



Wireless Fire Detection

Product Guide

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Scope

Welcome to the Wi-Fyre® manual and product guide. This document will provide you with general information as well as detailed instructions on how to install, operate and maintain the products.



It is essential that this product guide is read prior to planning and installation and, it is assumed that anyone using this guide has an appropriate level of knowledge and skill with respect to hardwired and wireless fire detection and alarm systems.

Document Conventions

The following typographic conventions are used in this document:

Convention	Description
Bold	Used to denote: Emphasis.
<i>Italics</i>	Used to denote: References to other parts of this document or other documents.

The following icons are used in this document:

Convention	Description
	Recommended guideline: Advising to do so.
	Caution: Not appropriate to do so or; care taken to avoid danger or mistakes.

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1.0 Introduction

1.1 Product Introduction

Wi-Fyre® is a field programmable, wired to wireless universal ‘point type’ fire detection and alarm interface, designed to enable a number of associated wireless input and output field devices to be seamlessly connected and integrated into a new or existing hard-wired fire detection and alarm system.

The associated Wi-Fyre ‘Wireless-Transmitter-Receiver’, referred to in this document as a ‘Transponder’ or ‘WTR’, is field programmable and has been designed to operate, as standard, in any one of the following modes:

1. Connected to a conventional fire detection and alarm system.
2. Connected to an analogue addressable fire detection and alarm system, providing a collective response.
3. Connected to a Eurofyre analogue addressable fire detection and alarm C.I.E. loop (for either collective or individual, addressable control and response).
4. Used alone or as part of a stand-alone ‘Grade C’ fire detection and alarm system, for use in residential applications in accordance with BS5839 Part 6.
5. A stand-alone ‘input to output’ and ‘output to input’ bi-directional non-latching repeating interface.

Detailed information relating to the necessary connections, specifications and programming of the WTR for operation in the above modes can be found in the appropriate sections of this manual.



Prior to installation of a Wi-Fyre system, it is essential that a successful wireless survey has been conducted and documented in accordance with our recommendations, which can be found in section 12 of this manual or as a separate document ref. WF-SURVEY-001

2.0 Principle of Operation

2.1 Overview

Wi-Fyre operates in the 868MHz short range, European licence exempt frequency band. A typical system will normally consist of one or more standalone wireless transponders, each programmed to communicate with up to 30 mixed field devices such as smoke and heat detectors, manual call points, sounders and input/output devices. Communications between the transponder and field devices is bi-directional and incorporates a proprietary protocol to ensure that messages and commands are transferred in a fault tolerant environment, without collision.

3.0 System Planning and Design

3.1 Overview

Wireless technology is all around us, and there is a high probability that numerous devices and systems, all transmitting on a variety of different, similar or parallel frequency bands will be operating in the vicinity of your intended Wi-Fyre installation locale. In addition, no two buildings or environments are ever the same, comprising a complex mixture of building materials and fabrics, all capable of attenuating radio signals – thereby reducing available signal strength and effective range. It is therefore essential that, prior to the final specification and installation of a wireless system, a comprehensive wireless survey is conducted in order to ensure that secure and trouble free operation is achieved following installation and commissioning.

Wi-Fyre has been designed to help make this task fast and easy to complete with the help of several standard, built-in transponder test modes, together with the availability of a hand-held signal strength ‘test head’. Please consult and follow section 12 of this manual for details, instructions and guidance.

3.2 Product List and Order Codes

Wi-Fyre Transponders and Accessories

Part No	Description
10-001	Universal Wireless Transponder c/w LCD Indication & Control
10-002	Universal Wireless Transponder, No LCD Indication & Control
10-005	Universal Wireless Transponder, Loop Only c/w LCD Indication & Control
10-006	Universal Wireless Transponder, Loop Only, No LCD Indication & Control
10-003	Loop Short Circuit Isolator PCB (for use with ProFyre Addressable Systems mode) Release Date TBC
10-004	Universal Wireless Transponder PC Interface and Cable

Wi-Fyre Detectors

Part No	Description
10-010	Wireless Optical Detector c/w Batteries
10-011	Wireless A1R Heat Detector c/w Batteries
10-012	Wireless A2S Heat Detector c/w Batteries
10-013	Wireless Optical Heat Detector c/w Batteries
10-014	Wireless CS Heat Detector, 90C, c/w Batteries

Wi-Fyre Manual Call Points

Part No	Description
10-020	Wireless Manual Call Point, Surface Mount c/w Batteries
40-001	Clear Protective Cover

Wi-Fyre Sounders, Maxitone

Part No	Description
10-030	Wireless Sounder, Wall Mounted, Red, c/w Batteries
10-031	Wireless Sounder, Wall Mounted, White, c/w Batteries
10-032	Wireless Sounder/LED Indicator, Wall Mounted, Red, c/w Batteries

Wi-Fyre Universal OEM Sounder Platform

Part No	Description
10-050	Wireless Sounder Platform, Red, c/w Batteries, 17V, 20mA max output
10-051	Wireless Sounder Platform, White, c/w Batteries, 17V, 20mA max output

Wi-Fyre Input/Output Units

Part No	Description
10-060	Wireless Input/Output Unit, Red, c/w Batteries
10-061	Wireless Input/Output Unit, White, c/w Batteries

Survey & Test

Part No	Description
10-071	Wireless Survey Test Head c/w Batteries

Spares, Consumables & Accessories

Part No	Description
10-080	Wireless Detector Lithium Battery Pack (Contains 4 x AA)
10-081	Wireless Sounder & I/O Lithium Battery Pack (Contains 4 x AA + 2 x C)
10-082	Wireless Manual Call Point Alkaline Battery Pack (Contains 3 x AA)
10-083	Transponder LCD Indication & Control Front-plate
10-084	Wireless Detector Base, Without Batteries
10-085	Wireless Optical Smoke Detector Head
10-086	Wireless A1R Heat Detector Head
10-087	Wireless A2S Heat Detector Head
10-088	Wireless Optical Heat Detector Head
10-090	Wireless CS Heat Detector, 90C Head
10-089	Locking Screwdriver for Detector Base Tamper Resistance

Table 1: Product List and Codes

3.3 Design, Planning and Spacing

When wireless fire detection system technology has been specified or requested, it is normally a result of poor access or the inability to install cable to a specific area or room without the risk of causing damage to the delicate fabric or decoration of the building. In the majority of buildings and applications, hard-wired systems are relatively easy and cost effective to install and provide a lower cost of ownership over their product lifetime compared to wireless technology, which requires several battery changes over the same lifetime. Until wireless technology is capable of providing a minimum of 10+ years of operation without the need to replace batteries, this situation is likely to remain.

Wi-Fyre has therefore been designed to allow wireless technology to compliment and seamlessly integrate into either existing or new system installations, creating a 'hybrid' wireless & hard-wired solution, enabling system designers to use wireless devices where appropriate and in an economical fashion.

Even in the most extreme or difficult to cable buildings, it is normally possible to route a cable from a hard-wired system within close proximity to the area or room where it is desirable to install a single or group of wireless devices. This may, for example, be in a nearby riser, service corridor or void, where it would also be desirable and practical to site a wireless transponder. In this manner, it is possible to site several transponders along the route of zone or loop cabling in order to provide the desired level of wireless coverage, without the need for additional signal boosters or repeaters.

Where a single site 'system design' requires the installation of several hard-wired transponders which are within relatively close proximity of one another, it is important that each transponder must be set to operate on a different radio channel to avoid interference. The operating channels chosen should be noise free (refer to survey section of this guide) and it is recommended that they should be separated in even or odd channel multiples of 2 e.g. in a 4 transponder system the channels might be 2, 4, 8, 10 or 1, 3, 5, 7. This normally means that the number of transponders in a single building is limited to 6.

When planning a larger 'addressable' type system where there are several loop powered transponders connected to a single loop, care must be taken to ensure that the operating channel, transponder and physical end-device addresses are not duplicated.

3.4 Radio Signal Range and Performance

Most wireless devices operating on allocated licence exempt frequencies will have an 'open field' range of several hundred metres. Unfortunately, buildings are quite different from fields and, as stated earlier, range can be adversely affected by building fabric and materials which may, in extreme conditions, result in effective ranges of only tens of meters. A wireless survey is therefore an essential requirement prior to installation.

4.0 Installation

4.1 Unpacking and Handling Precautions

When handling sensitive electronic equipment, try to avoid touching components and circuitry wherever possible and, where this is unavoidable, take appropriate anti-static precautions and measures. Detectors and field devices are all supplied with detachable mounting plate's or back boxes that contain no electronics. Prior to installation, please take time to read and follow the installation guidance sheet which is packed with each product.

To avoid damaging the Wi-Fyre transponder during installation and cable routing, it is advisable to remove the PCB from the back-box beforehand. The PCB is secured with 8 x M3 cross-head fixing screws. Once removed, keep the PCB in a protective anti-static box, package, or on a flat dust and static free surface.

4.2 Mounting

The Wi-Fyre transponder should be mounted so that the internal antenna is vertical and in the position chosen at the completion of the wireless survey. It should be on a flat non-metallic wall or surface, and a minimum distance of 3m away from other electronic systems. If several transponders are in the same area, they should be positioned at least 5m apart, with each operating on a clear noise free channel.

4.3 Wiring

Depending upon the selected operating mode, it is possible that there may be up to five 2-core cables to terminate within the transponder housing. 6 x 20mm cable entry points have been provided at the top of the unit for this purpose.

5.0 WTR Hardware Configuration & Connections

5.1 Internal PCB Layout

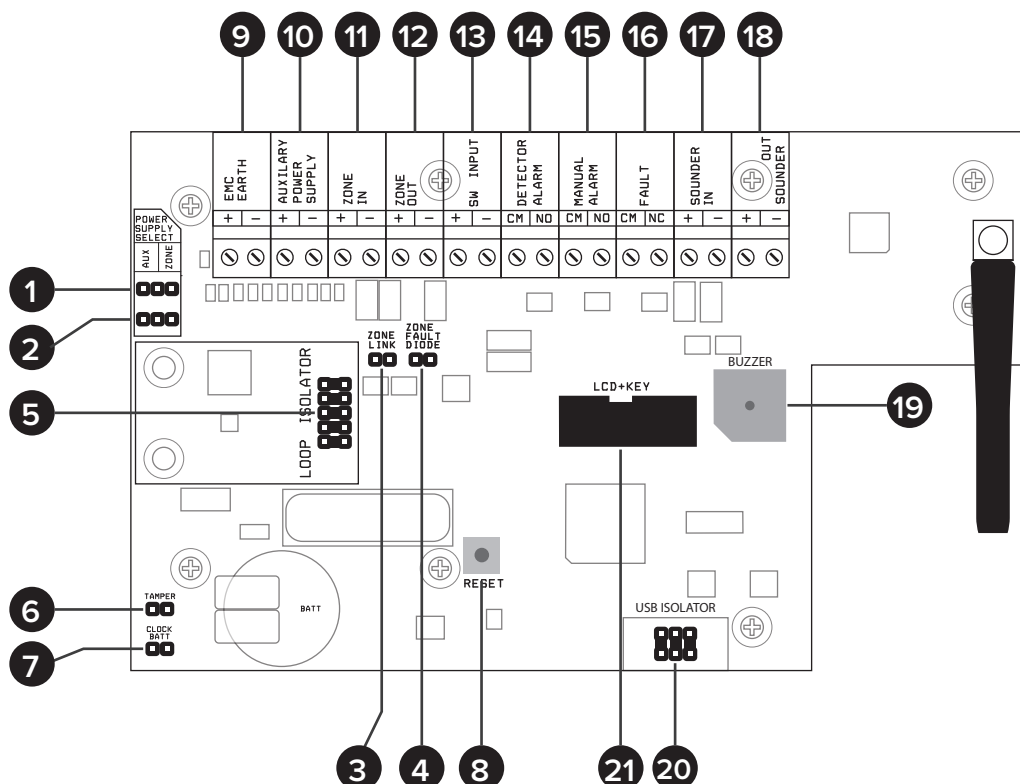


Figure 1: Transponder PCB Layout

No.	Feature	Notes
1	PSU selection header A	Allows selection of local or auxiliary power mode <i>See configuration options for details</i>
2	PSU selection header B	
3	Zone/Loop terminals, In/out shorting header	Remove when operating in conventional mode
4	Zone fault diode selection header	*Fitted when operating in conventional mode
5	Connection header for short circuit isolator PCB	Optional PCB is fitted for short-circuit loop isolation
6	Tamper disable header	Do not remove
7	Clock battery isolation header	Do not remove
8	Processor reset switch	Momentary switch for restarting processor
9	'System' earth terminal.	Do not connect to building earth
10	Auxiliary power supply input connection	See 1 & 2 above.
11	Conventional zone or addressable loop IN terminals	Connect detection zone or loop to these terminals
12	Conventional zone or addressable loop OUT terminals	Connect detection zone, loop out or end-of-line device
13	External volt-free switch input terminals	See cause and effects table for functionality
14	Automatic detector activation, volt-free contact output	Normally open, solid state contact
15	Manual call point activation, volt-free contact output	Normally open, solid state contact
16	General fault volt-free contact output	Normally closed, solid state contact
17	Conventional sounder circuit IN terminals	Connect sounder circuit to these terminals
18	Conventional sounder circuit OUT terminals	Connect sounder circuit out or end-of-line device
19	Internal buzzer	Used to warn of alarm and fault conditions (selectable)
20	PC Interface Header	Optional connection to PC software (requires interface)
21	Ribbon cable header to control/indication PCB	Connect to front panel

Table 2: Transponder PCB Legend

5.2 Conventional Panel Mode Using an Auxiliary PSU

When used in this configuration, it is possible to combine a Wi-Fyre transponder and its associated wireless field devices with an existing hard-wired conventional zone circuit, sounder circuit or a combination of both. This enables Wi-Fyre field devices to seamlessly co-exist with existing fire detectors and/or sounders on the same circuit.

The Wi-Fyre interface has been designed to be electrically compatible with most modern diode and non-diode based conventional panels and field devices, whilst at the same time allowing wireless field devices to share the fault monitoring capabilities of the conventional control panel. Faults reported by the wireless interface are none-latching and it is not necessary to perform any local reset or silence operations following the activation of an automatic detector or manual call point. Alarm and fault conditions transferred to the conventional control panel by the wireless interface are collective; however, individual devices can still be further diagnosed at the Wi-Fyre interface, which is fully addressable.

In this mode of operation, a local 9 to 40V dc (15mA minimum) power supply must be available at the transponder, which must be battery backed, fault monitored, and can either be derived (subject to availability) from the existing conventional fire alarm panel, or a local power supply complying with regulations in force. *If the power supply is local, it must also have a set of voltage free change-over contacts (VFCO) available, and should be connected as shown in Figure 2.

The Wi-Fyre transponder is equipped with both Zone and Sounder circuit 'IN' and 'OUT' terminals, which can be connected at any point on the existing hard-wired radial circuit(s). In the configuration described and shown below, Wi-Fyre will not take any power from the existing zone or sounder circuit and, therefore, device loading and battery standby capacities will not be affected.

Before proceeding, please ensure that the existing zone and sounder circuits are compatible with Wi-Fyre and that the required level of control and monitoring will be achieved. A specification for the transponder zone/loop and sounder terminations is provided in Appendix F. A full test should always be performed following installation in order to verify correct performance.

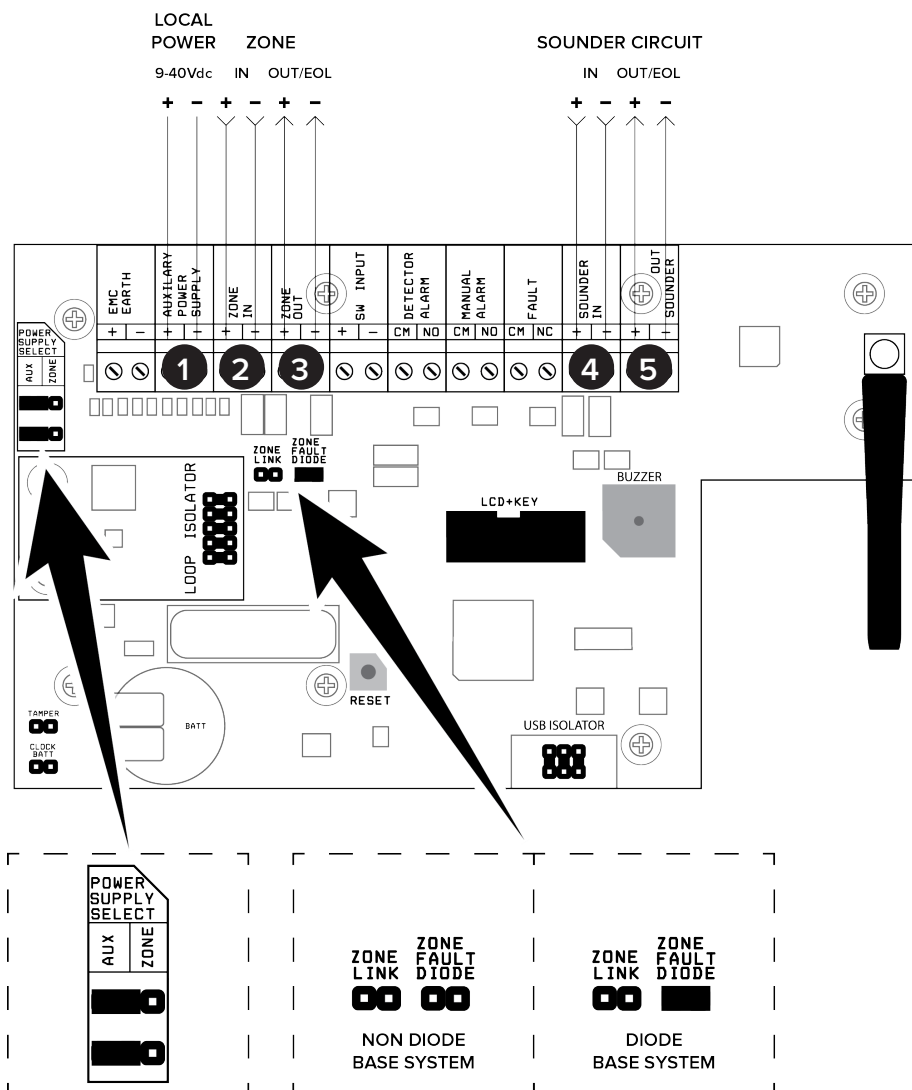


Figure 2: Conventional Wiring

No.	Termination & Configuration
1	Local Supply (9-40Vdc)
2	Zone Circuit In
3	Zone Circuit Out or EOL
4	Sounder Circuit In
5	Sounder Circuit Out or EOL

Table 3: Conventional Mode Wiring Legend

5.3 Conventional Panel Mode without an Auxiliary PSU

Depending upon the electrical specification of the fire detection and control panel, for convenience it may be possible to connect a Wi-Fyre transponder directly to the 2-wire zone circuit, which will then provide power and signalling between the wireless transponder and control panel without the need for an additional power supply source. Please contact Eurofyre for guidance and further advice.

5.4 Analogue Addressable Panel Mode with Collective Control and Response

This mode requires the host addressable fire detection and alarm system to have a compatible conventional zone monitor unit and/or sounder circuit controller available, together with a local 9 - 40V dc, battery backed and monitored power source (15mA @24v minimum).

Configuration of the Wi-Fyre transponder is very similar to that of the standard conventional mode, but with end-of-line monitoring components being fitted directly to the 'Zone' and Sounder 'OUT' terminals, rather than continuing on to other conventional detectors or sounders that may be on the same circuit.

5.5 ProFyre Addressable Panel Mode

When connected directly to the loop or zone wiring of a ProFyre addressable or analogue addressable control panel, the transponder will act as a seamless analogue-addressable gateway, enabling data and control to take place directly between the panel and individual wireless field devices - with wireless field devices behaving and appearing just like hard-wired devices. In this mode, power is taken from the loop itself and there is no need for a local power supply.

If associated wireless field devices are to form part of a new zone or area, an optional short-circuit isolator module is available, which is fitted to a header on the Wi-Fyre transponder motherboard, providing loop isolation in both directions.

Wireless field devices that are added to an individual transponder at the commissioning stage are each assigned a unique logical address, which will be in the range 1 – 125 and will also become their loop address. Wi-Fyre will not allow duplicate addresses to be added to the transponder, however, care should be taken to ensure that wireless addresses are not duplicated with existing hard-wired devices, as Wi-Fyre will not be able to detect this.

If there are insufficient address locations available on the chosen loop, it is possible to program the Wi-Fyre transponder so that a collective loop response is given from all associated wireless INPUT style field devices, which will mean that all fire or fault conditions will report and appear as a single address on the loop. This allows up to 30 additional input devices to be monitored as a group or zone.



Note: Loop outputs e.g. sounders and output units, are not included in 'collective mode' and will each continue to occupy a unique loop address.

Wireless devices forming part of an analogue addressable loop are 'type coded' and will appear within the host control panel 'device view' menus and displays by their respective type e.g. optical smoke, heat, sounder, manual call point.

An analogue value is also transmitted from each field device, which is a true representation of the current status of a particular wireless device. Unlike hard-wired devices, wireless field devices are required to continuously monitor their battery status, wireless connectivity and tamper status. This information is contained in the analogue value, which can be viewed and interpreted at the panel rather than having to interrogate the devices from the Wi-Fyre transponder. Values and their definitions are as follows:

Displayed Value

1	Communications Lost
2	Battery Fault - Low (30 days)
3	Battery Fault - Removed/Failed (7 Days)
4	Removed/Tampered
5	General Fault
16	Normal Condition
25	Detector Normal
32	I/O Relay(s) or Sounder is Active/ON.
64	I/O Input High or Manual Call Point Alarm/Operated
80	Detector Alarm

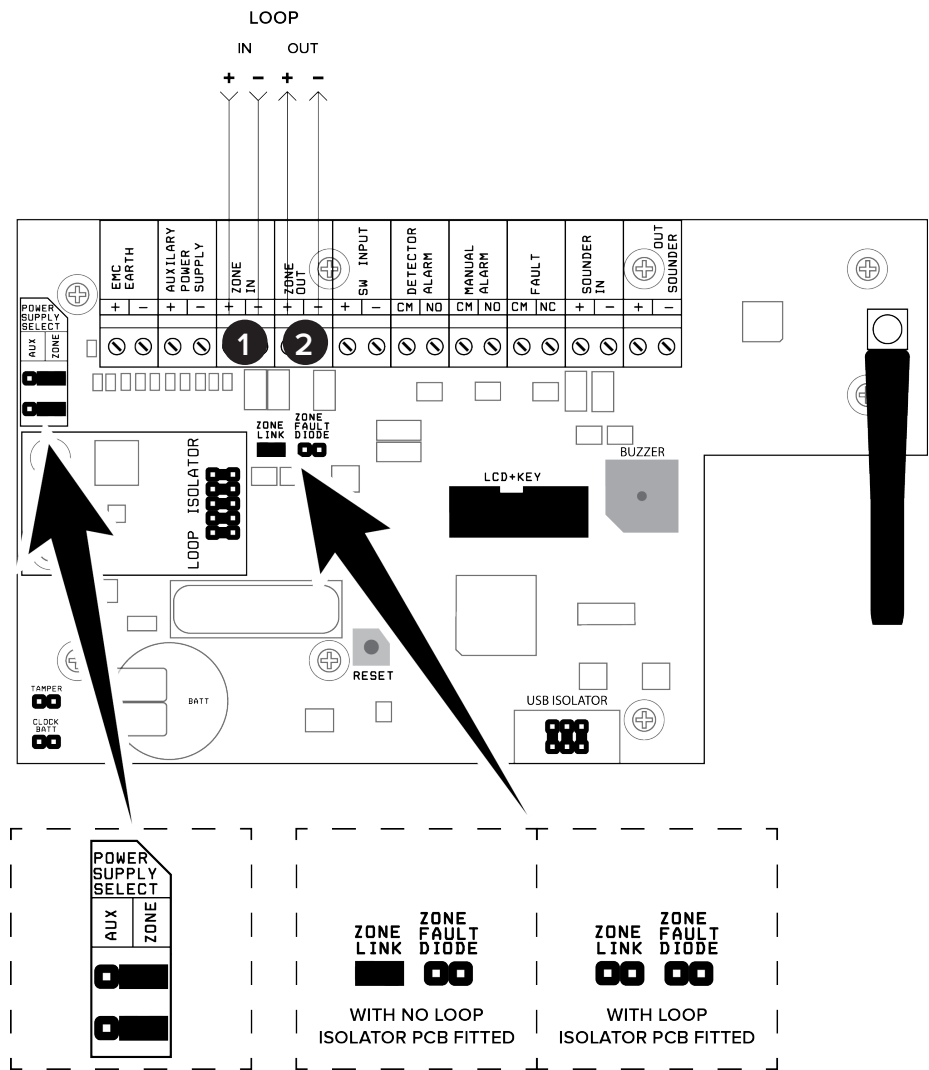


Figure 3: ProFyre Addressable Wiring

No.	Termination & Configuration
1	Loop In
2	Loop Out

Table 4: ProFyre Addressable Mode Wiring Legend

5.6 ProFyre 2-Wire Panel Mode

Please contact Eurofyre for W-Fyre to T8 Logical Address Comparison Chart.

5.7 Standalone Mode (Residential Use Only)

In standalone mode the Wi-Fyre transponder is transformed into a basic, menu driven control and indication panel, capable of displaying events and allowing fault and alarm conditions to be acknowledged, silenced and reset. This mode is intended for residential use only and must not be used in commercial systems. Power to the transponder must be provided from a Wi-Fyre mains derived power supply unit, which is monitored, battery backed and will provide a minimum of 72Hr standby power in the event of mains failure.

In addition to the local PSU input and monitoring connections, there are also voltage free contacts available for manual call point and/or automatic detector alarm events, together with a common fault. The alarm relays are normally open going closed on activation and the fault relay is 'failsafe' normally closed, going open on any fault. In stand-alone mode these outputs can therefore be used to connect the Wi-Fyre system to a remote manned centre or monitoring system, or for shutting down plant etc.

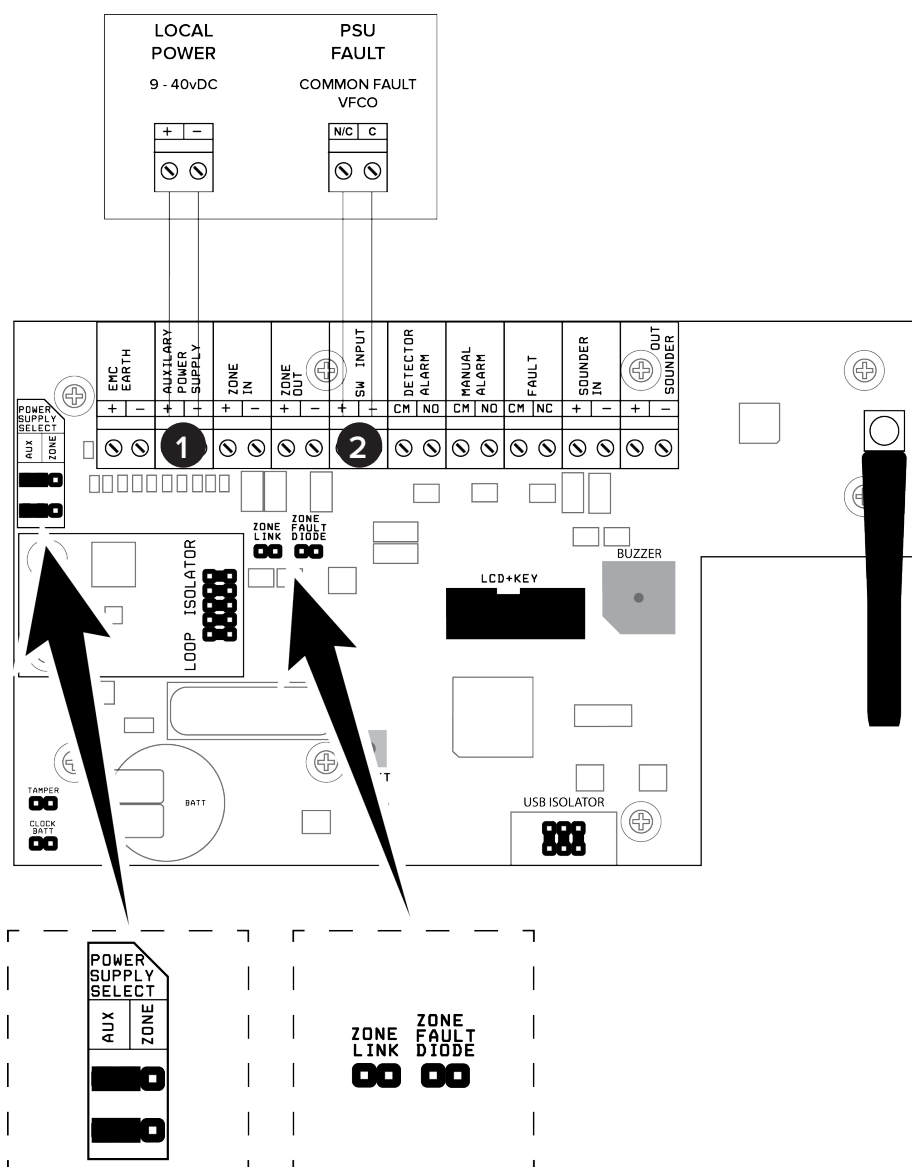


Figure 4: Standalone Wiring

No.	Termination & Configuration
1	Local Supply (9-28Vdc)
2	*PSU Fault (Common Fault VFCO)

Table 5: Standalone Mode Wiring Legend

5.8 Input/Output Reflection Mode

When operating in 'conventional mode', it is also possible to use a Wi-Fyre transponder together with one or more field mounted I/O units to wirelessly repeat inputs to outputs, and/or outputs to inputs. This, for example, will allow two systems to be wirelessly interconnected, provided that the wireless devices are within range. In this mode, wireless inputs and outputs are non-latching.

6.0 Menu Structure

6.1 Overview

Wi-Fyre can be set-up and put into use with the help of an integral panel-mounted LCD control interface, USB PC link, or a combination of both.

Irrespective of the method chosen, the graphical user interface is identical and all menus have been designed to be intuitive. As with most life safety system conventions, menus are split between USER and ENGINEER; the latter being password controlled in order to prevent unauthorised access and tampering.

Although a full display and control interface is always a useful feature to have, there may be occasions when it is not needed other than by the visiting engineer; therefore, at order stage, the Wi-Fyre transponder is available with or without a permanent, front-mounted control and indication fascia. Where a blind front-plate is preferred, it is also possible to order a separate transponder control fascia, which can then be carried by the engineer in order to interrogate and control a Wi-Fyre transponder during service and commissioning visits. The control and LCD display interface is connected to the motherboard by a polarised ribbon cable, which has strain relief and can be hot-swapped i.e. there is no need to power the system down and back up again to make or remove the connection.

In addition, there is also a Wi-Fyre 'USB PC link' kit available, which consists of a plug-in, electrically isolated micro USB interface PCB, together with connecting lead and software. This module can also be hot-swapped onto the motherboard and will enable the same level of display and control to be performed. A PC link also makes it possible to copy and paste the contents of the historic log and physical device lists into an excel file for record keeping purposes.

Transponder Menu Structure

Main Screen	Exit Main Menu			
	Engineer Menu	<Enter Password>	Exit Engineer Mode	
	View Point Status		View Point Status	
	View Event Log		View Event Log	
			Addressable Loop Test	
			WTR Status	Sound Mode
			Add New Device	
			Delete Device	
			System Admin	Silence
				Global Reset
				Change Password
			Test Channel	
			Set Date & Time	
			Select Language	
			Service Menu	Factory Reset
				Loop Type
				Common Alarm
				Alarm Duty Cycle
				PSU Monitor
				Comm.
			Check Voltage	
			Test Device	
			Device Information	

Table 6: Menu Structure

6.2 Main Screen

The main screen allows the user or engineer to view and verify the current, collective status of the transponder and its associated field devices. In stand-alone mode, which is the default on initial system power-up, the screen will display the alarm and fault status and allow the control keys to perform a basic silence and/or reset operation. In all other modes the screen will display additional information as detailed below.



Figure 5: Standalone Main Screen

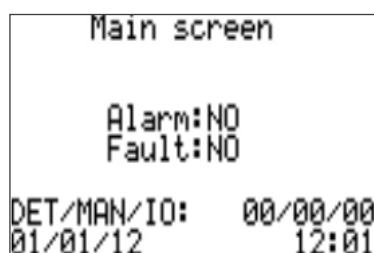


Figure 6: System Main Screen

Definitions:



Alarm:	If no automatic or manual fire alarm conditions are active, the word 'NO' will be displayed. If a single or multiple automatic or manual alarm(s) is active, the number of active alarms will be displayed in brackets e.g. (3), followed by the addresses of the first 2 alarm devices. If there are more than 2 active alarms, the address of these can be found within the 'View Point Status' menu.
Fault:	If no fault alarm conditions are active, the word 'NO' will be displayed. If a single or multiple fault alarm(s) is active, the number of active device faults will be displayed in brackets e.g. (3), followed by the address of the first 2 devices. If there are more than 2 active fault alarms, the address of these can be found within the 'View Point Status' menu.
DET/MAN/IO	The corresponding numerals to the right hand side of this field provides a summary of the total number of associated wireless field devices in use, e.g. 10/05/02 would mean that there are 10 automatic detectors, 5 manual call points and 2 output devices (sounder or I/O) currently associated with the transponder, 17 end-devices in total.
XX/XX/XX	The last line of this menu field shows the current, programmed date and time in the following format: DD/MM/YY & HH:MM. The time is in the 24 hour format and is not adjusted automatically for daylight savings.

6.3 View Point Status (Accessible at User and Engineers Menu)

This screen allows the user or engineer to view the current status of a single field device.



Figure 7: View Point Status Screen

Logical Address	This is the unique address of the field device being displayed, which was chosen during the 'Add new device' procedure. Use the  and  control to scroll between installed devices. Only existing/fitted devices will be displayed.
XXX Sec Ago	This is the time, in seconds, since the last valid auto-report message was received from the field device. Devices will normally report back at 150 second intervals.
1st Battery	The voltage of the primary battery pack in mV (millivolts).
2nd Battery	The voltage of the secondary battery pack in mV (millivolts). Note: Primary and Secondary battery packs are individually monitored and have the following additional attributes: '<' The battery pack currently in service 'L' low battery (30 days warning) 'X' Battery has 7 days or less capacity
Alarm 'YES' or 'NO'	The alarm status of the selected device
Fault 'YES' or 'NO'	The fault status of the selected device
PHY	This is the physical, numeric address of the device. It is a unique value, cannot be changed, and is a useful way to positively confirm the identity of a field device, which also has a corresponding bar coded and numeric label on the device PCB itself.
Type	This field confirms the type of device currently being displayed: OPT Optical smoke detector HTR Rate of rise heat detector HTH High temperature heat detector MCP Manual call point SNR Sounder I/O Input/Output unit

RSSI

This is short for 'Received Signal Strength Indication' and is the field strength received by the transponder from the field device, with levels shown in dBm. A corresponding six segment bar chart is also updated beneath, with the following calibrations:

6 Bars visible	-47dBm	<= RSSI	<	
5 Bars visible	-55dBm	<= RSSI	<	-47dBm
4 Bars visible	-63dBm	<= RSSI	<	-55dBm
3 Bars visible	-72dBm	<= RSSI	<	-63dBm
2 Bars visible	-80dBm	<= RSSI	<	-72dBm (-80dBm is the recommended minimum limit)
1 Bar visible	-88dBm	<= RSSI	<	-80dBm (signal strength is too low)
0 Bars visible	-97dBm	<= RSSI	<	-88dBm (signal strength is too low)

Values greater than -47dBm are not reported and, therefore, signal strengths equal or greater than -47 are always indicated as '> -47 dBm'.









AV

This is an Analogue Value, which is automatically generated as a result of 'device current status' and can be interpreted as previously described above, or when viewing in analogue mode at a ProFyre control and indication panel.

6.4 View Event Log

The event log is updated whenever a significant change in status occurs at the transponder and is available to assist the user or engineer. Events are time and date stamped and are shown as an 'Address' followed by a 'Code'. Codes are abbreviated and are described in Annex C. Up to 16 events are displayed at the transponder, or 128 when connected to the PC software. Events are arranged as first in, last out, and can be scrolled up and down.




6.5 Engineers Menu



This screen can be scrolled through  and  in order to stay within the user menu structure. Alternatively, pressing  will result in a request to enter an 'ENGINEERS' code. The factory default is '0000' which can be changed, or may have already been changed from within the engineers menu. Use the    and  keys to select the known code and then select and press . If an incorrect code is entered, an 'incorrect password' message will be given and the code must be re-entered.






The following menus 6.6 - 6.18 Are only accessible from within the engineers menu.

6.6 Addressable Loop Test

Press  to enter or   to scroll past.

This screen confirms the protocol status of associated wireless field device(s). Press  and  to scroll between devices, or EXIT to return to the menu.

6.7 WTR Status

Press  to enter or   to scroll past.

This screen allows the current operating channel and frequency of the WTR (transponder) to be verified. It also shows the current 'Alarm' and 'Fault' status of the transponder and allows the engineer to select an internal feedback buzzer 'Sound Mode' which can be set one of the following modes: OFF, ALL or EVENT.

6.8 Add New Device

Before proceeding:

1. Read and follow the installation instructions supplied with the chosen field device to ensure that the batteries are fitted correctly and that all factory fitted insulating battery 'white' transport strips have been removed.
2. Press and hold the **START** button of the field device for 15 seconds. This procedure will clear any previously stored data and ensures that the device is in its original factory default condition, ready for programming.

Press **OK** to start the adding procedure or **<** **>** to scroll past.



Figure 8: Add New Device Menu

3. A message 'Waiting for new device' is given.
4. Immediately press the **START** button of the field device for 3 seconds. If the device is functioning correctly and is within range, the screen will change to show the physical characteristics of the device to be added as shown above. PHY addresses and type should match. Note: Once the search process has been initiated, the field device start button must be pressed and found within 10 seconds, otherwise the search routine will time-out and it will be necessary to cancel and re-start the 'add new device' sequence.
5. The system will automatically assign the next available free address location and a default type code 'OPT'. The address line will now be highlighted. If this is acceptable, press the **>** scroll button followed by **ACCEPT**. Otherwise, continue to follow the procedure below to manually select another free address and/or alternative type code. Note: The type code chosen must match the type of detector head being fitted to the base.
6. Use the **<** **>** scroll buttons until the 'logical address' or 'Type' line is highlighted, then press **OK**. The highlight will now reduce in size to highlight the parameter to change.
7. Use the **^** **v** **<** **>** scroll buttons to make the necessary changes, followed by **OK**.
8. When finished, Press the **<** **>** scroll buttons until **ACCEPT** is highlighted, followed by **OK**.



Note: All address and type code changes must be completed and the device accepted within 1 minute of pressing the field-device start button, otherwise the end-point will time out and return to its default factory state.

6.9 Delete Device

Press **OK** or **<** **>** to scroll past.

Use this menu to delete an unwanted device from the transponder.

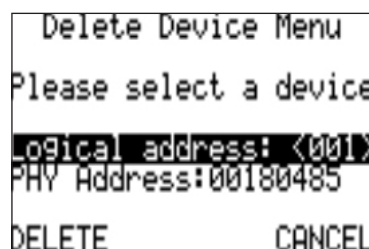


Figure 9: Delete Device Menu

1. The logical address line will be highlighted.
2. Press **OK** to highlight the address field.
3. Press **◀ ▶** until the address of the device to delete is reached, followed by **OK**.
4. Press **▶** to highlight DELETE, followed by **OK**.
5. Remove the physical, unwanted device from its base or fixing and, prior to removing its batteries, PRESS its START button for 15 seconds in order to return it to factory default.



Note: if this is not done, the device will continue to transmit its data to the transponder, which will reported periodically as a 'UNS' event within the event log.

6.10 System Administration

Press **OK** to enter or **◀ ▶** to scroll past.

This menu should be accessed if the transponder password needs to be changed; it also allows the engineer to manually Reset or Silence the transponder, if necessary, during service visits.

1. Press **◀ ▶** until the required field/line is highlighted, followed by **OK**.
2. If 'Change Password' is selected, use the **⬆ ⬇ ⬇ ⬆** keys to enter the OLD and NEW passwords, followed by **OK**.



Note: Be sure to check and make a note of the new password before saving, as it is not possible to retrieve it or reset to factory default afterwards.

6.11 Test Channel

Press **OK** to enter or **◀ ▶** to scroll past.

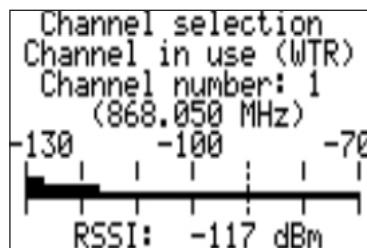


Figure 10: Channel Selection Menu

This menu is mainly used during a wireless survey to identify a suitable operating channel for the transponder; although it is also useful to access afterwards in order to verify performance. The display is calibrated in dBm and is continuously updated until the channel number is changed and, therefore, extended monitoring periods will produce better results. A suitable operating channel would be one that has very low noise levels. If, during the monitoring period, the noise level is seen to exceed the vertical dotted line, the channel is deemed unsuitable. The system is also able to detect other Wi-Fyre transponders in its vicinity and will display a message 'Channel in Use' if one is found to be in range at or near the chosen frequency. The display has three calibrated visible bars:

Top = Lowest noise level detected

Middle = Average noise level detected (also shown as an RSSI numeric dBm value)

Lower = Highest noise level detected

1. Press **◀ ▶** to change channels.
2. If the current channel appears to be low noise, leave for an extended monitoring period.
3. Observe and make a note of the final results.
4. Press **OK** to exit



Note: This menu is intended for display purposes only and it is not possible to change the current operating frequency of the transponder by changing from one channel to the next. If a system has been set to operate on a channel which is subsequently found to be unsuitable due to interference or high levels of background noise, it will be necessary to perform a full factory reset, followed by the reset and re-allocation of all associated field devices.

6.12 Set Time and Date

Press **OK** to enter or **◀ ▶** to scroll past.

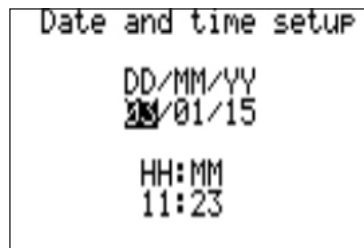


Figure 11: Date and Time Setup Menu

Enter the date and time using the **⬆ ⬇ ⬅ ➡** keys, then press **OK**.

6.13 Select Language

Press **OK** to enter or **◀ ▶** to scroll past.

As standard, the following transponder languages are available, and it is possible to switch between them at any time. Default is English. When a new language is selected, the controller will ask for confirmation in order to avoid making a change due to a key-press error.

English
French
German
Spanish

6.14 Service Menu

Press **OK** to enter or **◀ ▶** to scroll past.

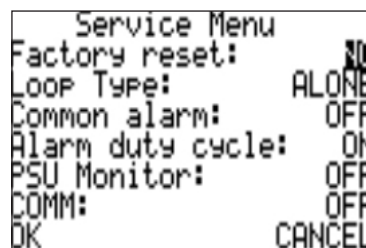


Figure 12: Service Menu

6.15 Check Voltage

Press **OK** to enter or **◀▶** to scroll past.

This is a high level engineering menu and can be used during fault finding.

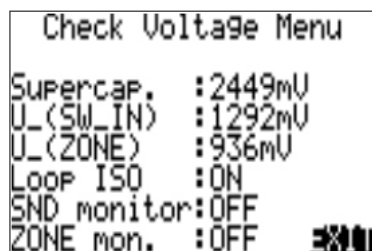


Figure 13: Check Voltage Menu

6.16 Test Device

Press **OK** to enter or **◀▶** to scroll past.

6.17 Device Information

Press **OK** to enter or **◀▶** to scroll past.

This screen is used for verification purposes and displays the version of transponder software and hardware currently in use.



Figure 14: Engineer Menu

6.18 Exit Engineers Menu






Press **OK** to leave the engineers menu or **◀▶** to scroll past.

7.0 Programming & Commissioning

7.1 Front Panel Layout

Although a Wi-Fyre transponder is available with or without an active front panel, the front panel is a convenient tool for initial set-up and commissioning, and also for interrogation at any time afterwards. The front panel has 5 tactile switches and an LCD display. Alternatively, a PC interface is available to perform the same function.

7.2 Navigation and Control

Ensure that the front panel 'keyed' ribbon cable is connected to the motherboard of the transponder. Use the four tactile buttons labelled     to navigate through the various menus, together with the  button.

7.3 WTR Start-up Procedure

Prior to start-up, please ensure that information gathered during the wireless site survey is to hand, as this information will be needed to ensure that the correct operating frequency/channel is selected.

Before the Wi-Fyre transponder can be powered and configured, a physical operating mode must have been chosen and all necessary wiring, connections and header positions completed, tested and verified in accordance with the instructions and guidance contained in section 5. Connections may also involve routing and connecting existing loop, zone and/or sounder circuits through and onto the Wi-Fyre interface, and care should be taken to ensure that these circuits are compatible and powered-down beforehand.

Once this has been completed, apply power to the transponder which, depending upon the mode of operation may require re-instating the addressable loop and/or the auxiliary power supplies.



Note: When Wi-Fyre is powered-up from rest for the first time or after a lengthy power down period, the display will remain blank for a period of approximately 40 seconds, after which a system progress screen will be displayed. The system will then become active as soon as the system voltage has progressively reached 2V. Once this happens, Wi-Fyre will then be in its default initialisation mode.

If the transponder has previously been powered and programmed, the initialisation routine will be skipped and the 'Main Screen' will be displayed immediately after the power-up sequence.

7.3.1 Selecting a 'common' WTR Logical Address








Note: This menu is only shown when Wi-Fyre is powered up for the first time, or after a Factory Reset has been selected from within the 'Service Menu'.







The system will prompt you to select a WTR logical address, which can be in the range 1 to 125. Factory default is 125, and it is only necessary to change this when a wireless field device is required at the same address or if the system is operating in loop mode and 125 is already in use, or if the control panel has a limited loop address range. If in doubt, change the logical address to a low number such as 30 or less, provided it is not already in use.

If address 125 is acceptable, press ; otherwise use     to scroll and select the desired address, and then press .

7.3.2 Set Time & Date

Enter the date and time using the     navigation keys, then press . If the date and time are entered incorrectly, changes can be made from within the 'set date and time' menu following completion of initial set-up. Note: The transponder does not support daylight saving.

7.3.3 Select Radio Operating Channel

Use the  and  keys to scroll to the operating channel that was chosen during the wireless survey and then press . The default channel is 1. If an incorrect channel is selected and you need to make a change, it will now be necessary to go into the 'Engineers Menu' to access the 'Service Menu'. From here set 'Factory Reset' to YES, followed by , which will then take you back to procedure 7.3.1. erasing all previously entered data.




At this point Wi-Fyre will now be in its default 'Standalone' display and operating mode.



Important Note: If the final operating mode chosen is not 'Standalone' it will be necessary to make changes as described in section 7.3.4 below. This can, however, be carried out at any time and it is often desirable to leave the transponder in standalone mode during initial commissioning of the wireless end-devices which would then allow local testing of detectors, call points and sounders without continuously triggering alarm and fault events on an addressable loop. Switching between operating modes has no effect on the field devices which have already been added to the Wi-Fyre transponder.

7.3.4 Select Software Enabled 'loop type', 'operating modes' and 'alarm duty cycle'

After deciding upon an appropriate operating mode as described in Section 5, it is important to ensure that the following, matching software settings are made or in place; otherwise Wi-Fyre will not behave as expected with appropriate cause, effect and functionality.

Go to the 'SERVICE MENU' and make the following changes, followed by .

Service Menu' Transponder Operating Mode

Parameter	Conventional	Addressable	Collective Addressable	Stand-alone
Factory Reset	OFF	OFF	OFF	OFF
Loop Type	CONV	ZETA or MKII	ZETA or MKII	ALONE
Common Alarm	OFF	OFF	ON	OFF
Alarm Duty Cycle	ON	OFF	OFF	OFF
PSU Monitor	*See Notes Below	OFF	OFF	ON
COMM.	**See Notes Below	**See Notes Below	**See Notes Below	**See Notes Below

Table 7: Transponder Operating Modes

* ON only if a local PSU is used. Connect the PSU normally closed volt free contact to the SW Input Terminals.

** ON for extended communication fault reporting timings. Extends fault timings beyond EN54-25 and will require a variation to be noted.

8.0 PC Interface

A PC interface kit is available (P/N 10-004), consisting of a Micro USB PCB sub-assembly, connecting lead and software. The PCB has a female header, which can be hot connected with a corresponding connector on the Transponder as shown in the diagram below. The software is non-executable and can be run directly from its own file location, which means that it may also be kept and run from on an external flash drive. For ease of use, the controls and visual interface displayed are identical to that of the Transponder LCD front-plate.

9.0 Service & Maintenance

9.1 Battery Replacement and Disposal

Batteries are supplied with each product at order stage and are designed to have a useful life of up to three years depending upon shelf life, ambient temperature and operating regimes.

Each Wi-Fyre field device contains a primary and secondary battery pack, each of which is individually monitored and will report a fault condition if it is depleted, missing or has 30 or 7 days of useful remaining capacity available. When a battery warning is given, all batteries for the particular field device must be replaced as soon as possible. Batteries used and specified for use by Wi-Fyre are standard, commercially available products. Part codes are shown in the specification section of this manual.

10.0 Environmental

Apart from the weatherproof manual call point, all field devices are for indoor use only.

11.0 Troubleshooting

1. **Q: When I try to ADD a new device to the transponder, the device is not found.**
A: Check that new batteries have been fitted and polarity is correct.
A: Perform a device **RESET** by holding down the **START** button for 15 seconds.
A: Make sure that the device is within range of the transponder.
2. **Q: When I check the event log, there is a 'UNS' message being reported periodically.**
A: A device which has previously been added to the transponder has been deleted, but still has its batteries fitted and is in transponder range. Locate and Reset the device by holding down its **START** button for 15 seconds, then remove the batteries.
3. **Q: A field-device has been added to the transponder successfully but is periodically reporting a C2F fault condition.**
A: Check that the field-device received RSSI signal strength is within the recommended limits (see section 6.3). If the levels are too low, try moving the device until the level is acceptable.
A: Remove and temporarily place the field-device close to the transponder. If the signal strength is still too low, check its batteries and, if the batteries are found to be ok, try replacing the device.
A: There is interference on the operating channel selected. Go to 'test channel' menu (see section 6.11), select and monitor the background RSSI level of the previously chosen operating channel. If noise levels are too high, re-configure the whole system, selecting a different 'clear' operating channel.
4. **Q: When I check the event log, field-devices are periodically and chaotically reporting a C1F condition.**
A: If the problem involves all devices, check the operating channel for interference (see section 6.11) and change if necessary.

12.0 Site Survey Procedure, Tools and Documentation

12.1 Introduction

Reference is made throughout this document to the importance of having a thorough, well planned and tested survey completed prior to installation. This will not only speed up the time taken to complete installation and commissioning, but will ensure that a reliable, trouble-free system is in place afterwards.

A Wi-Fyre survey is carried out using a standard Transponder together with a purpose designed Test-head. For consistency, the test-head has an identical performance to that of a standard wireless detector base and is fitted with an 8- way colour coded rotary LED array to indicate the signal strength received at the Transponder from its current location. Bi-directional received signal strength levels for the end-device and transponder are also periodically updated and displayed during testing at the Transponder (LCD front panel) for documentation purposes.

Procedure

For survey purposes, the transponder must be put into 'factory default' mode, and can be powered using a small, portable 9 -28V dc regulated table top power supply or, alternatively, a battery pack of equivalent voltage, which should be connected to the AUX POWER SUPPLY terminals. Remember to change the two top L/H PCB headers to the AUX position beforehand.

- When ready, place the Transponder at the desired, final location, ensuring that it is in the correct upright position and then apply power. After initialisation, go into the 'Engineers' menu and then navigate to the 'Service Menu'. Press **OK** to gain entry then:
- Change the 'Factory Reset' mode to **YES**
- Scroll down to the bottom of the screen, highlight OK and press **OK**.
- Press **OK** at the following 'Set WTR Address' and 'Date and Time Setup' menus. The 'Channel Selection' screen will now appear. Proceed to 12.2 below.

12.2 Channel Selection (See 6.11 for More Details)

The first part of a survey requires a clear operating channel to be identified.

- By default, the channel number monitored will now be Channel 1.
- If channel 1 appears to be noise free, monitor this channel for a minimum of 5 minutes, changing to another channel only if the lower 'maximum' bar exceeds the dotted vertical limit line.
- If the limit line is exceeded, immediately select another channel, repeating this process until a suitable result is obtained. The 'maximum' lower bar will always display the highest noise level detected and, if time allows, it is good practice to continue monitoring the channel for a longer period in case there are some infrequent sources of interference present.
- Make a note of the chosen channel and then press **OK**.
- The display will now be in the 'Conventional' main screen mode.

12.3 Range Integrity Testing

Go back into the 'Engineer' menu and then scroll to the 'Test Device' menu. Press **OK** to gain entry then:

- Ensure that you have a Test-head available with good batteries fitted.
- Highlight **OK** and then Press **OK** from within the 'Test Device' menu.
- Immediately operate the **START** button on the test-head base i.e. hold down for 3 seconds maximum.
- After a few seconds delay the test-head should have several LED indicators illuminated, and the transponder screen should be in test mode as shown below.

```

Device Test Menu
PHY:00170519 Type:05
T>E 00014 | 00021 E>T
PLR: 00.00 | 00.00 %
PER: 00.00 | 00.00 %
BER: 00.00 | 00.00 %
RSSI: > -47 | > -47 dBm
RESET PAUSE
  
```

Figure 14: Device Test Menu

Explanation of bi-directional data display:

1. The left-hand column shows data received by the End Device (Test head) from the Transponder
 2. The right-hand column shows data received by the Transponder from the End Device
 3. T>E or E>T The number of data packets transmitted and received
 4. PLR Packet lost rate, expressed as a percentage
 5. PER Packet error rate, expressed as a percentage
 6. BER Bit error rate, expressed as a percentage
 7. RSSI Received signal strength, expressed in dBm
- The test-head can now be used to establish the signal strength obtained at various locations and distances away from the transponder position. For optimum performance, a minimum of 4 mixed, green/yellow/red indications should remain illuminated on the test-head, or a value between **-46 and -80 dBm RSSI** in both directions at the transponder.



Note: The test-head is also designed to warn of positions, usually less than 5m away from the transponder, which are too close for reliable communication. In this, instance, the test-head will show **two solid green and two red indications**.

- When surveying an area, it is recommended that the test-head is kept in the correct orientation and at the exact position intended for the installation or the real detector. The test-head is the same shape and size as a normal detector and, where ceiling heights are excessive or a more accurate result is required, the assembly can be fitted to a suitable detector removal pole to position it as close as possible to the desired final position.



Note: Although a 'test head' is specified and is the recommended way of performing a survey (due to it having its own built-in visual signal strength indication), it is also possible to use any standard 'end-device' for the survey, as signal strength information is always displayed at the Transponder in 'device test mode'. If you decide to use a standard end-device for the survey, please ensure that the start button has been pressed for 15 seconds beforehand, so that it is in its factory default state.

12.4 Completing Documentation

Print and use the survey template provided to record the results. Try to provide as much detail as possible, as this will help the installation engineer.

Wi-Fyre Site Survey Form

Date					
Site Address					
Site Contact					
Location of Wireless Transponder					
Operating Channel Selected		Frequency (MHz)		AV. Noise Level (dBm)	

Ref.	Add.	Type	Location (include on drawing/sketch if possible)	Channel	Test Head LEDs Lit	Field Device to Transponder dBm	Transponder to Field Device dBm	Pass/ Fail
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

26								
27								
28								
29								
30								

Limits: PASS, 4 LEDs or more at test head. Transponder dBm levels between -46 and -80

Record the condition of site at time of survey

General Survey Notes (as much detail as possible. Use separate sheet if necessary)

Acceptable for Installation

Name

Signature

Appendix

Appendix A – Channel Frequency Table

Channel	MHz
1	868.050
2	868.150
3	868.250
4	868.350
5	868.450
6	868.550
7	868.775
8	868.875
9	868.975
10	869.075
11	869.175
12	869.475

Table 8: Channel Frequency

Appendix B – Analogue Value Definitions

Displayed Value

1	Communications Lost
2	Battery Fault - Low (30 days)
3	Battery Fault - Removed/Failed (7 Days)
4	Removed/Tampered
5	General Fault
16	Normal Condition
25	Detector Normal
32	I/O Relay(s) or Sounder is Active/ON.
64	I/O Input High or Manual Call Point Alarm/Operated
80	Detector Alarm

Appendix C – Event Log Definitions

In normal use the WTR will store important operational information in its historic event log, which is accessible from the user or engineers menu. The following codes and their definitions apply:

Code	Definition
000	No event
ON	WTR Power up
BOD	BrownOut detection reset
WDR	WatchDog reset
FRS	Factory reset Initiated
005	Battery replaced
ISO	Loop isolator activated
SAC	Sounder loop activated
SLA	Sounder activated
009	EEPROM read-write error

SLD	Sounder loop deactivated
ALM	Alarm
TAM	Tamper
FLT	Fault
PLO	Primary battery low
SLO	Secondary battery low
POF	Primary battery discharged
SOF	Secondary battery discharged
30D	Thirty days left in batteries
7D	Seven days left in batteries
PSF	Power supply fault
C2F	Device communications fault
C1F	Communication error
UNS	Status message received from unknown device
COK	Communication resumed
STT	WTR Time has been set or changed
PWF	Password entered incorrectly
LRS	Loop or zone reset
GRS	Global reset (from menu)
071	Detector reset
072	Manual call point reset
SRS	Sounder/IO reset
ADD	End device added to system successfully
DFA	End device failed to add successfully
DDC	End device declined
DEL	End device deleted from system
TES	Device in test
TOT	Timeout
CLR	Event log cleared

Table 9: Event Log Definitions

Appendix D – Device Type Codes in Use

Code	Definition
OPT	Optical smoke detector
CO	CO detector
MCP	Manual call point
HTR	Rate of rise heat detector
HTH	High temperature heat detector
OPH	Optical heat detector
ZMU	Zone monitoring unit (part of WTR)
I/O	Input output unit
SDR	Sounder

Table 10: Device Type Codes

Appendix E – Cause and Effects

Please contact Eurofyre.

Appendix F – Specifications

Wireless Transponder

Radio	
Operating Frequency	868 - 870 MHz, 14dBm
Operating Channels	12
Field Devices (max)	30 per interface
Range	150m open area
Electrical	
Power Source	Addressable Loop, Conventional Zone and/or Auxiliary
Display (optional)	LCD
Local Control (optional)	5 Tactile push-buttons or PC connection
Zone IN/OUT Ratings	19 - 28Vdc, 400mA
Zone IN/OUT Internal Alarm Resistance	Equivalent to 450 Ohm
Sounder IN/OUT Ratings (max)	8 - 24Vdc, 800mA
Auxiliary Supply Voltage (max)	9 - 40Vdc
Manual Alarm Relay Contact	1 x Solid-state normally open, 60Vdc, 600mA
Automatic Alarm Relay Contact	1 x Solid-state normally open, 60Vdc, 600mA
Common Fault Contact	1 x Solid-state normally closed (failsafe), 60V, 500mA
Cable Terminals	Rising clamp 1.5mm
Operating Current (nom.)	12mA
Configuration Interface	Local and/or Wi-Fyre PC interface
Environmental	
Operating Temperature	-10 to +55°C
Ingress Protection	IP 54, for Indoor use only
Humidity	10 to 95% RH (non-condensing)
Mechanical	
Max Outer Dimensions (W x H x D)	234 x 164 x 75mm
Mounting Box Recessing Dimensions (W x H x D)	228 x 133 x 51mm
Weight	620 grams
Housing Material	Polycarbonate
Colour	White
Cable Entries	6 x 20mm
General	
Applicable Standards	EN54-25, BS 5839 Part 1:2002 ENTSI 300:220

Table 11: Wireless Transponder Specification

Wireless Detector Base

Radio	
Operating Frequency	868 - 870 MHz, 14dBm
Range	150m open area
Electrical	
Power Source	4 x Lithium AA Cell (LS14500)
Battery Life	Up to 3 years
Mechanical	
Dimension with Smoke Det. Fitted (Diameter x H)	103 x 71mm
Weight, Inc. Batteries	330 grams
Housing Material	Polycarbonate
Colour	White
Tamper	Detector and/or base removal
General	
Applicable Standards	EN54-25, BS 5839 Part 1:2002 ENTSI 300:220, EN54-5, EN54-7

Table 12: Wireless Detector Specification

Wireless Manual Call Point

Radio	
Operating Frequency	868 - 870 MHz, 14dBm
Range	150m open area
Electrical	
Power Source	3 x Alkaline AA Cell (Duracell Procell)
Battery Life	Up to 3 years
Mechanical	
Operating Mechanism	Resettable operating element (mimics the feel of breaking glass)
Dimension (W x H x D)	87 x 87 x 58mm
Weight, Inc. Batteries	290 grams
Housing Material	Polycarbonate
Colour	Red
Tamper	Yes (optional)
General	
Applicable Standards	EN54-25, BS 5839 Part 1:2002 ENTSI 300:220, EN54-11

Table 13: Wireless Manual Call Point Specification

Wireless Sounders and Sounder/VID

Radio	
Operating Frequency	868 - 870 MHz, 14dBm
Range	150m open area
Electrical	
Power Source	4 x Lithium AA Cell (LS14500) + 2 x Lithium C Cell (LS26500)
Battery Life	Up to 3 years
Mechanical	
Dimension with Smoke Det. Fitted (W x H x D)	122 x 128 x 100mm
Weight, Inc. Batteries	650 grams
Housing Material	Polycarbonate
Colour	Red or White
Tamper	Yes (optional)
General	
Applicable Standards	EN54-25, BS 5839 Part 1:2002 ENTSI 300:220, EN54-3

Table 14: Wireless Sounder and Sounder/VID Specification

Wireless Input/Output

Radio	
Operating Frequency	868 - 870 MHz, 14dBm
Range	150m open area
Electrical	
Power Source	4 x Lithium AA Cell (LS14500) + 2 x Lithium C Cell (LS26500)
Battery Life	Up to 3 years
Input End-of Line	Normal = 22k Ohm, Alarm = 1k Ohm
Manual Alarm Relay Contact	1 x Solid-state normally open, 60Vdc, 600mA
Automatic Alarm Relay Contact	1 x Solid-state normally open, 60Vdc, 600mA
Common Fault Contact	1 x Solid-state normally closed (failsafe), 60V, 500mA
Mechanical	
Dimension (W x H x D)	122 x 128 x 50mm
Weight, Inc. Batteries	460 grams
Housing Material	ABS
Colour	Red or White
Tamper	Yes
General	
Applicable Standards	EN54-25, BS 5839 Part 1:2002 ENTSI 300:220

Table 15: Wireless Input/Output Specification

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