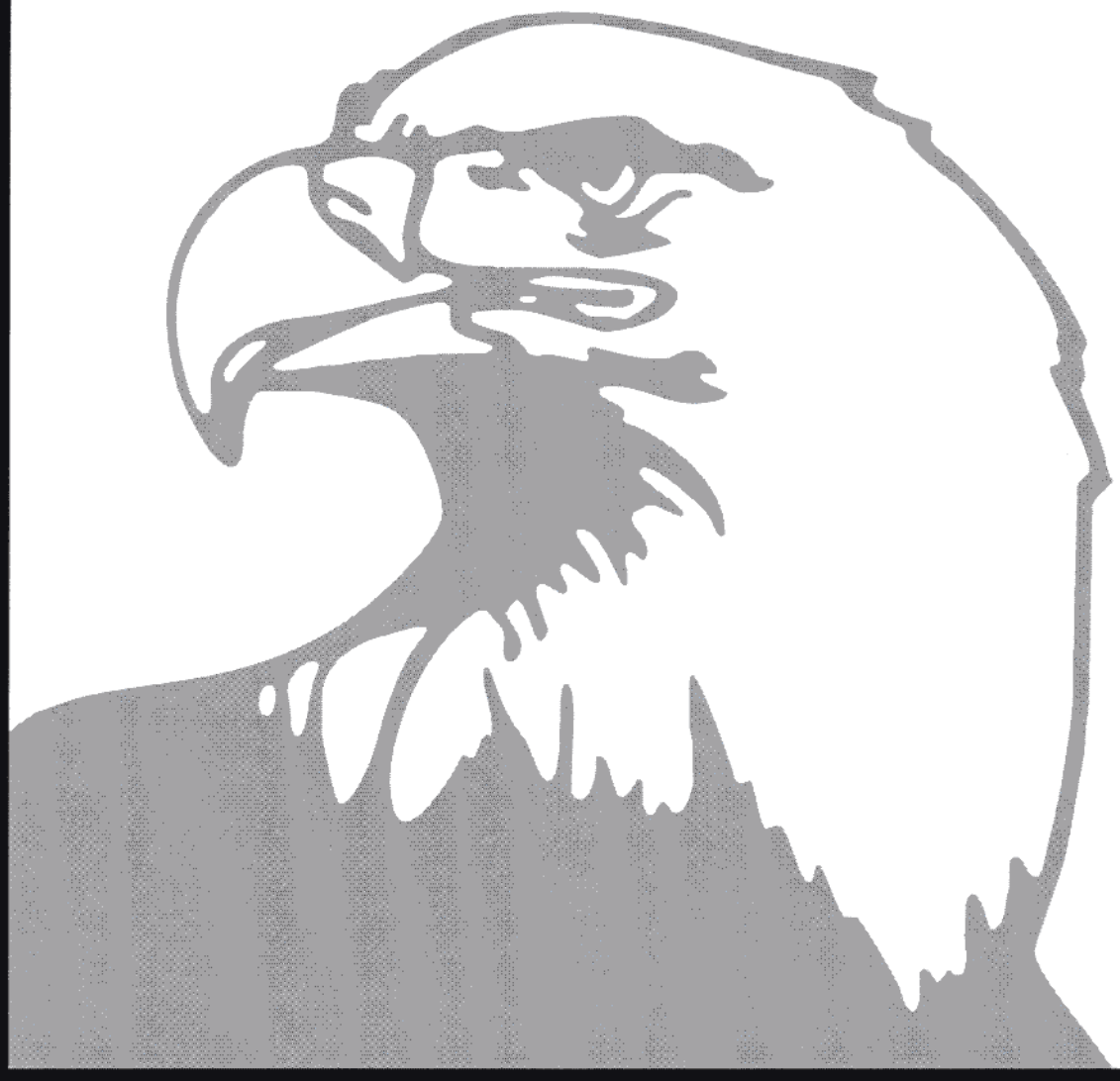
EPIC140



EAGLE TRAFFIC CONTROL SYSTEMS

EPIC140-PRETIMED CONTROLLER UNIT

Product Manual
Rev A.07 $15.00

PIM-186-Rev.A.07

EAGLE Traffic Control Systems
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1 SECTION 1 INTRODUCTION

1.1 GENERAL

The Eagle Traffic Control Systems EPIC140 series Controller Units are state-of-the-art traffic controller units designed for the control of pre-timed intersections.

Each unit consists of a housing, a printed circuit I/O board, a Processor board, and a plug-connected power supply for easy maintenance (no unit exclusive test equipment is required). The reduction in component parts results in improved reliability.

EEPROM technology is used to retain all timing and control parameters. NO BATTERIES ARE REQUIRED.

All programming is via a front panel keypad and LCD display. All program entries may be easily displayed for verification.

1.1.1 Unit Timings & Functions

- Signal Plans Sequences
- 32 Intervals Per Plan
- Initialization Interval(s)
- Interval Minimum Times
- Vehicle Recalls
- Vehicle Non-Locking Memory
- Vehicle Detector Extend Timing
- Vehicle Detector Delay Timing
- Pedestrian Recalls
- User Access Code
- Programmed Flash
  - Flash Entry Interval(s)
  - Flash Exit Interval(s)
  - Load Switch or CVM Control
- Start-Up (Pre-Initialization)
  - Time
  - Flash (Vol Mon Inactive) or
  - All Red (Volt Mon Active)
- Stop Time Reset
- Diagnostics
- Print Out Of:
  - Traffic
  - Coordination
  - Time Base
  - Preemption
  - System
- Unit-To-Unit Transfer Of:
  - Traffic
  - Coordination
  - Time Base
  - Preemption
  - System

1.1.2 Coordination Timings & Functions

- Commands: 16 Timing Plans (4 Dial / 4 Split) / 3 Offset
- 16 Timing Plans (48 patterns) EACH WITH NEW:
  - Interval Times (Splits)
  - Cycle Length (Possible)
  - Three Offsets
  - Signal Plan Select
- 4 Offset Correction Modes
- Sync Monitoring
- Manual Control
- Input Monitor (ST, & RF)
- Dial/Split Copy
- Master Line Driver Outputs

1.1.3 Time Base Timings & Functions

- (10) Program Weeks
- (99) Program Days
- (250) Event Capacity For:
  - Traffic Events
  - Auxiliary Events
  - Exception Dates
  - Alternate Weeks
  - Day Equates
- Three Auxiliary Outputs
- Eight Special Function Outputs
- Signal Dimming
- Alternate Detector Diagnostic Values
- System Detector Reporting

1.1.4 Preemption Timings & Functions

- Six (6) Preempt Sequences With:
  - Min Green/Walk Before Preempt
  - Delay & Duration (Multiple Runs)
  - Lock / Non-Lock Memory
  - Programmable Sequence
    - Vehicle R-G-FY-FR-DARK in TG & DW
    - Pedestrian. D-W-FW-DARK in TG & DW
    - Link To Another Preempt
    - Cycling Dwell
  - Programmable Exit Interval(s)
  - Programmable Flash Override
  - Programmable Priority
- Six (6) Low Priority Routines With:
  - Delay & Duration
  - Lock / Non-Lock Memory
  - Programmable Skip
  - Programmable Dwell
  - Programmable Exit Call
  - Programmable Max Call
  - Programmable Exit Interval(s)
  - Programmable Lockout

1.1.5 Other Timings & Functions

Eight Special Detectors Inputs
Detector Diagnosis For Each Detector Input
- No Activity Time
- Max Presence Time
- Erratic Output Count

Assign Detectors To System Sampling Function
Assign Detectors To Speed Trap Function
Measurements Of Effectiveness

Monitor & Log
- Cycle Faults
- Cycle Failure
- Voltage Monitor
- Conflict Flash
- Local Flash
- Remote Flash
- Preempt
- Local Free
- Power On/Off

Six Special Inputs
Eight Special Outputs
Respond To Remote "Manual" Overrides
Revert To Local TBC On Loss Of Comm.
Upload To Remote Locations
- Parameters
- Logs
- Real Time Status

Download From Remote Locations
- Parameters

An 8 line by 40 character per line LCD alpha-numeric display provide easy visibility into program entries, timers, and the instantaneous status of current intersection operation.

1.1.6 Front Panel Indications

Vehicle Call/Recall
Pedestrian Call/Recall
Stop Time State

A resident diagnostic program is standard. In addition to unit status, unit timing, and active timer countdown to aid in intersection setup, monitoring, and troubleshooting, the controller unit monitors its own operation automatically and continually verifying memory and processor operation with additional capability to verify inputs, outputs, keypad, and display.

1.2 SPECIFICATIONS

1.2.1 Power Input

Voltage: 89 to 135 VAC
Frequency : 57 to 63 Hz
Power : 25 watts @ 120 VAC
Interruption :
- 500 milliseconds or less; continuation
- 500 milliseconds to 999 milliseconds; either continuation or initialization
- 1000 milliseconds or more; initialization

1.2.2 Environment

Temperature: -30 °F (-34 °C) to +165 °F (+74 °C). Rate of change is not to exceed 30 °F (17 °C) per hour at the maximum relative humidity of 95%.

Humidity : Not to exceed 95% relative over the temperature range of +40 °F (4 °C) to 110 °F (43 °C) declining to 18% at 165 °F (74 °C).

1.2.3 Physical

Dimensions: 16" wide x 9.5" high x 8.0" deep; does not include mating connectors.

Weight: Approximately 14 lbs.

1.2.4 Timing

Accuracy: Timing is accomplished by digital methods. Any interval timed shall not deviate more than ±100 milliseconds based on its set value at a power line frequency of 60 Hertz.

1.2.5 Programming

16-position Keypad

1.2.6 Memory

EEPROM Memory. No battery is required to maintain operating parameters while power is off.

1.2.7 Display

Liquid Crystal 8 line by 40 characters per line alpha-numeric display for parameter entry and viewing.

1.2.8 Modes Of Operation

Pre-timed; with the capability of actuated alternate paths.

1.3 STANDARD FEATURES

Diagnostics
Data Print Out
Data Transfer

1.3.1 Interface Standards

AC Input Characteristics:
- Optically Isolated
- Low (False) State: 0 to 30 volts RMS
- High (True) State: 80 to 135 volts RMS
- Transition zone of input circuitry from Low to High state (and vice-versa) occurs between 30 and 80 volts.

DC Input Characteristics:
- Low (True) State: 0 to 8 VDC
- High (False) State: 16 VDC and over
- Input Current: 10 ma Max
- Input Impedance: 10K ohms max
- Transition zone of input circuitry from Low to High state (and vice-versa) occurs between 8 and 16 volts.

DC Output Characteristics:

Low (True) State: 0 to 4 VDC
High (False) State: Function of the load
Low State Sinking Capacity: 200 ma max
Applied Voltage: 30 VDC max
Current Flow In: 3 ma max at 30 VDC

1.3.2 Connector & Connections

All inputs, all outputs, interface voltage and common returns enter the unit through a front panel connector.

1.3.3 Inputs

AC Line
AC Neutral
Earth Ground
Logic Ground
External Start
Interval Advance
Stop Time
Manual Control Enable
Automatic Flash
Force Off
Hold
Vehicle Detector (4)
Pedestrian Detector (4)

1.3.4 Outputs

Voltage Monitor
+24 Volts dc
Flashing Logic
Green Driver (12)
Yellow Driver (12)
Red Driver (12)

1.4 EPIC140 CONNECTORS

The EPIC140 is provided in models which utilize connectors that are compatible with EF140 Series Solid State Pre-timed Controller Units manufactured by Eagle Traffic Control Systems and models which utilize connectors that are compatible with NEMA TS2 Type P2 Pre-timed Controller Units.

1.4.1 M01 & M02 Connectors

These models provide connectors with input/outputs that are similar with EF140 Series Solid State Pre-timed Controller Units manufactured by Eagle Traffic Control Systems.

The EF140 had the capability of forty Signal Circuits and provided dual function on Signal Circuit 30-40. Applications that utilize Connector "B" Pins A, B, U, c, BB, EE, FF, GG, HH, MM, NN, and PP should be reviewed to insure interchangeability.

1.4.1.1 Connector "A" Pin/Function

Input / Output connector pin terminations of Connector "A" interface is in accordance with the following:

19 Pin (plug) Type # -P

Pin	Function	I/O
A	AC Line	I
B	Not Used	-
C	AC Neutral	I
D	Not Used	-
E	Dial A (R+)	I
F	Dial B (R+)	I
G	Not Used	-
H	Earth Ground	I
J	Offset 1 (R+)	I
K	Offset 2 (R+)	I
L	Offset 3 (R+)	I
M	Not Used	-
N	Split A (R+)	I
P	Split B (R+)	I
R	Common Return (R-)	I
S	Not Used	-
T	Not Used	-
U	Automatic Flash (R+)	I
V	Not Used	-

1.4.1.2 Connector "B" Pin/Function

Input / Output connector pin terminations of Connector "B" interface is in accordance with the following:

61 Pin (socket) Type # -24-61S

Pin	Function	I/O
A	Status Bit A (SC37)	O
B	Status Bit B (SC38)	O
C	P4 Red Driver (SC22)	O
D	P3 Red Driver (SC19)	O
E	P1 Yellow Driver (SC14)	O
F	P1 Red Driver (SC13)	O
G	V3 Red Driver (SC07)	O
H	V1 Red Driver (SC01)	O
J	V1 Yellow Driver (SC02)	O
K	V2 Yellow Driver (SC05)	O
L	V2 Red Driver (SC04)	O
M	VA Yellow Driver (SC26)	O
N	VA Red Driver (SC25)	O
P	Vehicle 1 Detector	I
R	Pedestrian 1 Detector	I
S	Vehicle 2 Detector	I
T	Pedestrian 2 Detector	I
U	Flash Logic Out (SC40)	O

61 Pin (socket) Type # -24-61S

Pin	Function	I/O
V	Interval 1 On	O
W	Master Sync	O
X	Manual Control Enable	I
Y	Force Off	I
Z	Stop Time	I
a	Interval Advance	I
b	+24 VDC (External)	O
c	Status Bit C (SC39)	O
d	P4 Green Driver (SC24)	O
e	P3 Yellow Driver (SC20)	O
f	P1 Green Driver (SC15)	O
g	V3 Green Driver (SC09)	O
h	V3 Yellow Driver (SC08)	O
i	V1 Green Driver (SC03)	O
j	V2 Green Driver (SC06)	O
k	VA Green Driver (SC27)	O
m	Preempt 2 Detector	I
n	Signal Plan A	I
p	Master/Secondary	I
q	Signal Plan B	I
r	Preempt 1 Detector	I
s	Voltage Monitor	O
t	Logic Ground	O
u	External Start	I
v	Computer Control	I
w	P4 Yellow Driver (SC23)	O
x	P3 Green Driver (SC21)	O
y	P2 Red Driver (SC16)	O
z	V4 Red Driver (SC10)	O
AA	V4 Yellow Driver (SC11)	O
BB	VB Green Driver (SC30)	O
CC	VB Red Driver (SC28)	O
DD	VB Yellow Driver (SC29)	O
EE	Hold (On Line)	I
FF	VD Green Driver (SC36)	O
GG	VD Red Driver (SC34)	O
HH	VD Yellow Driver (SC35)	O
JJ	P2 Green Driver (SC18)	O
KK	P2 Yellow Driver (SC17)	O
LL	V4 Green Driver (SC12)	O
MM	VC Green Driver (SC33)	O
NN	VC Red Driver (SC31)	O
PP	VC Yellow Driver (SC32)	O

(XX) The function of the input or output for an EF140 Series Solid State Pre-timed Controller Unit.

1.4.1.3 Connector "D" Pin/Function

Input / Output connector pin terminations of the optional Connector "D" interface is in accordance with the following:

37 Pin (socket) AMP # 747315-2

Pin	Function	I/O
1	Mode * Input 1	(I)
2	Mode * Input 2	(I)
3	Mode * Input 3	(I)
4	Mode * Input 4	(I)
5	Mode * Input 5	(I)
6	Mode * Input 6	(I)
7	Mode * Input 7	(I)
8	Mode * Input 8	(I)
9	Remote Flash/Free	(I)
10	Preempt 1	(I)
11	Preempt 2	(I)
12	Preempt 3	(I)
13	Preempt 4	(I)
14	Conflict Flash Status	(I)
15	Manual Flash Status	(I)
16	Mode * Input 9	(I)
17	Mode * Input 10	(I)
18	Mode * Input 11	(I)
19	Mode * Input 12	(I)
20	Mode * Input 13	(I)
21	Mode * Input 14	(I)
22	Mode * Output 1	(O)
23	Mode * Output 2	(O)
24	Mode * Output 3	(O)
25	Mode * Output 4	(O)
26	Mode * Output 5	(O)
27	Mode * Output 6	(O)
28	Mode * Output 7	(O)
29	Mode * Output 8	(O)
30	Auxiliary 1	(O)
31	Auxiliary 2 or Any Preempt	(O)
32	Auxiliary 3 or Detector Reset	(O)
33	Logic Common	(O)
34	Optional Serial Comm. 1	(O)
35	Optional Serial Comm. 1	(O)
36	Reserved 1	(O)
37	Reserved 2	(O)

(*) Denotes multi purpose inputs or outputs. The function of the input or output is dependent on controller unit "D" Connector Mode programming and whether the unit has an address other than "000".

1.4.1.3.1 Mode Inputs

A Mode Input # function is dependent on controller unit "D" Connector Mode programming and whether the unit has an address other than "000".

See Paragraph 3.5.1 for programming "D" Connector input modes.

Input Mode 0 provides Coord & Expanded Detector inputs when no system address is programmed and Special Detectors & Special Status inputs when a system address is programmed.

Input Mode "0" provides input function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
1	On Line	Special Detector 1
2	Dial A	Special Detector 7
3	Dial B	Special Detector 8
4	Split A	Special Detector 5
5	Split B	Special Detector 6
6	Offset 1	Special Detector 2
7	Offset 2	Special Detector 3
8	Offset 3	Special Detector 4
16	Veh Detector 3	Special Status 1
17	Ped Detector 3	Special Status 2
18	Veh Detector 4	Special Status 3
19	Ped Detector 4	Special Status 4
20	Set Clock	Special Status 5
21	Dimming Enable	Special Status 6

Input Mode 1 provides input functions just opposite of Input Mode "0". Coord & Expanded Detector inputs when a system address is programmed and Special Detectors & Special Status inputs when no system address is programmed).

Input Mode "1" provides input function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
1	Special Detector 1	On Line
2	Special Detector 7	Dial A
3	Special Detector 8	Dial B
4	Special Detector 5	Split A
5	Special Detector 6	Split B
6	Special Detector 2	Offset 1
7	Special Detector 3	Offset 2
8	Special Detector 4	Offset 3
16	Special Status 1	Vehicle Detector 3
17	Special Status 2	Pedest Detector 3
18	Special Status 3	Vehicle Detector 4
19	Special Status 4	Pedest Detector 4
20	Special Status 5	Set Clock
21	Special Status 6	Dimming Enable

Input Mode 2 is not used at this time.

Input Mode 3 is not used at this time.

Input Mode 4 is not used at this time.

Input Mode 5 is not used at this time.

Input Mode 6 is not used at this time.

Input Mode 7 is not used at this time.

Input Mode 8 is not used at this time.

Input Mode 9 provides input functions which may be utilized with a central computer system.

Input Mode "9" provides input function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
1	Computer Control	Computer Control
2	Dial A	Dial A
3	Dial B	Dial B
4	Split A	Split A
5	Split B	Split B
6	Offset 1	Offset 1
7	Offset 2	Offset 2
8	Offset 3	Offset 3
16	Special Status 1	Special Status 1
17	Special Status 2	Special Status 2
18	Special Status 3	Special Status 3
19	Special Status 4	Special Status 4
20	Special Status 5	Special Status 5
21	Special Status 6	Special Status 6

1.4.1.3.2 Mode Outputs

A Mode Output # function is dependent on controller unit "D" Connector Mode programming and whether the unit has an address other than "000".

See Paragraph 3.5.1 for programming "D" Connector output modes.

Output Mode 0 provides Coord outputs when no system address is programmed and System Special Function outputs when a system address is programmed.

Output Mode "0" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Dial A	Special Function 7
23	Dial B	Special Function 8
24	Split A	Special Function 5
25	Split B	Special Function 6
26	Offset 1	Special Function 2
27	Offset 2	Special Function 3
28	Offset 3	Special Function 4
29	Automatic Flash	Special Function 1

Output Mode 1 provides output functions just opposite of Output Mode "0". Coord outputs when a system address is programmed and System Special Function outputs when no system address is programmed.

Output Mode "1" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Special Function 7	Dial A
23	Special Function 8	Dial B
24	Special Function 5	Split A
25	Special Function 6	Split B

Pin	Address = "000" Function	Address <> "000" Function
26	Special Function 2	Offset 1
27	Special Function 3	Offset 2
28	Special Function 4	Offset 3
29	Special Function 1	Automatic Flash

Output Mode 2 provides output functions similar to Mode 0 except when any Preempt routine has control then it is like Mode 4 below.

When Auxiliary #2 is not programmed for output as a TBC Auxiliary function, it will become an Any Preempt active function. The Any Preempt output will become active when any Low Priority routine or any Preempt routine is in control. This output may provide the control signal to correctly utilize these dual function outputs.

Output Mode 3 provides output functions similar to Mode 1 except when any Preempt routine has control then it is like Mode 4 below.

Output Mode 4 provides preempt status outputs that are active whenever a preempt routine (Preempt or Low Priority) is in control. The presence of the Any Priority output indicates a Low Priority routine is in control. Each routine (Preempt or Low Priority) is mutually exclusive.

Output Mode "4" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Preempt 6 Status	Preempt 6 Status
23	Any Priority	Any Priority
24	Preempt 4 Status	Preempt 4 Status
25	Preempt 5 Status	Preempt 5 Status
26	Preempt 1 Status	Preempt 1 Status
27	Preempt 2 Status	Preempt 2 Status
28	Preempt 3 Status	Preempt 3 Status
29	Special Function 1	Special Function 1

Output Mode 5 provides output functions similar to Mode "0" (Address = "000") except provides Interrupted Sync Pulses on the active Offset output. Interrupted Sync Pulses are provided at intervals equal to 20% and 25% of the cycle on alternate cycles.

Output Mode "5" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Dial A	Dial A
23	Dial B	Dial B
24	Split A	Split A
25	Split B	Split B
26	Offset 1	Offset 1
27	Offset 2	Offset 2
28	Offset 3	Offset 3
29	Automatic Flash	Automatic Flash

Output Mode 6 provides output functions similar to Mode 4 except when a Preempt is active provides a flashing output on the inactive preempt status outputs.

Output Mode 7 is not used at this time.

Output Mode 8 is not used at this time.

Output Mode 9 provides output functions which are provided as status feedback for the central computer system control established with Input Mode 9. It is established automatically when Input Mode 9 is programmed.

Output Mode "9" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Not Used	Not Used
23	Not Used	Not Used
24	Dwell	Dwell
25	Not Used	Not Used
26	Special Function 2	Special Function 2
27	Special Function 3	Special Function 3
28	Cycle 0	Cycle 0
29	Special Function 1	Special Function 1

See Paragraph 3.5.1 for functions names for all "D" Connector modes.

1.4.2 M10 & M11 Connectors

These models provide connectors with input/outputs that are similar with NEMA TS2 Type P2 Pre-timed Controller Units.

1.4.2.1 Connector "A" Pin/Function

Input / Output connector pin terminations of Connector "A" interface is in accordance with the following:

55 Pin (plug) Type # -22-55P

Pin	Function	I/O
A	Fault Monitor	O
B	+24 VDC (External)	O
C	Voltage Monitor	O
D	V1 Red Driver	O
E	P1 Red Driver	O
F	V2 Red Driver	O
G	P2 Red Driver	O
H	P2 Yellow Driver	O
J	P2 Green Driver	O
K	Vehicle 2 Detector	I
L	Pedestrian 2 Detector	I
M	* Mode Input 2	I
N	Stop Time	I
P	Reserved	I
R	External Start	I
S	Interval Advance	I
T	Ind. Lamp Control	I
U	AC Neutral	I
V	Earth Ground	I
W	Logic Ground	O
X	Flashing Logic Out	O
Y	Status Bit C	O
Z	V1 Yellow Driver	O
a	P1 Yellow Driver	O
b	V2 Yellow Driver	O
c	V2 Green Driver	O

55 Pin (plug) Type # -22-55P

Pin	Function	I/O
d	* Mode Output 10	O
e	* Mode Output 2	O
f	Vehicle 1 Detector	I
g	Pedestrian 1 Detector	I
h	* Mode input 1	I
i	Force Off	I
j	External Recall	I
k	Manual Control Enable	I
m	Reserved	I
n	Test A	I
p	AC Line	I
q	I/O Mode Bit A	I
r	Status Bit B	O
s	V1 Green Driver	O
t	P1 Green Driver	O
u	* Mode Output 9	O
v	* Mode Input 10	I
w	Reserved	I
x	Reserved	I
y	I/O Mode Bit B	I
z	Reserved	I
AA	Test B	I
BB	Reserved	I
CC	Status Bit A	O
DD	* Mode Output 1	O
EE	* Mode Input 9	I
FF	Reserved	I
GG	Reserved	I
HH	I/O Mode Bit C	I

(*) Denotes multi purpose inputs or outputs. The function of the input or output is dependent on the current status of the three Connector "A" I/O Mode Bits (inputs). See Section 1.4.2.3 for I/O Mode function definitions.

1.4.2.2 Connector "B" Pin/Function

Input / Output connector pin terminations of Connector "B" interface is in accordance with the following:

55 Pin (socket) Type # -22-55S

Pin	Function	I/O
A	* Mode Output 5	O
B	Preempt 2 Detector	I
C	* Mode Output 6	O
D	V3 Green Driver	O
E	V3 Yellow Driver	O
F	V3 Red Driver	O
G	V4 Red Driver	O
H	P4 Yellow Driver	O
J	P4 Red Driver	O
K	* Mode Output 12	O
L	Vehicle 4 Detector	I
M	Pedestrian 4 Detector	I
N	Vehicle 3 Detector	I
P	Pedestrian 3 Detector	I
R	* Mode Input 7	I

55 Pin (socket) Type # -22-55S

Pin	Function	I/O
S	* Mode Input 6	I
T	* Mode Input 13	I
U	* Mode Input 5	I
V	Reserved	I
W	Preempt 4 Detector	I
X	Preempt 5 Detector	I
Y	P3 Green Driver	O
Z	P3 Yellow Driver	O
a	P3 Red Driver	O
b	V4 Green Driver	O
c	V4 Yellow Driver	O
d	P4 Green Driver	O
e	* Mode Output 4	O
f	* Mode Output 8	O
g	* Mode Input 8	I
h	* Mode Input 4	I
i	* Mode Input 3	I
j	* Mode Input 11	I
k	* Mode Input 14	I
m	* Mode Input 15	I
n	* Mode Input 16	I
p	VA Yellow Driver	O
q	VA Red Driver	O
r	* Mode Output 11	O
s	* Mode Output 3	O
t	* Mode Output 7	O
u	VD Red Driver	O
v	Preempt 6 Detector	I
w	VD Green Driver	O
x	* Mode Input 12	I
y	Free Mode	I
z	Reserved	I
AA	VA Green Driver	O
BB	VB Yellow Driver	O
CC	VB Red Driver	O
DD	VC Red Driver	O
EE	VD Yellow Driver	O
FF	VC Green Driver	O
GG	VB Green Driver	O
HH	VC Yellow Driver	O

(*) Denotes multi purpose inputs or outputs. The function of the input or output is dependent on the current status of the three Connector "A" I/O Mode Bits (inputs). See Section 1.4.2.3 for I/O Mode function definitions.

1.4.2.3 CONNECTOR "A & B" I/O MODES

The status of the Connector "A" I/O Mode Bits (inputs) will establish the function of the mode defined inputs and outputs as follows:

1.4.2.3.1 Mode 0 Inputs & Outputs

I/O Mode 0 is not used. The Controller Unit shall not recognize any mode dependent input as valid nor shall it provide a valid output on any mode dependent output when I/O Mode 0 is active.

1.4.2.3.2 Mode 1 Inputs & Outputs

I/O Mode 1 provides Coordination input/output terminations suitable for a Secondary Controller Unit.

I/O Mode 1 provides input terminations as follows:

I/O Mode 1 Inputs

Pin	Function	I/O
A-h	Preempt 1 Detector	I
A-M	Preempt 3 Detector	I
B-i	Signal Plan A	I
B-h	Signal Plan B	I
B-U	Reserved	I
B-S	Reserved	I
B-R	Timing Plan C (Split A)	I
B-g	Timing Plan D (Split B)	I
A-EE	Dimming Enable	I
A-v	Automatic Flash	I
B-j	Timing Plan A (Dial A)	I
B-x	Timing Plan B (Dial B)	I
B-T	Offset 1	I
B-k	Offset 2	I
B-m	Offset 3	I
B-n	TBC On Line	I

I/O Mode 1 provides output terminations as follows:

I/O Mode 1 Outputs

Pin	Function	I/O
A-DD	Preempt 1 Status	O
A-e	Preempt 3 Status	O
B-s	TBC Auxiliary 1	O
B-e	TBC Auxiliary 2	O
B-A	Preempt 2 Status	O
B-C	Preempt 4 Status	O
B-t	Preempt 5 Status	O
B-f	Preempt 6 Status	O
A-u	Reserved	O
A-d	Automatic Flash Status	O
B-r	TBC Auxiliary 3	O
B-K	Reserved	O

1.4.2.3.3 Mode 2 Inputs & Outputs

I/O Mode 2 provides additional detector input and System input/output terminations.

I/O Mode 2 provides output terminations as follows:

I/O Mode 2 Inputs

Pin	Function	I/O
A-h	Preempt 1 Detector	I
A-M	Preempt 3 Detector	I
B-I	Special Detector 1	I
B-h	Special Detector 2	I
B-U	Special Detector 3	I
B-S	Special Detector 4	I
B-R	Special Detector 5	I
B-g	Special Detector 6	I
A-EE	Dimming Enable	I
A-v	Local Flash Status	I
B-j	Address Bit 0	I
B-x	Address Bit 1	I

I/O Mode 2 Inputs

Pin	Function	I/O
B-T	Address Bit 2	I
B-k	Address Bit 3	I
B-m	Address Bit 4	I
B-n	MMU Flash Status	I

I/O Mode 2 provides output terminations as follows:

I/O Mode 2 Outputs

Pin	Function	I/O
A-DD	Preempt 1 Status	O
A-e	Preempt 3 Status	O
B-s	TBC Auxiliary 1	O
B-e	TBC Auxiliary 2	O
B-A	Preempt 2 Status	O
B-C	Preempt 4 Status	O
B-t	Preempt 5 Status	O
B-f	Preempt 6 Status	O
A-u	Reserved	O
A-d	Automatic Flash Status	O
B-r	TBC Auxiliary 3	O
B-K	Reserved	O

1.4.2.3.4 Mode 3 Inputs & Outputs

I/O Mode 3 provides Coordination input/output terminations suitable for a Master / Secondary Controller Unit.

I/O Mode 3 provides output terminations as follows:

I/O Mode 3 Inputs

Pin	Function	I/O
A-h	Preempt 1 Detector	I
A-M	Preempt 3 Detector	I
B-i	Signal Plan A	I
B-h	Signal Plan B	I
B-U	Reserved	I
B-S	Reserved	I
B-R	Timing Plan C (Split A)	I
B-g	Timing Plan D (Split B)	I
A-EE	Dimming Enable	I
A-v	Automatic Flash	I
B-j	Timing Plan A (Dial A)	I
B-x	Timing Plan B (Dial B)	I
B-T	Offset 1	I
B-k	Offset 2	I
B-m	Offset 3	I
B-n	TBC On Line	I

I/O Mode 3 provides output terminations as follows:

I/O Mode 3 Outputs

Pin	Function	I/O
A-DD	Timing Plan A Status	O
A-e	Timing Plan B Status	O
B-s	TBC Auxiliary 1	O
B-e	TBC Auxiliary 2	O
B-A	Timing Plan C Status	O
B-C	Timing Plan D Status	O
B-t	Offset 1 Status	O
B-f	Offset 2 Status	O

I/O Mode 3 Outputs

Pin	Function	I/O
A-u	Offset 3 Status	O
A-d	Automatic Flash Status	O
B-r	Signal Plan A Status	O
B-K	Signal Plan B Status	O

1.4.2.3.5 Mode 4+ Inputs & Outputs

I/O Mode 3, 4, & 5 are reserved for future definition and use by NEMA.

1.4.2.3.6 Mode 6 Inputs & Outputs

I/O Mode 6 is for manufacturer specific applications and is not used at this time. A Terminal and Facilities wired to utilize I/O Mode 6 may not be compatible with other manufacturer's Controller Units.

1.4.2.3.7 Mode 7 Inputs & Outputs

I/O Mode 7 is for manufacturer specific applications and is not used at this time. A Terminal and Facilities wired to utilize I/O Mode 7 may not be compatible with other manufacturer's Controller Units.

All inputs, outputs, interface voltage and common returns not defined in the NEMA Standards enter the unit through special front panel connectors "D" and "RS232".

1.4.2.4 Connector "D" Pin/Function

Input / Output connector pin terminations of the optional Connector "D" interface is in accordance with the following:

37 Pin (socket) AMP # 747315-2

Pin	Function	I/O
1	Mode * Input 1	(I)
2	Mode * Input 2	(I)
3	Mode * Input 3	(I)
4	Mode * Input 4	(I)
5	Mode * Input 5	(I)
6	Mode * Input 6	(I)
7	Mode * Input 7	(I)
8	Mode * Input 8	(I)
9	Remote Flash/Free	(I)
10	Preempt 1 Detector	(I)
11	Preempt 2 Detector	(I)
12	Preempt 3 Detector.....	(I)
13	Preempt 4 Detector	(I)
14	Conflict Flash Status	(I)
15	Manual Flash Status	(I)
16	Mode * Input 9	(I)
17	Mode * Input 10	(I)
18	Mode * Input 11	(I)
19	Mode * Input 12	(I)
20	Mode * Input 13	(I)
21	Mode * Input 14	(I)
22	Mode * Output 1	(O)
23	Mode * Output 2	(O)
24	Mode * Output 3.....	(O)

37 Pin (socket) AMP # 747315-2

Pin	Function	I/O
25	Mode * Output 4	(O)
26	Mode * Output 5	(O)
27	Mode * Output 6.....	(O)
28	Mode * Output 7	(O)
29	Mode * Output 8	(O)
30	Auxiliary 1	(O)
31	Auxiliary 2 or Any Preempt	(O)
32	Auxiliary 3 or Detector Reset	(O)
33	Logic Common.....	(O)
34	Optional Serial Comm. 1	(O)
35	Optional Serial Comm. 1	(O)
36	Reserved 1	(O)
37	Reserved 2	(O)

(*) Denotes multi purpose inputs or outputs. The function of the input or output is dependent on controller unit "D" Connector Mode programming and whether the unit has an address other than "000".

1.4.2.4.1 Mode Inputs

A Mode Input # function is dependent on controller unit "D" Connector Mode programming and whether the unit has an address other than "000".

See Paragraph 3.5.1 for programming "D" Connector input modes.

Input Mode 0

Input Mode "0" provides Coord & Expanded Preempt inputs when no system address is programmed and Special Detectors & Special Status inputs when a system address is programmed.

Input Mode "0" provides input function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
1	TBC On Line	Special Detector 1
2	T Plan A (Dial A)	Special Detector 7
3	T Plan B (Dial B)	Special Detector 8
4	T Plan C (Split A)	Special Detector 5
5	T Plan D (Split B)	Special Detector 6
6	Offset 1	Special Detector 2
7	Offset 2	Special Detector 3
8	Offset 3	Special Detector 4
16	Signal Plan A	Special Status 1
17	Signal Plan B	Special Status 2
18	Preempt 5 Det	Special Status 3
19	Preempt 6 Det	Special Status 4
20	Set Clock	Special Status 5
21	Dimming Enable	Special Status 6

Input Mode 1

Input Mode "1" provides input functions just opposite of Input Mode "0". Coord & Expanded Preempt inputs when a system address is programmed and Special Detectors & Special Status inputs when no system address is programmed).

Input Mode "1" provides input function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
1	Special Detector 1	TBC On Line
2	Special Detector 7	T Plan A (Dial A)
3	Special Detector 8	T Plan B (Dial B)
4	Special Detector 5	T Plan C (Split A)
5	Special Detector 6	T Plan D (Split B)
6	Special Detector 2	Offset 1
7	Special Detector 3	Offset 2
8	Special Detector 4	Offset 3
16	Special Status 1	Signal Plan A
17	Special Status 2	Signal Plan B
18	Special Status 3	Preempt 5 Det
19	Special Status 4	Preempt 6 Det
20	Special Status 5	Set Clock
21	Special Status 6	Dimming Enable

Input Mode 2 is not used at this time.

Input Mode "3" is not used at this time.

Input Mode "4" is not used at this time.

Input Mode "5" is not used at this time.

Input Mode "6" is not used at this time.

Input Mode "7" is not used at this time.

Input Mode "8" is not used at this time.

Input Mode "9" provides input functions which may be utilized with a central computer system.

Input Mode "9" provides input function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
1	Computer Control	Computer Control
2	T Plan A (Dial A)	T Plan A (Dial A)
3	T Plan B (Dial B)	T Plan B (Dial B)
4	T Plan C (Split A)	T Plan C (Split A)
5	T Plan D (Split B)	T Plan D (Split B)
6	Offset 1	Offset 1
7	Offset 2	Offset 2
8	Offset 3	Offset 3
16	Special Status 1	Special Status 1
17	Special Status 2	Special Status 2
18	Special Status 3	Special Status 3
19	Special Status 4	Special Status 4
20	Special Status 5	Special Status 5
21	Special Status 6	Special Status 6

1.4.2.4.2 Mode Outputs

A Mode Output # function is dependent on controller unit "D" Connector Mode programming and whether the unit has an address other than "000".

See Paragraph 3.5.1 for programming "D" Connector output modes.

Output Mode "0" provides Coord outputs when no system address is programmed and System Special Function outputs when a system address is programmed.

Output Mode "0" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	T Plan A Status	Special Function 7
23	T Plan B Status	Special Function 8
24	T Plan C Status	Special Function 5
25	T Plan D Status	Special Function 6
26	Offset 1 Status	Special Function 2
27	Offset 2 Status	Special Function 3
28	Offset 3 Status	Special Function 4
29	Automatic Flash Status	Special Function 1

Output Mode "1" provides output functions just opposite of Output Mode "0". Coord outputs when a system address is programmed and System Special Function outputs when no system address is programmed.

Output Mode "1" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Special Function 7	T Plan A Status
23	Special Function 8	T Plan B Status
24	Special Function 5	T Plan C Status
25	Special Function 6	T Plan D Status
26	Special Function 2	Offset 1 Status
27	Special Function 3	Offset 2 Status
28	Special Function 4	Offset 3 Status
29	Special Function 1	Automatic Flash Status

Output Mode "2" provides output functions similar to Mode "0" except when any Preempt routine has control then it is like Mode 4 below.

When Auxiliary #2 is not programmed for output as a TBC Auxiliary function, it will become an Any Preempt active function. The Any Preempt output will become active when any Low Priority routine or any Preempt routine is in control. This output may provide the control signal to correctly utilize these dual function outputs.

Output Mode "3" provides output functions similar to Mode "1" except when any Preempt routine has control then it is like Mode 4 below.

Output Mode "4" provides preempt status outputs that are active whenever a preempt routine (Preempt or Low Priority) is in control. The presence of the Any Priority output indicates a Low Priority routine is in control. Each routine (Preempt or Low Priority) is mutually exclusive.

Output Mode "4" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Preempt 6 Status	Preempt 6 Status
23	Any Priority	Any Priority
24	Preempt 4 Status	Preempt 4 Status
25	Preempt 5 Status	Preempt 5 Status
26	Preempt 1 Status	Preempt 1 Status
27	Preempt 2 Status	Preempt 2 Status

Pin	Address = "000" Function	Address <> "000" Function
28	Preempt 3 Status	Preempt 3 Status
29	Special Function 1	Special Function 1

Output Mode "5" provides output functions similar to Mode "0" (Address = "000") except provides Interrupted Sync Pulses on the active Offset output. Interrupted Sync Pulses are provided at intervals equal to 20% and 25% of the cycle on alternate cycles.

Output Mode "5" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	T Plan A Status	T Plan A Status
23	T Plan B Status	T Plan B Status
24	T Plan C Status	T Plan C Status
25	T Plan D Status	T Plan D Status
26	Offset 1 Status	Offset 1 Status
27	Offset 2 Status	Offset 2 Status
28	Offset 3 Status	Offset 3 Status
29	Automatic Flash Status	Automatic Flash Status

Output Mode "6" provides output functions similar to Mode "4" except when a Preempt is active provides a flashing output on the inactive preempt status outputs.

Output Mode "7" is not used at this time.

Output Mode "8" is not used at this time.

Output Mode "9" provides output functions which are provided as status feedback for the central computer system control established with Input Mode 9. It is established automatically when Input Mode 9 is programmed.

Output Mode "9" provides output function terminations as follows:

Pin	Address = "000" Function	Address <> "000" Function
22	Not Used	Not Used
23	Not Used	Not Used
24	Dwell	Dwell
25	Not Used	Not Used
26	Special Function 2	Special Function 2
27	Special Function 3	Special Function 3
28	Cycle 0	Cycle 0
29	Special Function 1	Special Function 1

See Paragraph 3.5.1 for functions names for all "D" Connector modes.

1.5 PORT 2 "RS232" CONNECTOR

Input / Output connector pin terminations of the Port 2 RS232 interface is in accordance with the following:

25 Pin (socket) AMP # 745886-6

Pin	Function	I/O
1	Frame Ground (FG)	n/a
2	Transmit Data (TD)	To DCE
3	Receive Data (RD)	From DCE
4	Request To Send (RTS)	To DCE
5	Clear To Send (CTS)	From DCE
6	Not Used	
7	Signal Ground (SG)	n/a
8	Data Carrier Detect (DCD)	From DCE
20	Data Terminal Ready (DTR)	To DCE

9-19, & 21-25 Not Used

1.6 PORT 3 System Interface

An interface and connector is provided for interconnecting the Controller Unit to the system.

1.6.1 PORT 3 "FSK" CONNECTOR

Input / Output connector pin terminations of the optional Port 3 FSK interface is in accordance with the following:

9 Pin (male)

Pin	Function	I/O
1	Transmit 1	O
2	Transmit 2	O
3	Reserved	
4	Receive 1	I
5	Receive 2	I
6	Earth Ground	-
7	Reserved	
8	Reserved	
9	Earth Ground	-

1.6.2 PORT 3 "RS232" CONNECTOR

Input / Output connector pin terminations of the Port 3 RS232 interface is in accordance with the following:

25 Pin (socket) AMP # 745886-6

Pin	Function	I/O
1	Frame Ground (FG)	n/a
2	Transmit Data (TD)	To DCE
3	Receive Data (RD)	From DCE
4	Request To Send (RTS)	To DCE
5	Clear To Send (CTS)	From DCE
6	Data Set Ready (DSR)	From DCE
7	Signal Ground (SG)	n/a
8	Data Carrier Detect (DCD)	From DCE
20	Data Terminal Ready (DTR)	To DCE
22	Ring Indicator(RI)	From DCE

9-19, 21, & 23-25 Not Used

1.6.3 PORT 3 Fiber Optic

The optional Fiber Optic Interface provides a 2-Port Fiber Optic converter.

The Fiber Optic Interface card is provided with a 4-position switch that must set to configure the card.

Configuration Switch

Position	Function	Default
1	TTL - ON Enables TTL port. Must be ON for the controller unit to communicate via the fiber link.	ON
2	Port B - ON Enables Fiber-optic Port B. Disable if this controller unit is at the end of the fiber link.	ON
3	Port A - ON Enables Fiber-optic port A.	ON
4	Test - ON Enables Test Mode. Test mode allows visual testing of LED activity	OFF

2 SECTION 2 INSTALLATION

2.1 INTRODUCTION

The following paragraphs contain information for unpacking, inspecting, installing, repacking, and testing the EPIC140 series Controller Unit. The complete controller assembly is packed for shipment in heavy-duty containers.

2.2 UNPACKING INSTRUCTIONS

The controller assembly should be unpacked in accordance with the following instructions:

A. Carefully inspect the container for damage before opening. If the container appears damaged, it should be opened in the presence of the carrier.

B. Observe the markings on the containers and place each container on a flat surface with the top up, preparatory to unpacking.

C. Cut strapping and remove container.

D. Remove the contents of each box and check against the packing list attached to the shipment.

E. Inspect all items for shipping damage when it is unpacked. Check for dents, scratches, and bent parts. If the items are damaged, notify the carrier immediately.

F. After unpacking, retain the shipping container and packing material for possible use if reshipment of the items becomes necessary. The containers and packing material have been specifically designed for protection of the items during normal shipment.

2.3 HANDLING

Normal precautions for lifting and transporting electronic signaling equipment should be observed when handling the system units.

ELECTRO-STATIC DISCHARGE

MOS devices are NOT THE ONLY electronic components that can be damaged by static electricity!

Technology trends toward greater complexity, increased density, and thinner dielectrics result in parts becoming more sensitive to Electro-Static Discharge damage. Some components can be destroyed or damaged by as little as 20 volts of static electricity. (It requires more than 3500 volts before you can feel it.) Electro-Static Discharge damage can happen anywhere, while trading modules in the field or working on equipment in the shop. (Be aware: You can inflict Electro-Static Discharge damage by simply touching runners and edge connectors which lead to static sensitive components!!)

To insure that your Eagle Traffic Control Systems equipment remains as static free as the day you received it, follow these simple procedures:

A. MINIMIZE HANDLING OF ALL MODULES AND SEMICONDUCTORS. WHEN THEY ARE HANDLED, MAKE SURE IT IS ONLY AT A STATIC-FREE WORK STATION AND PERSONNEL ARE PROPERLY GROUNDED.

B. KEEP PARTS AND MODULES IN THEIR ORIGINAL CONTAINERS UNTIL YOU ARE READY TO USE THEM.

C. WEAR A WRIST GROUNDING DEVICE AND MAKE SURE IT IS IN CONTACT WITH THE SKIN; IT IS USELESS IF NOT IN CONTACT WITH THE SKIN AND GROUND. WEAR A WRIST STRAP AT YOUR WORK STATION AS WELL AS WHEN IN A CABINET.

D. KEEP ALL COMMON PLASTICS OUT OF YOUR STATIC-FREE WORK AREAS, I.E., STYROFOAM CUPS, POTATO CHIP BAGS, CLEAR, WHITE OR NON ANTI-STATIC CUSHIONING AND WRAPS, ETC. THESE ITEMS CAN CAUSE DAMAGE TO STATIC- SENSITIVE DEVICES.

E. IF YOU ARE RETURNING FAULTY MODULES FOR REPAIR, MAKE SURE THEY ARE INSIDE ANTI-STATIC BAGS. THIS WILL PREVENT ANY ADDITIONAL DAMAGE.

2.4 PHYSICAL INSPECTION

Directly following unpacking and before installation, inspect each controller assembly item to detect any damage which might have occurred during transit. A check of the following items is suggested:

A. Tighten any loose screws or locknuts on mechanical assemblies which might have worked loose.

B. Examine all controls, indicators, and enclosure panels for evidence of jamming and/or mechanical damage.

C. Remove cover and inspect the circuit board assemblies for damage.

In event of equipment damage, contact the agent of the company performing shipment. Inform the Eagle Traffic Control Systems Field Service of the situation and obtain instructions before proceeding further with system installation.

2.5 INSTALLATION

The EPIC140 series Controller Unit has been standardized with the requirements of the traffic control industry. The controls permit considerable latitude for timing and feature application. During the setup of an intersection, it is imperative that adequate precautions be taken to prevent settings and procedures which can affect the safety of the intersection.

The EPIC140 series Controller Unit should be installed in a location that allows easy access to the front of the controller unit. The controller unit should have sufficient room so that it can be easily removed if required. Care should be taken to prevent blocking the cooling vents on the back of the controller unit.

Placing the controller unit in control of the intersection is dependent upon the actual terminal facilities configuration and local law. The procedure which follows generally applies.

A. Obtain the services of the police for aid in intersection safety. Check that MAIN POWER circuit breaker is Off, the FLASH/NORMAL switch is in the Flash position.

B. Place the MAIN POWER circuit breaker in the On position when traffic is clear of the intersection. Observe that the controller unit initialization program is correct. Check that the flash program is correct.

C. If used, observe vehicle detector unit indicator lamps for indications that vehicle calls are received as vehicles cross the sensors. Observe that vehicle and pedestrian calls are placed in all actuated movements.

D. Permit the controller unit to operate for several minutes while checking that all controller times and function controls are properly set up and that the controller unit is timing correctly.

E. When satisfied that the controller unit is functioning properly, check traffic for a safe point to place the intersection under automatic control and place the FLASH/NORMAL switch in the Normal position.

2.5.1 Battery

Disconnecting the battery when the unit or board is not being used will extend the useful life of the battery.

Neglecting to connect the battery will cause a low battery condition to be displayed.

2.5.2 Display

A backlite LCD display is provided. A control for the LCD display's contrast is in the upper right hand corner of the front panel.

The backlite is activated at power up or whenever a key on the front panel is pressed. The light will turn off automatically ten minutes after the last key is pressed.

If during normal operation, a fault is reported that halts normal operation, the backlite will be activated and remain on until the fault condition is cleared.

2.6 RESHIPMENT

The controller assembly items should be prepared for reshipment by performing the following instructions:

A. Pack the item in the original Eagle Traffic Control Systems shipping container.

B. Use a qualified carrier to ship the item to its destination.

3 SECTION 3 FRONT PANEL BASIC

3.1 INTRODUCTION

The EPIC140 series Controller Unit Front Panel offers the interface between the user and the traffic control unit through:

1) 16 position keypad
2) Alpha-Numeric (8x40) LCD display

The Front Panel becomes active on power-up and remains active as long as power is applied to the unit.

3.1.1 Front Panel Summary

The EPIC140 series Controller Unit display provides true visibility into program entries, timers, and the instantaneous status of intersection operation. Related parameters are visible simultaneously making verification straight forward and eliminating the need to write the data down and/or scan back and forth in order to remember what the parameters are.

A. PROGRAMMING - All programming is via the front panel keypad and LCD display. Programming is easy and error free due to the English Language Menus with easy 1 digit selection and automatic forward and backward progressions. Within a menu, each parameter may be viewed and a cursor movement to that parameter makes changes easy and error free. If an error is made during programming, the operator will see messages such as "ENTRY OUT OF RANGE" on the bottom line.

   Additional help is provided in the appropriate display to aid the user in making keypad entries. Attempts to enter parameters outside the acceptable range are rejected on occurrence without destroying the existing values.

B. KEYPAD - On the Front Panel is a Keypad containing the numbers 0-9, and the letters A-F. These keys are used in various combinations for entering and displaying data.

C. DISPLAY - The EPIC140 Alpha-Numeric (8 lines x 40 characters per line) LCD display will present current real-time status.

   As a reminder, the upper left corner identifies the display and the lower line identifies cursor control and forward/backward menu selection.

3.1.2 Front Panel Entry

Data is entered or displayed by selection from menus. The menus are arranged in a hierarchy consisting of a top level menu made up of sub-menus which may or may not consist of more sub-menus. The following parts of this section are devoted to describing the key combination (input), the window display (output), and the purpose of each menu and sub-menu.

This section discusses the highest level menus first and then discusses each sub-menu. The "Main" Menu represents the highest level menu from which the user can choose. Pressing the "F" key a number of times will always return the user back to the top level menu. Each menu and sub-menu's purpose is discussed along with the correct keypad selection.

Front panel entered data is cross checked on a priority basis. To enable the check to have maximum value and to minimize error messages during entry, it is suggested data be entered in a Unit, Signal Plan, Coord, Time Base, Preempt, and System sequence.

3.1.3 Front Panel Timeout

There are two different types of time-out associated with the front panel:

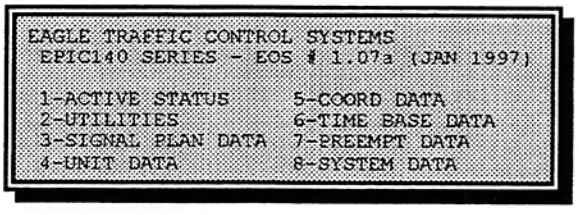
A. Except when perpetual access is programmed, access is automatically turned off approximately ten (10) minutes after either:
   1) Access was gained.
   2) The last keypad activity.

B. The front panel backlight is automatically turned off approximately ten (10) minutes after either the last front panel activity.

3.1.4 Main Menu

The following menu becomes active on application of power to the controller unit and is the basic starting point for all data/status review and/or entry.

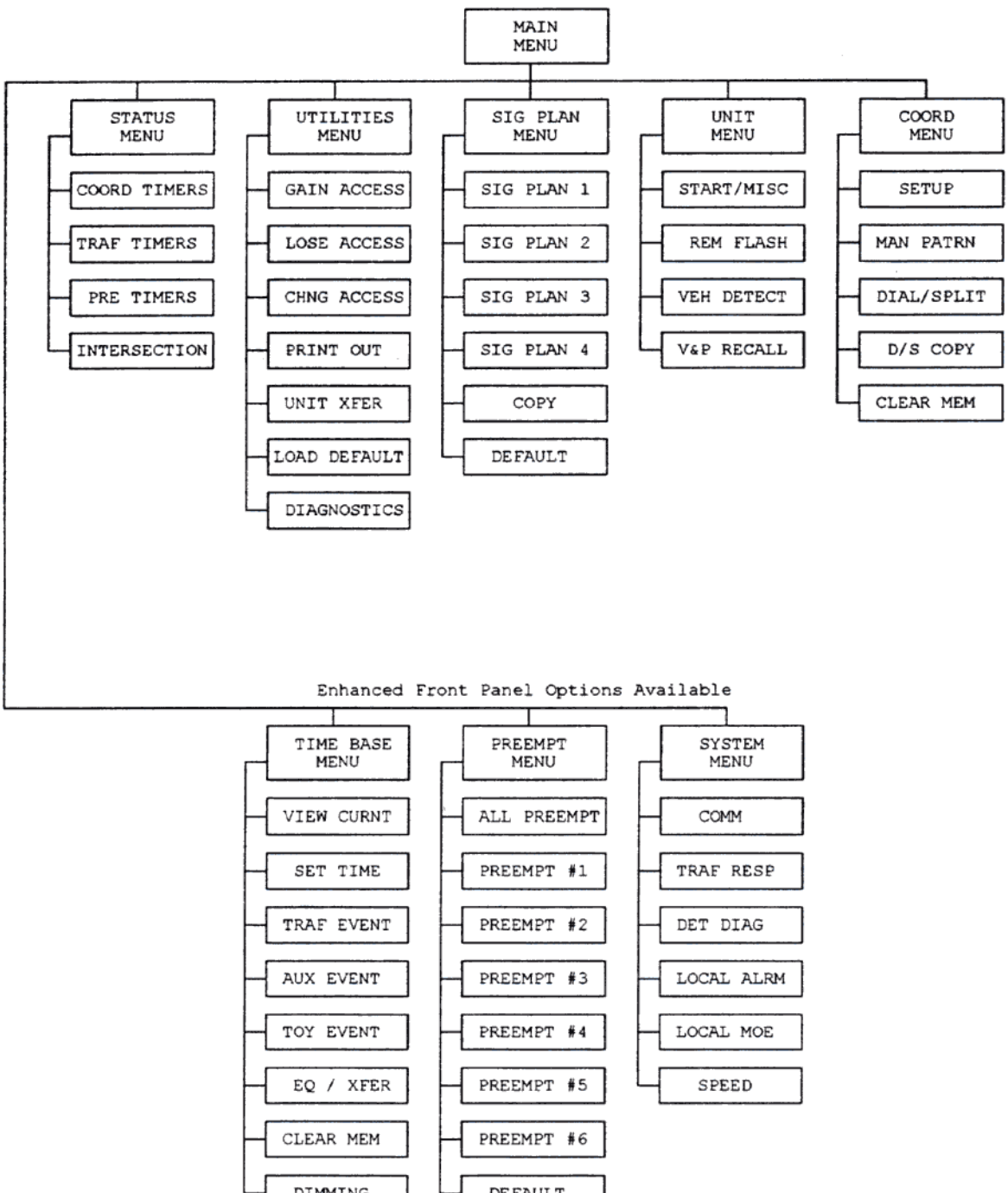
MENU AT POWER UP



1) ACTIVE STATUS - for real time displays.
2) UTILITIES - for miscellaneous parameters and features. (print-out, unit-to-unit, load default, and diagnostics).
3) SIGNAL PLAN DATA - for Signal Plan parameters.
4) UNIT DATA - for Unit parameters.
5) COORD DATA - for Coord parameters.
6) TIME BASE DATA - for TBC parameters and status.
7) PREEMPT DATA - for Preempt parameters.

SYSTEM DATA - for System parameters, status, and reports.

Figure 1 EPIC140 MENU STRUCTURE



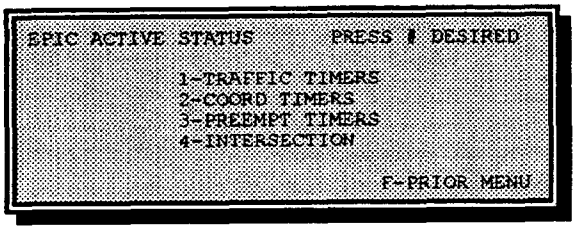
3.2 ACTIVE STATUS

Active Status allows the user to select and display real time controller activity. This provides a dynamic display mode (active timer) which shows the current state and/or timing interval(s) with the time remaining (countdown) in the timing interval(s).

3.2.1 Active Status Menu

The Active Status menu allows the user to select which real time function will be displayed.

PRESS "1" FROM MAIN MENU

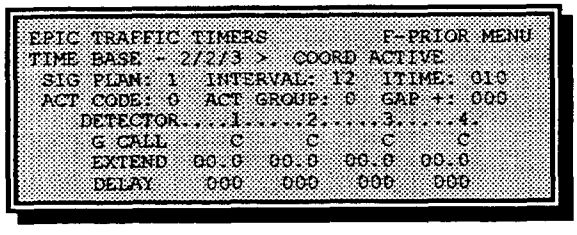


1) TRAFFIC TIMERS provides real time status of Traffic timers.
2) COORD TIMERS provides real time status of Interval and Coordination timers.
3) PREEMPT TIMERS provides real time status of Preemption timers.
4) INTERSECTION provides real time status of signal driver outputs and detector inputs.

3.2.2 Traffic Timers Display

The Traffic Timers Display allows the user to view real time status of Actuation timer(s).

PRESS "2" FROM ACTIVE STATUS MENU



A. Line 2 Status Indications (Source/Pattern/Mode)
   1) Source/Pattern - "TIME BASE" in the above display may be replaced with one of the following:
      blank; No function exerting control.
      MANUAL; Coord Mode is set to Free or Manual. If Manual mode is set, the Pattern (D/S/O) is also displayed.
      SYSTEM; System (MARC360, etc.) is in control, the Pattern (D/S/O) is also displayed.
      TIME BASE; TBC is in control, the Pattern (D/S/O) is also displayed.
      INTERCONN; Interconnect is in control, the Pattern (D/S/O) is also displayed.
      STANDBY; TBC or Interconnect is in control because the System set the control to "STANDBY", the Pattern (D/S/O) is also displayed.
      BACKUP; TBC or Interconnect is in control because of System failure, the Pattern (D/S/O) is also displayed.
      I'BACK; TBC is in control because of Interconnect failure, the Pattern (D/S/O) is also displayed.
      QUE1 LVL1; Traffic Responsive Queue 1 Level 1 is in control, the Pattern (D/S/O) is also displayed.
      QUE1 LVL2; Traffic Responsive Queue 1 Level 2 is in control, the Pattern (D/S/O) is also displayed.
      QUE2 LVL1; Traffic Responsive Queue 2 Level 1 is in control, the Pattern (D/S/O) is also displayed.
      QUE2 LVL2; Traffic Responsive Queue 2 Level 2 is in control, the Pattern (D/S/O) is also displayed.
   2) Mode - "COORD ACTIVE" in the above display may be replaced with one of the following:
      STARTUP FLASH; Runs for duration of Startup Flash as entered in Unit Data. May be retained as controlling mode by activity on Preempt inputs.
      VOLT MON FLASH; Recognition of external voltage monitor flash as caused by a failure in controller hardware.
      CONFLICT FLASH; Recognition of external voltage monitor flash as NOT caused by a failure in controller hardware.
      MANUAL FLASH; Recognition of external manual flash.
      REMOTE FLASH; Called Operation is Flash. Controller is implementing flash either through Voltage Monitor or Load Switch Driver control.
      FAILED FLASH; Controller is unable to run the Free Plan or the Free Plan does not cycle.
      LOCKOUT FLASH; Controller is implementing flash via Voltage Monitor output. A Communications download is making a change that impacts basic operation.

      COMMAND FREE; Called Operation is Free, the Pattern (1/1/1) plus Signal Plan 1 will run.
      BAD PLAN FREE; Called Plan was found to be unsuitable for the control of traffic, the Pattern (1/1/1) plus Signal Plan 1 will run.
      FAILED FREE; Called Plan did not cycle, the Pattern (1/1/1) plus Signal Plan 1 will run.
      DEFAULT FREE; Control Source does not take control, the Pattern (1/1/1) plus Signal Plan 1 will run.

      COORD ACTIVE; Running the selected plan with full coord operation. Offset correction will maintain synchronization between background and cycle timing.
      NO COORD; Running the selected plan. No offset correction will be made. Entered Offset greater than cycle length.
      ISOLATED; Running the selected plan. No offset correction will be made. Some alternate path interval group has no Default intervals. No synchronization is maintained.
      MASTER; Master Control input is active. Running the selected plan. No offset correction will be made.
      MANUAL ENABLE; Manual Control Enable input is active. Running the selected plan. No offset correction will be made.
      COMPUTER ENABLE; Computer Control input is active. Running the selected plan. No offset correction will be made.
      STOP TIME; Stop Time input is active. Running the selected plan. No offset correction will be made.

HOLD; Hold input is active. Running the selected plan. No offset correction will be made.
> ; A new plan is requested. It will be implemented after Minimum Pattern Duration time is satisfied.
>>; A new plan is requested. It will be implemented at the appropriate transfer interval.

B. Line 3 Status Indications
SIG PLAN; Active Signal Plan.
INTERVAL; Active Signal Plan Interval
ITIME; Interval Time Countdown

C. Line 4 Status Indications
ACT CODE; Interval Actuation Code
ACT GROUP; Actuation Code Group
GAP +; Added Time Countdown Due To Gap Out

D. Line 6, 7, & 8 Status Indications
G CALL; Group Call
EXTEND; Group Vehicle Stretch Time Countdown
DELAY; Group Vehicle Delay Dealy Countdown

3.2.3 Coord Timers Display

The Coord Timers Display allows the user to view real time status of Interval and Coordination timer(s).

PRESS "2" FROM ACTIVE STATUS MENU

```
EPIC COORD TIMERS              F-PRIOR MENU
TIME BASE - 2/2/3 > COORD ACTIVE
 SYNC REF: 090   CORRECTION: DI 015
 SIG PLAN:  1    INTERVAL: 12  HOLD
 TIMING:  CYCLE  OFFSET   ITIME    IMIN
 ACTIVE:   060     001    100.1    10.1
 SETING:   100     010    120.5    12.7
 ADJUST:  -010    -000    - 5.5    ----
```

A. Line 2 Status Indications
Same as Traffic Timers Line 2 Status

B. Line 3 Status Indications
SYNC REF; System cycle countup, in seconds.
CORRECTION; Correction mode in effect; "DW" for Dwell, "DI" for Dwell Interrupted plus Max Dwell Time, and "SW" for Shortway.

C. Line 4 Status Indications
SIG PLAN; Signal Plan in control.
INTERVAL; Current interval in control.
HOLD; Hold Input Is Active.
FORCE; Force Input Terminated a variable interval.

D. Line 6, 7, & 8 Timing Status
ACTIVE CYCLE; Pattern Cycle Length Countdown.
ACTIVE OFFSET; Pattern Offset At Last Cycle Zero.
ACTIVE ITIME; Interval Time Countdown.
ACTIVE IMIN; Interval Minimum Time Countdown.

SETING CYCLE; Pattern Cycle Length Setting.
SETING OFFSET; Pattern Offset Setting.
SETING IMIN; Interval Minimum Time Setting.
SETING ITIME; Interval Time Setting.

ADJUST CYCLE; Pattern Cycle Length Time Adjustment.
ADJUST OFFSET; Pattern Offset Time Adjustment.
ADJUST ITIME; Interval Time Adjustment.

3.2.4 Preemption Timers Display

The Preempt Timers Display allows the user to view real time status of preemption timer(s) and input status for any active preempt.

PRESS "3" FROM ACTIVE STATUS MENU

```
EPIC PREEMPTION TIMERS         F-PRIOR MENU
 PREEMPT 1 TRK GRN 005
PREEMPT.....1....2....3....4....5....6.
 STATUS...  DUR  CAL
 TIMING...  100   25
PRIORITY....1....2....3....4....5....6.
 STATUS...  DEL  DEL
 TIMING...  000   25
```

A. Line 2 Status & Timing Indications
PREEMPT #; Preempt 1 to 6 is in control.
MIN GRN; Minimum Green/Walk is timing.
SEL PCL; Selective Ped Clear is timing.
SEL YEL; Selective Yellow Change is timing.
SEL RED; Selective Red Clear is timing.
TRK GRN; Track Green is timing.
TRK PCL; Track Ped Clear is timing.
TRK YEL; Track Yellow Change is timing.
TRK RED; Track Red Clear is timing.
DWL GRN; Dwell Green is timing.
RET PCL; Return Ped Clear is timing.
RET YEL; Return Yellow Change is timing.
RET RED; Return Red Clear is timing.
"###"; Interval timing countdown.

B. Line 4 & 6 Status Indications
"LOC" - Priority Lockout
"DEL" - Delay Timing
"DUR" - Duration Timing
"EXT" - Extend Timing
"CAL" - Call Active (Not Timing)
"MAX" - Max Call Time Out Occurred

C. Line 5 & 7 Timing Indications
"###" - Status Timing Countdown

3.2.5 Intersection Display

The Intersection Display allows the user to view active status of all signal driver outputs and all detector inputs simultaneously.

PRESS "4" FROM ACTIVE STATUS MENU

```
EPIC INTERSECTION                F-PRIOR MENU

GROUP..V-1/2/3/4..P-1/2/3/4..V-A/B/C/D
  SIGNAL  G R W D    R R R R    R R R R

GRP ACTUATIONS.....1/2/3/4
    VEHICLE DET      C . . C
    PEDEST  DET      C . . C
```

PER GROUP INTERSECTION INDICATIONS

VEH SIG: Vehicle Signal Driver Status:
[G]-Green [Y]-Yellow [R]-Red [+]-Red/Green
[g]-Flsh Green [y]-Flsh Yellow [r]-Flsh Red
[.]-Dark
When Unit Drivers parameters defines a driver group as a Pedestrian Signal:
[W]-Walk [P]-Ped Clear [D]-Dont [+]-Dont/Walk
[w]-Flsh Walk [p]-Flsh Ped Clear [d]-Flsh Dont
[.]-Dark

VEH DET: Vehicle Detector Input Status

PED DET: Pedest Detector Input Status

3.3 UTILITIES

Utilities allows the user to display and/or enter controller parameters to:

1) Gain Access
2) Lose Access
3) Enter a new personal access code
4) Print Unit Parameters
5) Transfer Unit Parameters
6) Load Default parameters
7) Run Diagnostics

To enter data for these intervals requires user gain access.

3.3.1 Utilities Menu

The Utilities Menu allows the user to select which utility feature to be addressed.

PRESS "2" FROM MAIN MENU

```
EPIC UTILITIES              PRESS # DESIRED

1-ENABLE ACCESS          5-UNIT TRANSFER
2-DISABLE ACCESS         6-LOAD DEFAULT
3-CHANGE ACCESS          7-DIAGNOSTICS
4-PRINT OUT

                                F-PRIOR MENU
```

1) ENABLE ACCESS provides for gaining access.
2) DISABLE ACCESS provides for losing access.
3) CHANGE ACCESS provides for changing the access code.
4) PRINT OUT provides for printing controller unit data and reports.
5) UNIT TRANSFER provides for transferring controller unit data to a like unit.
6) LOAD DEFAULT provides for loading the PROM resident default parameter set as the active database.
7) DIAGNOSTICS provides for running the PROM resident diagnostic routines.

3.3.2 Enable Access

This function allows the user to gain access.

PRESS "1" FROM UTILITIES MENU

```
EPIC ENABLE ACCESS

        ..........VARIABLE..........
        ..........MESSAGE..........

                                F-PRIOR MENU
```

* VARIABLE MESSAGE will be:

```
ACCESS IS ENABLED
          AT LEVEL :  1
    ENTER THE FOUR DIGIT CODE
    AND PRESS "E" :   ....
```

or:

```
ACCESS IS DISABLED

    ENTER THE FOUR DIGIT CODE
    AND PRESS "E" :   ....
```

or:

```
ACCESS IS DISABLED

      IMPROPER ACCESS CODE
      PRESS "E" TO CONTINUE
```

or:

```
ACCESS IS ENABLED
          AT LEVEL :  1
      IMPROPER ACCESS CODE
      PRESS "E" TO CONTINUE
```

or:

```
ACCESS IS PERPETUAL
          AT LEVEL :  1
    ENTER THE FOUR DIGIT CODE
    AND PRESS "E" :   ....
```

or:

```
ACCESS IS PERPETUAL
          AT LEVEL :  0
     NO CHANGE IS POSSIBLE
```

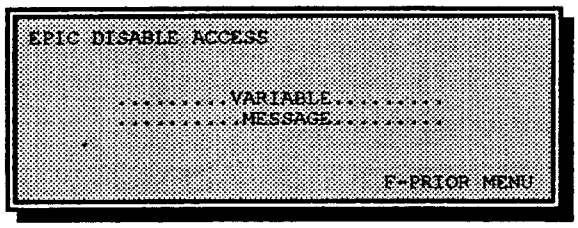
Code "0000" is the default access code. This requires any number of zeros be entered before access is provided.

Code "9999" will establish perpetual access.

3.3.3 Disable Access

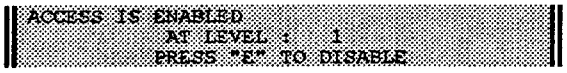
This function allows the user to lose access.

PRESS "2" FROM UTIL.MENU

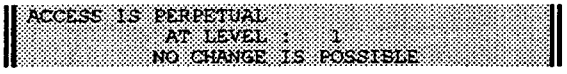


* VARIABLE MESSAGE will be:

or:



or:



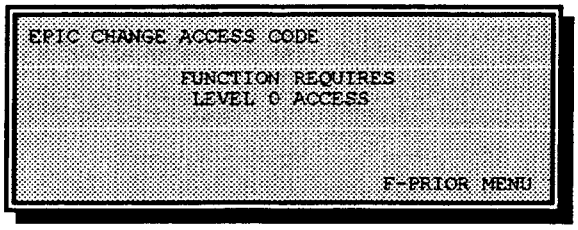
Once access is gained, it is automatically turned off approximately ten (10) minutes after either 1) access was gained or 2) the last keystroke. When "9999" has been entered as the code, access can not be turned off.

Disabling access will remove access completely for the current level. If a lower level of access is perpetual, access will revert to that level as perpetual.

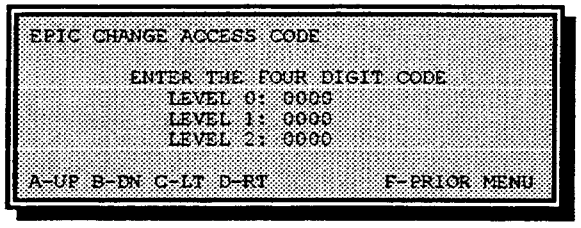
3.3.4 Change Access

This function allows the user to enter a new personal access code.

PRESS "3" FROM UTIL. MENU



or:



The new access code replaces any previous personal access code. Note that the personal access code can only be changed after access has been gained.

The default access code "0000" will work until a specific personal access code has been entered.

Level 0 access provides the capability to change ALL parameters.

Level 1 access provides the capability to change all parameters except Access Codes. Further any Printout will not show Access Codes.

Level 2 access provides the capability to change all parameters except:

- Access Codes
- Load Default
- Signal Plan Parameters
- Load Signal Plan Default
- Signal Plan Copy
- Coord Active Interval Parameters
- Coord Startup Interval Parameters
- Coord Flash Entry Interval Parameters
- Coord Flash Exit Interval Parameters
- Load Coord Default
- Coord Copy
- Printouts will not show Access Codes
- Unit To Unit will not function

Entry of "9999" as a personal access code will set the operation whereby access is continually enabled (disables all access requirements until a number between "0000" and "9998" inclusive is entered as a personal access code).

Level 0 code = "9999" sets perpetual access for all levels. Access is continually enabled at Level 0.

Level 1 code = "9999" sets perpetual access for Level 1 and 2. Access is continually enabled at Level 1 and 2.

Level 2 code = "9999" sets perpetual access for Level 2. Access is continually enabled at Level 2.

CAUTION: Be sure to write your personal access code down and store it in a safe place. If you should forget your specific code, the units memory device which stores it will have to be re-initialized and all data will be lost!

If units are returned for repair, the personal access code should be denoted on the unit.

3.3.5 Print Out Menu

It is possible to print controller unit parameters and reports to an 80 column or larger serial printer. The printer must be RS232C compatible, be able to receive ASCII coded serial data at 1200 baud, 8 bit, Odd parity, and provide X-On/Off signals.

The Print Out Sub-Menu allows the user to select which controller unit data area is to be printed.

PRESS "4" FROM UTIL.MENU

```
EPIC PRINT OUT                PRESS # DESIRED

1-TRAFFIC                   * MAKE SURE THE
2-COORDINATION                PRINTER IS ON,
3-TIME BASE                   READY, & HOOKED
4-PREEMPTION                  UP
5-SYSTEM DATA
6-SYSTEM REPORTS                    F-PRIOR MENU
```

1) TRAFFIC will print Basic Traffic parameters.
2) COORDINATION will print Coordination parameters.
3) TIME BASE will print Time Base parameters.
4) PREEMPTION will print Preemption parameters.
5) SYSTEM DATA will print System parameters.
6) SYSTEM REPORTS will print System reports.

Complete the setup for the printout by pressing the key for the database to print and wait for completion.

The printout will be in a form similar to the display in which the data is entered and/or viewed. Supporting code definition will be printed along with the parameter it represents.

Should an error occur during print, an error message will be displayed. Retry the function after checking all connections.

Care should be taken to not leave Printout Function displays active when printing tasks are complete as the EPIC140 series Controller Unit will not respond to messages sent to the RS232 port when active.

3.3.6 Unit Transfer Menu

It is possible to transfer parameters between like model controller units via the RS232C connector. The Unit Transfer Sub-Menu allows the user to select which controller parameter area is to be transferred to another unit.

The transmitting or receiving unit may initiate this function.

PRESS "5"FROM UTIL.MENU

```
EPIC UNIT TRANSFER          PRESS # DESIRED

1-TRAFFIC                   * MAKE SURE THE
2-COORDINATION                OTHER UNIT IS
3-TIME BASE                   ON, READY AND
4-PREEMPTION                  HOOKED UP
5-SYSTEM
                                    F-PRIOR MENU
```

1) TRAFFIC will transfer Basic Traffic parameters.
2) COORDINATION will transfer Coord parameters.
3) TIME BASE will transfer Time Base parameters.
4) PREEMPTION will transfer Preemption parameters.
5) SYSTEM DATA will transfer System parameters.

AFTER A SELECTION FROM TRANSFER MENU

```
EPIC UNIT TRANSFER          PRESS # DESIRED

WARNING...THIS OPTION WILL REPLACE
ALL CURRENT OPERATING DATA IN THE
RECEIVING CONTROLLER UNIT.........
- PRESS "A" TO TRANSMIT
- PRESS "B" TO RECEIVE
                                    F-PRIOR MENU
```

Only one of the two units may have a unit transfer display active to transfer data.

The approximate time to transfer is as follows:

	Receive	Function
Traffic	25 Sec	15 Sec
Coord	25 Sec	15 Sec
Time Base	30 Sec	20 Sec
Preempt	5 Sec	3 Sec
System	5 Sec	3 Sec

Complete the setup for the transfer by pressing the key for transmit or receive and wait for completion.

Should an error occur during transfer, an error message will be displayed. Retry the function after checking all connections.

Care should be taken to not leave Unit Transfer displays active when transfer tasks are complete as the EPIC140 series Controller Unit will not respond to messages sent to the RS232 port when active.

3.3.7 Load Default

This function allows the user to load the PROM resident default parameter set into memory to become the active database.

PRESS "6" FROM UTIL. MENU

```
EPIC LOAD DEFAULT PARAMETERS

WARNING...THIS OPTION WILL REPLACE
ALL CURRENT OPERATING PARAMETERS

- PRESS "E" TO CONTINUE

                                    F-PRIOR MENU
```

Throughout this section, parameters will be simulated for display purposes. Each such display will include the default data where default data is provided. In cases where there is no default data, it shall be so noted.

3.3.8 Diagnostics

This function allows the user to run the PROM resident diagnostic routines to check the controller unit hardware. See the Diagnostics section for more details on diagnostics.

PRESS "7" FROM UTIL. MENU

```
EPIC DIAGNOSTICS

WARNING...THE CONTROLLER UNIT SHOULD
NOT BE IN CONTROL OF AN INTERSECTION
WHILE RUNNING DIAGNOSTICS.
- PRESS "E" TO CONTINUE

                              F-PRIOR MENU
```

```
EPIC INTERNAL DIAGNOSTIC RESULTS:

SOFTWARE CLK:     TUE  10/29/91 14:30:00
RTC IC CLOCK:     TUE  10/29/91 14:30:00
ROM TEST ...: PASSED
EEPROM TEST : PASSED
RAM TEST ...: PASSED
                  PRESS "E" TO CONTINUE
```

SOFTWARE CLK and RTC IC CLK refer to the Software Clock and Real Time IC Clock. The Real Time IC Clock is read and used to initialize the Software Clock on power up. Thereafter, the Software Clock will maintain the date/time data updating the Real Time IC Clock as necessary. A difference should not exist between the data presented by these two devices.

If an error is found, the display will provide a message that will define the element which caused the error. The following are worst case messages:

ROM TEST - FAILED U12 U13 U18 U19
EEPROM TEST - FAILED U37
RAM TEST - FAILED U11 U17

The Diagnostics Sub-Menu allows the user to select which Diagnostics routine to be initiated.

```
EPIC DIAGNOSTICS          PRESS # DESIRED

          1-KEYPAD TEST
          2-STANDARD INPUT
          3-SPECIAL INPUT
          4-OUTPUT TEST
          5-LOOP BACK I/O TEST
          F-EXIT DIAGNOSTICS TO RESTART
```

1) KEYPAD TEST will start that diagnostic.
2) STANDARD INPUT will start that diagnostic .
3) SPECIAL INPUT will start that diagnostic.
4) OUTPUT TEST will start that diagnostic .
5) EXIT DIAGNOSTICS will return to normal traffic control after doing a restart.

PRESS "1" FROM DIAGNOSTICS SUB-MENU

```
EPIC DIAGNOSTICS

CHARACTER SET:0123456789abcdefghijklmnop
qrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ!@#$
%^&*()_+ ~[]<>,./?

KEYPAD TEST: _
                              F-PRIOR MENU
```

The keypad/display diagnostic will begin with the above display. It will automatically display all characters the display is capable of generating as shown in the top part of the display. The lower part will display each keys identity as it is pressed. The "F" key will abort the routine and return to the prior menu.

PRESS "2" FROM DIAGNOSTICS SUB-MENU

```
INPUT DIAGNOSTIC STANDARD
 DA-.   SA-.   |   ES-.   PA-.   HLD-.
 DB-.   SB-.   |   ST-.   PB-.   VD1-.
 01-.          |   MC-.   CC-.   PD1-.
 02-.   AF-.   |   IA-.   MS-.   VD2-.
 03-.          |   FO-.   P1-.   PD2-.
      Conn 'A' | Conn 'B'  P2-.   SP1-.
 ANY SPECIAL-.              F-PRIOR MENU
```

or:

```
INPUT DIAGNOSTIC STANDARD
  ES -.   TIB-.   ST -.   VD# -....
  MC -.   TIA-.   FO -.   PD# -....
  ER -.   ILC-.   IA -.   PMPT-x.x...
                          FREE-.
     I/O MODE: C: . B: . A: .
  MODE INPUTS-.........|+IO-.......
  ANY SPECIAL-.          F-PRIOR MENU
```

The standard input diagnostic will begin with the above display assuming no inputs to the controller unit are active.

Dynamic input status will be as follows:

Unit inputs will display a "1" next to the name when active.

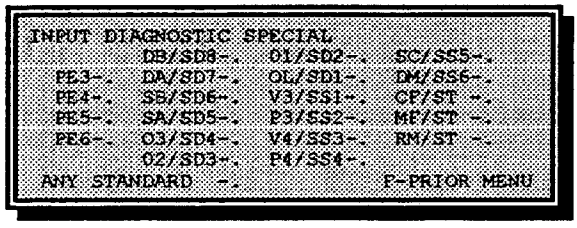
UNIT INPUTS
- DA : Dial A
- DB : Dial B
- 01 : Offset 1
- 02 : Offset 2
- 03 : Offset 3
- SA : Split A
- SB : Split B
- AF : Automatic Flash

- ES : External Start Active
- ST : Stop Time
- MC : Manual Control Enable
- IA : Interval Advance
- FO : Force Off
- MS : Master/Secondary
- PA : Signal Plan A
- PB : Signal Plan B

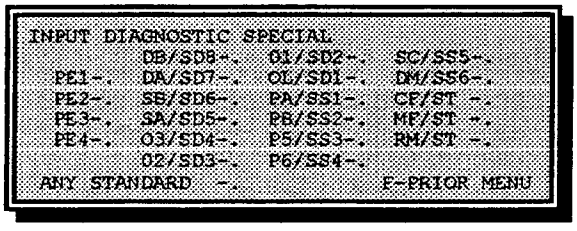
CC : Computer Control
P1 : Preempt 1
P2 : Preempt 2
VD1 : Veh Detector 1
PD1 : Ped Detector 1
VD2 : Veh Detector 2
PD2 : Ped Detector 2
SP1 : Spare Input 1

B. OTHER
ANY SPECIAL: This will display a "1" when any special input is active while displaying this window.

PRESS "3" FROM DIAGNOSTICS SUB-MENU



or:



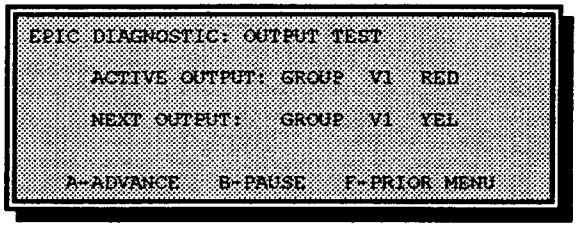
The special input diagnostic will begin with the above display assuming no inputs to the controller unit are active (Inputs will display a "1" next to the name when active).

Dynamic Status inputs will be as follows:

A. SPECIAL INPUTS
PE1 : Preempt 1
PE2 : Preempt 2
PE3 : Preempt 3
PE4 : Preempt 4
DB/SD8: Dial B - System Detector 8
DA/SD7: Dial A - System Detector 7
SB/SD6: Split B - System Detector 6
SA/SD5: Split A - System Detector 5
O3/SD4: Offset 3 - System Detector 4
O2/SD3: Offset 2 - System Detector 3
O1/SD2: Offset 1 - System Detector 2
OL/SD1: On-Line - System Detector 1
PA/SS1: Sig Plan A - Special Status 1
PB/SS2: Sig Plan B - Special Status 2
P5/SS3: Preempt 5 - Special Status 3
P6/SS4: Preempt 6 - Special Status 4
SC/SS5: Set Clock - Special Status 5
DM/SS6: Dimming - Special Status 6
CF/ST : Conflict Monitor Status
MF/ST : Manual Flash Status
RM/ST : Remote Flash Status

B. OTHER
ANY STANDARD: This will display a "1" when any standard input is active while displaying this window.

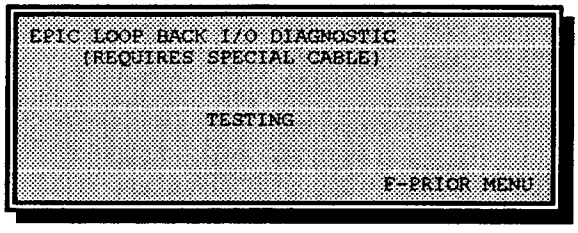
PRESS "4" FROM DIAGNOSTICS SUB-MENU



The output diagnostic will begin with the above display with Group V1 Red output active. The display denotes which output is active and which will become active next. The routine will automatically sequence through all outputs one at a time, each being active for approximately one second to allow time for visual verification. The routine will repeat until interrupted by pressing the "F" key.

The "A" key may be used to advance the display more rapidly and the "B" key may be used to pause the sequence for longer periods of time. Use the "A" key to terminate a pause interval.

PRESS "5" FROM DIAGNOSTICS SUB-MENU



The Loop Back I/O diagnostic will begin with the above display active. After a few seconds, the message "PASSED" or "FAILED" will denote the results of the test.

3.4 SIGNAL PLAN DATA

Signal Plan Data allows the user to display and/or enter parameters for the four signal plans as follows:

1) Signal Plan 1 Parameters
2) Signal Plan 2 Parameters
3) Signal Plan 3 Parameters
4) Signal Plan 4 Parameters
5) Copy Signal Plan Parameters
6) Load Default Parameters

To enter data for these intervals requires user access. See UTILITIES (3.2) for more information on gaining access.

3.4.1 Signal Plan Select Menu

The Signal Plan Select Menu allows the user to select which signal plan database will be addressed.

PRESS "3" FROM MAIN MENU

```
EPIC SIGNAL PLAN SELECT

 1-SIGNAL PLAN 1      5-COPY SIG PLAN
 2-SIGNAL PLAN 2      6-LOAD DEFAULT
 3-SIGNAL PLAN 3
 4-SIGNAL PLAN 4

PRESS # DESIRED              F-PRIOR MENU
```

1) SIGNAL PLAN 1 provides viewing and/or editing of Signal Plan 1 parameters.
2) SIGNAL PLAN 2 provides viewing and/or editing of Signal Plan 2 parameters.
3) SIGNAL PLAN 3 provides viewing and/or editing of Signal Plan 3 parameters.
4) SIGNAL PLAN 4 provides viewing and/or editing of Signal Plan 4 parameters.
5) COPY SIG PLAN will copy one Signal Plan parameters to another.
6) LOAD DEFAULT; provides for loading the PROM resident default parameter set as the active database.

3.4.2 Signal Plan Data Menu

The Signal Plan Data Menu allows the user to select which signal plan parameter database to be addressed.

PRESS "1" FROM SIGNAL PLAN MENU

```
EPIC SIGNAL PLAN 1 DATA MENU

 1-DRIVERS V1-V4      5-TRANSFER CONTROL
 2-DRIVERS P1-4P4     6-MISC CONTROL
 3-DRIVERS VA-VD      7-ACTUATIONS
 4-MIN INT TIMES

PRESS # DESIRED              F-PRIOR MENU
```

1. DRIVERS V1-V4; provides viewing and editing of Group V1 to V4 Load Switch Driver parameters for each interval.
2. DRIVERS P1-P4; provides viewing and editing of Group P1 to P4 Load Switch Driver parameters for each interval.
3. DRIVERS VA-VD; provides viewing and editing of Group VA to VD Load Switch Driver parameters for each interval.
4. MIN INT TIMES; provides viewing and editing of Minimum Time parameters for each interval.
5. TRANSFER CONTROL; provides viewing and editing of Transfer Control parameters.
6. MISC CONTROL; provides viewing and editing of Miscellaneous Control parameters.
7. ACTUATION; provides viewing and editing of Actuation parameters.

3.4.3 V1-V4 Drivers

The V1-V4 Drivers Display allows the user to view and/or modify the parameters which establish the output status of the signal drivers for Group V1 to V4.

PRESS "1"FROM SIGNAL PLAN 1 MENU

```
EPIC SP1 DRVRS 10........ 20........ 30..
INT#-123456789 0123456789 0123456789 012
  V1 111200000 0000000000 0000000000 000
  V2 000001112 0000000000 0000000000 000
  V3 113300000 0000000000 0000000000 000
  V4 000001133 0000000000 0000000000 000
 (0-R 1-G 2-Y 3-FR 4-FG 5-FY 6-RG 7-DK)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown For Signal Plan 1. The Default Data assumes Group V1 and V2 are used for vehicle signal drivers and Group V3 and V4 are used for pedestrian signal drivers. Default Data does not exist for Signal Plan 2, 3, and 4.

Code "0" : Status will be Red.
Code "1" : Status will be Green.
Code "2" : Status will be Yellow.
Code "3" : Status will be Flashing Red.
Code "4" : Status will be Flashing Green.
Code "5" : Status will be Flashing Yellow.
Code "6" : Status will be Red & Green.
Code "7" : Status will be Dark.

When the status of the Group for the current Signal Plan and Timing Plan active intervals is always Code "0", the group output status shall be dark.

When the Load Switch Driver Group is programmed as utilized to drive a Pedestrian Signal (See 3.5.2), special interpretation will be provided as follows:

Code "2" : Status will be Yellow & Flashing Red.
Code "3" : Status will be Yellow & Flashing Red.
Code "5" : Status will be Flashing Yellow & Flashing Red.
Code "6" : Status will be Green.

The bottom line of the display provides a reminder of the cursor control keys. A-UP, B-DN (Down), C-LT (Left), and D-RT (Right)

Changes to the defined signal drivers of the active signal plan will cause the unit to revert to Startup Flash. All changes to the active plan (Dial/Split/Signal Plan) occur at the defined transfer intervals. Lockout will prevent plan changes for a period of sixty seconds following the completion of the last plan data change (begins with the first change). Lockout means the unit will continue to run the active plan.

3.4.4 P1-P4 Drivers

The P1-P4 Drivers Display allows the user to view and/or modify the parameters which establish the output status of the signal drivers for Groups P1 to P4.

PRESS "2"FROM SIGNAL PLAN 1 MENU

```
EPIC SP1 DRVRS 10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
  P1 000000000 0000000000 0000000000 000
  P2 000000000 0000000000 0000000000 000
  P3 000000000 0000000000 0000000000 000
  P4 000000000 0000000000 0000000000 000
 (0-R 1-G 2-Y 3-FR 4-FG 5-FY 6-RG 7-DK)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown.

3.4.5 AV-AD Drivers

The VA-VD Drivers Display allows the user to view and/or modify the parameters which establish the output status of the signal drivers for Group VA to VD.

PRESS "3"FROM SIGNAL PLAN 1 MENU

```
EPIC SP1 DRVRS 10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
  VA 000000000 0000000000 0000000000 000
  VB 000000000 0000000000 0000000000 000
  VC 000000000 0000000000 0000000000 000
  VD 000000000 0000000000 0000000000 000
 (0-R 1-G 2-Y 3-FR 4-FG 5-FY 6-RG 7-DK)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown.

3.4.6 Minimum Interval Times

The Minimum Interval Display allows the user to view and/or modify the parameters which establish the Minimum Time that an interval must satisfy prior to termination during normal operation.

PRESS "4" FROM SIGNAL PLAN 1 MENU

```
EPIC SIGNAL PLAN 1 MIN INT TIMES
INT# MIN  INT# MIN  INT# MIN  INT# MIN
 01  10.0 05  01.0 09  04.0 13  00.0
 02  02.0 06  10.0 10  01.0 14  00.0
 03  08.0 07  02.0 11  00.0 15  00.0
 04  04.0 08  08.0 12  00.0 16  00.0

A-UP B-DN C-LT D-RT E-PGDN  F-PRIOR MENU
```

```
EPIC SIGNAL PLAN 1 MIN INT TIMES
INT# MIN  INT# MIN  INT# MIN  INT# MIN
 17  00.0 21  00.0 25  00.0 29  00.0
 18  00.0 22  00.0 26  00.0 30  00.0
 19  00.0 23  00.0 27  00.0 31  00.0
 20  00.0 24  00.0 28  00.0 32  00.0

A-UP B-DN C-LT D-RT E-PGUP  F-PRIOR MENU
```

Default Data is as shown For Signal Plan 1. Default Data does not exist for Signal Plan 2, 3, and 4.

"INT#"= Interval Number
"MIN" = Minimum Interval Time (0-99.9 Seconds)

3.4.7 Transfer Control

The Transfer Control Display allows the user to view and/or modify the parameters which establish which intervals that a transfer of Timing Plans and Signal Plans may occur.

PRESS "5" FROM SIGNAL PLAN 1 MENU

```
EPIC SP1 XFER  10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
 TPL 000000000 1000000000 0000000000 000
 SP2 000000000 1000000000 0000000000 000
 SP3 000000000 1000000000 0000000000 000
 SP4 000000000 1000000000 0000000000 000
             (0-NO 1-YES)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown For Signal Plan 1. Default Data does not exist for Signal Plan 2, 3, and 4.

"TPL" = Timing Plan Transfer may occur.
"SP2" = Transfer to Signal Plan 2 may occur.
"SP3" = Transfer to Signal Plan 3 may occur.
"SP4" = Transfer to Signal Plan 4 may occur.

For Signal Plan 2, the choices are SP1, SP3, & SP4. Etc. for Signal Plan 3 & 4.

Transfer occurs at the END of the interval programmed. Should the next interval in the TO Signal Plan not be enabled to run under traffic, the TO Signal Plan will commence with the next interval enabled.

In those cases where a Timing Plan transfer requires a change in Signal Plans, the Timing Plan will transfer at the Signal Plan transfer interval.

3.4.8 Miscellaneous Control

The Miscellaneous Control Display allows the user to view and/or modify the parameters which establish which intervals that specific control functions are operational.

PRESS "6" FROM SIGNAL PLAN 1 MENU

```
EPIC SP1 CONT  10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
 MCE 010000100 0000000000 0000000000 000
 COR 010000100 0000000000 0000000000 000
 FOR 010000100 0000000000 0000000000 000
 HLD 010000100 0000000000 0000000000 000
             (0-NO 1-YES)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown.

"MCE": Interval(s) may be terminated by the Interval Advance input when Manual Control Enable is active.

"COR": Interval(s) Offset Correction may impact (i.e., shorten in Shortway or lengthen in Dwell). If no offset correction interval is

programmed or available, interval 1 add only correction will be the implemented.

"FOR": Interval(s) Force will be effective.

"HLD": Interval(s) Hold will be effective.

3.4.9 Actuations

The Actuations Display allows the user to view and/or modify the parameters which provide Actuated Intervals within the pretimed sequence.

PRESS "7" FROM SIGNAL PLAN 1 MENU

```
EPIC SIGNAL PLAN 1 ACTUATIONS

          1-ACTUATION CONTROL
          2-VEHICLE MEMORY
          3-PEDEST MEMORY


 PRESS # DESIRED              P-PRIOR MENU
```

1) ACTUATION CONTROL provides viewing and editing of Actuation Control parameters.
2) VEHICLE MEMORY provides viewing and editing of Vehicle Memory parameters.
3) PEDEST MEMORY provides viewing and editing of Pedest Memory parameters.

3.4.9.1 Actuation Control

The Actuations Control Display allows the user to view and/or modify the parameters which establish which intervals are actuated and the detector(s) that actuate same.

PRESS "1" FROM ACTUATIONS MENU

```
EPIC SP1 ACT'N 10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
CODE 000000000 0000000000 0000000000 000
GRP# 000000000 0000000000 0000000000 000
 CODE: 0=NOT ACTUATED 1=EITHER 2=A ONLY
     3=B ONLY 4=BOTH 5=DEFAULT 6=A  7=B
 GRP#:  0=1(A)+2(B)    1=3(A)+4(B)
A-UP B-DN C-LT D-RT           P-PRIOR MENU
```

Default Data is as shown.

Code "0" (NOT ACTUATED): not actuated, always run, regardless of detector activity. Also serves as a choice interval during which the controller unit determines which interval to run next, given two or more primary branches in the interval path.

Code "1" (EITHER): either Detector A (1 or 3) or Detector B (2 or 4) calls, or both. Code 1 is used to provide the same signal displays in response to detector actuations regardless of which detector calls are received on (as opposed to no calls). Code 1 may be used in conjunction with the set of 2, 3, and 4 or exceptionally, the set of 6 and 7, with defaults (Code 5) defining the last alternate path.

Code "2" (A ONLY): actuated by calls on Detector A (1 or 3) only and no call on Detector B (2 or 4). Codes 2, 3, and 4 are used to provide differing signal sequences depending on whether there are Detector A only, Detector B only, or both Detector A and Detector B. Generally if one of the codes, 2, 3, or 4 is employed, paths should be provided for all three possibilities, otherwise the controller unit may encounter detector calls for which it does not have an appropriate response. These codes are designed for concurrent traffic movements.

Code "3" (B ONLY): actuated by calls on Detector B (2 or 4) only and no call on Detector A (1 or 3). See comments on Code 2.

Code "4" (BOTH): actuated only if both Detector A (1 or 3) and Detector B (2 or 4) have calls. See comments on Code 2.

Code "5" (DEFAULT): A default category, used to add time to fill out the cycle in case none of the other alternate paths is taken. Since the controller unit examines each interval consecutively to determine which interval to move to next, default (Code 5) intervals must constitute the LAST alternate path in a set of intervals.

Code "6" (A): actuated by calls on Detector A (1 or 3), regardless of whether there are any calls on Detector B (2 or 4). Codes 6 and 7 are for use with exclusive traffic movements, and are normally used in conjunction, along with Code 5 in case of no calls.

Code "7" (B): actuated by calls on Detector B (2 or 4), regardless of whether there are any calls on Detector A (1 or 3). See comments on Code 6.

Changes to the defined actuation codes of the active signal plan will cause the unit to revert to Startup Flash. All changes to the active plan (Dial/Split/Signal Plan) occur at the defined transfer intervals. Lockout will prevent plan changes for a period of sixty seconds following the completion of the last plan data change (begins with the first change). Lockout means the unit will continue to run the active plan.

Additional constraints on the use of Actuations Codes are as follows:

1) "T Zero" Interval (lowest numbered interval to run) MUST BE NOT-ACTUATED! Any other T0 interval programming shall be ignored.
2) Detector 1+2 and Detector 3+4 are for use with exclusive traffic movements and therefore can not be actuated in the same intervals.
3) The controller unit determines the alternate path to serve based on detector call status only in Non Actuated (Code 0) and Either (Code 1)intervals.
4) Primary branches in the interval path (branches from the main interval path) must be immediately preceded by a non-actuated (Code 0) interval. Secondary branches to Codes 2, 3, and 4 may follow Code 1 intervals.
5) It is possible to have secondary branches, such as a branch to Codes 2, 3, and 4, following a primary.
6) All actuated intervals, except those with Code 1, in a set of alternate paths must be assigned to consecutive intervals, with no non-actuated (Code 0) or Default (Code 5) intervals intervening, and those with the same Code must be grouped together.
7) Code 1 intervals may immediately precede or follow (or both) any group of actuated alternate paths (2-4 or 6-7). Since a

Code 1 interval will be serviced for any actuation, care must be taken to allow paths for all possible combinations of detector calls following or preceding Code 1 intervals (Code 1 intervals plus a choice of Codes 2, 3, and 4 or Code 1 intervals plus a choice of Codes 6 and 7).

8) In a set of alternate paths, there may be one or more Default (Code 5) intervals, which will then be serviced if none of the other alternatives is met; these Default interval(s) must also be consecutive, and must immediately follow the last actuated interval of that set of alternate paths.

   At the end of the not-actuated interval preceding an alternate path(s) set lacking a Default (Code 5) intervals, an interval selection will not take place until the actuation(s) permit path selection. This is defined as Isolated mode.

9) It is possible to have more than one set of primary branches in a cycle, if there is at least one non-actuated (Code 0) interval in between.

10) In branches with alternate paths Codes 6 and 7, if there are calls on both detectors, the path with the lower-numbered intervals will be serviced.

Actuated intervals that are also defined as Force Intervals will terminate prior to the designated Split time when the Minimum interval time has expired, the Stretch Time is Not Zero, and the Stretch Timer is timed out.

Unused time in an actuated path is added to the next Non-Actuated (Code 0) interval. Unused time is caused by gap out, force off, and alternate paths requiring different times.

Actuated intervals must be very carefully programmed for Signal Plan or Timing Plan transfer because differing Signal or Timing Plans may have alternate paths which would result in loss of synchronization with other intersection controller assemblies or abrupt or dangerous signalization changes.

3.4.9.2 Vehicle Memory Reset

The Vehicle Memory Reset Display allows the user to view and/or modify the parameters which establish which intervals will reset the vehicle memory.

PRESS "2" FROM ACTUATIONS MENU

```
EPIC SP1 V MEM 10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
GRP1 100000000 0000000000 0000000000 000
GRP2 100000000 0000000000 0000000000 000
GRP3 100000000 0000000000 0000000000 000
GRP4 100000000 0000000000 0000000000 000
   RESET DETECTOR MEMORY (0-NO 1-YES)
A-UP B-DN C-LT D-RT          E-PRIOR MENU
```

Default Data is as shown For Signal Plan 1. Default Data does not exist for Signal Plan 2, 3, and 4.

A. GRP1: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 1 vehicle memory is reset.

B. GRP2: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 2 vehicle memory is reset.

C. GRP3: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 3 vehicle memory is reset.

D. GRP4: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 4 vehicle memory is reset.

Detectors should be reset in Actuated Intervals that services the respective call.

It is necessary to reset unused vehicle detectors in at least one interval. The controller places calls on all detectors during Startup and Manual Control Enable. Any call which is not reset will cause a CYCLE FAILURE fault to occur (see 6.6.3-b).

3.4.9.3 Pedestrian Memory Reset

The Pedestrian Memory Reset Display allows the user to view and/or modify the parameters which establish which intervals will reset the pedestrian memory.

PRESS "3" FROM ACTUATIONS MENU

```
EPIC SP1 P MEM 10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
GRP1 100000000 0000000000 0000000000 000
GRP2 100000000 0000000000 0000000000 000
GRP3 100000000 0000000000 0000000000 000
GRP4 100000000 0000000000 0000000000 000
   RESET DETECTOR MEMORY (0-NO 1-YES)
A-UP B-DN C-LT D-RT          E-PRIOR MENU
```

Default Data is as shown For Signal Plan 1. Default Data does not exist for Signal Plan 2, 3, and 4.

A. GRP1: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 1 pedestrian memory is reset.

B. GRP2: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 2 pedestrian memory is reset.

C. GRP3: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 3 pedestrian memory is reset.

D. GRP4: This entry (Code "0" = No & Code "1" = Yes establishes the interval(s) which the Group 4 pedestrian memory is reset.

Detectors should be reset in Actuated Intervals that services the respective call.

It is a good idea to reset unused pedestrian detectors in at least one interval. The controller places calls on all detectors during Startup and Manual Control Enable. Any call which is not reset will show a call in the active status displays.

3.4.10 Signal Plan Copy

The Signal Plan Copy Display allows the user to copy the parameters from one signal plan to another within the controller unit.

PRESS "5" FROM SIGNAL PLAN MENU

```
EPIC SIGNAL PLAN COPY

COPY FROM SIGNAL PLAN: 1
COPY TO SIGNAL PLAN .: 2
 ENTER THE FROM & TO SIGNAL PLAN #'S AND
 THEN PRESS "E" TO INITIATE THE COPY

A-UP B-DN                    F-PRIOR MENU
```

3.4.11 Load Default

This function allows the user to load the PROM resident default signal plan parameter set into memory to become the active database.

PRESS "6" FROM SIGNAL PLAN MENU

```
EPIC LOAD SIGNAL PLAN DEFAULT

 WARNING....THIS OPTION WILL REPLACE
 ALL CURRENT OPERATING PARAMETERS.

 - PRESS "E" TO CONTINUE

                             F-PRIOR MENU
```

Throughout this section, parameters will be simulated for display purposes. Each such display will include the default data where default data is provided. In cases where there is no default data, it shall be so noted.

When Signal Plan default is loaded, the unit will automatically load default timing plan (coord) timings.

3.5 UNIT DATA

Unit Data allows the user to display and/or enter controller parameters for:

1. Startup & Miscellaneous Controls
2. Remote Flash Parameters
3. Vehicle Detector
4. Vehicle & Pedestrian Recalls

To enter data for these intervals requires user access. See UTILITIES (para 3.2) for more information on gaining access.

3.5.1 Unit Data Menu

The Unit Menu allows the user to select which unit parameter database area will be addressed.

PRESS "4" FROM MAIN MENU

```
EPIC UNIT DATA              PRESS # DESIRED

          1-STARTUP & MISC
          2-DRIVERS & REM FLSH
          3-VEHICLE DETECTOR
          4-VEH & PED RECALLS

                             F-PRIOR MENU
```

1) STARTUP & MISC provides viewing and editing of Startup and Miscellaneous control parameters on the controller unit.
2) REMOTE FLASH provides viewing and editing of Remote Flash parameters for the controller unit.
3) VEHICLE DETECTOR provides viewing and editing of Vehicle Detector parameters.
4) VEH & PED RECALLS provides viewing and editing of Vehicle and Pedestrian Recall parameters.

3.5.2 Startup & Misc Menu

The Startup & Miscellaneous Display allows the user to view and/or modify the Startup and miscellaneous control parameters for the controller unit.

PRESS "1" FROM UNIT MENU

```
EPIC STARTUP & MISC
  STARTUP TIME : 05  (SECONDS)
  STARTUP STATE:  0  (0-FLSH 1-RED)
  STOP T RESET :  0  (0-NO 1-YES)
  "D" CONN I/O MODE-INPUT: 0  OUTPUT: 0

   SEE DIAL/SPLIT FOR STARTUP INTERVAL
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown.

A. Start-Up Time:
   Code "0" (None): An entry of "00" eliminates the Start-Up state.
   Code "##": This entry (0 to 99 seconds) provides an adjustable timed period / state (Start-Up) prior to the Initialization routine when power is restored following a defined power interruption or Watchdog restart. No output, other than AC Power, shall prevent this state from completion and/or exit to the Initialization routine.

B. Start-Up State:
   Code "0" (Flash): This entry provides for flashing (Voltage Monitor Inactive) during the Start-up Period. When Flash is programmed as the Start-up state, no outputs are active except Flashing Logic and +24 Volts DC.
   Code "1" (All Red) This entry provides for a Start-up state with the Voltage Monitor Active. An extended All Red state is assumed as the most frequent use of this programming and is obtained by this entry and appropriate Startup Interval.

C. Stop Time Reset:

Code "0" (No): This is the standard operation. When Stop Time is active, the

Code "1" (Yes) The Controller Unit operation, upon release of a STOP TIME input, will be conditioned by the timing/state active when a the STOP TIME input was applied. Interval timing (Minimum and Normal) will be reset to the full time while all other timing will be maintained status-quo.

D. "D" Connector Input Mode:

Code "0" (Standard): "Standard " input mode provides Coord & Expanded Detector inputs when no system address is programmed and Special Detectors & Special Status inputs when a system address is programmed.

Code "1" (Alternate) This input mode provides input functions just opposite of Standard input mode (Coord & Expanded Detector inputs when a system address is programmed and Special Detectors & Special Status inputs when no system address is programmed).

Code "9" (Special) This input mode provides input functions which may be utilized with a central computer system.

Computer Hold - this input, when active, causes the coordinator times to stop at dwell points (end of the Hold Intervals) when Dial 3 is in control, and the Dial 3 input is active.

The Interconnect Mode "Free" to "Coordinated" transition shall not be dependent on an Offset Input when the Dial request is for Dial 3. Coord pickup will begin after a Dial 3 request is active for 15 seconds or 3% of the cycle (whichever is less).

When the coordinator Dial 3 is in control, all Offset transition methods will be disabled.

The Sync Monitoring functions shall not cause the unit to revert to "Free" mode when all Offset inputs are inactive for 15 seconds. Once coordination has begun, the lack of an Offset input will not cause the unit to revert to Free (the Central System may not provide an Offset for up to three cycles on a transfer from Computer Control to Backup).

The Coord Cycle Diagnostics shall be suspended when the coordinator is stopped at a dwell point.

See "D" Connector Output Mode 9 for Outputs that may be utilized with this input mode. Output Mode 9 is established automatically when Input Mode 9 is programmed.

E. "D" Connector Output Mode:

Code "0" (Standard): "Standard " output mode provides Coord outputs when no system address is programmed and System Special Function outputs when a system address is programmed.

Code "1" (Alternate) This output mode provides output functions just opposite of Standard output mode.

Code "2" (Special) This output mode provides output functions similar to Mode "0" except when any Preempt routine has control then it is like Mode 4 below.

When Auxiliary #2 is not programmed for output as a TBC Auxiliary function, it will become an Any Preempt active function. The Any Preempt output will become active when any Low Priority routine or any Preempt routine is in control. This output may provide the control signal to correctly utilize these dual function outputs.

Whenever an Auxiliary 2 event has been programmed and it is desired to again implement the Any Preempt output, the clear memory function within TBC must be used to eliminate all TBC or all Aux events (Code "0" or Code "2").

Code "3" (Special) This output mode provides output functions similar to Mode "1" except when any Preempt routine has control then it is like Mode 4 below.

Code "4" (Special) This output mode provides preempt status outputs that are active whenever a preempt routine (Preempt or Low Priority) is in control. The presence of the Any Priority output indicates a Low Priority routine is in control. Each routine (Preempt or Low Priority) is mutually exclusive.

Code "5" (Special) This output mode provides output functions similar to Mode "0" (Address = "000") except provides Interrupted Sync Pulses on the active Offset output. Interrupted Sync Pulses are provided at intervals equal to 20% and 25% of the cycle on alternate cycles.

Code "6" (Special) This output mode provides output functions similar to Mode "4" except when a Preempt is active provides a flashing output on the inactive preempt status outputs.

Code "9" (Special) This output mode provides output functions which are provided as status feedback for the central computer system control established with Input Mode 9. It is established automatically when Input Mode 9 is programmed.

Cycle 0 - this output will be operational during all coordination timing plans (Dial/Split combinations). Each time the background cycle passes through a point equal to local zero, the output will be inactive for a minimum of 5 seconds.

Dwell - a per ring output will be operational when Dial 3 is in control and a Dwell point is reached. See "D" Connector Input Mode 9 for a definition of dwell points.

3.5.3 Drivers & Remote Flash Menu

The Drivers & Remote Flash Display allows the user to view and/or modify the Driver Utilization and Remote Flash control parameters for the controller unit.

PRESS "2" FROM UNIT MENU

```
EPIC DRIVERS & REM FLSH      (0-NO 1-YES)
 GROUP..V-1/2/3/4..P-1/2/3/4..V-A/B/C/D.
 P SIG :  0 0 1 1    0 0 0 0    0 0 0 0
 FLASH :  1 1 0 0    0 0 0 0    0 0 0 0
 FL YEL:  0 0 0 0    0 0 0 0    0 0 0 0
 FL ALT:  0 1 0 0    0 0 0 0    0 0 0 0
 SEE DIAL/SPLIT FOR ENTER/EXIT INTERVAL
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown.

A. P SIG: The entry (Code "0" = No & Code "1" = Yes) establishes whether the controller unit will utilize the respective Load Switch Driver outputs to drive a pedestrian signal (No-Vehicle & Yes-Pedestrian). These entries impact the Intersection Status display and Preempt operation both of which need to know utilization for proper operation.

B. FLASH: The entry (Code "0" = No & Code "1" = Yes) establishes whether the controller unit will implement Remote Flash via Flashing the Load Switch Driver outputs for the group. When all output groups are programmed "0" the Voltage Monitor output is set false to implement Remote Flash.

C. FL YEL: The entry (Code "0" = No & Code "1" = Yes) establishes whether the Yellow Output for the group will flash during Remote Flash. When "0" (No) is programmed, the Red Output for the group will flash.

D. FL ALT: The entry (Code "0" = No & Code "1" = Yes) establishes whether the Yellow or Red Output for the group will flash (be On) during the alternate half second. All groups programmed "0" will be On and Off concurrently while those programmed "1" will operate exactly opposite.

Remote Flash (via Load Switch Driver outputs) will provide a 4 second exit transition period when any Flashing Yellow display will be followed by a Red, Flashing Red, or Dark display. The Load Switch Driver outputs during this period will be Yellow for those which were Flashing Yellow and Red for those which were Flashing Red.

3.5.4 Vehicle Detector Menu

PRESS "3" FROM UNIT MENU

```
VEHICLE DETECTOR
    GROUP.....1.....2.....3.....4.
     NL MEM      0     0     0     0
     EXTEND   00.0  00.0  00.0  00.0
     DELAY     000   000   000   000

    NL MEM CODES: (0-NO 1-YES)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

A. NL MEM
Code "0" (No):

B. EXTEND
Code "0" (None): This is the standard actuated vehicle detector operation.
Code "#.#" : When in the actuated intervals associated with the detector, an actuation (input duration) shall be extended from the point of termination by this time (0-99.9 Seconds).

Extend timings do not apply to "Either" or "Default" path intervals in regard to "Force Intervals" and extend/gap operation.

C. DELAY
Code "0" (None): This is the standard actuated vehicle detector operation.
Code "##" : When not in the actuated intervals associated with the detector, a detector actuation shall be delayed by this time (00-999 Seconds). Once the actuation has been present for the delay time it shall be continued for as long as it is present.

Delay is operational in "Either" or "Default" path intervals and disabled in other path intervals.

3.5.5 Veh & Ped Recalls Menu

PRESS "4" FROM UNIT MENU

```
VEH & PED RECALLS
    GROUP.....1.....2.....3.....4.
      V.RECALL    0     0     0     0
      P.RECALL    0     0     0     0
      CODES.....0.....1.....2.....3.
       VEHICLE   NONE  1CALL  MIN   MAX
       PEDEST.   NONE  1CALL  PED   ---
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

A. Vehicle Recalls
Code 0 (None); The group vehicle will operate as an actuated movement. It must, therefore, be connected to at least one detector.
Code 1 (Vehicle Call): Places one momentary vehicle actuation.
Code 2 (Min Vehicle Recall): Places a demand for vehicle service in memory each time the group leaves its actuated interval. As a result this group will continually demand at least a Minimum service even in the absence of actual vehicle or pedestrian calls. The Green interval may then be extended by vehicle actuations during the programmed interval in the usual manner.
Code 3 (Max Vehicle Recall): Places a continuous demand for vehicle service.

B. Pedestrian Recalls
Code 0 (None): The group pedestrian will operate as an actuated movement. It must, therefore, be connected to at least one detector.
Code 1 (Pedestrian Call): Places one momentary pedestrian actuation.
Code 2 (Pedestrian Recall): Places a continuous demand for pedestrian service.

3.6 COORD DATA

Coord Data allows the user to display and/or enter controller parameters for:

1. Setup (Mode/Correction) Parameters
2. Manual Mode Parameters
3. Dial/Split Parameters
4. Dial/Split Copy
5. Load Default Coord Data

To enter data for these intervals requires user access. See UTILITIES (3.3) for more information on gaining access.

3.6.1 Coordination Menu

The Coord Menu allows the user to select which coord parameter database to be addressed.

PRESS "5" FROM MAIN MENU

```
EPIC COORD DATA          PRESS # DESIRED

          1-SETUP COORD
          2-MANUAL CONTROL
          3-DIAL/SPLIT DATA
          4-COPY DIAL/SPLIT
          5-LOAD DEFAULT
                              F-PRIOR MENU
```

1) SETUP COORD provides viewing and editing of the overall coord/unit parameters.
2) MANUAL CONTROL provides viewing and editing of the pattern to control in manual mode.
3) DIAL/SPLIT DATA provides viewing and editing of the pattern parameters for each of the sixteen dial/split combinations.
4) COPY DIAL/SPLIT will copy one dial/split parameters to another.
5) CLEAR MEMORY will clear (zero out) all coord parameters.

3.6.2 Coord Setup

The Coord Setup Display allows the user to view and/or modify the overall coord/unit parameters.

PRESS "1" FROM COORD DATA MENU

```
EPIC COORD SETUP
      CODE....0.....1.....2.....3..
 OPER:   0 - FREE   AUTO   MANUAL   ---
 CORR:   0 - DWELL  MX DW  SH WAY   SW+

 MXDW: 000  MAX DWELL (0-999 SECONDS)
 MDUR: 000  MIN DURATION (0-99 MINUTES)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown.

A. OPER (Operation Mode)
   Code "0-FREE": This mode provides for Free (Non-Coordinated) operation.
   Code "1-AUTO": This mode provides for coord operation, or free, to be automatically determined by the possible sources (i.e., interconnect, time base, or system commands).
   Code "2-MANUAL": This mode provides for Manual Coord operation running the pattern as defined in the Manual Control entries.

B. CORR (Correction Mode)
   Code "0-DWELL": This correction mode provides an offset dwell until correction has been accomplished.
   Code "1-MX DW": This correction mode provides an offset dwell until correction has been accomplished with Max Dwell Time establishing the dwell limit for a single cycle.
   Code "2-SH WAY": This correction mode provides an offset correction by shortening or dwelling based on a shortest way calculation. Correction will not exceed 20% in a cycle and will automatically take into consideration minimum times.
   Code "3-SH+": This correction mode provides an offset dwell similar to MX DW except the max dwell time will be 20% of the cycle.

C. MXDW: This value establishes the maximum time (000-999 Seconds) the unit may dwell for offset correction in a single cycle (Maximum Dwell).

D. MDUR: This value establishes the minimum time (00-99 Minutes) a pattern will run (Minimum Duration).

If coord is bad or non-existent, run min interval times.

3.6.3 Coord Manual Control

The Coord Manual Control Display allows the user to view and/or set the pattern to be in control under manual coord mode.

PRESS "2" FROM COORD DATA MENU

```
EPIC COORD MANUAL CONTROL

 DIAL: 0  SPLIT: 0  OFFSET: 0  SYNC: 0

  TO SET CYCLE ZERO IN MANUAL CONTROL
  ENTER "1" FOR SYNC

A-LT B-RT C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown.

1) DIAL: This entry (1-4) establishes the DIAL part of the pattern definition that will control during manual mode.
2) SPLIT: This entry (1-4) establishes the SPLIT part of the pattern definition that will control during manual mode.
3) OFFSET: This entry (1-3) establishes the OFFSET part of the pattern definition that will control during manual mode.
4) SYNC: This entry (1) establishes the SYNC reference for the pattern that will control during manual mode. Once initiated this reference will be automatically regenerated once a cycle for the duration of the manual pattern.

3.6.4 Coord Dial/Split Menu

The Coord Dial/Split Display allows the user to view and/or modify the pattern parameters for each of the sixteen dial/split combinations.

PRESS "3" FROM COORD DATA MENU

```
EPIC DIAL/SPLIT
     DIAL: 1    SPLIT: 1    LEVEL: 1
  ENTER A DIAL, SPLIT, & LEVEL # THEN
  PRESS "E" TO CONTINUE.
     LEVEL CODE:  1-CYCLE + OFFSET
                  2-INTERVAL DATA

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

The "Level" code entry determines whether Cycle + Offset Data (3.6.3.1) or Interval Data (3.6.3.2).

3.6.4.1 Cycle & Offset Data

The Cycle & Offset Display allows the user to view and/or modify the respective parameters for each of the sixteen dial/split combinations.

PRESS "1" FROM DIAL/SPLIT MENU

```
EPIC DIAL 1 SPLIT 1 CYCLE & OFFSET DATA
  CYCLE LENGTH: 060    CALCULATED CYCLE:
  SIGNAL PLAN :   0     SIG PLAN 1: 000
  OFFSET 1 ...: 000     SIG PLAN 2: 000
  OFFSET 2 ...: 000     SIG PLAN 3: 000
  OFFSET 3 ...: 000     SIG PLAN 4: 000

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

1) CYCLE LENGTH (Calculated): This value is the calculated cycle length time (0-999 seconds) for the pattern defined.
2) CYCLE LENGTH (Programmed): This value is the programmed cycle length time (0-999 seconds) for the pattern defined.
3) OFFSET TIME (Offset Time): This value establishes the Offset Time (0-999 seconds) for the local cycle zero which will be maintained during the pattern defined.
4) PLAN: This entry establishes the Signal Plan (1-4) which will be in effect for the duration of the pattern defined (Dial/Split/Offset). If "0" is entered, the Signal Plan will be selected based on hardware inputs only.

A "** CYCLE NOT = CALCULATED **" will be displayed on line 7 of the above display when the cursor is on the Cycle Length field and the Cycle value programmed is not equal to that calculated for any signal plan (i.e., should equal that calculated for at least one plan). The cursor shall not automatically leave this field during data entry when this is true.

A "** OFFSET => CYCLE LENGTH **" will be displayed line 7 of the above display when the cursor is on the Offset field and the Offset value programmed is equal to or greater than the Cycle Length programmed (a valid Offset is less than the cycle length). The cursor shall not automatically leave this field during data entry when this is true.

Changes which alter the active interval definitions of the running pattern (Dial/Split) will cause the unit to revert to Startup Flash. All changes to the active plan (Dial/Split/Signal Plan) occur at the defined transfer intervals. Lockout will prevent plan changes for a period of sixty seconds following the completion of the last plan data change (begins with the first change). Lockout means the unit will continue to run the active plan.

3.6.4.2 Interval Data

The Interval Data Display allows the user to view and/or modify the respective parameters for each of the sixteen dial/split combinations.

PRESS "2" FROM DIAL/SPLIT MENU

In Display Mode

```
EPIC DIAL 1 SPLIT 1 INTERVAL DATA
  INT#..TIME...A..S..I..O.
    01    012.0  1   1   0   1     A-ACTIVE
    02    005.0  1   0   0   0     S-STARTUP
  > 03    008.0  1   0   0   0     I-FL ENTRY
    04    004.0  1   0   0   0     O-FL EXIT
    05    001.0  1   0   0   0
A-UP B-DN                 E-EDIT F-PRIOR MENU
```

Default Data is as shown for Dial 1, Split 1, Intervals 1 through 10 in this and the following window. Default Data does not exist for the remaining Timing Plans.

Screen Scrolls With ">" Pointer Denoting The Current Interval

In Edit Mode

```
EPIC DIAL 1 INTERVAL TIMES
  INT#..TIME...A..S..I..O.   CODES:
    06    012.0  1   0   0   0     A-ACTIVE
    07    005.0  1   0   0   0     S-STARTUP
    08    008.0  1   0   0   0     I-FL ENTRY
    09    004.0  1   0   0   0     O-FL EXIT
    10    001.0  1   0   1   0
A-UP B-DN C-LT D-RT E-EXIT   F-PRIOR MENU
```

Bottom Line changes in edit mode & "E" is used to exit edit mode for further scrolling. Automatically skip past any intervals not defined as active.

TIME; The entry establishes the Interval time (0-999.9 seconds) for the Dial/Split.

A (Active); The entry (Code "0" = No & Code "1" = Yes) establishes whether the Interval will be an Active Interval for the Dial/Split.

S (Startup); The entry (Code "0" = No & Code "1" = Yes) establishes whether the Interval will be the Startup Interval for the Dial/Split. Startup occurs at the Beginning of the Interval programmed. If a Startup Interval is not programmed, Startup will occur in the lowest number interval active.

I (Flash Entry); The entry (Code "0" = No & Code "1" = Yes) establishes whether the Interval will be the Flash Entry Interval for the Dial/Split. Flash Entry occurs at the End of the

Interval programmed. When there is no Entry, the controller unit will not provide Remote Flash.

O (Flash Exit); The entry (Code "0" = No & Code "1" = Yes) establishes whether the Interval will be the Flash Exit Interval for the Dial/Split. Flash Exit occurs at the Beginning of the Interval programmed. When there is no Exit Interval, Flash Exit occurs at the Beginning of the Startup Interval.

A "** INTERVAL < MINIMUM **" will be displayed on line 8 of the above display when the cursor is on a Time field and the interval time entered is less than equal to the Minimum Time in a Signal Plan. The cursor shall not automatically leave this field during data entry when this is true.

Changes as to which intervals are defined as active in the running pattern (Dial/Split) will cause the unit to revert to Startup Flash. All changes to the active plan (Dial/Split/Signal Plan) occur at the defined transfer intervals. Lockout will prevent plan changes for a period of sixty seconds following the completion of the last plan data change (begins with the first change). Lockout means the unit will continue to run the active plan.

3.6.5 Coord Copy Menu

The Coord Copy Display allows the user to copy the parameters from one dial/split to another within the controller unit.

PRESS "4" FROM COORD DATA MENU

```
EPIC COORD COPY

COPY FROM ........ DIAL: 1   SPLIT: 1
COPY TO .......... DIAL: 1   SPLIT: 2
 ENTER THE FROM & TO DIAL/SPLIT ## THEN
 PRESS "E" TO INITIATE THE COPY

A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

1) FROM DIAL: This entry (1-4) establishes the DIAL part of the pattern definition that will become the source of the copy function.
2) FROM SPLIT: This entry (1-4) establishes the SPLIT part of the pattern definition that will become the source of the copy function.
3) TO DIAL: This entry (1-4) establishes the DIAL part of the pattern definition that will become the destination of the copy function.
4) TO SPLIT: This entry (1-4) establishes the SPLIT part of the pattern definition that will become the destination of the copy function.

Pattern Copy operation will cause the unit to .

3.6.6 Coord Load Default Menu

The Coord Load Default Display allows the user to load the default coord parameters.

PRESS "5" FROM COORD DATA MENU

```
EPIC COORD LOAD DEFAULT

 WARNING....THIS OPTION WILL REMOVE ALL
 CURRENT OPERATING DATA ..............
 - PRESS "E" TO CONTINUE

                              F-PRIOR MENU
```

Load Default will not cause any change to Signal Plan parameters.

4 SECTION 4 FRONT PANEL ADVANCED

4.1 INTRODUCTION

The EPIC140 series Controller Unit include enhancements to the basic unit by the addition of preemption, time base, and system functions.

The EPIC140 series Controller Unit Front Panel offers the interface between the user and the traffic control unit.

4.2 TIME BASE DATA

Time Base Data allows the user to view or program controller parameters for:

1) View Current Activity
2) Set Time/Date
3) Traffic Events
4) Auxiliary Events
5) Time-Of-Year Events
6) Program Day Equate/Transfer
7) TBC Data Clear Feature
8) Dimming Definition

To enter data for these intervals requires user access. See UTILITIES (para 3.3) for more information on gaining access.

4.2.1 Time Base Menu

The Time Base Menu allows the user to select which area of the Time Base database to view and/or modify.

PRESS "6" FROM MAIN MENU

```
EPIC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT          5-TOY EVENTS
 2-SET TIME/DATE         6-EQUATE/TRANSFER
 3-TRAFFIC EVENTS        7-CLEAR MEMORY
 4-AUX EVENTS            8-DIMMING

                                F-PRIOR MENU
```

1) VIEW CURRENT provides viewing of the Time Base time, date, and event status.
2) SET TIME/DATE provides for setting the date, time, Daylight Savings, and Cycle Zero parameters.
3) TRAFFIC EVENTS provides viewing and editing of the Traffic Events.
4) AUX EVENTS provides viewing and editing of the Auxiliary Events.
5) TOY EVENTS provides viewing and editing of the Time Of Year Events.
6) EQUATE/TRANSFER will Transfer (copy) or Equate one program days events to another.
7) CLEAR MEMORY will clear (zero out) selective or all TBC event areas.
8) DIMMING provides viewing and editing of the dimming parameters.

4.2.2 Time Base Current

The Time Base Current Display allows the user to view the current time base status and control modes.

PRESS "1"FROM TIME BASE MENU

```
EPIC TIME BASE - CURRENT     F-PRIOR MENU
   WED  11/15/89  12:10:30  STD TIME
   DAY PROGRAM: 07   WEEK PROGRAM: 0
------TRAFFIC------   ----AUXILIARY----
 DL/SP/OF:  2/2/2       A: 12*    DIM:N
 GRP CALL:  1234        D: .2.
                        S: .*******
CODES: (#)-ON  (.)-OFF  (*)-NOT DEFINED
```

1) Day of Week - The current day of the week is displayed in an abbreviated English format (i.e., SUN, MON, etc).
2) Date & Time - The current Date (Month/Day/Year) and Time (Hour/Minute/Second) is displayed.
3) Daylight Savings Time - The current programming and status for Daylight Savings Time is displayed.
4) Program Day - The current Program Day is displayed.
5) Program Week - The current Program Week is displayed.
6) Traffic Event - The current Coordination Pattern, Flash, Free, Vehicle Calls, and Pedestrian Calls are displayed.
   DL/SP/OF - Pattern (Dial/Split/Offset)
   VEH CALL - Groups With Vehicle Calls
   PED CALL - Groups With Pedestrian Calls
7. Auxiliary Event - The current status of each Auxiliary, System Special Function, Detector Diagnostic parameters, System Detector Report, and Dimming event structure is displayed.
   A: 12* - Auxiliary Output | (#)-On (.)-Off
   D: .2. - Det Diag & Report > (.)-Off
   S: ******** - Sys Spec Function | (*)-Not Defined
   DIM: N - Dimming Enabled N-Off & Y-On

4.2.3 Time Base Set Time/Date

The Time Base Set Time/Date Display allows the user to modify/set the date/time within the controller unit.

PRESS "2" FROM TIME BASE MENU

```
EPIC TIME BASE - SET TIME/DATE
 --DATE--   --TIME--   WEEK   BEG-DST--END
 MM/DD/YY  HH:MM:SS   DAY    MM SW  MM SW
 09/21/85  10:00:00    7     04  5  10  5
 CYC ZERO: 00:00    (00:00 HH:MM - EVENT)
   CHANGE VALUES & PRESS "E" TO SET
CODES....0-NO..1-YES....SUNDAY-DAY 1....
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

1) DATE "MM/DD/YY": This entry establishes the current DATE from which the Time Base implements all time of year events.
2) TIME "HH:MM:SS": This entry establishes the current TIME from which the Time Base implements all time of day events.
3) WEEK DAY: This entry establishes the current DAY of the WEEK from which the Time Base implements the proper program day. (Ref. Sunday is Day 01)
4) DST (Daylight Savings Time)

BEG - MM & SW: An entry for "MM" establishes the month (01-12) along with an entry for "SW" establishes the Sunday Week (1-5) that Daylight Savings Time will begin.

END - MM & SW: An entry for "MM" establishes the month (01-12) along with an entry for "SW" establishes the Sunday Week (1-5) that Daylight Savings Time will end.

A Sunday Week entry of "5" will establish the last Sunday in the Month as the BEGIN or END point for Daylight Savings Time whether the last Sunday is the fourth or fifth Sunday in that month.

Besides an entry "0" in all of the above fields , an incomplete or invalid entry will prevent Daylight Savings Time from being implemented. Daylight Savings must BEGIN in a Month number lower than the Month number it will END to be considered valid.

5) CYC ZERO: This entry establishes the time of day from which all SYNC REFERENCES (CYCLE ZERO) for coordination will be made, entry of "24:00" will establish a midnight reference. When set at "00:00" the sync reference will be the time the event was initiated.

4.2.4 Traffic Events

The Traffic Events Display allows the user to view and/or modify the time base traffic events programmed in the unit's time base database.

PRESS "3" FROM TIME BASE MENU

```
EPIC TIME BASE - TRAFFIC EVENTS

DISPLAY / SCAN BEGINNING AT:
     DAY: 07    HH:MM: 10:00

ENTER DAY + TIME AND PRESS "E"
  (PRESS "E" W/O THE ABOVE FOR CURRENT)
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

The above display allows the user to establish a starting point (Date & Time) from which to scroll the traffic events database.

PRESS "E" FROM TRAFFIC EVENTS MENU

```
EPIC TIME BASE - TRAFFIC EVENTS
  DD  HH MM  DL SP OF  GRP. CALL
  01  06:00   1  1  1       1234
> 01  08:00   1  2  1       ....
  01  10:00   2  1  1       ....
CODES.......FL=DL/SP=5....FR=OF=4.....
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

1) DD (Program Day): This entry (01-99) establishes the PROGRAM DAY for the event to occur.
2) HH:MM (Time): This entry establishes the TIME of day for the event to occur.
3) DL (Dial): This entry (0-5) establishes the DIAL part of the traffic event which is to occur.

When an event requests Dial 5, Remote Flash will occur.

4) SP (Split): This entry (0-5) establishes the SPLIT part of the traffic event which is to occur.

When an event requests Split 5, Remote Flash will occur.

5) OF (Offset): This entry (0-4) establishes the OFFSET part of the traffic event which is to occur.

When an event requests Offset 4, Free (Non-Coordinated Operation will occur). When an event requests Offset 0, the Coord Pattern will be selected by interconnect inputs.

It is possible for the partial interconnect control only based on an event similar to "0/4/0" wherein Split 4 is selected by the Time Base but Dial and Offset are controlled by the Interconnect inputs.

6) GRP CALL: These entries (Group numbers) establish which groups will operate with a continuous call.

The pointed event is that used or that to receive values from the Add, Delete, or Edit functions.

Events may be entered in any order. The controller unit will place them in chronological order for display and implementation. The cursor control keys "A" and "B" will move the Event Pointer Up or Down in that chronological list.

Free (Non-Coordinated) Mode provides operation where Offset correction shall not occur and unused actuated time is thrown away.

4.2.5 Auxiliary Events

The Auxiliary Events Display allows the user to view and/or modify the time base auxiliary events.

PRESS "4" FROM TIME BASE MENU

```
EPIC TIME BASE - AUXILIARY EVENTS

DISPLAY / SCAN BEGINNING AT:
     DAY: 07    HH:MM: 10:00

ENTER DAY + TIME AND PRESS "E"
  (PRESS "E" W/O THE ABOVE FOR CURRENT)
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

The above display allows the user to establish a starting point (Date & Time) from which to scroll the auxiliary events database.

PRESS "E" FROM AUXILIARY EVENTS MENU

```
EPIC TIME BASE - AUXILIARY EVENTS
  DD  HH MM  A123  D123  DIM  S12345678
  01  06:00   100   000   0    00000000
> 01  08:00   010   000   0    00000000
  01  10:00   001   000   0    00000000
CODES.......0-OFF....1-ON.............
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

A. DD (Program Day): This entry (01-99) establishes the PROGRAM DAY for the event to occur.

B. HH:MM (Time): This entry establishes the TIME of day for the event to occur.

C. A1/--/A3 (Auxiliary Output)
Code "0": This entry (for each auxiliary) establish that the output shall be OFF.
Code "1": This entry (for each auxiliary) establish that the Output shall be ON.

D. D1 (Detector Diagnostic)
Code "0": This entry establishes that the Value 0 set of parameters shall be used for Detector Diagnostics.
Code "1": This entry establishes that the Value 1 set of parameters shall be used for Detector Diagnostics.

E. D2 (System Detector Report)
Code "0": This entry establishes that the System Detector Report stop (not start).
Code "1": This entry establishes that the System Detector Report shall start. After the "Start" command, the report will begin at an even multiple of the interval time (see 4.3.2.3) from 24:00 hours. The report will continue to log (repeat) until a "Stop" event is seen.

F. D3 (Detector Report Multiplier)
Code "0": This entry establishes that the multiplier used in the System Detector Report shall be 10.
Code "1": This entry establishes that the multiplier used in the System Detector Report shall be 100.

G. DIM (Dimming)
Code "0": This entry establishes that dimming shall not occur.
Code "1": This entry establishes that dimming shall occur.

H. S1/--/S8 (System Special Function Output)
Code "0": This entry (for each System Special Function) establishes that the output shall be OFF.
Code "1": This entry (for each System Special Function) establish that the output shall be ON.

The pointed event is that used or that to receive values from the Add, Delete, or Edit functions.

Events may be entered in any order. The controller unit will place them in chronological order for display and implementation. The cursor control keys "A" and "B" will move the Event Pointer Up or Down in that chronological list.

4.2.6 Time Of Year Events

The Time Of Year Events Display allows the user to view and/or modify the time base time of year events.

PRESS "5" FROM TIME BASE MENU

```
EPIC TIME BASE TIME OF YEAR EVENTS
  MM DD YY   SP DAY   SP WK   WEEK = P DAY
  11 28 85              1          0 = 01-07
> 12 25 85     52                 1 = 11-17
  01 01 86                 0       : = ::-::
                                   9 = 91-97
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

1. MM DD YY (Month Day Year): This entry establishes the DATE for the event to occur.
2. SP DAY (Special Day): This entry (01-99) establishes the SPECIAL (EXCEPTION) DAY of events to be run on that date.
3. SP WK (Special Week): This entry (0-9) establishes the SPECIAL (ALTERNATE) WEEK to start on the selected date.

The pointed event is that used or that to receive values from the Add, Delete, or Edit functions.

Events may be entered in any order. The controller unit will place them in chronological order for display and implementation. The cursor control keys "A" and "B" will move the Event Pointer Up or Down in that chronological list.

4.2.7 Equate/Transfer

The Equate/Transfer Display allows the user to equate and/or transfer events from one program day to another within the Controller Unit.

PRESS "6" FROM TIME BASE MENU

```
EPIC TIME BASE DAY EQUATE/TRANSFER

 CODE = 0   ( 0-EQUATE   1-TRANSFER )
 FROM = 01  TO = 02 .. .. .. .. .. ..
 PRESSING "E" BEFORE ANY "TO" DAY ENTRY
 WILL LIST DAYS EQUATED WITH "FROM" DAY

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

Code "0" (EQUATE): This entry will establish two or more days with identical event structures. Any change to either will effect all. This entry provides a short cut to programming days with the exact same events and has the added advantage of reducing memory requirements. An equated day consumes only one event of the 180 available no matter how many events are programmed within the equated day.
Code "1" (TRANSFER): This entry establishes two or more days with identical event structures. Any change to one will not affect the others. This entry provides a short cut to programming similar days without entering all the events (i.e., transfer then add and/or delete).

A. From (Source Day): This entry (01-99) establishes the SOURCE DAY of the equate/transfer function.

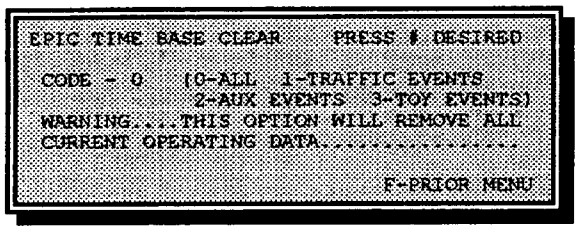
B. To (Destination Day): This entry (01-99) establishes the DESTINATION DAY of the equate/transfer function. Overwriting an existing "TO" day number with "00" will disequate that day.

(DISEQUATE): To remove one or more days from an equated list, follow the instructions in the display to view the list of equated days. When the list is displayed move the cursor to the day to be disequated and enter "00" over the day number.

4.2.8 Clear TBC Memory

The Clear TBC Memory Display allows the user to clear (zero out) specific time base data.

PRESS "7" FROM TIME BASE MENU



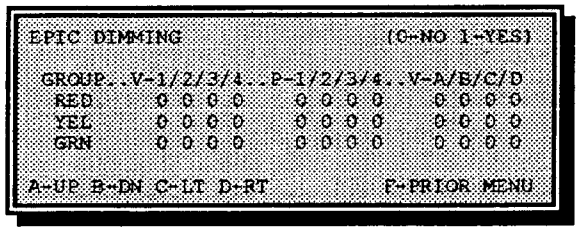
Code "0" (All): This entry clears all Time Base parameters.
Code "1" (Traffic Events): This entry clears Time Base Traffic events.
Code "2" (Auxiliary Events): This entry clears Time Base Auxiliary events.
Code "3" (Time Of Year): This entry clears Time Base Time Of Year events.

Once Time Base starts running an event, it continues to run that event until it encounters a new event to run. Therefore, clearing the Time Base events will not stop Time Base from continuing to run the event which was in effect.

4.2.9 TBC Dimming

The TBC Dimming Display allows the user to view and/or modify the signal driver outputs that are affected by the time base dimming function.

PRESS "8" FROM TIME BASE MENU



Default Data is as shown

For Each signal driver output, a program entry (Code "0" = No & Code "1" = Yes) establishes whether the output will be dimmed.

The driver groups will be dimmed (half cycle removed) on successive half cycles as follows:
1st half cycle: V1/P1/V3/P3/VA/VC
2nd half cycle: V2/P2/V4/P4/VB/VD

4.3 PREEMPT DATA

Preempt Data allows the user to display and/or enter controller parameters for the six preempts as follows:

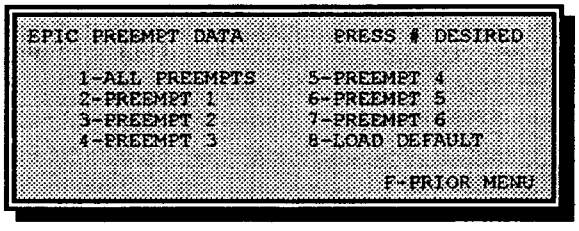
1) All Preempts (Min Gm & Priority)
2) Preempt 1 Parameters
3) Preempt 2 Parameters
4) Preempt 3 Parameters
5) Preempt 4 Parameters
6) Preempt 5 Parameters
7) Preempt 6 Parameters
8) Load Preempt Default Data

To enter data for these intervals requires user access. See UTILITIES (para 3.3) for more information on gaining access.

4.3.1 Preempt Menu

The Preempt Menu allows the user to select which area of the Preempt database to view and/or modify.

PRESS "7" FROM MAIN MENU

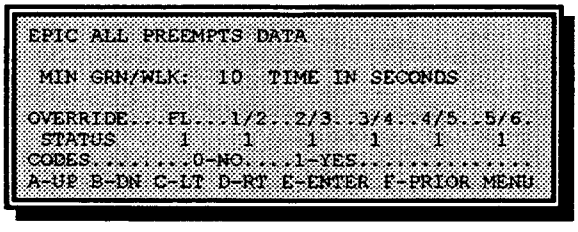


1) ALL PREEMPTS provides viewing and editing of Preemption parameters common to all preempts.
2) PREEMPT 1 provides viewing and editing of Preemption 1 parameters.
3) PREEMPT 2 provides viewing and editing of Preemption 2 parameters.
4) PREEMPT 3 provides viewing and editing of Preemption 3 parameters.
5) PREEMPT 4 provides viewing and editing of Preemption 4 parameters.
6) PREEMPT 5 provides viewing and editing of Preemption 5 parameters.
7) PREEMPT 6 provides viewing and editing of Preemption 6 parameters.
8) LOAD DEFAULT provides for loading the PROM resident default parameter set as the active database.

4.3.2 All Preempts Data

The All Preempt Data Display allows the user to view and/or modify the preempt parameters that are common to all six preempts.

PRESS "1"FROM PREEMPT MENU



Default Data is as shown

A. MIN GRN/WLK: This value establishes the time (000-999 Seconds) which any Green and/or Walk must have been displayed prior to it's termination for a transition to Preempt.

B. OVERRIDE STATUS:
FL - Preemption to Remote Flash
1/2 - Preempt 1 to Preempt 2
2/3 - Preempt 2 to Preempt 3
3/4 - Preempt 3 to Preempt 4
4/5 - Preempt 4 to Preempt 5
5/6 - Preempt 5 to Preempt 6

The entry (Code "0" = No & Code "1" = Yes) establishes whether the first function has priority over the second.

4.3.3 Preempt 1 Menu

The Preempt 1 Sub-Menu allows the user to select which area of the Preempt 1 data is to be viewed and/or modified.

PRESS "2" FROM PREEMPT MENU

```
EPIC PREEMPT 1              PRESS # DESIRED

  1-MISCELLANEOUS     5-CYCLING CONTROL
  2-EXIT INTERVALS    6-CYCLING INTRVLS
  3-INTERVAL TIMES    7-PRIORITY MISC
  4-SIGNAL DRIVERS    8-PRIORITY DWELL

                                F-PRIOR MENU
```

1) MISCELLANEOUS provides viewing and editing of miscellaneous parameters for Preempt 1.
2) EXIT INTERVALS provides viewing and editing of Exit Interval parameters for Preempt 1.
3) INTERVAL TIMES provides viewing and editing of Interval Times for Preempt 1.
4) SIGNAL DRIVERS provides viewing and editing of Load Switch Driver parameters for Track Green and Dwell intervals.
5) CYCLING CONTROL provides viewing and editing which LS Driver groups may cycle.
6) CYCLING INTRVLS provides viewing and editing of the Signal Plan Intervals that may be utilized to provide a cycling sequence for preempt.
7) PRIORITY MISC provides viewing and editing of miscellaneous parameters for Low Priority 1 routine.
8) PRIORITY DWELL provides viewing and editing of dwell parameters for Low Priority 1 routine.

4.3.3.1 Preempt 1 Miscellaneous

The Preempt 1 Miscellaneous Display allows the user to view and/or modify the basic parameters for Preempt 1.

PRESS "1` FROM PREEMPT 1 MENU

```
EPIC PREEMPT 1 MISC DATA  (0-NO & 1-YES)
 TEST.:   0  N-LOCK:    0  LINK PE#:    0
 DELAY: 000  EXTEND:  000  DURATION: 000
             MXCALL:  000  LOCK OUT: 000
 EXIT CALLS: GRP...1...2...3...4.
             CALL:   0    0    0    0

A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown

Pressing "E" in any field will terminate the entry and move to the next field.

TEST: This entry (Code "0" = No & Code "1" = Yes) provides a means to momentarily request a Preempt routine for testing of programming & operation.

NON-LOCK: This entry (Code "0" = No & Code "1" = Yes) establishes whether the Preempt Memory is Non-Locking.

LINK PE#: This entry establishes the higher priority Preempt routine which is to be linked to this Preempt routine.

This link will provide an automatic call at the end of the Dwell time for the higher priority routine and shall maintain that call for the demand of the original Preempt routine.

Any entry that is not a higher priority Preempt routine will be ignored.

DELAY: This entry denotes the number of seconds (000-999) that the Preempt actuation must be active prior to normal controller unit operation being interrupted for the Preempt routine.

EXTEND: This entry denotes the number of seconds (000-999) that each Preempt actuation (call duration) shall be extended from the point of termination of the actuation.

DURATION: This entry denotes the number of seconds (0-999) which a Preempt requires prior to a transition back to normal traffic operations can occur.

MXCALL: This entry establishes the time (000-999 seconds) which a preempt call may remain active and be considered valid. When the Preempt call has been active for this time period, the controller unit shall return to normal operation. This Preempt call shall be considered invalid until such time as a change in state occurs (no longer active).

When this value is "0", a Preempt call will be considered valid without reference to time.

LOCK OUT: This entry establishes the time (000-999 seconds) following the exit from the Preempt Routine that will occur prior to entering a Low Priority Routine and/or running coordination.

When this value is "0", Lockout will be in effect until:
a. No Serviceable Conflicting Call Exists or
b. Any phase is reserviced following the exit.

EXIT CALL: This entry (Code "0" = No & Code "1" = Yes) establishes whether a call (pedestrian) will be placed following the exit from the Preempt Routine.

All calls present at the beginning of the Preempt routine will be present (subject to memory programming and detector status) and will be serviced with the entered Exit Calls.

4.3.3.2 Preempt 1 Exit Intervals

The Preempt 1 Exit Intervals Display allows the user to view and/or modify the exit interval parameters for Preempt 1.

PRESS "2" FROM PREEMPT 1 MENU

```
EPIC PREEMPT 1 EXIT INTERVALS
          | DIAL .....1...2...3...4
  RETURN  | SPLIT 1:  00  00  00  00
  INTERVAL| SPLIT 2:  00  00  00  00
  ON EXIT | SPLIT 3:  00  00  00  00
          | SPLIT 4:  00  00  00  00

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

DIAL/SPLIT EXIT INTERVAL: This entry (Interval 01-32) establishes the interval that will be first in the normal cycle on exit from preempt.

If only one Timing Plan Interval is programmed above, cycling shall begin in that timing plan interval. If all defined timing plans have intervals programmed, the called timing plan shall control the one used. If no Timing Plan data is programmed above, preempt will not occur.

4.3.3.3 Preempt 1 Interval Times

The Preempt 1 Interval Times Display allows the user to view and/or modify the interval times for Preempt 1.

PRESS "3" FROM PREEMPT 1 MENU

```
EPIC PREEMPT 1 INTERVAL TIMES
 SEL PED CLR    08     TRK YEL CHG   4.0
 SEL YEL CHG   4.0     TRK RED CLR   2.0
 SEL RED CLR   2.0     DWELL GREEN    10
 TRACK GREEN    10     RET PED CLR    08
 TRK PED CLR    08     RET YEL CHG   4.0
                       RET RED CLR   2.0
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

1) SEL PCL (Selective Ped Clear): This entry sets the time (0-999 seconds) which will be provided to clear a terminating Walk during the transition to Track Green.
2) SEL YEL (Selective Yellow Change): This entry sets the time (3.0-99.9 seconds) which will be provided to clear a terminating Green during the transition to Track Green.
3) SEL RED (Selective Red Clear): This entry sets the time (0-99.9 seconds) which will be provided to clear a terminating Yellow during the transition to Track Green.
4) TRK GRN (Track Green): This entry sets the time (0-999 seconds) which will be provided Track Green interval. When Track Green is set to "0", it is skipped, regardless of any output programming resident.
5) TRK PCL (Track Ped Clear): This entry sets the time (0-999 seconds) which will be provided to clear a terminating Walk during the transition to Dwell Green.
6) TRK YEL (Track Yellow Change): This entry sets the time (3.0-99.9 seconds) which will be provided to clear a terminating Green during the transition to Dwell Green.
7) TRK RED (Track Red Clear): This entry sets the time (0-99.9 seconds) which will be provided to clear a terminating Yellow during the transition to Dwell Green.
8) DW GRN (Dwell Green): This entry sets the time (0-999 seconds) which will be provided Dwell Green interval.
9) RET PCL (Return Ped Clear): This entry sets the time (0-999 seconds) which will be provided to clear a terminating Walk during the transition to Normal Operation.
10) RET YEL (Return Yellow Change): This entry sets the time (3.0-99.9 seconds) which will be provided to clear a terminating Green during the transition to Normal Operation.
11) RET RED (Return Red Clear): This entry sets the time (0-99.9 seconds) which will be provided to clear a terminating Yellow during the transition to Normal Operation.

When Track Green time is Zero (0), "Track" intervals will not appear (i.e., Track Green, Track Ped Clear, Track Yellow, or Track Red Clear).

4.3.3.4 Preempt 1 Signal Drivers

The Preempt 1 Signal Drivers Display allows the user to view and/or modify the load switch driver parameters for the Track Green and Dwell intervals.

PRESS "4" FROM PREEMPT 1 MENU

```
EPIC PREEMPT 1 SIGNAL DRIVERS

 GROUP..V-1/2/3/4..P-1/2/3/4..V-A/B/C/D
  TRK G   0 0 0 0    0 0 0 0    0 0 0 0
  DWELL   0 0 0 0    0 0 0 0    0 0 0 0
 (0-R 1-G 2-Y 3-PR 4-PG 5-PY 6-PG 7-DK)

A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

Default Data is as shown

Track Green and Dwell Status
- Code "0" : Vehicle status will be Red.
- Code "1" : Vehicle status will be Green.
- Code "2" : Vehicle status will be Yellow.
- Code "3" : Vehicle status will be Flashing Red.
- Code "4" : Vehicle status will be Flashing Green.
- Code "5" : Vehicle status will be Flashing Yellow.
- Code "6" : Vehicle status will be Red & Green.
- Code "7" : Vehicle status will be Dark.

4.3.3.5 Preempt 1 Cycling Control

The Preempt 1 Cycling Control Display allows the user to view and/or modify the parameters for cycling within Preempt 1.

PRESS "5" FROM PREEMPT 1 MENU

```
EPIC PREEMPT 1 CYCLING
          | DIAL .....1...2...3...4
 INTERVAL | SPLIT 1:  00  00  00  00
 TO BEGIN | SPLIT 2:  00  00  00  00
 CYCLING  | SPLIT 3:  00  00  00  00
          | SPLIT 4:  00  00  00  00

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

DIAL/SPLIT INTERVAL TO BEGIN: This entry (Interval 01-32) establishes the interval that will be first in the cycling sequence.

If only one Timing Plan Interval is programmed above, cycling shall begin in that timing plan interval. If all defined timing plans have intervals programmed, the called timing plan shall control the one used. Timing Plan transfer shall not occur while running same under preempt. If no Timing Plan is programmed above, cycling will not occur.

4.3.3.6 Preempt 1 Cycling Intervals

The Preempt 1 Cycling Intervals Display allows the user to view and/or modify the intervals utilized for cycling in Preempt 1.

PRESS "6" FROM PREEMPT 1 MENU

```
EPIC CYCLING   10........ 20........ 30.
INT#-123456789 0123456789 0123456789 012
 SP1 000000000 0000000000 0000000000 000
 SP2 000000000 0000000000 0000000000 000
 SP3 000000000 0000000000 0000000000 000
 SP4 000000000 0000000000 0000000000 000
  ENABLE INTERVAL SERVICE (0-NO 1-YES)
A-UP B-DN C-LT D-RT          F-PRIOR MENU
```

These entries (Code "0" = No & Code "1" = Yes) establishes that Interval is allowed to occur during cycling. When all signal plan intervals are disabled, cycling will not occur.

4.3.3.7 Low Priority 1 Misc

The Priority Misc Display allows the user to view and/or modify the miscellaneous parameters for Priority 1.

PRESS "7" FROM PREEMPT 1 MENU

```
EPIC LOW PRIORITY 1 MISC  (0-NO & 1-YES)
 TEST.:   0  N-LOCK:    0  SKIP....:    0
 DELAY: 000  EXTEND: 000  DURATION: 000
 DWELL: 000  MXCALL: 000  LOCK OUT: 000
 EXIT CALLS: GRP...1...2...3...4.
             CALL: 0   0   0   0

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

TEST: The entry (Code "0" = No & Code "1" = Yes) provides a means to momentarily request a Low Priority routine for testing of programming & operation.

NON-LOCK: This entry (Code "0" = No & Code "1" = Yes) establishes whether the Low Priority Memory is Non-Locking.

SKIP: This entry (Code "0" = No & Code "1" = Yes) establishes whether a Low Priority Routine will skip the actuated intervals and cycle to service the Low Priority intervals. Intervals defined as Force intervals shall be served based on Minimum Interval times.

Isolated operation will proceed to the ALL calls path and skip will not be available.

DELAY: This entry denotes the number of seconds (000-999) that the Low Priority actuation must be active prior to normal controller unit operation being interrupted for the Low Priority routine.

EXTEND: This entry denotes the number of seconds (000-999) that each Low Priority actuation (call duration) shall be extended from the point of termination of the actuation.

DURATION: This entry denotes the number of seconds (000-999) which a Low Priority requires prior to a transition back to normal traffic operations can occur.

DWELL: This entry denotes the minimum number of seconds (000-999) a Low Priority dwell interval must be displayed prior to a return to normal operations.

MAX CALL: This entry denotes the number of seconds (000-999) that a Low Priority call may remain active and be considered valid. When the Low Priority call has been active for this time period, the controller unit shall return to normal operation. This Low Priority call shall be considered invalid until such time as a change in state occurs (no longer active).

When this value is "0", a Low Priority call will be considered valid without reference to time.

LOCKOUT: This entry denotes the number of seconds (000-999) following the exit from the Low Priority Routine that will occur prior to re-entering a Low Priority Routine and/or Offset Correction will be attempted.

When this value is "0", Lockout will be in effect until one complete cycle following the exit.

EXIT CALL: This entry (Code "0" = No & Code "1" = Yes) establishes whether a call (pedestrian) will be placed following the exit from the Preempt Routine.

All calls present at the beginning of the Preempt routine will be present (subject to memory programming and detector status) and will be serviced with the entered Exit Calls.

4.3.3.8 Low Priority 1 Dwell

The Priority Dwell Display allows the user to view and/or modify the dwell parameters for Priority 1.

PRESS "8" FROM PREEMPT 1 MENU

```
EPIC LOW PRIORITY 1 DWELL
                | DIAL .....1...2...3...4
  INTERVAL      | SPLIT 1:  00  00  00  00
  TO DWELL      | SPLIT 2:  00  00  00  00
                | SPLIT 3:  00  00  00  00
                | SPLIT 4:  00  00  00  00

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

DWELL INTERVAL: These entries (01-32) establish the interval in each Timing Plan that will be the Dwell Interval for the Low Priority routine. If an interval is not programmed for a specific Timing Plan, the routine is disabled when that Timing Plan is in control.

4.3.4 Load Preempt Default

The Load Preempt Default Display allows the user to replace the current parameters with the PROM resident default parameters within the controller unit.

PRESS "8" FROM PREEMPT MENU

```
EPIC PREEMPT LOAD DEFAULT

WARNING....THIS OPTION WILL REMOVE ALL
CURRENT OPERATING DATA ..............
- PRESS "E" TO CONTINUE

                              F-PRIOR MENU
```

4.4 SYSTEM DATA

Although defined as "systems" data, all of these capabilities are available and may be of value in the stand alone controller (i.e., Alarms, MOEs, etc).

System Data allows the user to display and/or enter controller parameters for:

1. Communications
2. Traffic Responsive Data
3. Detector Diagnostic Data
4. Local Alarm Report
5. Local MOE Report
6. Speed Data

To enter data for these intervals requires user access. See UTILITIES (para 3.3) for more information on gaining access.

4.4.1 System Menu

The System Menu allows the user to select which area of the system database to view and/or modify.

PRESS "8" FROM MAIN MENU

```
EPIC SYSTEM DATA

 1-COMMUNICATIONS      4-LOCAL ALARMS
 2-TRAF RESPONSIVE     5-LOCAL MOE'S
 3-DET DIAGNOSTIC      6-SPEED DATA

PRESS # DESIRED              F-PRIOR MENU
```

1) COMMUNICATIONS provides viewing and editing of Communications parameters, status, and report.
2) TRAF RESPONSIVE provides viewing and editing of Traffic Responsive parameters and report.
3) DET DIAGNOSTIC provides viewing and editing of Detector Diagnostic parameters, status, and report.
4) LOCAL ALARMS provides viewing of the Local Alarm report.
5) LOCAL MOE'S provides viewing of the Local MOE's report.
6) SPEED DATA provides viewing and editing of Speed Trap parameters and report.

4.4.2 Communications Menu

The Communications Sub-Menu allows the user to select which area of the Communications data is to be viewed and/or modified.

PRESS "1" FROM SYSTEM DATA MENU

```
EPIC SYSTEM - COMMUNICATIONS

          1-ADDRESS
          2-BACKUP
          3-STATUS
          4-FAIL LOG

PRESS # DESIRED              F-PRIOR MENU
```

1) ADDRESS provides viewing and editing of Local System Address.
2) BACKUP provides viewing and editing of time in minutes before reverting to local time base as a backup for system commands
3) STATUS provides viewing the current communications status.
4) FAIL LOG provides viewing the list of communications faults along with the date and time of occurrence.

4.4.2.1 Communications Address

The Communications Address Display allows the user to view and/or modify the controller unit system address (001-032).

PRESS "1" FROM COMM MENU

```
EPIC SYSTEM - COMM ADDRESS

  ENTER A 3 DIGIT ADDRESS & PRESS "E"
        CURRENT ADDRESS: 000
 WARNING....AN ADDRESS OTHER THAN "000"
 TRANSFERS I/O TO ITS SYSTEM DEFINITION

                              F-PRIOR MENU
```

Default Data is as shown

Address: This entry (001-032) establishes the system address the unit will respond to.

4.4.2.2 Communications Backup

The Communications Backup Display allows the user to view and/or modify the time after which the unit shall revert to local time base as a backup for system commands when not being polled by the MARC360 Master (001-255 minutes).

PRESS "2" FROM COMM MENU

```
EPIC SYSTEM - COMM BACKUP

  ENTER THE TIME BEFORE THE UNIT IS TO
  REVERT TO BACKUP OPERATION ON LOSS OF
  COMMUNICATIONS & PRESS "E"
       TIME IN MINUTES: 015

                              F-PRIOR MENU
```

Default Data is as shown

This value establishes the time (001-255 minutes) which an EPIC140 series Controller Unit will wait for MARC360 poll (normally, once a minute) and continue operating with the last MARC360 pattern prior to reverting to local Time Base as the Backup control. An entry of "000" will prevent the EPIC140 series Controller Unit reverting to Backup.

4.4.2.3 Communications Status

The Communications Status Display allows the user to view the current communications status.

PRESS "3" FROM COMM MENU

```
EPIC SYSTEM - COMM STATUS

   STATUS ..............: ON LINE
     CARRIER ...........: ACTIVE
     RECEIVING .........: DATA - VALID
     TRANSMITTING ......:

                              F-PRIOR MENU
```

1) STATUS: This display denotes the current communications status ON LINE or FAILED. A failed status is based on whether the unit has been polled since power was applied and at a frequency less than the Backup time.
2) CARRIER: This display denotes the current carrier status ACTIVE or INACTIVE.
3) RECEIVING: This display denotes when the unit is receiving data (DATA) plus the validity of that reception (VALID or ERROR).
4) TRANSMITTING: This display denotes when the unit is transmitting data (DATA) plus the response returned (ACK or NAK).

4.4.2.4 Communications Report

The Communications Failure Report Display allows the user to view the list of communications failures along with the date and time of occurrence.

PRESS "4" FROM COMM MENU

```
EPIC SYSTEM - COMM FAIL REPORT
  MM/DD  HH:MM  --------STATUS-------
  09/20  10:20  RECV ERROR
  09/21  22:10  ----------------------
  --/--  --:--  ----------------------
  --/--  --:--  ----------------------
  --/--  --:--  ----------------------
A-PRV B-NXT WINDOW  C-CLEAR F-PRIOR MENU
```

1) MM/DD (Date): This display denotes the date (Month and Month Day) of the fault.
2) HH:MM (Time): This display denotes the time of day (Hour and Minute) of the fault.
3) STATUS (Fault): This display denotes a description in English of the fault as follows:

See Section 6.4.5.3 for a list of possible report entries.

The Communications Failure Report has the capacity to store up to twenty faults. Faults will appear in the order in which they occur, with the initial display showing the oldest. The cursor control keys "A" and "B" will page through the report. The control key "C" will allow the clearing of the report log.

4.4.3 Traffic Responsive Menu

The Traffic Responsive Sub-Menu allows the user to select which area of the traffic responsive database to view and/or modify.

PRESS "2" FROM SYSTEM MENU

```
EPIC SYSTEM - TRAFFIC RESPONSIVE

  1-ASSIGN SYS DET      5-QUEUE ASSIGN
  2-V+O PARAMETERS      6-QUEUE SELECT
  3-REPORT PARAMETERS
  4-SYS DET REPORT

PRESS # DESIRED                F-PRIOR MENU
```

1) ASSIGN SYS DET provides viewing and editing of the system detector assignments.
2) V+O PARAMETERS provides viewing and editing of the system detector parameters required by the master for traffic responsive pattern selection.
3) REPORT PARAMETERS provides viewing and editing of the system detector report parameters.
4) SYS DET REPORT provides viewing of the system detector reports.
5) QUEUE ASSIGN provides viewing and editing of the assignments for the Queue Routines.
6) QUEUE SELECT provides viewing and editing of the parameters for Queue Select Routine

4.4.3.1 System Detector Assignment

The System Detector Assignment Display allows the user to view and/or modify the system detector assignments.

PRESS "1" FROM TRAFFIC RESPONSIVE MENU

```
EPIC SYSTEM - SYS DET ASSIGNMENT

SYS DET....1...2...3...4...5...6...7...8
  SP DET   1   2   3   4   5   6   7   8
  GR DET   0   0   0   0

  SYS DET ASSIGNED TO # SP OR # GR DET
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

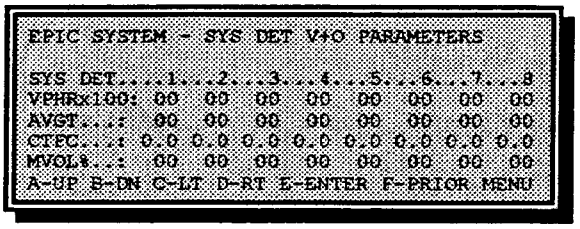
Default Data is as shown

These entries provide for assigning any of the eight Special Detectors (SP DET) inputs or any of the four Group Detectors (GR DET) inputs to the System Detector (SYS DET) function.

4.4.3.2 Volume + Occupancy Data

The V+O Data Display allows the user to view and/or modify the system detector parameters required for traffic responsive pattern selection.

PRESS "2" FROM TRAFFIC RESPONSIVE MENU



Default Data is not provided.

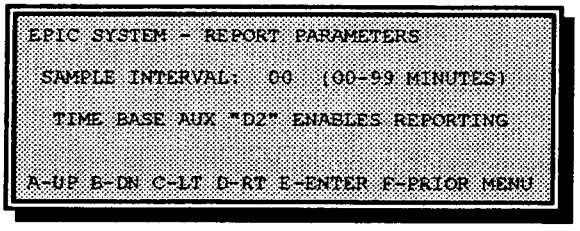
V+O Parameters

1) VPHRX100: This entry (00-99) establishes the lane capacity (Vehicle per Hour) utilized in the V+O preprocessing.
2) AVGT: This entry (00-99 minutes) establishes averaging time utilized in the V+O preprocessing.
3) CTFC: This entry (0-9.9) establishes occupancy correction factor utilized in the V+O preprocessing.
4) MVOL%: This entry (00-255) establishes minimum volume required prior to using occupancy in the V+O preprocessing. An entry over 250 will in effect prevent the addition of Occupancy in the V+O reported to the master.

4.4.3.3 Report Parameters

The Report Parameters Display allows the user to view and/or modify the system detector report parameters.

PRESS "3" FROM TRAFFIC RESPONSIVE MENU



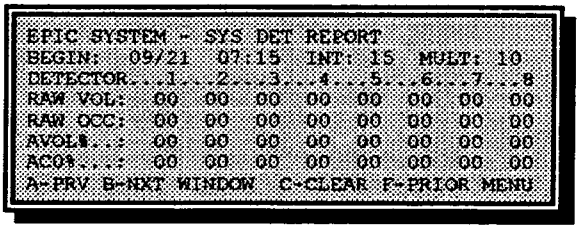
Default Data is as shown

The "SAMPLE INTERVAL" entry (00-99 minutes) establishes the time period for the report. When the Sample Interval exceeds the time between report requests, the report in process will complete and the second request will not be honored.

4.4.3.4 System Detector Report

The System Detector Report Display allows the user to view the system detector reports.

PRESS "4" FROM TRAFFIC RESPONSIVE MENU



Default Data is not provided

1) BEGIN: This display denotes the date (Month and Day) and time (Hour and Minute) the report began.
2) INT: This display denotes the Sample Interval (0-99 Minutes) the report data represents.
3) MULT: This display denotes the Multiplier (001, 0010, 0100 or 1000) for the "RAW" Values below. This value is determined automatically. If any raw volume or raw occupancy is:
   greater than 255 then the multiplier is 10
   greater than 2550 then the multiplier is 100
   greater than 25500 then the multiplier is 1000
   else the multiplier is 1
4) RAW VOL (Multiplier): This display denotes the Raw Volume Count (0-255) for each System Detector during the sample period.
5) RAW OCC (Multiplier): This display denotes the Raw Occupancy Count (0-255) for each System Detector during the sample period. The count is the number of full seconds of occupancy.
6) AVOL%: This display denotes the Average Volume Percent (0-250) for each System Detector during the sample period.
7) ACO%: This display denotes the Average Occupancy Percent (0-100) for each System Detector during the sample period.

The System Detector report collects volume and occupancy for the report period then calculates the averages.

The System Detector Report has the capacity to store up to ninety-six sample periods. Sample period data will appear in the order in which they were logged, the initial display will show the oldest. The cursor control keys "A" and "B" will page through the report. The control key "C" will allow the clearing of the report log.

4.4.3.5 Queue Assignment

The Queue Assignment Display allows the user to view and/or modify the parameters for two Queue routines.

PRESS "5" FROM TRAFFIC RESPONSIVE MENU

```
EPIC QUEUE ASSIGNMENT
      ---- NO. 1 ----    ---- NO. 2 ----
DETECT...1...2...3...4   ..1...2...3...4
 SYSD    0   0   0   0     0   0   0   0
 WTFC  000 000 000 000   000 000 000 000
INPUT SELECT..:  0         0  (0-AV/1-HI)
FAILED LEVEL..:  0         0  (# TO FAIL)
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

1) SYSD (Detector Number): This entry (1-8) establishes the system detector number that inputs V+O data to this routine.
2) WTFC # (Weighting Factor): This entry (0-100) establishes the weighting factor to be utilized for the V+O data received from this detector.

   The weighting factor represents a percentage 0-100 to be applied to the detected V+O data.
3) INPUT SELECT (Average or Highest): This entry establishes that the input will be an average of all operational assigned detectors.

   Code "1": This entry establishes that the input generated will the highest output of all operational assigned detectors.
4) FAILED LEVEL (# To Fail Channel) - Code "#": This entry (0-4) establishes the number of assigned detectors that must remain operational to consider the routine operational.

4.4.3.6 Queue Select

The Queue Select Display allows the user to view and/or modify the parameters for the two Queue Select Routines.

PRESS "6" FROM TRAFFIC RESPONSIVE MENU

```
EPIC QUEUE SELECT
------- NO.1 --------   ----- NO.2 -----
LEVEL.....1...2  LEVEL.....1...2
 % ENTER (UP)  00  00   % ENTER  00  00
 % LEAVE (DN)  00  00   % LEAVE  00  00
 DL/SPL/OFF   000 000   D/S/O   000 000

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

1) % ENTER (UP): This entry (00-255) establishes the V+O percentage required to enter the level when transitioning up from a lower level. An entry over 250 will in effect prevent entry to the programmed level.
2) % LEAVE (DN): This entry (00-255) establishes the V+O percentage required to leave the level when transitioning down to a lower level.
3) DL/SPL/OFF (Pattern): This entry establishes the pattern or partial pattern that will be operational when the V+O percentage for the routine matches that required to run or maintain the level. (### sets pattern, 0#0 sets the desired Split only, and #00 sets the desired Dial only).

4.4.4 Detector Diagnostics Menu

The Detector Diagnostic Sub-Menu allows the user to select which area of the Detector Diagnostic database to view or modify.

PRESS "3" FROM SYSTEM MENU

```
EPIC SYSTEM - DETECTOR DIAGNOSTICS

          1-DIAGNOSTIC VALUES
          2-DETECTOR STATUS
          3-DETECTOR REPORT


PRESS # DESIRED              F-PRIOR MENU
```

1) DIAGNOSTIC VALUES provides viewing and editing of the detector diagnostic parameters.
2) DETECTOR STATUS provides viewing of the current detector status as determined by the detector diagnostics.
3) DETECTOR REPORT provides viewing of the list of detector faults along with the date and time of occurrence.

4.4.4.1 Diagnostics Values

The Diagnostics Values Display allows the user to view and/or modify the detector diagnostic parameters.

PRESS "1" FROM DIAGNOSTIC MENU

```
EPIC SYSTEM - DIAGNOSTIC VALUES

DIAGNOSTIC    MX PRES  NO ACTY  ERR CNT
 VALUE 0....: 000 MIN  000 MIN  000 CPM
 VALUE 1....: 000 MIN  000 MIN  000 CPM
 - TIME BASE AUX "D1" ENABLES VALUE 1 -

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is as shown

1) "VALUE 0" and "VALUE 1" entries provide two parameter sets for detector diagnostics.
2) MX PRES: This entry (000-255 minutes) establishes the MAXIMUM PRESENCE a detector can exhibit prior to being considered a fault.
3) NO ACTY: This entry (000-255 minutes) establishes the NO ACTIVITY limit (maximum time between detector actuations) prior to being considered a fault.
4) ERR CNT: This entry (000-255 counts) establishes the MAXIMUM ACTUATIONS PER MINUTE that can occur prior to being considered a fault.

An entry of "000" into any routine (No Activity, Maximum Presence, or Erratic Output) will omit the routine from the diagnostic evaluation.

4.4.4.2 Detector Status

The Detector Status Display allows the user to view the current detector status as determined by the detector diagnostics.

PRESS "2" FROM DIAGNOSTIC MENU

```
EPIC SYSTEM - DETECTOR STATUS

DETECTOR...1...2...3...4...5...6...7...8
  SP DET   0   0   0   0   0   0   0   0
  GR DET   0   0   0   0   -   -   -   -

CODES...0-ON LINE..FAIL(1-MP,2-NA,3-EC)
                              F-PRIOR MENU
```

Default Data is not provided.

1) SP DET: This display denotes the current status of each Special Detector.
2) GR DET: This display denotes the current status of each Group Vehicle Detector.
3) STATUS

Code 0 (ON LINE): Detector is ON LINE (i.e. has passed all detector diagnostics).
Code 1 (MP): Detector has failed the MAX PRESENCE Diagnostics.
Code 2 (NA): Detector has failed the NO ACTIVITY Diagnostics.
Code 3 (EC): Detector has failed the ERRATIC COUNTS Diagnostics.

4.4.4.3 Detector Report

The Detector Report Display allows the user to view the list of detector failures along with the date and time of occurrence.

PRESS "3" FROM DIAGNOSTIC MENU

```
EPIC SYSTEM - DETECTOR FAIL REPORT
  MM/DD  HH:MM   -------STATUS-------
  09/20  10:20  PH 1 - FAIL ERR CNTS
  09/20  12:10  SP 2 - FAIL MAX PRES
  09/20  13:15  PH 1 - ON LINE
  09/20  23:55  SP 3 - FAIL NO ACTY
  --/--  -----  ---------------------
A-PRV B-NXT WINDOW  C-CLEAR F-PRIOR MENU
```

1) MM/DD (Date): This display denotes the date (Month and Month Day) of the fault.
2) HH:MM (Time): This display denotes the time of day (Hour and Minute) of the fault.
3) STATUS (Fault): This display denotes description in English of failed detector and the fault detected as follows:

See Section 6.4.7 for a list of possible report entries.

The Detector Failure Report has the capacity to store up to twenty diagnostic faults. Fault data will appear in the order in which it occurs, the initial display will show the oldest. The cursor control keys "A" and "B" will page through the report. The control key "C" will allow the clearing of the report log.

4.4.5 Local Alarms Report

The Local Alarms Report Display allows the user to view the list of local alarms along with the date and time of occurrence.

PRESS "4" FROM SYSTEM MENU

```
EPIC SYSTEM - LOCAL ALARMS REPORT
  MM/DD  HH:MM   -------STATUS-------
  09/20  10:20  OFF LINE - CYCLE F'LT
  09/20  10:22  OFF LINE - COORD F'IL
  09/20  10:24  ON LINE
  09/25  06:00  POWER OFF
  09/25  08:02  POWER ON ............
A-PRV B-NXT WINDOW  C-CLEAR F-PRIOR MENU
```

1) MM/DD (Date): This display denotes the date (Month and Month Day) of the fault.
2) HH:MM (Time): This display denotes the time of day (Hour and Minute) of the fault.
3) STATUS (Fault): This display denotes description in English of the fault detected as follows:

See Section 6.4.3 for a list of possible report entries.

The Local Alarms Report has the capacity to store up to eighty alarms. Alarms will appear in the order in which they occur, the initial display will show the oldest. The cursor control keys "A" and "B" will page through the report. The control key "C" will allow the clearing of the report log.

4.4.6 Local MOE's Report

The Local MOE's Report Display allows the user to view the pattern related MOE reports by beginning date and time.

PRESS "5" FROM SYSTEM MENU

```
EPIC SYSTEM - LOCAL MOE'S          D/S/O
BEGIN: 09/21  07:15                2/2/2




A-PRV B-NXT WINDOW  C-CLEAR F-PRIOR MENU
```

1) BEGIN: The displayed data denotes the date (Month and Day) and time (Hour and Minute) the report began.
2) D/S/O: The displayed data denotes the pattern the report is for.

The Local MOE's Report has the capacity to store up to twenty-four pattern sets of MOE's. Pattern MOE sets will appear in the order in which they occur, the initial display will show the oldest. The cursor control keys "A" and "B" will page through the report. The control key "C" will allow the clearing of the report log.

4.4.7 Speed Data Menu

The Speed Sub-Menu allows the user to select which area of the Speed database to view and/or modify.

PRESS "6" FROM SYSTEM MENU

```
EPIC SYSTEM - SPEED DATA

 1-ASSIGN DETECTORS     4-RANGES-DIAL 3
 2-RANGES-DIAL 1        5-RANGES-DIAL 4
 3-RANGES-DIAL 2        6-REPORT


PRESS # DESIRED                F-PRIOR MENU
```

1) ASSIGN DETECTORS provides viewing and editing of the speed trap detector assignments.
2) RANGES-DIAL 1 provides viewing and editing of the pattern related speed range parameters for Dial 1 Split 1 to 4.
3) RANGES-DIAL 2 provides viewing and editing of the pattern related speed range parameters for Dial 2 Split 1 to 4.
4) RANGES-DIAL 3 provides viewing and editing of the pattern related speed range parameters for Dial 3 Split 1 to 4.
5) RANGES-DIAL 4 provides viewing and editing of the pattern related speed range parameters for Dial 4 Split 1 to 4.
6) REPORT provides viewing of the pattern related speed reports.

4.4.7.1 Speed Trap Data

The Speed Trap Data Display allows the user to view and/or modify the basic speed trap parameters (detector assignments).

PRESS "1" FROM SPEED TRAP MENU

```
EPIC SYSTEM - SPEED TRAP DATA
MEASUREMENT:  0      (0-MPH 1-KPH)
TRAP # 1  D1..D2     TRAP # 2  D1..D2
 SP DET    0   0      SP DET    0   0
 GR DET    0   0      GR DET    0   0
 DISTANCE  0          DISTANCE  0
DISTANCE CODES....1-11 FT....2-22 FT....
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

MEASUREMENT: This entry provides for speed to be measured and reported based on Miles Per Hour ("0" entry) or Kilometers Per Hour ("1" entry).

TRAP # 1 AND # 2: These entries provide for assigning any of the eight Special Detector (SP DET) inputs or any of the eight Phase Detector (PH DET) inputs as the Speed Trap Detector (D1 or D2) input.

DISTANCE: These entries provide for spacing of 11 feet ("0" entry) or 22 feet ("1" entry) for the speed trap detector sensors.

4.4.7.2 Dial 1 Speed Trap Ranges

The Speed Trap Ranges Display allows the user to view and/or modify the pattern related speed range parameters.

PRESS "2" FROM SPEED TRAP MENU

```
EPIC SYSTEM - SPEED RANGES
 PAT  OFFSET 1    OFFSET 2    OFFSET 3
 D/S  LOW  HIGH   LOW  HIGH   LOW  HIGH
 1/1   035  045    030  040    035  045
 1/2   035  045    030  040    035  045
 1/3   035  045    030  040    035  045
 1/4   035  045    030  040    035  045
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

The "LOW" and "HIGH" entries provide a nominal speed range in MPH or KPH for the trap for each coordination pattern (i.e., Dial/Split/Offset).

4.4.7.3 Dial 2 Speed Trap Ranges

The Speed Trap Ranges Display allows the user to view and/or modify the pattern related speed range parameters.

PRESS "3" FROM SPEED TRAP MENU

```
EPIC SYSTEM - SPEED RANGES
 PAT  OFFSET 1    OFFSET 2    OFFSET 3
 D/S  LOW  HIGH   LOW  HIGH   LOW  HIGH
 2/1   035  045    030  040    035  045
 2/2   035  045    030  040    035  045
 2/3   035  045    030  040    035  045
 2/4   035  045    030  040    035  045
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

The "LOW" and "HIGH" entries provide a nominal speed range in MPH or KPH for the trap for each coordination pattern (i.e., Dial/Split/Offset).

4.4.7.4 Dial 3 Speed Trap Ranges

The Speed Trap Ranges Display allows the user to view and/or modify the pattern related speed range parameters.

PRESS "4" FROM SPEED TRAP MENU

```
EPIC SYSTEM - SPEED RANGES
 PAT  OFFSET 1    OFFSET 2    OFFSET 3
 D/S  LOW  HIGH   LOW  HIGH   LOW  HIGH
 3/1   035  045    030  040    035  045
 3/2   035  045    030  040    035  045
 3/3   035  045    030  040    035  045
 3/4   035  045    030  040    035  045
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Default Data is not provided.

The "LOW" and "HIGH" entries provide a nominal speed range in MPH or KPH for the trap for each coordination pattern (i.e., Dial/Split/Offset).

5 SECTION 5 OPERATION BASIC

5.1 INTRODUCTION

The EPIC140 series Controller Unit is one of the most advanced full feature, pre-timed traffic controller units specifically designed for the traffic controller market.

The EPIC140 series Controller Unit is an interval oriented device. The conditions of the output circuits (Load Switch Drivers) are programmable as to condition in each of the Signal Plan intervals. The interval sequence, interval timing, and output circuit condition are used to control the order in which traffic movements are assigned the right-of-way at the intersection and the time allocated to each.

The EPIC140 series Controller Unit is capable of operating as a master controller, isolated controller, or secondary controller without changes or additions.

The EPIC140 series Controller Unit will accept Dial, Split, and Offset commands from traditional interconnect systems, the internal system interface, and/or from a companion Time Base program.

The EPIC140 series Controller Unit is capable of providing the following features:

5.1.1 Timing Plans

The EPIC140 series Controller Unit provides control for sixteen timing plans. The Controller Unit shall select the timing plan to be used, according to the current status of the Dial and Split requests.

5.1.1.1 Cycles

The Controller Unit provides operation utilizing one to sixteen cycle lengths. Each cycle shall be adjustable over a range of 30 to 999 seconds in one-second increments.

5.1.1.2 Splits

The Controller Unit provides one set of splits per timing plan. Each split provides an adjustable time (0 to 99.9 seconds in 0.1 second increments) for each interval in the sequence.

5.1.1.3 Signal Plan

Means are provided in each Timing Plan, for user definition, of the Signal Plan to be active concurrent with that Timing Plan.

5.1.1.4 Start Up

Means are provided in each Timing Plan, for user definition, of the interval beginning as the start up interval. This interval will occur when External Start is active or following Startup Flash.

5.1.1.5 Automatic Flash

Means are provided in each Timing Plan, for user definition, of the interval end as the Automatic Flash Entry point and the interval beginning as the Automatic Flash Exit point.

5.1.2 Intervals

The EPIC140 series Controller Unit provides two to thirty-two intervals per timing plan (Dial/Split combination). When less than thirty-two intervals are required, it is possible to program only the number used.

5.1.3 Signal Plans

The EPIC140 series Controller Unit provides operation utilizing one to four signal plans. All signal plans shall have the same number of intervals.

Signal Plans shall be capable of being selected based on program entry, interconnect inputs, time base control events, and a system Interface.

The unit shall provide the signal plan interval control when zero interval time is provided as follows:

Signal Drivers.....:	No
Transfer Control.....:	Yes
Misc Control.....:	No
Actuated Control ....:	Yes
Memory Reset.....:	Yes

The controller unit shall be provide the following capability within each signal plan:

5.1.3.1 Minimum Time

Means are provided in each Signal Plan, for user definition, of a Minimum Time for each interval (0 to 99.9 seconds in 0.1 second increments).

5.1.3.2 Load Switch Driver Condition

Means are provided, for user definition, of the output condition (GREEN, YELLOW, or RED) of each Vehicle Load Switch Driver Group for each interval. A circuit closure to LOGIC GROUND shall be maintained at one of these three outputs at all times. The three outputs shall energize the appropriate vehicle signal load switching circuit to result in a GREEN, YELLOW, or RED indication for the duration of such required indication.

Means are provided, for user definition, of the output condition (WALK, PED CLEAR, or DONT WALK) of each Pedestrian Load Switch Driver Group for each interval. A circuit closure to LOGIC GROUND shall be maintained on at least one of these three outputs at all times. The three outputs shall energize the appropriate pedestrian signal load switching circuit to result in a WALK, PEDESTRIAN CLEARANCE, or DON'T WALK indication. The DON'T WALK output shall flash only during the PEDESTRIAN CLEARANCE interval(s).

5.1.3.3 Timing Plan Transfer

Means are provided in each Signal Plan, for user definition, of the interval end at which a Timing Plan transfer may occur.

5.1.3.4 Signal Plan Transfer

Means are provided in each Signal Plan, for user definition, of the interval end at which a Signal Plan transfer may occur.

5.1.3.5 Manual Control Enable

Means are provided in each Signal Plan, for user definition, of the intervals which shall be considered "variable" for manual control enable operation.

5.1.3.6 Correction

Means are provided in each Signal Plan, for user definition, of the intervals which shall be considered "variable" for offset correction operation.

5.1.3.7 Force

Means are provided in each Signal Plan, for user definition, of the intervals which shall be considered "variable" for force off operation.

5.1.3.8 Hold

Means are provided in each Signal Plan, for user definition, of the intervals which shall be considered "variable" for hold operation.

5.1.3.9 Actuated Interval(s)

Means are provided in each Signal Plan, for user definition, of the interval(s) which are serviced based on the activity of vehicle and/or pedestrian detectors.

Means are provided in each Signal Plan, for user definition, of the intervals (one for each actuated vehicle movement) which vehicle call memory is reset.

Means are provided in each Signal Plan, for user definition, of the intervals (one for each actuated pedestrian movement) which pedestrian call memory is reset.

5.1.4 Offset

The EPIC140 series Controller Unit provides three offset settings for each of the Timing Plans.

Each offset provides an adjustable interval time (0 to 999 seconds in 1.0 second increments) that determines the time in seconds that the starting point of Interval #1 (lowest numbered active interval), local time zero, shall lag the Synchronization pulse, system time zero. The only restriction as to the value is that it must be less than the cycle time for the respective Dial/Split program to be considered valid.

It is possible to enact Free Mode as a function of the Dial/Split/Offset in effect. This is accomplished by setting the Offset value equal to or greater than the cycle length for that timing program.

The Controller Unit recognizes when the sync reference and local offset in control indicate local zero is not correct. When establishing its offset based on the sync pulse, the Controller Unit will reference only the leading edge, regardless of the width of the sync pulse. The pulse width should be a minimum of 3 seconds or 3 percent of the cycle.

The coordinator shall have four methods of changing the actual offset:

a. Shortway/Smooth Transition - the coordinator shall establish a new offset by the shortest route possible by adding or subtracting to/from the defined interval split times in a manner to limit cycle length changes to a maximum of 18.75%.

b. Shortway Add Only - the coordinator shall establish a new offset by adding to the defined interval split times in a manner to limit cycle length changes to a maximum of 18.75%.

   If the Shortway negative value (max) equals zero, then distribution (long) will be equally across the correction intervals.

c. Infinite Dwell Transition - the coordinator shall establish a new offset by dwelling in the defined intervals.

d. Dwell With Interrupt Transition - the coordinator shall establish a new offset by dwelling in the defined intervals a maximum period adjustable over the range of 1 to 999 seconds in 1-second increments.

The offset correction method used shall be set via program entry.

If the new pattern requires a new timing plan or signal plan, the offset changes with the last of these that change (no new offset correction calculated at T0).

5.1.5 Sync Monitor

The EPIC140 series Controller Unit will monitor the Offset command requests for validity of the imposed sync reference.

The Controller Unit will shall revert to Sync Monitor "Free" (Uncoordinated) mode when:

1. No sync pulse is received for three consecutive cycles
2. No offset line active for 15 seconds or the Revert To Backup time. When the Revert To Backup time is zero then 15 seconds else the entered Revert To Backup time.
3. More than one offset line is active for fifteen seconds

During Sync Monitor "Free" mode, the Offset command requests will continue to be monitored and should the command request return to valid operation, the Controller Unit will implement the pattern commanded.

The Sync Monitor "Free" mode may be replaced by a TBC event. See the "On-Line" definition in the Time Base section.

5.1.6 Manual Control

The EPIC140 series Controller Unit may be set to manually operate in any pattern (Dial/Split/Offset) and signal plan via program entry. A manual selection of pattern and signal plan overrides all other pattern interface commands.

5.1.7 Initialization

Initialization in an EPIC140 series Controller Unit will occur under either of the following conditions:

1) Restoration of power after a defined power interruption.
2) Activation of EXTERNAL START input.

A program entry for initialization is provided to cause the Controller Unit to start at the beginning of the defined signal plan interval.

As part of the initialization routine, calls shall be placed on all actuated movements and retained until serviced.

5.1.8 Modes Of Control

Timing and Sequence parameters are validated to insure they are capable of supporting traffic control.

A valid Timing Plan will:

1) Have a cycle length, and
2) Have at least four intervals, and
3) Have a time entered for at least one of the defined intervals, and
4) Have a "T Zero" Interval (lowest numbered interval to run) that is Not-Actuated.

A valid Signal Plan will have an active interval programmed for other than Red or Don't Walk.

Should an invalid Timing Plan be found, the unit will run Free Failed. Should an invalid Signal Plan be found, the unit will run Signal Plan 1 unless Signal Plan 1 is invalid then the unit will revert to Flash (CVM Inactive - at the beginning of Start Flash timing state).

If the called plan (Timing & Signal) can not got to 1/1/1 Signal Plan 1 then it will drop to Free Failed and log a bad plan. Any plan which does not offer a path to plan 1/1/1 Signal Plan 1 is a bad plan. All actuated alternate paths must provide a transition to 1/1/1 Signal Plan 1 or it is a bad plan.

A. Coord Active - The Pattern Sequence (Dial, Split, Offset, and Signal Plan) is specified, is capable of supporting traffic control, and will provide the control parameters for traffic.

B. No Coord - The Pattern Sequence is specified and is capable of supporting traffic control but the offset is NOT valid (i.e., Offset => Cycle Length). The Pattern Sequence will provide the control parameters for traffic but Offset correction will not be attempted.

C. Isolated - The Pattern Sequence is specified and is capable of supporting traffic control but the signal plan contains alternate path(s) without default path(s). The Pattern Sequence will provide control parameters but Offset correction will not be attempted. At the end of the not-actuated interval preceding an alternate path(s) set lacking a default path, an interval selection will not take place until the actuation(s) permit path selection,.

D. Free - Dial 1, Split 1, Offset 1, and Signal Plan 1 (or Signal Plan called by D1/S1/01) is the Pattern Sequence but Offset correction will not be attempted.

E. Default Free - Coordination Setup is FREE or the selected controlling entity does not assume control (i.e., no TBC events).

F. Command Free - Controlling entity calls for FREE operation.

G. Failed Free - Control parameters called for by controlling entity will not support traffic control.

H. Flash -

I. Startup Flash - Runs for duration of Startup Flash as entered in Unit Data. May be retained as controlling mode by activity on Preempt inputs.

J. Voltage Monitor Flash - Recognition of external voltage monitor flash as caused by a failure in controller hardware.

K. Remote Flash - Called Operation is Flash. Controller is implementing flash either through Voltage Monitor or Load Switch Driver control.

L. Failed Flash - Controller is unable to run the Free Plan or the Free Plan does not cycle.

M. Lockout Flash - Controller is implementing flash either through Voltage Monitor. A Communications download is making a change that impact basic operation.

5.1.9 Actuated Movements

The EPIC140 series Controller Unit provides actuated operation to the extent that the signal sequence may be dependent of vehicle and/or pedestrian detector actuations.

5.1.9.1 Provision for Storing A Demand

There are provisions for storing a call for vehicle service on four vehicle movements when the specific movement is not being serviced. The vehicle memory feature is capable of being disabled via program entry.

There are provisions for storing a call for pedestrian service on each of the four movements, when the movement is not being serviced.

5.1.9.2 Placement of Vehicle Recall

Means are provided, via program entry, to place a recurring demand for vehicle service on the movement when that movement is not being serviced.

5.1.9.3 Placement of Pedestrian Recall

Means are provided, via program entry, to place a recurring demand for pedestrian service on the movement when that movement is not being serviced.

5.2 BASIC INTERFACE INPUTS

Basic Inputs to the EPIC140 series controller unit are associated with electrical signals generated external to the controller unit and are brought into the controller unit via Connectors A, B, & D.

All inputs are sampled every 16.7 milliseconds to detect changes in logic state. Any change that does not last over two samplings will be ignored.

Input Levels: All logic signals shall be low state (nominal 0 volts dc) for the operate condition of all inputs.

5.2.1 Inputs

The EPIC140 series controller unit provides the following inputs:

1. AC + (Line Side)
2. AC-(Common)
3. Chassis Ground
4. External Start
5. Interval Advance
6. Stop Timing
7. Force Off
8. Manual Control
9. Computer Control
10. Master Secondary
11. Pattern Inputs
12. Signal Plan Inputs
13. Vehicle Detector Call
14. Pedestrian Detector Call
15. System Detectors

5.2.1.1 AC Line

Current protected side of 120 VAC 60 Hertz power source within the controller unit.

5.2.1.2 AC Neutral

Unfused and unswitched side of 120 VAC 60 Hertz power source taken from neutral output of ac power source.

This input must not be connected to LOGIC GROUND or CHASSIS GROUND within the controller unit.

5.2.1.3 Chassis Ground

Terminal for connection to the chassis of the unit. CHASSIS GROUND shall be electrically connected to the shell of the connector(s) where applicable. This input shall not be connected to LOGIC GROUND or AC - (Common) within the controller unit.

5.2.1.4 External Start

An input to cause the controller unit to revert to its programmed initialization interval upon application. Upon removal of this input the controller unit shall commence normal timing.

5.2.1.5 Interval Advance

A complete ON-OFF operation of this input shall cause immediate termination of the interval in process of timing. The controller unit shall select the next interval to service based on it's normal sequence control method.

INTERVAL ADVANCE shall be used in conjunction with MANUAL CONTROL ENABLE to produce manual control of the programmable variable intervals with the remaining intervals self timing (see MANUAL CONTROL ENABLE).

INTERVAL ADVANCE shall be used in conjunction with STOP TIME to advance through all serviceable intervals. The termination of all signal plan intervals will be controlled by the INTERVAL ADVANCE input.

5.2.1.6 Stop Timing

An input which when activated causes cessation of controller unit interval timing for the duration of such activation. Upon removal of activation from this input, all portions which were timing will resume timing.

During stop timing, the controller unit shall not terminate any signal plan, interval or interval portion, except by activation of the INTERVAL ADVANCE input.

5.2.1.7 Force Off

An input when active causes the termination of the signal plan variable interval subject to the completion of any programmed signal plan Minimum Interval timing.

5.2.1.8 Manual Control

An input to place calls on all actuated movements, stop controller unit timing in programmed variable intervals, and inhibit the operation of INTERVAL ADVANCE during all other intervals.

5.2.1.9 Computer Control

An input to cause the controller unit to stop timing in programmed variable intervals, and inhibit the operation of INTERVAL ADVANCE during all other intervals. This mode is similar to Manual control except that calls are not placed.

5.2.1.10 Master Secondary

When active, this input disables all local Offset Correction. Caution should be exercised before making this input active.

5.2.1.11 Pattern Inputs

The Controller Unit shall select the pattern to be used, according to the current status of the Timing Plan (Dial/Split) and Offset requests. In the applicable mode, seven inputs for a hardwire type interconnect interface shall be available.

Pattern inputs shall be interpreted as command requests in accordance with the following tables:

TIMING PLANS

Com'nd Request	TP A Input	TP B Input	TP C Input	TP B Input	D/S Ref
TP 00	OFF	OFF	OFF	OFF	D1/S1
TP 01	ON	OFF	OFF	OFF	D1/S2
TP 02	OFF	ON	OFF	OFF	D1/S3
TP 03	ON	ON	OFF	OFF	D1/S4
TP 04	OFF	OFF	ON	OFF	D2/S1
TP 05	ON	OFF	ON	OFF	D2/S2
TP 06	OFF	ON	ON	OFF	D2/S3
TP 07	ON	ON	ON	OFF	D2/S4
TP 08	OFF	OFF	OFF	ON	D3/S1
TP 09	ON	OFF	OFF	ON	D3/S2
TP 10	OFF	ON	OFF	ON	D3/S3
TP 11	ON	ON	OFF	ON	D3/S4
TP 12	OFF	OFF	ON	ON	D4/S1
TP 13	ON	OFF	ON	ON	D4/S2
TP 14	OFF	ON	ON	ON	D4/S3
TP 15	ON	ON	ON	ON	D4/S4

OFFSET

Command Request	Off 1 Input	Off 2 Input	Off 3 Input
Offset 1	ON	OFF	OFF
Offset 2	OFF	ON	OFF
Offset 3	OFF	OFF	ON
Sync	OFF	OFF	OFF
Free (*)	OFF	OFF	OFF
Others	See Sync Monitor (*) After 15 seconds)		

AC Voltage Levels: OFF = 0 VRMS & ON = 120 VRMS
DC Voltage Levels: OFF = +24V & ON = 0V

5.2.1.12 Signal Plan Inputs

The Controller Unit shall select the signal plan to be used, according to the current status of the Signal Plan requests. In the applicable mode, two inputs shall be available.

Signal Plan inputs shall be interpreted as command requests in accordance with the following:

SIG PLAN

Command Request	Sig Plan A Input	Sig Plan B Input
Sig Plan 1	OFF	OFF
Sig Plan 2	ON	OFF
Sig Plan 3	OFF	ON
Sig Plan 4	ON	ON

Voltage Levels: OFF = +24V & ON = 0V

5.2.1.13 Vehicle Detector Call

(Four per Unit) - Provision to enter a vehicle demand for service of the appropriate interval(s) in the signal plan.

The following special vehicle detector functions shall be provided:

A. Delay - The vehicle detector actuation (input recognition) shall be capable of being delayed, by an adjustable program entered time (0-999 Seconds in increments of 1 second), when not in the actuated intervals associated with the detector. Once the actuation has been present for the delay time it shall be continued for as long as it is present.

B. Extension - The vehicle detector actuation (input duration) shall be capable of being extended from the point of termination by an adjustable program entered time (0-99.9 Seconds in increments of 0.1 second), when in the actuated intervals associated with the detector.

5.2.1.14 Pedestrian Detector Call

(Four per Unit) - Provision to enter a pedestrian demand for service of the appropriate interval(s) of the signal plan.

5.2.1.15 System Detectors

In the applicable mode eight System Detector inputs shall be provided.

5.3 BASIC INTERFACE OUTPUTS

Basic Outputs from the EPIC140 series controller unit are associated with electrical signals generated by the controller unit to control external electrical circuits. These signals exit the controller unit via Connectors A, B, & D.

Output Levels: All logic signals shall be low state (nominal 0 volts dc) for the operate condition.

5.3.1 Outputs

The EPIC140 series controller unit will provide the following outputs:

1. Logic Ground
2. Controller Unit Voltage Monitor
3. 24 Volts DC for External Use
4. Load Switch Drivers
5. Pattern Outputs
6. Interval 1 On
7. Master Sync

5.3.1.1 Logic Ground

Voltage reference point and current return for controller unit input and output logic circuits. This output must not be connected to AC-(Common) or CHASSIS GROUND within the controller unit.

5.3.1.2 Controller Unit Voltage Monitor

An open collector output which is maintained TRUE (low state) only as long as the voltages within the controller unit do not drop below predetermined levels required to provide normal operation.

5.3.1.3 Regulated 24 Volts DC for External Use

Positive 24 +/- 2 volts DC shall be regulated over an AC line voltage variation from 89 to 135 volts from no-load to full-load. Current capability shall be 500 milliamperes continuous with less than 0.5 volt peak-to-peak ripple.

5.3.1.4 Load Switch Drivers

Provision for separate GREEN, YELLOW, and RED outputs for each group. The three outputs shall energize the appropriate signal load switching circuit to result in a GREEN, YELLOW, or RED indication.

Provision of separate WALK, PEDESTRIAN CLEARANCE, and DON'T WALK outputs for each group. The three outputs shall energize the appropriate signal load switching circuit to result in a WALK, PEDESTRIAN CLEARANCE, or DON'T WALK indication.

5.3.1.5 Pattern Outputs

In the applicable mode, seven outputs for master type interconnect interface drivers shall be available. The outputs shall echo the active pattern. All outputs shall be constantly "on" when active except offset which is "off" for a minimum of 3 seconds or 3% of the cycle once each cycle beginning at the "0" point of the cycle.

Pattern outputs shall be interpreted as command requests in accordance 5.2.1.

5.3.1.6 Interval 1 On

This output is active (Low) during Interval 1 of the operating timing / signal plan.

5.3.1.7 Master Sync

This output provides a 3 second sync pulse once each cycle, beginning at Sync Cycle "0" of the active pattern.

Inputs which will cause a continuous output:

- External Start
- Stop Time
- Manual Control Enable
- Computer Control

Operational states which will cause a continuous output:

- Startup Flash State
- Isolated Mode
- Coord Free Mode

5.3.1.8 Coded Status Bits

These outputs will consists of three lines operating in parallel which indicate the status of the active interval. Only one of the coded status codes shall be active when the following conditions are present in the controller unit:

Code #	Bit States A	B	C	State Names
0	OFF	OFF	OFF	Min Green
1	ON	OFF	OFF	Variable
2	OFF	ON	OFF	Not Used
3	ON	ON	OFF	Not Used
4	OFF	OFF	ON	Not Used
5	ON	OFF	ON	Not Used
6	OFF	ON	ON	Not Used
7	ON	ON	ON	Undefined

Voltage Levels: OFF=24V & ON=0V

CODE.0..Minimum - When timing the Signal PLan Minimum portion of the interval.
CODE.1..Variable - That portion of the interval following the completion of the Signal PLan Minimum time.
CODE.2..Not Used
CODE.3..Not Used
CODE.4..Not Used
CODE.5..Not Used
CODE.6..Not Used
CODE.7..Undefined.

5.3.2 RS-232C Interface

An RS-232C interface and connector is provided for interconnecting to a printer, another EPIC140 series controller unit, a local personal computer, or a remote personal computer through an external modem.

5.3.2.1 Unit To Printer

It is possible to transmit ASCII coded information (data, letters, headings, etc) to an 80 column or larger printer. The printer must be RS232C compatible, be able to receive ASCII coded serial data at 1200 baud, and provide a Busy control signal.

The controller unit timing and operational data, pre-emption data, coordination program data, time base data, system data, and reports are individually transmitted to the printer. The printout is in a format easily understood by a trained traffic oriented person. The unit to printer transmissions shall not interrupt normal controller unit operation.

5.3.2.2 Unit To Unit

The controller unit timing and operational data, pre-emption data, coordination program data, time base data, and system data are individually transmitted to/from another EPIC140 series Controller Unit. The unit to unit transmissions will not interrupt normal controller unit operation except when Ring Structure data is

changed. When the received Ring Structure data is different from that running, the receiving unit automatically reverts to the Start Flash interval. The receiving unit times the Start Flash time and resumes normal operation in the programmed Initialization interval.

5.3.2.3 Unit To Personal Computer

The controller unit timing and operational data, pre-emption data, coordination program data, time base data, and system data are individually transmitted to/from a personal computer running the appropriate software. The transmissions will not interrupt normal controller unit operation except when Ring Structure data is changed. When the received Ring Structure data is different from that running, the receiving unit automatically reverts to the Start Flash interval. The receiving unit times the Start Flash time and resumes normal operation in the programmed Initialization interval.

The controller unit active status (Ring Timers, Coord Timers, Preempt Timers, and Time Base Current) are individually transmitted to a personal computer running the appropriate software.

The controller unit report logs (Local Alarms, Communications Faults, Detector Faults, System Detector Log, MOE Report, and Speed Report) are individually transmitted to a personal computer running the appropriate software.

5.4 PROCESSING

The majority of the Traffic Controller can be described as a state processor.

5.4.1 Initialization

Initialization [POWER UP] will occur under the following condition:

Restoration of power after a defined power interruption.

Programming for initialization is provided to cause the controller unit to start at the beginning of an interval. As part of the initialization routine, vehicle and pedestrian calls are placed on all actuated movements and retained until serviced.

5.4.1.1 Power Interruption

Two or more power interruptions which are separated by power restorations of 1500 or more milliseconds are considered as separate interruptions, and the controller will react to the power interruptions as follows:

1) Interruption Of 500 Milliseconds Or Less - Upon restoring power, the controller unit will continue to operate as though the power interruption had not occurred.
2) Interruption Of 500 Milliseconds To 1000 Milliseconds - Upon restoring power, the controller unit will either continue to operate as though the power interruption had not occurred or will begin the Start Up sequence.
3) Interruption Of 1000 Milliseconds Or More - Upon restoring power, the controller unit will begin the Start-Up sequence.

Three interruptions of 300 milliseconds or less which are separated by power restorations of 300 milliseconds or more will not cause the controller to begin its start-up sequence.

5.4.1.2 Start-up Sequence

The controller unit will start at the beginning of the interval programmed from the front panel. As part of the initialization routine, vehicle and pedestrian calls are placed on all actuated movements and retained until serviced.

The controller unit design has a provision whereby an adjustable timed period/state (StartUp Flash) will occur prior to the Initialization Start-up Sequence. The time range for Start-Up Flash is 0-99 seconds in increments of 1 second. The operational state provides that no outputs are active except Flashing Logic and +24 Volts DC. When power is restored, the Start-Up Flash states becomes operational. No input, other than loss of AC Power, prevents this state from the completion and exit to the Start-Up Sequence.

5.5 PROCESSOR MONITOR

The controller unit contains provisions to monitor the operation of the microprocessors. The monitor circuitry receives a signal, at least, once every 100 milliseconds from the microprocessor. When the signal is not received for approximately 1 second, the processor monitor circuitry initiates flashing operation (Voltage Monitor output inactive).

When flashing is initiated as a result of the processor monitor, the unit will display a definitive error message. The monitor circuitry is deactivated when there is a power failure and becomes active when power is restored.

The monitor circuitry attempts an automatic restart of the microprocessor to the power up Start-Up timing condition. The controller unit operates as though power had been removed long enough for a full restart. The front panel Watchdog message remains until any front panel key has been pressed.

5.6 PROGRAMMING

The controller unit prevents the alteration of keypad set unit variables prior to the user having entered a specific code. This "Access" code is also user programmable via the keypad.

There is provision (user entered code) to disable the requirement of entering an access code before alteration of keypad set unit variables.

5.6.1 Programming Security

The controller unit maintains user programmable variables in non-volatile memory to assure continued safe and efficient controller unit operation in the event of power loss.

The controller unit continuously monitors memory contents for checksum errors. If an error is found, the controller unit immediately ceases outputting signals to the processor monitor and thereby reverts to flashing operation (Voltage Monitor output inactive).

5.6.2 Default Programming

The controller unit contains a reserve data base of all controller unit keypad set variables stored in Programmable Read Only Memory (PROM). It is possible for an operator to activate the reserve data base by loading it into memory through a simple procedure involving front panel controls. Values programmed into the reserve data base may be loaded into memory on the initial power up prior to the unit's EEPROM having any keypad set variables entered.

5.7 PRIORITY OF FUNCTIONS

The priority of input functions are in the following order:

1) Power-Up
2) External Start
3) Preemption
4) Interval Advance
5) Stop Time
6) Remote Flash
7) Manual Control Enable
8) Force Off
9) Hold

Lower priority inputs will condition those of higher priority as defined elsewhere in this and referenced material.

Patterns and signal plans are capable of being selected based on program entry, Interconnect Inputs, Time Base Control events, and a System Interface. The pattern and signal plan select priority shall be as follows:

1) Program Entry
2) System Interface
3) Time Base Control Event
4) Interconnect Inputs

When the Time Base Control "On-Line" input is active, the Time Base Control event priority will be lower than Interconnect Inputs. Should the Sync Monitor diagnostic determine the Interconnect Offset to be invalid, a Time Base Control event may control.

6 SECTION 6 OPERATION ADVANCED

6.1 INTRODUCTION

The EPIC140 series Controller Unit includes operational capabilities for Preemption, Time Base, and System functions.

6.2 TIME BASE CONTROL

The internal Time Base Control is a special program operating within the controller unit. The Time Base Control program outputs pattern commands to the internal coordination program on a Time-Of-Day, Day-Of-Week, Month Day-Of-Year basis.

A minimum of 250 different Time Base Control events are capable of being programmed over a 99 year time frame. Time Base Control events may be entered through the controller unit front panel, downloaded through the system interface, or transferred from another EPIC140 series controller unit. Time Base Control settings and activity may be monitored on the controller unit display.

It is possible to control system detector reporting and intersection dimming functions within the Time Base Control program.

It is possible to perform functions not necessarily traffic related within the Time Base Control program by programming and use of three auxiliary and eight system special function outputs.

6.2.1 Clock Calendar

The Time Base Control is provided with a line frequency driven clock and backed up by a battery supported crystal controlled clock. During normal operation, the line frequency driven clock controls all timings and synchronizes the crystal controlled clock to the line frequency clock once per minute. When power is removed and reapplied, the crystal controlled clock provides the current time to the line frequency clock.

The Time Base Control provides a 99 year calendar for automatically determining the current day of week, day of month, month of year, and year based on the data set as a starting point. The calendar provides automatic compensation for leap years.

When the Set Clock input is active, the internal clock is reset to 04:00:00.

6.2.2 Memory & Clock Backup

A battery backup voltage source is provided with the TBC circuitry. In the battery backup mode time is maintained to within +/- 0.005% as compared to WWV time standard.

The battery is a lithium (non-rechargeable) type. Circuitry is provided to monitor the battery voltage and provide an indication when insufficient voltage is available to maintain the clock and RAM data in event of a power failure.

6.2.3 Daylight Savings Time

The Time Base Control provides for Daylight Savings Time to be programmed to occur automatically at any user selected Sunday or not to occur.

When programmed to occur automatically at a user selected Sunday, time will advance one hour on the date programmed at 02:00:00 A.M. and decrement one hour on the date programmed at 02:00:00 A.M.. Daylight Savings Time is only capable of being implemented once per year.

6.2.4 Program Day

A program day is the list of traffic and/or auxiliary events to occur in a 24 hour period. The Time Base Control program provides for 99 program days to be defined.

The normal day-of-week (Sunday through Saturday) event listing will utilize program days 01 through 07 with Sunday being program day 01.

The exceptions to the normal day-of-week event listings (special days) will utilize program days 01 through 99. Program days 01 through 49 will be utilized for special day programs which occur on the same date (month and month day) every year. Program days 50 through 99 shall be utilized for special days which occur on one date (year, month, & month day).

It is possible to equate program days which may require the same event listing to effectively multiply the event capacity.

It is possible to transfer (copy) an entire program day event listing to another program day to permit data editing to create a similar but different program day event listing.

6.2.5 Event Capacity

A minimum of 250 traffic and/or auxiliary events are capable of being programmed. A minimum of 250 time-of-year (special days) are capable of being programmed. The capacity of either of the above is inversely affected by the number of entries in the other.

The node count for events is one for each line entry made in the Traffic, Auxiliary, or Time-Of-Year structure plus one additional node for each program day plus one additional node for when TOY entries are made. A total of 250 nodes are available for events.

1) A traffic event shall consist of a Pattern (Dial #, Split #, & Offset #) and the time of occurrence (Hour, minute, & program day).
2) An auxiliary event shall consist of the condition of Auxiliary outputs, System Detector controls, Dimming control and the time of occurrence (Hour, minute, & program day).

3) A time-of-year event shall consist of a special day and/or special week plus the date of occurrence (year, month, & month day).

6.2.6 Input And Program Priorities

The coordination patterns are capable of being selected based on manual (keypad) inputs, System Interface, Time Base Control events, and interconnect ("A" connector or "D" connector) inputs. The pattern select priority is as follows:

1) Manual Inputs
2) System Interface
3) TBC Events
4) Interconnect Inputs

When the TBC On-Line input is active, the TBC events have no priority and program selection is based on manual inputs or interconnect inputs.

When the On-Line input is active, the coordination routine reverts to TBC control based on sync monitor failure.

6.2.7 Traffic Programs

In addition to dial, split, and offset commands, the Time Base Control program provides the following as traffic events:

1) Automatic Flashing
2) Free or Respond to Coord Inputs

The event programming capability when responding to Coord Inputs provides for partial TBC control and partial interconnect control as well as totally one or the other (When Dial and/or Split is Interconnect, Offset is automatically interconnect).

6.2.8 Data Entry, Display, And Removal

Time Base Control data may be entered through the controller unit front panel, downloaded through the system interface, or transferred from another EPIC140 series controller unit.

Time Base Control data may be displayed and/or scanned (forward or backward) from any point in time. Traffic events, auxiliary events, or special days may be displayed and/or scanned.

Time Base Control data may be removed as individual events, all traffic events and auxiliary events, all special days, or all time base data.

6.2.9 Auxiliary Outputs

There are three auxiliary outputs available. Each output is noncyclic, each totally independent of any other output. These outputs are not affected by any other input including the On-Line input. The auxiliary outputs may begin and/or end concurrently with another program.

6.2.10 TBC Alternate Week

The Time Base events are implemented from a weekly schedule of program days on a day-of-week (except for special days) basis.

The normal weekly schedule (Day-Of-Week, Sunday through Saturday) event listing will utilize program days 01 through 07 with Sunday being program day 01.

The Time-of-Year event structure provides a means of substituting nine alternate weekly schedules for the normal weekly schedule. Alternate Week 1 will utilize program days 11 through 17 with Sunday being program day 11, Alternate Week 2 will utilize program days 21 through 27 with Sunday being program day 21, etc through Alternate Week 9 which will utilize program days 91 through 97 with Sunday being program day 91.

6.2.11 TBC Dimming

The EPIC140 series Controller Unit may be programmed to provide output dimming based on a TBC auxiliary event entry, System Interface, or interconnect ("D" connector) input.

The dimming function within the controller unit is accomplished by controlling the load switch driver outputs with respect to the AC line voltage. The programmed outputs, when "DIMMED", will be turned "OFF" in alternate half cycles of the AC line.

When "DIMMED", the load switch driver outputs are not all turned off for the same half cycle. This will minimize the impact of dimming on the power service.

The user control is by selection of which load switch driver will have a "Dimmed" output (phase by phase by output).

When the controller is used in a cabinet that employs Absence Of Red Monitoring (current NEMA Monitor function), the user may be required to make a choice between:

1) Absence of Red Monitoring.
2) Dimming the Red Display.

6.2.12 External Interface

The availability of TBC input / output functions are dependent upon the controller unit hardware configuration, Terminal & Facilities wiring and configuration, and user programming. (See 1.4 thru 1.6, 3.5.1, and Terminal & Facilities print)

The TBC operates with an external interface as follows:

6.2.12.1 Time Base Inputs

The EPIC140 series Controller Unit provides the following inputs as Time Base features:

1) TBC On Line
2) Dimmer
3) Set Clock

6.2.12.2 Time Base Outputs

The EPIC140 series Controller Units provides the following outputs as Time Base features:

1) Auxiliary #1
2) Auxiliary #2 (*)
3) Auxiliary #3 or Det Reset (**)
4) Special Function #1 (#)
5) Special Function #2 (#)
6) Special Function #3 (#)
7) Special Function #4 (#)
8) Special Function #5 (#)
9) Special Function #6 (#)
10) Special Function #7 (#)
11) Special Function #8 (#)

(*) Auxiliary #2 output performs a dual purpose. When there is no time base event programming for Auxiliary #2, this output will function as a Any Preempt status output. (See 3.5.1)

(**) Auxiliary #3 output performs a dual purpose. When there is no time base event programming for Auxiliary #3, this output will function as a Detector Diagnostic Reset output. (See 6.7.7)

(#) System Special Function #1 to #8 outputs may be programmed individually as Local Time Base outputs. Once so programmed, a System Special Function output will not respond to system commands as to it's state.

6.3 INTERNAL PREEMPTION

Internal Preemption is a special program operating within the EPIC140 series Controller Unit. The Preemption program accepts commands from up to six preempt inputs and provides the timing and signal display programmed to occur in response to each.

Each Preempt Input provides two modes of priority control based on the form of the input signal. The standard input form, for Preempt (Railroad or Emergency Vehicle), is a continuous Ground True logic input. The alternate input form, for Low Priority (Bus or Transit Vehicles), is a pulsating (1 to 30 HZ) Ground True logic input.

The Preempt routine recognizes the current signal display at the time of preempt and provides transition timing and signal display to the programmed preempt condition. Two preempt conditions with an intermediate set of clearances are capable of being programmed (i.e., Track Clear and Dwell). Once the preempt dwell has been satisfied, the Preempt routine provides an exit transition timing and signal display to the programmed return-to-normal condition.

The Low Priority routine causes termination of the current active interval, if other than the Low Priority interval, and an orderly cycling to the Low Priority interval. Cycling to the Low Priority phase(s) will provide service according to minimum timing requirements of the intervals serviced while cycling. Once the Low Priority has been satisfied, the routine shall release control to normal operation.

Enabling a Low Priority routine will insert a delay of 500 milliseconds into the recognition of a standard Preempt routine. This delay is required to enable the unit to determine whether the current actuation is a Low Priority or Preempt call.

A Low Priority call will terminate 500 milliseconds before the Controller Unit can determine same. This delay is required to determine that the pulsating signal is not in an off cycle.

When a Low Priority routine is enabled and the Preempt call for the same input is a pulse signal, the duration of the pulse signal must be a minimum of one (1) second or the controller unit may interpret same as a Priority call or no call.

Preempt and Low Priority parameters may be entered through the controller unit keypad, downloaded through the System interface, or transferred from another EPIC140 series Controller Unit. Preempt and Low Priority settings and activity are capable of being monitored on the controller unit display. Preempt and Low Priority controls are internally applied and shall override the standard unit input modifiers.

6.3.1 Preempt Routines

The Preemption program provides for six Preempt routines.

6.3.1.1 Input Priorities

The Preemption program provides for setting priorities of the preempt routines with respect one to the other and to other inputs. The priorities shall be as follows:

A. Preempt routines always have priority over and override Low Priority routines. If a Preempt call becomes active while the Preemption program is in a Low Priority routine, the controller shall immediately terminate the Low Priority routine and enter the Preempt routine at Preempt Interval 1 (Selective Ped Clear).

B. Preempt 1 will normally have priority over and override Preempt 2. If Preempt 1 becomes active while the Preemption program is in the Preempt 2 routine, the controller shall immediately terminate the Preempt 2 routine and enter the Preempt 1 routine at Preempt Interval 1 (Selective Ped Clear).

When Preempt 2 has been terminated by Preempt 1, control will not return to Preempt 2 at the end of Preempt 1 except when Preempt 2 call is still active at the end of Preempt 1 or Preempt 2 Duration time has not expired at the end of Preempt 1.

The priority of Preempt 1 over Preempt 2 is capable of being canceled by an entry through the keypad. If the priority has been canceled and the Preempt 1 becomes active while the preemption program is in the Preempt 2 routine, the Preempt 2

routine will complete normally through Interval 8 (Dwell). After Preempt 2 Interval 8, the controller unit will enter the Preempt 1 routine at Interval 1 (Selective Ped Clear) only if the Preempt 1 call is still active or Preempt 1 Duration time has not expired.

A similar operation to the preceding will take place when Preempt 2 becomes active while the preemption program is in the Preempt 1 routine regardless of the priority of Preempt 1 versus Preempt 2.

Whenever more than one Preempt routine reaches the point of transition (Delay and Min Grn/Walk timed out) simultaneously, the lower numbered routine will have control.

C. Preempt 2 will normally have priority over and override Preempt 3. Operation capability as described above for Preempt 1 & 2 is provided for Preempt 2 & 3.

D. Preempt 3 will normally have priority over and override Preempt 4. Operation capability as described above for Preempt 1 & 2 is provided for Preempt 3 & 4.

E. Preempt 4 will normally have priority over and override Preempt 5. Operation capability as described above for Preempt 1 & 2 is provided for Preempt 4 & 5.

F. Preempt 5 will normally have priority over and override Preempt 6. Operation capability as described above for Preempt 1 & 2 is provided for Preempt 5 & 6.

G. All Preempt routines normally have priority over and override Automatic Flash (input, TBC, or System controlled). If any Preempt becomes active while the controller unit is in Automatic Flash, Automatic Flash terminates immediately and the Controller Unit enters the Preempt routine at Preempt Interval 2 (Selective Yellow Clear). The signal display for a transition from Automatic Flash to Interval 2 and 3 is:

1) Voltage Monitor Flash: Interval 2 is Red for all vehicle movements and Dont Walk for all pedestrian movements that are programmed in normal operation. The signal display for a transition from Automatic Flash in Preempt Interval 3 (Selective Red Clear) is Red for all vehicle movements and Dont Walk for all pedestrian movements that are programmed in normal operation.

2) Load Switch Driver Flash: Interval 2 and 3 are in accordance with Para 6.5.1.6 Transition.

The priority of all Preempts over Automatic Flash is capable of being canceled by an entry through the keypad. If the priority of Preempt over Automatic Flash has been canceled and a Preempt call becomes active while the controller unit is in Automatic Flash, the controller unit will remain in Automatic Flash until the demand (Automatic Flash and/or Preempt) is terminated. Preempt demand is determined by the state of the call and Duration timing.

H. Start-Up Flash always has priority over all Preempt routines. On exit from Start-Up Flash, if a Preempt call is active, the Controller Unit maintains the Start-Up Flash condition for the duration of the Preempt call.

I. External Start always has priority over all Preempt routines. If External Start becomes active during a Preempt routine, the controller unit will revert to Start-Up Flash rather than the Initialization condition. The Controller Unit will maintain the Start-Up Flash condition for the duration of the External Start, Preempt call, and/or Start-Up Flash time.

6.3.1.2 Output

A Preempt/Priority Output, when Aux 2 is not programmed for output as a TBC Auxiliary function, it will have a Preempt/Priority function. The Preempt/Priority output will become active whenever any Preempt or Priority routine is in control (i.e., running).

Whenever an Auxiliary 2 event has been programmed and it is desired to again implement the Preempt/Priority output, the clear memory function within TBC must be used to eliminate all TBC or all Aux events (Code "0" or Code "2").

6.3.1.3 Timing

The Preempt routine provides sixteen timing intervals for each Preempt routine and one timing interval for each ring in the controller unit.

The unit related timing interval provides the Minimum Green or Walk timing that must have occurred prior to a Preempt transition. This same timing shall apply on a Preempt to Preempt

The timing Intervals and Ranges are as follows:

	Interval	Range
I.	Min Grn/Wlk - Ring 1	0 to 999 Seconds

The sixteen timing intervals per Preempt routine are as follows:

	Interval	Range
A.	Delay	0 to 999 Seconds
B.	Extend	0 to 999 Seconds
C.	Duration	0 to 999 Seconds
D.	Max Call	0 to 999 Seconds
E.	Lock Out	0 to 999 Seconds
1.	Selective Ped Clear	0 to 999 Seconds
2.	Selective Yel Chg	3 to 99.9 Seconds
3.	Selective Red Clear	0 to 99.9 Seconds
4.	Track Green	0 to 999 Seconds
5.	Track Ped Clear	0 to 999 Seconds
6.	Track Yellow Chg	3 to 99.9 Seconds
7.	Track Red Clear	0 to 99.9 Seconds
8.	Dwell (Hold)	0 to 999 Seconds
9.	Return Ped Clear	0 to 999 Seconds
10.	Return Yel Change	3 to 99.9 Seconds
11.	Return Red Clear	0 to 99.9 Seconds

** Exit Phase (Return-To-Normal Display)

Interval 1 (Selective Ped Clear) shall terminate when all pedestrian signals that are to be Dont Walk in Interval 4 (Track Green) are Dont Walk, or when it's time has expired, or when any Ped Clear interval active at the beginning of Interval 1 has been active the lesser of the normal Ped Clear or the Preempt Selective Ped Clear.

Interval 2 (Selective Yel Change) shall terminate when all vehicle signals that are to be Red in Interval 4 (Track Green) are Red, or when it's time has expired, or when any Yel Change interval active at the beginning of Interval 2 has been active the lesser of the normal Yel Clear or the Preempt Selective Yel Clear.

Interval 3 (Selective Red Clear) shall terminate when it's time has expired, or when any Red Clear interval active at the beginning of Interval 3 has been active the lesser of the normal Red Clear or the Preempt Selective Red Clear.

Interval 8 (Dwell) terminates when it's time has expired, the Duration timing has completed, and the preempt demand is no longer active (see Link & Cycle).

6.3.1.4 Delay, Extend, & Duration

The Preempt routine provides a timed interval (DELAY) after the Preempt call is received before the Controller Unit operation is interrupted and a Preempt transition begins.

When a Preempt call is received, the Delay shall begin timing. The completion of the Delay will start the Preempt routine at Interval 1 (Selective Pedestrian Clear) if the Minimum Green/Walk timing is complete.

When the Preempt input memory has been programmed for non-locking and the Preempt call terminates during the Delay, the Delay and Duration timing will reset and a Preempt transition and display will not occur.

Once a Preempt transition has begun, the routine will complete regardless of the call status and/or memory programming.

The Extend timer will be reset whenever a Preempt actuation is received and will begin timing when the Preempt actuation terminates. A call for the Preempt routine will be placed for the period between the Extend timer reset and time out (extends the call).

The Duration timer will begin timing when the Preempt call is received. Duration timing will be internally set to a value equal to Delay plus Duration parameters and will time concurrently with Delay. The Duration timing will be reset with each Preempt actuation (extends Dwell for the passage of subsequent emergency vehicles).

6.3.1.5 Greens & Return

The Preempt routine provides for the selection of vehicle and pedestrian signal status in Interval 4 (Track Green) and Interval 8 (Dwell) and the interval to receive service first following the completion of Preempt.

Each vehicle load switch driver group (G-Y-R) and each pedestrian load switch driver group (W-PC-D) is selected as to the output condition (R, G, FY, FR, or DARK) and (D, W, FW, or Dark) in Intervals 4 (Track Green) and Interval 8 (Dwell) separately.

The controller unit shall be capable of setting a limit on the time a Preempt call may remain active (MXCALL) and be considered valid. When the Preempt call has been active for this time period, the Controller Unit shall return to normal operation (release from Dwell). This Preempt call shall be considered invalid until such time as a change in state occurs (no longer active).

The Preempt routine provides the capability to link itself to a higher priority Preempt to enable multiple clearance movements prior to a Dwell state. More than one Preempt Routine may be linked to the same Preempt Routine.

In that all load switch driver sets are not always used for normal signal control, the EPIC140 series Controller Unit has provided control of these drivers during Track Green and Dwell even though they may not be programmed as active during normal operation. This control may satisfy requirements for special signals and control during Preempt routines.

The interval to receive service first on exit from a Preempt is selected through the keypad.

All calls present at the beginning of the Preempt routine will be present (subject to memory programming and detector status) and will be serviced with the user entered Exit Calls.

On exit from a Preempt routine a return to coordinated operation or a Low Priority routine is prevented for a specified time period (LOCKOUT) or until one complete cycle of service to phases with serviceable calls.

6.3.1.6 Transition

The Preemption program provides the signal display for an orderly and safe transition from the point of entry to the first preempt green state (Track Green), from the first to second green state (Track Green to Dwell), and from the second green to the return-to-normal green state (Dwell to Normal).

The normal interval timing in effect at the moment Preempt is recognized (after Delay and Minimum Green/Walk are satisfied) will continue operating through Preempt Intervals 1, 2, and 3 so as not to provide abnormally long pedestrian clear, yellow, or red timings.

During a Preempt to Preempt transition, the Minimum Green/Walk operation will be satisfied prior to the Track Green or Dwell interval termination to service the higher priority Preempt. The shorter of Minimum Green/Walk or the appropriate interval time (Track or Dwell) must have occurred prior to the transition.

The display during intervals [1, 2, & 3], [5, 6, & 7], and [9, 10, & 11] are the result of a comparison between the prior display and the next display according to the following chart:

Vehicle Signal Transitions				
	Preempt Interval			
Prior Dsp	1 5 9	2 6 10	3 7 11	Next Dsp
R	R	R	R	R
R	R	R	R	G
R	R	R	R	Dark
R	R	R	R	FY
R	R	R	R	FR
Y*	Y/R	Y/R	R	R
Y*	Y/R	Y/R	R	G
Y*	Y/R	Y/R	R	FY
Y*	Y/R	Y/R	R	FR
Y*	Y/R	Y/R	R	Dark
G	G	Y	R	R
G	G	G	G	G
G	G	Y	R	FY
G	G	Y	R	FR
G	G	Y	R	Dark
FY	FY	Y	R	R
FY	FY	FY	FY	G
FY	FY	FY	FY	FY
FY	FY	Y	R	FR
FY	FY	Y	R	Dark
FR	FR	R	R	R
FR	FR	FR	FR	G
FR	FR	FR	FR	FY
FR	FR	FR	FR	FR
FR	FR	R	R	Dark
Dark	Dark	Dark	Dark	R
Dark	Dark	Dark	Dark	G
Dark	Dark	Dark	Dark	FY
Dark	Dark	Dark	Dark	FR
Dark	Dark	Dark	Dark	Dark
* Would apply to Interval 1-2-3 only.				

Pedestrian Signal Transitions				
	Preempt Interval			
Prior Dsp	1 5 9	2 6 10	3 7 11	Next Dsp
D	D	D	D	D
D	D	D	D	W
D	D	D	D	FW
D	D	D	D	Dark
F*	F/D	D	D	D
F*	F/D	D	D	W
F*	F/D	D	D	FW
F*	F/D	D	D	Dark

Pedestrian Signal Transitions				
	Preempt Interval			
Prior Dsp	1 5 9	2 6 10	3 7 11	Next Dsp
W	F	D	D	D
W	W	W	W	W
W	W	W	W	FW
W	F	D	D	Dark
FW	F	D	D	D
FW	FW	FW	FW	W
FW	FW	FW	FW	FW
FW	F	D	D	Dark
Dark	Dark	D	D	D
Dark	Dark	D	D	W
Dark	Dark	D	D	FW
Dark	Dark	Dark	Dark	Dark
* Would apply to Interval 1-2-3 only.				

Should the same Preempt call become active again during Intervals 9-10-11, those intervals will complete and be followed by Interval 8.

6.3.1.7 Cycle

The Preempt routine allows cycling during the Dwell interval prior to the completion of Duration and termination of the Preempt call. The Dwell interval time establishes the minimum cycling time.

Exit cycling operation to normal will operate like entrance to preempt.

6.3.2 Low Priority Routines

The Preemption program provides for six Low Priority routines.

6.3.2.1 Input Priorities

All Low Priority routines are equal in priority. Whenever more than one Low Priority routine reaches the point of transition (Delay timed out) simultaneously, the lower numbered routine will have control.

The Preemption program provides for priorities of the Low Priority routines with respect to other inputs. The priorities shall be as follows:

A. Preempt routines always have priority over and override Low Priority routines.

   If a Low Priority call is active on exit from a Preempt routine, the lockout for that Priority routine shall not terminate prior to the Low Priority call.

B. Automatic Flash and Low Priority routines are equal in priority.

   On exit from Automatic Flash, the Controller Unit will lockout all Low Priority routines until one complete cycle of service. If a Low Priority call is active on exit from Automatic Flash, the lockout for that Priority routine shall not terminate prior to the Low Priority call.

If Automatic Flash is dropped prior to Automatic Flash state, Lockout of priorities will occur.

C. Start-Up Flash always has priority over Low Priority routines.

On exit from Start-Up Flash, the Controller Unit will lockout all Low Priority routines until one complete cycle of service. If a Low Priority call is active on exit from Start-Up Flash, the lockout for that Priority routine shall not terminate prior to the Low Priority call.

D. External Start always has priority over Low Priority routines.

On exit from the External Start Initialization State, the Controller Unit will lockout all Low Priority routines until one complete cycle of service. If a Low Priority call is active on exit from the External Start Initialization State, the lockout for that Priority routine shall not terminate prior to the Low Priority call.

E. Stop Time always has priority over Low Priority routines.

When Stop Time becomes inactive, the Controller Unit will lockout all Low Priority routines until one complete cycle of service. If a Low Priority call is active when Stop Time becomes inactive, the lockout for that Priority routine shall not terminate prior to the Low Priority call.

6.3.2.2 Timing

The Low Priority routine provides six timing intervals for each Low Priority routine. The timing Intervals and Ranges are as follows:

The six timing intervals per Low Priority routine are as follows:

	Interval	Range
A.	Delay	0 to 999 Sec
B.	Extend	0 to 999 Sec
C.	Duration	0 to 999 Sec
D.	Dwell	0 to 999 Sec
E.	Max Call	0 to 999 Sec
F.	Lock Out	0 to 999 Sec

6.3.2.3 Delay, Extend, & Duration

The Low Priority routine provides a timed interval (DELAY) after the Low Priority call is received before the Controller Unit operation is interrupted and the Low Priority transition occurs.

When a Low Priority call is received, the Delay shall begin timing. The completion of the Delay will start the Low Priority transition to the Dwell interval.

When the Low Priority input memory has been programmed for non-locking and the Low Priority call terminates during the Delay, the Delay and Duration timing will reset and a Low Priority transition or dwell will not occur.

Once a Low Priority transition has begun, the routine will complete regardless of the input status and/or memory programming.

The Extend timer will be reset whenever a Low Priority actuation is received and will begin timing when the Low Priority actuation terminates. A call for the Low Priority routine will be placed for the period between the Extend timer reset and time out (extends the call).

The Duration timer will begin timing when the Low Priority call is received. Duration timing will be internally set to a value equal to Delay plus Duration parameters and will time concurrently with Delay. The Duration timing will be reset with each Low Priority actuation (extends Dwell for the passage of subsequent vehicles).

6.3.2.4 Transition

The Low Priority routine provides for an orderly and safe transition from the point the transition begins to the programmed Dwell Interval.

The controller unit will cycle until the Dwell Interval is active. During this period, no offset correction or time redistribution for gap out, unequal paths, etc will occur. Isolated mode will follow the "all" calls path to the Dwell Interval. Intervals defined as Force intervals will be serviced for the programmed Interval Minimum time.

The ability to Skip actuated movements with calls, during the transition cycle, is provided as a user option.

6.3.2.5 Dwell & Return

The Low Priority routine provides for the selection of the interval to be active during the Dwell period and the actuated movements to receive pedestrian calls upon termination of the Low Priority routine.

The Dwell period shall not terminate while:

1) The Low Priority Call is active
2) Duration is timing
3) Dwell is timing

The controller unit shall be capable of setting a limit on the time a Low Priority call may remain active (MXCALL) and be considered valid. When the Low Priority call has been active for this time period, the controller unit shall return to normal operation (release from Dwell). This Low Priority call shall be considered invalid until such time as a change in state occurs (no longer active).

All calls present at the beginning of the Low Priority routine as well as those received during the Low Priority routine will be present (subject to memory programming and detector status) and will be serviced with the entered Exit Calls.

On exit from a Low Priority routine a return to coordinated operation or a Low Priority routine is prevented for a specified time period (LOCKOUT) or until one complete cycle of service.

6.3.3 External Interface

The availability of Preemption input / output functions are dependent upon the Controller Unit hardware configuration, Terminal & Facilities wiring and

configuration, and user programming. (See 1.4 thru 1.6, 3.5.1, and Terminal & Facilities print)

The Preemption program operates with an external interface as follows:

6.3.3.1 Preemption Inputs

The EPIC140 series Controller Unit provides the following inputs as Preemption features:

1) Preempt/Priority 1
2) Preempt/Priority 2
3) Preempt/Priority 3
4) Preempt/Priority 4
5) Preempt/Priority 5
6) Preempt/Priority 6

Each Preempt/Priority Input provides two modes of control based on the form of the input signal. The standard input form, for Preempt (Railroad or Emergency Vehicle), is a continuous Ground True logic input. The alternate input form, for Low Priority (Bus or Transit Vehicles), is a pulsating (1 to 30 HZ) Ground True logic input.

6.3.3.2 Preemption Outputs

The EPIC140 series Controller Unit provides the following outputs, In Applicalbe Mode, as Preemption features:

1) Preempt/Priority
2) Priority Active
3) Preempt/Priority 1
4) Preempt/Priority 2
5) Preempt/Priority 3
6) Preempt/Priority 4
7) Preempt/Priority 5
8) Preempt/Priority 6

The Preempt/Priority Output provides Ground True logic output when any Priority or Preempt routine is in control.

The Priority Active Output provides Ground True logic output when a Priority routine is in control.

Each Preempt/Priority # Output provides Ground True logic output when either the corresponding Priority or Preempt # routine is in control.

6.4 SYSTEM INTERFACE

Although defined as "systems" interface, all of these capabilities are available and may be of value in the stand alone controller (i.e., Alarms, MOEs, Speed, etc).

6.4.1 System Control

The local controller receives command data from the on-street master. This data includes:

A. Plan Selection (a minimum of sixteen independently selected dial/split combinations, each with an independent cycle length and three offsets.

B. Coordinated, Free, Standby, or Flash Mode Selection

C. A System-Wide Clock Synchronization Command

D. Request for Local Data Response.

E. Timing Parameter Downloading and Verification.

F. Special Functions

6.4.2 Backup

a. Local Time Base coordination capabilities exist for standby operation.

b. In the absence of being polled by the On-Street Master, within a user defined period (1-255 minutes), the local will revert to backup Time Based coordination mode. When again polled by the On-Street Master, the local will return to the System mode and transition to the Master called program.

6.4.3 Alarms

The following functions are monitored and the status of each is logged in the Local Alarms Report for later uploading to the Central Office Master.

Items "a" through "k", as follows, are transmitted to the On-Street Master once each minute:

A. Cycle Fault: When the local controller is operating in the coordinated mode and cycling diagnostics indicate that a not-actuated interval or a called actuated interval has not been serviced for two cycles, the Intersection Status will be logged as NO COORD - CYCLE FAULT. The local intersection will automatically revert to Free (pattern 1/1/1). If the unit can not transfer to 1/1/1 within one cycle length, the Intersection Status will be logged as OFF-LINE CYCLE FAILURE.

B. Cycle Failure: When a local controller is operating in the non-coordinated mode, whether the result of a Cycle Fault or Free being the current normal mode, and cycling diagnostics indicate that a not-actuated interval or a called actuated interval has not been serviced for two cycles, the Intersection Status will be logged as OFF-LINE CYCLE FAILURE. The intersection will automatically and immediately revert to Flash (Voltage Monitor Inactive). The Controller Unit will not exit this state prior entry/download of signal plan, unit, or coord data or the AC Power being removed and reapplied.

   For the purpose of these cycling diagnostic tests, the following must be true:

   1) External Start Is Not Active
   2) Manual Control Enable Is Not Active
   3) Computer Control Is Not Active
   4) Stop Time Is Not Active
   5) Unit Is Not In Preempt
   6) Unit Is Not In Programmed Flash
   7) The Hold Is Not Active

   Two Cycles: When running coordinated, two times the pattern cycle length. When running non-coordinated, two times the sum of the active Interval times.

E. Voltage Monitor: If the local controller Voltage Monitor function is not normal, the Intersection Status will be logged as OFF-LINE

VOLTAGE MONITOR. If subsequent to a Voltage Monitor logging the Voltage Monitor function is corrected, the Intersection Status will be logged as ON-LINE if no other failure or Off-Line condition is present.

F. Conflict Flash: Should the Controller Unit Conflict Flash input remain active for a period of time exceeding the Start-Up Flash time, the Intersection Status is logged as OFF-LINE CONFLICT FLASH. If subsequent to a Conflict Flash logging the Conflict Flash input is removed, the Intersection Status will be logged as ON-LINE if no other failure or Off-Line condition is present.

G. Local Flash: Should the Controller Unit Local Flash input become active, Conflict Flash input is not active, and Flash is not commanded by the Master, the Intersection Status will be logged as OFF-LINE LOCAL FLASH. If subsequent to a Local Flash logging the Local Flash input is removed, the Intersection Status will be logged as ON-LINE if no other failure or Off-Line condition is present.

H. Automatic Flash: Should Automatic Flash be commanded, Conflict Flash input is not active, and Local Flash input is not active, the Intersection Status will be logged as OFF-LINE REMOTE FLASH. If subsequent to a Remote Flash logging the Command is removed, the Intersection Status will be logged as ON-LINE if no other failure or Off-Line condition is present.

I. Preempt: Should any of the Controller Unit Preempt inputs become active, the Intersection Status will be logged as OFF LINE PREEMPT #. If subsequent to a Preempt logging the Preempt input is removed, the Intersection Status will be logged as ON-LINE if no other failure or Off-Line condition is present.

J. Local Free: Should any of the Controller Unit inputs and/or programming cause it to not respond to coordination control, the Intersection Status will be logged as NO COORD - LOCAL FREE. If subsequent to a Local Free logging the controller unit becomes able to respond to coordination control, the Intersection Status will be logged as COORD ACTIVE if no other failure or NO COORD condition is present.

K. Special Status: Should any of the six Special Status inputs become active, the Intersection Status will be logged as SPECIAL STATUS # ON. If subsequent to a Special Status On logging the input is removed, the Intersection Status will be logged as SPECIAL STATUS # OFF.

L. Power On/Off: Should a power interruption exceeding 1000 milliseconds occur, the Intersection Status will be logged as POWER OFF. When power returns the Intersection Status will be logged as POWER ON.

The Local Alarms Report has the capacity to store up to eighty alarms. The alarms once logged will remain until the report capacity is exceeded at which time the oldest alarm will be deleted and the new one will be added.

The Local Alarms Report Format shall be as follows:

```
EPAC SYSTEM - LOCAL ALARMS REPORT
  MM/DD  HH:MM    -------STATUS-------
  09/20  10:20  NO COORD - CYCLE F'LT
  09/20  10:22  NO COORD - COORD F'LT
  09/20  10:24  COORD ACTIVE
  09/25  06:00  POWER OFF
  09/25  08:02  POWER ON
```

ALARM LOG FAULT: Local Alarm logging routine contains invalid record reference data.

COMM LOG FAULT: Communications Fault logging routine contains invalid record reference data.

COORD ACTIVE: the controller unit entered Coordinated operation based on local conditions and/or programming.

COORD OFFSET FAULT: the local controller is making an offset correction after a pattern has been active for longer than ten cycles.

CYCLE ZERO DELAY: the coord cycle reached zero prior to the coord timers reaching a corresponding position.

CYCLE ZERO FAULT: the coord cycle reached zero prior to the coord timers reaching a corresponding position.

DATA CHANGE - KEYPAD: new data has been entered via the keypad.

DATA CHANGE - REMOTE: new data has been downloaded.

DET LOG FAULT: Detector Fault logging routine contains invalid record reference data.

DIAG: ADDRESS FAULT: the processor attempts to access a word or an instruction at an odd address.

DIAG: BUS FAULT: the processor attempts to access memory that does not exist.

DIAG: DIVIDE BY ZERO: the processor encounters an instruction to divide by zero.

DIAG: FALSE INTERRUPT: the processor receives a Bus Fault during interrupt processing.

DIAG: INVALID OPCODE: the processor encounters an invalid instruction.

DIAG: INVALID TRAP: the processor encounters a invalid software interrupt instruction.

DIAG: IOP CLOCK TEST: the clock chip did not pass diagnostic.

DIAG: IOP INIT: the I/O processor's initial state is invalid.

DIAG: IOP RAM TEST: the I/O processor's RAM chip did not pass diagnostic.

DIAG: IOP ROM TEST: the I/O processor's ROM CRC did not check.

DIAG: IOP TIMEOUT: the 68008 timed out trying to gain access to the I/O processor.

DIAG: RAM TEST: the power up RAM read/write test failed.

DIAG: SYSTEM FAULT: miscellaneous processor faults.

DIAG: VRTX FAULT: a VRTX operating system error.

DIAG: UNSPECIFIED: processor faults not defined elsewhere.

DIALUP FAILED: a SOLO Critical Alarm Dialup failed to connect and report the alarms.

EEPROM CRC INITIALIZE: default parameters were loaded into EEPROM following a EEPROM CRC diagnostic error.

EEPROM INIT - KEYPAD: default parameters were loaded into EEPROM based on "LOAD DEFAULT" keypad command.

EEPROM WRITE COUNTS: the controller unit diagnostic of total writes to EEPROM has exceeded that recommended by the manufacturer of the EEPROM and therefore should be replaced.

EEPROM WRITE FAILURE: the controller unit experienced a failure in an attempt to write data to EEPROM and subsequently initiated flashing operation by causing the Voltage Monitor Output to be turned "OFF".

INCOMPAT MEM RESTART: default parameters were loaded based on keypad command from the INCOMPATIBLE PROM & EEPROM display.

INVALID PROM RESTART: default parameters were loaded based on keypad command from the INVALID PROM display.

LOW BATTERY CHK/REPLC: the controller unit battery voltage is below acceptable levels and the battery should be replaced.

MOES LOG FAULT: Measure Of Effectiveness logging routine contains invalid record reference data.

NO COORD - BAD P FREE: the controller unit entered Free operation based on the pattern requested not passing the valid plan checks.

NO COORD - COMND FREE: the controller unit entered Free operation based on Master and/or Local command.

NO COORD - COORD FREE: the controller unit entered Free operation based on the pattern offset being set equal to or larger than the cycle length.

NO COORD - CYCLE F'LT: the controller unit did not service a call while running coordinated.

NO COORD - FAIL FREE: the controller unit entered Free operation based on the cycling diagnostics.

NO COORD - INPUT FREE: the controller unit entered Free operation based on some input having a higher priority than coordination.

NO SYSTEM - BACKUP: the unit reverted to Backup Mode from System control.

NO SYSTEM - STANDBY: the unit reverted to Standby Mode based on a master command.

OFF LINE - CONFL FL: the controller unit conflict monitor became active.

OFF LINE - CYCLE FAIL: the controller unit did not service a call while running free.

OFF LINE - LOCAL FL: the controller unit manual flash became active.

OFF LINE - PREEMPT #: the controller unit entered the "#" preemption sequence.

OFF LINE - PRIORITY # : the controller unit entered the "#" low priority sequence.

OFF LINE - REMOTE FL: the controller unit entered programmed flash.

OFF LINE - VOLT MONIT: the controller unit Voltage Monitor output was "OFF" because of an internal voltage failure.

ON LINE: the controller unit has no "OFF LINE" alarm conditions.

POWER OFF: the controller unit experienced a loss of AC power.

POWER ON: the controller unit AC power was reapplied following a "Power Off" condition.

PROGRAM DAY 0: The Software Clock has been cleared to 01/01/80 00:00:00 PDAY 0 because both the Software Clock and RTC Chip time are invalid.

RTC CHIP ADJUST: RTC Chip time has been adjusted to match the Software Clock because the RTC Chip time invalid or did not match the valid Software Clock time .

RTC CHIP FAILURE: RTC Chip Read/Write time-out occurred or a Read provided out of range values.

RTC CHIP FAULT: RTC Chip Time has drifted outside the + 1/2 second tolerance.

SOFTWARE CLOCK ADJUST: Software Clock time has been adjusted to match the RTC Chip because the Software Clock time was invalid.

SPECIAL STATUS # OFF: the controller unit special status input "#" became inactive.

SPECIAL STATUS # ON: the controller unit special status input "#" became active.

SPEED LOG FAULT: Speed Trap logging routine contains invalid record reference data.

SYSTEM ACTIVE: the unit is picked up by the MARC360 Master.

TIME CHANGE - KEYPAD: the Time Base Date/Time has been changed via the keypad.

TIME CHANGE - REMOTE: the Time Base Date/Time has been changed by the Master or a Personal Computer via the Master or direct.

TRAFFIC TASK DELAYED: the task did not start within 0.1 seconds from the last time it started.

TRAF RESP LOG FAULT: Traffic Responsive logging routine contains invalid record reference data.

WATCHDOG TIMEOUT: the controller unit Watchdog function was not serviced in the allocated time and the unit went through an initialization startup.

6.4.4 MOE's

Measurements Of Effectiveness (MOE) are accumulated and reported to enable the evaluation of coordination pattern parameters based on actual data collected during the periods the pattern is in control. MOE calculations are made once each sequence cycle for volume, stops, delays, and utilization for each phase in the controller unit and then averaged over the duration of the pattern.

A. Volume: The average number of actuations during the sequence cycle for the duration of the pattern. Accumulates the vehicle actuations sum for each phase per sequence cycle and averages for the duration of the pattern.

B. Stops: The average number of vehicles which must stop at an intersection during the cycle for the duration of the pattern. Accumulates the vehicle actuations sum for each phase per sequence cycle during non-green time and averages for the duration of the pattern.

C. Delays: The average time in seconds that vehicles are stopped during the sequence cycle for the duration of the pattern. Accumulates the waiting time (number of cars waiting multiplied by time) for each phase per sequence cycle and averages for the duration of the pattern.

D. Utilization: The average seconds of Green time used by each phase during the sequence cycle for the duration of the pattern. Accumulates the green time used for each phase per sequence cycle and averages for the duration of the pattern.

The MOE Report has the capacity to store up to twenty four patterns of MOEs. The pattern MOEs once logged will remain until the report capacity is exceeded at which time the oldest pattern MOE will be deleted and the new one will be added.

The Local MOE's Report format shall be as follows:

EPIC SYSTEM - LOCAL MOE'S							D/S/O	
BEGIN: 09/21 07:15							2/2/2	
PHASE.....1...2...3...4...5...6...7...8								
VOLUME.:	50	100	50	100	50	100	50	100
STOPS..:	40	20	40	70	40	20	40	70
DLAY*10:	85	65	90	70	85	65	90	70
UTILIZ.:	15	35	10	30	15	35	10	30

MOEs are a pattern Cycle Zero to Cycle Zero calculation. At the pattern Cycle Zero the values are processed then reset to Zero. Under light traffic conditions (i.e., a phase has infrequent calls and/or service), the values will be low.

6.4.5 Communications

Each local intersection controller may be provided with a system interface which allows the reception of Central-Office Master or On-Street Master commands and the transmission of local intersection data to the respective site.

6.4.5.1 Modem (Internal)

The modem shall provide 2-wire half duplex communications.

The modem complies with the following requirements:

The modem complies with the following requirements:

1) Data Rate: 300 to 1200 baud.
2) Modulation: Phase coherent frequency shift keying (FSK).
3) Data Format: Asynchronous, serial by bit.
4) Line & Signal Requirement: Type 3002 voice-grade, unconditioned.
5) Tone Carrier Frequencies (Transmit & Receive): 1200 Hz (Mark) and 2200 Hz (Space) with plus or minus 0.03% tolerance. The operating band shall be (1/2 power, -3db) between 1000 Hz and 2400 Hz.
6) Transmitting Output Signal Level: 0 to 3 db continuous.
7) Receiver Input Sensitivity: 3 to -40 db.
8) Receiver Lowpass Filter: Shall provide 10 db/Octave, minimum active attenuation for all frequencies above the operating band.
9) Clear-To-Send (CTS) Delay: 27 Milliseconds (+/- 2 MilliSec).
10) Receive Line Signal Detect Time: 8 Milliseconds (+/- 2 MilliSec) Mark Frequency.
11) Modem Recovery Time: Capable of receiving data within 15 milliseconds after completion of transmission.
12) Error Rate: Shall not exceed 1 bit in 100,000 bits, with a signal-to-noise ratio of 16 db measured with flat-weight over a 300 to 3000 Hz band.
13) Transmit Noise: Less than 50 db across 600 ohm resistive load within the frequency spectrum of 300 to 3000 Hz at maximum output.

Indication is provided to indicate Carrier Detect, Transmit Data, and Receive Data.

The Modem operates within the local controller unit.

6.4.5.2 SOLO Modem (External)

For SOLO Intersection (Address=00) applications, an auto dial/auto answer modem may be provided to automatically answer calls from the Central-Office Master and to transmit stored data to the Central-Office Master via standard voice-grade, telephone lines.

The modem shall conform to the following requirements:

A. Hayes Smartmodem 1200 or EQUAL.
   1) Configuration Switch Settings:

Switch 1:	DOWN	Ignores DTR
Switch 2:	DOWN	Disable Word Codes
Switch 3:	DOWN	Result Codes Sent
Switch 4:	DOWN	Disable Echo
Switch 5:	UP	Auto Ans Enabled
Switch 6:	DOWN	Car Det On Always
Switch 7:	UP	Single Line Jack
Switch 8:	DOWN	Enables Commands
Switch 9:	UP	Bell 103/212A Comp
Switch 10:	UP	Reset - Turned On

If the modem is a Hayes Smartmodem 2400 or EQUAL, the configuration switch settings above must be duplicated by data set in the modems nonvolatile memory. This data may be sent to the modem via your PC using a modem program. To setup a Hayes Smartmodem Optima 2400 or EQUAL, send the following two commands to the modem:

1) AT &F <CR>
2) AT E0 M1 Q0 V0 X0 S0=1 <CR>
3) AT S7=30 <CR>
4) AT &Q0 <CR>
5) AT Y0 <CR>
4) AT &W0 <CR>

A SOLO Intersection (Address=00) equipped with an external modem has the capability of User definition of Critical Alarms and Alarm Telephone Numbers for automatic reporting on occurrence.

The Critical Alarm definition data WILL NOT be capable of being entered through the EPAC300 Front Panel. It must be downloaded from a PC.

The following events are capable of being defined as Critical Alarms:

Automatic Flash
Conflict Falsh
Coord Fail
Coord Fault
Cycle Fail
Cycle Fault
Local Flash
Local Free
Preemption
Special Status 1 - 6
Voltage Monitor

Any Special Status (1 to 6) defined as Critical will become an alarm function and will lose it's non-system functionality (i.e., ASA, ASB, ASC, ASD, Clock Set, & Dimming).

When System Data is downloaded to an EPAC, Special Identification is established as part of the download based on the Master Menu Letter choice of the downloading PC (i.e., If the Master Menu Letter is "A" in the PC which downloaded the EPAC System database, the Local will report as "Group A").

On occurrence of an Alarm defined as Critical in a SOLO EPAC, it's Critical Alarm dialup routine will begin.

The Critical Alarm dialup routine will dial Telephone #1 five times (one time equals 30 seconds of ringing then a minute wait). If #1 does not answer during the five tries, #2 is dialed five times. If #2 does not answer during it's five tries, the routines returns to #1 and repeats the above cycle two more times (#1 then #2) before a "DIALUP FAILED" is logged. When there is no #2 telephone number, the routine inserts a five minute wait in place of each #2 dialing noted above. In total the routine attempts to connect (dials) for 30 plus minutes prior to giving up and logging a "DIALUP FAILED" message.

If telephone #1 and #2 do not exist, no dialup attempt is made or dialup failure logged. When a dialup routine is entered, if it is determined a modem is not attached or is not responding correctly (i.e., no power), no dialup attempt is made or dialup failure logged.

Should the initial rounds of dialing fail to connect and report a Critical Alarm, the EPAC310 will make another attempt each hour thereafter to report same by repeating the above routine. On these hourly attempts, a "DIALUP FAILED" message will not be logged on failure to connect in order not fill up the log with that message.

6.4.5.3 Messages

The local system interface receives a command message composed of a serial bit stream. The receipt of a valid command message initiates a reply message of a serial bit stream. When a command is not received correctly within a user set period, the local system interface causes a transfer of intersection operation to local Time Base control.

Each local system controller is given a unique address from 001 to 032 through an entry via the front panel. Devices that may be resident at the local intersection (the controller unit, local detectors, eight system detectors, and two speed traps) are capable of being remotely monitored and/or controlled. A sequence of command and/or monitor messages are transmitted from the Central-Office Master or On-Street Master to local intersection controllers. The local intersection to which the message is directed responds to the Master. A command address of zero (0) is received by all locals. The zero command is used to communicate traffic patterns and other system messages to all locals simultaneously.

The message length is variable, depending on the nature of the message. The message content includes one or more of the following types of information:

Set
- Date (Month, Day, Year)
- Time (Day, Hour, Min, Sec)
- Traffic Pattern (Dial, Split, Offset)
- Sync (Pattern to Master Cycle)
- Intersection Mode
- Controller Unit Mode

Monitor
- Date
- Time
- Traffic Pattern
- Sync
- Controller Unit Mode
- System Detectors
- Intersection Alarms
- Intersection Status
- Controller Unit Display Status

Controller Unit I/O Status
Intersection Mode

Download Parameters =
Basic Traffic = Phase
Basic Traffic = Unit
Coord = All
Time Base Control = All
Preemption = All
System = All

Upload Parameters =
Basic Traffic = Phase
Basic Traffic = Unit
Coordination = All
Time Base Control = All
Preemption = All
System = All

Upload Reports =
Local Alarms Report
Comm Failure Report
System Detector Report
Detector Failure Report
Local MOE's
Speed Report
EDI Monitor Report & Data

Message security provides a CRC (Cyclic Redundancy Check). Invalid messages are rejected to prevent false commands at the local.

Operational indication is available on the front panel of the local intersection controller unit to denote when a carrier signal is being received, valid data is being received, and the unit is transmitting.

The Communications Failure Report has the capacity to store up to twenty faults. A fault once logged will remain until the report capacity is exceeded at which time the oldest fault will disappear and the new will be added.

The Communications Failure Report format shall be as follows:

```
EPIC SYSTEM - COMM FAIL REPORT
  MM/DD  HH:MM  --------STATUS-------
  09/20  10:20  MARC HAS RECEIVE PROB
  09/21  22:10  MID XMIT STOPPED
  09/22  06:00  MODEM TIMEOUT
  09/23  11:11  MODEM TIMEOUT
  09/24  18:01  MODEM TIMEOUT
```

"CNTL RESP DIE IN XMIT" denotes that the sending station ceases to send characters during the non-transparent (control) mode for 2 seconds.

"COMM DATA ERROR" denotes that the receiving station returned an immediate NAK to indicate receipt of transmission but it cannot process communications code.

"COMM MEMORY ALOCATION" denotes that the communications task could not get memory to operate within.

"COMM REQUEST" denotes that one of the tributaries has had an unsolicited request for selection or poll by the control unit.

"DATA RESP DIE IN XMIT" denotes that the sending station ceases to send characters during the transparent (data) stream for 1.5 seconds.

"EPAC COMM ERROR" denotes that the EPAC has received a command it does not recognize.

"MARC DOES NOT RESPOND" denotes that the MARC did not respond to the EPACs attempt to send a message for 2 seconds.

"MARC HAS RECEIVE PROB" denotes that the MARC response to the EPACs attempt to send a message was a NAK (negative acknowledge) or WACK (acknowledge but wait) on three consecutive tries.

"MID XMIT STOPPED" denotes that the receiving station has sent the character sequence which stops the sending station wherever it is in it's transmission.

"MODEM TIMEOUT" denotes that the EPAC has control of the communications line but has not transmitted a character for 0.1 seconds.

"RECEIVE CRC ERROR" denotes that the CRC for the message just received was incorrect.

6.4.6 System Detectors

The local intersection controller has the ability to receive input data from eight special detectors as well as it's normal actuated controller unit detectors. The user may assign any of these as system detectors. The local intersection controller unit processes the assigned system detectors data (volume + occupancy by scanning each input at a rate of sixty times a second) for a period of one minute and then transmits the results of this processing to the On-Street Master.

System Detector inputs are sampled every 16.7 milliseconds to detect changes in logic state. Any actuation that does not last over two samplings will be ignored.

The detector processing is as follows: (Refer to Figure 1 at the end of this section for conversions to percent and sensor averaging when reading the following)

A. Average Volume Percent (AVOL%): The detector volume percentage (VOL%) is computed by taking the raw one minute volume counts, multiplying by sixty to obtain the projected counts in an hour, multiplying by one hundred to convert the final result to a percentage, and then dividing by the vehicle per hour reference (VPHR). The vehicle per hour reference (VPHR) is a user assigned value depicting an estimate of the lane capacity in terms of the number of vehicles per hour.

   VOL% =((1 Min Volume Count)x60x100) / VPHR

   The average volume percent (AVOL%) is computed by summing a portion of the old average percent (OAV%) and the new volume percent. To simplify the ratio calculation, the portion of the old average volume percent and the new volume percent are based on the detectors averaging time (AVGT) in minutes and may be

varied between one (1) and ninety-nine (99) minutes (user selected).

AVOL% =(((AVGT-1) x OAV%) + VOL%) / AVGT

B. Average Corrected Occupancy Percent (ACO%): The percent occupancy (OCCP%) is computed by taking the raw one minute occupancy count, multiplying by the correction factor (CTFC; initially set to one), multiplying by one hundred to convert the final result to a percentage, and dividing by the maximum number of counts that can be received in one minute (MXOCC).

OCCP% = ((1 Min Occp Cnt)xCTFCx100)/MXOCC

Note that the maximum occupancy counts for a one minute period (100% occupancy) is 3600 counts where each count equals 1/60th of a second.

The average percent occupancy (AOCCP%) is computed by summing a portion of the old average percent occupancy and the new percent occupancy. As with the average volume percent, the portion of the old average percent occupancy (OAC%) and the new percent occupancy are based on the detectors averaging time (AVGT) in minutes.

AOCCP% = ((AVGT-1) x OAC%) + OCCP%) / AVGT

The ratio of the old average percent volume or occupancy to the new percent volume or occupancy determines the system's speed of response to the current traffic conditions. Please note that setting the AVGT to one (1) minute results in the immediate minute to minute response based on new volume or occupancy data. The average percent occupancy may require adjustments due to detector operation. These adjustments are made by changing the correction factor (CTFC) resulting in an average corrected percent occupancy (ACO%).

C. Volume + Occupancy Percent (V+O%): Each detector V+O value is computed every minute by summing the average volume percent and the average corrected percent occupancy. The volume value must exceed an operator set threshold, for each detector, before the occupancy is added in. This protects the system from vehicles that are parked over a detector for long periods of time.

The System Detector Report has the capacity to store up to twenty four sample periods. A sample period data set once logged will remain until the report capacity is exceeded at which time the oldest sample period data set will disappear and the new will be added.

The System Detector Report format shall be as follows:

```
EPIC SYSTEM - SYS DET REPORT
BEGIN:  09/21  07:15  INT: 15  MULT: 10
DETECTOR...1...2...3...4...5...6...7...8
RAW VOL:    9   13    9    9   13   18    9   13
RAW OCC:   12   23   12   11   23    4   11   23
AVOL%...:  54   31   54   21   79   42   54   31
ACO%....:  20   38   20   19   38    7   19   39
```

6.4.6.1 Queue Selection

The local controller shall be capable of selecting patterns based upon computed V+O of two queue selection routines (Queue 1, and Queue 2).

The priority of routines are in the following order:

1) Queue 2 Level 2
2) Queue 2 Level 1
3) Queue 1 Level 2
4) Queue 1 Level 1

Each routine shall have programmable threshold settings. If the threshold (Level 1 and/or 2) is reached on a routine, the local controller shall call for a pre-programmed pattern, overriding the pattern called for by the normal control source (System, TBC, Interconnect, etc.

It shall be possible to select different patterns with each of the routines.

It shall be possible to define all or part of the pattern these queue routines shall override. When only part of a pattern is overridden, the remaining shall be selected in the normal manner.

When a Queue routine defines a partial pattern, the source of the normal pattern provides sync, otherwise TBC provides sync reference. If no TBC event exists prior to occurrence of Queue override then sync to 24:00 hours when event sync is programmed else sync to last event time.

6.4.7 Detector Diagnostics

Each system detector assigned a special or group detector as input and each active group detector may be tested by diagnostics for conformance to specified parameters. The detector diagnostics monitors activity on each detector for constant calls, absence of calls, or erratic output.

Any system detector not assigned a special or group detector as input will not be tested for conformance to the specified parameters.

Any inactive group detector will not be tested for conformance to the specified parameters. Should this detector be assigned as a System Detector, it would be tested as that System Detector but not as the Group Detector.

A detector is classified as "On-Line" when the results the Monitoring and Diagnostic procedures indicate that data from the detector is within the allowable range of values.

A detector is classified as "Failed" when the results the Monitoring and Diagnostic procedures indicate that data from the detector is not within the allowable range of values. A Power Interrupt, External Start application, or running Diagnostics will reset a failed detector from "No Activity" and/or "Max Presence" failed mode.

Each detector is monitored for constant calls, absence of calls, or erratic counts.

A. No Activity. The unit provides two user-programmable "No Activity" periods of 0 to 255 minutes. If the detector does not exhibit an actuation during this period, it is considered a fault by the diagnostics.

B. Maximum Presence. The diagnostics provides two user programmable "Maximum Presence" periods of 0 to 255 minutes. If the detector exhibits a latched or continuous detection for the programmed time period, it is considered a fault by the diagnostics.

C. Erratic Output. The diagnostics provides two user programmable "Excessive Counts" parameters of 0 to 255 Counts Per Minute for identifying oscillating or pulsing detectors. If the detector exhibits an erratic output (counts in excess of the setting), it is considered a fault by the diagnostics.

D. Detector Reset Output. When Auxiliary 3 is not programmed for output as a TBC Auxiliary function, it will become a Detector Reset function. The Detector Reset output will become active for one half (1/2) second whenever the detector diagnostics detect a new fault.

Whenever an Auxiliary 3 event has been programmed and it is desired to again implement the detector reset output, the clear memory function within TBC must be used to eliminate all TBC or all Auxiliary events (Code "0" or Code "2").

Parameters for No Activity, Maximum Presence, and Erratic Output are user programmable. The selection of the effective parameter set (Primary or Alternate) is Time Base controlled. Each routine (No Activity, Maximum Presence, and Erratic Output) has the capability of being omitted from the diagnostic evaluation.

System Detector Status (Operational and/or Failed) is transmitted to the On-Street Master once each minute as polled.

Sensors which fail the diagnostics are automatically logged in the Detector Failure Report as FAILED for later review or uploading to the Central Office Master.

Sensors which have failed the diagnostics and subsequently operate within the diagnostic parameters are automatically logged in the Detector Failure Report as ON LINE for later review or uploading to the Central Office Master.

The Detector Failure Report has the capacity to store up to twenty diagnostic faults. The fault once logged will remain until the report capacity is exceeded at which time the oldest fault will be deleted and the new one will be added.

The Detector Failure Report format shall be as follows:

```
EPIC SYSTEM - DETECTOR FAIL REPORT
  MM/DD  HH:MM    -------STATUS-------
  09/20  10:20  VEH 1 - FAIL ERR CNTS
  09/20  10:45  VEH 1 - ON LINE
  09/20  12:10  SPC 2 - FAIL MAX PRES
  09/20  12:55  SPC 2 - ON LINE
  09/21  03:15  SPC 3 - FAIL NO ACTY
```

"GR # - FAIL ERR CNTS" denotes that the detector failed the ERRATIC COUNTS diagnostic.

"GR # - FAIL MAX PRES" denotes that the detector failed the MAXIMUM PRESENCE diagnostic.

"GR # - FAIL NO ACTY" denotes that the detector failed the NO ACTIVITY diagnostic.

"GR # - ON LINE" denotes that the detector is operating within the parameters established for diagnostic faults.

The "#" in the report entry will be the group number as applicable. The "GR" in the report entry will be "SP" when the entry applies to a Special Detector.

6.4.8 Speed Traps

The Speed Trap function provides speed monitoring capability. Two speed trap detector spacing can be used, 11 feet or 22 feet, depending on the application. Provision is made in the local controller to monitor the speed, in MPH or KPH. Also, a nominal speed range may be set for each pattern (combination of cycle / split / offset. The percent of vehicles higher, within, or lower than the nominal speed range may be logged.

The Speed Report has the capacity to store up to twelve patterns of Speed data. The pattern Speed data once logged will remain until the report capacity is exceeded at which time the oldest pattern Speed data will be deleted and the new one will be added.

The Speed Report format shall be as follows:

```
EPIC SYSTEM - SPEED REPORT
  --- BEGIN ---   PATRN  PERCENT OF TOTAL
  MM/DD  HH:MM   D/S/O  LOWR  W/IN  HIGH
  09/21  07:00   2/2/2   10    80    10
  09/21  08:00   3/1/1   15    85     5
  09/21  10:00   3/1/2    5    85    10
  09/21  12:00   2/2/2   20    70    10
```

6.4.9 External Interface

The availability of System input / output functions are dependent upon the Controller Unit hardware configuration, Terminal & Facilities wiring and configuration, and user programming. (See 1.4 thru 16, 3.5.1, and Terminal & Facilities print)

6.4.9.1 Systems Inputs

The EPIC140 Controller Units provide the following System inputs:

1) Special Detector #1
2) Special Detector #2
3) Special Detector #3
4) Special Detector #4
5) Special Detector #5
6) Special Detector #6
7) Special Detector #7
8) Special Detector #8
9) Special Status #1
10) Special Status #2
11) Special Status #3
12) Special Status #4

13) Special Status #5
14) Special Status #6
15) Conflict Monitor Status
16) Manual Flash Status

Special Detector inputs may be used as system detector inputs.

Special Status inputs may be used for logging specific events in the controller assembly. For example, if one of these inputs were wired to a cabinet door switch, it would log each occurrence of when the cabinet door was opened.

MMU Flash Status input may be used for logging an occurrence of monitor initiated flash operation.

Local Flash input may be used for logging an occurrence of local (manual) initiated flash operation

6.4.9.2 System Outputs

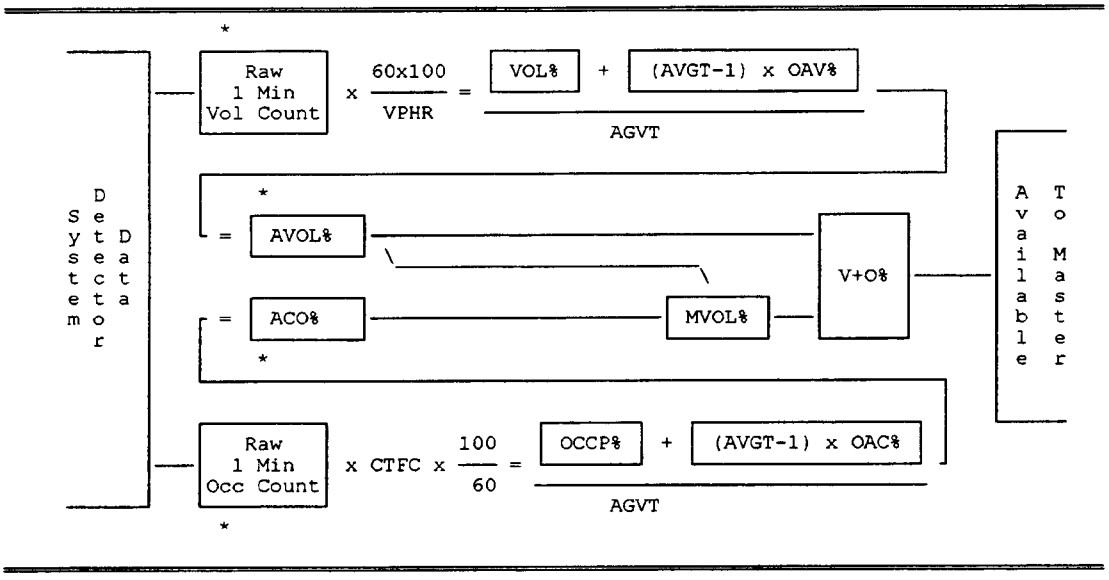
The EPIC140 Controller Units provide the following System outputs:

1) Special Function #1
2) Special Function #2
3) Special Function #3
4) Special Function #4
5) Special Function #5
6) Special Function #6
7) Special Function #7
8) Special Function #8

System Special Function outputs may be programmed individually as Local Time Base outputs. Once so programmed, a System Special Function output will not respond to system commands as to it's state until the clear memory function within TBC is used to eliminate all TBC or all Auxiliary events (Code "0" or Code "2").

Special Function outputs may be via a PC (Personal Computer) command. This control supplements the master (MARC360, etc) and local TBC control of these functions. That is to say, either may set an inactive function to ON but all must call for an inactive output before the output is OFF. Once set active via a PC, the output will remain ON until set inactive by the PC or power is cycled at the local.

Figure 2



Notes: The AVOL% and ACO% are stored in memory for one minute and become OAV% and OAC% values.

(*) These values are stored and transmitted to the central office to be logged for report purposes.

MVOL% equals the minimum AVOL% needed before ACO% can be added. "Volume Only" can be achieved by setting MVOL to a high percentage.

7 SECTION 7 DIAGNOSTICS

7.1 INTRODUCTION

The EPIC140 Series Controller Units provide resident diagnostic capabilities, some automatic and some user initiated describing its own internal state. It does not require internal access or changes to the controller unit to initiate the diagnostic routines.

7.2 AUTOMATIC DIAGNOSTICS

The Controller Unit automatically and continually performs self-checking diagnostics of memory and processor operation.

The "automatic" diagnostics perform an orderly search and testing of internal logic. The diagnostics evaluation is displayed in "messages" on the controller unit front panel display as an operator interface.

The "automatic" diagnostics capabilities provided include:

7.2.1 On Power Up

These test routines verify that essential elements are proper during power up. For a unit to exit the power up diagnostics and begin running traffic all tests must be passed.

When a fault is found an appropriate Error Message is displayed and the unit will maintain flashing operation (Controller Unit Voltage Monitor output inactive).

A. RAM Diagnostic - This test verifies that all RAM elements are operating correctly.
   1) Four patterns are automatically written to RAM. Each Write is followed by a read and compare to verify that it contains the pattern.
   2) Each Address is written

B. Power-Up I/O Processor Diagnostic - This test verifies whether the Main Processor can communicate with the I/O Processor. This is necessary before any additional diagnostics can be performed because the display and keypad are required for user interface. The routine includes a test of Display RAM, and performs a CRC (cyclic redundancy check) on I/O P ROM.

C. ROM Diagnostic - This test verifies that the Operating System ROM's contain the proper program. The routine performs a CRC (cyclic redundancy check) on each ROM and makes a comparison with a pre-programmed value.

D. EEPROM Diagnostic - This test verifies whether the EEPROM's contain data and that data has not changed since the last write. The routine will initialize EEPROMs which do not contain data or do not contain the correct data with the PROM resident default parameter set.

E. RAM (EEPROM Image) UPDATE - This routine compares EEPROM Image RAM with EEPROM and copies the EEPROM data into this RAM when the comparison is not equal.

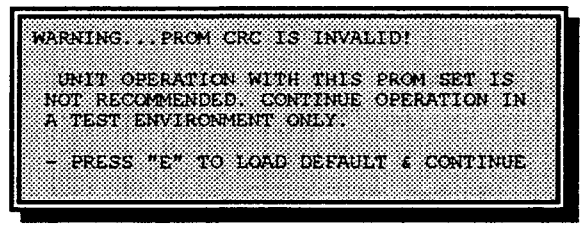
7.2.2 During Normal Operation

These test routines verify whether essential elements are operational while the controller unit is running. When a fault is found an appropriate Error Message is displayed and the unit will initiate and/or maintain flashing operation (Controller Unit Voltage Monitor output inactive).

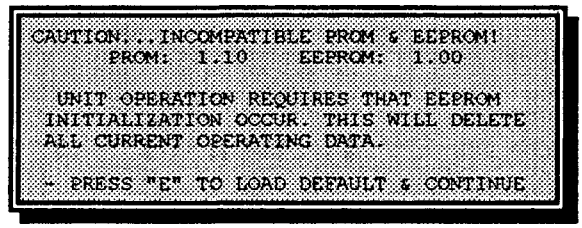
System Faults which are trapped by the running diagnostics are logged in the Local Alarm report. Following a System Fault, an automatic restart to the Startup Flash timing/state will occur until more than two System Faults have occurred in a single calendar day at which time a "PRESS ANY KEY" message will appear on the front panel. System Faults are defined in following paragraph (all begin with "**** ERROR:").

7.2.3 Diagnostic Messages

Diagnostic error messages:



When the Power Up PROM diagnostics detects the PROM CRC is not that which was running but is the same revision number, the message above will appear.



When the Power Up PROM diagnostics detects the PROM CRC is not that which was running but is an older revision number that may or may not be compatible or when the PROM CRC is not that which was running but is an new revision number that is not compatible, the message above will appear.

"INITIALIZATION COMPLETE!!! - CYCLE POWER OR PRESS ANY KEY TO RESTART"; the EEPROM has been initialized and the unit is ready to run.

"**** ERROR: BUS FAULT"; the processor attempts to access memory that does not exist.

"**** ERROR: ADDRESS FAULT"; the processor attempts to access a word or an instruction at an odd address.

"**** ERROR: INVALID OPCODE"; the processor encounters an invalid instruction.

"**** ERROR: DIVIDE BY ZERO"; the processor encounters an instruction to divide by zero

"**** ERROR: SYSTEM FAULT"; miscellaneous processor faults.

"**** ERROR: FALSE INTERRUPT"; the processor receives a Bus Fault during interrupt processing.

"**** ERROR: INVALID TRAP"; the processor encounters a invalid software interrupt instruction.

"**** ERROR: UNSPECIFIED"; processor faults not defined elsewhere.
"**** ERROR: RAM TEST FAILED"; the power up RAM read/write test failed
"**** ERROR: VRTX FAULT"; a VRTX operating system error.
"**** ERROR: COMM INIT."; the failure to initialize ACIA'S.

7.3 USER INITIATED DIAGNOSTICS

The controller unit can perform diagnostics enabling operator verification of properly operating inputs, outputs, keypad, and display.

The "user initiated" diagnostics are performed only after a user request through the controller unit front panel. The technique used is relatively simple. It suspends normal traffic operation during the test and the controller should be plugged into Suitcase-Sized Controller Test Set. The diagnostics evaluation is displayed in "messages" on the controller unit front panel display and/or indicators on the suitcase tester as an operator interface.

The "user initiated" diagnostics capabilities provided include:

7.3.1 Memory

These test routines verifies that essential elements are functioning normally. If a fault is found an appropriate Error Message is displayed.

A. ROM Diagnostic - This test verifies that the ROM's contain the proper program. The routine performs a CRC (cyclic redundancy check) on each ROM and makes a comparison with a pre-programmed value.

B. RAM Diagnostic - This test verifies that all RAM elements are operating correctly. A value is automatically written to a RAM location and this location is read to verify that it contains the value.

Diagnostic error messages:
1a. ROM TEST - TESTING
1b. ROM TEST - PASSED
1c. ROM TEST - FAILED U??
2a. EEPROM TEST - TESTING
2b. EEPROM TEST - PASSED
2c. EEPROM TEST - FAILED
3a. RAM TEST - TESTING
3b. RAM TEST - PASSED
3c. RAM TEST - FAILED U??

7.3.2 Input/Outputs

These test routines enable operator verification that input, output, keypad, and display functions are proper.

A. Output Test - This test determines that the output drivers are operating correctly. Each output is actuated in a fixed sequence. The user must observe the output sequence to determine correct operation. The test will repeat until interrupted.

B. Input Test - This test determines that the input buffers are operating correctly. The operator must activate each input. The routine will identify each input. The user must observe the front panel display to determine correct operation.

C. Panel Display Test - This test determines that front panel drivers and decoders are operating properly. The user must observe the front panel display to determine correct operation.

D. Keypad Validity Test - This test determines that the keypad is operating correctly. The operator may test the controller unit keys 0 through 9 and A through E (Key "F" will stop the test). The display will indicate the key pressed. The user must observe the front panel display to determine correct operation.

7.3.3 Procedure For User Initiated Diagnostics

A. Connect the controller unit to a Suitcase Test Set

B. Turn ON power to the controller unit

C. Make sure all logic inputs are inactive

D. Gain Access

E. Verify Output sequence

F. Activate any logic input

G. Verify inputs as you activate each

H. Verify Keypad as you press the key

7.4 OTHER DIAGNOSTICS

The controller unit performs additional diagnostics to verify and display events and/or status. The "other diagnostics" capabilities provided include:

7.4.1 EEPROM Writes

These test routines verify EEPROM while the controller unit is running.

A. A test to determine when EEPROM writes have been unsuccessful. When the test determines a failure an Alarm Entry "EEPROM WRITE FAILURE" denoting date and time will occur. The unit will initiate and/or maintain flashing operation (Controller Unit Voltage Monitor output inactive). The EEPROM must be replaced.

B. A test to determine when EEPROM writes have exceeded the I.C. manufacturer's recommended life. When the test calculates the recommended life has been exceeded an Alarm Entry "EEPROM WRITE COUNTS" denoting date and time will occur. The controller unit will continue to operate normally but EEPROM should be replaced.

7.4.2 RAM Data

These test routines verify RAM data while the controller unit is running.

A. A test to determine when RAM values are not equal to EEPROM values. When the test determines a difference, the EEPROM values are loaded into RAM.

7.4.3 Watchdog Indication

When a Watchdog time out occurs, the front panel display will revert to the Main Menu with the bottom line denoting "** WATCHDOG TIMEOUT **". This display will remain until a key has been pressed.

An Alarm Entry "WATCHDOG TIMEOUT" denoting date and time will occur concurrent with the above display.

The Watchdog Restart is a special feature of the EPIC140 Series Controller Unit that recognizes failures in the unit, and puts the controller in startup sequence automatically, eliminating the need to manually reset the controller. Startup Flash allows the user to set a transitional flash time that occurs before the Initialization condition following a power interruption and Watchdog Restart. CAUTION: If the Start-Up time is set at 00 seconds and the Watchdog puts the unit in the Startup sequence due to a failure in the unit, the intersection will go directly to the Initialization condition with no transitional flash time prior to the change.

7.4.4 Power Failure

When the AC Power is lost for 500ms, the processor goes into a "wait" mode. If AC Power is restored within approximately 100ms, the user program commences running as though there were no interruption. If AC Power does not return, however, both processors are RESET by the hardware time-out.

When the AC Power is lost for 500ms,an Alarm Entry "POWER OFF" denoting date and time will occur. When the AC Power returns, an Alarm Entry "POWER ON" denoting date and time will occur.

7.4.5 Battery Voltage

When the battery voltage falls below the required level, an Alarm Entry "LOW BATTERY CHK/REPLC" denoting date and time will occur.

The message "*LO BAT*" will be displayed in the lower left hand corner of the screen if the battery voltage drops below +2.6 (+ 0.1) volts at power up or anytime the display is refreshed and the information to be displayed does not write in that area. (Neglecting to turn the battery switch "ON" will cause this message to be displayed. See 2.5)

The controller unit will continue to operate normally but the battery should be replaced.

7.5 DATA ENTRY ERROR MESSAGES

Error Messages from the DATA ENTRY evaluation diagnostic routines will be presented on the front panel. The message will remain until specific user action has been completed.

Diagnostic error messages:

```
OUT OF RANGE       - PRESS "E" TO RETURN
ACCESS REQUIRED    - PRESS "E" TO RETURN
PRINTER UNAVAILABLE PRESS "E" TO RETURN
CABLE DISCONNECTED- PRESS "E" TO RETURN
CABLE LOSS- DEFAULT LOADED "E" TO RETURN
EPIC NOT AVAILABLE- PRESS "E" TO RETURN
EPIC ERROR DEFAULT LOADED "E" TO RETURN
DATA LOSS- DEFAULT LOADED "E" TO RETURN
UNIT TRANSFER ERROR PRESS "E" TO RETURN
BEG MON MUST BE < END MON "E" TO RETURN
Beg MON MUST BE < END MON "E" TO RETURN
NO "FROM" PROGRAM DAY      "E" TO RETURN
CAN'T EQUATE "FROM" DAY    "E" TO RETURN
CAN'T TRANSFER "FROM" DAY "E" TO RETURN
NO EQUATE-TRANSFER CODE    "E" TO RETURN
MAXIMUM EQUATES EXIST      "E" TO RETURN
```

PROGRAM LOG

EPIC140
SIGNAL PLAN 1
PROGRAM LOG

Prepared By:

Date .....: ___ / ___ / ___

MOVEMENT IDENTIFICATION																															
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Driver V1																																
|| V2																																
|| V3																																
|| V4																																
Driver P1																																
|| P2																																
|| P3																																
|| P4																																
Driver VA																																
|| VB																																
|| VC																																
|| VD																																
Minimum Interval Time																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Xfer Tim Pln																																
Xfer To SP 1																																
| | SP 2																																
| | SP 3																																
| | SP 4																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Man Cont Enable																																
Correction																																
Force Off																																
Hold																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Actuation Code																																
Actuation Group																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
V1 Mem Reset																																
V2 | |																															
V3 | |																															
V4 | |																															
P1 Mem Reset																																
P2 | |																															
P3 | |																															
P4 | |																															

EPIC140
SIGNAL PLAN 2
PROGRAM LOG

Prepared By: _____

Date .....: __ / __ / __

MOVEMENT IDENTIFICATION																															
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Driver V1																																
|| V2																																
|| V3																																
|| V4																																
Driver P1																																
|| P2																																
|| P3																																
|| P4																																
Driver VA																																
|| VB																																
|| VC																																
|| VD																																
Minimum Interval Time																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Xfer Tim Pln																																
Xfer To SP 1																																
| | SP 2																																
| | SP 3																																
| | SP 4																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Man Cont Enable																																
Correction																																
Force Off																																
Hold																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Actuation Code																																
Actuation Group																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
V1 Mem Reset																																
V2 | |																															
V3 | |																															
V4 | |																															
P1 Mem Reset																																
P2 | |																															
P3 | |																															
P4 | |																															

EPIC140
SIGNAL PLAN 3
PROGRAM LOG

Prepared By: _____

Date .....: ___ / ___ / ___

MOVEMENT IDENTIFICATION																															
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Driver V1																																
|| V2																																
|| V3																																
|| V4																																
Driver P1																																
|| P2																																
|| P3																																
|| P4																																
Driver VA																																
|| VB																																
|| VC																																
|| VD																																
Minimum Interval Time																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Xfer Tim Pln																																
Xfer To SP 1																																
| | SP 2																																
| | SP 3																																
| | SP 4																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Man Cont Enable																																
Correction																																
Force Off																																
Hold																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Actuation Code																																
Actuation Group																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
V1 Mem Reset																																
V2 | |																															
V3 | |																															
V4 | |																															
P1 Mem Reset																																
P2 | |																															
P3 | |																															
P4 | |																															

EPIC140
SIGNAL PLAN 4
PROGRAM LOG

Prepared By: _____

Date .....: __ / __ / __

MOVEMENT IDENTIFICATION																															
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Driver V1																																
|| V2																																
|| V3																																
|| V4																																
Driver P1																																
|| P2																																
|| P3																																
|| P4																																
Driver VA																																
|| VB																																
|| VC																																
|| VD																																
Minimum Interval Time																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Xfer Tim Pln																																
Xfer To SP 1																																
| | SP 2																																
| | SP 3																																
| | SP 4																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Man Cont Enable																																
Correction																																
Force Off																																
Hold																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Actuation Code																																
Actuation Group																																
INTERVAL NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
V1 Mem Reset																																
V2 | |																															
V3 | |																															
V4 | |																															
P1 Mem Reset																																
P2 | |																															
P3 | |																															
P4 | |																															

```
---------------------- UTILITIES - ACCESS ----------------------

   CODE ..............:  ____      CODES: Four Digits (0000-9999)


-------------------- UNIT DATA - GENERAL CONTROL ------------------

    Start Up Time .....:   __    <  Seconds (00-99)
    Start Up State ....:   _     <  0-Flash  1-Red
    Stop Time Reset ...:   _     <  0-No  1-Yes
    'D' Conn Input Mode :  _     <  0-Standard
    'D' Conn Output Mode :_          1/9-Alternate Function
    Group..V-1/2/3/4..P-1/2/3/4..V-A/B/C/D..   Codes: (0-No 1-Yes)
     P Sig : _ _ _ _    _ _ _ _    _ _ _ _      <  Ped Signal Driver
     Flash : _ _ _ _    _ _ _ _    _ _ _ _      <  Load Switch Flash
     Fl Yel: _ _ _ _    _ _ _ _    _ _ _ _      <  Flash Yellow
     Fl Alt: _ _ _ _    _ _ _ _    _ _ _ _      <  Flash Alternate


------------------ UNIT DATA - DETECTOR CONTROL ------------------

    Group ..........1......2......3......4
    NL Memry          _      _      _      _    < 0-No 1-Yes
    Stretch        __._   __._   __._   __._   < 0-99.9 Seconds
    Delay           ___    ___    ___    ___   < 0-999 Seconds

   Recalls:
    Group ..........1......2......3......4.
    Vehicle           _      _      _      _    < 0-None 1-Act 2-Min 3-Mx
    Pedest            _      _      _      _    < 0-None 1-Act 2-Ped
```

```
---------------------- COORDINATION DATA - MODE ---------------------

  CONTROL DATA                              CYCLE LENGTH TABLE
   OPERATION.................: _            Dial.....1.....2.....3.....4
   CORRECTION................: _            Split 1 :  ___   ___   ___   ___
   MAX DWELL TIME.....:  ___               Split 2 :  ___   ___   ___   ___
   MIN DURATION TIME.....:  __             Split 3 :  ___   ___   ___   ___
   MANUAL (DIAL/SPL/OFF).: _/_/_           Split 4 :  ___   ___   ___   ___

   CODES.....0.....1.....2.....3..    CYCLE LENGTH:  All of
    Operation..: FREE   AUTO    MANUAL   ---          the entries are in
    Correction.: DWELL  MX DW   SH WAY   SW+          Seconds. Care must
   TIMINGS: Max Dwell (0-999 Seconds)                 be taken to assure
            Min Duration (0-99 Minutes)               cycle length equals
       ('SW+' Is An ADD Only Shortway)                the intvl time sum.

--------------- COORDINATION DATA - DIAL 1 / SPLIT 1 ---------------

   INT#...TIME..A.S.I.O   INT#...TIME..A.S.I.O   INT#...TIME..A.S.I.O
    01    ___._  _ _ _ _    13    ___._  _ _ _ _    25    ___._  _ _ _ _
    02    ___._  _ _ _ _    14    ___._  _ _ _ _    26    ___._  _ _ _ _
    03    ___._  _ _ _ _    15    ___._  _ _ _ _    27    ___._  _ _ _ _
    04    ___._  _ _ _ _    16    ___._  _ _ _ _    28    ___._  _ _ _ _
    05    ___._  _ _ _ _    17    ___._  _ _ _ _    29    ___._  _ _ _ _
    06    ___._  _ _ _ _    18    ___._  _ _ _ _    30    ___._  _ _ _ _
    07    ___._  _ _ _ _    19    ___._  _ _ _ _    31    ___._  _ _ _ _
    08    ___._  _ _ _ _    20    ___._  _ _ _ _    32    ___._  _ _ _ _
    09    ___._  _ _ _ _    21    ___._  _ _ _ _   OFFSET....1....2....3
    10    ___._  _ _ _ _    22    ___._  _ _ _ _    TIME     ___   ___   ___
    11    ___._  _ _ _ _    23    ___._  _ _ _ _   SIGNAL PLAN
    12    ___._  _ _ _ _    24    ___._  _ _ _ _      #       _

--------------- COORDINATION DATA - DIAL 1 / SPLIT 2 ---------------

   INT#...TIME..A.S.I.O   INT#...TIME..A.S.I.O   INT#...TIME..A.S.I.O
    01    ___._  _ _ _ _    13    ___._  _ _ _ _    25    ___._  _ _ _ _
    02    ___._  _ _ _ _    14    ___._  _ _ _ _    26    ___._  _ _ _ _
    03    ___._  _ _ _ _    15    ___._  _ _ _ _    27    ___._  _ _ _ _
    04    ___._  _ _ _ _    16    ___._  _ _ _ _    28    ___._  _ _ _ _
    05    ___._  _ _ _ _    17    ___._  _ _ _ _    29    ___._  _ _ _ _
    06    ___._  _ _ _ _    18    ___._  _ _ _ _    30    ___._  _ _ _ _
    07    ___._  _ _ _ _    19    ___._  _ _ _ _    31    ___._  _ _ _ _
    08    ___._  _ _ _ _    20    ___._  _ _ _ _    32    ___._  _ _ _ _
    09    ___._  _ _ _ _    21    ___._  _ _ _ _   OFFSET....1....2....3
    10    ___._  _ _ _ _    22    ___._  _ _ _ _    TIME     ___   ___   ___
    11    ___._  _ _ _ _    23    ___._  _ _ _ _   SIGNAL PLAN
    12    ___._  _ _ _ _    24    ___._  _ _ _ _      #       _

  INT TIME: 0-999.9 Sec  OFFSET TIME: 0-999 Sec  PLAN: Signal Plan 1-4
    CODES: A-ACTIVE  S-STARTUP  I-FL ENTRY  O-FL EXIT  (0-No  1-Yes)
```

---------- COORDINATION DATA - DIAL 1 / SPLIT 3 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2 3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL PLAN		
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 1 / SPLIT 4 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2 3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL PLAN		
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 2 / SPLIT 1 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2 3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL PLAN		
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

INT TIME: 0-999.9 Sec OFFSET TIME: 0-999 Sec PLAN: Signal Plan 1-4
CODES: A-ACTIVE S-STARTUP I-FL ENTRY O-FL EXIT (0-No 1-Yes)

---------- COORDINATION DATA - DIAL 2 / SPLIT 2 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 2 / SPLIT 3 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 2 / SPLIT 4 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

INT TIME: 0-999.9 Sec OFFSET TIME: 0-999 Sec PLAN: Signal Plan 1-4
CODES: A-ACTIVE S-STARTUP I-FL ENTRY O-FL EXIT (0-No 1-Yes)

---------- COORDINATION DATA - DIAL 3 / SPLIT 1 ----------

INT#	TIME	A	S	I	O	INT#	TIME	A	S	I	O	INT#	TIME	A	S	I	O
01	___._	_	_	_	_	13	___._	_	_	_	_	25	___._	_	_	_	_
02	___._	_	_	_	_	14	___._	_	_	_	_	26	___._	_	_	_	_
03	___._	_	_	_	_	15	___._	_	_	_	_	27	___._	_	_	_	_
04	___._	_	_	_	_	16	___._	_	_	_	_	28	___._	_	_	_	_
05	___._	_	_	_	_	17	___._	_	_	_	_	29	___._	_	_	_	_
06	___._	_	_	_	_	18	___._	_	_	_	_	30	___._	_	_	_	_
07	___._	_	_	_	_	19	___._	_	_	_	_	31	___._	_	_	_	_
08	___._	_	_	_	_	20	___._	_	_	_	_	32	___._	_	_	_	_
09	___._	_	_	_	_	21	___._	_	_	_	_	OFFSET	1	....	2	....	3
10	___._	_	_	_	_	22	___._	_	_	_	_	TIME	___		___		___
11	___._	_	_	_	_	23	___._	_	_	_	_	SIGNAL	PLAN				
12	___._	_	_	_	_	24	___._	_	_	_	_	#	_				

---------- COORDINATION DATA - DIAL 3 / SPLIT 2 ----------

INT#	TIME	A	S	I	O	INT#	TIME	A	S	I	O	INT#	TIME	A	S	I	O
01	___._	_	_	_	_	13	___._	_	_	_	_	25	___._	_	_	_	_
02	___._	_	_	_	_	14	___._	_	_	_	_	26	___._	_	_	_	_
03	___._	_	_	_	_	15	___._	_	_	_	_	27	___._	_	_	_	_
04	___._	_	_	_	_	16	___._	_	_	_	_	28	___._	_	_	_	_
05	___._	_	_	_	_	17	___._	_	_	_	_	29	___._	_	_	_	_
06	___._	_	_	_	_	18	___._	_	_	_	_	30	___._	_	_	_	_
07	___._	_	_	_	_	19	___._	_	_	_	_	31	___._	_	_	_	_
08	___._	_	_	_	_	20	___._	_	_	_	_	32	___._	_	_	_	_
09	___._	_	_	_	_	21	___._	_	_	_	_	OFFSET	1	....	2	....	3
10	___._	_	_	_	_	22	___._	_	_	_	_	TIME	___		___		___
11	___._	_	_	_	_	23	___._	_	_	_	_	SIGNAL	PLAN				
12	___._	_	_	_	_	24	___._	_	_	_	_	#	_				

---------- COORDINATION DATA - DIAL 3 / SPLIT 3 ----------

INT#	TIME	A	S	I	O	INT#	TIME	A	S	I	O	INT#	TIME	A	S	I	O
01	___._	_	_	_	_	13	___._	_	_	_	_	25	___._	_	_	_	_
02	___._	_	_	_	_	14	___._	_	_	_	_	26	___._	_	_	_	_
03	___._	_	_	_	_	15	___._	_	_	_	_	27	___._	_	_	_	_
04	___._	_	_	_	_	16	___._	_	_	_	_	28	___._	_	_	_	_
05	___._	_	_	_	_	17	___._	_	_	_	_	29	___._	_	_	_	_
06	___._	_	_	_	_	18	___._	_	_	_	_	30	___._	_	_	_	_
07	___._	_	_	_	_	19	___._	_	_	_	_	31	___._	_	_	_	_
08	___._	_	_	_	_	20	___._	_	_	_	_	32	___._	_	_	_	_
09	___._	_	_	_	_	21	___._	_	_	_	_	OFFSET	1	....	2	....	3
10	___._	_	_	_	_	22	___._	_	_	_	_	TIME	___		___		___
11	___._	_	_	_	_	23	___._	_	_	_	_	SIGNAL	PLAN				
12	___._	_	_	_	_	24	___._	_	_	_	_	#	_				

INT TIME: 0-999.9 Sec OFFSET TIME: 0-999 Sec PLAN: Signal Plan 1-4
CODES: A-ACTIVE S-STARTUP I-FL ENTRY O-FL EXIT (0-No 1-Yes)

---------- COORDINATION DATA - DIAL 3 / SPLIT 4 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 4 / SPLIT 1 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 4 / SPLIT 2 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

INT TIME: 0-999.9 Sec OFFSET TIME: 0-999 Sec PLAN: Signal Plan 1-4
CODES: A-ACTIVE S-STARTUP I-FL ENTRY O-FL EXIT (0-No 1-Yes)

---------- COORDINATION DATA - DIAL 4 / SPLIT 3 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

---------- COORDINATION DATA - DIAL 4 / SPLIT 4 ----------

INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O	INT#	TIME	A.S.I.O
01	___._	_ _ _ _	13	___._	_ _ _ _	25	___._	_ _ _ _
02	___._	_ _ _ _	14	___._	_ _ _ _	26	___._	_ _ _ _
03	___._	_ _ _ _	15	___._	_ _ _ _	27	___._	_ _ _ _
04	___._	_ _ _ _	16	___._	_ _ _ _	28	___._	_ _ _ _
05	___._	_ _ _ _	17	___._	_ _ _ _	29	___._	_ _ _ _
06	___._	_ _ _ _	18	___._	_ _ _ _	30	___._	_ _ _ _
07	___._	_ _ _ _	19	___._	_ _ _ _	31	___._	_ _ _ _
08	___._	_ _ _ _	20	___._	_ _ _ _	32	___._	_ _ _ _
09	___._	_ _ _ _	21	___._	_ _ _ _	OFFSET	1	....2....3
10	___._	_ _ _ _	22	___._	_ _ _ _	TIME	___	___ ___
11	___._	_ _ _ _	23	___._	_ _ _ _	SIGNAL	PLAN	
12	___._	_ _ _ _	24	___._	_ _ _ _	#	_	

INT TIME: 0-999.9 Sec OFFSET TIME: 0-999 Sec PLAN: Signal Plan 1-4
CODES: A-ACTIVE S-STARTUP I-FL ENTRY O-FL EXIT (0-No 1-Yes)

---------- TIME BASE DATA - MISCELLANEOUS ----------

DST BEGIN: MONTH - __ WEEK - _
DST END : MONTH - __ WEEK - _

COORD CYCLE ZERO .....: __:__

EQUATED DAY: (DEFINED DAY = DAY)

__ = __ __ __ __ __ __ __
__ = __ __ __ __ __ __ __
__ = __ __ __ __ __ __ __
__ = __ __ __ __ __ __ __
__ = __ __ __ __ __ __ __
__ = __ __ __ = __ __ __
__ = __ __ __ = __ __ __

DST: Daylight Savings Time
Month = 01 to 12 (Begin < END)
Week = 1 to 5 (5 = Last Week)

CYCLE ZERO: Time (HH:MM) Sets Reference For Coord Sync.
- 00:00 = Event Time
- Other = That HH:MM

DAY EQUATES: Care Must Be Used To Insure Days Are Not Equated To Undefined Days Or Days That Are Equated To Other Days. The Result Will Be A Day Without Events To Run.

---------- TIME BASE DATA - TRAFFIC EVENTS ----------

DAY PDAY	TIME HH:MM	COORD PATTERN	GROUP CALL Group #s
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____
__	__:__	_/_/_	____

Reference Data
PDAY - (01-99)
Program Day
HH:MM - 24 Hour
Clock
PATTERN - (D/S/O)
Flash - 5/5/0
Free - 0/0/4
I'Con - 0/0/0

GROUP CALLS -
0 - No
1 - Yes

---------- TIME BASE DATA - DIMMING ----------

	V1	V2	V3	V4
SIGNAL DRIVER				
Red	_	_	_	_
Yellow	_	_	_	_
Green	_	_	_	_
	$\overline{P1}$	$\overline{P2}$	$\overline{P3}$	$\overline{P4}$
SIGNAL DRIVER				
Red	_	_	_	_
Yellow	_	_	_	_
Green	_	_	_	_
	$\overline{VA}$	$\overline{VB}$	$\overline{VC}$	$\overline{VD}$
SIGNAL DRIVER				
Red	_	_	_	_
Yellow	_	_	_	_
Green	_	_	_	_

CODES:
0-NO DIMMING
1-DIMMING

Signal Driver Groups May Be Utilized As A Vehicle Signal Driver Or Ped Signal Driver. "

---------------- TIME BASE DATA - AUXILIARY EVENTS ----------------

DAY PDAY	TIME HH:MM	AUXILIARY CONTROL FUNCTIONS A.123	D.123	DIM	S.12345678
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________
__	__:__	___	___	_	________

Reference Data
PDAY - (01-99)
Program Day
HH:MM - 24 Hr Clock
A.123 - Aux Output
D.123 - Detector
1-Det Diag Value
2-Enables Report
3-Rep. Multiplier
DIM - Dimming State
S.1>8 - Spec Func
Output
(All = 0-Off 1-On)"

-------------- TIME BASE DATA - TIME-OF-YEAR EVENTS --------------

DATE MM/DD/YY	SPECIAL DAY	SPECIAL WEEK	DATE MM/DD/YY	SPECIAL DAY	SPECIAL WEEK
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_
__/__/__	__	_	__/__/__	__	_

Reference Data
Special Day -
Any Program
Day 00-99

Special Week -
Week 1 =
Pday 01-07
Week 2 =
Pday 11-17
Week 3 =
Pday 21-27

```
-------------------- PREEMPTION DATA - GENERAL --------------------

  MINIMUM GREEN / WALK
     Minimum Time .........:  ___   Time In Seconds

  PRIORITIES
   FUNCTIONS:                          PRIORITY: 0-No, Equal Priority
     Preemption Over Flash .:  _                   1-Yes, 1st Has Priority
     Preempt PE1 Over PE2 ..:  _      - When a Function Has Priority
     Preempt PE2 Over PE3 ..:  _        Over Another, The Function Of
     Preempt PE3 Over PE4 ..:  _        Lower Priority
     Preempt PE4 Over PE5 ..:  _        And The Higher Priority Will
     Preempt PE5 Over PE6 ..:  _        Assume Control.

-------------------- PREEMPTION DATA - PREEMPT 1 --------------------

 N-Lock ...:    _    0-No 1-Yes Selective Ped Clear :  ___  |
 Link PE# .:    _    Preempt #    :  :    Yel Clear :  __._ |  Preempt
                                  :  :    Red Clear :  __._ |  Interval
 Delay ....:  ___  |              Track Green (_).....:  ___  > Times In
 Extend ...:  ___  |  Time In       :   Ped Clear ....:  ___ |  Seconds
 Duration .:  ___   > Seconds       :   Yel Clear ....:  __._ |
                   |                :   Red Clear ....:  __._ |  _ - If 0,
 MxCall ...:  ___  |              Dwell Green .........:  ___  |  Skip All
 Lock Out .:  ___  |              Return Ped Clear ...:  ___  |    Track
                                    :    Yel Clear ...:  __._ |  Intervals
 - Set MxCall = 0 To                :    Red Clear ...:  __._ |
   Disable Same.
 - Lock Out Duration Will Be One Sequence Cycle If Set To '0'.
PREEMPT 1 OUTPUT STATUS

 SIGNAL DRIVERS  GRP..V1.V2.V3.V4..P1.P2.P3.P4..VA.VB.VC.VD
    Track Status..:
    Dwell Status..:
    STATUS CODES: 0-Red    1-Green   2-Yellow   3-Fl Red
                  4-Fl Grn 5-Fl Yel  6-Red/Grn  7-Dark
    Ped Signal Utilization; 0-Dont Walk  1-Walk  3-Flsh Dont

 EXIT INTERVALS                      EXIT CALLS (Ped Call)
   DIAL.....1...2...3...4.            GRP.....1...2...3...4.  0-No
   Split 1...:  __  __  __  __        Calls..:   _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If no intervals are programmed,
   Split 4...:  __  __  __  __      PREEMPT shall not occur.
```

```
------------------- PREEMPTION DATA - PREEMPT 1 --------------------

PREEMPT 1 CYCLING

 CYCLING (Interval To Begin)       CYCLING
   DIAL.........1...2...3...4.      On Minimum Times ..:   _   0-No
   Split 1...:  __  __  __  __                                 1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If no intervals are programmed,
   Split 4...:  __  __  __  __      CYCLING shall not occur.

 CYCLING                  0........ 1......... 2......... 3..    Enable
   INTERVALS........... 123456789 0123456789 0123456789 012    Interval
   Signal Plan 1 ....:  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _    During
   Signal Plan 2 ....:  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _    Cycling.
   Signal Plan 3 ....:  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _     0-No
   Signal Plan 4 ....:  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _     1-Yes
PREEMPT 1 LOW PRIORITY ROUTINES

 N-Lock ....:    _   0-No 1-Yes    LOW PRIORITY ROUTINES
 Skip ......:    _   0-No 1-Yes    - Skip (Yes) Will Allow Actuated
 Delay .....:   ___  |               Intervals To Be Bypassed To Get
 Extend ....:   ___  |  Time In      To The Dwell Interval Faster.
 Duration ..:   ___  > Seconds     - Set MxCall = 0 To Disable Same.
 Dwell .....:   ___  |             - Lock Out Duration Will Be One
 MxCall ....:   ___  |                 Sequence Cycle If Set To '0'.
 Lock Out ..:   ___  |
 DWELL INTERVALS                   EXIT CALLS (Ped Call)
   DIAL.........1...2...3...4.      GRP.......1...2...3...4.   0-No
   Split 1...:  __  __  __  __      Calls..:  _   _   _   _    1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If an interval is not programmed for
   Split 4...:  __  __  __  __      a Timing Plan, no PRIORITY override
                                    will occur when that TPs in control.

------------------- PREEMPTION DATA - PREEMPT 2 --------------------

 N-Lock ...:    _    0-No 1-Yes Selective Ped Clear :  ___   |
 Link PE# .:    _    Preempt #     :  :     Yel Clear :  __._  |  Preempt
                                   :  :     Red Clear :  __._  |  Interval
 Delay ....:   ___  |            Track Green (_).....:  ___   > Times In
 Extend ...:   ___  |  Time In     :    Ped Clear ....:  ___   |  Seconds
 Duration .:   ___  > Seconds      :    Yel Clear ....:  __._  |
                    |              :    Red Clear ....:  __._  | _ - If 0,
 MxCall ...:   ___  |            Dwell Green ........:  ___   |  Skip All
 Lock Out .:   ___  |            Return Ped Clear ...:  ___   |   Track
                                   :     Yel Clear ...:  __._  |  Intervals
 - Set MxCall = 0 To               :     Red Clear ...:  __._  |
   Disable Same.
 - Lock Out Duration Will Be One Sequence Cycle If Set To '0'.
```

```
------------------- PREEMPTION DATA - PREEMPT 2 --------------------

PREEMPT 2 OUTPUT STATUS

 SIGNAL DRIVERS  GRP..V1.V2.V3.V4..P1.P2.P3.P4..VA.VB.VC.VD
    Track Status..:    _  _  _  _   _  _  _  _   _  _  _  _
    Dwell Status..:    _  _  _  _   _  _  _  _   _  _  _  _
    STATUS CODES: 0-Red     1-Green   2-Yellow   3-Fl Red
                  4-Fl Grn  5-Fl Yel  6-Red/Grn  7-Dark
    Ped Signal Utilization; 0-Dont Walk  1-Walk  3-Flsh Dont

 EXIT INTERVALS                     EXIT CALLS (Ped Call)
   DIAL.........1...2...3...4.       GRP.......1...2...3...4.  0-No
   Split 1...:  __  __  __  __       Calls..:  _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __     < If no intervals are programmed,
   Split 4...:  __  __  __  __       PREEMPT shall not occur.

PREEMPT 2 CYCLING

 CYCLING (Interval To Begin)        CYCLING
   DIAL.........1...2...3...4.       On Minimum Times ..:  _   0-No
   Split 1...:  __  __  __  __                                1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __     < If no intervals are programmed,
   Split 4...:  __  __  __  __       CYCLING shall not occur.

 CYCLING                   0........ 1......... 2......... 3..   Enable
   INTERVALS.............. 123456789 0123456789 0123456789 012   Interval
   Signal Plan 1 ....:     _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   During
   Signal Plan 2 ....:     _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   Cycling.
   Signal Plan 3 ....:     _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _    0-No
   Signal Plan 4 ....:     _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _    1-Yes
PREEMPT 2 LOW PRIORITY ROUTINES

 N-Lock ....:    _    0-No 1-Yes    LOW PRIORITY ROUTINES
 Skip ......:    _    0-No 1-Yes    - Skip (Yes) Will Allow Actuated
 Delay .....:   ___  |                Intervals To Be Bypassed To Get
 Extend ....:   ___  |  Time In       To The Dwell Interval Faster.
 Duration ..:   ___  >  Seconds     - Set MxCall = 0 To Disable Same.
 Dwell .....:   ___  |              - Lock Out Duration Will Be One
 MxCall ....:   ___  |                  Sequence Cycle If Set To '0'.
 Lock Out ..:   ___  |
 DWELL INTERVALS                    EXIT CALLS (Ped Call)
   DIAL.........1...2...3...4.       GRP.......1...2...3...4.  0-No
   Split 1...:  __  __  __  __       Calls..:  _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __     < If an interval is not programmed for
   Split 4...:  __  __  __  __       a Timing Plan, no PRIORITY override
                                     will occur when that TPs in control.
```

```
-------------------- PREEMPTION DATA - PREEMPT 3 ---------------------

 N-Lock ...:    _   0-No 1-Yes Selective Ped Clear :  ___  |
 Link PE# .:    _   Preempt #     :  :     Yel Clear : __._ |  Preempt
                                  :  :     Red Clear : __._ |  Interval
 Delay ....:  ___  |         Track Green (_).....:  ___   > Times In
 Extend ...:  ___  |  Time In     :   Ped Clear ....:  ___  |  Seconds
 Duration .:  ___  > Seconds      :   Yel Clear ....: __._ |
                   |              :   Red Clear ....: __._ | _ - If 0,
 MxCall ...:  ___  |         Dwell Green ........:  ___  |  Skip All
 Lock Out .:  ___  |         Return Ped Clear ...:  ___  |    Track
                                  :    Yel Clear ...: __._ |  Intervals
 - Set MxCall = 0 To              :    Red Clear ...: __._ |
   Disable Same.
 - Lock Out Duration Will Be One Sequence Cycle If Set To '0'.
PREEMPT 3 OUTPUT STATUS

 SIGNAL DRIVERS  GRP..V1.V2.V3.V4..P1.P2.P3.P4..VA.VB.VC.VD
    Track Status..:    _  _  _  _   _  _  _  _   _  _  _  _
    Dwell Status..:    _  _  _  _   _  _  _  _   _  _  _  _
    STATUS CODES: 0-Red     1-Green   2-Yellow   3-Fl Red
                  4-Fl Grn  5-Fl Yel  6-Red/Grn  7-Dark
    Ped Signal Utilization; 0-Dont Walk  1-Walk  3-Flsh Dont

 EXIT INTERVALS                     EXIT CALLS (Ped Call)
   DIAL..........1...2...3...4.      GRP........1...2...3...4.  0-No
   Split 1...:  __  __  __  __       Calls..:    _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If no intervals are programmed,
   Split 4...:  __  __  __  __      PREEMPT shall not occur.
PREEMPT 3 CYCLING

 CYCLING (Interval To Begin)        CYCLING
   DIAL..........1...2...3...4.      On Minimum Times ..:   _    0-No
   Split 1...:  __  __  __  __                                   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If no intervals are programmed,
   Split 4...:  __  __  __  __      CYCLING shall not occur.

 CYCLING                  0........ 1......... 2......... 3..   Enable
   INTERVALS............ 123456789 0123456789 0123456789 012   Interval
   Signal Plan 1 ....:   _________ __________ __________ ___   During
   Signal Plan 2 ....:   _________ __________ __________ ___   Cycling.
   Signal Plan 3 ....:   _________ __________ __________ ___    0-No
   Signal Plan 4 ....:   _________ __________ __________ ___    1-Yes
```

```
-------------------- PREEMPTION DATA - PREEMPT 3 --------------------

PREEMPT 3 LOW PRIORITY ROUTINES

 N-Lock ....:    _   0-No 1-Yes     LOW PRIORITY ROUTINES
 Skip ......:    _   0-No 1-Yes     - Skip (Yes) Will Allow Actuated
 Delay .....:  ___  |                 Intervals To Be Bypassed To Get
 Extend ....:  ___  |  Time In         To The Dwell Interval Faster.
 Duration ..:  ___   > Seconds      - Set MxCall = 0 To Disable Same.
 Dwell .....:  ___  |               - Lock Out Duration Will Be One
 MxCall ....:  ___  |                   Sequence Cycle If Set To '0'.
 Lock Out ..:  ___  |
 DWELL INTERVALS                    EXIT CALLS (Ped Call)
   DIAL.....1...2...3...4.           GRP.....1...2...3...4.  0-No
   Split 1...:  __  __  __  __       Calls..:   _   _   _   _  1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If an interval is not programmed for
   Split 4...:  __  __  __  __      a Timing Plan, no PRIORITY override
                                    will occur when that TPs in control.

-------------------- PREEMPTION DATA - PREEMPT 4 --------------------

 N-Lock ...:    _   0-No 1-Yes Selective Ped Clear :  ___  |
 Link PE# .:    _   Preempt #    :  :    Yel Clear : __._  |  Preempt
                                 :  :    Red Clear : __._  |  Interval
 Delay ....:  ___  |           Track Green (_).....:  ___   > Times In
 Extend ...:  ___  |  Time In    :   Ped Clear ....:  ___  |  Seconds
 Duration .:  ___   > Seconds    :   Yel Clear ....: __._  |
                   |             :   Red Clear ....: __._  |  _ - If 0,
 MxCall ...:  ___  |           Dwell Green .......:  ___  |  Skip All
 Lock Out .:  ___  |           Return Ped Clear ...:  ___  |    Track
                                 :    Yel Clear ...: __._  |  Intervals
 - Set MxCall = 0 To             :    Red Clear ...: __._  |
   Disable Same.
 - Lock Out Duration Will Be One Sequence Cycle If Set To '0'.
PREEMPT 4 OUTPUT STATUS

 SIGNAL DRIVERS  GRP..V1.V2.V3.V4..P1.P2.P3.P4..VA.VB.VC.VD
    Track Status..:     _  _  _  _   _  _  _  _   _  _  _  _
    Dwell Status..:     _  _  _  _   _  _  _  _   _  _  _  _
    STATUS CODES: 0-Red    1-Green   2-Yellow   3-Fl Red
                  4-Fl Grn 5-Fl Yel  6-Red/Grn  7-Dark
    Ped Signal Utilization; 0-Dont Walk  1-Walk  3-Flsh Dont

 EXIT INTERVALS                     EXIT CALLS (Ped Call)
   DIAL.....1...2...3...4.           GRP.....1...2...3...4.  0-No
   Split 1...:  __  __  __  __       Calls..:   _   _   _   _  1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __    < If no intervals are programmed,
   Split 4...:  __  __  __  __      PREEMPT shall not occur.
```

```
-------------------- PREEMPTION DATA - PREEMPT 4 --------------------

PREEMPT 4 CYCLING

 CYCLING (Interval To Begin)          CYCLING
   DIAL.....1...2...3...4.             On Minimum Times ..:   _   0-No
   Split 1...:  __  __  __  __                                    1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __     < If no intervals are programmed,
   Split 4...:  __  __  __  __       CYCLING shall not occur.

 CYCLING              0........ 1......... 2......... 3..     Enable
   INTERVALS.......... 123456789 0123456789 0123456789 012    Interval
   Signal Plan 1 ....: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _  During
   Signal Plan 2 ....: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _  Cycling.
   Signal Plan 3 ....: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   0-No
   Signal Plan 4 ....: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   1-Yes
PREEMPT 4 LOW PRIORITY ROUTINES

 N-Lock ....:    _   0-No 1-Yes    LOW PRIORITY ROUTINES
 Skip ......:    _   0-No 1-Yes    - Skip (Yes) Will Allow Actuated
 Delay .....:  ___  |                 Intervals To Be Bypassed To Get
 Extend ....:  ___  |  Time In        To The Dwell Interval Faster.
 Duration ..:  ___   > Seconds     - Set MxCall = 0 To Disable Same.
 Dwell .....:  ___  |              - Lock Out Duration Will Be One
 MxCall ....:  ___  |                  Sequence Cycle If Set To '0'.
 Lock Out ..:  ___  |
 DWELL INTERVALS                    EXIT CALLS (Ped Call)
   DIAL.....1...2...3...4.           GRP.....1...2...3...4.  0-No
   Split 1...:  __  __  __  __       Calls..:   _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __     < If an interval is not programmed for
   Split 4...:  __  __  __  __       a Timing Plan, no PRIORITY override
                                     will occur when that TPs in control.

-------------------- PREEMPTION DATA - PREEMPT 5 --------------------

 N-Lock ...:    _   0-No 1-Yes Selective Ped Clear :  ___  |
 Link PE# .:    _   Preempt #    :  :    Yel Clear :  __._ |  Preempt
                                 :  :    Red Clear :  __._ |  Interval
 Delay ....:  ___  |           Track Green (_).....:  ___   > Times In
 Extend ...:  ___  |  Time In    :   Ped Clear ....:  ___  |  Seconds
 Duration .:  ___   > Seconds    :   Yel Clear ....:  __._ |
              |                  :   Red Clear ....:  __._ | _ - If 0,
 MxCall ...:  ___  |           Dwell Green ........:  ___  |  Skip All
 Lock Out .:  ___  |           Return Ped Clear ...:  ___  |    Track
                                 :    Yel Clear ...:  __._ |  Intervals
 - Set MxCall = 0 To             :    Red Clear ...:  __._ |
   Disable Same.
 - Lock Out Duration Will Be One Sequence Cycle If Set To '0'.
```

```
-------------------- PREEMPTION DATA - PREEMPT 5 --------------------

PREEMPT 5 OUTPUT STATUS

 SIGNAL DRIVERS  GRP..V1.V2.V3.V4..P1.P2.P3.P4..VA.VB.VC.VD
    Track Status..:     _  _  _  _   _  _  _  _   _  _  _  _
    Dwell Status..:     _  _  _  _   _  _  _  _   _  _  _  _
    STATUS CODES: 0-Red      1-Green    2-Yellow    3-Fl Red
                  4-Fl Grn   5-Fl Yel   6-Red/Grn   7-Dark
    Ped Signal Utilization; 0-Dont Walk  1-Walk   3-Flsh Dont

 EXIT INTERVALS                        EXIT CALLS (Ped Call)
   DIAL..........1...2...3...4.         GRP........1...2...3...4.  0-No
   Split 1...:  __  __  __  __          Calls..:   _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __       < If no intervals are programmed,
   Split 4...:  __  __  __  __         PREEMPT shall not occur.

PREEMPT 5 CYCLING

 CYCLING (Interval To Begin)           CYCLING
   DIAL..........1...2...3...4.         On Minimum Times ..:   _   0-No
   Split 1...:  __  __  __  __                                     1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __       < If no intervals are programmed,
   Split 4...:  __  __  __  __         CYCLING shall not occur.

 CYCLING                 0........ 1......... 2......... 3..   Enable
   INTERVALS........... 123456789 0123456789 0123456789 012   Interval
   Signal Plan 1 ....:  _________ __________ __________ ___   During
   Signal Plan 2 ....:  _________ __________ __________ ___   Cycling.
   Signal Plan 3 ....:  _________ __________ __________ ___    0-No
   Signal Plan 4 ....:  _________ __________ __________ ___    1-Yes
PREEMPT 5 LOW PRIORITY ROUTINES

 N-Lock ....:     _    0-No 1-Yes     LOW PRIORITY ROUTINES
 Skip ......:     _    0-No 1-Yes     - Skip (Yes) Will Allow Actuated
 Delay .....:   ___  |                  Intervals To Be Bypassed To Get
 Extend ....:   ___  |  Time In         To The Dwell Interval Faster.
 Duration ..:   ___  > Seconds        - Set MxCall = 0 To Disable Same.
 Dwell .....:   ___  |                - Lock Out Duration Will Be One
 MxCall ....:   ___  |                    Sequence Cycle If Set To '0'.
 Lock Out ..:   ___  |
 DWELL INTERVALS                      EXIT CALLS (Ped Call)
   DIAL..........1...2...3...4.        GRP........1...2...3...4.  0-No
   Split 1...:  __  __  __  __         Calls..:   _   _   _   _   1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __      < If an interval is not programmed for
   Split 4...:  __  __  __  __        a Timing Plan, no PRIORITY override
                                      will occur when that TPs in control.
```

```
-------------------- PREEMPTION DATA - PREEMPT 6 ---------------------

 N-Lock ...:    _   0-No 1-Yes Selective Ped Clear :  ___   |
 Link PE# .:    _   Preempt #     :  :     Yel Clear : __._  |  Preempt
                                  :  :     Red Clear : __._  |  Interval
 Delay ....:  ___  |           Track Green (_).....:  ___   > Times In
 Extend ...:  ___  |  Time In     :    Ped Clear ....:  ___   |  Seconds
 Duration .:  ___  > Seconds      :    Yel Clear ....: __._  |
                   |              :    Red Clear ....: __._  | _ - If 0,
 MxCall ...:  ___  |           Dwell Green ........:  ___   |  Skip All
 Lock Out .:  ___  |           Return Ped Clear ...:  ___   |    Track
                                  :     Yel Clear ...: __._  |  Intervals
 - Set MxCall = 0 To              :     Red Clear ...: __._  |
   Disable Same.
 - Lock Out Duration Will Be One Sequence Cycle If Set To '0'.
PREEMPT 6 OUTPUT STATUS

 SIGNAL DRIVERS  GRP..V1.V2.V3.V4..P1.P2.P3.P4..VA.VB.VC.VD
    Track Status..:       _  _  _  _   _  _  _  _   _  _  _  _
    Dwell Status..:       _  _  _  _   _  _  _  _   _  _  _  _
    STATUS CODES: 0-Red     1-Green    2-Yellow    3-Fl Red
                  4-Fl Grn  5-Fl Yel   6-Red/Grn   7-Dark
    Ped Signal Utilization; 0-Dont Walk  1-Walk  3-Flsh Dont

 EXIT INTERVALS                       EXIT CALLS (Ped Call)
   DIAL.........1...2...3...4.         GRP.......1...2...3...4.   0-No
   Split 1...:  __  __  __  __         Calls..:  _   _   _   _    1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __      < If no intervals are programmed,
   Split 4...:  __  __  __  __        PREEMPT shall not occur.
PREEMPT 6 CYCLING

 CYCLING (Interval To Begin)          CYCLING
   DIAL.........1...2...3...4.         On Minimum Times ..:  _    0-No
   Split 1...:  __  __  __  __                                    1-Yes
   Split 2...:  __  __  __  __
   Split 3...:  __  __  __  __      < If no intervals are programmed,
   Split 4...:  __  __  __  __        CYCLING shall not occur.

 CYCLING                  0........ 1......... 2......... 3..    Enable
   INTERVALS............. 123456789 0123456789 0123456789 012    Interval
   Signal Plan 1 ....:    _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _    During
   Signal Plan 2 ....:    _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _    Cycling.
   Signal Plan 3 ....:    _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _     0-No
   Signal Plan 4 ....:    _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _     1-Yes
```

---------- PREEMPTION DATA - PREEMPT 6 ----------

PREEMPT 6 LOW PRIORITY ROUTINES

```
N-Lock ....:   _   0-No 1-Yes
Skip ......:   _   0-No 1-Yes
Delay .....:  ___  |
Extend ....:  ___  |  Time In
Duration ..:  ___  > Seconds
Dwell .....:  ___  |
MxCall ....:  ___  |
Lock Out ..:  ___  |
```

LOW PRIORITY ROUTINES
- Skip (Yes) Will Allow Actuated Intervals To Be Bypassed To Get To The Dwell Interval Faster.
- Set MxCall = 0 To Disable Same.
- Lock Out Duration Will Be One Sequence Cycle If Set To '0'.

DWELL INTERVALS

```
  DIAL.....1...2...3...4.
  Split 1...:  __  __  __  __
  Split 2...:  __  __  __  __
  Split 3...:  __  __  __  __
  Split 4...:  __  __  __  __
```

EXIT CALLS (Ped Call)

```
 GRP.....1...2...3...4.   0-No
 Calls..:   _   _   _   _   1-Yes
```

< If an interval is not programmed for a Timing Plan, no PRIORITY override will occur when that TPs in control.

---------- SYSTEM DATA - GENERAL ----------

```
LOCAL                              ADDRESS:
ADDRESS .............:  __                THREE DIGITS 001-032

REVERT                             REVERT:
TO BACKUP ...........:  ___               MINUTES 015-255
```

1) An Address Other Than "000" Transfers Local I/O To Its System Definition.
2) On Loss Of Communications The Local Will Revert To Its Time Base Events After The Time Set.

---------- SYSTEM DATA - SYSTEM DETECTORS ----------

```
          SYSTEM DETECTOR.....1....2....3....4....5....6....7....8
DETECTOR   Special Det...:   __   __   __   __   __   __   __   __
 ASSIGN    Phase Det.....:   __   __   __   __   __   __   __   __
          System Detector Assigned To #-Special Or #-Phase

          SYSTEM DETECTOR.....1....2....3....4....5....6....7....8
V+O        VPHR x 100 ...:  ___  ___  ___  ___  ___  ___  ___  ___
PARAMETER  AVGT .........:  ___  ___  ___  ___  ___  ___  ___  ___
           CTFC .........:  ___  ___  ___  ___  ___  ___  ___  ___
           MVOL % .......:  ___  ___  ___  ___  ___  ___  ___  ___
          VPHR - Lane Capacity        CTFC - Correction Factor
          AVGT - Averaging Time       MVOL% - Min Vol B4 Occup
```

```
------------------- SYSTEM DATA - QUEUE ROUTINES -------------------

  ASSIGNMENT          ------- QUEUE 1 -------     ------- QUEUE 2 -------
  Detector.............1.....2.....3.....4.     ...1.....2.....3.....4
    Sys Det #           _     _     _     _       _     _     _     _
    Factor WTFC        ___   ___   ___   ___     ___   ___   ___   ___
  Input Select...       _ (0-Avg  1-Highest)      _ (0-Avg  1-Highest)
  Failed Level...       _ (# to Fail Routine)     _ (# to Fail Routine)

  SELECT Level..... A ..... B .....     ..... A ..... B .....
    % Enter (Up)      __    __            __    __
    % Leave (Dn)
   Pattern.......  ..... D/S/O . D/S/O .....  ..... D/S/O . D/S/O ....
    Called           _/_/_   _/_/_             _/_/_   _/_/_

------------------- SYSTEM DATA - MISCELLANEOUS -------------------

DETECTOR DIAGNOSTIC VALUES
 DIAGNOSTIC.............  Max Presence  No Activity   Erratic Count
   Value 0 .............:     ___           ___            ___
   Value 1 .............:     ___           ___            ___
                          Minutes       Minutes     Count / Minute
            Time Base Auxiliary "D1" Enables Value 1

REPORT PARAMETERS
 Sample Interval .......:     ___        Interval:   00-99  Minutes

  Time Base Auxiliary "D2" Starts A Report (Interval Sets Duration)
  Time Base Auxiliary "D3" Sets "RAW" Multiplier (0= x10  1= x100)

---------------------- SYSTEM DATA - SPEED ----------------------

GENERAL
 Measurement ......: __       0-Miles/Hour   1-Kilometers/Hour

SPEED TRAPS
 TRAP NO. 1          Det 1  Det 2    TRAP NO. 2          Det 1  Det 2
 Special Detector .:  __     __       Special Detector .:  __     __
 Phase Detector ...:  __     __       Phase Detector ...:  __     __
 Distance .........:  __              Distance .........:  __
   1) Each Speed Trap Needs Two Detectors Assigned, Any Special
      Detector or Phase Detector May Be Assigned.
   2) The Distance Between Det 1 and Det 2 May Be Either 11 Feet
      or 22 Feet. Enter "1" For 11 Ft or "2" for 22 Ft.
```

---------- SYSTEM DATA - SPEED ----------

RANGES / PATTERN

PATTERN..... Dial	Split		OFFSET 1 Low	OFFSET 1 High	OFFSET 2 Low	OFFSET 2 High	OFFSET 3 Low	OFFSET 3 High
1	1	:	___	___	___	___	___	___
1	2	:	___	___	___	___	___	___
1	3	:	___	___	___	___	___	___
1	4	:	___	___	___	___	___	___
2	1	:	___	___	___	___	___	___
2	2	:	___	___	___	___	___	___
2	3	:	___	___	___	___	___	___
2	4	:	___	___	___	___	___	___
3	1	:	___	___	___	___	___	___
3	2	:	___	___	___	___	___	___
3	3	:	___	___	___	___	___	___
3	4	:	___	___	___	___	___	___
4	1	:	___	___	___	___	___	___
4	2	:	___	___	___	___	___	___
4	3	:	___	___	___	___	___	___
4	4	:	___	___	___	___	___	___

RANGES:
Enter The Low & High Speed In MPH or KPH For Each Pattern To Enable A Report of % Lower, Within, & Above It.

STATEMENT OF WARRANTY

WARRANTIES:

EQUIPMENT: Eagle Traffic Control Systems warrants that this equipment manufactured by Eagle Traffic Control Systems will be free of defects in material or workmanship for a period of one (1) year from date of receipt by buyer. Should any failure to conform to this warranty appear within the warranty period Eagle Traffic Control Systems, upon prompt written notification thereof, will, at its option, repair or replace any part(s) which, upon examination, by Eagle Traffic Control Systems is found to be defective, warranty inspections and repairs will be performed at the Eagle Traffic Control Systems manufacturing facilities after receipt of the item from Buyer. No equipment shall be returned during the warranty period without our prior written consent, which consent will not be unreasonably withheld.

SERVICES: Eagle Traffic Control Systems warrants that the recommendations, guidance, and performance of its personnel will reflect competent, professional knowledge and judgment. In the event any portion of the services furnished fails to comply with this warranty obligation and Eagle Traffic Control Systems is so notified in writing prior to warranty expiration, Eagle Traffic Control Systems will promptly reperform such portion of the service without additional compensation from Buyer.

WARRANTY CONDITIONS: These warranties are conditioned upon the proper receipt, handling, storage, maintenance, and installation of Equipment furnished or serviced hereunder in a safe and prudent manner and in accordance with any Eagle Traffic Control Systems recommendation, and upon such Equipment or material having been operated and maintained in a normal and proper manner under competent supervision and not having been subjected to accident, alteration, abuse, or misuse. All transportation charges associated with repairing or replacing Equipment at an Eagle Traffic Control Systems designated repair facility shall be Buyer's responsibility.

LIMITATIONS OF WARRANTIES AND REMEDIES:

WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER STATUTORY, EXPRESS, OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ALL WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OR TRADE. Remedies provided above are Buyer's sole remedies for any failure by Eagle Traffic Control Systems to comply with its warranty obligations. Correction of non-conformities in the manner and for the period of time provided herein shall constitute complete fulfillment of all the liabilities of Eagle Traffic Control Systems for defective equipment, materials, or services, whether the claims by Buyer are based in contract, in tort (including negligence or strict liability), or otherwise.

LIMITATION OF LIABILITY

Neither Eagle Traffic Control Systems not its sub-contractors or suppliers of any tier will be liable to Buyer for any special, indirect, liquidated, incidental or consequential damage or loss or for damage or loss of property or equipment not furnished under a purchase order resulting therefrom on which the liability is based, or claims of Buyer's customers. The remedies set forth herein are exclusive and for each item of equipment, material, or services, the total cumulative liability of Eagle Traffic Control Systems under any purchase order accepted by Eagle Traffic Control Systems or anything done in connection therewith, will be limited to the price of the item of equipment, material or services. In all cases where Buyer's claim, whether based in contract, in tort (including negligence and strict liability), under any warranty, or otherwise, arises out of or in connection with the sale, delivery, or use of defective equipment, material, or services supplied hereunder or damage resulting therefrom, Buyer's exclusive remedies and Eagle Traffic Control Systems sole liability shall be limited to those specifically outlined in the warranty provision.

The provisions of this section, Limitation of Liability, shall also protect Eagle Traffic Control Systems suppliers and sub-contractors and shall apply, to the full extent permitted by law and regardless of fault and shall survive either termination, cancellation or expiration of the order.

The provisions of this section, Limitation of Liability, shall apply notwithstanding any other provision of the purchase order.

The equipment and material are intended for use only for the purpose for which they were expressly provided. With respect to any other use, Eagle Traffic Control Systems makes no representation or warranty and assumes no liability of any kind, whether in contract or tort (including negligence and strict liability).

WARRANTY QUESTIONS AND ANSWERS

1. QUESTION – What is not covered in the Eagle Traffic Control Systems warranty?

   ANSWER – Equipment failures due to acts of God including damage by flood, vehicles, lightning strikes, etc., or errors or damage in installation, or improperly maintained equipment. Damage during transportation is not a failure within warranty; the purchaser recourse is against the carrier.

2. QUESTION – Must equipment always be returned to Austin?

   ANSWER – At Eagle Traffic Control Systems option, such repairs may be made by Eagle Traffic Control Systems personnel in the field.

3. QUESTION – What do I do in an emergency?

   ANSWER – Call Eagle Traffic Control Systems Technical Service Department before making any expenditure of funds. At Eagle Traffic Control Systems option and with OUR prior approval, a third party may be authorized to make such repairs. At the time of your call, the details of the work to be done, charges and billing will be determined.

4. QUESTION – May I rent or supply equipment for use while Eagle Traffic Control Systems equipment is under repair and bill Eagle Traffic Control Systems?

   ANSWER – No. Backup equipment is the purchaser's responsibility.

5. QUESTION – May I make some repairs without prior authorization and bill later?

   ANSWER – No, good business practice, just as you apply in your own business, dictates that NO UNAUTHORIZED REPAIRS WILL BE PAID by Eagle Traffic Control Systems.

6. QUESTION – What if it is found that the cause of a failure for which Eagle Traffic Control Systems has made a Field Service trip was due to equipment not supplied by Eagle Traffic Control Systems?

   ANSWER – Those service calls will be billed to you.

7. QUESTION – When I have equipment under warranty repaired, or replaced, what is my remaining warranty?

   ANSWER – Equipment will retain its warranted status, until the end of the original warranty period given when the equipment was purchased. (See Question 2)

8. QUESTION – If I return equipment and it is found not to be defective, what will happen?

   ANSWER – The cost of testing will be billed to you in such cases.

9. QUESTION – How is the repair of equipment out of warranty handled?

   ANSWER – After the equipment is received from you, prepaid, it will be restored to the original design specifications and returned. You will be billed for this service and granted a ninety day warranty from the date of shipment of the repaired equipment.

10. QUESTION – Will my returned equipment be the most up-to-date modification?

    ANSWER – Advances in the state of the art from time to time in worthwhile improvements in performance and reliability. When such is possible, you will be contacted by Eagle Traffic Control Systems Technical Service Department and given the option to approve such a modification. Charges for the modification and the effect on the balance of your equipment will be discussed in full.

11. QUESTION – Whom do I contact for more information?

    ANSWER – Call or write Eagle Traffic Control Systems – Supervisor, Technical Service Department.