PROJECT REFERENCE NO.	SHEET NO.
	1

PHASING DIAGRAM

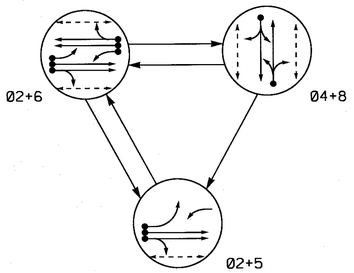


TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04+8	FLASH
21,22	G	G	R	Y
41,42	R	R	G	R
51	←	←	~~R~~	~~Y~~
61	~~F Y~~	~~F Y~~	~~R~~	~~Y~~
62,63	R	G	R	Y
81,82	R	R	G	R
P21,P22	W	W	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	DW	W	DW	DRK
P81,P82	DW	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,2B	6x6	70	3	-	2	Y	Y	-	-	-	-	-
4A	6x40	16	2-4-2	-	4	Y	Y	-	-	5	-	-
✱✱ 4B	6x6	0	2-4-2 Diagonal	-	4	Y	Y	-	-	5	-	-
5A	6x40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A,6B	6x6	70	4	-	6	Y	Y	-	-	-	-	-
6C	6x40	70	2-4-2	-	6	Y	Y	-	-	-	-	-
8A	6x40	16	2-4-2	-	8	Y	Y	-	-	5	-	-
✱✱ 8B	6x6	0	2-4-2 Diagonal	-	8	Y	Y	-	-	5	-	-
S01	6x6	+150	EXIST	-	-	-	-	-	-	-	Y	-
S02	6x6	+150	EXIST	-	-	-	-	-	-	-	Y	-

✱✱ Set Sensitivity to appropriate level to detect a bicycle.

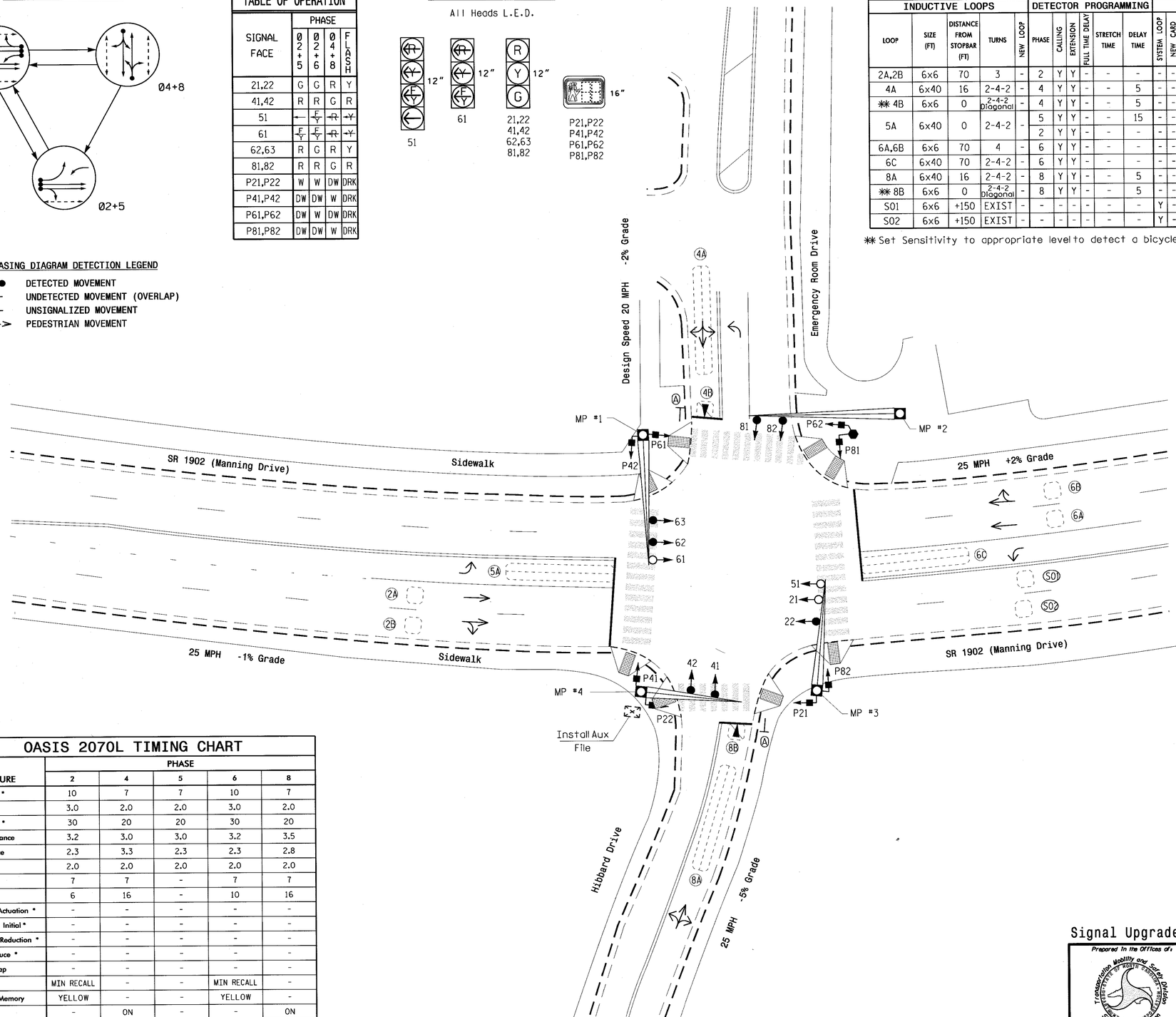
3 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 2.
4. Reposition existing signal heads numbered 22,62 and 63.
5. Set all detector units to presence mode.
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. 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	PHASE 8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	30	20	20	30	20
Yellow Clearance	3.2	3.0	3.0	3.2	3.5
Red Clearance	2.3	3.3	2.3	2.3	2.8
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	7	7	-	7	7
Don't Walk 1	6	16	-	10	16
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

* 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	
	Pedestrian Signal Pedestal	
	Bicycle Detector	
	Pavement Marking	
(A)	"To Request Green Wait on Line" Sign (R10-22)	(A)
N/A	Wheelchair Ramp	

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

SR 1902 (Manning Drive)
at
Hibbard Drive /
Emergency Room Drive

Division 7 Orange County Chapel Hill

PLAN DATE: July 2013 REVIEWED BY: JPG
PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON E. GALLOWAY
7/29/13

SIG. INVENTORY NO. 07-0183

29-JUL-2013 09:19
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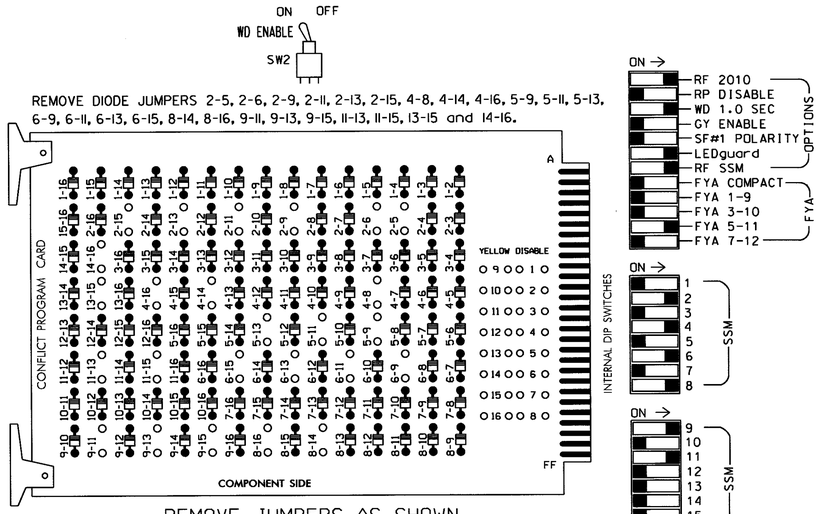
Stephen Sharp

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
8. Program phases 2 and 6 for Yellow Flash, and overlaps 1 as Wag Overlaps.
9. The cabinet and controller are part of the Chapel Hill-Carrboro 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,S2P,S4,S4P,S5,S6,S6P,S8,S8P,S9,S12.
PHASES USED.....2,4,5,6,8,2 PED,4 PED,6 PED,8 PED.
OVERLAP "A".....2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

*In NOTES section refer to note 7.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	P21, P22	NU	41,42	P41, P42	51	62,63	P61, P62	NU	81,82	P81, P82	61	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW		129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW							133											
✋			113			104			119			110						
🚶			115			106			121			112						

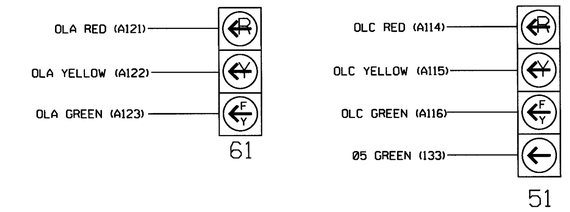
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S01	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L		NOT USED				Ø4 4B			SYS. DET. S02			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B	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	Ø6 6C				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
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			5
*S01	TB6-9,10	I9U	60	22	11	SYS					
*S02	TB6-11,12	I9L	62	24	13	SYS					
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
6C	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5
8B	TB5-11,12	J6L	46	8	18	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					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

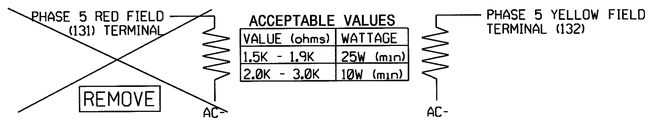
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

[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 resistors as shown below)



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

Disable Backup Protection for phase 2.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0183
DESIGNED: July 2013
SEALED: 7-29-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

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 1902 (Manning Drive)
at
Hibbard Drive /
Emergency Room Drive

Division 7 | Orange County | Chapel Hill
PLAN DATE: July 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 7-29-13 DATE

SIG. INVENTORY NO. 07-0183

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Users:[000,000]

PROJECT REFERENCE NO.	SHEET NO.
	Sig. 3

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:            |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:            |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0183
DESIGNED: July 2013
SEALED: 7-29-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1902 (Manning Drive) at Hibbard Drive / Emergency Room Drive	SEAL
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 7 Orange County Chapel Hill PLAN DATE: July 2013 REVIEWED BY: JTR PREPARED BY: James Peterson REVIEWED BY: REVISIONS INIT. DATE	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR. John T. Rowe Jr. 7-29-13 SIGNATURE DATE SIG. INVENTORY NO. 07-0183

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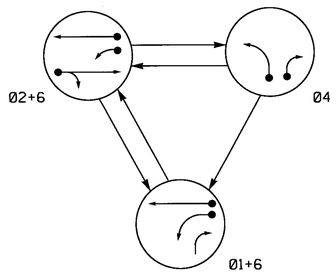
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
———	Sig.4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

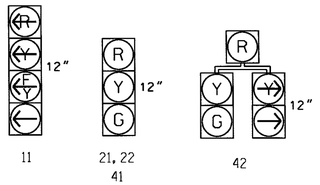
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 6	PHASE 0 2 + 6	PHASE 0 4	PHASE FLASH
11	←	F Y	R	Y
21,22	R	G	R	Y
41	R	R	G	R
42	R/←	R	G	R
61,62	G	G	R	Y

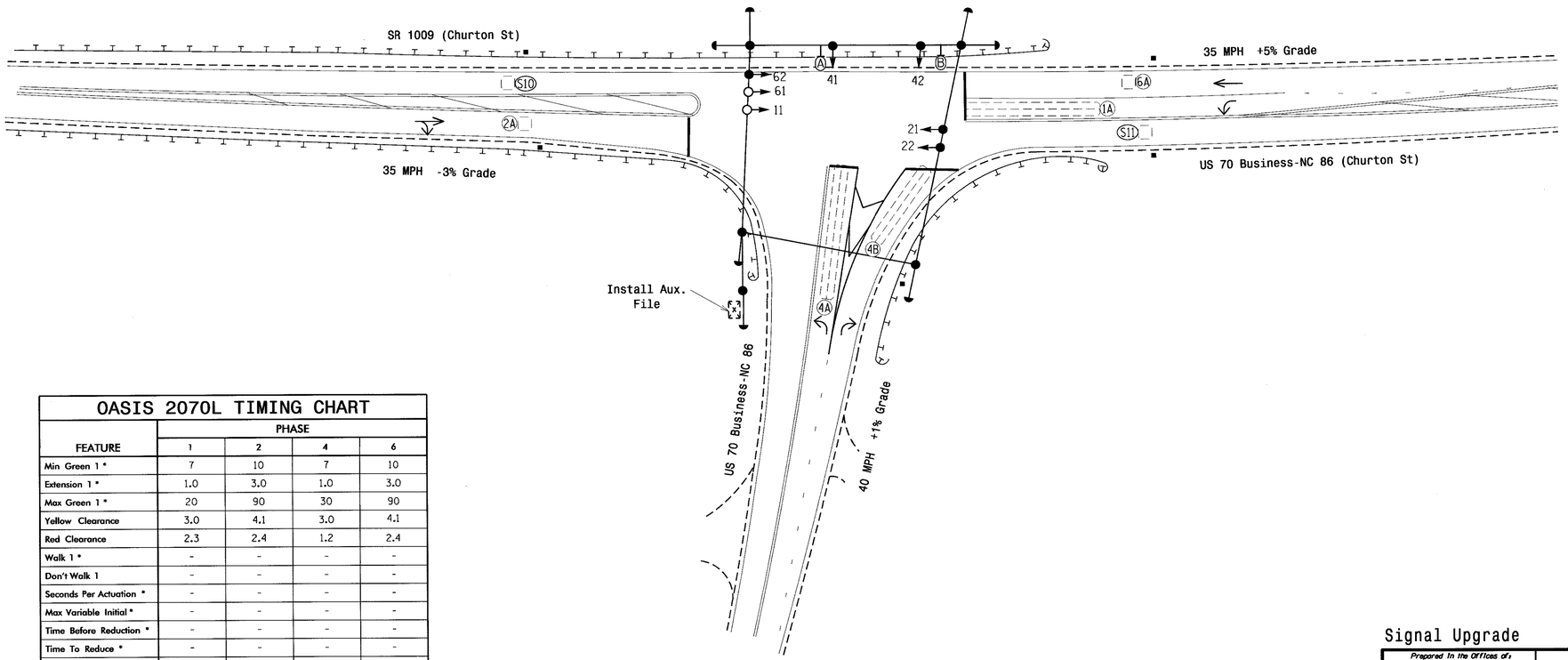
SIGNAL FACE I.D.

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	-	-
					6	Y	Y	-	-	-	-	-
2A	6X6	70	EXISTING	-	2	Y	Y	-	-	-	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	15	-	-
6A	6X6	70	EXISTING	-	6	Y	Y	-	-	-	-	-
S10	6X6	+200	4	-	-	Y	Y	-	-	-	Y	-
S11	6X6	+200	4	-	-	Y	Y	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	1.0	3.0	1.0	3.0
Max Green 1 *	20	90	30	90
Yellow Clearance	3.0	4.1	3.0	4.1
Red Clearance	2.3	2.4	1.2	2.4
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	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 Phase
Fully Actuated
US 70 Business/NC 57-86
(Churton St) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head numbered 62.
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. 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. Closed loop system data: Controller Asset #0203

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	Guard Rail	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ

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

US 70 Business-NC 86/
SR 1009 (Churton St)
at
US 70 Business-NC 86

Division 7 Orange County Hillsborough

PLAN DATE:	June 2013	REVIEWED BY:	PLA
PREPARED BY:	EW Minshew	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23489 PAMELA L. ARMOUR
SIGNATURE 7/2/13 DATE

SIG. INVENTORY NO. 07-0203

22-JUL-2013 07:54
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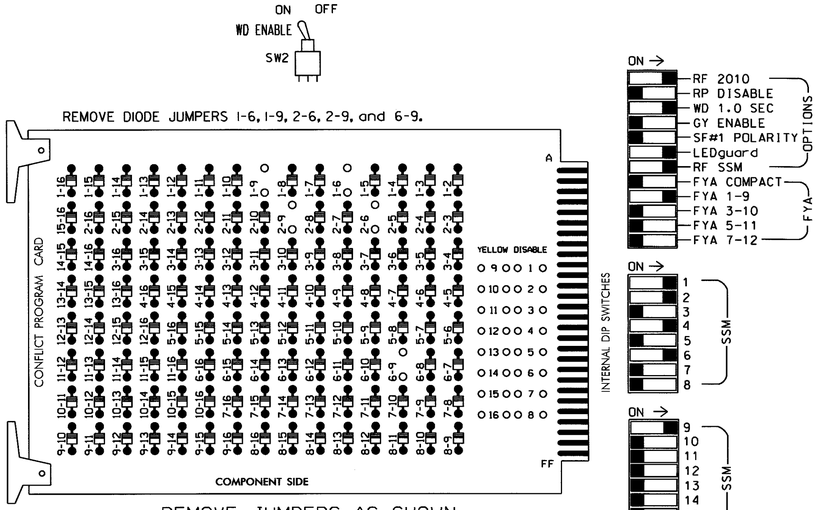
emminshew

PROJECT REFERENCE NO.	SHEET NO.
	Sig. 5

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

! IMPORTANT! 2010ECL-NC conflict monitor required for FYA operation.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5, 7,8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
6. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
7. The cabinet and controller are part of the US 70 Business/ NC 57-86 (Churton Street) Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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★	42	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		*	128			101			134										
YELLOW			129			102			135										
GREEN			130			103			136										
RED ARROW														A121					
YELLOW ARROW		126												A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	127																	

NU = Not Used

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

★ See pictorial of head wiring in detail below.

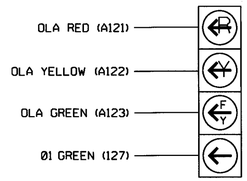
EQUIPMENT INFORMATION

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,S6,S9
PHASES USED.....1,2,4,6
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

* In NOTES section refer to note 6.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

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	SYS. DET. SIØ	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L	NOT USED	NOT USED				Ø4 4B			SYS. DET. S11					ST DC ISOLATOR
FILE "J" U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L		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	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
* SIØ	TB6-9,10	I9U	60	22	11	SYS					
* S11	TB6-11,12	I9L	62	24	13	SYS					

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

! IMPORTANT! Remove any jumpers previously installed on terminal blocks or on the rear of the input file associated with loop 1A before installing the jumper shown in footnote #1 above.

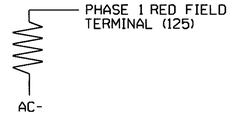
* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)



! IMPORTANT: The load resistor shown above is the only load resistor that should be installed.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0203
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy.Garner,NC 27529

US 70 Business-NC 86/
SR 1009 (Churton St)
at
US 70 Business-NC 86

Division 7 Orange County Hillsborough

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

REVISIONS	INIT.	DATE

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

SIGNATURE 7-23-13 DATE

SIG. INVENTORY NO. 07-0203

23-JUL-2013 07:22
S:\#TSS&SLM\TS Signals\workgroups\Sig Mgmt\armstrong\070203_sm_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.6

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

            ↓
       SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #50 ON
 SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

            ↓
       SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

            ↓
       SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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::XX
VEH OVL NOT VEH::
VEH OVL NOT PED::
VEH OVL GRN EXT::
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0203
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

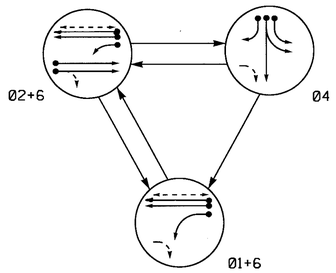
Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 70 Business-NC 86/ SR 1009 (Churton St) at US 70 Business-NC 86	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signals Management Section	Division 7 · Orange County · Hillsborough	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy.,Garner,NC 27529	PLAN DATE: July 2013 · REVIEWED BY: JTR	SIGNATURE · DATE: 7-23-13
	PREPARED BY: S. Armstrong · REVIEWED BY:	SIG. INVENTORY NO. 07-0203
	REVISIONS · INIT. · DATE	

23-JUL-2013 07:22
S:#TSASUM\TS Signals#Workgroups#Sig Mgmt#Armstrong#070203_smu_elo_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig. 7

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

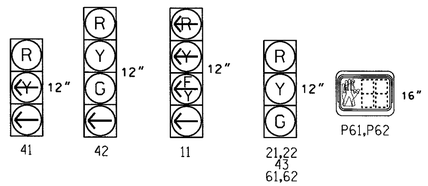
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←, ~~F~~ Y	~~R~~	~~Y~~	
21,22	R	G	R	Y
41	R	R	←	R
42	R	R	G ←	R
43	R	R	G	R
61,62	G	G	R	Y
P61,P62	W	W	DW	DRK

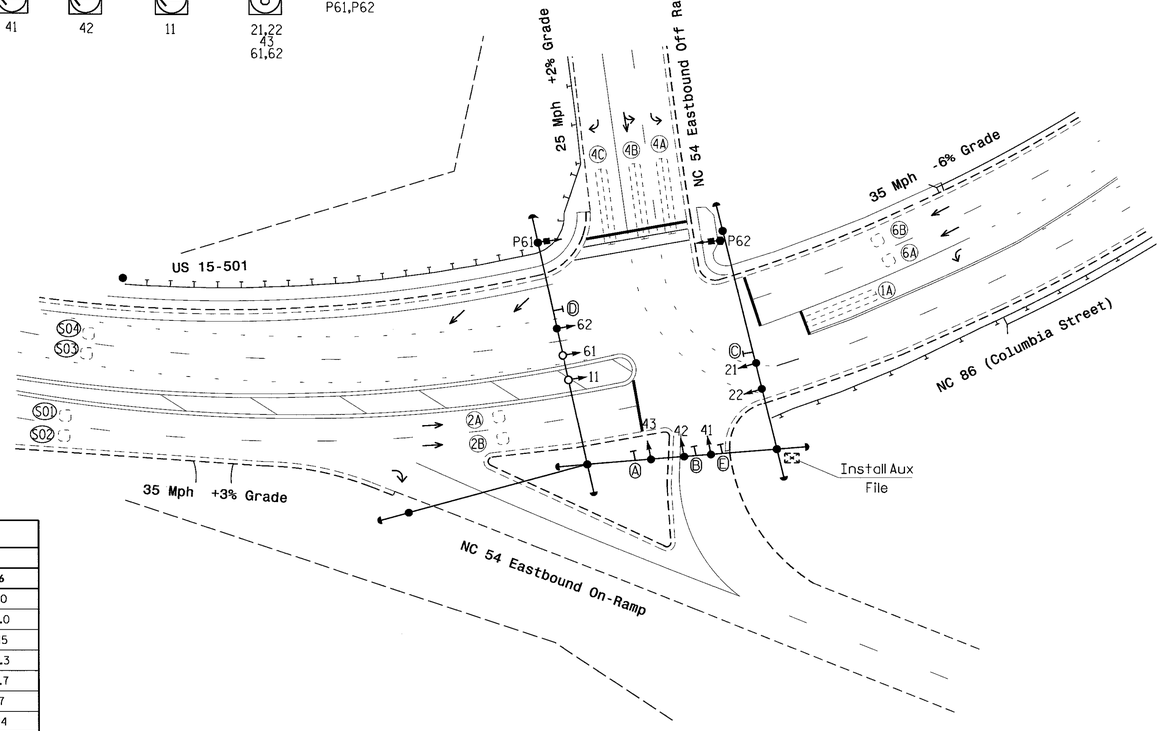
SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION

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
IA	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	-
2A,2B	6X6	70	4	-	2	Y	Y	-	-	-	-	-
4A	6X40	+9	2-4-2	-	4	Y	Y	-	-	-	-	-
4B,4C	6X40	+9	2-4-2	-	4	Y	Y	-	-	-	-	-
6A,6B	6X6	70	4	-	6	Y	Y	-	-	-	-	-
S01	6X6	300	4	-	-	-	-	-	-	-	Y	-
S02	6X6	300	4	-	-	-	-	-	-	-	Y	-
S03	6X6	+400	5	-	-	-	-	-	-	-	Y	-
S04	6X6	+400	5	-	-	-	-	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	1.0	3.0	2.0	3.0
Max Green 1 *	15	45	20	45
Yellow Clearance	3.1	4.3	3.1	4.3
Red Clearance	2.4	1.7	3.1	1.7
Walk 1 *	-	-	-	7
Don't Walk 1	-	-	-	14
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	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 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal heads numbered 62.
5. Set all detector units to presence mode.
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. 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	→
⬡	Pedestrian Signal Pedestal	⬢
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	No Left Turn Sign (R3-2)	Ⓒ
Ⓓ	No Right Turn Sign (R3-1)	Ⓓ
Ⓔ	Left Arrow "ONLY" Sign (R3-5L)	Ⓔ

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

US 15-501-NC 86 (Columbia Street) at NC 54 Eastbound Ramps

Division 7 Orange County Chapel Hill

PLAN DATE:	July 2013	REVIEWED BY:	JPG
PREPARED BY:	Jeff Spence	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY
SIGNATURE 7/25/13 DATE

SIG. INVENTORY NO. 07-0248

25-JUL-2013 08:04
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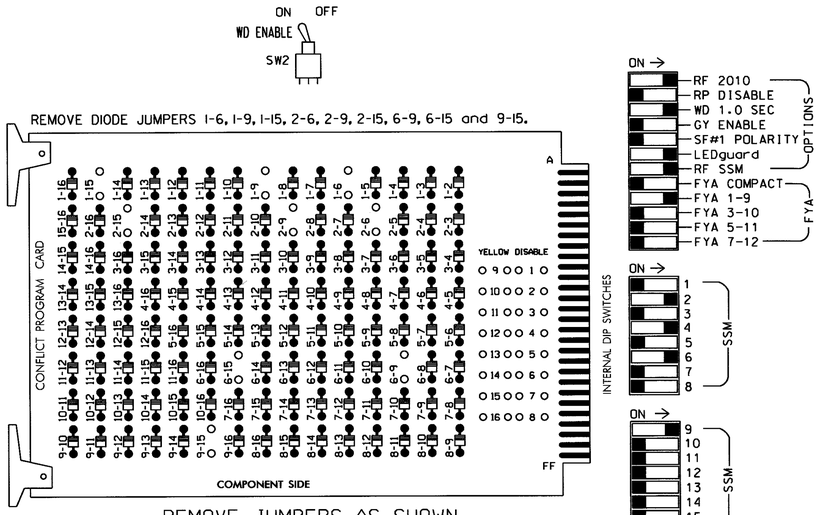
jrspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.8

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
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, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
8. The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.
   In NOTES section refer to note 7.

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,S6,S6P,S9.
PHASES USED.....1,2,4,6,6 PED.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

*In NOTES section refer to note 7.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4			S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	43	NU	NU	61,62	P61, P62	NU	NU	NU	11	NU	NU	NU	NU	NU
RED		128			101	101	101			134										
YELLOW	*	129				102	102			135										
GREEN		130				103	103			136										
RED ARROW															A121					
YELLOW ARROW					102										A122					
FLASHING YELLOW ARROW															A123					
GREEN ARROW	127				103	103														
✋											119									
🚶											121									

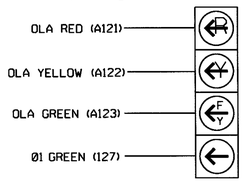
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED				Ø4 4B,4C			SYS. DET. SØ2				NOT USED	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A,6B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED							SYS. DET. SØ4					

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,4C	TB4-11,12	I6L	45	7	14	4	Y	Y			
*SØ1	TB6-9,10	I9U	60	22	11	SYS					
*SØ2	TB6-11,12	I9L	62	24	13	SYS					
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
*SØ3	TB7-9,10	J9U	59	21	15	SYS					
*SØ4	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
INSTALL DC ISOLATOR
IN INPUT FILE SLOT I13.

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

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

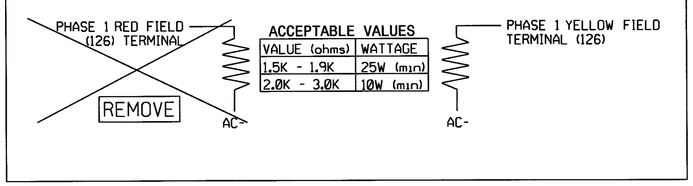
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0248
DESIGNED: July 2013
SEALED: 7-25-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 15-501-NC 88 (Columbia Street)
at
NC 54 Eastbound Ramps

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
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 7-26-13
SIGNATURE DATE
SIG. INVENTORY NO. 07-0248

26-JUL-2013 08:51
C:\Users\jtpeterson\Working Groups\Sig Mgmt\Peterson\070248_sm_ola_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.9

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON
AND RED CLEAR ON PHASE  #1  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          ¦12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0248
DESIGNED: July 2013
SEALED: 7-25-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 15-501-NC 88 (Columbia Street)
at
NC 54 Eastbound Ramps

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

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

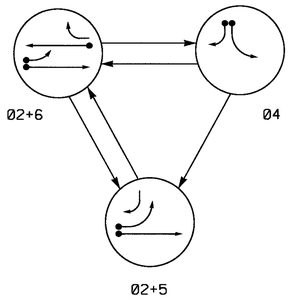
John T. Rowe Jr. 7-26-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0248

25-JUL-2013 14:16
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Peterson*070248_sm_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	10

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

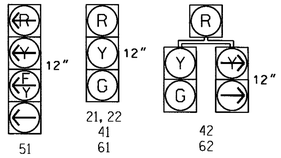
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	PHASE FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/	R	G	R
51	←	~~E Y~~	~~R~~	~~Y~~
61	R	G	R	Y
62	R	G	R/	Y

SIGNAL FACE I.D.

All Heads L.E.D.



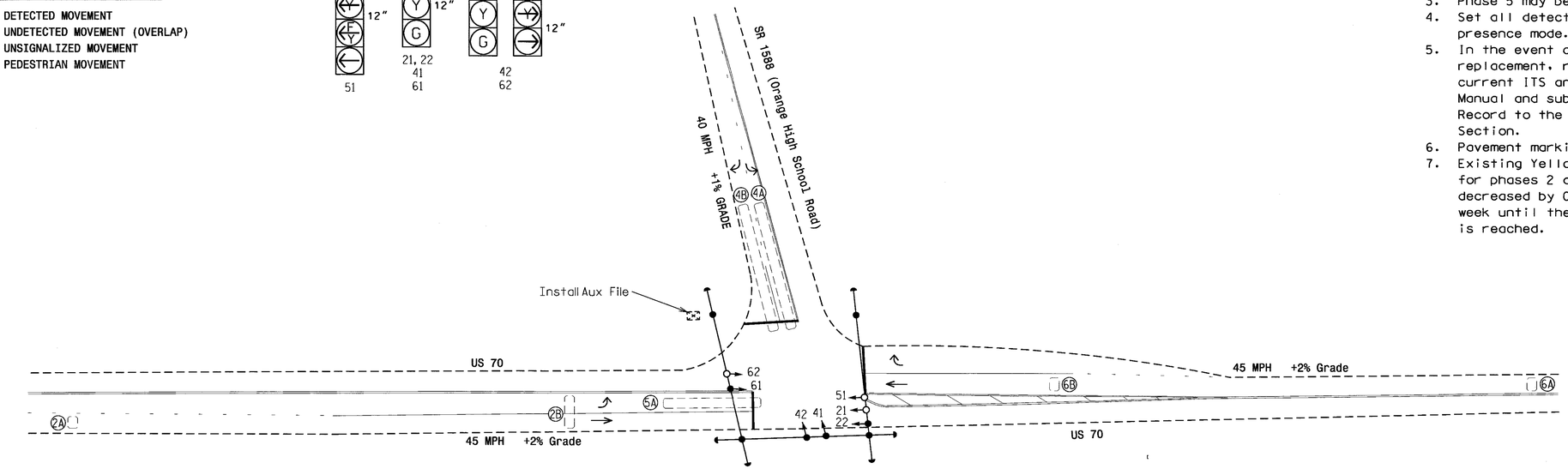
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	6X8	405	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X20	110	EXIST	-	2	Y	Y	-	3.0	-	-	-
4A	6X80	+5	EXIST	-	4	Y	Y	-	-	5	-	-
4B	6X80	+5	EXIST	-	4	Y	Y	-	-	10	-	-
5A	6X60	+5	EXIST	-	5	Y	Y	-	-	10	-	-
6A	6X7	405	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X7	110	EXIST	-	6	Y	Y	-	3.0	-	-	-

3 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
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 the Signal Design Section.
6. Pavement markings are existing.
7. Existing Yellow Change Interval for phases 2 and 6 may be decreased by 0.4 seconds per week until the required value is reached.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	12	7	7	12
Extension 1 *	2.0	1.0	1.0	2.0
Max Green 1 *	45	25	15	45
Yellow Clearance	4.3	3.0	3.0	4.3
Red Clearance	1.1	2.3	1.8	1.1
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	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
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 70
at
SR 1588 (Orange High School Rd)

Division 7 Orange County Hillsborough

PLAN DATE:	May 2013	REVIEWED BY:	JPG
PREPARED BY:	Alexander	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA W. ALEXANDER

7/1/13
SIGNATURE DATE

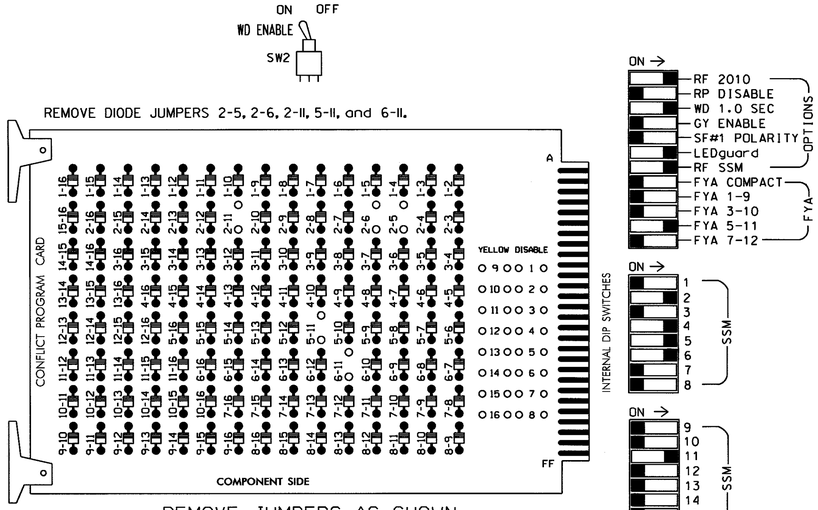
SIG. INVENTORY NO. 07-0396

01-JUL-2013 11:45
Signals#S:\Traffic\Signals\Design Section\Central Region\Div 7\07-0396\07039...

PROJECT REFERENCE NO.	SHEET NO.
	Sig.||

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

! IMPORTANT! 2010ECL-NC conflict monitor required for FYA operation.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4		S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	62	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101			*		134										
YELLOW		129			102					135										
GREEN		130			103					136										
RED ARROW																		A114		
YELLOW ARROW						102		132										A115		
FLASHING YELLOW ARROW																		A116		
GREEN ARROW						103		133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

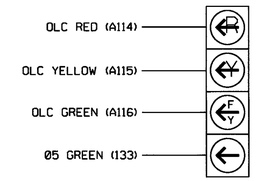
EQUIPMENT INFORMATION

CONTROLLER.....2070L
* CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

* AUXILIARY OUTPUT FILE REQUIRED FOR FYA OPERATION

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



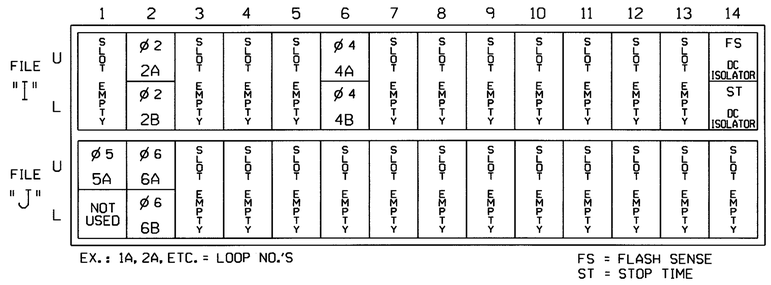
51

NOTE

The sequence display for signal heads 51 requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

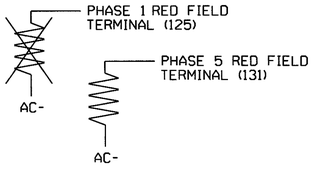
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y		3.0	
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	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		3.0	

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)



! IMPORTANT! Remove load resistor from Phase 1 Red field terminal, if present.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0396
DESIGNED: May 2013
SEALED: 7/1/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70
at
SR 1588 (Orange High School Rd)

Division 7 | Orange County | Hillsborough

PLAN DATE: June 2013 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, 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 | 7-3-13 DATE

SIG. INVENTORY NO. 07-0396

03-JUL-2013 06:56
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PROJECT REFERENCE NO.	SHEET NO.
	Sig.12

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0396
DESIGNED: May 2013
SEALED: 7/1/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

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

US 70
at
SR 1588 (Orange High School Rd)

Division 7 Orange County Hillsborough

PLAN DATE:	June 2013	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. 7-3-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0396

03-JUL-2013 06:56
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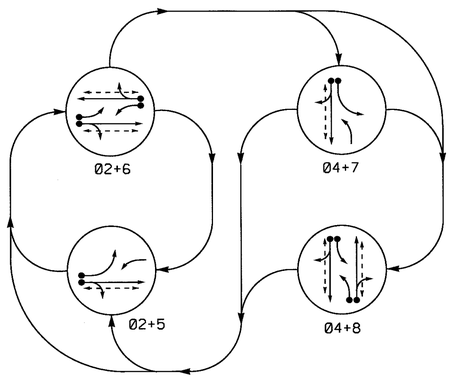
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.13

4 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	02+6	04+7	04+8	FLASH
21,22	G	G	R	R	Y
41,42	R	R	G	G	R
51	~~←~~	~~F Y~~	~~R~~	~~R~~	~~Y~~
61	~~F Y~~	~~F Y~~	~~R~~	~~R~~	~~Y~~
62,63	R	G	R	R	Y
71	~~R~~	~~R~~	~~←~~	~~F Y~~	~~R~~
81	~~R~~	~~R~~	~~F Y~~	~~F Y~~	~~R~~
82,83	R	R	R	G	R
P21, P22	W	W	DW	DW	DRK
P41, P42	DW	DW	W	W	DRK
P61, P62	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

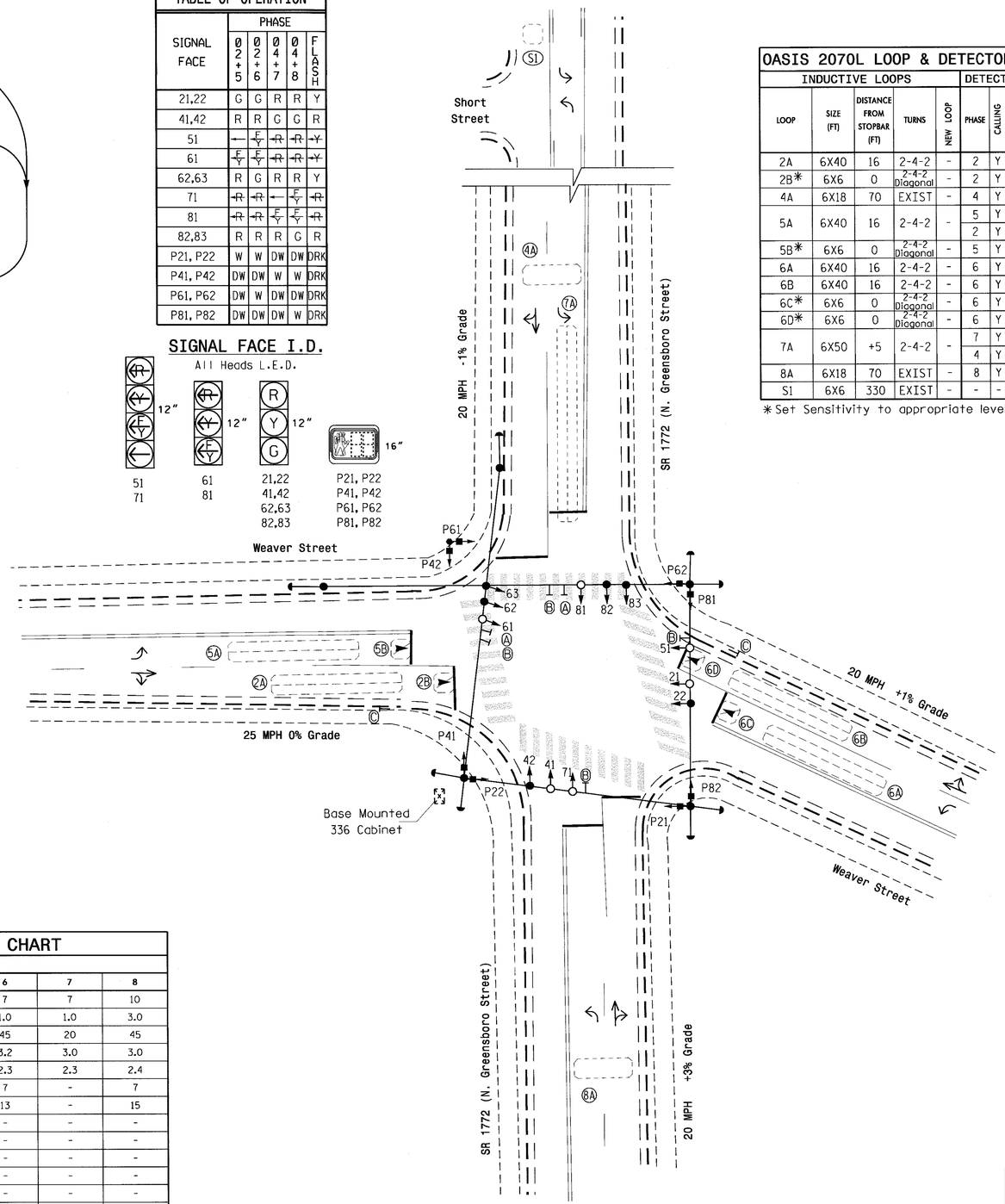
All Heads L.E.D.

51
71

61
81

21,22
41,42
62,63
82,83

P21, P22
P41, P42
P61, P62
P81, P82



OASIS 2070L LOOP & DETECTOR INSTALLATION

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	16	2-4-2	-	2	Y	Y	-	-	-	-	-
2B*	6X6	0	2-4-2 Diagonal	-	2	Y	Y	-	-	-	-	-
4A	6X18	70	EXIST	-	4	Y	Y	-	-	-	-	-
5A	6X40	16	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
5B*	6X6	0	2-4-2 Diagonal	-	5	Y	Y	-	-	15	-	-
6A	6X40	16	2-4-2	-	6	Y	Y	-	-	-	-	-
6B	6X40	16	2-4-2	-	6	Y	Y	-	-	-	-	-
6C*	6X6	0	2-4-2 Diagonal	-	6	Y	Y	-	-	-	-	-
6D*	6X6	0	2-4-2 Diagonal	-	6	Y	Y	-	-	-	-	-
7A	6X50	+5	2-4-2	-	7	Y	Y	-	-	15	-	-
					4	Y	Y	-	-	3	-	-
8A	6X18	70	EXIST	-	8	Y	Y	-	-	-	-	-
S1	6X6	330	EXIST	-	-	-	-	-	-	-	Y	-

*Set Sensitivity to appropriate level to detect a bicycle.

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 2 and 7.
4. Phase 5 may be lagged.
5. Phase 7 may be lagged.
6. Reposition existing signal heads numbered 22,62,63,82 and 83.
7. Set all detector units to presence mode.
8. 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.
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.
13. Program controller to operate using FYA Compact Mode.

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	⬢
▲	Bike Marking	▲
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	"TURNING TRAFFIC MUST YIELD TO PEDESTRIANS" Sign	Ⓑ
Ⓒ	TO REQUEST GREEN WAIT ON LINE — Bike Actuation Sign (R10-22)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	1.0	3.0	1.0	1.0	1.0	3.0
Max Green 1 *	45	45	20	45	20	45
Yellow Clearance	3.2	3.0	3.0	3.2	3.0	3.0
Red Clearance	2.3	2.4	2.1	2.3	2.3	2.4
Walk 1 *	7	7	-	7	-	7
Don't Walk 1	14	13	-	13	-	15
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	MIN/PED RECALL	PED RECALL	-	MIN/PED RECALL	-	PED 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:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

Weaver Street
at
SR 1772 (N. Greensboro Street)

Division 7 Orange County Carrboro

PLAN DATE: August 2013 REVIEWED BY:
PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23689 JEFFREY ALEXANDER
SIGNATURE 9/6/13 DATE

SIG. INVENTORY NO. 07-0504

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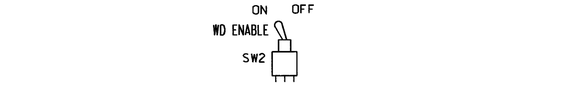
irasenge

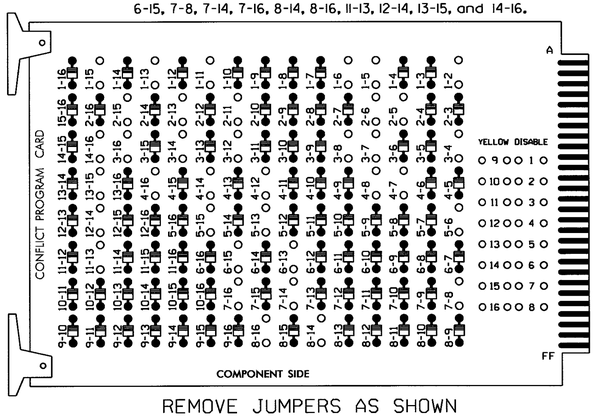
PROJECT REFERENCE NO.	SHEET NO.
	Sig.14

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

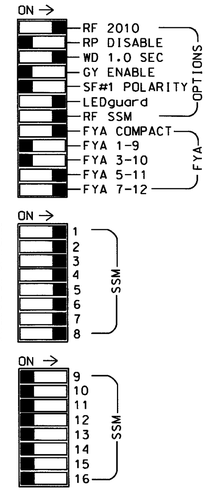
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS: 1-2, 1-5, 1-6, 1-11, 1-13, 1-15, 2-5, 2-6, 2-11, 2-13, 2-15, 3-4, 3-7, 3-8, 3-12, 3-14, 3-16, 4-7, 4-8, 4-12, 4-14, 4-16, 5-6, 5-13, 5-15, 6-13, 6-15, 7-8, 7-14, 7-16, 8-14, 8-16, 11-13, 12-14, 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. Make sure jumpers SEL2-SEL5 are present on the monitor board.
3. ! Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
7. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
8. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S8P
PHASES USED.....2,2PED,4,4PED,5,6,6PED,7,8,8PED
OVERLAP "A".....2
OVERLAP "B".....4
OVERLAP "C".....5+6
OVERLAP "D".....7+8

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P		S7	S8	S8P	
PHASE	OLA	2	2 PED	OLB	4	4 PED	OLC	6	5 GRN	6 PED	OLD	8	7 GRN	8 PED
SIGNAL HEAD NO.	61★	21,22	P21, P22	81★	41,42	P41, P42	51★	62,63	51★	P61, P62	71★	82,83	71★	P81, P82
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			
FLASHING YELLOW ARROW	127			118			133				124			
✋			113			104				119				110
GREEN ARROW									120				111	
🚶			115			106				121				112

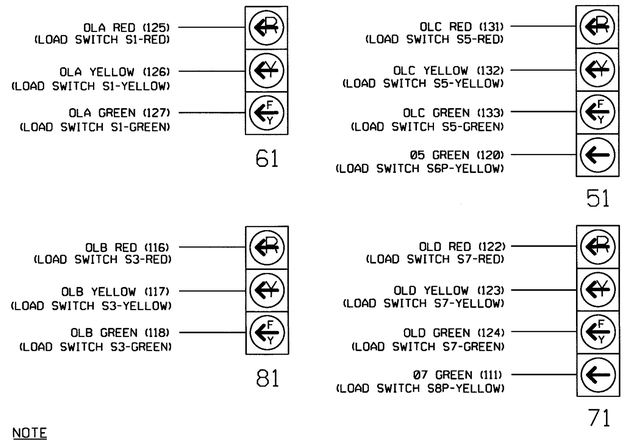
NU = Not Used

★ See pictorial of head wiring in detail below.

NOTE: Load Switches S1, S3, S5, S6P, S7, and S8P require output remapping. See sheets 3, 4, 5, and 6 of this electrical detail for instructions.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for these signal heads 51 and 71 require special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Ø6 6C	Ø2 2A	SYS. DET. S1	Ø4 4A	Ø5 5A	Ø6 6A	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
L	Ø6 6D	Ø2 2B	NOT USED	Ø5 5B	⊗ WIRED INPUT	Ø6 6B	⊗ WIRED INPUT	NOT USED				Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR

EX.: 1A, 2A, ETC. = LOOP NO.'S
⊗ Wired Input - Disable channel 2
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
6C	TB21-1,2	I1U	56	18	1	6	Y	Y			
6D	TB23-1,2	I1L	47	9	22	6	Y	Y			
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
S1	TB21-5,6	I3U	58	20	3	SYS					
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
5B	TB23-7,8	I4L	45	7	14	5	Y	Y			15
5A[1]	TB21-9,10	I5U	55	17	5	5	Y	Y			15
	-	I5L	48	10	26	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			
7A[2]	TB21-13,14	I7U	57	19	7	7	Y	Y			15
	-	I7L	50	12	28	4	Y	Y			3
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6 PED					
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

[1] Add jumper from I5-F to I5-W, on rear of input file.
[2] Add jumper from I7-F to I7-W, on rear of 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.

PED YELLOW CONFLICT MONITOR WIRING DETAIL

In order to use FYA COMPACT mode on the 2010ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: from 6 PY (field term. 120) to chan. 10 green (monitor pin R), and from 8 PY (field term. 111) to chan. 10 yellow (monitor pin U).

This is accomplished through a keyed plug connection found on the inside panel of the output file.

Fold down rear panel of output file and find a set of 3 white keyed connectors. Plug together the two connectors labeled as shown below:

1-2PY	1-CMU-13
2-4PY	2-CMU-16
3-6PY	3-CMU-R
4-8PY	4-CMU-U

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0504
DESIGNED: August 2013
SEALED: 9/6/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 6

ELECTRICAL AND PROGRAMMING DETAILS FOR:	Weaver Street at SR 1772 (N. Greensboro Street)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Traffic Engineering Branch, Signals Management Section	Division 7 Orange County Carrboro	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy.Garner,NC 27529	PLAN DATE: August 2013 REVIEWED BY: JTR	SIGNATURE 9-17-13 DATE
	PREPARED BY: S. Armstrong REVIEWED BY:	SIG. INVENTORY NO. 07-0504
	REVISIONS INIT. DATE	

13-SEP-2013 11:37
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smstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.15

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5, and 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #30 ON
SET OUTPUT  ASSIGNMENT #31 OFF
```

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #32 OFF
```

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #31 ON
```

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #22 ON
SET OUTPUT  ASSIGNMENT #23 OFF
```

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #24 OFF
```

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #23 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

OUTPUT REFERENCE SCHEDULE

OUTPUT 30 = Overlap C Red
OUTPUT 31 = Overlap C Yellow
OUTPUT 32 = Overlap C Green
OUTPUT 22 = Overlap D Red
OUTPUT 23 = Overlap D Yellow
OUTPUT 24 = Overlap D Green
OUTPUT 34 = Phase 5 Green
OUTPUT 36 = Phase 7 Green

Note: All outputs shown above have been remapped. See sheets 5 and 6 of this electrical detail.

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:          |12345678910111213141516
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  X 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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE:          |12345678910111213141516
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  X 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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0504
DESIGNED: August 2013
SEALED: 9/6/13
REVISED: N/A

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

Weaver Street
at
SR 1772 (N. Greensboro Street)

Division 7 | Orange County | Carrboro

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

SIGNATURE John T. Rowe III DATE 9-17-13

SIG. INVENTORY NO. 07-0504

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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.16

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 61

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

```
PAGE:1  C1 PIN:16  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID.1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:16  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN16  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID.1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 15

STEP 2

```
PAGE:1  C1 PIN:17  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID.1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:17  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:17  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID.1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 16

STEP 3

```
PAGE:1  C1 PIN:18  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID.1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:18  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:18  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID.1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

OUTPUT PROGRAMMING FOR HEAD 61 COMPLETE

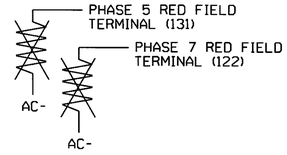
~~BACKUP PROTECTION NOTE~~

(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.

LOAD RESISTOR INSTALLATION DETAIL

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



IMPORTANT: Delete resistors shown above, if installed.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0504
DESIGNED: August 2013
SEALED: 9/6/13
REVISED: N/A

Signal Upgrade - Sheet 3 of 6

ELECTRICAL AND PROGRAMMING DETAILS FOR:	Weaver Street at SR 1772 (N. Greensboro Street)	SEAL
Prepared in the Offices of: Traffic Engineering Branch, Traffic Signals Management Section, NCDOT Division of Highways, Transportation Mobility and Safety Division	Division 7 · Orange County · Carrboro	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: August 2013 · REVIEWED BY: JTR	SIGNATURE · DATE: 9-17-13
	PREPARED BY: S. Armstrong · REVIEWED BY:	SIG. INVENTORY NO. 07-0504
	REVISIONS · INIT. · DATE	

09-SEP-2013 07:05
S:\TSSS\Traffic Signals\workgroups\Sig Man\Armstrong\070504_sheet_xxx.dgn
armstrong

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 81

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "6"

```
PAGE:1  C1 PIN:7   VEHICLE PHASE
OUTPUT ASSIGNMENT #.................6
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:7   VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...2
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:7   VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................6
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 7

STEP 2

```
PAGE:1  C1 PIN:8   VEHICLE PHASE
OUTPUT ASSIGNMENT #.................7
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:8   VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...2
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:8   VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................7
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 8

STEP 3

```
PAGE:1  C1 PIN:9   VEHICLE PHASE
OUTPUT ASSIGNMENT #.................8
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:9   VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...2
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:9   VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................8
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

OUTPUT PROGRAMMING FOR HEAD 81 COMPLETE

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 Function 1.
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:¦12345678910111213141516
IF PHASES ARE ON¦       X
OMIT PHASES     ¦       X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0504
DESIGNED: August 2013
SEALED: 9/6/13
REVISED: N/A

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

Weaver Street at SR 1772 (N. Greensboro Street)

Division 7 | Orange County | Carrboro

PLAN DATE: August 2013 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

SIGNATURE 9-17-13 DATE

SIG. INVENTORY NO. 07-0504

09-SEP-2013 07:05
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armstrong

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 51

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................30
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN32  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................30
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" KEY FOR OUTPUT 31

STEP 2

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................31
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:33  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................31
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE........................
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" KEY FOR OUTPUT 32

STEP 3

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................32
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(O=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:34  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................32
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE........................_
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" TWICE TO REACH OUTPUT 34.

STEP 4

```
PAGE:1  C1 PIN:36  NOT ENABLED
OUTPUT ASSIGNMENT #.................34
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................Y
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1  C1 PIN:36  NOT ENABLED
SELECT VEHICLE PHASE (1-16).........5
SELECT COLOR(O=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:36  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................34
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................_
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

OUTPUT PROGRAMMING FOR HEAD 51 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0504
DESIGNED: August 2013
SEALED: 9/6/13
REVISED: N/A

Signal Upgrade - Sheet 5 of 6

ELECTRICAL AND PROGRAMMING DETAILS FOR:	Weaver Street at SR 1772 (N. Greensboro Street)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, Signals Management Section, State of North Carolina Department of Transportation	Division 7 — Orange County — Carrboro	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: August 2013 — REVIEWED BY: JTR	SIGNATURE: John T. Rowe Jr. — DATE: 9-17-13
	PREPARED BY: S. Armstrong — REVIEWED BY:	SIG. INVENTORY NO. 07-0504
	REVISIONS — INIT. — DATE	

09-SEP-2013 07:04
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Armstrong*070504_sm_ele_xxx.dgn
sarmstrong

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 71

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "22"

```
PAGE:1  C1 PIN:24  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................22
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................_
VEHICLE PHASE......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:24  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...4
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN24  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................22
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................_
VEHICLE PHASE......................
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

PRESS "+" KEY FOR OUTPUT 23

STEP 2

```
PAGE:1  C1 PIN:25  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................23
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................
VEHICLE PHASE......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:25  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...4
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:25  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................23
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................
VEHICLE PHASE......................
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

PRESS "+" KEY FOR OUTPUT 24

STEP 3

```
PAGE:1  C1 PIN:26  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................24
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................
VEHICLE PHASE......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:26  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...4
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:26  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................24
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................
VEHICLE PHASE......................_
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

PRESS "+" UNTIL OUTPUT 36 IS REACHED.

STEP 4

```
PAGE:1  C1 PIN:38  NOT ENABLED
OUTPUT ASSIGNMENT #.................36
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................Y
VEHICLE PHASE......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1  C1 PIN:38  NOT ENABLED
SELECT VEHICLE PHASE (1-16).........7
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:38  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................36
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED........................_
VEHICLE PHASE......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP....................._
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT.............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

OUTPUT PROGRAMMING FOR HEAD 71 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0504
DESIGNED: August 2013
SEALED: 9/6/13
REVISED: N/A

Signal Upgrade - Sheet 6 of 6

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Weaver Street
at
SR 1772 (N. Greensboro Street)

Division 7 Orange County Carrboro

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

REVISIONS	INIT.	DATE

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

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

SIGNATURE DATE 9-17-13

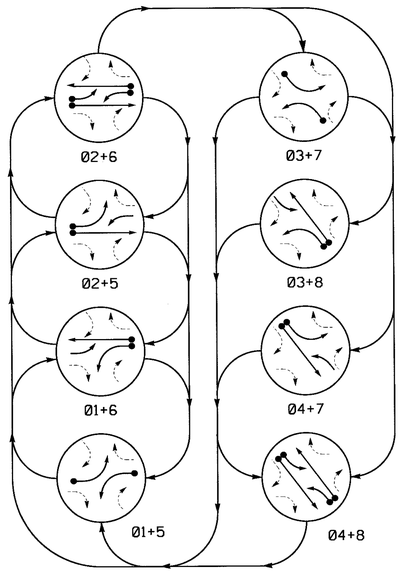
SIG. INVENTORY NO. 07-0504

09-SEP-2013 07:04
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Armstrong*070504_sm_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig 20

8 Phase Fully Actuated US 70 Business / NC 57-86 (Churton Street) CLS

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

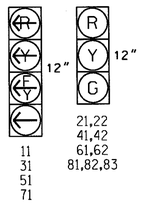
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	F Y	F Y	R	R	R	R	Y
21,22	R	R	G	G	R	R	R	Y	
31	R	R	R	R	←	←	F Y	F Y	R
41,42	R	R	R	R	R	G	G	R	
51	←	F Y	←	F Y	R	R	R	R	Y
61,62	R	G	R	G	R	R	R	Y	
71	R	R	R	R	←	F Y	←	F Y	R
81,82,83	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

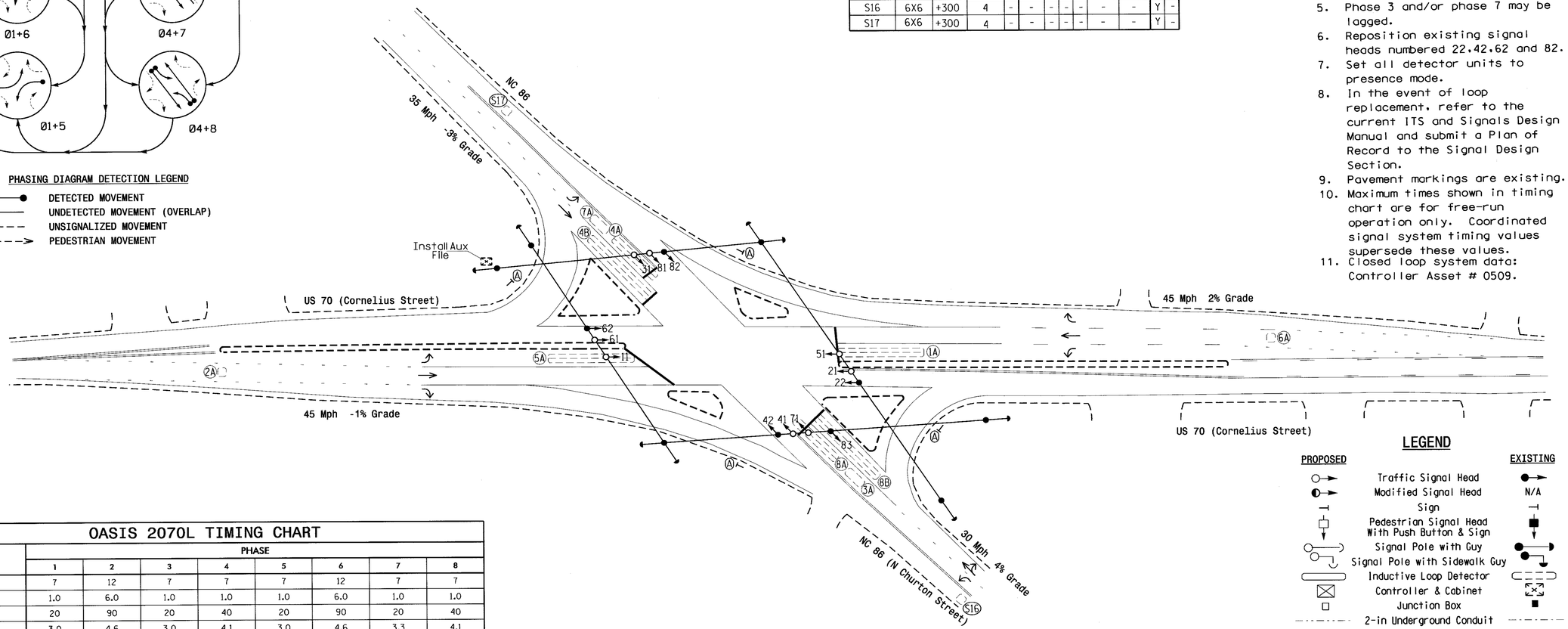


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
				-	6	Y	Y	Y	-	3	-	-
2A	6X6	300	4	-	2	Y	Y	-	-	-	-	-
3A	6X15	40	3	-	3	Y	Y	-	-	10	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
				-	2	Y	Y	Y	-	3	-	-
6A	6X6	300	5	-	6	Y	Y	-	-	-	-	-
7A	6X15	45	3	-	7	Y	Y	-	-	10	-	-
8A	6X40	+10	2-4-2	-	8	Y	Y	-	-	3	-	-
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	-
S16	6X6	+300	4	-	-	-	-	-	-	-	Y	-
S17	6X6	+300	4	-	-	-	-	-	-	-	Y	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phases 2,4,6 and 8.
4. Phase 1 and/or phase 5 may be lagged.
5. Phase 3 and/or phase 7 may be lagged.
6. Reposition existing signal heads numbered 22,42,62 and 82.
7. Set all detector units to presence mode.
8. 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.
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. Closed loop system data: Controller Asset # 0509.



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" Sign (R1-2)	A

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 *	1.0	6.0	1.0	1.0	1.0	6.0	1.0	1.0
Max Green 1 *	20	90	20	40	20	90	20	40
Yellow Clearance	3.0	4.6	3.0	4.1	3.0	4.6	3.3	4.1
Red Clearance	2.4	1.8	3.0	2.7	2.1	1.8	3.1	2.7
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 *	-	45	-	-	-	45	-	-
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	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

US 70 (Cornelius Street) at NC 86

Divisin 7 Orange County Hillsborough

PLAN DATE: June 2013 REVIEWED BY:

PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER JEFFREY ALEXANDER SPENCE
SIGNATURE 7/1/13 DATE

SIG. INVENTORY NO. 07-0509

01-JUL-2013 10:51
S:\#ITSSIG\#ITS Signals\Signal Design Section\Central Region\Div 7\07-0509\07D509_sig_dsn_2013mxdd.dgn
JSpence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.2

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

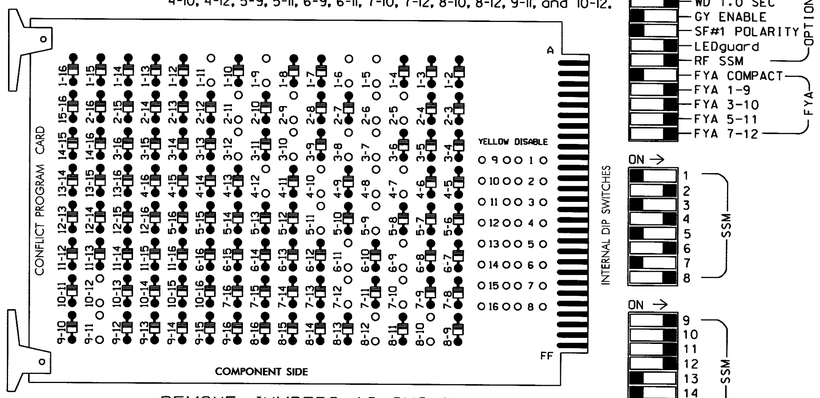
(remove jumpers and set switches as shown)

ON OFF

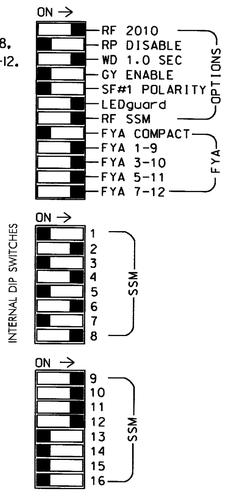
WD ENABLE

SW2

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

! IMPORTANT! 2010ECL-NC conflict monitor required for FYA operation.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 5,7,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Start Up In Green.
7. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
8. The cabinet and controller are part of the US 70 Bus./ NC 57-86 (Churton Street) Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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★	61,62	NU	71★	81,82 83	NU	11★	31★	NU	51★	71★	NU
RED		128			101			134			107							
YELLOW	✱	129		✱	102		✱	135		✱	108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127			118			133			124								

NU = Not Used

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

★ See pictorial of head wiring in detail below.

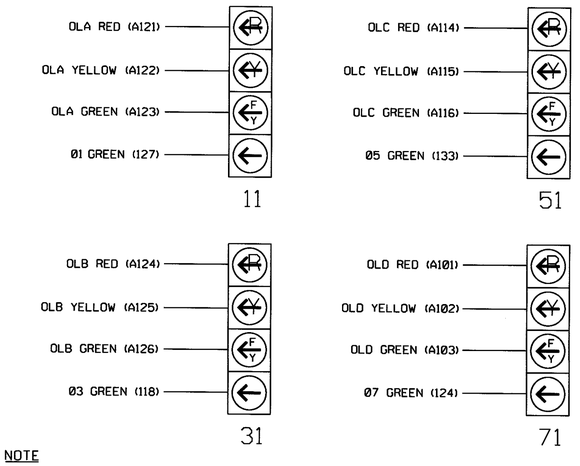
EQUIPMENT INFORMATION

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,S9,S10,S12,S13
PHASES USED.....1,2,3,4,5,6,7,8.
OVERLAP "A".....1+2
OVERLAP "B".....3+4
OVERLAP "C".....5+6
OVERLAP "D".....7+8

✱ AUXILIARY OUTPUT FILE REQUIRED FOR FYA OPERATION

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11, 31, 51, and 71 requires special logic programming. See sheet 2 for programming instructions.

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 ⊗	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S16	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L	NOT USED	NOT USED			NOT USED	Ø4 4B			SYS. DET. S17					ST DC ISOLATOR
FILE "J" U	Ø5 5A	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	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

⊗ 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			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
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
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			10
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
✱ S16	TB6-9,10	I9U	60	22	11	SYS					
✱ S17	TB6-11,12	I9L	62	24	13	SYS					

! IMPORTANT! Remove any "wired input" jumpers previously installed on the rear of the input file, then proceed to install the following:

[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.

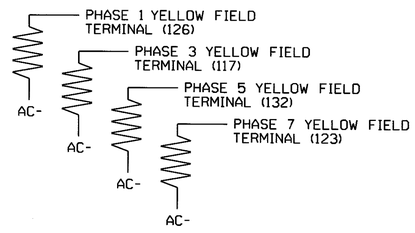
✱ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)



! IMPORTANT! The load resistors shown above are the only resistors that should be installed. All others should be removed from the output file.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0509
DESIGNED: June 2013
SEALED: 7/1/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 70 (Cornelius Street) at NC 86	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Traffic Management Section	Division 7 / Orange County / Hillsborough	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: June 2013 — REVIEWED BY: JTR	John T Rowe 7-3-13 SIGNATURE DATE
	PREPARED BY: S. Armstrong — REVIEWED BY:	SIG. INVENTORY NO. 07-0509
	REVISIONS / INIT. / DATE	

03-JUL-2013 07:09
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Armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.22

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, AND 12.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
PRESS '+'
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
PRESS '+'
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
PRESS '+'
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
PRESS '+'
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

```
LOGICAL I/O COMMAND #7  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
PRESS '+'
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

```
LOGICAL I/O COMMAND #8  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

```
LOGICAL I/O COMMAND #9  (+/-COMMAND#)
IF  YELLOW ON PHASE    #3  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #48 ON
PRESS '+'
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

```
LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
PRESS '+'
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

```
LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

```
LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #40 ON
PRESS '+'
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:          |12345678910111213141516
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  X 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
```

NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE:          |12345678910111213141516
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  X 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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

DISABLE 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 disable all Dynamic/Backup Control Functions.

2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions). Delete all programmed entries for all Dynamic/Backup Control Functions.

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0509
DESIGNED: June 2013
SEALED: 7/1/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 (Cornelius Street) at NC 86

Division 7 | Orange County | Hillsborough

PLAN DATE: June 2013 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
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.

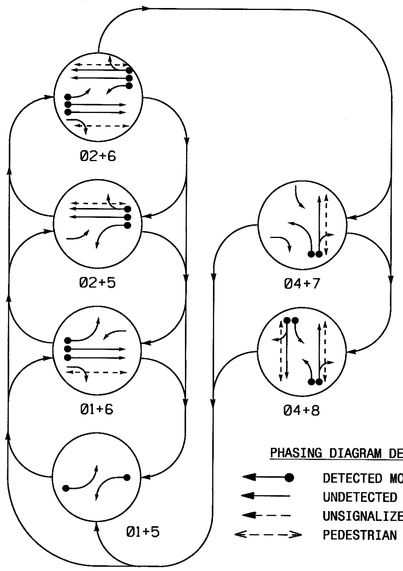
John T Rowe 7-3-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0509

03-JUL-2013 07:10
S:\#TSSG\UMTS Signal\eWorkgroups\Sig Mgmt\Armstrong\M70509_sm_ele.xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.23

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

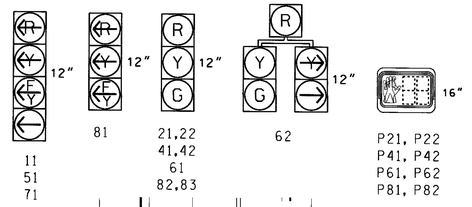
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+7	04+8	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~Y~~
21,22	R	R	G	G	R	R	Y
41,42	R	R	R	R	G	G	R
51	←	F Y	←	F Y	~~R~~	~~R~~	~~Y~~
61	R	G	R	G	R	R	Y
62	R	G	R	G	R/←	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	F Y	~~R~~
81	~~R~~	~~R~~	~~R~~	~~R~~	F Y	F Y	~~R~~
82,83	R	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DRK

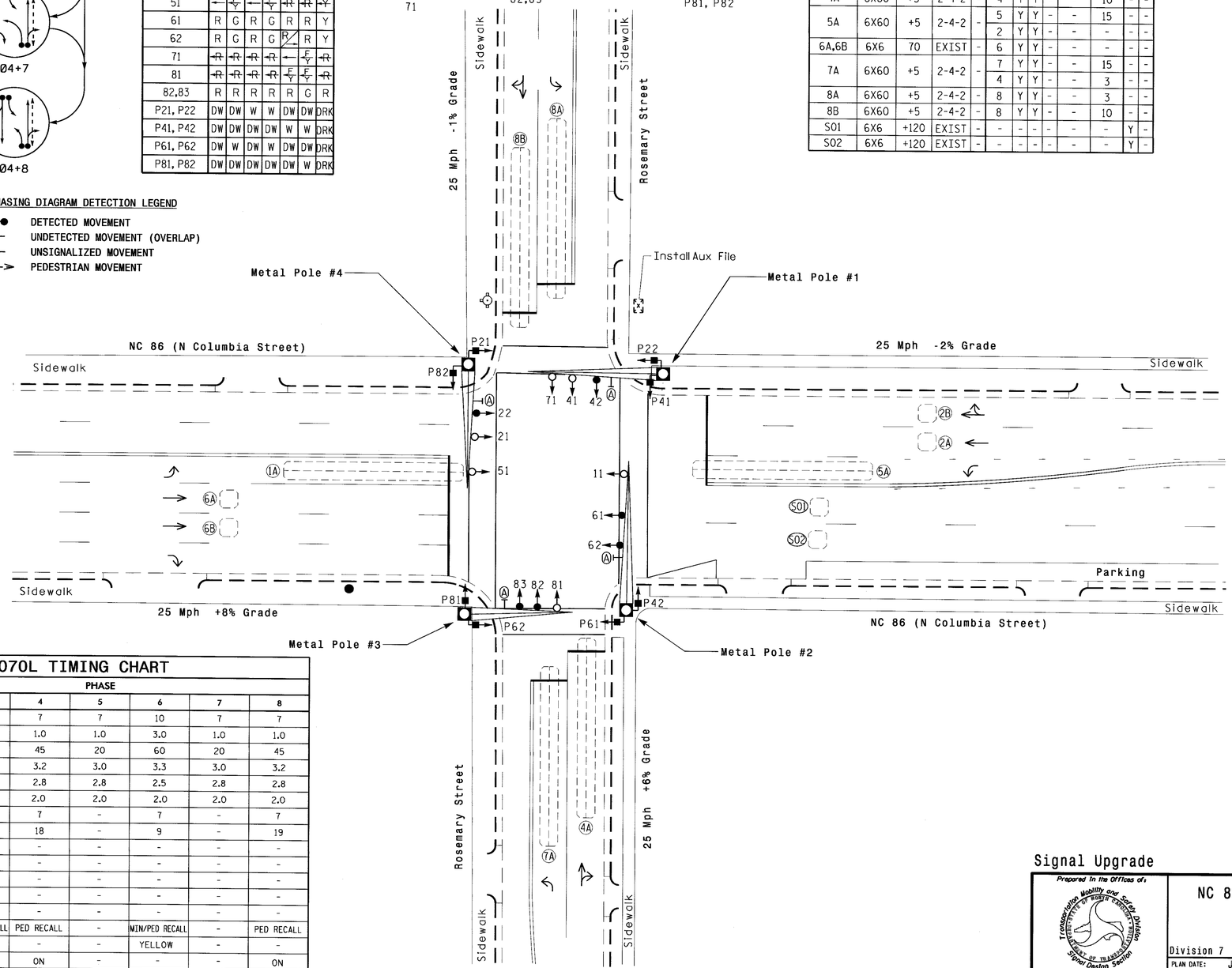
SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION

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	-	-
					6	Y	Y	-	-	-	-	-
2A,2B	6X6	70	EXIST	-	2	Y	Y	-	-	-	-	-
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X60	+5	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A,6B	6X6	70	EXIST	-	6	Y	Y	-	-	-	-	-
7A	6X60	+5	2-4-2	-	7	Y	Y	-	-	15	-	-
					4	Y	Y	-	-	3	-	-
8A	6X60	+5	2-4-2	-	8	Y	Y	-	-	3	-	-
8B	6X60	+5	2-4-2	-	8	Y	Y	-	-	10	-	-
SO1	6X6	+120	EXIST	-	-	-	-	-	-	-	Y	-
SO2	6X6	+120	EXIST	-	-	-	-	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	7	8
Min Green 1 *	7	10	7	7	10	7	7
Extension 1 *	1.0	3.0	1.0	1.0	3.0	1.0	1.0
Max Green 1 *	20	60	45	20	60	20	45
Yellow Clearance	3.0	3.3	3.2	3.0	3.3	3.0	3.2
Red Clearance	2.1	2.5	2.8	2.8	2.5	2.8	2.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	-	7	-	7
Don't Walk 1	-	10	18	-	9	-	19
Seconds Per Actuation *	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Recall Mode	-	MIN/PED RECALL	PED RECALL	-	MIN/PED RECALL	-	PED RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-	-
Dual Entry	-	-	ON	-	-	-	ON
Simultaneous Gap	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.

6 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable existing backup protection.
4. Phase 1 and/or phase 5 may be lagged.
5. Phase 7 may be lagged.
6. Reposition existing signal heads numbered 22,42, 82 and 83.
7. Set all detector units to presence mode.
8. 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.
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. Closed loop system data: Controller Asset # 0517.
12. Remove existing Left Arrow "Only" Signs.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Metal Pole with Mastarm	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
N/A	Wheel Chair Ramp	
	2-in Underground Conduit	
N/A	Fire Hydrant	
	Directional Arrow	
Ⓐ	"Turning Traffic Must Yield To Pedestrians" - Sign	Ⓐ

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

NC 86 (N. Columbia Street) at Rosemary Street

Division 7 Orange County Chapel Hill

PLAN DATE: June 2013 REVIEWED BY: JPG

PREPARED BY: Jeff Spence REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

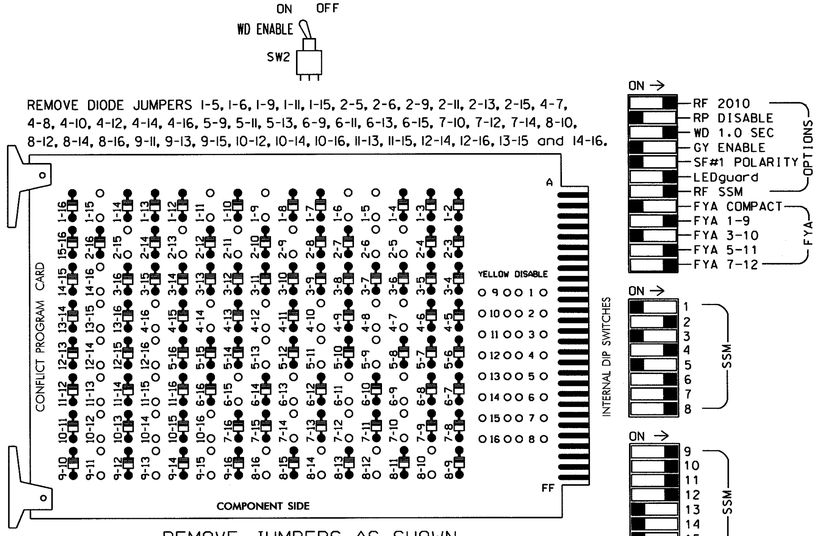
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY
SIGNATURE 7/11/13 DATE
SIG. INVENTORY NO. 07-0517

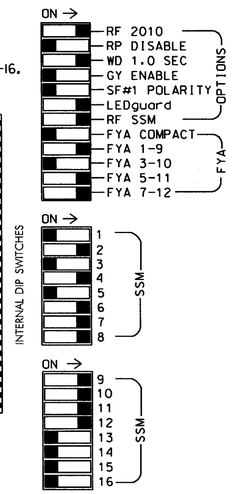
11-JUL-2013 14:55
S:\ATTS\SIGNALS\Signal Design Section\Control Regions\Div 7\407-0517\407051?_sig_dsn_2013mscd.dgn
jrspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.24

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
7. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
8. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Auxiliary Traffic Signal Control Equipment Specifications.*
9. The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7		S8	S8P	S9	S10	S11	S12	S13	S14
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	62	71★	82,83	P81, P82	11★	81★	NU	51★	71★	NU
RED		128			101			134		✱		107							
YELLOW	✱	129			102		✱	135				108							
GREEN		130			103			136				109							
RED ARROW														A121	A124		A114	A101	
YELLOW ARROW										123				A122	A125		A115	A102	
FLASHING YELLOW ARROW														A123	A126		A116	A103	
GREEN ARROW	127						133			124	124								
✋			113			104			119				110						
🚶			115			106			121				112						

NU = Not Used

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

★ See pictorial of head wiring in detail below.

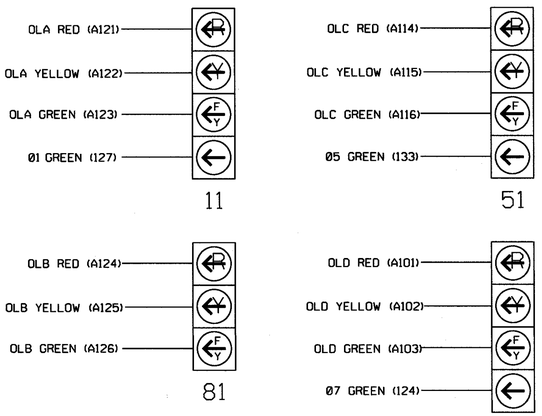
EQUIPMENT INFORMATION

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,S2P,S4,S4P,S5,S6,S6P,S7,S8, S8P,S9,S10,S12,S13
PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,7,8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....4
OVERLAP "C".....5+6
OVERLAP "D".....7+8

✱ In NOTES section refer to note 7.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for signals 11, 51 and 71 require special logic programming. See sheet 2 of 2 for programming instructions.

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	SLOT EMPTY	WD INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	WD INPUT ⊗	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED				NOT USED			SYS. DET. SØ2					ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B	SLOT EMPTY	WD INPUT ⊗	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

⊗ 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			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A[3]	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
✱ SØ1	TB6-9,10	I9U	60	22	11	SYS					
✱ SØ2	TB6-11,12	I9L	62	24	13	SYS					

[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.

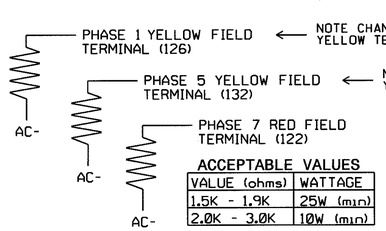
[3] Add jumper from J5-W to I8-W, on rear of input file.

✱ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)

Move Load Resistors:

1) FROM: PHASE 1 RED FIELD TERMINAL (125) TO: PHASE 1 YELLOW FIELD TERMINAL (126)

2) FROM: PHASE 5 RED FIELD TERMINAL (131) TO: PHASE 5 YELLOW FIELD TERMINAL (132)

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: 07-0517
DESIGNED: June 2013
SEALED: 7/11/13
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Public Transportation and Safety Services Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

NC 86 (N. Columbia Street) at Rosemary Street

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: T.Upm

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 7/15/13 DATE

SIG. INVENTORY NO. 07-0517

12-JUL-2013 11:37
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cestrickland

PROJECT REFERENCE NO.	SHEET NO.
	Sig.25

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8 AND 9.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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: 1234567891011121314 1516
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 X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 1234567891011121314 1516
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 X 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

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 1234567891011121314 1516
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 X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 1234567891011121314 1516
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 X 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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

REMOVAL OF
DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). If present, remove Dynamic/Backup Control Function 1.

2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions). If present, remove all phases from all "Dynamic/Backup Control Functions'.

~~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.

! IMPORTANT: Disable Backup Protection for phases 2 and 6.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0517
DESIGNED: June 2013
SEALED: 7/11/13
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

NC 86 (N. Columbia Street) at Rosemary Street

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: T. Jym
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 7/15/13 DATE

SIG. INVENTORY NO. 07-0517

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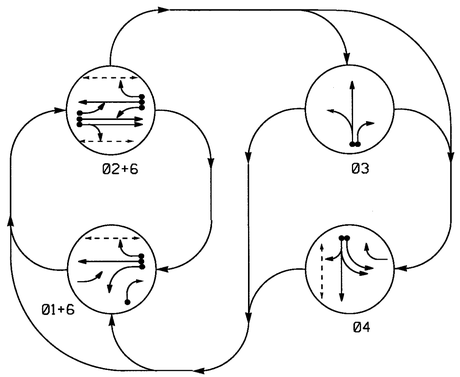
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
	Sig 26

4 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

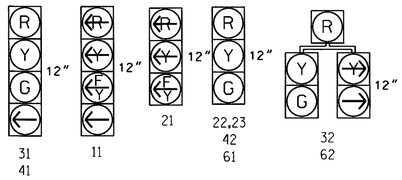
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø3	Ø4	FLASH
11	←	F Y	R	R	Y
21	F Y	F Y	R	R	Y
22,23	R	G	R	R	Y
31	R	R	G ←	R	R
32	R →	R	G	R	R
41	R	R	R	G ←	R
42	R	R	R	G	R
61	G	G	R	R	Y
62	G	G	R	R →	Y
P21,P22	DW	W	DW	DW	DRK
P41,P42	DW	DW	DW	W	DRK
P61,P62	W	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



P21,P22
P41,P42
P61,P62

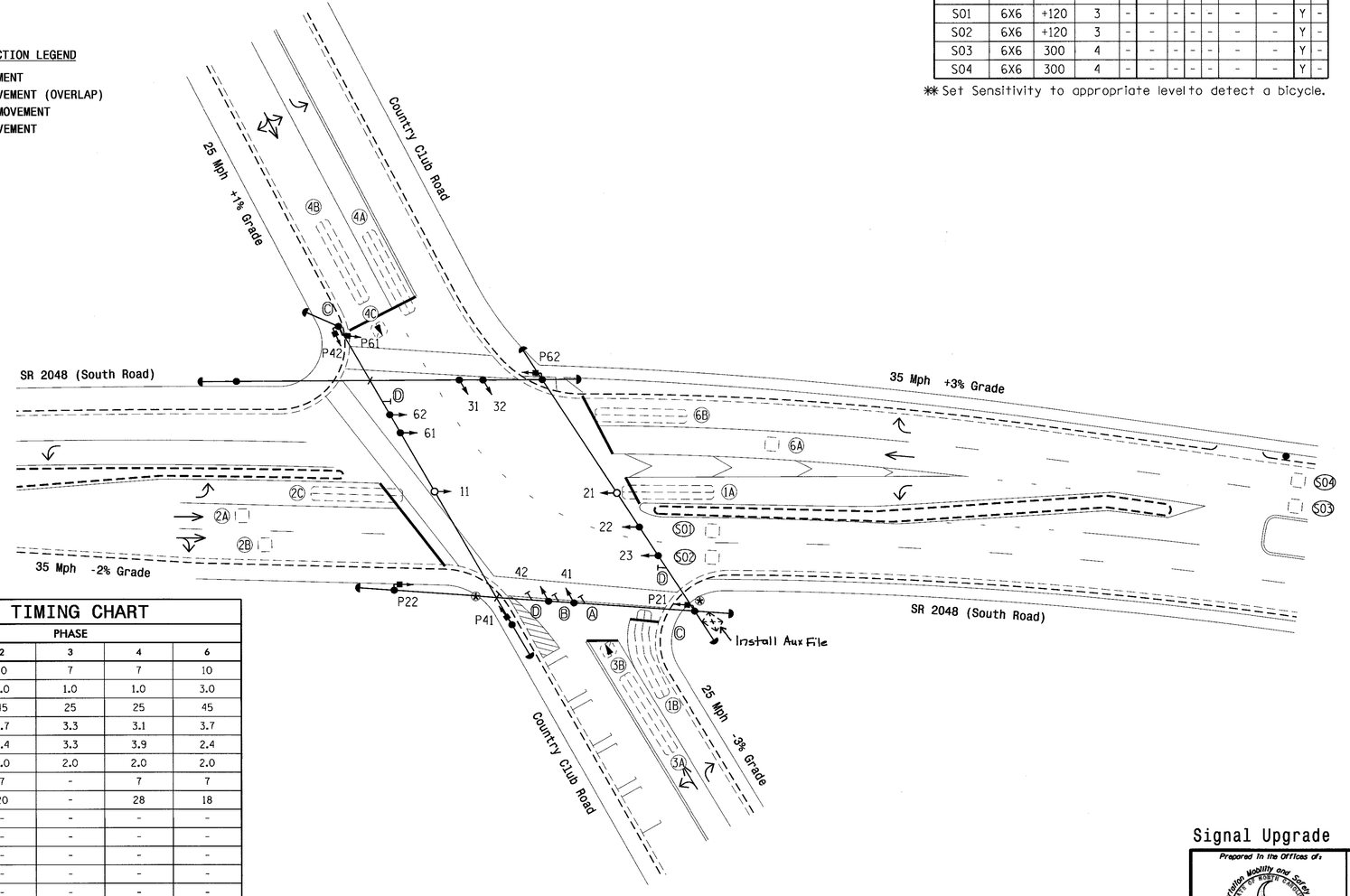
OASIS 2070L LOOP & DETECTOR INSTALLATION

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	-	-	25	-	-
					6	Y	Y	-	-	-	-	-
1B	6X40	+5	2-4-2	-	1	Y	Y	-	-	15	-	-
2A,2B	6X6	70	3	-	2	Y	Y	-	-	-	-	-
2C	6X40	+5	2-4-2	-	2	Y	Y	-	-	5	-	-
3A	6X40	16	2-4-2	-	3	Y	Y	-	-	-	-	-
✻✻ 3B	6X6	0	2-4-2 DIAGONAL	-	3	Y	Y	-	-	-	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X40	8	2-4-2	-	4	Y	Y	-	-	-	-	-
✻✻ 4C	6X6	+8	2-4-2 DIAGONAL	-	4	Y	Y	-	-	-	-	-
6A	6X6	70	3	-	6	Y	Y	-	-	-	-	-
6B	6X40	0	2-4-2	-	6	Y	Y	-	-	10	-	-
S01	6X6	+120	3	-	-	-	-	-	-	-	Y	-
S02	6X6	+120	3	-	-	-	-	-	-	-	Y	-
S03	6X6	300	4	-	-	-	-	-	-	-	Y	-
S04	6X6	300	4	-	-	-	-	-	-	-	Y	-

✻✻ Set Sensitivity to appropriate level to detect a bicycle.

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protection for phase 6.
4. Reposition existing signal heads numbered 22,23,61 and 62.
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. 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. 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	Pushbutton Pedestal	✱
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Dual Turn and Through Arrows Sign (R3-19)	Ⓑ
Ⓒ	"TO REQUEST GREEN WAIT ON LINE" Sign (R10-22)	Ⓒ
Ⓓ	"YIELD TO PEDESTRIANS" Sign	Ⓓ
▲	Bike Marking	▲

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Min Green 1 *	7	10	7	7	10
Extension 1 *	1.0	3.0	1.0	1.0	3.0
Max Green 1 *	15	45	25	25	45
Yellow Clearance	3.0	3.7	3.3	3.1	3.7
Red Clearance	2.1	2.4	3.3	3.9	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7	7
Don't Walk 1	-	20	-	28	18
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	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

SR 2048 (South Rd./Raleigh Rd.) at Country Club Road

Division 7 Orange County Chapel Hill

PLAN DATE: July 2013 REVIEWED BY:
PREPARED BY: Jeff Spence REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON R. GALLOWAY
SIGNATURE 9/21/13 DATE
SIG. INVENTORY NO. 07-0522

20-AUG-2013 15:54
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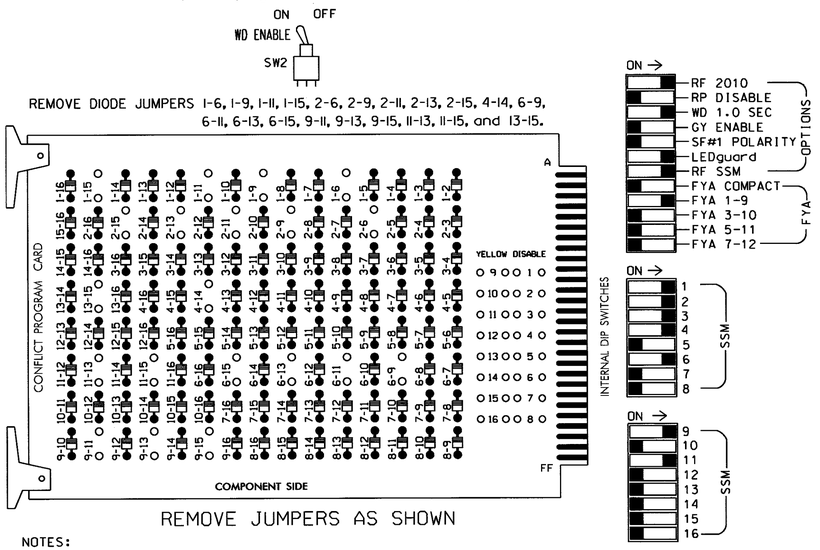
Jeffspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.27

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 5,7, 8,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
8. The cabinet and controller are part of the Chapel Hill-Carrboro System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3		S4			S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	22,23	P21, P22	31	32	41	42	62	P41, P42	NU	61,62	P61, P62	NU	NU	NU	11★	NU	NU	21★	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																	A121			A114		
YELLOW ARROW		126							102								A122			A115		
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127	127			118		103		103													
✋				113						104			119									
🚶				115						106			121									

NU = Not Used

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

★ See pictorial of head wiring in detail below.

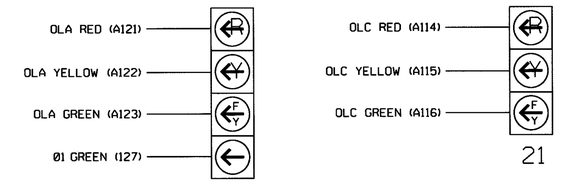
EQUIPMENT INFORMATION

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,S2P,S3,S4,S4P,S6,S6P,S9,S12
PHASES USED.....1,2,2PED,3,4,4PED,6,6PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....6
OVERLAP "D".....NOT USED

✳ In NOTES section refer to note 7.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

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	Ø4 4C	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2C		Ø3 3B	Ø4 4B	NOT USED		SYS. DET. SØ2			Ø4 PED DC ISOLATOR	NOT USED	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6B							SYS. DET. SØ4					

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			25
	-	J4U	48	10	26	6	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			
2C	TB2-11,12	I3L	76	38	42	2	Y	Y			5
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	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			
4C	TB6-1,2	I7U	65	27	34	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			10
✳SØ1	TB6-9,10	I9U	60	22	11	SYS					
✳SØ2	TB6-11,12	I9L	62	24	13	SYS					
✳SØ3	TB7-9,10	J9U	59	21	15	SYS					
✳SØ4	TB7-11,12	J9L	61	23	17	SYS					
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					

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.

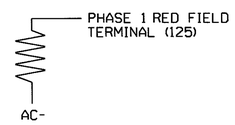
✳ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)



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: 07-0522
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2048 (South Rd./Raleigh Rd.)/ at Country Club Road

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
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 8-26-13 DATE
SIG. INVENTORY NO. 07-0522

2-AUG-2013 10:53
S:\Signals\Workgroups\Sig Mgt\armstrong\070522_sh_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.28

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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.

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0522
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

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 2048 (South Rd./Raleigh Rd.)/ at Country Club Road

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

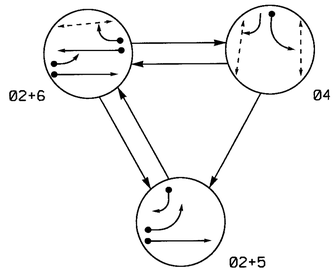
John T. Rowe, Jr. 8-26-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0522

21-AUG-2013 10:54
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Armstrong*070522_sm_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.29

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
21,22	G	G	R	Y
41	R	R	G	R
42	R/	R	G	R
51	←	F ↓	R	Y
61,62	R	G	R	Y
P41,P42	DW	DW	W	DRK
P43,P44	DW	DW	W	DRK
P61,P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION

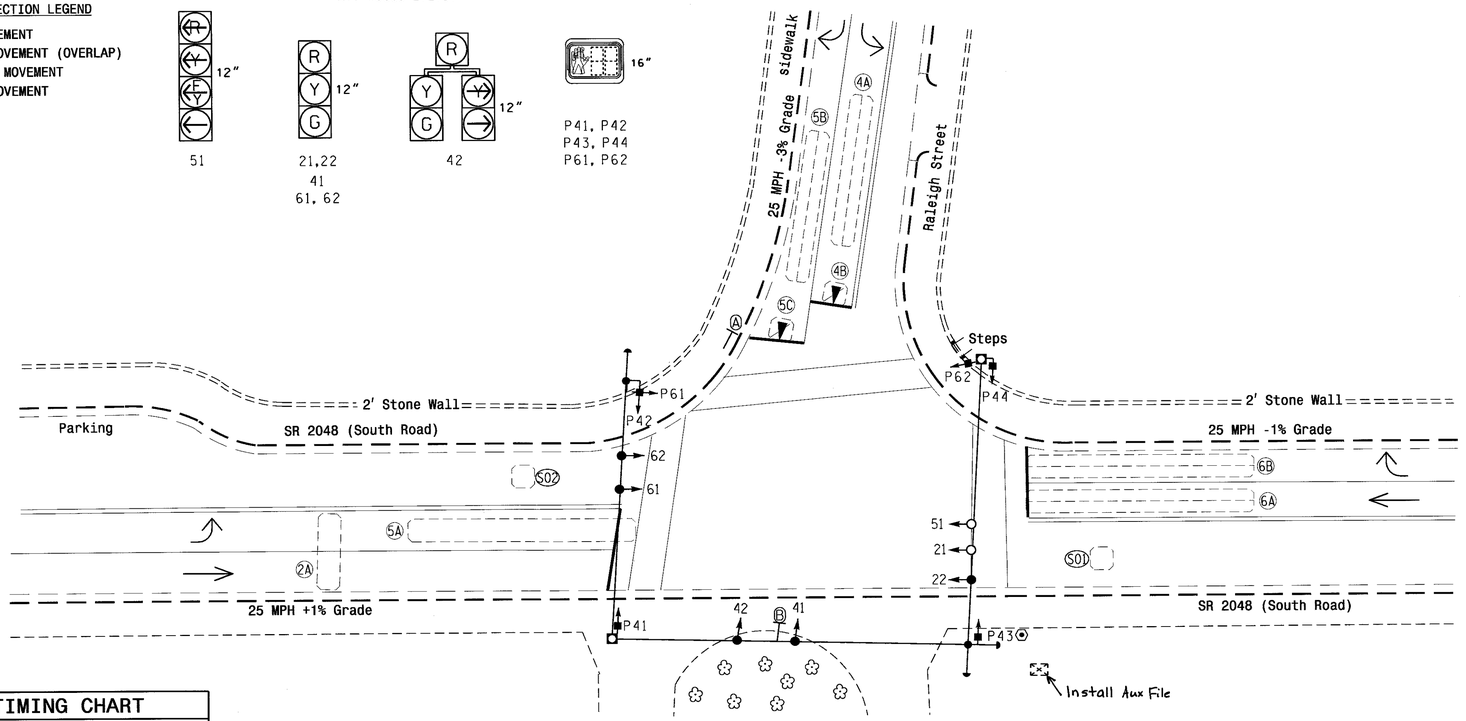
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X20	70	EXISTING	-	2	Y	Y	-	-	-	-	-
4A	6X40	16	2-4-2	-	4	Y	Y	-	-	3	-	-
✱✱4B	6X6	0	2-4-2 Diagonal	-	4	Y	Y	-	-	-	-	-
5A	6X60	+5	EXISTING	-	5	Y	Y	-	-	15	-	-
5B	6X40	16	2-4-2	-	5	Y	Y	-	-	15	-	-
✱✱5C	6X6	0	2-4-2 Diagonal	-	5	Y	Y	-	-	15	-	-
6A,6B	6X60	0	2-4-2	-	6	Y	Y	-	-	-	-	-
S01	6X6	+130	3	-	-	-	-	-	-	-	Y	-
S02	6X6	+130	3	-	-	-	-	-	-	-	Y	-

✱✱ Set Sensitivity to appropriate level to detect a bicycle

3 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 22.
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. 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. 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	→
▲	Bike Marking	▲
Ⓐ	"To Request Green Wait On Line" Sign (R10-22)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
⬡	Pedestrian Signal Pedestal	●

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	1.0	1.0	1.0
Max Green 1 *	30	15	20	30
Yellow Clearance	3.2	3.0	3.0	3.2
Red Clearance	2.6	2.6	2.6	2.6
Walk 1 *	-	7	-	7
Don't Walk 1	-	12	-	16
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	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 2048 (South Road)
at
Raleigh Street

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JPG
PREPARED BY: Jeff Spence | REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON M. GALLOWAY
SIGNATURE 8/16/13 DATE
SIG. INVENTORY NO. 07-0523

02-AUG-2013 13:09
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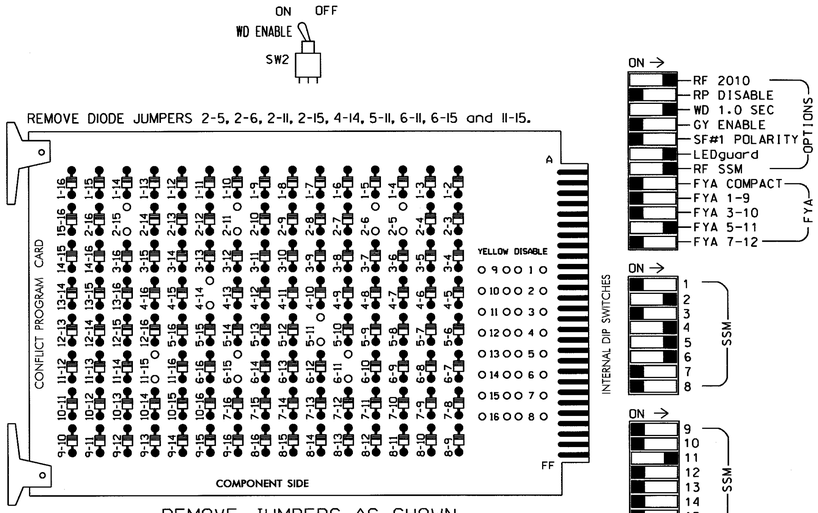
jrspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.30

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7, 8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 4 and 6 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
8. The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	P41,P42 P42,P44	42	51★	61,62	P61, P62	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101		*		134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											
✋						104				119									
🚶						106				121									

NU = Not Used

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

★ See pictorial of head wiring in detail below.

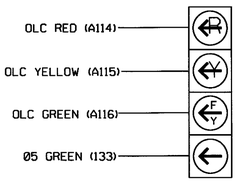
EQUIPMENT INFORMATION

CONTROLLER.....2070L
* CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S4P,S5,S6,S6P,S12
PHASES USED.....2,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

* In NOTES section refer to note 7.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

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	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	NOT USED	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L		NOT USED				Ø4 4B			SYS. DET. SØ2			Ø4 PED DC ISOLATOR	NOT USED	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A,6B	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	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			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y			
* SØ1	TB6-9,10	I9U	60	22	11	SYS					
* SØ2	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
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.

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)

PHASE 5 RED FIELD TERMINAL (131)
AC-

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: 07-0523
DESIGNED: July 2013
SEALED: 08/06/2013
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SR 2048 (South Road)
at
Raleigh Street

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY:

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 8/6/13 DATE

SIG. INVENTORY NO. 07-0523

06-AUG-2013 11:22
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$$$$STRICK

PROJECT REFERENCE NO.	SHEET NO.
	Sig.31

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #42 ON
 SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN   <-- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0523
DESIGNED: July 2013
SEALED: 08/06/2013
REVISED: N/A

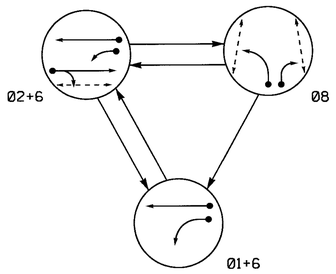
Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2048 (South Road) at Raleigh Street	SEAL
Prepared in the Offices of: NCDOT Traffic Engineering and Safety Systems Branch, Signals Management Section	Division 7 / Orange County / Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
750 N. Greenfield Pwky, Garner, NC 27529	PLAN DATE: August 2013 — REVIEWED BY:	SIGNATURE: George C. Brown — DATE: 8/6/13
	PREPARED BY: C. Strickland — REVIEWED BY:	SIG. INVENTORY NO. 07-0523
	REVISIONS / INIT. / DATE	

06-AUG-2013 11:23
S:\eITS\Sig\IS\Signals\Workgroups\Sig Mgmt\Strickland\07052З_sm_ele_xxx.dgn
easrtsk,ctb,cfg

PROJECT REFERENCE NO.	SHEET NO.
	Sig.32

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

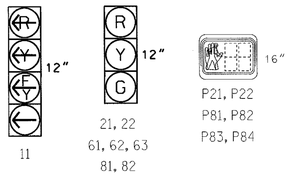
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
11	←	F Y	R	Y
21, 22	R	G	R	Y
61, 62, 63	G	G	R	Y
81, 82	R	R	G	R
P21, P22	DW	W	DW	DRK
P81,P82,P83,P84	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



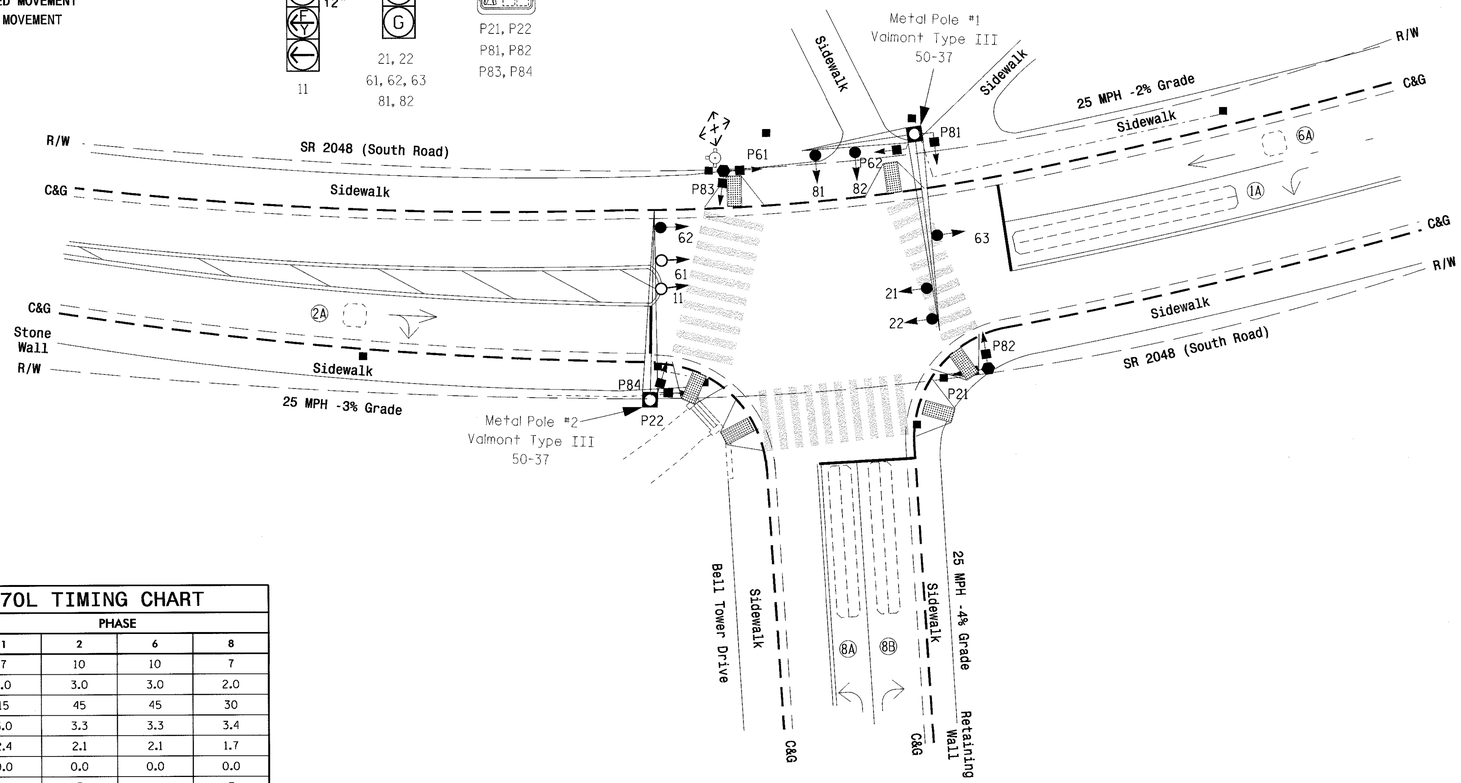
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	- -
					6	Y	Y	-	-	-	- -
2A	6X6	70	4	-	2	Y	Y	-	-	-	- -
6A	6X6	70	4	-	6	Y	Y	-	-	-	- -
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	3	- -
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	15	- -

3 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal heads numbered 62.
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. 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	◁

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	10	10	7
Extension 1 *	1.0	3.0	3.0	2.0
Max Green 1 *	15	45	45	30
Yellow Clearance	3.0	3.3	3.3	3.4
Red Clearance	2.4	2.1	2.1	1.7
Red Revert	0.0	0.0	0.0	0.0
Walk 1 *	-	7	-	7
Don't Walk 1	-	10	-	10
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	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

SR 2048 (South Road)
at
Bell Tower Drive

Division 7 Orange County Chapel Hill

PLAN DATE: June 2013 REVIEWED BY:
PREPARED BY: CJC/JN REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

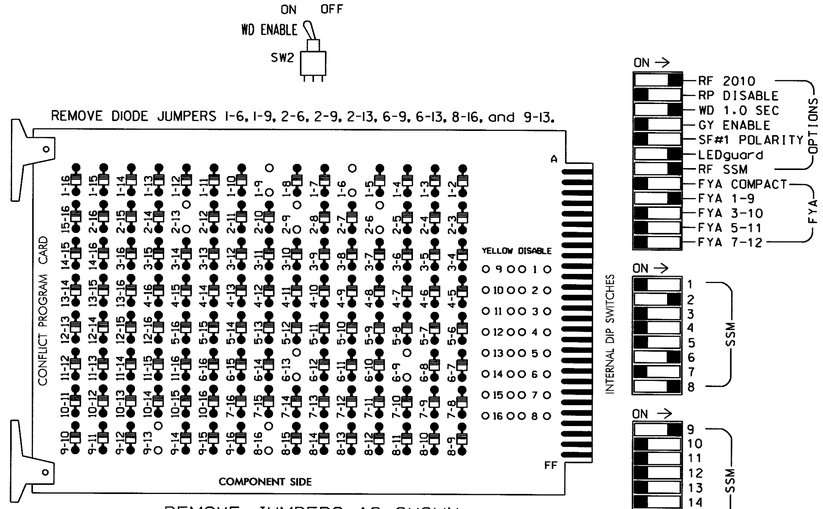
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON R. GALLOWAY
SIGNATURE
7/11/13 DATE
SIG. INVENTORY NO. 07-0524

10-JUL-2013 15:59
S:*ITSAS@MITS Signals\Signal Design Section\Central Region\Div 7\07-0524\070524_sig_dsn_2013xxxx.dgn
cjcollins

PROJECT REFERENCE NO.	SHEET NO.
	Sig.33

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 4,5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 8 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as WAG Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
8. The cabinet and controller are part of the Chapel Hill - Carrboro 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,S2P,S6,S8,S8P,S9
PHASES USED.....1,2,2PED,6,8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

* In NOTES section refer to note 7.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NU	NU	NU	61,62 63	NU	NU	81,82	P81,P82 P83,P84	11★	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW	*	129						135			108							
GREEN		130						136			109							
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	
✋			113									110						
🚶			115									112						

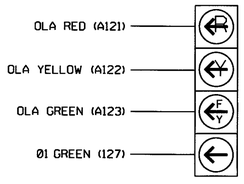
NU = Not Used

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

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



11

NOTE

The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
FILE "I" L	NOT USED	NOT USED										NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J" U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	WAG ⊗ INPUT	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" 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			15
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-5,6	I2U	39	1	2	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			3
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					
P81,P82,P83,P84	TB8-8,9	I13L	70	32	PED 8	8 PED					

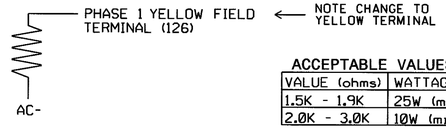
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

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

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)

! IMPORTANT: Move Load Resistors from Red Field Terminal to Yellow Field Terminal for Phase 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0524
DESIGNED: June 2013
SEALED: 7/11/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2048 (South Road) at Bell Tower Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

750 N.Greenfield Pkwy.,Garner,NC 27529

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

SIGNATURE 7-15-13 DATE

SIG. INVENTORY NO. 07-0524

15-JUL-2013 13:20
S:\#TSASG\#ITS Signals\#Workgroups\Sig Mgmt\Armstrong\#070524_smuele.xxx.dgn
armstrong

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

                 SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #50 ON
 SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

                 SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

                 SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN   <-- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0524
DESIGNED: June 2013
SEALED: 7/11/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section
DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy,Garner,NC 27529

SR 2048 (South Road)
at
Bell Tower Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | 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 7-15-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0524

12-JUL-2013 08:51
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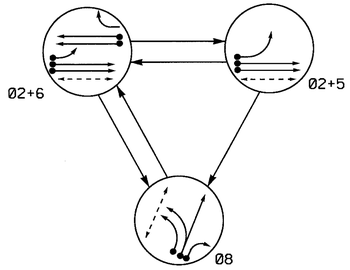
armstrong

PROJECT REFERENCE NO.	SHEET NO.
———	Sig.35

PHASING DIAGRAM



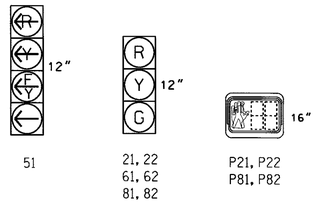
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION				
SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø8	FLASH
21,22	G	G	R	Y
51	~~←~~	~~↓~~	~~R~~	~~Y~~
61,62	R	G	R	Y
81,82	R	R	G	R
P21,P22	W	W	DW	DRK
P81,P82	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

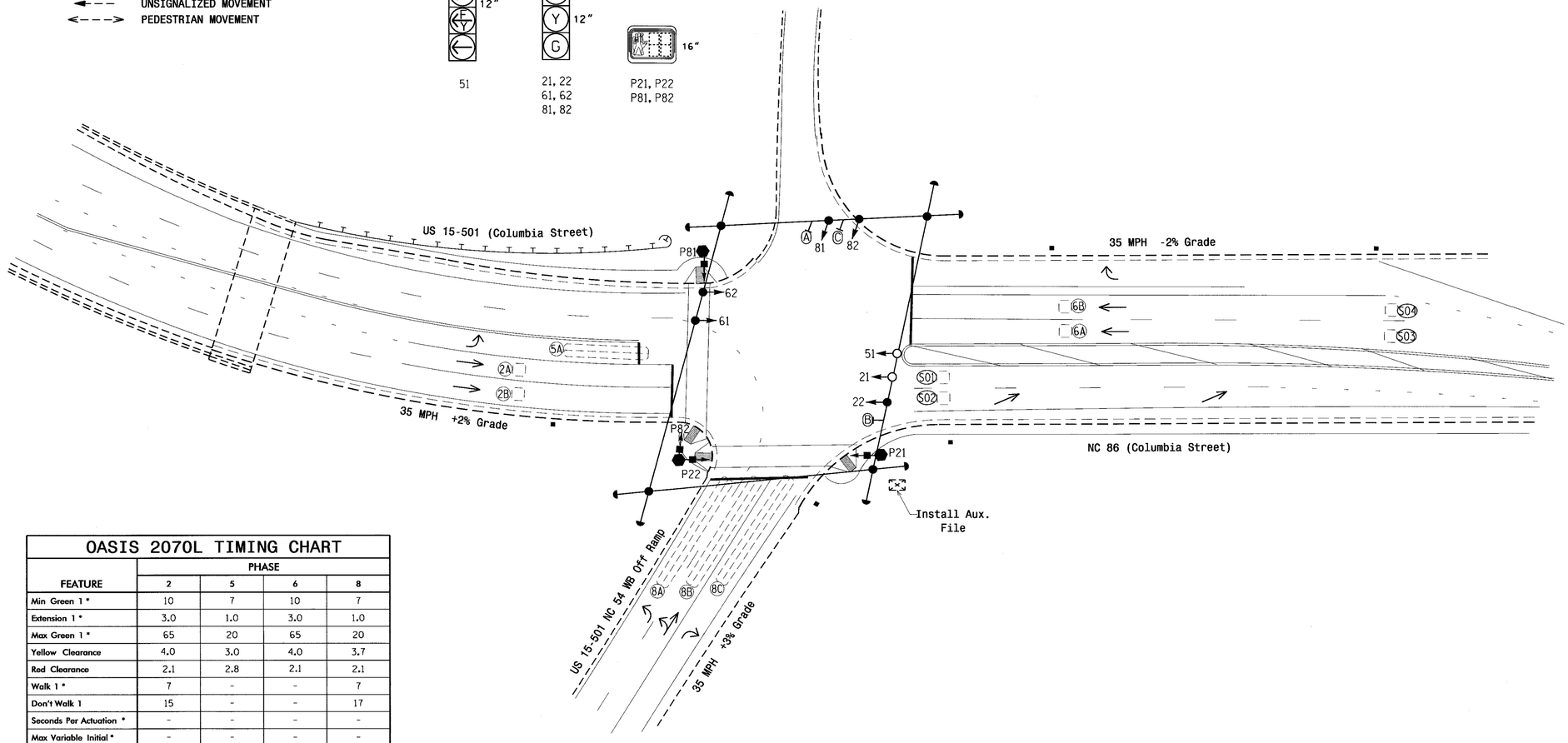


51

21, 22
61, 62
81, 82

P21, P22
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
2A,2B	6X6	70	4	-	2	Y	Y	-	-	-	-	-
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	20	-	-
					2	Y	Y	-	-	-	-	-
6A,6B	6X6	70	4	-	6	Y	Y	-	-	-	-	-
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	-
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	-
8C	6X60	0	2-4-2	-	8	Y	Y	-	-	15	-	-
S01	6X6	+125	3	-	-	-	-	-	-	-	Y	-
S02	6X6	+125	3	-	-	-	-	-	-	-	Y	-
S03	6X6	225	4	-	-	-	-	-	-	-	Y	-
S04	6X6	225	4	-	-	-	-	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	1.0	3.0	1.0
Max Green 1 *	65	20	65	20
Yellow Clearance	4.0	3.0	4.0	3.7
Red Clearance	2.1	2.8	2.1	2.1
Walk 1 *	7	-	-	7
Don't Walk 1	15	-	-	17
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	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 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may lead.
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. 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. 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	■↓
N/A	Pedestrian Pedestal	⬢
○—○	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	Guard Rail	⊥⊥
N/A	Wheel Chair Ramp	◢◣
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	No Right Turn Sign (R3-1)	Ⓑ
Ⓒ	"Turning Traffic Must Yield to Pedestrians" Sign	Ⓒ

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

US 15-501/NC 86
(Columbia Street)
at
US 15-501 NC 54 WB Off Ramps

Division 7 Orange County Chapel Hill

PLAN DATE:	June 2013	REVIEWED BY:	JPG
PREPARED BY:	EM Minshew	REVIEWED BY:	

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON R. GALLIMAX

SIGNATURE 6/18/13 DATE

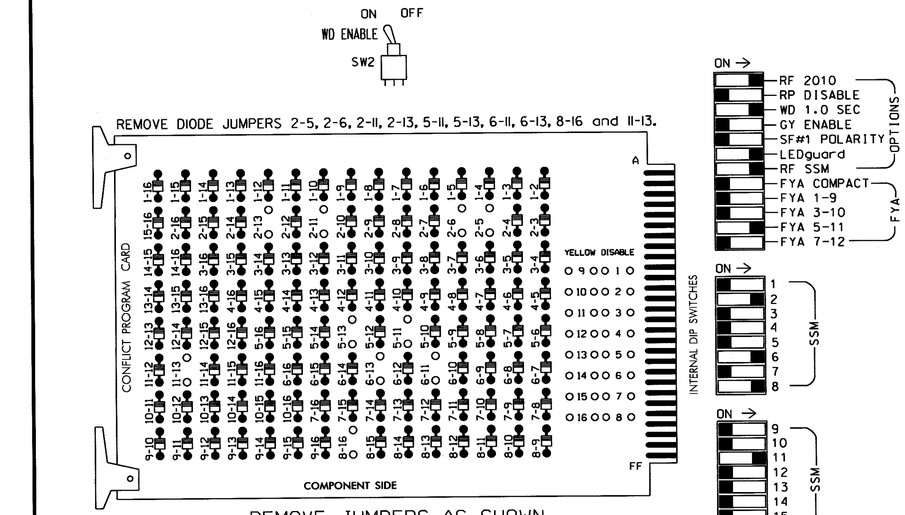
SIG. INVENTORY NO. 07-0570

17-JUN-2013 10:46
K:\TSG\Work\IS\Signals\Signal Design Section\Control Regions\div 7\07-0570\0705l0_sig_dsn_2013mod.dgn
emminshew

PROJECT REFERENCE NO.	SHEET NO.
	Sig.36

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4, 5,7,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 8 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Chapel Hill - Carrboro 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,S2P,S5,S6,S8,S8P,S12.
PHASES USED.....2,5,6,8,2 PED,8 PED.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	P21, P22	NU	NU	NU	51	61,62	NU	NU	81,82	P81, P82	NU	NU	NU	51	NU	NU
RED		128						134			107							
YELLOW		129					✱	135			108							
GREEN		130						136			109							
RED ARROW																A114		
YELLOW ARROW																A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW							133											
✋			113									110						
🚶			115									112						

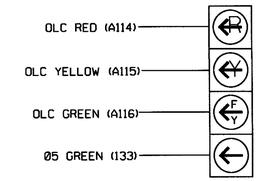
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

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	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L		NOT USED							SYS. DET. SØ2			NOT USED	ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A,6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	ø8 8C	SLOT EMPTY	SYS. DET. SØ3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				ø8 8B	NOT USED		SYS. DET. SØ4					

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,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
✱SØ1	TB6-9,10	I9U	60	22	11	SYS					
✱SØ2	TB6-11,12	I9L	62	24	13	SYS					
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			20
	-	I4U	47	9	22	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			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15
✱SØ3	TB7-9,10	J9U	59	21	15	SYS					
✱SØ4	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

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

✱ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

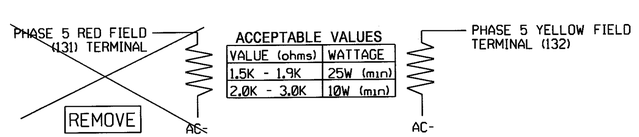
FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘

RNG	LEAD	BARRIER 1		X-LAG	LEAD	BARRIER 2		X-LAG
1	0	2	0	0	0	0	0	0
2	0	6	5	0	0	8	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0570
DESIGNED: June 2013
SEALED: 6-18-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 15-501/NC 86 (Columbia Street) at US 15-501 NC 54 WB Off Ramps	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, Signals Management Section	Division 7 Orange County Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: June 2013 REVIEWED BY: JTR	John T. Rowe, Jr. 6-25-13
	PREPARED BY: James Peterson REVIEWED BY:	SIGNATURE DATE
	REVISIONS INIT. DATE	SIG. INVENTORY NO. 07-0570

19-JUN-2013 07:55
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jpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.37

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE  #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:              |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

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: 07-0570
DESIGNED: June 2013
SEALED: 6-18-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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

US 15-501/NC 86
(Columbia Street)
at
US 15-501 NC 54 WB Off Ramps

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

SEAL

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

John T. Rowe, Jr. 6-25-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0570

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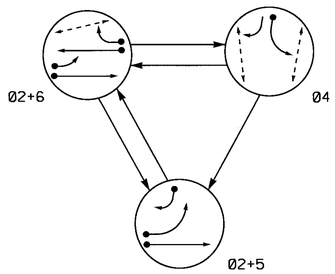
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	38

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

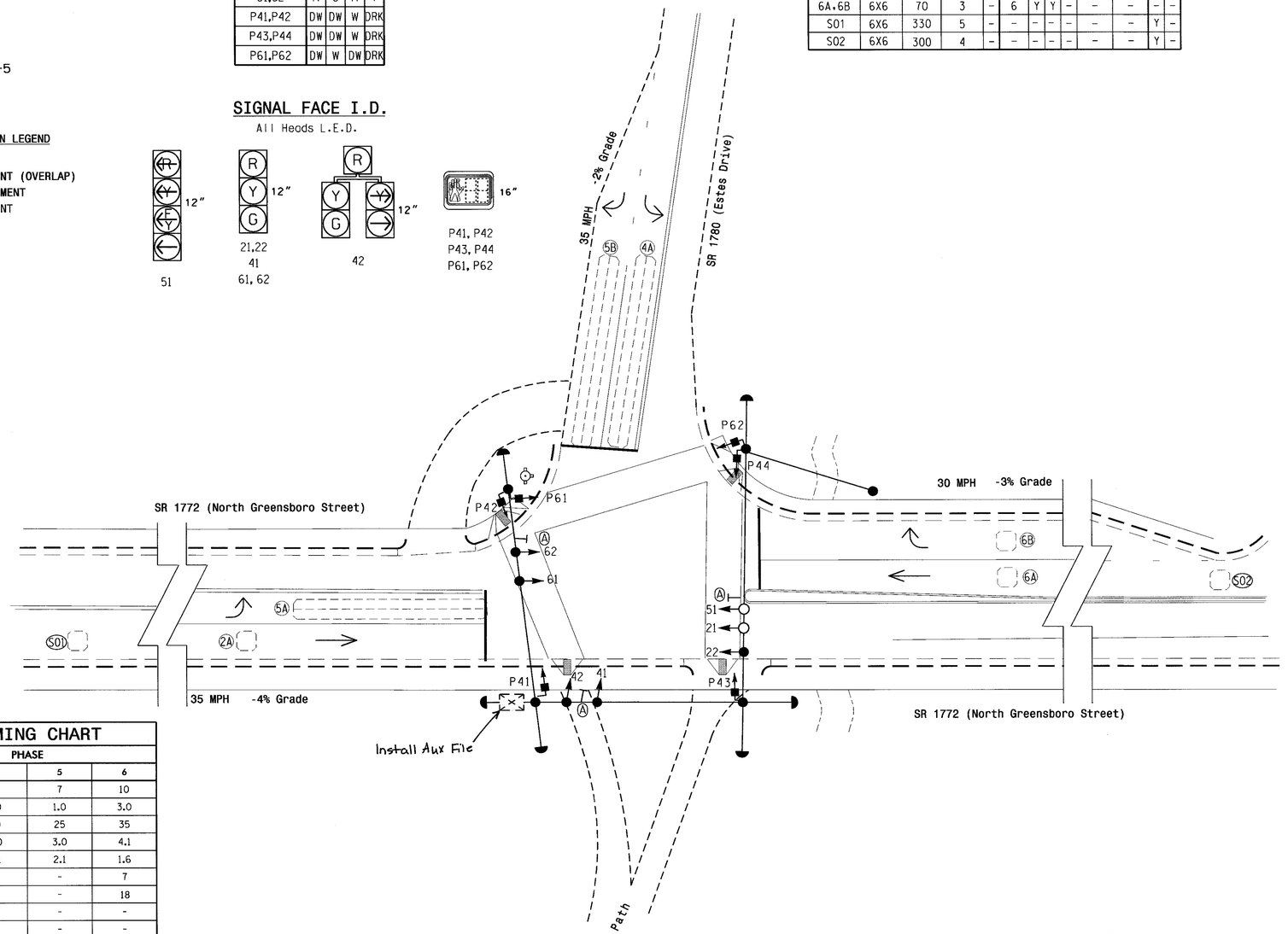
SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R/~~G~~	R	G	R
51	←/~~G~~	~~G~~	~~R~~	~~Y~~
61,62	R	G	R	Y
P41,P42	DW	DW	W	DRK
P43,P44	DW	DW	W	DRK
P61,P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION

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	–	–	–	–	–
4A	6X60	0	2-4-2	–	4	Y	Y	–	–	3	–	–
5A	6X60	0	2-4-2	–	5	Y	Y	–	–	20	–	–
					2	Y	Y	–	–	–	–	–
5B	6X60	0	2-4-2	–	5	Y	Y	–	–	20	–	–
6A,6B	6X6	70	3	–	6	Y	Y	–	–	–	–	–
S01	6X6	330	5	–	–	–	–	–	–	–	Y	–
S02	6X6	300	4	–	–	–	–	–	–	–	Y	–



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	1.0	1.0	3.0
Max Green 1 *	35	20	25	35
Yellow Clearance	4.1	3.0	3.0	4.1
Red Clearance	1.6	2.1	2.1	1.6
Walk 1 *	-	7	-	7
Don't Walk 1	-	16	-	18
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	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 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal head numbered 22.
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. 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	→
N/A	Fire Hydrant	⊙
N/A	Wheel Chair Ramp	▥
Ⓐ	"Turning Traffic Must Yield To Pedestrians" Sign (R10-15)	Ⓐ

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

SR 1772 (North Greensboro Street)
at
SR 1780 (Estes Drive)

Division 7 | Orange County | Carrboro

PLAN DATE: May 2013 | REVIEWED BY:
PREPARED BY: Jeff Spence | REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA K. ALEXANDER

SIGNATURE 6/28/13 DATE

SIG. INVENTORY NO. 07-0866

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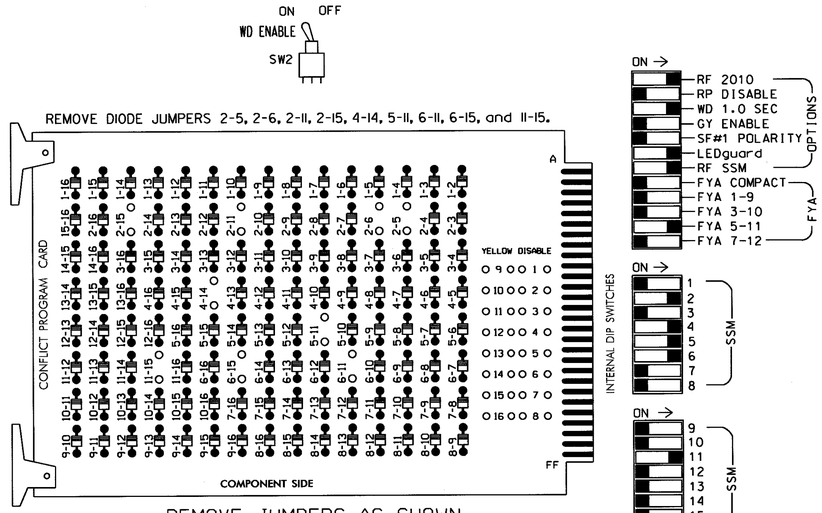
ESPENCE

PROJECT REFERENCE NO.	SHEET NO.
	Sig.39

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 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 Chapel Hill-Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	P41,P42 P43,P44	42	51★	61,62	P61, P62	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101		✱		134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											
✋						104				119									
🚶						106				121									

NU = Not Used

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

★ See pictorial of head wiring in detail below.

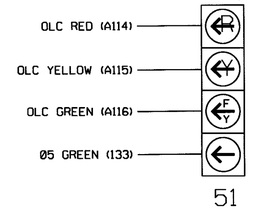
EQUIPMENT INFORMATION

CONTROLLER.....2070L
✱ CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S4P,S5,S6,S6P,S12
PHASES USED.....2,4,4PED,5,6,6PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

✱ AUXILIARY OUTPUT FILE REQUIRED FOR FYA OPERATION

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



51

NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

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	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	NOT USED	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L		NOT USED				NOT USED			SYS. DET. SØ2			Ø4 PED DC ISOLATOR	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	Ø6 6A,6B												

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			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			20
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			20
6A,6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
✱SØ1	TB6-9,10	I9U	60	22	11	SYS					
✱SØ2	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
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 J1-W to I4-W, on rear of input file.

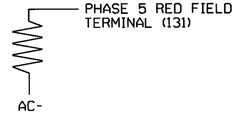
✱ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0866
DESIGNED: May 2013
SEALED: 6/28/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1772 (North Greensboro St) at SR 1780 (Estes Drive)	SEAL
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	Division 7 Orange County Carrboro PLAN DATE: June 2013 REVIEWED BY: JTR PREPARED BY: S. Armstrong REVIEWED BY: REVISIONS INIT. DATE	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR. SIGNATURE 6-28-13 DATE SIG. INVENTORY NO. 07-0866

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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.40

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #42 ON
 SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0866
DESIGNED: May 2013
SEALED: 6/28/13
REVISED: N/A

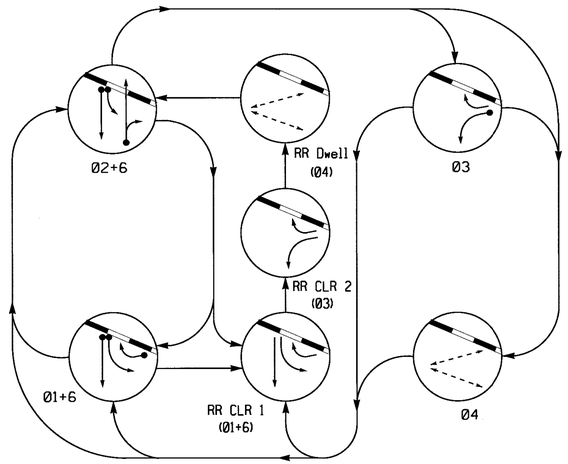
Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1772 (North Greensboro St) at SR 1780 (Estes Drive)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, NCDOT, Traffic Management Section	Division 7 — Orange County — Carrboro	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: June 2013 — REVIEWED BY: JTR	SIGNATURE — DATE: 6-28-13
	PREPARED BY: S. Armstrong — REVIEWED BY:	SIG. INVENTORY NO. 07-0866
	REVISIONS — INIT. — DATE	

28-JUN-2013 10:18
S:\#TS&E\#ITS Signals\workgroups\Sig Mans\armstrong\070866_sm_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
	41

PHASING DIAGRAM



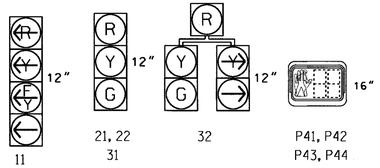
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	03	04	TCRLARCK1	TCRLARCK2	DWELL	FLASH
11	←	~~F Y~~	~~R~~	~~R~~	←	~~R~~	~~R~~	~~Y~~
21, 22	R	G	R	R	R	R	R	Y
31	R	R	G	R	R	G	R	R
32	~~R~~ →	R	G	R	~~R~~ →	G	R	R
61, 62	G	G	R	R	G	R	R	Y
P41, P42	DW	DW	DW	W	DW	DW	W	DRK
P43, P44	DW	DW	DW	W	DW	DW	W	DRK

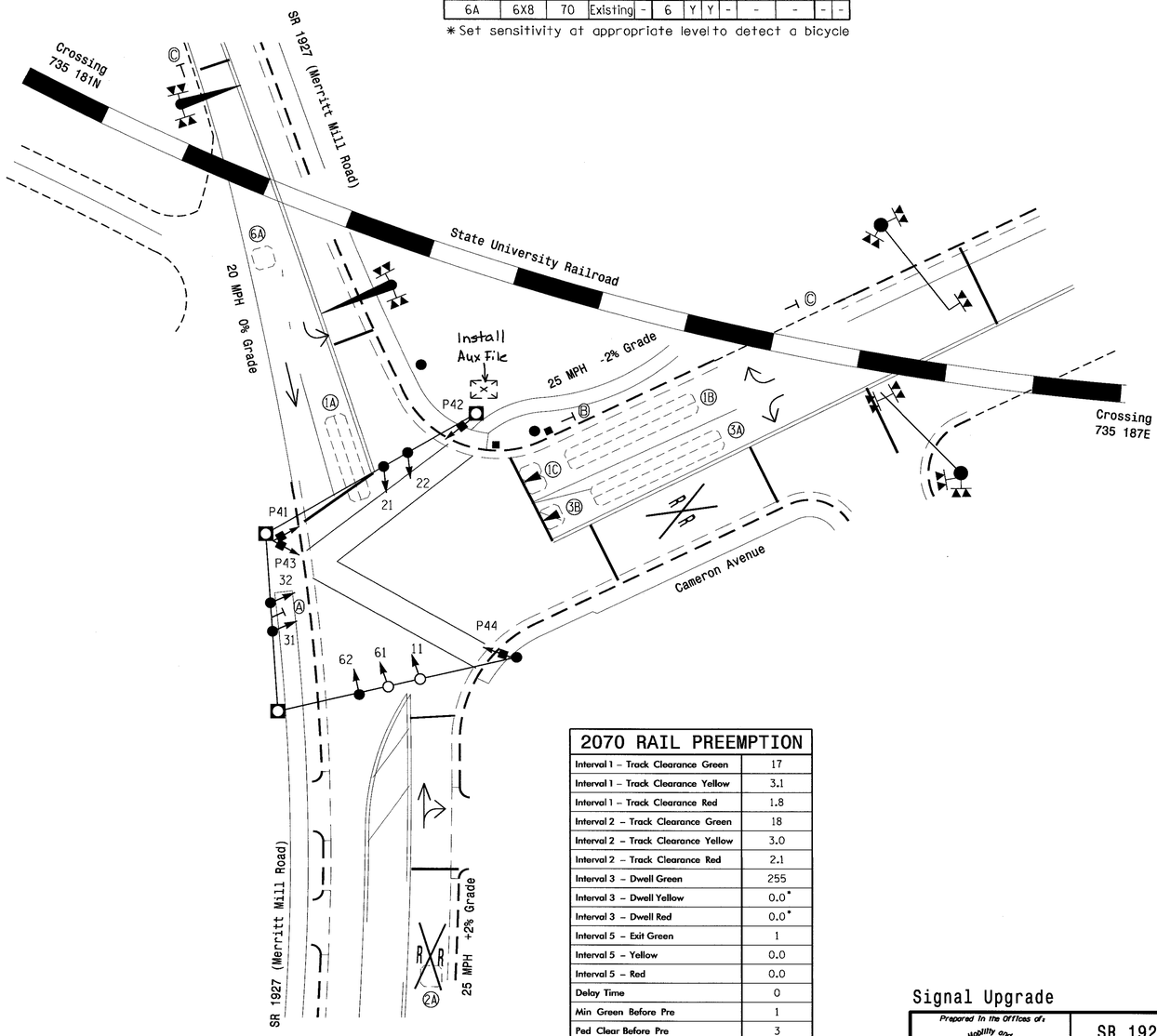
SIGNAL FACE I.D.



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	6X25	+5	2-4-2	-	1	Y	Y	-	-	25	-	-
					6	Y	Y	-	-	-	-	-
1B	6X40	15	2-4-2	-	1	Y	Y	-	-	15	-	-
1C*	8X6	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X6	70	Existing	-	2	Y	Y	-	-	-	-	-
3A	6X40	16	2-4-2	-	3	Y	Y	-	-	-	-	-
3B*	6X6	0	2-4-2 diagonal	-	3	Y	Y	-	-	3	-	-
6A	6X8	70	Existing	-	6	Y	Y	-	-	-	-	-

*Set sensitivity at appropriate level to detect a bicycle



4 Phase
Fully Actuated
w/ Railroad Preemption
Chapel Hill-Carrboro 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. Phase 1 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal head numbered 62.
6. Set all detector units to presence mode.
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. 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.

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Min Green 1 *	7	10	7	7	10
Extension 1 *	2.0	3.0	1.0	-	3.0
Max Green 1 *	15	45	30	20	45
Yellow Clearance	3.0	3.1	3.0	3.0	3.1
Red Clearance	1.6	1.8	2.1	0.0	1.8
Walk 1 *	-	-	-	7	-
Don't Walk 1	-	-	-	15	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduction *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN 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.

2070 RAIL PREEMPTION

Interval 1 – Track Clearance Green	17
Interval 1 – Track Clearance Yellow	3.1
Interval 1 – Track Clearance Red	1.8
Interval 2 – Track Clearance Green	18
Interval 2 – Track Clearance Yellow	3.0
Interval 2 – Track Clearance Red	2.1
Interval 3 – Dwell Green	255
Interval 3 – Dwell Yellow	0.0*
Interval 3 – 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	3
Yellow Clear Before Pre	3.0
Red Clear Before Pre	2.1
Dwell Min Time	7
Ped Clear Through Yellow	Y

* Time defaults to time used for phase during normal operation.

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	→
N/A	Railroad Tracks	▬
N/A	Railroad Gate and Flasher	▬
N/A	Railroad Cantilever	▬
Ⓐ	"YIELD TO BICYCLES AND PEDESTRIANS" Sign	Ⓐ
Ⓑ	"TO REQUEST GREEN WAIT ON LINE" Sign (R10-22)	Ⓑ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
▲	Bicycle Detector Pavement Marking	▲

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

SR 1927 (Merritt Mill Road) At Cameron Avenue

Division 7 | Orange County | Chapel Hill

PLAN DATE: June 2013 | REVIEWED BY:

PREPARED BY: C. J. Collins | REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA K. ALEXANDER

SIGNATURE 7/17/13 DATE

SIG. INVENTORY NO. 07-0909

17-JUL-2013 13:45
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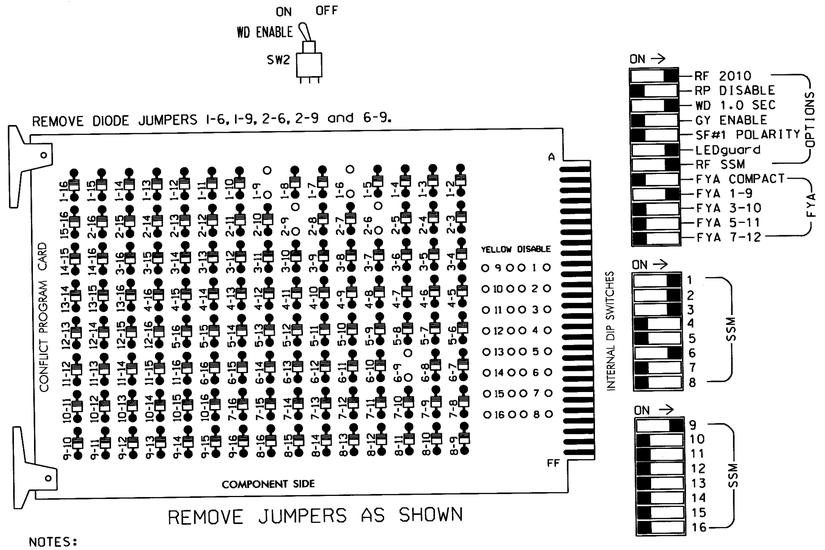
cjcollins

PROJECT REFERENCE NO.	SHEET NO.
	Sig.42

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 4,5,7, 8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
7. The cabinet and controller are part of the Chapel Hill - Carrboro 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,S4P,S6,S9.
PHASES USED.....1,2,3,*4,6.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

*USED FOR TIMING ONLY.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	31,32	NC	P41,P42 P43,P44	NU	61,62	NU	NU	NU	NU	11	NU	NU	NU	NU	NU
RED	*		128		116				134										
YELLOW			129		117				135										
GREEN			130		118				136										
RED ARROW														A121					
YELLOW ARROW		126												A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	127																	
✋							104												
🚶							106												

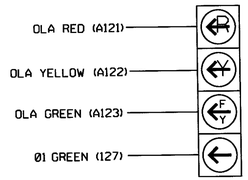
NU = Not Used. NC= No Connection

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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	Ø3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø1 1C*	NOT USED			Ø3 3B*						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	WAGO ⊗ INPUT	SLOT EMPTY	SLOT EMPTY	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			25
	-	J4U	48	10	26	6	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
1C *	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	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			3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
PED PUSH BUTTONS											
P41,P42, P43,P44	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.

* Set sensitivity on these detector channels to an appropriate level for detecting a bicycle.

INPUT FILE POSITION LEGEND: J2U
FILE J
SLOT 2
UPPER

LOAD RESISTOR INSTALLATION DETAIL

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

PH.1 RED FIELD TERMINAL (125)
AC-

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 this channel, which does not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0909
DESIGNED: June 2013
SEALED: 7-17-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1927 (Merritt Mill Road) at Cameron Avenue

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering Branch, Mobility and Safety Division, North Carolina Department of Transportation
750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 7-18-13 DATE
SIG. INVENTORY NO. 07-0909

18-JUL-2013 11:31
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ITS/ASU

PROJECT REFERENCE NO.	SHEET NO.
	Sig.43

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

                SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #50 ON
 SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

                SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

                SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          ¦12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0909
DESIGNED: June 2013
SEALED: 7-17-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1927 (Merritt Mill Road) at Cameron Avenue	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, NC DEPARTMENT OF TRANSPORTATION, Signal Management Section	Division 7 · Orange County · Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy.Garner,NC 27529	PLAN DATE: July 2013 · REVIEWED BY: JTR	SIGNATURE · DATE: 7-18-13
	PREPARED BY: James Peterson · REVIEWED BY:	SIG. INVENTORY NO. 07-0909
	REVISIONS · INIT. · DATE	

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jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.44

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu Press 'A' (Preemption), THEN '1' (Standard Preemptions).

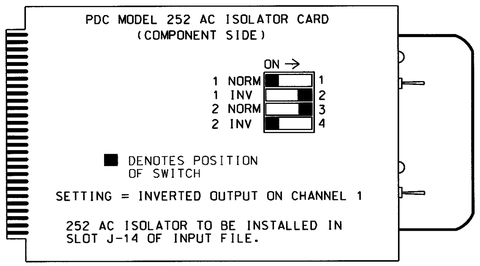
```
   PREEMPTION  #1   SETTINGS (NEXT:1-10)
 INTERVAL/TIMING  |  CLEAR/DWELL PHASES
   GRN YEL  RED   |12345678910111213141516
1  17  3.1  1.8  |X     X
2  18  3.0  2.1  |  X
3 255  0.0* 0.0* |    X
4   0  0.0  0.0  |
5   1  0.0  0.0  | X   X
EXIT CALLS       |
                OPTIONS
PRIORITY (Y/N TO SELECT) .............HIGH
DELAY TIMER (0-255 SEC) ..............0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....3
YELLOW CLEAR BEFORE PRE (0= DEFAULT).3.0
RED CLEAR BEFORE PRE (0= DEFAULT)....2.1
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? .......Y
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? .......Y <--- NOTICE !
RE-TIME DWELL INTERVAL? ..............N
OVERLAPS:                | ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   |
OMIT OVERLAPS:           |
```

PROGRAMMING COMPLETE

* TIME DEFAULTS TO TIME USED FOR PHASE DURING NORMAL OPERATION.

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



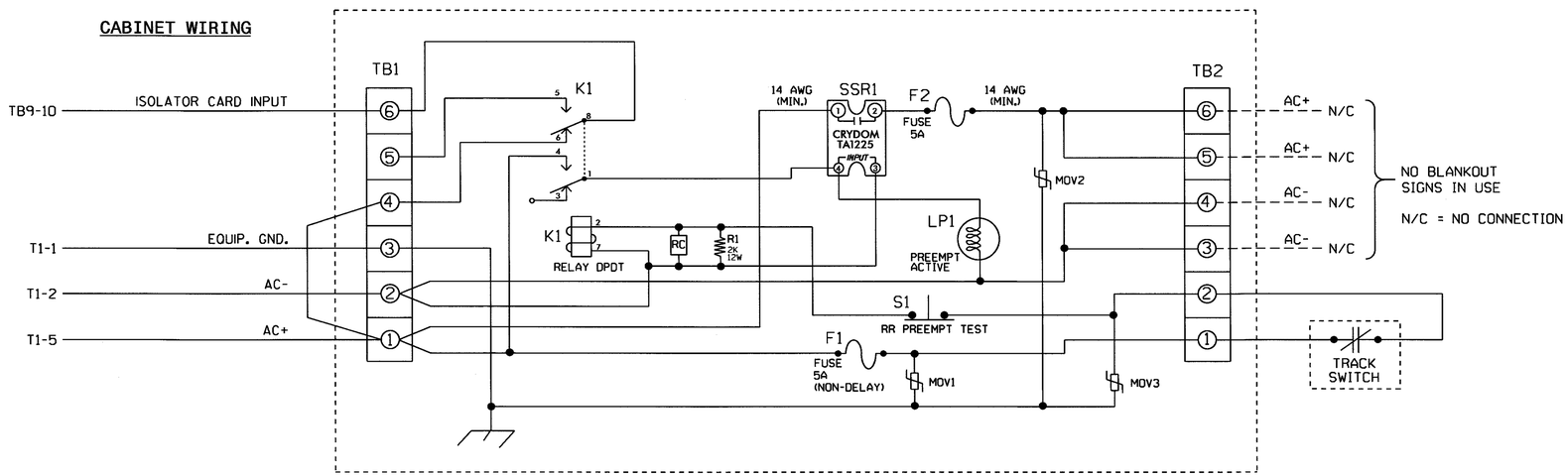
NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO BE EQUAL TO THAT SHOWN ABOVE.

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND BLANKOUT SIGN CONTROL BOX

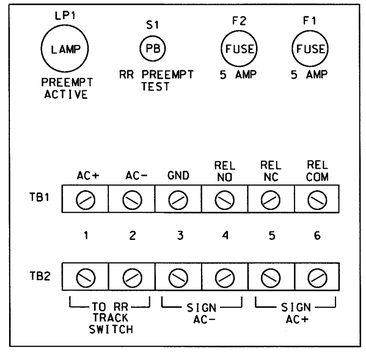
CABINET WIRING



NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operating state.
2. Relay K1 is a DPDT with 120VAC coil. Potter & Brumfield KRP11AG w/ octal base or approved equal.
3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Crydom TA1225 or approved equal.
4. AC Isolator Card will activate preemption upon removal of AC+ from the input. To accomplish this, set invert dip switch on AC Isolator Card. (See detail this sheet)
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K or approved equal.
6. RC network is valued at 0.1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101 or approved equal.
9. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, Terminal TB9-12 (on input panel) must be connected to AC neutral (jumper may have to be added).

FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0909
DESIGNED: June 2013
SEALED: 7-17-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 3 OF 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1927 (Merritt Mill Road) at Cameron Avenue

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

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

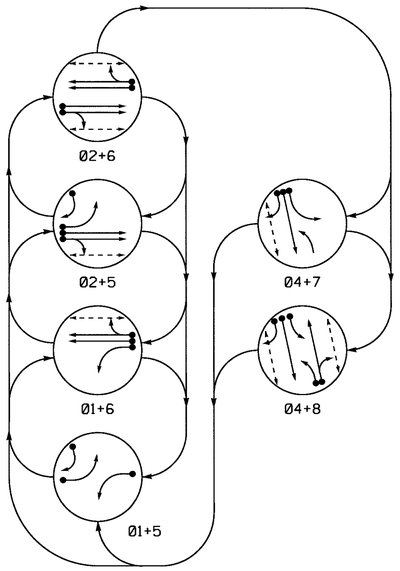
John T Rowe 7-18-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-0909

18-JUL-2013 11:32
S:\TSS\SIGNALS\Workgroups\Sig Mgmt\Peterson\070909_sm_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
————	Sig.4 5

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

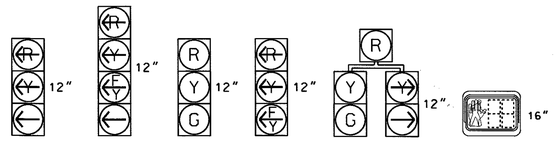
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	04+07	04+08	FLASH
11	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R	Y
41	R	R	R	R	G	G	R
42	~~R~~/~~←~~	R	~~R~~/~~←~~	R	G	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~F Y~~	~~R~~
81	~~R~~	~~R~~	~~R~~	~~R~~	~~F Y~~	~~F Y~~	~~R~~
82,83	R	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

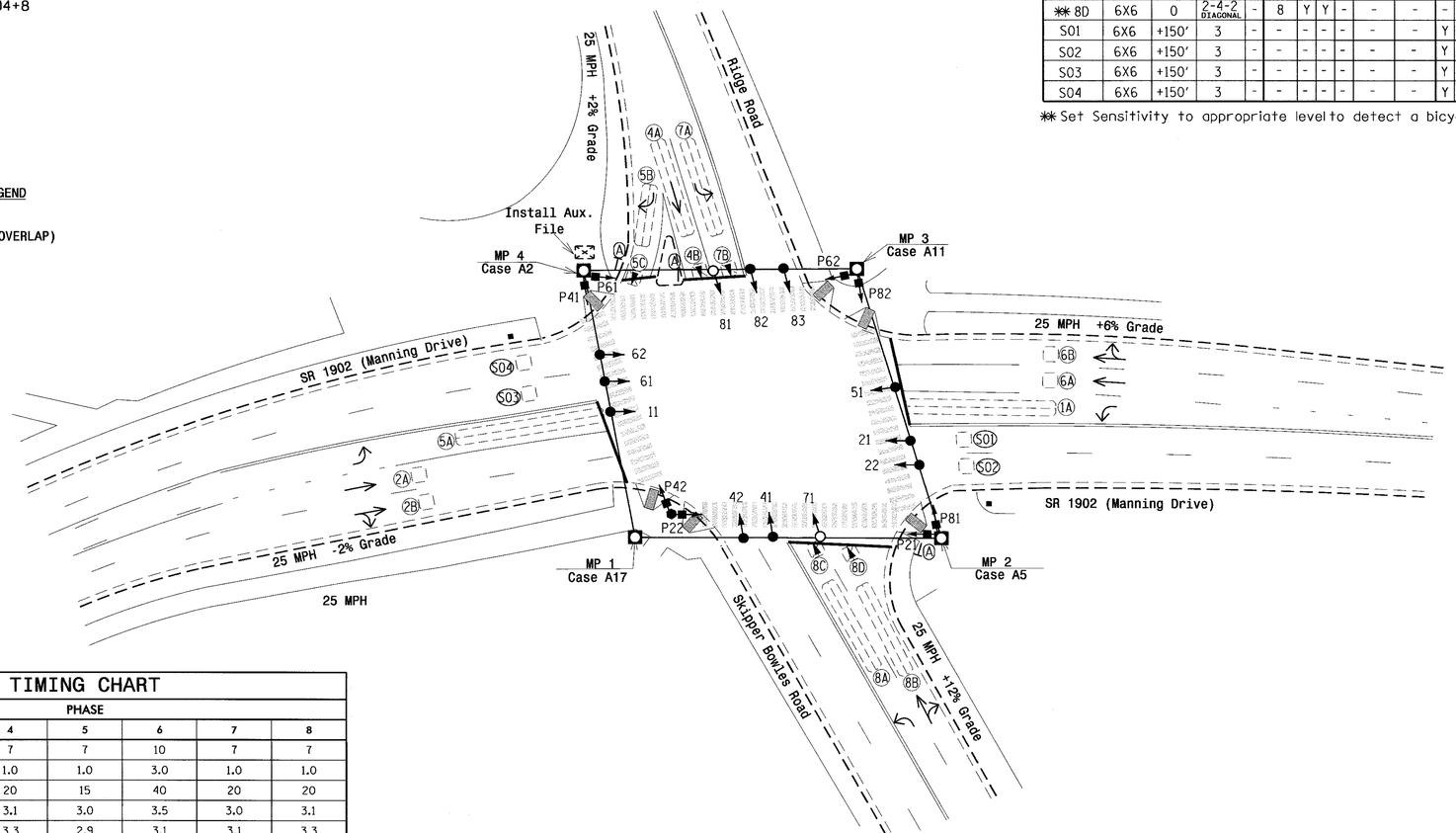


11, 51 | 71 | 21, 22, 41, 61, 62, 82, 83 | 81 | 42 | P21, P22, P41, P42, P61, P62, P81, P82

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	6X60	+5	2-4-2	-	1	Y	Y	-	-	3	-	-
2A, 2B	6X6	70	4	-	2	Y	Y	-	-	-	-	-
4A	6X40	16	2-4-2	-	4	Y	Y	-	-	-	-	-
✱✱ 4B	6X6	0	2-4-2 DIAGONAL	-	4	Y	Y	-	-	-	-	-
5A	6X60	+5	2-4-2	-	5	Y	Y	-	-	3	-	-
5B	6X25	16	2-4-2	-	5	Y	Y	-	-	15	-	-
✱✱ 5C	6X6	0	2-4-2 DIAGONAL	-	5	Y	Y	-	-	-	-	-
6A, 6B	6X6	70	4	-	6	Y	Y	-	-	-	-	-
7A	6X40	16	2-4-2	-	7	Y	Y	Y	-	20	-	-
					4	Y	Y	-	-	-	-	-
✱✱ 7B	6X6	0	2-4-2 DIAGONAL	-	7	Y	Y	-	-	20	-	-
8A	6X40	16	2-4-2	-	8	Y	Y	-	-	-	-	-
8B	6X40	16	2-4-2	-	8	Y	Y	-	-	10	-	-
✱✱ 8C	6X6	0	2-4-2 DIAGONAL	-	8	Y	Y	-	-	3	-	-
✱✱ 8D	6X6	0	2-4-2 DIAGONAL	-	8	Y	Y	-	-	-	-	-
S01	6X6	+150′	3	-	-	-	-	-	-	-	Y	-
S02	6X6	+150′	3	-	-	-	-	-	-	-	Y	-
S03	6X6	+150′	3	-	-	-	-	-	-	-	Y	-
S04	6X6	+150′	3	-	-	-	-	-	-	-	Y	-

✱✱ Set Sensitivity to appropriate level to detect a bicycle.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	7	8
Min Green 1 *	7	10	7	7	10	7	7
Extension 1 *	1.0	3.0	1.0	1.0	3.0	1.0	1.0
Max Green 1 *	20	40	20	15	40	20	20
Yellow Clearance	3.0	4.0	3.1	3.0	3.5	3.0	3.1
Red Clearance	2.8	2.9	3.3	2.9	3.1	3.1	3.3
Walk 1 *	-	7	7	-	7	-	7
Don't Walk 1	-	23	20	-	23	-	22
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

* 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 Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. REMOVE OMIT PHASE 7 DURING PHASE 8 ON.
4. Phase 1 and/or phase 5 may be lagged.
5. Phase 7 may be lagged.
6. Reposition existing signal heads numbered 82 and 83.
7. Set all detector units to presence mode.
8. 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.
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	→
N/A	Wheel Chair Ramp	
N/A	Bike Marking	
⬡	Pedestrian Signal Pedestal	●
Ⓐ	"To Request Green Wait on Line" Sign (R10-22)	Ⓐ
Ⓑ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓑ

Signal Upgrade

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

SR 1902 (Manning Drive) at Ridge Road/ Skipper Bowles Road

Division 7 Orange County Chapel Hill

PLAN DATE: June 2013 REVIEWED BY: JPG

PREPARED BY: EW Minshew REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 29904
ENGINEER
JASON P. GALLOWAY

SIGNATURE 7/22/13 DATE

SIG. INVENTORY NO. 07-1010

22-JUL-2013 13:21
S:\TSS&S\ITS Signals\Signal Design Section\Central Region\Div 7\07-1010\07010_sig_dsn_2013mmdd.dgn
emminshew

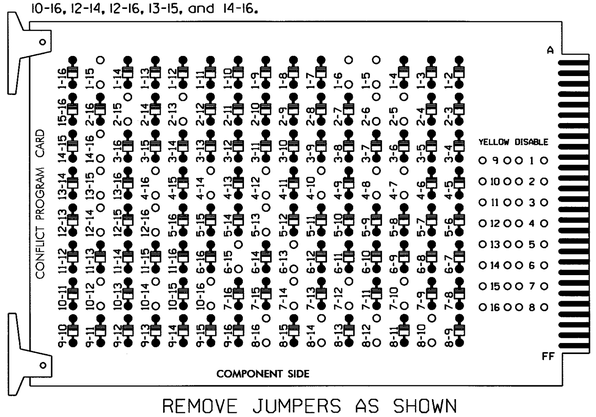
PROJECT REFERENCE NO.	SHEET NO.
	Sig.46

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

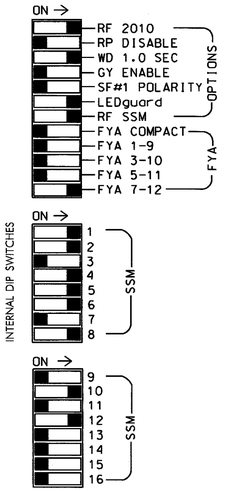
(remove jumpers and set switches as shown)

ON OFF
WD ENABLE
SW2

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 4-7, 4-8, 4-10, 4-12, 4-14, 4-16, 5-13, 6-13, 6-15, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 8-16, 10-12, 10-14, 10-16, 12-14, 12-16, 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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7,9, 11,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
7. Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
8. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to *Caltrans Traffic Signal Control Equipment Specifications* (TSCES).
9. The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....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,S2P,S4,S4P,S5,S6,S6P,S7,S8,S8P, S10,S13
PHASES USED.....1,2,2 PED,4,4 PED,5,6,6 PED,7,8,8 PED
OVERLAP "A".....NOT USED
OVERLAP "B".....4
OVERLAP "C".....NOT USED
OVERLAP "D".....7+8

* In NOTES section refer to note 8.

SIGNAL HEAD HOOK-UP CHART

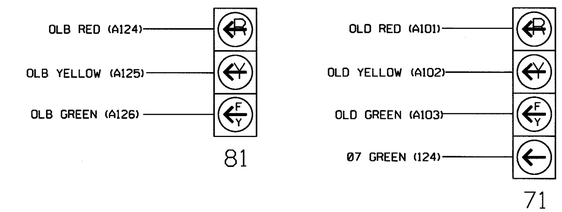
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	42	51	61,62	P61, P62	71★	82,83	P81, P82	NU	81★	NU	NU	71★	NU
RED		128			101				134			107							
YELLOW		129			102				135		*	108							
GREEN		130			103				136			109							
RED ARROW	125							131							A124			A101	
YELLOW ARROW	126						132	132							A125			A102	
FLASHING YELLOW ARROW															A126			A103	
GREEN ARROW	127						133	133			124								
✋			113			104				119			110						
🚶			115			106				121			112						

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for signal head 71 requires special logic programming. See sheet 2 of 2 for programming instructions.

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	SLOT EMPTY	WIRED ⊗ INPUT	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	ø2 PED DC ISOLATOR	ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED				ø4 4B			SYS. DET. SØ2			ø4 PED DC ISOLATOR	ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø5 5B	ø6 6A,6B	SLOT EMPTY	ø7 7A	ø8 8A	ø8 8C	SLOT EMPTY	SYS. DET. SØ3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	ø5 5C	ø7 7B		NOT USED	ø8 8B	ø8 8D		SYS. DET. SØ4					

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

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			3
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	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y			
7B	TB3-11,12	J3L	77	39	46	7	Y	Y			20
7A[1]	TB5-5,6	J5U	57	19	7	7	Y	Y	Y		20
	-	I8U	49	11	24	4	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
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			3
8D	TB7-3,4	J7L	79	41	48	8	Y	Y			
* SØ1	TB6-9,10	I9U	60	22	11	SYS					
* SØ2	TB6-11,12	I9L	62	24	13	SYS					
* SØ3	TB7-9,10	J9U	59	21	15	SYS					
* SØ4	TB7-11,12	J9L	61	23	17	SYS					
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.

[1] Add jumper from J5-W to I8-W, on rear of input file.

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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: 07-1010
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1902 (Manning Drive)
at
Ridge Road /
Skipper Bowles Road

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: T.J.H.
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE
7/24/13
DATE
SIG. INVENTORY NO. 07-1010

23-JUL-2013 07:51
S:\#TSASig\#TS Signals\#orangegroup\#Sig Man\#Strickland\#071010_sm_ele_xxx.dgn
cstrickland

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:          :12345678910111213141516
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  X GREEN   <- NOTICE GREEN FLASH
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
```

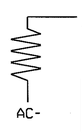
PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          :12345678910111213141516
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  X GREEN   <- NOTICE GREEN FLASH
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

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)

Move Load Resistor:

FROM: PHASE 7 RED FIELD TERMINAL (122)
TO: PHASE 7 YELLOW FIELD TERMINAL (123)

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 Function 1.

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:¦12345678910111213141516
IF PHASES ARE ON¦       X
OMIT PHASES     ¦       X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

! IMPORTANT: Disable Dynamic/Backup Control Function 1.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1010
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1902 (Manning Drive)
at
Ridge Road /
Skipper Bowles Road

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013	REVIEWED BY: T.W.
PREPARED BY: C. Strickland	REVIEWED BY:

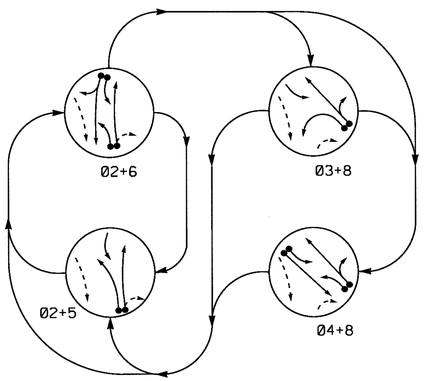
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 7/24/13 DATE
SIG. INVENTORY NO. 07-1010

23-JUL-2013 07:52
S:\TIS\SIG\TIS\Signals\Workgroups\Sig Man\Strickland\N071010_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
	Sig.4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

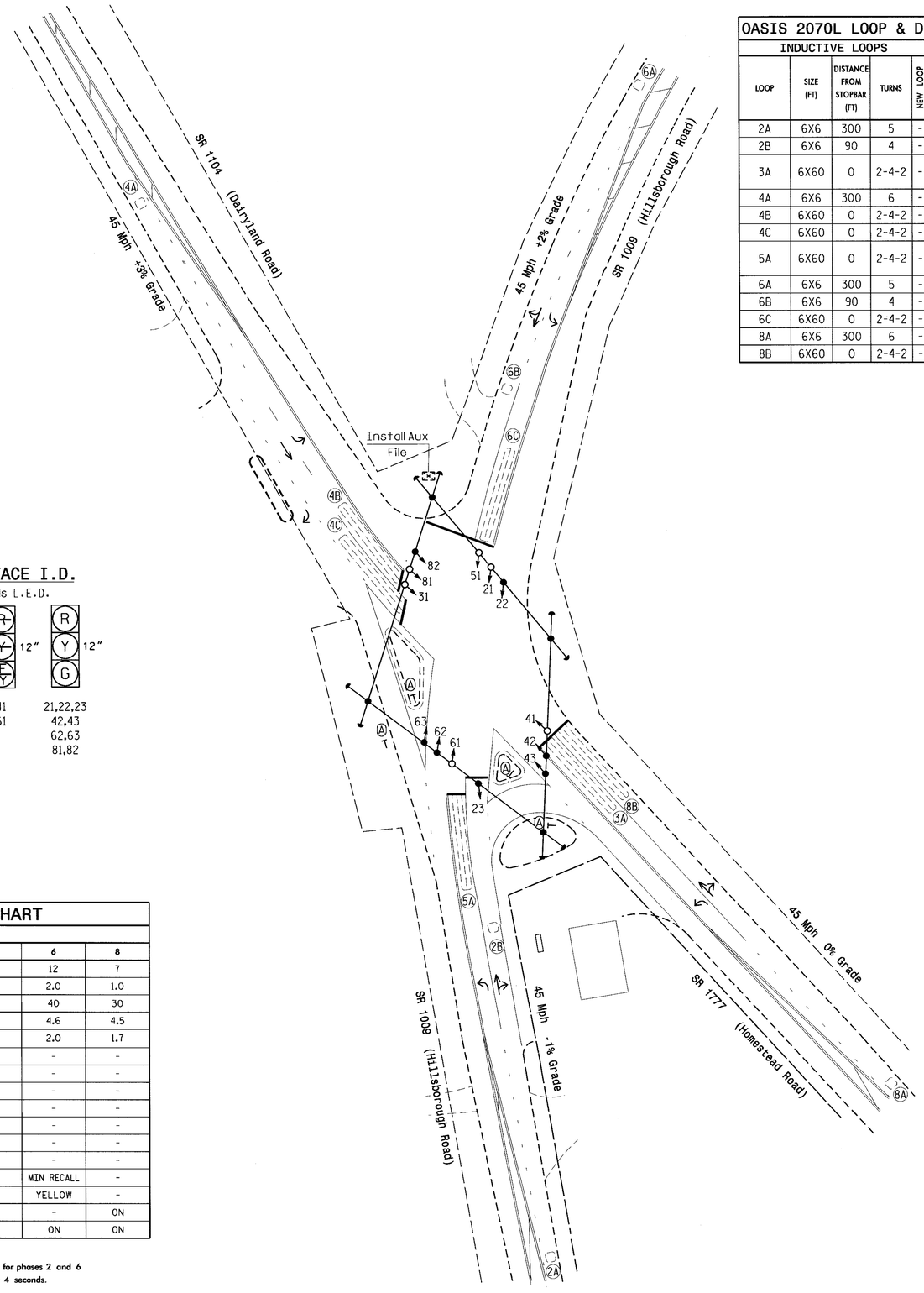
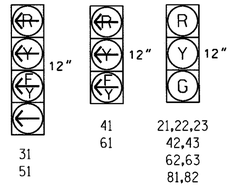


TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	02+6	03+8	04+8	FLASH
21,22,23	G	G	R	R	Y
31	~~R~~	~~R~~	←	FY	~~R~~
41	~~R~~	~~R~~	FY	FY	~~R~~
42,43	R	R	R	G	R
51	←	FY	~~R~~	~~R~~	~~Y~~
61	FY	FY	~~R~~	~~R~~	~~Y~~
62,63	R	G	R	R	Y
81,82	R	R	G	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



31
51

41
61

21,22,23
42,43
62,63
81,82

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	3	4	5	6	8
Min Green 1 *	12	7	7	7	12	7
Extension 1 *	2.0	1.0	1.0	1.0	2.0	1.0
Max Green 1 *	40	15	30	15	40	30
Yellow Clearance	4.6	3.0	4.5	3.0	4.6	4.5
Red Clearance	2.0	2.3	1.7	3.5	2.0	1.7
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.

OASIS 2070L LOOP & DETECTOR INSTALLATION

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	5	-	2	Y	Y	-	1.6	-	-	-
2B	6X6	90	4	-	2	Y	Y	-	-	-	-	-
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	15	-	-
					8	Y	Y	-	-	3	-	-
4A	6X6	300	6	-	4	-	Y	-	3.1	-	-	-
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4C	6X60	0	2-4-2	-	4	Y	Y	-	-		-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A	6X6	300	5	-	6	Y	Y	-	1.6	-	-	-
6B	6X6	90	4	-	6	Y	Y	-	-	-	-	-
6C	6X60	0	2-4-2	-	6	Y	Y	-	-	-	-	-
8A	6X6	300	6	-	8	-	Y	-	3.1	-	-	-
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	10	-	-

4 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phases 2 and 4.
4. Phase 5 may be lagged.
5. Phase 3 may be lagged.
6. Reposition existing signal heads numbered 22,42,43,62 63 and 82.
7. Set all detector units to presence mode.
8. 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.
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	→
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ

Signal Upgrade

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

SR 1009 (Hillsborough Road)
at
SR 1104 (Dairyland Road)/
SR 1777 (Homestead Road)

Division 7 Orange County Carrboro

PLAN DATE: May 2013 REVIEWED BY:
PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 40 1"=40'

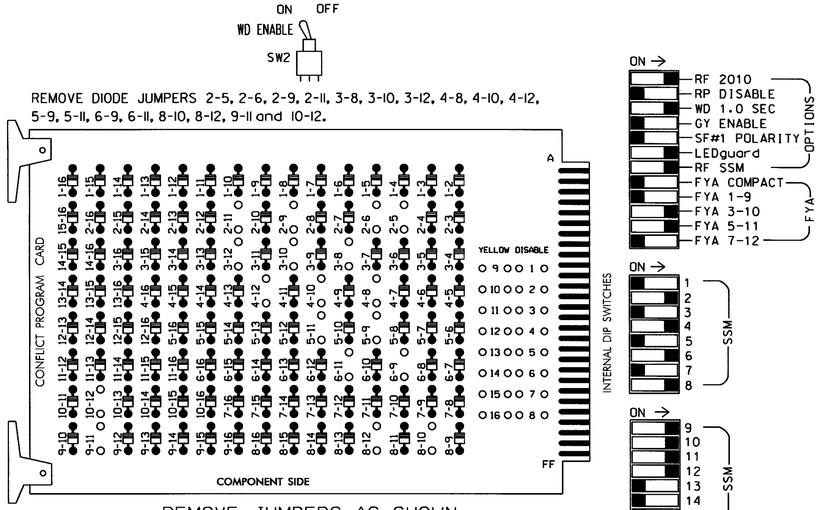
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA J. ALEXANDER
SIGNATURE 6/20/13 DATE
SIG. INVENTORY NO. 07-1013

20-JUN-2013 08:02
S:\ITS&Sig\ITS Signals\Signal Design Section\Central Region\Div 7\07-1013\07l013_sig_dsn_2013mod.dgn
jdspence

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
7. The cabinet and controller are part of the Chapel Hil - Carrboro 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,S3,S4,S5,S6,S8,S9,S10,S12,S13
PHASES USED.....2,3,4,5,6,8
OVERLAP "A".....2
OVERLAP "B".....3+4
OVERLAP "C".....5+6
OVERLAP "D".....8

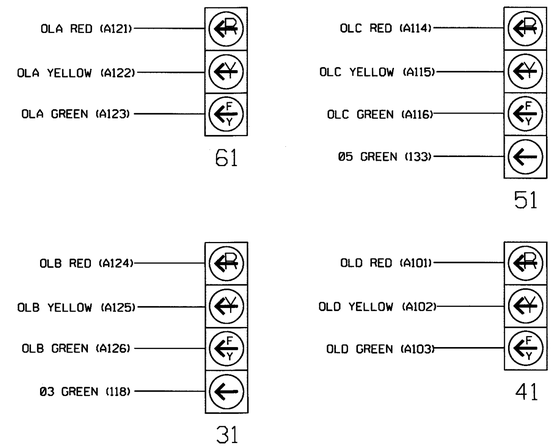
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	31★	42,43	NU	51★	62,63	NU	NU	81,82	NU	61★	31★	NU	51★	41★	NU
RED		128			101			134			107							
YELLOW		129		*	102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW				118			133											

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for signal heads 31 & 51 require special logic programming. See sheet 2 of 2 for programming instructions.

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 ⊗	Ø3 3A	Ø4 4A	Ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L		Ø2 2B			NOT USED	Ø4 4B	NOT USED							ST DC ISOLATOR
FILE "J" U	Ø5 5A	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L	NOT USED	Ø6 6B	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

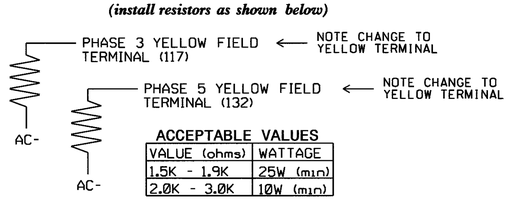
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y		1.6	
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A[1]	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4		Y		3.1	
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			3
4C	TB6-1,2	I7U	65	27	34	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		1.6	
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		3.1	
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

[1] Add jumper from I5-W to J8-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)

Move Load Resistors:

1) FROM: PHASE 3 RED FIELD TERMINAL (116)
   TO: PHASE 3 YELLOW FIELD TERMINAL (117)
2) FROM: PHASE 5 RED FIELD TERMINAL (131)
   TO: PHASE 5 YELLOW FIELD TERMINAL (132)

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1013
DESIGNED: May 2013
SEALED: 6/20/13
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
Division of Highways
Traffic Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SR 1009 (Hillsborough Road) at SR 1104 (Dairyland Road)/ SR 1777 (Homestead Road)

Division 7 | Orange County | Carrboro

PLAN DATE: June 2013	REVIEWED BY: T. Upchurch
PREPARED BY: C. Strickland	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE
6/25/13
DATE

SIG. INVENTORY NO. 07-1013

20-JUN-2013 15:25
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cstrickland

PROJECT REFERENCE NO.	SHEET NO.
	Sig.50

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
 LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
            ↓
       SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #42 ON
 SET OUTPUT  ASSIGNMENT #43 OFF
            PRESS '+'
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

```
 LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
            ↓
       SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #44 OFF
            PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

```
 LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
            ↓
       SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #43 ON
            PRESS '+'
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

```
 LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON
            ↓
       SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #47 ON
 SET OUTPUT  ASSIGNMENT #48 OFF
            PRESS '+'
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

```
 LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #3  IS ON
            ↓
       SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #49 OFF
            PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

```
 LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #3  IS ON
            ↓
       SCROLL DOWN
 THEN:
 SET OUTPUT  ASSIGNMENT #48 ON
            PRESS '+'
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

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:          |1234567891011121314151 6
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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 '+'
```

← NOTICE GREEN FLASH

```
 PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:          |1234567891011121314151 6
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  X 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 '+'
```

← NOTICE GREEN FLASH

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          |1234567891011121314151 6
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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 '+'
```

← NOTICE GREEN FLASH

```
 PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          |1234567891011121314151 6
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  X 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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

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 Function 1.

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:|12345678910111213141516
IF PHASES ARE ON|   X
OMIT PHASES     |   X
CALL PHASES     |
```

BACKUP PROTECTION PROGRAMMING COMPLETE

! IMPORTANT: Disable Dynamic/Backup Control Function 1.

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.

! IMPORTANT: If present, remove all phases from 'Backup Protect'.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1013
DESIGNED: May 2013
SEALED: 6/20/13
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1009 (Hillsborough Road) at SR 1104 (Dairyland Road)/ SR 1777 (Homestead Road)	SEAL
Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, North Carolina Department of Transportation, Signals Management Section	Division 7 / Orange County / Carrboro	NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
750 N. Greenfield Pkwy, Garner, NC 27529	PLAN DATE: June 2013 — REVIEWED BY: T. Sign	
	PREPARED BY: C. Strickland — REVIEWED BY:	
	REVISIONS / INIT. / DATE	George C. Brown 6/25/13 SIGNATURE DATE
		SIG. INVENTORY NO. 07-1013

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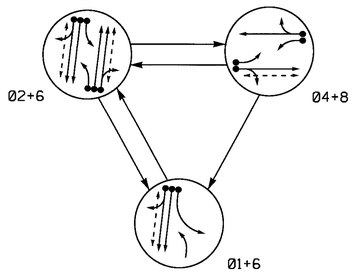
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
	Sig.51

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

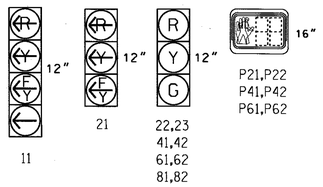
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

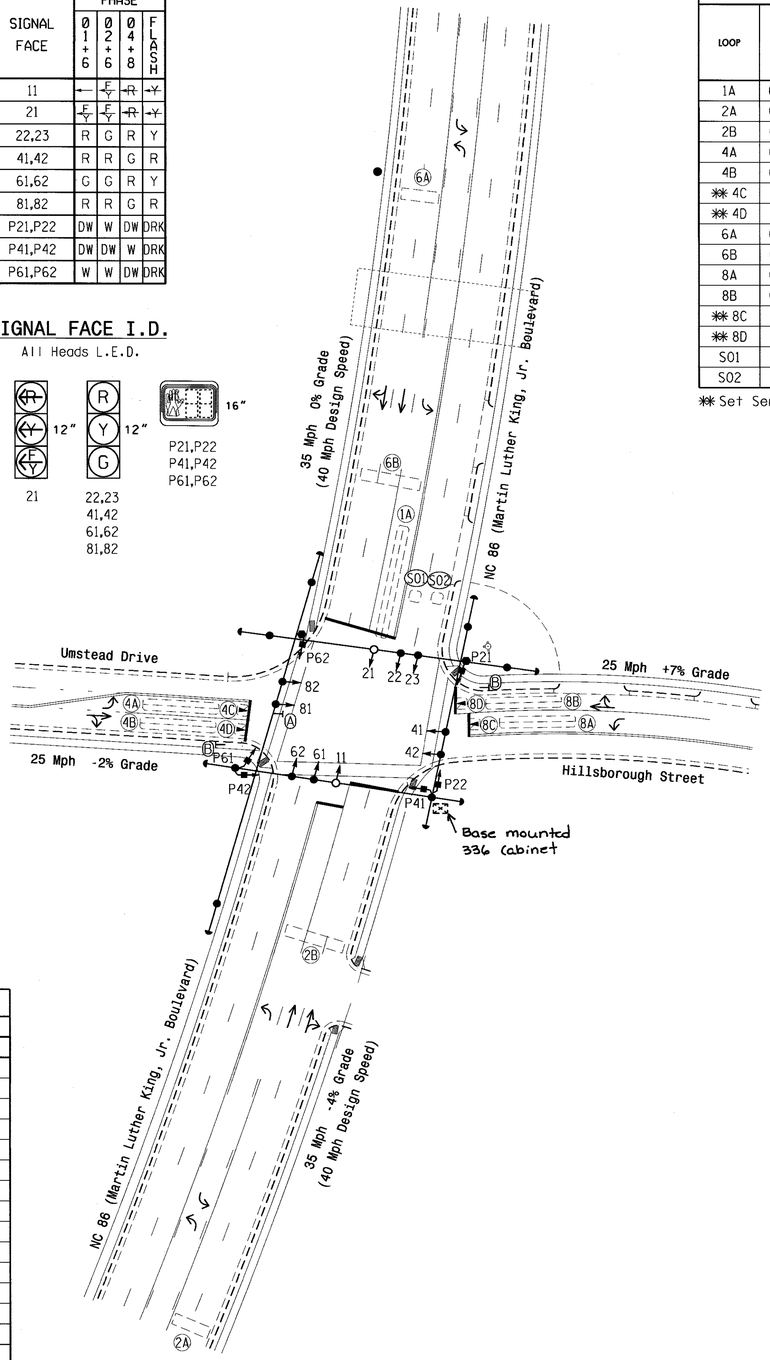
TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 6	PHASE 0 2 + 6	PHASE 0 4 + 8	FLASH
11	←	~~F Y~~	~~R~~	~~Y~~
21	~~F Y~~	~~F Y~~	~~R~~	~~Y~~
22,23	R	G	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y
81,82	R	R	G	R
P21,P22	DW	W	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 2070L LOOP & DETECTOR INSTALLATION

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	-	-
2A	6X20	295	Existing	-	2	Y	Y	-	2.2	-	-	-
2B	6X32	80	Existing	-	2	Y	Y	-	-	-	-	-
4A	6X40	16	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X40	16	2-4-2	-	4	Y	Y	-	-	10	-	-
✱✱ 4C	6X6	0	2-4-2 Diagonal	-	4	Y	Y	-	-	3	-	-
✱✱ 4D	6X6	0	2-4-2 Diagonal	-	4	Y	Y	-	-	10	-	-
6A	6X20	230	Existing	-	6	Y	Y	-	1.0	-	-	-
6B	6X32	80	Existing	-	6	Y	Y	-	-	-	-	-
8A	6X40	16	2-4-2	-	8	Y	Y	-	-	3	-	-
8B	6X40	16	2-4-2	-	8	Y	Y	-	-	10	-	-
✱✱ 8C	6X6	0	2-4-2 Diagonal	-	8	Y	Y	-	-	3	-	-
✱✱ 8D	6X6	0	2-4-2 Diagonal	-	8	Y	Y	-	-	10	-	-
S01	6X6	+120	3	-	-	-	-	-	-	-	Y	-
S02	6X6	+120	3	-	-	-	-	-	-	-	Y	-

✱✱ Set Sensitivity to appropriate level to detect a bicycle.

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	6	8
Min Green 1 *	7	12	7	12	7
Extension 1 *	1.0	2.0	1.0	2.0	1.0
Max Green 1 *	20	60	20	60	20
Yellow Clearance	3.0	4.5	3.3	4.5	3.0
Red Clearance	2.3	1.4	2.6	1.4	2.8
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	7	-
Don't Walk 1	-	12	20	15	-
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

* 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 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 6.
4. Phase 1 may be lagged.
5. Reposition existing signal heads numbered 22 and 23.
6. Set all detector units to presence mode.
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. 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.
12. Program controller to operate using FYA (compact Mode.

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	→
⬡	Pedestrian Signal Pedestal	⬢
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
▲	Bike Marking	▲
Ⓑ	"To Request Green Wait on Line" Sign (R10-22)	Ⓑ

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

NC 86 (MLK, Jr. Boulevard) at Hillsborough Street/ Umstead Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE:	June 2013	REVIEWED BY:	JPG
PREPARED BY:	Jeff Spence	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY
SIGNATURE 7/11/13 DATE

SIG. INVENTORY NO. 07-1031

11-JUL-2013 07:17
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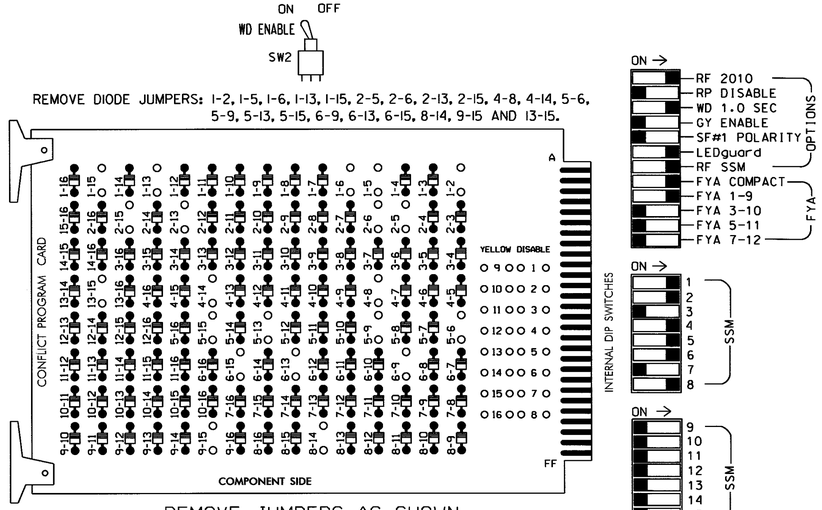
jfspence

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.
3. Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

■ = DENOTES POSITION OF SWITCH

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	ø4 4A	ø4 4C	SYS. DET. SØ1	ø6 6A	ø8 8A	ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø2 PED DC ISOLATOR	ø6 PED DC ISOLATOR	FS DC ISOLATOR
FILE "I" L	NOT USED	ø2 2B	ø4 4B	ø4 4D	SYS. DET. SØ2	ø6 6B	ø8 8B	ø8 8D				ø4 PED DC ISOLATOR	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
1A	TB21-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB21-3,4	I2U	39	1	2	2	Y	Y		2.2	
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-5,6	I3U	58	20	3	4	Y	Y			3
4B	TB23-5,6	I3L	49	11	24	4	Y	Y			10
4C	TB21-7,8	I4U	41	3	4	4	Y	Y			3
4D	TB23-7,8	I4L	45	7	14	4	Y	Y			10
* SØ1	TB21-9,10	I5U	55	17	5	SYS					
* SØ2	TB23-9,10	I5L	48	10	26	SYS					
6A	TB21-11,12	I6U	40	2	6	6	Y	Y		1.0	
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A	TB21-13,14	I7U	57	19	7	8	Y	Y			3
8B	TB23-13,14	I7L	50	12	28	8	Y	Y			10
8C	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8D	TB24-1,2	I8L	46	8	18	8	Y	Y			10
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: I2L
FILE I
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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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 4 and 8 for Dual Entry.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. The cabinet and controller are part of the Chapel Hill - Carrboro System.
9. Disable Backup Protect for phase 6.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S5,S6,S6P,S8.
PHASES USED.....1,2,4,6,8,2 PED,4 PED,6 PED.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....6
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.

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2010ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to chan. 9 green (monitor pin 13).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-13 ——— 2PY (term. 114)

NOTE: Some cabinet manufacturers use a molex plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

PROJECT REFERENCE NO.	SHEET NO.
	Sig.52

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P		S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
CMU CHANNEL NO.	1	2	9	13	3	4	14	5	6	15	7	8	16
PHASE	OLA	2	1 GRN	2 PED	3	4	4 PED	OLC	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11★	22,23	11★	P21, P22	NU	41,42	P41, P42	21★	61,62	P61, P62	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						
FLASHING YELLOW ARROW	127						133						
✋				113			104			119			
GREEN ARROW			114										
🚶				115			106			121			

NU = Not Used

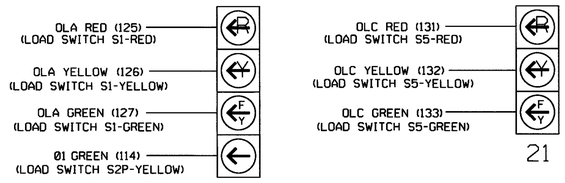
✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

NOTE: Load Switches S1, S2P, S5 require output remapping. See sheets 3 and 4 of this electrical detail for instructions.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic and output remapping. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1031
DESIGNED: June 2013
SEALED: 7-11-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

NC 86 (MLK, Jr. Boulevard) at Hillsborough Street/ Umstead Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

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

John T. Rowe 7-18-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1031

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jpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.53

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #14 ON
 SET OUTPUT  ASSIGNMENT #15 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #16 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #15 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 14 = Overlap A Red
OUTPUT 15 = Overlap A Yellow
OUTPUT 16 = Overlap A Green

Note: All outputs shown above have been remapped. See sheets 3 and 4 of this electrical detail.

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:          ¦12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          ¦12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1031
DESIGNED: June 2013
SEALED: 7-11-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 86 (MLK, Jr. Boulevard) at Hillsborough Street/ Umstead Drive	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signals Management Section	Division 7 · Orange County · Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: July 2013 · REVIEWED BY: JTR	SIGNATURE · DATE 7-18-13
	PREPARED BY: James Peterson · REVIEWED BY:	SIG. INVENTORY NO. 07-1031
	REVISIONS · INIT. · DATE	

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jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.54

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 11

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

```
PAGE:1  C1 PIN:16  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................14
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:16  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(O=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN16  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................14
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" KEY FOR OUTPUT 15

STEP 2

```
PAGE:1  C1 PIN:17  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................15
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:17  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(O=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:17  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................15
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................
VEHICLE PHASE........................
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" KEY FOR OUTPUT 16

STEP 3

```
PAGE:1  C1 PIN:18  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................16
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:18  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(O=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:18  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................16
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................
VEHICLE PHASE........................_
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................Y
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

PRESS "+" UNTIL OUTPUT 33 IS REACHED.

STEP 4

```
PAGE:1  C1 PIN:35  NOT ENABLED
OUTPUT ASSIGNMENT #.................33
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED..........................Y
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1  C1 PIN:35  NOT ENABLED
SELECT VEHICLE PHASE (1-16).........1
SELECT COLOR(O=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:35  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................33
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................._
VEHICLE PHASE........................Y
PEDESTRIAN PHASE....................._
VEHICLE OVERLAP......................_
PEDESTRIAN OVERLAP..................._
WATCHDOG............................._
DETECTOR RESET......................._
ADVANCE BEACON......................._
OUT OF PHASE FLASHER................._
CONTROLLER FLASH....................._
RUN FREE............................._
RESERVED............................._
PREEMPT.............................._
SOFT PREEMPT........................._
ANY PREEMPT.........................._
COORDINATION PLAN...................._
OFFSET..............................._
PHASE CHECK.........................._
PHASE ON............................._
PHASE NEXT..........................._
```

OUTPUT PROGRAMMING FOR HEAD 11 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1031
DESIGNED: June 2013
SEALED: 7-11-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 3 OF 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

**NC 86 (MLK, Jr. Boulevard)
at
Hillsborough Street/
Umstead Drive**

Division 7 Orange County Chapel Hill

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

REVISIONS	INIT.	DATE

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

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

SIGNATURE: John T. Rowe Jr. DATE: 7-18-13

SIG. INVENTORY NO. 07-1031

12-JUL-2013 11:54
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Peterson*071031_sm_ele_xxx.dgn
jtpeterson

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 21

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

→ THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

→ ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN32  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 31

STEP 2

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

→ THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

→ ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:33  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 32

STEP 3

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

→ THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

→ ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:34  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

OUTPUT PROGRAMMING FOR HEAD 51 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1031
DESIGNED: June 2013
SEALED: 7-11-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 4 OF 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 86 (MLK, Jr. Boulevard)
at
Hillsborough Street/
Umstead Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

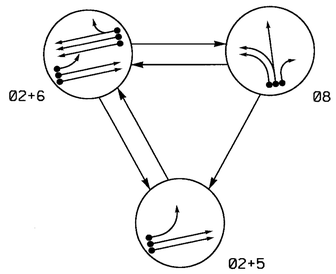
Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 7-18-13 DATE
SIG. INVENTORY NO. 07-1031

12-JUL-2013 11:55
S:\#TSS\SUM\ITS Signals\Workgroups\Sig Mon\Peterson\07-1031_sm_ele_xxx.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.56

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

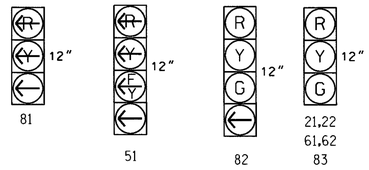
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21,22	G	G	R	Y
51	←	F Y	~~R~~	~~Y~~
61,62	R	G	R	Y
81	~~R~~	~~R~~	←	~~R~~
82	R	R	G ←	R
83	R	R	G	R

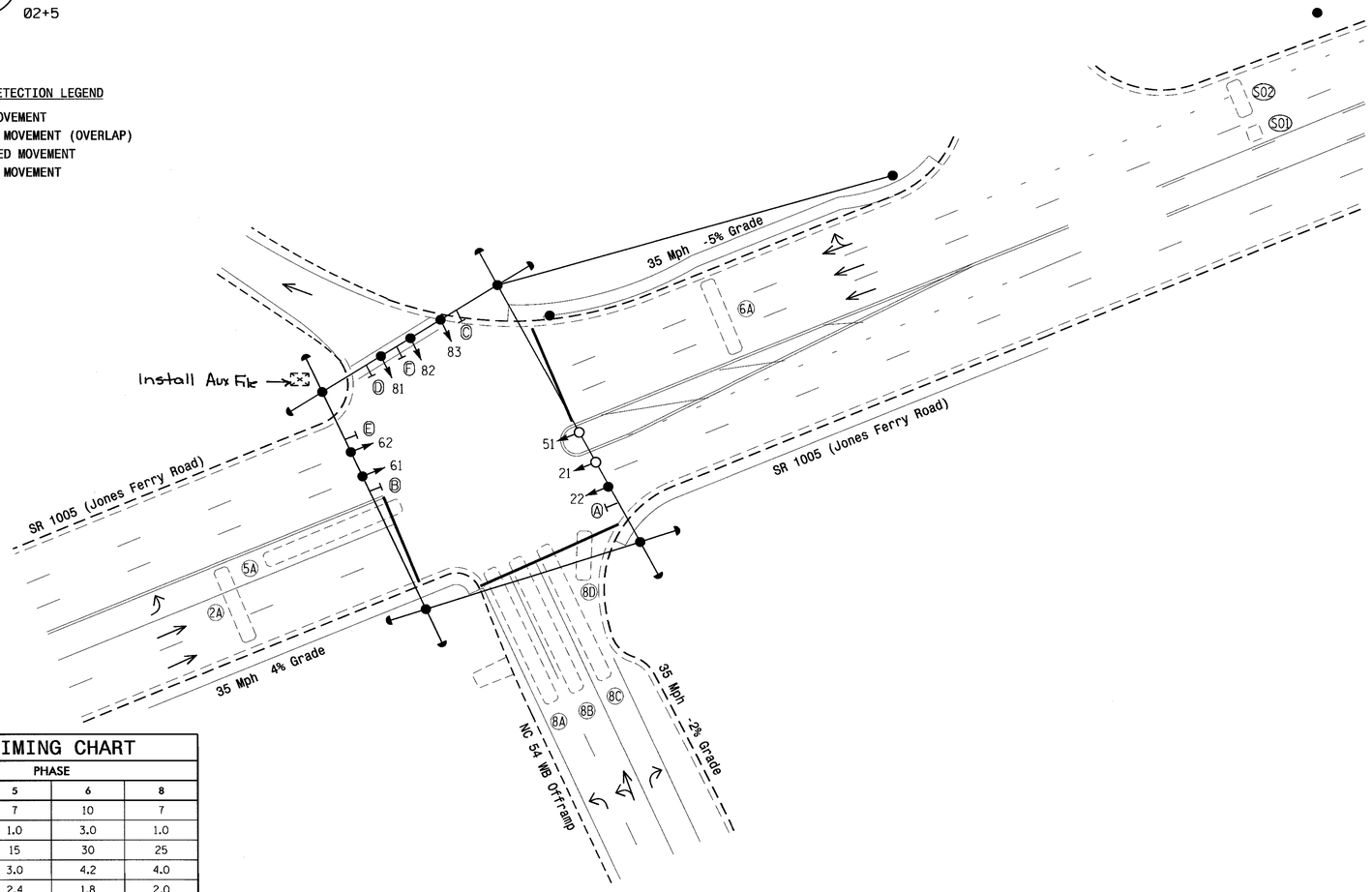
SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION

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	6X32	70	Existing	-	2	Y	Y	-	-	-	-	-
5A	6X60	+5	Existing	-	5	Y	Y	-	-	15	-	-
6A	6X32	70	Existing	-	6	Y	Y	-	-	-	-	-
8A	6X60	+5	Existing	-	8	Y	Y	-	-	-	-	-
8B	6X60	+5	Existing	-	8	Y	Y	-	-	-	-	-
8C	6X60	+5	Existing	-	8	Y	Y	-	-	15	-	-
8D	6X20	+5	Existing	-	8	Y	Y	-	-	15	-	-
S01	6X6	300	6	-	-	-	-	-	-	-	Y	-
S02	6X15	300	6	-	-	-	-	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	1.0	3.0	1.0
Max Green 1 *	30	15	30	25
Yellow Clearance	4.2	3.0	4.2	4.0
Red Clearance	1.8	2.4	1.8	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	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 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 21 and 22.
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. 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	→
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	Left Arrow "ONLY" Sign (R3-5L)	Ⓓ
Ⓔ	Combined Through and Right Arrow Sign (R3-6R)	Ⓔ
Ⓕ	Combined Through and Left Arrow Sign (R3-6L)	Ⓕ

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

SR 1005 (Jones Ferry Road)
at
NC 54 WB Ramps

Division 7 Orange County Carrboro

PLAN DATE:	June 2013	REVIEWED BY:	JPG
PREPARED BY:	Jeff Spence	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON R. GALLOWAY
SIGNATURE 7/11/13 DATE

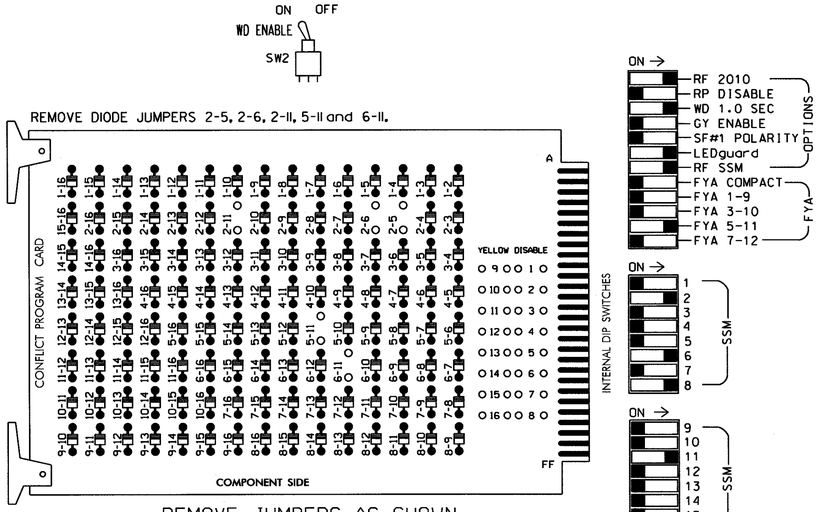
SIG. INVENTORY NO. 07-1034

11-JUL-2013 07:06
S:\TS&S\TS Signals\Signal Design Section\Central Region\Div 7\07-1034\071034_sig_dsn_2013mmdd.dgn
jspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.57

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4, 5,7,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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 Chapel Hill - Carrboro 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,S6,S8,S12.
PHASES USED.....2,5,6,8.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8			S8P	S9	S10	S11	S12	S13	S14
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	NU	NU	51	61,62	NU	NU	81	82	83	NU	NU	NU	NU	51	NU	NU
RED		128						134				107	107							
YELLOW		129					*	135				108	108							
GREEN		130						136				109	109							
RED ARROW											107							A114		
YELLOW ARROW											108							A115		
FLASHING YELLOW ARROW																		A116		
GREEN ARROW							133				109	109								

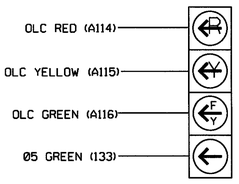
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED							SYS. DET. SØ2						ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	Ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				Ø8 8B	Ø8 8D								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

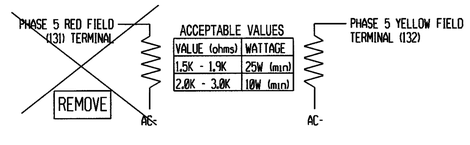
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15
8D	TB7-3,4	J7L	79	41	48	8	Y	Y			15
*SØ1	TB6-9,10	I9U	60	22	11	SYS					
*SØ2	TB6-11,12	I9L	62	24	13	SYS					

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1034
DESIGNED: June 2013
SEALED: 07-11-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1005 (Jones Ferry Road)
at
NC 54 WB Ramps

Division 7 | Orange County | Carrboro

PLAN DATE: June 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
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 | DATE 7-15-13

SIG. INVENTORY NO. 07-1034

12:10:06 2013 11:19
S:\Traffic\Signals\Projects\Sig Mon#Peterson#07-1034_sm_e10_xxx.dgn
jtpeterson

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

                SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #42 ON
 SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

                SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

                SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:          |12345678910111213141516
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  X GREEN   <-- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1034
DESIGNED: June 2013
SEALED: 7-11-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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 1005 (Jones Ferry Road)
at
NC 54 WB Ramps

Division 7 | Orange County | Carrboro

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

REVISIONS	INIT.	DATE

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

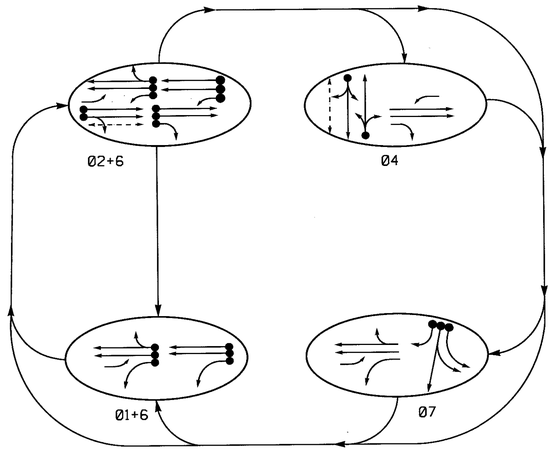
SIGNATURE John T Rowe 7-15-13 DATE

SIG. INVENTORY NO. 07-1034

12-JUL-2013 10:40
I:\Traffic\SIGNALS\Signals\MarkKorando\Sig Mat\Peterson\071034_sm.ele_xxx.dgn
$$$$USER

PROJECT REFERENCE NO.	SHEET NO.
———	Sig.5B

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

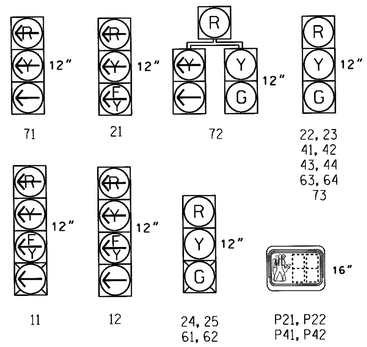
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	PHASE 07	FLASH
11	←	F Y	R	←	Y
12	←	F Y	F Y	R	Y
21	F Y	F Y	R	F Y	Y
22,23	R	G	R	R	Y
24,25	R	G	G	R	Y
41,42,43,44	R	R	G	R	R
61,62	G	G	R	G	Y
63,64	G	G	R	R	Y
71	R	R	R	←	R
72	R	R	R	G	R
73	R	R	R	G	R
P21,P22	DW	W	DW	DW	DRK
P41,P42	DW	DW	W	DW	DRK

SIGNAL FACE I.D.

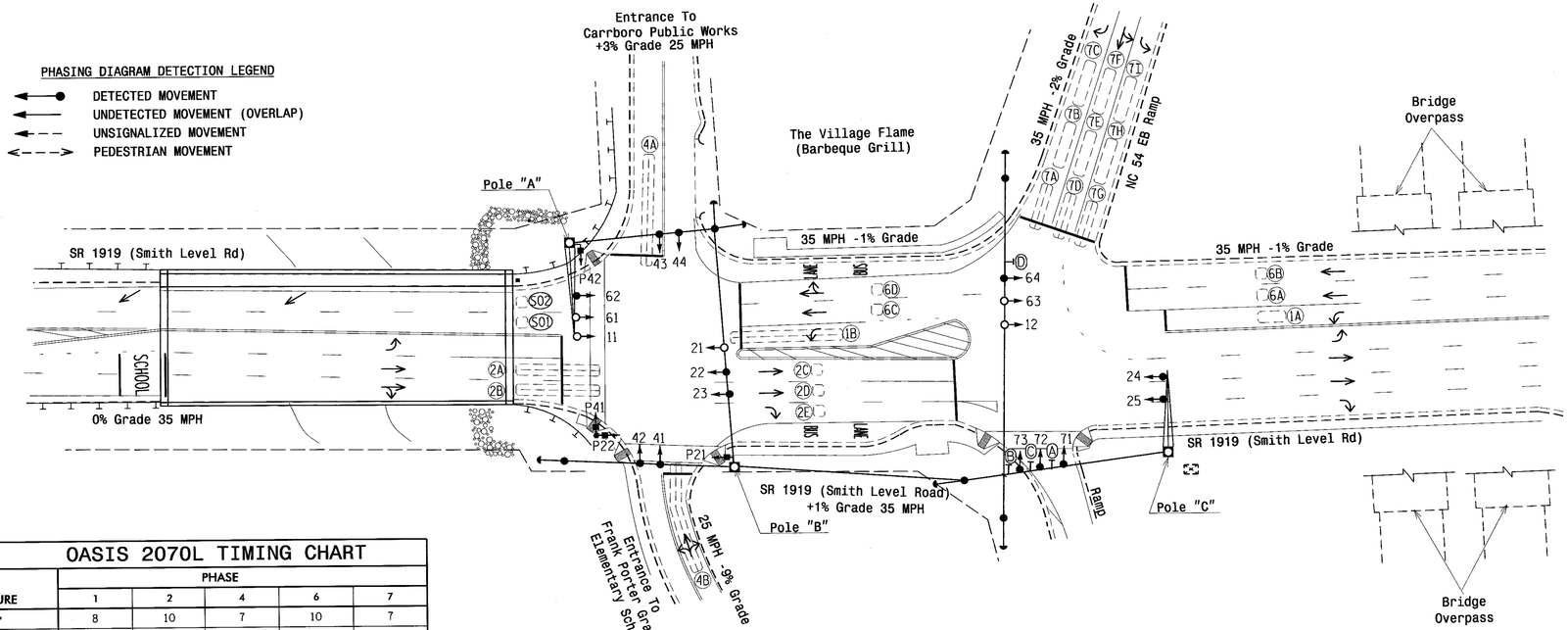
All Heads L.E.D.

Optically Programed



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	6X15	50	3	-	1	Y	Y	-	-	15	-	-
1B	6X60	+5	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X45	+20	2-4-2	-	2	Y	Y	-	-	-	-	-
2B	6X45	+20	2-4-2	-	2	Y	Y	-	-	-	-	-
2C,2D,2E	6X6	70	4	-	2	Y	Y	-	-	-	-	-
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	10	-	-
4B	6X60	+5	2-4-2	-	4	Y	Y	-	-	10	-	-
6A,6B	6X6	70	4	-	6	Y	Y	-	2	-	-	-
6C,6D	6X6	70	4	-	6	Y	Y	-	-	-	-	-
7A,7B,7C	Existing	Existing	Existing	-	7	Y	Y	-	-	10	-	-
7D,7E,7F	Existing	Existing	Existing	-	7	Y	Y	-	-	-	-	-
7G,7H,7I	Existing	Existing	Existing	-	7	Y	Y	-	-	-	-	-
SO1	6X6	+120	3	-	-	-	-	-	-	-	Y	-
SO2	6X6	+120	3	-	-	-	-	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 7
Min Green 1 *	8	10	7	10	7
Extension 1 *	2.0	3.0	1.0	3.0	1.0
Max Green 1 *	20	45	25	45	15
Yellow Clearance	3.0	3.9	3.8	3.9	4.0
Red Clearance	3.3	2.4	3.1	2.4	2.3
Walk 1 *	-	7	7	-	-
Don't Walk 1	-	10	22	-	-
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	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.

4 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 2+6.
4. Reposition existing signal heads numbered 22,23,62 and 64.
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. 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	
	Metal Pole with Mastarm	
⬡	Pedestrian Signal Pedestal	⬢
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Guard Rail	⊤⊤
N/A	Wheelchair Ramp	
N/A	Right of Way	——
→	Directional Arrow	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Combined Through and Left Arrow Sign (R3-6L)	Ⓒ
Ⓓ	No Right Turn Sign (R3-1)	Ⓓ

Signal Upgrade

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

SR 1919 (Smith Level Road) at NC 54 EB Ramps & Frank Porter Graham Elementary School/Carrboro Public Works

Division 07 Orange County Carrboro

PLAN DATE: July 2013 REVIEWED BY: JPG

PREPARED BY: EW Minshew REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY

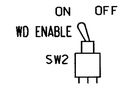
SIGNATURE 6/1/13 DATE

SIG. INVENTORY NO. 07-1037

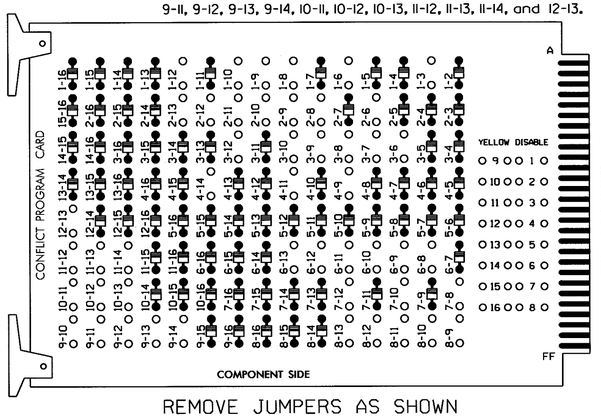
01-AUG-2013 12:10
K:\TIS\SW\TIS Signals\Signal Design Section\Central Region\Div 7\07-0037\07I037_sig_dsn_2013mdd.dgn
Smithlove

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

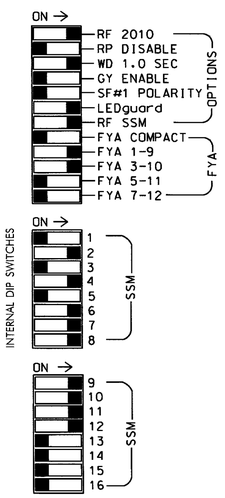
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS I-3, I-6, I-8, I-9, I-10, I-12, 2-6, 2-8, 2-9, 2-10, 2-11, 2-12, 2-13, 3-6, 3-7, 3-8, 3-9, 3-10, 3-12, 4-9, 4-11, 4-14, 6-8, 6-9, 6-10, 6-11, 6-12, 6-13, 7-8, 7-10, 7-12, 8-9, 8-10, 8-11, 8-12, 8-13, 9-10, 9-11, 9-12, 9-13, 9-14, 10-11, 10-12, 10-13, 11-12, 11-13, 11-14, and 12-13.



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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 5,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlaps 1 as Wag Overlaps. (Overlap B is a Wig Overlap to flash with overlap F)
7. The cabinet and controller are part of the Chapel Hill-Carrboro 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,S2P,S3,S4,S4P,S6,S7,S8, S9,S10,S12,S13
PHASES USED.....1,2,2PED,4,4PED,6,7
OVERLAP "A".....1+2+4
OVERLAP "B".....1+2+7
OVERLAP "C".....2+4
OVERLAP "D".....6+7
OVERLAP "E".....1+7
OVERLAP "F".....6+7

PROJECT REFERENCE NO.	SHEET NO.
	Sig.60

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7			S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	OLE	4	4 PED	5	6	6 PED	7			OLF	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	12★	22,23	P21, P22	11★	41,42 43,44	P41, P42	NU	63,64	NU	71	72	73	61,62	NU	12★	11★	NU	24,25	21	NU
RED		128			101			134			122	122	107					A114		
YELLOW	✳	129		✳	102			135			123	123	108					A115		
GREEN		130			103			136			124	124	109					A116		
RED ARROW										122					A121	A124			A101	
YELLOW ARROW										123	123				A122	A125			A102	
FLASHING YELLOW ARROW															A123	A126			A103	
GREEN ARROW	127			118						124	124									
✋			113			104														
🚶			115			106														

NU = Not Used

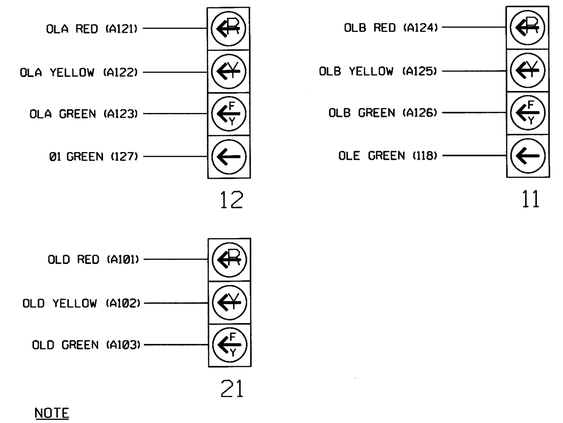
✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

NOTE: outputs for loadswitches S3 and S8 have been remapped. See sheets 2 and 3.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 12 requires special logic programming. See sheet 2 for programming instructions.

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	Ø2 2C, 2D,2E	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L		Ø1 1B	Ø2 2B	NOT USED		Ø4 4B			SYS. DET. SØ2			Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A,6B	SLOT EMPTY	SLOT EMPTY	Ø7 7A, 7B,7C	Ø7 7D, 7E,7F	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6C,6D			NOT USED	Ø7 7G, 7H,7I								

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

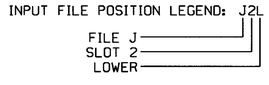
FS = FLASH SENSE
ST = STOP TIME

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			15
1B	TB2-7,8	I2L	43	5	12	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			
2C,2D,2E	TB4-1,2	I4U	47	9	22	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y		2.0	
6C,6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A,7B,7C	TB5-5,6	J5U	57	19	7	7	Y	Y			10
7D,7E,7F	TB5-9,10	J6U	42	4	8	7	Y	Y			
7G,7H,7I	TB5-11,12	J6L	46	8	18	7	Y	Y			
✳S01	TB6-9,10	I9U	60	22	11	SYS					
✳S02	TB6-11,12	I9L	62	24	13	SYS					
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 SLOT I12.

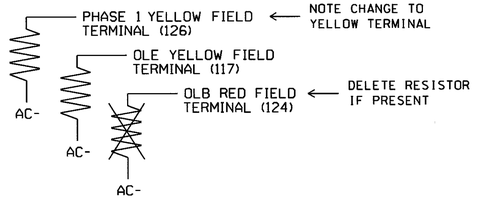
✳ SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.



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)



! IMPORTANT: Move Load Resistor from Red Field Terminal to Yellow Field Terminal for Phase 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1037
DESIGNED: July 2013
SEALED: 8/1/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1919 (Smith Level Rd) at NC 54
EB Ramps & Frank Porter Graham Elementary School/
Carrboro Public Works

Division 7 | Orange County | Carrboro

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

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe 8-7-13
SIGNATURE DATE
SIG. INVENTORY NO. 07-1037

02-AUG-2013 09:25
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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.61

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 12).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 12).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 12).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE OVERLAP     #5  IS ON
AND RED CLEAR ON OVL   #5  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
```

NOTE: LOGIC FOR RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2, OR FROM PHASE 7 TO PHASE 2. (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE OVERLAP     #5  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING OVERLAP E (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON OVERLAP  #5  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #48 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM OVERLAP E (HEAD 11).

PRESS '+'

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          |1234567891011121314151 6
VEH OVL PARENTS:|XX X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:          |1234567891011121314151 6
VEH OVL PARENTS:|XX    X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |1234567891011121314151 6
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?...Y
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 '+'

```
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE:          |1234567891011121314151 6
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'E' SETTINGS
PHASE:          |1234567891011121314151 6
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)....3
```

← NOTICE PHASE 3

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'F' SETTINGS
PHASE:          |1234567891011121314151 6
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?...Y
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 '+'

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1037
DESIGNED: July 2013
SEALED: 8/1/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1919 (Smith Level Rd) at NC 54
EB Ramps & Frank Porter Graham Elementary School/
Carrboro Public Works

Division 7 | Orange County | Carrboro

PLAN DATE:	July 2013	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 8-7-13

SIG. INVENTORY NO. 07-1037

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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.62

OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR LOADSWITCH S8 (OVERLAP F)

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS). THEN '1' (OUTPUT ASSIGNMENTS). WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "19"

```
PAGE:1  C1 PIN:21  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................19
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

SIGNAL HEADS 61.62

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:21  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...6
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:21  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................19
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 20

```
PAGE:1  C1 PIN:22  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................20
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:22  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...6
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:22  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................20
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 21

```
PAGE:1  C1 PIN:23  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................21
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:23  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...6
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA. THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:23  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................21
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

OUTPUT PROGRAMMING FOR LOADSWITCH S8 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1037
DESIGNED: July 2013
SEALED: 8/1/13
REVISED: N/A

Signal Upgrade - Sheet 3 of 4

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 1919 (Smith Level Rd) at NC 54
EB Ramps & Frank Porter Graham Elementary School/
Carrboro Public Works

Division 7 | Orange County | Carrboro

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

SIGNATURE 8-7-13 DATE

SIG. INVENTORY NO. 07-1037

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SSARMSTRONG

PROJECT REFERENCE NO.	SHEET NO.
	Sig.63

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	4	7	0
2	0	6	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

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 Function 1.
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 X X
CALL PHASES	X

BACKUP PROTECTION PROGRAMMING COMPLETE

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: 07-1037
DESIGNED: July 2013
SEALED: 8/1/13
REVISED: N/A

Signal Upgrade - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy.Garner,NC 27529

SR 1919 (Smith Level Rd) at NC 54
EB Ramps & Frank Porter Graham Elementary School/
Carrboro Public Works

Division 7 | Orange County | Carrboro

PLAN DATE: July 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

SIGNATURE 8-7-13 DATE

SIG. INVENTORY NO. 07-1037

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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.64

PHASING DIAGRAM

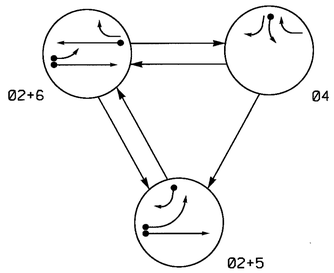


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4	FLASH
21,22,23	G	G	R	Y
41	R	R	G	R
42	R/→	R	G	R
51	←/F	F	~~R~~	~~Y~~
61,63	R	G	R	Y
62	R	G	R/←	Y

OASIS 2070L LOOP & DETECTOR INSTALLATION

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	5	-	2	Y	Y	-	1.9	-	- / -
2B	6X6	70	5	-	2	Y	Y	-	-	-	- / -
4A	6X40	16	2-4-2	-	4	Y	Y	-	-	-	- / -
4B **	6X6	0	2-4-2 Diagonal	-	4	Y	Y	-	-	3	- / -
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	- / -
					2	Y	Y	-	-	-	- / -
5B	6X40	16	2-4-2	-	5	Y	Y	-	-	15	- / -
5C **	6X6	0	2-4-2 Diagonal	-	5	Y	Y	-	-	15	- / -
6A	6X6	300	5	-	6	Y	Y	-	1.9	-	- / -
6B	6X6	70	5	-	6	Y	Y	-	-	-	- / -

** Set Sensitivity to appropriate level to detect a bicycle.

3 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

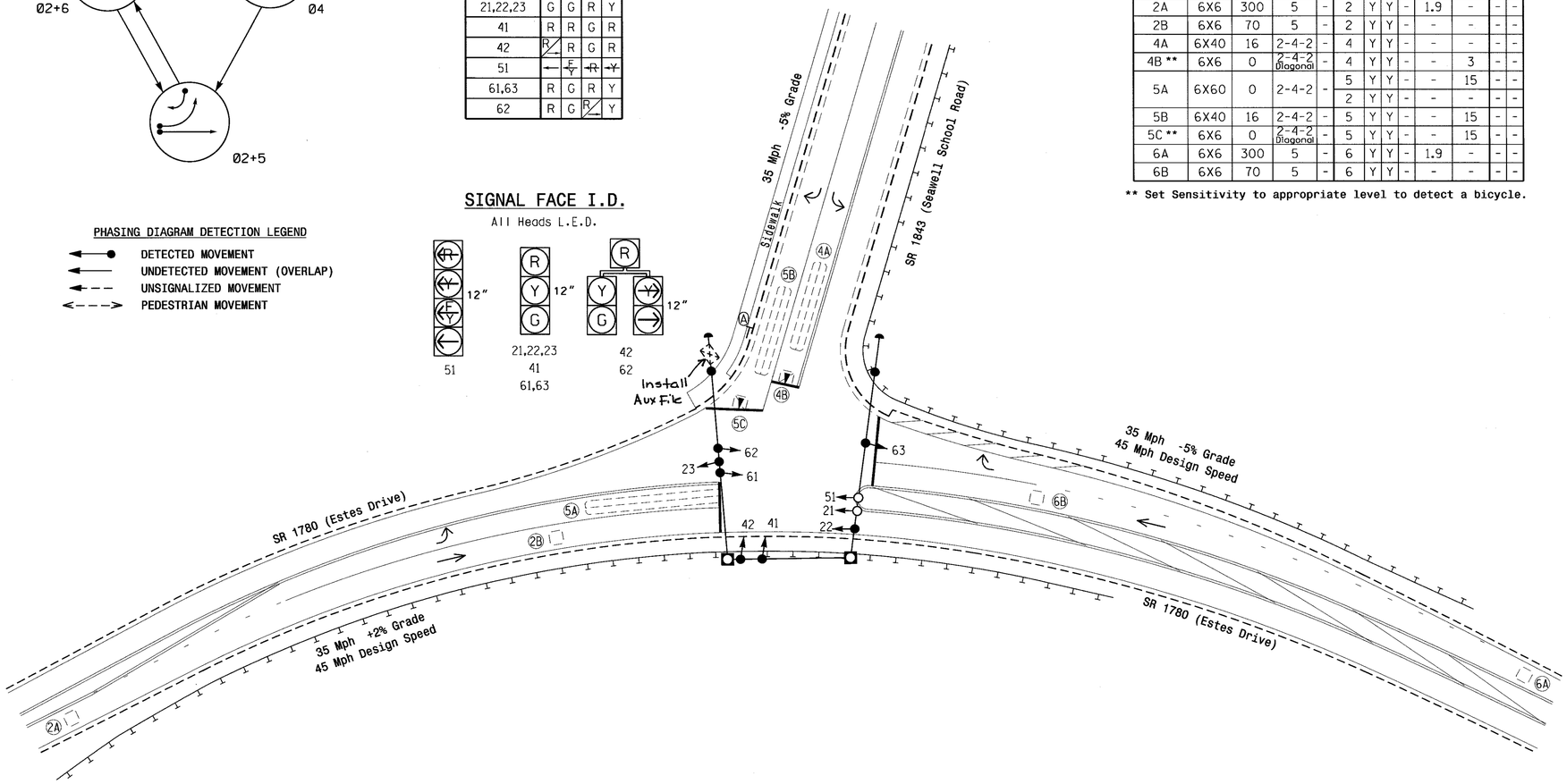
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 22.
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. 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.

PHASING DIAGRAM DETECTION LEGEND

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

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	→
▲	Bike Markings	▲
Ⓐ	"TO REQUEST GREEN WAIT ON LINE" Sign (R10-22)	Ⓐ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	2.0	1.0	1.0	2.0
Max Green 1 *	60	25	15	60
Yellow Clearance	5.0	3.1	3.0	5.0
Red Clearance	1.2	2.3	1.9	1.2
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	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 1780 (Estes Drive)
at
SR 1843 (Seawell School Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY:
PREPARED BY: Jeff Spence | REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

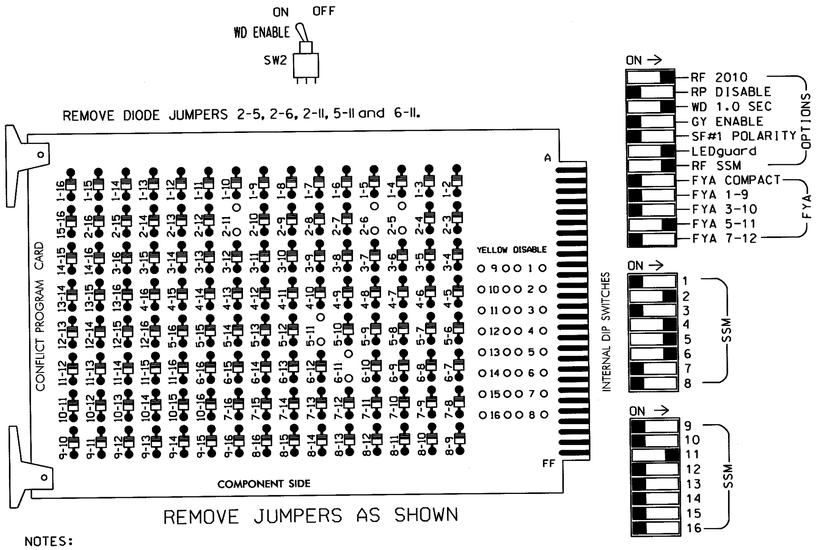
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY
SIGNATURE 7/23/13 DATE
SIG. INVENTORY NO. 07-1159

23-JUL-2013 09:12
S:\#ITS&Sig\#ITS\Signals\Signal Design Section\Central Region\Div 7\w07-1159\07i159_sig_dsn_2013mdd.dgn
jrspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.65

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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				ø4 4B								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

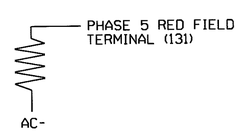
FS = FLASH SENSE
ST = STOP TIME

⊗ 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)



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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7,8, 9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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 Chapel Hill-Carrboro Signal System.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to *Caltrans Traffic Signal Control Equipment Specifications* (TSCES).

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4		S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	62	NU	51 ★	42	61,62 63	NU	NU	NU	NU	NU	NU	NU	51 ★	NU	NU
RED		128			101				✱	134										
YELLOW		129			102					135										
GREEN		130			103					136										
RED ARROW																		A114		
YELLOW ARROW						102			132									A115		
FLASHING YELLOW ARROW																		A116		
GREEN ARROW						103		133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

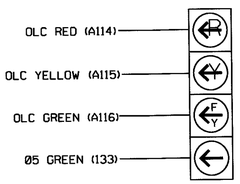
EQUIPMENT INFORMATION

CONTROLLER.....2070L
*CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12.
PHASES USED.....2,4,5,6.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

✱ In NOTES section refer to note 7.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

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			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			3
5A[1]	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
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y		1.9	
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

[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: 07-1159
DESIGNED: July 2013
SEALED: 7-23-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1780 (Estes Drive) at SR 1843 (Seawell School Road)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section, NC DEPARTMENT OF TRANSPORTATION	Division 7 · Orange County · Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
750 N.Greenfield Pkwy.,Garner,NC 27529	PLAN DATE: 7-16-13 · REVIEWED BY: T.Uya	SIGNATURE · DATE 7/25/13
	PREPARED BY: D.H. Spaulding · REVIEWED BY:	SIG. INVENTORY NO. 07-1159
	REVISIONS · INIT. · DATE	

24-JUL-2013 09:24
S:\#TSSIG\#ITS Signals\#Workgroups\#Sig Mgmt\Spaulding\#In-progress\#071159_sm_ele_2013xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
	Sig.66

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1159
DESIGNED: July 2013
SEALED: 7-23-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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 1780 (Estes Drive)
at
SR 1843 (Seawell School Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE:	7-16-13	REVIEWED BY:	T. Vyas
PREPARED BY:	D.H. Spaulding	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 7/25/13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1159

24-JUL-2013 09:25
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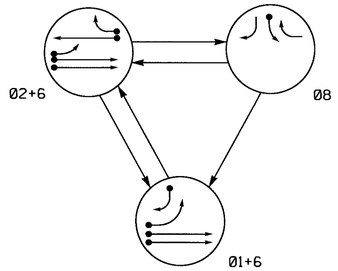
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
	Sig 67

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

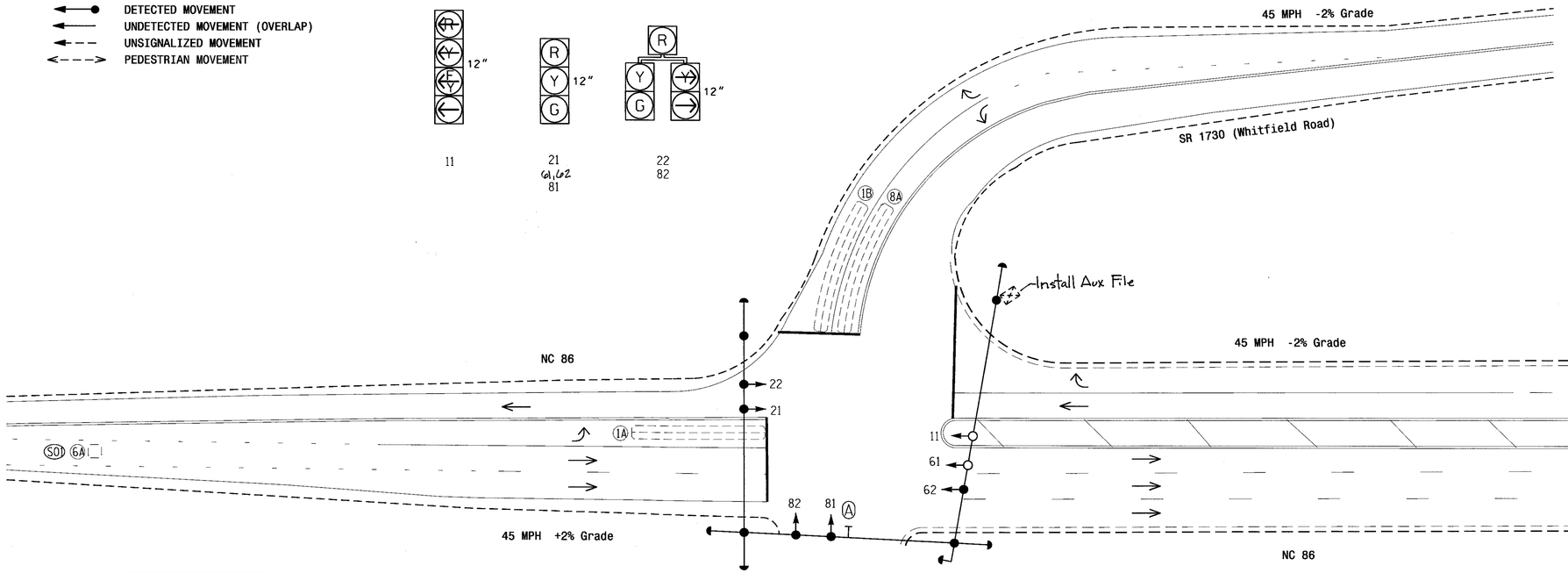
SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø8	FLASH
11	~~←~~ ~~Y~~	~~Y~~	~~R~~	~~Y~~
21	R	G	R	Y
22	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

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	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	Y	-	3	-	-
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X6	300	5	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	-	2	Y	Y	-	-	-	-	-
6A/S01	6X6	300	5	-	6	Y	Y	-	-	-	Y	-
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	-	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	6	8
Min Green 1 *	7	12	12	7
Extension 1 *	1.0	6.0	6.0	1.0
Max Green 1 *	15	120	120	20
Yellow Clearance	3.0	4.7	4.7	3.0
Red Clearance	1.9	1.3	1.3	2.3
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.0	2.0	-
Max Variable Initial *	-	34	34	-
Time Before Reduction *	-	20	20	-
Time To Reduce *	-	60	60	-
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.

3 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head numbered 62.
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. 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	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ

Signal Upgrade

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

NC 86
at
SR 1730 (Whitfield Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JPG
PREPARED BY: JWN/CJC | REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

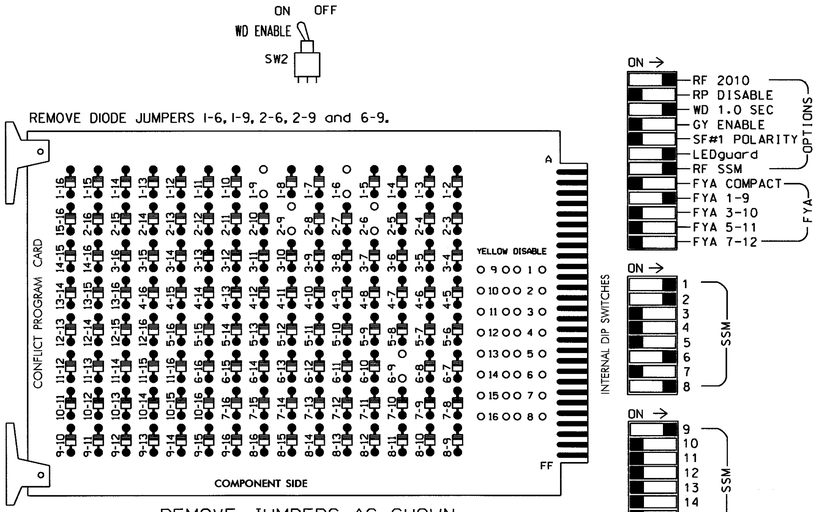
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904 JASON W. GALLOWAY
SIGNATURE 8/29/13 DATE

SIG. INVENTORY NO. 07-1234

29-AUG-2013 10:29
I:\Signals\ITS Signals\Signal Design Section\Central Region\Div 7\07-1234\07234_sig_dsn_20130829.dgn
jgalloway

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4,5,7, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
8. The cabinet and controller are part of the Chapel Hill-Carboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8		S8P	S9	S10	S11	S12	S13	S14
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	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU	11	NU	NU	NU	NU	NU
RED	✱		128						134				107							
YELLOW			129						135				108							
GREEN			130						136				109							
RED ARROW															A121					
YELLOW ARROW		126										108			A122					
FLASHING YELLOW ARROW															A123					
GREEN ARROW	127	127										109								

NU = Not Used

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

★ See pictorial of head wiring in detail below.

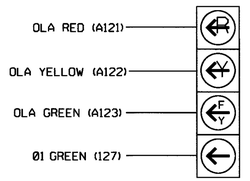
EQUIPMENT INFORMATION

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,S6,S8,S9.
PHASES USED.....1,2,6,8.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

*In NOTES section refer to note 7.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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 NOT USED	Ø1 1B NOT USED	Ø2 2A Ø2 2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6/SYS 6A/S01 NOT USED	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A NOT USED	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

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

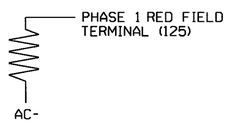
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
6A/S01	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3

[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: 07-1234
DESIGNED: July 2013
SEALED: 8-29-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 86
at
SR 1730 (Whitfield Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

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

750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe 9-4-13
SIGNATURE DATE
SIG. INVENTORY NO. 07-1234

04-SEP-2013 09:34
S:\ATS&SUM\ITS Signals\workgroups\Sig Mgmt\Peterson\07123_sample_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.69

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1234
DESIGNED: July 2013
SEALED: 8-29-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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 86
at
SR 1730 (Whitfield Road)

Division 7 Orange County Chapel Hill

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

REVISIONS	INIT.	DATE

SEAL

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

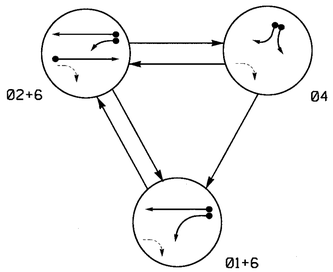
John T. Rowe Jr 9-4-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1234

29-AUG-2013 14:04
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Peterson*071234_sm_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig 70

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
11	←	~~F~~	~~R~~	~~Y~~
21,22	R	G	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

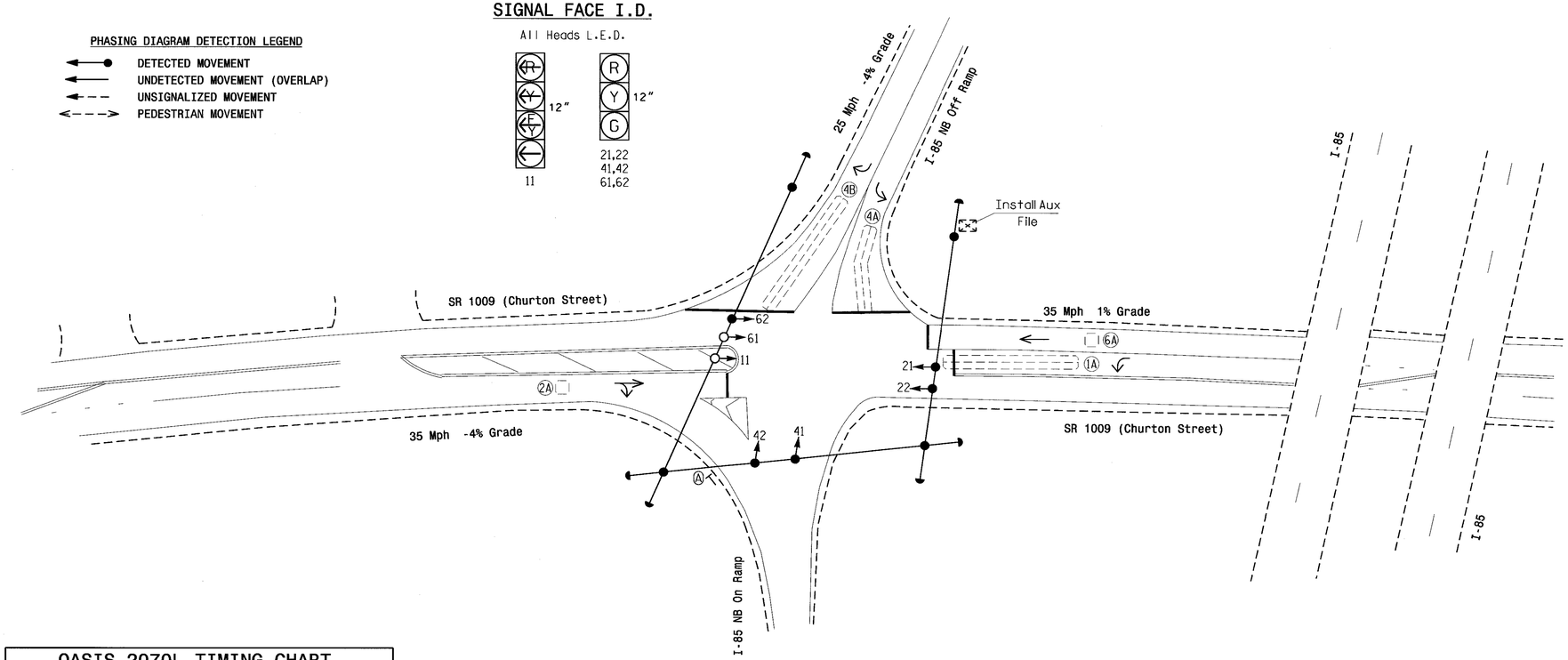
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	+5	2-4-2	-	1	Y	Y	-	-	15	- / -
					6	Y	Y	-	-	-	- / -
2A	6X6	70	4	-	2	Y	Y	-	-	-	- / -
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	- / -
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	15	- / -
6A	6X6	70	3	-	6	Y	Y	-	-	-	- / -

3 Phase
Fully Actuated
US 70 Business / NC 57-86
(Churton Street) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head numbered 62.
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. 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. Closed loop system data: Controller Asset # 1260.



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)	Ⓐ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	1.0	3.0	1.0	3.0
Max Green 1 *	20	90	30	90
Yellow Clearance	3.0	4.1	3.0	4.1
Red Clearance	2.1	1.6	1.8	1.6
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	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 1009 (Churton Street)
at
I-85 Northbound Ramps
Division 7 Orange County Hillsborough

PLAN DATE: June 2013 REVIEWED BY:
PREPARED BY: Jeff Spence REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA K. ALEXANDER
SIGNATURE 6/20/13 DATE

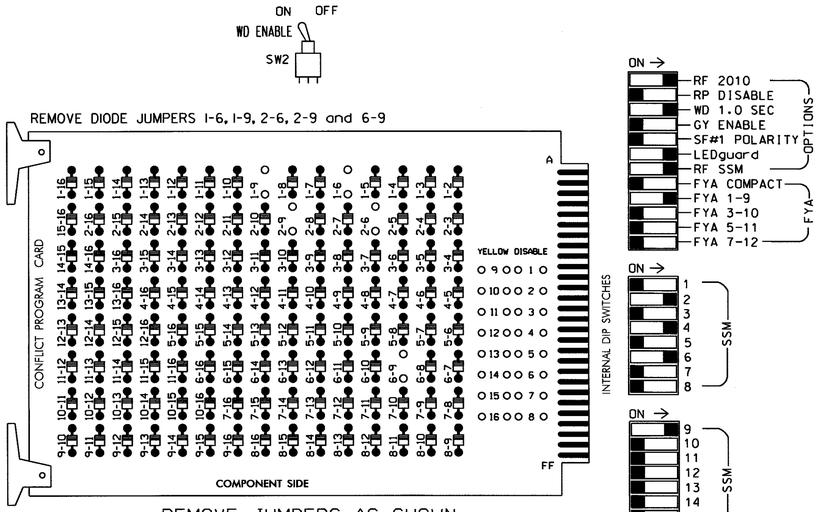
SIG. INVENTORY NO. 07-1260

20-JUN-2013 08:16
S:\TSS\Sig\TSS\Signals\Signal Design Section\Central Region\Div 7\07-1260\07l260_sig_dsn_2013mod.dgn
jrspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.71

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5 7,8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the US 70 Business/ NC 57-86 (Churton Street) Closed Loop 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,S6,S9
PHASES USED.....1,2,4,6
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NU	61,62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	✱	129			102			135										
GREEN		130			103			136										
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	

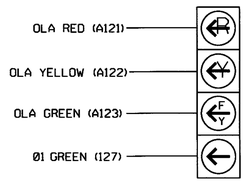
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



11

NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

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	NOT USED				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	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												

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'	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			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

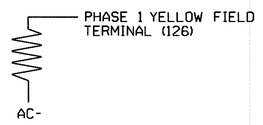
'Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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: 07-1260
DESIGNED: June 2013
SEALED: 6/20/13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1009 (Churton Street)
at
I-85 Northbound Ramps

Division 7 | Orange County | Hillsborough

PLAN DATE: June 2013 | REVIEWED BY: T. Upp

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety
Division
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 6/21/13 DATE

SIG. INVENTORY NO. 07-1260

21-JUN-2013 07:32
S:\TSG\IMS\ITS Signals\Workgroups\Sig Mgmt\Strickland\07i260_sht_ele_xxx.dgn
dgnref ew_1000

PROJECT REFERENCE NO.	SHEET NO.
	Sig.72

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          |1234567891011121314151 6
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1260
DESIGNED: June 2013
SEALED: 6/20/13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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 1009 (Churton Street)
at
I-85 Northbound Ramps

Division 7 | Orange County | Hillsborough

PLAN DATE: June 2013 | REVIEWED BY: T. Vgn

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 6/21/13

SIG. INVENTORY NO. 07-1260

21-JUN-2013 07:31
S:\TSSG\Mike\TS Signals\Workgroups\Sig Mgmt\07I260_sht_ole_xxx.dgn
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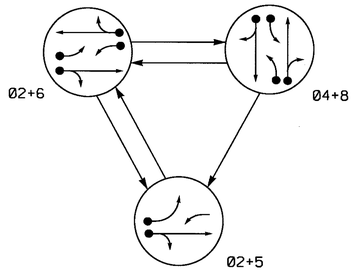
PROJECT REFERENCE NO.	SHEET NO.
———	Sig.7 3

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

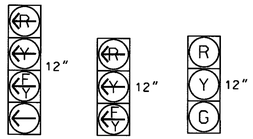
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4+8	FLASH
21,22	G	G	R	Y
41,42	R	R	G	R
51	←	~~F Y~~	~~R~~	~~Y~~
61	~~F Y~~	~~F Y~~	~~R~~	~~Y~~
62,63	R	G	R	Y
81,82	R	R	G	R

SIGNAL FACE I.D.

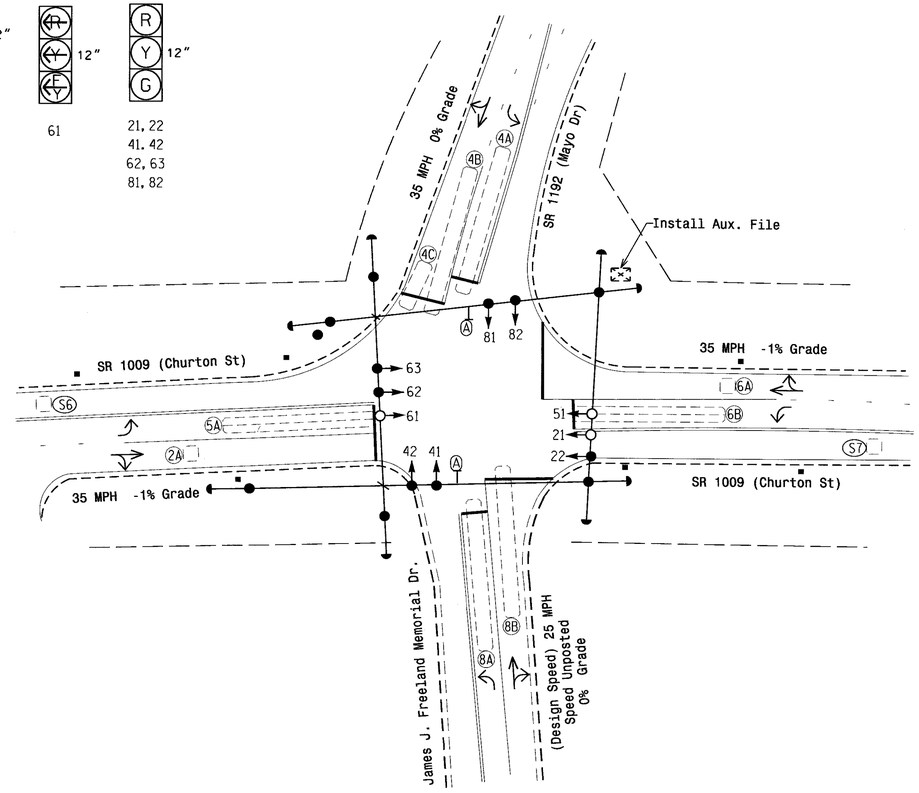
All Heads L.E.D.



51 — 61 — 21, 22 / 41, 42 / 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	6X6	70	4	-	2	Y	Y	-	-	-	-	-
4A	6X60	+5	EXISTING	-	4	Y	Y	-	-	3	-	-
4B	6X60	+5	EXISTING	-	4	Y	Y	-	-	10	-	-
4C	6X20	+5	EXISTING	-	4	Y	Y	-	-	15	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A	6X6	70	4	-	6	Y	Y	-	-	-	-	-
6B	6X60	0	2-4-2	-	6	Y	Y	-	-	-	-	-
8A	6X60	+5	EXISTING	-	8	Y	Y	-	-	3	-	-
8B	6X60	+5	EXISTING	-	8	Y	Y	-	-	10	-	-
S6	6X6	+200	4	-	-	-	-	-	-	-	Y	-
S7	6X6	+200	4	-	-	-	-	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	1.0	1.0	3.0	1.0
Max Green 1 *	90	40	20	90	40
Yellow Clearance	3.9	3.8	3.0	3.9	3.8
Red Clearance	1.4	1.8	1.6	1.4	1.8
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

* 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 Phase
Fully Actuated
US 70 Business/
NC 57-86 (Churton St) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable existing backup protection.
4. Phase 5 may be lagged.
5. Reposition existing signal heads numbered 22.62 and 63.
6. Set all detector units to presence mode.
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. Closed loop system data: Controller Asset #1298.

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)	Ⓐ

Signal Upgrade

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

SR 1009 (Churton St)
at
SR 1192 (Mayo St)/
James J. Freeland Memorial Dr

Division 7 Orange County Hillsborough

PLAN DATE:	June 2013	REVIEWED BY:	JPG
PREPARED BY:	EM Minshew	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASON P. GALLOWAY

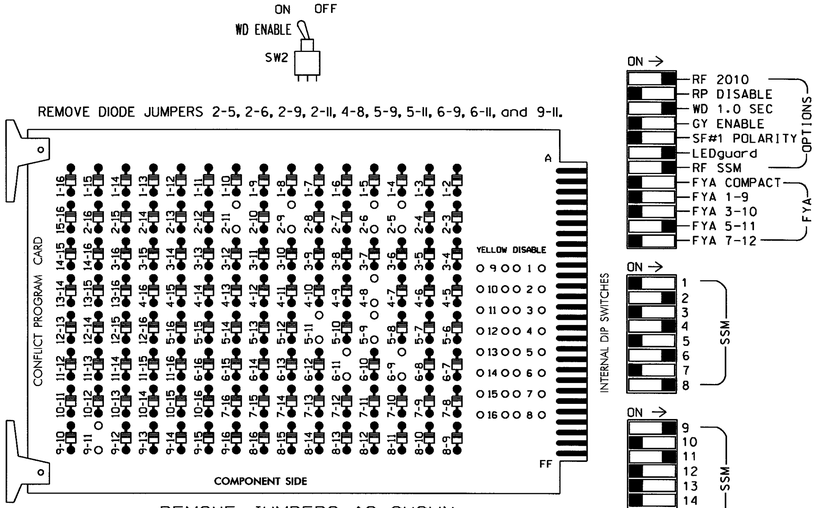
SIGNATURE 7/22/13 DATE

SIG. INVENTORY NO. 07-1298

22-JUL-2013 08:12
C:\USERS\emminshew\Signals\Signal Design Section\Central Region\Div 7\07-1298\07-1298_sig_dsn_2013mod.dgn
emminshew

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
8. The cabinet and controller are part of the NC-57-86 (Churton St) Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	51★	62,63	NU	NU	81,82	NU	61★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW		129			102		✱	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW							133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

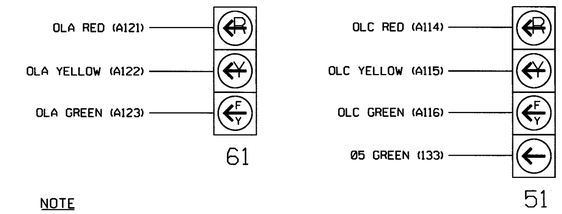
EQUIPMENT INFORMATION

CONTROLLER.....2070L
✱ CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S8,S9,S12
PHASES USED.....2,4,5,6,8
OVERLAP "A".....2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

✱ In NOTES section refer to note 7.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

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	Ø4 4C	SLOT EMPTY	SYS. DET. S6	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				Ø4 4B	NOT USED		SYS. DET. S7					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	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
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
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
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			
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
✱ S6	TB6-9,10	I9U	60	22	11	SYS					
✱ S7	TB6-11,12	I9L	62	24	13	SYS					

[1] Add jumper from J1-W to 14-W, on rear of input file.

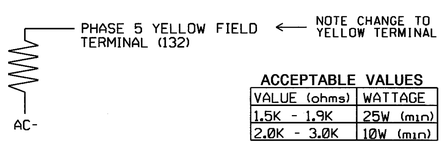
IMPORTANT! Remove any jumpers previously installed on terminal blocks or on the rear of the input file associated with loop 5A before installing the jumper shown in footnote #1 above.

✱ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)

IMPORTANT: Move Load Resistors from Red Field Terminal to Yellow Field Terminal for Phase 5.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1298
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy.,Garner,NC 27529

SR 1009 (Churton St)
at
SR 1192 (Mayo St)/
James J. Freeland Memorial Dr

Division 7 | Orange County | Hillsborough

PLAN DATE: July 2013 | 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 7-23-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1298

23-JUL-2013 07:03
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.75

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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 Function 1.

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:¦12345678910111213141516
IF PHASES ARE ON¦     X
OMIT PHASES     ¦    X
CALL PHASES     ¦   X
```

BACKUP PROTECTION PROGRAMMING COMPLETE

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:          ¦12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          ¦12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1298
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

SR 1009 (Churton St)
at
SR 1192 (Mayo St)/
James J. Freeland Memorial Dr

Division 7 | Orange County | Hillsborough

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

REVISIONS	INIT.	DATE

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

SIGNATURE 7-23-13 DATE

SIG. INVENTORY NO. 07-1298

23-JUL-2013 07:03
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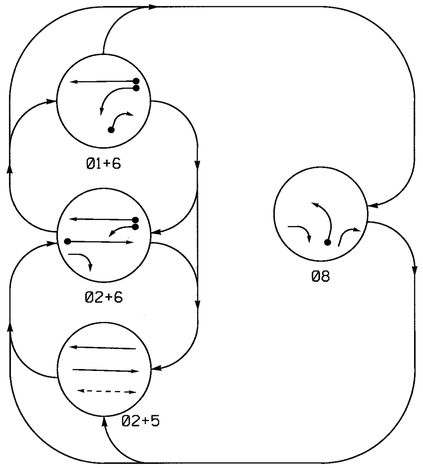
Armstrong

PROJECT REFERENCE NO.	SHEET NO.
———	Sig.76

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

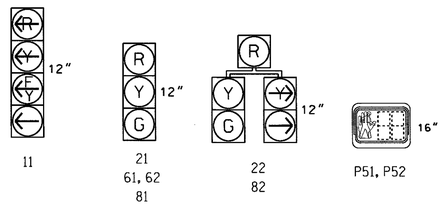
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 01+6	PHASE 08	FLASH
11	~~R~~	~~Y~~	←	~~R~~	~~Y~~
21	G	G	R	R	Y
22	G	G	R	R/←	Y
61, 62	G	G	G	R	Y
81	R	R	R	G	R
82	R	R	R/←	G	R
P51, P52	W	DW	DW	DW	DRK
Sign "B"	ON	OFF	OFF	OFF	DRK

SIGNAL FACE I.D.

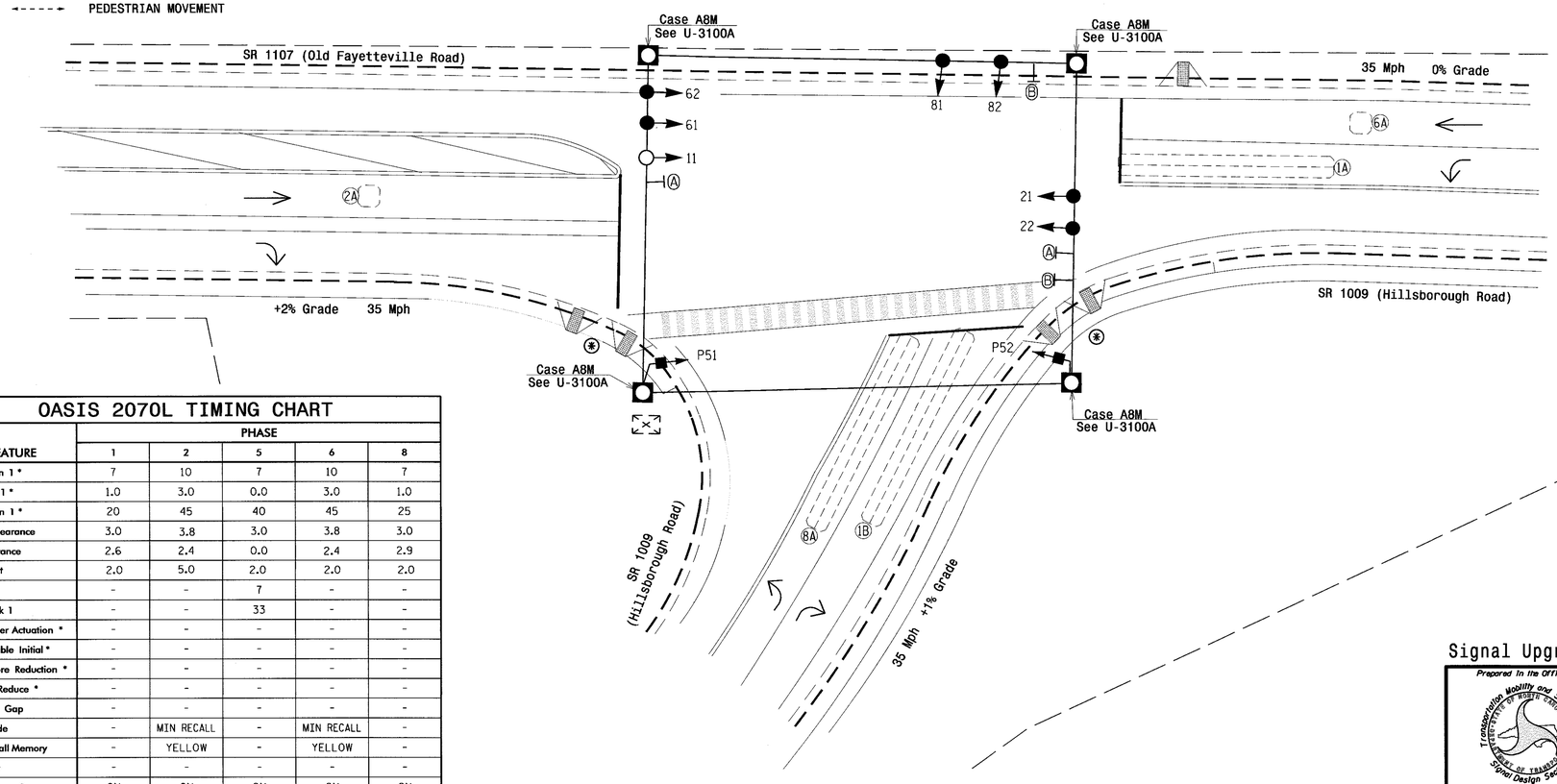
All Heads L.E.D.



11 — 21, 61, 62, 81 — 22, 82 — P51, P52

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	-	-
					6	Y	Y	-	-	-	-	-
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X6	65	3	-	2	Y	Y	-	-	-	-	-
6A	6X6	65	4	-	6	Y	Y	-	-	-	-	-
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	-	-



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 *	1.0	3.0	0.0	3.0	1.0
Max Green 1 *	20	45	40	45	25
Yellow Clearance	3.0	3.8	3.0	3.8	3.0
Red Clearance	2.6	2.4	0.0	2.4	2.9
Red Revert	2.0	5.0	2.0	2.0	2.0
Walk 1 *	-	-	7	-	-
Don't Walk 1	-	-	33	-	-
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	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.

4 Phase Fully Actuated Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
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. 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. Illuminate signs "B" during the "WALK and "FLASHING DON'T WALK" intervals of phase 5.
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	●
▣	Metal Strain Pole	■
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
- - - -	2-in Underground Conduit	- · - · -
N/A	Right of Way	— — —
→	Directional Arrow	→
N/A	Wheel Chair Ramp	
⊛	Pushbutton Pedestal	⊛
(A)	"TURNING TRAFFIC MUST YIELD TO PEDESTRIANS" Sign (R10-15)	(A)
(B)	LED BLANKOUT SIGN (NO RIGHT TURN)	(B)

Signal Upgrade

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

SR 1009 (Hillsborough Road)/ SR 1107 (Old Fayetteville Road) at SR 1009 (Hillsborough Road)

Division 7 Orange County Chapel Hill

PLAN DATE:	July 2013	REVIEWED BY:	JPG
PREPARED BY:	EM Winshew	REVIEWED BY:	

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL — NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON R. GALLOWAY

SIGNATURE 8/21/13 DATE

SIG. INVENTORY NO. 07-1427

21-AUG-2013 13:40
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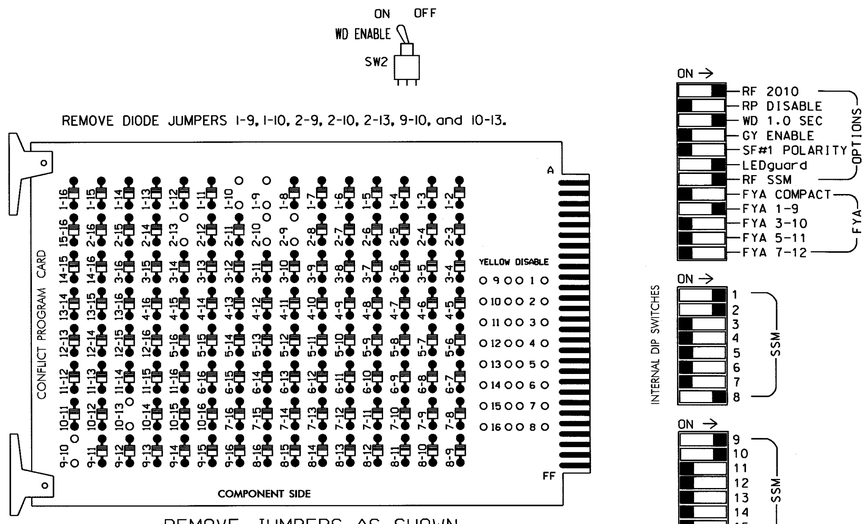
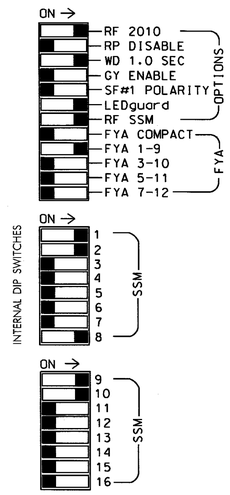
emwinshew

PROJECT REFERENCE NO.	SHEET NO.
	Sig.77

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. Verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4, 5,6,7,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start-Up in Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phase 5 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash, and Overlaps 1 and 2 as Wag overlaps.
7. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD,6-AUX)
LOAD SWITCHES USED.....S1,S2,S2P,S8,S9,S10
PHASES USED.....1,2,*5,5PED,6,8
OVERLAP'A'.....1+6
OVERLAP'B'.....1+2+5+6
OVERLAP'C'.....NOT USED
OVERLAP'D'.....NOT USED

*USED FOR TIMING ONLY OF PHASE 5 PED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8		S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	5 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	P51, P52	NU	NU	NU	NC	NU	NU	NU	22	81,82	NU	11★	61,62	NU	NU	NU	NU
RED		*	128										107			A124				
YELLOW			129										108			A125				
GREEN			130										109			A126				
RED ARROW															A121					
YELLOW ARROW		126										108			A122					
FLASHING YELLOW ARROW															A123					
GREEN ARROW	127	127										109								
✋				113																
🚶				115																

NU = Not Used

NC = No Connection. However, phase is used for timing purposes. Insert red flash program block & tie red monitor input to load switch AC+.

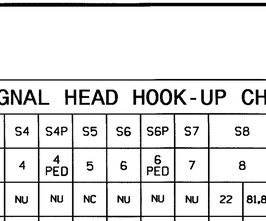
* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

NOTE: see sheet 3 for reassignment of PED 2 to PED 5.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

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

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	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø5 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED									NOT USED		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	WAGER 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								

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			
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			3
PED PUSH BUTTONS											
P51,P52	TB8-4,6	I12U	67	29	PED 2	5 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

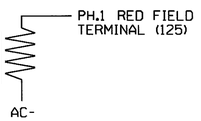
[1]Add jumper from I1-W to J4-W, on rear of input file.

! IMPORTANT! Remove jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

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 this channel, which does not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1427
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1009 (Hillsborough Road)/
SR 1107 (Old Fayetteville Road)
at
SR 1009 (Hillsborough Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NC DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

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

SIGNATURE 8-26-13 DATE

SIG. INVENTORY NO. 07-1427

22-AUG-2013 07:12
S:*TISS\Sig*\ITS Signals\work\groups\Sig Mgn\Armstrong\07-1427_sm.ele.xxx.dgn
armstrong

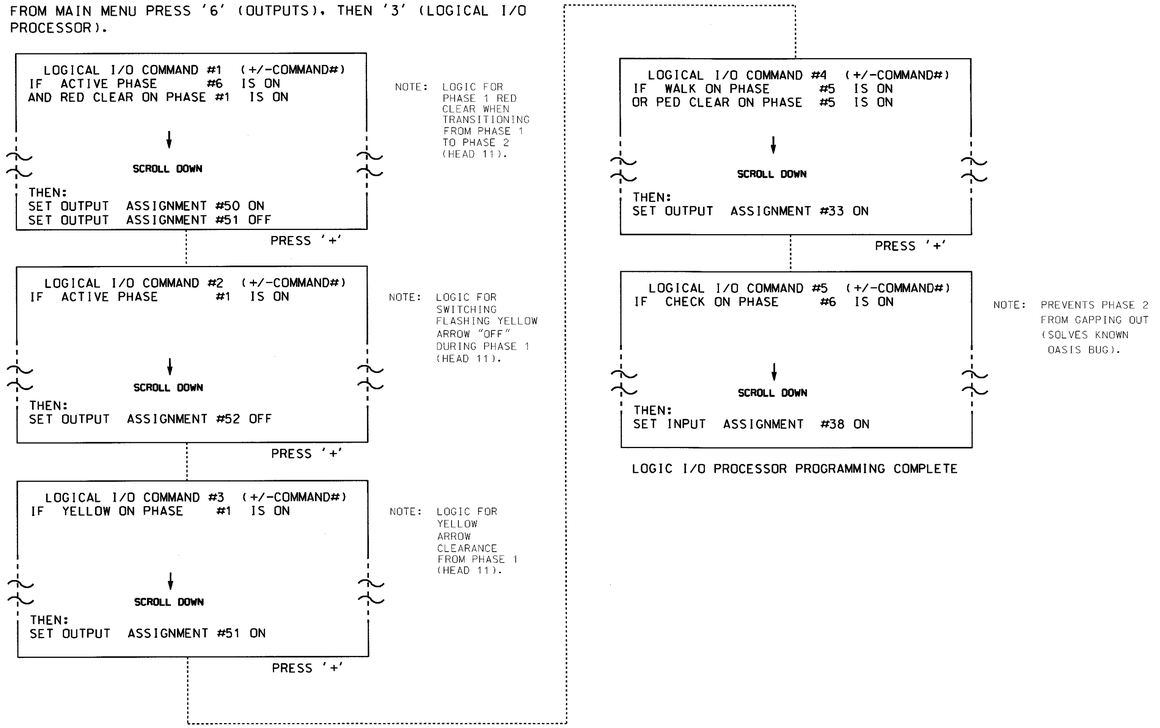
PROJECT REFERENCE NO.	SHEET NO.
	Sig.78

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SEQUENCE, AND TO CONTROL BLANKOUT SIGN

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, AND 5.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE

INPUT 38 = Phase 2 Veh Call
OUTPUT 33 = Phase 2 PED Yellow
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          |12345678910111213141516
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  X GREEN   <- NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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 '+' ONCE

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:          |12345678910111213141516
VEH OVL PARENTS:|XX   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?...Y
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1427
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1009 (Hillsborough Road)/
SR 1107 (Old Fayetteville Road)
at
SR 1009 (Hillsborough Road)

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NC DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 8-21-13 DATE
SIG. INVENTORY NO. 07-1427

22-AUG-2013 07:12
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.79

OUTPUT ASSIGNMENT PROGRAMMING TO REASSIGN PED PHASE 2 TO PED PHASE 5

(program controller as shown below)

①

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS). PRESS '+' UNTIL OUTPUT # 9 (PIN 10) IS REACHED.
OUTPUT # 9 = PHASE 2 DW

```
PAGE:1  C1 PIN:10  PEDESTRIAN PHASE
OUTPUT ASSIGNMENT #.................9
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................Y
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

②

IT IS NECESSARY TO SCROLL DOWN AND ENTER A 'Y' FOR 'PEDESTRIAN PHASE' (EVEN THOUGH THIS IS THE DEFAULT SETTING). UPON ENTERING 'Y', THE SCREEN SHOWN BELOW WILL APPEAR:

```
PAGE:1  C1 PIN:10  PEDESTRIAN PHASE
SELECT PEDESTRIAN PHASE (1-16).....5
SELECT COLOR(0=DWALK,1=YEL,2=WALK)..0
```

CHANGE DATA TO THAT SHOWN ABOVE. PRESS 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

③

PRESS '+' ONCE TO ADVANCE TO OUTPUT #10.
OUTPUT #10 = PHASE 2 W

```
PAGE:1  C1 PIN:11  PEDESTRIAN PHASE
OUTPUT ASSIGNMENT #................10
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................Y
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

④

IT IS NECESSARY TO SCROLL DOWN AND ENTER A 'Y' FOR 'PEDESTRIAN PHASE' (EVEN THOUGH THIS IS THE DEFAULT SETTING). UPON ENTERING 'Y', THE SCREEN SHOWN BELOW WILL APPEAR:

```
PAGE:1  C1 PIN:11  PEDESTRIAN PHASE
SELECT PEDESTRIAN PHASE (1-16).....5
SELECT COLOR(0=DWALK,1=YEL,2=WALK)..2
```

CHANGE DATA TO THAT SHOWN ABOVE. PRESS 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

PED PHASE 2 OUTPUT HAS NOW BEEN ASSIGNED TO PHASE 5

PROGRAMMING COMPLETE

TAKE EXTREME CARE THAT NO CHANGES ARE MADE TO 'C1 PIN:' FIELDS

PEDESTRIAN DETECTOR ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS). PRESS '+' UNTIL PED DETECTOR # 2 IS REACHED.

```
PED DETECTOR #2  SETTINGS   (+/- DET)
PHASE#           |12345678910111213141516
PHASES ASSIGNED  |     X
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
RECALL IF FAILED....................N
MAX CALLS/MINUTE (0-255).............255
MAX CALLS/DIAG PERIOD (0-255).......0
MAX OCCUPANCY % (0-100%)............100
```

PROGRAMMING COMPLETE

SPECIAL PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL MENU PRESS '4' (PHASE SEQUENCE)

PHASE SEQUENCE: PAGE 1 NEXT: PAGES) ↘

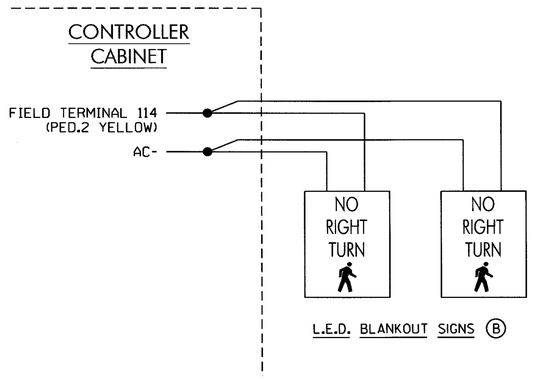
RING	LEAD	BARRIER 1		X-LAG	LEAD	BARRIER 2		X-LAG
1	0	2	0	1	0	0	0	0
2	5	6	0	0	0	8	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0

PROGRAMMING COMPLETE

! THIS PROGRAMMING IS NECESSARY FOR THE PROPER OPERATION OF THIS SIGNAL !

BLANKOUT SIGN WIRING DETAIL

(WIRE AS SHOWN)



L.E.D. BLANKOUT SIGNS (B)

BLANKOUT SIGN NOTE

IF TERMINAL 114 HAS A CONFLICT MONITOR WIRE CONNECTED, REMOVE, TAPE AND LABEL WIRE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1427
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1009 (Hillsborough Road)/
SR 1107 (Old Fayetteville Road)
at
SR 1009 (Hillsborough Road)

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NCDEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 8-21-13 DATE

SIG. INVENTORY NO. 07-1427

22-AUG-2013 07:13
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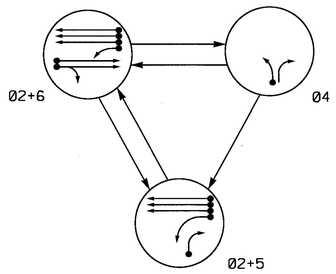
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig-8C

PHASING DIAGRAM



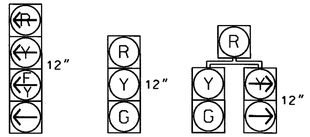
PHASING DIAGRAM DETECTION LEGEND

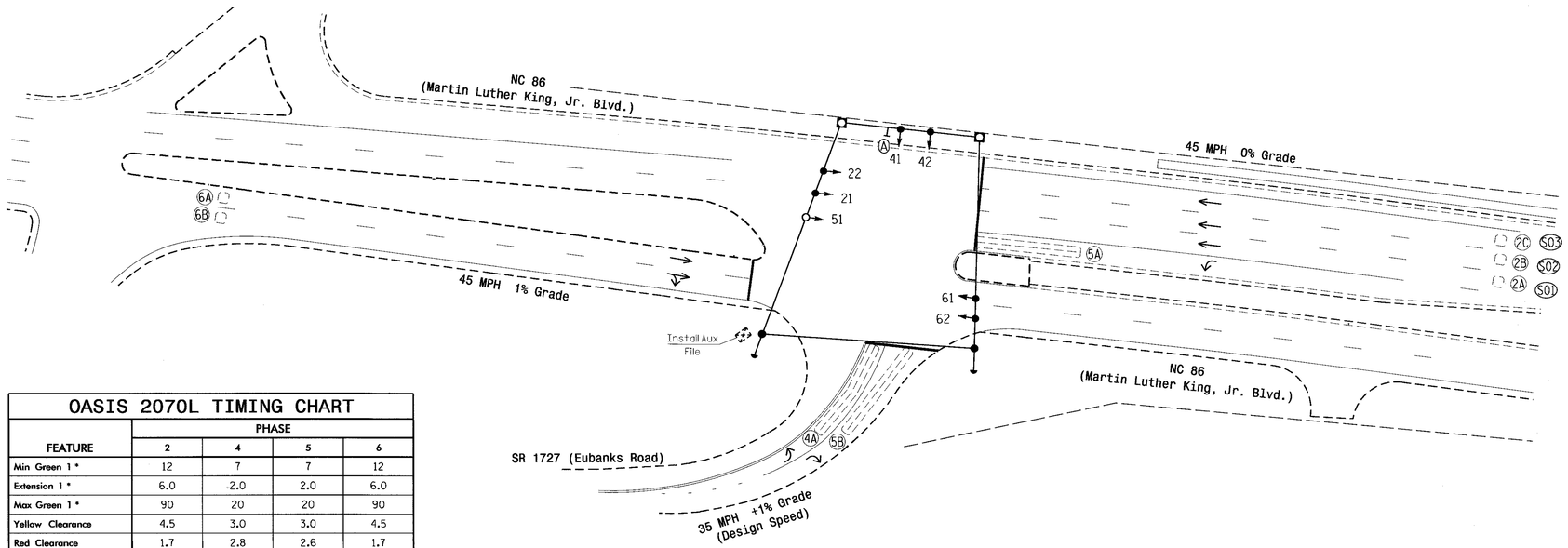
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION				
SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	←	~~F Y~~	~~R~~	~~Y~~
61, 62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 2070L LOOP & DETECTOR INSTALLATION												
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/S01	6X6	300	5	-	2	Y	Y	-	-	-	Y	-
2B/S02	6X6	300	5	-	2	Y	Y	-	-	-	Y	-
2C/S03	6X6	300	5	-	2	Y	Y	-	-	-	Y	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	Y	-	3	-	-
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	300	4	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	4	-	6	Y	Y	-	-	-	-	-

3 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
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 the Signal Design Section.
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)	Left Arrow "ONLY" Sign (R3-5L)	(A)
	Metal Strain Pole	

OASIS 2070L TIMING CHART				
	PHASE			
FEATURE	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	90	20	20	90
Yellow Clearance	4.5	3.0	3.0	4.5
Red Clearance	1.7	2.8	2.6	1.7
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 *	45	-	-	45
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.

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 86
(Martin Luther King, Jr. Blvd)
at
SR 1727 (Eubanks Road)

Division 07 Orange County Chapel Hill

PLAN DATE: July 2013 REVIEWED BY: JPG
PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

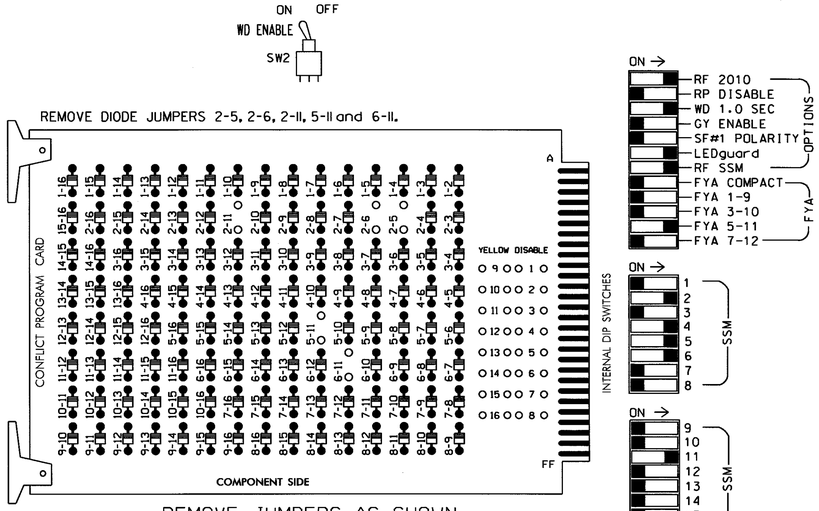
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904 JASON D. CALLOWAY
SIGNATURE 8/21/13 DATE
SIG. INVENTORY NO. 07-1452

20-AUG-2013 14:04
S:\#ITS&Sig\ITS Signals\Signal Design Section\Control Regional\Div 7\07-1452A\071452_sig_dsn_2013mod.dgn
Response

PROJECT REFERENCE NO.	SHEET NO.
	Sig.8I

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7, 8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
7. Program phases 2 and 6 for Yellow Flash.
8. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	51	NU	NU
RED		128			101			✱	134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

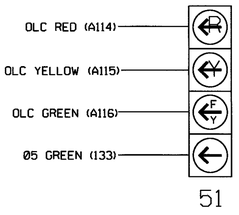
EQUIPMENT INFORMATION

CONTROLLER.....2070L
*CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12.
PHASES USED.....2,4,5,6.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

*In NOTES section refer to note 6.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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/S01	Ø2/SYS 2C/S03	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/SYS 2B/S02	NOT USED			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	NOT USED	Ø6 6B											

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/S01	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S02	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
2C/S03	TB2-9,10	I3U	63	25	32	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
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			

[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

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: 07-1452
DESIGNED: July 2013
SEALED: 8-21-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 86 (Martin Luther King, Jr. Blvd) at SR 1727 (Eubanks Road)	SEAL
Prepared in the Offices of, Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	Division 7 — Orange County — Chapel Hill PLAN DATE: August 2013 — REVIEWED BY: JTR PREPARED BY: James Peterson — REVIEWED BY:	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy.Garner.NC 27529	REVISIONS — INIT. — DATE	John T. Rowe 8-26-13 SIGNATURE DATE
		SIG. INVENTORY NO. 07-1452

21-AUG-2013 11:41
S:\#TSASIGNTS Signals\workgroups\Sig Mgmt\Peterson\07-1452_sm.ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.82

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE  #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:                 |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1452
DESIGNED: July 2013
SEALED: 8-21-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

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 86
(Martin Luther King , Jr. Blvd)
at
SR 1727 (Eubanks Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

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

John T. Rowe 8-26-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1452

21-AUG-2013 11:41
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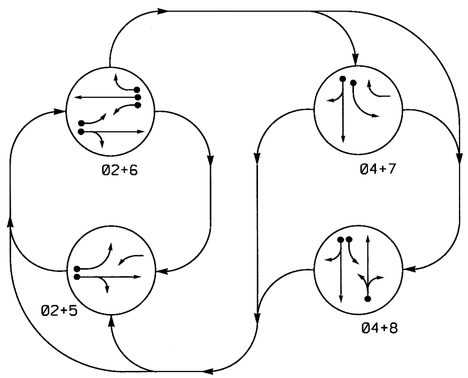
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
n/a	Sig 8B

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

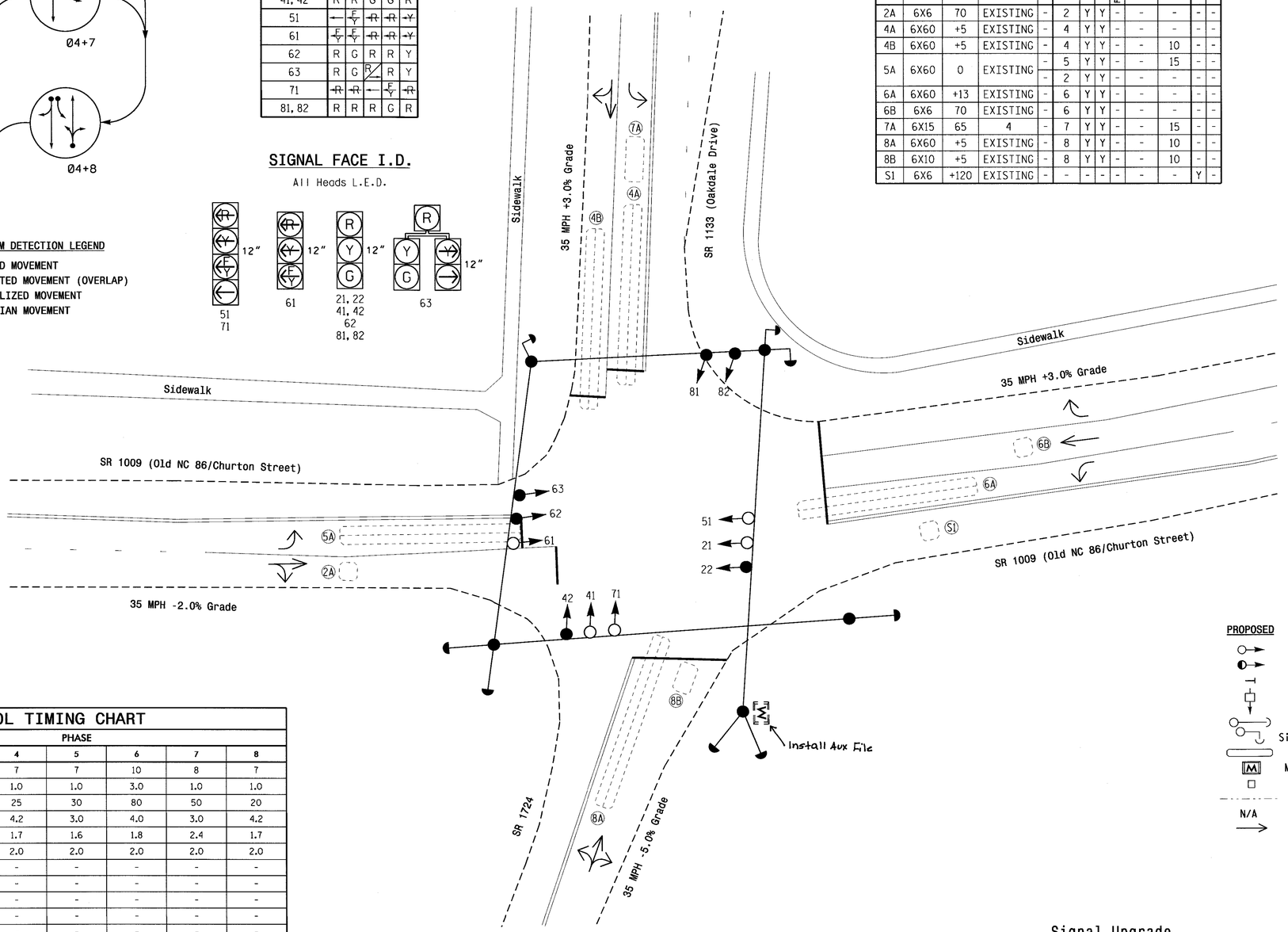
SIGNAL FACE	PHASE 02+5	02+6	04+7	04+8	FLASH
21, 22	G	G	R	R	Y
41, 42	R	R	G	G	R
51	←	F Y	~~R~~	~~R~~	~~Y~~
61	F Y	F Y	~~R~~	~~R~~	~~Y~~
62	R	G	R	R	Y
63	R	G	R	R	Y
71	~~R~~	~~R~~	←	F Y	~~R~~
81, 82	R	R	R	G	R

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
2A	6X6	70	EXISTING	-	2	Y	Y	-	-	-	- / -
4A	6X60	+5	EXISTING	-	4	Y	Y	-	-	-	- / -
4B	6X60	+5	EXISTING	-	4	Y	Y	-	-	10	- / -
5A	6X60	0	EXISTING	-	5	Y	Y	-	-	15	- / -
				-	2	Y	Y	-	-	-	- / -
6A	6X60	+13	EXISTING	-	6	Y	Y	-	-	-	- / -
6B	6X6	70	EXISTING	-	6	Y	Y	-	-	-	- / -
7A	6X15	65	4	-	7	Y	Y	-	-	15	- / -
8A	6X60	+5	EXISTING	-	8	Y	Y	-	-	10	- / -
8B	6X10	+5	EXISTING	-	8	Y	Y	-	-	10	- / -
S1	6X6	+120	EXISTING	-	-	-	-	-	-	-	Y / -



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	4	5	6	7	8
Min Green 1 *	10	7	7	10	8	7
Extension 1 *	3.0	1.0	1.0	3.0	1.0	1.0
Max Green 1 *	80	25	30	80	50	20
Yellow Clearance	4.0	4.2	3.0	4.0	3.0	4.2
Red Clearance	1.8	1.7	1.6	1.8	2.4	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 *	-	-	-	-	-	-
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.

4 Phase
Fully Actuated
US 70 Business/NC 57-86 (Churton St) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 7 during phase 8 on.
4. Disable Backup Protection for phase 6.
5. Phase 5 may be lagged.
6. Reposition existing signal heads numbered 22, 42, and 62.
7. Set all detector units to presence mode.
8. 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.
9. Pavement markings are existing unless otherwise noted.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Closed loop system data: Master Asset #10701, Controller Asset #1529.

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	▭
M	Master Controller & Cabinet	M
□	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
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy.,Garner,NC 27529

SR 1009 (Old NC 86/Churton St)
At
SR 1133 (Oakdale Dr)/SR 1724

Division 7 Orange County Hillsborough

PLAN DATE:	June 2013	REVIEWED BY:	CJC
PREPARED BY:	JMN	REVIEWED BY:	JPG

SCALE 0 20 1" = 20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON M GALLOWAY
SIGNATURE 7/22/13 DATE

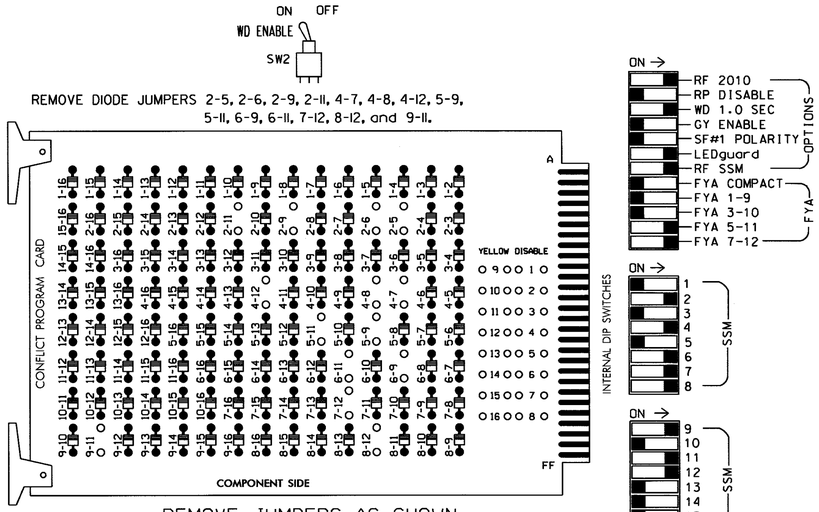
SIG. INVENTORY NO. 07-1529

19-JUL-2013 16:04
S:\TS&S\Traffic Signals\Signal Design Section\Central Region\div 7\07-1529\07529_sig_dsn_2013xxxx.dgn
cjcollins

PROJECT REFERENCE NO.	SHEET NO.
	Sig.84

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

! IMPORTANT! 2010ECL-NC conflict monitor required for FYA operation.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 5,10,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlaps 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
8. The cabinet and controller are part of the US 70 Bus./ NC 57-86 (Churton St) Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7		S8	S8P	S9	S10	S11	S12	S13	S14
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	51★	62,63	NU	63	71★	81,82	NU	61★	NU	NU	51★	71★	NU
RED		128			101			134		✱		107							
YELLOW		129			102		✱	135				108							
GREEN		130			103			136				109							
RED ARROW														A121			A114	A101	
YELLOW ARROW										123				A122			A115	A102	
FLASHING YELLOW ARROW														A123			A116	A103	
GREEN ARROW							133			124	124								

NU = Not Used

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

★ See pictorial of head wiring in detail below.

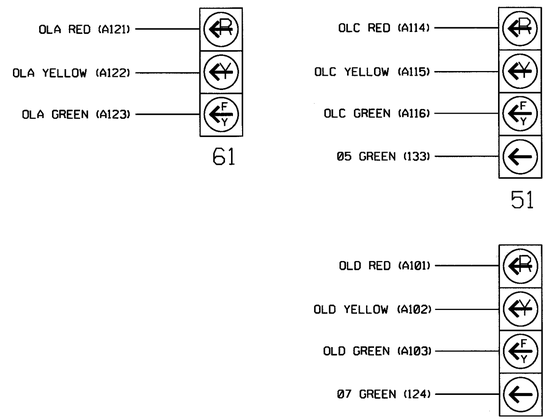
EQUIPMENT INFORMATION

CONTROLLER.....2070L
✱ CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S7,S8,S9,S12,S13
PHASES USED.....2,4,5,6,7,8
OVERLAP "A".....2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....7+8

✱ In NOTES section refer to note 7.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 51, and 71 requires special logic programming. See sheet 2 for programming instructions.

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	WAGE INPUT ⊗	SLOT EMPTY	ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L		NOT USED				ø4 4B								ST DC ISOLATOR
FILE "J" U	ø5 5A	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	ø7 7A	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L	NOT USED	ø6 6B				ø8 8B	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			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	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			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB7-1,2	J7U	66	28	38	7	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
✱ S1	TB7-9,10	J9U	59	21	15	SYS					

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

! IMPORTANT! Remove the following jumpers, if installed: TB3-9 to TB3-11, and TB3-10 to TB3-12.

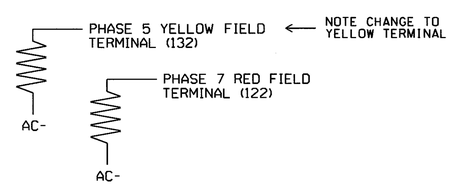
✱ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

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)



! IMPORTANT: Move Load Resistor from Red Field Terminal to Yellow Field Terminal for Phase 5.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1529
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

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 1009 (Old NC 86/Churton St)
at
SR 1133 (Oakdale Dr)/SR 1724

Division 7 | Orange County | Hillsborough

PLAN DATE: July 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 7-23-13 DATE
SIG. INVENTORY NO. 07-1529

23-JUL-2013 07:41
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.85

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON
        ↓
    SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

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:          |1234567891011121314 1516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:  (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          |1234567891011121314 1516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:  (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          |1234567891011121314 1516
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  X 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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

DISABLE CONTROL FUNCTION 1 →

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 X and 2.

2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DELETE PHASE ENTRIES →

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                    OVERLAPS:|ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE       |
OR        PHASES:|1234567891011121314 1516
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:|1234567891011121314 1516
IF PHASES ARE ON:|       X
OMIT PHASES      |     X
CALL PHASES      |
```

BACKUP PROTECTION PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1529
DESIGNED: June 2013
SEALED: 7/22/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1009 (Old NC 86/Churton St)
at
SR 1133 (Oakdale Dr)/SR 1724

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

Division 7 | Orange County | Hillsborough

PLAN DATE: July 2013 | REVIEWED BY: JTR

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

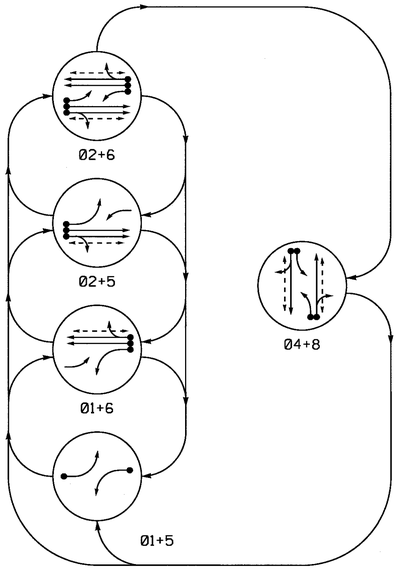
John T. Rowe 7-23-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1529

23-JUL-2013 07:42
S:\TSSU\ITS Signals\Workgroups\Sig Mon\armstrong\071529_sheet01_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.86

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

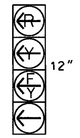
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

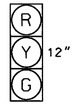
SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	F ↑	F ↑	R	Y
21,22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	F ↑	←	F ↑	R	Y
61,62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

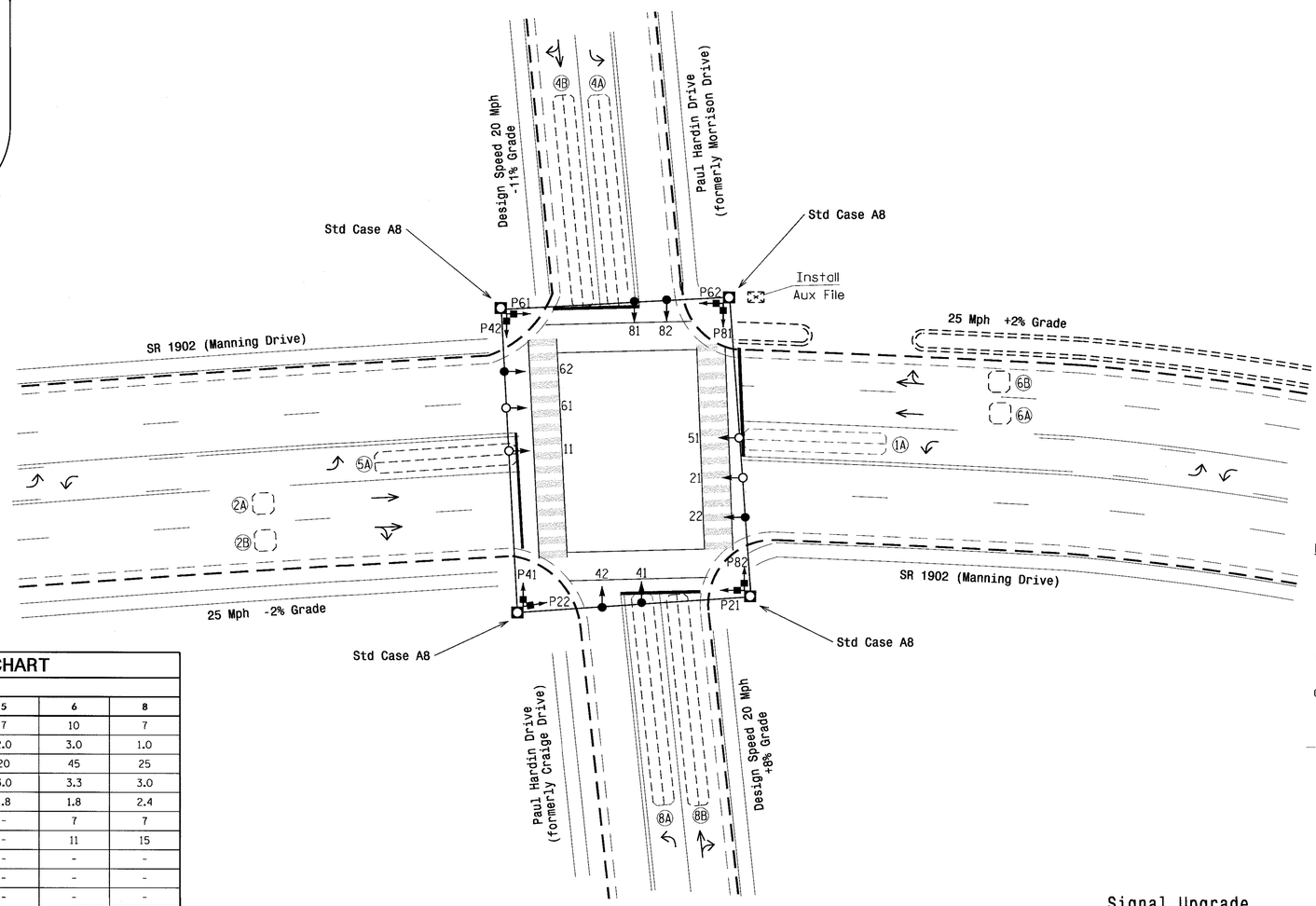


21,22
41,42
61,62
81, 82

P21, P22
P41, P42
P61, P62
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	2-4-2	-	1	Y	Y	-	-	15	-	-
				-	6	Y	Y	-	-	-	-	-
2A, 2B	6X6	70	4	-	2	Y	Y	-	-	-	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
				-	2	Y	Y	-	-	-	-	-
6A, 6B	6X6	70	4	-	6	Y	Y	-	-	-	-	-
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	-	-
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	10	-	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	3.0	1.0	2.0	3.0	1.0
Max Green 1 *	20	45	25	20	45	25
Yellow Clearance	3.0	3.3	3.5	3.0	3.3	3.0
Red Clearance	1.9	1.8	2.4	1.8	1.8	2.4
Walk 1 *	-	7	7	-	7	7
Don't Walk 1	-	11	17	-	11	15
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.

5 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protection for phases 2+6.
4. Reposition existing signal heads numbered 22 and 62.
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. 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 Strain Pole	

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

SR 1902 (Manning Drive) at Paul Hardin Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY:

PREPARED BY: Jeff Spence | REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA M ALEXANDER
SIGNATURE 8/22/13 DATE

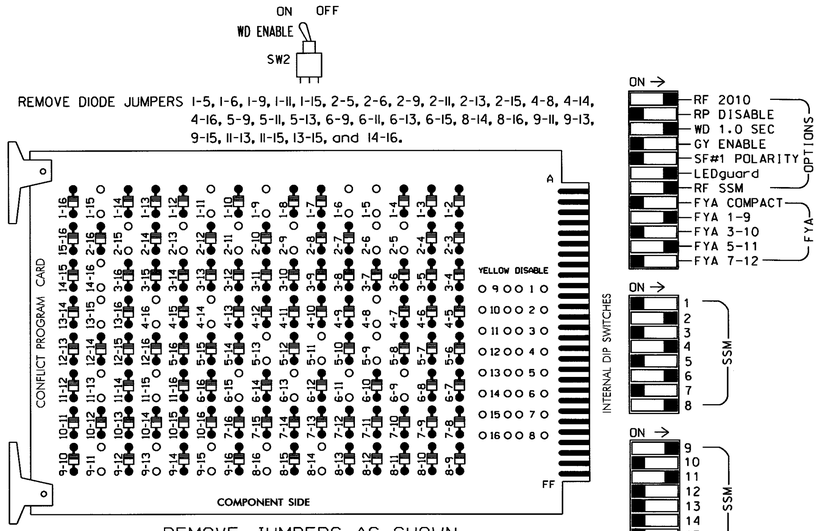
SIG. INVENTORY NO. 07-1534

22-AUG-2013 08:35
S:*ITS&Sig*TS Signals\Signal Design Section\Control Region\Div 7\07-1534\07I534_sig_dsn_2013mod.dgn
USER:jspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.87

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
9. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	✱	129			102		✱	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											
✋			113			104			119			110						
🚶			115			106			121			112						

NU = Not Used

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

★ See pictorial of head wiring in detail below.

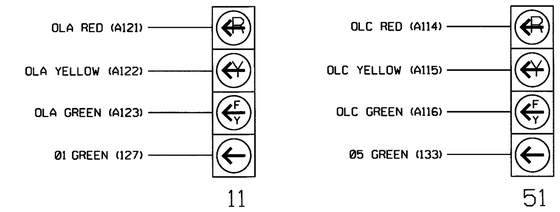
EQUIPMENT INFORMATION

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,S2P,S4,S4P,S5,S6,S6P,S8,S8P,S9,S12
PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

✱ In NOTES section refer to note 8.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

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	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	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	NOT USED				Ø4 4B						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	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	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,2B	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			15
	-	I4U	47	9	22	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			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
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.

[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.

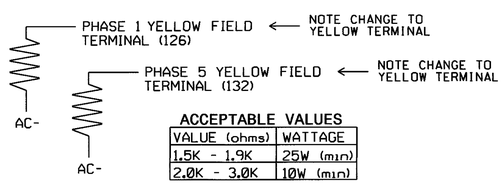
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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.

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)

! IMPORTANT: Move Load Resistors from Red Field Terminal to Yellow Field Terminal for Phases 1 and 5.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1534
DESIGNED: July 2013
SEALED: 8/22/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1902 (Manning Drive)
at
Paul Hardin Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 8-26-13 DATE

SIG. INVENTORY NO. 07-1534

23-AUG-2013 06:27
S:\MTISSIL\e\TS Signals\Work groups\Sig Mgmt\armstrong\071534.sm.dgn
SS#01.cdg

PROJECT REFERENCE NO.	SHEET NO.
	Sig.88

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
          ↓
     SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
          ↓
     SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON
          ↓
     SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
          ↓
     SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
          ↓
     SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
          ↓
     SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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: ¦XX
VEH OVL NOT VEH: ¦
VEH OVL NOT PED: ¦
VEH OVL GRN EXT: ¦
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:   _ RED  _ YELLOW  X GREEN   ← NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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 '+' 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:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:   _ RED  _ YELLOW  X GREEN   ← NOTICE GREEN FLASH
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1534
DESIGNED: July 2013
SEALED: 8/22/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

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 1902 (Manning Drive)
at
Paul Hardin Drive

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

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

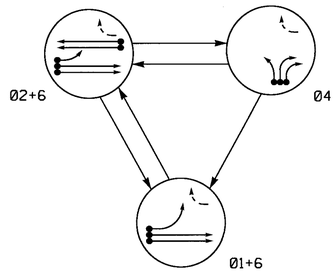
SIGNATURE 8-26-13 DATE

SIG. INVENTORY NO. 07-1534

23-AUG-2013 06:28
S:\Traffic\Shared\TIS Signals\Workgroups\Sig Mgt\armstrong\07-1534_sheet2_xxx.dgn
$$$$USERNAME

PROJECT REFERENCE NO.	SHEET NO.
	Sig 8

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

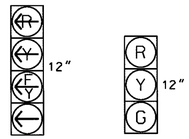
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	PHASE FLASH
11	←	~~G~~ Y	~~R~~	~~Y~~
21, 22	R	G	R	Y
41, 42	R	R	G	R
43, 44	R	R	G	R
61,62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

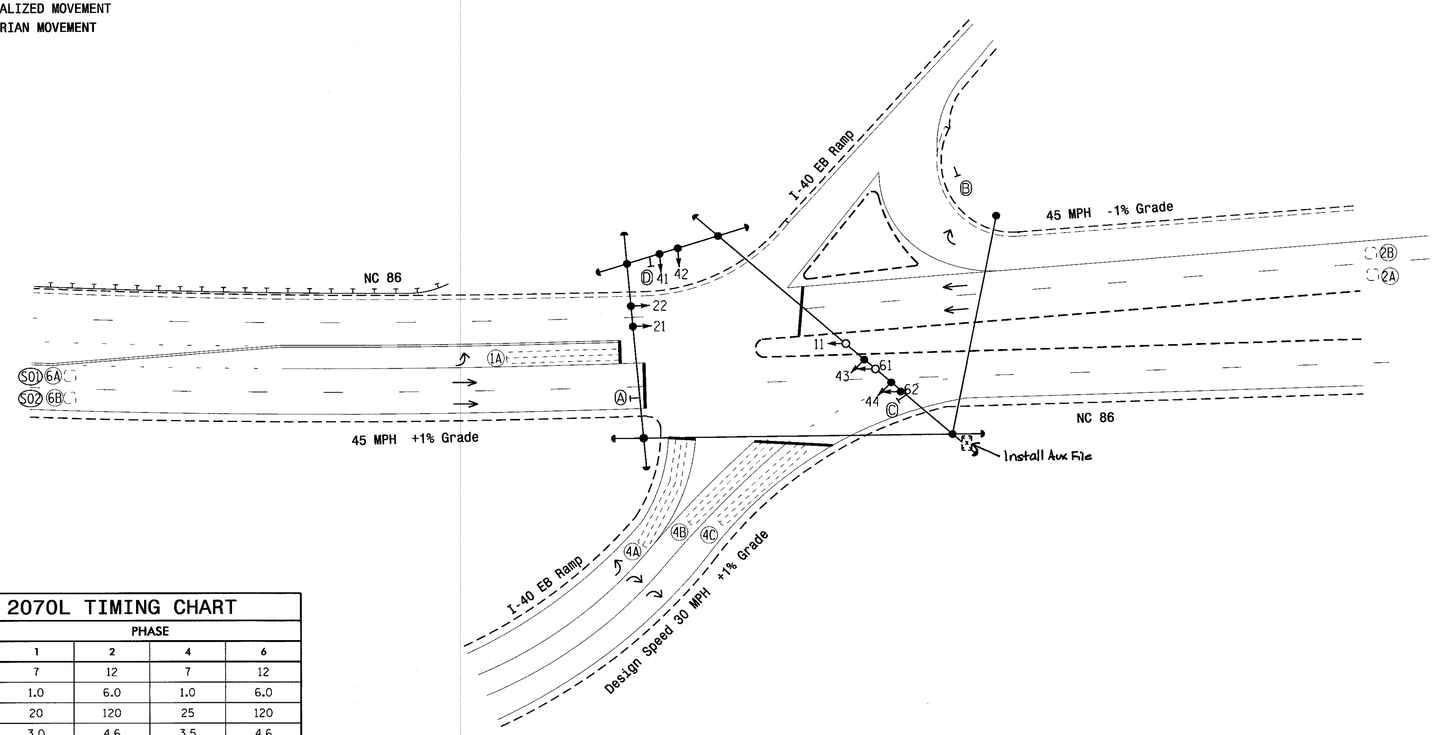


11

21, 22
41, 42, 43, 44
61,62

OASIS 2070L LOOP & DETECTOR INSTALLATION

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	-	-
					6	Y	Y	Y	-	3	-	-
2A	6X6	300	5	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	-	2	Y	Y	-	-	-	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	-
4C	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	-
6A/S01	6X6	300	5	-	6	Y	Y	-	-	-	Y	-
6B/S02	6X6	300	5	-	6	Y	Y	-	-	-	Y	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	12	7	12
Extension 1 *	1.0	6.0	1.0	6.0
Max Green 1 *	20	120	25	120
Yellow Clearance	3.0	4.6	3.5	4.6
Red Clearance	2.4	1.6	2.1	1.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.0	-	2.0
Max Variable Initial *	-	34	-	34
Time Before Reduction *	-	20	-	20
Time To Reduce *	-	60	-	60
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.

3 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head numbered 62.
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. 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	→
Ⓐ	"NO RIGHT TURN" Sign (R3-1)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	Left Arrow "ONLY" Sign (R3-5L)	Ⓓ

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

NC 86
at
I-40 EB Ramps

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JPG
PREPARED BY: Jeff Spence | REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY
SIGNATURE 8/22/13 DATE

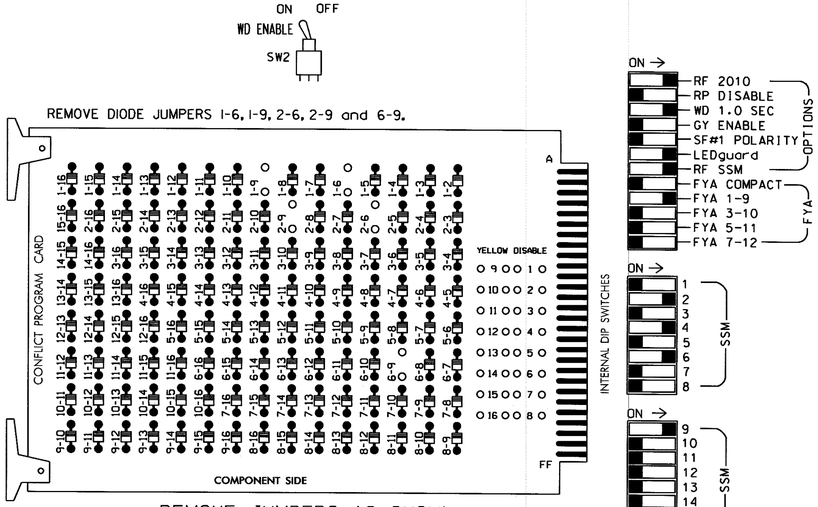
SIG. INVENTORY NO. 07-1550

22-AUG-2013 12:07
S:\TSAS\ITS Signals\Signal Design Section\Central Region\Div 7\07-1550\07155D_sig.dsn.2013mod.dgn
jspence

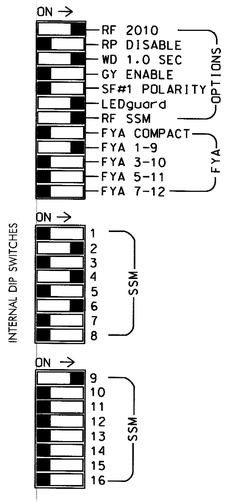
PROJECT REFERENCE NO.	SHEET NO.
	Sig.90

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
8. The cabinet and controller are part of the Chapel Hill-Carrboro 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,S6,S9
PHASES USED.....1,2,4,6.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

*In NOTES section refer to note 7.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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 43,44	NU	NU	61,62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	*	129			102			135										
GREEN		130			103			136										
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	

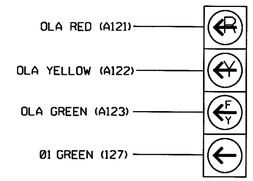
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



11

NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

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	Ø4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø4 4B	NOT USED							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6/SYS 6A/S01	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6/SYS 6B/S02												

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

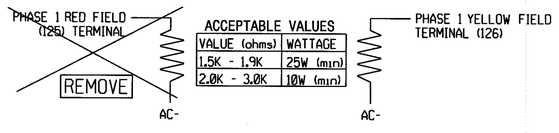
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			10
6A/S01	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S02	TB3-7,8	J2L	44	6	16	6/SYS	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

(install resistors as shown below)



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: 07-1550
DESIGNED: July 2013
SEALED: 8-22-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 86
at
I-40 EB Ramps

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: JTR

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
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 8-26-13 DATE
SIG. INVENTORY NO. 07-1550

26-AUG-2013 13:51
S:\TSSG\TS Signals\Workgroups\Sig Mon\Peterson\071550_sm_ele_xxx.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig 9 | 6

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
                                PRESS '+'
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
                                PRESS '+'
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:   _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1550
DESIGNED: July 2013
SEALED: 8-22-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 86 at I-40 EB Ramps	SEAL
Prepared in the Offices of: Traffic Engineering Branch, Mobility and Safety Division, NCDEPARTMENT OF TRANSPORTATION, Signal Management Section	Division 7 Orange County Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy.Garner,NC 27529	PLAN DATE: August 2013 REVIEWED BY: JTR	SIGNATURE DATE: 8-26-13
	PREPARED BY: James Peterson REVIEWED BY:	SIG. INVENTORY NO. 07-1550
	REVISIONS / INIT. / DATE	

26-AUG-2013 11:08
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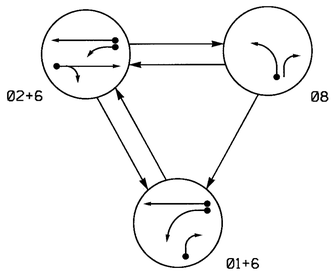
PROJECT REFERENCE NO.	SHEET NO.
	Sig92

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

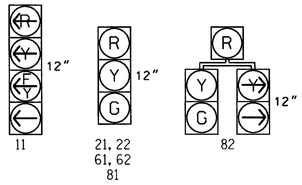
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
11	←–	FY	~~R~~	~~Y~~
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	6X60	+5	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	-
1B	6X60	+5	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X6	70	3	-	2	Y	Y	-	-	-	-	-
6A	6X6	70	3	-	6	Y	Y	-	-	-	-	-
8A	6X60	+5	2-4-2	-	8	Y	Y	-	-	3	-	-
S01	6X6	300	5	-	-	-	-	-	-	-	Y	-

3 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head numbered 62.
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. 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	→

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	10	10	7
Extension 1 *	1.0	3.0	3.0	1.0
Max Green 1 *	30	70	70	25
Yellow Clearance	3.0	3.8	3.8	3.0
Red Clearance	1.6	1.3	1.3	1.9
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	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

SR 1777 (Homestead Road)
At
SR 1834 (Seawell School Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: June 2013 | REVIEWED BY:
PREPARED BY: C. J. Collins | REVIEWED BY:

SCALE: 0 30, 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23489 ENGINEER PAMELA S. ALEXANDER
SIGNATURE 6/28/13 DATE

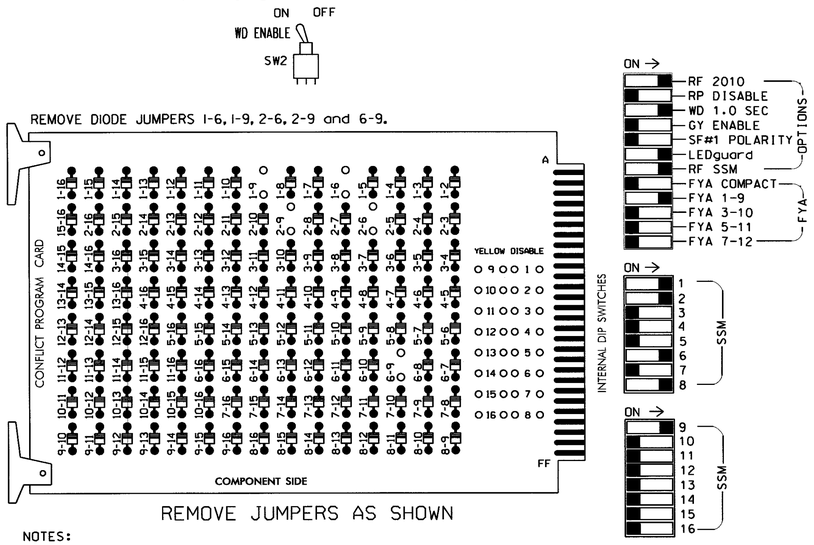
SIG. INVENTORY NO. 07-1609

28-JUN-2013 13:15
M:\TEOpS\Signals\Signal Design Section\Central Region\Div 7\407-1609\407609.sig.dsn_2013xxxx.dgn
Signals

PROJECT REFERENCE NO.	SHEET NO.
	Sig 93

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED						NOT USED					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	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								

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

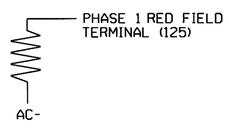
FS = FLASH SENSE
ST = STOP TIME

⊗ 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)



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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4,5,7, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11 ★	NU	NU	NU	NU	NU
RED		*	128						134			107							
YELLOW			129						135			108							
GREEN			130						136			109							
RED ARROW														A121					
YELLOW ARROW		126												A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	127																	

NU = Not Used

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

★ See pictorial of head wiring in detail below.

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,S6,S8,S9.
PHASES USED.....1,2,6,8.
OVERLAP "A".....1+2
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
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			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
* SØ1	TB6-9,10	I9U	60	22	11	SYS					
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3

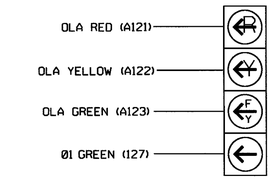
* System Detector Only. Remove The Vehicle Phase Assigned To This Detector In the Default Programming.

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



11

NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1609
DESIGNED: June 2013
SEALED: 6-28-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1777 (Homestead Road)
at
SR 1843 (Seawell School Road)

Division 07 | Orange County | Chapel Hill

PLAN DATE: 6-20-13 | REVIEWED BY: T. Igw

PREPARED BY: D.H. Spaulding | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
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 7/9/13

SIG. INVENTORY NO. 07-1609

28-JUN-2013 16:29
S:\Signals\Projects\Signal Workgroups\Sig Mgmt\Spaulding\In-progress\071609_sm.ole.2013xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
	Sig.94

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON
AND RED CLEAR ON PHASE  #1  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red

OUTPUT 51 = Overlap A Yellow

OUTPUT 52 = Overlap A Green

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:¦XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1609
DESIGNED: June 2013
SEALED: 6-28-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N. Greenfield Pwky, Garner, NC 27529

SR 1777 (Homestead Road)
at
SR 1843 (Seawell School Road)

Division 07 | Orange County | Chapel Hill

PLAN DATE: 6-20-13 | REVIEWED BY: T. Vyas

PREPARED BY: D.H. Spaulding | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

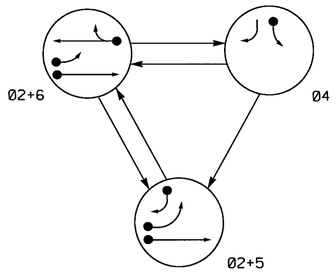
George C. Brown 7/9/13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1609

28-JUN-2013 16:31
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Spaulding*In-progress*071609_sm_ele_2013xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
———	Sig95

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

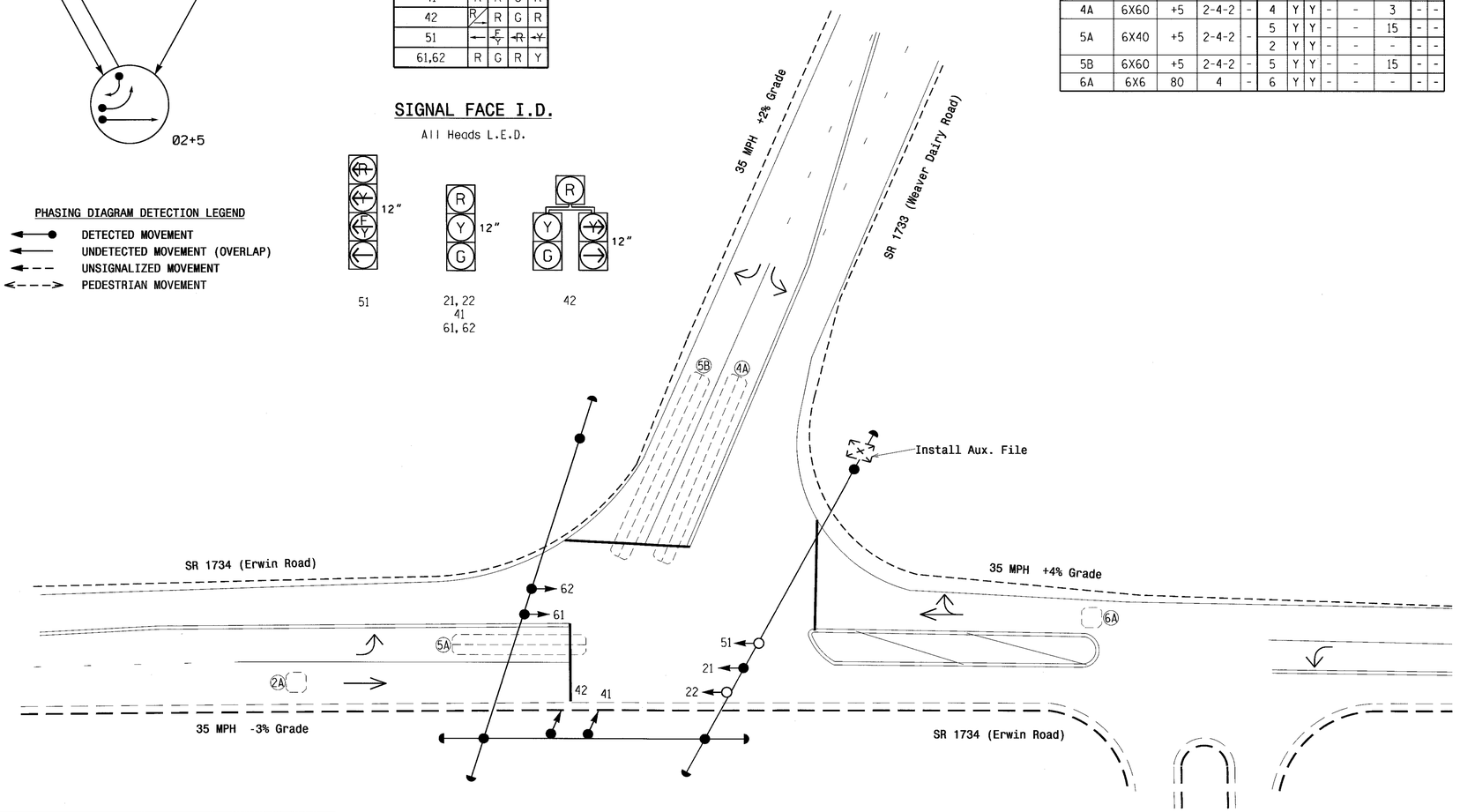
SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	~~←~~	~~F Y~~	~~R~~	~~Y~~
61,62	R	G	R	Y

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	80	4	-	2	Y	Y	-	-	-	-	-
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	3	-	-
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
5B	6X60	+5	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	80	4	-	6	Y	Y	-	-	-	-	-



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	4	5	6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	30	30	15	30
Yellow Clearance	4.1	3.0	3.0	4.1
Red Clearance	1.5	2.1	1.8	1.5
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	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 Phase
Fully Actuated
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal head numbered 21.
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. 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	→

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

SR 1734 (Erwin Road)
at
SR 1733 (Weaver Dairy Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JPG
PREPARED BY: EW Minshew | REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 29904
ENGINEER
JASON R. GALLOWAY

SIGNATURE 7/30/13 DATE

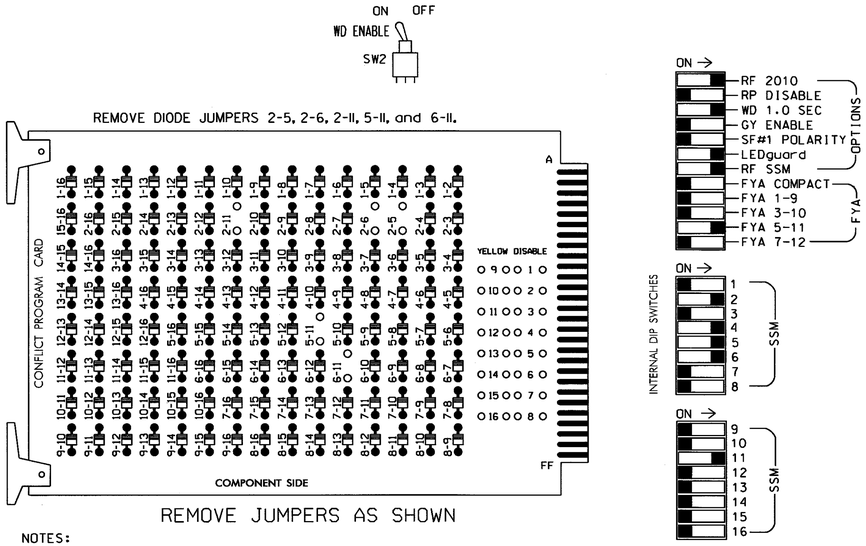
SIG. INVENTORY NO. 07-1657

30-JUL-2013 08:26
S:\#ITSASL#ITS Signals#Signal Design Section#Central Region#Div 7#07-1657#071657_sig_dsn_2013xxxx.dgn
emminshaw

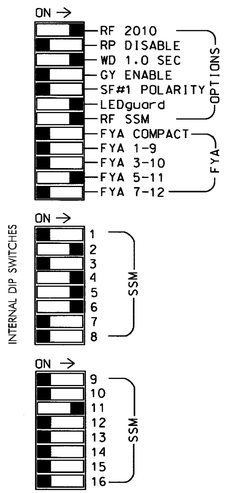
PROJECT REFERENCE NO.	SHEET NO.
	Sig 96

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. Verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start-Up in Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	51★	NU	NU
RED		128			101		*		134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

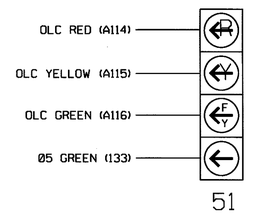
EQUIPMENT INFORMATION

CONTROLLER.....2070L
* CABINET.....332 W/ AUX FILE
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....5+6
OVERLAP D.....NOT USED

* In NOTES section refer to note 7.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

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		NOT USED				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	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			
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			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			

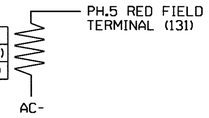
[1] Add jumper from J1-W to I4-W, on rear of input file.

! IMPORTANT! Remove the following jumpers: from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

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 this channel, which does not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1657
DESIGNED: July 2013
SEALED: 7/30/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1734 (Erwin Road)
at
SR 1733 (Weaver Dairy Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | 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 7-31-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1657

31-JUL-2013 07:45
S:\TSSD\UNITS Signals\Work\Projects\Sig Maint\armstrong\07165T_emele_xxx.dgn
Standard: Config

PROJECT REFERENCE NO.	SHEET NO.
	Sig.97

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE  #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

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:            |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1657
DESIGNED: July 2013
SEALED: 7/30/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SR 1734 (Erwin Road)
at
SR 1733 (Weaver Dairy Road)

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

SEAL

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

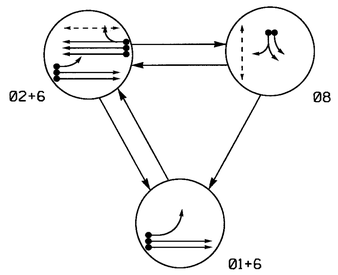
John T. Rowe 7-31-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1657

31-JUL-2013 07:45
S:*ITS&SU*ITS Signals*workgroups*Sig Man*Armstrong*071657_sm_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	98

PHASING DIAGRAM



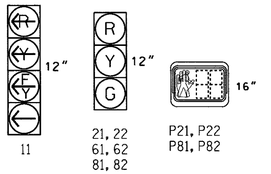
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION				
SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
11	←	←	←	←
21,22	R	G	R	Y
61, 62	G	G	R	Y
81, 82	R	R	G	R
P21,P22	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

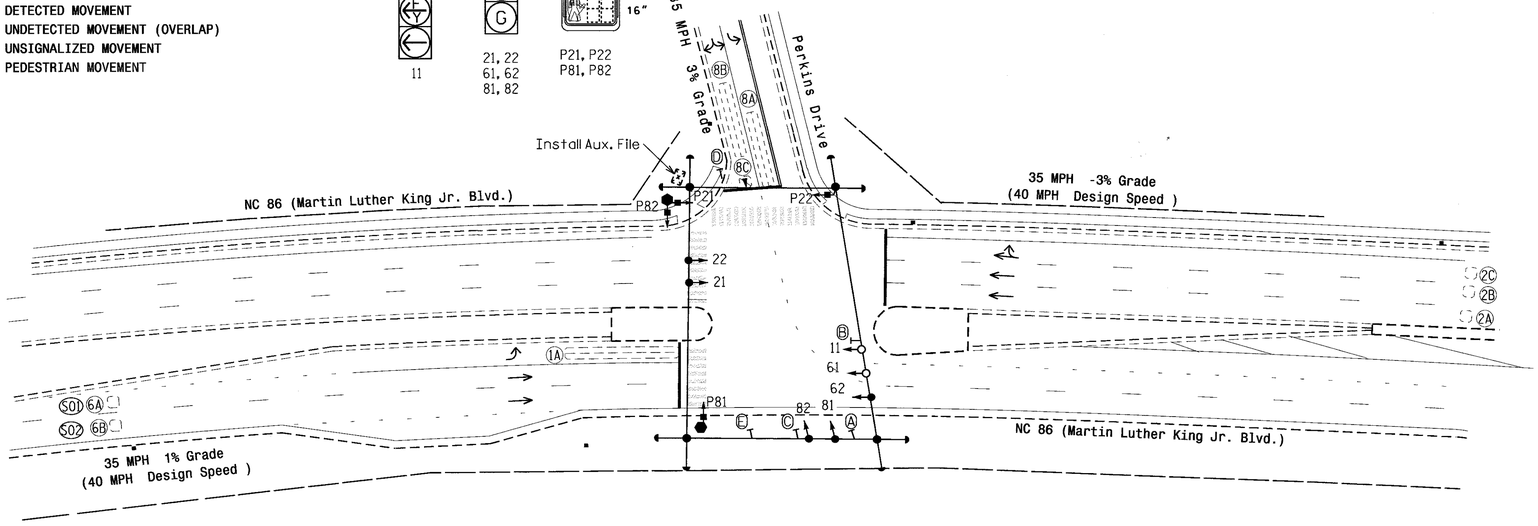
SIGNAL FACE I.D.

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
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	- / -
					6	Y	Y	Y	-	3	- / -
2A	6X6	300	4	-	2	Y	Y	-	-	-	- / -
2B	6X6	300	4	-	2	Y	Y	-	-	-	- / -
2C	6X6	300	4	-	2	Y	Y	-	-	-	- / -
SO1/6A	6X6	300	5	-	6	Y	Y	-	-	-	Y / -
SO2/6B	6X6	300	5	-	6	Y	Y	-	-	-	Y / -
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	3	- / -
8B	6X40	16	2-4-2	-	8	Y	Y	-	-	-	- / -
✻✻ 8C	6X40	0	2-4-2 Diagonal	-	8	Y	Y	-	-	-	- / -

✻✻ Set Sensitivity to appropriate level to detect a bicycle.



OASIS 2070L TIMING CHART				
FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	12	12	7
Extension 1 *	1.0	6.0	6.0	1.0
Max Green 1 *	20	90	90	30
Yellow Clearance	3.0	4.4	4.4	3.0
Red Clearance	3.3	2.2	2.2	3.5
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7
Don't Walk 1	-	15	-	26
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	40	40	-
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.

3 Phase
Fully Actuated
Chapel Hill-Carboro System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal heads numbered 62 and sign B.
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. 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	→
⬡	Pedestrian Signal Pedestal	⬢
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ
Ⓒ	Combined Arrows Sign (R3-6LR)	Ⓒ
Ⓓ	"TO REQUEST GREEN WAIT ON LINE" Sign (R10-22)	Ⓓ
Ⓔ	"TURNING TRAFFIC MUST YIED TO PEDESTRIANS" Sign (R10-15)	Ⓔ

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

NC 86
(Martin Luther King, Jr. Blvd.)
at
Perkins Drive

Division 7 Orange County Chapel Hill

PLAN DATE: July 2013 REVIEWED BY:

PREPARED BY: C.J. Collins REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON R. CALLOWAY
SIGNATURE 8/21/13 DATE

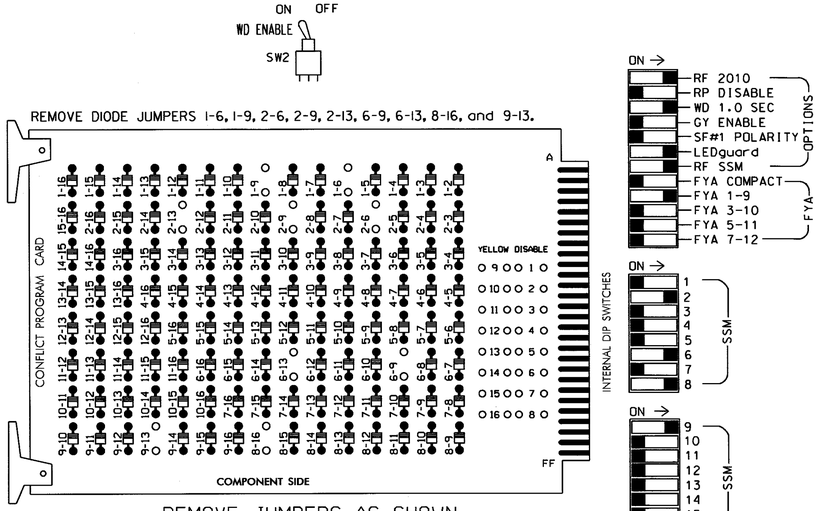
SIG. INVENTORY NO. 07-1742

21-AUG-2013 10:39
S:\MISC\Smits Signals\Signal Design Section\Control Region\Div 7\07-1742\07I742_sig_dsn_20130821.dgn
Jason Calloway

PROJECT REFERENCE NO.	SHEET NO.
	Sig.99

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	NOT USED									NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6/SYS 6A/S01	SLOT EMPTY	WIRED ⊗ INPUT	SLOT EMPTY	Ø8 8A	Ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6/SYS 6B/S02				Ø8 8B	NOT USED							

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

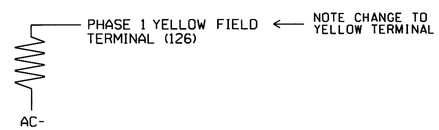
FS = FLASH SENSE
ST = STOP TIME

⊗ 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)



! IMPORTANT: Move Load Resistor from Red Field Terminal to Yellow Field Terminal for Phase 1.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 4,5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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 8 for 'STARTUP PED CALL'.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to CALTRANS *Traffic Signal Control Equipment Specifications.*
9. The cabinet and controller are part of the Chapel Hill-Carrboro 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,S2P,S6,S8,S8P,S9
PHASES USED.....1,2,2PED,6,8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

* In NOTES section refer to note 8.

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 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			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A/S01	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S02	TB3-7,8	J2L	44	6	16	6/SYS	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			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NU	NU	NU	61,62	NU	NU	81,82	P81, P82	11 ★	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW	✱	129						135			108							
GREEN		130						136			109							
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	
✋			113									110						
🚶			115									112						

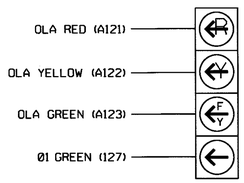
NU = Not Used

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

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1742
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy.Garner,NC 27529

NC 86
(Martin Luther King Jr. Blvd.)
at
Perkins Drive

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 8-21-13 DATE
SIG. INVENTORY NO. 07-1742

21-AUG-2013 11:09
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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig-100

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1   (+/-COMMAND#)
IF  ACTIVE PHASE        #1   IS ON
AND RED CLEAR ON PHASE #1   IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1   IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1   IS ON

                SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          :12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1742
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 2

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 86
(Martin Luther King Jr. Blvd.)
at
Perkins Drive

Division 7 | Orange County | Chapel Hill

PLAN DATE:	August 2013	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: 8-21-13

SIG. INVENTORY NO. 07-1742

21-AUG-2013 11:09
21.MSC,50,4,1,1,1
sarmstrong

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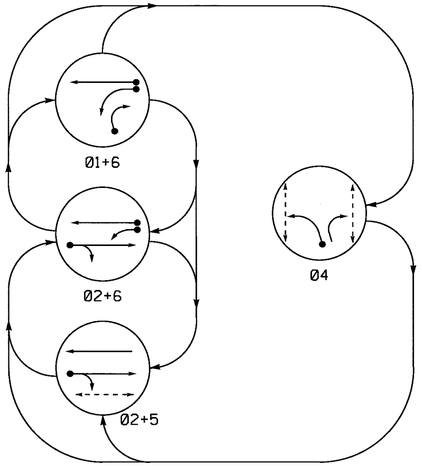
PROJECT REFERENCE NO.	SHEET NO.
	101

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

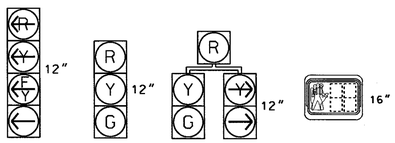
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø1+6	Ø4	FLASH
11	~~R~~	~~F Y~~	←	~~R~~	~~Y~~
21, 22	G	G	R	R	Y
41	R	R	R	G	R
42	R	R	R/←	G	R
61, 62	G	G	G	R	Y
P41, P42	DW	DW	DW	W	DRK
P43, P44	DW	DW	DW	W	DRK
P51, P52	W	DW	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



11 | 21, 22, 41, 61, 62 | 42 | P41, P42, P43, P44, P51, P52

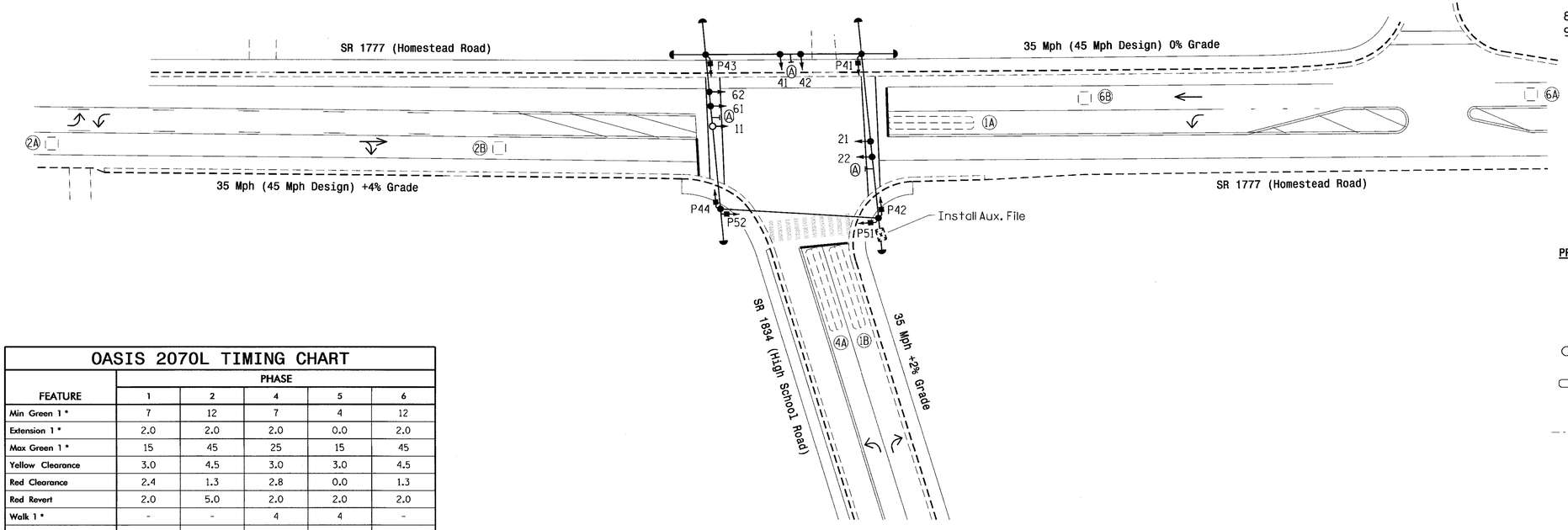
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	-	-
				-	6	Y	Y	-	-	-	-	-
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A/S01	6X6	300	4	-	2	Y	Y	-	1.6	-	Y	-
2B	6X6	90	3	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
6A/S02	6X6	300	4	-	6	Y	Y	-	1.6	-	Y	-
6B	6X6	90	3	-	6	Y	Y	-	-	-	-	-

4 Phase
Fully Actuated
Chapel Hill-Carboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
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. Reposition existing signal heads numbered 61.
5. Set all detector units to presence mode.
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. 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	→
Ⓐ	"TURNING TRAFFIC MUST YIELD TO PEDESTRIANS" Sign	Ⓐ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	12	7	4	12
Extension 1 *	2.0	2.0	2.0	0.0	2.0
Max Green 1 *	15	45	25	15	45
Yellow Clearance	3.0	4.5	3.0	3.0	4.5
Red Clearance	2.4	1.3	2.8	0.0	1.3
Red Revert	2.0	5.0	2.0	2.0	2.0
Walk 1 *	-	-	4	4	-
Don't Walk 1	-	-	14	11	-
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	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
1750 N.Greenfield Pkwy.,Garner,NC 27529

SR 1777 (Homestead Road) at SR 1834 (High School Road)

Division 7 Orange County Chapel Hill

PLAN DATE: July 2013 REVIEWED BY:
PREPARED BY: C. J. Collins REVIEWED BY:

SCALE 0 30 1"=30'

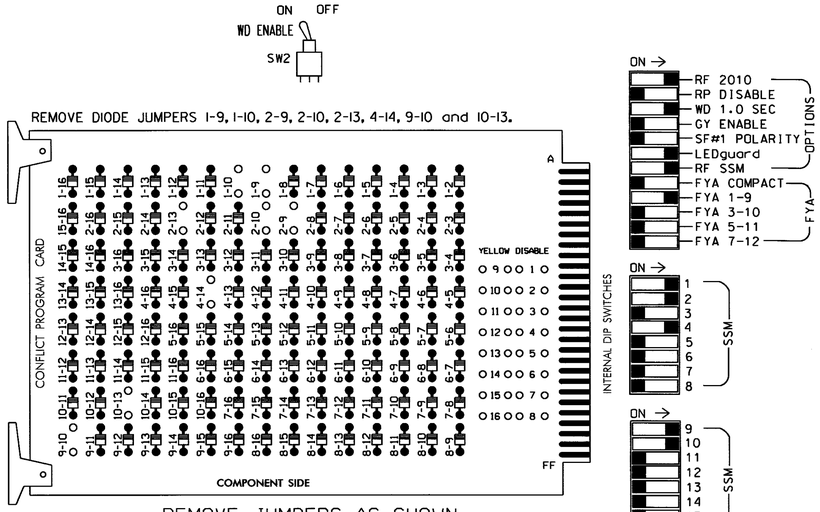
REVISIONS	INIT.	DATE

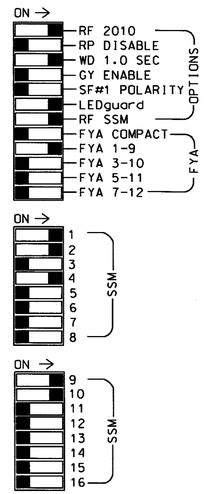
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON P. GALLOWAY
SIGNATURE 8/29/13 DATE
SIG. INVENTORY NO. 07-1755

29-AUG-2013 10:41
S:\Signals\TIS Signals\Signal Design Section\Central Region\July 7\07-1755\07175S_sig_dsn_20130829.dgn
Scott Howard

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = 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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 4 and 5 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
7. The cabinet and controller are part of the Chapel Hill-Carrboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....EAGLE TYPE 2070L**
CABINET.....McCAIN/CONTROL TECHNOLOGIES**
(DWG.NO.9500-332-NCDOT)
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S9,S10

PHASES USED.....1,2,4,5*,6,5PED,4PED
OVERLAP "A".....1+6
OVERLAP "B".....1+2+5+6
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

*USED FOR TIMING ONLY OF PHASE 5 PED
**EXISTING TO REMAIN IN USE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	5 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA ★	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	42	21,22	P51, P52	NU	41,42	P41,P42 P43,P44	NC	NC	NU	NU	NU	NU	11	61,62	NU	NU	NU	NU
RED	*		128			101									A124				
YELLOW			129			102									A125				
GREEN			130			103									A126				
RED ARROW														A121					
YELLOW ARROW		126												A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	127																	
✋				113			104												
🚶				115			106												

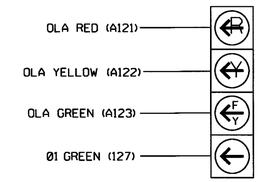
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1B	Ø1 1A	Ø2/SYS 2A/S01	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø5 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø6 1A	Ø2 2B			NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6/SYS 6A/S02	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		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
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A/S01	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y		1.6	
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
6A/S02	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y		1.6	
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
PED PUSH BUTTONS											
P51,P52	TB8-4,6	I12U	67	29	PED 2	5 PED					
P41,P42,P43,P44	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

[1]Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

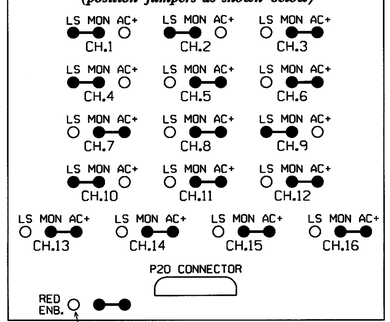
Countdown Ped Signals are required to display timing only during ped clearance interval. Consult Ped Signal Module User's Manual for instructions on selecting this feature.

BACKUP PROTECTION NOTE

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.

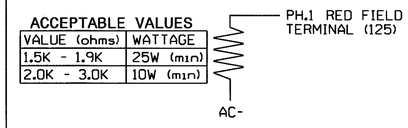
RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



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 this channel, which does not use the red display in the field.

11

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1755
DESIGNED: July 2013
SEALED: 8-29-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1777 (Homestead Road) at SR 1834 (High School Road)

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 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 9-4-13 DATE
SIG. INVENTORY NO. 07-1755

04-SEP-2013 10:43
S:\TSSDW\TS Signals\Workgroups\Sig Mgmt\Peterson\07-1755_sheet0_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig.103

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3 AND 4.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #6  IS ON
AND RED CLEAR ON PHASE #1  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  CHECK  ON PHASE     #6  IS ON

                 SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #9  ON
```

NOTE: PREVENTS PHASE 2 FROM GAPPING OUT (SOLVES KNOWN OASIS BUG).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

INPUT 9 = Phase 2 Veh Call
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:          |12345678910111213141516
VEH OVL PARENTS:|XX  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?...Y
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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1755
DESIGNED: July 2013
SEALED: 8-29-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 3

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 1777 (Homestead Road)
at
SR 1834 (High School Road)

Division 7 Orange County Chapel Hill

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

REVISIONS	INIT.	DATE

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

John T. Rowe 9-4-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-1755

04-SEP-2013 09:48
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Peterson*071755_sm_ele_xxx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
	Sig 04

OUTPUT ASSIGNMENT PROGRAMMING TO REASSIGN PED PHASE 2 TO PED PHASE 5

(program controller as shown below)

(1)

FROM MAIN MENU PRESS '6' (OUTPUTS). THEN '1' (OUTPUT ASSIGNMENTS). PRESS '+' UNTIL OUTPUT # 9 (PIN 10) IS REACHED.
OUTPUT # 9 = PHASE 2 DW

```
PAGE:1  C1 PIN:10  PEDESTRIAN PHASE
OUTPUT ASSIGNMENT #.................9
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................Y
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

(2)

IT IS NECESSARY TO SCROLL DOWN AND ENTER A 'Y' FOR 'PEDESTRIAN PHASE' (EVEN THOUGH THIS IS THE DEFAULT SETTING). UPON ENTERING 'Y', THE SCREEN SHOWN BELOW WILL APPEAR:

```
PAGE:1  C1 PIN:10  PEDESTRIAN PHASE
SELECT PEDESTRIAN PHASE (1-16).....5
SELECT COLOR(0=DWALK,1=YEL,2=WALK)..0
```

CHANGE DATA TO THAT SHOWN ABOVE. PRESS 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

(3)

PRESS '+' ONCE TO ADVANCE TO OUTPUT #10.
OUTPUT #10 = PHASE 2 W

```
PAGE:1  C1 PIN:11  PEDESTRIAN PHASE
OUTPUT ASSIGNMENT #................10
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................Y
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

(4)

IT IS NECESSARY TO SCROLL DOWN AND ENTER A 'Y' FOR 'PEDESTRIAN PHASE' (EVEN THOUGH THIS IS THE DEFAULT SETTING). UPON ENTERING 'Y', THE SCREEN SHOWN BELOW WILL APPEAR:

```
PAGE:1  C1 PIN:11  PEDESTRIAN PHASE
SELECT PEDESTRIAN PHASE (1-16).....5
SELECT COLOR(0=DWALK,1=YEL,2=WALK)..2
```

CHANGE DATA TO THAT SHOWN ABOVE. PRESS 'ENT' AFTER INPUTING DATA, THEN 'ESC'.

PED PHASE 2 OUTPUT HAS NOW BEEN ASSIGNED TO PHASE 5

PROGRAMMING COMPLETE

TAKE EXTREME CARE THAT NO CHANGES ARE MADE TO 'C1 PIN:' FIELDS

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	0	2	0	1	0	4	0	0
2	5	6	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0

PEDESTRIAN DETECTOR ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS). PRESS '+' UNTIL PED DETECTOR # 2 IS REACHED.

```
PED DETECTOR #2  SETTINGS   (+/- DET)
PHASE#          |12345678910111213141516
PHASES ASSIGNED |    X
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
RECALL IF FAILED....................N
MAX CALLS/MINUTE (0-255)............255
MAX CALLS/DIAG PERIOD (0-255).......0
MAX OCCUPANCY % (0-100%)............100
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1755
DESIGNED: July 2013
SEALED: 8-29-13
REVISED: N/A

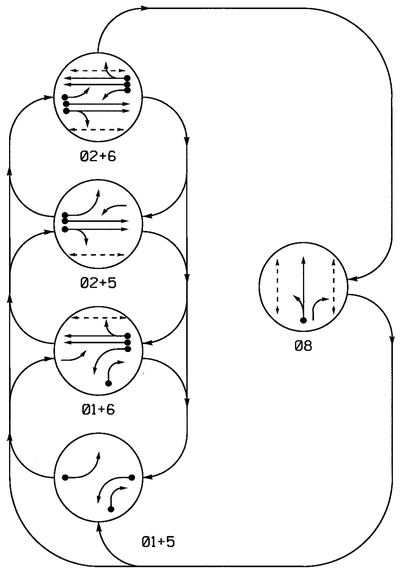
ELECTRICAL DETAIL SHEET 3 OF 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1777 (Homestead Road) at SR 1834 (High School Road)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signals Management Section	Division 7 · Orange County · Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy,Garner,NC 27529	PLAN DATE: August 2013 · REVIEWED BY: JTR	SIGNATURE · DATE: 9-4-13
	PREPARED BY: James Peterson · REVIEWED BY:	SIG. INVENTORY NO. 07-1755
	REVISIONS · INIT. · DATE	

29-AUG-2013 13:33
S:\#TSSIG\#TS Signals\#workgroups\#Sig Mgmt\PetersonM\07175S_sample_xxx.dgn
PetersonM

PROJECT REFERENCE NO.	SHEET NO.
n/a	Sig.05

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

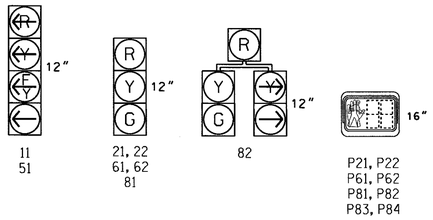
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 4 + 8	FLASH
11	←	←	F Y	F Y	~~R~~	~~Y~~
21, 22	R	R	G	G	R	Y
51	←	F Y	←	F Y	~~R~~	~~Y~~
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/←	R/←	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK
P83, P84	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

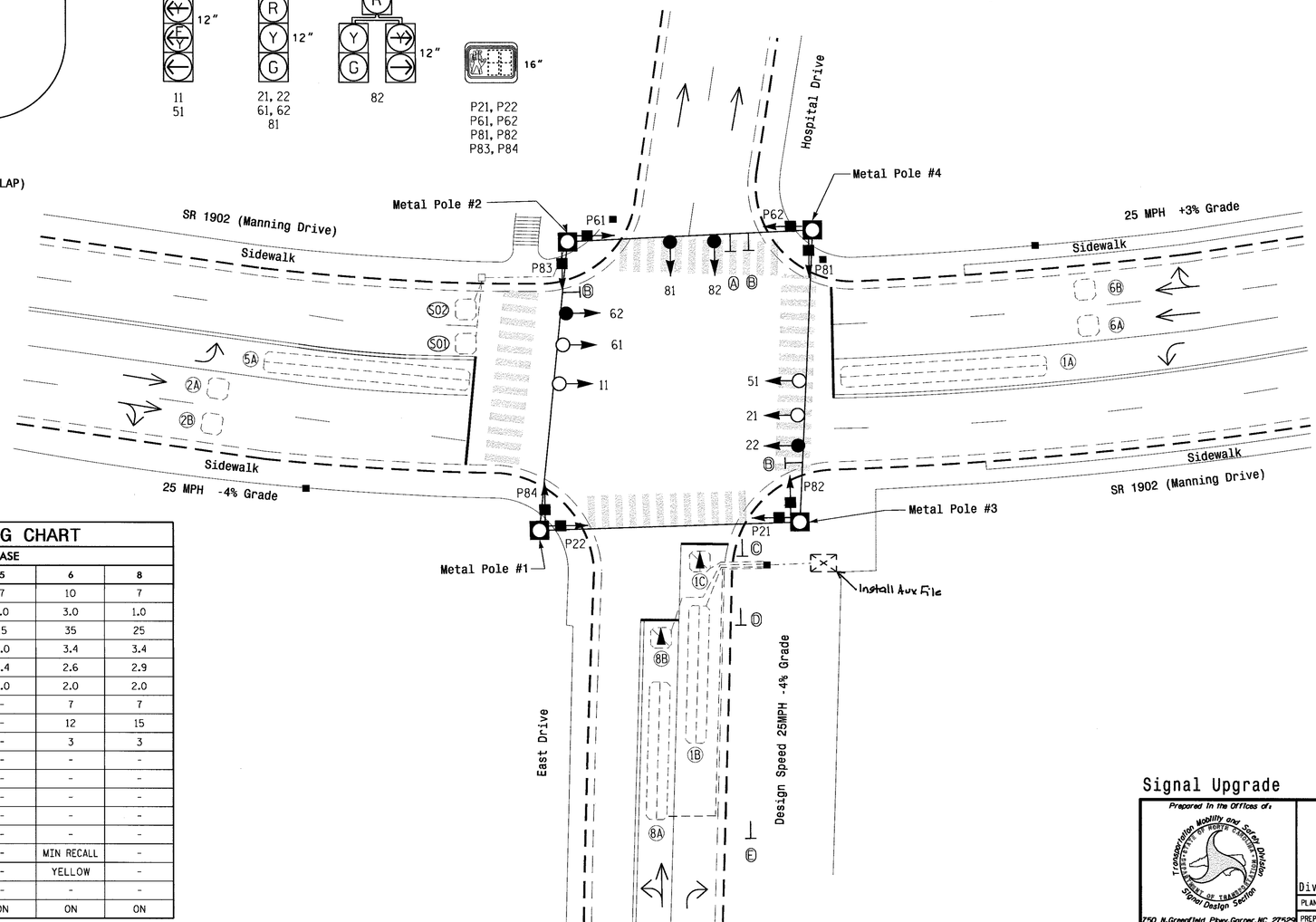
All Heads L.E.D.



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
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	-
1B	6X40	16	2-4-2	-	1	Y	Y	-	-	15	-	-
✱✱ 1C	6X6	0	2-4-2 Diagonal	-	1	Y	Y	-	-	15	-	-
2A	6X6	70	4	-	2	Y	Y	-	-	-	-	-
2B	6X6	70	4	-	2	Y	Y	-	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A	6X6	70	4	-	6	Y	Y	-	-	-	-	-
6B	6X6	70	4	-	6	Y	Y	-	-	-	-	-
8A	6X40	16	2-4-2	-	8	Y	Y	-	-	-	-	-
✱✱ 8B	6X6	0	2-4-2 Diagonal	-	8	Y	Y	-	-	3	-	-
S01	6X6	+100	3	-	-	-	-	-	-	-	-	-
S02	6X6	+100	3	-	-	-	-	-	-	-	-	-

✱✱ Set Sensitivity to appropriate level to detect a bicycle.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	5	6	8
Min Green 1 *	7	10	7	10	7
Extension 1 *	1.0	3.0	1.0	3.0	1.0
Max Green 1 *	15	35	15	35	25
Yellow Clearance	3.0	3.4	3.0	3.4	3.4
Red Clearance	2.4	2.6	2.4	2.6	2.9
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7	7
Don't Walk 1	-	13	-	12	15
Walk Advance Time	-	3	-	3	3
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	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
Chapel Hill-Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 2+6.
4. Phase 1 and/or phase 5 may be lagged.
5. Reposition existing signal heads numbered 22 and 62.
6. Set all detector units to presence mode.
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. 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 Strain Pole	◘
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	"TURNING TRAFFIC MUST YIELD TO PEDESTRIANS" Sign (R10-15)	Ⓑ
Ⓒ	"To Request Green Wait on Line" Sign (R10-22)	Ⓒ
Ⓓ	'THRU-LEFT LANE STOP HERE" Sign	Ⓓ
Ⓔ	"RIGHT TURN MUST TURN RIGHT" Sign (R3-7R)	Ⓔ
N/A	Bicycle Pavement Marking	▲

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

SR 1902 (Manning Drive)
at
East Drive and
Hospital Drive (Entrance)

Division 7 | Orange County | Chapel Hill

PLAN DATE: July 2013 | REVIEWED BY: JPG
PREPARED BY: JWN / CJC | REVIEWED BY:

SCALE: 0 20, 1" = 20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON N. GALLOWAY
SIGNATURE 8/21/13 DATE

SIG. INVENTORY NO. 07-1825

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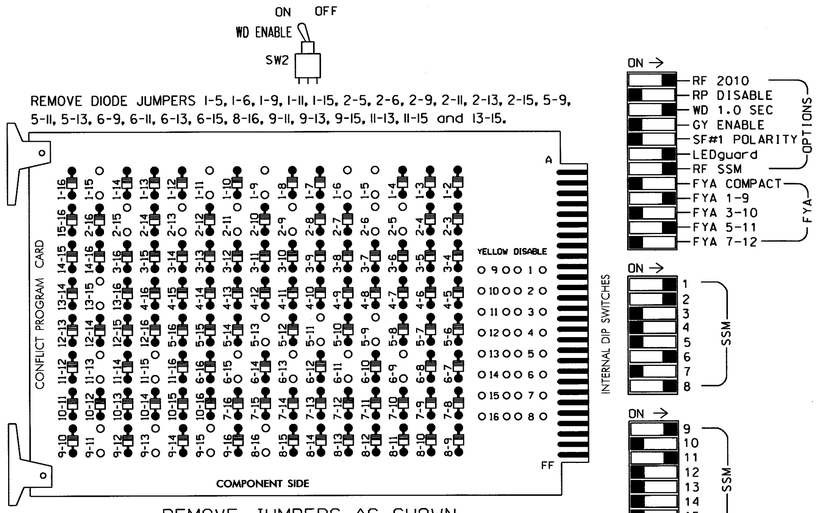
Gallowa

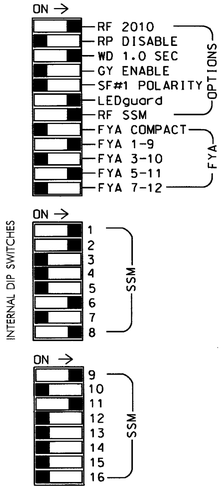
PROJECT REFERENCE NO.	SHEET NO.
	Sig.106

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

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	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ1	SLOT EMPTY	SLOT EMPTY	ø2 PED DC ISOLATOR	ø6 PED DC ISOLATOR	FS DC ISOLATOR
FILE "I" L	NOT USED	ø1 1C	ø2 2B						SYS. DET. SØ2			NOT USED	ø8 PED DC ISOLATOR	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
FILE "J" L	NOT USED	ø6 6B				ø8 8B								

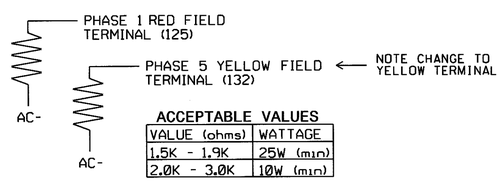
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

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)

Move Load Resistor:

1) FROM: PHASE 5 RED FIELD TERMINAL (131)
TO: PHASE 5 YELLOW FIELD TERMINAL (132)

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4,5, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2, 6 and 8 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Caltrans *Traffic Signal Control Equipment Specifications* (TSCES).
8. The cabinet and controller are part of the Chapel Hill-Carrboro 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,S2P,S5,S6,S6P,S8,S8P,S9,S12
PHASES USED.....1,2,2 PED,5,6,6 PED,8,8 PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

* In NOTES section refer to note 7.

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			15
1C	TB2-7,8	I2L	43	5	12	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			
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			
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			3
* SØ1	TB6-9,10	I9U	60	22	11	SYS					
* SØ2	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82, P83,P84	TB8-8,9	I13L	70	32	PED 8	8 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.

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1825
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NU	NU	NU	51★	61,62	P61, P62	NU	81,82	P81,P82 P83,P84	11★	NU	NU	51★	NU	NU
RED		*	128						134			107							
YELLOW			129					*	135			108							
GREEN			130						136			109							
RED ARROW														A121			A114		
YELLOW ARROW		126												A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127						133											
✋				113						119			110						
🚶				115						121			112						

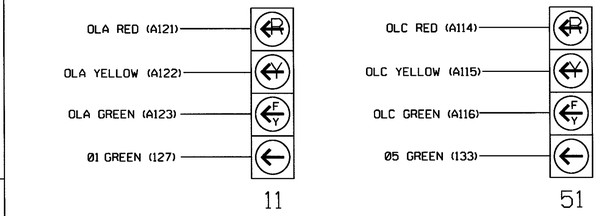
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

ADVANCED WALK NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 6, and 8 for 'Advanced Walk'. Make sure the Walk Advance Time shown on the Signal Design plans are programmed in the 'Phase Timing' menu.

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.

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1902 (Manning Drive) at East Drive and Hospital Drive (Entrance)

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2013 | REVIEWED BY: T.Upp

PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWNING
SIGNATURE 8/22/13 DATE

SIG. INVENTORY NO. 07-1825

21-AUG-2013 14:13
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cestrickland

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE
WITH ADVANCE WALK FEATURE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7 AND 8.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

BEGIN LOGIC STATEMENTS FOR FYA APPLICATION (LOGIC STATEMENTS 1-6).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

← END LOGIC STATEMENTS FOR FYA APPLICATION (LOGIC STATEMENTS 1-6).

PRESS '+'

```
LOGICAL I/O COMMAND #7  (+/-COMMAND#)
IF  OUTPUT ASSIGNMENT  #10  IS ON
AND OUTPUT ASSIGNMENT  #13  IS OFF

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
SET OUTPUT  ASSIGNMENT #50 ON
```

← BEGIN LOGIC STATEMENTS FOR ADVANCE WALK WITH FYA. (LOGIC STATEMENTS 7-8).

NOTE: TURN FYA (HEAD 11) OFF DURING 2 PED ADAVNCE WALK.

PRESS '+'

```
LOGICAL I/O COMMAND #8  (+/-COMMAND#)
IF  OUTPUT ASSIGNMENT  #26  IS ON
AND OUTPUT ASSIGNMENT  #29  IS OFF

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
SET OUTPUT  ASSIGNMENT #42 ON
```

NOTE: TURN FYA (HEAD 51) OFF DURING 6 PED ADAVNCE WALK.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 10 = 2 PED Walk
OUTPUT 13 = Vehicle 2 Green
OUTPUT 26 = 6 PED Walk
OUTPUT 29 = Vehicle 6 Green
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

~~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.~~

! IMPORTANT: Disable Backup Protection for phases 2 and 6.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1825
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1902 (Manning Drive) at East Drive and Hospital Drive (Entrance)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, NCDOT, Signal Management Section 750 N.Greenfield Pkwy,Garner,NC 27529	Division 7 — Orange County — Chapel Hill PLAN DATE: August 2013 — REVIEWED BY: T. Upchurch PREPARED BY: C. Strickland — REVIEWED BY: REVISIONS — INIT. — DATE	NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN SIGNATURE — DATE SIG. INVENTORY NO. 07-1825

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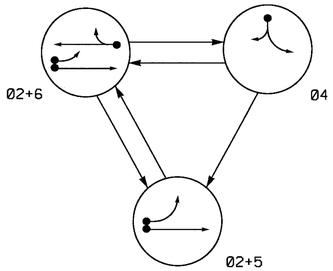
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
	Sig.1 08

PHASING DIAGRAM



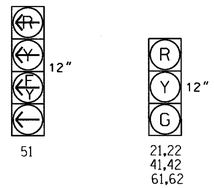
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION				
SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21,22	G	G	R	Y
41,42	R	R	G	R
51	←	FY	~~R~~	~~Y~~
61,62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION

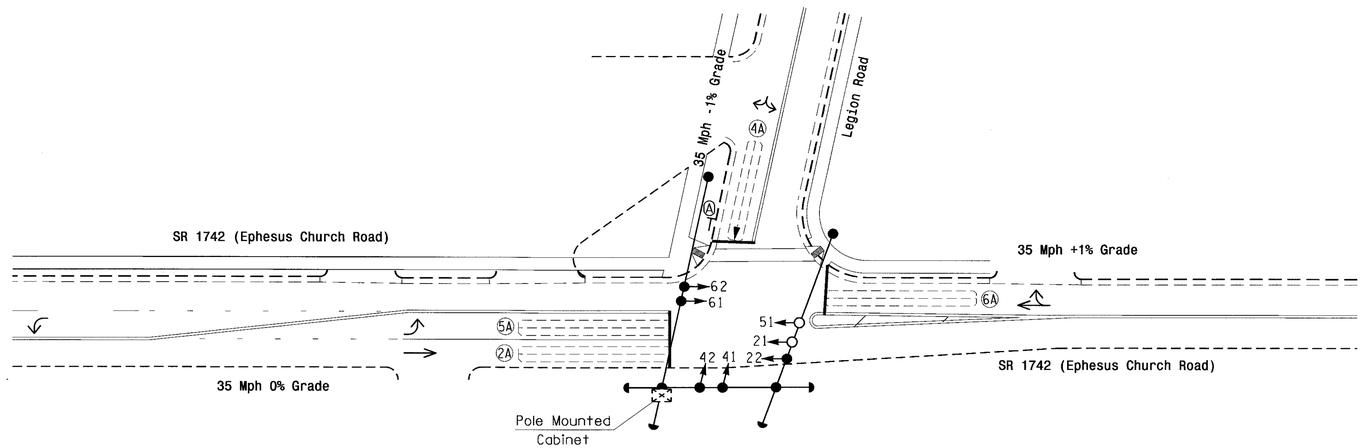
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X60	0	2-4-2	-	2	Y	Y	-	-	-	-	-
✳4A	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2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

✳Set sensitivity at appropriate level to detect bicycle

3 Phase
Fully Actuated
Chapel Hill - Carrboro Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
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 the Signal Design Section.
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. Operate FYA in compact mode.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	1.0	2.0	1.0	1.0
Max Green 1 *	40	25	30	40
Yellow Clearance	3.8	3.0	3.0	3.8
Red Clearance	1.1	1.6	1.6	1.1
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	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	→
▲	Bike Marking	▲
Ⓐ	"To Request Green Wait on Line" Sign (R10-22)	Ⓐ

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

SR 1742
(Ephesus Church Road)
at
Legion Road

Division 7 Orange County Chapel Hill

PLAN DATE:	July 2013	REVIEWED BY:	JPG
PREPARED BY:	Jeff Spence	REVIEWED BY:	

SCALE 0 30 1"=30'

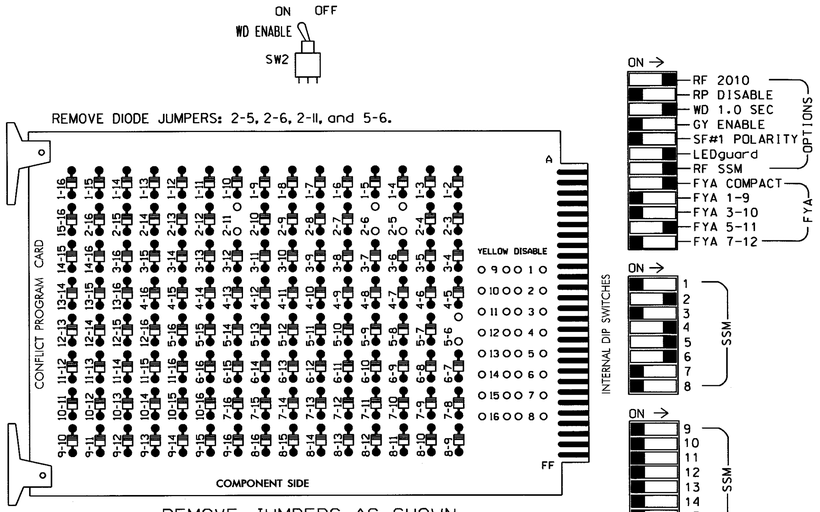
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON PAUL GALLOWAY
SIGNATURE 8/22/13 DATE
SIG. INVENTORY NO. 07-1883

22-AUG-2013 08:27
S:\#TSSGU#\TS Signals\Signal Design Section\Central Region\Div 7\07-1883\071883_sig_dgn_2013mmdd.dgn
ESpence

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.
3. Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

■ = 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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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 Chapel Hill-Carrboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S5,S6,S6P
PHASES USED.....2,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P		S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	OLC	6	5 GRN	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51 ★	61,62	51 ★	NU	NU	NU	NU
RED		128			101			134					
YELLOW		129			102			135					
GREEN		130			103			136					
RED ARROW							131						
YELLOW ARROW							132						
FLASHING YELLOW ARROW							133						
✋													
GREEN ARROW									120				
🚶										*			

NU = Not Used

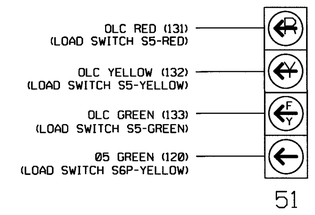
* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

NOTE: Load Switches S5 and S6P require output remapping. See sheet 3 of this electrical detail for instructions.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



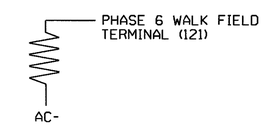
NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 for programming instructions.

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)



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	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L	SLOT EMPTY	NOT USED	SLOT EMPTY	NOT USED	⊗ WIRED INPUT	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Disable detector 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	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			10
5A[1]	TB21-9,10	I5U	55	17	5	5	Y	Y			15
		I5L	48	10	26	2	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

[1]Add jumper from I5-F to I5-W, on rear of input file.

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2010ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: from 6 PY (field term. 120) to chan. 10 green (monitor pin R).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-R ——————————— 6PY (term. 120)

NOTE: Some cabinet manufacturers use a keyed plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1883
DESIGNED: July 2013
SEALED: 8/22/13
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 1742
(Ephesus Church Road)
at
Legion Road

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 8-26-13 DATE
SIG. INVENTORY NO. 07-1883

22-AUG-2013 10:33
S:\#TSA\SUM\TS Signals\Workgroups\Sig Mgmt\Armstrong\071883_sm_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig IO

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #30 ON
 SET OUTPUT  ASSIGNMENT #31 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #32 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #31 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 30 = Overlap C Red
OUTPUT 31 = Overlap C Yellow
OUTPUT 32 = Overlap C Green
OUTPUT 34 = Phase 5 Green

Note: All outputs shown above have been remapped. See sheet 3 of this electrical detail.

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1883
DESIGNED: July 2013
SEALED: 8/22/13
REVISED: N/A

Signal Upgrade - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1742 (Ephesus Church Road) at Legion Road	SEAL
Prepared in the Offices of: NCDOT Transportation Mobility and Safety Division, Signals Management Section	Division 7 — Orange County — Chapel Hill	NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
750 N.Greenfield Pkwy.,Garner,NC 27529	PLAN DATE: August 2013 — REVIEWED BY: JTR	SIGNATURE — DATE: 8-26-13
	PREPARED BY: S. Armstrong — REVIEWED BY:	SIG. INVENTORY NO. 07-1883
	REVISIONS — INIT. — DATE	

22-AUG-2013 10:35
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armstrong

PROJECT REFERENCE NO.	SHEET NO.
	Sig.III

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 51

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN32  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 31

STEP 2

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:33  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" KEY FOR OUTPUT 32

STEP 3

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:34  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE....................
VEHICLE OVERLAP...................Y
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

PRESS "+" TWICE TO
REACH OUTPUT 34.

STEP 4

```
PAGE:1  C1 PIN:36  NOT ENABLED
OUTPUT ASSIGNMENT #.................34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.......................Y
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1  C1 PIN:36  NOT ENABLED
SELECT VEHICLE PHASE (1-16).........5
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:36  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.....................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP..................
WATCHDOG............................
DETECTOR RESET......................
ADVANCE BEACON......................
OUT OF PHASE FLASHER................
CONTROLLER FLASH....................
RUN FREE............................
RESERVED............................
PREEMPT.............................
SOFT PREEMPT........................
ANY PREEMPT.........................
COORDINATION PLAN...................
OFFSET..............................
PHASE CHECK.........................
PHASE ON............................
PHASE NEXT..........................
```

OUTPUT PROGRAMMING FOR HEAD 51 COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1883
DESIGNED: July 2013
SEALED: 8/22/13
REVISED: N/A

Signal Upgrade - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1742
(Ephesus Church Road)
at
Legion Road

Division 7 | Orange County | Chapel Hill

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

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE
8-26-13
DATE
SIG. INVENTORY NO. 07-1883

22-AUG-2013 10:35
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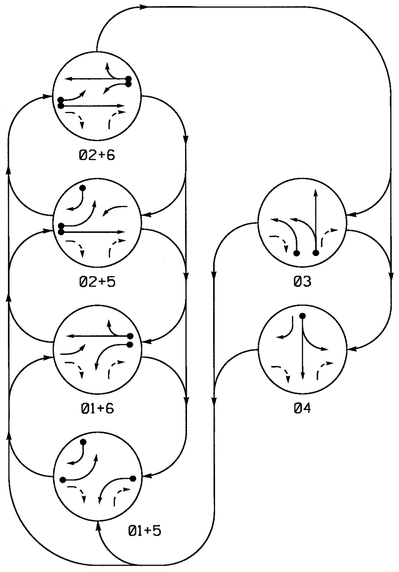
armstrong

PROJECT REFERENCE NO.	SHEET NO.
n/a	Sig.12

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

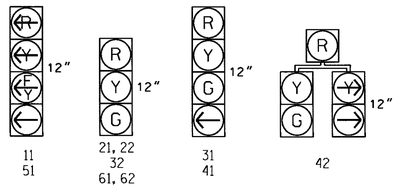
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03	04	FLASH
11	←	←	←/Y	←/Y	R	R	Y
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	←/Y	←/Y	←/Y	←/Y	R	R	Y
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



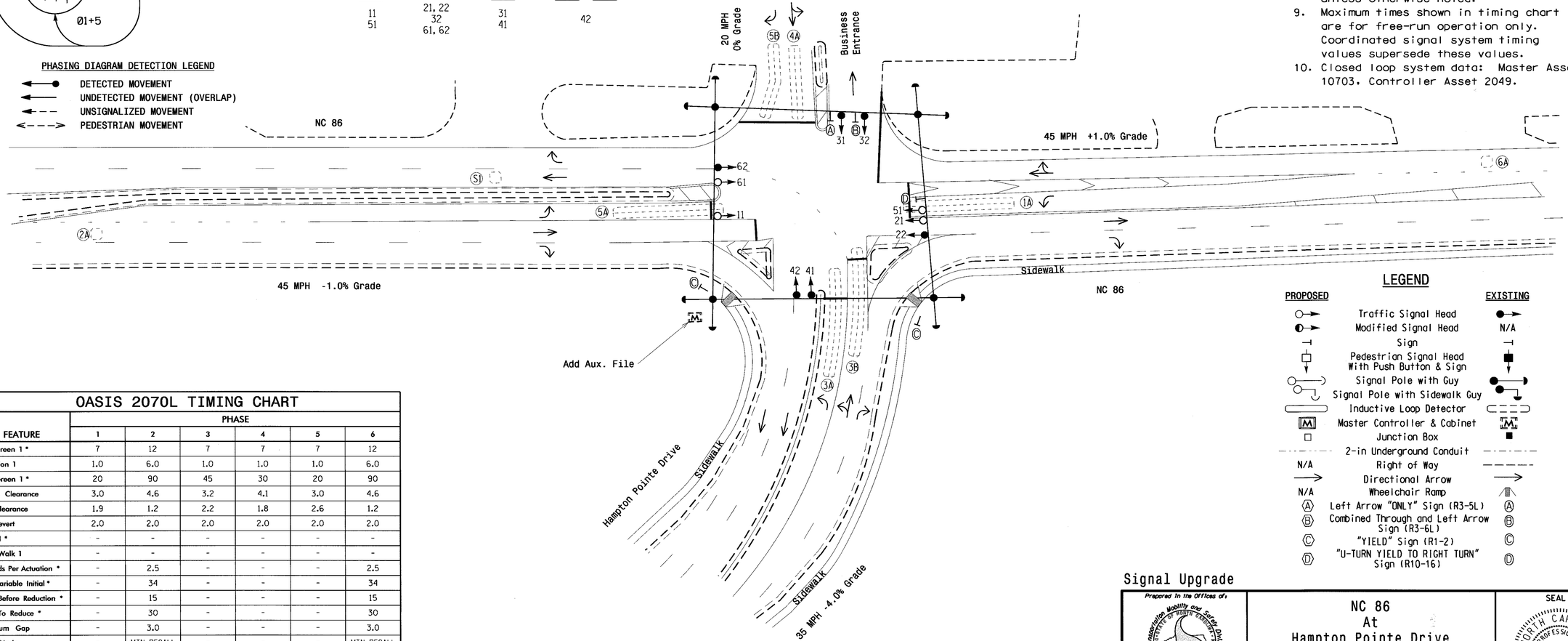
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	6X60	+5	2-4-2	-	1	Y	Y	-	-	15	-	-
				-	6	Y	Y	Y	-	3	-	-
2A	6X6	300	4	-	2	Y	Y	-	-	-	-	-
3A	6X60	+15	2-4-2	-	3	Y	Y	-	-	3	-	-
3B	6X60	+5	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
5A	6X60	+5	2-4-2	-	5	Y	Y	-	-	15	-	-
				-	2	Y	Y	Y	-	3	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	300	5	-	6	Y	Y	-	-	-	-	-
S1	6X6	+140	4	-	-	-	-	-	-	-	Y	-

6 Phase
Fully Actuated
NC 86/I-85 CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protection for phases 2 and 6.
4. Phase 1 and/or phase 5 may be lagged.
5. Reposition existing signal heads numbered 22 and 62.
6. Set all detector units to presence mode.
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. Pavement markings are existing unless otherwise noted.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Closed loop system data: Master Asset 10703, Controller Asset 2049.



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	▭
M	Master Controller & Cabinet	M
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	----------
→	Directional Arrow	→
N/A	Wheelchair Ramp	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓓ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1	1.0	6.0	1.0	1.0	1.0	6.0
Max Green 1 *	20	90	45	30	20	90
Yellow Clearance	3.0	4.6	3.2	4.1	3.0	4.6
Red Clearance	1.9	1.2	2.2	1.8	2.6	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 *	-	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	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

NC 86
At
Hampton Pointe Drive

Division 7 Orange County Hillsborough

PLAN DATE:	June 2013	REVIEWED BY:	CJC
PREPARED BY:	JMN	REVIEWED BY:	JPG

SCALE 0 30 1" = 30'

REVISIONS	INIT.	DATE

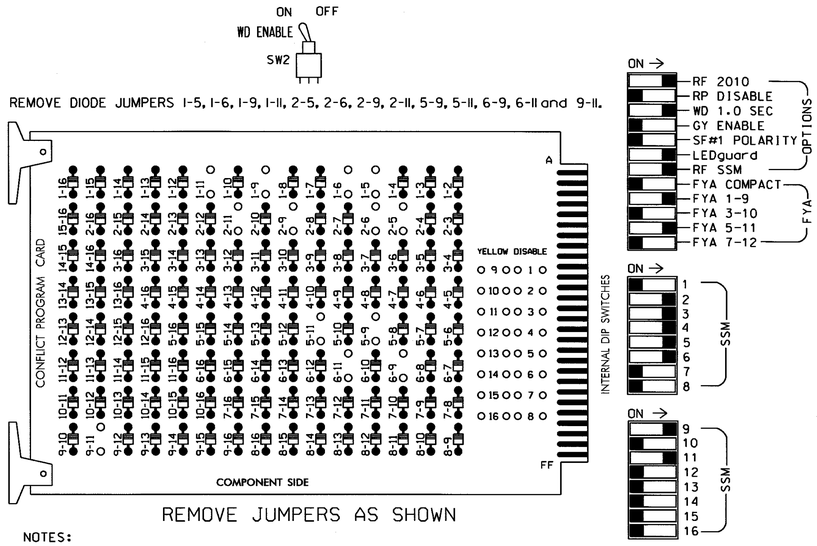
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29904 ENGINEER JASON M GALLOWAY
SIGNATURE 8/1/13 DATE
SIG. INVENTORY NO. 07-2049

01-AUG-2013 09:54
S:\MTS&SU\ITS Signals\Signal Design Section\Central Regions\Div 7\07-2049\07049_sig_dsn_2013xxxx.dgn
c:\coltrane

PROJECT REFERENCE NO.	SHEET NO.
	Sig.13

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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 ⊗	ø4 4A	ø3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	ø3 3B								ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A	ø5 5B	WIRED INPUT ⊗	SLOT EMPTY	SYS. DET. S1	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

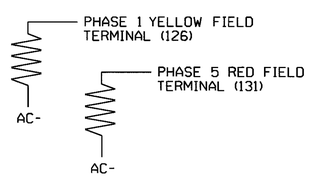
FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

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)



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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,7,8, 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
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, and overlap 1 as Wag Overlaps.
7. The cabinet and controller are part of the NC 86/I-85 Closed Loop System.
8. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to *Caltrans Traffic Signal Control Equipment Specifications* (TSCES).

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,S9,S12.
PHASES USED.....1,2,3,4,5,6.
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

* In NOTES section refer to note 8.

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			
4A	TB4-5,6	I5U	58	20	3	4	Y	Y			3
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
5B	TB3-9,10	J3U	64	26	36	5	Y	Y			15
* S1	TB5-9,10	J6U	42	4	8	SYS					

[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.

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

! IMPORTANT !

! If present, remove jumpers from TB2-9 to TB2-11, and from TB2-10 to TB2-12.

! If present, remove jumpers from TB3-9 to TB3-11, and from TB3-10 to TB3-12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2049
DESIGNED: June 2013
SEALED: 8-1-13
REVISED: N/A

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4		S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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★	42	61,62	NU	NU	NU	NU	11★	NU	NU	51★	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																A121			A114		
YELLOW ARROW										132						A122			A115		
FLASHING YELLOW ARROW																A123			A116		
GREEN ARROW	127			118		103			133	133											

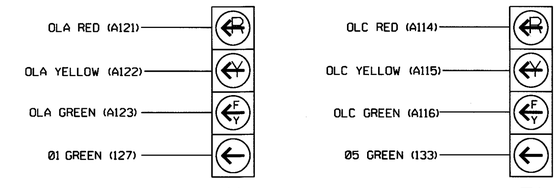
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

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:|12345678910111213141516
IF PHASES ARE ON|X
OMIT PHASES     |X
CALL PHASES     |  X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
                OVERLAPS:|ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE |
OR       PHASES:|12345678910111213141516
IF PHASES ARE ON|     X
OMIT PHASES     |    X
CALL PHASES     |   X
```

BACKUP PROTECTION PROGRAMMING COMPLETE

! IMPORTANT: 1. If present, remove all functions from 'Dynamic/Backup'.

! IMPORTANT: 2. If present, remove all phases from all 'Dynamic/Backup Control Functions'.

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 86
at
Hampton Pointe Drive

Division 07 | Orange County | Hillsborough

PLAN DATE: 07-23-13 | REVIEWED BY: T. Jay

PREPARED BY: D.H. Spaulding | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
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 8/2/13 DATE

SIG. INVENTORY NO. 07-2049

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S:\#TSSD\#ITS Signals\#Workgroups\Sig Mark\Spaulding\#In-progress\#072049_smLeie_2013xx.dgn
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
	Sig.114

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

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: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2049
DESIGNED: June 2013
SEALED: 8-1-13
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 86 at Hampton Pointe Drive	SEAL
Prepared in the Offices of: NCDOT Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section 750 N.Greenfield Pkwy,Garner,NC 27529	Division 07 Orange County Hillsborough PLAN DATE: 07-23-13 REVIEWED BY: T. Upg PREPARED BY: D.H. Spaulding REVIEWED BY:	NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN SIGNATURE 8/2/13 DATE SIG. INVENTORY NO. 07-2049
	REVISIONS INIT. DATE	

01-AUG-2013 13:32
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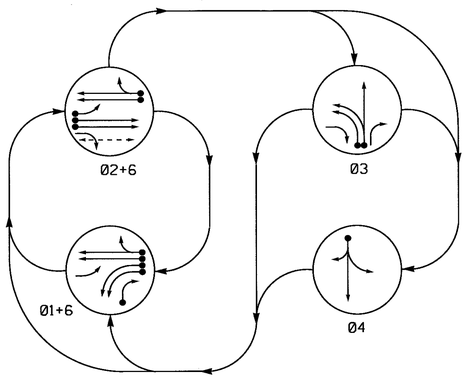
dspaulding

PROJECT REFERENCE NO.	SHEET NO.
Orange Co. FYA	Sig.|15

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

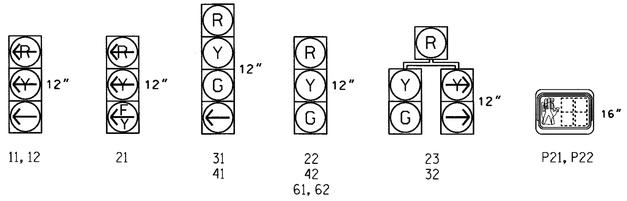
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 6	PHASE 0 2 + 6	PHASE 0 3	PHASE 0 4	FLASH
11, 12	←	R	R	R	R
21	F Y	F Y	R	R	Y
22	R	G	R	R	Y
23	R	G	R / G ←	R	Y
31	R	R	G ←	R	R
32	R / G	R	G	R	R
41	R	R	R	G ←	R
42	R	R	R	G	R
61, 62	G	G	R	R	Y
P21, P22	DW	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



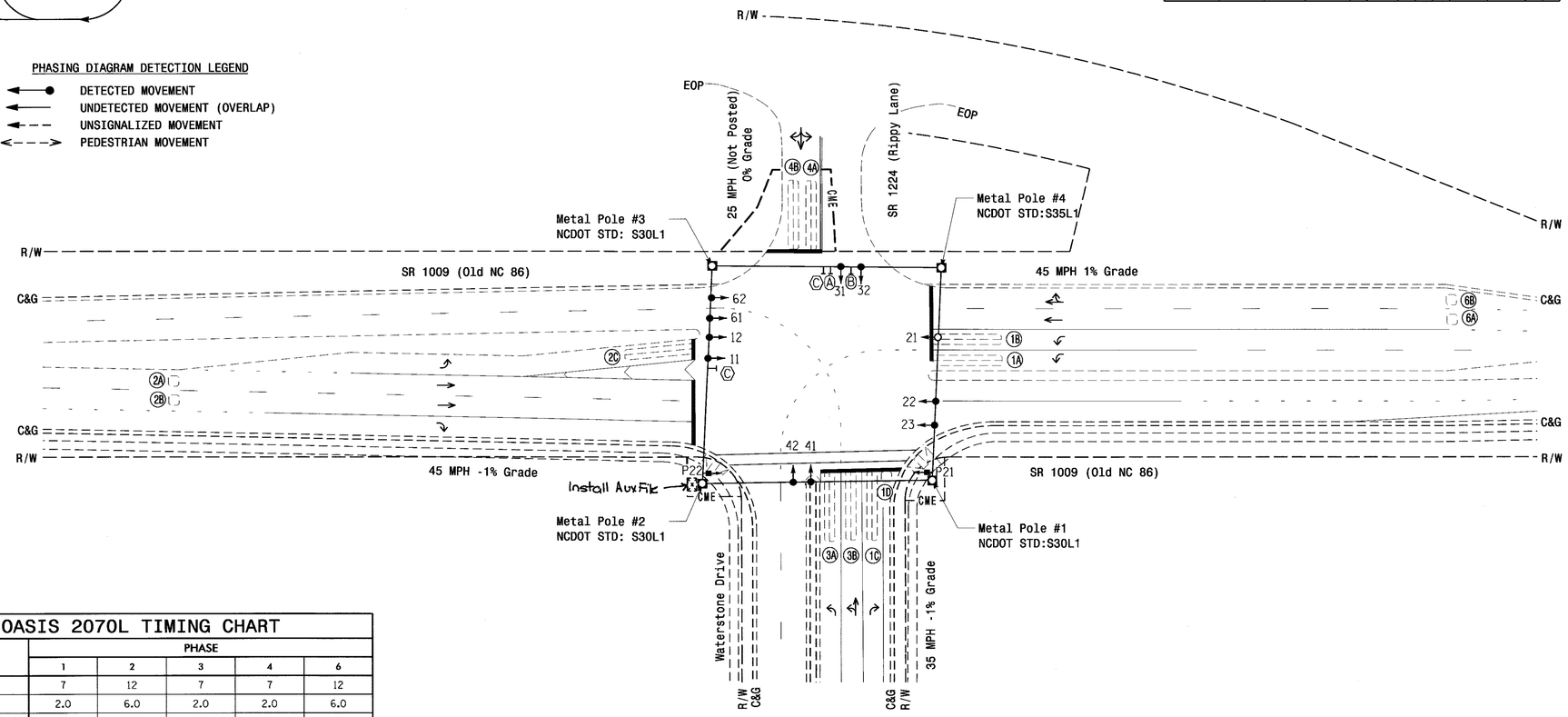
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	-
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	-
1C	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
1D	6X6	0	5	-	1	Y	Y	-	-	15	-	-
2A	6X6	300	6	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	6	-	2	Y	Y	-	-	-	-	-
2C	6X40	0	2-4-2	-	2	Y	Y	Y	-	3	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	-
6A	6X6	300	6	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	6	-	6	Y	Y	-	-	-	-	-

4 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protect for phase 6.
4. Phase 1 may be lagged.
5. The order of phase 3 and phase 4 may be reversed.
6. Set all detector units to presence mode.
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.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	6.0	2.0	2.0	6.0
Max Green 1 *	25	90	30	15	90
Yellow Clearance	3.0	4.6	3.9	3.2	4.6
Red Clearance	3.5	1.8	2.5	3.4	1.8
Red Revert	2.0	2.0	2.0	2.0	5.0
Walk 1 *	-	7	-	-	-
Don't Walk 1	-	29	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	34	-	-	34
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	45	-	-	45
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

* 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	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

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

SR 1009 (Old NC 86)
at
SR 1224 (Rippy Lane) and
Waterstone Drive

Division 7 Orange County Hillsborough

PLAN DATE: August 2013 REVIEWED BY:
PREPARED BY: Larry Blount REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

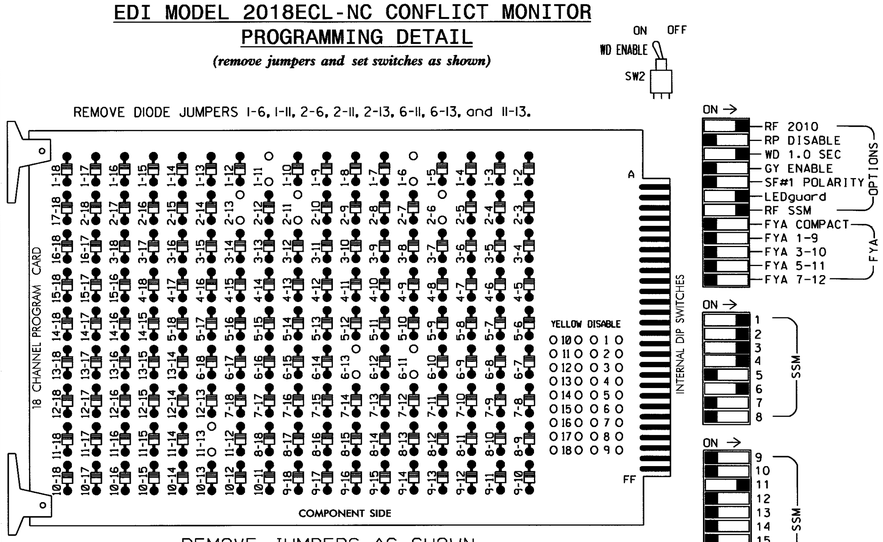
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 9/5/13 DATE
SIG. INVENTORY NO. 07-2129

05-SEP-2013 10:01
S:*TSG&SW\TS Signals\Signal Design Section\Central Region\Div 7\07-2129\072129_sig_dsn_20130905.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
	Sig.116

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 phase 2 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. Ensure Auxiliary Output File is compatible with existing cabinet. Auxiliary Output File required to conform to Los Angeles' specification No. 54-053-08. *Traffic Signal Cabinet Assembly Specification* (dated July, 2008).

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	32	22,23	P21, P22	23	31	32	41	42	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	21★	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																			A114		
YELLOW ARROW	126	126			117															A115		
FLASHING YELLOW ARROW																				A116		
GREEN ARROW	127	127			118	118		103														
✋				113																		
🚶				115																		

NU = Not Used

★ See pictorial of head wiring in detail below.

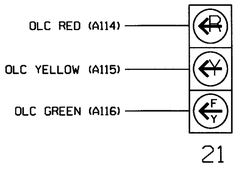
EQUIPMENT INFORMATION

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,S8,AUX S4
PHASES USED.....1,2,2PED,3,4,6
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....6
OVERLAP "D".....NOT USED

✱ In NOTES section refer to note 7.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



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	Ø2 2C	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	Ø1 1D	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø1 1C	Ø2 2B	NOT USED	NOT USED	Ø4 4B			Ø3 3B			NOT USED		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		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			
1C	TB2-7,8	I2L	43	5	12	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			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y	Y		3
3A	TB4-5,6	I5U	58	20	3	3	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
1D	TB6-9,10	I9U	60	22	11	1	Y	Y			15
3B	TB6-11,12	I9L	62	24	13	3	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					

NOTE:
INSTALL DC ISOLATORS 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: 07-2129
DESIGNED: August 2013
SEALED: 9/5/13
REVISED: N/A

Signal Upgrade - Sheet 1 of 2

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 1009 (Old NC 86)
at
SR 1224 (Rippy Lane) and Waterstone Drive

Division 7 | Orange County | Hillsborough

PLAN DATE:	August 2013	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. 9-6-13
SIGNATURE DATE

SIG. INVENTORY NO. 07-2129

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sarmstrong

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE
WITH ADVANCE WALK FEATURE

(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 ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7 AND 8.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

BEGIN LOGIC STATEMENTS FOR FYA APPLICATION (LOGIC STATEMENTS 1-6).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

← END LOGIC STATEMENTS FOR FYA APPLICATION (LOGIC STATEMENTS 1-6).

PRESS '+'

```
LOGICAL I/O COMMAND #7  (+/-COMMAND#)
IF  OUTPUT ASSIGNMENT  #10  IS ON
AND OUTPUT ASSIGNMENT  #13  IS OFF

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
SET OUTPUT  ASSIGNMENT #50 ON
```

← BEGIN LOGIC STATEMENTS FOR ADVANCE WALK WITH FYA. (LOGIC STATEMENTS 7-8).

NOTE: TURN FYA (HEAD 11) OFF DURING 2 PED ADAVNCE WALK.

PRESS '+'

```
LOGICAL I/O COMMAND #8  (+/-COMMAND#)
IF  OUTPUT ASSIGNMENT  #26  IS ON
AND OUTPUT ASSIGNMENT  #29  IS OFF

        SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
SET OUTPUT  ASSIGNMENT #42 ON
```

NOTE: TURN FYA (HEAD 51) OFF DURING 6 PED ADAVNCE WALK.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 10 = 2 PED Walk
OUTPUT 13 = Vehicle 2 Green
OUTPUT 26 = 6 PED Walk
OUTPUT 29 = Vehicle 6 Green
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          |12345678910111213141516
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  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

~~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.~~

! IMPORTANT: Disable Backup Protection for phases 2 and 6.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1825
DESIGNED: July 2013
SEALED: 8/21/13
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1902 (Manning Drive) at East Drive and Hospital Drive (Entrance)	SEAL
Prepared in the Offices of: Transportation Mobility and Safety Division, NCDOT, Signal Management Section 750 N.Greenfield Pkwy,Garner,NC 27529	Division 7 — Orange County — Chapel Hill PLAN DATE: August 2013 — REVIEWED BY: T. Upchurch PREPARED BY: C. Strickland — REVIEWED BY: REVISIONS — INIT. — DATE	NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN SIGNATURE — DATE SIG. INVENTORY NO. 07-1825

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