Application **Guide**

The Ex-Or MLS Digital

Building-wide Managed Lighting System

Innovative Lighting Management Systems

Ex-Or

Making light work

24/7 intelligence

1

2

3

1
Remote MLS Detectors installed at Prudential Assurance's Abbey Gate Centre

2
Hand-held Controllers give users total control at Swansea Land Registry

3
MLS Digital operates throughout the new Harlow Civic Centre

The Ex-Or Managed Lighting System (MLS Digital) is the most intelligent and efficient, cost effective and installer-friendly, flexible and reliable lighting system available.

Here's why…

MLS Digital is the most intelligent

because the luminaires work with networked MLS Digital Detectors each of which monitors presence and light levels. MLS Detectors throughout the building talk to each other constantly so that they can provide lighting exactly as you require it, for as long as you require it.

MLS Detectors know when you're in a particular area; they'll even tell other detectors in associated areas that you need the lights on there too. MLS Detectors automatically assess how bright it is in an area and adjust their luminaires accordingly to maintain ideal levels. They'll even automatically compensate for the condition of the lamp and surrounding reflectors – so there's no need to over-light at the beginning of the maintenance cycle, and you get the lighting level you want, 24/7.

You can also tell each MLS Detector (via a simple remote control) what you want, how you want it and when. You can create, store and select multiple special lighting environments with the scene-setting function; set different light levels for different light zones (from just one luminaire to all of them) and even temporarily override any luminaire or luminaire group for a specific task. The variety is endless.

MLS Digital is the most efficient

because individual luminaires will light at maximum output only when really necessary. Also, if any MLS Detectors sense no movement after a while, they can instruct the luminaires in the zone to dim or switch off completely. As each individual detector is endowed with intelligence, MLS Digital is exceptionally responsive to user requirements and current conditions.

MLS Digital is the most cost effective

because you are using only the amount of light that you need. This means superior energy savings and lower electricity bills. The ease with which the system is installed results in savings too. Furthermore, any changes required to the system in future can be made without incurring the cost of bringing in electricians or other specialists.

MLS Digital is the most installer friendly

because there's no central PC with complex software to deal with. The system is very simple to install. For instance, detectors are not pre-addressed, so the installer does not have to waste time laboriously matching up equipment with location. And, if you partner MLS Digital with the MLS CONNECT Digital plug-in system, the process is even simpler, making for more time and cost savings!

MLS Digital is the most flexible

because no other system gives you this incredible level of control over individual luminaires as well as groups. Changes can be made at any time, to the operation of just one luminaire or a whole floor of them, quickly and simply with the hand-held MLS Programmer. This is invaluable whenever office layouts, or the use of an area, change. Office churn presents no problems to MLS Digital - staff are kept happy with the optimum lighting conditions however often their desks get moved!

MLS Digital is the most reliable

because there are no computers involved and no centralised control. Intelligence is distributed throughout the system, so no one element can disrupt the system as a whole. If one luminaire fails (and more often than not, that's due to the lamp being old and nothing more) the rest keep working as normal.

Even if someone puts an axe through the bus cable, everything still works locally!

That's why we think you will agree that MLS is the ultimate in illuminated thinking.

MLS Digital in action

Office Environment

9.00am
Everyone comes piling in to work and it's a rotten, dreary winter's day. All the main lights are on at virtually maximum.

12.30pm
Marketing are about to have a small meeting. The lights in the immediate area are locally overridden and dimmed to 20% to assist with viewing the computer screen. This does not affect the other staff as their zoned lights are on.

Library

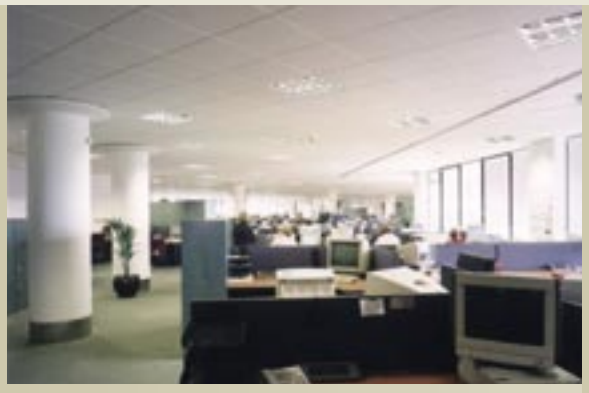
9.00am
The Library has just opened and the Supervisor is preparing for the day. No one else is in yet, so just the circulation lights are on as programmed. It's a bright morning and the lights have automatically dimmed in response to the extra daylight coming through the windows.

11.00am
Much busier now. Many people milling around the aisles sorting out what they need. The aisle lights came on when people started venturing down the aisles. The system has seen that there is less window light now, so the circulation lights have become brighter.

Conference Room

9.00am
The Conference Room is divided in two by a partition wall. The Partition Switch knows this and passes information throughout the system. Therefore, both halves of the room can have different settings at the same time. The larger area has some lights on but dimmed considerably. If anyone walks in, the overhead lights come on straight away.

10.30am
Time for a meeting. All lights are on in the main half, sensing people's movement. If any video presentations take place today, a push of the button on the Hand-held Controller activates a different lighting scene. All the lights adjust automatically and individually according to pre-set instruction.



2.30pm
The day is turning out to be very nice after all. The main work area lights have automatically adjusted to half strength due to the sun providing additional light through the windows.

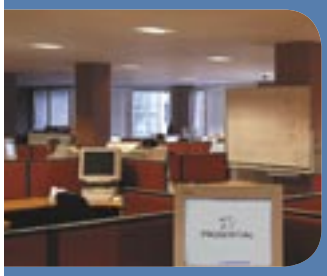
7.00pm
The IT team are working late. Everyone else has gone home. The lights specific to the IT Dept remain on as well as those in the corridors. The rest of the lights in the office automatically dim to 10% after 6.30pm so as to save energy. For those afraid of the dark, there is still enough light to see around the whole office without worry. It's also better for security.

3.00pm
Mid-afternoon and there is less activity. One or two people are quietly browsing in the aisles. The system knows where they are, so keeps the relevant aisles lit. All's quiet in the rest of the camp, bar for the Supervisor's area.

5.00pm
Home time. The Supervisor is doing final checks on the day's activities. The lighting programme is similar to that at 9.00am, but daylight is fading now and the circulation lights have adjusted to full on. That is all that's required until the Library is locked up for the night.

12.30pm
The main meeting is over and one or two people are just going over particulars in the smaller half of the Conference Room. The lights regulate accordingly; the main half goes back to the same 'empty room setting' it was on at 9.00am and the small half has its lights full on.

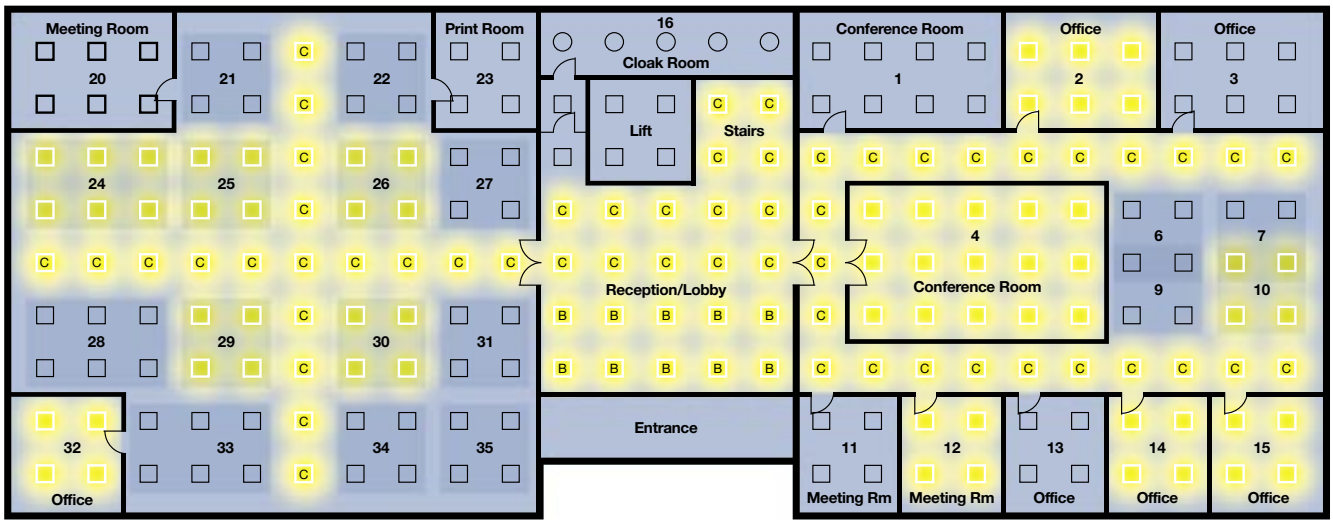
3.30pm
A seminar is taking place now. The chap conducting the presentation wants room for a bigger audience, so the partition wall is taken out. The Partition Switch recognises this and tells the system that the two rooms are now one. The lights are now set to graduate from dim at the front to brighter at the back.



MLS Digital is the ultimate in illuminated thinking!

- **Awake 24/7 in your building**
  a simple, but fully networked system which constantly monitors presence and levels of ambient light, both natural and artificial.
- **Infinite possibilities**
  gives you full control of every single luminaire in your building, if you require it.
- **Scene-setting function**
  create, store and select multiple special lighting environments.
- **Distributed intelligence philosophy**
  no need for a centralised computer.
- **Less wastage of light and power**
  lower electricity bills.
- **Ideal for most interior environments**
  from commercial properties to hospitals, conference centres to educational establishments.

Key: A number within a shaded square area denotes a programmed zone **C** Common Zone **B** Building Zone



MLS Digital overview

Luminaire Requirements

The use of high-frequency DSI/DALI control gear is essential for fluorescent luminaires where daylight regulation is required.

MLS Digital can also be used with fixed-output HF ballasts. All the zoning and switching features of the system are retained but not those relating to dimming.

Installation

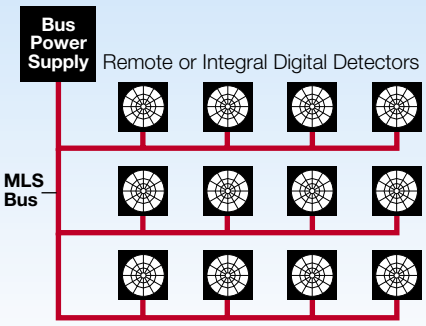
Since the zone functions of the system are carried out over the bus network, the programming of MLS Digital Detectors to switch luminaires in zones may be done without any reference to where the power originates. This means that adjacent luminaires that switch together as a zone may in fact be powered from different electrical phases or circuits. This flexibility is particularly important in refurbishment projects or when office layouts change.

Bus Routing

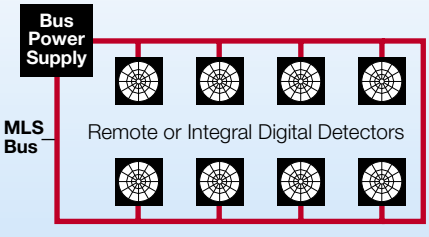
A two-wire communications bus connects all devices in order that they can share occupancy information; this gives greatly enhanced presence detection performance and facilitates a host of user-friendly control features such as automatic corridor linking (i.e. corridor lighting is sustained by occupancy in other areas).

The bus may be installed in a loop, tee or star arrangement. It may run alongside mains wiring, provided that the bus is suitably insulated. Where possible, however, the bus should be returned to the power supply unit as this enables an integrity test to be carried out.

Example of Radial Topology



Example of Ring Topology



For other wiring examples, see separate MLS Wiring Application Note

Bus Power Supply

A single Bus Power Supply synchronises and powers the bus for up to 200 MLS Digital devices. It is equipped with a test facility which provides a simple check of the bus integrity. Linking of the Bus Power Supply units enables building-wide common zones to be established without the need for additional hardware. Up to 100 Bus Power Supply units may be installed on one system to support up to 20,000 detectors.

Universal Bus Transceiver

The Universal Bus Transceiver expands the scope of the Ex-Or MLS Digital by enabling otherwise uncontrolled lighting and non-lighting loads to be brought into the system. UBTs also allow external devices to provide inputs to the system to provide global features such as load shedding and override on or off.

Integral MLS Digital Detector

Two types of communicating luminaire controller designed for integration within a luminaire. Ideal for use in open-plan office areas where frequent changes in layout may occur.

Remote MLS Digital Detector

Remote Presence Detector with ingenious fixing device to accommodate any tile thickness.

A high-performance, communicating presence detector associated with a group of luminaires, available in flush or surface-mount housings. May be used in cellular offices where lighting layouts are not expected to change.

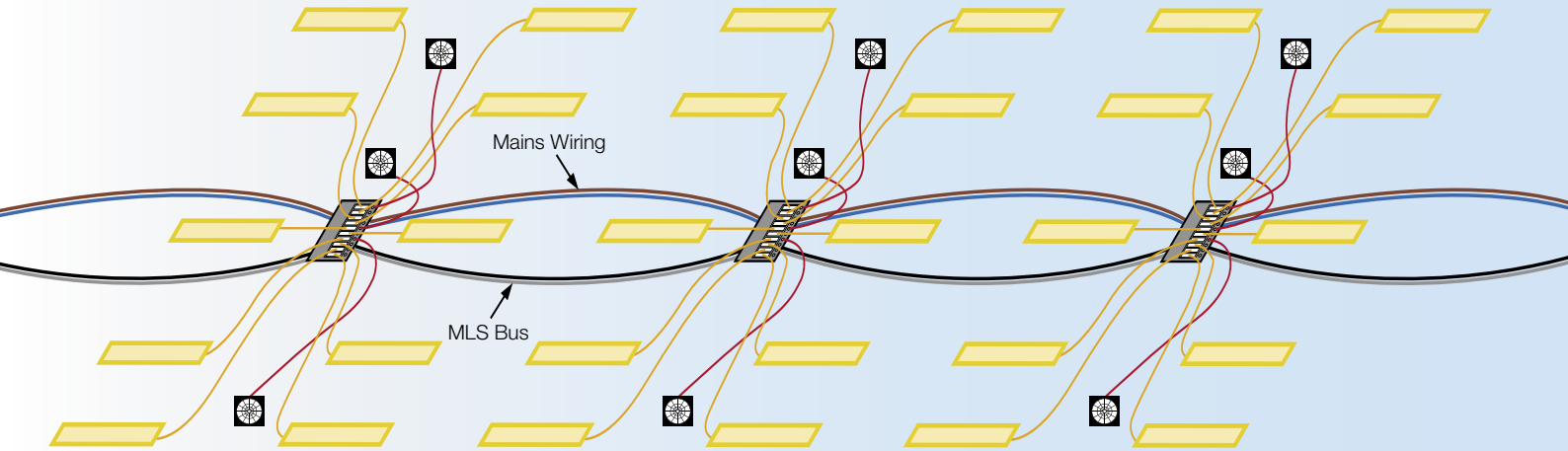
MLS Connect Digital*

Combining plug-in simplicity with lighting control technology for installation and operational savings

Connections for MLS Digital presence detectors, luminaires and automatic emergency lighting testing (using Ex-Or's FailSafe* system) are made via simple plugs and sockets. This speeds up the installation programme and eliminates wiring errors to bring substantial cost savings.

The purpose-designed CONNECT Digital Box (CD Box)* features automatic 'device recognition' to provide a simple yet powerful control hierarchy without the need to manually alter settings or re-programme the system. The CD Box has 5 detector inputs, 5 switch inputs and 10 luminaire outlet sockets. Its slim profile makes it suitable for most applications – including many with restricted void space.

* See relevant Application Guides for further details.



Programming the Ex-Or MLS Digital

The Ex-Or MLS Digital is very easy to commission and re-commission. Following installation, commissioning of the system is carried out locally using the hand-held infrared MLS Digital Programmer (HP2). The commissioning engineer receives positive feedback at all stages of the process. Settings from one detector can be copied in seconds to adjacent detectors operating luminaires in the same group. Settings can be checked at any time using the innovative download function on the HP2.

During the lifetime of the installation, the requirements for lighting may change. Changes to the layout or use of a workspace, no matter how extensive, require no alteration to the wiring of the system. Reprogramming of the parameters set during commissioning can be carried out quickly and easily using the HP2.

MLS Digital Programmer
The HP2 hand-held, battery-operated, infrared device is used to set all the detectors' programmable features as well as to download previously programmed information for checking.

Hand-held Controller
The HC5 allows users to make temporary adjustments to their lighting for the current occupancy period. Additionally, up to six scenes can be set and stored for future recall.

Programmable parameters

Power-up Condition

When power is first applied, detectors either switch the luminaires on immediately (power-up on) or hold the lighting load off for a short period before looking for occupancy (power-up off). Power-up on is usually preferable for corridors and access routes. Choosing power-up off for most other areas greatly reduces the start-up load following any interruption in supply.

Operation (PIR Response)

If set for automatic operation, the detector switches the luminaire on and off automatically. In semi-automatic mode, luminaires switch on only after receiving an occupancy signal relating to their own specific zone, or an instruction from the user, for example via a hand-held override. This feature (which is sometimes referred to as 'Absence Mode') is useful in an intermittently occupied area on the edge of a busy common zone.

Off Delay

This is the time between the last detected occupancy in a zone and the automatic switching off of the luminaires in that zone (or the activation of a 'When Vacant' option – see separate heading). There is a 10 second walk-test option for commissioning purposes.

Z O N E A L L O C A T I O N

Zones

Detectors may be programmed to operate luminaires in groups over nominated work zones. Occupancy by just one user anywhere within the zone ensures that all luminaires in the group remain on. Zone addresses are 01 to 50 and up to 4 zone addresses may be assigned to each detector.

Detectors need not be in adjacent luminaires in order to be programmed as members of the same group (i.e. have the same zone address). They are required only to be on the same bus network. Up to 200 MLS Detectors may be interconnected in any bus network. Up to 100 bus networks, supporting up to 20,000 detectors, may be set up within a building.

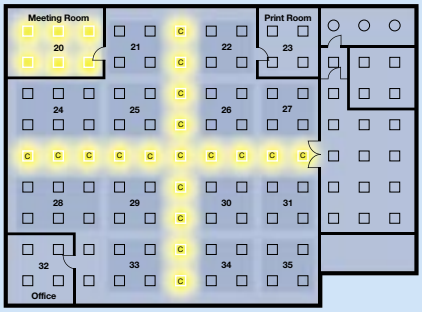
Common Zones

Common zones are groups of lights that are held on for safety and convenience when any other part of the system detects occupancy. This means that anyone working alone, outside normal hours for example, is not obliged to work in a pool of light surrounded by darkness.

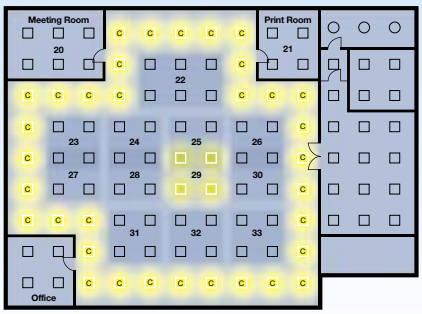
A building-wide common zone may be established across all the bus networks within an installation. It is desirable, for example, for stairwell lighting to remain on when any area of the building is occupied.

Global Zones

MLS Detectors can be programmed to respond to global messages which are useful for load shedding, security and other functions.



Common Zone luminaires are held on when any part of the office is occupied.
This facility automatically provides the last person working in the office with the reassurance of background safety lighting. In this configuration, Zone 20 is occupied and the Common Zone provides illumination across the centre of the open-plan office.



Revised layout of Zones shows Zone 29 occupied and the Common Zone providing illumination to the perimeter of the open-plan office.

Start Lamps

On entry, lamps can be struck at maximum or minimum, prior to ramping to their correct level for the programmed scene.

Entry Scene

Any one of six entry scenes can be programmed.

Bright-out

Lights can be programmed to switch off in very bright ambient conditions. If bright-out is not selected, the luminaire will simply remain at minimum light output until occupancy ceases or the daylight contribution decreases. This minimum level may be adjusted (pre-set) in order to maximise tube life.

Fade to Off

If fade to off is selected then luminaires dim over a period of a few minutes before switching off. Fade to off is recommended in open-plan office areas where instant off could cause distraction.

When Vacant

Luminaires can be programmed to switch off or dim to a minimum level once the time delay has elapsed. Alternatively, an exit scene can be programmed to instruct luminaires to stay at any level required. Options for when an area has been vacated include having the lights dim to a pre-set level and then switch off either after a longer time delay, or once the whole building is empty.

Photocell

If set to 100%, the photocell will regulate over the full range of the ballast's capacity. In certain instances, however, it may be preferable to set a minimum regulating level so that the photocell will not dim lights to less than the selected percentage of output.

Set Light Level

Using the HP2, luminaires are brightened or dimmed until the desired light level is achieved. This is then stored, again using the HP2.

Where luminaires are installed with regulating ballasts, any lighting level within the operating range of the luminaire may be set.

The system automatically compensates for deterioration in lamp and luminaire performance. Furthermore, the need to over-light at the beginning of the lamp maintenance cycle is eliminated.

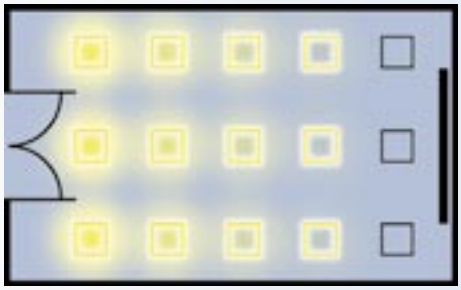
Request Download

Programmed settings may be downloaded from MLS Digital Detectors using this function.

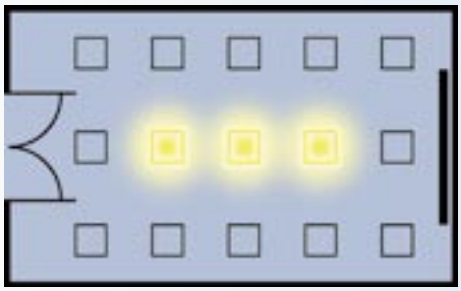
Programme All

Programmed selections are transmitted to the MLS Digital Detector by pressing the Send button.

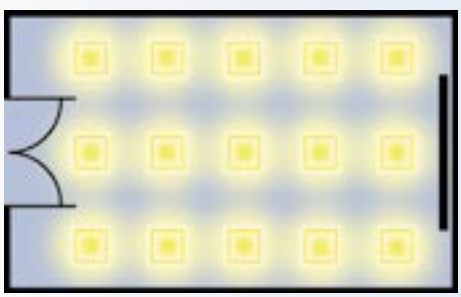
Scene Setting



Slide or Video Presentation



Small meeting around a table



Exhibition or Seminar

The Ex-Or MLS Digital system provides the facility for the user to create lighting scenes to suit their individual requirements and to recall them at will.

A scene is created by using a Hand-held Controller (HP2 or HC5) to adjust the settings for each detector until the desired effect is achieved.

The new settings are then saved in Scenes 2-6 (Scene 1 is reserved for regulating with reference to ambient light) and may be recalled at any time via a Hand-held Controller or Scene Switch Panel.

This unique feature makes the system ideal for multi-function rooms that require different lighting scenes on different occasions, as illustrated.

There is also a Partition Switch feature for use in areas which can be sub-divided into separate rooms.

Scene Switch Panel

Allows scenes to be programmed and recalled to alter the lit environment of a group zone

Local Control Plate

On/Off/Raise/Lower

The Ex-Or MLS Digital provides a flexible and user-responsive, building-wide managed lighting system via a network of communicating presence detectors.

It offers:

- Energy savings via daylight regulation and presence detection
- Zoned lighting for enhanced convenience and visual comfort
- Lighting in key circulation areas held on automatically
- Scene-setting facility
- Uncomplicated installation (no centralised computer; no pre-addressed components)
- Plug-in connection option
- Simple commissioning using a hand-held infrared programmer
- Flexibility to accommodate changes in an area's layout or usage without any alteration to the wiring

The Ex-Or MLS Digital may be specified for use with luminaires from any lighting manufacturer. This Application Guide provides an introduction to the system – please refer to technical data sheets and installation instructions for supplementary technical information.

Complete Service

Ex-Or offers a complete support service from initial design to complete project management.

We can help you by:

- Visiting you to discuss your requirements
- Identifying areas where control systems will provide benefits
- Recommending the appropriate control systems
- Supplying, installing and commissioning your complete project

If you would like to see the MLS Digital in action, you're welcome to join us at Haydock for one of our regular seminars. Please ring for details.

All Ex-Or products are CE marked and manufactured to ISO9002 at our own specialised surface-mount assembly plant.

ogc buying.solutions

ESTA energy systems trade association

Reference No: A4004B

The Ex-Or range of Lighting Management Systems comprises:

MLS Digital
Managed Lighting System

MLS CONNECT Digital
Lighting connection and management system

FailSafe
Emergency lighting testing systems

LightSpot
Lighting control by presence detection and photocell

SceneSelect II
Scene-setting and dimming system

LooSpot
Washroom management by presence detection

Ex-Or Limited
Haydock Lane
Haydock
Merseyside WA11 9UJ

T: +44 (0) 1942 719229
F: +44 (0) 1942 272767
E: ex-or@ex-or.com
W: www.ex-or.com

Ex-Or
Making light work