

TecNote 1005 - Programming a TS2 Ver 61.x Controller for First-Time Field Usage

The purpose of this TecNote is to help first-time user set up and configure a Naztec 980 Secondary Version 61.x Controller for field usage.



Background

Naztec Inc. has developed Ver 61.x software to be compliant with the NTCIP Standard specifications. The NTCIP spec references in this document apply to both ASC version 1 (TS 3.5-1996) and ASC version 2 (NTCIP 1202 ver 2.18). Since much of the standard refers to database features, you can [download the Cross-Platform NTCIP Based Controller Simulator](#) using this hyperlink and run it from your local hard drive. Just unzip the files to a new folder and create a shortcut on your desktop for the file "mm.htm". When you double-click on this file, your web browser will launch this page and you can quickly navigate the menu system even when you aren't on-line. To obtain an explanation of each NTCIP database feature, simply navigate to a specific menu screen and you can read each NTCIP reference and explanation by clicking on the hyperlinks.

Chan.	1	2	3	4	5	6	7	8	->
<u>Ø/olp#</u>	1	2	3	4	5	6	7	8	
<u>Type</u>	VEH	VEH	VEH	VEH	VEH	VEH	VEH	VEH	
<u>Flash</u>	RED	RED	RED	RED	RED	RED	RED	RED	
<u>Alt Hz</u>	X	.	X	.	X	.	X	.	
<u>Dim Grn</u>	.	.	.	.	.	.	.	.
<u>Dim Yel</u>	.	.	.	.	.	.	.	.
<u>Dim Red</u>	.	.	.	.	.	.	.	.
<u>Dim Cyc</u>	+	+	+	+	+	+	+	+	

Click on this hyperlink to jump to the [NTCIP Definition](#)

1	2	3
4	5	6
7	8	9
EXIT	MAIN DISP	ESC

Type

2.9.2.3 CHANNEL CONTROL TYPE PARAMETERS - The *Channel Source Parameter* and *Channel Control Type* (highlighted in yellow) combine to define each load switch output. The *Channel Control Type* parameter indicates the type of *Control Source*. The Control Source Type may be a Vehicle phase, Pedestrian phase, or an Overlap (VEH, PED, OLP).

Part I - Front Panel Display and Keyboard

Using the Ver 61.x controller Front Panel and Keyboard

The following slides summarize the Front Panel LCD display as well as Ver 61.x keyboard access.

Main Menu

- | | | |
|---------------|--------------|-----------------|
| 1. Controller | 4. Scheduler | 7. Status |
| 2. Coordinate | 5. Detectors | 8. Login, Utils |
| 3. Preempts | 6. Comm | |

Front Panel Display Notes:

- ~ 4 line by 40 Character LCD backlit display***
- ~ Utilizes Menu system to navigate to data locations***
- ~ Once you choose a menu number, the software will direct you to either a:***
 - Sub-menu or a Data Entry screen***

**Keystrokes will modify this 4
line by 40 character backlit
display**

**The white
keys are
used for:
Toggling
data or
entering
numeric data**

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

**Gray Keys
are used for:**

**Screen
Navigation**

**Red Keys are used for :
Menu Control**

Numeric Keys

***The White Keys are
used to:***

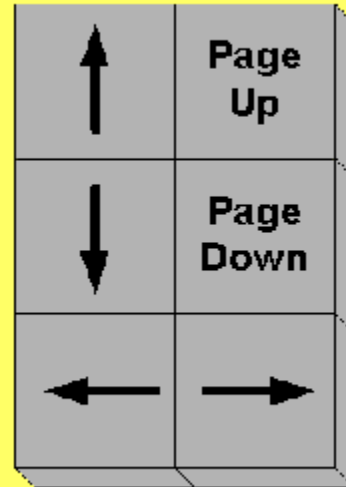
- ~ select sub-menus***
- ~ enter numerical data***
- ~ Enable, Disable or
Toggle data items***

1	2	3
4	5	6
7	8	9
	0	

Cursor Control Keys

Gray Keys are used for:

- ~ Movement around the 4x40 display
- ~ If you enter data and hit any arrow key, the data will be saved to the controller
- ~ ***Page Up*** and ***Page Down*** are used to update the screen 4 lines at a time



Function Keys

**Main
Disp**

Return to Main Menu

Entr

Enter Data

Esc

Go Back one Menu Level

**Alt
Fcn**

Run Alternate Functions

Main Menu

- | | | |
|---------------|--------------|-----------------|
| 1. Controller | 4. Scheduler | 7. Status |
| 2. Coordinate | 5. Detectors | 8. Login, Utils |
| 3. Preempts | 6. Comm | |

All data entry will be referenced to this Main Menu screen

Naztec's Notation for this screen is **MM**

You can get there by hitting the **Main Disp** once

or repeatedly using the **Esc** key until you return to the Main Menu

Naztec Notation to get to Phase timing is MM -> 1 -> 1 -> 1

Main Disp

is used to navigate to the Main menu

1

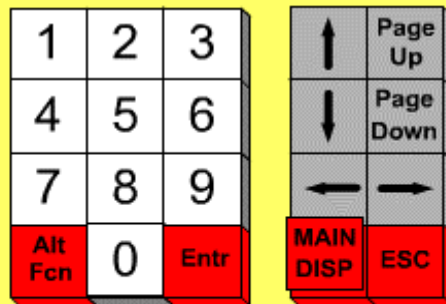
is used to navigate to the Controller menu

1

is used to navigate to the Phase menu

1

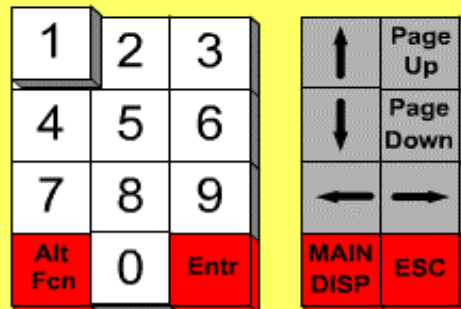
is used to navigate to the Timing menu



press the
Main/DISP Key
to get to the
Main Menu

Main Menu

- | | | |
|---------------|--------------|-----------------|
| 1. Controller | 4. Scheduler | 7. Status |
| 2. Coordinate | 5. Detectors | 8. Login, Utils |
| 3. Preempts | 6. Comm | |



press the 1
Key to get to
the Controller
Menu

Controller		
1. Phases	4. Flash	7. Enable Run
2. Unit, Ring	5. Overlaps	8. TempAlrt,Lamp
3. Chan,SDLC	6. Alarms	

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

Use your Mouse to press the 1 Key to get to the Phase Menu

PHASES		
1. Times	4. Ring, Start,Concur	7. Times+
2. Options	5. Call,Inhibit,Redirect	8. Copy
3. Options+	6. Alt Progs+	

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

Use your Mouse to press the 1 Key to get to the Timing Menu

	φ..1...	φ..2...	φ..3...	φ..4...	φ..5...	φ..6...	φ..7...	φ..8...	-->
Min Grn	
Gap, Ext	<u>...</u>	
Max 1	↓	

The Cursor
Underscores
where you
want to type
data

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

	φ..1...	φ..2...	φ..3...	φ..4...	φ..5...	φ..6...	φ..7...	φ..8...	-->
Min Grn	
Gap, Ext	<u>...</u>	
Max 1	↓	

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

Data is
entered by
typing the
Numeric
keys and is
right
justified

	$\phi..1...$	$\phi..2...$	$\phi..3...$	$\phi..4...$	$\phi..5...$	$\phi..6...$	$\phi..7...$	$\phi..8...$	-->
Min Grn	<u>0.15</u>	...	...	...	...	...	...	...
Gap, Ext	...	...	...	...	...	...	...	...
Max 1	↓	...	...	...	...	...	...	...

*Let's enter 15
seconds of
Minimum
Green for
Phase 1*

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

*Up to 3
numerical
digits are
entered and
are always
right-justified*

	$\phi..1...$	$\phi..2...$	$\phi..3...$	$\phi..4...$	$\phi..5...$	$\phi..6...$	$\phi..7...$	$\phi..8...$	-->
Min Grn	<u>0.15</u>	...	...	...	...	...	...	...
Gap, Ext	...	...	...	...	...	...	...	...
Max 1	↓	...	...	...	...	...	...	...

*Use any
cursor
Key*

*Or use
the Entr
Key*

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

*To Enter
the data in
the
Controller's
Memory*

	φ..1...	φ..2...	φ..3...	φ..4...	φ..5...	φ..6...	φ..7...	φ..8...	-->
Min Grn	<u>015</u>	...	...	...	...	...	...	...
Gap, Ext	...	...	...	...	...	...	...	...
Max 1 ↓	...	...	...	...	...	...	...	...

Let's enter 25
seconds of
Minimum
Green for
Phase 2

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

**Use the Right
Arrow key to
move the
cursor over**

	φ..1...	φ..2...	φ..3...	φ..4...	φ..5...	φ..6...	φ..7...	φ..8...	-->
Min Grn	<u>015</u>	<u>025</u>	...	...	...	...	...	...
Gap, Ext	...	...	...	...	...	...	...	...
Max 1 ↓	...	...	...	...	...	...	...	...

Let's enter 25
seconds of
Minimum
Green for
Phase 2

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

**Use the Right
Arrow key to
move the
cursor over**

	$\phi..1...$	$\phi..2...$	$\phi..3...$	$\phi..4...$	$\phi..5...$	$\phi..6...$	$\phi..7...$	$\phi..8...$	-->
Enable ϕ
Min Recall
Max Recall

**Let's
enable
Phase 1 by
toggling it**

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

**Hit White
Key such
as the "0"
key to toggle it**

	$\phi..1...$	$\phi..2...$	$\phi..3...$	$\phi..4...$	$\phi..5...$	$\phi..6...$	$\phi..7...$	$\phi..8...$	-->
Enable ϕ
Min Recall
Max Recall

1	2	3
4	5	6
7	8	9
Alt Fcn	0	Entr

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

Part II Initializing the Controller

Disable the Run Timer

Disabling the Run Timer allows you to reconfigure the entire controller. This includes changing Phasing, Ring Sequence, Phase Concurrency, all Input and Output assignments and Timing changes.

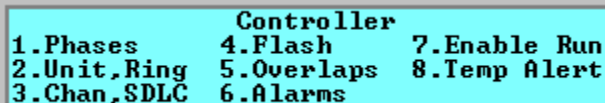
Go to the Main Menu by repeatedly depressing the **MAIN/DISP** key on the front panel keyboard. You should see the Front panel display the Main Menu as listed below (*Please note that when you see the Notation → throughout this document, it indicates that you should hit the numerical key which follows it to navigate through the Naztec Menu system*):



Main Menu

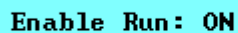
1.Controller	4.Scheduler	7.Status
2.Coordinate	5.Detectors	8.Login,Utills
3.Preempts	6.Comm	

Once at the Main Menu we must navigate to disable the Run Timer "Run Timer" by selecting MM→1→>7 as shown below :



Controller

1.Phases	4.Flash	7.Enable Run
2.Unit,Ring	5.Overlaps	8.Temp Alert
3.Chan,SDLC	6.Alarms	



Enable Run: ON

Now you must turn off the run timer by hitting any numerical key to toggle the selection to OFF.



Enable Run: OFF

Once it is set to OFF hit the ENTER Key to save the data and turn off the Run timer.

Initialize the database

Now we must initialize the database of the controller by navigating to MM→8→4→1.

```
Main Menu
1.Controller  4.Scheduler  7.Status
2.Coordinate  5.Detectors  8.Login,Utills
3.Preempts    6.Comm
```

```
Login and Utilities
1.Login       4.Init DBase  7.Clear Fault
2.Set Access  5.Load S/W
3.Print       6.Self Tests
```

```
Initialize DataBase
1.Clear & Init All
2.Clear EEPROM
3.Initial Part
```

```
Clear & Initial Controller
Select Operating Mode: NONE
```

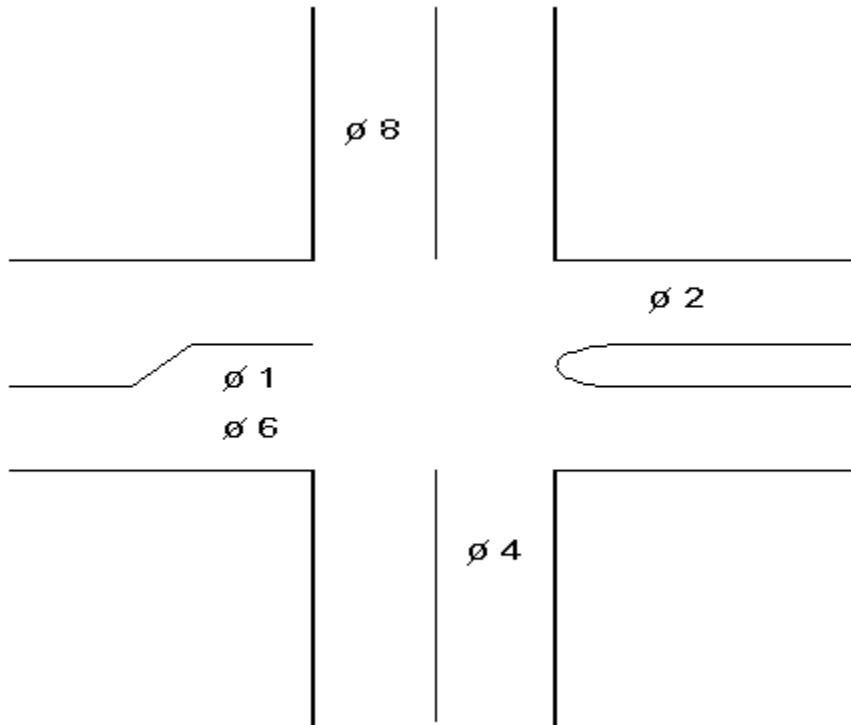
Although other options are available, most often we will set up our intersections for Standard 8 Phase operation. By initializing to STD8, you can shorten your programming time because the initialization will set up default data. Among the default data that is set up will be Ring Structure, Phase Concurrency, Basic Timing for Phase 1-8, Basic Phase options, Default detector phase inputs and switch pack Channel outputs. To set up Standard 8 Phase, Select the Operating Mode to STD8 by toggling the selections. Once you hit the **ENTR** key the following screen should be displayed:

```
CAUTION: You are about to initialize
program settings for STD-8P operation
press ENTR to continue,
press ESC to go back...
```

Hitting ENT a second time will start initialization. You may see a message “In Progress” during the initialization. You will then see the screen below which will indicate that initialization is complete.

```
CAUTION: You are about to initialize
program settings for STD-8P operation
DONE
```

PART III - Programming a Simple Intersection



Most agencies set up traffic control to do the basics, i.e. program phasing, timing, detection and outputs. To assist you in finding menu screens for these basic functions, we will program the following parameters for this intersection:

Phasing:

- Normal 8 phase STD8 setup
- Phases Allowed: 1,2,4,6,8
- Phases 2 & 6 are Artery (Main Road) phases and will be placed on Minimum Recall
- Phases 1 is Main Road Leading Left Turn Phase
- Phases 4 & 8 are Side Road Phases
- Pedestrian associated with Phases 4 and 8

Inputs:

- Detectors 1-8 associated with phases 1-8
- Ped detectors 4 & 8 are associated with phases 4 & 8

Outputs:

- Channels 1-8 (Load switch) are associated with Phases 1-8
- Channel 14 is associated with Ped Phase 4
- Channel 16 is associated with Ped Phase 8

Startup:

- Startup in phases 2 & 6 Green

Timing:

Phase (s)	Minimum	Maximum	Gap (Ext)	Yellow	Red	Walk	Ped Clr
2,6	20	40	2.0	3	1		
4,8	10	20	1.0	3	1	7	15
1	2	8	1.0	3	1		

Default Phase Sequence, Ring Concurrency Unit Parameters

As shown Below, by initializing the controller to STD8, the Ring Sequence (MM→1→2→4), Ring Concurrency (MM→1→1→4) and basic Unit Parameters (MM→1→2→1) have already been programmed for you.

Phase Ring Sequence

To set up STD8 Phase Ring Sequence navigate to MM→1→2→4.

Main Menu		
1.Controller	4.Scheduler	7.Status
2.Coordinate	5.Detectors	8.Login,Utills
3.Preempts	6.Comm	

Controller		
1.Phases	4.Flash	7.Enable Run
2.Unit,Ring	5.Overlaps	8.Temp Alert
3.Chan,SDLC	6.Alarms	

UNIT		RING	
1.Parameters		4.Sequence	
		5.Parms+	

Seq#	Ring	Sequence .of .Phases							
1	1	1	2	3	4	0	0	0	0
1	2	5	6	7	8	0	0	0	0
1	3	0	0	0	0	0	0	0	0
1	4	0	0	0	0	0	0	0	0

Ring Concurrency

To set up STD8 Ring Concurrency use MM→1→1→2.

```

Main Menu
1.Controller 4.Scheduler 7.Status
2.Coordinate 5.Detectors 8.Login,Utills
3.Preempts 6.Comm

```

Controller		
1. Phases	4. Flash	7. Enable Run
2. Unit, Ring	5. Overlaps	8. Temp Alert
3. Chan, SDLC	6. Alarms	

PHASES		
1. Times	4. Ring, Start, Concur	7. Times+
2. Options	5. Call, Inh, Redirect	8. Copy
3. Options+	6. Alt Progs+	9. AdvWarn

[illegible]

If you notice this screen allows you to set up what phases that you want to startup the controller with after a power down or after coming out of a flashing operation. As per above, we will start the controller in phases 2 and 6 green as programmed below.

[illegible]

Unit Parameters

To set up STD8 Unit Parameters use MM→1→2→1.

```

Main Menu
1.Controller 4.Scheduler 7.Status
2.Coordinate 5.Detectors 8.Login,Utills
3.Preempts 6.Comm
```

```

Controller
1.Phases 4.Flash 7.Enable Run
2.Unit,Ring 5.Overlaps 8.Temp Alert
3.Chan,SDLC 6.Alarms
```

```

UNIT RING
1.Parameters 4.Sequence
5.Parms+
```

```

UNIT PARAMETERS
StartUp Flash(s) 0 Red Revert 3.0
Backup Time(s) 0 Auto Ped Clr OFF
Phase Mode STD8 Diamond Mode 4P
Loc Flash Start OFF Start Red Tm 0.0
Min PedClr Tm 0
Allow <3 sec Yel OFF Allow SkipYel OFF
Disable Init Ped OFF Free Ring Seq 1
StopTm Over Prmp OFF Invert RailIn OFF
Feature Profile 0 Enable Run OFF
Display Time 10 Tone Disable OFF
TS2 Det Flts ON SDLC RetryTm 0
Max Cycle Tm 0 CycFlt Actn ALARM
Max Seek Track 0 MaxSeek Dwell 0
```

Phase Options and Phase Timing Entries

Phase Options

Set up the Phase Options via MM→1→1→2. In particular, you must enable phases 1,2,4,6 and 8 as shown below:

```

Main Menu
1.Controller 4.Scheduler 7.Status
2.Coordinate 5.Detectors 8.Login,Utills
3.Preempts 6.Comm
```

```

Controller
1.Phases 4.Flash 7.Enable Run
2.Unit,Ring 5.Overlaps 8.Temp Alert
3.Chan,SDLC 6.Alarms
```

PHASES		
1.Times	4.Ring,Start,Concur	7.Times+
2.Options	5.Call,Inh,Redirect	8.Copy
3.Options+	6.Alt Progs+	9.AduWarn

Options	P..	1..	2..	3..	4..	5..	6..	7..	8~
Enable P	X	X	.	X	.	X	X	X	X
Min Recall
Max Recall
Ped Recall
Soft Recall
Lock Calls
Auto Flash Entry
Auto Flash Exit
Dual Entry	.	X	.	X	.	X	.	X	.
Enable Simul Gap	X	X	X	X	X	X	X	X	X
Guarantd Passage
Rest In Walk
Condit'l Service
Non-Actuated 1
Non-Actuated 2
Added Init Calc	\$	\$	\$	\$	\$	\$	\$	\$	\$

Now enter the PhaseTiming parameters via MM→1→1→1 to reflect the time on the table above:

Main Menu		
1.Controller	4.Scheduler	7.Status
2.Coordinate	5.Detectors	8.Login,Utills
3.Preempts	6.Comm	

Controller		
1.Phases	4.Flash	7.Enable Run
2.Unit,Ring	5.Overlaps	8.Temp Alert
3.Chan,SDLC	6.Alarms	

PHASES		
1.Times	4.Ring,Start,Concur	7.Times+
2.Options	5.Call,Inh,Redirect	8.Copy
3.Options+	6.Alt Progs+	9.AduWarn

Times	P.1	2	3	4	5	6	7	8~
Min Grn	2	20	0	10	0	20	0	10
Gap,Ext	1.0	2.0	0.0	1.0	0.0	2.0	0.0	1.0
Max 1	8	40	0	20	0	40	0	20
Max 2	0	0	0	0	0	0	0	0
Yel Clr	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clr	1.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Walk	0	0	0	7	0	0	0	7
Ped Clr	0	0	0	15	0	0	0	15
Red Revt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Init	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Init	0	0	0	0	0	0	0	0
Gap Reduce								
Time B4	0	0	0	0	0	0	0	0
Cars B4	0	0	0	0	0	0	0	0
Time To	0	0	0	0	0	0	0	0
ReducBy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DyMaxLim	0	0	0	0	0	0	0	0
Max Step	0	0	0	0	0	0	0	0

Detector and Output Channel Programming

Detector Programming

The 980 Controller works with NEMA Cabinets so that for most installations software hardware mapping is unnecessary. To program the detector data use the Detection sub-menu at MM→5 .

Main Menu		
1.Controller	4.Scheduler	7.Status
2.Coordinate	5.Detectors	8.Login,Utills
3.Preempts	6.Comm	

DETECTORS		
1.Veh Parm	4.Ped Parm	7.Status
2.Veh Options	5.Alt Progs	8.U/O-Speed
3.Veh Parm+	6.Phas Recall	9.Copy

Begin programming detectors by programming Vehicle Parameters at MM→5→1. This main purpose of this menu is to map a phase to each detector as shown below:

Det#	Call	Switch	Delay	Extend	Queue
1	1	0	0.0	0.0	0
2	2	0	0.0	0.0	0
3	3	0	0.0	0.0	0
4	4	0	0.0	0.0	0
5	5	0	0.0	0.0	0
6	6	0	0.0	0.0	0
7	7	0	0.0	0.0	0
8	8	0	0.0	0.0	0

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

Notice that Vehicle detectors 1 thru 8 are already set up for Phases 1 thru 8 so no programming is necessary. Also notice this is where you would put in your detector delays, extensions and error checking data if specified. Our specifications above have said that our intersection we will not have any detector delays or extensions.

The next menu that should be programmed is Vehicle Options at MM→5→2. This menu sets up when the detector works throughout the cycle. We will program all detectors to work full-time as shown below:

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

Det#	Red.Lock	Yel.Lock	Occup	Uolum
1
2
3
4
5
6
7
8

We will next set up the Pedestrian Parameters by programming the menu at MM→5→4. Notice that by default the Pedestrian detectors are already set up for Ped detectors 4 & 8 calling Ped phases 4 and 8.

Det#	Call	NoAct	MaxPres	ErrCnt
1	1	0	0	0
2	2	0	0	0
3	3	0	0	0
4	4	0	0	0
5	5	0	0	0
6	6	0	0	0
7	7	0	0	0
8	8	0	0	0

Output Programming

The next step is to set up the Output Channels (switch packs) as per the specifications via MM→1→3→1.

Main Menu		
1.Controller	4.Scheduler	7.Status
2.Coordinate	5.Detectors	8.Login,Utills
3.Preempts	6.Comm	

Controller		
1.Phases	4.Flash	7.Enable Run
2.Unit,Ring	5.Overlaps	8.Temp Alert
3.Chan,SDLC	6.Alarms	

Channel		SDLC
1.Assign to Ps	4.Permisivs	7.SDLC Devcs
2.Chanls 17-24	5.MMU Map	8.Status
3.Chan,I/O Parm	6.Perm Diag	

Chan..	1	2	3	4	5	6	7	8
P/Olp#	1	2	3	4	5	6	7	8
Type	VEH	VEH	VEH	VEH	VEH	VEH	VEH	VEH
Flash	RED	RED	RED	RED	RED	RED	RED	RED
Alt Hz	.	.	.	.	.	.	.	.
Dim Grn	.	.	.	.	.	.	.	.
Dim Yel	.	.	.	.	.	.	.	.
Dim Red	.	.	.	.	.	.	.	.
Dim Cyc	+	+	+	+	+	+	+	+

Chan..	9	10	11	12	13	14	15	16
P/Olp#	1	2	3	4	2	4	6	8
Type	OLP	OLP	OLP	OLP	PED	PED	PED	PED
Flash	RED	RED	RED	RED	DRK	DRK	DRK	DRK
Alt Hz	.	.	.	.	.	.	.	.
Dim Grn	.	.	.	.	.	.	.	.
Dim Yel	.	.	.	.	.	.	.	.
Dim Red	.	.	.	.	.	.	.	.
Dim Cyc	+	+	+	+	+	+	+	+

Notice by default that Channels 1 thru 8 are already set to control Phases 1 thru 8 and Channels 14 and 16 are controlling Phase 4 and 8 Peds as specified. Therefore no programming is necessary.

Part IV Running this intersection

Enable the Run Timer

Go to MM→1→7. Now turn on the Run Timer and watch the intersection run!

Controller		
1. Phases	4. Flash	7. Enable Run
2. Unit, Ring	5. Overlaps	8. Temp Alert
3. Chan, SDLC	6. Alarms	

Enable Run: OFF

Now you must turn on the run timer by hitting any numerical key to toggle the selection to ON.

Enable Run: ON

Once you hit the **ENTR** key the intersection will start running.

Summary

This step-by-step procedure will allow the user to do basic programming of a TS2 controller using Ver 61,x software. For further detailed information on the various parameters that can be programmed please refer to the latest **Training Manual For NTCIP Based TS2 / 2070 Controllers** available from Naztec.
