County of Los Angeles
Advanced Transportation Management System

Operator's Manual

KITS

Kimley-Horn
Integrated Transportation System

Version: 1
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1 SYSTEM OVERVIEW

Kimley-Horn Integrated Transportation System (KITS®) is designed to allow its users to be productive in a very short time. This document is intended to describe the KITS user-interface. This manual has been revised to include the new functionality that will be part of the Los Angeles County (LACO) deployment. Video functionality is described, although it is not planned to be included in the County system at this time.

The predominant function of Los Angeles County's Advanced Transportation Management System is the efficient control of traffic signals. KITS allows your traffic operators and engineers to function efficiently through the use of advanced technology during the development, implementation, and selection of progressive timing plans for signals throughout the County. KITS includes a graphical user interface (GUI) that requires minimal training.

2   MAPS MENU

The Maps Menu permits an operator to open, save, create, or print new County-wide maps and intersection graphics displaying the current status of field components. Graphic elements are provided as layers on the map. Each layer can be made to appear at predefined zoom levels, allowing the operator to change the information displayed using zoom and pan functions.

In addition to displaying status information, many dynamic symbols on the map can be used to select system functions by either double-clicking or right-clicking on the symbol and selecting from a drop-down menu. In addition, the operator can exit the KITS application via the Maps Menu.

2.1   New Map (Maps | New)

Use the New Map selection to create a new map. KITS will display a blank map window where a new map can be created. See Map Windows for a full discussion of map window capabilities. New Map can also be selected by right-clicking on a currently open map window and selecting New from the pop-up menu.

2.1.1　Adding Layers

To add layers to a new map display, right-click inside the map area and select Add Layer. A list of available layer types is displayed. Available layers are listed in the following table:

Layer	Description	File Name
Static Layer	Background graphic elements including streets, landmarks, curb lines, and pavement markings. Aerials are added as static layers.	Various
Multi-Color Static Layer	A background Layer with multiple color symbols	
Static Label	Text labels	Various
Controller Status	Failure status of controllers including Online, Flash, Conflict, and Communication Failure.	Cab99.shp
Controller Operation/ Intersection Operation	Operational status of controllers including Online, Transition, Preempt, and Local Manual	Cab99.shp
Controller Phasing	Phase state of controller (green, yellow, or red)	*Name*Arrow.shp
Controller Pedestrian	Walk state of controller (walk, FDW, don't walk)	*Name*Walk.shp
Controller Overlaps	Overlap green state of controller (on or off)	*Name*Olap.shp
Controller Loops	Logical detector state per phase (on or off)	*Name*Loop.shp
Controller Push Buttons	Logical pedestrian push button state (on or off)	*Name*Button.shp
System Sync	Sync phase green state of controllers (on or off)	Cab99.shp
System Phasing	Phase green state of controllers (on or off)	Sphase.shp
System Detector Volume	Detector volume over/under threshold	Sysdet.shp
System Detector Occupancy	Detector occupancy over/under threshold	Sysdet.shp
System Detector Speed	Detector speed over/under threshold	Sysdet.shp
System Speed Traps	Speed trap speed over/under threshold	Speedtrap.shp
System Detector Status	Detector status	Sysdetectors.shp
Link Volume	Link volume over/under threshold	Link.shp
Link Occupancy	Link occupancy over/under threshold	Link.shp
Link Speed	Link speed over/under threshold	Link.shp
Maintenance of Traffic	Maintenance of traffic data	Construct.shp
Section Assignment	Highlights controller currently assigned to selected section	SecAssign.shp

Following the selection of a layer type, a list of available shape files is provided. Select the shape file corresponding to the layer type. An entry will be added to the legend located on the left side of the map display. Click on the check box next to the legend entry to display the newly added layer.

Continue to add layers until the map is complete. Note that static layers should be added before dynamic layers to prevent static layers from hiding dynamic information.

2.2　Open Map　(Maps | Open)

Use the Open Map selection to open a map. KITS will display the Open File Dialog Box prompting you to select a previously defined map. Once selected, the map will be displayed in the map window. See Map Windows for a full discussion of map window capabilities. Multiple maps can be opened at one time. Open Map can also be selected by right-clicking on a currently open map window and selecting Open from the pop-up menu.

2.3　Save Map　(Maps | Save)

Use the Save Map selection to save a currently open map to the disk. If the map has previously been named, the map will be saved under the same name to the same location. KITS will display the Save As

Dialog Box prompting you for the map name and storage location. Save Map can also be selected by right-clicking on a currently open map window and selecting Save from the pop-up menu.

2.4   Save Map As (Maps | Save As)

Use the Save Map As selection to save a currently open map to a specified location using a specified name. If the map does not have a name, KITS will display the Save As Dialog Box prompting you for the map name and storage location. Save Map As can also be selected by right-clicking on a currently open map window and selecting Save As from the pop-up menu.

2.5   Exit (Maps | Exit)

Use Exit to close the KITS application

3   DATABASE MENU

The Database Menu consists of four submenus: System, Controller, Scheduling, Traffic Responsive, and Turning Movement Counts. Each submenu provides the user with the capability to create, edit, delete, or save data to the central Oracle database.

3.1   System Database Menu

The System Database Menu allows an operator to create, edit, delete, or save traffic system components. These components include the following:

- Intersections

- Detectors

- Links

- Communication Lines

In addition to individual traffic components, groupings of components are defined in the system database. These groupings include the following:

- Sections

- Regions

- Areas

- Arterials

Finally, the operator has the capability of defining incident plans, and various system-wide parameters.

3.1.1   System Parameters (Database | System | Parameters)

Use the *System Parameters* form to specify the system-wide traffic responsive parameters and database parameters.

Traffic Responsive Parameters are used to fine-tune the Traffic Responsive process.

- **Detector Failure Threshold** defines the maximum number of detectors as a percentage of all detectors (between 1 and 100 percent) in a section that can be failed before traffic responsive operation is aborted and the scheduled plan is implemented.
  - ◆   Default = 50 percent

- **Detector Recover Threshold** defines the maximum number of detectors as a percentage of all detectors (between 1 and 100 percent) in a section that can be failed before traffic responsive operation is resumed.
  - ◆   Default = 40 percent

- **Occupancy Weighting Factors** sets the weight (between 0 and 500) that the detector real-time occupancy is given in traffic responsive calculations. The higher the number, the greater the weight of the occupancy.
  - ♦ Default = 50

Database Parameters are used to customize the historical database write and clean intervals.

- **Detector Summary Period** sets the historical database detector write interval (between 5 and 60 minutes).
  - ♦ Default = 15 minutes

  - ♦ **Cleaning Interval** sets the number of days (between 7 and 120) that historical data is preserved. This data includes link, detector, event log, error log, and controller communication statistics

Vehicle setting is used to specify general vehicle information.

- **Average Vehicle Length** sets the length of the average vehicle (between 10 and 30 feet) for speed calculations. Speed is calculated using the following formula:

S = D/T

Where:
S = Speed (MPH)
D = Total distance traveled, which is the sum of average vehicle length and loop length multiplied by 1 minute volume converted to miles
T = Total time occupied, which for a one minute sample period is 60 seconds multiplied by the fractional occupancy converted to hours.

- Increasing average vehicle length will have the effect of increasing calculated vehicle speeds.
  - ♦ Default = 17 feet

Turning Movement Count Analysis compares the latest two turning movement counts for an intersection

- The Turning Movement Count Analysis Threshold will be used when running an analysis. Any intersection approach which has increased or decreased by this threshold or greater, will be shown in the analysis.

3.1.2   Intersections (Database | System | Intersections | List)

Intersection	Line	Drop	Controller Type	State
ADAM-JEFF		3	BI233TLH	Enabled
ADAM-JENN		1	BI233TLH	Enabled
ADAM-MAGN		8	LACO4E	Enabled
ADAM-ORG		4	LACO4E	Enabled
ADAM-PRUS		7	LACO4E	Enabled
ADAM-TENN	ch 11	9	BI233TLH	Enabled
ALAB-OBAN		7	BI233TLH	Enabled
ALEN-MNRO		4	BI233TLH	Enabled
APKW-RICH		13	BI233TLH	Enabled
APKW-SUTR		2	BI233TLH	Enabled
AVIA-ROSE	ch 11	3	LACO4E	Enabled

Agency: LA County TMC

Search Key:

Intersection
- New
- Edit
- Delete

- Close

Use the *Intersection List* form to delete an intersection or view all currently defined intersections in the system. To filter the list by street name, enter up to the first 4 characters of the street(s) you are looking for in the search key. The list will automatically update based on each character input and display intersection names where either cross street matches the search key input.

Intersection displays the cross streets for each intersection.

Line shows the line each intersection is assigned to.

Drop indicates the drop address each intersection is using.

Controller Type shows what type of traffic controller each intersection has installed.

State indicates whether each intersection has polling enabled or disabled.

- **Agency** allows the list to be filtered for a particular agency.

3.1.2.1   Defining Intersections
To define a new intersection, click New. KITS displays the *Intersection Definition* form in which you can enter a new intersection.

3.1.2.2   Editing Intersections
To edit an existing intersection, highlight the intersection and click Edit, or double-click on the intersection name. KITS displays the *Intersection Definition* form in which you can view and edit the intersection data.

3.1.2.3   Deleting Intersections
To delete an existing intersection, highlight the intersection and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete an intersection that has been removed. Be sure the intersection information is no longer needed prior to removal.

3.1.3 Intersection Definition (Database | System | Intersections | List | New/Edit)

Use the *Intersection Definition* form to input a new intersection or view, edit, or print existing intersection data. Each intersection definition must include the information contained in the following sections: Intersection Definition (except section assignment), Type HW/SW Inputs, and Addresses.

Intersection Definition specifies the basic information for this intersection.

- **Street 1** is the full name of the first cross street in the intersection (up to 20 characters).

- **Street 2** is the full name of the second cross street in the intersection (up to 20 characters).

- **Short Name** is the abbreviated cross street's name used to identify intersections throughout KITS. Each street is specified by up to 4 characters.

- **Asset No.** is used to assign an internal identification number to the intersection (between 0 and 32,767).

- **ID** is the read-only identification number automatically assigned to the current intersection by KITS.

- **Preemption Device** indicates there is a preemption device located at this intersection when checked.
  - ♦ Default = unchecked

- **Agency** allows the list to be filtered for a particular agency.

- **Section** allows the user to assign the intersection to a pre-defined section contained in the drop-down list.

Type HW/SW inputs specify the controller hardware and software used at the intersection.

- **Controller Type** describes the traffic controller used at the intersection. Choose from the pre-defined types in the drop-down list.
  - ♦ Default = BI233TLH

- **Cabinet Type** describes the type of cabinet located at the intersection. Choose from the pre-defined types in the drop-down list.
  - ♦ Default = 552

Polling Parameters allows the user to specify intersection polling parameters.

- **Failure Threshold** indicates how many consecutive times the intersection is polled before it is considered failed. Choose from the pre-defined types in the drop-down list or enter a value (between 1 and 30 or "Infinite").
  - ♦ Default = 3

- **Retries** indicate the number of attempts to poll the intersection after it has failed. Choose from the pre-defined types in the drop-down list or enter a value (between 1 and 30 or "Infinite").
  - ♦ Default = 1

- **Polling State** allows you to enable or disable communication polling at the intersection.
  - ♦ Default = disabled

3.1.3.1 Phases
Allows the user to select the direction of travel for each traffic phase (up to 8 phases). Choose no assignment (blank) or select from the 12 pre-defined directions of travel provided in the drop-down list:

3.1.3.2

Direction	Description
NBR	Northbound right
NBT	Northbound through
NBL	Northbound left
SBR	Southbound right
SBT	Southbound through
SBL	Southbound left
EBR	Eastbound right
EBT	Eastbound through
EBL	Eastbound left
WBR	Westbound right
WBT	Westbound through
WBL	Westbound left

Two phases cannot be assigned to the same direction of travel.

Addresses specify the remote connection parameters such as drop, line, and phone number for the intersection. Both the line and phone number can be assigned, however only one can be enabled at a

time. For example, selecting the line button will automatically disable the phone number button and vice versa.

- **Drop Address** assigns the unique communication drop number (between 1 and 32) of the intersection. All intersections on a given line must have a unique drop address.

- **Line** allows the user to specify which communication line the intersection is connected to. Selecting the line button will indicate that the intersection will be using a line for remote connections.

- **Phone Number** is used for modem connections to the intersection. Selecting the phone number button will indicate that the intersection will be using dial-up remote connections.

Overlaps allows the user to specify a text description (up to 6 characters) associated with each overlap, A through H.

Pedestrians allows the user to assign the street (up to 6 characters) associated with each pedestrian phase 2, 4, 6, and 8.

3.1.3.3   Changing Intersections
To view or edit another intersection definition, choose Change, Next, or Previous. KITS will display the *Selection Dialog* form to change intersections, or display the next or previous intersection in the system alphabetically.

➲ You cannot change intersections while defining a new intersection. You must save the new intersection definition before the Change, Next, and Previous buttons will be available.

3.1.4 Intersection Polling States (Database | System | Intersections | Polling States)

Intersection	Polling State
4TH-OBAN	Enabled
4TH-PXNG	Disabled
6TH-TVIL	Enabled
7TH-TVIL	Enabled
ADAM-BLOX	Enabled
ADAM-COLL	Enabled
ADAM-GAIN	Enabled
ADAM-JEFF	Enabled
ADAM-JENN	Enabled
ADAM-MAGN	Enabled
ADAM-ORG	Enabled
ADAM-PRUS	Enabled
ADAM-TENN	Enabled
ALAB-OBAN	Enabled

Use the *Intersection Polling States* form to view or edit the polling state of any intersection in the system. To filter the list by street name, enter up to the first 4 characters of the street(s) you are looking for in the search key. The list will automatically update based on each character input and display intersection names where either cross street matches the search key input.

Intersection displays the cross streets for each intersection.

Polling State indicates whether each intersection has communication polling enabled or disabled. To change the polling state for an intersection, highlight the intersection's row and choose Enabled or Disabled from the drop-down list.

3.1.5   Region Definitions (Database | System | Regions)

Region Definitions

Region Name	
EAST	Delete
SOUTHEAST	
SOUTH	
SOUTHWEST	Save
WEST	
CBD	Close
ALL DAY	
Shop	Help
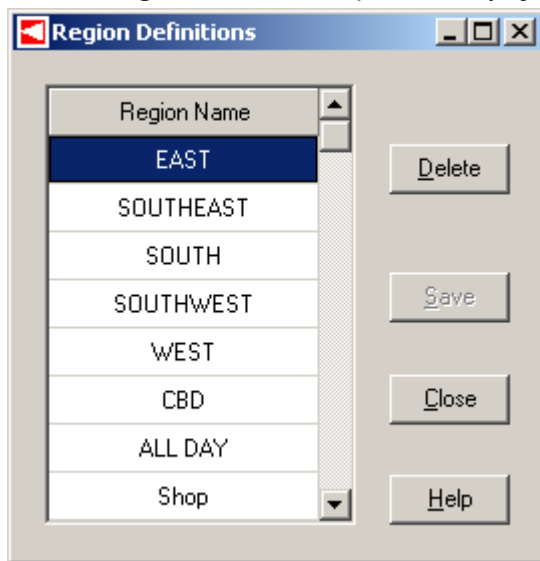
Use the *Region Definitions* form to define, edit, or delete a region. Regions are used to allow groupings of sections for time-of-day period assignments. For a region to have meaning, it must contain sections and have time-of-day period assignments.

3.1.5.1   **Defining Regions**
To define a new region, highlight the next available entry in the table and enter the region name (up to 20 characters).

3.1.5.2   **Editing Regions**
To edit an existing region, highlight the region name and enter changes.

3.1.5.3   **Deleting Regions**
To delete an existing region, highlight the region you wish to delete and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a region that has been removed. Be sure the region is no longer needed prior to removal.

3.1.6 Sections (Database | System | Sections)

Use the *Section List* form to delete a section or view all currently defined sections in the system. Sections are used to define a grouping of intersections for scheduling purposes.

Short Name displays the abbreviated name for each section.

Long Name shows the descriptive name for each section.

Region indicates which region each section is assigned to.

TRSP Improvement Factor shows the minimum improvement percentage (between 1 and 100) between the current timing plan and the optimal traffic responsive selected timing plan. This improvement factor must be met prior to implementing a new plan.

Agency allows the list to be filtered for a particular agency.

3.1.6.1   Defining Sections
To define a new section, click New. KITS displays the *Section Definition* form in which you can enter a new section.

3.1.6.2   Editing Sections
To edit an existing section, highlight the section and click Edit, or double-click on the section name. KITS displays the *Section Definition* form in which you can view and edit the section data.

3.1.6.3   Deleting Sections
To delete an existing section, highlight the section and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a section that has been removed. Be sure the section information is no longer needed prior to removal.

3.1.7   Section Definition   (Database | System | Sections | New/Edit)

Use the *Section Definition* form to input a new section or view/edit existing section data.

- **Short Name** is the abbreviated section name (up to 8 characters) used to identify sections throughout KITS.

- **Section ID** is the read-only identification number assigned to the current section by KITS.

- **Long Name** is the descriptive section name (up to 30 characters).

- **Region** allows the user to assign the section to a pre-defined region from the drop-down list.

- **Agency** allows the list to be filtered for a particular agency.

- **Scheduling Failure Threshold** defines the percentage (between 1 and 100) of non-responding intersections that will cause a section's scheduled plan to be overridden by standby.
    - ◆ Default = 30 percent

- **Scheduling Recovery Threshold** defines the percentage (between 1 and 100) of non-responding intersections that will cause a section's scheduled plan to stop being overridden by standby.
  - ◆ Default = 25 percent

3.1.7.1 Adding Intersections to a Section

To add an intersection, highlight the intersection name in the Intersection List box and click Add, or double-click on the intersection name in the Intersection List box. The intersection will be transferred to the Added Intersection box while remaining in the Intersection List box. Alternatively, holding down the Control key while selecting from the list can highlight multiple intersections. Click Add and the selected intersections will be added.

To filter the Intersection List, enter up to the first 4 characters of the intersections you are looking for in the search key. The list will automatically update based on each character input, and display intersection names where either cross street matches the search key input.

3.1.7.2 Removing Intersections from a Section

To remove an intersection, highlight the intersection name in the Added Intersection box and click Remove, or double-click on the intersection name in the Added Intersection box. The intersection will be removed from the Added Intersection box. Alternatively, holding down the Control key while selecting from the list can highlight multiple intersections. Click Remove and the selected intersections will be removed.

3.1.7.3 Viewing and Editing Time-of-Day Intersection Assignments

To view or edit the time-of-day intersection assignments, highlight an intersection in the Added Intersection box and click TOD Assignments. KITS displays the *Intersection Reassignment* form (shown below) from which you can view and edit the intersection's time-of-day section assignments.

3.1.8   Areas   (Database | System | Areas)
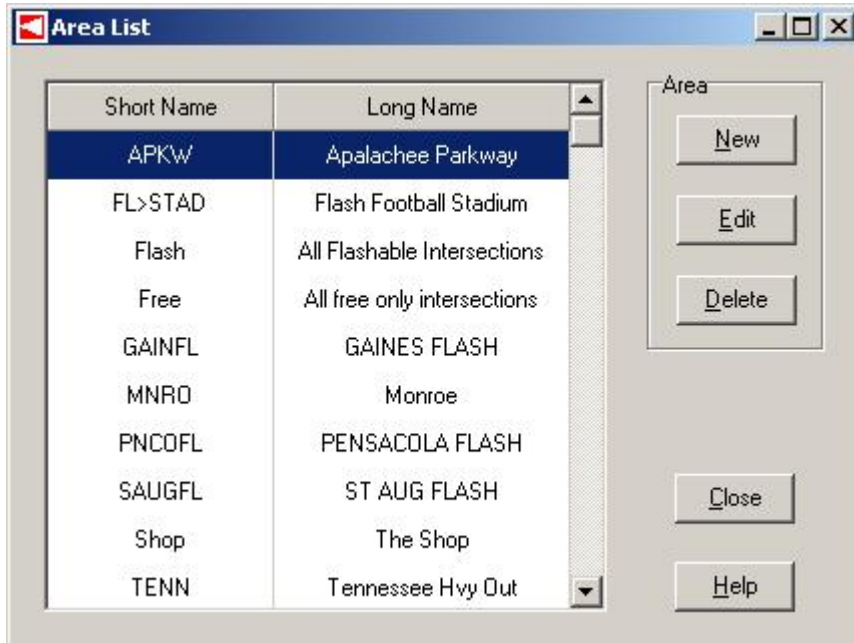
Use the *Area List* form to delete an area or view all currently defined areas in the system. Areas are used to define a collection of intersections for issuing manual commands.

Short Name displays the abbreviated name for each area.

Long Name shows the descriptive name for each area.

3.1.8.1   Defining Areas
To define a new area, click New. KITS displays the *Area Definition* form in which you can enter a new area.

3.1.8.2   Editing Areas
To edit an existing area, highlight the area and click Edit, or double-click on the area name. KITS displays the *Area Definition* form in which you can view and edit the area data.

3.1.8.3   Deleting Areas
To delete an existing area, highlight the area and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete an area that has been removed. Be sure the area information to be deleted is no longer needed prior to removal.

3.1.9 Area Definition (Database | System | Areas | New/Edit)

Use the *Area Definition* form to input a new area or view/edit existing area data.

- **Short Name** is the abbreviated area name (up to 8 characters) used to identify areas throughout KITS.

- **Area ID** is the read-only identification number assigned to the current area by KITS.

- **Long Name** is the descriptive area name (up to 30 characters).

3.1.9.1 Adding Intersections to an Area
To add an intersection, highlight the intersection name in the Intersection List box and click Add, or double-click on the intersection name in the Intersection List box. The intersection will be transferred to the Added Intersection box while remaining in the Intersection List box.

To filter the Intersection List, enter up to the first 4 characters of the intersections you are looking for in the search key. The list will automatically update based on each character input and display intersection names where either cross street matches the search key input.

3.1.9.2 Removing Intersections from an Area
To remove an intersection, highlight the intersection name in the Added Intersection box and click Remove, or double-click on the intersection name in the Added Intersection box. The intersection will be removed from the Added Intersection box.

3.1.10 Lines (Database | System | Lines)

Line Name	Connect	Baud Rate	Parity
Chan 01	Direct	9600	Even
Chan 02	Direct	9600	Even
Chan 03	Direct	9600	Even
Chan 04	Direct	9600	Even
Chan 05	Direct	9600	Even
Chan 06	Direct	9600	Even
Chan 07	Direct	9600	Even
Chan 08	Direct	9600	Even
Chan 09	Direct	9600	Even
Chan 10	Direct	9600	Even

Line: New, Edit, Delete, Close, Help
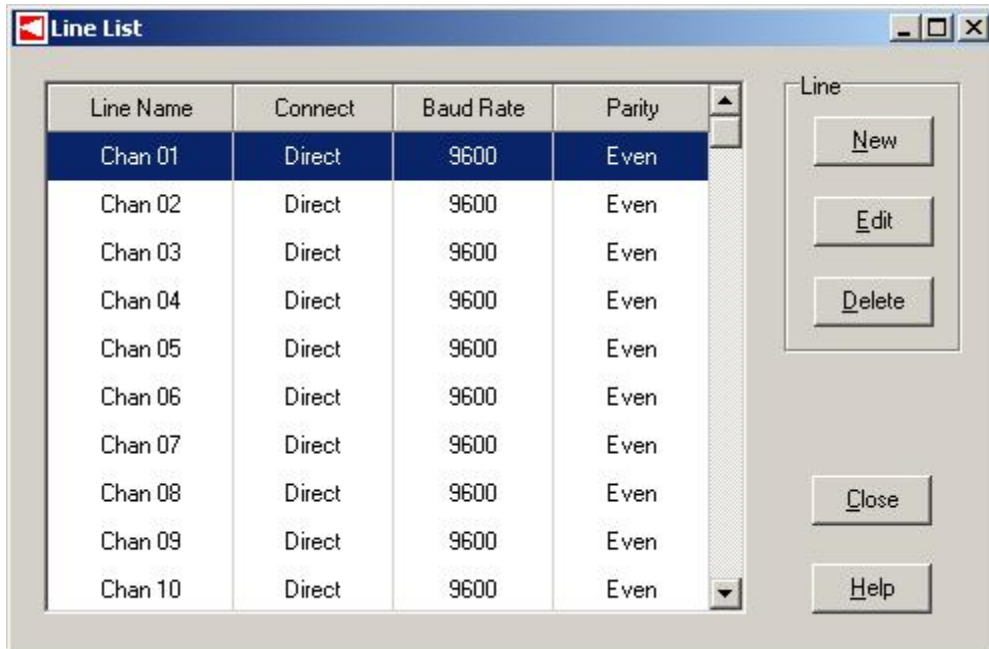
Use the *Line List* form to delete a line or view all currently defined lines in the system. Lines are used to define a communication channel out to the field.

Line Name displays the name for each line in the system.

Connect indicates the type of remote connection.

Baud Rate shows the data transfer rate in bps.

Parity displays the byte parity used during data transfers.

3.1.10.1 Defining Lines
To define a new line, click New. KITS displays the Line Definition form in which you can enter a new line.

3.1.10.2 Editing Lines
To edit an existing line, highlight the line and click Edit, or double-click on the line name. KITS displays the Line Definition form in which you can view and edit the line data.

3.1.10.3 Deleting Lines
To delete an existing line, highlight the line and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a line that has been removed. Be sure the line information is no longer needed prior to removal.

3.1.11 Line Definition <u>(D</u>atabase | <u>S</u>ystem | <u>L</u>ines | <u>N</u>ew/<u>E</u>dit)

```
┌──────────────────────────────────────────────────────────┐
│ ◤ Edit Line Definition                        _ □ ✕      │
│                                                           │
│                                          ┌─Line──────┐    │
│  Name:  [Chan 01          ]  Line ID:  1 │           │    │
│                                          │  Change   │    │
│  ┌─Connection────────────────────┐       │           │    │
│  │    ○ Dial Up    ⦿ Direct       │       │   Next    │    │
│  └────────────────────────────────┘       │           │    │
│                                          │  Previous │    │
│  ┌─Setup─────────────────────────────┐   │           │    │
│  │                                    │   │           │    │
│  │  Port Address: [1    ▼]  Parity  [Even ▼] │ Save  │    │
│  │                                    │   │           │    │
│  │  Line Type  [Tone  ▼]  Stop Bits [1   ▼] │         │    │
│  │                                    │   │  Close    │    │
│  │  Baud Rate  [9600  ▼]  Data Bits [8   ▼] │         │    │
│  │                                    │   │   Help    │    │
│  └────────────────────────────────────┘   └───────────┘    │
└──────────────────────────────────────────────────────────┘
```

Use the *Line Definition* form to input a new line or view/edit existing line data.

- **Name** is used to identify the line throughout KITS (up to 8 characters).
- **Line ID** is the read-only identification number assigned to the current line by KITS.
- **Connection** allows the user to specify the type of connection the current line will use (dial-up or direct).
  - ♦ Default = direct

Setup specifies the line settings used during data transfers.

- **Port Address** allows the user to assign the unique port for this line by selecting a port number from the drop-down list. A port cannot be assigned to more than one line at a time. Port addresses are sequential starting with 21.

- **Line Type** specifies whether the connection uses tone or pulse inputs.
  - ♦ Default = tone

- **Baud Rate** defines the connection rate in bits per second (baud). Supported transfer rates are 2400, 4800, and 9600 baud.
  - ♦ Default = 9600 baud

- **Parity** is the byte parity (even, odd, or none) used by the modem for error checking during data transfers. When using dial-up communication, the parity will be none.
  - ♦ Default = even

- **Stop Bits** are the number of bits (0, 1, or 2) used to indicate the end of a character by the modem.
  - ♦ Default = 1 bit

- **Data Bits** are the number of data bits (6, 7, or 8) per byte the modem expects during data transfers.
  - ♦ Default = 8 bits

3.1.11.1 Changing Lines
To view or edit another line definition, choose Change, Next, or Previous. KITS will display the *Selection Dialog* form to change lines, or display the next or previous line in the system alphabetically.

➲ You cannot change lines while defining a new line. You must save the new line definition before the Change, Next, and Previous buttons will be available.

3.1.12 Detectors (Database | System | Detectors)

Use the *Detector List* form to delete a detector or view all currently defined detectors for a selected section, intersection, or the system. To filter the detector list by their intersection assignments, enter up to the first four characters of the intersection in the search key. The list will automatically update based on each character input, and display intersection names where either cross street matches the search key input. Up to 24 system, count, and local detectors can be assigned to a single intersection. Up to four speed trap detectors can be assigned to a single intersection.

Intersection displays the intersection that each detector is currently assigned to.

Detector shows the name of each detector.

Type specifies the kind of detector (system, count, local, or speed trap).

Incident Station indicates if each detector is designated as an incident station.

3.1.12.1 Defining Detectors
To define a new detector, click New. KITS displays the *Detector Definition* form in which you can enter a new detector.

3.1.12.2 Editing Detectors
To edit an existing detector, highlight the detector and click Edit, or double-click on the detector name. KITS displays the *Detector Definition* form in which you can view and edit the detector data.

3.1.13 Deleting Detectors

To delete an existing detector, highlight the detector and click Delete. KITS will confirm the deletion prior to removing it.

➱ You cannot undelete a detector that has been removed. Be sure the detector information is no longer needed prior to removal.

3.1.13.1 Detector Definition (Database | System | Detectors | New/Edit)

Use the *Detector Definition* form to input a new detector or view/edit existing detector data.

Detector Definition inputs specify basic information for this detector.

- **Name** is the identifier used for this detector throughout KITS (up to 8 characters). The name must be unique among detectors assigned to the same intersection.

- **Detector ID** is the read-only identification number assigned to the current intersection by KITS.

- **Smoothing Factor %** sets smoothing percentage (between 1 and 100) for volume, occupancy, and speed, which weigh the new summary period data versus the old smoothed historical data, in calculating the new smoothed historical data. Increasing the smoothing factor favors the new summary data over the existing smoothed historical data.
    - ♦ Default = 50 percent

- **Associated Intersection** specifies the pre-defined intersection where the detector is located. To filter the list of intersections, enter up to the first 4 characters of the intersection you are looking for into the search key. The drop-down list will automatically update based on each character input, and display intersection names where either cross street matches the search key input.

Detector Type allows the user to define the kind of detector (system, count, local, or speed trap).
    - ♦ Default = system

Detector Info specifies more detailed information about a detector based on its type. Only system detectors that are contained in a link may be designated as an incident station. System, count, and local detectors must be assigned a number between 1 and 24, but speed trap detectors must be assigned a number between 1 and 4. Loop length is specified for system, count, and local detectors, while separation distance is specified for speed trap detectors. For example, selecting system detector type will enable the incident station checkbox and loop length input while disabling the separation distance input.

- **Incident Station** indicates whether the current system detector is designated as an incident station. When incident station is checked, the incident station settings button will be available to access the *Incident Stations* form.

- **Detector Number** allows the user to assign a slot number to the detector. Slots 1 through 24 are available for system, local, and count detectors, and slots 1 through 4 are available for speed trap detectors.

⮕ Detector numbers cannot be repeated among detectors assigned to the same intersection.

- **Loop Length** specifies the length of the detector loop (between 1 and 100) in feet for system, count, and local detectors.
    - ♦ Default = 6.0 feet

- **Separation Distance** specifies the distance between speed trap detectors (between 1 and 100) in feet.
    - ♦ Default = 6.0 feet

3.1.13.2 Changing Detectors
To view or edit another detector definition, choose Next or Previous. KITS will display the next or previous detector in the system alphabetically.

⮕ You cannot change detectors while defining a new detector. You must save the new detector definition before the Next and Previous buttons will be available.

3.1.13.3 Incident Stations (Database | System | Detectors | New/Edit | Incident Station Settings)

Incident Station Settings for EB_THRP:Mlk->Mnro

Detector Name	Incident Active Thresholds			Incident Recovery Thresholds		
	Min Volume [v/h]	Max Occupancy	Min Speed	Min Volume [v/h]	Max Occupancy	Min Speed
MLK-THRP: EBL1	100	30.0	30	120	25.0	35

Incident Response

Plan Definitions

Save

Close

Help

Assigned Response Plans
Accident 1
Accident2

Delete Response Plan

Viewing Options
Camera 1: OCAL - TENN
Preset 1: North
Camera 2: OCAL - PNCO
Preset 2: East

Coordinates
Longitude: -1
Latitude: -1

Use the *Incident Stations* form to view, edit, or delete incident station detectors within a given link. This form is used to specify the active incident and recovery thresholds for volume, occupancy, and speed, the assigned response plan(s), viewing options, and incident coordinates.

Incident Active Thresholds specify the thresholds that indicate an incident has occurred.

Incident Recovery Thresholds specify the thresholds that indicate an incident has been resolved.

- **Minimum Volume** is the minimum traffic volume (between 1 and 2000) to trigger an incident (active) or indicate a resolved incident (recovery). Recovery volume must be greater than or equal to the specified incident volume.

- **Maximum Occupancy** is the maximum vehicle occupancy (between 1 and 100) to trigger an incident (active) or indicate a resolved incident (recovery). Recovery occupancy must be less than or equal to the specified incident occupancy.

- **Minimum Speed** is the minimum traffic speed (between 1 and 100) to trigger an incident (active) or indicate a resolved incident (recovery). Recovery speed must be greater than or equal to the specified incident speed.

3.1.14 Coordinates

Identify the latitude and longitude of the link. To get the coordinates for a link, click Get Coordinates. KITS will obtain the latitude and longitude of the given link.

3.1.15   Editing Incident Stations

To designate a detector as an incident station, set values for at least one of the three active and recovery incident thresholds. For example, an incident station can be defined by minimum active and recovery volumes, maximum active and recovery occupancies, and/or minimum active and recovery speeds. If an active incident threshold is set, then the corresponding recovery threshold must also be set.

3.1.16   Deleting Incident Stations

To remove an incident station, clear all of the active incident and recovery fields for the specified detector.

3.1.17   Viewing and Editing Incident Response Plans

To view or edit the incident response plans, click Plan Definitions. KITS will display the *Incident Plan List* form in which you can view and edit the current incident response plans.

3.1.18   Editing Assigned Response Plans

To edit an assigned incident response plan, double-click on the plan you wish to change and select the new plan from the drop-down list provided.

3.1.19   Deleting Assigned Response Plans

To delete an assigned incident response plan, highlight the plan you wish to remove and click Delete Response Plan. KITS will confirm the deletion prior to removing it.

3.1.20   Links (Database | System | Links)

Link Name	Upstream Intersection	Downstream Intersection	No. Linked Detectors	Scaling Factor	Distance	Default Speed
NB_MNRO:Alen->Shar	ALEN-MNRO	MNRO-SHAR	2	100%	1745	45
NB_MNRO:Jknx->Alen	JKNX-MNRO	ALEN-MNRO	2	100%	1210	35
SB_MNRO:Alen->Jknx	ALEN-MNRO	JKNX-MNRO	2	100%	1210	35
SB_MNRO:Shar->Alen	MNRO-SHAR	ALEN-MNRO	2	100%	1745	45

Use the *Links List* form to delete a link or view all currently defined links for a selected intersection. Links are used to connect intersections so that links can be connected to form arterials.

- **Link Name** displays the name of each link.

- **Upstream Intersection** shows the first intersection defining the link.

- **Downstream Intersection** shows the last intersection defining the link.

- **No. Linked Detectors** indicates how many detectors are contained in the link.

- **Scaling Factor** is the percentage of total volume that is counted for each detector. This value is used to compensate for lane changes, which can result in an over-count.
  - ♦ Default = 100

- **Distance** is the distance between the two intersections comprising the link.

- **Speed** is the posted speed between the two intersections comprising the link.

3.1.20.1   Defining Links
To define a new link, click New. KITS displays the *Link Definition* form in which you can enter a new link.

3.1.20.2   Editing Links
To edit an existing link, highlight the link and click Edit, or double-click on the link name. KITS displays the *Link Definition* form in which you can view and edit the link data.

3.1.20.3   Deleting Links
To delete an existing link, highlight the link and click Delete. KITS will confirm the deletion prior to removing it.

⮕ You cannot undelete a link that has been removed. Be sure the link information is no longer needed prior to removal.

3.1.21 Link Definition (Database | System | Links | New/Edit)

Use the *Link Definition* form to input a new link or view/edit existing link data for a selected intersection.

- **Link Name** is used to identify the link throughout KITS (up to 20 characters).

- **Distance** is the total length (between 1 and 32,767 feet) of the link.
  - ◆ Default = 1000 feet

- **Scaling Factor** sets the percentage of total volume (between 0 and 100 percent) that is counted for each detector in the link.
  - ◆ Default = 100 percent

- **Default Speed** specifies the default travel speed (between 1 and 100 mph) over the link.

3.1.21.1 Additional Speeds (Database | System | Links | New/Edit | Additional Speeds)

When the user selects the Additional Speed button on the *Edit Link Definition*, KITS will display the *Additional Speeds* form. This form allows the user to enter different travel speeds (between 1 and 100 mph) for each timing plan for a link. This is reflected in the time-space diagram.

3.1.21.2 Connecting Intersections

The connecting intersections define the link. To select the upstream intersection, click Select next to the Upstream Intersection edit box. KITS displays the *Selection Dialog* form that allows you to search for and select a previously defined intersection. If the intersection selected is not the same as the downstream intersection, it will be set as the upstream intersection.

To select the downstream intersection, click Select next to the downstream intersection edit box. KITS displays the *Selection Dialog* form that allows you to search for and select a previously defined intersection. If the intersection selected is not the same as the upstream intersection, it will be set as the downstream intersection.

➲ The intersection that this link is associated with must be either the upstream or downstream intersection. Two links cannot contain the same set of upstream and downstream intersections.

3.1.21.3 Adding Detectors to a Link

To add a detector, highlight the detector name in the All Detectors box and click Add, or double-click on the detector name in the All Detectors box. The detector will be transferred to the Linked Detectors box while remaining in the All Detectors box.

3.1.21.4 Removing Detectors from a Link
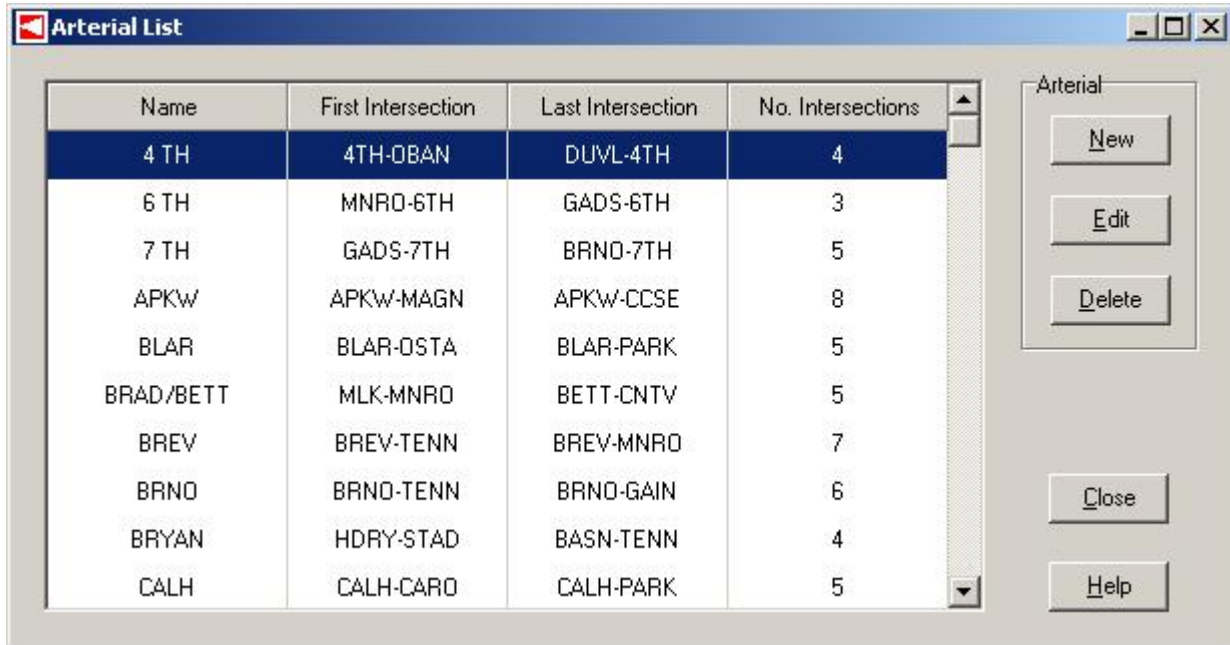
To remove a detector, highlight the detector name in the Linked Detectors box and click Remove, or double-click on the detector name in the Linked Detectors box. The detector will be removed from the Linked Detectors box.

3.1.21.5 Editing Incident Station Detectors

To edit the incident station detectors for the given link, click Incident Stations when detectors are contained in the link. KITS will display the *Incident Stations* form.

3.1.22   Arterials (Database | System | Arterials)

Use the *Arterial List* form to delete an arterial or view all currently defined arterials in the system. Arterials are used to develop time-space diagrams.

Name displays the name of each arterial.

First Intersection shows the first intersection defining the arterial.

Last Intersection shows the last intersection defining the arterial.

No. Intersections indicates how many intersections are contained in the arterial.

3.1.22.1   Defining Arterials
To define a new arterial, click New. KITS displays the *Arterial Definition* form in which you can enter a new arterial.

3.1.22.2   Editing Arterials
To edit an existing arterial, highlight the arterial and click Edit, or double-click on the arterial name. KITS displays the *Arterial Definition* form in which you can view and edit the arterial data.

3.1.22.3   Deleting Arterials
To delete an existing arterial, highlight the arterial and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete an arterial that has been removed. Be sure the arterial information is no longer needed prior to removal.

3.1.23 Arterial Definition (Database | System | Arterials | New/Edit)

Use the *Arterial Definition* form to input a new arterial or view/edit existing arterial data.

- **Name** is used to identify the arterial throughout KITS (up to 20 characters).

- **Arterial ID** is the read-only identification number assigned to the current arterial by KITS.

3.1.23.1 Adding Intersections to an Arterial

To add an intersection, select an intersection from the drop-down list. For each link, the drop-down list will display intersections linked to the previous intersection. To filter the list by street name, enter up to the first 4 characters of the street(s) you are looking for in the search key. The drop-down list will display intersection names where either cross street matches the search key input. The link number specifies the order of the links in the arterial.

Intersections cannot be repeated within an arterial, and intersections must be linked for the arterial to be valid. Arterials must consist of at least 3 links.

3.1.23.2 Removing Intersections from an Arterial

To remove an intersection, highlight the intersection name and click Delete. The intersection will be removed from the arterial, and any intersections following the deleted intersection will be moved up. However, if the deletion creates invalid links, the invalid links will be removed.

3.1.23.3 Editing an Intersection in the Arterial

To edit an intersection, highlight the intersection name and click Edit. KITS displays the *Intersection Definition* form that allows you to edit intersection data.

3.1.24 Setting the Direction of Travel for the Upstream and Downstream Phases

To specify an intersection's upstream and downstream direction of travel, highlight the intersection name, and select from the directions of travel provided in the upstream and downstream phases drop-down list.

The drop-down list will display only the defined directions of travel for each selected intersection. To define additional directions of travel, edit the selected intersection. Valid directions of travel are as follows:

3.1.24.1 **Direction** **Description**

Direction	Description
NBR	Northbound right
NBT	Northbound through
NBL	Northbound left
SBR	Southbound right
SBT	Southbound through
SBL	Southbound left
EBR	Eastbound right
EBT	Eastbound through
EBL	Eastbound left
WBR	Westbound right
WBT	Westbound through
WBL	Westbound left

3.1.24.2 **Viewing and Editing Link Assignments**

To view or edit the link assignments, click Links List. KITS displays the *Links List* form in which you can select a link to view and edit. However, if the link editing creates invalid links, the invalid links will be removed.

3.1.25 Incident Response Plans (Database | System | Incident Plans)
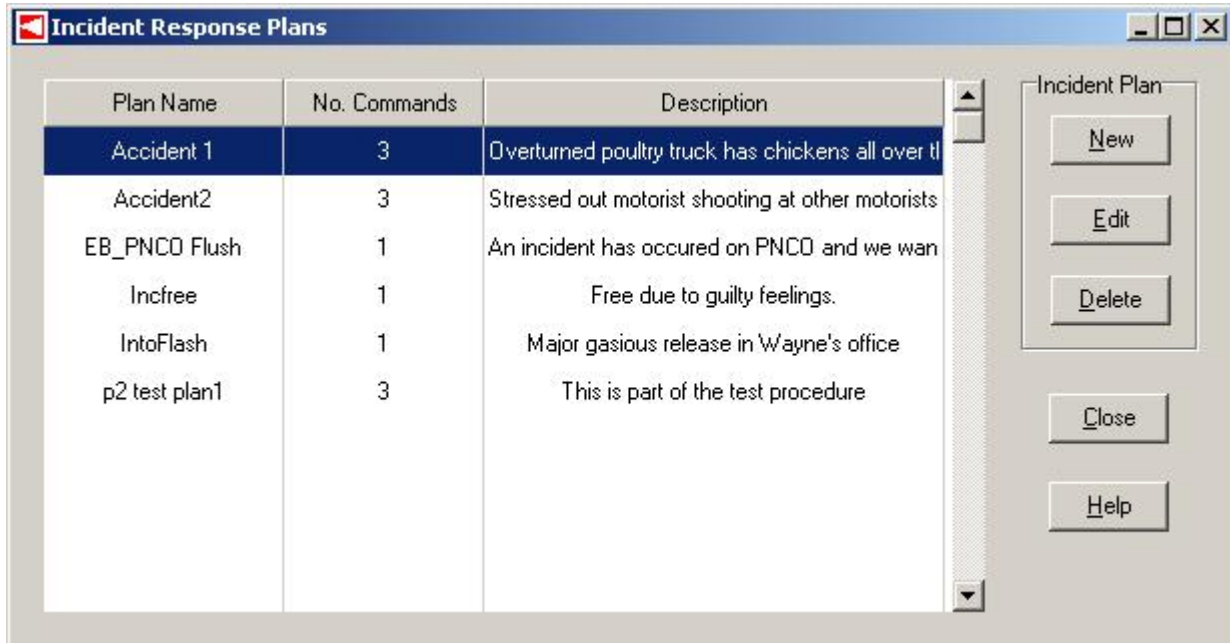
Use the *Incident Plan List* form to delete an incident plan or view all currently defined plans. Incident response plans provide a series of pre-selected manual commands used to manage incidents.

➲ The Incident Plan List menu item will only be available if the local workstation is designated as an incident management station and the current user has sufficient privileges to access the form.

Plan Name displays the name of each response plan.

No. Commands indicates the number of manual commands specified in the response plan.

Description provides more information about the response plan.

3.1.25.1 Defining Response Plans
To define a new response plan, click New. KITS displays the *Incident Response Plan Definition* form in which you can enter a new response plan.

3.1.25.2 Editing Response Plans
To edit an existing response plan, highlight the plan and click Edit, or double-click on the plan name. KITS displays the *Incident Response Plan Definition* form in which you can view and edit the plan information.

3.1.25.3 Deleting Response Plans
To delete an existing response plan, highlight the plan and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete an incident response plan that has been removed. Be sure the plan is no longer needed prior to removal.

3.1.26 Incident Response Plan Definition (Database | System | Incident Plans | New/Edit)

Use the *Incident Response Plan Definition* form to input a new incident response plan or view/edit existing response plans.

- **Name** is used to identify the response plan (up to 20 characters).

- **Description** provides more information about the response plan (up to 255 characters).

3.1.26.1 Adding Commands to a Response Plan

To add a command to a response plan, select an extent from the drop-down list. Based on the extent selected, the extent name will display a list of available sections, intersections, or areas. Next, select a timing plan or operation mode from the command list. Note that operation modes will only be available in the list if a section was selected previously. Based on the command chosen, the command type will indicate either plan or mode.

- **Extent** specifies the scope of the command (section, intersection, or area).

- **Extent Name** indicates the name of the target section, intersection, or area for the command.

- **Command** sets the timing plan or operation mode (section extent only) that will be sent to the selected section, intersection, or area.

- **Command Type** indicates whether the selected command is a timing plan or operation mode (Plan or Mode).

➲ You cannot specify more than one command for the same section, intersection, or area.

3.1.26.2 **Reordering Commands**

To change the execution order of the commands, select the command you wish to move and click Move Up or Move Down. KITS will perform the selected function.

3.1.26.3 **Deleting Commands**

To delete a command, highlight the command entry and click Delete. KITS will remove the command from the response plan, and any commands following the deleted command will be moved up.

4   CONTROLLER DATABASE MENU

The Controller Database Menu provides the capability of editing controller data; saving the data to the central database; copying timing data from one intersection to others; printing database pages; and uploading, downloading, and importing from the traffic controller.

4.1   Tool Bar

The following buttons are located at the top of all controller database forms

    Save – To save data entered into the timing page to the central database, click the save button. Use the *Database Page Save* form to override the default user name, insert a comment, and indicate if the changes are temporary. The date, time, user ID, comments, and temporary setting will be saved in a database modification log table. This table can be viewed by right-clicking in any database page and selecting History.

    Previous and Next – Switches to the previous or next intersection's data, alphabetically, for the current controller database page.

    Change – Opens the *Selection Dialog* form, allowing you to view the current database page for a different intersection.

    Import – Imports the data from the traffic controller and saves it to the central database. KITS will display a progress bar during the transfer, followed by a *Transfer Results* form that indicates if the import was successful.

Download – Downloads the data to the traffic controller. KITS will display the progress bar during the transfer, followed by the *Transfer Results* form that indicates if the download was successful.

Upload – Uploads the data from the traffic controller, allowing you to compare the data in the controller to the data stored in the central database.

Copy – Copies data from the current intersection to another intersection. Choose a destination intersection from the *Selection Dialog* form. KITS then opens the *Save Dialog* form, allowing you to override the default user name, insert a comment, and indicate if the changes are temporary.

Print – Prints the current database screen to the default printer.

Help – Opens KITS Online Help for the current database page. Help can also be invoked by pressing F1 on the keyboard.
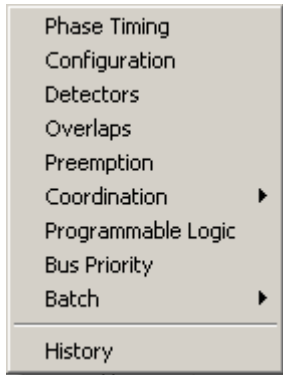
Legend – Opens a legend explaining values requiring extra information. All values explained in a legend have a bold (**L**) next to the label.

➲ The legend button is not on all controller database pages.

4.1.1 Right-Click Menu

A **right-click menu** allows you to quickly open other relevant forms from the controller database pages for the current intersection.

4.1.1.1 History

View all previous changes to a controller database form by right-clicking in a database page and selecting History. KITS will display a *Historical Data* table. View the Historical Data for a record by right-clicking the record in the table and selecting Compare. The differences between the historical data and the current data will be highlighted, and you can toggle between the two.

4 Controller Database Menu

4.2 Phase Timing (Database | Controller | Phase Timing)

The first form, Phase Timing, includes all of the per-phase intervals, miscellaneous timers, and the Phase Diagram block, which provides space to include information on the geometry of the intersection. The fields for Minimum Green and Yellow Clearance show the default values for all Permitted phases (set at location 1-F-0), if no data is entered for those parameters. The default values shown for pedestrian intervals only apply if that phase is flagged as a pedestrian movement (at locations 1-E-2 through 1-E-7). The bold, bracketed numbers following each interval description indicate the range of values that the interval will accept. Numbers with decimal points time in 0.1-second increments. Whole numbered intervals time in one second increments.

4.2.1 Timing Intervals

The Walk, Flashing Don't Walk, and Minimum Green intervals comprise a quantity referred to as "Minimums." Minimums are those portions of the green interval that are guaranteed to time, except when overridden by Preemption. As shown below, all green timers count down concurrently from start of green, and continue until zero (with exceptions noted below).

START OF GREEN

| WALK | FLASHING DON'T WALK | These must time sequentially |

MINIMUM GREEN

ADDED GREEN

QUEUE MAXIMUM — Resets to zero when queue detector drops call

VEHICLE EXTENSION — Resets to initial value as long as its calling detector is actuated

MAXIMUM GREEN (1 OR 2) — Resets to initial value when opposing call drops

| TIME BEFORE REDUCTION | TIME TO REDUCE | These must time sequentially and with a conflicting call present |

➲ The Walk, Flashing Don't Walk, and Minimum Green timers **cannot** be overridden by a Force Off but **can** be overridden by Railroad preempt Advance. A Force Off or Railroad preempt Advance will override all other green timers.
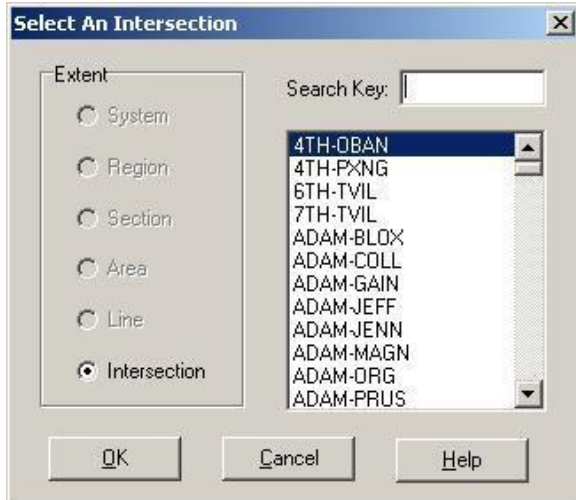
Use the *Select An Intersection* form to access the phase timing for each intersection. Search or scroll down to choose an intersection.

Use the *Phase Timing* form to view and edit controller basic timing data.

4.2.1.1 Interval Definitions

Walk - The amount of time that the international walk symbol or "WALK" message is displayed on the pedestrian signal head. The minimum Walk time that can be entered into the 170 is 1 second. The Walk interval must time out completely unless an EV or Railroad Preempt occurs. In which case, the Walk timer is forced to zero and the Walk interval ends immediately. [0 to 255]

Flashing Don't Walk - The amount of time that the flashing international Don't Walk symbol or "DON'T WALK" message is displayed on the Pedestrian Head. The minimum Flashing Don't Walk time that can be entered into the 170 controller is 1 second. As with the Walk time, the Flashing Don't Walk interval

4 Controller Database Menu

must time out completely unless an EV or Railroad Preempt occurs. In the case of a Railroad Preempt, the Flashing Don't Walk timer is forced to zero and the flashing DON'T WALK indication goes to a steady DON'T WALK immediately. With an EV Preempt, LACO4E allows two options. The default operation allows the Flashing Don't Walk interval to time out completely. By setting the appropriate flag on the Preemption Timing Sheet, the second option results in the immediate termination of the Flashing Don't Walk Interval. [0 to 255]

Minimum Green - The minimum length of time that a Vehicle indication will stay green (in the absence of a Preemption condition). [0 to 255]

Queue Maximum - The maximum length of time that a queue detector will hold a phase green. Queue Maximum times concurrently with Minimum Green. [0 to 255]

Added Green per Actuation - The amount of time that Added Green is increased for each calling detector actuation. Added Green times concurrently with Minimum Green. [0.0 to 25.5]

Vehicle Extension - The length of time that a phase will be held green (extended) in the absence of a detector actuation for that phase. Vehicle Extension begins timing when there is no actuation for the current phase and resets to its initial value when a call is reasserted. [0.0 to 25.5]

Time Before Reduction (TBR) - The amount of time that a phase waits before it begins timing Gap Reduction. TBR starts timing the moment when a conflicting call is present during the green. If no conflicting call is present the TBR timer resets to its initial value. [0.0 to 25.5]

Minimum Gap - The lower limit that a phase's Gap Out timer will be reached during Gap Reduction. Vehicle Extension will reduce down to this value only after the Time Before Reduction timer has expired. [0.0 to 25.5]

Max Green 1 and 2 - The maximum amount of green time that a phase will time. Max Green 1 is used during Free operation and Max Green 2 is used during coordinated operation. The Max Green timer begins timing at the start of the green interval. [0 to 255]

Max Added Green - The maximum amount of Added Green time that a phase can time. Limits the amount of Added Green resulting from excessive detector actuations. [0 to 255]

Time to Reduce (TTR) - The length of time to reduce the Gap Out timer (reduce Vehicle Extension time to Minimum Gap time). [0.0 to 25.5]

Yellow Clearance - The length of time that Yellow is displayed. Unless a phase is flagged for Yellow Ranging (at location 1DE), values less than 3.0 seconds will be changed to 3.0 seconds, and values greater than 5.0 seconds will be changed to 5.0 seconds. [3.0 to 5.0]

Red Clearance - The amount of time after the Yellow Clearance interval that a phase will display red. While this timer is active, no other phase in the same ring can start. [0.0 to 25.5]

4.2.1.2 **Phase Diagram**

TRUE NORTH	PHASE NORTH	1	2	3	4
		5	6	7	8

This is where the intersection phasing is to be indicated. The directions of True North and Phase North, and the movements associated with each phase should be indicated here. Overlap movements should also be identified in this diagram along with Restricted and/or Exclusive phases. Highlight the barrier-phase boundaries to emphasize the quad structure of the intersection. The example above shows Main Street phases (as set in location 1-E-0) to be 1, 2, 3, 5, and 6 with the barrier phases being 3 and 6. (Default barrier phases are 2 and 6).

4.2.1.3 Miscellaneous Timers

These are the timers that are not on a per-phase basis. Red Rest Delay, Green Rest Delay and Red Revert are per-ring intervals while Stuck All Red Fail Delay is a per-controller interval.

Miscellaneous Timers		
Time/Timer	Location	
Red Rest Delay Time	106	0
Green Rest Delay Time	107	0
Stuck All Red Fail Delay Time	10E	30
Red Revert Time	10F	2.0

Red Rest Delay Time - The time before a phase that is flagged to Rest in Red starts its termination sequence. At the beginning of green of the Red Rest phase, this value is copied to the respective Ring delay timer. Rings A and B have separate Red Rest Delay Timers that can be viewed at locations 1-A-C and 1-B-C, respectively. The Red Rest Delay Timer will count down when the Red Rest phase is resting in green (timing no interval with no opposing calls). Whenever this condition is not met, the Red Rest Delay Timer resets to the value entered here. [0 to 255]

Green Rest Delay Time - The time before a phase that is flagged to Rest in Green causes termination of a non-concurrent, non-Green Rest phase. At the beginning of green of any phase, this value is copied to the Green Rest Delay Timer (shared by both Rings) at location 1-0-8. The Green Rest Delay Timer will count down when any non-Green Rest phase is resting in green. Whenever this condition is not met, the Green Rest Delay Timer resets to the value entered here. [0 to 255]

Stuck All Red Fail Delay Time - By default, the Stuck-All-Red logic will put the controller into software flash 30 seconds after an all Red (with calls) condition is detected. This parameter allows the user to vary the failure detection window. A non-zero value entered here overrides the default of 30 seconds. [0 to 255]

Red Revert Time - The absolute minimum time that a just terminated phase must wait before it can be served again. At the beginning of each phase green, this value is copied to the respective Ring Red Revert Timer. The Red Revert timer times concurrently with the (just terminated) phase's Red Clearance timer. Ring A and Ring B have separate Red Revert Timers that can be viewed at location 1-A-B and 1-B-B respectively. [0.0 to 25.5]

4.3 Configuration (Database | Controller | Configuration)

Choose an intersection from the *Select An Intersection* form.

Phase Function	Flags	Street Configuration	Flags	Miscellaneous	Flags
Permitted Phases	12345678	Main Street Phases	12--56--		
Red Lock	--------	Side Street Phases	--34--78	Assoc. Phase Recall -1	--------
Red and Yellow Lock	-2-4-6-8	2 Ped Load Switch	-2------	Assoc. Phase Recall -2	--------
Minimum Vehicle Recall	-------8	4 Ped Load Switch	---4----	Assoc. Phase Recall -3	--------
Maximum Vehicle Recall	--------	6 Ped Load Switch	-----6--	Assoc. Phase Recall -4	--------
Rest in Green	-------	8 Ped Load Switch	-------8	Assoc. Phase Recall -5	--------
Rest in Red	1-3-5-7-	Ped A Load Switch	--------	Assoc. Phase Recall -6	--------
Barrier Recall	--------	Ped B Load Switch	--------	Assoc. Phase Recall -7	--------
Double Entry	--------	Ped Recall (Rest in Walk)	--------	Assoc. Phase Recall -8	--------
Exclusive Phases	--------	STA Mode	--------	Yellow Calling Phases	--------
Restricted Phases	--------			Yellow Phases Called	--------
Prot/Perm Left Turn	--------			User Flags (L)	--------
Lag Phases (Free)	-2-4-6-8			Green Offset Sync Pulse	--------
First Phases (after startup)	--------	Driveway Flash	--------	Yellow Offset Sync Pulse	--------
Yellow Startup Phases	-2---6--	2 Head Driveway Flash	--------	Yellow Ranging Phase	--------
Yellow Startup Overlaps	-----XXX	Overlap Driveway Flash	------XX	Yellow Ranging Overlap	------XX

Manual Control Configuration	
Omit Phases	--------
Lag Phases	--------
Recall Type (L)	0

Last Modification Date: 9/10/04, 10:09:51 am

Use the *Configuration* form to set all of the phase "flag" type parameters and Manual Control configuration parameters. The Phase Function, Street Configuration, and Miscellaneous phase flags further define the intersection's basic operation. Items on this form generally will only be set once.

4.3.1 Phase Function Flags

Permitted Phases - The phases that will time during normal operation of the intersection. Any changes to this location will be implemented immediately. If a Permitted Phase is timing any of its Green Intervals and that phase is removed from Permitted Phases, it will be forced off (after timing its Minimums) and no calls to that phase will be recognized.

Red Lock - Calls placed to any phase set at this location will be locked if those calls are placed during the phase's Red interval. The locked call will be removed when the flagged phase starts its Green interval.

Red and Yellow Lock - The same operation as Red Lock above except it also includes calls placed during the phase's Yellow interval.

Minimum Vehicle Recall - Causes a call to be placed for a phase during its Red interval only. This call will remain in place until the phase goes green.

Maximum Vehicle Recall - Causes a continuous call to be placed for a phase. This results in the phase staying green until its Maximum Green Timer has expired (even if no Vehicle Extension time is set for the phase).

Rest in Green - Causes a call to be placed to a phase if that phase is not in service and no opposing calls to that phase exist.

Rest in Red - Causes a termination sequence to begin for a phase if that phase is resting in green and there are no opposing calls to that phase.

Barrier Recall - Causes a call to be placed at barrier crossing for phases flagged here.

Double Entry - Causes a call to be placed, at barrier crossing, for flagged phase if no other call exists in the quadrant of the flagged phase.

Exclusive Phases - Any phase flagged here must time by itself, even if a normally compatible phase has demand. If a normally compatible phase is in service when an Exclusive phase requests service, the non-Exclusive phase will terminate as if a normally non-compatible phase was requesting service. A barrier crossing is required to implement changes to this location.

Restricted Phases - A phase set in this location will not be permitted to time concurrently with another Restricted phase. Restricted phasing can only be implemented in a standard quad configuration (phases 1, 2, 5, and 6 set to Main Street). Also, Exclusive phasing and Restricted phasing are mutually exclusive operations (on the same street). Exclusive phasing operation has priority over Restricted phasing operation. The data validation logic will not permit selecting a phase as Restricted if any other phases on that street are already selected as Exclusive. However, one street may implement Restricted phasing while the other street implements Exclusive phasing. A barrier crossing is required to implement changes to this location.

Protected/Permissive Left Turn - Used when entrapment conditions exist. Prevents the controller from backing up from a lagging phase to a leading phase. A call placed by a phase flagged for Prot/Perm Left Turn (while a lagging phase is green) will only be answered after the lag phases terminate and the controller crosses the barrier. Until then, the call will be ignored by the controller. A call placed by a Prot/Perm Left Turn phase, when a more lagging phase is green, is indicated by its Call light flashing at a slow rate. The call in this instance will be ignored.

➲ A lag (barrier) phase that is flagged as Prot/Perm Left Turn will never be served nor will a call to that phase be recognized or indicated in its call light.

➲ Care should be taken when flagging a lead phase for both Prot/Perm and ped operation. The same logic that prevents vehicle service will also prevent ped service.

Lag Phases (Free) - This location sets the lagging-most (barrier) phase for each quadrant, before crossing the barrier, when running Free (not in coordination). If no phases are set, the default is set to all even numbered phases. This location is ignored in non-standard quad configurations and barrier phases will be used as lag phases. A barrier crossing is required to implement changes in this location. Lag phasing for Manual Control Operation is set at location 3-C-2 on the Configuration timing sheet. Lag phasing for Coordination is set at 7-x-0 (x = Plan Number) on the Coordination Attributes timing sheet.

First Phases after Startup - Phases set in this location will be the first phases to go green after a long power down restart. Flagged phases must be able to time concurrently or the data validation logic will modify the data so that only concurrent phases remain. If only a single ring is flagged here, any compatible phase may go green once the flagged phase goes green.

Yellow Startup Phases - Flagged phases will start up in Yellow Clearance interval after a long power down restart. As with First phases, flagged phases must be able to time concurrently or the data validation logic will modify the data so that only concurrent phases remain. Flagged phases will time 5.0 seconds of Yellow Clearance regardless of the Yellow Clearance time entered on the Phase Timing Sheet.

Yellow Start Up Overlaps - Causes any flagged Overlap to start up yellow after a long power down restart. At least one of the Overlap's parents must be flagged as a Yellow Start Up Phase at location 1-F-E. Columns 1 through 6 correspond to Overlaps A through F. Flagged Overlaps will time 5.0 seconds of Yellow Clearance regardless of the overlap Yellow Clearance time entered on the Overlap Timing Sheet.

4.3.2   Street Configuration Flags

Main Street Phases - All phases that will be on the Main Street side of the barrier (even phases that may not be Permitted). On a long power down restart, if this location is not set, the program will default to a standard quad configuration, that is phases 1, 2, 5, and 6 will be set as Main Street phases. Since this parameter is so critical, User Flag Options (location 1-D-B) call light 2 must be turned on before this location can be changed. In addition, the change will not be implemented until a long power down restart occurs. Any phase not flagged as a Main Street phase will automatically be flagged as a Side Street Phase.

Side Street Phases - for observation only; the user cannot modify this location. After setting Main Street phases and performing a long power down restart, LACO4E automatically sets Side Street phases based on phases set in Main Street phases above.

Ped Phase Assignments (locations 1-E-2 through 1-E-7) - Assigns a corresponding vehicle phase to each ped. Only one phase may be set in any of the six Ped assignments. Ped A and Ped B share Overlap A and Overlap B outputs, respectively. If either of these Overlaps is enabled (by setting parent phases on the Overlap Timing Sheet), the corresponding Ped assignment will be cleared. Note that Ped A and Ped B share the Manual Control inputs (I11U/L). If either Ped A or Ped B is set, the Manual Control feature will be disabled.

Ped Recall - Also referred to as Rest in Walk. Causes a ped call to be placed for the flagged Ped phases. The call is continuous except during the flagged Ped's Walk interval. If no opposing call is present, the Ped indication will "rest" in Walk. The Walk interval will time down until 1 second remains in its timer. When an opposing call is placed, the remaining Walk time expires and the Flashing Don't Walk interval begins. If the opposing call drops any time before the phase's Flashing Don't Walk interval ends, the Ped Walk interval restarts and the process begins all over again. Only enabled Peds (as set in locations 1E2 through 1E7 above) can be flagged for Ped Recall.

Semi-Traffic Actuated (STA) Mode - Only enabled Peds (as set in locations 1-E-2 through 1-E-7 above) can be flagged for STA Mode. STA (Semi-Traffic actuated) mode is a modified form of Ped Recall that is used only in Coordination. While the controller is running in coordinated mode, the ped phases flagged here will be placed on recall. When the ped serves, it will time out its Walk interval and rest in Walk until the coordinator sets a Force Off for the phase. At that time the ped will time its Flashing Don't Walk interval and then terminate.

Driveway Flash Phases - Causes the green output of the flagged phase to flash (at the same flash rate as the Ped Clearance interval) while timing its green intervals.

2 Head Driveway Flash - Causes the red output of the flagged phase to be set ON during the flagged phase's yellow interval. Any phase flagged here must also be flagged in Driveway Flash Phases above. Used when a 2 section (red and green only) signal head is providing indications for the flagged phase.

Driveway Flash Overlaps - Causes the green output of the flagged overlap to flash (at the same frequency as the Ped Clearance interval) while in its green interval. The 2 Head Driveway Flash modifier above does not apply to this parameter.

4.3.3   Miscellaneous Flags

Associated Phase Recall - 1 - Any phase flagged here will have a locked call placed to it when phase 1 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 2 - Any phase flagged here will have a locked call placed to it when phase 2 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 3 - Any phase flagged here will have a locked call placed to it when phase 3 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 4 - Any phase flagged here will have a locked call placed to it when phase 4 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 5 - Any phase flagged here will have a locked call placed to it when phase 5 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 6 - Any phase flagged here will have a locked call placed to it when phase 6 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 7 - Any phase flagged here will have a locked call placed to it when phase 7 goes green. The call is dropped if the flagged phase is green.

Associated Phase Recall - 8 - Any phase flagged here will have a locked call placed to it when phase 8 goes green. The call is dropped if the flagged phase is green.

Yellow Calling Phase - If a phase flagged here is timing its yellow interval, a locked call is placed to all phases flagged in Yellow Phase Called, below.

Yellow Phase Called - A locked call is placed to all phases flagged here if a phase flagged in Yellow Calling Phase, above, is timing its yellow interval. This parameter is ignored if no phases are flagged in Yellow Calling Phase.

User Flags - Eight flags that enable or disable functions and features. Press the number corresponding to the desired feature to enable/disable it.

User Flag Options
1. Mid-Block Ped Crossing
2. Modify Main Street Phases (1E0)
3. Delay RR Track Clearance Phase Green
4. Modifies Barrier Crossing (Ignore True Max)
5. Disable Daylight Savings Time Update
6. Disable Output File Editing
7. Freeway Offramp Anti-Backup Logic
8. Ignore Stuck-All-Red Failure

- *1 = Mid-Block Ped Crossing* – Enables the special field indications for the vehicle phase when phase 4 ped is active. (see Section 8.3)

- *2 = Modify Main Street Phases* – This flag must be set in order to change the Main Street phases at location 1-E-0. A long power down is then required to implement the change at which time the flag is automatically cleared.

- *3 = Delay Track Clearance Phase Green until All overlaps have terminated* - Inhibits the start of Track Clearance Green if any overlap is timing any of its clearance intervals.

- *4 = Modified Barrier Crossing* – Permits a barrier crossing when any combination of Max-out and Gap-out occurs. If this flag is cleared, both rings must either Gap out or Max out.

- *5 = Disable Daylight Savings Time Update* – Prevents the automatic "Fall back" and "Spring ahead" time adjustment for those agencies that do not recognize Daylight Savings Time.

- *6 = Disable Ped Recycle logic* – Disables Ped Recycle logic for peds flagged as either STA Mode or Ped Recall.

- *7 = Freeway Off ramp Anti-Backup Logic* – Used to prevent freeway off ramp traffic from backing up onto the freeway lanes. Causes priority service of the off ramp phase when its advance detector stays actuated for a specified length of time. (see Section 8.4)

- **8 = *Ignore Stuck-All-Red Failure*** - Prevents the intersection from going into software flash if it gets stuck in an all-Red condition with active calls for more than 30 seconds. (Does not prevent the intersection from getting stuck all Red).

Green Offset Sync Phase - Used to notify another controller (usually the next one downstream in a communications link) when the flagged phase is green. Generally only one phase should be flagged at this location. Only used if one of this controller's Comm Ports is configured for comm option 6, Transmit Plan Data (see next page).

Yellow Offset Sync Phase - Used to notify another controller (usually the next one downstream in a communications link) when the flagged phase is yellow. Generally only one phase should be flagged at this location. Only used if one of this controller's Comm Ports is configured for comm option 6, Transmit Plan Data (see next page).

Yellow Ranging Phase - Allows the flagged phase to accept a time of less than 3.0 seconds (including 0.0 seconds) or greater than 5.0 seconds for its Yellow Clearance time.

Yellow Ranging Overlap - Allows the flagged overlap to accept a time of less than 3.0 seconds (including 0.0 seconds) or greater than 5.0 seconds for its Yellow Clearance time.

4.3.4   Manual Control Configuration

Omit Phases - Phases to be omitted while in Manual Control operation. All phases flagged here will be ignored when the Manual Control Enable input is ON.

Lag Phases - This location sets the last phase for each quadrant (before crossing the barrier) while in Manual Control operation. If no phases are set, the default is all even numbered phases. This location is ignored in non-standard quad configurations and barrier phases will be used as lag phases. A barrier crossing is required to implement changes in this location

Recall Type - This location determines what type of recall is in force during Manual Control operation. Any value other than the ones described below are ignored.

- **00 = *Disable Manual Control*** - Causes Manual Control operation to be ignored.

- **01 = *No recall*** - Only phases or peds with detector actuations will be served.

- **02 = *Vehicle Recall Only*** - All Permitted phases will be placed on recall while in the Manual Control Enable input is ON.

- **03 = *Ped and Vehicle Recall*** - All Permitted phases and enabled peds will be placed on recall while the Manual Control Enable input is ON.

4.4   Detectors (Database | Controller | Detectors)

Choose an intersection from the *Select An Intersection* form.

	App	Lanes	Description	File/Slot Channel	Delay	Extended Call	Phase Flags	Attribute Flags (L)
26	N	1	Queue	6J4U	7	8.0	----5---	-2------
27	N	2	Queue	6J4L				
28	W	LT	6X100	7J5U	9	1.0	123----8	123-56--
29	N	1,2	Advance	6J2U	0	0.0	-----6--	--------
30	E	1,2,3	Advance	8J6U	0	0.0	-------8	--------
31					0	0.0	--------	--------
32					0	0.0	--------	--------
33	E	1,2	Queue	8J8U				
34	E	3	Queue	8J8L	1	0.0	-------8	----5---
35					0	0.0	--------	--------
36					0	0.0	--------	--------

Special Detector Delay Assignments	Phase
Special Delay Option 1 (Attribute Bit 7)	
Special Delay Option 2 (Attribute Bit 8)	1234-6--

Last Modification Date: Unknown

The *Detector* form contains all parameters related to vehicle or system detection. Use this form to assign phases to be called by a detector along with any attributes which may modify the basic operation of each detector. The detector Delay and Extension times also are set here.

File/Slot Channel - The jumper position (for informational purpose only).

Delay Time - (For each of 28 detectors). Any time entered here will cause the detector's actuation to be ignored for the duration of the delay timer. The delay timer resets to its initial value whenever the detector is not actuated or when its assigned phase is yellow. If multiple phases are assigned to a detector, the delay timer reset is disabled during any assigned phase yellow interval. The delay timer will count down to zero as long as an actuation is present. The delay timer is ignored when the detector's assigned phase is not red. [0 to 255]

Extended Call Time - (For each of 28 detectors). A time entered here will cause the detector's actuation to be extended (or carried over) for the duration of the extension timer. The extension timer resets to its initial value whenever the detector is actuated and counts down to zero as long as there is no actuation. The extension timer is ignored when the detector's assigned phase is not green. [0 to 25.5]

Phase Flags - (For each of 28 detectors) Default phase assignments are indicated by shaded boxes. If no phase is assigned for a detector, then actuation of that detector will cause the shaded phase to be called. Any phase entry for a particular detector will disable the default calling logic for that detector. Any phase or phases can be assigned to any detector. Some detector attributes (described below) will be ignored if multiple phases are assigned.

Attribute Flags - (For each of 28 detectors) Select the number of the desired Attribute(s).

Detector Attributes	
Flag 1 - System Detector	Flag 5 - Queue Clearing
Flag 2 - Red and Yellow Lock	Flag 6 - Non-Counting
Flag 3 - Yellow Disconnect	Flag 7 - Special Delay Option 1

Flag 4 - Red Calling Only	Flag 8 - Special Delay Option 2

- *1 = System Detector* - This attribute allows a vehicle detector to also be used as a System Detector thus causing Volume, Occupancy and Speed (VOS) data to be calculated from it. Only 16 of the possible 28eight detectors will generate VOS data. They are located in the 332 cabinet input file as follows:

Sample I-File input rack

	2I2U	2I3U			4I6U	4I7U		
	2I2L	2I3L			4I6L	4I7L		
	6J2U	6J3U			8J6U	8J7U		
	6J2L	6J3L			8J6L	8J7L		

- *2 = Red and Yellow Lock* - Causes an actuation to be locked if it occurs during the detector phase's Red or Yellow interval.

- *3 = Yellow Disconnect* - Causes an actuation to be ignored if it occurs during the detector phase's Yellow interval.

- *4 = Red Calling Only* - Causes an actuation to place a call to the detector's assigned phase only if it occurs during the detector phase's Red interval.

- *5 = Queue Clearing* - Allows a detector to use Queue Clearing logic. A call will be placed to the detector's phase only during the phase's Red or Yellow interval. When the phase goes green, a Queue hold will be placed on the phase. If the actuation drops or the Queue Max timer expires, the detector will become disabled for the remainder of the current phase's service. Actuation of this type detector during its assigned phase green interval will not cause phase extension to occur.

- *6 = Non-Counting* - This attribute will inhibit count accumulation for the purposes of Added Initial Green computations.

- *7 = Special Delay Option 1* - Allows the user to select phases that, when in service, override the detector's delay timer. These phases are selected in Special Delay Option 1 Phases (location 2-F-8).

- *8 = Special Delay Option 2* - Allows the user to select phases that, when in service, override the detector's delay timer. These phases are selected in Special Delay Option 2 Phases (location 2-F-9).

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4.4.1 Detector Parameters

Stuck ON Threshold The time that passes with a constant call on the detector before the controller considers the detector stuck on.

Stuck OFF Threshold The time that passes with no calls on the detector before the controller considers the detector stuck off.

Chatter Threshold The max number of actuations per minute before the controller considers the detector in a chatter state.

Period The collection period of all detector statistical data. **The period should remain at 60 seconds to correspond with KITS.**

4.5 Overlaps (Database | Controller | Overlaps)

Choose an intersection from the *Select An Intersection* form.

Use the *Overlaps* form to view and edit controller overlap data.

➲ Only Overlap A timings are described here but timings for Overlaps B through F are identical.

Normal Parents - (For each of 6 overlaps) Parent phases to be used during normal (i.e. non-preempt) service. Phases flagged here must be flagged as Permitted (location 1-F-0) or they will be ignored.

Green Omit Parents - (For each of 6 overlaps) Prevents the overlap green output from coming on when any parent phase flagged here is green.

RR Preempt Parents - (For each of 6 overlaps) Parent phases to be used during Railroad preemption. Phases flagged here must also be flagged for Railroad Limited Service (location 3-A-3) or they will be ignored.

EV Preempt Parents - (For each of 6 overlaps) Parent phases to be used during Emergency Vehicle preemption. Phases flagged here must also be flagged as Normal parents and/or RR Preempt parents.

Load Switch Assignment - (For overlaps C, D, E or F only) Allows a three-color overlap output to be sent to any available load switch in addition to its default load switch assignment. This will override the output that is normally sent to this load switch. The value entered here corresponds to the CMU channel number assigned to each load switch. "00" means "not echoed", "01" thru "08" sends the overlap output to a vehicle load switch and "13" thru "16" echoes the overlap output to a ped load switch. Any other value is treated as "00". [1 thru 8 or 13 thru 16]

Delay Time - (For each of 6 overlaps) Causes the start of overlap green to be delayed for the length of time specified here. The overlap delay timer is set to its initial value whenever the overlap goes red. When any parent phase (not set as a Green Omit Parent) goes green, the delay timer begins to decrement. As long as the delay timer is active, the overlap will output red. When the delay timer expires, if a parent phase is still green, the overlap will go green. [0 to 25.5]

Green Extension Time - (For each of 6 overlaps) Causes the overlap to continue to output green beyond its normal termination point. If another overlap parent goes green while this timer is active, the timer will be reset until the next overlap termination sequence begins. [0 to 25.5]

Yellow Clearance Time - (For each of 6 overlaps) The length of time that the overlap will output yellow when it terminates. The time entered here is restricted to between 3.0 and 5.0 seconds unless the overlap is selected in Yellow Ranging Overlap (location 1-D-F). [3.0 to 5.0]

Red Clearance Time - (For each of 6 overlaps) The length of time that the overlap will display red during termination. [0 to 25.5]

4.6 Preemption (Database | Controller | Preemption)

Choose an intersection from the *Select An Intersection* form.

Use the *Preemption* form to view and edit preemption data.

4.6.1 Railroad Parameters

Railroad Select - Sets the Railroad mode for this controller as follows:

- *01 = Railroad A only* - Responds to the Railroad A input only and can only be configured for RR Flash operation only.

- *02 = Railroad B only* - Responds to the Railroad B input only and can be configured for RR Flash or Limited Service operation.

- *03 = Railroad A and Railroad B* - Responds to both Railroad A and Railroad B inputs with Railroad A configured for RR Flash operation and Railroad B configured for Limited Service operation.

Any other value entered here will be changed to "01" automatically and treated as Railroad A only.

All Red After RR Flash - The length of time that the intersection will display all-Red after RR Flash stops at the end of preempt. [0 to 25.5]

Track Clearance Time - The length of time that the phases flagged for Track Clearance (location 3-A-0) will spend in the green interval. If no time is entered here, then the intersection will go into RR Flash after all phases have terminated, regardless of what is entered for Railroad Select. [0 to 25.5]

Limited Service Max Time - The maximum length of time (in minutes) that Railroad B service will provide Limited Service operation. When this timer expires and the Railroad B input is still active, all phases in service will terminate and the intersection will go to RR Flash. If this location is set to "00", then RR Flash will never occur. [0 to 255]

Railroad Link to EV - This enables an EV preempt sequence that will service automatically following the end of a Railroad preempt sequence. This can be used to provide guaranteed service (as defined by the linked EV's parameters) to selected phases after a RR preempt. [1, 2, 3 or 4 (for EV A, B, C or D)]

Free Time After Preempt - Causes the intersection to remain Free after a preempt sequence has ended. Allows phases to serve by demand only in order to clear any backup that may have occurred during the preempt. [0 to 25.5]

Track Clearance Phases - The phases that become active in order to clear vehicles from the railroad tracks before a train arrives at the intersection. If no phases are selected here, then the intersection will go into RR Flash after all phases have terminated regardless of what is entered for Railroad Select. Phases entered here must be able to time concurrently.

Railroad Exit Phases - The phases that will service first after the Railroad preempt sequence ends. Phases entered here must be able to time concurrently.

Railroad Ped Only Phases - Ped movements that will service without a corresponding vehicle service. Generally set for phases for which ped service is desired but which are not selected as Limited Service Phases. Phases entered here must also be enabled on the Configuration timing sheet.

Limited Service Phases - Phases that will time normally after the Track Clearance interval of a Railroad B preempt service. Any phases may be entered here.

4.6.2   EV Parameters

Delay - Prevents any EV preempt from taking control of the intersection. The delay timer (observed at location 3-0-0) gets set and begins timing when an EV preempt input goes TRUE. While the delay timer is active, no Holds, Calls or Force Offs will be placed by the preempt logic. [0 to 255]

Active - The active timer (observed at location 3-0-1) gets set when an EV preempt input goes TRUE. When the delay timer expires, the active timer begins. During this period, the preempt logic places Holds and Calls to all of the EV Clearance phases. [0 to 255]

Clearance - This is the guaranteed length of time that the EV Clearance phases will display green. The clearance timer (observed at location 3-0-2) gets set when an EV preempt input goes TRUE. The clearance timer counts down after both the active and delay timers have expired and once all EV Clearance phases are green. If this time is not set, then the preempt sequence will go out of service as soon as the EV Clearance phases go green. [0 to 255]

Maximum - This time is used as a safeguard against a stuck ON preempt input. The max timer (observed at location 3-0-3) gets set when an EV preempt input goes TRUE. It begins to count down, in whole seconds, after both the active and delay timers have expired. NOTE: If this time is not set, then there will be no protection against stuck ON preempt inputs. [0 to 255]

Link to EV - This enables an EV preempt sequence that will service automatically following the end of this preempt sequence. This can be used to provide guaranteed service (as defined by the linked EV's parameters) to selected phases after a RR preempt. The EV will not be permitted to link to itself. Also, any value greater than "004" will be ignored. [1, 2, 3 or 4]

Minimum - This parameter is used to inhibit reservice of a preempt sequence for a set time. The EV minimum timer (location 3-1-6 for EVA, 3-2-6 for EVB, 3-3-6 for EVC and 3-4-6 for EVD) gets set when the preempt input goes ON. When the EV Clearance expires (indicating end of the preempt sequence), the EV minimum timer counts down to zero. As long as this timer is non-zero, further EV input actuations will be ignored. [0 to 255]

EV A Clearance Phases - Those phases that will serve during the EV A clearance interval. Flagged phases must also be either Permitted phases or Railroad Limited service phases. Phases entered here must be able to time concurrently. If no phases are set, the preempt is ignored.

EV B Clearance Phases - Those phases that will serve during the EV B clearance interval. Flagged phases must also be either Permitted phases or Railroad Limited service phases. Phases entered here must be able to time concurrently. If no phases are set, the preempt is ignored.

EV C Clearance Phases - Those phases that will serve during the EV C clearance interval. Flagged phases must also be either Permitted phases or Railroad Limited service phases. Phases entered here must be able to time concurrently. If no phases are set, the preempt is ignored.

EV D Clearance Phases - Those phases that will serve during the EV D clearance interval. Flagged phases must also be either Permitted phases or Railroad Limited service phases. Phases entered here must be able to time concurrently. If no phases are set, the preempt is ignored.

EV Flags - Modifies the default EV operation as follows:

- *1 = Forces EV A* to display all-Red clearance instead of Green clearance.

- *2 = Forces EV B* to display all-Red clearance instead of Green clearance.

- *3 = Forces EV C* to display all-Red clearance instead of Green clearance.

- *4 = Forces EV D* to display all-Red clearance instead of Green clearance.

- *5 = EV A truncates Ped Flashing Don't Walk interval.* If the EV preempt occurs during the Walk interval, the Flashing Don't Walk interval will be skipped. If the EV preempt occurs during the Flashing Don't Walk interval, the remainder of the Flashing Don't Walk time will be skipped.

- *6 = EV B truncates Ped Flashing Don't Walk interval.* If the EV preempt occurs during the Walk interval, the Flashing Don't Walk interval will be skipped. If the EV preempt occurs during the Flashing Don't Walk interval, the remainder of the Flashing Don't Walk time will be skipped.

- *7 = EV C truncates Ped Flashing Don't Walk interval.* If the EV preempt occurs during the Walk interval, the Flashing Don't Walk interval will be skipped. If the EV preempt occurs during the Flashing Don't Walk interval, the remainder of the Flashing Don't Walk time will be skipped.

- *8 = EV D truncates Ped Flashing Don't Walk interval.* If the EV preempt occurs during the Walk interval, the Flashing Don't Walk interval will be skipped. If the EV preempt occurs during the Flashing Don't Walk interval, the remainder of the Flashing Don't Walk time will be skipped.

Aux 3 Yellow Output Control - Allows the Aux 3 Yellow output to reflect the status of preemption and Manual Control. This output can be used to provide advance warning to motorists, etc. The Aux 3 Yellow output will go ON whenever any of the flagged functions is active.

4.7 Coordination (Database | Controller | Coordination)

4.7.1 Offset Times (Database | Controller | Coordination | Offset Times)

Choose an intersection from the *Select An Intersection* form.

The following parameters are common to both Standard Coordination and Zip Coordination.

Plan Offset Times - The desired offset time between the Master Cycle Timer and the Local Cycle Timer, for each of the nine plans. Values entered here should be less than the plan's Cycle Length. [0 to 255]

Offset Timing Plan - This defines which plan number to run when the Local Coordinator is configured for Offset Timing Mode. If no plan is entered, the default is Plan 3. [1 to 9]

Midnight Sync Pulse - The Hour and Minute that the Midnight Sync pulse will be transmitted to slave controllers in the "Transmit Plan" and "Transmit 7-Wire" communication messages. Hour [0 to 23], Minute [0 to 59]

System Manual - This parameter sets the Master operating mode. Available entries are:

- 0 = Automatic Time Base mode. Searches the Time Of Day table (as indicated in location 4-0-5) and runs the plan/function found there.

- 1 through 9 = The Master coordinator is manually set to operate the plan number indicated.

- 14 = Manually sets the Master coordinator to operate in the Free mode.

- Any Other entry = The entry is ignored and the last commanded plan is used.

Local Manual - A non-zero value here overrides the plan commanded by the Master (as indicated in System Manual, above). The available entries are:

- 0 = Automatic Time Base mode. Searches the Time of Day table (as indicated in location 4-0-5) and runs the plan/function found there.

- 1 through 9 = Manually runs the plan number entered here.

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- 10 = Manually turns the Special Function output ON.

- 11 = Manually turns the Special Function output OFF.

- 12 = Manually causes the local coordinator to run in Slave Mode.

- 13 = Manually causes the local coordinator to run in Offset Timing Mode.

- 14 = Manually sets the controller to operate in Free mode (disables local coordination).

Any other values are ignored.

Minimum Cycle Length - The minimum cycle length that can be timed. If this value is set to "255", it will automatically be changed to "254". [0 to 254]

Maximum Cycle Length - The maximum cycle length that can be timed. This value must be greater than the Minimum Cycle Length, above, or it will automatically be changed to 255. [11 to 255]

Temporary Plans - Allows the user to enter the timing values for the nine temporary timing plans.

4.7.2   Standard Coordination (Database | Controller | Coordination | Standard Coordination)

Choose an intersection from the *Select An Intersection* form.

Standard Coordination Plan 1 for 4TH-OBAN

Plan 1 ▼ | (dropdown: Plan 4, Plan 5, Plan 6, Plan 7, Plan 8, Plan 9, Temp 1, Temp 2)

	rvals	Force Off	Hold	Ped Restrict	Call
	1	--------	--------	--------	1-------
	2	--------	--------	--------	-2------
	3	--------	--------	--------	--3-----
	4	--------	--------	--------	---4----
	5	123-----	--------	--------	----6--
5	6	123456--	12345678	--------	------7-
6	7	--------	--------	--------	-------8
7	8	--------	--------	--------	1-------
8	9	--------	--------	--------	-2------
9	10	--------	--------	--------	--3-----
A	11	--------	--------	--------	---4----
B	12	--------	--------	--------	----5---
C	13	--------	--------	--------	-----6--
D	14	--------	--------	--------	------7-
E	15	--------	--------	--------	-------8
F	16	--------	--------	--------	1-------

Last Modification Date: 9/10/04, 10:09:51 am
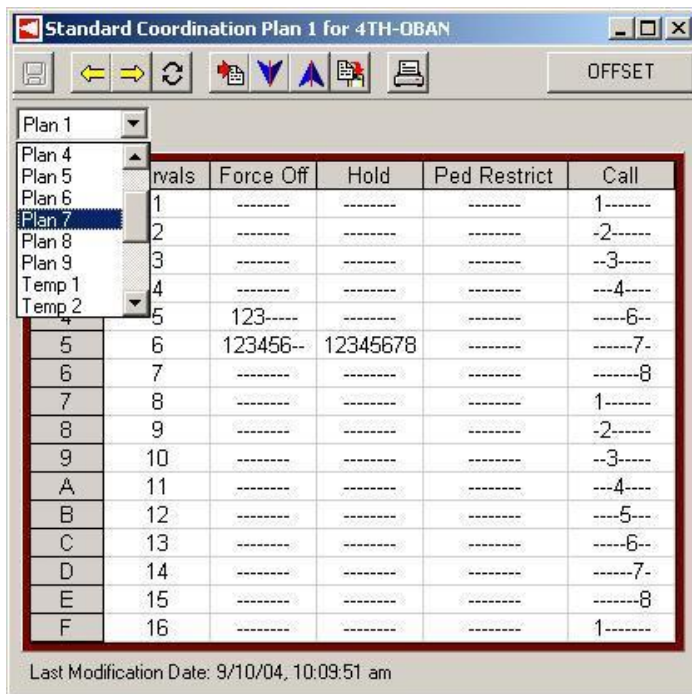
Select a plan from the dropdown menu.

Standard Coordination Plan 1 for MNRO-TENN

Plan 1 ▼

Plan 1	Intervals	Force Off	Hold	Ped Restrict	Call
0	90	-2---6--	--------	--------	--------
1	1	--------	--------	--------	--------
2	14	--3---7-	--------	--------	--------
3	15	--------	--------	--------	--------
4	18	--------	--------	---4----	--------
5	20	--------	--------	---4---8	--------
6	31	--------	--------	---4---8	-2---6--
7	42	---4---8	-2---6--	--------	--------
8	43	--------	-2---6--	--------	--------
9	54	----5---	-2---6--	--------	--------
A	55	--------	-2---6--	--------	--------
B	60	1-------	-2---6--	--------	--------
C	66	--------	-2---6--	-----6--	--------
D	69	--------	-2---6--	-2---6--	--------
E	83	--------	--------	-2---6--	--------
F	90	--------	--------	--------	--------

Last Modification Date: 9/10/04, 10:09:51 am
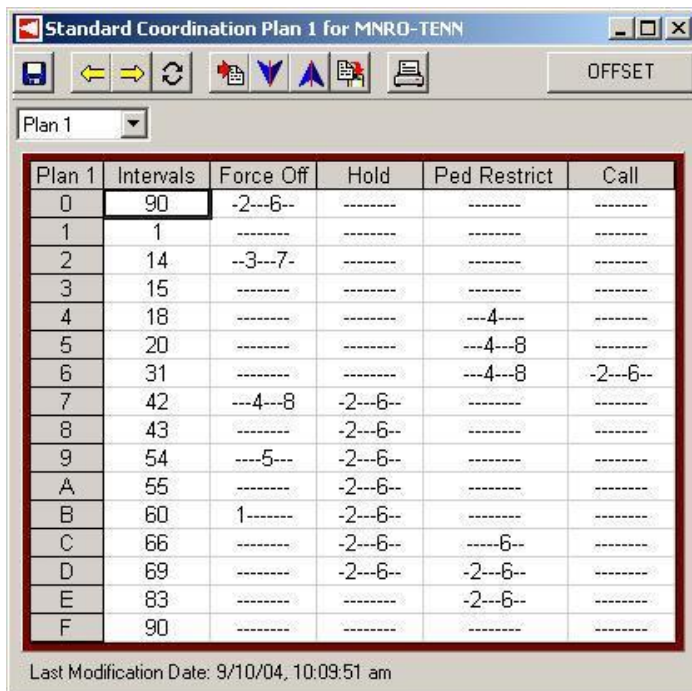
Coordination Functions work in conjunction with the Coordination Interval parameters. For example, if there is a time entered for interval 3 of Plan 2 (location 4-2-3), then the functions below will be applied to

the phases entered in row 3 of Plan 2 (locations 4-8-3, Force Off; 4-9-3, Hold; 4-A-3, Ped Restrict; 4-B-3, Call).

Intervals – Intervals are discrete points within a plan cycle indicating when a coordination function is turned ON or OFF. The first interval (row 0) defines the plan's Cycle Length (but is also treated by the program as Interval 1 with a fixed time of zero seconds). It should be the largest value of any entry in that column. Interval times should be in increasing value with increasing row number and cannot be greater than the cycle length. Also, all entries must be sequential (no entry can be skipped). [0 to 255]

Force Offs – Indicates the phases to be terminated at the desired interval when an opposing call is present. The Force Off will remain in effect until the phases are no longer indicated in the subsequent intervals or until cycle zero if there are no subsequent intervals.

Holds - Indicates the phases to be held at the desired interval. The Hold will remain in effect until the phases are no longer indicated in the subsequent intervals or until cycle zero if there are no subsequent intervals.

Ped Restricts - Indicates the phases for which the ped operation will be restricted (not be answered) at the desired interval. The Ped Restrict will remain in effect until the phases are no longer indicated in the subsequent intervals or until cycle zero if there are no subsequent intervals.

Calls - Indicates the phases to be called at the desired interval. The Call will remain in effect the phases are no longer indicated in the subsequent intervals (or cycle zero if there are no subsequent intervals).

Offset - Opens the Controller Offset database page for the current intersection.

4.7.3   Zip Coordination (Database | Controller | Coordination | Zip Coordination)

The following parameters are common to both Zip Coordination and Standard Coordination and are described in the Coordination subsection:

- System Manual (4-0-0)

- Local Manual (4-0-1)

- Minimum Cycle Length (4-0-8)

- Maximum Cycle Length (4-0-9)

- Plan Offsets (7-A-1 through 7-A-9)

- Midnight Sync Pulse Hour (7-A-B) and Minute (7-A-C)

- Offset Timing Plan (7-A-A)

The following parameters apply to Zip Coordination only:

Zip Coord Enable - Set this location to any non-zero value to enable the Zip Coord timing and disable the Standard Coordination timing.

➲ The following parameters can be set for each of nine plans.

Cycle Length - The length of the coordination cycle to be timed. This time must be greater than the Minimum Cycle Length and less than the Maximum Cycle Length above. [0 to 255]

Force Off 1 (through Force Off 8) - The point in the current cycle at which a Force Off is placed for the applicable phase. Force Off 1 applies to phase 1 and so on through Force Off 8. The Force Off is applied for 1 second. The time entered here must be less than the cycle length. [0 to 255]

Hold Release - The point in the cycle at which the coordination Hold is released from phases 2 and 6 (the default coordinated phases). The time entered here must be less than the cycle length. [0 to 255]

Temporary Plans – Allows the user to enter the timing values for the nine temporary timing plans.

Offset - Opens the Controller Offset database page for the current intersection.

4.8   Coordination Attributes

Choose an intersection from the *Select An Intersection* form.

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The coordination phase attributes operate the same as the Phase Function Flags on the Configuration Timing Sheet. The coordination phase attributes are active only when their corresponding coordination plan is active. Any phases flagged here must also be flagged as Permitted phases (location 1-F-0).

Any phases flagged here will be **in addition** to any phases flagged for the equivalent Phase Function Flag (on Timing Sheet 2). For example, if phases 2 and 6 are flagged for Phase Function Flag minimum recall and phases 3 and 7 are flagged for Plan 2 Coordination Minimum Recall, then phases 2, 3, 6 and 7 will all be on minimum recall while Plan 2 is active.

Coordination Lagging Phases - This location sets the lagging-most (barrier) phase for each quadrant, before crossing the barrier, when running coordinated. If no phases are set, the default is set to all even numbered phases. This location is ignored in non-standard quad configurations and barrier phases will be used as lag phases. A barrier crossing is required to implement changes in this location. If no phases are selected here, then those phases set at location 1-F-C (LAGFRE) will be used.

Minimum Vehicle Recall - Causes a call to be placed for a phase during its Red interval only. This call will remain in place until the phase goes green.

Ped Recall - Causes a ped call to be placed for the flagged Ped phases. The call is continuous except during the flagged Ped's Walk interval. If no opposing call is present, the Ped indication will "rest" in Walk. The Walk interval will time down until 1 second remains in its timer. When an opposing call is placed, the remaining Walk time expires and the Flashing Don't Walk interval begins. If the opposing call drops any time before the phase's Flashing Don't Walk interval ends, the Ped Walk interval restarts and the process begins all over again. Only enabled Peds (as set in locations 1E2 through 1E7) can be flagged for Ped Recall.

Maximum Vehicle Recall - Causes a continuous call to be placed for a phase. This results in the phase staying green until its Maximum Green Timer has expired (even if no Vehicle Extension time is set for the phase).

Barrier Recall - Causes a call to be placed at barrier crossing for flagged phase(s).

Green Calling - This parameter works in conjunction with Green Call-To phases, below. While any phase flagged here is green, the Green Call-To phases will have a locked call placed for them. Both of these parameters must be set or they will be ignored.

Green Call-To - This parameter works in conjunction with Green Calling phases, above. A locked call will be placed to all phases flagged here whenever any Green Calling phases are green. Both of these parameters must be set or they will be ignored.

Max I - Forces the flagged phases to use Max I green time instead of the default Max II green time.

Red Rest - Causes a phase to terminate and rest in red if that phase is resting in green and there are no opposing calls to that phase.

Omitted - Causes the program logic to ignore all phases flagged here while the configured plan is active. If a flagged phase is in service when the plan takes effect, it will be forced off (even if there is no call to a conflicting phase).

Omit System Detectors - Future implementation.

STA (Semi-Traffic Actuated Mode) - Only enabled Peds (as set in locations 1E2 through 1E7) can be flagged for STA Mode. While the controller is running in coordinated mode, the ped phases flagged here will be placed on recall. When the ped serves, it will time out its Walk interval and rest in Walk until the coordinator sets a Force Off for the phase. At that time the ped will time its Flashing Don't Walk interval and then terminate.

Temporary Timing - Allows the user to enter the timing values for the nine temporary timing plans.

4.9   Schedule (Database | Controller | Coordination | Schedule)

Coordination tables provide the user with more flexibility and options as to what Plan or Function to run and when to run it. The tables fall into two categories, Time of Day tables, and Exception tables. Time of Day tables are 0 -4; Table 0 is the default Time of Day table.

4.9.1   Time of Day Tables (0 through 4)

Choose an intersection from the *Select An Intersection* form.

Use the dropdown menu to select a table.

Plans are numbered 1 through 9

Functions include:

   A – Special Function Output Steady ON

   B – Special Function Output Flashing

   C – Offset Timing Mode

   D – Special Function Output OFF

   E – Free Mode

   F – Time of Day Flash

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Hour: Min - Specifies the time of day, military time, that the indicated plan or function is to take effect.

Plan or Function - One of nine coordination plans or six coordination functions to take effect at the specified time and day.

Day of Week - Indicates which days of the week a plan or function is to take effect.

4.9.2   Floating Holiday Table (5)

Choose an intersection from the *Select An Intersection* form.

This table is populated with the Los Angeles County default Floating Holiday data.

	Month	Occurrence	Table	Day Of Week
0	1	3	1	-2-----X
1	2	3	1	-2-----X
2	5	9	1	-2-----X
3	9	1	1	-2-----X
4	11	4	1	----5--X
5	0	0	0	-------X
6	0	0	0	-------X
7	0	0	0	-------X
8	0	0	0	-------X
9	0	0	0	-------X
A	0	0	0	-------X
B	0	0	0	-------X
C	0	0	0	-------X
D	0	0	0	-------X
E	0	0	0	-------X
F	0	0	0	-------X

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Month/Day - Indicates the month and on which occurrence of the specified day of week that specified table is to be used. For example, Event 0 will invoke Time of Day table 1 on the 3rd Monday in January.

Table - Enter Time of Day table number (0 through 4) to be used for the specified holiday.

Day of Week - Indicates which day of week that the holiday must fall on in order for the indicated table to be run.

4.9.3   Exception Day Table (6)

Choose an intersection from the *Select An Intersection* form.

The Exception Day table indicates all fixed holidays. All fixed holidays observed by Los Angeles County are defaulted here.

Month/Day – Enter the month and day, in MM/DD format, of the exception day to be searched for.

Table – Enter the Time of Day table number (tables 0 through 4) to be used when the exception day occurs.

Day of Week – Enter the day(s) of the week that the exception day must fall on in order to run the selected table.

4.9.4   Annual Event Table (7)

Choose an intersection from the *Select An Intersection* form.

The Annual Events table is used for any user-defined Annual events.

Month/Day – Enter the month and day, in MM/DD format, of the annual event to be searched for.

Table – Enter the Time of Day table number (tables 0 through 4) to be used when the annual event occurs.

Day of Week – Enter the day(s) of the week that the annual event must fall on in order to run the selected table.

4.10 Programmable Logic (Database | Controller | Programmable Logic)

Choose an intersection from the *Select An Intersection* form.

This feature provides all common logic operations including AND, OR and XOR gates (plus their negations), a Set/Reset Latch, a Relay, and Delay, Extension and One-Shot timers. Only C1 input pins can be modified but both C1 input pins and output pins can be used to modify the input. This timing sheet uses "logic" pin numbers that are derived from the I/O port and bit numbers. The logic pin numbers (and their associated I/O function and C1 pin number) can be found on the Programmable Logic Worksheet in Appendix E12, Appendix E1 (Inputs) and Appendix E2 (Outputs). For details on this feature including operation of each of the gates/functions and examples, refer to the *LACO 4 User's Manual*, Section 8.2.

Note that this data is accessed using the Extended Memory Display mode. This requires that the first key pressed be "8" followed by the 4-digit memory location. For example, to enter data for Input 1 of And Gate 1, the 5-key sequence would be "8-1-2-8-0". See section 2.1.6 for details on the Extended Memory Display mode.

Logic Gate Inputs – Enter the logic pin number of the input, output or logic gate link that is to be used for the desired logic operation. Logic pin numbers are entered just as they appear in the appendix referenced above. For example "22" corresponds to the I1 detector input.

Logic Gate Outputs – Enter the logic pin number of the input that gate logic is to act on (or logic gate link if this output is to be used as in input for another logic function).

Latch Inputs - Enter the logic pin number corresponding to the input, output or logic gate link that is to be used as the latch Set or Reset input.

Latch Outputs – Enter the logic pin number of the input that the Latch logic is to act on (or logic gate link if this output is to be used as in input for another logic function).

Relay Input - Enter the logic pin number corresponding to the input, output or logic gate link that is to be used as the Relay input.

Relay Coil - Enter the logic pin number corresponding to the input, output or logic gate link that is to be used as the Relay Coil control.

Relay Outputs - Enter the logic pin number of the input that the Relay logic is to act on (or logic gate link if this output is to be used as in input for another logic function).

Timer Input - Enter the logic pin number corresponding to the input, output or logic gate link that is to be used as the Timer input.

Timer Type – This parameter allows the user to select the timer type. The available options are:

01 = .1 second Delay timer   10 = Whole second Delay timer

02 = .1 second Extension timer   20 = Whole second Extension timer

03 = .1 second One Shot timer   30 = Whole second One Shot timer

Timer Time – Enter the desired timer interval here. The time entered here depends on the scale of the selected timer type. For a 3.0 second "tenth seconds" timer, enter "030". For a 3 second "whole second" timer enter "003".

Timer Output – Enter the logic pin number of the input that the Timer logic is to act on (or logic gate link if this output is to be used as in input for another logic function).

4.11 Bus Priority (Database | Controller | Bus Priority)

Bus Signal Priority (BSP) allows transit buses priority service through a signalized corridor, reducing the time buses stop at red lights. The operator has a series of locations to set to optimize the performance of the priority routine for each signal location.

4.11.1 Bus Priority Control

Manual Control – Enter zero (0) to activate the BSP Communications and Logic routines. To allow communications but inhibit the logic routine, enter one (1). For hardwired inputs, enter seven (7). To completely turn off the BSP code, enter 14.

- 0 = Full BSP functionality with serial communications

- 1 = Communication only

- 7 = Hardwired inputs

- 14 = Off

Primary Address - This location contains the lower order address information and has a range of 1-255. Address zero is undefined and will be ignored.

Secondary Address – This location has a range from 0-31. If the address location is not used, it must remain zero. Secondary Address is an extension of the Primary Address. Each number equals 256. For controller addresses greater than 255, set the extension number (1-31) at the Secondary Address location and the lower order address in Primary Address. (i.e. controller address 300. Set Primary Address = 1 and Secondary Address = 44, 256x1+44=300).

City Code - A unique city code number assigned to a city by the MTA. This location has a range from 0-127. It is part of the addressing logic and must be set correctly to receive the Bus Priority message.

Hardwired ETA - When running in the hardwired mode of operation (7), there is no communication from the bus to the traffic signal controller. The operator must set an average ETA for the priority buses based

4 Controller Database Menu

on the detection system in use. This number is an estimate of the time it will take the bus to arrive once it crosses the check in loop.

4.11.2 Bus Phases

Priority Phase - Allows the operator to select which phases will be given the priority consideration. Enter the phases (one per ring) that will be given priority consideration.

Demand Phase - Selects which phases will be included in the demand override logic. Priority service will not start if any phase, flagged for Demand Phase, is in Demand Override. If a phase Demand Override flag gets set during a priority, that phase will not have its timing modified. The Demand Override flag omits that phase from the logic, which inhibits modification of its green time. If the flag is not set, its green time will always be modified by the priority logic. This allows phases with continual heavy demand to be excluded from the logic, which steals green time from the non-priority phases and gives it to the priority phase.

- North Bound - Set the priority phase corresponding to buses traveling north.

- South Bound - Set the priority phase corresponding to buses traveling south.

- East Bound - Set the priority phase corresponding to buses traveling east.

- West Bound - Set the priority phase corresponding to buses traveling west.

These four direction locations tell the logic the association between phase and direction of the Bus.

4.11.3 BSP Time of Day Table

BSP Time of Day Table - Allows 16 entries and requires four user-entered values: Hours, Minutes, Day Week flag, and Direction override flags. If the priority logic is to be turned off for all directions, all four flags must be set.

- 1 = North

- 2 = South

- 3 = East

- 4 = West

The logic can be turned off "Overridden" by three tables. The Floating Holiday and Fixed Holiday tables are the same tables used for Holiday plan selection in LACO4. The code "B" for Bus will set the BSPFLT or BSPFIX locations and tell the logic to ignore all priority requests. The Time of Day table for the BSP logic is a separate table and resides on the BSP RAM page. The Hours, Minutes, Day of Week, and Direction to override need to be entered to inhibit the priority request for any given direction by Time of Day.

4.12 Batch (Database | Controller | Batch)

4.12.1 Print/Display (Database | Controller | Batch | Print/Display)

Batch Print/Display allows the user to display or print controller data from selected controllers. KITS will display the *Controller Database Print* form, which allows you to choose the desired data to display/print by checking the boxes. An intersection must be selected from the list. Select a multiple number of intersections by holding the Ctrl key on the keyboard and clicking all of the desired intersections. The Display Button will display all controller database pages selected. The print button will print all database pages selected for every intersection chosen.

4.12.2 Copy (Database | Controller | Batch | Copy)

4.12.2.1 Pages
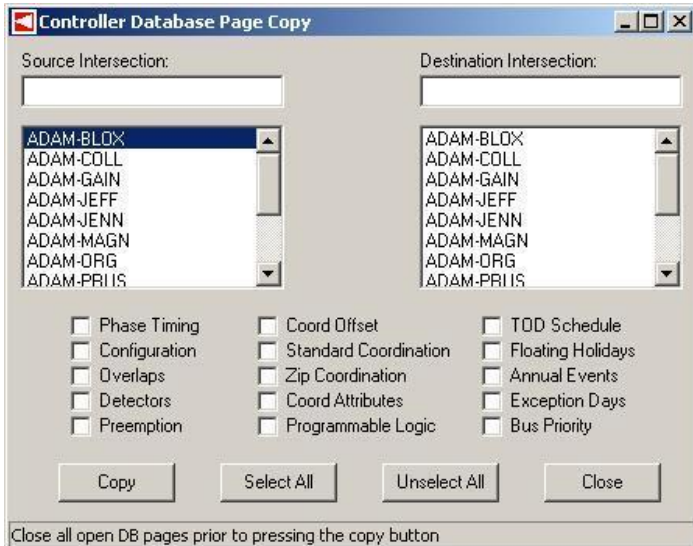
Copy Pages allows you to batch copy any or all database pages from one controller to other selected controllers. To select multiple destination intersection controllers hold down the Ctrl key on the keyboard until all selections are made.

4.12.2.2 Plans
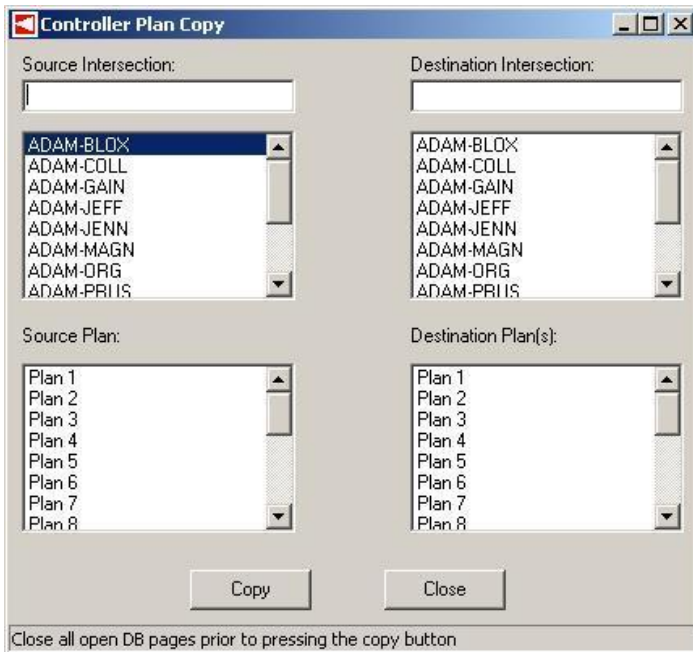
Copy Plan allows you to batch copy all plan-related information from one controller to one or a multiple number of controllers. More than one plan may be copied by holding down the Ctrl key on the keyboard until all plans to be copied are selected. The user may also select multiple destination controllers by using the same technique.

4.12.3 Batch Upload (Database | Controller | Batch | Upload)

Batch Upload allows you to upload all of the data from a selected controller. KITS will display the *Selection Dialog* form that allows you to search for and select a previously defined intersection for the upload. A prompt will verify that you wish to upload data from the selected intersection's controller. Once verified, the data will be uploaded and the results will be displayed in the *Transfer Results* form.

Transfer Results Form

	Data	Transaction	Intersection	Successful	Differences	Timestamp
1	Configuration	Import	ADAM-JEFF	No	--	14:02:22 08/15/2005
2	Phase Timing	Upload	MNRO-TENN	Yes	2	14:02:48 08/15/2005
3	Preemption Parameters	Download	MNRO-TENN	Yes	--	14:03:20 08/15/2005
4	Detectors	Upload	MNRO-TENN	Yes	5	14:04:28 08/15/2005
5				--		
6				--		
7				--		
8				--		
9				--		
10				--		
11				--		
12				--		
13				--		
14				--		
15				--		
16				--		
17				--		
18				--		
19				--		

[View]   [Clear]   [Help]   [Close]

In the *Transfer Results* form, successful uploads show as yellow and successful downloads as green. Unsuccessful uploads, downloads, or imports show as red. To view the differences, click the View button. Differences show as yellow.

Detectors Controller Data for MNRO-TENN

	App	Lanes	Description	File/Slot Channel	Delay	Extended Call	Phase Flags	Attribute Flags (L)
1				-				
2				-	211	1.2	123-----	12-4----
3				-	0	0.0	--------	--------
4				-	0	0.0	--------	--------
5				-	0	0.0	--------	--------
6				-	0	0.0	--------	--------
7				-				
8				-	0	0.0	--------	--------
9		6X100		-				
10				-	0	0.0	--------	--------
11				-	0	0.0	--------	--------
12				-	0	0.0	--------	--------
13				-	0	0.0	--------	--------
14								

4.12.4 Batch Download (Database | Controller | Batch | Download)

Batch Download allows you to download all of the database data to a selected controller. KITS will display the Selection Dialog form that allows you to search for and select a previously defined intersection for the download. A prompt will verify that you wish to download to the selected intersection's controller. Once verified, the data will be downloaded and the results will be displayed in the *Transfer Results* form.

4.13 SCHEDULING DATABASE MENU

The basis of scheduling in KITS is the time-of-day (TOD) period. Timing plan and operational modes are scheduled by TOD period. In addition, intersections can change section assignment by TOD period. Finally, parameters related to traffic responsive operation are defined per TOD period.

TOD periods are created and referenced using common names, e.g. AM Peak, Midday Peak, PM Peak, etc. The start and end times for each TOD period are defined separately for each region. This allows the TOD period to start at a different time in one area of the city than another. In addition, start and end times of TOD periods are defined separately for each day type. Day types are user defined and typically include Weekday, Friday, Weekend, and Holiday.

Day types are assigned to days of the week (i.e. Sunday-Saturday). Day types are assigned to both standard and exception weeks. Exception weeks are used to adjust schedules for seasonal changes of more than one day. For example, the period between Thanksgiving and Christmas might be defined to encompass a set of exception weeks. In this case, on days between Thanksgiving and Christmas the system would reference the exception-week day-type assignments. On any other day, the system would use the standard-week day-type assignment.

Exception days provide a mechanism for adjusting a schedule for a single day. Exception days can be defined as either fixed or floating. Fixed exception days occur on the same day of the month every year. Floating exception days occur on a selected day-of-week for a selected occurrence within a month. For example, Labor Day is the first occurrence of a Monday during September. Specifying the fifth occurrence selects the last occurrence of a day-of-week during a month whether it is actually the fourth or fifth occurrence.

The order of precedence used by the system to resolve the current day type is as follows. Exception week assignments override standard week assignments. Exception day assignments override both standard and exception week assignments.

The section schedule defines a set of TOD periods, modes, and timing plans. In sum, the TOD periods would typically encompass the entire day. The start and end times of the specified periods depend on both the region to which the section is assigned and the current day type.

The special event schedule provides a mechanism to override the section schedule starting and ending at user-specified times and dates.

Changes in the scheduling database become operational by selecting Update Schedule Changes from the Scheduling Database menu. This assures that all relevant changes are made prior to making the changes operational.

4.13.1 Day Type Definitions (**D**atabase | **S**cheduling | **D**ay Type Definitions)
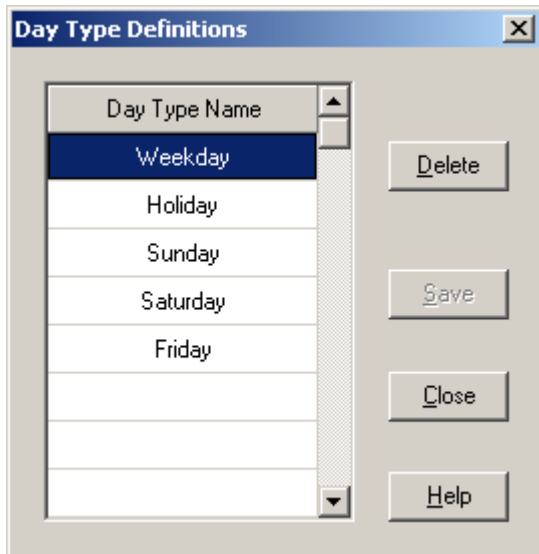
Use the *Day Type Definitions* form to define, view, edit, or delete a day type. Day types are used to group days of the week that have similar traffic patterns for scheduling operations.

4.13.1.1 **Defining Day Types**
To define a new day type, highlight the next available entry in the table and enter the day type name (up to 20 characters).

4.13.2 Editing Day Types

To edit an existing day type, highlight the day type name and enter changes.

4.13.3 Deleting Day Types

To delete an existing day type, highlight the day type you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a day type that has been removed. Be sure the day type is no longer needed prior to removal.

4.13.4 TOD Period Definitions (<u>D</u>atabase | <u>S</u>cheduling | TOD <u>P</u>eriod Definitions)

TOD Period Definitions	
Period Name	
ALL DAY	Delete
AM Peak	
Early Evening	
Football	Save
Late Evening	
Late Night	Close
Midday	
PM Peak	Help
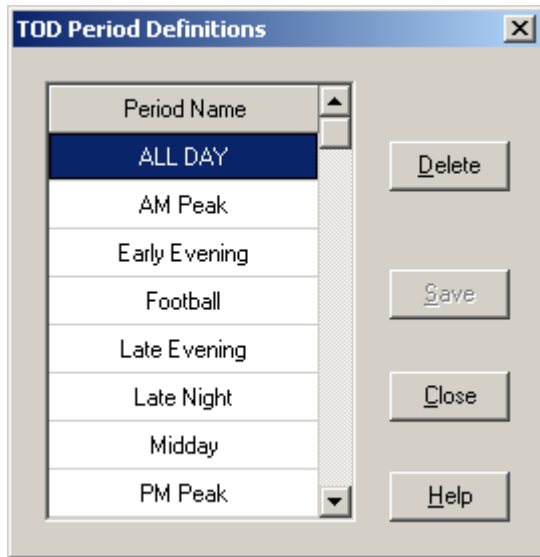
Use the *TOD Period Definitions* form to define, view, edit, or delete a time-of-day period. TOD periods are used to describe a particular traffic pattern for a section that occurs over the same time period.

4.13.4.1 **Defining TOD Periods**
To define a new TOD period, highlight the next available entry in the table and enter the TOD period name (up to 20 characters).

4.13.5 Editing TOD Periods

To edit an existing TOD period, highlight the TOD period name and enter changes.

4.13.6 Deleting TOD Periods

To delete an existing TOD period, highlight the TOD period you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a TOD period that has been removed. Be sure the TOD period is no longer needed prior to removal.

4.13.7 Timing Plan Definitions (Database | Scheduling | Timing Plan Definitions)

Use the *Timing Plan Definition* form to define, view, edit, or delete a timing plan. This form is used to name a plan number and offset combination.

- **Plan Name** is used to identify the timing plan throughout KITS (up to 20 characters).

- **Plan No.** is the timing plan number used by the intersection controller. Select a timing plan number (1 through 30) from the drop-down list.

4.13.8 Defining Timing Plans

To define a new timing plan, highlight the next available entry in the table, and enter the timing plan name, plan number, and an offset.

4.13.9 Editing Timing Plan

To edit an existing timing plan, double-click on the parameter field you wish to change and input the new value.

4.13.10 Deleting Timing Plan

To delete an existing timing plan, highlight the timing plan you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a timing plan that has been removed. Be sure the timing plan information is no longer needed prior to removal.

4.13.11 Exception Day Definitions (Database | Scheduling | Exception Day Definitions)

Use *the Exception Day Definition* form to define, view, edit, or delete an exception day. This form is used to define specific days that do not fall within the standard or exception week assignments. An exception day will override the standard and exception week settings.

- **Name** is used to identify the exception day throughout KITS (up to 20 characters).

- **Day Type** is the type of day that categorizes the exception day. Select from the drop-down list of pre-defined day types.

- **Month** specifies the month that the exception day occurs in. Select a month (January through December) from the drop-down list.

- **Type** describes whether the exception day occurs on a fixed date each year or occurs on a floating date each year, such as Thursday in the third week of November. Choosing a fixed exception day enables the day field while disabling the week of month and day of week fields. Conversely, choosing a floating exception day disables the day field while enabling the week of month and day of week fields. Select a type (fixed or floating) from the drop-down list.

- **Day** specifies the day of the month that the exception day occurs on when the exception day type is fixed. Select a day (1 through 31) from the drop-down list.

- **Week of Month** specifies the week of the month that the exception day occurs on when the exception day type is floating. Select a week (1 through 5) from the drop-down list.

- **Day of Week** specifies the day of the week that the exception day occurs on when the exception day type is floating. Select a day (Sunday through Saturday) from the drop-down list.

4.13.12 Defining Exception Days

To define a new exception day, highlight the next available entry in the table and enter the exception day name. Select the appropriate exception day parameters described above.

4.13.13 Editing Exception Days

To edit an existing exception day, double-click on the parameter field you wish to change and input the new value.

4.13.14 Deleting Exception Days

To delete an existing exception day, highlight the exception day you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

⮕ You cannot undelete an exception day that has been removed. Be sure that the exception day information is no longer needed prior to removal.

4.13.15 Viewing and Editing Day Types

To view or edit the day types, click Day Types. KITS displays the *Day Type Definition* form in which you can view and edit the current day types.

4.13.16 Exception Week Definitions (<u>D</u>atabase | <u>S</u>cheduling | Exception <u>W</u>eek Definitions)

Use the Exception Week Definition form to define, view, edit, or delete exception weeks. This form is used to define a single week or group of weeks that do not fall within the standard week configuration. Exception weeks override standard week configurations.

• **Name** is used to identify the exception week throughout KITS (up to 20 characters).

• **Start date** is the date (in MM/DD/YYYY format) that the exception week is set to begin.

• **End date** is the date (in MM/DD/YYYY format) that the exception week is set to end.

⮕ Exception weeks must have a starting date that occurs before the ending date, and exception weeks cannot overlap one another. Further, exception weeks cannot be defined for a period less than two days or greater than one year.

4.13.17 Defining Exception Weeks

To define a new exception week, highlight the next available entry in the table and enter the exception week name. Then input a starting and ending date for the exception week.

4.13.18 Editing Exception Weeks

To edit an existing exception week, double-click on the parameter field you wish to change and input the new value.
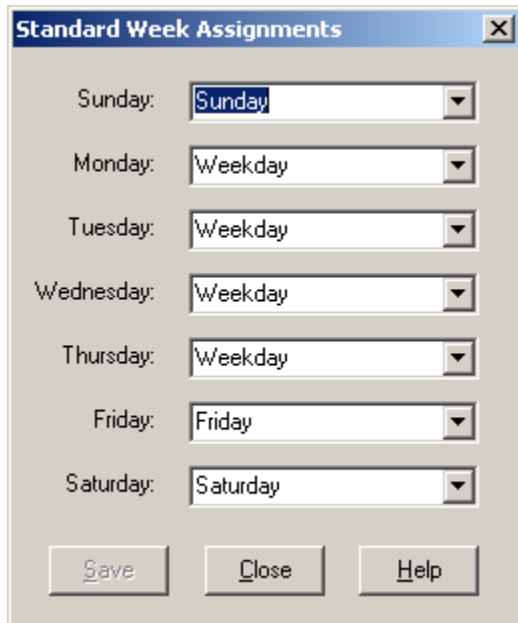
4.13.19 Deleting Exception Weeks

To delete an existing exception week, highlight the exception week you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete an exception week that has been removed. Be sure that the exception week information is no longer needed prior to removal.

4.13.20 Standard Week Assignments (<u>D</u>atabase | <u>S</u>cheduling | <u>S</u>tandard Week Assignments)
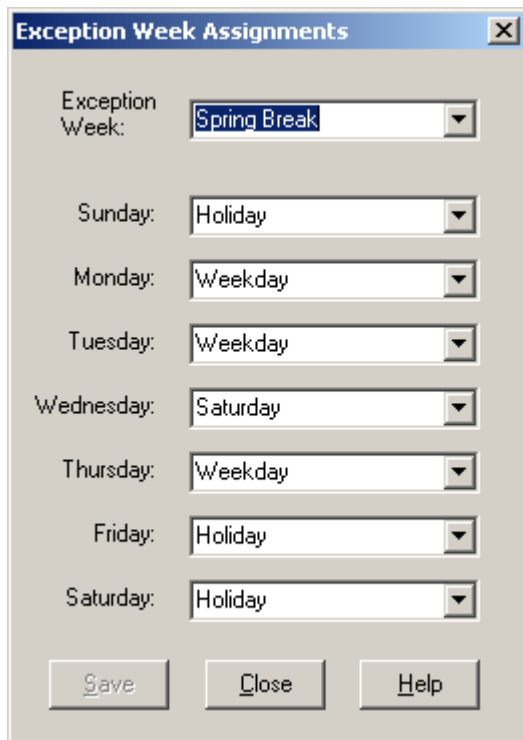
Use the *Standard Week Assignment* form to view or edit the standard week assignments. This form is used to map the days of the week to day types.

4.13.21 Editing Standard Week Assignments

For each day of the week (Sunday through Saturday), select the pre-defined day type from the drop-down list that best classifies that day.

➲ Each day of the week must be assigned a day type.

4.13.22 Exception Week Assignments (Database | Scheduling | Exception Week Assignments)

Use the *Exception Week Assignment* form to view or edit the exception week assignments. Exception week assignments are used to map the days of the week for an exception week to day types.

4.13.23 Editing Exception Week Assignments

To edit an exception week assignment, select a pre-defined exception week from the drop-down list. KITS will display the week's current assignments, if any. Then for each day of the week (Sunday through Saturday), select the pre-defined day type from the drop-down list that best classifies that day.

➲ Each day of the week must be assigned a day type.

4.14 TOD Period Assignments (Database | Scheduling | TOD Period Assignments)

Use the *TOD Period Assignment* form to view, edit, or delete the time-of-day period assignments for a given region and day type. This form is used to map the time-of-day periods to a start time and end time for a particular day type within a region.

- **Region** specifies the region that the period assignments are valid for. Select from the drop-down list of pre-defined regions.

- **Day Type** specifies the day type that the period assignments are valid for. Select from the drop-down list of pre-defined day types.

- **TOD Period** sets the time-of-day period that will be defined by the starting and ending times. Select from the drop-down list of pre-defined time-of-day periods.

- **Start Time** is the time (in HH:MM 24-hour format) that the time-of-day period is set to begin.

- **End Time** is the time (in HH:MM 24-hour format) that the time-of-day period is set to end.

⮎ Only one time-of-day period can have the same starting time for a given region and day type. Time-of-day periods cannot be assigned an interval of less than five minutes. It is possible to have a single TOD period span multiple time periods for a single day type.

4.14.1 Editing TOD Period Assignments

To edit an existing TOD period assignment, select a pre-defined region and day type from the drop-down lists. The form will display any existing current time-of-day period assignments. Double-click on the parameter field you wish to change and input the new value.

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4.14.2 Deleting TOD Period Assignments

To delete an existing TOD period assignment, select a pre-defined region and day type from the drop-down lists. Highlight the time-of-day period assignment you wish to remove and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a TOD period assignment that has been removed. Be sure that the TOD period assignment information is no longer needed prior to removal.

4.14.3 Viewing and Editing Day Types

To view or edit the day types, click Day Types. KITS displays the *Day Type Definition* form in which you can view and edit the current day types.

4.15 TOD Period Assignments (Database | Scheduling | TOD Assignments)

4.15.1 TOD Section Schedule (Database | Scheduling | TOD Section Schedule)

Use the *TOD Section Schedule* form to view, edit, or delete a time-of-day period schedule for a given section. This form is used to schedule the plan and operation mode that will be sent to each intersection contained in the section. If traffic responsive is selected as a mode, it will choose the optimal plan to run for the section.

- **TOD Period** is selected from the drop-down list of pre-defined time-of-day periods.

- **Plan** is the timing plan that will run during the specified time-of-day period. Select from the drop-down list of user-defined timing plans and system-defined timing plans (flash, free, and stand by).

- **Operation Mode** is the mode of operation that will execute during the specified time-of-day period. Select from the drop-down list between TOD schedule and traffic responsive. When selecting traffic responsive, a plan must also be selected. This plan will be run if the section exceeds its detector failure threshold.

⮕ TOD periods cannot be repeated within a given section schedule.

4.15.2 Editing TOD Schedules

To edit an existing TOD schedule for a given section, double-click on the parameter field you wish to change and input the new value.

4.15.3 Deleting TOD Schedules

To delete an existing TOD schedule for a given section, highlight the time-of-day period entry you wish to remove and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a TOD period schedule entry that has been removed. Be sure the information is no longer needed prior to removal.

4.15.4 Changing Sections

To view or edit another section's TOD schedule, click Change. KITS will display the Selection Dialog form that allows you to search for and select a previously defined section. The section's TOD schedule, if any, will be displayed. To go to the next or previous section in the system alphabetically, click Next or Previous.

4.15.5 Verifying Schedules

To verify the timing plan schedule, click the Verify Schedule button. Each timing plan will be used to verify the cycle length of each intersection assigned to the chosen section during the selected time-of-day period. Each cycle length must be greater than zero and be a multiple of all other cycle lengths to be considered valid.

4.15.6 Viewing and Editing TOD Periods

To view or edit the TOD periods, click TOD Periods. KITS displays the *TOD Period Definition* form in which you can view and edit the current time-of-day periods.
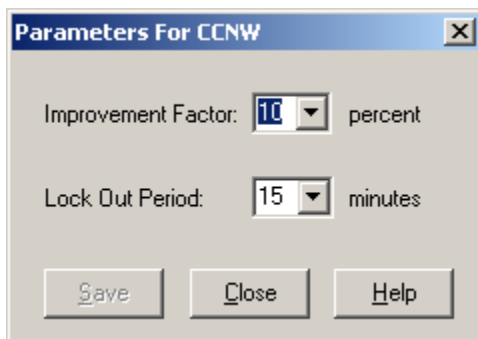
4.15.7 Viewing and Editing Timing Plans

To view or edit the timing plans, click Timing Plans. KITS displays *the Timing Plan Definition* form in which you can view and edit the current timing plans.

4.16 Intersection Reassignment (Database | Scheduling | Intersection Reassignment)

Use the *Intersection Reassignment* form to view, edit, or delete the section assignments for a given intersection. This form is used to assign an intersection to a different section based on the time-of-day period.

- **Primary Section Assignment** displays the section that the intersection is assigned to on a regular basis. This value cannot be modified from this form.

- **TOD Period** sets the time-of-day period that the intersection will be assigned to the selected section. Select from the drop-down list of pre-defined time-of-day periods. The intersection will change its assignment based on the TOD period of its new section, not its primary section.

- **Section** specifies the section that the intersection will be assigned to during the selected time-of–day period. Select from the drop-down list of pre-defined sections.

➲ TOD periods cannot be repeated for a given intersection.

4.16.1 Editing Intersection Assignments
To edit a given intersection's assignments, highlight a time-of-day period in the list and re-select the TOD period or section.

4.16.2 Deleting TOD Schedules
To delete a given intersection's assignments, highlight the time-of-day period entry you wish to remove and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete an assignment entry that has been removed. Be sure the information is no longer needed prior to removal.

4.16.3 Changing Intersections

To view or edit another intersection's assignments, click Change. KITS will display the *Selection Dialog* form that allows you to search for and select a previously defined intersection. The intersection's section assignments, if any, will be displayed. To go to the next or previous intersection in the system alphabetically, click Next or Previous.

4.16.4 Viewing and Editing TOD Periods

To view or edit the TOD periods, click TOD Periods. KITS displays the *TOD Period Definition* form in which you can view and edit the current time-of-day periods.

4.17 Special Event Schedule (Database | Scheduling | Special Event Schedule)

Use the *Special Event Schedule* form to define, view, edit, or delete a special event. Special events are used to schedule a plan for a section or area that does not fall within the other available scheduling options.

- **Name i**s used to identify the special event throughout KITS (up to 20 characters).

- **Start Date** is the date (in MM/DD/YYYY format) that the special event is set to begin.

- **End Date** is the date (in MM/DD/YYYY format) that the special event is set to end.

- **Start Time** is the time of day (in HH:MM 24-hour format) that the special event is set to begin.

- **End Time** is the time of day (in HH:MM 24-hour format) that the special event is set to end.

- **Extent** specifies the section or area for the special event. Select from the drop-down list of pre-defined sections. A special event may only be run on a section.

- **Action** indicates the timing plan or operation mode that should be used to handle the special event. Select a system timing plan (flash, free, or stand by), operation mode (time-of-day schedule or traffic responsive), or user-defined timing plan from the drop-down list.

➲ Special events must have a starting date/time that occurs before the ending date/time, and special events within the same section cannot overlap one another. Further, special events cannot be defined a period of less than fifteen minutes or greater than seven days.

4.17.1 Defining Special Events

To define a new special event, highlight the next available entry in the table and enter the special event name. Then select the appropriate special event parameters described above.

4.17.2 Editing Special Events

To edit an existing special event, highlight the special event name and enter changes. Edit the special event parameters described above.

4.17.3 Deleting Special Events

To delete an existing special event, highlight the special event you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

You cannot undelete a special event that has been removed. Be sure the special event information is no longer needed prior to removal.

4.17.4 Viewing and Editing Timing Plans

To view or edit the timing plans, click Timing Plans. KITS displays the Timing Plan Definition form in which you can view and edit the current timing plans.

4.18 Implement Schedule Changes (Database | Scheduling | Implement Schedule Changes)

Use the Implement Schedule Changes menu item to synchronize scheduling data changes with the scheduler server.

The Implement Schedule Changes menu item becomes enabled once any schedule-related data is changed. Selecting the menu item causes KITS to notify the scheduler that synchronization is required. If synchronization fails, the user is notified and the menu option remains enabled. If the synchronization is successful, the user is also notified and the menu option becomes disabled.

Saved modifications to scheduling data are written to the database; however, the scheduler server will not be immediately informed of the modifications unless this menu item is selected. The scheduler will automatically resynchronize with the database daily at midnight.

4.19 Traffic Responsive Database Menu (Database | Traffic Responsive)

The Traffic Responsive Menu allows an operator to create, edit, delete, and save traffic responsive information used to select optimal timing plans for a section based on current traffic conditions.

The primary data items used for traffic responsive operation are volume and occupancy signatures. These parameters are key inputs to the pattern matching process used by traffic responsive to select the best timing plan based on real-time detector data.

Signature data is defined on a section basis. Signatures can also vary by time-of-day (TOD) period. In addition to signature data, traffic responsive parameters include detector failure thresholds, improvement factor, and lockout period. The improvement factor and lockout period are used to dampen traffic responsive activity.

Traffic Responsive Setup

Use the *Traffic Responsive Setup* form to view, edit, or delete traffic responsive setup information for a given section. This form is used to specify the detectors, their weights, and the timing plans for traffic responsive signatures in a given section and time-of-day period. If traffic responsive is currently selected as the mode for a section, it will choose the optimal plan to run by comparing the volume and occupancy signatures for each plan to the current smoothed volume and occupancy for the detector.

To adjust traffic responsive parameters that are not section specific, use the *System Parameters* form.

- **TOD Period** is selected from the drop-down list of pre-defined time-of-day periods. Once chosen, the traffic responsive data for the selected section and TOD period is displayed.

- **Detector** allows the user to choose which detectors will be used for traffic responsive scheduling. Detectors are shown with their associated intersection separated by a colon. Select from the drop-down list of pre-defined detectors.

- **Weight** is the relative significance given to occupancy as compared to volume during traffic responsive calculations. Select from the drop-down list of weights (between 1 and 100).

- **Timing Plan** allows the user to choose the timing plan that traffic responsive can select. Select from the drop-down list of user-defined and system-defined timing plans (flash, free, and stand by).

➲ Detectors and timing plans cannot be repeated within a given section and time-of-day period, and the user must select at least one detector and one timing plan prior to saving.

4.19.1 Editing Detectors and Weights

To edit a detector entry or its weight, double-click on the detector or weight field you wish to change and select the new detector or weight. To filter the list of detectors, enter up to the first 8 characters of the intersection associated with the detectors you are looking for into the search key. The drop-down list will automatically update based on each character input and display intersection names where either cross street matches the search key input.

4.19.2 Deleting Detectors and Weights

To delete a detector entry and its weight, highlight the detector entry you wish to remove and click Detector Remove. KITS will confirm the deletion prior to removing it.

4.19.3 Editing Detector Volume and Occupancy Thresholds

To edit the minimum and maximum volume and occupancy settings for the selected detectors, click Detector Thresholds. The Detector Thresholds form will be displayed with the current detector information.

4.19.4 Editing Timing Plans

To edit a timing plan entry, double-click on the timing plan field you wish to change and select the new plan.

4.19.5 Deleting Timing Plans

To delete a timing plan entry, highlight the timing plan entry you wish to remove and click Timing Plan Remove. KITS will confirm the deletion prior to removing it.

4.19.6 Editing Traffic Responsive Parameters

To edit the traffic responsive parameters, click Parameters. The Traffic Responsive Parameters form will be displayed with the current settings.

4.19.7 Viewing Traffic Responsive Signatures

To view the signatures for the selected detectors and timing plans, click Signatures. KITS will prompt if you want to view the signatures for all the timing plans displayed or only the currently selected timing plan. The Traffic Responsive Signatures form will be displayed with the current signature information.

4.19.8 Changing Sections

To view or edit another section's traffic responsive information, click Change. KITS will display the Selection Dialog form that allows you to search for and select a previously defined section. The section's

traffic responsive information, if any, will be displayed. To go to the next or previous section in the system alphabetically, click Next or Previous.

4.19.9   Viewing and Editing TOD Periods

To view or edit the TOD periods, click TOD Periods. KITS displays the *TOD Period Definition* form in which you can view and edit the current time-of-day periods.

4.19.10 Viewing and Editing Detectors

To view or edit detectors, click the Detector Edit button. KITS will prompt if you want to view the detectors for the current section or the entire system. Then KITS displays the Detector List form in which you can view and edit the detector definitions.

4.19.11 Viewing and Editing Timing Plans

To view or edit the timing plans, click the Timing Plan Edit button. KITS displays the *Timing Plan Definition* form in which you can view and edit the current timing plans.

4.19.12 Verifying Schedules

To verify the timing plan schedule, click the Verify Schedule button. Each timing plan will be used to verify the cycle length of each intersection assigned to the chosen section during the selected time-of-day period. Each cycle length must be greater than zero and be a multiple of all other cycle lengths to be considered valid.

4.19.13 Traffic Responsive Parameters (Database | Traffic Responsive | Parameters)

Use the Traffic Responsive Parameters form to view or edit traffic responsive signatures for a given section.

- **Improvement Factor** sets the percentage (between 1 and 100) of improvement in the data pattern match between the current timing plan and the chosen traffic responsive timing plan. The newly selected plan will not be implemented if the minimum improvement is not met.

    - Default = 10 percent

- **Lock Out Period** sets the interval (between 5 and 60 minutes) for Traffic Responsive calculations. This is the minimum time interval for a new plan selection.

    - Default = 15 minutes

4.19.14 Traffic Responsive Signatures (Database | Traffic Responsive | Signatures)

Use the Traffic Responsive Signatures form to view or edit traffic responsive signatures for a given section and time-of-day period. Traffic responsive compares real-time detector data with the signatures listed in this form. The plan with the corresponding volume and occupancy signatures that most closely match the current weighted detector conditions will be selected and sent to each intersection contained in the section.

- **Section** is a read-only display of the currently selected section.

- **TOD Period** is a read-only display of the currently selected time-of-day period.

- **Timing Plan** is a read-only display showing either "all plans" if the user preferred to view the signature of all chosen timing plans or the name of the currently selected timing plan.

- **Plan** is a read-only field that displays the current timing plan selection.

- **Detector** is a read-only field that displays the current detector selection. Detectors are shown with their associated intersection separated by a colon.

- **Hourly Vol Sig** is the hourly volume signature (between 0 and 2000) for the given timing plan and detector.

- **% Occ Sig** is the percent occupancy signature (between 0 and 100 percent) for the given timing plan and detector. Select a percent from the drop-down list.

Editing Signatures

To edit an existing signature, double-click on the Vsig or Osig field you wish to change and select the new value.

4.19.15 Detector Thresholds (Database | Traffic Responsive | Detector Thresholds)

Use the *Detector Thresholds* form to view or edit minimum and maximum volume and occupancy settings for all traffic responsive detectors selected in a given section and time-of-day period. Traffic responsive compares real-time detector data with the minimum and maximum volume and occupancy thresholds listed in this form. If a given detector's volume and/or occupancy exceeds a threshold, the detector's historical replacement data will be used instead.

- **Section** is a read-only display of the currently selected section.

- **TOD Period** is a read-only display of the currently selected time-of-day period.

- **Detector** is a read-only field that displays the current detector selection. Detectors are shown with their associated intersection separated by a colon.

- **Hourly Vol Min** is the minimum hourly volume threshold (between 0 and 2000) for the given detector.

- **Hourly Vol Max** is the maximum hourly volume threshold (between 0 and 2000) for the given detector.

- **% Occ Min** is the minimum percent occupancy threshold (between 0.0 and 100.0 percent) for the given detector.

- **% Occ Max** is the maximum percent occupancy threshold (between 0.0 and 100.0 percent) for the given detector.

➲ Each minimum threshold must be less than the maximum threshold.

4.19.16 Editing Thresholds

To edit an existing threshold, double-click on the field you wish to change and input the new value. To remove a threshold setting, enter a space in the selected field.

4.20 Traffic Studies (Database | Traffic Studies)

4.20.1 Turning Movement Count (Database | Traffic Studies | Turning Movement)

The Turning Movement Count Data Entry Menu allows an operator to manually enter the turning movement counts directly into the KITS database based on an intersection, collected date, period, and time of day. The user is able to enter counts for all 12 intersection approaches using the KITS screen shown below. Counts may be printed using the *Turning Movement Count Report* menu item described in The Turning Movement Report section.

- **Change:** Displays the selection dialog, which allows the user to select a new intersection.

- **Save:** Saves the turning movement counts to the database.

- **Close:** Closes turning movement count data entry form.

4.20.2 Level of Service (LOS) Data (Database | Traffic Studies | Level of Service)

The LOS Data Entry Form allows the user to enter Level of Service for each intersection approach along with the overall Level of Service and Volume/Capacity ratio for each peak period.

Date is the date of the traffic study.

Start Time is the beginning time of the traffic study.

TOD Period is the peak period for this study (AM, Mid Day, or PM)

- **North Bound LOS** is the Level of Service for the north bound intersection approach.

- **South Bound LOS** is the Level of Service for the south bound intersection approach.

- **East Bound LOS** is the Level of Service for the east bound intersection approach.

- **West Bound LOS** is the Level of Service for the west bound intersection approach.

Total LOS is the overall Level of Service for the intersection.

Volume/ Capacity Ratio is for the intersection.

Clear All clears the entire form.

Change invokes the Selection Dialog, which allows the user to select a different intersection. If there have been changes made to the current intersection, a message box will appear asking if the user would like to save the changes.

Save performs a check to determine if data has been entered for this peak period and intersection with a date within one year of the specified date. If there is a record found in the intersection a message box will ask whether the user would like to overwrite the previous data. This allows the user to modify data that may have been entered incorrectly.

Close closes the form. If there have been changes made to the current intersection, a message box will appear asking if the user would like to save the changes.

5   COMMAND MENU

The Command Menu provides the capability to manually command a section or the system into an operational mode including traffic responsive and time-of-day schedule. In addition, an intersection, section, or the system can be commanded to execute a specified timing plan, including flash, free, stand by, or any user-defined timing plan. Finally, an intersection can be commanded into a different section.

Manual commands remain in effect until cancelled by the operator. Currently implemented commands can also be listed and cancelled at any time.

Dial-up communication is provided as part of the command menu. An operator can connect or disconnect a modem connection between the system and a controller. Finally, the operator can choose to upload preemption data from the field through the command menu.

5.1   Free Command (Command | Plan | Free)

The Free manual command allows a user to command an intersection, section, area, or the system into free operation. Free is defined as plan number 62, and will command the intersection to operate so it is not coordinated with surrounding intersections.

To send a free command, choose the Free command menu option. KITS displays the *Selection Dialog* form allowing the user to search for and select a previously defined intersection, section, area, or system. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the Current Commands form.

5.2   Flash Command (Command | Plan | Flash)

The Flash manual command allows a user to command an intersection, section, or area into flash operation. Flash is defined as plan number 63, and will command the intersection to display a flashing red light in all directions.

To send a flash command, choose the Flash command menu option. KITS displays the *Selection Dialog* form allowing the user to search for and select a previously defined intersection, section or area. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.3   Stand By Command (Command | Plan | Stand By)

The Stand By manual command allows a user to command an intersection, section, area, or the system into standby operation. Standby will command the intersection to run its internal scheduled timing plan.

To send a standby command, choose the Standby command menu option. KITS displays the *Selection Dialog* form allowing the user to search for and select a previously defined intersection, section, area, or system. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.4 Timing Plan Command (Command | Plan | Timing Plan)

The Timing Plan manual command allows a user to command an intersection, section, area, or the system into a user-defined timing plan operation. A user defined timing plan consists of a plan number (1 through 30).

To send a timing plan command, choose the Timing Plan command menu option. KITS displays the *Selection Dialog* form allowing the user to search for and select a previously defined intersection, section, area, or system, followed by a timing plan dialog box prompting the user to select a pre-defined timing plan from the drop-down list. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.5 TOD Schedule Command (Command | Mode | TOD Schedule)

The TOD Schedule manual command allows a user to command a section or the system into time-of-day schedule mode. This command will force the section or system to run the timing plan based on its TOD schedules.

To send a time-of-day schedule mode command, choose the TOD Schedule command menu option. KITS displays the *Selection Dialog* form allowing the user to search for and select a previously defined section or system. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.6 Traffic Responsive Command (Command | Mode | Traffic Responsive)

The Traffic Responsive manual command allows a user to command a section or the system into traffic responsive mode. The section or system will be commanded into the optimal plan that traffic responsive selects. Traffic responsive criteria can be defined in the *Traffic Responsive Setup* form.

To send a traffic responsive command, choose the Traffic Responsive command menu option. KITS displays the Selection Dialog form allowing the user to search for and select a previously defined section or the entire system. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.7 Section Assignment Command (Command | Section Assignment)

The Section Assignment manual command allows a user to command an intersection into a section. The intersection will remain in the section until the manual command is cancelled.

To send a section assignment command, choose the *Section Assignment* command menu option. KITS displays the Selection Dialog form allowing the user to search for and select a previously defined intersection. Next, KITS display the Selection Dialog form again allowing the user to search for and select a section. KITS will verify the command prior to implementation. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.8 Upload Preemption Log Command (Command | Upload Preemption Log)

The Upload Preemption Log manual command allows a user to obtain the preemption log for a selected intersection.

To send an upload preemption log command, choose the Upload Preemption Log command menu option. KITS displays the *Selection Dialog* form allowing the user to search for and select a previously defined intersection. If a preemption device is located at the selected intersection, KITS send up to three requests for the intersection's preemption log. If successful, KITS will indicate this to the user and store

the returned information in the database which can be viewed using the *Preempt Log Historical Report*. Otherwise, KITS will inform the user that the operation failed.

5.9   Incident Response Plan Command (<u>C</u>ommand | <u>I</u>ncident Response Plan)
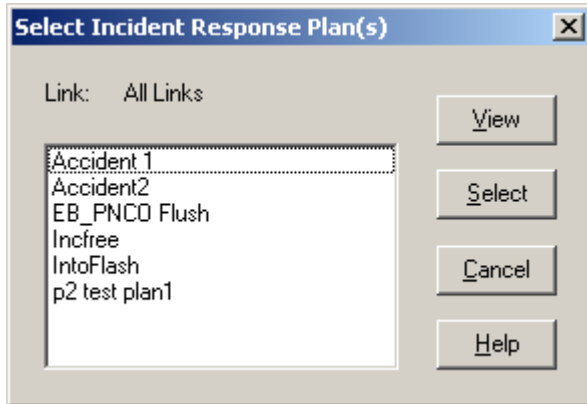
The Incident Response Plan manual command allows a user to issue one or more pre-defined incident response plans.

➲ Incident Response Plan manual command will only be available if the local workstation is designated as an incident management station and the current user has sufficient privileges to access the operation.

To send an incident response plan command, choose the Incident Response Plans command menu option. KITS displays the *Incident Response Plan Selection* form allowing the user to search for and select one or more previously defined incident plans. Each incident plan can be reviewed by highlighting the plan and clicking View. Once you have highlighted the response plans to send, click Select. KITS will confirm the operation prior to sending the command. Once sent, KITS will indicate the success or failure status of each manual command contained in the selected incident response commands. All manual commands can be viewed or cancelled using the *Current Commands* form.

5.10 Current Commands (Command | Current Commands)
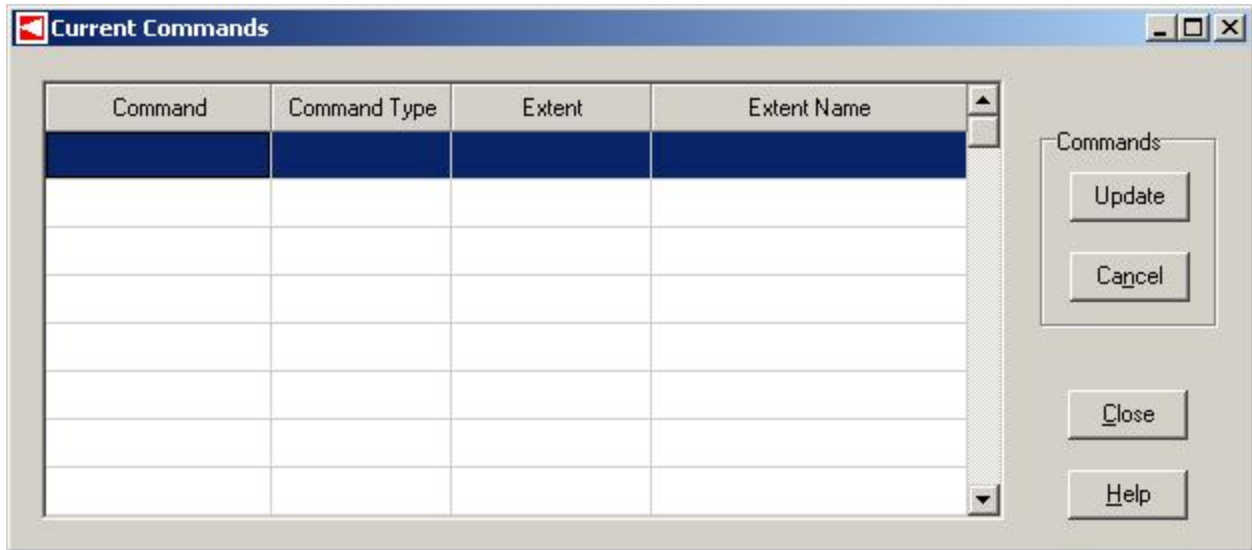
Use the *Current Commands* form to view or cancel manual commands.

- **Command** displays the plan and mode name currently executing.

- **Command Type** indicates whether the current command is a timing plan or operation mode (Plan or Mode).

- **Extent** displays the scope of the command (intersection, section, or system). If a command is sent to an area, each intersection within the area will be displayed on this form.

- **Extent name** displays the name of the target section or intersection for the command.

5.10.1 Updating commands

To update the list of manual commands, click Update. KITS will retrieve the most recent list of manual commands in operation. When a command is issued or canceled from your workstation, the list of commands will be updated; however, if a command is issued or canceled from another workstation, the list of commands may become unsynchronized.

5.10.2 Canceling commands

To cancel a manual command, highlight the command entry you wish to remove and click Cancel. KITS will confirm the cancellation prior to removing it.

5.11 Dial-up Communications (Command | Dial-up Communications)
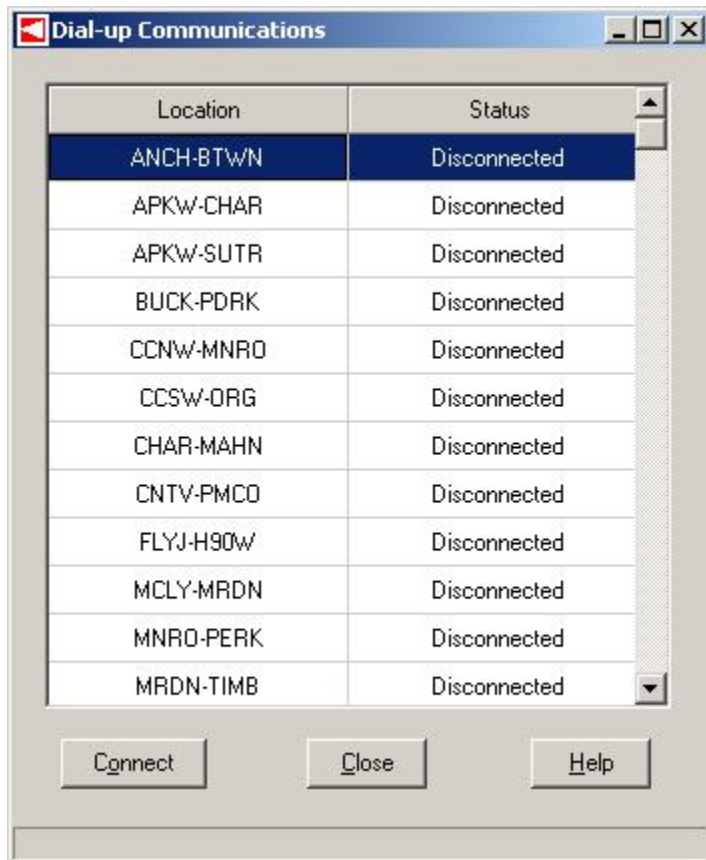
Use the Dial-up Communications form to view or change the connection status of all dial-up controllers in the system. The status of each controller is updated each second to reflect current conditions.

- **Controller** displays location of the dial-up controller.

- **Status** indicates whether dial-up controller is currently connected, disconnected, or in an unknown state (due to a communications error).

5.11.1 Changing Connection Status

To change the status of a dial-up controller, select the controller in the list and press the Connect/Disconnect button located at the bottom of the form. The status column will change to indicate the progress of the request. Once complete, the controller's final state will be reflected in the table.
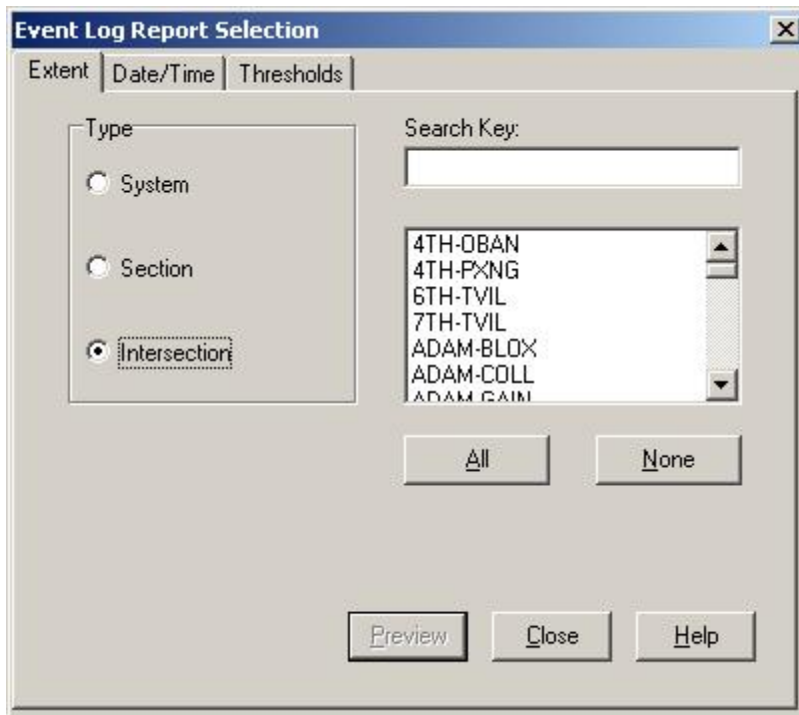
➲ A controller in an unknown state due to a communications error cannot have its status changed.

6 HISTORY REPORTS MENU
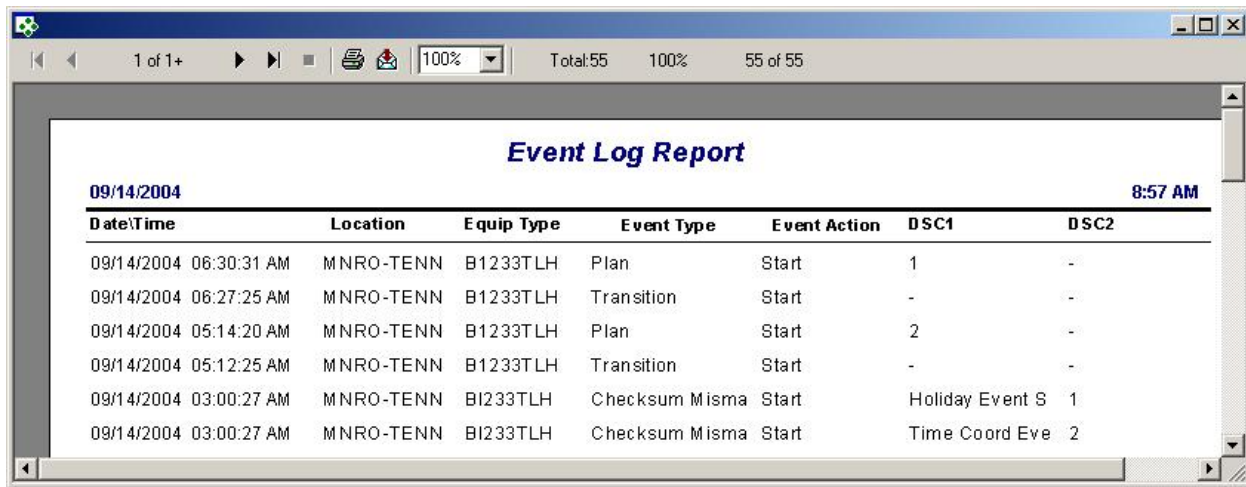
The History Reports Menu permits an operator to view, filter, and print online historical data including system events, user activities, system detector data, count detector data, link data, controller communications statistics, and preemption log. Filtering criteria includes multiple locations or groupings, date and time limits, and various numeric data limits. All of the reports are initially displayed on the screen with an option provided to print the report.

In addition to manual report option, the History Report Menu provides access to scheduled reports. Scheduled reports are predefined Crystal Reports that can be scheduled for printing daily, weekly, bi-monthly, or monthly.

6.1 Event Log Report (History Reports | Event Log)

Use the *Event Log Report* Selection form to filter event data and generate an event log report where the data can be viewed or printed.

An event record consists of:

- when the event occurred

- where the event occurred

- the type of equipment generating the event

- the type of event

- the action taken by the event

- an optional event description(s)

See System Events for a full discussion of potential events.

6.1.1   Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of events to be viewed. Once the extent (system, section, or intersection) is selected, the listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically.

- **Date/Time** allows the user to select the starting and/or ending date and time of events to be viewed.

- **Thresholds** allow the user to select the event and equipment types of events to be viewed.

6.1.2   Viewing the Report
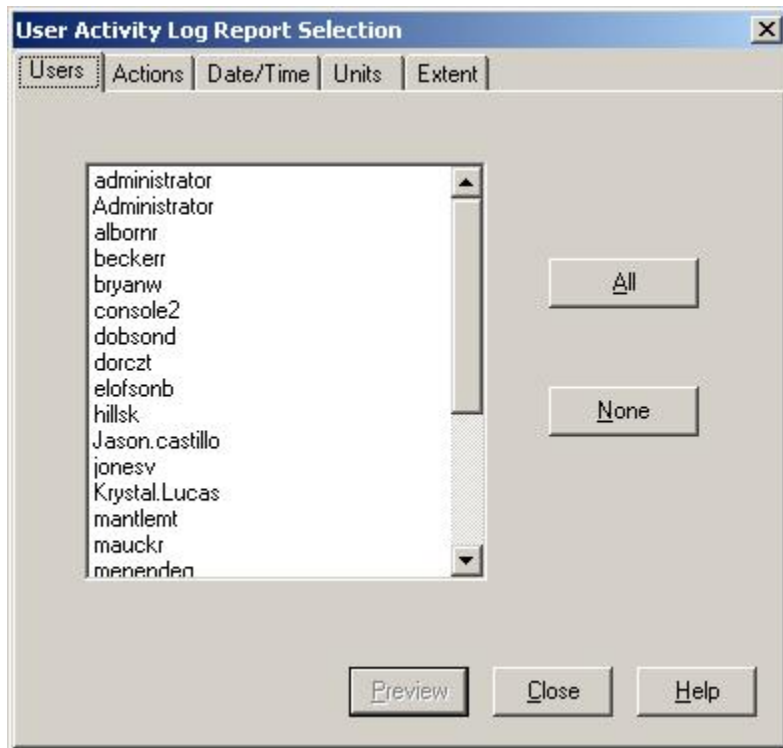
After choosing an extent in the selection form, click Preview. KITS will display the filtered event log report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the Event Log Report Selection form.
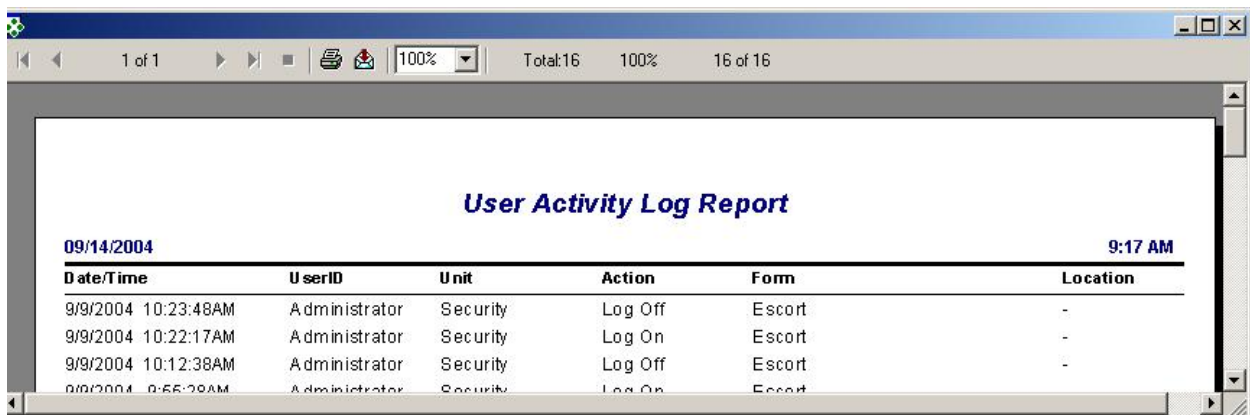
6.1.3   Printing the Report

To print the event log report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.2　Link History Report　(History Reports | Link History)

Use the *Link History Report* Selection form to filter link data and generate a link history report where the data can be viewed or printed.

A link data consists of:

- when the data was generated

- the link that generated the data

- the smoothed volume over the link

- the smoothed occupancy over the link

- the smoothed speed over the link

- the failed detectors in the link

6.2.1 Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of the links to be viewed. Once the extent (system or intersection) is selected, the left listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically. The links list is generated based on the extent selection. For example, if the user chooses an intersection extent, the links shown in the links list will be the links associated with the selected intersection. At least one link must be selected to enable the preview button.

- **Date/Time** allows the user to select the starting and/or ending date and time of detector data to be viewed.

- **Thresholds** allow the user to select the smoothed volume, smoothed occupancy, smoothed speed, and failed detector data to be viewed.

6.2.2 Viewing the Report

After choosing an extent in the selection form, click Preview. KITS will display the filtered link history report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the Link History Report Selection form.

6.2.3 Printing the Report

To print the link history report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.3 System Detectors Report (History Reports | System Detectors)

Use the *System Detectors Report Selection* form to filter system detector data and generate a system detector report where the data can be viewed or printed. Data is written to this report at the interval specified in the *System Parameters* form.

A system detector data entry consists of:

- when the data was generated

- the intersection that contains this detector

- the detector that generated the data

- the total number of vehicles that crossed the detector during the summary period

- the total percentage of time that a vehicle occupied the detector

- the average vehicle speed over the detector

- the detector status

See Detector Operations for a full discussion of detector usage.

6.3.1   Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of the detectors to be viewed. Once the extent (system, section, or intersection) is selected, the left listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically. The detector list is generated based on the extent selection. For example, if the user chooses an intersection extent, the detectors shown in the detector list will be the detectors contained in the selected intersection. At least one detector must be selected to enable the preview button.

- **Date/Time** allows the user to select the starting and/or ending date and time of detector data to be viewed.

- **Thresholds** allow the user to select the volume, occupancy, speed, and status of detector data to be viewed.

6.3.2   Viewing the report

After choosing an extent in the selection form, click Preview. KITS will display the filtered system detector report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the System Detectors Report Selection form.

6.3.3   Printing the report

To print the system detector report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.4 Count Detectors Report (History Reports | Count Detectors)

Use the *Count Detectors Report Selection* form to filter count detector data and generate a count detector report where the data can be viewed or printed. Data is written to this report at the interval specified in the *System Parameters* form.

A count detector data entry consists of:

- when the data was generated

- the intersection that contains this detector

- the detector that generated the data

- the total number of vehicles that crossed the detector during the summary period

- the detector status

See Detector Operations for a full discussion of detector usage.

6.4.1   Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of the detectors to be viewed. Once the extent (system, section, or intersection) is selected, the left listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically. The detector list is generated based on the extent selection. For example, if the user chooses an intersection extent, the detectors shown in the detector list will be the detectors contained in the selected intersection. At least one detector must be selected to enable the preview button.

- **Date/Time** allows the user to select the starting and/or ending date and time of detector data to be viewed.

- **Thresholds** allow the user to select the volume and status of detector data to be viewed.

6.4.2   Viewing the Report

After choosing an extent in the selection form, click Preview. KITS will display the filtered system detector report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the System Detectors Report Selection form.

6.4.3   Printing the Report

To print the system detector report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.5   Communication Statistics Report (<u>H</u>istory Reports | <u>C</u>ommunication Stats)

Use the *Communication Statistics Report Selection* form to filter communication data and generate a communication statistics report where the data can be viewed or printed. The report will detail the field communication statistics over a 15-minute interval.

A communication statistic entry consists of:

- when the communication summary was generated

- the intersection that generated the statistics

- the line of the intersection

- the drop address of the intersection

- the number of poll messages sent to the intersection during the summary period

- the number of no responses from the intersection to the poll messages during the summary period

- the number of bad responses from the intersection to the poll messages during the summary period

- the percent of correct poll message responses for the intersection during the summary period

See Field Communication Statistics for a full discussion of controller communication.

6.5.1   Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of communication statistics to be viewed. Once the extent (system, section, or intersection) is selected, the listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically.

- **Date/Time** allows the user to select the starting and/or ending date and time of the communication statistics to be viewed.

- **Thresholds** allow the user to select the quality range of communication statistics to be viewed.

6.5.2   Viewing the Report

After choosing an extent in the selection form, click Preview. KITS will display the filtered communication statistics report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the Communication Statistics Report Selection form.

6.5.3   Printing the Report

To print the communication statistics report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.6 User Activity Log Report (History Reports | User Activity Log)

Use the *User Activity Log Report* Selection form to filter user activity data and generate a user activity log report where the data can be viewed or printed.

A user activity entry consists of:

- when the activity occurred

- the user name (based on Windows NT login) that performed the activity

- the functional category of operations (units) that the activity occurred in. See Unit Categories for a full discussion of units.

- the action that occurred

- the user interface form involved in the activity

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- the location (intersection, section, etc.) involved in the activity

6.6.1 Filtering the Report

Use the selection form to filter report data. The form contains four tabbed categories of selection criteria: users, actions, date/time, and units.

- **Users** allows the user to select the users (by user ID) who performed the activity.

- **Actions** allow the user to select the actions to be viewed (delete, save, download, import, start plan, cancel plan, start mode, and cancel mode).

- **Date/Time** allows the user to select the starting and/or ending date and time of activities to be viewed.

- **Units** allow the user to select the category of operations the activity falls under to be viewed. See Unit Categories for a full discussion of units.

- **Extent** allows the user to select a specific intersection, Line, Section, or the entire system to be viewed in the report

6.6.2 Viewing the Report

After choosing the user(s) in the selection form, click Preview. KITS will display the filtered user activity log report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until at least one user has been chosen in the User Activity Log Report Selection form.

6.6.3 Printing the Report

To print the user activity log report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.7 Preemption Log Report (History Reports | Preemption Log)

Use the *Preemption Log Report* Selection form to filter preemption data and generate a preemption log report where the data can be viewed or printed.

A preemption log entry consists of:

- when the preemption occurred

- the name of the intersection where the preemption occurred

- the duration of the preemption

- the class of the preemption

- the status of the preemption

- the final greens of the preemption

- the total greens of the preemption

- the maximum intensity of the preemption

Refer to the preemption device manual for a more complete description of the preemption log fields.

6.7.1   Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of events to be viewed. Once the extent (system, section, or intersection) is selected, the listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically.

- **Date/Time** allows the user to select the starting and/or ending date and time of activities to be viewed.

- **Thresholds** allow the user to select the duration, final greens, total greens, and maximum intensity ranges of the preemption events to be viewed.
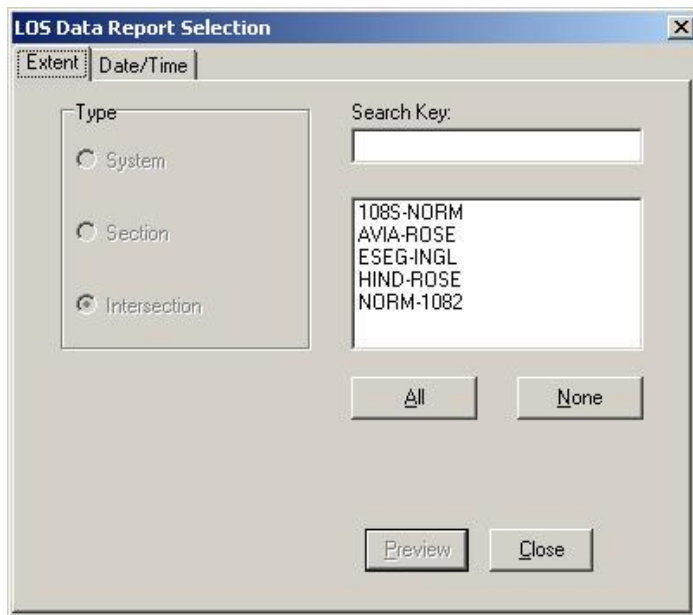
6.7.2   Viewing the Report

After choosing an extent in the selection form, click Preview. KITS will display the filtered preemption log report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the Preemption Report Selection form.

6.7.3   Printing the Report

To print the preemption log report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.8   Error Log Report (History Reports | Error Log)

Use the *Error Log Report Selection* form to edit the error log debugging levels, empty the error log, filter error condition data, and generate an error log report where the data can be viewed or printed.

An error log entry consists of:

- when the error occurred

- the severity of the error (error, warn, or info)

- the process generating the error (comm server, scheduler, traffic responsive, client, or watch dog)

- the description of the conditions present when the error occurred

6.8.1 Editing Error Log Debugging Levels

In the debug level section of the selection form, select the debug level (off, error, warn, or info) for each system process. Next click Update for the selected process, and KITS will update the system settings and notify the process of the new debug level.

6.8.2 Emptying the Error Log

In the error log section of the selection form, click Empty. KITS will clear the error log.

6.8.3 Filtering the Report

Use the error log section of the selection form to filter report data. The form contains three categories of selection criteria: date/time, processes, and severities.

- **Date/Time** allows the user to select the starting and/or ending date and time of errors to be viewed.

- **Processes** allow the user to select the processes generating the errors to be viewed (comm server, scheduler, traffic responsive, client, and watch dog).

- **Severities** allow the user to select the severity level of the errors to be viewed (error, warning, and info).

6.8.4 Viewing the report

In the selection form, click Preview. KITS will display the error log report in a separate report window. See Report Windows for a full discussion of report window capabilities.

6.8.5 Printing the report

To print the error log report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.9   Acknowledged Alerts Log (History Reports | Acknowledged Alerts Log)

Use the *Acknowledged Alert Report* to determine when alerts were received, when they were acknowledged and which user acknowledged them.
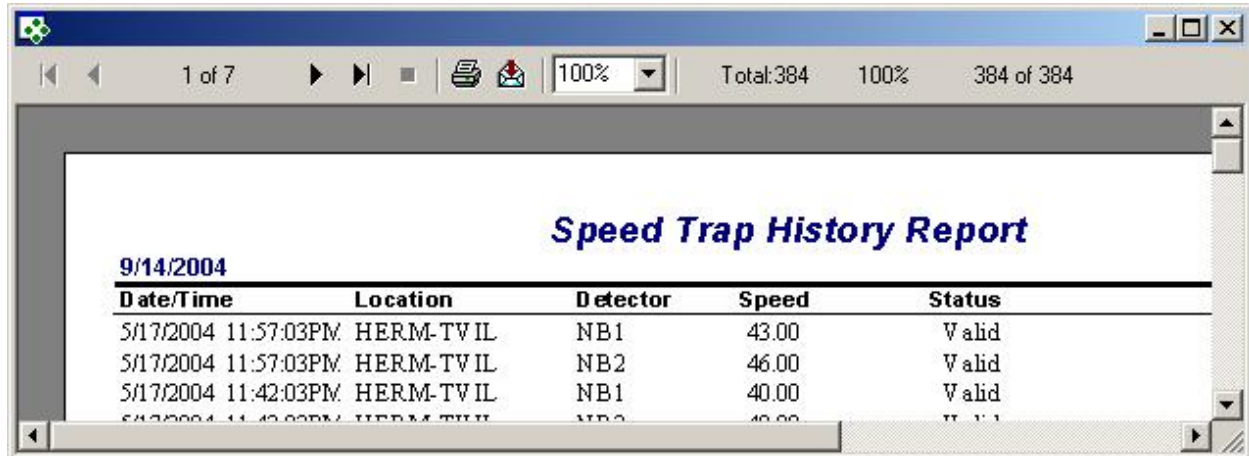
6.9.1   Filtering the report

Use the selection form to filter report data. The form contains two tabbed categories of selection criteria: extent and date/time.

Acknowledged Date/Time allows the user to select the starting and/or ending date and time of alert log to be viewed.

Event Date/Time allows the user to select the starting and/or ending date and time of the event to be viewed.

Event Type allows the user to select the type of event.

Users allow the user to select the users (by user ID) who performed the activity.

6.9.2   Viewing the report

In the selection form, click Preview. KITS will display the acknowledged alert log report in a separate report window. See Report Windows for a full discussion of report window capabilities.
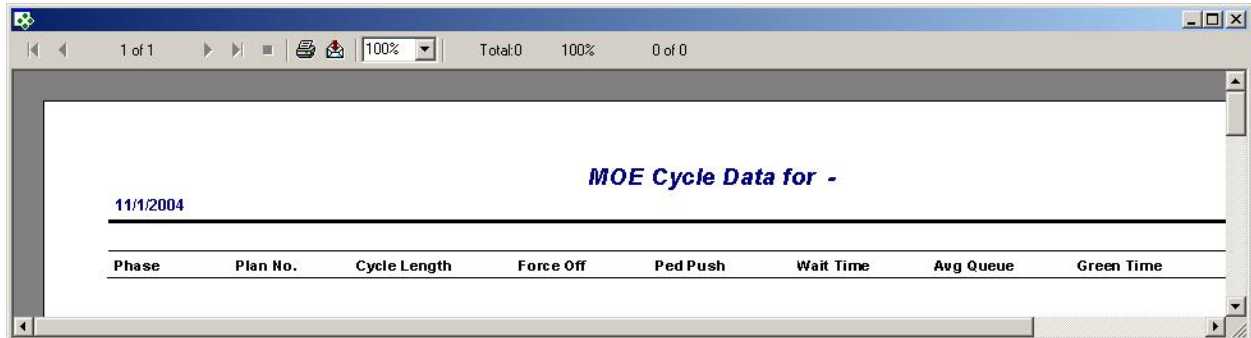
6.9.3   Printing the report

To print the acknowledged alert log report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

Turning Movement Count Reports (History Reports | Traffic Studies | Turning Movement Count Report)

Use the *Turning Movement Count Report Selection* form to filter Turning Movement Count data and generate a report where the data can be viewed or printed.

Turning Movement count data entry consists of:

- The Data and Time the data was collected

- The name of the intersection

- Minutes

- Turning Movement Count Data for all 12 intersection Approaches

6.9.4 Filtering the Report

Use the selection form to filter report data. The form contains two tabbed categories of selection criteria: extent and date/time.

- **Extent** allows the user to select the intersection whose data is to be viewed. Enter characters (up to 8) in the search key box to filter the list of intersections alphabetically.

- **Date/Time** allows the user to select the collection date and time of the TM Counts to be viewed.

6.9.5 Viewing the report

After choosing an extent in the selection form, click Preview. KITS will display the filtered TM Count data report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the Turning Movement Count Report Selection form.

6.9.6 Printing the report

To print the Turning Movement count report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.10 Turning Movement Count Analysis Report (History Reports | Traffic Studies| Turning Movement Count Analysis)

The *Turning Movement Analysis* will compare the latest two turning movement count entries and display all intersections and approaches which exceed a user-defined threshold. The threshold is defined from the *System Parameters* form.

The turning movement count analysis report consists of:

- **Intersection Name** – The short name pair of the intersection which exceeded the threshold.

- **TOD Period** – The peak period. (AM Peak, Mid-Day Peak, or PM peak).

- **Movement** – The direction of traffic for the turning movement count.

- **Change** – The difference between the latest two tuning movement counts.

- **TMC Date 1** – The date of the first turning movement count collection.

- **TMC Date 2** – The date of the second turning movement count collection. This is the most recent data entry.

6.10.1 Filtering the Report

Use the selection form to filter report data. The form contains two tabbed categories of selection criteria: extent and date/time.

Extent allows the user to select the intersection whose data is to be viewed. Enter characters (up to 8) in the search key box to filter the list of intersections alphabetically.

Date/Time allows the user to select the collection date and time of the TM Counts to be viewed.

6.10.2 Viewing the Report

After choosing an extent in the selection form, click Preview. KITS will display the filtered turning movement count analysis report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the *Turning Movement Count Report Selection* form.

6.10.3 Printing the Report

To print the turning movement count analysis report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.11 Level of Service Report (History Reports | Traffic Studies | Level of Service Report)

Use the *LOS Data Report Selection* form to filter Level of Service data and generate a report where the data can be viewed or printed.
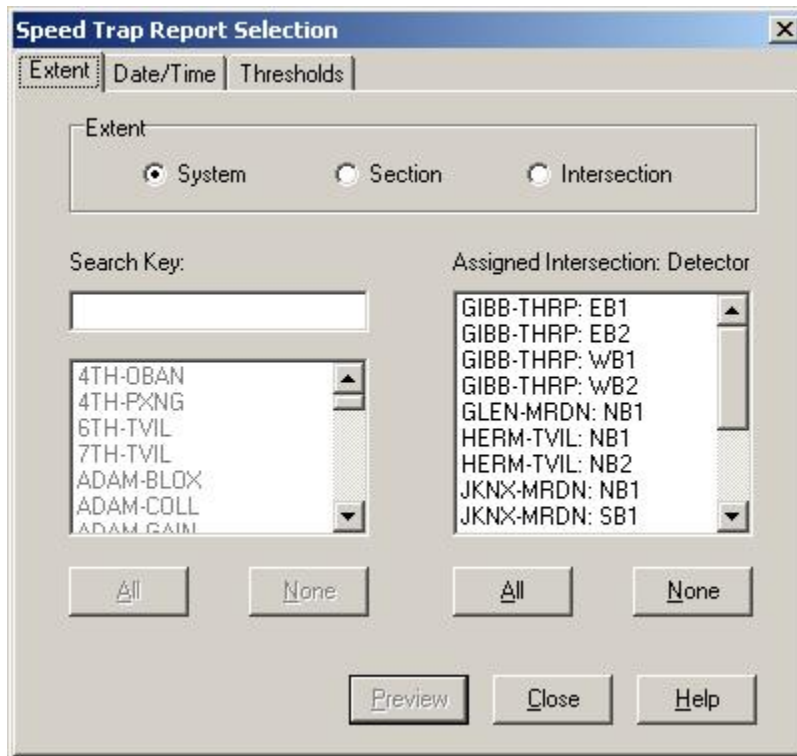
Level of Service data entry consists of:

- The Data and Time the data was collected
- The name of the intersection
- The Level of Service for all four intersection Approaches
- The Volume over Capacity Ratio

6.11.1 Filtering the Report

Use the selection form to filter report data. The form contains two tabbed categories of selection criteria: extent and date/time.

6.12 Speed Trap Report (Hïstory Reports | Speed Trap)

Use the *Speed Trap Report Selection* form to filter speed trap data and generate a report where the data can be viewed or printed. Data is written to this report at the interval specified in the *System Parameters* form.

A speed trap data entry consists of:

- when the data was generated

- the intersection that contains this detector

- the detector that generated the data

- the average vehicle speed over the detector

- the detector status

See Detector Operations for a full discussion of detector usage.

6.12.1   Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the scope of the detectors to be viewed. Once the extent (system, section, or intersection) is selected, the left listbox will display the choices within the selected extent. Enter characters (up to 8) in the search key box to filter the list of choices alphabetically. The detector list is generated based on the extent selection. For example, if the user chooses an intersection extent, the detectors that are shown in the detector list will be the detectors that are contained in the selected intersection. At least one detector must be selected to enable the preview button.

- **Date/Time** allows the user to select the starting and/or ending date and time of detector data to be viewed.

- **Thresholds** allow the user to select the speed and status of detector data to be viewed.

6.12.2   Viewing the report
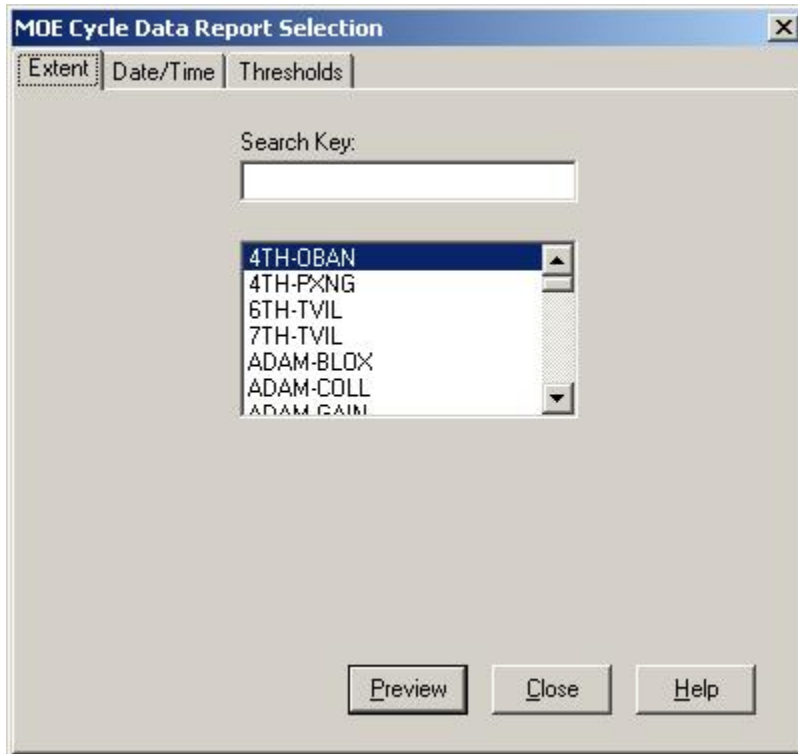
After choosing an extent in the selection form, click Preview. KITS will display the filtered speed trap report in a separate report window. See Report Windows for a full discussion of report window capabilities.
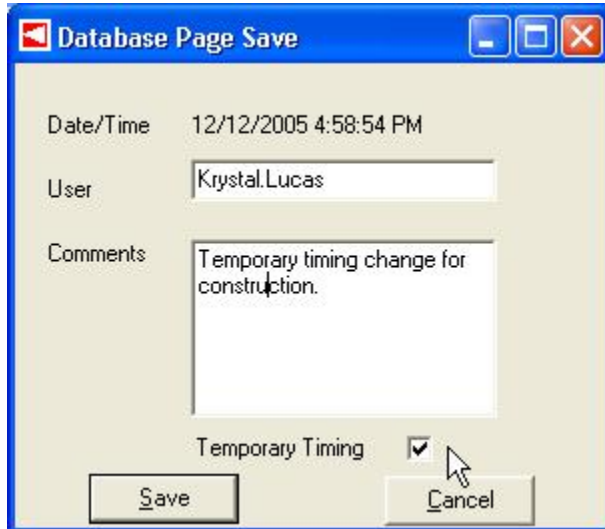
➲ You cannot view a report until an extent has been chosen in the Speed Trap Report Selection form.

6.12.3   Printing the report

To print the system detector report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.13 MOE Cycle Data Report (History Reports | MOE Cycle Data Report)

Use the *MOE Cycle Data Report Selection* form to filter measures-of-effectiveness (MOE) cycle data and generate a report where the data can be viewed or printed. Data is written to this report at the interval specified in the *System Parameters* form.

A MOE cycle data entry consists of:

- the name of the intersection where the MOE data was collected

- when the data collection occurred

- the intersection phase when the data was collected

- the current timing plan when the data was collected

- the phase cycle length

- whether the phase was forced off

- whether the pedestrian button was pushed

- the wait time

- the average queue

- the green time on approach

- the delay time on approach

6.13.1 Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the intersection whose data is to be viewed. Enter characters (up to 8) in the search key box to filter the list of intersections alphabetically.

- **Date/Time** allows the user to select the starting and/or ending date and time of activities to be viewed.

- **Thresholds** allow the user to select the cycle length and phases of the MOE cycle data to be viewed.

6.13.2 Viewing the report

After choosing an extent in the selection form, click Preview. KITS will display the filtered MOE cycle data report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the MOE Cycle Data Report Selection form.

6.13.3 Printing the report

To print the system detector report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.14 MOE Plan Data Report (History Reports | MOE Plan Data Report)

Use the *MOE Plan Data Report Selection* form to filter measures-of-effectiveness (MOE) plan data and generate a report where the data can be viewed or printed. Data is written to this report at the interval specified in the *System Parameters* form.

A MOE plan data entry consists of:

- the name of the intersections where the MOE data was collected

- when the data collection occurred

- the intersection phase when the data was collected

- the current timing plan when the data was collected

- the phase cycle length

- the percentage of force-offs

- the percentage of ped pushes

- the average wait time

- the average queue

- the average green time

- the average delay time

6.14.1 Filtering the Report

Use the selection form to filter report data. The form contains three tabbed categories of selection criteria: extent, date/time, and thresholds.

- **Extent** allows the user to select the intersections whose data is to be viewed. Enter characters (up to 8) in the search key box to filter the list of intersections alphabetically.

- **Date/Time** allows the user to select the starting and/or ending date and time of activities to be viewed.

- **Thresholds** allow the user to select the cycle length and phases of the MOE cycle data to be viewed.

6.14.2 Viewing the report

After choosing an extent in the selection form, click Preview. KITS will display the filtered MOE plan data report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the MOE Plan Data Report Selection form.

6.14.3 Printing the report

To print the system detector report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.15 Temporary Timing Report (History Reports | Temporary Timing)

Use the *Temporary Timing Report Selection* form to filter the report by intersection or database page and generate a report where the data can be viewed or printed. An intersection can be flagged as temporary timing when the user saves a controller database page.

The Temporary Timing Report consists of:

- The Intersection which is currently running temporary timing.
- The controller database page, which the user has marked as temporary.
- The Date and Time the user last saved the temporary timing data.

6.15.1 Filtering the Report

Use the selection form to filter report data. The form contains two tabbed categories of selection criteria: extent and database page.

- **Extent** allows the user to filter the report by intersection. Enter characters (up to 8) in the search key box to filter the list of intersections alphabetically.

- **Database Page** allows the user to filter the report by database page. The report will show which intersections have temporary timing flagged for the database pages selected.

6.15.2 Viewing the report

After choosing an extent in the selection form, click Preview. KITS will display the filtered Temporary Timing report in a separate report window. See Report Windows for a full discussion of report window capabilities.

➲ You cannot view a report until an extent has been chosen in the Temporary Timing Report Selection form.

6.15.3 Printing the report

To print the Temporary Timing report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

6.16 Scheduled Reports (History Reports | Scheduled Reports)

Use the *Scheduled Reports* form to periodically generate reports.

- **Description** is used to identify the scheduled report entry (up to 30 characters).

- **Time** is the time of day the report is scheduled to execute (in hh:mm 24-hour format).

- **Frequency** specifies how often the report is generated. Select from the following predefined options in the drop-down list:

    - **Daily (Mon - Sun)** indicates the report is generated every day.

    - **Weekdays (Mon - Fri)** indicates the report is generated on weekdays only.

    - **Weekly (Specify Day)** indicates the report is generated each week on the day selected in day/date field.

    - **Bi-Monthly (1st, 15th)** indicates the report is generated on the 1st and 15th of each month.

    - **Monthly (Specify Date)** indicates the report is generated once each month on the date selected in the day/date field.

- **Day/Date** specifies the day of the month the report is generated on when the frequency type is monthly, or the day of the week the report is generated on when the frequency type is weekly. Select a date (1 through 31) or day (Monday through Sunday) from the drop-down list.

- **Report** specifies the name of the report to be generated. Select from the drop-down list of stand-alone reports created by the user. If no reports have been created, the list will indicate that no reports were found in the specified directory.

6.16.1   Defining Scheduled Reports

To define a new scheduled report, highlight the next available entry in the table and enter the report description. Select the appropriate report parameters described above.

6.16.2 Editing scheduled reports

To edit an existing scheduled report, double-click on the parameter field you wish to change and input the new value.

6.16.3 Deleting exception days

To delete an existing scheduled report, highlight the report entry you wish to delete in the list and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a scheduled report that has been removed. Be sure that the report information is no longer needed prior to removal.

6.16.4 Creating scheduled reports

Scheduled reports are created using Crystal Reports report designer. The report file (.rpt) must be copied to the computer on which the report scheduler operates in the following subdirectory:
D:\Program Files\Kimley-Horn\KITS\Scheduled Reports

7 REALTIME MENU

The Realtime Menu allows an operator to view real-time data, including intersection coordination timing, system status, section status, and communication statistics. Additionally, a time-space diagram is provided to model the effects of various timing parameters on a green band prior to implementation.

7.1 Timing Values (Realtime | Timing Values)

Use the *Timing Values* form to view the real-time controller timing values for a selected intersection. The timing values will automatically update twice each second. Additional intersection timing values can be viewed by right clicking on the window and selecting the desired intersection.

The status table displays the current operating conditions of the selected controller.

- **Status** displays the status of the selected intersection controller (online, comm fail, flash, conflict, or coord fail).

- **Operation** indicates the current operation status of the selected intersection controller (local manual, nominal, not available, police control, railroad preempt, emergency vehicle preempt, and local TBC).

- **Plan** displays the currently executing timing plan (free, flash, transition, or unknown).

- **Master Timer** displays the master timer value of the selected intersection controller.

- **Local Timer** displays the local cycle timer value of the selected intersection controller.

The top of the phase table displays database values, previous cycle values, and current cycle values for the cycle length, offset, and splits (phases 1 through 8).

The bottom of the phase table displays the service, controls, and calls for the phases (1 through 8) using different colors for each condition as described below:

- **Vehicle Service** will indicate phase-active state as green or yellow.

- **Pedestrian Service** will indicate "walk" phases with blue and flashing "don't walk" phases with flashing blue.

- **Hold** will indicate the controller has asserted a hold on the phase. This does not apply to 170-controller.

- **Force Offs** will indicate the controller has asserted a force-off on the phase.

- **Phase Omits** will indicate the controller has asserted an omit on the phase. This does not apply to 170 controllers.

- **Vehicle Calls** will indicate active calls on phases.

- **Pedestrian Calls** will indicate pedestrian calls on phases.

7.2 Intersection Cycle Summary Graphic (Realtime | Cycle Summary)
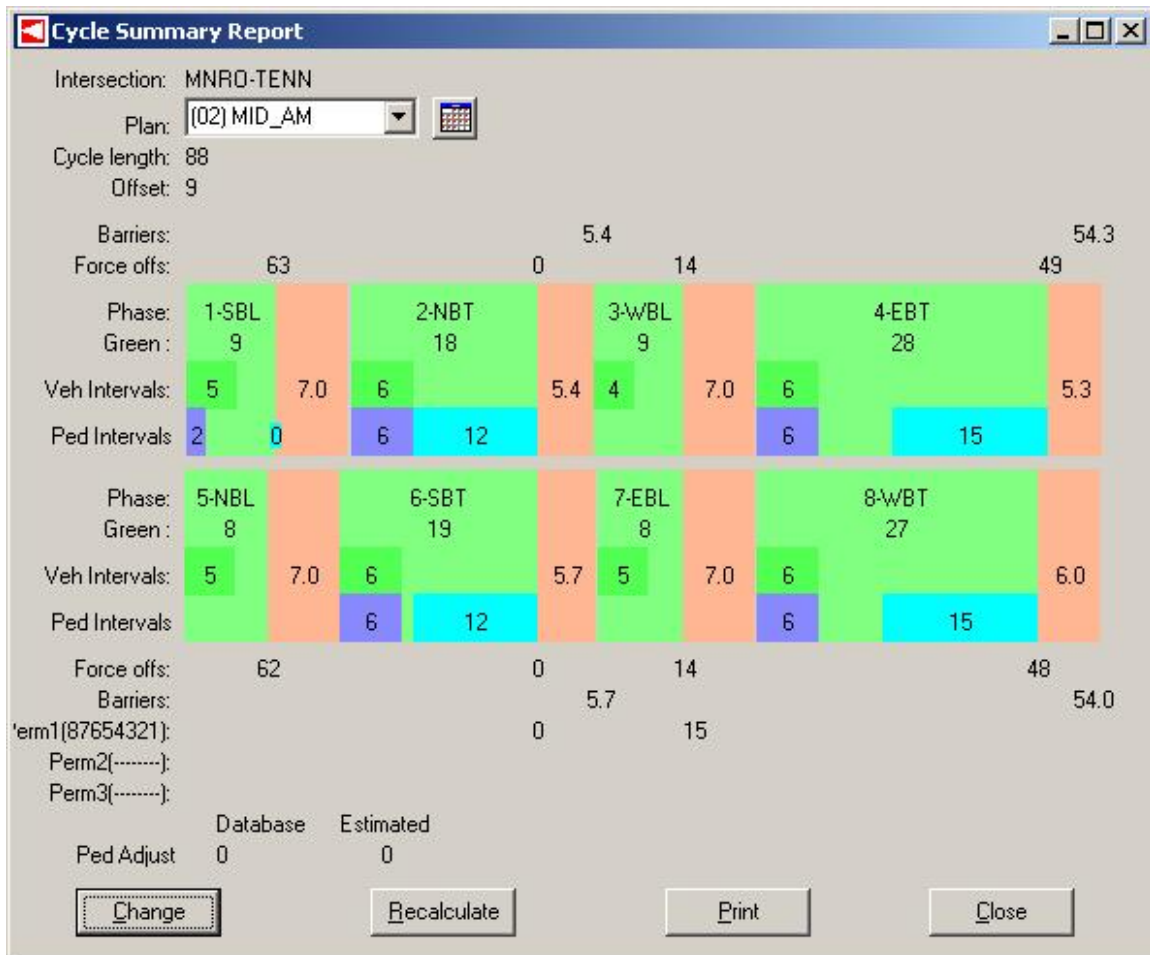
The *Cycle Summary Report* provides detailed coordination data for a selected intersection using a standard eight- phase, dual-ring diagram. Phases are designated by number and labeled as defined in the intersection database table. Barriers, zero-point in cycle, phase-green times, and vehicle clearances are designated numerically and graphically on the diagram. If rest-in-walk is enabled, the pedestrian clearance is displayed separately and zero-point is adjusted.

Graphical (color-coded) indications of phases in which green times violate minimums are displayed. If the green time violates the pedestrian walk + clearance, the actual and estimated ped-adjust values for the phase are displayed.

The following values displayed on the diagram consist of:

- **Cycle length**

- **Offset**

- **Force-off points** will indicate the controller has asserted a force-off on the phase.

- **Minimum green**

- **Pedestrian walk + clearance**

- **Start permissive and phase associations**

- **End permissive and phase associations**

- **Barrier crossing point**

- **Total green time by phase**

7.2.1   Viewing the Report

Select the Cycle Summary menu option. KITS will then display the *Selection Dialog* to allow you to choose individual intersections. If there is a communication error, KITS will indicate that it could not get the report data. Otherwise, KITS will display the Cycle Summary Report.

7.2.2   Printing the Report

To print the Cycle Summary Report, click the print button on the Cycle Summary Report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

7.3   System Status (Realtime | System Status)
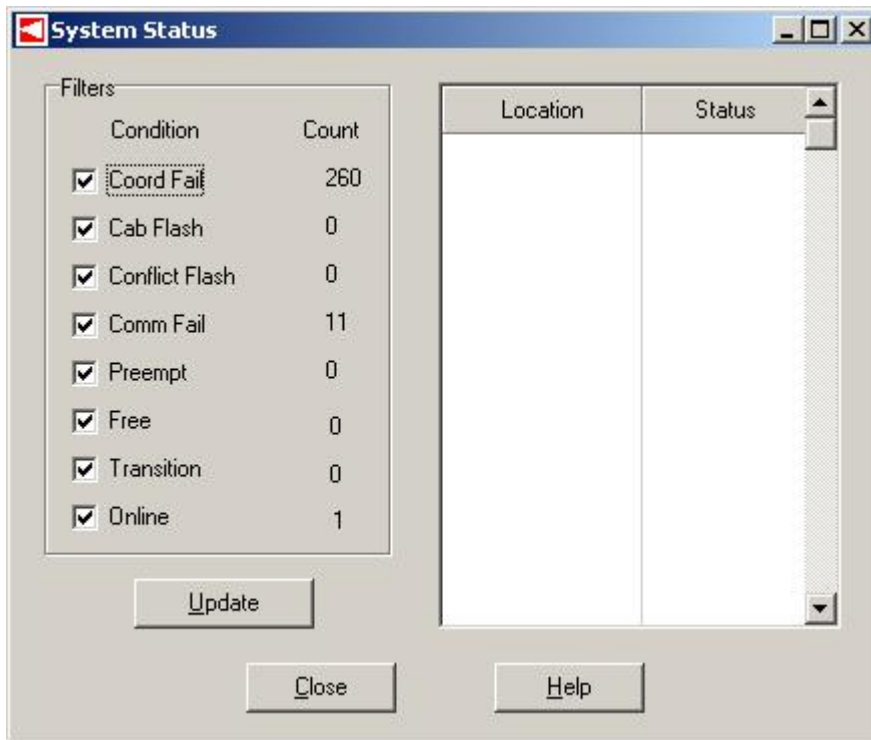
Use the *System Status* form to view the current status of the entire system. The status will automatically refresh every 2 seconds.
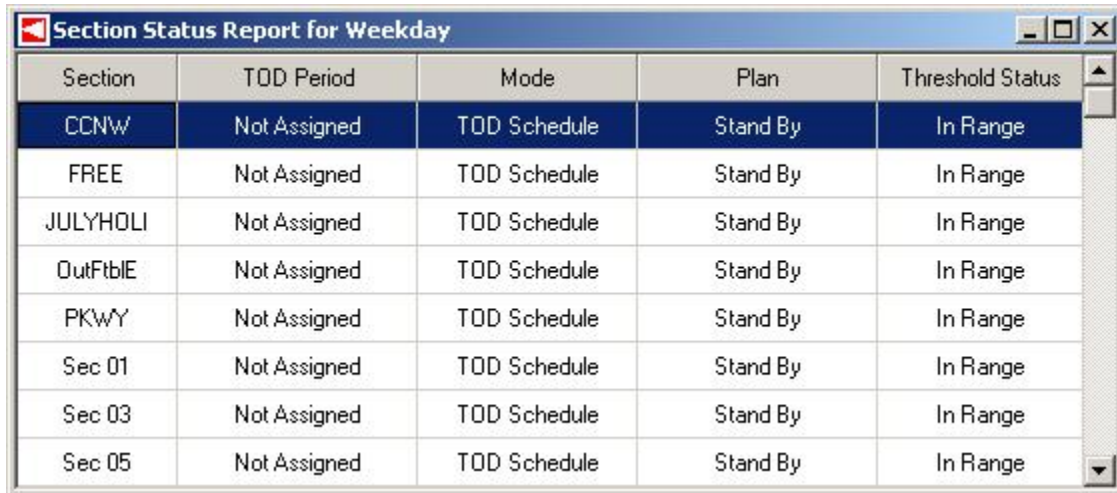
Location identifies the intersection reporting the status.

Status indicates the current status condition.

7.3.1   Filtering System Status

To filter the system status, select each status condition you wish to view. Clicking Update will display the locations reporting the selected status conditions and count the number of locations indicating the status condition.

7.4   Section Status (Realtime | Section Status)

Section	TOD Period	Mode	Plan	Threshold Status
CCNW	Not Assigned	TOD Schedule	Stand By	In Range
FREE	Not Assigned	TOD Schedule	Stand By	In Range
JULYHOLI	Not Assigned	TOD Schedule	Stand By	In Range
OutFtblE	Not Assigned	TOD Schedule	Stand By	In Range
PKWY	Not Assigned	TOD Schedule	Stand By	In Range
Sec 01	Not Assigned	TOD Schedule	Stand By	In Range
Sec 03	Not Assigned	TOD Schedule	Stand By	In Range
Sec 05	Not Assigned	TOD Schedule	Stand By	In Range

Section Status Report for Weekday

Use the *Section Status* form to view the current status of all sections in the system. The status will automatically refresh every 30 seconds.

Section identifies the section providing the status.

TOD Period indicates the time-of-day period for the section.

Mode displays the operation mode the section is currently executing. The valid operation modes for a section are traffic responsive and TOD schedule. If the section is currently commanded into a manual plan, N/A will indicate the mode is not applicable. Italicized text indicates a manual mode.

Plan displays the timing plan the section is currently executing. Italicized text indicates a manual plan.

Threshold Status indicates the status of the section relative to its failure threshold. The status is set to exceeded if the percent of failed (not responding or not enabled) intersections exceeds the user-defined section threshold. If the threshold has been exceeded, the row will be highlighted in yellow, and the section's plan set to stand by.

7.4.1   Viewing Section Status

Select the Section Status menu option. If there is a communication error, KITS will indicate that it could not get the status. Otherwise, KITS will display the Section Status form.

7.5 Current Plan Status (Realtime | Comm Statistics)

Current Timing Plan Report for System

9/14/2004		10:16 AM
Intersection		**Plan**
APKW-CONN		Not Assigned
CCSE-SAMS		Not Assigned

Use the *Current Plan Report* to view or print the current timing plan of selected controllers.
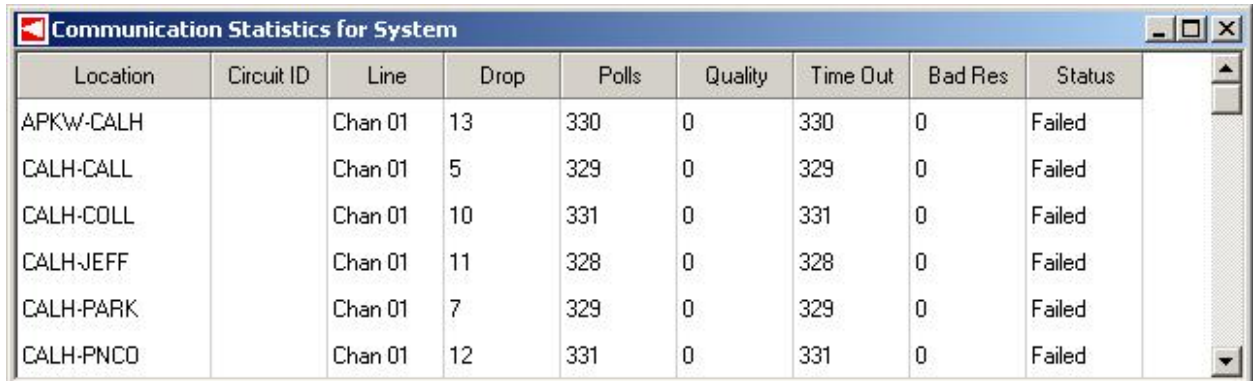
7.5.1 Viewing the Report

Select the Current Plan Status menu option. KITS will then display the *Selection Dialog* to allow you to choose individual intersections or a specific line, area, section, region, or system. If there is a communication error, KITS will indicate that it could not get the report data. Otherwise, KITS will display the Current Plan Report in a report window. See Report Windows for a full discussion of report window capabilities.

7.5.2 Printing the Report

To print the Current Plan Report, click the print icon (printer with paper inserted) in the report window. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

7.6 Communication Statistics (Realtime | Comm Statistics)

Location	Circuit ID	Line	Drop	Polls	Quality	Time Out	Bad Res	Status
APKW-CALH		Chan 01	13	330	0	330	0	Failed
CALH-CALL		Chan 01	5	329	0	329	0	Failed
CALH-COLL		Chan 01	10	331	0	331	0	Failed
CALH-JEFF		Chan 01	11	328	0	328	0	Failed
CALH-PARK		Chan 01	7	329	0	329	0	Failed
CALH-PNCO		Chan 01	12	331	0	331	0	Failed

Use the *Communication Statistics* form to view the current communication status of a selected intersection, line, or the system. The status will automatically refresh every 10 seconds.

Location identifies the intersection providing the status.

Circuit ID indicates the circuit to which the intersection is connected.

Line displays the communication line.

Drop indicates the drop address used in the communication.

Polls display the number of attempted polls during the report period.

Quality displays the quality of the communication as a percentage throughput.

Time Out displays the number of time-outs during the report period.
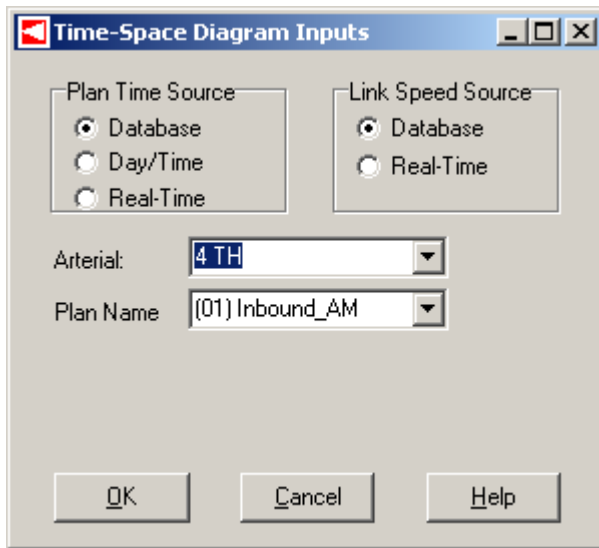
Bad Res displays the number of bad responses during the report period.

Status indicates the polling state (enabled/disabled) of the intersection.

7.6.1 Viewing Communication Statistics

Select the Communication Statistics menu option. KITS displays the *Selection Dialog* form that allows you to search for and select a previously defined intersection or the entire system, followed by the Communication Statistics form.

7.7 Time-Space Diagram (Realtime | Time-Space Diagram)
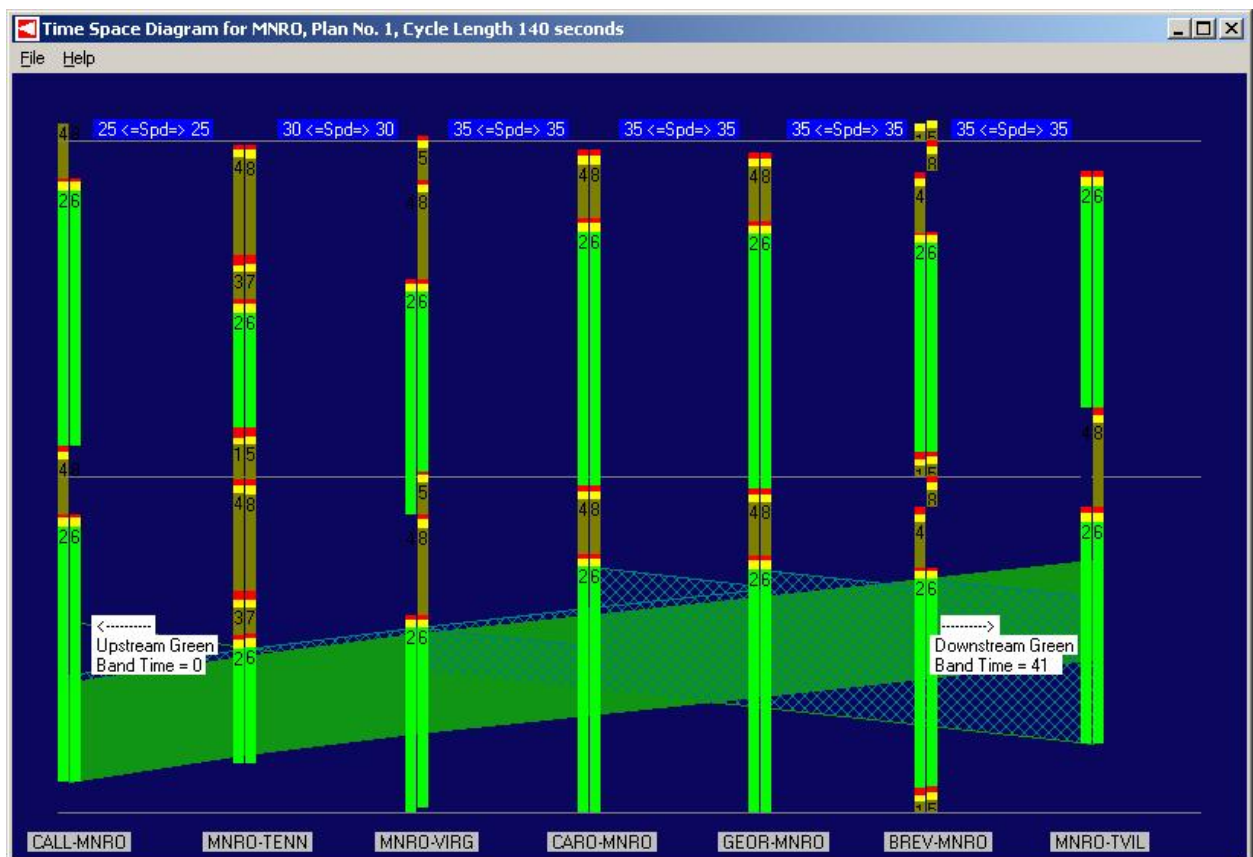
Use the *Time-Space Diagram* to view the green band for a given arterial, timing plan, and offset. An arterial can be defined in the *Arterial Definition* form. When defining an arterial, each intersection must define an upstream and downstream phase. A green band will be drawn attempting to connect the upstream and downstream phases using the distance and default speed for each link between the intersections. As the speed increases on a link, the slope of the green band decreases.

If a contiguous band extends through to the final intersection in the arterial, the contiguous band is highlighted in bright green. Any non-contiguous portion of green band that exists between two intersections is drawn in a dark green. The vertical axis is time in seconds and the horizontal axis is distance in feet.

7.7.1 Viewing a Time-Space Diagram

To view a time-space diagram, select the Time-Space Diagram menu option. KITS will display the Time-Space Diagram Inputs form prompting the user to select a pre-defined arterial, a user-defined timing plan, and the source for the split time and link speed (from the database or realtime data). If Day/Time is selected, the user shall enter the arterial, day of the week, and time (military time) of day. KITS will determine the corresponding scheduled timing plan. A notice will be displayed if any intersections in the arterial are running a different timing plan. Once the inputs are selected, the Time-Space Diagram will display the resultant green band. The offset for an intersection can be adjusted by clicking on the intersection, holding the mouse button down, and sliding the intersection up and down. The offset value will be displayed in the top left hand corner of the window. When the mouse button is released KITS will display a message asking the user if they would like to save the changes made to the offset.

7.7.2 Printing a Time-Space Diagram

To print a time-space diagram, select File on the menu bar and click print. The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

7.8   Test Board Display (Realtime | Test Board Display)

Use the *Test Board Display* form to view the realtime controller status for a selected intersection. Status data is provided for the phases (1 through 8), detectors, pedestrian calls, preemption, commands, inputs, and outputs. Additional intersection Input/Output status can be viewed by right clicking on the window and selecting another feature.

Test Board Display for ESEG-INGL

DETECTOR CALLS / PED CALLS

DETECTOR CALLS	PED CALLS
φ1	
φ2	φ2
φ3	
φ4	φ4
φ5	
φ6	φ6
φ7	
φ8	φ8

VEHICLE PHASES

φ1 φ2 φ3 φ4 φ5 φ6 φ7 φ8

2PED 4PED 6PED 8PED

OL-A OL-B OL-C OL-D OL-E OL-F

PREEMPTS

RR-1
RR-2
EV-A
EV-B
EV-C
EV-D

System Manual: 0	TOD Plan: Free
Local Manual: 0	Special Func: 0
Master Plan: Plan 1	Current Table: Table 0
Local Plan: Plan 1	Ring A: Min green
TMC Override: 0	Ring B: Min green
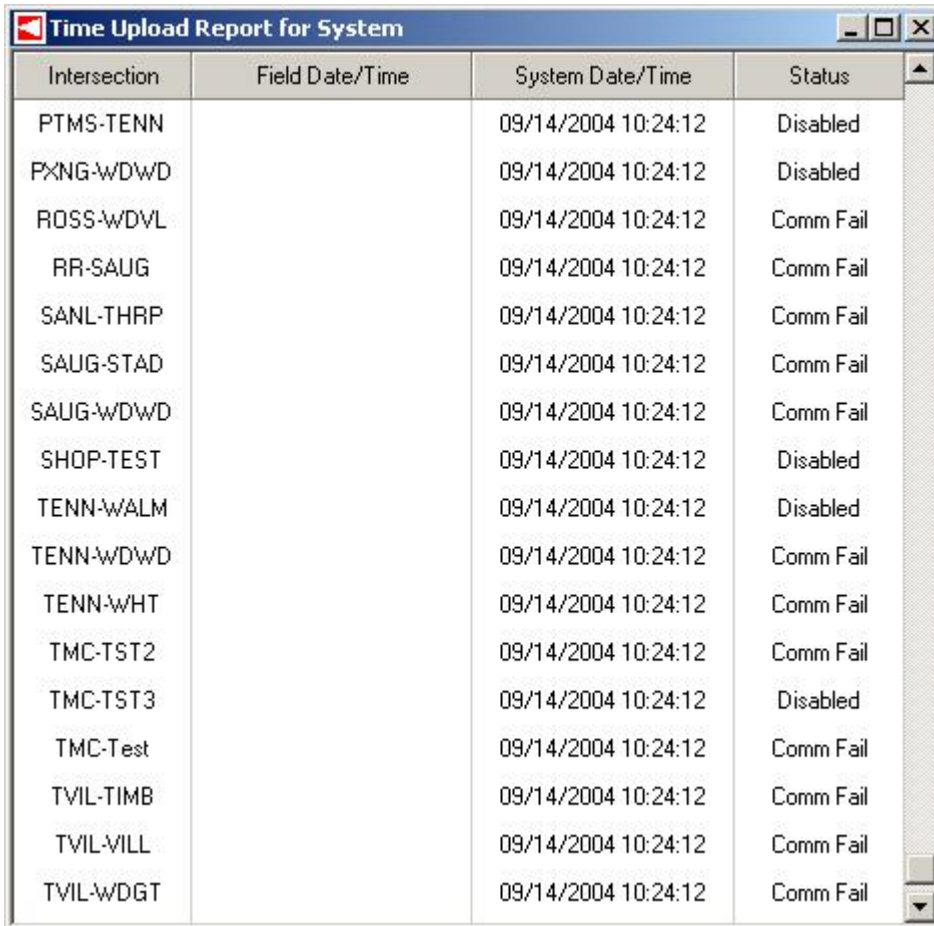
Master Cycle: 16	Force Off: ——
Local Cycle: 39	Hold: —6—2-
New Offset: 67	Ped Restrict: 8—4—
Current Offset: 67	Coord. Call: ——

8 TIME MENU

The Time Menu permits an operator to upload the time-of-day from any or all controllers. The uploaded time is compared to the clock in the operator workstation for correctness. The operator can also choose to download the time from the communication server to the controllers on a communication channel or to the entire system.

8.1 Time Upload Report (Time | Upload Report)

Intersection	Field Date/Time	System Date/Time	Status
PTMS-TENN		09/14/2004 10:24:12	Disabled
PXNG-WDWD		09/14/2004 10:24:12	Disabled
ROSS-WDVL		09/14/2004 10:24:12	Comm Fail
RR-SAUG		09/14/2004 10:24:12	Comm Fail
SANL-THRP		09/14/2004 10:24:12	Comm Fail
SAUG-STAD		09/14/2004 10:24:12	Comm Fail
SAUG-WDWD		09/14/2004 10:24:12	Comm Fail
SHOP-TEST		09/14/2004 10:24:12	Disabled
TENN-WALM		09/14/2004 10:24:12	Disabled
TENN-WDWD		09/14/2004 10:24:12	Comm Fail
TENN-WHT		09/14/2004 10:24:12	Comm Fail
TMC-TST2		09/14/2004 10:24:12	Comm Fail
TMC-TST3		09/14/2004 10:24:12	Disabled
TMC-Test		09/14/2004 10:24:12	Comm Fail
TVIL-TIMB		09/14/2004 10:24:12	Comm Fail
TVIL-VILL		09/14/2004 10:24:12	Comm Fail
TVIL-WDGT		09/14/2004 10:24:12	Comm Fail

Time Upload Report for System

Use the *Time Upload Report* form to view the current field date/time settings, workstation date/time settings, and difference between the field and workstation settings in seconds for an intersection, line, area, or the system.
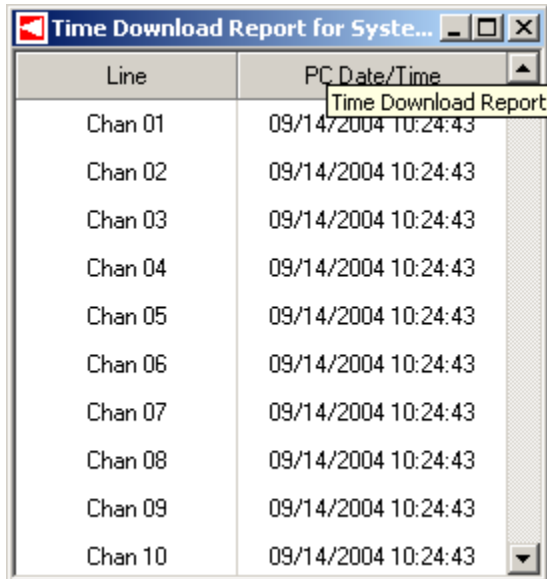
Intersection identifies the intersection reporting the date and time settings.

Field Date/Time displays date and time settings of the given intersection controller (in MM/DD/YYYY HH:MM:SS 24-hour format).

System Date/Time displays date and time settings of the local workstation (in MM/DD/YYYY HH:MM:SS 24-hour format).

Status indicates the difference between the field time and the system time in seconds. If the difference is greater than 3 seconds, the row will be highlighted in red. If the field date could not be obtained, KITS will indicate the communication failure.

8.2   Time Download Report (Time | Download Report)

Use the *Time Download Report* form to send the current date and time of the communication server to a selected line or system.

Line identifies the line that was sent the date and time.

PC Date/Time displays the date and time that were sent to the associated line (in MM/DD/YYYY HH:MM:SS 24-hour format).

9 SECURITY MENU

The Security Menu provides an operator with the capability to create, edit, delete, and save user roles and to assign a role to each operator. Roles grant the user a specified level of access to each system function. Security levels include no access, view only, upload, download, and full access. The name used to identify an operator is the same as the NT login name.

9.1 Role Definitions (Security | Role Definitions)

Use the *Role Definitions* form to add a new user role, delete a user role or view all existing user roles in the system.

Agency allows the list to be filtered for a particular agency.

Security Roles displays the currently defined roles in the system for the Agency shown in the Agency box.

9.1.1 Defining Roles
To define a new security role, click New. KITS displays the *Role Access Assignments* form in which you can specify new role settings.

9.1.2 Editing Roles
To edit an existing security role, highlight the role and click Edit, or double-click on the role name. KITS displays the *Role Access Assignments* form in which you can view and edit the role settings.

9.1.3 Deleting Roles
To delete an existing security role, highlight the role and click Delete. KITS will confirm the deletion prior to removing it.

➲ You cannot undelete a role that has been removed. Be sure the security role settings are no longer needed prior to removal.

9.2 Role Access Assignments (<u>S</u>ecurity | <u>R</u>ole Definitions | <u>N</u>ew / Edit)

Use the *Role Access Assignments* form to input a new security role or to view or edit existing security role settings. Security roles are used to specify the access privileges to each level of system functionality. Users are then assigned a security role (in the *User Assignments* form) to obtain varying levels of access to the system.

- **Role Name** is the name (up to 20 characters) used to identify the role throughout KITS.

- **Home Agency** is the Agency which that role is assigned to. In this example, the Chief operator is a role for the LA County TMC Agency.

- **Agency Privileges,** Each role has security settings for each agency. The Chief Operator's security access for El Segundo is shown in this example.

- **Unit** is the read-only category of functionality that will be assigned an access level for the current role. See Unit Categories for a full discussion of units.

- **Access** is the access level (no access, view only, download, upload, or full access) assigned to the given unit. Select an access level from the drop-down list. Each access provides the capabilities of any lower access levels. For example, upload access provides upload, download, and viewing capabilities.

9.2.1 Changing Security Roles

To view or edit another security role, choose Next or Previous. KITS will display the next or previous security role in the system alphabetically.

➲ You cannot change roles while defining a new role. You must save the new role settings before the Next and Previous buttons will be available.

9.3   User Assignments (Security | User Assignments)

Use the *User Role Assignments* form to view, edit, or delete users and their security role assignments. User assignments are provided to assign users to pre-defined security roles (specified in the *Role Access Assignments* form) thereby giving them varying levels of access to system functionality.

User ID identifies each system user by his or her Windows NT login name (up to 20 characters). User IDs must be modified through the Windows NT interface.

Role Assignment represents the security role assigned to each system user. Select from the pre-defined security roles in the drop-down list.

9.3.1   Viewing Roles

To view or edit the security roles, click Roles. KITS will display the *Role Definitions* form in which you can view and edit security role definitions.

9.4   Agency Definition (Security | Agency Definitions)
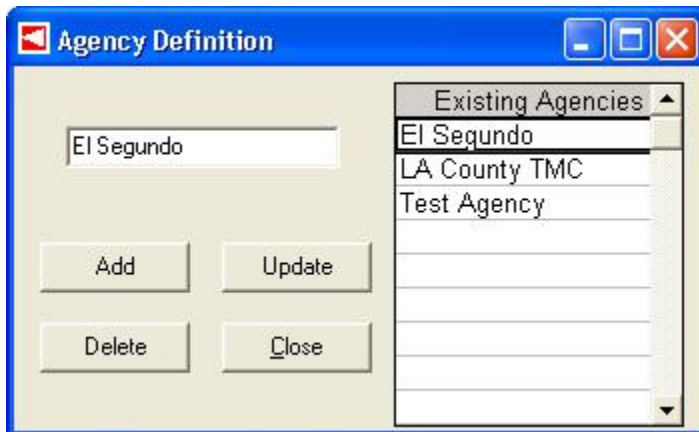
Use the *Agency Definition* form to add, edit, or delete Agencies.

To Add an Agency enter a new Agency in the edit box and click Add.

To Edit an Agency select the Agency to be edited in the list of existing agencies, make the modifications in the edit box, and select Update.

To Delete an Agency select the Agency to be deleted from the list of existing agencies and select Delete. A list of intersections, areas, sections, and roles associated with that agency will be shown before deletion.
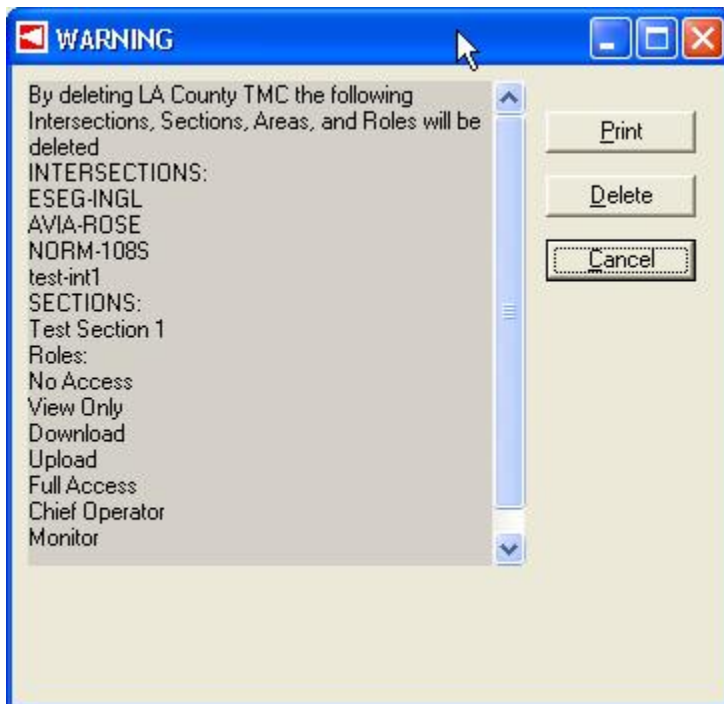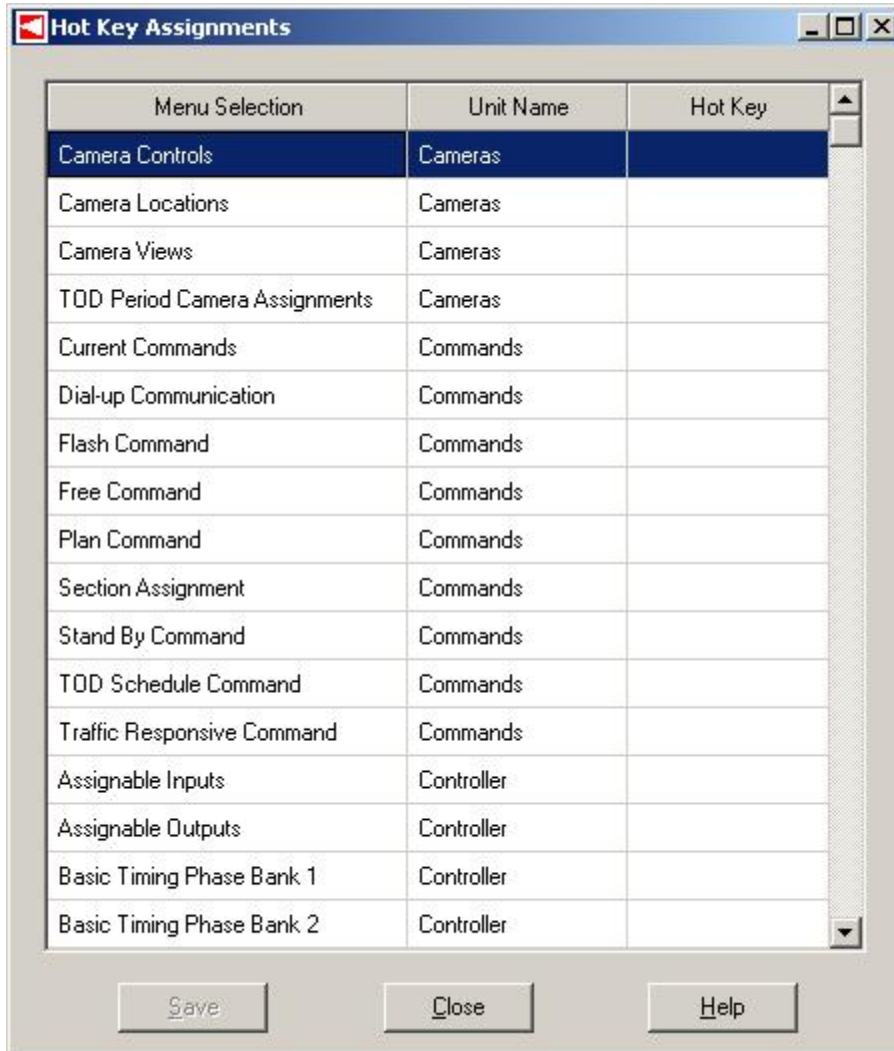
➲   This warning can be printed or the user can continue to delete the agency.

10 SYSTEM OPTIONS MENU

The System Options Menu allows an operator to specify the notification level of each system event. Notification levels include ignore, display, alarm, and page. Additionally, operator-specific hot key combinations can be specified for each user for each menu item in the system.

10.1 Hot Key Assignments (System Options | Hot Keys)

Use the *Hot Key Assignments* form to view or edit the hot key assignments for the current user. Hot key assignments are used as shortcut key combinations to access menu options. If assigned, they are displayed to the right of each main menu option. Pressing a given hot key combination while in the main menu will have the same affect as selecting the assigned menu option with the mouse.

Hot key assignments are saved for each system user. When KITS launches, the current user ID is obtained and if the user has assigned hot keys, they will be displayed in the main menu.

- **Menu Selection** displays each user interface form in the system.

- **Unit Name** displays the unit grouping for each user interface form. See Unit Categories for a full discussion of units.

- **Hot Key** allows the user to assign a unique hot key combination to each menu selection. Select a hot key combination from the provided drop-down list.

➲ A hot key combination cannot be assigned to more than one menu selection.

10.2 Event Filter (System Options | Event Filter)

Event Source	Event Name	Action	Alert	Priority	Icon
Controller	Cab Flash Start	Alarm	CARBRAKE.WAV	Medium	database.ico
Controller	Cab Flash End	Alarm	CLAP.WAV	Medium	CNFNOT.ICO
Controller	Stop Time Start	Alarm	forcebwu.wav	Medium	MOVER.ICO
Controller	Stop Time End	Alarm	DRIVEBY.WAV	Medium	mtgdi.ico
Controller	Cycle Failure Start	Alarm	Siren_1.wav	Medium	
Controller	Cycle Failure End	Alarm	carhorn2.wav	Medium	None
Controller	Door Open	Alarm	Intruder.wav	Low	hello.ico
Controller	Door Close	Alarm	DOORSLAM.WAV	Low	OOFL.ICO
Controller	Conflict Start	Page	siren.wav	High	FlagRed2.ico
Controller	Conflict End	Page	APPLAUSE.WAV	High	chkbook.ico
Controller	Plan Start	Ignore	------	Medium	------
Controller	Transition Start	Ignore	------	Medium	------
Controller	Transition End	Ignore	------	Medium	------
Controller	Free Start	Ignore	------	Medium	------
Controller	Flash Start	Alarm	breakitup.wav	Medium	icon2.ico
Controller	Comm Fail Start	Alarm	None	Medium	CONTACTS.ICO
Controller	Comm Fail End	Alarm	alert.wav	Medium	face01.ico

[Play Alert]   [Save]   [Close]   [Help]

Use the *Event Filter* form to view or edit the action assigned to each system event. See System Events for a full discussion of events
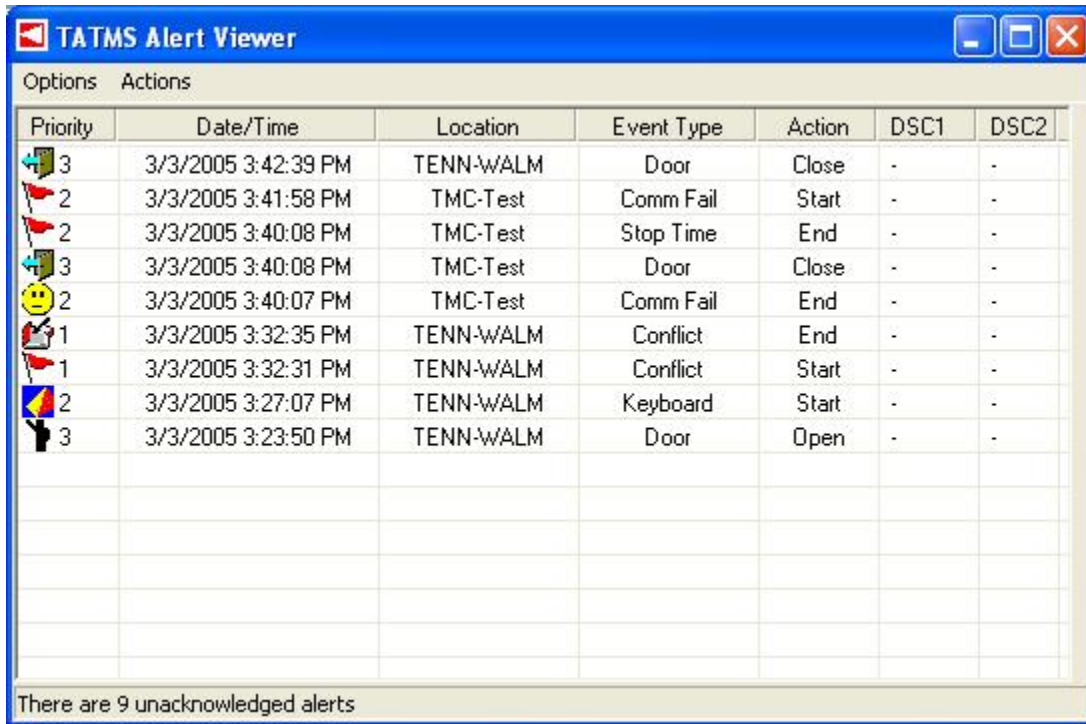
- **Event Source** displays the source of each event in the system (controller, scheduler, or traffic responsive).
- **Event Name** identifies the system event.
- **Action** allows the user to assign an action to each event. Select from the drop-down list of actions described below:
  - ♦ **Ignore** indicates no action will be taken when specified event occurs.
  - ♦ **Alarm** indicates that an alert window will be launched when the specified event occurs. See Alerts for a full discussion of alert windows.
  - ♦ **Page** indicates that a page will be sent to a system operator when the specified event occurs.
- **Alert** identifies the audio alert to be associated with an alarm or paging action. Select from the drop-down list of alerts provided.

10.2.1 Playing Alerts
To listen to an alert, highlight the alarm and click Play Alert. KITS will play the chosen selection.

11 ALERT OPTIONS MENU

The Alert Options Menu gives an operator the capability of viewing and acknowledging all system alerts.

Priority	Date/Time	Location	Event Type	Action	DSC1	DSC2
3	3/3/2005 3:42:39 PM	TENN-WALM	Door	Close	-	-
2	3/3/2005 3:41:58 PM	TMC-Test	Comm Fail	Start	-	-
2	3/3/2005 3:40:08 PM	TMC-Test	Stop Time	End	-	-
3	3/3/2005 3:40:08 PM	TMC-Test	Door	Close	-	-
2	3/3/2005 3:40:07 PM	TMC-Test	Comm Fail	End	-	-
1	3/3/2005 3:32:35 PM	TENN-WALM	Conflict	End	-	-
1	3/3/2005 3:32:31 PM	TENN-WALM	Conflict	Start	-	-
2	3/3/2005 3:27:07 PM	TENN-WALM	Keyboard	Start	-	-
3	3/3/2005 3:23:50 PM	TENN-WALM	Door	Open	-	-

There are 9 unacknowledged alerts

11.1 Alert Viewer (<u>A</u>lerts\Open Viewer)

The Alert Viewer displays all the alerts which the current user has selected to view. Use the *Event Filter* form to establish these settings. When an alert is displayed, the sound file chosen for the particular alert is played. Sounds may be disabled through the Options menu item. Clicking on the top of a column allows the user to rearrange the list.

To acknowledge alerts, select Actions\Open Manager.

11.2 Alert Manager

Acknowledge alerts by right-clicking on the alert from the *Alert Manager* form and selecting acknowledge. Acknowledge multiple alerts at one time by holding down the shift key and selecting other alerts.

12 ALERT WINDOWS MENU

The Alert Windows Menu allows an operator to horizontally tile, vertically tile, or cascade all open alarm windows.

12.1 Cascade Alert Windows (Alert Windows | Cascade)

Use Cascade Alert Windows to arrange all currently open alert windows in cascading manner so the most recent alert window opened is on top.

12.2 Tile Alert Windows Horizontally (Alert Windows | Tile Horizontally)

Use Tile Alert Windows Horizontally to arrange all currently open alert windows in a horizontal tiling manner.

12.3 Tile Alert Windows Vertically (Alert Windows | Tile Vertically)

Use Tile Alert Windows Horizontally to arrange all currently open alert windows in a vertical tiling manner

13 APPENDIX A

13.1 Selection Dialog
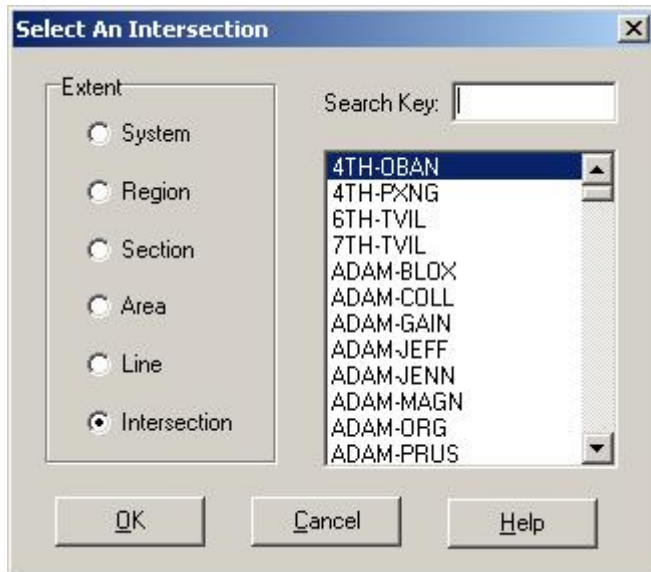
Use the *Selection Dialog* form to select a pre-defined intersection, line, area, section, region, or system.

Extent allows the user to select the objects to be displayed in the selection listbox. Once the extent is selected, the listbox will display the choices available within the selected extent. Not all extents will always be available. If the user selects a menu option that requires a choice of intersection or line, only the intersection and line extents will be available. Extent choices are as follows:

- **System** displays all pre-defined intersections in the selection listbox. Since this option automatically selects all intersections, the search key and selection list box are disabled when the system extent is selected.

- **Region** displays all the pre-defined regions in the selection listbox.

- **Section** displays all pre-defined sections in the selection listbox.

- **Area** displays all pre-defined areas in the selection listbox.

- **Line** displays all pre-defined lines in the selection listbox.

- **Intersection** displays all pre-defined intersections in the selection listbox.

Search key allows the user to enter characters (up to 8) to filter the selection list of choices alphabetically.

Selection list box allows the user to select a pre-defined intersection, line, area, section, region, or system depending on the chosen extent. Only one object can be selected at a time.

13.2 Map Windows
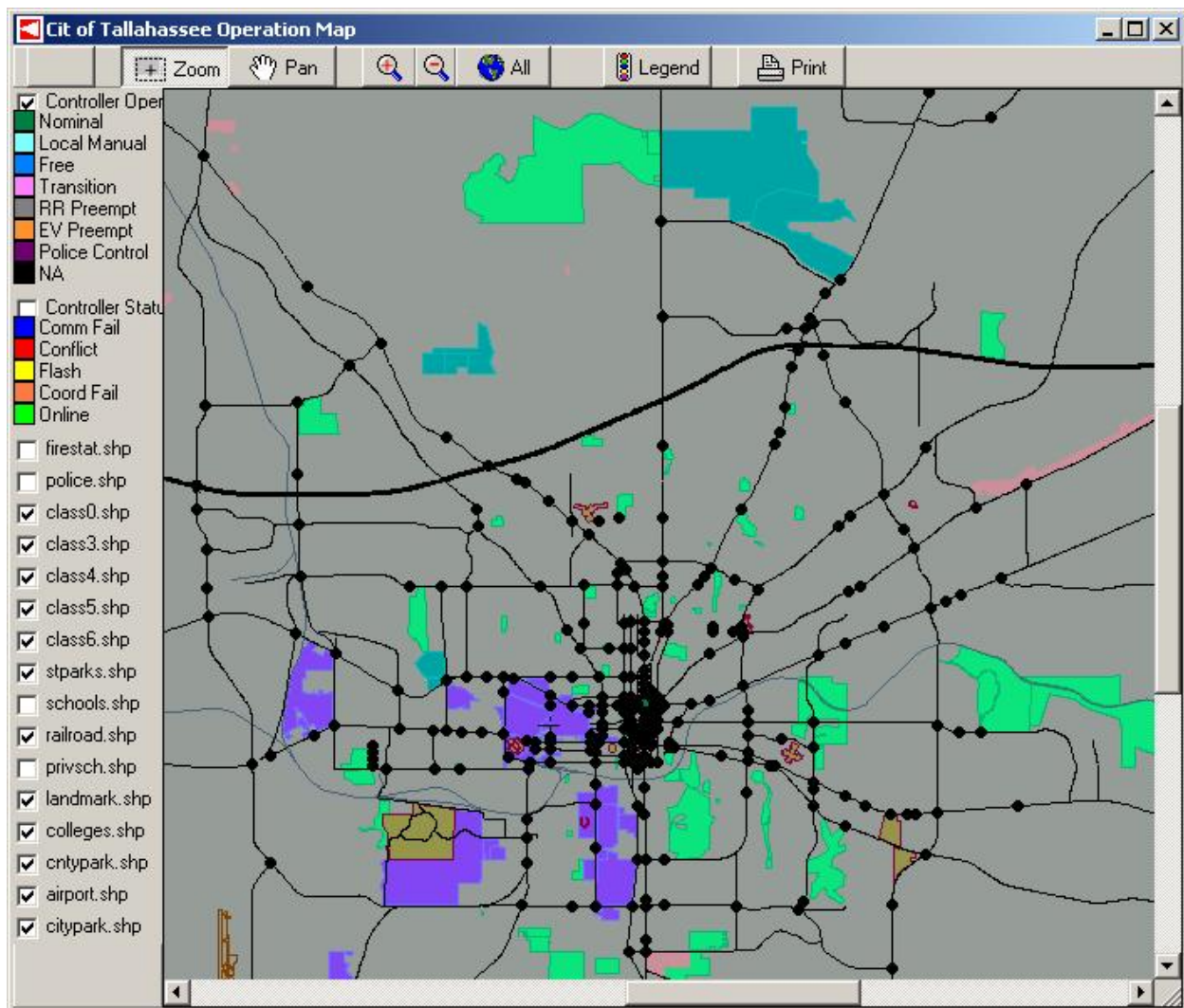
The Map Window provides special map viewing, printing, and navigating capabilities as well as the ability to view intersection and flood warning information, add/remove map layers, and set map/layer properties.

13.2.1 Navigating maps

Maps can be traversed using the horizontal and vertical scroll bars in addition to the following controls located on the navigation panel (above the map):

- **Zoom** allows the user to get a closer view of a map section. To use, click the zoom selection button and select a map area (denoted by a square) by pressing the left mouse button while dragging the mouse over the map.

- **Pan** allows the user to move the map view in any direction. To use, click the pan button and move the map view by pressing the left mouse button while dragging the map in the desired direction.

- **Zoom in one level** (magnifying glass with plus sign button) allows the user to zoom in to the next level of map detail. To use, click on the zoom in button, and KITS will display to the next zoom level.

- **Zoom out one level** (magnifying glass with minus sign button) allows the user to zoom out to the next level of map detail. To use, click on the zoom out button, and KITS will display to the next zoom level.

- **All map view** allows the user to view the entire map. To use, click on the all map view button, and KITS will display the entire map in the map window.

13.2.2 Toggling the map legend

To toggle the map legend panel (left of the map) on and off, repeatedly click the map legend button located on the navigation panel (above the map).

13.2.3 Viewing intersection data

To view the data associated with an intersection, right-click on the desired intersection symbol and select one of the following options from the pop-up menu:

- **Definition** displays the *Intersection Definition* form.

- **Realtime** sub-menu displays the *Timing Values* or *Input/Output Status* forms.

- **History Reports sub-menu** displays the Event Log Report.

- **Controller DB sub-menu** displays all of the information available from the *Controller Database Menu*.

- **Commands** allows the user to issue a manual plan to the controller.

13.2.4 Changing map properties

To change the properties of a currently open map, right-click on the map and select Properties from the pop-up menu. KITS will display the View Properties form allowing you to re-name the current map view and to select the background color by double-clicking on the background color box. Once the properties have been set, click Apply to update the current map properties.

13.2.5 Viewing map layers

All currently open map layers are displayed in the map legend. Each map layer is represented as a shape file with a check box to the left of it. If the box is checked, the layer will be visible. If the box is not checked, the layer will be hidden. The available map layers are listed below:

- Static layer
- Static label
- Controller status
- Controller operation
- Controller phasing
- Controller pedestrian
- Controller overlaps
- Controller loops
- Controller push buttons
- System phase layer
- System sync layer
- Section assignment

- Flood warning station
- System Detector Volume
- System Detector Occupancy
- System Detector Speed
- System Detector Status
- Speed Trap Speed
- Link Volume
- Link Occupancy
- Link Speed
- Maintenance of Traffic

13.2.6 Adding layers to a map

To add a map layer to the current view, right-click on the map and choose the desired layer from the Add Layer sub-menu of the pop-up menu. KITS will prompt you to select a shape file for the layer. Once chosen, KITS will add the layer to the current map window.

13.2.7 Removing layers from a map

To remove a map layer from the current view, highlight the layer by clicking on it and right-click on the map and select Remove Layer from the pop-up menu. KITS will remove the map layer from the legend.

13.2.8 Changing layer properties

To change the properties of a layer, right-click on the layer name and select Properties from the pop-up menu. KITS will display the Layer Properties form that allows you to specify the layer name (up to 12 characters), set the upper and lower display range, and change the shape's color, size, and style.

13.2.9 Changing dynamic layer legend settings

To change the legend of a dynamic layer, right-click on the layer name and select Edit Legend from the pop-up menu. KITS will display the Edit Legend that allows you to add or remove a status label or to change the color, name, or value of a status label.

13.2.10 Printing the Map

To print a map, click the print icon (printer with paper inserted). The view currently in the map window will be printed in grayscale.

13.3 Report Windows
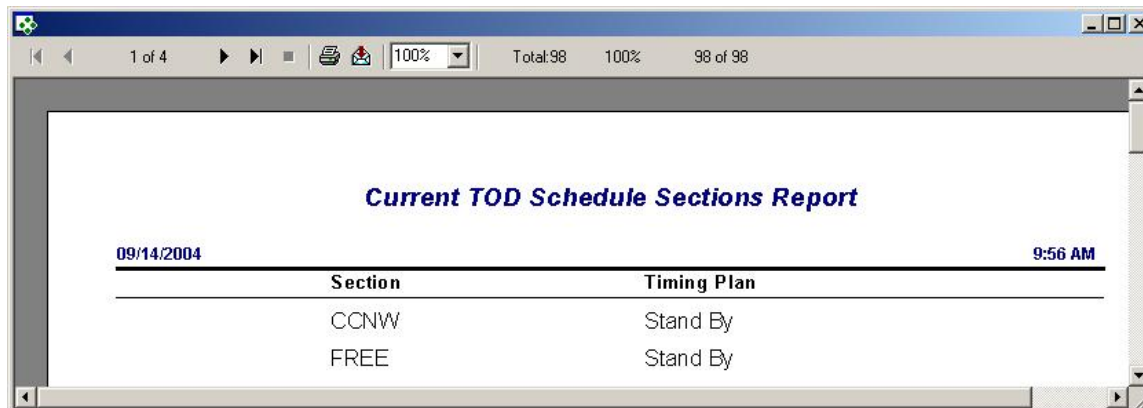
Report windows are used to view, export, and print data in report format.

13.3.1 Viewing report data

The report window displays the number of data records, the current page, and the total number of pages of the report in the header panel. To advance through multi-page reports, click the next and previous page icons (left and right facing triangles). To jump to the first or last page of a report, click the first and last page icons (left and right facing triangles with vertical lines).

Additionally, the report window can display the report at several different zoom levels (25% - 400%, whole page, or page width). To change the level, select the desired zoom level from the drop-down list. The report will automatically re-size.

♦   Default = 100%

Exporting report data

The report window allows a user to export the report data to a disk file, Exchange folder, Lotus Notes Database, or Microsoft Mail folder (MAPI). The data can be exported in several different formats:

- Character- separated values

- Comma-separated values (CSV)

- Crystal Reports format (RPT)

- data interchange format (DIF)

- HTML 3.0 (Draft Standard)

- HTML 3.2 (Extended)

- HTML 3.2 (Standard)

- Lotus 1-2-3 (WK1)

- Lotus 1-2-3 (WK3)

- Lotus 1-2-3 (WKS)

- Record style (columns of values)

- Tab-separated values

To export report data, click the export icon (open envelope with insertion arrow) and select the desired format and destination.

13.3.2 Printing report data

To print a report, click the print icon (printer with paper inserted). The print selection dialog box will show the destination printer and allow you to select the print range, number of copies, and collate copies option.

13.4 Bit Strings

Bit strings are used to input integer data by toggling the bits of an 8-bit string where bit 8 is the most-significant bit and bit 1 is the least-significant bit. To toggle a bit, press the digit (1 through 8) representing the bit you wish to toggle. When a bit is turned off, its position is represented by a dash.

Bit String	Description	Decimal Value	Hexadecimal Value
87654321	All bits on	255	0xFF
--------	All bits off	0	0x00
8-------	Bit 8 on	128	0x80
-------1	Bit 1 on	1	0x01
--65----	Bits 6 and 5 on	48	0x30
8-6-4321	Bits 8, 6, 4, 3, 2, and 1 on	175	0xAF

13.5 System Events

System events can be generated from five sources:

- signal controllers

- scheduler operations

- traffic responsive (TRSP) operations

- flood warning system operations

- uninterruptable power supply (UPS) system operations

System events are logged to the network database as they occur. If an action is specified for an event (ignore, store, display, alarm, or page) the activity is performed. See the *Event Filter* form for a full discussion of event actions. The following is a list of all potential system events and their source.

Event	Event Source
Cab Flash Start/End	Controller
Stop Time Start/End	Controller
Door Open/Close	Controller
Conflict Start/End	Controller
Plan Start	Controller
Transition Start/End	Controller
Free Start	Controller
Flash Start	Controller
Comm Fail Start/End	Controller
Police Control Start/End	Controller
RR Preempt Start/End	Controller
EV Preempt Start/End	Controller
Manual Start/End	Controller
Detector Fail/Repair	Controller
Download Set/Clear	Controller
Keyboard Start	Controller
Cycle Failure Start/End	Controller
Late Entry Start/End	Controller
Early Exit Start/End	Controller
Special Function 1 On/Off	Controller
Special Function 2 On/Off	Controller
Special Function 3 On/Off	Controller
Special Function 4 On/Off	Controller
Suspected Incident Start	Controller
Suspected Incident End	Controller
Plan Command Start/End	Scheduler
Mode Command Start/End	Scheduler
Schedule Plan Start	Scheduler
Schedule Mode Start	Scheduler
Section Failure Start/End	Scheduler
TRSP Command Start	TRSP
TRSP Det Fail Start/End	TRSP
Det Thresh Exceeded Start/End	TRSP

13.6 Detector Operations

Detectors are defined in the *Detector Edit* form. When defining a detector you must specify the detector number, loop length, and smoothing factor. Up to 24 detectors may be assigned to an intersection. Once a detector is assigned to an intersection, it may not be reassigned to a different intersection. Each detector associated with the same intersection must have a unique detector number. The detector number corresponds to the detector slot number of the controller. It is essential that this value correspond with the actual detector configuration.

The smoothing factor determines how much the current data is weighed relative to the existing smoothed running average. The smoothing factor applies to the detector's volume, occupancy, and speed. The greater the smoothing factor the more the current raw data will count. For example, if the existing smoothed 15-minute volume on a detector with a smoothing factor of 25 is 100 and the new raw data for the latest 15-minute volume is 200, the new smoothed volume will be 125.

The comm server uploads the detector data from the controller every minute. The raw data is validated prior to smoothing it into the existing data. If the volume exceeds the chatter volume threshold (raw volume > 2000 vehicles/hour), the current occupancy exceeds the excessive occupancy threshold (raw occupancy > 100%) or if there is no volume for the hour, the detector is marked invalid. If the data is not valid, it is not smoothed into the existing data.

The detector data is logged to the database at the interval defined in the *System Parameters* form. The data is written to the database independent of current status. Every 15 minutes system detectors are written to the database for replacement data. If a detector that is currently being used by traffic responsive fails, it will look up its historical data based on the day type and current time to substitute in for the raw data.

Detector data plays a critical role in traffic responsive. Traffic responsive is a pattern-matching algorithm that selects the optimal timing plan for each section by comparing the real-time detector data with the signatures for each detector. The plan whose signatures most accurately reflect the real-time conditions will be selected for the section. Detector signatures for each plan can be defined in the *Traffic Responsive Signatures* form.

13.7 Detector To Pin Number Mapping

The following detector numbers are mapped to the associated pin numbers located on the back of each intersection controller:

Detector No.   Pin No.

Detector No.	Pin No.
1	39
2	40
3	41
4	42
5	43
6	44
7	45
8	46
9	55
10	56
11	57
12	58
13	59
14	60
15	61
16	62

13.8 Field Communication Statistics

The *Communications Statistics Report* details the communication between the comm server and the controllers (intersections). The comm server will poll each enabled intersection once a second. If a response is not received within 3 seconds, the comm server increments the no-response count assuming that the controller did not respond. If an incorrect response is received from a poll message, the bad response count is incremented. If 3 consecutive poll messages do not receive a response or receive a bad response, the intersection is temporarily taken off-line. Detector data is not uploaded, plan and offset data is not sent, and poll messages are all temporarily suspended. The detector is then placed on a list where it is polled at least once every 5 minutes. Once the intersection begins to respond correctly to poll messages, it will be re-enabled.

The Communication Statistics Report allows the user to view the controller statistics. The communication statistics measure quality based upon poll messages. The equation for the quality level is (total poll messages sent – (bad poll responses + no poll responses))/ total poll messages sent. After the communications statistics have been written to the database, all values are reinitialized.

13.9 Unit Categories

KITS contains 12 categories of operations referred to as units. Units are provided as collections of related functionality to simplify activity descriptions and security privileges. Each unit is listed and described below:

- **Commands** provide the ability to issue and cancel manual commands.

- **Controller** provides the ability to input, save, and transfer controller data.

- **Events/Actions** provide the ability to specify the notification level of system events, actions to take for events, alert intervals, alert volume settings, and hot key combinations.

- **Maps** provide the ability to open, save or create new countywide maps displaying the current status and phasing of all intersections.

- **Realtime** provides the ability to view realtime data such as intersection input/output status and timing values, system status, section status, flood warning status, and communication statistics.

- **Scheduling** provides the ability to specify traffic scheduling data such as day types, time-of-day periods, timing plans, standard/exception weeks, and special event schedules.

- **Security** provides the ability to specify each user's access level to system functions.

- **System** provides the ability to specify any number of traffic system components such as intersections, sections, and detectors.

- **System Reports** provide the ability to generate historical and current reports.

- **Time** provides the ability to view a date/time upload report for any intersection or view a date/time download report.

- **Traffic Responsive** provides the ability to specify traffic responsive information used to select optimal timing plans for a section based on current traffic conditions.

- **Incidents** provides the ability to specify incident detectors and incident response plans.

- **Maintenance of Traffic (MOT)** provides the ability to track traffic maintenance work.

14 APPENDIX B

14.1 Map Editing

ArcView is used to maintain map components in KITS. Map displays include area and intersection graphics. Please refer to the ArcView manual or online help for detailed instruction on how to operate ArcView.

14.1.1 Area Graphics

Area graphics include the KITS countywide system map. The system map supports a variety of layers related to controller and detector devices. ArcView is used to maintain the system map layers.

System map layers stored in the Shapefile directory. The Shapefile directory is located as follows: D:\Program Files\Kimley-Horn\KITS\Maps\IntGraphics. The layers include all of the static layers provided by the County's GIS department. To update these layers, copy new files into the Shapefile directory.

The ArcView project containing system-map dynamic layers is named KITS.apr. The file is located in the Shapefile directory. Open the KITS.apr project in ArcView to modify dynamic system-map layers.

14.1.2 Adding New Symbols

To add a new symbol to an existing dynamic layer, select the theme from the map legend. Select Start Editing from the Theme menu. ArcView will now be ready to accept new symbols. Select the drawing tool which will be a point, line, or polygon depending on the theme symbol type.

Place, draw, or copy and paste the new symbol in the appropriate location. Repeat this process until all new symbols have been added. Run Script1 to re-index the symbols on the map layer. The index is simply a unique value used as a cross-reference to data provided by the system.

Open the attribute table for the theme by selecting Table from the Theme menu. Highlight one of the new symbols on the map. The corresponding entry in the attribute table will be automatically highlighted. Enter the system ID in the ID field of the table. The system ID can be located in the system database editor of KITS. Repeat this process for all of the new symbols.

After all of the new symbols have been added, select Stop Editing from the Theme menu. Press yes when prompted to save the edits.

14.1.3 Removing Symbols

To remove a symbol from an existing dynamic layer, select the layer in the map legend. Select Start Editing from the Theme menu. Select the Symbol from the drawing and press the delete key. Repeat the process until all of the desired symbols are removed. Select Stop Editing from the Theme menu. Press yes when prompted to save the edits.

14.1.4 Intersection Graphics

TAMS intersection graphics are derived from AutoCAD drawings. The process for translating AutoCAD drawings to ESRI shapefiles is described below.

Intersection drawings must be divided into the following individual layers in AutoCAD.

Layer	Description	Type
Static	All static data including curb lines and pavement markings	Polyline
Arrows	Phase indications	Polygon
Loops	Detector indications	Polyline
Walks	Pedestrian Indications	Polyline
Buttons	Push Buttons	Polygon
Text	Static text	Text

Each layer is then stored as a separate .dwg file. The name should consist of an abbreviation of the intersection name followed by the layer name.

Create a new subdirectory under IntGraphics. IntGraphics is located as follows:

D:\Program Files\Kimley-Horn\KITS\Maps\IntGraphics

Save or copy the AutoCAD layers saved in the previous step to the new directory. Create a new project in ArcView and store it in the new intersection subdirectory. Create a new view in the ArcView project. Add each of the AutoCAD layers to the new View as feature themes. Add layers using the following symbol type.

Layer	Symbol Type
Text	Annotation
Arrows	Polygon
Loops	Line
Walks	Line
Buttons	Polygon
Overlaps	Polygon

With the exception of the text layer, convert each AutoCAD layer to a shapefile and add to the project. Name the layer using a combination of the intersection name and layer name. Store the shapefiles in the same subdirectory as the ArcView project. Except for the text layer, delete the dwg layers from the map.

For each dynamic layer, open the attribute file and add the following fields:

1. ID

2. IntID

3. Phase

Add each filed as a number data type with a length of 8.

From the project window, run script1 to add cross-reference indexes to the dynamic tables. Open script2 and set the value in the first line to the KITS system ID. Compile and run script2. Edit each layer as follows:

1. Select Start Editing from the Theme menu item.

2. Select symbols assigned to Phase 1.

3. Open Script3

4. Change the value in line one to 1.

5. Compile and run script3.

6. Repeat steps 4 and 5 for each phase

When selecting start editing for the next layer, be sure to save the changes made to the previous layer.

After converting the AutoCAD layers to shapefiles and adding the system cross-reference information, copy all of the files except .dwg and .apr files to the Shapefiles directory.

To add the new intersection drawing to KITS, select New from the Map menu in the KITS Workstation application. Right-click on the drawing area of the new window and select Properties. Change the Title to the short name of the new intersection. Change the background color by clicking on the color box and selecting the color from the displayed palette or use the color designer. When completed, close the Properties form by pressing OK.

Add each drawing layer as follows:

1. Right-click on the drawing area and select Add Layer.

2. Select the layer type from the displayed list.

3. Select the layer file from the list of shapefiles.

Change the color of the static layer by right-clicking on the legend entry and selecting the color box on the Properties form.

After completing the preparation of an intersection drawing, copy all files except dwg and apr files from the intersection subdirectory to the shapefile subdirectory.

14.1.5 Distributing Graphics Changes

Changes in graphics files should only be made on one designated computer. To distribute changes to other workstations, copy **D:\Program Files\Kimley-Horn\KITS\Maps** from the designated computer to all of the other workstations.

15 APPENDIX C

15.1 Database Archival

Database archiving is used to offload historical data from the online ORACLE database to permanent storage on CD. The archiving process occurs once per day at 1:00AM. The process that handles archiving is located on the primary domain controller (PDC). A shortcut to the process is contained in the start menu of the PDC assuring that the process starts automatically.

Archived data includes the following:

- Event Log

- System Detector

- Count Detector

- Link

- User Log

- Error Log

- MOE Data

The amount of historical data stored online is determined by an operator specified parameter. The Clean-Out period is specified in the System Parameters form. The form is accessed through the Database menu of the KITS application. The Clean-out period establishes the number of days of online data to maintain. Data older than the Clean-out period is automatically archived to CD and deleted from the online database.

The archive CD should be replaced monthly. The replaced CD should be clearly marked with the date at which it was inserted and the date at which it was removed.

15.1.1 Restoring Archived Data

The Restore program located on the primary domain controller is used to transfer data stored on CD back to the online database. The Restore program allows the user to select the data type and date of interest. Restored data is accessible through History Reports of the KITS application.

15.2 Database Backup

The purpose of database backup is to provide a means of restoring the database in the event of a catastrophic database failure. The tape backup can then be used to reconstruct the database. The recommended approach is to store a series of daily backups over several weeks. This approach allows the database to be restored from any one of numerous tape backups.

Database backup to tape occurs daily at 3:00AM. The process includes exporting the entire database to files located on the file server cluster drive. The files are then transferred to the tape drive using NTBackup.

The tape should be replaced once per week. The replaced tape should be clearly marked with the date at which it was inserted and the date at which it was removed. After ten tapes have been filled, the first tape should be erased and reused. Continuing this process assures that ten weeks of backups will be available.

Contact ISS in the event the database ever needs to be reconstructed from tape.

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