

CONFIGURATION UTILITY

UDOT Automated Traffic Signal Performance Measures

Revision: June 5, 2019

ATSPM Configuration

Signal

Signal ID

Street Names

IP Address

Lat/long

Region

Controller Type

Chart Notes

Approach

Direction

Description

Protected Phase

Permissive Phase

Overlap

Detector

Detector Channel

Detection Type

Lane & Movement Type

Date Added

Internal Comment

Detection-specific Parameters

ATSPM Configuration - Signal

Create a new version when the configuration changes (Phase/Direction and/or detector channels change). This will map the phases and detectors correctly when evaluating historical data.

Signal 7072 Delete This Version Add New Version Copy Signal Delete This Signal Save

Version 2/14/2019 - Now a Cobalt
Primary Name 4500 South
Region Region 2
Controller Type Cobalt
Version Start 2/14/2019
Secondary Name I-15 SPUI
Display On Map

Version Label Now a Cobalt
IP Address 10.202.5.179
Latitude 40.67445623

Chart Notes Add Comment

If unchecked, signal will still show in Signal List. If unchecked and IP is configured, the system will still retrieve data.

Expand to create notes that will appear when displaying a metric for this signal

Chart Notes Add Comment

Comment Text

- Purdue Phase Termination
- Split Monitor
- Pedestrian Delay
- Preemption Details
- Turning Movement Counts
- Purdue Coordination Diagram
- Approach Volume
- Approach Delay
- Arrivals On Red
- Approach Speed
- Yellow and Red Actuations
- Purdue Split Failure
- Timing And Actuation

[Create](#)

ATSPM Configuration – Approach

If box is checked, Indicates the number in Protected Phase is the overlap number. A =1, B=2, C=3, etc. if letters are used. Otherwise code in the overlap # in the protected phase window.

EBL Ph1(6) (3 Detector(s)) Copy Delete

Direction	Description	Protected Phase	Permissive Phase	Protected Phase Overlap	Perm. Phase Overlap
EB	EBL Ph1(6)	1	6	<input type="checkbox"/>	<input type="checkbox"/>

Approach direction

Informational text for Phase/Direction header

Detector's primary phase. Usually the phase for through movement and the protected phase for P&P left turns.

Secondary phase for detector. Usually 0 for through movements and protected-only left turns. Input the permissive phase for P&P left turns. For FYA, it would be the opposing through phase.

Phase/Direction +

SBL Ph1(6) (2 Detector(s)) Copy Delete X

Direction	Description	Protected Phase	Permissive Phase	Overlap
SB	SBL Ph1(6)	1	6	<input type="checkbox"/>

Phase/Direction Description Convention:

SBL Ph1 = Southbound left protected phase 1.

NBL Ph(2) = Northbound left permitted phase 2. Note, permissive phases are in parentheses.

SBT Ph6 = Southbound through protected phase 6.

EBTL Ph4 – Eastbound through and left phase 4 (i.e. single lane that is for a left turn and a through movement).

WBT Ov12 = Westbound through protected phase overlap #2

EBL Ph3(4) = Eastbound left protected phase 3 and permitted phase 4 (FYA). Note, permissive phases are in parentheses.

ATSPM Configuration – Phase/Direction Convention

Phase/Direction Description Convention:

SBL Ph1 = Southbound left protected phase 1.

NBL Ph(2) = Northbound left permitted phase 2. Note, permissive phases are in parentheses.

SBT Ph6 = Southbound through protected phase 6.

EBTL Ph4 – Eastbound through and left phase 4 (i.e. single lane that is for a left turn and a through movement).

WBT Ovl2 = Westbound through protected phase overlap #2 show numbers only in configuration (no letters).



EBL Ph3(4) = Eastbound left protected phase 3 and permitted phase 4 (FYA). Note, permissive phases are in parentheses.

Each Through and Left Turn should have a separate “Phase/Direction”, even if a protected phase doesn’t exist, so the “Purdue Split Failure” and “Timing and Actuation” metric displays correctly .


Examples:















- Phases 2,4,6,8 in use (all left turns are permissive only): Eight “Phase/Direction” approaches should be created, one for each left turn and through movement. The through movements will show the protected phase number and will have a “blank” for the permissive phase. The left turns will show a “blank” for the protected phase and will show a number (either 2,4,6,8) for the permissive phases.
- Phases 1-8 in use (all left turns are FYA): Eight “Phase/Direction” approaches should be created, one for each left turn and through movement. Even though FYA are technically overlaps, do not code them in as overlaps. The through movements will show the protected phase number and will have a “blank” for the permitted phases. The left turns will show the left turn phase number for the protected phase and will show the opposing through phase number for the permitted phase.
- Phases 1,2,4,5,6,8 in use (phase 1 & 5 left turns are type 5 or doghouse and the other two left turns are permitted on phases 4 & 8): Eight “Phase/Direction” approaches should be created, one for each left turn and through movement. The through movements will show the protected phase number and will have a “blank” for the permitted phase. The left turns for phase 1&5 will show the left turn phase number for the protected phase and the adjacent through phase number for the permitted phase. The left turns for the permitted phases on 4&8 will show a “blank” for the protected phase and will show a number (4 or 8) for the permissive phase.
- Excluding FYA’s, if any overlaps exist, please code them all in correctly. We need what is shown in the field on the traffic signal display to be configured properly in ATSPM. To ensure that you have all overlaps coded in, verify by using the “Timing and Actuation” metric and selecting “Raw Data Display”.

ATSPM Configuration – Detection

EBT Ph4 (7 Detector(s)) Copy  Delete 

Direction	Description	Protected Phase	Permissive Phase	Overlap
EB ▼	EBT Ph4	4		<input type="checkbox"/>

Detectors 

- Detector 722038
Copy  Delete 
- Detector 722039
Copy  Delete 
- Detector 722040
Copy  Delete 
- Detector 722041
Copy  Delete 
- Detector 722042
Copy  Delete 
- Detector 722051
Copy  Delete 
- Detector 722052
Copy  Delete 

ATSPM Configuration – Detection

Det Channel

Detection Types

- Advanced Count
- Advanced Speed
- Lane-by-lane Count
- Lane-by-lane with Speed Restriction
- Stop Bar Presence
- Advanced Presence

Detection Hardware

Latency Correction

Lane Number (Lane-by-lane Count)

Movement Type (Lane-by-lane Count)

Lane Type (Lane-by-lane Count)

Date Added

Detector Comment [+ Add Detector Comment](#)

Internal only

Lane Type (Lane-by-lane Count)

Vehicle ▼

Vehicle

Bike

Pedestrian

Exit

Light Rail Transit

Bus

High Occupancy Vehicle

Movement Type (Lane-by-lane Count)

Thru ▼

Thru

Right

Left

Thru-Right

Thru-Left

Currently unused

Internal only


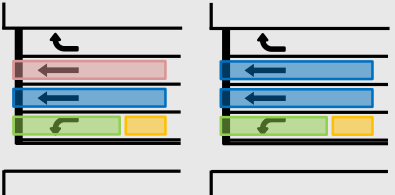


ATSPM Configuration – Configuration Table

Configuration Table

Detector ID	Det. Channel	Phase	Perm. Phase	Overlap	Direction	Enabled	Detection Types	Movement Type	Lane Number	Lane Type	MPH	Dist. From StopBar	Decision Point	Move. Delay	Min Speed Filter	Comment
722014	14	2		False	NB	True	Advanced Count Advanced Speed	Thru	1	Vehicle	40	350		15	5	was 6 dt 4-5-13
722016	16	6		False	SB	True	Advanced Count Advanced Speed	Thru	1	Vehicle	40	350		15	5	was 8 dt 4-5-13
722017	17	5		False	NB	True	Stopbar Presence	Left	1	Vehicle						
722018	18	2		False	NB	True	Stopbar Presence	Thru	1	Vehicle	40					
722019	19	2		False	NB	True	Stopbar Presence	Thru	2	Vehicle	40					
722020	20	2		False	NB	True	Stopbar Presence	Thru-Right	1	Vehicle	40					
722021	21	5		False	NB	True	Lane-by-lane Count	Left	1	Vehicle						
722022	22	2		False	NB	True	Lane-by-lane Count	Thru	1	Vehicle	40					3-27-15 - it was WB L1.
722023	23	2		False	NB	True	Lane-by-lane Count	Thru	2	Vehicle	40					3-27-15 - it was WB T1.
722024	24	2		False	NB	True	Lane-by-lane Count	Thru-Right	1	Vehicle	40					3-27-15 - it was WB R1.
722027	27	1		False	SB	True	Stopbar Presence	Left	1	Vehicle						
722028	28	6		False	SB	True	Stopbar Presence	Thru	1	Vehicle	40					
722029	29	6		False	SB	True	Stopbar Presence	Thru	2	Vehicle	40					
722030	30	6		False	SB	True	Stopbar Presence	Thru-Right	1	Vehicle	40					
722031	31	1		False	SB	True	Lane-by-lane Count	Left	1	Vehicle						
722032	32	6		False	SB	True	Lane-by-lane Count	Thru	1	Vehicle	40					
722033	33	6		False	SB	True	Lane-by-lane Count	Thru	2	Vehicle	40					
722034	34	6		False	SB	True	Lane-by-lane Count	Thru	3	Vehicle	40					
722035	35	6		False	SB	True	Lane-by-lane Count	Right	1	Vehicle	40					
722038	38	4		False	EB	True	Stopbar Presence	Left	1	Vehicle						
722039	39	4		False	EB	True	Stopbar Presence	Thru	1	Vehicle						
722040	40	4		False	EB	True	Lane-by-lane Count	Left	1	Vehicle						
722041	41	4		False	EB	True	Lane-by-lane Count	Thru	1	Vehicle						
722042	42	4		False	EB	True	Lane-by-lane Count	Right	1	Vehicle						

DETECTION TYPES

UDOT Automated Traffic Signal Performance Measures


Detection	Metric
<p>None (metrics will display and show info in ATSPM without detection, however, the metrics will be more useful with detection)</p> 	<p>Purdue Phase Termination (without detection, only maxouts/forceoffs) Split Monitor (without detection, splits will be fixed time) Preemption Details (requires preemption device) Pedestrian Delay (requires pedestrian detection) Timing and Actuation (without detection, only timing will be displayed)</p>
<p>Lane-by-lane or Lane Group Presence</p> 	<p>Purdue Split Failure</p>
<p>Lane-by-lane Stop Bar Count</p> 	<p>Turning Movement Counts Yellow and Red Actuations (requires placement of detection into the intersection and beyond the stop bar OR placement of detection at the stop bar with a speed filter)</p>
<p>Advanced Count (Lane-by-lane or group)</p> 	<p>Purdue Coordination Diagram Purdue Link Pivot Offset Optimization Approach Volume Approach Delay Arrivals on Red Approach Speed (requires detection with speed service)</p>

Detection – Lane-by-lane Presence



[Detector 709519](#)

Date detector added. Currently has no impact but may be used to set the valid dates for the configuration.


Det Channel	Lane Number (Lane-by-lane Count)	Date Added
19	1	3/8/2016 12:00:00 AM

Detection Types <input type="checkbox"/> Advanced Count <input type="checkbox"/> Advanced Speed <input type="checkbox"/> Lane-by-lane Count <input type="checkbox"/> Lane-by-lane with Speed Restriction <input checked="" type="checkbox"/> Stopbar Presence	Movement Type (Lane-by-lane Count) Thru ▼ Lane Type (Lane-by-lane Count) Vehicle ▼	Detector Comment  11/16/2016 Added 4:48:04 PM - 3/8/2016
---	---	--

Detection – Lane-by-lane Count

Detector 709523
Copy  Delete 

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
23	1	1/15/2016 3:50:07 PM

Detection Types <input type="checkbox"/> Advanced Count <input type="checkbox"/> Advanced Speed <input checked="" type="checkbox"/> Lane-by-lane Count <input type="checkbox"/> Lane-by-lane with Speed Restriction <input type="checkbox"/> Stopbar Presence	Movement Type (Lane-by-lane Count) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 5px;">Thru ▼</div> Lane Type (Lane-by-lane Count) <div style="border: 1px solid #ccc; padding: 2px;">Vehicle ▼</div>	Detector Comment  <div style="border: 1px solid #ccc; height: 150px; margin-top: 5px;"></div>
---	--	--

Detection – Lane-by-lane Count w/ Speed Restriction

Detector 722050 Copy Delete

Det Channel

Detection Types

- Advanced Count
- Advanced Speed
- Lane-by-lane Count
- Lane-by-lane with Speed Restriction
- Stop Bar Presence
- Advanced Presence

Detection Hardware

Latency Correction

Lane Number (Lane-by-lane Count)

Movement Type (Lane-by-lane Count)

Lane Type (Lane-by-lane Count)

Date Added

Detector Comment [+ Add Detector Comment](#)

If Wavetronix Matrix is used, use 1.2 seconds, unless the latency is known

Detection – Advanced Count & Speed

Detector 709506
Copy Delete

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
6	1	5/9/2016 11:15:57 AM

Detection Types <input checked="" type="checkbox"/> Advanced Count <input checked="" type="checkbox"/> Advanced Speed <input type="checkbox"/> Lane-by-lane Count <input type="checkbox"/> Lane-by-lane with Speed Restriction <input type="checkbox"/> Stopbar Presence	Movement Type (Lane-by-lane Count) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">Thru ▼</div> Lane Type (Lane-by-lane Count) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">Vehicle ▼</div> MPH (Advanced Count, Advanced Speed) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">45</div> Distance To Stop Bar (Advanced Count) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">350</div> Min Speed Filter (Advanced Speed) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">5</div> Decision Point (Advanced Count) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">0</div> Movement Delay (Advanced Speed) <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;">15</div>	Detector Comment <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 2px;"> 11/16/2016 4:48:04 PM - PCD Added 5/09/2016 </div>
--	--	--

Applies only to PCD metric:
 Detector distance from stop bar in feet. Detector actuations will be offset to arrival at the stop bar based on the distance and MPH configured.

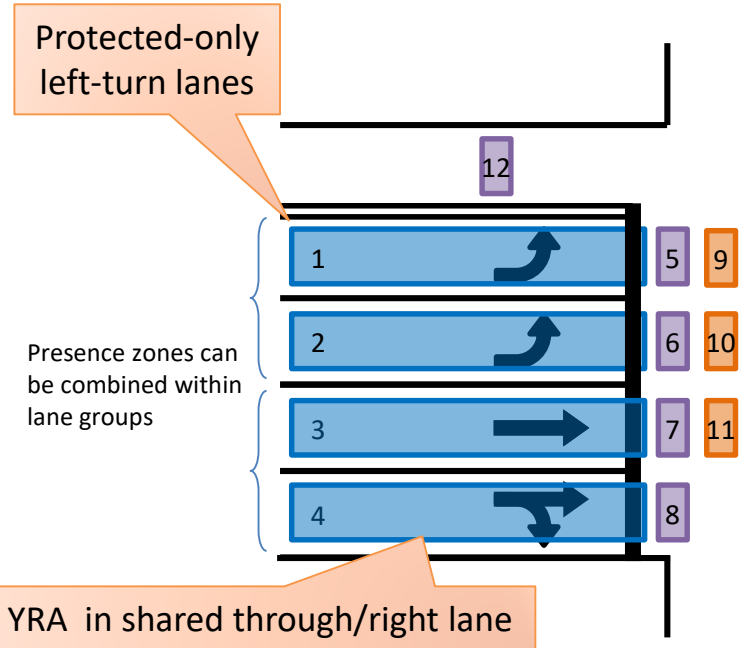
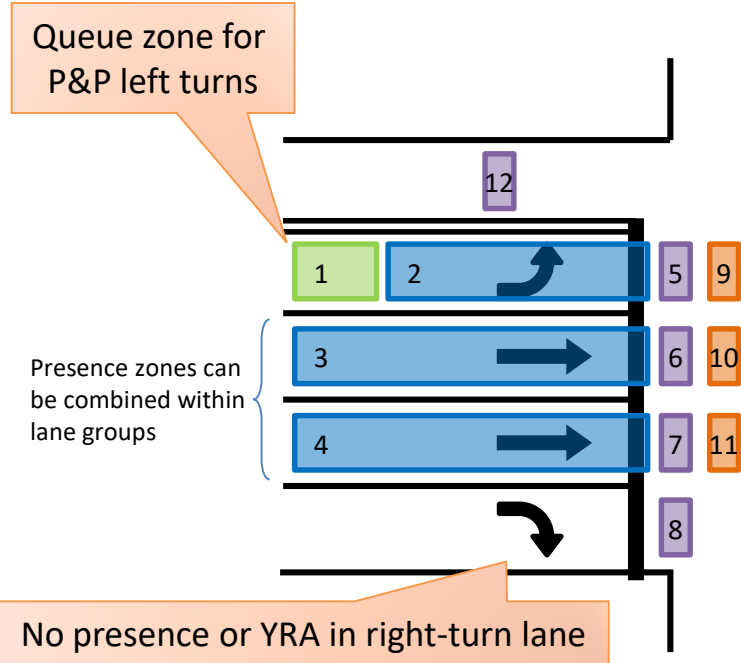
Applies only to PCD metric:
 Number of seconds to offset the detector actuations. Usually 0.

Applies only to Speed metric:
 Speeds below this number (mph) will not be included in the speed metric.

Applies only to Speed metric:
 Number of seconds after start of green to start using speed data. Should be roughly the queue clearance time to the detector. Usually 15s.





Wavetronix Matrix

Standard Detection Layout w/ Click 650



- ### Detection Channel Order
1. Presence zones, inside to outside. If P&P zones, the queue zone is first.
 2. Count channels, inside to outside
 3. YRA zones, inside to outside
 4. Count zones in exit lanes, inside to outside (*often skipped*)

- ### Matrix Sensor Order
1. Phase 2
 2. Phase 6
 3. Phase 4
 4. Phase 8

-  65' or 50' Presence zone, used for **Split Failure**
-  15' Presence zone w/ 3-sec delay in controller, not used for SPMs
-  Small zone, used for **Turning Movement Counts**
-  Small zone with 5 mph min speed filter, used for **Yellow & Red Actuations** (Note: Place immediately in front of stop bar and do not use in lanes that permit turns on red)

UDOT Detection Setup

Advanced Count zone

Used for:

- Purdue Coordination Diagram
- Purdue Link Pivot Offset Optimization
- Approach Volume
- Approach Delay & Arrivals on Red
- Approach Speed
- Timing and Actuation

Located: 350 to 600 ft behind the stop bar

Note: Place in advance of initial queue of vehicles during the red. Extra benefit if same as DZ detection.
Priority #2

Small yellow & red actuation zone

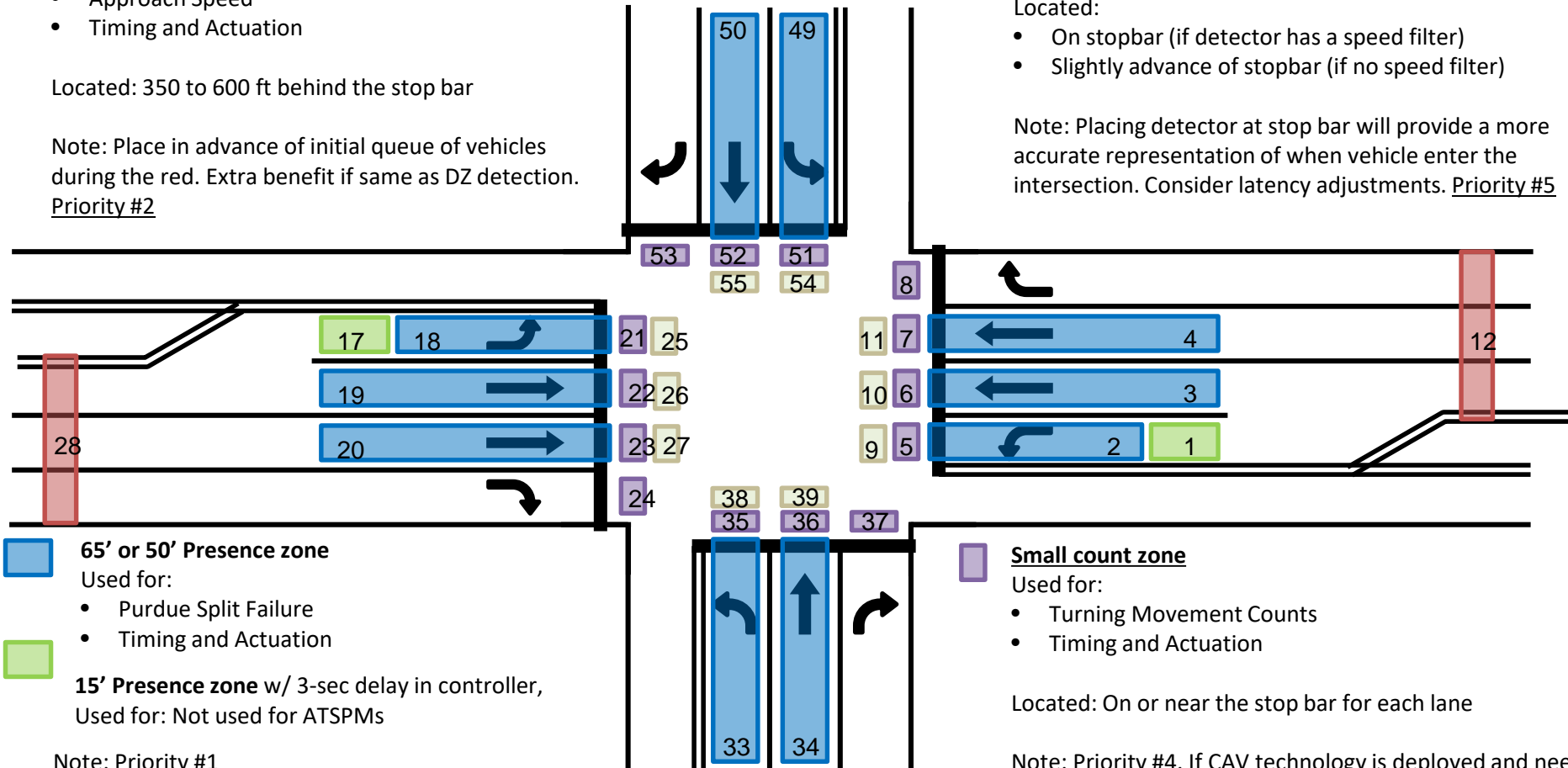
Used for:

- Yellow and Red Actuations

Located:

- On stopbar (if detector has a speed filter)
- Slightly advance of stopbar (if no speed filter)

Note: Placing detector at stop bar will provide a more accurate representation of when vehicle enter the intersection. Consider latency adjustments. Priority #5



65' or 50' Presence zone

Used for:

- Purdue Split Failure
- Timing and Actuation

15' Presence zone w/ 3-sec delay in controller,

Used for: Not used for ATSPMs

Note: Priority #1

Small count zone

Used for:

- Turning Movement Counts
- Timing and Actuation

Located: On or near the stop bar for each lane

Note: Priority #4. If CAV technology is deployed and needs space in the detector rack, CAV technology is priority #3

Wavetronix Matrix Configuration for TMC & YRA

Turning Movement Counts

Yellow & Red Actuations

Channel Type: **Counting**
 Min Speed: None
 Max Speed: None

Channel Type: Counting
 Min Speed: **5 mph**
 Max Speed: **None**

Make small zone:

Make small zone:

Wavetronix Advance Count Setup

Ch1 is for Dilemma Zone and Queue

Setup Channels-Alerts-Zones

1 | 2-SB Count | 3 | 4 | 5 | 6 | 7 | 8

Name **SB Count**

Type **Pulse**

Enabled

Zone Settings

Range (feet):
420 to 430

Speed (mph):
035 - 100

OK | Undo | Cancel

Verify Channels-Alerts-Zones

Ch2-A1-Z1

SB Count Pu

Total: 00006

Reset

460	54	5.8
335	51	4.4
240	50	3.2
175	51	2.3
70	49	0.9

>> | Range | Speed | ETA | Ch2

Monitor trackers and place count zone at distance with good detection

Wavetronix Advance Speed Setup

GDOT/UDOT Automated Traffic Signal Performance Measures

Installation Manual

Appendix A. Wavetronix SmartSensor Advance Configuration

In order to use a Wavetronix SmartSensor Advance with the ATSPM Speed Listener, it is necessary to configure the hardware to communicate with the system. There are two components of relevance to ATSPM, a Serial to Ethernet converter and the SmartSensor Device itself. UDOT has used the DIGI PortServer TS 4 serial to Ethernet converter (aka "Digi") in order to retrieve speed data from the Wavetronix SmartSensor Advance; however, other serial to Ethernet converters may work as well.

This appendix only covers configuration specifically related to ATSPM connection using Digi PortServers. For further information on SmartSensor configuration, please contact Wavetronix.

A.1. Serial to Ethernet Converter Configuration

Configure each port pushing speed data on the Digi as follows:

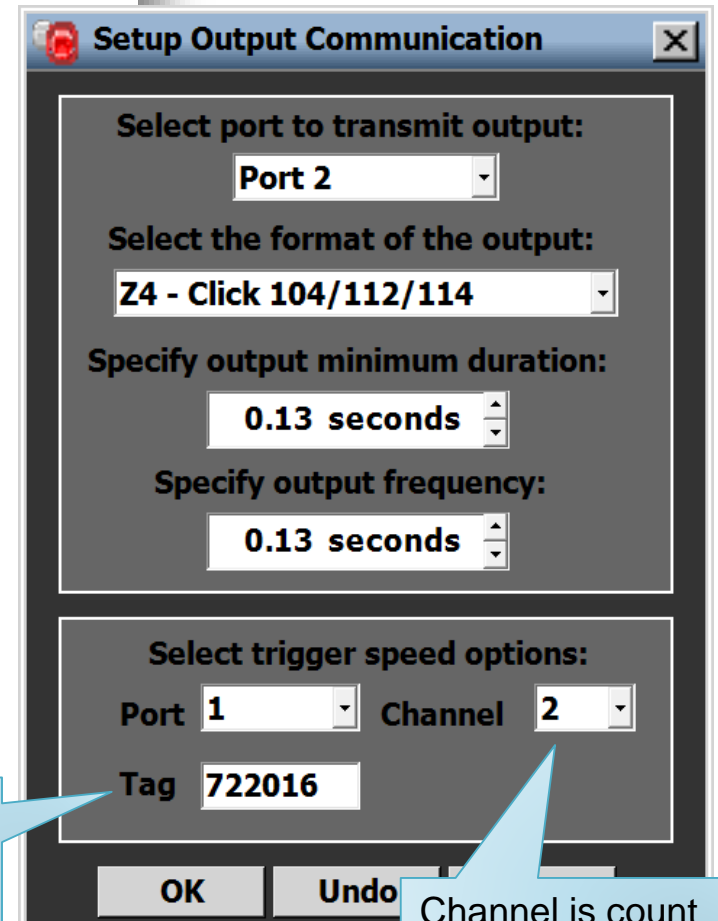
Set the Port Profile to either TCP or UDP Sockets (Select Change Profile to make a change). TCP sockets are preferred as they are more secure, more reliable and are native to the Wavetronix Advance and Matrix SmartSensors (as they are written around TCP internet protocols).

TCP:

1. Under the TCP Server Port Security Settings, check the box **Only allow network access from the following devices or networks**. In the IP Address: box, type in the IP address of the server to receive the data. Under the Advanced Serial Settings Terminal Type: box, type in "vt100", enable Verbose connection status message and enable Pre-delay and Post-delay.
2. Click the Apply button.

UDP:

1. Under the UDP Client enter the following settings: In the Send data to: box, type the name of the SPM server in Description, its IP address in Send To, "10088" in UDP Port, then click the Add button. Both this IP address and port must be publicly accessible.



Setup Output Communication

Select port to transmit output:
Port 2

Select the format of the output:
Z4 - Click 104/112/114

Specify output minimum duration:
0.13 seconds

Specify output frequency:
0.13 seconds

Select trigger speed options:
Port 1 Channel 2
Tag 722016

OK Undo

Tag = Signal ID (7220)
& Detector Channel
in controller(16)

Channel is count
Channel number

Econolite Controllers: Count Detector Setup

Detector	ECPI Log	Phase
1	.	4
2	X	0
3	.	8
4	X	0
5	.	2
6	X	0
7	.	6
8	X	0
9	.	0
10	.	0
11	.	0
12	.	0
13	.	0
14	.	0
15	.	0
16	.	0

Detector	ECPI Log	Phase
17	.	5
18	.	2
19	.	2
20	.	2
21	.	2
22	X	0
23	X	0
24	X	0
25	X	0
26	X	0
27	.	0
28	.	0
29	.	1
30	.	6
31	.	6
32	.	6

Detector	ECPI Log	Phase
33	.	6
34	X	0
35	X	0
36	X	0
37	X	0
38	X	0
39	.	0
40	.	0
41	.	7
42	.	4
43	.	4
44	.	4
45	X	0
46	X	0
47	X	0
48	X	0

Detector	ECPI Log	Phase
49	.	3
50	.	8
51	.	8
52	.	8
53	X	0
54	X	0
55	X	0
56	X	0
57	.	0
58	.	0
59	.	0
60	.	0
61	.	0
62	.	0
63	.	0
64	.	0

Enable ECPI Log for count zones on channels assigned to Phase 0

Econolite Controllers: Data Logger Setup

(Main Menu 9-3-1 then spc fct 3 times)

The screenshot shows a software interface for configuring an Econolite controller. At the top, there are input fields for IP Address (10.207.8.64) and Port (161), a 'Connect' button, and a volume control knob set to 100. Below these is a terminal window displaying the following text:

```
DATABASE DIAGNOSTICS  
CONFIGURATION TRANSFER IN PROGRESS..  UP  
DATABASE STATE.....  ALL SAVED  
DIAG CMD.. NO ACTION  VIOT TRACE ENA.  NO
```

To the right of the terminal window is a virtual keypad with the following buttons:

- Help, Status, Main Menu, Sub Menu
- ^, 1, 2, 3
- <, E, >, 4, 5, 6
- v, 7, 8, 9
- 0
- Spec Func, Clr, Start
- Next Page, Next Data, Next Scrn

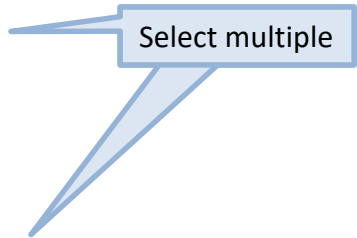
LOG ACTION TAKEN

UDOT Automated Traffic Signal Performance Measures

UDOT no longer manually logs any actions taken, but this can be a useful feature if your agency would like to keep track of how each metric is being used.

Log Action

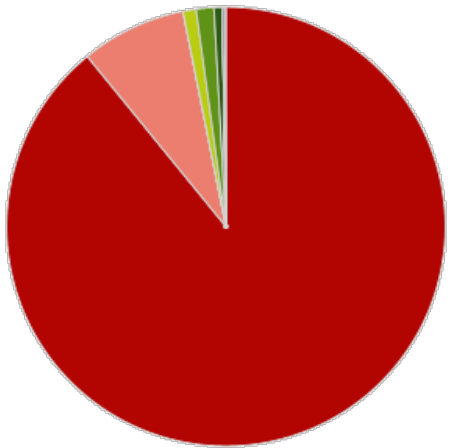
Name	<input type="text" value="Jamie Mackey"/>
Date	<input type="text" value="1/17/2017 11:07:05 AM"/>
Signal	<input style="border-bottom: 1px solid black;" type="text" value="7220 - Foothill Drive 1300 South"/>
Agency	<input style="border-bottom: 1px solid black;" type="text" value="State Government"/>
Actions	<input type="checkbox"/> Actuated Coord. <input type="checkbox"/> All-Red Interval <input type="checkbox"/> Coord On/Off <input type="checkbox"/> Modeling <input type="checkbox"/> Cycle Length <input type="checkbox"/> Traffic Study <input checked="" type="checkbox"/> Detector Issue <input type="checkbox"/> Yellow Interval <input type="checkbox"/> Offset <input type="checkbox"/> Force Off Type <input type="checkbox"/> Sequence <input checked="" type="checkbox"/> Split Adjustment <input type="checkbox"/> Time Of Day <input type="checkbox"/> Manual Command <input type="checkbox"/> Other
MetricTypes	<input type="checkbox"/> Purdue Phase Termination <input type="checkbox"/> Approach Volume <input checked="" type="checkbox"/> Split Monitor <input type="checkbox"/> Approach Delay <input checked="" type="checkbox"/> Pedestrian Delay <input type="checkbox"/> Arrivals On Red <input type="checkbox"/> Preemption Details <input type="checkbox"/> Approach Speed <input type="checkbox"/> Turning Movement Counts <input type="checkbox"/> Yellow and Red Actuations <input type="checkbox"/> Purdue Coordination Diagram <input type="checkbox"/> Purdue Split Failure
Comment	<input type="text" value="Identified broken detector and adjuste"/>
	<input type="button" value="Create"/>



Review Action and Metric Use

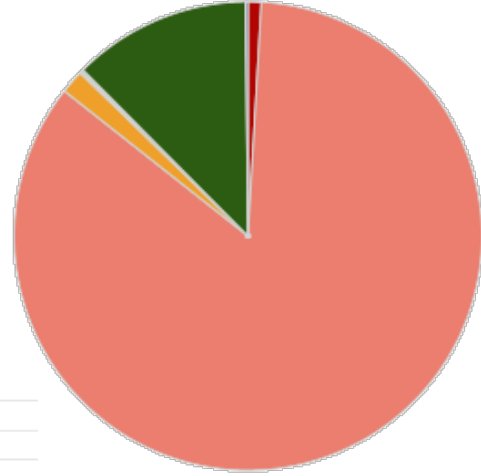
Chart Usage

- Purdue Phase Termination
- Split Monitor
- Pedestrian Delay
- Preemption Details
- Turning Movement Counts
- Purdue Coordination Diagram
- Approach Volume
- Approach Delay
- Arrivals On Red
- Approach Speed
- Yellow and Red Actuations
- Purdue Split Failure

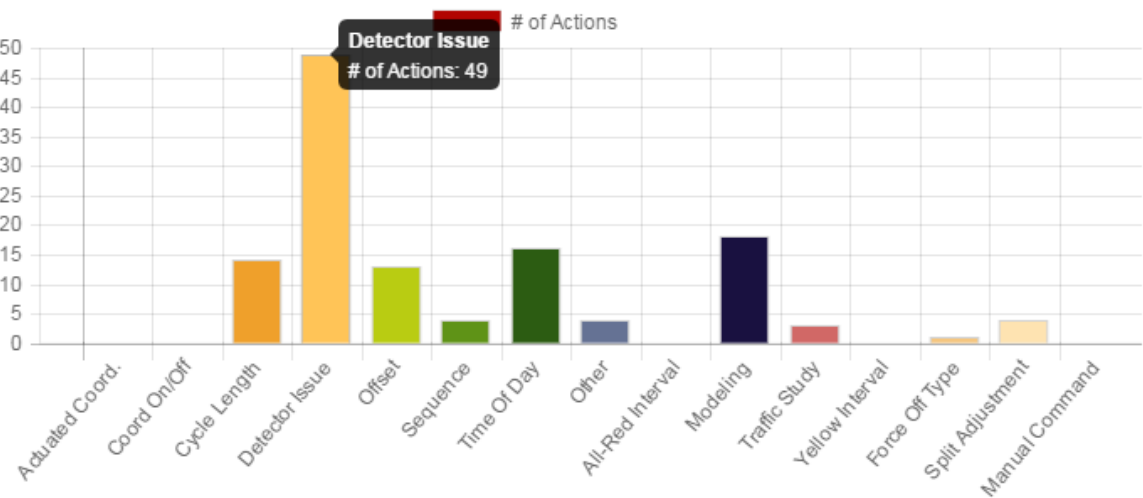


Agency Usage

- Academics
- City Government
- Consultant
- County Government
- Federal Government
- MPO
- State Government
- Other



Split Monitor



Review Metric Use

