

## ASC/2M-1000 System Master

On-street zone master system

### System Overview

The ASC/2M-1000 is a powerful on-street arterial system master which commands up to 24 traffic controllers via telemetry interconnect. It retrieves event, alarm, and diagnostic data from the attached local controller. Selection of the arterial traffic plan may be based on manual command, external input, Time-of-Day (TOD), or Traffic Responsive Plan (TRP).

Controllers interconnected with the ASC/2M can be any mix of Econolite models ASC/2 or ASC/3 Series, ASC-8000, KFT-18/2400, KMC-8000, and 2070 controllers running Econolite's ASC/2070 firmware or ASC/3 2070 firmware.

### ASC/2M Hardware

The ASC/2M is based on 32-bit microprocessor technology, which provides extensive processing and memory addressing capability. User data is stored in a small plug-in EEPROM data module, which can be transferred from one master to another. The ASC/2M meets all environmental requirements for installation in a TS1 or TS2 traffic cabinet.

The ASC/2M features a backlit 16-line by 40-character alphanumeric LCD display, eight dedicated function keys, a numeric key pad, and a four-arrow cursor control key. The keys are elastometric, and provide both tactile and audio feedback.

The ASC/2M provides easy, menu-driven programming, simple cursor control for data entry, and dynamic status displays in the form of clearly labeled tables. Context-sensitive help is available for any data entry by simply pressing the HELP key. Error and diagnostic messages assist with fault isolation.

### Stand-Alone System Control

The ASC/2M can serve as a stand-alone system master for up to 24 controllers in its zone. It will select the traffic plan (Plan Command) or cycle, offset, and split in effect in each controller on a zone-wide basis to optimize traffic flow.

In a stand-alone configuration, controllers can be programmed locally at each controller cabinet or remotely via a laptop or notebook computer running the Econolite Aries® Closed-Loop System Software.

### ASC/2M to Field

The ASC/2M communicates with each controller in its zone once per second. Communications are normally via dedicated RS-232 telemetry at communication speeds up to 19,200 bps or TDM/FSK telemetry at 1,200 bps. Physically, each telemetry channel typically consists of two twisted pairs of copper wires or two multi-mode or single mode fiber-optic cables. Fiber-optic cable provides total immunity to RFI, EMI, and lightning surges, electrical isolation and high bandwidth for future signal expansion.



A communications alternative is to use radio interconnect, which avoids the installation costs and right-of-way problems associated with any type of cabling. Econolite offers both narrow-band and license-free spread spectrum radio options.

### ASC/2M to Aries

Commercial dial-up telephone service is normally used for communications between ASC/2Ms and the central Aries computer. Software at each end provides auto-dial and auto-answer capabilities and calls can be initiated based on schedule or on an event. An external Hayes-compatible modem, such as Econolite's industrial 56K dial-up modem is required for the ASC/2M.

As an alternative to dial-up telephone lines, Aries supports direct connection of ASC/2M zone masters using a multi-port serial interface card in the central PC. This direct connection can be via copper or fiber-optic interconnect.

The ASC/2M can also communicate with third-party central systems using an optional open Advanced Traffic Management System (ATMS) protocol. This allows another system to communicate to the ASC/2M on one RS-232 port while Aries is communicating on another.

### Features

- Stand-alone master or zone master operation in Aries network
- System zone control and reporting for up to 24 controllers
- Compatible with ASC/3, ASC/2 Series, ASC-8000, KFT-18/2400, KMC-8000, and 2070 controllers running ASC/2070 firmware and/or ASC/3 2070 firmware
- Coordination based on TRP, TOD schedule, manual input, or external command
- Dual-coordination mode for crossing arterial control
- Communication with controllers via 4-wire telemetry, fiber-optic, or radio interconnect
- Communication with Aries central computer via dial-up telephone, leased lines, fiber-optics, or radio
- 16-line by 40-character LCD display
- Menu programming with context-sensitive help screens
- Proven in thousands of systems
- Optional interface to third-party central system via open protocol

## Traffic Plan Commands

The traffic plan consists of one of six cycle lengths, five offsets per cycle, and four splits per cycle. It can also call for free or flash and four system-wide special functions.

A special Plan Command mode allows the ASC/2M to select one of 32 fixed coordination plans in the interconnected local controllers. This allows breaking the intersections under control into sub-groups.

## TOD Plan Selection

The traffic plan in effect may be specified by TOD, day-of-week, and week-of-year. The ASC/2M makes provisions for up to 53 weeks per year, each with a choice of 10 weekly plans to accommodate seasonal traffic patterns. Each day of a weekly plan can implement one of 16 day plans. Each day plan can implement a series of program steps by TOD from an available 150 program steps. In addition, the ASC/2M makes provisions for 36 exception days for holidays and special events. These days may be or one date only or may repeat annually.

## Traffic Responsive Plan Selection

The traffic plan can be based on actual traffic demand. TRP operation may run full time, scheduled by TOD, or programmed to take over from TOD if actual traffic demand is greater than commanded by TOD.

The ASC/2M obtains volume and occupancy traffic data via telemetry from up to 32 system detectors in its zone. System detector data is used to select one of five volume levels ranging

from light traffic to heavy congestion, and four directional preferences, which are inbound, outbound, average, and non-arterial. A non-arterial preference is selected if traffic on a major cross street exceeds a preset threshold.

In combination, the five volume levels and four directional preferences specify 20 traffic plans, each of which in turn specifies the cycle, offset, and split of each controller in the zone. Hysteresis is provided between adjacent levels to avoid oscillation.

## Event, Status, & Log Reports

All status change events and failure events are automatically stored by the ASC/2M in an event buffer capable of holding up to 255 events, with the newest data overwriting the oldest. The stored event data can be retrieved locally via the RS-232 port or can be retrieved via modem by Aries central PC for incorporation into stored logs and reports. Telephone calls between the ASC/2M and the central PC may be initiated by the ASC/2M based on an event or be scheduled by the ASC/2M or Aries central PC.

In addition to system detector and event data, the ASC/2M provides access to the detailed operation of all intersections, as reported by the controllers (typically once per second), via telemetry. Five comprehensive status display screens provide an overview of system and controller operating status. This system monitoring capability allows the traffic engineer to quickly implement and test new traffic plans to optimize traffic flow.

The data collected by the ASC/2M is easily accessed by the Aries central PC, which can also remotely change most set-up data in the

ASC/2M and local controllers. The Aries system provides a wealth of graphic displays, printed logs, reports, and analytical tools. The ASC/2M and Aries have been developed as an integrated traffic control system.

## External Plan Selection

Specification of the traffic plan can also be set by an external device via a front panel I/O connector. This external device is typically another ASC/2M, making it a master/master and the second ASC/2M a slave or sub-master. The external plan command capability allows synchronization of crossing arteries or adjacent parallel arteries by multiple ASC/2M masters.

## Remote Diagnostics

The ASC/2M automatically performs diagnostic tests on system detectors, telemetry communications, and intersection operation as reported via telemetry. If a test determines that a fault event has occurred, the event is recorded in memory, identifying the device and cause of fault. An alarm output may be enabled for each fault category, and a priority level may be assigned which causes the ASC/2M to report to the Aries central PC.

The 32 system detectors are monitored for no activity, maximum presence, minimum presence, and excessive counts. All local detectors are monitored for no activity and maximum presence. Speed detectors are checked for no activity. All intersection controllers are monitored via telemetry for cycle failure (no phase change for two cycles), CMU flash, local flash, command flash, local free, commanded free, coordination alarm, coordination error, preemption, and status of auxiliary special functions.

### Traffic Plans

- Plan selection from 6 cycles, 5 offsets per cycle, 4 splits per cycle
- Plan Command with up to 32 numbered plans per master

### Diagnostics

- Controller diagnostics
- System and local detector diagnostics
- Telemetry diagnostics
- Speed trap diagnostics
- Prioritized alarms and events
- Buffer for 255 events
- System detector log
- 5 dynamic zone status reports to verify system performance

### Programming

- Menu-driven data entry
- Keys with audible and tactile feedback
- RS-232 port for programming via laptop
- 3 security levels
- Database upload/download between master, local, and Aries central PC

### Communication Alternatives: Master to Controllers

- 4-wire telemetry using 1,200 bps FSK telemetry module
- Fiber-optic interconnect using RS-232 telemetry module
- Radio interconnect, spread spectrum, or narrow-band using RS-232 telemetry module

### Communication Alternatives: Master to Aries

- Commercial telephone network using RS-232 auto-dial/auto-answer modem
- Fiber-optic connection using direct-connect
- Direct via front panel RS-232 connection

### Capacity per Master

- 24 interconnected controllers
- 32 system detectors
- 8 two-detector speed traps
- 4 system-wide special function outputs

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