ADVANCED SYSTEM CONTROLLER ASC/2 FAMILY PROGRAMMING MANUAL

P/N 37524-09

000302

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ASC/2 Controller **ASC/2S Controller**

CBD-6000 Controller

ASC/2 SERIES CONTROLLERS

The ASC/2 series of controllers includes the Advanced System Controller Version 2 (ASC/2), the Advanced System Controller Version 2 Surface Mount (ASC/2S) and the Central Business District Controller (CBD-6000). All of these controllers use the Motorola 68302 Central Processing Unit and, as a result, all of them can run the same software programs and use the same database configuration. For these reasons this programming manual is used for the entire series of controllers.

There are minor differences in the databases for the ASC/2, ASC/2S and CBD-6000 because the hardware platforms are different. These differences are clearly indicated in the text describing the data entries. Since this is a programming manual, only brief descriptions of the physical characteristics are included. Detailed physical specifications and descriptions are included in their respective maintenance manuals.

The ASC/2 and ASC/2S controllers function as semi-actuated or fully actuated traffic controller units in accordance with the National Electrical Manufacturers Association (NEMA) Standards Publication No. TS1-1989 and TS2-1992.

The CBD-6000 is an integrated cabinet/controller system supporting up to six load switches. The CBD-6000 controller is a repackaged ASC/2 Type 1 controller with Port 1, Port 2 and Port 3 serial interfaces, but without the enclosure or power supply. Controller power is supplied by the CBD-6000 cabinet power supply. When referring to the CBD-6000 cabinet system there is a tendency to confuse the cabinet with the controller. This is natural since the controller is an integral part of the cabinet. Keep in mind, however, that while the cabinet supports only six load switches, the CBD-6000 controller is a fully functional NEMA TS2-1992 Type 1 controller compatible with ASC/2 and ASC/2S Type 1 operation.

The ASC/2 series of controllers operate as two through twelve phase controllers with any combination of twelve vehicle phases, twelve pedestrian phases, eight concurrent groups, two timing rings and four overlaps. An electrically erasable PROM (EEPROM) may be specifically programmed to meet customer configuration requirements. In addition to standard controller capabilities, the controllers provide outstanding software and hardware features that greatly simplify programming, operation, monitoring, and maintenance.

Programming is completely menu driven and in most cases involves only option selections or numeric value data entries. Control flexibility is provided by numerous programming options and enhanced detector coordination, non-interconnected coordination (NIC), time of day, preemption, and diagnostic capabilities. Real-time controller activity can be monitored locally or remotely via the dynamic status displays which together show all controller dynamic parameters.

The ASC/2 and CBD-6000 controller designs uses the latest microprocessor, display, and keyboard technology. Fewer components increase overall system reliability and allow an efficient use of space. Each controller has two main electronic modules that are accessible without the use of extender cards.

The ASC/2S design is similar to the ASC/2, but takes advantage of the latest surface mount technology to reduce board count and increase reliability. In addition, PROM memory has been replaced with Flash EPROM that allows faster and easier software upgrades. The ASC/2S has a single main electronic module that is also accessible without the use of extender cards.

Both the ASC/2 and ASC/2S have power supply assemblies easily accessible with only a screwdriver. Optional telemetry or RS-232 modules are available for system applications and are compatible with the entire series of controllers.

PROGRAMMING MANUAL

Section I introduces the ASC/2, ASC/2S and CBD-6000 controllers and this manual.

Section II contains a brief technical description of the ASC/2, ASC/2S and CBD-6000 family of controllers. The various versions of the controller are outlined including functions, physical characteristics, power requirements, and operational features.

Section III contains unpacking and installation procedures, connector lists with part numbers, environmental requirements and storage instructions.

Section IV contains a detailed description of the ASC/2, ASC/2S and CBD-6000 front panel keyboard and display.

Section V contains programming instructions and parameter definitions. Each of the nine data entry submenus is presented in the same way: the submenu as it appears on the screen followed by programming for each submenu data screen in sequence. A table of definitions for each data screen is given. For the Status Display Submenu, each display is illustrated and all messages and indicators are defined.

Appendix A is a programming reference. It is a listing of all data screens that can be viewed on the ASC/2 series LCD displays. The data values shown on the data screens in this listing are the default values and settings.

Appendix B contains pin lists for interface connectors.

Appendix C contains pin lists and function assignments for the Terminal and Facilities and Detector Rack Bus Interface Units (BIUs).

Appendix D contains a keyboard entry tree.

Appendix E contains a list of error messages and status conditions.

Appendix F contains pretimed controller operation information

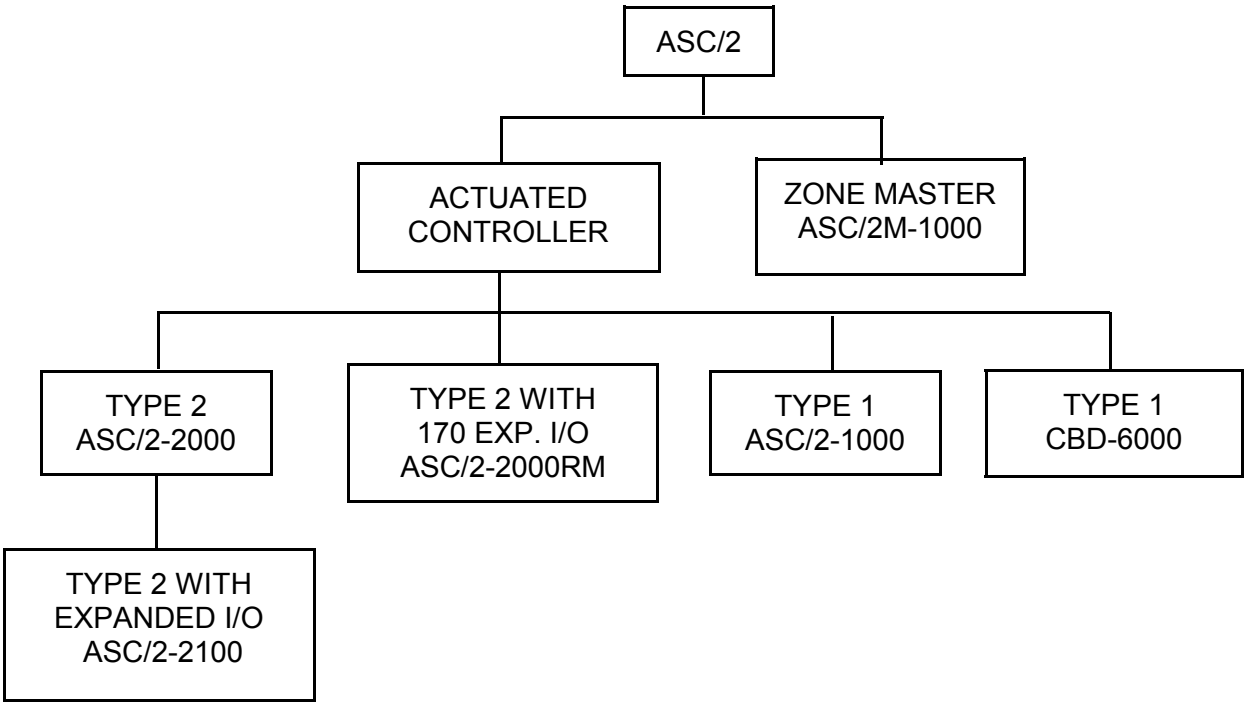
Appendix G contains a list of standard backup timing

ASC/2 SERIES CONTROLLERS

The ASC/2 series of controllers include the ASC/2, ASC/2S and CBD-6000. There are four ASC/2 models, three ASC/2S models and a single CBD-6000 model. Each model provides the same control functions, but uses different hardware input/output (I/O) configurations to interface with other components in a traffic control cabinet.

All models include three serial communication channels. The Port 1 channel is used to exchange data with a Malfunction Management Unit (MMU), retrieve vehicle detector data from detector racks and route I/O functions through Terminal and Facility Bus Interface Units (BIU). Port 2 is a terminal port with an RS-232 interface. Port 3 is a telemetry port using frequency-shift-key (FSK) or an RS-232 interface, depending on the telemetry module used.

The figure below shows the various ASC/2 models, including the ASC/2M Zone Master. The Zone Master is not discussed in this manual.



ASC/2-1000, ASC/2S-1000 and CBD-6000

These models provide an I/O interface conforming to NEMA TS2 standard requirements for Type 1 controllers. This interface controls all cabinet I/O over the Port 1 channel through one or more Terminal and Facility BIUs. Each BIU has 24 inputs/outputs, 15 dedicated outputs, 8 dedicated inputs and 4 optically coupled inputs. The CBD-6000 controller operates only as a Type 1 device.

ASC/2-2000 and ASC/2S-2000

These models provide an I/O interface conforming to NEMA TS1 and TS2 Type 2 standard requirements. This interface routes all I/O functions through industry standard circular connectors A, B and C. Terminal and Facility BIUs are not used. Most I/O signal assignments on the A, B and C connectors are fixed, but the Type 2 interface allows a combined total of 24 inputs and outputs on these connectors to be redefined based on an I/O mode selection. There are eight I/O modes, 0 through 7.

Mode 0, the default Type 2 I/O mode, is compatible with I/O requirements of the NEMA TS1 standard. Both controller models are functionally equivalent to a NEMA TS1 controller when I/O Mode 0 is selected and Port 1 is disabled. This allows the controllers to run in cabinets designed around the TS1 specification without any cabinet changes.

Both models can easily be programmed to operate as Type 1 controllers that are functionally equivalent to the ASC/2-1000 and ASC/2S-1000. In this configuration, controller I/O is switched from the A, B and C connectors to Port 1. This provides additional flexibility to a user who uses Type 1 and Type 2 controllers.

ASC/2-2100 and ASC/2S-2100

These models are ASC/2-2000 and ASC/2S-2000 controllers with expanded I/O. Both machines add a fourth circular I/O connector “D” and a telemetry connector. A NEMA overlap card connector is included in the ASC/2-2100, but is optional on the ASC/2S-2100. The ASC/2-2100 adds the necessary hardware using an expansion I/O module. The ASC/2S-2100 is designed so the additional hardware is added to the Processor-I/O module. Either model can be used as a replacement for an ASC-8000 in an existing cabinet without any cabinet changes.

ASC/2-2000RM

The fourth model of the ASC/2 actuated controller family is the ASC/2-2000RM. There is not a version based on the ASC/2S controller. This controller I/O interface conforms to the 170 cabinet requirements and controls I/O functions through the 170 standard C1 connector. It also includes the serial communications, terminal, and telemetry interfaces of the Type 1 interface.

The Port 1 channel of the ASC/2-2000RM interface is used to communicate with an MMU as it does with the Type 1 and Type 2 controllers. The ASC/2-2000RM can also be programmed to operate as a Type 1 controller. In this mode, external I/O interface is disabled and all I/O functions are handled over the serial communications channel. This allows the ASC/2-2000RM to duplicate the operation of the ASC/2-2100.

ASC/2 Controller

ASC/2 CONTROLLER

ASC/2 controller models are housed in a formed aluminum enclosure with front and rear access to the electronics. The front consists of a keyboard/display assembly and a connector interface panel. The keyboard/display assembly has a custom, weatherproof and dust-proof conductive rubber keyboard with numeric, function and cursor keys, and a high-contrast 16 line by 40-character liquid crystal display with LED back lighting. The connector interface panel includes two fuses (115 VAC, 1 amp and +24 VDC, 0.75 amp) and various interface connectors, depending on the model.

The ASC/2 controller has two main electronic modules and a power supply. The Processor module is mounted inside the hinged front panel. An MC68302 microprocessor controls all ASC/2 operations. The second module, the I/O Interface, is installed directly in the enclosure. This module transfers input and output signals between the I/O connectors and the processor. The I/O Interface has a connector for installing a telemetry module. Each model of the ASC/2 controller has its own I/O Interface module. A ribbon cable on the hinged side of the front panel interconnects the Processor and I/O Interface modules. The I/O module, with the various interface connectors, is held in place by four quarter-turn fasteners, six if the optional Extended I/O Interface module is installed. The Processor module is held in place by six screws. Both modules may be easily removed.

PHYSICAL DETAILS

The optional Extended I/O Interface electronic module provides an additional 25-pin telemetry connector and circular connector for controller I/O. This module is included in the ASC/2S-2100 controller.

The ASC/2 power supply furnishes various DC voltages and control signals required for controller operation. It is easily accessed via the hinged back panel of the enclosure. Card guides and a quarter-turn fastener hold the power supply in place. A ribbon cable connects it to the two electronic modules. The power transformer is located on the enclosure base and is connected to the power supply by a cable.

ASC/2 MODULES

Processor Module

The processor module contains the MC68302 microprocessor, timing and control logic, keyboard and display interface, and associated memory (battery backed static RAM, EPROM program memory). All user-entered data is stored in a small plug-in EEPROM Data Module. The processor module controls all ASC/2 operations following the instructions stored in the program memory.

I/O Interface Module

The input/output interface modules link input and output information between the microprocessor and external equipment. The modules contain control logic, latches for storage of information, buffers for logic level shifting between internal controller logic circuits and external circuits, and multiplex circuits for routing input data to the processor. Each version of the I/O Interface contains a connector interface for a serial communications channel (Port 1), RS-232C terminal (Port 2), and telemetry (Port 3). The Type 2 I/O Interface adds industry standard A, B, and C I/O connectors. The Expansion I/O Interface in the ASC/2-2100 adds connector D, telemetry, and NEMA overlap card interfaces. The ASC/2-2000RM interface has the 170 standard “C1" connector

Telemetry Module

The telemetry module contains a 1200 BPS FSK MODEM to transfer data to a zone master (ASC/2M-1000 or KMC-10,000) or a third-party Host system in an interconnected traffic control system. This optional module installs on the I/O Interface module. It operates over either a four-wire Full Duplex or two-wire Half-Duplex circuits with or without soft carrier turn off.

RS-232 Telemetry Interface

The RS-232 telemetry interface connects the controller to an external telemetry device for higher speed communications. Some examples are radio, fiber optics and high speed circuits.

Power Supply

The power supply furnishes the DC voltages, control and timing signals required for controller operation. This includes a minimum of 500 milliamps of +24 VDC power available for external loads and monitor circuits. Both the 115 VAC inputs and +24 VDC outputs of the power supply are fuse protected against current overloads.

PHYSICAL CHARACTERISTICS

Dimensions	9.00 in. high, 15.00 in. wide, 9.50 in. deep
Weight	20 lb.
Input Power Require-ments	89 to 135 V, 60 ± 3 Hz single phase (capacitor and battery backup provided for time clock functions)
Mounting	Shelf installation
Power	22 to 26 W (depending on configuration/module)

ASC/2S Controller

ASC/2S CONTROLLER

ASC/2S controller models are housed in a formed aluminum enclosure with front access to the electronics. The front consists of a user interface assembly and a connector interface panel. The user interface assembly has a custom, weatherproof and dust-proof conductive rubber keyboard with numeric, function and cursor keys, and a high-contrast 16 line by 40-character liquid crystal display with LED back lighting. ASC/2 literature usually refers to the user interface assembly as the keyboard/display assembly. The connector interface panel includes two fuses (115 VAC, 1 amp and +24 VDC, 0.5 amp) and various interface connectors, depending on the model.

The ASC/2S controller unit has two main electronic modules and a power supply. The Processor-I/O module is installed directly in the enclosure. This module incorporates an MC68302 microprocessor that controls all ASC/2S operations and has circuitry that transfers input and output signals between the I/O connectors and the processor. Also located on the Processor-I/O module is a connector for installing a telemetry module. The the User Interface module is hinge-mounted to the front of the enclosure. All versions of the ASC/2S controller use the same modules. The model type is defined by the components installed on the Processor-I/O module. A ribbon cable interconnects the Processor I/O and User Interface modules. The Processor-I/O module and connector interface panel are held in place by two quarter-turn fasteners and a card guide. The User Interface panel is held in place by two nuts. Both modules can be easily removed.

The ASC/2S power supply furnishes +24 VDC for controller operation. It is mounted internally on the back panel of the enclosure. The power supply is held in place by four screws and is connected to the Processor-I/O module by two wire harnesses. It is accessible by removing the Processor-I/O module.

ASC/2S MODULES

Processor-I/O Module

This processor section of this module contains the MC68302 microprocessor, timing and control logic, keyboard and display interface, and associated memory (battery backed static RAM, flash EPROM program memory). All user-entered data is stored in a small plug-in EEPROM Data Module. The processor controls all ASC/2S operations following the instructions stored in the program memory.

The input/output (I/O) section of this module links input and output information between the microprocessor and external equipment. This section contains control logic, latches for storage of information, buffers for logic level shifting between internal controller logic circuits and external circuits, and multiplex circuits for routing input data to the processor. Each module contains a connector interface for a serial communications channel (Port 1), RS-232C terminal (Port 2), and telemetry (Port 3). Each Processor-I/O module has different hardware installed depending on the controller configuration. In addition to the serial port connectors, the ASC/2S-1000 has the standard Type 1 NEMA power connector and the ASC/2S-2000 has the standard Type 2 NEMA A, B and C circular connectors. The ASC/2S-2100 adds a 25-pin "D" type serial telemetry connector and a circular D connector in addition to the connectors found on the ASC/2S-2000. Also, the ASC/2S-2100 may be ordered with or without an overlap card connector.

Telemetry Module

The telemetry module contains a 1200 BPS FSK MODEM to transfer data to a zone master (ASC/2M-1000 or KMC-10,000) or a third-party Host system in an interconnected traffic control system. This optional module installs on the Processor-I/O module. It operates over either a four-wire Full Duplex or two-wire Half-Duplex circuits with or without soft carrier turn off.

RS-232 Telemetry Interface

The RS-232 telemetry interface connects the controller to an external telemetry device for higher speed communications. Some examples are radio, fiber optics and high speed circuits.

Power Supply

The power supply furnishes +24VDC for controller operation. This includes a minimum of 500 milliamps of +24 VDC power available for external loads and monitor circuits. Both the 115 VAC inputs and +24 VDC outputs of the power supply are fuse protected against current overloads. It is mounted internally on the back panel of the enclosure. The power supply is held in place by four screws and is connected to the Processor-I/O module by two wire harnesses. It is accessible by removing the Processor-I/O module.

PHYSICAL DETAILS

Physical Characteristics

Dimensions	9.90 in. high, 15.00 in. wide, 7.75 in. deep
Weight	7.75lbs (ASC/2S-1000) 8.25lbs (ASC/2S-2100)
Input Power Require-ments	89 to 135 V, 60 ± 3 Hz single phase (battery backup provided for time clock functions)
Mounting	Shelf installation
Power	13 - 18 W (depending on configuration/module)

CBD-6000 Cabinet Assembly

CBD-6000 CONTROLLER

The CBD-6000 controller is installed in a hinged aluminum assembly. The CBD-6000 controller is a repackaged ASC/2 keyboard/display and I/O interface assembly. The keyboard/display assembly has a custom, weatherproof and dust-proof, conductive rubber keyboard with numeric, function and cursor keys, and a high-contrast 16 line by 40-character liquid crystal display with LED back lighting.

The CBD-6000 controller has two main electronic modules. The Processor module is mounted inside the hinged front panel. An MC68302 microprocessor controls all CBD-6000 operations. The second module, the I/O Interface, is installed in the back half of the aluminum frame. This module transfers input and output signals between the processor and BIUs via the Port 3

connector. The I/O Interface has a connector for installing a telemetry module. A ribbon cable on the hinged side of the front panel interconnects the Processor and I/O Interface modules.

PHYSICAL DETAILS

The I/O module, with the various interface connectors, is held in place by six screws. The Processor module is also held in place by six screws. Both modules are easily removed.

Power for the CBD-6000 controller is provided by a cabinet power supply that furnishes various DC voltages and control signals required for controller operation. Power is fused in the cabinet.

CBD-6000 Modules

Processor Module
The processor module contains the MC68302 microprocessor, timing and control logic, keyboard and display interface, and associated memory (battery backed static RAM, EPROM program memory). All user-entered data is stored in a small plug-in EEPROM Data Module. The processor module controls all ASC/2 operations following the instructions stored in the program memory.

I/O Interface Module
The input/output interface module links input and output information between the microprocessor and external equipment. The I/O Interface contains a connector interface for a serial communications channel (Port 1), RS-232C terminal (Port 2), and telemetry (Port 3). There is also a connector for a telemetry module.

Telemetry Module
The telemetry module contains a 1200 BPS FSK MODEM to transfer data to a zone master (ASC/2M-1000 or KMC-10000) or a third-party Host system in an interconnected traffic control system. This optional module installs on the I/O Interface module. It operates over either a four-wire Full Duplex or two-wire Half-Duplex circuits with or without soft carrier turn off.

RS-232 Telemetry Interface
The RS-232 telemetry interface connects the controller to an external telemetry device for higher speed communications. Some examples are radio, fiber optics and high speed circuits.

PHYSICAL CHARACTERISTICS

Dimensions	3.5 in. high, 15.00 in. wide, 3.50 in. deep
Weight	3.5 lbs
Input Power Requirements	89 to 135 V, 60 ± 3 Hz single phase (capacitor and battery backup provided for time clock functions
Mounting	CBD-6000 panel
Power	22 W

OPERATIONAL FEATURES

Actuated Control

- 12 phases, 8 concurrent groups, 2 timing rings.
- All standard NEMA TS1, TS2 and 170 timing functions.
- Alternate vehicle extension time.
- Pedestrian clearance through yellow.
- Pedestrian timing carryover.
- Guaranteed minimum times for minimum green, walk, pedestrian clear, yellow, red, and red revert.
- Density functions with addition of actuations before added and cars waiting.
- Restricted concurrent phase service.
- Five-section, left-turn head control.
- Soft recall.
- MUTCD flash with flash entry and exit phases selectable from keyboard.
- Simultaneous gap termination by concurrent group.
- Keyboard programming of sequence and configuration.
- Power on flash or all red time.
- Dimming by load switch and color.
- Four max green times for each phase including detector fail max.
- Dynamic extension of max time based on vehicle demand.
- Overlaps programmed from the keyboard or NEMA overlap card.
- Standard and protected-permissive overlaps.
- Lagging, leading, or advanced green timed overlaps.
- Program up to 16 overlap movements.
- Backup protection by concurrent group.

Coordinator

- 64 coordination patterns, each with its own cycle, offset, and split.
- Three interconnect methods: plan, TS2, standard.
- Offset and split entries in percent or seconds.
- Reference the offset to the beginning of lead (or lag) coordinated phase green or to the lead coordinated phase yield (or force-off) point.
- Coordinated, recall, max recall, ped recall or omit phases selectable by phase within each pattern.
- Alternate phase sequence selectable by pattern.
- Fixed or floating force-off.
- Dual yield points (one per ring) allow flexible lead-lag phasing.
- Actuated or non-actuated coordinated phases.
- Pick-up cycle provides smooth and orderly transition from free to coordinated operation.
- Phase re-service during coordination.
- Split interval for each controller phase, allows coordination of up to 12 phases.
- Local split demand operation.
- Dual coordination capability.
- Three methods of offset correction: smooth transition, add-only, dwell.
- Operation as a local controller or a master coordinator.
- Three permissive operations: automatic permissive, dual permissive, single permissive.
- Automatic calculation of yield point, permissives and force-offs from split intervals.
- Manual override.
- Manual command using NIC sync.
- Built in diagnostics to detect coordination and hardware failures.
- Multiple coordination operating modes including: time-based, hardwired, telemetry, time-based backup for hardwired or telemetry interconnect, time clock master/coordinator in an interconnected system.

OPERATIONAL FEATURES

Preemptor

- Six priority and four bus preemption sequences.
- Prioritized or first-come first-served operation.
- Lock or non-lock preempt call.
- Preempt delay, inhibit, duration and maximum timing in addition to green, clearance, hold, and flash interval timing.
- Guaranteed minimum green and pedestrian clearance times.
- Overlap and pedestrian indication control during preemption.
- Multiple hold interval options: green, all red, flash, and limited service.
- Preempt active outputs.
- Exit phase control.
- Phase maximum time override following preemption.
- Linking of priority preemptors for multiple track clearance or complex sequences.
- Special preemption to coordination exit sequence operation

Time-of-day

- Separate control for NIC (non interconnected coordination) and TOD (time of day) functions.
- 16 day programs.
- 10 week programs.
- Year program with 53 weeks.
- 36 holiday programs, fixed or floating.
- Up to 200 NIC program steps each allowing selection of coordination pattern and system override.
- Up to 100 TOD program steps each commanding: flash, dimming, red rest, alternate vehicle extension, detector logging and diagnostic plan, phase sequence; selection by phase of MAX 2, MAX3, recall, conditional service inhibit and omit; and eight special functions.
- Manual selection of NIC or TOD program step.
- Keyboard selectable sync reference point and resync time.
- Automatic compensation for leap year.
- Daylight savings time control.
- Day of week and week of year automatically calculated and displayed.
- External time reset capability.
- Timing accuracy:
  1) With power applied, accuracy of 60 Hz line frequency.
  2) With power removed, drift of less than 25 ppm.

Detectors

- Up to 64 vehicle detectors.
- Up to 16 system and speed detectors.
- Speed determined by single detection or two-detector speed trap.
- Vehicle detectors assignable to phase and function.
- Twelve pedestrian detector inputs.
- Delay and extended timing.
- Detector disconnect and switching.
- Nine detector types, including:
  -Stop bar detector with and without timing.
  -Calling detectors.
  -Bicycle detectors.
  -Dilemma zone detectors.

Telemetry

- Compatible with KMC-10,000 or ASC/2M-1000 zone masters.
- 1200 bps FSK Modem.
- High speed RS-232 telemetry interface.
- System command processing for selection of coordination pattern, master zero, and eight special functions.
- Readback of intersection status including vehicle, pedestrian, and overlap color, local detector activity, preempt call activity, coordination status, and local time.
- Split usage monitoring.
- Readback of volume and occupancy data for up to 16 system detectors and speed for up to two speed detectors.
- Upload/download of data base.
- Keyboard or external selection of system address.
- Compatible with Protocol-90™ (Computran Systems Corp.)
- Compatible with California AB3418.

Configuration

- Keyboard selection of phase sequence, phases in use, exclusive pedestrian phases, and phase to load switch assignment
- Options include: BIU enabling for terminals & facilities and detector racks; MMU disabling; diagnostic frame enabling; and peer to peer message enabling to ten external devices.
- Supervisor and data change access codes.
- Modem configuration and telemetry address definitions.
- Keyboard programming of valid MMU phases.

Diagnostic

- Power-ON diagnostics verify memory (RAM, PROM, EEPROM), MMU programming and microprocessor operation.
- Continuous, automatic run-time diagnostics to verify essential elements of controller operation including: PROM, EEPROM, Port 1 communications, and microprocessor.
- Operator-initiated diagnostics to verify operation of inputs, outputs, keyboard, and display.
- Time-of-day controlled detector diagnostics to test detectors for no-activity, maximum presence, and erratic output.
- BIU-connected detector diagnostics to test for watchdog failure, open or shorted loops, and excessive inductance change.
- Operator-initiated diagnostics to adjust telemetry channel operation.

Logging

- Separate log buffers for detectors, detector failures, controller events, and MMU events.
- Detector logging:
  - Automatic volume, occupancy, and average speed logging for selected vehicle and speed detectors.
  - Detector logging interval selectable as 5, 15, 30, or 60 minutes.
  - Detector logging enabled or disabled by time of day
- Detector failure logging:
  - Storage buffer for a minimum of 100 time and date-stamped detector events.
  - Failure logging of no activity, maximum presence, erratic output, watchdog time-out, shorted loop, open loop, and excessive inductance change.
  - Recovery logging as failed detectors return to on-line operation.
  - Disable feature for detector failure logging.
- Controller event logging
  - Storage buffer for a minimum of 200 time- and date-stamped events.
  - Event logging of Port 1 communication failures, coordination faults, MMU and local flash status, preempt events, power ON/OFF, low battery, and up to 16 alarms.
  - On line reporting when an event or failure returns to normal status.
  - Event logging enabled on a category basis.
  - Individual enabling of alarms.
- MMU event logging
  - Storage buffer of 16 time- and date- stamped MMU events

Status Display

- Keyboard selection of detailed dynamic status displays for each of the main controller functions, including: controller, coordinator, preemptor, NIC/TOD, detectors, telemetry, MMU, and flash.
- Display current telemetry status parameters including system detectors, telemetry modes, special functions, and speed traps.
- Flash status display identifies causes of flash conditions.

Utility

- Copy for phase timing, coordination pattern split data, and backup data.
- Clear entered data.
- Print entered data.
- Print detector, event and MMU logs.
- Display controller sign on message.
- Enable/disable keyboard audio feedback.
- Control LCD backlight.
- Custom programming of any application including custom signal control, detector processing, telemetry protocols for third-party systems, status displays, diagnostics, data entry, switches for special features.

UNPACKING

The ASC/2 controller is packed in a specially designed protective shipping carton. All necessary precautions have been taken to ensure that equipment arrives intact and in proper working order. However, you should follow these steps when unpacking the controller to verify that there is no shipping damage.

1. Carefully inspect the shipping container for damage before opening. If the container is damaged, unpack the controller unit in the presence of the carrier.

2. Save the packing materials as they have been specially designed to protect the controller during shipment. The special packing materials must be used should it be necessary to ship the controller again.

3. Carefully inspect the controller for damage. Check for broken wires, broken connectors, loose components, bent panels, and dents or scratches on the enclosure.

4. If you discover any physical damage, notify the carrier immediately.

INSTALLATION

Install ASC/2 and ASC/2S controllers in a location where the front panel is easily accessible. Leave adequate room around the controllers to allow easy removal. Care should be taken to make sure vents on the backside of the controllers are not blocked. The foregoing does not apply to the CBD-6000 controller. For all controllers, perform the following checks **before applying AC power.**

1. Open the front panel door, remove the plug-in data module and verify that the number on the EEPROM label matches the program number on the controller label located on the top surface of the unit. Re-seat the data module.

2. Verify that all modules are properly secured and that all connector ribbon cables are in place. Check to make sure ASC/2, ASC/2 and CBD-6000 socket-mounted components are properly seated.

3. If the controller is an ASC/2S or CBD-6000, **TURN ON THE BATTERY SWITCH.** This switch, located on the bottom right corner of the Processor Module, activates the backup battery. If you store or ship the controller, turn the switch off.

4. If the controller is an ASC/2S, change the battery jumber (JP2) from center-down to center-up. JP2 is located next to the battery (B1) just above the telemetry connector on the processor-I/O board.

The controller is now ready for operation. Cable connector part numbers are shown below. Refer to Appendix B for connector pin lists.

STORAGE

Should it be necessary to store the ASC/2S, ASC/2 or CBD-6000 controller with power removed, **THE BATTERY SHOULD BE REMOVED OR DISCONNECTED BY SETTING THE BATTERY SWITCH OR JUMPER TO THE OFF POSITION.** The battery is located on the processor module.

Should it be necessary to store the ASC/2S controller with power removed, **THE BATTERY SHOULD BE DISCONNECTED BY SETTING THE BATTERY JUMPER TO THE OFF POSITION (JP2 CENTER TO DOWN).** The battery is located on the processor module.

CONNECTORS / ENVIRONMENT / STORAGE

CABLE CONNECTORS AND PART NUMBERS

CONNECTOR	CABLE CONNECTOR	ECONOLITE PART NUMBER
A	MS-3116-22-55S	44143P1
B	MS-3116-22-55P	44143P2
C	MS-3116-24-61P	44143P3
D	AMP #205842-1	31163P2
CRIMP SOCKET	AMP #66504-3	31663P4
SDLC (Port 1)	CANNON DAU-15P	54665P4
TERMINAL (Port 2)	CANNON DBU-25P	54665P7
TELEMETRY (Port 3)	CANNON DEU-9S	54647P9
TELEMETRY (Optional)	CANNON DBU-25S	54647P6
POWER (Type 1)	MS-3106-18-1S	44181P1
C1 (ASC/2RM only)	AMP 201692-3	37134P2
I/O (ASC/2RM)	Cannon DCU-37P	54665P5

ENVIRONMENTAL OPERATION SPECIFICATIONS

The ASC/2 controller meets or exceeds the NEMA environmental standards for traffic control equipment summarized below.

(NEMA TS 2-1992 SECTION 2)

CATEGORY	REQUIREMENT
Ambient Temperature	Operating Range: -35EC to +74EC Storage Range: -45EC to +85EC
Humidity	Relative humidity is not to exceed 95% over the temperature range of +4.4EC to +43.3EC
Vibration	The controller will maintain its programmed functions and physical integrity when subjected to a vibration of up to 0.5g at 5 to 30 cycles per second, applied in each of the three mutually perpendicular planes.
Shock	The controller will not suffer either permanent mechanical deformation or any damage that renders the unit inoperable, when subjected to a shock of 10g applied in each of the three mutually perpendicular planes.

Figure 4-1. ASC/2 Front panel

KEY OPERATION

Keyboard Numbers 0 - 9

Data Entry

Use to enter/select timing values, detectors, program steps, addresses, and other data entry values. Auto-repeat feature allows multiple entry of a number by pressing and holding number key.

Go To

Go to desired data entry field without scrolling. Enter desired number then press ENTER. Available for parameters with a large number of data entries (vehicle detector numbers, detector-phase assignment, vehicle diagnostic detector numbers, holiday numbers, NIC program steps, TOD program steps, coordination patterns).

Placing Calls

Calls can be placed while viewing any status display. Auto-repeat feature allows placement of continuous calls by holding down call key.

Vehicle calls

While in status display, press number key corresponding to called phases 1-8 or cursor arrows for phases 9(8), 10(6), 11(9), and 12(7).

Pedestrian calls

While in status display, press Special Function (Spec Func) key then number key corresponding to called phases 1-8 or cursor arrows for phases 9(8), 10(6), 11(9), and 12(7).

Priority preemptor calls

In preemption status display to call priority preemptors press ENTER then number key 1-6 corresponding to called preemptor.

Bus preemptor calls

In preemption status display to call bus preemptors press ENTER then cursor

arrows for bus preemptors 1(8), 2(6), 3(9), and 4(7).

KEYBOARD AND DISPLAY

KEY OPERATION

Toggle Key ("0" numeric key)

Yes/No

Press "0" to toggle between YES and NO.

On/Off

Press "0" to toggle between "X" (ON) and blank (OFF).

Enable/Select

Use toggle key ("0") to enable options and select phases for various operations. "X" enables/selects unless otherwise specified by parameter definition.

+/-

Press "0" to select between "+" (positive), "-" (negative), or blank (not in use). This toggle selection used in dimming operation only.

Data entries

Some entries require data selection by toggling until desired entry is displayed.

Cursor Arrows Key

Cursor position

Controls movement and positioning of screen cursor.

Store data

Operates as ENTER key after data entries are made.

Additional phases

Arrows correspond to phases 9(8), 10(6), 11(9), and 12(7) when in status displays and bus preemptors 1(8), 2(6), 3(9), and 4(7) when in preemption status display. Used to call phases and bus preemptors.

Scrolling

Auto-repeat feature allows scrolling horizontally (7,6) and vertically (8,9) by pressing and holding cursor arrow keys.

Press cursor keys to advance through data entry screens. Top-of-page and end-of-page messages indicate boundaries of current group of data (Example: Top and end of Timing Data, Controller submenu). Use cursor with F2 (Next Screen), F4 (Next Data), or F6 (Next Page) for more advancing options.

Enter Key

Store data

Data is stored when ENTER is pressed or when user leaves that data field by using the cursor arrow keys or by going to main menu or submenus using function keys.

Execute function

Used to execute functions, such as memory clear, to protect user from erasing data by inadvertently pressing toggle at this field.

Spec Func Key

Pedestrian calls

Press Spec Func (Special Function) key then number key corresponding to called phases 1-8 or cursor arrows for phases 9(8), 10(6), 11(9), and 12(7). Calls may be placed when viewing status displays are on the controller screen.

Lock access

Lock access to controller data entry by pressing special function key then clear key. Keyboard is locked until supervisor or data change access codes is entered. Lock access function operates only when access codes have been entered.

Hex entry

Where entry of hexadecimal values is required press SPEC FUNC key then numbers 1-6 to select hex values A-F, respectively.

Clear Key

Clear data
Press to clear current data entry and restore previous entry. Data may not be cleared with CLEAR key once data is stored/entered using ENTER, cursor, or function keys.

EXIT helpscreens
Press CLEAR to from helpscreens to exit help.

Function Keys

Main Menu (F1)
Press F1 to display Main Menu. The main menu lists nine submenus containing all possible categories for data entry. From Main Menu press number keys 1-9 corresponding to desired submenu. Press F1 at any time to return to Main Menu.

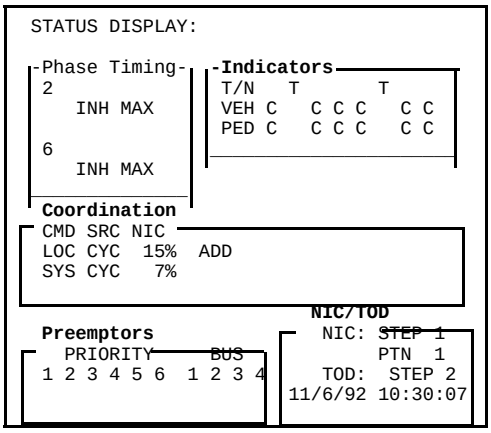
```
            ASC/2 MAIN MENU
1. CONFIGURATION    6. DETECTORS
2. CONTROLLER       7. STATUS DISPLAY
3. COORDINATOR      8. UTILITIES
4. PREEMPTOR        9. DIAGNOSTICS
5. NIC/TOD

       PRESS KEYS 1..9 TO SELECT
```

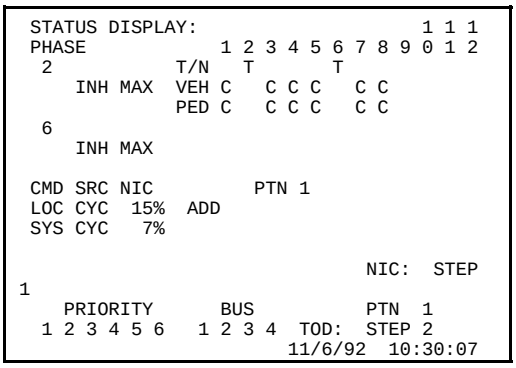
Submenu (F3)
Press F3 from any data entry screen to backup through all screens to current submenu. Continue to press to access Main Menu. Submenus are made up of a varying number of data groups which further categorize areas of data entry. To view or enter data press the number associated with the desired data group. The first screen appears for the selected data group and data may then be viewed or entered at any time. Submenus are always selected from Main Menu.

```
          CONTROLLER SUBMENU
1. TIMING DATA      6. START/FLASH DATA
2. PH OVLP ASSIGN   7. NO SERVE PHASES
3. PED CARRYOVER    8. DIMMING
4. RECALL DATA      9. OPTION DATA
5. OVERLAP DATA

       PRESS KEYS 1..9 TO SELECT
```

Example: Controller Submenu contains nine data entry groups. From Controller Submenu press "1" to access timing data group.

Status Display (F7)
Press F7 to view intersection status display.





Phase Timing For Phases 1-12
For each ring: current phase #, timing interval, and time remaining are displayed above termination/max timers/ped indications and their corresponding time remaining. Ring 1 status is above ring 2 status.

Timing intervals: MGRN, YEL, RED, ADDI, VEXT, MGRN DONE, GRN HOLD, GRN REST, GRN XFER, RED, HOLD, RED REST, RED XFER, HOLD.

Termination indications: Displays cause of previous green interval termination (PREEMPT, MAN ADV, FORCE OFF, MAX OUT, GUAR PASS, GAP OUT, MIN GAP).

Max Timers: Max timer in effect and time remaining PMAX (Preemptor max), DMAX (Detector fail max), MAX 1, 2 or 3. Max timers are displayed only when opposing call exists.

Peds: Pedestrian timing intervals and time remaining (WALK, WALK REST, WALK HOLD, PCLR).

Indicators
Timing/Next Indicators per phase:
T = Phase timing.
N = Phase to time next, indicated during yellow and red of previous phase timing.

Vehicle Call/Recall Indicators per phase:
C = Call from associated phase detector.
R = Recall to an actuated phase.
N = Recall to a non-actuated phase.

Pedestrian Call/Recall Indicators per phase:
C = Call from associated phase detector.
R = Recall to an actuated phase.
N = Recall to a non-actuated phase.

Coordination
CMD SRC = identifies coordination command source as NIC (non-interconnected), TLM (telemetry), or HDW (hardwire).
PTN 1 = pattern number
LOC CYC = local cycle count when local cycle is running. Offset correction (ADD, SUB, or DWELL) appears next to LOC CYC.
SYS CYC = system/master cycle count.

Status Display (F7) - continued

Preemptors
Priority preemptors 1 through 6 status indicators:
A = Active preemptor
C = Call present
I = Inhibit timer currently timing
D = Delay period currently timing

Bus preemptors 1 through 4 status indicators:
A = Active preemptor
C = Call present
I = Inhibit timer currently timing
D = Delay period currently timing
R = Reservice period

NIC/TOD
NIC program step (STEP) number and pattern (PTN) number.
TOD program step (STEP) number.

Last line shows the current controller date and time.

Help (F8)
Press F8 to display helpscreens with information about current data entry field, status display, or menu. To EXIT help press CLEAR or HELP key.

Next Screen (F2)
Allows single screen or rapid screen by screen advancing through data pages.

Single Screen Advance
Press F2, prompt asks for direction, press arrow key corresponding to desired advance direction.

Rapid Screen Advance
Press and hold F2, prompt asks for direction, press arrow key corresponding to desired advance direction.

Next Data (F4)
Searches for non-zero data and goes to that field. Allows user to search through data screens for valid entries.

Press F4, prompt asks for direction, press cursor key after prompt to control direction of search.
Choose from two directions for this function. Up/left (7,8) arrows have same effect and down/right (9,6) arrows have same effect.

Next Page (F6)
Allows advancing to previous or next group of data entry screens (data group) in a submenu. Press F6, prompt asks for direction, press cursor up or down arrow keys to control direction.

Display Adjust (F5)
Adjusts degrees of contrast of the display.

Screen Messages

Cold Start

Cold start message appears on power up. Press Main Menu (F1) key to exit cold start/sign on screen.

MORE -->, <--MORE

Indicates more information on next screen. Press right or left arrow cursor key and move to next right/left screen.

Top of Page

Marks first screen in group of data entry screens. To advance to next or previous group either go to submenu and select group or use Next Page (F6) function.

Additional Screens

Message at screen bottom indicates that current screen is one of more screens for that data page. Scroll with Next Screen (F2) function key or arrow keys to view additional screens.

Additional Pages

Message at screen bottom indicates that current data page is one of more data pages making up the current submenu. Scroll with F6 function key or arrow keys to view screens of additional data page groups.

End of Submenu

Message at screen bottom indicates end of all data pages (and all screens) in current submenu. To view more submenus return to Main Menu or use any of the scrolling function keys (F2, F4, F6).

Keyboard & Display Options

Select Configuration Submenu, Options #8 to enable/disable keyboard sound and backlight. KEY CLICK ENABLE - YES generates a beep each time a key is pressed. BACKLIGHT ENABLE YES - illuminates display.

Keyboard Inactivity

If no keys are pressed on controller keyboard for a period of thirty minutes the keyboard automatically reactivates access code entry requirement and data entry is not allowed until access code is re-entered (if access code feature is in effect). Screen displayed returns to main menu. Access state may be initiated by the user by pressing SPEC FUNC then CLEAR keys.

Access Code

An access code may be required before any data entries can be made. Refer to programming instructions for Configuration Submenu # 8 Options for information on access code feature.

Exit

To exit from data pages press Submenu (F3), Main Menu (F1), or Status Display (F7) function keys.

Help

Help function key (F8) can be pressed at any time. Help information is available for each data entry parameter.

PROGRAMMING

This section contains programming summaries for each of the submenus, basic programming instructions, data entry parameter definitions and ranges, and illustrations of data entry screens. Programming instructions are presented for each submenu in the order submenus appear on the main menu. Programming instructions are limited to keystrokes required for data entry. No attempt has been made to instruct the user on traffic applications although a few examples are given. The examples are used to illustrate controller features.

Each data entry screen is shown with the appropriate programming instructions. Keystrokes used to access screens are shown at the lower right of each screen. Note that Main Menu key is also labeled as F1. Keystroke example: ***Main Menu (F1)-1-1*** This represents pressing the Main Menu (F1) key, followed by the number 1 (Configuration Submenu), then again number 1 (Controller Sequence).

CONFIGURATION SUBMENU
Programming Summary

The configuration submenu has nine data groups. To view or enter data press the keyboard number (1 through 9) corresponding to desired data group.

```
          CONFIGURATION SUBMENU

1. CONTROLLER SEQ   6. PORT 3

2. PHASES IN USE    7. ENABLE LOGGING

3. PH TO LS ASSIGN  8. OPTIONS

4. SDLC OPTIONS     9. MMU PROGRAM

5. PORT 2



        PRESS KEYS 1..9 TO SELECT
```

1. CONTROLLER SEQUENCE
   Select ring phase assignment, order of rotation, and concurrent group barrier position to define controller phase sequence.

2. PHASES IN USE
   Enable phases to be used by controller.
   Select phases with exclusive pedestrian timing.

3. PH TO LS ASSIGN
   Assign phase, pedestrian and overlap outputs to MMU load switch channels.

4. SDLC OPTIONS
   Enable BIU used by terminals and facilities.
   Enable BIUs used by detector rack.
   Enable Type 2 controller to operate as Type 1.
   Disable MMU readback capabilities for Type 2 operation.
   Enable interface to test case for bench top diagnostics.
   Enable peer to peer communication.
   Define peer to peer device addresses.

5. PORT 2
   Select terminal data rate.
   Specify word length, parity and stop bit.
   Define AB3418 protocol parameters.
   Enable port 2.

6. PORT 3
   Assign telemetry address to local controllers.
   Assign status request address to groups of local system detectors.
   Set a telemetry response delay.
   Define telemetry modem status and communication parameters.
   Enable Port 3
   Define AB3418 protocol parameters.

7. ENABLE LOGGING
   Enable real-time logging of various events.

8. OPTIONS
   Enable access code feature.
   Enter/change supervisor and or data change access codes.
   Enable keyboard audio feedback feature.
   Enable display backlight.

9. MMU PROGRAM
   Enter the MMU program at the controller for comparison with MMU program card at the cabinet to enable conflict checking.

Controller Sequence

DO NOT CHANGE SEQUENCING WHILE CONTROLLER IS IN OPERATION ON THE STREET.

1. Select #1 Controller Seq from Configuration Submenu.
2. Position cursor along ring 1 (R1) and ring 2 (R2) rows and enter desired phase assignment. Phase numbers cannot be duplicated. User is not allowed to enter a phase numbers already appearing in a ring assignment. To "move" a phase from one position to another enter 0 for the phase then enter the phase number in desired priority position.
3. Use cursor keys to move to desired phase or barrier location.
4. Press toggle key to enter or remove barriers to define concurrent groups (CG).

Barrier position is indicated by ^ and a line appearing at that position. Change takes effect after leaving the Controller Sequence data screen.

```
            CONTROLLER SEQUENCE

    ------------ PRIORITY ------------
                                  1  1  1
    1..2..3..4..5..6..7..8..9..0..1..2
R1  1  2| 3  4| 9 10| 0  0  0  0  0  0
R2  5  6| 7  8|11 12| 0  0  0  0  0  0
CG   .  ^  .  ^  .  ^  .  .  .  .  .  .

R1,R2 = RING 1 AND 2 PHASE ASSIGNMENT.

CG    = BARRIER LOCATION BETWEEN
        CONCURRENT PHASE TIMING GROUPS.


END OF SUBMENU
```

Main Menu (F1)-1-1

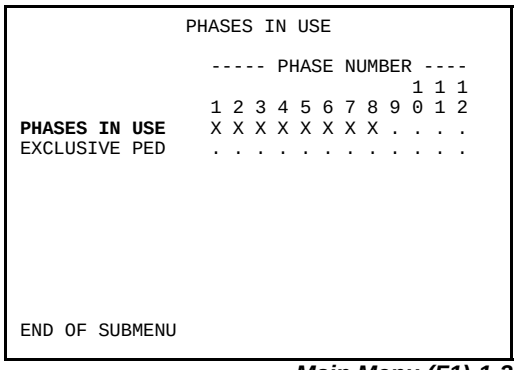
(Standard Quad Shown)

If the controller sequence is not programmed in the standard quad controller mode of operation the following functions are disabled: backup protection, red over green arrow, low priority service, and conditional service.

PARAMETER	DEFINITION	RANGE
R1 R2	Defines the phases that are assigned to ring 1 (R1) and ring 2 (R2). A phase may only be entered once.	0 disable 1-12
CG	CONCURRENT GROUPS Move barrier location to define concurrent groups of phases where concurrent selection and timing of conflicting phases for traffic movement in different rings is not allowed. A phase from ring 1 may time simultaneously with a phase from ring 2 in the same concurrent group but not in different concurrent groups. *****WARNING***** DO NOT change ring assignments or concurrent group barrier location while the controller is in operation in the field. This parameter should be changed only during bench test.	^ assigns location

Phases In Use
Phases must be programmed "in use" to be active and able to use any assigned functions. This allows phases to be omitted from use without having to delete assignment of detectors and/or functions throughout various data entry pages. When the phase is needed it can be selected as active.

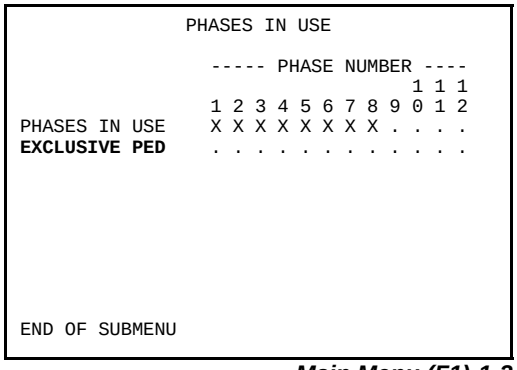
1. Select #2 Phases In Use from Configuration Submenu.
2. Use toggle key to select phase(s) in use. Select with X under desired phase next to PHASES IN USE parameter.



Main Menu (F1)-1-2

Exclusive Pedestrian Timing
In some applications it is required to have phases timing only pedestrian intervals. An example is diagonal pedestrian crossings at an intersection where vehicle traffic is stopped in all directions and only pedestrian intervals are displayed to allow pedestrian traffic to cross in any number of directions at one time.

1. Select #2 Phases In Use from Configuration Submenu.
2. Use toggle key to select exclusive ped phase(s). Press key to indicate X under desired phase next to EXCLUSIVE PED parameter.
3. Enter pedestrian interval timing values as needed (Controller Submenu, Timing Data).
4. Enter phase movement time that is less than Walk plus pedestrian clearance.



Main Menu (F1)-1-2

PARAMETER	DEFINITION	RANGE
PHASES IN USE	Indicates phases to be active. A phase times intervals only when it is in use so phases not selected are omitted from controller operation.	X enables
EXCLUSIVE PED	Phases timing only pedestrian intervals without concurrent vehicle movement	X enables

Phase To Load Switch (MMU) Assignment

Phase outputs are wired to load switches at the cabinet with no particular constraints. This relationship/assignment must be defined at the controller. For Type 1 and 2 controllers assignment defines phase output to load switch/MMU channel relationship. Phase to load switch assignment is required when TS2 MMU is used and when dimming feature is enabled. Load switch numbers correspond to MMU channel number.

1. Identify actual phase output to load switch wiring arrangement.
2. From Configuration submenu select # 3 Ph to LS Assign. Enter number of the corresponding phase or overlap output under PH/OLAP parameter and after each load switch/MMU channel number (1-16). Entries of numbers 13, 14, 15, and 16 for PH/OLAP correspond to overlaps A, B, C, and D, respectively.
3. Enter 'X' in ped column to indicate ped associated with the corresponding phase.

```
   PHASE TO LOAD SWITCH (MMU) ASSIGNMENT

LOAD       SIGNAL    LOAD       SIGNAL
SWITCH     DRIVER    SWITCH     DRIVER
(MMU)      GROUP     (MMU)      GROUP
CHANNEL PH/OLAP PED  CHANNEL PH/OLAP PED
   1       1     .      9       2     X
   2       2     .     10       4     X
   3       3     .     11       6     X
   4       4     .     12       8     X
   5       0     .     13      13     .
   6       0     .     14      14     .
   7       0     .     15      15     .
   8       0     .     16      16     .
ENTER 13-16 FOR OVERLAPS A-D
END OF SUBMENU
```

Main Menu (F1)-1-3

PARAMETER	DEFINITION	RANGE
PHASE TO LOAD SWITCH (MMU) ASSIGNMENT	Assigns phases 1-12 and overlaps A-D to MMU channels and load switches 1-16. Numbers 13, 14, 15, and 16 correspond to overlaps A, B, C, and D, respectively. Pedestrian phases must be identified. SDLC processing uses this relationship for compatibility checks and color verification. This assignment applies only to TS2 operation with TS2 MMU.	-
PH/OLAP	Phase or overlap number assigned to load switch channel.	1-16
PED	Associated phase is a pedestrian phase.	X indicates ped phase

SDLC Options/Enables

Bus Interface Unit (BIU) Enable

TS2 controllers use port 1 controller interface connects to the malfunction management unit, terminals and facilities (Type 1 only), and/or detector rack. Synchronous Data Link Control (SDLC) protocol is used to communicate with various devices where controller is the master and BIUs and MMU are slaves. Only the controller can send or request data from either of these. Up to eight terminals and facilities and up to eight detector rack BIUs can be attached to the controller network.

1. Use toggle key to indicate X under BIU number and after TERM & FACIL parameter to identify terminals and facilities BIUs present on controller network.
2. Use toggle key to indicate X under BIU number and after DETECTOR RACK parameter to identify detector rack BIUs present on controller network.

*****WARNING*****
Incorrect programming of Terminals and Facilities BIUs, "MMU Disable" and "Type 2 runs as Type 1" can result in immediate intersection flash.

```
          SDLC OPTIONS/ENABLES

                   ----- BIU NUMBER -----
                   1..2..3..4..5..6..7..8
TERM & FACIL...    X  X  X  X  .  .  .  .
DETECTOR RACK..    X  X  X  X  .  .  .  .

TYPE 2 RUNS AS TYPE 1.............. .
MMU DISABLE........................ X
DIAGNOSTIC ENABLE (TEST FIXTURE)..... X
PEER TO PEER ENABLE................ .

PEER TO PEER ADDRESSES:
1) 101  2) 102  3) 103  4) 104   5) 105
6) 106  7) 107  8) 108  9) 109  10) 110
END OF SUBMENU
```

Main Menu (F1)-1-4

Type 2 Runs as Type 1

Type 1 controllers communicate only over the SDLC link to the terminals and facility and detector BIUs and to the MMU. A Type 2 controller may be programmed to communicate with detector BIUs and the MMU over the SDLC link but will receive inputs and set outputs via the A,B,C, and D connectors.

Enabling Type 2 runs as Type 1 causes a Type 2 controller to communicate only with terminals and facilities BIUs over the SDLC link and to ignore the A, B, C, and D connectors.

Use toggle key to enable (X) use of SDLC network protocol used with Type 1 controllers and to disables outputs in A, B, C, D connectors.

MMU Disable

Used with Type 2 controllers. If controller is Type 1 then MMU cannot be disabled.

Use toggle key to disable (X) communication with MMU.

```
          SDLC OPTIONS/ENABLES

                   ----- BIU NUMBER -----
                   1..2..3..4..5..6..7..8
TERM & FACIL...    X  X  X  X  .  .  .  .
DETECTOR RACK..    X  X  X  X  .  .  .  .

TYPE 2 RUNS AS TYPE 1.............. .
MMU DISABLE........................ X
DIAGNOSTIC ENABLE (TEST FIXTURE)..... X
PEER TO PEER ENABLE................ .

PEER TO PEER ADDRESSES:
1) 101  2) 102  3) 103  4) 104   5) 105
6) 106  7) 107  8) 108  9) 109  10) 110
END OF SUBMENU
```

Diagnostic Test Feature
Use toggle key to enter an (X) to enable communication with a test fixture that responds to the TS2 defined frame 30. An error is logged, if enabled, when not connected to a test fixture.

Peer to Peer Communication
Up to ten devices external to controller network can communicate with each other through the controller with SDLC link. Devices are identified by their assigned addresses. When peer to peer communication is enabled the controller checks each device for communication requests. When a request is present the controller receives and transmits information from one device to the other.

1. Use toggle key to enable (X) peer to peer communication.
2. Use keyboard numeric keys to enter a unique address for each device used in network. Address assignment enables and a zero entry disables device communication. Do not enable a device if not physically present in the network.

```
          SDLC OPTIONS/ENABLES

                  ----- BIU NUMBER -----
                  1..2..3..4..5..6..7..8
TERM & FACIL...   X  X  X  X  .  .  .  .
DETECTOR RACK..   X  X  X  X  .  .  .  .

TYPE 2 RUNS AS TYPE 1.............. .
MMU DISABLE........................ X
DIAGNOSTIC ENABLE (TEST FIXTURE)..... X
PEER TO PEER ENABLE................. .

PEER TO PEER ADDRESSES:
1) 101  2) 102  3) 103  4) 104   5) 105
6) 106  7) 107  8) 108  9) 109  10) 110
END OF SUBMENU
```

*****WARNING*****
Incorrect programming of Terminals and Facilities BIUs, "MMU Disable" and "Type 2 runs as Type 1" can result in immediate intersection flash.

PARAMETER	DEFINITION	RANGE
BIU NUMBER	Bus Interface Unit communication Controls enabling/disabling of Terminals and Facilities and Detector Rack BIUs. Provides control of load switch outputs, detector resets, conditioning and conversion of terminals and facilities, and loop detector call inputs for the controller. Each BIU provides a physical interface between the serial RS-485 SDLC link of the controller and discrete NEMA level I/O ports. BIUs are used in TS2 Type 1 and 2 for detector racks. See Terminals and Facilities and Detector Rack definitions.	1-4 usable BIU 5-8 spares
TERM & FACIL	Terminals and Facilities Enables BIU used by terminals and facilities to interface the input/output functions to the controller. BIU #1-4 are assignable. BIU #5-6 are reserved for future use. BIU #7-8 are manufacturer's specific.	X assigns

PARAMETER	DEFINITION	RANGE
DETECTOR RACK	Enables BIUs used by detector rack for all detector interface functions. BIU address inputs control assignment of detector functions. BIU #1-4 are assignable. BIU #5-6 are reserved for future use. BIU #7-8 are manufacturer's specific.	X assigns
TYPE 2 RUNS AS TYPE 1	Type 2 controller operates as Type 1 controller Allows existing equipment to communicate with new Type 1 equipment. Type 1 controller uses Synchronous Data Link Control (SDLC) and Type 2 controller uses input/output connectors A-D.	X enables
MMU DISABLE	Malfunction Management Unit Disable Disables MMU readback capabilities of detection and response to improper and conflicting signals and improper operating voltages. Disabled when other monitoring device is used. Disable function is allowed with Type 2 controller only.	X disables
DIAGNOSTIC ENABLE	Enables interface to test fixture (case). Test fixture responds to TS2 defined frame 30. Error is logged if enabled when not connected to tester.	X enables
PEER TO PEER ENABLE	Enables communications between devices external to traffic control system via the controller. Enables peer-to-peer communications with secondary stations via the RS-485 SDLC link. A unique address must be assigned to each secondary station.	X enables
PEER TO PEER ADDRESSES	Communications addresses for up to ten external devices attached to SDLC. Each device must be identified by a unique address for each of up to 10 secondary stations. Entering 255 disables communications with the secondary station. Zero is a valid address.	0-254, 0 disables

Port 2 (Terminal)

Select configuration parameters required by the communication device used. AB3418 parameters are selectable according to the requirements of California AB3418 protocol.

Terminal-Modem

The ASC/2 has a slide switch (S1) just below the telemetry connector on the Input/Output (I/O) board. This switch has two positions, “TERM” and “MODEM,” and allows Port 2 to communicate with a terminal/personal computer or a modem, respectively, using a straight RS232 cable. In the “TERM” position, the controller is configured as a DCE device and in the “modem” position as a DTE device.

In the ASC/2S controller, the “S1" switch function is replaced by a new Port 2 data entry “CONNECT TO.” The user can toggle between “MODEM” and “TERMNL.”

```
              PORT 2 (TERMINAL)



PORT 2 PROTOCOL.................   TERMNL
PORT 2 ENABLE...................      YES

AB3418 ADDRESS..................        0
AB3418 GROUP ADDRESS............        0
ABER18 RESPONSE DELAY...........        0
AB3418 SINGLE FLAG ENABLE.......       NO
AB3418 DROP-OUT TIME............        0
AB3418 TOD SF SELECT............        0
CONNECT TO .....................   TERMNL
DATA RATE (BPS).................     9600
DATA PARITY, STOP...............  8, N, 1
```

PARAMETER	DEFINITION	RANGE
PORT 2 PROTOCOL	Toggles the protocol of Port 2 between terminal (TERMNL) and California required (AB3418).	TERMNL AB3418
PORT 2 ENABLE	Enables/disables Port 2 operation.	NO/YES
AB3418 ADDRESS	AB3418 slave address to allow master station to access this local. “0" inhibits AB3418 operation	0-65535
AB3418 GROUP ADDRESS	All devices with a common group address in the range 1-65535 may be addressed simultaneously using the group address. Address 63 is an “all station” address. Address 0 (zero) indicates a device does not have a group address.	0-65535 except 63
AB3418 RESPONSE DELAY	Delay before acknowledgment of a sequence frame	0-71 msec
AB3418 SINGLE FLAG ENABLE	The close-frame flag is used as the open-frame flag for next frame.	NO/YES
AB3418 DROP-OUT TIME	Time before returning to local control after last AB3418 command. “0" disables feature.	0-64800 sec
AB3418 TOD SF SELECT	If the value is 0 (zero), the controller responds to all valid AB3418 commands. If the value is 1 through 8, then a time-of-day (TOD) step must be active and programmed with a special function number that matches this value. This allows the controller to accept or reject AB3418 commands by time-of-day.	0-8
CONNECT TO	Toggle to specify the type of device the controller is communicating with. This parameter is used with the ASC/2S controller and is ignored by ASC/2 software.	TERMNL/ MODEM
TERMINAL DATA RATE	Specify appropriate terminal baud rate from range provided. Rate is in bits per second (bps) applies to the RS-232 TERMINAL port (Port 2)	1200, 2400, 4800, 9600, 19.2K
DATA, PARITY, STOP	Specify word length, parity, and stop bit. Setting applies to the signal from RS-232 TERMINAL port (Port 2).	7, E, 1 or 8, N, 1

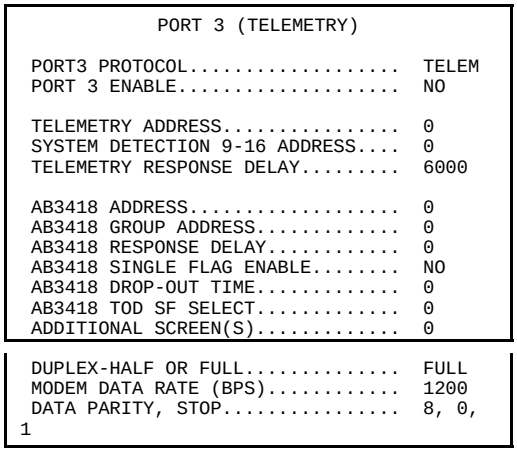
Port 3 (Telemetry)

Select configuration parameters required by the communication device used. Toggle will select protocol, enable and modem parameters.

AB3418 parameters are selectable according to the requirements of California AB3418 protocol.

Telemetry and system detector 9-16, address (0-24), is enterable where zero is not valid and disables data transfer.

Telemetry response delay compensates for differences in the accrued delay from and to the Zone Master. A value of 6,000 gives optimum delay compensation in most situations.



PARAMETER	DEFINITION	RANGE
PORT 3 PROTOCOL	Toggles the protocol of Port 3 between normal operation telemetry (TELEM) and California required (AB3418)	TELEM AB3418
PORT 3 ENABLE	Enables/disables Port 3 operation.	NO/YES
TELEMETRY ADDRESS	A telemetry address is assigned to each of the system local controllers. Addresses are used by master controller to identify the local controller for data transfer. Addresses may be any number from 0 to 24.	0-24
SYSTEM DETECTOR 9-16 ADDRESS	System Detector 9-16 Address Detector status request address for group of local system detectors (numbers 9 through 16). Enter a unique address number 1-24 to allow a zone master to access system detectors 9-16 as defined by the controller. This is one of the 24 addresses available on the zone master system. System detectors 1-8 do not require an address separate from that of the controller.	0-24, 0 disables

PARAMETER	DEFINITION	RANGE
TELEMETRY RESPONSE DELAY	Delay due to telephone lines. Delay varies at different installations and in some cases may be significant enough to cause interference in network operations. User may use telemetry response delay value to adjust and minimize the effects of lengthy delays. This value is factory set at 7800 to compensate for standard communication delays of leased or customer owned lines when using the 1200 bps FSK telemetry module. Telemetry response delay should not be adjusted without consulting factory. Decreasing this value compensates for longer delays, increasing it compensates for shorter delays, as with the RS-232/RS-485 telemetry module.	consult factory
AB3418 ADDRESS	AB3418 slave address to allow master station to access this local “0" inhibit AB3418 operation	0-65535
AB3418 GROUP ADDRESS	All devices with a common group address in the range 1-65535 may be addressed simultaneously using the group address. Address 63 is an “all station” address. Address 0 (zero) indicates a device does not have a group address.	0=65535 except 63
AB3418 RESPONSE DELAY	Delay before acknowledgment of a sequence frame	0-71 msec
AB3418 SINGLE FLAG ENABLE	The close-frame flag is used as the open-frame flag for next frame.	NO/YES
AB3418 DROP-OUT TIME	Time before returning to local control after last AB3418 command. “0" disables feature.	0-64800 sec
AB3418 TOD SF SELECT	If the value is 0 (zero), the controller responds to all valid AB3418 commands. If the value is 1 through 8, then a time-of-day (TOD) step must be active and programmed with a special function number that matches this value. This allows the controller to accept or reject AB3418 commands by time-of-day.	0-8
DUPLEX	The modem may be configured as Half or Full duplex as required by modem specifications.	FULL/HALF
MODEM DATA RATE	Specify the data transfer rate from range provided. Rate is in bits per second (bps) and applies to the RS-232 telemetry interface. This data transfer rate must be set to 1200 for use with the standard telemetry module.	1200, 2400, 4800, 9600, 19.2K
DATA PARITY, STOP	Refer to modem specifications for appropriate setting.	8, 0, 1, 8,N,1 8, E, 1, 7,E,1

Enable Event Logs

Enables real-time logging of various events as selected by user. Up to 300 events are stored in buffer.

1. From Configuration Submenu select #7 Enable Logging.
2. Use TOGGLE key to enable logging of various events. X indicates logging enabled.

```
            ENABLE EVENT LOGS

CRITICAL RFE'S (MMU/TF) . . . . . .   X
NON-CRITICAL RFE'S (DET/TEST) . . .   X
DETECTOR ERRORS . . . . . . . . . .   X
COORDINATION ERRORS . . . . . . . .   X
MMU FLASH FAULTS  . . . . . . . . .   X
LOCAL FLASH FAULTS  . . . . . . . .   X
PREEMPT . . . . . . . . . . . . . .   X
POWER ON/OFF  . . . . . . . . . . .   X
LOW BATTERY . . . . . . . . . . . .   X
SPARE . . . . . . . . . . . . . . .   X
ALARM 1 . . . . . . . . . . . . . .   .
ALARM 2 . . . . . . . . . . . . . .   .
ALARM 3 . . . . . . . . . . . . . .   .
ADDITIONAL SCREEN(S)
```

Main Menu (F1)-1-7

PARAMETER	DEFINITION	RANGE
CRITICAL RFEs (MMU/TF)	Critical Response Frame Errors (Malfunction Management Unit/Terminals and Facilities) Enables logging of SDLC response frame errors (RFEs) related to the MMU and terminals & facilities (TF). If communication links break an error condition is set, controller is set to flash and this event is logged if enabled. NOTE These RFEs are considered critical and will put the intersection into flash. Logging of MMU/TF RFEs applies only if MMU and/or TF command frames are enabled under TS2 operation.	X enables
NON-CRITICAL RFEs (DET/TEST)	Non-Critical Response Frame Errors (Detector Bus Interface Units/Test Fixture) Enables logging of SDLC response frame errors (RFEs) related to detectors and the test fixture. These RFE's are considered non-critical and DO NOT put the intersection into flash. Inputs from detectors are TRUE if error detected as communication link failure. Logging of non-critical RFEs applies only if command frames are enabled under TS2 operation.	X enables
DETECTOR ERRORS	Enables user to log detector errors. Detector errors reported via valid SDLC response frames include watchdog failure, open loop, shorted loop, excessive and inductance change. Detector errors reported under TS2 Type 1 or Type 2 operation include no activity, max presence and erratic counts.	X enables

PARAMETER	DEFINITION	RANGE
COORDINATION ERRORS	Logs coordination status conditions or any condition of errors related to data entry.	X enables
MMU FLASH FAULTS	Malfunction Management Unit Flash Faults Enables logging of flash events reported via SDLC from the MMU or detected by the controller. Reports when and why MMU flash event occurs. This logging mode applies to TS2 Type 1 or Type 2 operation if a TS2 MMU is enabled.	X enables
LOCAL FLASH FAULTS	Enables logging of local flash events such as cabinet flash and TOD flash. This logging mode applies to TS2 Type 1 or Type 2 operation.	X enables
PREEMPT	Enables logging of preemption events. Log indicates when priority or bus preemptors are active. Records occurrence date, time, and preemptor number. This logging mode applies to TS2 Type 1 or Type 2 operation.	X enables
POWER ON/OFF	Enables logging of power ON and power OFF events. Reports when power on and off occur. This logging mode applies to TS2 Type 1 or Type 2 operation.	X enables
LOW BATTERY	Enables logging of low voltage conditions of the battery used to hold up the CMOS RAM that stores run-time data. A battery in good condition can hold up the RAM in excess of 30 days. This logging mode applies to TS2 Type 1 or Type 2 operation.	X enables
ALARMS 1-16	Enables logging of ALARMS 1 through ALARM 16 events. These alarms are NEMA level inputs that can be connected as needed by the user to sense external conditions, such as an open cabinet door. This logging mode applies to TS2 Type 1 or Type 2 operation.	X enables

Options

Access Codes

Initial entry of supervisor and data change access code is done by selecting Configuration Submenu #8 Options. Codes are never displayed so user must be careful to document these codes. If codes are forgotten or entered incorrectly the controller cannot be accessed and user must contact the factory.

1. Enter four-digit supervisor code. Numbers entered are not displayed. Only XXXX appears on screen when an access code is programmed.
2. Enter four-digit data change code if desired. Numbers entered are not displayed. Only XXXX appears when access code is programmed.

```
                OPTIONS


SUPERVISOR ACCESS CODE..... 0000

DATA CHANGE ACCESS CODE..... 0000

KEY CLICK ENABLE.............   NO

BACKLIGHT ENABLE............  YES



END OF SUBMENU
```

Main Menu (F1)-1-8

Once codes are programmed data entry is allowed only if codes are entered correctly. User must enter either supervisor or data change access code when prompted. Entry of supervisor code allows data entry and changing of codes. Entry of data change access code allows data entry only. "SUPERVISOR ACCESS CODE ACCEPTED" or "DATA CHANGE ACCESS CODE ACCEPTED" are displayed if codes are entered correctly, and "ACCESS DENIED" if codes are entered incorrectly. Access to the Controller will remain in effect for 20 minutes after the last keystroke or until manually reset by depressing “SPEC FUNC” then “CLEAR.”

Change/Delete Supervisor Access Code

1. Press any number key after Supervisor Access Code parameter then enter current supervisor access code at prompt.
2. Enter new number after supervisor code parameter or enter all zeros to delete code. New number is not displayed. Deleting supervisor access code automatically deletes data change access code and 0000 is displayed.

Change/Delete Data Change Access Code

1. Press any number key after Data Change Access Code parameter then enter current supervisor access code at prompt.
2. Enter new number after data change access code parameter or enter all zeros to delete code. New number is not displayed. Deleting data change access code does not delete supervisor access code.

Key Click Enable and Backlight Enable

1. Select Configuration Submenu, Options #8 to enable/disable keyboard sound and backlight.
2. Toggle to YES after KEY CLICK ENABLE to generates a beep each time a key is pressed.
3. Use toggle key (to indicate YES) after BACKLIGHT ENABLE to illuminate display.

PARAMETER	DEFINITION	RANGE
SUPERVISOR ACCESS CODE	Highest level of data entry security. Supervisor access code is used to prevent unauthorized changes in controller data base. Supervisor code may be used alone or with Data Change Access Code to install a second level of security. The user of the supervisor access code may change or delete either access code and may make changes in controller data base. Deleting code(s) allows free access to controller data base. Deleting supervisor access code automatically deletes data change access code.	any four-digit number
DATA CHANGE ACCESS CODE	User is allowed to make changes in the data base but not may not change or delete the access code. Supervisor access code must be entered first before data change access code. Controller prompts for codes.	any four-digit number
KEY CLICK ENABLE	YES enables a beep sound when a front panel key is pressed. NO selects silent operation.	YES/NO, YES enables
BACKLIGHT ENABLE	YES allows the LCD backlight to come on for 30 minutes whenever a front panel key is actuated. The intensity is adjustable using the DISPLAY ADJUST (F5) key. The backlight will automatically turn off after 30 min of keyboard inactivity. Selecting NO disables the backlight.	YES/NO, YES enables

MMU Program
The malfunction management unit program card is pre-programmed and installed in the cabinet. The same program specified by the jumpers on the MMU program card can be entered at the controller using this MMU program option. If no entries are made for this MMU program, the controller attempts to compute the correct MMU program. In either case, the controller MMU program is compared to the pre-programmed MMU program on the card. If the programs are incompatible, the controller generates a compatibility program fault which results in flash.

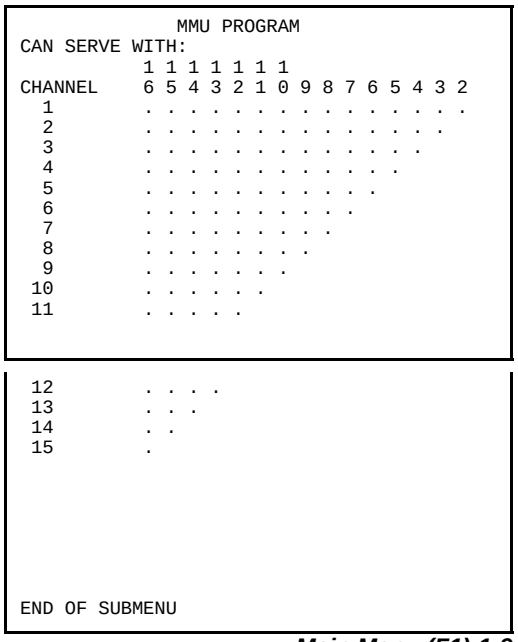
Please note that the layout of the MMU program screen (***Main Menu (F1)-1-9***) and the layout of the MMU program card are not the same. Make sure that compatible MMU channels are correct on the MMU program card and in the MMU data entry screen.

Phase Assignment

1. Make note of the MMU program card program. Note: not all MMU program cards may be programmed in the same way and therefore may not be interchangeable.

2. Copy the MMU program to this screen by entering an X for the appropriate channel assignments. The channels listed on the far left of the screen can time with the channels listed across the top of the screen, which are assigned by X. Do not program while the intersection is in operation.

3. Verify that controller program and MMU program match exactly. If they do not match, the intersection will go into flash.



Main Menu (F1)-1-9

WARNING

ANY PROGRAMMING OF MMU PROGRAM WILL
RESULT IN IMMEDIATE INTERSECTION FLASH. SET
INTERSECTION TO FLASH PRIOR TO ENTERING ANY DATA.

WARNING

ANY PROGRAMMING OF MMU PROGRAM WILL
RESULT IN IMMEDIATE INTERSECTION FLASH. SET
INTERSECTION TO FLASH PRIOR TO ENTERING ANY DATA.

PARAMETER	DEFINITION	RANGE
MMU Program Channel Can Serve With:	This option is used to verify controller program compatibility with the MMU program card at the cabinet thus insuring that the MMU program card has the correct program for the intersection. Entries made must match the MMU program exactly. If no entries are made for this option, the controller attempts to compute the correct MMU program. In either case, the controller MMU program is compared to the pre-programmed MMU program on the card. If the programs are incompatible, the controller generates a compatibility program fault which results in flash. The appearance (layout) of the MMU program screen (***Main Menu (F1)-1-9***) and the layout of the MMU program card are not the same. Make sure that compatible MMU channels are correct on the MMU program card and in the MMU data entry screen.	X selects

CONTROLLER SUBMENU
Programming Summary

The controller submenu has nine data groups. To view or enter data press the keyboard number (1 through 9) corresponding to desired data group.

```
            CONTROLLER SUBMENU

1. TIMING DATA       6. START/FLASH DATA

2. PH OVLP ASSIGN    7. NO SERVE PHASES

3. PED CARRYOVER     8. DIMMING

4. RECALL DATA       9. OPTION DATA

5. OVERLAP DATA



        PRESS KEYS 1..9 TO SELECT
```

1. TIMING DATA
   Enter timing values for all standard timing intervals.
   Enter timing values for all vehicle density parameters.

2. PH OVLP ASSIGN
   Assign phase outputs as overlaps.

3. PED CARRYOVER
   Enable pedestrian timing carryover.

4. RECALL DATA
   Select phases with locking memory.
   Enable continuous vehicle recall.
   Enable continuous pedestrian recall.
   Enable recall to maximum green time.
   Enable soft recall.
   Select phases controller cannot rest in.
   Set ped indicator dark until call received.

5. OVERLAP DATA
   Program phase movements as overlaps (A, B, C, D).
   Set up standard, protected, and permitted overlaps.
   Enable timed overlaps.
   Enable lag and/or lead overlaps.
   Enter timing values for timed overlap intervals.
   Enter time and enable advance green overlap.
   Enable ped overlaps.

6. START/FLASH
   Select active phase(s) and interval at power start.
   Select active phase(s) and interval at external start. Select entry and exit remote flash phase(s).
   Select yellow remote flash phases.
   Select remote/auto flash phases and/or overlaps to flash together.
   Select power/enter start phase colors
   Set power start timing for All Red and Flash.
   Enable out of flash yellow or all red.
   Enable minimum vehicle recall.
   Enable use of alternate flash.
   Enable flash through load switches.
   Enable rotating through phases.

7. NO SERVE PHASES
   Select phase pairs that cannot serve together.

8. DIMMING
   Assign AC line phase per load switch indication.

9. OPTION DATA
   Select phase(s) timing guaranteed passage.
   Designate call-to-non actuated phase(s).
   Select phases serviced together in dual entry.
   Select conditional service/re-service phases.
   Select phase(s) with actuated rest in walk.
   Select phase(s) with flashing walk.
   Select control phases for five-section left-turn head control.
   Enable dual entry mode of operation.
   Enable conditional service operation.
   Enable conditional service with detector cross switching.
   Enable protected pedestrian clearance.
   Select special preempt overlap flash.
   Enable locking of detectors in red only.
   Enable backup protection for concurrent groups.
   Enable simultaneous gap termination.

Timing Data

Enter data using keyboard number, cursor and ENTER keys. Move cursor up/down to desired parameter then right/left to desired phase number. Enter timing value then press ENTER or any other keyboard key to store the data.

Bike Minimum Green

1. Assign desired number of detectors as bike detectors (Detector submenu).
2. Assign detectors to desired phases (Detector submenu).
3. Enter bike minimum green time for each phase with a bike detector.
4. Use corresponding detector extension timer to program bike extension time if desired. (Detector submenu)

Conditional Service

1. Enter conditional service minimum green time (Timing Data).
2. Enter Conditional Service phases (Option Data).
3. Enable conditional service (Option Data).

Vehicle Extension 2

1. Enter desired time (Timing Data).
2. Enable at desired TOD program step (NIC/TOD submenu, TOD Prog Steps data page, enable ALT VEH EXTSN parameter).

```
         CONTROLLER TIMING DATA
PHASE...   1...2...3...4...5...6...7...8
MIN GRN.   2   2   2   2   2   2   2   2
BIKE GRN   0   0   0   0   0   0   0   0
CS MGRN.   0   0   0   0   0   0   0   0
WALK....   0   3   0   3   0   3   0   3
PED CLR.   0   5   0   5   0   5   0   5
VEH EXT. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
VEH EXT2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
MAX EXT.   0   0   0   0   0   0   0   0
MAX1....  35  35  35  35  35  35  35  35
MAX2....  40  40  40  40  40  40  40  40
MAX3....  45  45  45  45  45  45  45  45
DET MAX.   0   0   0   0   0   0   0   0

ADDITIONAL SCREEN(S)              MORE->
```

```
YELLOW.. 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0
RED CLR. 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
RED RVT. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

ACT B4..   0   0   0   0   0   0   0   0
SEC/ACT. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
MAX INI.   0   0   0   0   0   0   0   0
TIME B4.   0   0   0   0   0   0   0   0
CARS WT.   0   0   0   0   0   0   0   0
TTREDUC.   0   0   0   0   0   0   0   0
MIN GAP. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0


END OF SUBMENU                    MORE->
```

Main Menu (F1)-2-1

```
         CONTROLLER TIMING DATA
PHASE...   9..10..11..12
MIN GRN.   2   2   2   2
BIKE GRN   0   0   0   0
CS MGRN.   0   0   0   0
WALK....   0   3   0   3
PED CLR.   0   5   0   5
VEH EXT. 0.0 0.0 0.0 0.0
VEH EXT2 0.0 0.0 0.0 0.0
MAX EXT.   0   0   0   0
MAX1....  35  35  35  35
MAX2....  40  40  40  40
MAX3....  45  45  45  45
DET MAX.   0   0   0   0

ADDITIONAL SCREEN(S)           <-MORE
```

PARAMETER	DEFINITION	RANGE
MIN GRN	Minimum green (initial green) time. The shortest possible vehicle green time, before any added initial or vehicle extensions. Actual minimum green time will be the longest of the following: minimum green plus any added initial, vehicle extension, bike minimum green, ped walk plus ped clearance.	0-255 sec. *
BIKE MGRN	Bike minimum green time due to a bike detector call. Bike minimum green times concurrently with phase minimum green and is normally set to a larger value than phase minimum green thus allowing bicycle more time to clear the intersection. Extension may be added by further bike detector calls.	0-255 sec.
CS MGRN	Conditional Service Minimum Green Minimum green time for conditionally serviced phases. Conditional service phases must be assigned and feature must also be enabled.	0-255 sec.
WALK	Pedestrian walk time Time during which WALK or walking person symbol is displayed following a ped call.	0-255 sec.
PED CLR	Pedestrian clearance time Time during which DON'T WALK or hand symbol is flashing following ped WALK time.	0-255 sec. *
VEH EXT	Vehicle Extension (Preset gap, Passage Time) When minimum green finishes timing, the green interval is allowed to extend for a length of time equal to maximum time (Max 1, 2, or 3) in effect. Actual length of extension period depends on vehicle extension time, frequency of vehicle actuations, and minimum gap setting. NOTE: Extensions time can be set on a Detector-by-Detector basis (Detector submenu).	0-25.5 sec.
VEH EXT2	Vehicle Extension 2 Vehicle extension period 2 operates like VEH EXT but is activated by time-of-day. Can be used instead of but not together with VEH EXT.	0-25.5 sec.

PARAMETER	DEFINITION	RANGE
MAX EXT	Maximum Extension - (Maximum Green Extension) If a green interval is terminated due to a vehicle extension max-out for two successive cycles, the max time in effect (MAX1 or MAX2) automatically extends by successive increments of max extension time (MAX EXT). Max time increases by MAX EXT each time it maxes-out, but stops adding MAX EXT when the total maximum time is equal to MAX 3. If, however, the phase gaps out on two successive cycles before max time reaches MAX 3, the max timer is reset. When MAX EXT is used (MAX EXT > 0), MAX 3 becomes the maximum green time and must be greater than MAX1 and MAX2. When MAX EXT is not used (MAX EXT = 0), the maximum green time is equal to the selected max timer (MAX 1, 2, or 3).	0-255 sec.
MAX 1, 2, 3	Maximum Green (1,2,3) Maximum green time allowed in the presence of an opposing call.	0-255 sec.
DET MAX	Detector Fail Maximum Green Time Maximum green time allowed per phase when its assigned detector is sensed as failed and the fail action selected is PROGRAMMED (selected from No Action, Min Recall, Max Recall, Programmed from Detector Submenu).	0-255 sec.
YELLOW	Yellow Clearance time Time allowed for yellow interval timing on a phase.	0-25.5 sec. *
RED CLR	Red Clearance time Length of All-Red clearance following yellow interval.	0-25.5 sec. *
RED RVT	Red Revert Time Minimum red time before immediate phase reservice. Red revert interval times concurrently with red clearance period.	2.0-25.0 sec.
ACT B4	Actuations Before Number of actuations received during the yellow and red intervals before adding time to initial green.	0-255 actuations
SEC/ACT	Seconds per actuation (Added Initial) Time by which the variable initial time period is increased from zero with each vehicle actuation received during associated phase yellow and red intervals.	0-25.5 sec.
MAX INI	Maximum Initial time Maximum initial green time allowed.	0-255 sec.

PARAMETER	DEFINITION	RANGE
TIME B4	Time Before (Reduction) Length of time before start of gap reduction. Begins timing when phase is green and there is a conflicting serviceable call.	0-255 sec.
CARS WT	Cars Waiting before reduction Number of cars waiting before starting gap reduction. NOTE Start of gap reduction (time to reduce) is initiated by TIME B4 or CARS WT, whichever reaches its maximum value first.	0-255 cars
TTREDUC	Time To Reduce Length of time before reaching minimum gap.	0-255 sec.
MIN GAP	Minimum Gap Minimum time between vehicle actuations before GAP-OUT. NOTE Guaranteed minimum values are factory programmed on request.	0-25.5 sec.

*Guaranteed minimum values are factory programmed on request

Phase Overlap Assignment
Use this feature to create multiple overlaps. The signal driver group associated with the selected phase is assigned as an overlap and operates as a standard overlap. When a phase is not used as an overlap it MUST be programmed as an overlap of itself (example: all phases are assigned as overlaps of themselves in screen shown).

1. Select Ph Ovlp Assign #2 from Controller Submenu.
2. Use toggle key to assign phase outputs as overlaps. Move cursor up/down and right/left to desired phase pair. Press toggle key to assign (indicated by X) then press ENTER or any other keyboard key to store the entry.

```
        PHASE OVERLAP ASSIGNMENTS
OVERLAP CONSISTS OF PHASES:       1 1 1
OVLP PHASE       1 2 3 4 5 6 7 8 9 0 1 2
     1           X . . . . . . . . . . .
     2           . X . . . . . . . . . .
     3           . . X . . . . . . . . .
     4           . . . X . . . . . . . .
     5           . . . . X . . . . . . .
     6           . . . . . X . . . . . .
     7           . . . . . . X . . . . .
     8           . . . . . . . X . . . .
     9           . . . . . . . . X . . .
    10           . . . . . . . . . X . .
    11           . . . . . . . . . . X .
    12           . . . . . . . . . . . X
END OF SUBMENU
```

Main Menu (F1)-2-2

PARAMETER	DEFINITION	RANGE
ASSIGN PHASE OUTPUTS AS OVERLAPS	Phase outputs can be used as overlaps thus allowing multi-overlap capability. In addition to the A, B, C, D overlaps defined by NEMA, the ASC/2 allows any of the available 12 phase outputs to be used as overlaps. Phase outputs assigned as an overlap operate as a "standard overlaps". If a phase is not used as an overlap it MUST be programmed as an overlap of itself. Enter an X for each parent phase of the overlap. Use extreme caution to avoid conflicts. A single X in a row, with the same row and column numbers for the X, is required to establish a normal, non-overlapped phase assignment.	X assigns

Ped Timing Carryover
Use this feature to create pedestrian timing between two phases in the same ring. Enter equal pedestrian times for phase pairs (Timing Data). Example: Phase = phase 2, End Ped Phase = phase 3. Pedestrian interval is holding phase 2 active. If a call is received on phase 3 the pedestrian interval continues timing but phase 2 is allowed to terminate and control goes to phase 3.

1. Select Ped Carryover #3 from Controller Submenu.
2. Enable feature by selecting phase pairs of start and end phases.
3. Move cursor up/down to desired start phase then enter number of desired end phase and press ENTER or any other keyboard key to store the entry.

```
          PED TIMING CARRYOVER

        PHASE       END PED PHASE
          1               0
          2               0
          3               0
          4               0
          5               0
          6               0
          7               0
          8               0
          9               0
         10               0
         11               0
         12               0
END OF SUBMENU
```

Main Menu (F1)-2-3

PARAMETER	DEFINITION	RANGE
PED TIMING CARRYOVER	Pedestrian Timing Carryover Allows ped timing to begin with one phase and carry over to another phase in the same ring, thus allowing multiple vehicle movements while pedestrians are crossing wide streets. Both phases must have the same WALK and ped clearance timing values. Pedestrian interval time is allowed to carryover from parent phase to selected phase but must terminate with selected phase. If interval advance is used the ped terminates in start phase. If ped start phase and ped end phase have another phase programmed between them in the controller sequence (PRA) and a call exists on that third phase, ped will time only in ped start phase. Enter number of carry over phase to enable ped carryover feature.	1-12

Recall Data
Each recall data group function can be enabled on a per phase basis for up to twelve phases.

1. Select #4 Recall Data from Controller Submenu.
2. Press toggle key to enable/disable functions. X indicates function enabled, blank indicates function disabled.

```
          CONTROLLER RECALL DATA

PHASE:                              1 1 1
PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
LOCKING MEMORY.  . . . . . . . . . . . .
VEHICLE RECALL.  . . . . . . . . . . . .
PED RECALL.....  . . . . . . . . . . . .
RECALL TO MAX..  . . . . . . . . . . . .
SOFT RECALL....  . . . . . . . . . . . .
DON'T REST HERE  . . . . . . . . . . . .
PED DARK N/CALL  . . . . . . . . . . . .




END OF SUBMENU
```

Main Menu (F1)-2-4

PARAMETER	DEFINITION	RANGE
LOCKING MEMORY	When locking memory is enabled, an actuation on a detector input of the associated phase is "remembered" as a vehicle call and is not reset when the vehicle call is no longer present. Reset occurs during green interval. NOTE Locking memory function can be assigned per detector to each detector associated with a phase. (See Detector submenu)	X enables
VEHICLE RECALL	Places a demand for vehicle service on a phase by registering a call while the phase is not green.0	X enables
PED RECALL	Places a demand for pedestrian service on a phase by registering a call while the phase times yellow and red intervals.	X enables
RECALL TO MAX	Places a continuous vehicle call on a phase. The phase times to maximum green time. Maximum green timer begins timing as though an opposing call was present, but the phase does not terminate unless there is an actual opposing call.	X enables
SOFT RECALL	Soft recall phases are rest phases. Once all calls on other phases are serviced, the controller returns to and rests in the soft recall phases until other calls are detected.	X enables

PARAMETER	DEFINITION	RANGE
DON'T REST	Controller does not rest in phases with don't rest function enabled. Use when it is desired to rest in left turns without using soft recall. This feature is disabled by any recalls and advances only in the normal (forward) controller sequence.	X enables
PED DARK NO CALL	Pedestrian indicators on selected phases remain dark until a pedestrian call is received. DON'T WALK is displayed when call is received. This feature is used for power conservation and can be programmed to be effective during phase red (write protect area, programmed per controller).	X enables

Overlap Data

Two kinds of entries are required for overlap programming: phase selection and timer value setting. Phases are enabled as standard, protected, permitted, or timed by pressing the toggle key at the desired overlaps parameter under the desired phase number(s). Entry of timer values enables timed overlaps and defines interval lengths.

Advance Green Overlap

1. Scroll to desired overlap A, B, C, or D screen(s).
2. Enable leading overlap phases (enable lead) with toggle key.
3. Enter advance green time.

Standard/Protected/Permitted Overlaps

1. Scroll to desired overlap A, B, C, or D screen(s).
2. Enable phases as standard and protected, or permitted with toggle key. Example: To program standard overlap A of (Ö1 + Ö2), Enable phases 1 and 2 (indicated by X) after Standard parameter heading on overlap A screen.

Timed Overlaps

1. Scroll to desired overlap A, B, C, or D screen(s).
2. Enable lead and/or lag overlap phases with toggle key.
3. Enter times for green, yellow and red overlap intervals.

   Timed overlap programming example:
   a. Select phase 7 as standard overlap.
   b. Select phase 8 selected as lead overlap.
   c. Enter lag/lead green, yellow, and red times.

   Result:
   On leaving ö 7 going to ö 8 the overlap times a lag overlap. On leaving ö 7 to any other phase the lead overlap does not time.

```
          CONTROLLER OVERLAP DATA

                                    1 1 1
OVERLAP A.....   1 2 3 4 5 6 7 8 9 0 1 2
STANDARD......   X X . . . . . . . . . .
PROTECTED.....   . . . . . . . . . . . .
PERMITTED.....   . . . . . . . . . . . .
ENABLE LAG....   . . . . . . . . . . . .
ENABLE LEAD...   . . . . . . . . . . . .
SPARE.........   . . . . . . . . . . . .

     ADVANCE GREEN TIMER      0.0
     LAG/LEAD GREEN TIMER     0.0
     LAG/LEAD YELLOW TIMER    0.0
     LAG/LEAD RED TIMER       0.0
ADDITIONAL PAGE(S)
```

Main Menu (F1)-2-5

```
          CONTROLLER OVERLAP DATA

                                    1 1 1
OVERLAP B.....   1 2 3 4 5 6 7 8 9 0 1 2
STANDARD......   . . . . . X X . . . . .
PROTECTED.....   . . . . . . X . . . . .
PERMITTED.....   . . . . . . . . . . . .
ENABLE LAG....   . . . . . . . . . . . .
ENABLE LEAD...   . . . . . . . . . . . .
SPARE.........   . . . . . . . . . . . .

     ADVANCE GREEN TIMER      0.0
     LAG/LEAD GREEN TIMER     0.0
     LAG/LEAD YELLOW TIMER    0.0
     LAG/LEAD RED TIMER       0.0
ADDITIONAL PAGE(S)
```

PARAMETER	DEFINITION	RANGE
STANDARD OVERLAP	A right-of-way indication that allows traffic movement when right-of-way is assigned to two or more traffic phases. To distinguish overlaps from basic phases, overlaps are identified as A, B, C, and D. Yellow and red clearance timing of standard overlap phase is equal to yellow and red clearance of phase terminating the overlap.	X selects
PROTECTED OVERLAP	A movement having a protected green arrow (no conflicting phases timing).	X selects
PERMITTED OVERLAP	Used only with four-section left-turn head control. In this movement a left turn is allowed while the through phases in the same concurrent group are timing. This turn is not protected.	X selects
TIMED OVERLAPS	Similar to standard overlaps except that instead of beginning the clearance period additional green, yellow, and red intervals are timed.	
ENABLE LAG	Timed overlap times only when controller is exiting selected phases.	X selects
ENABLE LEAD	Timed overlap times only when controller is about to serve the selected lead phases.	X selects
LAG/LEAD (GREEN YELLOW RED) TIMERS	Similar to standard overlaps with the exception that when the standard overlap would normally begin its clearance period, additional green, yellow, and red intervals are timed. Allows overlap to be used to control an inside lag phase.	0-25.5 sec.
ADVANCE GREEN TIMER	Converts a leading overlap to an advance green overlap. This overlap allows an early green time as follows: When advance green timer is set to a value greater than 0 for any overlap (A-D) the overlap goes green and begins timing the advance green period when phase next is the phase programmed as "Enable Lead". Advance green period begins timing with yellow of the terminating phase (thus allowing the early green time). If advance green time is greater than terminating phase yellow plus red clearance, the controller is held in all red until advance green time expires. "Enable lead" phase goes green when advance green time expires.	0-25.5 sec.

PARAMETER	DEFINITION	RANGE
OVERLAP PRIORITY	Priority is established on a per overlap basis. When permissive phases are programmed, standard overlaps are ignored. When protected phases without permitted phases are programmed, standard overlaps are ignored. When no protected or permitted phases are programmed standard overlaps are computed.	-
OVERLAP CARD	User may specify overlap programming with overlap card and override keyboard programming. To enable this feature, consult factory. Overlap card programming is transferred to keyboard data entry area therefore keyboard entry of overlap data is inhibited. A beep sounds if data entry is attempted.	-

Ped Overlap Assignments

Use this feature to create multiple ped overlaps. The signal driver group associated with the selected phase is assigned as a ped overlap and operates as defined later in this section.

1. From the Main Menu, select #2 Controller Submenu, then #5 Overlap Data. Press next screen to the last data screen.
2. Use toggle key to assign phase outputs as ped overlaps. Move cursor up/down to desired phase pairs. Press toggle key to assign then press ENTER or any other keyboard key to store the entry.
3. The illustration shows:
   Ö2 ped output = 2 ped + 3 ped
   Ö6 ped output = 6 ped + 7 ped

```
          PED OVERLAP ASSIGNMENTS
 OVERLAP CONSISTS OF PHASES:        1 1 1
 OVLP PHASE       1 2 3 4 5 6 7 8 9 0 1 2
      1           . . . . . . . . . . . .
      2           . X X . . . . . . . . .
      3           . . . . . . . . . . . .
      4           . . . . . . . . . . . .
      5           . . . . . . . . . . . .
      6           . . . . . X X . . . . .
      7           . . . . . . . . . . . .
      8           . . . . . . . . . . . .
      9           . . . . . . . . . . . .
     10           . . . . . . . . . . . .
     11           . . . . . . . . . . . .
     12           . . . . . . . . . . . .
 END OF SUBMENU
```

Main Menu (F1)-2-5

PARAMETER	DEFINITION	RANGE
PED OVERLAP ASSIGNMENTS (OVERLAP CONSISTS OF PHASES)	Pedestrian Overlap Phase Assignment A ped overlap is a right-of-way indication that allows pedestrian movement when right-of-way is assigned to two or more phases. It is possible to program up to 12 ped overlaps which operate in a way similar to phase overlaps. Ped overlaps are not intended for all intersection configurations and should be used only when the operation, as described below, is desired. Ped overlap operation When a ped overlap is programmed, the ped walk interval always times. In the case of ped overlaps in both rings, with different walk times, and a barrier being crossed, the longer walk will time and the opposing ring will be held in walk. If one or more of the phases to time next has a ped interval which is part of the ped overlap, the ped clear does not time at the end of walk and the phase terminates normally with walk displayed. Ped overlaps and priority preemptors If a ped overlap walk is active during vehicle clear and a priority preemptor call is applied, the walk terminates and ped clear will time even if the phase has to halt in red transfer. Ped overlaps and coordinated phases If a coordinated phase is part of a ped overlap, the phase must be programmed as non-actuated and the Walk Rest Modifier must be applied.	X selects

Start/Flash Data

Start/Flash programming requires selection of phases or overlaps enabled for use in start or flash operations, selection of intervals and entry of interval times used at start-up, and enabling of various options used during a remote flash condition. Use toggle key to select phases (X selects).

Power Start

Power start phases begin timing selected interval after flash and all red time elapse.

1. Enable phases active at controller power start. Use toggle key to enable up to two non-conflicting phases.
2. Select interval timed by selected phases. Press toggle key repeatedly to display desired interval.
3. Enter power start all red time; this interval times after flash time when both have non-zero entries. Zero entry disables all red timing function.
4. Enter power start flash time; this intervals times before all red time when both have non-zero entries. Zero entry disables flash timing function.

External Start

1. Enable phases active at controller external start. Use toggle key to enable up to two non-conflicting phases.
2. Select interval timed by selected phases. Press toggle key repeatedly to display desired interval.

Remote Flash

1. Select phases active on entry to remote flash.
2. Select phases active upon exiting remote flash.
3. Select phases to flash yellow during remote flash operation.
4. Select phases to flash together during flash condition.
5. Select overlaps to flash together during flash condition.
6. Enable remote flash options as required.

```
        CONTROLLER START/FLASH DATA
                                    1 1 1
 PHASE.....  1 2 3 4 5 6 7 8 9 0 1 2
 POWER START....  . X . X . . . . . . .
 EXTERNAL START.  . . . . . X . X . . .
 ENTRY REM FLASH  . . . . . . . . . . .
 EXIT REM FLASH.  . . . . . . . . . . .
 REM FLASH YEL..  . . . . . . . . . . .
 FL TOGETHER PHS  . . . . . . . . . . .
 FL TOGETHER OVLPS  A: .  B: .  C: .  D:.

 POWER START.............   GREEN
 EXTERNAL START..........   GREEN
 POWER START ALL RED TIME..  0 SECONDS
 POWER START FLASH TIME....  0 SECONDS
 ADDITIONAL PAGE(S)
```

```
REMOTE FLASH OPTIONS:
OUT OF FLASH YELLOW..... .
OUT OF FLASH ALL RED..... .
MINIMUM RECALL.......... .
SPARE................... .
FLASH THRU LOAD SWITCHES.... .
CYCLE THRU PHASES.......... .




END OF SUBMENU
```

Main Menu (F1)-2-6

PARAMETER	DEFINITION	RANGE
POWER START	Initial power applied to the controller or power re-applied after an interruption greater than 0.5 seconds.	-
POWER START	Power Start Phases Phase(s) selected to begin timing after a controller power start.	X enables
EXTERNAL START	External start input.	-
EXTERNAL START	External Start Phases Phases selected to begin timing after a controller external start.	X enables
ENTRY REM FLASH	Entry Remote Flash Phase(s) Phase(s) active last before flash. Phases controller enters and times before initiating remote (automatic) flash.	X enables
EXIT REM FLASH	Exit Remote Flash Phase(s) Phase(s) active first before flash. Phases controller times first when exiting remote (automatic) flash.	X enables
REM FLASH YEL	Remote Flash Yellow Phase(s) Phase(s) that flash yellow during remote (automatic) flash.	X enables
FL TOGETHER PHASES	Select phases that will flash together during a flash condition.	X enables
FL TOGETHER OVLP	Select overlaps that will flash together during a flash condition.	X enables
SPARE	(Not defined.)	X enables
POWER START (INTERVAL)	Interval that begins timing immediately after power is applied to the controller. NOTE If YEL O'LAP start interval is selected, start phases and any associated overlaps start in yellow.	GREEN, YELLOW, RED, YELLOW OVERLAP
EXTERNAL START (INTERVAL)	Interval that begins timing immediately after external start input is applied to the controller and released. NOTE If YEL O'LAP start interval is selected start phases and any associated overlaps start in yellow.	GREEN, YELLOW, RED, YELLOW OVERLAP

PARAMETER	DEFINITION	RANGE
POWER START ALL RED TIME	Time during which all phases are red at initial power start.	0-255 sec.
POWER START FLASH TIME	Time during which all phases are in Flash at initial power start. NOTE FLASH interval times first when both RED and FLASH times are entered. If FLASH timing is entered, the controller sets all outputs FALSE for 2 seconds prior to timing the FLASH period.	0-255 sec.
REMOTE FLASH OPTIONS	Optional functions used with remote (automatic) flash operation.	-
OUT OF FLASH (YELLOW, ALL RED)	Enables controller to exit remote flash in yellow or all red exit phases, whichever is selected. Controller normally exits remote flash with exit phases displaying Green/Walk.	X enables
MINIMUM RECALL	Applies minimum recall to all phases when remote (automatic) flash is requested. All phases are recalled before entering into flash.	X enables
FLASH THRU LOAD SWITCHES	Controller sets intersection in flash by flashing the signals through the load switch. Controller performs flashing function instead of using flasher.	X enables
CYCLE THRU PHASES	Forces controller to serve all phases, until reaching entry phases, before serving Entry phases. Controller does not omit any phases when moving to (Entry) Flash phases.	X enables

No Serve Phases

Use toggle key to select phases in the same concurrent group, but different priority reference, which cannot time any intervals together.

1. Move cursor to field where phase pairs intersect
2. Press toggle key. X indicates selection.

```
                NO SERVE PHASES
CANNOT SERVE WITH: 1 1 1
PHASE              2 1 0 9 8 7 6 5 4 3 2
  1                . . . . . . . . . . .
  2                . . . . . . . . . .
  3                . . . . . . . . .
  4                . . . . . . . .
  5                . . . . . . .
  6                . . . . . .
  7                . . . . .
  8                . . . .
  9                . . .
 10                . .
 11                .

 END OF SUBMENU
```

Main Menu (F1)-2-7

PARAMETER	DEFINITION	RANGE
CANNOT SERVE WITH	Selects phases in same concurrent group that cannot be served together. Select only one phase for each column entry. Phases selected as not serving together may not have the same priority (reference Controller Sequence (F1)-1-1)).	X selects

Dimming

Dimming feature MUST be enabled at the factory before it is available through the keyboard to the operator. It is enabled only upon request or when required by customer specifications. When dimming function is enabled do the following:

1. Use toggle to select + or - for each load switch used for dimming.
2. Enable dimming in a TOD program step to be used.
3. Set/verify external dimming input is TRUE (factory set to TEST C when dimming function is enabled).

```
                    DIMMING


LOAD SWITCH....  1..2..3..4..5..6..7..8
DIM GRN/WLK....  -  -  +  -  -  -  +  -
DIM YEL/PC.....  -  -  +  -  -  -  +  -
DIM RED/DW.....  +  +  +  -  +  +  +  -

LOAD SWITCH....  9.10.11.12.13.14.15.16
DIM GRN/WLK....  +  -  +  -  +  -  +  -
DIM YEL/PC.....  +  -  +  -  +  -  +  -
DIM RED/DW.....  +  +  +  -  +  +  +  -



END OF SUBMENU
```

Main Menu (F1)-2-8

Use of Dimming with Malfunction Management Unit or Conflict Monitor Unit

When the red monitoring function of the MMU (or CMU) is used during dimming, the red output from the load switch will be below the MMU (or CMU) red sensing voltage threshold. This is not a problem of the dimming function but an incompatibility with the MMU or CMU.

** CAUTION **

If the red monitoring function of the Malfunction Management Unit or Conflict Monitor Unit is used, the following precautions must be taken:

1) Inhibit red monitoring during dimming if red outputs are dimmed.
2) Do not dim red outputs if red monitoring is required.

PARAMETER	DEFINITION	RANGE
DIM GRN/WLK YEL/PC RED/DW	Dimming Green/Walk, Yellow/Pedestrian Clearance, Red/Don't Walk Dimming is controlled on a per indication basis. Dimming occurs when load switch is turned off for ½ cycle of AC line. Each indication can eliminate positive or negative half cycles to balance loading and to prevent DC offset to power company. User selects load switch circuits (1-16) and AC line phase (+ or -) used for dimming.	+, - selects indication and half cycle

Option Data

Guaranteed Passage
Gap timing for a phase is modified by designating a guaranteed passage interval for that phase. To select guaranteed passage phases move cursor to desired phase and press toggle key. 'X' selects phase with a guaranteed passage interval assigned to it.

Nonactuated I/Nonactuated II
Call-to-nonactuated inputs I and II may be assigned to any phase. To assign phases move cursor to desired phase and press toggle key. 'X' selects phase as call-to-nonactuated input I (or II) and enables it to operate as a nonactuated when corresponding input is active. Call-to-nonactuated I phases are typically used in coordination and call-to-nonactuated II phases are used in cross arterial (dual) coordination.

Dual Entry
Dual Entry phases are forced to time when there are no calls present on their associated ring.

1. Moving cursor to desired phases and press toggle key. 'X' indicates selection.
2. Enable dual entry function on next option data screen. Press toggle key to display ON after DUAL ENTRY parameter.

Conditional Service/Reservice

1. Select phases allowed conditional service or reservice by moving cursor to desired phase(s) and pressing the toggle key. 'X' indicates selection.
2. Enable conditional service function. Press toggle key to display ON after COND SERVICE ENABLE parameter.

NOTE
The intersection phasing must be a standard quad with leading left turns.

Rest In Walk/Flashing Walk
'X' enables phases as “Rest-In-Walk” and “Flashing Walk.” Rest-In-Walk phases are normally Actuated Rest-In-Walk phases, but define Extended Walk phases if Pretimed Operation is programmed. Use toggle key to select phases.

Five-Section Left-Turn Heads
To select the phase-control phases for a five-section left-turn head, move cursor to desired phase pair (5-2, 3-8, 7-4, 11-10, 1-6, 9-12) and press toggle key to display 'X'. Selection of phase pair 1-6 results as:

ö6		ö1	
Interval	Signal	Interval	Signal
Green	Green	Green	G Arrow
Yellow	Yellow	Yellow	Y Arrow
Red	Red		

When phase six yellow or red signals are ON, phase one arrows are dark. Right-turn head control is discussed in overlap data programming section of the controller submenu.

```
                CONTROLLER OPTION DATA

                                          1 1 1
PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
GUAR PASSAGE...  . . . . . . . . . . . .
NONACTUATED I..  . X . X . . . . . . . .
NONACTUATED II.  . . . . . X . X . . . .
DUAL ENTRY.....  . . . . . . . . . . . .
COND SERVICE...  . . . . . . . . . . . .
COND RESERVICE.  . . . . . . . . . . . .
REST IN WALK .,  . . . . . . . . . . . .
FLASHING WALK..  . . . . . . . . . . . .

----- FIVE SECTION LEFT TURN HEADS -----
   5-2 :  .     7-4 :  .     1-6 :  .
   3-8 :  .    11-10:  .    9-12 :  .
ADDITIONAL PAGE(S)
```

Main Menu (F1)-2-9

Cond Service Det Cross Switching

Allows cross switching of detector actuations from left turn phases to through movement phases. Example: Phase 2 is gapped out and in green rest while phase 6 is still extending. A call on phase 1 causes conditional service computation then calls on phase 1 are switched to phase 6 to extend phase 6 to max. Phase 6 vehicle and max extension times are used. Operation can be inhibited on a per phase basis by TOD.

1. Select (X) conditional service phases.
2. Assign (X) cross switch detectors to desired phases.
3. Enable conditional service function. Press toggle key to display ON after COND SERVICE ENABLE parameter.
4. Enable conditional service detector cross switching function. Press toggle key to display ON after COND SERVICE DET X SWITCHING parameter.

```
          CONTROLLER OPTION DATA
DUAL ENTRY..................... OFF
COND SERVICE ENABLE............ OFF
COND SERVICE DET X SWITCHING.... OFF
PED CLR PROTECT................ OFF
SPEC PREEMPT OVLP FLASH........ OFF
LOCK DETECTORS IN RED ONLY..... OFF
RESERVED.......................
RESERVED.......................
BACKUP PROTECTION GROUP 1...... OFF
BACKUP PROTECTION GROUP 2...... OFF
BACKUP PROTECTION GROUP 3...... OFF
SIMULTANEOUS GAP GROUP 1....... OFF
SIMULTANEOUS GAP GROUP 2....... OFF
SIMULTANEOUS GAP GROUP 3....... OFF
END OF SUBMENU
```

Main Menu (F1)-2-9

Spec Preempt Ovlp Flash

To enable flashing overlap feature used in a special preemption application:

1. Program preemptor and overlaps.
2. Apply phase omit to correct phase.
3. Press toggle key to indicate 'ON' after SPEC PREEMPT OVLP FLASH parameter.

Ped Clr Protect/Lock Detectors In Red Only/Ped Recycle/Walk Reservice

Enable functions using toggle key to indicate ON after desired function parameter. Refer to definitions for more information.

Backup Protection Groups 1, 2, 3

To enable Backup Protection

Press toggle key to indicate 'ON' after desired backup protection group 1-3. When the function is disabled, normal controller sequences with conditional service and revert operations are allowed. When the function is enabled, all revert operations are inhibited.

Simultaneous Gap Groups 1, 2, 3

To enable Simultaneous Gap function

Press toggle to indicate 'ON' after desired concurrent group 1-3. When the function is enabled, phases timing in opposite rings must either gap-out together or max-out in order to cross the barrier.

PARAMETER	DEFINITION	RANGE
GUAR PASSAGE	The Guaranteed Passage time interval is equal to the difference between vehicle extension time and the value of the gap at gapout. This interval modifies gap timing when gap time (at gap-out) is less than vehicle extension time. When gap-out occurs, the phase continues to time the guaranteed passage interval.	X enables
NONACTUATED I NONACTUATED II	Call-to-nonactuated mode inputs I and II force the assigned phases to operate in nonactuated mode Nonactuated phases normally have pedestrian time settings. If no phases are selected as coordinated phases, those phases selected as call-to-nonactuated I are designated as the coordinated phases. In Dual Coordination the phases programmed as call-to-nonactuated II are the crossing artery phases.	X enables
DUAL ENTRY PHASES	Dual entry is a mode of operation in which one phase in each ring must be in operation. If there is no call on a ring when the controller crosses the barrier, a call is automatically placed on the compatible dual entry phase in the opposite ring.	X enables
COND SERVICE PHASES	Conditional service allows an odd phase to time again after normal service to that phase. Requirements for conditional service: 1) Standard quad configuration 2) A call received on an odd phase while even phases are timing. 3) The even phase (same ring as odd phase) gaps out of maxes out. 4) Vehicle clearance time of gapped/maxed out phase, plus conditional service minimum green time is less than or equal to the time remaining on the max timer of the even phase still timing.	X enables
COND RESERVICE PHASES	Conditional reservice allows reservice of an even phase (through phase) after an odd phase is conditionally serviced. Once the odd phase is allowed conditional service as described above, the even phase (same ring) may begin timing again but times only minimum green.	X enables

PARAMETER	DEFINITION	RANGE
REST IN WALK	If a phase has a serviceable pedestrian call and there are no other serviceable calls on conflicting phases, phase continues to reset at end of pedestrian walk interval until a conflicting serviceable call is received.	X enables
FLASHING WALK	Pedestrian walk output flashes during walk interval.	X enables
FIVE SECTION LEFT TURN HEADS	Comprising: red, yellow, and green indications plus a left-turn yellow arrow and a left-turn green arrow. Used to program protected and permissive left-turns that require through-phase yellow to inhibit left-turn yellow arrow. Use of this type of head control is restricted to standard quad operation.	X enables
DUAL ENTRY ENABLE	Enables dual entry function when dual entry phases have been selected.	ON enables
COND SERVICE ENABLE	Conditional Service Enable Enables conditional service and reservice for phases selected to operate with these functions.	ON enables
COND SERVICE DET X SWITCHING	Conditional Service Detector Cross Switching Allows left turn movement to extend the through movement during conditional service by switching the left turn detector to the through phase during conditional service.	ON enables
PED CLR PROTECT	Pedestrian clearance protection forces the controller to time pedestrian clearance on all phases with pedestrian clearance settings and ignores manual advance inputs. This function is used only when manual control is enabled.	ON enables
SPC PMT OLAP FLSH	Special Preempt Overlap Flash Enables flashing overlaps in a preemption sequence defined by user. When overlaps A and B are programmed and overlap A is green, overlap A green and overlap B red flash. When overlap B is green, overlap B green flashes and overlap A red does not flash. A spare phase must be used for overlap B and phase omit input must be applied to it.	ON enables
LOCK DETECTORS IN RED ONLY	When enabled, allows locking only when phase is Red. When disabled, calls are locked if received during Yellow or Red intervals on a phase.	ON enables
BACKUP PROTECTION GROUP*	Inhibits reservice of leading left-turn phases within the same concurrent group. Control is always given to the next sequential phase. Backup protection can be assigned to any or all concurrent groups.	ON enables

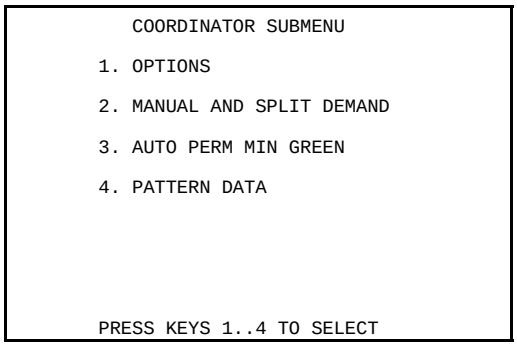
PARAMETER	DEFINITION	RANGE
SIMULTANEOUS GAP GROUP*	ON indicates: When crossing a barrier, phases in both rings must gap out together in order to terminate the green interval. The simultaneous gap condition can be assigned to any or all concurrent groups. OFF indicates: Phases in both rings allowed to gap out independently to terminate green interval when crossing a barrier.	ON enables

*Must be a standard quad configuration.

COORDINATOR SUBMENU
Programming Summary

Coordination

The coordination submenu has four data groups. To view or enter data press the keyboard number (1 through 4) corresponding to desired data group.



1. OPTIONS

Select split and offset units as percent or seconds.
Select interconnect format (Plan, TS2, Standard)
Select interconnect source of commands.
Enter resync count.
Select smooth, add only, or dwell transition method.
Enter dwell period.
Enable coordinated phases as actuated.
Enable actuated rest in walk phases.
Inhibit maximum timing curing coordination.
Select max 2 timer for use during coordination.
Select multisync operation.
Select floating force-off.
Choose alternate phase sequence (phase reversal) used during free operation.

2. MANUAL AND SPLIT DEMAND

Enable manual plan.
Select pattern used during manual operation.
Enable split demand operation.
Select split demand call time.
Enter split demand cycle count.
Select split demand phases.

3. AUTO PERM MIN GREEN

Enter automatic permissive minimum green times.

4. PATTERN DATA

Plan format:
- **S**elect plan.

TS2 format:
- **S**elect timing plan.
- **E**nter offsets for each pattern.

Standard format:
- **S**elect cycle/offset/split commands or free operation.

All formats:
- **E**nter cycle length.
- **E**nter offset.
- **E**nter splits for each phase.
- **E**nter vehicle permissive periods 1 and/or 2.
- **E**nter vehicle permissive 2 displacement.
- **E**nable phase reservice.
- **E**nable split extension.
- **S**elect split demand pattern.
- **S**elect pattern used at crossing arteries.
- **S**elect coordinated phases.
- **E**nable vehicle recall.
- **E**nable maximum vehicle recall.
- **E**nable pedestrian recall.
- **E**nable phase omit.
- **S**elect an alternate phase sequence (phase reversal).

Options

```
              COORDINATOR OPTIONS


SPLIT UNITS..     %    ACT CRD PHASE..  .
OFFSET UNITS.     %    ACT WALK/REST..  .
INTERCNT FMT.   TS2    INHIBIT MAX....  .
INTERCNT SRC.   NIC    MAX 2 SELECT...  .
RESYNC COUNT.     0    MULTISYNC......  .
TRANSITION...  SMOOTH FLOAT FORCE OFF  .
DWELL PERIOD.     0%


                              A B C D E F
FREE ALTERNATE SEQUENCE       . . . . . .


END OF SUBMENU
```

Main Menu (F1)-3-1

Split and Offset Units

Split and offset related data may be entered in percent or seconds. Values entered for split or offset related parameters must be consistent with units specified.

1. Press toggle key to select % (percent) or SEC (seconds).
2. Verify entries for phase splits, vehicle permissives, vehicle permissive displacement, split extension time, offset, and dwell period. These values must be consistent with units selected.

Interconnect Format and Source

Indicate interconnect format and source. Format determines pattern data pages needed for programming. Appropriate pattern data pages are automatically generated and displayed once format selection is made.

1. Press toggle key at INTERCNT FMT parameter until correct format is displayed (PLAN, STD, or TS2).
2. Press toggle key at INTERCNT SRC parameter until correct source is displayed: NIC (Non-Interconnected), TLM (telemetry), or HDW (hardwire).

Inhibit Max and Max 2 Select

1. Press toggle key to inhibit (X) phase maximum timers. See definition.
2. Press toggle key to select (X) Max 2 timer for use instead of Max 1.

Multisync

Press toggle key to indicate (X) sync input has multiple syncs for all available dials on the same line.

Float Force Off

Press toggle key to indicate (X) use of floating force off operation.

Resync Count

Select the number of missed syncs allowed from an external source before reverting to NIC. Use keyboard number keys to enter desired count. Zero will default to one missed sync.

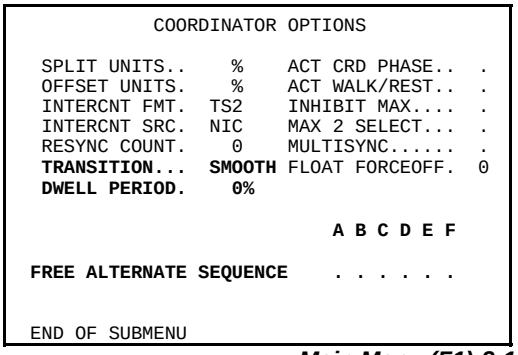
Actuated Coordinated Phases and Walk/Rest

Makes the coordinated phases non-actuated until the yield point then actuated thereafter.

1. Press toggle key to actuate (X) the coordinated phases.
2. Press toggle key to enable (X) actuated rest in walk.

Transition and Dwell Period

1. Press toggle key to select transition mode. Select from SMOOTH, ADD ONLY, or DWELL.
2. If transition by dwell is selected dwell period must be entered. Enter desired dwell period in percent or seconds depending on units selected in Coordination Submenu, Options. Dwell period entry of either 0% or 0 seconds causes use of default dwell period. Default dwell period is 20% of the dial cycle length.



Main Menu (F1)-3-1

Free Alternate Sequence

Select an alternate sequence used when coordinator is free. Phase reversal for up to six pairs of phases in the same ring and same concurrent group is allowed. Any number of phase reversals can be selected. Phase reversal is also selectable per coordination pattern. Note that external phase reversal is ignored if phase reversal is programmed internally in a coordination pattern or TOD program step.

Press toggle key under desired phase reversal pair A through F. X indicates selection. Refer to definitions section for information on effect of selection.

PARAMETER	DEFINITION	RANGE
SPLIT UNITS	Select either seconds or percent of cycle as the units used for split values.	%, sec.
OFFSET UNITS	Select either seconds or percent of cycle as the units used for offset values.	%, sec.
INTERCNT FMT	Interconnect Format Select interconnect format used by controller. PLAN Plan - allows accessing all 64 coordination patterns directly by number. STD Standard - allows accessing the coordination patterns by Econolite-standard cycle/offset/split commands. TS2 Fixed time - allows accessing coordination patterns as 20 timing plans each with 3 offsets.	PLAN, STD, TS2

PARAMETER	DEFINITION	RANGE
INTERCNT SRC	Interconnect Source NIC Non-Interconnected Coordination - All coordination commands are determined by time-of-day programming. NOTE: NIC functions as a back-up mode in case of failure when using TLM or HDW as interconnect type. TLM Telemetry Interconnect - Telemetry module is the source of system commands unless NIC override is active. The coordination plan is provided by telemetry interconnect from a zone master. HDW Standard Interconnect - The hardwire input is the source of system commands unless NIC override is active. The coordination plan is provided by external hardwired inputs.	NIC, TLM, HDW
RESYNC COUNT	Number of complete cycles during which the coordinator self-syncs if a sync pulse does not occur. Coordination reverts to NIC commands after the resync count unless the resync count is 255. If resync count equals 255 the coordinator continues to self-sync. If NIC is not programmed (NIC step not active) the coordinator sets the controller free.	0-255 cycles
ACT CRD PHASE	Actuated Coordinated Phase(s) Phase assignment allows coordinated phases to be actuated instead of non-actuated during coordination. Phases are serviced based on actual serviceable calls. This allows coordinated phases to respond to vehicle detector inputs and extend the coordinated phase split after the yield point.	X enables
ACT WALK/REST	Actuated Rest in Walk If a phase has a serviceable pedestrian call and there are no other serviceable calls on conflicting phases, the phase continues to reset at the end of the pedestrian walk interval until a conflicting serviceable call is received.	X enables
INHIBIT MAX	Maximum timing inhibit prevents maximum green time from terminating a phase allowing extension of green periods based on split interval settings during coordination.	X enables
MAX 2 SELECT	When selected, Max 2 timer is used during coordination.	X enables

PARAMETER	DEFINITION	RANGE
MULTISYNC	Indicates that sync input has syncs for all available dials on the same line (usually 2 or 3). X enables multisync operation which allows the coordinator to receive sync pulses for multiple cycle lengths and pick out the sync pulse applying to the cycle length in effect.	X enables
FLOAT FORCE OFF	Floating force off points change standard phase termination. Split entries for the non-coordinated phases determine the max time for those phases and unused split time for non-coordinated phases reverts to the coordinated phases. Fixed force off points change phase termination by allowing the unused split time to revert to a following phase.	X enables
TRANSITION	Offset change by smooth transition or dwell.	SMOOTH, ADD ONLY, DWELL
SMOOTH TRANSITION	Offset is changed by moving the current offset toward the desired offset in the shortest time possible. Change is made by adding a maximum of 20% or subtracting a maximum of 17% of cycle length per cycle by either addition or subtraction. Add: Desired offset is greater than the current offset by no more than 50% . Subtract: Desired offset is less than the current offset by more than 50% . OR Desired offset is greater than the current offset by more than 50%. NOTE The coordinator forces the offset to be changed by addition if it determines that subtraction shortens the current cycle below the controller minimum cycle.	-
ADD ONLY	Change is made by adding a maximum of 20% of cycle length per cycle.	-
DWELL	Offset is changed by holding the coordinated phases at the beginning of green for the dwell period. At the end of the dwell period the coordinated phases are released and normal timing resumes. The dwell period is repeated once each cycle until the desired offset is reached.	-

PARAMETER	DEFINITION	RANGE
DWELL PERIOD	Period of time during which the controller dwells in the coordinated phases for an offset correction.	0-99% or 0-255 sec. (units of % or sec depends on Offset Units)
FREE ALTERNATE SEQUENCE	Define alternate sequence A through F to be used when coordinator is FREE. A reverses phases 1 and 2 B reverses phases 3 and 4 C reverses phases 5 and 6 D reverses phases 7 and 8 E reverses phases 9 and 10 F reverses phases 11 and 12	X enables

Manual And Split Demand

Manual

1. Press toggle key after MANUAL ENABLE parameter to enable (ON)/disable (OFF) manual selection of a coordination pattern.
2. Enter coordination pattern number to be in effect. Select pattern from those created in pattern data page. Zero selects free operation.

Split Demand

Program up to two split demand operations. Split demand 2 has priority over split demand 1 when both are enabled and operative. The split demand pattern used is a pattern containing the demand splits; this pattern must be programmed with the set of splits favoring the phases needing additional service. Split demand operation is disabled if no pattern split demand entry is made or if splits associated with the selected demand pattern are all set to zero or dual coordination is selected.

1. Enter demand call time in seconds to specify length of call time before split demand operation is selected. Zero entry disables split demand operation.
2. Enter number of cycles (DEMAND CYCLE COUNT) during which split demand operation remains in effect once selected.
3. Use toggle key to select (X) the split demand phases.
4. Verify programming of split demand pattern (SPL DMD PATTERN) in Coordination Submenu, Pattern Data.

```
      COORD MANUAL AND SPLIT DEMAND

MANUAL ENABLE: OFF    MANUAL PATTERN   0

 ----------------------------------------

SPLIT DEMAND:       DEMAND 1  DEMAND 2
DEMAND CALL TIME        0s        0s
DEMAND CYCLE COUNT      0         0

                                   1 1 1
DEMAND PHASE:    1 2 3 4 5 6 7 8 9 0 1 2
DEMAND 1 PHASES  . . . . . . . . . . . .
DEMAND 2 PHASES  . . . . . . . . . . . .

END OF SUBMENU
```

Main Menu (F1)-3-2

Automatic Permissive Minimum Green

1. Enter desired automatic permissive minimum green times for each phase 1-12. Zero entry disables function for the corresponding phase. Refer to definitions for more information and allowable ranges.
2. To enable automatic permissive operation set vehicle permissive periods [1] and [2], and vehicle permissive displacement to zero.

```
          COORD AUTO PERM MIN GREEN


          PHASE   AUTO PERM MIN GRN
            1              0s
            2              0s
            3              0s
            4              0s
            5              0s
            6              0s
            7              0s
            8              0s
            9              0s
           10              0s
           11              0s
           12              0s
    END OF SUBMENU
```

Main Menu (F1)-3-3

PARAMETER	DEFINITION	RANGE
MANUAL ENABLE	Enables manual commands to be in effect by using MANUAL PATTERN, thus overriding any other coordination pattern.	ON/OFF
MANUAL PATTERN	Manual Pattern Select coordination pattern to be in effect when manual command is enabled. Zero entry sets coordination FREE when manual command is enabled. Manual commands have highest priority.	1-64, 0 sets FREE
SPLIT DEMAND PATTERN SELECTION	The coordinator will select special SPLIT DEMAND coordination patterns 1 and 2, as specified in COORD PATTERN, if an actuation is continuously sensed by a queue detector for a period exceeding DEMAND CALL TIME while DEMAND 1 or DEMAND 2 PHASES are green. Once SPLIT DEMAND has been selected, it remains in effect for the number of cycles set in DEMAND CYCLE COUNT.	-
DEMAND CALL	In order for the controller to select SPL DMD PATTERN 1 or 2 (as specified in Coordination submenu, #4 Pattern Data) to continue local demand service, vehicle actuations must continue to be sensed by the queue detector (Split Demand Input) for the entire length of DEMAND CALL TIME. Zero entry disables operation.	0-255 sec.
DEMAND CYCLE COUNT	The split demand pattern continues local demand service for the number of cycles specified by DEMAND CYCLE COUNT. Zero entry disables operation.	0-255 cycles

PARAMETER	DEFINITION	RANGE
DEMAND PHASES	Phases which require favored timing to service local traffic demand. Split demand inputs are monitored during split demand phase green. If the split demand inputs are TRUE for a period of time greater than or equal to DEMAND CALL TIME, the SPLIT DEMAND PATTERN is used. Actual phase splits are determined by the SPLIT DEMAND PATTERN, not the DEMAND SPLIT PHASES. This operation is disabled if no phases are selected. Demand 2 phases have priority if both demands 1 and 2 are enabled.	X enables
AUTO PERMISSIVE	Automatically computed permissive period. Each sequential phase is automatically assigned a vehicle and pedestrian permissive period. The length of the vehicle permissive period is determined by the phase split interval and phase minimum time (The phase minimum time is equal to the auto permissive minimum green, the phase minimum green, or bike minimum green, whichever is larger, plus the yellow and red clearance time.).	-
AUTO PERM MIN GRN	Automatic Permissive Minimum Green is provided for each phase. Per phase assignment of (automatic permissive) minimum green times different from (normal) minimum green times. Auto permissive green time allows phase minimum green to be set to a low value but allows the user to make sure that a phase with a very short minimum green will have a reasonable amount of phase green. NOTE Auto permissive minimum green times are used ONLY for auto permissive calculations. The larger of phase min green, bike min green and auto permissive min green is used when determining the permissive end point for a phase. The larger the value, the sooner the permissive end point occurs for the given phase.	0-255 sec.

Pattern Data

Coordination is controlled with patterns (#1-64). Each pattern is defined by the associated coordination parameters programmed by the user. The pattern consists of independent cycle length, offset, and splits for each of the 12 phases. Each pattern allows independent selection of vehicle permissive operations (versus auto permissive operation), phase reservice, split extension, split demand pattern, crossing artery pattern, coordinated phases, alternate phase sequences, and by phase selection of vehicle recall, max recall, ped recall, and phase omits. The pattern screens used for programming depend on the interconnect format selected (PLAN, STD, or TS2). Use "go to" feature to advance to desired pattern number; enter desired pattern number and press ENTER after COORD PATTERN.

Permissives

1. Automatic permissive: Enter zero for vehicle permissives 1 and 2 and vehicle permissive displacement.
2. Single permissive: Enter desired single permissive period for VEH PERMISSIVE [1] parameter then enter zero for VEH PERMISSIVE [2] and VEH PERM 2 DISP.
3. Dual permissive: Enter desired values for VEH PERMISSIVE [1] and [2], and VEH PERM 2 DISP.

Phase Reservice

Press toggle to enable (X) phase reservice operation.

NOTE:

For phase reservice to work, the controller must be fully actuated, including coordinated phases.

Split Extension

Use keyboard number keys to enter split extension time for each ring. Example: If a coordinated phase split is 20%, and a split extension value of 10% is programmed, the coordinated phase split can extend to 30% provided vehicle actuations are present on the coordinated phase. If the actuated coordinated phase gaps out before it has extended to the full 30% maximum split, the actual coordinated phase split may be less than 30%.

Split Demand Pattern

Specify split demand pattern to be selected when split demand function is in enabled.

NOTE:

Verify phase split assignments the split demand pattern. Verify split demand entries of call time, cycle count and selection of demand phases (Coordinator Submenu Manual and Split Demand F1, 3,2).

Crossing Artery Pattern

Enter crossing artery pattern to be used when dual coordination is selected.

Phase Enables

Use toggle key to select (X) coordinated phases, phase to be omitted, phases with vehicle, maximum, and pedestrian recall.

Alternate Sequence

Use toggle key to select (X) alternate phase sequences A through F. Phase reversal defined by this selection is in effect when pattern is used to control coordination.

PLAN Format Coordination Pattern

Pattern and plan numbers identify the plan format. All 64 coordination patterns are accessed directly by number. All other parameters are the same for standard and TS2 formats. Each coordination pattern may have different coordination parameter values.

1. Use cursor keys or "go to" feature to move to desired coordination pattern number (1-64).
2. Enter cycle length (seconds).
3. Enter splits on per phase basis and enter offset (units of percent or seconds as specified in Coordinator Submenu Options F1, 3, 1).

```
COORD PATTERN  1

CYCLE LENGTH.....   0s PLAN.........  1
OFFSET...........   0%
SPLITS:
PHASE  1)  0%   2)  0%   3)  0%   4)  0%
PHASE  5)  0%   6)  0%   7)  0%   8)  0%
PHASE  9)  0%  10)  0%  11)  0%  12)  0%

VEH PERMISSIVE.......  [1]   0% [2]   0%
VEH PERM 2 DISP......... .   0%
PHASE RESERVICE.....    .
SPLIT EXTENSION/RING.  [1]   0% [2]   0%
SPL DMD PATTERN......  [1]   0  [2]   0
XARTERY PATTERN.....    0
ADDITIONAL SCREEN(S)
```

```
                                  1 1 1
PHASE            1 2 3 4 5 6 7 8 9 0 1 2
COORD PHASES     . . . . . . . . . . . .
VEHICLE RECALL   . . . . . . . . . . . .
VEH MAX RECALL   . . . . . . . . . . . .
PED RECALL       . . . . . . . . . . . .
PHASE OMIT       . . . . . . . . . . . .
SPARE            . . . . . . . . . . . .

                 A B C D E F
ALT SEQUENCE:    . . . . . .



ADDITIONAL SCREEN(S)
```

Main Menu (F1)-3-4

TS2 Format Coordination Pattern

Pattern numbers in groups of three and timing plan number identify the TS2 format. Coordination is accessed as 20 timing plans each with 3 offsets. All other parameters are the same as PLAN format. Pattern is computed from the timing plan/offset input. There are three patterns per timing plan (patterns 1,2,3 with timing plan 0, patterns 4,5,6 with timing plan 1, etc., up to 60 patterns). The difference between each pattern in the group is the offset.

```
COORD PATTERN  1, 2, 3

CYCLE LENGTH.....   0s TIMING PLAN..  0
OFFSET.1)  0%   2)  0%   3)  0%
SPLITS:
PHASE  1)  0%   2)  0%   3)  0%   4)  0%
PHASE  5)  0%   6)  0%   7)  0%   8)  0%
PHASE  9)  0%  10)  0%  11)  0%  12)  0%

VEH PERMISSIVE.......  [1]   0% [2]   0%
VEH PERM 2 DISP.....    .   0%
PHASE RESERVICE.....    .
SPLIT EXTENSION/RING.  [1]   0% [2]   0%
SPL DMD PATTERN......  [1]   0  [2]   0
XARTERY PATTERN.....    0
ADDITIONAL SCREEN(S)
```

```
                                  1 1 1
PHASE            1 2 3 4 5 6 7 8 9 0 1 2
COORD PHASES     . . . . . . . . . . . .
VEHICLE RECALL   . . . . . . . . . . . .
VEH MAX RECALL   . . . . . . . . . . . .
PED RECALL       . . . . . . . . . . . .
PHASE OMIT       . . . . . . . . . . . .
SPARE            . . . . . . . . . . . .

                 A B C D E F
ALT SEQUENCE:    . . . . . .



ADDITIONAL SCREENS
```

Main Menu (F1)-3-4

STD Format Coordination Pattern

Pattern number and cycle/offset/split identify the standard format. Coordination is accessed with cycle/offset/split command. All other parameters are the same as PLAN format.

```
COORD PATTERN  1

CYCLE LENGTH.....   0s  C/O/S..... FREE
OFFSET..........    0%
SPLITS:
PHASE  1)  0%   2)  0%   3)  0%   4)  0%
PHASE  5)  0%   6)  0%   7)  0%   8)  0%
PHASE  9)  0%  10)  0%  11)  0%  12)  0%

VEH PERMISSIVE.......  [1]   0% [2]   0%
VEH PERM 2 DISP.....    0%
PHASE RESERVICE.....    .
SPLIT EXTENSION/RING.  [1]   0% [2]   0%
SPL DMD PATTERN.....   [1]   0  [2]   0
XARTERY PATTERN.....    0
ADDITIONAL SCREENS
```

```
                                  1 1 1
PHASE           1 2 3 4 5 6 7 8 9 0 1 2
COORD PHASES    . . . . . . . . . . . .
VEHICLE RECALL  . . . . . . . . . . . .
VEH MAX RECALL  . . . . . . . . . . . .
PED RECALL      . . . . . . . . . . . .
PHASE OMIT      . . . . . . . . . . . .
SPARE           . . . . . . . . . . . .

A B C D E F
ALT SEQUENCE:   . . . . . .



ADDITIONAL SCREENS
```

Main Menu (F1)-3-4

PARAMETER	DEFINITION	RANGE
COORD PATTERN	Identifies all programmed cycle, offset, split, and other functions in any of the selected formats. Formats include PLAN, STD, and TS2. STD - allows accessing the coordination patterns by Econolite-standard cycle/offset/split commands. TS2 - allows accessing coordination patterns as 20 timing plans each with 3 offsets. NOTE Selection of a pattern without a cycle length causes controller to go free.	1-64 1-60 (TS2)

PARAMETER	DEFINITION	RANGE
TIMING PLAN	In TS2 format timing plan 0 relates to patterns 1, 2, 3 where offsets 1, 2, 3 select patterns 1, 2, 3 respectively. Timing plan 1 relates to patterns 4, 5, 6 where offsets 1, 2, 3 select patterns 4, 5, 6, respectively, and so on up to twenty timing plans. Pattern number is used by the coordinator to calculate the TS2 TIMING PLAN number TP 00-19, shown in the upper right. The relationship is: TP = truncated (pattern number - 1) /3	0-19
PLAN	In PLAN format the plan number relates directly to the coordination pattern selected thus allowing access to all 64 coordination patterns directly by number.	1-64
C/O/S	Cycle/Offset/Split Select from six cycles, five offsets, four splits, or a Zone Master plan command (cycle 7) and a plan number (01-32), or FREE operation. In STD format the coordination pattern is associated with cycle/offset/split combination.	1-6 cycles/1-5 offsets/ 1-4 splits 0/0/0 sets FREE 701-732 Zone Master plan command
CYCLE LENGTH	Coordination cycle length. NOTE A minimum cycle length is calculated by the controller based on the timing intervals for all phases serviced during the cycle. The actual controller cycle length may be longer than the coordination cycle length if insufficient time is given to phases via split entries.	30-255 sec.

OFFSET	A value calculated to account for vehicle travel time from the system reference intersection (master intersection) to the intersection currently being considered. The offset determines the guaranteed starting point of the coordinated phase green period (Local Zero) for the cycle in effect. Offset (sec) = Distance between intersections (ft) /travel speed (ft/sec). Offset (%) = [Offset (sec)/Cycle length (sec)] X 100. NOTE The offset may be referenced to the coordinated phase yield point or to the force off point (end of coordinated phase green). This option is available by programming in the write protected area of the controller. (Consult factory.)	0-99%, 0-255 sec.
PHASE SPLITS	Division of cycle time into sections (split intervals) which establish the maximum amount of time that is allocated to each timing phase during coordination. NOTE Entering zero for any phase split causes that phase to be omitted. Entering zero for ALL splits sets controller free.	0-99%, 0-255 sec.
VEH PERM 1	Vehicle permissive period 1 Portion of the cycle length during which phases other than the coordinated phases may be serviced. This period begins timing at the coordinated phase yield point. If VEH PERM 2 DISP or VEH PERM 2 are equal to zero all non-coordinated phases may be serviced during this period. If VEH PERM 2 DISP or VEH PERM 2 are not equal to zero (dual permissive operation) then only the phase(s) following the coordinated phase(s) (first permissive phases) are serviced during this period.	0-99%, 0-255 sec.
VEH PERM 2	Vehicle permissive period 2 Begins timing immediately after its adjustable displacement period. Calls on phases other than those serviced during the first permissive period are answered. Phase Omit is applied to the first permissive phase(s).	0-99%, 0-255 sec.

PARAMETER	DEFINITION	RANGE
VEH PERM 2 DISP	(Vehicle) Permissive 2 displacement Begins timing at the coordinated phase yield point. At the end of this displacement period the second permissive period begins timing. End of VehPerm 2 Disp = (Yield Point % + Perm2 Disp%).	0-99%, 0-255 sec.
PHASE RESERVICE	Phase Reservice Allows phases to be reserviced during coordination and still maintain coordination. NOTE: Requires Actuated Coordinated phases.	X enables
SPLIT EXT	Coordinated Phase Split Extension Vehicle extension time for an actuated coordinated phase. This time allows the coordinated phase split interval to be increased based on traffic demand. Extension begins at the coordinated phase force-off point. Force-off is applied to the coordinated phase when the extension period is over. To ensure that remaining phases are allowed service for a full split interval, the coordination cycle is modified based on extension period length. Remaining phase splits are shifted by the coordinated phase extension time and are allowed to use their full split interval. If each phase uses its maximum split interval time, cycle time for the last split interval is reduced, thus service time for the last sequential phase is reduced. Coordinator tries to extend last phase split interval but if this requires the phase to terminate after local zero, force-off is applied to the phase 0.5 seconds before local zero. This normally results in a coordination error (offset error) which is corrected by smooth transition or dwell when the coordinated phases are re-entered.	0-99%, 0-255 sec.
SPLIT DMD PATRN	Split Demand Pattern Select the pattern programmed with split values which favor the phases requiring additional service.	1-64, 0 disables
XARTERY PATTERN	Crossing Artery Pattern Enter number of coordination pattern if a crossing artery is to be coordinated with the main artery. Split values used for coordination will be those of the crossing artery pattern. 0 disables crossing artery coordination.	1-64, 0 disables

PARAMETER	DEFINITION	RANGE
COORD PHASES	Coordinated phases - Phases that are synchronized to establish a progression of signals. Whether actuated or non-actuated, the coordinated phases are held green until the yield point. There must be one coordinated phase in each ring of the concurrent group that contains the coordinated phases. It is permissible to have only one ring in the concurrent group.	X selects
VEHICLE RECALL	Places a demand for vehicle service on a phase by registering a call while the phase is in yellow and red intervals. Vehicle recall is selected on a per phase basis.	X selects
VEH MAX RECALL	Vehicle Maximum Recall Places a continuous vehicle call on a phase. Maximum recall is selected on a per phase basis.	X selects
PED RECALL	Places a demand for pedestrian service on a phase by registering a call while the phase is in pedestrian clearance and Don't Walk intervals. Ped recall is selected on a per phase basis.	X selects
PHASE OMIT	Omits service to selected phases on a per phase basis.	X selects
ALT SEQUENCE	Alternate Sequence Select use of alternate phase sequence. Controller alters the sequence of phase pairs to reverse the order in which phases are served. Each alternate sequence entry (A-F) selects reversing a different phase pair: A Reverses 1 & 2 D Reverses 7 & 8 B Reverses 3 & 4 E Reverses 9 & 10 C Reverses 5 & 6 F Reverses 11 & 12 Alternate sequences defined in the coordination pattern have highest priority. Alternate sequences selected in TOD program step have next highest priority. Alternate sequences selected by any external means have lowest priority.	X selects
COORD PHASES	Coordinated phases - Phases that are synchronized to establish a progression of signals. Whether actuated or non-actuated, the coordinated phases are held green until the yield point. There may be up to two coordinated phases, one per timing ring. Both coordinated phases must be in the same concurrent group.	X selects
VEHICLE RECALL	Places a demand for vehicle service on a phase by registering a call while the phase is in its yellow and red intervals. Vehicle recall is selected on a per phase basis.	X selects

PARAMETER	DEFINITION	RANGE
VEH MAX RECALL	Vehicle Maximum Recall Places a continuous vehicle call on a phase. Maximum recall is selected on a per phase basis.	X selects
PED RECALL	Places a demand for pedestrian service on a phase by registering a call while the phase is in its yellow and red intervals. Ped recall is selected on a per phase basis.	X selects
PHASE OMIT	Omits service to selected phases on a per phase basis.	X selects
ALT SEQUENCE	Alternate Sequence Select use of alternate phase sequence. Controller alters the sequence of phase pairs to reverse the order in which phases are served. Each alternate sequence entry (A-F) selects reversing a different phase pair: A Reverses 1 & 2 D Reverses 7 & 8 B Reverses 3 & 4 E Reverses 9 & 10 C Reverses 5 & 6 F Reverses 11 & 12 Alternate sequences defined in the coordination pattern have highest priority. Alternate sequences selected in TOD program step have next highest priority. Alternate sequences selected by any external means have lowest priority.	X selects

NOTE
This following definitions do not appear on any of the data entry screens. They are included here because they are necessary in understanding the data entry parameters for this section.

PARAMETER	DEFINITION	RANGE
PERMISSIVE OPERATIONS	The ASC/2 controller is programmed to calculate permissive periods by any one of three operations: Automatic, Dual, and Single.	-

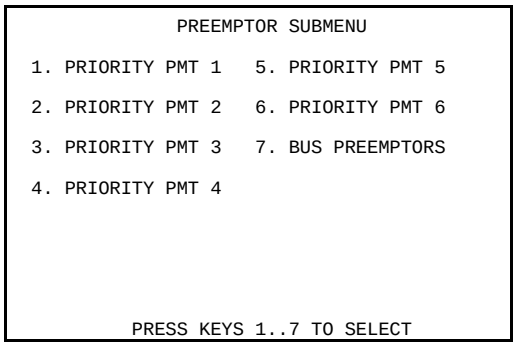
PARAMETER	DEFINITION	RANGE
AUTO PERMISSIVE	Automatically computed permissive period. Each sequential phase is automatically assigned a vehicle and pedestrian permissive period. The length of the vehicle permissive period is determined by the phase split interval and phase minimum time. (Phase minimum time is equal to auto permissive minimum green, bike minimum green, or phase minimum green, whichever is larger, plus the yellow and red clearance time.) Auto permissive green time allows the phase minimum green to be set to a low value but still ensures that the auto permissive period provides sufficient green time if the controller yields to the phase at the end of the permissive.	-
DUAL PERMISSIVE	A permissive operation that requires operator data entry of three parameter values: VEH PERMISSIVE 1 and 2, and VEH PERM 2 DISP. During this permissive operation the Vehicle permissive period 1 times first. This period begins at the yield point. Vehicle permissive period 2 begins timing immediately after an adjustable time period (Vehicle Permissive Period 2 Displacement). During the vehicle permissive period 1, only those phases immediately following the coordinated phases are serviced. If the controller yields during the first permissive, all remaining calls are serviced in normal sequence and the second permissive period is not used.	-
SINGLE PERMISSIVE	Single permissive operation is selected by setting the Vehicle Permissive 2 displacement to zero. Only the Vehicle Permissive Period 1 and its associated pedestrian permissive period are timed and begin timing at the yield point. During the Single Permissive period the controller will yield to a call on any phase.	-

PARAMETER	DEFINITION	RANGE
PERMISSIVE PERIOD END POINT	End Point = (Split Sum) - (K Phase Clear) - (Perm Phase Min Green and Clear) Where: Split Sum = Sum of splits from coordinated through permissive phases, inclusive. K Phase Clear = Coordinated phase Yellow + All Red (If Walk Rest Modifier input = TRUE, NOT USED) K Phase Clear = Coordinated phase Ped Clear + Yellow + All Red (If Walk Rest Modifier input = FALSE, USED) Perm Phase Min Green and Clear = Permissive phases minimum green + Yellow + All Red Perm Phase Min Green = Permissive Phase minimum green or (Walk + Ped Clear), whichever is greater.	-
YIELD POINT	Yield Point = Coordinated phase split interval - Coordinated phase clearance time (Pedestrian + vehicle clearance time).	-
ACTUATED YIELD POINT	Act. Yield Point = Coord phase split interval - Coordinated phase vehicle clearance time.	-
OFFSET POINT	The offset entry establishes the offset point to the LEAD (first to time) coordinated phase. The offset reference may be to the start of phase green, to the yield point or to the force off point (selectable by configuration bits). The offset relationship between the LEAD and LAG coordinated phases, permissive start and end points and force off points is established by timing relationships as determined by phase splits.	-
DUAL YIELD POINTS	The ASC/2 coordinator uses dual yield points; one yield point is computed per ring. There are two distinct yield points. Hold and Yield are independent calculations based on offset, coordinated phase splits and coord phase timing.	-
MINIMUM CONTROLLER CYCLE TIME	The shortest possible cycle length allowing all phases to time their minimum interval times.	-

PARAMETER	DEFINITION	RANGE
DUAL COORDINATION	Dual coordination is established when the dual coordination input is TRUE. This forces the crossing artery split (XARTY PATTERN) to be used and places a continuous vehicle demand on the call-to-nonactuated (NONACTUATED II) phases	

PREEMPTOR SUBMENU
Programming Summary

The Preemptor Submenu has seven data groups. To view or enter data press the keyboard number corresponding to desired group. Data groups 1 through 6 correspond to priority preemptors 1 through 6 and data group 7 corresponds to bus preemptors.



1. PRIORITY PREEMPTORS 1-6

Terminate phase overlaps.
Designate track clearance phases.
Designate hold phases.
Designate exit phases.
Select phases to have calls placed at end of preemption.
Terminate overlaps
Enable priority preemptors.
Select preemptors as priority or non-priority.
Designate preemption input as lock or non-lock.
Enable hold phase flash condition.
Terminate overlaps ASAP
Specify pedestrian indicators as dark.
Enable pedestrian indicators.
Enable pedestrian clearance time of zero.
Select pedestrian clearance to time through yellow.
Enable Terminal phases
Prevent preemptor from overriding remote flash.
Set all preempt outputs to flash.
Select yellow to green option.
Select active preempt outputs only during hold interval.
Set no voltage monitor in flash.
Set hold interval green to fast flash.
Select out of flash color.
Enter preemptor maximum time in hold interval.
Enter preemptor minimum time in hold interval.
Enter minimum pedestrian clearance time.
Enter preemptor exit maximum time.
Enter minimum preemption duration time.
Enter delay time between preemptor call and start of preemption.
Enter phase inhibit time.
Enter min green, yellow, red entrance interval times.
Enter track clearance interval times.
Enter hold green, yellow, and red interval times.
Enable preemptor linking.
Enter reservice time.
Enter delay time.
Enter phase inhibit time.
Enter minimum green, yellow, red, and pedestrian clearance entrance interval times.
Enter minimum hold time.
Select hold phases for each bus preemptor.

7. BUS PREEMPTORS

Enable bus preemptors.
Designate lock/non-lock bus preemption input.
Enter maximum hold time.

Priority Preemptors 1-6

Up to six priority preemptors may be programmed. Preemptors may be programmed but remain unused until ACTIVE parameter is programmed as YES. Service to preemptors is prioritized such that the lowest number preemptor with priority enabled has the highest priority. Preemptors without priority enabled are first-come, first served. There are three data entry screens per preemptor; the screens allow selection of preemption phases, options, and timing values. Priority preemptor # 1 screens are shown.

Phases/Overlaps

Use toggle key to indicate selection (X) of track clearance, hold, exit, and terminate overlap phases.

Options

Use toggle key to select desired preemption options. YES and X indicate option enabled.

Timing Values

Use keyboard number keys to enter timing values for minimum intervals, track clearance, and hold phases. Enable various timing options by entering the desired value after the parameter. Zero entry disables function.

Linked Preemptors

Preemptors two through six can be linked to a higher order priority preemptor.

Preemptor #1 cannot be linked to any other preemptor since it is the highest priority preemptor. Preemptor #2 can be linked with preemptor #1, preemptor #3 can be linked with preemptor #2 or #1, and so on. No preemptor is allowed to link with preemptor #6 since it is the lowest priority preemptor.

1. Move cursor to LINKED PRE parameter of desired preemptor.
2. Enter linking preemptor number after LINKED PRE parameter.
3. Verify that track clearance phases (and other parameters) are defined for each preemptor.

```
            PRIORITY PREEMPTOR 1
                                          1 1 1
PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP. . . . . .
TRK CLR PHASE..  . . . . . . . . . . . .
HOLD PHASES....  . . . . . . . . . . . .
EXIT PHASES....  . . . . . . . . . . . .
EXIT CALLS.....  . . . . . . . . . . . .
SPARE..........  . . . . . . . . . . . .
TERM OVERLAPS..   A: .  B: .  C: .  D: .

ACTIVE......... NO  PED DARK....... NO
PRIORITY....... NO  PED ACTIVE..... NO
DET LOCK....... NO  ZERO PC TIME... NO
HOLD FLASH..... NO  PC THRU YELLOW. NO
TERM OVLP ASAP. NO  TERM PHASES.... NO
ADDITIONAL PAGE(S)
```

```
DON'T OVERRIDE FLASH.....  .
FLASH ALL OUTPUTS........  .
YELLOW-RED GOES GREEN....  .
ENABLE MAX PREEMPT TIME..  .
ACTIVE ONLY DURING HOLD..  .
NO CVM IN FLASH..........  .
FAST FLASH GRN ON HOLD...  .
OUT OF FLASH.............  RED


ADDITIONAL PAGE(S)
```

```
MAX TIME......  0  DURATION TIME.  0
MIN HOLD TIME.  0  DELAY TIME....  0
MIN PED CLEAR.  0  INHIBIT TIME..  0
EXIT MAX......  0  HLD DELAY TIME. 0

                GRN  YEL  RED
MINIMUM.......    0  0.0  0.0
TRACK CLEAR...    0  0.0  0.0
HOLD..........       0.0  0.0


END OF SUBMENU
```

Main Menu (F1)-4-1

PARAMETER	DEFINITION	RANGE
TERM PHASE OVLP	Terminate Phase Overlap (Outputs 1-12) The selected phase overlap outputs 1 - 12 (not controller phases) will be forced to red before track clearance/hold movements begin if any overlaps or phases assigned as overlaps are timing when preemption is initiated. These overlap outputs remain red until preemption sequence is complete. NOTE If a phase overlap is forced to terminate during preemption, and hold phases are part of the overlap, exit phases must be programmed. Exit phases must be different from hold phases.	X selects
TRACK CLEARANCE PHASES	Phases serviced first when preemption begins. Up to two permissive phases (i.e., any two phases able to time together) may be selected as track clearance phases. More than two phases or other combination of phases are not accepted by the controller. Each track clearance phase times track-clear green, yellow and red intervals once, then control is transferred to the hold phases.	X enables
HOLD PHASES	Phases remaining in effect during preemption until duration time elapses minimum hold time and preemptor call is dropped (or max preemption time expires). Hold phases may be any phase except those selected as track clearance phases. When hold flash option is enabled, only up to two permissive phases may be selected. When preemptor call is no longer present, preemption is terminated and control is transferred to exit phases. NOTE If a phase overlap is forced to terminate during preemption and hold phases are part of the overlap, exit phases must be programmed. Exit phases must be different from hold phases.	X enables
EXIT PHASES	Phase(s) that time last after a preemption sequence. These serve as transition phases when returning to normal controller timing sequence. Up to two permissive phases may be selected as exit phases. Exit phases time normal interval times.	X enables
EXIT CALLS	Phases called at termination of preemption sequence. Phases programmed as exit phases are serviced first.	X enables

PARAMETER	DEFINITION	RANGE
TERM OVERLAP A, B, C, D	Terminate Overlap - If any overlaps are timing when preemption is initialized, these overlaps are terminated and forced to red before track clearance/hold movements begin. They remain red until preemption sequence is complete.	X enables
ACTIVE	Active preemptors are in use. Up to six priority preemptors may be selected as active. NOTE For controllers equipped with expanded I/O (ASC/2-2100): If preemptors are in use, the controller CMU stop time input (pin 58 of the "D" connector) should be connected to the stop time signal from the conflict monitor unit (CMU). This input should be diode isolated from the cabinet stop time to allow the controller to sense when the CMU has set the intersection to flash. Additionally, the Preempt CMU Interlock output (pin 59 of the "D" connector) should be connected to the CMU 24V II monitor input. This will cause the intersection to be placed in flash if the controller is removed or not programmed for preemptor operation. ** CAUTION ** The Preempt CMU Interlock output may be damaged if connected directly to 24 VDC. Remove any jumpers connecting CMU 24V I to 24V II prior to connecting the Preempt CMU Interlock. the CMU 24V II monitor input. This causes the intersection to be placed in flash if the controller is removed or not programmed for preemptor operation.	YES enables
PRIORITY	Preemptors programmed as PRIORITY have highest priority. A priority preemptor call overrides all other non-priority preemptors. Active preemptors that are priority preemptors are served in ascending order (e.g., if all six preemptors are priority preemptors and are active, preemptor #1 is served first and preemptor #6 served last). Preemptors not programmed as priority have next to highest priority. Calls for these preemptors are served in sequence. Non-priority preemptor calls override bus preemptor.	YES enables

PARAMETER	DEFINITION	RANGE
DET LOCK	Detector Lock - A preemptor may have either locked or non-locked detector inputs. The lock parameter is in effect during delay time. NO (Non-Locked): If preemptor call is dropped during delay time, the preemptor is not serviced. YES (Locked Detector): If preemptor call is dropped during delay time, the preemptor is serviced. Locks call until preemptor is serviced.	YES enables
HOLD FLASH	Hold phases are affected by the hold flash setting. Enabling the hold flash function causes hold phases to flash yellow while all other phases flash red. This flash interval replaces hold green interval, and is in effect under the same conditions as hold green. No more than two permissive phases may be selected to flash.	YES enables
TERM OVLP ASAP	Terminate Overlap As Soon As Possible Preemptor forces all overlaps to terminate with first ring to reach preemptor minimum yellow interval. Normally, when this function is not enabled, the overlap does not terminate until both rings have reached preempt minimum yellow interval.	YES enables
PED DARK	Pedestrian Indications Dark Pedestrian indicators are forced OFF during preemptor ACTIVE. If operating in TS-1 mode or in TS-2 mode with ASC controller software versions 1.65 and below, consult Econolite Application Note 1041.	YES enables
PED ACTIVE	YES selection allows ped calls to be serviced during the preemption HOLD interval (whether or not the ped indication is turned on or off by PED DARK). NO selection does not allow ped calls to be serviced during preemption HOLD.	YES enables
ZERO PC TIME	Zero Pedestrian Clearance Time Allows pedestrian clearance time to zero seconds during preemption.	YES enables
PC THRU YELLOW	Pedestrian Clearance Through Yellow If any phase is timing walk or pedestrian clearance intervals when a preemption call is received, pedestrian clearance time may be extended through the yellow interval. Pedestrian clearance interval normally ends at or before the beginning of the yellow interval. The length of pedestrian clearance time during green is reduced by the minimum yellow time.	YES enables

PARAMETER	DEFINITION	RANGE
TERM PHASES	Terminate Phases Forces both through phases to terminate when preemption is called if only one of the phases is programmed as a track clear or hold phase. Normally used to avoid a protected/permissive left turn signal trap when terminating phases for preemption.	YES enables
DON'T OVERRIDE FLASH	Does not allow preemptor to override remote (automatic) flash.	X enables
FLASH ALL OUTPUTS	Active preemptor output is on solid and all other active outputs flash during preemption.	X enables
YELLOW-RED GOES GREEN	If enabled, a phase is allowed to go immediately from yellow to green if it has been timing a yellow clearance interval of the track clearance shall when a preemption call is received. If not enabled, the phase will proceed to red in the normal sequence.	X enables
ENABLE MAX PREEMPT TIME	Enables non-priority preemptor to time the to MAX TIME. Maximum preempt time is inhibited if preemptor is programmed as a priority preemptor.	X enables
ACTIVE ONLY DURING HOLD	Preempt active outputs are TRUE only during hold interval. Normally the outputs are TRUE at all times during preemption.	X enables
NO CVM IN FLASH	Disables setting the conflict voltage monitor (CVM) to FALSE during preemptor HOLD flash. This allows the controller to flash through the load switches.	X selects option
FAST FLASH GRN ON HOLD	Enables hold flash phases to flash green at 2.5 Hz during hold interval. If not enabled then hold phases are solid green.	X enables
OUT OF FLASH	Selects out of flash color for preempt exit phases.	Green, Yellow, Red
MAX TIME	Preemptor Maximum Time in Hold Interval Controls maximum time preemptor remains in hold interval. Duration and minimum hold times must expire before the preemptor maximum time causes preemptor to exit hold interval. If max timer times out, the preemption call is inhibited until removed. Preemptor max time inhibited if preemptor is programmed as a priority preemptor.	0-999 sec.

PARAMETER	DEFINITION	RANGE
MIN HOLD TIME	Preemptor Minimum Hold Time Preemptor must remain in hold for this minimum time once hold interval begins.	0-255 sec.
MINIMUM PED CLEAR	Minimum Pedestrian Clearance Minimum time allowed for pedestrian clearance during preemption. Zero entry causes controller's normal pedestrian clearance settings to be used. If zero is the desired pedestrian clearance time, the ZERO PC TIME parameter must be enabled.	0-255 sec.
EXIT MAX	Preemptor Exit Maximum Time Maximum time in effect on exit preemptor for one controller cycle for all phases except hold phases. Allows faster clearing of intersection at preemption exit. Zero entry disables this function.	0-255 sec.
DURATION TIME	Minimum time during which preemption is active.	0-999 sec.
DELAY TIME	Time between receipt of preemptor call and initialization of preemption movements. Preemption is not initialized if call is not locked then is removed during delay timing period.	0-255 sec.
INHIBIT TIME	Last portion of delay time during which all phases normally serviced next, and are not part of the preemption movement, are inhibited from being serviced. Inhibit time must be less than or equal to delay time.	0-255 sec.
HLD DELAY TIME	Hold Delay Time Preemptor remains in HOLD interval for the duration of Hold Delay Time when preempt call is removed. If preempt call is reapplied during the Hold Delay Time, preemptor reverts to start of HOLD interval.	0-255 sec.

PARAMETER	DEFINITION	RANGE
MINIMUM (GRN,YEL, RED)	Minimum green, yellow and red interval times for all phases timing when preemption is initialized. All elapsed green, yellow or red time is included as preemption minimum time. 1) If a phase is timing a green interval when preemption is initialized and the phase has been in green for a time greater than preemption minimum green, the phase is terminated and immediately goes to preemption minimum yellow and red intervals. 2) If a phase is timing a green interval when preemption is initialized and the phase has been in green for a time less than preemption minimum green, the phase continues to time the difference then goes to preemption minimum yellow and red intervals. 3) Both 1 and 2 above are true for minimum yellow interval with the exception that only minimum red clearance times after minimum yellow clearance. 4) Both 1 and 2 above are true for the red interval with the exception that when minimum red clearance interval ends, control is transferred to the track clearance phases.	Green 0-225 Yellow 0-25.5 Red 0-25.5 seconds*
LINKED PREEMPTOR	Preemptors two through six can be linked to a higher order priority preemptor. Linking preemptors allows multiple track clearances or complex preemption sequences with one preemptor calling another. Example: If preemptor 3 is linked to 2, it will go through its track clearance interval, then call preemptor 2 during its HOLD interval. This will transfer control to preemptor 2. Preemptor 2, in turn, can be linked to preemptor 1, which has a lower number and hence a higher priority.	1-5 0 disables
TRACK CLEAR	Green, yellow and red interval times used for track clearance phases. Track clearance green interval begins timing immediately after preemption minimum red interval.	Green 0-255 Yellow 0-25.5 Red 0-25.5 seconds*
HOLD YELLOW RED	Hold Phase Yellow and Red Interval Times These clearance intervals only time once. They are the last clearance intervals to time before control is transferred to the exit phases.	Yellow 0-25.5 Red 0-25.5 seconds*

*NOTE: A zero entry for the minimum intervals causes a default to minimum green (no extension), yellow, and red intervals normally used by the controller.

Bus Preemptors

Preemptor Active/Detector Lock
Select active bus preemptors and lock detector associated with preemptor using toggle key to indicate X after each parameter.

Timing Entries
Using keyboard number keys enter timing values then press ENTER or any other keyboard key. See parameter definitions for allowable ranges.

Hold Phases
Select hold phases for each active bus preemptor. Use toggle key to indicate X after preemptor number and under desired phase numbers.

```
                BUS PREEMPTOR

                        - BUS PREEMPTOR -
                          1    2    3    4
  PREEMPTOR ACTIVE.       .    .    .    .
  DETECTOR LOCK....       .    .    .    .
  MAXIMUM TIME.....       0    0    0    0
  RESERVICE TIME...       0    0    0    0
  DELAY TIME.......       0    0    0    0
  INHIBIT TIME.....       0    0    0    0
  ENTRANCE GREEN...       0    0    0    0
  ENTRANCE PED CLR.       0    0    0    0
  ENTRANCE YELLOW..     0.0  0.0  0.0  0.0
  ENTRANCE RED.....     0.0  0.0  0.0  0.0
  MIN HOLD TIME....       0    0    0    0
  ADDITIONAL PAGE(S)
```

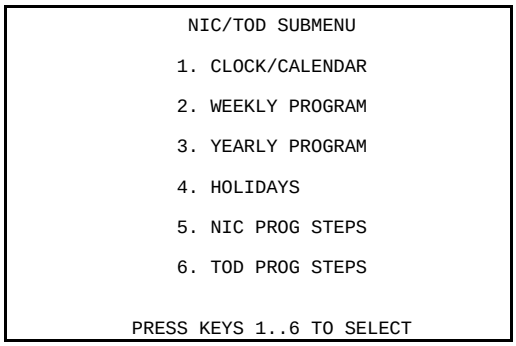
```
          ------ HOLD PHASE -----
                                          1 1 1
  1 2 3 4 5 6 7 8 9 0 1 2
  PREEMPTOR 1....  . . . . . . . . . . . .
  PREEMPTOR 2....  . . . . . . . . . . . .
  PREEMPTOR 3....  . . . . . . . . . . . .
  PREEMPTOR 4....  . . . . . . . . . . . .




  END OF SUBMENU
```

Main Menu (F1)-4-7

PARAMETER	DEFINITION	RANGE
PREEMPTOR ACTIVE	Active bus preemptor status indicates readiness for use. Up to four bus preemptors may be selected as active. NOTE For controllers equipped with Expanded I/O (ASC/2-2100): If preemptors are in use, the controller's CMU stop time input (pin 58 of the "D" connector) should be connected to the stop time signal from the conflict monitor unit (CMU). This input should be diode isolated from the cabinet stop time to allow the controller to sense when the CMU has set the intersection to flash. Additionally, the Preempt CMU Interlock output (pin 59 of the "D" connector) should be connected to the CMU 24V II monitor input. This will cause the intersection to be placed in flash if the controller is removed or not programmed for preemptor operation. ** CAUTION ** The Preempt CMU Interlock output may be damaged if connected directly to 24 VDC. Remove any jumpers connecting CMU 24V I to 24V II prior to connecting the Preempt CMU Interlock.	YES enables
DETECTOR LOCK	Bus preemptors may have either locked or non-locked detectors. Locking of preemptor input is in effect only during the delay period. NO (Non-Locked Detector): If preemptor call is dropped during delay time, preemptor is not serviced. YES (Locked Detector): If preemptor call is dropped during delay time, preemptor is serviced.	YES enables
MAXIMUM TIME	Maximum Time in Hold Maximum time bus preemptor remains in hold interval. If max time times out, the preemption call is inhibited until it is removed. Zero entry disables use of max time in hold.	0-255 sec.
RESERVICE TIME	Maximum time allowed between bus preemptor calls in order for preemptor to be reserviced. Bus preemptor is not reserviced if a call is received before the reservice time has elapsed. If no reservice time is entered (zero entry) then all phases with a call, when leaving preemptor sequence, must be serviced before a bus preemptor can be served again.	0-255 sec.

PARAMETER	DEFINITION	RANGE
DELAY TIME	Time between receipt of preemptor call and initialization of bus preemption.	0-255 sec.
INHIBIT TIME	Last portion of delay time during which all phases normally serviced next and not part of the preemption movement are inhibited from being serviced. Inhibit time must be less than or equal to delay time.	0-255 sec.
ENTRANCE GREEN	Green time equivalent to priority preemptor minimum green. Green time used for all phases timing when preemption is initialized.	0-255 sec.
ENTRANCE PED CLEAR	Equivalent to priority preemptor minimum pedestrian clearance time. Minimum time allowed for pedestrian clearance during preemption. Zero entry causes use of controller's normal pedestrian clearance settings.	0-255 sec.
ENTRANCE YELLOW	Equivalent to priority preemptor minimum yellow interval.	0-25.5 sec.
ENTRANCE RED	Equivalent to priority preemptor minimum red interval.	0-25.5 sec.
MIN HOLD TIME	Equivalent to priority preemptor minimum hold time. Preemptor must remain in hold for this minimum time once hold interval begins. Minimum hold interval has priority over maximum time in hold interval.	0-255 sec.
HOLD PHASE PREEMPTOR	Hold phase(s) for bus preemptors are the same as hold phases for priority preemptors except that only up to two permissive phases may be selected as hold phases. NOTE Bus Preemptors 1-4 will respond to a pulsing input that is applied to Preemptor Call input 3-6, respectively. Priority preemptors 3 through 6 will respond to an input that is applied for at least 0.8 seconds to Preemptor Call inputs 3 through 6, respectively.	X selects

The NIC/TOD Submenu has six data groups. To view or enter data press the keyboard number (1 through 6) corresponding to desired group.



1. CLOCK/CALENDAR
   View current day of week, week of year, time, day and date.
   Enter current date and time.
   Enter manual NIC and TOD program step to override other program steps.
   Enter synchronization reference time.
   Select a synchronization reference.
   Select week one of the year.
   Enable/Disable Daylight Savings time correction.
   Select Daylight Savings Time to begin on either first or last Sunday in April.

2. WEEKLY PROGRAM
   Set up to ten different weekly programs by assigning a day program to each day. (Allows each day program within the week to be different, therefore each weekly program can be unique).

3. YEARLY PROGRAM
   Select a weekly program for each week of the year (1 to 53 weeks).

4. HOLIDAYS
   Select unique day programs for up to 36 holidays.
   Select fixed of float holidays.
   Identify holidays by date or day of week, week of month.
   Repeat fixed holidays the following year without further programming.

5. NIC PROGRAM STEP
   Define up to 200 NIC program steps.
   Assign a day program number 1-16 to each NIC step.
   Enter the time of program step execution.
   Select from 64 coordination patterns to be used by the coordinator or free.
   Force NIC step coordination pattern to override pattern selected by telemetry or hardwired system command.

6. TOD PROGRAM STEP
   Define up to 100 TOD program steps.
   Assign a day program number 1-16 to each TOD step.
   Enter the time of program step execution.
   Select automatic flash state.
   Select controller Red Rest function.
   Enable detector type 0 delay
   Assign diagnostic plans used for detector diagnostics.
   Enable controller dimming operation.
   Select use of second vehicle extension interval.
   Enable detector logging function.
   Select alternate phase sequences.
   Enable Max 2 or 3 on a per phase basis.
   Enable Vehicle, Max, and Ped Recall to be applied on a per phase basis.
   Inhibit conditional service on a per phase basis.
   Apply phase omit to selected phases.
   Select ON/OFF status of eight TOD special functions.

Clock/Calendar

Date/Time

Enter or change date and time. Correct date and time as necessary for accurate controller operation in non-interconnected mode.

1. Move cursor to DATE SET parameter and enter correct date as month/day/year.
2. Move cursor to TIME SET parameter and enter time in hours:minutes:seconds according to 24 hour clock (1 a.m. = 1, 1 p.m. = 13, 11 p.m. = 23).
3. Press ENTER.

Pressing ENTER at any time while cursor is at time or date field causes both time and date to be updated to whatever is shown on the screen after DATE SET and TIME SET. Although the controller clock and calendar update automatically these parameters do not update so they always display the time and date when entering in this data entry screen.

Manual NIC/TOD Program Steps

Manually select a TOD or NIC program step.

1. Go to TOD and NIC program step data pages and create desired program(s) to be in effect when manual program selection is required.
2. Enter NIC program step number next to MANUAL NIC PROGRAM STEP parameter.
3. Enter TOD program step number next to MANUAL TOD PROGRAM STEP parameter.

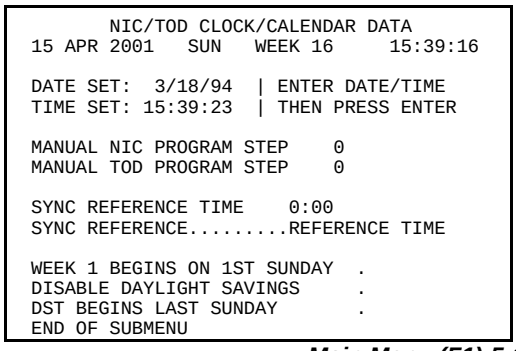
The manual selection of an NIC step selects the particular step. The resulting pattern is implemented when the next local zero is reached.

Sync Reference

1. Enter sync reference time if desired.
2. Press toggle key to select desired sync reference (REFERENCE TIME, LAST EVENT, LAST SYNC) used to generate synchronization point. Select REFERENCE TIME if a sync reference time is entered.

Daylight Savings Time/Week 1 Begins

1. Use toggle key to define week 1 of the yearly program. X selects week with first Sunday. Blank (.) selects week with January 1st in it.
2. Use toggle key to enable/disable automatic daylight savings time compensation function. X disables function. Blank (.) enables function.
3. If daylight savings time is enabled, use toggle key to select last/first Sunday in April for beginning of daylight savings time. X selects last Sunday in April.



Main Menu (F1)-5-1

PARAMETER	DEFINITION	RANGE
DATE SET	Enter current date.	1-31 day/1-12 mo/00-99 yr
TIME SET	Enter current time.	0:00 - 23:59:59, hrs:mins:secs
MANUAL NIC PROGRAM STEP	Manual selection of NIC step which specifies a coordination pattern. The step programmed remains in effect until another NIC manual step is selected or until zero is entered for NIC manual step. NIC is independent of TOD program steps. Zero entry allows automatic selection.	0-100 steps (0-200 expanded memory) 0 = not active
MANUAL TOD PROGRAM STEP	Manual selection of TOD step which specifies control parameters. The step programmed remains in effect until another manual TOD step is selected or until zero is entered for TOD manual step. TOD steps are independent of NIC program steps. Zero entry allows automatic selection.	0-50 steps (0-100 expanded memory) 0 = not active
SYNC REFERENCE TIME	Synchronization Reference Time User specified time marking the beginning of all cycles. Cycles are reset to zero each day at this time. Reference time used for sync point calculation for cycle called by coordination pattern. Sync point is computed using present time, sync reference time, and current cycle length.	0:00 - 23:59 hrs.
SYNC REFERENCE	Synchronization Reference Determines reference used to generate sync point. REFERENCE TIME - Sync point is referenced to sync reference time entered by user. LAST EVENT - Sync point is referenced to the time of the NIC step that initiated the current cycle. LAST SYNC - Sync point is referenced to the point in time that represents the end of the last complete cycle of the cycle length in effect prior to selecting the current cycle length.	Reference Time Last Event Last Sync

PARAMETER	DEFINITION	RANGE
WEEK 1 BEGINS ON 1st SUNDAY	Week one of the yearly program can be assigned as the week with the first Sunday in it. Otherwise the default setting assigns week one as the week of January 1st.	X enables, 0 disables
DST BEGINS LAST SUNDAY	Daylight savings time can be selected to begin on the last Sunday in April. Default starts daylight savings time on the first Sunday in April.	X enables, 0 disables

Weekly And Yearly Programs

Create up to ten weekly programs then assign weekly programs to each week of the year to create yearly programs.

1. Create daily programs in NIC or TOD program step data pages.
2. Position cursor next to desired week number (1-10) and under days of the week (SUN - SAT) then enter desired daily program number (1-16) for that day. Zero entry for any day disables corresponding weekly program.
3. Go to NIC/TOD YEARLY PROGRAM data page. Position cursor under week of year (1-53) and enter number of desired weekly program for that week. Zero entry disables yearly program.

NIC/TOD WEEKLY PROGRAMS

WEEK	SUN	MON	TUE	WED	THU	FRI	SAT
1	10	2	3	4	5	6	10
2	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1

END OF SUBMENU

Main Menu (F1)-5-2

NIC/TOD YEARLY PROGRAM

WEEK OF YEAR	1	2	3	4	5	6	7	8
WEEKLY PROGRAM	1	1	1	1	1	1	1	1
WEEK OF YEAR	9	10	11	12	13	14	15	16
WEEKLY PROGRAM	1	1	1	1	1	1	1	1
WEEK OF YEAR	17	18	19	20	21	22	23	24
WEEKLY PROGRAM	1	1	1	1	1	1	1	1
WEEK OF YEAR	25	26	27	28	29	30	31	32
WEEKLY PROGRAM	1	1	1	1	1	1	1	1
WEEK OF YEAR	33	34	35	36	37	38	39	40
WEEKLY PROGRAM	1	1	1	1	1	1	1	1

ADDITIONAL SCREEN(S)

WEEK OF YEAR	41	42	43	44	45	46	47	48
WEEKLY PROGRAM	1	1	1	1	1	1	1	1
WEEK OF YEAR	49	50	51	52	53			
WEEKLY PROGRAM	1	1	1	1	1			

END OF SUBMENU

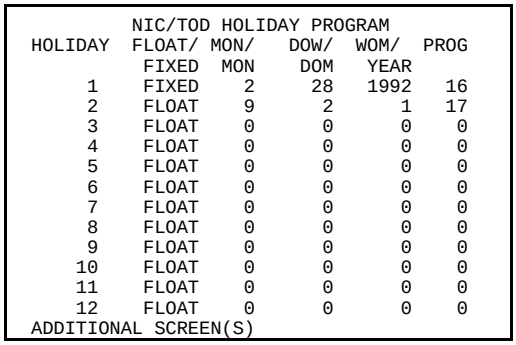
Main Menu (F1)-5-3

PARAMETER	DEFINITION	RANGE
WEEK (1-10)	Up to ten different weekly programs can be created to accommodate normal and seasonal traffic demands. Each weekly program is made up of seven week days. Each week day is assigned a day program created for that day's particular traffic needs. Weekly programs are numbered one through ten, these numbers are used to assign a weekly program to each week-of-year. The programs also control the selection of NIC and TOD daily programs in effect.	1-16 daily programs
WEEK OF YEAR	There are 53 weeks in the program year. This is calculated from a 365-day year and a 7-day week. Division results in 52 weeks plus 1 day which is considered as the 53rd week. The controller uses date and time to calculate current day of week and week of year.	-
WEEKLY PROGRAM	Each week-of-year is assigned a weekly program. Although most weeks in the year generally require the same weekly program, the option to accommodate seasonal traffic patterns (i.e., Christmas week, back-to-school week) is available. NOTE Default value for the weekly programs is set to "1" so that only special weeks require programming. Weekly program 1 must be defined.	1-10 weekly programs

Holidays

Up to 36 holiday programs are optionally used for holidays or any day having special traffic demands.

1. Create a daily program to be used on holiday date (NIC and TOD program steps).
2. Use toggle key under FLOAT/FIXED parameter to define occurrence of holiday. Refer to definitions for more information.
3. Enter holiday month (1-12).
4. Floating holiday: Enter holiday day of week (DOW) and week of month (WOM) Fixed holiday: Enter day of month (DOM) and year (YEAR).
5. Enter number of daily program (PROG) to be selected on date specified.



NIC/TOD HOLIDAY PROGRAM

HOLIDAY	FLOAT/ FIXED	MON/ MON	DOW/ DOM	WOM/ YEAR	PROG
1	FIXED	2	28	1992	16
2	FLOAT	9	2	1	17
3	FLOAT	0	0	0	0
4	FLOAT	0	0	0	0
5	FLOAT	0	0	0	0
6	FLOAT	0	0	0	0
7	FLOAT	0	0	0	0
8	FLOAT	0	0	0	0
9	FLOAT	0	0	0	0
10	FLOAT	0	0	0	0
11	FLOAT	0	0	0	0
12	FLOAT	0	0	0	0

ADDITIONAL SCREEN(S)

Main Menu (F1)-5-4

PARAMETER	DEFINITION	RANGE
HOLIDAY	A holiday program overrides the day program normally used on a specific day. When the current date matches a programmed holiday date, the daily program number (1-16) assigned to the holiday substitutes the program normally used. Up to 36 holidays are programmed by selecting the holiday type, date, and daily program to be used. The holiday program is effective only if NIC is the command source.	1-36
FIXED/FLOAT	A floating holiday is one that occurs on a specific day and week of the month (third Thursday in November). A fixed holiday is one that occurs on a specific day of the year (July 4th).	Fixed, Float
MONTH	Selects the month for the holiday program.	1-12 mos., 0 disables
DOW/DOM	Day of Week/Day of Month Select the day of the week for a floating holiday or selects the day of the month for a fixed holiday. Day 1 of the week corresponds to Sunday.	1-7 wks./1-12 mos. 0 disables
WOM/YEAR	Week of Month/Year For a floating holiday: enter the week of the month. For a fixed holiday: If an entry is made at the year parameter the holiday program is executed once on the month, day and year programmed. If the year parameter is set to zero, the holiday program repeats yearly on the month and day specified.	1-5 WOM, 0 disables 1990-2089, 0 repeats
PROG	Program Selects the day program used on holiday date programmed.	1-16 daily programs

NIC Program Steps

NIC daily programs are created separately from TOD daily programs. NIC program steps are used to create daily programs which call coordination patterns at specified times of the current day. Up to 100 (200 with expanded memory) NIC program steps are available.

NIC program step data page displays up to 100 program steps (200 if expanded memory in place). Two screens displaying steps 1 through 24 are shown below. Use "go to" feature to advance up or down to desired step numbers; position cursor in step column enter desired step number then press ENTER. Other advancing functions can be used with function keys. Refer to keyboard/display section for more information.

1. Create/define coordination patterns (Coordination Submenu, Pattern Data (F1,3,4)).
2. Create daily programs (F1,5,6): Enter a daily program number next to step numbers. A daily program may have any number of steps. Example: Daily program #12 may be made up of five NIC steps. Steps 4-8 might have the number 12 assigned.
3. For each step, enter time when step becomes active.
4. Enter number of coordination pattern used when step becomes active.
5. Use toggle key to enable/disable override option. X indicates NIC pattern selected unconditionally and overrides hardwired or telemetry system command inputs.

```
                NIC PROGRAM STEP

  STEP  PGM TIME PATTERN OVERRIDE
    1    1  6:15    1       .
    2    1 18:00    1       .
    3    0  0:00    0       .
    4    0  0:00    0       .
    5   16  5:30    1       .
    6   16 12:00    1       .
    7    0  0:00    0       .
    8    0  0:00    0       .
    9    0  0:00    0       .
   10    0  0:00    0       .
   11    0  0:00    0       .
   12    0  0:00    0       .
 ADDITIONAL SCREEN(S)
```

Main Menu (F1)-5-5

NIC Program steps 13 through 100 (200) are not shown.

PARAMETER	DEFINITION	RANGE
STEP	NIC Program Steps Used to select coordination pattern on a time of day basis and active only if day program containing the step is active. Step starts when current time of day corresponds to time programmed for the step. The step remains in effect until current time of day is equal to programmed time of another valid NIC step. Each NIC program step must have a daily program number and start time. NOTE NIC program steps operate independently of TOD program steps.	1-100 steps (1-200 expanded memory)
PGM	Assigns the NIC step to 1 of 16 day programs	1-16 daily programs 0 clears step
TIME	Time of day program step execution time if the day program containing the NIC step is in effect.	00:00 to 23:59, hrs:mins
PATTERN	Selects coordination pattern used by NIC step. Enter a coordination pattern number (1-64) or zero. A zero is a programmed FREE condition. If the coordination pattern is to override any current hardwired or telemetry system command, select override.	1-64 patterns 0 sets FREE
OVERRIDE	Coordination pattern selected by NIC program step overrides pattern selected by current telemetry or hardwired system command.	X = override 0 = no override

TOD Program Steps

TOD daily programs are created separately from NIC daily programs. TOD program steps are used to create daily programs which select phases and enable various functions by time of day. Up to 50 program steps (100 with expanded memory) are available. Daily programs may contain any number of steps up to available limit.

<u>TOD Program Step/Daily Program/Begin Time</u>

1. Use cursor keys or "go to" feature to advance to program steps needed to create daily program.
2. For each step in daily program enter the daily program number after DAY PGM NUM.
3. For each step in daily program enter time step is active. Any functions selected for this step will become active at the time entered here when the daily program containing this step is active.

```
TOD PROGRAM STEP   1

DAY PGM NUM....  1
STEP BEGINS....  7:30

FLASH.......... .   DIM ENABLE..... .
RED REST....... .   ALT VEH EXTSN... .
SPARE 5........ .   DET LOG ENABLE.. X
SPARE 3........ .   SPARE 4........ .
TYPE 0 DELAY EN. .  SPARE 2........ .
DET DIAG PLAN... 7

                       A..B..C..D..E..F
ALTERNATE SEQUENCE     .  .  .  .  .  .

ADDITIONAL SCREEN(S)
```

```
                                    1 1 1
PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
MAX 2 ENABLE...  . . . . . . . . . . . .
MAX 3 ENABLE...  . . . . . . . . . . . .
VEH RECALL.....  . . . . . . . . . . . .
VEH MAX RECALL.  . . . . . . . . . . . .
PED RECALL.....  . . . . . . . . . . . .
COND SERV INH..  . . . . . . . . . . . .
PHASE OMIT.....  . . . . . . . . . . . .

SPECIAL FCTNS..  . . . . . . . (1 - 8)
ADDITIONAL SCREEN(S)
```

Main Menu (F1)-5-6

TOD program steps 2 through 50 (100) are not shown.

<u>TOD Functions</u>

The following functions can be enabled by time of day when selected in a TOD program step and the daily program containing the step is active.

1. Flash
   Select flash phases (Controller Submenu, Start/Flash Data, FL TOGETHER PHS). Use toggle key to enable (X) flash function.
2. Red rest
   Use toggle key to enable (X) red rest function. Causes phases to rest in red when no calls are present.
3. Type 0 delay enable.
   Use toggle key to enable (X) the delay timing for a type 0 detector. (Detector submenu (F1,6,1).)
4. Detector diagnostic plan (F1,6,1).
   Assign detectors to vehicle detector diagnostic plans in Detector Submenu, VEH DIAG PLANS data page (F1,6,6). For NIC time of day selection of the plan(s) enter detector diagnostic plan number (1-8) to be executed when this step is active.
5. Dim enable
   Set up dimming operation in Controller Submenu, Dimming data page. Use toggle key to enable (X) dimming function.
6. Alternate vehicle extension
   Enter timing value for VEH EXT 2 in Controller Submenu, Timing Data. Use toggle key to enable (X) use of VEH EXT 2 instead of VEH EXT.

7. Detector log enable. Use toggle key to enable (X) logging of detectors selected in Detector Submenu, Enable Logging.
8. Alternate sequence
   Use toggle key to select (X) one or more alternate phase sequences A through F. Refer to definitions for more information.

Phase Enables
Use toggle key to select (X) phases to use the following functions: Maximum timer 2 enable, Maximum timer 3 enable, vehicle recall, vehicle maximum recall, pedestrian recall, conditional service inhibit, and phase omit.

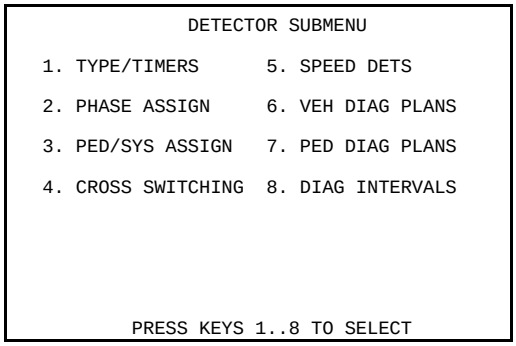
Special Functions
Use toggle key to enable (X) any of eight user defined special functions.

PARAMETER	DEFINITION	RANGE
STEP	TOD Program Step Used to enable various controller functions on a time of day basis. TOD step is active only if day program containing the step is active. TOD step starts when current time of day corresponds to time programmed for the TOD step. The step remains in effect until another TOD program step is selected..	1-50 steps (1-100 expanded memory)
DAY PGM NUM	Day Program Number Assigns step to one of sixteen daily programs.	1-16 daily programs
STEP BEGINS	Time of program step execution if the day program containing the step is in effect.	00:00 to 23:59, hrs:mins
FLASH	Forces controller to enter automatic flash.	X enables
RED REST	Enables controller red rest. Controller rests in red when no calls present. Controller normally rests in last green phase.	X enables
TYPE 0 DELAY EN	Use toggle key to enable (X) the delay timing for a type 0 detector. (Detector submenu (F1,6,1).) Type 0 Delay Enable	X enable
DET DIAG PLAN	Detector Diagnostic Plan Diagnostic plans used for detector diagnostics. Plans are selected by time of day to allow varying the diagnostic intervals to match traffic requirements.	1-8 plans 0 = not active

PARAMETER	DEFINITION	RANGE
DIM ENABLE	Enables controller dimming operation. Controller dims selected signal outputs when both DIM ENABLE and the Dimming enable inputs are TRUE (enabled). Refer to Controller Submenu, #8 Dimming.	X enables
ALT VEH EXTSN	Enables use of vehicle extension 2 interval (VEH EXT2, Controller Submenu, Timing Data) as the preset gap.	X enables
DET LOG ENABLE	Enables detector logging function. Logging includes volume, occupancy, and speed measurements.	X enables
ALTERNATE SEQUENCE	Selects alternate phase sequence to be used. The controller can alter the sequence of phase pairs to reverse the order in which the phases are served. Each alternate sequence entry A-F selects reversing a different phase pair as shown: A - Reverses 1 and 2 B - Reverses 3 and 4 C - Reverses 5 and 6 D - Reverses 7 and 8 E - Reverses 9 and 10 F - Reverses 11 and 12 Alternate sequences defined in the coordination pattern have highest priority. Alternate sequences selected in TOD program step have next highest priority. Alternate sequences selected by any external means have lowest priority.	X selects
MAX 2 ENABLE	Selects Max 2 to be used on a by phase basis.	X selects
MAX 3 ENABLE	Selects Max 3 to be used on a by phase basis.	X selects
VEH RECALL	Selects Vehicle Recall to be applied on a by phase basis.	X selects
VEH MAX RECALL	Selects Max Recall to be applied on a by phase basis.	X selects
PED RECALL	Selects Pedestrian Recall to be applied on a by phase basis.	X selects
COND SERV INH	Conditional Service Inhibit Inhibit conditional service to a phase on a per phase basis.	X selects
PHASE OMIT	Applies phase omit to the selected phases.	X selects

PARAMETER	DEFINITION	RANGE
SPECIAL FUNCT	Special Functions Operator can enable up to eight special functions for time-of-day control of other equipment in the controller vicinity. Each of the eight special function may be internally mapped to eight different controller inputs.	X selects

The detector submenu has eight data groups. To view or enter data press the keyboard number corresponding to desired group.



1. TYPE
   Assign detector types for up to thirty-two (sixty-four with expanded memory) detectors.
   Choose from nine detector types: Standard, Extend/Delay, Extend/Delay Call, Stop Bar (three types), Calling, Bike, Dilemma Zone.
   Enable locking memory for each detector
   Enable detector call reset function.
   Enable detector to be logged.

2. PHASE PED/SYS ASSIGNMENT
   Assign pedestrian detectors to phases.
   Assign vehicle detectors as local system detector.
   Enter detector log interval.

3. TIMERS
   Enter delay and extend times.
   Select fail actions for situations where diagnostics find detectors have failed.

4. CROSS SWITCHING
   Assign cross switch phases to detectors.

5. SPEED DETECTORS
   Assign local detectors to up to eight speed detectors or speed traps.
   Specify vehicle and loop length for one-detector speed calculation.
   Specify speed trap length for two-detector speed calculation.
   Enable logging of vehicle speeds.

6. DIAGNOSTIC PLAN
   Assign one of 32 diagnostic intervals for each plan.
   Select any of eight diagnostic plans for each vehicle and pedestrian detector.
   Enter scaling and frequency values to determine the diagnostic period lengths for no-activity, max presence, and erratic counts.

Type/Timers

Detectors are identified by numbers 1 through 32 (64 with expanded memory). These are assigned to phases as vehicle or pedestrian detectors for use with various functions. Detectors must be defined in this data page for later assignment to phases and functions.

1. Select detector type (0 to 8) by entering type number under TYPE column. Refer to definitions for a description of each type.
2. Enable detector as locked (X) or non-locked (.).
3. Enter extend time if needed for type specified.
4. Enter delay time if needed for type specified.
5. Enable (X) logging function on a per detector basis. Logging is enabled in NIC/TOD Submenu 6 (F1,5,6)

```
            DETECTOR TYPE/TIMERS
                                    NO    SYSLOG
DET TYPE LOCK  EXTEND DELAY RESET ENABLE
 1   0     .     0.0     0    .       .
 2   0     .     0.0     0    .       .
 3   0     .     0.0     0    .       .
 4   0     .     0.0     0    .       .
 5   0     .     0.0     0    .       .
 6   0     .     0.0     0    .       .
 7   0     .     0.0     0    .       .
 8   0     .     0.0     0    .       .
 9   0     .     0.0     0    .       .
10   0     .     0.0     0    .       .
11   0     .     0.0     0    .       .
12   0     .     0.0     0    .       .
ADDITIONAL SCREEN(S)
```

Screens for detectors 13-52 not shown

```
            DETECTOR TYPE/TIMERS
                                    NO    LOG
 DET TYPE LOCK  EXTEND DELAY RESET ENABLE
 53   0     .     0.0     0    .       .
 54   0     .     0.0     0    .       .
 55   0     .     0.0     0    .       .
 56   0     .     0.0     0    .       .
 57   0     .     0.0     0    .       .
 58   0     .     0.0     0    .       .
 59   0     .     0.0     0    .       .
 60   0     .     0.0     0    .       .
 61   0     .     0.0     0    .       .
 62   0     .     0.0     0    .       .
 63   0     .     0.0     0    .       .
 64   0     .     0.0     0    .       .
 END OF SUBMENU
```

Main Menu (F1)-6-1

PARAMETER	DEFINITION	RANGE
DETECTOR TYPE	In the following definitions, when reference is made to a phase, it is implied that it is the phase assigned to a detector.	0-8 types
TYPE 0	NORMAL or STANDARD EXTEND/TOD DELAY Calls received during green are extended if extend time is programmed. Calls received during yellow/red are delayed if delayed time is programmed and enabled by time of day or by bit 5 in the Write Protect Area at offset 0x007.	-
TYPE 1	EXTEND/DELAY Calls received during green are extended if extend time is programmed. Calls received during yellow/red are delayed if delay time is programmed.	-
TYPE 2	EXTEND CALL/DELAY CALL Detector operates as follows at beginning of phase green: 1) Extend time is used during phase green. When a call is detected and dropped (passage of a vehicle moving through the detection zone), the extend timer begins timing and the call is held for the length of the Extend Time. If a gapout occurs then detector operates as follows: 2) Delay Time is used when the phase is green. When a call is detected, the call is not acknowledged by the controller until Delay Time has elapsed. If neither Extend nor Delay Time is entered, the detector operates as a normal detector.	-
TYPE 3	STOP BAR Stop Bar detector operates as follows: Vehicle calls are accepted only when phase is not green. When a call is detected, it is held until the detection area is empty. Once the detection area is empty, no further calls are accepted until the phase is again not green.	-
TYPE 4	STOP BAR WITH EXTEND TIMER Stop Bar detector with timer operates as follows: Vehicle calls are accepted only when the phase is not green. When a call is detected, it is held through the green until the detection area is empty. The extend timer begins timing with the phase green. Once the extend timer times-out OR the detection area is empty, no further calls are accepted until the phase is again not green. Stop Bar with Timer operation is effectively the same as Stop Bar operation with the exception that a timed-out extend timer can also cause detector disconnect.	-

PARAMETER	DEFINITION	RANGE
TYPE 5	STOP BAR WITH EXTEND TIMER RESET The Stop Bar detector with Reset Timer operates as follows: Vehicle calls are accepted only when the phase is not green. When a call is detected, it is held until the detection area is empty. The extend timer begins timing with the phase green. If a call is received before the extend timer times out, the timer is reset. Timer reset continues to occur until a gap between the calls is large enough to allow the extend timer to time-out. Once time-out occurs, no further calls are accepted until the phase is again not green.	-
TYPE 6	CALLING Calling detector operates as a normal calling detector. One call is accepted while the phase is red.	-
TYPE 7	BIKE Operates like a standard (normal) detector, but enables the bike minimum green interval when the phase is served. Bike minimum green times concurrently with phase minimum green. During phase green the detector operates in extend mode and phase green is extended by bike detector extend time.	-

PARAMETER	DEFINITION	RANGE
TYPE 8	DILEMMA ZONE Operation requires two detectors arranged in pairs with the number 1 detector (det #1) being odd and the number 2 detector (det #2) being even. For arrangement with number 1 detector placed before number 2 detector operation is as follows: In phase green: 1) A vehicle enters det #1 and starts det #1 extension timer. 2) If the vehicle enters det #2 before det #1 extension timer times out a call is entered and phase green is extended by det #2 extension time plus phase vehicle extension time (DET EXTEND TIME + VEH EXT TIME). 3) If the vehicle enters det #2 after det #1 extension timer has timed out: A call is not entered until after det #1 delay timer has timed out. Not in phase green: Det #2 is a Type 0 (Normal) detector. Det #1 enters no calls. Type 8 detectors require pair entries. Assigning Type 8 to an odd detector results in automatic assignment of Type 8 to the next consecutive even detector. NOTE Odd numbered detectors are automatically assigned as start detectors and even numbered detectors are assigned as end detectors.	-
LOCK	Locking Memory When enabled, an actuation on this detector input during yellow or red is "remembered" as a vehicle call and is not reset when the vehicle call is no longer present. NOTE Locking memory is also programmable per phase. See Controller submenu, Recall data (F1,2,4)..	X enables

PARAMETER	DEFINITION	RANGE
EXTEND	When using an Extend/Delay detector, Extend Time is the time during which a call is held. Extend Time begins timing when the call is dropped (refer to Detector Type definitions). When using a Stop Bar with Timer detector, Extend Time is used as a timer that marks the detector disconnect point if the detector area is still occupied. The timer starts at the beginning of green. When using a Stop Bar with Reset Timer detector, extend time is used as a timer that marks the detector disconnect point. Calls received before the disconnect point reset the extend timer. The timer can time-out or be continuously reset until the end of green.	0-25.5 sec.
DELAY	Delay Time is used with the Extend/Delay detector. The time a call must be present before it is applied to its assigned phase(s).	0-255 sec.
NO RESET	Does not reset vehicle extension timer (VEH EXT) when enabled.	X enables
LOG ENABLE	Log Enable Enable logging of detector information. Set the logging interval to the desired frequency (DETECTOR LOG INTERVAL) and TOD (step in effect) DET LOG ENABLE. Logging of detector counts, diagnostic failures, events and alarms is enabled.	X enables

Phase Assign

Use "go to" feature to advance to desired detector number.

Detector Phase Assignment

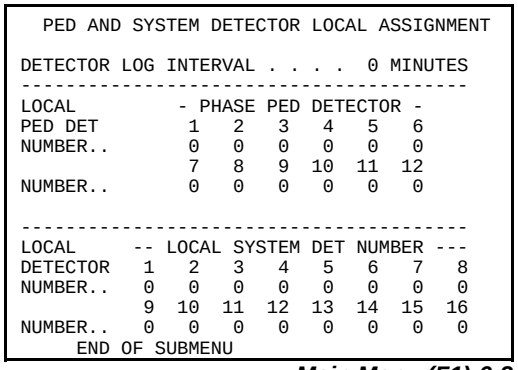
Assign up to 32 detectors (64 with expanded memory) to any of 12 phases. Detectors should be defined by type before assignment is made (Detector Submenu, #1 Type/Timers (F1,6,1)). Position cursor next to desired detector number and under phase number then press toggle key to assign (X).

```
        DETECTOR PHASE ASSIGNMENT
                 PHASE ASSIGNMENT: 1 1 1
 DETECTOR        1 2 3 4 5 6 7 8 9 0 1 2
     1           X . . . . . . . . . . .
     2           . X . . . . . . . . . .
     3           . . X . . . . . . . . .
     4           . . . X . . . . . . . .
     5           . . . . X . . . . . . .
     6           . . . . . X . . . . . .
     7           . . . . . . X . . . . .
     8           . . . . . . . X . . . .
     9           . . . . . . . . X . . .
    10           . . . . . . . . . X . .
    11           . . . . . . . . . . X .
    12           . . . . . . . . . . . X
 ADDITIONAL SCREEN(S)
```

Main Menu (F1)-6-2

PARAMETER	DEFINITION	RANGE
ASSIGN PHASE	Each of the 32 (64) vehicle detectors can be assigned to any of twelve (12) phases. The detector-phase assignment determines which phases are affected by the associated detector inputs. The detector places calls on all phases that are assigned to it.	X assigns

Ped/Sys Assign



Main Menu (F1)-6-3

Detector Log Interval
Use toggle key to set the detector log interval of 5, 15, 30 or 60 seconds.

Pedestrian and Local System Detector Assignment

1. Assign pedestrian detectors numbered 1 through 12 to any of the 12 phases.
2. Assign any vehicle detector input to be used as one of the up to 16 system detectors.

PARAMETER	DEFINITION	RANGE
DETECTOR LOG INTERVAL	Determines how often logging occurs. Logging includes volume, occupancy, and average speed.	0, 5, 15, 30, and 60 min. intervals
PHASE PED DETECTOR	Phase pedestrian detector Assign pedestrian detectors 1-12 to phases 1 through 12.	# 1-12 0 = not active
LOCAL SYSTEM DETECTOR	Assign vehicle detectors to create up to 16 local system detectors used for reporting system detector information, such as volume and occupancy, to an arterial master.	# 1-32 (64) 0 = not active

Cross Switching

Up to 32 detectors (64 with expanded memory) can be selected to cross switch their calls with their assigned cross switch phase(s). Position cursor next to detector number and below desired cross switch phase then press toggle key to assign (X).

```
              CROSS SWITCHING
                PHASES:           1 1 1
 DETECTOR       1 2 3 4 5 6 7 8 9 0 1 2
     1          . . . . . . . . . . . .
     2          . . . . . . . . . . . .
     3          . . . . . . . . . . . .
     4          . . . . . . . . . . . .
     5          . . . . . . . . . . . .
     6          . . . . . . . . . . . .
     7          . . . . . . . . . . . .
     8          . . . . . . . . . . . .
     9          . . . . . . . . . . . .
    10          . . . . . . . . . . . .
    11          . . . . . . . . . . . .
    12          . . . . . . . . . . . .
 ADDITIONAL SCREEN(S)
```

Main Menu (F1)-6-4

Speed Detectors

Detectors can be assigned to one-detector or two-detector speed measurement operations. Two-detector speed measurement uses detector pairs with a known distance between them.

Speed Detectors 1 and 2 are reported to Zone Master as speed trap STA & STB, respectively.

One-detector speed measurement

1. Assign any of 32 (or 64) detectors as speed detectors 1-8.
2. Select units of centimeters or inches after UNITS parameter using toggle key.
3. Enter average vehicle length (in selected units) for each speed detector used.
4. Enter detector loop length (in selected units) for each speed detector used.

Two-detector speed measurement

1. Assign any of 32 (or 64) detectors, in pairs, as speed detectors 1-8. If speed detectors 1 and 2 are assigned as a pair speed detector number 1 is the odd detector and number 2 the even detector.
2. Enter the distance (speed trap length) between the two detectors.

<u>Enable Log</u>

Use toggle key to enable (X) speed detectors to log. Logging is enabled in Configuration Submenu, #7 Enable Logging.

Press F2 plus arrow key to view additional screens for all 8 detectors . F2 plus right/left arrows or F2 plus up/down arrows.

```
                SPEED DETECTORS


  SPEED DET NUMBER:  ...1....2....3....4
ONE DETECTOR SPEED:
 LOCAL DET NUMBER...    0    0    0    0
 VEHICLE LENGTH....   999    0    0    0
 LOOP LENGTH.......     0    0    0    0

TWO DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 SPEED TRAP LENGTH.     0    0    0    0

ENABLE LOG.........     .    .    .    .

UNITS:  INCHES
ADDITIONAL PAGE(S)                MORE->
```

Main Menu (F1)-6-5

PARAMETER	DEFINITION	RANGE
DETECTOR CROSS SWITCHING	Under certain conditions detectors are allowed to alternately place calls on their assigned phases and their assigned cross switch phases. Conditions for use: 1) If the assigned phase is not green and the cross switch phase is green, the detector places calls on its cross switch phase(s). 2) If the assigned phase is omitted by the coordinator, the detector places calls on its cross switch phase(s).	X assigns
SPEED DETECTORS	Eight detectors used to find vehicle speed. Any vehicle detector can be assigned to one type of speed detector: one-detector or two-detector arrangement used to calculate vehicle speed.	-
ONE-DETECTOR SPEED CALCULATION	Calculates speed based on an average vehicle length and a specific detector length. Speed is read back to the master controller and is used to generate a log of speed readings in low, nominal, and high speed bands.	-
LOCAL DET NUMBER	Local Detector Number (One Detector Speed) Number of vehicle detector (1-32) assigned to the speed detector (1-8). A number cannot be assigned for more than one speed detector.	1-32 (64) 0 = not active
VEHICLE LENGTH	Average vehicle length. This value can be determined based on the type of traffic sensed by the detector.	0-999 in. 0-999 cm.
LOOP LENGTH	Physical length of detector from start edge to stop edge. Used with vehicle length to compute vehicle speed during one detector mode of operation. NOTE Inches (in.) *or* centimeters (cm.) may be entered for some parameters. User must select one of these units with the toggle key at the **UNITS:** data entry field.	0-999 in. 0-999 cm.

PARAMETER	DEFINITION	RANGE
TWO-DETECTOR SPEED CALCULATION	The first detector encountered by a passing vehicle is the Start Detector and the second is the End Detector. A travel time counter is enabled by an actuation of the Start Detector and disabled by an actuation of the End Detector. Speed is calculated using the vehicle travel time and distance between detectors. Speed is read back to the master controller and is used to generate a log of speed readings in low, nominal, and high speed bands. NOTE Odd numbered detectors are automatically assigned as Start Detectors and even numbered detectors are assigned as End Detectors.	-
LOCAL DET NUMBER	Local Detector Number (Two Detector Speed)	1-63 0 = not active
SPEED TRAP LENGTH	Speed Trap Length Distance between leading edge of start detector and leading edge of end detector.	0-999 in. 0-999 cm.
ENABLE LOG	Enable logging of speed detector information. Set the logging interval to the desired frequency (DETECTOR LOG INTERVAL). Logging includes volume, occupancy, and average speed.	X enables
UNITS	Select units of inches or centimeters for all parameters related to distance. This affects the calculations and the display of these parameters.	inches or centimeters

Vehicle/Ped Diagnostic Plans

Vehicle and pedestrian detectors may be tested for no-activity, maximum presence, and erratic output. Tests can be enabled on a per detector basis when detectors are assigned to diagnostic plans and intervals. The plans are active when selected by TOD program steps.

Eight diagnostic plans are available. Each plan used must have a diagnostic number (referring to one of 32 diagnostic intervals) and a scaling factor. A detector is assigned to a plan when these two entries have been made. Fail actions must be selected for vehicle detector diagnostic plans thus detectors that fail can be placed on minimum recall, maximum recall, or can place associated phase in a detector fail max mode. Up to 32 (64 with expanded memory) vehicle detectors or up to 12 pedestrian detectors may be assigned to up to eight plans.

Diagnostic Intervals

Define up to 32 diagnostic intervals. Use F2 to advance to screens with detectors 12-32.

1. From Detector Submenu select #8 Diag Intervals.
2. Enter desired diagnostic interval values for no-activity, maximum presence, and erratic counts.

DETECTOR DIAGNOSTIC INTERVAL

DIAGNOSTIC NUMBER	NO ACTIVITY	MAX PRESENCE	ERRATIC COUNTS
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	220
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0

ADDITIONAL SCREEN(S)

Main Menu (F1)-6-8

Vehicle Detector Diagnostic Plans

1. Assign diagnostic interval values as above.
2. From Detector Submenu select # 6 Veh Diag Plans. Plan numbers appear on left hand column (PLAN 1-6). PLAN 7 and 8 appear on next screen. Press F2 to view additional screens. Detector numbers appear across the top of the screen. DET NUMBER 1-8 on screen shown. Use F2 to view additional detector numbers.
3. Assign diagnostic numbers 1-32 (DIAG NUM) to desired detectors.
4. Enter scaling value (SCALING) below each diagnostic number or leave default value of 1.
5. Select a fail action (0-3) for use when detector failure is diagnosed.
6. Program the selection of plan(s) in TOD program steps, Coordinator Submenu.

VEHICLE DETECTOR DIAGNOSTIC PLAN

PLAN	DET NUMBER	1	2	3	4	5	6	7	8
1	DIAG NUM.	0	0	0	0	0	0	0	0
	SCALING..	1	1	1	1	1	1	1	1
2	DIAG NUM.	0	0	0	0	0	0	0	0
	SCALING..	1	1	1	1	1	1	1	1
3	DIAG NUM.	0	0	0	0	0	0	0	0
	SCALING..	1	1	1	1	1	1	1	1
4	DIAG NUM.	0	0	0	0	0	0	0	0
	SCALING..	1	1	1	1	1	1	1	1
5	DIAG NUM.	0	0	0	0	0	0	0	0
	SCALING..	1	1	1	1	1	1	1	1
0									
	SCALING..	1	1	1	1	1	1	1	1

ADDITIONAL SCREEN(S)

Main Menu (F1)-6-6

Pedestrian Detector Diagnostic Plans

1. Assign diagnostic interval values as above.
2. From Detector Submenu select # 7 Ped Diag Plans. Plan numbers appear on left hand column (PLAN 1-6). PLAN 7 and 8 appear on next screen. Press F2 to view additional screens. Detector numbers (1-12) appear across the top of the screen. Use F2 to view additional detector numbers.
3. Assign diagnostic numbers 1-32 (DIAG NUM) to desired detectors.
4. Enter scaling value (SCALING) below each diagnostic number or leave default value of 1.
5. Program the selection of plan(s) in TOD program steps, Coordinator Submenu.

```
        PED DETECTOR DIAGNOSTIC PLAN

PLAN DET NUMBER  1  2  3  4  5  6  7  8
  1  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
  2  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
  3  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
  4  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
  5  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
  6  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
ADDITIONAL SCREENS                MORE->
```

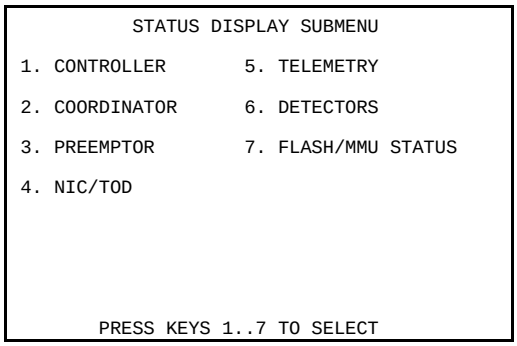
```
        PED DETECTOR DIAGNOSTIC PLAN

PLAN DET NUMBER  1  2  3  4  5  6  7  8
  7  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
  8  DIAG NUM.   0  0  0  0  0  0  0  0
     SCALING..   1  1  1  1  1  1  1  1
END OF SUBMENU                    MORE->
```

Main Menu (F1)-6-7

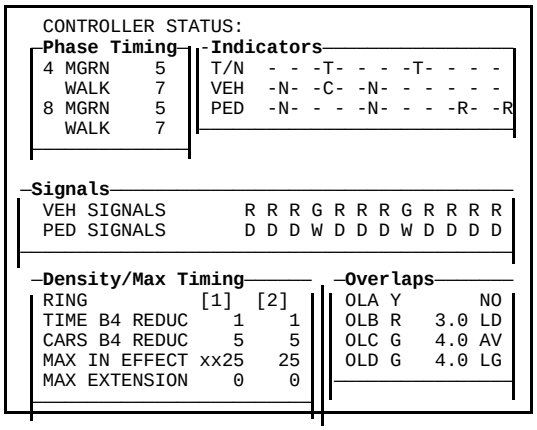
PARAMETER	DEFINITION	RANGE
DIAGNOSTIC PLANS	Up to eight plans can be created and assigned to each of the vehicle and pedestrian detectors. Plans may be assigned to more than one detector. Each plan contains a scaling factor and diagnostic number which defines the diagnostic intervals used to test detectors. Plans are enabled by time-of-day in TOD program steps.	1-8
DIAGNOSTIC (INPUT)	Select from 32 inputs used for monitoring the 32 vehicle detectors, 12 pedestrian detectors, or any combination of these. Diagnostic inputs are assigned to detectors but do not need to have a one-to-one correspondence. i.e., You do not have to assign diagnostic input #1 to detector #1. You may choose to assign diagnostic input #5 to detector #1.	1-32 0 = not active

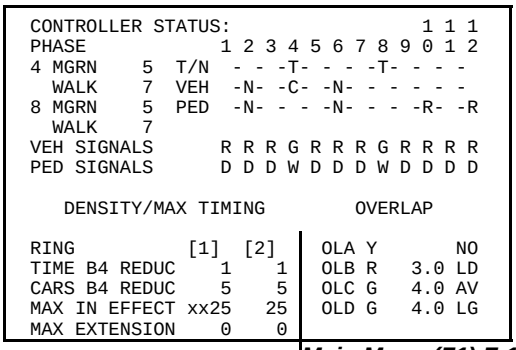
PARAMETER	DEFINITION	RANGE
SCALING	Determines length of no-activity and maximum presence periods. No-activity and maximum presence periods can have values between 0 and 255 assigned to them. Scaling these values results in desired period length. Examples: 1) no-activity period = 1 min, scale value = 2 Result: Detector input must be active at least once every two minutes. If not then inactivity is reported. 2) maximum presence period = 5 min, scale value = 15 Result: Detector must not be active for more than 60 min if max presence us reported.	1,2,15,60 Min.
FAIL ACTION	Detector failure action. If a detector is diagnosed as failed, a failure action is set in operation. Select one of four failure actions for each detector: 0 - No Action. Does nothing. 1 - Min Recall. Places the phase on minimum recall. 2 - Max Recall. Places the phase on maximum recall. 3 - Programmed. Places the phase on maximum recall but uses Detector Fail Maximum time (DET MAX) instead of current max time (Max1,2,or 3).	0-3
DIAGNOSTIC INTERVAL	Defined by values assigned to no-activity, maximum presence, and erratic counts.	-
NO ACTIVITY	Period during which detector input must be active. If not active during this period then no-activity is reported.	0-255 sec.
MAXIMUM PRESENCE	Period during which a detector must remain ON in order for maximum presence to be reported.	0-255 sec.
ERRATIC COUNTS	Number of counts per minute which must be detected. If not detected then erratic counts is reported.	0-255 counts per minute

To view a display press the keyboard number corresponding to desired status display.



1. CONTROLLER
   - **V**iew current controller status.
   - **V**iew phase and interval currently timing and time remaining.
   - **V**iew phases to time next.
   - **V**iew phases with vehicle and pedestrian calls.
   - **V**iew density and maximum timers.
   - **V**iew overlap signal timing and time remaining.
   - **V**iew output signal colors.
   - **V**iew max extension.
2. COORDINATOR
   - **D**isplays status messages including background error, free, interconnect error, and warning.
   - **D**isplays coordination command source, commanded and local cycle, commanded and actual offset.
   - **I**ndicates use of actuated coordinated phases and actuated rest in walk.
   - **I**ndicates per ring direction, hold, force off, permissive, and split extension.
   - **I**ndicates use of phase reservice and inhibit max.
   - **C**urrent NIC and TOD program step in effect.
   - **V**iew coordination pattern in effect.
   - **D**isplays vehicle permissive periods.
   - **I**ndicates cycle/offset/split match.
   - **D**isplays split demand 1 and 2 patterns in effect.
   - **D**isplays split crossing artery pattern in effect.
   - **I**ndicates active coordination phases, phases with vehicle recall, max recall, ped recall, and phase omit.
   - **I**ndicates alternate sequence in effect.
3. PREEMPTOR
   - **V**iew current controller status.
   - **V**iew phase and interval currently timing and time remaining.
   - **V**iew phases to time next.
   - **V**iew phases with vehicle and pedestrian calls.
   - **V**iew density and maximum timers.
   - **V**iew output signal colors.
   - **D**isplays preemption step in effect, interval, and time remaining.
   - **I**ndicators show calls present, timer inhibit, reservice period, active preemptor, and delay period.
   - **B**us preemption duration time remaining is displayed.
   - **F**lash message appears when preemptor using flash condition.
4. NIC/TOD
   - **V**iew current date and time.
   - **D**isplays current day and week programs.
   - **I**ndicates active program of NIC or TOD.
   - **N**IC or TOD program step:
     - **D**isplays pattern number in effect.
     - **I**ndicates system override status.
     - **C**ommand source.
     - **I**ndicates program step number in effect.
     - **I**ndicates program step start time.
     - **D**isplays day and week program in effect.
     - **I**ndicates next step and step time.
     - **I**ndicates number of highest program step.
     - **I**ndicates alternate sequence in effect.
   - **T**OD program steps:
     - **D**isplays active TOD step.
     - **D**isplays status of programmed functions including: flash, red rest, dimming, alternate vehicle extension, and detector log enable.
     - **I**ndicates detector diagnostic plan in effect.
     - **I**ndicates functions/operations active on phases 1-12 including: max 2 enable, max 3 enable, vehicle, max, and ped recall, conditional service inhibit, and phase omit.
     - **I**ndicates active special functions.
5. TELEMETRY
   - **D**isplays calls on system detectors.
   - **I**ndicates telemetry modes active.
   - **I**ndicates special functions in effect.
   - **D**isplays telemetry address.
   - **I**ndicates valid/invalid transmission of data.
   - **D**isplays first two speed trap speeds.
6. DETECTORS
   - **I**ndicates processed detector calls on active detectors.
7. FLASH/MMU STATUS
   - **I**ndicates the reason(s) for flash conditions at the controller and/or at the intersection installation. **S**hows status for malfunction management unit response frames 129 and 131 readback.





Main Menu (F1)-7-1

Phase Timing
For each ring: current phase, timing interval, and time remaining is displayed above termination/max timers/ped indications and their corresponding time remaining. Ring 1 status is above ring 2 status.

Phase numbers: 1-12

Timing intervals: MGRN, YEL, RED, ADDI, VEXT, MGRN DONE, GRN HOLD, GRN REST, GRN XFER, RED, HOLD, RED REST, RED XFER.

Termination indications: Displays cause of previous green interval termination (PREEMPT, MAN ADV, FORCE OFF, MAX OUT, GUAR PASS, GAP OUT, MIN GAP).

Max Timers: Max timer in effect and time remaining PMAX (Preemptor Max), DMAX (Detector Fail Max), MAX 1, 2 or 3. Max timers are displayed only when opposing call exists.

Peds: Pedestrian timing intervals and time remaining (WALK, WALK REST, WALK HOLD, PCLR).

Indicators
Timing/Next Indicators:
T = Phase timing.
N = Phase to time next, indicated during yellow and red of previous phase timing.

Vehicle Call/Recall Indicators:
C = Call from associated phase detector.
R = Recall to an actuated phase.
N = Recall to a non-actuated phase.

Pedestrian Call/Recall Indicators:
C = Call from associated phase detector.
R = Recall to an actuated phase.
N = Recall to a non-actuated phase.

Signals
Each signal is displayed below the corresponding phase.

Vehicle signals indicate signal color for each phase: R = red, G = green, Y = yellow.

Pedestrian signals indicate current pedestrian interval for each phase: D = don't walk, W = walk, blank.

Density/Max Timing

Density interval and maximum timing for rings 1 and 2 are displayed with their current time remaining. Columns [1] and [2] indicate rings 1 and 2 respectively.

Density Intervals:
Time B4 REDUC = time before reduction
CARS B4 REDUC = cars before reduction
GAP = gap interval
TIME TO REDUC = time to reduce

Max time in effect:
PMAX (Preemptor max)
DMAX (Detector fail max)
MAX 1, 2, or 3
Max extension time

Overlaps

Displays overlaps A, B, C, D signals, time remaining, and overlap indicator.

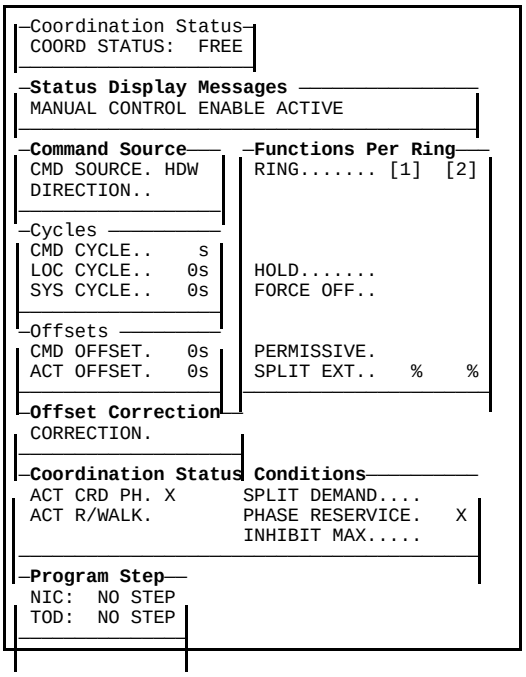
Signals: G = green, Y = yellow, R = red

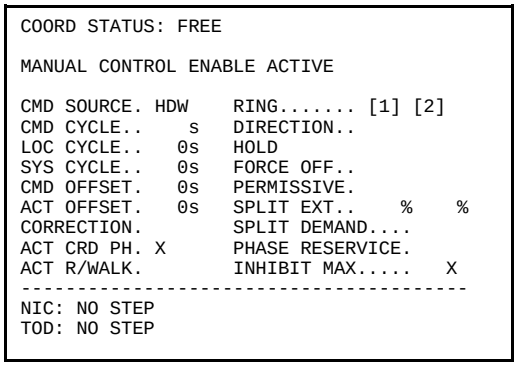
Overlap Indicators:
NO = no overlap
LE = lead
AV = average
LG = lag

I/O Mode Change Status Screen

```
INTERSECTION SET TO FLASH BECAUSE
THE TYPE 2 I/O MODE CHANGED WHILE
THE CONTROLLER WAS OPERATIONAL.
```

TS2 Type 2 has eight (four are defined) different I/O modes of operation. To prevent any I/O unexpected operation, the controller was sent to flash. The controller must be powered down and up again to clear this error status. Check mode select wires and input buffers.





Main Menu (F1)-7-2

Coordination Status
Indicates status for various formats and free operation. Displays one of the following:

FREE

PATTERN # (NIC)

PATTERN # PLAN COMMAND # (plan)

PATTERN # COS #/#/# (standard)

TP # OFT # (TS2)

Status Display Messages
Up to three lines may appear to indicate free, background error, interconnect, or warning messages. Refer to appendix F for a listing of these messages.

Command Source
Indicates source of coordination command.

NIC Non-interconnected
TLM Telemetry
STD Standard interconnect
MAN Manual commands programmed
HDW Hardwire inputs

Cycles
The programmed commanded cycle is displayed. The local cycle count (LOC CYCLE) is displayed when there is a local cycle running. The system (master) cycle count is indicated by SYS CYCLE. The offset between the local cycle count and the master cycle is reflected by CMD OFFSET and ACT OFFSET values. Cycle counts are displayed in either percent or seconds, whichever is programmed.

Offsets
Commanded (programmed) offset is displayed with actual offset between local and system cycles. When commanded offset is not equal to actual offset, the offset correction operation in use is indicated.

Offset Correction

Blank — Indicates commanded offset equal to actual offset

ADD — Indicates commanded offset not equal to actual offset. Smooth transition correction by addition is in effect.

SUB — Indicates commanded offset not equal to actual offset. Smooth transition by subtraction is in effect.

DWELL — Indicates offset correction by dwell is in effect.

Coordination Status Conditions

ACT CRD PH — X indicates coordinated phases are actuated.

ACT R/WALK — X indicates actuated rest in walk is selected for coordinated phases.

SPLIT DEMAND — A "SPLIT DEMAND" status line in the Coordinator Status Display indicates split demand status. If split demand is inoperative, the status line is blank. When split demand is in effect, the status line displays text in the format, "N/P," where N is the split demand in effect and P is the pattern number from which the demand splits are obtained.

PHASE RESERVICE — X indicates phase reservice selected for coordinated phases.

INHIBIT MAX — X indicates max times are inhibited.

Program Step
Indicates current NIC or TOD program step and pattern in effect or indicates NO STEP when NIC/TOD not in effect.

May display one of the following after NIC:

NO STEP

STEP # PATTERN # OVERRIDE
(override indicated only if selected)

STEP # PATTERN 0/FREE

May display one of the following after TOD:

NO STEP

STEP #

Functions Per Ring

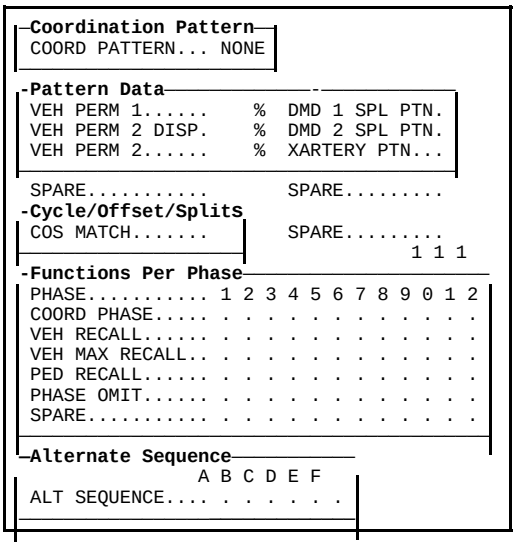
DIRECTION — X indicates controller green band period of coordinated phases.

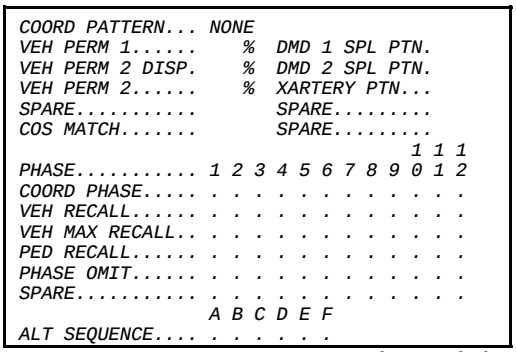
HOLD — X indicates hold applied to coordinated phases.

FORCE OFF — X indicates force off signal applied to coordinated phases.

PERMISSIVE — Displays phase number of automatic permissive phase(s). When single or dual permissive operation is used and permissive period 1 is in effect, 1 appears below [1] and [2]. When permissive period 2 is in effect 2 appears below [1] and [2].

SPLIT EXT — Displays amount of remaining split extension (percent or seconds).





Main Menu (F1)-7-2
(Toggle)

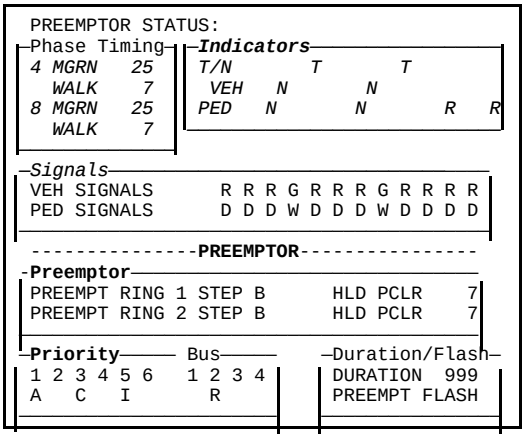
Coordination Pattern
Indicates current pattern number 1 through 64 or indicates NONE when pattern not used.

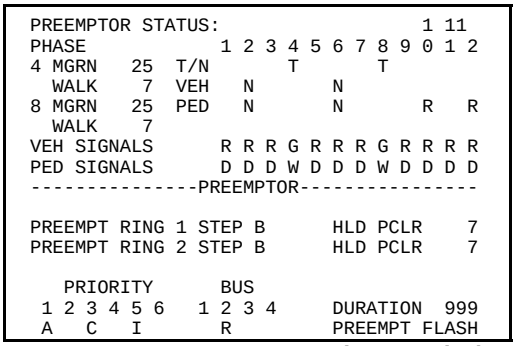
Pattern Data
Displays programmed values for
Vehicle Permissive 1
Vehicle Permissive 2 Displacement
Vehicle Permissive 2
Split Demand Pattern 1
Split Demand Pattern 2
Crossing Artery Pattern

Cycle/Offset/Split
Displays cycle/offset/split match when one occurs in current pattern for standard format. Input command displayed in COORD STATUS may indicate a C/O/S different from the match displayed here if NIC override is selected.

Functions Per Phase
Displays functions/phases programmed for coordination in data entry menus.
X indicates phases programmed as coordinated phases
X indicates phases programmed with vehicle recall, vehicle recall to max, pedestrian recall, and phase omit.

Alternate Sequence
Displays programming for alternate sequence. X indicates alternate sequence selection of A, B, C, D, E, or F.





Main Menu (F1)-7-3

Phase Timing
For each ring: current phase, timing interval, and time remaining is displayed above termination/max timers/ped indications and their corresponding time remaining. Ring 1 status is above ring 2 status.

Phase numbers: 1-12

Timing intervals: MGRN, YEL, RED, ADDI, VEXT, MGRN DONE, GRN HOLD, GRN REST, GRN XFER, RED, HOLD, RED REST, RED XFER.

Termination indications: Displays cause of previous green interval termination (PREEMPT, MAN ADV, FORCE OFF, MAX OUT, GUAR PASS, GAP OUT, MIN GAP).

Max Timers: Max timer in effect and time remaining (MAX 1, 2, 3, or MAX 1, 2, 3 INH (max inhibit)). Max timers are displayed only when opposing call exists.

Peds: Pedestrian timing intervals and time remaining (WALK, WALK REST, WALK HOLD, PCLR).

Indicators
Timing/Next Indicators:
T = Phase timing.
N = Phase to time next, indicated during yellow and red of previous phase timing.

Vehicle Call/Recall Indicators:
C = Call from associated phase detector.
R = Recall to an actuated phase.
N = Recall to a non-actuated phase.

Pedestrian Call/Recall Indicators:
C = Call from associated phase detector.
R = Recall to an actuated phase.
N = Recall to a non-actuated phase.

Signals
Each signal is displayed below the corresponding phase.

Vehicle signals indicate signal color for each phase: R = red, G = green, Y = yellow.

Pedestrian signals indicate current pedestrian interval for each phase: D = don't walk, W = walk, blank.

Preemptor
Displays preemption step in effect, interval, and time remaining for rings 1 and 2.

Shows preemption step in effect and time remaining in ring 2.

Preemption steps: Refer to definition of each step.

Initial Clearance		Track Clearance	
Step	Interval	Step	Interval
1 =	Min Green	6 =	Green
2 =	Ped Clear	7 =	Yellow
3 =	Yellow	8 =	All Red
4 =	Yellow Overlap		
5 =	All Red		

Hold

Step	Interval
9 =	Lock
A =	Duration
B =	Hold

Exit

Step	Interval
C =	Yellow
D =	All Red
E =	Exit

Priority
Preemption indicators appear below priority preemptors 1-6 indicating current preemption activity.

Preemption Indicators:
C = Call present
I = Inhibit timer currently timing
R = Reservice period - Bus preemptor
A = Active preemptor
D = Delay period currently timing

Bus
Preemption indicators appear below bus preemptors 1-4 indicating current preemption activity.

Preemption Indicators
C = Call present
I = Inhibit timer currently timing
R = Reservice period - Bus preemptor
A = Active preemptor
D = Delay period currently timing

Duration/Flash
Duration:
Displays preemption duration time remaining.

Preempt Flash:
Flash message appears when preemptor using flash condition.

STEP 1 Minimum/Guaranteed Green Interval
Times until programmed time elapses. Start time occurs upon phase entry of green, not at preemption initiation. If the phase was in green longer than the interval programmed time prior to initiation of preemption, the preemptor advances to interval 3.

STEP 2 Minimum/Guaranteed Green-Ped Clearance
Times until programmed time has elapsed. Start time is when phase enters pedestrian clearance, not on preemption initiation. If the phase was in pedestrian clearance longer than the interval programmed time prior to initiation of preemption, the preemptor advances to step 3.

STEP 3 Minimum/Guaranteed Phase Yellow
Times until programmed time has elapsed. Start time is when phase enters yellow clearance, not on preemption initiation. If the phase was in yellow clearance longer than the interval programmed time prior to initiation of preemption, the preemptor advances to step 4.

STEP 4 Minimum/Guaranteed Overlap Yellow
Times until programmed time has elapsed. Start time is when phase enters overlap yellow clearance, not on preemption initiation. If the phase was in overlap yellow clearance longer than the interval programmed time prior to initiation of preemption, the preemptor advances to step 5.

STEP 5 Minimum/Guaranteed Overlap All-Red Clearance
Times until programmed time has elapsed. Start time is when phase enters red clearance, not on preemption initiation. If the phase was in red clearance longer than the interval programmed time prior to initiation of preemption, the preemptor advances to step 6.

STEP 6 Track Clearance Green

STEP 7 Track Clearance Yellow

STEP 8 Track Clearance All-Red Clearance

STEP 9 Hold/Lock

STEP A Hold/Duration

STEP B Hold
Preemption Hold phases. Sets exit phases when preemption is terminating.

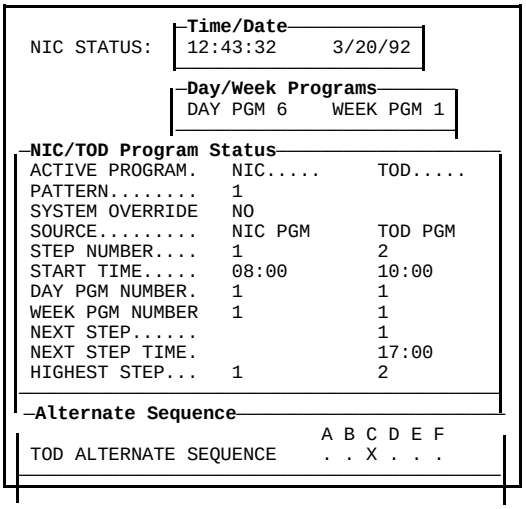
STEP C Exit Yellow

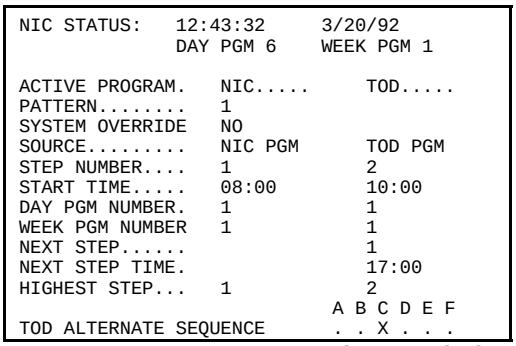
STEP D Exit All-Red Clearance

STEP E Exit Lock
Preemptor exit lock interval. When both preemption rings get to exit/lock interval, the preemptor exits the preemption sequence as follows:

1. Resets preemptor detector lock, non-lock status
2. Resets all preemption timers
   Resets all preemption control over the controller
4. Sets exit calls

STATUS DISPLAY SUBMENU
NIC / TOD Status





Main Menu (F1)-7-4

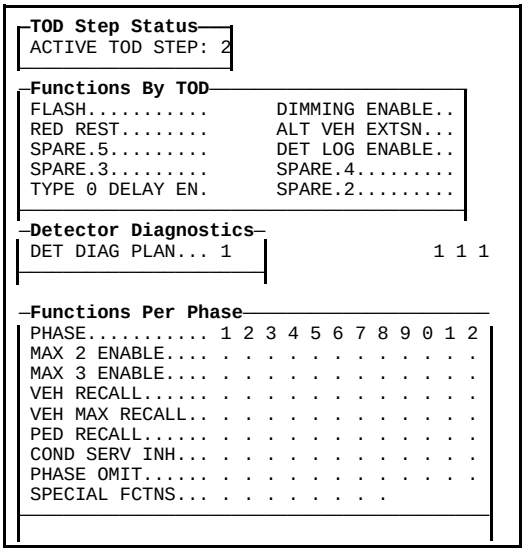
Time/Date
Current time (hours:minutes:seconds) and date (month/day/year) are displayed.

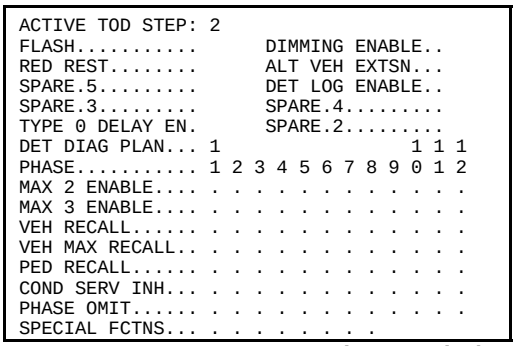
Day/Week Programs
Indicates day program (number) and weekly program (number) currently in effect.

NIC/TOD Program Status
Status of NIC/TOD parameters is indicated:

Pattern	indicates NIC pattern number in effect. TOD is blank.
System override	YES indicates NIC override in operation. NO indicates no NIC override operation. TOD is blank.
Source	indicates coordination source as NIC PGM, TOD PGM, MANUAL, or HOLIDAY.
Step number	current program step number.
Start time	indicates time when current step became active.
Day pgm number	number of day program in effect at the start of program step.
Week pgm number	number of week program in effect at the start of program step.
Next step	program step to be active next.
Next step time	execution time of program step to be active next.
Highest step	highest TOD/NIC step programmed. Not necessarily equal to the number of programmed steps.

Alternate Sequence
Displays alternate sequence programmed.





Main Menu (F1)-7-2

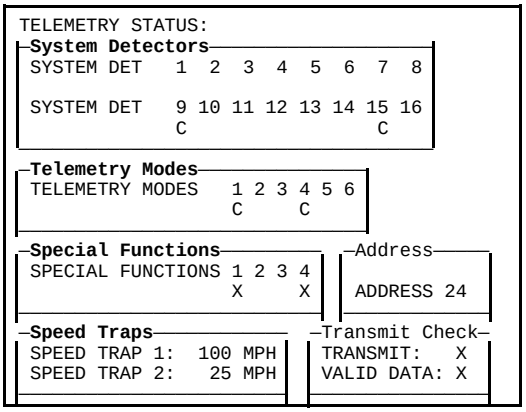
TOD Step Status
Indicates current time-of-day program step in effect.

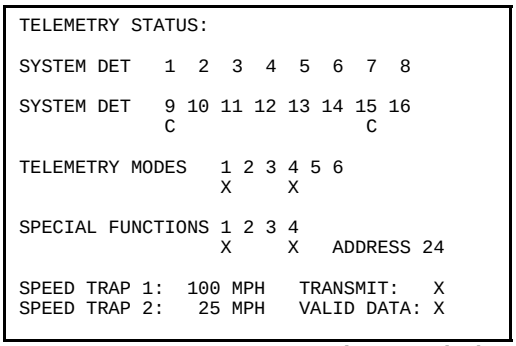
Functions By TOD
Displays currently active TOD functions as programmed in data entry menus. X indicates functions enabled/selected: flash, red rest, detector Type 0 delay enable, alternate vehicle extension, detector log enable.

Detector Diagnostics
Displays detector diagnostic plan selected in data entry menus.

Functions Per Phase
Displays currently active TOD functions assigned to phases as programmed in data entry menus. X indicates phases programmed: Max 2, and 3 enable, vehicle recall, vehicle recall to max, pedestrian recall, conditional service inhibit, phase omit.

Special Functions
Displays current active special functions 1-8 as programmed in data entry menus. C indicates the special function(s) that is active.





Main Menu (F1)-7-5

System Detectors
System detectors 1-16 calls indicated when C appears below detector number.

Telemetry Modes
X indicates telemetry mode ON for modes 1 through 6.
1 = Dual coordination
2 = Flash
3 = Free
4 = Max recall
5 = Unassigned
6 = Unassigned

Special Functions
X indicates special function ON for special functions 1 through 4.
1 = System commanded flash
2 = Unassigned
3 = Unassigned
4 = Unassigned

Address
Indicates telemetry address used for data transmission. 0-24 or E1-24 (external address)

Speed Traps
Displays last monitored speed for speed trap 1 and speed trap 2.

Transmit Check

Transmit	X indicates data currently being transmitted.
Valid Data	X indicates controller receiving valid data.

```
PROCESSED DETECTOR STATUS:

DETECTOR     1  2  3  4  5  6  7  8

DETECTOR     9 10 11 12 13 14 15 16

DETECTOR    17 18 19 20 21 22 23 24

DETECTOR    25 26 27 28 29 30 31 32

PRESS TOGGLE FOR DETECTORS 33-64
```

Main Menu (F1)-7-6

```
PROCESSED DETECTOR STATUS:

DETECTOR    33 34 35 36 37 38 39 40

DETECTOR    41 42 43 44 45 46 47 48

DETECTOR    49 50 51 52 53 54 55 56

DETECTOR    57 58 59 60 61 62 63 64

PRESS TOGGLE FOR DETECTORS 1-32
```

(toggle)

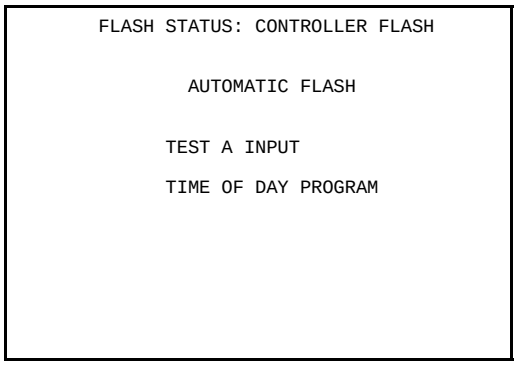
Processed Detector Status
Calls on detectors 1-32 (64 with expanded memory) are indicated as they occur. C appears below detector number when a call is received.

FLASH STATUS

The Flash Status Display is a diagnostic tool used to determine the cause of a flash condition. When a flash condition occurs, this display shows a message or series of messages which define the cause of the flash condition. In some cases, the display shows conflicts and sources of errors. Because flash conditions can occur for any number of reasons, the status displays will vary. This section identifies the messages which could appear on this display.

When a flash condition occurs go the Main Menu (F1) then select Status Display Submenu (#7) then Flash/MMU (#7).

Depending on the cause of the flash condition, you will see a display similar to the sample display shown here. The flash status messages are listed and defined below.



Main Menu (F1)-7-7

NO FLASH CONDITION
Indicates that there is no flash condition and operation is normal.

Controller (Emergency) Flash / No MMU Flash

When the flash condition is generated by the controller, not the malfunction management unit (MMU), any of the following messages can be displayed. The messages are listed in order of priority where MMU/TF SDLC COMM FAULT has the highest priority.

MMU/TF SDLC COMM FAULT
Indicates a Synchronous Data Link Control (SDLC) communications error. When a malfunction management unit (MMU) or terminals and facilities (TF) communications error causes a flash condition, the status display lists the response frames which generated the initial error and the current response frames with errors.
(Example: TF: 138 139 MMU: 128 129
Indicates no communication with terminals and facilities response frames 138 and 139. No communication with MMU frames 128, 129.) Flash condition is cleared when these errors are no longer detected.

Possible causes: loose connections, SDLC disconnect, BIU, controller, or MMU failure.

COMPATIBILITY PGM FAULT
The program on the MMU program card and the MMU program entered at the controller do not match. The fault status display shows the channel number(s) where there is a mismatch, the controller state (0,1), and MMU state (0 or 1). The MMU program card should be pulled from the cabinet to verify the program with the entered MMU program (Configuration Sub- menu, MMU Program - ***Main Menu (F1)-1-9***. Either the controller program or the MMU program must be corrected, as appropriate.

Controller (Emergency) Flash / No MMU Flash - continued

COLOR MISMATCH
A color difference was detected between the colors generated by the controller and the channel colors returned by the MMU. The flash status display shows the controller readback of the MMU channels and phase colors. An X appears below each channel and next to its associated phase color. The conflict is summarized at the bottom of the screen where the channel numbers, mismatched output and MMU colors are indicated (Example: **13GN** indicates channel 13, output color = **G**reen, MMU color = **N**o color).

Channel and phase relationships are determined by the phase to load switch assignment programmed at the controller. Keyboard reset clears flash condition.

CONFLICT DETECTED
There is a conflict detected by the controller which was not detected by the MMU. The display shows the colors, indicated by X, that the controller reads back from the MMU. Keyboard reset clears the flash condition. (This message will probably never appear.)

PHASE NEXT ERROR
The phase to time next and the present phase timing are displayed with the cause of the phase next error. Keyboard reset clears the flash condition.

CYCLE FAILURE
A cycle failure occurs when there are calls present on a phase that has not been serviced for 2 cycles. Keyboard reset clears the flash condition.

DEFAULT FLASH 1
The flash display routine cannot determine the cause of the emergency flash.

Controller (Emergency) Flash and MMU Flash
When the flash condition is cause by an Emergency flash and an MMU flash, any of the following messages can be displayed. The messages are listed in order of priority where FAILURE STATUS NOT REPORTED has the highest priority. When the MMU has caused the intersection to go into flash, you must reset the MMU to clear the flash condition.

FAILURE STATUS NOT REPORTED
The MMU has not communicated the reason for the emergency flash.

PORT 1 TIMEOUT
The MMU detected a failure from the controller. Possible causes for this failure include: interrupted communications between controller and MMU.

DIAGNOSTIC FAILURE
The MMU has detected that it has a diagnostic failure. Controller is alerted.

CVM/CFM
The MMU detected a Controller Voltage Monitor/Controller Fault Monitor failure.

Controller (Emergency) Flash and MMU Flash - continued

+24 V MON I
The MMU detected a +24 Volt Monitor I failure.

+24 V MON II
The MMU detected a +24 Volt Monitor II failure.

MIN CLEAR FAIL
Minimum Clearance Failure
The minimum clearance time (yellow) was not long enough.

CONFLICT
Indicates that a color conflict at an intersection caused the flash condition. The flash status display indicates, with X, the status of all channels by phase color (red, yellow, green) at the time the conflict occurred.
An X is shown under each active channel and next to the corresponding color.

Conflicts can be observed by comparing the phases and colors. Channel and phase relationships are determined by the phase to load switch assignment programmed at the controller.

RED FAIL
A red indication was not given when it should have been. The flash status display shows an X under each channel and next to the phase color. Identify red failure by checking for X on red on all movements that should indicate red.

UNKNOWN MMU FLASH CONDITION
Indicates unknown MMU flash condition. Depending on the MMU manufacturer, additional flash information may have been communicated which is not recognized.

CHECK MMU STATUS DISPLAY
Prompts for user to view the MMU status display. Depending on the MMU manufacturer, additional flash information may have been communicated which is not recognized. The MMU status display may identify errors or failures.

Controller Flash
When the flash condition is caused by a controller as part of its normal operation, one of the following messages can be displayed. The messages are listed in order of priority where POWER ON FLASH has the highest priority.

POWER ON FLASH
The controller is timing Power On Flash which was previously programmed. Refer to the Controller Submenu, Start/Flash Data (***Main Menu (F1)-2-6***).

EXTERNAL START PREEMPT FLASH
At power on, the external start input is true and preempt is active. External start input is programmed in the Controller Submenu, Start/Flash Data (***Main Menu (F1)-2-6***).

POWER ON PREEMPT FLASH
Flash occurs because the preemptor is active during power on.

Controller Flash - continued

PREEMPT FLASH
Preemptor program is calling for flash as part of the preemption sequence.

AUTOMATIC FLASH
The Automatic Flash Input is enabled.

LOCAL FLASH
The local flash input from the cabinet is active. Example: Police switch at the cabinet.

CVM/CFM
Controller Voltage Monitor/Controller Fault Monitor failure has caused the flash condition.

Automatic Flash (Remote Flash)
When the flash condition is caused by automatic flash the following messages can be displayed. The messages are listed in order of priority where AUTOMATIC FLASH INPUT has the highest priority.

AUTOMATIC FLASH INPUT
The Automatic Flash (Remote Flash) input at the cabinet is enabled.

TEST A
The Test A input is enabled at the cabinet.

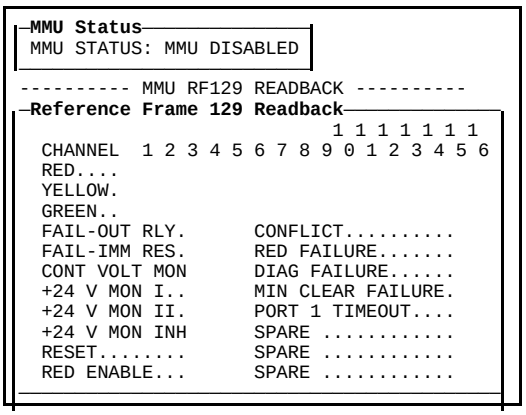
TEST B
The Test B input is enabled.

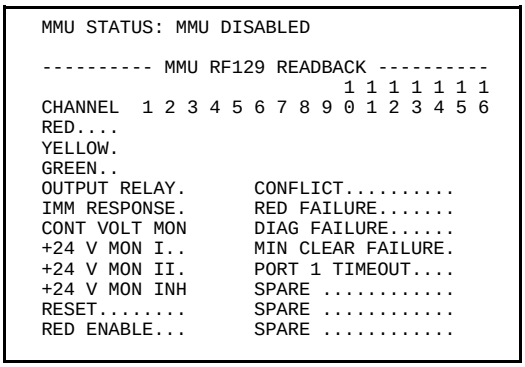
TIME OF DAY PROGRAM
A time-of-day program step is calling for flash. To disable flash, modify the time-of-day program step.

TLM SPECIAL FUNCTION 1
Telemetry Special Function 1 message indicates that the system master has initiated a system flash.

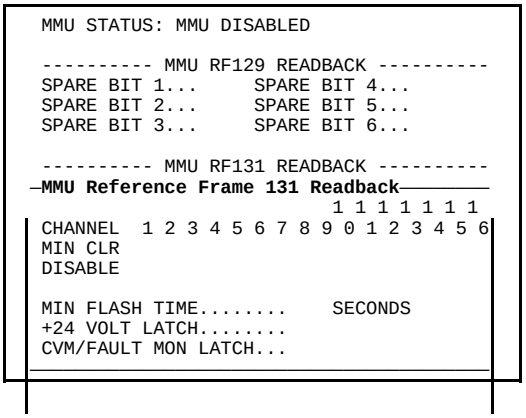
TLM MODE 2
Telemetry Mode 2 message indicates that the system master has initiated an intersection flash.

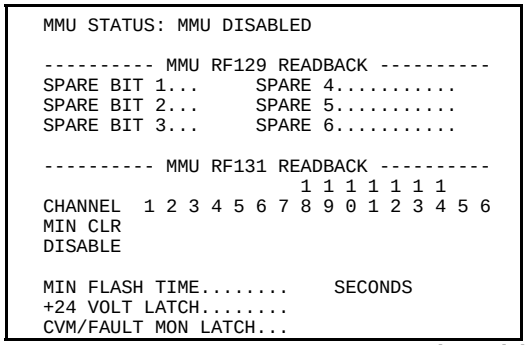
APPLICATION PROM
Application logic Proms are calling for flash. This flash condition is specific to the particular application program.





Main Menu (F1)-7-7 (Toggle)



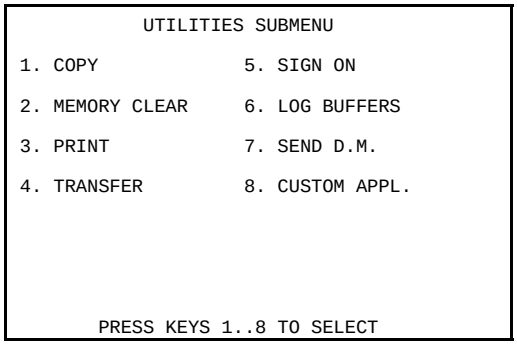


(Toggle)

MMU Status
Indicates when malfunction management operating status: MMU ENABLED or MMU DISABLED.

Reference Frame Readback
Indicates status condition of MMU response frames 129 and 131. X indicates readback signal for RED, YELLOW, GREEN, MIN CLR (minimum clearance), and DISABLE per channel. X indicates readback bit TRUE for other parameters.

The utilities submenu has eight data groups. To view or enter data press the keyboard number corresponding to desired data group.



1. COPY
   Copy all timing data from one phase to another.
   Copy all pattern timing and functions data from one pattern to another.
   Copy BACKUP TIMING load default data base.

2. MEMORY CLEAR
   Select to clear diagnostic enables, coordinator, NIC/TOD, preempt, or detector data.

3. PRINT
   Select to print configuration, controller, coordinator, NIC/TOD, preemptor, or detector data.

4. TRANSFER
   Select to transfer data between controllers

5. SIGN ON
   View sign on message to verify part numbers and version levels.

6. LOG BUFFERS
   View events currently in log buffer, print and/or clear events.

7. SEND D.M.
   Send image of data module to terminal port. In Motorola “S” record format.

8. CUSTOM APPL.
   Select a user defined option or set of options.

Copy Utility

Phase Copy

Use to copy all timing data from one phase to another. Copy feature is used to avoid repetitive manual entry of values.

1. Enter phase number to copy from.
2. Enter phase number to copy to.
3. Press ENTER to begin copying. All data previously entered for "copy to" phase is replaced.

```
                PHASE COPY

CHOOSE 'COPY FROM PHASE'
THEN CHOOSE 'COPY TO PHASE':

COPY FROM PHASE   0
COPY TO PHASE     0









PRESS 'ENTER' TO BEGIN COPYING
```

Main Menu (F1)-8-1-1

Pattern Copy

Use to copy all coordination data from one pattern to another. Copy feature is used to avoid repetitive manual entry of values.

1. Enter pattern number to copy from.
2. Enter pattern number to copy to.
3. Press ENTER to begin copying. All data previously entered for "copy to" pattern is replaced.

```
               PATTERN COPY

CHOOSE 'COPY FROM PATTERN'
THEN CHOOSE 'COPY TO PATTERN':

COPY FROM PATTERN   0
COPY TO PATTERN     0









PRESS 'ENTER' TO EXECUTE COPYING
```

Main Menu (F1)-8-1-2

Backup Timing Copy

All controllers have a backup data base. The backup values normally used are found in Appendix F. Backup values may also be customer specified and entered at the factory. Loading backup timing allows the user to initiate controller operation with standard timing values.

All current data is cleared when backup timing is loaded. Execution of this option clears diagnostic enables, coordinator, NIC/TOD, preempt, and detector data.

1. To load backup timing use toggle key to indicate X next to COPY BACKUP TIMING.
2. Press ENTER to begin loading.

```
                BACKUP TIMING

SELECT LOAD BACKUP TIMING:

COPY BACKUP TIMING          .









PRESS 'ENTER' TO BEGIN LOADING
```

Main Menu (F1)-8-1-3

Memory Clear

Execution of this option clears all user entered data. Data base is cleared to zero with no backup or default values in place. Only detector assignments are replaced with default settings.

1. Move cursor next to data group(s) to be cleared (coordinator, NIC/TOD, preempt, detector, diagnostic). Press toggle key to select (X) clear function for desired data base areas.
2. Press ENTER key to clear selected data base areas. Clear function begins immediately.

```
                MEMORY CLEAR

SELECT DATA TO CLEAR:

CLEAR COORDINATOR DATA      .
CLEAR NIC/TOD DATA          .
CLEAR PREEMPT DATA          .
CLEAR DETECTOR DATA         .
CLEAR DIAGNOSTIC ENABLES    .









PRESS 'ENTER' TO BEGIN CLEARING
```

Main Menu (F1)-8-2

Print

Print current data base. Select data groups to print as shown on print utility screen.

1. Connect printer or personal computer running ProComm (or equivalent) to TERMINAL port 2.
2. From Configuration submenu select Terminal Port then make appropriate selections to configure for equipment used for printing in step 1 above.
3. From Utilities submenu select #3 Print. Use toggle to select (X) desired data to print. When all selections have been made press ENTER to begin printing immediately.

```
                PRINT UTILITY

SELECT DATA TO PRINT:

PRINT CONFIGURATION DATA    .
PRINT CONTROLLER DATA       .
PRINT COORDINATOR DATA      .
PRINT PREEMPTOR DATA        .
PRINT NIC/TOD DATA          .
PRINT DETECTOR DATA         .




PRESS 'ENTER' TO BEGIN PRINTING
```

Main Menu (F1)-8-3

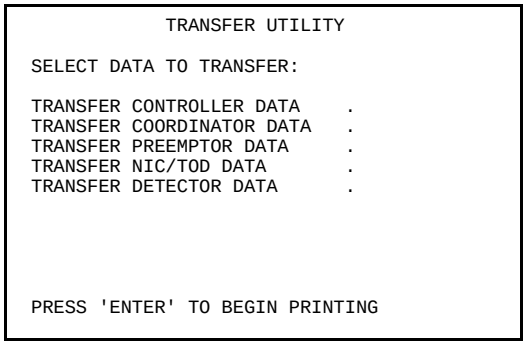
Transfer Utility

This utility is used to copy data from a source controller to destination controller. Prior to using the utility, connect a null modem cable between the two controller "Terminal" ports (Port 2). From the CONFIGURATION SUBMENU, select "PORT2," then set the following parameters:

PORT2 PROTOCOL	TERMNL
PORT2 ENABLE	YES
DATA RATE (BPS)	The same on both controllers
DATA PARITY, STOP	The same on both controllers

On the source controller go to the Main Menu, select "UTILITIES," then "TRANSFER" (F1-8-4). The "TRANSFER UTILITY" screen appears.

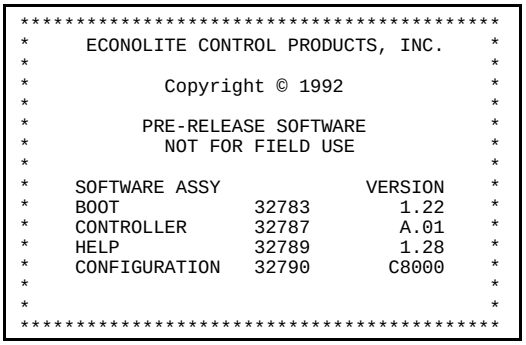
Select the data items to transfer by positioning the cursor over the period at the end of each line and press the "TOGGLE" key (the "0" key). When all data has been selected, press the "Enter" key to begin the transfer. A series of information screens will appear asking the user to verify that the proper data transfer parameters have been entered. From these information screens the user may continue the transfer process by pressing "Enter" or abort by pressing "Clear." If the decision is made to continue the transfer, the user is alerted to the fact that the receiving controller will be put into flash at the end of the transfer and can be put into normal operation only by cycling power.



Main Menu (F1)-8-4

Sign On

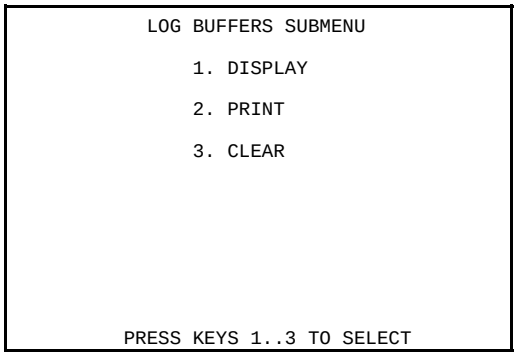
Sign on screen lists controller software assemblies with their version level and part numbers. Software assemblies include boot, controller, help, logic (if installed), and configuration.



Main Menu (F1)-8-5

Log Buffers Submenu

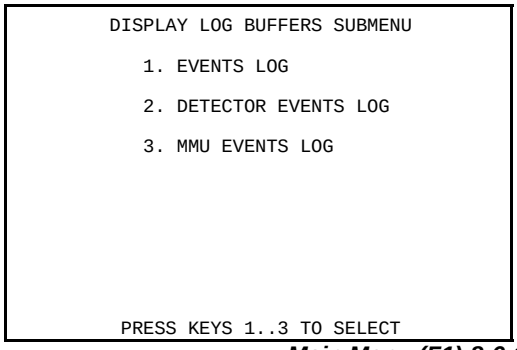
Log Buffers Submenu
From Utilities submenu select Log Buffers then press desired key to display, print or clear data logged in memory.



Main Menu (F1)-8-6

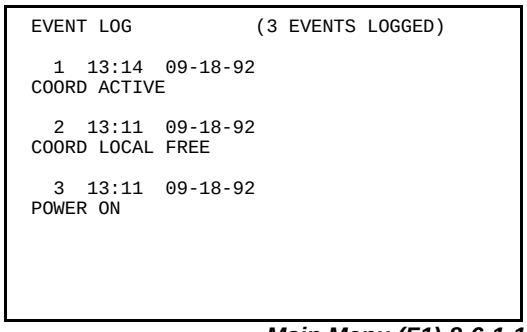
Display Events, Detector Events, and MMU Logs
Submenu for displaying log buffers allows immediate displaying of events log or detector events log on controller screen. Events reflect general controller operation and detector events reflect detector errors.

1. From Utilities Submenu select Log Buffers, then from Log Buffers Submenu select Display.
2. To immediately display events log select events log. To immediately display Detector Events log select Detector Event log. To immediately display MMU log select MMU Events log.



Main Menu (F1)-8-6-1

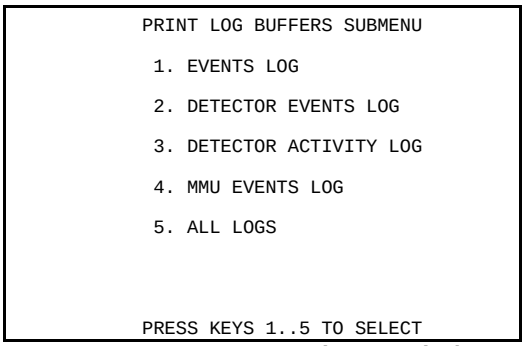
Events are identified by number (1-300), time, date, and a brief message. The event number is updated each time a new event is logged so that event number 1 is the most recent event in the buffer. The total number of events is displayed in the upper right hand corner of the screen. Event log display is shown here. Refer to Appendix E for a listing of possible event messages.



Main Menu (F1)-8-6-1-1

Print Log Buffers
Allows printing of logs to printer or computer connected to TERMINAL port 2.

1. Connect printer or personal computer running ProComm (or equivalent) to TERMINAL port 2.
2. From Configuration Submenu select Terminal Port then make appropriate selections to configure for equipment used for printing in step 1 above.
3. From Utilities Submenu select Log Buffers then from Log Buffer Submenu select Print to generate Print Log Buffers Submenu.
4. Press desired number(s) (1-4) to immediately print the corresponding log(s) (events, detector events, detector activity, or all).

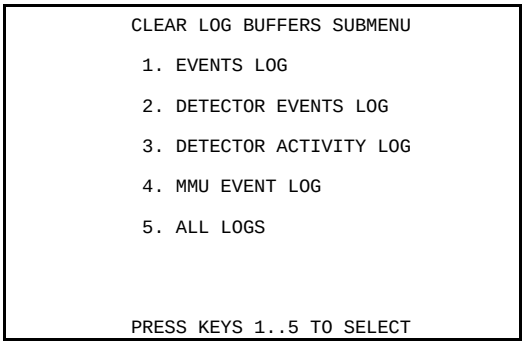


Main Menu (F1)-8-6-2

Events Log/Detector Events Log
Detector Activity Log(system logging including speed, volume and occupancy)
Refer to Appendix F for a listing of possible event messages.

Clear Log Buffers
Allows clearing of buffers from memory. If buffers are not cleared, the newest data automatically overwrites the oldest when the buffer fills. Logs including Events Log, Detector Events Log, and Detector Activity Log (system logging including speed, volume and occupancy). Refer to Appendix F for a listing of possible event messages.

1. From Utilities Submenu select Log Buffers then from Log Buffer Submenu select Clear to generate Clear Log Buffers Submenu.
2. Press desired number(s) (1-4) to immediately clear the corresponding log(s) (events, detector events, detector activity, or all).

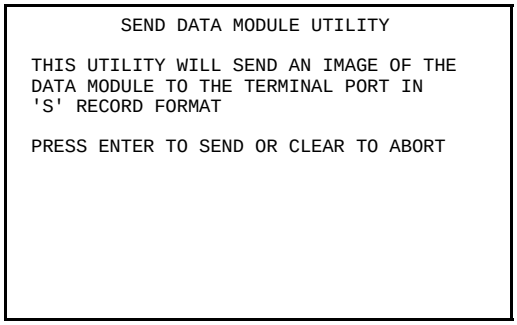


Main Menu (F1)-8-6-3

Send Data Module

Generates an image of data module then sends it to a TERMINAL port to a personal computer using ProComm (or equivalent).

1. Connect printer or personal computer running ProComm (or equivalent) to TERMINAL port.
2. From Configuration Submenu select Terminal Port then make appropriate selections to configure for equipment used in step 1 above.
3. From Utilities Submenu select Send D.M.
4. Once utility screen is displayed, as shown here, press ENTER key to continue or press CLEAR key to abort operation.



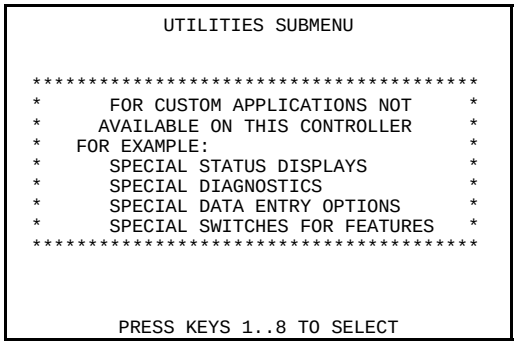
Main Menu (F1)-8-7

Custom Application

This utility option is reserved for user defined applications which can be specially designed and programmed at the factory for the user. When a user specified program is used, selection of this option may generate screens with custom menus, options, displays, etcetera. These screens may subsequently allow use of the controller and its data in ways other than those provided as the standard.

Some examples of custom applications include, but are not limited to, special status displays, diagnostics, data entry options, and switches for special features.

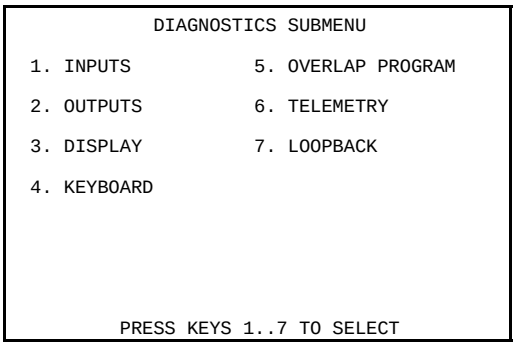
To use this feature you must contact the factory.



Main Menu (F1)-8-8

DIAGNOSTICS SUBMENU
Programming Summary

Do not enable diagnostics in this submenu while controller is in control of an intersection. Diagnostics allow verification, with Econolite tester, of correct controller operation. Tests may be selected individually from the submenu.



1. INPUTS
   Verify proper operation of controller input functions.
2. OUTPUTS
   Verify proper operation of controller output functions.
3. DISPLAY
   Verify proper operation of controller display screen, backlight, display adjust, characters, and cursor position.
4. KEYBOARD
   Verify proper operation of all controller keyboard keys.
5. OVERLAP PROGRAM
   Displays current overlap card programming.
6. TELEMETRY
   Test for telemetry mark, space, modem, and I/o loopback.
7. LOOPBACK
   Test all connectors.

Inputs

Do not enable input diagnostic while controller is in control of an intersection. Diagnostics allow verification of correct controller input functions for up to eight phases. Fault and Voltage Monitor are set FALSE during input test.

1. Setup controller and suitcase tester as required and power up controller.
2. From Main Menu select Diagnostics then select Inputs. A warning screen is displayed as shown here.
3. Press ENTER key to continue with input diagnostics or press F3 (Submenu) to exit.
4. If diagnostic is continued the next screen is displayed to allow selection of a three-second time delay between each test error. "For a 3 second delay after each input error press 1, else press 0."

   If the delay option is selected, the controller is set to flash. You may continue the test and expect a 3 second delay after an error is detected. If 0 is pressed for no delay then controller is set to flash and you may continue the test.

   Diagnostics continue by displaying the first of seven screens listing controller inputs on A, B, C, D, and telemetry connectors.
5. To verify correct operation of input functions press the desired input button on the suitcase tester (set input TRUE) and observe X appearing at the corresponding input on the controller screen.
6. Press F6 Next Page function key to view the remaining screens.

```
INPUT DIAGNOSTIC CONNECTORS A, B & C

PHASE          1  2  3  4  5  6  7  8
VEH DETECTOR..
PED DETECTOR..
HOLD.........
PHASE OMIT....
PED OMIT......
```

Main Menu (F1)-9-1

```
INPUT DIAGNOSTIC CONNECTORS A, B & C

     RING 1              RING 2

MAX RED STP FRC     MAX RED STP FRC
INH RST TIM OFF     INH RST TIM OFF


PED MAX OMT         PED MAX OMT
REC  2  AR          REC  2  AR
```

(Next Page)

```
INPUT DIAGNOSTIC CONNECTORS A, B & C

PHASE          1  2  3  4  5  6  7  8
VEH DETECTOR..
PED DETECTOR..
HOLD.........
PHASE OMIT....
PED OMIT......
```

(Next page)

```
****************************************
*              WARNING                 *
*                                      *
* THIS DIAGNOSTIC RESULTS IN           *
* INTERSECTION FLASH! PRESS ENTER TO   *
* PROCEED OR SUBMENU TO EXIT.          *
*                                      *
****************************************
```

Input diagnostic screens

```
    INPUT DIAGNOSTIC CONNECTORS A, B & C


MIN  WRST CNA  CNA  TEST TEST TEST
REC  MOD   1    2    A    B    C


INT  MCON LAMP EXT       I/O  MODE
ADV   EN  OFF  STRT     A    B    C


PMT  PMT  PMT  PMT  CORD
 2    4    5    6   FREE
```

(Next page)

```
      INPUT DIAGNOSTIC CONNECTOR D


 CYC  CYC  CYC  CORD OFT  OFT  OFT  REM
  1    2    3   FREE  1    2    3   FLSH
  X    X             X    X


 SPLT SPLT DUAL SPLT PMT  PMT  TIME
  1    2   CORD DMD   1    2   RESET


 PMT  PMT  PMT  PMT
  3    4    5    6
```

(Next page)

```
      INPUT DIAGNOSTIC CONNECTOR D


 CORD TEST TEST TEST CMU
 SYNC  C    D    E   ST



        EXPANDED DETECTORS
  1    2    3    4    5    6    7    8
```

(Next page)

```
   INPUT DIAGNOSTIC TELEMETRY CONNECTOR


 LOC  MAIN ALRM ALRM CMU  EXTD TLM  TLM
 FLSH REQD  1    2   FLSH ADDR SP1  SP2



         SYSTEM DETECTORS
  1    2    3    4    5    6    7    8
```

(Next page)

Outputs

Do not enable output diagnostic while controller is in control of an intersection. Diagnostic allows verification of correct controller output functions. Fault and Voltage Monitor are set FALSE during output test.

1. Setup controller and suitcase tester as required and power up controller.
2. From Main Menu select Diagnostics then select Outputs. A warning screen is displayed as shown here.
3. Press ENTER key to continue with output diagnostics or press F3 Submenu to exit.
4. If diagnostic is continued a second screen is displayed to allow selection of a three second time delay between each test error. "For a 3 second delay after each input error press 1, else press 0".

   If delay option is selected controller is set to flash. User may continue test and expect a 3 second delay after an error is detected. If 0 is pressed for no delay then controller is set to flash and user may continue test.

   Diagnostic continues by displaying the first of five screens listing controller outputs on A, B, C, D, and telemetry connectors.
5. To verify correct operation of input functions move cursor to desired output function and press toggle key and observe LED ON/OFF condition at the corresponding output at suitcase tester.
6. Press F6 Next Page function key to view the remaining screens.

```
**************************************
*              WARNING               *
*                                    *
* THIS DIAGNOSTIC RESULTS IN         *
* INTERSECTION FLASH! PRESS ENTER TO  *
* PROCEED OR SUBMENU TO EXIT.        *
*                                    *
**************************************
```

```
   OUTPUT DIAGNOSTIC CONNECTORS A, B & C


 PHASE           1  2  3  4  5  6  7  8

 RED...........
 YELLOW........
 GREEN.........
 WALK..........
 DON'T WALK....
 PED CLEAR.....
 CHECK.........
 PHASE ON......
 PHASE NEXT....

         PRESS TOGGLE TO CHANGE
```

Main Menu (F1)-9-2

```
   OUTPUT DIAGNOSTIC CONNECTORS A, B & C

     RING 1 STATUS       RING 2 STATUS
A     B     C      A     B     C


 OVERLAP      A     B      C      D

 RED
 YELLOW
 GREEN

 FLASHING LOGIC


         PRESS TOGGLE TO CHANGE
```

(Next page)

```
       OUTPUT DIAGNOSTIC CONNECTOR D


 CYC  CYC  CYC  SYNC OFT  OFT  OFT XSTR
  1    2    3   OUT   1    2    3  SYNC


 SPLT SPLT NIC  NIC  PMT  PMT  CMU  CORD
  1    2   SF1  SF2   1    2   INLK STAT


         PRESS TOGGLE TO CHANGE
```

(Next page)

Output diagnostic screens

```
       OUTPUT DIAGNOSTIC CONNECTOR D

PMT  PMT  PMT  PMT
 3    4    5    6


              SPARE OUTPUTS
 1    2    3    4    5    6    7    8


  OUTPUT DIAGNOSTIC TELEMETRY CONNECTOR

TLM  TLM  TLM  TLM
SF1  SF2  SF3  SF4

         PRESS TOGGLE TO CHANGE
```

(Next page)

```
   OUTPUT DIAGNOSTIC CONNECTORS A, B & C


PHASE           1  2  3  4  5  6  7  8

RED...........
YELLOW........
GREEN.........
WALK..........
DON'T WALK....
PED CLEAR.....
CHECK.........
PHASE ON......
PHASE NEXT....

         PRESS TOGGLE TO CHANGE
```

(Next page)

Display

Diagnostics test all ASC/2 display functions. Verify display operation periodically by selecting one or more tests. Press numeric keys 1-6 to initiate the corresponding display diagnostic. Diagnostic begins immediately then a pass/fail status message is displayed. To leave screens, push MENU, SUBMENU, CLEAR or STATUS DISPLAY keys. A warning screen appears before the user is allowed to select diagnostics. Warning: THIS DIAGNOSTIC RESULTS IN INTERSECTION FLASH! PRESS ENTER TO PROCEED OR SUBMENU TO EXIT.

Cursor Address
Tests cursor position. User observes display filling up with characters. The four corners point should be in the middle of the screen, with 8 lines above and below, 20 columns to the left and right.

Character Font
Shows all characters used on display. User should verify that all 77 characters are properly shaped and not have any missing pixels.

Display Adjust
Display contrast of the LCD is automatically changed under control of the internal test program.

Back lighting
Display back lighting is turned ON and OFF automatically.

Keyboard

Tests all front panel keys. User is prompted to press each key in a particular order. Verify correct operation by observing that key name/identifier is displayed on the controller screen as it is pressed. Once keyboard diagnostic test is in operation you must continue pressing keys as prompted until test is complete or test is terminated after 20 seconds if keys are not pressed as prompted. Warning screen appears before test begins. Warning: THIS DIAGNOSTIC RESULTS IN INTERSECTION FLASH! PRESS ENTER TO PROCEED OR SUBMENU TO EXIT.

Full-Screen
All pixel positions are set to black under control of the internal test program. Only spaces between the character positions should remain blank.

All Tests For Display
Diagnostic program automatically cycles through display tests 1-5.

```
              DISPLAY SUBMENU

             1. CURSOR ADDRESS

             2. CHARACTER FONT

             3. DISPLAY ADJUST

             4. BACKLIGHTING

             5. FULL SCREEN

             6. ALL TESTS


          PRESS KEYS 1..6 TO SELECT
```

Main Menu (F1)-9-3

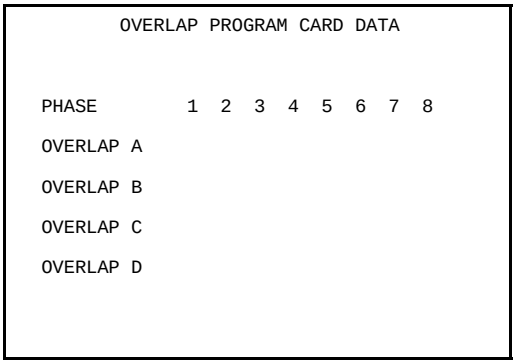
```
XX  XX         U         1    2    3
XX  XX    L         R    4    5    6
XX  XX         D         7    8    9
XX  XX       ENTER       X    0    X



Press 'F1' key
```

Main Menu (F1)-9-4

DIAGNOSTICS SUBMENU
Overlap Program / Telemetry / Loopback

Overlap Program

Display only - no entries required. Screen shows current overlap card programming. X indicates which phases 1-8 have been assigned to NEMA overlaps A-D sing the plug-in overlap card. Display does not show overlaps which have been programmed through software.



Main Menu (F1)-9-5

Telemetry

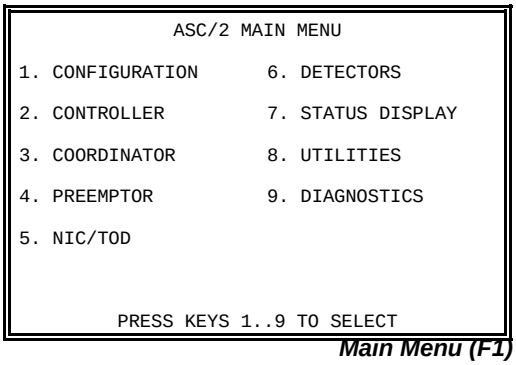
1. From Diagnostics Submenu select Telemetry to display telemetry diagnostics submenu.
2. Select from four tests. Press desired test number 1 through 4 to begin test immediately.
   1. MARK - message indicates test in progress.
   2. SPACE - message indicates test in progress.
   3. MODEM - tests receiver and transmitter message indicates test in progress.
   4. TELEM I/O LOOPBACK - displays error code then pass/fail test status. User is allowed option of 3 second delay after occurrence of each error.
3. Select another test or press F1, F3, F7 or CLEAR to exit.

Loopback

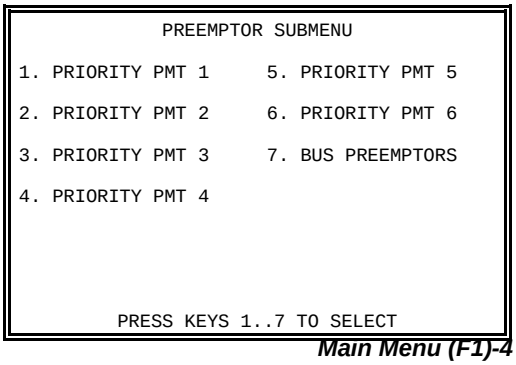
Warning screen appears before user is allowed to select diagnostics. Warning: THIS DIAGNOSTIC RESULTS IN INTERSECTION FLASH! PRESS ENTER TO PROCEED OR SUBMENU TO EXIT.

1. From Diagnostics Submenu select Telemetry to display loopback diagnostics submenu. User is allowed selection of 3 second delay after each error.
2. Select from five tests. Press desired test number 1 through 5 to begin test immediately.
   1. STD I/O - tests A, B, and C connectors
   2. EXP I/O - tests D and telemetry connectors
   3. TERMINAL - tests terminal connector
   4. SDLC - tests synchronous data link communications connector
   5. ALL - tests all of the above (1-4).

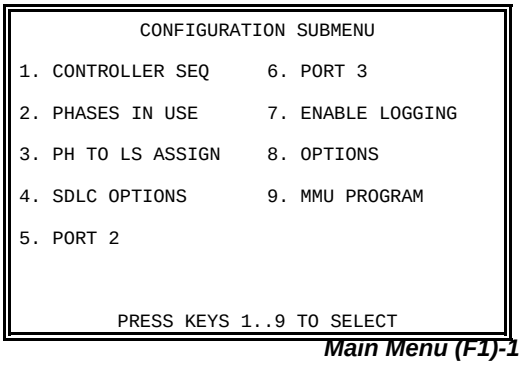
Programming Reference



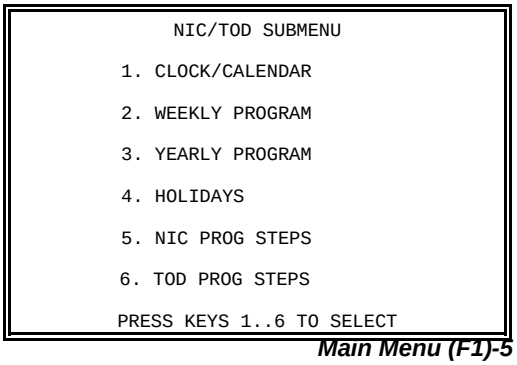
Main Menu (F1)



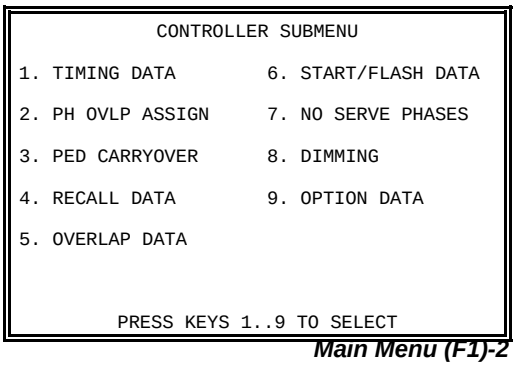
Main Menu (F1)-4



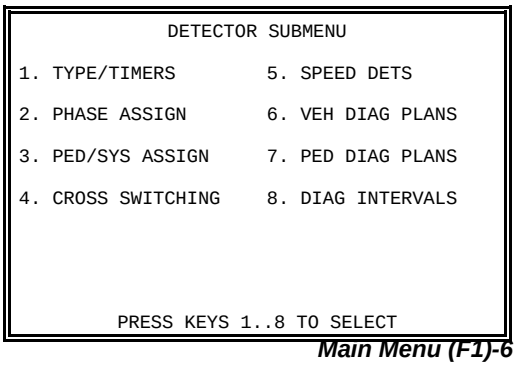
Main Menu (F1)-1



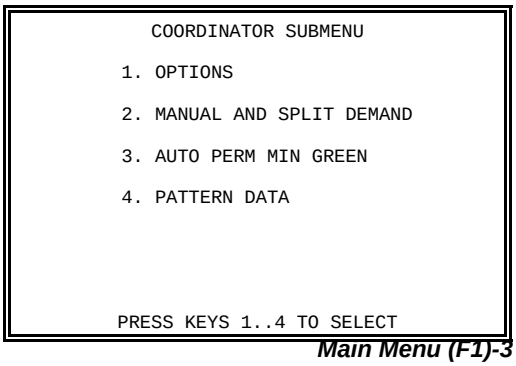
Main Menu (F1)-5



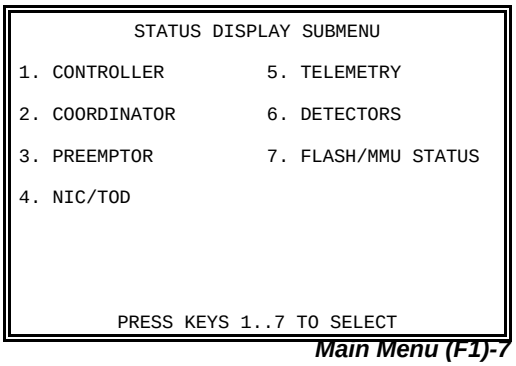
Main Menu (F1)-2



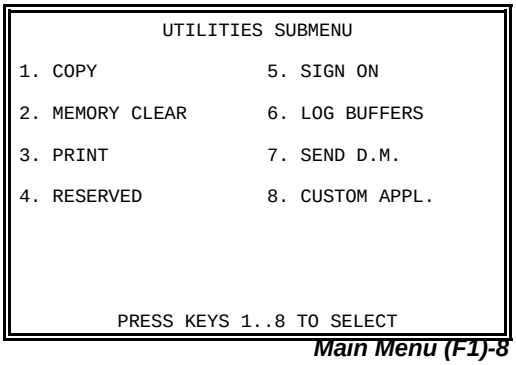
Main Menu (F1)-6



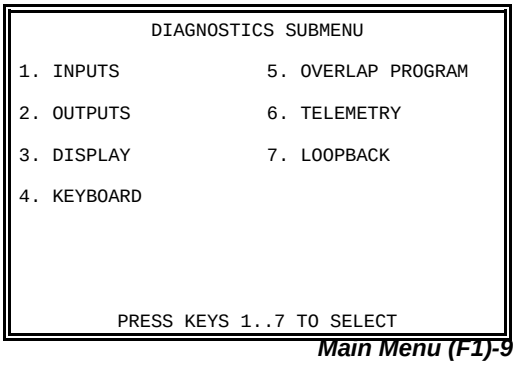
Main Menu (F1)-3



Main Menu (F1)-7



Main Menu (F1)-8



Main Menu (F1)-9

Configuration Submenu

```
          CONFIGURATION SUBMENU

1. CONTROLLER SEQ      6. PORT 3

2. PHASES IN USE       7. ENABLE LOGGING

3. PH TO LS ASSIGN     8. OPTIONS

4. SDLC OPTIONS        9. MMU PROGRAM

5. PORT 2


       PRESS KEYS 1..9 TO SELECT
```

Main Menu (F1)-1

1. CONTROLLER SEQ

```
            CONTROLLER SEQUENCE

    ------------ PRIORITY ------------
                               1  1  1
    1..2..3..4..5..6..7..8..9..0..1..2
R1  1  2| 3  4| 9 10| 0  0  0  0  0  0
R2  5  6| 7  8|11 12| 0  0  0  0  0  0
CG   .  ^  .  ^  .  ^  .  .  .  .  .  .

R1,R2 = RING 1 AND 2 PHASE ASSIGNMENT.

CG    = BARRIER LOCATION BETWEEN
        CONCURRENT PHASE TIMING GROUPS.

END OF SUBMENU
```

Main Menu (F1)-1-1

2. PHASES IN USE

```
                PHASES IN USE

      ----- PHASE NUMBER ----
                                 1 1 1
                 1 2 3 4 5 6 7 8 9 0 1 2
 PHASES IN USE   X X X X X X X X . . . .
 EXCLUSIVE PED   . . . . . . . . . . . .









END OF SUBMENU
```

Main Menu (F1)-1-2

3. PH TO LS ASSIGN

```
 PHASE TO LOAD SWITCH (MMU) ASSIGNMENT

  LOAD       SIGNAL     LOAD       SIGNAL
  SWITCH     DRIVER     SWITCH     DRIVER
  (MMU)      GROUP      (MMU)      GROUP
  CHANNEL PH/OLAP PED   CHANNEL PH/OLAP PED
     1       1     .      9       2     X
     2       2     .     10       4     X
     3       3     .     11       6     X
     4       4     .     12       8     X
     5       5     .     13      13     .
     6       6     .     14      14     .
     7       7     .     15      15     .
     8       8     .     16      16     .
ENTER 13-16 FOR OVERLAPS A-D
END OF SUBMENU
```

Main Menu (F1)-1-3

4. SDLC OPTIONS

```
          SDLC OPTIONS/ENABLES

                  ----- BIU NUMBER -----
                  1..2..3..4..5..6..7..8
TERM & FACIL...   .  .  .  .  .  .  .  .
DETECTOR RACK..   .  .  .  .  .  .  .  .

TYPE 2 RUNS AS TYPE 1.............. .
MMU DISABLE........................ X
DIAGNOSTIC ENABLE (TEST FIXTURE)..... .
PEER TO PEER ENABLE................. .

PEER TO PEER ADDRESSES:
1) 255  2) 255  3) 255  4) 255   5) 255
6) 255  7) 255  8) 255  9) 255  10) 255
END OF SUBMENU
```

Main Menu (F1)-1-4

5. PORT 2

```
          PORT2 CONFIGURATION

PORT2 PROTOCOL.............    TERMNL
PORT2 ENABLE...............        NO

AB3418 ADDRESS.............         0
AB3418 GROUP ADDRESS.......         0
AB3418 RESPONSE DELAY......         0
AB3418 SINGLE FLAG ENABLE..        NO
AB3418 DROP-OUT TIME.......         0
AB3418 TOD SF SELECT.......         0
DTE/DCE SELECT ............       DTE
DATA RATE (BPS)............      9600
DATA, PARITY, STOP.........   8, N, 1

END OF SUBMENU
```

Main Menu (F1)-1-5

6. PORT 3

```
          PORT3 CONFIGURATION

PORT2 PROTOCOL.............     TELEM
PORT2 ENABLE...............       YES

TELEMETRY ADDRESS..........         1
SYSTEM DETECTOR 9-16 ADDRESS..      0
TELEMETRY RESPONSE DELAY...... 6000

AB3418 ADDRESS.............         0
AB3418 GROUP ADDRESS.......         0
AB3418 RESPONSE DELAY......         0
AB3418 SINGLE FLAG ENABLE..        NO
AB3418 DROP-OUT TIME.......         0
AB3418 TOD SF SELECT.......         0
ADDITIONAL SCREEN(S)
```

```
DUPLEX - HALF OR FULL.....      FULL
MODEM DATA RATE (BPS).....      1200
DATA, PARITY, STOP........    8,0,1
```

Main Menu (F1)-1-6

7. ENABLE LOGGING

```
            ENABLE EVENT LOGS

 CRITICAL RFE'S (MMU/TF) . . . . . .   X
 NON-CRITICAL RFE'S (DET/TEST) . . .   X
 DETECTOR ERRORS . . . . . . . . . .   X
 COORDINATION ERRORS . . . . . . . .   X
 MMU FLASH FAULTS  . . . . . . . . .   X
 LOCAL FLASH FAULTS  . . . . . . . .   X
 PREEMPT . . . . . . . . . . . . . .   X
 POWER ON/OFF  . . . . . . . . . . .   X
 LOW BATTERY . . . . . . . . . . . .   X
 SPARE . . . . . . . . . . . . . . .   X
 ALARM 1 . . . . . . . . . . . . . .   .
 ALARM 2 . . . . . . . . . . . . . .   .
 ALARM 3 . . . . . . . . . . . . . .   .
 ADDITIONAL SCREEN(S)
```

```
 ALARM 4 . . . . . . . . . . . . . .   .
 ALARM 5 . . . . . . . . . . . . . .   .
 ALARM 6 . . . . . . . . . . . . . .   .
 ALARM 7 . . . . . . . . . . . . . .   .
 ALARM 8 . . . . . . . . . . . . . .   .
 ALARM 9 . . . . . . . . . . . . . .   .
 ALARM 10. . . . . . . . . . . . . .   .
 ALARM 11. . . . . . . . . . . . . .   .
 ALARM 12. . . . . . . . . . . . . .   .
 ALARM 13. . . . . . . . . . . . . .   .
 ALARM 14 . . . . . . . . . . . . . .  .
 ALARM 15. . . . . . . . . . . . . .   .
 ALARM 16. . . . . . . . . . . . . .   .
```

Main Menu (F1)-1-7

8. OPTIONS

```
                 OPTIONS


  SUPERVISOR ACCESS CODE...... 0000

  DATA CHANGE ACCESS CODE..... 0000

  KEY CLICK ENABLE............  YES

  BACKLIGHT ENABLE............  YES




             END OF SUBMENU
```

Main Menu (F1)-1-8

9. MMU PROGRAM

```
                 MMU PROGRAM
 CAN SERVE WITH:
            1 1 1 1 1 1 1
 PHASE      6 5 4 3 2 1 0 9 8 7 6 5 4 3 2
   1        . . . . . . . . . . . . . . .
   2        . . . . . . . . . . . . . .
   3        . . . . . . . . . . . . .
   4        . . . . . . . . . . . .
   5        . . . . . . . . . . .
   6        . . . . . . . . . .
   7        . . . . . . . . .
   8        . . . . . . . .
   9        . . . . . . .
  10        . . . . . .
  11        . . . . .
  ADDITIONAL SCREEN(S)
```

Main Menu (F1)-1-9

```
                 MMU PROGRAM
 CAN SERVE WITH:
            1 1 1 1 1 1 1
 PHASE      6 5 4 3 2 1 0 9 8 7 6 5 4 3 2
   12       . . . .
   13       . . .
   14       . .
   15       .
```

CONTROLLER SUBMENU

```
            CONTROLLER SUBMENU

1. TIMING DATA       6. START/FLASH DATA

2. PH OVLP ASSIGN    7. NO SERVE PHASES

3. PED CARRYOVER     8. DIMMING

4. RECALL DATA       9. OPTION DATA

5. OVERLAP DATA




         PRESS KEYS 1..9 TO SELECT
```

Main Menu (F1)-2

1. TIMING DATA

```
CONTROLLER TIMING DATA
PHASE...    1...2...3...4...5...6...7...8
MIN GRN.    5   5   5   5   5   5   5   5
BIKE GRN    0   0   0   0   0   0   0   0
CS MGRN.    0   0   0   0   0   0   0   0
WALK....    0   3   0   3   0   3   0   3
PED CLR.    0   7   0   7   0   7   0   7
VEH EXT. 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0
VEH EXT2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
MAX EXT.    0   0   0   0   0   0   0   0
MAX1....   35  35  35  35  35  35  35  35
MAX2....   40  40  40  40  40  40  40  40
MAX3....    0   0   0   0   0   0   0   0
DET MAX.    0   0   0   0   0   0   0   0

ADDITIONAL SCREEN(S)                MORE->
```

Main Menu (F1)-2-1

```
          CONTROLLER TIMING DATA
 PHASE...    9..10..11..12
 MIN GRN.    5   5   5   5
 BIKE GRN    0   0   0   0
 CS MGRN.    0   0   0   0
 WALK....    0   3   0   3
 PED CLR.    0   7   0   7
 VEH EXT. 5.0 5.0 5.0 5.0
 VEH EXT2 0.0 0.0 0.0 0.0
 MAX EXT.    0   0   0   0
 MAX1....   35  35  35  35
 MAX2....   40  40  40  40
 MAX3....    0   0   0   0
 DET MAX.    0   0   0   0

 ADDITIONAL SCREEN(S)              <-MORE
```

```
          CONTROLLER TIMING DATA
PHASE...    1...2...3...4...5...6...7...8
YELLOW.. 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0
RED CLR. 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
RED RVT. 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0

ACT B4..    0   0   0   0   0   0   0   0
SEC/ACT. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
MAX INI.   30  30  30  30  30  30  30  30
TIME B4.    0   0   0   0   0   0   0   0
CARS WT.    0   0   0   0   0   0   0   0
TTREDUC.    0   0   0   0   0   0   0   0
MIN GAP. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0


END OF SUBMENU                      MORE->
```

```
          CONTROLLER TIMING DATA
PHASE...    9..10..11..12
YELLOW.. 3.0 3.0 3.0 3.0
RED CLR. 1.0 1.0 1.0 1.0
RED RVT. 2.0 2.0 2.0 2.0

ACT B4..    0   0   0   0
SEC/ACT. 0.0 0.0 0.0 0.0
MAX INI.   30  30  30  30
TIME B4.    0   0   0   0
CARS WT.    0   0   0   0
TTREDUC.    0   0   0   0
MIN GAP. 0.0 0.0 0.0 0.0


END OF SUBMENU                    <-MORE
```

2. PH OVLP ASSIGN

```
          PHASE OVERLAP ASSIGNMENTS
OVERLAP CONSISTS OF PHASES:          1 1 1
OVLP PHASE          1 2 3 4 5 6 7 8 9 0 1 2
     1              X . . . . . . . . . . .
     2              . X . . . . . . . . . .
     3              . . X . . . . . . . . .
     4              . . . X . . . . . . . .
     5              . . . . X . . . . . . .
     6              . . . . . X . . . . . .
     7              . . . . . . X . . . . .
     8              . . . . . . . X . . . .
     9              . . . . . . . . X . . .
    10              . . . . . . . . . X . .
    11              . . . . . . . . . . X .
    12              . . . . . . . . . . . X
END OF SUBMENU
```

Main Menu (F1)-2-2

3. PED CARRYOVER

```
          PED TIMING CARRYOVER

         PHASE      CARRYOVER PHASE
           1              0
           2              0
           3              0
           4              0
           5              0
           6              0
           7              0
           8              0
           9              0
          10              0
          11              0
          12              0
END OF SUBMENU
```

Main Menu (F1)-2-3

4. RECALL DATA

```
          CONTROLLER RECALL DATA

PHASE:                              1 1 1
PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
LOCKING MEMORY. X X X X X X X X X X X X
VEHICLE RECALL. . . . . . . . . . . . .
PED RECALL.....  . . . . . . . . . . . .
RECALL TO MAX..  . . . . . . . . . . . .
SOFT RECALL....  . . . . . . . . . . . .
DON'T REST HERE  . . . . . . . . . . . .
PED DARK N/CALL  . . . . . . . . . . . .




END OF SUBMENU
```

Main Menu (F1)-2-4

APPENDIX A. PROGRAMMING REFERENCE

5. OVERLAP DATA

```
        CONTROLLER OVERLAP DATA

                                  1 1 1
 OVERLAP A.....   1 2 3 4 5 6 7 8 9 0 1 2
 STANDARD......   . . . . . . . . . . . .
 PROTECTED.....   . . . . . . . . . . . .
 PERMITTED.....   . . . . . . . . . . . .
 ENABLE LAG....   . . . . . . . . . . . .
 ENABLE LEAD...   . . . . . . . . . . . .
 SPARE.........   . . . . . . . . . . . .

      ADVANCE GREEN TIMER      0.0
      LAG/LEAD GREEN TIMER     0.0
      LAG/LEAD YELLOW TIMER    0.0
      LAG/LEAD RED TIMER       0.0
ADDITIONAL PAGE(S)
```

```
                                  1 1 1
 OVERLAP B.....   1 2 3 4 5 6 7 8 9 0 1 2
 STANDARD......   . . . . . . . . . . . .
 PROTECTED.....   . . . . . . . . . . . .
 PERMITTED.....   . . . . . . . . . . . .
 ENABLE LAG....   . . . . . . . . . . . .
 ENABLE LEAD...   . . . . . . . . . . . .
 SPARE.........   . . . . . . . . . . . .

      ADVANCE GREEN TIMER      0.0
      LAG/LEAD GREEN TIMER     0.0
      LAG/LEAD YELLOW TIMER    0.0
      LAG/LEAD RED TIMER       0.0
 ADDITIONAL PAGE(S)
```

```
                                  1 1 1
 OVERLAP C.....   1 2 3 4 5 6 7 8 9 0 1 2
 STANDARD......   . . . . . . . . . . . .
 PROTECTED.....   . . . . . . . . . . . .
 PERMITTED.....   . . . . . . . . . . . .
 ENABLE LAG....   . . . . . . . . . . . .
 ENABLE LEAD...   . . . . . . . . . . . .
 SPARE.........   . . . . . . . . . . . .

      ADVANCE GREEN TIMER      0.0
      LAG/LEAD GREEN TIMER     0.0
      LAG/LEAD YELLOW TIMER    0.0
      LAG/LEAD RED TIMER       0.0
 ADDITIONAL PAGE(S)
```

```
                                  1 1 1
 OVERLAP D.....   1 2 3 4 5 6 7 8 9 0 1 2
 STANDARD......   . . . . . . . . . . . .
 PROTECTED.....   . . . . . . . . . . . .
 PERMITTED.....   . . . . . . . . . . . .
 ENABLE LAG....   . . . . . . . . . . . .
 ENABLE LEAD...   . . . . . . . . . . . .
 SPARE.........   . . . . . . . . . . . .

      ADVANCE GREEN TIMER      0.0
      LAG/LEAD GREEN TIMER     0.0
      LAG/LEAD YELLOW TIMER    0.0
      LAG/LEAD RED TIMER       0.0
 ADDITIONAL PAGE(S)
```

```
PED OVERLAP ASSIGNMENTS
 OVERLAP CONSISTS OF PHASES:      1 1 1
 OVLP PHASE       1 2 3 4 5 6 7 8 9 0 1 2
      1           . . . . . . . . . . . .
      2           . . . . . . . . . . . .
      3           . . . . . . . . . . . .
      4           . . . . . . . . . . . .
      5           . . . . . . . . . . . .
      6           . . . . . . . . . . . .
      7           . . . . . . . . . . . .
      8           . . . . . . . . . . . .
      9           . . . . . . . . . . . .
     10           . . . . . . . . . . . .
     11           . . . . . . . . . . . .
     12           . . . . . . . . . . . .
 END OF SUBMENU
```

Main Menu (F1)-2-5

6. START/FLASH DATA

```
        CONTROLLER START/FLASH DATA
                                      1 1 1
 PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
 POWER START....  . X . . . X . . . . . .
 EXTERNAL START.  . X . . . X . . . . . .
 ENTRY REM FLASH  . X . . . X . . . . . .
 EXIT REM FLASH.  . X . . . X . . . . . .
 REM FLASH YEL..  . . . . . . . . . . . .
 FL TOGETHER PHS  . X . X . X . X . X . X
 FL TOGETHER OVLPS A: .  B: .  C: .  D: .

 POWER START.............   YELLOW
 EXTERNAL START..........   YELLOW
 POWER START ALL RED TIME..  0 SECONDS
 POWER START FLASH TIME....  0 SECONDS
 ADDITIONAL PAGE(S)
```

```
 REMOTE FLASH OPTIONS:

 OUT OF FLASH YELLOW..... .
 OUT OF FLASH ALL RED..... X
 MINIMUM RECALL.......... .
 SPARE................... .
 FLASH THRU LOAD SWITCHES.... .
 CYCLE THROUGH PHASES..... .




 END OF SUBMENU
```

Main Menu (F1)-2-6

7. NO SERVE PHASES

```
            NO SERVE PHASES
 CANNOT SERVE WITH: 1 1 1
 PHASE              2 1 0 9 8 7 6 5 4 3 2
   1                . . . . . . . . . . .
   2                . . . . . . . . . .
   3                . . . . . . . . .
   4                . . . . . . . .
   5                . . . . . . .
   6                . . . . . .
   7                . . . . .
   8                . . . .
   9                . . .
  10                . .
  11                .

 END OF SUBMENU
```

Main Menu (F1)-2-7

8. DIMMING

```
                DIMMING


LOAD SWITCH....  1..2..3..4..5..6..7..8
DIM GRN/WLK....  .  .  .  .  .  .  .  .
DIM YEL/PC.....  .  .  .  .  .  .  .  .
DIM RED/DW.....  .  .  .  .  .  .  .  .

LOAD SWITCH....  9.10.11.12.13.14.15.16
DIM GRN/WLK....  .  .  .  .  .  .  .  .
DIM YEL/PC.....  .  .  .  .  .  .  .  .
DIM RED/DW.....  .  .  .  .  .  .  .  .



END OF SUBMENU
```

Main Menu (F1)-2-8

9. OPTION DATA

```
     CONTROLLER OPTION DATA
                                    1 1 1
PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
GUAR PASSAGE...  . . . . . . . . . . . .
NONACTUATED I..  . X . . . X . . . . . .
NONACTUATED II.  . . . X . . . X . . . .
DUAL ENTRY.....  . X . X . X . X . X . X
COND SERVICE...  X . X . X . X . X . X .
COND RESERVICE.  . . . . . . . . . . . .
REST IN WALK...  . . . . . . . . . . . .
FLASHING WALK..  . . . . . . . . . . . .

----- FIVE SECTION LEFT TURN HEADS -----
5-2 :  .     7-4 :  .     1-6 :  .
3-8 :  .    11-10:  .    9-12 :  .
ADDITIONAL PAGE(S)
```

```
 DUAL ENTRY..................... OFF
 COND SERVICE ENABLE............ OFF
 COND SERVICE DET X SWITCHING.... OFF
 PED CLR PROTECT................ OFF
 SPEC PREEMPT OVLP FLASH........ OFF
 LOCK DETECTORS IN RED ONLY..... OFF
 RESERVED....................... OFF
 RESERVED....................... OFF
 BACKUP PROTECTION GROUP 1...... OFF
 BACKUP PROTECTION GROUP 2...... OFF
 BACKUP PROTECTION GROUP 3...... OFF
 SIMULTANEOUS GAP GROUP 1....... OFF
 SIMULTANEOUS GAP GROUP 2....... OFF
 SIMULTANEOUS GAP GROUP 3....... OFF
 END OF SUBMENU
```

Main Menu (F1)-2-9

APPENDIX A. PROGRAMMING REFERENCE

COORDINATOR SUBMENU

```
          COORDINATOR SUBMENU

        1. OPTIONS

        2. MANUAL AND SPLIT DEMAND

        3. AUTO PERM MIN GREEN

        4. PATTERN DATA




        PRESS KEYS 1..4 TO SELECT
```

Main Menu (F1)-3

1. OPTIONS

```
          COORDINATOR OPTIONS

SPLIT UNITS..    %    ACT CRD PHASE..  X
OFFSET UNITS.    %    ACT WALK/REST..  X
INTERCNT FMT.  STD    INHIBIT MAX....  X
INTERCNT SRC.  HDW    MAX2 SELECT....  .
RESYNC COUNT.    0    MULTISYNC......  .
TRANSITION...  SMOOTH FLOAT FORCE OFF  .
DWELL PERIOD.    0%


                           A B C D E F
FREE ALTERNATE SEQUENCE    . . . . . .


END OF SUBMENU
```

Main Menu (F1)-3-1

2. MANUAL AND SPLIT DEMAND

```
      COORD MANUAL AND SPLIT DEMAND

MANUAL ENABLE: OFF    MANUAL PATTERN   0

----------------------------------------

SPLIT DEMAND:       DEMAND 1  DEMAND 2
DEMAND CALL TIME         0s        0s
DEMAND CYCLE COUNT       0         0

                                  1 1 1
DEMAND PHASE:    1 2 3 4 5 6 7 8 9 0 1 2
DEMAND 1 PHASES  . . . . . . . . . . . .
DEMAND 2 PHASES  . . . . . . . . . . . .

END OF SUBMENU
```

Main Menu (F1)-3-2

3. AUTO PERM MIN GREEN

```
        COORD AUTO PERM MIN GREEN

        PHASE   AUTO PERM MIN GRN
          1              0s
          2              0s
          3              0s
          4              0s
          5              0s
          6              0s
          7              0s
          8              0s
          9              0s
         10              0s
         11              0s
         12              0s
END OF SUBMENU
```

Main Menu (F1)-3-3

4. PATTERN DATA

STD FORMAT

```
COORD PATTERN  1

CYCLE LENGTH.....  80s  C/O/S.....  331
OFFSET...........   0%
SPLITS:
PHASE  1) 20%   2) 30%   3) 20%   4) 30%
PHASE  5) 20%   6) 30%   7) 20%   8) 30%
PHASE  9)  0%  10)  0%  11)  0%  12)  0%

VEH PERMISSIVE.......  [1]   0% [2]   0%
VEH PERM 2 DISP......   0%
PHASE RESERVICE......   .
SPLIT EXTENSION/RING.  [1]   0% [2]   0%
SPL DMD PATTERN......  [1]   0  [2]   0
XARTERY PATTERN......   0
ADDITIONAL SCREEN(S)
```

```
                                  1 1 1
PHASE            1 2 3 4 5 6 7 8 9 0 1 2
COORD PHASES     . X . . . X . . . . . .
VEHICLE RECALL   . . . . . . . . . . . .
VEH MAX RECALL   . . . . . . . . . . . .
PED RECALL       . . . . . . . . . . . .
PHASE OMIT       . . . . . . . . . . . .
SPARE            . . . . . . . . . . . .

                 A B C D E F
ALT SEQUENCE:    . . . . . .



ADDITIONAL SCREEN(S)
```

Main Menu (F1)-3-4

PLAN FORMAT

```
COORD PATTERN  1

CYCLE LENGTH.....  80s PLAN.........  1
OFFSET...........   0%
SPLITS:
PHASE  1) 20%   2) 30%   3) 20%   4) 30%
PHASE  5) 20%   6) 30%   7) 20%   8) 30%
PHASE  9)  0%  10)  0%  11)  0%  12)  0%

VEH PERMISSIVE.......  [1]   0% [2]   0%
VEH PERM 2 DISP......   0%
PHASE RESERVICE......   .
SPLIT EXTENSION/RING.  [1]   0% [2]   0%
SPL DMD PATTERN......  [1]   0  [2]   0
XARTERY PATTERN......   0
ADDITIONAL SCREEN(S)
```

```
                                  1 1 1
PHASE            1 2 3 4 5 6 7 8 9 0 1 2
COORD PHASES     . X . . . X . . . . . .
VEHICLE RECALL   . . . . . . . . . . . .
VEH MAX RECALL   . . . . . . . . . . . .
PED RECALL       . . . . . . . . . . . .
PHASE OMIT       . . . . . . . . . . . .
SPARE            . . . . . . . . . . . .

                 A B C D E F
ALT SEQUENCE:    . . . . . .



ADDITIONAL SCREEN(S)
```

Main Menu (F1)-3-4

TS2 FORMAT

```
          COORD PATTERN  1, 2, 3

 CYCLE LENGTH.....  80s TIMING PLAN..  0
 OFFSET.1)  0%   2)  0%   3)  0%
 SPLITS:
 PHASE  1) 20%   2) 30%   3) 20%   4) 30%
 PHASE  5) 20%   6) 30%   7) 20%   8) 30%
 PHASE  9)  0%  10)  0%  11)  0%  12)  0%

 VEH PERMISSIVE.......  [1]   0% [2]   0%
 VEH PERM 2 DISP......   0%
 PHASE RESERVICE......   .
 SPLIT EXTENSION/RING.  [1]   0% [2]   0%
 SPL DMD PATTERN......  [1]   0  [2]   0
 XARTERY PATTERN......   0
 ADDITIONAL SCREEN(S)
```

```
                                  1 1 1
 PHASE            1 2 3 4 5 6 7 8 9 0 1 2
 COORD PHASES     . X . . . X . . . . . .
 VEHICLE RECALL   . . . . . . . . . . . .
 VEH MAX RECALL   . . . . . . . . . . . .
 PED RECALL       . . . . . . . . . . . .
 PHASE OMIT       . . . . . . . . . . . .
 SPARE            . . . . . . . . . . . .

                  A B C D E F
 ALT SEQUENCE:    . . . . . .




 ADDITIONAL SCREEN(S)
```

Main Menu (F1)-3-4

APPENDIX A. PROGRAMMING REFERENCE

PREEMPTOR SUBMENU

```
            PREEMPTOR SUBMENU

  1. PRIORITY PMT 1   5. PRIORITY PMT 5

  2. PRIORITY PMT 2   6. PRIORITY PMT 6

  3. PRIORITY PMT 3   7. BUS PREEMPTORS

  4. PRIORITY PMT 4




  PRESS KEYS 1..7 TO SELECT
```

Main Menu (F1)-4

1. PRIORITY PMT 1

```
      PRIORITY PREEMPTOR 1     1 1 1
 PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
 TERM PHASE OVLP  . . . . . . . . . . . .
 TRK CLR PHASE..  . . . . . . . . . . . .
 HOLD PHASES....  . . . . . . . . . . . .
 EXIT PHASES....  . . . . . . . . . . . .
 EXIT CALLS.....  . . . . . . . . . . . .
 SPARE..........  . . . . . . . . . . . .
 TERM OVERLAP...   A: .  B: .  C: .  D: .
 ACTIVE......... NO  PED DARK....... NO
 PRIORITY....... NO  PED ACTIVE..... NO
 DET LOCK....... NO  ZERO PC TIME... NO
 HOLD FLASH..... NO  PC THRU YELLOW. NO
 TERM OVLP ASAP. NO  TERM PHASES.... NO

 ADDITIONAL PAGE(S)
```

```
 DON'T OVERRIDE FLASH.....  .
 FLASH ALL OUTPUTS........  .
 YELLOW-RED GOES GREEN....  .
 ENABLE MAX PREEMPT TIME..  .
 ACTIVE ONLY DURING HOLD..  .
 NO CVM IN FLASH..........  .
 FAST FLASH GRN ON HOLD...  .
 OUT OF FLASH.............  GREEN




 ADDITIONAL PAGE(S)
```

```
 MAX TIME......  0  DURATION TIME.. 0
 MIN HOLD TIME.  0  DELAY TIME..... 0
 MIN PED CLEAR.  0  INHIBIT TIME... 0
 EXIT MAX......  0  HLD DELAY TIME. 0

                 GRN  YEL  RED
 MINIMUM.......    0  0.0  0.0
 TRACK CLEAR...    0  0.0  0.0
 HOLD..........       0.0  0.0



              END OF SUBMENU
```

Main Menu (F1)-4-1

2. PRIORITY PMT 2

```
      PRIORITY PREEMPTOR 2     1 1 1
 PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
 TERM PHASE OVLP  . . . . . . . . . . . .
 TRK CLR PHASE..  . . . . . . . . . . . .
 HOLD PHASES....  . . . . . . . . . . . .
 EXIT PHASES....  . . . . . . . . . . . .
 EXIT CALLS.....  . . . . . . . . . . . .
 SPARE..........  . . . . . . . . . . . .
 TERM OVERLAP...   A: .  B: .  C: .  D: .
 ACTIVE......... NO  PED DARK....... NO
 PRIORITY....... NO  PED ACTIVE..... NO
 DET LOCK....... NO  ZERO PC TIME... NO
 HOLD FLASH..... NO  PC THRU YELLOW. NO
 TERM OVLP ASAP. NO  TERM PHASES.... NO

 ADDITIONAL PAGE(S)
```

```
 DON'T OVERRIDE FLASH.....  .
 FLASH ALL OUTPUTS........  .
 YELLOW-RED GOES GREEN....  .
 ENABLE MAX PREEMPT TIME..  .
 ACTIVE ONLY DURING HOLD..  .
 NO CVM IN FLASH..........  .
 FAST FLASH GRN ON HOLD...  .
 OUT OF FLASH.............  GREEN




 ADDITIONAL PAGE(S)
```

```
 MAX TIME......  0  DURATION TIME.. 0
 MIN HOLD TIME.  0  DELAY TIME..... 0
 MIN PED CLEAR.  0  INHIBIT TIME... 0
 EXIT MAX......  0  HLD DELAY TIME. 0

                 GRN  YEL  RED
 MINIMUM.......    0  0.0  0.0
 TRACK CLEAR...    0  0.0  0.0
 HOLD..........       0.0  0.0

 LINKED PREEMPTOR.....0


 END OF SUBMENU
```

Main Menu (F1)-4-2

Preemptor screens for priority preemptors 3 through 5 not shown.

6. PRIORITY PMT 6

```
          PRIORITY PREEMPTOR 61

PHASE.....  1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP  . . . . . . . . . . .
TRK CLR PHASE..  . . . . . . . . . . .
HOLD PHASES....  . . . . . . . . . . .
EXIT PHASES....  . . . . . . . . . . .
EXIT CALLS.....  . . . . . . . . . . .
SPARE.....  . . . . . . . . . . . . .
TERM OVERLAP...   A: .  B: .  C: .  D: .
ACTIVE..... NO  PED DARK..... NO
PRIORITY..... NO  PED ACTIVE..... NO
DET LOCK..... NO  ZERO PC TIME... NO
HOLD FLASH..... NO  PC THRU YELLOW. NO
TERM OVLP ASAP. NO  TERM PHASES.... NO
```

```
DON'T OVERRIDE FLASH.....  .
FLASH ALL OUTPUTS........  .
YELLOW-RED GOES GREEN....  .
ENABLE MAX PREEMPT TIME..  .
ACTIVE ONLY DURING HOLD..  .
NO CVM IN FLASH..........  .
FAST FLASH GRN ON HOLD...  .
OUT OF FLASH.............  GREEN



ADDITIONAL PAGE(S)
```

```
MAX TIME......  0  DURATION TIME.. 0
MIN HOLD TIME.  0  DELAY TIME..... 0
MIN PED CLEAR.  0  INHIBIT TIME... 0
EXIT MAX......  0  HLD DELAY TIME. 0

                GRN  YEL  RED
MINIMUM.......    0  0.0  0.0
TRACK CLEAR...    0  0.0  0.0
HOLD..........       0.0  0.0

LINKED PREEMPTOR..... 0


END OF SUBMENU
```

Main Menu (F1)-4-6

7. BUS PREEMPTORS

```
                BUS PREEMPTOR

                    - BUS PREEMPTOR -
                     1    2    3    4
PREEMPTOR ACTIVE.    .    .    .    .
DETECTOR LOCK....    .    .    .    .
MAXIMUM TIME.....    0    0    0    0
RESERVICE TIME...    0    0    0    0
DELAY TIME.......    0    0    0    0
INHIBIT TIME.....    0    0    0    0
ENTRANCE GREEN...    0    0    0    0
ENTRANCE PED CLR.    0    0    0    0
ENTRANCE YELLOW..  0.0  0.0  0.0  0.0
ENTRANCE RED.....  0.0  0.0  0.0  0.0
MIN HOLD TIME....    0    0    0    0
ADDITIONAL PAGE(S)
```

Main Menu (F1)-4-7

```
                BUS PREEMPTOR

                  ------ HOLD PHASE -----
                                       1 1 1
                    1 2 3 4 5 6 7 8 9 0 1 2
PREEMPTOR 1....  . . . . . . . . . . . .
PREEMPTOR 2....  . . . . . . . . . . . .
PREEMPTOR 3....  . . . . . . . . . . . .
PREEMPTOR 4....  . . . . . . . . . . . .









END OF SUBMENU
```

APPENDIX A. PROGRAMMING REFERENCE

NIC/TOD SUBMENU

```
NIC/TOD SUBMENU

1. CLOCK/CALENDAR

2. WEEKLY PROGRAM

3. YEARLY PROGRAM

4. HOLIDAYS

5. NIC PROG STEPS

6. TOD PROG STEPS


PRESS KEYS 1..6 TO SELECT
```

Main Menu (F1)-5

1. CLOCK/CALENDAR

```
NIC/TOD CLOCK/CALENDAR DATA
15 APR 2001    SUN  WEEK 16     15:39:16

DATE SET:  3/18/94  | ENTER DATE/TIME
TIME SET:  5:39:28  | THEN PRESS ENTER

MANUAL NIC PROGRAM STEP    0
MANUAL TOD PROGRAM STEP    0

SYNC REFERENCE TIME    0:00
SYNC REFERENCE.........REFERENCE TIME

WEEK 1 BEGINS ON 1ST SUNDAY  .
DISABLE DAYLIGHT SAVINGS     .
DST BEGINS LAST SUNDAY       .
END OF SUBMENU
```

Main Menu (F1)-5-1

2. WEEKLY PROGRAM

```
NIC/TOD WEEKLY PROGRAMS
 WEEK  SUN  MON  TUE  WED  THU  FRI  SAT
   1    1    1    1    1    1    1    1
   2    1    1    1    1    1    1    1
   3    1    1    1    1    1    1    1
   4    1    1    1    1    1    1    1
   5    1    1    1    1    1    1    1
   6    1    1    1    1    1    1    1
   7    1    1    1    1    1    1    1
   8    1    1    1    1    1    1    1
   9    1    1    1    1    1    1    1
  10    1    1    1    1    1    1    1



 END OF SUBMENU
```

Main Menu (F1)-5-2

3. YEARLY PROGRAM

```
NIC/TOD YEARLY PROGRAM
 WEEK OF YEAR      1  2  3  4  5  6  7  8
 WEEKLY PROGRAM    1  1  1  1  1  1  1  1

 WEEK OF YEAR      9 10 11 12 13 14 15 16
 WEEKLY PROGRAM    1  1  1  1  1  1  1  1

 WEEK OF YEAR     17 18 19 20 21 22 23 24
 WEEKLY PROGRAM    1  1  1  1  1  1  1  1

 WEEK OF YEAR     25 26 27 28 29 30 31 32
 WEEKLY PROGRAM    1  1  1  1  1  1  1  1

 WEEK OF YEAR     33 34 35 36 37 38 39 40
 WEEKLY PROGRAM    1  1  1  1  1  1  1  1
 ADDITIONAL SCREEN(S)
```

```
 WEEK OF YEAR     41 42 43 44 45 46 47 48
 WEEKLY PROGRAM    1  1  1  1  1  1  1  1

 WEEK OF YEAR              49 50 51 52 53
 WEEKLY PROGRAM             1  1  1  1  1









 END OF SUBMENU
```

Main Menu (F1)-5-3

4. HOLIDAYS

```
NIC/TOD HOLIDAY PROGRAM
HOLIDAY  FLOAT/  MON/  DOW/  WOM/  PROG
         FIXED   MON   DOM   YEAR
   1     FIXED     0     0     0    0
   2     FIXED     0     0     0    0
   3     FIXED     0     0     0    0
   4     FIXED     0     0     0    0
   5     FIXED     0     0     0    0
   6     FIXED     0     0     0    0
   7     FIXED     0     0     0    0
   8     FIXED     0     0     0    0
   9     FIXED     0     0     0    0
  10     FIXED     0     0     0    0
  11     FIXED     0     0     0    0
  12     FIXED     0     0     0    0
ADDITIONAL SCREEN(S)
```

```
  13     FIXED     0     0     0    0
  14     FIXED     0     0     0    0
  15     FIXED     0     0     0    0
  16     FIXED     0     0     0    0
  17     FIXED     0     0     0    0
  18     FIXED     0     0     0    0
  19     FIXED     0     0     0    0
  20     FIXED     0     0     0    0
  21     FIXED     0     0     0    0
  22     FIXED     0     0     0    0
  23     FIXED     0     0     0    0
  24     FIXED     0     0     0    0
ADDITIONAL SCREEN(S)
```

```
  25     FIXED     0     0     0    0
  26     FIXED     0     0     0    0
  27     FIXED     0     0     0    0
  28     FIXED     0     0     0    0
  29     FIXED     0     0     0    0
  30     FIXED     0     0     0    0
  31     FIXED     0     0     0    0
  32     FIXED     0     0     0    0
  33     FIXED     0     0     0    0
  34     FIXED     0     0     0    0
  35     FIXED     0     0     0    0
  36     FIXED     0     0     0    0
END OF SUBMENU
```

Main Menu (F1)-5-4

5. NIC PROG STEPS

```
            NIC PROGRAM STEP

STEP  PGM TIME PATTERN OVERRIDE
  1    1  8:00    1       .
  2    0  0:00    0       .
  3    0  0:00    0       .
  4    0  0:00    0       .
  5    0  0:00    0       .
  6    0  0:00    0       .
  7    0  0:00    0       .
  8    0  0:00    0       .
  9    0  0:00    0       .
 10    0  0:00    0       .
 11    0  0:00    0       .
 12    0  0:00    0       .
 ADDITIONAL SCREEN(S)
```

Main Menu (F1)-5-5

NIC Program steps 13 through 100 (200) are not shown.

6. TOD PROG STEPS

```
TOD PROGRAM STEP   1

DAY PGM NUM....  1
STEP BEGINS.... 17:00

FLASH.......... .   DIM ENABLE...... .
RED REST........ .   ALT VEH EXTSN... .
SPARE 5........ .   DET LOG ENABLE.. X
SPARE 3........ .   SPARE 4........ .
TYPE 0 DELAY EN. .   SPARE 2........ .
DET DIAG PLAN... 1

                       A..B..C..D..E..F
ALTERNATE SEQUENCE     .  .  .  .  .  .

ADDITIONAL SCREEN(S)
```

```
                                  1 1 1
 PHASE.........  1 2 3 4 5 6 7 8 9 0 1 2
 MAX2 ENABLE....  . . . . . . . . . . . .
 MAX3 ENABLE....  . . . . . . . . . . . .
 VEH RECALL.....  . . . . . . . . . . . .
 VEH MAX RECALL.  . . . . . . . . . . . .
 PED RECALL.....  . . . . . . . . . . . .
 COND SERV INH..  . . . . . . . . . . . .
 PHASE OMIT.....  . . . . . . . . . . . .
 SPECIAL FCTNS..  . . . . . . . . (1 - 8)




 ADDITIONAL SCREEN(S)
```

Main Menu (F1)-5-6

TOD program steps 2 through 50 (100) are not shown.

APPENDIX A. PROGRAMMING REFERENCE

DETECTOR SUBMENU

```
            DETECTOR SUBMENU

  1. TYPE/TIMERS      5. SPEED DETS

  2. PHASE ASSIGN     6. VEH DIAG PLANS

  3. PED/SYS ASSIGN   7. PED DIAG PLANS

  4. CROSS SWITCHING  8. DIAG INTERVALS




         PRESS KEYS 1..8 TO SELECT
```

Main Menu (F1)-6

1. TYPE/TIMERS

```
            DETECTOR TYPE/TIMERS
                                  NO    LOG
 DET TYPE LOCK  EXTEND DELAY RESET ENABLE
  1   2     .     0.0     0    .      .
  2   2     .     0.0     0    .      .
  3   2     .     0.0     0    .      .
  4   2     .     0.0     0    .      .
  5   2     .     0.0     0    .      .
  6   2     .     0.0     0    .      .
  7   2     .     0.0     0    .      .
  8   2     .     0.0     0    .      .
  9   2     .     0.0     0    .      .
 10   2     .     0.0     0    .      .
 11   2     .     0.0     0    .      .
 12   2     .     0.0     0    .      .
 ADDITIONAL SCREEN(S)
```

```
  53   2     .     0.0     0    .      .
  54   2     .     0.0     0    .      .
  55   2     .     0.0     0    .      .
  56   2     .     0.0     0    .      .
  57   2     .     0.0     0    .      .
  58   2     .     0.0     0    .      .
  59   2     .     0.0     0    .      .
  60   2     .     0.0     0    .      .
  61   2     .     0.0     0    .      .
  62   2     .     0.0     0    .      .
  63   2     .     0.0     0    .      .
  64   2     .     0.0     0    .      .
 END OF SUBMENU
```

Main Menu (F1)-6-1

Screens for detectors 13-52 not shown.

2. PHASE ASSIGN

```
        DETECTOR PHASE ASSIGNMENT
                 PHASE ASSIGNMENT: 1 1 1
   DETECTOR      1 2 3 4 5 6 7 8 9 0 1 2
       1         X . . . . . . . . . . .
       2         . X . . . . . . . . . .
       3         . . X . . . . . . . . .
       4         . . . X . . . . . . . .
       5         . . . . X . . . . . . .
       6         . . . . . X . . . . . .
       7         . . . . . . X . . . . .
       8         . . . . . . . X . . . .
       9         . . . . . . . . X . . .
      10         . . . . . . . . . X . .
      11         . . . . . . . . . . X .
      12         . . . . . . . . . . . X
   ADDITIONAL SCREEN(S)
```

Main Menu (F1)-6-2

```
        DETECTOR PHASE ASSIGNMENT
                 PHASE ASSIGNMENT: 1 1 1
   DETECTOR      1 2 3 4 5 6 7 8 9 0 1 2
      53         . . . . . . . . . . . .
      54         . . . . . . . . . . . .
      55         . . . . . . . . . . . .
      56         . . . . . . . . . . . .
      57         . . . . . . . . . . . .
      58         . . . . . . . . . . . .
      59         . . . . . . . . . . . .
      60         . . . . . . . . . . . .
      61         . . . . . . . . . . . .
      62         . . . . . . . . . . . .
      63         . . . . . . . . . . . .
      64         . . . . . . . . . . . .
   END OF SUBMENU
```

3. PED/SYS ASSIGN

```
 PED AND SYSTEM DETECTOR LOCAL ASSIGNMENT

 DETECTOR LOG INTERVAL.........  0 MINUTES
 ---------------------------------------
 LOCAL          - PHASE PED DETECTOR -
 PED DET         1   2   3   4   5   6
 NUMBER..        1   2   3   4   5   6
                 7   8   9  10  11  12
 NUMBER..        7   8   9  10  11  12
 ---------------------------------------
 LOCAL      -- LOCAL SYSTEM DET NUMBER ---
 DETECTOR   1   2   3   4   5   6   7   8
 NUMBER..   0   0   0   0   0   0   0   0
            9  10  11  12  13  14  15  16
 NUMBER..   0   0   0   0   0   0   0   0
 END OF SUBMENU
```

Main Menu (F1)-6-3

4. CROSS SWITCHING

```
            CROSS SWITCHING
             PHASES:          1 1 1
 DETECTOR    1 2 3 4 5 6 7 8 9 0 1 2
     1       . . . . . . . . . . . .
     2       . . . . . . . . . . . .
     3       . . . . . . . . . . . .
     4       . . . . . . . . . . . .
     5       . . . . . . . . . . . .
     6       . . . . . . . . . . . .
     7       . . . . . . . . . . . .
     8       . . . . . . . . . . . .
     9       . . . . . . . . . . . .
    10       . . . . . . . . . . . .
    11       . . . . . . . . . . . .
    12       . . . . . . . . . . . .
 ADDITIONAL SCREEN(S)
```

```
    53       . . . . . . . . . . . .
    54       . . . . . . . . . . . .
    55       . . . . . . . . . . . .
    56       . . . . . . . . . . . .
    57       . . . . . . . . . . . .
    58       . . . . . . . . . . . .
    59       . . . . . . . . . . . .
    60       . . . . . . . . . . . .
    61       . . . . . . . . . . . .
    62       . . . . . . . . . . . .
    63       . . . . . . . . . . . .
    64       . . . . . . . . . . . .
          END OF SUBMENU
```

Main Menu (F1)-6-4

Screens for detectors 13-52 not shown

5. SPEED DETS

```
            SPEED DETECTORS

  SPEED DET NUMBER:  ...1....2....3....4
ONE DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 VEHICLE LENGTH....     0    0    0    0
 LOOP LENGTH.......     0    0    0    0

TWO DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 SPEED TRAP LENGTH.     0    0    0    0

ENABLE LOG.........     .    .    .    .

UNITS:  INCHES
ADDITIONAL PAGE(S)                MORE->
```

```
  SPEED DET NUMBER:  ...5....6....7....8
ONE DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 VEHICLE LENGTH....     0    0    0    0
 LOOP LENGTH.......     0    0    0    0

TWO DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 SPEED TRAP LENGTH.     0    0    0    0

ENABLE LOG.........     .    .    .    .

UNITS:  INCHES
ADDITIONAL PAGE(S)                MORE->
```

```
  SPEED DET NUMBER:  ...9...10...11...12
ONE DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 VEHICLE LENGTH....     0    0    0    0
 LOOP LENGTH.......     0    0    0    0

TWO DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 SPEED TRAP LENGTH.     0    0    0    0

ENABLE LOG.........     .    .    .    .

UNITS:  INCHES
ADDITIONAL PAGE(S)                MORE->
```

```
  SPEED DET NUMBER:  ..13...14...15...16
ONE DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 VEHICLE LENGTH....     0    0    0    0
 LOOP LENGTH.......     0    0    0    0

TWO DETECTOR SPEED:
 LOCAL DET NUMBER..     0    0    0    0
 SPEED TRAP LENGTH.     0    0    0    0

ENABLE LOG.........     .    .    .    .

UNITS:  INCHES
ADDITIONAL PAGE(S)              <-MORE
```

Main Menu (F1)-6-5

6. VEH DIAG PLANS

```
     VEHICLE DETECTOR DIAGNOSTIC PLAN

PLAN DET NUMBER  1  2  3  4  5  6  7  8
  1  DIAG NUM..  1  1  1  1  1  1  1  1
     SCALING...  1  1  1  1  1  1  1  1
  2  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  3  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  4  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  5  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  6  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
ADDITIONAL SCREEN(S)
```

```
PLAN DET NUMBER  1  2  3  4  5  6  7  8
  7  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  8  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
FAIL ACTION....  0  0  0  0  0  0  0  0

ADDITIONAL SCREEN(S)
```

```
     VEHICLE DETECTOR DIAGNOSTIC PLAN

PLAN DET NUMBER 57 58 59 60 61 62 63 64
  1  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  2  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  3  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  4  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  5  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  6  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
ADDITIONAL SCREEN(S)
```

```
PLAN DET NUMBER 57 58 59 60 61 62 63 64
  7  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
  8  DIAG NUM..  0  0  0  0  0  0  0  0
     SCALING...  1  1  1  1  1  1  1  1
FAIL ACTION....  0  0  0  0  0  0  0  0

END OF SUBMENU
```

Main Menu (F1)-6-6

Screens for detector numbers 9-56 not shown.

APPENDIX A. PROGRAMMING REFERENCE

7. PED DIAG PLANS

PED DETECTOR DIAGNOSTIC

PLAN	DET NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
1	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1
2	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1
3	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1
4	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1
5	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1
6	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1

ADDITIONAL SCREEN(S)

PLAN	DET NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
7	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1
8	DIAG NUM..	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING...	1	1	1	1	1	1	1	1	1	1	1	1

END OF SUBMENU

Main Menu (F1)-6-7

8. DIAG INTERVALS

DETECTOR DIAGNOSTIC INTERVAL

DIAGNOSTIC NUMBER	NO ACTIVITY	MAX PRESENCE	ERRATIC COUNTS
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0

ADDITIONAL SCREEN(S)

12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0

ADDITIONAL SCREEN(S)

22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
32	0	0	0

END OF SUBMENU

Main Menu (F1)-6-8

STATUS DISPLAY SUBMENU

```
        STATUS DISPLAY SUBMENU

 1. CONTROLLER       5. TELEMETRY

 2. COORDINATOR      6. DETECTORS

 3. PREEMPTOR        7. FLASH/MMU STATUS

 4. NIC/TOD




       PRESS KEYS 1..8 TO SELECT
```

Main Menu (F1)-7

1. CONTROLLER

```
CONTROLLER STATUS:                1 1 1
PHASE            1 2 3 4 5 6 7 8 9 0 1 2
2 GRN REST  T/N   T     T
            VEH
5 GRN REST  PED

VEH SIGNALS      R G R R G R R R R R R R
PED SIGNALS      D D D D D D D D D D D D

   DENSITY/MAX TIMING   |    OVERLAP
                        |
RING          [1]  [2]  | OLA R
                        | OLB R
                        | OLC R
MAX IN EFFECT   35   35 | OLD R
MAX EXTENSION    0    0 |
```

Main Menu (F1)-7-1

2. COORDINATOR

```
COORD STATUS:  PATTERN 1    COS 331



CMD SOURCE. HDW    RING....... [1]  [2]
CMD CYCLE..  80s   DIRECTION..         X
LOC CYCLE..   7%   HOLD.......    X    X
SYS CYCLE..  45%   FORCE OFF..
CMD OFFSET.   0%   PERMISSIVE.
ACT OFFSET.  37%   SPLIT EXT..   0%   0%
CORRECTION. SUB    SPLIT DEMAND....
ACT CRD PH. X      PHASE RESERVICE.
ACT R/WALK. X      INHIBIT MAX.....    X
----------------------------------------
NIC:  STEP 1    PATTERN 1
TOD:  STEP 2                    15:51:39
```

Main Menu (F1)-7-2

```
COORD PATTERN... 1
VEH PERM 1......   0%  DMD 1 SPL PTN. 0
VEH PERM 2 DISP.   0%  DMD 2 SPL PTN. 0
VEH PERM 2......   0%  XARTERY PTN... 0
SPARE...........       SPARE.........
COS MATCH....... 331   SPARE.........
                                  1 1 1
PHASE........... 1 2 3 4 5 6 7 8 9 0 1 2
COORD PHASE..... . X . . . X . . . . . .
VEH RECALL...... . . . . . . . . . . . .
VEH MAX RECALL.. . . . . . . . . . . . .
PED RECALL...... . . . . . . . . . . . .
PHASE OMIT...... . . . . . . . . . . . .
SPARE........... . . . . . . . . . . . .
                A B C D E F
ALT SEQUENCE.... . . . . . .
```

(Toggle)

3. PREEMPTOR

```
PREEMPTOR STATUS:                 1 1 1
PHASE           1 2 3 4 5 6 7 8 9 0 1 2
 2 MGRN DONE T/N   T     T
   PCLR    3 VEH           N
 5 GRN REST  PED           N

VEH SIGNALS      R G R R G R R R R R R R
PED SIGNALS      D D D D D D D D D D D D

----------------PREEMPTOR---------------
PREEMPT RING 1 STEP   NOT ACTIVE
PREEMPT RING 2 STEP   NOT ACTIVE

   PRIORITY      BUS
 1 2 3 4 5 6   1 2 3 4
```

Main Menu (F1)-7-3

4. NIC/TOD

```
NIC STATUS:   13:15:47     9/18/92
              DAY PGM 1    WEEK PGM 1

ACTIVE PROGRAM.   NIC.....     TOD.....
PATTERN........   1
SYSTEM OVERRIDE   NO
SOURCE.........   NIC PGM      TOD PGM
STEP NUMBER....   1            2
START TIME.....   08:00        10:00
DAY PGM NUMBER.   1            1
WEEK PGM NUMBER   1            1
NEXT STEP......                1
NEXT STEP TIME.                17:00
HIGHEST STEP...   1            2
                             A B C D E F
TOD ALTERNATE SEQUENCE        . . X . . .
```

Main Menu (F1)-7-4

```
ACTIVE TOD STEP: 2
FLASH...........      DIMMING ENABLE..
RED REST........      ALT VEH EXTSN...
SPARE5..........      DET LOG ENABLE..
SPARE3..........      SPARE4..........
TYPE 0 DELAY EN.      SPARE2..........
DET DIAG PLAN... 1                1 1 1
PHASE........... 1 2 3 4 5 6 7 8 9 0 1 2
MAX 2 ENABLE.... . . . . . . . . . . . .
MAX 3 ENABLE.... . . . . . . . . . . . .
VEH RECALL...... . . . . . . . . . . . .
VEH MAX RECALL.. . . . . . . . . . . . .
PED RECALL...... . . . . . . . . . . . .
COND SERV INH... . . . . . . . . . . . .
PHASE OMIT...... . . . . . . . . . . . .
SPECIAL FCTNS... . . . . . . . .
```

(Toggle)

5. TELEMETRY

```
TELEMETRY STATUS:

SYSTEM DET   1  2  3  4  5  6  7  8


SYSTEM DET   9 10 11 12 13 14 15 16


TELEMETRY MODES    1 2 3 4 5 6 7


SPECIAL FUNCTIONS 1 2 3 4
                             ADDRESS  0

SPEED TRAP 1:   0 MPH    TRANSMIT:
SPEED TRAP 2:   0 MPH    VALID DATA:
```

Main Menu (F1)-7-5

6. DETECTORS

```
PROCESSED DETECTOR STATUS:

DETECTOR     1  2  3  4  5  6  7  8

DETECTOR     9 10 11 12 13 14 15 16

DETECTOR    17 18 19 20 21 22 23 24

DETECTOR    25 26 27 28 29 30 31 32

PRESS TOGGLE FOR DETECTORS 33-64
```

Main Menu (F1)-7-6

```
PROCESSED DETECTOR STATUS:

DETECTOR    33 34 35 36 37 38 39 40

DETECTOR    41 42 43 44 45 46 47 48

DETECTOR    49 50 51 52 53 54 55 56

DETECTOR    57 58 59 60 61 62 63 64

PRESS TOGGLE FOR DETECTORS 1-32
```

(Toggle)

7. FLASH/MMU

```
FLASH STATUS:




           NO FLASH CONDITION
```

Main Menu (F1)-7-7

Flash status display varies depending on the cause of the flash condition.

```
MMU STATUS: MMU DISABLED

---------- MMU RF129 READBACK ----------
                              1 1 1 1 1 1 1
CHANNEL  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
RED....
YELLOW.
GREEN..
FAIL-OUT RLY.      CONFLICT.........
FAIL-IMM RES.      RED FAILURE.......
CONT VOLT MON      DIAG FAILURE......
+24 V MON I..      MIN CLEAR FAILURE.
+24 V MON II.      PORT 1 TIMEOUT....
+24 V MON INH      SPARE.............
RESET........      SPARE.............
RED ENABLE...      SPARE.............
```

(Toggle)

```
MMU STATUS: MMU DISABLED

---------- MMU RF129 READBACK ----------
SPARE BIT 1......  SPARE BIT 4.......
SPARE BIT 2......  SPARE BIT 5.......
SPARE BIT 3......  SPARE BIT 6.......

---------- MMU RF131 READBACK ----------
                              1 1 1 1 1 1 1
CHANNEL  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
MIN CLR
DISABLE

MIN FLASH TIME........    SECONDS
+24 VOLT LATCH........
CVM/FAULT MON LATCH...
```

(Toggle)

UTILITIES SUBMENU

```
            UTILITIES SUBMENU

 1. COPY              5. SIGN ON

 2. MEMORY CLEAR      6. LOG BUFFERS

 3. PRINT             7. SEND D.M.

 4. TRANSFER          8. CUSTOM APPL.




        PRESS KEYS 1..8 TO SELECT
```

Main Menu (F1)-8

1. COPY

```
               COPY UTILITY

          1. COPY PHASE

          2. COPY PATTERN

          3. COPY BACKUP TIMING




        PRESS KEYS 1..3 TO SELECT
```

Main Menu (F1)-8-1

```
               PHASE COPY

 CHOOSE 'COPY FROM PHASE'
 THEN CHOOSE 'COPY TO PHASE':

 COPY FROM PHASE   0
 COPY TO PHASE     0









 PRESS 'ENTER' TO BEGIN COPYING
```

Main Menu (F1)-8-1-1

```
               PATTERN COPY

 CHOOSE 'COPY FROM PATTERN'
 THEN CHOOSE 'COPY TO PATTERN':

 COPY FROM PATTERN   0
 COPY TO PATTERN     0









 PRESS 'ENTER' TO EXECUTE COPYING
```

Main Menu (F1)-8-1-2

```
               BACKUP TIMING

 SELECT COPY BACKUP TIMING:

 COPY BACKUP TIMING         .









 PRESS 'ENTER' TO BEGIN COPYING
```

Main Menu (F1)-8-1-3

2. MEMORY CLEAR

```
               MEMORY CLEAR

 SELECT DATA TO CLEAR:

 CLEAR COORDINATOR DATA     .
 CLEAR NIC/TOD DATA         .
 CLEAR PREEMPT DATA         .
 CLEAR DETECTOR DATA        .
 CLEAR DIAGNOSTIC ENABLES   .









 PRESS 'ENTER' TO BEGIN CLEARING
```

Main Menu (F1)-8-2

3. PRINT

```
               PRINT UTILITY

 SELECT DATA TO PRINT:

 PRINT CONFIGURATION DATA   .
 PRINT CONTROLLER DATA      .
 PRINT COORDINATOR DATA     .
 PRINT PREEMPTOR DATA       .
 PRINT NIC/TOD DATA         .
 PRINT DETECTOR DATA        .









 PRESS 'ENTER' TO BEGIN PRINTING
```

Main Menu (F1)-8-3

4. TRANSFER SUBMENU

```
               TRANSFER UTILITY

 SELECT DATA TO TRANSFER:

 TRANSFER CONTROLLER DATA    .
 TRANSFER COORDINATOR DATA   .
 TRANSFER PREEMPTOR DATA     .
 TRANSFER NIC/TOD DATA       .
 TRANSFER DETECTOR DATA      .









 PRESS 'ENTER' TO BEGIN PRINTING
```

Main Menu (F1)-8-4

5. SIGN ON

```
*****************************************
*     ECONOLITE CONTROL PRODUCTS, INC.    *
*                ASC/2-2100               *
*            Copyright (C) 1992           *
*                                         *
*        Solving tomorrow's traffic       *
*             problems... today           *
*                                         *
*   SOFTWARE ASSY              VERSION    *
*   BOOT            32783         1.22    *
*   MAIN PROGRAM    32787         1.26    *
*   APPLICATION     XXXXX         1.00    *
*   HELP            32789         1.28    *
*   CONFIGURATION   32790        C8000    *
*                                         *
*****************************************
```

Main Menu (F1)-8-5

6. LOG BUFFERS

```
            LOG BUFFERS SUBMENU

                1. DISPLAY

                2. PRINT

                3. CLEAR




            PRESS KEYS 1..3 TO SELECT
```

Main Menu (F1)-8-6

1. DISPLAY (LOG BUFFERS SUBMENU)

```
         DISPLAY LOG BUFFERS SUBMENU

            1. EVENTS LOG

            2. DETECTOR EVENTS LOG

            3. MMU EVENTS LOG




           PRESS KEYS 1..3 TO SELECT
```

Main Menu (F1)-8-6-1

```
 EVENT LOG           (3 EVENTS LOGGED)

   1  13:14  09-18-92
 COORD ACTIVE

   2  13:11  09-18-92
 COORD LOCAL FREE

   3  13:11  09-18-92
 POWER ON
```

Main Menu (F1)-8-6-1-1

```
 DETECTOR EVENT LOG  (0 EVENTS LOGGED)
```

Main Menu (F1)-8-6-1-2

```
MMU EVENT LOG
EVENT:              (0 EVENTS LOGGED)
```

Main Menu (F1)-8-6-1-3

2. PRINT (LOG BUFFERS SUBMENU)

```
         PRINT LOG BUFFERS SUBMENU

            1. EVENTS LOG

            2. DETECTOR EVENTS LOG

            3. DETECTOR ACTIVITY LOG

            4. MMU EVENT LOG

            5. ALL LOGS



           PRESS KEYS 1..5 TO SELECT
```

Main Menu (F1)-8-6-2

3. CLEAR (LOG BUFFERS SUBMENU)

```
         CLEAR LOG BUFFERS SUBMENU

         1. EVENTS LOG

         2. DETECTOR EVENTS LOG

         3. DETECTOR ACTIVITY LOG

         4. MMU EVENT LOG

         5. ALL LOGS



        PRESS KEYS 1..5 TO SELECT
```

Main Menu (F1)-8-6-3

7. SEND D.M.

```
        SEND DATA MODULE UTILITY

THIS UTILITY WILL SEND AN IMAGE OF THE
DATA MODULE TO THE TERMINAL PORT IN
'S' RECORD FORMAT

PRESS ENTER TO SEND OR CLEAR TO ABORT
```

Main Menu (F1)-8-7

8. CUSTOM APPLICATION

```
            UTILITIES SUBMENU


 ***************************************
 *      FOR CUSTOM APPLICATIONS NOT     *
 *     AVAILABLE ON THIS CONTROLLER     *
 *   FOR EXAMPLE:                       *
 *      SPECIAL STATUS DISPLAYS         *
 *      SPECIAL DIAGNOSTICS             *
 *      SPECIAL DATA ENTRY OPTIONS      *
 *      SPECIAL SWITCHES FOR FEATURES   *
 ***************************************



        PRESS KEYS 1..8 TO SELECT
```

Main Menu (F1)-8-8

APPENDIX A. PROGRAMMING REFERENCE

DIAGNOSTICS SUBMENU

```
          DIAGNOSTICS SUBMENU

 1. INPUTS            5. OVERLAP PROGRAM

 2. OUTPUTS           6. TELEMETRY

 3. DISPLAY           7. LOOPBACK

 4. KEYBOARD




        PRESS KEYS 1..7 TO SELECT
```

Main Menu (F1)-9

```
 ****************************************
 *              WARNING                 *
 *                                      *
 * THIS DIAGNOSTIC RESULTS IN           *
 * INTERSECTION FLASH! PRESS ENTER TO   *
 * PROCEED OR SUBMENU TO EXIT.          *
 *                                      *
 ****************************************
```

1. INPUTS

```
  INPUT DIAGNOSTIC CONNECTORS A, B & C

 PHASE           1  2  3  4  5  6  7  8

 VEH DETECTOR..

 PED DETECTOR..

 HOLD.........

 PHASE OMIT....

 PED OMIT......
```

Main Menu (F1)-9-1

```
  INPUT DIAGNOSTIC CONNECTORS A, B & C

     RING 1               RING 2

 MAX RED STP FRC      MAX RED STP FRC
 INH RST TIM OFF      INH RST TIM OFF


 PED MAX OMT          PED MAX OMT
 REC  2  AR           REC  2  AR
```

(Next Page)

```
  INPUT DIAGNOSTIC CONNECTORS A, B & C


 MIN  WRST CNA  CNA  TEST TEST TEST
 REC  MOD   1    2    A    B    C



 INT  MCON LAMP EXT       I/O  MODE
 ADV   EN  OFF  STRT     A    B    C



 PMT  PMT  PMT  PMT  CORD
  2    4    5    6   FREE
```

(Next Page)

```
      INPUT DIAGNOSTIC CONNECTOR D


 CYC  CYC  CYC  CORD OFT  OFT  OFT  REM
  1    2    3   FREE  1    2    3   FLSH
  X    X             X    X


 SPLT SPLT DUAL SPLT PMT  PMT  TIME
  1    2   CORD DMD   1    2   RESET



 PMT  PMT  PMT  PMT
  3    4    5    6
```

(Next Page)

```
      INPUT DIAGNOSTIC CONNECTOR D



 CORD TEST TEST TEST CMU
 SYNC  C    D    E   ST



        EXPANDED DETECTORS
  1    2    3    4    5    6    7    8
```

(Next Page)

```
  INPUT DIAGNOSTIC TELEMETRY CONNECTOR


 LOC  MAIN ALRM ALRM CMU  EXTD TLM  TLM
 FLSH REQD  1    2   FLSH ADDR SP1  SP2



         SYSTEM DETECTORS
  1    2    3    4    5    6    7    8
```

(Next Page)

2. OUTPUTS

```
 OUTPUT DIAGNOSTIC CONNECTORS A, B & C


PHASE           1  2  3  4  5  6  7  8

RED...........
YELLOW........
GREEN.........
WALK..........
DON'T WALK....
PED CLEAR.....
CHECK.........
PHASE ON......
PHASE NEXT....

          PRESS TOGGLE TO CHANGE
```

Main Menu (F1)-9-2

```
 OUTPUT DIAGNOSTIC CONNECTORS A, B & C

    RING 1 STATUS      RING 2 STATUS
    A     B     C      A     B     C


    OVERLAP    A      B      C      D


    RED
    YELLOW
    GREEN

    FLASHING LOGIC

          PRESS TOGGLE TO CHANGE
```

(Next Page)

```
     OUTPUT DIAGNOSTIC CONNECTOR D



  CYC  CYC  CYC  SYNC OFT  OFT  OFT XSTR
   1    2    3   OUT   1    2    3  SYNC



  SPLT SPLT NIC  NIC  PMT  PMT  CMU  CORD
   1    2   SF1  SF2   1    2   INLK STAT




          PRESS TOGGLE TO CHANGE
```

(Next Page)

```
     OUTPUT DIAGNOSTIC CONNECTOR D

  PMT  PMT  PMT  PMT
  3    4    5    6


             SPARE OUTPUTS
  1    2    3    4    5    6    7    8


   OUTPUT DIAGNOSTIC TELEMETRY CONNECTOR

  TLM  TLM  TLM  TLM
  SF1  SF2  SF3  SF4

          PRESS TOGGLE TO CHANGE
```

(Next Page)

3. DISPLAY

```
         DISPLAY SUBMENU

       1. CURSOR ADDRESS

       2. CHARACTER FONT

       3. DISPLAY ADJUST

       4. BACKLIGHTING

       5. FULL SCREEN

       6. ALL TESTS


    PRESS KEYS 1..6 TO SELECT
```

Main Menu (F1)-9-3

1. CURSOR ADDRESS

```
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
AAAAAAAAAAAAAAAAAAAA,,,,,,,,,,,,,,,,,,,,
>>>>>>>>>>>>>>>>>>>>SSSSSSSSSSSSSSSSSSSS

>>>>>>>>>>>>>>>>>>>>SSSSSSSSSSSSSSSSSSSS
>>>>>>>>>>>>>>>>>>>>SSSSSSSSSSSSSSSSSSSS

>>>>>>>>>>>>>>>>>>>>SSSSSSSSSSSSSSSSSSSS

>>>>>>>>>>>>>>>>>>>>SSSSSSSSSSSSSSSSSSSS
```

Main Menu (F1)-9-3-1

2. CHARACTER FONT

```
          CHARACTER FONT





       ABCDEFGHIJKLMNOPQRSTUVWXYZ
       abcdefghijklmnopqrstuvwxyz
        0123456789:;<+>?!#$%&'()*
```

Main Menu (F1)-9-3-2

3. DISPLAY ADJUST

```



       DISPLAY ADJUST TEST



```

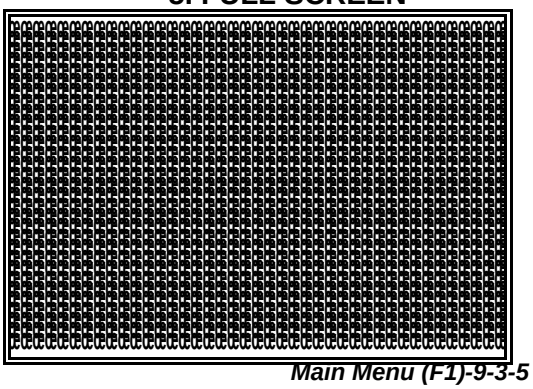
Main Menu (F1)-9-3-3

4. BACKLIGHTING

```
BACKLIGHT TEST
```

Main Menu (F1)-9-3-4

5. FULL SCREEN



Main Menu (F1)-9-3-5

6. ALL TESTS (Display Submenu)

Main Menu (F1)-9-3-6

This test option performs all Display Submenu tests # 1 - 5 in sequence.

4. KEYBOARD

```
          KEYBOARD DIAGNOSTICS


   XX  XX             X          1  2  3
   XX  XX           X     X
   XX  XX             X          4  5  6
   XX  XX
                                 7  X  X
                    XXXXX
                                    X  X


   PRESS '8' KEY
```

Main Menu (F1)-9-4

5. OVERLAP PROGRAM

```
          OVERLAP PROGRAM CARD DATA


PHASE         1  2  3  4  5  6  7  8
OVERLAP A
OVERLAP B
OVERLAP C
OVERLAP D
```

Main Menu (F1)-9-5

6. TELEMETRY

```
              TELEMETRY SUBMENU

         1. MARK

         2. SPACE

         3. MODEM

         4. TELEMETRY I/O LOOP BACK



         PRESS KEYS 1..4 TO SELECT
```

Main Menu (F1)-9-6

1. MARK (Telemetry Submenu)

```
****************************************
*                                      *
*   SENDING TELEMETRY MARK - 1200 HZ   *
*                                      *
****************************************
```

Main Menu (F1)-9-6-1

2. SPACE (Telemetry Submenu)

```
****************************************
*                                      *
*   SENDING TELEMETRY MARK - 2200 HZ   *
*                                      *
****************************************
```

Main Menu (F1)-9-6-2

3. MODEM

```
**************************************
*                                    *
*       TESTING TELEMETRY DATA       *
*                                    *
**************************************
```

Main Menu (F1)-9-6-3

4. TELEMETRY I/O

Generates interactive screens not shown here.

Main Menu (F1)-9-6-4

7. LOOPBACK

```
**************************************
*                                    *
*  FOR A 3-SECOND DELAY AFTER EACH   *
*  I/O ERROR, PRESS 1, ELSE PRESS 0  *
*                                    *
**************************************
```

```
          LOOPBACK SUBMENU

          1. STANDARD I/O

          2. EXPANDED I/O

          3. TERMINAL

          4. SDLC

          5. ALL


      PRESS KEYS 1..5 TO SELECT
```

Main Menu (F1)-9-7

Selections from this menu generate interactive screens not shown here.

APPENDIX B
PIN LISTS / INTERFACE CONNECTIONS

CONNECTOR A
55 Pin (Plug) Type #22-55P

PIN	FUNCTION	I/O
A	Fault Monitor	[O]
B	+24 VDC External	[O]
C	Voltage Monitor	[O]
D	ö1 Red	[O]
E	ö1 Don't Walk	[O]
F	ö2 Red	[O]
G	ö2 Don't Walk	[O]
H	ö2 Ped Clear	[O]
J	ö2 Walk	[O]
K	Vehicle Detector 2	[I]
L	Ped Detector 2	[I]
M	ö2 Hold	[I]
N	Stop Time (Ring 1)	[I]
P	Inhibit Max Term (Ring 1)	[I]
R	External Start	[I]
S	Interval Advance	[I]
T	Indicator Lamp Control	[I]
U	AC-Common	[I]
V	Chassis Ground	[I]
W	Logic Ground	[O]
X	Flashing Logic Out	[O]
Y	Status Bit C (Ring1)	[O]
Z	ö1 Yellow	[O]
a	ö1 Ped Clear	[O]
b	ö2 Yellow	[O]
c	ö2 Green	[O]
d	ö2 Check	[O]
e	ö2 Phase On	[O]
f	Vehicle Detector 1	[I]
g	Ped Detector 1	[I]
h	ö1 Hold	[I]
i	Force-Off (Ring 1)	[I]
j	Ext Min Recall	[I]
k	Manual Control Enable	[I]
m	Call To Non Actuated I	[I]
n	Test A	[I]
p	AC+ (Control)	[I]
q	I/O Mode Bit A	[I]
r	Status Bit B (Ring 1)	[O]
s	ö1 Green	[O]
t	ö1 Walk	[O]
u	ö1 Check	[O]
v	ö2 Ped Omit	[I]
w	Omit All Red Clear (Ring1)	[I]
x	Red Rest (Ring 1)	[I]
y	I/O Mode Bit B	[I]
z	Call To Non Actuated II	[I]
AA	Test B	[I]
BB	Walk Rest Modifier	[I]
CC	Status Bit A (Ring 1)	[O]
DD	ö1 Phase On	[O]
EE	ö1 Ped Omit	[I]
FF	Ped Recycle (Ring 1)	[I]
GG	Max II Selection (Ring 1)	[I]
HH	I/O Mode Bit C	[I]

CONNECTOR B
55 Pin (Socket) Type #22-55S

PIN	FUNCTION	I/O
A	ö1 Phase Next	[O]
B	Preempt 2 Detector	[I]
C	ö2 Phase Next	[O]
D	ö3 Green	[O]
E	ö3 Yellow	[O]
F	ö3 Red	[O]
G	ö4 Red	[O]
H	ö4 Ped Clear	[O]
J	ö4 Don't Walk	[O]
K	ö4 Check	[O]
L	Vehicle Detector 4	[I]
M	Ped Detector 4	[I]
N	Vehicle Detector 3	[I]
P	Ped Detector 3	[I]
R	ö3 Phase Omit	[I]
S	ö2 Phase Omit	[I]
T	ö5 Ped Omit	[I]
U	ö1 Phase Omit	[I]
V	Ped Recycle (Ring 2)	[I]
W	Preempt 4 Detector	[I]
X	Preempt 5 Detector	[I]
Y	ö3 Walk	[O]
Z	ö3 Ped Clear	[O]
a	ö3 Don't Walk	[O]
b	ö4 Green	[O]
c	ö4 Yellow	[O]
d	ö4 Walk	[O]
e	ö4 Phase On	[O]
f	ö4 Phase Next	[O]
g	ö4 Phase Omit	[I]
h	ö4 Hold	[I]
i	ö3 Hold	[I]
j	ö3 Ped Omit	[I]
k	ö6 Ped Omit	[I]
m	ö7 Ped Omit	[I]
n	ö8 Ped Omit	[I]
p	Overlap A Yellow	[O]
q	Overlap A Red	[O]
r	ö3 Check	[O]
s	ö3 Phase On	[O]
t	ö3 Phase Next	[O]
u	Overlap D Red	[O]
v	Preempt 6 Detector	[I]
w	Overlap D Green	[O]
x	ö4 Ped Omit	[I]
y	Free (No Coord)	[I]
z	Max II Selection (Ring 2)	[I]
AA	Overlap A Green	[O]
BB	Overlap B Yellow	[O]
CC	Overlap B Red	[O]
DD	Overlap C Red	[O]
EE	Overlap D Yellow	[O]
FF	Overlap C Green	[O]
GG	Overlap B Green	[O]
HH	Overlap C Yellow	[O]

CONNECTOR C
61 Pin (Socket) Type #24-61S

PIN	FUNCTION	I/O
A	Status Bit A (Ring 2)	[O]
B	Status Bit B (Ring 2)	[O]
C	ö8 Don't Walk	[O]
D	ö8 Red	[O]
E	ö7 Yellow	[O]
F	ö7 Red	[O]
G	ö6 Red	[O]
H	ö5 Red	[O]
J	ö5 Yellow	[O]
K	ö5 Ped Clear	[O]
L	ö5 Don't Walk	[O]
M	ö5 Phase Next	[O]
N	ö5 Phase On	[O]
P	Vehicle Detector 5	[I]
R	Ped Detector 5	[I]
S	Vehicle Detector 6	[I]
T	Ped Detector 6	[I]
U	Ped Detector 7	[I]
V	Vehicle Detector 7	[I]
W	Ped Detector 8	[I]
X	ö8 Hold Off	[I]
Y	Force-Off (Ring 2)	[I]
Z	Stop Time (Ring 2)	[I]
a	Inhibit Max Term (Ring 2)	[I]
b	Test C	[I]
c	Status Bit C (Ring 2)	[O]
d	ö8 Walk	[O]
e	ö8 Yellow	[O]
f	ö7 Green	[O]
g	ö6 Green	[O]
h	ö6 Yellow	[O]
i	ö5 Green	[O]
j	ö5 Walk	[O]
k	ö5 Check	[O]
m	ö5 Hold	[I]
n	ö5 Phase Omit	[I]
p	ö6 Hold	[I]
q	ö6 Phase Omit	[I]
r	ö7 Phase Omit	[I]
s	ö8 Phase Omit	[I]
t	Vehicle Detector 8	[I]
u	Red Rest Mode (Ring 2)	[I]
v	Omit Red Clear (Ring 2)	[I]
w	ö8 Ped Clear	[O]
x	ö8 Green	[O]
y	ö7 Don't Walk	[O]
z	ö6 Don't Walk	[O]
AA	ö6 Ped Clear	[O]
BB	ö6 Check	[O]
CC	ö6 Phase On	[O]
DD	ö6 Phase Next	[O]
EE	ö7 Hold	[I]
FF	ö8 Check	[O]
GG	ö8 Phase On	[O]
HH	ö8 Phase Next	[O]
JJ	ö7 Walk	[O]
KK	ö7 Ped Clear	[O]
LL	ö6 Walk	[O]
MM	ö7 Check	[O]
NN	ö7 Phase On	[O]
PP	ö7 Phase Next	[O]

APPENDIX B
TYPE 2 INTERFACE CONNECTIONS

I/O MODE BITS (3 PER UNIT)

Mode #	Bit States A	B	C	State Names
0	OFF	OFF	OFF	TS 1 Compatible
1	ON	OFF	OFF	Hardwire Interconnect
2	OFF	ON	OFF	System Interface
3	ON	ON	OFF	Reserved
4	OFF	OFF	ON	Reserved
5	ON	OFF	ON	Reserved
6	OFF	ON	ON	Manufacturer Specific
7	ON	ON	ON	Manufacturer Specific

Voltage Levels: OFF = +24; ON = 0V

MODE 0 INPUT/OUTPUT FUNCTIONS

Inputs:

Pin	Function
A-h	Phase 1 Hold
A-M	Phase 2 Hold
B-i	Phase 3 Hold
B-h	Phase 4 Hold
C-m	Phase 5 Hold
C-p	Phase 6 Hold
C-EE	Phase 7 Hold
C-X	Phase 8 Hold
B-U	Phase 1 Phase Omit
B-S	Phase 2 Phase Omit
B-R	Phase 3 Phase Omit
B-g	Phase 4 Phase Omit
C-n	Phase 5 Phase Omit
C-q	Phase 6 Phase Omit
C-r	Phase 7 Phase Omit
C-s	Phase 8 Phase Omit
A-EE	Phase 1 Ped Omit
A-v	Phase 2 Ped Omit
B-j	Phase 3 Ped Omit
B-x	Phase 4 Ped Omit
B-T	Phase 5 Ped Omit
B-k	Phase 6 Ped Omit
B-m	Phase 7 Ped Omit
B-n	Phase 8 Ped Omit

Outputs:

Pin	Function
A-DD	Phase 1 Phase On
A-e	Phase 2 Phase On
B-s	Phase 3 Phase On
B-e	Phase 4 Phase On
C-N	Phase 5 Phase On
C-CC	Phase 6 Phase On
C-NN	Phase 7 Phase On
C-GG	Phase 8 Phase On
B-A	Phase 1 Phase Next
B-C	Phase 2 Phase Next
B-t	Phase 3 Phase Next
B-f	Phase 4 Phase Next
C-M	Phase 5 Phase Next
C-DD	Phase 6 Phase Next
C-PP	Phase 7 Phase Next
C-HH	Phase 8 Phase Next
A-u	Phase 1 Check
A-d	Phase 2 Check
B-r	Phase 3 Check
B-K	Phase 4 Check
C-k	Phase 5 Check
C-BB	Phase 6 Check
C-MM	Phase 7 Check
C-FF	Phase 8 Check

MODE 1 INPUT/OUTPUT FUNCTIONS

Inputs:

Pin	Function
A-h	Preempt 1
A-M	Preempt 3
B-i	Vehicle Detector 9
B-h	Vehicle Detector 10
C-m	Vehicle Detector 13
C-p	Vehicle Detector 14
C-EE	Vehicle Detector 15
C-X	Vehicle Detector 16
B-U	Vehicle Detector 11
B-S	Vehicle Detector 12
B-R	Timing Plan C
B-g	Timing Plan D
C-n	Alternate Sequence A
C-q	Alternate Sequence B
C-r	Alternate Sequence C
C-s	Alternate Sequence D
A-EE	Dimming Enable
A-v	Automatic Flash
B-j	Timing Plan A
B-x	Timing Plan B
B-T	Offset 1
B-k	Offset 2
B-m	Offset 3
B-n	TBC On Line

Outputs:

Pin	Function
A-DD	Preempt 1 Status
A-e	Preempt 3 Status
B-s	TBC Auxiliary 1
B-e	TBC Auxiliary 2
C-N	Timing Plan A
C-CC	Timing Plan B
C-NN	Offset 1
C-GG	Offset 2
B-A	Preempt 2 Status
B-C	Preempt 4 Status
B-t	Preempt 5 Status
B-f	Preempt 6 Status
C-M	Offset 3
C-DD	Timing Plan C
C-PP	Timing Plan D
C-HH	Reserved
A-u	Free/Coord Status
A-d	Automatic Flash
B-r	TBC Auxiliary 3
B-K	Reserved
C-k	Reserved
C-BB	Reserved
C-MM	Reserved
C-FF	Reserved

MODE 2 INPUT/OUTPUT FUNCTIONS

Inputs:

Pin	Function
A-h	Preempt 1
A-M	Preempt 3
B-i	Vehicle Detector 9
B-h	Vehicle Detector 10
C-m	Vehicle Detector 13
C-p	Vehicle Detector 14
C-EE	Vehicle Detector 15
C-X	Vehicle Detector 16
B-U	Vehicle Detector 11
B-S	Vehicle Detector 12
B-R	Vehicle Detector 17
B-g	Vehicle Detector 18
C-n	Vehicle Detector 19
C-q	Vehicle Detector 20
C-r	Alarm 1
C-s	Alarm 2
A-EE	Dimming Enable
A-v	Local Flash Status
B-j	Address Bit 0
B-x	Address Bit 1
B-T	Address Bit 2
B-k	Address Bit 3
B-m	Address Bit 4
B-n	MMU Flash Status

Outputs:

Pin	Function
A-DD	Preempt 1 Status
A-e	Preempt 3 Status
B-s	TBC Auxiliary 1
B-e	TBC Auxiliary 2
C-N	Timing Plan A
C-CC	Timing Plan B
C-NN	Offset 1
C-GG	Offset 2
B-A	Preempt 2 Status
B-C	Preempt 4 Status
B-t	Preempt 5 Status
B-f	Preempt 6 Status
C-M	Offset 3
C-DD	Timing Plan C
C-PP	Timing Plan D
C-HH	Reserved
A-u	Free/Coord Status
A-d	Automatic Flash
B-r	TBC Auxiliary 3
B-K	Reserved
C-k	System Special Function 1
C-BB	System Special Function 2
C-MM	System Special Function 3
C-FF	System Special Function 4

APPENDIX B
EXPANSION I/O CONNECTORS

CONNECTOR D

PIN	FUNCTION	I/O
25	SYSTEM COMMAND CYCLE BIT 1 INPUT	[I]
35	SYSTEM COMMAND CYCLE BIT 2 INPUT	[I]
6	SYSTEM COMMAND CYCLE BIT 3 INPUT	[I]
12	SYSTEM COMMAND OFFSET BIT 1 INPUT/	[I]
	EXTERNAL ADDRESS BIT 0	[I]
10	SYSTEM COMMAND OFFSET BIT 2 INPUT/	[I]
	EXTERNAL ADDRESS BIT 1	[I]
36	SYSTEM COMMAND OFFSET BIT 3 INPUT/	[I]
	EXTERNAL ADDRESS BIT 2	[I]
16	SYSTEM COMMAND SPLIT BIT 1 INPUT/	[I]
	EXTERNAL ADDRESS BIT 3	[I]
9	SYSTEM COMMAND SPLIT BIT 2 INPUT/	[I]
	EXTERNAL ADDRESS BIT 4	[I]
4	SYSTEM COMMAND COORD SYNC INPUT	[I]

NOTE:
Tx pins at the BIU are Rx pins at the controller.
Rx pins at the BIU are Tx pins at the controller.

26	COORD FREE	[I]
60	AUTOMATIC FLASH	[I]
3	SPLIT DEMAND	[I]
38	DUAL COORD	[I]
14	TIME RESET	[I]
20	TEST INPUT C	[I]
37	TEST INPUT D	[I]
19	TEST INPUT E	[I]
57	PREEMPTOR CALL #1	[I]
49	PREEMPTOR CALL #2	[I]
50	PREEMPTOR CALL #3/BUS PREEMPTOR #1	[I]
55	PREEMPTOR CALL #4/BUS PREEMPTOR #2	[I]
56	PREEMPTOR CALL #5/BUS PREEMPTOR #3	[I]
61	PREEMPTOR CALL #6/BUS PREEMPTOR #4	[I]
58	CMU STOP TIME (CONFLICT FLASH)	[I]
17	EXPANDED DETECTOR #1	[I]
47	EXPANDED DETECTOR #2	[I]
31	EXPANDED DETECTOR #3	[I]
18	EXPANDED DETECTOR #4	[I]
30	EXPANDED DETECTOR #5	[I]
39	EXPANDED DETECTOR #6	[I]
40	EXPANDED DETECTOR #7	[I]
13	EXPANDED DETECTOR #8	[I]

NOTE
Priority preemptors 1 & 2 will respond to any NEMA defined input that is applied to Preemptor Call input 1 & 2, respectively.
Priority preemptors 3-6 will respond to any NEMA defined input that is applied for at least 0.8 seconds to Preemptor Call inputs 3-6, respectively.
Bus Preemptors 1-4 will respond to a pulsing (1 pps at 50% duty cycle) NEMA defined input that is applied to Preemptor Call input 3-6, respectively.

PIN	FUNCTION	I/O
43	SYSTEM COMMAND CYCLE BIT 1 OUTPUT	[O]
44	SYSTEM COMMAND CYCLE BIT 2 OUTPUT	[O]
29	SYSTEM COMMAND CYCLE BIT 3 OUTPUT	[O]
33	SYSTEM COMMAND OFFSET BIT 1 OUTPUT	[O]
42	SYSTEM COMMAND OFFSET BIT 2 OUTPUT	[O]
2	SYSTEM COMMAND OFFSET BIT 3 OUTPUT	[O]
21	SYSTEM COMMAND SPLIT BIT 1 OUTPUT	[O]
46	SYSTEM COMMAND SPLIT BIT 2 OUTPUT	[O]
53	SYSTEM COMMAND SYNC OUT	[O]

PIN	FUNCTION	I/O
23	PREEMPTOR #1 ACTIVE	[O]
32	PREEMPTOR #2 ACTIVE	[O]
22	PREEMPTOR #3 ACTIVE	[O]
34	PREEMPTOR #4 ACTIVE	[O]
1	PREEMPTOR #5 ACTIVE	[O]
48	PREEMPTOR #6 ACTIVE	[O]
59	PREEMPT CMU INTERLOCK	[O]
15	PREEMPTOR FLASH CONTROL	[O]
	(1K PULL UP)	[O]
27	COORD STATUS	[O]
5	CROSS STREET SYNC	[O]
28	NIC SPECIAL FUNCTION 1	[O]
8	NIC SPECIAL FUNCTION 2	[O]
24	NIC SPECIAL FUNCTION 3/	[O]
	SPARE OUTPUT 1	[O]
11	NIC SPECIAL FUNCTION 4/	[O]
	SPARE OUTPUT 2	[O]
41	SPARE OUTPUT 4	[O]
45	SPARE OUTPUT 5	[O]
51	SPARE OUTPUT 6	[O]
52	SPARE OUTPUT 7	[O]
54	SPARE OUTPUT 8	[O]

TELEMETRY CONNECTOR

PIN	FUNCTION	I/O
3	SYSTEM DETECTOR A1	[I]
2	SYSTEM DETECTOR A2	[I]
5	SYSTEM DETECTOR B1	[I]
19	SYSTEM DETECTOR B2	[I]
4	SYSTEM DETECTOR C1	[I]
1	SYSTEM DETECTOR C2	[I]
7	SYSTEM DETECTOR D1	[I]
8	SYSTEM DETECTOR D2	[I]
18	LOCAL FLASH	[I]
20	CONFLICT FLASH	[I]
16	DOOR OPEN	[I]
	(MAINTENANCE REQUIRED)	[I]
17	ALARM 1	[I]
21	ALARM 2	[I]
14	TLM SPARE 1	[I]
6	TLM SPARE 2	[I]
15	EXTERNAL ADDRESS ENABLE	[I]
24	RECEIVE 1	[O]
25	RECEIVE 2	[O]
12	TRANSMIT 1	[O]
13	TRANSMIT 2	[O]
9	TLM SPECIAL FUNCTION 1	[O]
22	TLM SPECIAL FUNCTION 2	[O]
10	TLM SPECIAL FUNCTION 3	[O]
23	TLM SPECIAL FUNCTION 4	[O]

APPENDIX B
PORTS 1, 2, 3 / TYPE 1 POWER

PORT 1 SDLC

PIN	FUNCTION	I/O
1	Tx Data +	[O]
2	Logic Ground	[-]
3	Tx Clock +	[O]
4	Logic Ground	[-]
5	Rx Data +	[I]
6	Logic Ground	[-]
7	Rx Clock +	[I]
8	Logic Ground	[-]
9	Tx Data -	[O]
10	Port 1 Disable (0VDC=disable)	[I]
11	Tx Clock -	[O]
12	Chassis Ground	[-]
13	Rx Data -	[I]
14	Reserved	
15	Rx Clock -	[I]

NOTE:
Tx pins at the BIU are Rx pins at the controller.
Rx pins at the BIU are Tx pins at the controller.

TYPE 1 POWER

PIN	FUNCTION	I/O
A	AC Neutral	[I]
B	Not Used	
C	AC Line	[I]
D	Not Used	
E	Not Used	
F	Fault Monitor	[O]
G	Logic Ground	[O]
H	Chassis Ground	[I]
	Not Used	
J	Not Used	

PORT 2 TERMINAL

PIN	FUNCTION	I/O
1	Chassis Ground	[-]
2	Transmit Data	[O]
3	Receive Data	[I]
4	Request To Send	[O]
5	Clear To Send	[I]
6	Not Used	
7	Logic Ground	[-]
8	Data Carrier Detect	[I]
9-19	Not Used	
20	Data Terminal Ready	[O]
21-25	Not Used	

PORT 3 EIA-232 TELEMETRY

PIN	FUNCTION	I/O
1	DXD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	NC	
9	NC	

PORT 3 TELEMETRY

PIN	FUNCTION	I/O
1	Transmit 1	[O]
2	Transmit 2	[O]
3	Reserved	
4	Receive 1	[I]
5	Receive 2	[I]
6	Chassis Ground	[-]
7	Reserved	
8	Reserved	
9	Chassis Ground	[-]

APPENDIX B
ASC/2-2000RM C1 CONNECTIONS

PIN NO.	170A FUNCTION	ASC/2-2000RM (C5000) FUNCTION
1	LOG GND	LOGIC GROUND
2	4P RED	ö4 DW
3	4P GRN	ö4 WALK
4	4 RED	ö4 RED
5	4 YEL	ö4 YELLOW
6	4 GRN	ö4 GREEN
7	3 RED	ö3 RED
8	3 YEL	ö3 YELLOW
9	3 GRN	ö3 GREEN
10	2P RED	ö2 DW
11	2P GRN	ö2 WALK
12	2 RED	ö2 RED
13	2 YEL	ö2 YELLOW
14	LOG GND	LOGIC GROUND
15	2 GRN	ö2 GREEN
16	1 RED	ö1 RED
17	1 YEL	ö1 YELLOW
18	1 GRN	ö1 GREEN
19	8P RED	ö8 DW
20	8P GRN	ö8 WALK
21	8 RED	ö8 RED
22	8 YEL	ö8 YELLOW
23	8 GRN	ö8 GREEN
24	7 RED	ö7 RED
25	7 YEL	ö7 YELLOW
26	7 GRN	ö7 GREEN
27	6P RED	ö6 DW
28	6P GRN	ö6 WALK
29	6 RED	ö6 RED
30	6 YEL	ö6 YELLOW
31	6 GRN	ö6 GREEN
32	5 RED	ö5 RED
33	5 YEL	ö5 YELLOW
34	5 GRN	ö5 GREEN
35	OLA GRN	OLA GREEN
36	OLB GRN	OLB GREEN
37	OLA YEL	OLA YELLOW
38	OLB YEL	OLB YELLOW
39	2 EX,CT	VEH DET 2
40	6 EX,CT	VEH DET 6
41	4 EX,CT	VEH DET 4
42	8 EX,CT	VEH DET 8
43	2 EX,CT	VEH DET 9
44	6 EX,CT	VEH DET 13
45	4 EX,CT	VEH DET 11
46	8 EX,CT	VEH DET 15
47	2 CALL	VEH DET 10
48	6 CALL	VEH DET 14
49	4 CALL	VEH DET 12
50	8 CALL	VEH DET 16
51	RR1	PMT CALL 1
52	RR2	PMT CALL 2

PIN NO.	170A FUNCTION	ASC/2-2000RM (C5000) FUNCTION
53	ADV EN	MAN CONT EM
54	SPARE 2	TEST A
55	5 EX,CT	VEH DET 5
56	1 EX,CT	VEH DET 1
57	7 EX,CT	VEH DET 7
58	3 EX,CT	VEH DET 3
59	5 EX,CT	VEH DET 21
60	1 EX,CT	VEH DET 17
61	7 EX,CT	VEH DET 23
62	3 EX,CT	VEH DET 19
63	2 EX,CT	VEH DET 18
64	6 EX,CT	VEH DET 22
65	4 EX,CT	VEH DET 20
66	8 EX,CT	VEH DET 24
67	2 PED PB	PED DET 1
68	6 PED PB	PED DET 3
69	4 PED PB	PED DET 2
70	8 PED PB	PED DET 4
71	EVA	PMT CALL 3
72	EVB	PMT CALL 4
73	EVC	PMT CALL 5
74	EVD	PMT CALL 6
75	SPARE 3	MMU STOP TIME
76	2 EXT	VEH DET 25
77	6 EXT	VEH DET 27
78	4 EXT	VEH DET 26
79	8 EXT	VEH DET 28
80	ADVANCE	INT ADV
81	FL SENSE	LOCAL FLASH
82	STOP TIME	STOP TIME
83	TOD OUT 1	PMT FLASH
84	TOD OUT 3	-
85	OLD RED	OLD RED
86	OLD YEL	OLD YELLOW
87	OLD GRN	OLD GREEN
88	OLC RED	OLC RED
89	OLC YEL	OLC YELLOW
90	OLC GRN	OLC GREEN
91	RESERVED	-
92	LOG GND	LOGIC GND
93	RESERVED	-
94	OLB RED	OLB RED
95	OLB YEL	OLB YELLOW
96	OLB GRN	OLB GREEN
97	OLA RED	OLA RED
98	OLA YEL	OLA YELLOW
99	OLA GRN	OLA GREEN
100	TOD OUT 2	-
101	CAL FL OUT	-
102	DET RESET	-
103	WATCHDOG	1 PPS
104	LOG GND	LOGIGND

APPENDIX B
ASC/2-2000RM EXPANSION I/O CONNECTIONS

PIN NO.	UNIVERSAL FUNCTION	ASC/2-2000RM FUNCTION
1		+24/VE
2		COORD X ST SYNC OUT
3		NIC SF1
4		COORD SYNC (OUT)
5		-
6		TEST C
7		DUAL C
8		AUTO FLASH
9		COORD SYNC
10		PMT 1 STATUS
11		PMT 4 STATUS
12		PMT 6 STATUS
13		-
14		CYC BIT 2
15		TEST D
16		OFFSET BIT 3
17		OFFSET BIT 1
18		MMU STOP TIME
19		LOGIC GROUND
20		-
21		PMT CMU INTERLOCK
22		NIC SF 2
23		COORD STATUS
24		-
25		TIME RESET
26		SPLIT DEMAND 1
27		COORD FREE
28		PMT 2 STATUS
29		PMT 3 STATUS
30		PMT 5 STATUS
31		-
32		CYC BIT 1
33		-
34		SPLIT BIT 2
35		OFFSET BIT 2
36		CYC BIT 3
37		SPLIT BIT 1

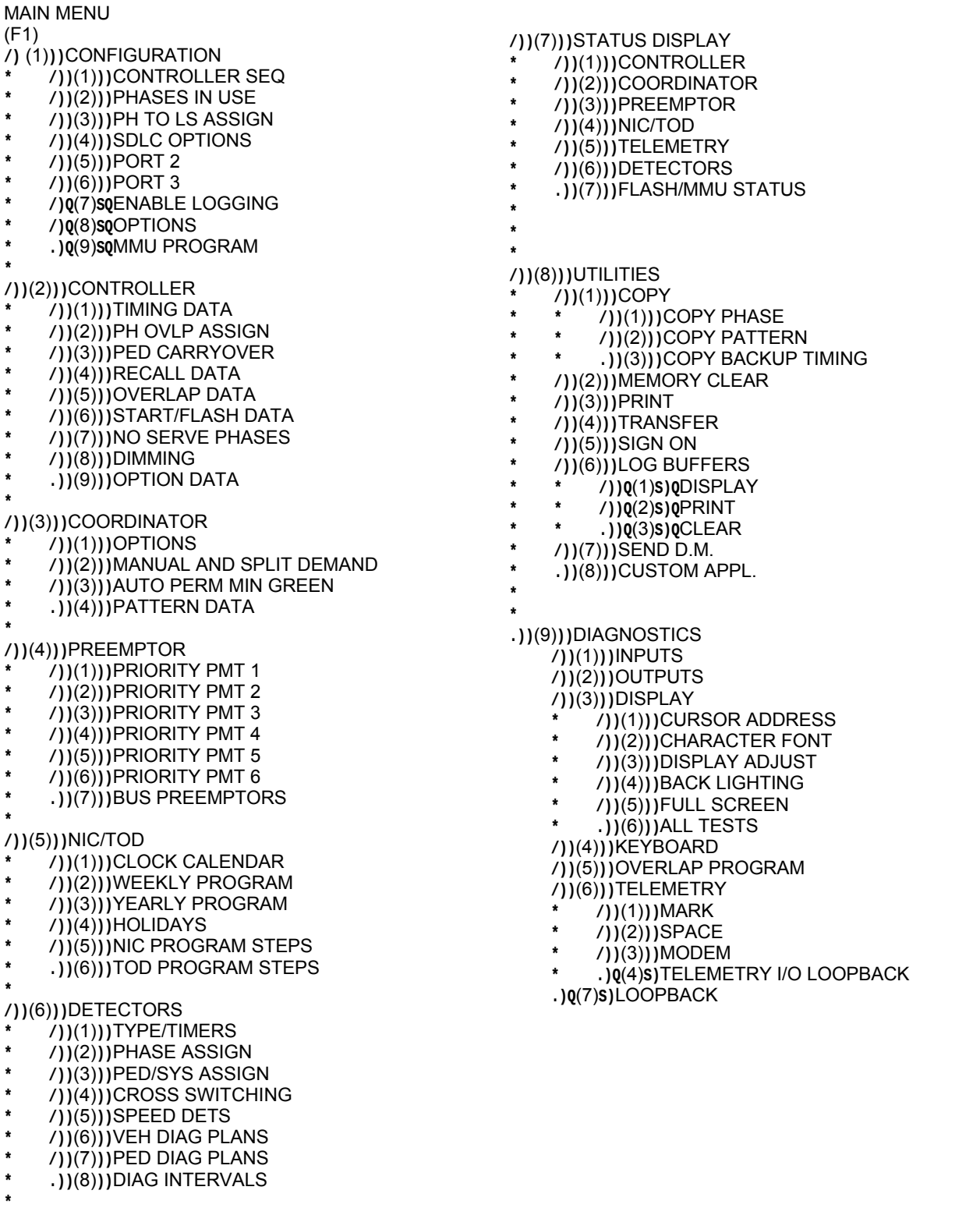
APPENDIX C
BIU CONNECTOR PIN ASSIGNMENTS

Pin	Function	TF #1 Function	TF #2 Function	TF #3 Function	TF4 Function
1a	+24 VDC IN				
1b	+24 VDC IN				
2a	Output 1	Load Switch 1 Red Driver	Load Switch 9 Red Driver	Timing Plan A Output	Phase 1 On
2b	Output 2	Load Switch 1 Yellow Driver	Load Switch 9 Yellow Driver	Timing Plan B Output	Phase 2 On
3a	Output 3	Load Switch 1 Green Driver	Load Switch 9 Green Driver	Timing Plan C Output	Phase 3 On
3b	Output 4	Load Switch 2 Red Driver	Load Switch 10 Red Driver	Timing Plan D Output	Phase 4 On
4a	Output 5	Load Switch 2 Yellow Driver	Load Switch 10 Yellow Driver	Offset 1 Output	Phase 5 On
4b	Output 6	Load Switch 2 Green Driver	Load Switch 10 Green Driver	Offset 2 Output	Phase 6 On
5a	Output 7	Load Switch 3 Red Driver	Load Switch 11 Red Driver	Offset 3 Output	Phase 7 On
5b	Output 8	Load Switch 3 Yellow Driver	Load Switch 11 Yellow Driver	Automatic Flash	Phase 8 On
6a	Output 9	Load Switch 3 Green Driver	Load Switch 11 Green Driver	System Special Func 1	Phase 1 Next
6b	Output 10	Load Switch 4 Red Driver	Load Switch 12 Red Driver	System Special Func 2	Phase 2 Next
7a	Output 11	Load Switch 4 Yellow Driver	Load Switch 12 Yellow Driver	System Special Func 3	Phase 3 Next
7b	Output 12	Load Switch 4 Green Driver	Load Switch 12 Green Driver	System Special Func 4	Phase 4 Next
8a	Output 13	Load Switch 5 Red Driver	Load Switch 13 Red Driver	Reserved	Phase 5 Next
8b	Output 14	Load Switch 5 Yellow Driver	Load Switch 13 Yellow Driver	Reserved	Phase 6 Next
9a	Output 15	Load Switch 5 Green Driver	Load Switch 13 Green Driver	Reserved	Phase 7 Next
9b	Input/Output 1	Load Switch 6 Red Driver [O]	Load Switch 14 Red Driver [O]	Ring 1 Status Bit A [O]	Phase 8 Next [O]
10a	Input/Output 2	Load Switch 6 Yellow Driver[O]	Load Switch 14 Yellow Driver [O]	Ring 1 Status Bit B [O]	Phase 1 Check [O]
10b	Input/Output 3	Load Switch 6 Green Driver [O]	Load Switch 14 Green Driver [O]	Ring 1 Status Bit C [O]	Phase 2 Check [O]
11a	Input/Output 4	Load Switch 7 Red Driver [O]	Load Switch 15 Red Driver [O]	Ring 2 Status Bit A [O]	Phase 3 Check [O]
11b	Input/Output 5	Load Switch 7 Yellow Driver [O]	Load Switch 15 Yellow Driver [O]	Ring 2 Status Bit B [O]	Phase 4 Check [O]
12a	Input/Output 6	Load Switch 7 Green Driver [O]	Load Switch 15 Green Driver [O]	Ring 2 Status Bit C [O]	Phase 5 Check [O]
12b	Input/Output 7	Load Switch 8 Red Driver [O]	Load Switch 16 Red Driver [O]	Red Rest Ring 1 [I]	Phase 6 Check [O]
13a	Input/Output 8	Load Switch 8 Yellow Driver [O]	Load Switch 16 Yellow Driver [O]	Red Rest Ring 2 [I]	Phase 7 Check [O]
13b	Input/Output 9	Load Switch 8 Green Driver [O]	Load Switch 16 Green Driver [O]	Omit All Red Ring 1 [I]	Phase 8 Check [O]
14a	Input/Output 10	TBC Aux #1 Output [O]	TBC Aux #3 Output [O]	Omit All Red Ring 2 [I]	Address Bit 0 [I]
14b	Input/Output 11	TBC Aux #2 Output [O]	Free/Coord Status [O]	Red Recycle Ring 1 [I]	Address Bit 1 [I]
15a	Input/Output 12	Preempt 1 Output [O]	Preempt 3 Output [O]	Red Recycle Ring 2 [I]	Address Bit 2 [I]
15b	Input/Output 13	Preempt 2 Output [O]	Preempt 4 Output [O]	Alternate Sequence A [I]	Address Bit 3 [I]
16a	Input/Output 14	Preempt 1 Input [I}	Preempt 5 Output [O]	Alternate Sequence B [I]	Address Bit 4 [I]
16b	Input/Output 15	Preempt 2 Input [I]	Preempt 6 Output [O]	Alternate Sequence C [I]	Spare
17a	Input/Output 16	Test Input A [I]	Preempt 3 Input [I]	Alternate Sequence D [I]	Spare
17b	Input/Output 17	Test Input B [I]	Preempt 4 Input [I]	Phase Omit 1 [I]	Spare
18a	Input/Output 18	Automatic Flash [I]	Preempt 5 Input [I]	Phase Omit 2 [I]	Spare
18b	Input/Output 19	Dimming Enable [I]	Preempt 6 Input [I]	Phase Omit 3 [I]	Spare
19a	Input/Output 20	Manual Control Enable [I]	Call To Nonactuated II [I]	Phase Omit 4 [I]	Reserved
19b	Input/Output 21	Interval Advance [I]	Spare	Phase Omit 5 [I]	Reserved
20a	Input/Output 22	External Minimum Recall [I]	Spare	Phase Omit 6 [I]	Reserved
20b	Input/Output 23	External Start [I]	Spare	Phase Omit 7 [I]	Reserved
21a	Input/Output 24	TBC ON Line [I]	Spare	Phase Omit 8 [I]	Reserved
21b	Input 1	Stop Time Ring 1 (Stop Time)	Inhibit Max Ring 1	Hold Phase 1	Ped Omit 1
22a	Input 2	Stop Time Ring 2	Inhibit Max Ring 2	Hold Phase 2	Ped Omit 2
22b	Input 3	Max II Selection Ring 1	Local Flash	Hold Phase 3	Ped Omit 3
23a	Input 4	Max II Selection Ring 2	MMU Flash	Hold Phase 4	Ped Omit 4
23b	Input 5	Force Off Ring 1 (Force Off)	Alarm 1	Hold Phase 5	Ped Omit 5
24a	Input 6	Force Off Ring 2	Alarm 2	Hold Phase 6	Ped Omit 6
24b	Input 7	Call To Non Act I	Free (No Coord)	Hold Phase 7	Ped Omit 7
25a	Input 8	Walk Rest Modifier	Test Input C	Hold Phase 8	Ped Omit 8
25b	Opto Input 1	Phase 1 Ped Call	Phase 5 Ped Call (Signal Plan A)	Timing Plan A Input	Offset 1 Input
26a	Opto Input 2	Phase 2 Ped Call	Phase 6 Ped Call (Signal Plan B)	Timing Plan B Input	Offset 2 Input
26b	Opto Input 3	Phase 3 Ped Call	Phase 7 Ped Call	Timing Plan C Input	Offset 3 Input
27a	Opto Input 4	Phase 4 Ped Call	Phase 8 Ped Call	Timing Plan D Input	Spare
27b	Opto Common	12 VAC	12 VAC	Interconnect Common	Interconnect Common
28a	Address Select 0	Open	Logic GND	Open	Log GND
28b	Address Select 1	Open	Open	Logic GND	Log GND
29a	Address Select 2	Open	Open	Open	Open
29b	Address Select 3	Open	Open	Open	Open
30a					
30b	Data Transmit (reserved)				
31b	Data Receive (reserved)				
31a	Line Frequency Reference				
32b	Logic Ground				

APPENDIX C
BIU CONNECTOR PIN ASSIGNMENTS

Pin	Function	DET #1 Function		DET #2 Function		DET #3 Function		DET #4 Function	
1a	+24 VDC IN	Detector Reset Slot ½							
1b	+24 VDC IN	Detector Reset Slot 3/4							
2a	Output 1	Detector Reset Slot 5/6							
2b	Output 2	Detector Reset Slot 7/8							
3a	Output 3	Reserved							
3b	Output 4	Reserved							
4a	Output 5	Reserved							
4b	Output 6	Reserved							
5a	Output 7	Reserved							
5b	Output 8	Reserved							
6a	Output 9	Reserved							
6b	Output 10	Reserved							
7a	Output 11	Reserved							
7b	Output 12	Reserved							
8a	Output 13	Reserved							
8b	Output 14	Channel 1 Call	[I]	Channel 17 Call	[I]	Channel 33 Call	[I]	Channel 49 Call	[I]
9a	Output 15	Channel 2 Call	[I]	Channel 18 Call	[I]	Channel 34 Call	[I]	Channel 50 Call	[I]
9b	Input/Output 1	Channel 3 Call	[I]	Channel 19 Call	[I]	Channel 35 Call	[I]	Channel 51Call	[I]
10a	Input/Output 2	Channel 4 Call	[I]	Channel 20 Call	[I]	Channel 36 Call	[I]	Channel 52 Call	[I]
10b	Input/Output 3	Channel 5 Call	[I]	Channel 21 Call	[I]	Channel 37 Call	[I]	Channel 53 Call	[I]
11a	Input/Output 4	Channel 6 Call	[I]	Channel 22 Call	[I]	Channel 38 Call	[I]	Channel 54 Call	[I]
11b	Input/Output 5	Channel 7 Call	[I]	Channel 23 Call	[I]	Channel 39 Call	[I]	Channel 55 Call	[I]
12a	Input/Output 6	Channel 8 Call	[I]	Channel 24 Call	[I]	Channel 40 Call	[I]	Channel 56 Call	[I]
12b	Input/Output 7	Channel 9 Call	[I]	Channel 25 Call	[I]	Channel 41 Call	[I]	Channel 57 Call	[I]
13a	Input/Output 8	Channel 10 Call	[I]	Channel 26 Call	[I]	Channel 42 Call	[I]	Channel 58 Call	[I]
13b	Input/Output 9	Channel 11 Call	[I]	Channel 27 Call	[I]	Channel 43 Call	[I]	Channel 59 Call	[I]
14a	Input/Output 10	Channel 12 Call	[I]	Channel 28 Call	[I]	Channel 44 Call	[I]	Channel 60 Call	[I]
14b	Input/Output 11	Channel 13 Call	[I]	Channel 29 Call	[I]	Channel 45 Call	[I]	Channel 61 Call	[I]
15a	Input/Output 12	Channel 14 Call	[I]	Channel 30 Call	[I]	Channel 46 Call	[I]	Channel 62 Call	[I]
15b	Input/Output 13	Channel 15 Call	[I]	Channel 31 Call	[I]	Channel 47 Call	[I]	Channel 63 Call	[I]
16a	Input/Output 14	Channel 16 Call	[I]	Channel 32 Call	[I]	Channel 48 Call	[I]	Channel 64 Call	[I]
16b	Input/Output 15	Channel 1 Fault Status	[I]	Channel 17 Fault Status	[I]	Channel 33 Fault Status	[I]	Channel 49 Fault Status	[I]
17a	Input/Output 16	Channel 2 Fault Status	[I]	Channel 18 Fault Status	[I]	Channel 34 Fault Status	[I]	Channel 50 Fault Status	[I]
17b	Input/Output 17	Channel 3 Fault Status	[I]	Channel 19 Fault Status	[I]	Channel 35 Fault Status	[I]	Channel 51 Fault Status	[I]
18a	Input/Output 18	Channel 4 Fault Status	[I]	Channel 20 Fault Status	[I]	Channel 36 Fault Status	[I]	Channel 52 Fault Status	[I]
18b	Input/Output 19	Channel 5 Fault Status	[I]	Channel 21 Fault Status	[I]	Channel 37 Fault Status	[I]	Channel 53 Fault Status	[I]
19a	Input/Output 20	Channel 6 Fault Status	[I]	Channel 22 Fault Status	[I]	Channel 38 Fault Status	[I]	Channel 54 Fault Status	[I]
19b	Input/Output 21	Channel 7 Fault Status	[I]	Channel 23 Fault Status	[I]	Channel 39 Fault Status	[I]	Channel 55 Fault Status	[I]
20a	Input/Output 22	Channel 8 Fault Status	[I]	Channel 24 Fault Status	[I]	Channel 40 Fault Status	[I]	Channel 56 Fault Status	[I]
20b	Input/Output 23	Channel 9 Fault Status		Channel 25 Fault Status		Channel 41 Fault Status		Channel 57 Fault Status	
21a	Input/Output 24	Channel 10 Fault Status		Channel 26 Fault Status		Channel 42 Fault Status		Channel 58 Fault Status	
21b	Input 1	Channel 11 Fault Status		Channel 27 Fault Status		Channel 43 Fault Status		Channel 59 Fault Status	
22a	Input 2	Channel 12 Fault Status		Channel 28 Fault Status		Channel 44 Fault Status		Channel 60 Fault Status	
22b	Input 3	Channel 13 Fault Status		Channel 29 Fault Status		Channel 45 Fault Status		Channel 61 Fault Status	
23b	Input 4	Channel 14 Fault Status		Channel 30 Fault Status		Channel 46 Fault Status		Channel 62 Fault Status	
23a	Input 5	Channel 15 Fault Status		Channel 31 Fault Status		Channel 47 Fault Status		Channel 63 Fault Status	
24b	Input 6	Channel 16 Fault Status		Channel 32 Fault Status		Channel 48 Fault Status		Channel 64 Fault Status	
24a	Input 7	Reserved							
25a	Input 8	Reserved							
25b	Opto Input 1	Reserved							
26a	Opto Input 2	Reserved							
26b	Opto Input 3	Reserved							
27a	Opto Input 4	-		Logic GND		-		Logic GND	
27b	Opto Common	-		-		Logic GND		Logic GND	
28b	Address Select 0	-		-		-		-	
28a	Address Select 1	Logic GND		Logic GND		Logic GND		Logic GND	
29b	Address Select 2								
29a	Address Select 3								
30b	Data Transmit (reserved)								
30a	Data Receive (reserved)								
31b	Earth Ground								
31a	Line Frequency Reference								
32b	Logic Ground								

APPENDIX D
ASC/2 KEYBOARD TREE



APPENDIX E
EVENT AND COORDINATION STATUS MESSAGES

Free Messages
I/O ERROR FLASH ACTIVE
MMU/CMU STOP TIME ACTIVE
MANUAL CONTROL ENABLE ACTIVE
AUTOMATIC FLASH INPUT ACTIVE
PREEMPTOR ACTIVE
COORD FREE INPUT ACTIVE
RING ½ STOP TIME ACTIVE
TELEMETRY COMMANDING FREE
COORD MANUAL FREE SELECTED
COORD MANUAL PATTERN ERROR
CLOCK NOT SET
NO STEP ACTIVE
TBC ON LINE ACTIVE
STEP SELECTING FREE
WAITING FOR DIAL SYNC
COMMANDING FREE
HDW ERROR OR CLOCK NOT SET
ALL PHASE SPLITS ARE ZERO
CRITICAL COORD DATA ERROR(S)
PICKUP
CYCLE FAULT
COORD FAILURE
CYCLE FAILURE
MMU OR TF BIU RESPONSE FRAME FAULT(S)
MMU PROGRAM COMPATIBILITY ERROR
INTERNAL MMU COMPATIBILITY ERROR
INTERNAL MMU I/O ERROR
PHASE NEXT ERROR

Background Error Messages
CYCLE LENGTH LESS THAN 30 SECONDS
NO VALID COORD PHASE(S)
COORD PHASES NOT IN SAME CG
COORD PHASES IN SAME RING
SPLIT TIME > 327 SECONDS
CYCLE LENGTH TOO SHORT
COORD PHASE SPLIT TOO SHORT

Interconnect Error Messages
TELEMETRY NOT PRESENT
TELEMETRY DATA INVALID
CLOCK NOT SET (NO INTERNAL SYNC)
PATTERN RANGE ERROR
PATTERN CYCLE LENGTH < 30 SECONDS
STD FORMAT - NO PATTERN MATCH
SYNC TRUE > 15 SECONDS
TLM/HDW: NO SYNC FOR RESYNC + 1 CYCLE,
TS2 MULTIPLE OFFSETS > 15 SECONDS
TLM/HDW: WAITING FOR FIRST SYNC

Warning Messages
WARNING: LOCAL ZERO ERROR
WARNING: YIELD ERROR
WARNING: FORCE OFF ERROR
WARNING: ZERO SPLIT OMITTING PHASE(S)
WARNING: CYCLE LENGTH < SPLIT SUM
WARNING: PHASE SPLIT AT MINIMUM

Event Messages
TF BIU #X ENABLED
TF BIU #X DISABLED
RESPONSE FAULT NNN (TF BIU X)
RESPONSE FAULT NNN (TF BIU X) CLEARED
MMU ENABLED
MMU DISABLED
RESPONSE FAULT NNN (MMU)
RESPONSE FAULT NNN (MMU) CLEARED
XFER OUTPUTS COMM ERROR (CF 18)
XFER OUTPUTS COMM ERROR (CF 18) CLEARED
3 CRITICAL SDLC ERRORS IN 24 HRS
3 CRITICAL SDLC ERRORS IN 34 HRS CLEARED
DET BIU #X ENABLED
DET BIU #X DISABLED
TEST ENABLED
TEST DISABLED
RESPONSE FAULT NNN (DET BIU #X)
RESPONSE FAULT NNN (DET BIU #X) CLEARED
RESPONSE FAULT NNN (TEST)
RESPONSE FAULT NNN (TEST) CLEARED
COORD ACTIVE
CYCLE FAULT (FREE)
COORD FAULT (FREE)
COORD FAILURE (FREE)
COORD LOCAL FREE
COORD DATA ERRORS (FREE)
COORD PROGRAM FREE
COMPATIBILITY FAULT FLASH
RESPONSE FRAME FAULT FLASH
CONFLICT FAULT FLASH
COLOR MISMATCH FAULT FLASH
MMU FLASH
CYCLE FAILURE FLASH
PHASE NEXT ERROR FLASH
MMU FLASH - CONFLICT
MMU FLASH - RED FAILURE
MMU FLASH - VOLTAGE MONITOR
MMU FLASH - +24 VOLT MONITOR I
MMU FLASH - +24 VOLT MONITOR II
MMU FLASH - MINIMUM CLEARANCE FAILURE
MMU FLASH - DIAGNOSTIC FAILURE
MMU FLASH - PORT 1 TIMEOUT FAILURE
AUTOMATIC FLASH
LOCAL FLASH
PRIORITY PREEMPTOR X ACTIVE
BUS PREEMPTOR X ACTIVE
BUS ADVANCE DETECTOR X
PREEMPTOR INACTIVE
POWER ON
POWER OFF
CONTROLLER ON LINE
COORDINATOR ACTIVE
CONTROLLER ON LINE - COORDINATOR ACTIVE
BATTERY LOW
ALARM X ACTIVE
ALARM X INACTIVE

Log Coordination Errors
COORD ACTIVE: No fault or conflict.
CYCLE FAULT: A serviceable call has not been serviced for two cycles.
COORD FAULT: A cycle fault is in effect, and a serviceable call has been serviced within two cycles.
COORD LOCAL FREE: Controller taken out of coordination by a command.
COORD PROGRAM FREE: Controller taken out of coordination by TOD program.
COORD DATA ERRORS: Bad programming data.

APPENDIX E.
EVENT AND COORDINATION STATUS MESSAGES

Flash Status Messages

NO FLASH CONDITION
MMU/TF SDLC COMM FAULT
COMPATIBILITY PFM FAULT
COLOR MISMATCH
CONFLICT DETECTED
PHASE NEXT FAULT
CYCLE FAIL
DEFAULT FLASH 1
FAILURE STATUS NOT REPORTED
PORT 1 TIMEOUT
DIAGNOSTIC FAILURE
UNKNOWN MMU FLASH CONDITION
CVM/CFM
+24V MON I
+24V MON II
MIN CLEAR FAIL
CONFLICT
RED FAILURE
POWER START FLASH
EXTERNAL START PREEMPT FLASH
POWER ON PREEMPT FLASH
PREEMPT FLASH
AUTOMATIC FLASH
LOCAL FLASH

I/O MODE CHANGE STATUS SCREEN

```
************************************
*                                  *
*  Intersection set to flash because  *
*  the Type 2 I/O Mode changed while  *
*  the controller was in operation.   *
*                                  *
************************************
```

TS2 Type 2 has eight (four are defined) different I/O modes of unexpected operation, the controller was sent to flash. The controller must be powered down and up again to clear this error status. Check mode select wires and input buffers.

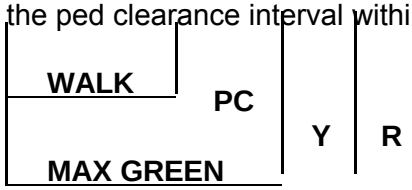
APPENDIX F
PRETIMED CONTROLLER OPERATION

Pretimed operation provides “fixed time” capability and a provision to extend walk on selected phases. Extending walk means that the walk interval is expanded to make walk plus ped clearance equal to the green time on a phase. Two changes were made to accommodate “Pretimed Operation.” First, a bit was defined in the write protect area which enables “Pretimed Operation.” Second, the “Act Rest in Walk” data entry in Main Menu 2.9 was renamed “Rest in Walk” and now has a dual definition. The “Rest in Walk” data entry specifies which phases are to have extended walk if “Pretimed Operation” is programmed. It also defines “actuated rest in walk” phases, as it previously did, when “Pretimed Operation” is not selected.

To select “Pretimed Operation,” set bit 3 (0x08) at address 0x004 in the protect area. When you do this, the controller converts phases defined in the “Rest in Walk” data entry in Main Menu 2,9 to nonactuated operation and automatically places vehicle and pedestrian recalls on them. Max Recall is placed on all remaining phases. If the controller is being coordinated remotely, “Hold-On-Line” is used to signal the controller that Hold and Force Off signals are being issued by an external (remote) device. In this case, CNA1 phases are also converted to non-actuated operation.

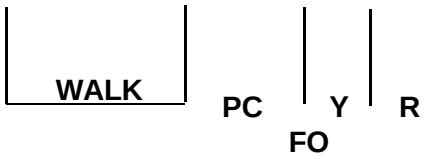
Pretimed Operation: Free and Coordinated without Hold-On-Line

Free Operation
The programmed Rest In Walk phases are non-actuated. An internal Hold is applied to each of these phases during Green until “max in effect” minus elapsed green time is equal to the programmed ped clearance time. As a result, walk is displayed until there is just enough time for the ped clearance interval within the remaining phase green time.



Phases not programmed as Rest In Walk phases have Max Recall applied and will time the “max in effect.” Pedestrian movements on these phases are actuated. Ped calls are not automatically placed on these phases. If there is a ped call, the phase will time walk, ped clear and go to “don’t walk” until the phase terminates.

Coordinated Operation
Timing of phases and ped movements for non-coordinated phases is essentially the same as described during Free. The only real difference is in how the removal of the internal Hold signal is computed for the Rest In Walk phases. A “green split time” is calculated by subtracting the vehicle clearance times from the phase split time. An internal Hold is then applied to the phase during green until “green split time” minus elapsed green time on the phase is equal to the programmed ped clearance time. As a result, walk is displayed until there is just enough time for the ped clearance time within the remaining green time.

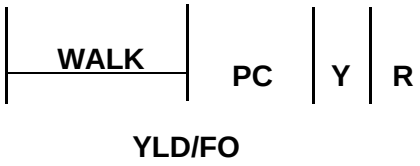


APPENDIX F
PRETIMED CONTROLLER OPERATION

Coordinated phases operate as they normally do.

Pretimed Operation: Remote System Coordination with Hold-On-Line
The Host system communicates to the controller via the telemetry interface and sends a Hold-On-Line to signal Remote Coordination Mode. In this mode the controller converts “Rest in Walk” and coordinated (CNA1) phases to non-actuated operation and automatically places vehicle and pedestrian recalls on them. Max Recall is placed on all other phases.

Hold is used to control the yield point on coordinated (CNA1) phases. The Host system can also issue a Force Off command to the coordinated phases instead of yielding.



With the exception of the coordinated (CNA1) phases, Force Off is normally used to advance non-actuated (“Rest In Walk”) phases from walk to ped clearance. These phases are held in walk by an internally generated Hold signal. In the event a Force Off command is not received on one of these phases, or the Host does not issue Force Off commands, the controller will automatically advance non-actuated phases from walk to ped clearance. This is accomplished as follows. The controller computes a maximum green time for a phase which is equal to Max 3 if the value is not zero and the current “max in effect” if it is. When green time remaining on a phase is equal to the ped clearance interval, the controller advances the phase from walk to ped clearance.

Phases not programmed for “Rest in Walk” have Max Recall applied. The ped movements are actuated. These phases are normally terminated by Force Off issued by the Host. If a Force Off command is not received, the phase will automatically terminate when the max timer is equal to Max 3, or the current “max in effect” if Max 3 is zero. Max Inhibit is ignored.