http://www.trafficware.com

http://www2.naztec.com/sites/default/files/documents/training/simulator/mm.htm

TS2 Keyboard Interface

```
           Main Menu
1.Controller  4.Scheduler  7.Status
2.Coordinate  5.Detectors  8.Login,Utils
3.Preempts    6.Comm       9.CLP Master
```

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

↑	Page Up
↓	Page Down
←	→
MAIN DISP	ESC

Main Menu & Software Notation

- To get to the main Menu from the TS2 controller use the MAIN/DISP Key

- Naztec uses the notation MM for Main Menu

MAIN DISP

```
            Main Menu
1.Controller  4.Scheduler  7.Status
2.Coordinate  5.Detectors  8.Login,Utils
3.Preempts    6.Comm       9.CLP Master
```

Software Notation (continued)

- Using MM to indicate Main Menu allows us to tell the user how to navigate to the appropriate screen.

- To Program Phase timing must type—MM→1→1→1 to get to screen on right

Times	0.1...2...3...4...5...6...7...8 ->
Min Grn	255 5 3 5 3 5 3 5
Gap,Ext	25.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0
Max 1	255 25 25 25 25 25 25 25
Max 2	255 50 50 50 50 50 50 50
Yel Clr	25.5 3.0 3.0 3.0 3.0 3.0 3.0 3.0
Red Clr	25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Walk	255 5 0 5 0 5 0 5
Ped Clr	255 10 0 10 0 10 0 10
Red Revt	25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Add Init	25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Max Init	255 0 0 0 0 0 0 0
Gap Reduce	
Time B4	255 0 0 0 0 0 0 0
Cars B4	255 0 0 0 0 0 0 0
Time To	255 0 0 0 0 0 0 0
ReducBy	25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Min Gap	25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
DyMaxLim	255 0 0 0 0 0 0 0
Max Step	255 0 0 0 0 0 0 0

Software Notation-What you see

MM →

```
                        Main Menu
        1.Controller  4.Scheduler  7.Status
        2.Coordinate  5.Detectors  8.Login,Utils
        3.Preempts    6.Comm       9.CLP Master
```

1 →

```
                        Controller
        1.Phases       4.Flash       7.Enable Run
        2.Unit,Ring    5.Overlaps    8.TempAlrt,Lamp
        3.Chan,SDLC    6.Alarms      9.Light Rail
```

1→

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

1

Times	Ø.1	...2	...3	...4	...5	...6	...7	...8 ->
Min Grn	255	5	3	5	3	5	3	5
Gap,Ext	25.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Max 1	255	25	25	25	25	25	25	25
Max 2	255	50	50	50	50	50	50	50
Yel Clr	25.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clr	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk	255	5	0	5	0	5	0	5
Ped Clr	255	10	0	10	0	10	0	10
Red Revt	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Init	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Init	255	0	0	0	0	0	0	0
Gap Reduce								
Time B4	255	0	0	0	0	0	0	0
Cars B4	255	0	0	0	0	0	0	0
Time To	255	0	0	0	0	0	0	0
ReducBy	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DyMaxLim	255	0	0	0	0	0	0	0
Max Step	255	0	0	0	0	0	0	0

Trafficware
Engineered by N Naztec

Editing Data

- Data on specific screens can be edited based on field type
  - Toggle field is On/Off entry denoted by an "X" if enabled or a "." if disabled
  - Numeric Field is numeric data that can be
    - Whole numbers
    - Decimal Numbers
    - Date/Time info

Toggle field

- Typing MM→1→1→2 brings you to the Phase Options Screen
- For example Phase enable is a toggle field
- To enable a phase move the cursor to that phase and type any number---an "X" will appear

```
Options        0..1..2..3..4..5..6..7..8 ->
      Enable 0  X  X  X  X  X  X  X  X
     Min Recall  .  X  .  .  .  X  .  .
     Max Recall  .  .  .  .  .  .  .  .
     Ped Recall  .  .  .  .  .  .  .  .
    Soft Recall  .  .  .  .  .  .  .  .
     Lock Calls  .  X  .  .  .  X  .  .
Auto Flash Entry  .  .  .  X  .  .  .  X
 Auto Flash Exit  .  X  .  .  .  X  .  .
     Dual Entry  .  X  .  X  .  X  .  X
Enable Simul Gap  .  X  .  X  .  X  .  X
Guarantd Passage  .  .  .  .  .  .  .  .
    Rest In Walk  .  X  .  .  .  X  .  .
Condit'l Service  .  .  .  .  .  .  .  .
   Non-Actuated 1  .  .  .  .  .  .  .  .
   Non-Actuated 2  .  .  .  .  .  .  .  .
 Added Init Calc  S  S  S  S  S  S  S  S
```

Numeric Field

- Type MM→1→1→1 to get to Phase Timing screen
- Cursor over to appropriate timing data
- Enter numeric data (right justified)
- ENTR or cursor movement(arrow key) will enter data

Times	0.1	..2.	..3.	..4.	..5.	..6.	..7.	..8 ->
Min Grn	255	5	3	5	3	5	3	5
Gap Ext	25.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Max 1	255	25	25	25	25	25	25	25
Max 2	255	50	50	50	50	50	50	50
Yel Clr	25.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clr	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk	255	5	0	5	0	5	0	5
Ped Clr	255	10	0	10	0	10	0	10
Red Revt	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Init	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Init	255	0	0	0	0	0	0	0
Gap Reduce								
Time B4	255	0	0	0	0	0	0	0
Cars B4	255	0	0	0	0	0	0	0
Time To	255	0	0	0	0	0	0	0
ReducBy	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DyMaxLim	255	0	0	0	0	0	0	0
Max Step	255	0	0	0	0	0	0	0

Left & Right Menus

The "->" symbol indicates a "Left menu" has been selected ("<-" indicates a *Right Menu* has been selected)

- Only a limited amount of Data can be displayed on the on the front panel
- If you see a --> use the cursor and move cursor past the right boundary to get to the next page
- If you see a <-- use the cursor and move cursor past the left boundary to get to the previous page

Other Field Types

```
Set Date & Time
                    Date        Day       Time       Secs
    Current      05-29-01      TUE      02:44       27
    Set To       00-00-00               00:00       00
```

- Selection field are multiple choice type entries toggled by any numeric key such as day of week entries or Flash entries
- One numeric key will toggle through each choice

Select/Proceed Fields

- Cursor will stop to allow the user to issue a command
- Usually see on warning screens or inside menus
- Follow the instructions on the screen

```
CAUTION: This function erases ALL
   operator programmable settings --
        press ENTR to continue,
        press ESC to go back...
```

Special Keys-ESC
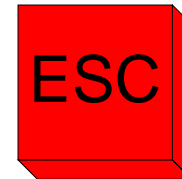
- Escape Key
  - Causes the controller to exit the active screen and go to previous screen
  - If ESC is pressed prior to saving data via the ENTR key—a warning message is posted to allow user to save data before going to prior screen
  - Continued pressing of ESC will bring user to Main Menu

Special Keys-Enter
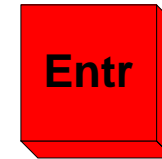
Entr

- ENTR for TS2,
- Process the current field (i.e. saves data to memory
  - Select field-loads the screen or takes desired action
  - Proceed field- correlates to a Yes

Display Control

- Use MAIN/DISP for TS2,
- Allows user to quickly move to the main menu
- Will also turn on display Backlight if hit once in Main menu

Alternate Function
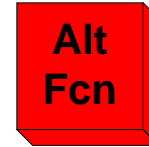
- ALT FCN for TS2
- Provides access to various features such as help or default status
- Used in combination with other key
- The following few slides shows the Alternate Functions

ALT FCN, ALT FCN Help Screen

- Load content sensitive Help from any screen that you are in.
- Repeating Alt FCN ALT FCN will bring you back to the original timing

TS2 Keystrokes
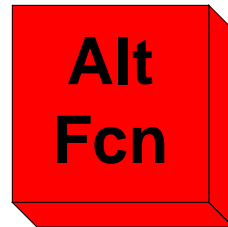
Alt Fcn   **Alt Fcn**

ALT FCN, ESC
Restore Clear Field

- Restore previous (original) data value to field that user just edited data prior to pressing the ENTR key
- Only valid for last data entry

TS2 Keystrokes

Alt Fcn

ESC
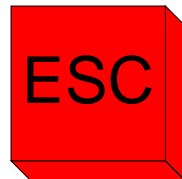
ALT FCN, MAIN/DISP Back Light Control

- Toggle on/off the back light for the display

Alt Fcn

MAIN DISP

Alt FCN, 1
Key Calls Mode

Trafficware
Engineered by **N Naztec**
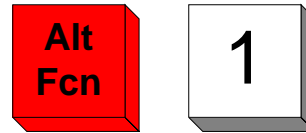
Alt Fcn   **1**

TS2 Keystrokes

- Activated from Timing Status screen Only (I.e. MM→7→1)
- Testing purpose only
- To apply:
  - Type ALT FCN then 1
  - Enter 2 digits for Phase number (01,02….16)
  - Then enter Down Arrow Key to apply Phase call or Up Arrow key to remove Phase call
- Once leave Phase status screen the calls are automatically removed

Overview Status Screen
ALT FCN, 9
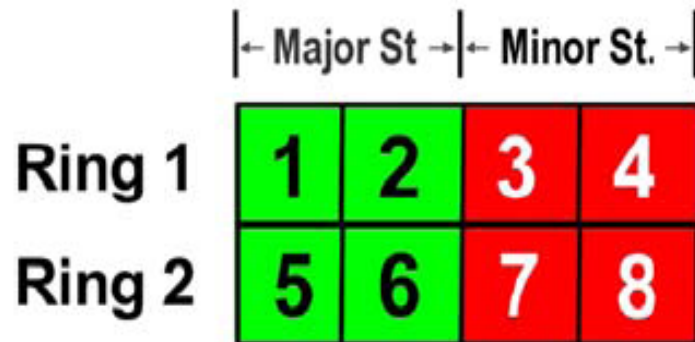
Alt Fcn **9**

```
Controller   Monitor    Cabinet    System
 TIMING    | NO DATA  | NO DATA  | ONLINE
 COORD     |          |          |
           |          |          |
```

- Display Overview Status Screen
  - General Operating Status of controller
- Logs you off if you enter an access code
- Can also be accessed via the following keystrokes: MM→7→9→5

STD 8 Phase assignments
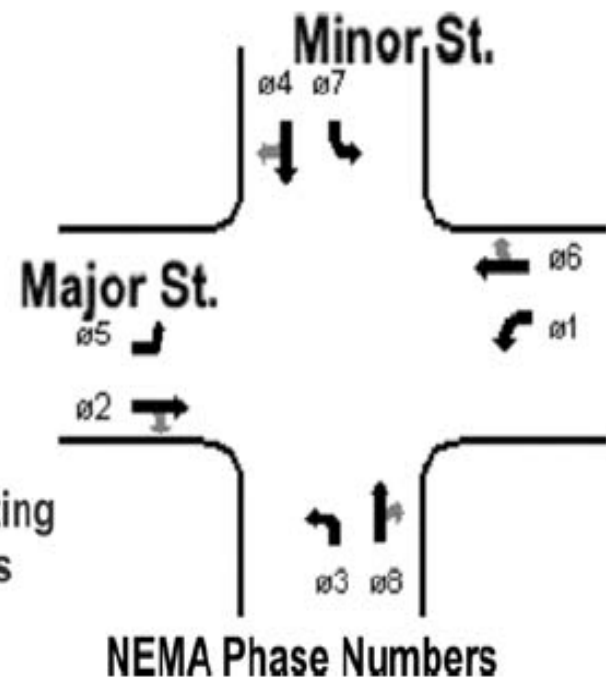
STD8 Ring Barrier
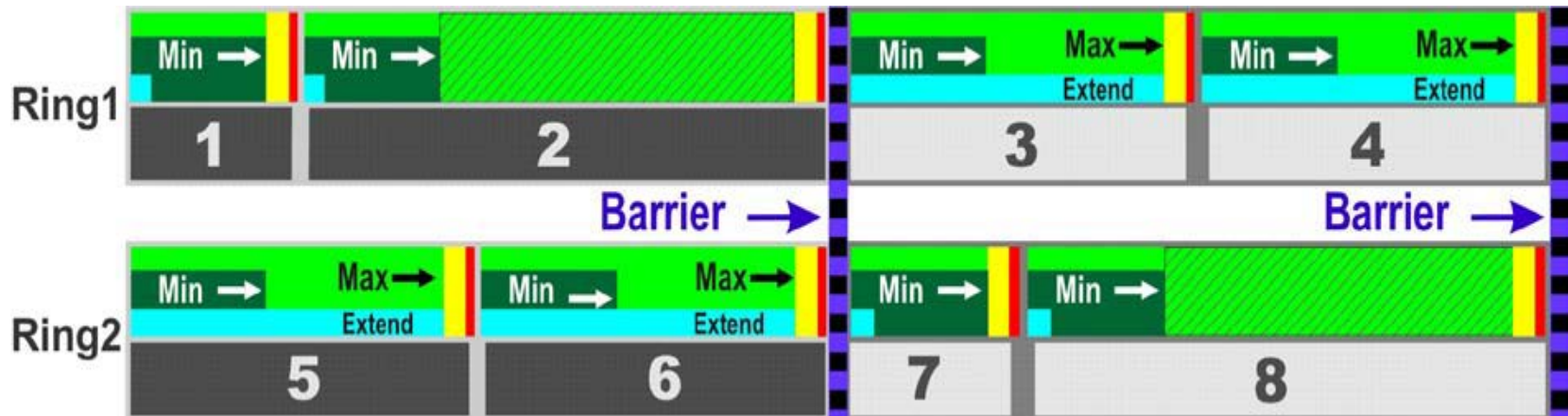
STD8 Operation - Min Recalls on Phases 1, 2, 7 and 8
Max Recalls on Phases 3, 4, 5 and 6

Controller Timing
MM 1→1→1

```
              Main Menu
  1.Controller  4.Scheduler  7.Status
  2.Coordinate  5.Detectors  8.Login,Utils
  3.Preempts    6.Comm       9.CLP Master
```

```
              Controller
  1.Phases       4.Flash        7.Enable Run
  2.Unit,Ring    5.Overlaps     8.TempAlrt,Lamp
  3.Chan,SDLC    6.Alarms       9.Light Rail
```

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

Phase Time (MM→1→1→1

Times	0	1	2	3	4	5	6	7	8	->
Min Grn	255	5	3	5	3	5	3	5		
Gap,Ext	25.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
Max 1	255	25	25	25	25	25	25	25		
Max 2	255	50	50	50	50	50	50	50		
Yel Clr	25.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Red Clr	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Walk	255	5	0	5	0	5	0	5		
Ped Clr	255	10	0	10	0	10	0	10		
Red Revt	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Add Init	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Max Init	255	0	0	0	0	0	0	0		
Gap Reduce										
Time B4	255	0	0	0	0	0	0	0		
Cars B4	255	0	0	0	0	0	0	0		
Time To	255	0	0	0	0	0	0	0		
ReducBy	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Min Gap	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
DyMaxLim	255	0	0	0	0	0	0	0		
Max Step	255	0	0	0	0	0	0	0		

Non-Density Phase Timing Functions

```
Times    Ø.1...2...3...4...5...6...7...8 ->
Min Grn  255   5   3   5   3   5   3   5
Gap,Ext 25.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0
Max 1    255  25  25  25  25  25  25  25
Max 2    255  50  50  50  50  50  50  50
Yel Clr 25.5 3.0 3.0 3.0 3.0 3.0 3.0 3.0
Red Clr 25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Walk     255   5   0   5   0   5   0   5
Ped Clr  255  10   0  10   0  10   0  10
Red Revt25.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

Non-Density Phase Timing Functions

- Non Density refers to Basic timing Functions

- Minimum Intervals are always guaranteed

- Min Green-Same as Initial Green
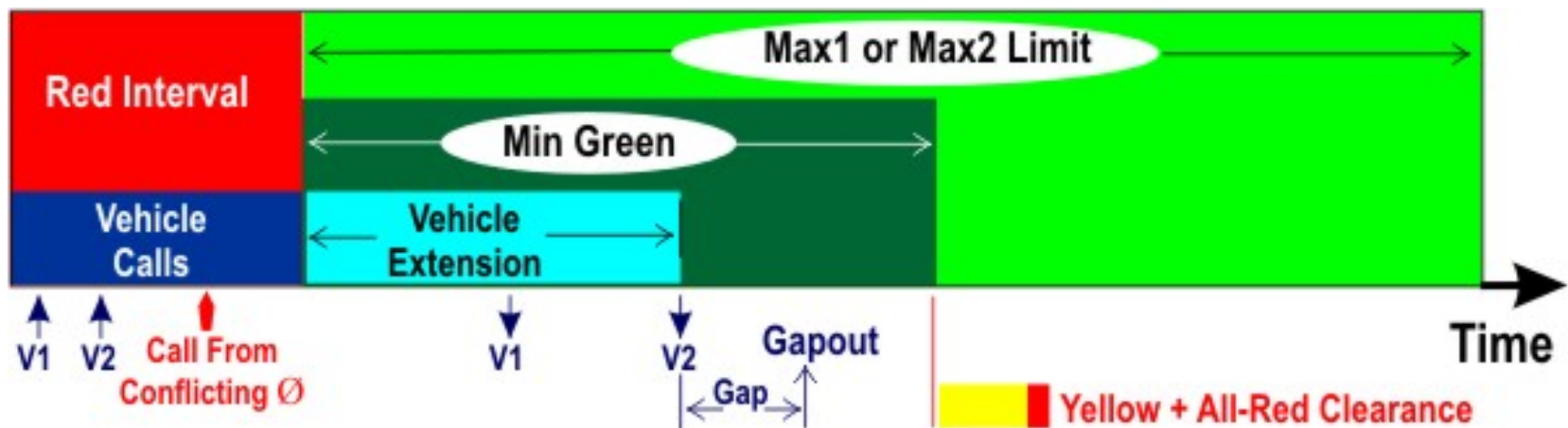
Non-Density Phase Timing Functions

- Gap Extension
    - Begins timing down when goes to the phase
    - Actuations for the phase reset this and force it to retime
    - Expires when reach Max or if phase is Forced off Max
    - Will rest in phase if there is no opposing call
    - Once Opposing call occurs will go to that next phase
- Max 1-Maximum Time to allow for phase
    - Max Timer will start upon first opposing call and will be reset if opposing call disappears
- Max 2- can change Max to this time on a time of day basis
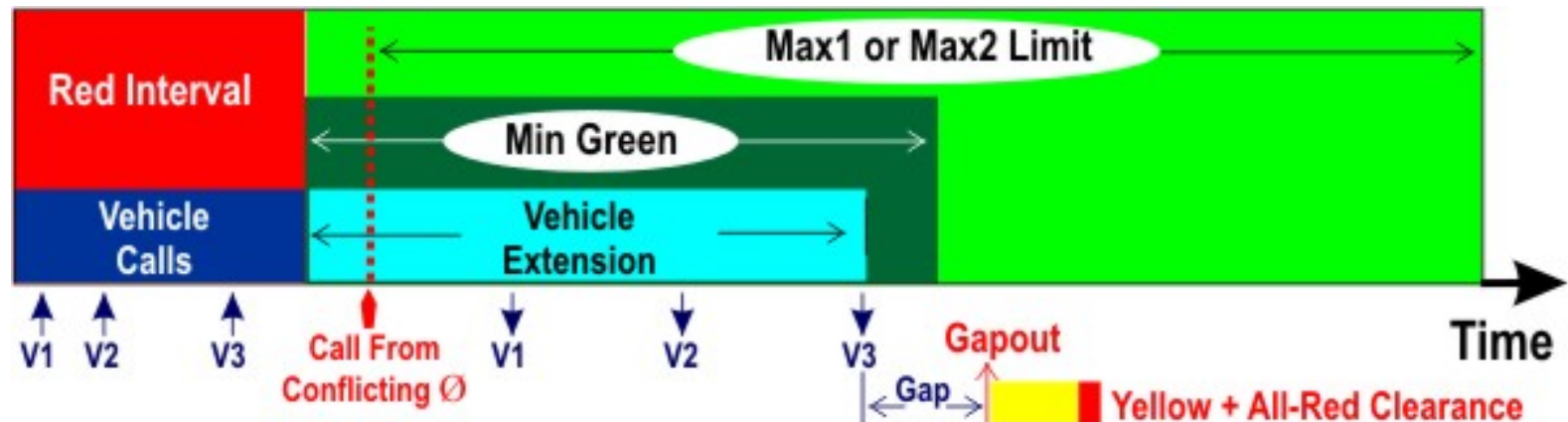
Non-Density Phase Timing Functions

○ Yel Clr- Yellow time

○ Red Clr- All red time

○ Like Min times clearance intervals are guaranteed

Pedestrian Timing

Walk- Walk Time

Ped Clr- Pedestrian Clearance

Min Green will extend to max extent of Ped Clearance Time

Non-Density Phase Timing Functions

- Red Revert

  - Red Revert Interval will follow Yellow Timer whenever the signal indication is returning to the phase just serviced.

  - This is the amount of time that the phase is required to be red before reservice.

Density Phase Timing Functions

Add Init	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Init	255	0	0	0	0	0	0	0
Gap Reduce								
Time B4	255	0	0	0	0	0	0	0
Cars B4	255	0	0	0	0	0	0	0
Time To	255	0	0	0	0	0	0	0
ReducBy	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DyMaxLim	255	0	0	0	0	0	0	0
Max Step	255	0	0	0	0	0	0	0

Density Phase Timing Functions

- These timers control traffic based on Traffic Actuations and are not guaranteed
- Variable Initial or Added Initial
  - Times concurrently with initial
  - Is increased by each vehicle counted during yellow/red
  - Must be set for each detector
  - Limit is set by Max Init
  - Initial time becomes the greater if Initial or Max Initial

Density Phase Timing Functions

- Variable Initial or Added Initial
  - Times concurrently with initial
  - Is increased by each vehicle counted during yellow/red
  - Must be set for each detector
  - Limit is set by Max Init
  - Initial time becomes the greater if Initial or Max Initial
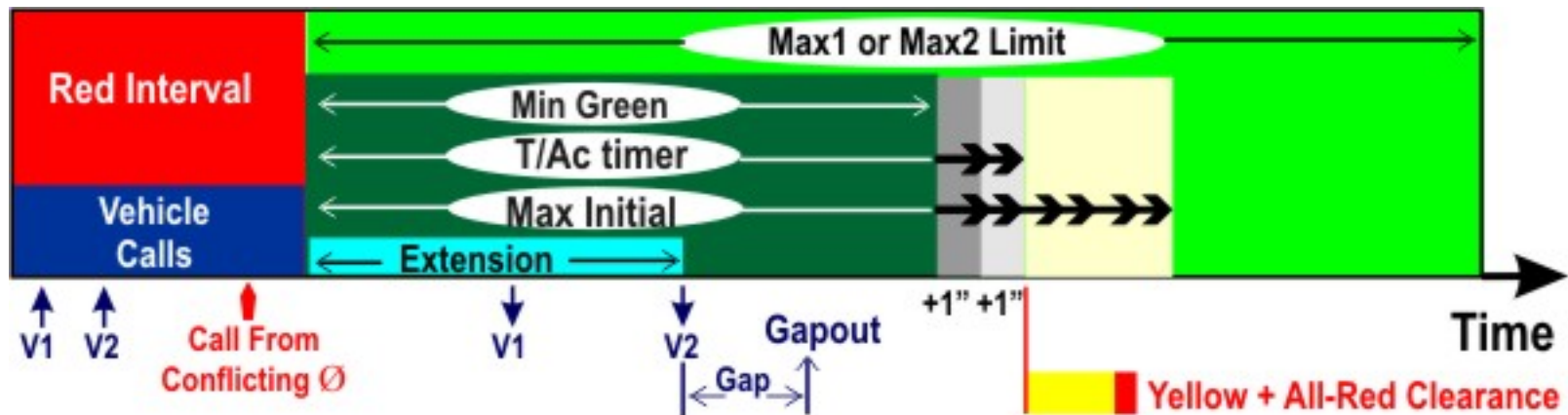
Density Phase Timing Functions

- For Gap reduction Programming
  - Time Before or Cars Before Reduction
    - Time that occurs or # of vehicles that are counted before reduction begins
    - Resets if opposing demand goes away

Density Phase Timing Functions

- Once Reduction begins
  - Max Gap (Gap,Ext) is reduced to Min Gap in "Reduce By" steps over the period programmed as "Time to Reduce"
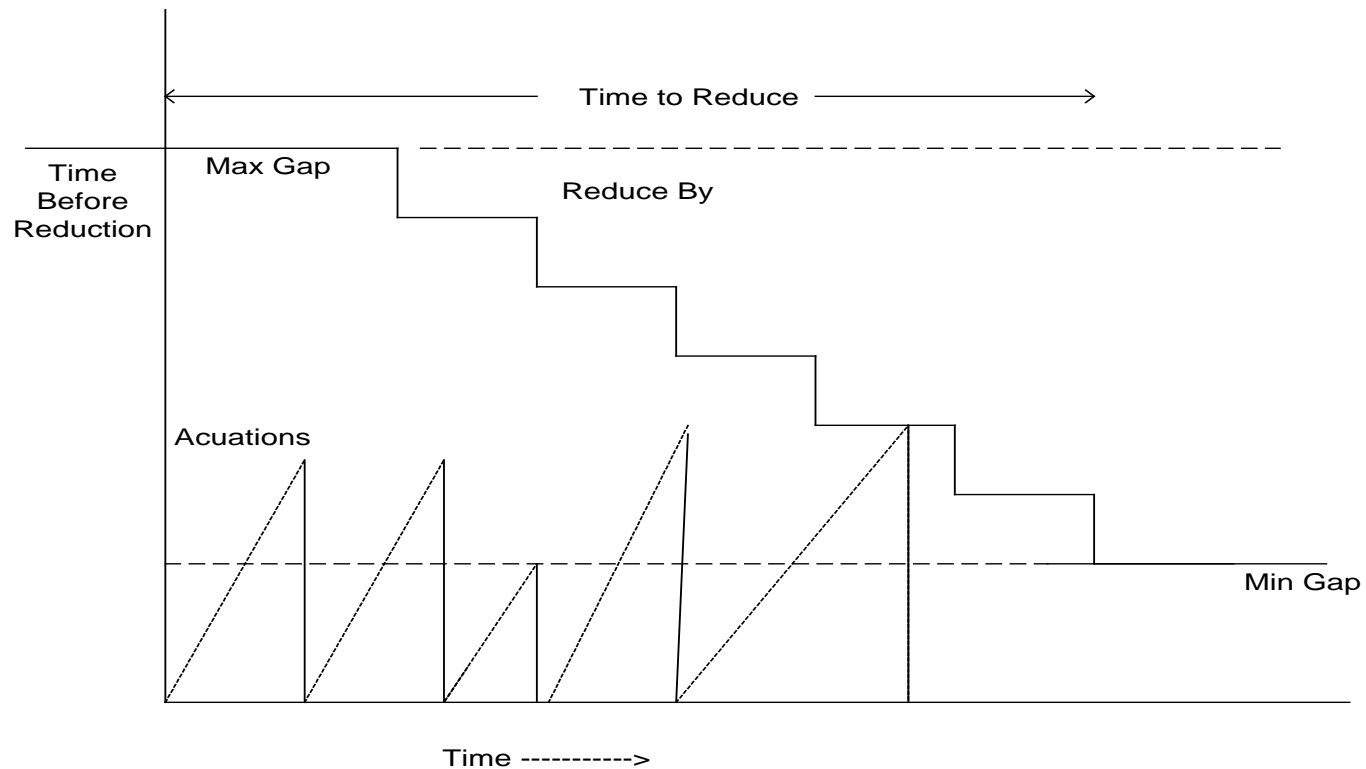
Density Phase Timing Functions

- **OR** Linear Reduction will occur if the user just programs "Time to Reduce"
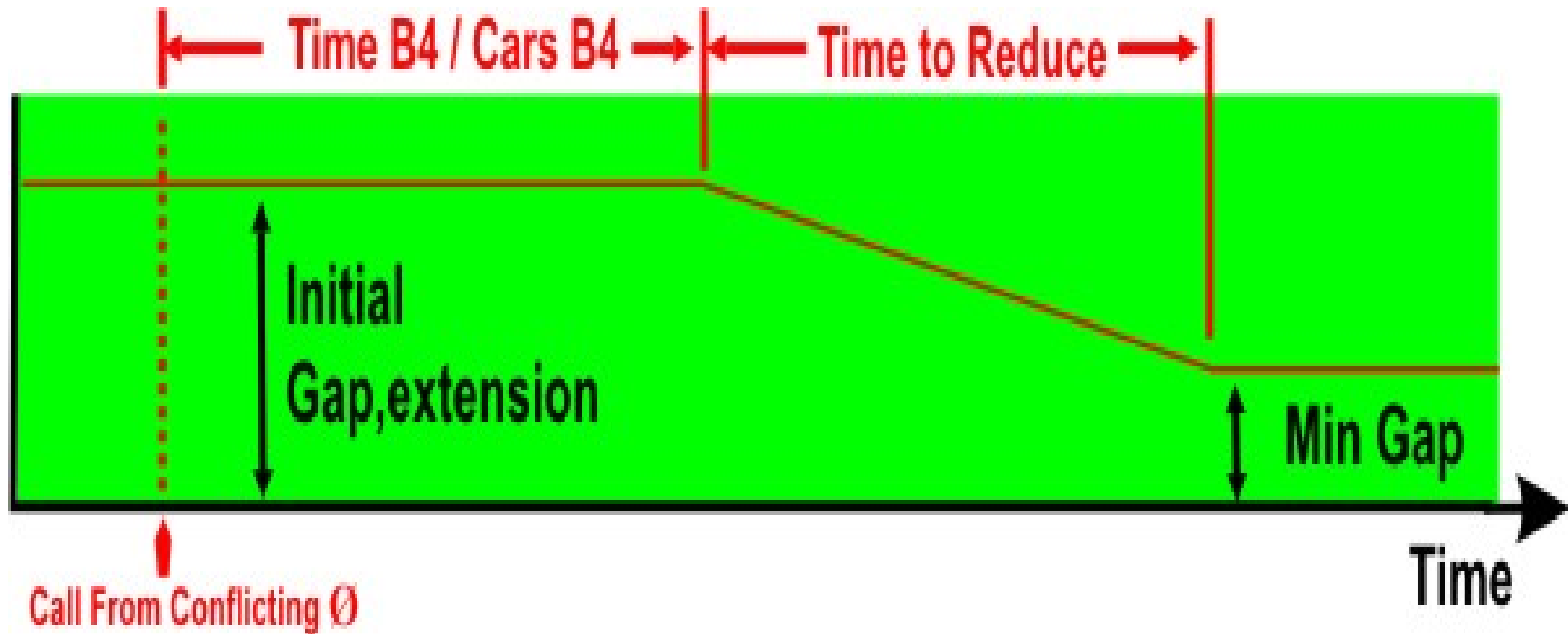
Density Phase Timing Functions

- PHASE DYNAMIC MAX LIMIT - Dynamic Max Limit determines either the upper or lower limit of the running max (0-255 sec) during dynamic max operation.

- Normal maximum (MAX1, MAX2) determines the other limit.

- If the dynamic max limit is larger than the normal maximum, it is then the upper limit, if it is smaller, it becomes the lower limit.

- Maximum recall or a failed detector that is assigned to the associated phase disables dynamic max operation for the phase.

Density Phase Timing Functions

- PHASE DYNAMIC MAX STEP - Dynamic Max Step determines the automatic adjustment to the max time (0-255 sec). When a phase maxes out twice in a row, (and for each successive max out afterwards) one dynamic step value is added to the running max. After two gap outs in a row, each subsequent successive gap out reduces the running max by one dynamic step.

Max 2 = Lower Limit = 35"
Dynamic Max Step = 3"

Dynamic Max Limit = Upper Limit = 48"

Max + 3"

Max = 35"

Max=35"

Max=38"

Max - 3"

Max=38"

Max=35"

Max-Out   Max-Out   Gap-Out   Gap-Out   Time

Phase Options
MM→1→1→2

```
              Main Menu
   1.Controller 4.Scheduler 7.Status
   2.Coordinate 5.Detectors 8.Login,Utils
   3.Preempts   6.Comm      9.CLP Master
```

```
                    Controller
   1.Phases      4.Flash      7.Enable Run
   2.Unit,Ring   5.Overlaps   8.TempAlrt,Lamp
   3.Chan,SDLC   6.Alarms     9.Light Rail
```

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

Options	0	1	2	3	4	5	6	7	8	->
Enable 0	X	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	.	.	.	.	.	.	.	.		
Enable Simul Gap	.	.	.	.	.	.	.	.		
Guarantd Passage	.	.	.	.	.	.	.	.		
Rest In Walk	.	.	.	.	.	.	.	.		
Condit'l Service	.	.	.	.	.	.	.	.		
Non-Actuated 1	.	.	.	.	.	.	.	.		
Non-Actuated 2	.	.	.	.	.	.	.	.		
Added Init Calc	S	S	S	S	S	S	S	S		

Phase Options

- Enable Ø-Vehicle Phases Permitted
- Min Recall- Vehicle Recall based on the Min time on each phase designated
- Max Recall- Vehicle Recall based on the Max time on each phase designated
- Ped Recall- Recall based on the Pedestrian Time (Walk + Don't Walk) on each phase designated

Phase Options

- Soft Recall-
  - Designated phase will be called if there is no demand on any other phase in the Controller
  - A soft recall will not start the MAX or GAP timers for phases currently Green and having demand
- Lock Calls-Phases that lock detector memory at beginning of Yellow

Phase Options

- Auto Flash Entry- When running time clock flash; the controller services the designated entry phases, clears to all red, then proceeds with flashing operation.

- Auto Flash Exit- When exiting time clock flash to resume normal Operation the controller proceeds to the beginning of phases designated as these exit phases.

- Dual Entry Ø- Will be run only when cross barrier and no other Ø in the same ring has a demand

Phase Options

- Enable Simultaneous Gap
  - Controller is not allowed to cross barrier unless Current GREEN phases in both rings GAP out or MAX out.
    - If not set, the controller is permitted to cross the barrier if one ring GAPS out and the other MAX's out
    - If set the passage timer will be reset on the phase with this feature enabled while it's concurrent phase is being extended.
    - This is a very important setting for the through movements during actuated operation. If *enable simultaneous gap* is not set for the main street phases, you can easily create a situation when one main street phase has gaped when the leading edge of a platoon of vehicles begins hitting the detector. The platoon cannot extend the phase because it has already gapped out and *enable simultaneous gap* is not set for this phase

Simultaneous Gap Example

- Assume that simultaneous gap is enabled for main street phase Ø2, but not for phase Ø6.
- If Ø2 gaps out while Ø6 is still being extended, the Ø2 *Passage* timer will reset if *enable simultaneous gap* is set and Ø2 receives a new call.
- However, if Ø6 gaps out while Ø2 is still being extended, the Ø6 *Passage* timer will NOT reset because *Enable Simultaneous Gap* is NOT set even if Ø6 receives a new vehicle call.

STD 8 Phase assignments

Implied Barrier Separating
Concurrent Phase Pairs
1-2 / 5-6 and 3-4 / 7-8

NEMA Phase Numbers
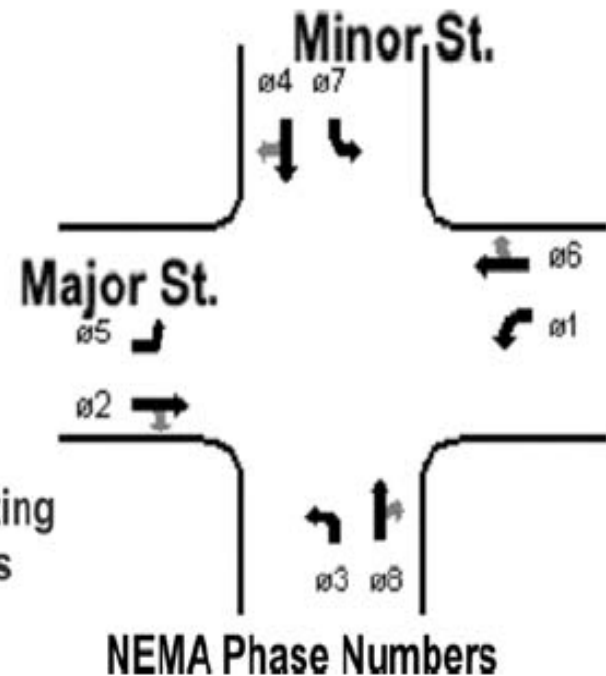
Phase Options

- Rest in Walk
- Phases declared as Rest in Walk will not time the Ped Clearance interval until an opposing call occurs
- Typically works with Artery Ped Recycle to allow pedestrians movement to run as long as possible in the artery movement

Phase Options + MM→1→1→3

- These are Naztec Specific Options that enhance controller operations
- NTCIP definitions are generic between manufacturers and our user base requested other operational parameters that we incorporated in our software

Options +

- Reservice Phase
  - Used with Conditional Service
  - Under conditional service
    - Once a phase ends and the controller goes back to a conditional service phase—it can't go back to the phase it left
  - If a phase is declared as a Reservice Phase it can be reserved after conditionally serving the lead phase

Options +

- Red Rest-Rest in red in absence of conflicting call
  - Forces phase to time out
  - *If Recall or Hold is set then there is No Red Rest*
- Max II- allows the declared Phases to run the Max II timer

Options +

- Ped Delay & Green Ped Delay -
  - Works together to delay the start of the green (Advanced Ped) or delay the Walk interval from timing
  - Ped Delay is the Phase
  - Green Ped Delay is the time to delay
- Included in Coordination Diagnostics to insure that split time is not compromised.

Options +

- Conflicting Ø
  - This Designated phase will not be allowed to run with the phase it conflicts with—must be used with concurrent phase in other ring
  - Example Program


```
Options+        Ø..1..2..3..4..5..6..7..8 ->

  Conflicting Ø   5  0  0  0  0  0  0  0
   Conflicting ø   0  0  0  0  0  0  0  0
Omit Yel, Yel ø   0  0  0  0  0  0  0  0
Ped Out/Ovrlp ø   0  0  0  0  0  0  0  0
StartYel,Next Ø   0  0  0  0  0  0  0  0
```


Ring 1: 1 2 3 4
Ring 2: 6 6 5 7 8

  - Phase 5 can't be run with Phase 1
- Useful in forcing left turns on same road to be served separately

Rings Sequences & Phase Concurrency

- Various menus control these features
- Naztec software supports 16 phases assigned to up to 4 rings.
- The Controller software uses the ring sequences and concurrency definitions to determine the order that phases are run.
- Various Phase modes may be selected

Unit parameters MM→1→2→1

- Choose Phase Mode as discussed on last slide


```
            UNIT PARAMETERS
StartUp Flash(s)     0   Red Revert      3.0
Backup Time(s)       0   Auto Ped Clr    OFF
Phase Mode        STD8   Diamond Mode     4Ø
Local 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 Prmpt  OFF   Invert RailIn   OFF
Feature Profile      0   Enable Run       ON
Display Time        30   Tone Disable     ON
TS2 Det Flts        ON   SDLC Retry Tm     0
Max Cycle Tm         0   CycFlt Actn   ALARM
Max Seek Trak        0   Max Seek Dwell    0
```

Unit parameters
MM➔1➔2➔1

- Choose Phase Mode as discussed on last slide

Ring Concurrency, Startup MM→1→1→4

- Must define what phases are concurrent
- Also can define how you want to start up the controller
  - Red-Phase will startup in Red interval
  - RedCl- startup in Red interval using Start Red Time parameter (MM→1→2→1), i.e. all phases will startup in red
  - Yellow- Phase will startup in yellow interval
  - Green-Phase will startup in green interval (no peds)
  - Walk- Phase will startup in green & walk intervals

STD 8 Phase assignments
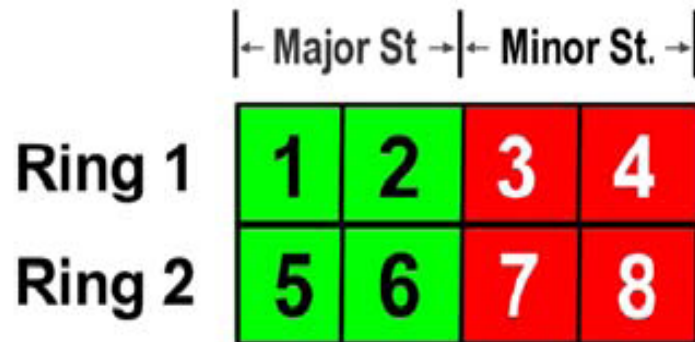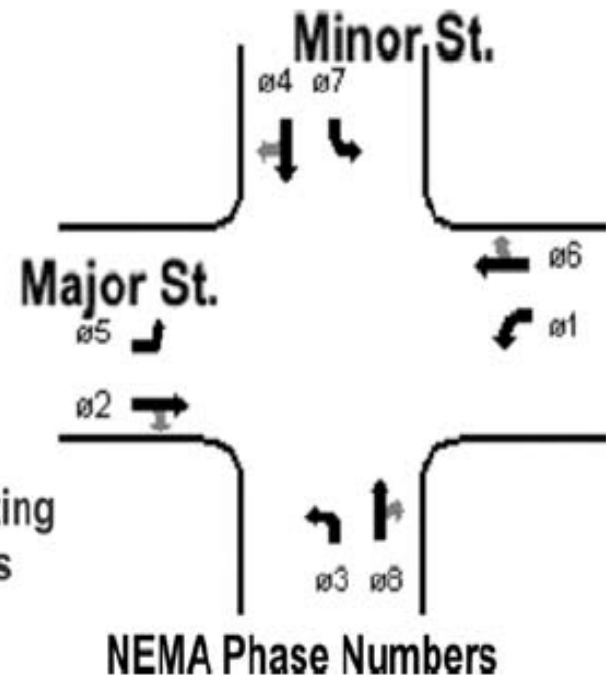
STD8 Ring Default Sequences
Every Lead/Lag Combination

Seq #	Phase Seq.			
1	1 2	5 6	3 7	4 8
2	1 2	6 5	3 7	4 8
3	2 1	5 6	3 7	4 8
4	2 1	6 5	3 7	4 8
5	1 2	5 6	3 8	4 7
6	1 2	6 5	3 8	4 7
7	2 1	5 6	3 8	4 7
8	2 1	6 5	3 8	4 7

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

User Mode Example

- Programming up to a 16 phase sequence
  - The software only allows for 8 phases per each ring.
  - Example: To get 12 Phases just continue to next ring

Overlap Programming

Main Menu

1. Controller 4. Scheduler 7. Status
2. Coordinate 5. Detectors 8. Login, Utils
3. Preempts   6. Comm   9. CLP Master

Controller

1. Phases   4. Flash   7. Enable Run
2. Unit, Ring 5. Overlaps   8. TempAlrt, Lamp
3. Chan, SDLC 6. Alarms   9. Light Rail

Overlaps

1. General Parms
2. Program
3. Status

Overlaps – MM→1→5

- Naztec Provides 16 fully programmable Overlaps that may be assigned to any load switch in the cabinet
- An overlap is a customized channel output driven by one or more included phases
- It is a way to allow a movement that wouldn't normally run to occur if there are no conflicts

Overlap Example # 1

Overlap 1 =

Ø4 + Ø5

Its Load Switch Output will turn green whenever the software is running Phases 4 or 5 and will stay green while transitioning from Phase 4 to 5.

Overlap Example # 2

OL 1 = 1+2

Ring 1: 1 2 3 4
Ring 2: 5 6 7 8

Consecutive Included Ø 1+ Ø 2 in the Same Ring

OL 1 = 1+6

Ring 1: 1 2 3 4
Ring 2: 5 6 7 8
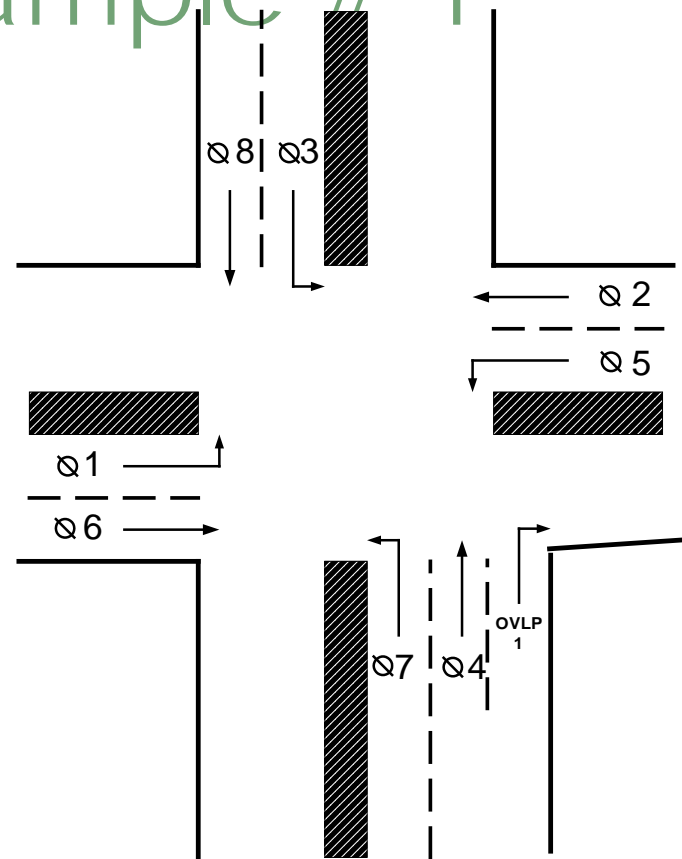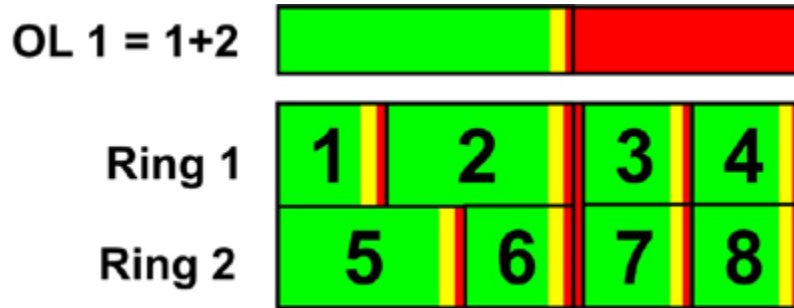
Non-consecutive Included Ø 1+6 in Separate Rings

Overlap Example # 3

- Overlaps may be defined with any number of phases in the same ring as shown below.

- This feature is useful in sequential phase operation (8SEQ or USER phase mode) to create signal displays that overlap any number of phases in the sequence.

OL 1 = 1+2+4+8+9+10

Ring 1: 1 2 3 4 7 8 9 10 11

When Included Phases Are Not Consecutive, the Overlap Will Time Multiple Clearances During the Sequence

Overlap Program Selection & Configuration

MM→1→5→2

```
              Overlap G
1.Program Parms
2.Confl Prog+
```

MM→1→5→2→#→1

```
Ovrlp G    Øs....................
Included Øs   0   0   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
```

- Included Phases
  - Max of 8 Phases (Parent Phases) can be assigned to the overlap
- Modifier Phases
  - Max of 8 phases can be assigned to alter the overlap operation
  - Based on Overlap Type

Overlap Program Selection & Configuration

- Overlap Green Extension
  - Extends the Overlap green also known as Trailing Green (0-255 sec)
    - Example is Double Clearance
  - Occurs once included phase terminates and control goes to a non included phase
- Overlap Yellow Clearance (0-25.5 sec) & Overlap Red Clearance
  - Must be programmed if Overlap Green Extension is programmed
  - Doesn't need to be programmed if program Parent Phase Clearance feature (MM→1→5→1) is set to "ON"

Normal

- The overlap is green when an included phase is green, or an included phase is timing yellow/red clearance and an included phase is next
- The overlap is yellow when an included phase is yellow and an included phase is not next
- The overlap is red when the overlap green and yellow are not on
- The overlap is dark (all outputs off) when a modifier phase is on during it's green, yellow or all-red interval
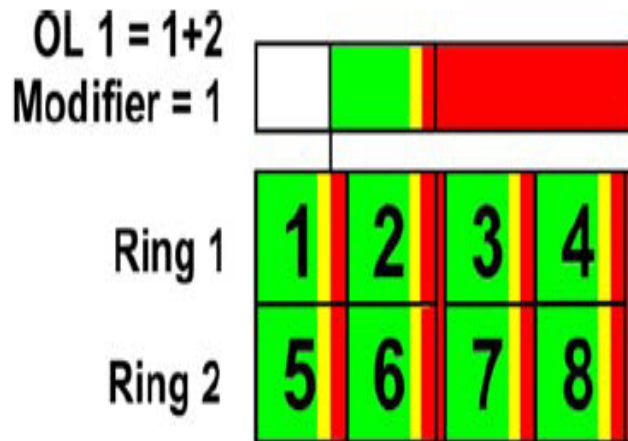
General Overlap Parameters MM→1→5→1

General Overlap Parameters
Lock Inhibit OFF   Program Card OFF
Confl Lock Enable OFF   Fast-Fl Rate OFF
Parent 0 Clrncs   ON

General Overlap Parameters

- Conflict Lock Enable is used with Lock Inhibit
- Conflict Lock Enable
  - On-Controller will suppress all conflicting phases (veh & peds) until overlap completes timing overlap Green extension and clearance intervals
  - Off- Conflicting phases (veh & peds) will proceed while the overlap is timing these intervals

General Overlap Parameters

- Parent Phase Clearance
  - On- Overlap clearances are timed using Parent Phase timings (MM→1→1→1)
  - Off- the green extension, yellow and all-red clearances for each overlap are used
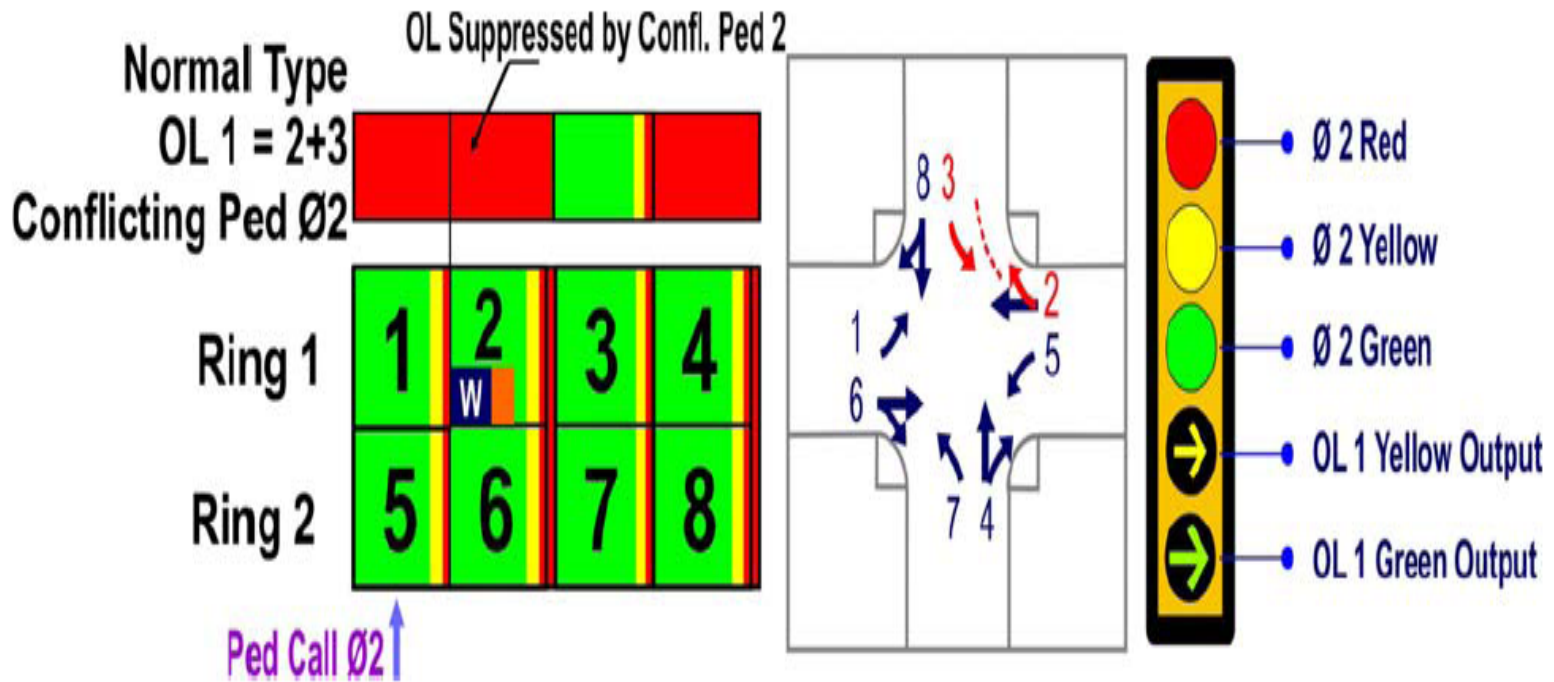
Overlap +

MM→1→5→2→

Enter overlap #

→2

```
   Ovrlp G       Øs.....................
Confl Øs        0  0  0  0  0  0  0  0
Confl Ovrlps    0  0  0  0  0  0  0  0
Confl Peds      0  0  0  0  0  0  0  0
Lead Grn   OFF Delay  0
```

Conflicting phases, pedestrian and overlaps terminate an overlap when the conflicting phase, pedestrian movement or overlap is next and continue to suppress the overlap while the conflicting phase, pedestrian movement or conflicting overlap is timing green and yellow clearance.

Conflict Ped Example

MM→1→5→3

Overlap Status Display

```
Overlap    .A1..B2..C3..D4..E5..F6..G7.H8 ->
 Interval  --- --- --- --- --- --- --- ---
 Time      0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Ø/Intvl    2/GRN   6/GRN   0/---   0/---
```

- Detector Programming
  - Use MM→5

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

Vehicle Parameters
MM→5→1

- Call Ø - Actuates during red
  - Actuates during green if Extend or Queue is set
- Switch Ø is extended when
  - Call Ø is Red or yellow and the switch Ø is green
  - Used for protected/permitted lefts to call & extend a protected left turn Ø after cross street is serviced

Det#	Call	Switch	Delay	Extend	Queue ->
1	1	0	0.0	0.0	0
2	64	16	25.5	25.5	255
3	3	0	0.0	0.0	0
4	4	0	12.0	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	12.0	0.0	0
. . . .					
64	1	0	0.0	0.0	0

Vehicle Parameters
MM→5→1

- Delay Ø- Delay time before actuation (during Red)
- Extend Ø- Extend actuation time during Green
- Queue Limit- Time that the detector is active during green-once this time expires the detector is ignored.

Det#	Call	Switch	Delay	Extend	Queue	->
1	1	0	0.0	0.0	0	
2	64	16	25.5	25.5	255	
3	3	0	0.0	0.0	0	
4	4	0	12.0	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	12.0	0.0	0	
. . . .						
64	1	0	0.0	0.0	0	

Vehicle Options
MM➔5➔2

- Each Detector can be programmed as a Calling, Extension, Queue, Added Initial, Red Lock, Yellow Lock Volume and Occupancy detector

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

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

Vehicle Option Notes

- Call Option- calls during Ø Red
- Extend- Resets extension timer during green interval & overrides Queue Option
- Queue – Extends assigned Ø until gap occurs or green is active longer than Queue Timer
- Added Initial- count during yellow & red

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

Pedestrian Parameters
MM→5→4

- Pedestrian Call Phase
- Pedestrian Detector Diagnostics
  - No Activity
  - Max Presence
  - Erratic Counts

Det#	Call	NoAct	MaxPres	ErrCnt
1	16	255	255	255
2	2	0	3	0
3	0	0	0	0
4	4	0	3	0
5	0	0	0	0
6	6	0	3	0
7	0	0	0	0
8	8	0	3	0

Detector Status Screens
MM→5→7

```
        DETECTOR STATUS
1.Veh Dets 1-32    4.Delay, Extend
2.Veh Dets 33-64   5.V/O Sample
3.Ped Dets         6.Speed Sample
```

```
    (1-16) Det # 1....... 9....... ->
Veh Call           -------- --------
Veh Alarm          -------- --------
```

```
            Det # 1......8
    Ped Call       --------
    Ped Alarm      --------
```

Channel Assignments
MM→1→3→1

- A channel is an output driver that switches 120V AC Power to a signal display
- Channel outputs Red, Yellow & Green via three different output pins
- Channel Types
  - Vehicle
  - Pedestrian
  - Overlap

Channel Assignments
MM→1→3→1

```
Chan...1...2...3...4...5...6...7..8→
P/Olp#      9    2   10   11   12    6   13   14
  Type     OLP  VEH  OLP  OLP  OLP  VEH  OLP  PED
 Flash     RED  YEL  RED  RED  RED  YEL  RED  DRK
Alt Hz      .    X    .    .    .    X    .    .
Dim Grn     .    X    .    .    .    X    .    .
Dim Yel     .    X    .    .    .    X    .    .
Dim Red     X    X    X    X    X    X    X    .
Dim Cyc ↓   +    -    +    +    +    -    +    +
```

```
<- Chan..9..10..11..12..13..14..15..16
Ø/Olp#    1    2    3    4    2    4    6    8
Type     OLP  OLP  OLP  OLP  PED  PED  PED  PED
Flash    RED  RED  RED  RED  RED  RED  RED  RED
Alt Hz    X    X    X    X    X    X    X    X
```

Time Base Scheduler MM→4

- Fully Compliant NTCIP Time of Day Scheduler
- Program the NTCIP Way via Advanced Scheduler Option or….
- Can program Naztec's way via Easy Scheduler
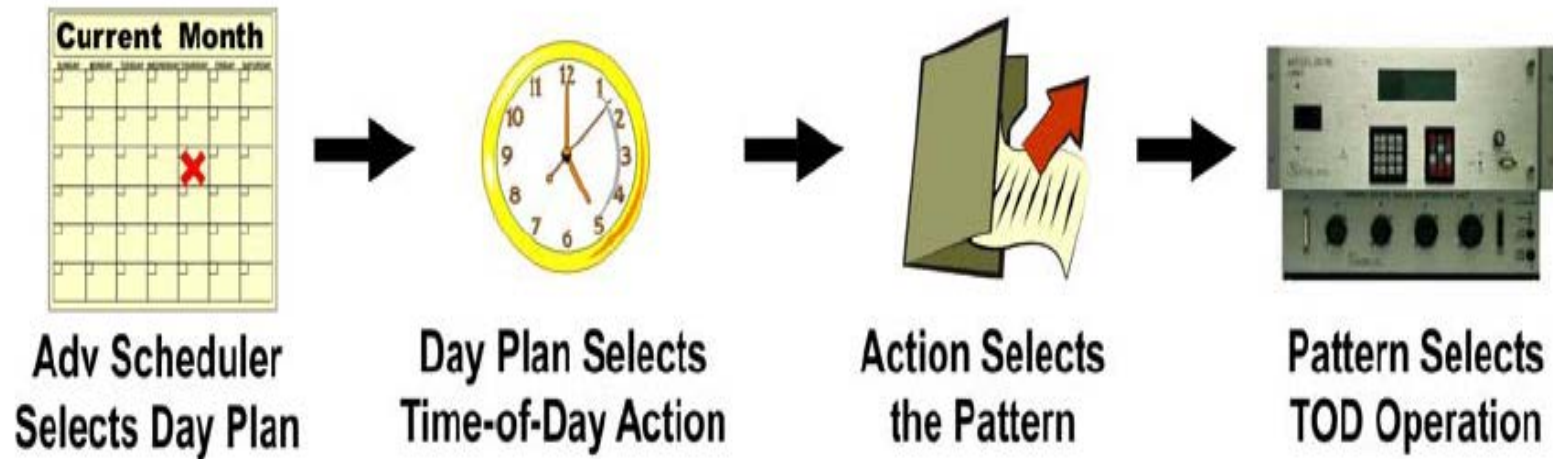- The Time of Day Database will always reside in Advanced Scheduler

```
          Time Based Scheduler
1.Set Date/Time   4.Day Plan        7.Status
2.Easy Schedule   5.Action Table    8.SplFeat
3.Adv Schedule    6.Parameters      9.More
```

Theory of Operation

- Each day the controller checks the Advanced *Scheduler* to determine the most applicable *Day Plan*.

- If the current day is not specified in the *Advanced Schedule*, the controller will run "free" in Pattern # 0.

- The controller checks the current *Day Plan* once per minute to retrieve the current time-of-day action.

- The controller then performs a lookup in the *Action Table* to determine the active *TBC Pattern*.

- The *TBC Pattern* determines the current time-of-day operation of the controller.

Theory of Operation

Adv Scheduler Selects Day Plan → Day Plan Selects Time-of-Day Action → Action Selects the Pattern → Pattern Selects TOD Operation

Advanced Scheduler

The Advanced Scheduler is an annual calendar used for the current year to select the Day Plan for the current day. Choose Day Plans from 1-32.

Advanced Scheduler

- Can select multiple entries for Day month & Date
  - For example you can choose one Day Plan for Sat & Sun each week by programming Day as S…..S
  - You can choose another Day Plan for Monday-Friday each week by programming Day as .MTWTF
- Can have duplicate entries for the same day—controllers chooses the more specific entry
  - Previous slide Entry says run Day Plan 1 every day of the year
  - If you program Day plan 2 for December 25, it will override the previous because it is more specific

Easy Scheduler

- Alternate way of programming the schedule
- Each entry applies to a consecutive range of days, months or days of months
- Range is automatically transferred Advanced Scheduler
- A DOM entry of "**-**" means that a more complex entry has been set up in the Advanced Scheduler

#	Day	Mo:From-Thru	DOM:From-Thru	Plan
1	ALL	01-12	01-31	1
2	OFF	00-00	00-00	1
3	OFF	00-00	00-00	1
4	OFF	00-00	00-00	1
5	OFF	00-00	00-00	1
6	OFF	00-00	00-00	1
7	OFF	00-00	00-00	1
. . . . .				
95	OFF	00-00	00-00	1

Day Plan Table

Plan-24	Evt	Time	Actn	Evt	Time	Actn
Link: 0	1	00:00	0	2	00:00	0
	3	00:00	0	4	00:00	0
	5	00:00	0	6	00:00	0
	7	00:00	0	8	00:00	0
	9	00:00	0	10	00:00	0
	11	00:00	0	12	00:00	0
	13	00:00	0	14	00:00	0
	15	00:00	0	16	00:00	0

- The *Scheduler* reads the active *Day Plan* for the current date once per minute to update the current *Action*.
- The *Action* drives the active *Pattern* and controls the state of the special function outputs from the *Action Table*.

Day Plan Table Parameters

- Time defines the time of day that the associated Action will become active
  - Program in military time
- Action (1-100) is the action number (see Action Table).
  - Action "0" is the do nothing action (**Not Free!**)
  - Good Practice to assign an event and *Action* at 00:00 (midnight) for every *Day Plan* called by the *Advanced Schedule.*
  - Insures that even if the controller date is changed and a new *Day Plan* is referenced that at least the first *Action* specified for 00:00 will be selected.

Action Table MM➔4➔5

- Controls Patterns and 24 special function outputs selected by the current day plan

```
Actn    Patrn   Aux-12345678    Spec-12345678 ->
   1       1        ........        .........
   2       2        ..... ...       ........ .
   3       3        ....... .       ........ ..
   4       0        ........        .........
   5       0        ..... . ..      ......... .
   6     254        .......         ........ .
   7     255        .......         ..........
. . . .
 100       0        ...... . .      ..........
```

Action Table

- Pattern is a TBC Pattern selected by the current Action #
  - Valid Patterns #'s 1-48, 254 is free, 255 Flash
- Aux-12345678- Controls the state of the auxiliary outputs when the action is active
- Spec-12….24 – Controls the Special Functions outputs when each action is active