

Quick Design & Install Guide

Computerised Emergency Evacuation System
LONWORKS™ Powerline Technology

The Quick Design and Install Guide

This Zoneworks SoundEscape guide is designed as a quick reference or basic overview for system designers and installers. It summarises the main requirements for a typical Zoneworks SoundEscape installation, and can be used as an instruction tool for electrical contractors. This document does not cover every detail such as configuring for off-site or integrated network installations, but following this guide will ensure a successful installation which can then be configured for other options if required.

1. Design and installation summary

Zoneworks uses a combination of data cable and power line signalling to communicate with devices on the network. Zoneworks Power Line Routers are installed at each electrical distribution board where emergency lighting is present. The Powerline Routers are connected via a "daisy chained" data cable back to the head-end location to form the system "backbone". The Zoneworks Powerline Routers couple the data cable signal to a Power Line signal for transmission on the emergency lighting circuits.

TYPICAL TOPOLOGY

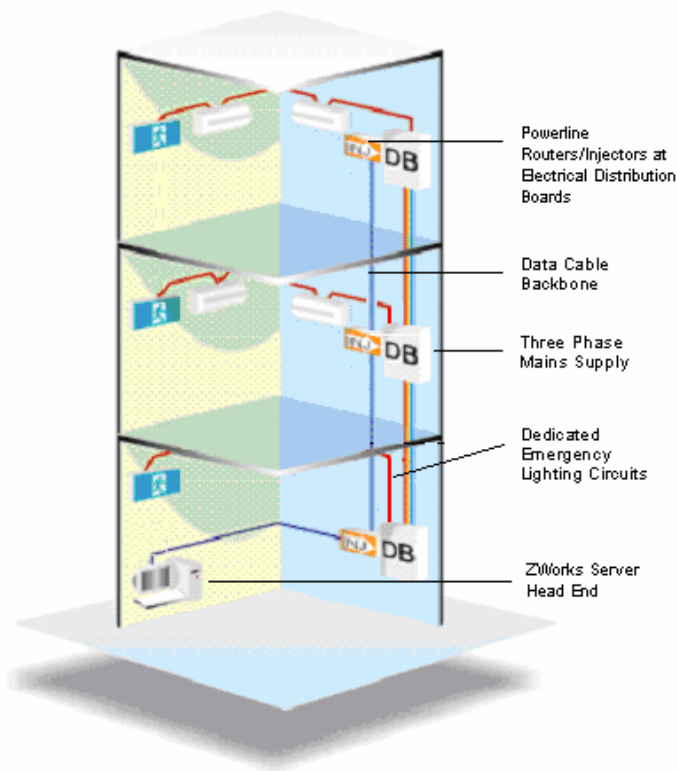


Figure 1

The Zoneworks Server is the intelligence hub of the system. It holds the database, group testing schedules and network communications hardware. The Zoneworks Server is located on site. Scheduled test results and real time status updates are stored and processed by the Zoneworks Server for compliance, maintenance and log book reports. Manual or automatic tests can be initiated from the Zoneworks Server, as well as system maintenance such as uploading firmware updates and configuration information.

2. Example Topology:

- Typically, the Zoneworks Server is connected to the data cable backbone by a Lonworks™ USB Network Interface.
- From the Network Interface a data cable is Daisy Chained to all Distribution Boards that supply Emergency Lights to form the 'backbone' of the system.
- At these distribution boards, 3-Phase Powerline Routers/Injectors are installed to communicate with each emergency luminaire over the Mains Supply wiring. The backbone data cable is connected to this Powerline Router.

3. System Design

A PC Server is permanently connected to the Lonworks network and provides a means of significantly enhancing the capabilities of the system.

The network consists of the Zoneworks Server connected to a network of routers and the luminaires are connected to the routers, typically via power line.

There is a strong focus on extended and remote connectivity. Where extended connectivity is required the Zoneworks System can utilise data cable, fibre optic and LAN/WAN facilities for interconnection between buildings and remote control/monitoring is achieved via the **Zoneworks WEB Service**.

4. System backbone

a) A "daisy chained" data cable must be run from the Server location to each Powerline Router.

Cable Type: **Belden 8471**, **Number of Pairs:** 1, **Total Number of Conductors:** 2, **AWG:** 16, **Stranding:** 19x29, **Conductor Material:** TC - Tinned Copper, **Insulation Material:** PVC - Polyvinyl Chloride, **Inner Shield Material:** Unshielded, **Outer Shield Material:** Unshielded, **Outer Jacket Material:** PVC - Polyvinyl Chloride, **Plenum (Y/N):** N, **Applications:** Control and Instrumentation Cable

b) Allow enough space within each relevant electrical distribution board cupboard to install the Zoneworks 3-Phase Router. Each Router will require a standard 240V socket outlet in addition to a 3-Phase Coupling to the Distribution Board. Router installation details are found within the 3-Phase Powerline Router Installation Guide. Router Dimensions: 250mm W x 240mm H x 65mm D.

Please see the Clevertronics Zoneworks Systems Schematics on page 6 and 7 for comprehensive installation and wiring details.

5. Software

The Zoneworks Software is designed to provide a simple but very powerful interface to the network of Zoneworks devices.

Features:

- Real Time Status information – this ensures that the latest information is available at all times and reduces the time spent “polling” the network.
- Group Test Scheduling
- “Drag and Drop” Group Allocation
- Visualisation of the Network Topology and Devices
- Automatic Database backup
- Windows Explorer based Tree View and List View Display
- Intuitive menu and command structure

The Zoneworks software runs on the Clevertronics Zoneworks Server equipped with remote control capability via telephone line, LAN/WAN or the Internet - **Zoneworks WEB Service**. Please contact Clevertronics for further details.

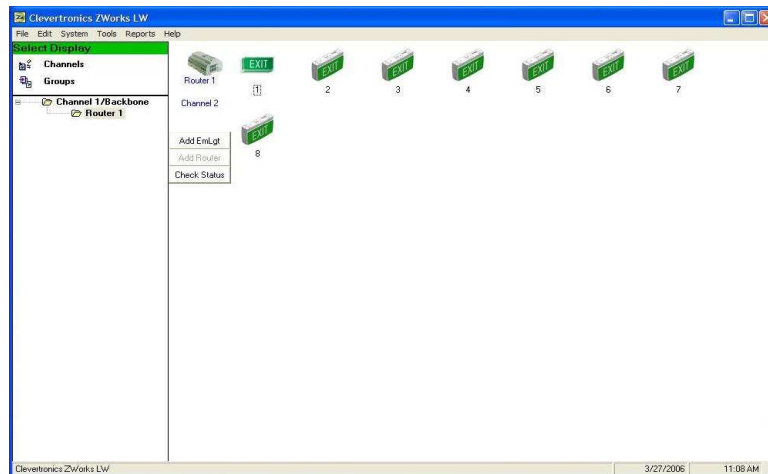


Figure 2 Zoneworks Interface

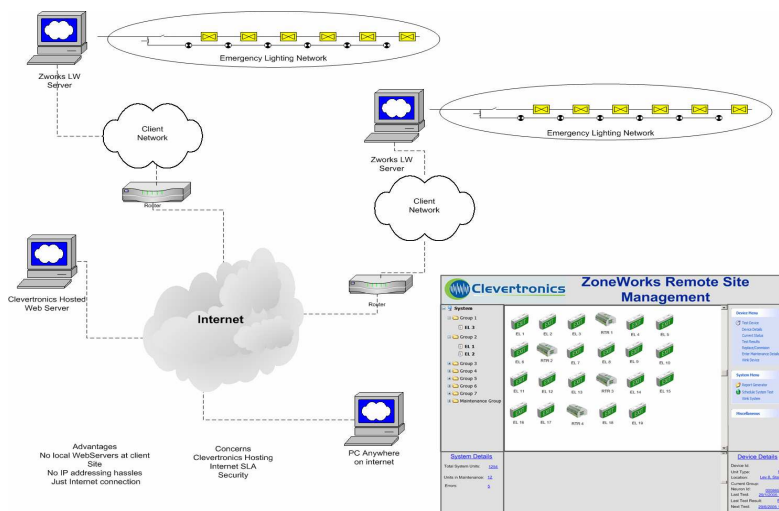
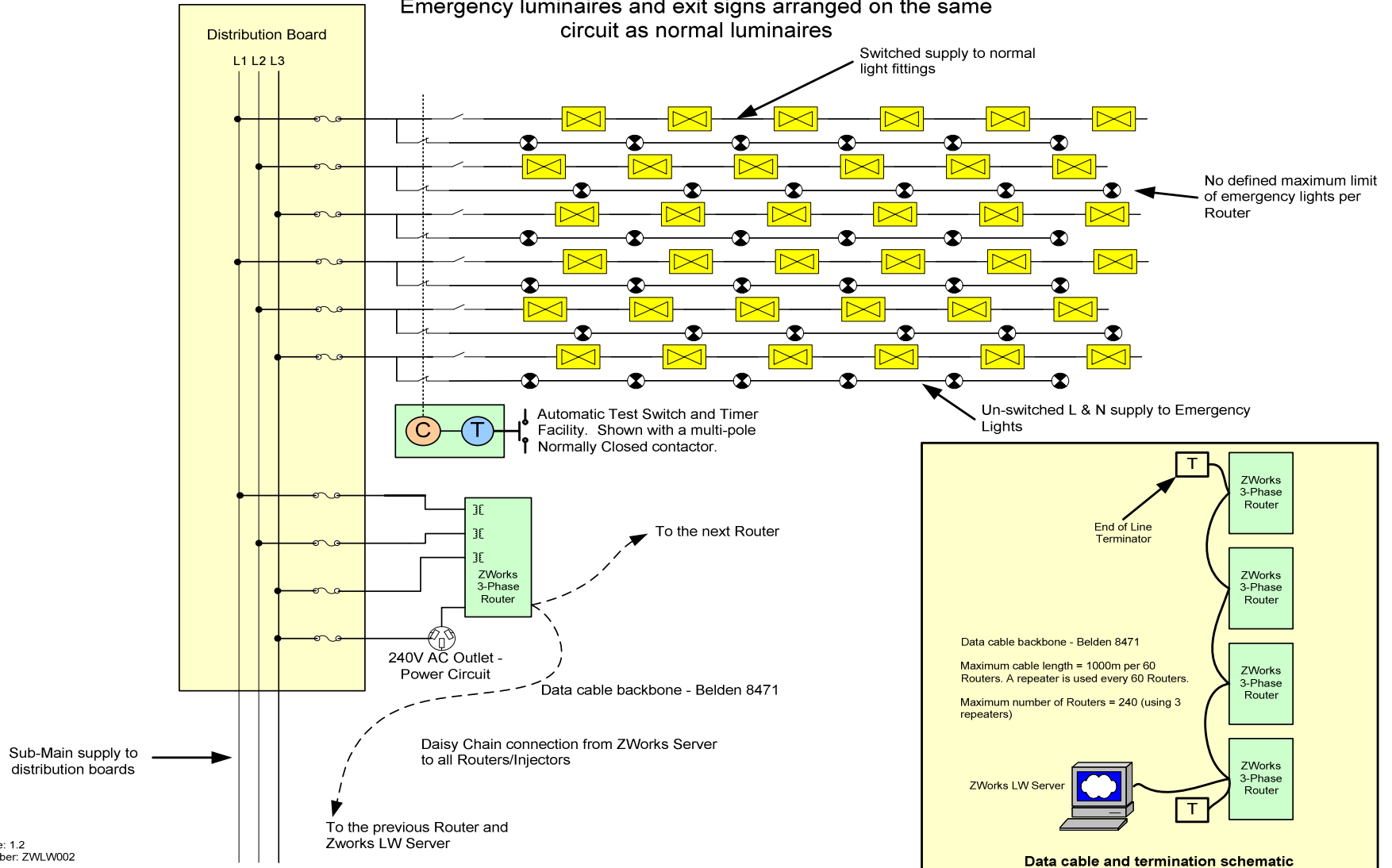


Figure 3 Zoneworks Web Service and Interface

Clevertronics ZWorks Wiring Schematic - Option 1
 Emergency luminaires and exit signs arranged on the same circuit as normal luminaires

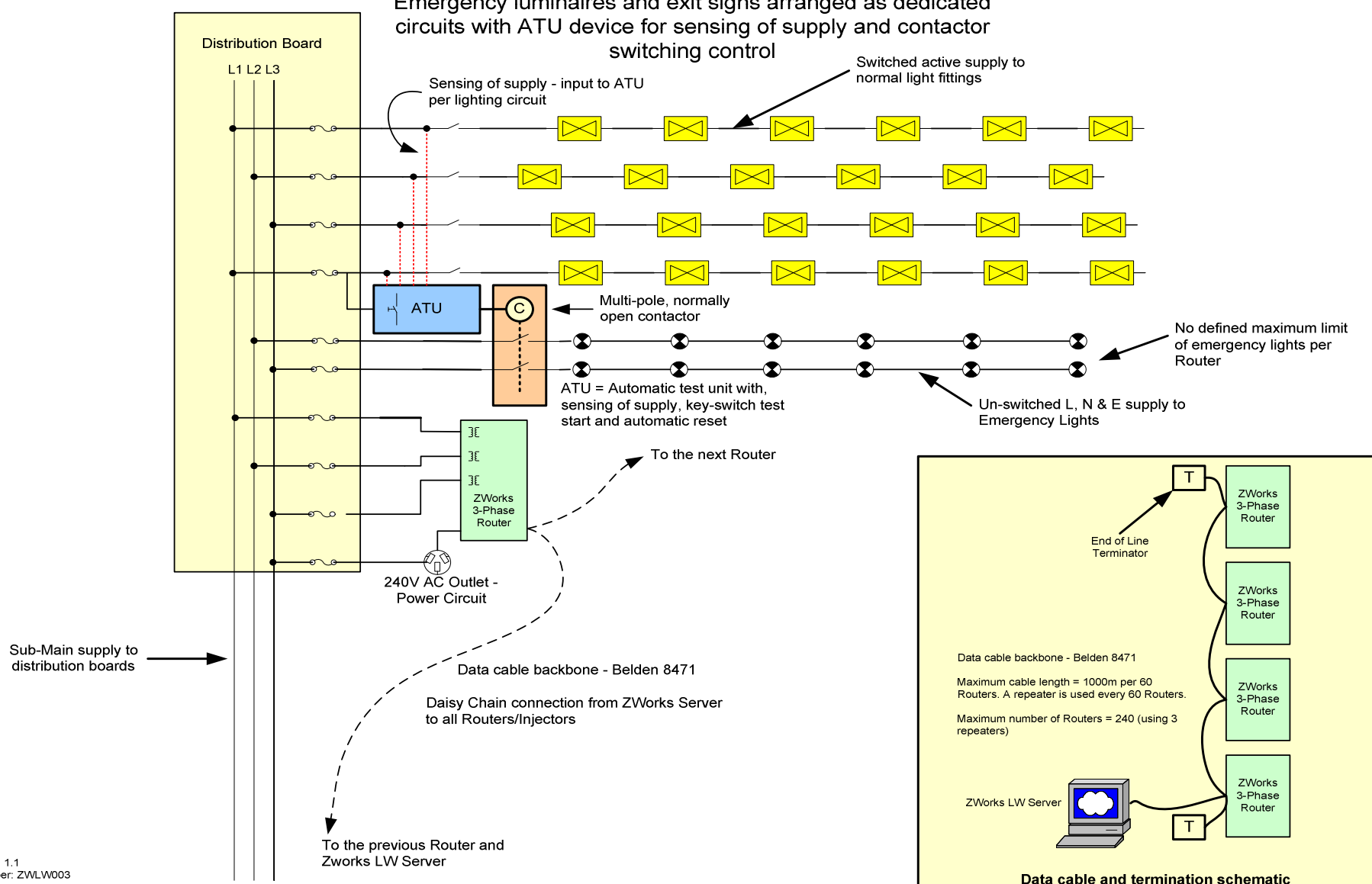


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Figure 5

Clevertronics ZWorks Wiring Schematic - Option 2

Emergency luminaires and exit signs arranged as dedicated circuits with ATU device for sensing of supply and contactor switching control



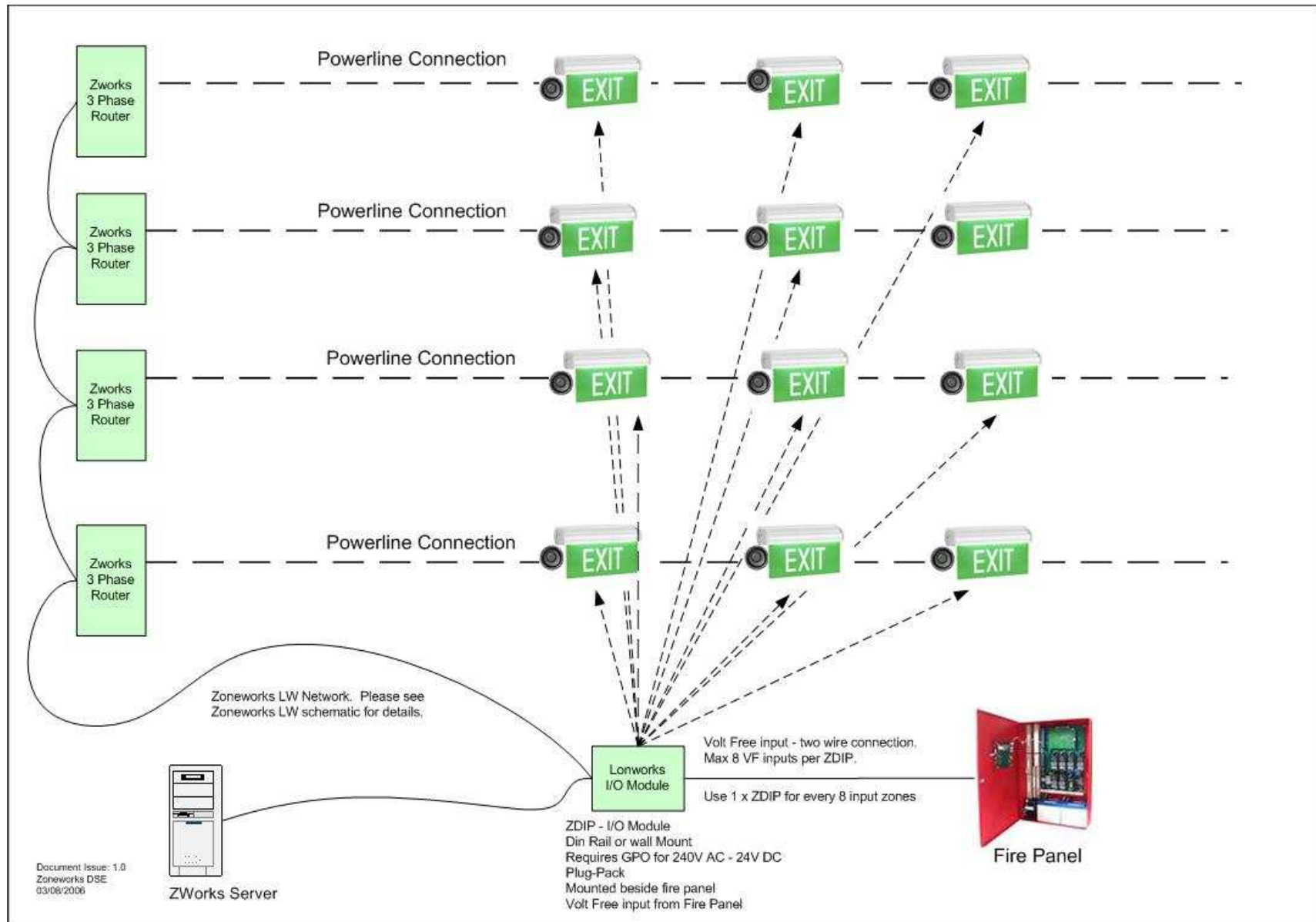
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01/02/2006

Figure 6

7. Zoneworks System with DSE Capability

The figure on the next page (figure 7) shows the most typical application where the Zoneworks Emergency Luminaires and SoundEscape Exit Luminaires are connected as part of a network via the powerline, routers and data cable back to the Zoneworks LW Server.

This figure also shows a Fire panel interface to a Lonworks Digital I/O module via contact inputs. In this scenario if the contacts are open the I/O module would send a network variable update to all the devices it is bound to. In the case above the I/O module is bound to all devices but this could be “zoned” based upon multiple inputs to the I/O module. There is a limit of 8 inputs and zone outputs per I/O module but there is no limit to the number of I/O modules allowed in the system. The user will be able to bind selected SoundEscape Exit Luminaires to the particular contact input on the Lonworks I/O module.



SOUNDESACPE Network Schematic and Interface with the Fire Panel

Figure 7

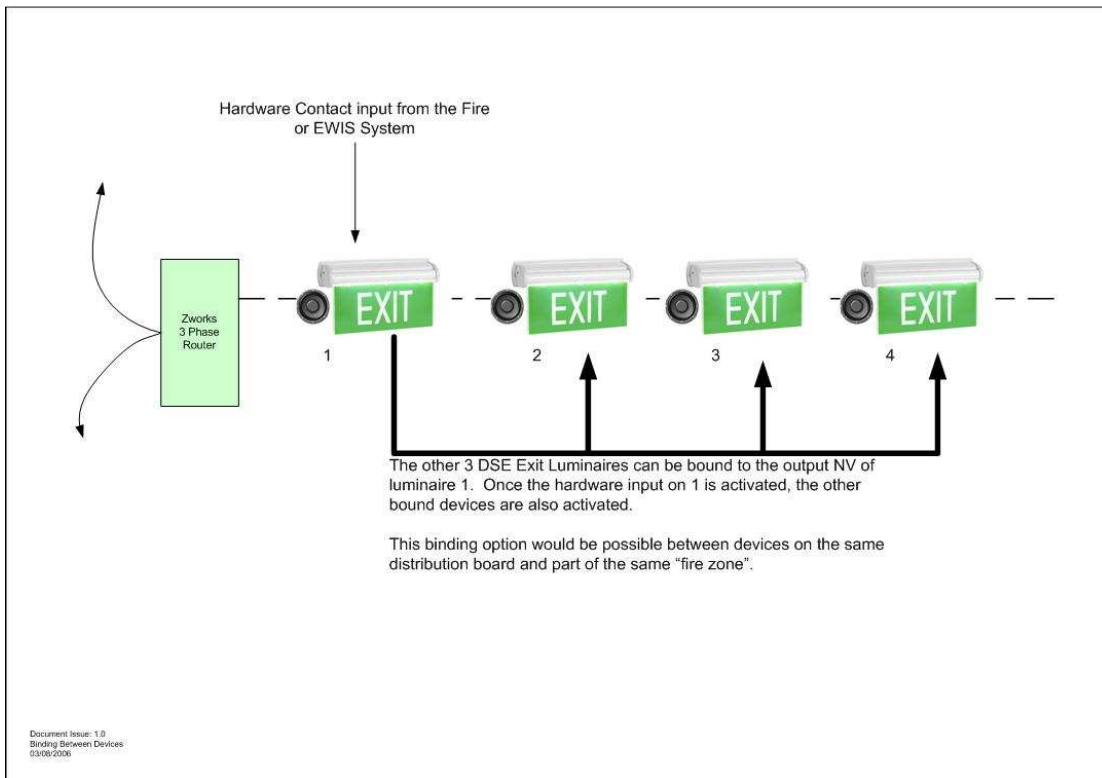


Figure 8

The figure above (figure 8) shows how a one device can be bound to another or many devices. This may be required in certain circumstances and can be used in combination with the setup in figure 7 i.e. devices can be bound to the Lonworks I/O module and bound to another device. Device 1 above may be bound to the I/O module, physically connected to the fire system via contact inputs and then bound to other devices.

Positioning of the *Sound Escape* DSE EXIT Luminaires

The *Sound Escape* EXIT sign can be configured to output the Broadband pulse at different rates and different volumes depending on the position of the Luminaire relative to the final exit door of an evacuation path.

As an example the system could be configured for the following purposes;

- EXIT or "Perimeter Marking"
- EXIT and Evacuation path marking

Perimeter marking is a simple method for identifying just the EXIT doors within a building or large space. The rate of the Broadband Pulse would typically be configured at its fastest combined with a Voice Annunciation of "EXIT Here" between three broadband pulse bursts at the loudest volume level.

Exit and Evacuation Path marking is achieved by configuring each *Sound Escape* EXIT sign according to its position in the evacuation path to the final exit door. As a building occupant moves along the evacuation path, the broadband pulse rate become faster and annunciation is used to indicate critical changes in direction. The number of possible scenarios is extensive and this highlights the significance of the configuration options available for each *Sound Escape* Exit sign. A DSE module pulsing at a slow rate could indicate the beginning of an evacuation path and upon reaching this point the occupant would hear the next sign pulsing at a faster rate and perhaps the final sign may be configured with a Voice Annunciation of "EXIT Here" between three broadband pulse bursts at the loudest volume level.

System Commissioning

The Clevertronics support team can assist with design, configuration, commissioning and maintenance of the Zoneworks *Sound Escape* System. The Zoneworks LW framework provides all the necessary configuration tools for the Emergency and *Sound Escape* luminaires allowing for a flexible, scalable design and efficient, configurable commissioning process.

Further information

For more information, please contact your nearest Clevertronics office.

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Please note:

Clevertronics make every effort to ensure information supplied is accurate, however, the installing contractor or specifier should ensure that the installation is compliant with all relevant codes and standards and information such as provided here is accurate and up to date with any changes or revisions that may apply at the time of design and installation.

References (Text and Images):

1. Powerline Communication Technology Update (presentation), Echelon Corporation
2. Evaluating Power Line Environments Using the Echelon PLCA-22 Communication Analyzer (presentation), Echelon Corporation
3. Designing with the Power Line Smart Transceiver (presentation), Echelon Corporation

Appendix

Router Installation Diagram
Echelon Digital Input Module - ZDIP