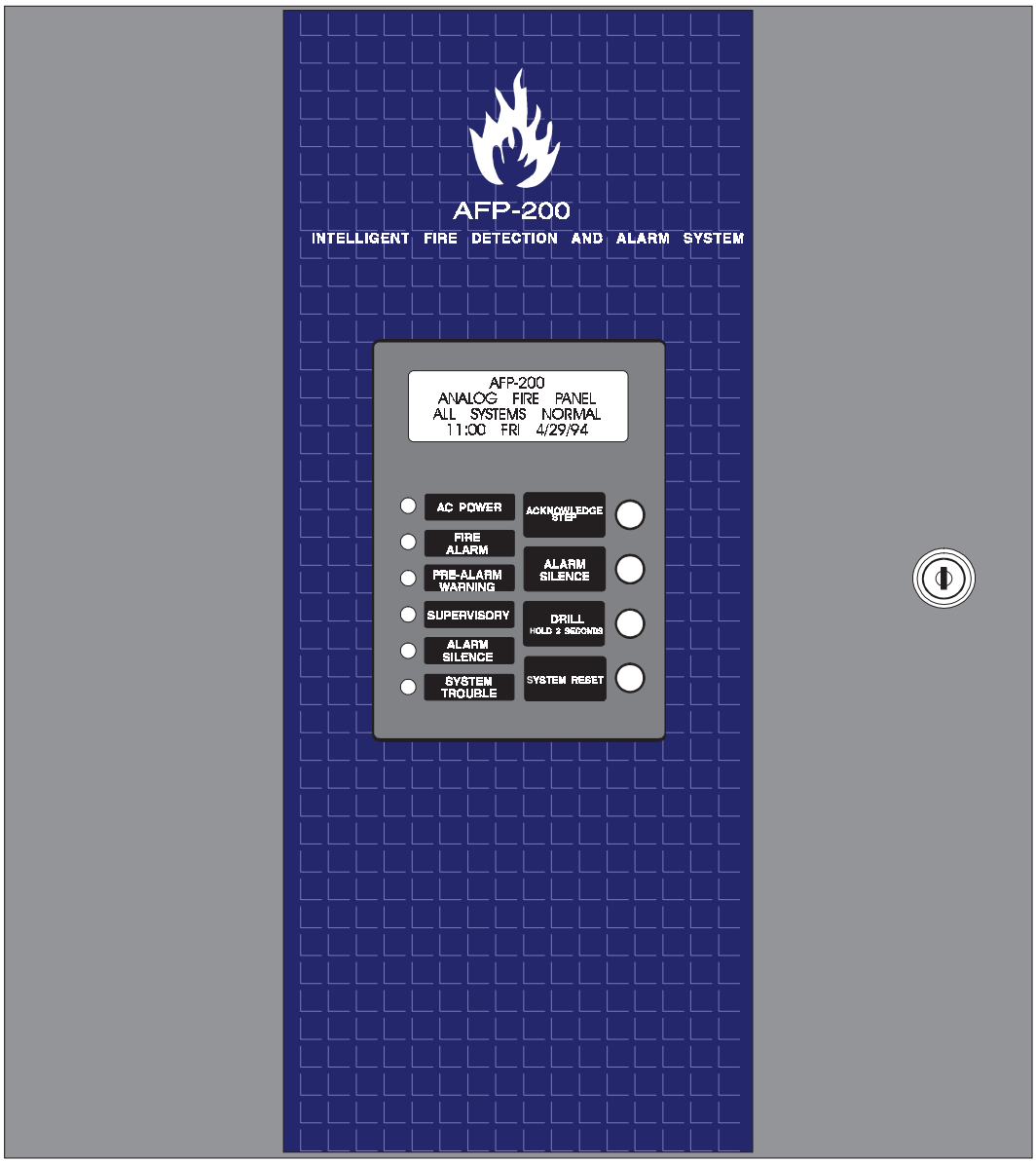
NOTIFIER

12 Clintonville Road
Northford, CT 06472
TEL (203) 484-7161
FAX 203.484.7718



EIA-232D Protocol And Data Formats for the AFP-200 Fire Alarm Control Panel

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1.0 Introduction

This document defines the protocol and data formats that the Notifier AFP-200 Fire Alarm Control Panel uses to communicate information over the EIA-232D serial interface.

2.0 Protocol

The AFP-200 FACP protocol is as follows:

- serial communications
- 2400 BAUD
- full duplex
- 1 start bit
- 7 data bits
- 1 parity bit
- even parity
- 1 stop bit

3.0 Interface Connections

The serial interface used to connect the AFP-200 to external devices (terminals, monitors and printers) is located on the AFP-200 motherboard terminal block TB4 and is as follows:

AFP-200 TB4	Function	DB-25 Connector
Terminal 1	Transmit	Pin 3
Terminal 2	Reference	Pin 7
Terminal 3	Receive	Pin 2

4.0 Input Characters

The following sections describe the valid data characters the AFP-200 FACP will process, all other input characters will be ignored.

The general input characters are as follows:

Characters	Hexadecimal Codes
A - Z	41 - 5A
a - z	61 - 7A
0 - 9	30 - 39
Space	20
(	28
)	29
-	2D
.	2E
Back Space	08
Carriage Return	0D
~	7E

4.1 Special Function Keys

The following list defines the character codes the AFP-200 FACP will look for when a special function key is depressed. These keys must be programmed as defined for proper special function key operation.

Key	Function	Code
F1	Read Status	~A
F2	Alter Status	~B
F5	Prior	~E
F6	Next	~F
F12	Acknowledge	~L
F13	Signal Silence	~M
F14	System Reset	~N
Shift F13	Manual Evacuate	~Q

5.0 Output Characters

The general output characters are as follows:

Characters	Hexadecimal Codes
A - Z	41 - 5A
0 - 9	30 - 39
Space	20
"	22
#	23
(	28
)	29
*	2A
+	2B
,	2C
-	2D
.	2E
/	2F
:	3A
=	3D
?	3F
Carriage Return	0D
Line Feed	0A
BELL	07
Solid Block	FF
ESCape	1B
@	40
f	66
g	67

5.1 Printer Characters

The printer characters are as follows:

Characters	Hexadecimal Codes
A - Z	41 - 5A
0 - 9	30 - 39
SPace	20
"	22
#	23
(	28
)	29
*	2A
+	2B
,	2C
-	2D
.	2E
/	2F
:	3A
=	3D
?	3F
Carriage Return	0D
Line Feed	0A
ESCape	1B
x	78
NULL	00

5.2 Message Terminator

The terminator for an 80 character output message is a Carriage Return (0D hexadecimal) followed by a Line Feed (0A hexadecimal).

6.0 Modes of Operation

The AFP-200 FACP may communicate with a remote terminal, computer or printer connected to its EIA-232 serial port. The EIA-232 port can be configured for interactive operation or for monitoring only. Interactive operation requires that all equipment be UL listed under UL Standard for Safety UL864 and be installed/configured as directed under "Local Terminal Mode (LocT)" or "Local Monitor Mode (LocM)." Electronic Data Processing (EDP) listed equipment is permitted for ancillary system monitoring when the system is installed/configured as directed under "Remote Monitor Mode (RemM)."

Note: *The use of EDP listed equipment is also permitted for temporary applications such as system servicing or programming.*

The EIA-232 ports on some terminals/computers, including the Notifier CRT-2, are not isolated from earth ground. These devices should be connected to the AFP-200 via isolation modems only, since their direct connection would result in a ground fault being introduced on the AFP-200.

There are three different operating modes for the EIA-232 port, Local Terminal, Local Monitor, and Remote Monitor. The operating mode is selected during panel programming, under the system parameters section (7=SYSTEM). The operation of each mode is described in the following section.

6.1 Local Terminal Mode (LocT)

Local Terminal Mode operation allows the user to perform Read Status and Alter Status operations from the terminal. In addition the user can also Acknowledge, Signal Silence, Reset, and perform a Drill function from the terminal. A user definable password is required to perform the Alter Status function. The following functions are available when operating in Local Terminal Mode:

Note: *The Terminal must be mounted in a UL-864 listed enclosure, a Notifier Rack-51, Rack-67 or arranged to provide equivalent protection against unauthorized use.*

Read Status

Display the status of an individual point (Detector, Module, Panel Circuit, or Zone)
Display a list of all the points in alarm or trouble
Display a list of all programmed points in the system
Step through the history buffer event by event
Display the entire history buffer

Alter Status

Disable/Enable an individual point
Change the sensitivity of a detector
Clear the verification counter of all detectors
Clear the entire history buffer
Set the AWACS alert and action levels

Control Functions

Acknowledge
Signal Silence
System Reset
Drill

6.2 Local Monitor Mode (LocM)

Local Monitor mode operation allows the same functions as Local Terminal mode with the exception that a password is required to perform Acknowledge, Silence, Reset, and Drill. Because of this password security feature the terminal does not need to be enclosed in a rack to prevent unauthorized use.

6.3 Remote Monitor Mode (RemM)

Remote Monitor mode operation only permits the user to perform the Read Status function. This mode can be used with UL EDP listed terminals, including personal computers using *Notifier PK-1 release 2.0 software* or terminal emulation software. It is also intended for terminals that are connected through modems, including FSK modems connected through a public switched telephone network.

7.0 Message Formats and Descriptions

The following section describes the different types of 80-character message strings produced by the AFP-200 Fire Alarm Control Panel. These are shown using the 1 line by 80 character format that would typically be displayed on a monitor or 80-column printer. Sections 8.0 and 9.0 detail inquiries and programming changes that may be made via the EIA-232D port. ***Note:*** *Section 7.0 details the AFP-200 messages as they would appear while the panel is operating in normal USA mode. For information regarding European mode operation refer to Appendix C.*

7.1 Alarm Messages

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
ALARM: SMOKE (ION)  <CUSTOM POINT LABEL <CUSTOM ZONE LABEL>  HH:MMA MM/DD/YY DNN
```

Status Field (6 Characters)

ALARM:
ACTIVE

Type Code Field (12 Characters)

SMOKE (ION)
SMOKE(PHOTO)
HEAT(ANALOG)
MONITOR
PULL STATION
SMOKE DETECT
HEAT DETECT
WATERFLOW
SUPERVISORY
TAMPER
NON FIRE
HAZARD ALERT
FIRE CONTROL
ABORT SWITCH
MAN. RELEASE
SILENCE
SYSTEM RESET
EVACUATE
PAS INHIBIT
TROUBLE MON
BURGLAR ALA

Custom Point Label (19 Characters)

The user defined label for the activated device will be displayed in this field.

Custom Zone Label (19 Characters)

The user defined label for the first zone that is mapped to this device will be displayed in this field.

Time of Alarm/Activation (6 Characters)

The time the device was activated will be displayed in an hour:minutes format, with the last character of the string being either an A for AM or a P for PM.

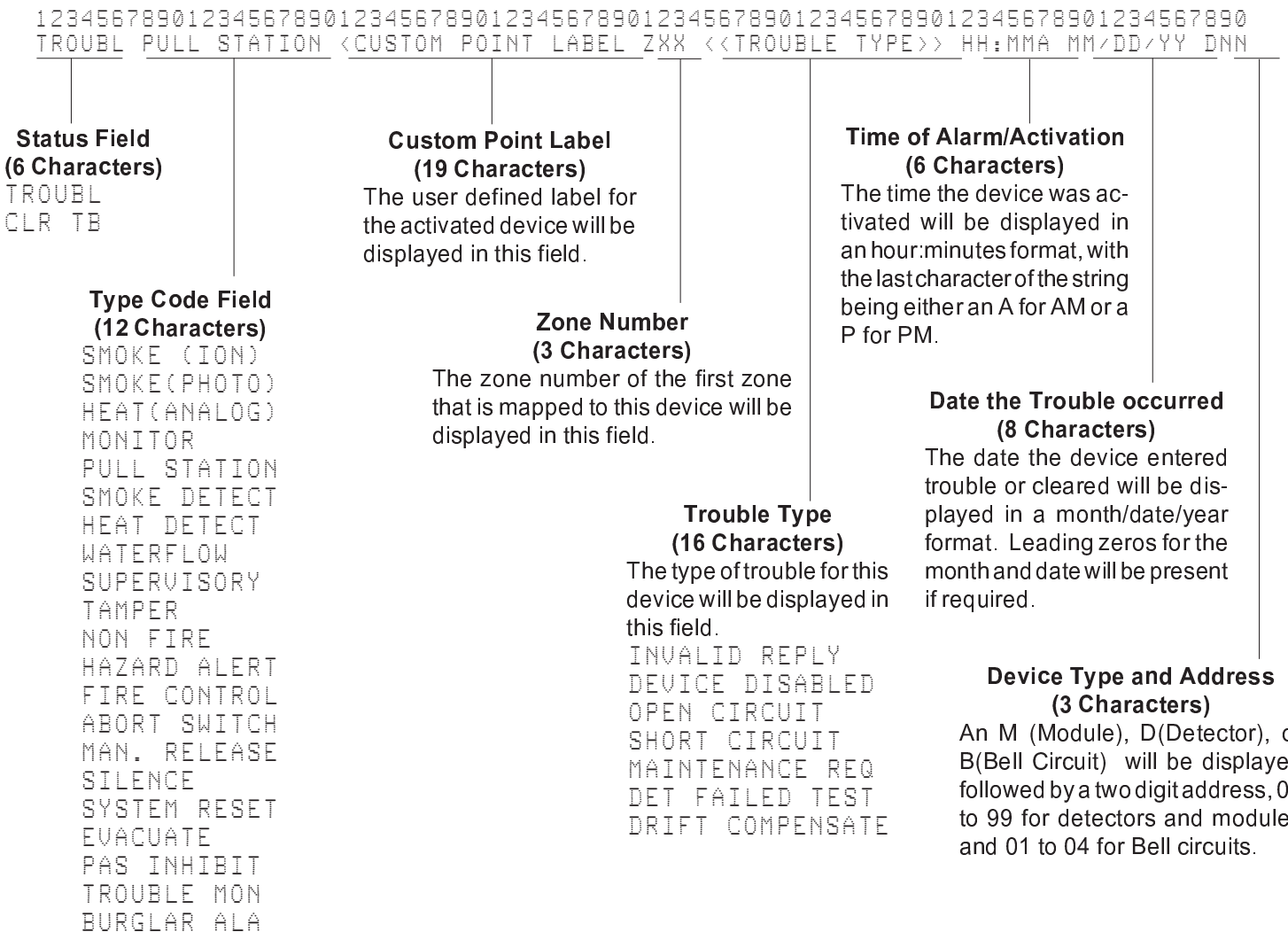
Date of Alarm/Activation (8 Characters)

The date the device was activated will be displayed in a month/date/year format. Leading zeros for the month and date will be present if required.

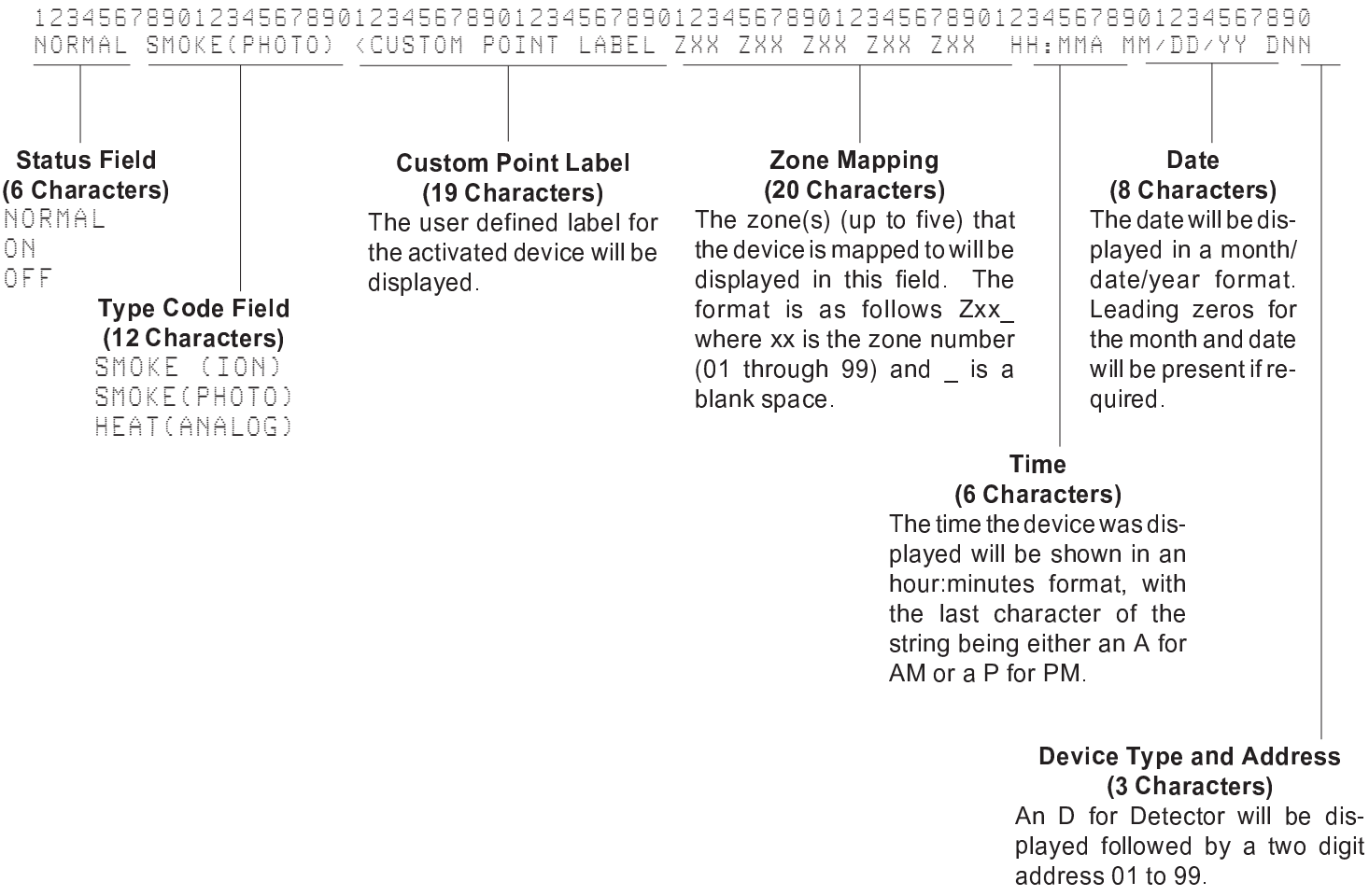
Device Type and Address (3 Characters)

An M (Module) or D (Detector) will be displayed followed by a two digit address (01 to 99).

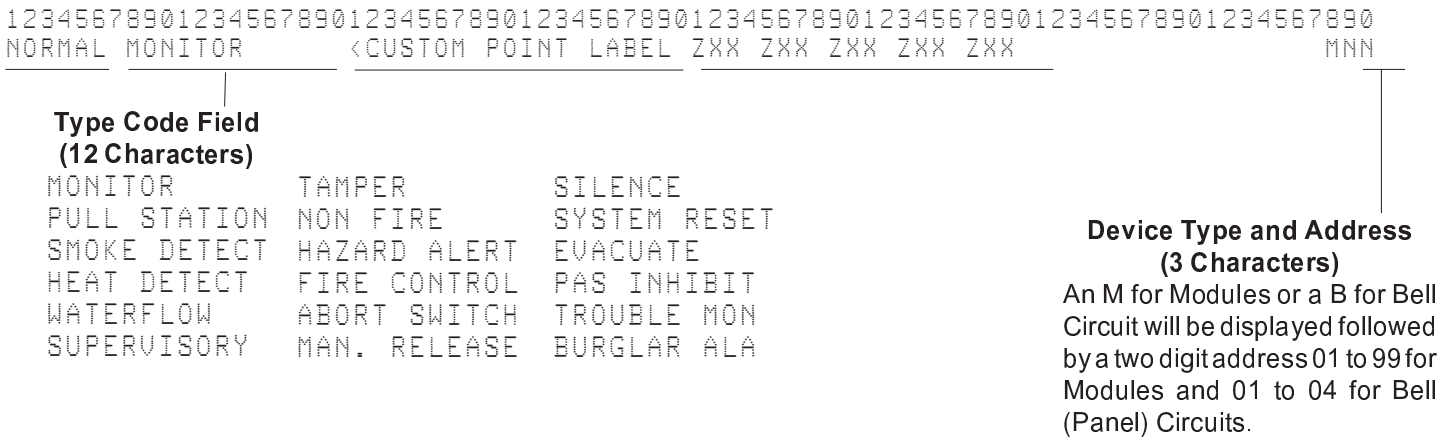
7.2 Point Trouble Messages



7.3 Normal Messages (Addressable Detectors)

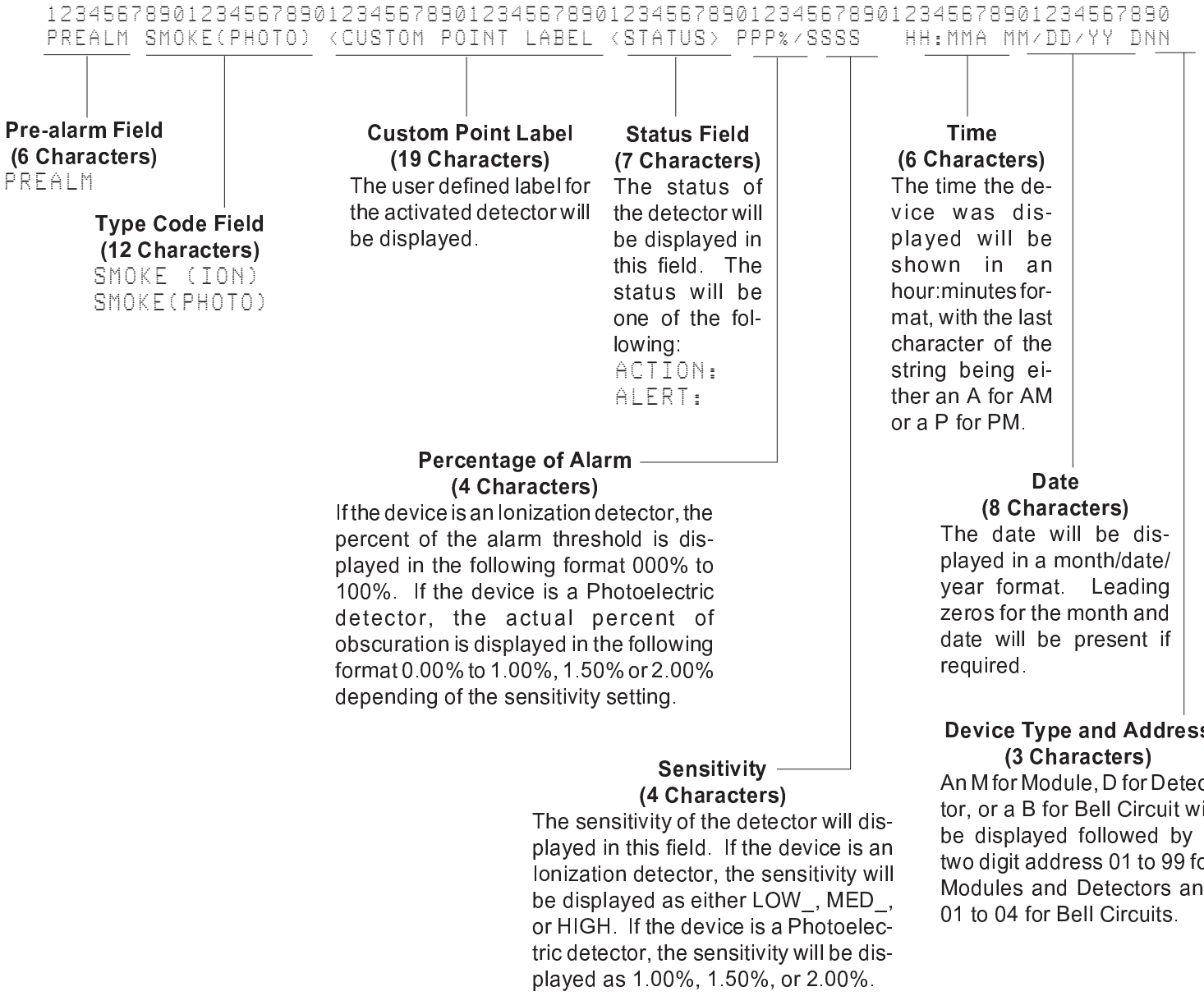


7.4 Normal Messages (Addressable Modules)

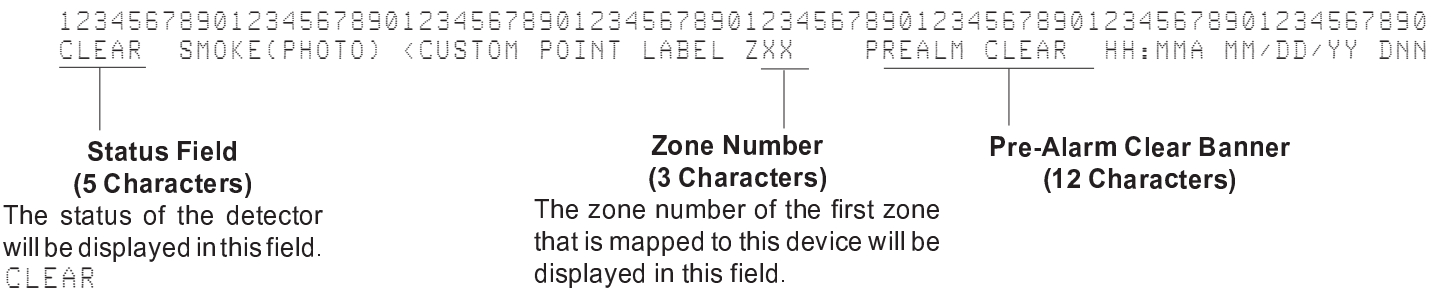


Note: *Refer to Section 7.3 (above) for the remaining field descriptions.*

7.5 Pre-alarm Messages



7.6 Pre-alarm Clear Messages



Note: *Refer to Section 7.5 (above) for the remaining field descriptions.*

7.7 System Trouble Messages

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
TROUBL IN SYSTEM    <<<TYPE OF TROUBLE>>                    HH:MMA DAY MM/DD/YY
```

Trouble in system banner followed by 4 blanks (20 Characters)

Type of Trouble (20 Characters)

Each banner is preceded by a blank space.

```
 GROUND FAULT
 AC FAIL
 BATTERY
 STYLE 6
 OPTION MODULE
 TERM. SUPERVISORY
 ANNUN. 1 TROUBLE
 ANNUN. 2 TROUBLE
 ANNUN. 1 NO ANSWER
 ANNUN. 2 NO ANSWER
 EPROM ERROR
 INTERNAL RAM ERROR
 EXTERNAL RAM ERROR
 PROGRAM CORRUPTED
 NO DEVICES INSTALLED
 AUPS. TROUBLE
```

Time (6 Characters)

The time the device was displayed will be shown in an hour:minutes format, with the last character of the string being either an A for AM or a P for PM.

Day of Week (3 Characters)

A three letter abbreviation for the actual day of the week, such as: MON, TUE, WED, THU, FRI, SAT, SUN.

Date (8 Characters)

The date will be displayed in a month/date/year format. Leading zeros for the month and date will be present if required.

8.0 Read Status

The Read Status function enables the user to:

1) View the present status of any point in the system
2) View all current alarms and troubles
3) View the status of all points, zones and system parameters
4) View a selected portion or all of the history buffer (650 events)

A Read Status inquiry is initiated by sending a ~A to the AFP-200 Fire Alarm Control Panel. If the function keys are properly programmed this corresponds to pressing the function key F1. The AFP-200 will respond by sending the following character string:

```
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
Read point=1      Alm/tbl Status=2     Read All Points=3   History: Step=4/All=5
```

8.1 Point Read

To perform a Read Status on any point in the system the user must press the number 1 and the Enter key. The AFP-200 will respond by sending the following string:

```
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
Enter D(Det.) / M(Mod.) / B(Bell) / Z(Zone),AA  OR S(system params.)
```

The user may now perform a Read Status on any Detector, Module, Bell (panel) circuit, Zone, or System parameter by entering information in the following format:

Dxx Enter	where D is for Detector and xx is any address from 01 through 99
Mxx Enter	where M is for Module and xx is any address from 01 through 99
Bxx Enter	where B is for Bell Circuit and xx is circuit 01 through 04
Zxx Enter	where Z is for Zone and xx is any zone number 01 through 99
S Enter	where stands S for System parameters

Once a detector, module, bell circuit or zone number is entered, the user may step through a list of these devices/zones by using the Prior (F5) or Next (F6) function keys. These function keys actually send a ~E and ~F to the AFP-200 respectively.

8.2 Alarm and Trouble Status

To see a list of all the devices that are currently in alarm or trouble, the user should press the number 2 followed by the Enter key. The AFP-200 will send a series of 80-character lines for each alarm and trouble, including system troubles. Each line of text will be followed by a blank line. An example of an Alarm/Trouble Status report is shown below.

```
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
TROUBL IN SYSTEM     GROUND FAULT                                    03:26 FRI 04/30/94

TROUBL IN SYSTEM     BATTERY                                         03:45 FRI 04/30/94
```

8.3 All Points

To get a continuous list of all detectors, modules, bell circuits, and zones in the system the user must press the 3 followed by Enter. The AFP-200 will send an 80-character line followed by a blank line for each device/zone in the system.

8.4 Read History - Step

The user has the option of stepping through the history buffer one event at a time. Upon pressing the number 4 followed by Enter, the AFP-200 will respond with the following:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
EVENT HISTORY START                    EVENTS IN HISTORY : XXX
```

Number of events in buffer
(3 Characters)

The total number of events in the history buffer will be displayed in this field. The history buffer may contain up to 650 events.

If the history buffer is empty, the following message will be sent by the AFP-200:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
   HISTORY EMPTY                       ****************************************
```

The AFP-200's pointer will be at the top of the history buffer. Pressing Next (F6)(~F) will cause the AFP-200 to respond by sending the oldest history event in 80-column format. Pressing Next again will allow the user to step one event at a time forward through the history buffer. By pressing the Prior (F5)(~E) key a user may step backwards through the history buffer. A sample history buffer report is shown below.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
ALARM: SMOKE (ION)  <CUSTOM POINT LABEL><<CUSTOM ZONE LABEL> HH:MMA MM/DD/YY DNN
 ACKNOWLEDGE                                                  12:45P FRI 04/22/94
```

8.5 Read History - All

By pressing 5 and then Enter, the panel will respond by sending the oldest event in the history buffer followed by a blank line. The panel will then continue to send each subsequent event (from the oldest to the most recent) until the entire history buffer has been dumped.

9.0 Status Change

The Status Change function enables the user to:

1) Disable or enable any point in the system
2) Change the sensitivity of any addressable photoelectric or ionization detector in the system
3) Globally clear the verification counter
4) Clear the entire history buffer
5) Globally set the Action/Alert levels for the AWACS operation

A Status Change inquiry is initiated by sending a ~B to the AFP-200 Fire Alarm Control Panel. If the function keys are properly programmed this corresponds to pressing the F2 function key. The AFP-200 will respond by sending the following character string:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1=Disable 2=Sensitivity 3=Clear Verification 4=Clear History  5=Set Action/Alert
```

9.1 Disable/Enable

The user may selectively enable or disable any point in the system including addressable detectors, modules, and bell/panel circuits. After pressing the number 1 and then Enter, the AFP-200 will respond with the following inquiry.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Disable/Enable D(Det.) / M(Mod.) / B(Bell ckt.),AA
```

From this menu prompt, the user may enable or disable any detector, module, or bell circuit. To enable or disable a specific device, the user must enter a D (detector), M (module), or B (bell circuit) followed by a two digit address. The address must be in the range of 01 to 99 for detectors and modules, and from 01 to 04 for bell/panel circuits. The example below shows addressable detector 30 being disabled.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
D30 Now Enabled, Enter E(Enable) / D(Disable) or Esc. to Abort
```

To disable this detector the user must enter a D. Shortly after pressing the D key, the AFP-200 will enter a trouble condition because a device has been disabled and the appropriate trouble message will be sent from the EIA-232 port.

9.2 Detector Sensitivity

The user may change the sensitivity of any photoelectric or ionization detector in the system. This is done by pressing the number 2 and Enter at the Status Change prompt. An example of changing a detectors sensitivity is shown below.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Det. Sensitivity    Enter point: AA,E

91
D91 now  Hi sens. Enter H, M, or L to change, Esc. to Abort
```

Note: *At the detector sensitivity prompt, the user need only enter the two digit address of the detector to change, it is not necessary to prefix the address with a D.*

9.3 Clear Verification Counters

The verification counters for all the addressable detectors may be reset back to zero by using this feature. The user must enter the number 3 followed by the Enter key. The AFP-200 will respond with the following prompt.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Press Enter to Clear Verification Counts or Esc. to Abort
```

Pressing the Enter key will globally reset all the verification counters to zero. The Escape key aborts the operation without affecting the counters.

9.4 Clear History

The entire history buffer may be cleared by using this function. The user must press the number 4 followed by the Enter key. The AFP-200 will respond with the following menu prompt.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Press Enter to Clear History or Esc. to Abort
```

Pressing the Enter key will erase the entire history buffer, all events will be lost. Pressing the Escape key aborts the function with no action being taken.

9.5 Action and Alert Levels

By using this function the user may set the Alert and Action levels (AWACS operation) to any value between 1% to 100%. The user must press the number 5 followed by the Enter key. The control panel will respond with the following prompt.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Set % of Alarm: Alert(T) & Action(N)    Format: TxxNxx  then Enter
```

Example: *To enter an Alert level of 60% and an Action level of 85%, the user would use the following format: T60N85 followed by the Enter key.*

10.0 System Commands

While connected to the EIA-232D interface, the user may send Acknowledge, Signal Silence, System Reset, and Manual Evacuate commands to the AFP-200. ***Note:*** *The AFP-200 must be programmed for Local Terminal Mode (LocT) or Local Monitor Mode (LocM) in order for these commands to be accepted.* The message formats for these commands are detailed in the following sections.

10.1 Acknowledge

When the user initiates an Acknowledge (by pressing the F12 key and sending a ~L) the panel will respond with the following message:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
 ACKNOWLEDGE                                                HH:MMA DAY MM/DD/YY
```

Time (6 Characters)

Day of Week (3 Characters)

Date (8 Characters)

Note: *For detailed field descriptions, refer to Section 7.6*

10.2 Signal Silence

When the user sends a Signal Silence command (by pressing the F13 key and sending a ~M) to the AFP-200, the panel will respond with the following message string:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
 ALARM SILENCED                                             HH:MMA DAY MM/DD/YY
```

Time (6 Characters)

Day of Week (3 Characters)

Date (8 Characters)

Note: *For detailed field descriptions, refer to Section 7.6*

10.3 System Reset

When the user sends a System Reset command (by pressing the F14 key and sending a ~N) to the AFP-200, the panel will respond with the following message string:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
   SYSTEM RESET                                                HH:MMA DAY MM/DD/YY
```

Time
(6 Characters)

Day of Week
(3 Characters)

Date
(8 Characters)

Note: *For detailed field descriptions, refer to Section 7.6*

10.4 Manual Evacuate

When the user sends a Manual Evacuate (Drill) command (by pressing Shift F13 which sends a ~Q) to the AFP-200, the panel will respond with the following message string:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
 MANUAL EVACUATE                                             HH:MMA DAY MM/DD/YY
```

Time
(6 Characters)

Day of Week
(3 Characters)

Date
(8 Characters)

Note: *For detailed field descriptions, refer to Section 7.6*

Appendix A: AFP-200 Type Codes

The following is a list of all the valid Type ID's for the AFP-200 Fire Alarm Control Panel. The Type ID's are listed under their respective categories.

Detectors	Monitor Modules	Control Modules	Panel Circuits
123456789012	123456789012	123456789012	123456789012
SMOKE(PHOTO)	MONITOR	RELAY	BELL CIRCUIT
SMOKE (ION)	PULL STATION	STROBE CKT	STROBE CKT
HEAT(ANALOG)	SMOKE DETECT	BELL CIRCUIT	HORN CIRCUIT
	WATERFLOW	HORN CIRCUIT	AUDIBLE CKT
	SUPERVISORY	AUDIBLE CKT	RELEASE CKT
	TAMPER	RELEASE CKT	REL CKT ULC
	NON FIRE	REL CKT ULC	
	HAZARD ALERT	RELEA. FORMC	
	FIRE CONTROL		
	ABORT SWITCH		
	MAN. RELEASE		
	SILENCE		
	SYSTEM RESET		
	EVACUATE		
	PAS INHIBIT		
	TROUBLE MON		
	BURGLAR ALA		

Appendix B: AFP-200 Status Banners

The following is a list of all the AFP-200 character strings that may appear in the point status/system trouble field of an 80-character message.

Status Strings	Point Trouble Strings	System Trouble Strings
1234567890123456	1234567890123456	12345678901234567890
ON	INVALID REPLY	GROUND FAULT
OFF	DEVICE DISABLED	AC FAIL
NORMAL	MAINTENANCE REQ	BATTERY
ACTIVE	DET FAILED TEST	STYLE 6
ALARM:	DRIFT COMPENSATE	OPTION MODULE
CLR AL	OPEN CIRCUIT	TERM. SUPERVISION
TROUBL	SHORT CIRCUIT	ANNUN. 1 TROUBLE
CLR TB		ANNUN. 2 TROUBLE
PREALM		ANNUN. 1 NO ANSWER
		ANNUN. 2 NO ANSWER
		EPROM ERROR
		INTERNAL RAM ERROR
		EXTERNAL RAM ERROR
		PROGRAM CORRUPTED
		NO DEVICES INSTALLED
		AVPS. TROUBLE

Appendix C: European Mode Operation

The AFP-200 Fire Alarm Control Panel may be programmed to operate in European mode. This selection is made in the system parameters section of programming (refer to the AFP-200 Instruction Manual) by changing the USA TIME banner to EUR TIME. Operating the AFP-200 in European mode affects certain 80-character message fields. European mode changes the 12-hour time format to 24-hour (military) time and changes the date display by placing the day before the month. In USA mode, the date appears in a format of MM:DD:YY. However, in EUR mode, the date appears in a DD:MM:YY format.

> ***Example:*** *When the panel is operating in European mode, a time of 3:38 PM will be displayed as 15:38 and the date November 14, 1994 will be displayed as 14/11/94.*

In addition to time/day changes, European mode also affects two status banners in the 80-character messages. When the AFP-200 displays a trouble message, the character string TROUBL is replaced by the string FAULT as shown in the example below.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
FAULT  SMOKE(PHOTO) TECH. PUBLISHING    Z01 INVALID REPLY    15:38  14/11/94 D42
```

When a device or zone is disabled, the AFP-200 will display a disable message and the character string DISABLED will be replaced by ISOLATED as shown below.

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
FAULT  SMOKE(PHOTO) TECH. PUBLISHING    Z01 DEVICE ISOLATED  15:38  14/11/94 D42
```