X-Lite Transmitter

User Manual

Xlite2 Manual

PREFACE

Important Installation Information

It is the purchasers' responsibility to determine the suitability of this equipment and its derivatives for any given application, Scope cannot give specific advice in this manual, as each use will require independent evaluation.

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.

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.

The supply of this equipment is governed by our standard terms and conditions of sale, which can be found on the reverse of all order acknowledgements*, proforma invoices*, delivery notes, price lists and invoices. Alternatively, these can be provided on request.

* Faxed proforma invoices and quotations refer to "conditions available upon request".

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.

Do NOT subject this equipment to:
Mechanical shock
Excessive humidity or moisture
Extremes of temperature
Corrosive liquids

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 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.

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Preface

Important Safety Information

Removal of covers from the equipment must only be undertaken by authorised service personnel, who must ensure that power is isolated prior to removal.

Installation

Installation must only be undertaken by an Approved contractor, who shall ensure that all work is carried out in compliance with IEE Wiring Regulations. For mains powered equipment, a readily accessible isolating fuse or switched socket must be located within 1 metre of the equipment.

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 attaching to the equipment. Further liability for the operation of the equipment, under the applicable law, will pass to the user, who will absolve the manufacturer of any further responsibility for it's correct operation and use.

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 it's 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.
This product complies with the essential requirements of the R&TTE Directive 1999/5/EC
Copies of the Declaration of Conformity covering this product can be obtained from Scope at:
Quantum House, Steamer Quay, Totnes TQ9 5AL United Kingdom.

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

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System Overview

The Scope X-Lite is a POCSAG data display radio paging system which can be used to transmit both text and numeric messages direct to pocket pagers carried by individuals or entire groups. Information is input by way of an RS232 serial port.

Note ! This system requires a valid OFCOM licence for operation in the UK. It is the user's responsibility to apply for an On-Site Paging licence on form Of21 Private Business Radio Licence Application Form, available online at www.ofcom.org.uk.

The relevant clauses on the Of21 form should be completed as follows:

Section 2, item 9. Tick "**Self-Select PBR licence**"

Section 4, item 28. Generally, antennas provided by Scope are **Omni-Directional**, with a gain of **0 dB.**

Section 4, item 30. ERP level: **1W** as standard.

Section 1: Installation

The information contained in this Section is intended for use by authorised system installation engineers only. Unqualified personnel should not undertake installation of this equipment under any circumstances whatsoever.

Siting of the hardware

Before locating the hardware in any given location, it is important to take into account the range of operation that you require to obtain from your system. The standard transmitter can quite easily provide ranges of up to a mile or more and will provide excellent propagation on most industrial sites, covering a considerable area with just a quarter wave antenna (BNC terminated) connected directly to the unit.

For coverage of very large sites, or where exceptionally difficult operating conditions exist, it may be advantageous to install an external antenna. Installing the transmitter on the second or third floor of a building will more often than not boost overall range. However, horizontal range is not always required as much as propagation through a multi storey building. Here it may be more useful to use a small external antenna mounted outside the building at half the building height. Sometimes range is required more in one direction than in the other: moving the aerial to one side of the building can provide a bias in the required direction, which may overcome the range difficulties. (See section: **Other Antennas***).*

Important: coaxial feeds that are longer than 5 metres must employ low loss 50 ohm coax. We normally do not recommend feeds of more than 15 metres for standard applications. However, we suggest you contact our technical department where other considerations may prove this to be impractical.

A further consideration that must be taken into account is the distance between the transmitter and the source of the data feeding the transmitter. If the unit is to deploy a standard RS232 serial interface, reliable reception of the data should not be attempted in excess of **15 metres** of cable. These cables should be screened/shielded and must be kept clear of sources of induced magnetic or electrical noise. In the event that distances of over 15 metres are required for the data feed, additional drivers or amplifiers must be installed at both ends of the data link.

Some major points to consider when installing equipment:

1 Never install antennas near or adjacent to telephone, public address or data communication lines or overhead power cables.

2 Avoid, where ever possible, running antenna coax alongside other cables.

3 Avoid mounting the transmitter in the immediate vicinity of telephone exchanges or computer equipment.

4 Always use proprietary 50 ohm coaxial cable between the antenna and the transmitter. If cable runs exceed 5 metres, always use low loss 50 ohm cable such as RG213, UR67 or equivalent.

Coaxial cable intended for TV, Satellite or CCTV installations is normally 75 OHM and therefore totally unsuitable for any transmitter installation manufactured by Scope.

5 Also remember that the performance of the system will be effected by the type of material the unit is mounted on and its surroundings.

The following is a list of materials that this transmitter will be adversely affected by if mounted on or if mounted in close proximity to:

a) Foil back plasterboard
b) Metal mesh or wire reinforced glass
c) Metal sheeting, large mirrors or suspended ceilings
d) Lift shafts

All of the above can reflect radio waves and thereby reduce the capability of the transmitter to perform its desired functions.

6 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.

7 *Warning!* Never transmit without an aerial attached to the transmitter

8 *Warning!* Carefully check the **Installation** section in this manual covering data pin connections prior to installation. Damage caused by incorrect connection is the responsibility of the installer!

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Installation

The following procedure must be adhered to when installing the X-Lite paging system. Ensure you have taken into consideration all of the above information before selecting the location for your transmitter. If in doubt, If any further advice is needed or technical manuals Please call our Technical Support Department on 01803 860720 or support@scope-uk.com

1 Remove the cover from the X-Lite transmitter unit by undoing the two Pozi head screws located on the front face of the unit.

2 Carefully lift off the cover and set aside.

3 The transmitter should be fixed to an even wall surface using No. 8 pan head screws fitted through the holes provided in the chassis plate. Hold the chassis up to the chosen location and with the aid of a pencil mark the position of the mounting holes.

Warning: Do not use the chassis plate as a template for drilling the holes into the wall. Hammer drills vibrating through the chassis may irreparably damage the quartz crystals on the printed circuit boards.

4 Place the X-Lite transmitter over the mounting holes and fit the screws. Check that the chassis plate does not bend and that the screws do not snag or pinch any internal cables.

5 Connect the antenna to the unit via the BNC connector located at the top of the housing. If the antenna is an external antenna, or an antenna that is separate from the transmitter unit itself, ensure that the previous criteria covered under the section headed **Siting of the Hardware**, have been strictly adhered to (also see section headed **Other Antennas**).

6 The transcoder has been configured as an RS232 input on PL1.

PL1 SERIAL PORT (9-way D Type Plug)
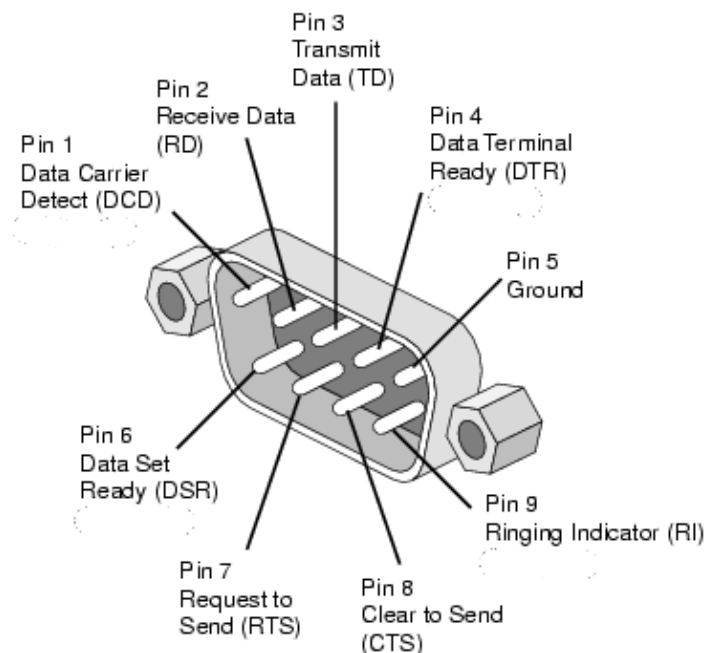
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Prior to connecting the data cable, thoroughly check the system pin connections as shown above.

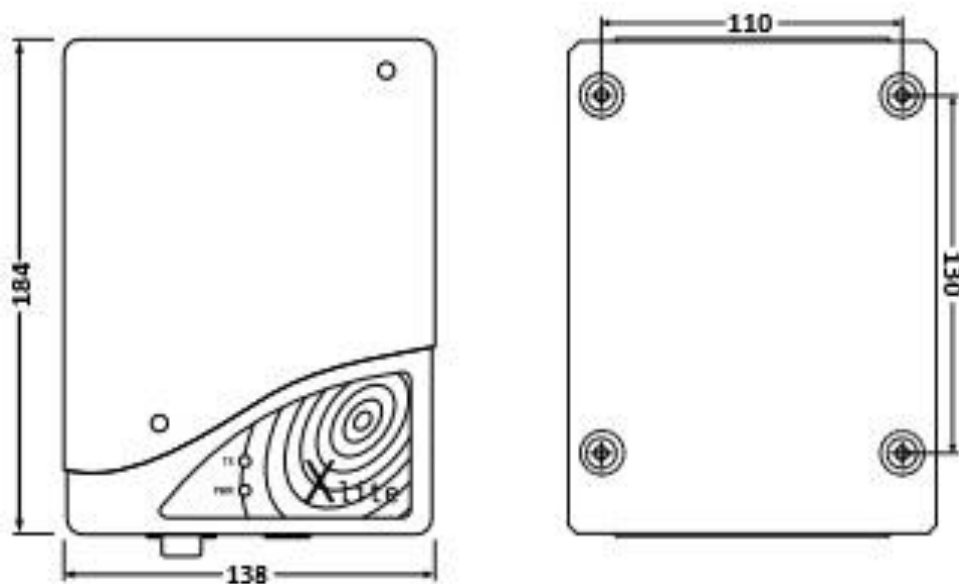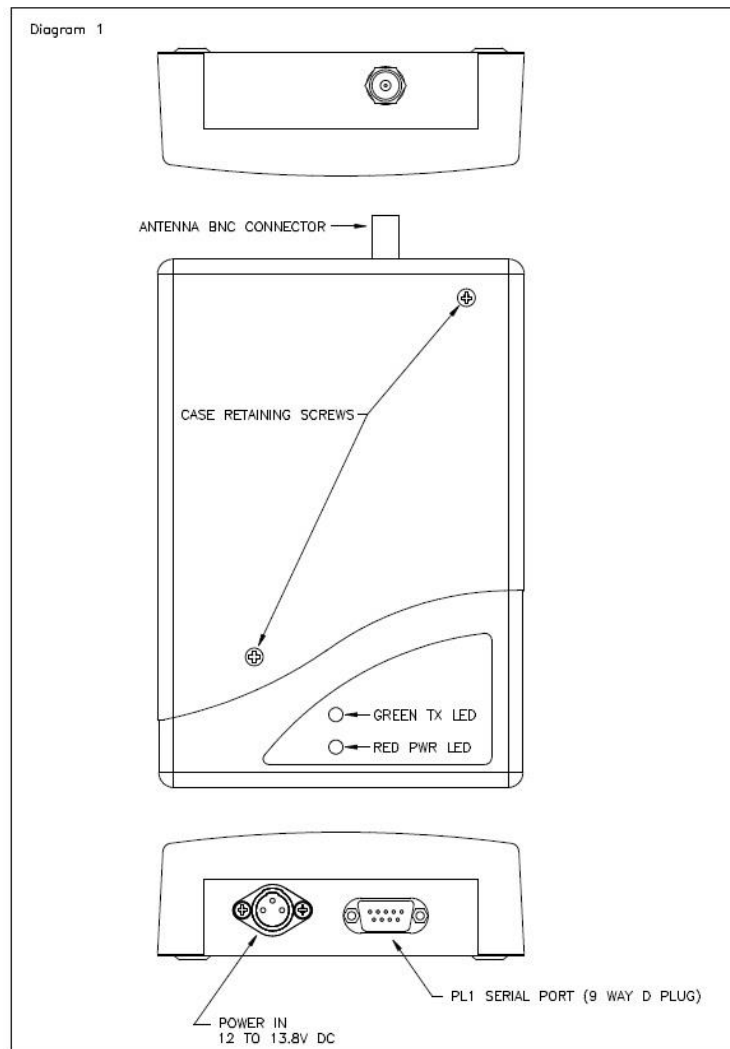Then connect the data cable from the host to PL1 on the X-Lite unit.

7 Power input must be **12 to 13.8V dc max**. The DC socket provided requires a 2.1 x 5.5mm jack, centre pin positive.

8 Replace the cover and refit the two retaining screws.

9 Finally, after checking all connections, apply power to the unit, ensuring that this is set at 13.8V dc max, 12V dc minimum.

10 The system is now ready to accept calls from the host terminal.

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Diagram 1

ANTENNA BNC CONNECTOR →

CASE RETAINING SCREWS →

○→ GREEN TX LED
○→ RED PWR LED

→ PL1 SERIAL PORT (9 WAY D PLUG)

POWER IN
12 TO 13.8V DC

184

138

110

130

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Section 2: System Operation

The RS232 protocol must be set as N,8,1 (*exception: when sending numeric messages @9600 baud using Pagelink Pro, this must be set to N,8,2). The default serial baud rate is 9600 baud.

The default transmission (pager) baud rate is 512.

Maximum message length: 117 characters (Scope protocol).

Scope protocol requires all 7 digits of the capcode + beep type. All capcodes must be in Frame 0.

All input commands have to be in upper case.

The serial baud rate, paging baud rate, paging format (alphanumeric or numeric) and base ID can be changed using the following commands:-

Serial baud rate commands
XB1 Carriage Return = 1200 Baud
XB2 Carriage Return = 2400 Baud
XB4 Carriage Return = 4800 Baud
XB9 Carriage Return = 9600 Baud

Paging Baud Rate
XS Carriage Return = 512 Baud
XF Carriage Return = 1200 Baud

Paging Format
XTA Carriage Return = Alphanumeric
XTN Carriage Return = Numeric

Base ID
XIxxxxxxx Carriage Return. Example, XI0100000 carriage return will set the base ID to 0100000.

Transmitter Testing
XA Carriage Return will enable the transmitter with a modulation of 600Hz.

Please note, when using our Scope protocol if the paging baud rate character "N" or "F" is used, then the Xlite will default to that paging baud until power is removed. After power is reapplied it will return to the baud rate set by the "XS" or "XF" commands.

Sending data using Scope protocol (see Technical Section, **Calling Pagers**) will invoke transmitted messages to the relevant pagers. Note: if using Pagelink Pro, sequential message feature cannot be used with the X-Lite transmitter.

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Problems and Fault Finding.

1 Check and re-check the data cable connections. This, together with an incorrect signalling format, result in more faults than any other problem.

2 Check that the communications protocol is set to N,8,1.

3 Check that the pagers are at least 3 metres from the transmitter and aerial. Under certain conditions it is possible to flood the pager receivers and corrupt the data received.

4 Check that the pagers have the battery installed with the correct polarity and are correctly powered up.

5 Check that the aerial is correctly installed.

6 Check that the red power LED on the front of the transcoder is lit. If not, check the power hook up with the aid of a suitable meter.

7 Check that the green LED lights for the duration of the transmission. If not, go back to the data cabling and re-check the signal format.

8 Check that the aerial is correctly installed.

9 Check the pagers are set to the correct baud rate and are resident on the correct radio frequency.

IMPORTANT: Internal access and adjustments strictly limited to authorised service personnel only.

Other Antennas

The range and performance of this equipment can be improved by the addition of more efficient antennas*. These can be installed either inside or outside the building and are connected to the transmitter with 50 OHM coaxial cable.

Glass mount antenna (UHFGM): for installation on the inside of a suitable window. This can boost range, especially if it is required in one direction from the building.

The centre fed half wave di-pole, measuring approximately 12 inches from tip to tip, will provide excellent all round local signalling. This can be mounted either inside or outside a building. Two versions are available:
1) a light duty antenna suitable for sheltered environments/internal installation (LUHFDP).
2) a heavy duty stainless unit with optional mounting hardware for more arduous applications (UHFDP).

Other antennas, including co-linears, are available for external applications. Pre-terminated coaxial feeder cables are available for 5, 10 or 15 metre requirements. Consult our Sales Department for further details.

Note ! High frequencies can equate to high power losses. Always use quality cable. RG58 is only acceptable on cable runs of up to 5 metres. We recommend RG213, or equivalent, on greater lengths. If in doubt consult our Technical Department.

subject to license conditions, specifically, mounting height and Effective Radiated Power (ERP).

Service Information

If you experience a problem with your equipment you must first telephone our service hotline, where we may request that you undertake a few simple checks. If a problem still remains, we will arrange collection of your system by overnight carrier at our expense. Upon receipt, we will endeavour to service or replace the system within 24 working hours and return the same by overnight carrier.

We suggest that you retain the packaging for your control equipment. Incorrectly packed goods returned for service are the responsibility of the customer. If we deem that new packaging is required before we can return the unit, a charge will be made.

In the event that a pager requires service, return it directly to Scope (in the pre-addressed service bag supplied with your system) by registered post. Ensure that you carefully fill out the service form provided. Failure to complete this form in full will result in inevitable delays!

Pagers returned with flat, incorrectly installed or leaking batteries will be charged for!

Record your system details here for quick reference:-

Date supplied____/____/____ Serial Number of the base console_____

Transmitter frequency _____MHz Type No: SERILINK

Number of pagers supplied with the system _____

For information on individual pager types, refer to the appropriate pager manual

System Specification

System Operating Voltage: 13.8V dc

System Power Consumption: less than 22mA standby, 550mA (transmit)

Transmitter:

Power output: 1W max

Frequency Range: 450-470 MHz

Channel Spacing: 25 or 12.5 KHz

Adjacent Channel: better than 200nW @ 4.5 KHz deviation

TX Baud Rate: 512 or 1200

RF Standard applied: ETS 300 224

Type No: SERILINK (Notified Body No: 0891)

EMC Standard applied: ETS 300 682

General:

Ports: RS232 serial on PL1

Comms Baud Rate: 1200 to 9600

Footprint (mm): 184 (L) x 138 (W) x 45 (D) max

excluding aerial

Scope's policy is one of continuous development and specifications are subject to change without notice

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Section 3: Technical Information

This section provides a more in depth understanding of how messages are formatted for serial communication from a host. It need only be studied by those intending to write their own serial comm.'s software.

Calling Pagers

Pagers all use 7 digit numeric addresses which enables the system to support thousands of pagers without identity clashes. Most pagers will support multiple addresses (sometimes referred to as CAP codes, RIC's or identities). This enables the pager not only to respond to its own unique address but also to respond to group or global addresses.

These **real** 7 digit numeric codes are often substituted for shorter **logical** numbers which are easier to remember. Under these conditions the host or speciality program within the transcoder will perform an algorithm on the data string received to convert the simpler **logical** number back into a **real** 7 digit number for transmission.

For improved data recovery without error the **real** 7 digit pager numbers are always spaced 8 digits apart.

To avoid system identity clashes, transcoders are provided with a base number within the range of 1000 to 1,999,000. If for example a base address of 0100,000 is applied to a transcoder, the first **real** pager number will 0100,008 followed by 0100,016 and so on.

Logical pager numbers are normally used on systems fitted with the telephone interface and those which are interfaced to personal computers. The algorithm would perform the following function:-

For example take the **logical** pager number of 123

The **logical** pager number 123 will be multiplied by 8 and then added to the base number to provide the 7 digit **real** number

Logical No Base No **Real** No

123 x 8 = 984 + 0100,000 = 0100984

Pager address 1 is normally reserved as the personal identity for that specific pager. Other addresses, of which there can be 6 or more, can be tagged to specific pagers to form selected groups. Address 2 could, for example, be used for all pagers to formulate a global call.

Address codes can be divided between full addresses and sub addresses. Full addresses can allow four different bleep types, A, B, C or D, whereas sub-addresses will only accommodate a fixed bleep type. A status line of information will normally be provided on the pager screen which will highlight the type of bleep sent together with other status information.

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Section 3: Technical Information

Alphanumeric Pagers

Example serial message string:- A0012300A This is a message <CR>

The data format is exactly as for numeric pagers, except that the recognition character at the front of the message is changed from an 'N' to an 'A'.

Transmission baud rate: in the above example, the default baud rate is sent (1200 baud).
To change the transmission baud rate in a message string, placing a letter "N" after the "A" will alter it to 512 baud. Placing a letter "F" after the "A" will alter it to 1200 baud.

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