

Freeway Adaptive system

IH 10

TxDOT HOU

AIM

- Help alleviate freeway traffic through signalized intersections when adjacent freeway's level of service is worsen.

CONCEPT

- Adapting same concept as truck rollover technology.
- Using the Wavetronix HD Radar sensor for freeway detection.
- Detecting vehicle speed, volume, and occupancy.

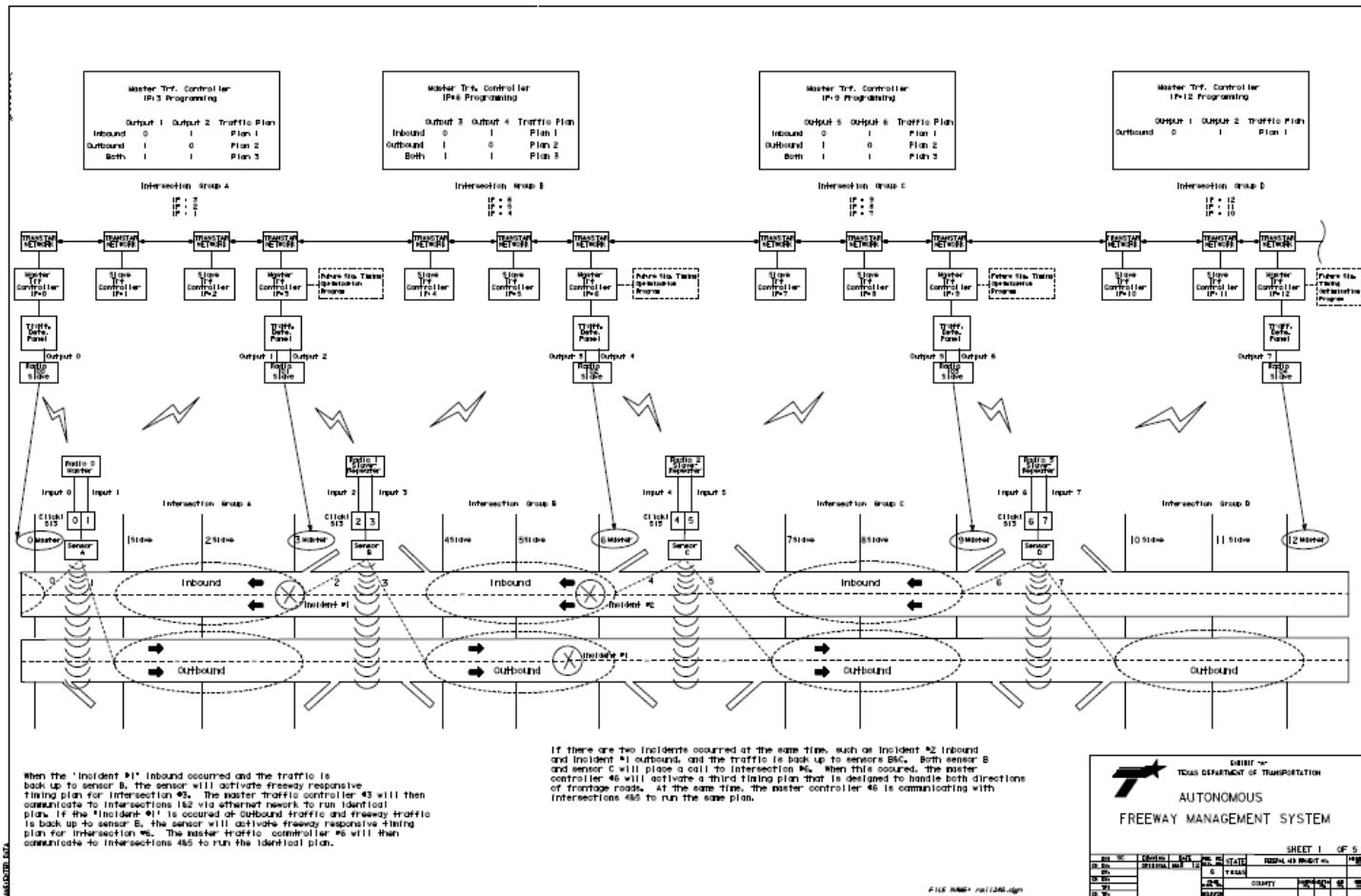
CONCEPT

- Use contact closure to send contact signals to traffic signal cabinet.
- Using two contact inputs to generate 3 timing plan.
- Ex: on-off plan 1, off-on plan 2, and on-on plan 3.

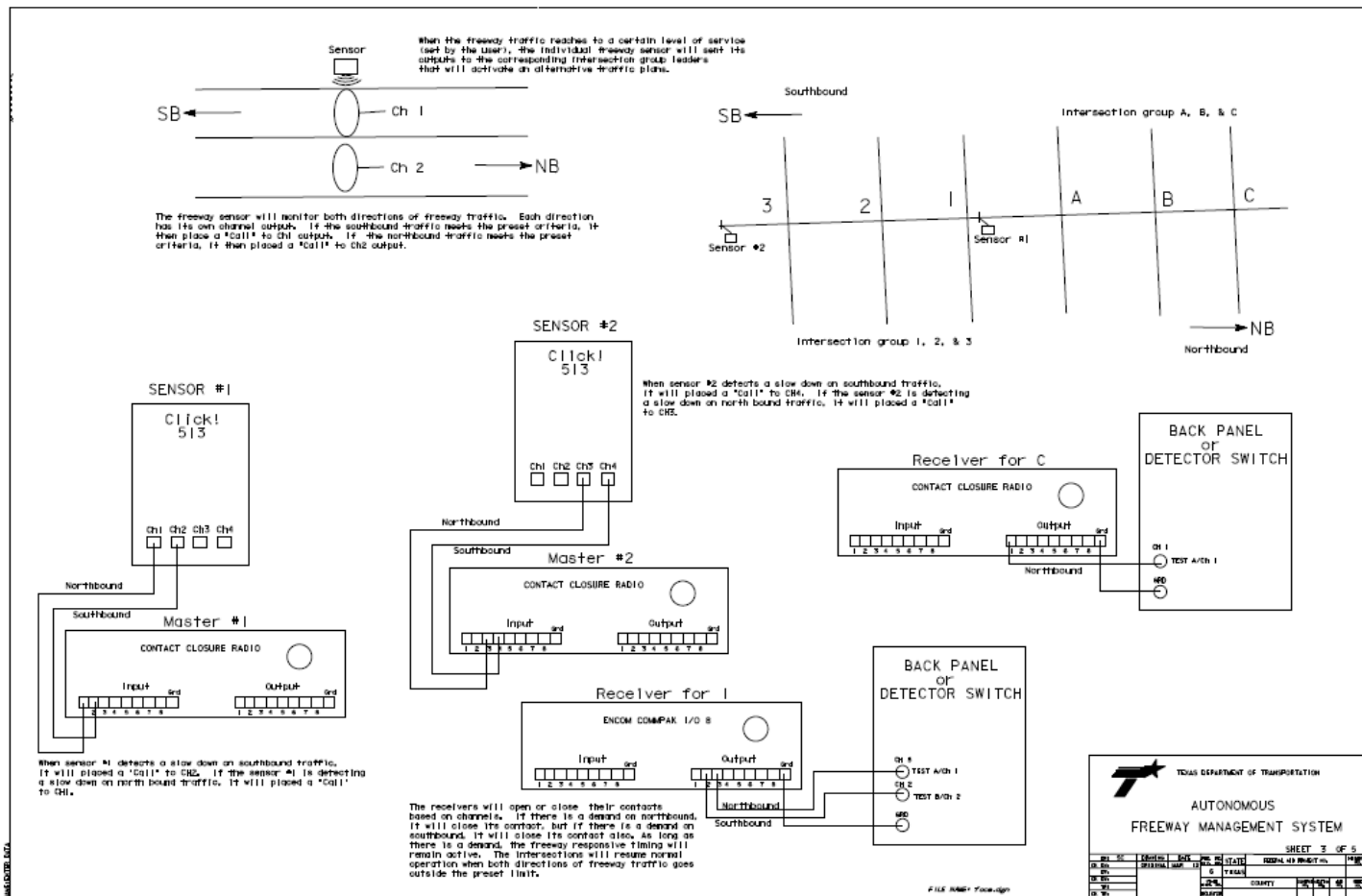
DESIGN

- Sensors monitor freeway condition
- Sensor output contact when condition met
- Sending information to intersections
- Intersection receiving information
- Intersection reacts to the input

DESIGN



DESIGN



EQUIPMENTS

- Wavetronix HD Sensor with Criteria Signaling feature
- Click! 513 contact closure
- Intuicom 900 MHz radio with I/O contact closure
- Updated version of traffic signal controller firmware

INSTALLATION

- Using existing freeway sensors
- Additional equipment for adaptive system
- Communication equipment

INSTALLATION



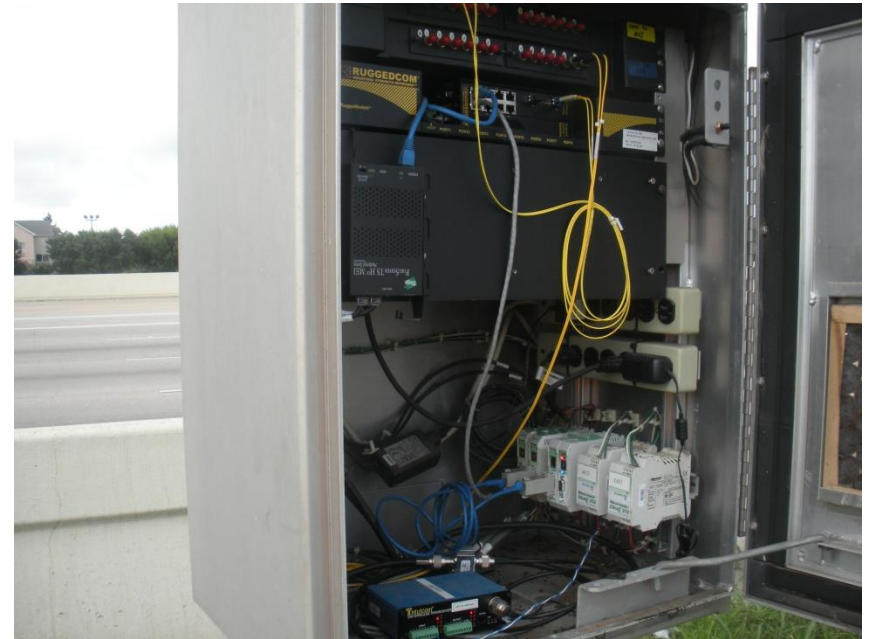
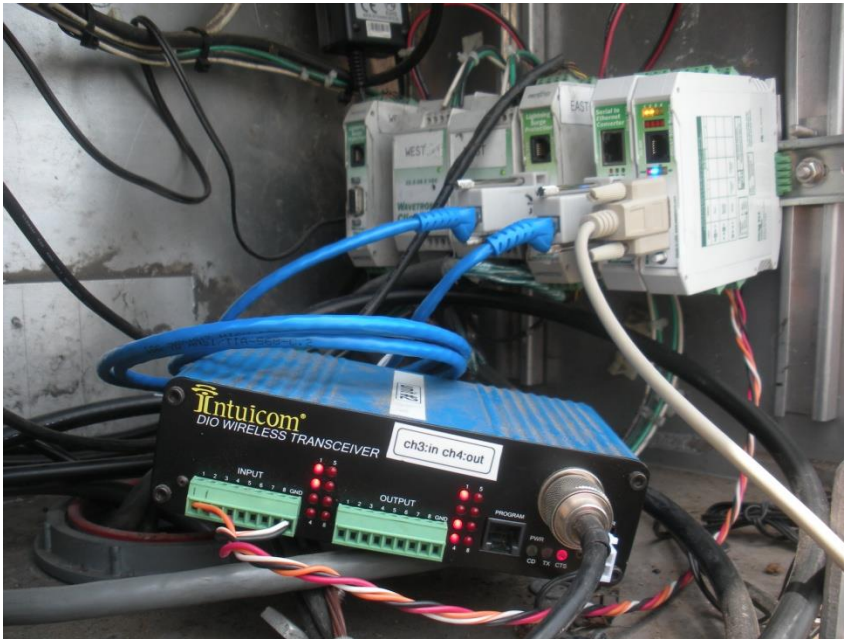
INSTALLATION



INSTALLATION



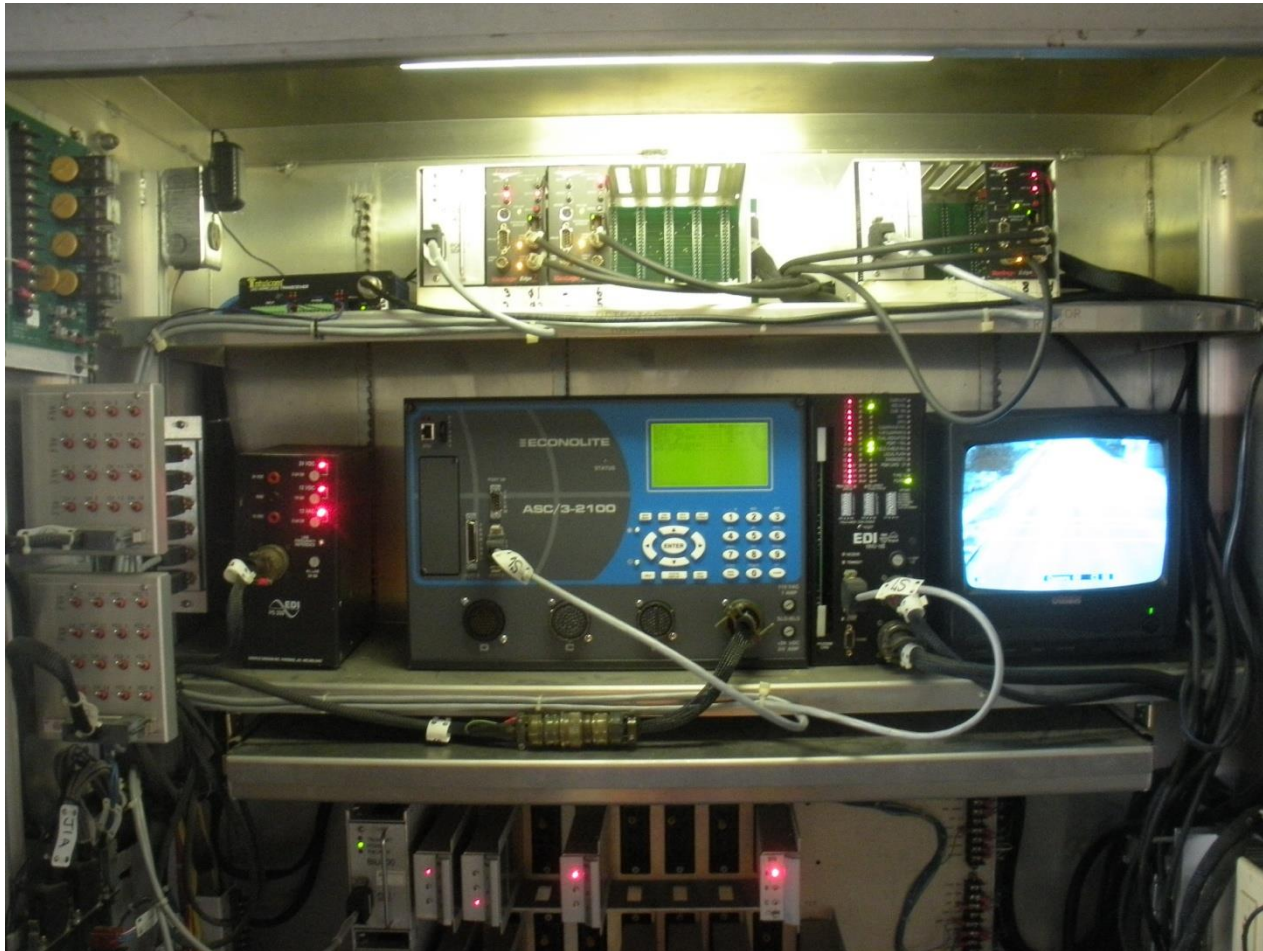
INSTALLATION



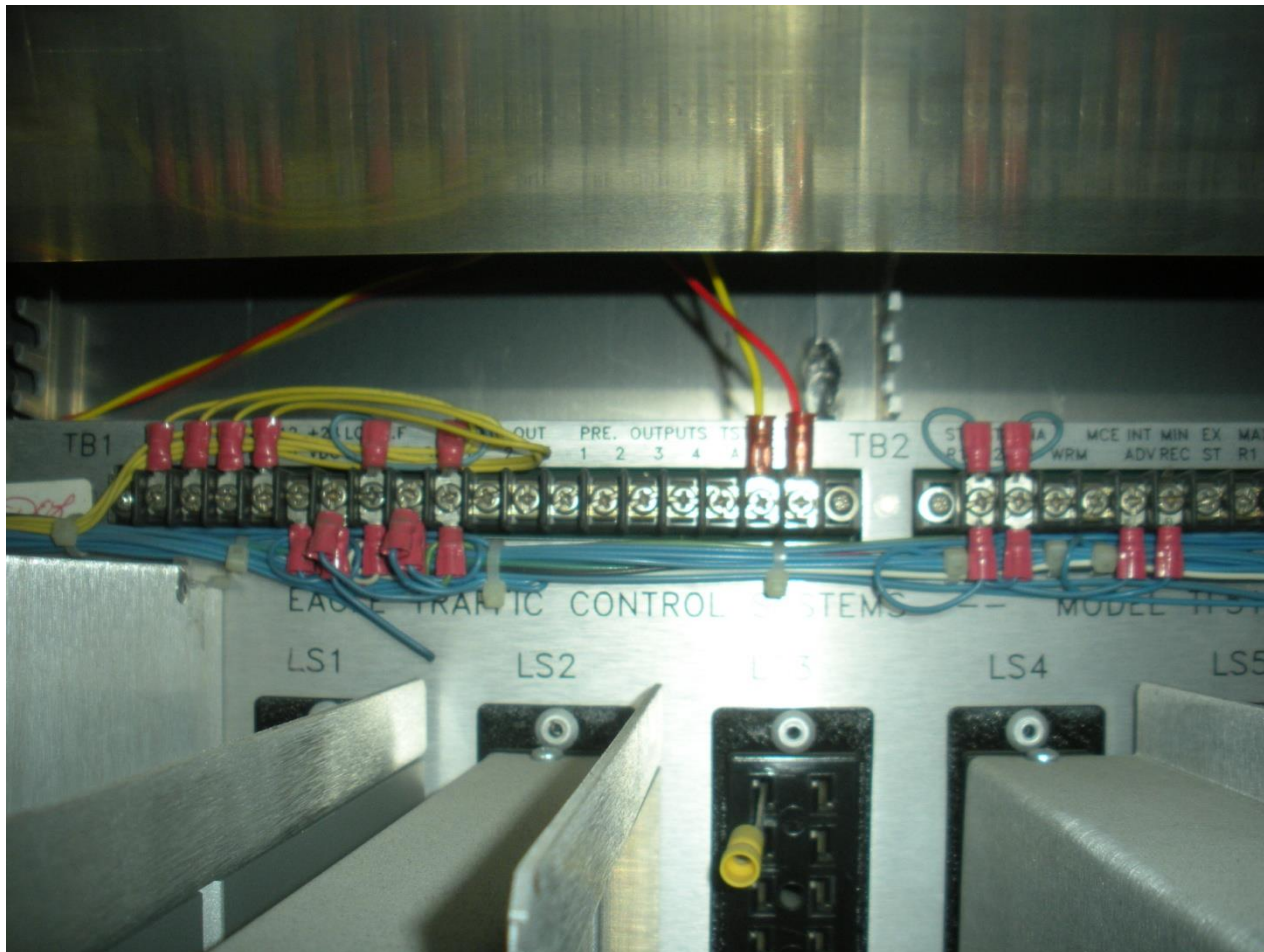
INSTALLATION



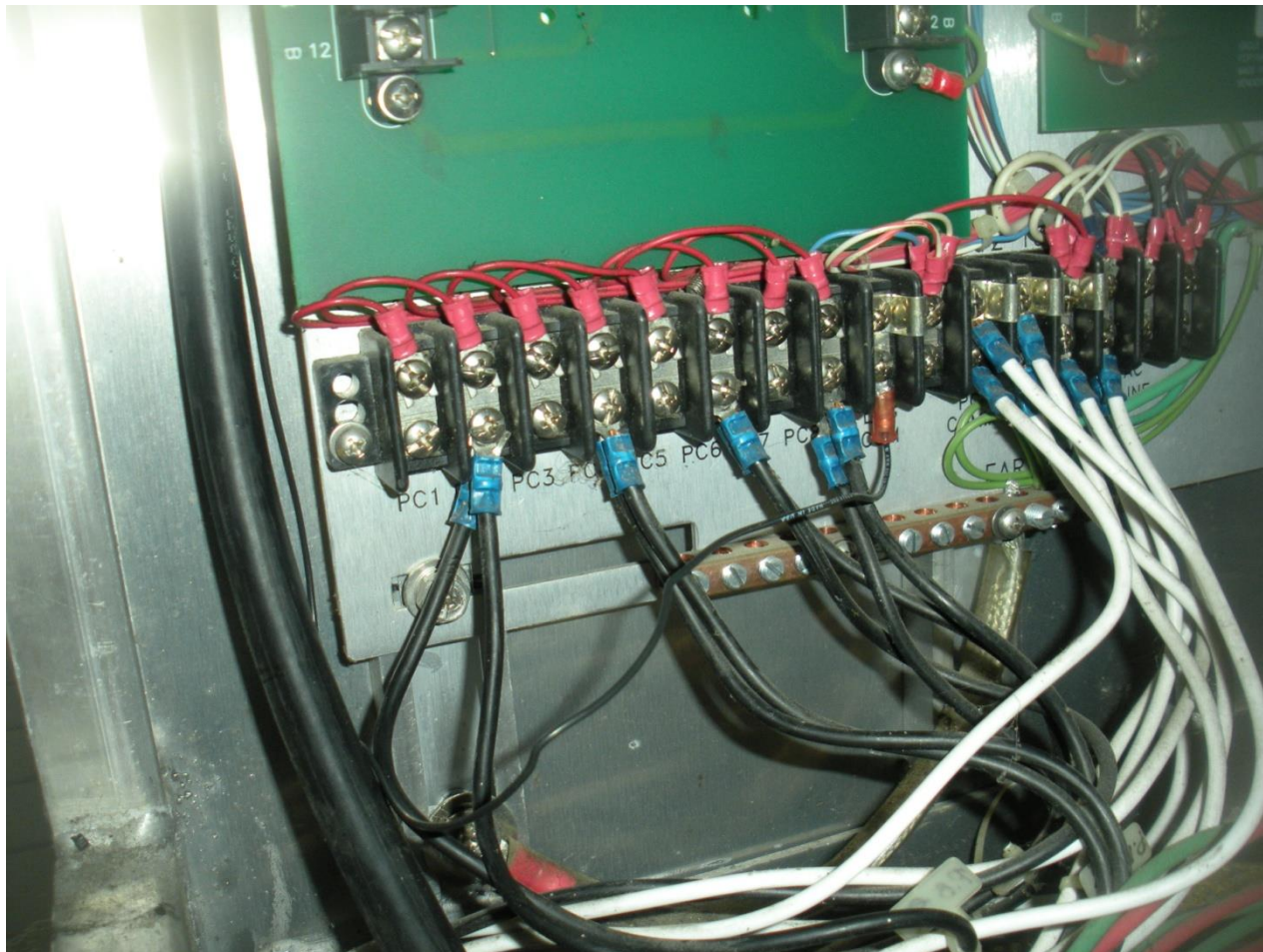
INSTALLATION



INSTALLATION



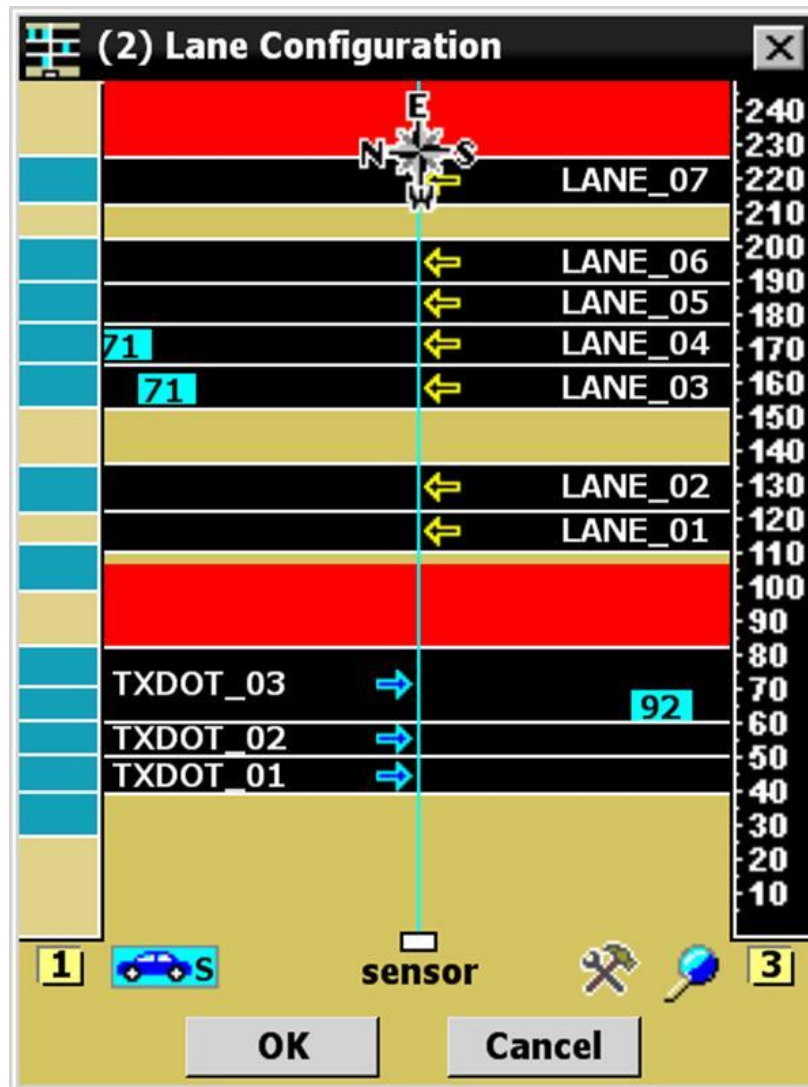
INSTALLATION



SETUP/OPERATION

- Sensor setup – how many lanes and directions
- Contact closure setup- send an output signal base on interval criteria, speed, volume and/or occupancy.
- Connect radio for inbound and outbound directions. (Sensor and traffic signal cabinet)
- Connect the radio output at the intersection to designated terminal base on controller used.

SETUP/OPERATION



SETUP/OPERATION

Approaches [X]

1 2 3 4

Approach Name: 1

Lanes	1
LANE_01	TXDOT_01
LANE_02	TXDOT_02
LANE_03	TXDOT_03
LANE_04	
LANE_05	
LANE_06	
LANE_07	

[>] [←]

OK Undo Cancel

Approaches [X]

1 2 3 4

Approach Name: 2

Lanes	2
TXDOT_01	LANE_03
TXDOT_02	LANE_04
TXDOT_03	LANE_05
LANE_01	LANE_06
LANE_02	
LANE_07	

[>] [←]

OK Undo Cancel

SETUP/OPERATION

EXPERT CLICK 513 SETUP

Save Tools Quit

System 513

General Approach 1 Approach 2 ◀ ▶

Enable Approach 1

☐ Over Speed	50
☒ Under Speed	20
☒ Over Occupancy	80
☐ Under Occupancy	80
☐ Over Volume	2
☐ Under Volume	10

EXPERT CLICK 513 SETUP

Save Tools Quit

System 513

General Approach 1 Approach 2 ◀ ▶

Sensor ID 7005

Interval Horizon 10

Interval Threshold 10

Logic AND

Interval 30

Poll Interval (ms) 1000

SETUP/OPERATION

Intuicom CommPro 1.1.14 - [Intuicom Configuration]

File Action Help

COM1 Read Config Program Radio Factory Defaults Document Config

Applications



Configurator



Diagnostics



Spectrum Analyzer



Local Diagnostics

Serial Number
859-3410

Template (Driver) Name
N/A

Firmware
9100b3

Template (Driver) Description
N/A

Output #	Remote Unit ID	Remote Input #	Failsafe Timeout (ms)	Failsafe State	Turn Off Delay (ms)
1	1	1	10000	Last	0
2	1	2	10000	Last	0
3	2	1	10000	Last	0
4	2	2	10000	Last	0
5	3	1	10000	Last	0
6	3	2	10000	Last	0
7	4	1	10000	Last	0
8	4	2	10000	Last	0

Key Parameters

Outputs

Selected Port: COM1

Radio Type: DIO Transceiver(all Models)

SETUP/OPERATION

- Program the controller for the system.
- Siemens uses Traffic Responsive system feature
- Econolite, Naztec, Intelite, 2070 Next Phase used logic input and/or statement.

SETUP/OPERATION

EPAC QUEUE ASSIGNMENT

NO. 1				NO. 2				
DETECT...	1	2	3	4	1	2	3	4
SYSD	2	0	0	0	1	2	0	0
WTFC	30	30	0	0	10	10	0	0
INPUT SELECT..:	0				0	(0-AV/1-HI)		
FAILED LEVEL..:	2				2	(# TO FAIL)		
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU								

EPAC QUEUE SELECT

NO. 1				NO. 2			
LEVEL.....	1	2		1	2		
% ENTER (UP)	20	30		% ENTER	20	0	
% LEAVE (DN)	10	25		% LEAVE	10	0	
DL/SPL/OFF	111	211		D/S/O	311	000	
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU							

SETUP/OPERATION

- IF:
 - IF CIB CODE ON 160
 - AND CIB CODE OFF 161
 - THEN:
 - SET ACTION PLAN ON 10
 - ELSE:
 -
- IF:
 - IF CIB CODE OFF 160
 - AND CIB CODE ON 161
 - THEN:
 - SET ACTION PLAN ON 11
 - ELSE:
 -

SETUP/OPERATION

- IF:
 - IF CIB CODE ON160
 - AND CIB CODE ON161
- THEN:
 - SET ACTION PLAN ON12
- ELSE:
 -

SETUP/OPERATION

Database Editor

File Utilities Communication Help

Menu Configuration Controller Coordination Preempt Time Base Detectors

Action Plan (MM) 5-2

Action Plan #: 10

Pattern: 254 - FREE

Timing Plan: 4

Veh Detector Plan: 4

Flash: No

Veh Det Diag Pln: 0

Dimming Enable: No

Pmt Ped Priority Ret: No

Pmt Cond Delay: No

Override Sys: No

Sequence: 0

Det Log: None

Red Rest: No

Ped Det Diag Pln: 0

Pmt Veh Priority Ret: No

Pmt Queue Delay: No

Phase 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Ped Rcl: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Walk 2: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Vex 2: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Veh Rcl: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Max Rcl: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Max 2: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Max 3: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

CS Inhibit: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Omit: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1 2 3 4 5 6 7 8

Spc Fct (1-8): 1 2 3 4 5 6 7 8

Aux Fct (1-3): 1 2 3

1 2 3 4 5 6 7 8 9 10

LP 1-10: 1 2 3 4 5 6 7 8 9 10

LP 11-20: 1 2 3 4 5 6 7 8 9 10

LP 21-30: 1 2 3 4 5 6 7 8 9 10

LP 31-40: 1 2 3 4 5 6 7 8 9 10

LP 41-50: 1 2 3 4 5 6 7 8 9 10

LP 51-60: 1 2 3 4 5 6 7 8 9 10

LP 61-70: 1 2 3 4 5 6 7 8 9 10

LP 71-80: 1 2 3 4 5 6 7 8 9 10

LP 81-90: 1 2 3 4 5 6 7 8 9 10

LP 91-100: 1 2 3 4 5 6 7 8 9 10

Clear Clear All

COST

- HD SENSOR- 1
- POWER SUPPLY- 1
- CLICK! 513- 1
- I/O RADIO- 2
- ANTENNA- 2
- Total : approx. \$11,000.00/ location
- Additional intersection : \$3500.00

IMPROVEMENT

- Ability to adjust threshold and interval input base on time of day.
- Use of existing Ethernet network for contact closure.
- Incorporate adaptive software for timing adjustment.

Conclusion

- Every extra second we provided is an extra second they would not have gotten if this system is not in placed.