MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	6	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	-	-	-	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0888
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

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

SR 1010 (Ten Ten Road)
at
Chalice Lane

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

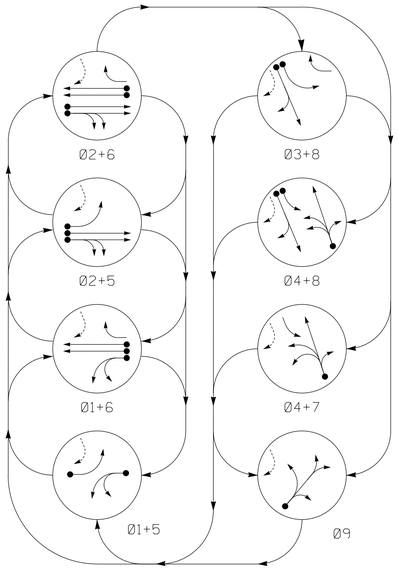
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
D8EC537F8...
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-0888

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 14.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

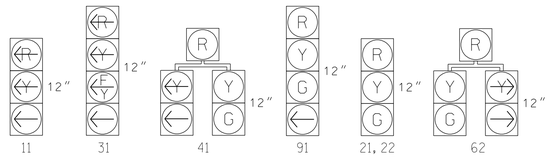
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+8	Ø4+8	Ø4+7	Ø9	FLASH
11	←R	←R	R	R	R	R	R	R	R
21, 22	R	R	G	G	R	R	R	R	Y
31	←R	←R	R	R	←	F Y	←R	R	R
41	R	R	R	R	R	G	R	R	
42, 43	R	R	R	R	G	G	R	R	
51	←R	←R	←R	←R	←R	←R	←R	←R	R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
81, 82	R	R	R	R	G	G	R	R	R
91	R	R	R	R	R	R	G ←	R	
92	R	R	R	R	R	R	G	R	

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	+5	2-4-2	-	1	-	-	X	-	X	-	-
2A	6X6	405	EXIST	-	2	-	-	X	X	X	-	-
2B	6X6	405	EXIST	-	2	-	-	X	X	X	-	-
3A	6X40	0	2-4-2	-	3	15	-	X	-	X	-	-
					8	3	-	X	-	X	-	-
4A	6X60	+5	2-4-2	-	7	15	-	X	-	X	-	-
					4	3	-	X	-	X	-	-
5A	6X40	+5	2-4-2	-	5	-	-	X	-	X	-	-
6A	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
6B	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	-
9A	6X60	+5	2-4-2	-	9	3	-	X	-	X	-	-

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8	9
Walk *	–	–	–	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–	–	–	–
Min Green	7	14	7	7	7	14	7	7	7
Passage *	2.0	6.0	2.0	1.0	2.0	6.0	1.0	2.0	1.0
Max 1 *	20	90	15	30	25	90	15	20	30
Yellow Change	3.0	4.8	3.0	4.5	3.0	5.0	3.0	4.5	4.3
Red Clear	3.6	1.0	3.3	2.7	2.6	1.1	3.5	2.7	2.5
Added Initial *	–	2.0	–	–	–	2.0	–	–	–
Maximum Initial *	–	45	–	–	–	45	–	–	–
Time Before Reduction *	–	15	–	–	–	15	–	–	–
Time To Reduce *	–	30	–	–	–	30	–	–	–
Minimum Gap	–	3.4	–	–	–	3.4	–	–	–
Advance Walk	–	–	–	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–	X	X	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–	–	–
Dual Entry	–	–	–	X	–	–	–	X	–

* 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.

8 Phase Fully Actuated (Fuquay-Varina Signal System)

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. Omit phase 3 during phase 4 on.
4. Phase 1 and/or phase 5 may be lagged.
5. The order of phases 3+8 and 4+7 shall not be reversed.
6. Phase 9 may be served prior to phase 3+8 and 4+8.
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. Install new controller, software and conflict monitor in existing cabinet.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Disconnect and abandon existing loops 2C, 2D, 6C and 6D.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	"NO TURN ON RED" Sign (R10-11)	(A)
(B)	Yield Sign (R1-2)	(B)

Signal Upgrade

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

US 401 (N Main St/Fayetteville Rd) at SR 2752 (Air Park Road)/ SR 1393 (Hilltop Needmore Road) and SR 2751 (Hilltop Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

Documented by: Anthony Encarnacion 4/14/2023
CHECKSTYLE SIGNATURE DATE

SIG. INVENTORY NO. 05-0925

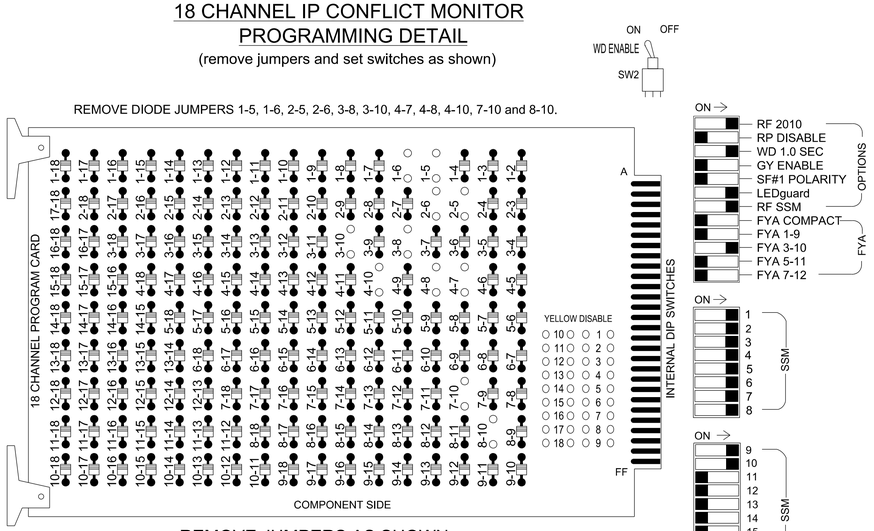
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

13-APR-2023 12:27
pw://SUS003343.watkins.com:ATKNAN01/Documents/Roads and Bridges/Projects/100053268 Fuquay Varina/Task 05_11_Signals/050925_sig_dsn_2022nmda.dgn
STIF4685 AT LUS49089

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 14.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S4, S5, S7, S8, S10, S11, AUX S1, AUX S2
Phases Used.....1, 2, 3, 4, 5, 6, 7, 8, 9
Overlap "1".....*
Overlap "2".....*
Overlap "3".....NOT USED
Overlap "4".....NOT USED

*See overlap programming detail on sheet 2

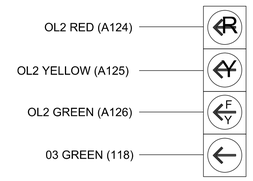
SIGNAL HEAD HOOK-UP CHART

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	OL1		OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31★	62	41,42, 43	NU	51	61,62	NU	41	81,82	NU	91	92	31★	NU	NU	NU	NU
RED		128			*	101			134		*	107		A121	A121					
YELLOW		129				102			135			108		A122	A122					
GREEN		130				103			136			109		A123	A123					
RED ARROW	125							131								A124				
YELLOW ARROW	126				117			132			123					A125				
FLASHING YELLOW ARROW																A126				
GREEN ARROW	127			118	118			133			124			A123						

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

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

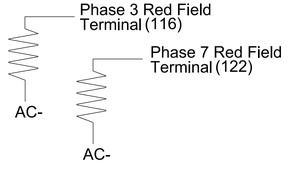
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1			X		X	
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3	15		X		X	
				-	30	8	3		X		X	
5A	TB3-1,2	J1U	55	17	15	5			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6			X		X	
4A	TB5-5,6	J5U	57	19	21	7	15		X		X	
				-	32	4	3		X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
9A	TB5-11,12	J6L	46	8	23	9	3		X		X	

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0925
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401 (N Main St/Fayetteville Road) at SR 2752 (Air Park Road)/ SR 1393 (Hilltop Needmore Road) and SR 2751 (Hilltop Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

Developed by: Anthony Encarnacion 4/14/2023
DOCUSIGNED SIGNATURE DATE

SIG. INVENTORY NO. 05-0925

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 14.2

SEQUENCE DETAIL

Front Panel
Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	1,2,a,3,4,b,9,c
2	5,6,a,8,7,b,c

COMPATIBILITY

Front Panel
Main Menu >Controller >Sequence & Phs Config>No Served Phase Plans

Web Interface
Home >Controller >Phase Configuration>No Served Phase Plans

Sequence 1

Phase	No Serve Phase
1	-
2	-
3	7
4	-
5	-
6	-
7	-
8	-

BACKUP PREVENTION PROGRAMMING

Front Panel
Main Menu >Controller >Sequence & Phs Config >Backup Prevention >
Backup Protection Plan

Web Interface
Home >Controller> Backup Prevention >Backup Protection Plan

Sequence 1

No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	-	-	-	-	-	-	-	-
Serve Phase 2	-	-	-	-	-	-	-	-
Serve Phase 3	-	-	-	-	-	-	-	-
Serve Phase 4	-	-	X	-	-	-	-	-
Serve Phase 5	-	-	-	-	-	-	-	-
Serve Phase 6	-	-	-	-	-	-	-	-
Serve Phase 7	-	-	-	-	-	-	-	-
Serve Phase 8	-	-	-	-	-	-	-	-

OVERLAP PROGRAMMING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	Normal	FYA 4 - Section	-	-
Included Phases	9	4	-	-
Modifier Phases	-	3	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0925
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 401 (N Main St/Fayetteville Road)
at SR 2752 (Air Park Road)/
SR 1393 (Hilltop Needmore Road)
and SR 2751 (Hilltop Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INT.	DATE

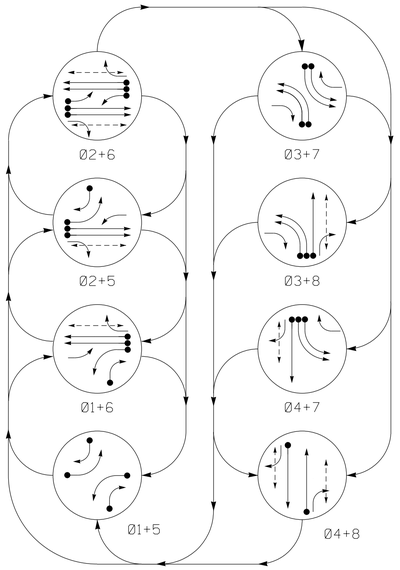
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

Docusigned by: Anthony Encarnacion 4/14/2023
DOCUSIGNED SIGNATURE DATE

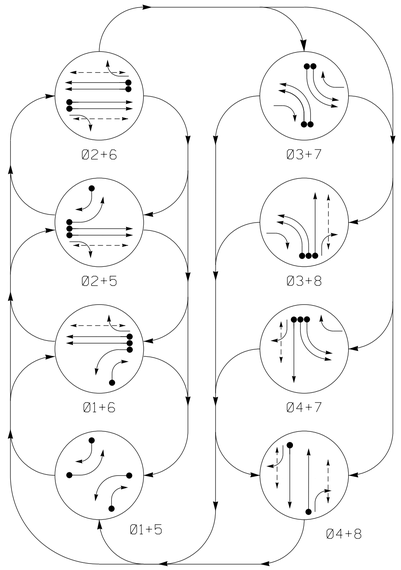
SIG. INVENTORY NO. 05-0925

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 15.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	X
					6#	3	-	X	-	X	X	X
1B	6X40	0	2-4-2	-	1	15	-	X	-	X	-	X
2A	6X6	200	3	X	2	-	-	X	X	X	-	X
2B	6X6	200	3	X	2	-	-	X	X	X	-	X
3A	6X40	0	2-4-2	-	3	-	-	X	-	X	-	X
3B	6X40	0	2-4-2	-	3	-	-	X	-	X	-	X
4A	6X40	0	2-4-2	-	4	-	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
					2#	3	-	X	-	X	X	X
5B	6X40	+5	2-4-2	-	5	15	-	X	-	X	-	X
6A	6X6	200	3	X	6	-	-	X	X	X	-	X
6B	6X6	200	3	X	6	-	-	X	X	X	-	X
7A	6X40	0	2-4-2	-	7	-	-	X	-	X	-	X
7B	6X40	0	2-4-2	-	7	-	-	X	-	X	-	X
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	X
S1	6X6	300	EXIST	-	-	-	-	X	-	-	-	X
S2	6X6	300	EXIST	-	-	-	-	X	-	-	-	X
S3	6X6	300	EXIST	-	-	-	-	X	-	-	-	X
S4	6X6	300	EXIST	-	-	-	-	X	-	-	-	X

* Reduce delay to 3 seconds during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

8 Phase Fully Actuated (Fuquay-Varina Signal System)

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. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. 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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Disconnect and abandon existing loops 4A and 8A.

SIGNAL FACE I.D.

All Heads L.E.D.

MAXTIME TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Walk *	–	7	–	7	–	7	–	7
Ped Clear *	–	22	–	23	–	24	–	23
Min Green	7	10	7	7	7	10	7	7
Passage *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	20	30	25	90	20	30
Yellow Change	3.0	3.8	3.0	3.8	3.0	3.8	3.0	4.0
Red Clear	3.6	2.8	3.2	2.4	3.4	2.8	3.1	2.4
Added Initial *	–	1.5	–	–	–	1.5	–	–
Maximum Initial *	–	24	–	–	–	24	–	–
Time Before Reduction *	–	15	–	–	–	15	–	–
Time To Reduce *	–	30	–	–	–	30	–	–
Minimum Gap	–	3.0	–	–	–	3.0	–	–
Advance Walk	–	3	–	3	–	3	–	3
Non Lock Detector	X	–	X	X	X	–	X	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–	–
Dual Entry	–	–	–	–	–	–	–	–

* 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.

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	←Y	←Y	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R→	R→	R	R	Y
31, 32	←R	←R	←R	←R	←	←	←R	←R	←R
41	R	R	R	R	R	R	G	G	R
42	R→	R	R→	R	R	R	G	G	R
51	←	←Y	←Y	←Y	←R	←R	←R	←R	←Y
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R→	R	R→	R	Y
71, 72	←R	←R	←R	←R	←	←R	←	←R	←R
81	R	R	R	R	G	R	G	R	R
82	R→	R→	R	R	G	R	G	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	←R	←R	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R→	R→	R	R	Y
31, 32	←R	←R	←R	←R	←	←	←R	←R	←R
41	R	R	R	R	R	R	G	G	R
42	R→	R	R→	R	R	R	G	G	R
51	←	←R	←R	←R	←R	←R	←R	←R	←Y
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R→	R→	R	R	Y
71, 72	←R	←R	←R	←R	←	←R	←	←R	←R
81	R	R	R	R	G	R	G	R	R
82	R→	R→	R	R	G	R	G	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
○↓	Pedestrian Signal Head	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	———
→	Directional Arrow	→
○	Type II Signal Pedestal	●
N/A	Curb Ramp	♿
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	No U-Turn Sign (R3-4)	Ⓑ
Ⓒ	Type 3 Object Marker w/ No U-turn Symbol	Ⓒ

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

Prepared for 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

US 401-NC 42-55 (N Main Street) at SR 1301 (Sunset Lake Road/ Purfoy Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

Digitally Signed by: Anthony Encarnacion
DocuSigned by: 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-0935

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

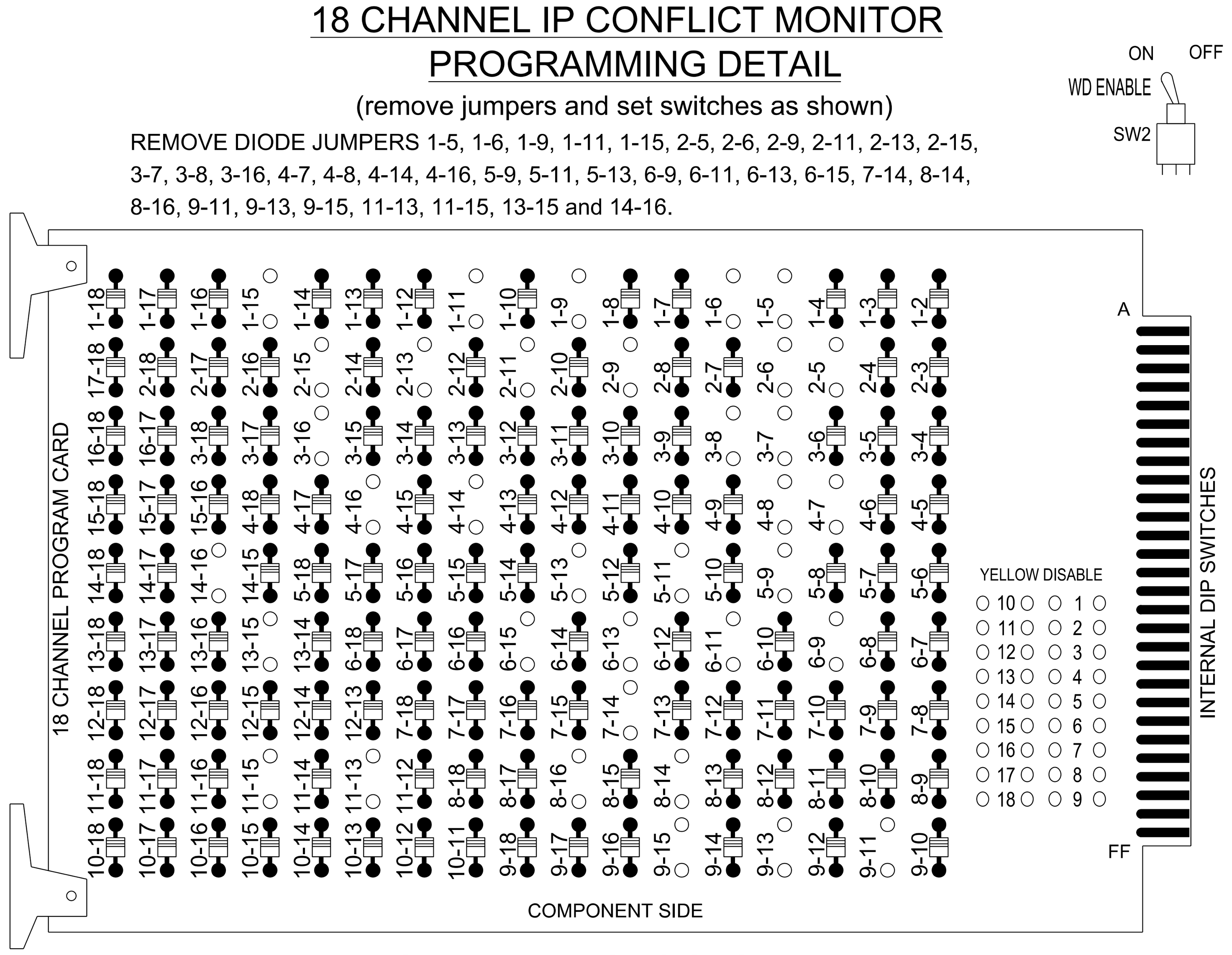
13-APR-2023 12:29
pw:/SUS0036345.wsatkins.com:ATKNANC01/Documents/Roads and Bridges/Projects/10006368 Fuquay Varina/Task 05_11_Signals/050935_sig_dsn_2022mmdd.dgn
STIFF4685 AT LUS491089

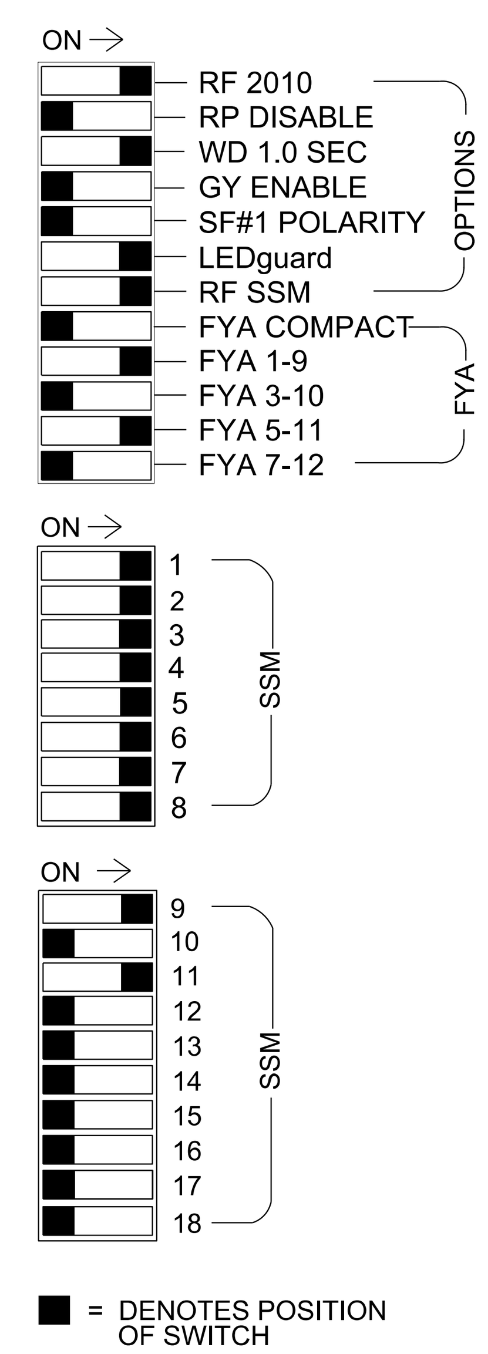
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 15.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-14, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15 and 14-16.





REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount......................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, AUX S1, AUX S4
Phases Used..1, 2, 3, 4, 5, 6, 7, 8
Overlap "1"...*
Overlap "2"...NOT USED
Overlap "3"...*
Overlap "4"...NOT USED

*See overlap programming detail on this sheet

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	82	21,22	P21, P22	22	31,32	41,42	P41, P42	42	51★	61,62	P61, P62	62	71,72	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						116								122			A121			A114		
YELLOW ARROW		126			117	117			132				123	123			A122			A115		
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127	127			118	118			133	133			124	124								
(Don't Walk hand)				113				104				119				110						
(Walk person)				115				106				121				112						

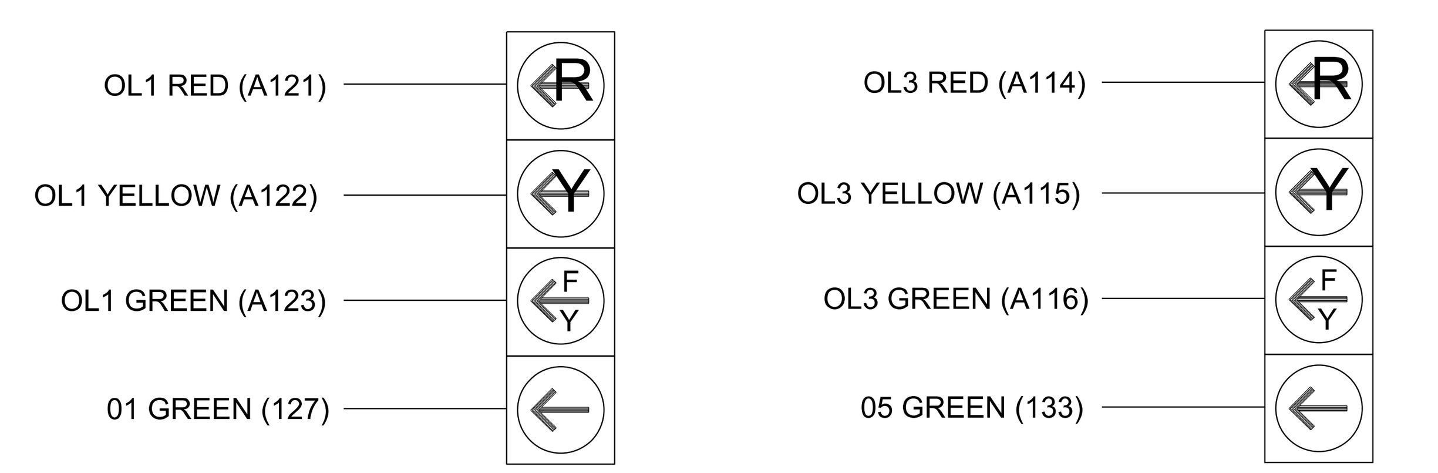
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



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)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
1B	TB2-5,6	I2U	39	1	2	1	15		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
2B	TB2-11,12	I3L	76	42	5	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3			X		X	
3B	TB4-7,8	I5L	58	20	7	3			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS			X		X	
*S2	TB6-11,12	I9L	62	24	14	SYS			X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
5B	TB3-5,6	J2U	40	2	16	5	15		X		X	
6A	TB3-9,10	J3U	64	30	18	6			X	X	X	
6B	TB3-11,12	J3L	77	43	19	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21	7			X		X	
7B	TB5-7,8	J5L	57	19	21	7			X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
*S3	TB7-9,10	J9U	59	21	27	SYS			X		X	
*S4	TB7-11,12	J9L	61	23	28	SYS			X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

*System detector only. Remove any assigned vehicle phase.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L

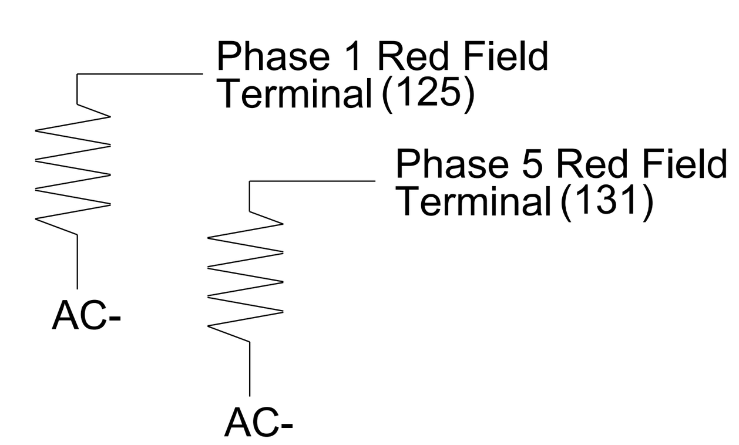
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0935
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

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)



ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

US 401-NC 42-55 (N Main Street)
at
SR 1301 (Sunset Lake Road/ Purfoy Road)

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

Division 5	Wake County	Fuquay-Varina	
PLAN DATE: April 2023		REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff		REVIEWED BY: PL Alexander	
REVISIONS		INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion — D8EC537F8 — SIGNATURE — 4/14/2023 — DATE

SIG. INVENTORY NO. 05-0935

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 15.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	6	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	-	-	-	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0935
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 401-NC 42-55 (N Main Street)
at
SR 1301 (Sunset Lake Road/ Purfoy Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

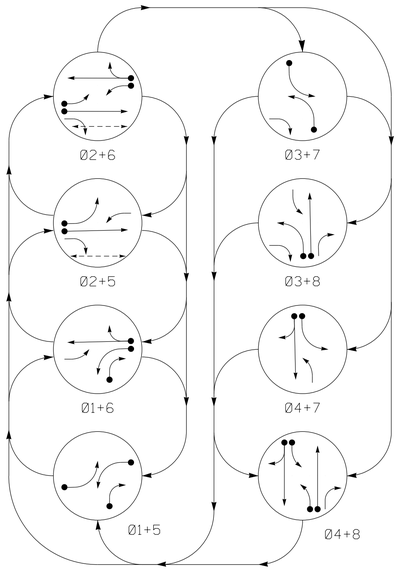
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-0935

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 16.0

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

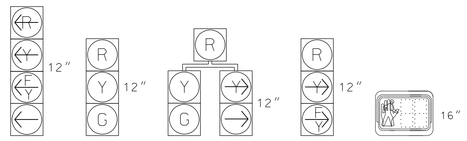
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	FY	FY	R	R	R	R	Y
21, 22	R	R	G	G	R	R	R	R	Y
23	R	R	FY	FY	FY	FY	R	R	Y
31	R	R	R	R	←	←	FY	FY	R
41, 42	R	R	R	R	R	R	G	G	R
51	←	FY	←	FY	R	R	R	R	Y
61, 62	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	FY	←	FY	R
81	R	R	R	R	R	G	R	G	R
82	R/	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK

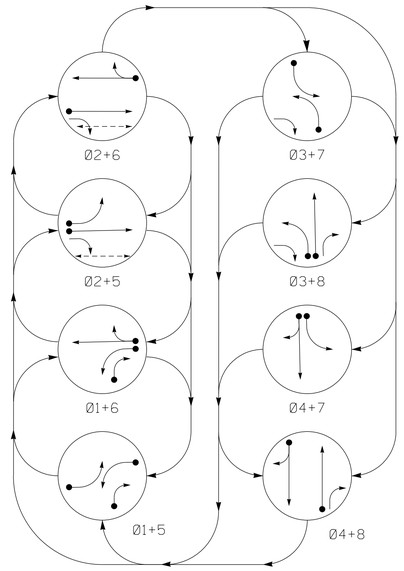
SIGNAL FACE I.D.

All Heads L.E.D.



11, 31, 51, 71 — 21, 22, 41, 42, 61, 62, 81 — 82 — 23 — P21, P22

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	R	R	R	R	R	R	Y
21, 22	R	R	G	G	R	R	R	R	Y
23	R	R	FY	FY	FY	FY	R	R	Y
31	R	R	R	R	←	←	R	R	R
41, 42	R	R	R	R	R	R	G	G	R
51	←	R	←	R	R	R	R	R	Y
61, 62	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	R	←	R	R
81	R	R	R	R	R	G	R	G	R
82	R/	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK	

8 Phase
Fully Actuated
(Fuquay-Varina Signal System)

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. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to 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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
11. Install new controller, software and conflict monitor in existing cabinet.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Disconnect & abandon existing loops 2B and 6B.
14. To provide a leading pedestrian interval on phase 2, program FYA heads 11 and 23 to delay for 3 seconds after the start of the phase 2 walk interval. See electrical details.

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Walk *	–	7	–	–	–	–	–	–
Ped Clear *	–	22	–	–	–	–	–	–
Min Green	7	12	7	7	7	12	7	7
Passage *	3.0	6.0	3.0	4.0	3.0	6.0	3.0	4.0
Max 1 *	15	90	20	75	15	90	20	75
Yellow Change	3.0	4.6	3.0	4.4	3.0	4.6	3.0	4.4
Red Clear	2.9	1.4	2.6	1.3	2.6	1.4	1.9	1.3
Added Initial *	–	2.5	–	–	–	2.5	–	–
Maximum Initial *	–	34	–	–	–	34	–	–
Time Before Reduction *	–	15	–	–	–	15	–	–
Time To Reduce *	–	30	–	–	–	30	–	–
Minimum Gap	–	3.0	–	–	–	3.0	–	–
Advance Walk	–	**	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–	X	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–	–
Dual Entry	–	–	–	X	–	–	–	X

* 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.
** See Note 15

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	-
					6#	3	-	X	-	X	X	-
1B	6X40	+5	2-4-2	X	1	15	-	X	-	X	-	X
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	-
3A	6X40	+5	2-4-2	-	3	15*	-	X	-	X	-	-
					8#	3	-	X	-	X	-	-
4A	6X60	+5	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X30	+5	2-4-2	-	5	15*	-	X	-	X	-	-
					2#	3	-	X	-	X	X	-
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	-
7A	6X60	+5	2-4-2	-	7	15*	-	X	-	X	-	-
					4#	3	-	X	-	X	-	-
8A	6X60	+5	2-4-2	-	8	-	-	X	-	X	-	-

* Reduce delay to 3 seconds 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	■↓
○)	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	Curb Ramp	♿
⊛	Type I Pushbutton Post	⊛
○	Type II Signal Pedestal	●
Ⓐ	"RIGHT TURN SIGNAL" Sign (R10-10R)	Ⓐ

Signal Upgrade

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

SCALE 0 40 1"=40'

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

SR 1010 (Ten Ten Road)
at
SR 1375 (Lake Wheeler Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL
SEAL 044476
ENGINEER
ANTHONY M. ENCARNACION

Digitally signed by Anthony Encarnacion
DocuSigned by: Anthony Encarnacion
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1126

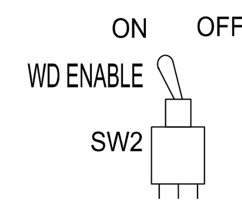
13-APR-2023 12:30
pw://SUS005343.westkins.com:ATKNAC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 05.11.Signals/051126_sig_dsn_2022nmds.dgn
STIFF4685 AT LU5491089

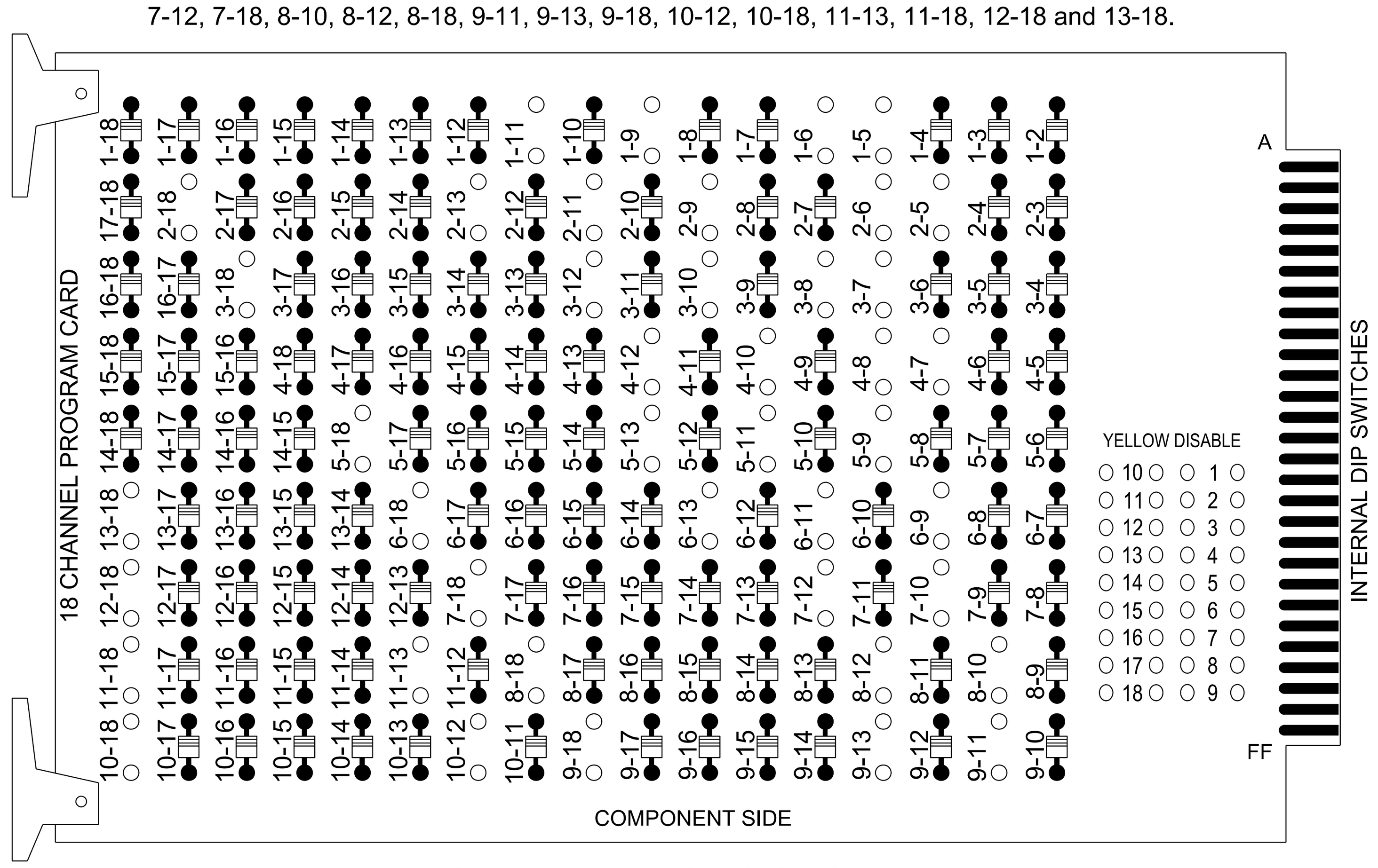
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 16.1

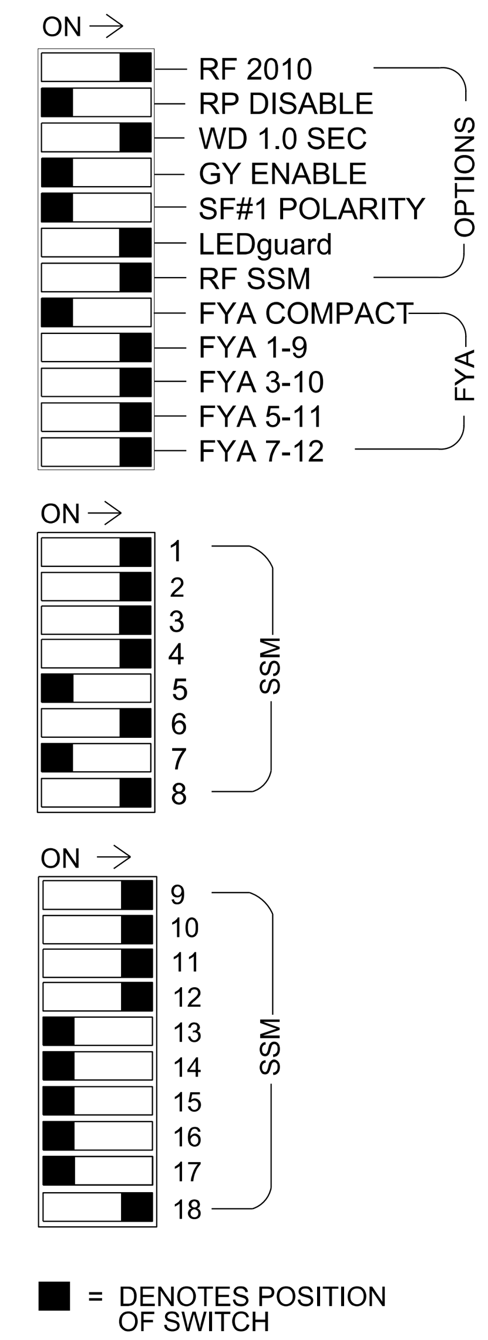
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 2-18, 3-7, 3-8, 3-10, 3-12, 3-18, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 5-13, 5-18, 6-9, 6-11, 6-13, 6-18, 7-10, 7-12, 7-18, 8-10, 8-12, 8-18, 9-11, 9-13, 9-18, 10-12, 10-18, 11-13, 11-18, 12-18 and 13-18.







REMOVE JUMPERS AS SHOWN

NOTES:
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S3, S4, S5, S7, S8, S10, S11,
AUX S1, AUX S2, AUX S4, AUX S5, AUX S6
Phases Used.......................................1, 2, 2PED, 3, 4, 5, 6, 7, 8
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..*
Overlap "6"..*

*See overlap programming detail on sheet 2

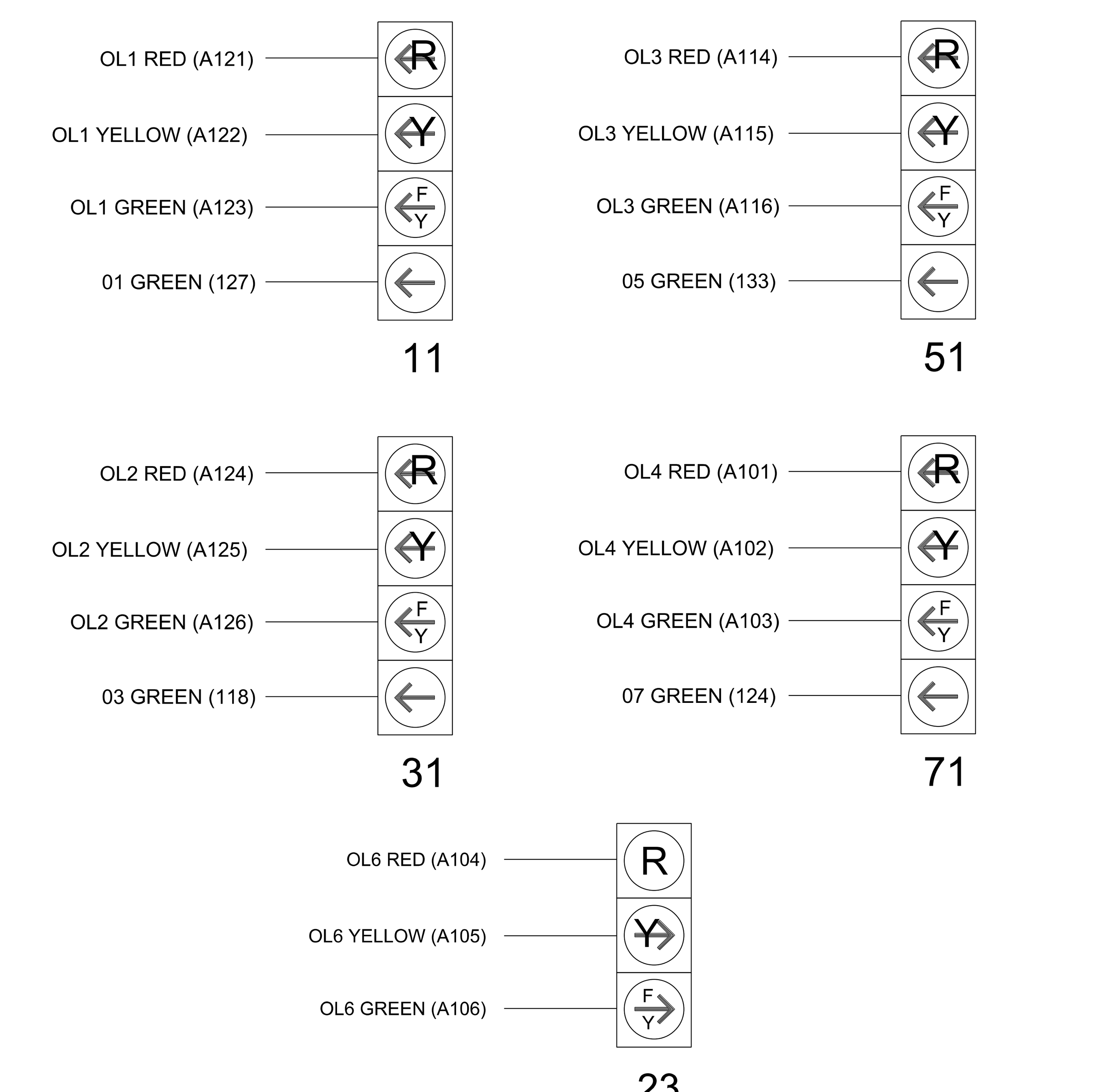
SIGNAL HEAD HOOK-UP CHART

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	OL1	OL2	SPARE	OL3	OL4	OL6
SIGNAL HEAD NO.	11★	82	21,22	P21, P22	31★	41,42	NU	51★	61,62	NU	71★	81,82	NU	11★	31★	NU	51★	71★	23★
RED		*	128			101			134			107							A104
YELLOW			129		*	102		*	135		*	108							
GREEN			130			103			136			109							
RED ARROW														A121	A124		A114	A101	
YELLOW ARROW		126												A122	A125		A115	A102	A105
FLASHING YELLOW ARROW														A123	A126		A116	A103	A106
GREEN ARROW	127	127			118			133			124								
(Don't Walk symbol)				113															
(Walk symbol)				115															

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
1B	TB2-9,10	I3U	63	29	4	1	15		X		X	
3A	TB4-5,6	I5U	58	20	7 ★	3	15		X		X	
				-	30 ★	8	3		X		X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21 ★	7	15		X		X	
				-	32 ★	4	3		X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

*System detector only. Remove any assigned vehicle phase.

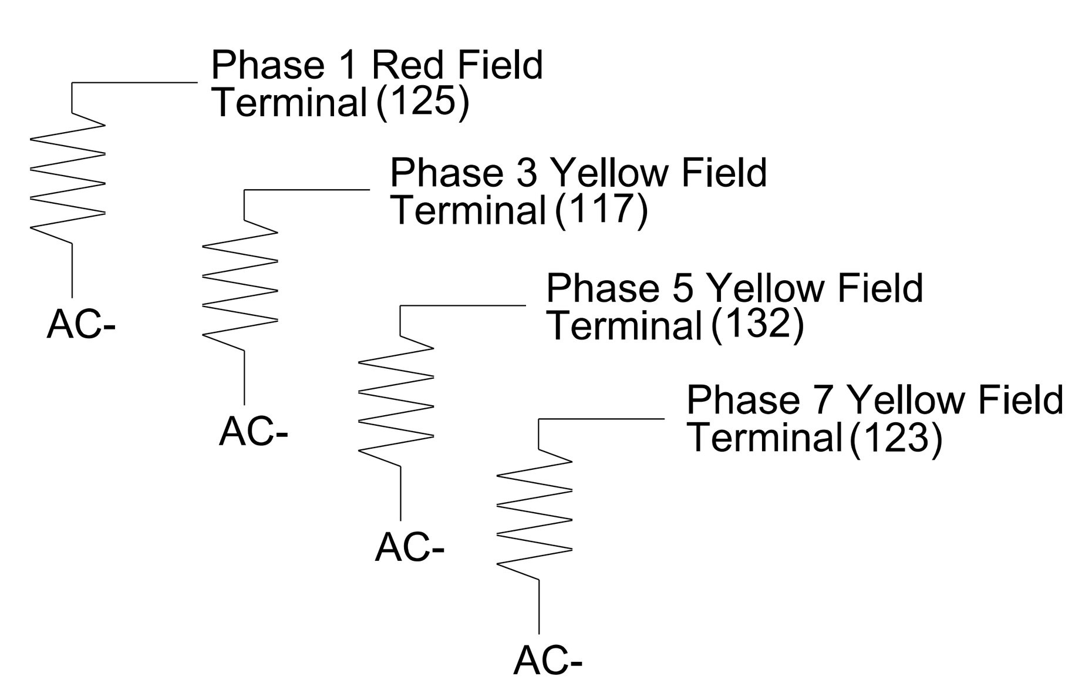
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1126
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

SR 1010 (Ten Ten Road)
at
SR 1375 (Lake Wheeler Road)

Division 5	Wake County	Fuquay-Varina	
PLAN DATE: April 2023		REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff		REVIEWED BY: PL Alexander	
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 044476
ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1126

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 16.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	6
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8	2,3
Modifier Phases	1	3	5	7	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	0.0	0.0	0.0	3.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	6
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	-	-	-	2,3
Modifier Phases	1	3	5	7	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	0.0	0.0	0.0	3.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 11, 31, 51, and 71 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 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 3 seconds.

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.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 3A, 5A & 7A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

3A

Detector	Call Phase	Delay
7	3	3
30	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

7A

Detector	Call Phase	Delay
21	7	3
32	0	-

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: 05-1126
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared for the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1010 (Ten Ten Road)
at
SR 1375 (Lake Wheeler Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

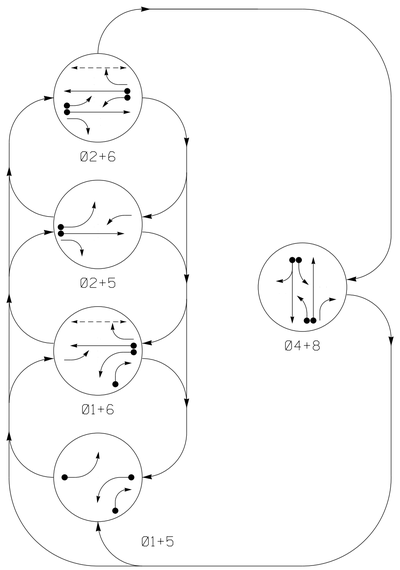
Docusigned by: Anthony Encarnacion 4/14/2023
DOCUSIGNED SIGNATURE DATE

SIG. INVENTORY NO. 05-1126

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 17.0

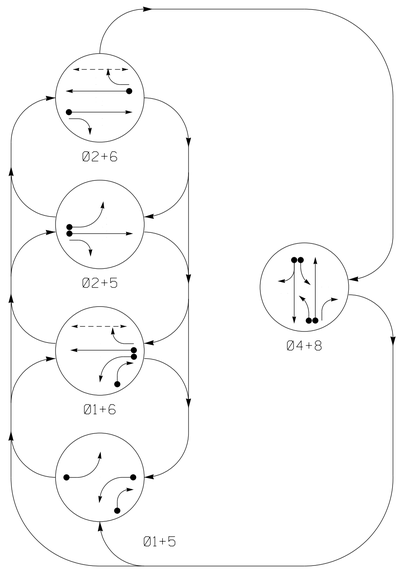
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←R	←R	←FY	←FY	R	Y
21, 22	R	R	G	G	R	Y
41	→R	→R	→R	→R	FY	→R
42, 43	R	R	R	R	G	R
51	←R	←FY	←R	←FY	R	Y
61, 62	R	G	R	G	R	Y
81	→R	→R	→R	→R	FY	→R
82	R	R	R	R	G	R
83	R/→R	R/→R	R	R	G	R
P61, P62	DW	W	DW	W	DW	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←R	←R	→R	→R	R	Y
21, 22	R	R	G	G	R	Y
41	→R	→R	→R	→R	FY	→R
42, 43	R	R	R	R	G	R
51	←R	←R	←R	←R	R	Y
61, 62	R	G	R	G	R	Y
81	→R	→R	→R	→R	FY	→R
82	R	R	R	R	G	R
83	R/→R	R/→R	R	R	G	R
P61, P62	DW	W	DW	W	DW	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X60	+5	2-4-2	-	1	15*	-	X	-	X	-	-
					6#	3	-	X	-	X	X	-
1B	6X40	+5	2-4-2	-	1	15	-	X	-	X	-	-
2A	6X6	300	5	X	2	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	3	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X60	+5	2-4-2	-	5	15*	-	X	-	X	-	-
					2#	3	-	X	-	X	X	-
6A	6X6	300	5	X	6	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	3	-	X	-	X	-	-
8B	6X40	+5	2-4-2	-	8	-	-	X	-	X	-	-

* Reduce delay to 3 seconds during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

5 Phase Fully Actuated (Fuquay-Varina Signal System)

NOTES

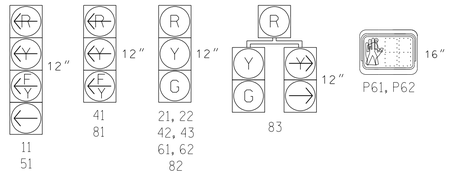
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing 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. 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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
11. Install new controller, software and conflict monitor in existing cabinet.
12. 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	
	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	
	Type II Signal Pedestal	
N/A	Curb Ramp	

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	7	–
Ped Clear *	–	–	–	–	17	–
Min Green	7	12	7	7	12	7
Passage *	1.0	6.0	2.0	1.0	6.0	2.0
Max 1 *	15	70	30	15	70	30
Yellow Change	3.0	4.8	4.5	3.0	4.8	4.5
Red Clear	2.3	1.0	1.8	2.4	1.0	1.8
Added Initial *	–	2.5	–	–	2.5	–
Maximum Initial *	–	34	–	–	34	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	30	–	–	30	–
Minimum Gap	–	3.0	–	–	3.0	–
Advance Walk	–	–	–	–	3	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

NC 55
at
SR 2765 (Old Honeycutt Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

Designed by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE
SIG. INVENTORY NO. 05-1357

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

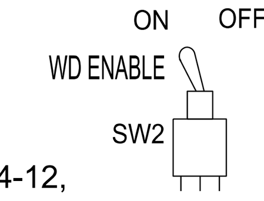
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

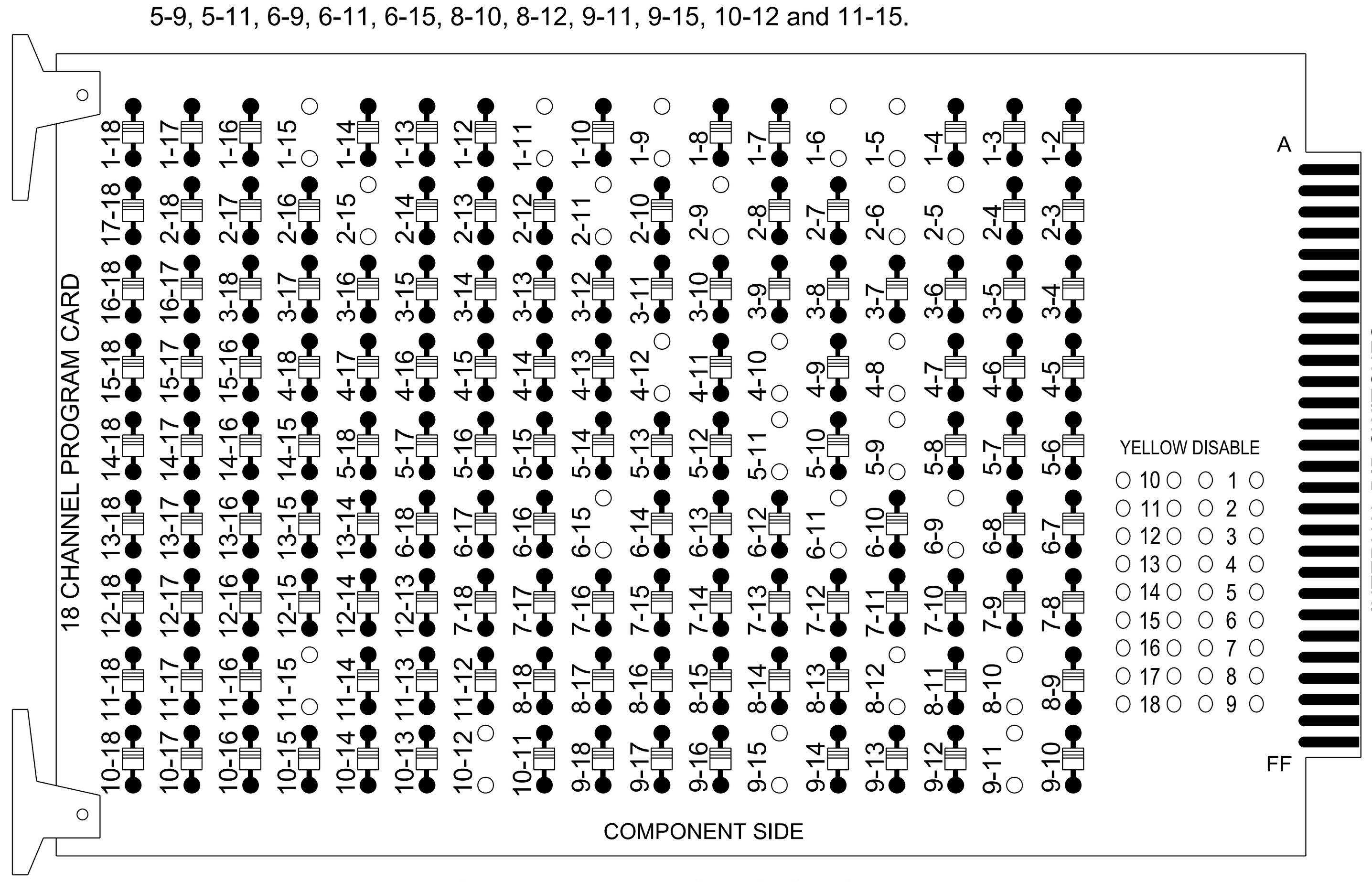
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 17.1

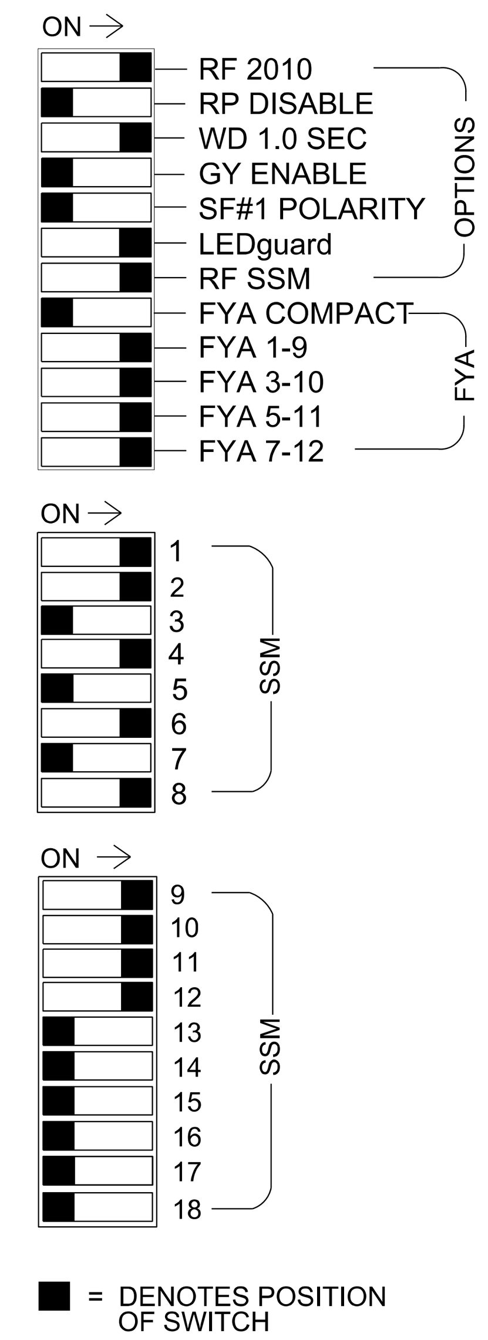
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-15, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 6-15, 8-10, 8-12, 9-11, 9-15, 10-12 and 11-15.





REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. Program phase 6 for simultaneous start.
5. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount...................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S1, S2, S5, S7, S8, S9, S11,
AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.......................................1, 2, 4, 5, 6, 6PED, 8
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..*

*See overlap programming detail on sheet 2

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	83	21,22	NU	NU	42,43	NU	51★	61,62	P61, P62	NU	82,83	NU	11★	81★	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		126												A122	A125		A115	A102	
FLASHING YELLOW ARROW														A123	A126		A116	A103	
GREEN ARROW	127	127						133											
✋										119									
🚶										121									

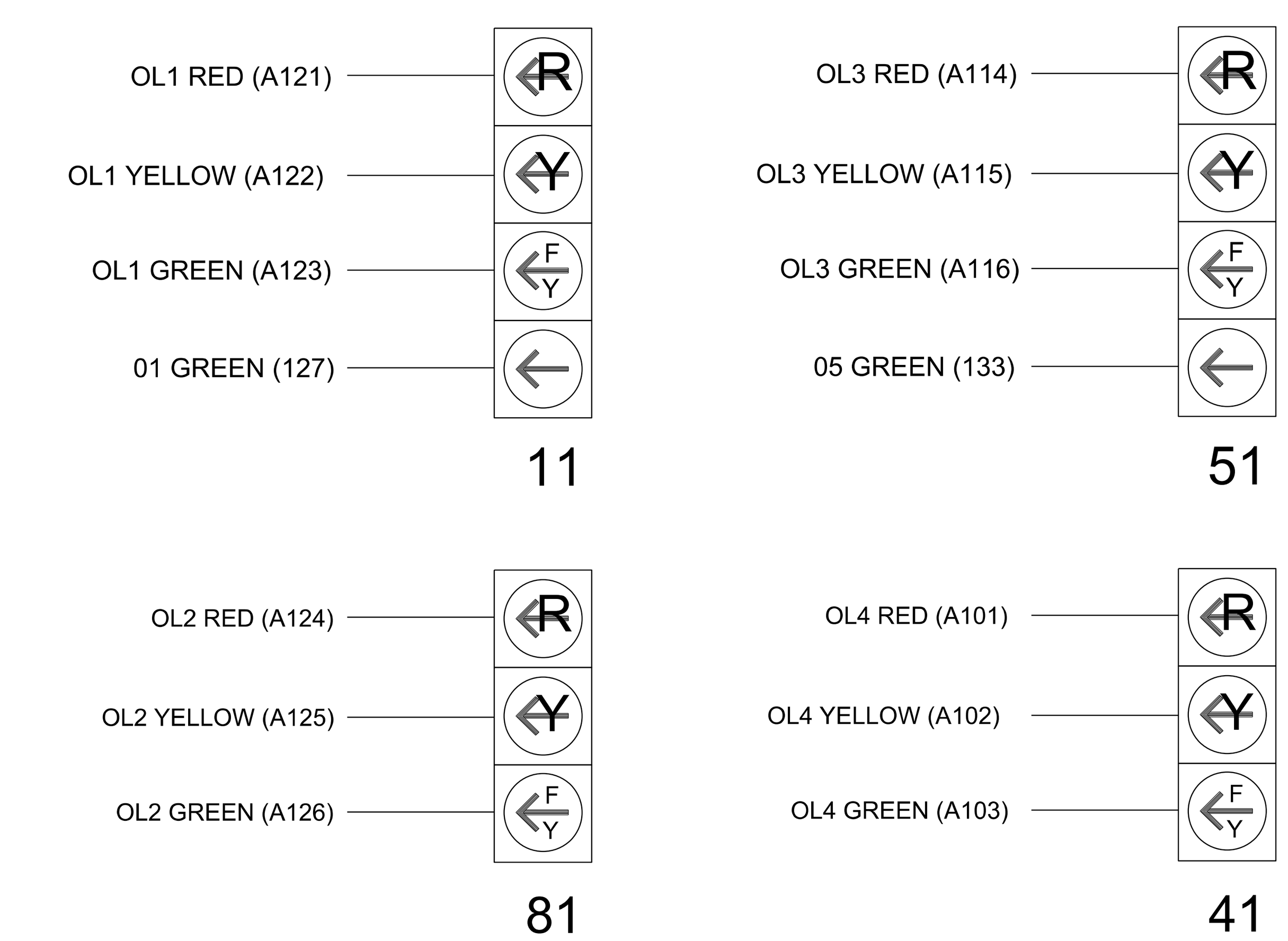
NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
1B	TB2-5,6	I2U	39	1	2	1	15		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	3		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8			X		X	
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

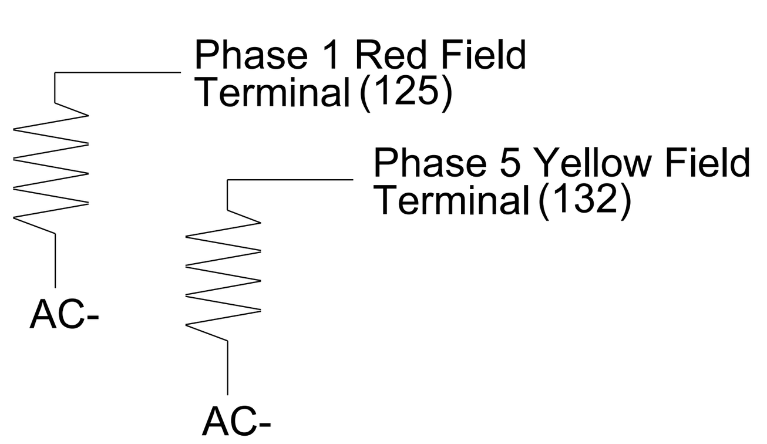
INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

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)



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: 05-1357
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

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

NC 55
at
SR 2765 (Old Honeycutt Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
D8EC537F8...
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1357

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4	-	8
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1357
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

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

NC 55
at
SR 2765 (Old Honeycutt Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

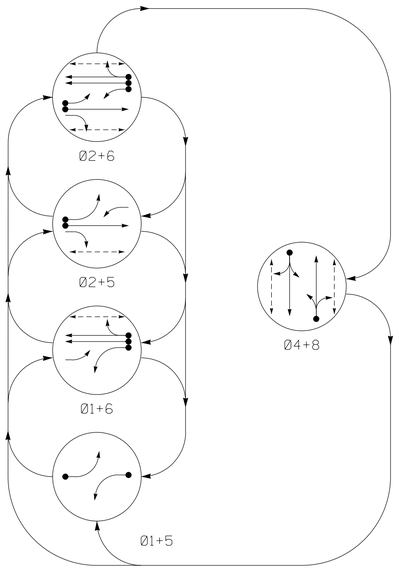
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1357

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 18.0

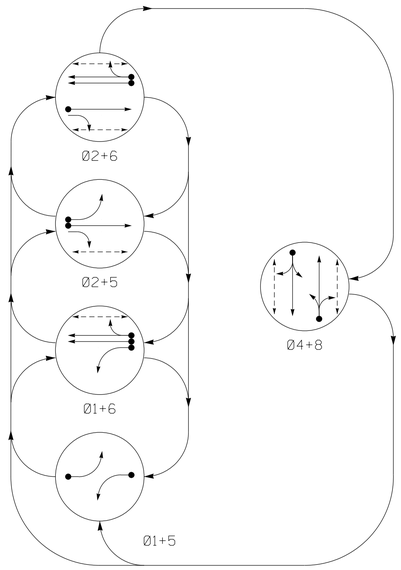
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~FY~~	~~FY~~	~~R~~	~~Y~~
21,22	R	R	G	G	R	Y
23	R	R	~~FY~~	~~FY~~	R	~~Y~~
41,42	R	R	R	R	G	R
51	←	~~FY~~	←	~~FY~~	~~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

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~Y~~
21,22	R	R	G	G	R	Y
23	R	R	~~FY~~	~~FY~~	R	~~Y~~
41,42	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~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

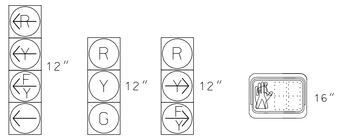
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	-
					6#	3	-	X	-	X	X	-
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	-
					2#	3	-	X	-	X	X	-
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	10	-	X	-	X	-	-

* Reduce delay to 3 seconds during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

SIGNAL FACE I.D.

All Heads L.E.D.



11, 51 — 21,22, 41,42, 61,62, 81,82 — 23 — P21,P22, P41,P42, P61,P62, P81,P82

5 Phase Fully Actuated (Fuquay-Varina Signal System)

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. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
7. Pavement markings are existing.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. Install new controller, software and conflict monitor in existing cabinet.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. To provide leading pedestrian intervals on phase 2, program FYA heads 11 and 23 to delay for 3 seconds after the start of the phase 2 walk interval. See electrical details.
12. Program phase 4 ped detector to call phase 8 ped and phase 8 ped detector to call phase 4 ped for leading pedestrian interval on phases 4 and 8.

PHASING DIAGRAM DETECTION LEGEND

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Type II Signal Pedestal	
N/A	Curb Ramp	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	"RIGHT TURN SIGNAL" Sign (R10-10R)	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	7	7	–	7	7
Ped Clear *	–	10	22	–	18	20
Min Green	7	12	7	7	12	7
Passage *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	90	30	15	90	30
Yellow Change	3.0	4.8	3.1	3.0	4.8	4.1
Red Clear	2.3	1.2	2.7	1.9	1.2	1.8
Added Initial *	–	2.5	–	–	2.5	–
Maximum Initial *	–	34	–	–	34	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	30	–	–	30	–
Minimum Gap	–	3.0	–	–	3.0	–
Advance Walk	–	**	3	–	3	3
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

* 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.
** See Note 12

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

SR 1010 (Ten Ten Road) at SR 2722 (Old McCullers Road)/ Tawny Slope Court

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

Documented by: Anthony Encarnacion 4/14/2023
DIGITALLY SIGNED SIGNATURE DATE

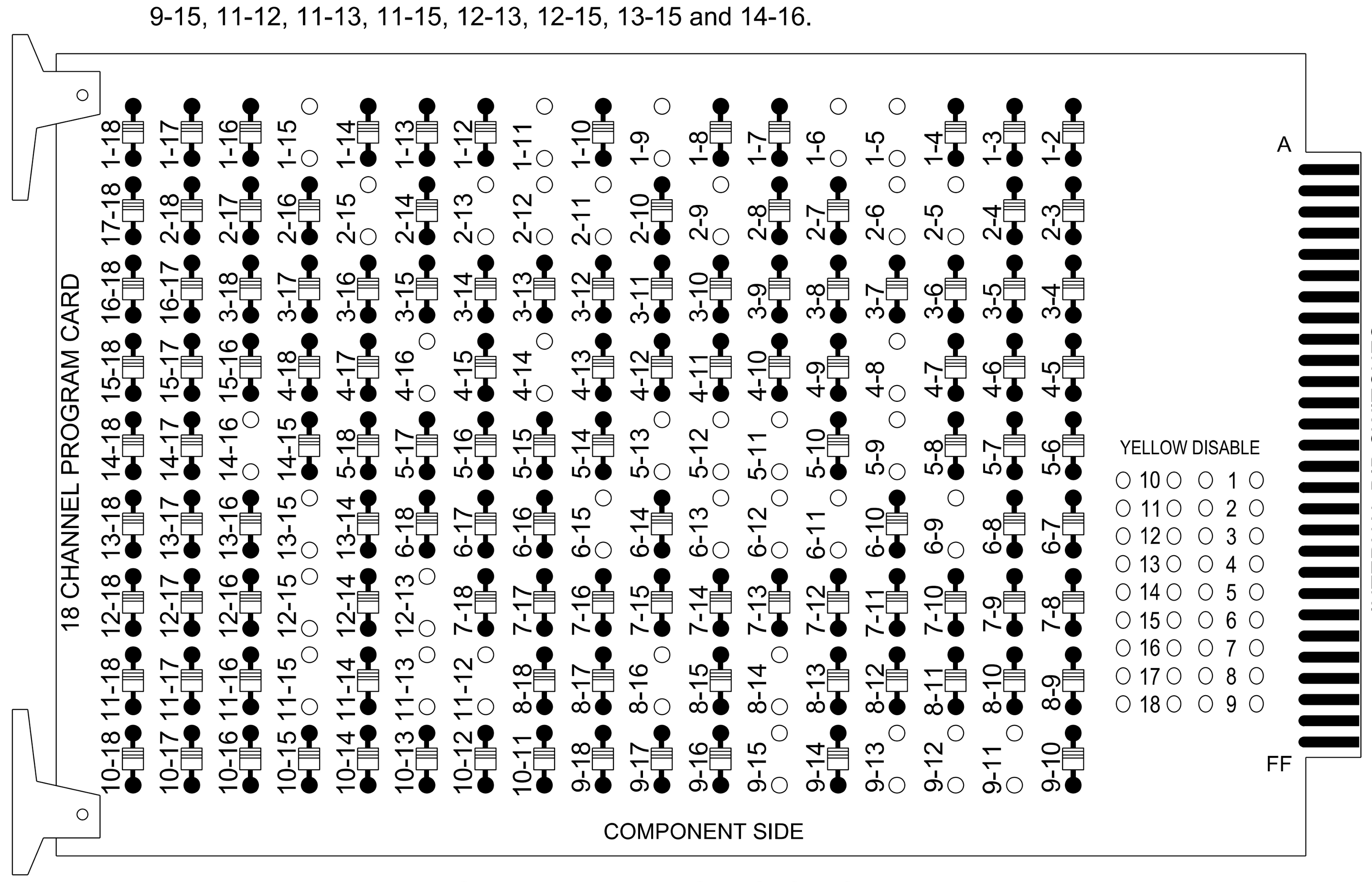
SIG. INVENTORY NO. 05-1512

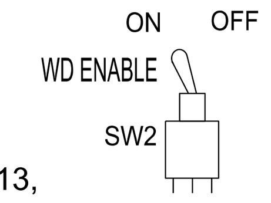
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 18.1

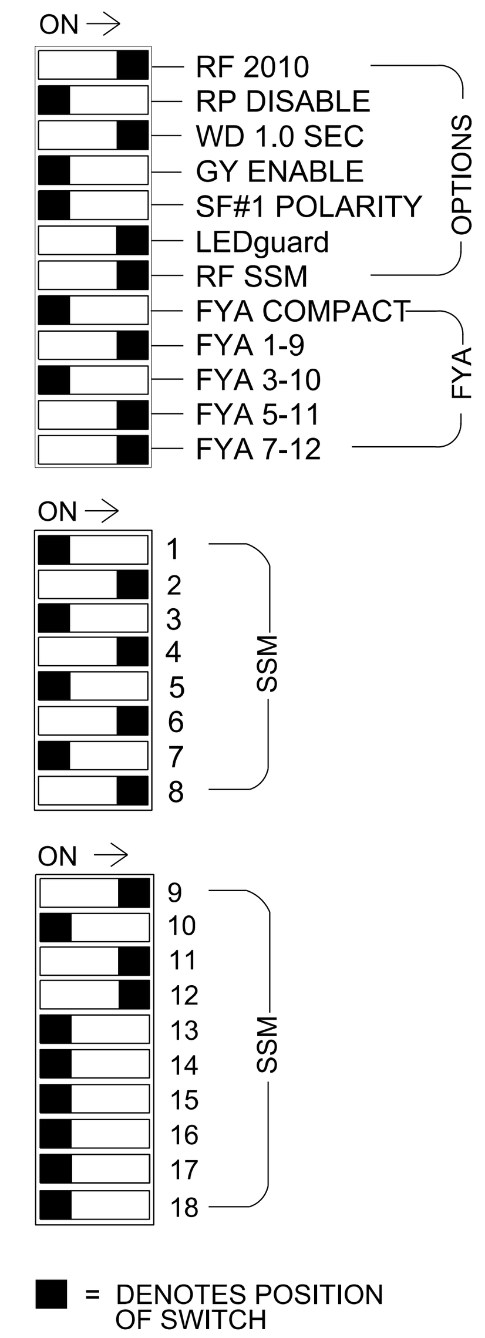
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-12, 2-13, 2-15, 4-8, 4-14, 4-16, 5-9, 5-11, 5-12, 5-13, 6-9, 6-11, 6-12, 6-13, 6-15, 8-14, 8-16, 9-11, 9-12, 9-13, 9-15, 11-12, 11-13, 11-15, 12-13, 12-15, 13-15 and 14-16.







REMOVE JUMPERS AS SHOWN

NOTES:
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. Program phases 4 and 8 for simultaneous start.
5. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S3, S5, S6, S7, S8, S9
S11, S12, AUX S1, AUX S4, AUX S5
Phases Used..1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1"...*
Overlap "2"...NOT USED
Overlap "3"...*
Overlap "4"...*

*See overlap programming detail this sheet

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	OL1	OL2	SPARE	OL3	OL4	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★	23★	NU
RED		128			101			134			107						A101	
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW	127						133											
(Don't Walk hand)			113			104			119			110						
(Walk person)			115			106			121			112						

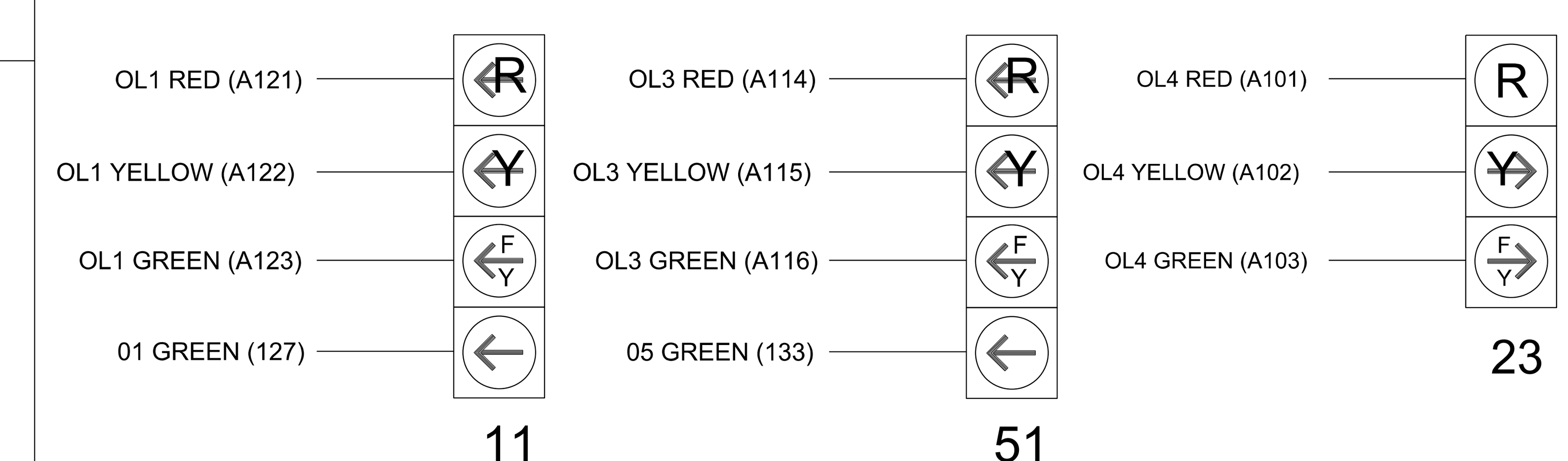
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 2 PED DC ISOLATOR	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED				NOT USED						Ø 4 PED DC ISOLATOR	Ø 8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED				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 POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	10		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

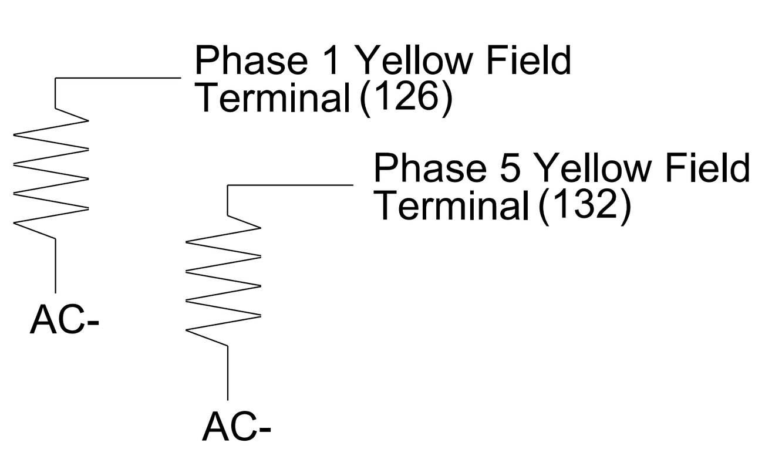
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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)

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: 05-1512
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

SR 1010 (Ten Ten Road)
at
SR 2722 (Old McCullers Road)/
Tawny Slope Court

Division 5 | Wake County | Fuquay-Varina

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

PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1512

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 18.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	FYA 4 - Section
Included Phases	2	-	6	2
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	0.0	0.0	3.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	FYA 4 - Section
Included Phases	-	-	-	2
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	0.0	0.0	3.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1512
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

SR 1010 (Ten Ten Road)
at
SR 2722 (Old McCullers Road)/
Tawny Slope Court

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

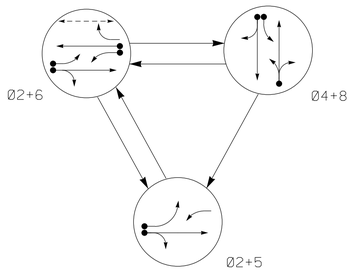
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

Digitally signed by: Anthony Encarnacion
DocuSigned by: SIGNATURE
4/14/2023 DATE

SIG. INVENTORY NO. 05-1512

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 19.0

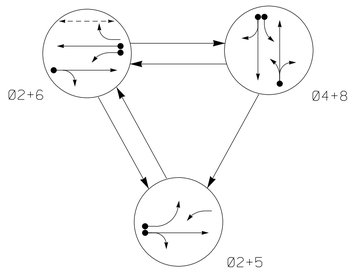
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4+8	FLASH
21, 22	G	G	R	Y
41	←R	←R	←FY	←R
42, 43	R	R	G	R
51	←	←FY	←R	←Y
61	←FY	←FY	←R	←Y
62, 63	R	G	R	Y
64	R	FY→	R	Y→
81, 82	R	R	G	R
P61,P62	DW	W	DW	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4+8	FLASH
21, 22	G	G	R	Y
41	←R	←R	←FY	←R
42, 43	R	R	G	R
51	←	←R	←R	←Y
61	←FY	←FY	←R	←Y
62, 63	R	G	R	Y
64	R	FY→	R	Y→
81, 82	R	R	G	R
P61,P62	DW	W	DW	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	-	4	3	-	X	-	X	-	X
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
					2#	3	-	X	-	X	X	X
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	X
6B	6X40	0	2-4-2	-	6	3	-	X	-	X	X	X
8A	6X40	0	2-4-2	-	8	5	-	X	-	X	-	X

* Reduce delay to 3 seconds during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

3 Phase
Fully Actuated
(Fuquay-Varina Signal System)

NOTES

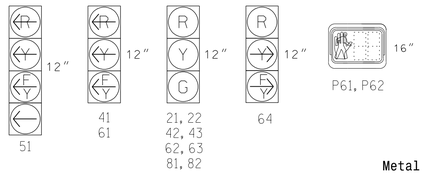
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads 62 and 63.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. The Division Traffic Engineer will determine the hours of use for each phasing plan.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. To provide leading pedestrian interval on phase 6, program FYA heads 51 and 64 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Walk *	–	–	–	7	–
Ped Clear *	–	–	–	8	–
Min Green	12	7	7	12	7
Passage *	6.0	2.0	2.0	6.0	2.0
Max 1 *	90	30	15	90	30
Yellow Change	4.7	3.8	3.0	4.7	3.8
Red Clear	1.0	1.8	2.4	1.0	1.8
Added Initial *	2.5	–	–	2.5	–
Maximum Initial *	34	–	–	34	–
Time Before Reduction *	15	–	–	15	–
Time To Reduce *	30	–	–	30	–
Minimum Gap	3.0	–	–	3.0	–
Advance Walk	–	–	–	**	–
Non Lock Detector	–	X	X	–	X
Vehicle Recall	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	X	–	–	X

* 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.
** See Note 13

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	----------
→	Directional Arrow	→
◯	Metal Strain Pole	◘
⬡	Type II Signal Pedestal	⬢
N/A	Curb Ramp	◢◣
Ⓐ	"RIGHT TURN SIGNAL" Sign (R10-10R)	Ⓐ

Signal Upgrade

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

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

SR 1301 (Sunset Lake Road) at SR 1431 (Products Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

Authorized by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

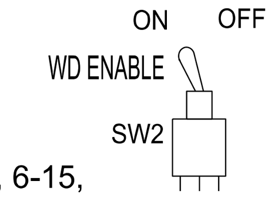
SIG. INVENTORY NO. 05-1544

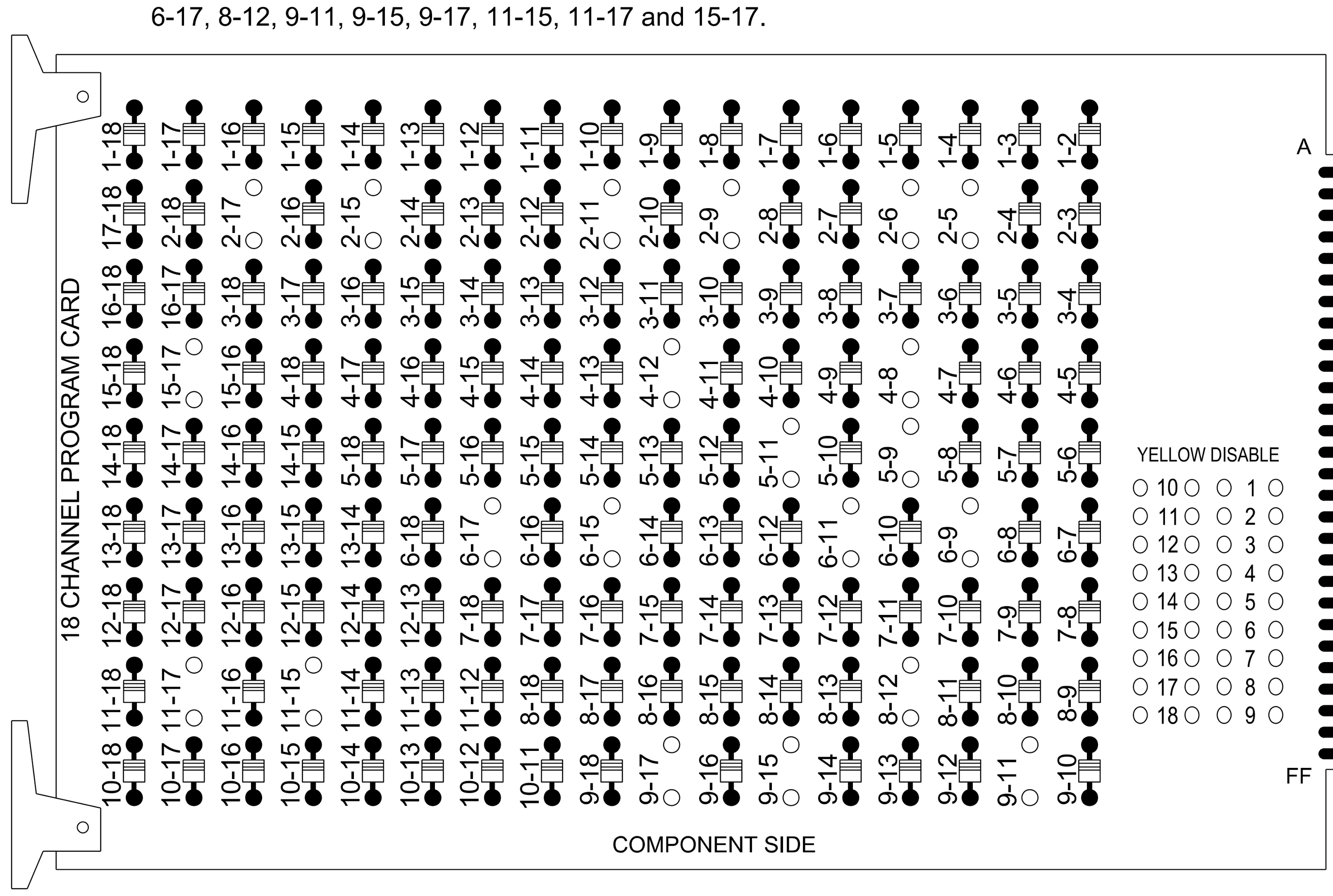
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 19.1

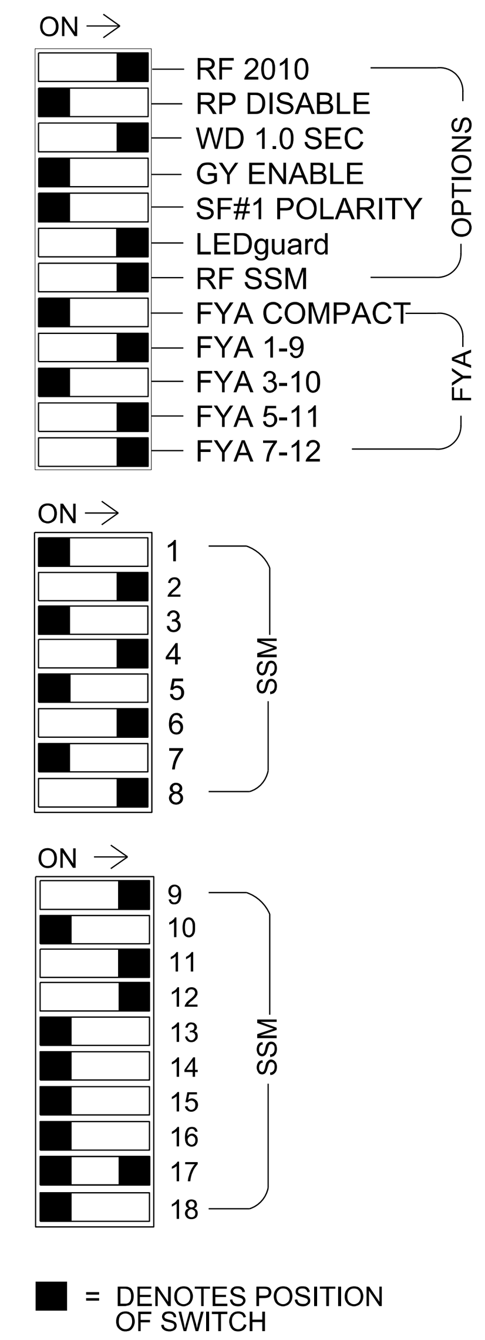
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 2-15, 2-17, 4-8, 4-12, 5-9, 5-11, 6-9, 6-11, 6-15, 6-17, 8-12, 9-11, 9-15, 9-17, 11-15, 11-17 and 15-17.







REMOVE JUMPERS AS SHOWN

NOTES:
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used...........................S2, S5, S7, S8, S9, S11, AUX S1, AUX S3, AUX S4, AUX S5
Phases Used.......................................2, 4, 5, 6, 6PED, 8
Overlap "1"..*
Overlap "2"..NOT USED
Overlap "3"..*
Overlap "4"..*
Overlap "5'..*

*See overlap programming detail on this sheet

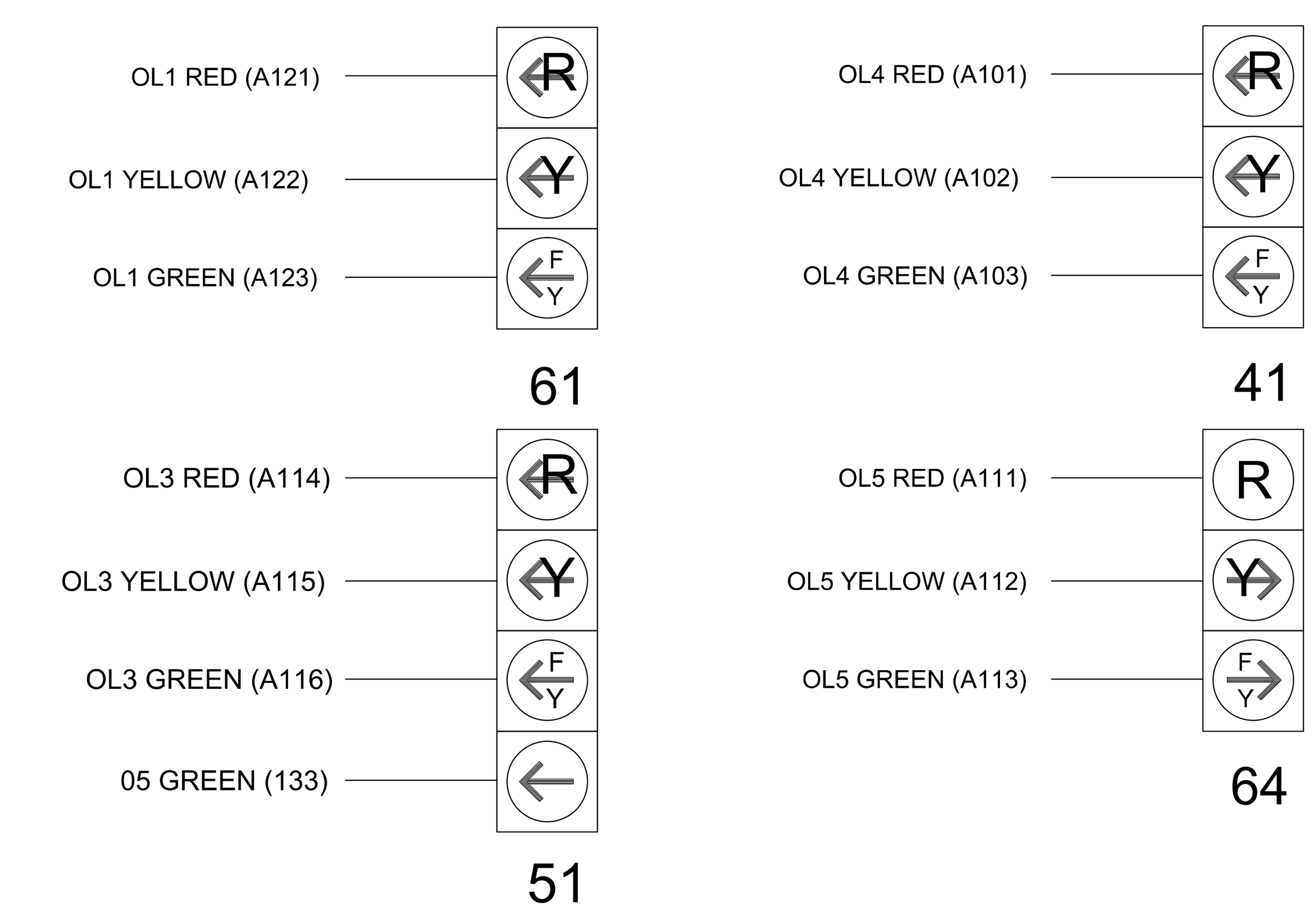
SIGNAL HEAD HOOK-UP CHART

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	OL1	OL2	OL5	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	42,43	NU	51★	62,63	P61, P62	NU	81,82	NU	61★	NU	64★	51★	41★	NU
RED		128			101			134			107				A111			
YELLOW		129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114	A101	
YELLOW ARROW													A122		A112	A115	A102	
FLASHING YELLOW ARROW													A123		A113	A116	A103	
GREEN ARROW							133											
(hand)									119									
(walking person)									121									

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
"I"	U	SLOT EMPTY	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
	L		NOT USED				Ø 4 4B							NOT USED	ST DC ISOLATOR
"J"	U	Ø 5 5A	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B				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 POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	3		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6	3		X		X	X
8A	TB5-9,10	J6U	42	4	22	8	5		X		X	
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

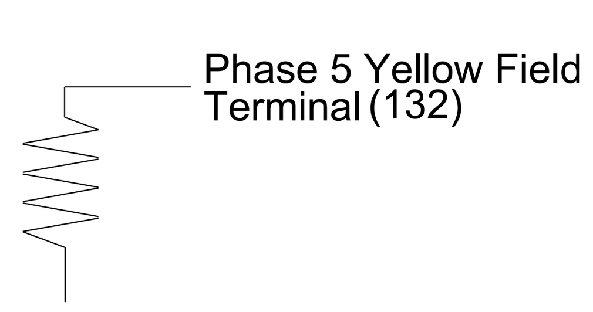
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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 resistor as shown)

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: 05-1544
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

SR 1301 (Sunset Lake Road)
at
SR 1431 (Products Road)

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

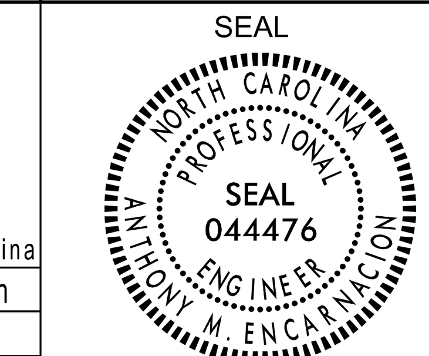
Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



DocuSigned by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1544

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 19.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	5
Type	FYA 4 - Section	-	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	-	6	8	6
Modifier Phases	-	-	5	-	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	3.0	0.0	3.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	5
Type	FYA 4 - Section	-	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	-	-	8	6
Modifier Phases	-	-	5	-	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	3.0	0.0	3.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

	Detector	Call Phase	Delay
5A	15	5	3
	31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phase for head 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1544
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

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

SR 1301 (Sunset Lake Road)
at
SR 1431 (Products Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

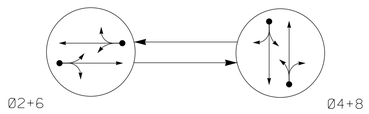
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1544

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 20.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

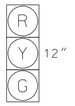
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

SIGNAL FACE I.D.

All Heads L.E.D.



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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	EXIST	-	2	-	-	X	-	X	-	X
2B	6X40	0	2-4-2	-	2	5	2.0	X	-	X	X	X
4A	6X6	300	EXIST	-	4	-	-	X	-	-	-	X
4B	6X60	0	2-4-2	-	4	5	2.0	X	-	X	X	X
6A	6X6	300	EXIST	-	6	-	-	X	-	X	-	X
6B	6X40	0	2-4-2	-	6	5	2.0	X	-	X	X	X
8A	6X6	300	EXIST	-	8	-	-	X	-	-	-	X
8B	6X60	0	2-4-2	-	8	5	2.0	X	-	X	X	X

2 Phase
Fully Actuated
(Fuquay-Varina Signal System)

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. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. The cabinet should be designed to include an Auxilliary Output File for future use.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	12	7	12	7
Passage *	6.0	6.0	6.0	6.0
Max 1 *	90	40	90	40
Yellow Change	4.7	4.8	4.3	4.5
Red Clear	1.0	1.0	1.0	1.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	15	5	15	5
Time To Reduce *	30	20	30	20
Minimum Gap	3.0	3.0	3.0	3.0
Advance Walk	–	–	–	–
Non Lock Detector	X	X	X	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	X	–	X

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

LEGEND

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

Signal Upgrade

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

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

SCALE 0 40 1"=40'

SR 1375 (Lake Wheeler Road) at SR 1393 (Hilltop Needmore Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

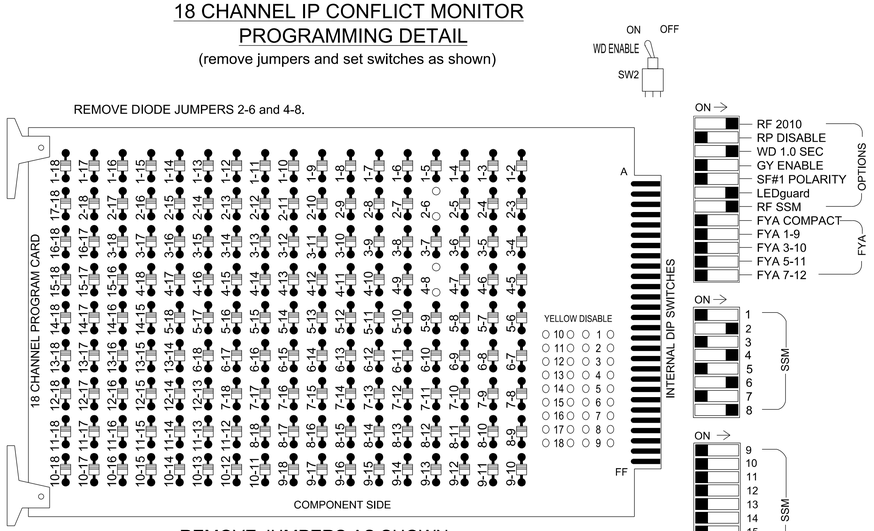
Docusigned by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1553

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 20.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, S5, S8, S11
Phases Used.....2, 4, 6, 8
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X		X	
2B	TB2-7,8	I2L	43	5	3	2	5	2.0	X		X	X
4A	TB4-9,10	I6U	41	3	8	4			X			
4B	TB4-11,12	I6L	45	7	9	4	5	2.0	X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6	5	2.0	X		X	X
8A	TB5-9,10	J6U	42	4	22	8			X			
8B	TB5-11,12	J6L	46	8	23	8	5	2.0	X		X	X

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1553
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

SR 1375 (Lake Wheeler Road)
at
SR 1393 (Hilltop Needmore Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

Documents Designed by: Anthony Encarnacion 4/14/2023
DOCUSIGNED SIGNATURE DATE

SIG. INVENTORY NO. 05-1553

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 21.0

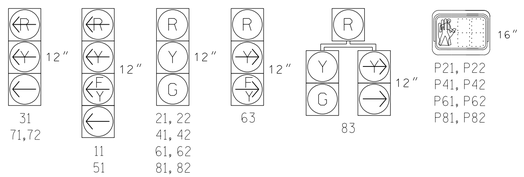
8 Phase Fully Actuated w/ Railroad Preemption (Fuquay-Varina Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. 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. Ensure flashing operation does not alter operation of blankout signs.
11. The Division 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. Remove existing Right Arrow "ONLY" (R3-5R) and "U-TURN YIELD TO RIGHT TURN" (R10-16) signs.
14. To provide leading pedestrian interval on phase 6, program FYA heads 51 and 63 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.
15. Program phase 10 to run green concurrently with all phases during normal operation. Phase 10 shall clear to red prior to entering preemption.

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	X
					6#	3	-	X	-	X	X	X
1B	6X40	0	2-4-2	-	1/9	15	-	X	-	X	-	X
2A	6X6	200	4	X	2	-	-	X	X	X	-	X
2B	6X6	200	4	X	2	-	-	X	X	X	-	X
3A	6X40	0	2-4-2	-	3/9	-	-	X	-	X	-	X
4A	6X40	0	2-4-2	-	4	-	-	X	-	X	-	X
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
					2#	3	-	X	-	X	X	X
6A	6X6	200	4	X	6	-	-	X	X	X	-	X
6B	6X6	200	4	X	6	-	-	X	X	X	-	X
7A	6X40	0	2-4-2	-	7	-	-	X	-	X	-	X
7B	6X40	0	2-4-2	-	7	-	-	X	-	X	-	X
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	X
8B	6X40	0	2-4-2	-	8	-	-	X	-	X	-	X
S1	6X6	300	EXIST	-	-	-	-	-	-	-	-	X
S2	6X6	300	EXIST	-	-	-	-	-	-	-	-	X
S3	6X6	300	EXIST	-	-	-	-	-	-	-	-	X
S4	6X6	300	EXIST	-	-	-	-	-	-	-	-	X

* Reduce delay to 3 seconds during alternates 2 and 3 phasing operation
\# Disable phase call for loop(s) during alternates 2 and 3 phasing operation

MAXTIME TIMING CHART

FEATURE	PHASE									
	1	2	3	4	5	6	7	8	9	10 (DUMMY)
Walk *	–	7	–	7	–	7	–	7	–	
Ped Clear *	–	22	–	20	–	24	–	23	–	
Min Green	7	10	7	7	7	10	7	7	7	1
Passage *	2.0	5.0	2.0	2.0	2.0	5.0	2.0	2.0	2.0	
Max 1 *	30	45	20	30	15	45	35	30	20	1
Yellow Change	3.0	3.8	3.0	3.7	3.0	3.8	3.0	3.7	3.0	3.8
Red Clear	3.2	2.6	3.3	2.3	3.3	2.6	3.4	2.3	3.3	3.2
Added Initial *	–	1.5	–	–	–	1.5	–	–	–	
Maximum Initial *	–	24	–	–	–	24	–	–	–	
Time Before Reduction *	–	15	–	–	–	15	–	–	–	
Time To Reduce *	–	30	–	–	–	30	–	–	–	
Minimum Gap	–	3.0	–	–	–	3.0	–	–	–	
Advance Walk	–	3	–	3	–	**	–	3	–	
Non Lock Detector	X	–	X	X	X	–	X	X	X	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–	–	–	MIN RECALL
Dual Entry	–	–	–	–	–	–	–	–	–	X

* 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.
** See Note 16

MAXTIME PREEMPTION CHART

FUNCTION	PRE 1
Type	RAIL ROAD
Exit Phases	4+7
Delay	0
Max Presence	0
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	4
Enter Yellow Change	3.8
Enter Red Clear	3.4
Track Green	27
Track Yellow Change	3.7
Track Red Clear	3.4
Dwell Green	0
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Dwell Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	Y
Require All Red Entry	–

* Directs controller to use default phase timing.

This signal was designed for advanced preemption

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
N/A	Curb Ramp	
N/A	Railroad Gate and Flasher	
N/A	Railroad Tracks	
N/A	Railroad Cantilever	
(A)	"RIGHT TURN SIGNAL" Sign (R10-10R)	(A)
(B)	"NO TURN ON RED" L.E.D. Blankout Sign	(B)
(C)	"DO NOT STOP ON TRACKS" Sign (R8-8)	(C)
(D)	Street Name Sign (D3-1)	(D)
(E)	"RIGHT TURN YIELD TO U-TURN" Sign	(E)

Signal Upgrade - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401-NC 42-55 (N Main Street)
at
SR 2768/SR 5056
(Judd Parkway NE)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
CHECKED BY SIGNATURE DATE

SIG. INVENTORY NO. 05-1559

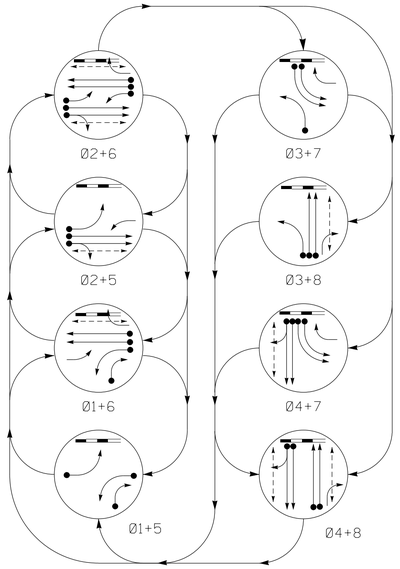
ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

14-APR-2023 13:22
p:\\SUS036343.wgatkins.com:ATKNAC01\Documents\Roads and Bridges\Projects\100063268 Fuquay Varina\Task 05.11 Signals\051559_sig_dsn_2022mmdd.dgn
STIF4685 AT LUS491089

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 21.1

8 Phase
Fully Actuated
w/ Railroad Preemption
(Fuquay-Varina Signal System)

DEFAULT PHASING DIAGRAM

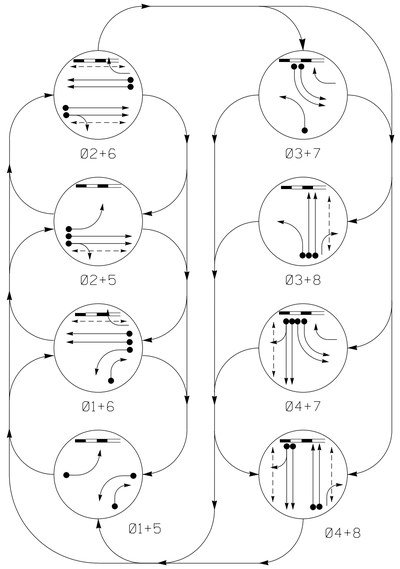


DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE													
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	TRACKR	DWELL	DWELL2	DWELL3	FLASH
11	←~~	←~~	F Y ←	F Y ←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←~~	F Y ←	~~Y~~
21, 22	R	R	G	G	R	R	R	R	R	R	R	G	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	G	G	G	R	R	R	R	R
51	←~~	F Y ←	←~~	F Y ←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	G	R	R	R	R	R	R	G	G	Y
63	R	F Y →	R	F Y →	F Y →	R	F Y →	R	R	R	R	R	~~Y~~ →
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R	R	R	R	R
83	R →	R →	R	R	R	G	R	G	R	R →	R →	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DW	W	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	W	W	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DW	DW	DW	DW	DRK
Sign B	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	✳

✳See Note 10

ALTERNATE 2 PHASING DIAGRAM



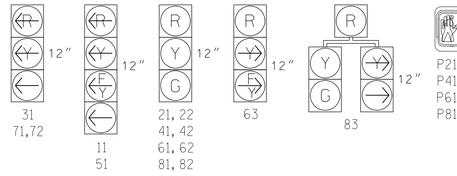
ALTERNATE 2 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE													
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	TRACKR	DWELL	DWELL2	DWELL3	FLASH
11	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←~~	~~R~~	~~Y~~
21, 22	R	R	G	G	R	R	R	R	R	R	R	G	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	G	G	G	R	R	R	R	R
51	←~~	~~R~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	G	R	R	R	R	R	R	G	G	Y
63	R	F Y →	R	F Y →	F Y →	R	F Y →	R	R	R	R	R	~~Y~~ →
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R	R	R	R	R
83	R →	R →	R	R	R	G	R	G	R	R →	R →	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DW	W	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	W	W	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DW	DW	DW	DW	DRK
Sign B	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	✳

✳See Note 10

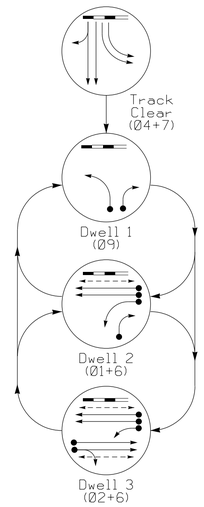
SIGNAL FACE I.D.

All Heads L.E.D.



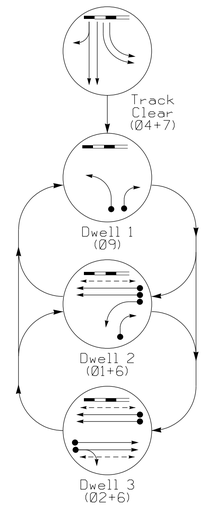
DEFAULT AND ALTERNATE 1 RAIL PREEMPT PHASES

(High Priority)



ALTERNATES 2 AND 3 RAIL PREEMPT PHASES

(High Priority)



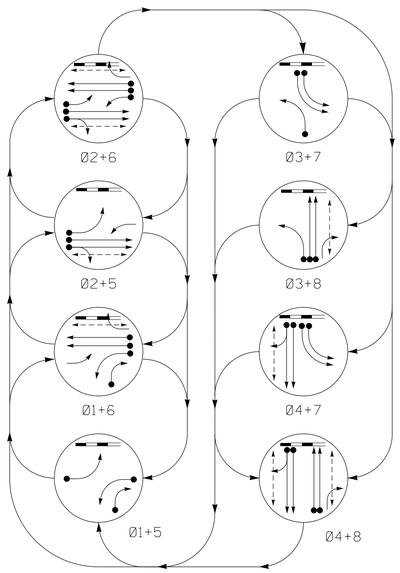
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. 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. Ensure flashing operation does not alter operation of blankout signs.
11. The Division 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. Remove existing Right Arrow "ONLY" (R3-5R) and "U-TURN YIELD TO RIGHT TURN" (R10-16) signs.
14. To provide leading pedestrian interval on phase 6, program FYA heads 51 and 63 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.
15. Program phase 10 to run green concurrently with all phases during normal operation. Phase 10 shall clear to red prior to entering preemption.

PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE 1 PHASING DIAGRAM

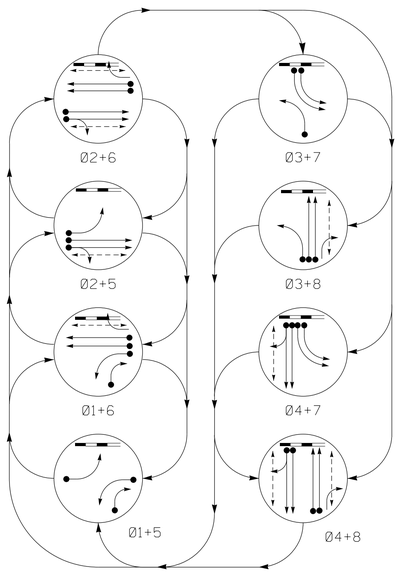


ALTERNATE 1 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE													
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	TRACKR	DWELL	DWELL2	DWELL3	FLASH
11	←~~	←~~	F Y ←	F Y ←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←~~	F Y ←	~~Y~~
21, 22	R	R	G	G	R	R	R	R	R	R	R	G	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	G	G	G	R	R	R	R	R
51	←~~	F Y ←	←~~	F Y ←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	G	R	R	R	R	R	R	G	G	Y
63	R	F Y →	R	F Y →	F Y →	R	F Y →	R	R	R	R	R	~~Y~~ →
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R	R	R	R	R
83	R →	R →	R	R	R	G	R	G	R	R →	R →	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DW	W	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	W	W	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DW	DW	DW	DW	DRK
Sign B	ON	OFF	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	✳

✳See Note 10

ALTERNATE 3 PHASING DIAGRAM



ALTERNATE 3 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE													
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	TRACKR	DWELL	DWELL2	DWELL3	FLASH
11	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←~~	~~R~~	~~Y~~
21, 22	R	R	G	G	R	R	R	R	R	R	R	G	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	G	G	G	R	R	R	R	R
51	←~~	~~R~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
61, 62	R	G	R	G	R	R	R	R	R	R	G	G	Y
63	R	F Y →	R	F Y →	F Y →	R	F Y →	R	R	R	R	R	~~Y~~ →
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	←~~	←~~	←~~	←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R	R	R	R	R
83	R →	R →	R	R	R	G	R	G	R	R →	R →	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DW	W	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	W	W	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DW	DW	DW	DW	DRK
Sign B	ON	OFF	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	✳

✳See Note 10

Signal Upgrade - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401-NC 42-55 (N Main Street)
at
SR 2768/SR 5056
(Judd Parkway NE)

Division 5	Wake County	Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander	

SCALE: N/A

REVISIONS	INIT.	DATE

Designed by: Anthony Encarnacion 4/14/2023
DESIGNER SIGNATURE DATE

SIG. INVENTORY NO. 05-1559

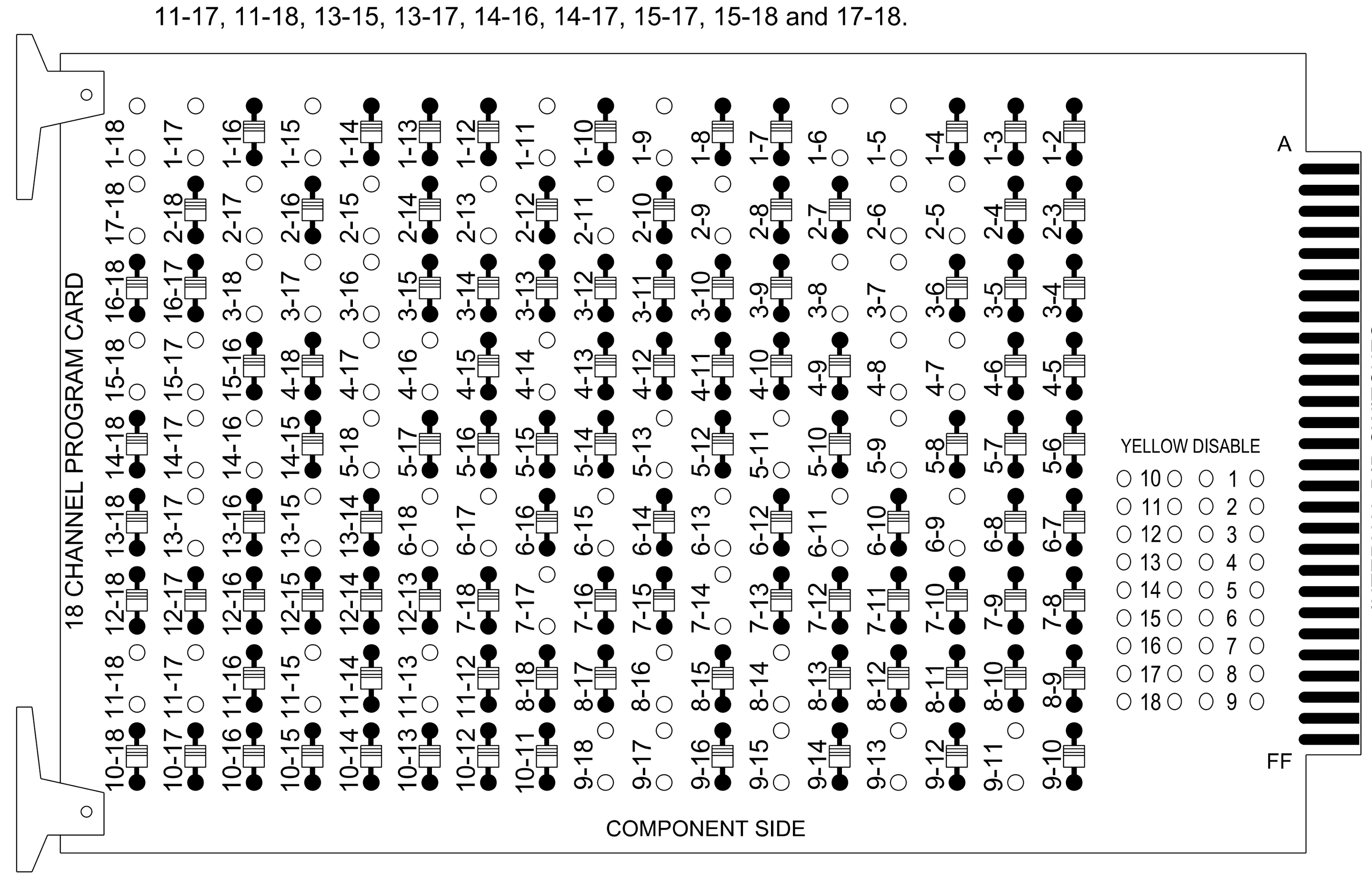
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

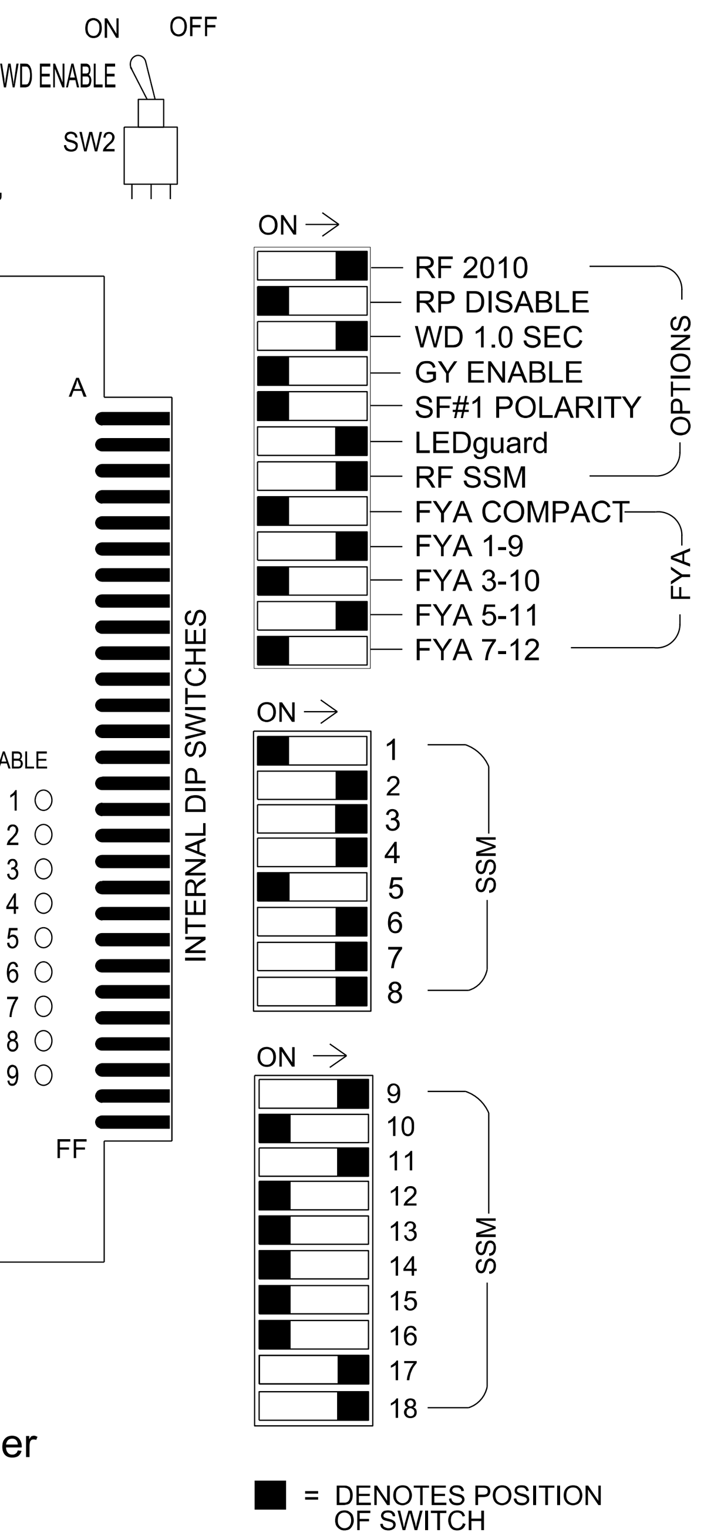
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 1-17, 1-18, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 2-17, 3-7, 3-8, 3-16, 3-17, 3-18, 4-7, 4-8, 4-14, 4-16, 4-17, 5-9, 5-11, 5-13, 5-18, 6-9, 6-11, 6-13, 6-15, 6-17, 6-18, 7-14, 7-17, 8-14, 8-16, 9-11, 9-13, 9-15, 9-17, 9-18, 11-13, 11-15, 11-17, 11-18, 13-15, 13-17, 14-16, 14-17, 15-17, 15-18 and 17-18.



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program controller to start up in phase 2 Green No Walk, 6 Green No Walk and phase 16 Green No Walk.
3. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, AUX S1, AUX S2, AUX S3, AUX S4, AUX S6
Phases Used..1, 2, 2PED, 3, 4, 4PED, 5, 6, 6PED, 7, 8, 8PED, 9**, 10
Overlap "1"..*
Overlap "2"..NOT USED
Overlap "3"..*
Overlap "4"..NOT USED
Overlap "5"..*
Overlap "6"..*
Overlap "7"..*

*See overlap programming detail on sheet 2
**Phase used during preemption only

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	OL7	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11★	21,22	P21, P22	31	41,42	P41, P42	51★	61,62	P61, P62	71,72	81,82, 83	P81, P82	11★	NU	63★	51★	NU	83
RED		128			101			134			107				A111			*
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW				116						122			A121			A114		
YELLOW ARROW				117						123			A122		A112	A115		A105
FLASHING YELLOW ARROW													A123		A113	A116		
GREEN ARROW	127			118			133			124								A106
(Don't Walk hand)			113			104			119			110						
PED YELLOW			** 114															
(Walk person)			115			106			121			112						

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
** Output used for special blankout sign relay control and driver selection operation. See sheet 2 for details.
★ See pictorial of head wiring in detail this sheet.
Note: Load Switch S4 requires output remapping. See sheet 2 of programming details.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	Ø 2 PED DC ISOLATOR	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø 2 2B		NOT USED	Ø 4 4B			SYS. DET. S2			Ø 4 PED DC ISOLATOR	Ø 8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L	NOT USED		Ø 6 6B		Ø 7 7B	Ø 8 8B			SYS. DET. S4					NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
1B	TB2-5,6	I2U	39	1	2	1	15		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
2B	TB2-11,12	I3L	76	42	5	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21	7			X		X	
7B	TB5-7,8	J5L	57	19	21	7			X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
8B	TB5-11,12	J6L	46	8	23	8			X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
*S3	TB7-9,10	J9U	59	21	27	SYS						
*S4	TB7-11,12	J9L	61	23	28	SYS						
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

*System detector only. Remove any assigned vehicle phase.

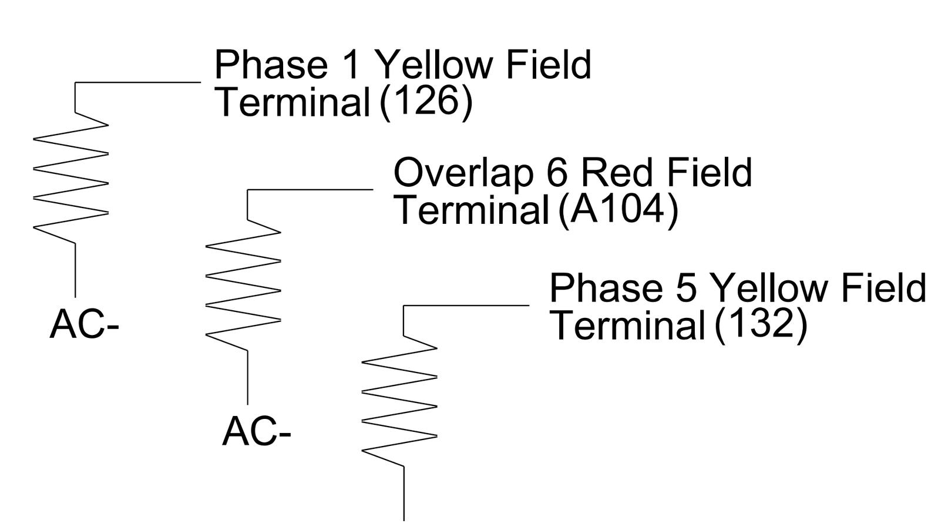
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheets 2 and 3.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

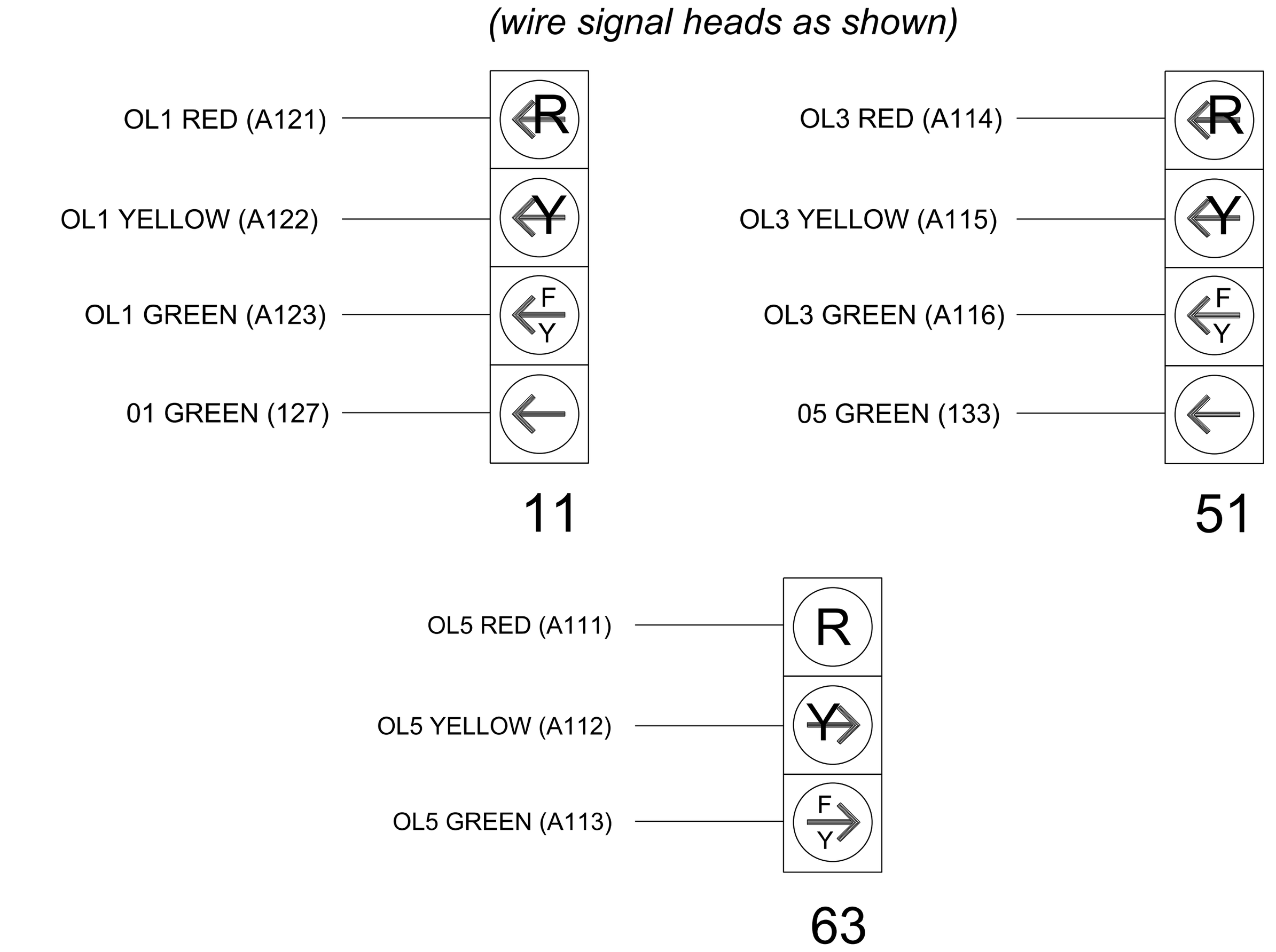
ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1559
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



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.

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401-NC 42-55 (N Main Street)
at
SR 2768/SR 5056
(Judd Parkway NE)

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

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 044476
ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1559

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 21.3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	5	6	7
Type	FYA 4 - Section	-	FYA 4 - Section	-	FYA 4 - Section	Normal	Normal
Included Phases	2	-	6	-	6,7	1,9	3,9
Modifier Phases	1	-	5	-	-	-	-
Trail Green	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	3.0	0.0	3.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING 1

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	5	6	7
Type	FYA 4 - Section	-	FYA 4 - Section	-	FYA 4 - Section	Normal	Normal
Included Phases	2	-	6	-	6	1,9	3,9
Modifier Phases	1	-	5	-	-	-	-
Trail Green	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	3.0	0.0	3.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING 2

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 3. Modify Overlap Plan 3 as shown below and save changes.

Overlap Plan 3

Overlap	1	2	3	4	5	6	7
Type	FYA 4 - Section	-	FYA 4 - Section	-	FYA 4 - Section	Normal	Normal
Included Phases		-		-	6,7	1,9	3,9
Modifier Phases	1	-	5	-	-	-	-
Trail Green	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	3.0	0.0	3.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING 3

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 4. Modify Overlap Plan 4 as shown below and save changes.

Overlap Plan 4

Overlap	1	2	3	4	5	6	7
Type	FYA 4 - Section	-	FYA 4 - Section	-	FYA 4 - Section	Normal	Normal
Included Phases		-		-	6	1,9	3,9
Modifier Phases	1	-	5	-	-	-	-
Trail Green	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	3.0	0.0	3.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	1	2
*	2	3
*	2	4

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1559
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 4

Electrical and Programming Details For:

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

US 401-NC 42-55 (N Main Street)
at
SR 2768/SR 5056
(Judd Parkway NE)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M ENCARNACION

Digitally signed by Anthony Encarnacion 4/14/2023
DocuSign SIGNATURE DATE

SIG. INVENTORY NO. 05-1559

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 21.4

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 3 →

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2	X			2
3	Overlap	7		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6	X		X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2		X	X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5	X		X	17
18	Overlap	6		X		18

LOGIC PROCESSOR PROGRAMMING

Front Panel
Main Menu >Controller >More >User Programs >Definition

Web Interface
Home >Controller >User Programs Configuration >User Programs Definition

Program 1

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Phase Phase Omit	9	Result=!A	Preempt Status	1	None	0	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Omits phase 9 while not in preempt.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasings, select a Pattern that is programmed to run Overlap Plans 2, 3 or 4 and Detector Plans 1 or 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING 1	2	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING 2	3	2
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING 3	4	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLANS 2, 3 OR 4 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASINGS":

OVERLAP PLAN 2: Modifies overlap included phase for head 63 to remove phase 7.

OVERLAP PLAN 3: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

OVERLAP PLAN 4: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

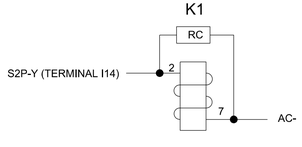
Modifies overlap included phase for head 63 to remove phase 7.

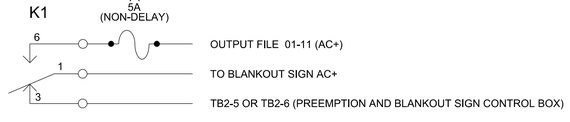
VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

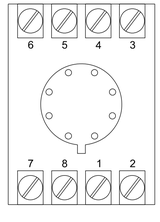
SPECIAL BLANKOUT SIGN RELAY CONTROL AND DRIVER SELECTION WIRING DETAIL

(relay shown in the de-energized default phasing state)





OCTAL RELAY BASE
(DOT NO. 625028630)
TERMINAL LOCATIONS



Note: Relay K1 is an enclosed SPDT general purpose relay with a 120VAC coil, 10A contacts, and octal-style plug (DOT NO. 625028600). The RC network is valued at 0.1 microfarad, 100 ohm (DOT NO. 10601875).

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: 05-1559
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 401-NC 42-55 (N Main Street)
at
SR 2768/SR 5056
(Judd Parkway NE)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

Docusigned by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1559

PREEMPTION PROGRAMMING

Front Panel
Main Menu >Controller >Preemption >Preempt Phasing/Preempt Parameters

Web Interface
Home >Controller >Preempt Configuration >Preempts

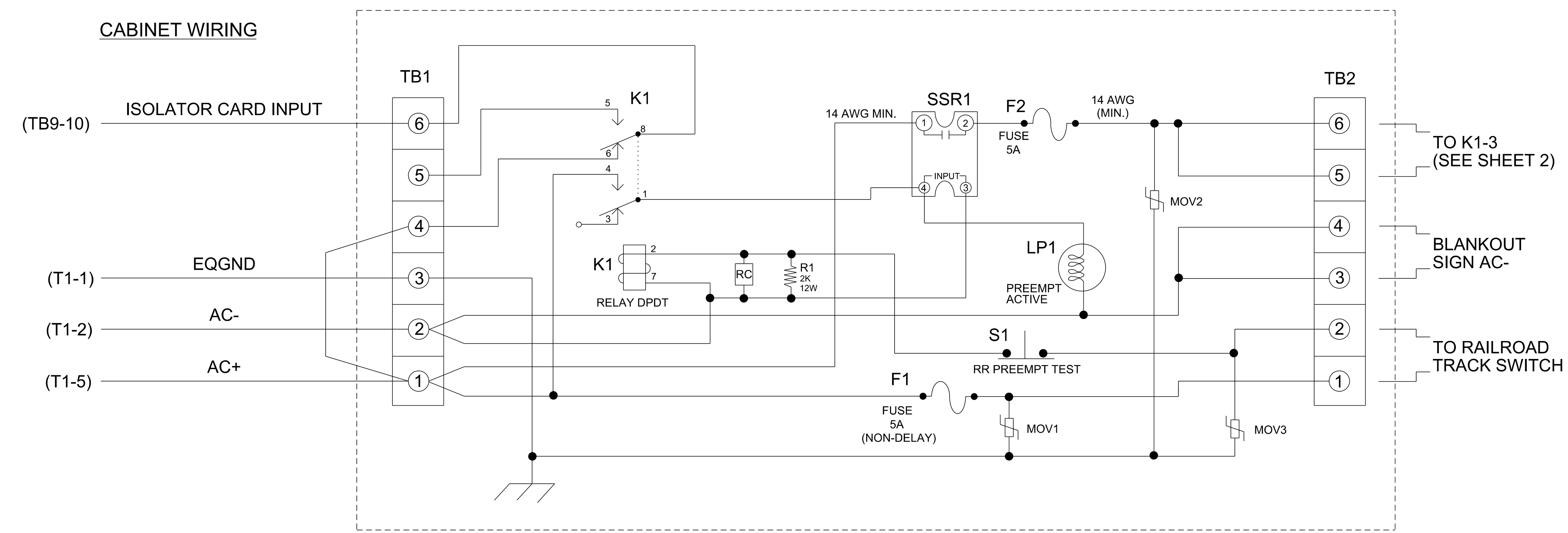
Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	4,7
Track Overlaps	-
Dwell Phases	-
Dwell Overlaps	-
Cycling Phases	1,2,6,9
Cycling Overlaps	1,6,7
Exit Phases	4,7
Exit Overlaps	-
Delay	0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	4
Enter Yellow Change	3.8
Enter Red Clear	3.4
Track Green	27
Track Yellow Clr	3.7
Track Red Clear	3.4
Dwell Green	0
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Dwell Ext Time	1.0
Exit Type	Exit Phases
Not Ovrd Flash	X
Not Ovrd Nxt Pre	-
Track Clear Ovrd	X
Ped Clear During Yellow	X

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

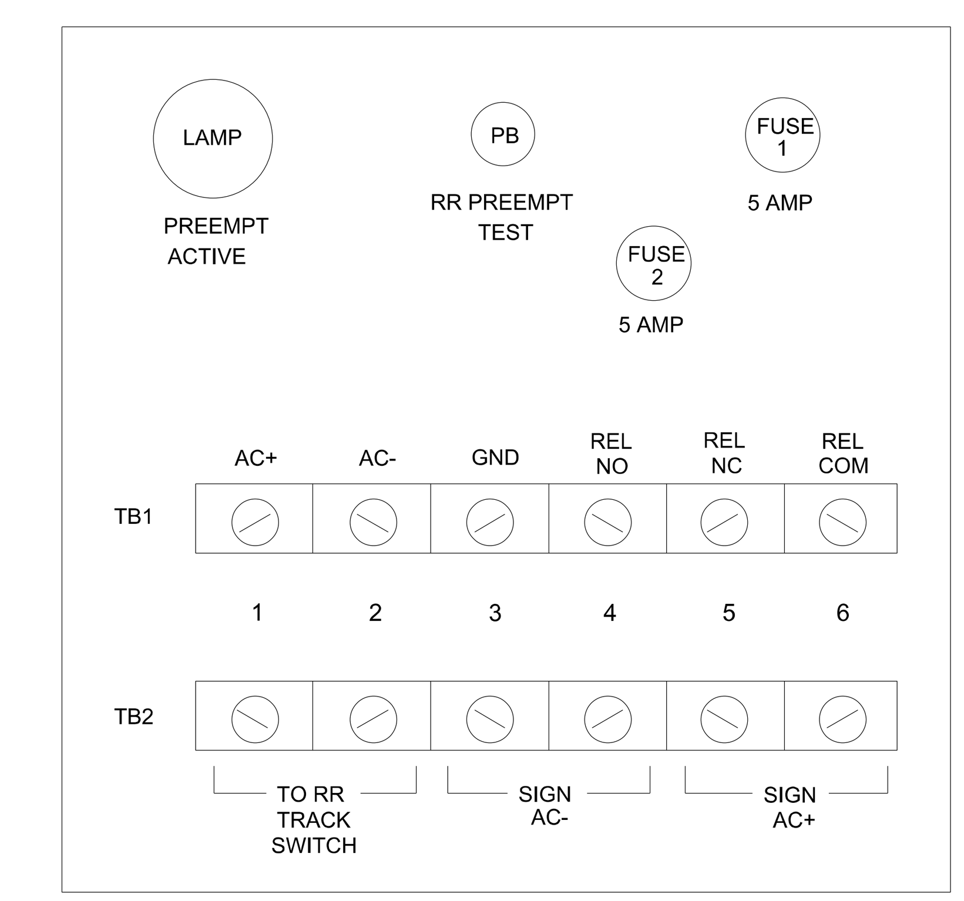
PREEMPTION AND BLANKOUT SIGN CONTROL BOX



NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a DPDT with 120VAC coil with octal base.
3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
5. 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) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



SEQUENCE DETAIL

Front Panel
Main Menu >Controller >Sequence & Phs Config>Sequences

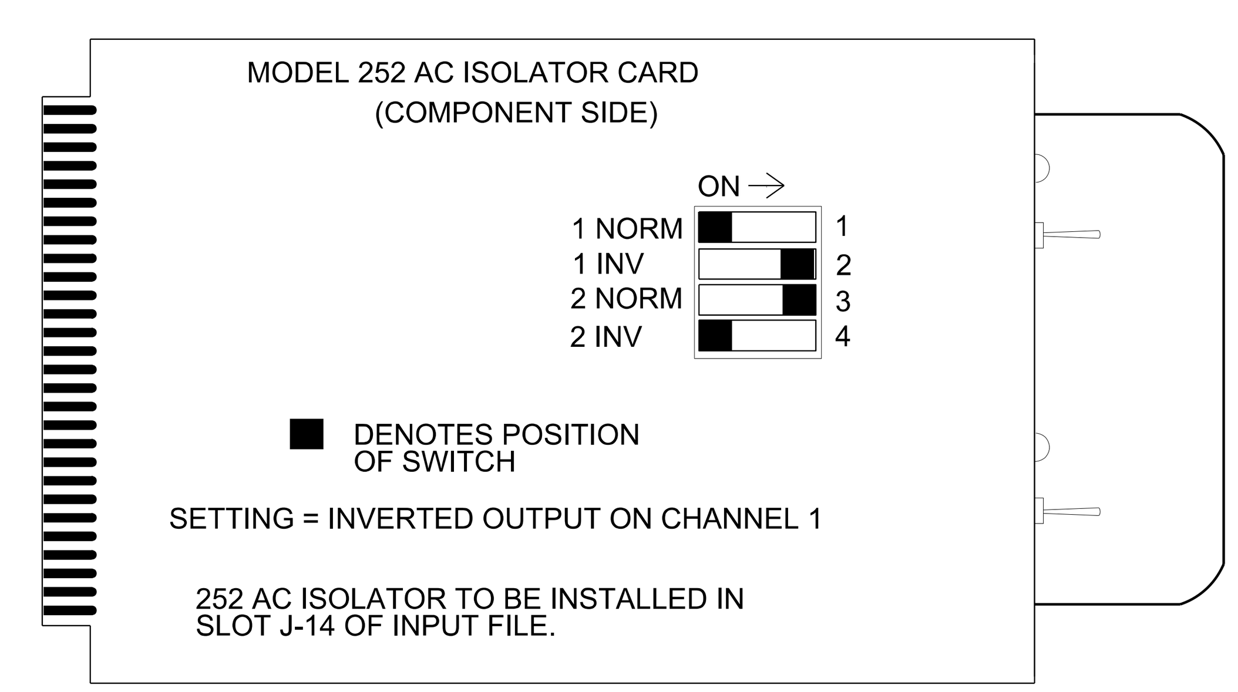
Web Interface
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	1,2,a,3,4,b,9,c
2	5,6,a,7,8,b,c
3	10,d

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1559
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 4 of 4

Electrical and Programming Details For:

US 401-NC 42-55 (N Main Street)
at
SR 2768/SR 5056
(Judd Parkway NE)

Division 5 Wake County Fuquay-Varina

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

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

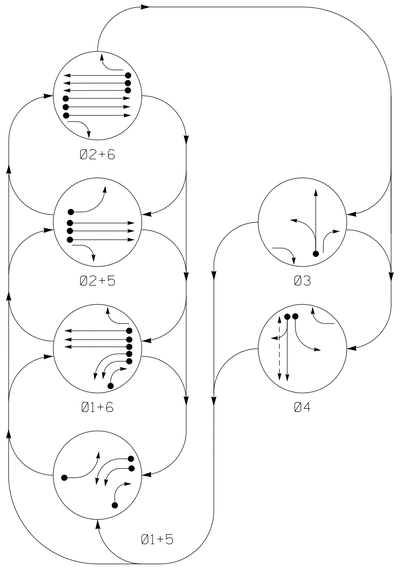
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1559

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 22.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

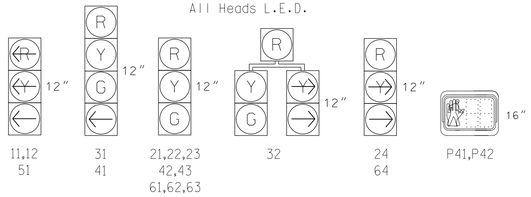
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11, 12	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	R	Y
24	R	R	→	→	→	R	~~Y~~
31	R	R	R	R	G ←	R	R
32	R ↗	R ↗	R	R	G	R	R
41	R	R	R	R	G ←	R	R
42, 43	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	R	Y
64	R	→	R	→	R	→	~~Y~~
P41, P42	DW	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



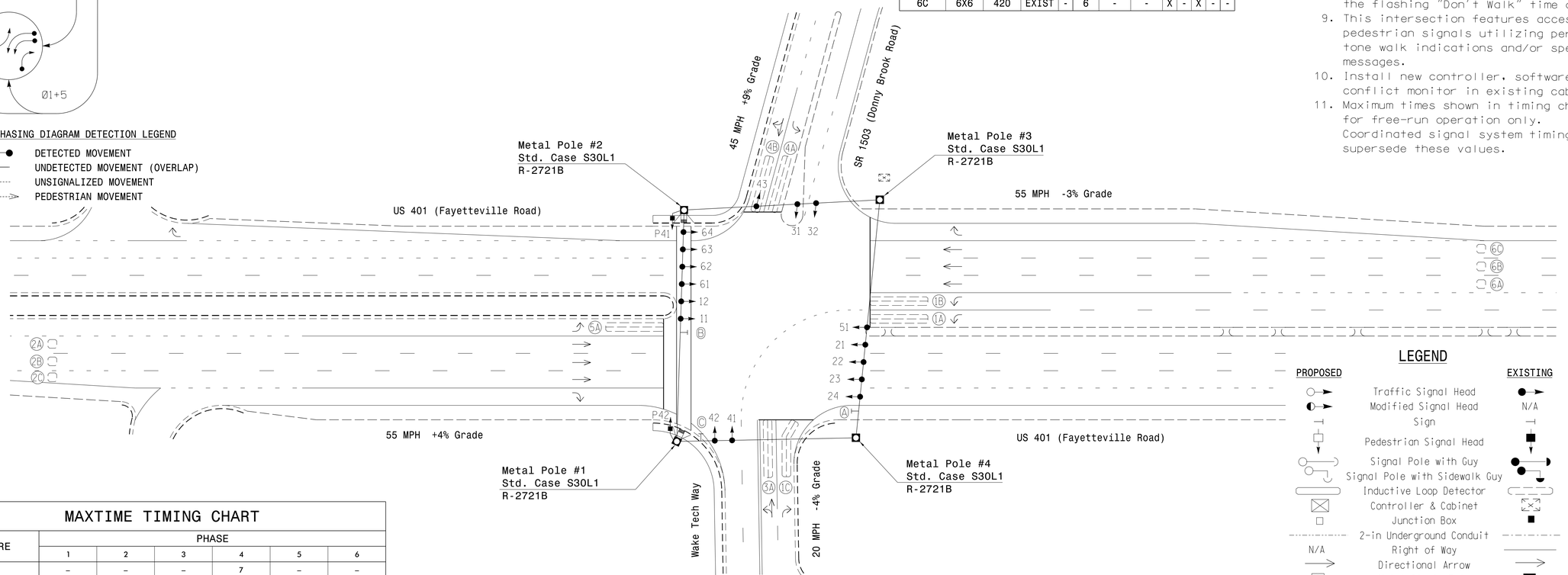
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	-	-	X	-	X	-	-
1B	6X40	0	2-4-2	-	1	-	-	X	-	X	-	-
1C	6X40	0	2-4-2	-	1	15	-	X	-	X	-	-
2A	6X6	420	EXIST	-	2	-	-	X	-	X	-	-
2B	6X6	420	EXIST	-	2	-	-	X	-	X	-	-
2C	6X6	420	EXIST	-	2	-	-	X	-	X	-	-
3A	6X40	0	2-4-2	-	3	3	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	-	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	-	-	X	-	X	-	-
6A	6X6	420	EXIST	-	6	-	-	X	-	X	-	-
6B	6X6	420	EXIST	-	6	-	-	X	-	X	-	-
6C	6X6	420	EXIST	-	6	-	-	X	-	X	-	-

6 Phase Fully Actuated (Fuquay-Varina Signal System)

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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Pavement markings are existing.
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. This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
10. Install new controller, software and conflict monitor in existing cabinet.
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	■
○	Signal Pole with Guy	●
○╮	Signal Pole with Sidewalk Guy	●╮
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-----	2-in Underground Conduit	-----
N/A	Right of Way	———
→	Directional Arrow	→
○	Metal Strain Pole	■
N/A	Curb Ramp	▨
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ
Ⓒ	"TURNING TRAFFIC MUST YIELD TO PEDESTRIANS" Sign (R10-15)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	7	–	–
Ped Clear *	–	–	–	33	–	–
Min Green	7	14	7	7	7	14
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	50	70	20	20	20	70
Yellow Change	3.0	4.8	3.0	3.9	3.0	5.5
Red Clear	3.6	1.4	3.8	2.3	3.5	1.6
Added Initial *	–	1.5	–	–	–	1.5
Maximum Initial *	–	46	–	–	–	46
Time Before Reduction *	–	15	–	–	–	15
Time To Reduce *	–	45	–	–	–	45
Minimum Gap	–	3.4	–	–	–	3.4
Advance Walk	–	–	–	5	–	–
Non Lock Detector	X	–	X	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL
Dual Entry	–	–	–	–	–	–

* 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.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross US 401.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross US 401.

Signal Upgrade

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

US 401 (Fayetteville Road) at SR 1503 (Donny Brook Road)/ Wake Tech Way

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
CHECKED SIGNATURE DATE

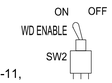
SIG. INVENTORY NO. 05-1696

14-APR-2023 13:37
pw://SUS003543:wsatkins.com:ATKNAN001/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 05_11_Signals/051696_sig_dsn_2022mmds.dgn
STI#4685 AT LUS491089

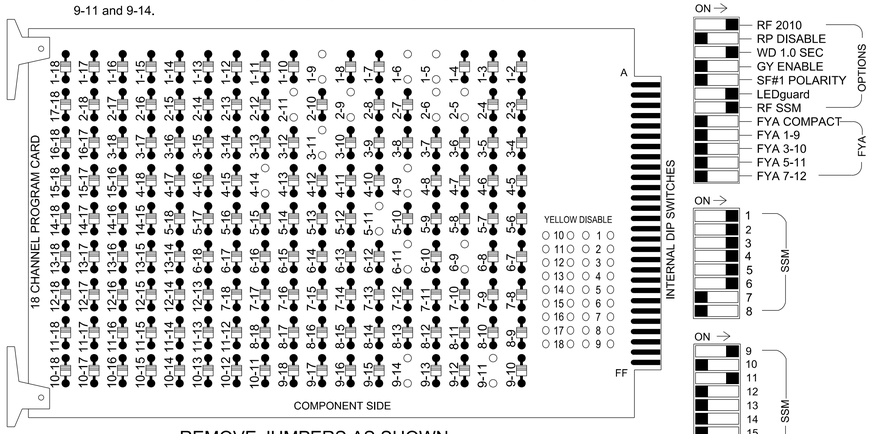
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 22.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 2-5, 2-6, 2-9, 2-11, 3-11, 4-9, 4-14, 5-11, 6-9, 6-11, 9-11 and 9-14.



■ = DENOTES POSITION OF SWITCH

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S4, S5, S6, S7, S8, AUX S1, AUX S4
Phases Used.....1, 2, 3, 4, 4PED, 5, 6
Overlap "1".....*
Overlap "2".....NOT USED
Overlap "3".....*
Overlap "4".....NOT USED

*See overlap programming detail on sheet 2

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	32	21,22, 23	NU	31	32	41	42,43	P41, P42	51	61,62, 63	NU	NU	NU	NC	64★	NU	NU	24★	NU	NU
RED			128		116	116	101	101			134					A121			A114		
YELLOW			129		117	117	102	102			135										
GREEN			130		118	118	103	103			136										
RED ARROW	125									131											
YELLOW ARROW	126	126								132						A122			A115		
GREEN ARROW	127	127			118		103			133						A123			A116		
✋									104												
🚶									106												

NU = Not Used
NC = Not Connected
★See pictorial of head wiring in detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	∅ 1 1A	∅ 1 1B	∅ 2 2A	∅ 2 2C	∅ 3 3A	∅ 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	∅ 1 1C	∅ 2 2B	NOT USED	NOT USED	∅ 4 4B						∅ 4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	∅ 5 5A	∅ 6 6A	∅ 6 6C	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	∅ 6 6B	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 POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1			X		X	
1B	TB2-5,6	I2U	39	1	2	1			X		X	
1C	TB2-7,8	I2L	43	5	3	1	15		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X		X	
2B	TB2-11,12	I3L	76	42	5	2			X		X	
2C	TB4-1,2	I4U	47	9	6	2			X		X	
3A	TB4-5,6	I5U	58	20	7	3	3		X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15	5			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6			X		X	
6C	TB3-9,10	J3U	64	30	18	6			X		X	
PED PUSH BUTTONS												
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

OVERLAP PROGRAMMING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	Normal	-	Normal	-
Included Phases	6,4	-	2,3	-
Modifier Phases	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1696
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared for the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TSS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (Fayetteville Road)
at
SR 1503 (Donny Brook Road)/
Wake Tech Way

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M ENCARNACION

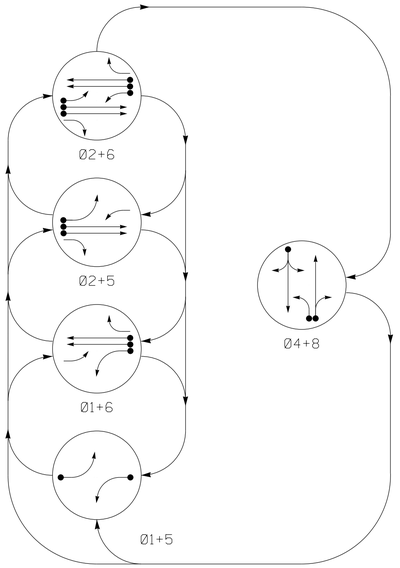
Digitally Signed by: Anthony Encarnacion 4/14/2023
DocuSign SIGNATURE DATE

SIG. INVENTORY NO. 05-1696

14-APR-2023 13:42
pw://SUS0036343.wsatkins.com:ATKNAC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 05_11_Signals/Electrical Details/051696_smele_2022mods.dgn
STIFF4685 AT LUS491089

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 23.0

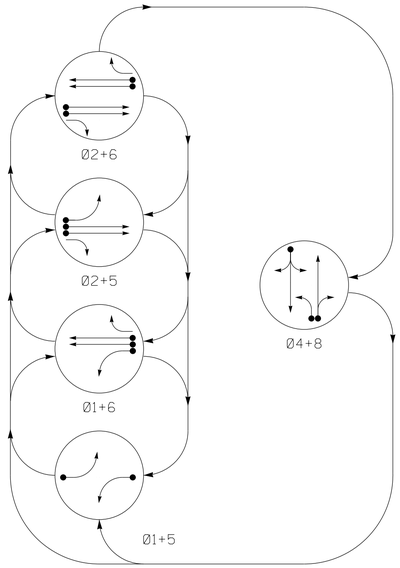
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←FY	←FY	←R	←Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	←FY	←	←FY	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←FY	←R
82, 83	R	R	R	R	G	R

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←R	←R	←R	←Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	←R	←	←R	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←FY	←R
82, 83	R	R	R	R	G	R

PHASING DIAGRAM DETECTION LEGEND

- ←● DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ⇠ UNSIGNALIZED MOVEMENT
- ⇠⇢ PEDESTRIAN MOVEMENT

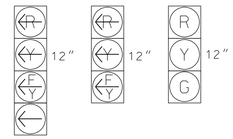
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	-
					6#	3	-	X	-	X	X	-
2A	6X6	420	EXIST	-	2	-	-	X	X	X	-	-
2B	6X6	420	EXIST	-	2	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	-
					2#	3	-	X	-	X	X	-
6A	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
6B	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	3	-	X	-	X	-	-
8B	6X40	0	2-4-2	-	8	10	-	X	-	X	-	-

* Disable delay during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

SIGNAL FACE I.D.

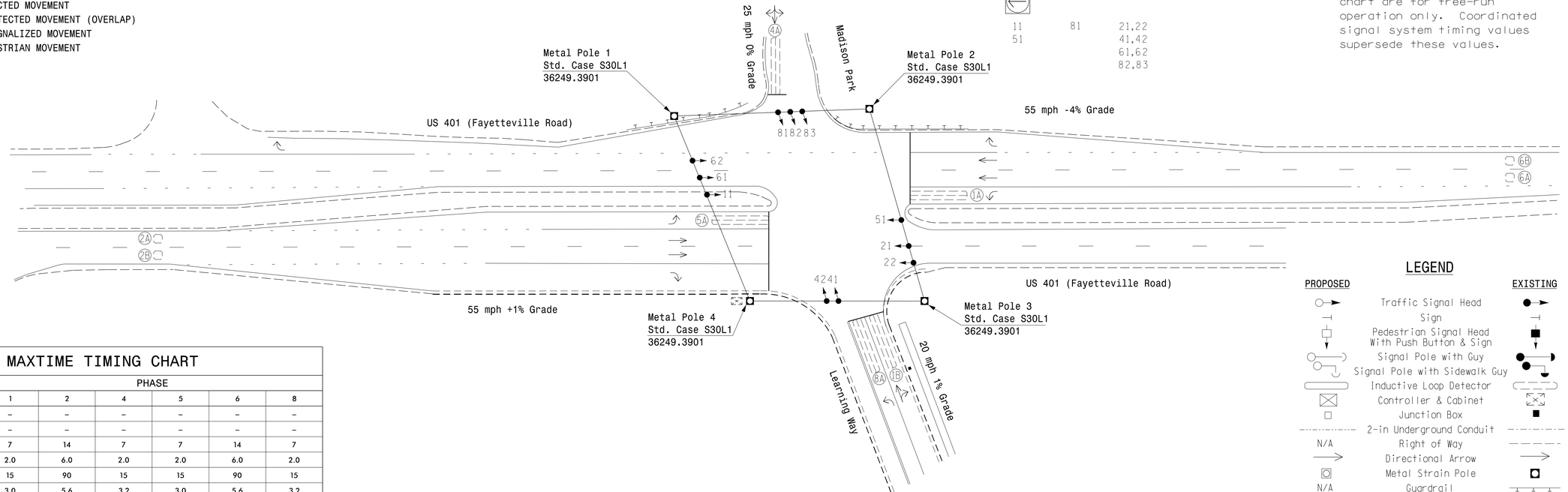
All Heads L.E.D.



5 Phase
Fully Actuated
(Fuquay-Varina Signal System)

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. Reposition existing signal heads 41 and 42.
5. Set all detector units to presence mode.
6. Pavement markings are existing.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. Install new controller, software and conflict monitor in existing cabinet.
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	●→
⊣	Sign	⊣
□	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	———
→	Directional Arrow	→
⊡	Metal Strain Pole	□
N/A	Guardrail	⊥⊥⊥

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–
Min Green	7	14	7	7	14	7
Passage *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	90	15	15	90	15
Yellow Change	3.0	5.6	3.2	3.0	5.6	3.2
Red Clear	3.1	1.2	3.9	2.8	1.2	3.9
Added Initial *	–	1.5	–	–	1.5	–
Maximum Initial *	–	46	–	–	46	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	45	–	–	45	–
Minimum Gap	–	3.4	–	–	3.4	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

* 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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401 (Fayetteville Road) at Learning Way/Madison Park

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

Anthony Encarnacion 4/14/2023
ORIGINAL SIGNATURE DATE

SIG. INVENTORY NO. 05-1699

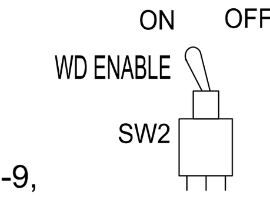
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

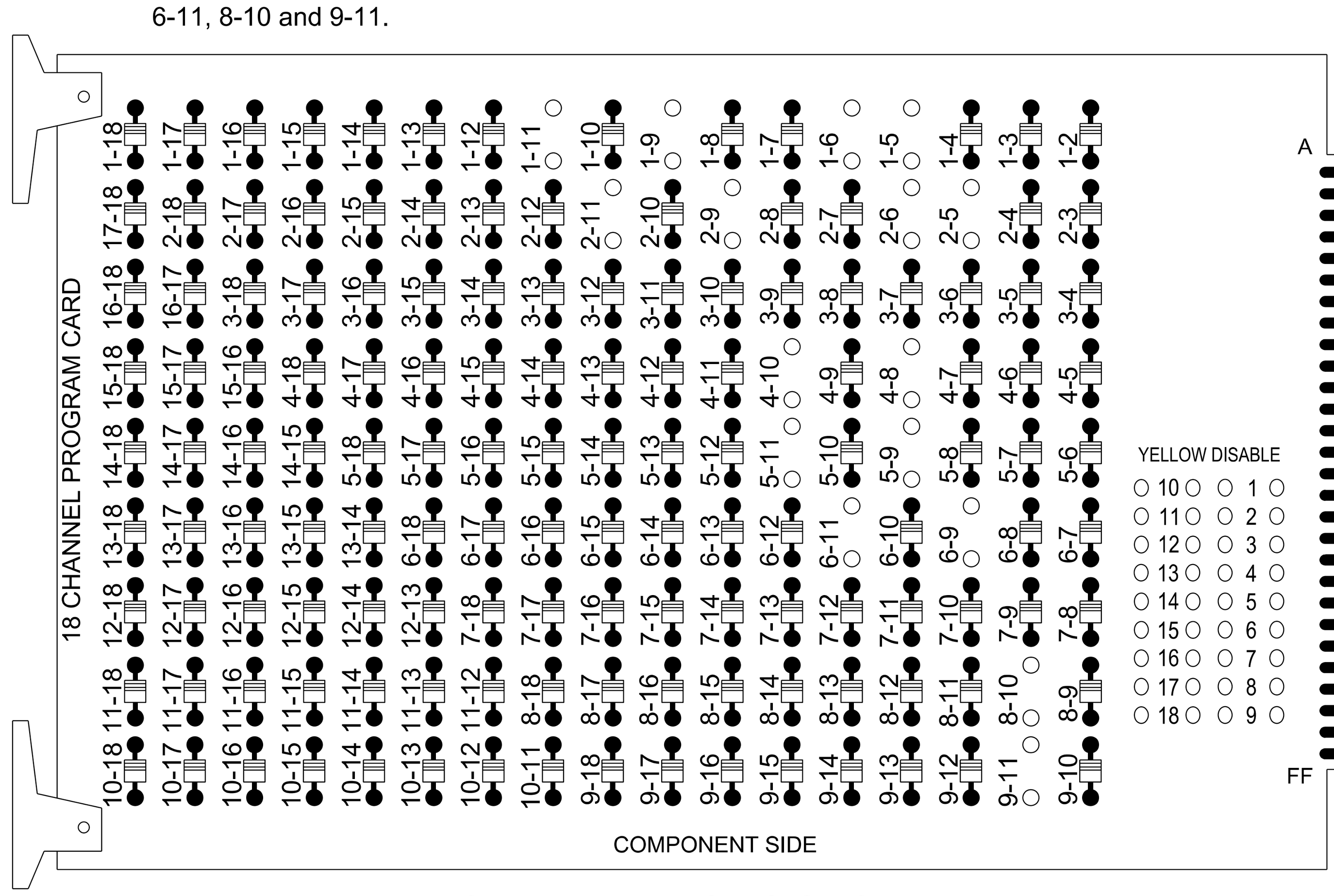
PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 23.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

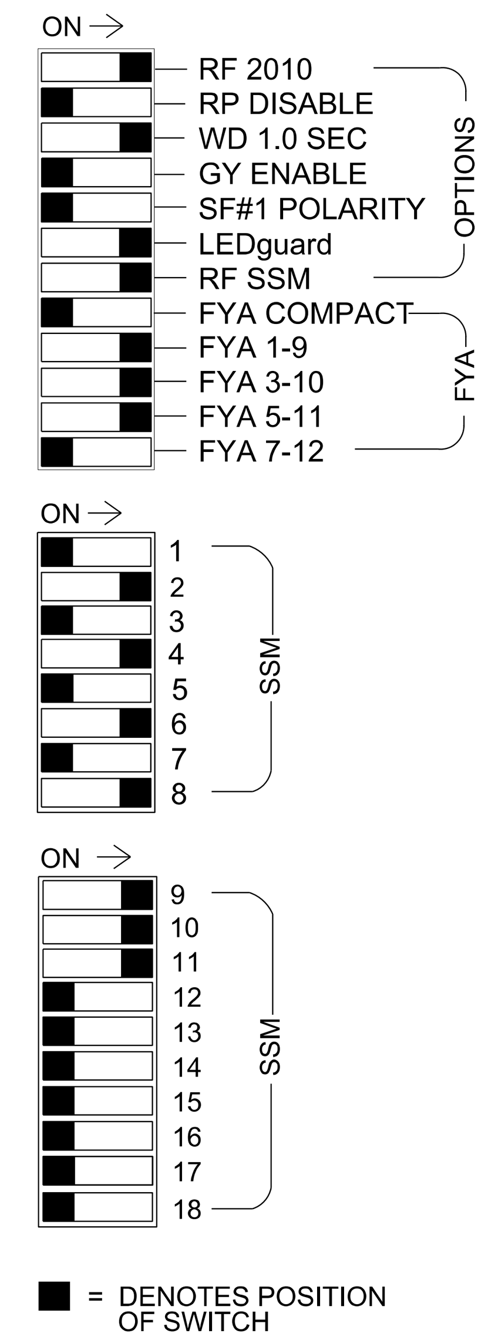
(remove jumpers and set switches as shown)

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





REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S5, S7, S8, S11, AUX S1, AUX S2, AUX S4
Phases Used.......................................1, 2, 4, 5, 6, 8
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..NOT USED

*See overlap programming detail on sheet 2

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41,42	NU	51★	61,62	NU	NU	82,83	NU	11★	81★	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114		
YELLOW ARROW													A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW	127						133											

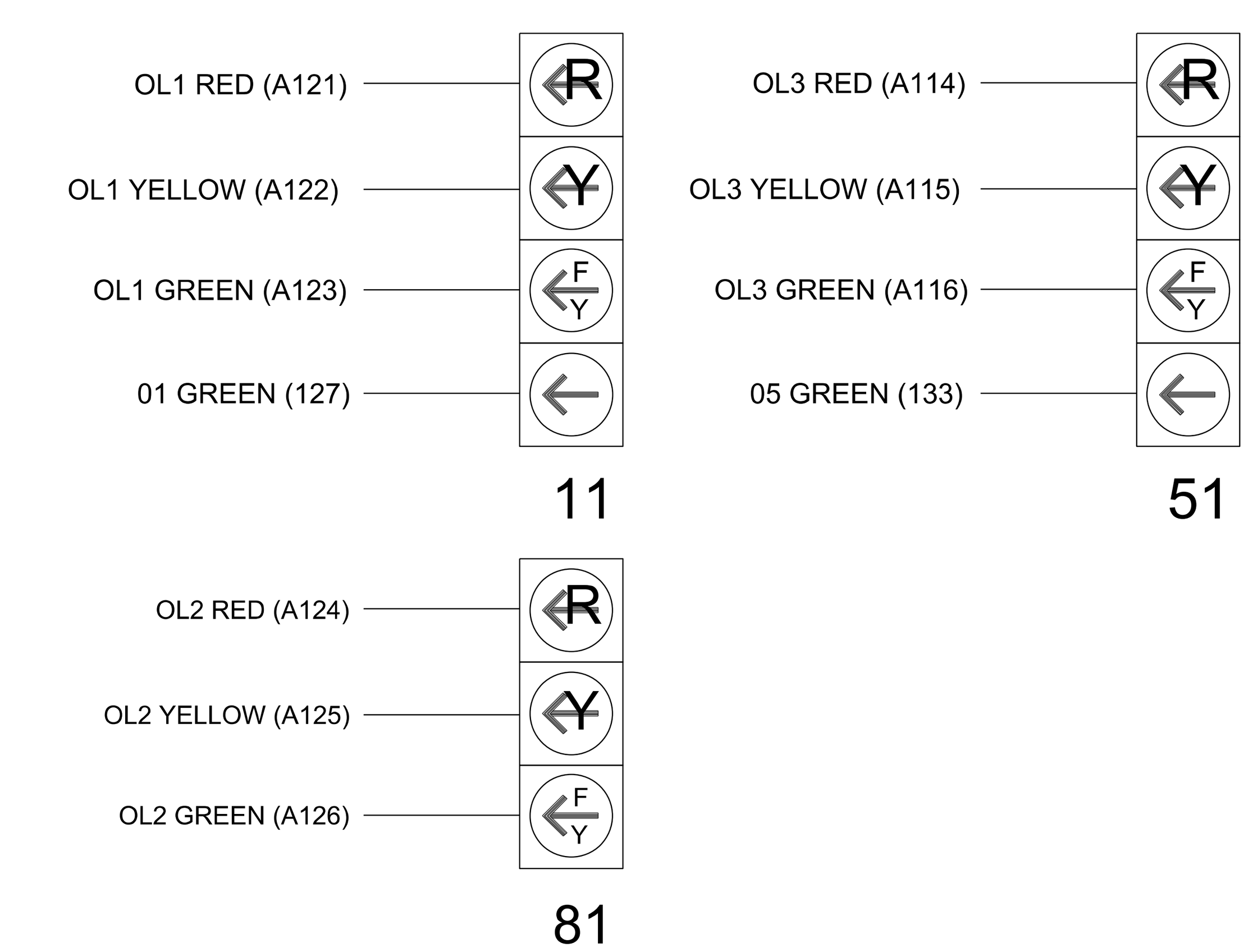
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		X		X	X
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
2B	TB2-11,12	I3L	76	42	5	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

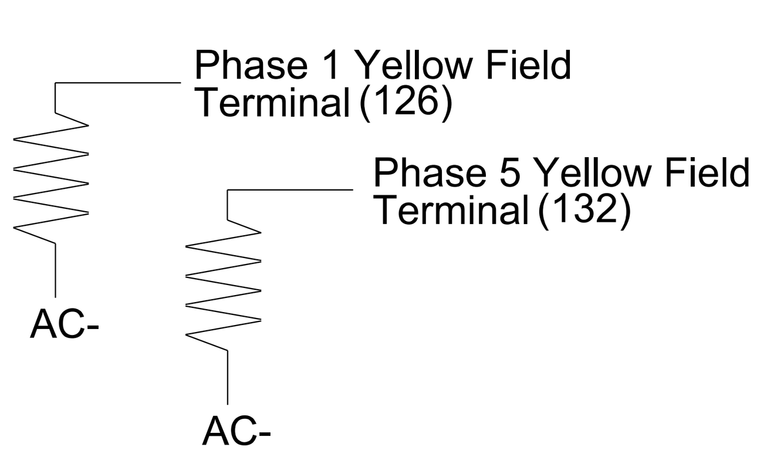
INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1699
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared for the Offices of:

Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
ITS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (Fayetteville Road)
at
Learning Way/Madison Park

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 044476
ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
D8EC537F...
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1699

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 23.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	-
Included Phases	2	4	6	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	-	
Included Phases	-	4	-	-	← NOTICE INCLUDED PHASE
Modifier Phases	1	-	5	-	
Trail Green	0	0	0	0	
Trail Yellow	0.0	0.0	0.0	0.0	
Trail Red	0.0	0.0	0.0	0.0	

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	0
29	0	-

5A

Detector	Call Phase	Delay
15	5	0
31	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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1699
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (Fayetteville Road) at Learning Way/Madison Park

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

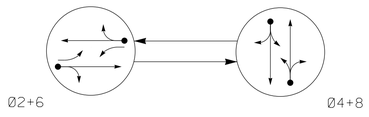
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
DESIGNER SIGNATURE DATE

SIG. INVENTORY NO. 05-1699

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 24.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

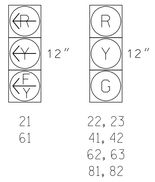
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	PHASE FLASH
21	~~G~~	~~R~~	~~Y~~
22, 23	G	R	Y
41, 42	R	G	R
61	~~G~~	~~R~~	~~Y~~
62, 63	G	R	Y
81, 82	R	G	R

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	-	4	10	-	X	-	X	-	X
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	-	8	10	-	X	-	X	-	X

SIGNAL FACE I.D.

All Heads L.E.D.



2 Phase
Fully Actuated
(Fuquay-Varina Signal System)

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. Renumber existing signal heads 21, 22, 61 and 62 as 22, 23, 62 and 63, respectively.
4. Reposition existing signal heads numbered 22, 23, 62 and 63.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. 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	
	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	

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max 1 *	80	20	80	20
Yellow Change	4.4	4.9	4.4	4.3
Red Clear	1.0	1.0	1.0	1.0
Added Initial *	2.5	–	2.5	–
Maximum Initial *	34	–	34	–
Time Before Reduction *	15	–	15	–
Time To Reduce *	30	–	30	–
Minimum Gap	3.0	–	3.0	–
Advance Walk	–	–	–	–
Non Lock Detector	–	X	–	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	X	–	X

* 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.

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Signal Upgrade

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

SR 1393 (Hilltop Needmore Road)
at
SR 1404 (Johnson Pond Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

Developed by: Anthony Encarnacion 4/14/2023
DESIGNER SIGNATURE DATE

SIG. INVENTORY NO. 05-1702

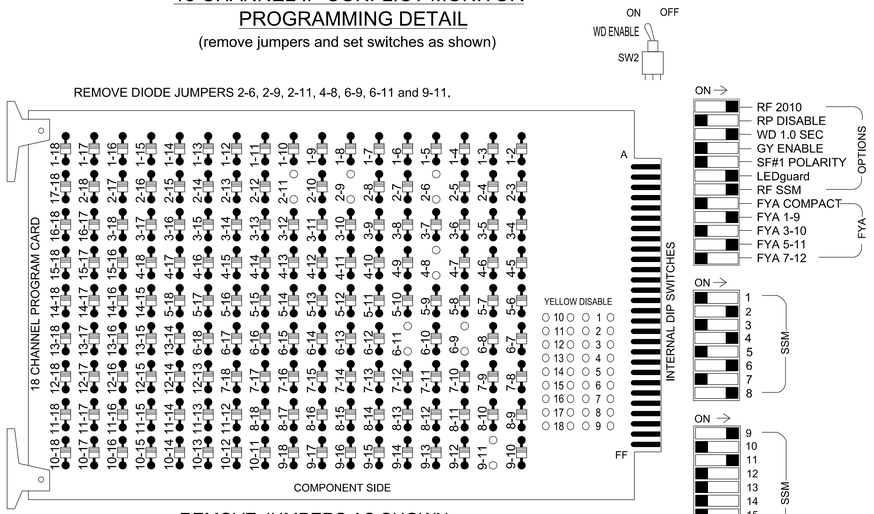
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 24.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, S5, S8, S11, AUX S1, AUX S4
Phases Used.....2, 4, 6, 8
Overlap "1".....*
Overlap "2".....NOT USED
Overlap "3".....*
Overlap "4".....NOT USED

*See overlap programming detail on this sheet

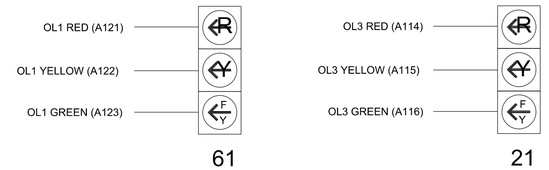
SIGNAL HEAD HOOK-UP CHART

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82	NU	61★	NU	NU	21★	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																		

NU = Not Used
★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads 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	SLOT EMPTY	∅2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	∅4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	∅6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	∅8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	10		X		X	

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

OVERLAP PROGRAMMING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	6	-
Modifier Phases	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1702
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

SR 1393 (Hilltop Needmore Road)
at
SR 1404 (Johnson Pond Road)

Division 5 | Wake County | Fuquay-Varina

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

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

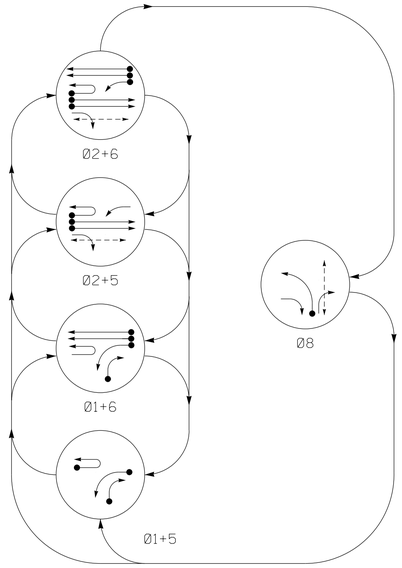
Anthony Encarnacion 4/14/2023
SIGNATURE DATE

SIG. INVENTORY NO. 05-1702

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 25.0

5 Phase Fully Actuated (Fuquay-Varina Signal System)

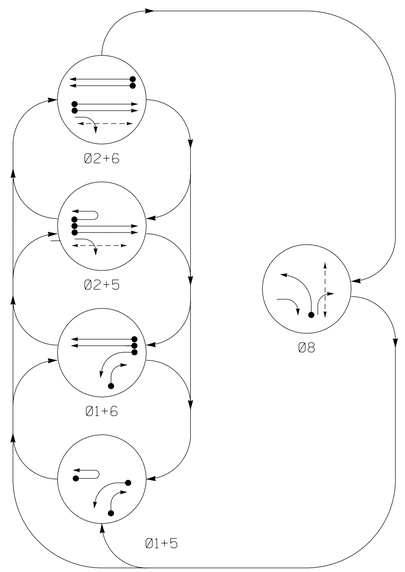
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø8	FLASH
11	←	←	←FY	←FY	←R	←Y
21, 22	R	R	G	G	R	Y
23	R	R	→FY	→FY	→	→Y
51	↶	↶FY	↶	↶FY	↶R	↶Y
61, 62	R	G	R	G	R	Y
81, 83	←R	←R	←R	←R	←	←R
82	→	→	R	R	→FY	R
P21, P22	DW	DW	W	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø8	FLASH
11	←	←	←R	←R	←R	←Y
21, 22	R	R	G	G	R	Y
23	R	R	→FY	→FY	→	→Y
51	↶	↶R	↶	↶R	↶R	↶Y
61, 62	R	G	R	G	R	Y
81, 83	←R	←R	←R	←R	←	←R
82	→	→	R	R	→FY	R
P21, P22	DW	DW	W	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

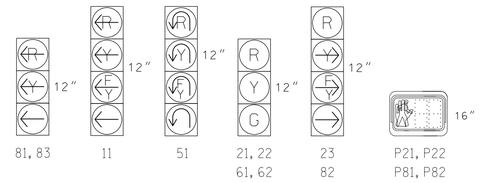
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD
1A	6X60	0	2-4-2	-	1	15*	-	X	-	X	-	-
					6#	-	-	X	-	X	-	-
1B	6X40	0	2-4-2	-	1	15	-	X	-	X	-	-
2A,2B	6X6	90	EXIST	-	2	-	-	X	-	X	-	-
5A	6X60	0	2-4-2	-	5	15*	-	X	-	X	-	-
					2#	-	-	X	-	X	-	-
6A,6B	6X6	90	EXIST	-	6	-	1.6	X	-	X	-	-
6C,6D	6X6	300	EXIST	-	6	-	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	3	-	X	-	X	-	-
S1	6X6	+130	EXIST	-	-	-	-	-	-	-	-	-
S2	6X6	+130	EXIST	-	-	-	-	-	-	-	-	-
S3	6X6	+130	EXIST	-	-	-	-	-	-	-	-	-
S4	6X6	+130	EXIST	-	-	-	-	-	-	-	-	-

* Disable delay during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

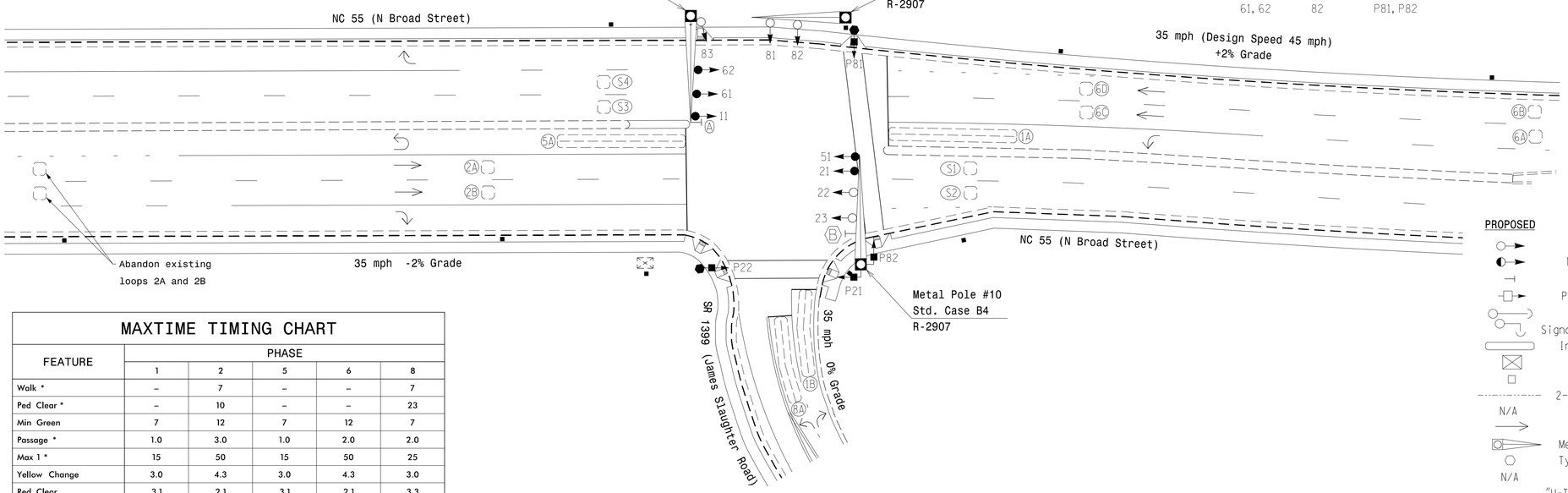
SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	5	6	8
Walk *	–	7	–	–	7
Ped Clear *	–	10	–	–	23
Min Green	7	12	7	12	7
Passage *	1.0	3.0	1.0	2.0	2.0
Max 1 *	15	50	15	50	25
Yellow Change	3.0	4.3	3.0	4.3	3.0
Red Clear	3.1	2.1	3.1	2.1	3.3
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	–	**	–	–	**
Non Lock Detector	X	–	X	–	X
Vehicle Recall	–	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	–	–	–	–

* 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.
** See Note 16

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. Renumber existing loops 2C and 2D as 2A and 2B. Renumber existing heads 22 and 23 as 21 and 22, respectively.
5. Reposition existing signal head 21.
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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
12. Install new controller, software and conflict monitor in existing cabinet.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
14. Disconnect and abandon existing loops 2A and 2B.
15. To provide a leading pedestrian interval on phase 2, program FYA head 23 to delay for 3 seconds after the start of phase 2 walk interval. See electrical details.
16. To provide a leading pedestrian interval on phase 8, program FYA head 11 to delay for 3 seconds after the start of phase 8 walk interval. See electrical details.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□→	Pedestrian Signal Head	■→
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
□	Junction Box	■
	2-in Underground Conduit	
N/A	Right of Way	
→	Directional Arrow	→
	Metal Pole with Mastarm	
⬡	Type II Signal Pedestal	●
N/A	Curb Ramp	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	"RIGHT TURN SIGNAL" Sign (R10-10R)	Ⓑ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 55 (N Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
CHECKED BY SIGNATURE DATE

SIG. INVENTORY NO. 05-1731

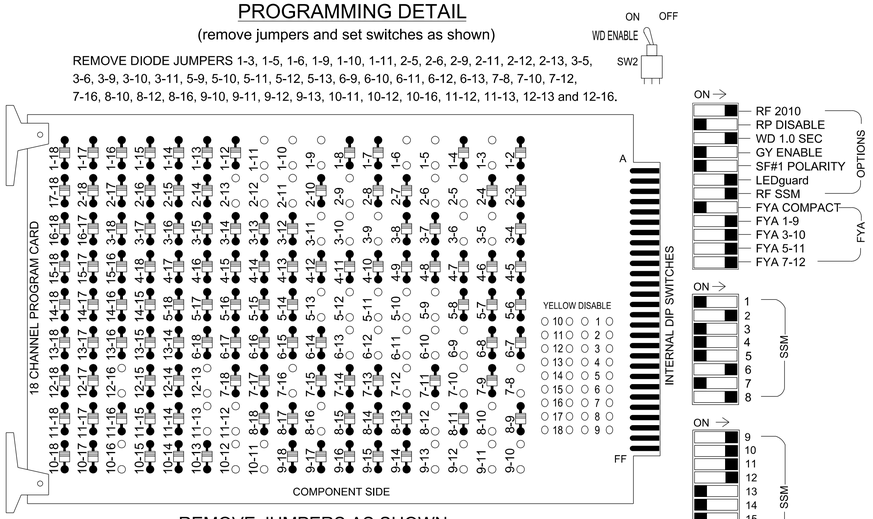
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 25.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-5, 1-6, 1-9, 1-10, 1-11, 2-5, 2-6, 2-9, 2-11, 2-12, 2-13, 3-5, 3-6, 3-9, 3-10, 3-11, 5-9, 5-10, 5-11, 5-12, 5-13, 6-9, 6-10, 6-11, 6-12, 6-13, 7-8, 7-10, 7-12, 7-16, 8-10, 8-12, 8-16, 9-10, 9-11, 9-12, 9-13, 10-11, 10-12, 10-16, 11-12, 11-13, 12-13 and 12-16.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S3, S4, S7, S8, S10, S11, S12, AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.....1, 2, 2PED, 5, 6, 8, 8PED
Overlap "1".....*
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*
Overlap "7".....*
Overlap "8".....*

*See overlap programming detail on sheet 2

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	OL7	4	4 PED	5	6	6 PED	OL8	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	82★	NU	NU	51★	61,62	NU	23★	81,83	P81, P82	11★	82★	NU	51★	23★	NU
RED		128						134						A124			A101	
YELLOW	*	129		*			*	135		*								
GREEN		130						136										
RED ARROW											107		A121			A114		
YELLOW ARROW											108		A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127			118			133			124	109							
✋			113									110						
🚶			115									112						

NU = Not Used

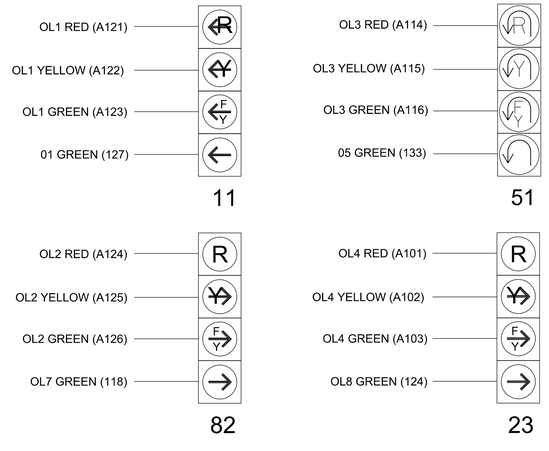
*Denotes install load resistor. See load resistor installation detail this sheet.

★See pictorial of head wiring in detail this sheet.

Note: Load Switches S4 and S10 require output remapping. See sheet 2 for programming details.

FYA SIGNAL WIRING DETAIL

(wire signal heads 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	∅ 1 1A	∅ 1 1B	∅ 2 2A,2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	∅ 2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED						SYS. DET. S2			NOT USED	∅ 8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	∅ 5 5A	∅ 6 6A,6B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	∅ 8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	∅ 6 6C,6D				NOT USED			SYS. DET. S4					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6			X		X	
1B	TB2-5,6	I2U	39	1	2	1	15		X		X	
2A,2B	TB2-9,10	I3U	63	29	4	2			X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2			X		X	
6A,6B	TB3-5,6	J2U	40	2	16	6		1.6	X		X	
6C,6D	TB3-7,8	J2L	44	6	17	6			X		X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
*S3	TB7-9,10	J9U	59	21	27	SYS						
*S4	TB7-11,12	J9L	61	23	28	SYS						
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

*System detector only. Remove any assigned vehicle phase.

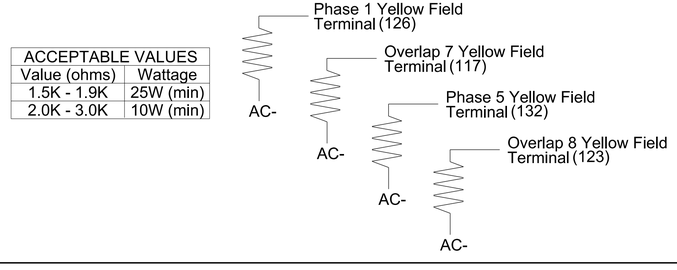
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



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: 05-1731
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

NC 55 (N Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

Documents originated by: Anthony Encarnacion 4/14/2023
DOCUMENTS NOT CONSIDERED FINAL UNLESS SIGNATURE DATE

SIG. INVENTORY NO. 05-1731

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 25.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	7	8
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	Normal
Included Phases	2	8	6	2	1	8
Modifier Phases	1	-	5	-	-	-
Modifier Overlaps	-	7	-	8	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	3.0	0.0	3.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	7	8
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	Normal
Included Phases	-	8	-	2	1	8
Modifier Phases	1	-	5	-	-	-
Modifier Overlaps	-	7	-	8	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	3.0	0.0	3.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	0
29	0	-

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 3 →
NOTICE OVERLAP 8 ASSIGNED TO CHANNEL 7 →

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2	X			2
3	Overlap	7		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6	X		X	6
7	Overlap	8		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2		X	X	10
11	Overlap	3	X			11
12	Overlap	4	X			12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

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.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1731
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

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

NC 55 (N Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5	Wake County	Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

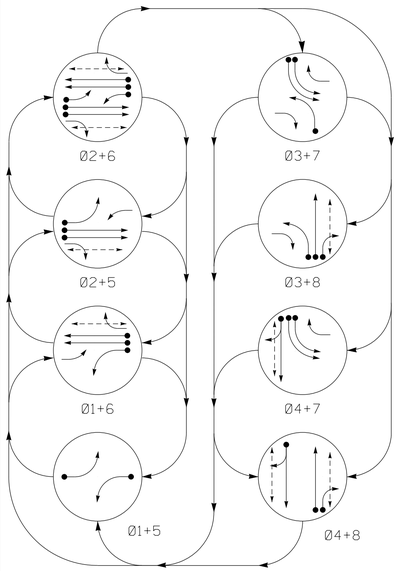
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
CHECKED SIGNATURE DATE

SIG. INVENTORY NO. 05-1731

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 26.0

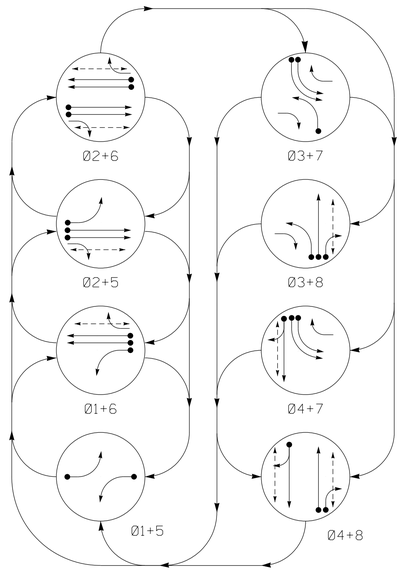
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←●	←●	←F	←F	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R→	R→	R	R	Y
31	←R	←R	←R	←R	←	←	←R	←R	←R
41, 42	R	R	R	R	R	R	G	G	R
51	←	←F	←	←F	←R	←R	←R	←R	←Y
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R→	R	R→	R	Y
71, 72	←R	←R	←R	←R	←	←	←R	←R	←R
81, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←●	←●	←R	←R	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R→	R→	R	R	Y
31	←R	←R	←R	←R	←	←	←R	←R	←R
41, 42	R	R	R	R	R	R	G	G	R
51	←	←R	←	←R	←R	←R	←R	←R	←Y
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R→	R	R→	R	Y
71, 72	←R	←R	←R	←R	←	←	←R	←R	←R
81, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	-
					6#	-	-	X	-	X	-	-
2A	6X6	90	EXIST	-	2	-	-	X	-	X	-	-
2B	6X6	90	EXIST	-	2	-	-	X	-	X	-	-
3A	6X40	0	2-4-2	-	3	3	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	-
					2#	-	-	X	-	X	-	-
6A	6X6	90	EXIST	-	6	-	-	X	-	X	-	-
6B	6X6	90	EXIST	-	6	-	-	X	-	X	-	-
7A	6X40	0	2-4-2	-	7	-	-	X	-	X	-	-
7B	6X40	0	2-4-2	-	7	-	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	-	-	X	-	X	-	-
8B	6X40	0	2-4-2	-	8	15	-	X	-	X	-	-
8C	6X6	0	EXIST	-	8	15	-	X	-	X	-	-
S1	6X6	+200	EXIST	-	-	-	-	-	-	-	-	-
S2	6X6	+200	EXIST	-	-	-	-	-	-	-	-	-
S3	6X6	+200	EXIST	-	-	-	-	-	-	-	-	-
S4	6X6	+200	EXIST	-	-	-	-	-	-	-	-	-

* Disable delay during alternate phasing operation
\# Disable phase call for loop(s) during alternate phasing operation

8 Phase Fully Actuated (Fuquay-Varina Signal System)

NOTES

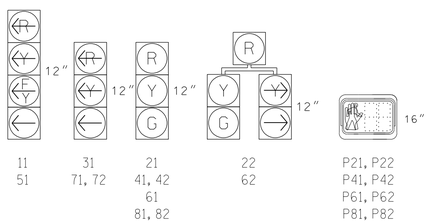
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
10. Install new controller, software and conflict monitor in existing cabinet.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

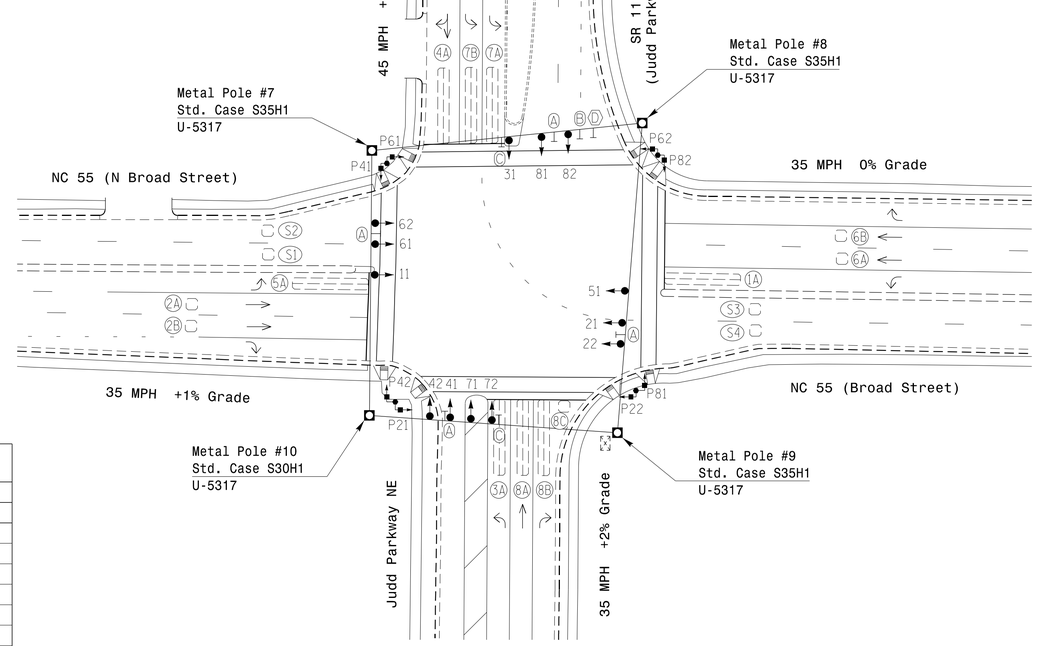
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



11, 51 | 31, 71, 72 | 21, 41, 42, 61, 81, 82 | 22, 62 | P21, P22, P41, P42, P61, P62, P81, P82



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head	■↓
○→	Signal Pole with Guy	●→
○⤵	Signal Pole with Sidewalk Guy	●⤵
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	————
→	Directional Arrow	→
◎	Metal Strain Pole	■
⬡	Type II Signal Pedestal	⬢
N/A	Curb Ramp	◢
Ⓐ	Street Name Sign (D3-1)	Ⓐ
Ⓑ	"RIGHT TURN ON RED MUST YIELD TO U-TURN" Sign (R10-30)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ
Ⓓ	Right Arrow "ONLY" Sign (R3-5R)	Ⓓ

MAXTIME TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Walk *	–	7	–	7	–	7	–	7
Ped Clear *	–	25	–	23	–	30	–	26
Min Green	7	10	7	7	7	10	7	7
Passage *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max 1 *	15	50	20	25	15	50	20	25
Yellow Change	3.0	3.8	3.0	4.4	3.0	3.8	3.0	3.7
Red Clear	3.6	2.9	3.2	1.9	3.3	2.9	3.8	2.5
Added Initial *	–	–	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–	–	–
Advance Walk	–	3	–	3	–	3	–	3
Non Lock Detector	X	–	X	X	X	–	X	X
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL	–	–
Dual Entry	–	–	–	–	–	–	–	–

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

NC 55 (N Broad Street) at SR 1110 (Judd Parkway)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

SCALE: 0 40, 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
DRAWN BY: SIGNATURE DATE

SIG. INVENTORY NO. 05-1816

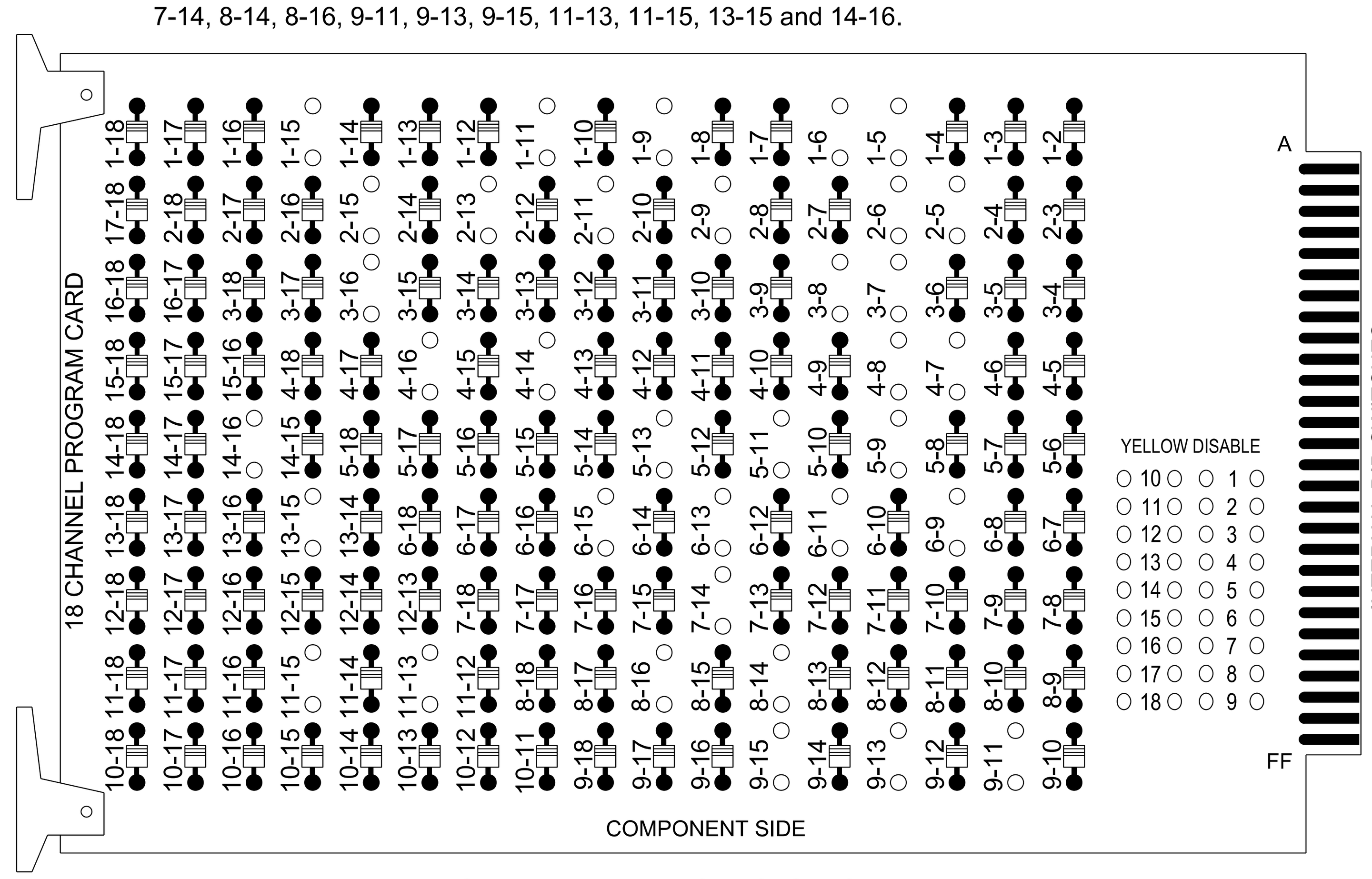
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

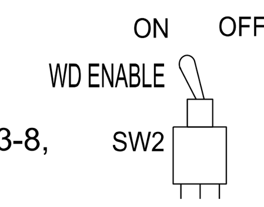
13-APR-2023 12:44
p:\7_SUS036343\wgatkins.com:ATKNANC01\Documents\Roads and Bridges\Projects\100063268 Fuquay Varina\Task 05_11_Signals\051816_sig_dsn_2022mmdd.dgn
STIF4685 AT LUS491089

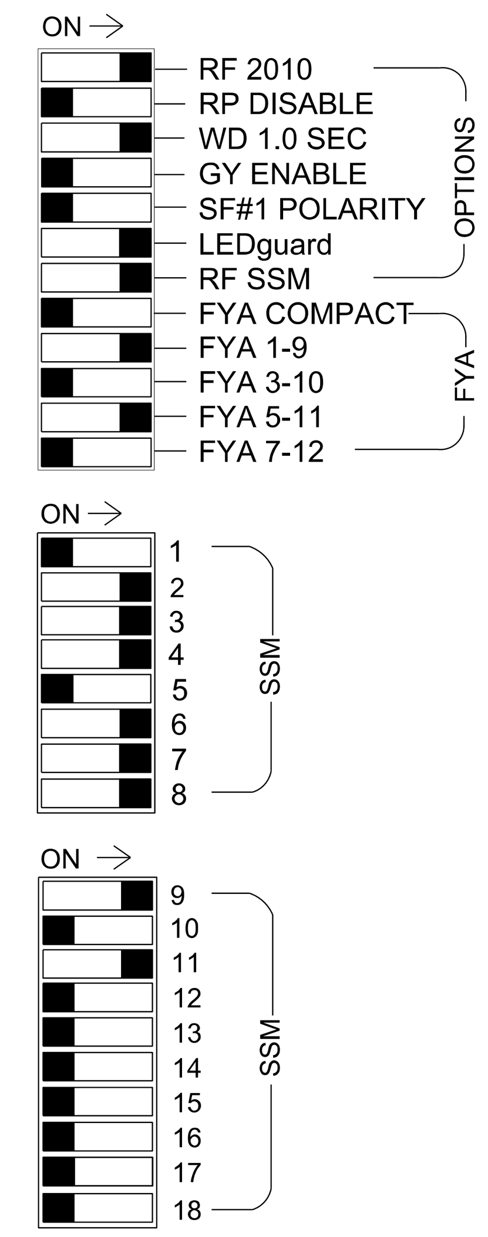
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-14, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15 and 14-16.







■ = DENOTES POSITION OF SWITCH

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

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 plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S3, S4, S5, S6, S7, S8, S9
S10, S11, S12, AUX S1, AUX S4
Phases Used..1, 2, 2PED, 3, 4, 4PED, 5, 6, 6PED,
7, 8, 8PED
Overlap "1"...*
Overlap "2"...NOT USED
Overlap "3"...*
Overlap "4"...NOT USED

*See overlap programming detail on sheet 2

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	22	31	41,42	P41, P42	51★	61,62	P61, P62	62	71,72	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					116							122			A121			A114		
YELLOW ARROW				117	117						123	123			A122			A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW	127			118	118			133			124	124								
✋			113				104			119				110						
🚶			115				106			121				112						

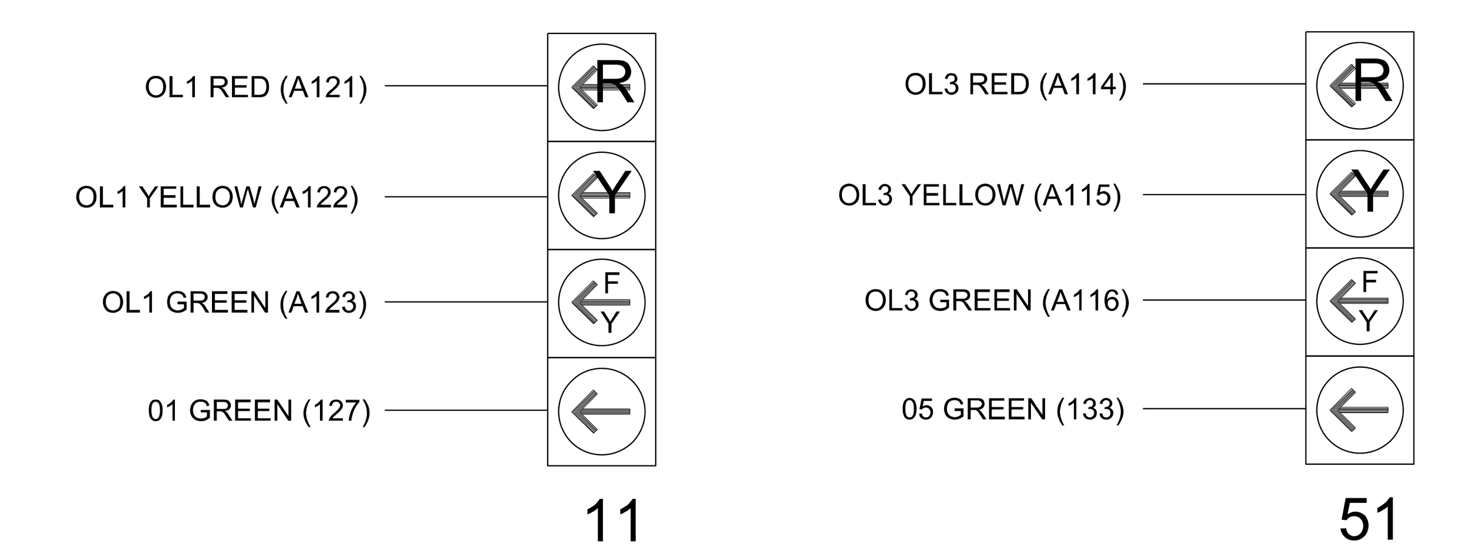
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	∅ 1 1A	∅ 2 2A	SLOT EMPTY	SLOT EMPTY	∅ 3 3A	∅ 4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	∅ 2 PED DC ISOLATOR	∅ 6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	∅ 2 2B			NOT USED	NOT USED			SYS. DET. S2			∅ 4 PED DC ISOLATOR	∅ 8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	∅ 5 5A	∅ 6 6A	SLOT EMPTY	SLOT EMPTY	∅ 7 7A	∅ 8 8A	∅ 8 8C	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	∅ 6 6B			∅ 7 7B	∅ 8 8B	NOT USED		SYS. DET. S4					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6			X		X	
2A	TB2-5,6	I2U	39	1	2	2			X		X	
2B	TB2-7,8	I2L	43	5	3	2			X		X	
3A	TB4-5,6	I5U	58	20	7	3	3		X		X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
6B	TB3-7,8	J2L	44	6	17	6			X		X	
7A	TB5-5,6	J5U	57	19	21	7			X		X	
7B	TB5-7,8	J5L	57	19	21	7			X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
8B	TB5-11,12	J6L	46	8	23	8	15		X		X	
8C	TB7-1,2	J7U	66	32	24	8	15		X		X	
*S3	TB7-9,10	J9U	59	21	27	SYS						
*S4	TB7-11,12	J9L	61	23	28	SYS						
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

*System detector only. Remove any assigned vehicle phase.

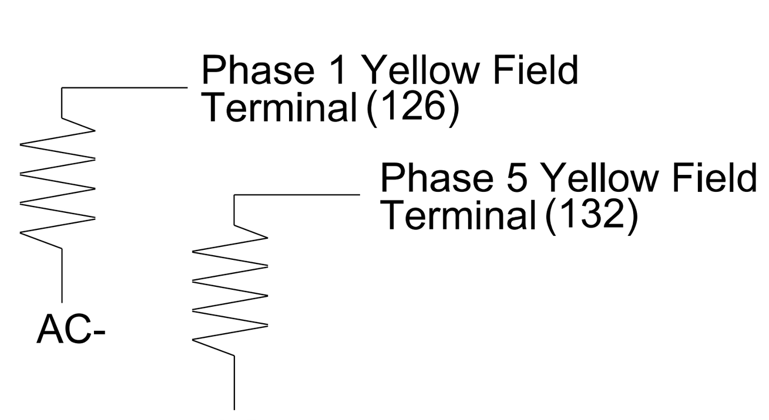
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



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: 05-1816
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

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

NC 55 (N Broad Street)
at
SR 1110 (Judd Parkway)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: April 2023 | REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff | REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

DocuSigned by: Anthony Encarnacion
SIGNATURE 4/14/2023 DATE

SIG. INVENTORY NO. 05-1816

PROJECT REFERENCE NO.	SHEET NO.
U-6022	Sig. 26.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	6	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	-	-	-	-
Modifier Phases	1	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

1A

Detector	Call Phase	Delay
1	1	0
29	0	-

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1816
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

NC 55 (N Broad Street)
at
SR 1110 (Judd Parkway)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	April 2023	REVIEWED BY:	AM Encarnacion
PREPARED BY:	JT Stiff	REVIEWED BY:	PL Alexander

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476 ANTHONY M. ENCARNACION

Designed by: Anthony Encarnacion 4/14/2023
DESIGNER SIGNATURE DATE

SIG. INVENTORY NO. 05-1816