Y	-	-	-	Y	Y
3A	6X40	+5	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	3	-	Y
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A/S3	6X6	300	EXISTING	-	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	300	EXISTING	-	6	Y	Y	-	-	-	Y	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Existing Right Arrow "ONLY" signs (R3-5R) may be removed at the direction of the Engineer.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. New signal heads 33 and 43 shall be black in color with black visors.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	Street Name Sign (D3-1)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	25	80	25	25	25	80
Yellow Clearance	3.0	4.9	3.9	3.0	3.0	4.3
Red Clearance	2.8	1.4	1.7	2.6	2.6	1.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	7	-	-	-
Don't Walk 1	-	-	19	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Boulevard) at Frontis Plaza Boulevard and Pavilions Plaza (West Entrance)

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2012 REVIEWED BY:
PREPARED BY: C.E. Carter REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIMBA
SIGNATURE DATE 2/6/13
SIG. INVENTORY NO. 09-0937

05-MAR-2013 16:57
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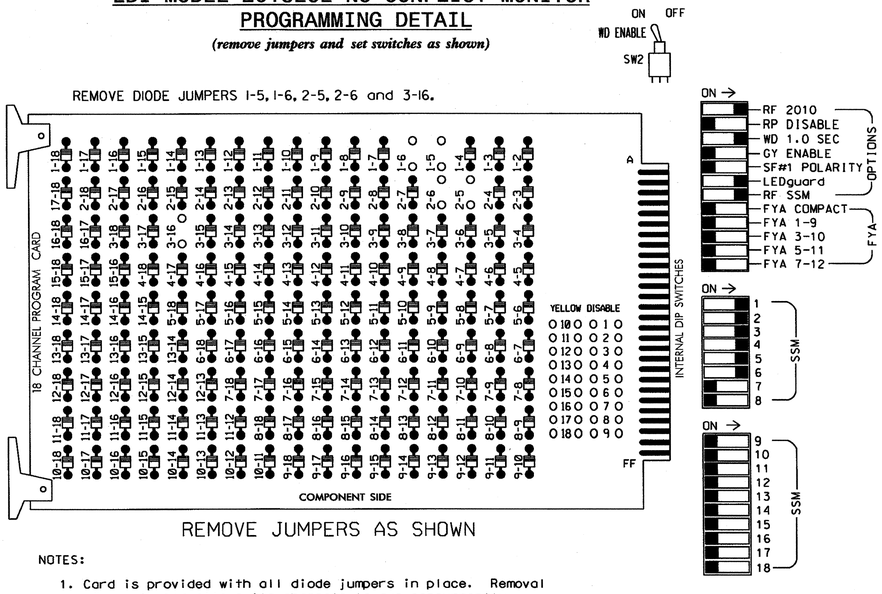
rzimba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 183

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phase 3 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4		4 PED	5		6	6 PED	7	8	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	33	21,22	NU	31	32,33	41	42,43	NU	43	51	61,62	NU	NU	NU	P31, P32	NU	NU	NU	NU	NU	NU
RED			128		116	116	101	101				134										
YELLOW			129		117	117	102	102				135										
GREEN			130		118	118	103	103				136										
RED ARROW	125										131											
YELLOW ARROW	126	126								132	132											
GREEN ARROW	127	127			118		103			133	133											
✋																110						
🚶																112						

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S12
PHASES USED.....1,2,3,4,5,6,3 PED
OVERLAPS.....NONE

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2/SYS 2A/S1	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2/SYS 2B/S2		NOT USED	NOT USED							Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6/SYS 6A/S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6/SYS 6B/S4											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A/S1	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/S2	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A/S3	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S4	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			
PED PUSH BUTTONS											
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

PED 3 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
2. ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
3. SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
4. ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
5. BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
6. SELECT '1' (OUTPUT ASSIGNMENTS)
7. ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
8. REPEAT STEPS # 3 AND # 4.

CHANGING INPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0937
DESIGNED: December 2012
SEALED: 2-06-13
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3153 (Hanes Mall Boulevard)
at
Frontis Plaza Boulevard and
Pavillions Plaza (West Entrance)

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
750 N.Greenfield Pkwy, Garner, NC 27529

Division 9	Forsyth County	Winston-Salem
PLAN DATE: January 2013	REVIEWED BY: JTR	
PREPARED BY: James Peterson	REVIEWED BY:	

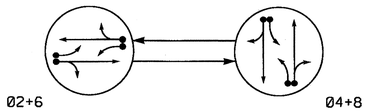
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 2-18-13 DATE
SIG. INVENTORY NO. 09-0937

07-FEB-2013 13:17
S:\ITSSG\ITS\Signals\Workgroups\Sig Mgmt\Peterson\09037_smle_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 184

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

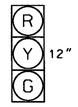
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21, 22
41, 42
61, 62
81, 82

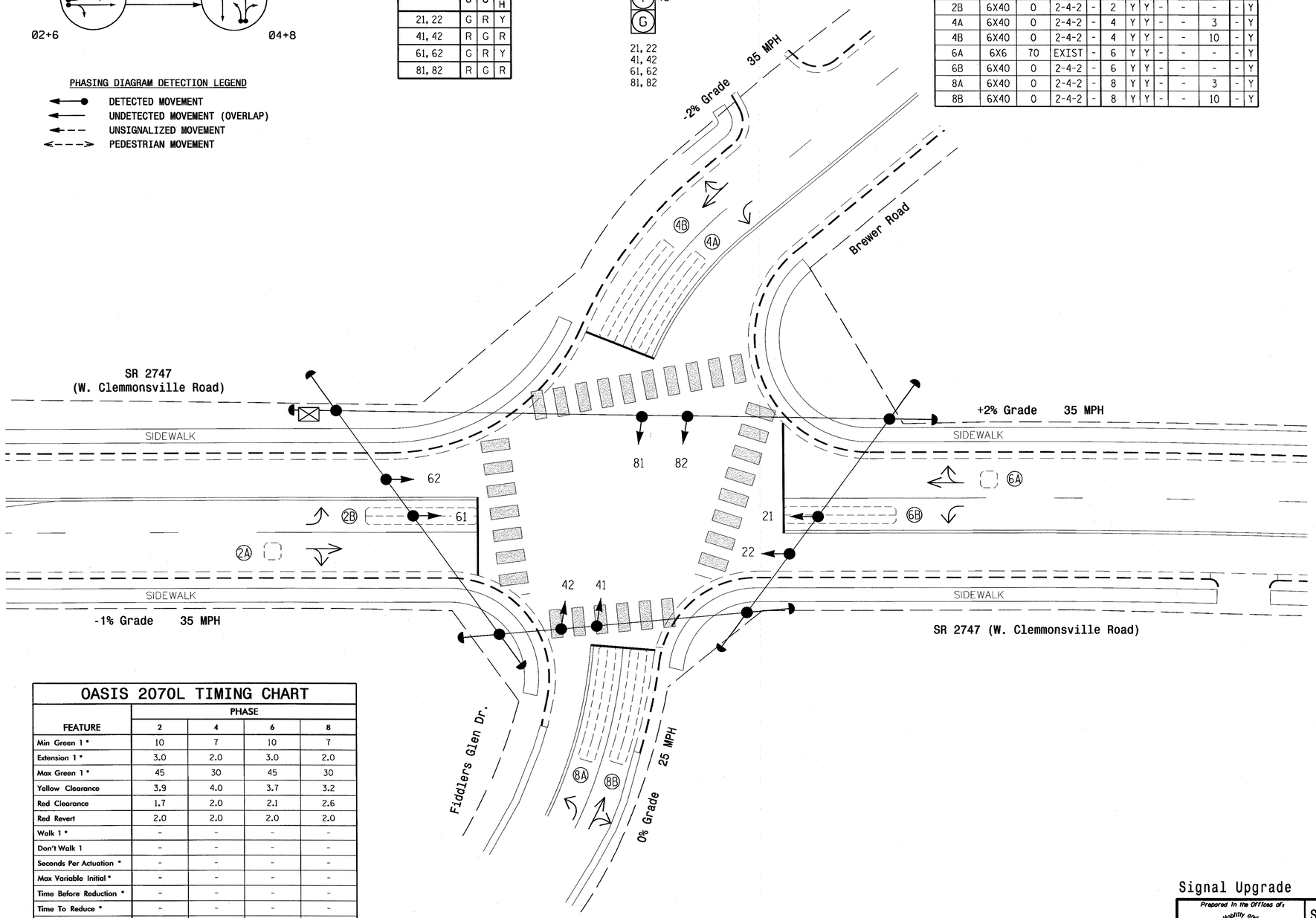
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
6A	6X6	70	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. The cabinet should be designed to include an Auxiliary Output file for future use.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	30	45	30
Yellow Clearance	3.9	4.0	3.7	3.2
Red Clearance	1.7	2.0	2.1	2.6
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 20 1"=20'

SR 2747 (W. Clemmonsville Rd.)
at
Brewer Road/Fiddlers Glen Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

REVISIONS	INIT.	DATE

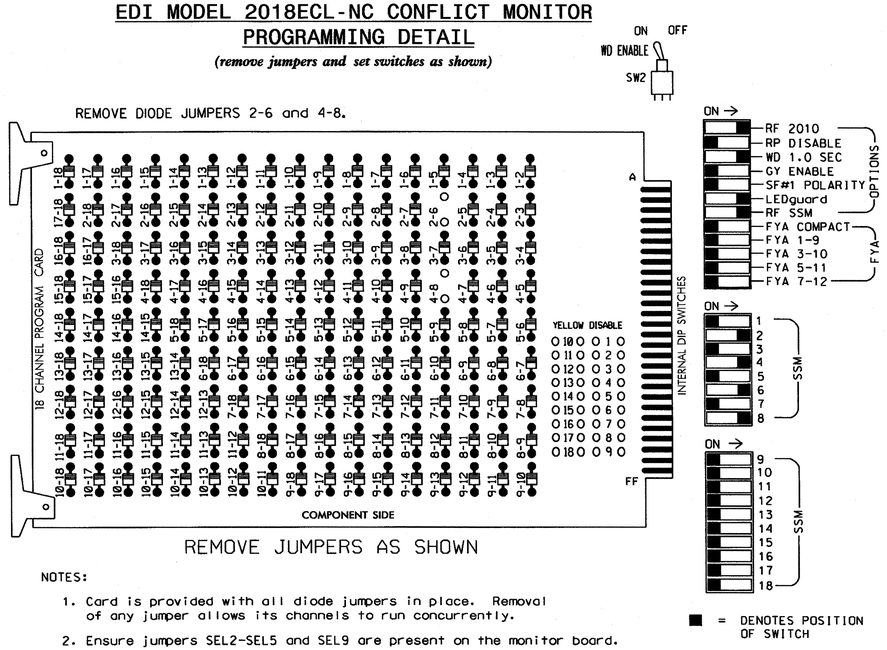
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIENDA
SIGNATURE 1/9/13 DATE
SIG. INVENTORY NO. 09-0939

09-JAN-2013 10:30
S:\TIMS\H-TS\Signals\Signal Design Sections\Central Region\Div 9\C-5224 Winston Salem\Signals\09-0939\090939_sig_dsn_20130109.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
C-52248	Sig. 185

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø 2 2A	SLOT	SLOT	SLOT	Ø 4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø 2 2B	EMPTY	EMPTY	EMPTY	Ø 4 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø 6 6A	SLOT	SLOT	SLOT	Ø 8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø 6 6B	EMPTY	EMPTY	EMPTY	Ø 8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0939
DESIGNED: December 2012
SEALED: 1-09-13
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2747 (W. Clemmonsville Road)
at
Brewer Road/Fiddlers Glen Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE: January 2013 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

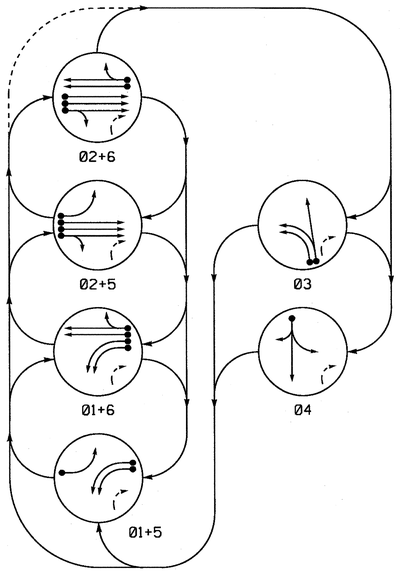
Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 1-9-13 DATE
SIG. INVENTORY NO. 09-0939

09-JAN-2013 11:50
S:\Signals\Workgroups\Sig Man\PetersonM\09939_sm_e1a_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 186

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

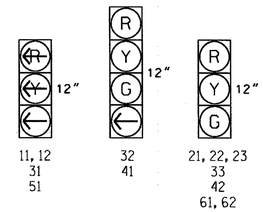
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11, 12	←	←	R	R	R	R	R
21, 22, 23	R	R	G	G	R	R	Y
31	R	R	R	R	←	R	R
32	R	R	R	R	G ←	R	R
33	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51	←	R	←	R	R	R	R
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



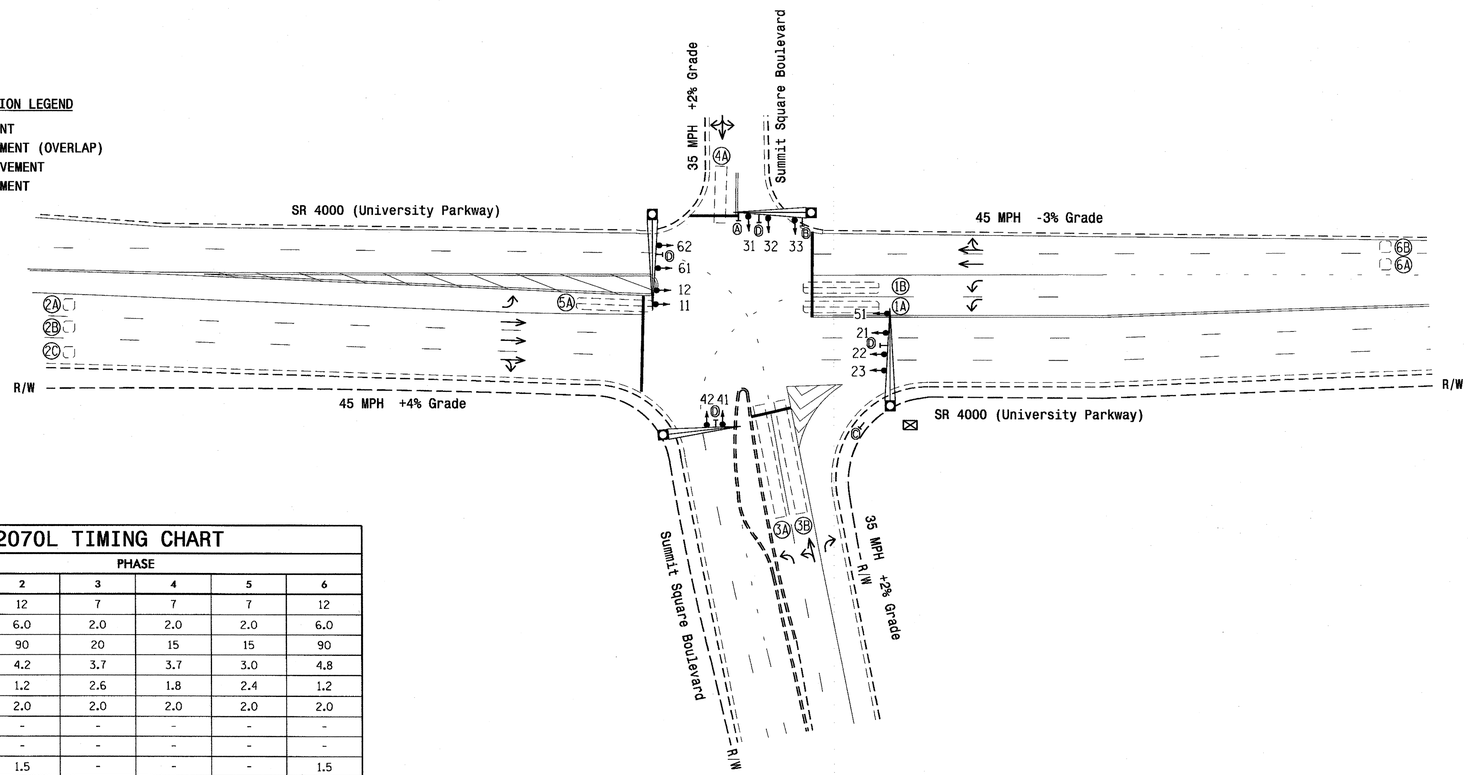
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	3	-	Y
1B	6X40	+5	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2C	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X60	+5	EXIST	-	3	Y	Y	-	-	-	-	Y
3B	6X60	+5	EXIST	-	3	Y	Y	-	-	-	-	Y
4A	6X30	+5	EXIST	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	3	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Existing lane control signs may be removed at the direction of the Engineer.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	25	90	20	15	15	90
Yellow Clearance	3.0	4.2	3.7	3.7	3.0	4.8
Red Clearance	2.9	1.2	2.6	1.8	2.4	1.2
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 4000 (University Pkwy.)
at
Summit Square Blvd.

Division 9 Forsyth County Winston-Salem

PLAN DATE:	November 2011	PREPARED BY:	L. Blount
PREPARED BY:	Sterling	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

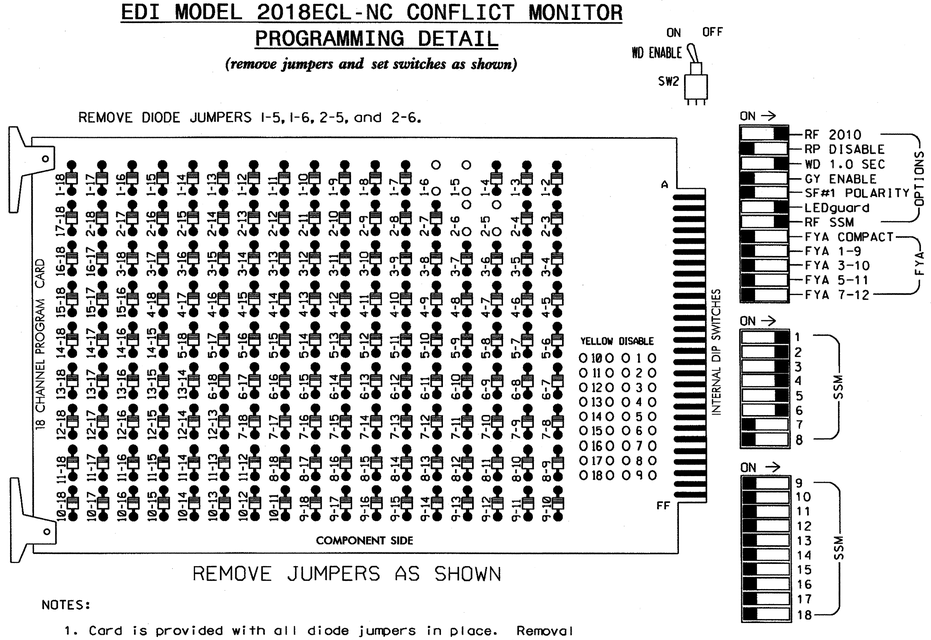
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 12/22/12 DATE
SIG. INVENTORY NO. 09-0967

05-MAR-2013 14:59
S:*ITSGis*ITS Signals*Signal Design Section*Central Region*Div 9*C-5224 Winston Salem*Signals*09-0967*09096T_sig_dsn_20121022.dgn
c:10mdc

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 187

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4			S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3			4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3			4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12	21,22 23	NU	31	32	33	41	41	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			116	116	101	101			134										
YELLOW		129			117	117	102	102			135										
GREEN		130			118	118	103	103			136										
RED ARROW	125			116						131											
YELLOW ARROW	126			117						132											
GREEN ARROW	127			118	118		103			133											

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	ø1 1A	ø2 2A	ø2 2C	SLOT	ø3 3A	ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS OC ISOLATOR
	L	EMPTY	ø1 1B	ø2 2B	NOT USED	EMPTY	ø3 3B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST OC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	ø6 6B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			3
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0967
DESIGNED: November 2011
SEALED: 10/22/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 4000 (University Pkwy.) at Summit Square Blvd.

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Division 9 | Forsyth County | Winston-Salem
PLAN DATE: October 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

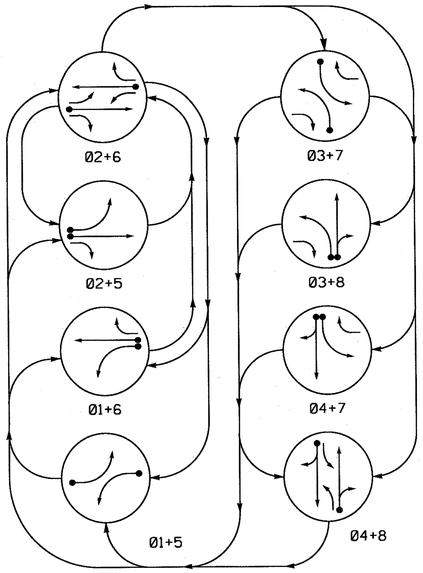
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 10-23-12
SIG. INVENTORY NO. 09-0967

23-OCT-2012 06:59
S:#ITSASU#ITS Signals#Workgroups#Sig Man#armstrong#09067_sml_ele.xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 188

8 Phase
Fully Actuated
(Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
23	R	R	G	G	R	R	R	R	Y
41	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
63	R	G	R	G	R	R	R	R	Y
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

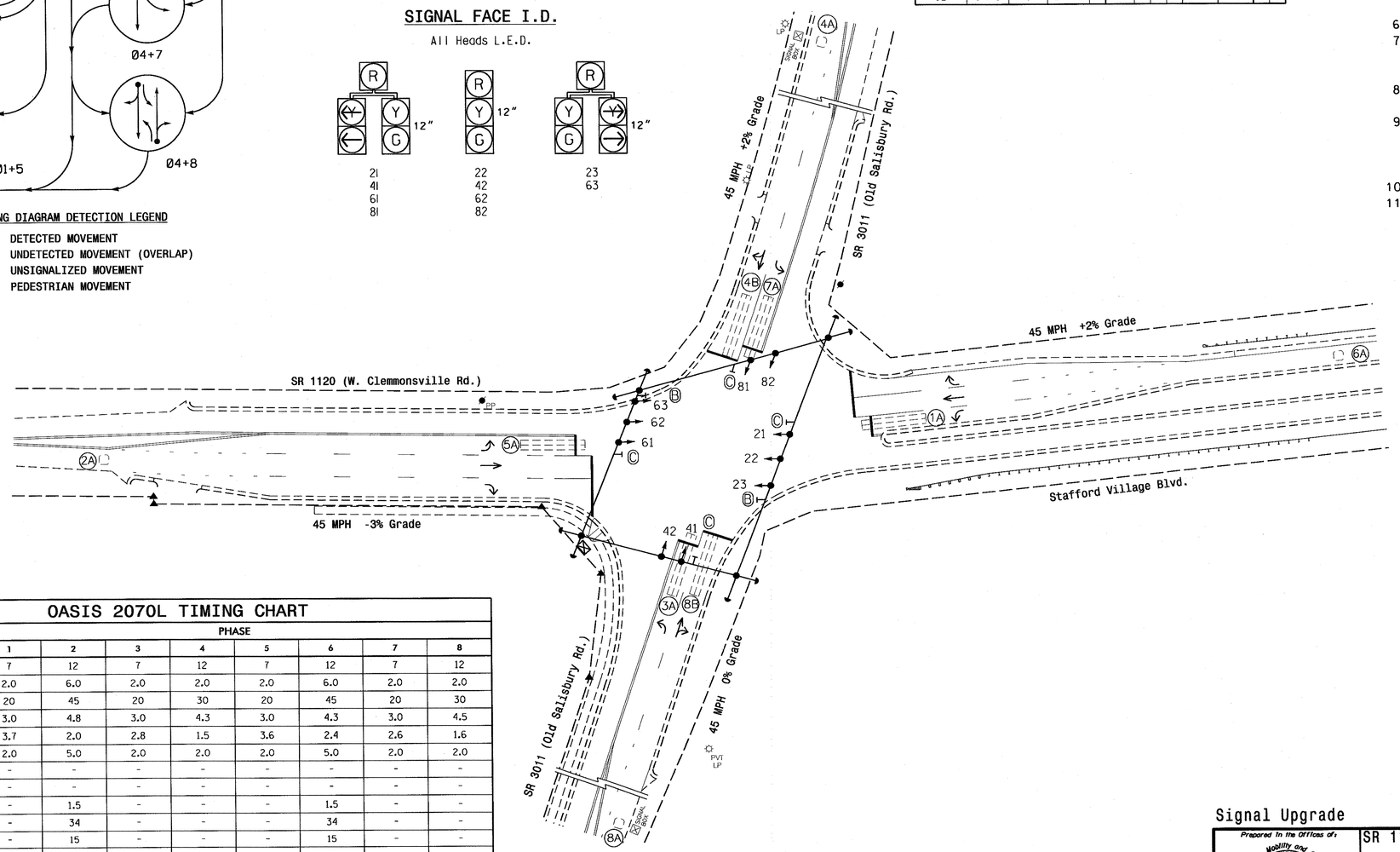
All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	300	5	-	2	Y	Y	-	-	-	-	Y
3A	6X40	+5	2-4-2	-	3	Y	Y	-	-	15	-	Y
4A	6X6	300	Existing	-	4	-	Y	-	2.4	-	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	300	5	-	6	Y	Y	-	-	-	-	Y
7A	6X40	+5	2-4-2	-	7	Y	Y	-	-	15	-	Y
8A	6X6	300	Existing	-	8	-	Y	-	2.4	-	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through an all red display.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Existing "Left Turn Yield on Green" ball (R10-12) and/or Right Arrow "ONLY" (R3-5R) signs may be removed at the direction of the Engineer.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	12	7	12	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	20	45	20	30	20	45	20	30
Yellow Clearance	3.0	4.8	3.0	4.3	3.0	4.3	3.0	4.5
Red Clearance	3.7	2.0	2.8	1.5	3.6	2.4	2.6	1.6
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.4	-	-	-	3.4	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ

Signal Upgrade

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section, 750 N.Greenfield Pkwy, Garner, NC 27529

SR 1120 (W. Clemmonsville Road)/ Stafford Village Blvd. at SR 3011 (Old Salisbury Road)

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: November 2011	PREPARED BY: Monif
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELBA

SIGNATURE | DATE 9/19/12

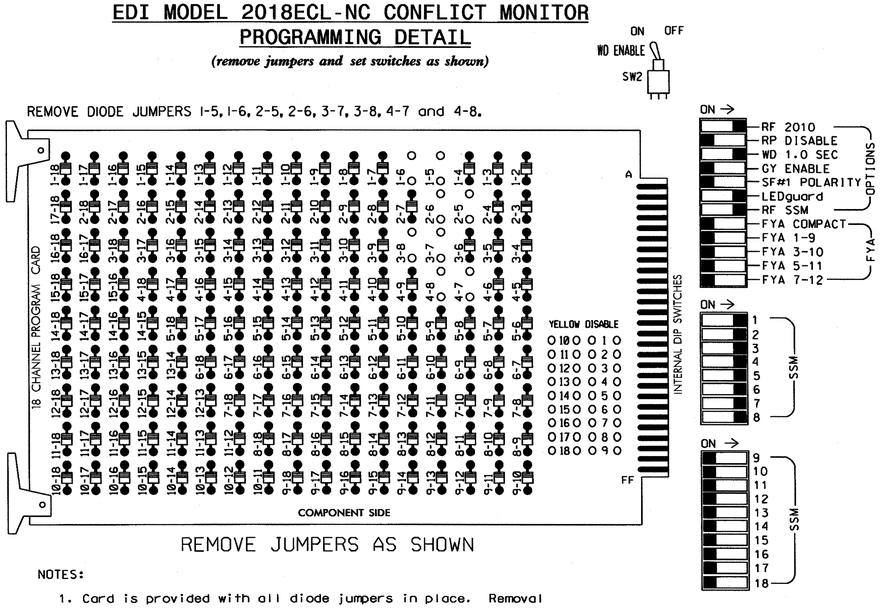
SIG. INVENTORY NO. 09-0988

09-MAR-2013 15:26
S:#ITS&SU#ITS Signals#Signal Design Section#Central Region#Div 9#C-5224 Winston Salem#Signals#09-0988#090988_sig.dgn_20120919.dgn
rzielbo

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 189

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21, 22,23	NU	23,81	41,42	NU	21	61, 62,63	NU	41,63	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128		*	101		*	134		*	107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126			117			132			123								
GREEN ARROW	127			118			133			124								

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR          PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦    X
OMIT PHASES     ¦   X
CALL PHASES     ¦
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
              OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR          PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦        X
OMIT PHASES     ¦       X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED			NOT USED	Ø8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4		Y		2.4	
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8		Y		2.4	
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L

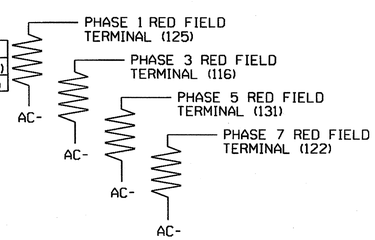
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0988
DESIGNED: November 2011
SEALED: 09/19/2012
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1120 (W. Clemmonsville Road) / Stafford Village Blvd. at SR 3011 (Old Salisbury Road)

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2012 REVIEWED BY: T. Yates

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section

750 N.Greenfield Pkwy, Garner, NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

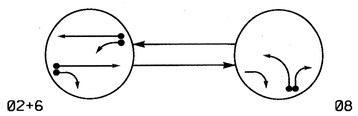
SIGNATURE DATE 9/21/12

SIG. INVENTORY NO. 09-0988

20-SEP-2012 07:34
S:\TSAU\ITS Signals\Work Groups\Sig Mgmt\Strickland\09988_smr_ele_xxx.dgn
$$$$USERNAME

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 19D

PHASING DIAGRAM



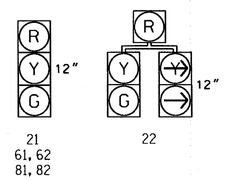
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 08	FLASH
21	G	R	Y
22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

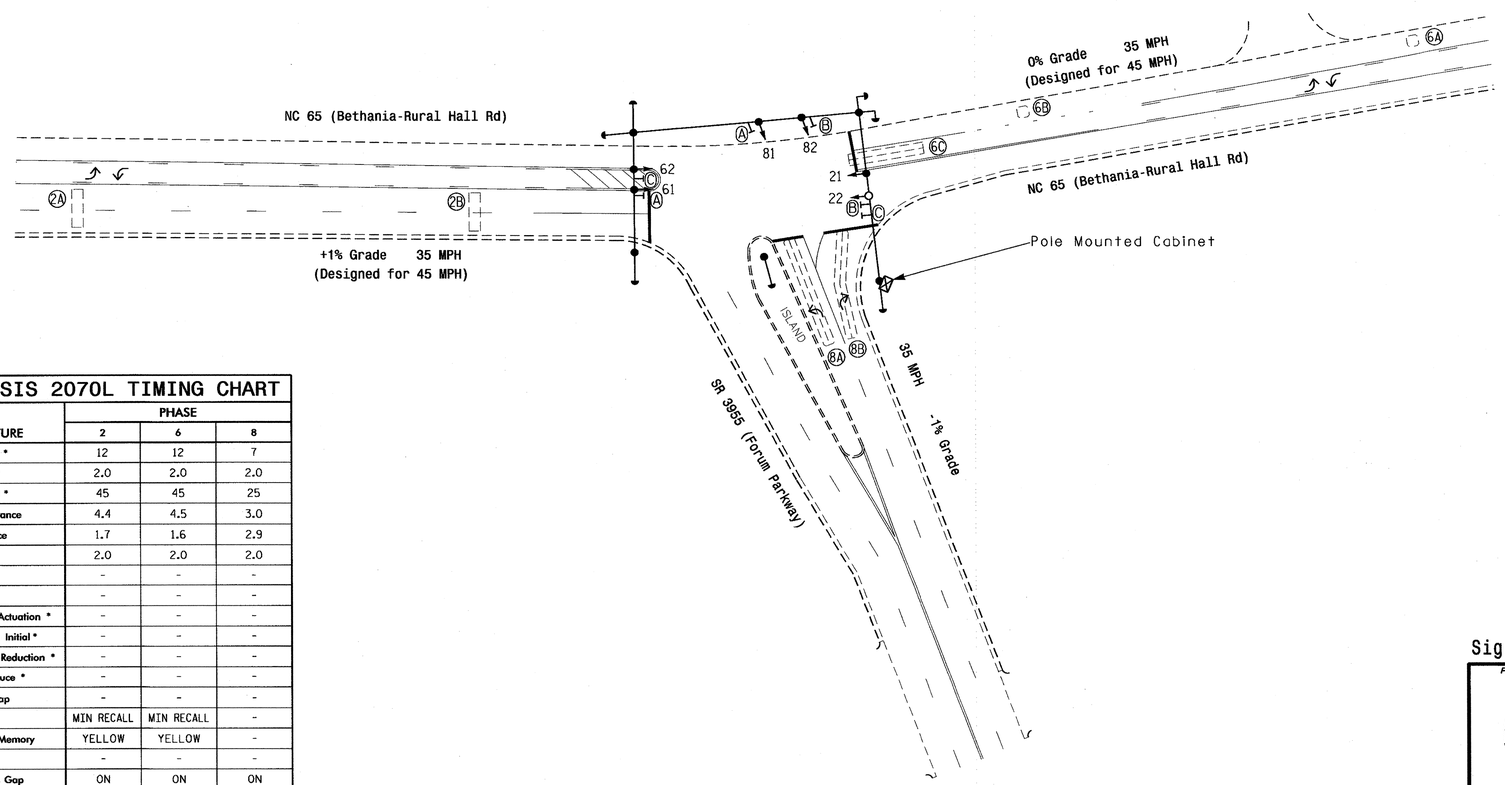


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X20	300	EXIST	-	2	Y	Y	-	1.6	-	-	Y
2B	6X20	90	EXIST	-	2	Y	Y	-	-	-	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	1.6	-	-	Y
6B	6X6	90	EXIST	-	6	Y	Y	-	-	-	-	Y
6C	6X40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6X60	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6X60	+5	2-4-2	-	8	Y	Y	-	-	15	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) late night flash based on existing programing for this location.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Existing lane control signs may be removed at the direction of the Engineer.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. New signal head 22 shall be black in color with black visors.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	12	12	7
Extension 1 *	2.0	2.0	2.0
Max Green 1 *	45	45	25
Yellow Clearance	4.4	4.5	3.0
Red Clearance	1.7	1.6	2.9
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	YELLOW	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	Street Name Sign (D3-1)	C

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40
1" = 40'

NC 65 (Bethania-Rural Hall Rd) at SR 3955 (Forum Parkway)

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

REVISIONS	INIT.	DATE

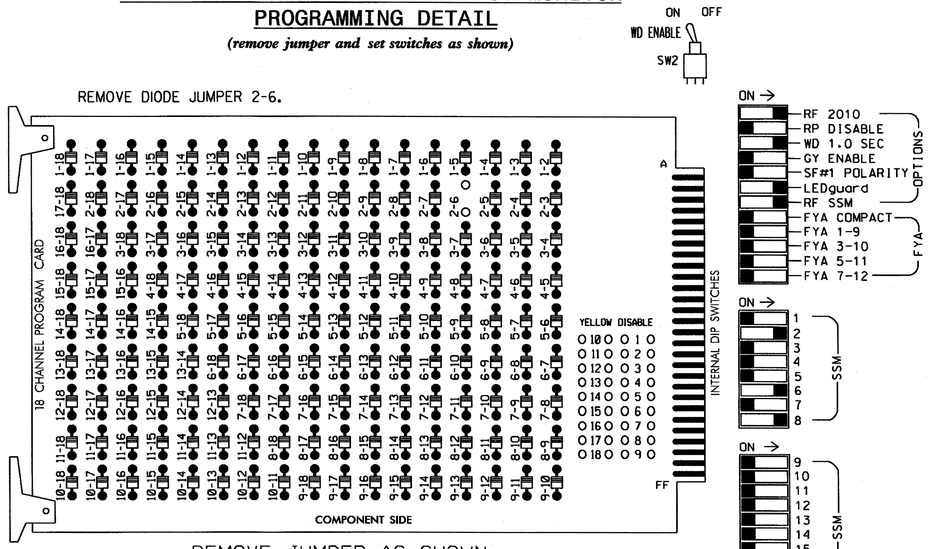
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 9/14/12
SIG. INVENTORY NO. 09-0997

17-SEP-2012 10:58
S:*ITS&S*ITS Signals*Signal Design Sections*Central Region*Div 9*C-5224 Winston Salem*Signals*09-0997*09-0997_sig_dsn_20120914.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. (9)

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S8,S11
PHASES USED.....2,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11		S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8		16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU
RED		128						134				107	
YELLOW		129						135				108	
GREEN		130						136				109	
RED ARROW													
YELLOW ARROW											108		
GREEN ARROW											109		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT	Ø2 2A	SLOT	SLOT	NOT USED	Ø6 6A	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	Ø2 2B	EMPTY	EMPTY	Ø6 6C	Ø6 6B	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y		1.6	
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y		1.6	
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
6C	TB23-9,10	I5L	48	10	26	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			15

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0997
DESIGNED: February 2012
SEALED: 09/14/12
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 65 (Bethania-Rural Hall Rd)
at
SR 3955 (Forum Parkway)

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2012 REVIEWED BY:
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 9/28/12
SIG. INVENTORY NO. 09-0997

17-SEP-2012 08:15
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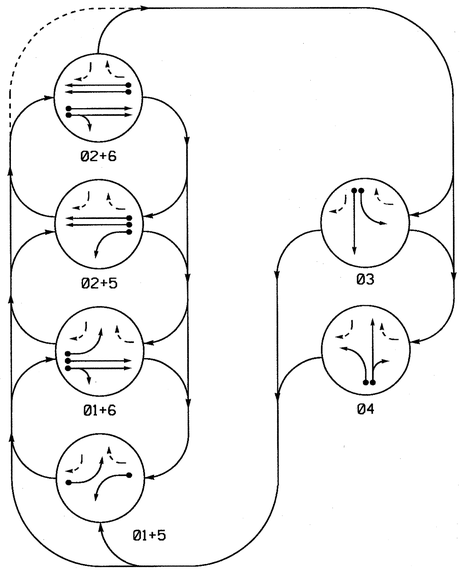
CASTFORD\PW

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 192

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

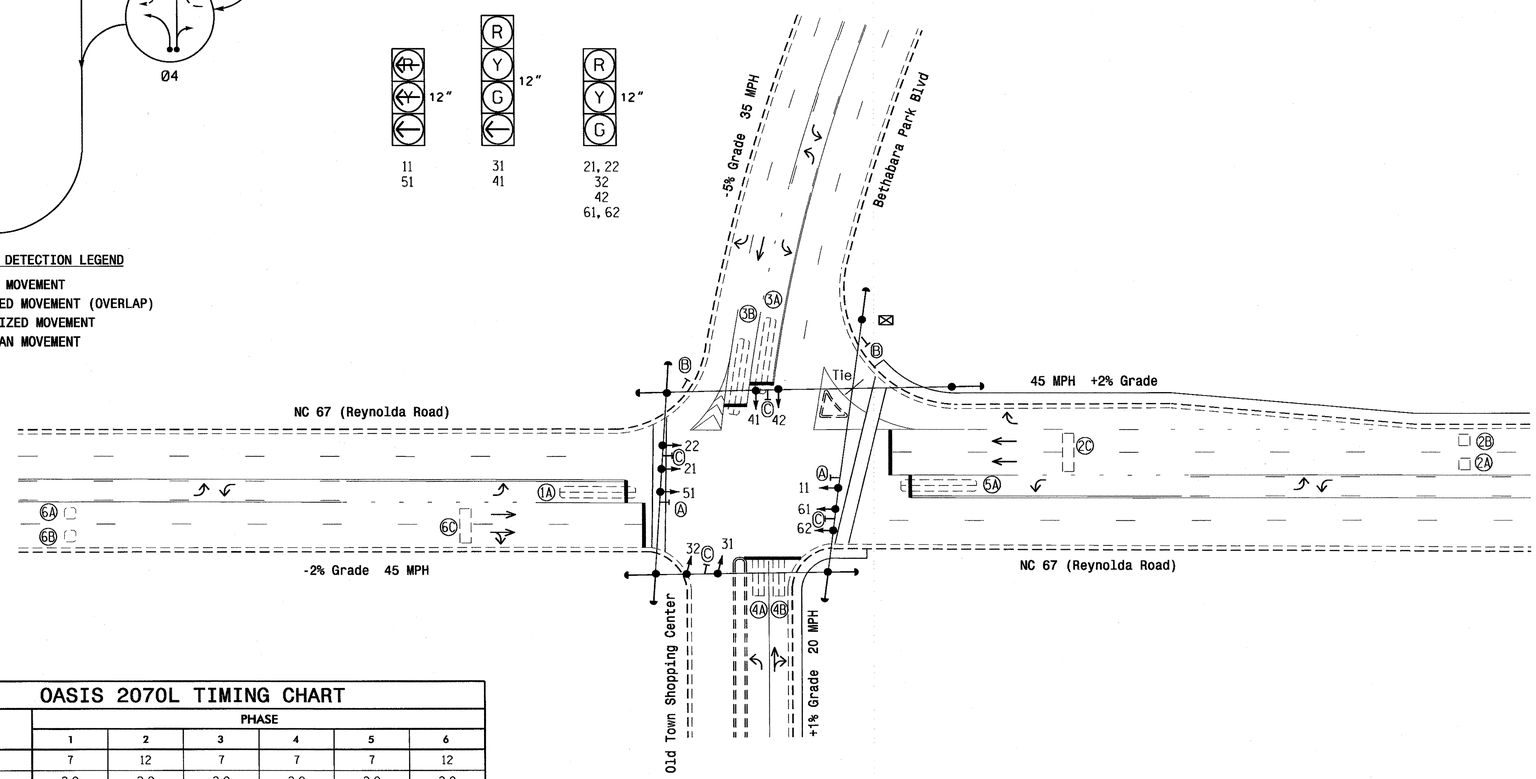
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	3	-	Y
2A, 2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2C	6X20	90	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X40	+5	2-4-2	-	3	Y	Y	-	-	3	-	Y
3B	6X40	+5	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X20	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X20	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	3	-	Y
6A, 6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6C	6X18	90	EXIST	-	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing Left Arrow "ONLY" sign (R3-5L) may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	25	50	30	20	20	0
Yellow Clearance	3.0	4.3	4.2	3.0	3.0	4.7
Red Clearance	2.9	1.9	1.7	2.4	3.3	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	"YIELD" Sign (R1-2)	B
C	Street Name Sign (D3-1)	C

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 67 (Reynolda Road) at Bethabara Park Blvd. and Old Town Shopping Center

Division 9 Forsyth County Winston-Salem

PLAN DATE:	October 2011	PREPARED BY:	L. Blount
PREPARED BY:	W. Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

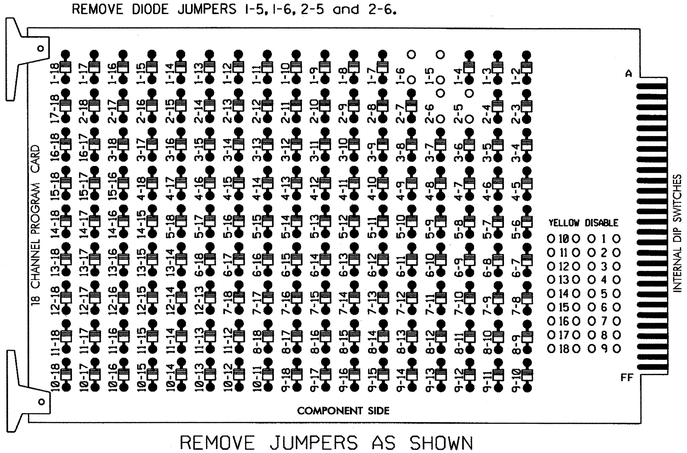
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE
DATE 6/12/12
SIG. INVENTORY NO. 09-0999

12-JUN-2012 18:14
S:\TMS\LMTS\Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-0999\09999_sig_dsn_20120612.dgn
FZIEMBA

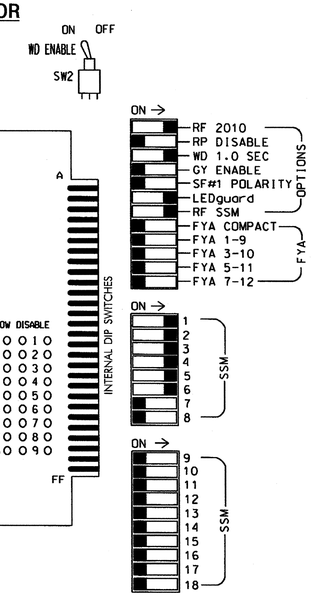
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 193

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128		116	116	101	101			134										
YELLOW		129		117	117	102	102			135										
GREEN		130		118	118	103	103			136										
RED ARROW	125								131											
YELLOW ARROW	126								132											
GREEN ARROW	127			118		103			133											

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1	Ø 2	SLOT	SLOT	SLOT	Ø 3	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A,2B				3A	4A							DC ISOLATOR
	L	NOT USED	Ø 2	EMPTY	EMPTY	EMPTY	Ø 3	Ø 4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST
			2C				3B	4B							DC ISOLATOR
FILE "J"	U	Ø 5	Ø 6	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A,6B												
	L	NOT USED	Ø 6	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			6C												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
2C	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			3
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
6C	TB3-7,8	J2L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0999
DESIGNED: October 2011
SEALED: 06/12/12
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 67 (Reynolda Road) at Bethabara Park Blvd. and Old Town Shopping Center

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: June 2012 | REVIEWED BY: T. Joy
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

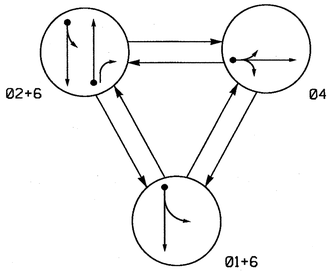
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 6/13/12
SIGNATURE DATE
SIG. INVENTORY NO. 09-0999

13-JUN-2012 07:49
S:\TSS\Sig\TS Signals\Workgroups\Sig Mgmt\Strickland\M090999_sm_ele_xxx.dgn
cbestrickland

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 194

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

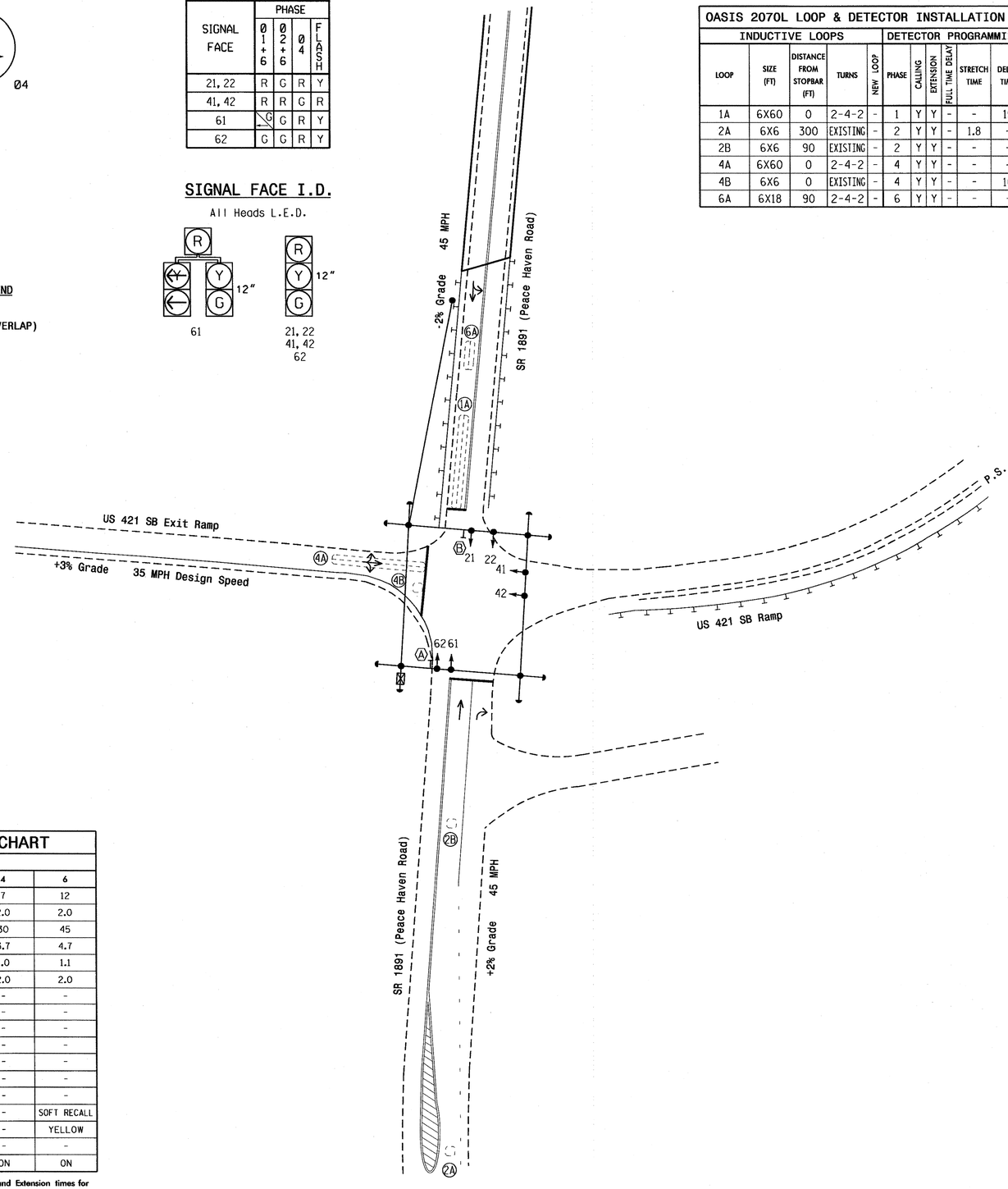
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	300	EXISTING	-	2	Y	Y	-	1.8	-	-	Y
2B	6X6	90	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X6	0	EXISTING	-	4	Y	Y	-	-	10	-	Y
6A	6X18	90	2-4-2	-	6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	12	7	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	30	45	30	45
Yellow Clearance	3.0	4.3	3.7	4.7
Red Clearance	1.8	1.3	1.0	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	SOFT RECALL	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
A	No Right Turn Sign (R3-1)	A
B	No Left Turn Sign (R3-2)	B

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1891 (Peace Haven Road)
at
US 421 SB Ramps

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

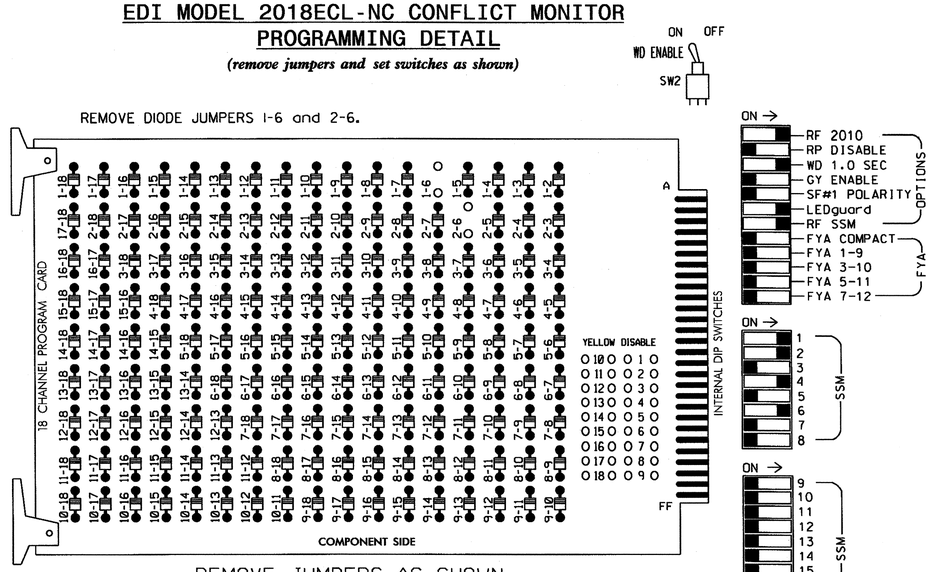
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIMBA
SIGNATURE DATE 10/22/12
SIG. INVENTORY NO. 09-1043

22-OCT-2012 15:50
S:\ITS&SU\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1043\091043.sig_dsn_20121022.dgn
rzimba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 195

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y		1.8	
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

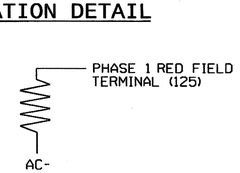
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1043
DESIGNED: February 2012
SEALED: 10/22/12
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1891 (Peace Haven Road) at US 421 SB Ramps

Division 9 | Forsyth County | Winston Salem

PLAN DATE: October 2012 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section, Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

SIGNATURE | DATE 10-23-12

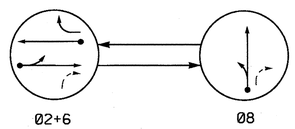
SIG. INVENTORY NO. 09-1043

23-OCT-2012 06:34
S:\ITSSIGNALS\Workgroups\Sig Mon\armstrong\091043_smu_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 196

2 Phase
Fully Actuated
(Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

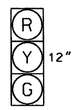
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	PHASE FLASH
21, 22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



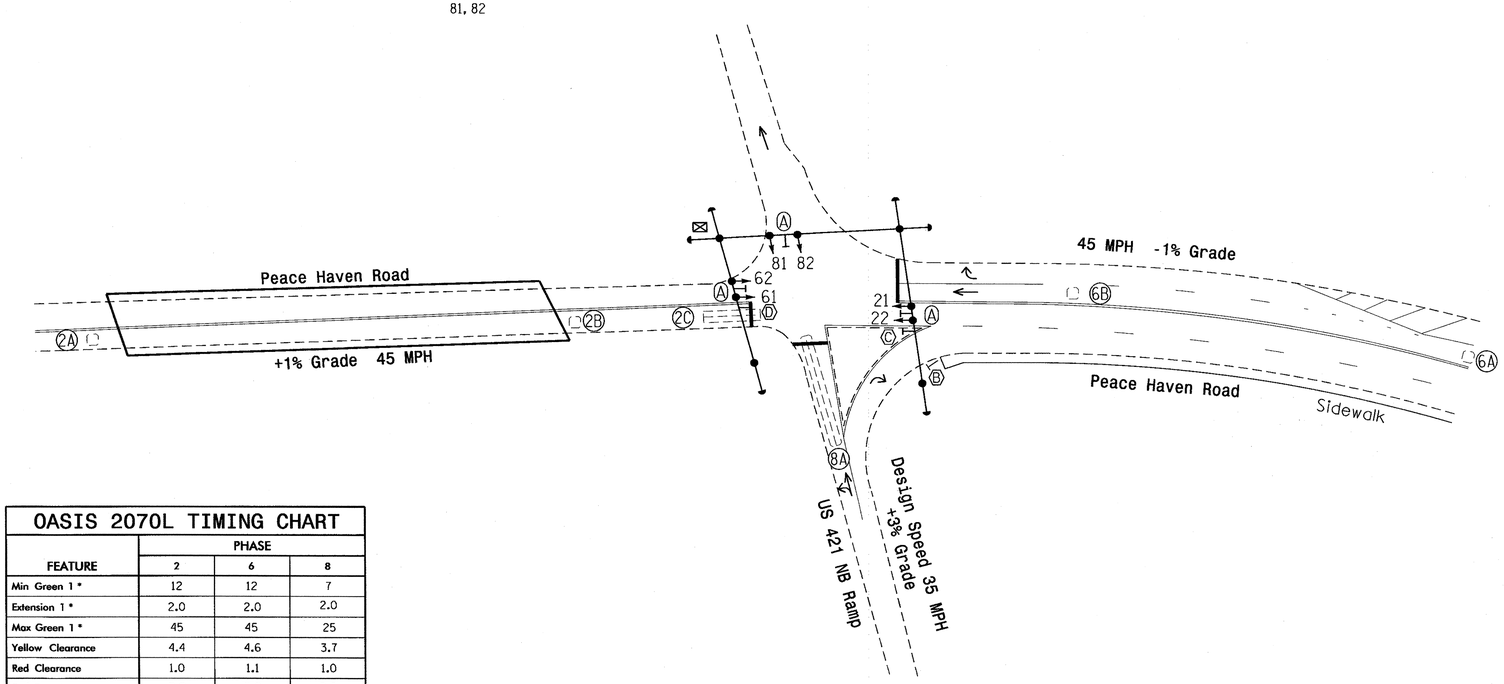
21, 22
61, 62
81, 82

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	345	4	-	2	Y	Y	-	2.4	-	-	Y
2B	6X6	90	4	-	2	Y	Y	-	-	-	-	Y
2C	6X30	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
6A	6X6	300	5	-	6	Y	Y	-	1.6	-	-	Y
6B	6X6	90	5	-	6	Y	Y	-	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Street Name Sign (D3-1)	A
B	"YIELD" Sign (R1-2)	B
C	No Right Turn Sign (R3-1)	C
D	No Left Turn Sign (R3-2)	D

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	12	12	7
Extension 1 *	2.0	2.0	2.0
Max Green 1 *	45	45	25
Yellow Clearance	4.4	4.6	3.7
Red Clearance	1.0	1.1	1.0
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	LOCK	LOCK	NON-LOCK
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40
1"=40'

Peace Haven Road
at
US 421 NB Ramps

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	
PREPARED BY:	M. Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

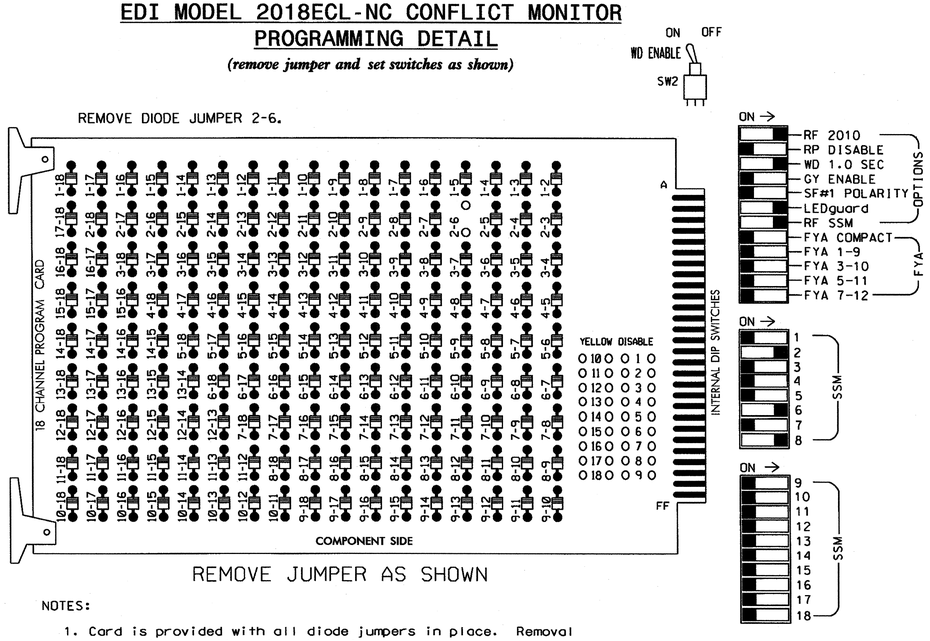
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 8/8/12 DATE
SIG. INVENTORY NO. 09-1046

05-MAR-2013 15:40
S:#ITS&SU#ITS Signals#Signal Design Sections#Central Region#Div 9#C-5224 Winston Salem#Signals#09-1046#091046_sig_dsn_20120808.dgn
rzziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 197

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S8,S11
PHASES USED.....2,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	ø2 2A	ø2 2C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	ø2 2B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	ø6 6A	SLOT	SLOT	SLOT	ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	ø6 6B	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y		2.4	
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1046
DESIGNED: March 2012
SEALED: 8/8/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Statewide Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Peace Haven Road
at
US 421 NB Ramps

Division 9 | Forsyth County | Winston-Salem

PLAN DATE:	August 2012	REVIEWED BY:	JTR
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

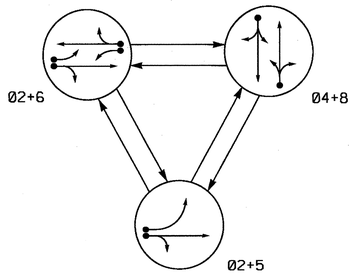
SIGNATURE | DATE 8-13-12

SIG. INVENTORY NO. 09-1046

09-AUG-2012 08:17
S:\TSSG\ITS Signals\Workgroups\Sig Non\Armstrong\091046_sample_xxx.dgn
samstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 198

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

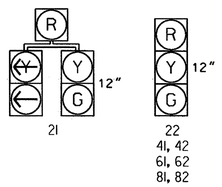
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	G	G	R	Y
22	G	G	R	Y
41, 42	R	R	G	R
61, 62	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



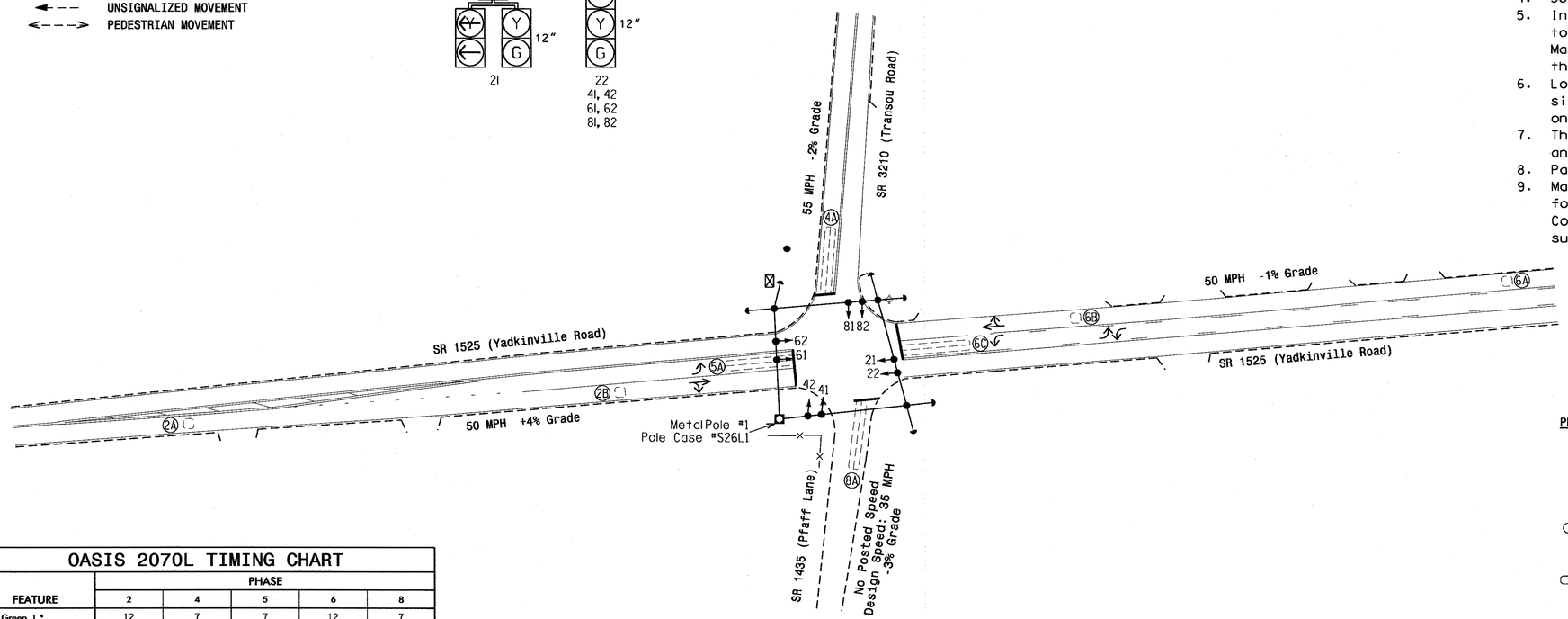
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	355	EXISTING	-	2	Y	Y	-	1.9	-	-	Y
2B	6X6	100	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A	6X6	355	EXISTING	-	6	Y	Y	-	1.9	-	-	Y
6B	6X6	100	EXISTING	-	6	Y	Y	-	-	-	-	Y
6C	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	5	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Metal Strain Pole	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	12	7	7	12	7
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	30	15	60	30
Yellow Clearance	4.5	5.4	3.0	4.9	5.1
Red Clearance	1.0	1.0	1.2	1.0	1.0
Red Revert	5.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1525 (Yadkinville Road)
at
SR 3210 (Transou Road)
and SR 1435 (Pfaff Lane)

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: December 2011 | REVIEWED BY:
PREPARED BY: Sterling | REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIMBA
SIGNATURE | DATE 8/6/12
SIG. INVENTORY NO. 09-1085

21-FEB-2013 17:20
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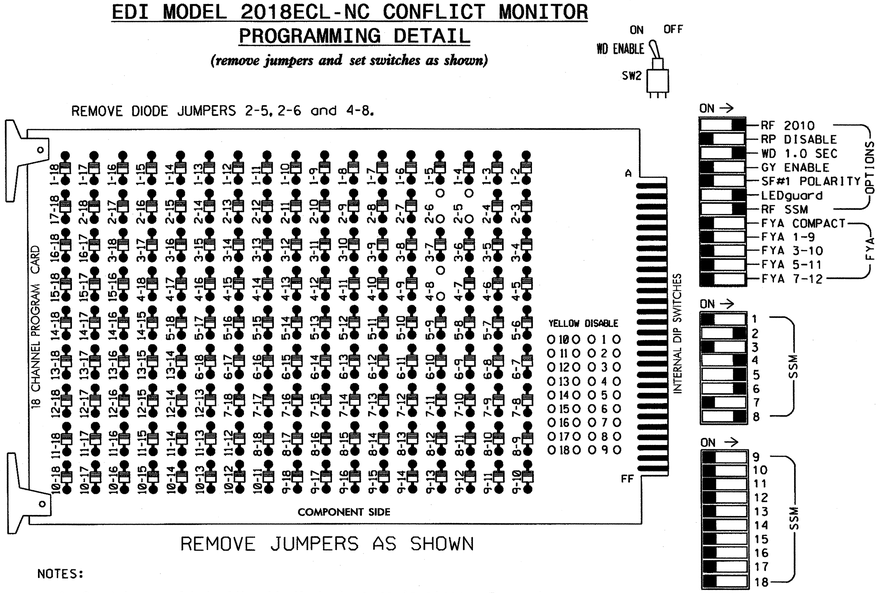
rzimba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 19

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S7,S8,S11
PHASES USED.....2,4,5,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW							133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B	NOT USED			NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y		1.9	
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y		1.9	
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5

[1] Add jumper from J1-W to I4-W. on rear of input file.

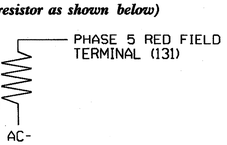
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1085
DESIGNED: December 2011
SEALED: 08/06/2012
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1525 (Yadkinville Road)
at
SR 3210 (Transou Road)
and SR 1435 (Pfaff Lane)

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: August 2012 | REVIEWED BY: T. Vgn
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

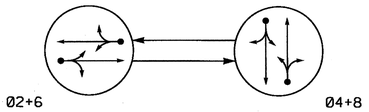
George C. Brown 8/6/12
SIGNATURE DATE

SIG. INVENTORY NO. 09-1085

08-AUG-2012 12:23
S:\TSG\SM\TS Signals\Workgroups\Sig Mon\Strickland\091085_sm_o16_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 200

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

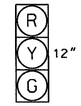
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21, 22
41, 42
61, 62
81, 82

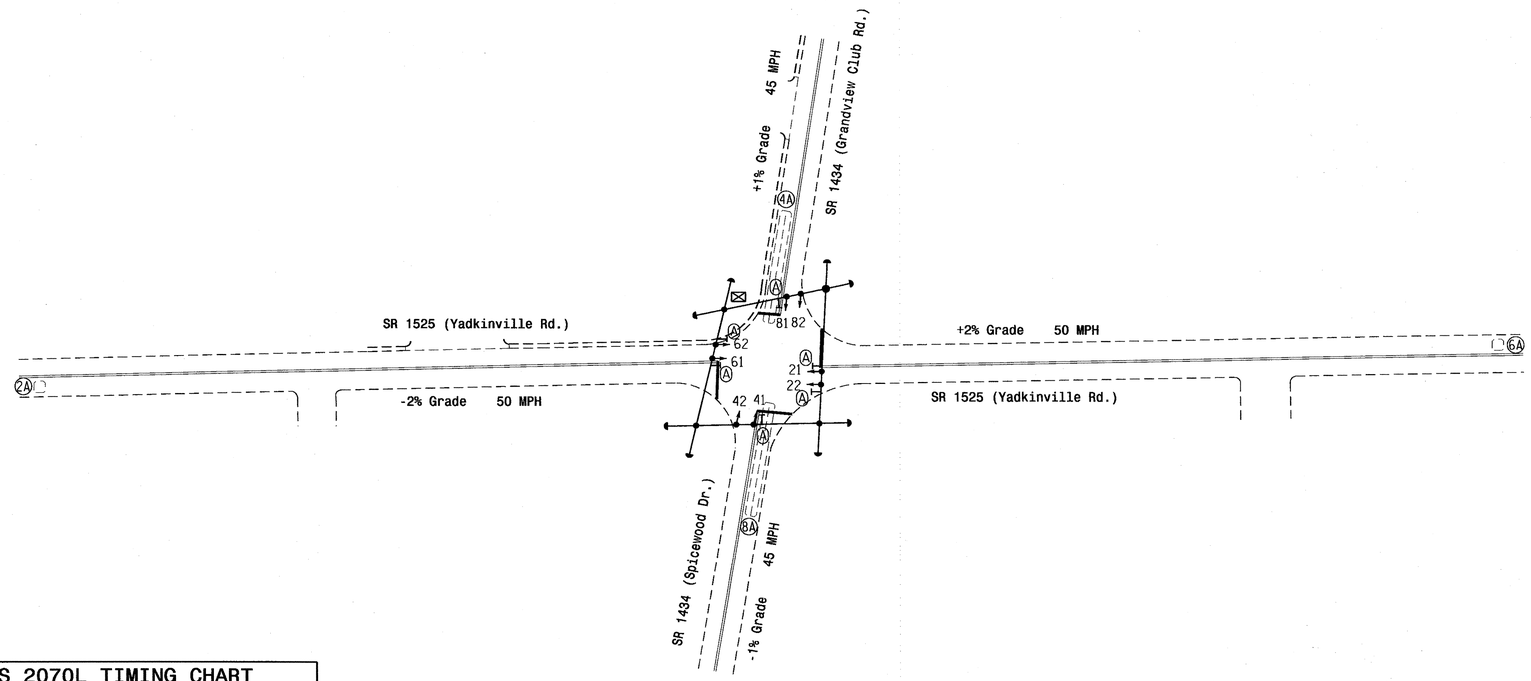
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	355	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	10	-	Y
6A	6X6	355	EXIST	-	6	Y	Y	-	-	-	-	Y
8A	6X60	+5	2-4-2	-	8	Y	Y	-	-	10	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. The cabinet should be designed to include an Auxiliary Output file for future use.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	12	7	12	7
Extension 1 *	6.0	1.0	6.0	1.0
Max Green 1 *	120	25	120	25
Yellow Clearance	5.0	4.4	4.6	4.6
Red Clearance	1.0	1.0	1.0	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	2.5	-
Max Variable Initial *	40	-	40	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	50	-	50	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1535 (Yadkinville Road) at SR 1434 (Grandview Club Road/ Spicewood Drive)

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2011 PREPARED BY: L. Blount

PREPARED BY: Sterling REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

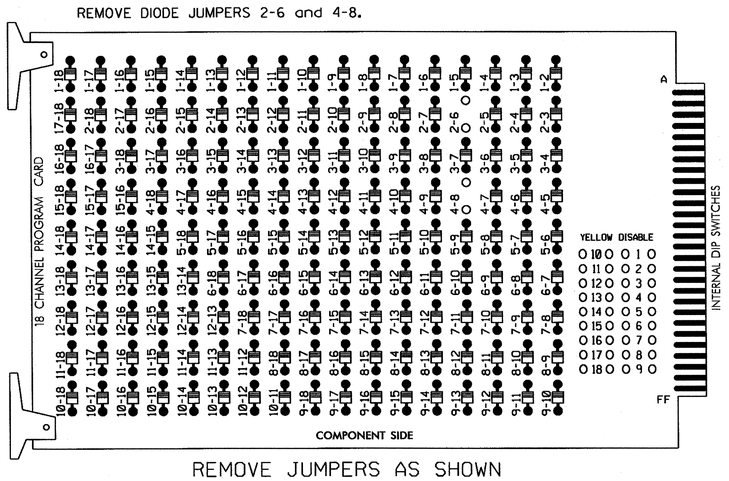
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
2/18/13
SIGNATURE DATE
SIG. INVENTORY NO. 09-1103

18-FEB-2013 18:03
S:\ITS&SU\ITS\Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1103\091103_sig_dsn_20130218.dgn
rziemba

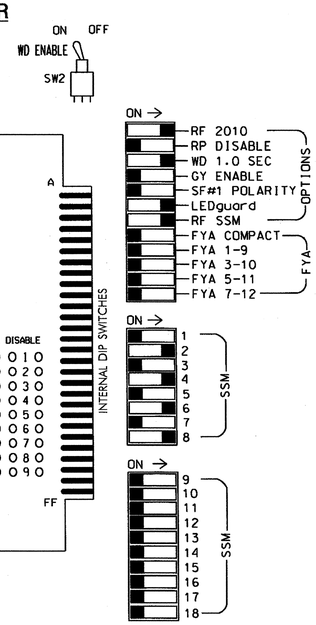
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 201

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

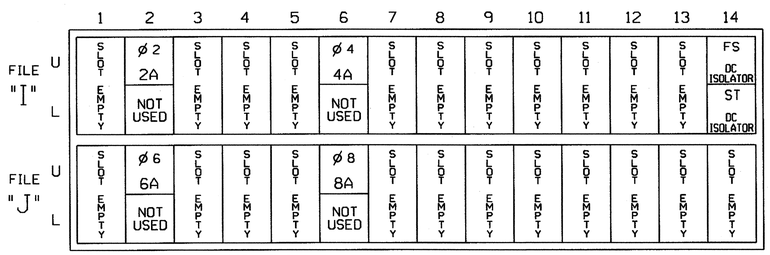
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	12U	39	1	2	2	Y	Y			
4A	TB4-9,10	16U	41	3	4	4	Y	Y			10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1103
DESIGNED: December 2011
SEALED: 2/18/13
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1535 (Yadkinville Road)
at
SR 1434 (Grandview Club Road/ Spicewood Drive)

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2013 REVIEWED BY: JTR
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

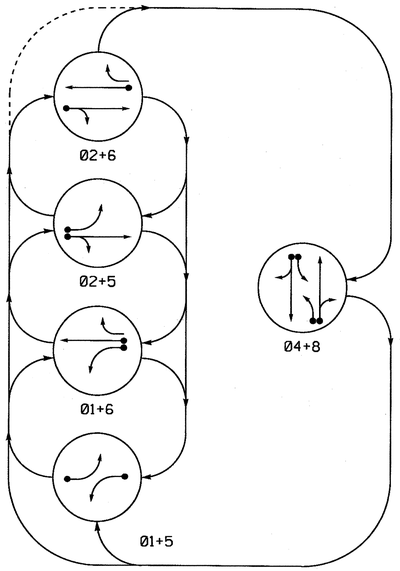
Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 2-19-13 DATE
SIG. INVENTORY NO. 09-1103

19-FEB-2013 09:07
S:\TTSA\SUM\TS\Signals\Working-Groups\Sig Mark\armstrong\091103_smallsig_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 202

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

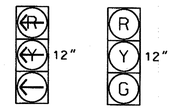
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 04+8	PHASE FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	Y
41, 42, 43	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81, 82, 83	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

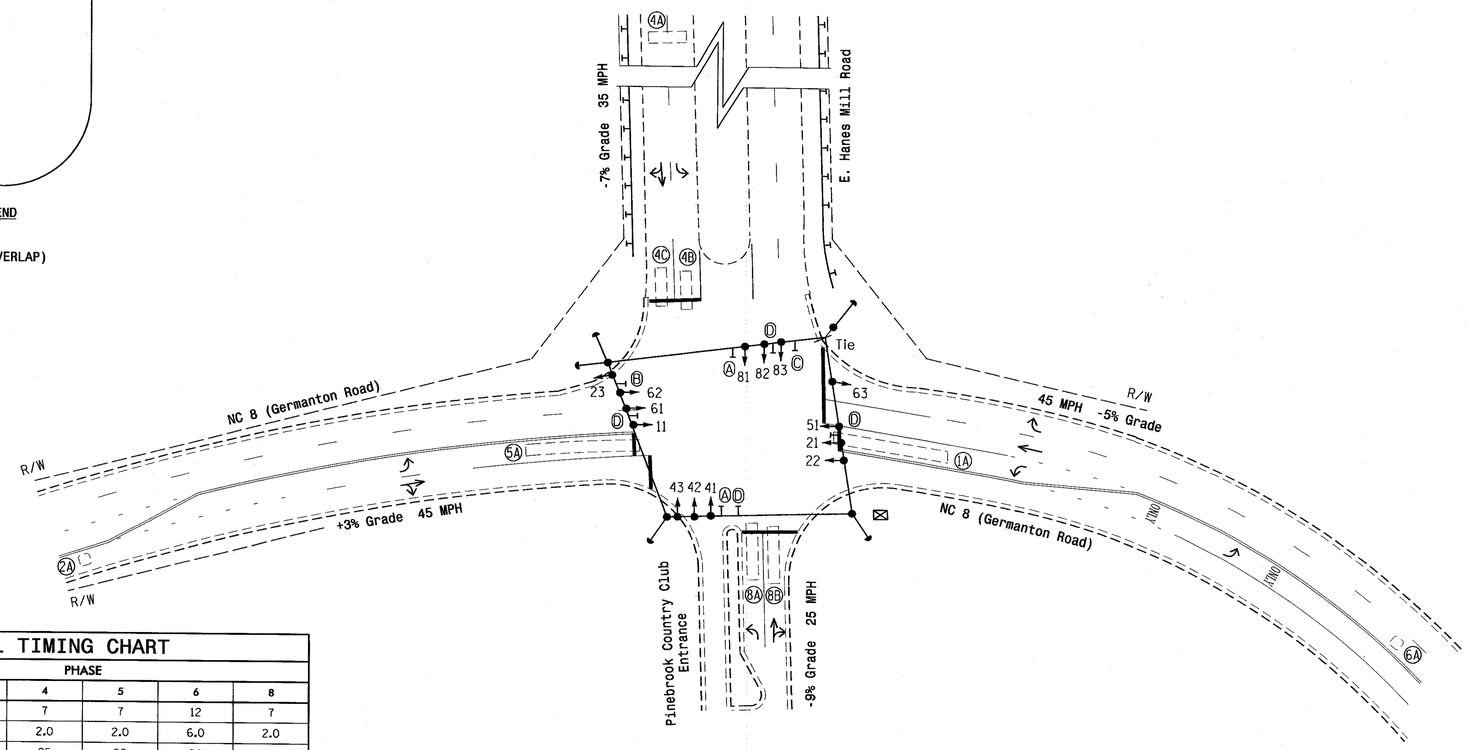


11
51

21, 22, 23
41, 42, 43
61, 62, 63
81, 82, 83

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+3	EXIST	-	1	Y	Y	-	-	3	-	Y
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6X20	330	EXIST	-								
4B	6X20	+5	EXIST	-	4	Y	Y	-	-	-	-	Y
4C	6X20	+3	EXIST	-								
5A	6X60	+3	EXIST	-	5	Y	Y	-	-	3	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
8A	6X30	+5	EXIST	-	8	Y	Y	-	-	-	-	Y
8B	6X30	+3	EXIST	-	8	Y	Y	-	-	-	-	Y



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	20	90	25	20	90	25
Yellow Clearance	3.1	4.3	4.4	3.0	5.0	3.8
Red Clearance	2.4	1.3	2.1	2.6	1.5	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Existing Left Arrow "ONLY" (R3-5L) signs may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"NO TURN ON RED" Sign (R10-11)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 8 (Germanton Road) at E. Hanes Mill Road

Division 9 Forsyth County Winston-Salem

PLAN DATE:	February 2013	REVIEWED BY:	R. Hough
PREPARED BY:	W.Bazzarie	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE 2/21/13 DATE

SIG. INVENTORY NO. 09-1113

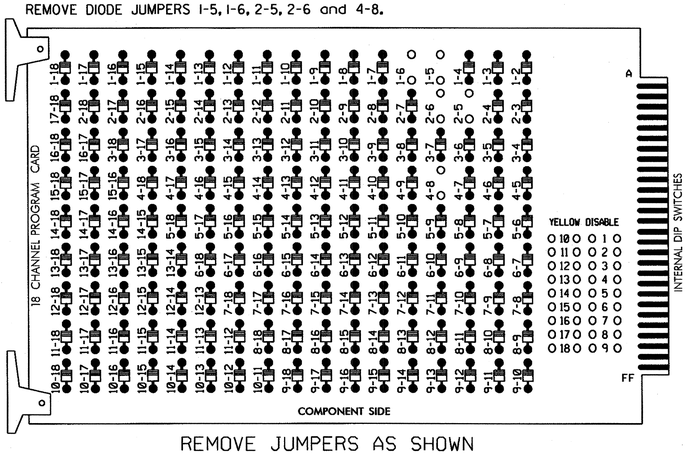
21-FEB-2013 18:20
s-ziemba@dot.state.nc.us
I:\Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1113\09113_sig_dsn_20130221.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 203

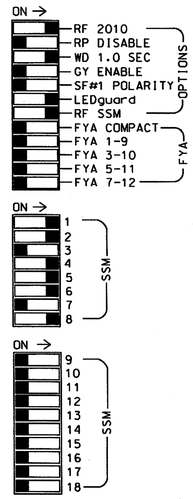
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6 and 4-8.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21, 22,23	NU	NU	41, 42,43	NU	51	61, 62,63	NU	NU	81, 82,83	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125						131					
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ø1 1A	ø2 2A	SLOT	SLOT	SLOT	ø4 4A, 4B,4C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A	SLOT	SLOT	SLOT	ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A,4B,4C	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1113
DESIGNED: February 2013
SEALED: 2/21/13
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 8 (Germanton Road)
at
E. Hanes Mill Road

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: February 2013 | REVIEWED BY: T. Vick
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

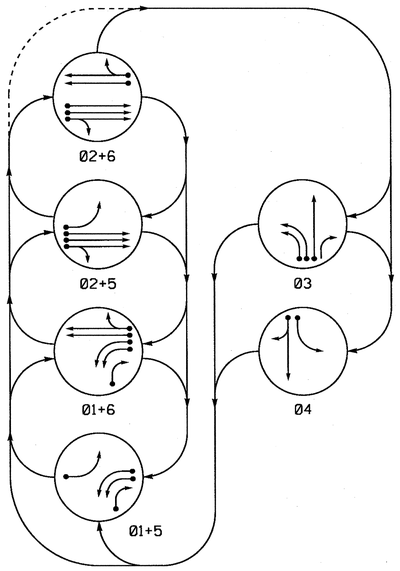
SIGNATURE | DATE 2/26/13

SIG. INVENTORY NO. 09-1113

26-FEB-2013 09:52
S:##TSASL##TS Signals##workgroups##Sig Mgmt##Strickland##091113_sm_ele_xxx.dgn
cbstrickland

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 204

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

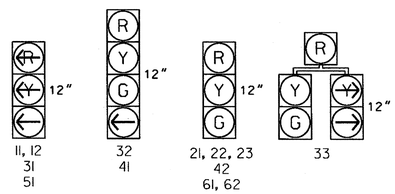
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11, 12	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	~~R~~
32	R	R	R	R	G ←	R	R
33	R/→	R/→	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



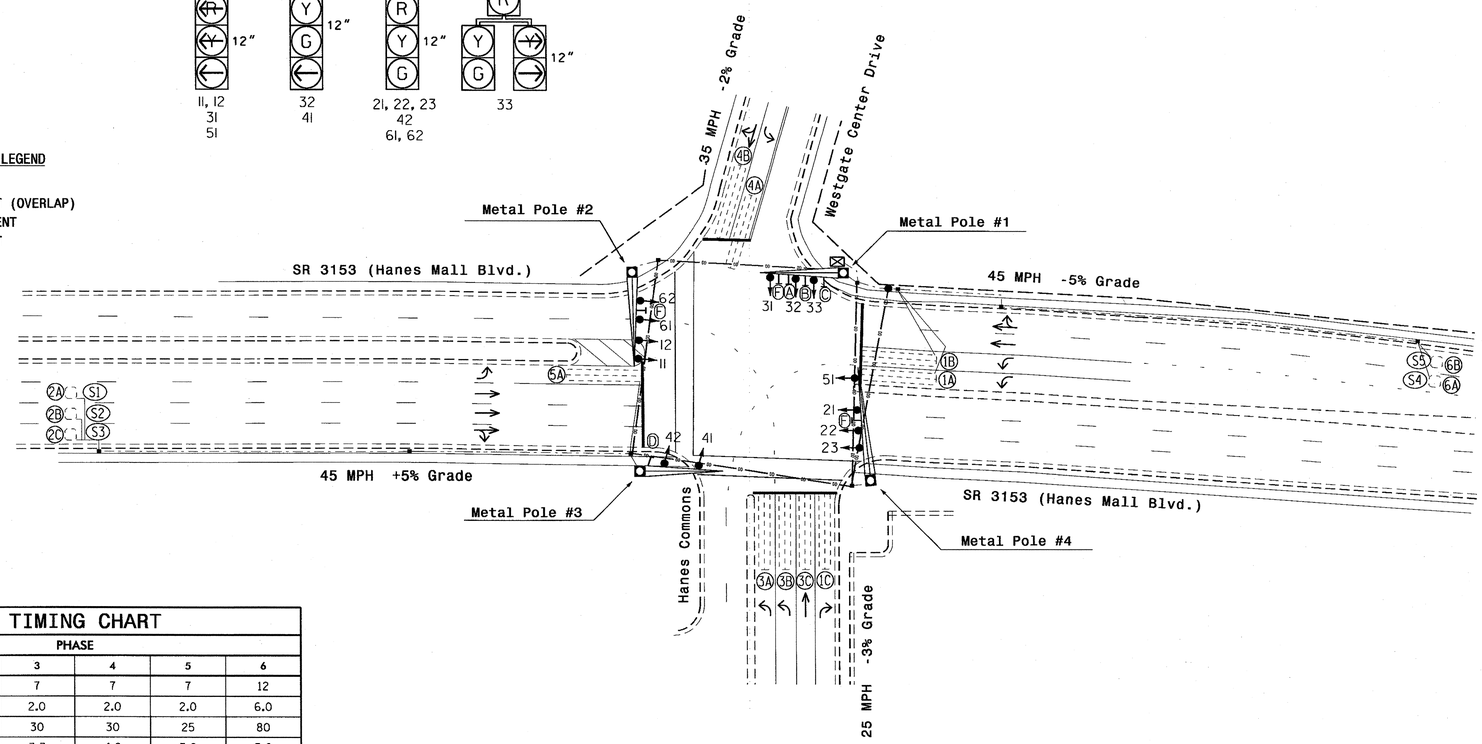
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1C	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A/S1	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
2C/S3	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3C	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X40	+15	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A/S4	6X6	300	EXIST	-	6	Y	Y	-	-	-	Y	Y
6B/S5	6X6	300	EXIST	-	6	Y	Y	-	-	-	Y	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing lane control signs may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
DD	Directional Drill	N/A
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Through Arrow "ONLY" Sign (R3-5A)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	Combined Through and Right Arrow Sign (R3-6R)	D
F	Street Name Sign (D3-1)	F

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	25	80	30	30	25	80
Yellow Clearance	3.1	4.1	3.3	4.0	3.0	5.0
Red Clearance	3.2	1.6	3.1	2.3	2.4	1.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

SR 3153 (Hanes Mall Blvd.) at Westgate Center Drive and Hanes Commons

Division 9 Forsyth County Winston-Salem

PLAN DATE: August 2012 REVIEWED BY:
PREPARED BY: C.E. Carter REVIEWED BY:

REVISIONS	INIT.	DATE

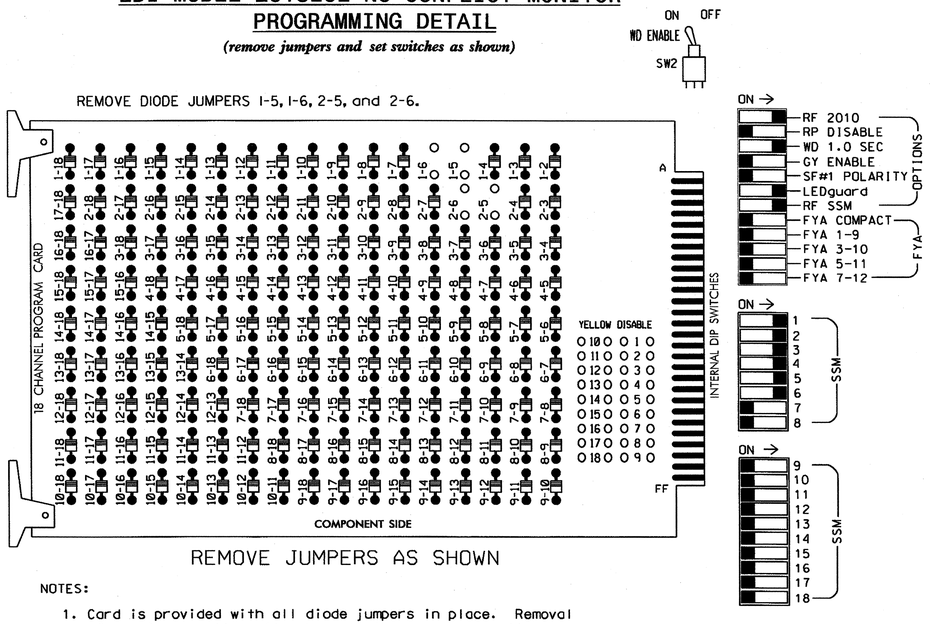
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 12/3/12 DATE
SIG. INVENTORY NO. 09-1132

03-DEC-2012 13:03
S:\ITS&SL\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1132\09113 2_sig_dsn_20111203.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 205

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4			S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3			4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3			4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12	33	21,22 23	NU	31	32	33	41	42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED			128			116	116	101	101			134										
YELLOW			129			117	117	102	102			135										
GREEN			130			118	118	103	103			136										
RED ARROW	125				116						131											
YELLOW ARROW	126	126			117						132											
GREEN ARROW	127	127			118	118		103			133											

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1	Ø 1	Ø2/SYS	Ø2/SYS	Ø 3	Ø 3	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	1B	2A/S1	2C/S3	3A	3B	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	Ø 1	Ø2/SYS	NOT USED	NOT USED	Ø 3	Ø 4							ST
			1C	2B/S2			3C	4B							DC ISOLATOR
FILE "J"	U	Ø 5	Ø6/SYS	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A/S4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	Ø6/SYS												
			6B/S5												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
1C	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A/S1	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/S2	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
2C/S3	TB4-1,2	I4U	47	9	22	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
3C	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			3
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A/S4	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S5	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1132
DESIGNED: August 2012
SEALED: 12/3/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.) at Westgate Center Drive and Hanes Commons

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: November 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 12-4-12
SIG. INVENTORY NO. 09-1132

04-DEC-2012 08:32
S:\ms15\Signals\Workgroups\Sig Mark\armstrong\09132_sample_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 206

PHASING DIAGRAM

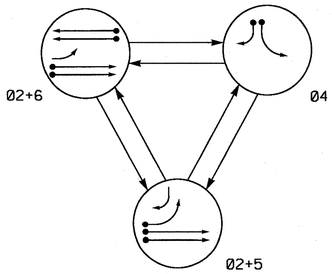
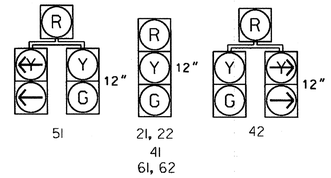


TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	Ø2+5	Ø2+6	Ø4	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	G	G	R	R
61, 62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A, 2B	6X6	300	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	5	-	Y
4B	6X60	0	2-4-2	-								
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	Y

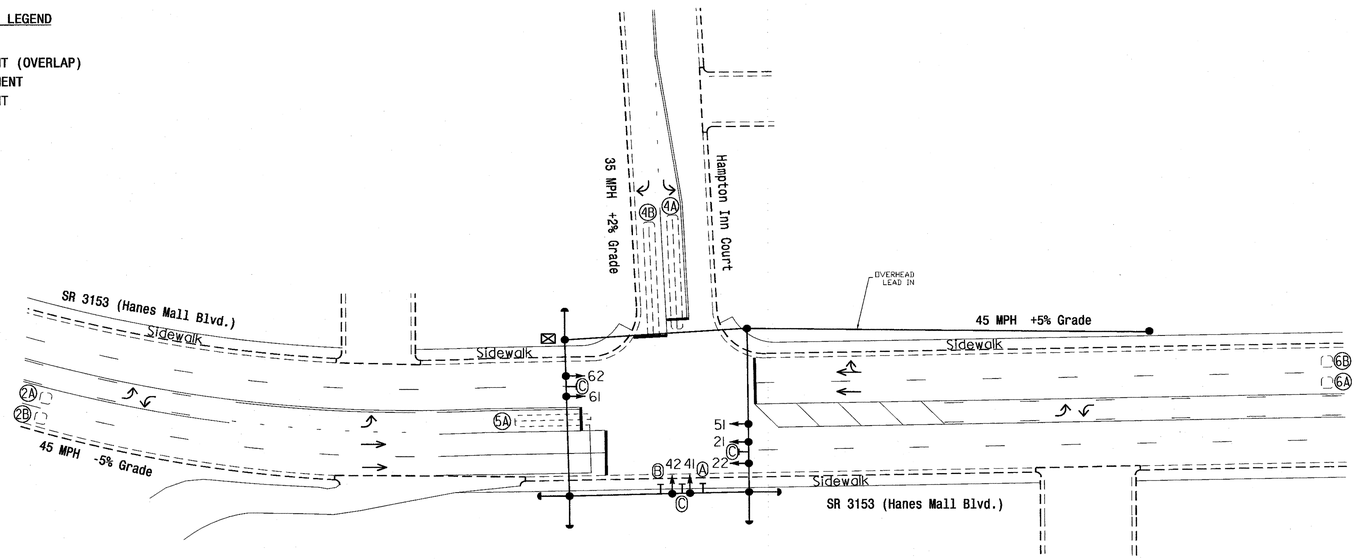
3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Existing lane control signs may be removed at the direction of the Engineer.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	80	30	25	80
Yellow Clearance	5.0	3.0	3.1	4.1
Red Clearance	1.0	2.3	2.4	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.5	-	-	1.5
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

SR 3153 (Hanes Mall Blvd.) at Hampton Inn Court

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2012 PREPARED BY: L. Blount

PREPARED BY: C.E. Carter REVIEWED BY:

REVISIONS	INIT.	DATE

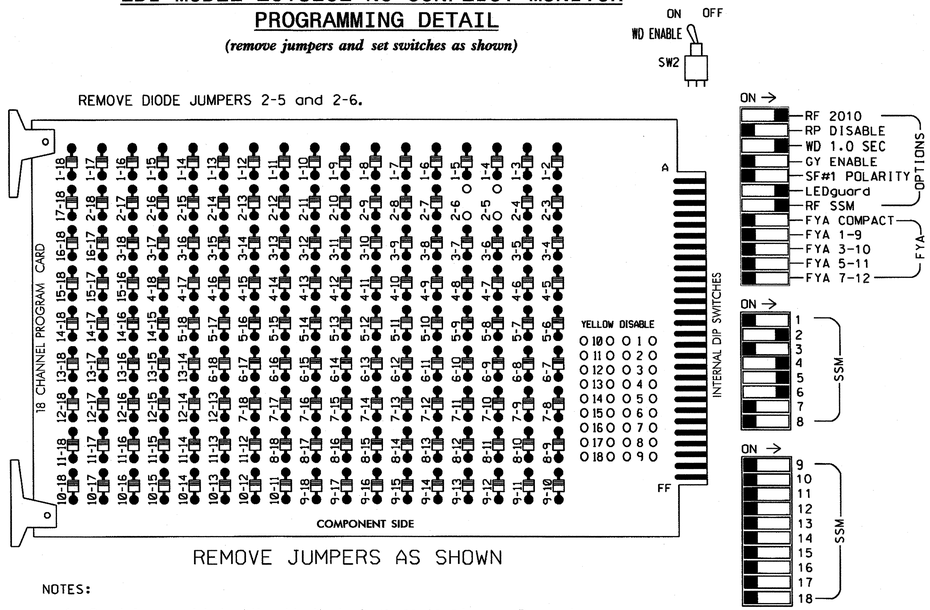
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 11/26/12 DATE
SIG. INVENTORY NO. 09-1165

26-NOV-2012 11:14
S:\ITS&S\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1165\09116S_sig_dsn_20121126.dgn
rzziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 207

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22 51	NU	NU	41,42	NU	42,51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101		*	134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW							133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A,2B	SLOT	SLOT	SLOT	Ø4 4A,4B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			5
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

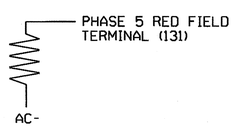
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1165
DESIGNED: September 2012
SEALED: 11/26/12
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Hampton Inn Court

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: November 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

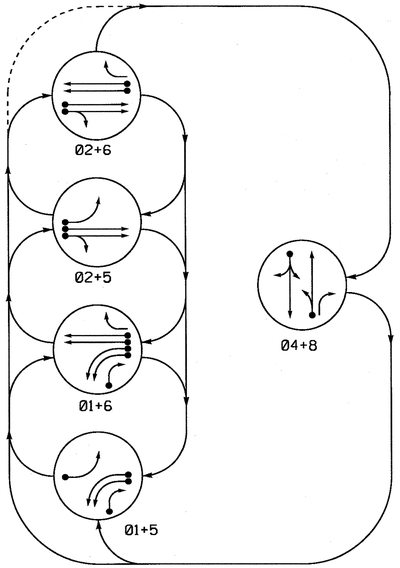
John T. Rowe Jr. 11-27-12
SIGNATURE DATE

SIG. INVENTORY NO. 09-1165

27-NOV-2012 07:14
S:#ITSASU#ITS Signals#workgroups#Sig Ops#armstrong#091165_smlele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 208

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

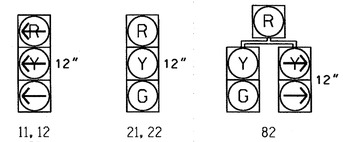
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11, 12	←—	←—	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←—	~~R~~	←—	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/←—	R/←—	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



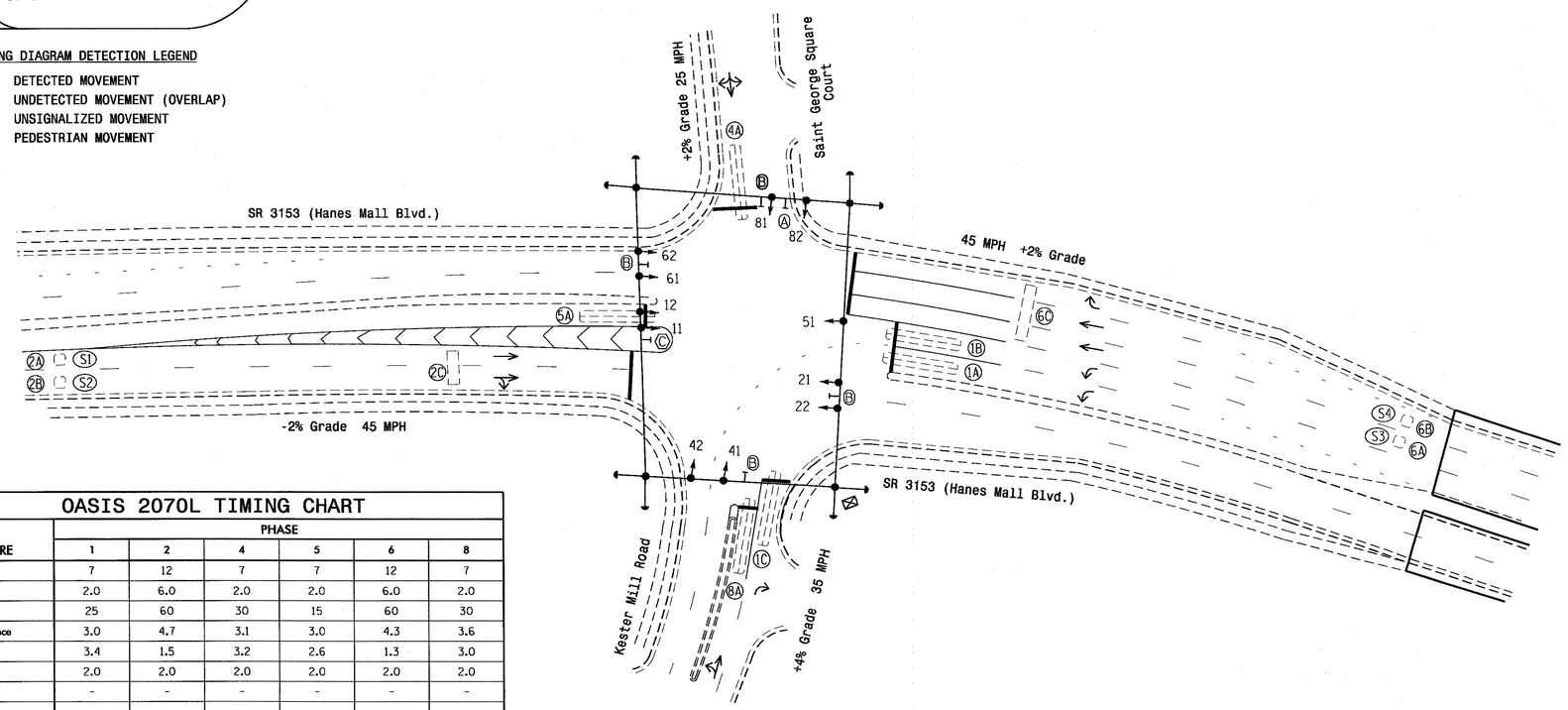
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A, 1B	6X40	+5	2-4-2	-	1	Y	Y	-	-	-	-	Y
1C	6X40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A/S1	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
2C	6X18	90	EXIST	-	DISCONNECT						-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A/S3	6X6	300	EXIST	-	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	300	EXIST	-	6	Y	Y	-	-	-	Y	Y
6C	6X30	90	EXIST	-	DISCONNECT						-	-
8A	6X40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Disconnect existing loops 2C and 6C.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing lane control signs may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	25	60	30	15	60	30
Yellow Clearance	3.0	4.7	3.1	3.0	4.3	3.6
Red Clearance	3.4	1.5	3.2	2.6	1.3	3.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Combined Through Left/ and Right Arrow" Sign (R3-8F)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.) at Kester Mill Road and Saint George Square Court

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2012 REVIEWED BY:
PREPARED BY: M.Bazzarie REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

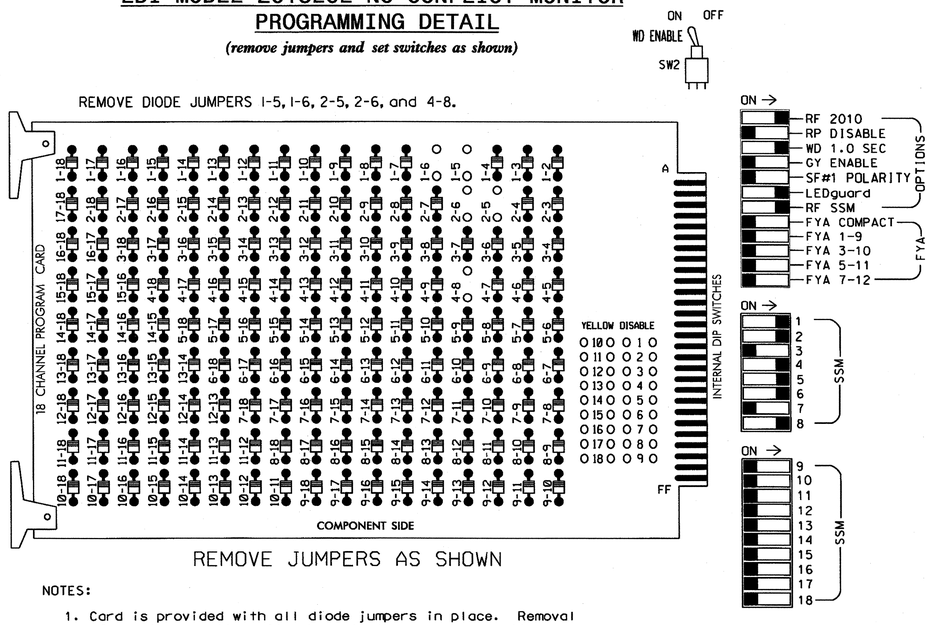
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 11/26/12 DATE
SIG. INVENTORY NO. 09-1173

26-NOV-2012 11:12
S:\TSS\SW\ITS Signals\Signal Design Section\Central Region\Div 9\WC-5224 Winston Salem\Signals\09-1173\09173_sig_dsn_20121126.dgn
rzziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 209

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12	82	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED			128			101			134			107							
YELLOW			129			102			135			108							
GREEN			130			103			136			109							
RED ARROW	125							131											
YELLOW ARROW	126	126						132											
GREEN ARROW	127	127						133											

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø 1	Ø2/SYS	SLOT	SLOT	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
			1A,1B	2A/S1			4A								DC ISOLATOR
	L	EMPTY	Ø 1	Ø2/SYS	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST
			1C	2B/S2											DC ISOLATOR
FILE "J"	U	Ø 5	Ø6/SYS	SLOT	SLOT	SLOT	Ø 8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A/S3				8A								
	L	NOT USED	Ø6/SYS	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			6B/S4												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A,1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
1C	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A/S1	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/S2	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A/S3	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S4	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1173
DESIGNED: March 2012
SEALED: 11/26/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Kester Mill Road and
St. George Square Court

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: November 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

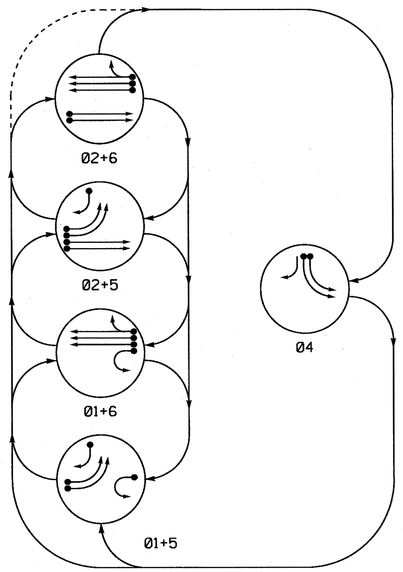
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 11-27-12
SIG. INVENTORY NO. 09-1173

27-NOV-2012 06:53
S:\#TS&SU\ITS Signals\workgroups\Sig Mon\armstrong\#091173_smlele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 2.1D

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

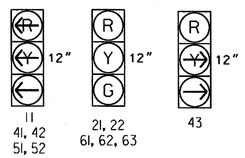
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

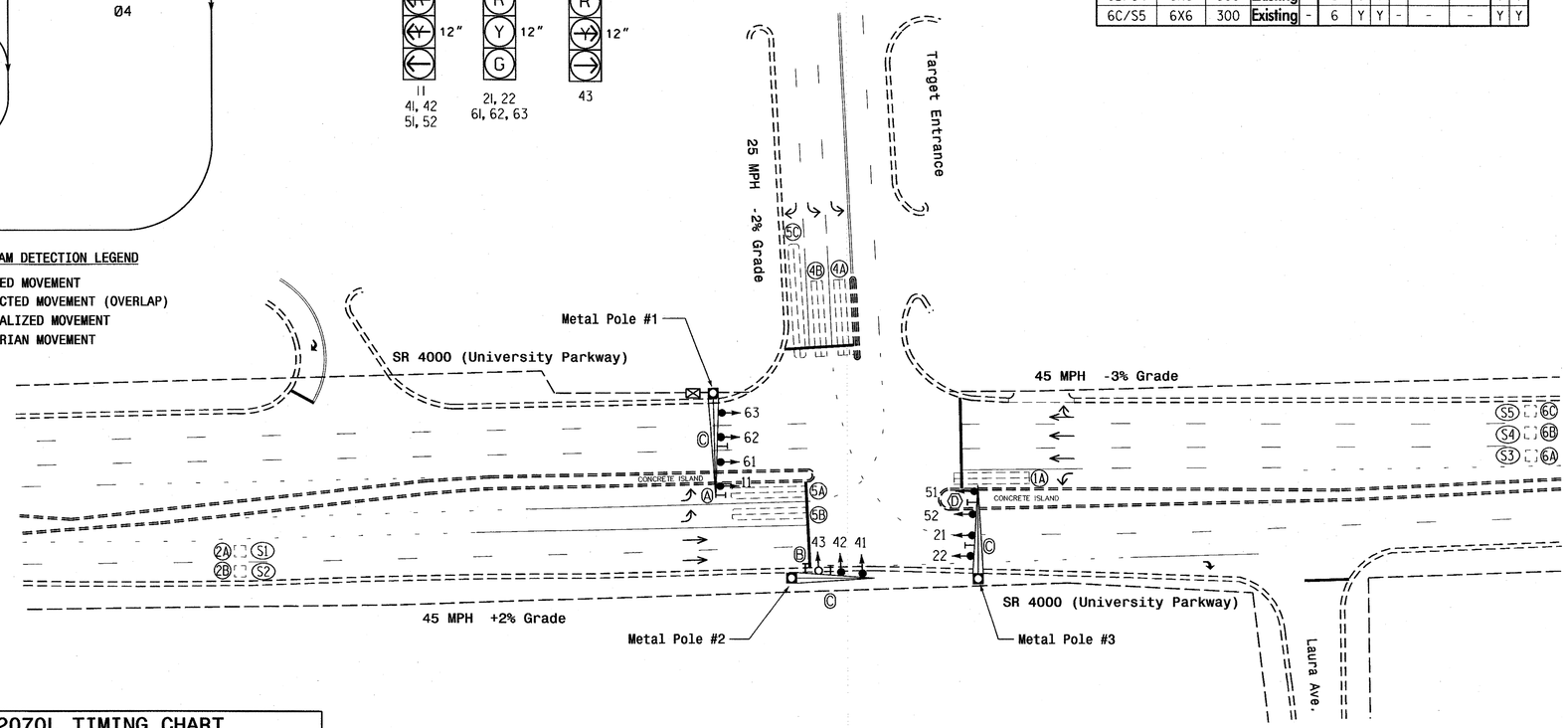
SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	Y
41, 42	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~
43	→	R	→	R	→	R
51, 52	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A/S1	6X6	300	Existing	-	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	300	Existing	-	2	Y	Y	-	-	-	Y	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5C	6X60	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A/S3	6X6	300	Existing	-	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	300	Existing	-	6	Y	Y	-	-	-	Y	Y
6C/S5	6X6	300	Existing	-	6	Y	Y	-	-	-	Y	Y



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	6.0
Max Green 1 *	15	60	20	20	60
Yellow Clearance	3.0	4.3	3.0	3.0	4.8
Red Clearance	3.4	1.3	3.6	2.4	1.4
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	34	-	-	34
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	30	-	-	30
Minimum Gap	-	3.0	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

5 Phase Fully Actuated (Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Existing Right Arrow "Only" sign (R3-5R) may be removed at the direction of the Engineer.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. New signal head 43 shall be black in color with black visors.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
Ⓐ	"U-Turn Signal" Sign	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ
Ⓓ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓓ

Signal Upgrade

Prepared in the Offices of: Transportation Mobility and Safety Division, Department of North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 4000 (University Pkwy.) at Target Entrance

Division 9 Forsyth County Winston-Salem

PLAN DATE: November 2011 REVIEWED BY:
PREPARED BY: Sterling/Blount REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS | INIT. | DATE

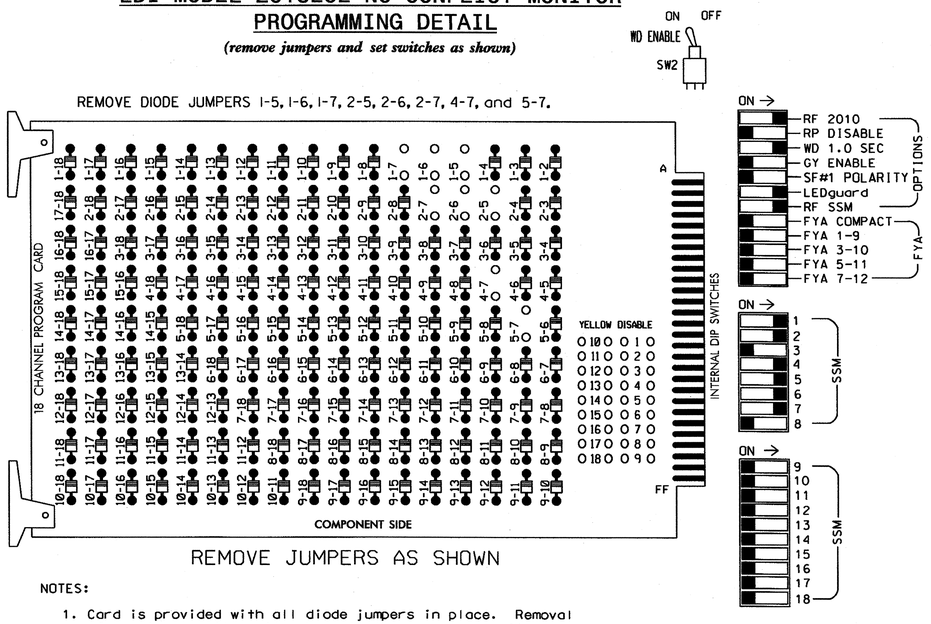
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 10/22/12 DATE
SIG. INVENTORY NO. 09-1176

22-OCT-2012 13:08
S:\TSAS\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1176\09117 6.sig_dsn.20121022.dgn
rzziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 211

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S10
PHASES USED.....1,2,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED
OVERLAP E.....4+5

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	OLE	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51,52	61,62 63	NU	43	NU	NU
RED		128						134		122		
YELLOW		129						135				
GREEN		130						136				
RED ARROW	125				101		131					
YELLOW ARROW	126				102		132			123		
GREEN ARROW	127				103		133			124		
✋												
🚶												

NU = Not Used

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' FOUR TIMES

```
PAGE 1: VEHICLE OVERLAP 'E' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|   XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....7
```

← NOTICE OUTPUT AS PHASE

OVERLAP PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2/SYS 2A/S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2/SYS 2B/S2				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6/SYS 6A/S3	Ø6/SYS 6C/S5	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5C	Ø6/SYS 6B/S4	NOT USED										

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A/S3	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S4	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			
6C/S5	TB5-1,2	J4U	48	10	26	6/SYS	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1176
DESIGNED: November 2011
SEALED: 10/22/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 4000 (University Pkwy.) at Target Entrance

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: October 2012 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

John T. Rowe, Jr. 10-23-12
SIGNATURE DATE

SIG. INVENTORY NO. 09-1176

23-OCT-2012 06:51
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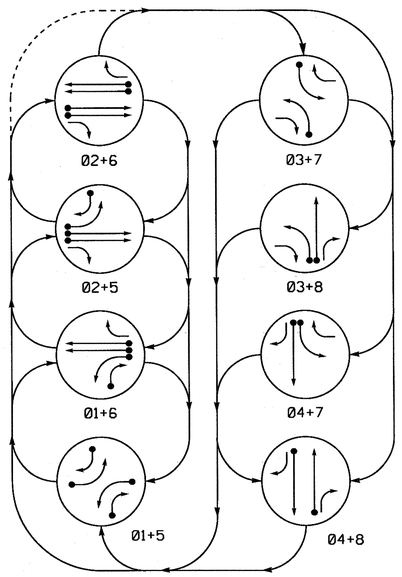
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 212

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

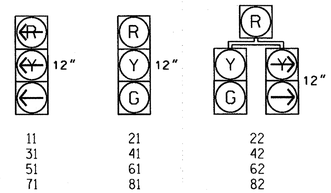
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	↚	↚	R̸	R̸	R̸	R̸	R̸	R̸	R̸
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/←	R/←	R	R	Y
31	R̸	R̸	R̸	R̸	↚	↚	R̸	R̸	R̸
41	R	R	R	R	R	R	G	G	R
42	R/←	R	R/←	R	R	R	G	G	R
51	↚	R̸	↚	R̸	R̸	R̸	R̸	R̸	R̸
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/←	R	R/←	R	Y
71	R̸	R̸	R̸	R̸	↚	R̸	↚	R̸	R̸
81	R	R	R	R	R	G	R	G	R
82	R/←	R/←	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



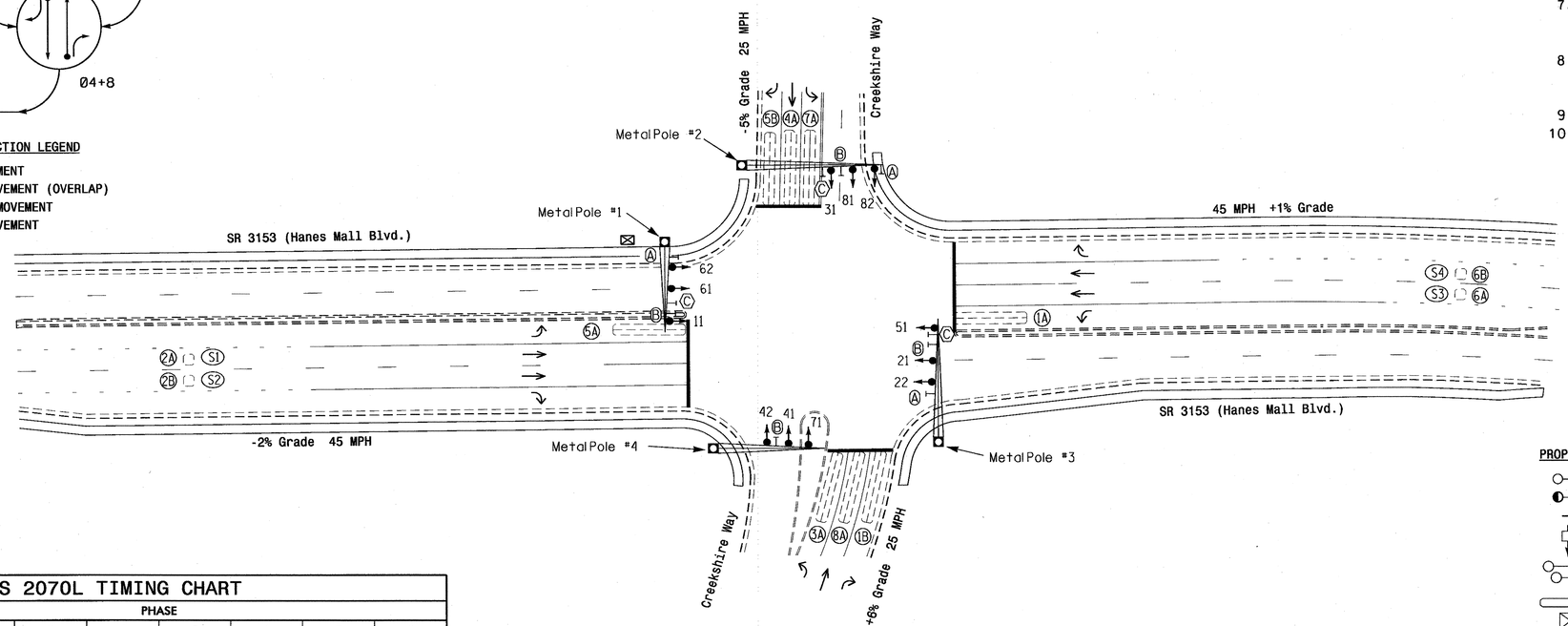
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A/S1	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	300	EXIST	-	2	Y	Y	-	-	-	Y	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A/S3	6X6	300	EXIST	-	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	300	EXIST	-	6	Y	Y	-	-	-	Y	Y
7A	6X40	0	2-4-2	-	7	Y	Y	-	-	3	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

8 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing Right Arrow "ONLY" signs (R3-5R) may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	90	20	30	25	90	20	30
Yellow Clearance	3.0	4.7	3.0	3.5	3.0	4.4	3.1	3.0
Red Clearance	3.3	1.8	3.2	3.1	3.2	1.8	3.1	3.2
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

SR 3153 (Hanes Mall Blvd.) at Creekshire Way

Division 9 | Forsyth County | Winston-Salem

PLAN DATE:	March 2012	PREPARED BY:	L. Blount
PREPARED BY:	M.Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

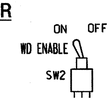
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 11/6/12 DATE
SIG. INVENTORY NO. 09-1211

05-MAR-2013 15:58
S:\TTSA&S\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1211\09121116.dgn
rzieMBG

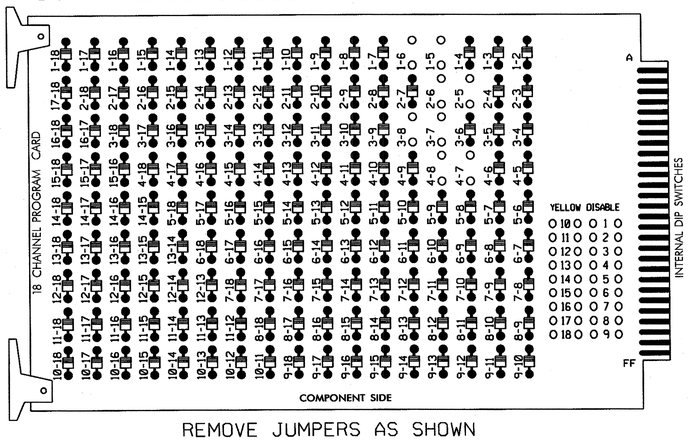
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 213

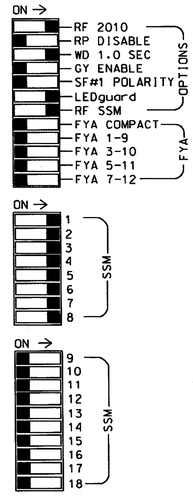
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 4-7 and 4-8.





■ = DENOTES POSITION OF SWITCH

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7		S8	S9	S10		S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5		6	15	7		8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5		6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	NU	22	31	41,42	NU	42	51	61,62	NU	62	71	81,82	NU	NU	NU	NU	NU	NU	NU
RED			128				101				134				107							
YELLOW			129				102				135				108							
GREEN			130				103				136				109							
RED ARROW	125					116				131				122								
YELLOW ARROW	126	126			117	117			132	132			123	123								
GREEN ARROW	127	127			118	118			133	133			124	124								

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2/SYS 2A/S1	SLOT	Ø3 3A	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2/SYS 2B/S2	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6/SYS 6A/S3	SLOT	Ø7 7A	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	Ø6/SYS 6B/S4	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A/S1	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/S2	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A/S3	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S4	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1211
DESIGNED: March 2012
SEALED: 11/16/2012
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Creekshire Way

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: November 2012 | REVIEWED BY:
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 11/19/12

SIG. INVENTORY NO. 09-1211

19-NOV-2012 07:22
S:\TSG\TITS\Signals\Workgroups\Sig Mgmt\Strickland\0901211_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 2.14

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
41, 42
61, 62
81, 82

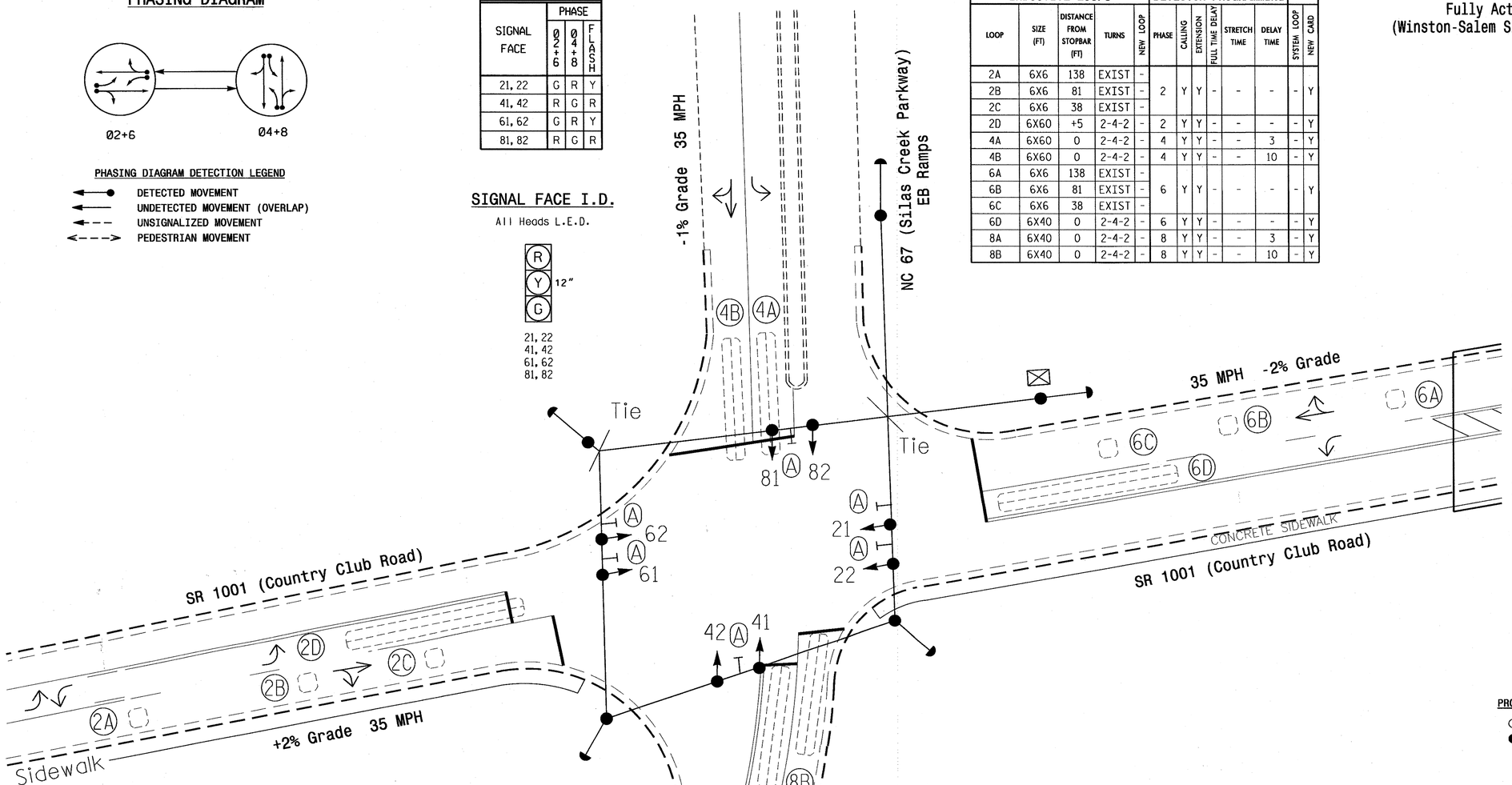
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	138	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	81	EXIST	-								
2C	6X6	38	EXIST	-								
2D	6X60	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
6A	6X6	138	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	81	EXIST	-								
6C	6X6	38	EXIST	-								
6D	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	25	45	25
Yellow Clearance	3.8	3.9	4.0	3.7
Red Clearance	2.6	1.3	1.9	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 20 1"=20'

SR 1001 (Country Club Road)
at
NC 67 (Silas Creek Pkwy.) EB
and Harper Street

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2012 REVIEWED BY:
PREPARED BY: M. Bazzarie REVIEWED BY:

REVISIONS	INIT.	DATE

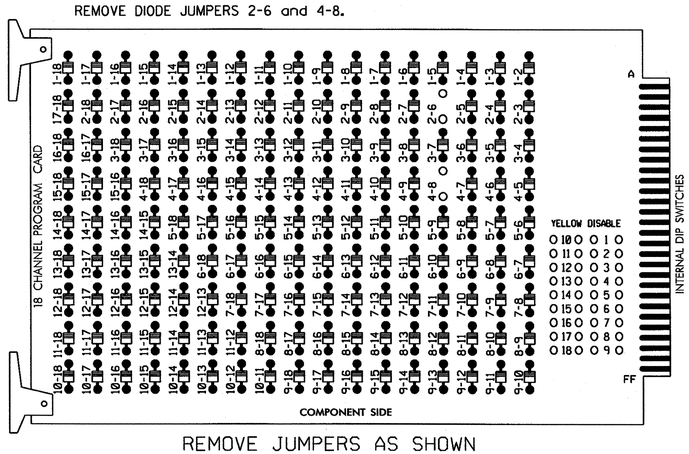
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 6/12/12 DATE
SIG. INVENTORY NO. 09-1252

28-SEP-2012 13:10
S:\TSA&S\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1252\091252_sig_dsn_20120612.dgn
rziemba

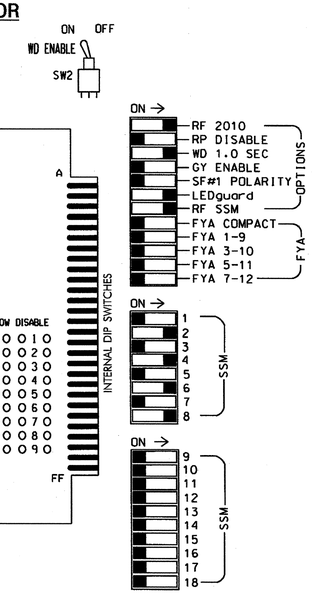
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 215

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	ø2 2A, 2B,2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		ø2 2D				ø4 4B								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø6 6A, 6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		ø6 6D				ø8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1252
DESIGNED: March 2012
SEALED: 06/12/12
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1001 (Country Club Road) at NC 67 (Silas Creek Pkwy.) EB and Harper Street

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: June 2012 | REVIEWED BY: T. Jay

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

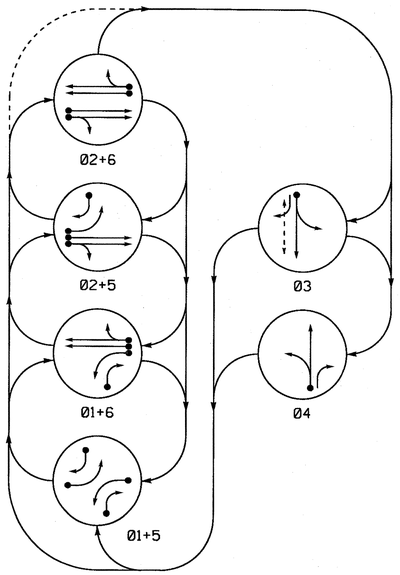
SIGNATURE | DATE 6/13/12

SIG. INVENTORY NO. 09-1252

13-JUN-2012 08:40
S:*ITSASUMITS Signals*workgroups*Sig Mgmt*strickland*09-1252_sm_ele_xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 216

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

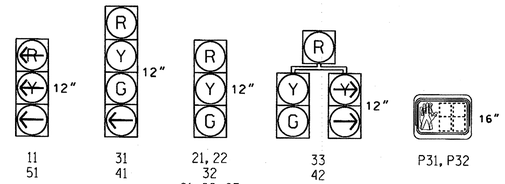
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	~~-~~	~~-~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	R	R	Y	
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
33	R/-	R	R/-	R	G	R	R
41	R	R	R	R	R	G	R
42	R/-	R/-	R	R	R	G	R
51	~~-~~	~~R~~	~~-~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	R	Y
P31, P32	DW	DW	DW	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



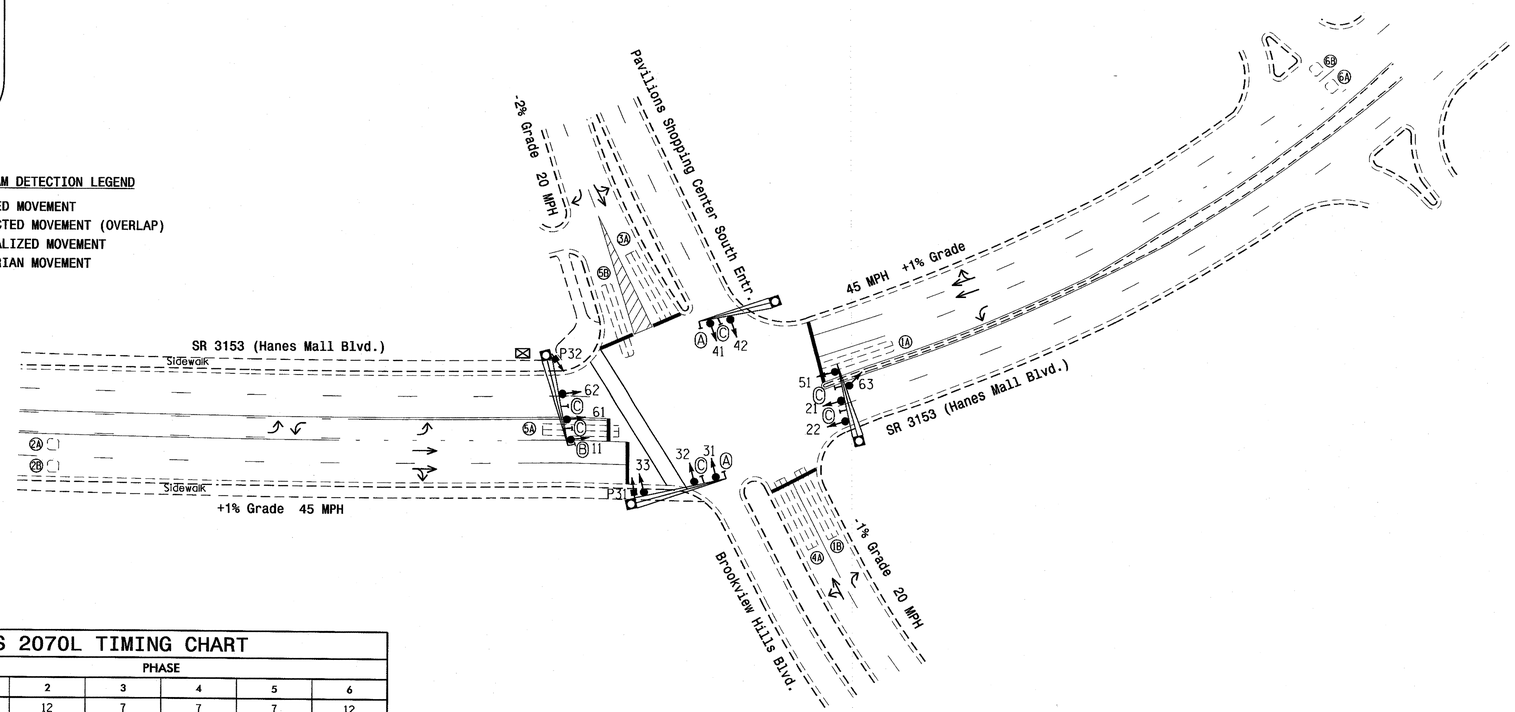
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A, 2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	3	-	Y
5B	6X40	+10	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	Combined Through and Left Arrow Sign (R3-6L)	A
B	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	B
C	Street Name Sign (D3-1)	C

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	20	90	25	25	20	90
Yellow Clearance	3.0	4.5	3.1	3.0	3.0	4.4
Red Clearance	2.6	1.5	3.1	2.9	2.8	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	4	-	-	-
Don't Walk 1	-	-	21	-	-	-
Seconds Per Actuation *	-	1.8	-	-	-	1.8
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
1 South Wilmington Street
Raleigh, North Carolina 27601
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.) at Brookview Hills Blvd. and Pavilions Shopping Center

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 PREPARED BY: L. Blount

PREPARED BY: M.Bazzarie REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

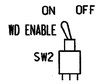
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 12/4/12
SIG. INVENTORY NO. 09-1268

05-MAR-2013 16:11
S:\TSS\Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1268\091268_sig_dsn_20121211.dgn
rziemba

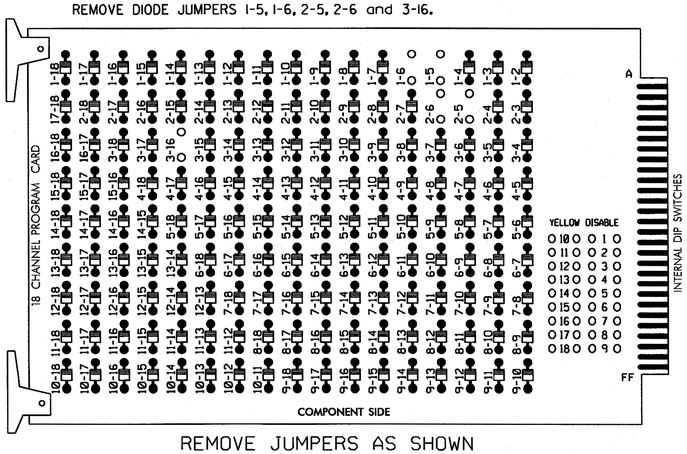
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 2.17

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

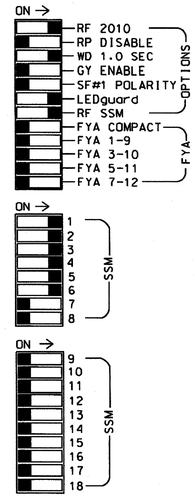
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6 and 3-16.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phase 3 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S12
PHASES USED.....1,2,3,4,5,6,3 PED
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4		4 PED	5		6	6 PED	7	NU	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	42	21,22	NU	31	32,33	41	42	NU	33	51	61,62 63	NU	NU	NU	P31, P32	NU	NU	NU	NU	NU	NU
RED			128		116	116	101	101				134										
YELLOW			129		117	117	102	102				135										
GREEN			130		118	118	103	103				136										
RED ARROW	125										131											
YELLOW ARROW	126	126								132	132											
GREEN ARROW	127	127			118		103			133	133											
✋																110						
🚶																112						

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

PED 3 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '6' (OUTPUTS). THEN '1' (OUTPUT ASSIGNMENTS)
2. ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
3. SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
4. ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
5. BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
6. SELECT '1' (OUTPUT ASSIGNMENTS)
7. ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
8. REPEAT STEPS # 3 AND # 4.

CHANGING INPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '7' (DETECTORS). THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A,2B	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED		NOT USED	NOT USED							Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
PED PUSH BUTTONS											
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1268
DESIGNED: February 2012
SEALED: 12-11-12
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.) at Brookview Hills Blvd. and Pavilions Shopping Center

Division 9	Forsyth County	Winston-Salem
PLAN DATE: December 2012	REVIEWED BY: JTR	
PREPARED BY: James Peterson	REVIEWED BY:	

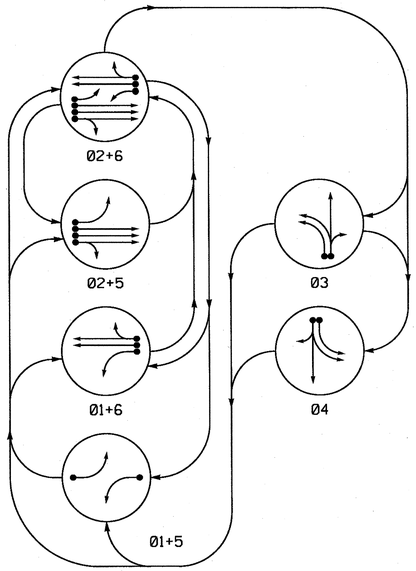
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 12-12-12 DATE
SIG. INVENTORY NO. 09-1268

12-DEC-2012 09:58
S:#ITS&S1#ITS Signals#Workgroups#Sig Mon#Peterson#091268_sm_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 218

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

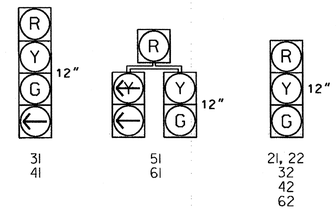
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	G	R	R
42	R	R	R	R	R	G	R
51	R	R	G	G	R	R	Y
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



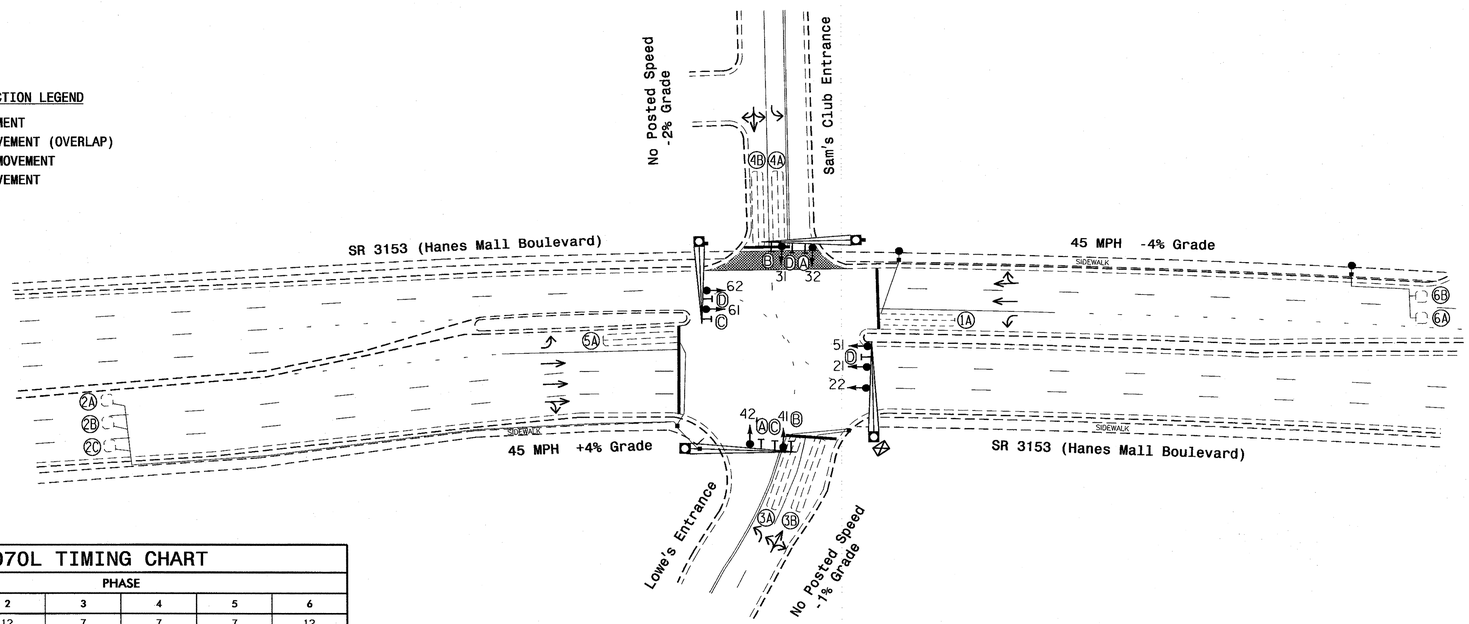
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2C	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	10	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through an all red display.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Existing loop detection is based on the standards of the City of Winston-Salem DOT.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
Ⓐ	Dual Turn and Through Arrow Sign	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	20	80	25	25	20	80
Yellow Clearance	3.0	4.2	3.2	3.3	3.0	4.9
Red Clearance	2.8	1.4	3.0	2.5	2.6	1.2
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Boulevard)
at
Lowe's and Sam's Club Entrances

Division 9 Forsyth County Winston-Salem

PLAN DATE: September 2012	REVIEWED BY:
PREPARED BY: C.E. Carter	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

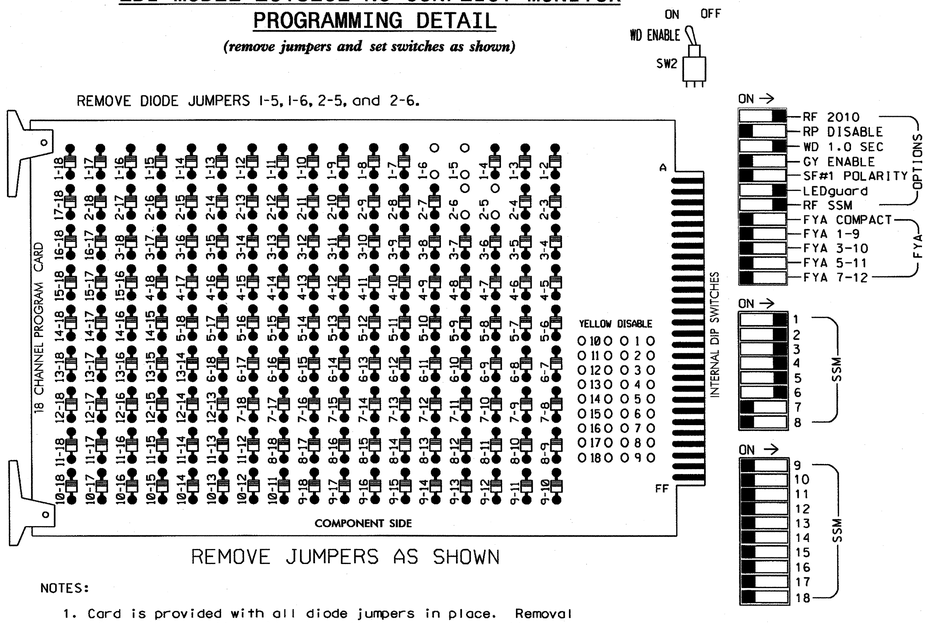
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE
DATE 12/6/12
SIG. INVENTORY NO. 09-1274

05-MAR-2013 16:09
S:\TSG&S\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1274\091274_sig_dsn_20121206.dgn
21.8.0

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 219

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22 51	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED	*	128		116	116	101	101		*	134										
YELLOW		129		117	117	102	102			135										
GREEN		130		118	118	103	103			136										
RED ARROW																				
YELLOW ARROW	126								132											
GREEN ARROW	127			118		103			133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	Ø2 2C	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	NOT USED			Ø3 3B	Ø4 4B							ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			10
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			3
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

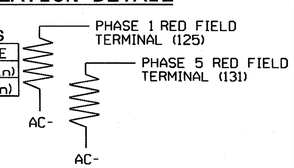
(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1274
DESIGNED: September 2012
SEALED: 12/6/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3153 (Hanes Mall Boulevard) at Lowe's and Sam's Club Entrances

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: November 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

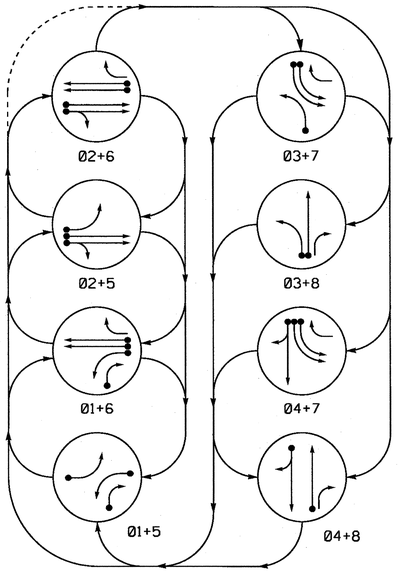
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 12-7-12
SIG. INVENTORY NO. 09-1274

07-DEC-2012 06:38
S:#ITSSGU#ITS Signals#workgroups#sig Mane#armstrong#091274_smlele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 220

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

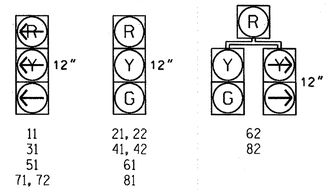
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/←	R	R/←	R	Y
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/←	R/←	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



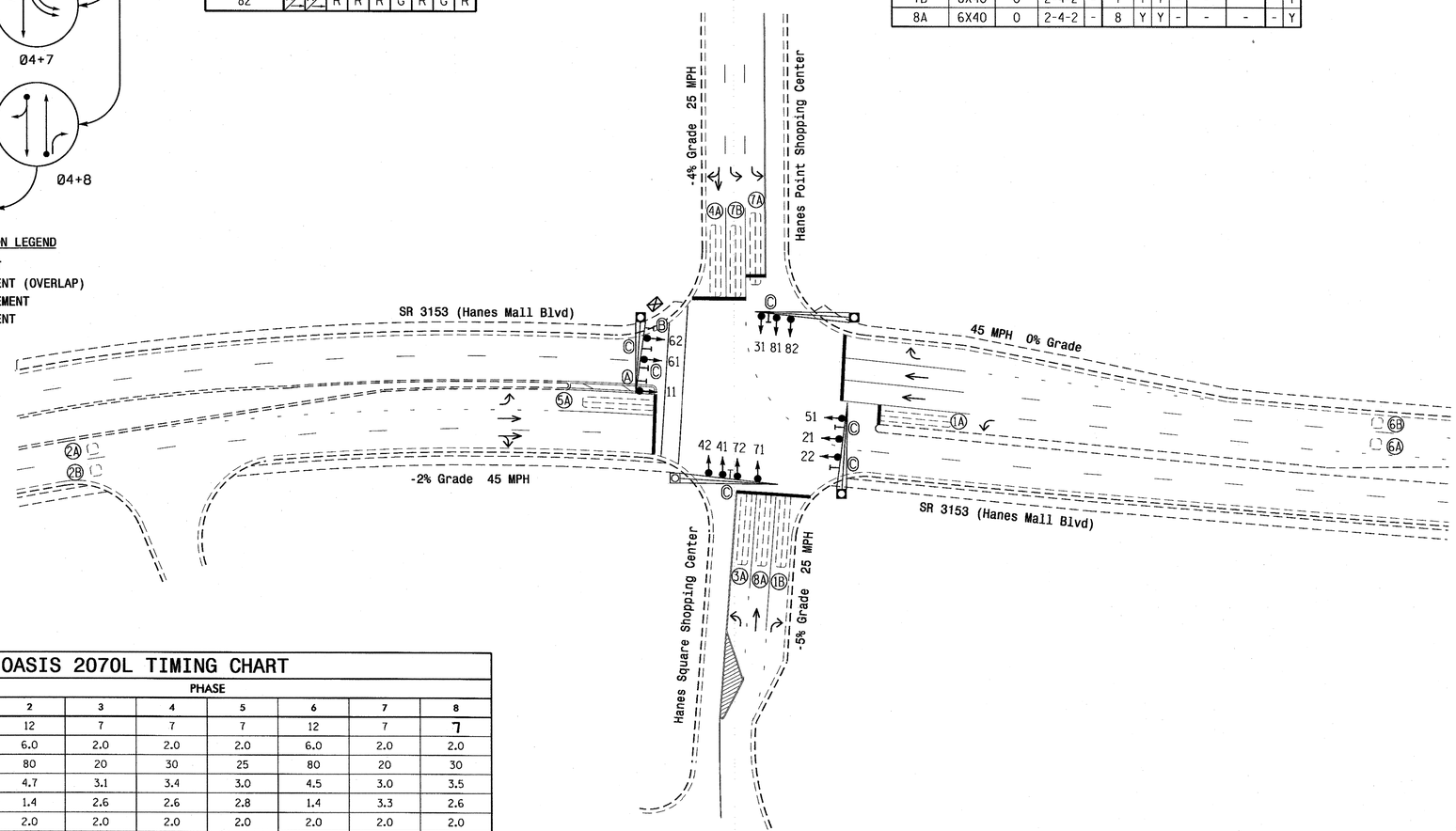
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	3	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
7A	6X40	0	2-4-2	-	7	Y	Y	-	-	3	-	Y
7B	6X40	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

8 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing Right Arrow "ONLY" sign (R3-5R) may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	80	20	30	25	80	20	30
Yellow Clearance	3.0	4.7	3.1	3.4	3.0	4.5	3.0	3.5
Red Clearance	3.1	1.4	2.6	2.6	2.8	1.4	3.3	2.6
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	U-Turn "MUST YIELD" Sign (R3-27)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	Street Name Sign (D3-1)	C

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Hanes Square Shopping Center &
Hanes Point Shopping Center

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2012 REVIEWED BY:
PREPARED BY: M. Bazzarie REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

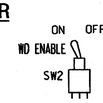
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 12/6/12
SIG. INVENTORY NO. 09-1275

05-MAR-2013 16:07
S:\ITS&SU\ITS Signals\Signal Design Sections\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1275\09175_sig_dsn_20121206.dgn
rziembo

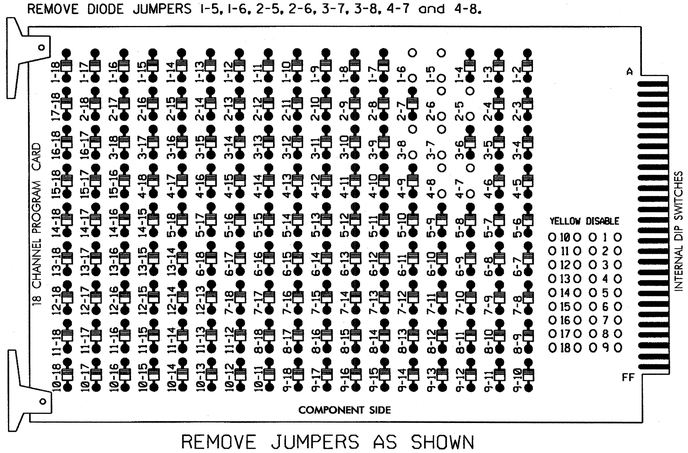
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.221

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

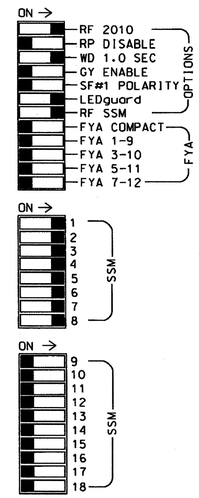
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 4-7 and 4-8.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4	S5	S6	S7	S8	S9	S10		S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5	6	15	7		8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	NU	31	41,42	NU	51	61,62	NU	62	71,72	81,82	NU	NU	NU	NU	NU	NU	NU
RED			128			101			134				107							
YELLOW			129			102			135				108							
GREEN			130			103			136				109							
RED ARROW	125				116			131				122								
YELLOW ARROW	126	126			117			132			123	123								
GREEN ARROW	127	127			118			133			124	124								

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø 2 2B		NOT USED	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	Ø 7 7A	Ø 7 7B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B			NOT USED	Ø 8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
7B	TB5-9,10	J6U	42	4	8	7	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1275
DESIGNED: March 2012
SEALED: 12/06/12
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.) at Hanes Square Shopping Center & Hanes Point Shopping Center

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2012 REVIEWED BY: T. Vgh
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

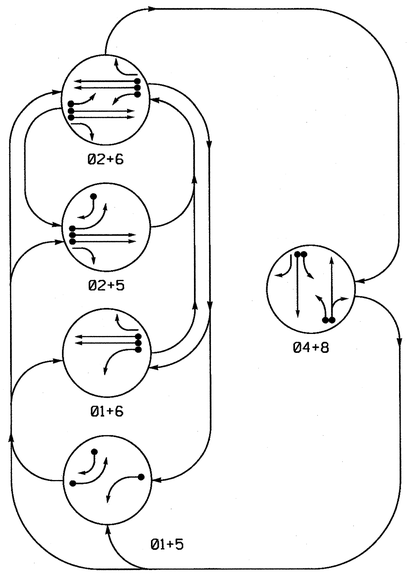
SIGNATURE DATE 12/7/12
SIG. INVENTORY NO. 09-1275

06-DEC-2012 13:40
S:#3153&#75 Signals#workgroups#Sig MarkStrick|gmd#091275_sm.ele.xxx.dgn
ossrtp01/ows

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 222

5 Phase Fully Actuated (Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

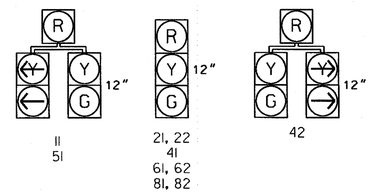
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	R/G	R/G	R	G	R	Y
21, 22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/G	R	R/G	R	G	R
51	R/G	R	R/G	G	R	Y
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

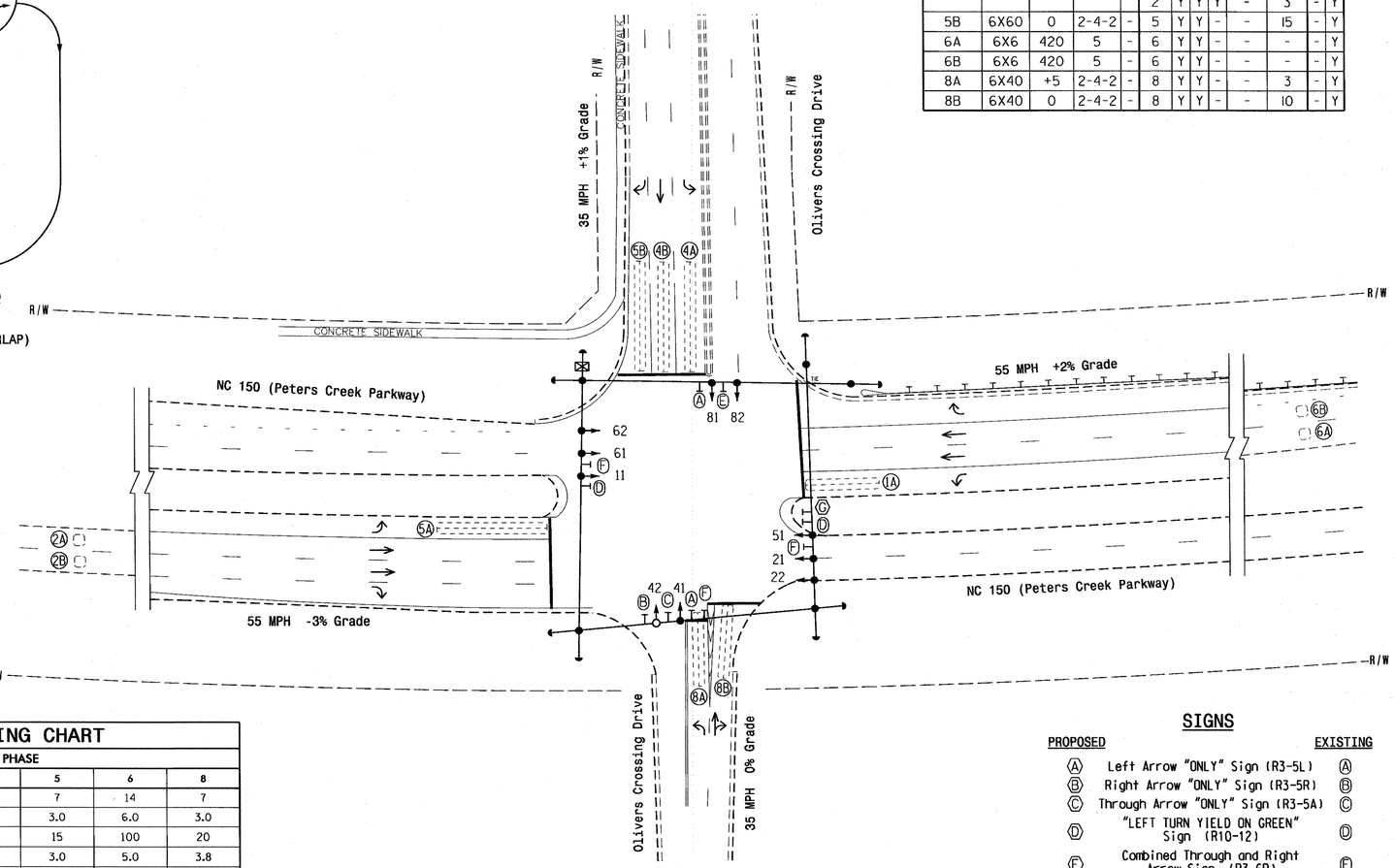


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A	6X6	420	5	-	2	Y	Y	-	-	-	-	Y
2B	6X6	420	5	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	420	5	-	6	Y	Y	-	-	-	-	Y
6B	6X6	420	5	-	6	Y	Y	-	-	-	-	Y
8A	6X40	+5	2-4-2	-	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxilary Output file for future use.
8. Existing lane control and/or "Left Turn Yield on Green" ball (R10-12) signs may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. New signal head 42 shall be yellow in color with yellow visors.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	14	7	7	14	7
Extension 1 *	3.0	6.0	3.0	3.0	6.0	3.0
Max Green 1 *	15	100	25	15	100	20
Yellow Clearance	3.0	5.5	3.8	3.0	5.0	3.8
Red Clearance	3.3	1.4	2.5	3.5	1.3	2.3
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	46	-	-	46	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.4	-	-	3.4	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

SIGNS

PROPOSED		EXISTING
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	Through Arrow "ONLY" Sign (R3-5A)	C
D	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	D
E	Combined Through and Right Arrow Sign (R3-6R)	E
F	Street Name Sign (D3-1)	F
G	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	G

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	

Signal Upgrade

Prepared In the Offices of: Transportation Mobility and Safety Division, Signal Design Section, 750 N.Greenfield Pkwy.Garner,NC 27529

NC 150 (Peters Creek Parkway) at Olivers Crossing Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2011	REVIEWED BY:
PREPARED BY: L. Blount	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TEMPLEMAN

SIGNATURE DATE 9/18/12

SIG. INVENTORY NO. 09-1282

18-SEP-2012 15:47
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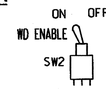
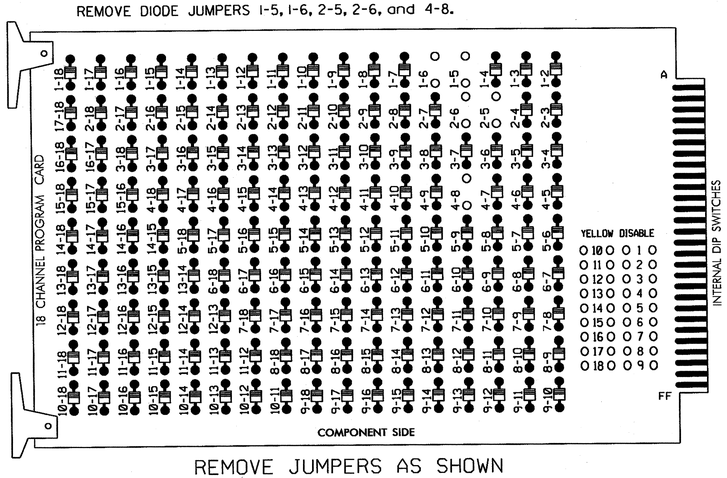
rzlemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.223

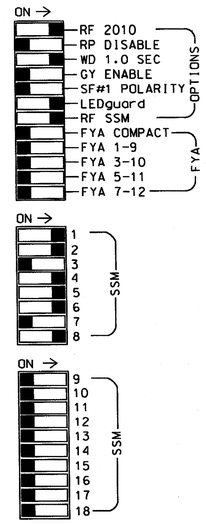
EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, and 4-8.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22 51	NU	NU	41,42	NU	42,51	61,62 11	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
GREEN ARROW	127						133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

BACKUP PROTECTION NOTE
(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B			Ø8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from J1-W to I4-W, on rear of input file.

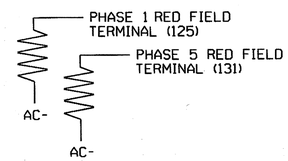
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1282
DESIGNED: December 2011
SEALED: 9/18/12
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 150 (Peters Creek Parkway)
at
Olivers Crossing Drive

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: September 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

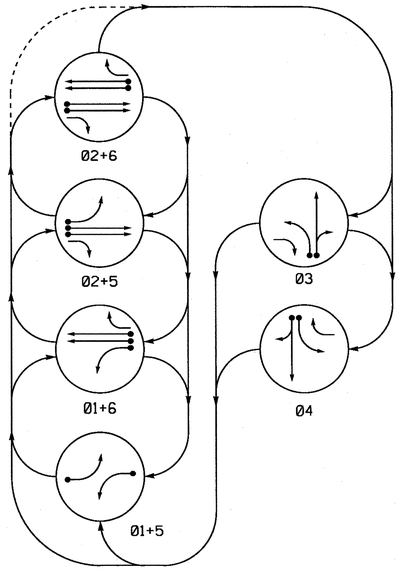
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 9-19-12
SIG. INVENTORY NO. 09-1282

06-MAR-2013 07:54
C:\Users\armstrong\Documents\structure\Electrical Detail Archive\091282_sm.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 224

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/G	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G	R
42	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R/G	Y

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	3	-	Y
2A/S1	6X6	70	3	Y	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	70	3	Y	2	Y	Y	-	-	-	Y	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	10	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	3	-	Y
6A/S3	6X6	70	3	Y	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	70	3	Y	6	Y	Y	-	-	-	Y	Y

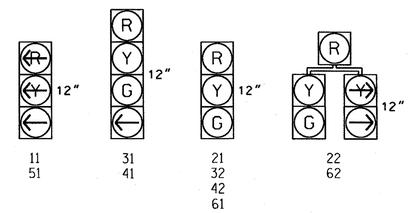
6 Phase
Fully Actuated
(Winston-Salem Signal System)

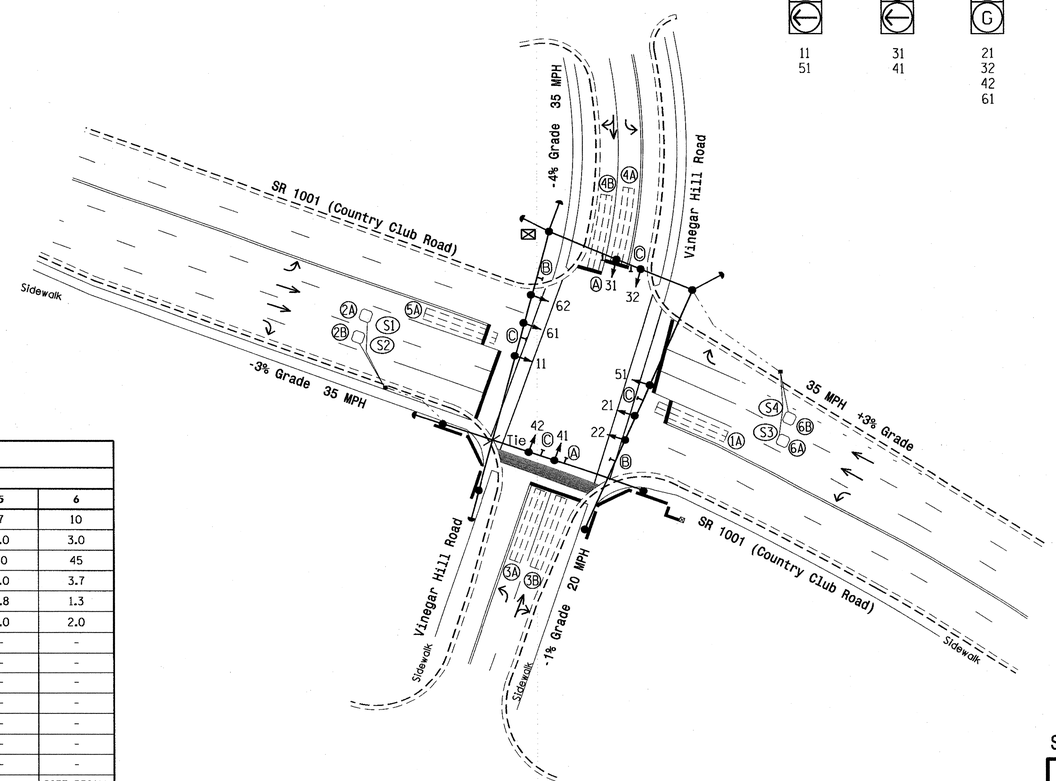
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing lane control signs may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0
Max Green 1 *	20	45	25	25	20	45
Yellow Clearance	3.0	4.1	3.0	4.1	3.0	3.7
Red Clearance	2.8	1.4	3.4	2.2	2.8	1.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

SR 1001 (Country Club Road) at Vinegar Hill Road

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	
PREPARED BY:	M. Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

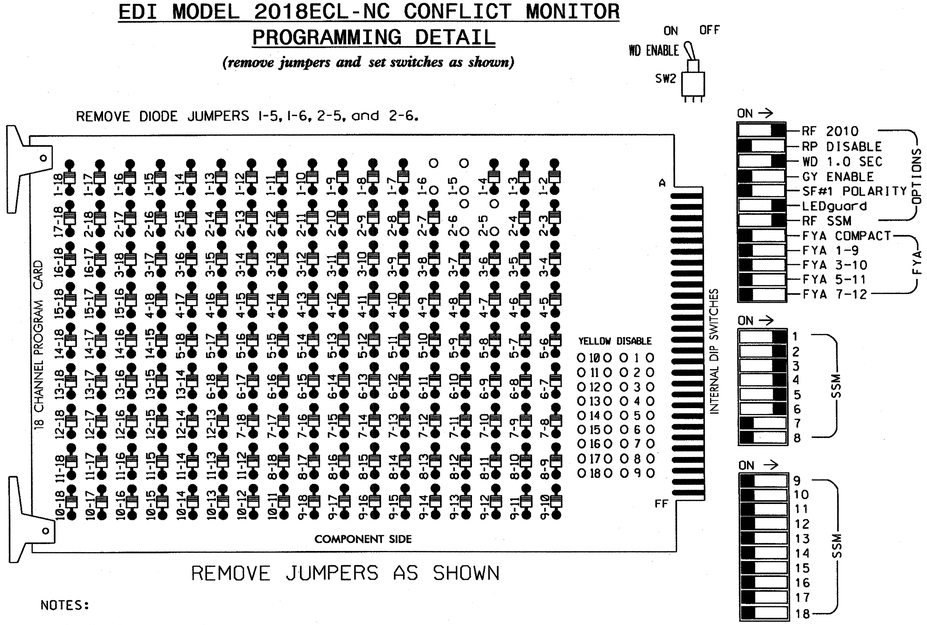
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIELINSKI
SIGNATURE DATE 8/21/12
SIG. INVENTORY NO. 09-1295

21-AUG-2012 12:35
S:\ITS&SU\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1295\09295-sig_dsn.20120821.dgn
rzielinski

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 225

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4			S5			S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3			4			14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3			4			4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	22	31	32	41	42	62	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			116	116	101	101				134										
YELLOW		129			117	117	102	102				135										
GREEN		130			118	118	103	103				136										
RED ARROW	125										131											
YELLOW ARROW	126			117					102		132											
GREEN ARROW	127			118	118		103		103		133											

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX FILE
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1	Ø2/SYS	SLOT	SLOT	SLOT	Ø 3	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A/S1				3A	4A							DC ISOLATOR
	L	NOT USED	Ø2/SYS	EMPTY	EMPTY	EMPTY	Ø 3	Ø 4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST
			2B/S2				3B	4B							DC ISOLATOR
FILE "J"	U	Ø 5	Ø6/SYS	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A/S3												
	L	NOT USED	Ø6/SYS	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			6B/S4												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			3
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			10
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			3
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A/S3	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S4	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1295
DESIGNED: March 2012
SEALED: 8/21/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
750 N.Greenfield Pkwy, Garner, NC 27529

SR 1001 (Country Club Road) at Vinegar Hill Road

Division 9 | Forsyth County | Winston-Salem

PLAN DATE:	August 2012	REVIEWED BY:	JTR
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

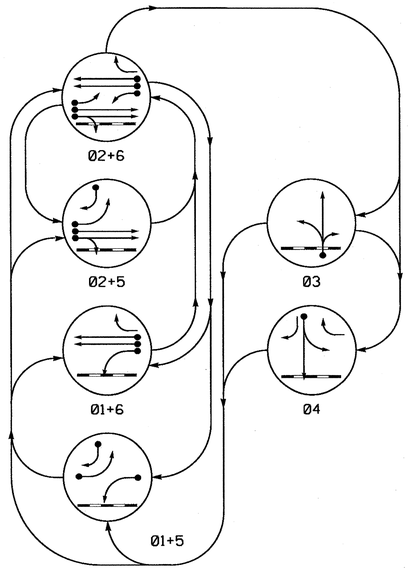
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 8-21-12 DATE
SIG. INVENTORY NO. 09-1295

21-AUG-2012 13:57
S:\HITSCSUM\ITS Signals\Workgroups\Sig Mgmt\armstrongm\091295_smlelte_xxx.dgn
armstrongm

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 2A6

6 Phase
Fully Actuated
(Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

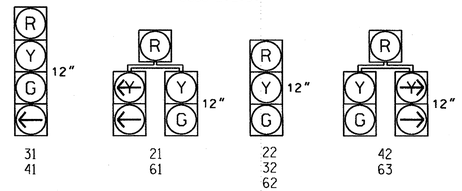
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
21	R	R	G	G	R	R	Y
22	R	R	G	G	R	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	G	R	R
42	R	R	R	R	R	G	R
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
63	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

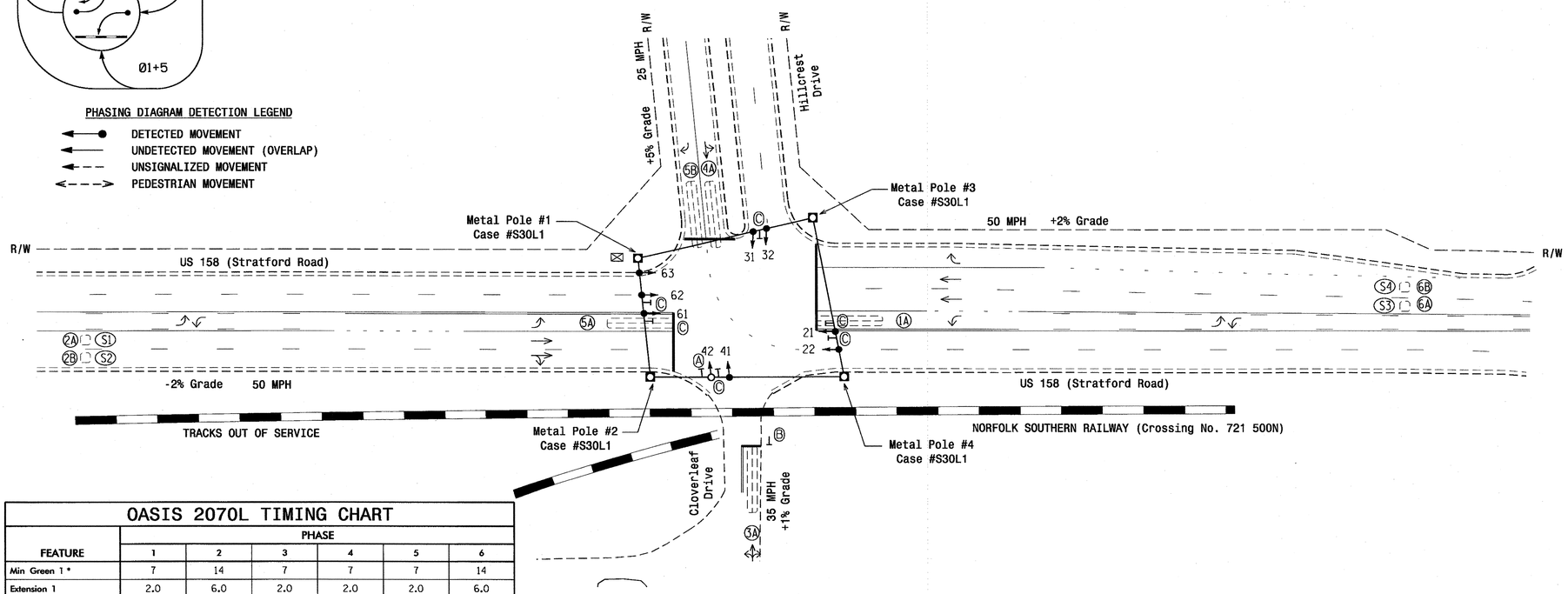


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A/S1	6X6	355	EXIST	-	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	355	EXIST	-	2	Y	Y	-	-	-	Y	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	10	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A/S3	6X6	355	EXIST	-	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	355	EXIST	-	6	Y	Y	-	-	-	Y	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phase 2+6 to allow the controller to clear from 2+6 to phase 1+6 or 2+5 by progressing through all red display.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing Right Arrow "ONLY" sign (R3-5R) may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Railroad Crossing 721 500N is currently out of service and protected by a "Stop and Flag" order, as issued by Norfolk Southern Railway. This signal operates as shown without Railroad Preemption. If the tracks are returned to service and the "Stop and Flag" order is removed, this signal shall be redesigned to operate with Railroad Preemption. The Railroad Preemption shall be in operation before the "Stop and Flag" order is removed.
12. New signal head 42 shall be black in color with black visors.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
N/A	Railroad Tracks	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	"STOP HERE ON RED" Sign (R10-6)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	14	7	7	7	14
Extension 1	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	15	100	25	25	15	100
Yellow Clearance	3.0	5.0	3.8	3.0	3.0	4.6
Red Clearance	2.1	1.0	2.5	2.4	2.4	1.1
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	40	-	-	-	40
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 1"=40'

US 158 (Stratford Road)
at
Cloverleaf Dr./Hillcrest Dr.

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2011 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE Robert J. Ziemba DATE 10/8/12
SIG. INVENTORY NO. 09-1298

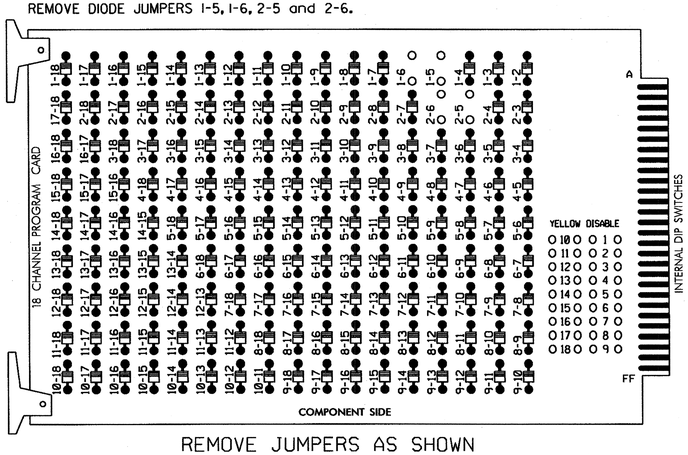
08-OCT-2012 17:56
S:\TTSAS\Traffic Signals\Signal Design Sections\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1298\09129B_sig_dsn_20121008.dgn
ZIEMBA

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.227

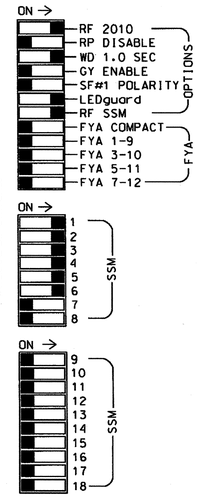
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5 and 2-6.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5			S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4			14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4			4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	NU	31	32	41	42	63	NU	21,42	61, 62,63	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED	*	128		116	116	101	101			*	134										
YELLOW		129		117	117	102	102				135										
GREEN		130		118	118	103	103				136										
RED ARROW																					
YELLOW ARROW	126							102		132											
GREEN ARROW	127			118		103		103		133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø2/SYS 2A/S1	SLOT EMPTY	WIRED INPUT ⊗	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2/SYS 2B/S2			NOT USED	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 5 5B	Ø6/SYS 6A/S3	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6/SYS 6B/S4											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A/S3	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S4	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

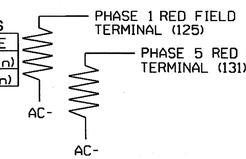
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1298
DESIGNED: December 2011
SEALED: 10/08/2012
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy,Garner,NC 27529

US 158 (Stratford Road) at Cloverleaf Dr./Hillcrest Dr.

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: October 2012 | REVIEWED BY: T. Vaz
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

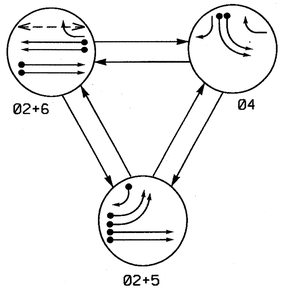
SIGNATURE | DATE 8/10/12

SIG. INVENTORY NO. 09-1298

09-OCT-2012 11:02
S:##TSGS\##TS Signals##Workgroups##Sig Mon&StrickLand##091298_sample_xxx.dgn
cassff/CSYLONG

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 228

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

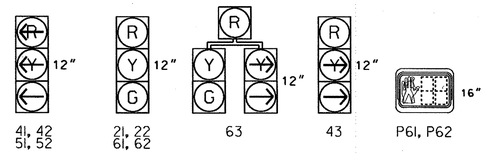
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21, 22	G	G	R	Y
41, 42	~~R~~	~~R~~	←	~~R~~
43	→	R	→	R
51, 52	←	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	Y
63	R	G	R/→	R
P61, P62	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



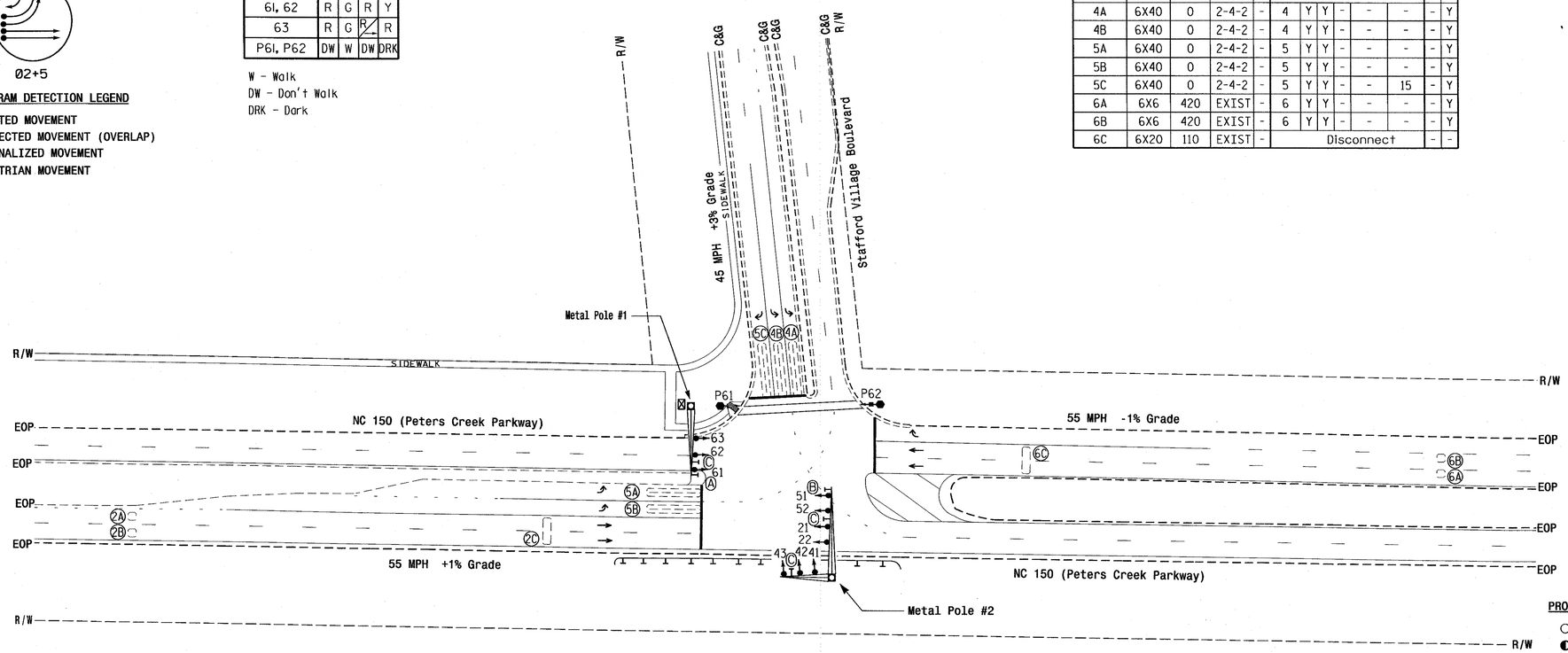
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	420	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	420	EXIST	-	2	Y	Y	-	-	-	-	Y
2C	6X20	110	EXIST	-	Disconnect						-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5C	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	420	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	420	EXIST	-	6	Y	Y	-	-	-	-	Y
6C	6X20	110	EXIST	-	Disconnect						-	-

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 5 may be lagged.
4. Disconnect and abandon existing loops 2C and 6C.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Signal Pedestal	
N/A	Guardrail	
Ⓐ	No U-Turn Sign (R3-4)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	14	7	7	14
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	60	30	25	60
Yellow Clearance	5.1	3.0	3.0	5.3
Red Clearance	1.5	3.7	3.8	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	7
Don't Walk 1	-	-	-	22
Seconds Per Actuation *	1.5	-	-	1.5
Max Variable Initial *	46	-	-	46
Time Before Reduction *	15	-	-	15
Time To Reduce *	40	-	-	40
Minimum Gap	3.4	-	-	3.4
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 150 (Peters Creek Parkway) at Stafford Village Boulevard

Division 9 Forsyth County Winston-Salem

PLAN DATE: December 2011	REVIEWED BY: Monif
PREPARED BY: L. Blount	REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

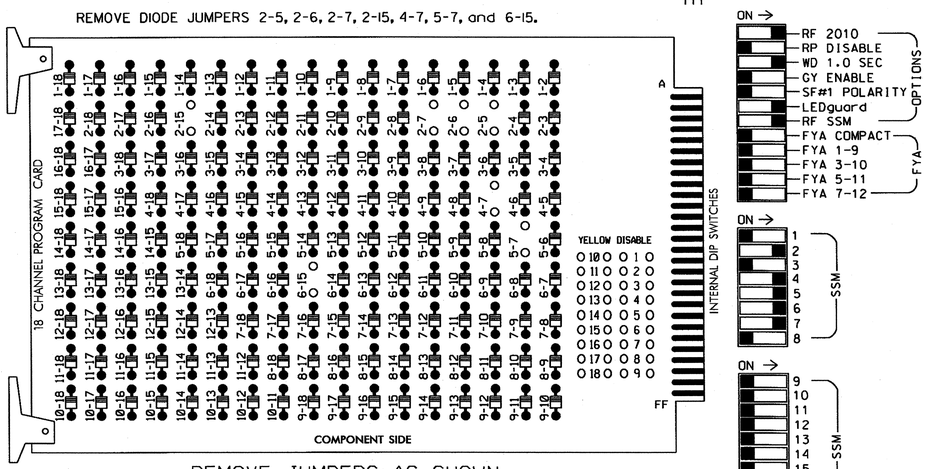
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 9/18/12 DATE
SIG. INVENTORY NO. 09-1321

18-SEP-2012 15:51
S:\MTS&SU\ITS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1321\09132l_sig_dsn_20120918.dgn
rzieme3

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 229

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phase 6 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S7,S8,S9,S10
PHASES USED.....2,4,5,6,6PED
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED
OVERLAP E.....4+5

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	OLE	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	63	NU	51,52	61,62 63	P61, P62	43	NU	NU
RED		128							134		122		
YELLOW		129							135				
GREEN		130							136				
RED ARROW					101			131					
YELLOW ARROW					102	102		132			123		
GREEN ARROW					103	103		133			124		
✋										119			
🚶										121			

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6PED DC ISOLATOR	FS DC ISOLATOR
	L		Ø2 2B				Ø4 4B							NOT USED	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5C	Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' FOUR TIMES

```
PAGE 1: VEHICLE OVERLAP 'E' SETTINGS
PHASE:              |123456789101112131415 16
VEH OVL PARENTS:    |  XX
VEH OVL NOT VEH:    |
VEH OVL NOT PED:    |
VEH OVL GRN EXT:    |
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....7
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1321
DESIGNED: December 2011
SEALED: 9/18/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 150 (Peters Creek Parkway) at Stafford Village Boulevard

Division 9	Forsyth County	Winston-Salem
PLAN DATE: September 2012	REVIEWED BY: JTR	
PREPARED BY: S. Armstrong	REVIEWED BY:	

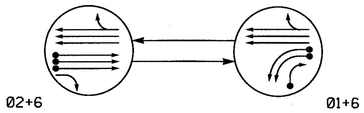
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 9-19-12 DATE
SIG. INVENTORY NO. 09-1321

19-SEP-2012 07:03
S:\TSASIG\TS\Signals\Workgroups\Sig Mgt\armstrong\09132l_smele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 23D

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

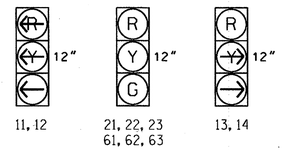
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	FLASH
11, 12	←	~~R~~	~~R~~
13, 14	→	R	R
21, 22, 23	R	G	Y
61, 62, 63	G	G	Y

SIGNAL FACE I.D.

All Heads L.E.D.



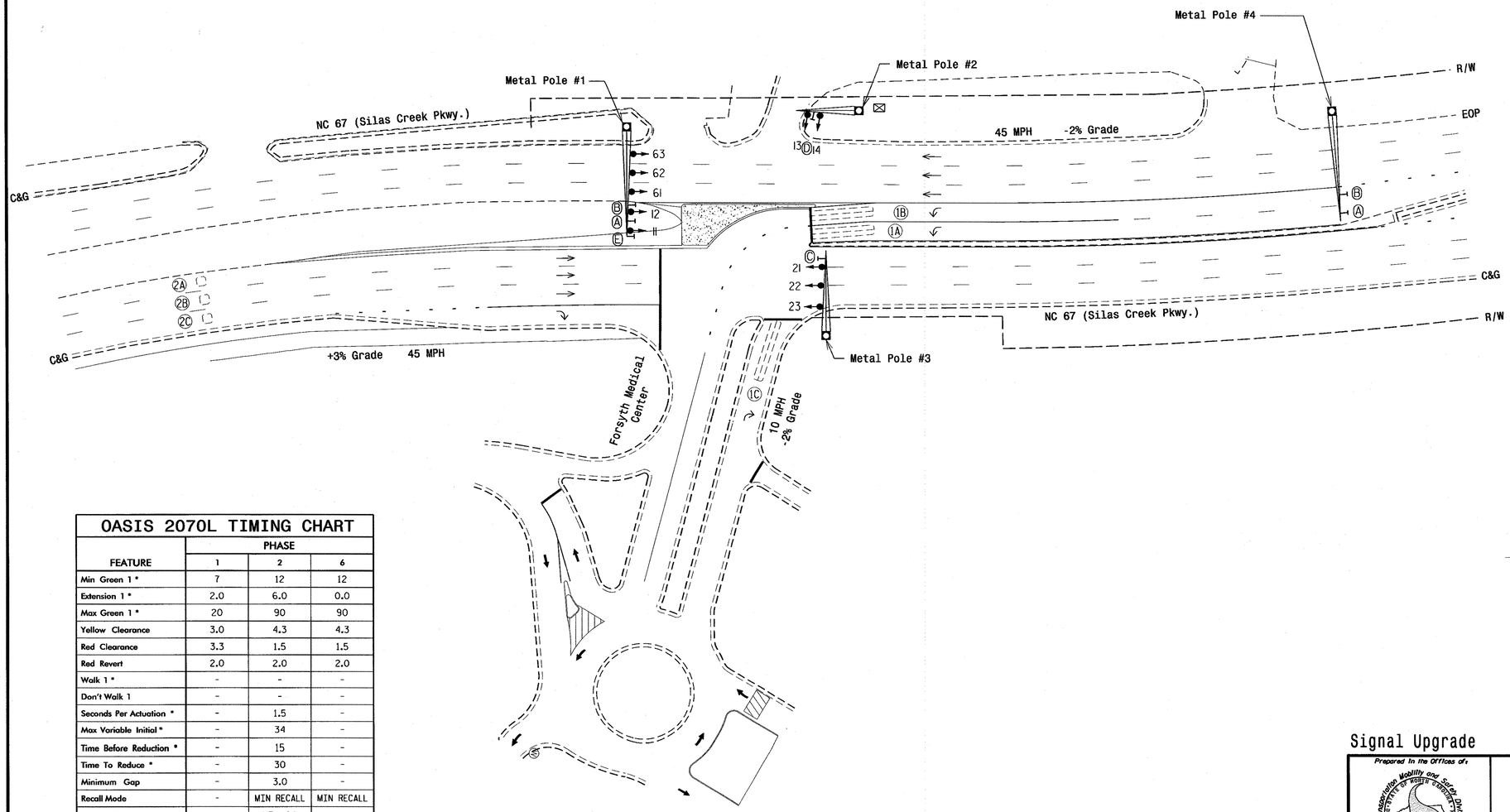
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1C	6X40	0	2-4-2	-	1	Y	Y	-	-	20	-	Y
2A	6X6	300	5	-	2	Y	Y	-	-	-	-	Y
2B	6X6	300	5	-	2	Y	Y	-	-	-	-	Y
2C	6X6	300	5	-	2	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
Ⓐ	"HOSPITAL/PARKING" Sign	Ⓐ
Ⓑ	"EMERGENCY" Sign	Ⓑ
Ⓒ	No Left Turn Sign (R3-2)	Ⓒ
Ⓓ	Right Arrow "ONLY" Sign (R3-5R)	Ⓓ
Ⓔ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓔ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6
Min Green 1 *	7	12	12
Extension 1 *	2.0	6.0	0.0
Max Green 1 *	20	90	90
Yellow Clearance	3.0	4.3	4.3
Red Clearance	3.3	1.5	1.5
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	1.5	-
Max Variable Initial *	-	34	-
Time Before Reduction *	-	15	-
Time To Reduce *	-	30	-
Minimum Gap	-	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL
Vehicle Call Memory	-	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 67 (Silas Creek Pkwy.) at Forsyth Medical Center

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

SCALE 0 40 1" = 40'

REVISIONS	INIT.	DATE

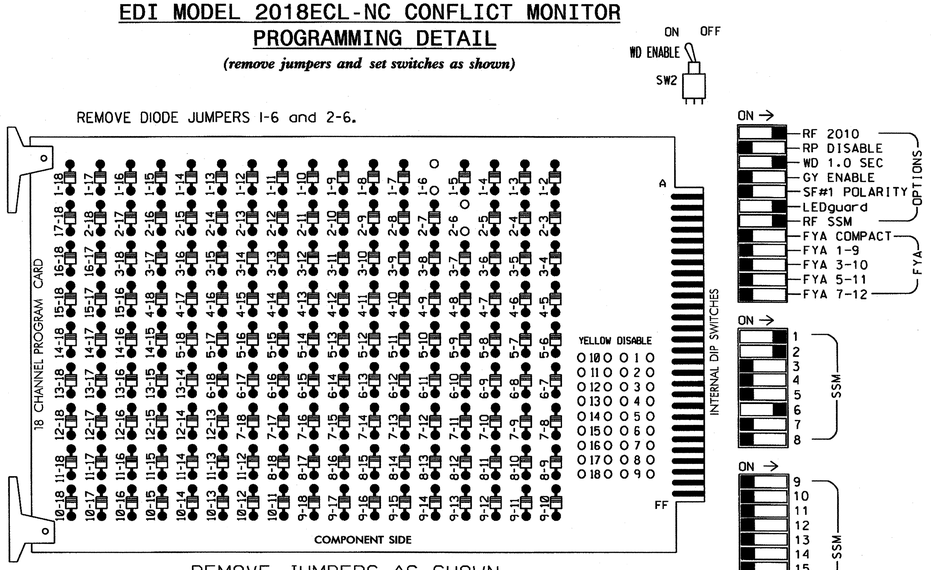
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 9/17/12 DATE
SIG. INVENTORY NO. 09-1324

17-SEP-2012 12:59
S:#ITS&SU#ITS'Signals#Signal Design Section#Central Region#Div 9#C-5224 Winston Salem#Signals#09-1324#091324_sig_dsn_20120917.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.231

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phase 2 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S8
PHASES USED.....1,2,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1		2	13	3	4	14	5	6	15	7	8	16
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11,12	13,14	21,22 23	NU	NU	NU	NU	NU	61,62 63	NU	NU	NU	NU
RED		125	128						134				
YELLOW			129						135				
GREEN			130						136				
RED ARROW	125												
YELLOW ARROW	126	126											
GREEN ARROW	127	127											
✋													
🚶													

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A	Ø 2 2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 1 1C	Ø 2 2B	NOT USED										ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
1C	TB2-7,8	I2L	43	5	12	1	Y	Y			20
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1324
DESIGNED: February 2012
SEALED: 9/17/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 67 (Silas Creek Pkwy) at Forsyth Medical Center

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: September 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

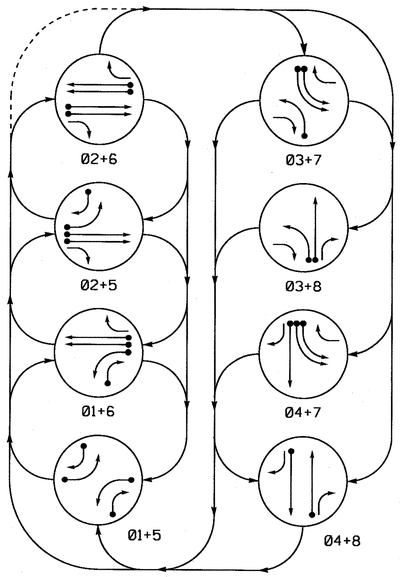
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 9-17-12
SIG. INVENTORY NO. 09-1324

17-SEP-2012 13:52
S:\traffic\Signals\Workgroups\Sig Mgmt\Armstrong\09324_smallelo_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 232

8 Phase
Fully Actuated
(Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

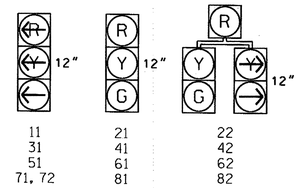
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	-	-	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/-	R/-	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	-	-	~~R~~	~~R~~	~~R~~
41	R	R	R	R	R	R	G	G	R
42	R/-	R	R/-	R	R	R	G	G	R
51	-	~~R~~	-	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/-	R	R/-	R	Y
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	-	~~R~~	-	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/-	R/-	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

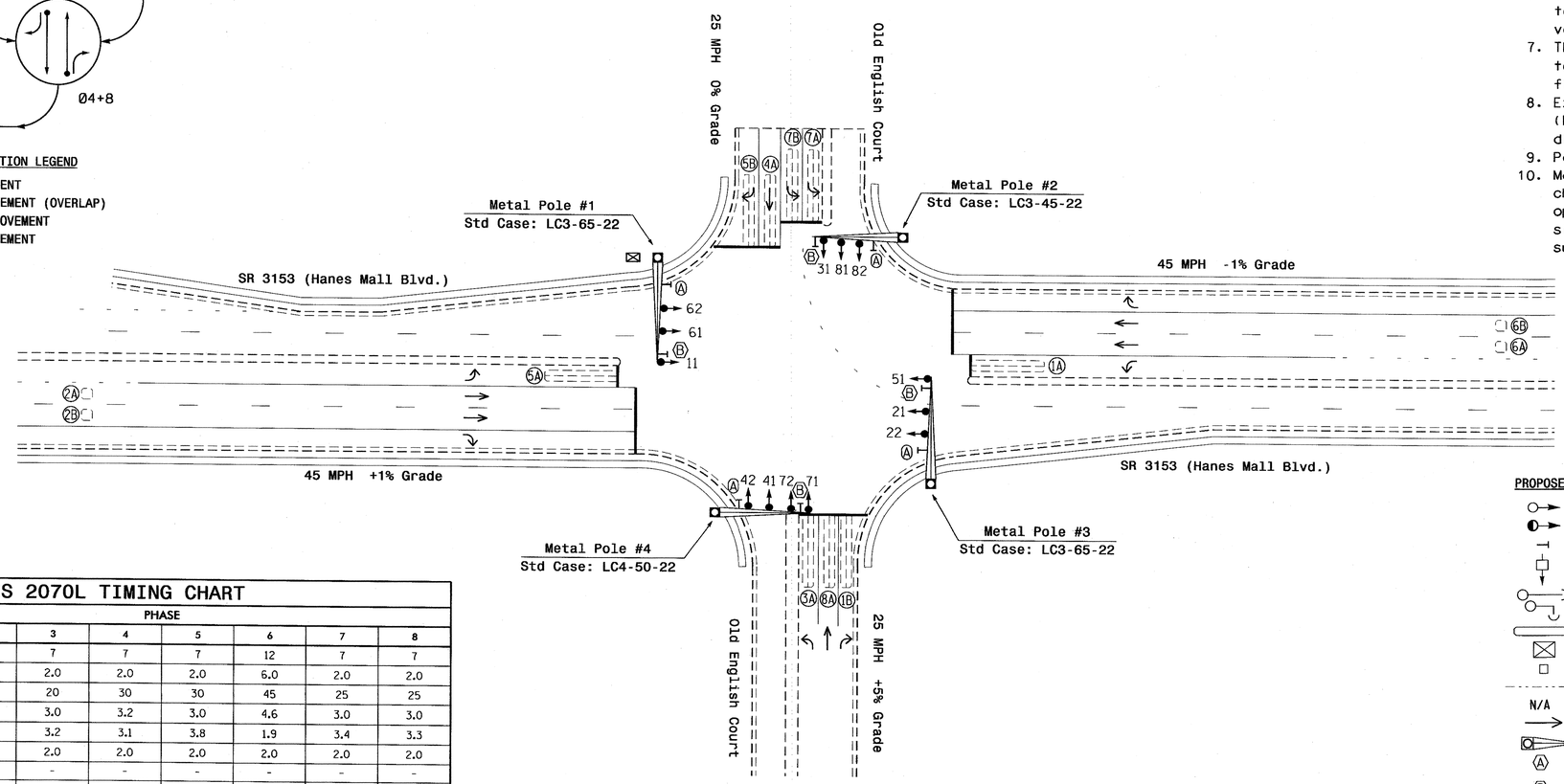


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
7A	6X40	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
7B	6X40	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Existing "Right Arrow "ONLY" sign (R3-5R) may be removed at the direction of the Engineer.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	30	45	20	30	30	45	25	25
Yellow Clearance	3.0	4.4	3.0	3.2	3.0	4.6	3.0	3.0
Red Clearance	3.6	1.9	3.2	3.1	3.8	1.9	3.4	3.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	15	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Old English Court

Division 9 Forsyth County Winston-Salem

PLAN DATE:	July 2012	REVIEWED BY:	
PREPARED BY:	C.E. Carter	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

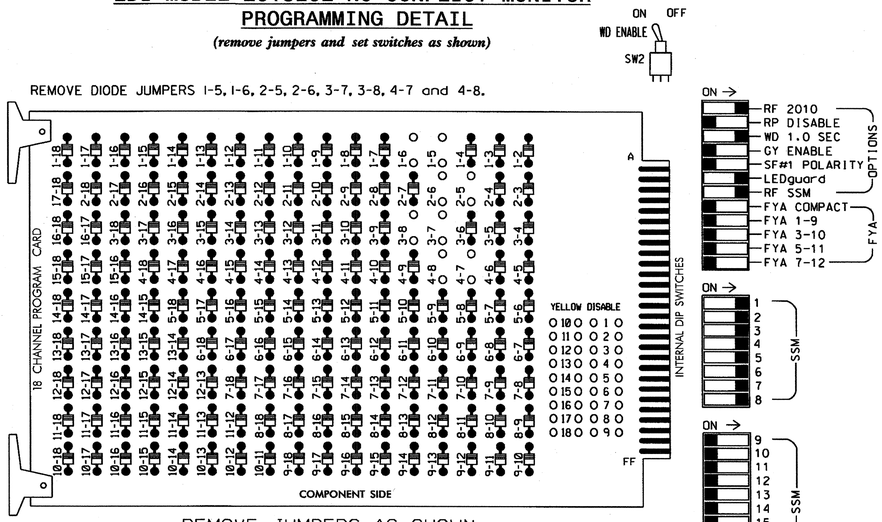
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 11/16/12 DATE
SIG. INVENTORY NO. 09-1330

05-MAR-2013 16:34
S:\MTS&SL\MTS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1330\09130_sig_dsn_20121116.dgn
rzemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.233

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7		S8	S9	S10		S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5		6	15	7		8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5		6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	NU	22	31	41,42	NU	42	51	61,62	NU	62	71,72	81,82	NU	NU	NU	NU	NU	NU	NU
RED			128				101				134				107							
YELLOW			129				102				135				108							
GREEN			130				103				136				109							
RED ARROW	125					116				131				122								
YELLOW ARROW	126	126			117	117			132	132			123	123								
GREEN ARROW	127	127			118	118			133	133			124	124								

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT	Ø3 3A	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT	Ø7 7A	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	Ø6 6B	EMPTY	Ø7 7B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-7,8	J5L	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1330
DESIGNED: July 2012
SEALED: 11/16/2012
REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3153 (Hanes Mall Blvd.)
at
Old English Court

Division 9 | Forsyth County | Winston-Salem

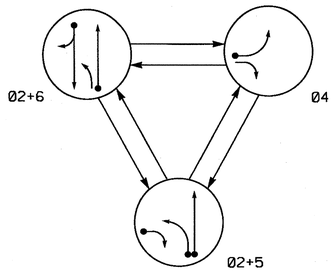
PLAN DATE: November 2012	REVIEWED BY: T. Jym		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE | DATE 11/19/12
SIG. INVENTORY NO. 09-1330

19-NOV-2012 07:31
S:\TSD\TMS\Signals\Workgroups\Sig Mgmt\Strickland\09091330_smlele_xxx.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 234

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

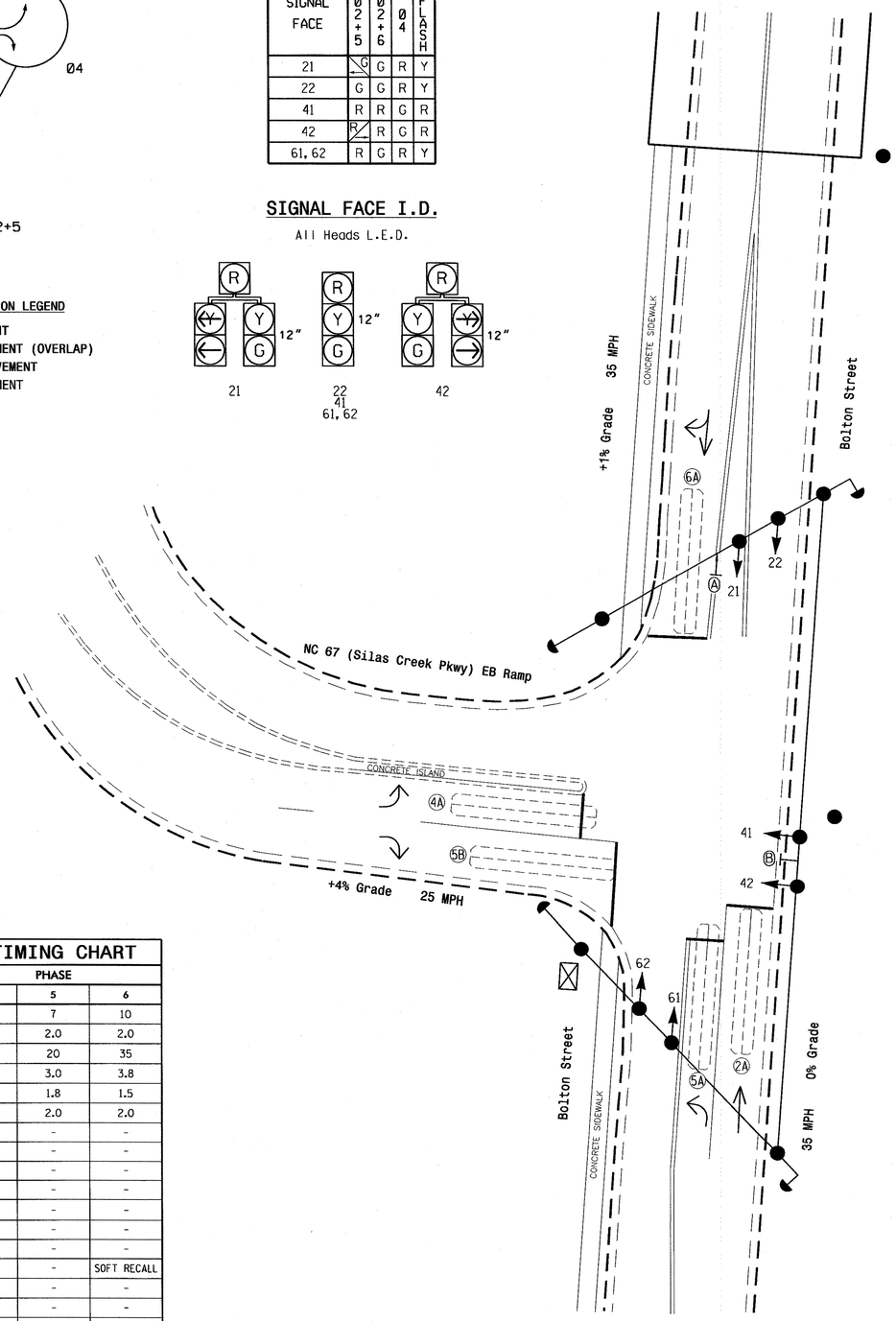
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21	G	G	R	Y
22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
61, 62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	10	-	Y
5B	6X40	0	2-4-2		5	Y	Y	-	-	10	-	Y
6A	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. The cabinet should be designed to include an Auxiliary Output file for future use.
7. Existing "Left Turn Yield on Green" ball sign (R10-12) may be removed at the direction of the Engineer.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	35	25	20	35
Yellow Clearance	3.8	3.0	3.0	3.8
Red Clearance	1.1	2.1	1.8	1.5
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	A
B	Street Name Sign (D3-1)	B

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

Bolton Street
at
NC 67 (Silas Creek Pkwy.) EB Ramp

Division 9 Forsyth County Winston-Salem

PLAN DATE: February 2012 REVIEWED BY:
PREPARED BY: L. Blount REVIEWED BY:

SCALE 0 20 1" = 20'

REVISIONS	INIT.	DATE

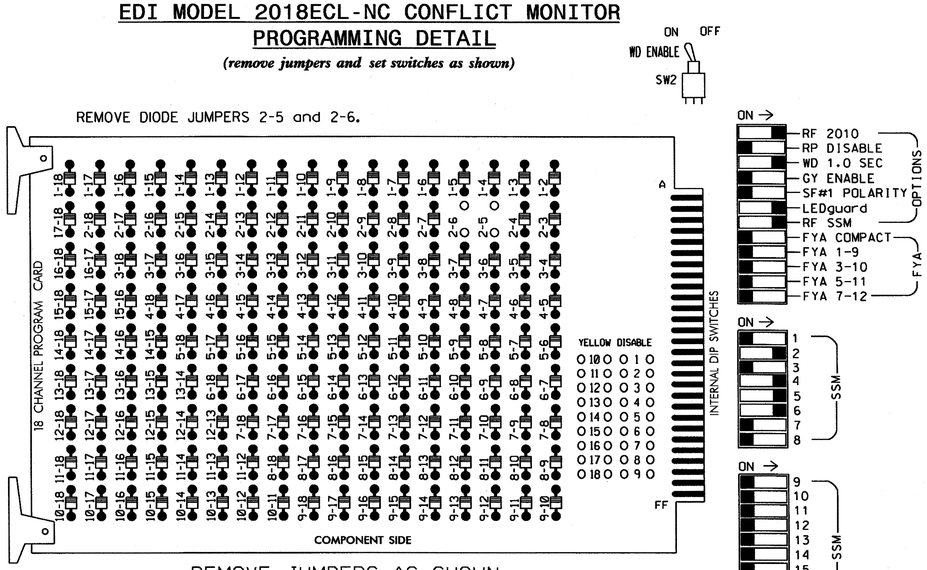
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 9/17/12
SIG. INVENTORY NO. 09-1332

17-SEP-2012 13:04
S:\TTSAS\TTS Signals\Signal Design Section\Central Region\Div 9\C-5224 Winston Salem\Signals\09-1332\09-1332_sig_dsn_20120917.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.235

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. FILE
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21,42	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101		*	134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW							132											
GREEN ARROW							133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2	SLOT	SLOT	SLOT	Ø4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		EMPTY	2A	EMPTY	EMPTY	EMPTY	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L		NOT USED				NOT USED								ST
															DC ISOLATOR
FILE "J"	U	SLOT	Ø5	Ø6	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		EMPTY	5A	6A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L		Ø5 5B	NOT USED											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

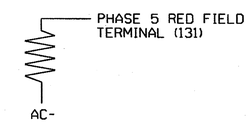
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			10
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			10
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1332
DESIGNED: February 2012
SEALED: 9/17/12
REVISED: N/A

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

Bolton Street
at
NC 67 (Silas Creek Pkwy.) EB Ramp

Division 9 | Forsyth County | Winston-Salem
PLAN DATE: September 2012 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

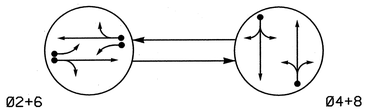
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 9-17-12
SIG. INVENTORY NO. 09-1332

17-SEP-2013 14:00
S:\TTSA\HITS\Signals\Workgroups\Sig Man\armstrong\091332_sm_elb_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 236

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

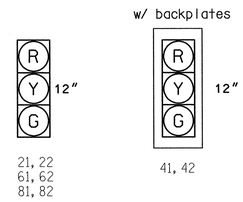
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



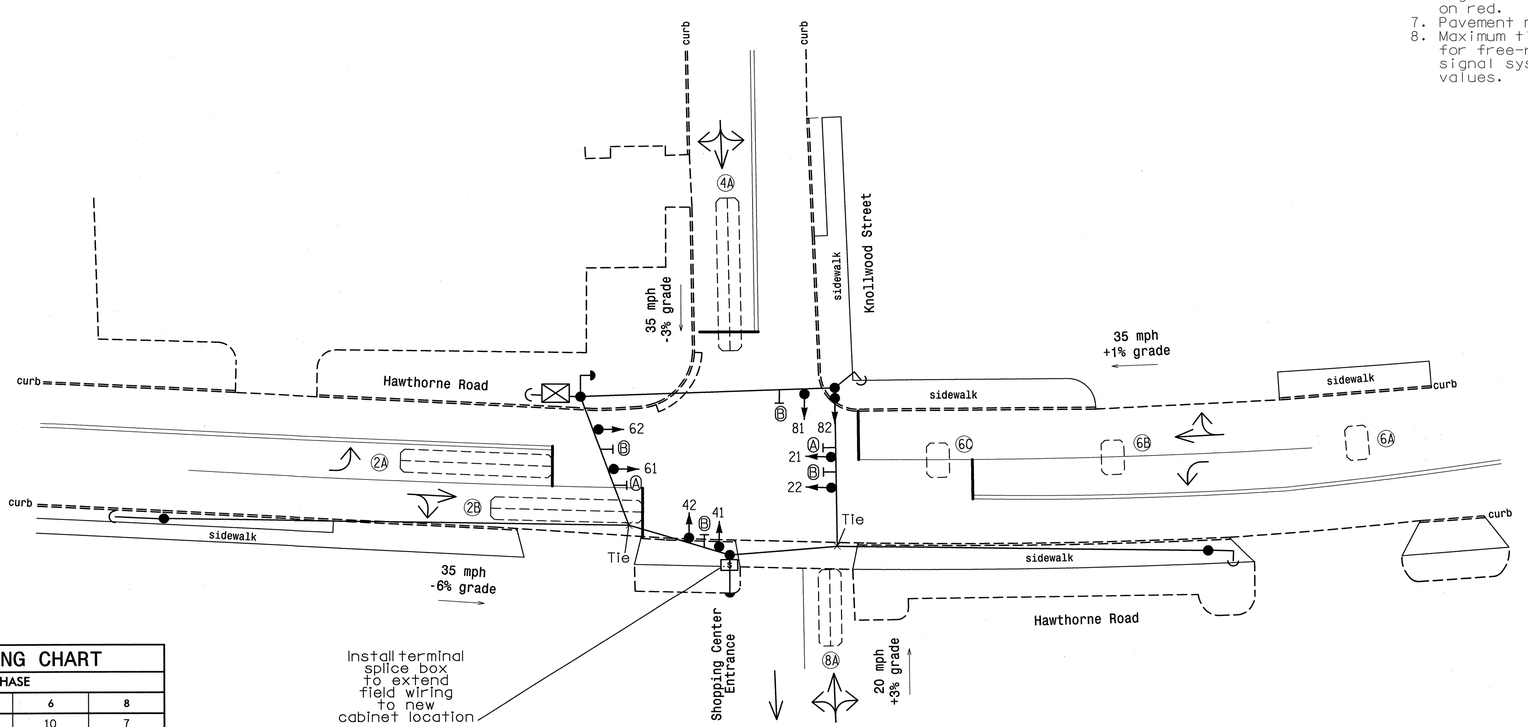
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	0	exist	-	2	Y	Y	-	-	-	-	Y
2B	6x40	0	exist	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	exist	-	4	Y	Y	-	-	-	-	Y
6A	6x9	128	exist	-								
6B	6x9	64	exist	-	6	Y	Y	-	-	-	-	Y
6C	6x9	18	exist	-								
8A	6x20	0	exist	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "2012 NCDOT Roadway Standard Drawings" and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	25	35	25
Yellow Clearance	4.3	4.1	3.8	3.0
Red Clearance	1.1	1.2	1.0	1.8
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
S	Terminal Splice Box	S
A	Left Turn "ONLY" Sign (R3-5L)	A
B	Street Name Sign	B

Signal Upgrade

Winston-Salem

N

SCALE 0 20 1"=20'

Hawthorne Road
at
Knollwood Street /
Shopping Center Entrance

Division 09 Forsyth County Winston-Salem

PLAN DATE: March 2012	REVIEWED BY: LM Moon
PREPARED BY: JA Wiles	REVIEWED BY: MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-005

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
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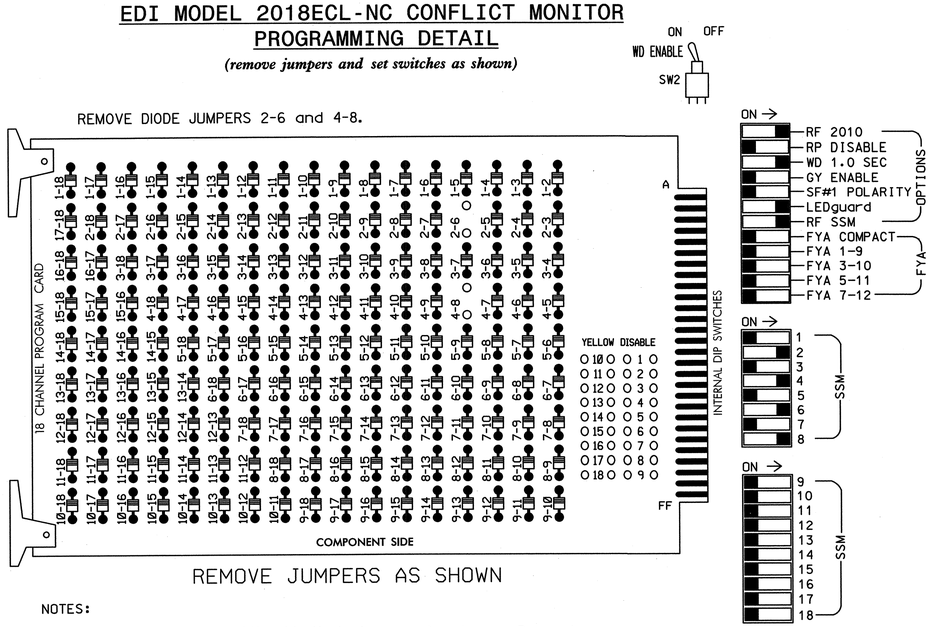
2551

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.237

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A,6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-005
DESIGNED: 03-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Hawthorne Road
at
Knollwood Street

Division 09 Forsyth County Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

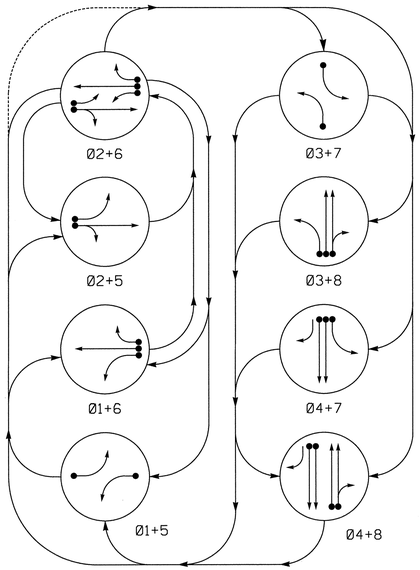
SIG. INVENTORY NO. C-005

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
I:*transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Melissa\Wiring\C-005e.dgn
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 238

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
21	↖R	R	↖G	G	R	R	R	R	Y
22,23	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41,42	R	R	R	R	R	R	G	G	R
61	↖R	↖G	R	G	R	R	R	R	Y
62,63	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81,82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

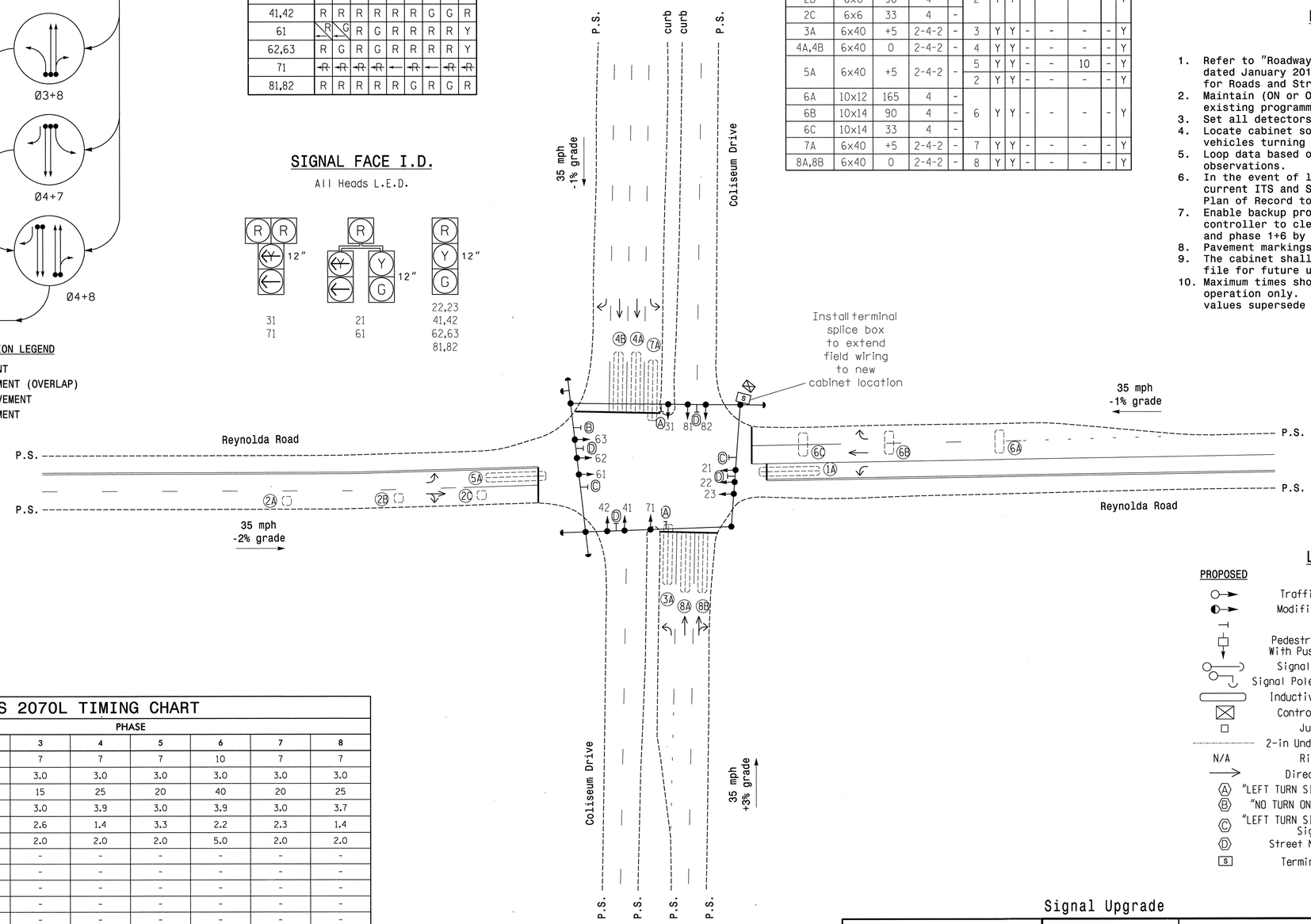
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	+5	2-4-2	-	1	Y	Y	-	-	10	-	Y
					6	Y	Y	-	-	-	-	Y
2A	6x6	165	4	-	2	Y	Y	-	-	-	-	Y
2B	6x6	90	4	-								
2C	6x6	33	4	-								
3A	6x40	+5	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A,4B	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x40	+5	2-4-2	-	5	Y	Y	-	-	10	-	Y
					2	Y	Y	-	-	-	-	Y
6A	10x12	165	4	-	6	Y	Y	-	-	-	-	Y
6B	10x14	90	4	-								
6C	10x14	33	4	-								
7A	6x40	+5	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A,8B	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

8 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Locate cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Loop data based on previous plan and/or field observations.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Enable backup protect for phase 2 and 6 to allow the controller to clear from phase 2+6 to phase 2+5 and phase 1+6 by progressing through all red display.
8. Pavement markings are existing.
9. The cabinet shall be designed to include Auxiliary Output file for future use.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	"LEFT TURN SIGNAL" Sign (R10-10L)	Ⓐ
Ⓑ	"NO TURN ON RED" Sign (R10-11)	Ⓑ
Ⓒ	"LEFT TURN SIGNAL YIELD ON GREEN" Sign (R10-21)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ
S	Terminal Splice Box	S

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	15	40	15	25	20	40	20	25
Yellow Clearance	3.0	4.0	3.0	3.9	3.0	3.9	3.0	3.7
Red Clearance	2.9	2.4	2.6	1.4	3.3	2.2	2.3	1.4
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40 1"=40'

Coliseum Drive
at
Reynolda Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CLIFTON B. HOLDEN

SIGNATURE 3/22/2013 DATE

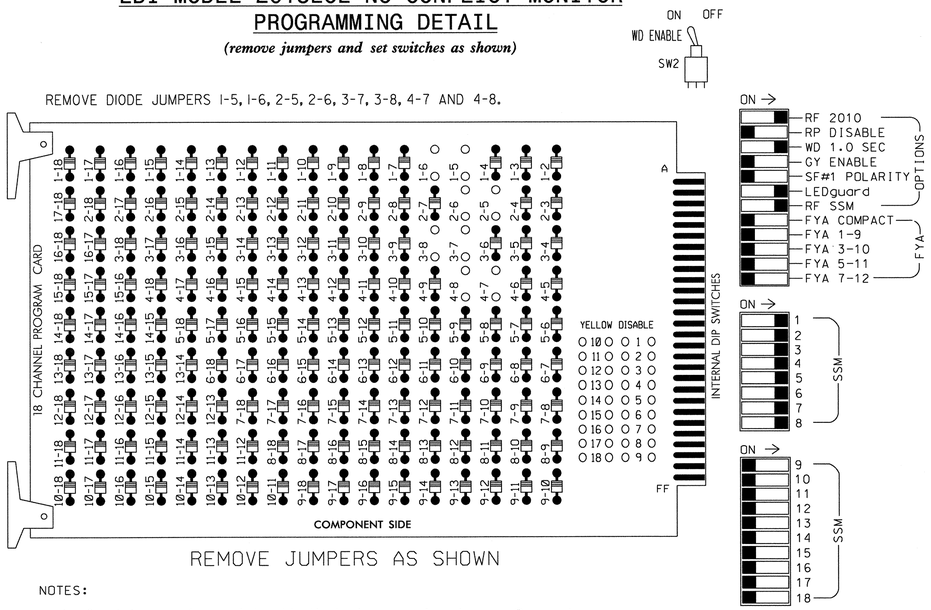
SIG. INVENTORY NO. C-021

3/21/2013
N:\traffic\Signals\SIGNALS\Phase 8\C-021.dgn
Fr. Hyde

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 239

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX ✱
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

✱ Aux file to be installed for future use

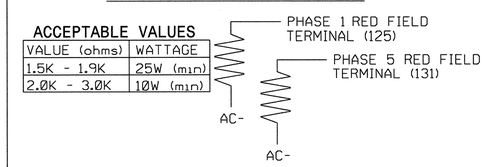
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22, 23	NU	31	41,42	NU	21	61,62, 63	NU	71	81,82	NU	NU	NU	NU	NU	NU	NU
RED	✱	128			101		✱	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW				116						122								
YELLOW ARROW	126			117			132			123								
GREEN ARROW	127			118			133			124								
✋																		
🚶																		

NU = Not Used

✱ Denotes install load resistor. See load resistor installation detail this sheet.

LOAD RESISTOR INSTALLATION DETAIL



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø2	SLOT	WIRED ⊗ INPUT	Ø3	Ø4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A,2B,2C	EMPTY		3A	4A,4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	NOT USED								ST
															DC ISOLATOR
FILE "J"	U	Ø5	Ø6	SLOT	WIRED ⊗ INPUT	Ø7	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A,6B,6C	EMPTY		7A	8A,8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	NOT USED			NOT USED	NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A,8B	TB5-9,10	J6U	42	4	8	8	Y	Y			

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-021
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Winston-Salem

Coliseum Drive
at
Reynolda Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	J O Deaton
PREPARED BY:	M W Yalch	REVIEWED BY:	

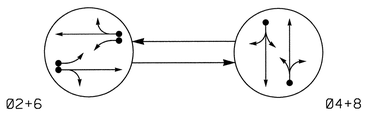
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
James O. Deaton 3/22/13
SIGNATURE DATE
SIG. INVENTORY NO. C-021

3/22/2013
R:\Traffic\Signals\Electrical Details\Phase 8\C-021e-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224 B	Sig. 240

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61.62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

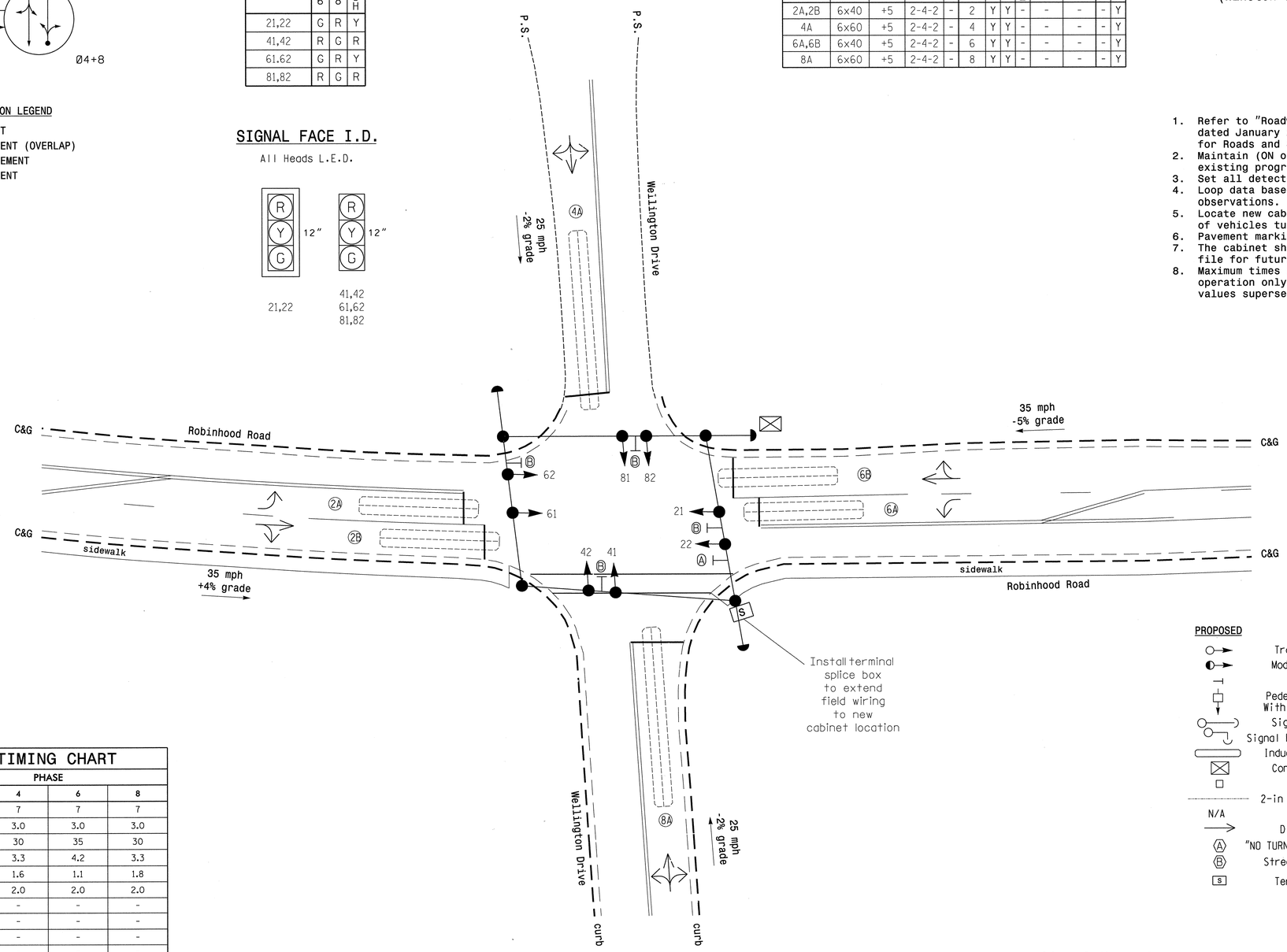
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A,2B	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x60	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A,6B	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x60	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. The cabinet shall be designed to include Auxiliary Output file for future use.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"NO TURN ON RED" Sign (R10-11)	A
B	Street Name Sign (D3-1)	B
S	Terminal Splice Box	S

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	7	7	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	30	35	30
Yellow Clearance	3.6	3.3	4.2	3.3
Red Clearance	1.3	1.6	1.1	1.8
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase B\C-032.dgn
Fkeys

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20 1"=20'

N

Robinhood Road
at
Wellington Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CLYDE BROOK HOLDEN

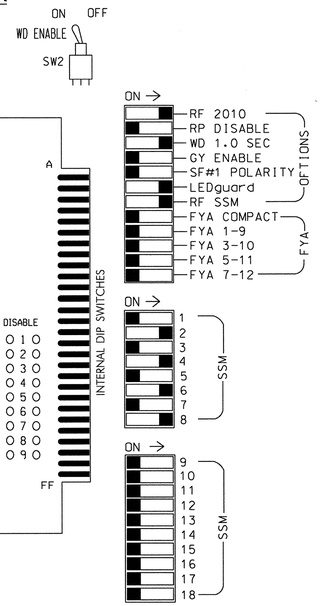
3/22/2013

SIGNATURE	DATE
SIG. INVENTORY NO. C-032	

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 241

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

* Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		
✋																		
🚶																		

NU = Not Used

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø 2 / 2A,2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 / 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 / 6A,6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-032
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Robinhood Road
at
Wellington Drive

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 03/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

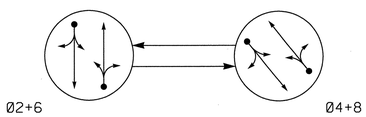
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-032

3/22/2013
R:\Traffic\Signals\Electrical Details\Phase 8\C-032a-02-141.dgn
rkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 242

PHASING DIAGRAM



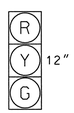
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

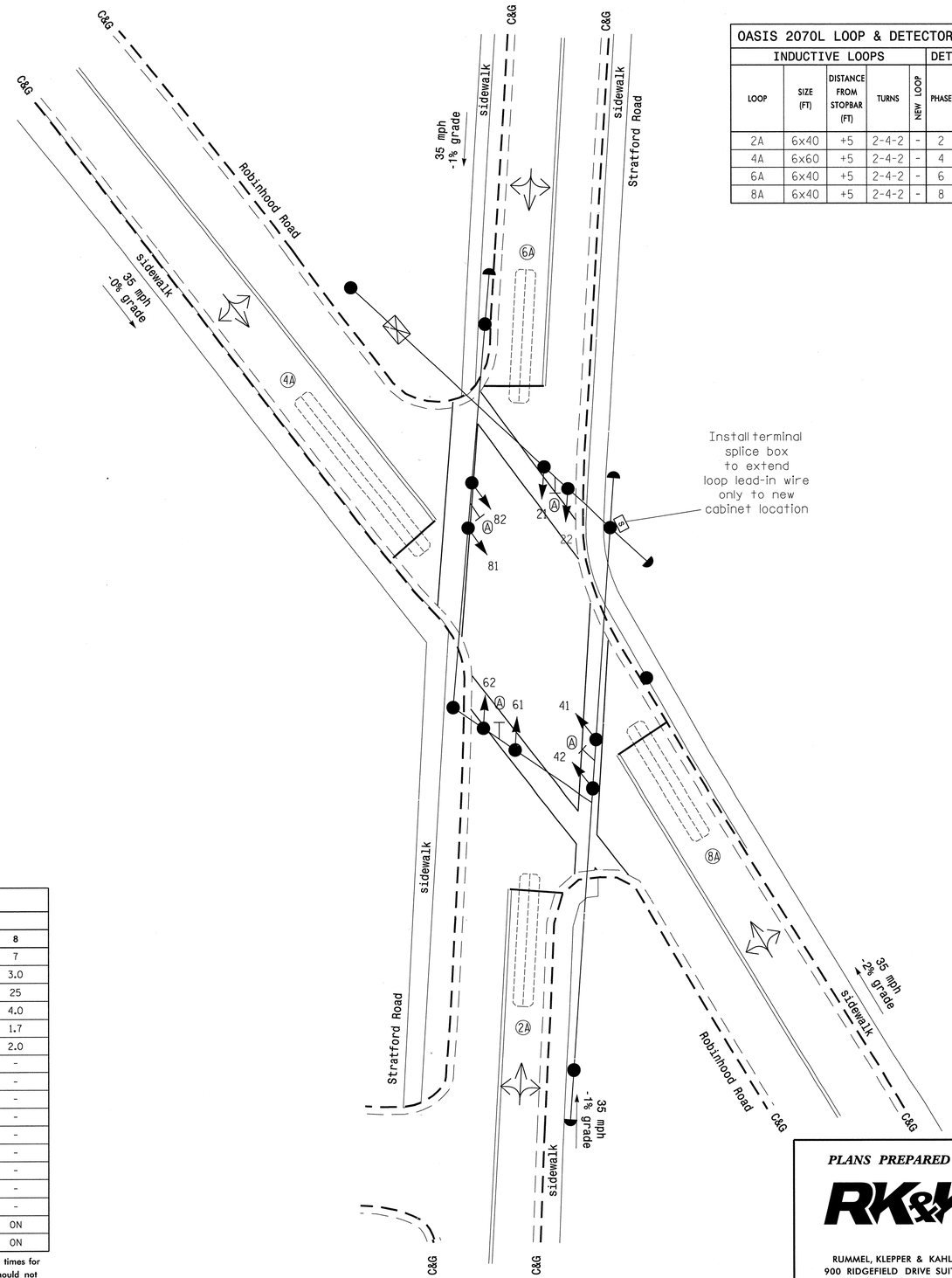
All Heads L.E.D.



21,22
41,42
61,62
81,82

OASIS 2070L TIMING CHART				
FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	7	7	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	25	35	25
Yellow Clearance	3.9	3.8	3.9	4.0
Red Clearance	2.4	1.6	2.2	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x60	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance on vehicles turning right on red.
5. Loop data based on previous plan and/or field observations.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	
	Terminal Splice Box	

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20
1"=20'

Robinhood Road
at
Stratford Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CYRUS BYRON HOLDEN

SIGNATURE DATE 3/22/2013

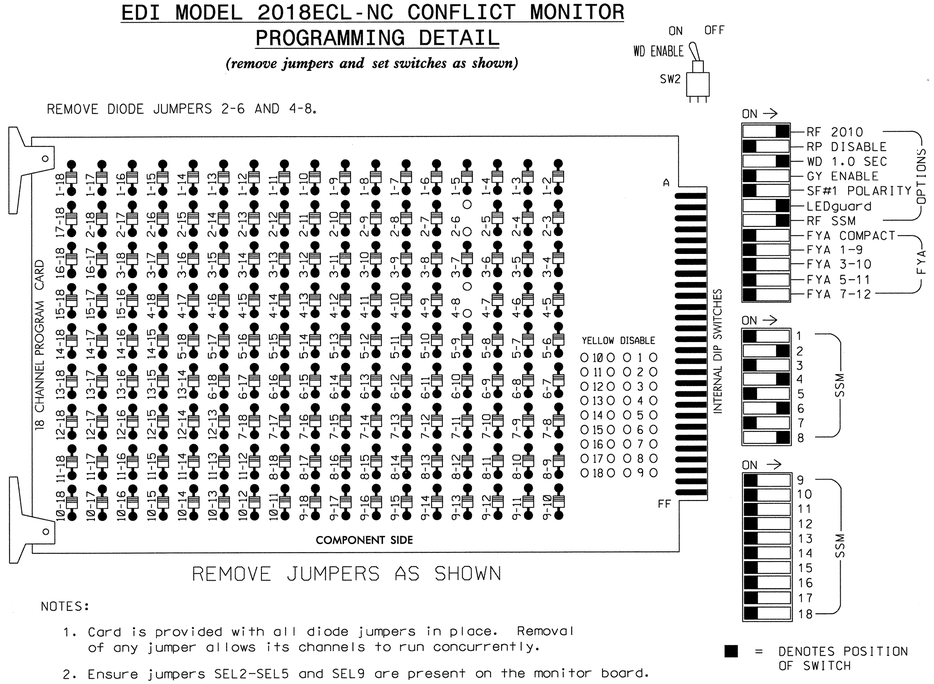
SIG. INVENTORY NO. C-033

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase Diag\C-033.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 243

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A	SLOT	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-033
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Robinhood Road
at
Stratford Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	03/22/2013	REVIEWED BY:	J O Deaton
PREPARED BY:	M W Yalch	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
07438
ENGINEER
JAMES O. DEATON

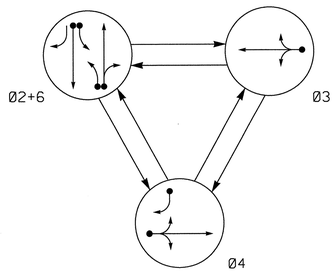
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-033

3/22/2013
R:\Traffic\Signals\Electrical Details\Phase B\C-033e-02-141.dgn
F.Keys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 244

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø3	PHASE Ø4	FLASH
21,22	G	R	R	Y
31	R	G ←	R	R
32,33	R	G	R	R
41	R	R	G ←	R
42,43,44	R	R	G	R
61	G	R	R	Y
62	G	R	R ↗	Y

SIGNAL FACE I.D.

All Heads L.E.D.

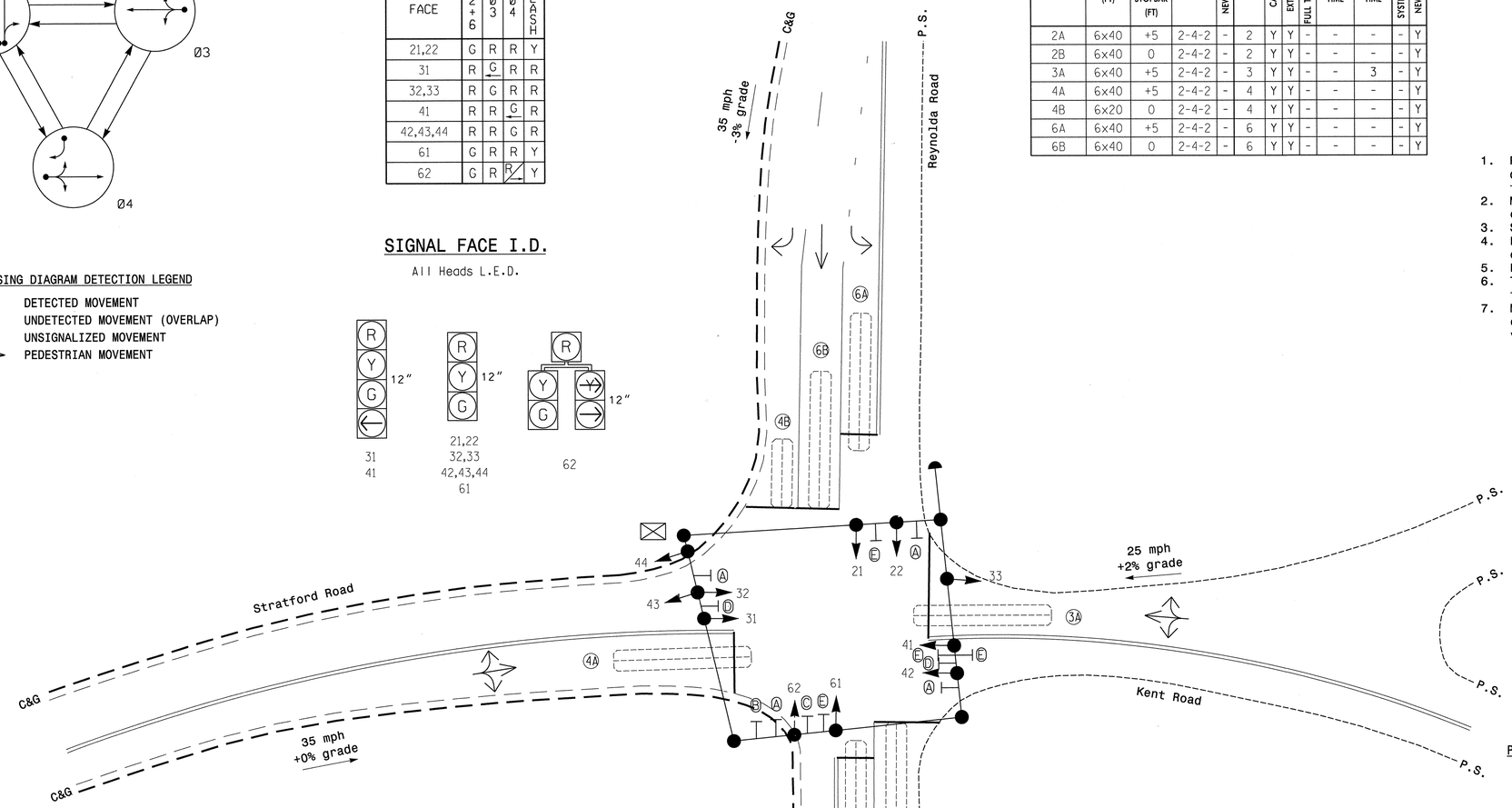
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
2B	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
3A	6x40	+5	2-4-2	-	3	Y	Y	-	-	3	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x20	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6x40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. The cabinet shall be designed to include Auxiliary Output file for future use.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"NO TURN ON RED" Sign (R10-11)	A
B	"RIGHT TURN SIGNAL" Sign (R10-10R)	B
C	Through Arrow "ONLY" Sign (R3-5A)	C
D	Dual Turn and Through Arrow Sign	D
E	Street Name Sign (D3-1)	E

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 3	PHASE 4	PHASE 6
Min Green 1 *	7	7	7	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	25	25	35
Yellow Clearance	3.5	3.1	3.8	4.1
Red Clearance	1.3	1.5	1.1	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20 1"=20'

Reynolda Road
at
Stratford Road/Kent Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

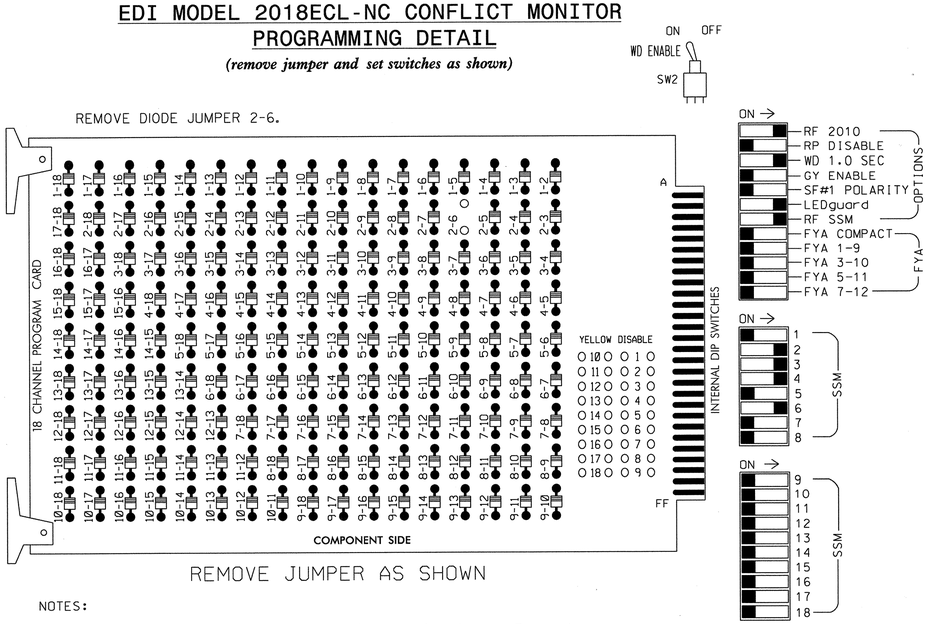
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHYRON B. HOLDEN
SIGNATURE 3/22/2013 DATE
SIG. INVENTORY NO. C-034

3/21/2013
R:\#Traffic Signals\SIGNALS\Phase B\C-034.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 245

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5			S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4			14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4			4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	31	32,33	41	42,43, 44	62	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128		116	116	101	101				134										
YELLOW		129		117	117	102	102				135										
GREEN		130		118	118	103	103				136										
RED ARROW																					
YELLOW ARROW								102													
GREEN ARROW				118		103		103													
✋																					
🚶																					

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A	SLOT	SLOT	Ø3 3A	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø2 2B	EMPTY	EMPTY	NOT USED	Ø4 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø6 6B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/ AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S4,S5,S8
PHASES USED.....2,3,4,6
OVERLAPS.....NONE

* Aux file to be installed for future use

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-034
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Reynolda Road
at
Stratford Road/Kent Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	J O Deaton
PREPARED BY:	M W Yalch	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

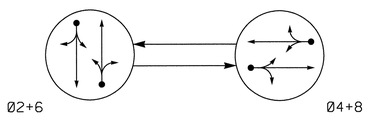
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-034

3/22/2013
R:\Traffic\Signals\Electrical\Details\Phase I\WC-034e-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 246

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42
61,62
81,82

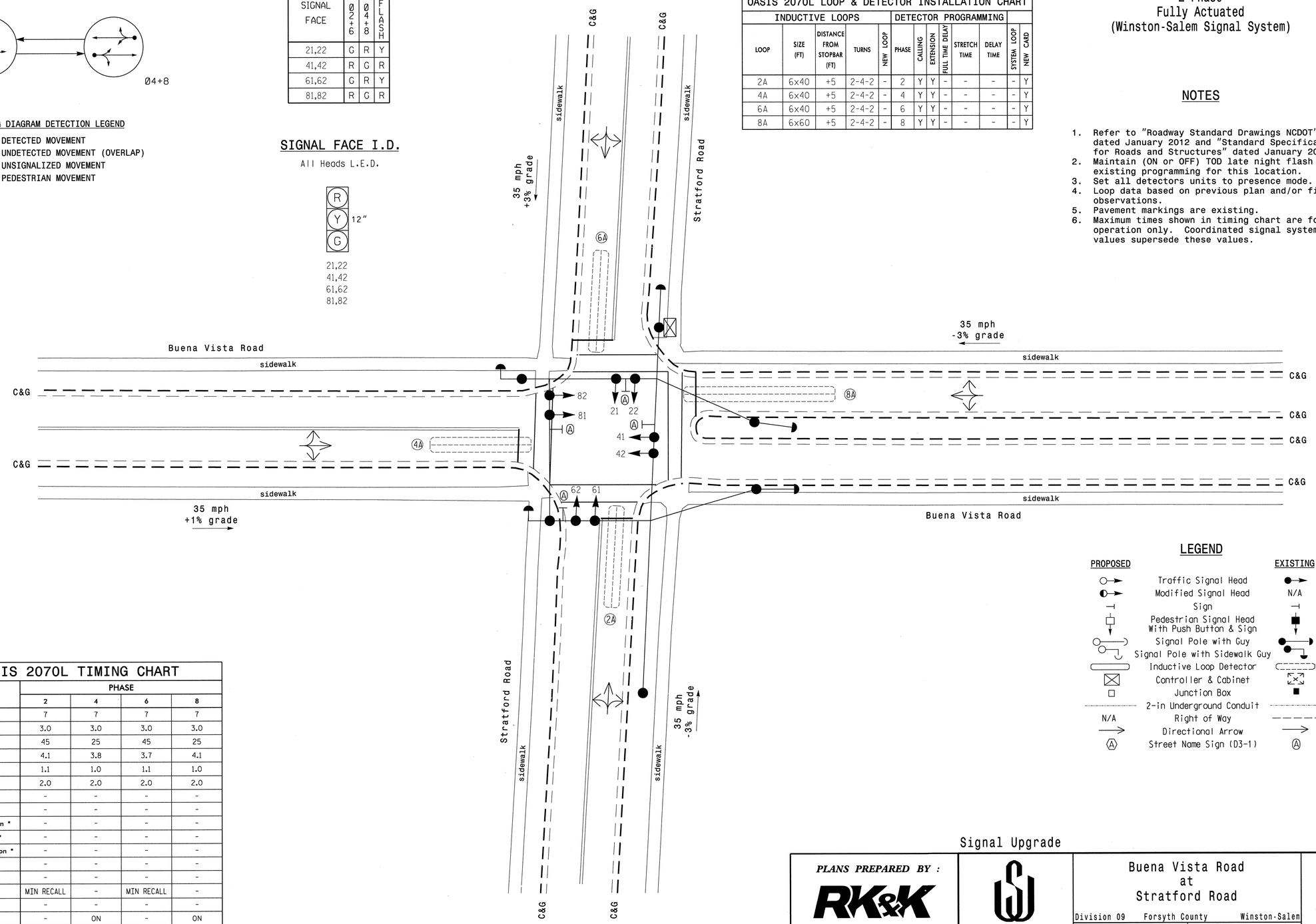
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x60	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	7	7	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	45	25	45	25
Yellow Clearance	4.1	3.8	3.7	4.1
Red Clearance	1.1	1.0	1.1	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 1"=20' (0 – 20)

Buena Vista Road
at
Stratford Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

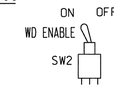
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CABROM HOLDEN
3/22/2013
SIGNATURE DATE
SIG. INVENTORY NO. C-039

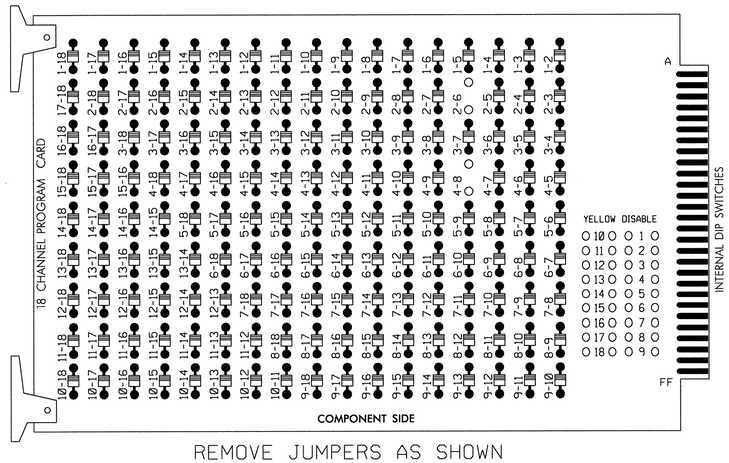
3/21/2013
R:\Traffic\Signals\SIGNALS\Phase BWC-039.dgn
Fkeys

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

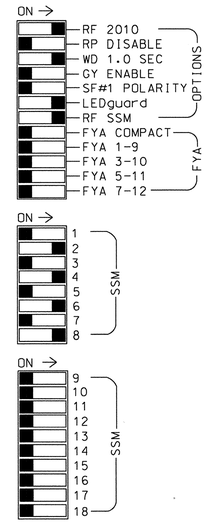
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6 AND 4-8.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	Ø4 4A	SLOT EMPTY	Ø6 6A	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L		NOT USED		NOT USED		NOT USED		NOT USED						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	12U	39	1	2	2	Y	Y			
4A	TB21-7,8	14U	41	3	4	4	Y	Y			
6A	TB21-11,12	16U	40	2	6	6	Y	Y			
8A	TB22-1,2	18U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-039
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Buena Vista Road
at
Stratford Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	J O Deaton
PREPARED BY:	M W Yalch	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

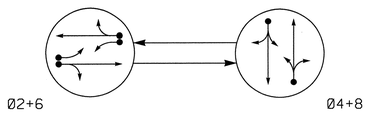
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-039

3/22/2013
R:\TrafficSignals\ElectricalDetails\Phase B\C-039e-01-141.dgn
ekeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 248

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42
61,62
81,82

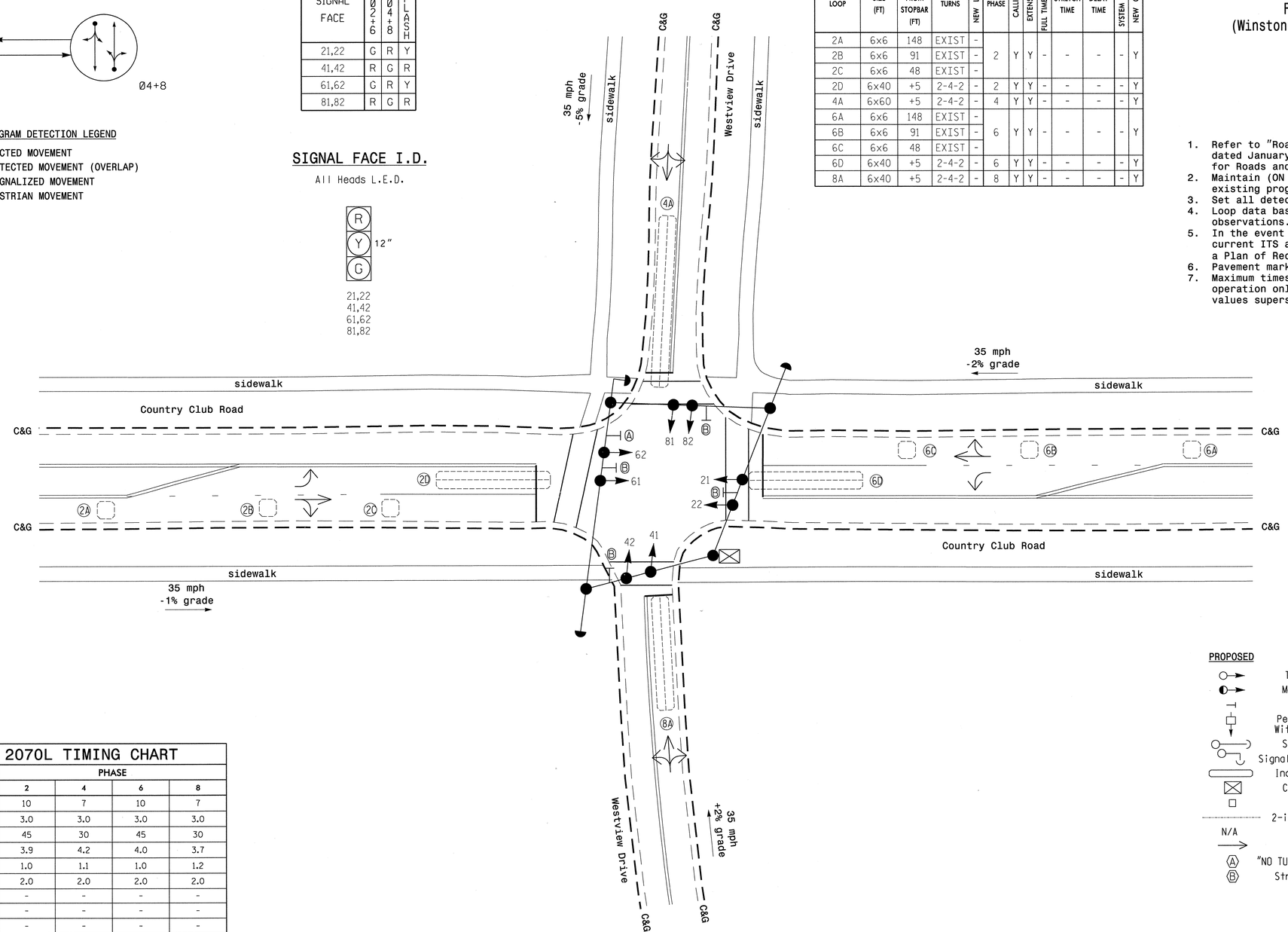
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x6	148	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6x6	91	EXIST	-								
2C	6x6	48	EXIST	-								
2D	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x60	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6x6	148	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6x6	91	EXIST	-								
6C	6x6	48	EXIST	-								
6D	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"NO TURN ON RED" Sign (R10-11)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	45	30	45	30
Yellow Clearance	3.9	4.2	4.0	3.7
Red Clearance	1.0	1.1	1.0	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 1"=20' (0 – 20)

Country Club Road
at
Westview Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

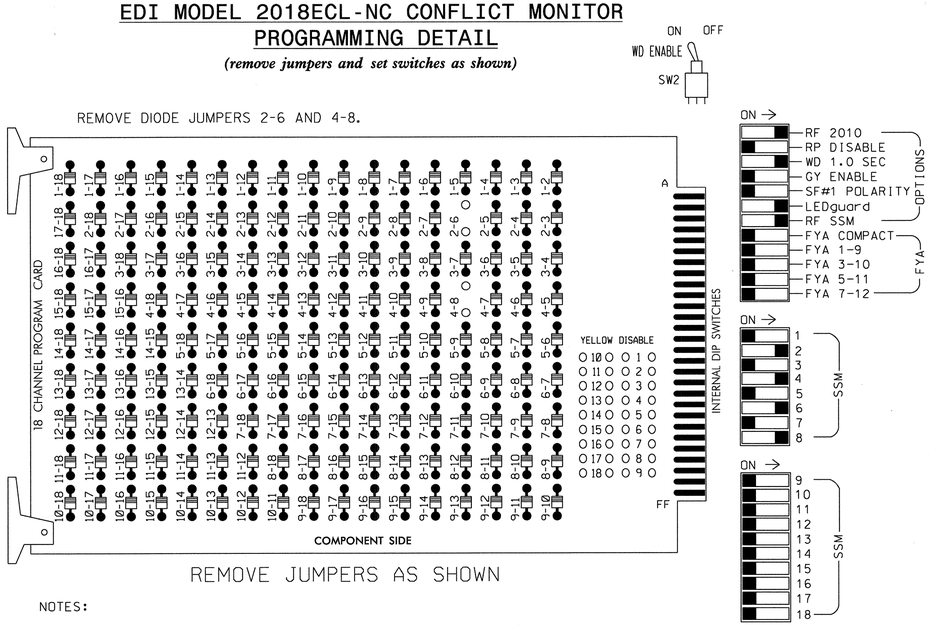
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CYRON HOLDEN
SIGNATURE 3/22/2013 DATE
SIG. INVENTORY NO. C-052

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase BMC-052.dgn
Freys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 249

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT EMPTY	Ø 2 2A,2B,2C	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	Ø 6 6A,6B,6C	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L		Ø 2 2D		NOT USED		Ø 6 6D		NOT USED						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB21-3,4	I2U	39	1	2	2	Y	Y			
2D	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
6A,6B,6C	TB21-11,12	I6U	40	2	6	6	Y	Y			
6D	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-052
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Country Club Road
at
Westview Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE: 3/22/2013	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

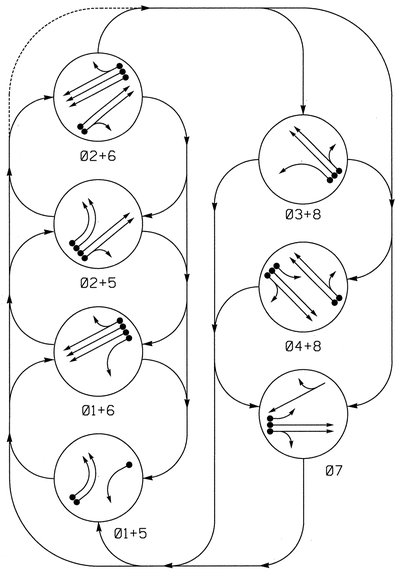
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-052

3/27/2013
R:\Traffic\Signals\ElectricalDetails\Phase B\C-052e-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 250

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

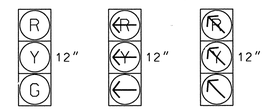
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+8	04+8	07	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R
31	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	G	R	Y
51, 52	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	~~R~~ ↖	↖	~~R~~ ↖	↖	~~R~~ ↖	~~R~~ ↖	~~R~~ ↖	~~R~~ ↖
63, 64	R	G	R	G	R	R	G	R
71, 72	R	R	R	R	R	R	G	R
81, 82	R	R	R	R	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



21, 22
41, 42
63, 64
71, 72
81, 82

11
31
51, 52

61, 62

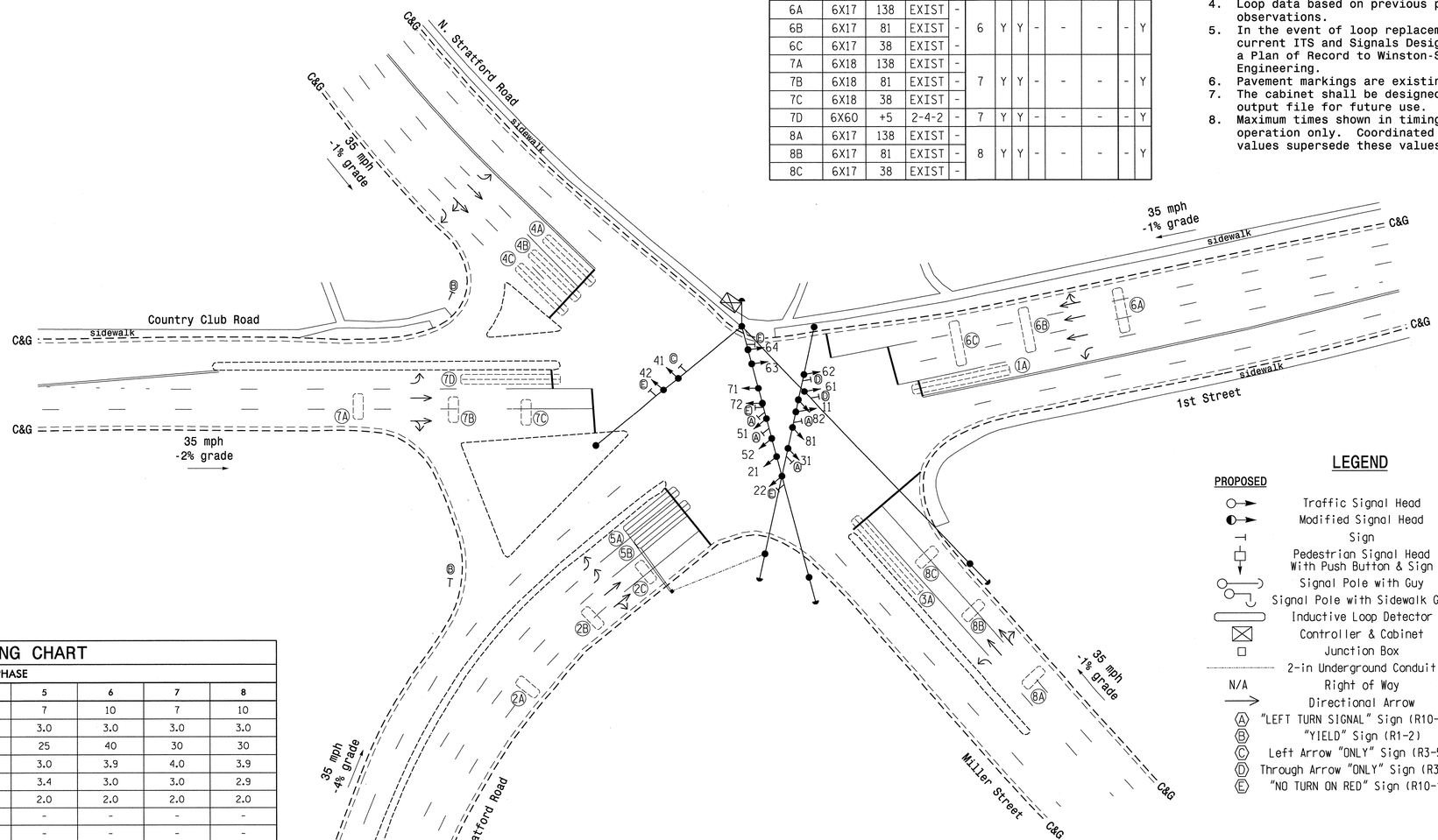
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A	6X17	138	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X17	81	EXIST	-								
2C	6X17	38	EXIST	-								
3A	6X60	+5	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4C	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X60	+5	2-4-2	Y	5	Y	Y	-	-	-	-	Y
5B	6X60	+5	2-4-2	Y	5	Y	Y	-	-	-	-	Y
6A	6X17	138	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X17	81	EXIST	-								
6C	6X17	38	EXIST	-								
7A	6X18	138	EXIST	-	7	Y	Y	-	-	-	-	Y
7B	6X18	81	EXIST	-								
7C	6X18	38	EXIST	-								
7D	6X60	+5	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6X17	138	EXIST	-	8	Y	Y	-	-	-	-	Y
8B	6X17	81	EXIST	-								
8C	6X17	38	EXIST	-								

7-Phase
Fully Actuated
(Winston-Salem City Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. The cabinet shall be designed to include Auxiliary output file for future use.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
□	Junction Box	■
	2-in Underground Conduit	
N/A	Right of Way	
→	Directional Arrow	→
Ⓐ	"LEFT TURN SIGNAL" Sign (R10-10L)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	Left Arrow "ONLY" Sign (R3-5L)	Ⓒ
Ⓓ	Through Arrow "ONLY" Sign (R3-5A)	Ⓓ
Ⓔ	"NO TURN ON RED" Sign (R10-11)	Ⓔ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	10	7	10	7	10
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	25	40	20	30	25	40	30	30
Yellow Clearance	3.0	4.1	3.0	3.9	3.0	3.9	4.0	3.9
Red Clearance	3.2	2.1	4.8	3.5	3.4	3.0	3.0	2.9
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	YELLOW	YELLOW
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 1"=40' (0 – 40)

Stratford Road/Miller Street
at
1st Street/Country Club Road

Division 9 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

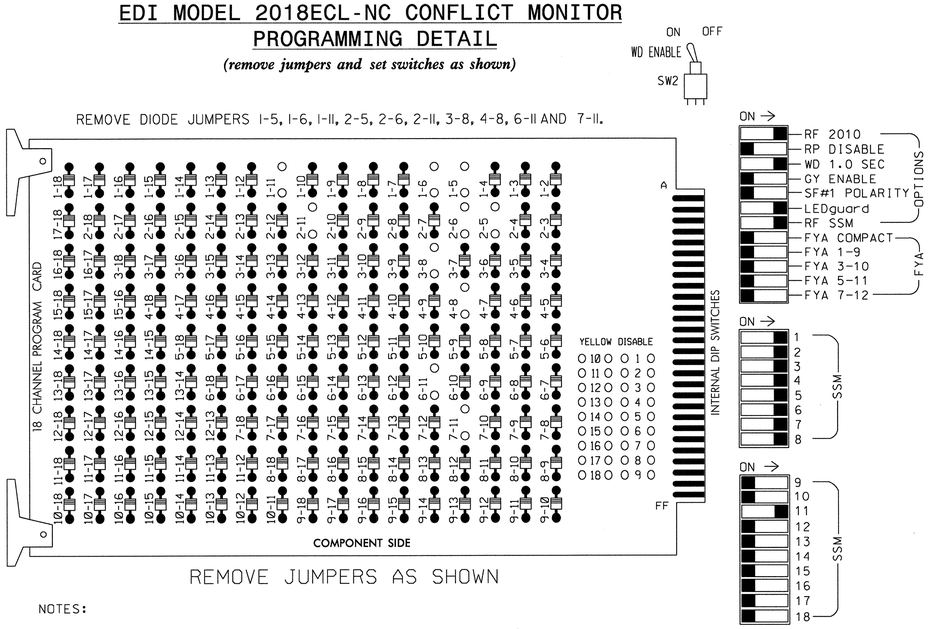
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHRISTOPHER BYRON HOLDEN
SIGNATURE 3/22/2013 DATE
SIG. INVENTORY NO. C-065

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase 8\WC-065.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 251

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 4 and 8 for Start Up In Green.
5. Program phases 4 and 8 for Yellow Flash, and overlaps 1 and 2 as WAG Overlaps.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11, AUX S4
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP A.....NONE
OVERLAP B.....NONE
OVERLAP C.....6+7
OVERLAP D.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	41,42	NU	51,52	61,62	NU	71,72	81,82	NU	NU	NU	NU	63,64	NU	NU
RED		128			101					122	107					A114		
YELLOW		129			102					123	108					A115		
GREEN		130			103					124	109					A116		
RED ARROW	125			116			131	134										
YELLOW ARROW	126			117			132	135										
GREEN ARROW	127			118			133	136										
✋																		
🚶																		

NU = Not Used

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦      XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: X RED  _ YELLOW  _ GREEN
FLASH COLORS:  X RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A,2B,2C	SLOT	SLOT	Ø3 3A	Ø4 4A,4B,4C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	NOT USED	EMPTY	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B,6C	SLOT	Ø7 7A,7B,7C	Ø7 7D	Ø8 8A,8B,8C	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø5 5B	EMPTY	NOT USED	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A,4B,4C	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			
7A,7B,7C	TB5-1,2	J4U	48	10	26	7	Y	Y			
7D	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A,8B,8C	TB5-9,10	J6U	42	4	8	8	Y	Y			

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

```
PHASE SEQUENCE: PAGE 1  NEXT: PAGES)   ↘
RNG¦LEAD   BARRIER 1  X-LAG¦LEAD   BARRIER 2  X-LAG
1  ¦1     2     0     0   ¦3     4     0     0
2  ¦5     6     7     0   ¦0     8     7     0
3  ¦0     0     0     0   ¦0     0     0     0
4  ¦0     0     0     0   ¦0     0     0     0
```

Signal Upgrade

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-065
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Winston-Salem

Stratford Road/Miller Street
at
1st Street/Country Club Road

Division 09 | Forsyth County | Winston-Salem

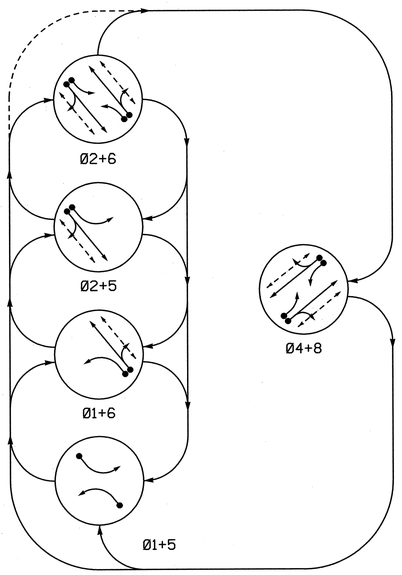
PLAN DATE: 03/22/2013	REVIEWED BY: J O Deaton		
PREPARED BY: M W Yalch	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
James O. Deaton 3/22/13
SIGNATURE DATE
SIG. INVENTORY NO. C-065

3/22/2013
R:\Traffic\Signals\Electrical\Details\Phase B\C-065e-02-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 252

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

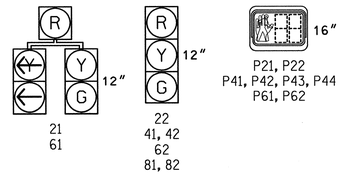
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42, P43, P44	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



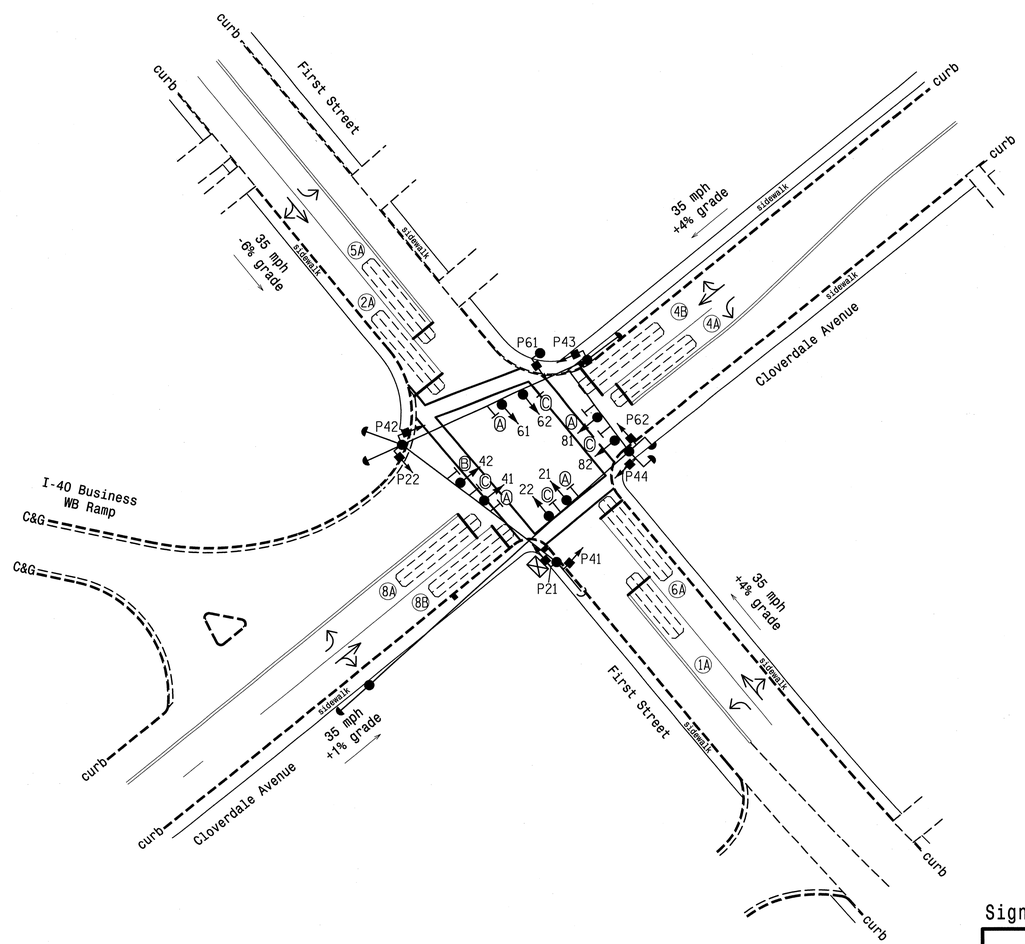
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME (SEC)	DELAY TIME (SEC)	SYSTEM LOOP	NEW CARD
1A	6x30	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	+5	2-4-2	-								
5A	6x40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6x40	+5	2-4-2	-								

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable Backup Protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Loop data based on previous plan and/or field observation.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. The cabinet should be designed to include an Auxiliary Output file for future use.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	"NO TURN ON RED" Sign (R10-11)	Ⓑ
Ⓒ	Street Name Sign	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	40	30	20	40	30
Yellow Clearance	3.0	4.3	3.6	3.1	3.6	3.8
Red Clearance	2.6	1.6	1.5	2.8	2.0	1.3
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	4	4	-	4	-
Don't Walk 1	-	15	9	-	11	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

First Street
at
Cloverdale Avenue

Division 09 Forsyth County Winston-Salem

PLAN DATE: May 2012	REVIEWED BY: MB Toth
PREPARED BY: AJ Davis	REVIEWED BY: LM Moon

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

SIGNATURE 3-22-13 DATE

SIG. INVENTORY NO. C-071

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

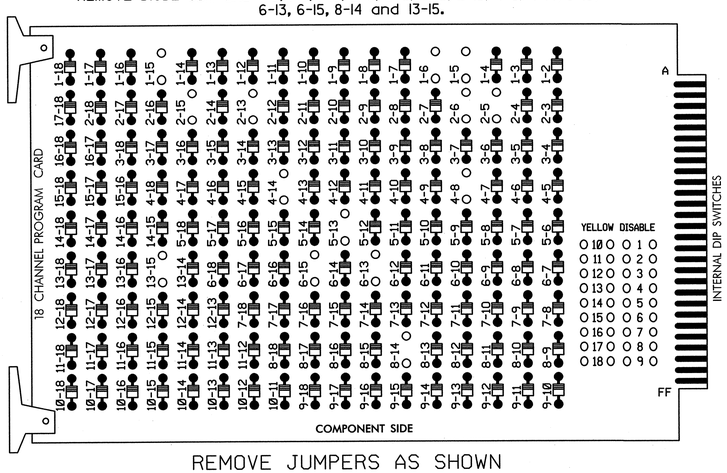
21-MAR-2013 15:39
O:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\LisaMC-071.dgn
25251

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 253

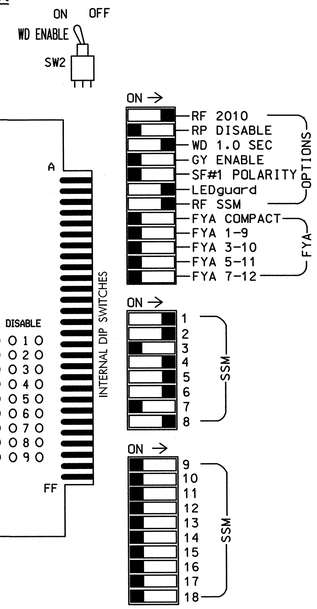
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 4-8, 4-14, 5-13, 6-13, 6-15, 8-14 and 13-15.



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2, 4, and 6 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX ✱
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S5,S6, S7,S8,S9,S11
PHASES USED.....1,2,2PED,4,4PED, 5,6,6PED,8
OVERLAPS.....NONE

✱ Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	P21, P22	NU	41,42	P41,P42 P43,P44	21	61,62	P61, P62	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	✱	128			101		✱	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
FLASHING YELLOW ARROW																		
GREEN ARROW	127						133											
✋			113			104			119									
🚶			115			106			121									

NU = Not Used

✱ Denotes install load resistor. See load resistor installation detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2+6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A,4B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED				NOT USED						Ø4 PED DC ISOLATOR	NOT USED	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A,8B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A,8B	TB5-9,10	J6U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42 P43,P44	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

[1] Add jumper from I1-W to J4-W, on rear of input file.

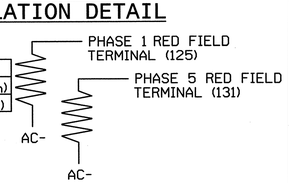
[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-071
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

First Street
at
Cloverdale Avenue

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

SIGNATURE Melissa B. Toth DATE 3/22/13

SIG. INVENTORY NO. C-071

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
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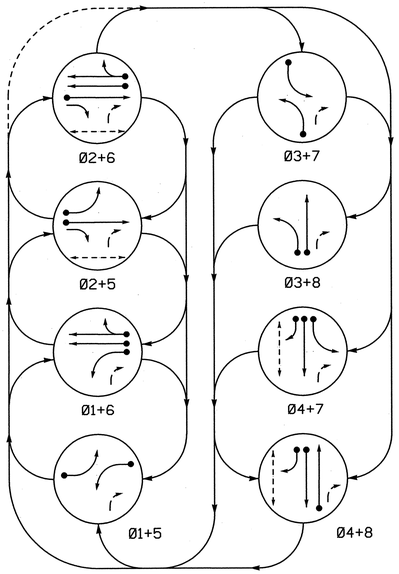
25983

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 254

8 Phase Fully Actuated (Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

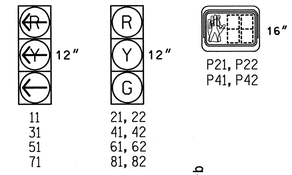
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.

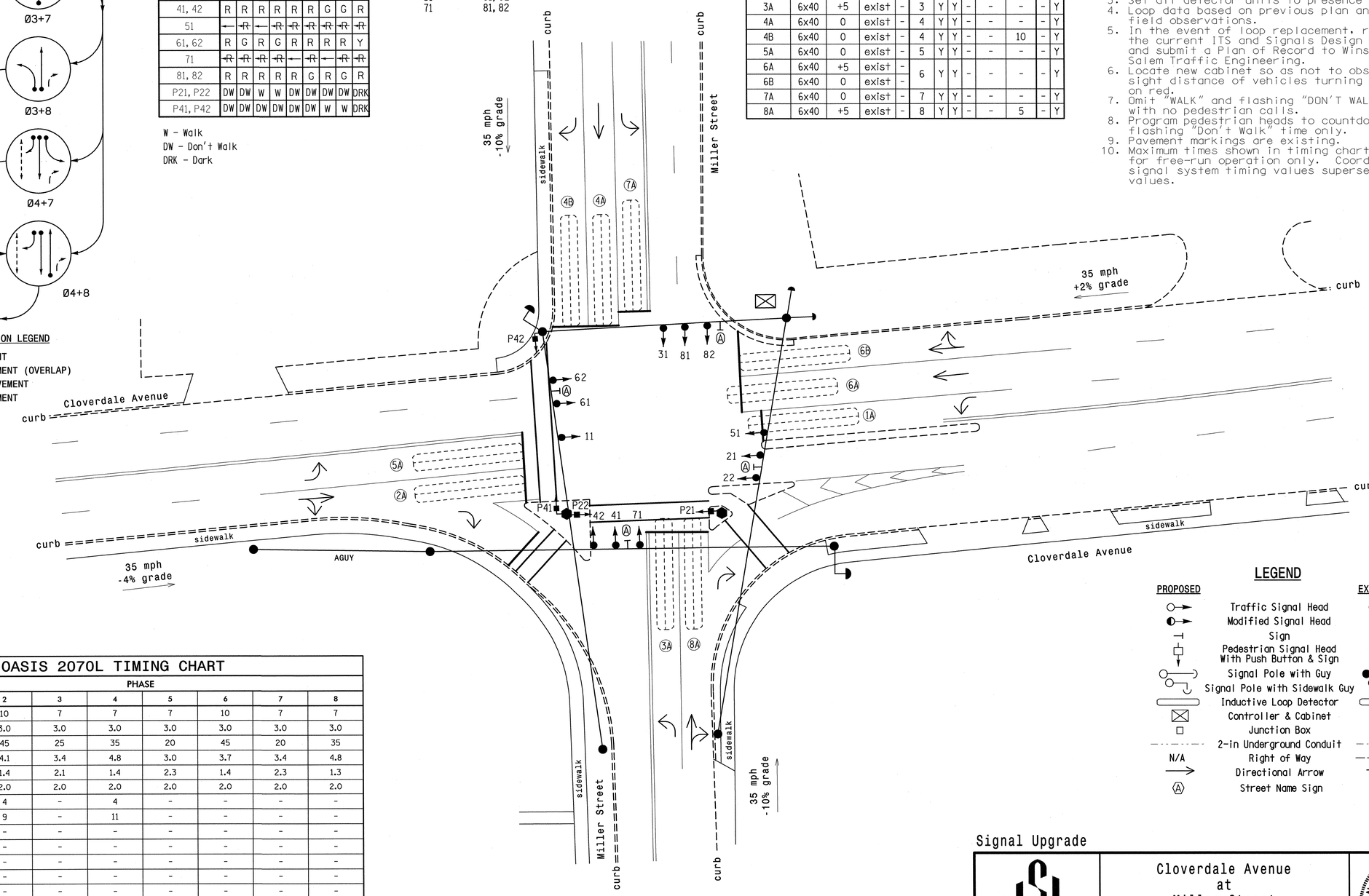


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	+5	exist	-	1	Y	Y	-	-	-	-	Y
2A	6x40	0	exist	-	2	Y	Y	-	-	5	-	Y
3A	6x40	+5	exist	-	3	Y	Y	-	-	-	-	Y
4A	6x40	0	exist	-	4	Y	Y	-	-	-	-	Y
4B	6x40	0	exist	-	4	Y	Y	-	-	10	-	Y
5A	6x40	0	exist	-	5	Y	Y	-	-	-	-	Y
6A	6x40	+5	exist	-	6	Y	Y	-	-	-	-	Y
6B	6x40	0	exist	-								
7A	6x40	0	exist	-	7	Y	Y	-	-	-	-	Y
8A	6x40	+5	exist	-	8	Y	Y	-	-	5	-	Y

NOTES

1. Refer to "2012 NCDOT Roadway Standard Drawings" and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign	

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	25	45	25	35	20	45	20	35
Yellow Clearance	3.0	4.1	3.4	4.8	3.0	3.7	3.4	4.8
Red Clearance	1.9	1.4	2.1	1.4	2.3	1.4	2.3	1.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	4	-	4	-	-	-	-
Don't Walk 1	-	9	-	11	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	-	-	-	-	-	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

Cloverdale Avenue
at
Miller Street

Division 09 Forsyth County Winston-Salem

PLAN DATE: March 2012	REVIEWED BY: LM Moon
PREPARED BY: JA Wiles	REVIEWED BY: MB Toth

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025892 MELISSA B. TOTH

SIGNATURE DATE 3/22/13

SIG. INVENTORY NO. C-076

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
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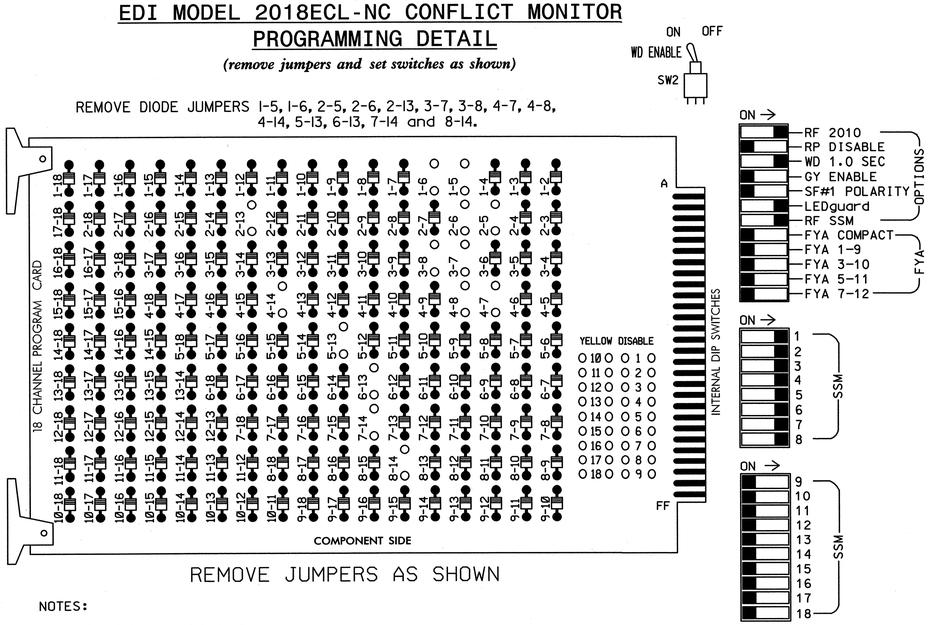
2&C51

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.255

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 2-13, 3-7, 3-8, 4-7, 4-8, 4-14, 5-13, 6-13, 7-14 and 8-14.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 4 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6, S7,S8,S10,S11
PHASES USED.....1,2,2PED,3,4,4PED, 5,6,7,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	P21, P22	31	41,42	P41, P42	51	61,62	NU	71	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		
✋			113			104						
🚶			115			106						

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	Ø4 4B						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B	SLOT EMPTY	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED			NOT USED	NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			5
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-076
DESIGNED: 03-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Cloverdale Avenue
at
Miller Street

Division 09	Forsyth County	Winston-Salem
PLAN DATE: March 2012	REVIEWED BY:	LM Moon
PREPARED BY: AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-076

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
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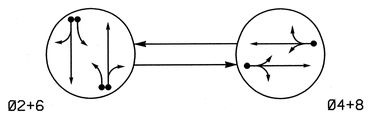
25893

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 256

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
41, 42
61, 62
81, 82

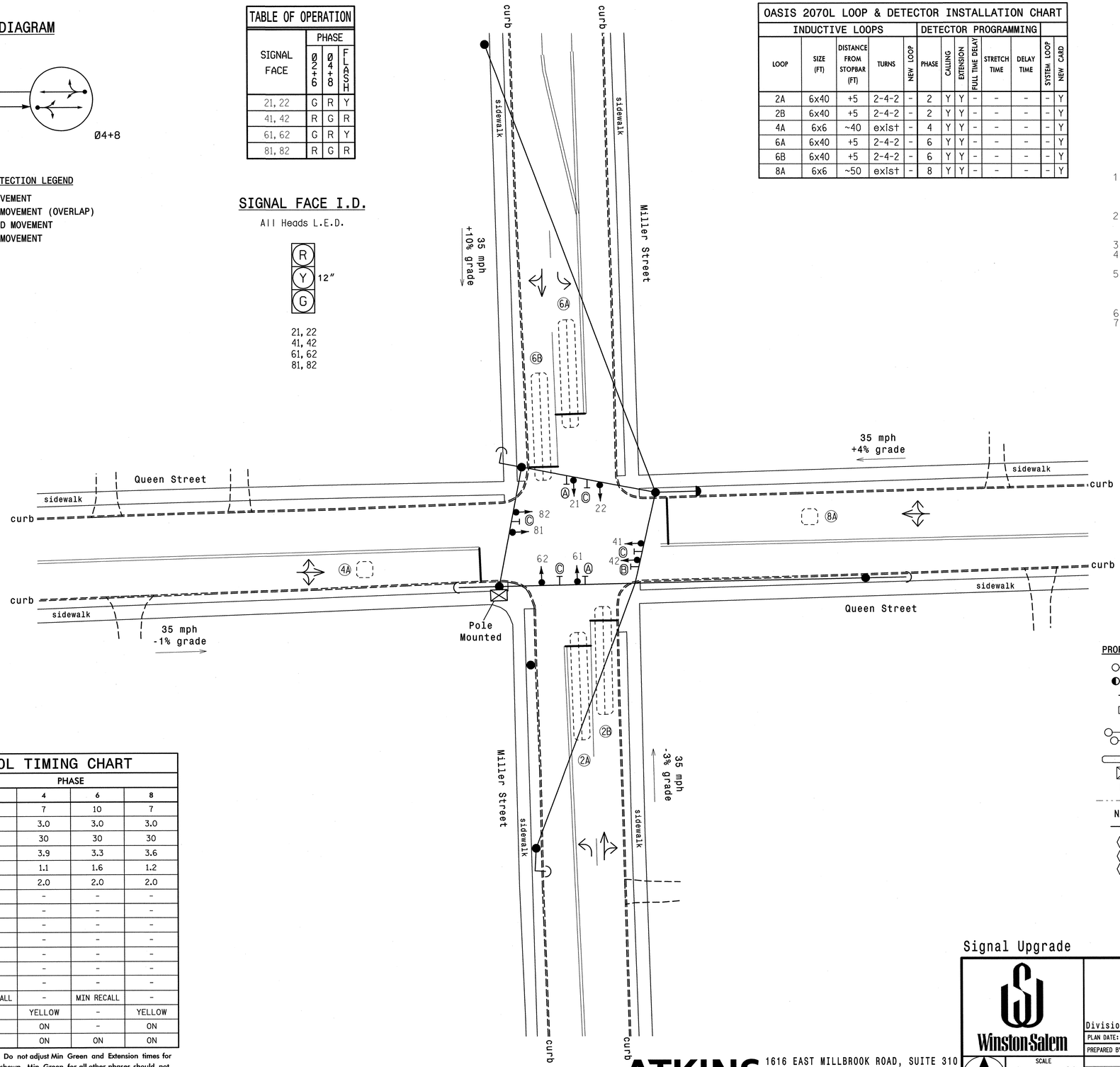
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
2B	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x6	~40	exist	-	4	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x6	~50	exist	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	"NO TURN ON RED" Sign (R10-11)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	30	30	30	30
Yellow Clearance	4.1	3.9	3.3	3.6
Red Clearance	1.0	1.1	1.6	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

SCALE 0 20 1"=20'

N

Miller Street at Queen Street

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

SIGNATURE 3-22-13 DATE

SIG. INVENTORY NO. C-085

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
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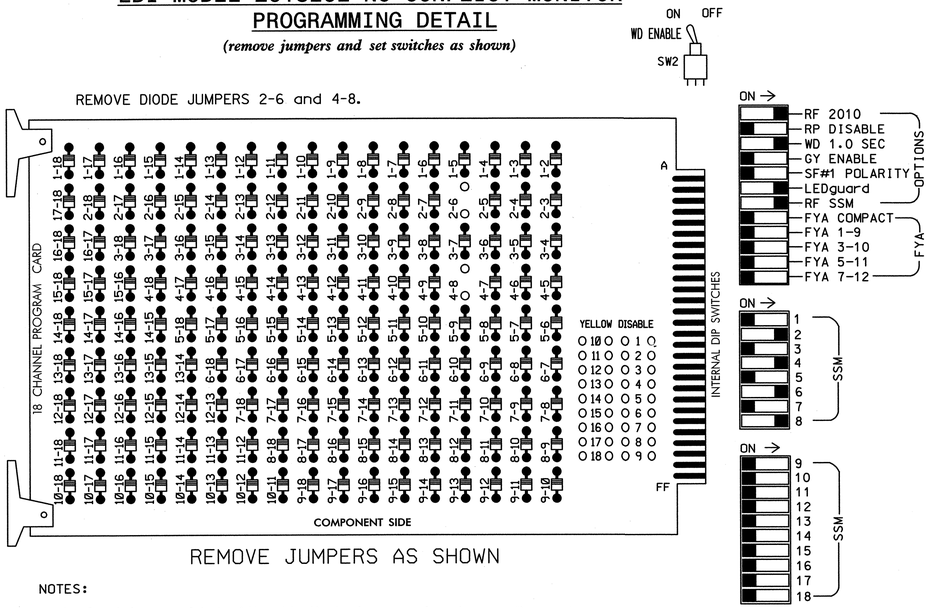
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 257

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT	Ø2 2A	SLOT	Ø4 4A	SLOT	Ø6 6A	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	Ø2 2B	EMPTY	NOT USED	EMPTY	Ø6 6B	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-085
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Miller Street
at
Queen Street

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-085

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:39
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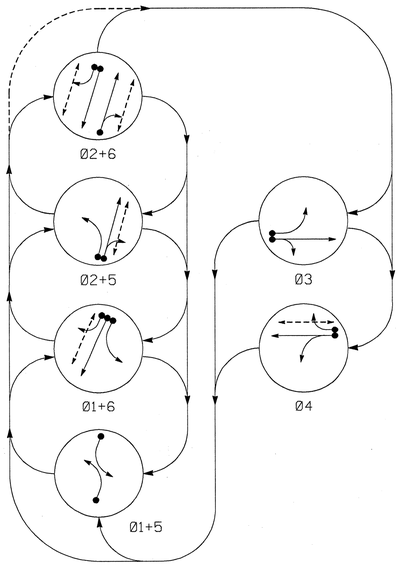
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-258

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~←R~~	~~←R~~	~~←R~~	~~←R~~	~~←R~~
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51	←	~~←R~~	←	~~←R~~	~~←R~~	~~←R~~	~~←R~~
61,62	R	G	R	G	R	R	Y
P21,P22	DW	DW	W	W	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

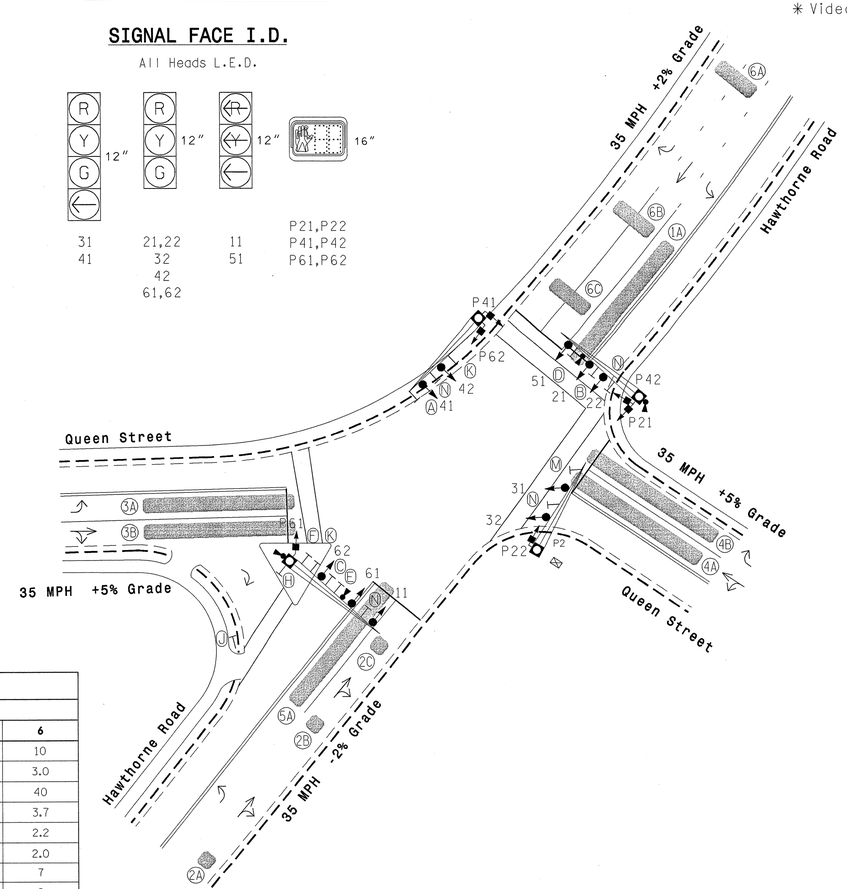
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+3	✳	-	1	Y	Y	-	-	-	-	Y
2A	6X6	124	✳	-	2	Y	Y	-	-	-	-	Y
2B	6X6	55	✳	-	2	Y	Y	-	-	-	-	Y
2C	6X6	15	✳	-	2	Y	Y	-	-	-	-	Y
3A	6X60	+3	✳	-	3	Y	Y	-	-	-	-	Y
3B	6X60	+3	✳	-	3	Y	Y	-	-	5	-	Y
4A	6X60	+3	✳	-	4	Y	Y	-	-	-	-	Y
4B	6X60	+3	✳	-	4	Y	Y	-	-	10	-	Y
5A	6X60	+3	✳	-	5	Y	Y	-	-	-	-	Y
6A	6X20	124	✳	-	6	Y	Y	-	-	-	-	Y
6B	6X20	55	✳	-	6	Y	Y	-	-	-	-	Y
6C	6X20	15	✳	-	6	Y	Y	-	-	-	-	Y

✳ Video Detection

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. The order of phase 3 and phase 4 may be reversed.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. The cabinet shall be designed to include an Auxiliary Output File for future use.
7. Loop data based on previous plan and/or field observations.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Out of Pavement Detector	
	Video Detection Area	
Ⓐ	Combined Through and Left Arrow Sign (R3-6L)	Ⓐ
Ⓑ	Hospital (symbol) (D9-2) and Left Arrow Sign (D2-9AL)	Ⓑ
Ⓒ	Hospital (symbol) (D9-2) and Right Arrow Sign (D2-9AR)	Ⓒ
Ⓓ	Parking Area (Left Arrow) (D4-1)	Ⓓ
Ⓔ	Parking Area w/ Right Arrow (D4-1)	Ⓔ
Ⓕ	"NO TURN ON RED" Sign (R10-11)	Ⓕ
Ⓗ	Push Button For Pedestrian Signal (R10-4B)	Ⓗ
Ⓙ	"YIELD" Sign (R1-2)	Ⓙ
Ⓚ	Right Arrow "ONLY" Sign (R3-5R)	Ⓚ
Ⓜ	"LEFT TURN SIGNAL" Sign (R10-10L)	Ⓜ
Ⓝ	Street Name Sign (D3-1)	Ⓝ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	15	40	25	30	15	40
Yellow Clearance	3.0	4.0	3.6	3.6	3.0	3.7
Red Clearance	1.9	2.2	3.2	2.2	1.9	2.2
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	4	-	7
Don't Walk 1	-	15	-	13	-	8
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Farrington Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-872-5415 Fax.
www.rameykemp.com

Winston-Salem

SCALE 0 30 1"=30'

N

Hawthorne Road at Queen Street

Division 9 Forsyth County Winston Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton

PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

SIGNATURE 3/18/13 DATE

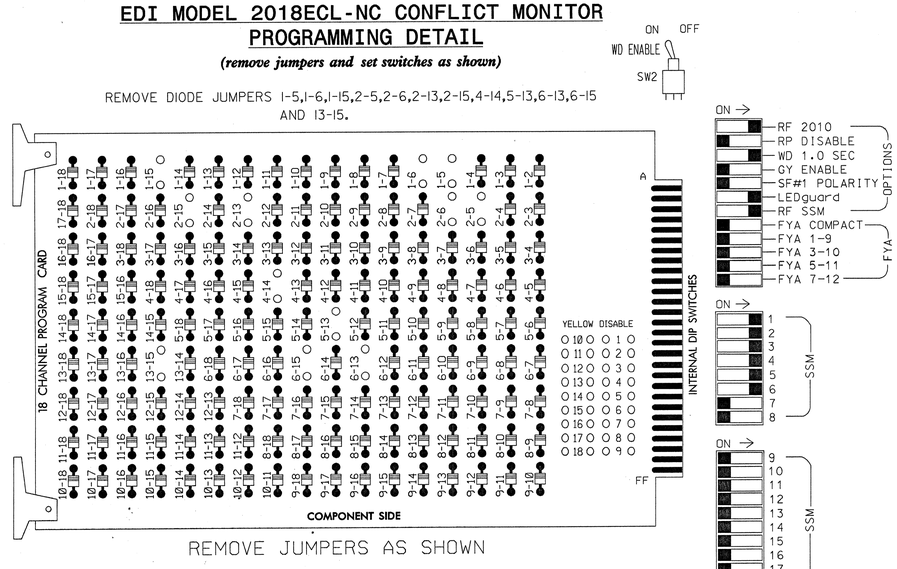
TRAFFIC FILE NO. C-86

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-259

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5,1-6,1-15,2-5,2-6,2-13,2-15,4-14,5-13,6-13,6-15 AND 13-15.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2,4 and 6 for 'STARTUP PED CALL'.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	31	32	41	42	P41, P42	51	61,62	P61, P62	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128		116	116	101	101			134										
YELLOW		129		117	117	102	102			135										
GREEN		130		118	118	103	103			136										
RED ARROW	125								131											
YELLOW ARROW	126								132											
GREEN ARROW	127			118		103			133											
✋			113					104			119									
🚶			115					106			121									

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

VIDEO DETECTION

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ø 1	ø 2	SLOT	SLOT	SLOT	ø 3	SLOT	SLOT	SLOT	SLOT	SLOT	ø2 PED	ø6 PED	FS
		1A	2A,2B 2C	EMPTY	EMPTY	EMPTY	3A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
	L	NOT USED	NOT USED				ø 3 3B						NOT USED	ø4 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	ø 5	ø 2	SLOT	SLOT	SLOT	ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A,6B 6C	EMPTY	EMPTY	EMPTY	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	NOT USED				ø 4 4B								

EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLASH SENSE ST = STOP TIME

VIDEO DETECTION!!

VIDEO DETECTION

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	VIDEO DETECTION			1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	VIDEO DETECTION			2	Y	Y			
3A	TB4-9,10	I6U	VIDEO DETECTION			3	Y	Y			
3B	TB4-11,12	I6L	VIDEO DETECTION			3	Y	Y			5
4A	TB5-9,10	J6U	VIDEO DETECTION			4	Y	Y			
4B	TB5-11,12	J6L	VIDEO DETECTION			4	Y	Y			10
5A	TB3-1,2	J1U	VIDEO DETECTION			5	Y	Y			
6A	TB3-5,6	J2U	VIDEO DETECTION			6	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-8,9	I13L	70	32	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-86
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Hawthorne Road
at
Queen Street

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

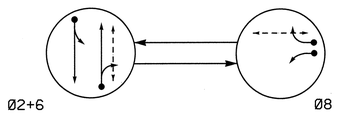
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

SIGNATURE DATE 3/18/13

TRAFFIC FILE NO. C-86

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 260

PHASING DIAGRAM

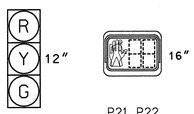


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.

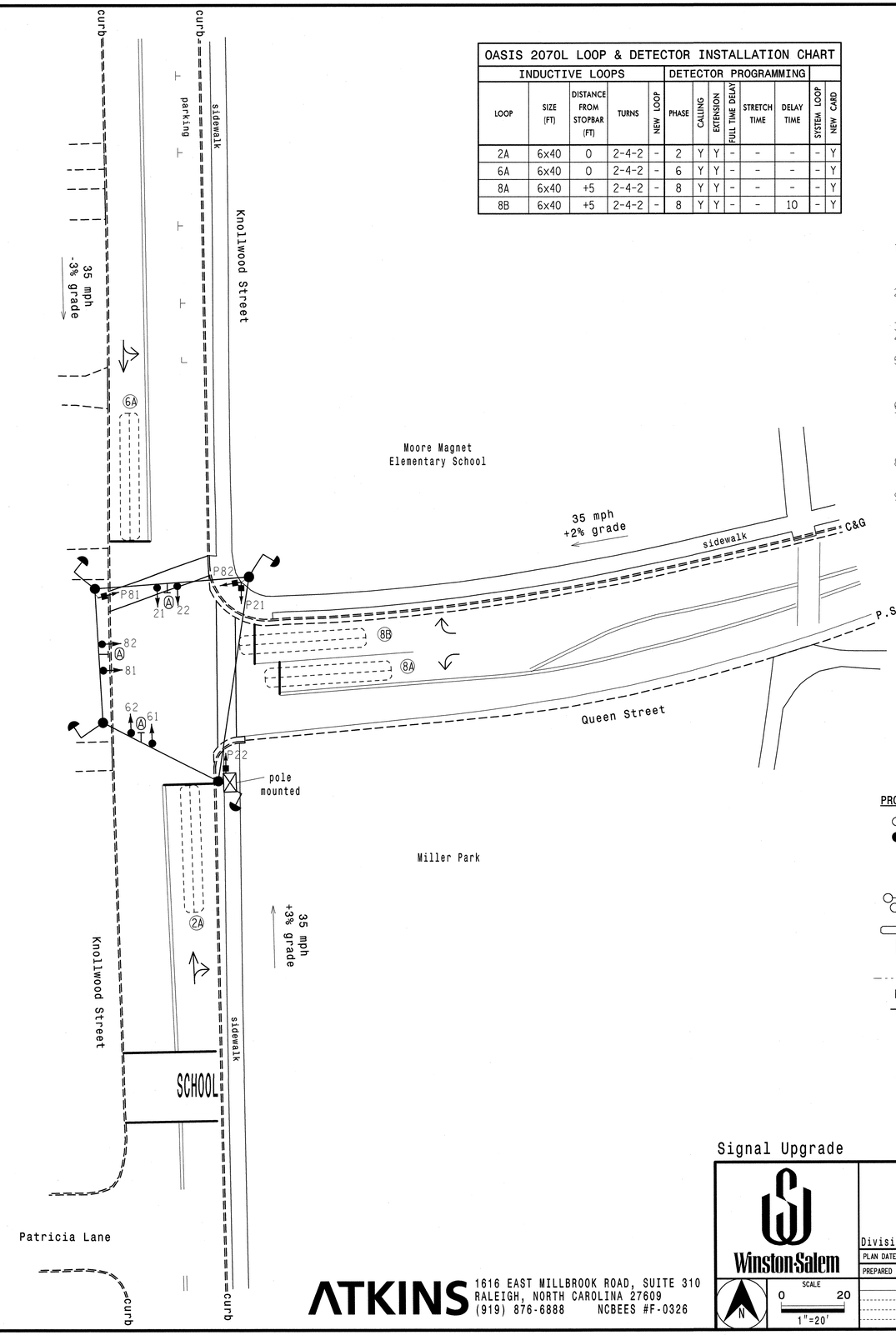


21, 22
61, 62
81, 82

P21, P22
P81, P82

TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2+6	Ø8	FLASH
21, 22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK
P81, P82	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
6A	6x40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6x40	+5	2-4-2	-	8	Y	Y	-	-	10	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls for phase 8 PED only. Phase 2 PED is on PED RECALL.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Street Name Sign (D3-1)	A

OASIS 2070L TIMING CHART			
FEATURE	PHASE		
	2	6	8
Min Green 1 *	10	10	7
Extension 1 *	3.0	3.0	3.0
Max Green 1 *	40	40	25
Yellow Clearance	3.7	4.1	3.0
Red Clearance	1.3	1.3	1.8
Red Revert	2.0	2.0	2.0
Walk 1 *	8	-	8
Don't Walk 1	11	-	9
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	PED / MIN	MIN RECALL	-
Vehicle Call Memory	YELLOW	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

SCALE 1"=20' (0 – 20)

Knollwood Street
at
Queen Street

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

SIGNATURE DATE 3-22-2013

SIG. INVENTORY NO. C-091

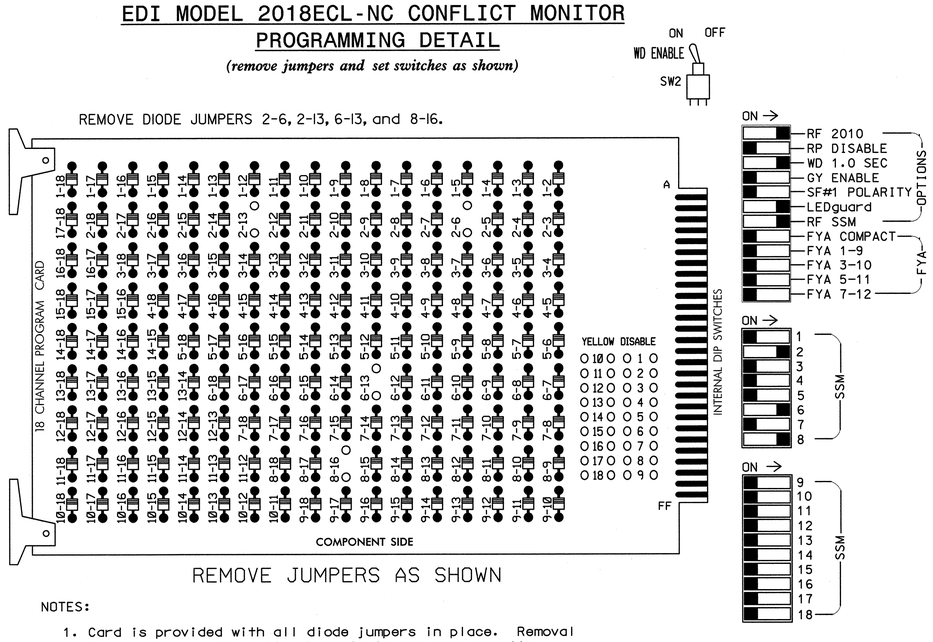
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

11-APR-2013 13:03
Q:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Lisa\mc-091.dgn
13833

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 261

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 8 for 'STARTUP PED CALL'.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S3,S8,S11,S12
PHASES USED.....2,2PED,6,8,8PED
OVERLAPS.....NONE

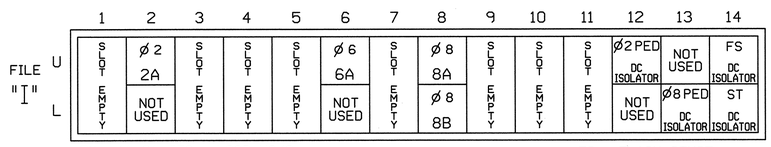
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	NU	NU	NU	61,62	NU	NU	81,82	P81, P82
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋			113									110
🚶			115									112

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			10
PED PUSH BUTTONS											
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

NOTES: Phase 2 PED previously had push buttons associated with it, however, the push buttons have been removed. Do not connect any existing ph 2 PED lead-in wire to the input file.

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-091
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Knollwood Street
at
Queen Street

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3-22-13
SIGNATURE DATE

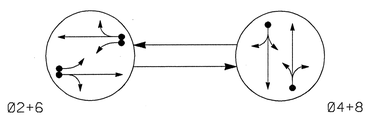
SIG. INVENTORY NO. C-091

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

11-APR-2013 13:03
U:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Lisom\Wiring Diagrams\wc-091e.dgn
13833

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-262

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

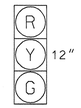
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	PHASE FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21,22
41,42
61,62
81,82

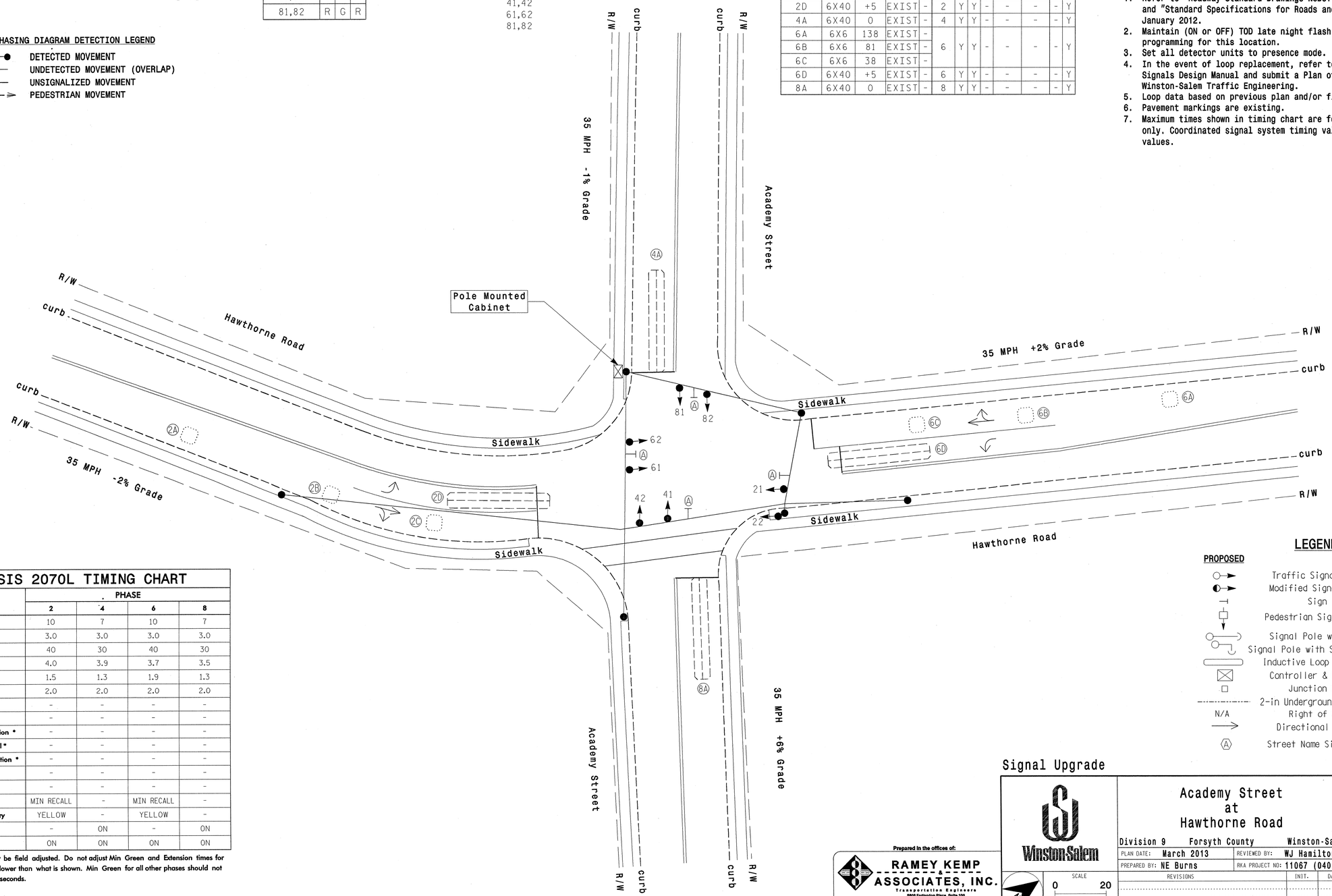
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	138	EXIST	-								
2B	6X6	81	EXIST	-	2	Y	Y	-	-	-	-	Y
2C	6X6	38	EXIST	-								
2D	6X40	+5	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	EXIST	-	4	Y	Y	-	-	-	-	Y
6A	6X6	138	EXIST	-								
6B	6X6	81	EXIST	-	6	Y	Y	-	-	-	-	Y
6C	6X6	38	EXIST	-								
6D	6X40	+5	EXIST	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	EXIST	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. Loop data based on previous plan and/or field observations.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	40	30	40	30
Yellow Clearance	4.0	3.9	3.7	3.5
Red Clearance	1.5	1.3	1.9	1.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-872-5416 Fax.
www.rameykemp.com

Winston Salem

SCALE 0 20 1"=20'

Academy Street
at
Hawthorne Road

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

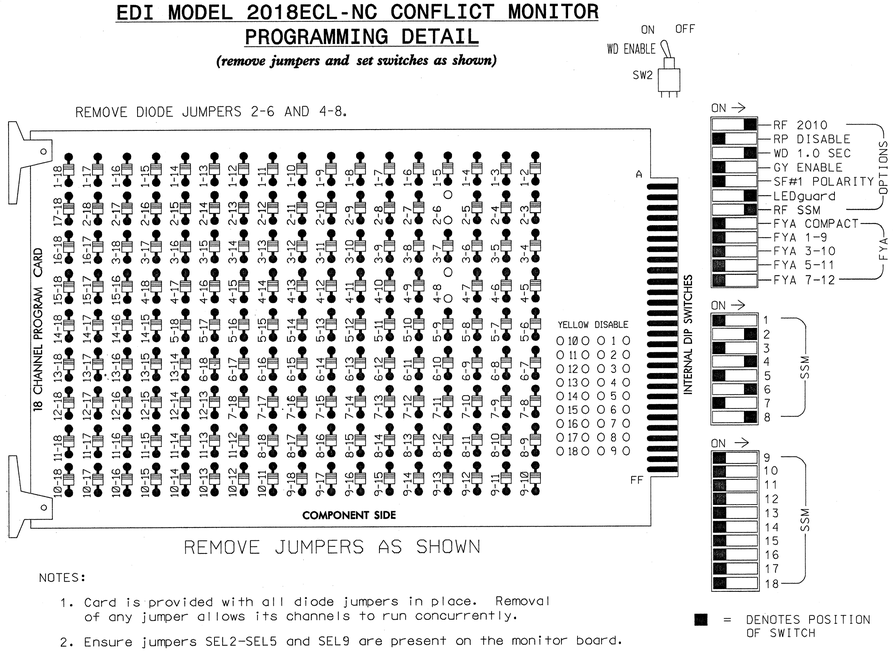
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-92

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-263

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"		1	2	3	4	5	6	7	8	9	10	11	12	13	14
	U	SLOT	Ø 2 2A,2B, 2C	SLOT	Ø 4 4A	SLOT	Ø 6 6A,6B, 6C	SLOT	Ø 8 8A	SLOT	SLOT	SLOT	NOT USED	NOT USED	FS DC ISOLATOR
	L	EMPTY	Ø 2 2D*	EMPTY	NOT USED	EMPTY	Ø 6 6D	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	NOT USED	ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB21-3,4	I2U	39	1	2	2	Y	Y			
2D	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
6A,6B,6C	TB21-11,12	I6U	40	2	6	6	Y	Y			
6D	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-92
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Winston-Salem

Academy Street
at
Hawthorne Road

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)

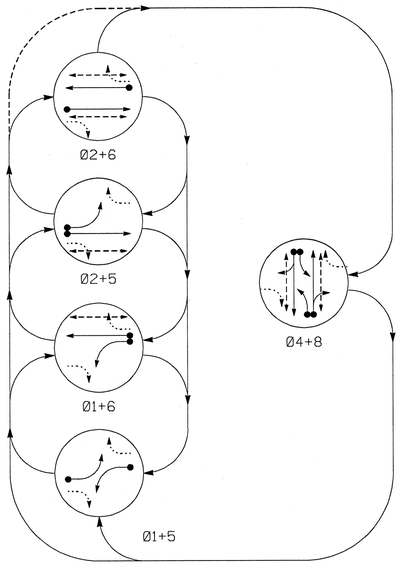
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-92

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-264

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

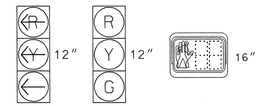
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	04+08	FLASH
11	←	←	~~←R~~	~~←R~~	~~←R~~	~~←R~~
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	~~←R~~	←	~~←R~~	~~←R~~	~~←R~~
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



11	21,22	P21,P22
51	41,42	P41,P42
	61,62	P61,P62
	81,82	P81,P82

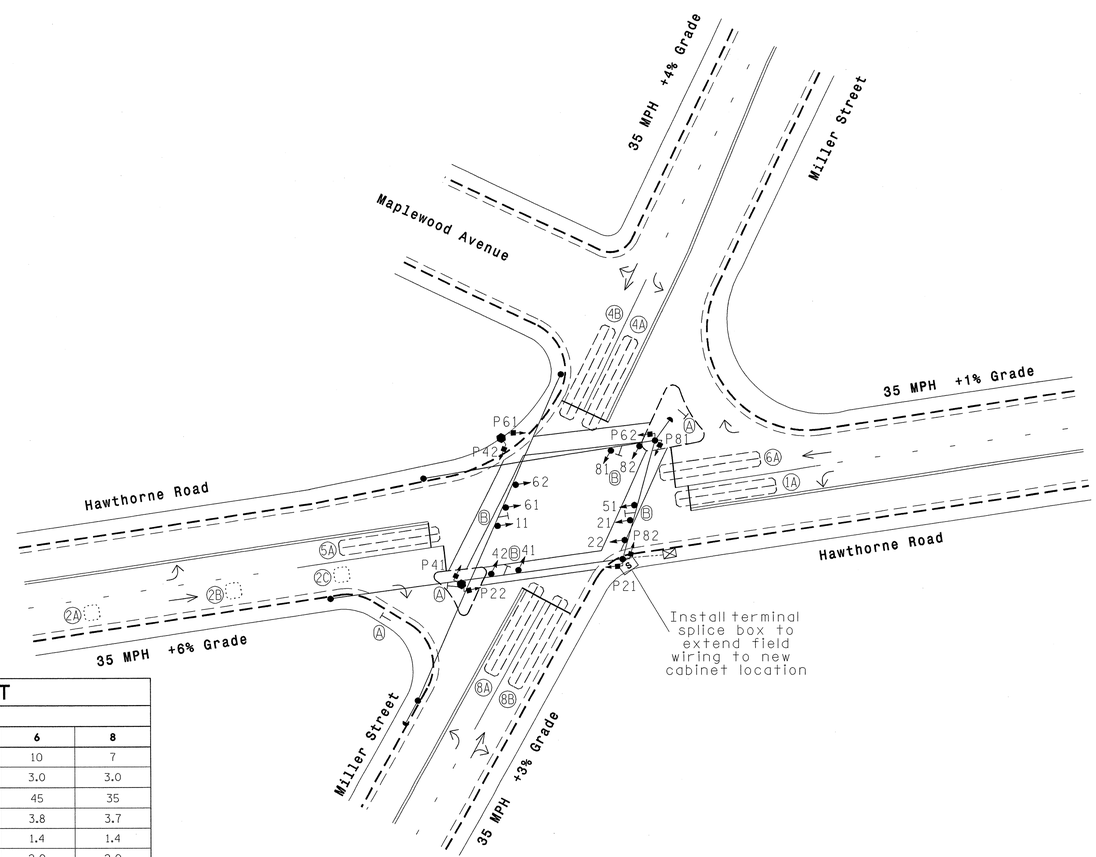
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A	6X6	138	4	-	2	Y	Y	-	-	-	-	Y
2B	6X6	81	4	-								
2C	6X6	38	4	-								
4A,4B	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A	6X40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A,8B	6X40	+5	2-4-2	-	8	Y	Y	-	-	3	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. The cabinet shall be designed to include an Auxiliary Output File for future use.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Loop data based on previous plan and/or field observations.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Pavement markings are existing
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	45	35	20	45	35
Yellow Clearance	3.0	3.5	3.6	3.0	3.8	3.7
Red Clearance	2.3	1.4	1.4	2.8	1.4	1.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	4	-	7	4
Don't Walk 1	-	11	13	-	11	11
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	-	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ

Signal Upgrade

Winston-Salem

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-872-5418 Fax.
www.rameykemp.com

SCALE 0 30 1"=30'

Hawthorne Road at Miller Street

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2013	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	RKA PROJECT NO:	11067 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

SIGNATURE 3/18/13 DATE

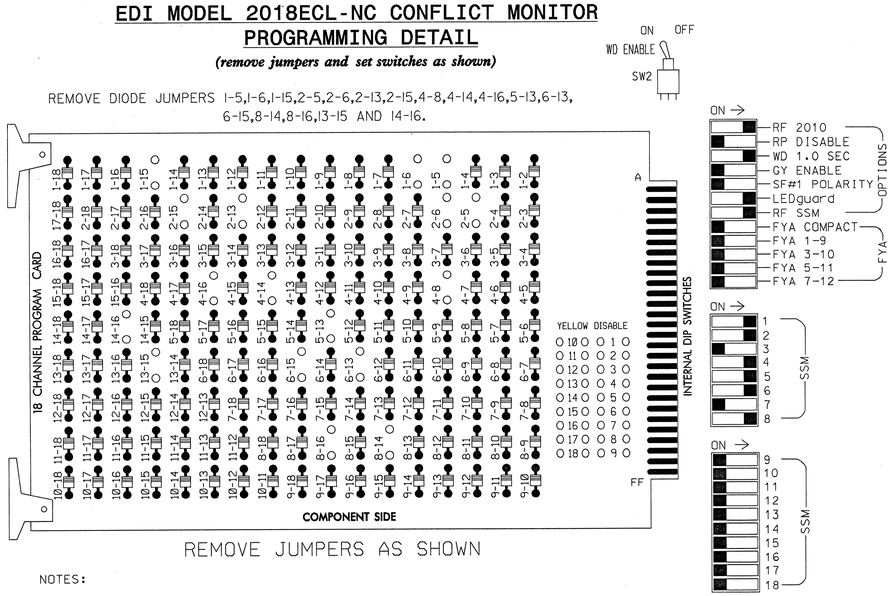
TRAFFIC FILE NO. C-97

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-265

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5,1-6,1-15,2-5,2-6,2-13,2-15,4-8,4-14,4-16,5-13,6-13, 6-15,8-14,8-16,13-15 AND 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2,4,6 and 8 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125						131											
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋			113			104			119			110						
🚶			115			106			121			112						

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S7,S8,S9,S11,S12
PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A,2B, 2C	SLOT	SLOT	SLOT	Ø 4 4A,4B	SLOT	SLOT	SLOT	SLOT	SLOT	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	SLOT	SLOT	SLOT	Ø 8 8A,8B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A,8B	TB5-9,10	J6U	42	4	8	8	Y	Y			3
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-97
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:

RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Hawthorne Road
at
Miller Street

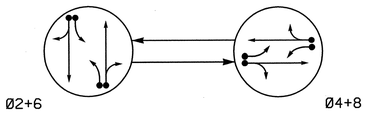
Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton		
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-97

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 266

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

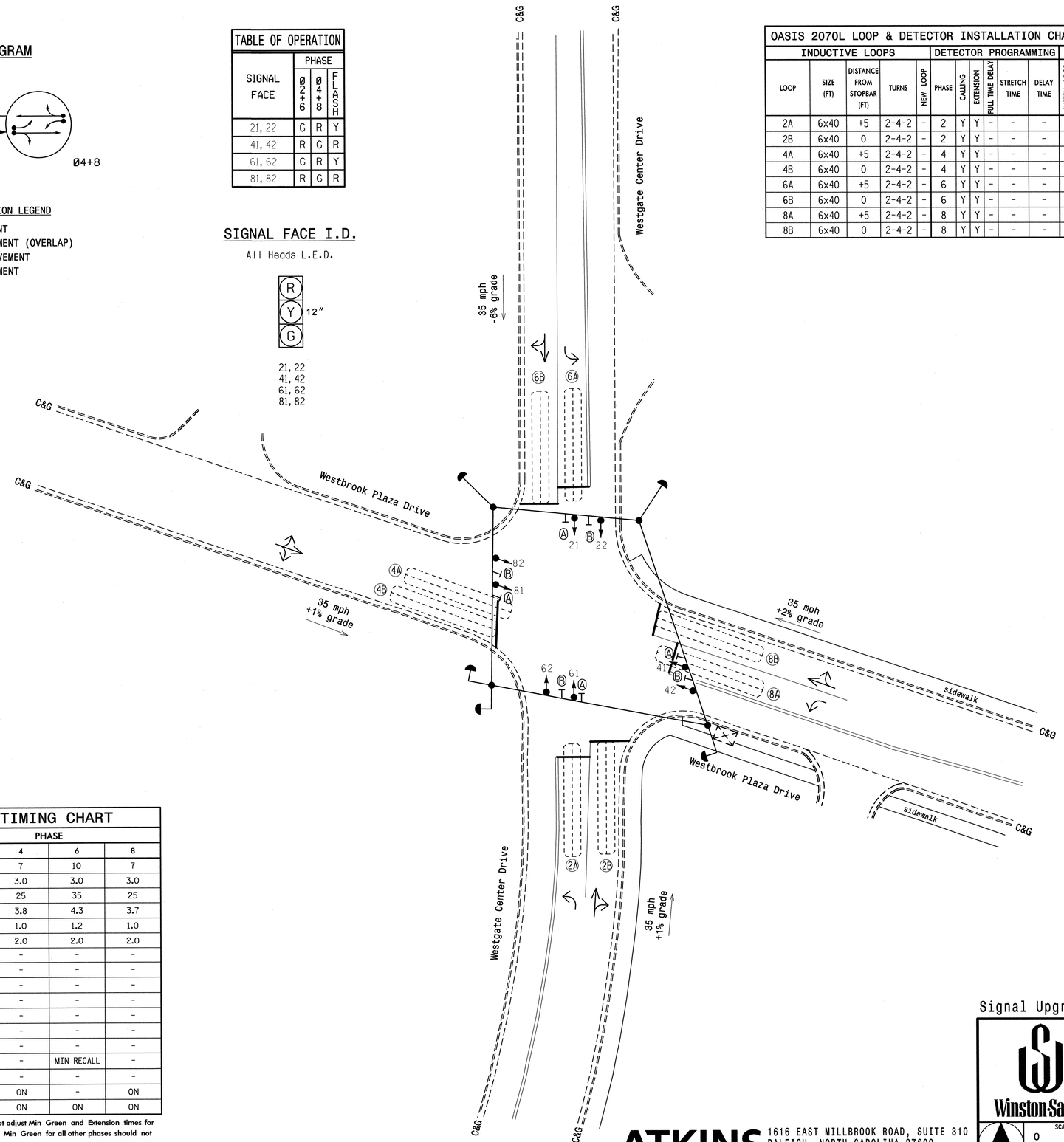
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
41, 42
61, 62
81, 82



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
2B	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6x40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. The cabinet should be designed to include an Auxiliary Output file for future use.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART				
FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	25	35	25
Yellow Clearance	3.8	3.8	4.3	3.7
Red Clearance	1.3	1.0	1.2	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

SCALE 0 20 1"=20'

Westgate Center Drive at Westbrook Plaza Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M. Moon 3-22-13
SIGNATURE DATE

SIG. INVENTORY NO. C-098

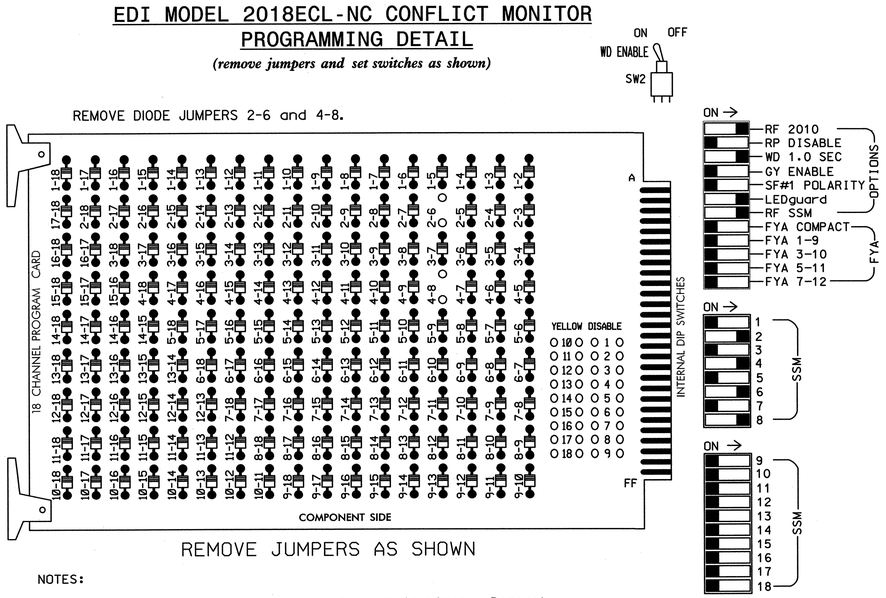
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
D:\#transportation\#Traffic\#Curr\#10002712 Winston Salem Sig Sys\#Signals\#Design\#Lisa\#C-098.dgn
22591

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 267

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX ✱
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S8,S11.
PHASES USED.....2,4,6,8.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
✱ Aux file to be installed for future use

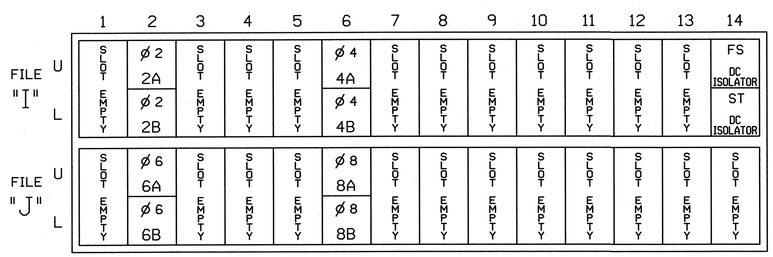
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-098
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Westgate Center Drive
at
Westbrook Plaza Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

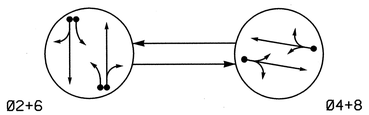
Melissa B. Toth 3/22/13
SIGNATURE DATE
SIG. INVENTORY NO. C-098

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
O:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Misc\Wiring Diagrams\C-098e.dgn
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 268

PHASING DIAGRAM

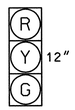


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



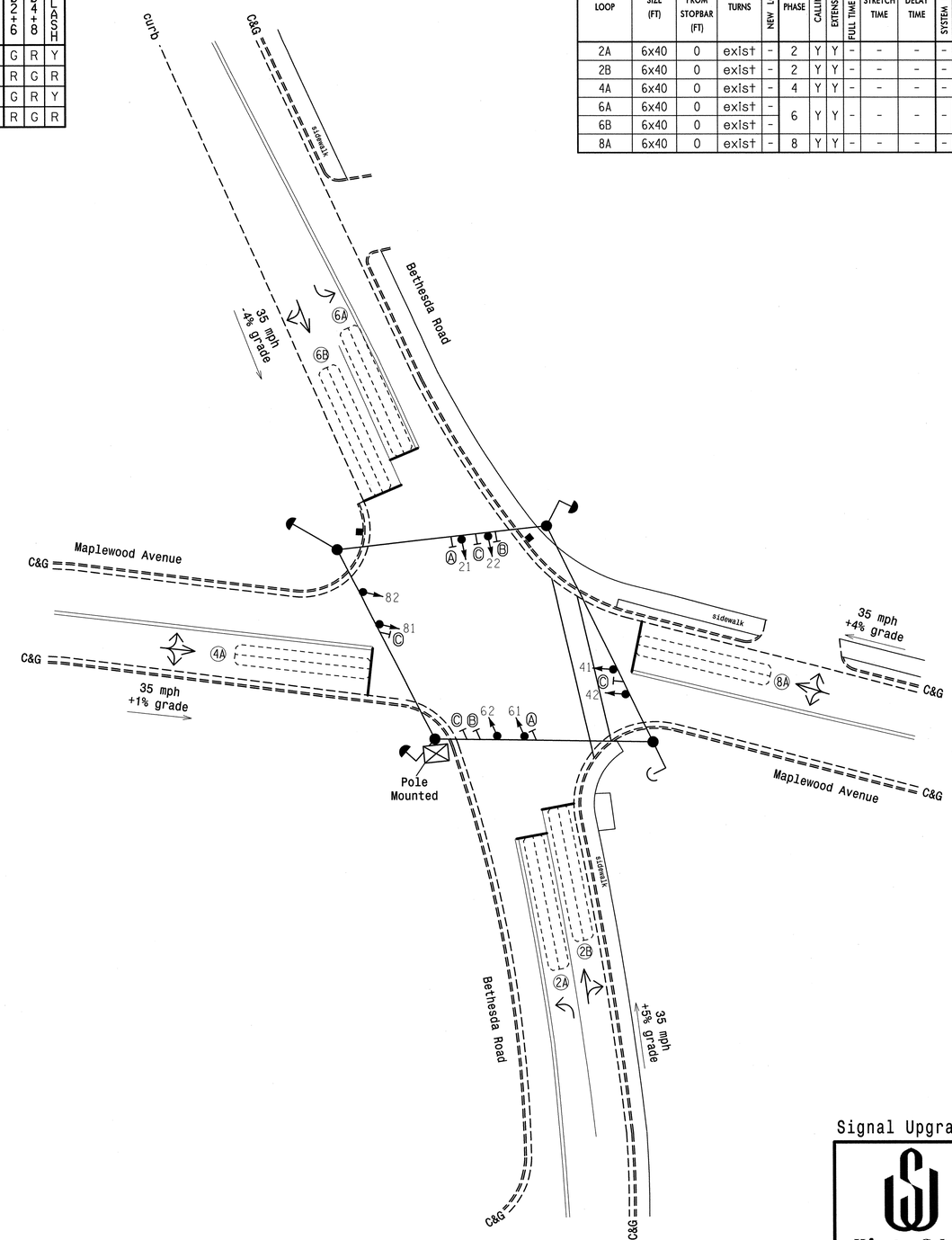
21, 22
41, 42
61, 62
81, 82

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	0	exist	-	2	Y	Y	-	-	-	-	Y
2B	6x40	0	exist	-	2	Y	Y	-	-	-	-	Y
4A	6x40	0	exist	-	4	Y	Y	-	-	-	-	Y
6A	6x40	0	exist	-	6	Y	Y	-	-	-	-	Y
6B	6x40	0	exist	-								
8A	6x40	0	exist	-	8	Y	Y	-	-	-	-	Y



2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winton-Salem Traffic Engineering.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Right Arrow Sign (R3-6R)	Ⓑ
Ⓒ	Street Name Sign (D-3)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	30	35	30
Yellow Clearance	3.6	3.8	4.1	3.6
Red Clearance	1.7	1.1	1.5	1.4
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

N

SCALE 0 20 1"=20'

Bethesda Road
at
Maplewood Avenue

Division 09 Forsyth County Winston-Salem

PLAN DATE: May 2012	REVIEWED BY: LM Moon
PREPARED BY: AJ Davis	REVIEWED BY: MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M Moon 3-22-13
SIGNATURE DATE

SIG. INVENTORY NO. C-100

21-MAR-2013 15:40
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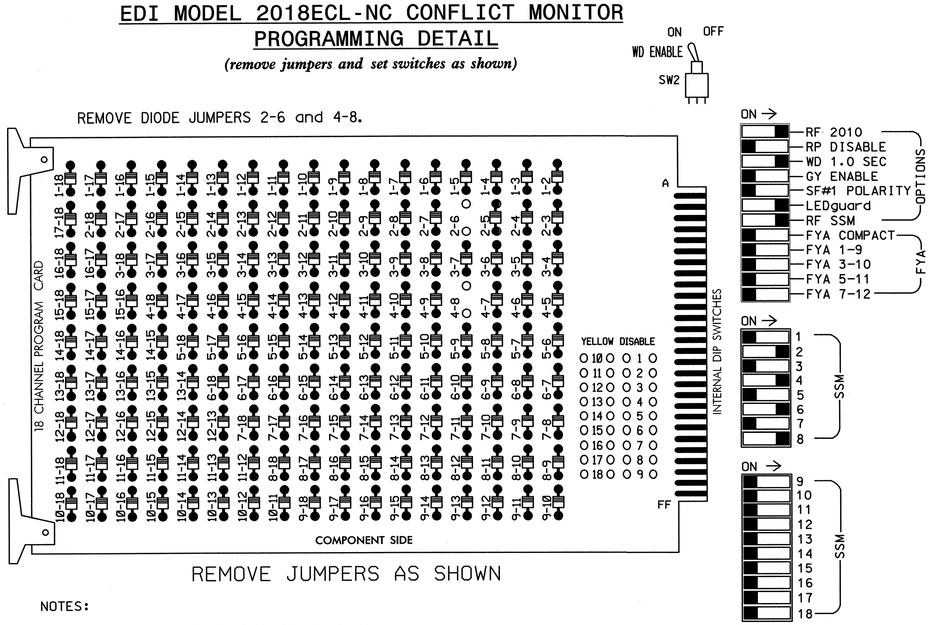
22651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 269

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	Ø4 4A	SLOT EMPTY	Ø6 6A,6B	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		Ø2 2B		NOT USED		NOT USED		NOT USED						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
6A,6B	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-100
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethesda Road
at
Maplewood Avenue

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-100

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
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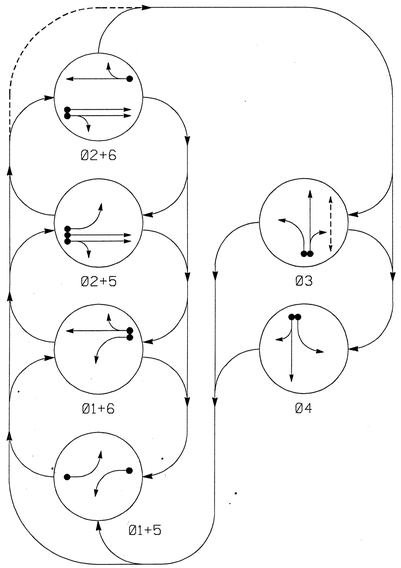
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-270

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

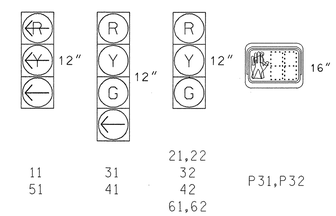
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←-	←-	←R	←R	←R	←R	←R
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	G —	R	R
42	R	R	R	R	G	G	R
51	←-	←R	←-	←R	←R	←R	←R
61,62	R	G	R	G	R	R	Y
P31,P32	DW	DW	DW	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



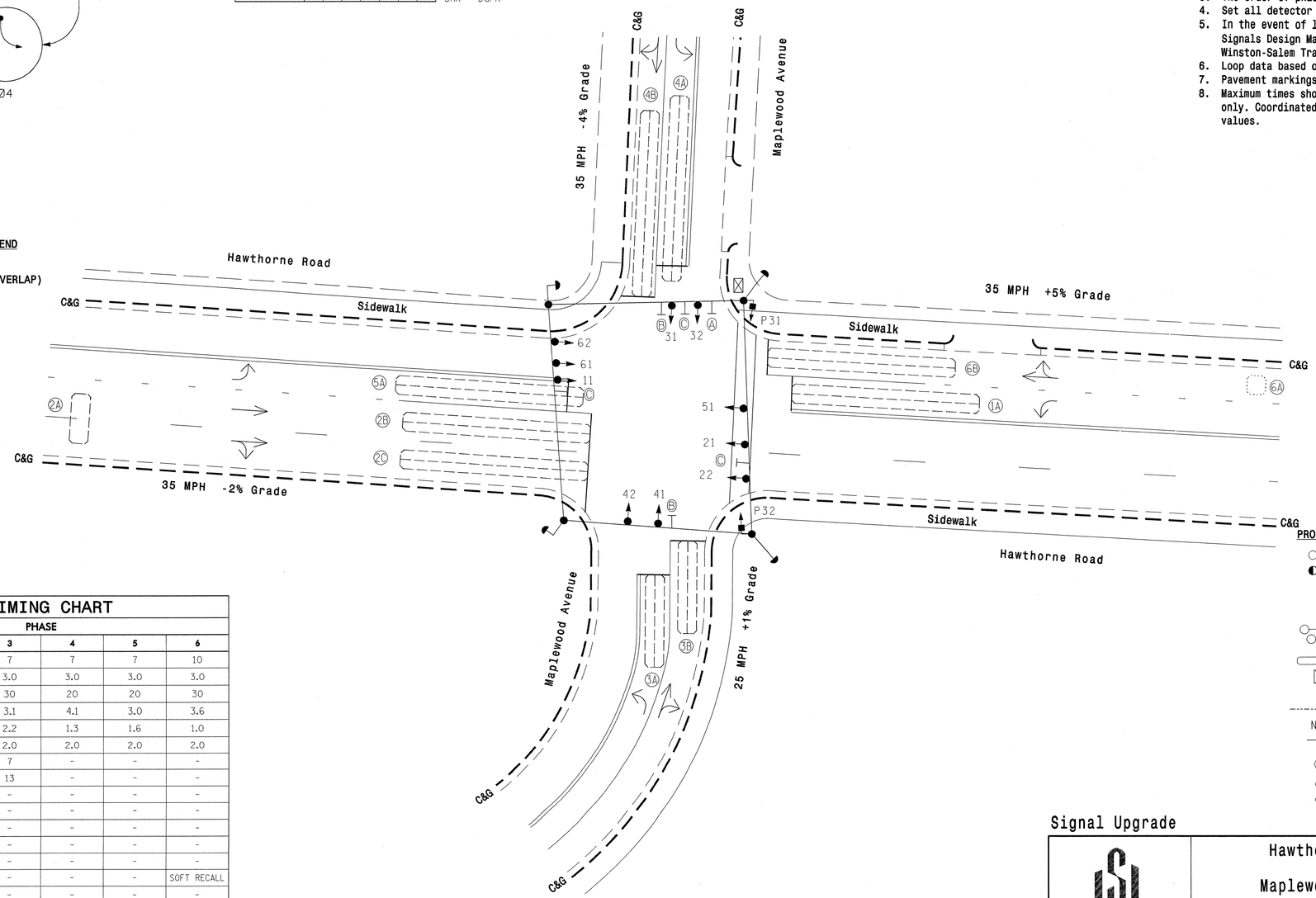
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	EXIST	-	1	Y	Y	-	-	-	-	Y
2A	6X16	160	EXIST	-	2	-	Y	-	-	-	-	Y
2B,2C	6X60	0	EXIST	-	2	Y	Y	-	-	-	-	Y
3A,3B	6X30	0	EXIST	-	3	Y	Y	-	-	-	-	Y
4A	6X60	+5	EXIST	-	4	Y	Y	-	-	-	-	Y
4B	6X60	0	EXIST	-	4	Y	Y	-	-	10	-	Y
5A	6X60	+5	EXIST	-	5	Y	Y	-	-	-	-	Y
6A	6X6	160	EXIST	-	6	-	Y	-	-	-	-	Y
6B	6X60	0	EXIST	-	6	Y	Y	-	-	-	-	Y

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash on existing programming for this location.
3. The order of phase 3 and phase 4 may be reversed.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Loop data based on previous plan and/or field observations.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"YIELD TO PEDESTRIANS IN CROSSWALK" Sign	A
B	Left Arrow "ONLY" Sign (R3-5L)	B
C	Street Name Sign (D3-1)	C

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	30	30	20	20	30
Yellow Clearance	3.0	4.0	3.1	4.1	3.0	3.6
Red Clearance	2.1	1.0	2.2	1.3	1.6	1.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	7	-	-	-
Don't Walk 1	-	-	13	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com

SCALE 0 20 1"=20'

Hawthorne Road at Maplewood Avenue

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2013	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	RKA PROJECT NO:	11067 (040)

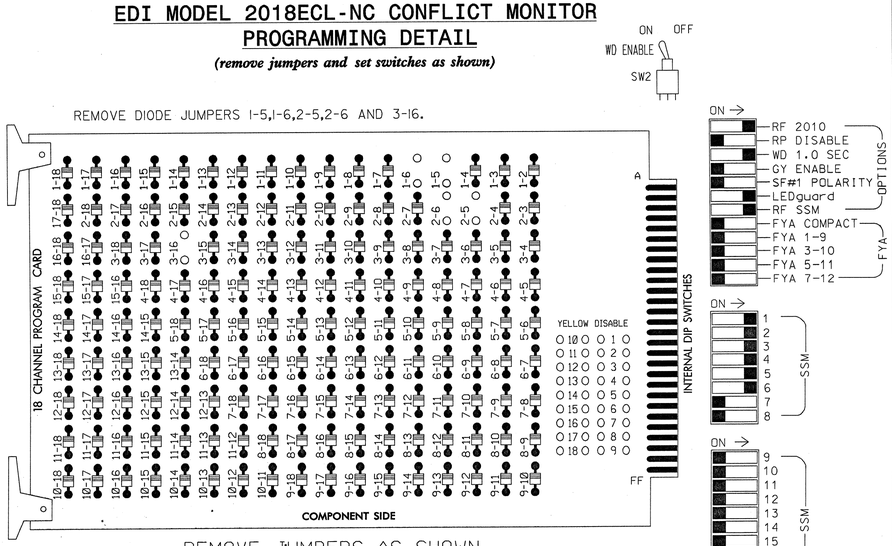
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-103

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-271

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phase 3 for 'STARTUP PED CALL'.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	3 PED
SIGNAL HEAD NO.	11	21,22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	P31, P32
RED		128		116	116	101	101			134				
YELLOW		129		117	117	102	102			135				
GREEN		130		118	118	103	103			136				
RED ARROW	125								131					
YELLOW ARROW	126								132					
GREEN ARROW	127			118		103			133					
✋														110
🚶														112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S12
PHASES USED.....1,2,3,4,5,6,3PED
OVERLAPS.....NONE

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	NOT USED	FS DC ISOLATOR
	L	NOT USED	Ø2 2B,2C	EMPTY	EMPTY	EMPTY	Ø4 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT	SLOT	SLOT	Ø3 3A,3B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6B	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B,2C	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
3A,3B	TB5-9,10	J6U	42	4	8	3	Y	Y			
PED PUSH BUTTONS											
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-103
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Winston-Salem

Hawthorne Road
at
Maplewood Avenue

Division 9 Forsyth County Winston-Salem

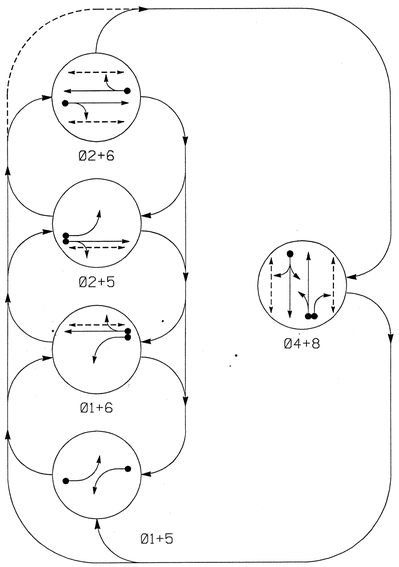
PLAN DATE: March 2013		REVIEWED BY:	WJ Hamilton
PREPARED BY: NE Burns		RKA PROJECT NO:	11067 (040)
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-103

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-272

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←R	←R	←R	←R
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.

11	21,22	P21,P22
51	41,42	P41,P42
	61,62	P61,P62
	81,82	P81,P82

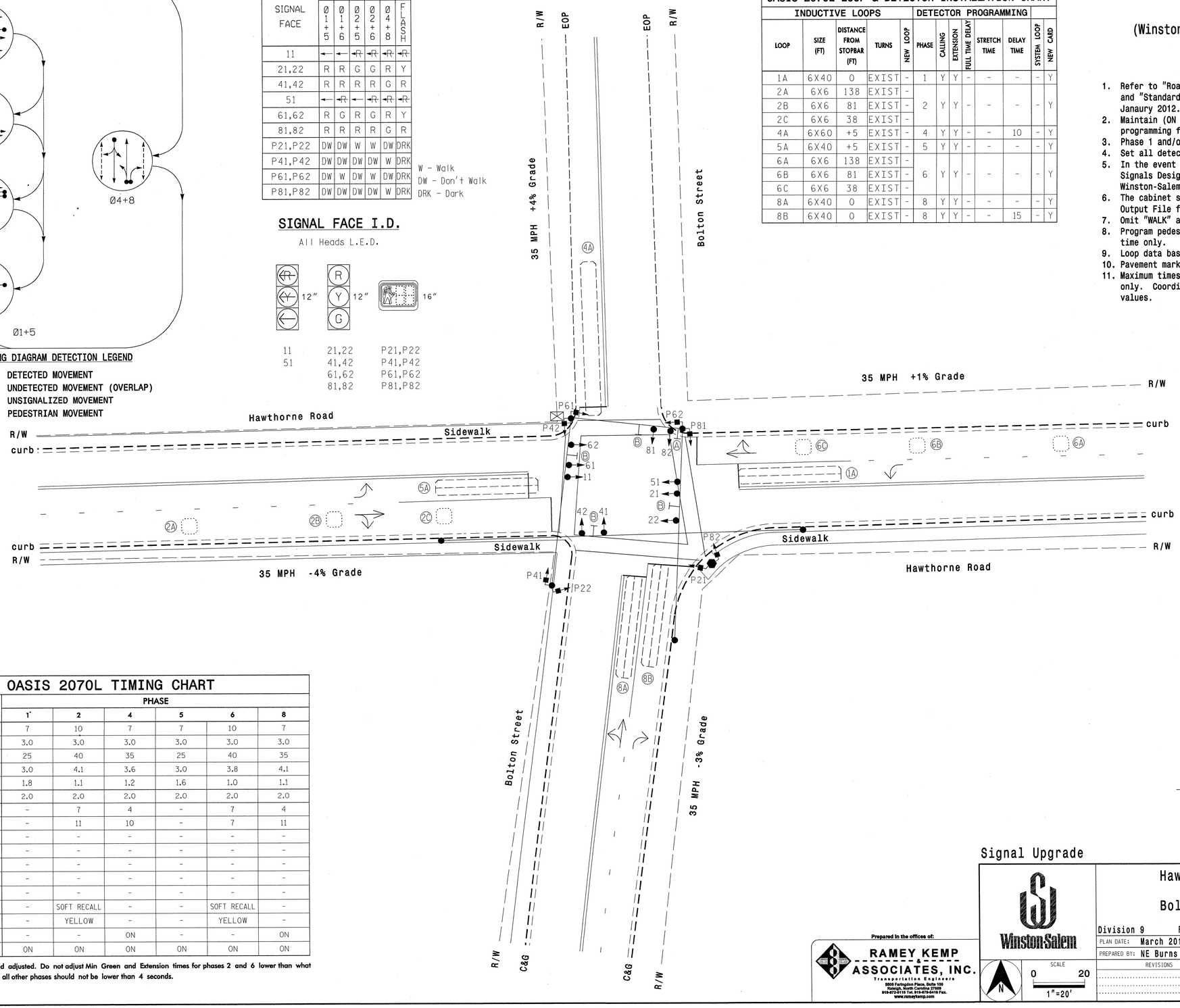
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	EXIST	-	1	Y	Y	-	-	-	-	Y
2A	6X6	138	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X6	81	EXIST	-								
2C	6X6	38	EXIST	-								
4A	6X60	+5	EXIST	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	EXIST	-	5	Y	Y	-	-	-	-	Y
6A	6X6	138	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X6	81	EXIST	-								
6C	6X6	38	EXIST	-								
8A	6X40	0	EXIST	-	8	Y	Y	-	-	-	-	Y
8B	6X40	0	EXIST	-	8	Y	Y	-	-	15	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated Janaury 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. The cabinet shall be designed to include an Auxiliary Output File for future use.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Loop data based on previous plan and/or field observations.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 1*	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	25	40	35	25	40	35
Yellow Clearance	3.0	4.1	3.6	3.0	3.8	4.1
Red Clearance	1.8	1.1	1.2	1.6	1.0	1.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	4	-	7	4
Don't Walk 1	-	11	10	-	7	11
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

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Winston-Salem

SCALE 1"=20' (0 – 20)

Hawthorne Road at Bolton Street

Division 9 | Forsyth County | Winston-Salem

PLAN DATE: March 2013 | REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns | RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

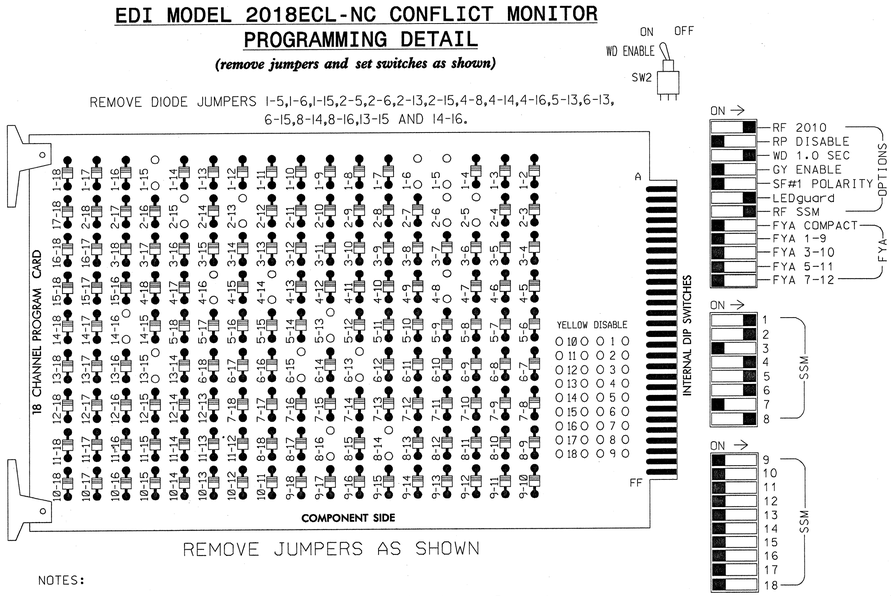
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE | DATE 3/18/13

TRAFFIC FILE NO. C-104

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-273

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2,4,6 and 8 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125						131											
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋			113			104			119			110						
🚶			115			106			121			112						

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S7,S8,S9,S11,S12
PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A,2B, 2C	SLOT	SLOT	SLOT	Ø 4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A,6B, 6C	SLOT	SLOT	SLOT	Ø 8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	Ø 8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-104
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:

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Winston-Salem

Hawthorne Road
at
Bolton Street

Division 9 Forsyth County Winston-Salem

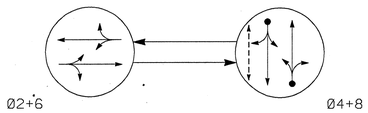
PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-104

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-274

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

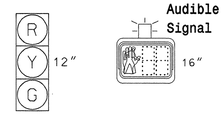
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P41,P42	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



21,22
41,42
61,62
81,82

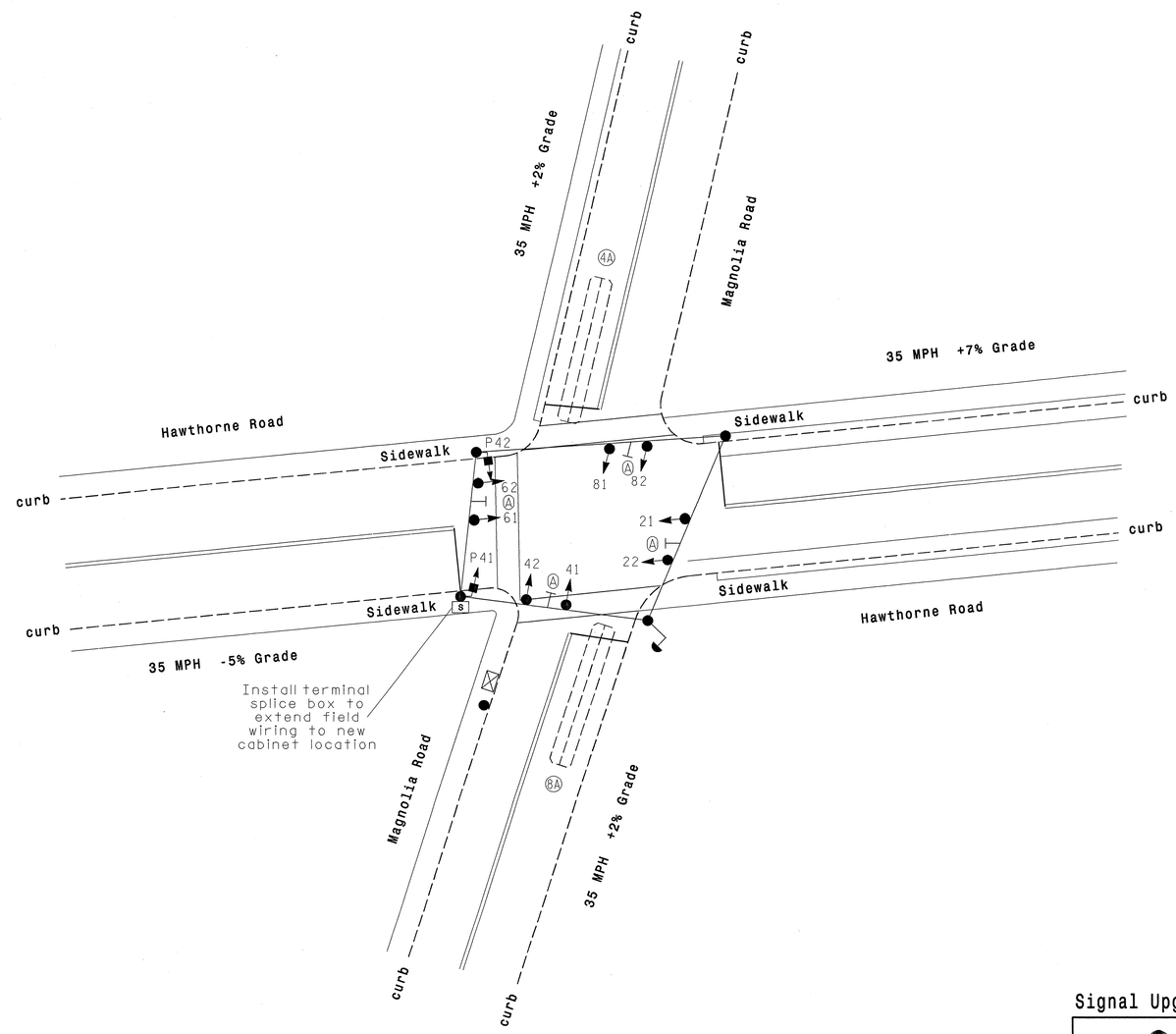
P41,P42

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X40	+5	EXIST	-	4	Y	Y	-	-	-	-	Y
8A	6X40	+5	EXIST	-	8	Y	Y	-	-	-	-	Y

2 Phase
Semi-Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Loop data based on previous plan and/or field observations.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	0.0	3.0	0.0	3.0
Max Green 1 *	35	20	35	20
Yellow Clearance	4.2	3.7	3.5	3.7
Red Clearance	1.0	1.1	1.4	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	-
Don't Walk 1	-	8	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	-	MAX RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
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Winston-Salem

SCALE 1"=20' (0 – 20)

Hawthorne Road at Magnolia Road

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2013	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	RKA PROJECT NO:	11067 (040)

REVISIONS	INIT.	DATE

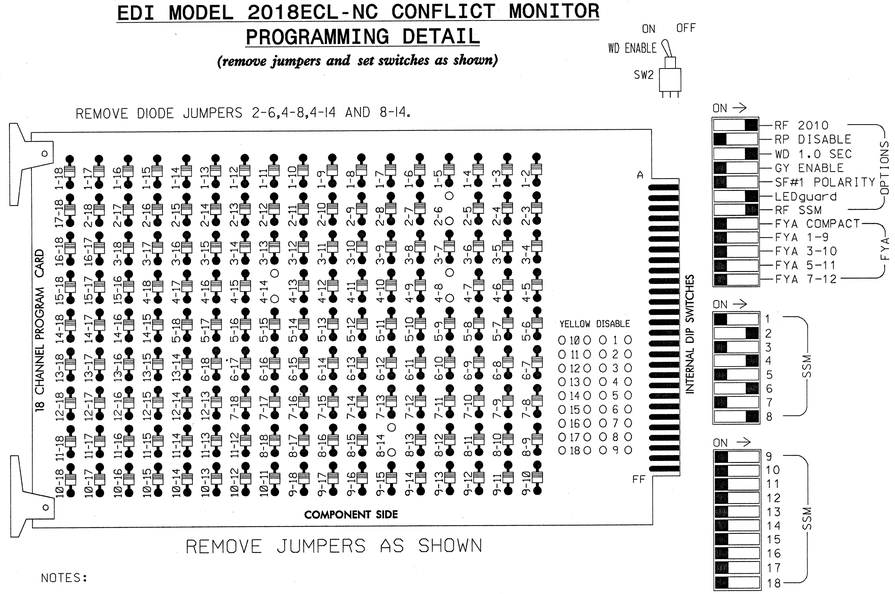
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-105

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-275

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phase 4 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						
🚶						106						

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S6,S8,S11
PHASES USED.....2,4,4PED,6,8
OVERLAPS.....NONE

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT	SLOT	SLOT	SLOT	SLOT	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	NOT USED	SLOT	FS DC ISOLATOR
FILE "I" L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	4A NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø 4 PED DC ISOLATOR	EMPTY	ST DC ISOLATOR
FILE "J" U	SLOT	SLOT	SLOT	SLOT	SLOT	Ø 8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
FILE "J" L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	8A NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-105
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:

RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
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Winston-Salem

Hawthorne Road
at
Magnolia Road

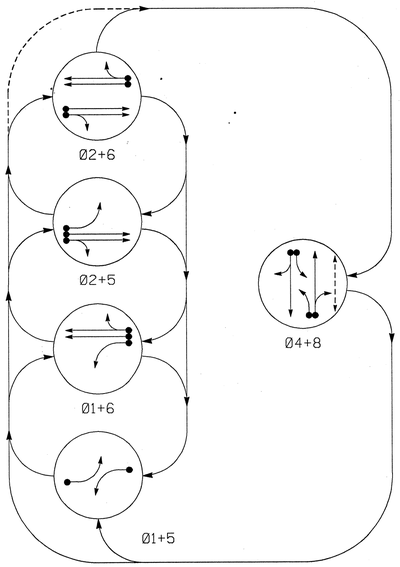
Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton		
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-105

PROJECT REFERENCE NO.	SHEET NO.
C-2554B	Sig-276

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

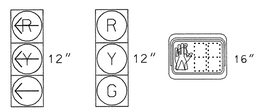
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	↚	↚	↖̸	↖̸	↖̸	↖̸
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	↚	↖̸	←	↖̸	↖̸	↖̸
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P81,P82	DW	DW	DW	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

21,22
41,42
61,62
81,82

P81,P82

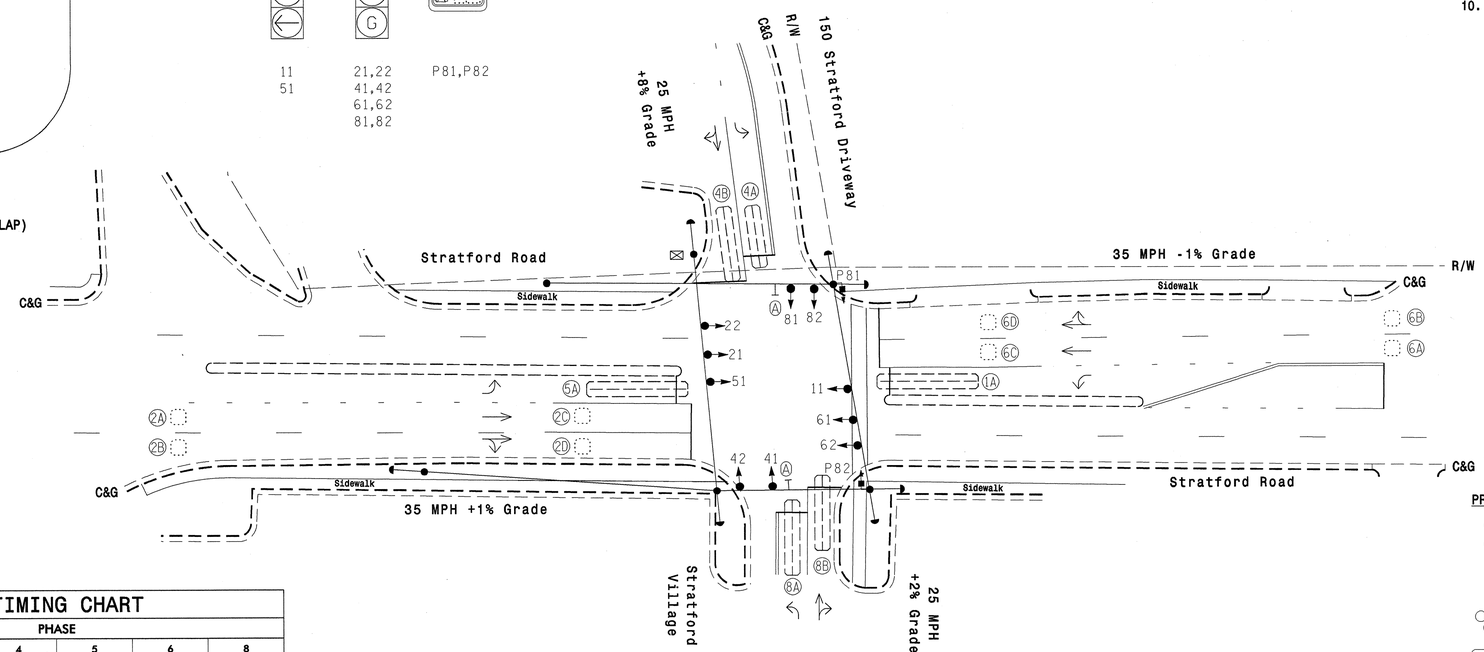
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	EXIST	-	1	Y	Y	-	-	-	-	Y
2A,2B	6X6	200	EXIST	-	2	Y	Y	-	2.5	-	-	Y
2C,2D	6X6	40	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6X25	+5	EXIST	-	4	Y	Y	-	-	-	-	Y
4B	6X30	0	EXIST	-	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	EXIST	-	5	Y	Y	-	-	-	-	Y
6A,6B	6X6	200	EXIST	-	6	Y	Y	-	2.5	-	-	Y
6C,6D	6X6	40	EXIST	-	6	Y	Y	-	-	-	-	Y
8A,8B	6X30	+5	EXIST	-	8	Y	Y	-	-	-	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2012 and "Standard Specifications for Roads and Structures" dated July 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, reder to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. The cabinet shall be designed to include an Auxiliary Output File for future use.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Loop data based on previous plan and/or field observations.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓐ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	15	45	25	15	45	25
Yellow Clearance	3.0	3.8	3.0	3.0	3.9	3.1
Red Clearance	2.1	1.3	2.6	2.1	1.3	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	4
Don't Walk 1	-	-	-	-	-	16
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Farrington Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com

Winston-Salem

SCALE 0 30 1"=30'

Stratford Road
at
150 Stratford

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2013	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	REVIEWED BY:	11067 (040)

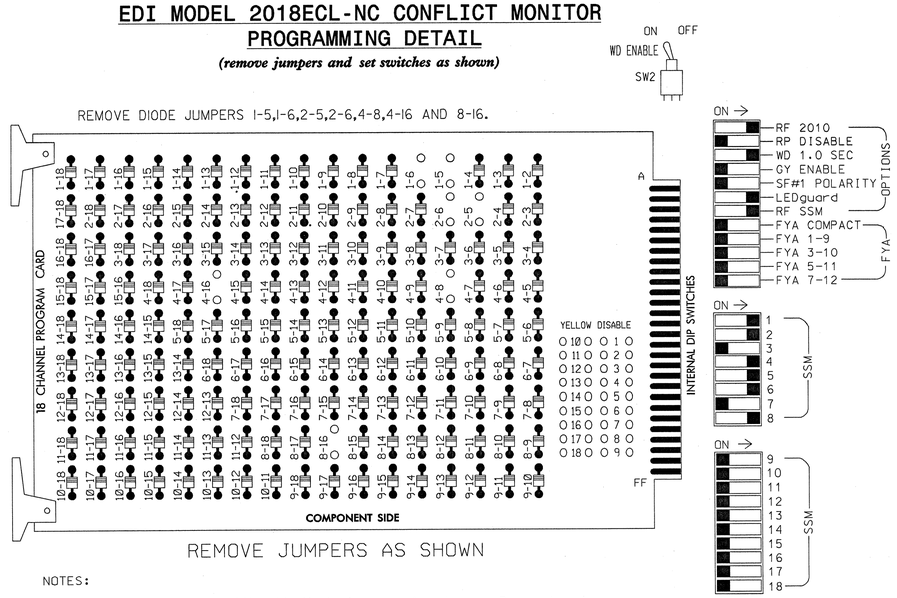
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
SIG. INVENTORY NO. C-107

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-277

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phase 8 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125						131											
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋												110						
🚶												112						

NU = Not Used

EQUIPMENT INFORMATION

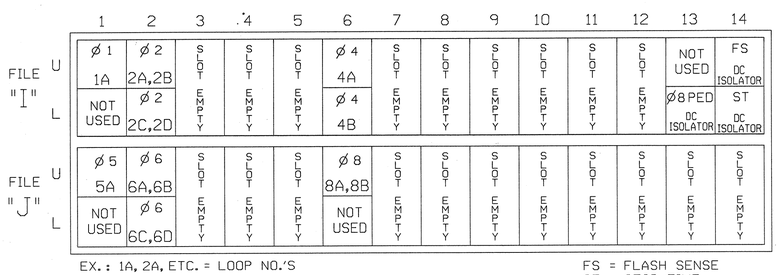
CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,S12
PHASES USED.....1,2,4,5,6,8,8PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		2.5	
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		2.5	
6C,6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A,8B	TB5-9,10	J6U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-107
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Stratford Road
at
150 Stratford

Division 9 Forsyth County Winston-Salem

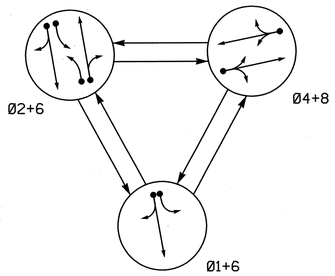
PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-107

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 278

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

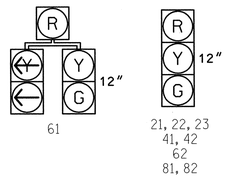
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	FLASH
21, 22, 23	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



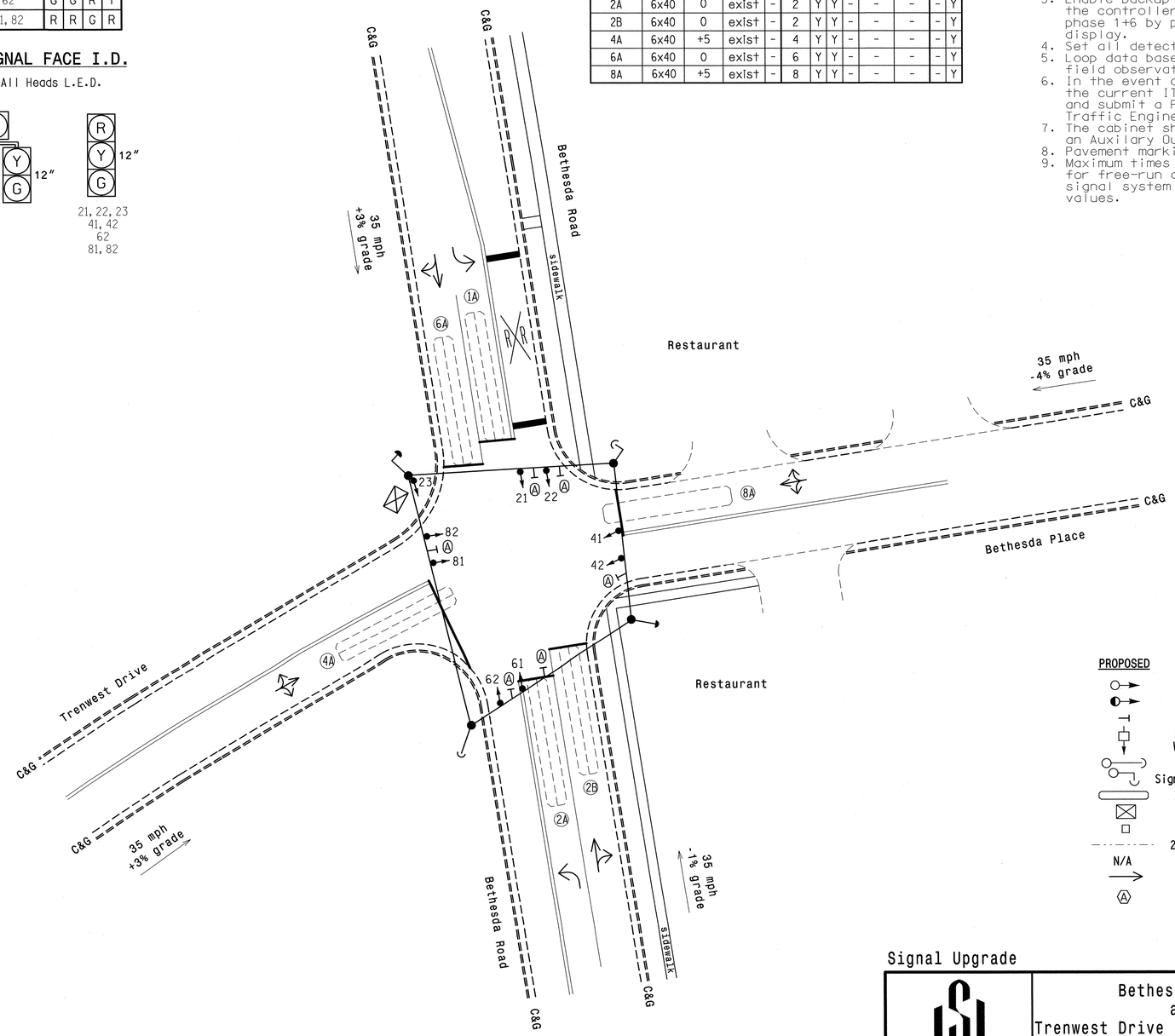
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	0	exist	-	1	Y	Y	-	-	10	-	Y
					6	Y	Y	-	-	3	-	Y
2A	6x40	0	exist	-	2	Y	Y	-	-	-	-	Y
2B	6x40	0	exist	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	exist	-	4	Y	Y	-	-	-	-	Y
6A	6x40	0	exist	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	exist	-	8	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "2012 NCDOT Roadway Standard Drawings" and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through all red display.
4. Set all detector units to presence mode.
5. Loop data based on previous plan and/or field observations.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. The cabinet should be designed to include an Auxiliary Output File for future use.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign	

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	40	30	40	30
Yellow Clearance	3.0	3.9	3.7	3.7	4.1
Red Clearance	1.6	1.2	1.0	1.0	1.1
Red Revert	2.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	SOFT RECALL	-
Vehicle Call Memory	-	-	-	-	-
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

Bethesda Road
at
Trenwest Drive / Bethesda Place

Division 09 Forsyth County Winston-Salem

PLAN DATE: March 2012	REVIEWED BY: LM Moon
PREPARED BY: JA Wiles	REVIEWED BY: MB Toth

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

SIGNATURE Melissa B Toth DATE 3/22/13

SIG. INVENTORY NO. C-121

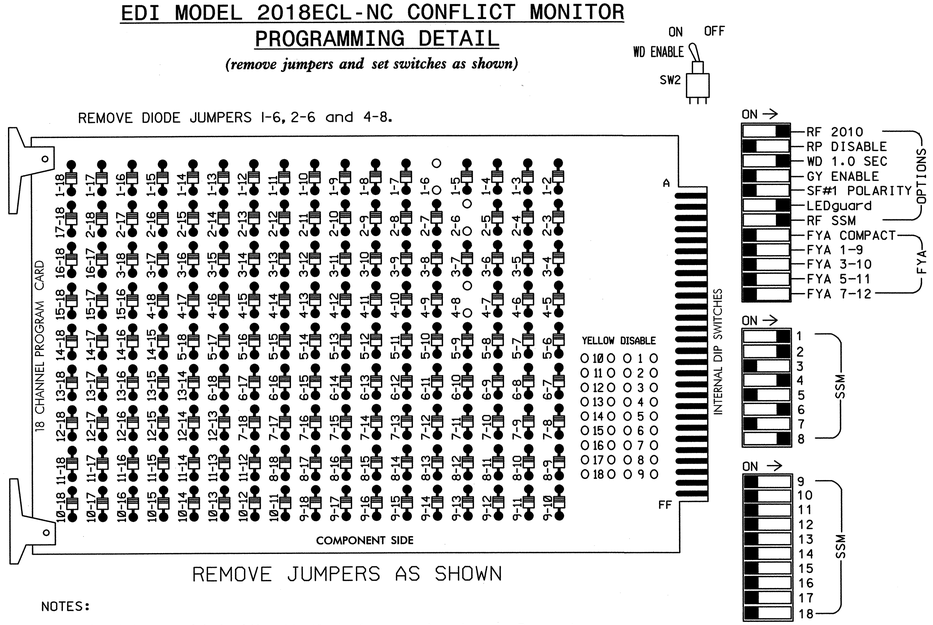
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
D:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Melissa\C-121_Bethesda Rd and Trenwest-Bethesda Pl_ATKINS.dgn
25631

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.279

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22, 23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126																	
FLASHING YELLOW ARROW																		
GREEN ARROW	127																	

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S8,S11
PHASES USED.....1,2,4,6,8
OVERLAPS.....NONE

* Aux file to be installed for future use

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1	Ø 2	SLOT	SLOT	SLOT	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A	EMPTY	EMPTY	EMPTY	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	Ø 2				NOT USED								ST
			2B												DC ISOLATOR
FILE "J"	U	SLOT	Ø 6	SLOT	WIRED ⊗ INPUT	SLOT	Ø 8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		EMPTY	6A	EMPTY		EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L		NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	Y			3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

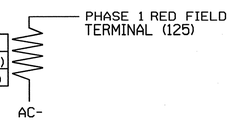
[1] Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-121
DESIGNED: 03-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethesda Road
at
Trenwest Drive / Bethesda Place

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B Toth 3/22/13
SIGNATURE DATE

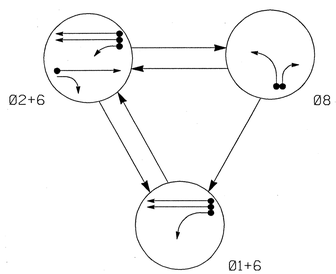
SIG. INVENTORY NO. C-121

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
O:\Transportation\Traffic\Cur\10022212 Winston Salem Sig Sys\Signals\Design\Melissa\Wiring\C-121a.dgn
25851

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-280

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

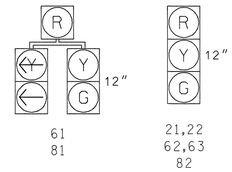
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
21,22	R	G	R	Y
61	G	G	R	Y
62,63	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



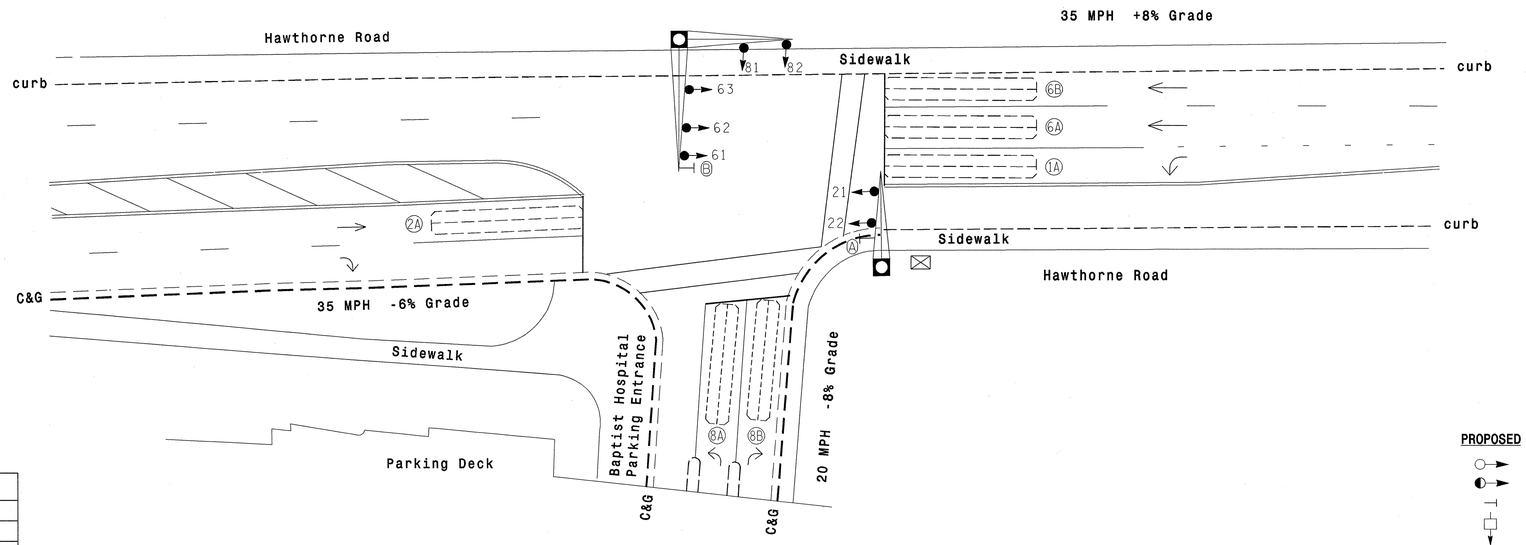
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP NEW CARD
1A	6X40	0	EXIST	-	1	Y	Y	-	-	10	- Y
					6	Y	Y	-	-	-	- Y
2A	6X40	0	EXIST	-	2	Y	Y	-	-	-	- Y
6A	6X40	0	EXIST	-	6	Y	Y	-	-	-	- Y
6B	6X40	0	EXIST	-	6	Y	Y	-	-	-	- Y
8A	6X30	0	EXIST	-	8	Y	Y	-	-	-	- Y
8B	6X30	0	EXIST	-	8	Y	Y	-	-	15	- Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Loop data based on previous plan and/or field observations.
7. The cabinet should be designed to include Auxiliary Output File for future use.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	"LEFT TURN SIGNAL" Sign (R10-10L)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	10	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	30	40	40	40
Yellow Clearance	3.0	4.3	3.4	3.3
Red Clearance	1.9	1.3	1.5	1.6
Red Revert	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-8416 Fax.
www.rameykemp.com

Winston-Salem

SCALE 0 20 1"=20'

Hawthorne Road at Baptist Hospital

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton

PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

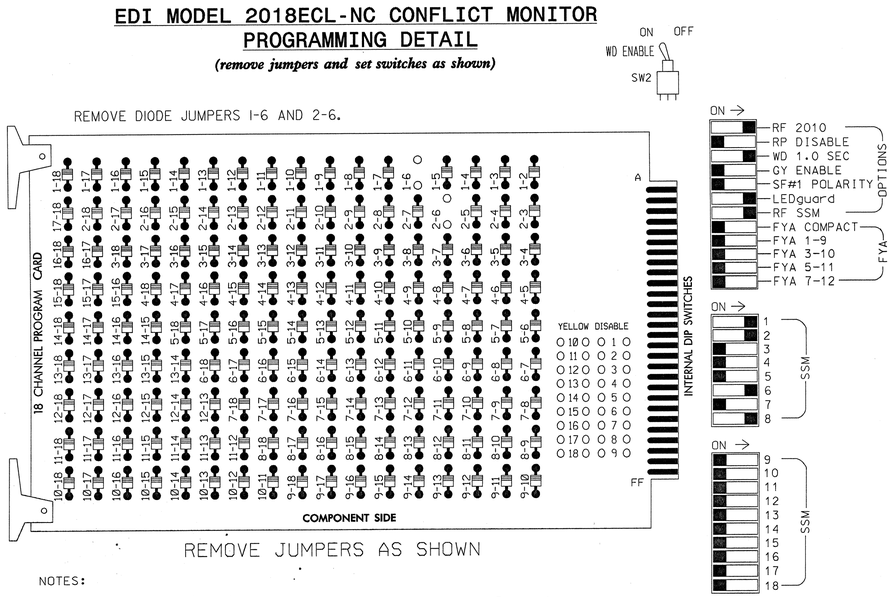
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-207

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-281

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11		S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8		16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	NU	NU	NU	NU	NU	61,62, 63	NU	NU	81	82	NU	NU	NU	NU	NU	NU	NU
RED	✳	128						134			107	107							
YELLOW		129						135			108	108							
GREEN		130						136			109	109							
RED ARROW																			
YELLOW ARROW	126										108								
GREEN ARROW	127										109								
✋																			
🚶																			

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S8,S11
PHASES USED.....1,2,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2+6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED												ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A,6B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				Ø8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

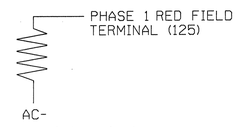
[1]Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-207
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Winston-Salem

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Hawthorne Road
at
NC Baptist Hospital

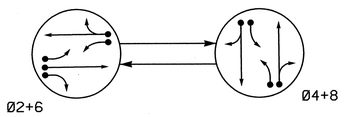
Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013		REVIEWED BY:	WJ Hamilton
PREPARED BY: NE Burns		REVIEWED BY:	11067 (040)
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
SIG. INVENTORY NO. C-207

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 282

PHASING DIAGRAM



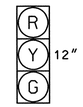
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2+6	Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



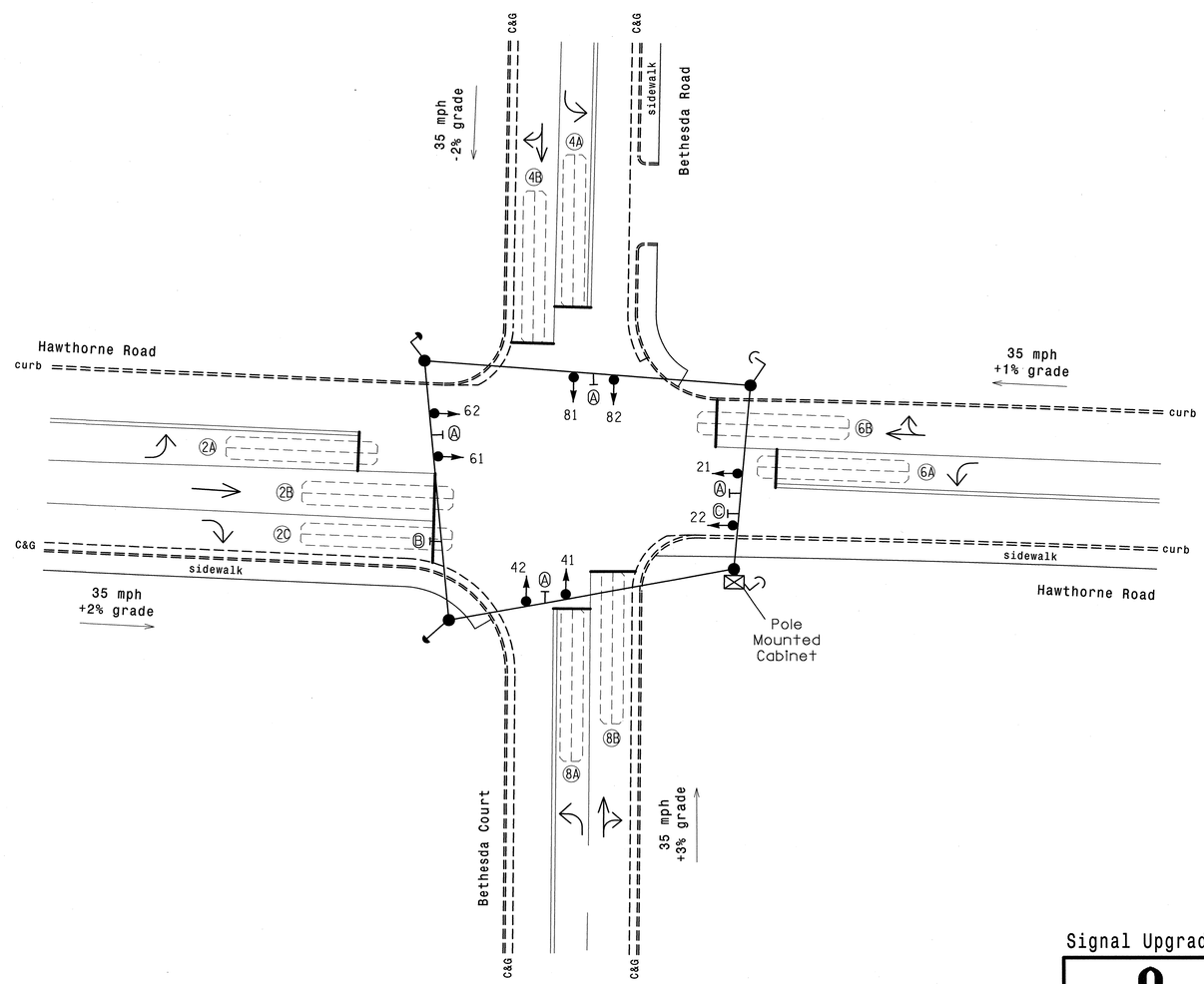
21, 22
41, 42
61, 62
81, 82

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
2B, 2C	6x40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6x40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A, 8B	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "2012 NCDOT Roadway Standard Drawings" and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Street Name Sign	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	"No Turn on Red" Sign (R10-11)	C

OASIS 2070L TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	40	30	40	30
Yellow Clearance	3.1	4.0	3.1	3.7
Red Clearance	2.2	1.2	2.3	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

SCALE 0 20 1"=20'

Bethesda Road / Bethesda Court at Hawthorne Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	LM Moon
PREPARED BY:	JA Wiles	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-217

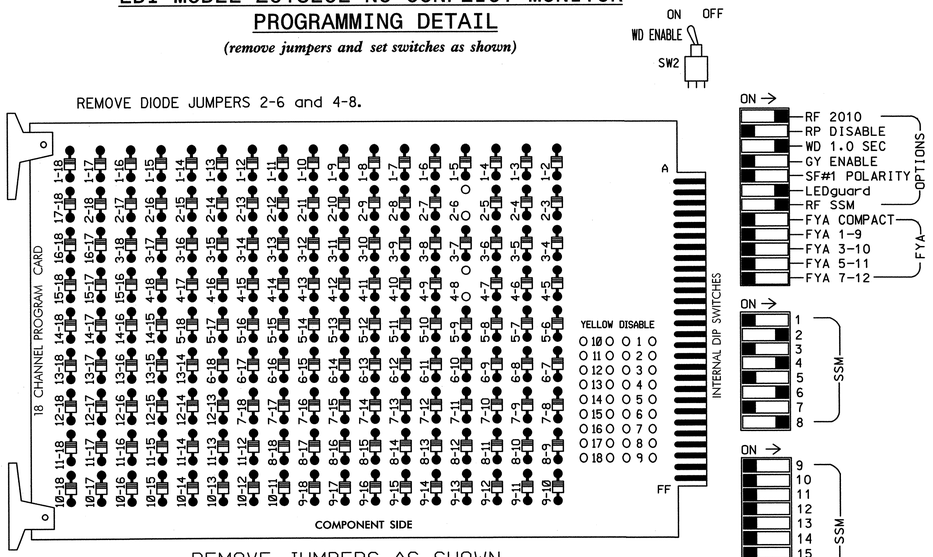
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
01:#transportation#Traffic#Curr#100022712 Winston Salem Sig Sys#Signals#Design#Melissa#C-217_Bethesda and Hawthorne_Atkins.dgn
25.51

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.283

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	Ø4 4A	SLOT EMPTY	Ø6 6A	SLOT EMPTY	Ø8 8A,8B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		Ø2 2B,2C		Ø4 4B		Ø6 6B		NOT USED						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B,2C	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A,8B	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-217
DESIGNED: 03-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethesda Road / Bethesda Court
at
Hawthorne Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

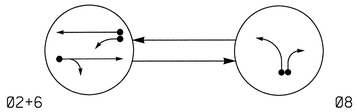
SIG. INVENTORY NO. C-217

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
O:\Transportation\Traffic\Curr\100022112 Winston Salem Sig Sys\Signals\Design\Melissa\Wiring\C-217e.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 284

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

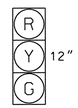
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	FLASH
21,22	G	R	Y
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21,22
61,62
81,82

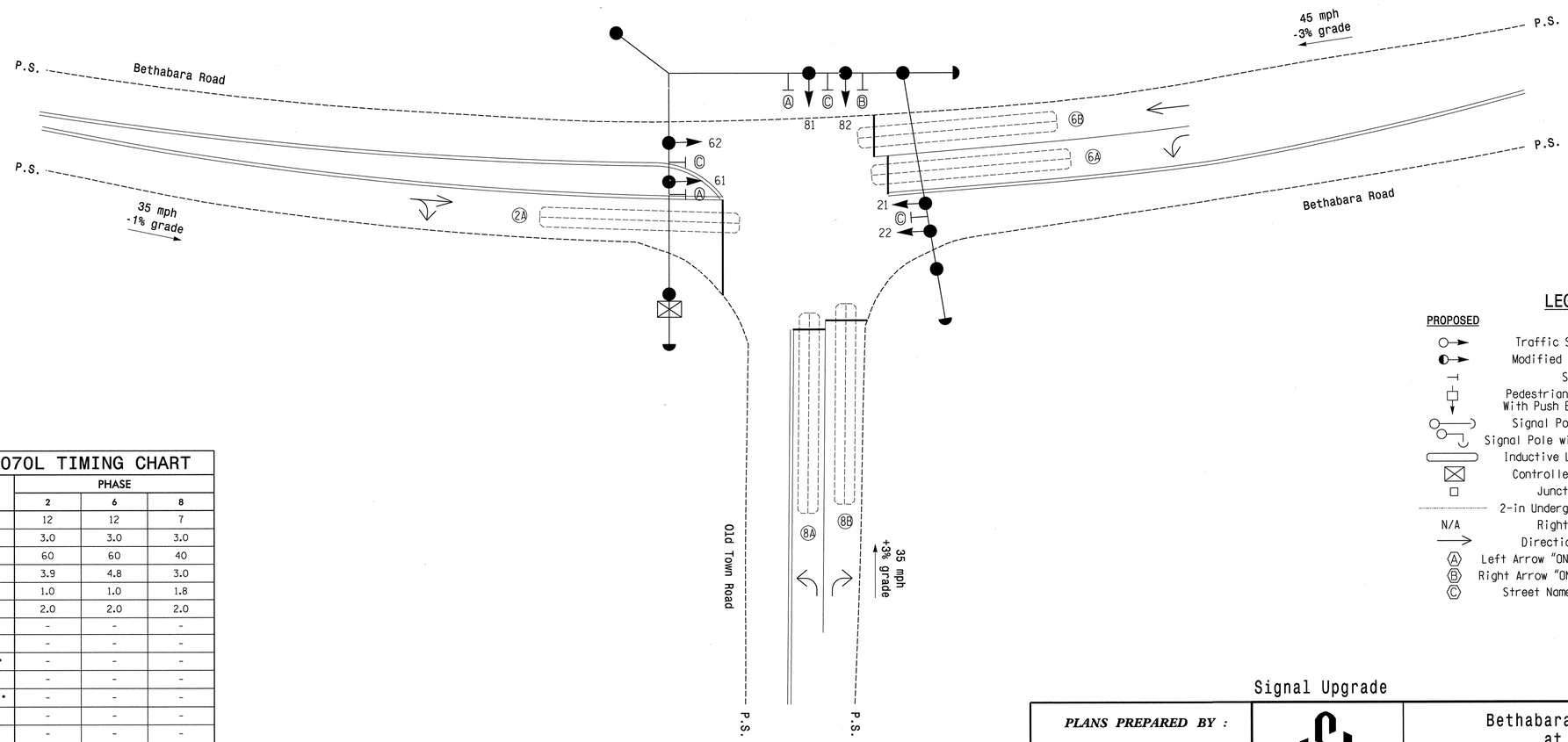
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x60	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
6A	6x60	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6x60	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A,8B	6x60	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B
C	Street Name Sign (D3-1)	C

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	12	12	7
Extension 1 *	3.0	3.0	3.0
Max Green 1 *	60	60	40
Yellow Clearance	3.9	4.8	3.0
Red Clearance	1.0	1.0	1.8
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20 1"=20'

Bethabara Road
at
Old Town Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

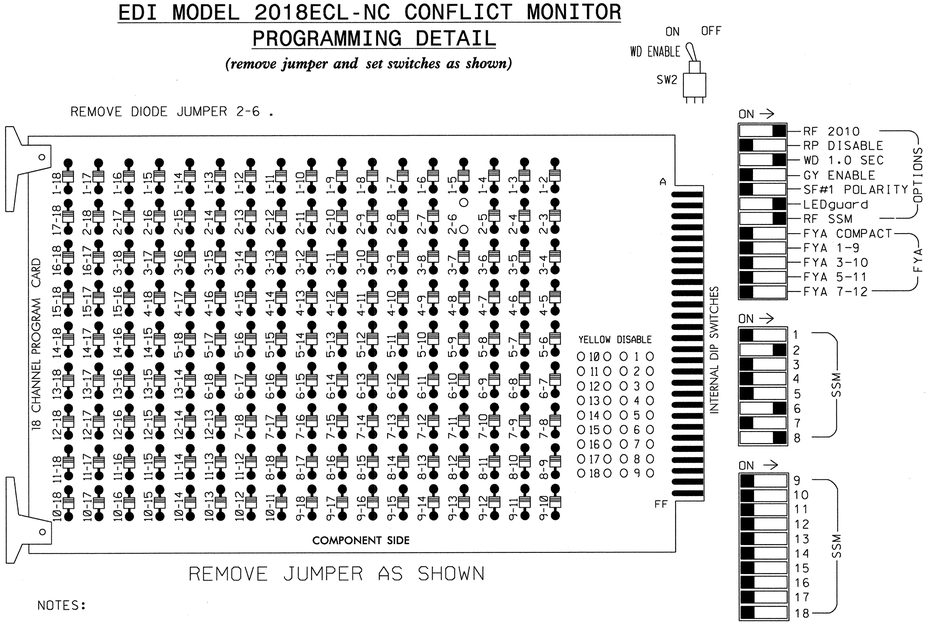
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER C. BYRON HOLDEN
3/22/2013
SIGNATURE DATE
SIG. INVENTORY NO. C-218

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase 8\C-218.dgn
FKeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 285

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S8,S11
PHASES USED.....2,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6 6A	SLOT EMPTY	Ø8 8A,8B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		NOT USED				Ø6 6B		NOT USED						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A,8B	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-218
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethabara Road
at
Old Town Road

Division 09 Forsyth County Winston-Salem

PLAN DATE: 3/22/2013	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-218

3/22/2013
R:\Traffic\Signals\Electrical Details\Phase B\C-2184-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224	Sig. 286

PHASING DIAGRAM

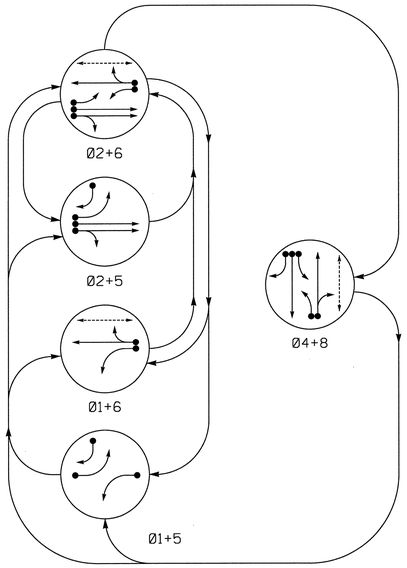


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	R	R	G	G	R	Y
22,23	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

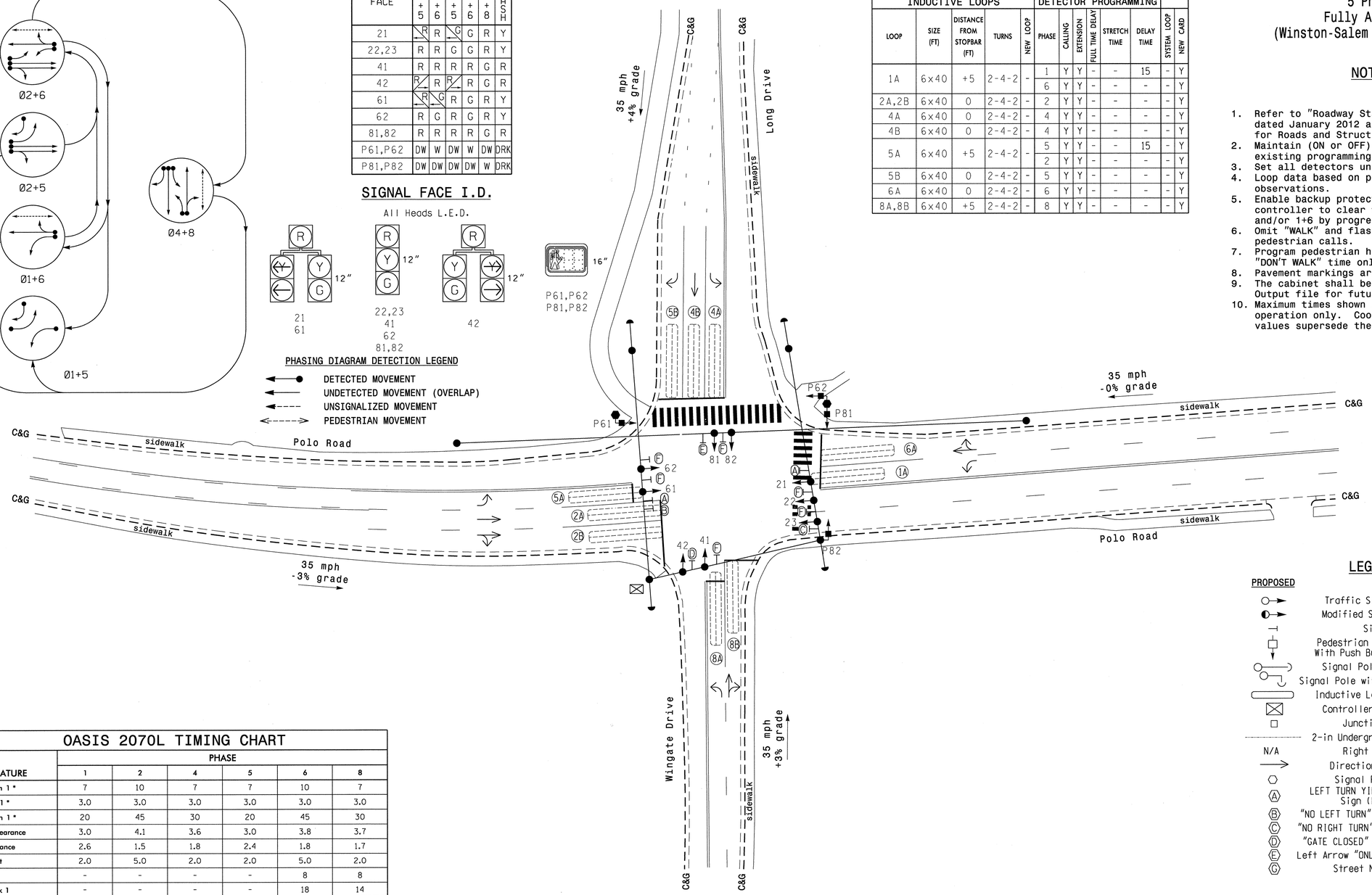
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A,2B	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
5B	6x40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A	6x40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A,8B	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Enable backup protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 2+5 and/or 1+6 by progressing through an all red display.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
8. Pavement markings are existing.
9. The cabinet shall be designed to include Auxiliary Output file for future use.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Signal Pedestal	
Ⓐ	LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓐ
Ⓑ	"NO LEFT TURN" (Lighted Sign)	Ⓑ
Ⓒ	"NO RIGHT TURN" (Lighted Sign)	Ⓒ
Ⓓ	"GATE CLOSED" (Lighted Sign)	Ⓓ
Ⓔ	Left Arrow "ONLY" Sign (R3-5L)	Ⓔ
Ⓖ	Street Name Sign	Ⓖ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	45	30	20	45	30
Yellow Clearance	3.0	4.1	3.6	3.0	3.8	3.7
Red Clearance	2.6	1.5	1.8	2.4	1.8	1.7
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	8	8
Don't Walk 1	-	-	-	-	18	14
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 30 1"=30'

N

Polo Road
at
Long Drive / Wingate Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE:	4/17/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHYRON HOLDEN

SIGNATURE 4/17/2013 DATE

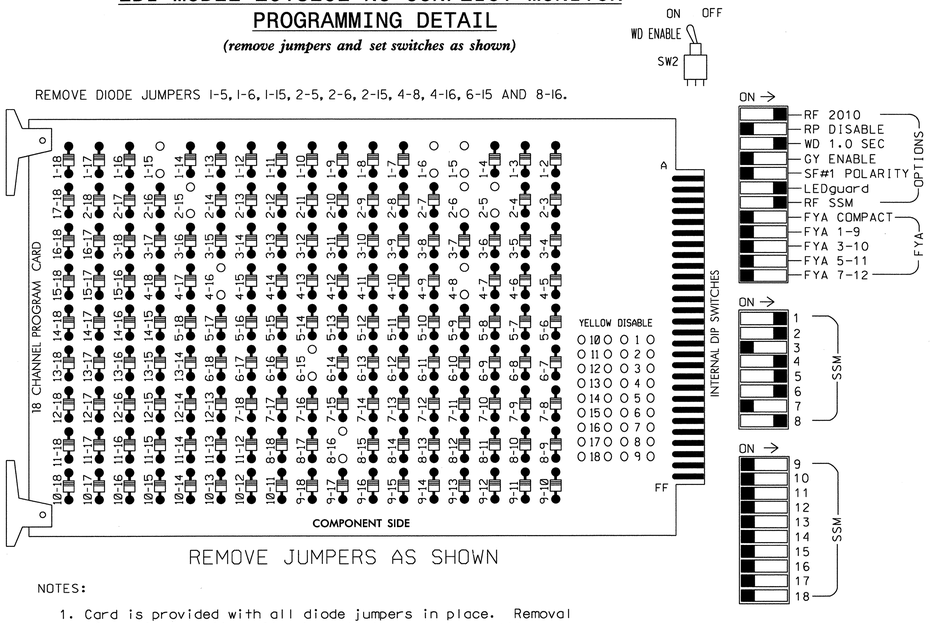
SIG. INVENTORY NO. C-231

4/17/2013
R:\Traffic\Signals\SIGNALS\Phase BMC-231.dgn
bholden

PROJECT REFERENCE NO.	SHEET NO.
C-5224	SIG. 287

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 6 and 8 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22, 23	NU	NU	41,42	NU	21,42	61,62	P61, P62	NU	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED	*	128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋									119			110						
🚶									121			112						

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/ AUX*
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S9,S11,S12
PHASES USED.....1,2,4,5,6,8,6PED,8PED
OVERLAPS.....NONE

* Aux file to be installed for future use

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø2	SLOT	WIRED ⊗ INPUT	SLOT	Ø4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	Ø6 PED	FS
		1A	2A,2B	EMPTY		EMPTY	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR	DC ISOLATOR
	L	NOT USED	NOT USED				Ø4							Ø8 PED	ST
							4B							DC ISOLATOR	DC ISOLATOR
FILE "J"	U	Ø5	Ø5	SLOT	WIRED ⊗ INPUT	SLOT	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	5B	EMPTY		EMPTY	8A,8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	Ø6				NOT USED								
			6A												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
6A	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A,8B	TB5-9,10	J6U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

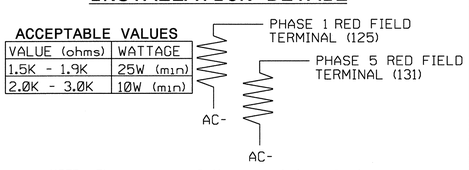
(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-231
DESIGNED: 4/17/2013
SEALED: 4/17/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Polo Road
at
Long Drive / Wingate Drive

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 4/17/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

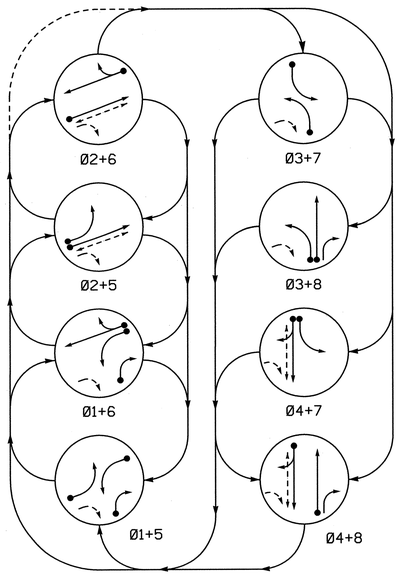
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
4/17/13
SIGNATURE | DATE
SIG. INVENTORY NO. C-231

4/17/2013
R:\Traffic\Signals\Electrical Details\Phase B\C-231e-02-141.dgn
bhaldan

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 288

PHASING DIAGRAM

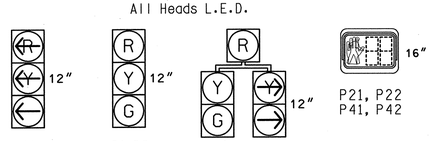


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



11, 31, 51, 71 — 21,22, 41,42, 61,62, 81 — 82 — P21, P22, P41, P42

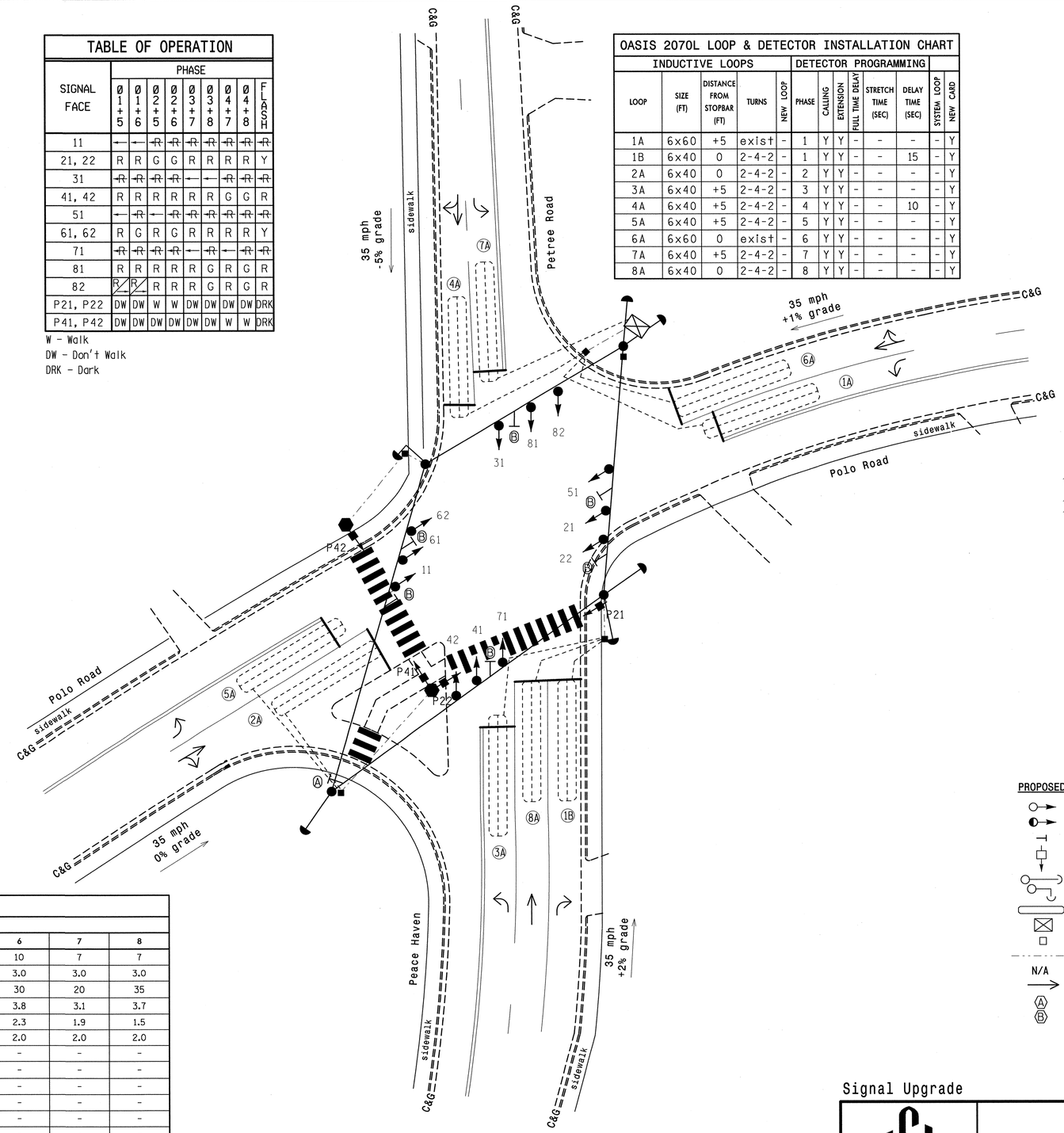
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/~~R~~	R/~~R~~	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME (SEC)	DELAY TIME (SEC)	SYSTEM LOOP	NEW CARD
1A	6x60	+5	exist	-	1	Y	Y	-	-	-	-	Y
1B	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
3A	6x40	+5	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6x40	+5	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A	6x60	0	exist	-	6	Y	Y	-	-	-	-	Y
7A	6x40	+5	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y



8 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Loop data based on previous plan and/or field observation.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
8. The cabinet should be designed to include an Auxiliary Output file for future use.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. Pavement markings are existing.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	25	30	20	30	20	30	20	35
Yellow Clearance	3.0	3.8	3.0	4.2	3.0	3.8	3.1	3.7
Red Clearance	3.5	1.6	2.6	1.7	2.8	2.3	1.9	1.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	4	-	4	-	-	-	-
Don't Walk 1	-	11	-	8	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	-	-	-	-	-	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

N

SCALE 0 20 1"=20'

Polo Road
at
Peace Haven Road /
Petree Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M Moon 3-22-13
SIGNATURE DATE

SIG. INVENTORY NO. C-254

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

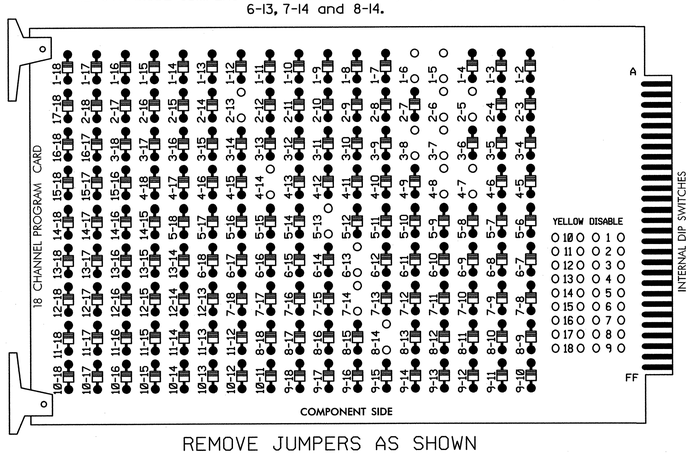
21-MAR-2013 15:40
O:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Lisa\C-254.dgn
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.289

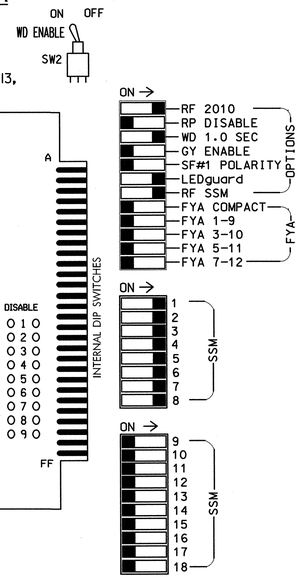
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 2-13, 3-7, 3-8, 4-7, 4-8, 4-14, 5-13, 6-13, 7-14 and 8-14.



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 4 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX ✱
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S10,S11
PHASES USED.....1,2,2PED,3,4,4PED,5,6,7,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
✱ Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 82	21,22	P21, P22	31	41,42	P41, P42	51	61,62	NU	71	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125			116			131			122								
YELLOW ARROW	126	126		117			132			123								
FLASHING YELLOW ARROW																		
GREEN ARROW	127	127		118			133			124								
✋			113			104												
🚶			115			106												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø1 1A	Ø2 2A	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 1B	NOT USED		NOT USED	NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U		Ø5 5A	Ø6 6A	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED	NOT USED		NOT USED	NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-254
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Polo Road
at
Peace Haven Road /
Petree Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

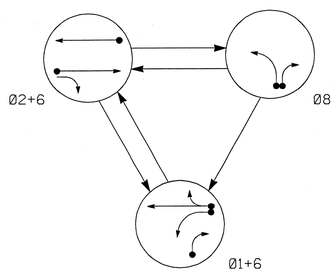
SIG. INVENTORY NO. C-254

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
O:*Transportation\Traffic\Curr\100022112 Winston Salem Sig Sys\Signals\Design\Misc\Wiring Diagrams\C-254b.dgn
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-290

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

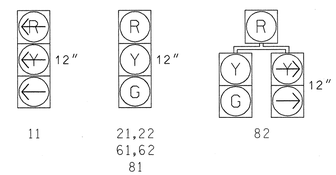
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
11	←	~~R~~	~~R~~	~~R~~
21,22	R	G	R	Y
61,62	G	G	R	Y
81	R	R	G	R
82	R/→	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



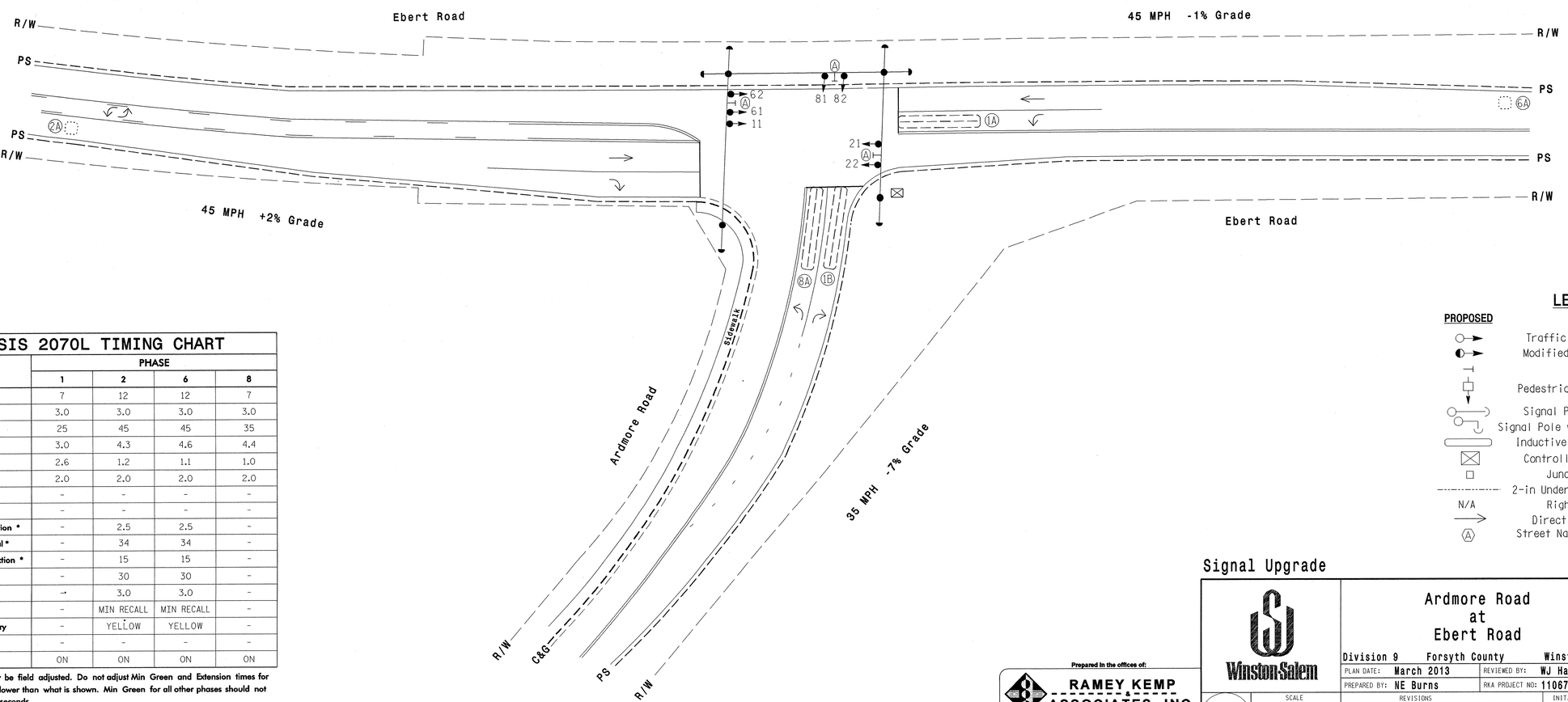
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	EXIST	-	1	Y	Y	-	-	-	-	Y
1B	6X40	0	EXIST	-	1	Y	Y	-	-	15	-	Y
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	EXIST	-	8	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. Loop data based on previous plan and/or field observations.
6. The cabinet should be designed to include an Auxiliary Output File for future use.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	12	12	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	25	45	45	35
Yellow Clearance	3.0	4.3	4.6	4.4
Red Clearance	2.6	1.2	1.1	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	2.5	-
Max Variable Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	30	30	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-9418 Fax.
www.ramey-kemp.com

Winston-Salem

SCALE 0 30 1"=30'

Ardmore Road at Ebert Road

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton

PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

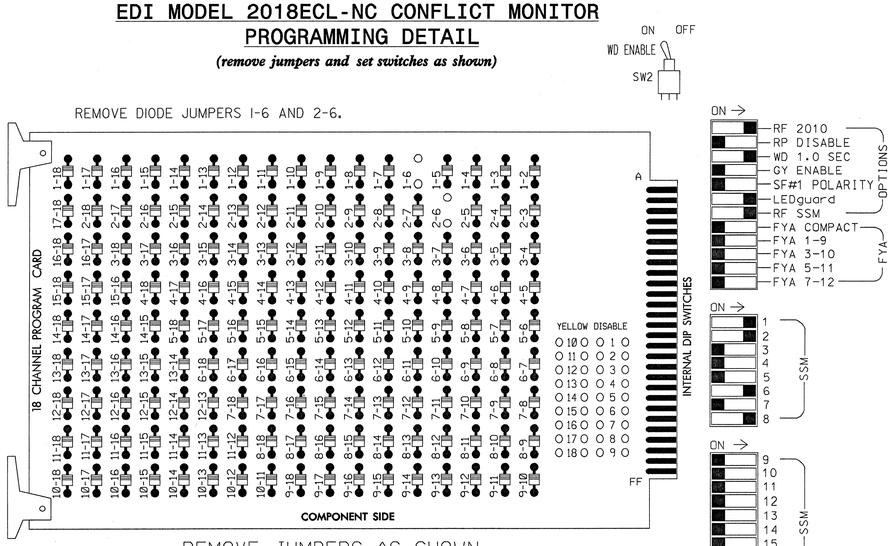
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-260

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-291

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	OLF
SIGNAL HEAD NO.	11	82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED			128						134			107							
YELLOW			129						135			108							
GREEN			130						136			109							
RED ARROW	125																		
YELLOW ARROW	126	126																	
GREEN ARROW	127	127																	
✋																			
🚶																			

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S8,S11
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED											ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-260
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Ardmore Road
at
Ebert Road

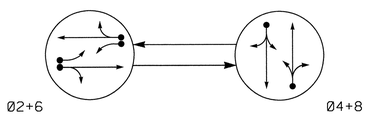
Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY:	WJ Hamilton	
PREPARED BY: NE Burns	REVIEWED BY:	11067 (040)	
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
SIG. INVENTORY NO. C-260

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 292

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42,43	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42,43
61,62
81,82

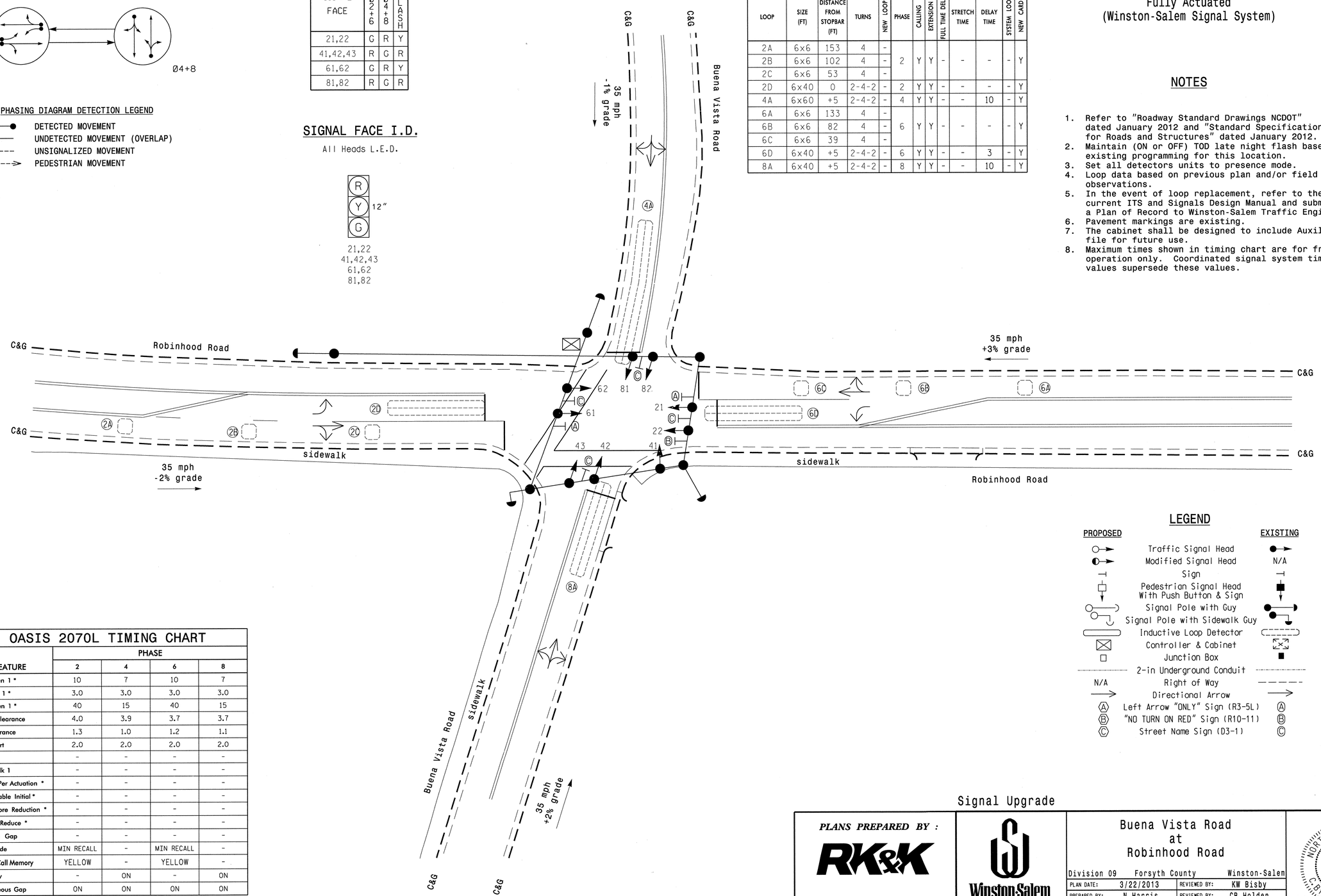
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x6	153	4	-	2	Y	Y	-	-	-	-	Y
2B	6x6	102	4	-								
2C	6x6	53	4	-								
2D	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x60	+5	2-4-2	-	4	Y	Y	-	-	10	-	Y
6A	6x6	133	4	-	6	Y	Y	-	-	-	-	Y
6B	6x6	82	4	-								
6C	6x6	39	4	-								
6D	6x40	+5	2-4-2	-	6	Y	Y	-	-	3	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	10	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Pavement markings are existing.
7. The cabinet shall be designed to include Auxiliary Output file for future use.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	"NO TURN ON RED" Sign (R10-11)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	40	15	40	15
Yellow Clearance	4.0	3.9	3.7	3.7
Red Clearance	1.3	1.0	1.2	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 1"=20' (0 – 20)

Buena Vista Road
at
Robinhood Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER C. BYRON HOLDEN

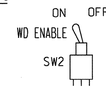
SIGNATURE DATE 3/22/2013

SIG. INVENTORY NO. C-264

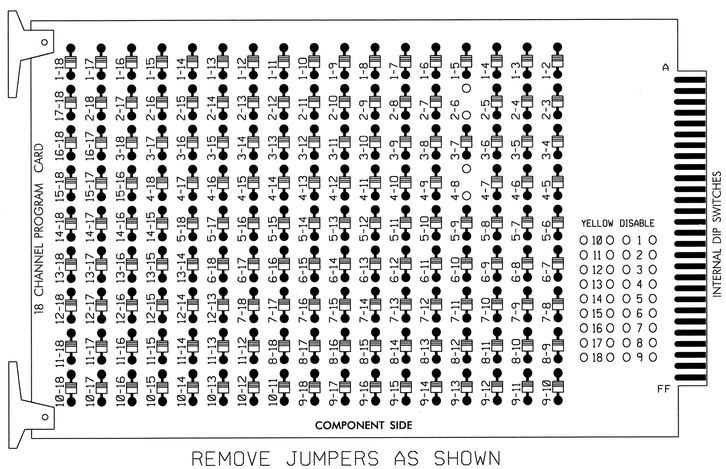
3/21/2013
R:\Traffic\Signals\SIGNALS\Phase BWC-264.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 293

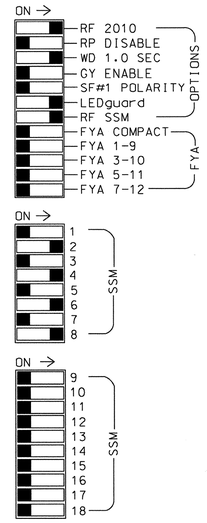
EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6 AND 4-8.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

*Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42, 43	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		
✋																		
🚶																		

NU = Not Used

INPUT FILE POSITION LAYOUT
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø 2 / 2A,2B,2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 / 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / DC ISOLATOR
	L		Ø 2 / 2D				NOT USED								ST / DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 / 6A,6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 6 / 6D				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
6D	TB3-7,8	J2L	44	6	16	6	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-264
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Buena Vista Road
at
Robinhood Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 3/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-264

3/22/2013
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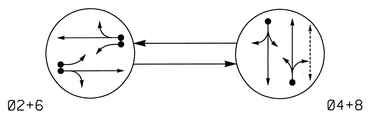
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 294

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22,23	G	R	Y
41,42	R	G	R
61,62,63	G	R	Y
81,82	R	G	R
P41,P42	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

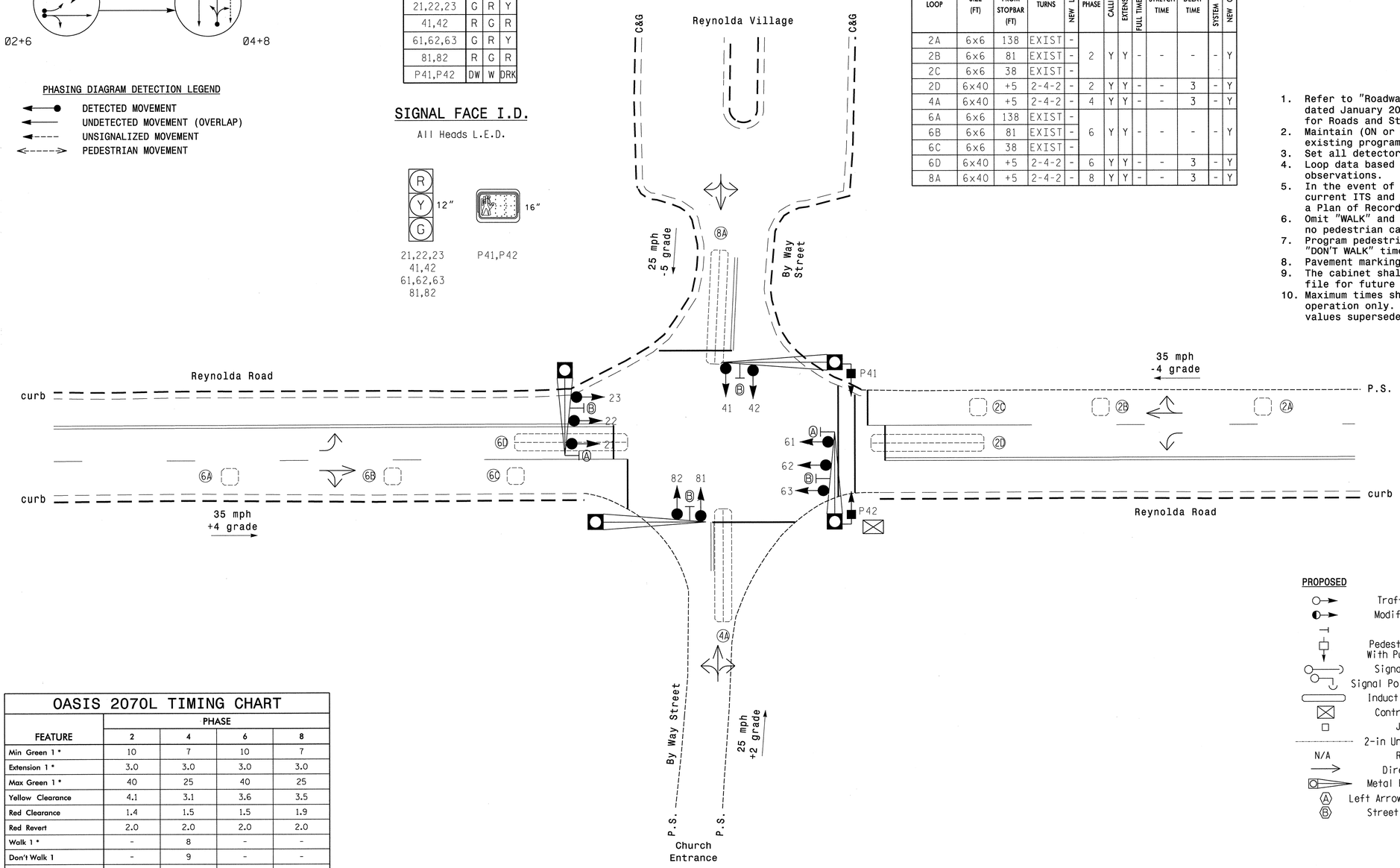
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x6	138	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6x6	81	EXIST	-								
2C	6x6	38	EXIST	-								
2D	6x40	+5	2-4-2	-	2	Y	Y	-	-	3	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	3	-	Y
6A	6x6	138	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6x6	81	EXIST	-								
6C	6x6	38	EXIST	-								
6D	6x40	+5	2-4-2	-	6	Y	Y	-	-	3	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	3	-	Y

2 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
8. Pavement markings are existing.
9. The cabinet shall be designed to include Auxiliary Output file for future use.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	40	25	40	25
Yellow Clearance	4.1	3.1	3.6	3.5
Red Clearance	1.4	1.5	1.5	1.9
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	8	-	-
Don't Walk 1	-	9	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20 1"=20'

Reynolda Road
at
By Way Street

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CLYDE BROWN HOLDEN
3/22/2013

SIGNATURE	DATE
SIG. INVENTORY NO.	C-271

3/21/2013
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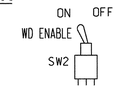
Fkeys

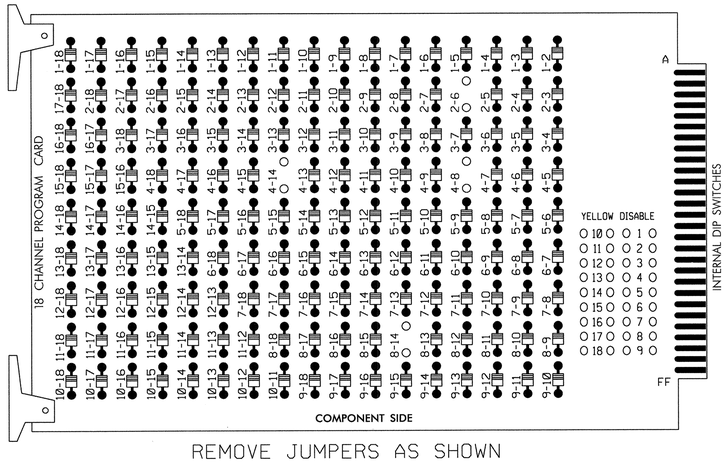
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 295

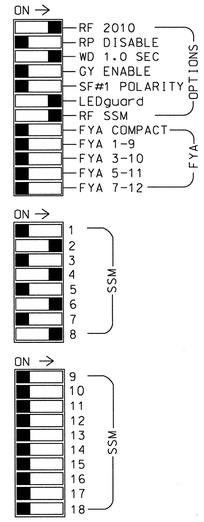
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6, 4-8, 4-14 AND 8-14.





REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S6,S8,S11
PHASES USED.....2,4,6,8,4PED
OVERLAPS.....NONE

*Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22, 23	NU	NU	41,42	P41, P42	NU	61,62, 63	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		
✋						104												
🚶						106												

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A,2B,2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2D				NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A,6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6D				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
2D	TB2-7,8	I2L	43	5	12	2	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
6D	TB3-7,8	J2L	44	6	16	6	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. Program phase 4 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of the Winston-Salem Signal System.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-271
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Winston-Salem

Reynolda Road
at
By Way Street

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 3/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

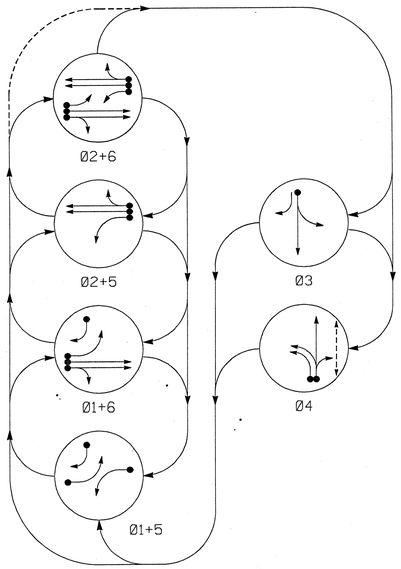
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
James O. Deaton 3/22/13
SIGNATURE DATE
SIG. INVENTORY NO. C-271

3/22/2013
R:\ATCDrafts\Signals\Electrical Details\Phase B\C-271e-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-296

6 Phase
Fully Actuated
(Winston-Salem Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

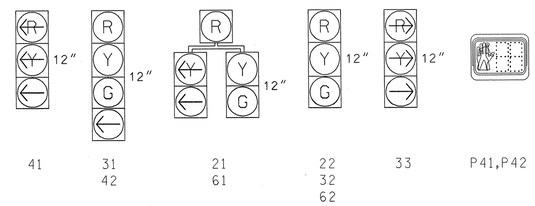
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
21	R	R	G	G	R	R	Y
22	R	R	G	G	R	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
33	→	→	R	R	→	R	R
41	R	R	R	R	R	←	R
42	R	R	R	R	R	G	R
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
P41,P42	DW	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



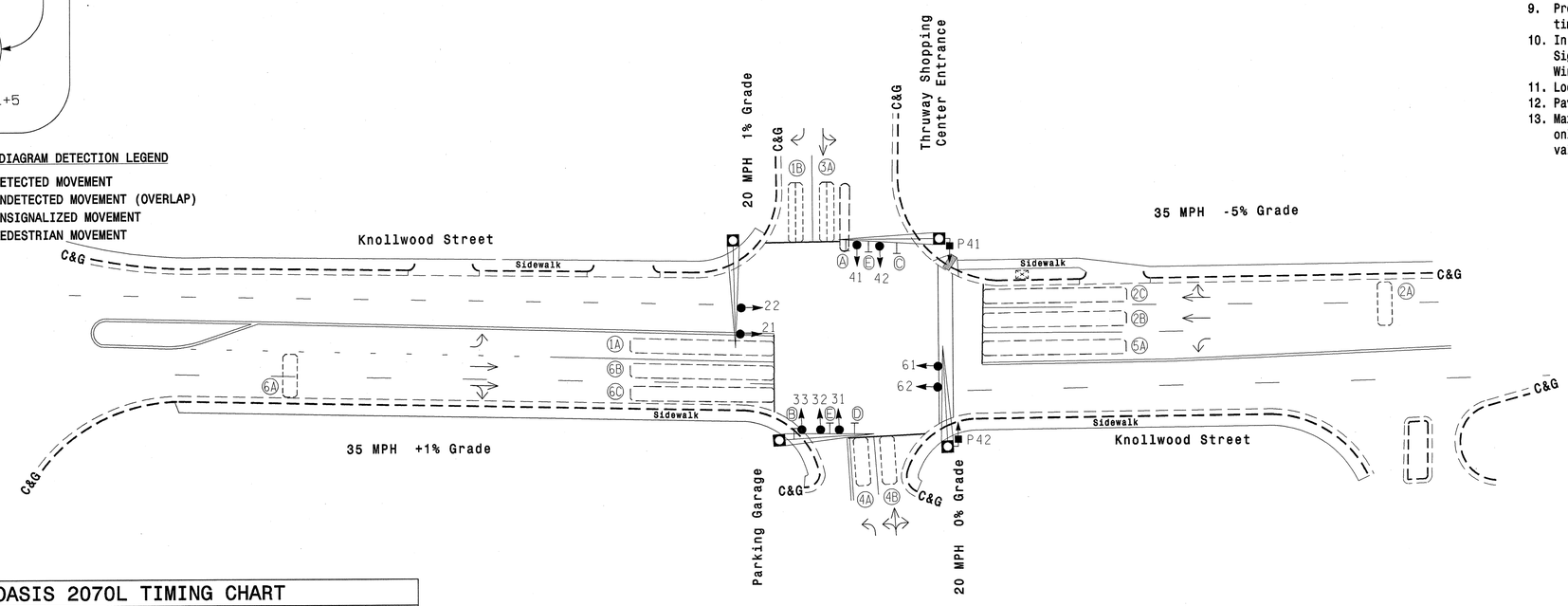
W - Walk
DW - Don't Walk
DRK - Dark

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	EXIST	-	1	Y	Y	-	-	10	-	-
					6	Y	Y	Y	-	-	-	-
1B	6X25	0	EXIST	-	1	Y	Y	-	-	10	-	-
2A	6X18	180	EXIST	-								
2B	6X60	0	EXIST	-	2	Y	Y	-	-	-	-	-
2C	6X60	0	EXIST	-								
3A	6X25	0	EXIST	-	3	Y	Y	-	-	-	-	-
4A	6X20	0	EXIST	-	4	Y	Y	-	-	-	-	-
4B	6X20	0	EXIST	-								
5A	6X40	0	EXIST	-	5	Y	Y	-	-	10	-	-
					2	Y	Y	Y	-	-	-	-
6A	6X18	200	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X60	0	EXIST	-								
6C	6X60	0	EXIST	-								

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phases 2 and 6 to allow the controller to clear from phase 2+6 to phase 2+5 and 1+6 by progressing through an all red display.
4. Phase 1 and/or phase 5 may be lagged.
5. The order of phase 3 and phase 4 may be reversed.
6. Set all detector units to presence mode.
7. The cabinet should be designed to include an Auxiliary Output File for future use.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
11. Loop data based on previous plan and/or field observations.
12. Pavement markings are existing.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	15	40	25	25	15	40
Yellow Clearance	3.0	4.2	3.0	3.0	3.1	3.8
Red Clearance	1.8	1.6	2.6	1.9	2.3	1.4
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1 *	-	-	-	7	-	-
Don't Walk 1	-	-	-	16	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	"RIGHT TURN SIGNAL" Sign (R10-10R)	B
C	Straight and Dual Turn Arrows Sign	C
D	Combined Through and Left Arrow Sign (R3-6L)	D
E	Street Name Sign (D3-1)	E

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Farrington Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-872-5416 Fax.
www.rameykemp.com

Winston-Salem

SCALE 0 30 1"=30'

Knollwood Street
at
Thruway Shopping Center
Entrance

Division 9 Forsyth County Winston Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns RKA PROJ. NO: 11067 (040)

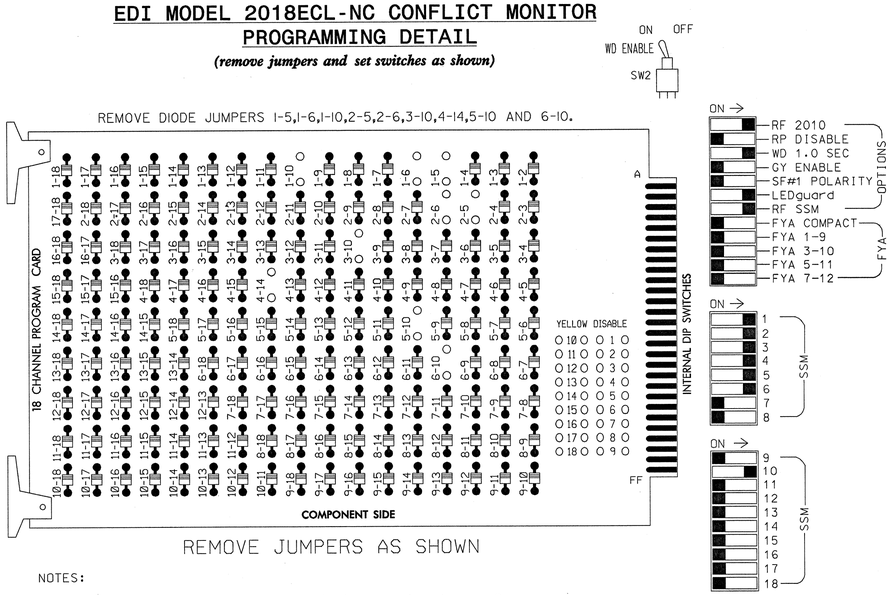
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/08/13 DATE
SIG. INVENTORY NO. C-295

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-297

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A,2B, 2C	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A,4B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED			NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B, 6C	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				NOT USED								

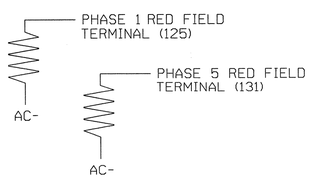
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)



ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2+6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phase 4 for 'STARTUP PED CALL'.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S7,S8,AUX S2
PHASES USED.....1,2,3,4,4PED,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....1+3
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			10
2A,2B,2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB5-9,10	J6U	42	4	8	3	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-295
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	NU	31	32	41	42	P41, P42	21	61,62	NU	NU	NU	NU	NU	33	NU	NU	NU	NU
RED	✳	128		116	116		101		✳	134						A124				
YELLOW		129		117	117		102			135										
GREEN		130		118	118		103			136										
RED ARROW						101														
YELLOW ARROW	126					102			132							A125				
GREEN ARROW	127			118		103	103		133							A126				
✋								104												
🚶								106												

NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press '8' (Overlaps), then '1' (Vehicle Overlap Settings).

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|X X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

Signal Upgrade

Winston-Salem

Knollwood Street at Thruway Shopping Center

Division 9 Forsyth County Winston-Salem

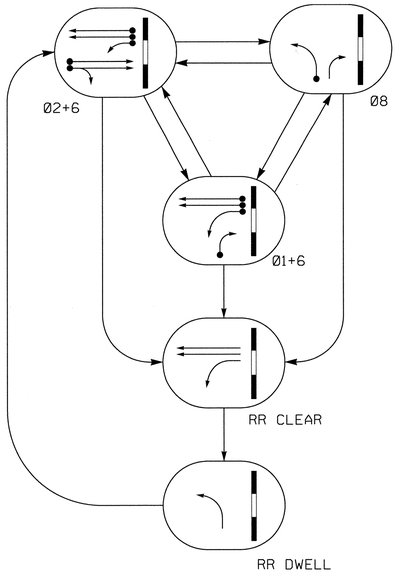
PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns	RKA PROJ. NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE DATE 3/18/13
SIG. INVENTORY NO. C-295

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

VIDEO DETECTION	PROJECT REFERENCE NO.	SHEET NO.
	C-5224 B	Sig. 298



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

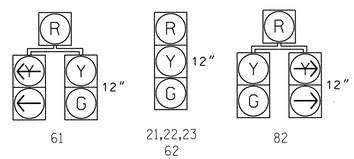
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	RR CLR	RR DWELL	FLASH
21,22,23	R	G	R	R	R	Y
61	G	G	R	G	R	Y
62	G	G	R	G	R	Y
81	R	R	G	R	G	R
82	R	R	G	R	G	R
Sign A	OFF	OFF	OFF	ON	ON	*

* See Note 5

SIGNAL FACE I.D.

All Heads L.E.D.



2070 RAIL PREEMPTION

Interval 1 – Track Clearance Green	26
Interval 1 – Track Clearance Yellow	4.4
Interval 1 – Track Clearance Red	1.7
Interval 2 – Dwell Green	255
Interval 2 – Dwell Yellow	0.0*
Interval 2 – Dwell Red	0.0*
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
Delay Time	0
Min Green Before Pre	1
Ped Clear Before Pre	0
Yellow Clear Before Pre	0.0*
Red Clear Before Pre	0.0*
Dwell Min Time	7
Ped Clear Through Yellow	N

* Time defaults to time used for phase during normal operation.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

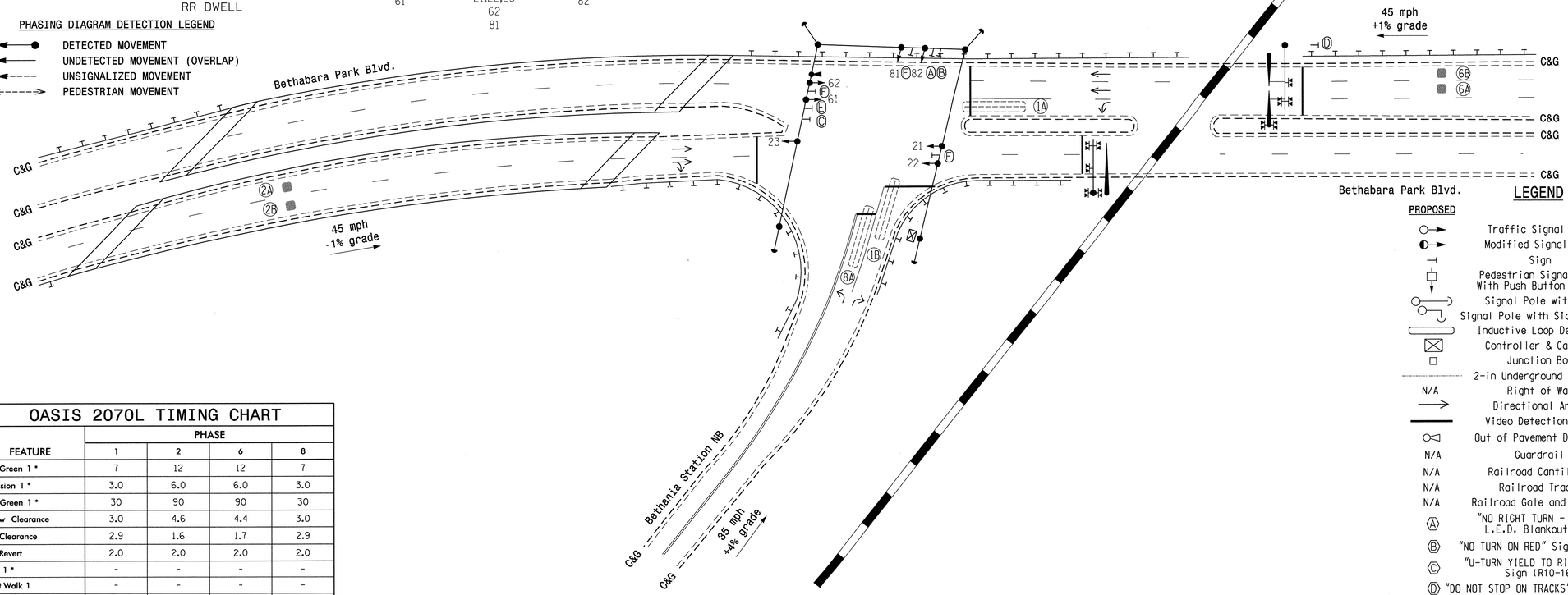
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	-	-	Y
1B	6x40	+5	2-4-2	-	1	Y	Y	-	-	10	-	Y
2A	6x6	300	*	*	2	Y	Y	-	-	-	-	*
2B	6x6	300	*	*	2	Y	Y	-	-	-	-	*
6A	6x6	300	*	*	6	Y	Y	-	-	-	-	*
6B	6x6	300	*	*	6	Y	Y	-	-	-	-	*
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

* Video Detection Zone

3 Phase W/RR Preempt
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Ensure flashing operation does not alter operation of blankout sign.
6. Pavement markings are existing.
7. Program parent phases for Overlap "P" for all phases used in normal operation.
8. The cabinet shall be designed to include Auxiliary Output file for future use.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Video Detection Area	
	Out of Pavement Detector	
N/A	Guardrail	
N/A	Railroad Cantilever	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
A	"NO RIGHT TURN - TRAIN" L.E.D. Blankout Sign	A
B	"NO TURN ON RED" Sign (R10-11)	B
C	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	C
D	"DO NOT STOP ON TRACKS" Sign (R8-8)	D
E	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	E
F	Street Name Sign (D3-1)	F

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	12	12	7
Extension 1 *	3.0	6.0	6.0	3.0
Max Green 1 *	30	90	90	30
Yellow Clearance	3.0	4.6	4.4	3.0
Red Clearance	2.9	1.6	1.7	2.9
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.8	1.8	-
Max Variable Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	30	30	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	SOFT RECALL	SOFT RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 1"=40' (0 – 40)

Bethabara Park Blvd.
at
Bethania Station NB

Division 09 Forsyth County Winston-Salem

PLAN DATE: 3/22/2013	REVIEWED BY: KW Bisby
PREPARED BY: N Harris	REVIEWED BY: CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHRYSTAL B. HOLDEN
3/22/2013
SIGNATURE DATE

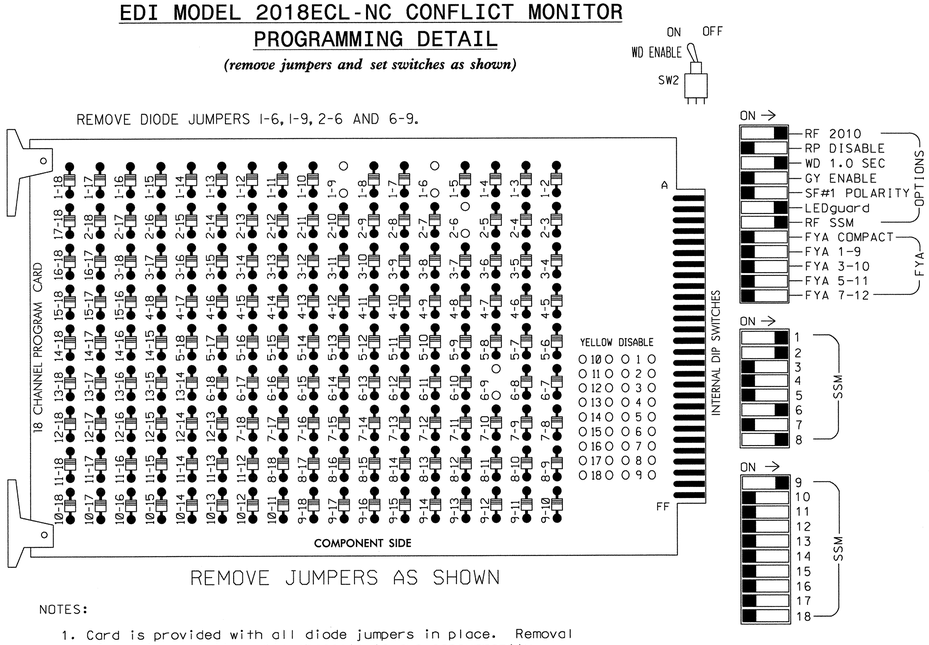
SIG. INVENTORY NO. C-297

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase BWC-297.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 299

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22, 23	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	82	NU	NU	NU	NU	NU
RED	✱	128						134			107		✱					
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW																		
YELLOW ARROW	126												A122					
GREEN ARROW	127												A123					

NU = Not Used

✱ Denotes install load resistor. See load resistor installation detail this sheet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash, and overlap 1 as WAG Overlap.
5. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX FILE
SOFTWARE.....ECONOLITE OASIS 3.02.77
OR LATEST APROVED VERSION
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S8,S11,AUX S1
PHASES USED.....1,2,6,8
OVERLAP A.....1
OVERLAP B.....NONE
OVERLAP C.....NONE
OVERLAP D.....NONE
OVERLAP P.....1+2+6+8

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED												ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L						NOT USED								NOT USED

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			10
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

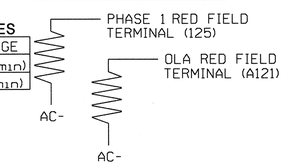
[1] Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

SPECIAL DETECTOR NOTE

Install a machine vision detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-297
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

Electrical Detail - Sheet 1 of 2

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethabara Park Blvd.
at
Bethania Station NB

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 03/22/2013	REVIEWED BY: J O Deaton		
PREPARED BY: M W Yalch	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-297

3/22/2013
R:\Traffic\Signals\Electrical Details\Phase B\C-297e-04-141.dgn
F.Keys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 300

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions).

```
   PREEMPTION  #1  SETTINGS (NEXT:1-10)
 INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
  GRN YEL  RED   ¦123456789101112131415 16
1  26  4.4  1.7  ¦X    X
2 255  0.0  0.0  ¦       X
3   0  0.0  0.0  ¦
4   0  0.0  0.0  ¦
5   1  0.0  0.0  ¦ X   X
EXIT CALLS       ¦
              OPTIONS
PRIORITY (Y/N TO SELECT) ............HIGH
DELAY TIMER (0-255 SEC) .............0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
DWELL MIN TIMER (0-255 SEC) .........7
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................N
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? ......N
PED CLEARANCE THROUGH YELLOW? .......N
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? ......N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? ...............N
ALLOW PEDS IN DWELL INTERVAL? .......N
RE-TIME DWELL INTERVAL? .............N
OVERLAPS:                ¦ ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   ¦
OMIT OVERLAPS:           ¦ X               X
```

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
 PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE:            ¦123456789101112131415 16
VEH OVL PARENTS:   ¦X
VEH OVL NOT VEH:   ¦
VEH OVL NOT PED:   ¦
VEH OVL GRN EXT:   ¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

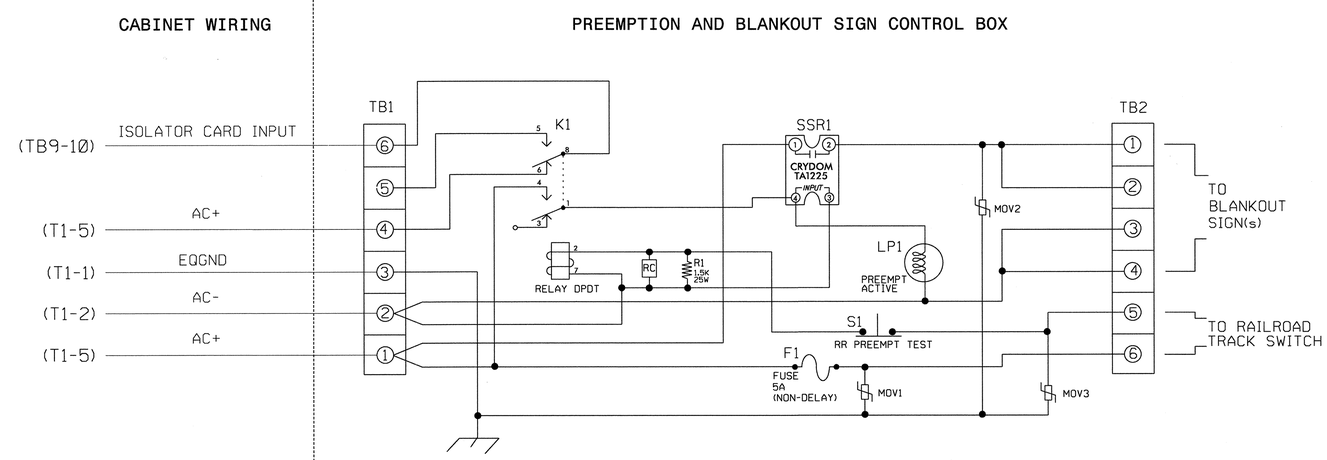
PRESS '+' TO REACH OVERLAP P

```
 PAGE 1: VEHICLE OVERLAP 'P' SETTINGS
 PHASE:            ¦123456789101112131415 16
VEH OVL PARENTS:   ¦XX   X X
VEH OVL NOT VEH:   ¦
VEH OVL NOT PED:   ¦
VEH OVL GRN EXT:   ¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

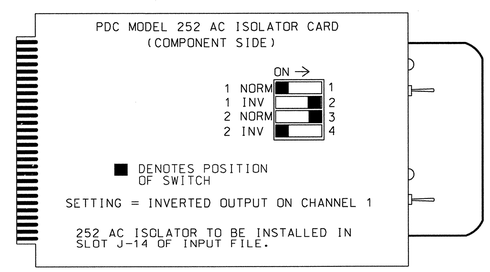


NOTES

1. Relay K1 is shown in the energized (Preempt not active) Normal Operation state.
2. Relay K1 is a DPDT with 120VAC coil OMRON MK2P-3 with octal base (or equivalent).
3. Relay SSR1 is a SPST (normally open) solid state relay with AC input and AC (25 Amp) output. Crydom TA1225 or equivalent.
4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card (See detail this sheet).
5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J-14K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-297
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

Electrical Detail - Sheet 2 of 2

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethabara Park Blvd.
at
Bethania Station NB

Division 09	Forsyth County	Winston-Salem
PLAN DATE: 03/22/2013	REVIEWED BY:	J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

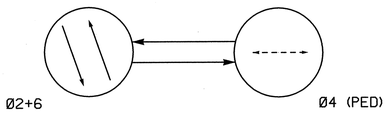
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-297

3/22/2013
R:\Traffic\Signals\Electrical\Details\Phase BWC-297B-04-141.dgn
Pbaugh

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 301

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

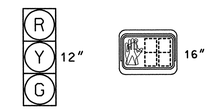
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4 PED	PHASE FLASH
21, 22	G	R	Y
61, 62	G	R	Y
P41, P42	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



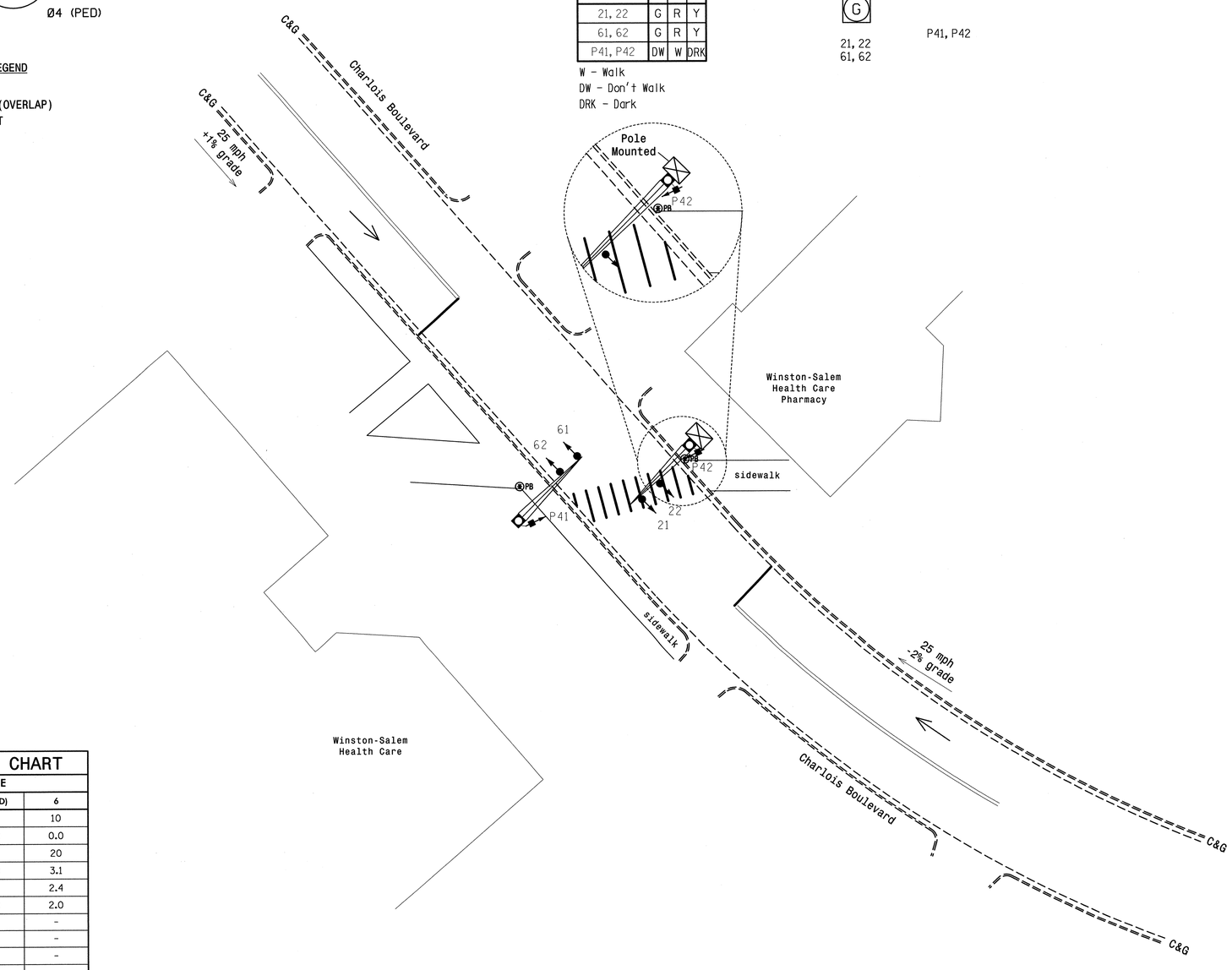
21, 22
61, 62

P41, P42

2 Phase
Semi-Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Metal Pole with Mastarm	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
PB	Push Button Post w/ Sign	N/A

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4 (PED)	PHASE 6
Min Green 1 *	10	8	10
Extension 1 *	0.0	0.0	0.0
Max Green 1 *	20	20	20
Yellow Clearance	3.3	3.0	3.1
Red Clearance	1.4	-	2.4
Red Revert	2.0	2.0	2.0
Walk 1 *	-	8	-
Don't Walk 1	-	12	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MAX RECALL	-	MAX RECALL
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

SCALE 0 20 1"=20'

Charlois Boulevard
at
Healthcare

Division 09 Forsyth County Winston-Salem

PLAN DATE: May 2012	REVIEWED BY: LM Moon
PREPARED BY: AJ Davis	REVIEWED BY: MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M. Moon 3.22.13
SIGNATURE DATE

SIG. INVENTORY NO. C-301

21-MAR-2013 15:40
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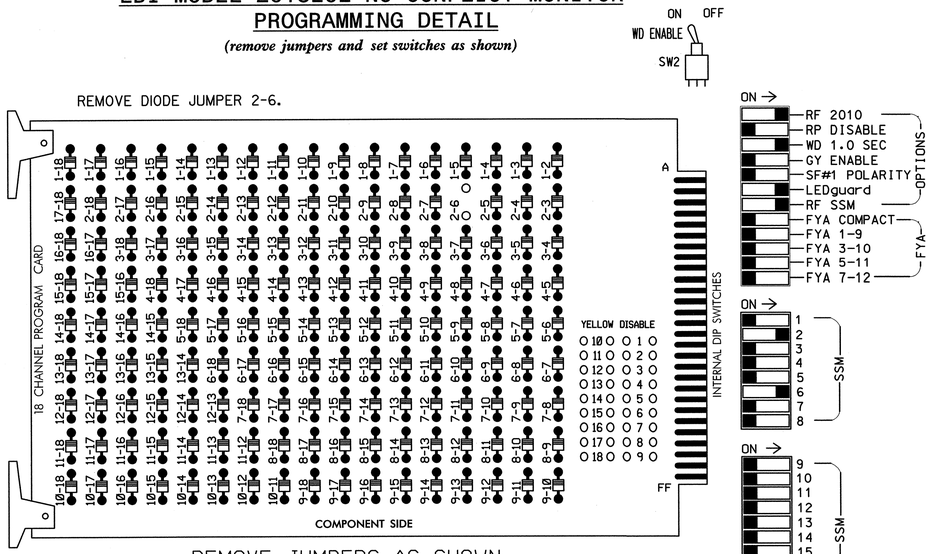
2.0S1

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 302

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phase 4 for 'STARTUP PED CALL'.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S6,S8.
PHASES USED.....2,4*,4PED,6
OVERLAPS.....NONE

*PHASE USED FOR TIMING PURPOSES ONLY

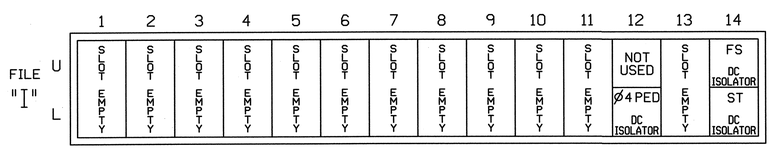
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	P41, P42	NU	61,62	NU	NU	NU	NU
RED		128						134				
YELLOW		129						135				
GREEN		130						136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						
🚶						106						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
PED PUSH BUTTONS											
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-301
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Charlois Boulevard
at
Healthcare

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-301

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
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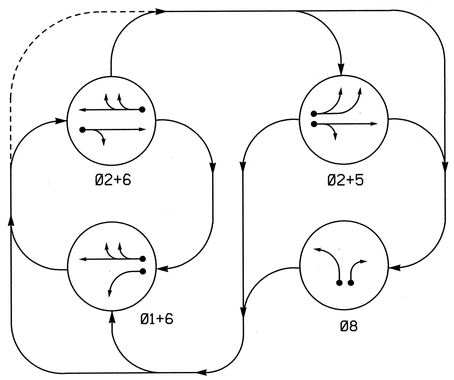
ZS51

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 303

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

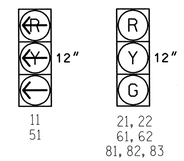
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
11	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	G	G	R	Y
51	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62	G	R	G	R	Y
81, 82, 83	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



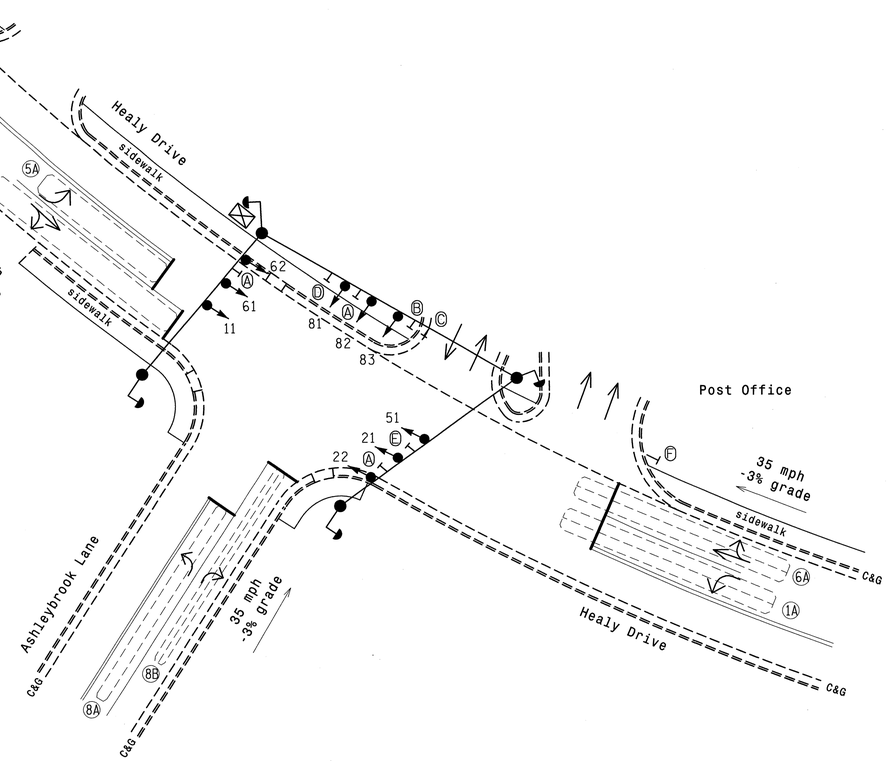
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x60	+10	exist	-	1	Y	Y	-	-	5	-	Y
2A	6x60	0	exist	-	2	Y	Y	-	-	-	-	Y
5A	6x40	0	exist	-	5	Y	Y	-	-	-	-	Y
6A	6x60	+10	exist	-	6	Y	Y	-	-	5	-	Y
8A	4x60	0	exist	-	8	Y	Y	-	-	-	-	Y
8B	4x40	0	2-4-2	-	8	Y	Y	-	-	5	-	Y

4 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "2012 NCDOT Roadway Standard Drawings" and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. The cabinet should be designed to include an Auxiliary Output file for future use.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Street Name Sign	Ⓐ
Ⓑ	"No Turn on Red" Sign (R10-11)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	Left Arrow "ONLY" Sign (R3-5L)	Ⓓ
Ⓔ	"Post Office w / Left Arrow" Sign	Ⓔ
Ⓕ	"Stop Here on Red" Sign (R10-6)	Ⓕ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	40	20	40	30
Yellow Clearance	3.0	3.7	3.0	4.1	3.3
Red Clearance	3.2	1.2	3.4	2.1	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	SOFT RECALL	-
Vehicle Call Memory	-	-	-	-	-
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

SCALE 0 20 1"=20'

Ashleybrook Lane at Healy Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	LM Moon
PREPARED BY:	JA Wiles	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-317

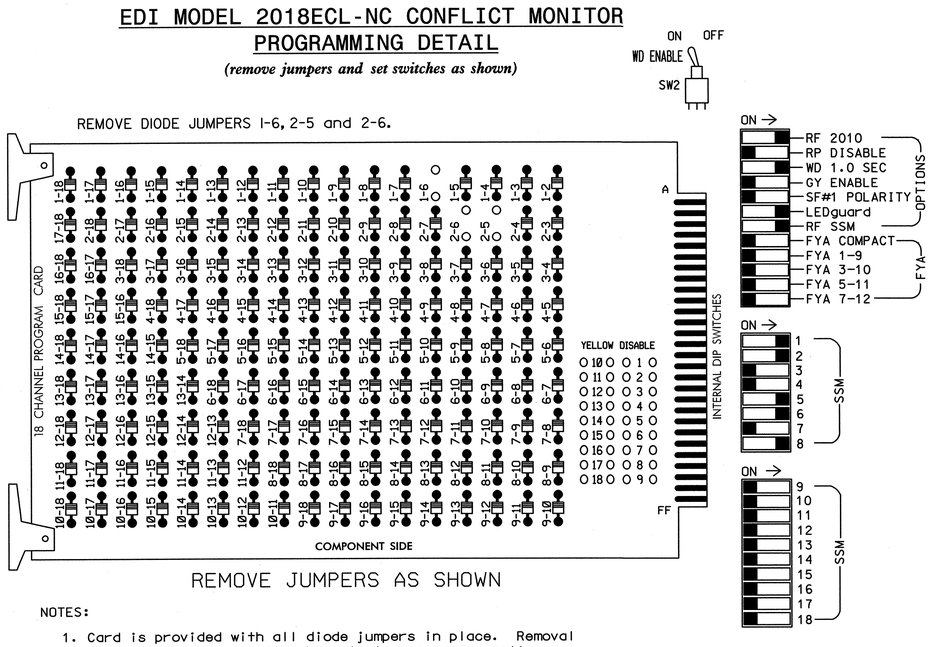
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
D:*Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Melissa\C-317_Ashleybrook and Healy_Atkins.dgn
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.304

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	NU	NU	51	61,62	NU	NU	81,82, 83	NU	NU	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW	125						131											
YELLOW ARROW	126						132											
FLASHING YELLOW ARROW																		
GREEN ARROW	127						133											

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX ✱
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S7,S8,S11
PHASES USED.....1,2,5,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
✱ Aux file to be installed for future use

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘

RNG	LEAD	BARRIER 1		X-LAG	LEAD	BARRIER 2		X-LAG
1	1	2	0	0	0	0	0	0
2	0	6	0	5	0	8	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED												ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				Ø8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			5
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			5
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			5

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-317
DESIGNED: 03-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Ashleybrook Lane
at
Healy Drive

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	March 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

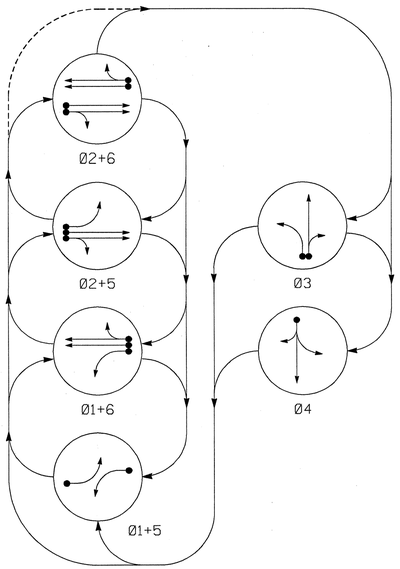
SIG. INVENTORY NO. C-317

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
Q:\Transportation\Traffic\Curr\100022712 Winston Salem Sig Sys\Signals\Design\Melissa\Wiring\C-317e.dgn
25651

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-305

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

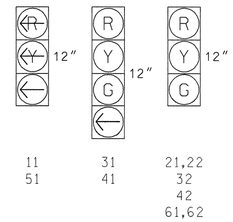
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G ←	R
42	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



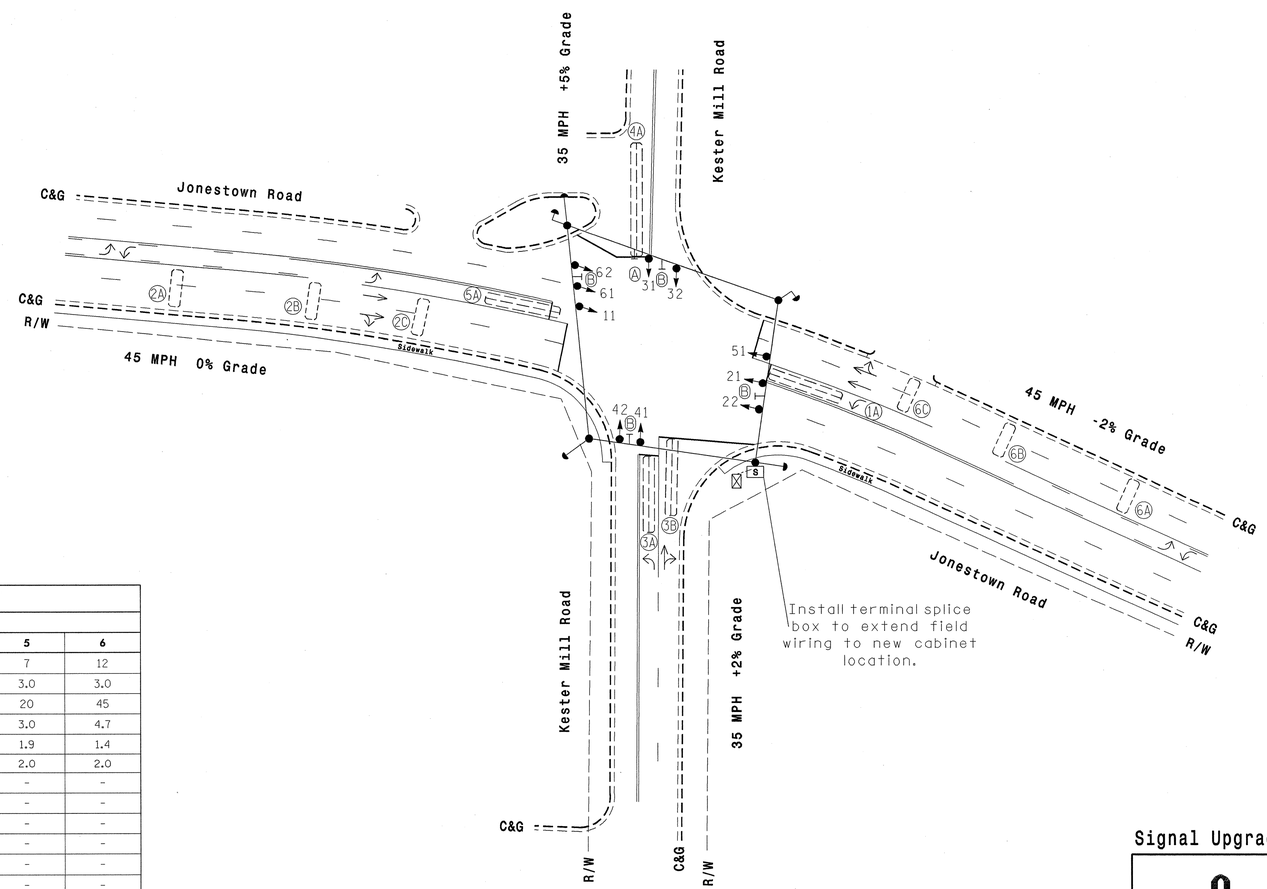
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	EXIST	-	1	Y	Y	-	-	-	-	-
2A	6X18	211	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X18	139	EXIST	-	2	Y	Y	-	-	-	-	-
2C	6X18	82	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X40	0	EXIST	-	3	Y	Y	-	-	-	-	-
3B	6X40	0	EXIST	-	3	Y	Y	-	-	10	-	-
4A	6X60	0	EXIST	-	4	Y	Y	-	-	-	-	-
5A	6X40	+5	EXIST	-	5	Y	Y	-	-	-	-	-
6A	6X18	211	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X18	139	EXIST	-	6	Y	Y	-	-	-	-	-
6C	6X18	82	EXIST	-	6	Y	Y	-	-	-	-	-

6 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based one existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Loop data based on previous plan and/or field observations.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. This cabinet should be designed to include an Auxiliary Output File for future use.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	25	45	25	25	20	45
Yellow Clearance	3.0	4.5	3.7	3.6	3.0	4.7
Red Clearance	2.6	1.3	2.1	1.8	1.9	1.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-6416 Fax.
www.rameykemp.com

Winston-Salem

SCALE 0 40 1"=40'

Jonestown Road at Kester Mill Road

Division 9 Forsyth County Winston Salem

PLAN DATE:	March 2013	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	RKA PROJ. NO:	11067 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

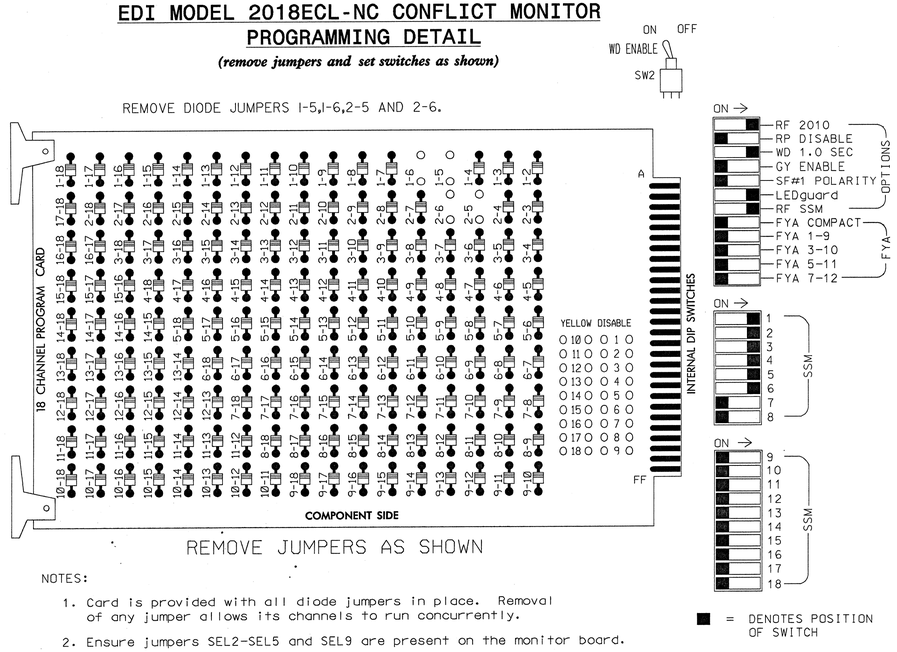
SIGNATURE DATE 3/18/13

SIG. INVENTORY NO. C-327

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-306

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128		116	116	101	101			134										
YELLOW		129		117	117	102	102			135										
GREEN		130		118	118	103	103			136										
RED ARROW	125								131											
YELLOW ARROW	126								132											
GREEN ARROW	127			118		103			133											
✋																				
🚶																				

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	Ø 2 2C	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 2 2B	NOT USED			NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	Ø 3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B	NOT USED			Ø 3 3B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB5-9,10	J6U	42	8	8	3	Y	Y			
3B	TB5-11,12	J6L	46	8	18	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-327
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:

RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Jonestown Road
at
Kester Mill Road

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton		
PREPARED BY: NE Burns	REVIEWED BY: 11067 (040)		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
SIG. INVENTORY NO. C-327

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-307

PHASING DIAGRAM

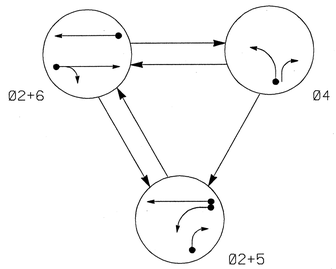
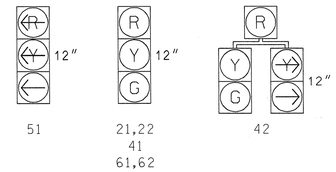


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	←	←R	←R	←R
61,62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X40	0	EXIST	-	4	Y	Y	-	-	-	-	Y
5A	6X40	0	EXIST	-	5	Y	Y	-	-	-	-	Y
5B	6X40	0	EXIST	-	5	Y	Y	-	-	15	-	Y

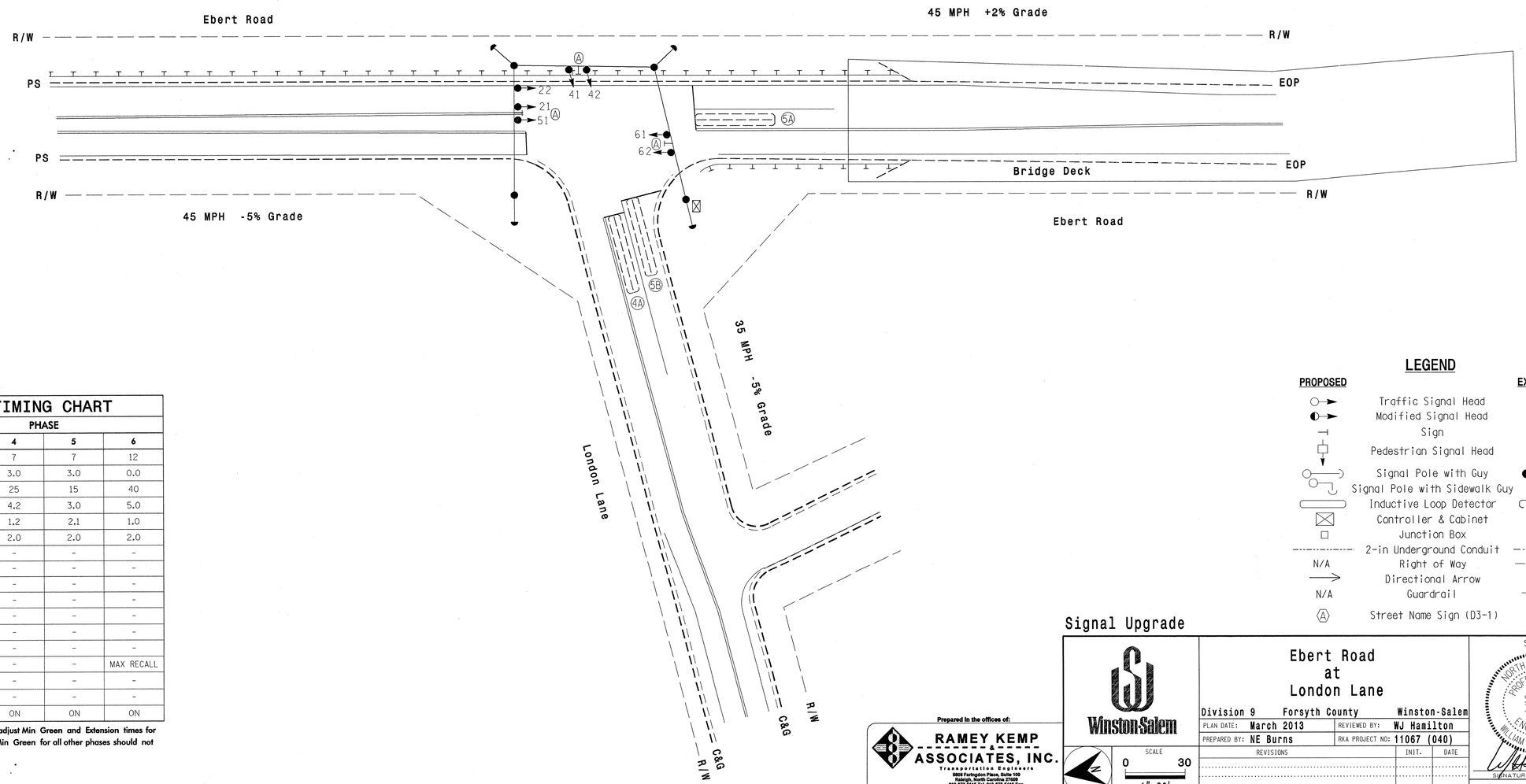
3 Phase
Semi-Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. Loop data based on previous plan and/or field observations.
7. The cabinet should be designed to include an Auxiliary Output File for future use.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	12	7	7	12
Extension 1 *	0.0	3.0	3.0	0.0
Max Green 1 *	40	25	15	40
Yellow Clearance	4.3	4.2	3.0	5.0
Red Clearance	1.2	1.2	2.1	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	-	-	MAX RECALL
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-872-5116 Fax.
www.rameykemp.com

Winston Salem

SCALE 0 30 1"=30'

Ebert Road
at
London Lane

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

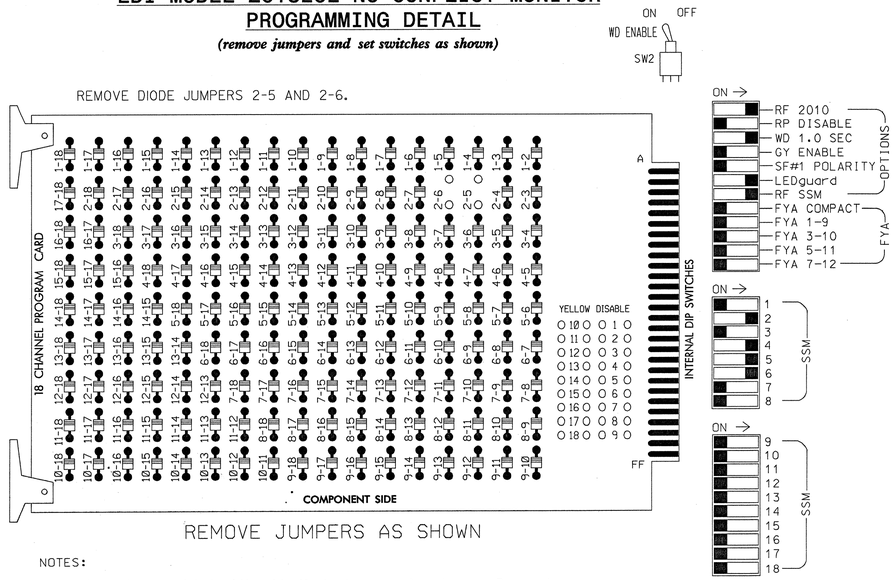
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE DATE 3/18/13
TRAFFIC FILE NO. C-331

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-308

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L						NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED												

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	42	51	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW								131											
YELLOW ARROW							132	132											
GREEN ARROW							133	133											
✋																			
🚶																			

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-331
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Ebert Road
at
London Lane

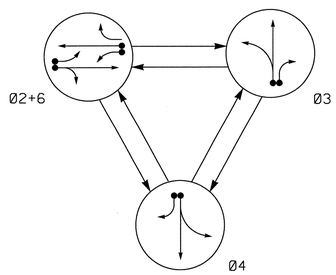
Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY:	WJ Hamilton	
PREPARED BY: NE Burns	REVIEWED BY:	11067 (040)	
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
SIG. INVENTORY NO. C-331

PROJECT REFERENCE NO.	SHEET NO.
C-5224	Sig. 309

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø3	PHASE Ø4	FLASH
21, 22	G	R	R	Y
31	R	G	R	R
32	R	G	R	R
41	R	R	G	R
42	R	R	G	R
61, 62	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
32
42
61, 62

31
41

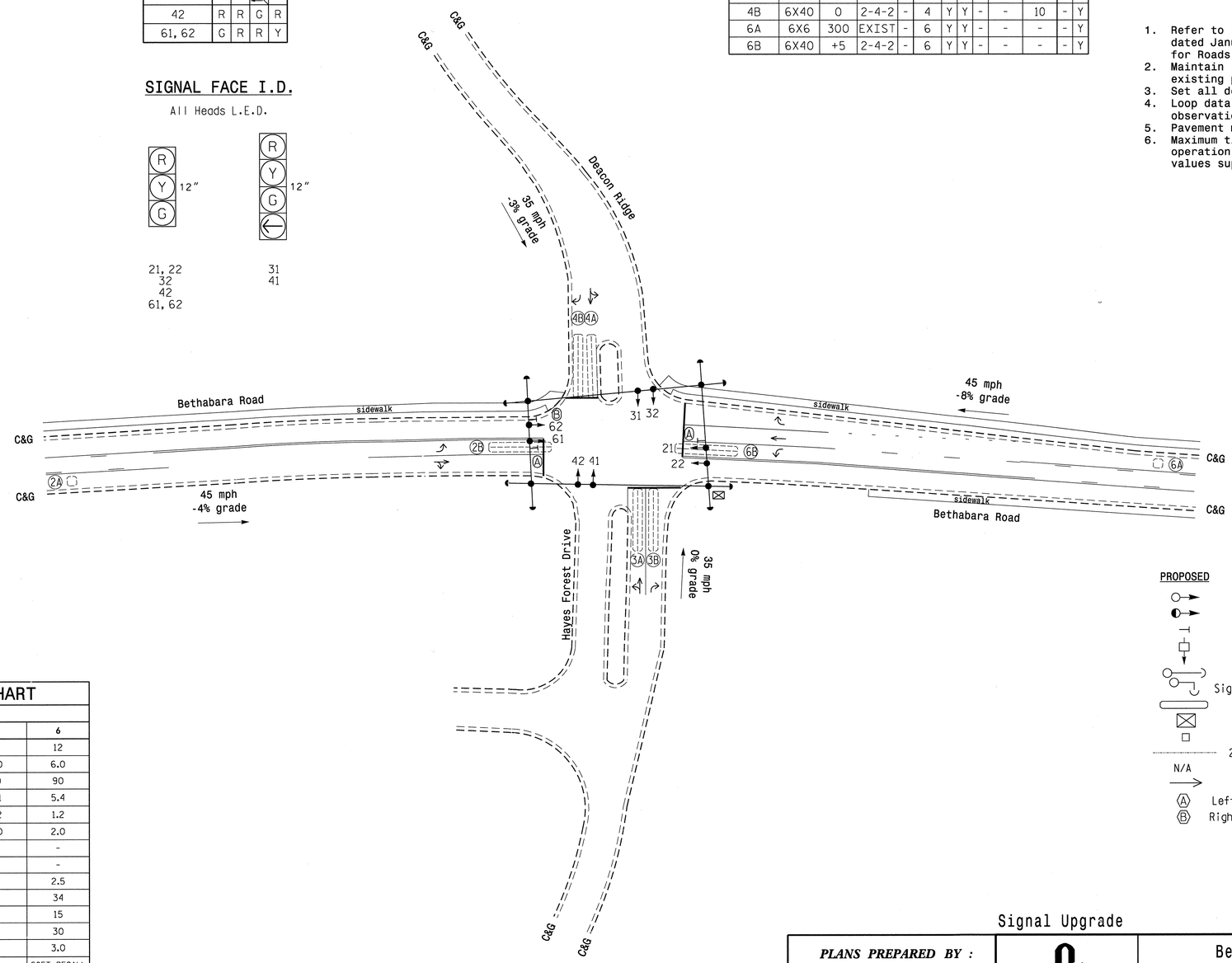
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6X40	+5	2-4-2	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	10	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6X40	+5	2-4-2	-	6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 3	PHASE 4	PHASE 6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	3.0	3.0	6.0
Max Green 1 *	90	20	30	90
Yellow Clearance	4.9	3.8	4.1	5.4
Red Clearance	1.3	1.3	1.2	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40
1"=40'

Bethabara Road
and
Deacon Ridge/Hayes Forest Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE:	4/17/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

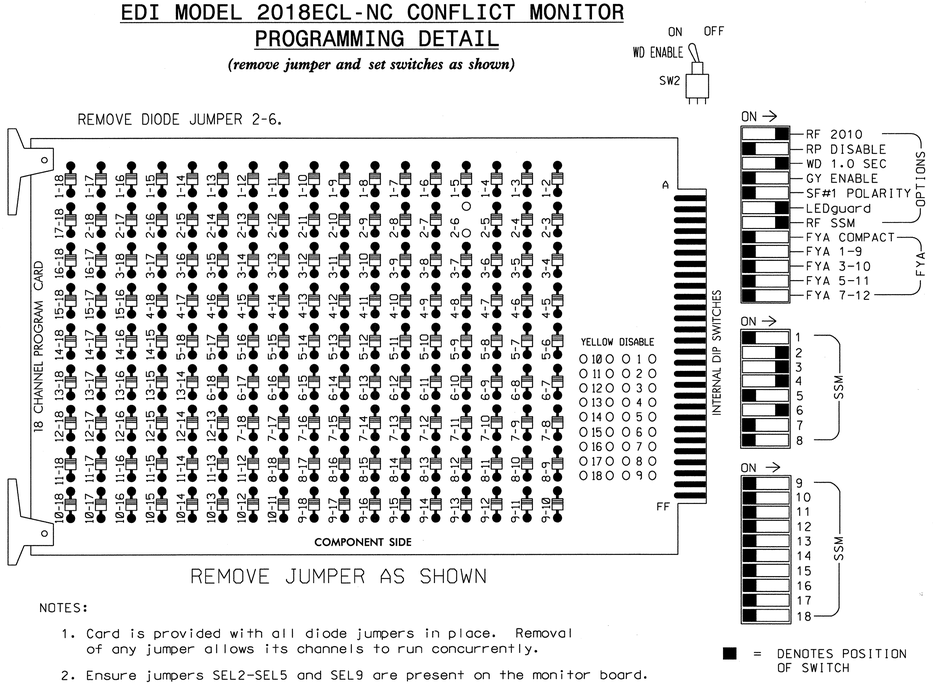
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHYRON HOLDEN
SIGNATURE 4/17/2013 DATE
SIG. INVENTORY NO. C-338

4/17/2013
R:\traffic\Signals\SIGNALS\Phase 8\WC-338.dgn
bholden

PROJECT REFERENCE NO.	SHEET NO.
C-5224	SIG. 310

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	31	32	41	42	NU	NU	61,62	NU	NU	NU	NU
RED		128		116	116	101	101			134				
YELLOW		129		117	117	102	102			135				
GREEN		130		118	118	103	103			136				
RED ARROW														
YELLOW ARROW														
GREEN ARROW				118		103								
✋														
🚶														

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT	Ø2 2A	Ø3 3A	Ø4 4A	SLOT	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	Ø2 2B	Ø3 3B	Ø4 4B	EMPTY	Ø6 6B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	12U	39	1	2	2	Y	Y			
2B	TB23-3,4	12L	43	5	12	2	Y	Y			
3A	TB21-5,6	13U	58	20	3	3	Y	Y			
3B	TB23-5,6	13L	49	11	24	3	Y	Y			10
4A	TB21-7,8	14U	41	3	4	4	Y	Y			
4B	TB23-7,8	14L	45	7	14	4	Y	Y			10
6A	TB21-11,12	16U	40	2	6	6	Y	Y			
6B	TB23-11,12	16L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S5,S8
PHASES USED.....2,3,4,6
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-338
DESIGNED: 4/17/2013
SEALED: 4/17/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethabara Road
and
Deacon Ridge/Hayes Forest Drive

Division 09 Forsyth County Winston-Salem

PLAN DATE: 4/17/2013 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

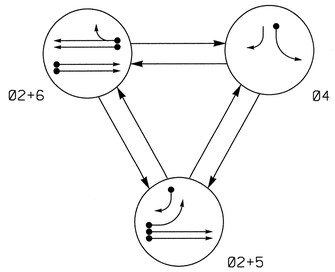
REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
4/17/13
SIGNATURE DATE
SIG. INVENTORY NO. C-338

4/17/2013
R:\#Grafics\Signals\Electrical\Details\Phase BWC-338a-02-141.dgn
bholden

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 311

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21,22,23	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

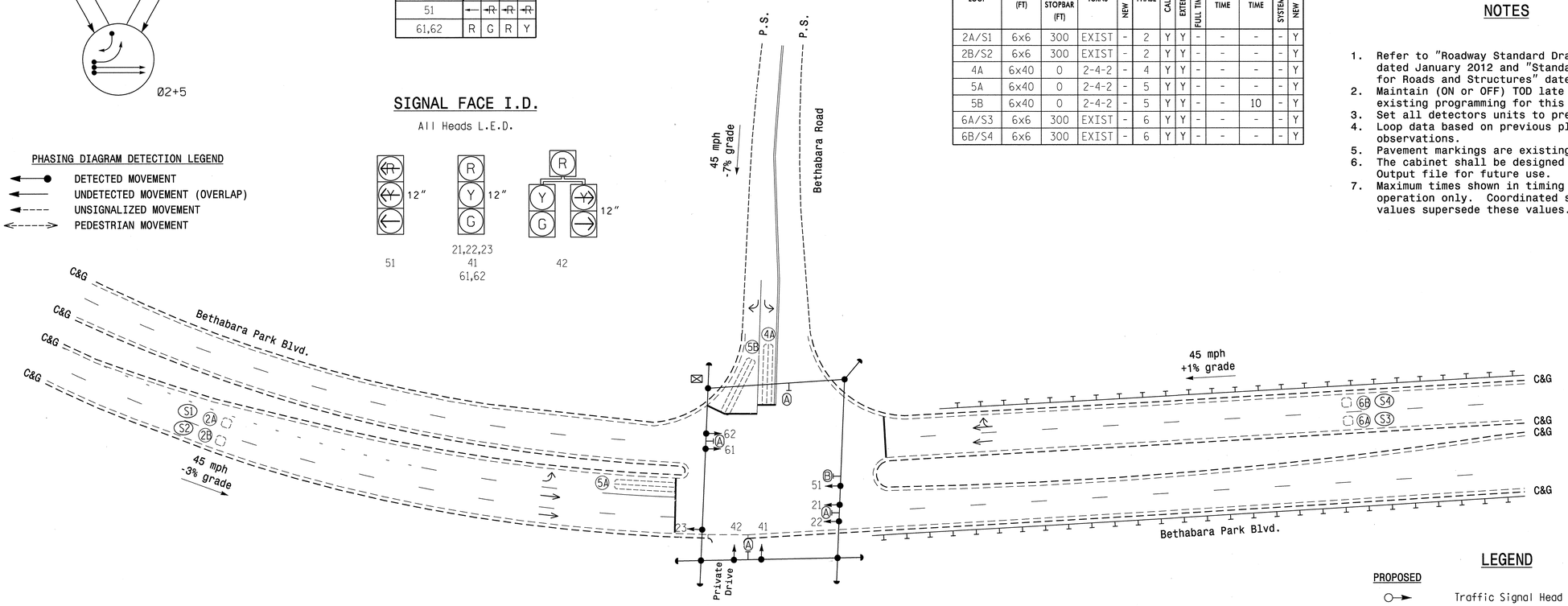
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S1	6x6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B/S2	6x6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6x40	0	2-4-2	-	5	Y	Y	-	-	10	-	Y
6A/S3	6x6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B/S4	6x6	300	EXIST	-	6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. The cabinet shall be designed to include Auxiliary Output file for future use.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
A	Street Name Sign (D3-1)	A
B	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	3.0	3.0	6.0
Max Green 1 *	90	30	25	90
Yellow Clearance	4.8	3.2	3.0	4.4
Red Clearance	1.6	2.3	2.9	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.8	-	-	1.8
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40 1"=40'

Bethabara Park Blvd.
at
Bethabara Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

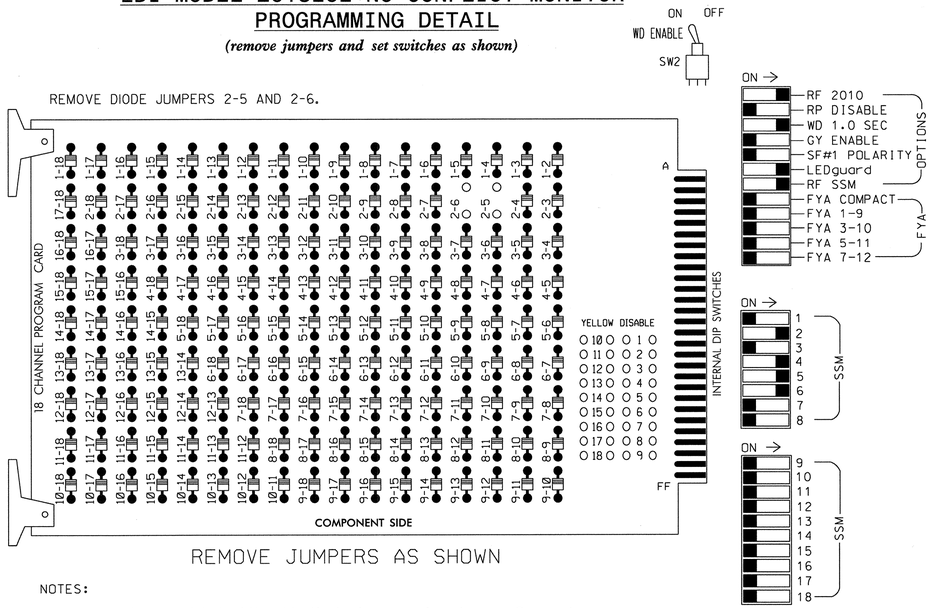
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHRONA HOLDEN
SIGNATURE 3/22/2013 DATE
SIG. INVENTORY NO. C-341

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase 8\C-341.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 312

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w AUX FILE *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED

* Auxiliary file installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22, 23	NU	NU	41,42	NU	42	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW								131											
YELLOW ARROW							132	132											
GREEN ARROW							133	133											
✋																			
🚶																			

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2/SYS	SLOT	SLOT	SLOT	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
			2A/S1				4A								DC ISOLATOR
	L	EMPTY	Ø2/SYS	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST
			2B/S2												DC ISOLATOR
FILE "J"	U	SLOT	Ø 5	Ø6/SYS	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
			5A	6A/S3											
	L	EMPTY	Ø 5	Ø6/SYS	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			5B	6B/S4											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			10
6A/S3	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S4	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-341
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethabara Park Blvd.
at
Bethabara Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 03/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

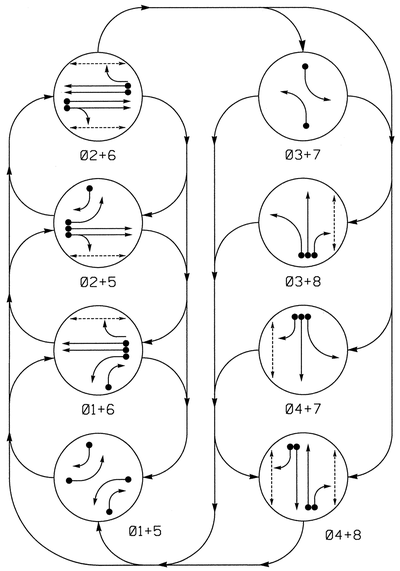
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-341

3/22/2013
R:\Traffic\Signals\ElectricalDetails\Phase BWC-341e-03-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 313

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

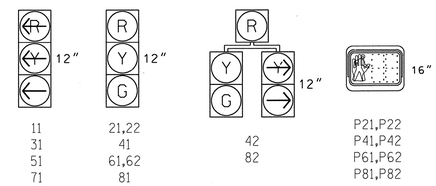
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41	R	R	R	R	R	R	G	G	R
42	R↘	R	R↘	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R↘	R↘	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



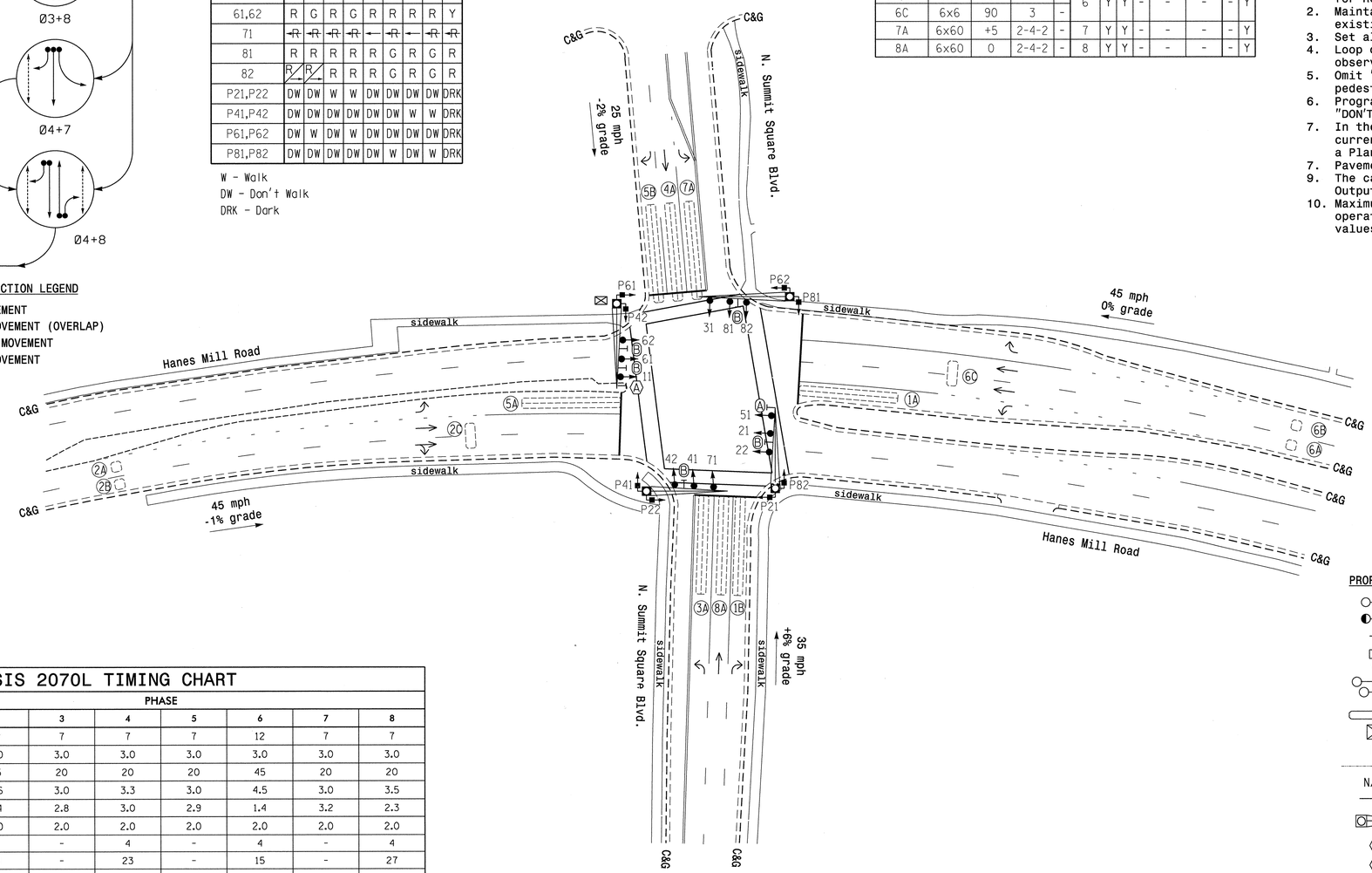
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6x60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A,2B	6x6	300	3	-	2	Y	Y	-	-	-	-	Y
2C	6x6	90	3	-								
3A	6x60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6x60	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6x60	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B	6x60	300	3	-	6	Y	Y	-	-	-	-	Y
6C	6x6	90	3	-								
7A	6x60	+5	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6x60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

8 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Pavement markings are existing.
9. The cabinet shall be designed to include Auxiliary Output file for future use.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	45	20	20	20	45	20	20
Yellow Clearance	3.0	4.6	3.0	3.3	3.0	4.5	3.0	3.5
Red Clearance	2.9	1.4	2.8	3.0	2.9	1.4	3.2	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	4	-	4	-	4	-	4
Don't Walk 1	-	14	-	23	-	15	-	27
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40 1"=40'

Hanes Mill Road
at
N. Summit Square Blvd.

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHRON HOLDEN
3/22/2013

SIGNATURE DATE

SIG. INVENTORY NO. C-342

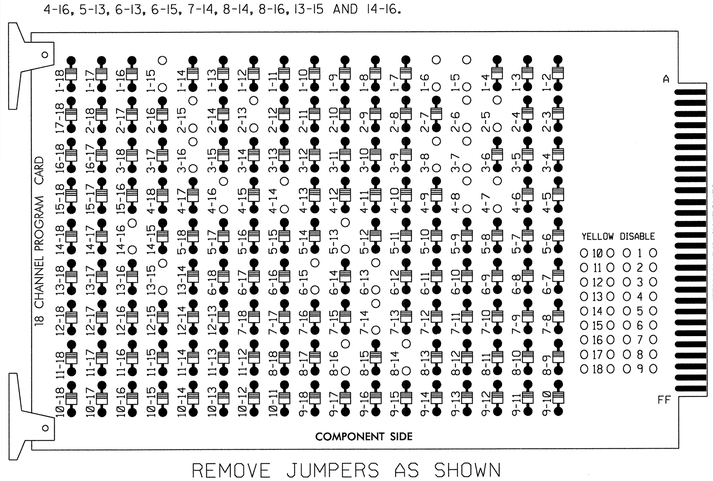
3/21/2013
kwbisby
c:\signals\SIGNALS\Phase 8WC-342.dgn
Pkeys

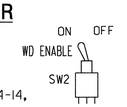
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 314

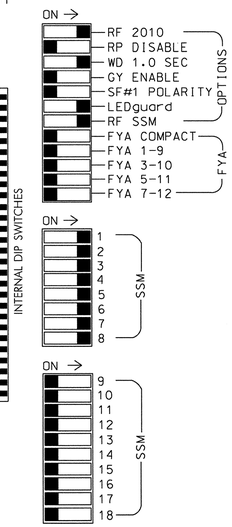
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-13, 6-13, 6-15, 7-14, 8-14, 8-16, 13-15 AND 14-16.







REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX*
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8, S9,S10,S11,S12
PHASES USED.....1,2,3,4,5,6,7,8,2PED, 4PED,6PED,8PED
OVERLAPS.....NONE

* Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4	S5	S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	P21, P22	31	41,42	P41, P42	51	42	61,62	P61, P62	71	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED			128			101				134			107							
YELLOW			129			102				135			108							
GREEN			130			103				136			109							
RED ARROW	125				116			131				122								
YELLOW ARROW	126	126			117			132	132			123								
GREEN ARROW	127	127			118			133	133			124								
✋				113			104				119			110						
🚶				115			106				121			112						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2C	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2A,2B	NOT USED		NOT USED	NOT USED						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6C	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6A,6B	NOT USED		NOT USED	NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A,6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-342
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Signal Upgrade

Hanes Mill Road
at
N. Summit Square Blvd.

Division 09 Forsyth County Winston-Salem

PLAN DATE: 03/22/2013	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

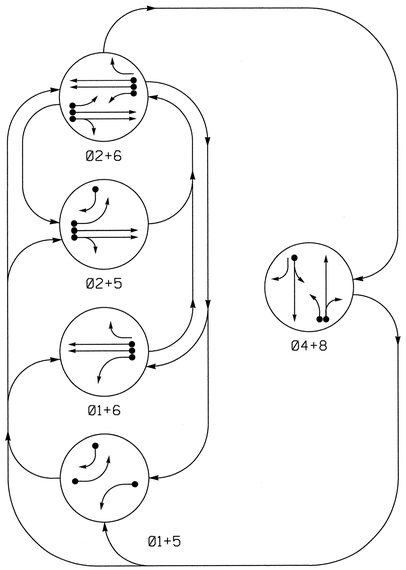
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-342

3/22/2013
R:\Traffic\Signals\Electrical Details\Phase B\C-342a-02-141.dgn
EDWYS

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 315

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	←R	R	←G	G	R	Y
22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R→	R	R→	R	G	R
61	←R	G	R	G	R	Y
62,63	R	G	R	G	R	Y
81,82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

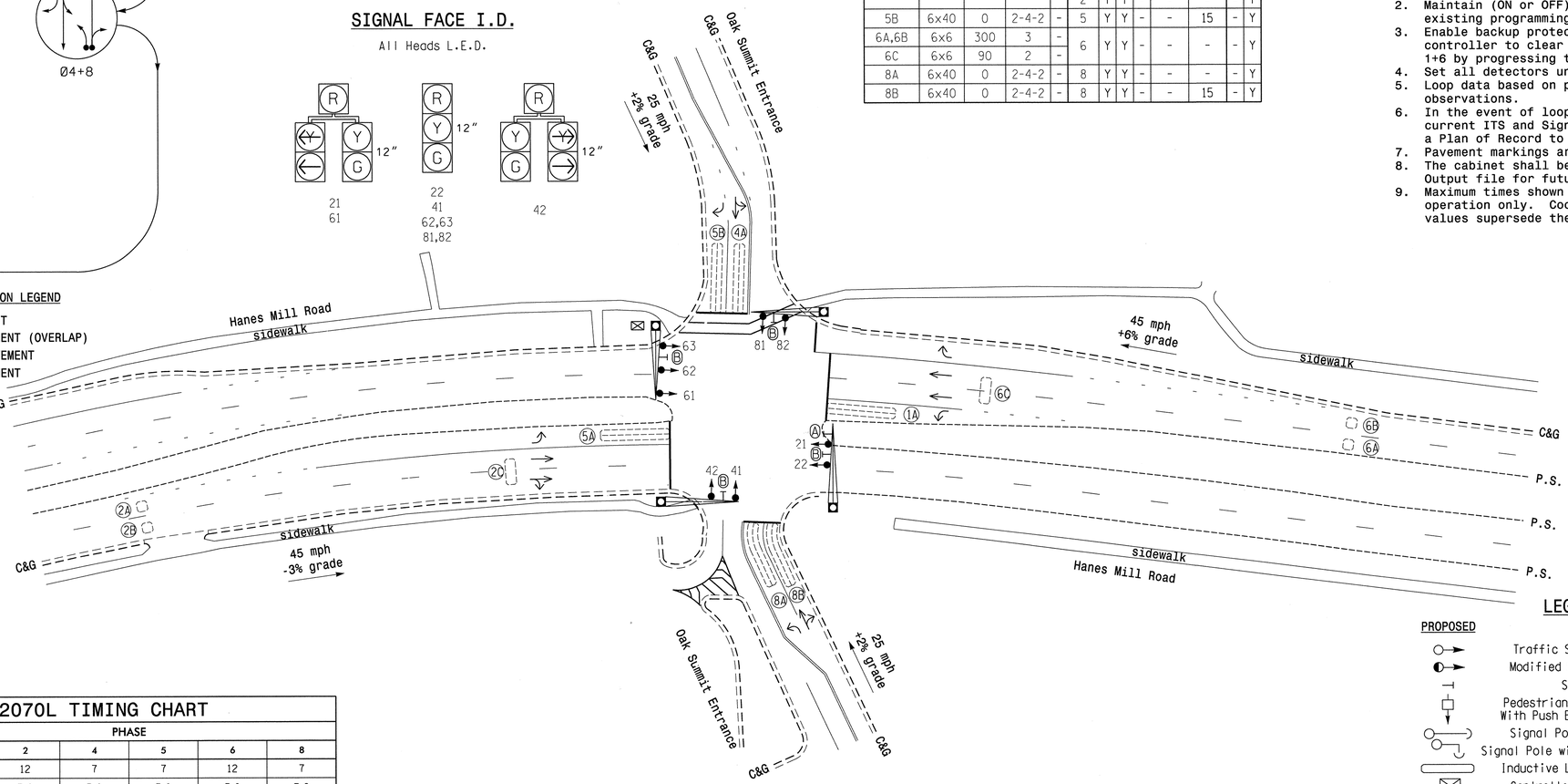
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A,2B	6x6	300	3	-	2	Y	Y	-	-	-	-	Y
2C	6x6	90	2	-								
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
5B	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B	6x6	300	3	-	6	Y	Y	-	-	-	-	Y
6C	6x6	90	2	-								
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6x40	0	2-4-2	-	8	Y	Y	-	-	15	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 2+5 and/or 1+6 by progressing through an all red display.
4. Set all detectors units to presence mode.
5. Loop data based on previous plan and/or field observations.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Pavement markings are existing.
8. The cabinet shall be designed to include Auxiliary Output file for future use.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	15	45	15	15	45	15
Yellow Clearance	3.0	4.8	3.1	3.0	4.1	3.1
Red Clearance	2.6	1.1	2.9	2.9	1.5	3.1
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40 1"=40'

Hanes Mill Road
at
Oak Summit Entrance #2

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CLIFFORD B. HOLDEN
3/22/2013

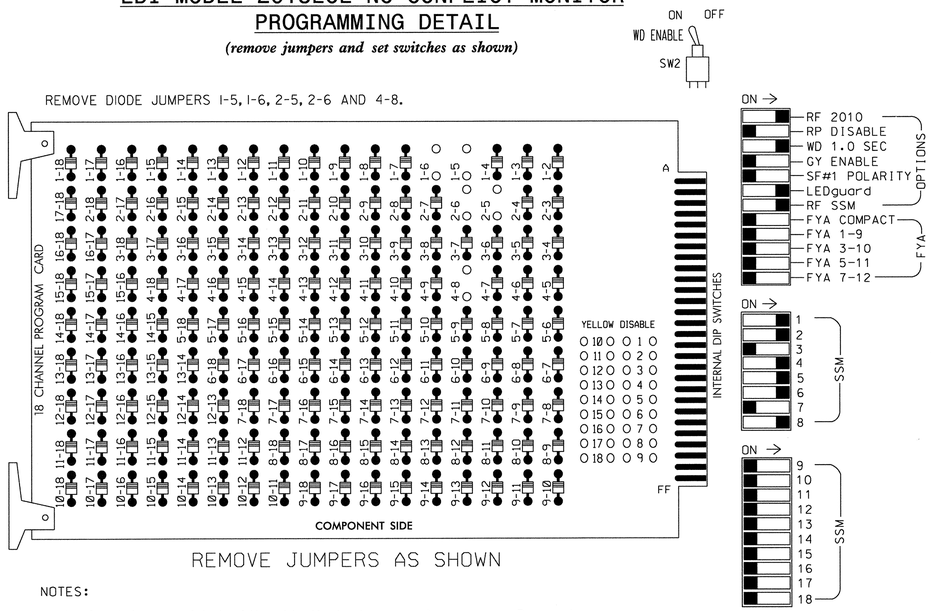
SIGNATURE DATE

SIG. INVENTORY NO. C-343

3/21/2013
kwbisby
c:\signals\SIGNALS\Phase BMC-343.dgn
Pkeys

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX FILE*
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

*Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	21,42	61,62, 63	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋																		
🚶																		

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 / 1A	Ø 2 / 2A,2B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø 4 / 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / DC ISOLATOR
	L	NOT USED	Ø 2 / 2C				NOT USED								ST / DC ISOLATOR
FILE "J"	U	Ø 5 / 5A	Ø 5 / 5B	Ø 6 / 6A,6B	WIRED INPUT ⊗	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø 6 / 6C			Ø 8 / 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
2C	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y			
6C	TB3-11,12	J3L	77	39	46	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

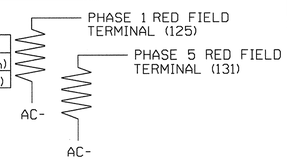
(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-343
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Hanes Mill Road
at
Oak Summit Entrance #2

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 3/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

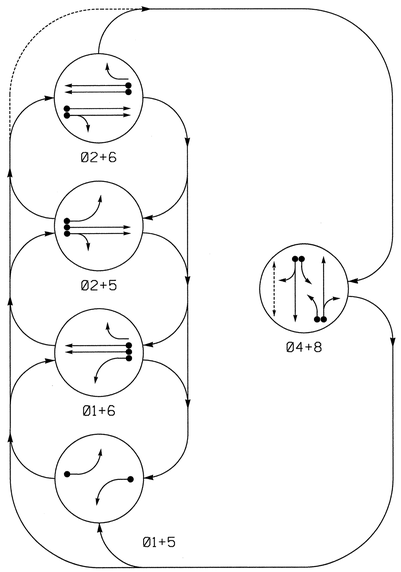
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-343

3/22/2013
3:24:07 PM
C:\Projects\Signals\Electrical\Details\Phase BWC-343a-01-141.dgn
FKopp

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 317

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

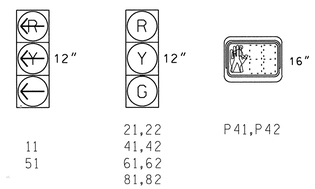
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R
P41,P42	DW	DW	DW	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



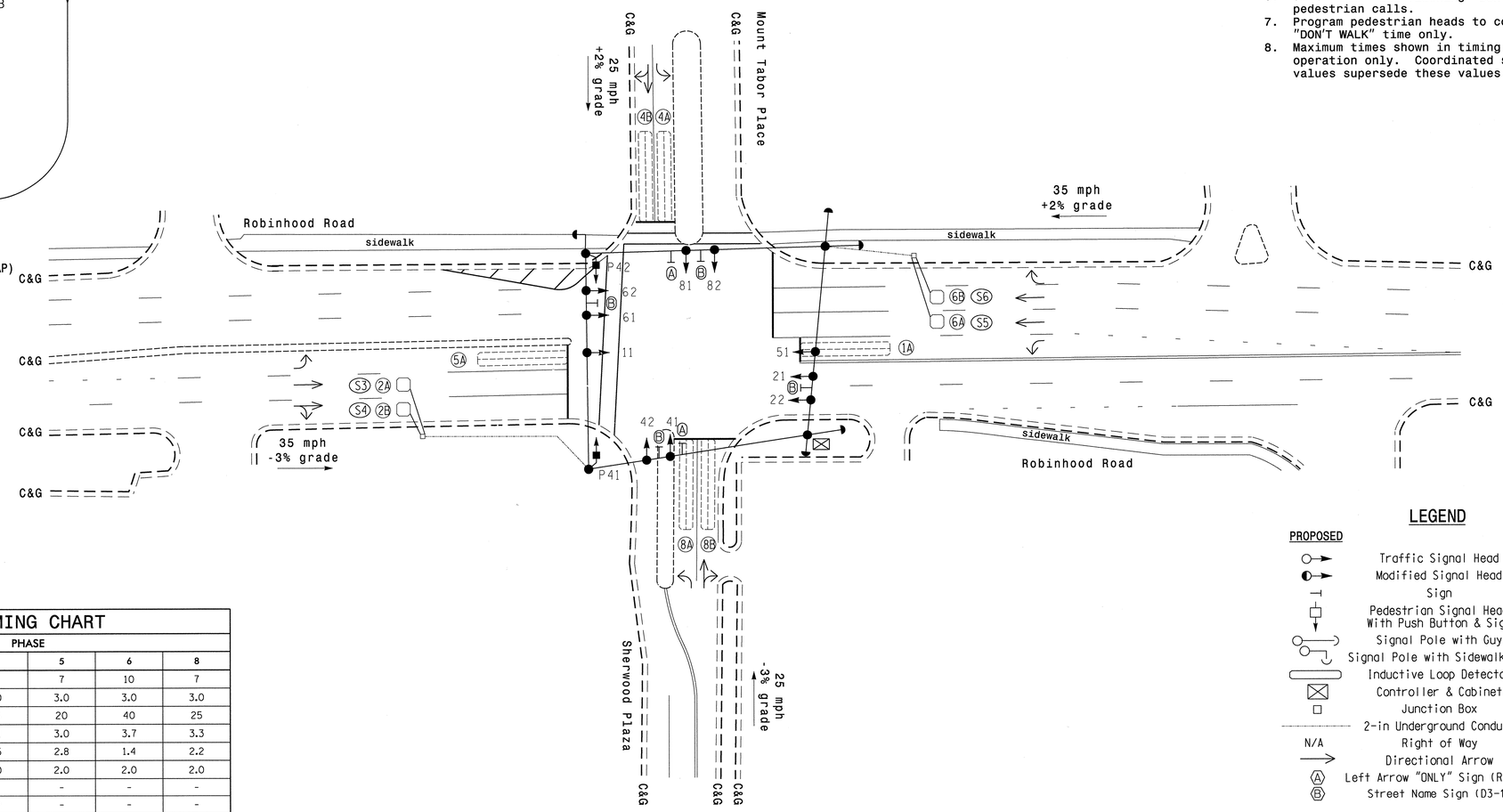
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x40	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A,S3	6x6	70	4	Y	2	Y	Y	-	-	-	Y	Y
2B,S4	6x6	70	4	Y	2	Y	Y	-	-	-	Y	Y
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A,S5	6x6	70	3	Y	6	Y	Y	-	-	-	Y	Y
6B,S6	6x6	70	3	Y	6	Y	Y	-	-	-	Y	Y
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6x40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	40	25	20	40	25
Yellow Clearance	3.0	4.1	3.1	3.0	3.7	3.3
Red Clearance	2.6	1.5	2.5	2.8	1.4	2.2
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	4	-	-	-
Don't Walk 1	-	-	22	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 30 1"=30'

Robinhood Road
at
Mount Tabor Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

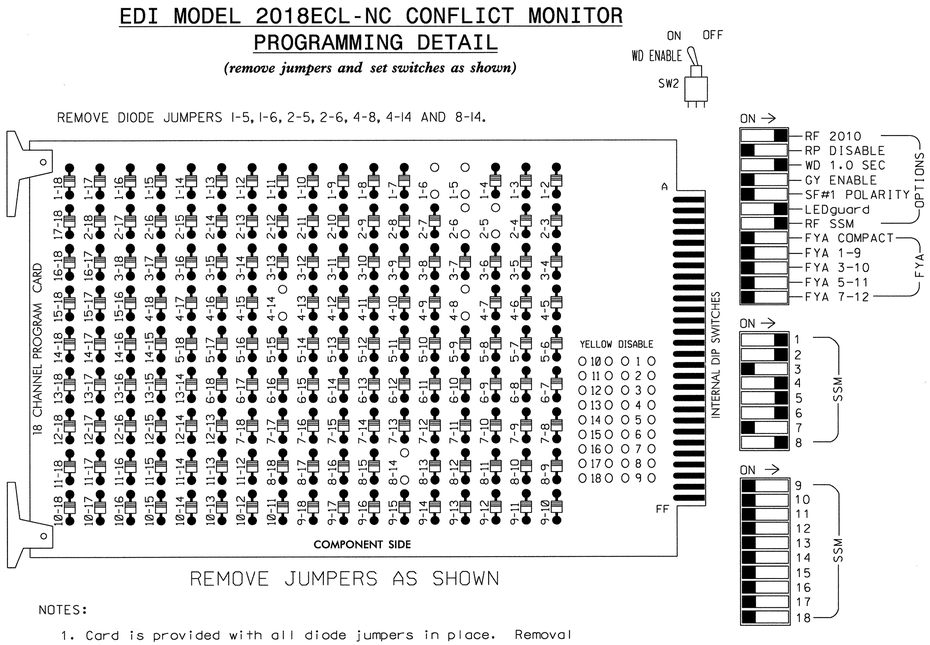
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CLYDE BYRON HOLDEN
3/22/2013
SIGNATURE DATE
SIG. INVENTORY NO. C-344

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase 8\C-344.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 318

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. Program phase 4 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of the Winston-Salem Signal System.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	P41, P42	51	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125						131					
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋						104						
🚶						106						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1	Ø2/SYS	SLOT	SLOT	SLOT	Ø 4	SLOT	SLOT	SLOT	SLOT	SLOT	NOT USED	SLOT	FS
		1A	2A/S3				4A								DC ISOLATOR
	L	NOT USED	Ø2/SYS	EMPTY	EMPTY	EMPTY	Ø 4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED	EMPTY	ST
			2B/S4				4B						DC ISOLATOR		DC ISOLATOR
FILE "J"	U	Ø 5	Ø6/SYS	SLOT	SLOT	SLOT	Ø 8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A/S5				8A								
	L	NOT USED	Ø6/SYS	EMPTY	EMPTY	EMPTY	Ø 8	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			6B/S6				8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A/S3	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S4	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A/S5	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S6	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S6,S7,S8,S11
PHASES USED.....1,2,4,5,6,8,4PED
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-344
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Robinhood Road
at
Mount Tabor Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	J O Deaton
PREPARED BY:	M W Yalch	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

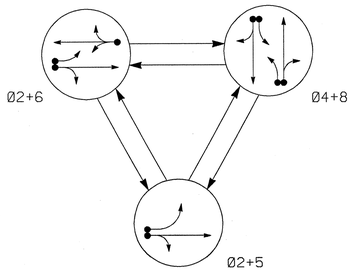
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-344

3/22/2013
R:\Traffic\Signals\Electrical\Details\Phase BWC-344e-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-319

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	G	G	R	Y
22	G	G	R	Y
41,42	R	R	G	R
61,62	R	G	R	Y
81,82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

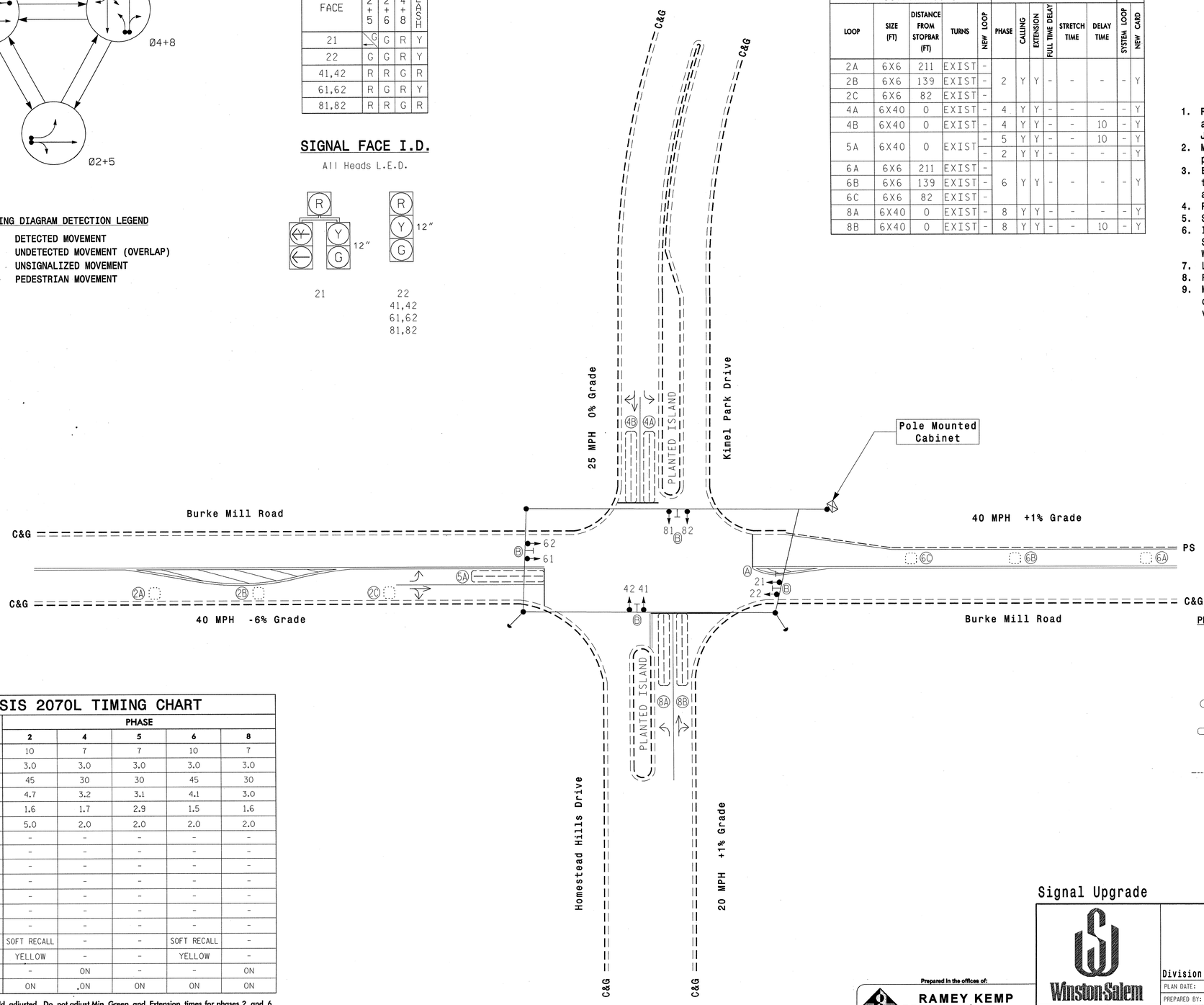
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	211	EXIST	-								
2B	6X6	139	EXIST	-	2	Y	Y	-	-	-	-	Y
2C	6X6	82	EXIST	-								
4A	6X40	0	EXIST	-	4	Y	Y	-	-	-	-	Y
4B	6X40	0	EXIST	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	EXIST	-	5	Y	Y	-	-	10	-	Y
				-	2	Y	Y	-	-	-	-	Y
6A	6X6	211	EXIST	-								
6B	6X6	139	EXIST	-	6	Y	Y	-	-	-	-	Y
6C	6X6	82	EXIST	-								
8A	6X40	0	EXIST	-	8	Y	Y	-	-	-	-	Y
8B	6X40	0	EXIST	-	8	Y	Y	-	-	10	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red phase.
4. Phase 5 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Loop data based on previous plan and/or field observations.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"LEFT TURN SIGNAL" Sign (R10-10L)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	45	30	30	45	30
Yellow Clearance	4.7	3.2	3.1	4.1	3.0
Red Clearance	1.6	1.7	2.9	1.5	1.6
Red Revert	5.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com

Winston Salem

SCALE 0 30 1"=30'

Burke Mill Road at Kimel Park Drive / Homestead Hills Drive

Division 9 Forsyth County Winston Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton

PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

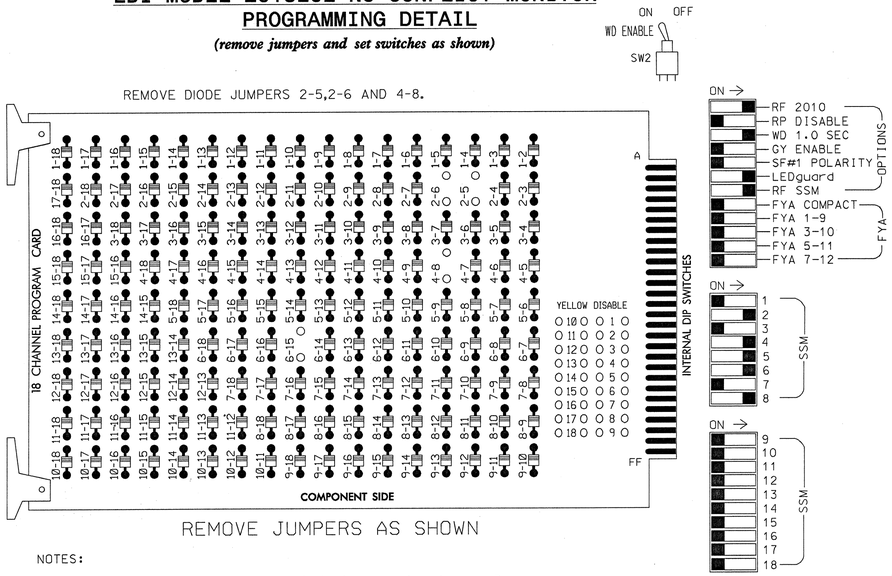
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-345

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-320

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU
RED		128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S7,S8,S11
PHASES USED.....2,4,5,6,8
OVERLAPS.....NONE

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø 2 2A,2B 2C	SLOT EMPTY	Ø 4 4A	Ø 5 5A	Ø 6 6A,6B 6C	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		NOT USED		Ø 4 4B	⊗ WIRED INPUT	NOT USED		Ø 8 8B						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Turn off Channel 2.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			10
5A[1]	TB21-9,10	I5U	55	17	5	5	Y	Y			10
	-	I5L	48	10	26	2	Y	Y			
6A,6B,6C	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			10

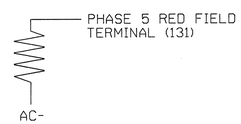
[1] Add jumper from I5-F to I5-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-345
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Burke Mill Road
at
Kimel Park Drive/
Homestead Hills Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY:	WJ Hamilton	
PREPARED BY: NE Burns	RKA PROJECT NO:	11067 (040)	

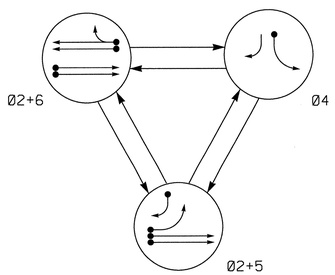
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-345

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 321

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R/	R	G	R
51	←	←R	←R	←R
61,62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

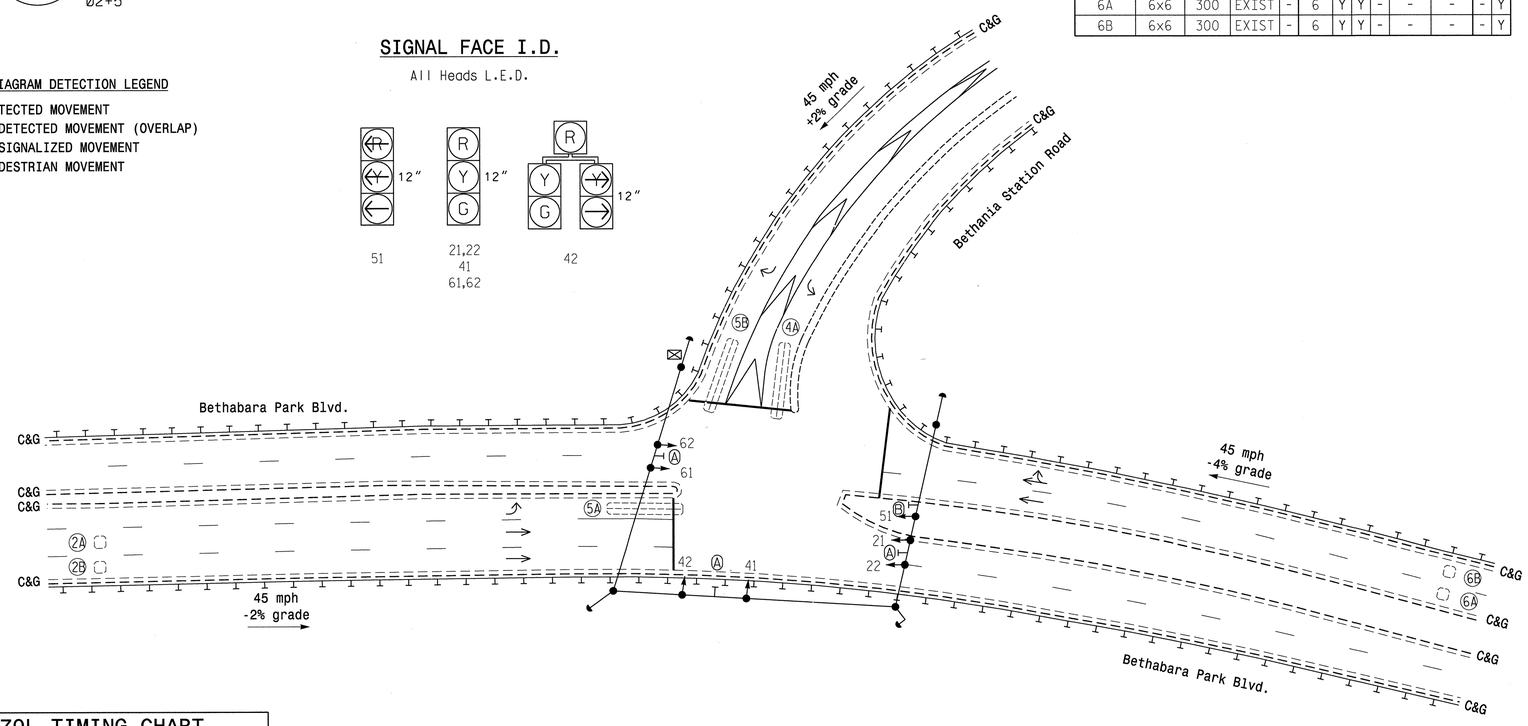
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6x6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6x6	300	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x40	+5	2-4-2	-	5	Y	Y	-	-	-	-	Y
5B	6x40	+5	2-4-2	-	5	Y	Y	-	-	10	-	Y
6A	6x6	300	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6x6	300	EXIST	-	6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. The cabinet shall be designed to include Auxiliary Output file for future use.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	3.0	3.0	6.0
Max Green 1 *	90	20	25	90
Yellow Clearance	4.7	3.0	3.0	4.9
Red Clearance	1.3	2.6	2.9	1.6
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.8	-	-	1.8
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
A	Street Name Sign (D3-1)	A
B	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	B

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40 1"=40'

Bethabara Park Blvd. at Bethania Station Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

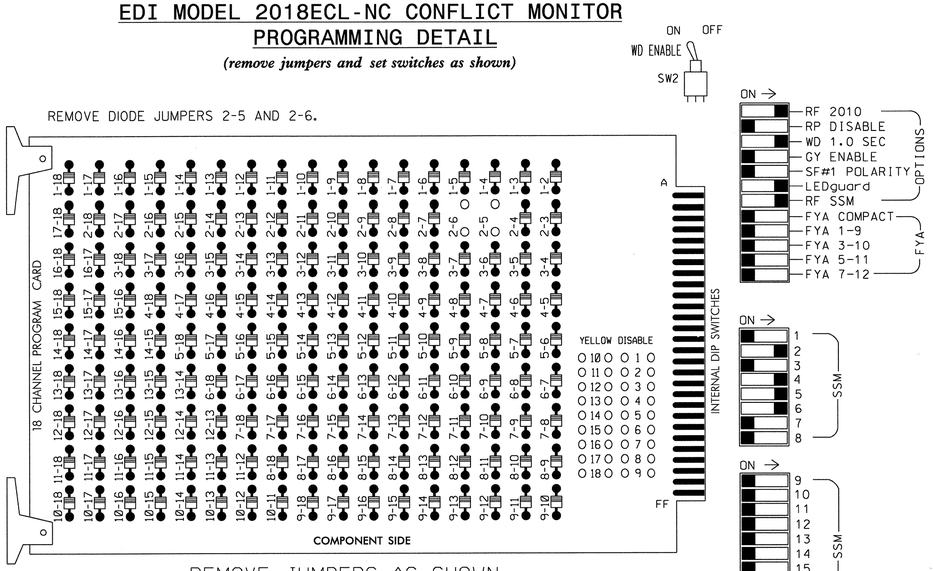
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHYRON B. HOLDEN
SIGNATURE 3/22/2013 DATE
SIG. INVENTORY NO. C-347

3/21/2013
R:\TrafficSignals\SIGNALS\Phase BWC-347.dgn
FKeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 322

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w AUX FILE *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED

* Auxiliary file installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	42	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW								131											
YELLOW ARROW							132	132											
GREEN ARROW							133	133											
✋																			
🚶																			

NU = Not Used

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			10
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-347
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Bethabara Park Blvd.
at
Bethania Station Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 3/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

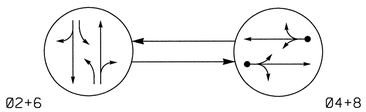
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-347

3/22/2013
jamesdeaton
PrefOfficSignalsElectricalDetailsPhase BWC-347e-02-141.dgn
Page

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 323

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	PHASE FLASH
21,22	G	R	Y
41,42	R	G	R
61,62,63	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42
61,62,63
81,82

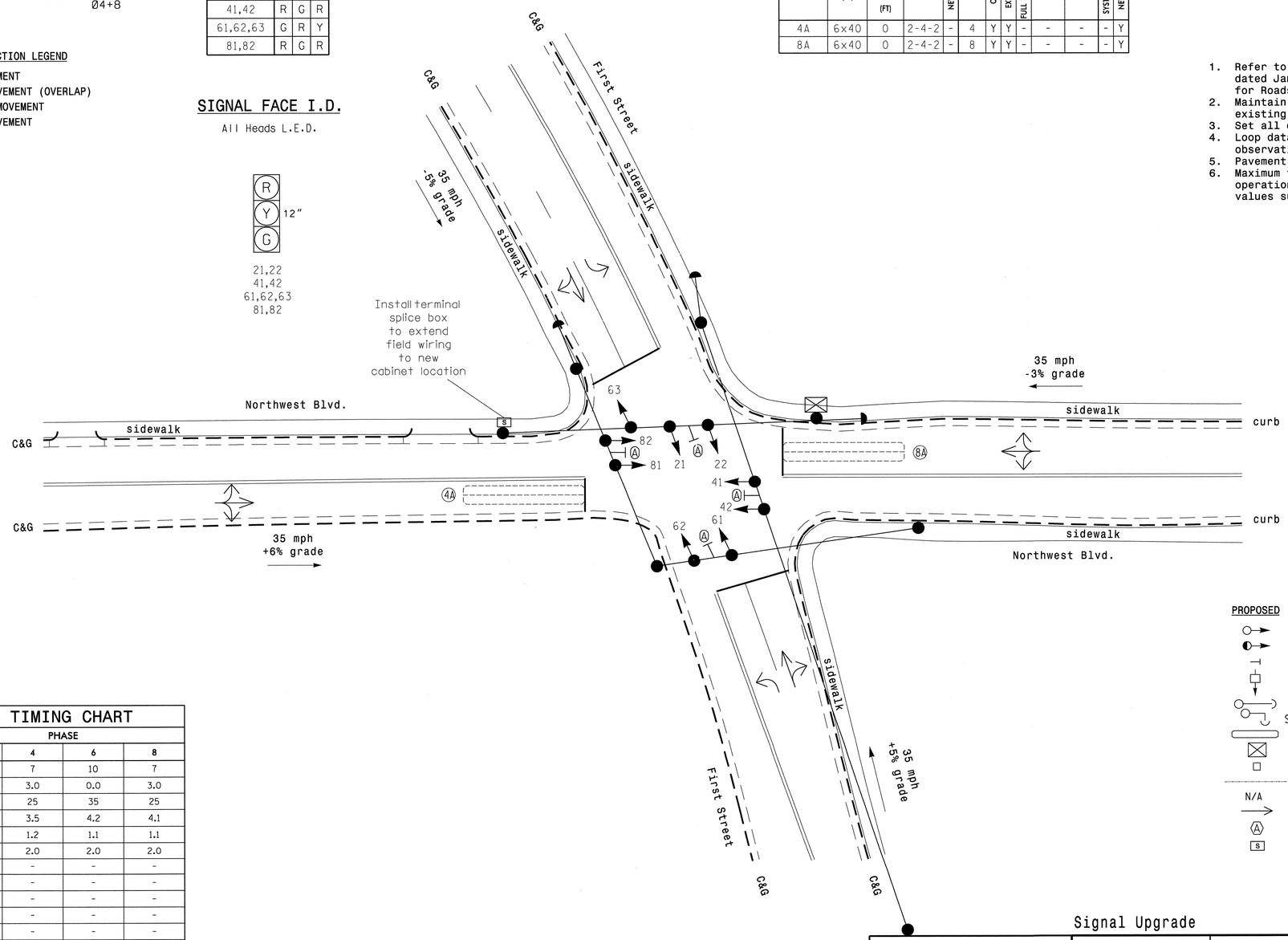
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6x40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y

2 Phase
Semi-Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	
	Terminal Splice Box	

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	0.0	3.0	0.0	3.0
Max Green 1 *	35	25	35	25
Yellow Clearance	3.6	3.5	4.2	4.1
Red Clearance	1.2	1.2	1.1	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	-	MAX RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20
1"=20'

First Street
at
Northwest Blvd.

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CLYDE BROWN HOLDEN

SIGNATURE 3/22/2013 DATE

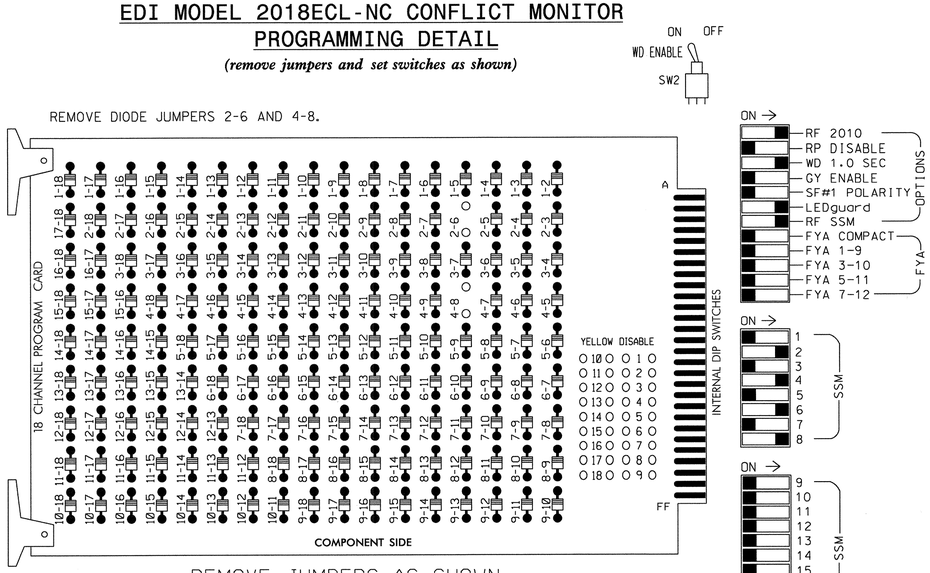
SIG. INVENTORY NO. C-351

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase B\C-351.dgn
Fkeys

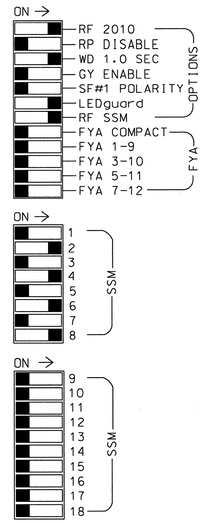
PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 324

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62, 63	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L				NOT USED				NOT USED						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-351
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

First Street
at
Northwest Blvd.

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 03/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

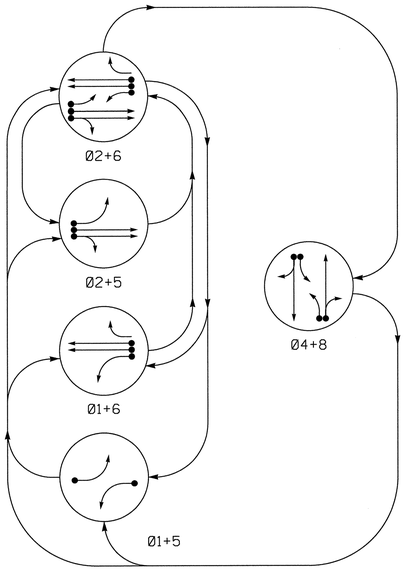
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-351

3/22/2013
R:\Signals\Electrical Details\Phase B\C-351e-02-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 325

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	PHASE 01+6	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62,63	R	G	R	G	R	Y
81,82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

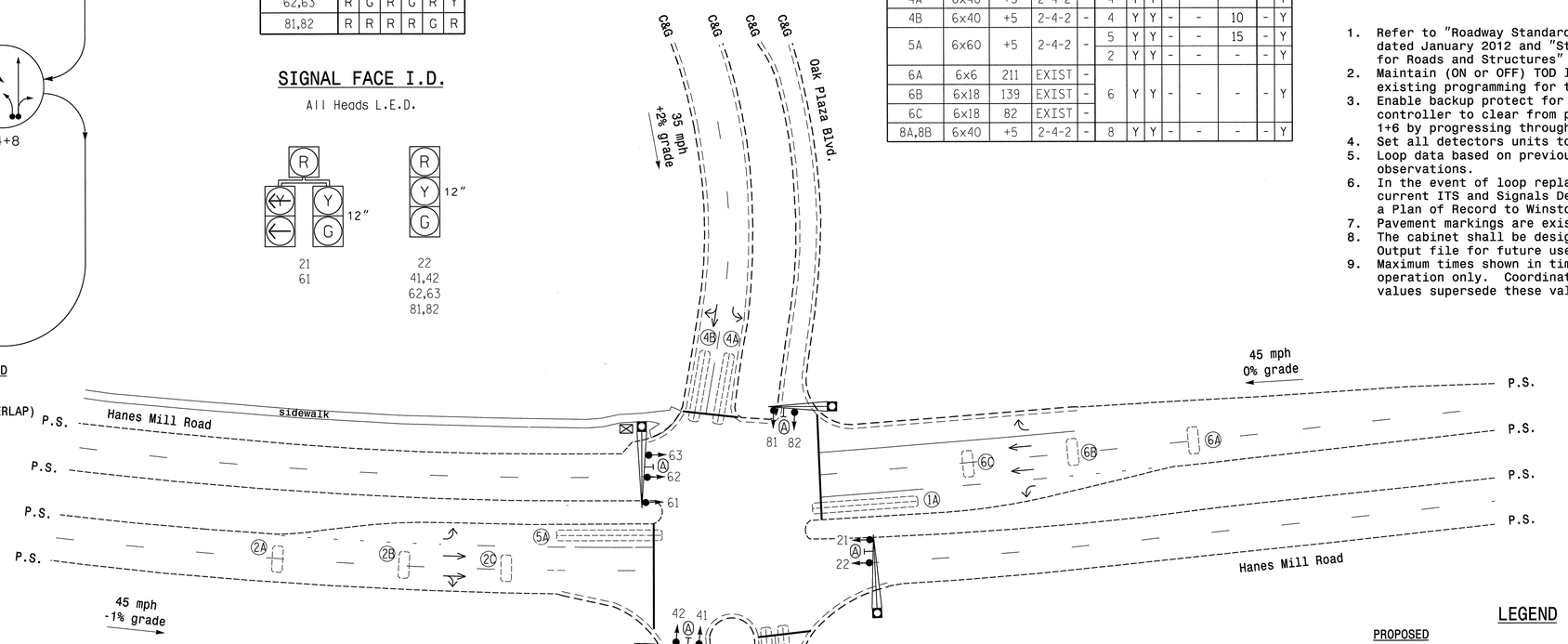
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x60	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A	6x18	211	EXIST	-	2	Y	Y	-	-	-	-	Y
2B	6x18	139	EXIST	-								
2C	6x18	82	EXIST	-								
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6x40	+5	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6x60	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A	6x6	211	EXIST	-	6	Y	Y	-	-	-	-	Y
6B	6x18	139	EXIST	-								
6C	6x18	82	EXIST	-								
8A,8B	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 2+5 and/or 1+6 by progressing through an all red display.
4. Set all detectors units to presence mode.
5. Loop data based on previous plan and/or field observations.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Pavement markings are existing.
8. The cabinet shall be designed to include Auxiliary Output file for future use.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Street Name Sign (D3-1)	

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	15	40	25	25	40	25
Yellow Clearance	3.0	4.6	3.7	3.0	4.5	4.0
Red Clearance	3.1	1.7	2.4	3.3	1.6	2.4
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 40 1"=40'

Hanes Mill Road
at
Oak Plaza Blvd.

Division 09 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

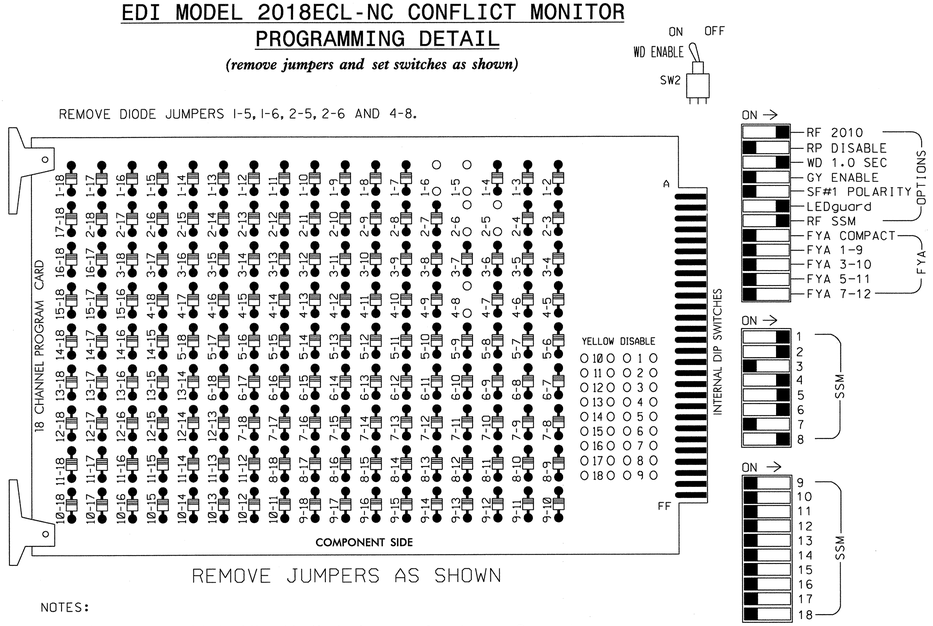
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER CHYRON BYRON HOLDEN
3/22/2013
SIGNATURE DATE
SIG. INVENTORY NO. C-353

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase B\C-353.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 326

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

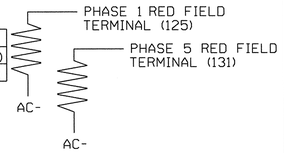
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	21	61,62, 63	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋																		
🚶																		

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 w/AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

*Aux file to be installed for future use

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A,2B,2C	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B,6C	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A,8B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A,8B	TB5-9,10	J6U	42	4	8	8	Y	Y			

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-353
DESIGNED: 3/22/2013
SEALED: 3/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Hanes Mill Road
at
Oak Plaza Blvd.

Division 09 Forsyth County Winston-Salem

PLAN DATE: 3/22/2013	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

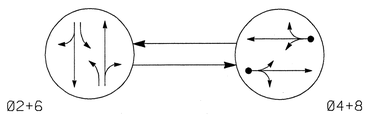
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-353

3/22/2013
R:\Traffic\Signals\ElectricalDetails\Phase B\C-353a-01-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-327

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42
61,62
81,82

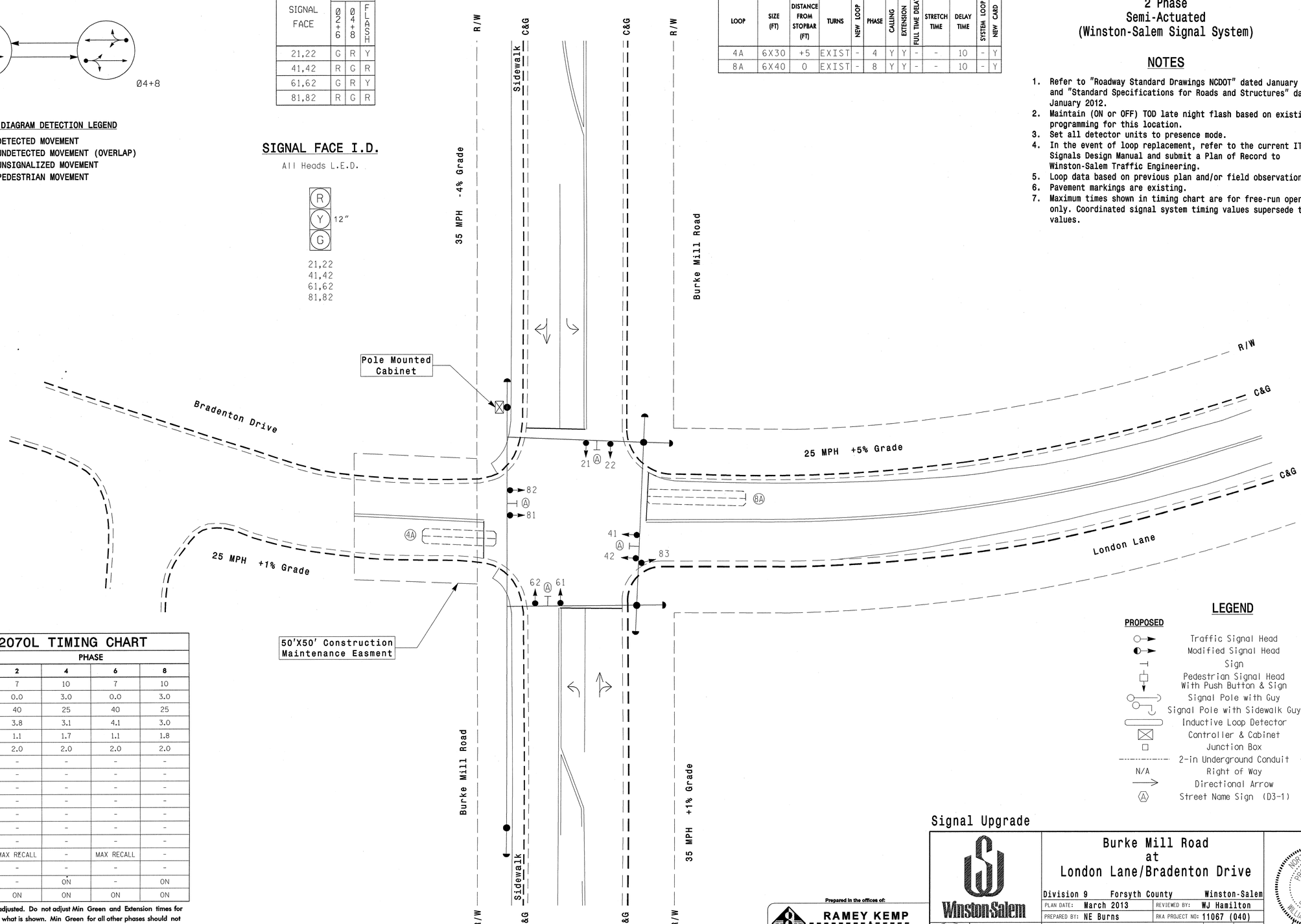
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A	6X30	+5	EXIST	-	4	Y	Y	-	-	10	-	Y
8A	6X40	0	EXIST	-	8	Y	Y	-	-	10	-	Y

2 Phase
Semi-Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. Loop data based on previous plan and/or field observations.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	10
Extension 1 *	0.0	3.0	0.0	3.0
Max Green 1 *	40	25	40	25
Yellow Clearance	3.8	3.1	4.1	3.0
Red Clearance	1.1	1.7	1.1	1.8
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	-	MAX RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-9418 Fax.
www.rameykemp.com

Winston Salem

SCALE 0 20 1"=20'

Burke Mill Road at London Lane/Bradenton Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton

PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

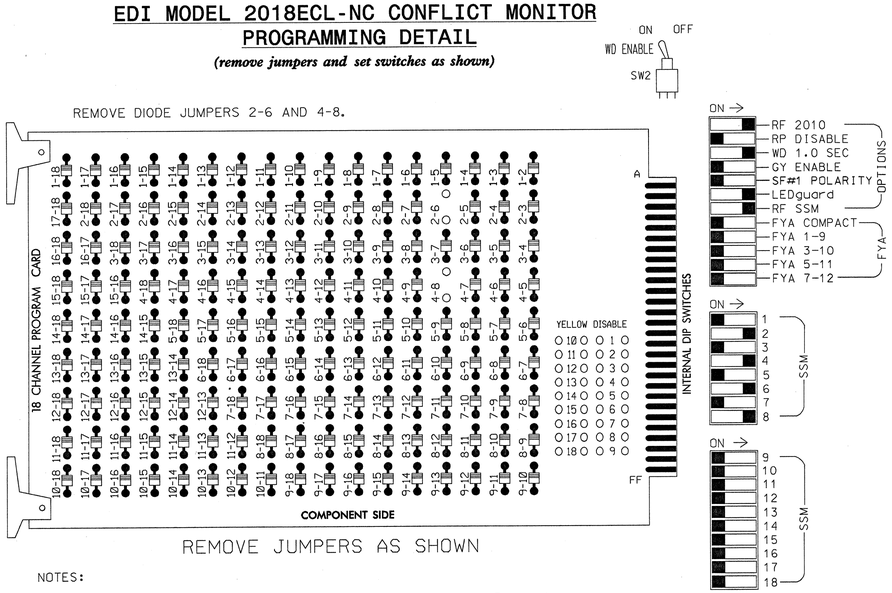
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

SIGNATURE DATE 3/18/13

TRAFFIC FILE NO. C-358

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-328

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT
(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 / 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / DC ISOLATOR
L				NOT USED				NOT USED						ST / DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-358
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Burke Mill Road
at
London Lane/Bradenton Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE:	March 2013	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	RKA PROJECT NO:	11067 (040)

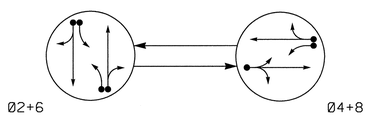
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE DATE 3/18/13
TRAFFIC FILE NO. C-358

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 329

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62, 63	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
41, 42
61, 62, 63
81, 82

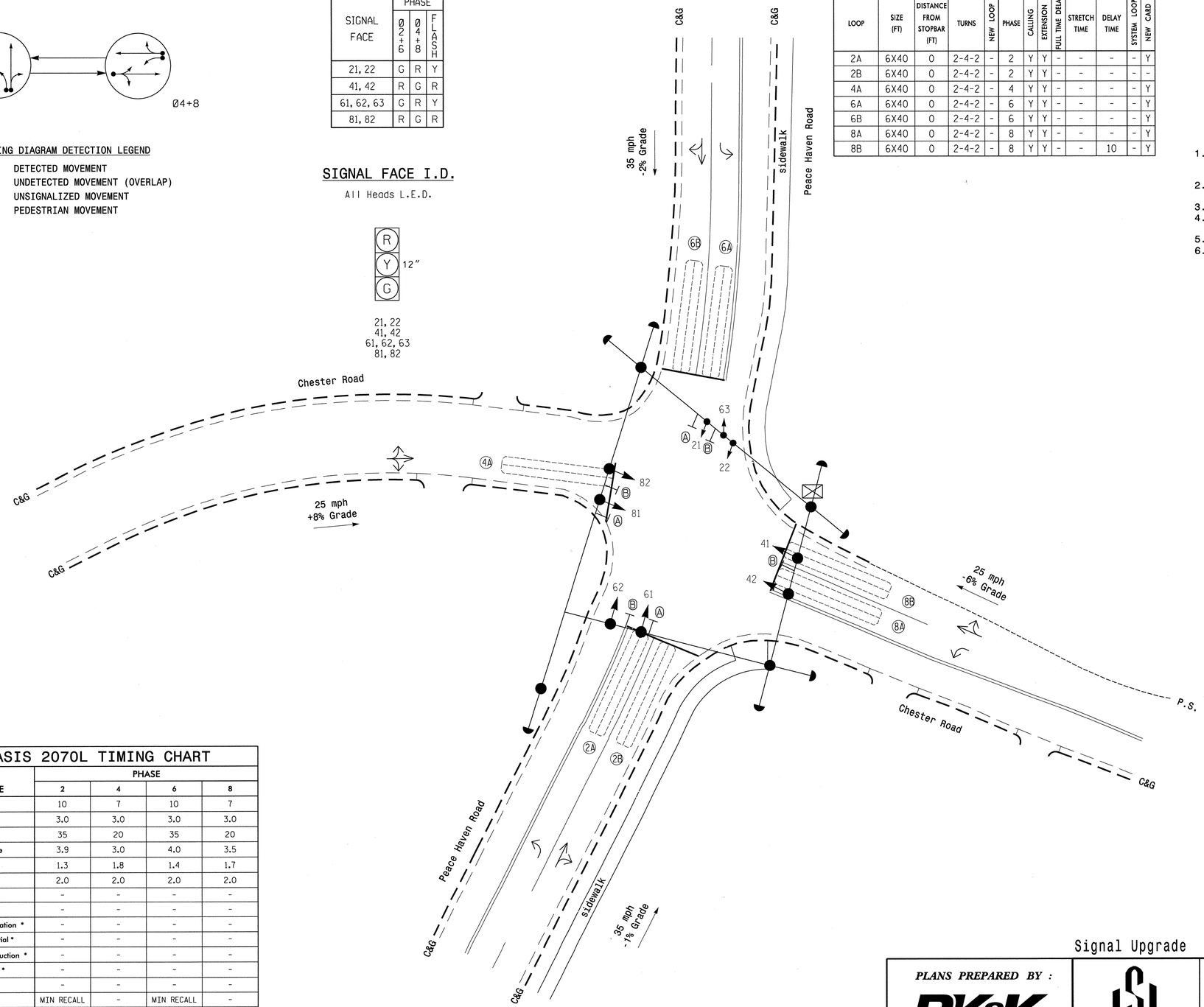
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
6A	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
6B	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	Y

2 Phase
Fully Actuated
(Winston-Salem City Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detectors units to presence mode.
4. Loop data based on previous plan and/or field observations.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Left Arrow "ONLY" Sign (R3-5L)	A
B	Street Name Sign (D3-1)	B

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	35	20	35	20
Yellow Clearance	3.9	3.0	4.0	3.5
Red Clearance	1.3	1.8	1.4	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3/21/2013
R:\Traffic\Signals\SIGNALS\Phase BWC-361.dgn
Fkeys

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Winston-Salem

SCALE 0 20 1"=20'

Chester Road
at
Peace Haven Road

Division 9 Forsyth County Winston-Salem

PLAN DATE:	3/22/2013	REVIEWED BY:	KW Bisby
PREPARED BY:	N Harris	REVIEWED BY:	CB Holden

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 33753 ENGINEER C. BYRON HOLDEN
3/22/2013

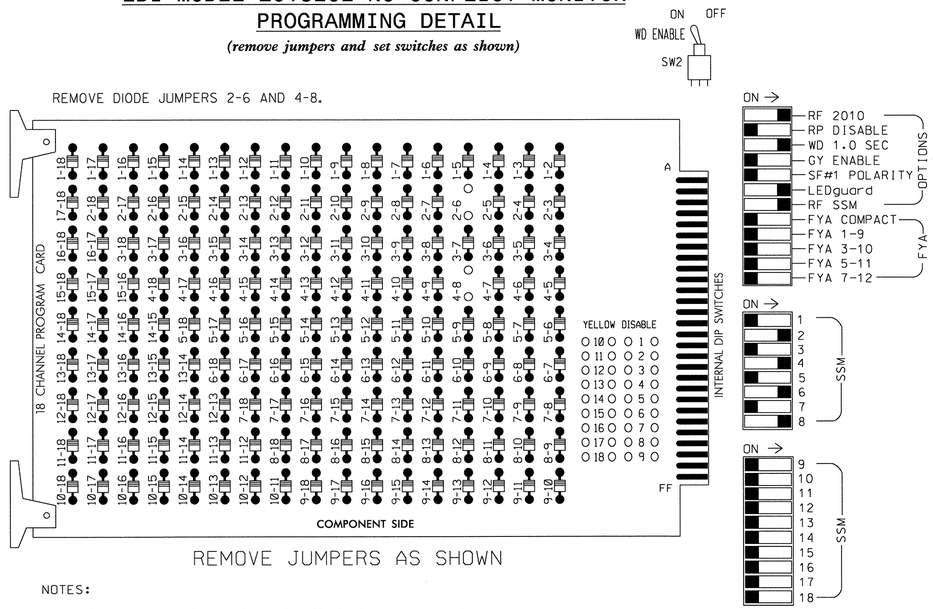
SIGNATURE DATE

SIG. INVENTORY NO. C-361

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	SIG. 330

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62, 63	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø 2 2A	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		Ø 2 2B		NOT USED		Ø 6 6B		Ø 8 8B						ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	12U	39	1	2	2	Y	Y			
2B	TB23-3,4	12L	43	5	12	2	Y	Y			
4A	TB21-7,8	14U	41	3	4	4	Y	Y			
6A	TB21-11,12	16U	40	2	6	6	Y	Y			
6B	TB23-11,12	16L	44	6	16	6	Y	Y			
8A	TB22-1,2	18U	42	4	8	8	Y	Y			
8B	TB24-1,2	18L	46	8	18	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336S
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-361
DESIGNED: 03/22/2013
SEALED: 03/22/2013
REVISED:

Signal Upgrade

PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Chester Road
at
Peace Haven Road

Division 09 | Forsyth County | Winston-Salem

PLAN DATE: 03/22/2013 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

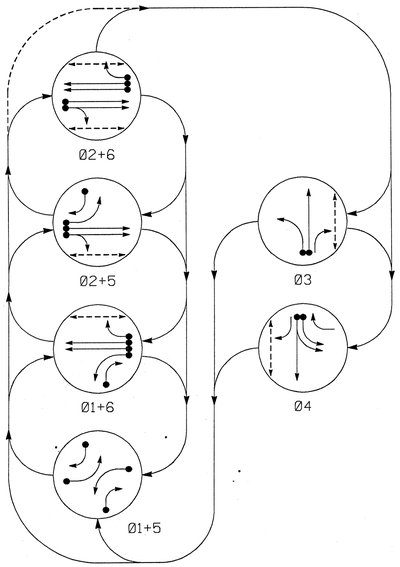
James O. Deaton 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-361

3/22/2013
R:\Traffic\Signals\ElectricalDetails\Phase B\C-3616-02-141.dgn
Fkeys

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-331

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

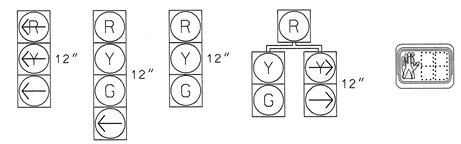
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	↖R	↖R	↖R	↖R	↖R
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	←G	R	R
32	R↘	R↘	R	R	G	R	R
41	R	R	R	R	R	←G	R
42	R↘	R	R↘	R	R	G	R
51	←	↖R	←	↖R	↖R	↖R	↖R
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R↘	Y
P21,P22	DW	DW	W	W	DW	DW	DRK
P31,P32	DW	DW	DW	DW	W	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

All Heads L.E.D.



11, 51 | 31, 41 | 21,22, 61 | 32, 42, 62 | P21,P22, P31,P32, P41,P42, P61,P62

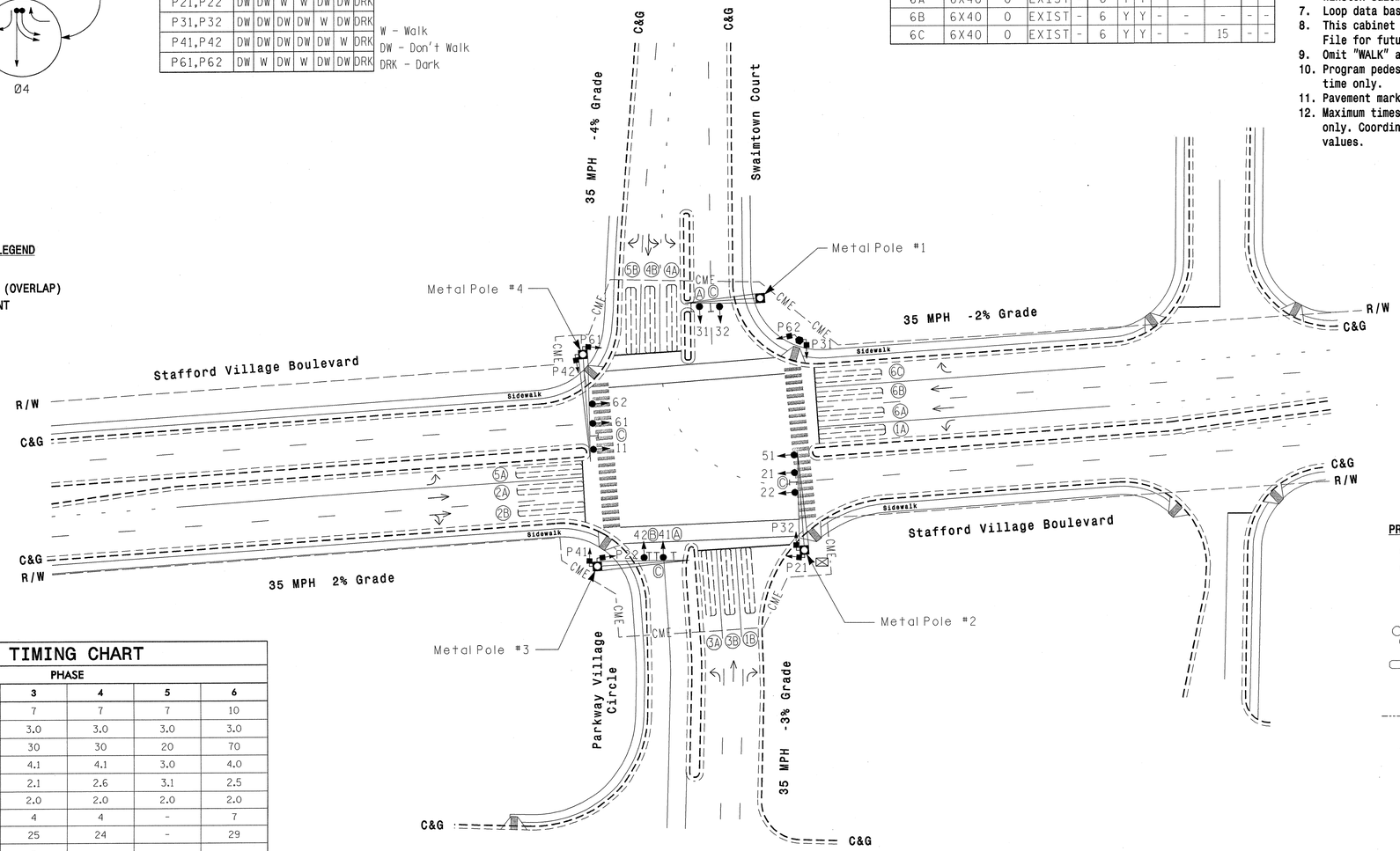
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	EXIST	-	1	Y	Y	-	-	-	-	-
1B	6X40	0	EXIST	-	1	Y	Y	-	-	15	-	-
2A	6X40	0	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X40	0	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X40	0	EXIST	-	3	Y	Y	-	-	-	-	-
3B	6X40	0	EXIST	-	3	Y	Y	-	-	-	-	-
4A	6X40	0	EXIST	-	4	Y	Y	-	-	-	-	-
4B	6X40	0	EXIST	-								
5A	6X40	0	EXIST	-	5	Y	Y	-	-	-	-	-
5B	6X40	0	EXIST	-	5	Y	Y	-	-	15	-	-
6A	6X40	0	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X40	0	EXIST	-	6	Y	Y	-	-	-	-	-
6C	6X40	0	EXIST	-	6	Y	Y	-	-	15	-	-

6 Phase Fully Actuated (Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
7. Loop data based on previous plan and/or field observations.
8. This cabinet should be designed to include an Auxiliary Output File for future use.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. Pavement markings are existing.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	25	70	30	30	20	70
Yellow Clearance	3.0	3.7	4.1	4.1	3.0	4.0
Red Clearance	3.3	2.6	2.1	2.6	3.1	2.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	4	4	-	7
Don't Walk 1	-	30	25	24	-	29
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-0416 Fax.
www.rameykemp.com

SCALE 1"=40' (0 – 40)

Stafford Village Boulevard at Parkway Village Circle / Swaimtown Court

Division 9 | Forsyth County | Winston Salem

PLAN DATE: March 2013 | REVIEWED BY: WJ Hamilton

PREPARED BY: NE Burns | 11067 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

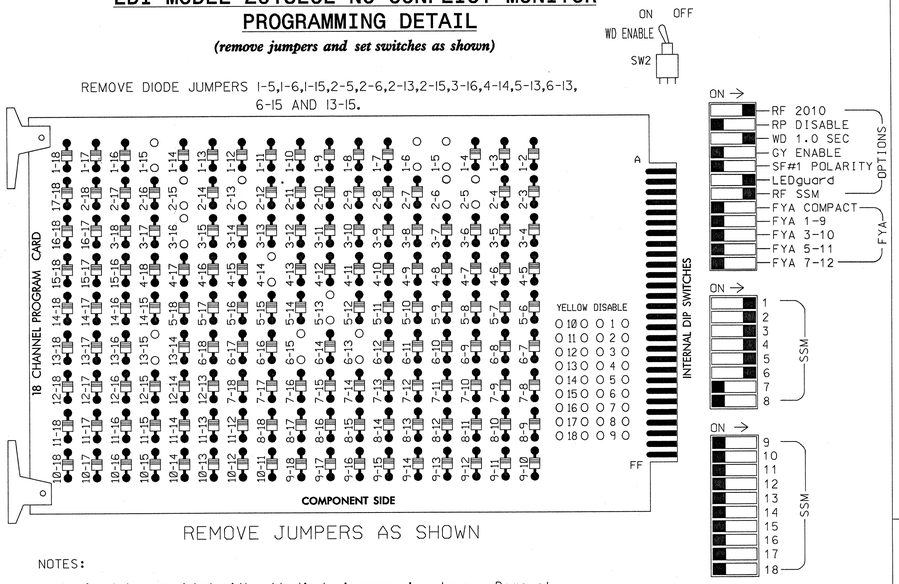
SIGNATURE | DATE 3/18/13

SIG. INVENTORY NO. C-362

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-332

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 2,3,4 and 6 for 'STARTUP PED CALL'.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5			S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4			14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4			4 PED	5		6	6 PED	7	8	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	32	21,22	P21, P22	31	32	41	42	62	P41, P42	51	42	61,62	P61, P62	NU	NU	P31, P32	NU	NU	NU	NU	NU	NU
RED			128		116	116	101	101					134									
YELLOW			129		117	117	102	102					135									
GREEN			130		118	118	103	103					136									
RED ARROW	125										131											
YELLOW ARROW	126	126							102		132	132										
GREEN ARROW	127	127			118		103		103		133	133										
✋				113						104				119			110					
🚶				115						106				121			112					

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S12
PHASES USED.....1,2,2PED,3,3PED,4,4PED,5,6,6PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø4 4A,4B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B			NOT USED						Ø4 PED DC ISOLATOR	Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	Ø6 6C	SLOT EMPTY	Ø3 3A,3B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B	NOT USED		NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A,4B	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
6C	TB5-1,2	J4U	48	10	26	6	Y	Y			15
3A,3B	TB5-9,10	J6U	42	4	8	3	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P31,P32	TB8-8,9	I13L	70	32	PED 3	3 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-362
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Winston-Salem

Stafford Village Boulevard
at
Parkway Village Circle / Swaimtown Court

Division 9 Forsyth County Winston-Salem

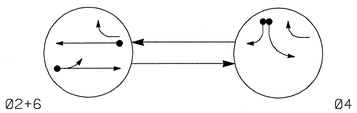
PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton		
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE
TRAFFIC FILE NO. C-362

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-333

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61	G	R	Y
62	G	R/→	Y

SIGNAL FACE I.D.

All Heads L.E.D.

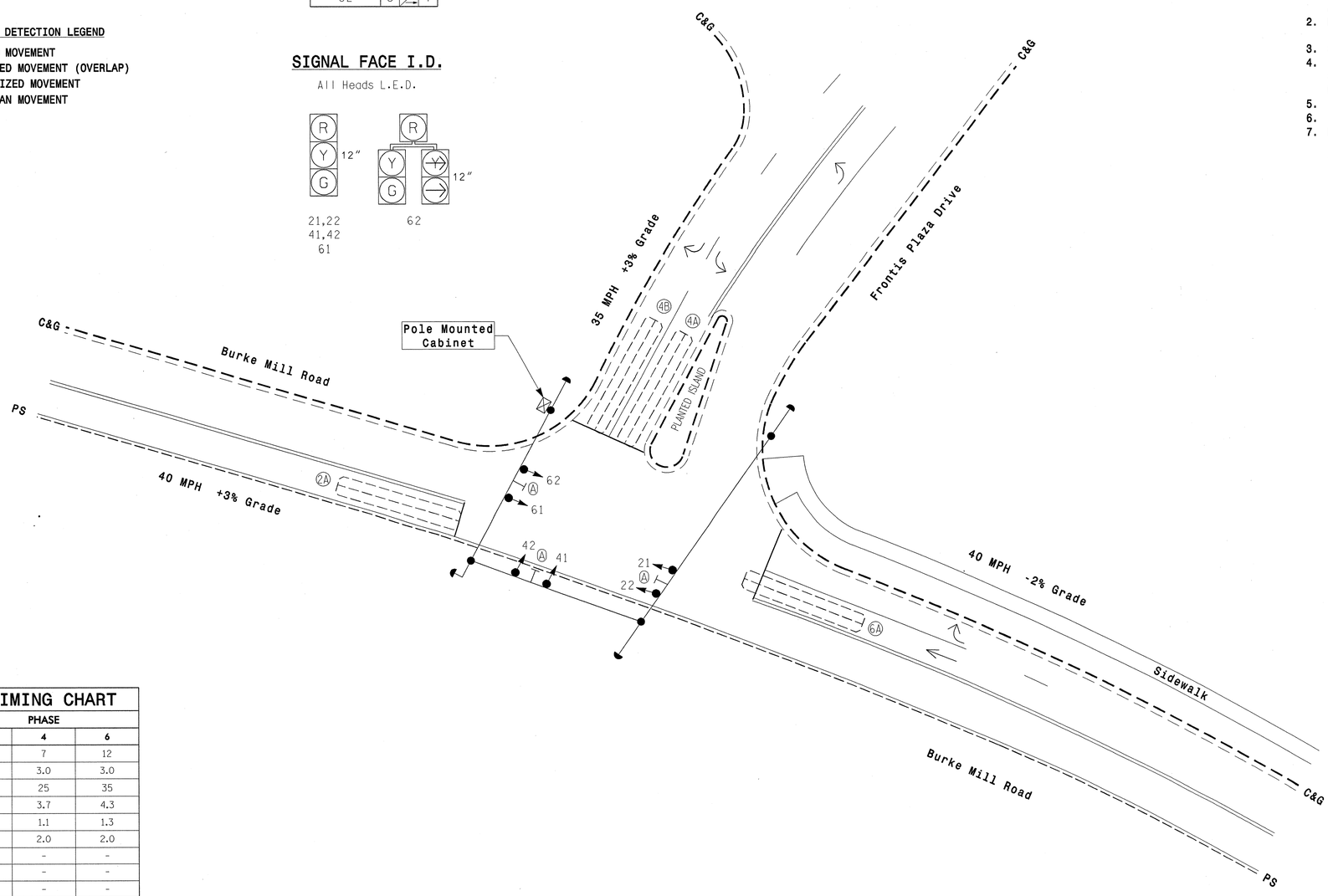
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP NEW CARD
2A	6X40	0	EXIST	-	2	Y	Y	-	-	-	- Y
4A	6X40	0	EXIST	-	4	Y	Y	-	-	-	- Y
4B	6X40	0	EXIST	-	4	Y	Y	-	-	15	- Y
6A	6X40	+5	EXIST	-	6	Y	Y	-	-	-	- Y

2 Phase
Semi-Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
5. Loop data based on previous plan and/or field observations.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	12	7	12
Extension 1 *	3.0	3.0	3.0
Max Green 1 *	35	25	35
Yellow Clearance	4.0	3.7	4.3
Red Clearance	1.3	1.1	1.3
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-872-5416 Fax.
www.rameykemp.com

Winston-Salem

SCALE 0 20 1"=20'

Burke Mill Road at Frontis Plaza Drive

Division 9 Forsyth County Winston Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

REVISIONS	INIT.	DATE

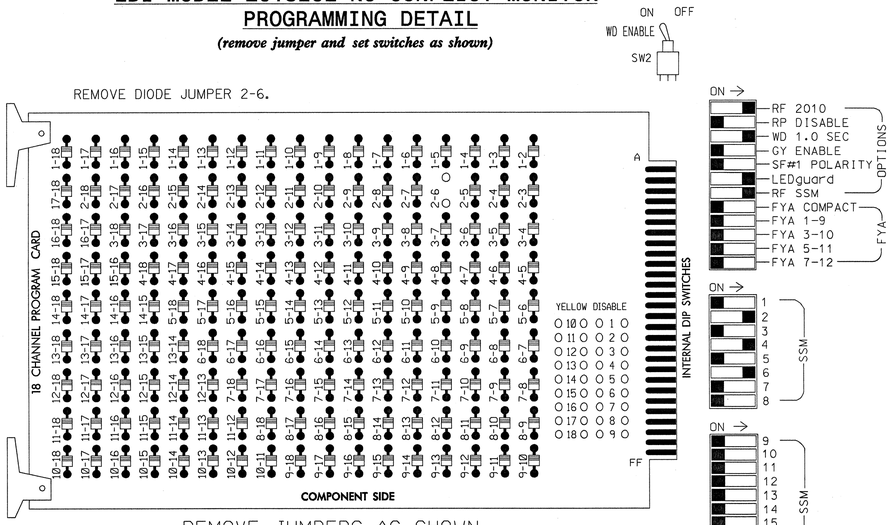
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/13/13 DATE

TRAFFIC FILE NO. C-368

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-334

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	NU	61,62	NU	NU	NU	NU
RED		128			101				134				
YELLOW		129			102				135				
GREEN		130			103				136				
RED ARROW													
YELLOW ARROW						102							
GREEN ARROW						103							
✋													
🚶													

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8
PHASES USED.....2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT	Ø2 2A	SLOT	Ø4 4A	SLOT	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	NOT USED	EMPTY	Ø4 4B	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: C-368
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:
RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-5416 Fax.
www.rameykemp.com, NC License No. C-0910

Winston-Salem

Burke Mill Road
at
Frontis Plaza Drive

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)

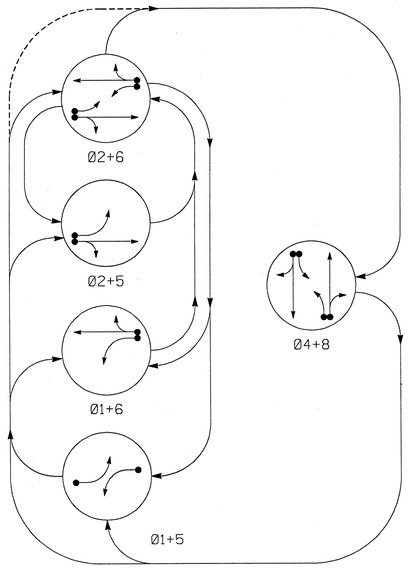
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-368

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-335

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

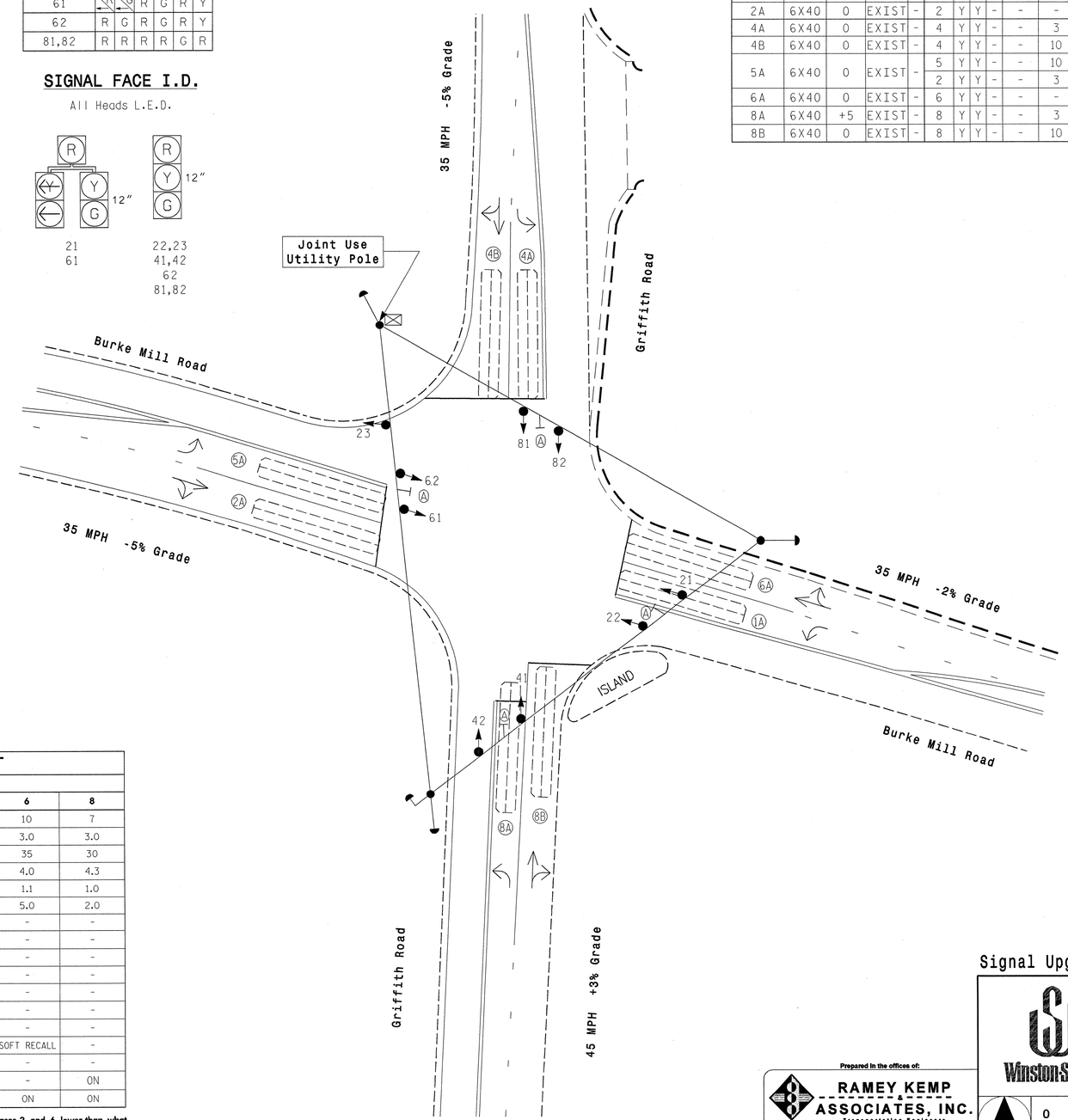
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
21	R	R	G	G	R	Y
22,23	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
81,82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	EXIST	-	1	Y	Y	-	-	10	-	Y
					6	Y	Y	-	-	3	-	Y
2A	6X40	0	EXIST	-	2	Y	Y	-	-	-	-	Y
4A	6X40	0	EXIST	-	4	Y	Y	-	-	3	-	Y
4B	6X40	0	EXIST	-	4	Y	Y	-	-	10	-	Y
5A	6X40	0	EXIST	-	5	Y	Y	-	-	10	-	Y
					2	Y	Y	-	-	3	-	Y
6A	6X40	0	EXIST	-	6	Y	Y	-	-	-	-	Y
8A	6X40	+5	EXIST	-	8	Y	Y	-	-	3	-	Y
8B	6X40	0	EXIST	-	8	Y	Y	-	-	10	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable backup protect for phase 2+6 to allow the controller to clear from phase 2+6 to phase 1+6 or 2+5 by progressing through an all red phase.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to Winston-Salem Traffic Engineering.
6. The cabinet shall be designed to include an Auxiliary Output File for future use.
7. Loop data based on previous plan and/or field observations.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	35	30	20	35	30
Yellow Clearance	3.0	4.2	4.2	3.1	4.0	4.3
Red Clearance	1.4	1.3	1.2	1.9	1.1	1.0
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Street Name Sign (D3-1)	

Signal Upgrade

Prepared in the offices of:
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www.rameykemp.com

Winston-Salem

SCALE 0 20
1"=20'

Burke Mill Road at Griffith Road

Division 9 Forsyth County Winston-Salem

PLAN DATE: March 2013 REVIEWED BY: WJ Hamilton
PREPARED BY: NE Burns RKA PROJECT NO: 11067 (040)

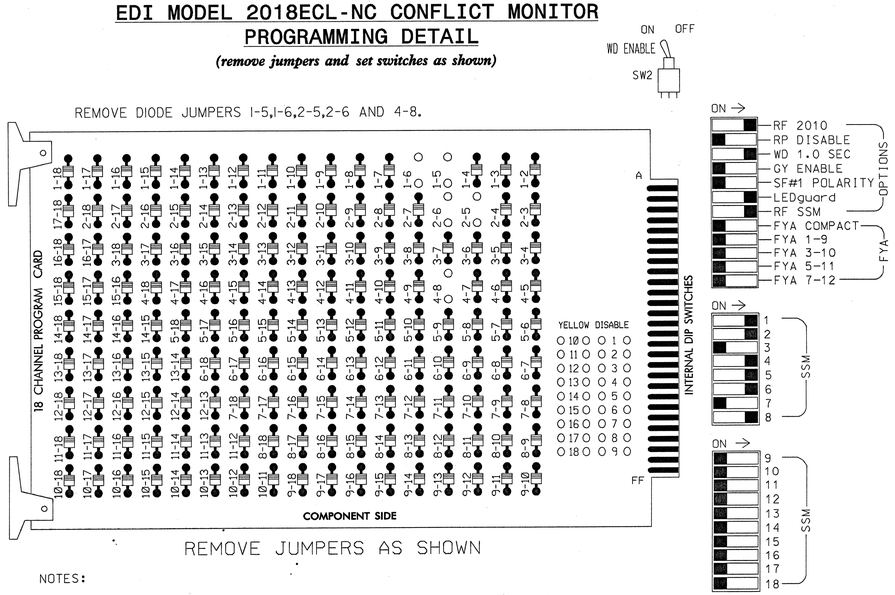
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/14/13 DATE
TRAFFIC FILE NO. C-369

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig-336

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phase 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. The cabinet and controller are part of the Winston-Salem Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22, 23	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
GREEN ARROW	127						133											
✋																		
🚶																		

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2+6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø2	SLOT	WIRED ⊗ INPUT	SLOT	Ø4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A	EMPTY		EMPTY	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	NOT USED				Ø4								ST
							4B								DC ISOLATOR
FILE "J"	U	Ø5	Ø6	SLOT	WIRED ⊗ INPUT	SLOT	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A	EMPTY		EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	NOT USED				Ø8								
							8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired input - Do not populate slot with detector card.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			10
	-	J4U	48	10	26	6	Y	Y			3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			10
	-	I4U	47	9	22	2	Y	Y			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

[1] Add jumper from I1-W to J4-W, on rear of input file.

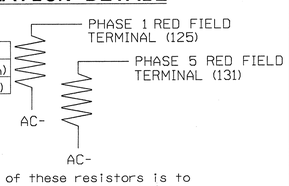
[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-369
DESIGNED: Mar 2013
SEALED: 03-18-2013
REVISED:

Signal Upgrade

Prepared in the offices of:

RAMEY KEMP & ASSOCIATES, INC.
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Winston-Salem

Burke Mill Road
at
Griffith Road

Division 9 Forsyth County Winston-Salem

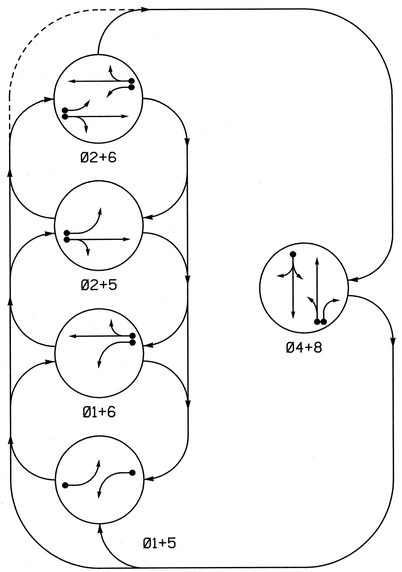
PLAN DATE: March 2013	REVIEWED BY: WJ Hamilton		
PREPARED BY: NE Burns	RKA PROJECT NO: 11067 (040)		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON
SIGNATURE 3/18/13 DATE

TRAFFIC FILE NO. C-369

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig. 337

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
81, 82	R	R	R	G	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

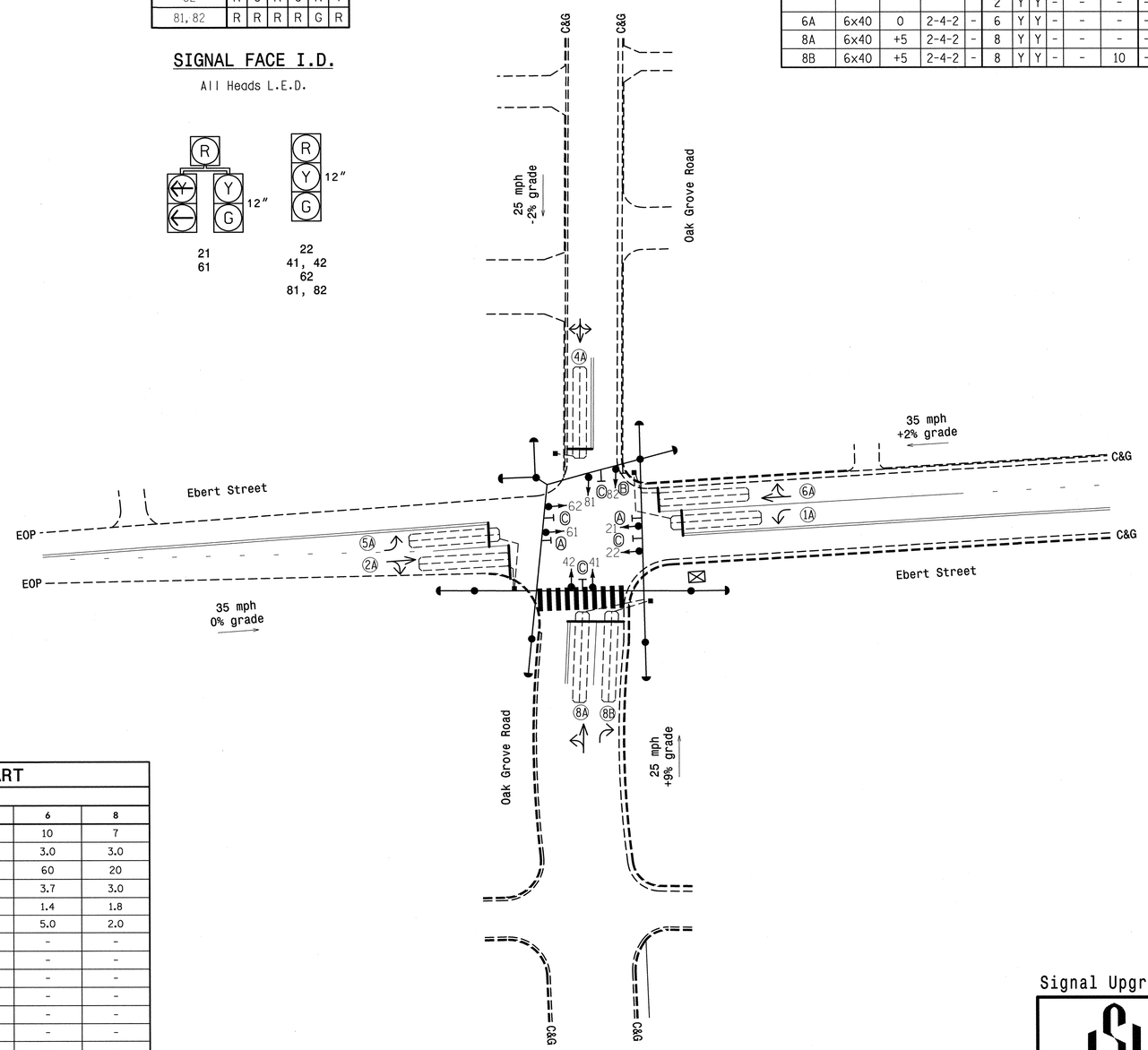
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME (SEC)	DELAY TIME (SEC)	SYSTEM LOOP	NEW CARD
1A	6x40	+5	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A	6x40	0	2-4-2	-	2	Y	Y	-	-	-	-	Y
4A	6x40	+5	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6x40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A	6x40	0	2-4-2	-	6	Y	Y	-	-	-	-	Y
8A	6x40	+5	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6x40	+5	2-4-2	-	8	Y	Y	-	-	10	-	Y

5 Phase
Fully Actuated
(Winston-Salem Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Maintain (ON or OFF) TOD late night flash based on existing programming for this location.
3. Enable Backup Protect for phases 2 and 6 to allow the controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through an all red display.
4. Set all detector units to presence mode.
5. Loop data based on previous plan and/or field observation.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a plan of record to Winston-Salem Traffic Engineering.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. The cabinet should be designed to include an Auxiliary Output file for future use.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Street Name Sign	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	3.0	3.0	3.0	3.0	3.0	3.0
Max Green 1 *	20	60	20	20	60	20
Yellow Clearance	3.0	3.8	3.3	3.0	3.7	3.0
Red Clearance	2.1	1.1	1.5	1.9	1.4	1.8
Red Revert	2.0	5.0	2.0	2.0	5.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	SOFT RECALL	-	-	SOFT RECALL	-
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Winston-Salem

Ebert Street
at
Oak Grove Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	MB Toth
PREPARED BY:	AJ Davis	REVIEWED BY:	LM Moon

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M. Moon 3-22-13
SIGNATURE DATE

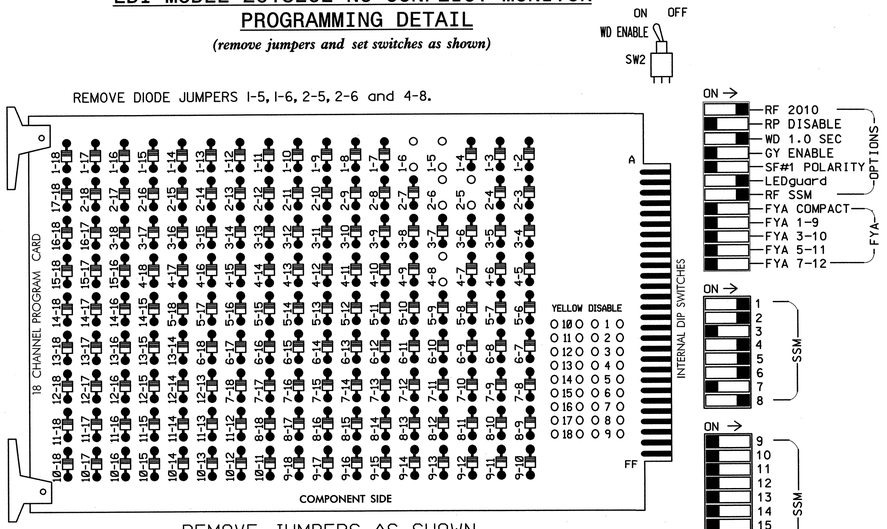
SIG. INVENTORY NO. C-375

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
C-5224B	Sig.338

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Winston-Salem Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX *
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11
PHASES USED.....1,2,4,5,6,8
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
* Aux file to be installed for future use

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101		*	134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126						132											
FLASHING YELLOW ARROW																		
GREEN ARROW	127						133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2+6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				Ø8 8B								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

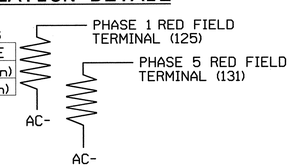
[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: C-375
DESIGNED: 05-2012
SEALED: 03-22-2013
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Winston-Salem

Ebert Street
at
Oak Grove Road

Division 09 Forsyth County Winston-Salem

PLAN DATE:	May 2012	REVIEWED BY:	LM Moon
PREPARED BY:	AJ Davis	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 3/22/13
SIGNATURE DATE

SIG. INVENTORY NO. C-375

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

21-MAR-2013 15:40
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