

# **Addressable Call System**

**Incorporating:**

**- Quantec Addressable Call System**

**Consultants Specification**

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## **1 SCOPE OF WORK**

- 1.1 To design, supply and install an addressable call system suitable for nursing homes, hospitals, health centres, leisure centres, government buildings and other private and public sector establishments.
- 1.2 The system shall provide flexible call routing, full monitoring of all network devices and be tailored to suit a building's exact requirements with different day, night and call divert arrangements.

## **2 STANDARDS AND REGULATIONS**

- 2.1 Where applicable, the addressable call system shall comply fully with the following British Standards and/or other nominated rules and regulations. The equipment manufacturer shall confirm compliance with the standards.
- 2.2 The equipment manufacturer shall be approved to BS EN ISO 9001 quality system standard for the design and manufacture of the equipment.
- 2.3 All wiring shall be installed in accordance with the current edition of BS 7671 (IEE Wiring Regulations), and/or other relevant national standards.

## **3 ADDRESSABLE CALL SYSTEM**

### **3.1 Key Features**

- 3.1.1 The addressable call system shall comprise of call communication equipment including a network Controller, call points, ceiling pulls, monitoring points, small displays (with or without controls), large displays (without controls), infrared ceiling receivers, radio receivers, overdoor lights, pagers, etc.
- 3.1.2 Each Controller shall have integral indicators, controls, backlit LCD display, PSU, batteries (optional) and network connections.
- 3.1.3 Call points shall send notification of a call to the Controller which shall pass the call onto pre-selected displays.
- 3.1.4 The system shall support multiple call levels including:
  - standard calls
  - help required (assist) calls
  - emergency calls
  - infrared staff attack calls (optional).
- 3.1.5 The system shall support up to 256 addressable devices (displays, call points, etc.) connected on a system together with 'slave' ancillary devices (ceiling pulls, overdoor lights, etc.).
- 3.1.6 The addressable call system shall provide full monitoring of all network devices for faults including short-circuit fault, open-circuit fault, incorrect addressing, and unauthorised device removal.
- 3.1.7 The system shall be supplied with Mains voltage and distribute 24 Vdc to the system. As an option, in the event of Mains failure, operation of the system shall be maintained for 24 hours (standby) and 3 hours (in use) using 2 x 12 V batteries.

- 3.1.8 The addressable call system shall have two RS-232 interfaces to allow connections to a printer or data analysis PC and radio paging equipment.
- 3.1.9 The addressable call system shall incorporate a real-time clock to enable events to be referenced against time and date. The user shall be able to change the time and date settings of the clock.
- 3.1.10 The addressable call system shall have an event log capable of storing up to the last 499 events.
- 3.1.11 The addressable call system shall incorporate a simple to operate keypad enabling users to access the various built-in functions and interact with the information displayed on the LCD. The system shall be programmable via upload/down software or by using front panel buttons.

## **4 SPECIFICATION FOR NETWORK DEVICES**

### **4.1 Overview**

The addressable call system's network devices shall be small, discreet and designed to blend into any sort of decor. Up to 256 network devices shall be used per system, each containing non-volatile memory to store its unique address ID number.

The equipment manufacturer shall have available the following types of network devices which make up the addressable call system:

- Controller
- Call points
- Monitoring points
- Small displays (with or without controls)
- Large displays (without controls)
- Infrared ceiling receivers
- Radio receivers
- Addressable overdoor lights & Addressable sounders.

### **4.2 Controller**

- 4.2.1 The system's Controller is normally located in the manager/matron's office. Its enclosure shall comprise of a plastic hinged lid and metal back box containing the following PCBs:
  - Main Control PCB; shall provide all the network 'spine' connections, auxiliary output connections, PC connection (for programming), printer or PC connection (for data analysis), radio pager connection, Non Volatile Memory (NVM) which holds site specific data.
  - Power Supply PCB; shall provide connections to the mains supply and optional standby batteries. It shall be a 185-265 Vac, 50-60 Hz off-line switched mode PSU.
  - Display PCB.
- 4.2.2 Programming the Controller shall be usually carried out via a laptop PC running upload/download software (see section 8). The buttons on the Controller's front panel shall also be available for programming (see section 7).

4.2.3 The Controller shall hold a library of 40 pre-set place names consisting of the following: Annex, Area, Bathroom, Bedroom, Conservtry, Corridor, Dining Room, Disabled WC, Display, Door, Doorbell, Drugs Cab, Entrance, ESMI Unit, Exit, Fire Exit, Flat, Floor, Gents WC, Hairdresser, Kitchen, Ladies WC, Laundry, Lift, Lounge, Meeting Rm, OD Light, Phone, Quiet Room, Reception, Room, Shower, Sluice, Special, Staff Room, Toilet, Treat Room, TV Room, Ward, Zone.

In addition, up to 45 custom place names (of up to 11 characters) shall be available for programming into the Controller for assigning to network devices.

It shall be possible for up to four alphanumeric characters to be tagged onto the end of all pre-set and custom place names, e.g. "Disabled WC.....AB01".

4.2.4 The Controller shall incorporate the following LED indicator, as a minimum:

LED Label	LED Colour	Description
Supply Present	Green	Lit steady to show that all power supplies are functioning correctly.

4.2.5 The Controller shall have an integral 2-line x 40 character, backlit, LCD alphanumeric display that acts as an operator interface. The LCD shall provide detailed information (in a textual format) and display system status for the following conditions:

- Normal conditions
- Call status
- Fault status
- Access levels 1, 2 & 3 menu functions.

4.2.6 The Controller shall incorporate the following pushbutton controls, as a minimum:

Button Label	Description
Numbered buttons (1, 2, & 3)	Used to input numeric codes to access to the Controller's menus.
Scroll up & Scroll down	Dependent on the status of the system, these buttons shall: <ul style="list-style-type: none"> <li>• scroll vertically through any call, or fault conditions that appear on the Controller's LCD display</li> <li>• scroll vertically through the Controller's access level menus</li> <li>• set date, time and day/night mode settings, etc.</li> <li>• serve as code input buttons to access levels 2 or 3.</li> </ul>
Escape & Accept	Dependent on the status of the system, these buttons shall: <ul style="list-style-type: none"> <li>• scroll horizontally through the Controller's access level menus</li> <li>• escape, or accept options available in the Controller's access level menus.</li> </ul>

4.2.7 The Controller shall provide auxiliary outputs which shall be used for driving peripheral equipment, e.g. activating relays (when an attack, or emergency call is active on the system) to drive tone pagers, strobes, etc. The following auxiliary outputs shall be provided, as a minimum:

- +24V - +24 V (protected by 100 mA resettable fuse)
- OP1 - Activated when any standard call is active on the system. Max. current = 25 mA
- OP2 - Activated when any help required call is active on the system. Max. current = 25 mA
- OP3 - Activated when any emergency call is active on the system. Max. current = 25 mA
- OP4 - Activated when any attack call is active on the system. Max. current = 25 mA
- OP5 - Unused
- 0V - 0V

4.2.8 The Controller shall constantly monitor all network devices and indicate the exact ID number of any faulty devices. When a fault occurs on the system the Controller shall respond by activating its internal sounder and displaying the precise location of the fault on the LCD.

### 4.3 Call Points

Call points shall be sited next to a bed (preferably above bedhead height to avoid damage to leads) and in lounges, dining rooms, etc.

Call points shall have two buttons, a red/green confidence light and an optional remote socket for connecting ancillary devices, e.g. tail call leads and pressure pads. They shall either have a button, or magnetic reset, complete with an integral sounder and/or infrared receiver. Call points shall be available with, or without, the internationally recognised nursecall symbol.

The equipment manufacturer shall have available the following types of call points for connection to the system. Each call point variant listed below shall be available with, or without, remote sockets:

- Call point, button reset
- Call point, button reset with sounder
- Call point, button reset with I/R receiver
- Call point, button reset with sounder & I/R receiver
- Call point, magnetic reset
- Call point, magnetic reset with sounder
- Call point, magnetic reset with I/R receiver
- Call point, magnetic reset with sounder & I/R receiver.

### 4.4 Monitoring Points

Monitoring points shall have one button, a red/green confidence light and an isolation keyswitch to prevent operation when a door is to be left open. If required, ancillary devices, e.g. fire exits, doorbells, telephones, etc., may be connected so that operating them makes a standard, or emergency call. They shall either have a button, or magnetic reset.

### 4.5 Displays

Displays shall be located strategically around the premises where they can be easily seen by staff, in areas such as nursing stations, junctions in corridors, staff rooms, etc. Small displays (with or without controls) and large displays (without controls) shall be available.

Displays shall scroll automatically and only show the calls which are most urgent plus a message saying how many calls are waiting on that part of the system. If there are no calls on the system the displays will show the time, then staff presence calls, standards calls, help required calls, emergency calls and attack calls.

The small display (with controls) shall have an Accept button, plus buttons to control divert and other features.

### 4.6 Infrared Ceiling Receivers

Infrared ceiling receivers shall be designed for use with the system's infrared transmitters (see section 5.7). They are usually located in bedrooms, corridors, common rooms and any other internal area that requires infrared coverage. Slave infrared ceiling receivers shall also be available (up to three per master infrared ceiling receiver, or infrared call point) to improve coverage. Dependent on the type of transmitter(s) used, master ceiling receivers shall allow standard and/or attack calls to be

made. The type of calls that can be made from a slave ceiling receiver shall depend on whether they are connected to a master ceiling receiver (standard and attack calls only), or an infrared call point (standard, help required, emergency and/or attack calls).

To summarise, the equipment manufacturer shall have available the following types of infrared ceiling receivers for connection to the system:

- Master infrared ceiling receiver
- Slave infrared ceiling receiver
- Test infrared ceiling receiver.

## **4.7 Radio Receivers**

Radio receivers shall be designed for use with the system's range of dual action infrared/radio transmitters (see section 5.7). Dependent on the transmitter(s) used, they shall allow standard and/or attack calls to be made from external areas such as car parks, loading bays, etc.

Receivers shall be mounted internally, typically in a building's roof space, where they shall provide RF coverage of typically 60m (dependent on conditions/location). An optional RF extension aerial shall be available for outdoor use (recommended for sites where the receiver is located close to large metallic objects, or thick structural walls). It shall be possible for multiple radio receivers to be used for areas such as large car parks to ensure sufficient coverage.

For sites with multiple, separately-managed areas, it shall be possible for different radio receivers to be set up to respond to calls from certain transmitters only. This shall be achieved via an RF grouping facility whereby a receiver in, say, RF group 3, will only respond to transmitters assigned to the same RF group. The default setting for all radio receivers and transmitters shall be RF group 1 (of 16).

To help ensure the integrity of the radio receivers, it is recommended at least one monitored RF integrity transmitter is used with every radio receiver. These shall work by sending a periodic test transmission to the radio receiver. If the receiver fails to receive the test signal, it shall send a fault message to the Controller to advise that something is wrong.

To summarise, the equipment manufacturer shall have available the following types of radio receivers for connection to the system:

- Radio receiver
- External extension aerial for the radio receiver
- RF integrity transmitter.

## **4.8 Addressable Overdoor Lights & Addressable Sounders**

Addressable overdoor lights shall be designed to act as area indicators, or to provide 'follow me' lights at the ends of corridors, etc. They shall have built-in sounders and be similar in appearance to standard overdoor lights. It shall be possible to instruct them to light when certain groups of call points are calling. Addressable sounders shall be used to increase sound levels in long corridors, outside communal areas, etc.

## **5 SPECIFICATION FOR ANCILLARY DEVICES**

### **5.1 Slave Overdoor Lights**

Slave overdoor lights shall comprise two red and two green ultra-bright LEDs inside a triangular diffuser. They shall provide low current consumption and connect to call points via 4-core cable (2-cores are the same as the two network wires so connection to the network can be made at the overdoor light, or the call point). They shall normally be fitted outside rooms.

### **5.2 Ceiling Pulls**

Ceiling pulls shall comprise a red confidence light and a 3 metre cord with two open-sided triangular pulls specially designed for ease of use by the infirm. They shall generally be reset at a call point to which they connect via 3-cores. They shall be fitted in each bathroom and WC.

### **5.3 Slave Call Points**

Slave call points shall be functionally the same as ceiling pulls and as such shall be used in conjunction with a master call point. They shall comprise a call button, remote socket, confidence light and designed for use in areas such as double bedrooms where more than one call button may be required. All calls shall be reset at the master.

### **5.4 Tail Call Buttons**

Tail call buttons shall consist of a pear-shaped push, a lead and a plug that connects it to a call point's remote socket. A call shall be made by pressing the button, or by pulling the plug out. Tail call leads shall be available in a variety of different lengths to suit different applications.

### **5.5 Hand/Foot Operated Pneumatic Pads**

Hand/foot operated pneumatic pads shall be available for patients who find it difficult to press buttons. It shall be used in conjunction with a remote air switch. Applying pressure to the pad shall operate the air switch which, when connected to a call point's remote socket, triggers a call.

### **5.6 Portable Movement Detectors**

Portable movement detectors shall comprise of an adjustable weight sensor which sits under the leg of a bed and connects to a call point's remote socket via a jack plug. A call shall be triggered when the bed is vacated, thus alerting staff to the possibility of a wandering patient.

### **5.7 Dual-Action Infrared/Radio Transmitters**

Rechargeable dual-action infrared/radio transmitters shall have a typical infrared transmitting range of 10 metres (line of sight) and a typical radio transmitting range of approximately 60 metres.

Each transmitter shall have two infrared emitters (one on each side to maximise performance), two buttons (A & B) and a retained 'pull clip'. Depending on its configuration, pressing a transmitter's buttons, or activating its 'pull clip' shall generate a standard, help required, emergency, or staff attack call on a compatible infrared and/or radio receiver.

Housed in a tough plastic enclosure, each transmitter shall provide battery low indication as standard and be recharged fully in approximately 14 hours using a single-way charging unit. A ten-way charging unit, shall also be available for sites with multiple transmitters.

Two pre-configured transmitters shall be available; a push for attack/pull for attack transmitter and a push for call/pull for attack transmitter. If a different transmitter configuration is required, a configurator (see section 5.8) shall allow an engineer to reprogram any of the above transmitters to suit the operational requirements of an individual site.

To summarise, the equipment manufacturer shall have available the following types of transmitters for connection to the system:

- Dual action infrared/radio transmitter (configured for push for attack/pull for attack)
- Dual action infrared/radio transmitter (configured for push for call/pull for attack)
- Single-way battery charging unit for range transmitters
- Ten-way battery charging unit for range transmitters.

## **5.8 Configurator for Dual-Action Transmitters**

A configurator shall allow the operation of any range transmitter to be tailored to suit the requirements of a specific site. In particular it shall allow authorised engineers to:

- Assign the level of call that will be triggered when the transmitter's A button is pressed.
- Assign the level of call that will be triggered when the transmitter's B button is pressed.
- Assign the level of call that will be triggered when the transmitter's 'pull clip' is activated.
- Set the transmitter's A & B buttons so they only trigger a call when both are pressed simultaneously.
- Turn the transmitter's on-board 'confidence' beeper on, or off.
- Turn the transmitter's radio action off.
- Set the transmitter's transmission time to run continuously, or to automatically switch off after a pre-determined time.
- Assign the transmitter an RF group ID address (1 to 16) to match the setup of any radio receivers on the system (see Radio Receivers, section 4.7 for further details).
- Change the transmitter's mode of infrared transmission to 'pulsed' to suit older addressable call systems.

Each configurator shall be supplied with a programming CD (Windows 2000/XP compatible), a USB connection lead (to connect the configurator to a PC) and a lead for connecting the configurator to a range transmitter for programming.

## **5.9 Strip Switches**

Strip switches (of various lengths) shall comprise a continuous, flexible plastic pressure strip. Pushing the strip anywhere along its full length closes electrical contacts inside the strip, sending a signal to a remote device.

The strip switch shall interface to the addressable call system and generate calls, either standard, help required, emergency or attack calls.

## **6 SYSTEM OPERATION**

### **6.1 Standard Calls**

To trigger a call, the user shall either press the 'CALL' button on a wall-mounted call point, pull the cord of a ceiling pull unit, or operate the remote button of a tail call lead. This shall cause the call point's confidence light to pulse red slowly. Outside the room, sounders shall pulse slowly, overdoor lights (if fitted) pulse red slowly and all relevant displays show the exact location of the calling room.

### **6.2 Call Accept**

When a call is shown on several displays at the same time, several staff may respond simultaneously. To help prevent this happening, a member of staff shall be able to accept the call at a display (with controls) by pressing its 'Accept' button. This shall remove the call from all displays (but for safety reasons the call shall return if it is not dealt with quickly).

### **6.3 Staff Presence**

When a member of staff arrives, the call point's 'RESET' button shall be pressed to cancel the call and to put the call point into staff presence mode. This shall cause the call point's confidence light to pulse green slowly. Outside the room, overdoor lights (if fitted) pulse green slowly and all relevant displays shall show the location of the room where staff are present.

### **6.4 Call Follower Sounders (optional)**

If fitted, low level sounders shall sound at all call points in staff presence mode when the system is in night mode and a call occurs elsewhere. This shall help reduce sound levels by quietly informing staff that other calls are waiting, prompting them to visit the relevant display.

### **6.5 Reset**

When a member of staff leaves a room, the call point's 'RESET' button shall be pressed again to take it out of staff presence mode and return it to normal. If preferred, magnetic reset call points may be used with magnetic reset keys (see Call Points, section 4.3 for further details).

### **6.6 Help Required (Assistance) Calls**

If assistance is required (but it is not an emergency), pressing the call point's 'CALL' button whilst it is in standard call, or staff presence mode shall make a help required call. This shall cause the call point's confidence light to pulse red more urgently than when a standard call is made. Outside the room, sounders shall pulse more urgently, overdoor lights (if fitted) shall pulse red and a help required message shall appear on all relevant displays together with the location of the room where assistance is required.

**Note:** Repeated operation of a tail call button, or ceiling pull shall not initiate a help required call.

## **6.7 Emergency Calls**

In an emergency, pressing the call point's 'CALL' and 'RESET' buttons together shall make an emergency call regardless of the previous state of the call point (unless in attack mode, see below). This shall cause the call point's confidence light to flash red and green. Outside the room, sounders shall pulse rapidly, overdoor lights (if fitted) shall flash red and green and an emergency message appears on all relevant displays together with the location of the calling room.

## **6.8 Infrared Staff Attack Calls (optional)**

To help protect staff against the threat of verbal abuse, the addressable call system shall have an optional infrared staff attack facility. It shall work as described below:

Designated staff shall carry an infrared transmitter which they attach to their uniforms. When an attack takes place, they shall activate the transmitter by pressing one of its buttons, or releasing its retained pull clip to fill the area with infrared signals. These signals shall be received by a special infrared call point, or ceiling receiver which instantly informs the addressable call system that an attack is taking place. An urgent, piercing alarm shall be sounded throughout the building (as programmed) and the exact location of the attack shall be indicated at all relevant displays, thus prompting the quick response of security staff.

For security reasons, attack calls shall only be reset by entering a special code at the Controller, or a display (with controls).

In addition to attack calls, the infrared call points and ceiling receivers shall also generate other levels of call. The type of call generated shall depend on the type of transmitter(s) and receiver(s) used.

All the transmitters shall have the ability to send radio as well as infrared calls. To generate a radio call, at least one radio receiver shall be required. Radio receivers shall detect calls in outside areas such as car parks and loading bays where infrared transmission is not practical.

## **6.9 Day/Night Mode**

The user shall be able to manually select night mode or, if preferred, the commissioning engineer shall be able to allocate times at which the system will automatically enter and exit night mode. When in night mode, all calls shall be shown on all displays but only selected displays shall sound. This shall allow for lower staffing levels and reduced sound levels. Night mode shall be backed up by the use of optional call follower sounders in call points (see section 6.4).

## **6.10 Automatic Divert**

If a call remains unanswered for a preset time (1-8 mins), it shall be possible to set up the system to automatically divert the call to other areas to ensure it does not remain unattended indefinitely.

## **6.11 Manual Divert**

If a member of staff leaves one area, it shall be possible for them to divert calls to another area via a display (with controls).

## 6.12 Datalogging

The system's built-in datalogger shall record the date, time, location description and type/level of call for output to a serial printer (if connected). Printer kits shall be available and include a printer, interface lead and connection socket. All kits shall be tested and calibrated with the system prior to despatch.

## 6.13 Paging (optional)

It is recommended that as a reliable, practical alternative to paging the use of call follower sounders and a larger number of displays shall be used, due to problems of misuse (pagers being dropped, etc.). However, when paging is specified, the following options shall be available:

**Tone Only Paging:** a basic paging facility designed to indicate that a call has been raised. No priority is given to the level of incoming call, i.e. if a standard call is flagged before an emergency call, the pager will not show the emergency call until the standard call clears. Standard calls beep once and the number 1 is shown, help required calls beep twice and the number 2 is shown, emergency and attack calls beep three times and the number 3 is shown. To determine the exact location of a call, staff shall visit a display.

**Alphanumeric Radio Paging:** this option shall allow call information from the Controller to be broadcast globally to alphanumeric pagers via a radio transmitter. It shall be possible to select which type of call(s) are transmitted to the pagers, e.g. emergency calls only, but different levels of calls cannot be prioritised. For example, if a standard call is triggered, followed by an emergency call, the emergency call will not be displayed until the standard call has been accepted. (This is not the case at displays where different types of calls are still prioritised).

## 7 PROGRAMMING USING FRONT PANEL BUTTONS

It shall be possible to program the addressable call system's Controller by either using its front panel buttons and LCD display, or by using upload/download software. The former method of programming is only recommended for updating existing site data. See section 8 for programming using upload/download software.

Three access levels shall be available at the system's Controller; general user (access level 1), authorised user (access level 2) and engineer (access level 3).

### 7.1 General User Functions (Access Level 1)

7.1.1 Access level 1 functions shall be available for general users without the need to input a security code.

7.1.2 The system's Controller shall incorporate the following access level 1 function, as a minimum:

Function	Description
Setup Divert	Allows calls to be diverted from one group of displays to another.

### 7.2 Authorised User Functions (Access Level 2)

7.2.1 Access level 2 functions shall be restricted to authorised users (e.g. managers, matrons) and require the input of a security code.

7.2.2 The system's Controller shall incorporate the following access level 2 functions, as a minimum:

Function	Description
Set Day/Night	Allows the routing of calls to be changed from the programmed day mode configuration to night mode configuration, or vice versa.
Output Log	Allows information stored in the Controller's datalogger to be outputted to an RS232 printer (if connected).
Set Date	Allows the date to be programmed into the Controller.
Set Time	Allows the time to be programmed into the Controller.
Network Reset	Allows a network reset to be performed if, for example, a system device malfunctions.

### 7.3 Engineer Functions (Access Level 3)

7.3.1 Access level 3 functions shall be restricted to engineers and require the input of a security code.

7.3.2 The engineer functions shall incorporate all access level 2 functions listed in section 7.2.2.

7.3.3 The system's Controller shall incorporate the following 'Program' menu functions, as a minimum:

Function	Description
Display Device	Changes the function of the Controller's LCD display to show the calling device ID number instead of the place name.
Print All	Sends a list of all site-specific data to an RS232 printer (if connected).
Print Devices	Sends a list of all network devices to an RS232 printer (if connected).
Print Groups	Sends a list of all groups (displays) to an RS232 printer (if connected).
Print Zones	Sends a list of all zones (overdoor lights/sounders) to an RS232 printer (if connected).

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7.3.4 The system's Controller shall incorporate a 'System Setup' menu that shall allow an engineer to send the Controller specific details about how the system shall work. The 'System Setup' menu functions shall incorporate the following, as a minimum:

Function	Description
Set Time Outs	Sets a time period before a call is diverted from one group of displays to another, or an unanswered 'accepted' call returns to the displays.
Set AL2 Code	Changes the four-digit security code for access level 2 (this shall be any combination using the 1, 2 and 3 numbered buttons).
Set AL3 Code	Changes the four-digit security for access level 3 (this shall be any combination using the 1, 2 and 3 numbered buttons).
Set Attack Reset	Allows the four-digit 'Attack Reset' code to be entered, or changed (for systems utilising the infra-red attack call level).
Set Call Reset	Allows the four-digit 'Call Reset' code to be entered, or changed.
Setup Logger	Allows the system's datalogging facility to be set up.
Emergency G/L	Allows the system to be set up so that emergency calls are sent to all display groups (globally) regardless of how the group area routing arrangements have been set up.
Attack G/L	Allows the system to be set up so that infrared attack calls are sent to all display groups (globally) regardless of how the group area routing arrangements have been set up.
Radio Pager	If radio paging equipment is connected to the Controller's RS232 paging terminal, this function shall be selected to enable it to operate.
Auto Night Mode	Allows an automatic night mode function to be enabled, or disabled, and for preset entry and exit times to be programmed into the Controller.
Monitor Point	Allows any ID address to be polled from the Controller. When polling the address, the relevant device's confidence LED shall flash or, in the case of an addressable sounder, its beeper shall sound at the standard call rate.
Double Address	Any double addressed devices on the system shall be automatically flagged on the Controller's LCD display.
HTM2015 * Mode (optional)	Allows the system to enable, or disable, the optional HTM2015 mode of operation. When enabled, the following changes shall occur: <ul style="list-style-type: none"> <li>- Auto Night Mode is disabled</li> <li>- Day/Night mode cannot be entered using the Controller's access level menus</li> <li>- The Controller's internal sounder is disabled for call type signalling.</li> </ul>
Data Analysis Mode	Allows the system's data analysis mode to be enabled, or disabled. This function is used in conjunction with the system's data management software (see section 9). When enabled, the following changes shall occur: <ul style="list-style-type: none"> <li>- the Controller's logging output is set to 'output on every event' and cannot be changed</li> <li>- the 'printer fault' message on the Controller is suppressed when the PC is turned off, or disconnected from the Controller.</li> </ul>

\* HTM2015 (Health Technical Memorandum 2015) is issued by the UK's Department of Health and provides comprehensive advice on the design, installation and operation of bedhead services, in particular patient-to-nurse call systems.

7.3.5 The system’s Controller shall incorporate ‘Assignment’ menu that shall allow the introduction of unassigned devices onto the network and the setting up of routing arrangements for areas (call points), groups (displays) and zones (overdoor lights/sounders). The functions shall also allow parameters of any existing device, including its name, to be changed. The ‘Assignment’ menu functions shall incorporate the following, as a minimum:

Function	Description
New Device	Allows new individual devices to be assigned an ID number. The device set range is from 2 to 255. <b>Note:</b> Address ‘1’ shall always be allocated to the Controller. When activated the new device shall be assigned an appropriate area (call points), group (displays), or zone (overdoor lights/sounders) and location by the Controller.
Autoscan	Allows multiple devices to be assigned an ID number. In autoscan mode, unassigned devices shall be activated in sequence and the Controller shall automatically assign the next available ID number from 2 to 255. <b>Note:</b> Address ‘1’ shall always be allocated to the Controller. When the autoscan sequence is complete all assigned devices shall have default set memberships and no location descriptions. These shall be settable using the edit ‘Existing Devices’ function, below.
Existing Device	Allows changing the default (blank) settings given to devices entered onto the system via the autoscan function. Also allows the parameters of any device on the system to be reassigned, temporarily disabled (for maintenance purposes), or deleted from the system altogether.
Replace Device	Allows a faulty device to be replaced with a new one without having to delete its name, location and area (call points), group (displays), or zone (overdoor lights/sounders) details from the system.
Setup Group	Allows relationships between areas (call points) and groups (displays) to be assigned, or edited.
Setup Zone	Allows routing of calls to the relevant addressable overdoor light(s), or sounder(s).
Edit Custom Texts	Allows up to 45 custom place names (of up to 11 characters) to be added to the Controller’s library of 40 pre-set place names.
Send Custom Texts	Allows the newly added custom place names to be sent to the displays’ memories.
Clean Start	Forces the Controller to reset all site data to the factory default settings. To prevent accidental use of the feature, a warning prompt and special code shall be inputted before this action can be executed.

## 8 PROGRAMMING USING SOFTWARE

8.1 In addition to programming the addressable call system’s Controller via its front panel buttons, it shall be possible to program the Controller using upload/download software. This method shall allow off-site programming and archiving of data for future reference.

8.2 The system’s Controller shall be capable of interfacing with a laptop PC running a bespoke Windows-based program for programming and configuration updates. The programming PC shall connect to the system’s Controller via a suitable serial connector.

8.3 The upload/download software shall include the following programming tools, as a minimum:

Programming Tool	Description
Upload/Download Data	Allows transfer of data between the PC and the Controller; either small amounts of data, or the whole of the Controller’s data.
Device Summary	Presents network devices as a list and allows editing of place names, area (call points), group (displays) and zones (overdoor lights/sounders).

Programming Tool	Description
Devices	Presents network devices graphically as icons, including their network address. Allows selection and editing of network devices.
Zone Configuration	Displays the zone equations for editing.
Group Configuration	Displays the group equations for editing.
Place Names	Presents the standard and custom (editable) place names.
Site Configuration	Presents the Controller setups for day/night mode, access levels and reset codes. Also, printer/pager setups and timeouts. Specific information about the site shall be entered using this tool.
View Event Log	Presents the Controller's event log for viewing, printing and saving.
Help File	Displays a help file which includes topics explaining each programming tool and assists the engineer.

## 9 DATA MANAGEMENT SOFTWARE

- 9.1 Data management software shall be available for use with the addressable call system. The software shall display information on a PC's desktop and be password protected to prevent unauthorised access.
- 9.2 The software shall assist healthcare managers/building owners to control their care facilities by evaluating staff performance, reviewing patient demands and determining optimum labour levels/shift patterns.
- 9.3 In addition to displaying 'real-time' call, reset and room occupancy information, the software shall perform detailed data analysis reports for the following criteria, as a minimum:
- call history of a particular room
  - rooms that make the most calls
  - staff performance/busiest shifts
  - call response times
  - distribution and frequency of calls throughout the day.
- 9.4 The PC running the data analysis software shall connect to the system's Controller via an RS232 connector. The Controller shall be set up by an engineer to transmit data to the data analysis software via the Controller's System Setup menu (see section 7.3.4).

## 10 WIRING

**See Figure 1 (page 20) for typical addressable call system wiring.**

- 10.1 All wiring shall be installed in accordance with the current edition of BS 7671 (IEE Wiring Regulations), and/or other relevant national standards.
- 10.2 Mains supply to the Controller's integral PSU shall be fixed wiring, using 3-core cable (no less than 0.75 mm<sup>2</sup> and no more than 2.5 mm<sup>2</sup>) fed from an isolating un-switched fused spur, fused at 3 amps.
- 10.3 Network splitters shall be used for wiring the addressable call system. The splitters ensure voltage drop problems are substantially avoided and allow cable and equipment faults to be easily identified and isolated. Each network splitter shall have the following connections:
- one input network 'spine' connection (unfused)
  - one output network 'spine' connection (unfused)
  - six 'limb' outputs (fused).

- 10.4 Network spines shall connect from the Controller to the network splitters and also between network splitters. They shall be wired in 1 mm<sup>2</sup> to 2.5 mm<sup>2</sup> cable (e.g. twin & earth), see Figure 1 (page 20) for spine lengths and sizes.
- 10.5 Network limbs shall connect the network splitters to network devices. They shall be wired in 4-core security cable, see Figure 1 (page 20) for limb lengths and sizes.
- 10.6 A maximum of 15 networked devices shall be connected to any single limb with the most distant networked device no further than 40 metres from the network splitter. A maximum of 64 network devices shall be connected to each splitter.
- 10.7 Network devices shall be distributed at approximately equal distances along the length of a limb.
- 10.8 The network splitter shall incorporate the following LED indicators, as a minimum:

LED Label	LED Colour	Description
Power	Green	Indicates that power is being supplied to the network.
Fault	Yellow	Indicates that one of the circuits in use on that splitter has blown a fuse.

## 11 POWER SUPPLY SPECIFICATION

- 11.1 The Controller’s integral PSU shall operate on a Mains supply voltage of 185-265 Vac, 50/60 Hz.
- 11.2 The PSU shall power the addressable control system at 24 Vdc (nominal), maximum current 1.5 A and combine the functions of a power supply unit, battery charging unit and battery monitoring unit.
- 11.3 As an option, the Power Supply PCB shall be capable of charging stand-by batteries (two, 12 volt VRLA type, connected in series). The batteries shall provide an autonomy of 24 hours in standby mode and 3 hours in use mode.
- 11.4 The power supply and batteries shall be monitored for failure.

## 12 MECHANICAL SPECIFICATION

- 12.1 The addressable call system’s components shall not exceed the following approximate overall dimensions:

Component	Width (mm)	Height (mm)	Depth (mm)
Controller’s metal back box	410	250	80
Controller’ plastic lid	439	274	7
Call point (master and slave)	87	87	35
Monitoring point	87	87	35
Small display (with or without controls)	146	87	35
Large display (without controls)	800	160	80
Infrared ceiling receiver	87	87	35
Radio receiver	271	155	170
Overdoor light (master and slave)	87	87	60
Ceiling pull	93ø	-	27
Pressure pad	93ø	-	22
Portable movement detector	100	48	187
Infrared transmitter (main body)	45	115	25
RF integrity transmitter plate	87	87	25
Network splitter	146	87	35

- 12.2 All single-gang devices (87 mm x 87 mm) shall mount on 25 mm single-gang UK back boxes.
- 12.3 All double-gang devices (146 mm x 87 mm) shall mount on 35 mm double-gang UK back boxes.
- 12.4 The Controller shall be supplied in a metal back box and shall be surface, or semi-flush mounted using a suitable mounting bezel.
- 12.5 Radio receivers shall be designed to be surface mounted.
- 12.6 Ceiling pulls shall have four knockouts for 16 mm square minitrunking and their backplate shall fit BESA centres.
- 12.7 Strip switch kits shall be available in various lengths from 0.3 m to 8 m, including base rail, insert and end caps.

### **13 DOCUMENTATION**

- 13.1 The equipment manufacturer shall provide a complete set of documents describing the addressable call system including its installation, operating and maintenance instructions.
- 13.2 The following documentation shall be provided by the equipment manufacturer, as a minimum:
  - Installation and Programming Manual
  - Wiring Instructions
  - User Guides.

ADDRESSABLE CALL SYSTEM

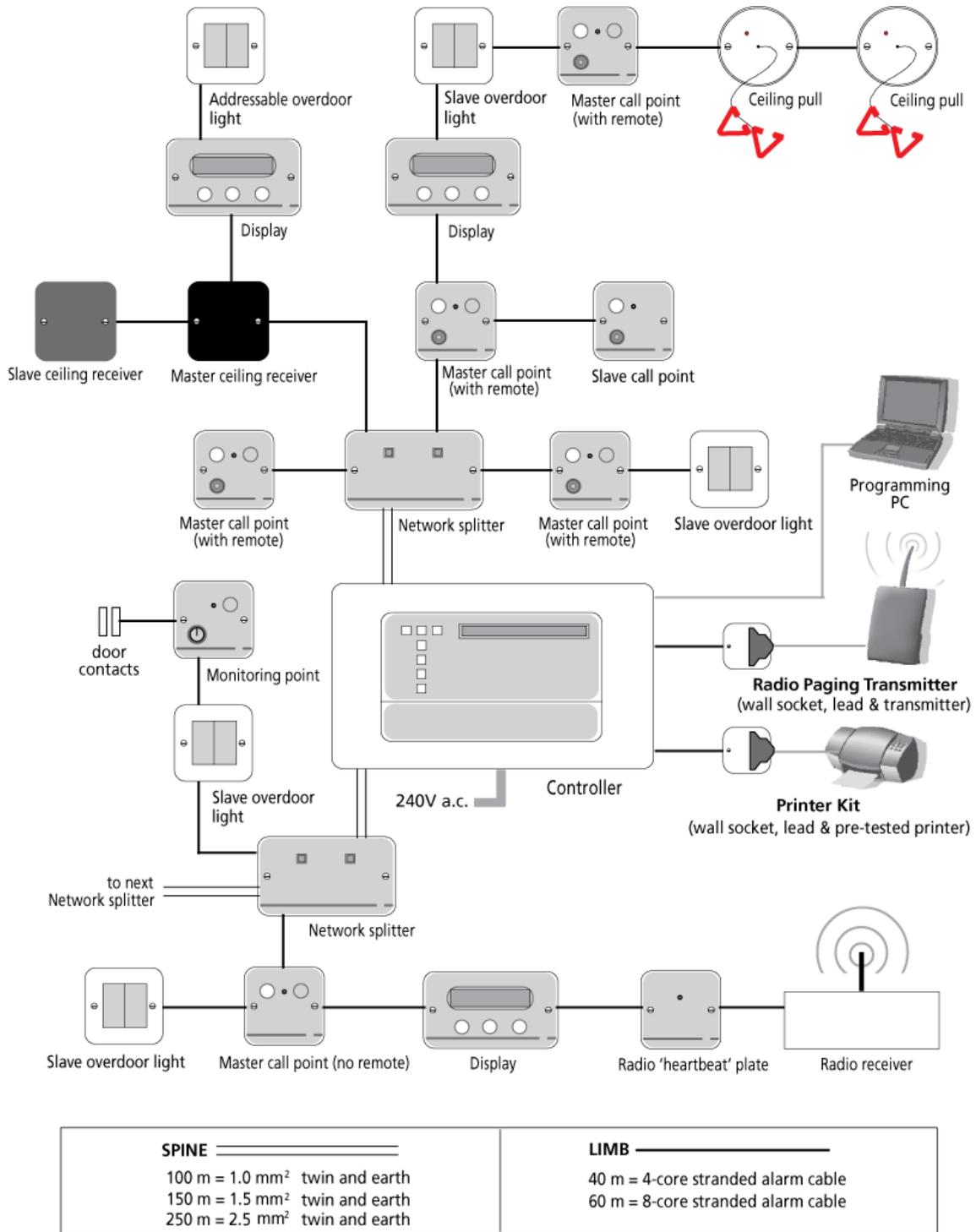


Figure 1: Typical Addressable Call System Wiring