

Description

The **FireFinder™ SPX** series is an Intelligent Analogue/Addressable and/or Conventional Fire Alarm Control Panel (FACP) capable of supporting;

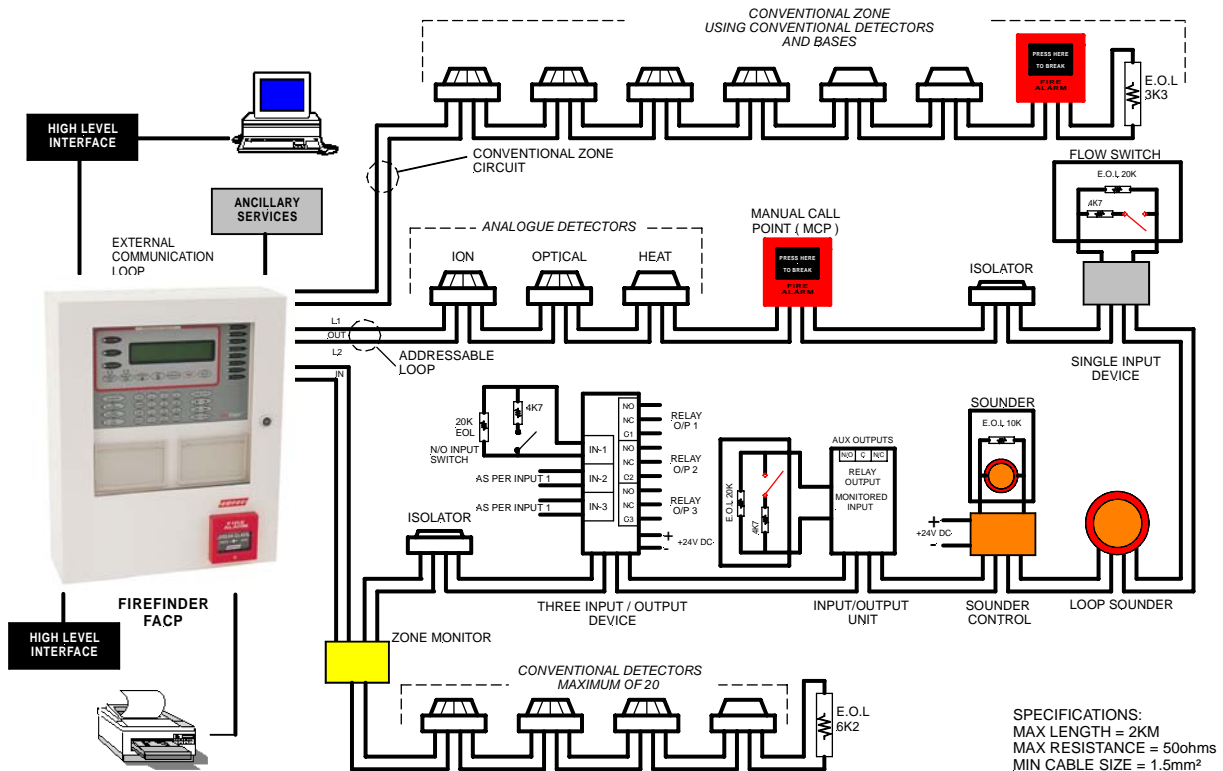
- ✓ Apollo Discovery and XP95 Intelligent Detectors, Multisensor, Photoelectric, Ionisation, Thermal (heat) and CO detectors.
- ✓ Addressable initiating devices and modules that monitor any conventional normally open contact such as supervisory switches and flow switches.
- ✓ conventional two wire zone detector circuits
- ✓ Orbis range of conventional detectors
- ✓ a range of conventional devices i.e. beam detectors
- ✓ a range of Panel Add-ons
- ✓ multiple input/outputs
- ✓ high level interfaces
- ✓ **SmartGraphics** - graphical interface system
- ✓ remote LCD Repeaters / SmartTerminal (LCDA)
- ✓ remote LED mimics
- ✓ networking - peer to peer, master/slave (Main/Sub), distributed (Main/Data Gathering Panels)
- ✓ approved to AS4428.1



FireFinder™ SP1X



FireFinder™ SP8X



Typical System Configuration for FireFinder

Basic Configuration

A basic FireFinder comprises of the following components:

1. Main Board – mandatory component
2. Front Panel Board – mandatory component
3. Brigade/PSU Monitor Board – mandatory component
4. Slave CPU – mandatory component
5. Conventional Board and/or
6. Loop Termination Board
7. Panel Add-ons – optional

Main Board

The Main Board is the "heart" of the FACP and carries the devices that interconnect to all the other boards, a buzzer for auditory indication, the backlight power supply for the LCD and CPU Reset.

The Main CPU that is mounted on this board provides interfacing to

- ✓ Up to 4 Slave CPU's
- ✓ A printer
- ✓ A Modem/Graphics Output
- ✓ An Expansion Panel
- ✓ An Internal serial communications bus
- ✓ An External communication bus

Front Panel Board

The Front Panel Board provides the buttons used to control the FACP as well as all LED indications. All LED's are surface mounted and the buttons are embedded within the board. The LCD is viewed / protected by a clear perspex screen.

Brigade/PSU Monitor Board

The Brigade/PSU Monitor Board monitors and controls the power supply, battery charging, monitored/un-monitored inputs, outputs and the 7 relay outputs.

TB	Function	Type of O/P
3	Bell 1	2 Amp Fused
	Bell 2	2 Amp Fused
4	Plant (Aux) Monitored	1 Amp Fused
	Plant (Aux) Un-Monitored	1 Amp (VFC)
5	Warn Sys (Evac) Monitored	1 Amp Fused
	Warn Sys (Evac) Un-Monitored	1 Amp (VFC)
6	Fault Monitored	1 Amp Fused
	Fault Un-Monitored	1 Amp (VFC)
7	Isolate	1 Amp (VFC)
8	Alarm	1 Amp (VFC)
9	Valve Monitor	1 Amp (VFC)
10	Batt Fail (Normally Energised)	1 Amp (VFC)
1	Battery Output	Protected
2	Aux Power Output 1	1 Amp Fused
	Aux Power Output 1 – EV40 use	3 Amp Fused
	Aux Power Output 2	1 Amp Fused

NB: VFC = Voltage Free Contacts

Slave CPU

A Slave CPU (Central Processing Unit) is fitted on the main board and provides the interfacing signals to a variety of termination boards.

A single chip micro controller controls all operations of the FACP Slave CPU. This device contains the control program within Read Only Memory (ROM).

Conventional Board

Under the control of a Slave CPU the Conventional Zone Board provides the interface between it and conventional devices in the field.

16 Conventional zones can be connected to a Conventional Zone Board. All un-used zone connections MUST be terminated with an EOL resistor of 3K3Ω.

Addressable Loop Termination Board

The Addressable Loop Termination Board acts as the interface between field addressable devices and **FireFinder™**.

The board provides terminations for two loops each requiring one slave CPU per loop.

LED's mounted on the board show the status of the loop.

Note: *Apollo devices L2 is +ve (positive), L1 is -ve (negative)*

NB: AMPAC strongly recommends that the LoopManager test set is used to check that the Apollo loop has been correctly installed and commissioned before connecting it to the FireFinder™

Loop Parameters

- ✓ 126 Apollo Devices
- ✓ 250mA Current Max
- ✓ Short circuit protection circuitry activates at approximately 300mA

Panel Add-ons

A wide array of optional Panel Add-ons is available. These add-ons are connected to the FACP via an internal serial communications bus using CAT5 cable terminated to RJ45 connectors.

NB: refer to manual for full list and further technical detail

Power Supplies

AC Mains will be connected to either a 2 Amp, 5 Amp or 18Amp 27 VDC supply. When the 18Amp power supply is used a Current Limiter, Fuse Board is required to provide protection for the boards, cards and other 27VDC distribution within the FACP.

Specification

Power Supply Specifications				
Type No	Output		R & N	Eff.
SP-60-27	2.2A @ 27VDC	± 1%	150mV	79%
SP-150-27	5.6A @ 27VDC	± 1%	150mV	84%
SP-500-27	18A @ 27VDC	± 1%	200mV	86%
Input Voltage		85 to 264 VAC		
Input Frequency		47 to 63Hz.		
PFC		0.95~230VAC		
Panel Current Draw		450 mA (min)		
Tolerance at 27V		±1%		
Load Regulation		±0.5%		
Line Regulation		±0.5%		

Environmental Specifications	
Temperature	-5°C to + 55°C
Humidity	25% to 75%
IP Rating	IP51
Max Devices per Loop	126
Max Devices per Zone	40
Cable Loop Characteristics	2 core 1.5 to 2.5mm ²
Battery Type and Capacity	2 x 12V SLA batteries(min)
NB: Battery capacity is determined by the installation configuration and supplementary documentation Power Supply and Battery Calculation.	
Compliance	AS4428.1&5:1998
SSL Listing Number	afp-1160

Mechanical Specification		
Construction		Modular
Case finish		Arch White powder coat
Model	Material	Dimension
SP1X	1.2mm steel	500H x 405W x 145Dmm
SP8X	1.2mm steel	840H x 515W x 170Dmm
SP16X	1.6mm steel	1200H x 625W x 240Dmm
10U	1.6mm steel	700H x 625W x 240Dmm
16U	2.0 mm steel	1200H x 700W x 375Dmm
28U	2.0mm steel	1800H x 700W x 375Dmm
SP1X Anc Cab	1.2mm steel	250H x 405W x 145Dmm
SP8X Anc Cab	1.2mm steel	418H x 515W x 170Dmm

NB: Configurations SP1X, SP8X and SP16X relate to a standard cabinet size while 10, 16 and 29U relate to the number of rack units available.

Item Numbers

Item Number	Description
Panel	
8550-1150	SP1X 16Zone AS4428
8550-1100	SP1X 1Loop AS4428
8550-1250	SP1X 16Zone ASE AS4428
8550-1200	SP1X 1Loop ASE AS4428
8550-1450	SP1X 16Zone EV20+Mic 5.6A AS4428
8550-1400	SP1X 1Loop EV20+Mic 5.6A AS4428
8550-1430	SP1X 16Zone EV40+Mic 5.6A AS4428
8550-1440	SP1X 1Loop EV40+Mic 5.6A AS4428
8550-4150	SP8X 16Zone 5.6A AS4428
8550-4100	SP8X 1Loop 5.6A AS4428
8550-4250	SP8X 16Zone ASE 5.6A AS4428
8550-4200	SP8X 1Loop ASE 5.6A AS4428
8550-4450	SP8X 16Zone EV40+Mic 5.6A AS4428
8550-4400	SP8X 1Loop EV40+Mic 5.6A AS4428
8550-4460	SP8X 16Zone EV60+Mic 5.6A AS4428
8550-4470	SP8X 1Loop EV60+Mic 5.6A AS4428
8550-4480	SP8X 16Zone EV120+Mic 18A AS4428
8550-4490	SP8X 1Loop EV120+Mic 18A AS4428
8550-5150	SP16X 16Zone 5.6A AS4428
8550-5100	SP16X 1Loop 5.6A AS4428
8550-6150	10U 16Zone 5.6A AS4428
8550-6100	10U 1Loop 5.6A AS4428
8550-6250	16U 16Zone 5.6A AS4428
8550-6200	16U 1Loop 5.6A AS4428
8550-6350	29U 16Zone 5.6A AS4428
8550-6300	29U 1Loop 5.6A AS4428
Ancillary Cabinet & Surround	
8510-9003	SP1X Ancillary Cabinet
8510-9010	SP8X Ancillary Cabinet
ENC1798-F	SP1X Surround
158-0033	SP8X Surround
ENC2844-F	SP16X Surround
ENC1797-F	SP1X+Ancillary Cabinet Surround
158-0027	SP8X+Ancillary Cabinet Surround

Cabling Recommendations

Conventional Zones

Cabled in red Twin Plastic Sheath (TPS) or fire rated Radox or approved equivalent.

Analogue Loop for detectors/devices

Two core cable. The minimum cable size is 0.75mm², the maximum loop resistance is 50 ohms and the maximum loop distance is 2km.

RS 422 Communications Loop

4-Wire NIC – Two (2) twisted pair screened (4 core)

2-Wire NIC – One (1) twisted pair screened (2 core)

In both scenarios, cable originates from FACP, extends through the protected areas and returning to the FACP.

Cable Specifications

Capacitance of 100 picofarads per metre or less

Resistance of 100 milliohms per metre or less

Impedance of loop typical 100 to 120 ohms

Maximum distances between modules 1.2km providing cable meets above specifications.

Recommended cable type

Belden 8132 or 9842 (non fire rated)

Radox FR Communication 0.75mm² 1 pair (fire rated) x 2

LCD Repeater

Two by two twisted pair shielded cable (4 core) plus 2 core power, or local supply. Maximum distance between LCD mimic panel and FACP. is 1.2km.

NB: If the LCD operates in a redundant path mode the total cores including power is 10. The preferred cabling method in this case is 1 X 2 pair twisted shielded cable (4 core) and 1 X two pair twisted shielded cable (4 core) plus 2 core power

SmartTerminal (LCDA)

Two core twisted shielded cable (No return loop) plus 2 core power or local supply. Max distance 1.2km.

Recommended Cable Type

Hartland HC2335

Belden 9841

Radox FR Communication

LED Mimic (RS485)

Two (2) core twisted shielded cable (No return loop) plus two (2) core power for local supply.

Maximum distance between each LED repeater card and FACP is 1.2km.

Recommended Cable Type

Hartland HC2335

Belden 9841

Radox FR Communication

Fire Alarm Bell Connection

Two core 1.5mm² PVC sheathed MIMS (Mineral Insulated Metal Sheathed) to the bell location.

Brigade Connection Via Landline

Two core 1.5mm² PVC sheathed MIMS from the FACP to the landline MDF.

System Expansion

Overview

The **FireFinder™** FACP can be expanded either internally or externally. Both these expansions will require the use of optional hardware. Internal expansion allows the capacity of a base FACP to be increased within the confines of the enclosure. It stands to reason that the choice of cabinet size in this scenario would be an important consideration. External expansion on the other hand infers a network of nodes all interconnected on the same communications bus. **SmartGraphics** may be considered as an external expansion but is not part of the network system.

Internal Expansion

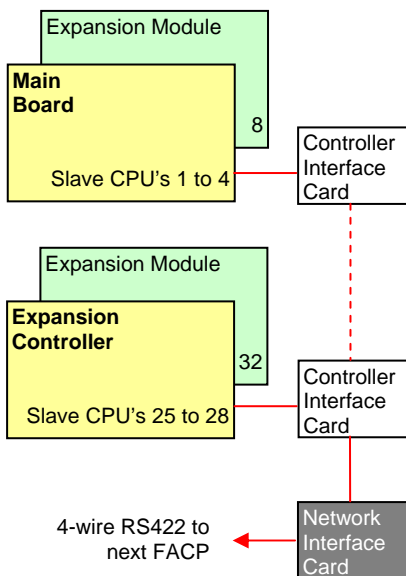
A base FireFinder has a single Slave CPU fitted with capacity on the main board to add three (3) more. Each slave CPU can be configured to run either an addressable loop, 16 zone conventional circuits or 128/128 Input/Output interconnection board. The main board therefore supports a combination of a loop, zone or I/O board.

If, for example, more than four (4) addressable loops are required, an **Expansion Board** needs to be fitted. A connector resides on the main board specifically for this expansion that should be fitted not more than 20cm away. With the addition of an Expansion board, the main board now supports up to eight (8) Slave CPU's.

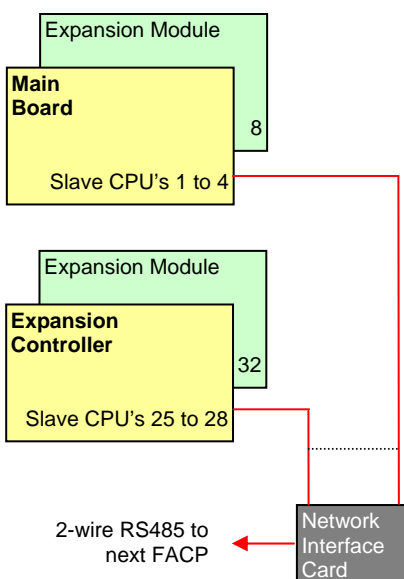
If more addressable loops are required past the eight (8) than an **Expansion Controller Board** is required. This board is not the same as the Expansion Board. An Expansion Controller can be described as a main board without a Front Panel.

FireFinder supports up to three (3) Expansion Controllers. This lifts the capacity of slave CPU's to 32 – or as an example, 32 loops or combination of zone and I/O boards thereof.

Whenever the first Expansion Controller is added to the FACP, a Network Interface Card (NIC) is required. If a 4-wire NIC is fitted, a Controller Interface Card (CIC) is also required. If however a 2-wire NIC is fitted, an additional CIC is not required. This additional hardware facilitates the communication between the Expansion Controller and the main board.



Typical 4-wire Network Configuration



Typical 2-wire Network Configuration

External Expansion - Network systems

When FACP's are connected to each other they form a "NETWORK". Individual FACP's in the network are referred to as NODES. Typically an entire Network could consist of 100 Slave CPU's connected to loops, zones and or input/output cards spread over several nodes. System commands can be global or restricted to specific parts of the network.

The system can be programmed from Node 1 in the Network and is connected as a data loop which provides redundancy should there be a single cabling fault.

A networked fire system may be configured in one of 3 methods:

- ✓ *Peer to Peer* – a collective of FACP's on the one site interconnected via a communications bus. The key feature is that global (site wide) control is available at every FACP (node)
- ✓ *Master/Slave* – only one FACP will be nominated as the Main FACP and thus have global access. Other nodes have control and indication for the local area only
- ✓ *Distributed System* – also regarded as Main/Data Gathering Panels (DGP's). In this scenario, there is only one (1) FACP and it has global access. All other nodes are purely termination for field wiring. There is no provision for DGP's to have control or visual indication

Network Communication

The Network Interface Card provides the communication between nodes in a network system. A 2-wire NIC or 4-wire NIC supports RS485 or RS422 respectively.

NB: Fibre Optic cables may replace copper wire as a medium of communication but does not change the principals of networked systems

The principal concept of networking is similar across all configurations. The network communications between nodes is a redundant loop to improve system integrity.

Under normal conditions, data flow on the network communications loop is unidirectional. When there is a short or open circuit on the network communications loop, the all nodes will attempt to direct and receive data in both directions. It is possible to interrogate the system to determine between which nodes the fault has occurred.

Another intrinsic function of the NIC is to provide the associated node with isolation from high transient voltages that may appear on the network communications loop. The NIC comprises two (2) components – the termination board and the piggy back CPU.



External Expansion – other

The system has the capacity to interface with a variety of services external to the node. Some of the services include:

- ✓ LCD Repeater (LCDR)
- ✓ SmartTerminal (LCDA)
- ✓ SmartGraphics
- ✓ High Level Interface (HLI) – EV3000
- ✓ High Level Interface (HLI) – PLC Systems
- ✓ Remote LED's

The NIC and CIC mentioned in the previous section also play a vital role in providing communications with services list above.

Whilst the NIC has a primary role of providing the communications (RS422) port used for networking at each node, the CIC offers either RS485 or RS232. Apart from the LCDR, communications for all other services are derived from the CIC.

LCD Repeater (LCDR)

An operator at a LCDR will be able to interrogate the status of the either the local node or system globally depending on the configuration.

The LCDR communicates with the FireFinder only via a 4-wire network communications loop.

SmartTerminal (LCDA)

The function of the LCDA is similar to the LCDR in that it provides the operator ability to interrogate the system. Two (2) aspects that sets them apart is that SmartTerminal:

1. communicates with FireFinder via an RS485 bus
2. is always set to access information limited to the FACP it is connected to

SmartGraphics

SmartGraphics presents a graphical interface of the site to the operator. There are multiple levels of controls and all are password protected.

At the basic level, SmartGraphics will display the status of each point on the system that has been mapped. (Points that are not mapped will obviously not be monitored by SmartGraphics.) These points may represent point-type addressable detectors, zones or input signals i.e. status of diesel pumps, supply air fans or solenoid valves etc.

The following products are required for SmartGraphics to operate correctly:

1. an RS485 or RS232 port available at a node
2. an Ampac approved computer with the appropriate configuration and peripherals
3. Ampac licensed graphics software
4. Ampac approved/configured site maps
5. the FireFinder configuration is correctly set to recognize the presence of a SmartGraphics system

Features

- ✓ Remote control of the fire system
- ✓ Display status of devices, zones and network nodes
- ✓ Supports user defined maps
- ✓ Security / password protection
- ✓ Option for mouse driven, touch screen interface or other pointing devices
- ✓ Operates using industry standard ModBus protocol
- ✓ Event and user access logs
- ✓ User may embed photographs. Supports passive symbols e.g., fire extinguishers, hose reels, hydrants etc.
- ✓ Key map helps user to navigate throughout the site
- ✓ Supports user defined messages for each map e.g. HazChem information, special instructions etc.
- ✓ Supports multiple user levels
- ✓ Multiple zoom levels

RS485 provides the user with the opportunity to locate **SmartGraphics** a farther distance from **FireFinder™** as compared with the RS232 protocol. The protocol adopted is based on the industry standard ModBus and has worldwide acceptance because of its high data integrity and reliability.

SmartGraphics – system requirements

Computer (Rec Min)	<ul style="list-style-type: none"> ✓ Pentium IV 2.4Ghz, 1G RAM, ✓ 200GB Harddrive, CDROM ✓ Serial Comms for mouse or touch screen interface ✓ Parallel Comms port for hardware security key/printer ✓ Serial Comms port for connection to FACP, RS232 or RS485 as required ✓ Windows 98, 2000, NT, XP
Monitor	17" min (resolution 1024 x 768)
RS232 Comms	1 pair twisted & screened 15m maximum from FireFinder™ Baud rate – 9600 to 38400
RS485 Comms	1 pair twisted & screened 1200m maximum from FireFinder™ Baud rate – 9600 to 38400
Item Number	159-0074 Complete system package

High Level Interface (HLI) to EV3000

The traditional way to provide "FIB" interface with a Sound System (EV3000) from an FACP is to use relays. Each relay represents a fire zone, and then wire between the two (2) panels individually. Therefore if there is a substantial number of fire zones the work can be a little tedious and challenging when it comes to both installation and commissioning.

To facilitate ease of installation and improve efficiency, the HLI provides a much better solution. FireFinder and EV3000 connect via a HLI which is a specific protocol that uses RS485 as a communications bus.

High Level Interface (HLI) to PLC systems

This concept of HLI follows from that used in the interface with an EV3000. RS485 is the preferred communications bus but in this application running ModBus protocol.

ModBus is a protocol that has been widely utilised for PLC systems or similar. Typical application for ModBus protocol is the control of all supply air, exhaust and stair-pressurisation fans, in a building, for smoke control in the event of an incipient fire.

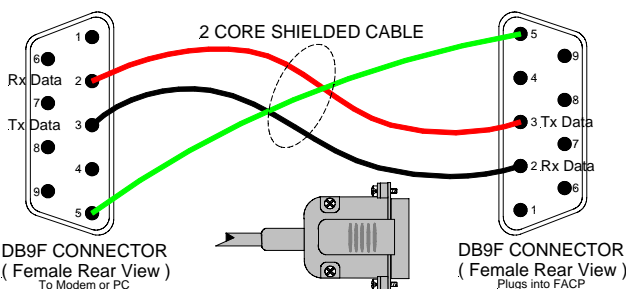
With duplex communications, FireFinder is able to receive inputs via this port and interpret them by turning on LED's on the panel or changing a colour of an icon in SmartGraphics depending on the requirement and system configuration.

RS232 Modem/Programming & Debug Interfacing

The modem I/O port is a DB9 connector on the Main Board that is normally used for programming of the FACP via the serial port of a PC or Laptop.

The Controller also has the required hand shaking to support connection to a Modem, thus allowing the FACP to be programmed from a remote site that has an established telephone connection.

This allows the system software to be upgraded by simply transmitting a file via the serial port of the PC or Modem external to the FACP. Diagnostic facilities are also available via the same connection.



Modem/Programming/Debug Cabling

Occupant Warning and Sound Systems

The range of Occupant Warning Systems (OWS) – amplified sound system includes EV20, EV40, EV60 and EV120. All these products generate alert/evacuation signals, provide for PA facilities and are normally mounted on the back pan of the FACP. Should an alarm condition exist the "Warning System" output on the Brigade PSU Monitor Board initiates the Alert/Evacuation sequence.

The Ampac EV3000 is a microprocessor based integrated Sound System and Intercommunication System for emergency purposes.

The system comprises of two (2) distinct parts:

1. Sound System; and

The prime function of the sound system is to broadcast alert signals, evacuation signals and public address in evacuation zones via speakers.

Active "FIB" inputs from FireFinder (either via relay interface or HLI) automatically initiates evacuation sequence. Manual operation can also be achieved by Emergency Alarm Initiating Devices (EAID) connected to the system. EV3000 supported non-emergency functions, e.g. background music and general PA facilities.

2. Intercommunication System.

The intercommunication system provides to point to point communication between phones at the EV3000 MECP and Warden Intercommunication Phones (WIP's) located at various the evacuation zones in the building – Master WIP and WIP respectively. WIP to WIP calling is not possible. The Chief Warden manning the Master WIP can however establish a 5 WIP simplex communication. In this mode, the WIP can hear instructions from the Chief Warden but are not able to communicate with the Chief Warden.

A fault in the EV3000 will be registered as a Warning System Fault indication on the FACP.

Product Data Sheets

EV20	PDS222-0020
EV40	PDS222-0021
EV60	PDS222-0022
EV120	PDS222-0023
EV3000	PDS105-0001



COMPATIBLE EXPANSION CARDS, MODULES & BOARDS

Item Numbers	Description	System Limit
In-Panel		
4310-0050	8 Way Serial Relay Board – In panel	Up to 15 boards max
4310-0060	Sounder/Bell Controller Board 8 X 1A per Circuit	Up to 15 boards max
4310-0021	Fire Fan Module with Reset Facility	Up to 15 modules max
4310-0071	Fire Fan Module with Reset Facility (Loop Driven)	Up to 15 cards max
4310-0074	Network Interface Card 4-wire	One card per node
4310-0075	Network Interface Card 2-wire	One card per node
4310-0076	Controller Interface Card	One card per node
4310-0077	Controller Interface Card 2W	One card per node
4310-0073	Printer	One printer per node
4310-0011	Agent Release Module AS4214	Up to 15 modules max
4310-0034	General Indicator Card (16/16 Zone Alarm/Fault)	Up to 15 cards max
Remote		
4310-0055	8 Way Serial Relay Board – Remote	Up to 15 boards max
4350-0003	SmartTerminal LCD Annunciator	Up to 30 LCDA's max
159-0044	LCD Repeater (LCDR)	Dependant on network configuration
4310-0019	Local Control Station (IP40)	Up to four (4) per Agent Release Module