Aritech

Addressable Fire

Fault Finding Guide

FFG2000

Revision 2.2, May 2002

Aritech is an Interlogix company

CONTENTS

1. INTRODUCTION

1.1. Scope

This manual explains how to diagnose and fault find the Aritech Addressable and Analogue Addressable fire detection panels.

Other reference manuals that may be consulted are:

FP2000/1200/1100 Reference Guide

FP2000/1200/1100 Installation and Commissioning Manual

FP2000/1200/1100 User's Manual

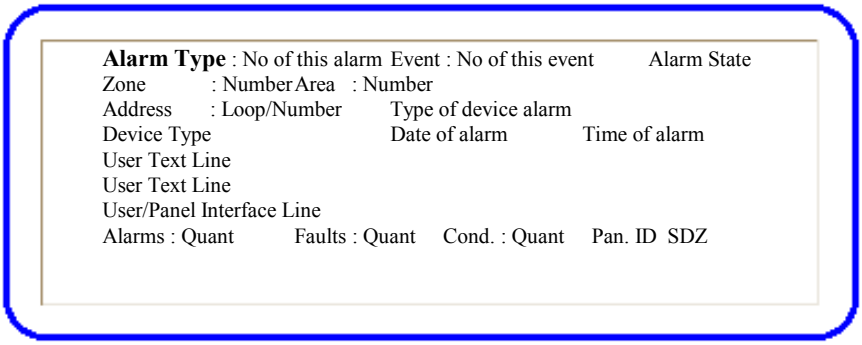
900 Series Installation Guide

2000 Series Installation Guide

2. HOW TO USE THIS GUIDE

Alarms on the Aritech fire panel are divided into 3 main categories: Fire Alarms, Fault Alarms and Condition Alarms. These alarms are normally indicated on the fire panel LCD display as follows:

Figure 1: Alarm Type



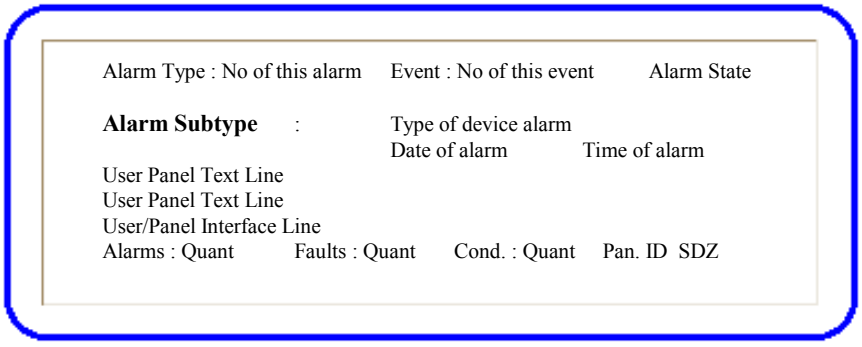
✍ *The boldface items indicate the important information for using this guide.*

Each of these alarm types can again be subdivided into three categories. For the purpose of fault finding with this guide, these alarms are divided into Panel Alarms, Device Alarms and Programmed Alarms. These alarms have specific characteristics on the LCD display as indicated in the following sections.

2.1. Panel Alarms

These alarms are specific to the panel and do not have any device or input/output data attached. Note that the fire panel cannot generate fire alarms without device or input/output data. Consequently, there are no panel specific fire alarms.

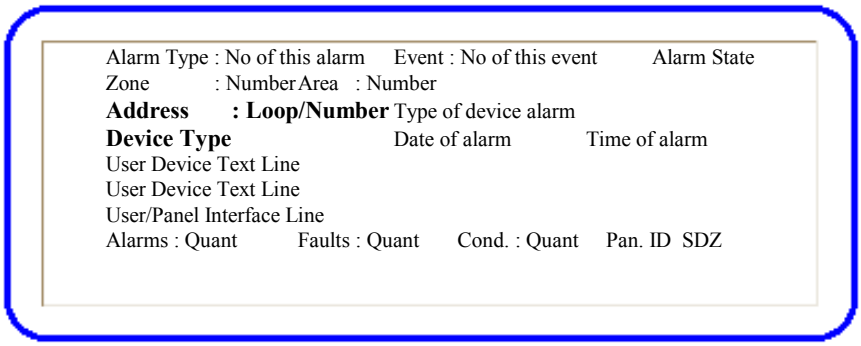
Figure 2: Panel Alarms



2.2. Device Alarms

Devices on the panel loop lines generate these alarms. With these alarms, device specific data is always displayed.

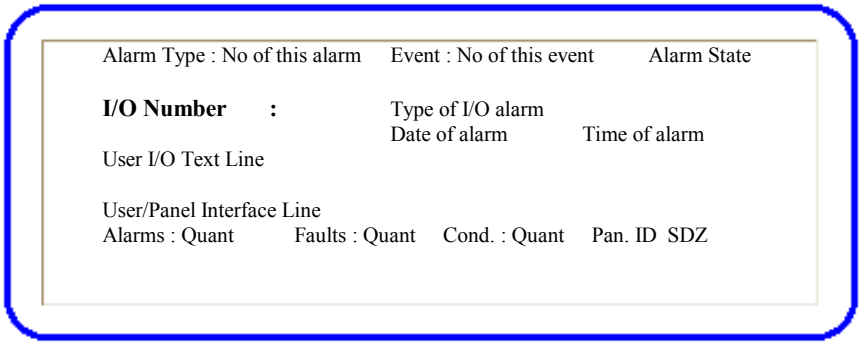
Figure 3: Device Alarms



2.3. Programmed Alarms

These alarms are generated by user programming, and therefore are without specific device data. However, it does clearly indicate input/output information.

Figure 4: Programmed Alarms

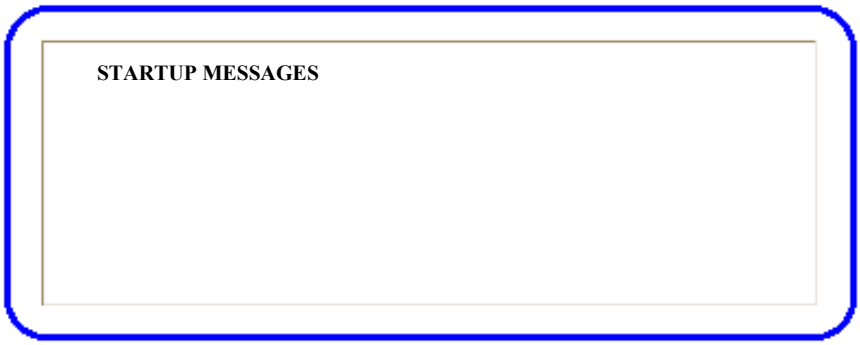


2.4. Panel Messages

The panel messages may be divided into two groups:

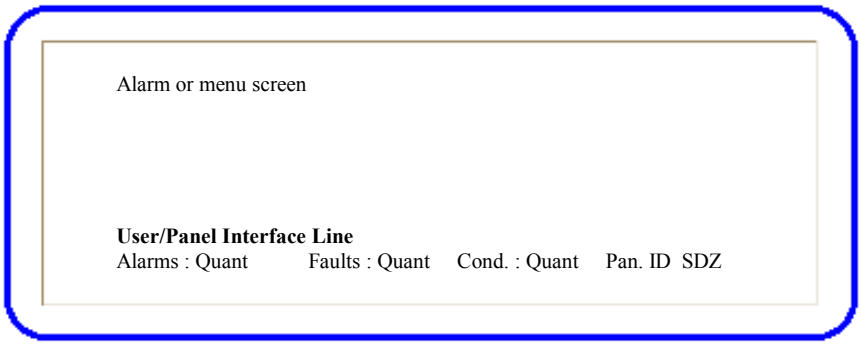
The first group is classified as ***Start-up Messages***, and appears in the process of a panel restart. These messages give the user information about the actions being performed by the panel during the restart process, and may be found at the top left corner of the panel LCD display.

Figure 5: Panel Messages



The second group is the ***User Information Messages***. The fire panel can interact with the user by providing feedback on the user interface line. This line is normally used to indicate to the operator which keys on the numeric keyboard are active at any specific moment in time. When the panel presents the user with a specific message, the panel beeps in a very specific way, and the message from the panel is displayed on the 'User Interface line' only for a few seconds. These messages only happen on certain actions from the operator.

Figure 6: User Information Messages



These panel messages are explained in the section 4 of this manual. They cannot be classified as fire, fault or condition alarms, and are not logged in the event buffer.

3. PANEL STATES

3.1. Fire Alarms

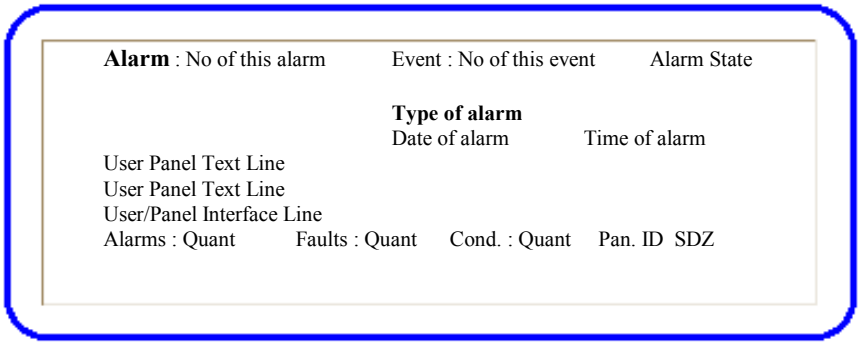
The following sections describe the fire alarm formats as displayed on the 8 line x 40-character LCD display of the fire panel.

3.1.1. Panel Alarms

The fire panel, on its own, is not capable of generating a fire alarm. The panel can only generate a fire alarm when a device, or an operator's programming function, instructs it to. Consequently, there are no panel specific fire alarms.

There is only one exception to this rule: when the alarm is generated from the Logic Programming of the operator. In this case, the panel just indicates a General Alarm with no I/O or device specific information. The operator then needs to 'debug' the logic programming of the panel in order to establish how the alarm was generated.

Figure 7: Panel Alarms

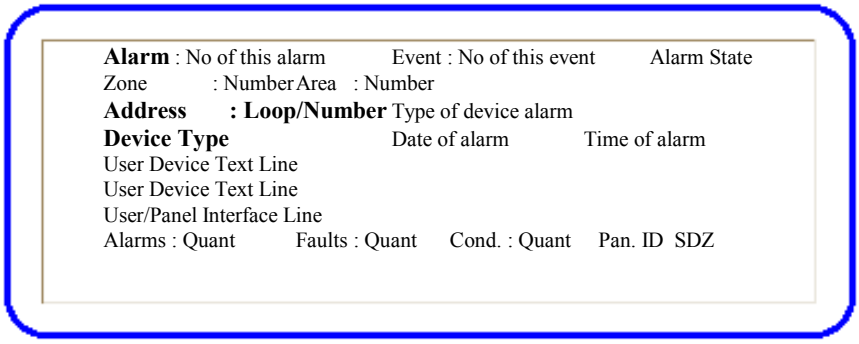


Alarm Indicates that this is a Fire Alarm
Type of Alarm Indicates that this is a General Alarm

3.1.2. Device Alarms

Devices on the detection loop can generate a fire alarm as follows:

Figure 8: Device Alarms

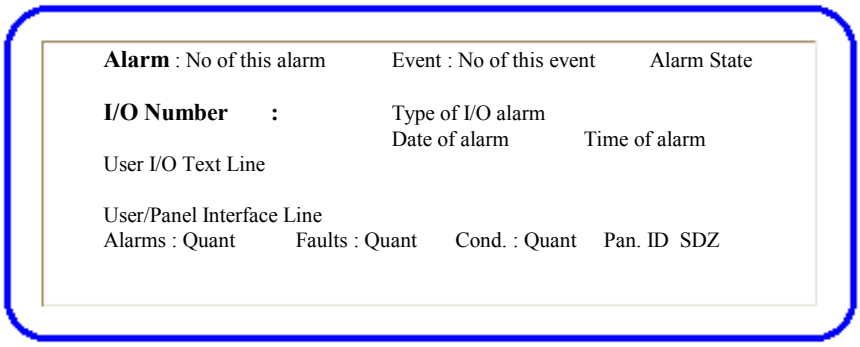


Alarm Indicates that this is a Fire Alarm
Address Indicates the address of the device that reported the alarm
Device Type Indicates the User Type of the device that reported the alarm

3.1.3. Programmed Alarms

User programming in the input/output logic of the fire panel can also generate fire alarms:

Figure 9: Programmed Alarms



Alarm Indicates that this is a Fire Alarm
I/O Number Indicates the number of the Input or Output that caused the panel to display this alarm

✍ *There is only one exception to this rule, and that is when the alarm is generated from the Logic Programming of the operator. In this case, the panel would just cause a General Alarm (see Panel Fire alarms)*

3.1.3.1. Fire

Cause:
This type of fire alarm occurs when the user has programmed an input or output function to be 'logged as fire'.

Diagnostic:
The number of the input or output is displayed in the 'I/O Number' field indicated above. The text field for this input or output indicates the reason for this event. To establish which input triggered this output (if an output was the cause of this fire), the logic programming of the panel has to be debugged.

To Clear:
Reset the fire panel once the cause for this alarm has been established.

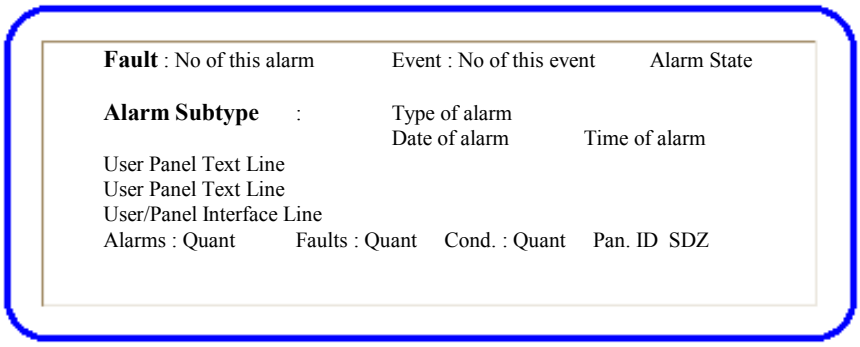
3.2. Fault Alarms

The following sections describe the fault alarm formats as displayed on the 8 line x 40-character LCD display of the fire panel.

3.2.1. Panel Faults:

The panel can report the following fault alarms:

Figure 10: Panel Faults



✍ *There is only one exception to this rule, and that is when the alarm is generated from the Logic Programming of the operator. In this case, the panel would just indicate a General Alarm, with no I/O or device specific information. The operator would then need to 'debug' the logic programming of the panel in order to establish how the alarm was generated.*

The individual PANEL FAULT ALARM SUBTYPES are:

3.2.1.1. Access Fault

Cause:
This type of fault occurs when an operator inputs an access code incorrectly three times in succession.

Diagnostic:
Check the 'Type of alarm' field indicated above. This field contains the access code entered on the third attempt by the operator. An operator with programming access to the 'Access Levels' menu on the panel is able to check for the correct operator access code and assign or allow an operator access by entering a new code for the operator, or retrieving the correct code for the operator.

To Clear:
Reset the fire panel.

3.2.1.2. Aux. Supply Fault

Cause:
This type of fault is caused by overloading the auxiliary supply on a FP1200/1216.

Diagnostic:
Check the current consumption of ALL equipment connected to the auxiliary supply of the panel. The FP1200/16 only allows for a maximum current of 100 mA to be supplied from its auxiliary supply output.

Reduce the output current on the auxiliary supply. If this does not solve the problem, the PS1200 power supply is damaged and must be replaced.

To Clear:
Reset the fire panel.

3.2.1.3. Battery Disconnected

Cause:
This type of fault is caused when the panel detects that the batteries have been disconnected.

Diagnostic:
Check the 'Battery ON' LED on the PS2000 power supply. If it is off, switch the silver switch at the top of the supply to the 'On' position. The silver switch at the top of the PS2000 power supply can disconnect the batteries from the charger supply and the panel. If no batteries are connected to the battery terminals on the PS2000 power supply, two 12V, series connected batteries (24V) must be connected. Observe the correct polarity as indicated on the batteries and PS2000 power supply.

To Clear:
This fault automatically clears when the batteries have been reconnected.

3.2.1.4. Battery Low

Cause:
This type of fault occurs when the panel is running only on its secondary supply (batteries). A low battery indication means that the batteries have reached a critical voltage of 21 V, and that the panel will turn itself off shortly in order to protect the batteries from discharging fully.

Diagnostic:
Determine why the power to the panel is not supplied via the main supply. The cause could be a power failure, or a charger failure. The mains 'On/Off' switch at the bottom of the PS2000 power supply might also be switched off. Check the 'Charger ON' LED at the top of the PS2000 power supply to determine whether the charger is on.

To Clear:
This fault automatically clears once the main supply has been restored, the charger is on, and the batteries have sufficiently recovered (recharged).

3.2.1.5. Battery Failed

Cause:
This type of fault occurs when the panel performs a battery test and finds the battery faulty. A battery test is automatically performed and cannot be prevented.

Diagnostic:
Physically check the batteries for any leaks or cracks. Replace the batteries, if necessary. Remember that just measuring the battery voltage is not an indication of the true status of the batteries. In order to determine whether the batteries are faulty, current must be drawn and the voltage response of the battery monitored. In most cases, the battery must be replaced.

To Clear:
Reset the panel.

3.2.1.6. Battery Test Failed

Cause:
This type of fault occurs when the panel performs a battery test and determines that the batteries do not have the current capacities to support the panel if the main supply to the panel should fail.

Diagnostic:
Check the batteries by performing a current check.

To Clear:
Reset the fire panel.

3.2.1.7. Battery Over voltage

Cause:
This type of fault occurs when the panel determines that the batteries have been overcharged.

Diagnostic:
Measure the charger output to the batteries. This voltage should be no more than 27.6 V. If the voltage is higher than 27.6, the charger is faulty and must be replaced. In most cases the batteries would be damaged and must be replaced.

To Clear:
Reset the fire panel.

3.2.1.8. Battery Under Voltage

Cause:
This type of fault occurs when the panel determines that the batteries have not been charged sufficiently.

Diagnostic:
Measure the charger output to the batteries. This voltage should be 27.6 V. If the voltage is lower than 27.6 V, the charger is faulty and must be replaced. In most cases the batteries recover once the correct charging voltage is supplied.

To Clear:
This fault automatically resets once the batteries have fully recovered.

3.2.1.9. Charger Fault

Cause:
This type of fault occurs when the panel determines that the main power supply (charger) is not functioning within its specified limits. A charger fault is raised when the battery charging voltage is above the maximum allowed battery-charging voltage. It is tested every second.

Diagnostic:
Replace the main power supply (charger).

To Clear:
This fault automatically resets once the fault has been removed.

3.2.1.10. Checksum Fault

Cause:
This type of fault occurs when the panel determines that there is a checksum error in the panel configuration.

Diagnostic:
The following block numbers are assigned to the different memory blocks of an Aritech fire panel:

#	Description	#	Description
0	Configuration	12	Areas
1	Loop 1	13	Events
2	Loop 2	14	System
3	Loop 3	15	General
4	Loop 4	16	Loops
5	Loop 5	17	Logic
6	Loop 6	18	Markers
7	Loop 7	19	Timers
8	Loop 8	20	Modem
9	Outputs	21	Current Loop Devices
10	Inputs	22	Lon Devices
11	Zones		

To Clear:
The panel automatically clears this fault when the panel is restarted. Be aware that, in some cases, the only way for the panel to clear this fault would be to clear the memory block. Some parts of the panel programming may be lost in the process. Download the affected parts again. If the problem persists, the following should be done:

a) Clear the panel configuration by pressing and holding the '0' button on the keypad when the panel restarts and displays the message 'Starting FPxxxxx'. When you see the message 'Clearing all site data' the command has been executed. The panel will now be totally cleared, and would have to be reconfigured as from new.
b) If this problem persists, replace the HOST CPU.

A hardware test can be done at any time to determine if the fault will return. If the hardware test returns "Hardware Test OK", then the problem is solved.

3.2.1.11. CL Device Fault

Cause:
This type of fault occurs when a pre-programmed current loop device fails to respond to communications from the panel.

Diagnostic:
Check the following:

1. Does the current loop device exist on the system? If not, remove the programming of this device from the CL-Device set-up in the Communications menu of the panel.
2. Check the diagnostic LED's on the fire panel's host CPU. The LED's are located behind the current loop port terminal. The LED at the top (LED 2) indicates transmit information, while the LED at the bottom (LED 1) indicates received information. For every pulse on the transmit (TX) LED, there should be an immediate response from the current loop device, indicated by a pulse on the receive (RX) LED. The result is that the LED's should blink alternately. Is the TX LED blinking? If not, remove the TX cable from the terminal connector. Does the TX LED now blink? If not, replace the CPU PCB.
3. Check the DC power on the current loop device. Is the 24 Vdc power to the device connected and within the specified voltage limits?

4. Check the LED status of the diagnostic LED's of the affected current loop device. The LED closes to the TX terminal indicates transmitted information, whilst the LED closest to the RX terminal indicates received data. Is the RX LED blinking? If not, check the cable continuity and polarity between the fire panel and the current loop device, specifically noting that the TX line from the panel is connected to RX-IN connector on the current loop device.
5. Is the TX LED blinking? If not, check the address setting of the current loop device. The address of the current loop device must correspond to the programmed number in the fire panel. Cutting the address resistors on the current loop device sets the address. Note that the current loop device must be powered down before changing the address. If the device's address is correct, the DC power to the device is within specifications and it is receiving the data from the panel (RX LED blinks) and it still does not respond, replace the current loop device.
6. Check the cable continuity and polarity between the fire panel and the current loop device, specifically noting that the RX line from the panel is connected to TX-out terminal on the current loop device.

To Clear:
This fault automatically resets when communications between the current loop device and the panel has been restored.

3.2.1.12. Configuration Fault

Cause:
This type of fault occurs when a panel detects an invalid hardware configuration.

Diagnostic:
Check that all the PCB's inside the panel are properly connected and configured.

To Clear:
Restart the panel.

3.2.1.13. Earth Fault

Cause:
This type of fault occurs when any power-carrying component is inadvertently connected to earth or referenced to earth with a resistance smaller than 100 kΩ.

Diagnostic:
An Earth Fault is caused from any connection to earth after the panel's power supply. It could be:

- On the auxiliary supply outputs
- On the battery connection leads
- On the current loop port connections
- On the serial (RS232) port connections
- On the device loop cables
- On the supervised outputs/inputs on the VdS board
- On the panel's internal electronics

✍ *Note that the FP1100/1200, FR1200 and UN2011 always show an 'earth fault' when connected to a computer. This is because the Host power supply power is NOT isolated. In these units, once it is established that this earth*

fault is ONLY caused by the PC connection to the RS232 Port, the Earth Fault can be masked in the Maintenance Menu of the panel. The FP2000 and FR2000 have the Host CPU power isolated, and therefor it does not have this problem.

In order to clear an earth fault, a detailed investigation needs to be done in systematic fashion. The panel is not able to determine where the problem originates from, and therefor the service engineer needs to employ his skills to a great extent. In each case the diagnostic Earth Fault LED on the host power supply (where present), or the indication on the panel's LCD display can be used to determine the status on the earth fault.

Here follows a recommended fault finding procedure (always leave the panel turned on while performing these functions):

1. Remove any auxiliary power connections from the panel 's power supply. Wait for 10 seconds. Is the earth fault still present? If not, the problem is in the auxiliary power cable or in the connected auxiliary equipment.
2. Disconnect the batteries and remove the battery cables from the panel's charger. Wait for 10 seconds. Is the earth fault still present? If not, the problem is in the cable connection to the batteries.
3. Remove the communications cables to any current loop devices in the fire panel. Wait for 10 seconds. Is the earth fault still present? If not, the problem is in the communications cables to the current loop devices or in the current loop devices themselves, or in the external power supplies to the current loop devices. Investigate all these options and repair where necessary.
4. Remove any cables that may be connected to any RS232 ports on the panel. Wait for 10 seconds. Is the earth fault still present? If not, the problem is in the equipment or cable connected to the RS232 port. This fault can be masked in the Maintenance menu of the FP1100/1200, the FR1200 and the UN2011 panels.
5. Remove all the loop cables from the loop connectors in the fire panel. Wait for 10 seconds. Is the earth fault still present? If not, the problem is in the loop cables. The loops can now be connected one by one to determine which cable(s) cause(s) the earth fault. Once this is established, the affected cable must be divided, and sub-divided to determine the exact location of this fault. Always remember that Earth Faults can also be caused by faulty input/output wiring to I/O units, as well as by the use of incorrect zener barriers.
6. Disconnect all supervised input/output cables connected to the fire panel's sounder/VdS board. Wait for 10 seconds. Is the earth fault still present? If not, the problem is in these cables. The cables can now be connected one by one to determine which cable(s) cause(s) the earth fault. Once this is established, the affected cable must be divided, and sub-divided to determine the exact location of this fault.
7. When all cables have been disconnected without removing the Earth Fault, the problem is internal to the fire panel. In most instances, the host power supply (FP/FR2000 panels only) would be the cause. Replace this PCB.

To Clear:
An earth fault clears automatically when the earth fault is removed from the system.

3.2.1.14. Emulation Disconnected

Cause:
This type of fault occurs when the panel detects that a programmed printer fails to respond to communications from the panel.

Diagnostic:
Check that the emulation equipment is properly connected, and that the correct serial port on the panel (Ser1 or Ser2) and the correct communication parameters between the emulation equipment and the panel is used.

The communications to emulation equipment is configured in the 'Ports' menu on the 'Communications menu' of the fire panel.

To Clear:
This fault automatically clears once communications to the emulation equipment has been established.

3.2.1.15. FEP Fault

Cause:
This type of fault is caused when the panel detects a problem with the Front End Processor. Normally the panel automatically restarts to attempt a recovery from this failure. In order to provide the operator with the reason for this restart from the panel, this message is displayed with its corresponding number once the panel has restarted.

Diagnostic:
Under normal conditions, the panel would automatically recover from this failure by restarting. This means that no operator or technician's intervention is required, unless this fault occurs often (more than once) in quick succession. This would mean that the panel cannot recover from this failure and that user intervention is required. A number always accompanies the FEP fault. This number has the following meanings:

0: Fault signal on 'fault in line'

1: Reserved

2: No communication with FEP

3: Packet number mismatch

4: Message from FEP before communication was initialised

Continuous failure indicating number '0' would mean that the FEP has failed and must be replaced.

Failures indicating numbers '2','3' or '4' indicate a communications problem between the FEP and Host PCB's. If your panel is using Firmware versions 4.20 and earlier, please upgrade to the latest firmware versions. Unless the Host CPU, Front End Processor or the interconnecting cable between the two CPU's is faulty, upgrading to a version 4.21 or later firmware solves this problem.

Be aware that a FEP fault is always accompanied by a Watchdog Timeout message. Refer to the section on 'Watchdog Timeouts', later in this manual, for a detailed description of this fault.

To Clear:
Once the panel has recovered from this failure, the panel must be reset to clear this message.

3.2.1.16. Fbrig. Fault

Cause:
This type of fault occurs on the panel when the second supervised output (Out 2) on the SD1200/2000 becomes either open circuit or short circuit. (The panel does not detect the end-of-line resistor correctly or overloads on activation)

Diagnostic:
When the fault occurs in monitoring mode (the fire brigade is not activated), measure the resistance of the end-of-line resistor as seen from the panel. The value should be close to

3k3 Ohm. If this is not correct, check the cable and the end-of-line resistor and ensure that all contacts are securely fastened. If this is correct, check the connection if the cable to the output. If this is also correct, replace the SD1200/2000 PCB.

When the fault only appears when an alarm occurs, measure the output current to the connected line. This should be less than 1 A when activated. If not, some devices must be removed from this output. If the activation current is less than 1 A, replace the SD1200/2000 PCB.

To Clear:
The panel has to be reset once the problem has been resolved.

3.2.1.17. FItrt Output

Cause:
This type of fault occurs when the fourth supervised output on the SD1200/2000 (Out 1) becomes either open circuit or short circuit. (The panel does not detect the end-of-line resistor correctly or overloads)

Diagnostic:
When the fault occurs in monitoring mode (the output is not activated), measure the resistance of the end-of-line resistor as seen from the panel. The value should be close to 3k3 Ohm. If this is not correct, check the cable and the end-of-line resistor and ensure that all contacts are securely fastened. If this is correct, check the connection of the cable to the output. If this is also correct, replace the SD1200/2000 PCB.

When the fault only appears when an alarm occurs, measure the output current to the connected line. This should be less than 100 mA when activated. If not, some devices must be removed from this output. If the activation current is less than specified, replace the SD1200/2000 PCB.

To Clear:
The panel has to be reset once the problem has been resolved.

3.2.1.18. Fprot Equipment Fault

Cause:
This type of fault occurs on the panel when the panel is in VdS mode when a SD2000 is installed or in EP or VdS mode when a FSK2000 PCB is installed. In these modes, an input (P3 – 15,16 on FSK2000) or (IN 6 on SD2000) supervises the Fire Protection Equipment. When the monitoring on this input fails, this fault occurs.

Diagnostic:
Check that the end of line resistor (3K3 Ohm) is measurable at the end of the line as seen from the panel. Also ensure that all connections in the cables are securely fastened and that the cables are securely connected at the panel.

If this input is NOT being used for the supervision of the Fire Protection Equipment, then the panel has to be switched to another operating mode, such as EP mode. In this mode this input becomes freely programmable. Note that this option is not available when using an FSK2000 PCB. (Refer to the Installation and Commissioning manuals for more details)

To Clear:
The panel has to be reset once the problem has been resolved.

3.2.1.19. Fprot Return

Cause:
This type of fault occurs on the panel when the panel is in EP or VdS mode. In these modes, the second supervised input (IN6) on the SD1200/2000 PCB supervises the Fire Protection Equipment. When the supervision of the line is compromised (the line is open circuit or short circuit) this fault occurs.

Diagnostic:
Check that the end of line resistor (3K3 Ohm) is measurable at the end of the line as seen from the panel on IN6 on the SD2000/1200 PCB. Note that when active, this input should measure 560 Ohm.

If this input is NOT being used for the supervision of the Fire Protection Equipment, then the panel has to be switched to another operating mode, such as EP mode. In this mode IN5, IN6, IN7 and IN8 becomes freely programmable. (Refer to the Installation and Commissioning manual and Reference Guide for more details)

To Clear:
The panel has to be reset once the problem has been resolved.

3.2.1.20. G-Repeater Fault

Cause:
This type of fault occurs when the panel is programmed to communicate on the network with a Global Repeater using 'Netx_check', and the Global Repeater fails to respond to this communication.

Diagnostic:
1. Check that the Global Repeater has its network communications assigned to communicate with the panel indicating the fault. This is done under the Network menu option in the Communications menu.
2. Check the network cable for continuity between the panel and the Global Repeater. Also check the cable polarity connections and the cable resistance to earth. Note that the panel does not check the network cable for earth faults.
3. Ensure that the network cable is correctly terminated (where required).

To Clear:
This fault automatically clears when communications between the panel and the Global Repeater have been established.

3.2.1.21. Hardware Test

Cause:
This type of fault occurs when the panel finds a problem with the internal panel hardware or firmware. The panel performs a transparent hardware test at random times every hour automatically. A test number always accompanies this message, and is of the utmost importance. The test number indicates to the service technician what type of hardware failure the panel has experienced.

Diagnostic:
Under most conditions, the panel would automatically try to recover from this failure by restarting. This means that normally no operator or technician's intervention is required, unless this fault occurs often (more than once).

In some cases (especially for problems with memory in the panel) the service personnel can try to restart the panel. After restarting, perform a manual 'Hardware Test' and confirm that the problem has been cleared. If not, this would mean that the panel cannot recover from this failure and that technical intervention is required.

A number always accompanies the '*Hardware Test Failed*' fault. The hardware test numbers could be any of the following:

100: Faulty Host EPROM

2xx: Faulty non volatile block (xx = block, see Block Numbers below)

3xx: Faulty protected volatile block (xx = block, see Block Numbers below)

4xx: Faulty save memory (xx = module number, see Module Numbers below)

5xx: Faulty configuration (xx = board position, 0...15 Host, 16...24 FEP)

600: Faulty LCD

601: Faulty Port 2

602: Faulty Port 3

603: Faulty ARCNET 1

604: Faulty ARCNET 2

700: Faulty FEP EPROM

800: Faulty FEP RAM

900: Faulty modem
The modem is tested every 60 minutes as part of the hardware test. The panel tests if the modem is connected (if the modem settings are ok and the software is able to talk to it), and then if there is dial-tone (if the line is connected, and it can detect a dial-tone)

The following ***block numbers*** are assigned to the different memory blocks of an Aritech fire panel:

#	Description	#	Description
0	Configuration	11	Zones
1	Loop 1	12	Areas
2	Loop 2	13	Events
3	Loop 3	14	System
4	Loop 4	15	General
5	Loop 5	16	Loops
6	Loop 6	17	Logic
7	Loop 7	18	Markers
8	Loop 8	19	Timers
9	Outputs	20	Modem
10	Inputs	21	Current Loop Devices

The following ***module numbers*** are assigned to the various modules of the Aritech fire panel:

#	Description	#	Description
0	Boo number	23	Text Danish number
1	Nuc0 number	24	Text Swedish number
2	Sys number	25	Text Norwegian number
3	Dis number	26	Men number
4	LCD number	27	Dtm number (see note)
5	Tim number	28	Alarm number
6	RTC number	29	Link number

#	Description	#	Description
7	CIO number	30	Sup number
8	TOL number	31	Configuration number
9	Serial number	32	FEP number
10	VDU number	33	Dia number
11	Printer number	34	Rel number
12	Lip number	35	Input number
13	Lop number	36	Net number
14	Text number	37	Arc number
15	Text English number	38	Zone number
16	Text French number	39	Crl number
17	Text Italian number	40	Mdm number
18	Text Spanish number	41	Nuc1 number
19	Text German number	42	Trm number
20	Text Portuguese number	43	Text Czech number
21	Text Belgian number	44	Text Polish number
22	Text Dutch number	45	Text Slovakian number

✍ *For the user, the number 27 is irrelevant. It is only an indication of where the fault occurred and is only useful to programmers in case of a reoccurring fault.*

Hardware test faults 4xx can be fixed by restarting the panel. No information is lost since the data will be copied from non-volatile memory to volatile memory on start-up. These blocks (one per software module) are protected by a checksum that is verified every hour. A fault in such a block is normally caused by faulty hardware or tampering with the CPU.

To Clear:
After this fault has been rectified, the panel must be reset.

3.2.1.22. Incomplete Netx Setup

Cause:
This type of fault occurs when the user attempts to configure two network protocols on two serial ports. The fire panel can only accommodate one network protocol on any serial port at any one time.

Diagnostic:
Access the 'Port Setup' menu in the Communications Menu. Look at the configuration for SER1 and SER2. The configurations 'NET1, NET2 and Setup' are all network protocols. Only one port can have any of these configured at any one time.

To Clear:
Correct the port set-up by reconfiguring one of the serial port configurations, and reset the panel.

3.2.1.23. L-Repeater Fault

Cause:
This type of fault occurs when the panel is programmed to communicate on the network with a Local Repeater using 'Netx_check', and the Local Repeater fails to respond to this communication.

Diagnostic:

1. Check that the Local Repeater has its network communications assigned to communicate with the panel indicating the fault. This is done under the Network menu option in the Communications menu.
2. Check the network cable for continuity between the panel and the Local Repeater. Also check the cable polarity connections and the cable resistance to earth. Note that the panel does not check the network cable for earth faults.
3. Ensure that the network cable is correctly terminated (where required).

To Clear:
This fault automatically clears when communications between the panel and the Local Repeater have been established.

3.2.1.24. Logic Disabled

Cause:
This type of fault occurs when the panel detects changes in the Input Table, Output Table or Logic Table of the panel. Changes to the input, output and logic tables are always performed by an operator, either locally (on the panel) or from PCC/M2000.

Diagnostic:
This process is a precautionary measure from the panel to avoid the accidental activation of outputs whilst editing. The fault will remain active until the editing has stopped and the operator logs out of the panel. If the editing was done using PCC2000, the fault will remain until the panel is reset.

To Clear:
Exit the Input/Output menu (stop the editing) and ‘reset’ the panel.

3.2.1.25. Loop Open Circuit

Cause:
This type of fault occurs when the panel detects that a Class-A loop configuration is not closed i.e. there is a break in the cable. Because of the method that the panel uses to determine this fault, when one has communications problems on a loop, 'loop open circuit' faults can very often be the result. For the same reason, the panel could also indicate a Loop Open Circuit fault on a Class-B loop.

Diagnostic:
The first step in clearing this problem is to determine whether the Loop Open Circuit actually exists. This can be done by accessing the Loop Test menu located in the Maintenance menu of the panel. Select ‘General Loop Test’ from this menu and start the test.

To Clear:
After the problem has been rectified, the panel must be reset.

3.2.1.26. Loop Overload

Cause:
The panel’s loop driver is designed to limit the output current to the loop devices. When this limit is exceeded, the driver shuts down in order to protect itself and a 'Loop Overload' message is displayed on the panel.

Diagnostic:
Overload A and B

When one has no isolators installed in a class-A loop, the loop acts as a straight through, 2-wire connection. If a problem now occurs where the current limit is exceeded on the loop for any reason e.g. a short circuit or a device drawing excessive current, the loop

driver shuts down. Because the panel normally scans the devices from the A-side, this driver shuts down and a message 'Overload -A' appears on the panel. Because of the functionality of a Class-A loop, the B-driver now tries to take over the scanning since the A-driver is shut down, but of course the problem is still present and causes the B-driver to also overload and shut down. The message 'Overload A' is followed by the message 'Overload-B'. When the drivers have shut down like this, there is no voltage on the loops any more, and therefore no devices can operate. Consequently there are no communications to and from the devices, and the panel finds no detectors. (See 'Comms Fault')

Overload A or B

When only one of the two drivers overload, and you have no isolators installed, it means that you have at lease two problems on the loop. Because of the straight forward 2-wire connection explained above, and short circuit or overload is visible to both loop drivers, unless you have an isolator installed, or you have a second problem, like a loop open circuit or a faulty loop driver. Whether the panel is able to communicate to any devices depends on where the loop is open circuit. If it were open circuit in the middle of your loop, then you would only find half the devices. If the loop happens to be open circuit after the last device on the A-side, and there was a short circuit on the B-side, the panel is not able to determine this until the 'Hardware Test' is performed. The A-driver is able to operate normally and communicate with all the devices, but when the loop test is performed on the panel (normally done every hour), it finds that there is a short circuit on the line when it tried to read the devices from the B-side. The panel can therefore still communicate to all the devices using the A-driver.

To Clear:
After the cause of the overload has been determined and the problem has been rectified, the panel must be reset.

3.2.1.27. Mains Fault

Cause:
This type of fault occurs when the panel senses that the charger has been disconnected from the main power (AC source). The panel automatically switches over to the secondary supply, the batteries.

Diagnostic:

1. The charger on/off switch disconnects the mains supply from the charger and turns the charger off. Check that this switch, located at the bottom of the FP2000 power supply has been switched on and that the green charger LED on the top end of the supply is lit.
2. If the charger is on but the green charger LED at the top is not lit, check the mains supply with a multi-meter. The supply should be 110 Vac or 220 Vac, depending on the country.
3. If the mains supply is present and the fault remains, replace the power supply.

To Clear:
This fault automatically clears once the main supply to the panel has been restored.

3.2.1.28. Memory Unlocked

Cause:
This type of fault occurs when the panel detects that its memory is unprotected. The panel has a 'Memory Lock' switch that allows the operator to unlock the memory when changes in configurations need to be performed.

Diagnostic:
Open the panel door and check the topmost switch (or jumper) on the Host CPU PCB on the door of the panel. The switch should be in the locked position (or the jumper should be removed)

To Clear:
This fault clears automatically when the 'Memory Lock' switch is closed.

3.2.1.29. Modem Fault

Cause:
This type of fault occurs when the modem returns an error message to the panel on initialisation.

Diagnostic:
Check that the correct initialisation string is being sent to the modem. By verifying the initialisation string in the Modem Setup menu in the Communications section of the panel, this can be done. Note that if the initialisation string is changed, the panel has to be reset in order for the changes to take effect. In some instances, the modem may have to be turned off and on again in order for the new initialisation string to be accepted.

To Clear:
This fault clears automatically once the modem has initialised correctly.

3.2.1.30. No comms. with Lon device

Cause:
This type of fault occurs when the fire panel looses communications with a pre-configured device on the LON communications network.

Diagnostic:
1. Ensure that the LON device in question has it's 24 Vdc power connected
2. Ensure that the communications cable between the panel and the LON device is not broken.
3. Ensure that the connections between the LON device and the cable and the fire panel and the cable are securely fastened.

Check the status of the service LED on the LON2000 interface on the panel. If it is blinking periodically, the LON port on the panel has not been enabled.

Check the status of the service LED on the LON device in question. If the service LED is ON, the device is unconfigured i.e. not correctly installed on the panel. Press the service switch on the LON device or clear the panel's LON programming for this device and redo the setup procedure as described in the FP2000 Reference Guide.

Please note that an earth fault anywhere in the system may also be the cause of this failure. See section 3.2.1.13 for more information.

To Clear:
This fault automatically resets when communications between the LON device and the panel has been restored.

3.2.1.31. No Fbrig Feedback

Cause:
This type of fault occurs when the panel is setup in EN or VdS operating mode. When a fire alarm is activated, the panel expects to get an acknowledgement from the fire brigade signalling equipment that the signal has been received, within 10 seconds after activation of the fire brigade output.

Diagnostic:
1. Check that the corresponding input (input 6) on the VdS board has been wired to receive the acknowledgement input from the fire brigade signalling equipment.
2. If this function is not required either:
   - set the panel to a different operating mode (such as EP mode);
   - or if EN or VdS operating mode is required, remove the monitoring resistor from input 6 (on the VdS board) and wire input 6 to the voltage free (B contacts) on the fire brigade output (output 2). Ensure that the correct end of line resistor is selected via the jumper settings for this output.

To Clear:
To clear this fault, the panel must be reset.

3.2.1.32. No Fprot Feedback

Cause:
This type of fault occurs when the panel is set-up in EN or VdS operating mode. When a fire alarm is activated, the panel expects to get an acknowledgement from the fire protection equipment that the signal has been received, within 10 seconds after activation of the fire protection (common fire) output.

Diagnostic:
1. Check that the corresponding input (input 7) on the VdS board has been wired to receive the acknowledgement input from the fire brigade signalling equipment.
2. If this function is not required, either:
   - set the panel to a different operating mode (such as EP mode);
   - or if EN or VdS operating mode is required, remove the monitoring resistor from input 7 (on the VdS board) and wire input 7 to the voltage free (B contacts) on the fire routing (common fire) output (output 3). Ensure that the correct end of line resistor is selected via the jumper settings for this output. (For more information, please refer to the relevant section in the Installation and Commissioning Manual)

To Clear:
To clear this fault, the panel must be reset.

3.2.1.33. No Snd Feedback

Cause:
This type of fault occurs when the panel is setup in EN or VdS operating mode. When a fire alarm is activated, the panel expects to get an acknowledgement from the alarm signalling equipment (sounders) that the signal has been activated, within 10 seconds after activation of the sounder output.

Diagnostic:
1. Check that the corresponding input (input 5) on the VdS board has been wired to receive the acknowledgement input from the alarm signalling equipment (sounders).
2. If this function is not required, either:
   - set the panel to a different operating mode (such as EP mode);
   - or if EN or VdS operating mode is required, remove the monitoring resistor from input 5 (on the VdS board), and wire input 5 to the voltage free (B contacts) on the sounder output (output 1). Ensure that the correct end of line resistor is selected via the jumper settings for this output.

To Clear:
To clear this fault, the panel must be reset.

3.2.1.34. Panel Fault

Cause:
This type of fault occurs when the panel is programmed to communicate on the network with another panel using 'Netx_check', and the other panel fails to respond to this communication.

Diagnostic:
1. Check that the other panel has its network communications assigned to communicate with the panel indicating the fault. This is done under the Network menu in the Communications menu.
2. Check the network cable for continuity between the panels. Also check the cable polarity connections and the cable resistance to earth. Note that the panel does not check the network cable for earth faults.
3. Ensure that the cable is correctly terminated.

To Clear:
This fault automatically disappears when communications between the panels have been established.

3.2.1.35. Port Configuration

Cause:
This type of fault is caused when the fails in an attempt to initialise one or more of the communication ports on the panel.

Diagnostic:
Together with the 'Port Configuration' message, the panel supplies the problematic port number. The port numbers are:

PORT			DESCRIPTION
0	INT		Internal
1	CL		Current Loop
2,3,4,5	SER 1, 2, 3, 4		RS232
6,7	PAR 1, 2	(not supported)	Parallel
8,9	ARC 1, 2		Arcnet
10	RES	(not supported)	reserved
11	EPS	(not supported)	Printer

A port configuration fault, Port 8 for example, would mean that the panel was unable to initialise the ARC1 port i.e. the first network card. This could be due to a hardware failure on the NC20xx, but also because of a duplicate node ID problem (another panel on the ARC1 network is already functioning with the ID assigned to this node.

To Clear:
After the problem has been corrected, the panel has to be restarted to allow for the correct initialisation of this port.

3.2.1.36. Port Installation

Cause:
This type of fault is caused when the user attempts to configure two network protocols on the two serial ports of the FP2000. The FP2000 can only cater for one network on any of the serial ports at any one time.

Diagnostic:
Check the port configuration of the serial ports of the panel under the Port Setup menu on the Communications menu. Note that Ser1 and Ser2 cannot simultaneously be configured

for ‘Setup’, ‘Net1’ or ‘Net2’. Only one of these network protocols can be assigned to any serial port at any one time.

To Clear:
After the port configuration has been corrected, the panel has to be reset.

3.2.1.37. Printer Disconnected

Cause:
This type of fault occurs when the panel detects that a programmed printer fails to respond to communications from the panel.

Diagnostic:
Check that the printer is properly connected, the paper feed is normal, and that the power supply to the printer has been turned on. Also check that the printer has been connected to the correct serial port on the panel (Ser1 or Ser2) and that the communication parameters between the printer and the panel is the same.

The communications to a printer is configured in the ‘Ports’ menu on the ‘Communications menu’ of the fire panel.

To Clear:
This fault automatically clears once communications to the printer has been established.

3.2.1.38. Service Switch On

Cause:
This type of fault occurs when the panel detects that the service mode switch has been turned on. The panel has a ‘Service Mode’ switch that allows the operator to prevent the activation of any outputs on the panel, directly connected or programmed, when maintenance needs to be performed.

Diagnostic:
Open the panel door and check the bottom switch (or jumper) on the Host CPU PCB on the door of the panel. The switch should be in the off position (or the jumper should be removed).

To Clear:
This fault clears automatically when the ‘Service Mode’ switch is closed.

3.2.1.39. Setup Changed

Cause:
This type of fault occurs when the operator restarts the panel before the panel has completed a function previously assigned.

Diagnostic:
Functions such as ‘Autosetup’ have to write new information into memory after completion. If the panel is restarted during this process, only some of the information may be written, whilst the other is lost due to the restart process. The affected memory blocks are also indicated. The information for these blocks needs to be reloaded in order to ensure normal operation of the panel.

The following ***block numbers*** are assigned to the different memory blocks of an Aritech fire panel:

#	Description	#	Description
0	Configuration	11	Zones
1	Loop 1	12	Areas
2	Loop 2	13	Events

#	Description	#	Description
3	Loop 3	14	System
4	Loop 4	15	General
5	Loop 5	16	Loops
6	Loop 6	17	Logic
7	Loop 7	18	Markers
8	Loop 8	19	Timers
9	Outputs	20	Modem
10	Inputs	21	Current Loop Devices

To Clear:
Reset the panel after reloading the information for affected memory block.

3.2.1.40. Sounder Fault

Cause:
This type of fault occurs when the first supervised output on the SD1200/2000 (Out 1) becomes either open circuit or short circuit. (The panel does not detect the end-of-line resistor correctly or overloads)

Diagnostic:
When the fault occurs in monitoring mode (the sounder is not activated), measure the resistance of the end-of-line resistor as seen from the panel. The value should be close to 3k3 Ohm. If this is not correct, check the cable and the end-of-line resistor and ensure that all contacts are securely fastened. If this is correct, check the connection of the cable to the output. If this is also correct, replace the SD1200/2000 PCB.

When the fault only appears when an alarm occurs, measure the output current to the connected line. This should be less than 800 mA (FP2000) or 100 mA (FP1200) when activated. If not, some devices must be removed from this output. If the activation current is less than specified, replace the SD1200/2000 PCB.

To Clear:
The panel has to be reset once the problem has been resolved.

3.2.1.41. Sounder Output

Cause:
This type of fault occurs when the first supervised output on the SD1200/2000 (Out 1) becomes either open circuit or short circuit. (The panel does not detect the end-of-line resistor correctly or overloads)

Diagnostic:
When the fault occurs in monitoring mode (the sounder is not activated), measure the resistance of the end-of-line resistor as seen from the panel. The value should be close to 3k3 Ohm. If this is not correct, check the cable and the end-of-line resistor and ensure that all contacts are securely fastened. If this is correct, check the connection of the cable to the output. If this is also correct, replace the SD1200/2000 PCB.

When the fault only appears when an alarm occurs, measure the output current to the connected line. This should be less than 800 mA (FP2000) or 100 mA (FP1200) when activated. If not, some devices must be removed from this output. If the activation current is less than specified, replace the SD1200/2000 PCB.

To Clear:
The panel has to be reset once the problem has been resolved.

3.2.1.42. Tamper

Cause:
This type of fault occurs on the panel when the tamper switch on the door of the panel has been activated. This function is available on the FP2000 Series panels only.

Diagnostic:
Check that the panel door is securely closed and locked, with both keys when available. If this is the case but the tamper alarm remains, check the alignment of the switch mounting on either side of the fire panel door. If this is seems correct and the fault still remains, replace the switch.

To Clear:
This fault would automatically clear once the panel door has been closed.

3.2.1.43. VDU Disconnected

Cause:
This type of fault occurs when the panel detects that a programmed display unit fails to respond to communications from the panel.

Diagnostic:
Check that the VDU is properly connected, and that the correct serial port on the panel (Ser1 or Ser2) and that the correct communication parameters between the VDU and the panel are used.

The communications to a VDU is configured in the ‘Ports’ menu on the ‘Communications menu’ of the fire panel.

To Clear:
This fault automatically clears once communications to the VDU has been established.

3.2.1.44. Watchdog Timeout

Cause:
When the panel detects internal problems, such as timing errors and/or hardware failures, it would attempt to correct these automatically. If the panel finds it impossible to continue, it would restart automatically. In order to explain the reason for the automatic restart, a 'Watchdog Timeout x' fault is displayed on the screen. This 'x' is very important and tells us what specifically the panel is having problems with.

Diagnostic:
The Watchdog timeout numbers are:

#	Description	#	Description
0	Host (general) watchdog time-out	16	Hardware test
1	FEP watchdog time-out	17	Dump set-up to FEP
2	Divide error exception	18	Reset ZMU
3	Array bounds exception	19	Remove no type alarms
4	Unused opcode exception	20	Set/reset isolated zones
5	Escape opcode exception	21	Set/reset sensors in zone test
6	Numeric opcode exception	22	Host process not ready for reset
7	Reserved	23	FEP alarm process not ready for reset
8	Reserved	24	One second process not ready for reset
9	Controlled restart	25	Link response process not ready for reset
10	Not used	26	Dialogue process not ready for reset
11	20 min Update	27	Reset pulse to i/o
12	30 s Update	28	System stuck for longer than 180 s
13	Fire brigade switching	29	No data from FEP for longer than 60 s
14	Day/night mode switching	30	No reply from FEP
15	Auto set-up	31	Excessive replies from FEP
		32	LON2000 restart

- Number 0 occurs mostly when the main microprocessor fails. This could be due to a CPU hardware failure or a faulty EPROM in the main CPU.
- Numbers 4 and 5 sometimes occur when starting a new panel with new firmware, or when starting an old panel after upgrading to a new firmware version.
- Number 28 is normally seen on big installations when starting up into a cleared system.
- Numbers 29 to 31 generally indicates a problem in the communication between the FEP and Host Processors. The communications are sometimes disrupted because of bad connections on the Molex cable connector of the Host CPU or the FEP CPU. These connections and cables must be checked for continuity
- Number 32 is mostly due to the FC2011 not communicating correctly with the LON2000.

In itself, a watchdog timeout fault is not a critical failure. It is an indication only that the panel had to take action in order to compensate for a potentially crippling event. However, it could be an indication that something is about to go wrong, and therefore should be investigated if they occur more than once.

To Clear:
This fault can be cleared, after investigation, by resetting the panel.

3.2.1.45. Wrong Time/Date

Cause:
This type of fault occurs when the panel detects that an invalid time or date has been configured in the panel.

Diagnostic:
Check and correct the system time and date in the 'Times' menu on the panel. Also remember that the FP1200, FP1100 and the UN2011 does not have a battery backed up

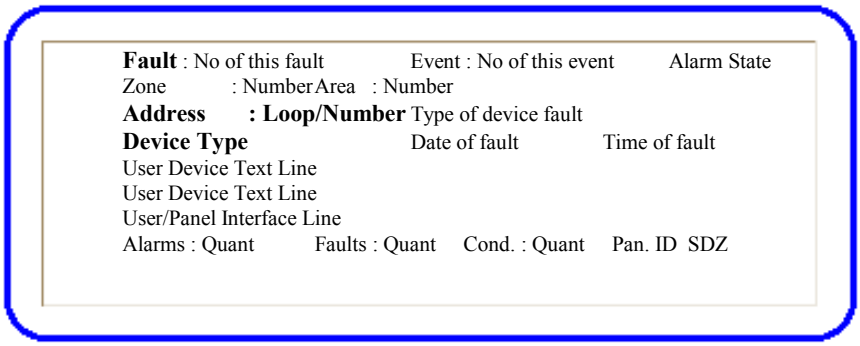
clock. These units have to have their date and time set every time that the system is switched off.

To Clear:
To clear this fault, reset the panel.

3.2.2. Device Faults:

Devices on the detection loop can generate the following fault alarms:

Figure 11: Device Faults



The different types of device faults are:

3.2.2.1. Communication Fault

Cause:
This type of fault occurs when a pre-configured detector fails to communicate with the fire panel.

Diagnostic:
The 'CommQlt' value is the communications quality to that specific device. This value may be found on the second 'Device Setup' screen in the 'Device' menu. Anything below 100% is considered bad and could potentially lead to failures such as 'Communication Fault', 'Loop Open Circuit', 'Double Address' etc. Interference, especially from systems such as P.A. systems, can also cause havoc with digital communications to devices on the loop, and may also be the cause of 'Communications Faults'.

When the panel is experiencing problems communicating to devices, the 'CommQlt' parameter on the device set-up screen, second page, can be used as a diagnostic tool. The communications quality of all configured devices should ideally always be at 100%.

To Clear:
Always remember that the panel would automatically re-use a detector if it were functional after a fault had been reported, even without a panel reset. Therefore, other alarms can still be generated from a device in 'Communication fault'. To clear such an alarm, correct the problem and reset the panel.

3.2.2.2. Double Address

Cause:
This type of fault occurs when more than one device returns an answer to the panel when the particular address is polled.

Diagnostic:
The loop number and the device number are displayed in the fault alarm.

Check whether there is any communication failures on the same loop. The device in communications fault is most probably the device reporting the incorrect address of a

different device. Remove the device in communications fault and correct its address. Replace the device.

To Clear:
To clear this fault, the panel must be reset after the problem has been corrected.

3.2.2.3. Fault

Cause:
This type of fault is cause when the analogue level reported from a device drops below the specified level for this device. All Aritech sensors are specified to never report an analogue level below 16.

Diagnostic:
Check the 'Fld Data' field (Field Data) on the second screen of the device set-up menu. If the device reports a level close to 16, and the device is not an I/O unit or an ionisation sensor, the device is faulty and must be replaced. If the device is an ionisation sensor, investigate if the sensor is not subjected to excessive airflow (such as wind).

To Clear:
After replacement of the sensor, or correction of the problem, the panel must be reset to clear this alarm.

3.2.2.4. No Type

Cause:
This type of fault is cause when the panel finds an enabled device that has not been given a user type by the operator.

Diagnostic:
Note the loop number and the device address on the fault screen. Access the device on the device set-up menu by entering the loop number and the device address. Enter a device type in the 'Type' field on the first screen of the device set-up menu. This device type can be verified by looking at the 'Fld Type' field (Field Type) on the second screen of the device set-up menu. Under normal conditions, the two fields must be identical. The only exception is when sub-types of the field type are used.

To Clear:
When the user programming has been rectified, the panel must be reset to clear this alarm.

3.2.2.5. Wrong Type

Cause:
This type of fault occurs when the panel finds that the field type of an installed device on a specific address does not match with the user programmed device type.

Diagnostic:
Note the loop number and the device address on the fault screen. Access the device on the device set-up menu by entering the loop number and the device address. Check the 'Type' field on the first screen of the device set-up menu against the 'Fld Type' field (Field Type) on the second screen of the device set-up menu. Under normal conditions, the two fields must be identical. The only exception is when sub-types of the field type are used.

This fault may have one of two solutions:

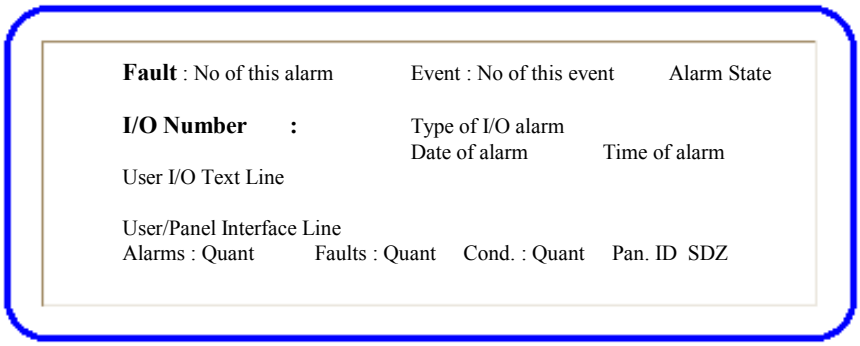
- Change the device in the field to correspond with the user programming or
- Correct the user programming to correspond with the device in the field.

To Clear:
After the fault has been rectified, the panel must be reset to clear this fault.

3.2.3. Programmed Faults:

User programming in the input/output logic of the fire panel can also generate fault alarms:

Figure 12: Programmed Faults



The following types of Input and Output alarms may occur:

3.2.3.1. Error In Logic

Cause:
This type of fault occurs when the operator makes an error with regards to the panel's rules of I/O programming.

Diagnostic:
Check the following rules:

1. Every open bracket should have an accompanying closed bracket i.e. ( )
2. One function should never have more than seven open brackets at any one time.
3. A function end after an '=' or 'set'/'reset' command. A new function cannot start with 'and' or 'or', ad mostly starts with a'(' i.e. open bracket)

To Clear:
Correct the programming error and reset the panel.

3.2.3.2. Fault

Cause:
This type of fault occurs when the user has programmed an input or output function to be 'logged as fault'.

Diagnostic:
The number of the input or output is displayed in the 'I/O Number' field indicated above. The text field for this input or output indicates the reason for this programming. To establish which input triggered this output (if an output was the cause of this fault), the logic programming of the panel has to be debugged.

To Clear:
Inputs and outputs can be programmed to 'latch' or 'unlatch' mode of operation.

If this input or output was programmed using the 'latch' attribute, reset the fire panel once the cause for this alarm has been established.

If the input and output was programmed using the 'unlatched' attribute, it would automatically clear once the trigger for the input has been removed (the alarm has returned to normal)

3.2.3.3. Faulty Input Setup

Cause:
This type of fault occurs when the operator makes an error with regards to the panel's rules of I/O programming.

Diagnostic:
Check the following rules:

1. An input can only be assigned from a device that exists. The device has to be configured in the fire panel system, otherwise programming I/O to this device is not allowed. This rule includes network programming.
2. An input cannot be defined twice with different trigger modes of operation i.e. latched/unlatched

To Clear:
Correct the problem in the input set-up and reset the panel.

3.2.3.4. Faulty Output Set-up

Cause:
This type of fault occurs when the operator, with regards to the panel's rules of I/O programming, makes a programming error.

Diagnostic:
Check the following rules:

1. An output can only be assigned to a device that exists. The device has to be configured in the fire panel system, otherwise programming I/O to this device is not allowed. This rule includes network programming.
2. An output cannot be defined twice with different trigger modes of operation i.e. latched/unlatched. If an output must be defined twice for any reason, both instances should have the 'latched' attribute set.

To Clear:
Correct the problem in the output set-up and reset the panel.

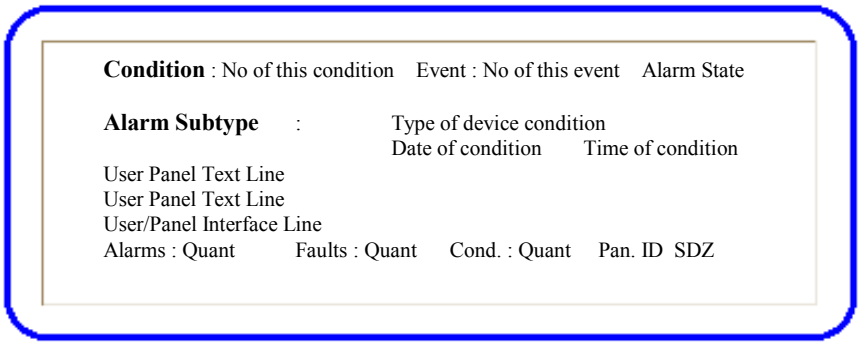
3.3. Condition Alarms

The following sections describe the condition alarm formats as displayed on the 8 line x 40-character LCD display of the fire panel:

3.3.1. Panel Conditions:

The panel can report the following condition alarms:

Figure 13: Panel Conditions



The following panel condition sub-types may occur

3.3.1.1. Event buffer full

Cause:
This type of condition occurs when the panel detects that the event buffer of the panel is full.

Diagnostic:
This condition is a warning message only, to allow the operator the decision on whether the event buffer of the panel should be backed up. If this is not required, then this message may be ignored and the panel reset. The message never appears again unless the event buffer is cleared.

To Clear:
Once the event buffer has been backed up, 'Reset' the panel. Clear the buffer using the 'Clear Events' option on the 'Maintenance' menu of the panel.

If backing up is not required, simply 'Reset' the panel.

3.3.1.2. Fbrig Delay ON

Cause:
This type of condition occurs when the panel detects that the fire brigade delay has been enabled. In this mode, the activation of the fire brigade and all linked outputs are delayed by a pre-programmed time when an automatic detector is activated.

Diagnostic:
The fire brigade delay control is available on the front panel 'Fire Brigade' group. A yellow LED indicates the status of the Fire Brigade Delay. Depress this button if this option is not required.

To Clear:
This condition clears automatically when the fire brigade delay has been deactivated.

3.3.1.3. Fbrig Disabled

Cause:
This type of condition occurs when the panel detects that the fire brigade output on the panel has been disabled. In this mode, the activation of the fire brigade and all linked outputs are disabled.

Diagnostic:
The fire brigade enable/disable control is available on the front panel 'Fire Brigade' group. A yellow LED indicates the status of the Fire Brigade output. Depress this button if this option is not required.

To Clear:
This condition clears automatically when the fire brigade has been enabled.

3.3.1.4. Maintenance Reminder

Cause:
This type of condition occurs when the user has programmed a pre-determined date in the maintenance times menu of the panel. The condition indicates that maintenance is due to be performed.

Diagnostic:
Check the programming in the 'Maintenance Times' option of the Test menu of the panel. Assign a new date for maintenance if necessary.

To Clear:
Once the maintenance has been performed, reset the panel.

3.3.1.5. Sounder Delay ON

Cause:
This type of condition occurs when the panel detects that the sounder delay has been enabled. In this mode, the activation of the sounder and all linked outputs are delayed by a pre-programmed time when an automatic detector is activated.

Diagnostic:
The sounder delay control is available on the front panel 'Sounders' group. A yellow LED indicates the status of the Sounder Delay. Depress this button if this option is not required.

To Clear:
This condition clears automatically when the sounder delay has been deactivated.

3.3.1.6. Sounder Disabled

Cause:
This type of condition occurs when the panel detects that the sounder output on the panel has been disabled. In this mode, the activation of the sounder output and all linked outputs are disabled.

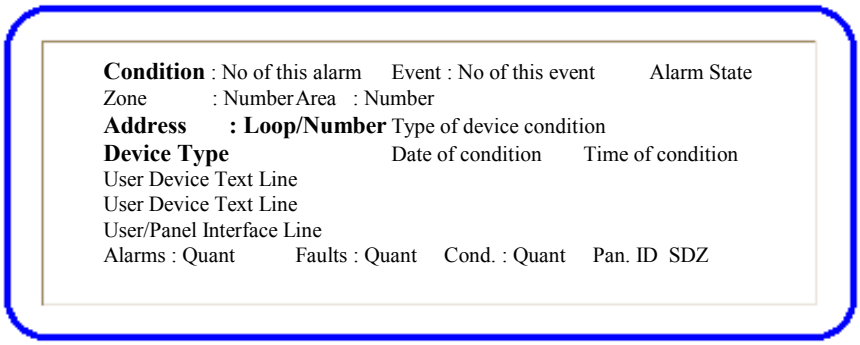
Diagnostic:
The sounder enable/disable control is available on the front panel 'Sounders' group. A yellow LED indicates the status of the Sounder output. Depress this button if this option is not required.

To Clear:
This condition clears automatically when the sounder has been enabled.

3.3.2. Device Conditions

Devices on the detection loop can generate the following condition alarms:

Figure 14: Device Conditions



The following device conditions may occur:

3.3.2.1. Disabled

Cause:
This type of condition is caused when the panel finds a hardware device on the system but it is not allowed to use this device since the user has not programmed the device. The user may have also purposefully disallowed the device from being used.

Diagnostic:
Verify the type of disablement with the relevant information displayed on the LCD display of the panel. The zone number (if a zone is disabled) or device number (if a device is disabled) and or other relevant hardware information (e.g. Modem) about the disablement is given together with this condition. This additional information may be used to enable the affected hardware and clear the condition.

To Clear:
This condition disappears automatically from the system once the operator has allowed the use of the hardware.

✍ *It is always recommended to reset the panel after enabling any function.*

3.3.2.2. Maintenance

Cause:
This type of condition is given when any sensor reaches 100% contamination.

Diagnostic:
The fire panel performs automatic compensation for each smoke sensor in order to maintain the pre-set sensitivity. A measure of ‘contamination’ is shown once the clean air value rises to such a level that no more compensation can occur, and the pre-set sensitivity cannot be maintained.

To Clear:
To clear this condition, the panel must be reset after the affected device has been cleaned or replaced.

3.3.2.3. Pre-Alarm

Cause:
This type of condition occurs on the panel when the device reports an analogue level to the panel that is higher than the pre-alarm level set by the operator for this device. Even though the level is not yet high enough to be interpreted as a fire alarm, the panel warns the operator of the possibility that a fire alarm may be imminent.

The analogue level of a sensor also increases as the sensor becomes more contaminated. Eventually the sensor would cross the pre-condition and then the fire alarm level, thus giving a nuisance alarm.

Diagnostic:
Note the descriptive 2 lines of text included in the message. The location of this device may be indicated here.

Investigate the cause of a pre-alarm by visiting the environment around the device. Try to establish whether a fire has started.

If there is no smoke or dust present in the environment of the sensor, check the contamination level of the device on the second device set-up screen of the Device menu. In indication of 80% and above means that the device is contaminated and that maintenance is required on the sensor.

To Clear:
Reset the fire panel once the cause for this alarm has been established and rectified.

3.3.2.4. Soak Test

Cause:
This type of condition occurs when one or more devices have been disabled on the panel in 'Soak Test' mode.

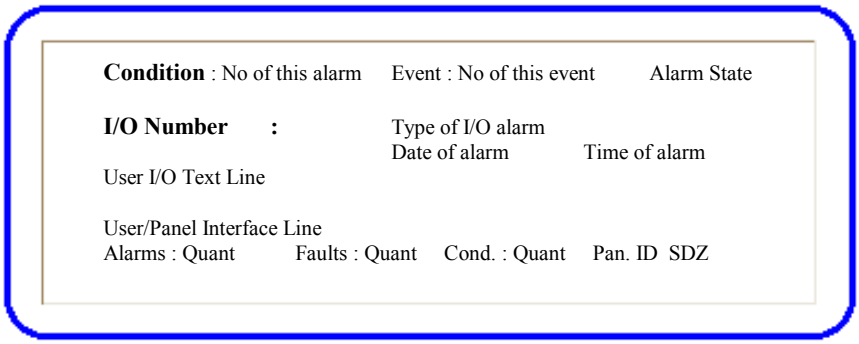
Diagnostic:
Access the 'Reports' menu on the panel from the 'Disable' menu. Draw a report on all the 'Devices' that are disabled in the system. This list indicates which devices have been set to 'Soak Test' mode.

To Clear:
The condition clears automatically once all the devices have been taken out of soak test.

3.3.3. Programmed Conditions

User programming in the input/output logic of the fire panel can also generate condition alarms:

Figure 15: Programmed Conditions



The following device conditions may occur:

3.3.3.1. Input True

Cause:
This type of condition occurs when the user has programmed an input function to be 'logged as condition'.

Diagnostic:
The number of the input is displayed in the 'I/O Number' field indicated above. The text field for this input indicates the reason for this programming.

To Clear:
Inputs can be programmed to 'latch' or 'unlatch' mode of operation.

If this input was programmed using the 'latch' attribute, reset the fire panel once the cause for this alarm has been established.

If the input was programmed using the 'unlatched' attribute, it would automatically clear once the trigger for the input has been removed (the alarm has returned to normal).

3.3.3.2. Output True

Cause:
This type of condition occurs when the user has programmed an output function to be 'logged as condition'.

Diagnostic:
The number of the output is displayed in the 'I/O Number' field indicated above. The text field for this output indicates the reason for this programming. To establish which input triggered this output, the logic programming of the panel has to be debugged.

To Clear:
Outputs can be programmed to 'latch' or 'unlatch' mode of operation.

If this output or triggering input was programmed using the 'latch' attribute, reset the fire panel once the cause for this alarm has been established.

If the output and triggering input was programmed using the 'unlatched' attribute, it would automatically clear if the trigger for the input has been removed (the alarm has returned to normal).

4. PANEL MESSAGES

4.1. Start-up Messages

4.1.1. Calculating Checksums

Cause:
This is a routine message during start-up indicating the current panel operation.

Diagnostic:
Checksums are used to keep track of what configurations and programming are used in the panel. Should anything change, the checksums change accordingly. Checksums therefore allow the panel to determine if anything significant has been changed in the panel since the last restart.

4.1.2. Checking FEP Software

Cause:
This is a routine message during start-up indicating the current panel operation.

Diagnostic:
If the panel finds any mismatch in the software versions of the HOST and the FEP processor, this is indicated on the screen. (Also refer to section 4.1.6)

4.1.3. Checking Hardware Configuration (FEP)

Cause:
This is a routine message during start-up indicating the current panel operation.

Diagnostic:
If the panel finds any alteration of the hardware configuration of the FEP electronics, then this fact is indicated on the screen – assuming that the memory lock of the panel is in the 'locked' position. (Refer to section 4.1.5)

If the panel fails to pass this section during restart, it may be an indication of a FEP failure or a communications failure between the FEP and Host processors. Power down the panel and switch it back on. If it still fails to pass here, one of the following corrective actions could be taken: (in the recommended order)

1. Replace the FEP software
2. Replace the FEP processor PCB
3. Replace the HOST processor PCB
4. Replace the wiring harness between the two processors.

4.1.4. Checking Hardware Configuration (Host)

Cause:
This is a routine message during start-up indicating the current panel operation.

Diagnostic:
If the panel finds any alteration of the hardware configuration of the Host electronics, then this fact is indicated on the screen of the panel. (Refer to section 4.1.7)

4.1.5. INCOMPATIBLE FEP HARDWARE CONFIGURATION

Cause:
This message indicates that the panel has found a change in the hardware configuration of the FEP electronics. This may be due to a deliberate addition or removal of one or more of the PCB's on the FEP side of the panel.

Diagnostic:
Any changes in hardware configuration are indicated on the screen of the panel. (Refer to the FP2000 Reference Guide for more information). Once the memory lock is unlocked, the panel continues with auto-configuration and ***all user programming is lost.***

If the user had not made any hardware changes to the panel, then this could mean that one of the PCB's failed to start up. The unit in question is indicated on the screen and should be replaced.

4.1.6. Incompatible FEP Software!

Cause:
This message indicates that the panel has found a mismatch between the software used in the Host processor, and that used in the FEP processor.

Diagnostic:
Refer to the FP2000 compatibility matrix to establish what FEP software should be used with your current host software, or vice versa. Replace the PROMS as required.

4.1.7. INCOMPATIBLE HOST HARDWARE CONFIGURATION

Cause:
This message indicates that the panel has found a change in the hardware configuration of the HOST electronics. This may be due to a deliberate addition or removal of one or more of the PCB's on the HOST side of the panel.

Diagnostic:
Any changes in hardware configuration are indicated on the screen of the panel. (Refer to the FP2000 Reference Guide for more information). Once the memory lock is unlocked, the panel continues with auto-configuration and ***all user programming is lost.***

If the user had not made any hardware changes to the panel, then this could mean that one of the PCB's failed to start up. The unit in question is indicated on the screen and should be replaced.

4.1.8. INCOMPATIBLE MEMORY CONFIGURATION

Cause:
This message is displayed when a panel starts/restarts and it determines that it has no memory configuration information, or that the memory configuration does not match the hardware configuration information. The panel automatically reconfigures the memory and restarts in order for the memory configuration to match the hardware information. This message should only appear on first start-up of a brand new panel, or after a firmware or hardware change. After the first start-up, the memory configuration would be saved, and the process is not required any more.

Diagnostic:
If this happens consistently every time that the panel restarts, check the following:
1. The battery backup jumper on the Host CPU of the panel is in the 'on' position.
2. The battery voltage - the battery voltage can be measured on any memory IC (the tree big IC's in the centre of the HOST PCB), PIN 16 and 32 (the bottom left pin/top right

pin of any memory IC). A battery voltage below 2V could be considered to be a problem, and the battery must be replaced.

4.1.9. INCOMPATIBLE PROTOCOL CONFIGURATION

Cause:
This message appears when the protocol dip switch of the FP2000 (or the Protocol Configuration in the System Configuration menu in the FP1200) is set to one protocol, but the panel detects that the previous panel configuration was for another protocol. (Refer to the FP2000 Reference Guide for more information.)

Diagnostic:
Once the memory lock is unlocked, the panel continues with auto-configuration and ***all user programming is lost.***

If the user had not made any configuration changes to an FP1200 panel, then this could mean that panel has lost it's memory configuration and is reverting to its default configuration. Check the backup battery as described in section 4.1.8.

To rectify the situation on the FP2000 panel, turn of the panel. Correct the dip switch settings as indicated in the FP2000 Installation and Commissioning manual and tun the panel back on.

4.1.10. Initialising ports

Cause:
This is a routine message during start-up indicating the current panel operation.

Diagnostic:
After this message, all communications ports are active and messages may be received on any of these ports i.e. RS232, RS485, Current Loop or LonWorks.

4.1.11. RESET

Cause:
This is a routine message before the reset procedure takes place.

Diagnostic:
Under normal circumstances this message does not remain on the screen for more than a few seconds. The reset sequence is only initiated when all processes indicate to the main processor that they can be successfully reset. If a process cannot be reset, this could be an indication of trouble in that processing area. Should this message remain on the screen for extended periods of time (30 seconds), then a hardware watchdog restarts the panel automatically, and this fact is logged on the screen as a fault condition. (Refer to section 4.1.12. for the restart messages, and section 3.2.1.44 for the Watchdog messages)

4.1.12. RESTART

Cause:
This is a routine message before the restart procedure takes place.

Diagnostic:
Under normal circumstances this message does not remain on the screen for more than a few seconds. The restart sequence is only initiated when all processes indicate to the main processor that they have successfully shut down. If a process does not shut down, this could be an indication of trouble in that processing area. Should this message remain on the screen for extended periods of time (30 seconds), then a hardware watchdog restarts the panel automatically, and this fact is logged on the screen as a fault condition.

(Refer to section 3.2.1.44) If this happens every time that the panel is restarted, please report this to you local Aritech sales office.

4.1.13. RESTARTING WITH NEW CONFIGURATION

Cause:
This message is displayed when a panel restarts after it has automatically reconfigured the memory for any new configuration that may have taken place.

Diagnostic:
Also see section 4.1.15

4.1.14. FPxxxx

Cause:
This is the first routine message that is displayed when a panel starts/restarts and is in indication of what firmware the panel is operating with.

Diagnostic:
This message is only an indication of the panel series i.e. FP2000, UN2011, FP1200 etc., and should match the panel ordered. If not, please contact your local Aritech sales office.

✍ *Running a panel with incorrect firmware leads to unpredictable results.*

4.1.15. (Starting without configuration)

Cause:
This message is displayed when a panel starts/restarts and it determines that it has no hardware configuration information. This only happens when

1. a brand new panel starts up for the very first time
2. an upgrade was done from one mayor firmware version to another (such as v5.xx to v6.xx)
3. the battery backup jumper was removed from the host CPU in de-powered mode

Diagnostic:
If this happens consistently every time that the panel restarts, check the following:

1. The battery backup jumper on the Host CPU of the panel is in the 'on' position.
2. The battery voltage - the battery voltage can be measured on any memory IC (the tree big IC's in the centre of the HOST PCB), PIN 16 and 32 (the bottom left pin/top right pin of any memory IC). A battery voltage below 2V could be considered to be a problem, and the battery must be replaced.

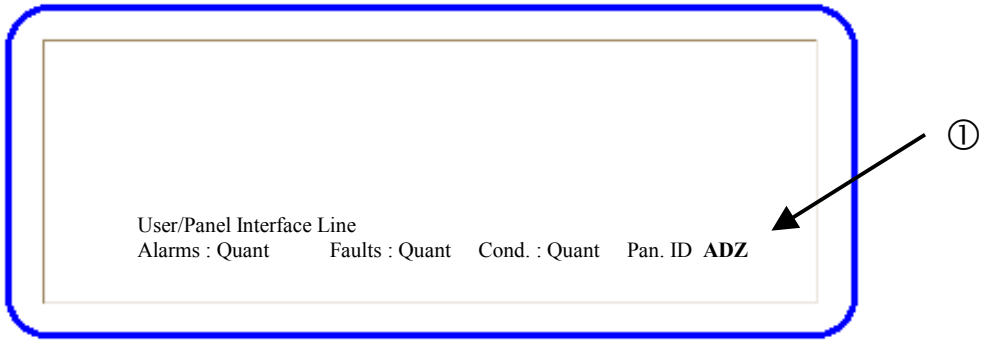
4.2. User Messages

4.2.1. Busy with autosetup

Cause:
This message occurs when the ‘Set Default - Devices’ menu is used when the panels is already busy with setting up the devices from a previous request.

Diagnostic:
If this function is again required to set up a different loop, wait until the FEP reports that it has completed the first ‘Autosetup’ function. This can be seen by looking at the indicators at the bottom right of the LCD display (1). During autosetup, the first character of the last word on the bottom right would be an ‘A’ (Autosetup). If this character turns to anything else, the FEP has completed the first ‘Autosetup’ command and is ready to accept another.

Figure 16: Autosetup



4.2.2. Buzzer already silent

Cause:
This message occurs when the ‘Silence Buzzer’ button is pressed and there is no buzzer to silence.

4.2.3. Call Fire Brigade

Cause:
This message occurs when a fire alarm occurs on the panel, and the Fire Brigade output has been disabled by the user. The message indicates that the fire brigade has to be called MANUALLY because the panel cannot do this at this time.

4.2.4. Disabled by Keyswitch

Cause:
This message occurs when the Fire Brigade output has been disabled by both the Keyswitch on the panel, as well as the Disable Button on the panel. By pressing the ‘Disable’ button on the panel, the message indicates which of the two actions has the final Disable control function. Also see section 4.2.5.

4.2.5. Disabled on Panel

Cause:
This message occurs when the Fire Brigade output has been disabled by both the keyswitch on the panel, as well as the Disable Button on the panel. By switching the Fire

Brigade Key on the panel, the message indicates which of the two actions has the final Disable function. Also see section 4.2.4.

4.2.6. Fltrt active

Cause:
This message occurs when operator attempts to disable the 'Fault Routing Output' of the panel when this output is already activated i.e. there is already a fault reported on the panel and the fault routing output has switched off.

Diagnostic:
The panel must be cleared of all fault conditions before this output can be disabled. Always take into account that this output is active when it is 'off' and inactive when it is 'on' i.e. fail to safe.

4.2.7. Function not supported

Cause:
This message occurs when operator attempts to perform a function from the keyboard of the panel that is not supported by the firmware.

Diagnostic:
The panel only allows functions to be used that are relevant to the application of the panel. A repeater, for example, does not have the ability to communicate with devices on a loop line. Therefor a repeater does not support 'Device Setup'.

4.2.8. Hardware Test OK

Cause:
This message occurs when the operator has instructed the panel to perform a 'Hardware Test' from the Maintenance menu. When this test has been successfully completed, this message is displayed. If the test was not successful, the panel generates a fault message.

4.2.9. Incompatible FEP Firmware

Cause:
This message occurs when the panel restarts after a firmware change and it detects that the FEP firmware has not been matched to the correct version of host firmware.

Diagnostic:
Change the FEP firmware or the Host firmware in the panel so that the two firmware versions match. Applicable information can be found in the FP2000 compatibility matrix.

4.2.10. Invalid Key

Cause:
This message occurs when the operator pushes a key on the panel's alphanumeric keyboard that is not currently allowed. The pressed key therefore has no meaning with regard to the displayed menu.

Diagnostic:
All allowable keys on this keyboard at any moment in time are indicated on the user interface line of the LCD display. This line is always visible and is the second line from the bottom on the standard LCD display.

4.2.11. Keyboard Locked

Cause:
This message occurs when the operator attempts to use keys on the panel being protected by the key-lock function of the panel when this key-lock is enabled.

Diagnostic:
When the panel key-lock is enabled, only the Silence Buzzer, Fire Brigade Delay off, and Sounder Delay off buttons are active. Unlock the panel keyboard using the key-switch located on the front of the panel to enable the operation of any of the other keys.

4.2.12. Memory Locked

Cause:
This message occurs when the operator attempts to change the programming or setup of the panel whilst the panel's protected memory is locked. The ***Memory Lock*** switch/jumper on the Host PCB must be in the OPEN position for the change to be accepted.

Diagnostic:

Unlock the panel's memory using the switch/jumper located on the PSH2000 (Host Processor PCB) located on the door of the panel to allow for the new data to be saved. Note that a fault message is generated to warn that the panel's memory has been unlocked. Re-enter the information on the panel.

4.2.13. Memory too small

Cause:
This message occurs when the operator attempts to allocate more memory than is currently available on the panel.

Diagnostic:
Re-adjust the memory configuration of the panel, specifically noting the free memory indication on the top right of the LCD display. Should the required memory be insufficient for the application, a memory upgrade kit may be purchased from Aritech to allow for more configurable memory to be available.

4.2.14. Memory Unlocked

Cause:
This message occurs when the operator attempts to restart a v3.x or earlier panel when the 'Memory Lock' has been unlocked. In later versions of the panel it is no longer required to lock the memory before a panel is restarted, although it is considered to be good practice to do so.

Diagnostic:
Lock the panel's memory using the switch/jumper located on the PSH2000 (Host Processor PCB) located on the door of the panel. Re-enter the function on the panel.

4.2.15. No Access

Cause:
This message occurs when the operator attempts to access a menu item for which he does not have sufficient access rights.

Diagnostic:
Gain access to the menus by using an access code with sufficient access rights. Access codes are available on three access levels and can be freely assigned by the system administrator. Individual menu items can also be programmed with the required access privileges (refer to the Reference Guide for your panel for more information in this regard).

4.2.16. Nothing Found

Cause:
This message occurs when the operator instructs the panel to perform a search for reporting purposes, and the panel cannot find any information that fulfils the search criteria.

Diagnostic:
Check that the proper search parameters have been entered and retry the search.

4.2.17. Not in service mode

Cause:
This message occurs when the operator attempts to perform a function on the panel that must have the 'Service Mode' enabled.

Diagnostic:
Set the panel into 'service mode' by using the switch/jumper located on the PSH2000 (Host Processor PCB) located on the door of the panel. Note that a fault message is generated to warn that the panel has entered service mode. Re-enter the function on the panel. Re-lock the 'Service Mode' switch/jumper when the operation has been completed.

4.2.18. Open Memory Lock

Cause:
This message occurs with two variations:

1. When the panel's memory lock is closed before the current operational changes of the panel could be completely written to protected memory.
2. When hardware is added to or removed from the panel and the panel is restarted. New memory allocations are therefor required to be written to protected memory. ***NOTE: All configuration programming is lost.***

Diagnostic:
Unlock the panel's memory using the switch/jumper located on the PSH2000 (Host Processor PCB) located on the door of the panel to allow for the new data to be saved. Note that a fault message is generated to warn that the panel's memory has been unlocked. Allow the panel to complete all changes before the memory is locked.

4.2.19. Panel already assigned

Cause:
This message occurs when the operator attempts to change the panel's ID to an ID that has been configured in the communication settings of his panel.

Diagnostic:
The message indicates that the operator may be setting up a duplicate node ID, since the ID he is attempting to configure is available elsewhere on the same network. Confirm that the node ID does not exist elsewhere in the network, and that the panel that is being set up does not have communications settings to the ID being assigned.

4.2.20. Panel already emulated

Cause:
This message occurs when the operator attempts to emulate a panel on the network when a different repeater panel is already emulating the panel that he is trying to emulate.

Diagnostic:
Wait for the other panel to stop emulation and try again. If the other user 'forgets' to stop his emulation, the panel would automatically stop the emulation 10 minutes after the last button on the panel was pressed.

4.2.21. Panel ID Used

Cause:
This message occurs when the operator attempts to configure network communications to his own panel node ID.

Diagnostic:
A panel never communicates to itself on the network. Ensure that you are setting up the correct panel, and that you are setting communications to the OTHER nodes on the network.

4.2.22. Panel not on the network

Cause:
This message occurs when the operator attempts to emulate a panel that is not currently available on the network.

Diagnostic:
Check that the correct panel ID has been entered into the repeater and that both panels are set up correctly to communicate with each other.

4.2.23. Port allocation used

Cause:
This message occurs when the operator attempts to set up a port with an allocation that is already in use on another port on his panel.

Diagnostic:
Check the configuration of all the ports on the system. Any port allocation can only be assigned to one port at a time. To reassign a port allocation, remove the first instance of the allocation first, and then assign it to the other port.

4.2.24. System abnormal

Cause:
This message occurs when the operator attempts to clear the panel's or system's Event Log with an alarm, fault or condition active on the system.

Diagnostic:
All active system events must be cleared before clearing the system event log. Check which events are active by looking at the LCD display of the panel. These events MUST be reset before the system allows the clearing of the event buffer.

4.2.25. Turn keyswitch

Cause:
This message occurs when the operator attempts to perform panel operations that have been protected by the key-lock function of the panel.

Diagnostic:
Unlock the keyboard by using the key-switch provided on the front face of the panel.

4.2.26. Unlock memory

Cause:
This message occurs when the operator locks the memory of the panel after making some modifications to the panel set-up or programming functions before the panel has completed writing the new information to protected memory.

Diagnostic:
Unlock the panel's memory using the switch/jumper located on the PSH2000 (Host Processor PCB) located on the door of the panel to allow for the new data to be saved. Note that a fault message is generated to warn that the panel's memory has been unlocked. The information is automatically written to memory.

4.2.27. Use dedicated test and disable keys

Cause:
This message occurs when the operator attempts to use the menu item 'Test/Disable' in the 'Maintenance' menu of the panel.

Diagnostic:
Every panel is supplied with dedicated 'Test' and 'Disable' keys on the front panel. These keys should be used to perform their associated functions.

5. ADVANCED DIAGNOSTICS

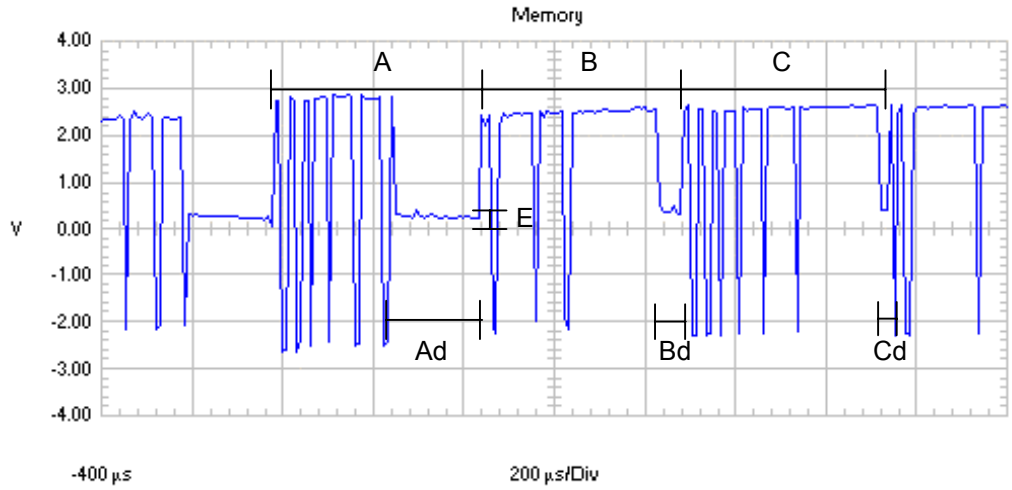
5.1. Network Diagnostics with an Oscilloscope

5.1.1. The token

When all standard routes of diagnosing the Analogue Panel Network have been exhausted, and problems still exist on the network. The following checks can be done with an oscilloscope.

Preparation: Connect an ISOLATED oscilloscope directly across the network cables (preferably at one end of the network). Set the probe to DC coupling and the scale of the oscilloscope to the values indicated in each section.

Figure 17: The network



A, B and C indicate the tokens of three nodes on this network. Each node on the network has a token, except for PC's that use the token of the Universal Node to communicate.

5.1.1.1. The shape of each token

PCB Revisions: As can be seen from the screen above, the tokens in this case look slightly different. The reason for this is due to hardware.

A – A signal from an NC2000 Network card
B – A signal from an old NC2011
C – A signal from a new NC2011

The differences are most easily noted in the dead time after the back porch (Ad, Bd, Cd) of each token. Notice the change in dead time length. The new NC2011 has the shortest back porch. (Version 7 and up) It is never recommended to mix the network card hardware versions in a single network.

Diagnostic:
Exchange all network cards of older versions with a specific revision network card. It has to be emphasised that any revision network card functions properly, but a mixture of revisions may cause problems.

5.1.1.2. The amplitude of each token

The amplitude of the token is a function of the resistance of the cable. The smaller the signal is, the further it has had to travel to reach your location. (The location of the oscilloscope on the network) The biggest amplitude therefor indicates the closest node, whilst the smallest amplitude indicates the node furthest away.

Note that on a closed ring network and on a network using network amplifiers, tokens may have the same amplitude because of amplification though the repeater/amplifier.

Amplitudes may vary between 5 V peak-to-peak and 1.4 V peak-to-peak. Smaller signals than 1.4 V peak-to-peak mean that some panels on the network may not detect the signal and that the signal requires amplification for stabilisation of the network.

Diagnostic:
Use the NC2011 in repeat mode and 'amplify' the signals from the furthest panels where the signal amplitude reaches critical levels. Install a second NE2011, or use fibre optic cable when this is not practical.

5.1.1.3. The DC Bias level

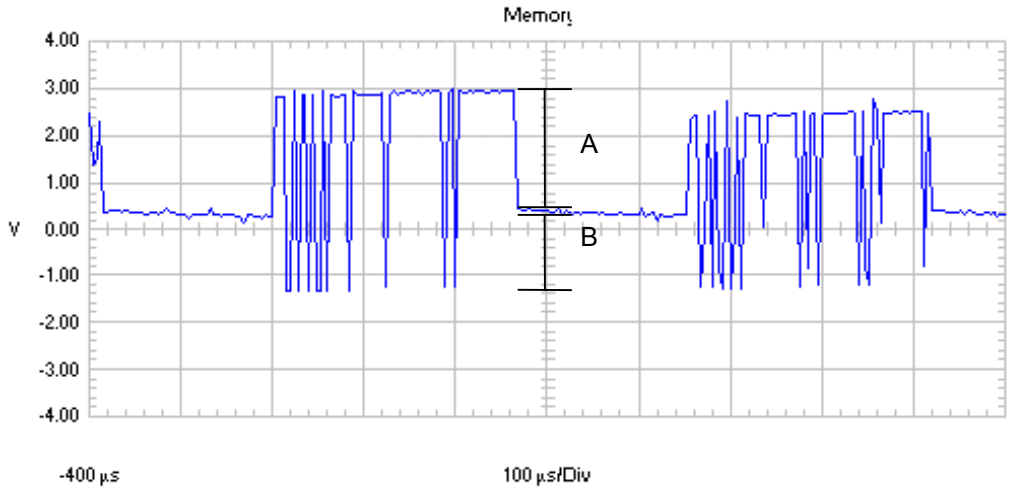
'E' Represents the DC biasing on this network. This level is ONLY present on networks running NC2000 Network cards. This level should be between 250 and 350 mV. The NC2011 network cards do not require any biasing and therefor this level is at 0 V on such networks.

Diagnostic:
Never mix NC2000 network cards with NC2011 network cards on the same network, and do not use NA2004 network amplifiers with NC2011 network cards. Ensure that all NC2000 (and NA2000) biasing jumpers are in the correct 'number of nodes' location as indicated on the NC2000 PCB. If too much biasing exists on the network, reduce the biasing by increasing the number of nodes on the NC2000 biasing jumpers. If too little biasing exists on the NC2000 network (remember that an NC2011 network does not have biasing) and the biasing jumpers are already on the lowest node setting, insert a second jumper in the biasing matrix on either side. This places the biasing resistors in parallel and allows for more biasing on the network. Do this on every panel in the network until the level is sufficient i.e. 250 to 350 mV. Up to 4 jumpers can be inserted on either side of the biasing matrix. If this does not help, the network card(s) is faulty and must be replaced.

5.1.1.4. Distortions of the token

Assembly fault: Another form of hardware distortion occurred on some v7 and v8 PCB's of the NC2000. Incorrect assembly of some components on the PCB caused this, and subsequently caused the network signal to distort as indicated in Figure 18 below. Notice the difference in amplitude between the positive (A) and negative (B) pulses of this token. This is a clear indication that the panel transmitting this token has a faulty NC2000 installed. This problem can in addition also cause serious distortions of the data pulses inside the token.

Figure 18: Reversed Diode Problem



Diagnostic:
Replace or repair this network card. More information is available from technical support at your local Aritech sales office on what modifications are required to correct this problem.

5.1.2. The data

When the horizontal frequency of the oscilloscope is changed as indicated in Figure 19, the data pulse inside the token can be investigated.

Figure 19: Token pulse

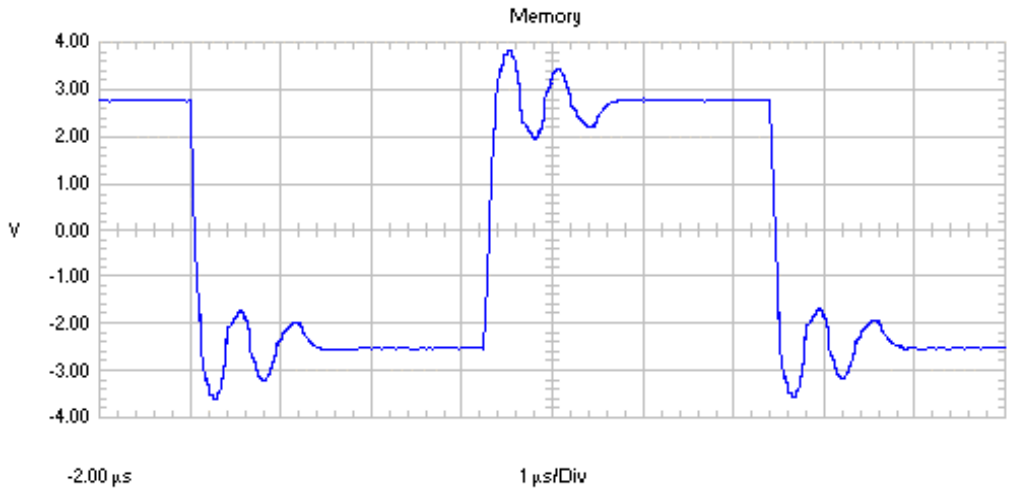
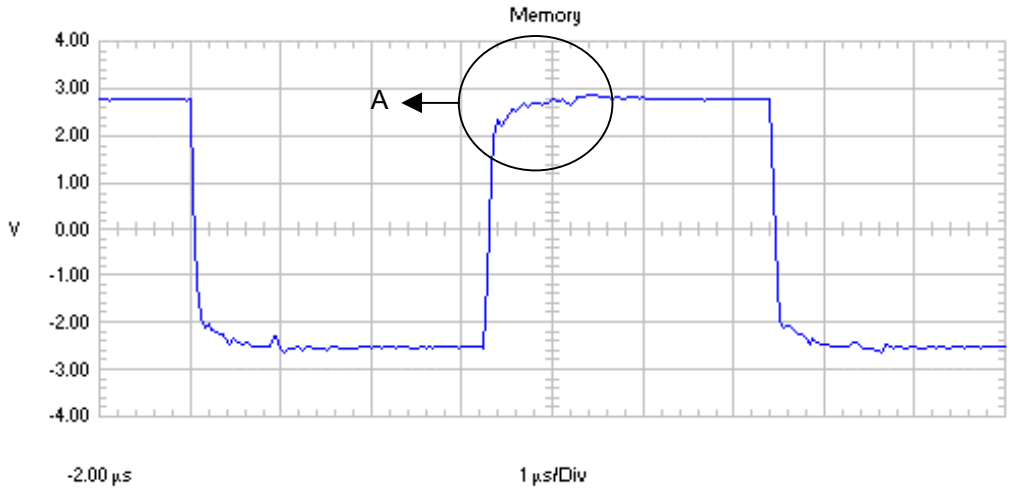


Figure 20: Token pulse



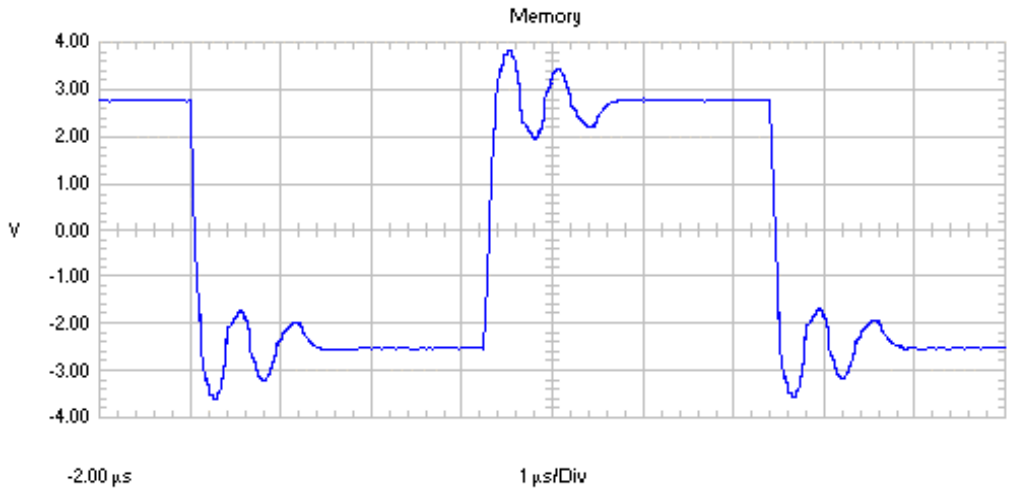
5.1.2.1. The shape of the data pulses

The shape of the data pulse can vary due to many influences on the signal. A perfect data pulse would of course be absolutely square, with no irregularities. Because of noise and capacitance/inductance effects, this is not achievable in real installations. A few basic guidelines are discussed and illustrated here. Figure 20 illustrates a very good data pulse that is achievable in the field. 'A' indicates typical distortion due to capacitance and inductance that cannot be avoided.

The following problems can be noticed by evaluation of section A on Figure 20:

a) **Terminations:** When the termination resistors are not inserted correctly, or the terminations are not matched to the cable impedance, distortions in 'A' manifests itself in the form of ringing (not enough or no termination) and dampening (too much termination). Dampening displays itself very similar to the signal on Figure 23: Hardware Distortion.

Figure 21: Under Terminated Distortion



Diagnostic:
Check the termination jumpers on all network cards. Ensure that the terminations are only inserted where required, at either ends of each network bus. Special conditions apply for duel bus, repeater mode and where NA2000 network amplifiers are used. Please refer to the Aritech Network Configuration Guide for further details.

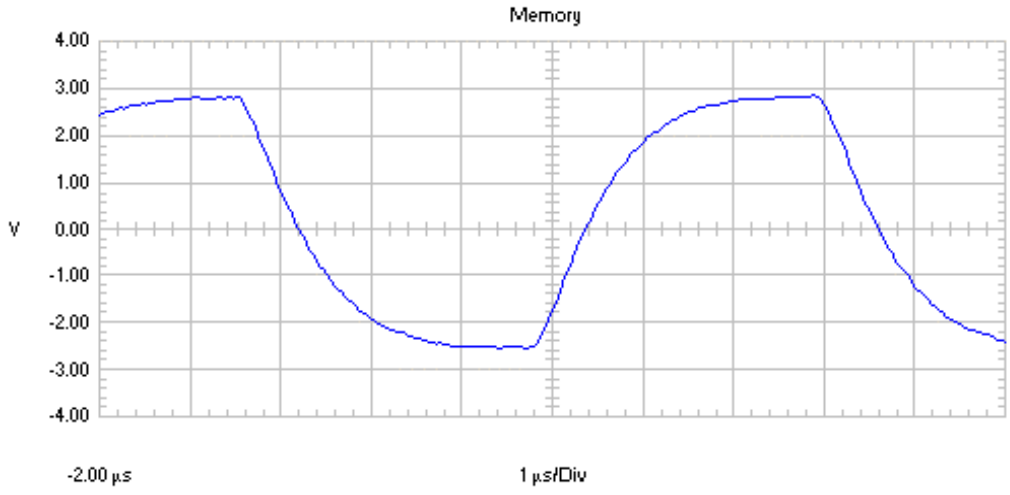
Confirm the cable impedance from the manufacturer of the network cable. The onboard termination resistor only matches correctly to a cable with characteristic impedance of 120 Ohms. If any other cables are used, the onboard terminations cannot be used and resistors matching the specific cable impedance must me manually inserted at the ends of the cable bus, at the locations where the normal terminations must be placed.

b) **Capacitance:** When there is to much capacitance on the cable, serious distortion of the data pulse is a result (saw tooting). Even situations as bad as the one indicated below are tolerated by the system. If however this condition is accompanied by on of the other mentioned distortions, this can cause intermittent network failures.

Refer to Figure 22.

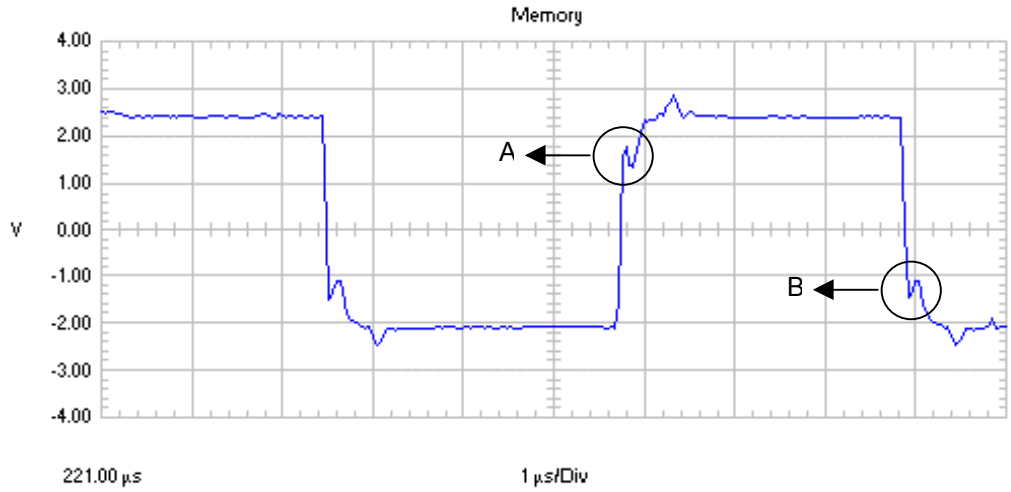
Diagnostic:
There is no solution for this problem.
The Aritech Fire system network has been designed to tolerate a large capacitance on the network. Obviously timing problems occur if capacitive distortion becomes too great. In such cases, replace the network cable with the specified data cable for the Aritech Fire panel. Refer to the network Configuration Guide for more information.

Figure 22: Capacitive Distortion



c) **Hardware**: Older network cards (in particular the NC2000), induce a certain amount of noise distortion into the system due to the isolation transformers. This is indicated below.

Figure 23: Hardware Distortion



Diagnostic:
Generally this does not present the system with any problems, unless the down pulse 'A' or the up-pulse 'B' becomes so large that it crosses through the trigger points of the network (around the 0.7 V and –0. 7 V) levels. If this is the case, replace the network card.

d) **Noise**: Noise normally presents itself as spikes on top of the signal and/or on the dead zone at 0 level (refer to Figure 17). Noise generally do not cause many network problems unless the noise amplitude is large enough to break trough the trigger levels i.e. 0.7 V and -0.7 V. When the noise reaches these levels, unwanted triggering is a result, and this causes communications failures between the panels.

Diagnostic:
1. Ensure that all screening on the network cable has been done in accordance with the guidelines for screening and earthing.
2. Turn off each node in the network, one at a time, and establish that the network card is not the source of the noise.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