Scope Communications UK Ltd

F-LINK MK4
INSTALLATION MANUAL

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Preface

Important Installation Information

It is the purchasers' responsibility to determine the suitability of this equipment and its derivatives for any given application. Any connection diagrams or usage information are provided as examples only; each use will require independent evaluation. Advice regarding connections to/from 3rd party equipment should always be sought from the equipment manufacturer. When used with fire alarm systems the configuration and performance of the F-Link system should be confirmed with the fire alarm System Designer and all other Interested Parties to establish that it complies with the system design and Fire Risk Assessment. Any references made to Standards / Codes of Practice are provided for information only, and although believed to be correct at time of publication are subject to change.

Scope has, wherever possible, employed extra safeguards to monitor the system's performance. Certain system installations, operational requirements or budgets may, however, limit the effectiveness of these safeguards. Again, the suitability of the system for any given application must therefore be decided by the installer and their customer, relative to the application and risk. Good working practice dictates that a suitable system installation log must be generated, together with a record of the dates when the system has been manually checked, (with the aid of signal strength meters etc.) enabling the system performance to be compared with the original installation data.

Installation must only be undertaken by a competent person (defined as a person with relevant and current training and experience, with access to the requisite tools, equipment and information, and capable of carrying out the task), who shall ensure that all work is carried out in compliance with national wiring regulations and applicable standards. This instruction manual is intended for use only by persons with a reasonable knowledge of electrical and electronic equipment, industry standard conventions and terminology.

For UK equipment, Scope has no control of the use and application of the frequencies issued by OFCOM. Some equipment that is licensed may have greater protection than other equipment which is operated on a WT Act License Exempt basis.

Important Safety Information

Scope products are designed to operate safely when installed and used according to general safety practices. The following requirements should be observed at all times:

This equipment is designed for indoor use, unless expressly stated otherwise, and must not be used in classified Hazardous Areas, including areas containing explosive or flammable vapours, unless express authorisation has been given in writing by the manufacturer. If in doubt, consult your local product dealer for further information.

Do NOT subject this equipment to:	Mechanical shock	Moisture
	Electrostatic discharge	Extremes of temperature
	Excessive humidity	Corrosive liquids

Do not obstruct any slots or openings in the product. These are provided for ventilation to ensure reliable operation of the product and to protect it from overheating. Only use a damp cloth for cleaning (not liquid or aerosol based cleaners), and ensure that any power is removed from the unit prior to beginning the cleaning operation. Removal of covers from the equipment must only be undertaken by authorised service personnel, who must ensure that power is isolated prior to removal.

Liability

Scope does not accept liability for any damage or injury, howsoever caused as the result of misuse of this equipment. It is the responsibility of the user to ensure that the equipment is operated in the manner for which it was intended and that it is the correct item of equipment for the required task.

Warranty

This product is warranted as free from defects of workmanship and materials for a period of one year from the original purchase date. During this time, if there is a defect or malfunction of this product, Scope will, with proof of purchase, repair or replace at its discretion any defective parts, free of charge. This does not include where the adjustments, parts and repair are necessary due to circumstances beyond the control of Scope, including but not limited to fire or other casualty, accident, neglect, abuse, abnormal use or battery leakage damage.

WARNING! No User Serviceable Parts

Alteration or modification to any part of this equipment, without the prior written consent of the manufacturer, will invalidate all approvals and warranties attached to the equipment. Further liability for the operation of the equipment, under applicable law, will pass to the person making the modification, who will absolve the manufacturer of any further responsibility for its correct operation and use.

Do not discard. At end of life this equipment must be sent to an authorised waste treatment centre. Contact Scope at the address below for further details.

The circuit boards within this equipment may be harmed by Electrostatic Discharge (ESD). Installers should ensure that both themselves and the system's chassis are grounded before beginning any installation, and should ensure that adequate anti-static procedures are adhered to at all times.

CE

Hereby, the manufacturer Scope Communications UK Ltd declares that the radio equipment type: F-LINK4, is in compliance with Radio Equipment Directive 2014/53/EU and ROHS Directive 2011/65/EU.
The full text of the EU Declaration of Conformity is available at the following internet address:
www.scope-uk.com/technical/doc/DOCFLINK4.pdf
or from Scope at: Quantum House, Steamer Quay, Totnes, TQ9 5AL United Kingdom.

The supply of this equipment is governed by our standard terms and conditions of sale, which can be provided on request.

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1. Introduction

The Scope F-Link is a four input four output transceiver which works with up to fifteen other F-Link units to form a mesh radio network for remote alerting and status monitoring, typically of fire or security panels. A minimum of two F-Link units are required to form a system. Each F-Link operates as both transmitter and receiver (transceiver).

Each unit has 4 volt-free input zones, each with a corresponding changeover relay output; a further relay to indicate a fault or test condition; and an alphanumeric display to show text descriptions of system events.

Each F-Link can be configured as either a "Master" or a "Node" in a supervised private radio network, employing polling, acknowledge-back and "listen-before-talk" (LBT) techniques to ensure robustness and reliability of the radio system. The radio link between F-Link units is monitored for failure in accordance with the relevant sections of BS5839-1:2017 (24.2b) and BSEN54-25:2008 (4.2.6).

The front panel display indicates active zones, unit status, network/radio status and the received signal strength of incoming transmissions. A button is provided to mute the internal fault sounder, and a keyswitch allows the unit to be reset or placed into test mode.

The system is programmable on-site using a Windows PC and the relevant configuration software (available from Scope). Programmed settings are wirelessly distributed by the Master unit to installed Nodes. Software-configurable options include: text descriptors for each Node and each zone event; zone input type; and output relay operating mode. The address of each Node is set on site using dip switches, as is the frequency channel used by the system.

An optional F-Link paging transmitter can be added to the system to send alarm and fault event descriptions to portable belt-worn pagers. An optional interface can be fitted to provide a serial data output for logging purposes.

Manual layout

Each F-Link unit has an integral information display, which is referred to throughout this manual either by showing a graphical representation of the display screen, or by USING A DISPLAY FONT.

Advice:

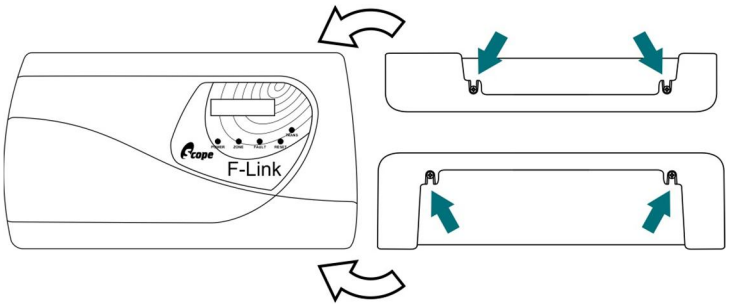
PRO TIP In various places throughout this manual, additional explanations and best practice advice have been included, highlighted as PRO TIP "Tips for Professional Installers".

Warnings:

CAUTION Warnings about various items are given using CAUTION boxes to highlight potential pitfalls, and to help avoid undesirable operation and/or damage to the units.

Case/lid removal

Many procedures described in this manual will require the outer case lid of the F-Link to be removed. To achieve this, loosen the 4 cover screws (as pictured) and carefully slide the lid away from the chassis. The lid remains attached via a plug-in ribbon cable, which can be unplugged if required whilst the unit is depowered (for example whilst affixing to the wall).



Technical support

If you have any questions, either before, during, or after the installation of this equipment then please do not hesitate to contact the Scope technical support team for assistance – especially if this is your first time working with this particular type of system.

SCOPE TECHNICAL SUPPORT call: 01803 860700 (normally available 0830–1730 Mon–Fri)

email: support@scope-uk.com

2. Pre-Installation

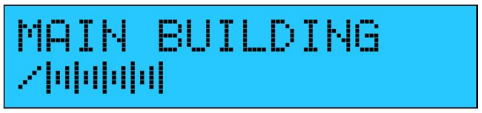
We strongly recommend that steps 2.1 - 2.3 are undertaken with all units located in the same area, *before* they are installed in their final positions.

2.1 Setting the frequency channel

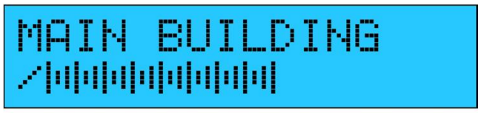
The F-Link system can operate on one of 32 frequency channels between 458.5125MHz and 458.9375MHz. A full radio survey of the site should be carried out to establish the most suitable clear frequency, and a range test kit is available to loan from Scope. However in the absence of a full survey it is possible to carry out a basic check using a single F-Link unit.

2.1.1 Basic RSSI Check

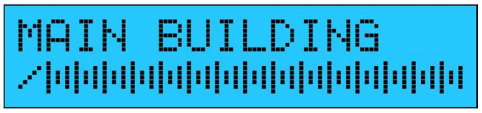
Working with a single F-Link unit, first connect the antenna and then connect a suitable temporary 12v or 24v dc power supply (or charged 12v battery) to the power input terminals. Make sure none of the other F-Links are powered up. The display will show the background RSSI signal level for the currently selected frequency channel as a bar graph. A consistent level below approx. 30% suggests the chosen frequency channel is probably suitable for use. If any signals are witnessed over this level then an alternative frequency channel should be selected, and the check repeated. See 2.1.3 overleaf for details on how to change the frequency channel.



Maximum acceptable background signal level



Background signal level too high, try a different channel

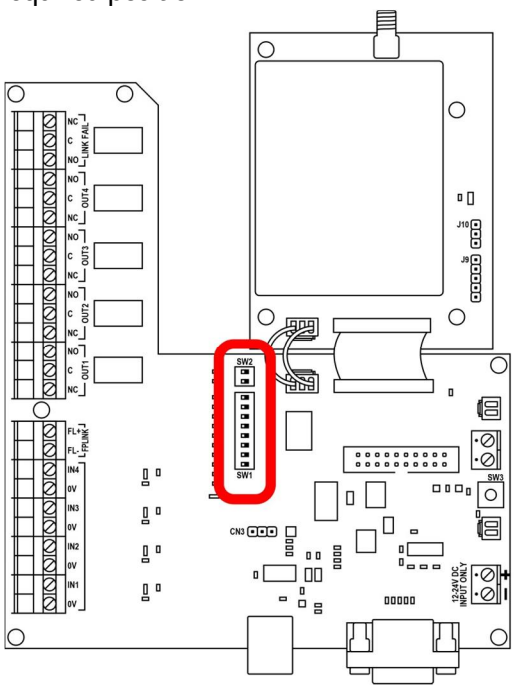


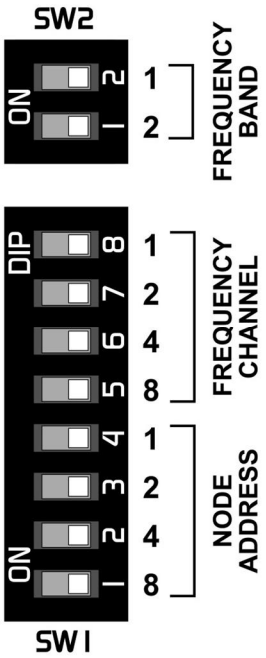
Strong interfering signal, try a different channel

Once a clear frequency channel is found, set <u>all</u> F-Links to use this channel and proceed to step 2.2 'Creating the F-Link network' on page 7.

2.1.2 Dip switch settings

The next few steps involve changing dip switch settings, which are located on the main circuit board as shown below. To make changes, use a suitable non-conductive implement to carefully move each dip switch to the required position.





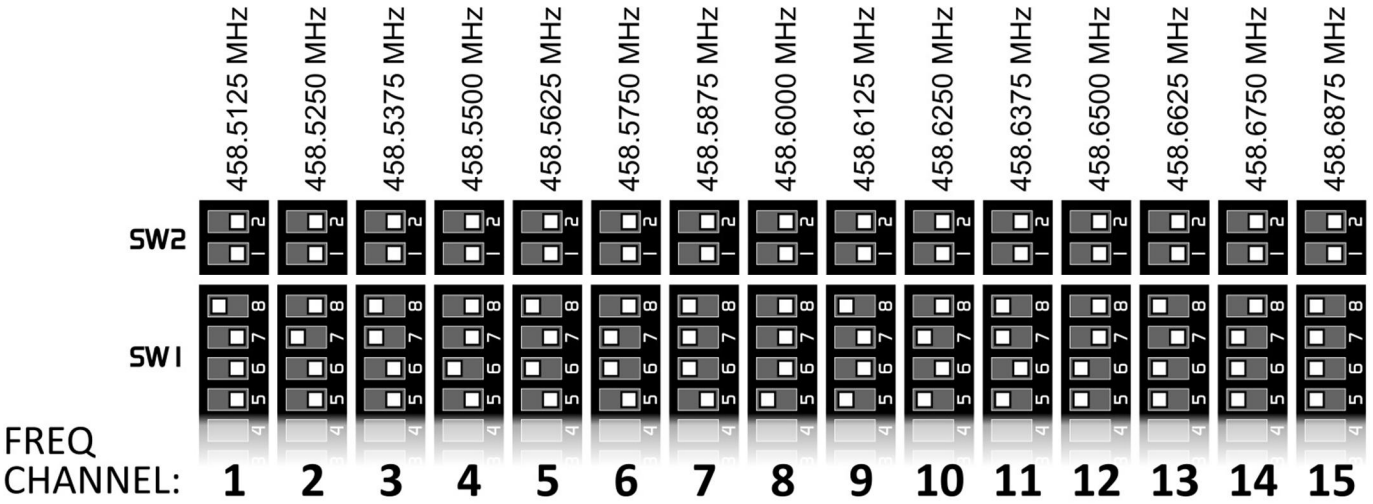
You may need to remove a protective film from the top of the dip switches if present (this is left over from the manufacturing process and is not required).

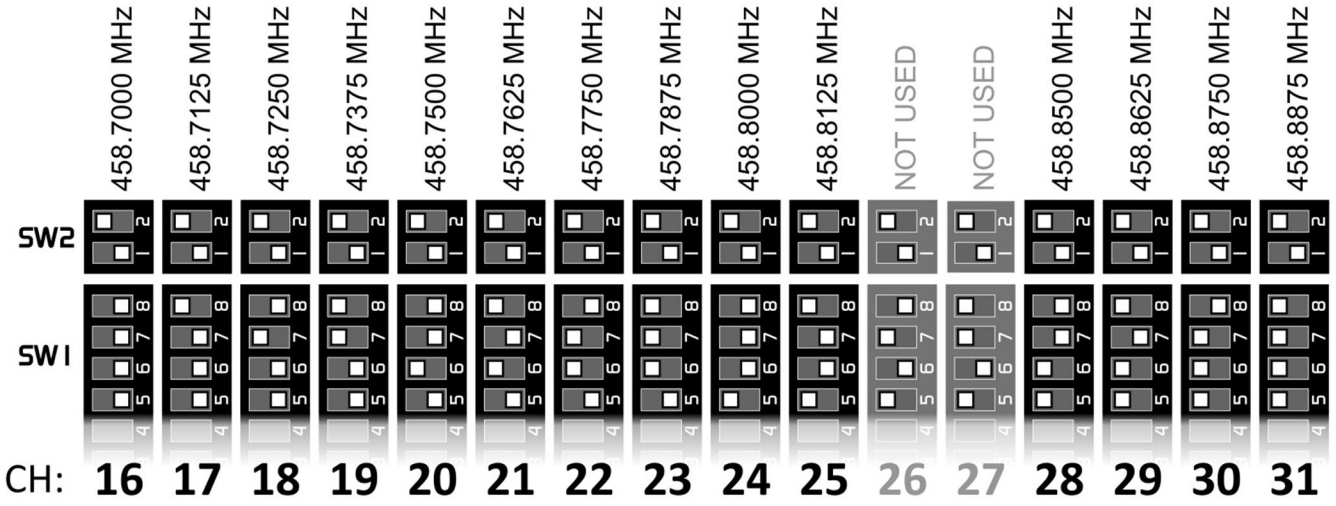
The F-Link will detect any changes made to its dip switch settings and reboot automatically after a few seconds.

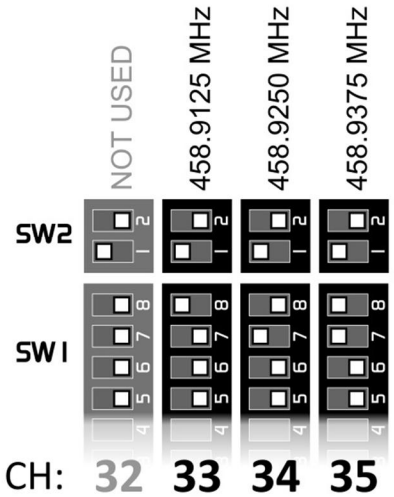
If Node addresses have been changed then the system may also need to automatically redistribute its configuration settings, which will take several minutes.

2.1.3 Changing the frequency channel

Use the DIP switches on the F-Link circuit board to select the required frequency channel. The F-Link will detect the change and reboot, displaying the selected frequency. All F-Links on a system must be set to use the same frequency channel.







PRO TIP

If an unavailable channel is selected (e.g. channel 26), the F-Link will automatically use the closest available channel.

The actual frequency in use is displayed each time the F-Link reboots.

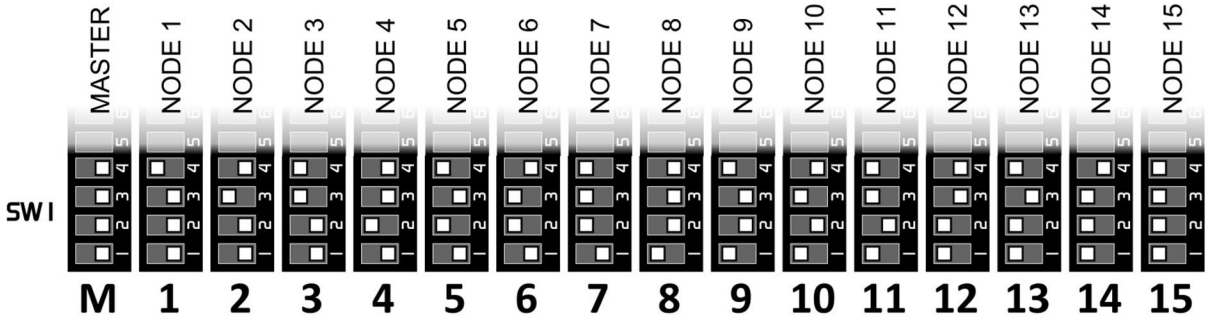
2.2 Creating the F-Link network

The F-Link network must be created on site by 'joining' all F-Link Nodes to the Master.

2.2.1 Node addressing

Each F-Link must have a unique address for the system to operate. One F-Link must be set as the Master (address 0) and the other F-Links set as Nodes (addresses 1-15). The Node addresses do not need to be consecutive, but they must be unique.

Use the DIP switches on the circuit board inside each F-Link to select the required address. If powered, the F-Link will detect the change and reboot.



2.2.2 Preparing to join

Once the frequency channel has been chosen and set (see page 5) and all units are correctly addressed as above, the site network can be created. Firstly, connect antenna(s) and power to all remaining F-Link unit(s).

Never operate an F-Link without a suitable antenna connected.

The Master F-Link will display NOT JOINED TO ANY NODE and on factory-default systems will be named "Main Building"). The Node F-Links will display NOT JOINED TO A MASTER.

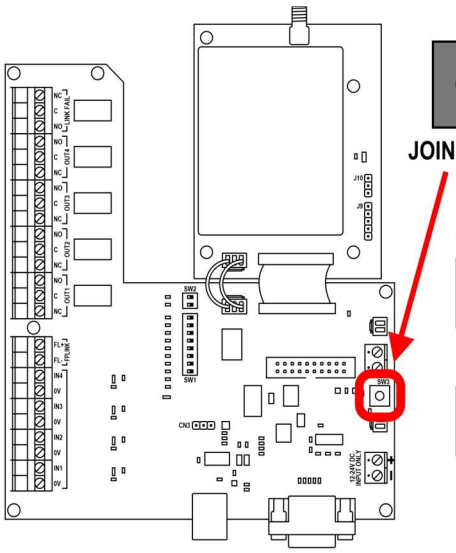
PRO TIP You can still join the F-Links to the network and make changes to the configuration after the units have been installed. However having all the F-Links together in one place whilst you do this makes the process much easier. It allows any issues to be dealt with quickly and simply – without the need to repeatedly walk back and forth across the site. The network settings (and any other configuration changes) are stored in non-volatile memory and retained even when the power is disconnected, so any changes made will still be there once the units have been installed in their final locations.

2.2.3 Network join procedure

1. <u>Put the system into network join mode</u>
   Press and hold the 'join' switch on the Master F-Link until it displays LISTENING FOR NODES
2. <u>Join each Node to the network</u>
   Press and hold the 'join' switch on any one Node until it displays JOINING NETWORK. CONTACT MASTER. Once joined, it will display SUCCESSFULLY JOINED NETWORK and then reset.

   Repeat step 2 for each Node in turn.

   Any un-joined Nodes will continue to display NOT JOINED TO A MASTER.
3. <u>Exit network join mode</u>
   Press and hold the 'join' switch on the Master until it displays STOPPING JOIN IN 5S.



Push and hold for approx 3 seconds, until the display shows:

On the Master:

```
Listening For
Nodes
```

On the Nodes:

```
Joining Network
..Contact Master
```

The Master will then display LISTENING ENDED NOW HAVE {NN} NODES. Make sure the number of Nodes shown is correct.

If not manually stopped, network join mode will automatically exit after 30 minutes.

Assuming all previous steps have been successfully followed, the F-Links will now be joined as a network and the system will be fully operational, albeit not yet installed. Each F-Link will be set up with the factory default configuration, and should display its own node name and signal meter, with no other messages or faults. The signal meters should show regular pulses, as each Node announces its status to the network at approximately 30 second intervals. The processor status icon should rotate continually.

Quiescent (normal) display

Processor status icon rotating

Announcement pulse

PRO TIP Using a suitable tool or short length of wire, it is possible to temporarily trigger a selection of F-Link zone inputs in order to help gain an understanding of how the system behaves. By default, each input is set as 'Normally Open', so connecting a link between the relevant 0v and IN terminals will trigger that zone. Full details of the factory default configuration are given below.

2.3 Default configuration

The default configuration has been designed to meet the most common requirements and may be sufficient in many cases. It can easily be changed if required by connecting a Windows laptop to the Master F-Link and using the relevant software (see page 16).

2.3.1 Node name

Each F-Link has a text description, which can be up to 16 characters in length. This 'node name' is used to identify the units across the system, and is added to all alarm, reset and fault messages associated with that unit. By default the Master is named "MAIN BUILDING" and each Node is named "BUILDING {X}" where {X} is the node address (1-15).

2.3.2 Input type

All zone inputs are volt-free. Each input of each F-Link unit can be individually set to operate as either Normally Open (short to trigger) or Normally Closed (open to trigger). The default is Normally Open.

2.3.3 Relay output mode

Each of the four zones can have its relay outputs set to operate in 'Follow', 'Momentary', 'Latched' or 'Class Change' mode. This setting applies globally to every F-Link on the system. By default, outputs 1-3 are set as 'Follow' and output 4 is set as 'Class Change'.

Follow	The output will clear when the input is cleared. This is the default mode for outputs 1-3.
Momentary	The output will clear after a set period (max 125 seconds), regardless of the input state.
Latched	The output will remain switched until manually reset using the keyswitch or external reset input.
Class Change	The output will switch for a set period only (normally 2 seconds) with no message shown on the display. This can be considered as a special 'transparent' version of the Momentary mode, and is designed primarily for use with school class bells. This is the default mode for output 4.

2.3.4 Trigger/Clear messages

Two messages can be assigned to each input of each F-Link; one for use when the input is triggered, and one for when it is cleared. These messages can be set individually for each F-Link on the system. Each message can be up to 16 characters in length and is added to the 'node name' when displayed across the system. Any messages not required can be left blank and will not be used.

The default messages are:

Zone	Trigger Message	Clear Message
1	FIRE	FIRE RESET
2	FP FAULT	FP FAULT CLEAR
3	LOCKDOWN	LOCKDOWN OVER
4	CLASS CHANGE	[blank]

PRO TIP Although no messages are displayed for any zones set to 'Class Change' mode, the optional F-Link paging transmitter uses these messages for display on portable pagers, as does the optional serial logging output; so they should still be programmed.

2.3.5 Priority display

A zone can be set to have 'priority display' if required. This means that the trigger message for this zone is displayed on top of all other messages whilst the zone is active. The display will resume cycling through other system messages once any 'priority' zones have cleared. This is primarily intended for use with zones connected to fire alarm systems. By default zone 1 is set to 'priority display' and zones 2-4 are set to 'normal'.

2.3.6 Default configuration summary

MASTER: "MAIN BUILDING" NODE {X} = "BUILDING {X}"					Mode				
Zone	Input Type NO	Input Type NC	Trigger Message	Clear Message	Follow	Momentary	Latched	Class Change	Priority
1	✓		FIRE	FIRE RESET	✓				✓
2	✓		FP FAULT	FP FAULT CLEAR	✓				
3	✓		LOCKDOWN	LOCKDOWN OVER	✓				
4	✓		CLASS CHANGE	[blank]				✓	

If this default configuration is sufficient then the units can now be installed in their final positions around the site. See section 3 "Installation" below for full instructions, especially section 3.1 which has important advice about choosing suitable locations.

If a customised configuration is required then refer to page 17 which has full details of how to make configuration changes using the supplied PC software. Only the Master needs to be reprogrammed; any changes made are distributed wirelessly to the Nodes. Although it is still possible to make configuration changes once the system is installed, it may be easier to carry out any necessary programming at this pre-installation stage, before the units are installed in their final locations.

3. Installation

3.1 Siting the hardware

Before positioning the hardware in a specific location, it is important to take into account a number of factors as set out below:

3.1.1 Antennas

Never operate any Scope equipment without a suitable antenna connected. The F-Link can communicate over a considerable distance with the supplied ¼ wave antenna connected directly to the unit. On sites where difficult operating conditions exist, it may be advantageous to install remotely mounted antenna(s):

LDPSMA

A wall-mounted mini dipole antenna, supplied with 3m feeder cable.

FDKIT10SMA

A heavy-duty folded dipole antenna supplied with 10m feeder cable and wall bracket (optional pole mount bracket also available).

Scope antennas are available from your usual equipment supplier.

ALWAYS use the supplied low-loss 50-ohm feed cable between the transceiver and a remote antenna. This cable must not be coiled and can only be shortened using specialist tools and the correct RF-quality 50-ohm connectors. Coaxial cable intended for TV, Satellite or CCTV installations is normally 75-ohm and therefore totally unsuitable for any transmitter/receiver installation manufactured by Scope.

AVOID mounting antennas (remote or directly connected) on or close to: foil-backed plasterboard; metal mesh; wire reinforced glass; metal sheeting; large mirrors; lift shafts; suspended ceiling grids; large metal items (e.g. girders or steel beams); or similar. All of these can reflect, absorb or scatter radio waves and thereby reduce the capability of the transceiver to perform its desired functions.

NEVER install antennas near or adjacent to telephone equipment or cabling, public address or data communication lines, overhead power cables, or computer equipment.

ALWAYS follow the installation instructions provided with the antenna.

AVOID running antenna feeder cables alongside other cables.

3.1.2 Range considerations

Each F-Link can easily operate across distances of up to 1km, and potentially further. Although all F-Links can communicate directly with each other when necessary, network status and Node health are monitored by the Master. This means that every F-Link Node must be installed within direct range of the Master.

Installing the F-Link or remote antenna on a higher floor within a building will generally boost overall range. Moving the F-Link or remote antenna nearer to one side of the building will often provide a bias in that direction.

Mounting a remote antenna outside the building, at height, will generally give the longest range from that side of the building, but may decrease range in the opposite direction.

A Scope range test kit (part code RTESTF) is available from your usual supplier to establish the achievable range, the optimum mounting location and the required antennas.

PRO TIP

For operational reasons it is always preferable to locate the Master F-Link in the 'Main' building on site. However for systems with unusual layouts (for example where the buildings are mainly in one straight line over a large distance), it may be necessary to locate the master closer to the centre of the network so that the network monitoring can be maintained.

3.1.3 Environment

The F-Link needs a dry indoor environment which is free from excessive humidity or moisture, mechanical shock, temperature extremes and corrosive atmospheres. All F-Link units should be located where they are readily and safely accessible by the end user and for maintenance purposes.

The ambient light level in the vicinity should allow the indicators and legends to be easily read, and the controls easily operated. The ambient noise level should allow the fault warning sounder to be heard.

Each F-Link should be located in an area of low fire hazard, particularly when used with a fire alarm system.

3.1.4 Mounting height

The display screen should be mounted in a location and at a height where it can be easily read by the end user. Easy access to the control keyswitch on the underside of the unit will be required for reset purposes, and to place the system in test mode for routine maintenance.

3.1.5 Interconnect cabling

A further consideration is the distance between the transmitter and the connected equipment. Interconnection cables should preferably be of the shielded type and kept as short as possible, no more than 3 metres. They should be kept away from any other cabling, especially mains and data cables, to avoid potential interference. All relevant Standards and Codes of Practice should also be followed (e.g. as regards fire resistance). When used with a commercial fire alarm system, BS5839-1:2017 sections 24.2 & 26.2 may apply.

3.2 Connections

3.2.1 Power connection

Each F-Link unit requires a permanent power supply voltage of between 10 and 30 volts DC from a suitable source capable of delivering at least 500mA (½ Amp).

Normally a separate power supply unit should be used (not provided), and this may be battery-backed if required.

In some circumstances it may be possible to power an F-Link unit directly from connected equipment (e.g. a control panel), but this must be capable of delivering at least 500mA; and note that the standby time of the connected system in mains fail condition may be dramatically reduced.

PRO TIP

Note that for commercial fire alarm systems installed within the UK, the Code of Practice BS5839-1:2017 precludes the powering of other systems directly from the fire alarm (see section 9.2d of that Standard) – it recommends that a separate power supply unit is used instead.

Scope Communications UK Ltd
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Detachable F-Link Configuration Record

These pages should be completed, detached from the manual and left on site either with the equipment itself or with premises management.

Site name _____

Installation Company _____

Contact phone number _____

Name of engineer _____

Date of commissioning _____

DETACH HERE

Leave completed configuration record on site

DETACH HERE

	Default Name	Configured Name / Location *(if different)*	Joined	Rec'd Signal (%)
Master	*MAIN BUILDING*		✓	100
Node 1	*BUILDING 1*			
Node 2	*BUILDING 2*			
Node 3	*BUILDING 3*			
Node 4	*BUILDING 4*			
Node 5	*BUILDING 5*			
Node 6	*BUILDING 6*			
Node 7	*BUILDING 7*			
Node 8	*BUILDING 8*			
Node 9	*BUILDING 9*			
Node 10	*BUILDING 10*			
Node 11	*BUILDING 11*			
Node 12	*BUILDING 12*			
Node 13	*BUILDING 13*			
Node 14	*BUILDING 14*			
Node 15	*BUILDING 15*			

F-Link

Output settings

Zone	Follow	Momentary	Latched	Class Change	Priority Display
1					
2					
3					
4					

Input type

Node / Zone	M		1		2		3		4		5		6		7	
	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC
1																
2																
3																
4																

Node / Zone	8		9		10		11		12		13		14		15	
	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC
1																
2																
3																
4																

By default, all inputs are Normally Open (NO).

Zone messages (0-7)

	Zn	Trigger Message	Clear Message
MASTER	1		
	2		
	3		
	4		
NODE 1	1		
	2		
	3		
	4		
NODE 2	1		
	2		
	3		
	4		
NODE 3	1		
	2		
	3		
	4		
NODE 4	1		
	2		
	3		
	4		
NODE 5	1		
	2		
	3		
	4		
NODE 6	1		
	2		
	3		
	4		
NODE 7	1		
	2		
	3		
	4		

Zone messages (8-15)

	Zn	Trigger Message	Clear Message
NODE 8	1		
	2		
	3		
	4		
NODE 9	1		
	2		
	3		
	4		
NODE 10	1		
	2		
	3		
	4		
NODE 11	1		
	2		
	3		
	4		
NODE 12	1		
	2		
	3		
	4		
NODE 13	1		
	2		
	3		
	4		
NODE 14	1		
	2		
	3		
	4		
NODE 15	1		
	2		
	3		
	4		

⇩ DETACH HERE ⇩ Leave completed configuration record on site ⇩ DETACH HERE ⇩

Zone inputs

> **CAUTION**
> All inputs are volt-free. **DO NOT apply voltage to any input** (other than the power supply connection) because this will cause irrevocable damage not covered by warranty.

Each F-Link has four volt-free zone inputs, which can each be configured as 'Normally Open' (default) or 'Normally Closed' using the configuration software. If the input is set as Normally Open (N/O) then linking the input terminal to the 0v terminal will trigger the input. If the input is set as Normally Closed (N/C) then removing a link between the input terminal and the 0v terminal will trigger the input.

When a zone input is triggered on any F-Link, the corresponding relay output will trigger on all other F-Links on the network (but not on the originating F-Link). The relevant text will be displayed on all units, unless the zone is set to "class change" mode (see page 8).

3.2.2 FP link input

Each F-Link has a volt-free "FP-link" monitored input. This input is primarily designed to be used to monitor the cabling to/from connected equipment, but can also be used to monitor external fault conditions, e.g. a power supply fault relay. This input has a normal 'end-of-line' resistance value of 680 ohms, and is triggered by removing the resistance (i.e. open circuit), or by linking the input terminals together (i.e. short circuit). This input is volt-free and can be triggered by dry contact only – do not apply voltage to this or any other control input.

When the FP-link fault input is triggered on a Node, the Link Fail fault relay will trigger on the Master and the originating Node only. The corresponding fault message will be displayed on the Master and originating Node only.

3.2.3 Reset input

Each F-Link has an external reset input, which is connected to the integral key-switch. If required, this input can be connected to an external volt-free normally-open contact to allow remote reset. The external contact can either be connected in place of the keyswitch (disabling the local key reset function) or wired in parallel to it (so the F-Link can be reset either remotely or using the key). See page 20 for details of the reset function. This input is volt-free and can be triggered by dry contact only – do not apply voltage to this or any other control input.

3.2.4 Zone outputs

Each F-Link has four zone output relays which will switch over when the corresponding input is triggered on another F-Link unit. The output relay will switch back in accordance with its mode setting – either when the input clears (follow), after a set time (momentary), or when manually reset (latched). The text associated with the zone and originating F-Link will be displayed on the screen (unless the zone is set to "class change" mode).

> **CAUTION**
> Each relay output is capable of switching a maximum voltage of 50V (AC or DC) at a maximum current of 0.5A. **DO NOT use these relays to directly switch voltages in excess of 50V** because this is hazardous and will cause damage not covered by warranty.

These settings are changed using the configuration software. For more information about relay output modes, see 2.3.3 on page 8. Each relay output is capable of switching a maximum voltage of 50V (AC or DC) at a maximum current of 0.5A.

3.2.5 Link Fail output

Each F-Link has a "Link Fail" fault relay output, which should be used to signal to the connected equipment that there is a problem with the F-Link network. The Link Fail output will be active during the following conditions, and will automatically clear when the situation resolves:

- Loss of radio communication
- Test mode active
- FP-Link fault input triggered

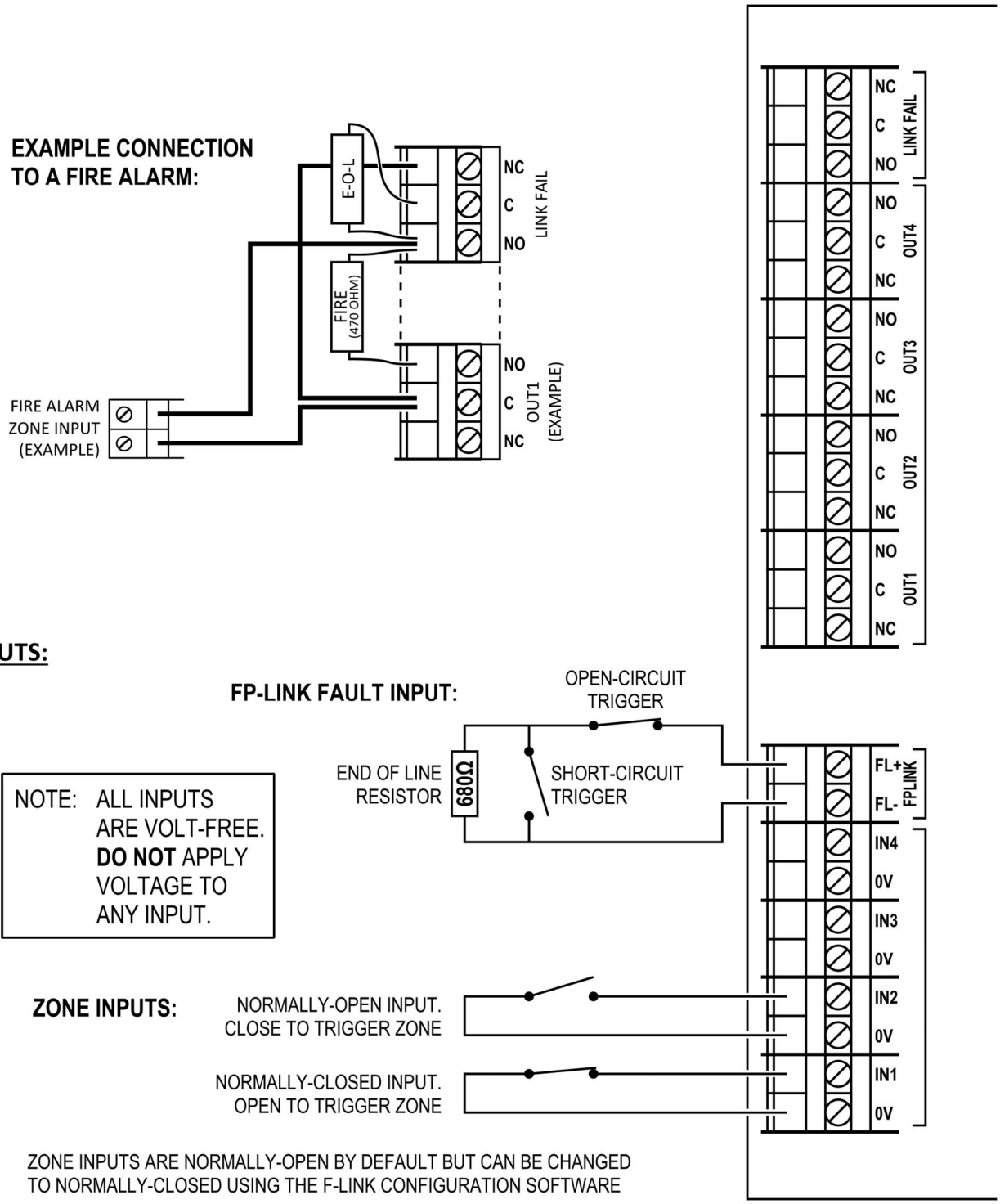
Individual Nodes will only switch their Link Fail relay for conditions relating to themselves or the Master. The Master will switch its Link Fail relay for conditions relating to itself or any Node.

The Link Fail relay is capable of switching a maximum voltage of 50V (AC or DC) at a maximum current of 0.5A.

3.2.6 Wiring diagrams

OUTPUTS:

(NOTE THAT THE LINK FAIL OUTPUT CONTACTS ARE REVERSED COMPARED TO THE OTHER OUTPUTS BECAUSE THE RELAY IS NORMALLY ENERGISED).



4. Configuration

All F-Link units are supplied with a factory default configuration which allows a fully operational system to be created without the need for programming. Although carefully designed to be suitable for many common scenarios, the default configuration can be easily changed using the F-Link Pro Configuration Utility software (available from Scope).

4.1 Overview

1) Install the F-Link-Pro Configuration Utility software onto a Windows PC or laptop.
2) Make sure the Master F-Link and all Node F-Links are powered up and joined to the network.
3) Connect the supplied USB lead from the PC/laptop to the Master F-Link. This is the unit with a node address of '0' – see page 7 for details.
4) For Windows 10, you may need to enable VCP: Open Windows Device Manager and find the "USB Serial Converter" which has appeared at the end of the "Universal Serial Bus Controllers" section. To check you have the correct device, unplug the lead from your laptop and re-connect it - you will see the device disappear and reappear in the list. Right-click the device and choose "Properties", then go to the "Advanced" tab and make sure "Load VCP" is ticked then click OK. Device Manager should now add the device as a COM port in the "Ports (COM & LPT)" section - note the COM port number assigned to it. Close Device Manager.
5) Open the F-Link Configuration Utility. On the "Port" tab, select the correct COM port from the list, click the "CONNECT" button on the right, then when connected click the "Read" button.
6) Before making changes, go to the "File" menu and click "Save As" to save the original configuration to your laptop or PC. This may be useful for future reference.
7) Make the required changes to the configuration (see details below).
8) Go to the "File" menu, click "Save As" and save the modified configuration to your laptop or PC - with a different filename.
9) Click the "Write" button to write the modified configuration back to the Master.
10) Acknowledge the "success" message, then click "DISCONNECT".

The Master F-Link will now wirelessly distribute the changed configuration around the network to all connected Nodes. This may take up to 5 minutes; depending on the number and type of changes made, the signal strength of the nodes, and the amount of radio traffic. During this time, the F-Links may reset several times. Wait until the Master F-Link display has cleared of messages and returned to the standby signal graph display before proceeding.

> **CAUTION** **ALWAYS** thoroughly test the entire system after making any configuration changes to ensure that it operates as intended.

4.2 General tab

This tab shows system information, including the date the unit was last factory calibrated and the firmware version installed.

4.3 Units tab → Global

This tab is for settings which affect the entire system. When the desired changes have been made, follow steps 8-10 in section 4.1 above to save the new configuration and write it to the F-Link system.

4.3.1 Priority display

Trigger messages from zones with Priority Display are shown over the top of all other messages/zones. Designed primarily for Fire Alarm zones, this feature may also have other applications. Note that Priority Display only affects message display, not actual system operation. See 2.3.5 on page 9 for more details.

4.3.2 Relay output mode

Each zone output can be set to operate as: Follow (follow the input), Momentary (fixed time), Latching (until reset), and Class Change (transparent timed). The time periods used for Momentary and Class Change modes are set at the bottom of the tab. See 2.3.3 on page 8 for more details.

4.3.3 DEFAULT trigger and clear messages

Although the zone trigger and zone clear messages are set individually for each F-Link unit in their own individual settings tabs (see 4.4 below), this shortcut allows all messages across all tabs to be changed in one go, avoiding the need to retype the same message multiple times. Change the default messages as required and click "COPY to ALL units". This will overwrite the messages in every individual F-Link settings tab and cannot be undone without manually re-typing them individually.

4.3.4 Trigger time

This is how long the zones must be open or closed to trigger the input, and can be set between 0 and 2500 milliseconds (2½ seconds). A value of 150ms is recommended for normal use to help avoid spurious activations due to contact bounce etc. This setting applies to all zones on the system.

4.3.5 Momentary time

This is the operation time for the output relays on any zones set to Momentary, and can be set between 0 and 125 seconds.

4.3.6 Class change time

This is the operation time for the output relays on any zones set to Class Change, and can be set between 0 and 125 seconds.

4.4 Units tab → Main / 1-15

Each F-Link unit has its own sub-tab: Main (Master) and Nodes 1-15; in which each individual zone input can be changed from Normally Open to Normally Closed, and text can be set for the individual trigger message and clear message for each zone.

4.5 Network tab

This tab shows the status of the F-Link radio network. The Network List can only be read and written using the separate controls on this tab.

Clicking 'Network List - Read' will update the list with the status of all Nodes. Nodes shown as 'Joined' are connected to the network and are actively being monitored by the Master. Nodes which have a Network ID set but are not shown as joined are historic – they have been joined at some point but are not currently part of the network, or have had their node address changed.

CAUTION

Individual Nodes can be permanently removed from the network by un-ticking the 'Joined' box for that Node and clicking 'Network List – Write'. Un-joined Nodes must also be powered down and/or individually wiped (see section 5.5 overleaf) to fully deactivate them.

Only make changes to the network list if you know what you are doing, or under the direction of Scope Technical Support staff.

5. Network Changes

The F-Link network is designed to be resilient and self-healing. A copy of the entire system configuration is stored in every Node, and can be restored by the system as required. This means that any damaged F-Link units, including the Master, can be replaced on site without the need for reprogramming – because the new F-Link will learn the system configuration from the existing network.

5.1 Adding a Node

1) Set the frequency channel of the new Node to match the existing network (see page 6).
2) Set the address of the new node, making sure this address is not already in use on the network (see page 7).
3) Put the Master F-Link into Network Join Mode and join the new Node to the network (see the Network Join Procedure on page 7). Note that only the new Node needs to be joined to the Master; the existing Nodes will remain connected.
4) The new Node will automatically learn its configuration from the network. If required, this can be changed by connecting a laptop to the Master F-Link and using the F-Link configuration software to change the settings (see section 0 on page 16).
5) Test the system.

5.2 Deleting a Node (requires a PC and configuration software)

1) Connect a laptop running the F-Link configuration software to the Master F-Link and remove the relevant entry from the Network List as described in section 4.5 above.

2) Wipe the memory of the deleted Node as described in section 5.5 below (NOTE: only wipe the deleted Node).
3) Power down the Node and remove from site.

It is technically possible to delete a Node without using a PC, but only by returning the entire system to factory default configuration (as described in section 5.5 below) and then recreating the network from scratch, leaving out the unwanted Node.

5.3 Replacing a Node

1) Power down the Node being replaced.
2) Set the frequency and address dip switches of the new Node to exactly match the old Node.
3) Power up the new Node.
4) Put the Master F-Link into Network Join Mode and join the new Node to the network (see the Network Join Procedure on page 7). Note that only the new Node needs to be joined to the Master; the existing Nodes will remain connected.
5) The new Node will now receive the existing network configuration wirelessly from the Master.
6) Test the system.

5.4 Replacing the Master

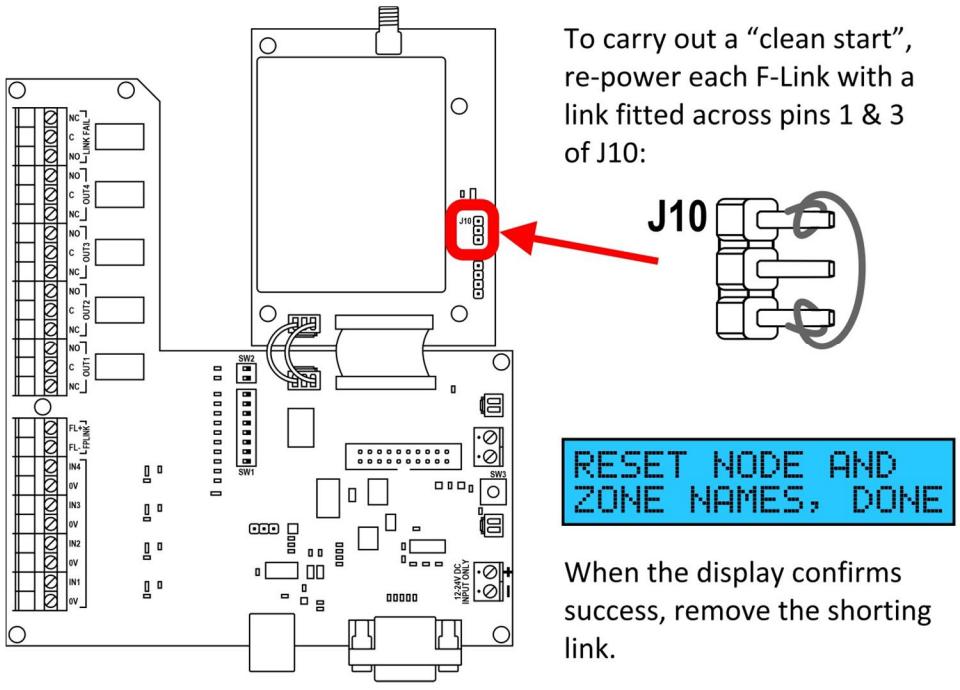
1) Wipe the memory of the unit which is to be the new Master, as described in section 5.5 below (NOTE: only wipe the new unit). This ensures that the new unit has a factory default configuration, which is essential.
2) Power down the old Master.
3) Set the frequency and address dip switches of the new Master to exactly match the old Master.
4) Power up the new Master.
5) Put one of the existing Nodes into Network Join Mode and join the new Master to the network (see the Network Join Procedure on page 7). Note that only the new Master and one existing Node need to be joined; the existing Nodes will remain connected.
6) As long as the new Master has a factory default configuration, it will now receive the existing network configuration wirelessly from the Node.
7) Test the system.

CAUTION

If a Master unit with a pre-existing configuration (e.g. taken from another site) is joined to a network then it will overwrite the entire network setup with its own pre-existing configuration. It is therefore essential to ensure that the new Master has been wiped before adding it.

5.5 Clean start

Although not normally necessary, it is possible to carry out a manual "clean start" and return an entire system to factory default. All F-Links must be powered down, and then powered back up individually with a shorting link fitted to the outside two pins (1 & 3) of jumper J10 on the radio module. Once every F-Link has been cleared the system will be at factory default.



To carry out a "clean start", re-power each F-Link with a link fitted across pins 1 & 3 of J10:

When the display confirms success, remove the shorting link.

NOTE: if any units are re-joined to the network before all units have been cleared, the old configuration will restore automatically across the network from the un-cleared units.

6. Operation

6.1 Normal use

The F-Link network is designed to be transparent in normal use. The linked systems will communicate with each other using the F-Link as a wireless bridge. The display on each F-Link provides status information and gives details of alarm messages. Any alarms or faults are signalled by relay outputs to the controlling equipment for notification as required.

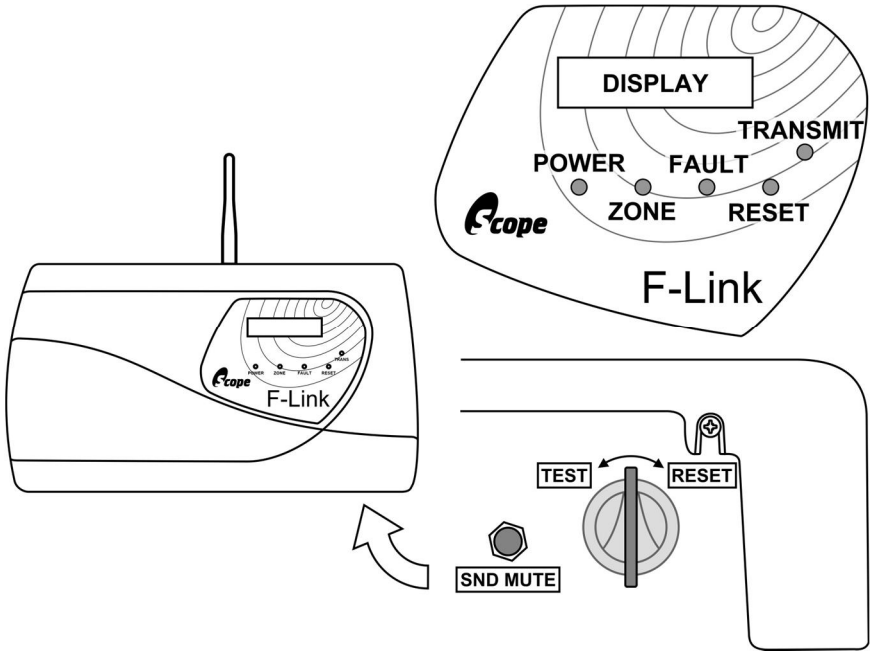
Daily: Each F-Link unit status display should be visually checked and any faults reported to the relevant maintenance organisation.

Weekly: Send a signal between all F-Link units and check that they are communicating correctly (this might be as part of the normal weekly fire alarm test). Any issues should be reported to the relevant maintenance organisation.

At an appropriate maintenance interval (e.g. 6 months) the F-Link network should be thoroughly tested for full and correct operation by a suitable maintenance organisation, normally as part of the maintenance of the linked system/s (e.g. Fire Alarm System).

Any faults detected by the F-Link system are reported on the display, by triggering the fault relay, and operating a local fault sounder. This sounder can be muted by pressing the SND MUTE button, but it will re-start if a new condition is detected.

6.2 Status LED's



POWER: Unit has power.

ZONE: A zone input or output is active.

FAULT (ON): Indicates a communication fault, either local (FP-Link) or radio (Link Fail).

FAULT (FLASH): Test mode is active.

RESET: Unit is resetting (via key or remote input).

TRANSMIT: Unit is transmitting, either to update zone status or as a regular (30 sec) announcement / poll.

DISPLAY: Scrolls to show details of all current events. Any 'Priority' events are shown on top of other messages.

6.3 Reset

The default configuration for the F-Link units is for the outputs to self-reset once clear. However, if any outputs have been set to operate in Latched mode then they will need to be manually reset once triggered.

To reset the F-Link, insert the key into the keyswitch on the underside and turn to the reset position then return to normal. The F-Link will reset and clear any triggered zones.

6.4 Test mode

Each F-Link can be placed in test mode using the keyswitch on the underside of the unit. F-Links in test mode will beep intermittently and operate their fault relay to warn of the impairment, as will the Master. Whilst in test mode the F-Link will not trigger its output relays or cause other F-Links to trigger their output relays, although messages are displayed as usual (so that message transmission can be checked). Any F-Links not in test mode will operate as usual.

6.5 Replacement keys

The reset/test key is an industry-standard 'Burgess TOK 1' type. Replacement keys are widely available from 3rd-party suppliers, or as a complete replacement switch and two keys from Scope (part code K23FBA-123).

7. Troubleshooting

Symptom	Possible Cause(s)	Remedial Action
Display shows NOISE ON CHANNEL	Interference caused by other equipment using the same frequency.	Conduct a radio survey to establish the source of the interference, then either remove/modify the interfering equipment or change the F-Link system to use a clear frequency channel (see 2.1 on page 5).
LINK FAIL fault and/or alarms not getting through.	External interference.	As above.
	Inadequate current available from power supply.	Ensure the power supply can provide at least 500mA (½ Amp) at 10v-30v DC, and/or fit a separate PSU. (If the F-Link cannot draw enough current quickly enough when it needs to transmit then this can stop signals getting through).
	Site attenuation (signal being blocked by walls etc.)	Conduct a radio survey to establish achievable coverage and the optimum aerial type and location. Depending on the survey results, relocate/upgrade aerials as required (see 3.1.1 on page 9).
Zone "stuck" on / not resetting.	Zone input still active.	Restore the zone input (short for normally-closed zones and open for normally-open zones).
	Zone is designed to latch (output mode set to Latched).	Reset the F-Link using the keyswitch.
	Intermittent transmission problem.	See under "LINK FAIL" above.
FP-LINK fault.	There is a fault on the interconnect wiring or the equipment being monitored by the FP-Link input (e.g. a local PSU).	Rectify the fault on the other equipment/wiring. If nothing is connected to the FP-Link input, check the 680Ω end-of-line resistor is securely fitted to the FP-Link terminals in the relevant F-Link unit.

SCOPE TECHNICAL SUPPORT call: 01803 860700 (normally available 0830–1730 Mon–Fri)
email: support@scope-uk.com

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9. Specification

Supply voltage:	10-30V dc, 500mA
Power consumption:	~50mA (standby) ~300mA (transmitting) +25mA per active relay
Transmitter output:	500mW ERP max
Frequency range:	458.5125MHz to 458.9375MHz
Channel spacing:	12.5KHz
Receiver Blocking:	Category 1.5 (Improved Performance SRD)
Receiver sensitivity:	-117 dBm
Radio standard:	EN 300 220-2 V3.1.1 (2017-02)
EMC standard:	EN 301 489-2 V2.1.0 (2017-03)
Safety standard:	EN 60950-1: 2006+A2: 2013
EU Conformity:	Radio Equipment Directive 2014/53/EU
Inputs:	4 x volt-free zone inputs (Can be set to normally-open or normally-closed) 1 x volt-free fault input (680Ω end-of-line, triggered by open- or short-circuit) 1 x volt-free remote reset input (normally-open)
Outputs:	4 x configurable volt-free zone output relay 1 x fault/test output relay (all changeover relays 50V 0.5A max)
Text descriptions:	Individual Node name (16 characters) 4 x input trigger messages (16 characters each) 4 x input clear messages (16 characters each)
Control ports:	USB port for programming function 9-pin RS232 port for interconnection to other systems
Configuration:	Node address and operating frequency via DIP switches Operation and function via PC software (available from Scope)
Footprint (mm):	330w x 190*h x 70d mm (*excluding aerial)

Scope's policy is one of continuous development. Specification is subject to change without notice.