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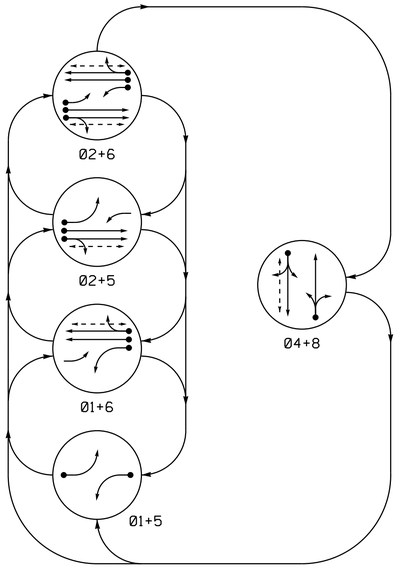
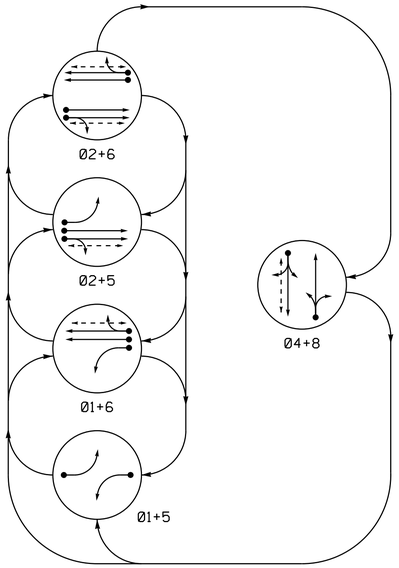
PROJECT REFERENCE NO.	SHEET NO.
W-5705P	Sig. 1

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	EVP 3	EVP 5	FLASH
11	←—	←—	F Y	F Y	~~R~~	←—	F Y	~~Y~~
21, 22	R	R	G	G	R	R	G	Y
41, 42	R	R	R	R	G	R	R	R
51	←—	F Y	←—	F Y	~~R~~	F Y	←—	~~Y~~
61, 62	R	G	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

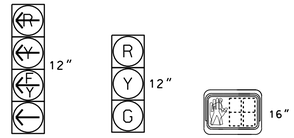
SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	EVP 3	EVP 5	FLASH
11	←—	←—	~~R~~	~~R~~	~~R~~	←—	~~R~~	~~Y~~
21, 22	R	R	G	G	R	R	G	Y
41, 42	R	R	R	R	G	R	R	R
51	←—	~~R~~	←—	~~R~~	~~R~~	~~R~~	←—	~~Y~~
61, 62	R	G	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DRK

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

5 Phase
Fully Actuated
w/ Emergency Vehicle Preemption
(Cary Signal System)

SIGNAL FACE I.D.

All Heads L.E.D.



NOTES

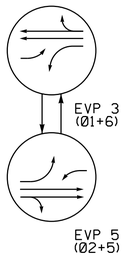
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. 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. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
10. Opticom detector 10 calls EVP 3. Opticom detector 20 calls EVP 5.
11. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Cary signal system data: Fiber Channel #: 15.

PHASING DIAGRAM DETECTION LEGEND

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

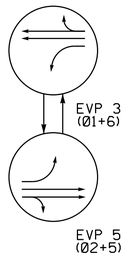
DEFAULT PHASING EV PREEMPT PHASES

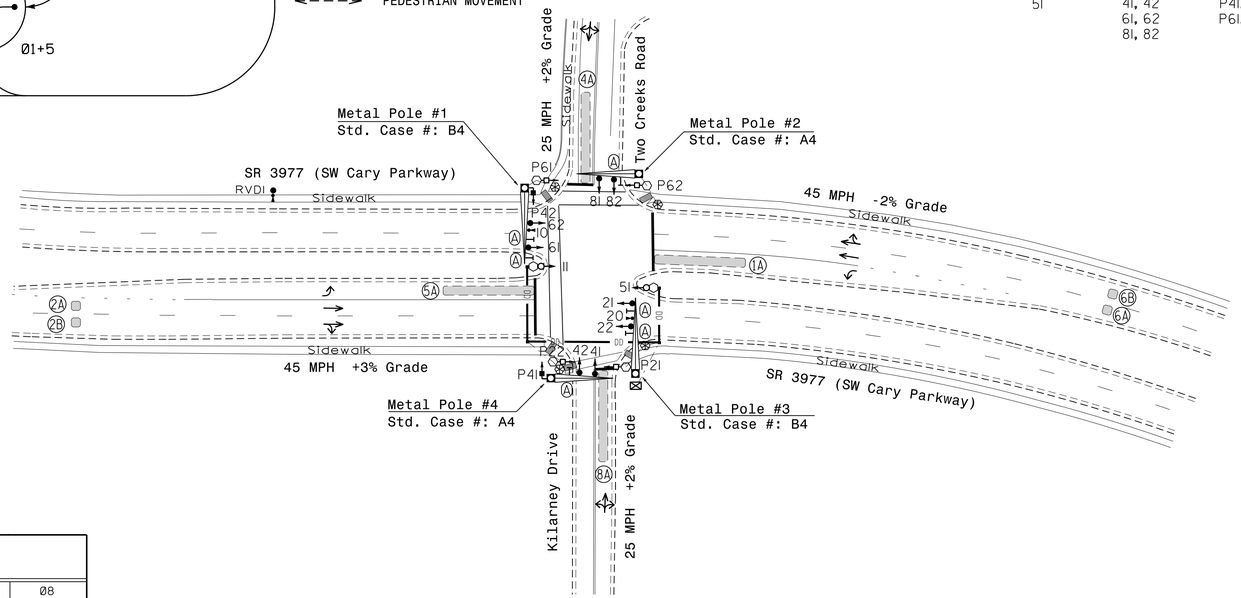
(Medium Priority)



ALTERNATE PHASING EV PREEMPT PHASES

(Medium Priority)





TIMING CHART

ASC/3-2070LN2 CONTROLLER

PHASE	01	02	04	05	06	08
MINIMUM GREEN *	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
VEHICLE EXT. *	2.0 SEC.	6.0 SEC.	2.0 SEC.	2.0 SEC.	6.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.7 SEC.	3.1 SEC.	3.0 SEC.	4.7 SEC.	3.1 SEC.
RED CLEARANCE	3.1 SEC.	1.5 SEC.	3.1 SEC.	2.8 SEC.	1.5 SEC.	3.0 SEC.
MAX. 1 *	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
RECALL POSITION	NONE	MIN. RECALL	NONE	NONE	MIN. RECALL	NONE
LOCK DET.	OFF	ON	OFF	OFF	ON	OFF
WALK *	– SEC.	7 SEC.	7 SEC.	– SEC.	7 SEC.	– SEC.
PED. CLEAR	– SEC.	5 SEC.	24 SEC.	– SEC.	10 SEC.	– SEC.
VOLUME DENSITY	OFF	ON	OFF	OFF	ON	OFF
ACTUATION B4 ADD *	– VEH.	– VEH.	– VEH.	– VEH.	– VEH.	– VEH.
SEC. PER ACTUATION *	– SEC.	1.5 SEC.	– SEC.	– SEC.	1.5 SEC.	– SEC.
MAX. INITIAL *	– SEC.	34 SEC.	– SEC.	– SEC.	34 SEC.	– SEC.
TIME B4 REDUCTION *	– SEC.	15 SEC.	– SEC.	– SEC.	15 SEC.	– SEC.
TIME TO REDUCE *	– SEC.	45 SEC.	– SEC.	– SEC.	45 SEC.	– SEC.
MINIMUM GAP	– SEC.	3.0 SEC.	– SEC.	– SEC.	3.0 SEC.	– SEC.
DUAL ENTRY	OFF	OFF	ON	OFF	OFF	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.

EMERGENCY VEHICLE PREEMPTION

FUNCTION	EVP 3 (1+6) SECONDS	EVP 5 (2+5) SECONDS
DELAY BEFORE PREEMPT	0	0
PMT OVERRIDE	OFF	OFF
PED CLEAR THROUGH YELLOW	Y	Y
TERMINATE PHASES	N	N
ENTRANCE WALK	1	1
ENTRANCE PED CLEAR	12	12
ENTRANCE MIN GREEN	1	1
ENTRANCE YELLOW CLEAR	25.5*	25.5*
ENTRANCE RED CLEAR	25.5*	25.5*
MIN DWELL GREEN	7	7
MAX CALL TIME	120	120
EXIT PHASE(S)	2+6	2+6
EXIT YELLOW CLEAR	25.5*	25.5*
EXIT RED CLEAR	25.5*	25.5*

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

LOOP & DETECTOR INSTALLATION CHART

ASC/3-2070LN2 CONTROLLER w/ TS-2 CABINET

INDUCTIVE LOOPS ZONE NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	TURNS	NEW	EXISTING	DETECTOR UNITS NEMA PHASE	NEW	EXISTING	TIMING FEATURE	TIMING TIME	USE ADDED INITIAL	DET. TYPE
1A	6X60	0	*	-	X	1	X	-	DELAY	15#	–	S
						6##	X	-	DELAY	3	–	G
2A	6X6	300	*	-	X	2	X	-	-	-	X	N
2B	6X6	300	*	-	X	2	X	-	-	-	X	N
4A	6X60	0	*	-	X	4	X	-	DELAY	10	–	S
5A	6X60	0	*	-	X	5	X	-	DELAY	15#	–	S
						2##	X	-	DELAY	3	–	G
6A	6X6	300	*	-	X	6	X	-	-	-	X	N
6B	6X6	300	*	-	X	6	X	-	-	-	X	N
8A	6X60	0	*	-	X	8	X	-	DELAY	10	–	S
RVDI	-	+250	-	-	X	-	X	-	SYSTEM DETECTOR			N

* Video Detection Zone
\# Disable Delay During Alternate Phasing Operation.
\## Disable Phase Call For Loop(s) During Alternate Phasing 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	●
▭	Video Detection Area	▭
⊠	Controller & Cabinet	⊡
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	----------
→	Directional Arrow	→
▱	Metal Pole with Mastarm	▱
N/A	Directional Drill	—DD—
⊂	Optical Detector	●
⊛	Type I Pushbutton Post	⊛
⬡	Type II Signal Pedestal	⬢
N/A	Curb Ramp	◢
Ⓐ	Street Name Sign (D3-1)	Ⓐ

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 3977 (SW Cary Parkway)
at
Two Creeks Road and
Kilarney Drive

Division 5 Wake County Cary

PLAN DATE: June 2018 REVIEWED BY:
PREPARED BY: C.E. Carter REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
DocuSigned by: 7/10/2018
SIGNATURE DATE

SIG. INVENTORY NO. 05-2140

07-AUG-2018 15:29
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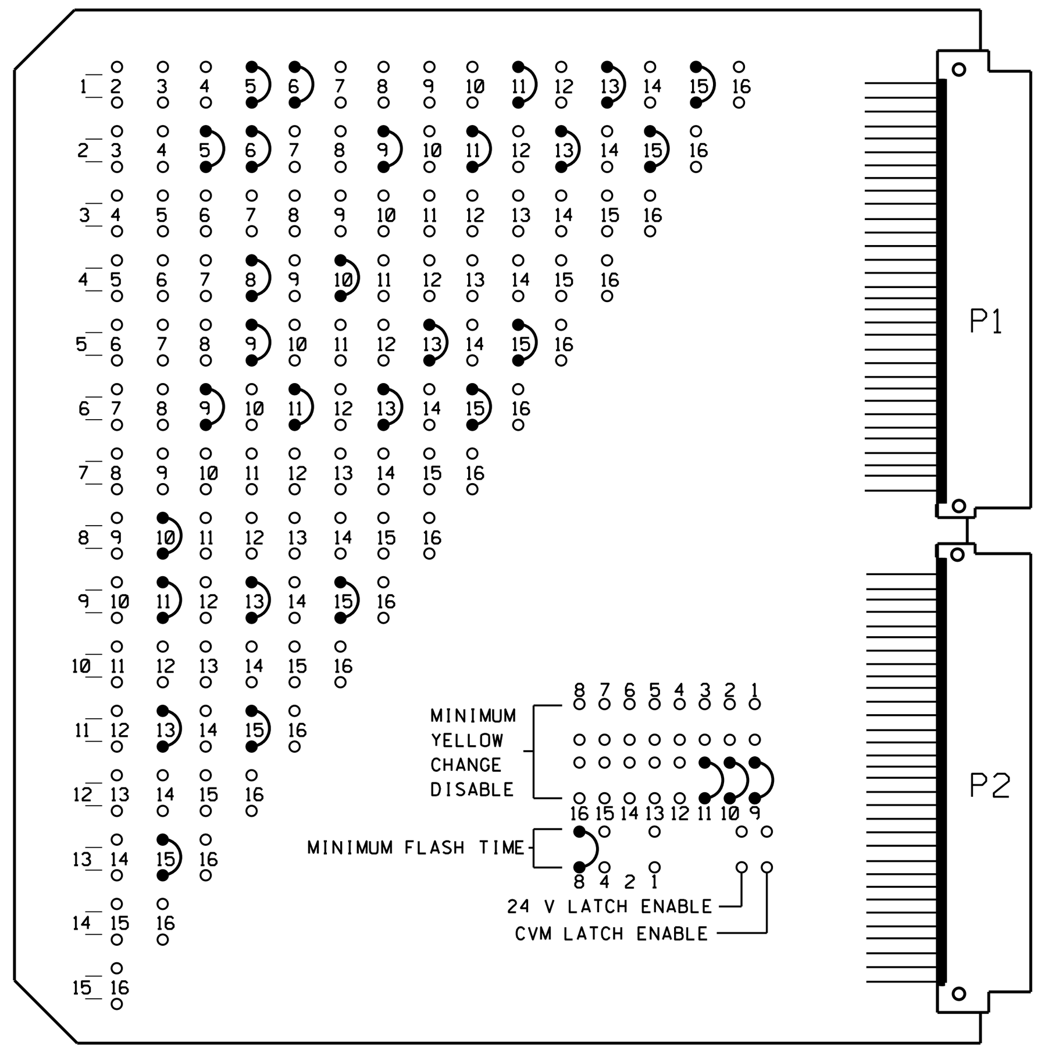
rziemba

EDI MODEL MMU2-16LEip MALFUNCTION MANAGEMENT UNIT PROGRAMMING DETAIL

(program card and tables as shown)



MMU PROGRAMMING CARD

FIELD CHECK ENABLE DUAL IND ENABLE RED FAIL ENABLE	
CHANNEL NUMBER	ENABLE/ DISABLE
1	DISABLE
2	ENABLE
3	DISABLE
4	ENABLE
5	DISABLE
6	ENABLE
7	DISABLE
8	ENABLE
9	ENABLE
10	ENABLE
11	ENABLE
12	DISABLE
13	ENABLE
14	DISABLE
15	ENABLE
16	DISABLE

UNIT OPTIONS	
OPTION	SETTING
RECURRENT PULSE	ON
WALK DISABLE	OFF
LOG CVM FAULTS	ON
EXTERN WATCHDOG	OFF
24V-2=12VDC	OFF
PGM CARD MEMORY	ON
LEDguard	ON
FORCE TYPE 16	OFF
TYPE12-SDLC	OFF
VM 3x/Day Latch	ON

FLASHING YELLOW ARROW	
CONFIG MODE	B
ENABLE CHANNEL PAIR, FYA	
CH 1-13	ON
CH 3-14	OFF
CH 5-15	ON
CH 7-16	OFF
RED/YEL INPUT ENABLE	
CH 1	ON
CH 3	OFF
CH 5	ON
CH 7	OFF
FLASH RATE FAULT	ON
FYA TRAP DETECT	ON

MMU PROGRAMMING NOTE

ENSURE YELLOW CHANGE PLUS RED CLEARANCE MONITORING IS ENABLED FOR ALL CHANNELS.

NOTES

1. To prevent "flash-conflict" problems, wire all unused load switches to flash red. Verify that signal heads flash in accordance with the signal plans.
2. To prevent red failures on unused monitor channels, tie unused load switch red outputs 1,3,5,7,12,14 and 16 to load switch AC+ by inserting a jumper plug in the unused load switch socket from pin 1 (LS AC+) to pin 3 (RED out). Make sure all flash transfer relays are in place.
3. Program controller to start up in phase 2 Walk and 6 Walk.
4. Set power-up flash time to 10 seconds and implement on the Malfunction Management Unit. Set controller power-up flash time to 0 seconds.
5. Program detectors in accordance with the manufacturer's instructions to accomplish the detection schemes shown on the signal design plans.
6. Program detector call delay and extension timing on the controller, unless otherwise specified.
7. Set all detector card unit channles to "presence" mode.
8. Program phases 4 and 8 for dual entry.
9. The cabinet and controller are a part of the Cary Siganl System.

PROJECT REFERENCE NO.	SHEET NO.
W-5705P	Sig. 2

SIGNAL HEAD HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	11★	21,22	NU	41,42	51★	61,62	NU	81,82	P21, P22	P41, P42	P61, P62	NU	11★	NU	51★	NU
RED	✳	2R		4R	✳	6R		8R								
YELLOW	✳	2Y		4Y	✳	6Y		8Y								
GREEN		2G		4G		6G		8G								
RED ARROW													13R		15R	
YELLOW ARROW													13Y		15Y	
FLASHING YELLOW ARROW													13G		15G	
GREEN ARROW	1G				5G											
									9R	10R	11R					
									9G	10G	11G					

NU = Not Used
✳ Denotes install load resistor. See Load Resistor Installation Detail on sheet 3.
★ See pictorial of head wiring detail this sheet.

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

RACK #1	BIU	SLOT EMPTY	CH1 L1 Ø1 / CH2 L2 Ø6	CH1 L7 Ø5 / CH2 L8 Ø2	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	CHA EVP3 Ø1,6 / CHB EVP4 Ø2,5	SLOT EMPTY	SLOT EMPTY

RACK #2	BIU	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

	LOOP NO.	LOOP PANEL TERMINALS
ADD JUMPERS FROM: L1A TO L2A, AND L1B TO L2B	1A	L1A,L1B
		L2A,L2B
ADD JUMPERS FROM: L7A TO L8A, AND L7B TO L8B	5A	L7A,L7B
		L8A,L8B
	NU	L15A,L15B
	NU	L16A,L16B

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

	CONTROLLER DETECTOR NO.	FUNCTION	TIMING FEATURE	TIMING TIME(SEC)
★	1	Ø1	DELAY	15
★	✳ 2	Ø6	DELAY	3
★	7	Ø5	DELAY	15
★	✳ 8	Ø2	DELAY	3
	15			
	16			

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
S1	L17A,L17B
S2	L18A,L18B
NU	L19A,L19B
NU	L20A,L20B
NU	L21A,L21B
NU	L22A,L22B
NU	L30A,L31B
NU	L32A,L32B

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING FEATURE	TIMING TIME(SEC)
✳✳ 17	SYSTEM		
✳✳ 18	SYSTEM		
19			
20			
21			
22			
31			
32			

✳ Detector Type - G (remove delay from existing detector card)
✳✳ Detector Type - N
★ see vehicle detector setup programmming detail sheet 3

SPECIAL DETECTOR NOTE

1) For this design zones 1A and 5A detector card placement and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheets 3 and 4 of this electrical detail.

2) For all other zones install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

3) Install a radar detection system for vehicle detection Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting location to accomplish the detection schemes shown shown on the Signal Design Plans.

NOTE

BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	Ø1
2	Ø2
3	Ø3
4	Ø4
5	Ø5
6	Ø6
7	Ø7
8	Ø8
9	Ø2 PED
10	Ø4 PED
11	Ø6 PED
12	Ø8 PED
13	OLA
14	OLB
15	OLC
16	OLD

UNUSED LOAD SWITCH CHANNELS SHALL BE DISABLED IN CONTROLLER PROGRAMMING

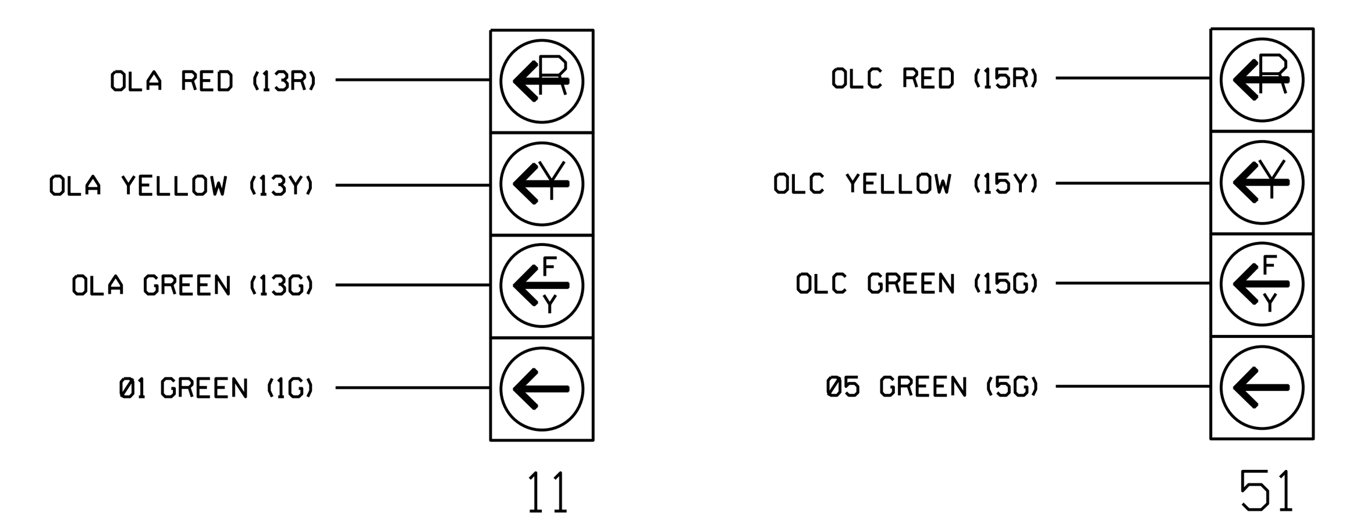
EQUIPMENT INFORMATION

CONTROLLER.............2070EN2
CABINET TS-2
SOFTWARE ....ECONOLITE ASC/3-2070
CABINET MOUNT..........BASE
LOADBAY POSITIONS.......16
LOAD SWITCHES USED......1,2,4,5,6,8,9,10,11,13,15
PHASES USED............1,2,2 PED,4,4 PED,5,6,6 PED,8
OLA.....................✳
OLB.....................NOT USED
OLC.....................✳
OLD.....................NOT USED

✳ See overlap programming detail on sheet 2

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2140
DESIGNED: June 2018
SEALED: 7-10-18
REVISED: N/A

Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

SR 3977 (SW Cary Parkway)
at
Two Creeks Road and
Kilarney Drive

Division 5 Wake County Cary

PLAN DATE: July 2018	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 8/3/2018
430320FAA2654C3...
DATE

SIG. INVENTORY NO. 05-2140

03-AUG-2018 12:09
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jtpeterson

ECONOLITE ASC/3-2070 EMERGENCY VEHICLE PREEMPT PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [4. PREEMPTOR/TSP]
2. From PREEMPTOR/TSP/SCP Submenu select [1. PREEMPT PLAN 1-10]

Place cursor in [ ] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

```
PREEMPT PLAN [  3]    ENABLE....YES
 VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . . . . . . . . . . . . .
TRKCLR O . . . . . . . . . . . . . . . .
ENA TRL  . . . . . . . . . . . . . . . .
DWEL VEH X . . . . X . . . . . . . . . .
DWEL PED . . . . . . . . . . . . . . . .
DWEL OLPF1 .F1 . . . . . . . . . . . . .
CYC VEH  . . . . . . . . . . . . . . . .
CYC PED  . . . . . . . . . . . . . . . .
CYC OLP  . . . . . . . . . . . . . . . .
EXIT PH  . X . . . X . . . . . . . . . .
EXIT CAL . . . . . . . . . . . . . . . .
SP FUNC  . . . . . . . . . . . . . . . .

ENABLE... YES|PMT OVRIDE..|INTERLOCK. NO
DET LOCK... X|DELAY..    0|INHIBIT...  0
OVERIDE FL. .|DURATION   0|CLR-GRN... NO
TERM OLP.  NO|PC>YEL   YES|TERM PH    NO
PED DARK.. NO|TC RESRV  NO|DWELL FL  OFF
LINK PMT....0|X FLCOLR RED|EXIT OPT. OFF
X TMG PLN...0|RE-SERV..  0|FLT TYPE.HARD
FREE DUR PMT|R1  NO|R2  NO|R3  NO|R4  NO
--TIMING-----WALK|PED CL|MN GR| YEL| RED
ENTRANCE TM.    1|    12|    1|25.5|25.5
-----------MIN GR|EXT GR|MX GR| YEL| RED
TRACK CLEAR     0|     0|    0| 0.0| 0.0
-----------MIN DL|PMTEXT|MX TM| YEL| RED
DWL/CYC-EXIT    7|   0.0|  120|25.5|25.5
PMT ACTIVE OUT..ON   PMT ACT DWELL...NO
OTHER - PRI PMT.OFF  NON-PRI PMT.....OFF
INH EXT TIME... 0.0  PED PR RETURN...OFF
PRIORITY RETURN.OFF  QUEUE DELAY.... OFF
COND DELAY......OFF
PHASES     1   2   3   4   5   6   7   8
PR RTN%    0   0   0   0   0   0   0   0
PHASES     9  10  11  12  13  14  15  16
PR RTN%    0   0   0   0   0   0   0   0
```

Place cursor in [ ] next to Preempt Plan and press 4. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #4.

```
PREEMPT PLAN [  4]    ENABLE....YES
 VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . . . . . . . . . . . . .
TRKCLR O . . . . . . . . . . . . . . . .
ENA TRL  . . . . . . . . . . . . . . . .
DWEL VEH . X . . X . . . . . . . . . . .
DWEL PED . . . . . . . . . . . . . . . .
DWEL OLPF1 .F1 . . . . . . . . . . . . .
CYC VEH  . . . . . . . . . . . . . . . .
CYC PED  . . . . . . . . . . . . . . . .
CYC OLP  . . . . . . . . . . . . . . . .
EXIT PH  . X . . . X . . . . . . . . . .
EXIT CAL . . . . . . . . . . . . . . . .
SP FUNC  . . . . . . . . . . . . . . . .

ENABLE... YES|PMT OVRIDE..|INTERLOCK. NO
DET LOCK... X|DELAY..    0|INHIBIT...  0
OVERIDE FL. .|DURATION   0|CLR-GRN... NO
TERM OLP.  NO|PC>YEL   YES|TERM PH    NO
PED DARK.. NO|TC RESRV  NO|DWELL FL  OFF
LINK PMT....0|X FLCOLR RED|EXIT OPT. OFF
X TMG PLN...0|RE-SERV..  0|FLT TYPE.HARD
FREE DUR PMT|R1  NO|R2  NO|R3  NO|R4  NO
--TIMING-----WALK|PED CL|MN GR| YEL| RED
ENTRANCE TM.    1|    12|    1|25.5|25.5
-----------MIN GR|EXT GR|MX GR| YEL| RED
TRACK CLEAR     0|     0|    0| 0.0| 0.0
-----------MIN DL|PMTEXT|MX TM| YEL| RED
DWL/CYC-EXIT    7|   0.0|  120|25.5|25.5
PMT ACTIVE OUT..ON   PMT ACT DWELL...NO
OTHER - PRI PMT.OFF  NON-PRI PMT.....OFF
INH EXT TIME... 0.0  PED PR RETURN...OFF
PRIORITY RETURN.OFF  QUEUE DELAY.... OFF
COND DELAY......OFF
PHASES     1   2   3   4   5   6   7   8
PR RTN%    0   0   0   0   0   0   0   0
PHASES     9  10  11  12  13  14  15  16
PR RTN%    0   0   0   0   0   0   0   0
```

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2140
DESIGNED: June 2018
SEALED: 7-10-18
REVISED: N/A

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.

ECONOLITE ASC/3-2070 PREEMPT FILTERING PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [4. PREEMPTOR/TSP]
2. From PREEMPT/TSP/SCP Submenu select [2. ENABLE PREEMPT FILTERING & TSP/SCP]

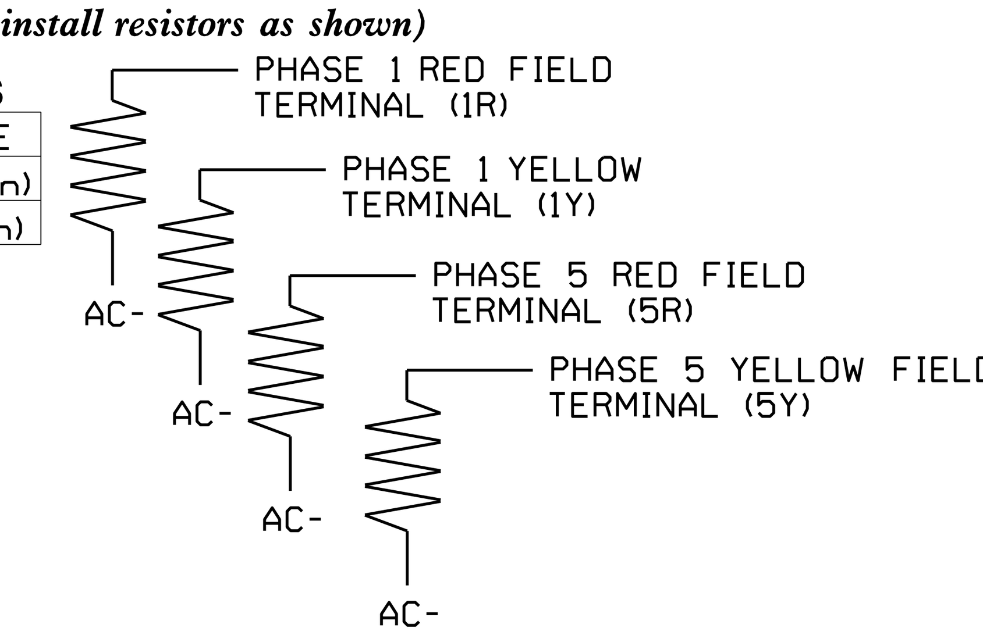
```
ENABLE PREEMPT FILTERING & TSP/SCP
FILTERED     SOLID          PULSING
INPUT  1 ...BYPASSED.. ...BYPASSED..
       2 ...BYPASSED.. ...BYPASSED..
       3 ..PREEMPT  3. ...BYPASSED..
       4 ..PREEMPT  4. ...BYPASSED..
       5 ..PREEMPT  5. ...BYPASSED..
       6 ..PREEMPT  6. ...BYPASSED..
       7 ...BYPASSED.. ...BYPASSED..
       8 ...BYPASSED.. ...BYPASSED..
       9 ...BYPASSED.. ...BYPASSED..
      10 ...BYPASSED.. ...BYPASSED..
```

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES

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



Electrical Detail - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy,Garner,NC 27529

SR 3977 (SW Cary Parkway)
at
Two Creeks Road and
Kilarney Drive

Division 5 | Wake County | Cary

PLAN DATE: July 2018 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 8/3/2018
DATE

SIG. INVENTORY NO. 05-2140

03-AUG-2018 11:40
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jtpeterson

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED PHASE (LEFT TURN)......... 1
PERMISSIVE PHASE (OPPOSING THRU).... 2
FLASHING ARROW OUTPUT.....CH13 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 1
```

← NOTICE ACTION PLAN SF BIT "1"

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

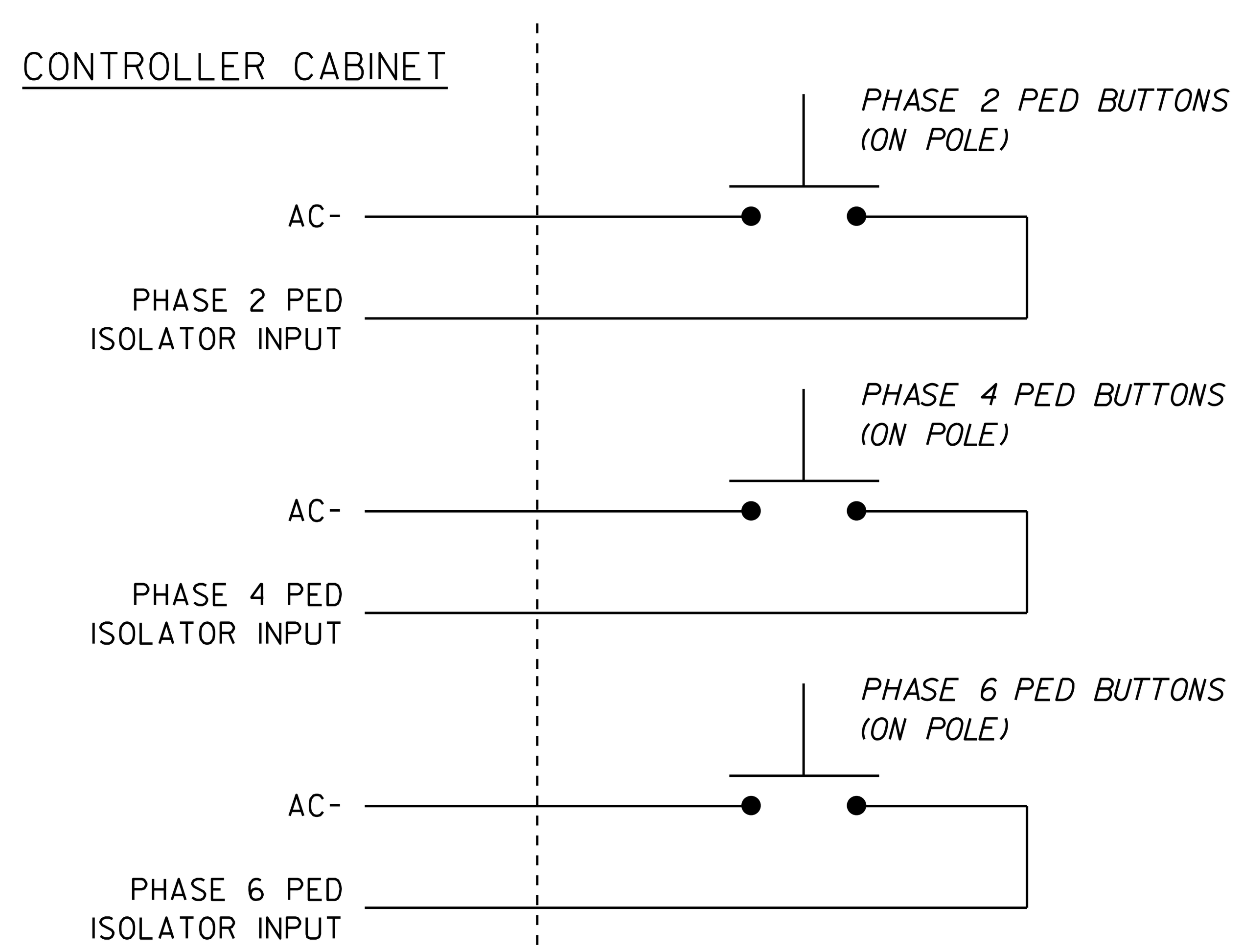
```
TMG VEH OVLP...[C] TYPE: .....PPLT FYA

PROTECTED PHASE (LEFT TURN)......... 5
PERMISSIVE PHASE (OPPOSING THRU).... 6
FLASHING ARROW OUTPUT.....CH15 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 5
```

← NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

PEDESTRIAN PUSH BUTTON WIRING DETAIL

(wire push buttons as shown)



ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select [8. UTILITIES]
2. From UTILITIES Submenu select [1. COPY/CLEAR]
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```
COPY / CLEAR UTILITY
     FROM                TO
PHASE TIMING.... . > PHASE TIMING.... .
TIMING PLAN..... . > TIMING PLAN..... .
PH DET OPT PLAN. . > PH DET OPT PLAN. .
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
  TOGGLE TO SELECT A "FROM" AND A "TO"
           THEN PRESS ENTER
```

4. From Main Menu select [6. DETECTORS]
5. From DETECTOR Submenu select [2. VEHICLE DETECTOR SETUP]
6. Place cursor in VEH DET PLAN [ ] position and enter "2".

- Place cursor in VEH DETECTOR [ ] position and enter "1".
- Set delay time to "0".

```
VEH DETECTOR [ 1]   VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 1  1   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...   0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN....... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "2".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [ 2]   VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 2  0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...   0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN....... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

← NOTICE VEH DET PLAN 2

- Place cursor in VEH DETECTOR [ ] position and enter "7".
- Set delay time to "0".

```
VEH DETECTOR [ 7]   VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 7  5   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...   0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN....... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [ ] position and enter "8".
- Set assigned phase to "0".

ENSURE PHASE IS SET TO "0" →

```
VEH DETECTOR [ 8]   VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... . ECPI LOG.......   NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
 8  0   . . . . . . . . . . . . . . . .
EXTEND TIME...  0.0 DELAY TIME...   0.0
USE ADDED INITIAL . CROSS SWITCH PH..  0
LOCK IN....... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
```

← NOTICE VEH DET PLAN 2

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2140
DESIGNED: June 2018
SEALED: 7-10-18
REVISED: N/A

Electrical Detail - Sheet 3 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3977 (SW Cary Parkway) at Two Creeks Road and Kilarney Drive

Division 5 | Wake County | Cary

PLAN DATE: July 2018 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS | INIT. | DATE

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 8/3/2018 DATE

SIG. INVENTORY NO. 05-2140

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ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN DEFAULT PHASING	1	NONE
ACTIONS REQUIRED TO RUN ALTERNATE PHASING	2	1, 5

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1 AND 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 1,5: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select [5. TIME BASE]
2. From TIME BASE Submenu select [2. ACTION PLAN]

```
ACTION PLAN...[  1]
PATTERN..........AUTO   SYS OVERRIDE.... NO
TIMING PLAN........ 0   SEQUENCE........  0
VEH DETECTOR PLAN.. 2   DET LOG........NONE
FLASH...........   --   RED REST........ NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE..   NO   PRIORITY RETURN. NO
PED PR RETURN..    NO   QUEUE DELAY..... NO
PMT COND DELAY     NO
  PHASE   1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PED RCL   . . . . . . . . . . . . . . . .
WALK 2    . . . . . . . . . . . . . . . .
VEX 2     . . . . . . . . . . . . . . . .
VEH RCL   . . . . . . . . . . . . . . . .
MAX RCL   . . . . . . . . . . . . . . . .
MAX 2     . . . . . . . . . . . . . . . .
  PHASE   1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
MAX 3     . . . . . . . . . . . . . . . .
CS INH    . . . . . . . . . . . . . . . .
OMIT      . . . . . . . . . . . . . . . .
SPC FCT   X . . . X . . . (1-8)
AUX FCT   . . . (1-3)
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
LP 1-15   . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . .
LP 91-100 . . . . . . . . . . . . . . .
```

ECONOLITE ASC/3-2070 SPECIAL MMU PROGRAMMING

(program controller as shown)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [4. PORT 1 (SDLC)]
3. From PORT 1 (SDLC) Submenu select [2. MMU PROGRAM]

CAUTION!

Set intersection to Flash before attempting to enter or change any MMU programming data.

This programming and that of the MMU programming card must match exactly. If they do not, the intersection will be placed into Flash.

```
MMU PROGRAM [     MANUAL]

   CH  6 5 4 3 2 1 0 9 8 7 6 5 4 3 2
    1  . X . X . X . . . . X X . . .
    2  . X . X . X . X . . X X . .
    3  . . . . . . . . . . . . .
    4  . . . . . . X . X . . .
    5  . X . X . . . X . . .
    6  . X . X . X . X . .
    7  . . . . . . . . .
    8  . . . . . . X .
    9  . X . X . X .
   10  . . . . . .
   11  . X . X .
   12  . . . .
   13  . X .
   14  . .
   15  .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2140
DESIGNED: June 2018
SEALED: 7-10-18
REVISED: N/A

Electrical Detail - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3977 (SW Cary Parkway) at Two Creeks Road and Kilarney Drive

Division 5 | Wake County | Cary

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: July 2018	REVIEWED BY:
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 430320FAA2654C3...
8/3/2018
DATE

SIG. INVENTORY NO. 05-2140

03-AUG-2018 11:39
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jtpeterson