



RAIL FIRE & MAINTENANCE

Fire Detection & Suppression System

FP3470 Panel
Operators Manual

Version History

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Document Copyright Statement

Product Name: FP3470 Locomotive Fire Alarm Panel

Manufactured to Conform to Clients Specification and AS5062

(Note – Testing Certification to AS5062 is pending)

Manufacturer's Type Number: FP3470

Author: Simon Dunn

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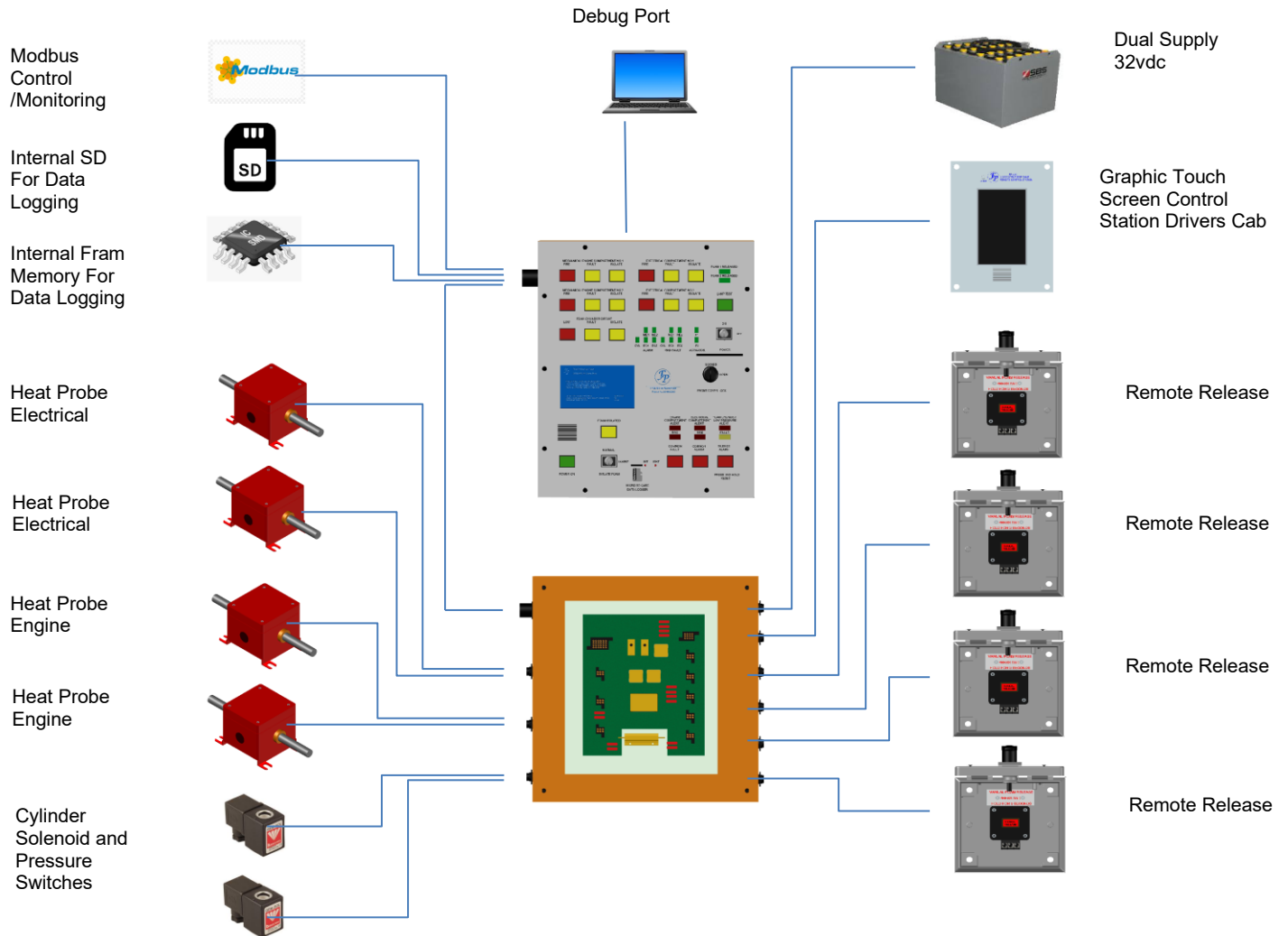
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Section 1.0 Fire Detection Overview

The FP3470 locomotive fire alarm panel used to monitor and control a fire within a locomotive engine compartment and electrical compartments; this method is achieved by monitoring a series of fixed thermal detectors set at 200°C that are placed within perceived fire risk area throughout the locomotive. The thermal detectors monitor the environment within the locomotive for increases in ambient temperature. Once the thermal detector set point has been reached, the fire alarm panel respective zone will be activated and pre-determined series of event will occur, depending on the fire alarm location.

These thermal detectors are to be arranged in a dual sensing mode i.e. one (1) thermal detector in alarm provides visual and audible notification at the fire alarm panel and two (2) thermal detectors in alarm simultaneously activates the fire extinguishing agent to suppress the fire.

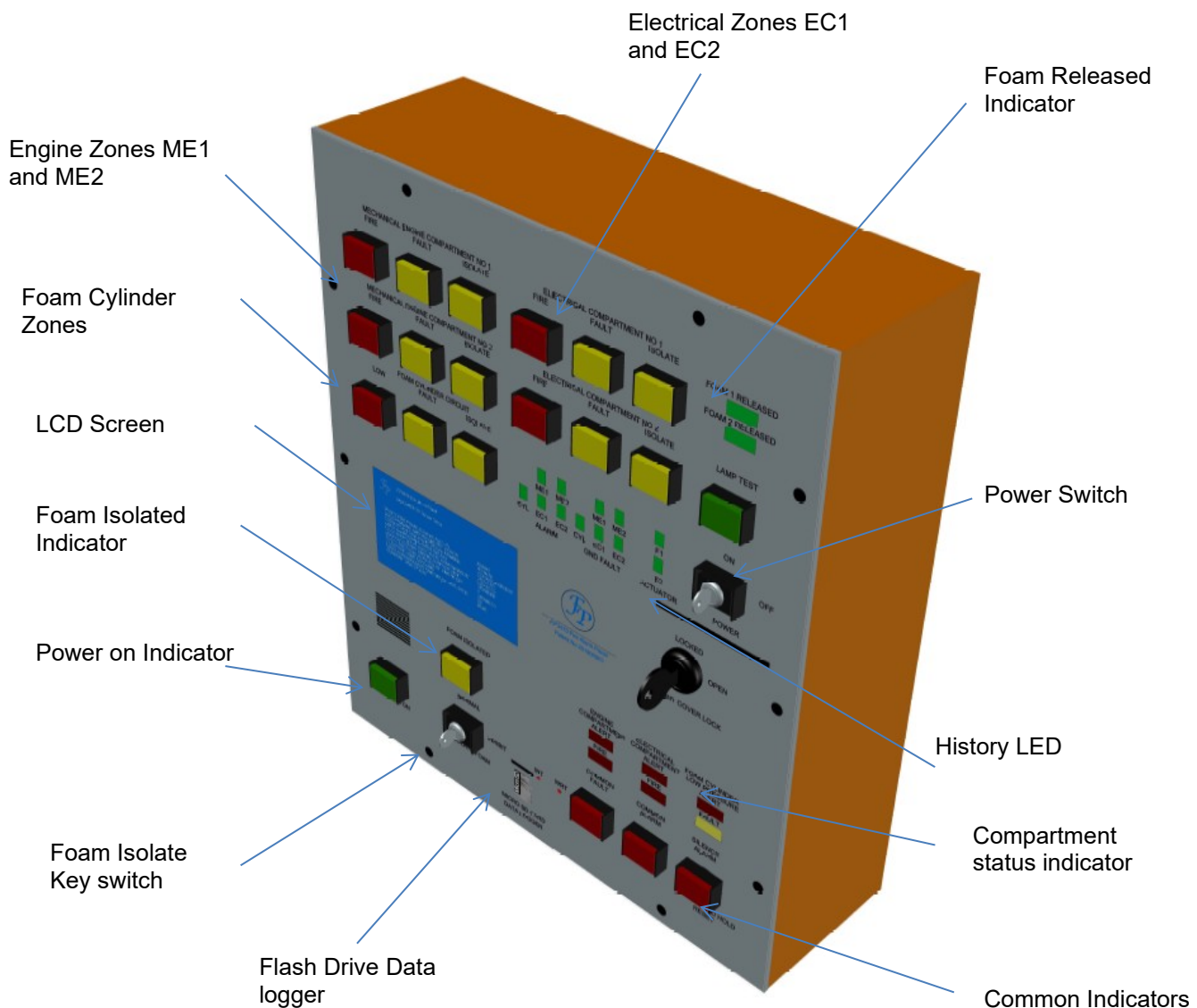


Section 2.0 Fire Detection System

Section 2.1 FP3470 Fire panel

The locomotive FP3470 fire alarm panel is constructed from metal enclosure measuring 370mm High by 320mm wide and 112mm deep this enclosure with a hinged front cover. The enclosure contains a total eight (8) printed circuit board (PCB) that make up the entire fire alarm panel. Seven (7) printed circuit boards are mounted to the front stainless steel facia metal plate and one (1) to the rear of the enclosure see drawing 13 for details on this enclosure and drawing 12 details on the front facia.

Below is an overview of the front facia of the FP3470 fire alarm panel. With the front protective cover opened showing the operator controls and indicators.



Section 2.2 FP3470 Fire panel Internals

The termination printed circuit board (Section 9.7) is mounted to the rear of the enclosure and is used to terminate the incoming cable into the fire alarm panel, and present the signal to the control card printed circuit board (Section 9.4) via a 40 way ribbon cable.

The control card printed circuit board (Section 9.4) is used to monitor the locomotive thermal detectors, control the output relays, log text information to the SD flash drive (Section 9.6), control the Modbus interface and update the real time clock (Section 9.8). The data gathered by control card is passed on to the display card (Section 9.5) via an I2C internal data bus.

The display card printed circuit board is used to monitor all of the front facia controls and indication for the user to view or operate. The display card printed circuit board is connected to the SD interface card (Section 9.6), history LED card (Section 9.9), foam LED card (Section 9.10), common LED card (Section 9.11) via ribbon cable.

The SD Flash card data logger uses an ATmega328 running at all data logged is stored on the microSD card. Size from 512MB to 32GB microSD card should work both FAT16 and FAT32 SD formats. A new file each time the FP3470 fire panel powers up a new file is created for store any event recorded to a LOG#####.txt which is incremented each time to a max of 65533 logs.

The real time clock is based around the DS3234 Real Time Clock IC. The DS3234 is a low-cost, extremely accurate SPI bus real-time clock with an integrated temperature-compensated crystal oscillator and crystal. The real time clock maintains seconds, minutes, hours, day, date, month, and year information. The date at the end of the month is automatically adjusted for months with fewer than 31 days, including corrections of leap year. The real time clock is poled at a regularly intervals by the control card ATmega2560 to maintain an accurate time for log events.

The History LED card provides a means of supporting the twelve (12) 5mm red rectangle LED's that are displayed through the front of the fire alarm panel.

The Foam LED card provides a means of supporting the two (2) green bar LED's that are displayed through the front of the fire alarm panel.

The Common LED card provides a means of supporting the five (5) red and one (1) amber LED's that are displayed through the front of the fire alarm panel.

The FP3470 panel itself system consists of eleven (11) main parts:

1. Two (2) 12 volt DC to DC electrically isolated regulators one (1) regulated power source is for the fire panel internal solid state logic the second (2) for the external equipment connected to the fire alarm panel.
2. Five (5) conventional fire alarm zones each zone having three functions Alarm, Fault, Isolate these alarm zone are connected to bimetallic conventional thermal temperature detector installed with the locomotive engine and electrical compartment.
3. Two (2) output to drive the warning lights on the drivers overhead console one (1) fire light, one (1) fault light.
4. One(1) Input to monitor each of the four (4)remote release stations switches external to the locomotive driver's cabin located on each corner of the locomotive and one (1) release switch fitted to the driver console with the drivers cabin.
5. Two (2) Monitored power 12vdc 1A output to release the suppression system.
6. Two (2) inputs for monitoring a remote fire alarm panel, one input for common alarm the second input used for common fault there signal are sent between fire alarm panel using the interconnecting train lines.
7. Five (5) indicators for monitoring for displaying zone circuit ground faults.

8. Five (5) latched indicator for the five (5) alarm zone (history lights) these light will remain illuminated even if the alarm has cleared until such time the panel is manually reset or powered down.
9. RS485 serial Modbus monitoring and control using function 15 using a registers 40001 to 40016 see section 6.
10. One (1) SD flash drive data logging plan text (ASCII format).
11. One (1) voltage free contact to shut down the locomotive fuel pump.

The fire alarm panel is to be located in the a suitable location within the locomotive and connect to fire junction box with a 24 core and earth cable used to connect all ancillary fire detection equipment installed with the locomotive (See cable schematic Section 9.1).

The fire alarm power supply input is nominal 32vdc supply which is filtered, regulated and feed into the fire panel where two electrically isolated dc to dc converter to produce a regulated 12Vdc supply by the fire alarm panel internal circuit and second 12vdc regulator for the external equipment.

The monitoring, logic and timing for the fire alarm panel is solid state electronics and integrated circuits that comprises of discrete CMOS integrated circuit, switching transistors, Darlington drivers, output relays, opto couplers and two ATmega2560 micro controllers being the control card and display card configuration over I2C bus.

The of the five (5) conventional alarm zone, two (2) foam solenoid circuits and one (1) manual release switch circuit are monitored using a leakage current circuit through the 1K ohm resistor the circuit continually monitors the current been drawn at approximately 6mA for a normal condition. When the circuit detects increase in current to approximately 25mA the alarm output is activated putting the ATmega2560 into alarm condition. A decrees in current to approximately 0mA would indicate a fault is present putting the ATmega2560 into fault condition.

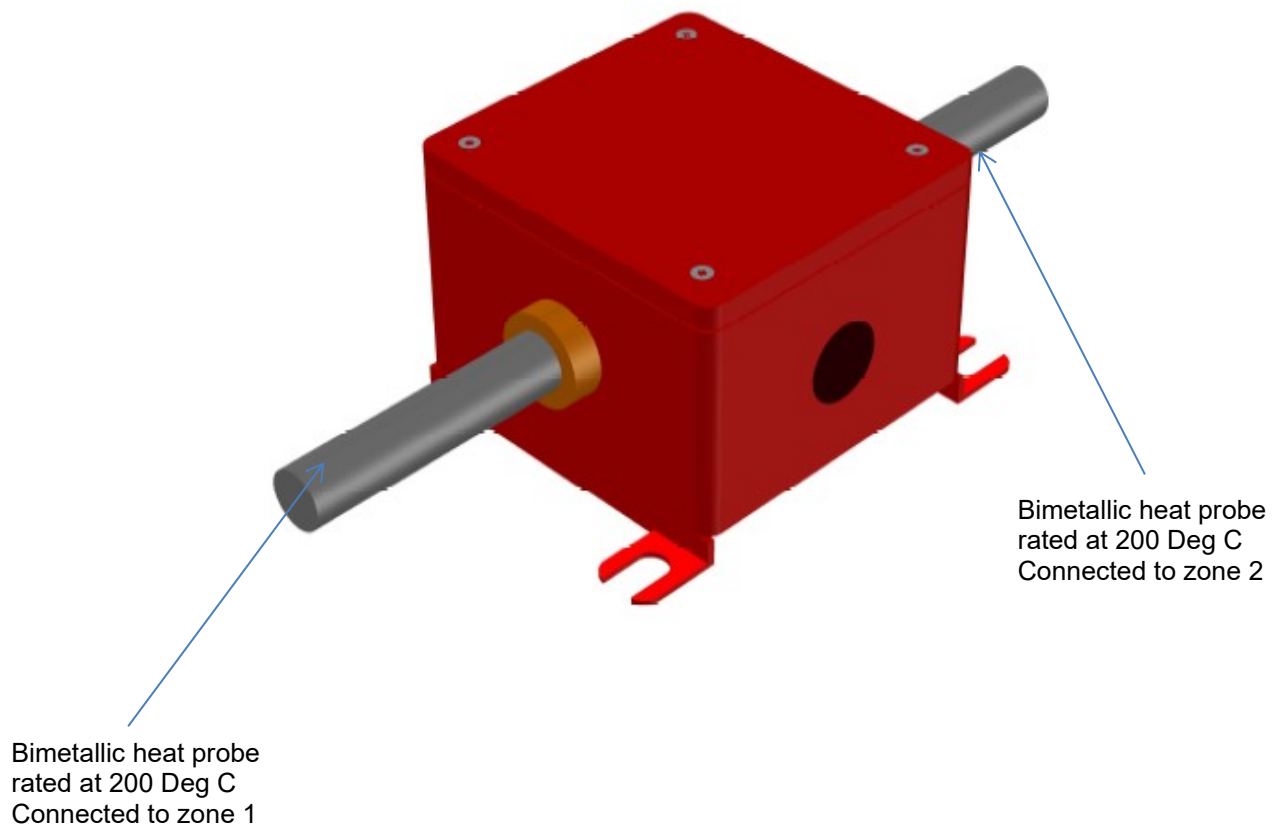
Each of the monitored circuit include two (2) opto couplers to ensure the internal electronics are electrically isolated from the external environment, transistors and logic gate to produce a switch 5v output onto the assigned input pins on the ATmega2560 control card micro controller see figure 1 (fire zone flow diagram) and figure 2 (fire zone circuit diagram).

Section 2.3 FP3470 Detection System

Temperature detectors are used to detect a presence of fire using a dual detection circuit. The thermal detectors are brass probes with a fixed temperature rating set at 200°C. The locomotive is fitted with a total of eighteen (18) detectors in the following compartments.

- Engine Compartment = 12 probes
- Electrical Compartment = 4 probes
- Cooling Hood = 2 probes

Typical drawing of a heat probe junction box installed with the engine compartment. Each enclosure has two type “E” probes (rated at 200deg C) fitted connected to a apposing fire detection circuit.



Section 2.4 Automatic Operation

The Fire Detection System employs thermal detectors located in the engine compartment, electrical compartment & engine cooling hood. These detectors are arranged in a dual sensing mode. i.e. 2 detectors must be in alarm mode before extinguishant release cycle can be initiated.

Section 2.4.1 Automatic Operation Details

The detection and initiation cycle is as follows:

Upon one thermal detector sensing a fire condition, a signal is transmitted to the fire alarm panel located in the locomotive cabin. This signal is then sampled for a period of four (4) seconds (configurable). If after this time the signal is still present, the 'alert light' for the particular area and the zone fire light is illuminate;

Upon the second thermal detector on an alternate alarm circuit sensing a fire condition, a signal is to be transmitted to the fire alarm panel and after the hold period of four (4) seconds (configurable), the "fire light" for the affected area is illuminate and commence flashing, as will the 'common alarm fire light' and the 'cancel alarm light'; and a thirty (30) sec time delay (configurable) start to release the suppression system.

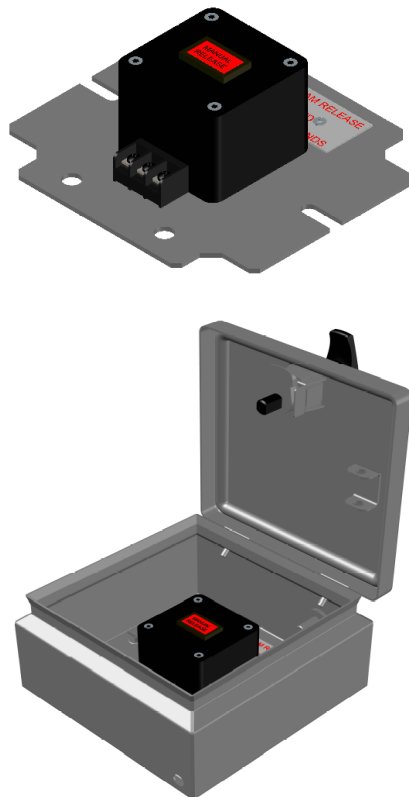
Upon the second thermal detector on an alternate alarm circuit the locomotive fuel pump is shutdown, this will prevent fuel been continually pump into the fire risk. A manual over ride switch is provided on the remote control station to restart the fuel pump. This allows the locomotive to be moved of the tracks if required.

Audible alarm sounder is also commenced operating and the locomotive will be shut down due to lack fuel and after a thirty (30) second delay (configurable) the suppression system activated. At any time during the alarm cycle audible alarm can be silenced by pressing the 'cancel alarm light' causing the alarm sounder to stop and all lights to go to a steady state.

Section 2.5 Manual Operation

Manual activation of the suppression into the main engine compartment is from any of the five (5) remote release stations.

Section 2.5.1 Manual Operation Details



Pressing any one of the five (5) illuminated remote release stations switches for two (2) seconds, the fire agent suppression is to be released into the engine compartment, after release of the fire agent suppression system the light is to go out confirming foam release. After a period of four (4) seconds (configurable), the engine compartment fire light, common alarm fire light and cancel alarm light is illuminate and commence flashing, the alert sounder is operate, and fire agent suppression is be released into the affected area. By pressing the cancel alarm light the alert sounder is silence and all lights go to a steady state.

If a fault condition occurs in the system due to damaged wiring or failure of components, the fault affected fire zone fault light will illuminate along with common fault on the front facia of the fire alarm panel.

Locomotives are connected in a consist, the common fault and fire alarms are relayed to each locomotive fire alarm panel, causing the common fault or common fire lights to illuminate and the 'common fire light to commence flashing in those locomotives. Also in the event of a common fire alarm, the alert sounder will operate and the cancel alarm will illuminate and commence flashing. The alert sounder is to be able to be silenced by pressing the cancel alarm light in the particular locomotive required.

All events received by the fire alarm panel will be logged to a SD flash drive fitted to the front fascia prefixed with a time date stamp to provide a history of event that have occurred in real time.

All events received by the fire alarm panel can be monitored by a third party SCADA system using Modbus over RS485 utilizing registers in the range of 40001 through to 40016.

The fire alarm panel is fully automatic and monitors all conditions in the engine compartment, electrical compartment and the suppression system. The fire suppression is to be restricted to the engine compartment only.

Note

- The conformation light illuminating the manual release switch goes out when the switch is pressed.
- Foam 1 and Foam 2 Green lights will illuminate

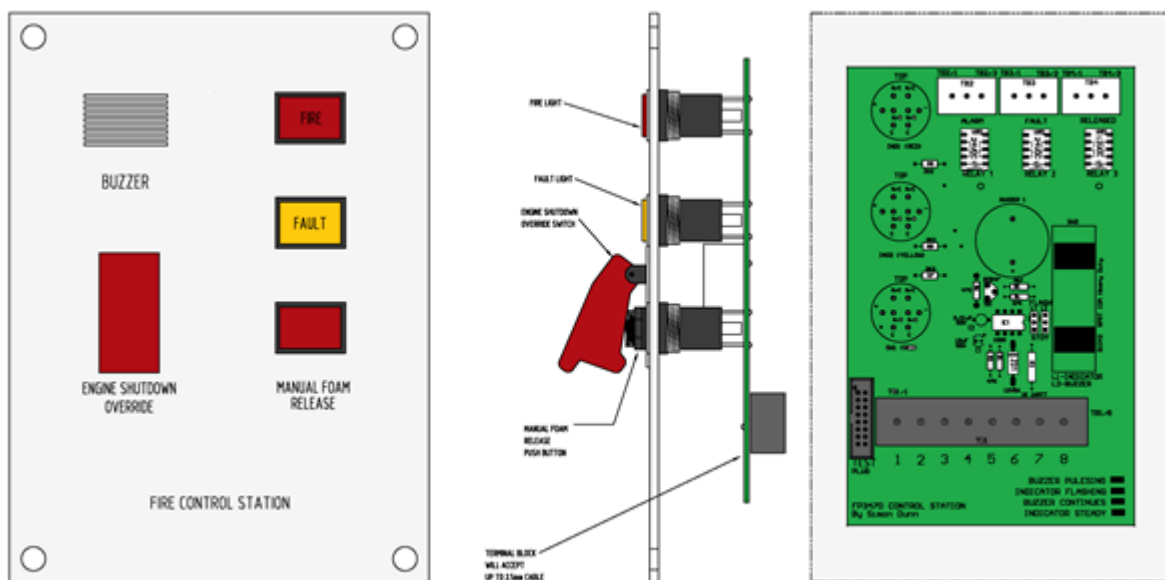
Section 3.0 Fire Control Station

The drivers cab fire control station is used to provide the driver with conformation on the status of the fire detection system and also a means to manually release the extinguishing agent. The fire control station will annunciate the following signals.

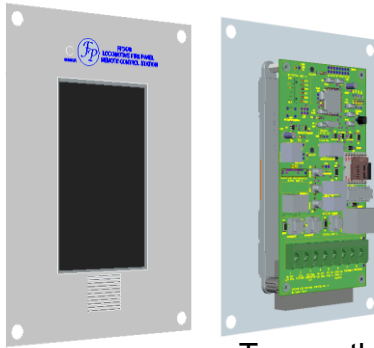
Section 3.1 Original Control Station

The original control station shown below has been in service since the early 1980 and provides the following information to the driver. This control station is compatible the FP3470 locomotive fire control panel described in this manual.

- Fire Light – RED
- Fault Light – YELLOW
- Manual Release Button
- Engine Shutdown Override Switch
- Buzzer



Section 3.2 FP3470 LCD Control Station



The revised local drivers cab control station can be used with any of the fire control panels produced since 1980; the FP3470 drives cab control station now incorporates 5" Colour graphic touch screen similar to the screen on the FP3470 fire alarm panel as shown below.

To use the this new drivers cab control station the JB1 printed circuit board will need to be replaced in the early models as a small plugin micro controller card is required to communicate the drivers cab control station.

The new JB1 circuit board is computable within the early fire control panel and remote station control station show in section 3.1. This new JB1 circuit card is now supplied as standard on all replacement and new installations to make allowances for the option to change out the control station at a later time.



The LCD control station will provided the driver the following information on the home screen

1. Fire Alarm Local Panel
2. Fault Condition on the Local Panel
3. Engine Shutdown Signal is Activated
4. Trainline Alarm Condition Activated
5. Trainline Fault Condition Activated
6. Primary Power Fault
7. Secondary Power Fault
8. Virtual Pushbutton For Manual Release
9. Virtual Pushbutton For Engine Override

New FP3470 Drivers Cab Control Station

The drivers cab control station has a small MP3 player fitted that access and industrial micro SD card detailed in section 5.9 when an event occurs. The audio files can be changed to play specific tone or voice warning in any language as long as it a MP3or wav format.

File Name	Message Played	File Name	Message Played
1	<i>Power Up Complete</i>	6	<i>Trainline Fault Activated</i>
2	<i>Fire Alarm Detected</i>	7	<i>Engine Shutdown Override Activated</i>

3	Fire System Fault	8	Foam Release Activated
4	Fuel Pump Shutdown	9	Primary Power Supply Failure
5	Trainline Alarm Activated	10	Secondary Power Supply Failure

Audio Message Saved To Drivers Cab Remote Control Station

Section 3.2.1 FP3470 LCD Control Station Display Home Screen



The local drivers cab control station shown to the left is in the normal working condition where the screen back light will be driven to max during the day, as the light dims the control station back light will also dims, this is to ensure during night time operations the drivers are not distracted by the unit. However if any event is been displayed the back light will revert to full brightness.

Section 3.2.3 FP3470 LCD Control Station Display in Alarm



The local drivers cab control station shown to the left is in the is in the alarm condition where the screen back light will be driven to maximum brightness an addable buzzer will sound and audible message will be played at a repeated three second intervals.

Red indicators show local panel in alarm and fuel shutdown is activated.

Note

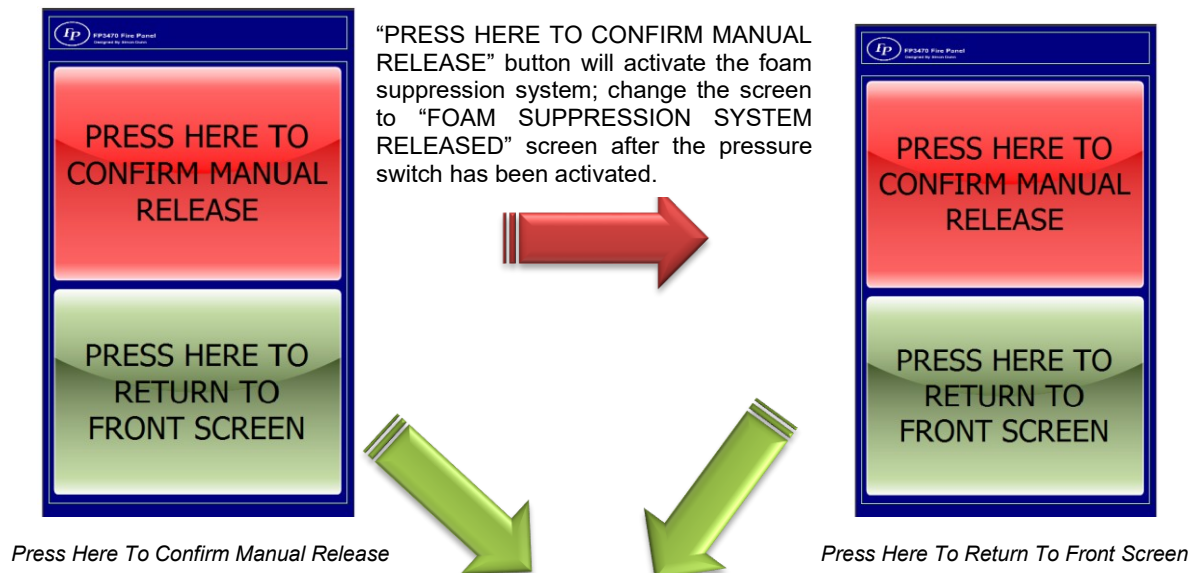
The buzzer and audible message is played continuously at three seconds intervals until the fire system has been reset, whilst the trainline alarm, trainline fault, fire system fault and shutdown alarm only an audible message will be played for a period of time so as not to distract the drive.

Section 3.2.3 FP3470 LCD Control Station Display Release Screens

The manual foam release button is a two stage process to ensure that the foam is not released by mistake.

Pressing the virtual button “PRESS HERE TO RELEASE FOAM” on the home screen, the screen will change to the conformation screen shown below. Pressing the virtual red button “PRESS HERE TO CONFIRM MANUAL RELEASE” on this screen will activate the foam suppression system; the screen will now change to the screen to “FOAM SUPPRESSION SYSTEM RELEASED” screen, once the pressure switch zone has been activated along three very short beeps and audible message will be played as conformation back to the driver.

Pressing the virtual button “PRESS HERE TO RETURN TO FRONT SCREEN” will cancel the command and return you to the home screen.





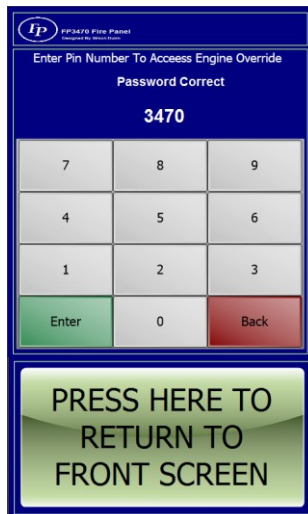
Home Screen

Section 3.2.4 FP3470 LCD Control Station Display Engine Override Screen

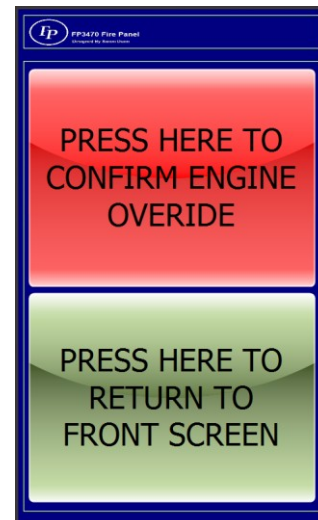
The engine override button is a two stage process to ensure that the locomotive is not restated by mistake.

Pressing the virtual button “PRESS HERE FOR ENGINE OVERRIDE” on the home screen, will the screen will change to the conformation screen shown below.

A password has been added for conform to AS5062 to enable the engine override function Enter using the numeric keypad “3470” and press enter.

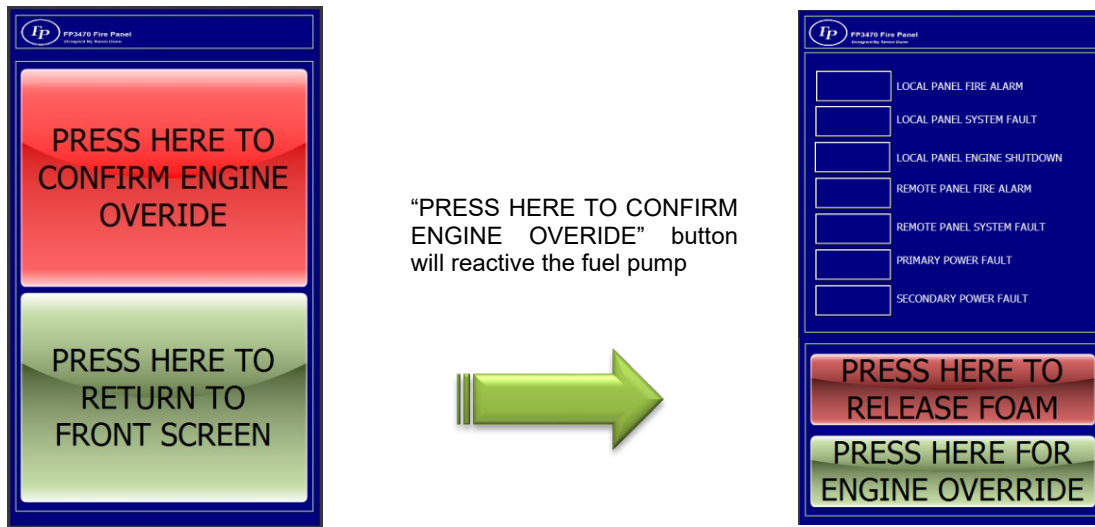


Once the password has been validated the screen will chance to “Press Here To Confirm Engine Override”



Pressing the virtual red button “PRESS HERE TO CONFIRM ENGINE OVERRIDE” on this screen will re activate the fuel pump and allow the locomotive to be moved.

Pressing the virtual button “PRESS HERE TO RETURN TO FRONT SCREEN” will cancel the command and return you to the home screen.



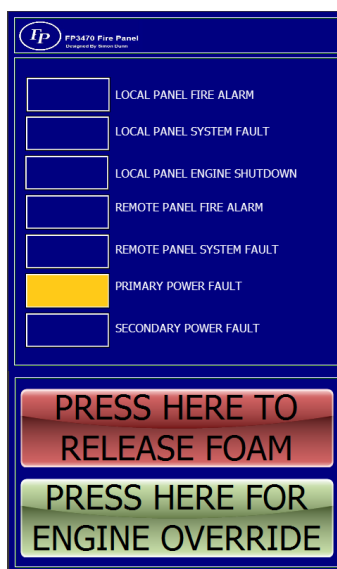
Press Here To Confirm Engine Override

Home Screen

Section 3.2.5 FP3470 LCD Control Station Display Power Supply Fault

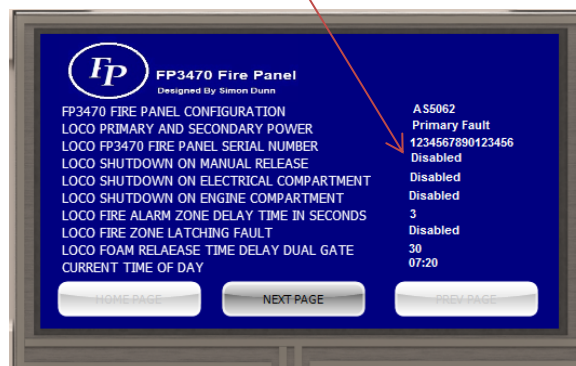
The primary and secondary power supply used by the FP3470 is feed directly into JB1, the primary power is obtained from a 72vdc to 32vdc converter, whereas the secondary power supply is obtained by a centre tap from the locomotive bank of batteries.

If either power supply voltage drop below the minimum required to operate the panel, a indicator on the control station will be illuminated and a description on the main FP3470 home screen displayed, as shown below.



Control Station PSU Fault

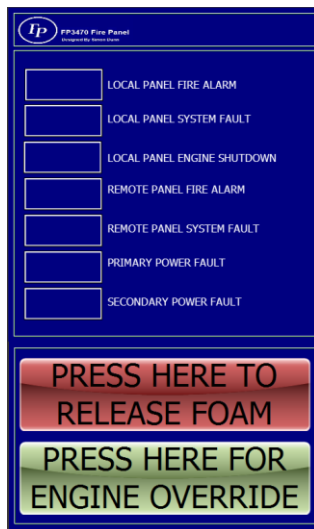
Power Supply Fault on the Primary supply



FP3470 Home Screen

Section 3.2.6 FP3470 LCD Control Station Display Communication Error

The communication error screen is shown when there is no communication between the fire system and the drivers control station for more than 20 seconds. Once communication is established the screen will clear and return to the home screen.



Home Screen

Communication Error for more than 20 seconds

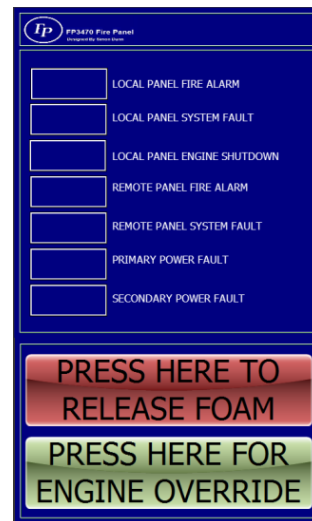


Error Screen



Error Screen

Communication established



Home Screen

Section 3.2.6 FP3470 LCD Control Station Back Light Set Point

The remote station has back light contrast set point can be adjusted via the communication port using TTL logic level 0-5v only “DO NOT CONNECT PC DIRECT TO THIS PORT” A FTDI Chip, 5 V TTL USB to UART Cable, TTL-232R-5V must be used to connect to a PC running any terminal program.



The six way header is connected to the main cpu card making note of the orientation of the connector green wire closest to the relay, also note the description on the PCB. See image below.

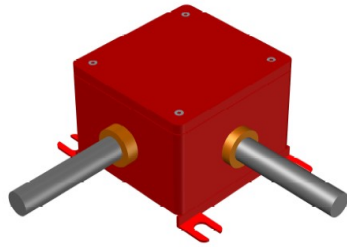
The serial port will send data out at 57600, N,8,1 and can be viewed on any terminal window such as Terminal 1.9, PUTTY or HyperTerminal.

During power the terminal program will display what process is been performed. When ask to “Set The Back Light” you have 5 sec to send a lower case “s” to the remote station. This will suspended the start-up process and you will be asked to enter two values, the first been the up threshold where the display is it brightest and a lower threshold where the display is at its dimmest.

1. The upper and lower threshold can be set to any value from 0-1023
2. By default this is set to 800 for the lower and 1000 for the upper

Section 3.3 FP3470 Heat Probes

Section 3.3.1 Overview



The fire alarm panel used to monitor and control a fire within the risk area; this method is achieved by monitoring a series of fixed thermal detectors set at 200°C that are placed within perceived fire risk area. The thermal detectors monitor the environment within the risk for increases in ambient temperature. Once the thermal detector set point has been reached, the fire alarm panel respective zone will be activated and pre-determined series of event will occur, depending on the fire alarm location.

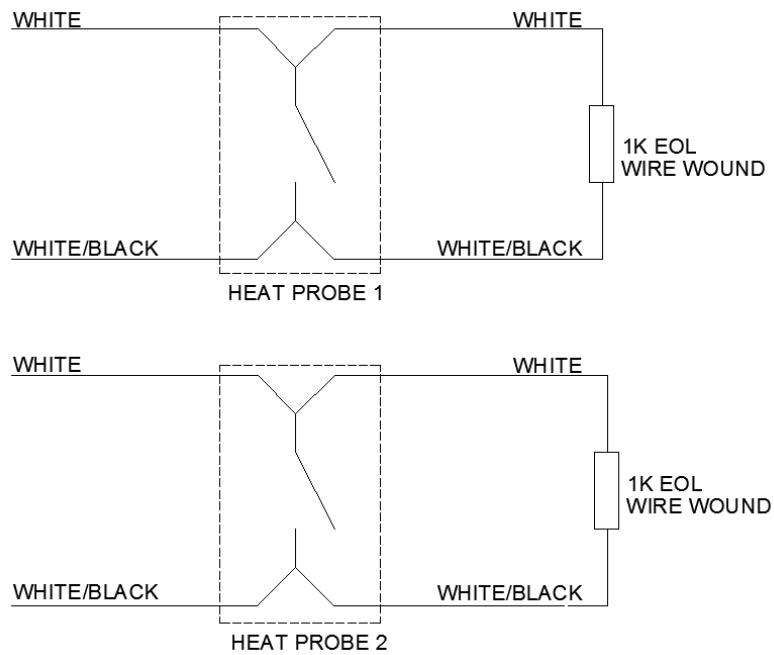
Section 3.3.2 Description

The heat detectors are the “heart” of many fire protection systems. These highly reliable devices have been the standard for over 65 years. In fire system these heat detectors are used as an ALARM device, to sense overhear or fire and alert personnel. Heat detectors have met with wide acceptance because they are designed with rate compensation.

This type of provides a unique advantage over both fixed temperature and rate-of-rise types of detectors accurately senses the surrounding air temperature regardless of the fire growth rate. At precisely the pre-determined danger point, the system is activated. Fixed temperature detectors must be completely heated to alarm temperature and therefore a lag in response time may occur with a fast rate fire. Rate-of-rise devices, on the other hand, are triggered by the rate of increase in ambient temperature and are subject to false alarms caused by harmless, transient thermal gradients such as the rush of warm air from process ovens. The key to the unit’s sensitivity is in the design. The outer shell is made of a rapidly expanding alloy which closely follows changes in surrounding air temperature. The inner struts are made of a slower expanding alloy. Designed to resist thermal energy absorption and sealed inside the shell, the struts follow temperature changes more slowly. A slow rate fire will heat the shell and struts together. At the “set point”, the unit will trigger, actuating the alarm or releasing the extinguishant. A transient rush of warm air up to 40°F/min. may expand the shell, but not enough to trigger the unit. By ignoring transient warm air excursions, the heat detector virtually eliminates false alarms prevalent with rate-of-rise devices. If a fast rate fire starts, the shell will expand rapidly. The struts will close, actuating the alarm and/or

releasing the agent. The faster the fire rate of growth, the sooner the heat detector will react.

Section 3.3.3 Termination Schematic



Section 3.4 FP3470 Foam Actuator

Section 3.4.1 Overview



The Australian standards AS5062 requires the actuator line to be monitored for open and short circuit fault. This is achieved by switch the polarity of the actuator line and the use of a blocking diode and a 1K End of Line configuration as shown below.

Jumper link JP8 and JP9 on the main CPU card have been provided to disable the short circuit monitoring when using a FP3470 panel on an existing system that has not been fitted with any blocking diodes.

- JP8 is used to enable / disable short circuit monitor on Foam 1
- JP9 is used to enable / disable short circuit monitor on Foam 2

The link position E – Enable short circuit monitoring, D- Disable Short Circuit Monitoring

Note The fire system will not provide any power to the actuator if there is a short circuit on the actuator cable. Therefore it is recommended to always fit the blocking diode and back EMF diode to each actuator as shown below.

Section 3.4.1 Description

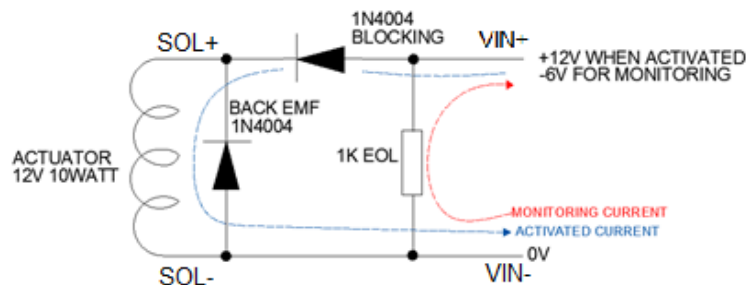
The actuator coil has a low resistance of approx 14 ohms, this low resistance makes monitoring of the actuator line difficult for a short circuit. The FP3470 uses a simple technique of reversing polarity and including a blocking diode at the actuator. This will ensure all the monitoring current is directed through the 1K end of line resistor, (red line) current now flows from 0v to -6v, as current will always flow to the lesser potential voltage.

When the fire system requires the actuator to be released, the polarity changes from -6v to +12v and the current now flows in the other direction, most of which will pass through the actuator coil and the blocking diode (blue line) again current flows to the lesser potential which is now 0v rail.

When fire system is reset, power is removed from actuator a magnetic field generated by the coil will start collapse, this will now induces current into the cable and in turn into the monitoring circuit.

By adding a back EMF diode across the coil of the actuator, all the current generated by the collapsing magnetic field is channelled through the back EMF diode rather than back into the fire system.

Section 3.4.2 Termination Schematic



Section 4.0 Fire Control Panel

The fire alarm panel is fully automatic and monitors all conditions in the engine compartment, electrical compartment and the suppression system. The fire suppression foam is to be restricted to the engine compartment only.

The fire alarm panel system consists of eleven (11) main parts:

1. Two (2) 12 volt DC to DC electrically isolated regulators one (1) regulated power source is for the fire panel internal solid state logic the second (2) for the external equipment connected to the fire alarm panel.
2. Five (5) conventional fire alarm zones each zone having three functions Alarm, Fault, Isolate these alarm zone are connected to bimetallic conventional thermal temperature detector installed with the locomotive engine and electrical compartment.
3. Two (2) output to drive the warning lights on the drivers overhead console one (1) fire light, one (1) fault light.
4. One(1) Input to monitor each of the four (4)remote release stations switches external to the locomotive driver's cabin located on each corner of the locomotive and one (1) release switch fitted to the driver console with the drivers cabin.
5. Two (2) Monitored power 12vdc 1A output to release the suppression system.
6. Two (2) inputs for monitoring a remote fire alarm panel, one input for common alarm the second input used for common fault there signal are sent between fire alarm panel using the interconnecting train lines.
7. Five (5) indicators for monitoring for displaying zone circuit ground faults.

8. Five (5) latched indicator for the five (5) alarm zone (history lights) these light will remain illuminated even if the alarm has cleared until such time the panel is manually reset or powered down.
9. RS485 serial Modbus monitoring and control using function 15 using a registers 40001 to 40016.
10. One (1) SD flash drive data logging plan text (ASCII format).
11. One (1) voltage free contact to shut down the locomotive fuel pump.

The fire alarm panel is to be located in a suitable location within the locomotive and connect to fire junction box with a 24 core and earth cable used to connect all ancillary fire detection equipment installed with the locomotive (See cable schematic Section 9.1).

The fire alarm power supply input is nominal 32vdc supply which is filtered, regulated and feed into the fire panel where two electrically isolated dc to dc converter to produce a regulated 12Vdc supply by the fire alarm panel internal circuit and second 12vdc regulator for the external equipment.

The monitoring, logic and timing for the fire alarm panel is solid state electronics and integrated circuits that comprises of discrete CMOS integrated circuit, switching transistors, Darlington drivers, output relays, opto couplers and two ATmega2560 micro controllers being the control card and display card configuration over I2C bus.

The of the five (5) conventional alarm zone, two (2) foam solenoid circuits and one (1) manual release switch circuit are monitored using a leakage current circuit through the 1K ohm resistor the circuit continually monitors the current been drawn at approximately 6mA for a normal condition. When the circuit detects increase in current to approximately 25mA the alarm output is activated putting the ATmega2560 into alarm condition. A decrees in current to approximately 0mA would indicate a fault is present putting the ATmega2560 into fault condition.

Each of the monitored circuit include two (2) opto couplers to ensure the internal electronics are electrically isolated from the external environment, transistors and logic gate to produce a switch 5v output onto the assigned input pins on the ATmega2560 control card micro controller see figure 1 (fire zone flow diagram) and figure 2 (fire zone circuit diagram).

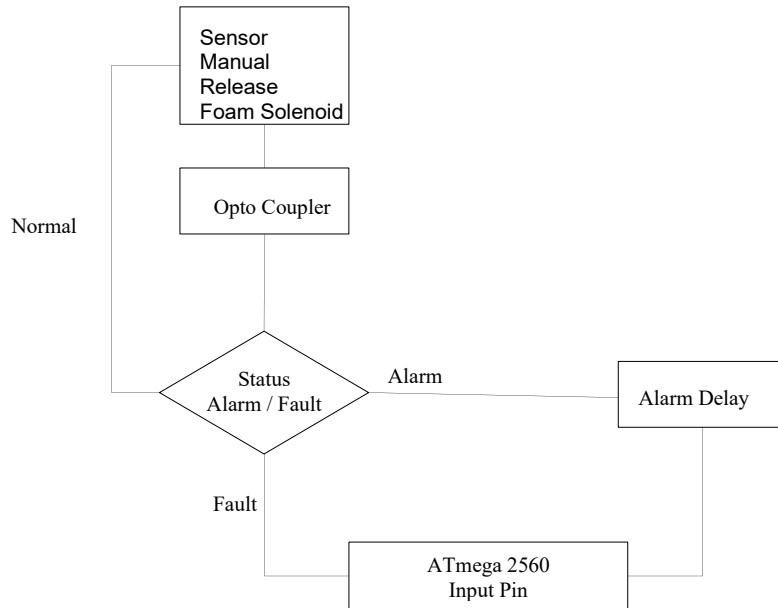


Figure 1 Typical Fire Zone Flow diagram

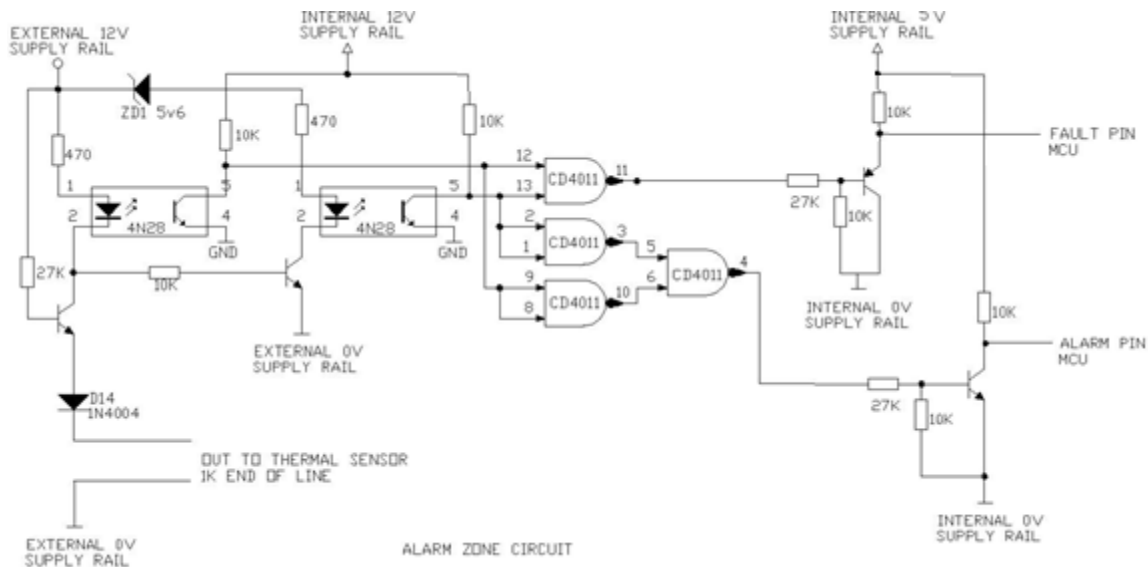


Figure 2 Typical Fire Zone Circuit

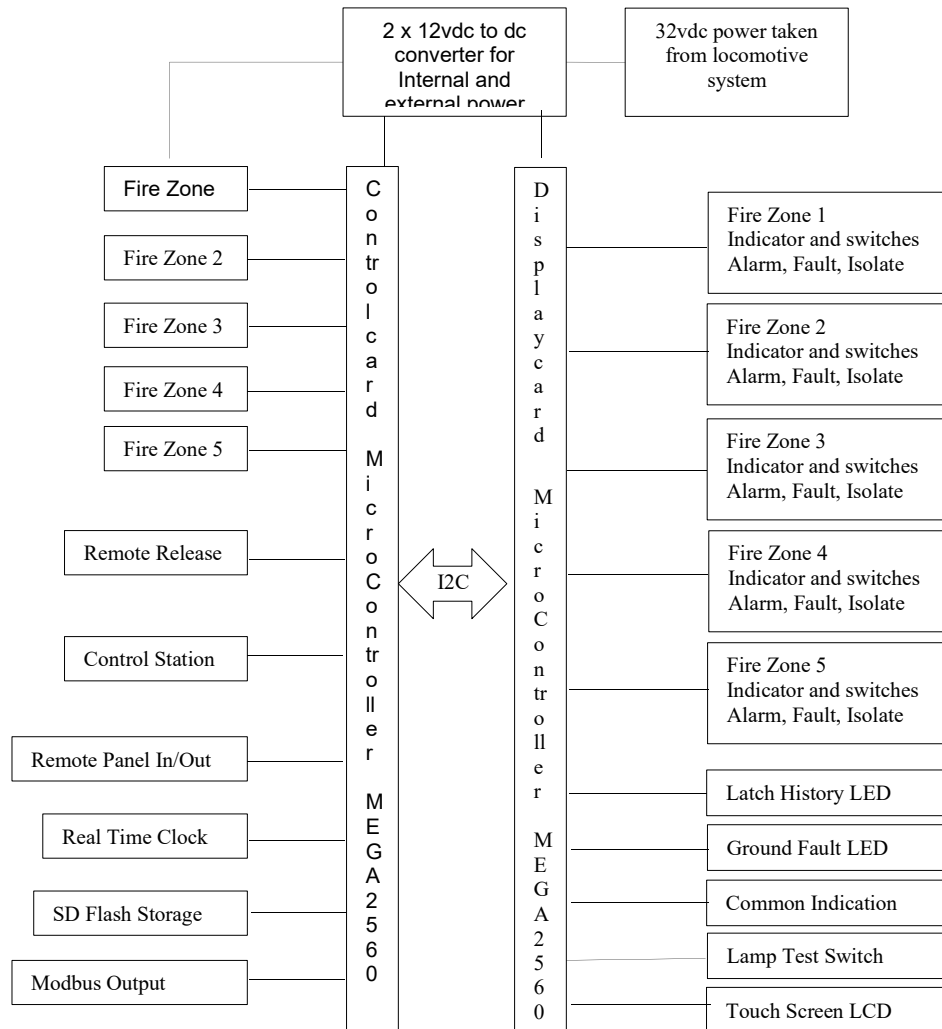
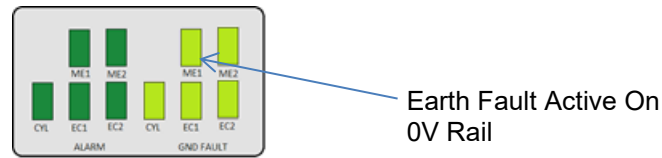


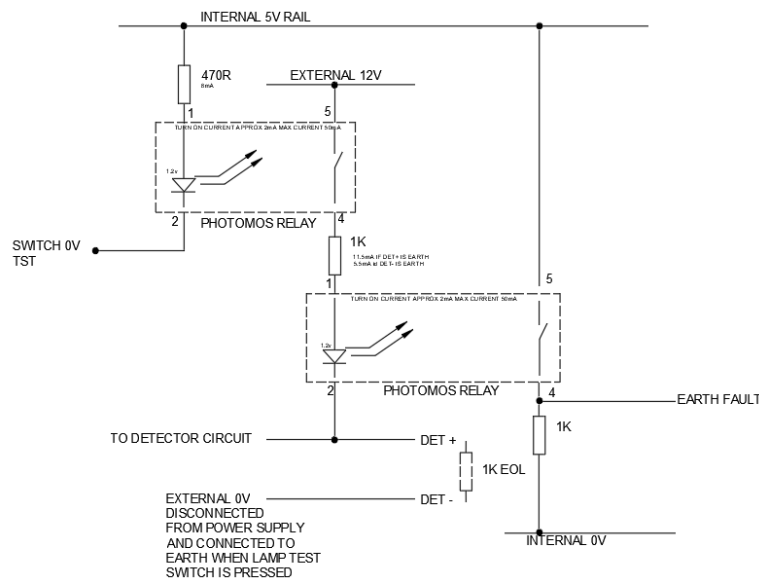
Figure 4 Fire Alarm Panel Block Diagram

The fire panel has five (5) earth fault monitoring indicators that are active during the lamp test.



EARTH MONITORING INDICATOR ON FRONT PANEL

When the lamp test button is pressed an internal relay will operate, this disconnects the detector external 0v rail (DET-). The external 0volt is then connected to the locomotive earth once the lamp test is complete the DET- is reconnected.



EARTH MONITORING CIRCUIT

The earth monitoring circuit shown above simply monitors the earth pin of the FP3470, if there is an earth fault within the locomotive, current will flow from the “External 12volt rail” through the 1K resistor and in turn photomos relay will operate, causing the contacts to close, triggering the ATmega2560 micro controller earth monitoring input pin.

During a lamp test the follow two possible events could occur.

1. Earth fault on 0V rail or DET- rail all five (5) indicators will illuminate.
2. Earth fault on DET+ rail, that indicator only will illuminate.

That zone will also be in alarm prior to pressing the lamp test button.

The fire alarm panel front facia a colour graphic touchscreen liquid crystal display connected to the display card ATmega2560 micro controller via a transistor to transistor logic (TTL) serial bus running at 9600 board rate, series of illuminated press button switches, indicators and LED's. These switches, indicator and LED's are monitored and driven directly from pin of the display card ATmega2560 micro controller. This provides the locomotive driver real time feedback on the status of the fire detection system. See Section 9.2 fire panel facia details.

Table 1 LCD Menus

LCD screen	Function
Home Screen	Soft Touch Buttons for navigating Provides system configuration details 1. Serial number (random generated) 2. Latching or non-latching faults 3. Activate alarm time delay 4. Suppression system release time delay 5. Time of day 6. Engine shutdown output operated form 6a) Engine compartment 6b) Electrical compartment 6c) Manual release
Status Screen	Soft Touch Buttons for navigating 1. Colour graphic moving bar graph of each of the 5 conventional zone 2. Graphic LED Indicator for remote alarm / fault 3. Run time DD:HH:MM:SS the system has been powered up 4. Rolling over heat beat Indicator 0 - 255 between two micro controllers (control card to display card)
Configuration Screen	1. Soft touch buttons for navigating graphic screens. 2. 12 digit keypad for data entry password

protected. (3470)

Table 2 Main Engine Service Controls and Indicator

Function	Colour	Action
Engine Compartment Fire Test 1	Red	Press Switch / Indicator
Engine Compartment Fault Test 1	Amber	Press Switch / Indicator
Engine Compartment Isolate Test 1	White	Press Switch / Indicator
Engine Compartment Fire Test 2	Red	Press Switch / Indicator
Engine Compartment Fault Test 2	Amber	Press Switch / Indicator
Engine Compartment Isolate Test 2	White	Press Switch / Indicator

Table 3 Electrical compartment service controls and Indicator

Function	Colour	Action
Electrical Compartment Fire Test 1	Red	Press Switch / Indicator
Electrical Compartment Fault Test 1	Amber	Press Switch / Indicator
Electrical Compartment Isolate Test 1	White	Press Switch / Indicator
Electrical Compartment Fire Test 2	Red	Press Switch / Indicator
Electrical Compartment Fault Test 2	Amber	Press Switch / Indicator
Electrical Compartment Isolate Test 2	White	Press Switch / Indicator

Table 7 suppression service controls and indicator

Function	Colour	Action
Suppression Cylinder Low Pressure Test	Red	Press Switch / Indicator
Suppression Fault Test	Amber	Press Switch / Indicator
Suppression Isolate	White	Press Switch / Indicator
Suppression Release	Green	Indicator

Table 8 general service controls and indicator

Function	Colour	Action
Lamp Test	Green	Press Switch / Indicator
Fire LED's (5)	Red	LED Indicator
Ground LED's (5)	Red	LED Indicator
LED's (2)	Red	LED Indicator
Power on/off	N/A	Keyed Switch
Gas Isolate	N/A	Keyed Switch
Power on	Green	Indicator
Foam Isolate	Amber	Indicator
Gas Isolate	Amber	Indicator
Main Engine Alert / Fire	Red	Indicator
Electrical Compartment Alert / Fire	Red	Indicator
Low Pressure Fire / Fault	Amber	Indicator
Common Fault	Amber	Indicator
Common Fire	Red	Indicator
Cancel Alarm	Red	Indicator

The user controls and indicator description shown on Section 9.2 has been detailed below.

1. The 'power on' is a green indicator to show that electrical power is available to the fire detection and suppression system.
2. The 'gas isolate' is to be an amber indicator show when the 'keyed gas isolate switch' is activated.
3. The 'gas isolate' keyed switch - upon activating this switch the gas isolate lamp will light and extinguishant to all areas will be deactivated. This switch also inhibits the locomotive from being started by disabling the fuel pump.
4. The 'engine compartment alert and fire indicator' are red LED's with two (2) legends - 'alert' and 'fire' and its associated circuitry monitor the state of the fire detectors zones in the engine compartment. The 'alert' LED is illuminated on any engine compartment alarm whereas the 'fire' LED is illuminated on having both engine compartment zones in alarm at the same time.
5. The 'electrical compartment alert and fire indicator' are red LED's with two (2) legends - 'alert' and 'fire' and its associated circuitry monitor the state of the fire detectors zones in the electrical compartment. The 'alert' LED is illuminated on any engine compartment alarm, whereas the 'fire' LED is illuminated on having both engine compartment zones in alarm at the same time.
6. The foam low pressure alert / fire' is to be a amber / red indicator containing two (2) legends, 'alert' and 'fire' and its associated circuitry is to monitor the state of the suppression system zone. The 'fire' red LED will be illuminated on release of the foam system, whereas the amber 'alert' LED will illuminate on a fault with the foam system.
7. The 'common fault' is to be an amber indicator that illuminates if a fault occurs in the wiring to any of the detectors in the system or any of the extinguishant release actuators.

8. The 'common fire' is to be a red indicator, which is to illuminate upon any alarm condition from the locomotive in which the panel is located and any alarms from other locomotives in consist.

9. The 'silence alarm' is to be a red momentary press indicator switch that is to illuminate on any dual alarm condition. By pressing this switch the audible alarm is to be cancelled and all lights are to go to a steady state. Hold this switch down for more than 5 sec will cause the fire panel to reset.

10. The 'engine compartment fire test' 1 and 2, is a red alternate illuminate switches. Upon pressing one switch, that switch is to lock on and illuminate after four (4) - seconds and the 'main fire alert' indicator is to illuminate. On pressing the second switch, after a four (4) second delay, the fire indicator is to illuminate and the 'main fire alert' indicator will commence to flash and in addition the 'common fire' and 'cancel alarm' indicators are to illuminate. The panel is then to go through its complete sequence but not activate the extinguishing agent, as the system is to be isolated by the isolate multiplexer. Upon releasing the two switches and operating the power on / off switch, the panel is to reset to normal.

11. The 'engine compartment fault test' 1 and 2 is a amber momentary indicator switches. Upon pressing one switch the fault light is to illuminate, and a common fault alarm is to activate. By depressing both switches, the first light will stay illuminated and the common fault will still be activated.

12. The 'engine compartment isolate' 1 and 2 is a white alternate indicator switches. Upon pressing one switch, the switch is to illuminate and isolate that detector from the main system. Upon leaving the switch depressed, the main system will now become a single alarm system. Upon pressing both switches, the detectors to the main area will become inoperative.

13. The 'electrical compartment fire test' 1 and 2, is a red alternate illuminate switches. Upon pressing one switch, that switch is to lock on and illuminate after four (4) - seconds and the 'main fire alert' indicator is to illuminate. On pressing the second

switch, after a four (4) second delay, the fire indicator is to illuminate and the 'electrical compartment fire alert' indicator will commence to flash and in addition the 'common fire' and 'cancel alarm' indicators are to illuminate. The panel is then to go through its complete sequence but not activate the extinguishing agent, as the system is to be isolated by the isolate multiplexer. Upon releasing the two switches and operating the power on / off switch, the panel is to reset to normal.

14. The 'electrical compartment fault test' 1 and 2 is a amber momentary indicator switches. Upon pressing one switch the fault light is to illuminate, and a common fault alarm is to activate. By depressing both switches, the first light will stay illuminated and the common fault will still be activated.

15. The 'electrical compartment isolate' 1 and 2 is a white alternate indicator switches. Upon pressing one switch, the switch is to illuminate and isolate that detector from the main system. Upon leaving the switch depressed, the main system will now become a single alarm system. Upon pressing both switches, the detectors to the main area will become inoperative.

16. The 'foam cylinder low pressure test' is a red alternate indicator switch which, when pressed is to illuminate itself and the 'common fire' lights.

17. The 'foam cylinder low pressure fault test' - is a amber momentary indicator switch which when pressed is to illuminate the electrical fault lamp as well as itself and the 'common fault' lamp will activate.

18. The 'foam cylinder low pressure isolate' is a white alternative indicator switch which when pressed is to isolate the electrical compartment detectors from the system.

19. The 'foam 1 and foam 2' is dual green indicators that are to monitor the state of the control panel. If extinguishant is released into the engine compartment, the foam 1 or foam 2 lamps are to illuminate. These indicators are to only be reset pressing and holding the reset button or by powering down the fire alarm panel.

20. The 'lamp test' is a green illuminating momentary switch. Upon pressing this switch, all lamps on the panel are to be illuminated in sequences and the ground leak indicators will illuminate if a ground fault is detected.
21. The 'fire LED's (5)' are red LED's that are to illuminate if any detector circuit goes into alarm condition. These LED's are to stay locked on until reset by the power on switch or the reset button.
22. The 'ground LED's (5)' are red LED's that are to illuminate when the 'lamp test' switch is operated. If any circuit wiring is grounded.
23. The 'foam LED's (2)' are red LED's that are to illuminate if any actuator circuit is open or the actuator is operated, and are to remain so until the actuator or the open circuit has been repaired or replaced.
24. The 'power on / off' is a key operated switch to turn supply power off the panel and also to reset lock on facilities.
25. The colour liquid crystal display used to configure and monitor the fire system.

Section 5.0 Custom Configuration

The FP3470 fire panel can be configured to change some of the operating parameters via the liquid crystal display.

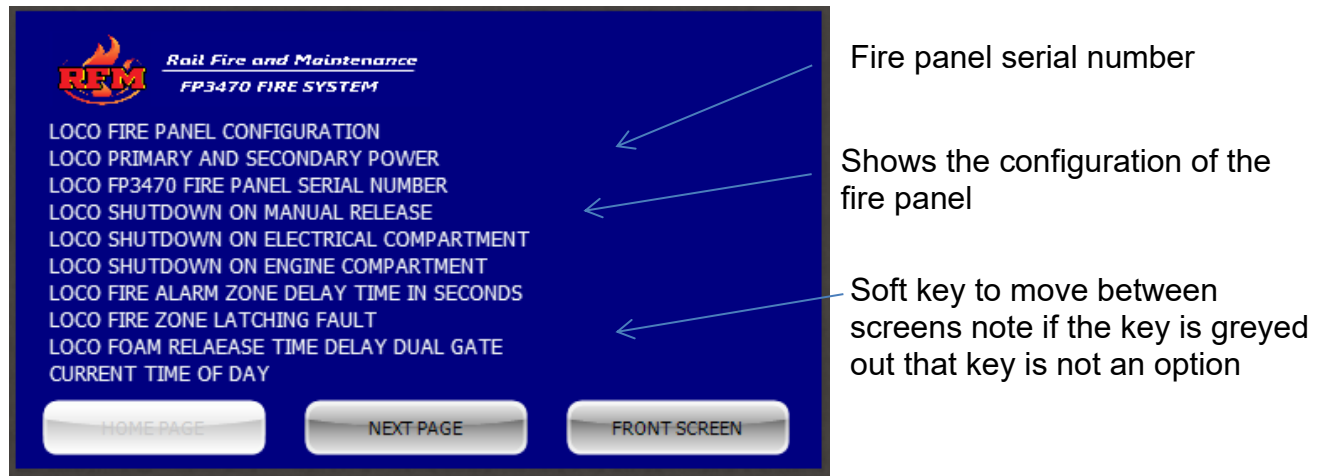
Section 5.1 Power Up Screen

During power up the LCD display will please wait screen



Section 5.2 Home Screen

The Home screen shown below, provides the basic configuration of the fire system



Functions shown on this screen are detailed below

FP3470 Fire Panel Configuration- This indicates if the fire panel is operating in the original mode as specified by the client's specification or with additional feature as indicated in AS5062.

Loco Primary and Secondary Power- This indicates if either of the power supply is operating above the mini voltage level.

Loco Fire Panel Serial Number - This number is generated are manufacture and burnt into the software once generated the number cannot be changed and remains with the fire panel printed circuit boards.

Loco Shutdown on Manual release - This is ether "Enabled" or "Disabled" function and will activate the shutdown signal if enabled and the manual release button pressed.

Loco Shutdown on Electrical Compartment - This is ether "Enabled" or "Disabled" function and will activate the shutdown signal if enabled and the detector in the electrical compartment are activated.

Loco Shutdown on Mechanical Compartment - This is either “Enabled” or “Disabled” function and will activate the shutdown signal if enabled and the detector in the mechanical compartment are activated.

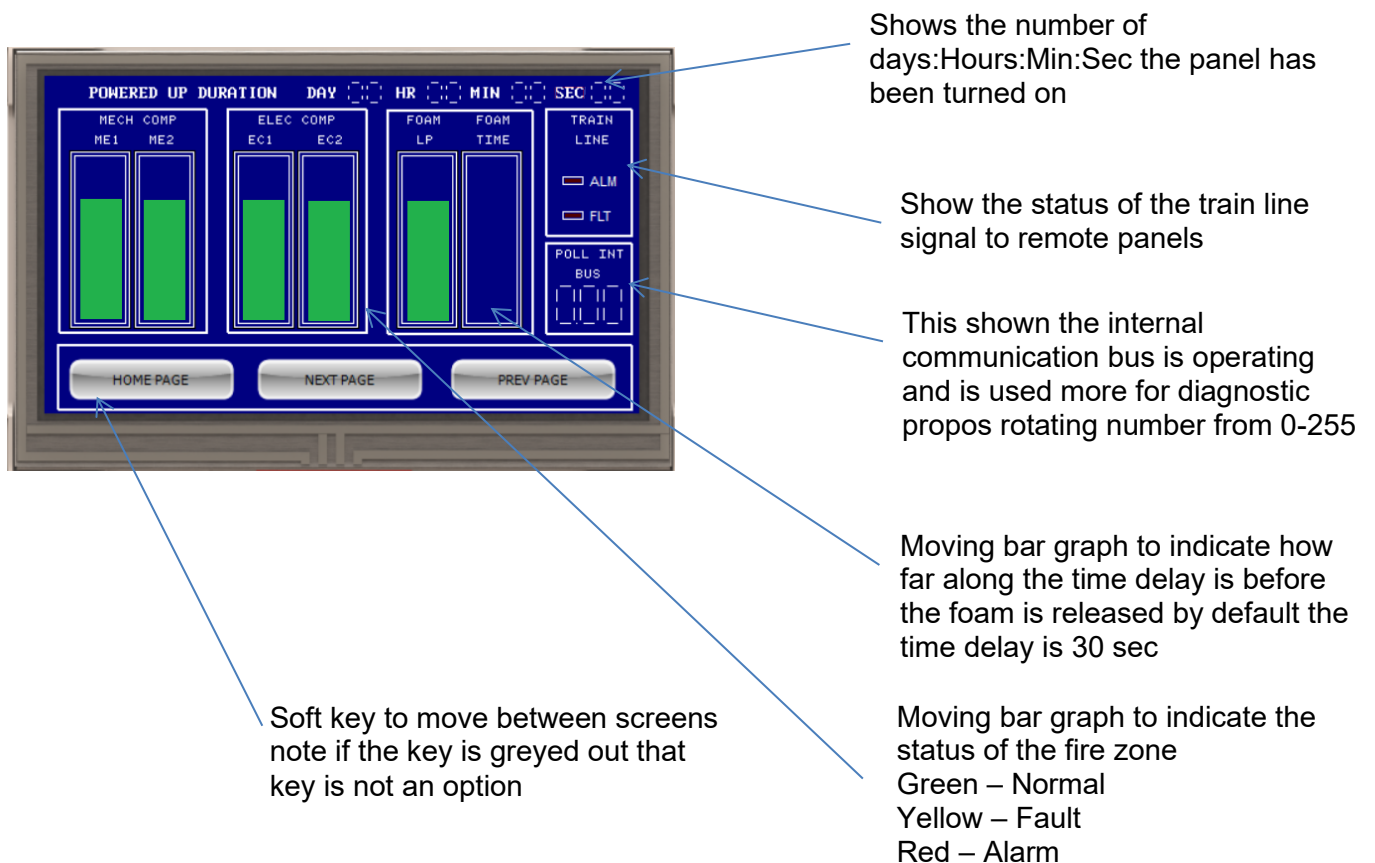
Zone Time Delay – This will provided a delay in sec from 0 - 27sec that the detector can be activated for before the alarm is registered on the fire panel by default this is set to 3 sec.

Latching Fault – This is either an enable or disables function and will latch the fault if a fault is reported on the fire panel.

Foam Release Time Delay – This will provided a delay in sec from 30 - 270sec that the fire panel will wait until the solenoid are activated and the foam is discharged.

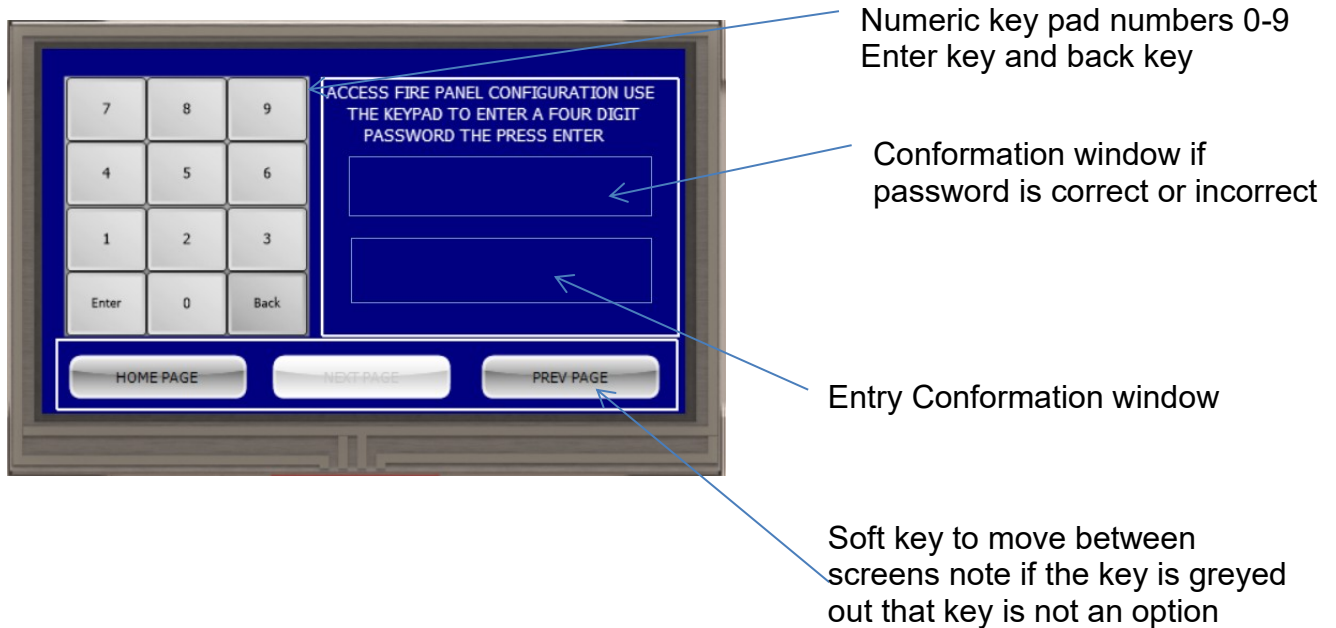
Section 5.3 Monitor Screen

The monitor screen provided an overview of the fire system to the operator

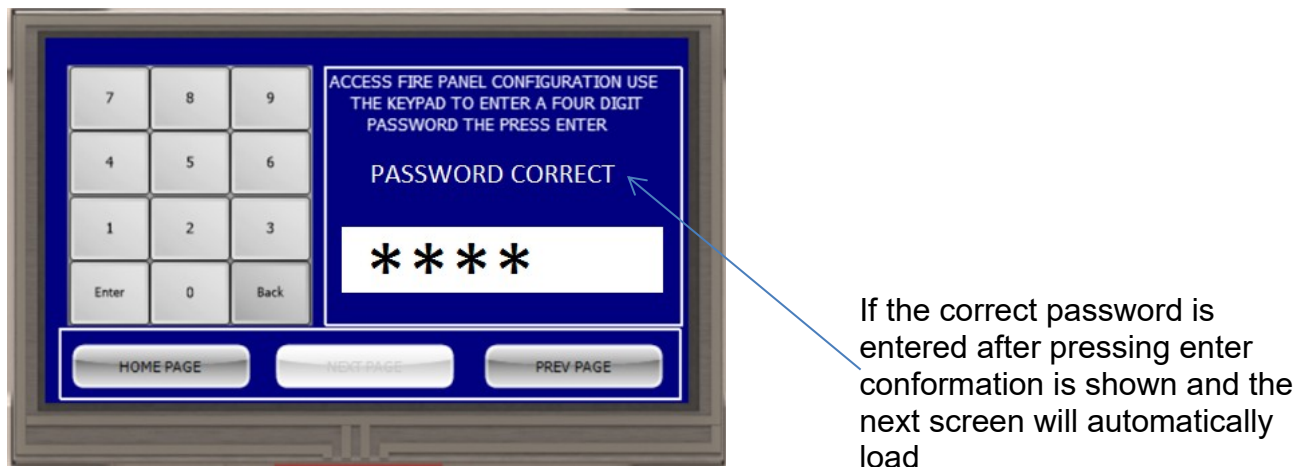


Section 5.4 Password Screen

The password screen has been provided to limit access to the configuration screen the password is generic to all fire panels.



Using the numeric keypad enter the 4 digit password and press “Enter”, if a mistake is made the “back” key can be used to erase the last entry or entries.

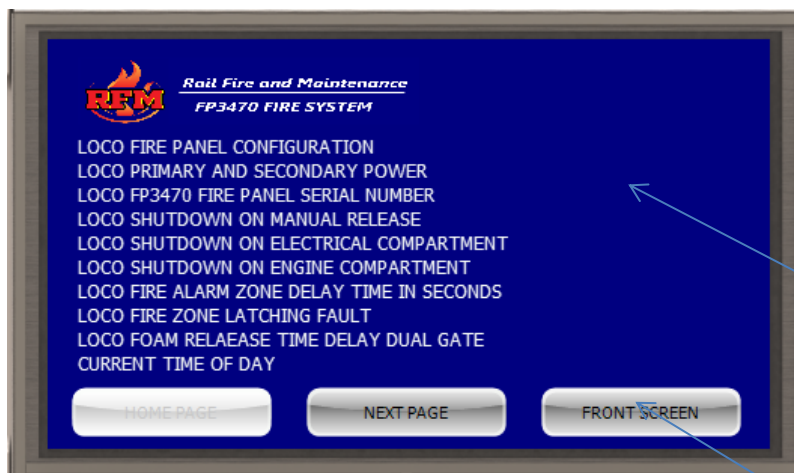


Section 5.5 Configuration Screen

The configuration screen is used to set up the basic operation of the fire panel.

Options available are

- Set Loco Fuel Shutdown - Used to set the parameters on when fuel shutdown relay will be activated.
- Set Time Delay for Alarm – Used to increase the delay time before an alarm is received by the fire panel this option is used to help prevent false alarm.
- Set Zone Fault Latch – Used to latch any faults on the fire system this option can be used to determine the location of an intermittent fault
- Set Foam Release Time Delay- Used to increase the delay before the foam is released after both zones are in alarm simultaneously
- Set Time Date – Used to set the time and date of the real time clock



Using any of the five softkey select the option that requires changes to be made

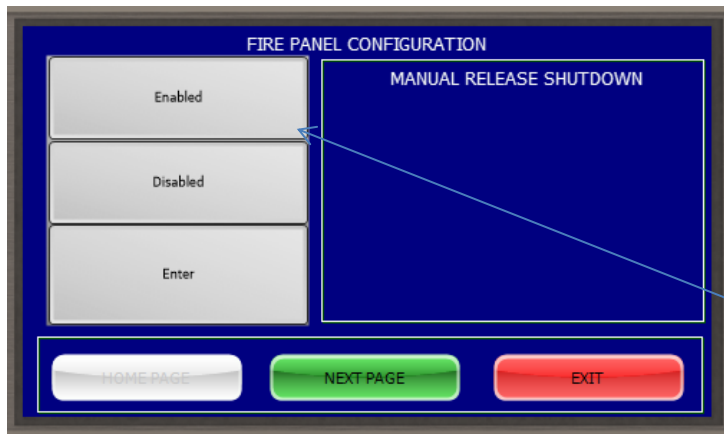
Once all the changes have been made press the softkey "Exit With Save" or "Exit Without Save"

Note

When all the changes have been made, press the "EXIT WITH SAVE" pressing the "EXIT WITHOUT SAVE" will retain the original settings.

Section 5.5.1 Engine Shutdown

The following window is for the fire panel to perform an engine shutdown when any of the five manual release buttons have been pressed.

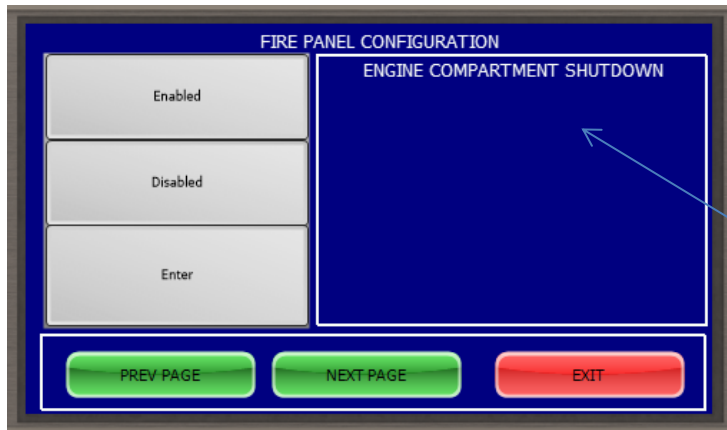


Using the keypad select either "Enable" or a "Disable" and press enter

Once the "Enter" key has been pressed the display will confirm that the entry has been set.

- Pressing the "Next Page" Key will move to the next screen which is engine shutdown on engine compartment alarm.
- Pressing the "Prev Page" Key will move back to the main configuration screen.
- Pressing Exit will take you back to the main configuration screen.

The following window is for the fire panel to perform an engine shutdown when two zones are in alarm with the engine compartment.

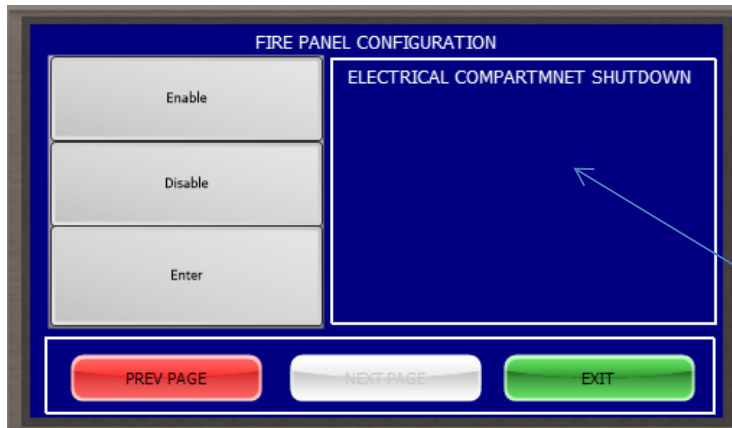


Using the keypad select either "Enabled" or a "Disabled" and press enter

Once the "Enter" key has been pressed the display will confirm that the entry has been set.

- Pressing the "Next Page" Key will move to the next screen which is engine shutdown on electrical compartment alarm.
- Pressing the "Prev Page" Key will move back to the previous screen which is manual release screen.
- Pressing "Exit" will take you back to the main configuration screen.

The following window is for the fire panel to perform an engine shutdown when two zones are in alarm with the electrical compartment.



Using the keypad select either "Enabled" or a "Disabled" and press enter

Once the "Enter" key has been pressed the display will confirm that the entry has been set.

- Pressing the "Prev Page" Key will move back to the previous screen which is engine shutdown on electrical compartment alarm.
- Pressing "Exit" will take you back to the main configuration screen.

Section 5.5.2 Time Delay

The following detail on setting a time delay to the alarm zones by default this is 3 seconds however the panel will allow for 0seconds through to 255 seconds.



Using the numeric keypad select the required delay 0-255 seconds and press enter

Once the "Enter" key has been pressed the display will confirm that the entry has been set.

- Pressing "Exit" will take you back to the main configuration screen.

Section 5.5.3 Zone Latching

The following detail on setting the alarm zone and actuator circuit to latch any intermittent faults.



Using the numeric keypad enter either a "Enabled" or "Disabled" Default should be disabled

Once the "Enter" key has been pressed the display will confirm that the entry has been set.

- Pressing "Exit" will take you back to the main configuration screen.

Section 5.5.4 Foam Time Delay

The following detail on setting a foam time delay default this is 30 seconds however the panel will allow for 30 seconds through to 255 seconds.



Using the numeric keypad enter either a value from 0 through to 255 seconds

Once the “Enter” key has been pressed the display will confirm that the entry has been set.

- Pressing “Exit” will take you back to the main configuration screen.

Section 5.5.5 Time and Date

The following detail on setting the time and date is primarily used for logging events.

Setting the time



Using the numeric keypad enter a six digit number for the time (24hour clock) in the format of HHMMSS
In this case 23min pass 2 in the afternoon.

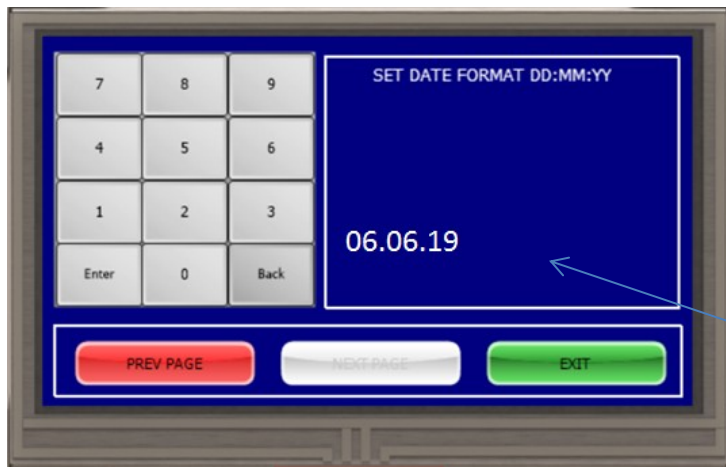
Once the “Enter” key has been pressed the display will confirm that the entry has been set.



Pressing “Exit” will take you back to the main configuration screen.

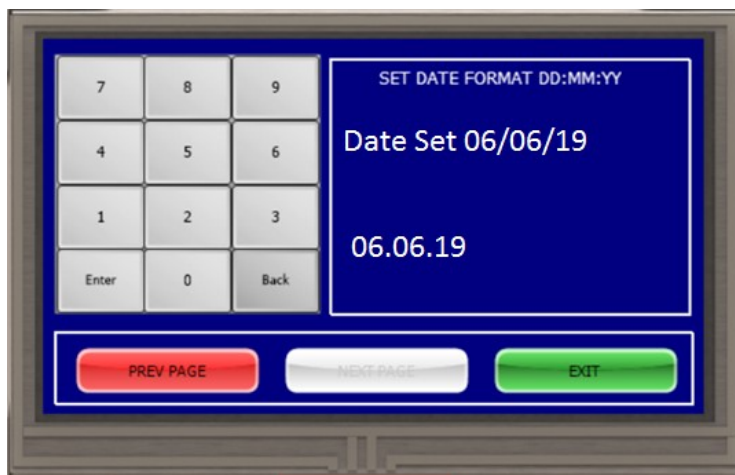
Pressing the “Next Page” Button the screen will change to setting the date

Setting the date



Using the numeric keypad enter a six digit number for the date in the format DDMMYY

Once the “Enter” key has been pressed the display will confirm that the entry has been set.



Pressing “Exit” will take you back to the main configuration screen.

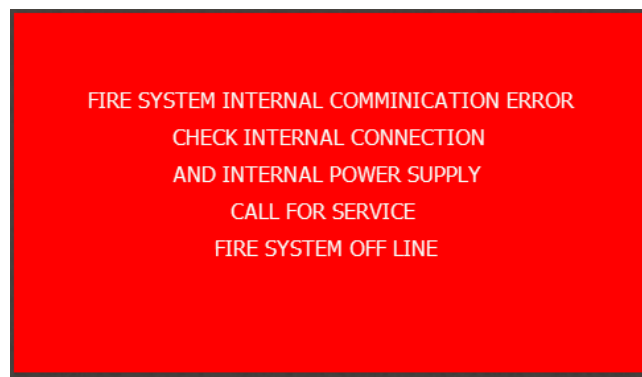
Pressing the “Prev Page” Button the screen will move back to the time page.

Section 5.5.6 Internal Error

The FP3470 fire control panel is made of two main printed circuit boards the Display Card is used to monitor and control all the front panel switch and indicators. Whilst the Main Control card monitors the detection circuit, relay and the SD logging.

The display card micro controller is polled every 500 milliseconds to pass information between the two card, if this communication fails the fire system will fail to operate as intended.

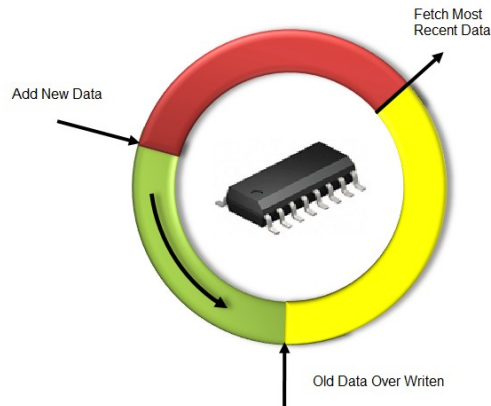
If this event does occur the LCD will display a red screen and a voice message will be played on a regular basis until the fault is fix. The main control card will continue to poll internally and if communication is re-established the LCD will return to normal front screen.



Internal Error Screen

Section 5.6 Internal Non Volatile Ram (FRAM)

The FP3470 has been fitted with a non-volatile ram FM25W256-GTR that will hold the last 250 event; any new event will over write the existing in a circular buffer.



The FM25W256 is a serial F-RAM memory. The memory array is logically organized as $32,768 \times 8$ bits and is accessed using an industry standard serial peripheral interface (SPI) bus. The functional operation of the F-RAM is similar to serial flash and serial EEPROMs. The major difference between the FM25W256 and a serial flash or EEPROM with the same pinout is the F-RAM's superior write performance, high endurance, and low power consumption.

FM25W256 It provides reliable data retention for 151 years without any power or battery while eliminating the complexities, overhead, and system level reliability problems caused by serial flash, EEPROM, and other nonvolatile memories. Unlike serial flash and EEPROM, the FM25W256 performs write operations at bus speed. No write delays are incurred. The FM25W256 is capable of supporting 1^{14} or 1,000,000,000,000,000 read/write cycles, or 100 million times more write cycles than EEPROM can manage.

Section 5.7 Debug Port

The FP3470 has been fitted limited debug port for monitoring the fire system the port is TTL logic level 0-5v only “**DO NOT CONNECT PC DIRECT TO THIS PORT**” A FTDI Chip, 5 V TTL USB to UART Cable, TTL-232R-5V must be used to connect to a PC running any terminal program.



The six way header is connected to the main cpu card making note of the orientation of the connector green wire closest to the relay, also note the description on the PCB. See image below.

The serial port will send data out at 57600, N,8,1 and can be viewed on any terminal window such as Terminal 1.9, PUTTY or HyperTerminal. On power up the following is made available.

1. Software Version Bootloader and configuration.
2. Conformation that the SD “Flash Drive” card is fitted.
3. Conformation at the internal non-volatile memory is working.
4. RTC reading the current time and data from the real time clock module.
5. Address number / Serial Number.

A user banner is provided with five options that can be selected by pressing the required option. If no option is selected the FP3470 will continue to reboot within ten seconds

1. Dump the contents of non-volatile ram.
2. Erase the entire non-volatile ram.
3. Exit and continue to reboot.
4. Copy the non-volatile ram to the flash drive.
5. View Manufacture Details.

Note

Dumping, Erasing, and Copying the internal ram can take about 50 sec depending on the amount of data stored.

Section 5.7.1 Debug Port Register Status

The debug port also sends data out in real time during normal operations, this data showing the status of the internal registers as shown below in the table. This is sent every 60 sec or when an event has cause a change in any of the bits

The data is shown in binary “Little Endian” which means bit 0 is the left most and bit 8 is the right most.

Example of the status bit with fire system Normal operation		Example of the status bit with fire system Loco Shutdown Relay Activated	
ME1 Actual:-	00000000	ME1 Actual:-	00 1 00000
ME2 Actual:-	00000000	ME2 Actual:-	00000000
EC1 Actual:-	00000000	EC1 Actual:-	00000000
EC21 Actual:-	00000000	EC21 Actual:-	00000000
LP Actual:-	00000000	LP Actual:-	00000000
TL Actual:-	00000000	TL Actual:-	00000000
Relay:-	00000000	Relay:-	1 0000000
JB1 Status:-	00000000	JB1 Status:-	00000000
FIP Mode:-	00000000	FIP Mode:-	00000000

Label	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
ME1 Actual	Not Used	Not Used	Not Used	Fire Alarm On Zone	Fault On Zone	Isolated There For Deemed To Be In Alarm	Earth Fault On Zone	Zone Isolated On Front Panel
ME2 Actual	Not Used	Not Used	Not Used	Fire Alarm On Zone	Fault On Zone	Isolated There For Deemed To Be In Alarm	Earth Fault On Zone	Zone Isolated On Front Panel
EC1 Actual	Not Used	Not Used	Not Used	Fire Alarm On Zone	Fault On Zone	Isolated There For Deemed To Be In Alarm	Earth Fault On Zone	Zone Isolated On Front Panel
EC2 Actual	Not Used	Not Used	Not Used	Fire Alarm On Zone	Fault On Zone	Isolated There For Deemed To Be In Alarm	Earth Fault On Zone	Zone Isolated On Front Panel
Low Pressure	Not Used	Not Used	Not Used	Fire Alarm On Zone	Fault On Zone	Isolated There For Deemed To Be In Alarm	Earth Fault On Zone	Zone Isolated On Front Panel
Trainline	Common Alarm	Common Fault	Manual Release Switch Pressed	Manual Release Switch Fault	Foam 1 Released Activated	Foam 1 Fault	Foam 2 Released Activated	Foam 2 Fault
Relay Status	Loco Shutdown Relay 5	Earth Teat Relay 1	Manual Release Indicator Relay 2	Common Fire Alarm Relay 3	Common Fault Relay 4	Foam 2 Release Relay Activated	Foam 1 Release Relay Activated	Global Reset
JB1 Status	Fire System Alarm	Fire System Fault	Fire System Fuel Pump Shutdown	Fire System TL Alarm	Fire System TL Fault	PSU Primary Fault	PSU Secondary Fault	Is Byte For FIP Or Remote FIP = 1 Remote = 0

FIP Mode	Compliant AS5602 Or Not	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
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Section 5.8 MP3 Audio Files

The FP3470 fire panel has been fitted with MP3 Audio player, where sixteen audio files are store on Micro SD Card; these files are used to provide the operator with audio feed back on the status of the fire system, as well as audio feedback during the configuring the fire system.

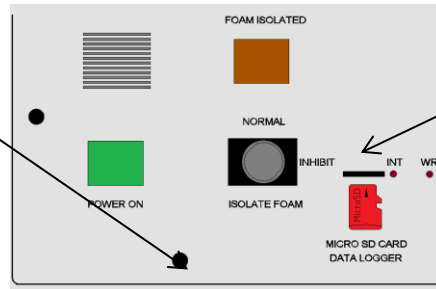
The MP3 audio files can be changed to meet any client's requirement for that event. For example feedback could be provided in native language or bilingual.

Below is a list of audio files.

- 1.Mp3 - Fire System Ready
- 2.Mp3 - Fire Detected In Main Engine Compartment
- 3.Mp3 - Fire Detected In Electrical Engine Compartment
- 4.Mp3 - Foam Suppression System Released
- 5.Mp3 - Train Line Activated
- 6.Mp3 - Fire System Internal Error
- 7.Mp3 - Lamp And Earth Fault Test Complete
- 8.Mp3 - Resetting Fire Panel
- 9.Mp3 - Configure Engine Fire Shutdown
- 10.Mp3 - Configure Electrical Fire Shutdown
- 11.Mp3 - Configure Manual Release Shutdown
- 12.Mp3 - Set Time Hours, Minutes, Seconds
- 13.Mp3 - Set Date Day, Month, Years
- 14.Mp3 - Configure Fire Alarm Time Delay
- 15.Mp3 - Configure Fire Zone Fault To Latching
- 16.Mp3 - Configure Foam Release Time Delay

The Micro SD card is located on the front internal PCB next to the power on lamp indicator.

Mp3 Audio Micro SD Card
 Located behind the metal
 fascia next to the power on
 light indicated.
 Push the SD in first to
 release the locking
 mechanism.
 Do Not just pull the card
 else damage to the sock
 may occur.



Note this slot is
 for the MicroSD
 Card used to log
 data and does
 not hold the
 audio files

Section 5.9 Micro SD card

Any mirco SD card can be used in the FP3470 fire panel. However not all flash card are the same or manufactured to the same standards or features. The FP3470 fire panel is supplied from the factory with only "WORM" mirco SD Card W.O.R.M Write Once and Read Many, there type of SD card provided the high level of security as once the data is written it cannot be changed of deleted.

Designed to meet even the most stringent compliance requirements, WORM SD/MicroSD cards offer only the highest level of security to provide a tamper-proof way to ensure integrity protection.

Specifically built for applications where data reliability and safety are paramount, WORM SD/MicroSD cards allow data to be permanently saved and unaltered for read access only. They also provide the benefit of time and date authentication which facilitates quick search, retrieval of archived files, and can provide extra security protection for stored data.

Once the data is saved into the write-once-read-many (WORM) card, the information will be rendered completely unalterable, non-rewritable, and non-erasable regardless of any accidental or intentional commands from the host, providing a tamper-proof form of media product storage that's secure, compatible, and cost effective.

Unalterable data storage



The moment any illegal action is attempted on the existing card data, the WORM card will instantly transform into write-protect mode to ensure the highest data and integrity.

Default WORM card mode



Unlike other solutions of the market that require a specific software trigger to enable WORM card function, SD Card are set to WORM card mode by default.

Up to 100 years of durable, unalterable data storage.

Power loss protection



Secure your data against unexpected power shutdowns.

Read disturbance management



Avoid read-disturb errors that cause data loss and enhance reliability. Good for read intensive applications that reduces the chances of un-correctable errors, resulting from repeated read attempts.

Section 5.10 Foam Actuator

The FP3470 fire panel is fitted with dual foam output release circuit F1 and F2, the actuator line is monitored by a 1K end of line resistor and when activated 12vdc power is supplied to release the foam.

The actuator specification is as followed.

Manufacture:-	Baccara
Part No: -	GE-B-23
Coil winding insulation:-	H 180°C
Temperature range Coil:-	-20°C to 150°C , Ambient : -20°C to 70°C
Duty cycle *:-	100% ED
Electrical connection:-	AMP pins, DIN 46242, 2 poles + 1 earth
Assembly:-	In any position
Coil fixing:-	One nut G1/4" hexagonal 19mm
Coil voltage:-	Voltage 12vdc
	Power 10W
	Resistance 14Ω
	Current ≈ 0.8A
Standard / Certification:-	CE
Standard protection class:-	IP65 with connector *
	Option: IP68 (please refer to GEM-BP Coil)

Note

The coil should not be energized without being assembled on the operator.

Section 5.11 Manufacture Setup and User Information

The FP3470 fire panel has been fitted with 32K of internal non-volatile ram as described in section 5.7 of this manual.

When the USB to serial communication cable (FTDI Chip, 5 V TTL USB to UART Cable, TTL-232R-5V) is connected to the debug port during power up the following initial configuration options are available.

1. Dump the contents of non-volatile ram.
2. Erase the entire non-volatile ram.
3. Exit and continue to reboot.
4. Copy the non-volatile ram to the flash drive.
5. View Manufacture Details
6. Manufacture Details
7. Unlock Code (Used to Unlock The software at manufacture time)

Section 5.11.1 Power Up Options

Section 5.11.1.1 Power Up Option 1 Dump Fram:- This option dumps the entire 250 event from the internal memory out through the debug port, regardless of the number of event saved this will take approx. 50 sec to complete and you should wait until the “completed” statement is received.

Section 5.11.1.2 Power Up Option 2 Erase Fram:- This option erases the entire non-volatile ram this will take approx. 50 sec to complete and you should wait until the “completed” statement is received.

Section 5.11.1.3 Power Up Option 3 Exit:- This allows the system to continue booting

Section 5.11.1.4 Power Up Option 4 Copy Fram:- This option will dump the entire 250 events from the internal memory to the SD card a file will be created in the format of

Log#####.txt size of 32k bits this will take approx. 50 sec to complete and you should wait until the “completed” statement is received.

Section 5.11.1.5 Power Up Option 5 View Manufacture Details:- This option will show the information entered during initial factory testing.

Date- The date the panel was manufactured.
Name- Name of the technician who tested the system
Client Name- The owner or company of the panel
Notes- This section allows of any additional information

Section 5.11.1.6 Power Up Option 6 Enter Manufacture Details:- This option allow for the following details to be added into the internal memory of the fire system for tracking details.

Date- The date the panel was manufactured.
Name- Name of the technician who tested the system
Client Name- The owner or company of the panel
Notes- This section allows of any additional information

Section 5.11.1.7 Power Up Option 7 Unlock Number:- This option displays the hardware serial number and waits for the user to enter a 16 digit number / lower case letter to unlock the software. This set an internal flag within the microcontroller to unlock the software once set this never has to be done again and the options 7 and 6 will not be displayed again but can always be accessed.

Section 5.12 PCB Links and Jumper Settings

Section 5.12.1 *FP3470 Open Log PCB*

- CN3 –This DTR jumper is used to reset the micro controller when software is been uploaded this link should always be in the 3v3 position due to the compotes used.
- CN1 –This TX jumper is used to set the voltage level of the serial data been sent to the main micro controller this can be in either the 3v3 or 5v position by default it set to 3v3.
- CN2 –This RX jumper is used to set the voltage level of the serial data been sent to the open log controller this link should always be in the 3v3 position due to the compotes used.

Section 5.12.2 *FP3470 Main Controller Card*

JP2 RS485 - This jumper is used to control the flow of RS485 data used for the Modbus interface

- ON - This position holds the transceiver permanently on.
- MCU- This allow the micro controller to control the direction of data this is the default position.
- OFF- This position disable the RS485 by turning off the transceiver.

JP1 MODE - This link is located in the bottom left side has been provided to ensure the new fire system operate exactly are the FP280 fire panel to ensure backwards compatibility is maintained.

- Link on the bottom two pins original mode (FP280)
- Link in the top two pins the system will operate AS5602 mode
- Removing the Link altogether fall back to default mode AS5602
- Link in the middle position is for custom configuration (Future)

JP8- Foam 1 Actuator Short Circuit Enable or Disable

- E- Allow the fire system to monitor the actuator line for short circuit this is required as part of AS5062 but the actuator must be fitted with a blocking diode for this to work correctly.
- D- This disables the short circuit fault monitoring.

JP9- Foam 2 Actuator Short Circuit Enable or Disable

- E- Allow the fire system to monitor the actuator line for short circuit this is required as part of AS5062 but the actuator must be fitted with a blocking diode for this to work correctly.
- D- This disables the short circuit fault monitoring.

Relay RL2 Fault

- Lk1- Switch either 0v or 12v through the relay set to 12v by default.
- Lk4- Set if the relay is Normally Open or Normally Closed the link is set to Normally Open By Default.

Relay RL3 Fire

- Lk2- Switch either 0v or 12v through the relay set to 12v by default.
- Lk5- Set if the relay is Normally Open or Normally Closed the link is set to Normally Open By Default.

Relay RL4 Release Indicator

- Lk3- Switch either 0v or 12v through the relay set to 12v by default.
- Lk8- Set if the relay is Normally Open or Normally Closed the link is set to Normally Closed By Default.

Relay RL5 Shutdown

- Lk6- Switch either 0v or 12v through the relay set to 12v by default
- Lk10- Set if the relay is Normally Open or Normally Closed the link is set to Normally Open By Default

Relay RL6 Foam 2

- Lk7- Switch either 0v or 12v through the relay set to 12v by default
- Lk12- Set if the relay is Normally Open or Normally Closed the link is set to Normally Open By Default

Relay RL7 Foam 1

- Lk9- Switch either 0v or 12v through the relay set to 12v by default
- Lk11- Set if the relay is Normally Open or Normally Closed the link is set to Normally Open By Default

Section 5.12.3 *FP3470 Display Card*

LCD Prog – These two jumpers are used to connect the LCD screen to the serial consumption port

- LK1,2- Links data from the main micro controller to the LCD this is the default position
- LK7,8- Links data from the main micro controller to the LCD this is the default position

Serial 0

- ON - This position holds the transceiver permanently on.
- MCU- This allow the micro controller to control the direction of data this is the default position.
- OFF- This position disable the RS485 by turning off the transceiver

Section 6.0 Modbus Registers

The FP3470 fire panel has been fitted with a RS485 Modbus interface for monitoring and control by third party system, if other means of communication is required moxa media converts or similar can be used.

Section 6.1 Modbus Specification

Serial Communication

- Serial Port 0
- Communication RS485
- Modbus Slave
- Baud Rate 19200
- Number of Bits 8
- Parity Bit None
- Stop Bit 1

Section 6.2 Modbus RTU protocol description

Modbus -communication protocol is based on the master-slave architecture. It uses RS-485, RS-422, RS-232 interfaces, as well as Ethernet TCP / IP networks (Modbus TCP protocol) for data transfer.

The Modbus RTU message consists of the address of the SlaveID device, the function code, the special data, depending on the function code and the CRC of the checksum.

SlaveID	Function code	Special data	CRC
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If you discard the SlaveID address and the CRC checksum, you get the PDU, Protocol Data Unit. SlaveID is the address of the device, it can take a value from 0 to 247, addresses from 248 to 255 are reserved. Data in the module is stored in 4 tables. Two tables are read-only and two are read-write. 9999 values are placed in each table.

REGISTER NUMBER	REGISTER ADDRESS HEX	TYPE	NAME	TYPE
1-9999	0000 to 270E	read-write	Discrete Output Coils	DO
10001-19999	0000 to 270E	read	Discrete Input Contacts	DI
30001-39999	0000 to 270E	read	Analog Input Registers	AI
40001-49999	0000 to 270E	read-write	Analog Output Holding Registers	AO

The Modbus message uses the register address.

Example of function 16 multiple outputs.

In this example, writing to all 16 registers at slave ID 01, starting at 40001 to 40016. We transmit the following data

TX 01 10 00 00 00 10 20 00 83 bc

Response back once the data has been written is.

Slave ID, function code, first address number of registers, crc

RX 01 10 00 00 00 10 c1 c5

BYTE	REQUEST	BYTE	ANSWER
(Hex)	Field name	(Hex)	Field name
01	Device address	01	Device address
10	Functional code	10	Functional code
00	Address of the first register Hi bytes	00	Address of the first register Hi bytes
00	Address of the first register Lo bytes	00	Address of the first register Lo bytes
00	Number of registers Hi bytes	00	Number of recorded registers Hi bytes
10	Number of registers Lo bytes	10	Number of recorded registers Lo bytes
20	Number of bytes more	C1	Checksum CRC
00	Value Hi 40001	C5	Checksum CRC
00	Value Lo 40001		
00	Value Hi 40002		
00	Value Lo 40002		
00	Value Hi 40003		
00	Value Lo 40003		
00	Value Hi 40004		
00	Value Lo 40004		
00	Value Hi 40005		
00	Value Lo 40005		
00	Value Hi 40006		
00	Value Lo 40006		
00	Value Hi 40007		
00	Value Lo 40007		
00	Value Hi 40008		
00	Value Lo 40008		
00	Value Hi 40009		
00	Value Lo 40009		
00	Value Hi 4000A		
00	Value Lo 4000A		
00	Value Hi 4000B		
00	Value Lo 4000B		
00	Value Hi 4000C		
00	Value Lo 4000C		
00	Value Hi 4000D		
00	Value Lo 4000D		
00	Value Hi 4000E		
00	Value Lo 4000E		
00	Value Hi 4000F		
00	Value Lo 4000F		
00	Value Hi 40010		
00	Value Lo 40010		
C6	Checksum CRC		
F0	Checksum CRC		

Section 6.3 Function 4 Holding Registers

Modbus address 40001 - Offset 4001 = Address 0000 Bit 0 – Electrical Compartment 1 Is In Alarm
Modbus address 40001 - Offset 4001 = Address 0000 Bit 1 – Electrical Compartment 1 Is In Fault
Modbus address 40001 - Offset 4001 = Address 0000 Bit 2 – Electrical Compartment 1 Is In Isolate
Modbus address 40001 - Offset 4001 = Address 0000 Bit 3 – Electrical Compartment 2 Is In Alarm
Modbus address 40001 - Offset 4001 = Address 0000 Bit 4 – Electrical Compartment 2 Is In Fault
Modbus address 40001 - Offset 4001 = Address 0000 Bit 5 – Electrical Compartment 2 Is In Isolate
Modbus address 40001 - Offset 4001 = Address 0000 Bit 6 – Not Used
Modbus address 40001 - Offset 4001 = Address 0000 Bit 7 – Not Used

Modbus address 40002 - Offset 4001 = Address 0001 Bit 0 – Mechanical Compartment 1 Is In Alarm
Modbus address 40002 - Offset 4001 = Address 0001 Bit 1 – Mechanical Compartment 1 Is In Fault
Modbus address 40002 - Offset 4001 = Address 0001 Bit 2 – Mechanical Compartment 1 Is In Isolate
Modbus address 40002 - Offset 4001 = Address 0001 Bit 3 – Mechanical Compartment 2 Is In Alarm
Modbus address 40002 - Offset 4001 = Address 0001 Bit 4 – Mechanical Compartment 2 Is In Fault
Modbus address 40002 - Offset 4001 = Address 0001 Bit 5 – Mechanical Compartment 2 Is In Isolate
Modbus address 40002 - Offset 4001 = Address 0001 Bit 6 – Not Used
Modbus address 40002 - Offset 4001 = Address 0001 Bit 7 – Not Used

Modbus address 40003 - Offset 4001 = Address 0002 Bit 0 – Foam Low Pressure
Modbus address 40003 - Offset 4001 = Address 0002 Bit 1 – Foam Low Pressure Switch Fault
Modbus address 40003 - Offset 4001 = Address 0002 Bit 2 – Foam Low Pressure Switch Isolated
Modbus address 40003 - Offset 4001 = Address 0002 Bit 3 – Not Used
Modbus address 40003 - Offset 4001 = Address 0002 Bit 4 – Not Used
Modbus address 40003 - Offset 4001 = Address 0002 Bit 5 – Not Used
Modbus address 40003 - Offset 4001 = Address 0002 Bit 6 – Not Used
Modbus address 40003 - Offset 4001 = Address 0002 Bit 7 – Not Used

Modbus address 40004 - Offset 4001 = Address 0003 Bit 0 – Train Line Alarm Activated From This Panel
Modbus address 40004 - Offset 4001 = Address 0003 Bit 1 – Train Line Fault Activated From This Panel
Modbus address 40004 - Offset 4001 = Address 0003 Bit 2 – Not Used
Modbus address 40004 - Offset 4001 = Address 0003 Bit 3 – Not Used
Modbus address 40004 - Offset 4001 = Address 0003 Bit 4 – Not Used
Modbus address 40004 - Offset 4001 = Address 0003 Bit 5 – Not Used
Modbus address 40004 - Offset 4001 = Address 0003 Bit 6 – Not Used
Modbus address 40004 - Offset 4001 = Address 0003 Bit 7 – Not Used

Modbus address 40005 - Offset 4001 = Address 0004 Bit 0 – Train Line Alarm Activated From Remote Panel
Modbus address 40005 - Offset 4001 = Address 0004 Bit 1 – Train Line Fault Activated From Remote Panel
Modbus address 40005 - Offset 4001 = Address 0004 Bit 2 – Manual Release Switch Has Been Pressed
Modbus address 40005 - Offset 4001 = Address 0004 Bit 3 – Manual Release Switch Fault
Modbus address 40005 - Offset 4001 = Address 0004 Bit 4 – Foam Release 1 Solenoid Activated
Modbus address 40005 - Offset 4001 = Address 0004 Bit 5 – Foam Release 1 Solenoid Fault
Modbus address 40005 - Offset 4001 = Address 0004 Bit 6 – Foam Release 2 Solenoid Activated
Modbus address 40005 - Offset 4001 = Address 0004 Bit 7 – Foam Release 2 Solenoid Fault

Modbus address 40006 - Offset 4001 = Address 0005 Bit 0 – Shutdown Relay Within Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 1 – Earth Teat Relay Within Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 2 – Manual Release Indicator Relay Within Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 3 – Common Fire Alarm Relay With Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 4 – Common Fault Relay Within Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 5 – Foam 1 Solenoid Relay Within Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 6 – Foam 1 Solenoid Relay Within Fire Panel Activated
Modbus address 40006 - Offset 4001 = Address 0005 Bit 7 – Not Used

Section 6.4 Function 16 Multiple Registers Write

Modbus Register 40007 – Offset 40001 = address 0006 Bit 0 – Not Used
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 1 – Not Used
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 2 – Not Used
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 3 – Activate Mechanical Compartment 1 Into Alarm
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 4 – Activate Mechanical Compartment 1 Into Fault
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 5 – Not Used
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 6 – Not Used
 Modbus Register 40007 – Offset 40001 = address 0006 Bit 7 – Activate Mechanical Compartment 1 Into Isolate

Modbus Register 40008 – Offset 40001 = address 0007 Bit 0 – Not Used
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 1 – Not Used
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 2 – Not Used
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 3 – Activate Mechanical Compartment 2 Into Alarm
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 4 – Activate Mechanical Compartment 2 Into Fault
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 5 – Not Used
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 6 – Not Used
 Modbus Register 40008 – Offset 40001 = address 0007 Bit 7 – Activate Mechanical Compartment 2 Into Isolate

Modbus Register 40009 – Offset 40001 = address 0008 Bit 0 – Not Used
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 1 – Not Used
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 2 – Not Used
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 3 – Activate Electrical Compartment 1 Into Alarm
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 4 – Activate Electrical Compartment 1 Into Fault
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 5 – Not Used
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 6 – Not Used
 Modbus Register 40009 – Offset 40001 = address 0008 Bit 7 – Activate Electrical Compartment 1 Into Isolate

Modbus Register 40010 – Offset 40001 = address 0009 Bit 0 – Not Used
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 1 – Not Used
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 2 – Not Used
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 3 – Activate Electrical Compartment 2 Into Alarm
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 4 – Activate Electrical Compartment 2 Into Fault
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 5 – Not Used
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 6 – Not Used
 Modbus Register 40010 – Offset 40001 = address 0009 Bit 7 – Activate Electrical Compartment 2 Into Isolate

Modbus Register 40011 – Offset 40001 = address 000A Bit 0 – Not Used
 Modbus Register 40011 – Offset 40001 = address 000A Bit 1 – Not Used
 Modbus Register 40011 – Offset 40001 = address 000A Bit 2 – Not Used
 Modbus Register 40011 – Offset 40001 = address 000A Bit 3 – Activate Low Pressure Into Alarm
 Modbus Register 40011 – Offset 40001 = address 000A Bit 4 – Activate Low Pressure Into Fault
 Modbus Register 40011 – Offset 40001 = address 000A Bit 5 – Not Used
 Modbus Register 40011 – Offset 40001 = address 000A Bit 6 – Not Used
 Modbus Register 40011 – Offset 40001 = address 000A Bit 7 – Activate Low Pressure Into Isolate

Modbus Register 40012 – Offset 40001 = address 000B Bit 0 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 1 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 2 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 3 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 4 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 5 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 6 – Future
 Modbus Register 40012 – Offset 40001 = address 000B Bit 7 – Future

Modbus Register 40013 – Offset 40001 = address 000C Bit 0 – Activate The Relay For Loco Shutdown
 Modbus Register 40013 – Offset 40001 = address 000C Bit 1 – Activate The Relay For Earth Test
 Modbus Register 40013 – Offset 40001 = address 000C Bit 2 – Not Used
 Modbus Register 40013 – Offset 40001 = address 000C Bit 3 – Activate The Relay For Train Line Common Alarm
 Modbus Register 40013 – Offset 40001 = address 000C Bit 4 – Activate The Relay For Train Line Common Fault
 Modbus Register 40013 – Offset 40001 = address 000C Bit 5 – Activate The Relay For Foam 2 Solenoid
 Modbus Register 40013 – Offset 40001 = address 000C Bit 6 – Activate The Relay For Foam 2 Solenoid
 Modbus Register 40013 – Offset 40001 = address 000C Bit 7 – Activate The Reset / Reboot

Section 7.0 SD Flash Drive Data Logging

The FP3470 fire panel front facia has been fitted with a SD Card port to allow data logging of unusual events that occur in real time. All data logged s stored on the microSD card that involves the following features:

- 64MB to 64GB
- FAT16 or FAT32

The FP3470 fire system is monitored every second of any unusual event, such as alarm, faults, isolate etc.. If an event is registered the message is automatically sent to the flash drive and saved to a file in plain text format with a time date stamp that that event occurred on.

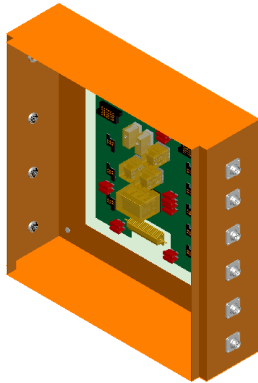
Sample of data log file to file name Log00001.txt

Sample of log events

25-01-18 07.00.00 Electrical Compartment Zone 1 Alarm.....
25-01-18 07.00.03 Electrical Compartment Zone 2 Alarm.....
25-01-18 07.00.04 Fire Panel Loco Shutdown Activated.....

The SD card is inserted through the front facia in a push in push out manner and has been designed to be completely flush to prevent any damage.

Section 8.0 Fire Alarm Junction Box



The FP3470 Fire Alarm Junction Box (JB1-P) is constructed from a metal enclosure measuring 400mm High by 400mm wide and 130mm deep this enclosure has a removable front cover. The enclosure contains a single printed circuit board. The JB1-P enclosure located between the HVAC and Battery compartment under the drivers cabin of the locomotive, and provides a central point for all the fire cables to connect through.

The FP3470 Fire Alarm Junction Box contains a printed circuit card, Interface relay, interconnection sockets and fuses for the entire fire system, which is made up of the following equipment.

- Plug “A” Fire Alarm Panel
- Plug “B” Heat Detections Probes Engine Compartment
- Plug “C” Heat Detectors Probes Electrical Compartment
- Plug “D” Foam System AFFF Solenoid and Pressure Switch
- Plug “E” Train line Alarm, Train line Fault, Fuel Pump Shutdown
- Plug “F” Drivers Cab Control Station
- Plug “G” Manual Release Station
- Plug “H” Manual Release Station
- Plug “J” Manual Release Station
- Plug “K” Manual Release Station

FP3470 Fire Alarm Junction box printed circuit board contain ten (10) fuses and two (2) of which are spare to protect the system from excessive current draw damage by third party equipment each fuse is rated at 10A and have been placed in all third party outgoing and incoming interface connection as indicated below.

- Train lines “Alarm”
- Train Line “Fault”
- Fuel Shutdown relay
- Locomotive 0v reference Line
- 32vdc Power from converter
- 0vdc Power from converter
- 32vdc Centre tap from battery back
- 0vdc From Negative terminal battery back

FP3470 Fire Alarm Junction box has previous to control the LCD remote display card by the use of a plugin micro controller.

Section 8.1 JB1 Micro Controller

The microcontroller monitors the following signal and sends the information out over an optocoupled serial connection to the remote control station.

1. Local Alarm (Engine or Electrical dual gate or pressure switch)
2. Local Fault (Fault with the panel In this locomotive)
3. Fuel Shutdown (The engine fuel pump is switch off)
4. Trainline Alarm (Alarm that is generated at the local or remote panel)
5. Trainline Fault (Fault that is generated at the local or remote panel)
6. Secondary Power Supply (Issue with the battery connection)
7. Primary Power Supply (Issue with the Main PSU power Supply)

The micro controller card has a built in time delay for the Secondary / Primary power supply alarm point by default this is 30 Seconds this is to prevent intermittent drop in power. (A primary or secondary power supply fault must be present for the entire

duration). By using a terminal program and an FTDI Chip, 5 V TTL USB to UART Cable, TTL-232R-5V Serial cable the time delay can be adjusted from 1sec to 4,000,000,000 Seconds. Event can also be masked out if there are not required to be transmitted to the Remote Control Station in the drivers cab

Section 8.2 Event Masking

To Mask out any event

1. Remove the fixing M3 screw from the micro controller card if already fitted
2. Remove the Microcontroller from the JB1 PCB
3. Plug the serial cable into the laptop or smart phone
4. Open your provided serial program
 - For laptop recommended “Real Term”
<https://learn.sparkfun.com/tutorials/terminal-basics/real-term-windows>
 - For Android Smart Phone “USB Terminal” From the play store
5. Set the communication port
6. Set the board rate to 300,8,n,1
7. Plug the micro controller card and open communication port
8. You will have approx. 5 sec to send a command for set up or erase back to default
 - Send lower case “s” for set up
 - Send lower case “e” for erase to default (all events active)

Once in the set up mode you will need to enter either an “e” to enable or “d” to disable to each of the event indicated below each one will be shown consecutive order.

1. Local Alarm (Engine or Electrical dual gate or pressure switch)
2. Local Fault (Fault with the panel In this locomotive)
3. Fuel Shutdown (The engine fuel pump is switch off)
4. Trainline Alarm (Alarm that is generated at the local or remote panel)
5. Trainline Fault (Fault that is generated at the local or remote panel)
6. Secondary Power Supply (Issue with the battery connection)
7. Primary Power Supply (Issue with the Main PSU power Supply)

Once complete the primary and secondary time delay will need to be set if no change is required just reenter the current delay again.

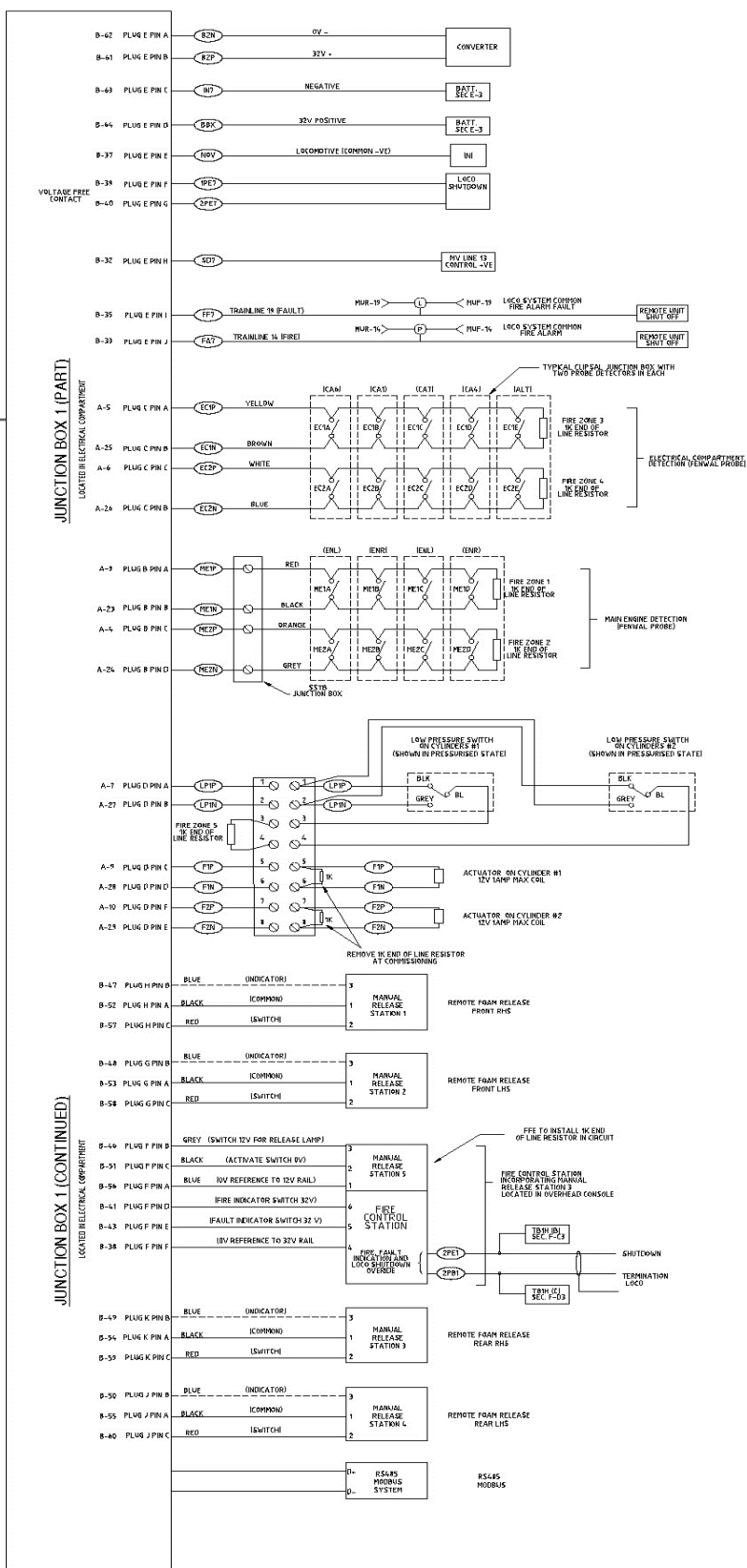
Section 8.3 JB1 Primary and Secondary Power Fault Time Delay

To adjust the time delay to a custom setting.

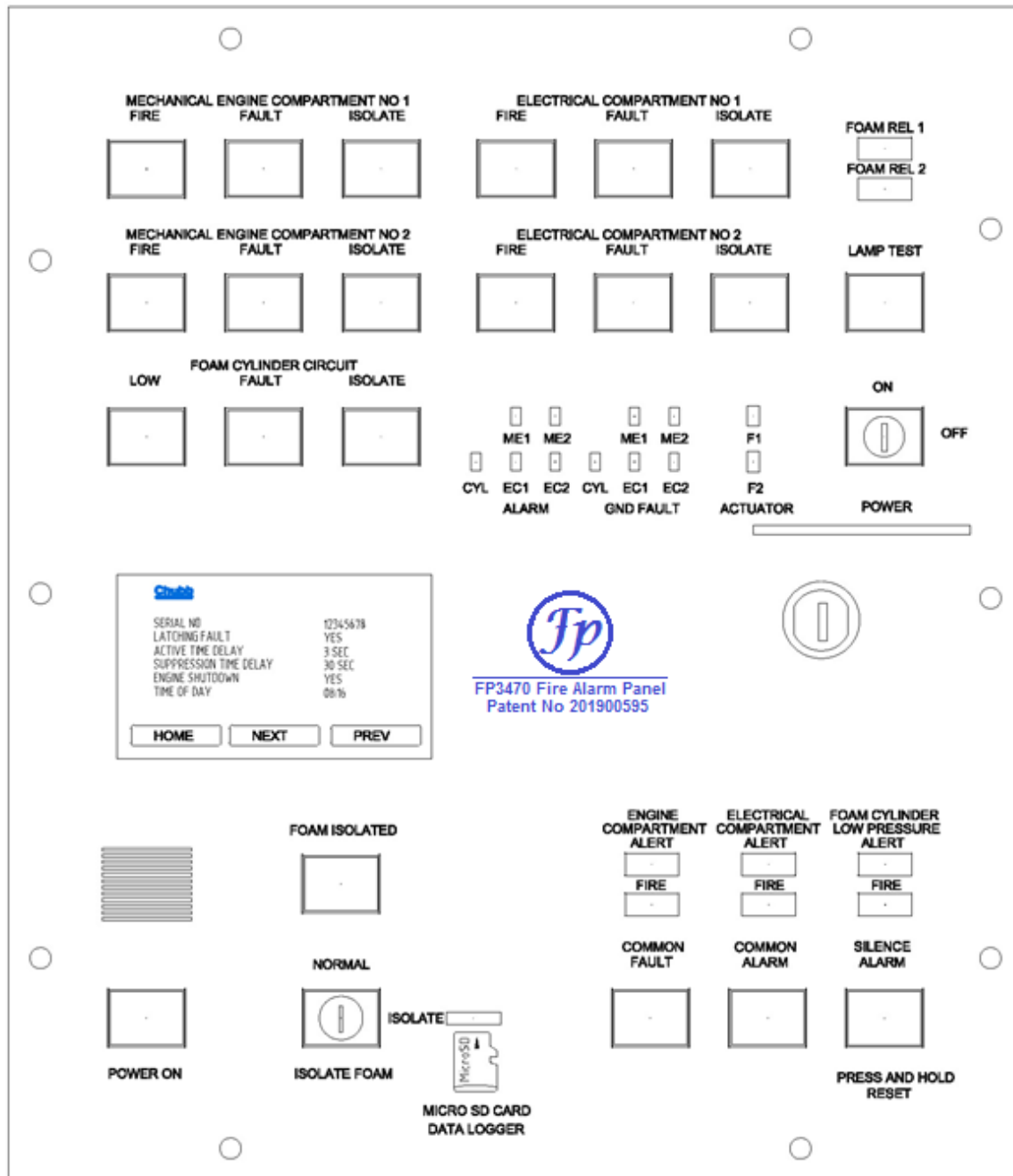
1. Remove the fixing M3 screw from the micro controller card if already fitted
2. Remove the Microcontroller from the JB1 PCB
3. Plug the serial cable into the laptop or smart phone
4. Open your provided serial program
5. For laptop recommended “Real Term”
 - a. <https://learn.sparkfun.com/tutorials/terminal-basics/real-term-windows>
6. For Android Smart Phone “USB Terminal” From the play store
7. Set the communication port
8. Set the board rate to 300,8,n,1
9. Plug the micro controller card and open communication port
10. You will have approx. 5 sec to send a command for set up or erase back to default
 - a. Send lower case “s” for set up
 - b. Send lower case “e” for erase to default
 - c. When the card is entering set up wait until the text has all been displayed and the card is asking you to enter the time delay in seconds from 1 to 4,000,000,000 (126 Years)
11. Enter the required time delay
12. The card will send conformation that the new time delay has been set
13. Replace the micro controller back on JB1 ensuring the screw hole is perfectly allied
14. Replace the locking M3 Screw.

Section 9.0 FP3470 Fire Panel Drawings

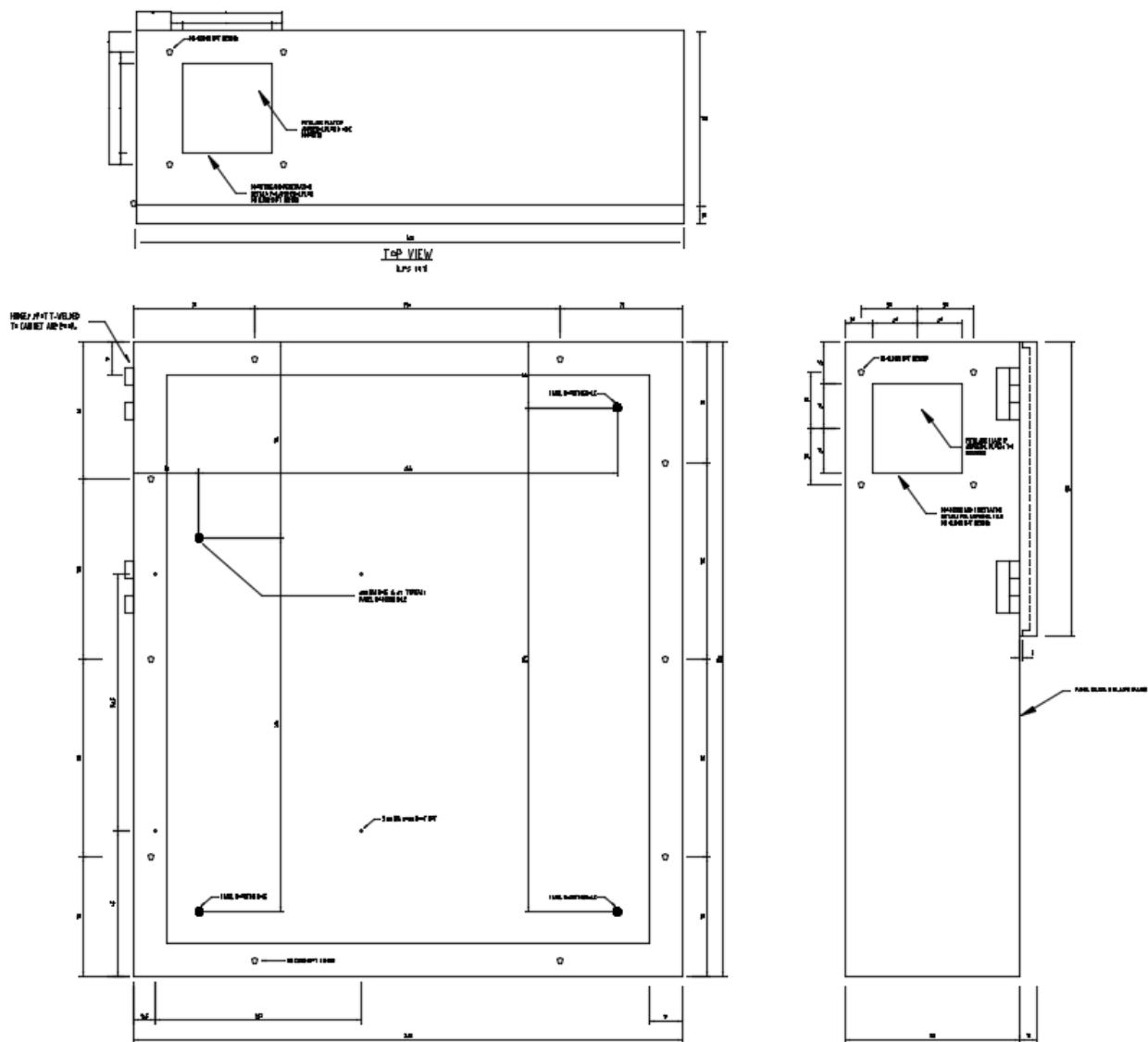
Section 9.1 Cable schematic



Section 9.2 Fire Panel Facia



Section 9.3 Fire Panel Enclosure Details



Section 9.4 Control card printed circuit board layout

The printed circuit board shown in Section 9.4 contains the following

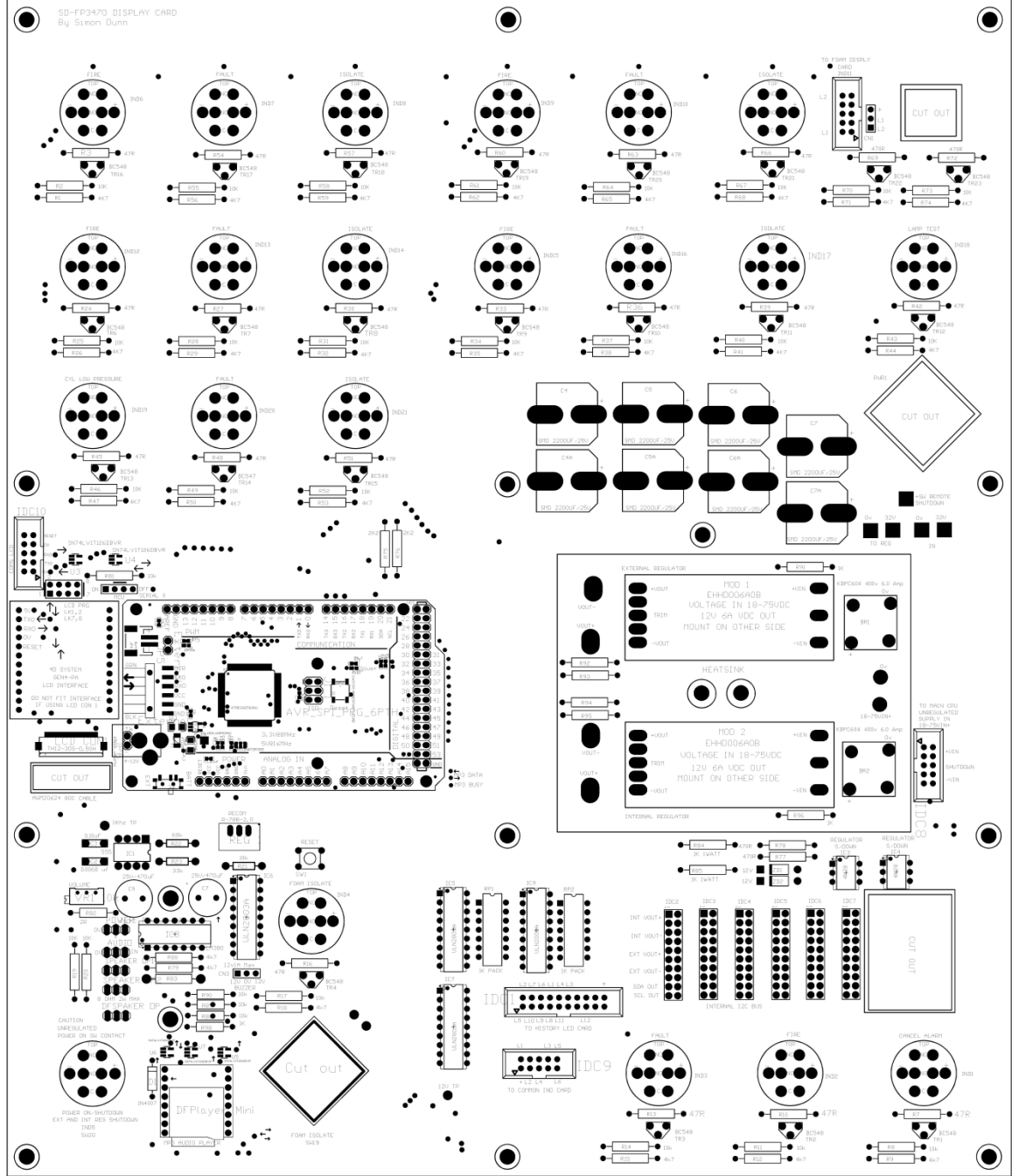
1. Eight leaking zone monitors
2. Control card ATmega2560 Micro Controller
3. Relay Outputs
4. Real Time clock
5. SD Flash Interface
6. RS485 modbus interface
7. Interface to fire junction box



Section 9.5 Display card printed circuit board layout

The printed circuit board shown in Section 9.5 contains the following

1. Illuminated LED push buttons.
2. Power supply for the internal and external 12vdc.
3. Internal Sounder.
4. History LED Driver integrated darlington drivers.
5. TTL serial port for the Liquid crystal display.
6. Audio Amplifier for playing MP3 files

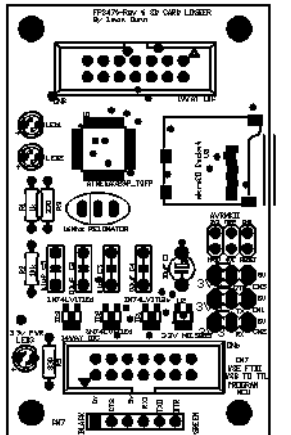


Section 9.6 SD Flash Card Interface printed circuit board

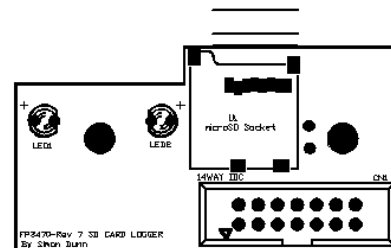
The printed circuit board shown contains the following

1. Atmega328P micro controller to service the flash drive.
2. 16.0 MHz Crystal.
3. Power regulator 3.3vdc.

4. Tactual Switch
5. SD Card Socket
6. IDC 10 Way Ribbon for external SD Card Front Facia Socket
7. Logic Level Shifter with Output Enable



SD flash card controller



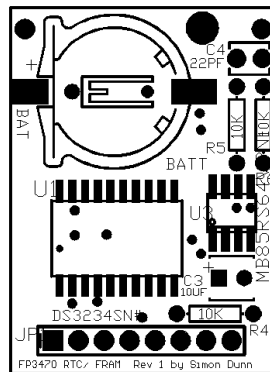
SD flash card Front facia Socket

Section 9.8 Real Time Clock printed circuit board

The printed circuit board shown contains the following

1. DS3224 Real time clock IC
2. Button cell battery back up
3. 64k bits of 8 bit FRAM memory

The printed circuit board is polled by the control card ATmega2560 to obtain the time of day for the flash drive data logging.

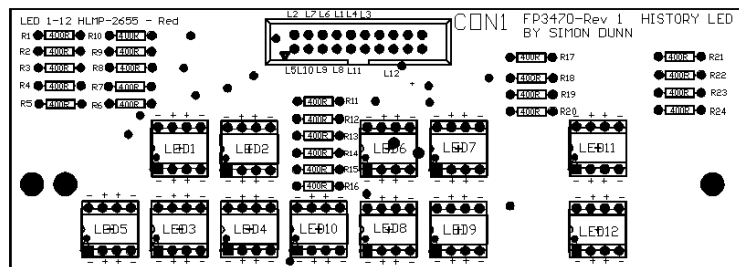


Section 9.9 History LED printed circuit board

The printed circuit board shown contains the following

1. LED socket holder for the history LED to be mounted.

These led are visible though the front facia for the FP3470 fire panel see Section 9.2 items 21, 22 and 23

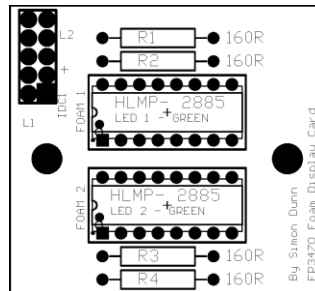


Section 9.10 Foam LED printed circuit board

The printed circuit board shown contains the following

1. LED socket holder for the foam LED to be mounted,

These led are visible though the front facia for the FP3470 fire panel see Section 9.2 items 19

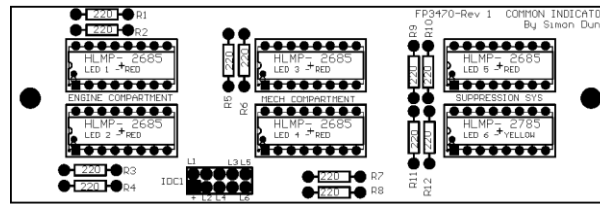


Section 9.11 Common LED printed circuit board

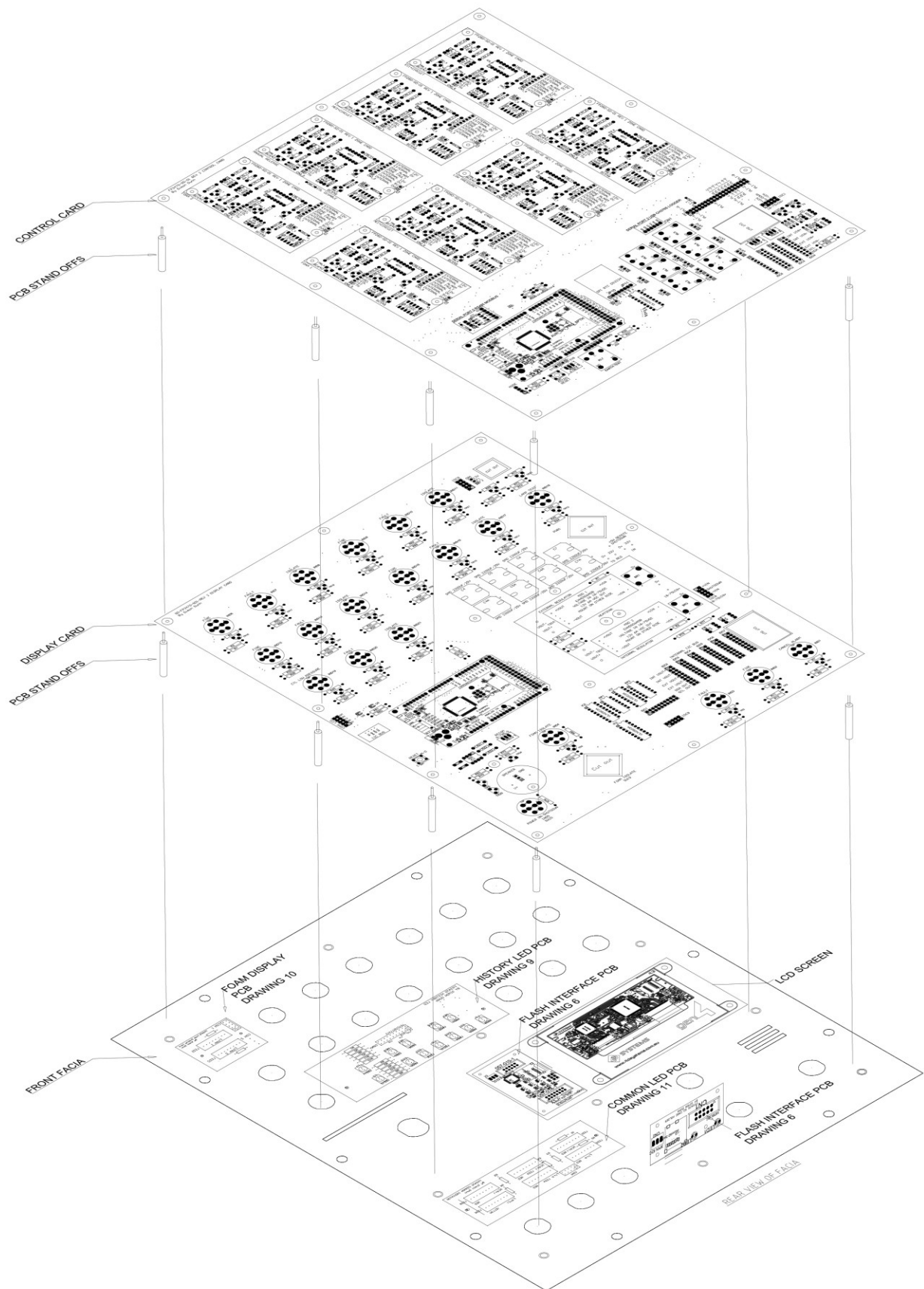
The printed circuit board shown contains the following

1. LED socket holder for the common alarm LED to be mounted,

These led are visible though the front facia for the FP3470 fire panel see Section 9.2 items 7,8,9



Section 9.12 Front Facia Review View Showing Printed Circuit Board

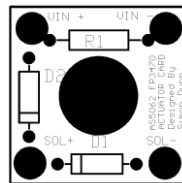


Section 9.14 Actuator Card

The actuator PCB is designed to be installed within the plug of the foam actuator plug assembly, due to the limited room within the socket and the requirements to monitor for open and short circuit fault monitoring.

The printed circuit board shown contains the following components

- R1 - 1K Resistor (End Of Line)
- D1 - 1N4004 Diode (Back EMF)
- D2 - 1N4004 Diode (Blocking Diode)



FP3470 Actuator PCB

Section 10 Fire System Sequence of Events

Check the mode link on the bottom left hand side and ensure it is in the bottom location for the fire system to operate in the original mode.

The following details the sequence of event for field testing the FP3470 Fire panel. This can also be used for a full commissioning or part of for any required testing.

- Ensure That 32Gigabit or Less, FAT16 or FAT32 Micro SD Card is fitted
- Turn The Power On.
- Ensure The LCD has powered up and displaying the home screen
- Confirm the audible “**Fire System Ready**” message has played
- Check that the “INT” led next to the Micro SD Card Slot flashes this is to ensure all test are log to the Sd Card
- Check Fire Panel Is All Normal
- Green Power On Light Is Illuminated
- Make Note of The serial Number on the LCD display.

Section 10.1 Lamp test

Lamp Test Switch

- Ensure The Panel Is Fault Free And Only The Green Power Light Is Illuminated
- Press And Release The Lamp Test Switch
- Confirm That Each Indicator Will Illuminate For ½ Second Before Moving To The Next This Will Continue Until All Indicators Have Been Tested.

Note

Any Indicator That Are Currently Illuminated Will Remain Illuminated During The Lamp Test

Section 10.2 Solenoid Foam Test

Solenoid Foam Cylinder 1 Test

- Disconnect Solenoid Foam Cylinder 1 From The Cable
- Confirm History “F1” Light Is Illuminated
- Confirm Common Fault Light Is Illuminated
- Confirm Train Line “Fault” Has Been Activated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault” Light Is Illuminated
- Reconnect Solenoid Foam Cylinder 1 To The Cables
- Confirm The History “F1” Light Is Extinguished
- Confirm Common Fault Light Is Extinguished
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault” Light Is Extinguished

- Confirm Train Line “Fault” Signal Has Been De-Activated

Solenoid Foam Cylinder 2 Test

- Disconnect Solenoid Foam Cylinder 2 From The Cable
- Confirm History “F2” Light Is Illuminated
- Confirm Common Fault Light Is Illuminated
- Confirm Train Line “Fault” Has Been Activated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault” Light Is Illuminated
- Reconnect Solenoid Foam Cylinder 1 To The Cables
- Confirm The History “F2” Light Is Extinguished
- Confirm Common Fault Light Is Extinguished
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault” Light Is Extinguished
- Confirm Train Line “Fault” Signal Has Been De-Activated

Section 10.3 Electrical Compartment Single Zone Test

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “EC1” Light Will Illuminate
- Confirm Electrical Compartment “Alert Light” Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated

Reset Electrical Compartment Test 1 (Zone 3)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “EC1” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated
- Confirm Foam Isolate Will Be Extinguished

Electrical Compartment Test 2 (Zone 4)

- Activate Electrical Compartment Test 2 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “EC2” Light Will Illuminate
- Confirm Common Electrical Compartment “Alert” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated

Reset Electrical Compartment Test 2 (Zone 4)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “EC2” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated
- Confirm Foam Isolate Will Be Extinguished

Note Both The History “EC1” And “EC2” Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Section 10.4 Electrical Compartment Alarm Dual Zone Test

Electrical Compartment Test 1 (Zone 3 and Zone 4)

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “EC1” Light Will Illuminate
- Confirm Common Electrical Compartment “Alert” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated

Electrical Compartment Test 2 (Zone 4)

- Activate Electrical Compartment Test 2 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “EC2” Light Will Illuminate
- Confirm Common Electrical Compartment “Fire” Light Will Illuminate
- Confirm Internal Fire Panel Sounder Will Be Activated
- Confirm Internal Audible Message is played “[Fire Detected in Electrical Compartment](#)”
- Confirm “Cancel Alarm” Light Will Illuminate (Flashing)
- Confirm Common “Fire” Light Will Illuminate (Flashing)
- Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder
- Press The “Cancel Alarm” And Light Will Illuminate (Steady)
- Confirm Common “Fire” Light Will Illuminate (Steady)
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fire” Light Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Buzzer” Is Activated
- Confirm Train Line “Alarm” Has Been Activated

Reset Electrical Compartment Test 1 (Zone 3)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “EC1” Light Will Remain Illuminated
- Confirm Common “Fire” Light Will Extinguish
- Confirm The Train Line Alarm” Will De-Activated
- Confirm The Control Station (Drivers Cab) And Confirm “Fire” Light Will Extinguish

Reset Electrical Compartment Test 2 (Zone 4)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “EC2” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish

- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated

Note Both The History “EC1” And “EC2” Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Section 10.5 Electrical Compartment Alarm and Isolate Dual Zone Test

Electrical Compartment Test 1 (Zone 3 Isolated and Zone 4 Alarms)

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 “Isolate” Press Switch (Switch Will Latch)
- Confirm “Isolate” Light Will Illuminate

Electrical Compartment Test 2 (Zone 4)

- Activate Electrical Compartment Test 2 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “EC2” Light Will Illuminate
- Confirm Common Electrical Compartment “Fire” and “Alert” Light Will Illuminate
- Confirm Internal Fire Panel Sounder Will Be Activated
- Confirm Internal Audible Message is played “[Fire Detected in Electrical Compartment](#)”
- Confirm “Cancel Alarm” Light Will Illuminate (Flashing)
- Confirm Common “Fire” Light Will Illuminate (Flashing)
- Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder
- Press The “Cancel Alarm” And Light Will Illuminate (Steady)
- Confirm Common “Fire” and “Alert” Light Will Illuminate (Steady)
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fire” Light Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Buzzer” Is Activated
- Confirm Train Line “Alarm” Has Been Activated

Reset Electrical Compartment Test 2 (Zone 4)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “EC2” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 “Isolate” Press Switch (Switch Will Unlatch)
- Confirm “Isolate” Light is Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Note

1. Repeat the above test this time isolating Zone 4 and alarm testing Zone 3 the same sequence should happen.
2. Both The History “EC1” And “EC2” Light Will Be Illuminated until reset.

Section 10.6 Main Engine Compartment Alarm Single Zone Test

Main Engine Test 1 (Zone 1)

- Activate Main Engine Test 1 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “ME1” Light Will Illuminate
- Confirm Common Main Engine “Alert” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated

Reset Main Engine Test 1 (Zone 1)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “ME1” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated
- Confirm Foam Isolate Light Will Be Extinguished

Main Engine Test 2 (Zone 2)

- Activate Main Engine Test 2 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “ME2” Light Will Illuminate
- Confirm Common “Alert” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated.

Reset Main Engine Test 2 (Zone 2)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “ME2” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated
- Confirm Foam Isolate Light Will Be Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Note

Both The History “ME1” And “ME2” Light Will Be Illuminated

Section 10.7 Main Engine Compartment Alarm Dual Zone Test

Main Engine Test 1 And Test 2 (Zone 1 And Zone 2)

Main Engine Test 1 (Zone 1)

- Activate Main Engine Test 1 “Fire” Press Switch (Switch Will Latch)
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “ME1” Light Will Illuminate
- Confirm Common Main Engine “Alert” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated

Main Engine Test 2 (Zone 2)

- Activate Main Engine Test 2 “Fire” Press Switch “Switch Will Latch”
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “ME2” Light Will Illuminate
- Confirm Common Main Engine “Fire” Light Will Illuminate
- Confirm Internal Fire Panel Sounder Will Be Activated
- Confirm Internal Audible Message is played “[Fire Detected in Engine Compartment](#)”
- Confirm “Cancel Alarm Light Will Illuminate” Flashing
- Confirm Common “Fire” Light Will Be Illuminated (Flashing)
- Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder
- Press The “Cancel Alarm” And Light Will Go Steady
- Confirm Common “Fire” Light Will Be Illuminated (Steady)
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fire Light” Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Buzzer” Is Activated
- Wait Approx. 30 Sec And Confirm The Foam 1 And Foam 2 Light Illuminate
- Confirm The Output To The Cylinder Solenoid Has **Not** Activated (Due To Foam Isolate)
- Confirm Manual Foam Release Light Will Extinguish
- Confirm Train Line “Alarm” Has Been Activated

Reset Main Engine Test 1 (Zone 1)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “ME1” Light Will Remain Illuminated
- Confirm Common “Fire” Light Will Extinguish
- Confirm “Cancel Alarm” Light Is Extinguished
- Confirm Train Line 14 “Alarm” Will De-Activated
- Confirm Control Station (Drivers Cab) And Confirm “Fire” Light Will Extinguish

Reset Main Engine Test 2 (Zone 2)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “ME2” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated
- Confirm Manual Release Light Are Illuminated

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Note

Both The History “ME1” And “ME2” Light Will Be Illuminated

Section 10.8 Main Engine Compartment Alarm and Isolate Zone Test

Main Engine Test 1 And Test 2 (Isolated Zone 1 And Zone 2)

Main Engine Test 1 (Zone 1)

- Activate Main Engine Test 1 “Isolate” Press Switch (Switch Will Latch)
- Confirm “Isolate” Light Will Illuminate

Main Engine Test 2 (Zone 2)

- Activate Main Engine Test 2 “Fire” Press Switch “Switch Will Latch”
- Confirm “Fire” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “ME2” Light Will Illuminate
- Confirm Common Main Engine “Fire” Light Will Illuminate
- Confirm Internal Fire Panel Sounder Will Be Activated
- Confirm Internal Audible Message is played “[Fire Detected in Engine Compartment](#)”
- Confirm “Cancel Alarm Light Will Illuminate” Flashing
- Confirm Common “Fire” and “Alert” Light Will Be Illuminated (Flashing)
- Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder
- Press The “Cancel Alarm” And Light Will Go Steady
- Confirm Common “Fire” Light Will Be Illuminated (Steady)
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fire Light” Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Buzzer” Is Activated
- Wait Approx 30 Sec And Confirm The Foam 1 And Foam 2 Light Illuminate
- Confirm The Output To The Cylinder Solenoid Has **Not** Activated (Due To Foam Isolate)
- Confirm Manual Foam Release Light Will Extinguish
- Confirm Train Line “Alarm” Has Been Activated
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated

Reset Main Engine Test 2 (Zone 2)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “Fire” Light Will Be Extinguished
- Confirm History “ME1” Light Will Remain Illuminated
- Confirm Common “Fire” Light Will Extinguish
- Confirm “Cancel Alarm” Light Is Extinguished
- Confirm Train Line 14 “Alarm” Will De-Activated
- Confirm Control Station (Drivers Cab) And Confirm “Fire” Light Will Extinguish

Reset Main Engine Test 1 (Zone 1)

- Press “Isolate” Switch Again To Unlatch The Alarm
- Confirm “Isolate” Light Will Be Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Note

1. Repeat the above test this time isolating Zone 2 and alarm testing Zone 1 the same sequence should happen.
2. Both The History “ME1” And “ME2” Light Will Be Illuminated until reset.

Section 10.9 Foam Cylinder Low Pressure Zone Test

Foam Cylinder Pressure Test (Zone 5)

- Activate Foam Cylinder Pressure Test “Fire” Press Switch “Switch Will Latch”
- Confirm “Cyl Low Press” Light Will Illuminate
- Confirm “Foam Isolate” Will Illuminate
- Confirm History “Cyl Low Press” Light Will Illuminate
- Confirm Common Foam Cylinder Low Pressure “Alert” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated
- Confirm Internal Fire Panel Sounder Will Be Activated
- Confirm Internal Audible Message is played “[Foam Suppression System Activated](#)”
- Confirm Common “Fault” Light Will Be Illuminated
- Confirm “Cancel Alarm” Light Will Illuminate (Flashing)
- Confirm Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault Light” Is Illuminated
- Confirm Train Line “Fault” Has Been Activated

Reset Foam Cylinder Pressure (Zone 5)

- Press “Cyl Low Press” Switch Again To Unlatch The Alarm
- Confirm “Cyl Low Press” Light Will Extinguish
- Confirm History “Cyl Low Press” Light Will Remain Illuminated
- Confirm Common “Alert” Light Will Extinguish
- Confirm “Foam Isolate” Light Will Extinguish
- Confirm Loco Shutdown Signal To Fuel Pump Is De-Activated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault” Light Is Extinguished
- Confirm Train Line “Fault” Has Been De-Activated

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Section 10.10 Fault Test Each Zone

Zone fault test on zone 1,2,3,4

- Press And Hold Down The “Fault” Switch
- Confirm The Switch Has Illuminated
- Confirm The Common Fault Light Has Illuminated
- Confirm Train Line “Fault” Has Been Activated

Resetting Zone fault test on zone 1,2,3,4

- Release The Held Down Fault Switch
- Confirm The Switch Has Extinguished
- Confirm The Common “Fault” Light Has Extinguished
- Confirm The Trainline “Fault” Is De-Activated

Section 10.11 Foam Discharge Test Zone 1 and Zone 2

Foam Discharge Test Main Engine Field Activation (Zone 1 And Zone 2)

Main Engine Test 1 (Zone 1)

- Activate Main Engine Test 1 By Shorting The Detector End Of Line Resistor
- Confirm “Fire” Light Will Illuminate
- Confirm History “ME1” Light Will Illuminate
- Confirm Common Main Engine “Alert” Light Will Illuminate

Main Engine Test 2 (Zone 2)

- Activate Main Engine Test 2 By Shorting The Detector End Of Line
- Confirm “Fire” Light Will Illuminate
- Confirm History “ME2” Light Will Illuminate
- Confirm Common Main Engine “Fire” Light Will Illuminate
- Confirm Loco Shutdown Signal To Fuel Pump Is Activated
- Confirm Common “Fire Alarm” Light Will Illuminates (Flashing)
- Confirm Internal Fire Panel Sounder Will Be Activated
- Confirm Internal Audible Message is played “[Fire Detected in Engine Compartment](#)”
- Confirm “Cancel Alarm Light Will Illuminate” Flashing
- Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder
- Confirm The “Cancel Alarm” And Light Will Go Steady
- Confirm Common “Fire” Light Will Be Illuminated (Steady)
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fire Light” Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Buzzer” Is Activated
- Confirm Train Line 14 “Alarm” Has Been Activated
- Wait Approx 30 Sec And Confirm The Foam 1 And Foam 2 Light Illuminate
- Confirm History F1 And F2 Light Have Illuminated
- Confirm The Foam 1 And Foam 2 Output To The Cylinder Solenoid Has Activated (Water Released)
- Confirm Manual Foam Release Light Will Extinguish
- Confirm Common “Fault” Light Will Illuminate
- Confirm Train Line “Fault” Has Been Activated Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault Light” Is Illuminated
- Wait 90 Sec For All The Water To Be Released
- Activate The Cylinder Bank Low Pressure Switch By Shorting The End Of Line Resistor
- Confirm “Cyl Low Press Light” Will Illuminate (Foam Cylinder Pressure Test)
- Confirm History “Cyl Low Press” Light Will Illuminate
- Confirm Common Cylinder Foam Low Pressure “Alert” Light Is Illuminated
- Confirm Fire Panel Internal Sounder Will Be Re-Activated
- Confirm “Cannel Alarm” Light Re-Main Steady
- Press The “Cancel Alarm” Switch To Silence The Fire Panel Sounder

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Section 10.12 Manual Foam Release

Manual Foam Release Test

- Re-Charge Cylinder With Foam
- Remove The Solenoid From The Cylinder
- Press Manual Foam Release Switch (Press And Hold For 3 Sec)
- Confirm Foam 1 And Foam 2 Have Illuminated
- Confirm History F1 And F2 Light Are Illuminated
- Confirm Common “Fault” Light Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “Fault Light” Is Illuminated
- Confirm Cylinder Solenoid 1 And 2 Have Been Activated (Test Magnetic Coil)
- Confirm Train Line “Fault” Has Been Activated

NOTE

This is an Optional requirement for some locomotive

- Confirm Loco Shutdown Signal To Fuel Pump Is Activated
- Repeat This Test For Each Manual Release Switch (Total Of Five)

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset

Section 11 AS5062 Fire System Sequence of Events

Check the mode link on the bottom left hand side and ensure it is in the middle location for the fire system to operate in AS5062 mode.

The following details the sequence of event for field testing the FP3470 Fire panel in AS5062 Compliant mode. This can also be used for a full commissioning or part of for any required testing.

- Ensure That 32Gigabit or Less, FAT16 or FAT32 Micro SD Card is fitted
- Turn The Power On.
- Ensure The LCD has powered up and displaying the home screen
- Confirm the audible “**Fire System Ready**” message has played
- Check that the “INT” led next to the Micro SD Card Slot flashes this is to ensure all test are log to the Sd Card
- Check Fire Panel Is All Normal
- Green Power On Light Is Illuminated
- Make Note of The serial Number on the LCD display.

Section 11.1 Lamp test

Lamp Test Switch

- Ensure The Panel Is Fault Free And Only The Green Power Light Is Illuminated
- Press And Release The Lamp Test Switch
- Confirm That Each Indicator Will Illuminate For ½ Second Before Moving To The Next This Will Continue Until All Indicators Have Been Tested.

Note

Any Indicator That Are Currently Illuminated Will Remain Illuminated During The Lamp Test

Section 11.2 Solenoid Foam Test

Solenoid Foam Cylinder 1 Test

- Disconnect Solenoid Foam Cylinder 1 From The Cable
- Confirm History “**F1**” Light Is Illuminated
- Confirm Common “**Fault**” Light Is Illuminated
- Confirm Train Line “**Fault**” Has Been Activated
- Confirm The Fire Panel “**Internal Buzzer**” is Pulsing
- Confirm The “**Alarm Cancel**” Light Is Flashing
- Confirm The Fire Control Station “**Local Fault**” Icon On The LCD Is Illuminated
- Confirm The Fire Control Station “**Trainline Fault**” Icon On The LCD Is Illuminated

- Confirm The Voice Message Is Played “**Fire System Fault**” And “**Fault Trainline Activated**” For A Max Of Five Times
- Reconnect Solenoid Foam Cylinder 1 To The Cables
- Confirm The History “**F1**” Light Is Extinguished
- Confirm “**Common Fault**” Light Is Extinguished
- Confirm The Fire Control Station “**Local Fault**” Icon On The Lcd Is Extinguished
- Confirm The Fire Control Station “**Trainline Fault**” Icon On The Lcd Is Extinguished
- Confirm The Voice Message Is Played “**Fire System Fault**” And “**Fault Trainline Activated**” Is No Longer Playing
- Confirm Train Line “**Fault**” Signal Has Been De-Activated
- Confirm The Fire Panel “**Internal Buzzer**” Is No Longer Active
- Confirm The Alarm “**Cancel Button**” Light Is Extinguished

Solenoid Foam Cylinder 2 Test

- Disconnect Solenoid Foam Cylinder 2 From The Cable
- Confirm History “**F2**” Light Is Illuminated
- Confirm Common “**Fault**” Light Is Illuminated
- Confirm Train Line “**Fault**” Has Been Activated
- Confirm The Fire Panel “**Internal Buzzer**” is Pulsing
- Confirm The “**Alarm Cancel**” Light Is Flashing
- Confirm The Fire Control Station “**Local Fault**” Icon On The LCD Is Illuminated
- Confirm The Fire Control Station “**Trainline Fault**” Icon On The LCD Is Illuminated
- Confirm The Voice Message Is Played “**Fire System Fault**” And “**Fault Trainline Activated**” For A Max Of Five Times
- Reconnect Solenoid Foam Cylinder 2 To The Cables
- Confirm The History “**F2**” Light Is Extinguished
- Confirm Common “**Fault**” Light Is Extinguished
- Confirm The Fire Control Station “**Local Fault**” Icon On The LCD Is Extinguished
- Confirm The Fire Control Station “**Trainline Fault**” Icon On The LCD Is Extinguished
- Confirm The Voice Message Is Played “**Fire System Fault**” And “**Fault Trainline Activated**” is no longer playing
- Confirm “**Trainline Fault**” Signal Has Been De-Activated
- Confirm the Fire panel “**Internal Buzzer**” is No Longer Active
- Confirm The alarm “**Cancel Button**” Light is Extinguished

Section 11.3 Electrical Compartment Single Zone Test

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**EC1**” Light Will Illuminate
- Confirm Electrical Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fuel Pump Shutdown**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Reset Electrical Compartment Test 1 (Zone 3)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**EC1**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguished
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated
- Confirm “**Foam Isolate**” Will Be Extinguished
- Confirm The Fire Control Station “**Fuel Pump Shutdown**” Icon On The LCD Is Extinguished
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” Is No Longer Playing

Electrical Compartment Test 2 (Zone 4)

- Activate Electrical Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**EC2**” Light Will Illuminate
- Confirm Electrical Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fuel Pump Shutdown**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Reset Electrical Compartment Test 2 (Zone 4)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**EC2**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguished
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated

- Confirm **“Foam Isolate”** Will Be Extinguished
- Confirm The Fire Control Station **“Fuel Pump Shutdown”** Icon On The LCD Is Extinguished
- Confirm The Remote Control Station Voice Message Is Played **“Fuel Pump Shutdown”** Is No Longer Playing

Note Both The History **“EC1”** And **“EC2”** Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 11.4 Electrical Compartment Alarm Dual Zone Test

Electrical Compartment Test 1 (Zone 3 and Zone 4)

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**EC1**” Light Will Illuminate
- Confirm Electrical Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fuel Pump Shutdown**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Electrical Compartment Test 2 (Zone 4)

- As Per Test No1 Above with the additions of the following
- Activate Electrical Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**EC2**” Light Will Illuminate
- Confirm Common Electrical Compartment “**Fire**” Light Will Illuminate
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm The Control Station “**Sounder**” Will Be Activated
- Confirm Fire panel Internal Audible Message is played “**Fire Detected in Electrical Compartment**”
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Common “**Alarm**” Light Will Illuminate
- Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Press The “**Cancel Alarm**” And Light Will Extinguish
- Confirm The Remote Control Station “**Fire Alarm**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fuel Pump Shutdown**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fire Alarm Trainline**” Icon Light Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “**Buzzer**” Is Activated
- Confirm The Remote Control Station Voice Message Is Played “**Fire Alarm**”
- Confirm The Remote Control Station Voice Message Is Played “**Fire Tarinline Activated**”
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**”

Reset Electrical Compartment Test 1 (Zone 3)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**EC1**” Light Will Remain Illuminated
- Confirm Common “**Alarm**” Light Will Extinguish
- Confirm The “**Trainline Alarm**” Will De-Activated
- Confirm The Control Station “ **Alarm**” Icon is Extinguished
- Confirm The Control Station “**Trainlinme Alarm**” Icon Remains Illuminated
- Confirm The Control Station “**Sounder**” is Silenced

Reset Electrical Compartment Test 2 (Zone 4)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**EC2**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguish
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated

Note Both The History “**EC1**” And “**EC2**” Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 11.5 Electrical Compartment Alarm and Isolate Dual Zone Test

Electrical Compartment Test 1 (Zone 3 Isolated and Zone 4 Alarms)

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 Zone “**Isolate**” Press Switch (Switch Will Latch)
- Confirm “Isolate” **Light** Will Illuminate

Electrical Compartment Test 2 (Zone 4)

- As Per Test No1 Above with the additions of the following
- Activate Electrical Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**EC2**” Light Will Illuminate
- Confirm Common Electrical Compartment “**Alert**” and “**Fire**” Light Will Illuminate
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm The Control Station “**Sounder**” Will Be Activated
- Confirm Fire panel Internal Audible Message is played “**Fire Detected in Electrical Compartment**”
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Common “**Alarm**” Light Will Illuminate
- Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Press The “**Cancel Alarm**” And Light Will Extinguish
- Confirm The Remote Control Station “**Fire Alarm**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fuel Pump Shutdown**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fire Alarm Trainline**” Icon Light Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “**Buzzer**” Is Activated
- Confirm The Remote Control Station Voice Message Is Played “**Fire Alarm**”
- Confirm The Remote Control Station Voice Message Is Played “**Fire Tarinline Activated**”
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**”

Reset Electrical Compartment Test 2 (Zone 4)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**EC2**” Light Will Remain Illuminated
- Confirm Common “**Alarm**” Light Will Extinguish
- Confirm The “**Trainline Alarm**” Will De-Activated
- Confirm The Control Station “**Alarm**” Icon is Extinguished
- Confirm The Control Station “**Trainlinme Alarm**” Icon is Extinguished
- Confirm The Control Station “**Sounder**” is Silenced

Electrical Compartment Test 1 (Zone 3)

- Activate Electrical Compartment Test 1 “**Isolate**” Press Switch (Switch Will Unlatch)

- Confirm “**Isolate**” Light is Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Note

1. The History “**EC2**” Light Will Be Illuminated until reset.

Electrical Compartment Test 1 (Zone 4 Isolated and Zone 3 Alarms)

Electrical Compartment Test 1 (Zone 4)

- Activate Electrical Compartment Test 1 Zone “**Isolate**” Press Switch (Switch Will Latch)
- Confirm “**Isolate**” **Light** Will Illuminate

Electrical Compartment Test 2 (Zone 3)

- As Per Test No1 Above with the additions of the following
- Activate Electrical Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**EC1**” Light Will Illuminate
- Confirm Common Electrical Compartment “**Alert**” and “**Fire**” Light Will Illuminate
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm The Control Station “**Sounder**” Will Be Activated
- Confirm Fire panel Internal Audible Message is played “**Fire Detected in Electrical Compartment**”
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Common “**Alarm**” Light Will Illuminate
- Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Press The “**Cancel Alarm**” And Light Will Extinguish
- Confirm The Remote Control Station “**Fire Alarm**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fuel Pump Shutdown**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fire Alarm Trainline**” Icon Light Is Illuminated
- Confirm The Fire Control Station (Drivers Cab) And Confirm “**Buzzer**” Is Activated
- Confirm The Remote Control Station Voice Message Is Played “**Fire Alarm**”
- Confirm The Remote Control Station Voice Message Is Played “**Fire Tarinline Activated**”
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**”

Reset Electrical Compartment Test 2 (Zone 3)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**EC1**” Light Will Remain Illuminated
- Confirm Common “**Alarm**” Light Will Extinguish

- Confirm The “**Trainline Alarm**” Will De-Activated
- Confirm The Control Station “ **Alarm**” Icon is Extinguished
- Confirm The Control Station “**Trainlinme Alarm**” Icon is Extinguished
- Confirm The Control Station “**Sounder**” is Silenced

Electrical Compartment Test 1 (Zone 4)

- Activate Electrical Compartment Test 1 “**Isolate**” Press Switch (Switch Will Unlatch)
- Confirm “**Isolate**” Light is Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Note.

The History “EC2” Light Will Be Illuminated until reset.

Section 11.6 Main Engine Compartment Alarm Single Zone Test

Engine Compartment Test 1 (Zone 1)

- Activate Engine Compartment Test 1 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME1**” Light Will Illuminate
- Confirm Engine Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fire Alarm**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Reset Engine Compartment Test 1 (Zone 3)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**ME1**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguished
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated
- Confirm “**Foam Isolate**” Will Be Extinguished
- Confirm The Fire Control Station “**Fire Alarm**” Icon On The LCD Is Extinguished
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” Is No Longer Playing

Engine Compartment Test 2 (Zone 2)

- Activate Engine Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME2**” Light Will Illuminate
- Confirm Engine Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fire Alarm**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Reset Engine Compartment Test 2 (Zone 4)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**ME2**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguished
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated

- Confirm “**Foam Isolate**” Will Be Extinguished
- Confirm The Fire Control Station “**Fire Alarm**” Icon On The LCD Is Extinguished
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” Is No Longer Playing

Note Both The History “**ME1**” And “**ME2**” Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 11.7 Main Engine Compartment Alarm Dual Zone Test

Engine Compartment Test 1 (Zone 1 and Zone 2)

Engine Compartment Test 1 (Zone 1)

- Activate Engine Compartment Test 1 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME1**” Light Will Illuminate
- Confirm Engine Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fuel Pump Shutdown**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Engine Compartment Test 2 (Zone 2)

- As Per Test No1 Above with the additions of the following
- Activate Engine Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME2**” Light Will Illuminate
- Confirm Common Engine Compartment “**Fire**” Light Will Illuminate
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm The Control Station “**Sounder**” Will Be Activated
- Confirm Fire panel Internal Audible Message is played “**Fire Detected in Engine Compartment**”
- Confirm The Foam “**FOAM1**” and “**FOAM2**” Release Light Remain Extinguished.
- Confirm The solenoid have “**NOT**” Been Activated Due to Foam Isolate
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Common “**Alarm**” Light Will Illuminate
- Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Press The “**Cancel Alarm**” And Light Will Extinguish
- Confirm The Remote Control Station “**Fire Alarm**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fuel Pump Shutdown**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fire Alarm Trainline**” Icon Light Is Illuminated
- Confirm The Fire Control Station And Confirm “**Buzzer**” Is Activated
- Confirm The Remote Control Station Voice Message Is Played “**Fire Alarm**”
- Confirm The Remote Control Station Voice Message Is Played “**Fire Tarinline Activated**”
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**”

Reset Engine Compartment Test 1 (Zone 1)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**ME1**” Light Will Remain Illuminated
- Confirm Common “**Alarm**” Light Will Extinguish
- Confirm The “**Trainline Alarm**” Will De-Activated
- Confirm The Control Station “ **Alarm**” Icon is Extinguished
- Confirm The Control Station “**Trainlinme Alarm**” Icon is Extinguished
- Confirm The Control Station “**Sounder**” is Silenced

Reset Engine Compartment Test 2 (Zone 2)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**ME2**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguish
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated

Note The “**ME2**” Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 11.8 Main Engine Compartment Alarm and Isolate Zone Test

Main Engine Test 1 And Test 2 (Isolated Zone 1 And Zone 2)

Main Engine Test 1 (Zone 1)

- Activate Main Engine Test 1 “**Isolate**” Press Switch (Switch Will Latch)
- Confirm “**Isolate**” Light Will Illuminate

Main Engine Test 2 (Zone 2)

- Activate Engine Compartment Test 2 Zone “**Fire**” Press Switch (Switch Will Latch)
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME2**” Light Will Illuminate
- Confirm Common Engine Compartment “**Alert**” and “**Fire**” Light Will Illuminate
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm The Control Station “**Sounder**” Will Be Activated
- Confirm Fire panel Internal Audible Message is played “**Fire Detected in Engine Compartment**”
- Confirm The Foam “**FOAM1**” and “**FOAM2**” Release Light Remain Extinguished
- Confirm The solenoid have “**NOT**” Been Activated Due to Foam Isolate
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Common “**Alarm**” Light Will Illuminate
- Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Press The “**Cancel Alarm**” And Light Will Extinguish
- Confirm The Remote Control Station “**Fire Alarm**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fuel Pump Shutdown**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fire Alarm Trainline**” Icon Light Is Illuminated
- Confirm The Fire Control Station And Confirm “**Buzzer**” Is Activated
- Confirm The Remote Control Station Voice Message Is Played “**Fire Alarm**”
- Confirm The Remote Control Station Voice Message Is Played “**Fire Tarinline Activated**”
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**”

Reset Main Engine Test 2 (Zone 2)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “**Fire**” Light Will Be Extinguished
- Confirm History “**ME1**” Light Will Remain Illuminated
- Confirm Common “**Fire**” Light Will Extinguish
- Confirm “**Cancel Alarm**” Light Is Extinguished
- Confirm Train Line 14 “**Alarm**” Will De-Activated
- Confirm Control Station (Drivers Cab) Return to Normal

Reset Main Engine Test 1 (Zone 1)

- Press **“Isolate”** Switch Again To Unlatch The Alarm
- Confirm **“Isolate”** Light Will Be Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Note

The History **“ME2”** Light Will Be Illuminated until reset.

Main Engine Test 1 And Test 2 (Isolated Zone 2 And Zone 1)

Main Engine Test 1 (Zone 2)

- Activate Main Engine Test 1 **“Isolate”** Press Switch (Switch Will Latch)
- Confirm **“Isolate”** Light Will Illuminate

Main Engine Test 2 (Zone 1)

- Activate Engine Compartment Test 2 Zone **“Fire”** Press Switch (Switch Will Latch)
- Confirm Zone **“Fire”** Light Will Illuminate
- Confirm **“Foam Isolate”** Will Illuminate
- Confirm History **“ME1”** Light Will Illuminate
- Confirm Common Engine Compartment **“Alert”** and **“Fire”** Light Will Illuminate
- Confirm Internal Fire Panel **“Sounder”** Will Be Activated
- Confirm The Control Station **“Sounder”** Will Be Activated
- Confirm Fire panel Internal Audible Message is played **“Fire Detected in Engine Compartment”**
- Confirm The Foam **“FOAM1”** and **“FOAM2”** Release Light Remain Extinguished
- Confirm The solenoid have **“NOT”** Been Activated Due to Foam Isolate
- Confirm **“Cancel Alarm”** Light Will Illuminate (Flashing)
- Confirm Common **“Alarm”** Light Will Illuminate
- Press The **“Cancel Alarm”** Switch To Silence The Fire Panel Sounder
- Press The **“Cancel Alarm”** And Light Will Extinguish
- Confirm The Remote Control Station **“Fire Alarm”** Icon Light Is Illuminated
- Confirm The Remote Control Station **“Fuel Pump Shutdown”** Icon Light Is Illuminated
- Confirm The Remote Control Station **“Fire Alarm Trainline”** Icon Light Is Illuminated
- Confirm The Fire Control Station And Confirm **“Buzzer”** Is Activated
- Confirm The Remote Control Station Voice Message Is Played **“Fire Alarm”**
- Confirm The Remote Control Station Voice Message Is Played **“Fire Tarinline Activated”**
- Confirm The Remote Control Station Voice Message Is Played **“Fuel Pump Shutdown”**

Reset Main Engine Test 2 (Zone1)

- Press “Fire” Switch Again To Unlatch The Alarm
- Confirm “**Fire**” Light Will Be Extinguished
- Confirm History “**ME1**” Light Will Remain Illuminated
- Confirm Common “**Fire**” Light Will Extinguish
- Confirm “**Cancel Alarm**” Light Is Extinguished
- Confirm Train Line 14 “**Alarm**” Will De-Activated
- Confirm Control Station (Drivers Cab) Return to Normal

Reset Main Engine Test 1 (Zone 2)

- Press “**Isolate**” Switch Again To Unlatch The Alarm
- Confirm “**Isolate**” Light Will Be Extinguished

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Note

The History “**ME1**” Light Will Be Illuminated until reset.

Section 11.9 Foam Cylinder Low Pressure Zone Test

Foam Cylinder Pressure Test (Zone 5)

- Activate Foam Cylinder Pressure Test “**Fire**” Press Switch “Switch Will Latch”
- Confirm “**Cyl Low Press**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**Cyl Low Press**” Light Will Illuminate
- Confirm Common Foam Cylinder Low Pressure “**Alert**” Light Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated On Remote Control Station
- Confirm Loco Shutdown Signal To “**Local Alarm**” Is Activated On Remote Control Station
- Confirm Loco Shutdown Signal To “**Trainline**” Is Activated On Remote Control Station
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm Internal Audible Message Is Played “**Foam Suppression System Activated**”
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Confirm Common “**Common Alarm**” Light Will Be Illuminated
- Confirm on Remote Control Station “**Fire Alarm**” Message is played
- Confirm on Remote Control Station “**Fuel Pump Shutdown**” Message is played
- Confirm on Remote Control Station “**Trainline Activated**” Message is played

Reset Foam Cylinder Pressure (Zone 5)

- Press “**Cyl Low Press**” Switch Again To Unlatch The Alarm
- Confirm “**Cyl Low Press**” Light Will Extinguish
- Confirm History “**Cyl Low Press**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguish
- Confirm “**Foam Isolate**” Light Will Extinguish
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-activated On Remote Control Station
- Confirm Loco Shutdown Signal To “**Local Alarm**” Is De-activated On Remote Control Station
- Confirm Loco Shutdown Signal To “**Trainline**” Is De-activated On Remote Control Station
- Confirm on Remote Control Station “**Fire Alarm**” Message is no longer been played
- Confirm on Remote Control Station “**Fuel Pump Shutdown**” Message is no longer been played
- Confirm on Remote Control Station “**Trainline Activated**” Message is no longer been played

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 11.10 Fault Test Each Zone

Zone fault test on zone 1,2,3,4

- Press And Hold Down The “**Fault**” Switch
- Confirm The “**Fault**” Switch Has Illuminated
- Confirm The “**Common Fault**” Light Has Illuminated
- Confirm Train Line “**Fault**” Has Been Activated
- Confirm Fire Panel “**Buzzer**” Is Activated (Pulsing)
- Confirm The “**Cancel Alarm**” Light Is Flashing
- Confirm The Drivers Cab Remote Station “**Local Fire Panel Fault**” Icon Is Illuminated
- Confirm The Drivers Cab Remote Station “**Trainline Fault**” Icon Is Illuminated
- Confirm The Voice Message Is Been Played “**Fire System Fault**” Max Of 5 Times
- Confirm The Voice Message Is Been Played “**Trainline Fault Activated**” Max Of 5 Times

Resetting Zone fault test on zone 1,2,3,4

- Release The Held Down “**Fault**” Switch
- Confirm The “**Fault**” Switch Has Extinguished
- Confirm The “**Common Fault**” Light Has Extinguished
- Confirm The Trainline “**Fault**” Is De-Activated
- Confirm “**Voice Message**” Stop Playing
- Confirm The Drivers Cab Remote Control Station Returns To “**Normal**”

Zone fault test on zone 5

- Press And Hold Down The “**Fault**” Switch
- Confirm The “**Fault**” Switch Has Illuminated
- Confirm The “**Common Fault**” Light Has Illuminated
- Confirm Train Line “**Fault**” Has Been Activated
- Confirm Cylinder Low Pressure “**Fault**” light illuminated
- Confirm Fire Panel “**Buzzer**” Is Activated (Pulsing)
- Confirm The “**Cancel Alarm**” Light Is Flashing
- Confirm The Drivers Cab Remote Station “**Local Fire Panel Fault**” Icon Is Illuminated
- Confirm The Drivers Cab Remote Station “**Trainline Fault**” Icon Is Illuminated
- Confirm The Voice Message Is Been Played “**Fire System Fault**” Max Of 5 Times
- Confirm The Voice Message Is Been Played “**Trainline Fault Activated**” Max Of 5 Times

Resetting Zone fault test on zone 5

- Release The Held Down “**Fault**” Switch
- Confirm The “**Fault**” Switch Has Extinguished
- Confirm The “**Common Fault**” Light Has Extinguished
- Confirm The Trainline “**Fault**” Is De-Activated
- Confirm Cylinder Low Pressure “**Fault**” light illuminated
- Confirm “**Voice Message**” Stop Playing
- Confirm The Drivers Cab Remote Control Station Returns To “**Normal**”

Section 11.11 Foam Discharge Test Zone 1 and Zone 2

Foam Discharge Test Main Engine Field Activation (Zone 1 And Zone 2)

Main Engine Test 1 (Zone 1)

- Activate Main Engine Test 1 Zone 1 By Shorting The Detector End Of Line Resistor
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME1**” Light Will Illuminate
- Confirm Engine Compartment “**Alert Light**” Will Illuminate
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is Activated
- Confirm The Fire Control Station “**Fire Alarm**” Icon On The LCD Is Illuminated
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**” For A Max Of Five Times

Engine Compartment Test 2 (Zone 2)

- Activate Main Engine Test 2 Zone 2 By Shorting The Detector End Of Line Resistor
- Confirm Zone “**Fire**” Light Will Illuminate
- Confirm “**Foam Isolate**” Will Illuminate
- Confirm History “**ME2**” Light Will Illuminate
- Confirm Common Engine Compartment “**Fire**” Light Will Illuminate
- Confirm Internal Fire Panel “**Sounder**” Will Be Activated
- Confirm The Control Station “**Sounder**” Will Be Activated
- Confirm Fire panel Internal Audible Message is played “**Fire Detected in Engine Compartment**”
- Confirm The Foam “**FOAM1**” and “**FOAM2**” Release Light Illuminated.
- Confirm The solenoid have Been “**Activated**”.
- Confirm “**Cancel Alarm**” Light Will Illuminate (Flashing)
- Confirm Common “**Alarm**” Light Will Illuminate
- Press The “**Cancel Alarm**” Switch To Silence The Fire Panel Sounder
- Press The “**Cancel Alarm**” And Light Will Extinguish
- Confirm The Remote Control Station “**Fire Alarm**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fuel Pump Shutdown**” Icon Light Is Illuminated
- Confirm The Remote Control Station “**Fire Alarm Trainline**” Icon Light Is Illuminated
- Confirm The Fire Control Station And Confirm “**Buzzer**” Is Activated
- Confirm The Remote Control Station Voice Message Is Played “**Fire Alarm**”
- Confirm The Remote Control Station Voice Message Is Played “**Fire Tarinline Activated**”
- Confirm The Remote Control Station Voice Message Is Played “**Fuel Pump Shutdown**”

Reset Engine Compartment Test 1 (Zone 1)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished

- Confirm History “**ME1**” Light Will Remain Illuminated
- Confirm Common “**Alarm**” Light Will Extinguish
- Confirm The “**Trainline Alarm**” Will De-Activated
- Confirm The Control Station “ **Alarm**” Icon is Extinguished
- Confirm The Control Station “**Trainlinme Alarm**” Icon is Extinguished
- Confirm The Control Station “**Sounder**” is Silenced

Reset Engine Compartment Test 2 (Zone 2)

- Press Zone “**Fire**” Switch Again To Unlatch The Alarm
- Confirm Zone “**Fire**” Light Will Be Extinguished
- Confirm History “**ME2**” Light Will Remain Illuminated
- Confirm Common “**Alert**” Light Will Extinguish
- Confirm Loco Shutdown Signal To “**Fuel Pump**” Is De-Activated

Note Both The History “**ME1**” And “**ME2**” Light Will Be Illuminated until reset

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 11.12 Manual Foam Release

Manual Foam Release Test

- Re-Charge Cylinder With Foam
- Remove The “**Actuator**” From The Cylinder
- Press “**Manual Foam Release**” Switch (Press And Hold For 3 Sec)
- Confirm “**Foam 1**” And “**Foam 2**” Have Illuminated
- Confirm Cylinder “**Actuator 1**” And “**Actuator 2**” Have Been Activated (Test Magnetic Coil)
- Confirm The Drivers Cab Fire Control Station “**Engine Shutdown**” Icon Is Activated (If Set)
- Confirm The Fire Control Station “**Fuel Pump Shutdown**” Is Played

NOTE

This is an Optional requirement for some locomotive

- *Confirm Loco Shutdown Signal To Fuel Pump Is Activated (If Activated)*
- Repeat This Test For Each Manual Release Switch (Total Of Five)

Resetting Fire Alarm Panel

- Power Down Fire Alarm Panel to Reset or Press And Hold The Cancel Switch For Longer than Five (5) Seconds

Section 12 System Update and System Programming

The FP3470 fire system has multiple micro controllers looking are each element that make up the entire system, the micro controllers have been programmed with a small bootloader that when powered loads the system operating system.

Section 12.1 Settings and Programming

Section 12.1.1 JB1 Micro Controller User Configuration

The JB1 micro controller is fitted with a basic user configuration setup to either enable or disable alarm been displayed, and a time delay on the primary and secondary power failure alarm.

The micro controller is programmed and configured using the FTDI USB to TTL cable 5v and any terminal program

To access the settings

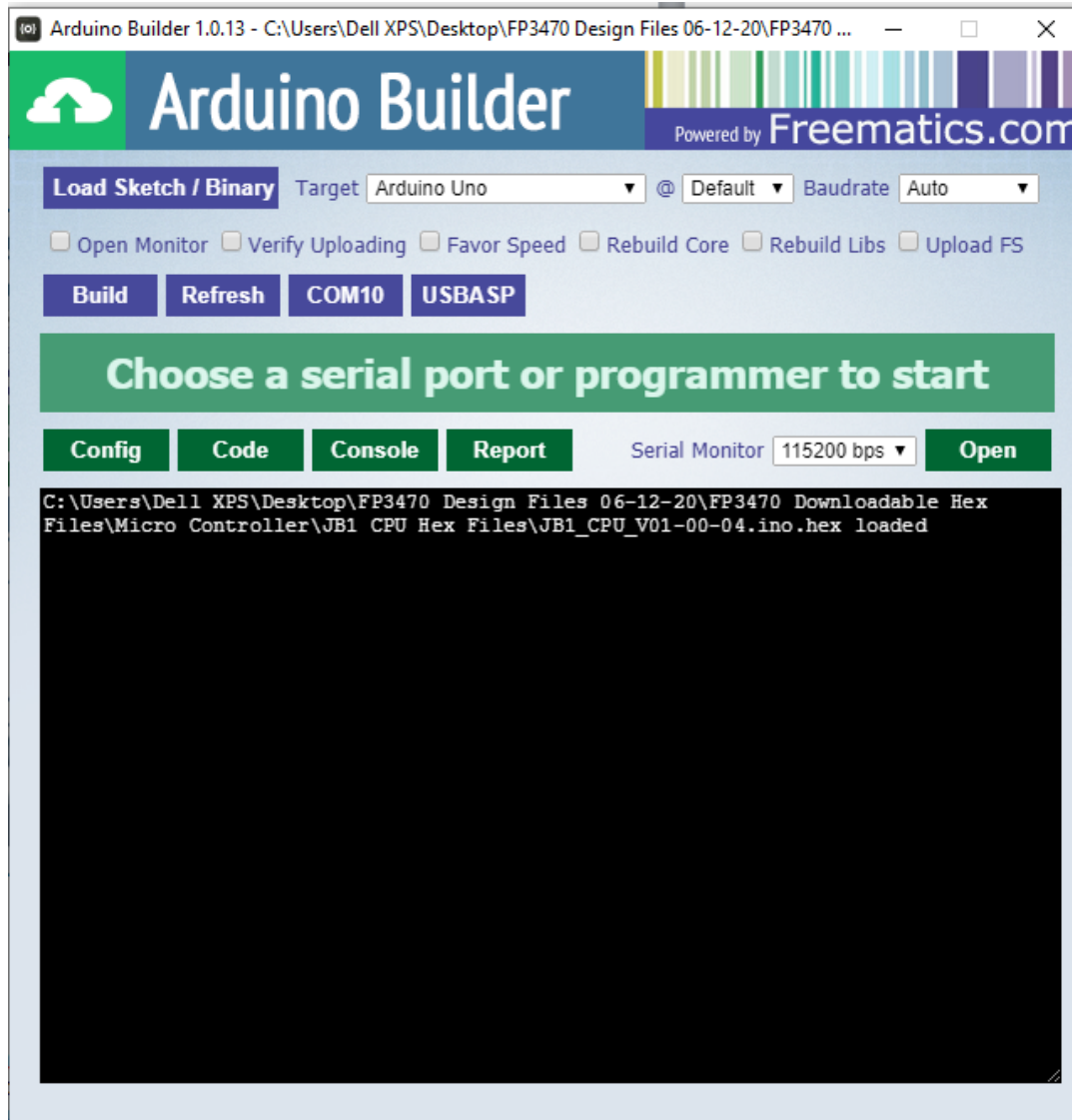
1. Set terminal program to 300 baud
2. Plug the 6 pin black inline socket into the JB1 controller make note of the cable core colours on the PCB and the connector (Green, Black)
3. Plug the USB end into the Computer, the computer will provided the power
4. During power up the works “Setup” will be shown you have approx. 5 sec to send the word “setup” in lower case
5. upon entering setup software version and date is displayed
6. using e to enable and d to disable, select that status of each alarm
7. set the primary and secondary time delay alarm this can be from 0 sec through to 126 years

Once all the function have been set the card will automatically reboot.

Section 12.1.2 System Configuration Downloading

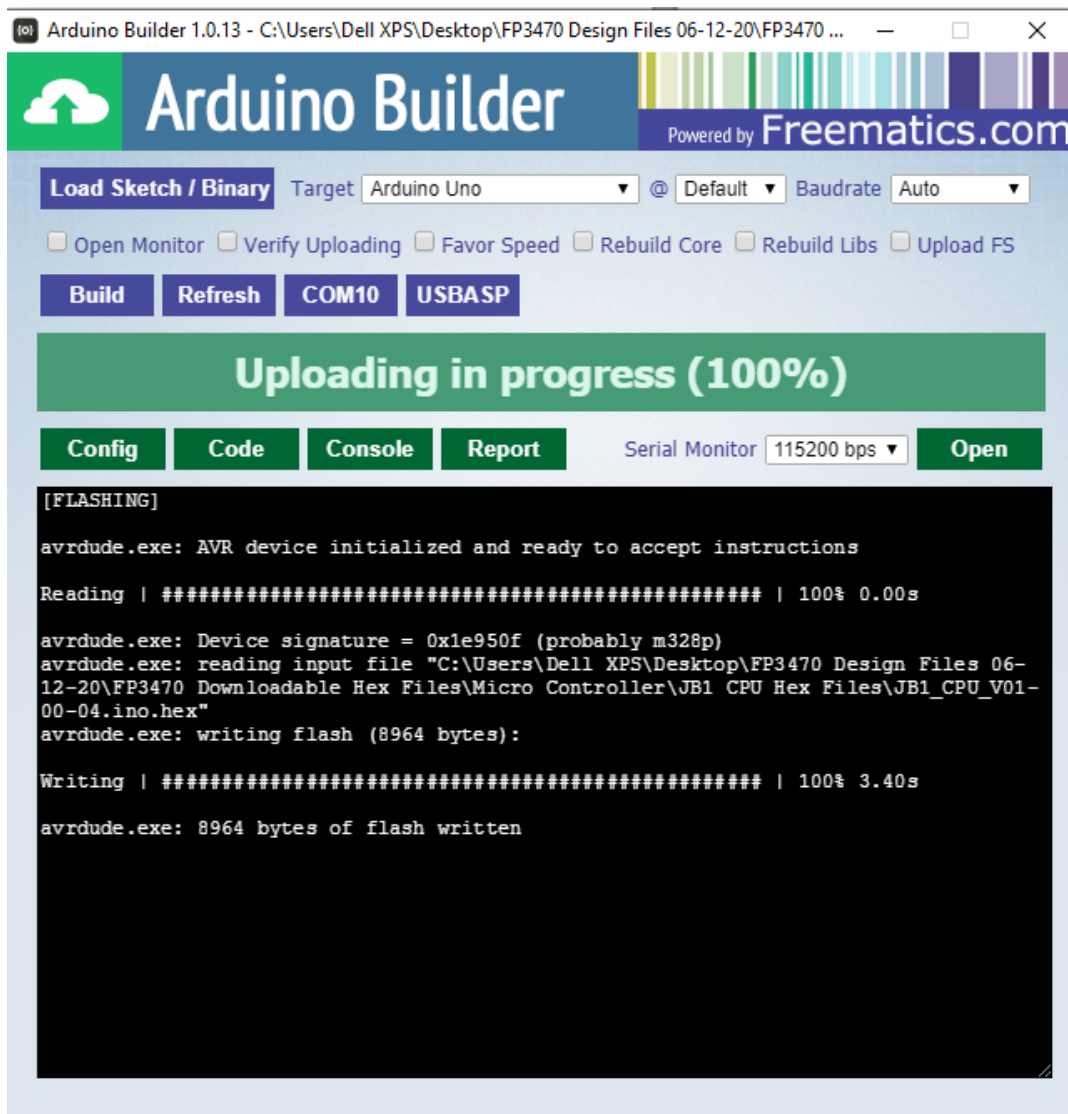
The micro controller is programmed and using the FTDI USB to TTL cable 5v and a hex uploaded program.

The simplest way is to use a standalone up loader such as Arduino Builder



1. Select the load Sketch / Binary and navigate to the HEX file.
2. Select the target Chip
 - For JB1 Select – Arduino UNO
 - For Micro SD Controller Select Arduino UNO
 - For Display Card Select Arduino Mega 2560 ADK
 - For Main Controller Card Select Arduino Mega 2560 ADK
 - For Remote Control Station Card Select Arduino Mega 2560 ADK

3. Select the serial comms port



4. The programming will start Automatically by erasing the flash memory and uploading the new HEX file

Section 12.1.3 User Configuration Remote Station

The remote station has two user configuration settings

1. Set Back light Upper and Lower limits as different area have different amounts of light Lower level 0, upper level 1023
Default is 50 for the lower level and 700 for the upper level
During the run time a light sensor data is provided show the current settings and the raw value been returned from the sensor itself.
2. Error fault count this is a running counter to help diagnose communication faults.
The fault counter will retain the last value even after power down and have a range from 0 to 4000,000,000.

To enter set up mode

1. place a jumper link across the two pins A8 (last two pins on the pin header on the top of the PCB)
2. Using FTDI USB to TTL 5v Cable plug the 6 pin connector into the pin connector “serial port 0” ensures the “green wire is at the top” and the “black wire is at the bottom”.
3. The micro controller will be powered directly from the USB port or you can leave the fire system power up.
4. Connect using a terminal program with a baud rate of 57600, 8, N,1

During power up the remote station will send log on settings and what it is currently configuring see screen shot below.

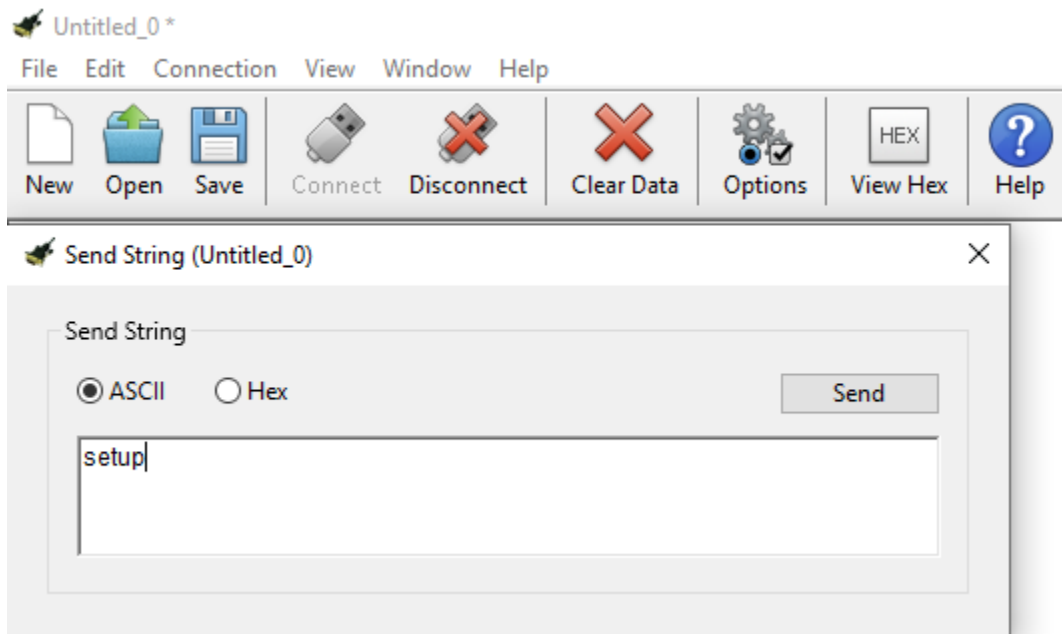
Arduino is running Sketch: Remote_Control_Station_V01-01-04
Compiled on: Nov 19 2020 at 07:35:39

Setting Password To Eeprom
Configuring Port for MP3, LCD, JB1
Setting MP3 Port
Default Mode Remote Control Station Set For FP3470
Setting Internal Buzzer Port

Setting Manual Release Port
Ensure Release Output Is set To Normal
Setting Manual Release Indicator Port
Waiting For LCD To Power Up
Setting MP3 Amplifier To High
Getting Serial Number
Already Unlock
Insert Link On A8 Mode Pins To Enable Setup Mode, Power Down, Add Link
Power Up !!
Set Up Mode Enabled

Once the remote station has reached this point you have approx. 5 sec to send the word “setup” followed by enter for back light setup or “erase” followed by enter to clear fault counter this may involve preloading the send string with the with the word

To Enter back Light Setup Type Lower Case 'setup' OR
'erase' To Erase Coms Fault Log Then Press Enter



Follow the instruction given the following is the order in which the setting are required

1. Upper Light level default 700
2. Lower Light level between 10 and the already set value

See text captured bellow.

The Back Light Level Upper Limit by default is 700
Enter New Background Light Level Upper Limit For Full Brightness
The Range Can be Between 10 and 1023
>?

800

The Background Upper Light Level Full Brightness is: 800

The Back Light Level Lower Limit default is 50
Enter New Background Light Level Lower Limit For Dim
The Range Can Be Between 10 to 800
>?

60

Lower Level Value Set : 60

Set Up Complete Ensure Link A8 is Now Removed

Loading Upper Back Light Limit to - 800

Loading Lower Back Light Limit to - 60

Starting LCD Event Handler

Hardware Check :- Hardware Match !!

Waiting For FIP To Be Switch On !!

Fire System Is Now On !! Manual Release Line ON

Flushing Input Buffer Out

Flushing Input Buffer Out

Waiting for JB1 To Send Heat Beat

Byte Revived for JB1 0x80

Remote Station Sync Now Sync To JB1

Flushing Input Buffer Out

*

Remote Station Sync Now Sync To JB1

Comms Error Timer Started

System Ready Show Home Screen

Sounder Isolate Button Enabled

Engine Override Button Enabled

Foam Release Button Enabled

Serial Number 28de39fb0800007e

Power Up Fire System Normal

Play Power Up Message

Backlight Valve:- Raw Value 185 , Lower Limit 60 , Upper Limit 800
Current Level 14 , Last Level 14 , Final Level 3

From the above we have a raw light sensor valve of 185, with a full dim valve set to 60 and full bright value set to 800, the current screen brightness is 14 the last bright level is 14 and the final brightness level will be 3 based on the raw valve of 185

Note – Don't forget to move the link from A8 not essential but lockout the configuration settings

The following jumper setting is available on the remote control station depending on site requirements.

The mode jumper is located at the top of the PCB and is made up of 8 vertical jumper setting (Jumper fitted or jumper removed).

Placing a small jumper vertical to the following pins jumper A1 is the further most left and Jumper A8 is the furthest right these setting are only loaded in during power up so the jumper must remain in place unlike A8 which is the programming jumper which is only fitted for entering programming mode.

Mode Jumper A1 Fitted FP280 panel removed FP3470 this can affect how the foam suppression release operates as FP280 is fault condition FP3470 Alarm Condition.

Mode Jumper A2 Fitted disables the buzzer mute icon on the LCD screen.

Mode Jumper A3 Fitted disables the Engine Override Icon on the LCD screen.

Mode Jumper A4 Fitted disables the Manual Release Icon on the LCD screen.

Mode Jumper A5 Future.

Mode Jumper A6 Future.

Mode Jumper A7 Future.

Mode Jumper A8 Configuration Setting (Only Fit when Entering Setup mode).

Note any icon disabled with a jumper will turn blue and have the word "Disabled" shown no matter how hard or how many times you press the screen this will have no effect.

Section 12.2 FP3470 Remote Station and Fire System and LCD Display

This section cover updating the SD installed with the display, the SD card contains all the display configuration files to operate. There are two options in updating the SD card.

1. Remove the card from the display this involves disassembling the fire panel and coping the file to the card with a computer
2. Using “4D system Transfer Program” and “4D system Programming cable “to upload the file with the SD card installed.

Option 1

No recommended of field work

Option 2

With the fire system powered up

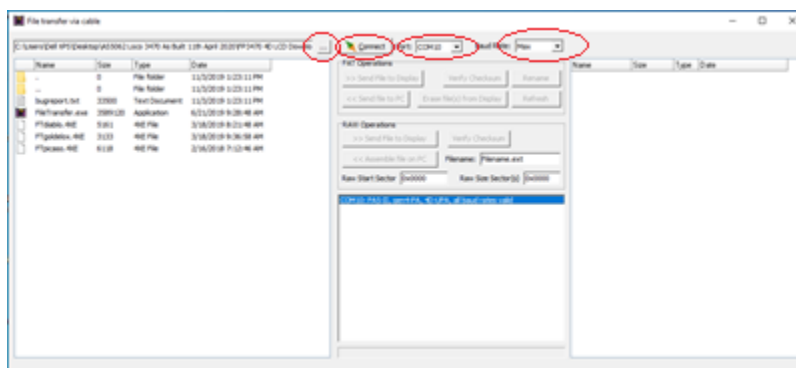
1. Connect the 5 pin black inline connector to the pin provided on the back of the diplay card located near the LCD display
2. Remove the LCD Program jumper pin this disabled the Micro controller communication line and alow data to be passed directly top the display from the computer.

Note:- Jumper is installed joining the center tow pins of a 4 way pin header near the small back regulator and the fire system next to the programming connector on the rear of the display card.

3. Plug the USB connector into the computer

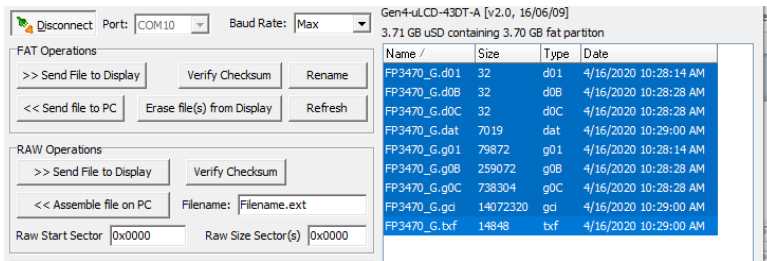


Open “File Transfer program “to put the file directly on to the SD card installed with the display using the 4D programming cable



1. Set the baud rate slowest 115200
2. Set The coms Port
3. Browse to the file locations
4. Click Connect

If the display has an existing config male a backup prior to deleting the files



Back Up

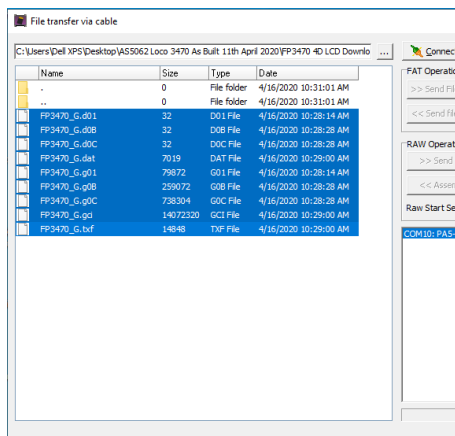
1. Create a temporary folder for saving the files
2. Highlight the files in the right window file and select "Send to PC"

Erase Files

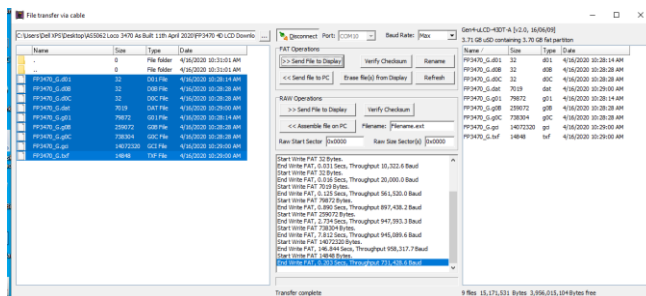
1. Highlight the files in the right window file and select "Erase From Display"

Upload New Files

1. Copy new file to the SD card Highlight the file on the left and press "Send file to display"



2. Once Complete the file will now be shown on the right window panel



3. Download Complete
4. Disconnect the Programming cable and fit the jumper link back

Section 13 Trouble Shooting Guide Loco Fire System

The FP3470 fire panel termination card has the following test point (TP) made available on the PCB. This make fault find simpler as all the fire system control line pass though.

Test Point	Description
TP- A	32VDC POWER IN
TP- B	0VDC POWER IN
TP- C	ENGINE COMPARTMENT 1 DETECTION +
TP- D	ENGINE COMPARTMENT 2 DETECTION +
TP- E	ELECTRICAL COMPARTMENT 1 DETECTION +
TP- F	ELECTRICAL COMPARTMENT 2 DETECTION +
TP- G	LOW PRESSURE DETECTION +
TP- H	SPARE
TP- J	FOAM ACTUATOR No 1 + (MONITORING VOLTAGE -)
TP- K	FOAM ACTUATOR No 2 + (MONITORING VOLTAGE -)
TP- L	
TP- M	
TP- N	COMMON 0V
TP- P	COMMON 0V
TP- R	REMOTE ACTUATOR RELEASE
TP- S	
TP- T	REMOTE ACTUATOR INDICATOR
TP- U	
TP- V	COMMON FIRE SIGNAL OUT
TP- W	COMMON FAULT SIGNAL OUT
TP- X	SHUTDOWN SIGNAL OUT
TP- Z	COMMON FIRE INPUT
TP- a	COMMON FAULT INPUT
TP- b	0V POWER (12VRAIL)
TP- c	0V POWER (12VRAIL)
TP- d	EARTH
TP- e	
TP- f	
TP- g	
TP- h	

Fault	Description	Remark
Panel has no power No green power light	The fire system obtains it power from:- 32vdc Powers Supply Unit (primary source) 32vdc from a centre tap of the battery (secondary supply)	• Check that 32v is present on JB1 Connector E terminals A (+) and B (-) Primary Source. • Check that 32v is present on JB1 Connector E terminals C (+) and D (-) Secondary Source. • Check that 32v Is present on JB1 Connector A Terminal A(+) and B(-) • Check the cable looms with JB1 are seated correctly • Check relay “H” the four pole change over relay is seated correctly • Check the PSU1,2 BAT1,2 fuses are not blown • Check the fuse on the FP3470 Termination card is not blown. • Check the fire panel power key switch is turned on • Check for power on Termination Card TP-A and TP-B should be 32vdc • Check the 40 way ribbon cable with the FP3470 panel is connected to the Main CPU card and the Termination card • Check CN2 on the termination card has 12vdc power on Ext and Int <i>Note ensure you measure with respect of the correct 0v as they are isolated supplies</i> • Check 10way and 20way ribbon cable are connected between the two large PCB within the FP3470 panel • Check that two internal regulator are working by viewing two red leds on the front card

Engine Compartment 1 Fault Light Illuminated	Panel is unable to detect the 1K end of line resistor	• Check the loom to socket B with JB1 is seated correctly see drawing FP3470-E-08. • Check that the detector line has power this should be approx. 6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-C(+) and TP-N(0v) on the termination card mounted to the inside back pan of the FP3470 Panel. • Voltage of approx. 11.1v would indicate that there is an open circuit on the cable check would need to be made at each detector to ensure the correct termination or there no damage to the heat probes.
Engine Compartment 2 Fault Light Illuminated	Panel is unable to detect the 1K end of line resistor	• Check the loom to socket B with JB1 is seated correctly see drawing FP3470-E-08. • Check that the detector line has power this should be approx. 6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-D(+) and TP-N(0v). on the termination card mounted to the inside back pan of the FP3470 Panel • Voltage of approx. 11.1v would indicate that there is an open circuit on the cable check would need to be made at each detector to ensure the correct termination or there no damage to the heat probes.
Electrical Compartment 1 Fault Light Illuminated	Panel is unable to detect the 1K end of line resistor	• Check the loom to socket C with JB1 is seated correctly see drawing FP3470-E-08. • Check that the detector line has power this should be approx. 6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-E(+) and TP-N(0v) on the termination card mounted to the inside back pan of the FP3470 Panel. • Voltage of approx. 11.1v would indicate that there is an open circuit on the cable check would need to be made at each detector to ensure the correct termination or there no damage to the heat probe.

Electrical
Compartment 2 Fault
Light Illuminated

Panel is unable to detect
the 1K end of line
resistor

- Check the loom to socket C with JB1 is seated correctly see drawing FP3470-E-08.
- Check that the detector line has power this should be approx. 6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-F(+) and TP-N(0v) on the termination card mounted to the inside back pan of the FP3470 Panel
- Voltage of approx. 11.1v would indicate that there is an open circuit on the cable check would need to be made at each detector to ensure the correct termination or there no damage to the heat probe.

Low Pressure Fault
Light Illuminated

Panel is unable to detect
the 1K end of line
resistor

- Check the loom to socket D with JB1 is seated correctly see drawing FP3470-E-08.
- Check that the detector line has power this should be approx. 6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-G(+) and TP-N(0v) on the termination card mounted to the inside back pan of the FP3470 Panel
- Voltage of approx. 11.1v would indicate that there is an open circuit on the cable check would need to be made at each detector to ensure the correct termination or there no damage to the heat probe.

F1 Actuator Fault	Panel is unable to detect the 1K end of line resistor or monitor the actuator coils	• Check the loom to socket D with JB1 is seated correctly see drawing FP3470-E-08. • Check that the actuator line has power this should be approx. -6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-J(+) and TP-N(0v) on the termination card mounted to the inside back pan of the FP3470 Panel • Check that the actuator has the correct 1k resistor, the back EMF diode, and a monitoring blocking diode fitted a small PCB that has all three comports on is fitted with the socket of the actuator • Voltage of approx. -11.1v would indicate that there is an open circuit on the cable check would need to be made at each through junction box.
F2 Actuator Fault	Panel is unable to detect the 1K end of line resistor or monitor the actuator coils	• Check the loom to socket D with JB1 is seated correctly see drawing FP3470-E-08. • Check that the actuator line has power this should be approx. -6.4v with the end of line resistor fitted with a multimeter check between Terminal TP-J(+) and TP-N(0v) on the termination card mounted to the inside back pan of the FP3470 Panel • Check that the actuator has the correct 1k resistor, the back EMF diode, and a monitoring blocking diode fitted a small PCB that has all three comports on is fitted with the socket of the actuator • Voltage of approx. -11.1v would indicate that there is an open circuit on the cable check would need to be made at each through junction box.

Manual Release
Hand switch indicator
not illuminated

Manual release indicator
is not illuminated at the 5
remote stations

- Check the loom with JB1 is seated correctly
Loom to socket K is for back right
Loom to socket J is for back left
Loom to socket H is for Front right
Loom to socket G is for back left
Loom to socket F is control Station
- Using a multi meter check that that power is been provided from the FP3470 by measuring 12VDC between Terminal TP-T(+) and TP-b(0v) on the termination card mounted to the inside back pan of the FP3470 Panel

Manual Release
Hand switch not
working

Manual release hand
switch not working

- Check the loom with JB1 is seated correctly
Loom to socket K is for back right
Loom to socket J is for back left
Loom to socket H is for Front right
Loom to socket G is for back left
Loom to socket F is control Station
- This is a monitored circuit however to ensure backwards compatibility the monitoring resistor has been placed with the FP3470 panel. Using a multi meter check that that power is been provided from the FP3470 by measuring 6.4VDC between Terminal TP-R(+) and TP-b(0v) on the termination card mounted to the inside back pan of the FP3470 Panel

Section 14 AS5062 Cause and Effect

[illegible]

