

 Click here to print a copy of this document in PDF format.

TecNote 3011 – NTCIP Database Guidelines Part II

This TecNote extends the controller operation described in [TecNote 3010 - "Guidelines For NTCIP Databases Part I"](#). These enhancements are recommended for "power users" who want to take advantage of the following Naztec controller features:

- Twice Per Cycle Left-Turn (TPCLT) Operation
- Enabling Detector Diagnostics and Error Recovery
- Defeating Detector Diagnostics During Free Operation
- Enabling Volume and Occupancy Counts
- Enabling Detector Switching

If you use STD8Ø (standard 8 phase) operation and do not wish to use these features, just ignore this TecNote and follow the guidelines presented in [TecNote 3010](#). However, if you wish to take advantage of any of these advanced features, you can easily modify the "Data Template" from [TecNote 3010](#) for copy the Screen database changes in StreetWise to any (or all) controllers in your system.

Modifying the NTCIP Database For Twice Per Cycle Left-Turns

[TecNote 1102 - "Twice Per Cycle Left-Turns"](#) fully describes this enhanced feature. This section provides step-by-step instructions to provide TPCLT in your standard Data Template.

Provide a Phase Sequence for TPCLT Operation

To use Twice Per Cycle Left-Turn sequences, you must change the Phase Mode on the unit parameters screen from STD8Ø to USER. Before you can change this setting, you must turn the Run Timer OFF (MM->1->7). You will also need to turn the Run Timer ON after the Phase Mode setting is changed. USER mode is required to use phases 9 through 16 or rings 3 and 4 in the phase sequence definition.

Modify sequence #16 in the sequence table (MM->1->2-4) as shown below. This sequence replaces the lag / lag sequence in your Data Template.

16	Twice Per Cycle LeftTurns	R1: 1 2 9 3 4 11 R2: 5 6 13 7 8 15
----	---------------------------	---------------------------------------

Warning!!!: DO NOT use Twice Per Cycle Left-Turn Operation if a left-turn signal display contains protected and permitted indications unless you follow all of the guidelines in [TecNote 1103 - The Permitted Lag Left-Turn Display](#) or some other method approved by your Agency. Naztec, Inc. assumes no liability for the "Yellow Trap" safety problem discussed in these TecNotes.

Define the Channel Assignments for Twice Per Cycle Left-Turns

NTCIP and TS-2 refer to a load switches as a "channel". The controller software allows you to drive a load switch with any vehicle, ped or phase output. In the Naztec TS-2 controller, this assignment is made from the Main Menu using the sequence MM->1->3->1.

Chan..	1	2	3	4	5	6	7	8	->
ø/olp#	9	2	11	4	13	6	15	8	
Type	OLP	VEH	OLP	VEH	OLP	VEH	OLP	VEH	
Flash	RED	RED	RED	RED	RED	RED	RED	RED	

These channel (Chan) assignments are required to drive the protected left-turn displays using overlaps 9, 11, 13 and 15. The overlaps are defined using the *standard* left-turn phases 1, 3, 5 and 7 with *auxiliary* left-turn phases 9, 11, 13 and 15 as discussed in [TecNote 1102 - "Twice Per Cycle Left-Turns"](#)

The important thing to note here is that the outputs for the protected left-turn displays are reassigned in software without having to modify the field wiring in the controller cabinets. The same load switches are used to drive the protected left-turn displays, but are now driven by an overlap rather than a single phase.

Note that the Flash settings are all set to RED. This cause the intersection to go to an all-way red flash when the flash switch is activated in the cabinet door (automatic flash).

Enable the Auxiliary Left-Turn Phases for TPCLT

The *auxiliary* left-turn phases 9, 11, 13 and 15 are enabled from the Main Menu using key sequence MM->1->1->2. Use your right arrow to cursor to the right-hand screen from this menu.

Options	0..9..10..11..12..13..14..15..16
Enable	0 X . . . X . . . X . . . X . .
Min Recall
Max Recall

Even though these *auxiliary* left-turn phases are enabled, they are not serviced unless the controller is running sequence 16 because phases 9 through 16 are not included in sequences 1-15. You do will not service any of these *auxiliary* left-turn phases unless you specifically call for sequence #16 in a timing pattern.

Define the Concurrent Phases for TPCLT

The concurrent phases for this sequence are defined in the table MM->1->1->4.

Concurrent phases define the "barriers" for multi-ring controllers under NTCIP. Phases 9, 11, 13 and 15 are included as concurrent phases to provide [TPCLT operation](#) using sequence #16.

P	Ring	StartUp	Concurrent	Ps
1	1	RED CLR	5 6 13	0 0 0 0 0
2	1	RED CLR	5 6 13	0 0 0 0 0
3	1	RED CLR	7 8 15	0 0 0 0 0
4	1	RED CLR	7 8 15	0 0 0 0 0
5	2	RED CLR	1 2 9	0 0 0 0 0
6	2	RED CLR	1 2 9	0 0 0 0 0
7	2	RED CLR	3 4 11	0 0 0 0 0
8	2	RED CLR	3 4 11	0 0 0 0 0
9	1	RED CLR	5 6 13	0 0 0 0 0
10	1	RED CLR	0 0 0	0 0 0 0 0
11	1	RED CLR	7 8 15	0 0 0 0 0
12	0	RED CLR	0 0 0	0 0 0 0 0
13	2	RED CLR	1 2 9	0 0 0 0 0
14	0	RED CLR	0 0 0	0 0 0 0 0
15	2	RED CLR	3 4 11	0 0 0 0 0
16	0	RED CLR	0 0 0	0 0 0 0 0

Define the Overlaps for TPCLT

The Data Template defines Overlaps 9, 11, 13 and 15 for [TPCLT operation](#). The user is encouraged to enter any additional standard overlaps in the Data Template.

Overlaps are defined using the controller sequence MM->1->5->2.

Note: NEMA has traditionally labeled overlaps using a character sequence. For example, Overlap 1 is also referred to as overlap A, Overlap 2 is Overlap B. In this example, Overlap 9 is Overlap I:

In this Data Template, overlap 9 is programmed for parent phases 1 and 9 using the keyboard sequence MM->1->5->2->9 ENTER ->1

Ovr1p I		Øs.....							
Included	Øs	5	9	0	0	0	0	0	0
Modifier	Øs	0	0	0	0	0	0	0	0
Type:	NORMAL	Grn:	0	Yel:	3.5	Red:	1.5		

Overlaps 9, 11, 13 and 15 are used for TPCLT and are summarized as follows. Note that the overlap numbers and the auxiliary left-turn phases numbers for [TPCLT operation](#) are the same and that the auxiliary left-turn is the same as the left-turn phase plus eight. This numbering was chosen to simplify the phase numbers for TPCLT and to keep overlaps 1 through 8 open for the user to define.

Load Switch Channel Output	Overlap Assigned To Channel	Phases Assigned To Overlap
1	9 (I)	1, 9
3	11 (J)	3, 11
5	13 (K)	5, 13
7	15 (L)	7, 15

Note: The overlaps clearances in this Data Template are timed with the parent phase clearances - set "Parent Ø Clnrcs" value ON under the "General Overlap Parameters" screen (MM->1->5->1). When you customize the phase timing for each controller, the clearance times for phases 1 and 9, phases 3 and 11, phases 5 and 13 and phases 7 and 15 should be the same. This insures that the overlaps used for TPCLT operation use the phase clearances times because the "Parent Ø Clnrcs" value set ON.

Detector Operation for TPCLT

The controller is initialized with detectors 1 through 8 calling phases 1 through 8. Even though we have set up sequence #16 to service auxiliary left-turn phases 9, 11, 13 and 15, we have no way of calling these phases from detectors 1, 3, 5 and 7. What we need is a way to call phases 1 and 9 from detector 1. The Naztec controller allows you to indirectly source (Src) a detector call from another detector on screen MM->5->3.

Det#	Occ:	G	Y	R	Delay	PS	Mode	Src
51		X	X	.	0	0	NORMAL	1
52		.	.	.	0	0	NORMAL	0
53		X	X	.	0	0	NORMAL	3
54		.	.	.	0	0	NORMAL	0
55		X	X	.	0	0	NORMAL	5
56		.	.	.	0	0	NORMAL	0
57		X	X	.	0	0	NORMAL	7
58		.	.	.	0	0	NORMAL	0

If the Src of a detector is zero, then that detector is called directly. For example, detector #52 above is called by detector 52. However, detector #51 is sourced from detector #1.

Detectors 51, 53, 55 and 57 are programmed to call the *auxiliary* left-turn phases 9, 11, 13 and 15 using the "Detector Parameters" under screen MM->5->1

Det#	Call	Switch	Delay	Extend	Queue	->
51	9	0	0.0	0.0	0	
52	0	0	0.0	0.0	0	
53	11	0	0.0	0.0	0	
54	0	0	0.0	0.0	0	
55	13	0	0.0	0.0	0	
56	0	0	0.0	0.0	0	
57	15	0	0.0	0.0	0	
58	0	0	0.0	0.0	0	

Using these assignments, detectors 1, 3, 5 and 7 call left-turn phases 1, 3, 5 and 7 and also indirectly call the *auxiliary* left-turn phases 9, 11, 13 and 15 using the source feature to redirect the vehicle calls. This method allows each left-turn detector to call two separate phases as discussed in the [TecNote on TPCLT operation](#).

Enabling TS-2 Detector Diagnostics and Recovery

Use your left or right arrow keys to scroll to the "right" screen of MM->5->1 and adjust the settings as shown below:

Det#	NoAct	MaxPres	ErrCnt	FailTime
1	15	15	40	0
2	15	15	40	0
3	15	15	40	0
4	15	15	40	0
5	15	15	40	0
6	15	15	40	0
7	15	15	40	0
8	15	15	40	0

These defaults will enable the controller detector diagnostics for detectors 1 through 8 (these diagnostics are disabled when the controller is initialized with zero values for NoAct, MaxPres and ErrCnt). The values above will generate a detector failure (recorded in the occupancy data) when a detector has no call (No Activity) or a constant call (MaxPres) for a period of 15 minutes. A separate diagnostic will generate an error if there are more than 40 counts per minute (cpm) indicating an "ErrCnt" or chattering detector.

The "FailTime" defaults to zero which disable the ability of the controller to extend an artificial call placed on the phase when one of the detector diagnostics fail. The user should customize the "FailTime" to extend this artificial call longer than the min time of the phase if desired.

The controller also provides a similar set of diagnostics for pedestrian pushbuttons under screen MM->5->4. Ped buttons can be checked for "NoAct" (No Activity), "MaxPres" (max presence or constant call) and "ErrCnt" (chattering pedestrian detector). The system can generate a "Pedestrian Detector Alarm" for these conditions. The controller initializes the "NoAct", "MaxPres" and "ErrCnt" values to zero which disables pedestrian detector diagnostics in the Data Template.

After you have programmed NoAct, MaxPres and ErrCnt times into the controller, take a look at the detector status screen under MM->5->7->1. You will notice that *Veh Calls* for detectors 1 through 8 are inactive and *Veh Alarms* are inactive. Now, power down the controller and go back to status screen MM->5->7->1 (this puts a call into each phase on start-up). After 15 minutes of no-activity (NoAct), you will notice *Veh Calls* and *Veh Alarms* for phases 1 through 8. The detector diagnostic places a min recall on each phase until a detector call resets the no activity timer. This feature is very useful during "moderate" to "heavy" traffic volume periods; however, late at night, the diagnostic can generate unnecessary alarms. In the next section, you will learn how to defeat this feature by time-of-day using an alternate detector map.

Defeating Detector Diagnostics During Free Operation

In the last section, we learned how to enable detector diagnostics to check for no activity, constant call and chattering detectors. No activity errors can be expected late at night during free operation, so this section shows you how to use alternate detector maps to disable detector diagnostics during free operation.

Take a look at Alternate Detector Map #1 under MM->5->5->1 ENTER. Notice that the alternate map options are the same as the detector options under screen MM->5. The alternate map is used to overlay these normal detector options when associated with a timing pattern.

Go to MM->5->5->1 ENTER 1, to modify the Vehicle Parameters for any detectors that you want to redefine by the alternate map (in this case detectors 1 through 8). Each detector number (Det#) specified in this map is redefined by the alternate detector map. Other detectors defined in the controller are not modified by the alternate map if they are not listed in this table.

Row	Det#	Call	Switch	Delay	Extend	Queue->
1	1	1	0	0.0	0.0	0
2	2	2	0	8.5	0.0	0
3	3	3	0	0.0	0.0	0
4	4	4	0	8.5	0.0	0
5	5	5	0	0.0	0.0	0
6	6	6	0	8.5	0.0	0
7	7	7	0	0.0	0.0	0
8	8	8	0	8.5	0.0	0
9	0	0	0	0.0	0.0	0
10	0	0	0	0.0	0.0	0
11	0	0	0	0.0	0.0	0
12	0	0	0	0.0	0.0	0
13	0	0	0	0.0	0.0	0
14	0	0	0	0.0	0.0	0
15	0	0	0	0.0	0.0	0
16	0	0	0	0.0	0.0	0

This example provides a 8.5" delay for through phases 2, 4, 6, and 8 during free operation to reduce the problem of pre-mature gap-out from right-turns on red during free operation.

Scroll to the right screen from this menu to disable the detector diagnostics for detectors 1 through 8.

<-Row	Det#	NoAct	MaxPres	ErrCnt	FailTime
1	1	0	0	0	0
2	2	0	0	0	0
3	3	0	0	0	0
4	4	0	0	0	0
5	5	0	0	0	0
6	6	0	0	0	0
7	7	0	0	0	0
8	8	0	0	0	0

Now, modify the Veh Options for detectors 1 - 8 called for in this alternate map - MM->5->5->1 ENTER 2. If you forget this step, detectors 1 through 8 will no longer call and extend.

Row	Det#	Call	Extend	Queue	Add.Init	->
1	1	X	X	.	.	
1	2	X	X	.	.	
1	3	X	X	.	.	
1	4	X	X	.	.	
1	5	X	X	.	.	
1	6	X	X	.	.	
1	7	X	X	.	.	
1	8	X	X	.	.	

You can modify Veh Parms+ for Detector Map #1 on screen MM->5->5->1 ENTER 3 if you want to override any of the Parms+ features with this detector map:

Row	Det#	Occ:	G	Y	R	Delay.Øs	Mode	Src
1	1	.	.	.	0	0	NORMAL	0
2	2	.	.	.	0	0	NORMAL	0
3	3	.	.	.	0	0	NORMAL	0
4	4	.	.	.	0	0	NORMAL	0
5	5	.	.	.	0	0	NORMAL	0
6	6	.	.	.	0	0	NORMAL	0
7	7	.	.	.	0	0	NORMAL	0
8	8	.	.	.	0	0	NORMAL	0

You can also override the pedestrian call detectors under "Ped Parms" for Detector Map #1 - MM->5->5->1 ENTER 4. However, leaving "Ped Parms" blank for the map will not override the standard pedestrian calls in the controller.

To assign Alternate Detector Map #1 to Pattern 48 (Free Operation), go to the Alt Tables+ menu (MM->2->6) and scroll down to Pat# 48.

Pat#	Alt:	ØOpt	ØTime	DetGrp	Call/Inh	->
48		0	0	1	0	

Whenever Pattern 48 is called, the controller goes to free operation and alternate detector map (DetGrp) #1 overlays the standard detector definitions. This detector map disables detector diagnostics for detectors 1 through 8 during free operation.

Enabling Volume and Occupancy Counts

Occupancy is a measure of the percentage of time that a vehicle is over a detector. The Naztec controller can sample occupancy during the green, yellow and or red interval of the vehicle phase that it calls. The controller is initialized with occupancy turned off, so the Vehicle Parameters+ screen must be modified to sample occupancy during the green and yellow period as follows (MM->5->3).

Det#	Occ:	G	Y	R	Delay	PS	Mode	Src
1		X	X	.	0	0	NORMAL	0
2		X	X	.	0	0	NORMAL	0
4		X	X	.	0	0	NORMAL	0
5		X	X	.	0	0	NORMAL	0
6		X	X	.	0	0	NORMAL	0
7		X	X	.	0	0	NORMAL	0
8		X	X	.	0	0	NORMAL	0

An "X" in the "G" and "Y" columns of this data template allows occupancy to be sampled during the green and yellow periods for detectors 1 through 8. Occupancy measured during the red interval is meaningless for local intersection detectors because vehicles are stopped on the detectors during the red portion of the phase. System detectors located far enough upstream to avoid queuing during the red interval can be sampled during G + Y + R.

Enable Volume and Occupancy for Vehicle Calls 1 Through 8

Volume and occupancy must be enabled under the "Vehicle Options" screen MM->5->2 (scroll to the right screen).

<- Det#	Red.Lock	Yel.Lock	Occup	Volume
1	.	.	X	X
2	.	.	X	X
3	.	.	X	X
4	.	.	X	X
5	.	.	X	X
6	.	.	X	X
7	.	.	X	X
8	.	.	X	X

The occupancy sample rate defaults to 15 minutes when the controller is initialized (see screen MM->5->8->1). A fifteen minute sample is considered adequate for the standard controller Data Template.

The Data Template above assumes that all detectors in adjacent traffic lanes are are wired to separate detector inputs. Just remember, that Volume can only be sampled accurately with one detector per lane per detector channel.

Enabling Detector Switching

Switch detectors are useful in systems with permitted left-turn signals. Enabling switch detectors allows the left-turn detectors to extend the opposing through phases when the turn phase is red and the adjacent through phase is green.

Detector switching uses the source (Src) feature described under the above section on Twice Per Cycle Left-turns. Switch detectors 52, 54, 56 and 58 are indirectly sourced (Src) from Det # 1, 3, 5 and 7 because each detector can be a call detector or a switch detector (but not both).

Detector switching is provided for detectors 52, 54, 56 and 58 on the Vehicle Parameters+ screen (MM->5->3) as follows.

Det#	Occ:	G	Y	R	Delay	PS	Mode	Src
51		.	.	.	0	0	NORMAL	0
52		.	.	.	0	0	NORMAL	1
53		.	.	.	0	0	NORMAL	0
54		.	.	.	0	0	NORMAL	3
55		.	.	.	0	0	NORMAL	0
56		.	.	.	0	0	NORMAL	5
57		.	.	.	0	0	NORMAL	0
58		.	.	.	0	0	NORMAL	7

If you have already modified your Data Template for Twice Per Cycle Left-Turns, screen MM->5->3 should be appear as follows:

Det#	Occ:	G	Y	R	Delay	PS	Mode	Src
51		X	X	.	0	0	NORMAL	1
52		.	.	.	0	0	NORMAL	1
53		X	X	.	0	0	NORMAL	3
54		.	.	.	0	0	NORMAL	3
55		X	X	.	0	0	NORMAL	5
56		.	.	.	0	0	NORMAL	5
57		X	X	.	0	0	NORMAL	7
58		.	.	.	0	0	NORMAL	7

Detector switching is programmed for detectors 52, 54, 56 and 58 using the "Detector Parameters" under screen MM->5->1:

Det#	Call	Switch	Delay	Extend	Queue	->
51	0	0	0.0	0.0	0	
52	1	2	0.0	0.0	0	
53	0	0	0.0	0.0	0	
54	3	4	0.0	0.0	0	
55	0	0	0.0	0.0	0	
56	5	6	0.0	0.0	0	
57	0	0	0.0	0.0	0	
58	7	8	0.0	0.0	0	

If you have already modified your Data Template for Twice Per Cycle Left-Turns, screen MM->5->1 should appear as follows:

Det#	Call	Switch	Delay	Extend	Queue	->
51	9	0	0.0	0.0	0	
52	1	2	0.0	0.0	0	
53	11	0	0.0	0.0	0	
54	3	4	0.0	0.0	0	
55	13	0	0.0	0.0	0	
56	5	6	0.0	0.0	0	
57	15	0	0.0	0.0	0	
58	7	8	0.0	0.0	0	

Switch detectors should not be used for protected-only left-turns. Unless the left-turn is permitted on a green ball indication, there is no need to extend the opposing through phase with detector switching. You can defeat detector switching by changing the "Src" of Det# 52, 54, 56 and 58 to zero.

Print

If you are running Microsoft Internet Explorer, you can [this page here](#).

Otherwise, print a copy of the document using the PDF file at the beginning of this page



© Copyright 2000 by Naztec, Inc - All Rights Reserved

No part of this html page may be copied, reproduced, distributed, resold, translated, or reduced to any medium or form without the express consent of Naztec, Inc.

The Technology That Moves America

Naztec, Inc
820 Park Two Dr.
Sugar Land, TX 77478, USA.

(281) 240-7233 (FAX) 240-7238
Email: naztec@naztec.com
