# Installation Guide
# teleCARE IP
# Emergency Call System

17 July 2017 / Ver. PF3

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|---|---|
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# Contents

# 1 Introduction

The installation guide covers the mechanical and electrical installation of the teleCARE IP Emergency Call System. The teleCARE IP "System Description" (TD 92608GB) should be read before reading this manual to gain a general understanding of the teleCARE IP system.

Throughout this document there are "cross-references" in the text which indicate that further details can be found in another section of this document. The cross-references are colored blue and linked to the relevant place in the document. Positioning the cursor over the "cross-reference" then click the left mouse button to go to the relevant section of the document. The product illustrations in this document represent the products when the illustrations were created. The actual appearance of the products may vary due to subsequent technical modifications and component changes.

Many devices in this manual are static sensitive. When you see this icon in the manual, observe all proper handling procedures for static sensitive devices.

## 1.1 General

teleCARE IP is a Local Area Network (LAN) based Emergency Call System for assisted living and independent living facilities. The LAN/WLAN infrastructure is used to communicate the information generated in the emergency call system, such as calls for help or assistance, staff presence, emergency alarms, technical alarms, etc. The IP integration is at room level with at least one IP port per room.

teleCARE IP operates on a Ethernet LAN based on 10/100 BaseT, using a Cat 5 (or higher) structured wiring for 100 BaseT. The network shall be a dedicated network.

The teleCARE IP system is modular, scalable and built around the Room Controller (NIRC3). Power is supplied using an external 24Vdc power supply.

teleCARE IP peripherals are connected to the room controller by a digital room bus. Each room controller includes four room buses with eight addresses per bus.

In a teleCARE IP Emergency Call System the maximum number of individual call locations must not exceed 200.

The modularity of teleCARE IP makes it easy to extend and add new functions to already installed systems. The LAN technology allows easy installation of new room controllers and peripherals in order to extend the existing teleCARE IP system.

## 1.2 Installation and Commissioning

The installation and commissioning of teleCARE IP should only be undertaken by qualified technicians and carried out in accordance with all regulations. Only original teleCARE IP parts and components are to be used in any teleCARE IP installation. In order for the system to function properly these parts must be installed in accordance with the appropriate teleCARE IP installation instructions.

The teleCARE IP equipment should only be installed when the building work is completed and when the environment is clean, dry and totally weatherproof. All control and distribution equipment must be accessible for commissioning and servicing.

The acceptable environmental conditions for the teleCARE IP system, associated power supplies and related equipment are all listed systems and components and are in compliance with the safety requirements of ANSI/UL 2560 Standard for Safety, Emergency Call Systems for Assisted Living and Independent Living Facilities and CAN/CSA No. 205-12, Signal Equipment.

**WARNING:** The teleCARE IP equipment should not be installed in areas where the air pressure is below 850 millibar (approximate maximum altitude of 6100ft (2000m)).

**WARNING:** teleCARE IP components, including all handsets, are not intended for use in oxygen enriched environments.

**WARNING:** teleCARE IP components, including all handsets, are not intended for use in rooms where flammable (anesthetic) gases are used.

## 1.3 teleCARE IP With Speech

The basic installation for a teleCARE IP system with speech is the same as for teleCARE IP without speech with the exception that room controllers with speech support and a supplementary VoIP gateway are required. In addition each location where speech is required must have a teleCARE IP speech module. The speech module can only be used in combination with the teleCARE IP door side module (NIDM), the bedside module (NIBM), and the pull cord module (NIPC).

### 1.3.1 Compatible Ascom IM Handsets

teleCARE IP with speech is designed to work with Ascom Interactive Messaging using the Ascom handsets which support multi-layer interactive messaging. At the time of publication of this document the Ascom handsets which support multi-layer interactive messaging are:

9d24 / mkII (software 3.71 or higher)

d62 (software 3.0.5 or higher)

d81 (software 2.0.5 or higher)

i62

i75 (software 1.7.7 or higher)

### 1.3.2 System Overview teleCARE IP with Speech

The following illustration shows a typical example of a teleCARE IP speech system. The options and system components depend on the specific project requirements.

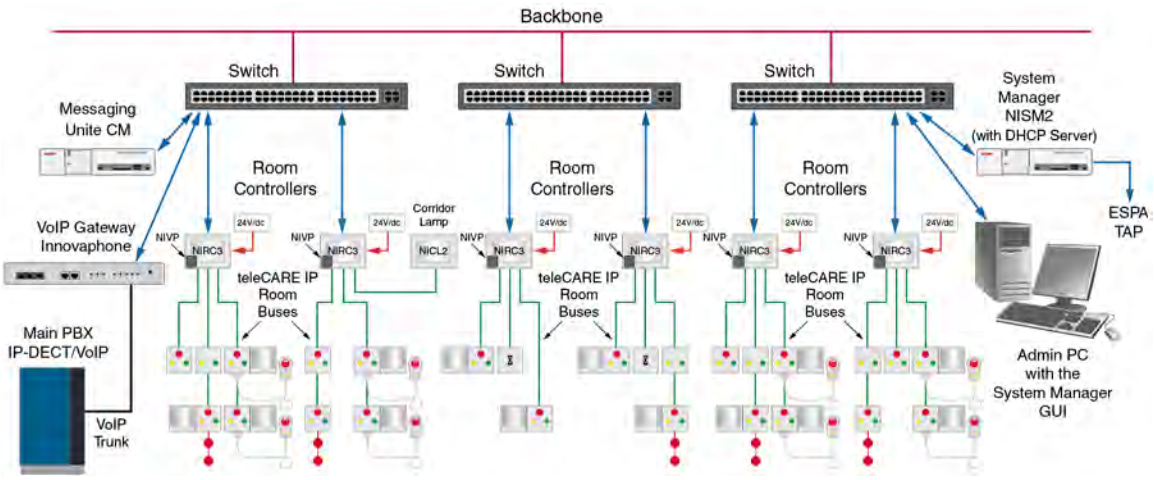



*Figure 1. System overview teleCARE IP with speech*

### 1.3.3 ESPA and TAP Paging System Interface

With the appropriate license, the NISM2 serves as the interface between the teleCARE IP system and ESPA or TAP paging systems.

### 1.3.4 Innovaphone VoIP Gateway

The teleCARE IP system uses the supplementary Innovaphone VoIP gateway to support VoIP speech functionality. The Innovaphone VoIP gateway is an IP based gateway providing the VoIP based solution which supports all the features of a traditional PBX. For the teleCARE IP VoIP the SIP Trunk must be used for the interface to the main PBX. The SIP trunk must be set to "Early offer".For more information refer to the teleCARE IP Configuration Manual TD 93019US.

The Innovaphone VoIP gateway is powered by a mains adapter power supply (output 40Vdc 375mA). It is connected and integrated in the existing telephone system network directly using SIP protocol. It is configured with the project specific requirements using the teleCARE IP System Manager.

A license is required for the Innovaphone VoIP gateway. For this an activation code has to be ordered from Ascom before downloading the license from the Innovaphone Customer Portal (https://my.innovaphone.com/).

# 2 Practical Engineering Parameters

In order to ensure the optimal performance of a teleCARE IP system it is important to consider certain parameters and limitations. The following tables show the most important practical values which can have an influence on the teleCARE IP system performance.

**WARNING:** Any deviation from the values and recommendations shown in the following tables can significantly reduce the performance of the teleCARE IP system.

## 2.1 General Limitations

| teleCARE IP Items | Practical Limits |
|---|---|
| NIRC3s per NISM | Max. 200 |
| Active peripherals per room bus (addressable - 0 to 3) | Max. 4 |
| Active peripherals per room bus (fixed address - 4 to 7) | Max. 4 |
| Pull cord peripherals on a passive bus | Max. 1 |
| Toilet cancel peripherals on a passive bus | Max. 1 |
| Total cable length of an NIRC3 IP room bus | Max. 100 feet (30 meters) |
| Minimum IP room bus voltage | 4.5 Vdc |

## 2.2 Network Expectations

| Network Expectations |
|---|
| The LAN installation must be certified and tested in accordance with ANSI/TIA/EIA-568-A. |
| The LAN must be dedicated and isolated from any general purpose LAN |
| The LAN installation should be in accordance with ANSI/TIA/EIA-568-A |
| LAN cable type: Category 5 (or higher) |
| Maximum LAN cable length: 328 ft (100 meters) |
| The LAN must only use switching equipment listed in UL file E360946. |
| A switch port is required for each room controller |
| Existing customer LANs must be assessed by Ascom before committing (not applicable for UL2560 installations which prohibit use of customer LAN's) |
| For details of the teleCARE IP load and performance see document TD92636GB, (IP Infrastructure Requirements) |

## 2.3 VoIP Requirements (Supplementary)

| VoIP Considerations |
|---|
| The Innovaphone VoIP gateway version 10 (or later) is required for teleCARE IP with speech, as the interface to the PBX. |
| An interoperability test between the VoIP gateway and main PBX must be performed. |
| The connection between the PBX and the Innovaphone can be PRI or SIP Trunk |
| teleCARE IP only supports CODEC G.711 (a-law) |
| SIP trunk to the VoIP gateway must be set to "Early offer" |
| teleCARE VoIP shall use the Emergency Call System LAN only. |
| Ascom Recommendations:<br>Delay - less than 50 ms is good<br>Jitter - less than 30 ms is good<br>Packet Loss - 1% is good (up to 4% is acceptable) |
| The maximum capacity of the network used for voice should not exceed 25% of the total network capacity |
| The maximum capacity of the network used for data and voice together should not exceed 75% of the total network capacity |

## 2.4 teleCARE IP Compatible Ascom Handsets (Supplementary)

| teleCARE IP Compatible Ascom Handsets |
|---|
| 9d24 / mkII (software 3.71 or higher)<br>d62 (software 3.0.5 or higher)<br>d81 (software 2.0.5 or higher)<br>i62<br>i75 (software 1.7.7 or higher) |

# 3 System LAN Cabling

## 3.1 Ethernet Switch

The 8-port Ethernet Switch, Ascom part number APS5001, shall be used with the teleCARE IP system and can be purchased through Ascom.

**WARNING:** Use of any Ethernet Switch other than Ascom part number APS5001 violates the UL 2560 listing.

### 3.1.1 Ethernet Switch DIN Rail Mounting

The Ethernet Switch shall be mounted on a 1.5in (35mm) DIN-rail, which can be mounted on a wall. See instructions inside the Ethernet Switch Installation Guide provided with the switch.

### 3.1.2 Ethernet Switch 19" Rack and Cabinet Mounting

The Ethernet Switch can be mounted into a 19in (483mm) rack secured to a DIN Rail, which must be attached with screws or other fixtures to the rack and must not be easily movable.

### 3.1.3 Ethernet Switch Installation – Seismic

For installations requiring seismic considerations, refer to OSHPD Installation Requirements and Instructions, document number 3101998, for selection, sourcing, and installation of racks and cabinets. After the racks or cabinets are installed, the Ethernet Switch can then be installed into a cabinet or rack, in accordance with the instructions described in 3.1.2.

**WARNING:**

- Use only the cabinets or rack listed in the OSHPD Installation Requirements and Instructions document (P/N 3101998).
- Do not use the uninterruptible power supplies described in the OSHPD installation document. The battery backup for the teleCARE IP system must be provided by the power supply described in section 4.2, 24Vdc / 8 Amp Power Supply (Seismic).
- Use the rack mounting accessories described in section 3.1.2 to mount the Ethernet switch to the rack or cabinet.
- Do not apply the OSHPD Label to the rack, cabinet or, Ethernet Switch. If an OSHPD label is required, contact your Ascom Sales Representative.

### 3.1.4 Ethernet Switch Power

The Ethernet Switch must be powered by the 24Vdc / 3 Amp Power Supply Ascom model APS5000 described in Section 4 of this manual. The power conductors must be in accordance with the requirements specified in section 4.4 and connected to the four-pin removable keyed connector provided with the unit. Power connections to the Ethernet Switch shall be in accordance with the Figure 2.

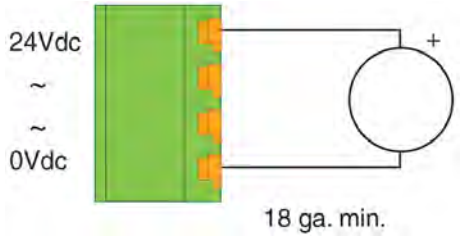



*Figure 2. Ethernet Switch Power Connection*

### 3.1.5 Ethernet Switch Operation

When properly installed and operating, LED indicators on the Ethernet Switch will be observed as follows:

| | |
|---|---|
| PWR (green) | Illuminates steady when proper power is supplied to the Ethernet Switch. |
| LINK (green) | Each port has a LINK LED which indicates that a valid Ethernet link has been established. The LED flashes when data transfer is occurring. |
| HS (yellow) | Each port has a DATA RATE LED which illuminates steady indicating that data is transferring at 100 Mbps. |

## 3.2 Ethernet LAN and Room Bus Cables

High quality cables must be used to install the teleCARE IP system. The individual wire cores of the cables should be color coded. Care should be taken when stripping cables from the outer mantle to avoid damaging the insulation of the wire cores.

The system wiring is classified as low voltage and therefore cabling must be separated from higher voltage system through the use of separate conduits or divided cable trays.

A minimum of 19.75in (50cm) of free cable should be left at the location of the room controllers, and corridor lamps. For the room peripherals a minimum of 6in (15cm) of free cable should be left at the location of each peripheral. All cables should be clearly marked at both ends.

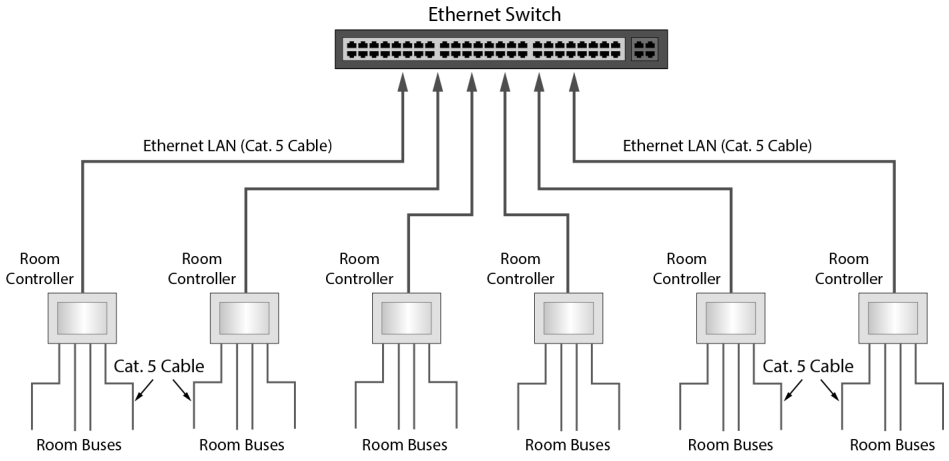



*Figure 3. Ethernet LAN and room bus cabling*

***Note:*** *Suitable existing wiring could also be used for the room bus. Contact your local representative for further information.*

### 3.2.1 Ethernet LAN Cable

The cable required for the Ethernet LAN must comply with the specification TIA/IEA 568-A Category 5 or higher. This is a standard 4 x unshielded twisted pair (UTP) solid bare copper with a diameter of 24 AWG (0.5mm).

| Cable Type | Wire Size Diameter / AWG | Max. Cable Length |
|---|---|---|
| **TIA/IEA 568-A, Category 5 or higher (4 x UTP)** | 24 AWG (0.5mm) | 328ft (100m) |

*Table 1. Recommended Ethernet LAN cable*

***Caution:*** *The maximum length of the Cat 5 (or higher) Ethernet LAN cable is 328 feet/100 meters.*

### 3.2.2 Room Bus Cable

The room bus cable connects the room controller to the associated teleCARE IP peripherals. It consists of four wires which carry 5.5 volts, Data, Voice and Ground.

The recommended cable for the room bus is TIA/IEA 568-A Category 5 or higher. It is also acceptable to use 2 x twisted pairs of solid copper wires each 20 AWG (0.8mm). The table below shows the recommended cable type and maximum cable length.

| Cable Type | Wire Size Diameter / AWG | Max. Cable Length |
|---|---|---|
| **TIA/IEA 568-A Category 5 or higher (4 x UTP)** | 24 AWG (0.5mm) | 98.4ft (30m) |

*Table 2. Recommended teleCARE room bus cable*

**Room Bus Cable Considerations**

It is important to consider the factors of cable length and load when installing the room bus for the following reasons:

- The resistance of the wires in the room bus cable increases with the length and this causes the voltage to decrease progressively along the length of the cable.
- The room bus voltage also drops in proportion to the load.
- The effect of "cross-talk" increases as the cable length increases.

**Room Bus Power Considerations**

The room bus power supply output from the room controller is limited to 500mA per room bus but the maximum acceptable load on the room bus decreases significantly as the distance from the room controller increases due to the resistance of the room bus cable.

**Room Bus Voltage Considerations**

The power supply to the room bus at the output from the room controller is >5.5Vdc without load but this will drop as the room bus cable length and/or the load increases. The minimum acceptable voltage at any point on the room bus cable is 4.5Vdc.

**Room Bus Cable Length and Power Limitations**

The IP Room Controller offers up to four room buses. The load of any room bus must not exceed 300mA and the minimum acceptable voltage anywhere along the room bus is 4.5 volts.

When UTP category 5 cable (or higher) is used the length of any room bus cable should not exceed 98.4ft (30m), irrespective of the load. Below 98.4ft (30m), the maximum acceptable length of the room bus cable depends on the load.

# 4 System Power

The teleCARE IP system power supply shall be sourced from an external 24Vdc power supply, utilizing a dedicated 2-wire power distribution bus. The external power requirement for teleCARE IP is 24Vdc, with an acceptable range of 21.6Vdc to 26.4Vdc.

**WARNING:** Use of any Power Supply other than those which are specified in this manual violates the UL 2560 listing.

## 4.1 24Vdc / 3 Amp Power Supply (Standard)

The 24Vdc / 3 Amp Power Supply, Ascom part number APS5000, must be used with the teleCARE IP system and can be purchased through Ascom.

The teleCARE IP Standard Power Supply shall be used to power the teleCARE IP system. This power supply converts 115Vac / 60Hz input power to a 24Vdc / 3 Amp, Class 2 Rated regulated output.

There is a built-in charger to charge sealed lead acid batteries. The batteries provide the Secondary Power to the teleCARE IP system in the event of mains AC power failure. There is an automatic switchover to the batteries when input AC power fails. During switchover, there is zero voltage drop at the power output. The power output fuse is rated at 15A/32Vdc.

**WARNING:**

- Do not use the Standard Power Supply for installations that require seismic considerations. Use the 24Vdc / 8 Amp Power Supply (Seismic) described in section 4.2 instead.
- Make certain that the AC circuit breaker is off before making any wiring connections between the circuit breaker and the power supply.
- Always de-energize the power supply prior to servicing.
- When servicing, the AC mains circuit breaker should be in the off position and locked out to prevent accidental activation.
- When necessary, always replace the fuse with the same type and rating (15A/32Vdc).
- This power supply is intended for indoor use only. Do not expose the unit to rain or moisture.
- After installation or servicing make sure that the cover is secured with the provided Key Lock.

### 4.1.1 Power Supply (Standard) Installation

The teleCARE IP Standard Power Supply is provided with an Installation Guide that is packaged with the unit. The unit is intended for wall mounting at a fixed location. Follow the instructions in the Installation Guide for mounting the power supply to a wall.

***Note:*** *Power distribution is best organized with the power supply unit located as close as possible to the rooms which it powers. This minimizes the voltage drop caused by the length of the power supply wires and the load of the powered teleCARE IP system devices.*

For setup and configuration, refer to the illustrations in the Installation Guide to identify the switch which must be set for 24Vdc operation, and to identify the terminals for connecting the power supply board to the batteries and teleCARE IP system.

**WARNING:**

- Batteries must be secured within the HPFF8 cabinet enclosure.
- Batteries must be lead acid and must comply with UL 2054. (See Section 4.3 Secondary Power.)
- Before applying power, inspect the Power Supply Board (Figure 1 in the Power Supply Installation Guide) to ensure that SW1 is set to the Open position, to configure the unit for 24Vdc operation.
- Before applying power, inspect the Power Supply Board to ensure that jumper J1, AC Delay, is in place.
- The Power Supply Board is not wired to chassis ground. When connecting the mains AC grounding conductor, DO NOT connect to the G terminal on the Power Supply Board.
- Use a crimping wire nut of appropriate size to connect the mains AC grounding conductor to the green with yellow stripe grounding conductor lead attached to the power supply cabinet backpanel.
- Measure the output voltage at the [+BAT-] and [+DC-] terminals before connecting the batteries or teleCARE IP system. Improper high voltage will damage the connected devices.
- Always de-energize the power supply unit prior to connecting the batteries and teleCARE IP system.
- Refer to sections 4.4 and 4.5 in this manual before connecting and powering the teleCARE IP system.

Connect the AC main power (115Vac/60Hz) to the terminals marked [L, N] on the Power Supply Board. Apply mains AC power. Measure and confirm 20Vdc to 26.4Vdcat the [+BAT-] and [+DC-] terminals. Adjust the potentiometer next to SW1 to get 26.4Vdc at the [+BAT-] terminals. De-energize the power supply, connect the batteries and teleCARE IP system, and re-energize the power supply.

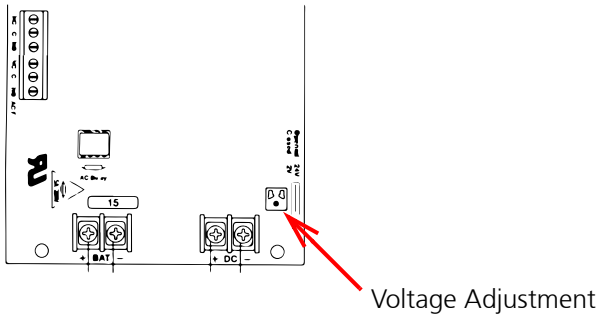



*Figure 4. Adjust the voltage to 26.4 Vdc*

### 4.1.2 Power Supply (Standard) Operation and Maintenance

The teleCARE IP Standard Power Supply should be tested at least once a year for proper operation. Under normal load conditions, the DC output voltage should be checked for proper voltage level, which is 24Vdc for the teleCARE IP system.

Under normal load conditions, check that the battery is fully charged. Check for the specified voltage (24Vdc) at both the battery terminals and power supply board terminals marked [+BAT-] to ensure there is no break in the battery connection wires.

***Note:***

- The maximum charging current under discharge is 0.7 amperes.
- Expected battery life is 5 years. However, it is recommended to change the batteries in 4 years, or less if needed.

| Red (DC) | Green (AC) | Power Supply Status |
|---|---|---|
| ON | ON | Normal operating condition. |
| ON | OFF | Loss of AC, Stand-by battery supplying power. |
| OFF | ON | No DC output. |
| OFF | OFF | Loss of AC. Discharged or no stand-by battery. No DC output. |

*Table 3. Power Supply Board LED Diagnostics (Red DC / Green AC)*

| Red (BAT) | Battery Status |
|---|---|
| ON | Normal operating condition |
| OFF | Battery fail/low battery |

*Table 4. Power Supply Board LED Diagnostics (Red BAT)*

## 4.2 24Vdc / 8 Amp Power Supply (Seismic)

For installations requiring Seismic compliance, the only external power supply which is certified for use with the teleCARE IP system is model HPFF8 by Honeywell Power Products, which can be purchased through an electrical supplier such as, Graybar or Arrow.

***Note:*** *The HPFF8 is listed under OSHPD Special Seismic Certification Pre-Approval: OSP-0071-10.*

The HPFF8 power supply converts 115Vac / 60Hz input power to 24Vdc / 8 Amps of continuous power output, distributed through four supervised power limited output circuits. The maximum current for any one output circuit is 3.0 Amperes. Each power output circuit has built in fault detection and automatic recovery when faults are removed.

There is a built-in charger to charge sealed lead acid batteries. The batteries shall provide Secondary Power to the teleCARE IP system in the event of mains AC power failure. There is an automatic switchover to the batteries when input AC power fails. During switchover, there is zero voltage drop at the power output.

**WARNING:**

- Batteries must be secured within the HPFF8 cabinet enclosure using Seismic Installation Kit (SEISKIT-COMMENC).
- Batteries must be lead acid and must comply with UL 2054. (See section 4.3, Secondary Power.)
- The HPFF8 Power Supply is a UL 864 listed power supply, normally intended to power and function with a Fire Alarm System (FAS). When used to power the teleCARE IP system, the features normally required to make the power supply operational as a FAS unit are not supported by Ascom.
- Except for the instructions for mounting the unit to a wall, which are provided in the HPFF8 Installation and Operation Manual, follow only the instructions provided in this manual for safety, setup, configuration, and wiring to the teleCARE IP system.

- Make certain that the AC circuit breaker is off before making any wiring connections between the circuit breaker and the power supply.
- Always de-energize the power supply prior to servicing.
- When servicing, the AC mains circuit breaker should be in the off position and locked out to prevent accidental activation.
- This power supply is intended for indoor use only. Do not expose the unit to rain or moisture.
- After installation or servicing make sure that the cover is secured with the provided Key Lock.

### 4.2.1 Power Supply (Seismic) Installation

The HPFF8 Power Supply is provided with an Installation Manual that is packaged with the unit. The unit is intended for wall mounting at a fixed location. Follow the instructions for Backbox Mounting of a Standard Cabinet provided in the Installation Manual.

***Note:*** *Power distribution is best organized with the power supply unit located as close as possible to the rooms which it powers. This minimizes the voltage drop caused by the length of the power supply wires and the load of the powered teleCARE IP system devices.*

For setup and configuration, use the illustrations provided in the HPFF8 Installation Manual to identify the locations of jumpers and terminals. Follow the instructions in this manual for connecting the power supply board to the batteries and teleCARE IP system

Inspect the Control Circuit Board (Figure 1.1 in the HPFF8 Installation Manual) to ensure that the Charger Disable Jumper (J1) and Ground Fault Disable Jumper (J2) are both installed.

Install the Reference Resistor to the REF+ and REF- terminals on TB3. Use either a 3.9K or 4.7k ohm, ¼ watt resistor as the Reference Resistor.

***Caution:*** *The same value resistor used for the Reference Resistor must be used as the End of Line (EOL) resistor for the teleCARE IP system power bus.*

Before connecting and powering the teleCARE IP system, refer to sections 4.4 and 4.5 in this manual. Install the EOL resistor at the last NIRC3 unit on the teleCARE IP power bus.

***Caution:*** *Measure the output voltage at the [+BAT-] and [+DC-] terminals before connecting the batteries or teleCARE IP system. Improper high voltage will damage the connected devices.*

***Caution:*** *Always de-energize the power supply unit prior to connecting the batteries and teleCARE IP system.*

***Caution:*** *Maintain vertical separation where power-limited (i.e., DC power to teleCARE IP) and non-power-limited circuits (i.e., mains AC and battery wiring connections to the Control Circuit Board) appear to cross.*

Before connecting and powering the Secondary Power Batteries, the batteries must be secured within the HPFF8 cabinet enclosure using the Seismic Installation Kit. Follow the instructions provided with Honeywell model SEISKIT-COMMENC.

Connect the AC mains power (115Vac/60Hz) to the TB1 terminals marked [L1, Ground, L2] on the HPFF8 Power Supply Board.

Apply mains AC power. Measure and confirm 24Vdc at the [+BAT-] and [1L1/1L2 through 4L1/4L2 and A+/A-] terminals.

De-energize the power supply, connect the batteries and teleCARE IP system (to the 4L1/4L2) terminals.

***Caution:*** *Connect the negative (-) lead of the teleCARE IP System to the 4L1 terminal and the positive (+) lead to the 4L2 terminal.*

Re-energize the power supply.

### 4.2.2 Power Supply (Seismic) Operation and Maintenance

The HPFF8 Power Supply should be tested at least once a year for proper operation. Under normal load conditions, the DC output voltage should be checked for proper voltage level, which is 24Vdc for the teleCARE IP system.

Under normal load conditions, check that the battery is fully charged. Check for the specified voltage (24Vdc) at both the battery terminals and power supply board terminals marked [+BAT-] to ensure there is no break in the battery connection wires.

***Note:***

- The maximum charging current under discharge is 0.75 amperes.
- Expected battery life is 5 years. However, it is recommended to change the batteries in 4 years, or less if needed.

The HPFF8 provides supervised functions of the field wiring for the following adverse conditions:

- Field-wiring fault (short or open) on the teleCARE IP power bus.
- AC failure or brownout at the power supply.
- Battery failure (no battery or battery voltage less than 20.5Vdc) condition at the power supply.
- Battery charger failure on the power supply.
- Ground fault condition.
- +/- Reference Resistor

There are 8 LEDs on the Control Circuit Board for indicating normal and trouble operation of the HPFF8 Power Supply (see Figure 1.1 in the HPFF8 Installation Manual.) When viewed from top to bottom, the LEDs operate as follows:

| LED | Label | Condition | Illumination | Reset |
|---|---|---|---|---|
| 1 | PWR ON | Power On | Steady | Auto |
| | | Loss or Brownout | Blink | |
| 2 | AUX TRBL Note 1 | Normal | Off | Auto |
| | | Excessive load or short | Steady | |
| 3 | BAT TRBL Note 2 | Normal | Off | Auto |
| | | Charger Fault | Blink | |
| | | No battery or <20.5Vdc | Steady | |
| 4 | GF TRBL | Normal | Off | Auto |
| | | Ground Fault | Steady | |
| 5 | SIG4 TRBL Note 3 | Normal | Off | Auto |
| | | Short or Open Present | Steady Note 5 | |
| | | Short or Open Past Note 4 | Blink | Note 6 |
| 6 | SIG3 TRBL Note 3 | Normal | Off | Auto |
| | | Short or Open Present | Steady Note 5 | |
| | | Short or Open Past Note 4 | Blink | Note 6 |
| 7 | SIG2 TRBL Note 3 | Normal | Off | Auto |
| | | Short or Open Present | Steady Note 5 | |
| | | Short or Open Past Note 4 | Blink | Note 6 |
| 8 | SIG1 TRBL Note 3 | Normal | Off | Auto |
| | | Short or Open Present | Steady Note 5 | |
| | | Short or Open Past Note 4 | Blink | Note 6 |

*Table 5. Control Circuit Board LED Diagnostics*

***Note:***

*1* Relates to the A+/A- terminals on TB4. Not used in teleCARE IP.

*2* A battery fail indication can occur if there was an AC failure within the first 24 hours after initial power-up and the battery voltage had been discharged to a voltage of 20.5Vdc or less. The BAT TRBL LED may also illuminate steady, after a certain delay during charging, to indicate the battery was discharged and may not support full load. The delay is based on operational conditions (time remaining in the first 24 hours and time in stand-by) and will automatically reset if the battery charging has time to reach its full float voltage.

*3* SIG4 TRBL through SIG1 TRBL associate with TB4 terminals 4L1/4L2 through 1L1/1L2 respectively.

*4* The HPFF8 has Trouble Memory for the supervised outputs. This is useful as an aide in knowing when past troubles have occurred and if intermittent problems are present on the SIG4 through SIG1 output circuits.

*5* If all four SIG TRBL LEDs are illuminated steady, check if the Reference Resistor is missing or doesn't match the EOL resistor used to terminate the teleCARE IP Power Bus. Otherwise, each power circuit probably has a problem.

6 To restore a SIG4 – SIG1 blinking LED to normal, press SW2 on the Control Circuit Board or, power cycle the HPFF8 OFF/ON.

## 4.3 Secondary Power

Secondary Power for the teleCARE IP system shall be provided by two lead acid Batteries installed in the primary power supply. The batteries are each rated for 12Vdc, 7 ampere hours (AH) and can be purchased through an electrical supplier such as Graybar.

**WARNING:**

- Batteries must be secured within the power supply cabinet as described in section 4.2.1.
- The lead acid Batteries must comply with UL 2054.
- When installing or servicing the lead acid Batteries, follow the instructions for installation of the appropriate power supply and observe all WARNINGS and CAUTIONS described in sections 4.1 and 4.2.

Use the following table to determine the total Standby and Active load in amperes hours for Secondary Power, when used with the teleCARE IP Standard Power Supply for standard installation and the HPFF8 Power Supply for seismic installations.

| | |
|---|---|
| **100% Load (3A)** | **1 Hour Battery Life** |
| **10% Load (.3A)** | **3 Hours Battery Life** |

*Table 6. Total Secondary Power at 24Vdc*

## 4.4 teleCARE IP Power Supply Wiring

It is important to use the correct wire sizes and to consider the length of the 24Vdc power supply wires. The minimum acceptable wire size of the 24Vdc bus is 18 AWG (1mm).

For the stub wiring between the 24Vdc bus and the control module wire size 18 AWG (1mm) must be used.

***Warning:*** *Incorrect wire size can result in dangerous overheating of the wires!*

***Caution:*** *Excessive 24Vdc bus length can result in unacceptable voltage drop! The lowest acceptable voltage at any point in the 24Vdc distribution is 21.6Vdc.*

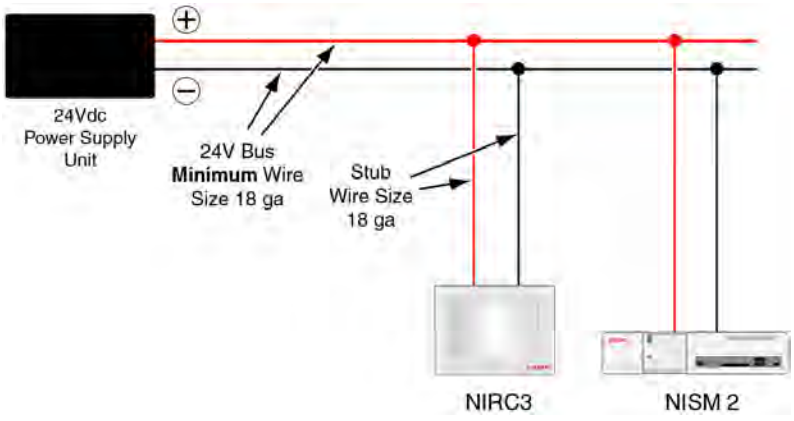



*Figure 5. teleCARE IP 24Vdc power supply wiring*

## 4.5 Power Supply Unit (24Vdc) with Multiple Power Buses

The output of the power supply unit can be divided over multiple buses. This method is recommended as it will reduce the power cable lengths.

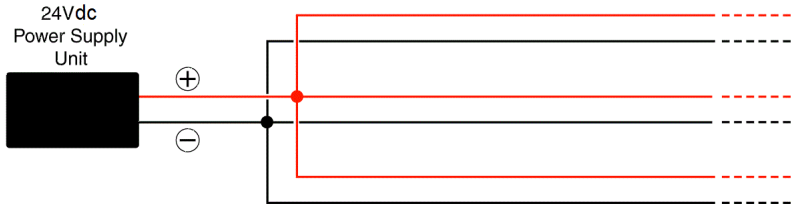



*Figure 6. Multiple power buses*

### 4.5.1 Power Supply Basic Installation

The 24Vdc power is carried on a two-wire bus that loops from room controller to room controller. The minimum wire size for the 24Vdc power supply bus is 18 AWG (1mm).

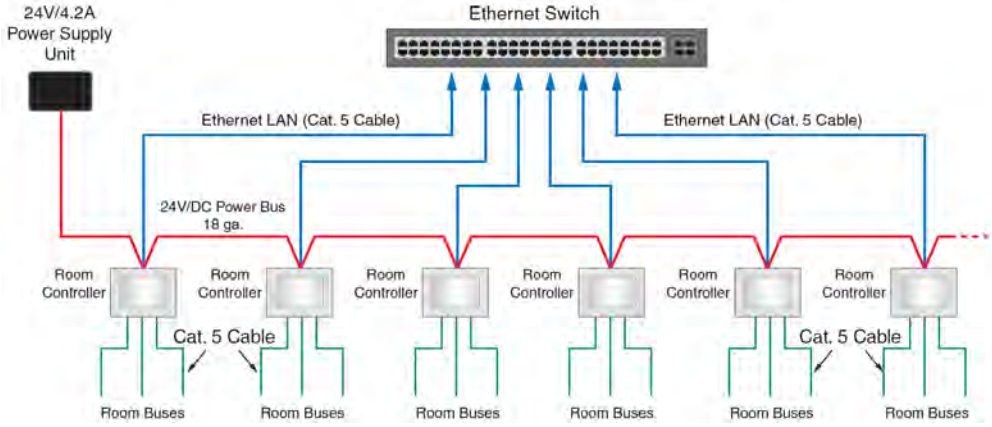



*Figure 7. LAN and room bus cables with power supply (24Vdc)*

### 4.5.2 Power Supply for Systems with Slave Corridor Lamps

Each slave corridor lamp receives its power supply (5.5Vdc) directly from the room bus. The room controller can support four corridor lamps.

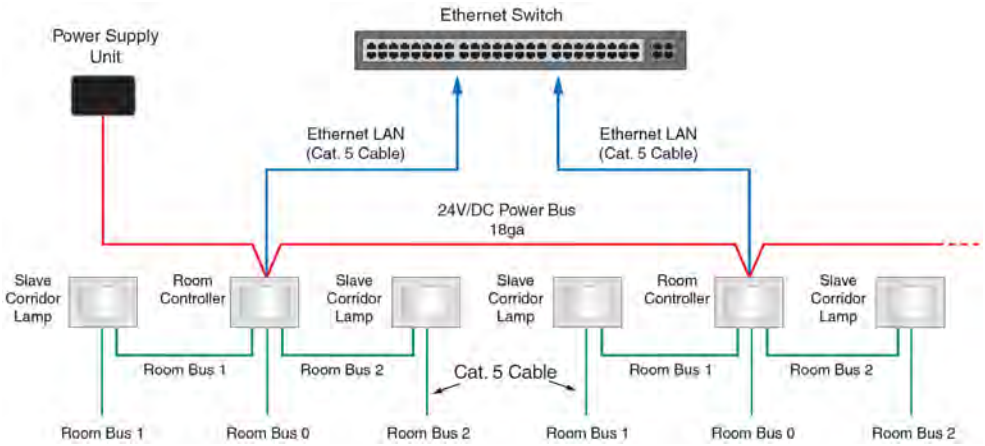



*Figure 8. Power supply (24Vdc) for room controllers with room bus powered (5.5Vdc) corridor lamps*

## 4.6 Maintenance and Service

Other than battery replacements and Secondary Power testing at the power supply unit, periodic maintenance is typically not needed for the teleCARE IP Emergency Call System.

- Always keep and refer to the installation and service instructions provided with the Ethernet Switch and the 24Vdc / 3 Amp Power Supply (Standard) or the 24Vdc / 8 Amp Power Supply (Seismic.)
- Refer to sections 4.1.2 and 4.2.2 in this manual for Maintenance and Service of the Power Supply (Standard) or Power Supply (Seismic.)
- Always replace the Secondary Power Supply battery or primary batteries for Wireless Devices (Section 8), whenever a "battery fail" or "low battery" alarm is reported.
- Refer to the NIFX, NITX, and NILF descriptions in section 7 for expected battery life intervals.

# 5 Control Equipment

This section describes the installation instructions for the following products:



## 5.1 Preparation

It is important to refer to the following teleCARE IP control module installation instructions for complete electrical connection and assembly details before starting the installation.

The Ingress Protection of the control modules is IP40, therefore the areas in which the teleCARE equipment is to be installed must be clean, dry, and weatherproof.

The walls on which the control modules are to be installed should be finished (painted, wall papered etc.) before the control module is installed.

It is important to have the appropriate length of free cable pulled out at every location where the control module is to be installed. The length of stripped cable and length of exposed copper wire must conform to the relevant installation instructions. Electrical power to the equipment must be off before connecting any devices.

## 5.2 Room Controller (NIRC3)

The Room Controller (NIRC3) has a translucent dome cover which accepts up to four LED boards which must be ordered separately. The LEDs are used for the signaling of calls, attendant presence and faults. The LED board is available in five colors: red, green, yellow, white and blue.


*Figure 11. The teleCARE IP room controller with corridor lamp*

The Room Controller (NIRC3) has been tested and found to comply with the emission levels for a Class B device as described in EN55022:2010.

The input power for the NIRC3 shall be supplied over an external 24Vdc power supply bus,. The external power supply input requirement is 24Vdc ± 10%. The power input has an on-board, self-resetting fuse.

The NIRC3 has four room buses. Each room bus has four wires, consisting of: data, voice, power (5.5V DC) and ground (0V). Each room bus power output has a self-resetting 650mA fuse. The room bus power output provides power to the connected peripheral devices. The NIRC3 can support up to four slave corridor lamps NICL2. Each room bus can accept one corridor lamp and each corridor lamp has the fixed room bus address 5.

The NIRC3 can accommodate 4 LED Lamp Boards (NILD2s), enabling the NIRC3 to be used as a corridor lamp. The NIRC3 also has the provisions to provide 24Vdc power for up to two teleCARE IP Corridor Lamps (NICL2s).

When an NICL2 data bus is connected to one of the four room buses, it becomes an active corridor lamp that operates independently of the NIRC3. In this configuration, the NICL2 takes up fixed Room Bus Address 5 on the NIRC3 bus. When connected to the NIRC3 External Corridor Lamp Outputs bus, an NICL2 becomes a passive corridor lamp and the LEDs operate in parallel with the NIRC3 display lamps.

The NIRC3 can be extended with an optional voice piggyback module (NIVP) to include speech and with an optional transceiver module (NIRX) for wireless call functionality.

### 5.2.1 Room Bus Addresses

Each room bus of the NIRC3 support eight addresses. The lowest four addresses (0 - 3) are for teleCARE IP peripherals and the highest four address (4 - 7) are dedicated for devices, such as the duty selector, card reader and the corridor lamp.

The total room bus address applications are summarized in the following table:

| Room Bus Address | Active Peripheral | Address Setting |
|---|---|---|
| 0 - 3 | Door side Modules<br>Bed side Modules<br>Pull Cord Modules<br>Medical Rail Socket | Set by DIP switch |
| 4 | Toilet Cancel Module | Fixed |
| 5 | Slave Corridor Lamp<br>Duty Selector | |
| 6 | Card Reader | |
| 6 + 7 | Room Display | |

*Table 7. Room bus addresses and applications*

### 5.2.2 NIRC3 Parts

The NIRC3 includes a housing, a translucent dome cover, and a printed circuit board which has four connectors for LED boards. The LED board (must be ordered separately) is available in five colors: red, green, yellow, white, and blue. The LEDs are used for the signaling of calls, staff presence, and faults.

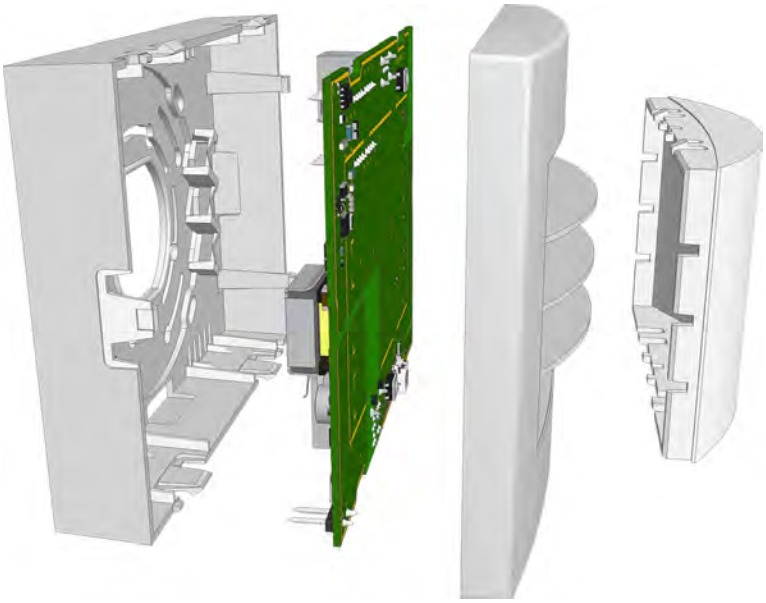


*Figure 12. Room controller (NIRC3) parts*

### 5.2.3 Blank Front Cover for the Room Controller

A blank solid plastic front cover for the room controller is available in white. The blank front cover is fitted to the room controller in place of the standard front cover with a translucent dome. It is used when there is no requirement for LED lamps on the room controller.


*Figure 13. NIRC3 room controller with blank front cover*

***Note:*** *The blank front cover must be ordered separately.*

### 5.2.4 Installing the Room Controller

When installing the Room Controller the first step is to separate the top section (cover, PC board, and lamp dome) from the housing. To do that simply grip the top edge of the cover and pull it away from the housing, as shown in the following illustration:

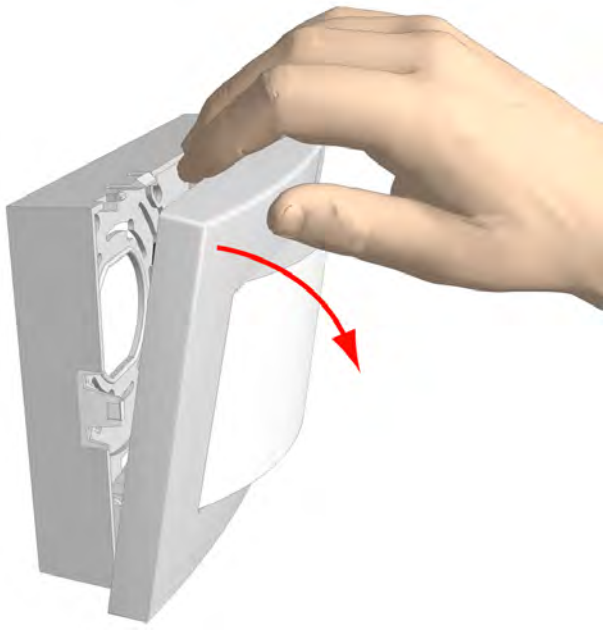


*Figure 14. Separating the top section from the housing*

### 5.2.5 Removing the Room Controller Printed Circuit Board

To remove the circuit board from the housing, press the holding clip outwards until it releases the circuit board (1). With the printed circuit board released from the holding clip, slightly pivot the circuit board (2) and remove the board from the housing, as shown in the following illustration:

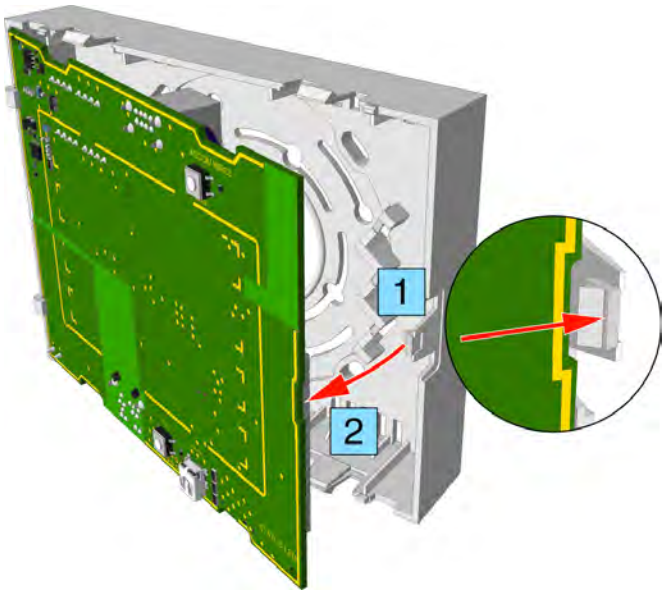



*Figure 15. Removing the circuit board from the housing*

### 5.2.6 Room Controller Housing

The room controller housing is designed to be surface mounted. It can be mounted over a back box or fixed directly on to a wall surface. The same housing is used for the IP room controller with LED lamps and with blank cover and for the corridor lamp.

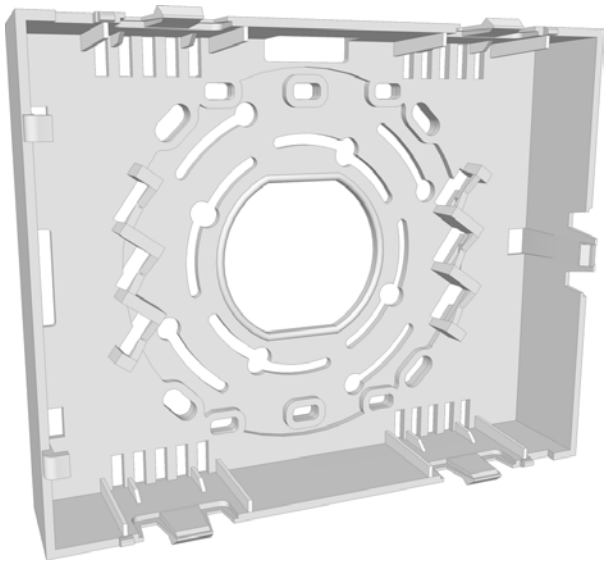


*Figure 16. Room controller housing*

### 5.2.7 Mounting the Housing over a Back Box

Place the housing over the back box so that the long sides are at the top and bottom. Pass the four screws through the appropriate holes in the base of the housing, as shown in the following illustration:

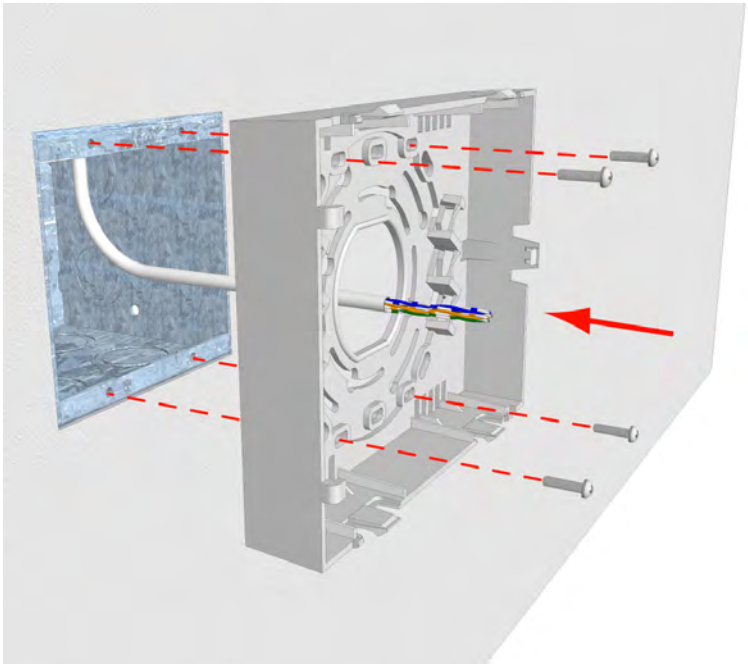


*Figure 17. Positioning the screws*

Make sure the long sides are horizontal, then tighten the back box fixing screws to secure the housing.

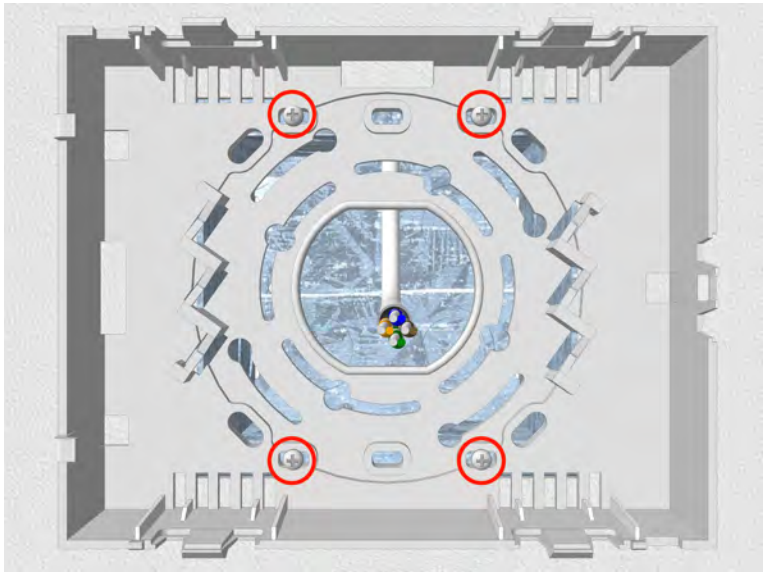


*Figure 18. Fixing the housing*

### 5.2.8 Mounting the Housing without a Back box

The housing can be mounted on a flat surface, without a back box, using four suitable screws in the outer fixing holes, as shown in the illustration below. When the room controller is surface mounted without a back box the cables should enter and leave the housing through the two knock-outs in the sides of the housing.

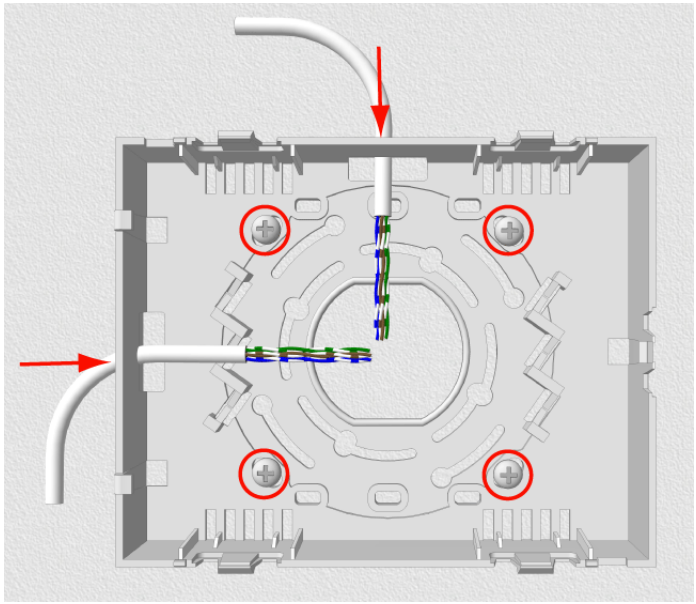


*Figure 19. Mounting the NIRC3 housing without a back box*

***Caution:*** *Do not distort the NIRC3 housing when it is mounted with or without a back box. If the housing is distorted the top section will not fit properly and could fall off. To prevent distortion only mount the NIRC3 housing on a smooth, level surface and do not over-tighten the fixing screws!*

## 5.3 Preparing the Room Bus and Power Cables

It is important to prepare the cables appropriately and to guide the wires correctly inside the housing in order to avoid the wires pressing on the printed circuit board which could result in damage and also prevent the top section from closing properly.

The following instructions apply to the room bus cables, the power supply cable, and the corridor lamp cables.

### 5.3.1 Stripping the Outer Jacket of the Cables

The first step is to strip the outer jacket of the cables to a length of 6.0in (150mm), then position the cable in the back box so that only the stripped wires enter the NIRC3 housing.

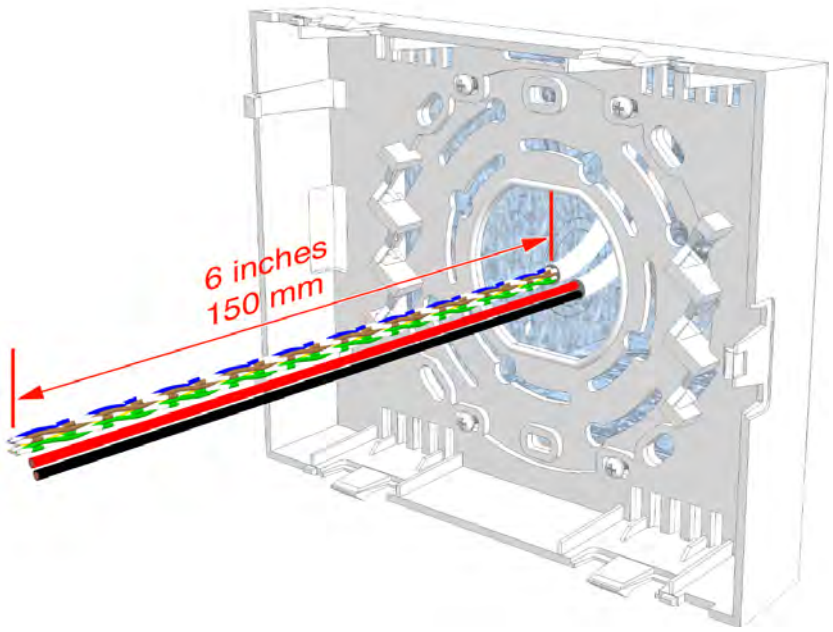



*Figure 20. Stripping and positioning the cables for the NIRC3*

***Caution:*** *Each room bus requires four wires. If the cable contains more than four wires the excess wires should be carefully stowed in the back box, away from the printed circuit board and other components to avoid electrical faults and safety problems.*

### 5.3.2 Room Controller (NIRC3) Connections

The electrical connections on the component side of the room controller printed circuit board are shown in the following drawing of the NIRC3 circuit board.

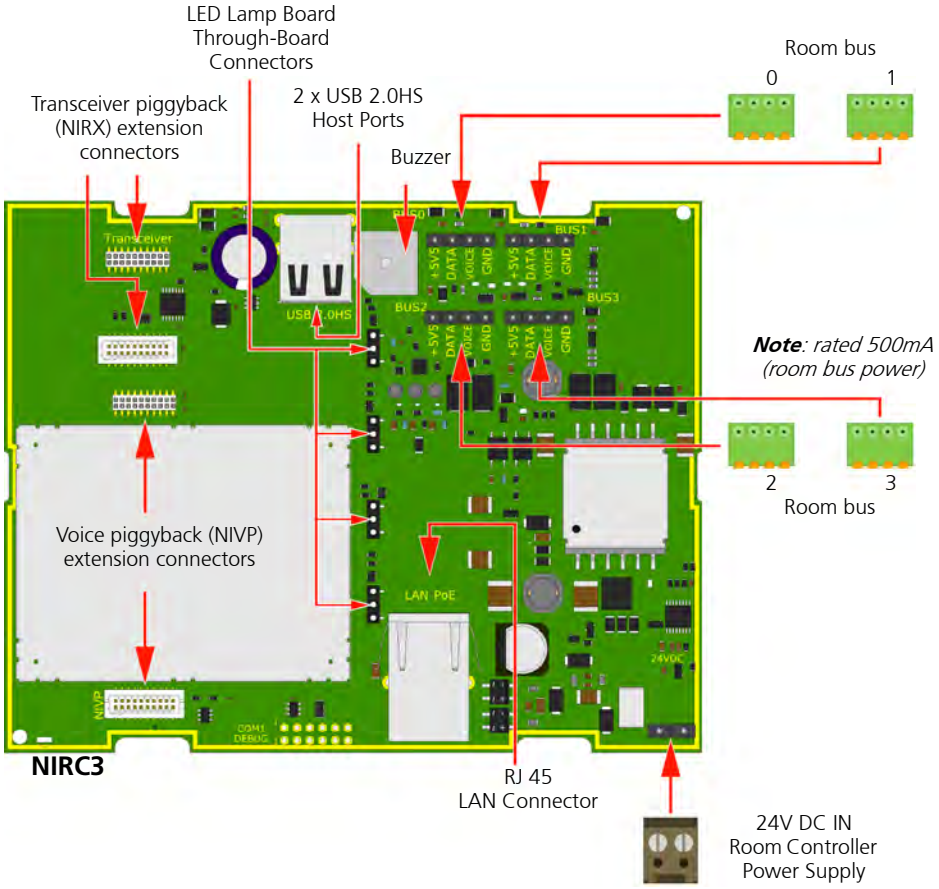



*Figure 21. Room controller (NIRC3) PCB electrical connections*

Details of the room bus connections are given in 5.5.1, 4-Pole Connector Terminal (NICT-4AA), page 31.

The NIRC3 is powered by an external 24V DC power supply.

Details of the 24V DC power supply connections are given in 5.5.2, 2-Pole Connector Terminal (NICT-2BA), page 33

The NIRC3 has two USB2.0HS host ports. Will be used in a future release to support WiFi functionality.

> ***Note:*** *The 4-pole and the 2-pole connector terminals required for the room bus and the 24V power supply are not supplied with the room controller. The connectors are available as accessories and must be ordered separately.*

Details of the LED lamp boards are given in section 5.7, LED Lamp Boards (NILD2), page 38.

Details on how to install the transceiver piggyback module (NIRX) are given in section "NIRX teleCARE IP Transceiver" on page 137.

### 5.3.3 Room Controller (NIRC3) Printed Circuit Board Back View

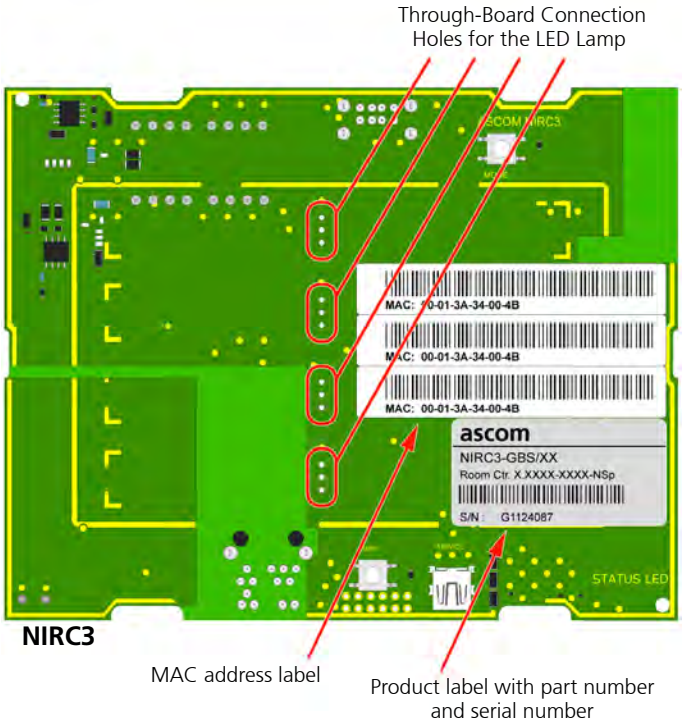



*Figure 22. NIRC3 printed circuit board back view*

On the back of the NIRC3 printed circuit board there are four sets of through-board connection holes for LED lamp boards. Details of for connecting the LED lamp boards are given in section 5.7, LED Lamp Boards (NILD2), page 38.

### 5.3.4 NIRC3 Status Information

The NIRC3 status information is visible through an LED that can be seen from the bottom of the NIRC3 housing.


*Figure 23. NIRC3 Status LED*

The multi color status LED on the NIRC3 will indicate the following:

| NIRC3 - Status color | Status | Remarks |
|---|---|---|
| Steady blue | Normal operation | |
| Steady orange | Starting-up | for about 22 seconds after power on or reboot. |
| Fast blue flashing | Application start-up | |
| Steady orange | Image installation mode | The NIRC3 will end up in image installation mode after 4 unsuccessful boot attempts |

**System Faults**

System faults like LAN failure, disconnected module will be visible through the yellow lamp on the NIRC3.


*Figure 24. Fault indications on the NIRC3 yellow lamp*

| Fault - yellow LED | Status | Remarks |
|---|---|---|
| ■ □ ■ □ ■ □ ■ □ ■ □ | LAN failure | |
| ■ □ ■ □ ■ □ ■ □ □ | Peripheral lost | |

## 5.4 Voice Piggy Back (NIVP)

The teleCARE IP Voice Piggy Back module (NIVP) is a printed circuit module which is piggy back mounted on the teleCARE IP Room Controller 3 (NIRC3).

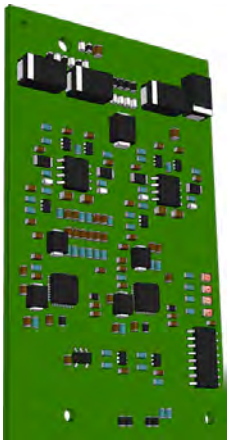


*Figure 25. Voice Piggy Back - NIVP*

The NIVP has four half duplex speech channels allowing four speech sessions at the same time, one speech session for each room bus. Each speech channel has an LED indicator which illuminates when a speech session is in progress. The NIVP allows existing non speech teleCARE IP installations using the NIRC3 to be upgraded to teleCARE IP with speech.

### 5.4.1 Connecting the Voice Piggy Back module to the NIRC3

The NIVP is mounted on the NIRC3 using the two 20-pole connectors located at the back of the NIVP:

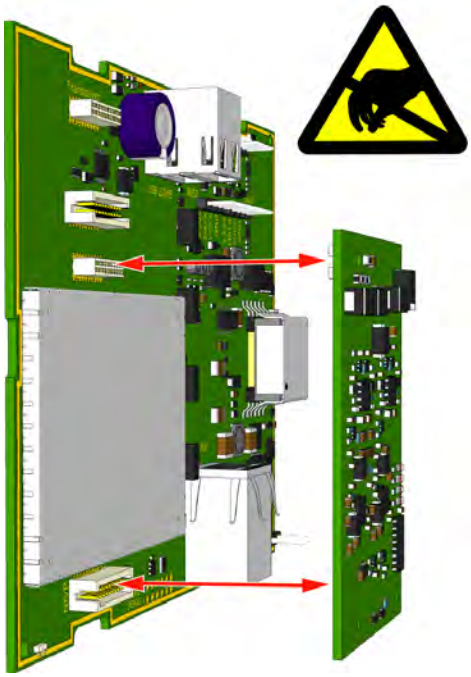


*Figure 26. Mounting the voice piggy back module on the NIRC3*

***IMPORTANT:*** *Power down the room controller NIRC3 before mounting the voice piggy back module NIVP.*

The following illustration shows the NIVP voice piggy back module mounted on the NIRC3:

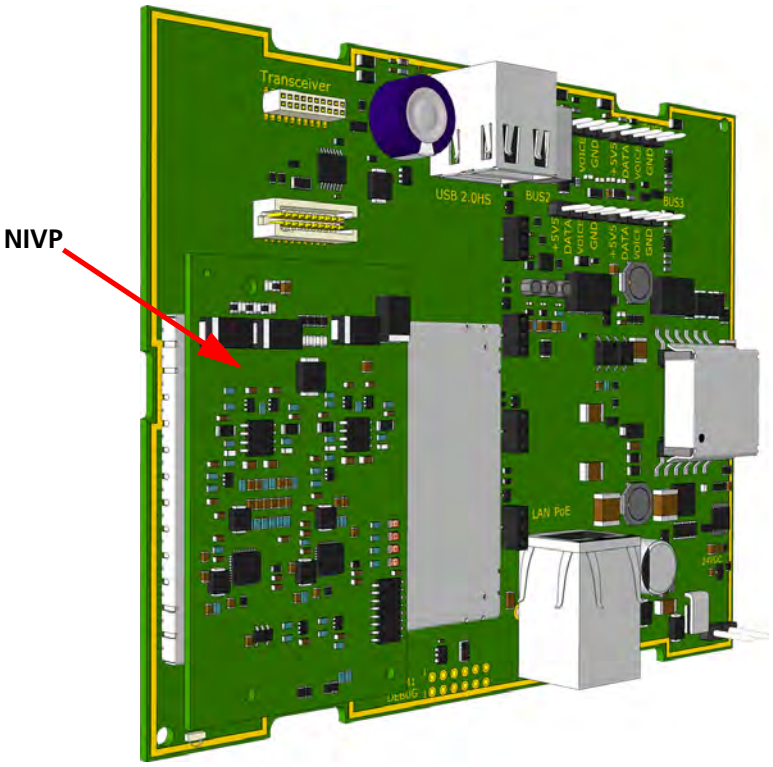



*Figure 27. Voice piggy back module mounted on the NIRC3*

## 5.5 Connection Terminals

The 4-pole and the 2-pole connector terminals required for the room bus and the 24Vdc power supply are not supplied with the IP room controller. The connectors are available as accessories and must be ordered separately.

### 5.5.1 4-Pole Connector Terminal (NICT-4AA)

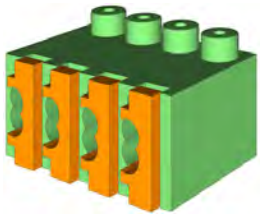


*Figure 28. 4-pole connector terminal*

The 4-pole connector terminal is used for connecting the room bus. It has a screw-less "spring-cage" connection technique and each terminal has two connection points.

The designation of the required four wires is as shown in the following illustration.

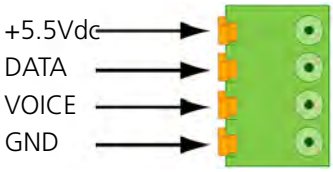



*Figure 29. 4-pole connector terminal with the room bus*

**Preparing the Wires for the 4-pole Connector Terminal**

The 4-pole connector terminal has four terminals with two connection points at each terminal. Each connection point accepts one solid wire of maximum wire size 20 AWG (0.8mm).

To connect the wires first strip the jacket from the cables and pull the wires through the housing leaving a length of 6in (150mm) free, as described in section 5.3, Preparing the Room Bus and Power Cables on page 25. Then strip 0.25in (6.5mm) of the insulation from the end of each wire which is to be connected.

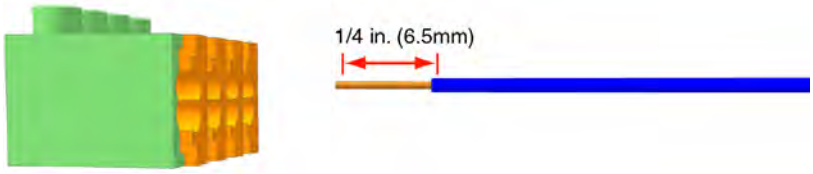



*Figure 30. Stripping the wires for insertion in the connection terminal*

After stripping the wire to expose 0.25in (6.5mm) of conductor, insert the wire in the appropriate opening of the connection point by pressing the wire firmly into the terminal, as illustrated below.

***Note:*** *Each connection point in the connector terminal accepts only one wire. Maximum wire size 20 AWG (0.8mm).*

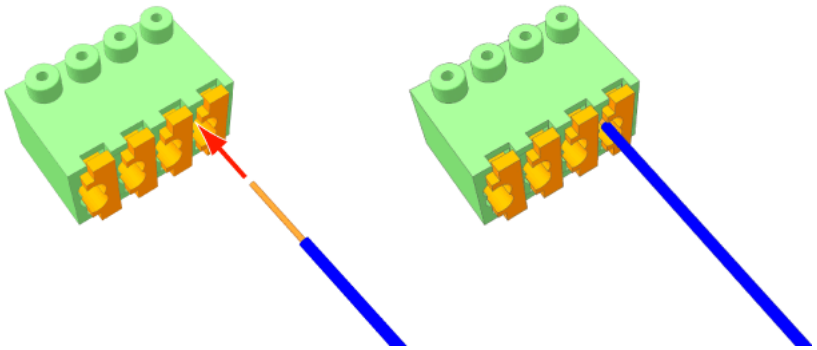


*Figure 31. Inserting a wire in the connection point*

Check that a good connection has been made by gently pulling on the wire after it has been inserted. The wire should stay fixed in the terminal.

Four wires are required for the room bus, passive bus, and light relay outputs, so repeat the above illustrated procedure on the remaining three wires.

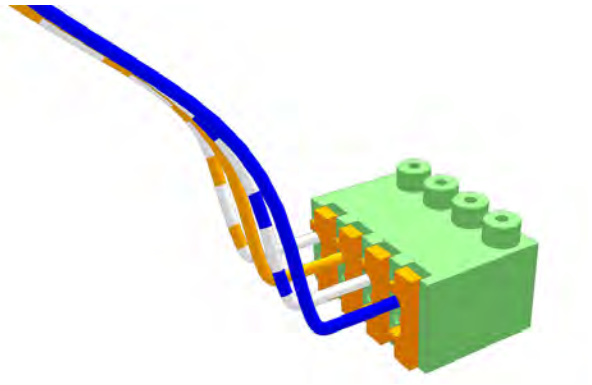


*Figure 32. Connector terminal complete with four wires*

**Disconnecting a Wire from the Connector Terminal**

First carefully place the point of a small screw driver (point approximately 0.1in (2.5mm) wide) on the relevant orange colored release key of the connection terminals and press the key in firmly to open the spring-cage connector (1). With the release key pressed in pull the wire from the terminal (2) then remove the screw driver.

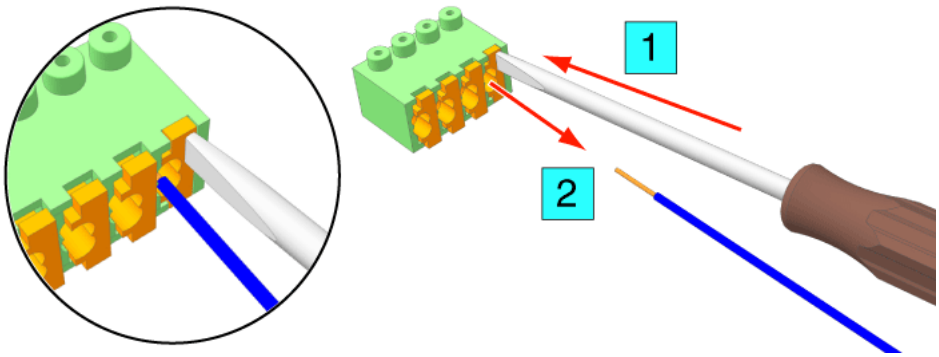



*Figure 33. Removing a wire from a connection point*

### 5.5.2 2-Pole Connector Terminal (NICT-2BA)

*Figure 34. 2-pole connector terminal*

The 2-pole connector terminal is used for connecting the 24Vdc power supply when a separate power supply is used. It is also used for the 24Vdc power supply from the room controller to the corridor lamp.

The 2-pole terminal connector has two screw terminals. Each terminal accepts one wire (up to wire size 15 AWG (1.4mm) or two wires (each up to 18 AWG (1mm).

***Note:*** *The recommended maximum wire size for the teleCARE power supply is 18 AWG (1mm).*

#### Preparing the Wires for the 2-pole Connector Terminal

To connect the wires first pull the wires through the housing leaving a length of 6in (150mm) free, as described in section 5.3, Preparing the Room Bus and Power Cables on page 25. Then strip 0.25 inch (6.5mm) of the insulation from the end of each wire which is to be connected.

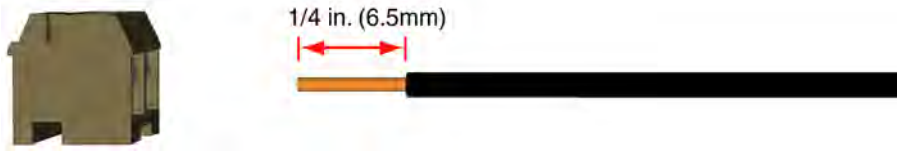



*Figure 35. Stripping the wires for insertion in the connection point*

After stripping the wire insert the wire in the appropriate opening of the connector terminal and tighten the terminal screw.

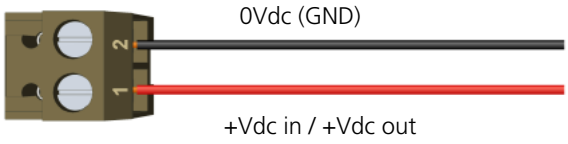



*Figure 36. 2-pole connector terminal wiring*

***Note:*** *If stranded wire is used for the power supply cabling then a suitable ferrule (barrel outer diameter > 0.04in (1mm) should be used over the wire cores to ensure a reliable connection.*

#### 2-Pole Connector Terminal with Looped Wiring

In cases where the power supply cable loops from room controller to room controller, the incoming and outgoing wires are connected in the same screw terminal, as shown in the following illustration:

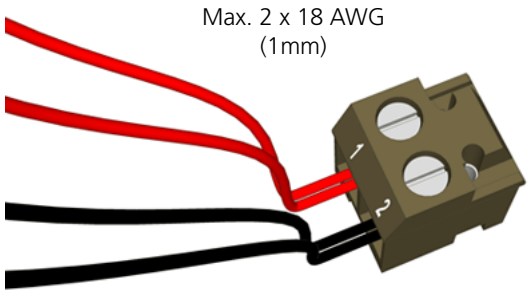



*Figure 37. Connector terminal with looped wiring*

***Note:*** *The maximum size of each wire when two wires are inserted in one screw terminal of the 2-pole connector terminal is 18 AWG (1mm).*

## 5.6 Connecting the IP Room Controller Printed Circuit Board

When preparing the wiring for connecting the printed circuit board of the IP room controller make sure that the power supply wires and the room bus wires are stripped of the cable outer jacket and that the wires are long enough, as described in section 5.3, Preparing the Room Bus and Power Cables on page 25.

It is best to arrange the wires and cables neatly and securely inside the housing. The power wires and the room buses should be guided around sides of the room controller housing and held in place by the wire holding clips.

### 5.6.1 Connecting the 24Vdc Power Supply

The 24Vdc power supply uses a 2-pole connection terminal as described in section 5.5.2 on page 33. The connection point on the room controller circuit board for the power supply is shown in section 5.3.2 on page 26.

The power supply wires should be guided around the sides of the room controller housing and held in place by the wire holding clip, as shown in the following illustration:

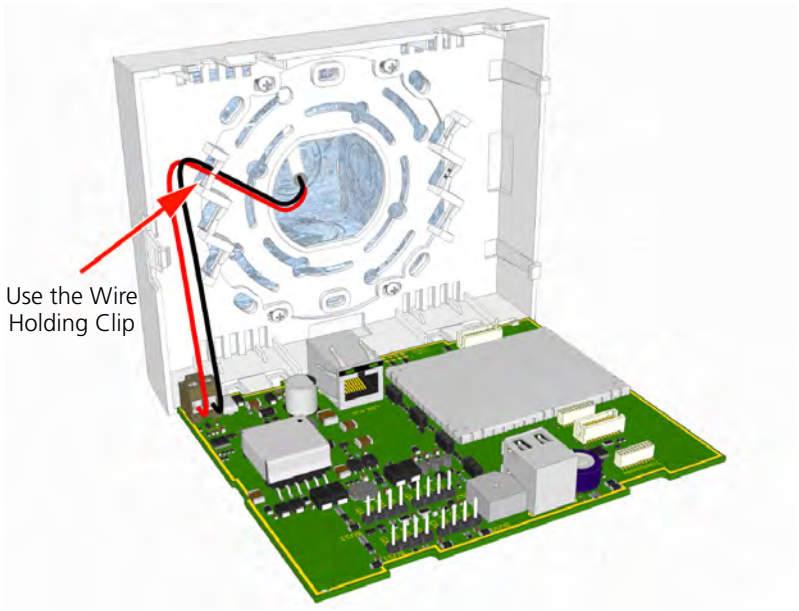



*Figure 38. Connecting the 24Vdc power supply to the NIRC3*

### 5.6.2 Connecting the Room Bus

The room bus uses a 4-pole connection terminal as described in section 5.5.1 on page 31. The connection point on the room controller circuit board for the room bus is shown in section 5.3.2 on page 26.

The room bus wires should be guided around sides of the room controller housing and held in place by the wire holding clip, as shown in the following illustration:

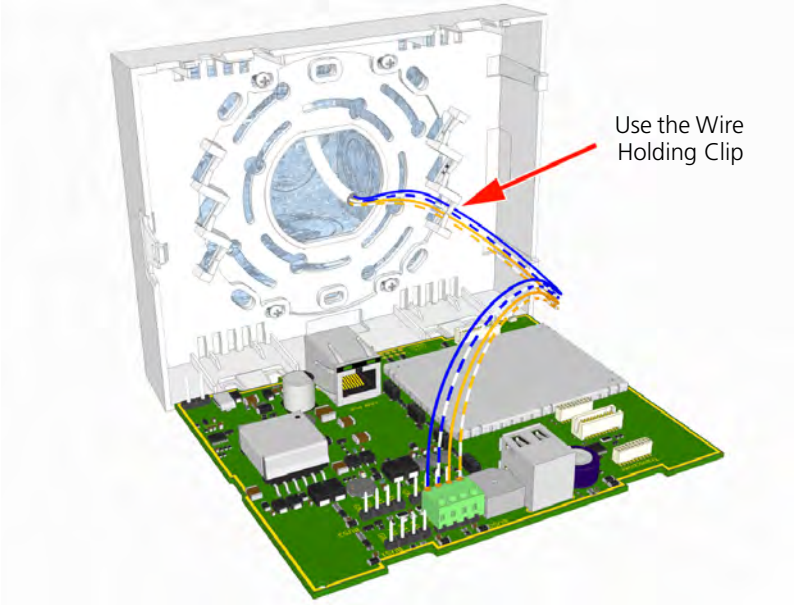



*Figure 39. Connecting a room bus to the NIRC3*

### 5.6.3 Connecting Multiple Room Buses

The IP room controller supports four room buses and each has a 4-pole connection terminal which is wired as described in section 5.5.1 on page 31. The connection points on the room controller PCB for the room buses are shown in section 5.3.2 on page 26.

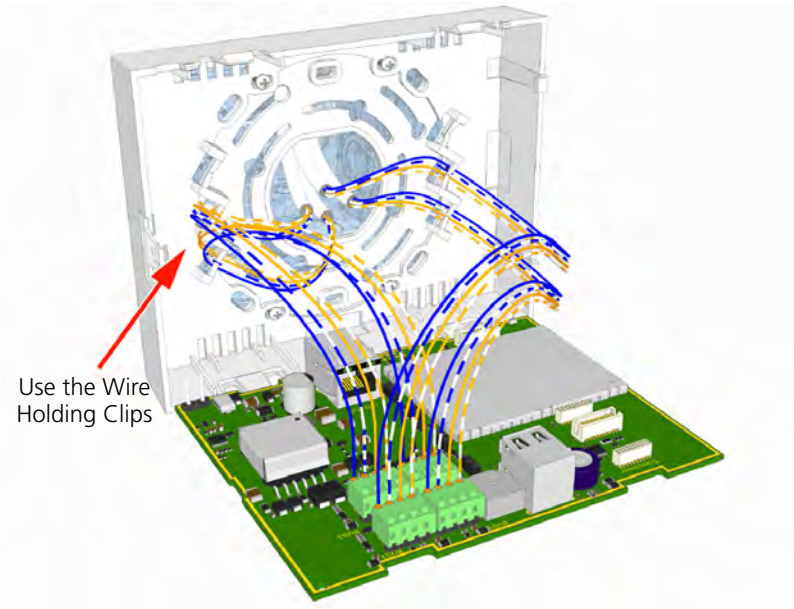



*Figure 40. Connecting multiple room buses to the NIRC3*

### 5.6.4 Connecting LAN Cable

The LAN cable has an RJ45 plug which connects to the socket on the room controller printed circuit board shown in section 5.3.2 on page 26. The LAN cable should not be guided through the wiring clips inside the room controller housing. It should be plugged directly into the RJ45 connector on the printed circuit board with enough cable to avoid straining the LAN connection.

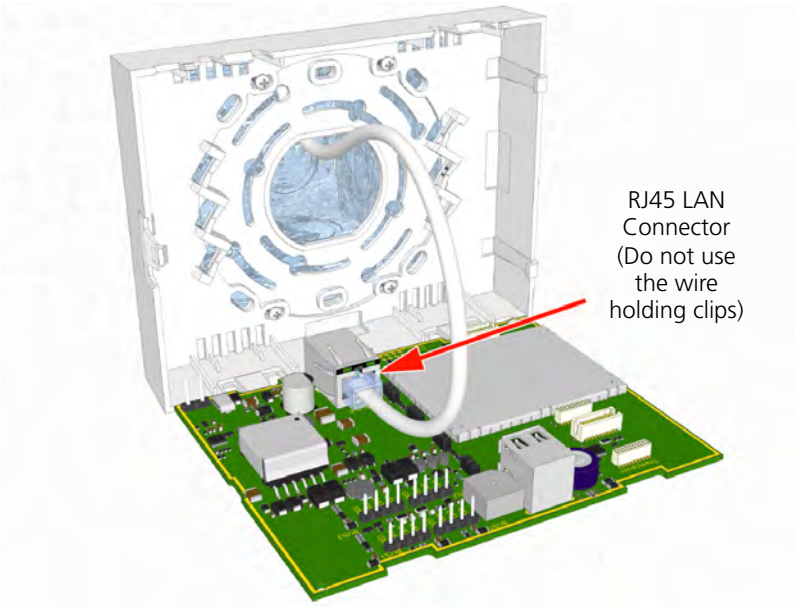



*Figure 41. Connecting the LAN cable to the NIRC3*

### 5.6.5 Fully Wired IP Room Controller

The following illustration shows how the room controller (NIRC3) should look with all wiring connected when external power is used:

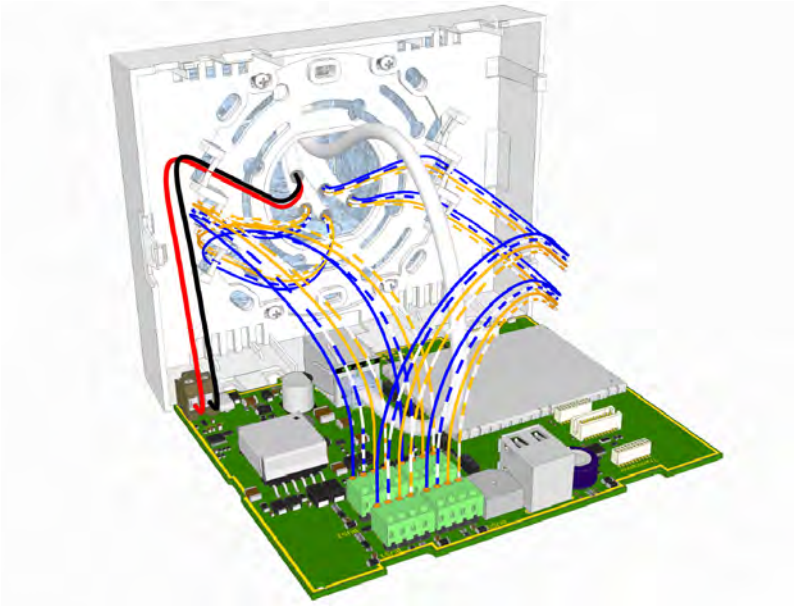


*Figure 42. Fully Wired room controller - NIRC3*

## 5.7 LED Lamp Boards (NILD2)

The LED lamp board contains four high intensity LED lamps which are used in the corridor lamp of the room controller and corridor lamp. The three pins in the back side of the board are used to connect the LED lamp board through holes in the back side of the room controller or corridor lamp printed circuit board. The room controller and the corridor lamp each accept up to four LED lamp boards.

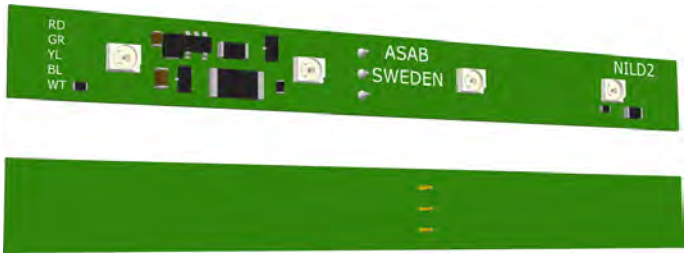



*Figure 43. NILD2 - LED lamp board front and back view*

The color of the LEDs is determined during manufacture and cannot be changed. A resistor on the component side (front) of the board indicates the color of the LEDs, as shown in the following illustration:

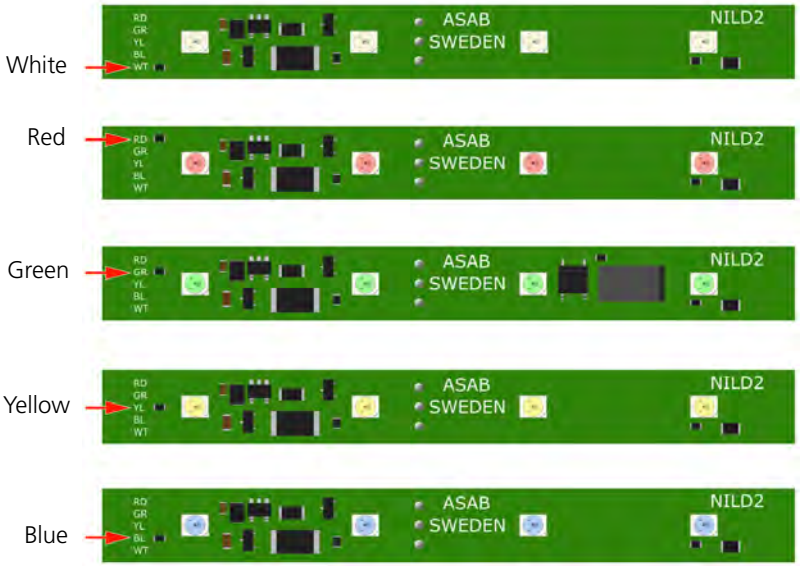



*Figure 44. NILD2 - LED lamp boards: white, red, green, yellow and blue*

The LED lamp boards can be plugged into any of the LED connection points on the room controller board and the corridor lamp but it is normal to have each color in the same position in every room controller board. The functioning of the LEDs colors is determined by the system setup.

***Note:*** *The NILD2 - LED lamp boards are not delivered as part of the room controller and therefore, must be ordered separately.*

### 5.7.1 Auxiliary Lamp Connection - NILD2

The green LED board (NILD2-GAA) has a galvanically isolated relay contact that can be used to connect to an auxiliary lamp. It has a maximum switching capacity of 0.4A at 60V peak.

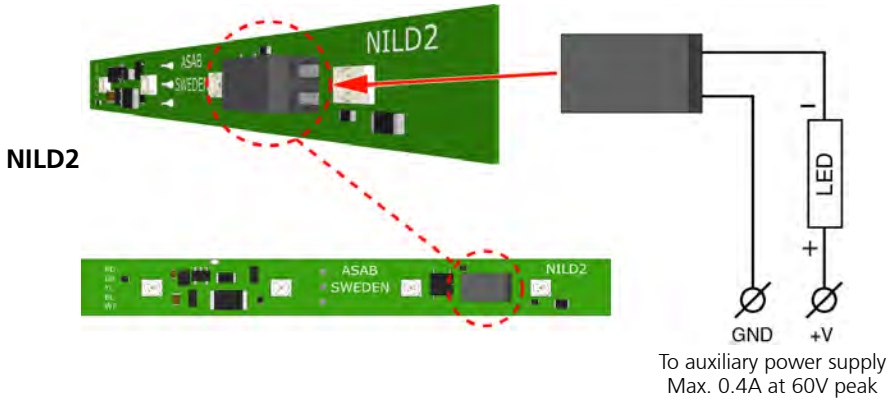



*Figure 45. External corridor lamp connections through the NILD2-GAA*

***IMPORTANT:*** *In order to retain the galvanic isolation, it is not allowed to connect the GND(-) of the auxiliary power supply to the GND (-) of the NIRC3.*

**Disabling the LEDs**

If the relay contact only is required, without the green LED on the NILD2-GAA board, then the conductor track should be cut through at the break point to disable the LEDs, as shown in the following illustration:

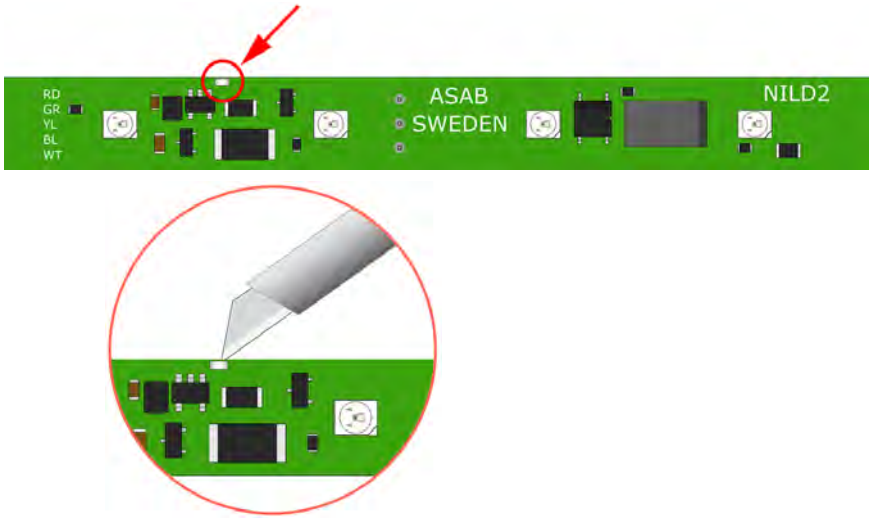



*Figure 46. Disabling the LEDs of the NILD2-GAA*

### 5.7.2 Connecting the Wires to the NILD2-GAA

The 2-pole connector terminal on the green LED lamp board (NILD2-GAA) has two terminals with one connection point at each terminal. A connection point accepts one solid wire of maximum wire size of 24 AWG (0.5mm). To connect the wires first strip 1/4 in. (6mm) of the insulation from the end of each wire which is to be connected.

After stripping the wire, insert the wire in the appropriate opening of the connection point by pressing the wire firmly into the terminal, as illustrated below:

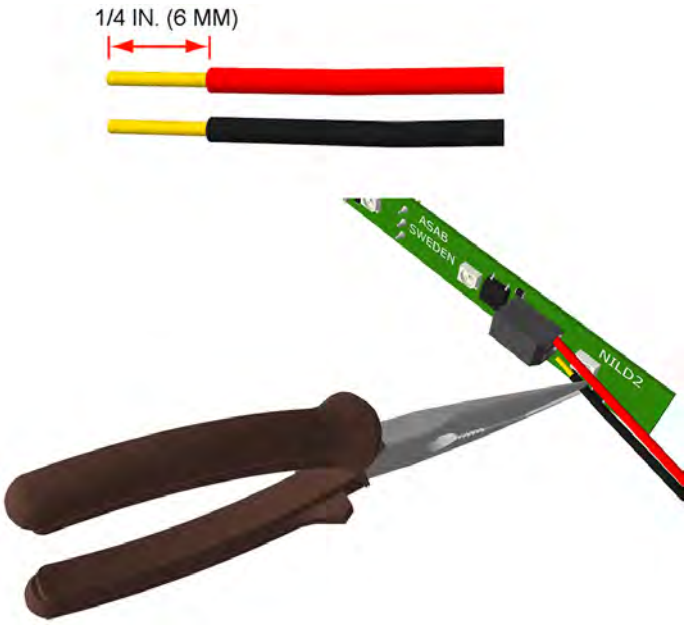



*Figure 47. Connecting the wires of an external lamp*

***Note:*** *Each connection point in the connector terminal accepts only one solid wire. Maximum wire size 24 AWG (0.5mm).*

### 5.7.3 Installing the LED Lamp Boards on the IP Room Controller Board

On the back side of the IP room controller PCB there are the four sets of through-board connections for the LED lamp boards. Each through-board connector has three holes which accept the three connecting pins on the LED lamp board.

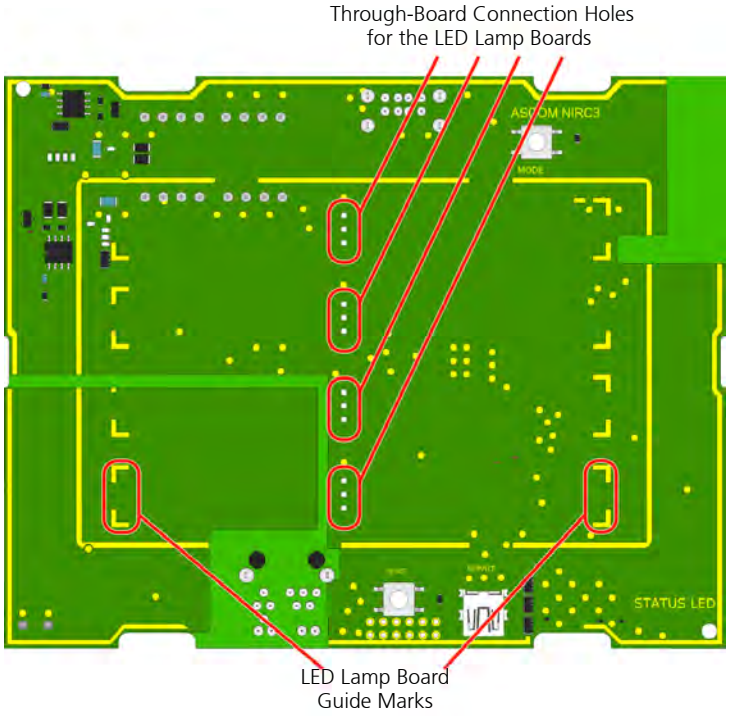



*Figure 48. LED through-board connectors and guide marks*

The LED lamp connection points are labeled LED0, LED1, LED2, and LED3. Any color LED board can be plugged into any of the connection points in the IP room controller. The appropriate position of the LED color is determined during the system setup.

***Caution:*** *The pins on the LED lamp board are not in the center of the board so it is important to make sure that the LED lamp board lines up with the guide marks on the IP room controller PCB when the pins are inserted.*

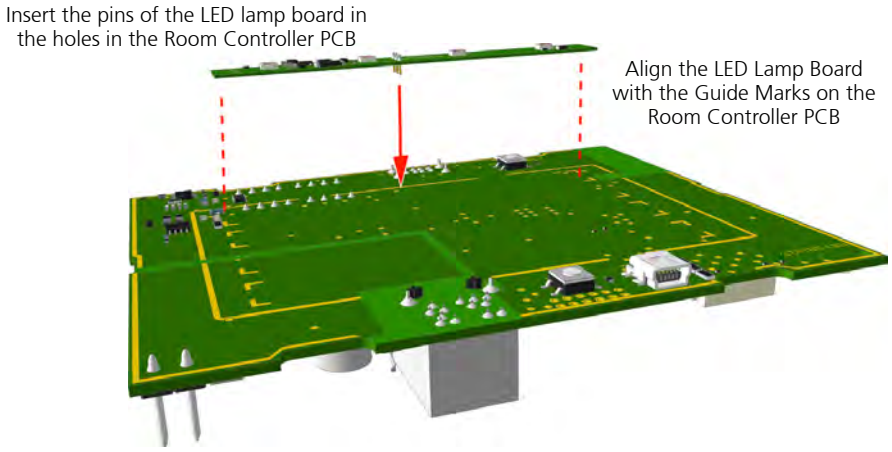



*Figure 49. Plugging LED lamp board into the room controller PCB*

With the three pins inserted and the LED lamp board lined up with the guide marks, firmly press the LED lamp board into the IP room controller PCB. Repeat the procedure on the other required LED lamp boards.

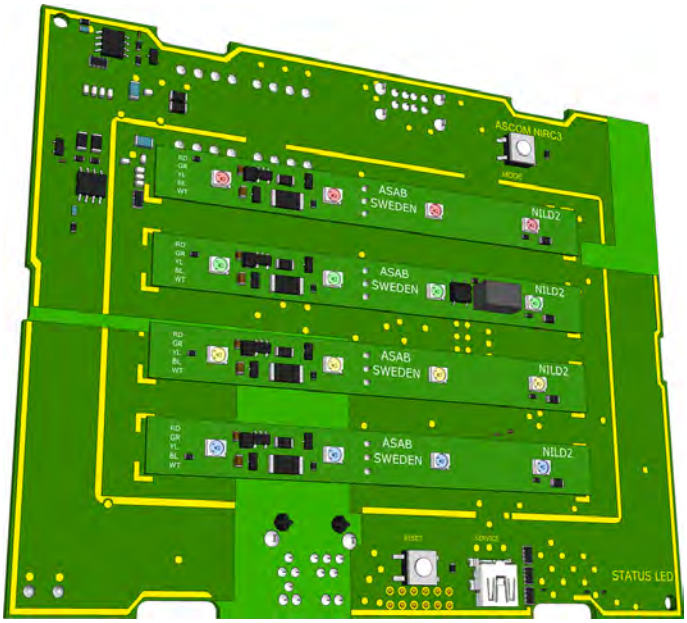



*Figure 50. NIRC3- room controller PCB with 4 LED lamp boards*

***Caution:*** *The maximum load on each external LED circuit is 60mA.*

### 5.7.4 Auxilliary Lamp Connection

The room controller (NIRC3) circuit board does not support an external corridor lamp directly, however an external lamp can be connected through a green LED lamp board (NILD2-GAA) which has a galvanically isolated relay contact available with a maximum switching capacity of 0.4A at 60V peak.

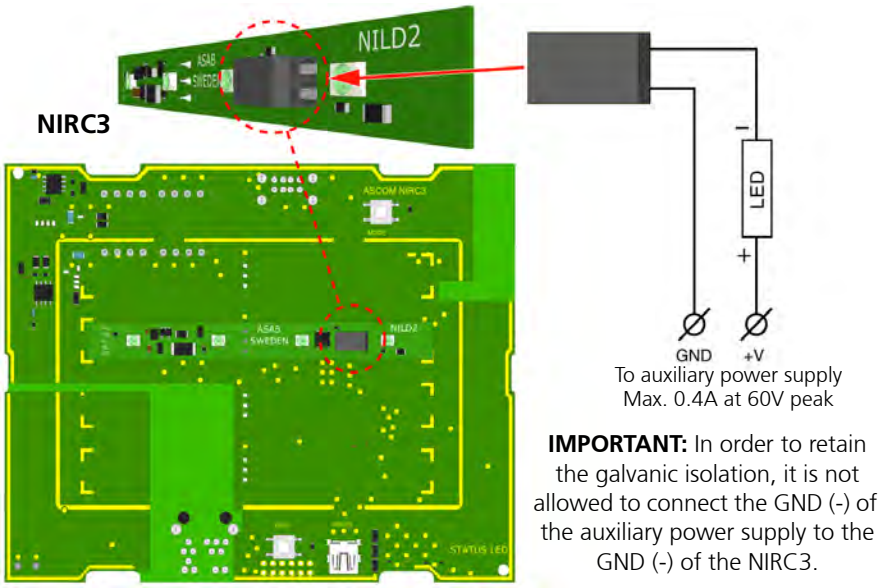



*Figure 51. External corridor lamp connections through the NILD2-GAA*

For detailed information "Auxiliary Lamp Connection - NILD2" on page 39.

## 5.8 Corridor Lamp (NICL2)

The room controller (NIRC3) can support four corridor lamps. Each Corridor Lamp is connected to one of the room buses of the Room Controller and it always has the fixed address 5.


*Figure 52. The teleCARE IP corridor lamp*

The Corridor Lamp consists of a back box, a printed circuit module, a cover plate, and translucent dome cover that can accept up to four LED boards, as shown in the following illustration:

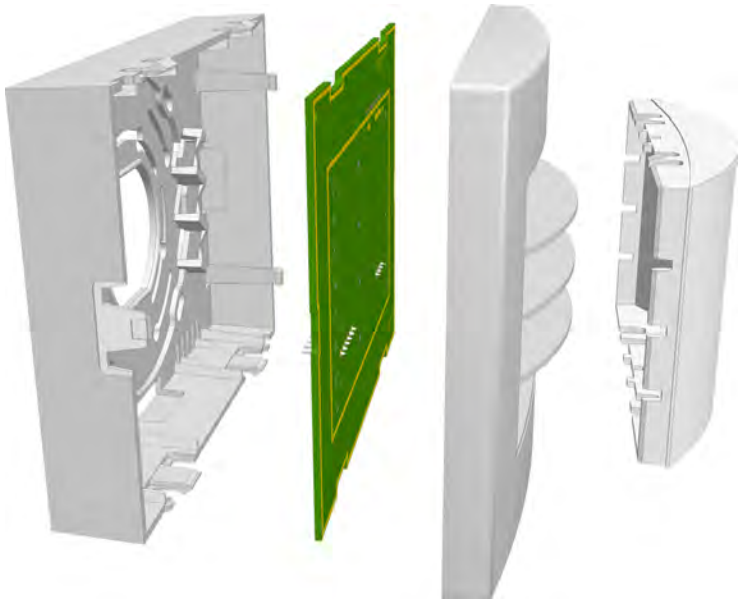


*Figure 53. Corridor lamp (NICL2) parts*

### 5.8.1 Installing the Corridor Lamp

When installing the Corridor Lamp the first step is to separate the top section (cover, PC board, and lamp dome) from the housing. To do that simply grip the top edge of the cover and pull it away from the housing, as shown in the following illustration:

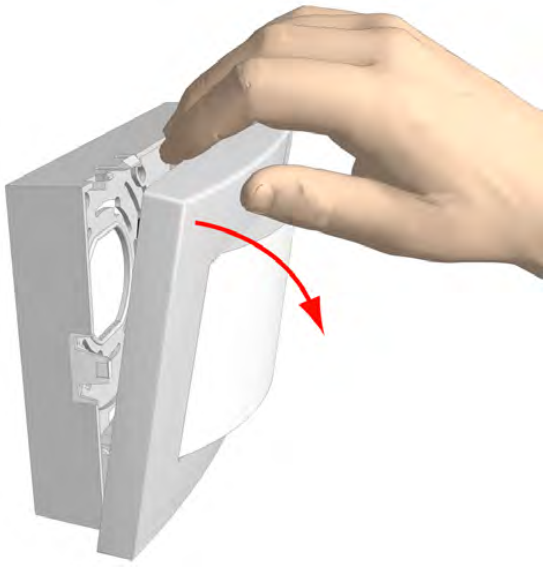


*Figure 54. Separating the top section from the housing*

### 5.8.2 Removing the Corridor Lamp Printed Circuit Board

To remove the circuit board from the housing, press the holding clip outwards until it releases the circuit board, as shown in the following illustration:

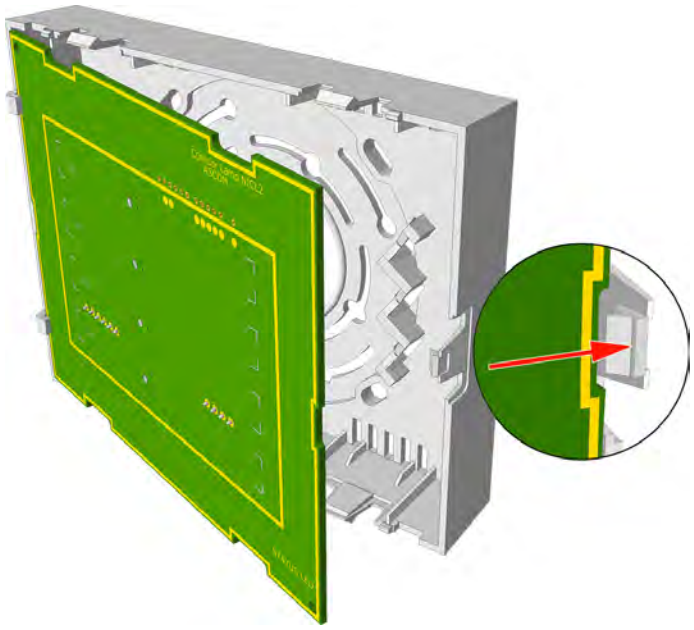


*Figure 55. Removing the circuit board from the housing*

With the printed circuit board released from the holding clip, partly rotate the circuit board and remove it from the housing.

### 5.8.3 Corridor Lamp Housing

The corridor lamp has the same housing as used for the IP room controller which is designed to be surface mounted. Refer to section 5.2.6, Room Controller Housing on page 23 for details of mounting the housing.

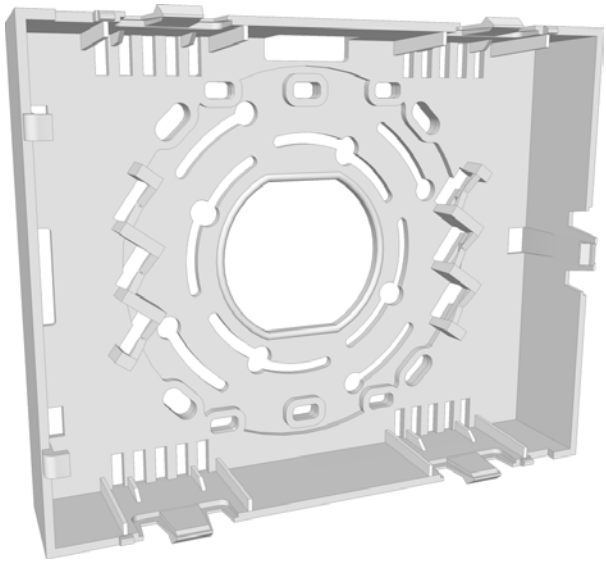


*Figure 56. IP room controller housing*

### 5.8.4 NICL2 - Corridor Lamp Electrical Connections

The wiring between NIRC3 and the NICL2 Corridor Lamp consists of the teleCARE IP four-wire room bus.

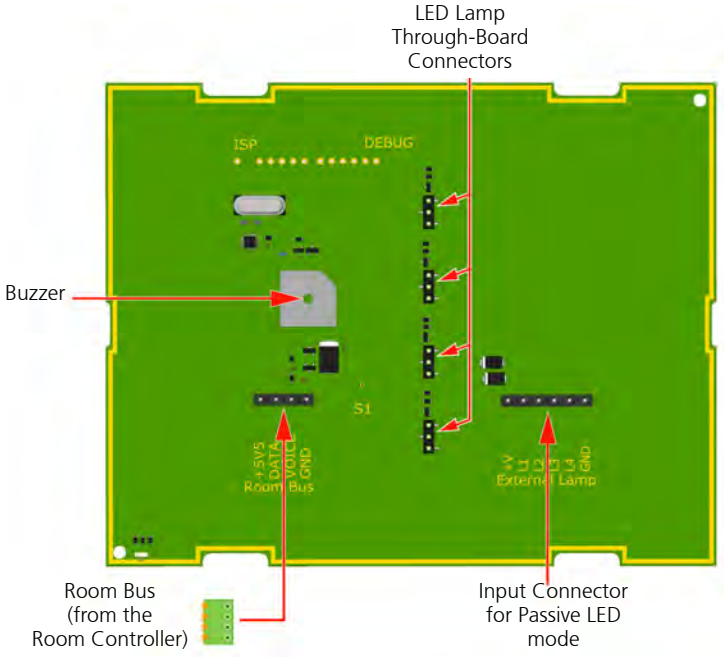



*Figure 57. NICL2 - Corridor lamp PCB component side electrical connections*

### 5.8.5 4-Pole Connector Terminal

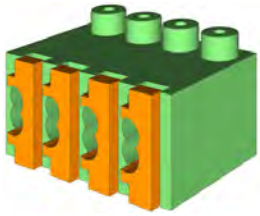


*Figure 58. 4-pole connector terminal*

The 4-pole connector terminal is used for connecting the room bus. It has a screw-less "spring-cage" connection technique and each terminal has two connection points.

The designation of the required four wires is as shown in the following illustration.

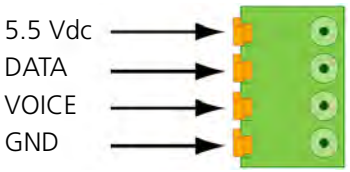



*Figure 59. 4-pole connector terminal with the room bus*

Preparing the wires and connecting the 4-pole connection terminal is described in section 5.5.1, 4-Pole Connector Terminal (NICT-4AA) on page 31.

### 5.8.6 Connecting the Corridor Lamp Printed Circuit Board

When preparing the wiring for connecting the printed circuit board of the corridor lamp make sure that the room bus wires are stripped of the cable outer jacket and that the wires are long enough, as described in section 5.3, Preparing the Room Bus and Power Cables, page 25.

The wires and cable should be neatly and securely inside the housing. The room bus wires should be guided around the sides of the housing and held in place by the wire holding clips.

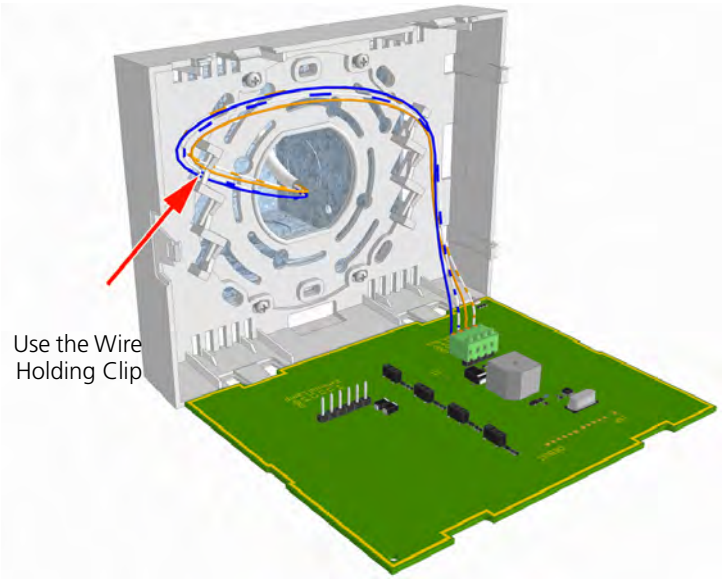



*Figure 60. Connecting the NICL2 - corridor lamp*

### 5.8.7 LED Lamp Boards for the Corridor Lamp

***Note:*** *The LED lamp boards are not delivered as part of the corridor lamp and therefore, must be ordered separately.*

The LED lamp board contains four high intensity LED lamps which are used for the signaling of various types of calls including staff presence, and system faults.

The three pins in the back side of the LED board are used to connect the LED lamp board through holes in the back side of the corridor lamp printed circuit board. The corridor lamp accepts up to four LED lamp boards.

The LED lamp connection points are labeled LED0, LED1, LED2, and LED3. Any color LED board can be plugged into any of the connection points on the IP room controller. The appropriate position of the LED color is determined during the system setup.

The LED lamp board is available in five colors: red, green, yellow, white, and blue. The functions of the LEDs are determined by the system setup.

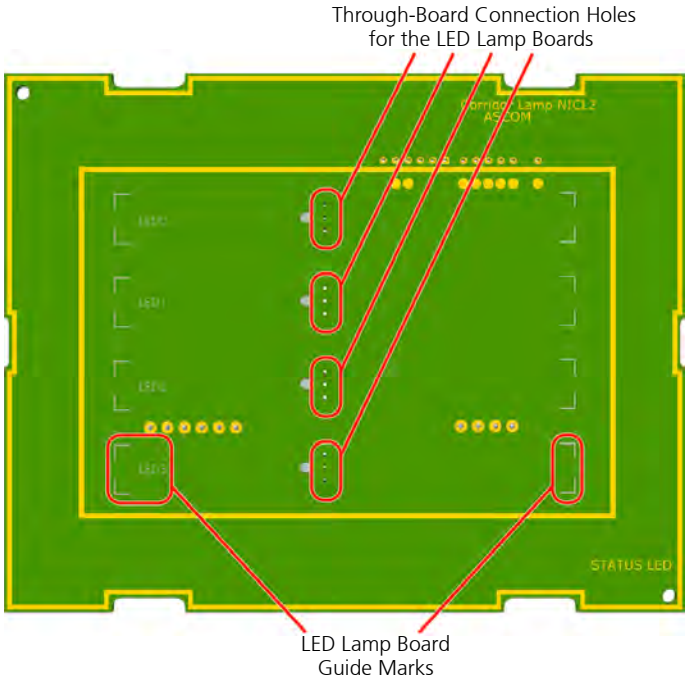



*Figure 61. LED through-board connectors and guide marks*

For full details of the LED lamp boards refer to section 5.7, LED Lamp Boards (NILD2), page 38.

### 5.8.8 Connecting the LED Lamp Boards

To connect the LED lamp board, insert the three pins of the LED lamp board into the appropriate three holes in the back side of the corridor lamp PCB.

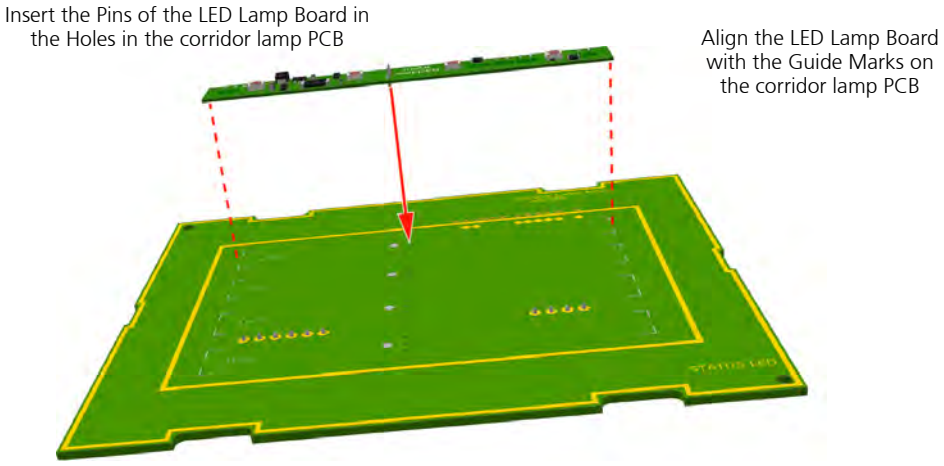



*Figure 62. Plugging LED lamp board into the corridor lamp PCB*

With the three pins inserted and the LED lamp board lined up with the guide marks, firmly press the LED lamp board into the corridor lamp PCB. Repeat the procedure on the other required LED lamp boards.

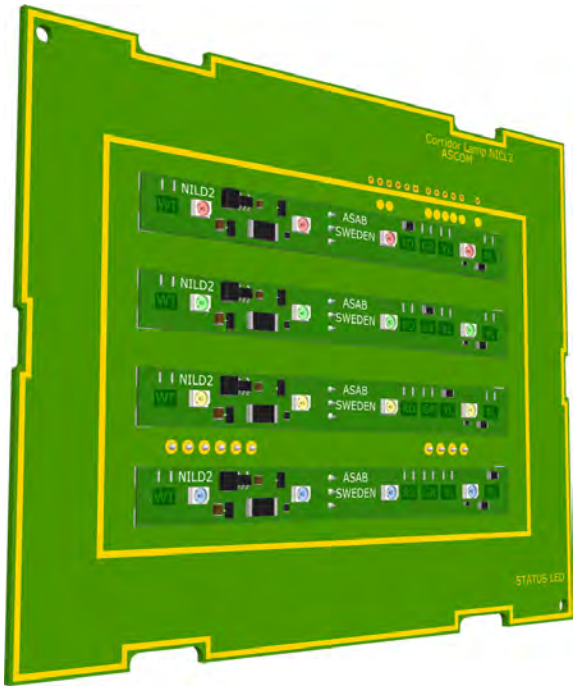



*Figure 63. Corridor lamp PCB with 4 LED lamp boards*

***Caution:*** *The pins on the LED lamp board are not in the center of the board so it is important to make sure that the LED lamp board lines up with the guide marks on the corridor lamp PCB when the pins are inserted.*

### 5.8.9 External Corridor Lamp Inputs

The NICL2 corridor lamp can be used as a passive external LED corridor lamp (not connected to a room bus). It has a 6-pole input/output connector which can accept inputs from an external source (such as an NIRC3 room controller).

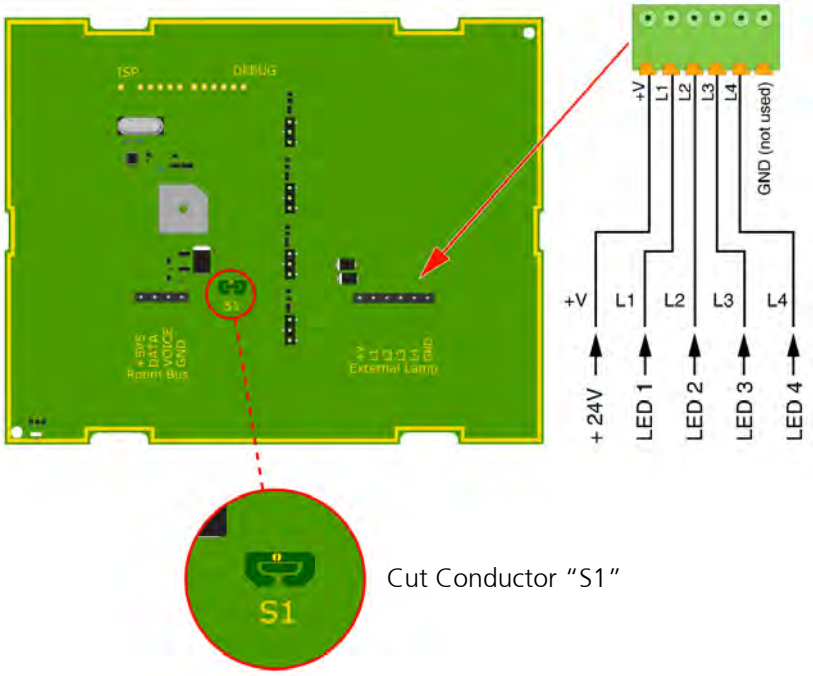



*Figure 64. External LED inputs to the NICL2 - corridor lamp*

**Disabling the Room Bus Section of the NICL2**

When using the external LED inputs of the second generation corridor lamp NICL2 it is necessary to cut the conductor "S1" on the circuit board in order to disable the room bus section of the NICL2.

Cut conductor "S1" using a sharp knife.

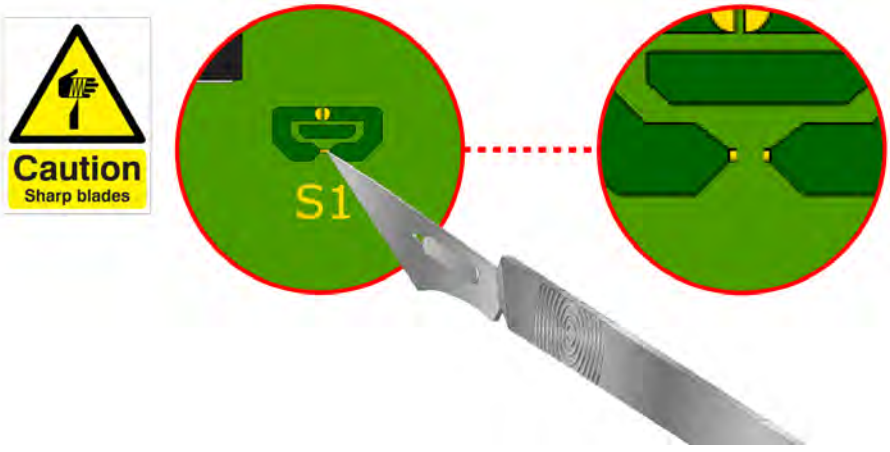



*Figure 65. Cut conductor "S1"*

The external corridor lamp inputs of the NICL2 can now be used.

### Restoring the Room Bus Section on the NICL2

To restore the NICL2 to the default configuration when the conductor "S1" has been cut, put a drop of solder on the gold plated contacts of "S1" using a soldering iron.

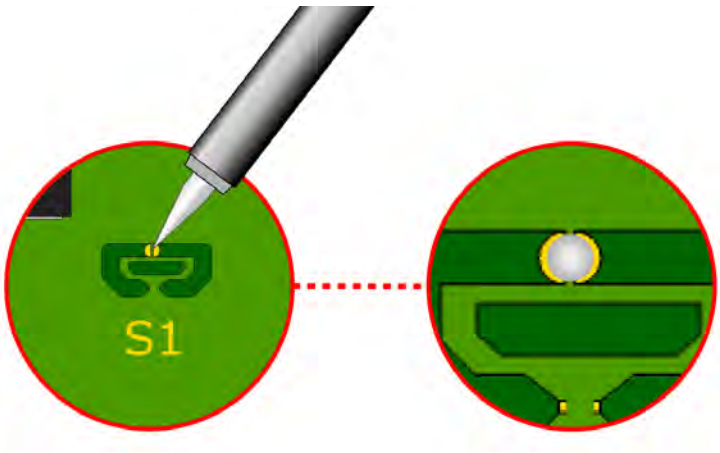



*Figure 66. Restoring to the default NICL2 configuration*

## 5.9 System Manager (NISM2)

The teleCARE IP System Manager (NISM2) is an Ascom ELISE3 application. The ELISE3 module serves as the interface to a 100base-T Ethernet LAN and it contains a Linux based web server.

The NISM2 is the management tool for centrally managing the teleCARE IP system. It is used to setup and maintain the teleCARE IP system and it also includes a staff GUI for creating and maintaining staff assignments.

The NISM2 is connected to the IP network and stores the configurations for each of the teleCARE IP Room Controllers that are connected to the IP network.

In teleCARE IP installations which include NIRD Room Displays but do not include Ascom Messaging, the NISM2 is used as the Interactive Messaging server for the room displays.

A Java based graphical user interface (GUI) is supplied with the NISM2. The setup of the teleCARE IP system is done using a web browser. Any Internet browser that can interpret Java ™ script 1.2 (CSS-2) is acceptable. Microsoft Internet Explorer 7.0 or higher with Sun Java ™ Runtime Environment 1.6 or later is recommended.

The NISM2 has two RS232 COM ports (COM1 and COM2) which can be used for connection of a TAP (or an ESPA) paging system. A license is required for support of a TAP or an ESPA paging system.


*Figure 67. System Manager (NISM2)*

***Note:*** *Refer to the "Installation Guide ELISE3" (TD 92679GB) for ELISE 3 general information and mounting instructions.*

### 5.9.1 NISM2 Electrical Connections

The following illustration shows the appropriate electrical connections for teleCARE IP applications:

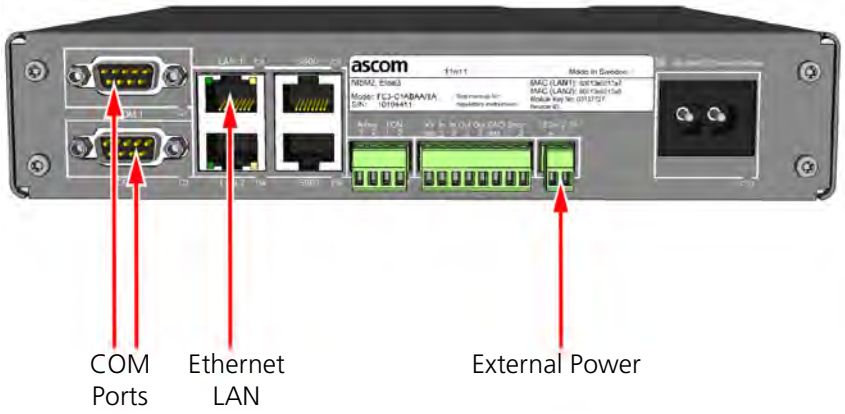



*Figure 68. NISM electrical connections*

***Note:*** *All other connections are not used in teleCARE IP applications.*

### 5.9.2 Ethernet LAN Cable

Connect the Ethernet LAN cable to the "LAN 1" port.

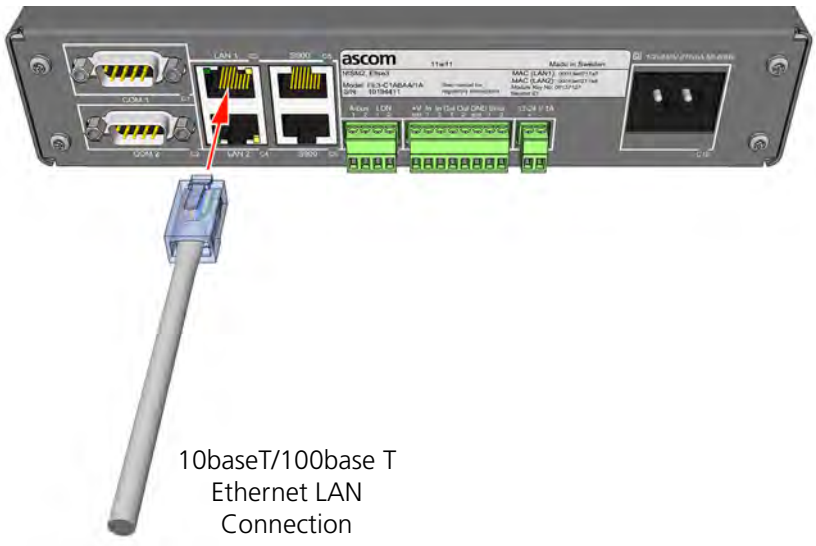



*Figure 69. Connecting the Ethernet LAN cable*

### 5.9.3 NISM2 Power Supply

Connect the 24V power supply to the NISM2 at the "12-24V 1A" connector, as show in the following illustration:

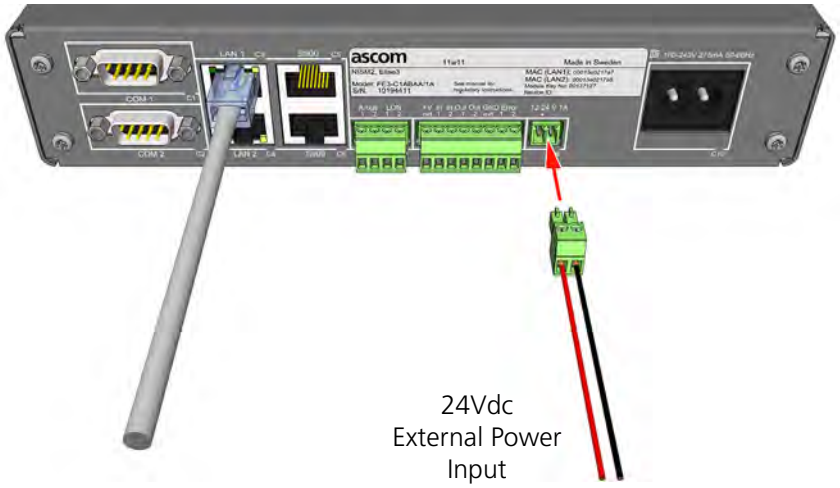



*Figure 70. Connecting the 24Vdc power supply*

***IMPORTANT:*** *For UL 2560 installations, the NISM2 can only be connected to the systems external 24Vdc power supply (see "System Power" on page 10). Do not connect to mains power!*

### 5.9.4 Setting the type of Power Supply in the NISM Advanced Settings

After connecting the external power supply to the NISM select the appropriate type of power supply in the NISM Advanced Configuration of the teleCARE IP System Manager.

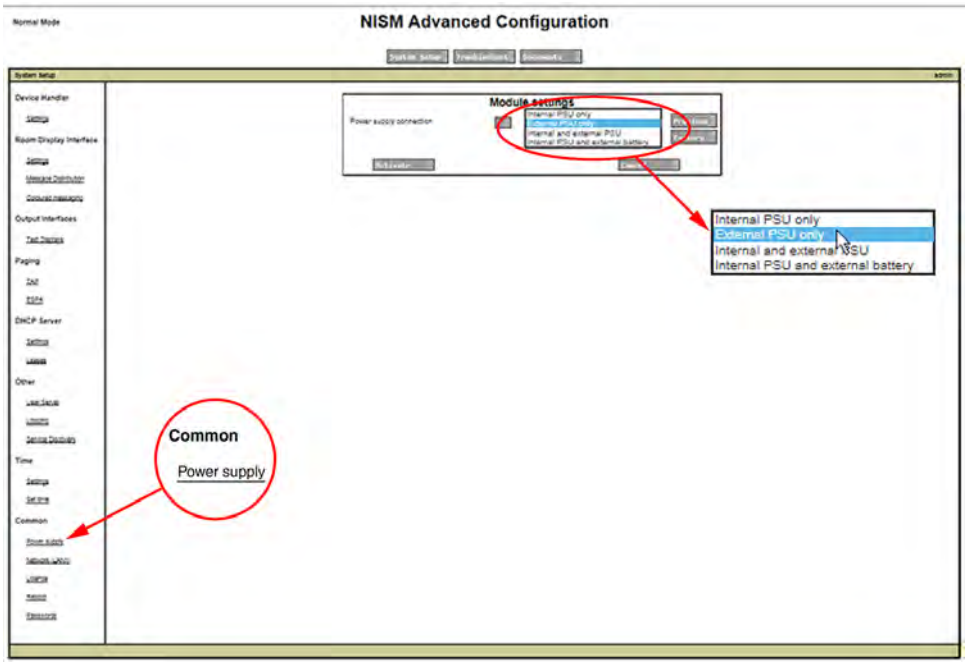



*Figure 71. NISM power supply connection settings*

The "Power supply" setting is located under "Common" on the "Advanced Configuration" page.

There are four options available:

- Internal PSU only
- External PSU only
- Internal and external PSU
- Internal PSU and external battery

***Note:*** *For UL 2560 installations, select "External PSU only".*

When the correct power supply is set in the NISM Advanced Configuration, the power LED on the front of the NISM2 will show a steady blue indication.


*Figure 72. NISM power indicator LED*

If there is a conflict between the NISM setting and the type of power supply then the NISM2 power LED will show a red flashing indication.

### 5.9.5 Connecting a Paging System

Either of the RS232 COM ports (COM1 and COM2) can be used for connection of ESPA or TAP paging systems. A license is required for support of a TAP or an ESPA paging system.

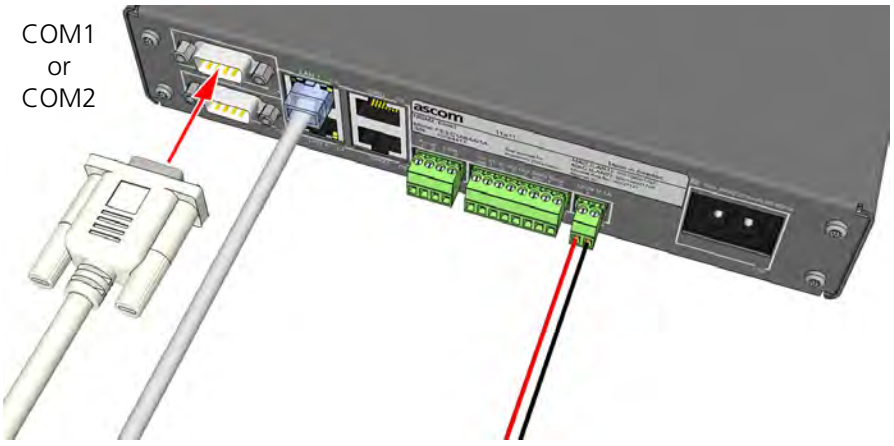



*Figure 73. Connecting a paging system to a COM port*

The type of paging system protocol must be selected in the NISM Advanced Configuration page of the teleCARE IP System Manager. The paging system protocol selection is located under "Paging":

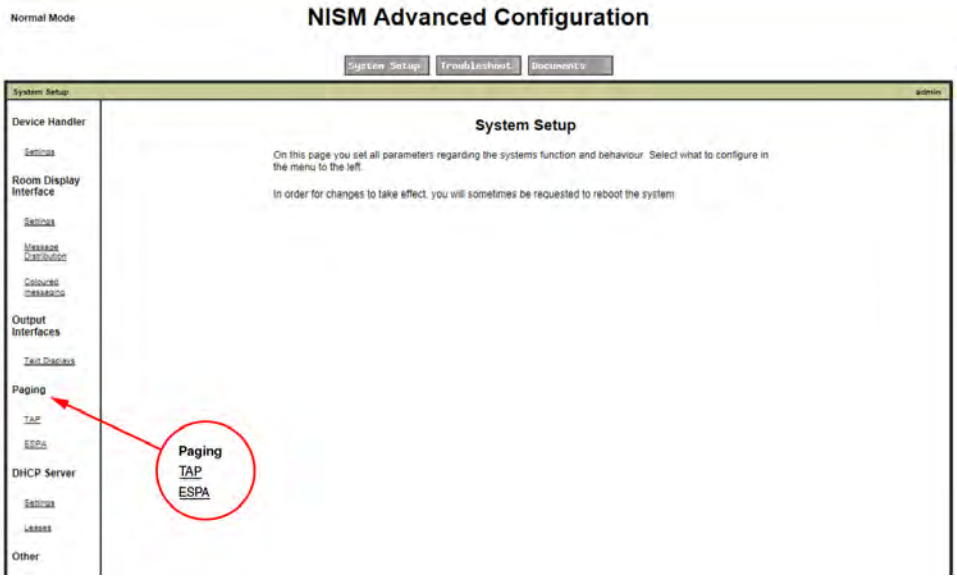



*Figure 74. Paging system selection*

Select the appropriate paging protocol for the system to be connected (TAP or ESPA) to access the settings.

# 6 Peripherals

The switch modules all have the same basic format and can be mounted as a single unit on a single backplate or as a double unit on a double backplate.

The switch modules have one, two or three buttons with LEDs and some switch modules have a buzzer. The functions of the buttons and buzzer are determined by the software when system is configured using the system manager (NISM).

## 6.1 Preparation

It is important to refer to the following teleCARE IP switch module installation instructions for complete electrical connection and assembly details before starting the installation.

Ensure that the electrical power to the equipment is switched off before connecting the switch modules.

The Ingress Protection of the switch modules is IP40, therefore it is important that the area in which the teleCARE equipment is to be installed must be clean, dry and weatherproof.

The walls on which the switch modules are to be installed should be finished (painted, wall papered, etc.) before the switch modules are installed.

It is important to ensure that a minimum of 14in (35cm) of free cable is pulled through at every location where teleCARE IP switch modules are to be installed.

It is important to have the appropriate lengths of stripped cable and exposed copper wire.

## 6.2 Installation Instructions

This section describes the basic installation of the following devices:


- "Bedside Module (NIBM2)" (details on page 68)
- "Medical Rail Socket (NIMS2)" (details on page 72)
- "Door Side Module (NIDM)" (details on page 77)
- "Pull Cord Module - Active (NIPC-W3A)" (details on page 78)
- "Toilet Cancel Module - Active (NITC-XXA)" (details on page 80)
- "Pull Cord Module - Passive (NIPC-XXP)" (details on page 81)
- "Toilet Cancel Module - Passive (NITC-XXP)" (details on page 82)
- "Pull Cord Module (NIPC2) Active and Passive" (details on page 83)
- "Duty Selector (NIDS)" (details on page 94)
- "Card Reader (NICR)" (details on page 97)
- "Speech Module (NISP)" (details on page 101)
- "Room Display (NIRD)" (details on page 103)
- "Television Interface Module" (details on page 110)
- "Sunblind Control Module" (details on page 112)


***Note:*** *In all descriptions that follow, the*  *button represents the Emergency Call function.*

## 6.3 Backplates and Surface Mounting Spacer

The teleCARE IP switch modules are designed to be mounted on flat walls using the teleCARE backplate. The backplate is designed to be mounted over flush fitted back boxes and an array of holes in the backplate allows it to be mounted over various international back boxes.

As an alternative to the backplate a spacer is available for surface mounting the teleCARE switch modules, with or without a back box. The spacer can be mounted directly on to a flat wall surface or alternatively, the holes in the base of the spacer allows it to be mounted over various international back boxes.

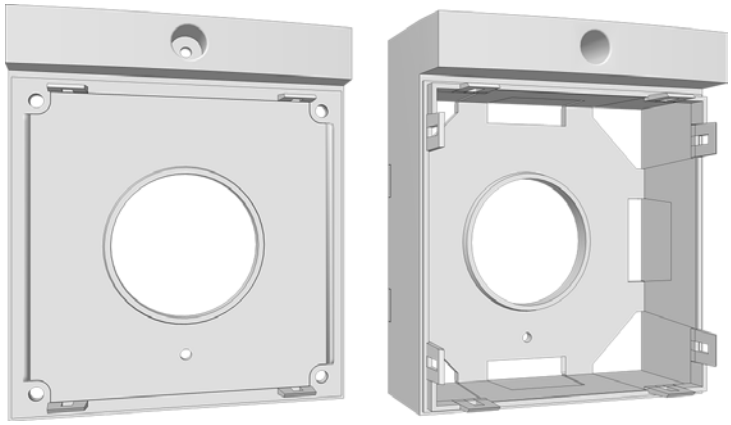


*Figure 67. Backplate and surface mounting spacer*

***Note:*** *The duty selector can only be mounted on a surface mounting spacer, not on a switch module backplate.*

### 6.3.1 Mounting the Backplate on a Back box

To mount the backplate on a back box, first remove the mounting screws from the back box.

**Important:** Use only the plastic back boxes listed in Table 8.

| | |
|---|---|
| **Single** | **Raco 7887RAC or equivalent** |
| **Dual** | **Raco 7488RAC or equivalent** |

*Table 8. Plastic Back Box Manufacturer/Model/Part Number*

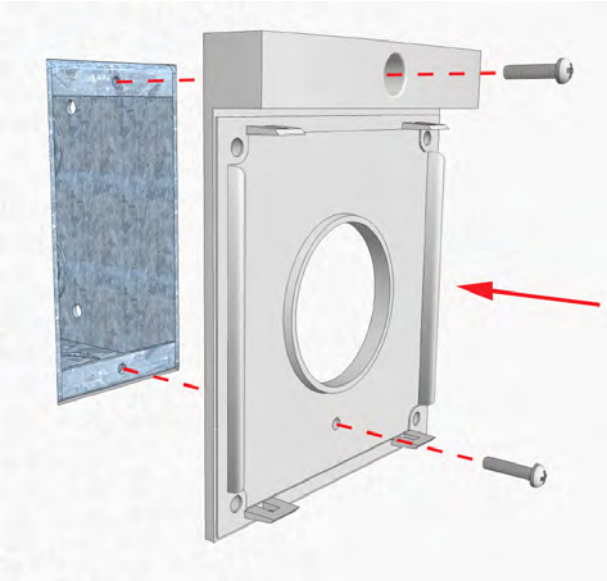


*Figure 68. Mounting the backplate (or spacer) on the back box*

The backplate should be placed over the back box with the side marked "TOP" at the top. Tighten the two screws that will hold the backplate in place.

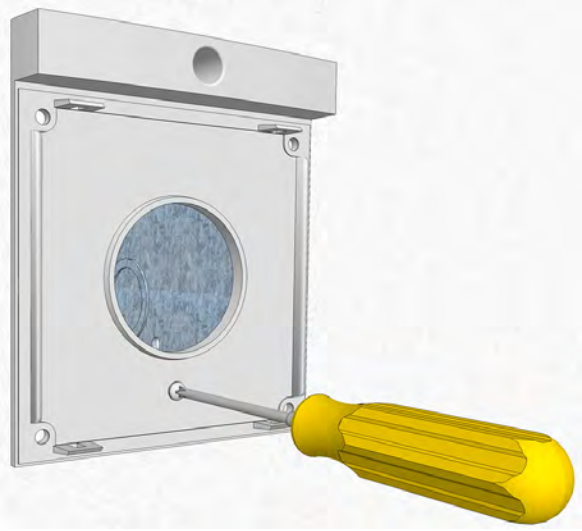


*Figure 69. Securing the backplate (or spacer) to the back box*

### 6.3.2 Surface Mounting Spacer

The surface mounting spacer is available for surface mounting the teleCARE IP switch modules, with or without a back box. The spacer can be mounted directly on to a flat wall surface or on a back box.

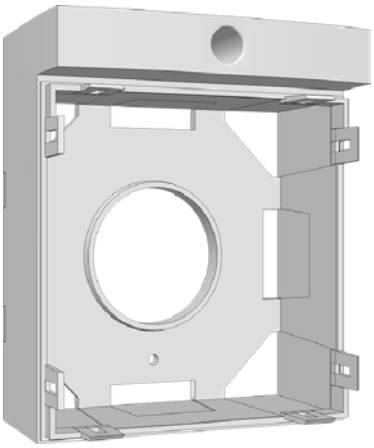


*Figure 70. Surface mounting spacer*

### 6.3.3 Mounting the Spacer on a Back Box

To mount the spacer on a back box, first remove the mounting screws from the back box.

The spacer should be placed over the back box so that the side marked “TOP” will be up. Tighten the two screws that will hold the back box in place.

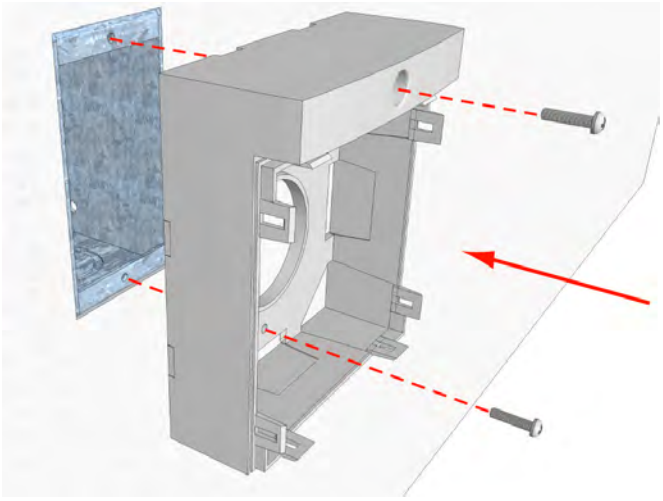


*Figure 71. Mounting the spacer on the back box*

## 6.4 Switch Module Electrical Connections

It is important to ensure that a minimum of 14in (35cm) of free cable is pulled out of the back box at every location where teleCARE peripherals are to be installed.

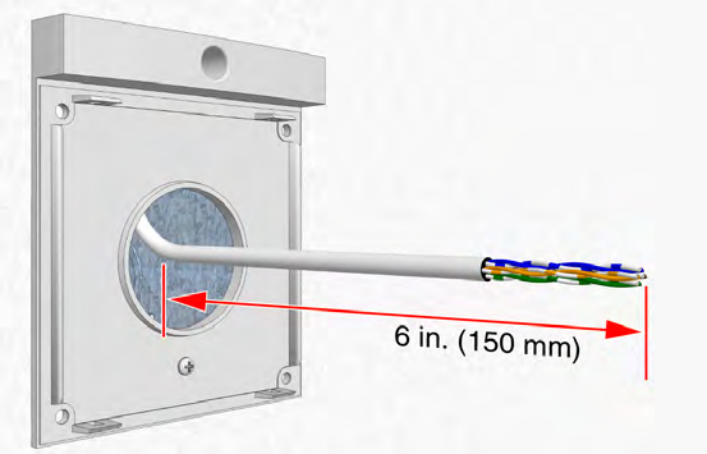



*Figure 72. Connecting the switch module*

Refer to the relevant switch module description in the following sections for details of the electrical connections.

### 6.4.1 4-Pole Connector Terminal

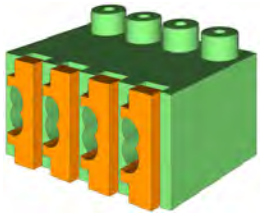


*Figure 73. 4-pole connector terminal*

The 4-pole connector terminals required for the room bus and also for the connection of a passive bus or the bed light switching relays. It has a screw-less "spring-cage" connection technique and each terminal has two connection points.

The 4-pole connector is not supplied with the switch modules but they are available as accessories and must be ordered separately.

The designation of the room bus wires is shown in the following illustration.

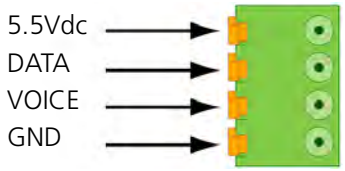



*Figure 74. 4-pole connector terminal with the room bus*

The designation of the passive bus wires is shown in the following illustration.

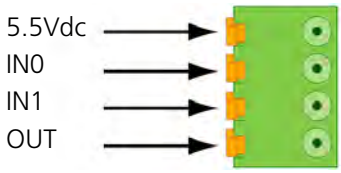



*Figure 75. 4-pole connector terminal with the passive bus*

The designation of the light switching relay connections is shown in the following illustration.

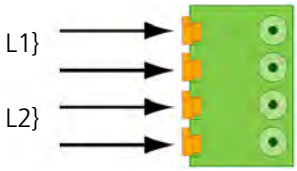



*Figure 76. 4-pole connector terminal for the light relay*

### 6.4.2 Preparing the Wires for the 4-pole Connector Terminal

The 4-pole connector terminal has four terminals with two connection points at each terminal. Each connection point accepts one solid wire of maximum wire size 20 AWG (0.8mm).

To connect the wires first strip the jacket from the cables and pull the wires through the housing leaving a length of 6in (150mm) free, as described in section 5.3, Preparing the Room Bus and Power Cables on page 25. Then strip 0.25in (6.5mm) of the insulation from the end of each wire which is to be connected.

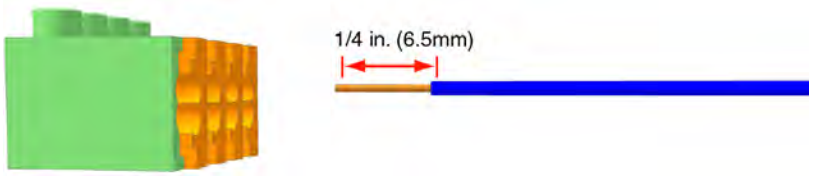



*Figure 77. Stripping the wires for insertion in the connection terminal*

### 6.4.3 Connecting the wire in the 4-pole Connector Terminal

After stripping the wire to expose 0.25in (6.5mm) of conductor, insert the wire in the appropriate opening of the connection point by pressing the wire firmly into the terminal, as illustrated below.

> ***Note:*** *Each connection point in the connector terminal accepts only one wire. Maximum wire size 20 AWG (0.8mm).*

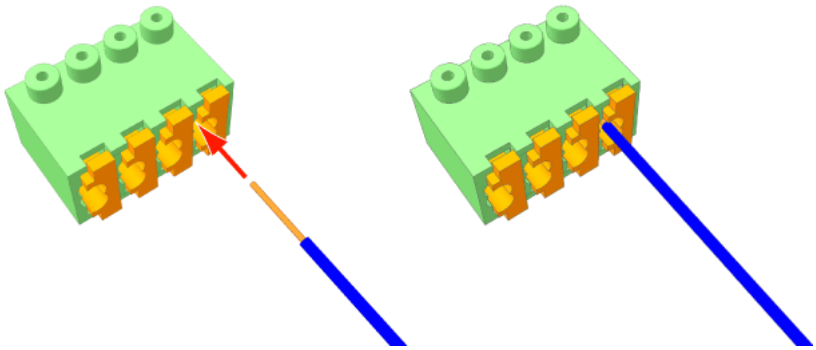


*Figure 78. Inserting a wire in the connection point*

Check that a good connection has been made by gently pulling on the wire after it has been inserted. The wire should stay fixed in the terminal.

Four wires are required for the room bus, passive bus and light relay outputs, so repeat the above illustrated procedure on the remaining three wires.

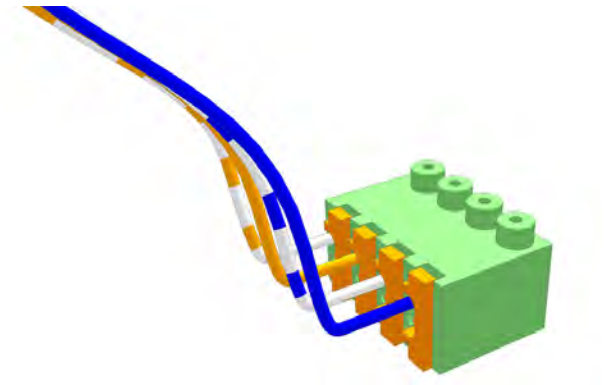


*Figure 79. Connector terminal complete with four wires*

### 6.4.4 4-Pole Connector Terminal with Looped Wiring

In cases where the cable loops from peripheral to peripheral (with incoming and outgoing wiring) one set of wires should be inserted in the top connection points and the other set in the lower connection points, as shown in the following illustration:

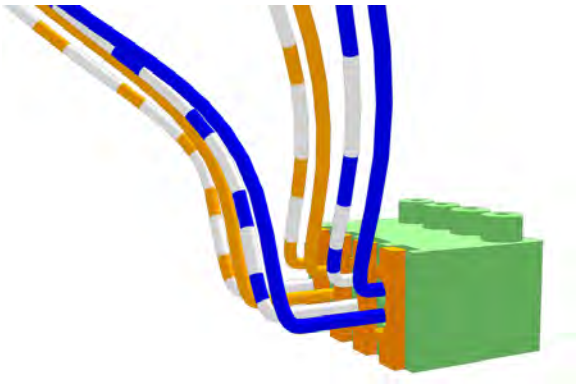


*Figure 80. Connector terminal with looped wiring*

### 6.4.5 Disconnecting a Wire from the Connector Terminal

First carefully place the point of a small screw driver (point approximately 0.10in (2.5mm) wide on the relevant orange colored release key of the connection terminals and press the key in firmly to open the spring-cage connector (1). With the release key pressed in pull the wire from the terminal (2) then remove the screw driver.

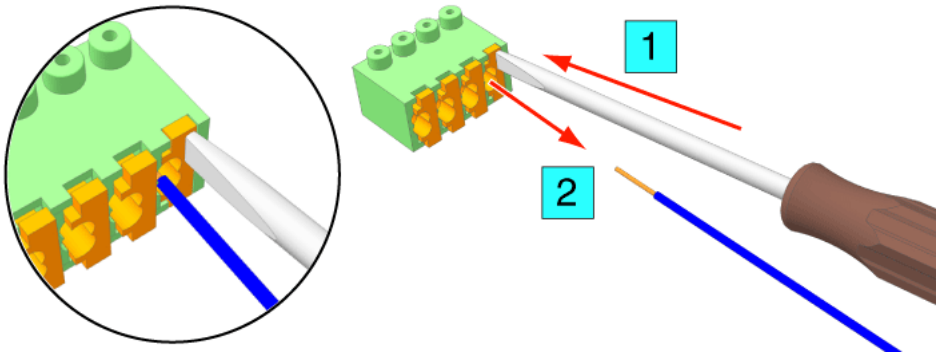



*Figure 81. Removing a wire from a connection point*

### 6.4.6 Mounting the Switch Module to the Backplate

To mount the switch module onto the backplate or spacer, after connecting the switch module place the lower edge of the switch module on the two lower snap fasteners of the backplate (1). Next place the switch module on to the two top fasteners (2) and press the switch module firmly so that it snaps closed on the backplate.

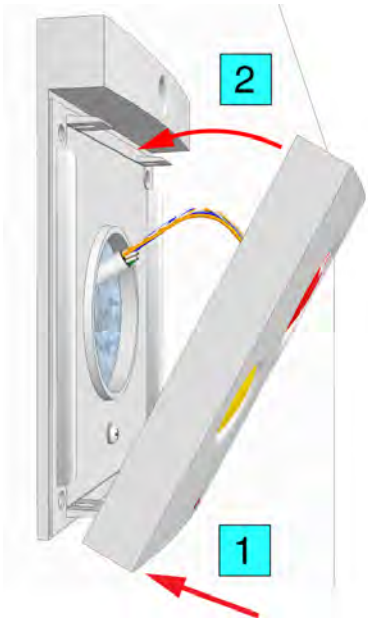



*Figure 82. Mounting the switch module on the back plate*

### 6.4.7 Mounting the Switch Module to the Surface Mounting Spacer

To mount the switch module onto the spacer, place the lower edge of the switch module on the two lower snap fasteners of the spacer (1). Next place the switch module on to the two top fasteners (2) and press the switch module so that it snaps closed on the spacer.

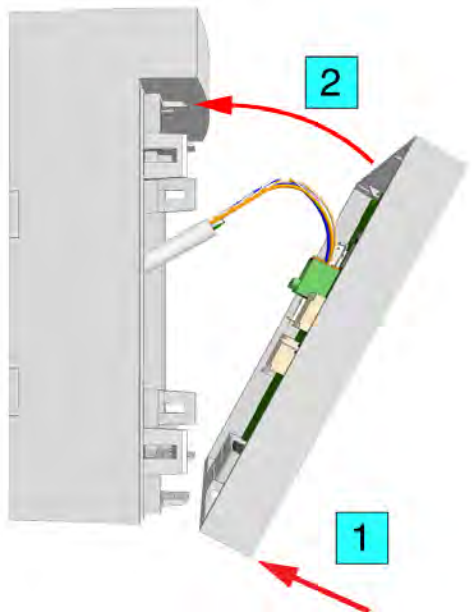



*Figure 83. Mounting the switch module on the spacer*

### 6.4.8 Dismantling the Switch Modules

To separate the switch module from the backplate, a screwdriver with a point of approximately 0.25in (6mm) wide should be used.

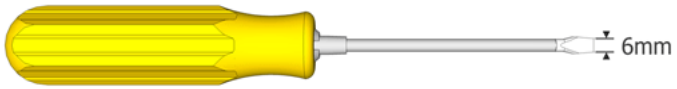



*Figure 84. Suitable screwdriver for dismantling switch modules*

Insert the point of the screwdriver into the groove at the side of the switch module between the faceplate and the back plate at about 0.4in (10mm) down from one of the top corners.

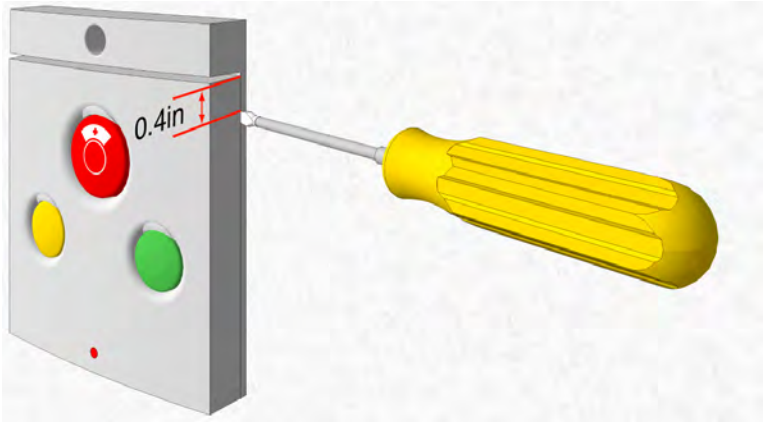



*Figure 85. Inserting the screwdriver*

Gently push and turn the screwdriver until the switch module releases from the back plate.

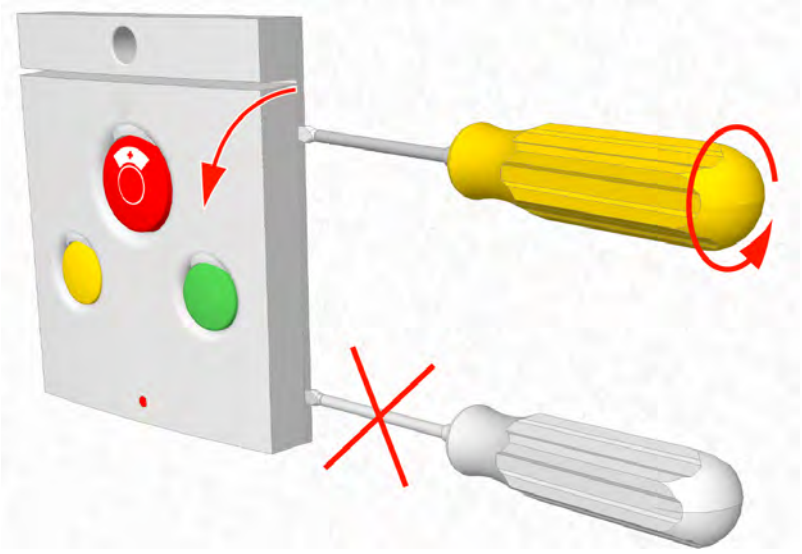


*Figure 86. Removing the switch module from the back plate*

***Note:*** *Do not insert the screwdriver into the bottom corner of the faceplate.*

### 6.4.9 Dismantling a Switch Module from a Spacer

Insert the point of the screwdriver into the groove at the side of the switch module between the faceplate and the spacer at about 0.40in (10mm) down from one of the top corners.

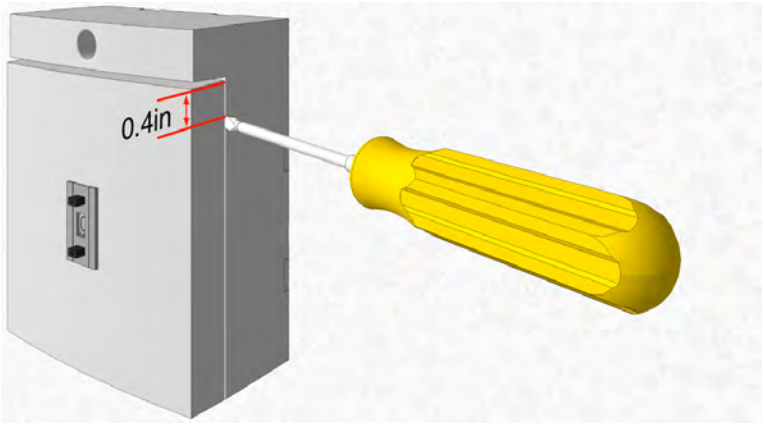



*Figure 87. Inserting the screwdriver*

Gently push and turn the screwdriver until the switch module releases from the spacer.

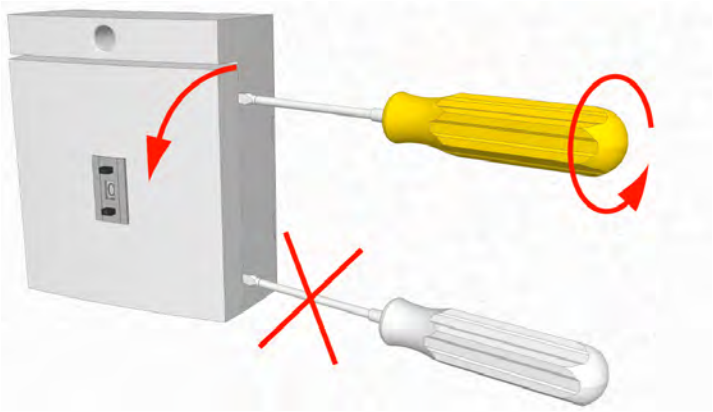


*Figure 88. Removing the switch module from the backplate*

***Caution:*** *Do not insert the screwdriver into the bottom corner of the faceplate.*

### 6.4.10 Dip Switch Settings

Each room bus provides eight addresses for the connection of teleCARE IP switch modules. The lower four of these addresses are set by a DIP switch that is located on the PCB of the certain switch module. The upper four addresses cannot be set as they are dedicated to certain switch modules which have the appropriate address permanently set in the switch module.

The image below shows the location of the DIP switch which is in the same place on all active switch modules.

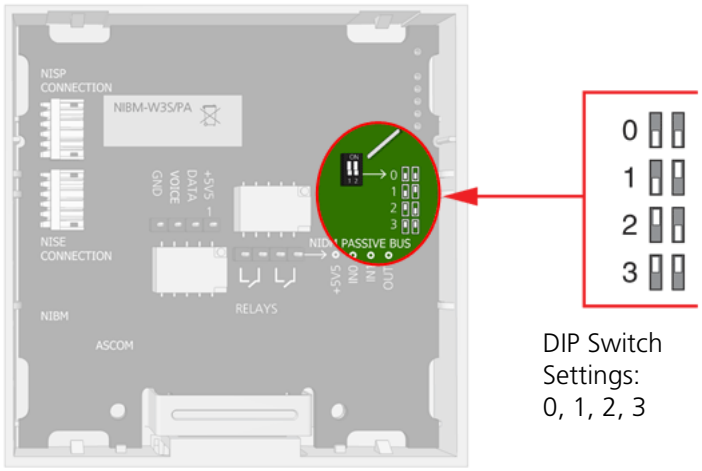



*Figure 89. Active switch module DIP switch location*

The the DIP switch allows 4 addresses to be set: 0, 1, 2 and 3. These settings are only used for active switch modules and active socket modules.

Address 4 is used for the toilet cancel module and this module has the address fixed and it is not set by a DIP switch.

The addresses 5 to 7 are used for special teleCARE IP peripherals consisting of the corridor lamp, duty selector, card reader and room display. These module have the address fixed and it is not set by a DIP switch.

The room bus address assignments are summarized in the following table:

| Room Bus Address | Active Peripheral | Address Setting |
|---|---|---|
| 0 - 3 | Door side Modules<br>Bedside Modules<br>Pull Cord Modules<br>Medical Rail Socket | Set by DIP switch |
| 4 | Toilet Cancel Module | Fixed |
| 5 | Slave Corridor Lamp<br>Duty Selector | Fixed |
| 6 | Card reader | Fixed |
| 6 + 7 | Room Display | Fixed |

## 6.5 Bedside Module (NIBM2)

The Bedside Module (NIBM2) is designed for use in the teleCARE IP system. It is suitable for use with all teleCARE IP handsets and it supports teleCARE IP speech and entertainment.

The NIBM2 has a Safe Release connection socket for the handset and it is available with three or one button. The NIBM2-G3S and NIBM2-W3S have three function buttons: red, green and yellow. The NIBM2-W1S and NIBM2-G1S have one red button.


*Figure 90. Bedside module NIBM2: front and back view*

In addition to the a 4-pole connector for the room bus, the NIBM2 has connectors for the following inputs and outputs:

- Control outputs for 2 light switching relays
- Stereo TV audio input from the television interface module
- External call input with a reassurance LED output
- NISP speech module

### 6.5.1 NIBM2 Electrical Connections and DIP Switch Settings

The Bedside Module (NIBM2) is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector. The room bus connector includes the 5.5Vdc power supply for the NIBM2.

Each room bus offers individual addresses for up to four switch modules. The address is selected using the DIP switch on the switch module printed circuit board.

The NIBM2 requires a single switch module back-plate. Alternatively, a spacer with installation kit is available for surface mounting. A double backplate is required when the NIBM2 is combined with a speech module.

For details of the backplates and surface mounting spacer see 6.3, Backplates and Surface Mounting Spacer on page 57.

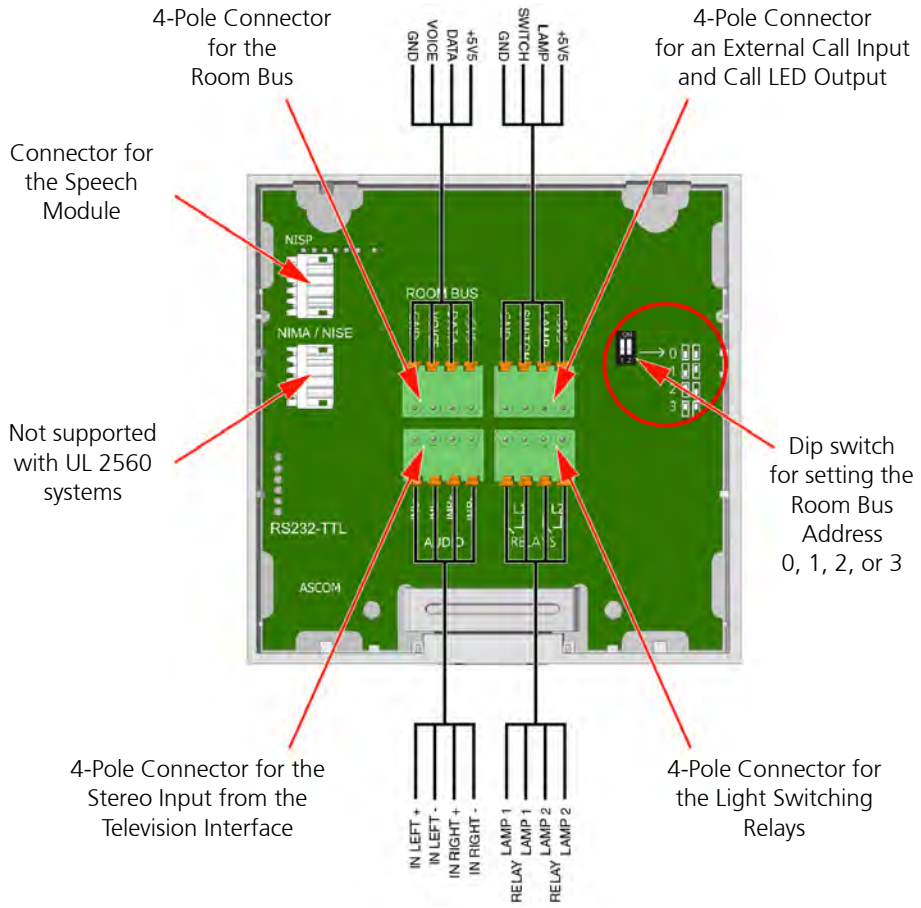



*Figure 91. Bedside module NIMB2 electrical connections and address setting*

The address is selected using the DIP switch on the switch module printed circuit board. For details of the DIP switch settings see 6.4.10, Dip Switch Settings on page 67.

For details of the 4-Pole connector see 6.4.1, 4-Pole Connector Terminal on page 60.

For light switching relay details see 6.5.2, Light Switching Relay Maximum Load and Surge Damping Diode on page 70.

For details of connecting a speech module see 6.15.1, Connecting the Speech Module on page 101.

For details of connecting the external call see 6.5.3, External Call Contact with Call Lamp Output on page 71.

> ***Note:*** *The 4-pole connector terminals required for the room bus and other inputs and outputs are not supplied with the switch module. They are available as accessories and must be ordered separately.*

### 6.5.2 Light Switching Relay Maximum Load and Surge Damping Diode

The teleCARE switch module NIBM2 with a socket and bed light control include 2 light switching circuits. Each circuit is suitable for switching a bi-stable 24Vdc relay. The maximum switching current for each relay must not exceed 0.3A at maximum 30Vdc.

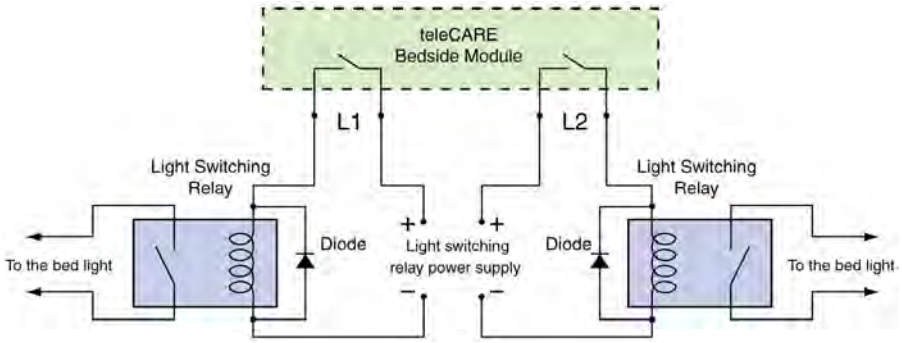



*Figure 92. Light switching relay with surge damping diode*

**WARNING:**

- The equipment that is connected to this interface is not considered to be part of the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- Do not connect the bed light circuitry directly to the L1 and L2 switch contacts on the NIBM2.
- The Light Switching Power Supply and Relay must be UL listed or recognized components.
- The maximum switching current for the L1 and L2 contacts on the L1 and L2 contacts on the NIBM2 must not exceed 0.3A at 30Vdc.
- A diode (1N4004 or equivalent) must be connected across the coil of the bed light switching relay to prevent surges caused by the relay coil.

### 6.5.3 External Call Contact with Call Lamp Output

The external call connection allows an external normally open third-party contact to activate a teleCARE call in parallel to the red button of the bedside module.

The 4-pole connector provides SWITCH and GND terminals for connection to a normally open contact of an external switching device. These terminals provide 5.5Vdc at 0.6mA, for monitoring the external device contact.

The 4-pole connector also provides a +5.5V output and an open collector driver on the Lamp terminal. Together, the +5.5V and Lamp terminals provide power and switching for an external LED lamp. The external LED lamp will be switched on when the contact on the external switching device connected to the SWITCH and GND terminals closes.

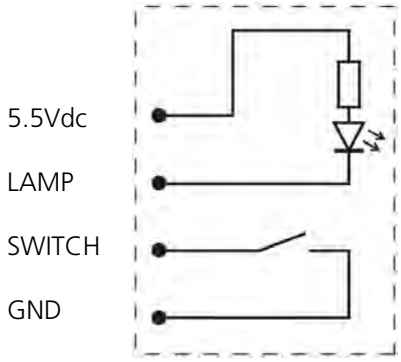



*Figure 93. External Call Contact with Call LED*

**WARNING:**

- The equipment that is connected to this interface is not considered to be part of the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- The SWITCH and LAMP circuits are not electrically isolated.
- The cable length for the SWITCH circuit must not exceed 33ft (10m) and the cable must be appropriately separated from power cables and sources of electromagnetic interference.
- The LAMP circuit is power limited to 5.5Vdc at 50mA.
- The SWITCH circuit is power limited to 5.5Vdc at 50mA.

## 6.6 Medical Rail Socket (NIMS2)

The Medical Rail Socket (NIMS2) is a teleCARE IP peripheral. The NIMS2 is designed to be flush mounted by two screws in an opening in a medical rail.

The NIMS2 supports teleCARE IP speech and stereo TV audio input from the television interface module.


*Figure 94. Medical Rail Module NIMS2 (top, front, bottom)*

The NIMS2 is connected to the teleCARE IP room bus by a 4-pin connector. The room bus connector includes the 5.5Vdc power supply for the NIMS2.

The medical rail socket is functionally compatible with the teleCARE IP bedside module. It includes the teleCARE Safe Release Socket.

The medical rail socket is supplied with two self-tapping screws which are used to mount the socket in the medical rail.

In addition to the a 4-pole connector for the room bus, the NIBM2 has connectors for the following inputs and outputs:

- Control outputs for 2 light switching relays
- Stereo TV audio input from the television interface module
- External call input with a reassurance LED output
- NISP speech module

### 6.6.1 NIMS2 Electrical Connections and DIP Switch Settings

The medical rail socket (NIMS2) is an "active peripheral" which must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector. The room bus connector includes the 5.5Vdc power supply for the NIMS2.

Each room bus offers individual addresses for up to four switch modules. The address is selected using the DIP switch on the switch module printed circuit board. Details of the DIP switch settings are given in 6.4.10, Dip Switch Settings on page 67.

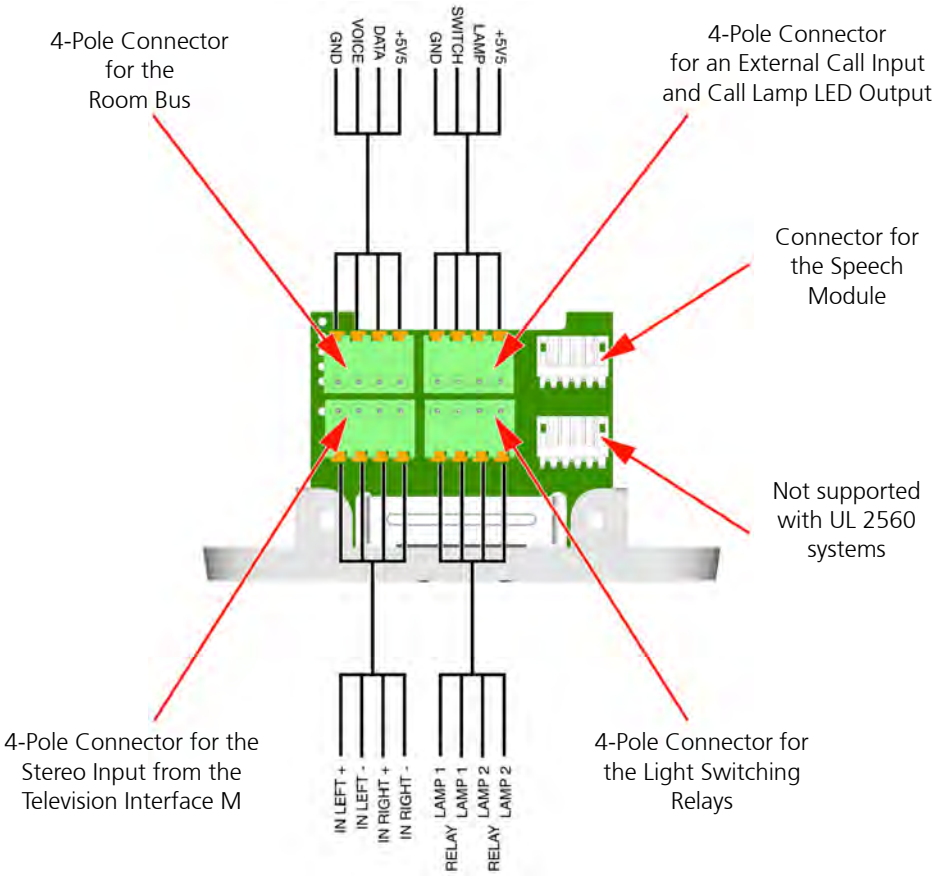



*Figure 95. Medical Rail Socket NIMS2 electrical connections and address setting*

For details of the 4-Pole connector see 6.4.1, 4-Pole Connector Terminal on page 60.

For light switching relay details see 6.5.2, Light Switching Relay Maximum Load and Surge Damping Diode on page 70.

For details of connecting a speech module see 6.15.1, Connecting the Speech Module on page 101.

For details of connecting the external call see 6.5.3, External Call Contact with Call Lamp Output on page 71.

> ***Note:*** *The 4-pole connector terminals required for the room bus and other inputs and outputs are not supplied with the switch module. They are available as accessories and must be ordered separately.*

### 6.6.2 NIMS2 Room Bus Address Setting

The room bus address of the medical rail socket is selected using the DIP switch on the top side of the printed circuit board. For details of the DIP switch settings see 6.4.10, Dip Switch Settings on page 67.

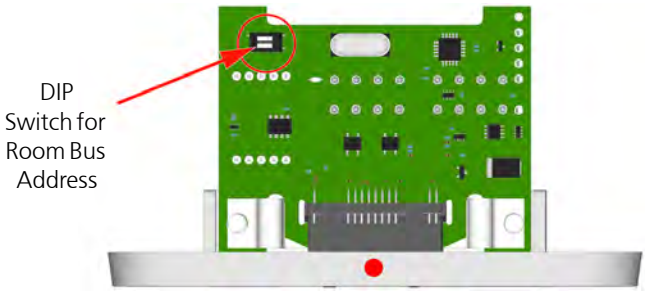



*Figure 96. NIMS2 DIP switch*

### 6.6.3 Light Switching Relay Maximum Load and Surge Damping Diode

The medical rail socket NIMS2 includes 2 light switching circuits with normally open (N/O) contacts. The contacts are potential free and galvanically isolated. Each circuit is suitable for switching a bi-stable 24 volt DC external relay. The maximum switching current for each relay must not exceed 0.3A at maximum 30Vdc.

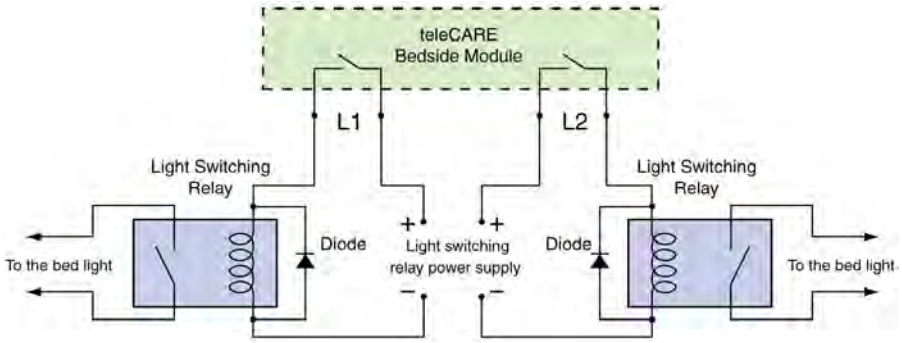



*Figure 97. Light switching relay with surge damping diode*

**WARNING:**

- The equipment that is connected to this interface is not considered to be part pf the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- Do not connect the bed light circuitry directly to the L1 and L2 switch contacts on the NIMS2.
- The Light Switching Power Supply and Relay must be UL recognized components.
- The maximum switching current for the L1 and L2 contact on the NIMS2 must not exceed 0.3A at 30Vdc.
- A diode (1N4004 or equivalent) must be connected across the coil of the bed light switching relay to prevent surges caused by the relay coil.

### 6.6.4 External Call Contact with Call LED Output

The external call connection allows an external normally open third-party contact to activate a teleCARE call in parallel to the red button of the bedside module.

The 4-pole connector provides SWITCH and GND terminals for connection to a normally open contact of an external switching device. These terminals provide 5.5Vdc at 0.6mA, for monitoring the external device contact.

The 4-pole connector also provides a +5.5V output and an open collector driver on the Lamp terminal. Together, the +5.5V and Lamp terminals provide power and switching for an external LED lamp. The external LED lamp will be switched on when the contact on the external switching device connected to the SWITCH and GND terminals closes.

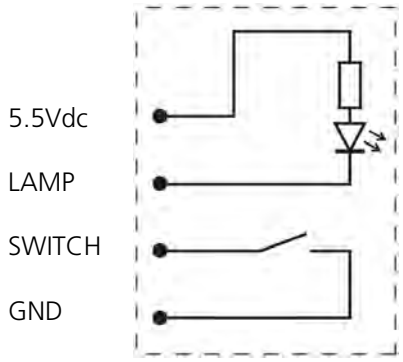



*Figure 98. External Call Contact with Call LED*

**WARNING:**

- The equipment that is connected to this interface is not considered to be part pf the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- The SWITCH and LAMP circuits are not electrically isolated.
- The cable length for the SWITCH circuit must not exceed 33ft (10m) and the cable must be appropriately separated from power cables and sources of electromagnetic interference.
- The LAMP circuit is power limited to 5.5Vdc at 50mA.
- The SWITCH circuit is power limited to 5.5Vdc at 50mA.

### 6.6.5 Mounting the Medical Rail Socket

The following illustration shows how the medical rail socket is mounted in the underside of a medical rail.

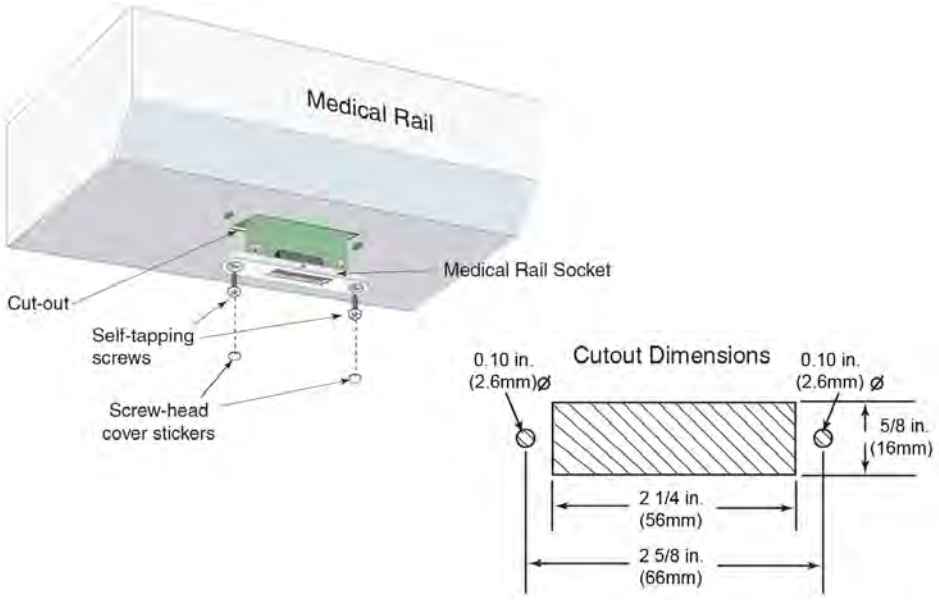



*Figure 99. Medical rail socket mounting and cut-out dimensions*

## 6.7 Door Side Module (NIDM)

The Door Side Module (NIDM) is a three-button switch module which is connected to the teleCARE IP room bus. It has a buzzer which can be used to signal calls, a 4-pole connector for the room bus, a 4-pole connector for a passive bus and connector for speech module.

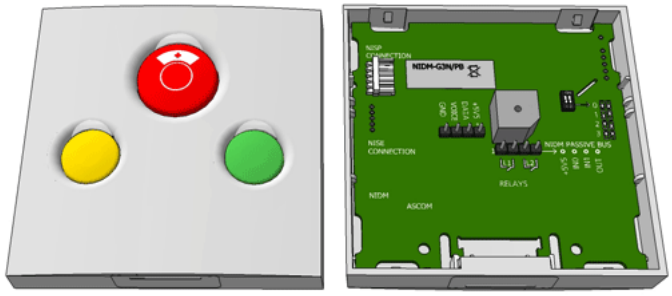


*Figure 100. Door-Side module: front and back view*

### 6.7.1 Door Side Module Electrical Connections and DIP Switch Settings

The Door Side (NIDM) Module is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 6.4.1, 4-Pole Connector Terminal on page 60).

Each room bus offers individual addresses for up to four switch modules. The address is selected using the DIP switch on the switch module printed circuit board. The door side module also has another 4-pole connector for a "passive bus" which is used to connect a passive pull cord switch module and a passive cancel switch module.

***Note:*** *Only one passive pull cord switch module can be connected per passive bus.*

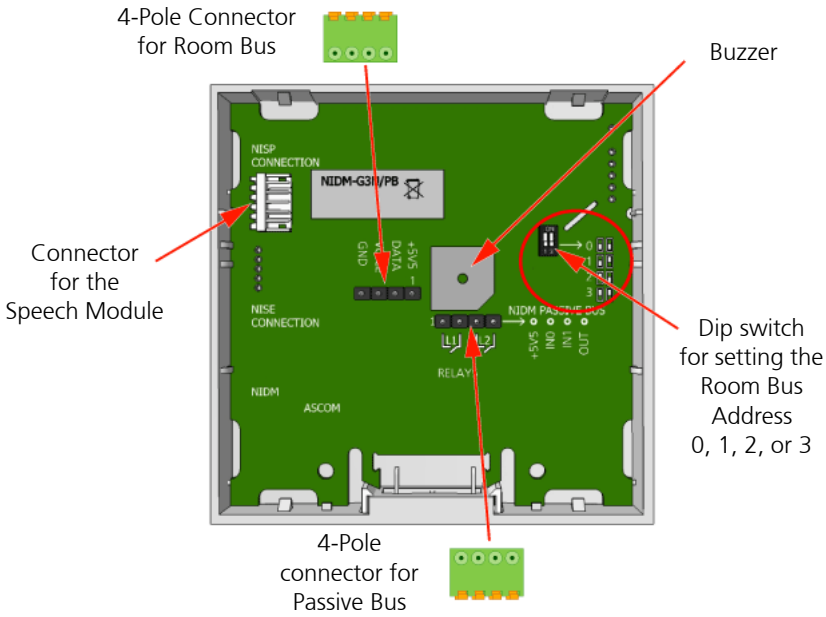



*Figure 101. Door Side module electrical connections and address setting*

The NIDM has a 5-pin connector for connecting a speech module. Refer to 6.15.1, Connecting the Speech Module on page 101 for details of the speech module.

***Note:*** *The 4-pole connector terminals required for the room bus and the passive bus connections module must be ordered separately.*

## 6.8 Pull Cord Module - Active (NIPC-W3A)

The Pull Cord Module (NIPC) is intended for use in the teleCARE IP system, in areas such as bathrooms and toilets. It is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller.

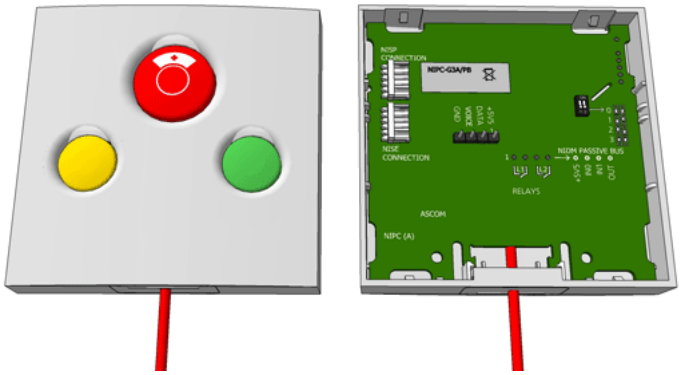



*Figure 102. Pull cord module (active)*

The NIPC has a 4-pin connector for the room bus, a 5-pin connector for the speech module and a 5-pin connector for future use.

Each room bus offers individual addresses for up to four switch modules. The address is selected using the DIP switch on the switch module printed circuit board.

The NIPC has a 2 meter long pull cord for call activation with two safety break plastic balls, and it is available with three function buttons: red, green and yellow.

**Important:** At least one active NIPC module must be permanently located in the bathroom of each resident apartment.

***Note:*** *The 4-pole connector terminal required for the room bus is not supplied with the switch module. It is available as an accessory and must be ordered separately.*

The NIPC requires a single backplate which must be ordered separately. The backplate enables this switch module to be mounted over different types of back-boxes. Alternatively, a spacer with installation kit is available for surface mounting the switch module.

### 6.8.1 Pull Cord Module (Active) Electrical Connections and DIP Switch Settings

This pull cord module is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 6.4.1, 4-Pole Connector Terminal on page 60).

Each room bus offers individual addresses for up to four switch modules. The address is selected using the DIP switch on the switch module printed circuit board.

For details of connecting a speech module refer to 6.15.1, Connecting the Speech Module on page 101

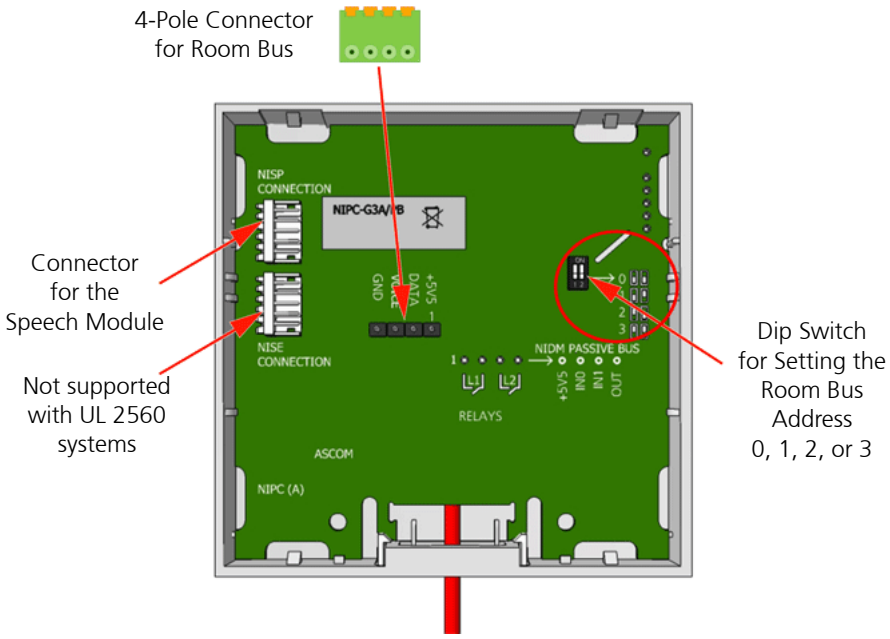



*Figure 103. Pull cord module electrical connections and address setting*

***Note:*** *The 4-pole connector terminals required for the room bus connections is not supplied with the switch module. It is available as accessories and must be ordered separately.*

### 6.8.2 Assembling and Attaching the Pull Cord

It is important to assemble and attach the pull cord to the pull switch module correctly to ensure the cord is securely attached and that the "safety break" mechanism works reliably. The following illustrations show how to attach the pull cord:

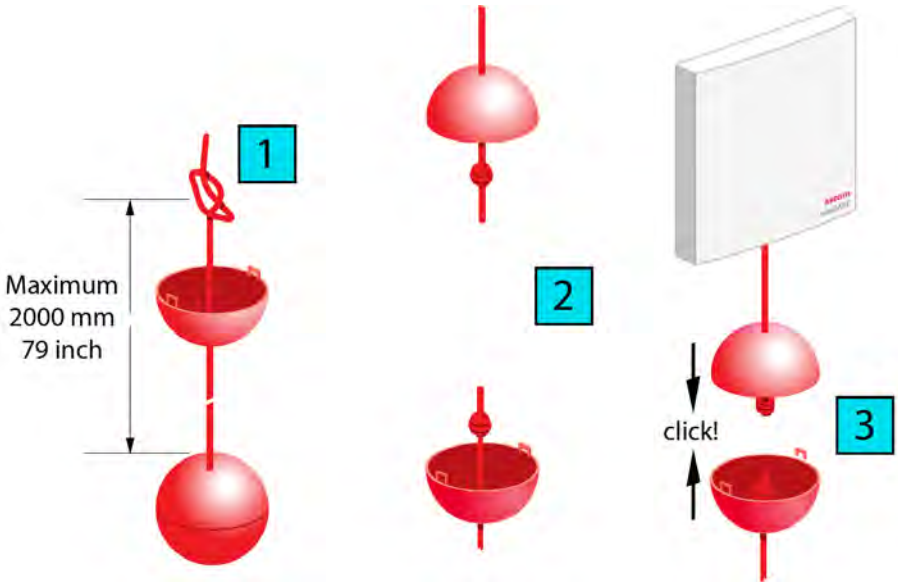



*Figure 104. Assembling and attaching the pull cord*

## 6.9 Toilet Cancel Module - Active (NITC-XXA)

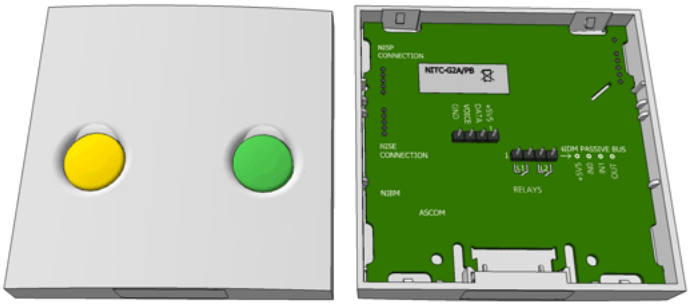


*Figure 105. Toilet cancel module (active)*

The Toilet Cancel Module is designed for use in the teleCARE IP system. It is a wall mounted single switch module used to cancel toilet calls made by linked toilet call devices.

Each room bus offers individual addresses for up to four switch modules. The address is of the active toilet cancel module is fixed at number 4 and cannot be changed.

The toilet cancel module requires a single backplate which must be ordered separately. The backplate enables this switch module to be mounted over different types of back-boxes. Alternatively, a spacer with installation kit is available for surface mounting.

### 6.9.1 Toilet Cancel Module (Active) Electrical Connections

The toilet cancel module is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 6.4.1, 4-Pole Connector Terminal on page 60).

The toilet cancel module also has a 4-pole connector for the passive bus to which a passive pull-cord call module can be connected (see 6.10.1, Pull Cord Module (Passive) Electrical Connections on page 81).

***Note:*** *Only one passive pull cord switch module can be connected per passive bus.*

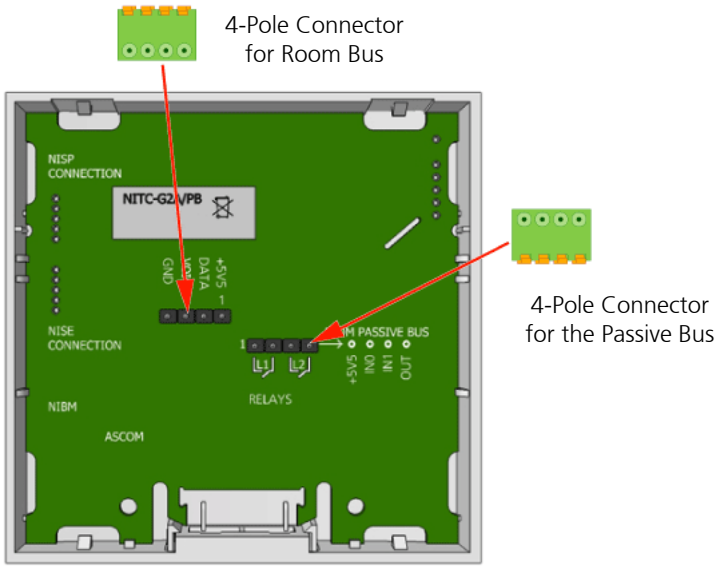



*Figure 106. Toilet cancel module electrical connections*

***Note:*** *The 4-pole connector terminals required for the room bus and the passive bus must be ordered separately as accessories.*

## 6.10 Pull Cord Module - Passive (NIPC-XXP)

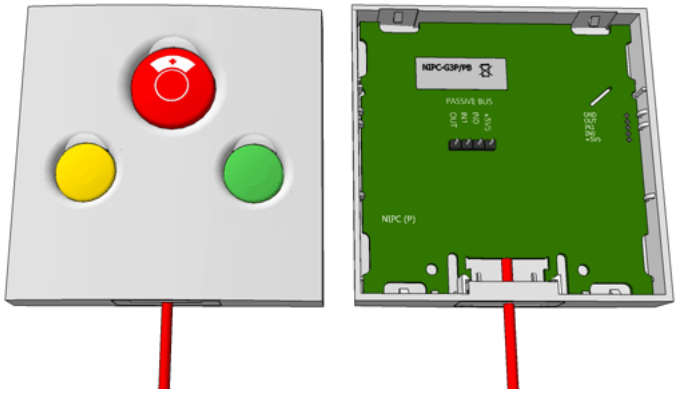


*Figure 107. Passive pull cord module 3 buttons*

The Passive Pull Cord Module is intended for use in the teleCARE IP system, in areas such as bath-rooms and toilets. It must be connected to the passive bus of a door side module or active pull cord cancel module. When connected to the door side module, it can be combined with the passive toilet cancel module on the same passive bus. The passive bus consists of four wires (see 6.4.1, 4-Pole Connector Terminal on page 60).

***Note:*** *Only one Passive Pull Cord Module can be connected per passive bus.*

For assembly and attaching instructions for the pull cord refer to 6.8.2, Assembling and Attaching the Pull Cord on page 79.

The Passive Pull Cord Module requires a single backplate which must be ordered separately. The backplate enables this switch module to be mounted over different types of back boxes. Alternatively, a spacer with installation kit is available for surface mounting.

### 6.10.1 Pull Cord Module (Passive) Electrical Connections

The passive pull cord module is a “passive peripheral” therefore it must be connected to the passive bus of the linked door side module or active pull cord module by the 4-pole passive bus connector (see 6.4.1, 4-Pole Connector Terminal on page 60).

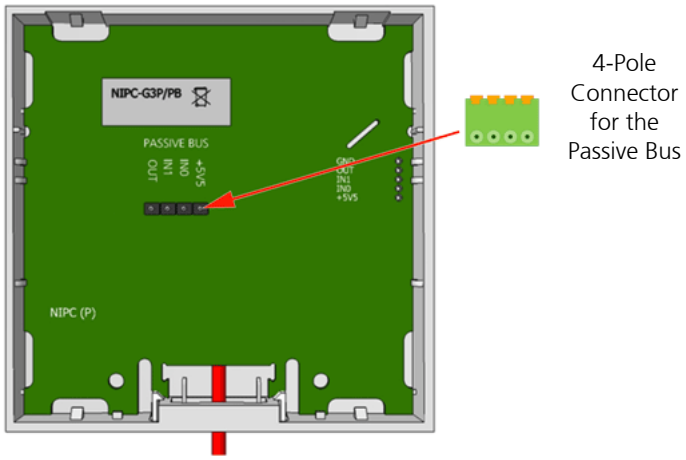



*Figure 108. Passive pull cord module electrical connections*

## 6.11 Toilet Cancel Module - Passive (NITC-XXP)

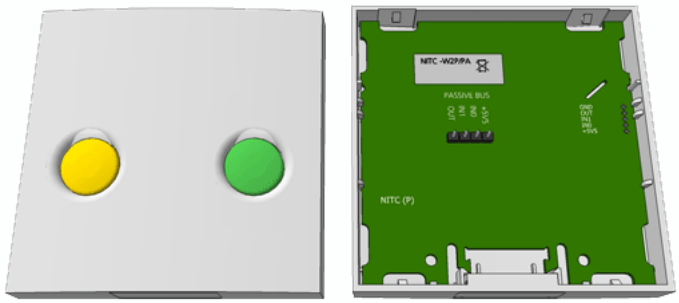


*Figure 109. Passive toilet cancel module*

The Passive Toilet Cancel Module is intended for use in the teleCARE IP system, in areas such as bathrooms and toilets. It must be connected to the passive bus of a door side module or a room display module.

> ***IMPORTANT:*** *Together with the passive toilet cancel module a passive pull cord module which contains the line break detection circuitry must be installed. The passive pull cord module must be connected at the end of the passive bus.*

The Passive Toilet Cancel Module requires a single backplate which must be ordered separately. The backplate enables this switch module to be mounted over different types of back boxes. Alternatively, a spacer with installation kit is available for surface mounting the switch module.

### 6.11.1 Passive Toilet Cancel Module (Passive) Electrical Connections

This toilet cancel module is a "passive peripheral" therefore it must be connected to the passive bus of the linked door side module by the 4-pole passive bus connector (see 6.4.1, 4-Pole Connector Terminal

on page 60).

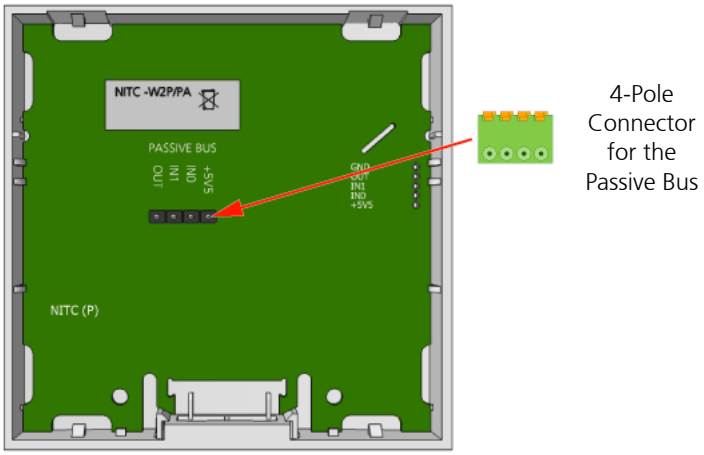



*Figure 110. Passive toilet cancel module electrical connections*

***Note:*** *The 4-pole connector terminal for the passive bus is not supplied with the switch module. It is available as an accessory and must be ordered separately.*

## 6.12 Pull Cord Module (NIPC2) Active and Passive

The NIPC2 Pull Cord Modules are designed for use in the teleCARE IP system. They are IP44 splash proof and therefore suitable for use in rooms with showers, baths and in similar wet areas. They are available as an “active” module and a “passive” module.

The NIPC2 has a pull cord of length 79 in. (2 m) with two plastic balls. The top ball acts as a safety break by splitting in half when the cord is pulled with excessive force.

*Figure 111. NIPC2 Pull cord module (exploded/assembled)*

The active version of the NIPC2 is connected to one of the room buses of the IP Room Controller. It has a 4-pin connector for the connection of the room bus, consisting of: 5.5Vdc, data, voice and ground (0V). The room bus address is set by DIP switches.

The passive version must be connected to the passive bus of a door side module, a room display or a toilet cancel module. It has a 4-pin connector for the connection of the passive bus, consisting of: 5.5Vdc, Aux-In0, Aux-In1 and Aux-out.

***Note:*** *The 4-pole connector terminal required for the room bus is not supplied with the switch module. It is available as an accessory and must be ordered separately.*

The NIPC2 Pull Cord Module includes a special backplate with two urethane foam gaskets which makes the NIPC2 splash water resistant to IP44 standard. The backplate must be mounted on a flat wall surface using the four corner holes in the backplate.

The module is fixed on to the backplate by two latches and two screws through the cover plate. The screws are supplied with the module.

**WARNING:** The NIPC2 can only be mounted on the supplied IP44 backplate. It is not compatible with the standard teleCARE switch module backplate and it is not compatible with the teleCARE surface mounting spacer.

### 6.12.1 Mounting the NIPC2 Pull Cord Module

In order to avoid physical damage to the module and to reduce the risk of exposure to excessive spray water in shower rooms, bathrooms and similar wet areas, the NIPC2 should be installed with the pull cord module mounted above the height of any water source.

The NIPC2 should be mounted in a location which ensures that the pull cord hangs free of any obstructions, is clearly seen and within easy reach so that it can be pulled to activate a call by residents or staff in an emergency or when assistance is required.

The NIPC2 should be mounted at a minimum height of 90.5in (2300mm) above the floor and at least 8in (200mm) above the highest position of the shower head. Where possible the pull cord should extend down to approximately 9in (200mm) above the floor.

The following illustration shows some examples of suitable locations for the pull cord module.

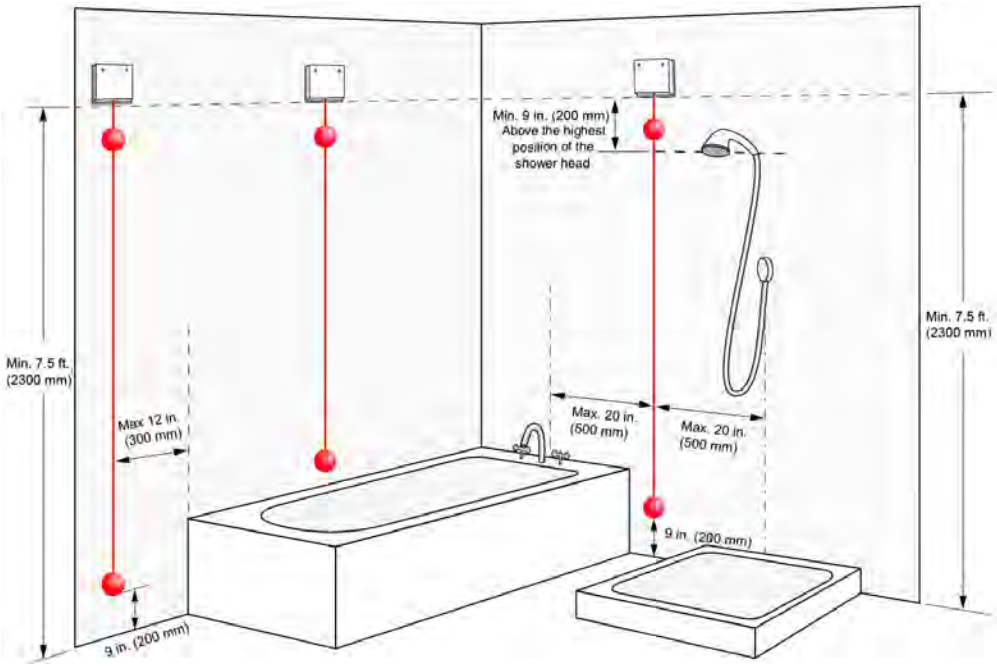



*Figure 112. Examples of suitable locations for mounting the NIPC2*

### 6.12.2 Positioning the Back box for the Pull Cord Module

The NIPC2 pull cord module must be mounted on a smooth flat surface in order to ensure that it is splash water proof in accordance with IP44. The ideal surface is a ceramic tiled wall with the back box for the NIPC2 situated in the center of a tile so that the pull cord module backplate does not sit over a gap between tiles, as shown in the following illustration:

*Figure 113. Positioning the back box on a tiled wall*

### 6.12.3 NIPC2 Back plate

The NIPC2 back plate has a urethane foam gasket on both sides to prevent water entering the pull cord module. With the NIPC2 switch module mounted correctly on the back plate the switch module conforms to the ingress protection rating of IP44.


*Figure 114. NIPC2 backplate*

### 6.12.4 Mounting the NIPC2 Backplate

The backplate of the NIPC2 must be mounted over the back box using the holes in the corners of the backplate in order to ensure that the NIPC2 is IP44 splash water proof.

### 6.12.5 Drilling the Backplate Mounting Holes

Four suitably sized holes should be drilled around the back box at 3in (77mm) between the centers (1). A wall plug which will accept a screw of diameter 0.14in (3.5mm) to 0.15in (3.8mm) should be inserted in each hole (2).

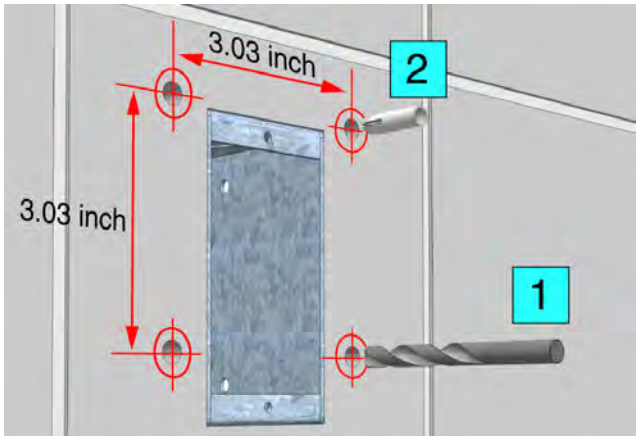
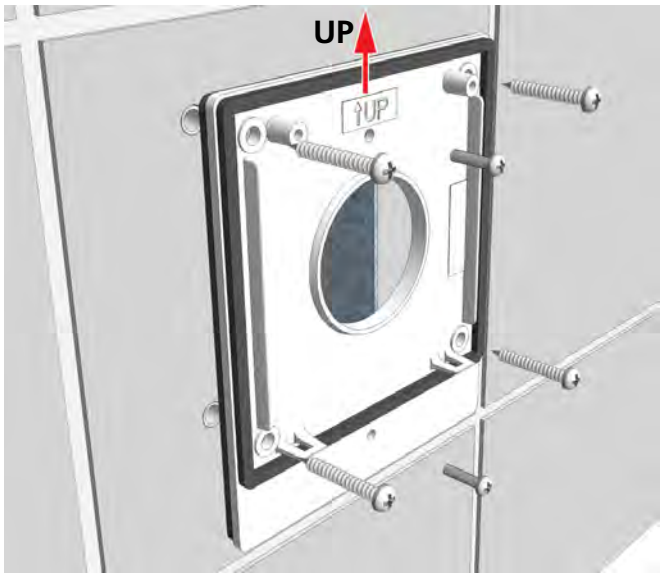



*Figure 115. Drilling the backplate mounting holes*

***Note:*** *The type and length of the screw depends on the type of wall and the wall plugs. The diameter of the screw must not exceed 0.15in (3.8mm).*

### 6.12.6 Mounting the Backplate on the Wall

The backplate should be placed over the back box, with the four holes in the corners of the backplate lining up holes in the wall and with the side marked "UP" at the top.




**NOTE:**
The screws inside the back box must not be used to mount the backplate. Four holes must be drilled in the wall surface and fitted with suitable wall plugs to allow the backplate to be mounted using the four corner holes.

*Figure 116. Fixing the backplate to the wall*

The four screws should be tightened carefully so that just enough pressure is applied on the gasket to compress it evenly all around between the backplate and the wall surface.

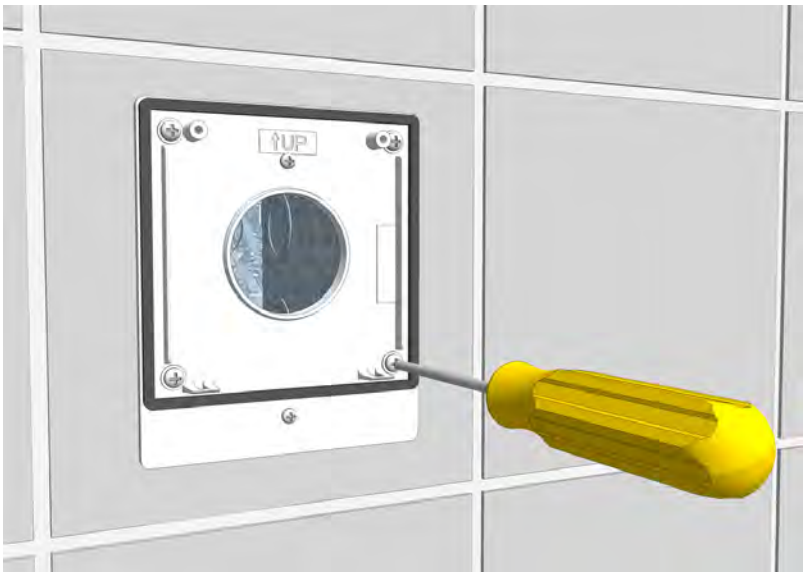



*Figure 117. Fixing the backplate to the wall*

***Caution:*** *Do not excessively tighten the fixing screws as this will distort the backplate and the foam gasket resulting in an ineffective waterproof seal.*

### 6.12.7 Preparing the Cable for the Pull Cord Module

After fixing the backplate to the back box, pull the cable through. It is important to ensure that a minimum of 6in (15cm) of free cable is pulled out of the back box where teleCARE pull cord switch module is to be installed.

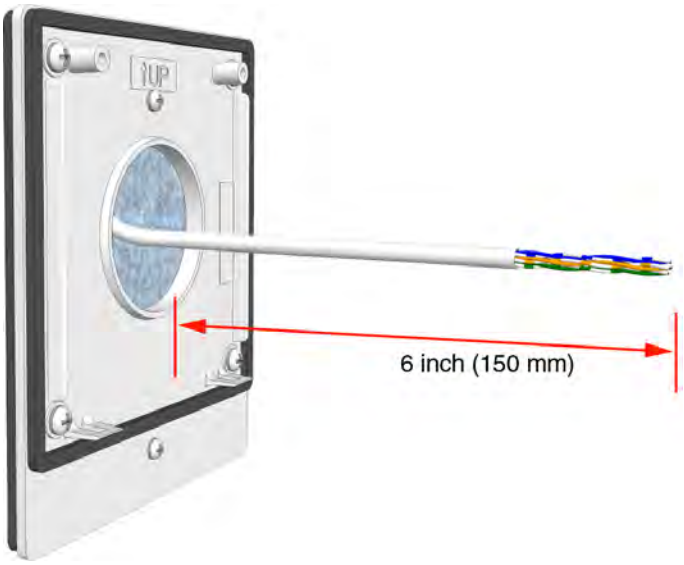



*Figure 118. Preparing the cable for the pull cord module*

### 6.12.8 Room Bus Electrical Connections

The NIPC2 WAA is an active teleCARE IP peripheral which must be connected to the 4-pin room bus connector on the switch module.

Refer to section 6.4.2, Preparing the Wires for the 4-pole Connector Terminal on page 61). in order to correctly strip the cable and prepare the wires for the 4-pole connector.

The connections of the room bus wires in the 4-pole connector are shown in the following illustration.

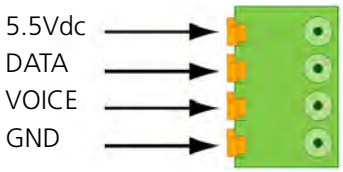



*Figure 119. 4-pole connector terminal with the room bus*

### 6.12.9 Room Bus Address DIP Switch Settings

The NIPC2 uses one of the first four addresses (0, 1, 2 and 3) of the room bus. The address is set by a DIP switch.

The illustration below shows the location of the room bus connector and the location of the DIP switch with the address settings.

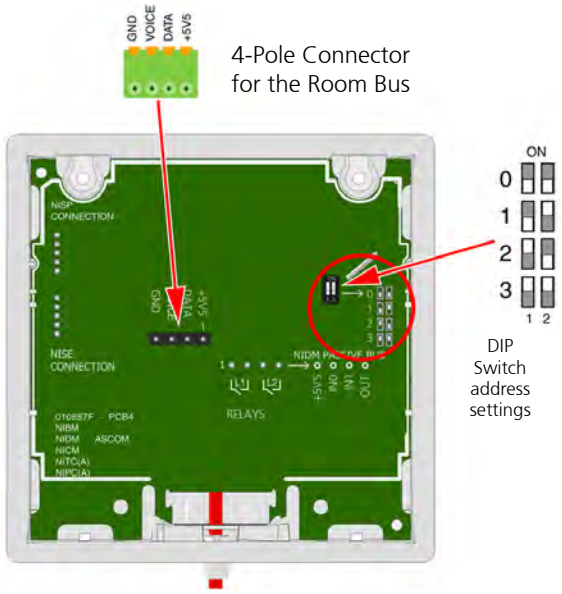



*Figure 120. Room bus connector and DIP switch location*

### 6.12.10 Passive Pull Cord Module Electrical Connections

The NIPC2 WAP is a passive teleCARE IP peripheral which must be connected to the passive bus of a door side module or a toilet cancel module.

Refer to section 6.4.2, Preparing the Wires for the 4-pole Connector Terminal on page 61). in order to correctly strip the cable and prepare the wires for the 4-pole connector.

The connections of the passive bus wires is shown in the following illustration.

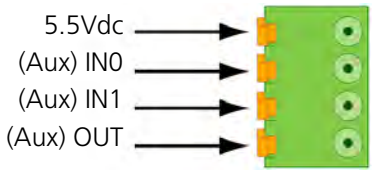



*Figure 121. 4-pole connector terminal with the passive bus*

The illustration below shows the location of the passive bus connector:

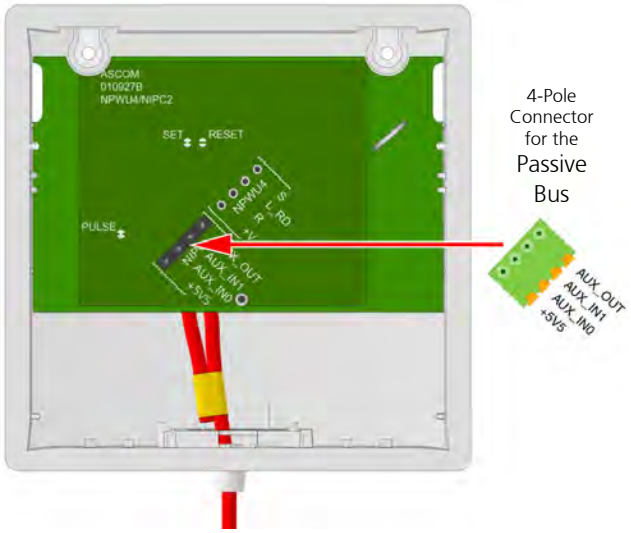



*Figure 122. Passive bus connector location*

### 6.12.11 Mounting the NIPC2 Pull Cord Module to the Backplate

The method described for mounting the switch module to the backplate is basically the same for the active and the passive pull cord switch modules. The following illustration shows the back plate mounted on the back box with the cable pulled through and connected to the 4-pole connection terminal.

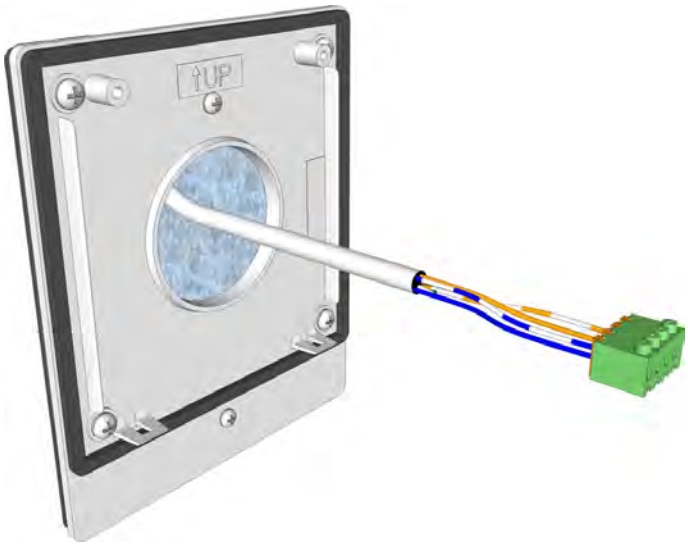



*Figure 123. Cable of the pull cord module with the 4-pole connector*

Plug in the connection terminal to the appropriate 4-pin connector of the pull cord module (active = room bus connector, passive = passive bus connector).

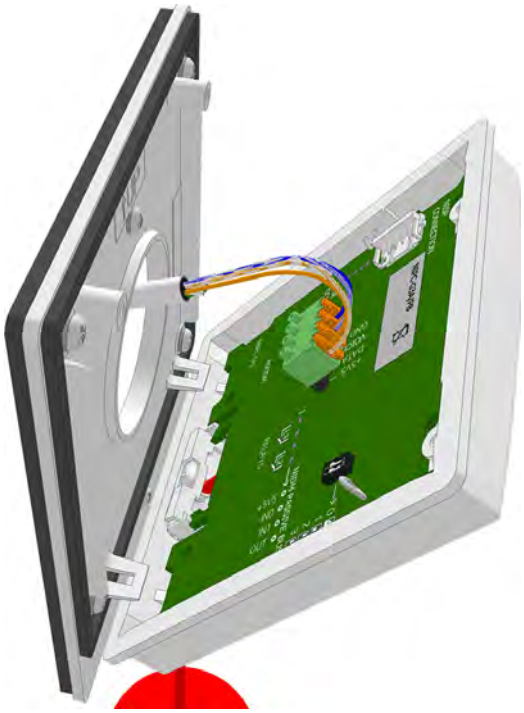


*Figure 124. Connecting the room bus to the switch module*

Mount the switch module on the backplate by first position the two latch fasteners of the backplate over the two teeth on the inside of the lower edge of the cover plate (1). Next rotate the pull cord module up to the backplate (2) so that the screws line up with the fixing posts on the back plate.

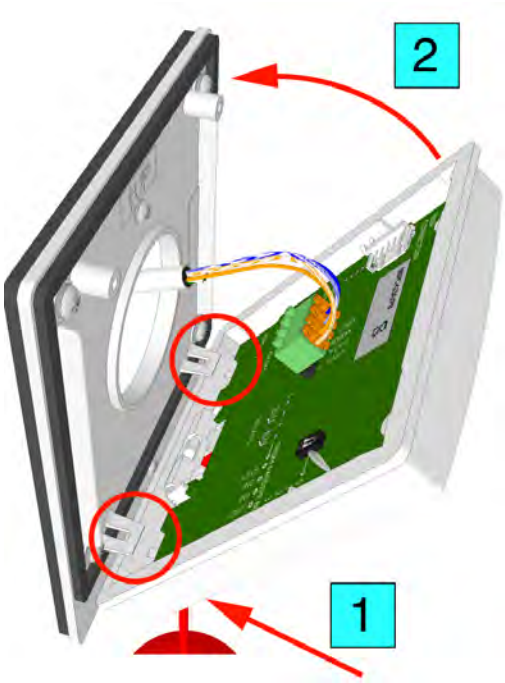



*Figure 125. Mounting the switch module on the backplate*

Press the pull cord module on to the backplate (making sure that the latch fasteners stay engaged) and carefully tighten the two fixing screws. The screws should be tightened to apply just enough pressure on the gasket to compress it evenly all around between the cover plate and the backplate.

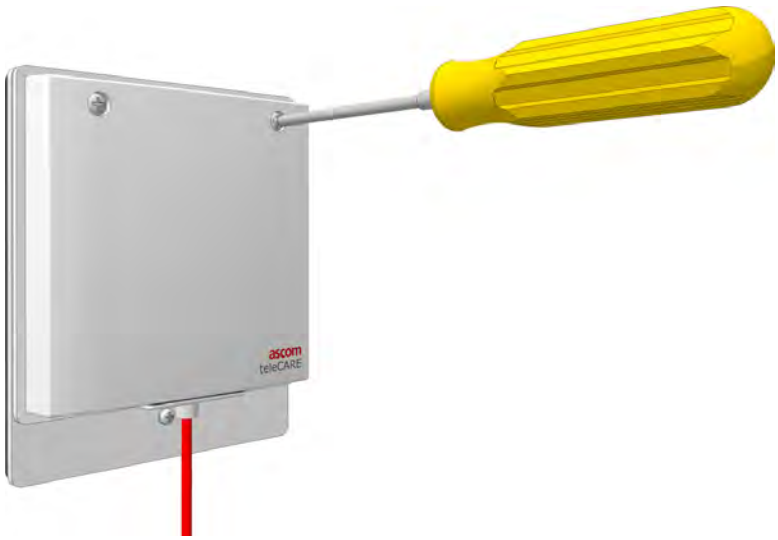



*Figure 126. Tightening the pull cord fixing screws*

***Caution:*** *Do not excessively tighten the fixing screws as this will distort the cover plate and the foam gasket resulting in an ineffective waterproof seal.*

### 6.12.12 Assembling and Attaching the Pull Cord

It is important to assemble and attach the pull cord to the pull switch module correctly to ensure the cord is securely attached and that the "safety break" mechanism works reliably. The following illustrations show how to prepare the pull cord:

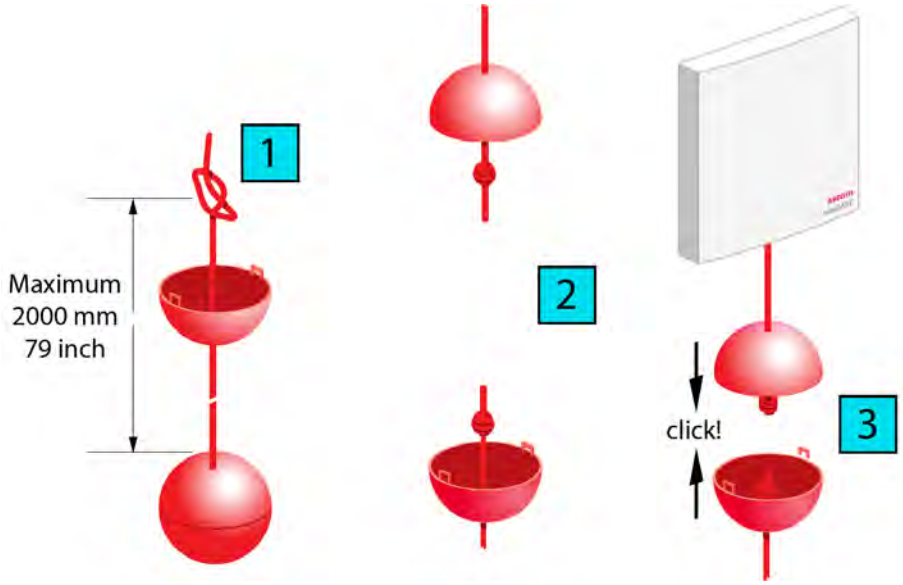



*Figure 127. Assembling and attaching the pull cord*

## 6.13 Duty Selector (NIDS)

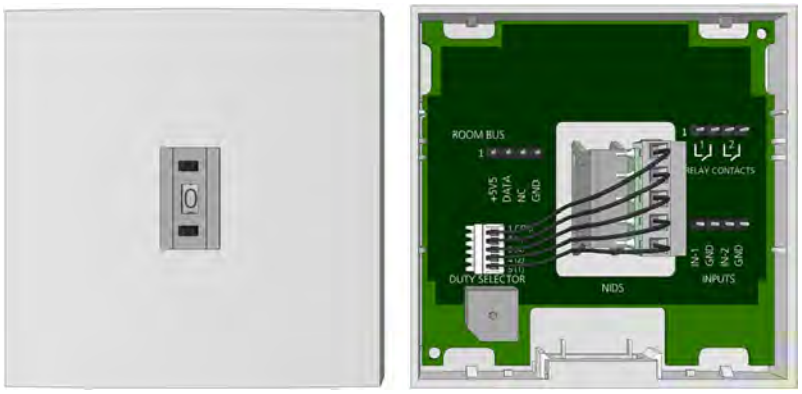



*Figure 128. Duty Selector front and back view*

**Important:** An NIDS module must be permanently located adjacent to the primary NIRD annunciator.

The Duty Selector is an auxiliary peripheral which can be connected to any one of the four room buses from the room controller. It has a fixed address number 5 on the room bus which cannot be changed.

It has the same basic housing as the teleCARE IP switch modules but it must be mounted on a surface mounting spacer which is delivered with the Duty Selector (see 6.3.2, Surface Mounting Spacer on page 59 for details).

The Duty Selector decides the call forwarding groups and response sequences according to the duty configurations which have been configured in the system setup.

It has a push-button selector switch allowing up to 10 pre-programmed duties to be selected. The numbers from 0 to 9 are displayed in the window at center of the unit to indicate the selected duty.

The Duty Selector includes a buzzer which can be configured in the system setup to signal calls etc. when a specific selection on the duty selector.

It also has two inputs and two galvanically isolated outputs via relays. The two input circuits and the two output circuits are available as interfaces to external devices. These inputs and outputs can be controlled over the LAN via the room controller.

> ***Note:*** *To be compliant with clause 49.2 of UL 2560, a NIDS module must be installed in a supervisory location. This allows for an auditory indication of alarms.*

### 6.13.1 Duty Selector Electrical Connections

The duty selector is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector. It has the fixed room bus address of 5 and this address cannot be changed.

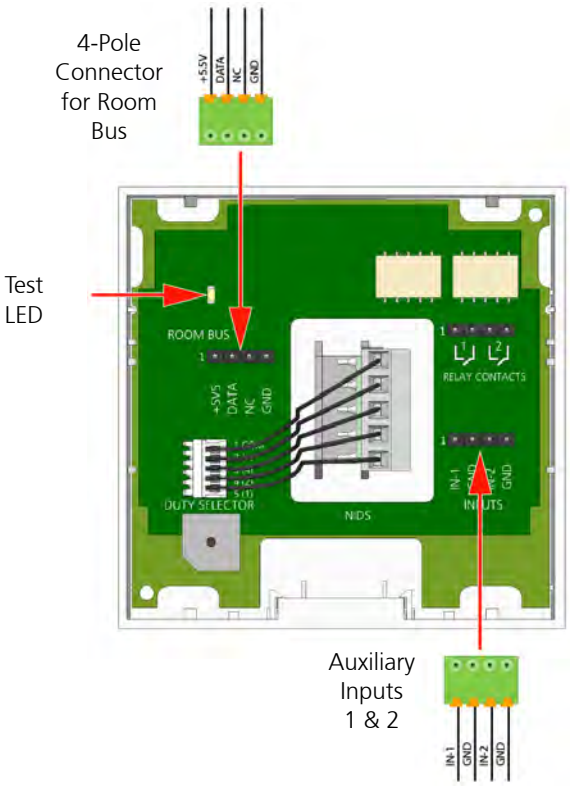



*Figure 129. Duty selector electrical connections*

***Note:*** *The 4-pole connector terminals required for the room bus and the inputs are not supplied with the duty selector. They are available as accessories and must be ordered separately.*

### 6.13.2 Auxiliary Inputs

The third 4-pole connector is used for auxiliary inputs. It has two input circuits which are available as interfaces to external devices. These terminals provide 5.5Vdc at 0.6mA, for monitoring the external device contacts, as shown in Figure 130.

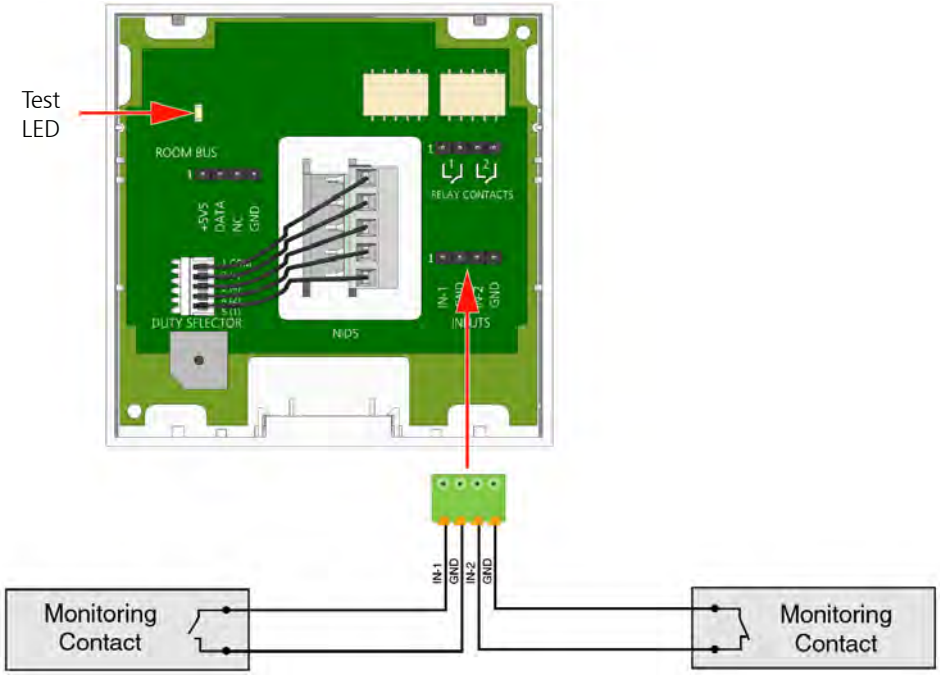



*Figure 130. Auxiliary Inputs*

**WARNING:**

- The equipment that is connected to this interface is not considered to be part of the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- The Auxiliary Monitoring circuits are not electrically isolated.
- The cable length for the Auxiliary Monitoring circuits must not exceed 33ft (10m) and the cables must be appropriately separated from power cables and sources of electromagnetic interference.
- The Auxiliary Monitoring circuits are power limited to 5.5Vdc at 0.6mA.

## 6.14 Card Reader (NICR)

The Card Reader Module (NICR) is a single switch module suitable for use in the teleCARE IP system. It is an RFID device, operating frequency of 13.56 MHz, for use with contactless (Mifare Classic) smart cards.

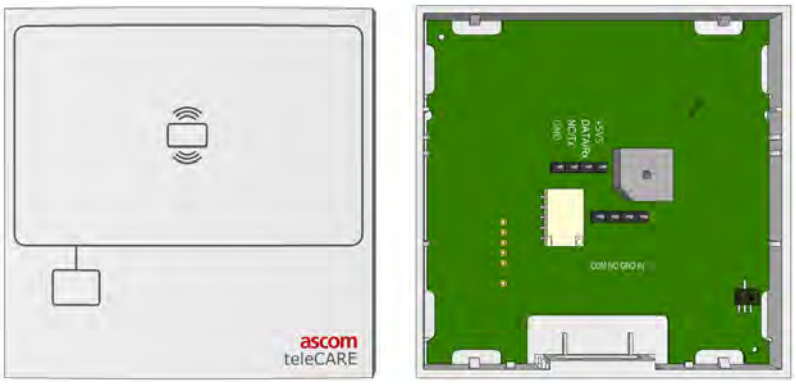



*Figure 131. Card reader front and back view*

The NICR allows staff members to register their presence in a room or to open an electrically locked door through a contactless proximity authorized smart card.

The NICR should be mounted in an accessible location (usually next to the entrance door of the room) so that the smart card can be held close to the reader when the staff member enters or leaves the room.

The NICR will read the smart card when it is at a distance of up to 0.8in (20mm) in front of the card reader. When a card is detected a buzzer in the NICR sounds.

The NICR has a red LED and a green LED which shine through the cover plate. The green LED shows for two seconds when an authorized card is detected, the red LED shows for two seconds when an unauthorized card is detected, and flashes for two seconds when the card reader is unconfigured. A short flash repeated every second on the red LED indicates that an error has been detected by the watchdog.

The NICR offers two auxiliary functions: a relay circuit for switching an external device, such as an electrically operated door lock, and a connection for monitoring, such as door open detection. The relay connection is a "normally open" potential-free contact and the monitoring connections consist of ground (GND) and an input line (IN).

A tamper alarm switch is mounted on the NICR printed circuit board detects when the card reader is removed from the backplate. The system can be configured, using the System Manager, to generate an alarm call when the tamper switch is operated.

***Note:*** *The tamper alarm function is not possible when the spacer is used.*

The NICR is available in white and it requires a single backplate which must be ordered separately. A spacer with installation kit is also available for surface mounting the switch module (see 6.3.2, Surface Mounting Spacer on page 59 for details).

**WARNING:**

- The equipment that is connected to this interface is not considered to be part of the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- The Axillary monitoring circuits are not electrically isolated.
- The cable length for the Axillary Monitoring circuits must not exceed 33ft (10m) and the cables must be appropriately separated from power cables and sources of electromagnetic interference.

- The Auxiliary Monitoring circuits are power limited to 5.5Vdc at 0.6mA.

### 6.14.1 Card Reader Electrical Connections

The NICR has two connectors consisting of the room bus and the auxiliary connections. It is an "active peripheral" therefore it must be connected to one of the four room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 6.4.1, 4-Pole Connector Terminal on page 60).

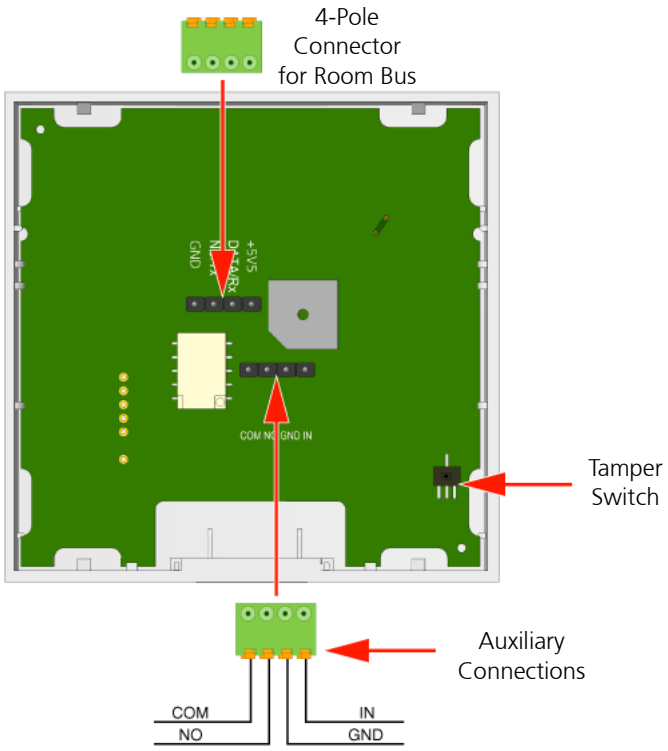



*Figure 132. Card reader electrical connections*

***Note:*** *The two 4-pole connector terminals required for the room bus and the auxiliary connections are not supplied with the card reader. They are available as accessories and must be ordered separately.*

#### NICR Room Bus Address

The NICR can be connected to any of the room buses of the IP room controller. Each room bus supports one NICR and the address of the NICR is fixed at 6.

It is highly recommended to place the NICR as the first teleCARE IP peripheral on the room bus, closest to the room controller, to minimize the risk of a voltage drop on the room bus power lines caused by the NICR power fluctuations.

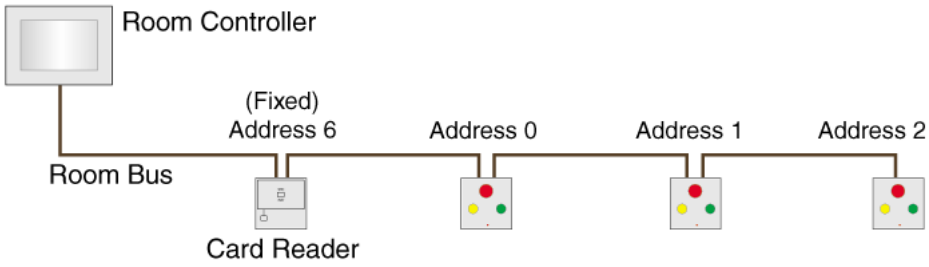



*Figure 133. Typical installation with card reader*

### 6.14.2 Card Reader Auxiliary Connections

The NICR has auxiliary connections which provide for the control of external functions such as activating an electrically operated door locks and monitoring door-open alarm contacts or other suitable purposes. The applications of the relay contacts and the auxiliary connections are configured in the System Manager.

#### Relay Connections

The relay connections (COM and NO) offers a normally open, potential-free relay contacts which can be used to control a remotely operated electrical door lock, or similar applications. The relay contact is rated at a maximum voltage of 30Vdc with a maximum switching current of 1A.

#### Monitoring Connections

The auxiliary monitoring connections (GND and IN) can be used to monitor a potential-free contact, such as a door open monitoring contact. The monitoring contact can be "normally open" or "normally closed". The functionality of the monitoring connections is configured in the System Manager (NISM).These connections provide 5.5Vdc at 0.6mA, for monitoring the external device contacts.

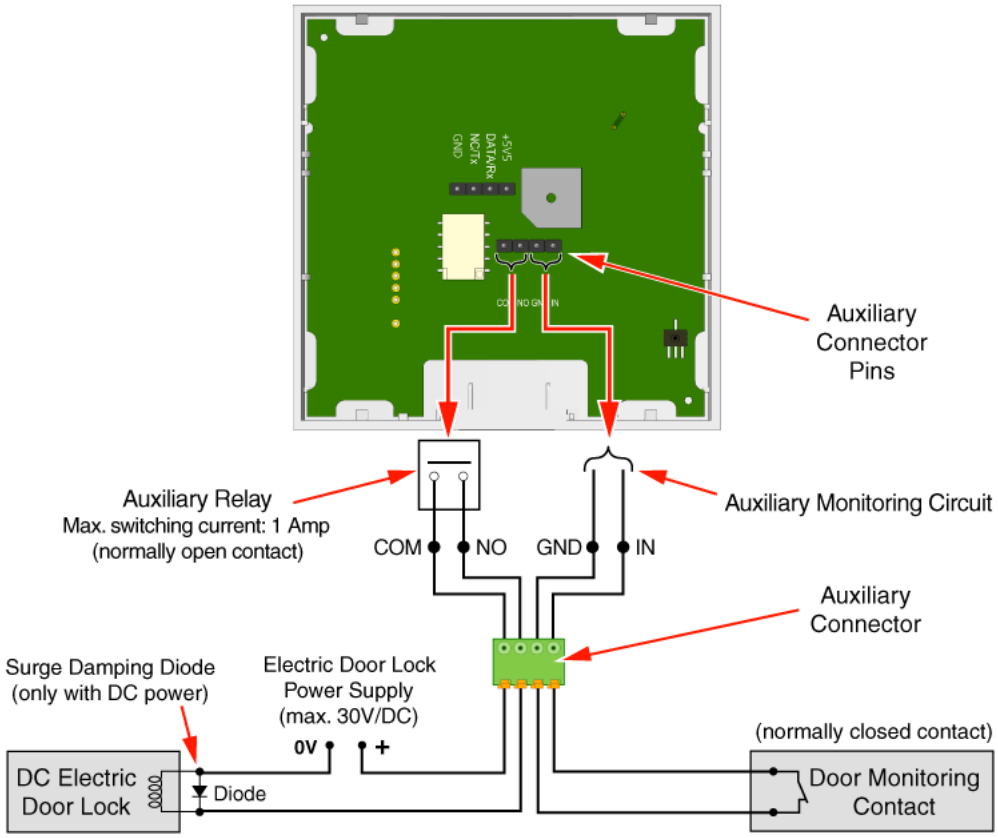



*Figure 134. NICR auxiliary connections*

**WARNING:**

- The equipment that is connected to this interface is not considered to be part of the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- The Auxiliary Monitoring circuit is not electrically isolated.
- The cable length for the Auxiliary Monitoring circuit must not exceed 33ft (10m) and the cable must be appropriately separated from power cables and sources of electromagnetic interference.
- The Auxiliary Monitoring circuit is power limited to 5.5Vdc at 0.6mA.
- The external Auxiliary Relay Power Supply and Relay must be UL listed or recognized components.
- The maximum switching current for the NICR Auxiliary Relay contact must not exceed 30Vdc at 1A.
- A diode (1N4004 or equivalent) must be connected across the coil of the external Auxiliary Relay to prevent surges caused by the relay coil.
- There must be a minimum distance of 1in (30mm) in all directions between the room display and any metal objects to avoid the degradation of the card reader antenna.

## 6.15 Speech Module (NISP)

The Speech Module (NISP) is a teleCARE IP peripheral which facilitates speech in combination with Ascom Interactive Messaging (IM). It consists of a white plastic body, a printed circuit board and a perforated anodized aluminum face plate.


*Figure 135. Speech Module (NISP) front and back view*

The NISP incorporates a pre-amp circuit and a speaker amplifier and includes two loudspeakers and an electric microphone. It has a two-color LED which shows red to indicate that the speech direction from staff to resident is active and green to indicate that the speech direction from resident to staff is active.

The NISP can only be used in combination with the teleCARE IP Door side Module (NIDM), the bedside module (NIBM2), the Medical Rail Socket (NIMS2) the active Pull Cord Module (NICP), and the Room Display (NIRD).

### 6.15.1 Connecting the Speech Module

The 5-wire cable with two 5-pole plugs is required to connect the speech module to the associated switch module. It is available in three lengths: 7.0in (170mm) (R190192), 8.0in (200mm) (R190193) and 15.75in (400mm) (660313). The 15.75in (400mm) long cable is used when the speech module is mounted separately from the associated switch module.

For a two-module combination with the speech module mounted to the right side of the switch module (viewed from the front) the R190192 cable 7.0in (170mm) is required.

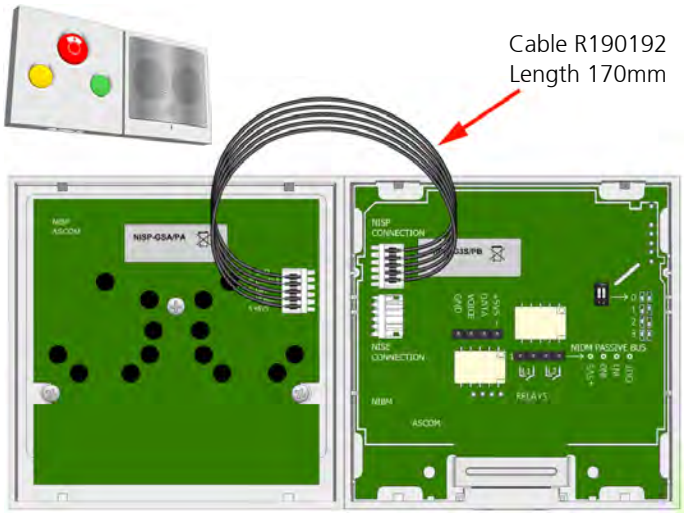



*Figure 136. Speech module to the right of the switch module*

For a two-module combination with the speech module mounted to the left side of the switch module (viewed from the front) the R190193 cable 8.0in (200mm) is required.

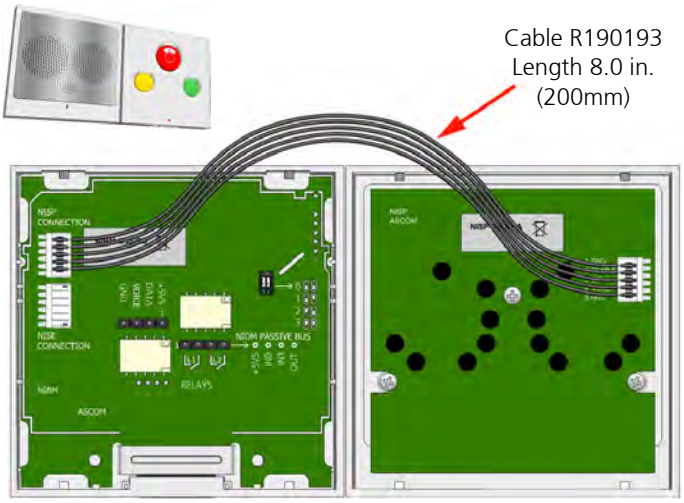



*Figure 137. Speech module to the left of the switch module*

For a three-module combination the R190192 cable (length 7.0in (170mm) and the R190193 cable length 8.0in (200mm) are both required

## 6.16 Room Display (NIRD)

The NIRD Room Display (NIRD) combines Ascom interactive messaging (IM) functionality, with a teleCARE door side module and an RFID card reader in a wall mounted module which is suitable for use in residents rooms and staff rooms. It has an EBA polyester film membrane which covers the display and incorporates the buttons, keys and the LEDs.

**Important:** At least one NIRD serving the property must be permanently installed in a fixed location.


*Figure 138. Room Display*

The NIRD includes three teleCARE function buttons (red, yellow and green). Each of these buttons has an LED which illuminates to indicate the activated condition. Three function keys and a scroll button are included for controlling the display and speech.

The LCD screen measures 2.5in (63mm) x 1.3in (35mm). It displays large, easy to read characters showing calls and the locations of staffs. Above the LCD screen is a three-color LED which illuminates to emphasize the type or category of calls received.

The NIRD also includes a buzzer speaker which signals the configured beep codes for the received messages.

The integrated card reader is an RFID device operating in the 13.56 MHz frequency range. It is used in combination with contactless smart cards.

The NIRD is an active module and must be connected to the teleCARE IP room bus. It uses two fixed room bus addresses 6 and 7.

The NIRD has a 5-pole connector for the teleCARE IP speech module and a 4-pin connector for supporting a passive peripheral bus.

> ***Note:*** *The 4-pole connector terminal required for the room bus and the 8-pole connector terminal which is required to connect the room bus and a passive peripheral bus are not supplied with the NIRD. They are available as accessories and must be ordered separately.*

There are two dedicated backplates available for the NIRD: a short backplate for mounting the NIRD as a single module and a long backplate for combining the NIRD with the NISP speech module. These backplates must be ordered separately.

> ***Note:*** *The NIRD is not compatible with the standard teleCARE switch module backplates and it is not compatible with the teleCARE surface mounting spacer.*

### 6.16.1 Room Bus Electrical Connections

The NIRD is an active teleCARE IP peripheral which must be connected to teleCARE IP room bus by a 4-pole connector, as shown below.

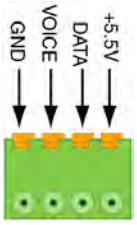



*Figure 139. 4-pole connector terminal for the room bus*

### 6.16.2 Room Bus with Passive Peripheral Bus Electrical Connections

When a passive peripheral bus is required the room bus and the passive peripheral bus must be combined in an 8-pole connector.

The locations of the room bus connector, the passive peripheral bus connector and the NISP speech module connector are shown below:

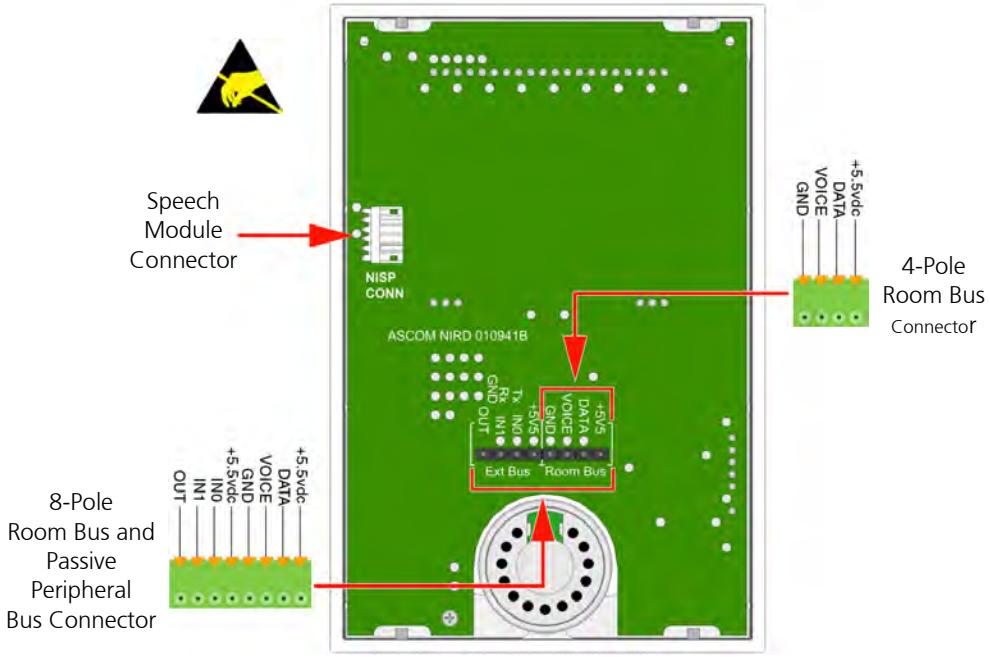



*Figure 140. Connector terminals for the room bus and passive peripheral bus*

### 6.16.3 Room Display Backplate (Short)

To mount the NIRD as a single module the short backplate must be used: Figure 141 indicates the location of a hole which needs to be drilled for mounting purposes.


*Figure 141. Room display backplate (short)*

The backplate must be fixed to the wall using the four corner holes (indicated in the drawing below by red circles).


***CAUTION!***
*DO NOT MOUNT THE ROOM DISPLAY CLOSE TO OR OVER METAL OBJECTS.*

*There must be a minimum distance of 1 in (30mm) in all directions between the room display and any metal objects to avoid the degradation of the card reader antenna performance.*

*Figure 142. Mounting the room display backplate*

The backplate has an arrangement of fixing holes (indicated in the drawing above by blue circles) which make it suitable for mounting on various international back boxes.

***Caution:*** *Even when the backplate is mounted on a back box it must also be fixed to the wall with the corner holes.*

### 6.16.4 Room Display Combined with the Speech Module

The NIRD can be combined with the NISP Speech Module in teleCARE IP systems with speech. The NIRD is used to select calls, control voice communication and cancel calls. The NISP facilitates two-way voice communication via a press-to-talk function on the NIRD.

(For details of the NISP speech module refer to chapter 6.15"Speech Module (NISP)" on page 101.)


*Figure 143. Room display combined with the speech module*

### 6.16.5 Room Display Backplate (Long)

The long backplate must be used to mount the NIRD combined with the NISP. Figure 144 indicates the location of a hole which needs to be drilled for mounting purposes.

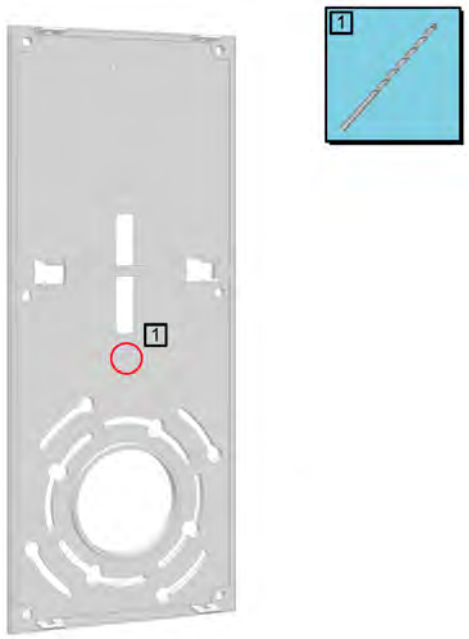



*Figure 144. Room display backplate (long)*

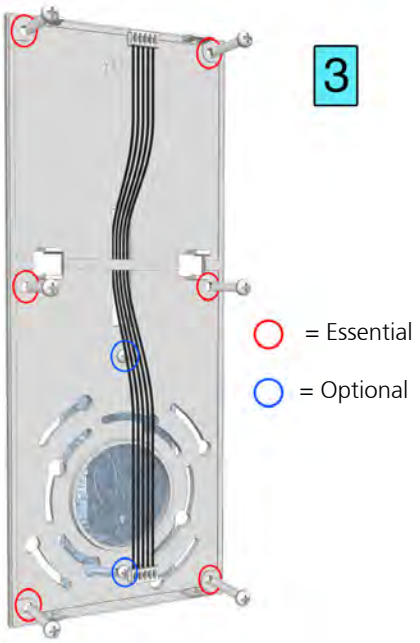
**Mounting the Backplate and Installing the NIRD and NISP**

It is important to insert the NIRD to NISP connection cable through the backplate before the backplate is screwed to the wall, as shown in the following illustration:


*Figure 145. Inserting the connection cable through the backplate*

***Note:*** *Make sure that the cable lies in the recess under the strip in the middle of the backplate to avoid trapping the cable under the backplate when it is screwed to the wall.*

The backplate must be fixed to the wall using the four corner holes and the two holes in the middle of the backplate (indicated in the drawing below by red circles).




***CAUTION!***
*DO NOT MOUNT THE ROOM DISPLAY CLOSE TO OR OVER METAL OBJECTS.*

*There must be a minimum distance of 1 inch (30mm) in all directions between the room display and any metal objects to avoid the degradation of the card reader antenna performance.*

*Figure 146. Mounting the room display long backplate*

The backplate has an arrangement of fixing holes (indicated in the drawing above by blue circles) which make it suitable for mounting on various international back boxes.

> ***Caution:*** *Even when the backplate is mounted on a back box it must also be fixed to the wall with the corner holes and the middle holes.*

When the backplate is screwed to the wall connect the NISP and snap fit it to the backplate.


*Figure 147. Connecting the NISP and mounting it on the backplate*

Next connect the NIRD room display to the NISP and plug in the room bus connector.

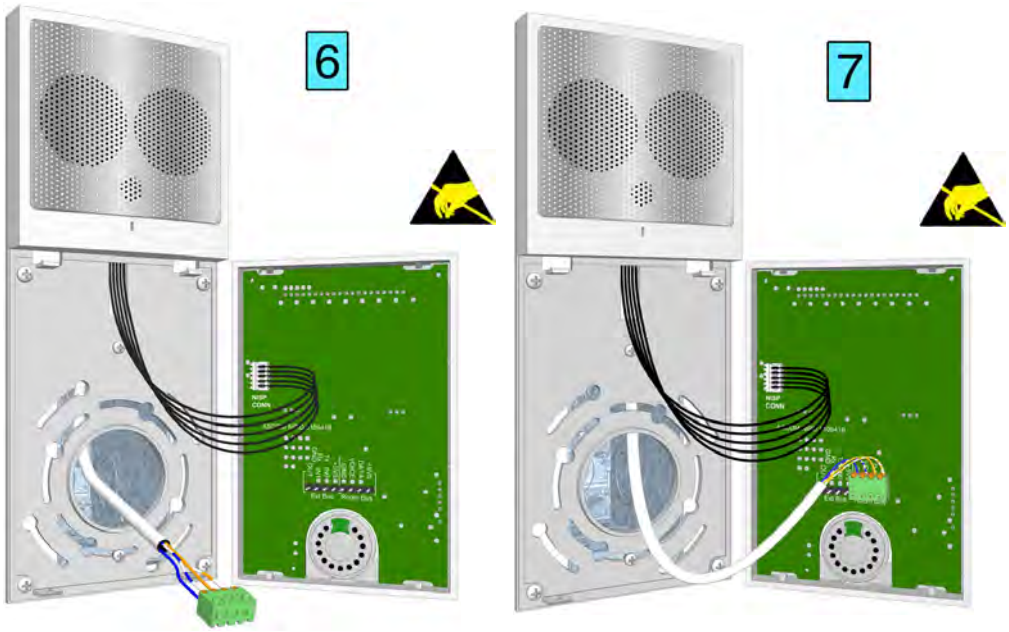



*Figure 148. Connecting the NIRD to the NISP and connecting the room bus*

Refer to 6.16.1, Room Bus Electrical Connections on page 104 for full details.

Next, snap fit the room display to the backplate.


*Figure 149. Mounting the NIRD on the backplate*

## 6.17 Television Interface Module

The television interface module is the interface between the television stereo audio output and the teleCARE IP system. It provides the necessary galvanic separation between the television and the teleCARE peripherals. In the teleCARE IP application the television interface module is a passive device requiring no power supply.

*Figure 150. Television interface module: front and back view*

The television interface module mounted on the supplied surface mounting spacer. See 6.3.2, Surface Mounting Spacer on page 59 for details.

The stereo audio input to the television interface module is taken from the headphone jack socket of the television and connected to the television interface module at J1. The output from J2 of the television interface module is connected to the "Audio" connector of the NIBM2 bedside module.

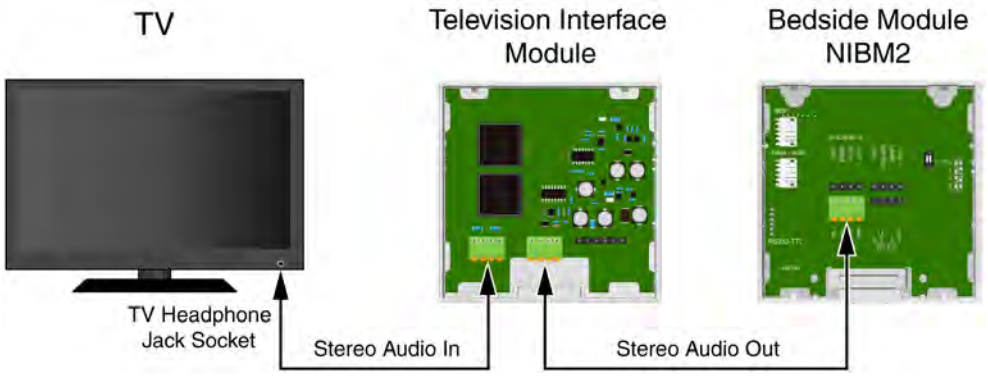



*Figure 151. Television audio connections*

**WARNING:** The equipment that is connected to this interface is not considered to be part of the teleCARE IP system UL listing.

The handset NIPH-AES is required to listen to the TV audio. The audio can be broadcasted through the speaker of the handset or listened to through stereo headphones plugged into the jack socket in the cable of the handset.

### General Considerations

- The maximum audio input voltage is 2Vpp.
- The maximum audio input impedance is 2k ohms.

### 6.17.1 Television Interface Module Electrical Connections

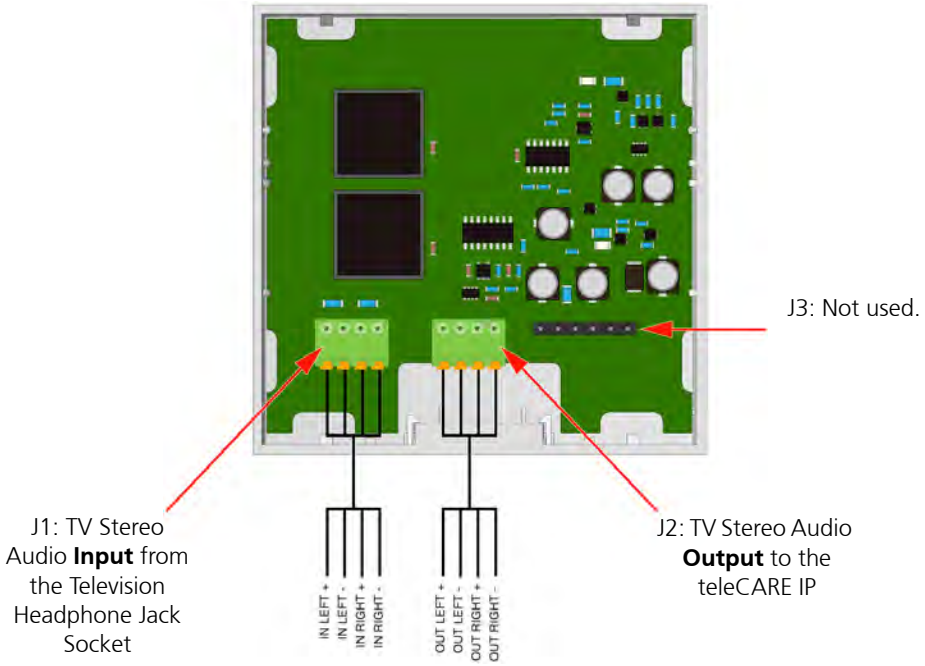



*Figure 152. Television interface module electrical connections*

***Note:***

- The equipment that is connected to this interface is not considered to be part of the system configuration unless the equipment complies with ANSI/UL 2560 standard for Emergency Call Systems for Assisted Living and Independent Living Facilities.
- The Television Interface Module provides electrical isolation between the Television and the teleCARE IP Emergency Call System.
- Television audio in teleCARE IP requires the bedside module NIBM2. For details of the NIBM2 refer to chapter 6.5"Bedside Module (NIBM2)" on page 68.
- The 4 pole connector terminals must be ordered separately.

## 6.18 Sunblind Control Module

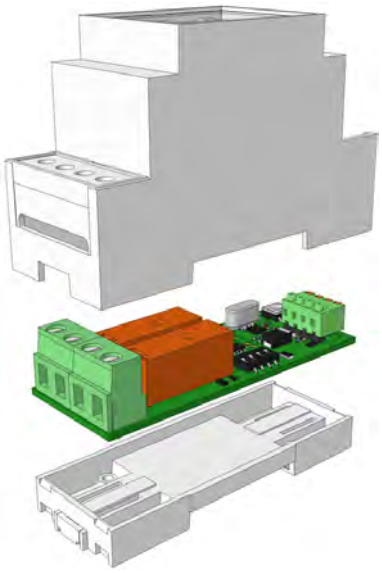


*Figure 153. Sunblind Control Module*

The Sunblind Control Module is a passive device on the teleCARE IP room bus. It has two heavy duty relays with normally open contacts to control the sunblind motor.

The sunblind control module is compatible with the bedside module NIBM2 and the medical rail socket NIMS2. It is used in combination with the NIPH3-A7A and NIPH3-AES handsets to control the up and down motors of sunblinds.

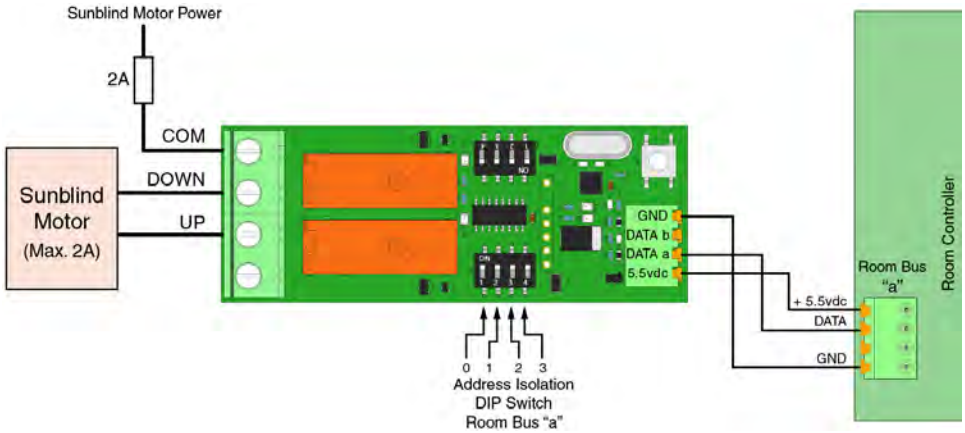



*Figure 154. Sunblind control module electrical connections*

The Sunblind Control Module is mounted on a 1-1/2" DIN rail, which must be permanently mounted to a wall. It must not be within reach or intentional access of a resident (e.g., above a ceiling tile), or it can be mounted within a separate electrical equipment enclosure.

The sunblind control module can be connected to one room bus and will only respond to room bus addresses 0 to 3 of the connected room bus. The Room Bus "a" DIP switches are used to prevent the sunblind control module from responding to specific room bus addresses. Setting a DIP switch to the ON position selects that particular address, 0 to 3 to control the module.

**WARNING:** Up to 230Vac power to the sunblind motor control relay must be fused at 2 Amps. Appropriate cable for the voltage and current must be used for the sunblind motor control.

**WARNING:** The equipment that is connected to this interface is not considered to be part of the teleCARE IP system.

# 7 External Inputs

In many installations, the need for connecting external alerts from sensors to the teleCARE IP system might arise. Some modules are already capable of handling external inputs. Other modules need a special Connection Board (NICB) to handle these external inputs.

The external inputs connection board (NICB) extends teleCARE IP system capability of processing external inputs from normally open (N.O.) or normally closed (N.C.) dry relay contacts

This section describes which switch modules need a NICB and how to connect them.

## 7.1 Switch modules compatible with NICB

The NICB extends the system with external inputs on switch modules that are not capable of handling those external inputs directly.

The compatible switch modules are:

- "Bed Module (NIBM2) and Pull Cord Module - Active (NIPC-XXA)" (details on page 118)
- "Door Side Module (NIDM) and Toilet Cancel Module - Active (NITC-XXA)" (details on page 119)
- "Room Display (NIRD)" (details on page 122)

This Connection Board (NICB) filters and protects the switch modules from ESD (Electrostatic Discharges) and EFT (Electric Fast Transients).

The NICB printed circuit board is enclosed in a heat shrink wrap.

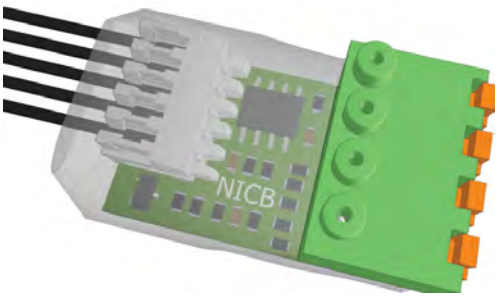



*Figure 155. Connection Board (NICB)*

## 7.2 Other switch modules with external inputs

Some switch modules are already prepared for external inputs without the need for the NICB. For a detailed description of these modules, refer to the respective paragraphs:

- "Medical Rail Socket (NIMS2)" (details on page 72)
- "Duty Selector (NIDS)" (details on page 94)
- "Card Reader (NICR)" (details on page 97)
- "NIFX Fixed Transceiver" (details on page 139)

## 7.3 Preparation

Read the following NICB installation instructions for complete electrical connection and assembly details before starting the installation.

Ensure that the electrical power to the equipment is switched off before connecting the Connection Board to any of the listed switch modules.

The area in which the teleCARE equipment is to be installed must be clean, dry and weatherproof.

The NICB must be mounted in the back box onto which the switch modules are mounted.

## 7.4 NICB-kit

The NICB is part of a kit. NICB-kit order number is NICB-AAA. The NICB-kit contains the following parts:

- Connection Board (NICB)
- Cross Cable (R190193)
- 4-Pole connector (NICT4-AA)

The cross cable and the Connection Board are already connected and enclosed in a heat shrink wrap.


*Figure 156. Connection Board Kit NICB-AAA.*


*Figure 157. Product label on the Connection Board.*


*Figure 158. Product label on the NICB-AAA.*

## 7.5 Connection Board

The NICB has two connectors: a 5-pole connector for connection to the cross cable and a 4-pole connector (NICT4-AA) for connections to the external inputs. The following figure shows the connections.


*Figure 159. Connections on the NICB*

### 7.5.1 4-Pole Connector Terminal

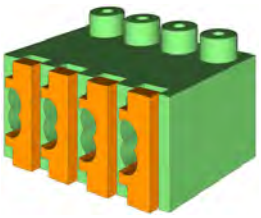


*Figure 160. 4-pole connector terminal*

The NICB kit (NICB-AAA) contains a 4-pole connector terminal (NICT4-AA). It has a screwless "spring-cage" connection technique and each terminal has two connection points. See "4-Pole Connector Terminal" on page 60.

The designation of the external inputs is shown in the following figure.

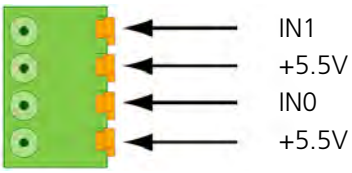



*Figure 161. 4-pole connector terminal with the inputs.*

### 7.5.2 External Contacts

The external connections (+5.5V, IN0, and IN1) can be used to monitor potential-free dry relay contacts, such as a door open contact or a passive infra-red (PIR) contact. The external contacts can be "normally open" or "normally closed". The functionality of the monitoring connections is configured in the System Manager (NISM2).

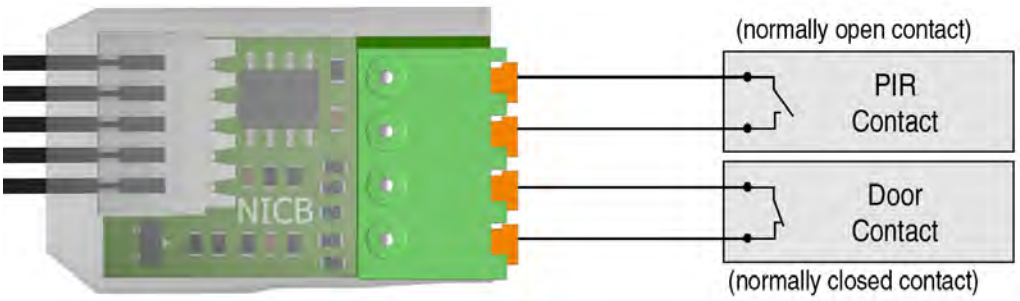



*Figure 162. NICB connected to external contacts.*

***IMPORTANT:*** *The maximum cable length between the NICB and the external contacts shall not exceed 10m/33ft.*

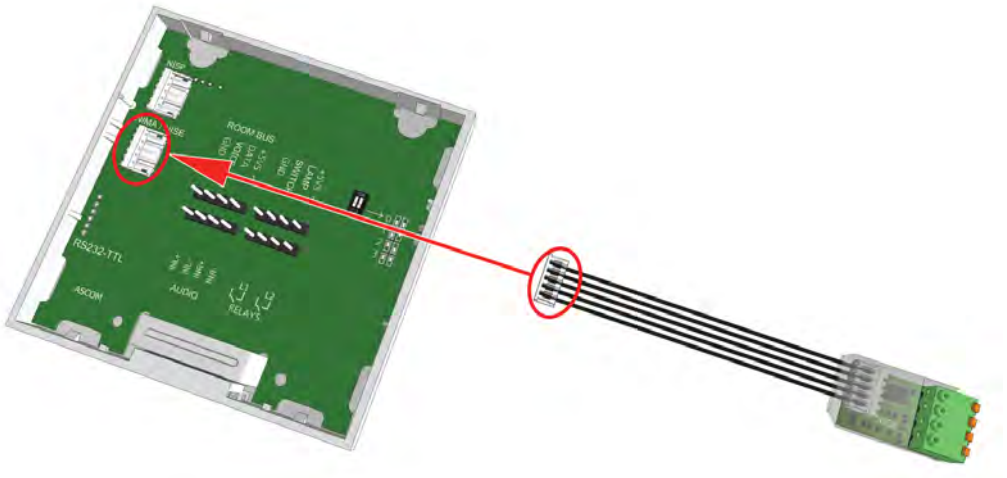
## 7.6 Bed Module (NIBM2) and Pull Cord Module - Active (NIPC-XXA)

The modules NIBM2 and active NIPC can be connected to the NICB for the use of one external input.

***IMPORTANT:*** *Only IN0 of the NICB shall be used. IN1 of the NICB shall not be connected. If IN1 of the NICB is connected, the switch module cannot properly detect the presence of the NICB.*


*Figure 163. Bedside module NIBM2: front and back view*

- Connect the end of the cross cable in the connector marked NISE.




***Note:*** *The NIPC-XXA is connected in a similar way as the NIBM2.*

## 7.7 Door Side Module (NIDM) and Toilet Cancel Module - Active (NITC-XXA)

The modules NIDM and active NITC can be connected to the NICB for the use of two external inputs.

These modules shall be connected to the NICB via two 4-pole screw terminals.

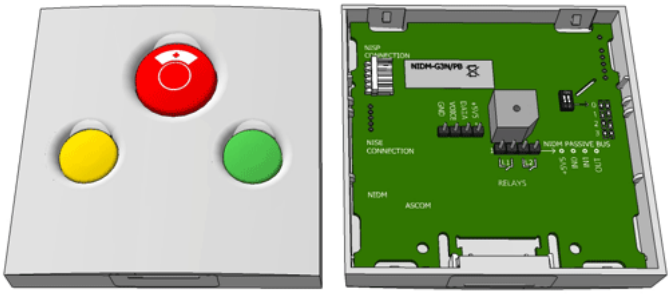


*Figure 164. Door side module: front and back view*

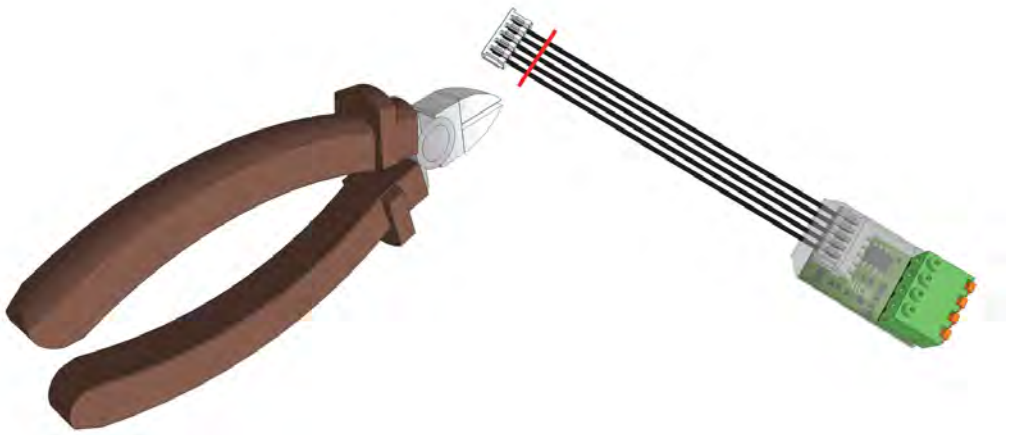
***Note:*** *The two 4-pole screw terminals which are required to connect the room bus and the passive bus to the NICB module must be ordered separately. The article number is R180768.*See "Connecting to the NICB" on page 119.

### 7.7.1 Connecting to the NICB

The NICB cross cable needs to be prepared to be connected to the two 4-pole screw terminals before connecting to the switch module.

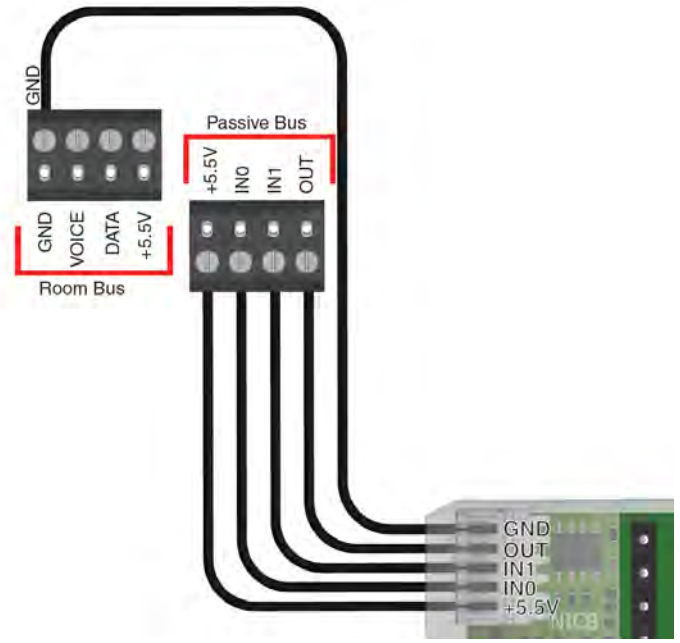
***Note:*** *The cross cable wires are not solid and cannot be used with the NICT4-AA 4-pole connector.*

- Cut off the end of the cross cable.

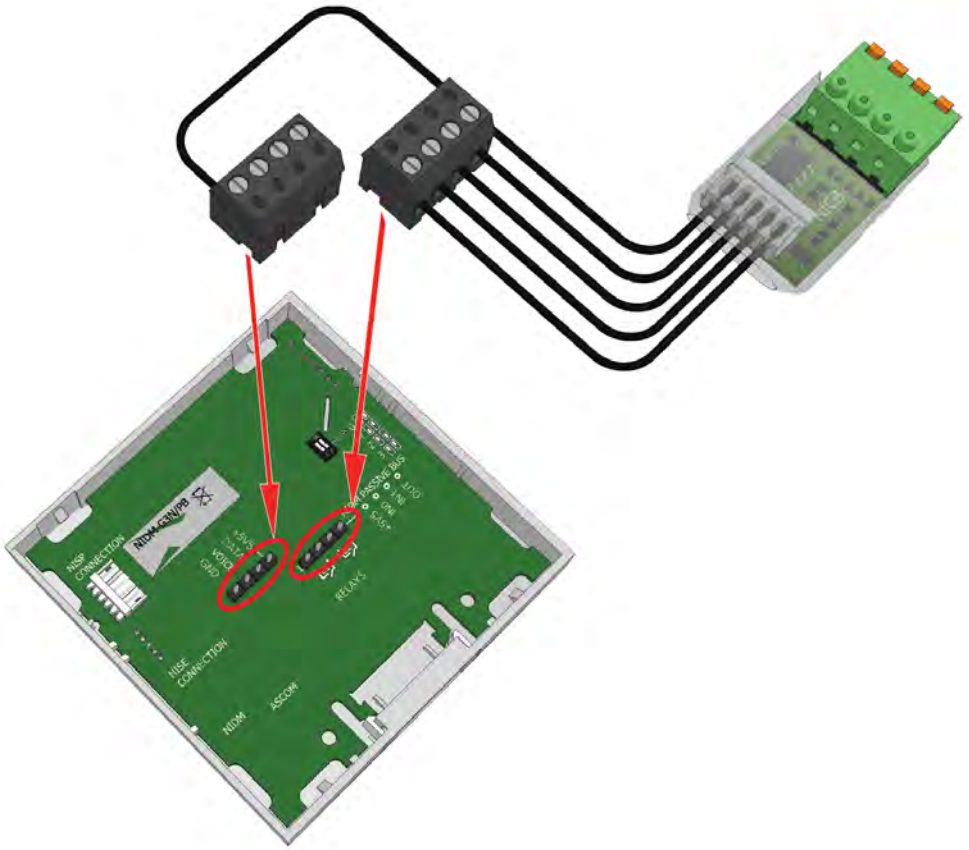


- Strip the insulation from the end of each wire over 5mm (3/16in).


- Connect the cross cable wires to the two 4-pole screw connectors.



- Place the 4-pole screw connectors on the switch module.




***Note:*** *The NITC-XXA is connected in a similar way as the NIDM.*

## 7.8 Room Display (NIRD)

The Room Display (NIRD) can be connected to the NICB for the use of two sensor inputs.

An 8-pole screw terminal is used for the connection of the Room bus and the NICB.


*Figure 165. Room Display*

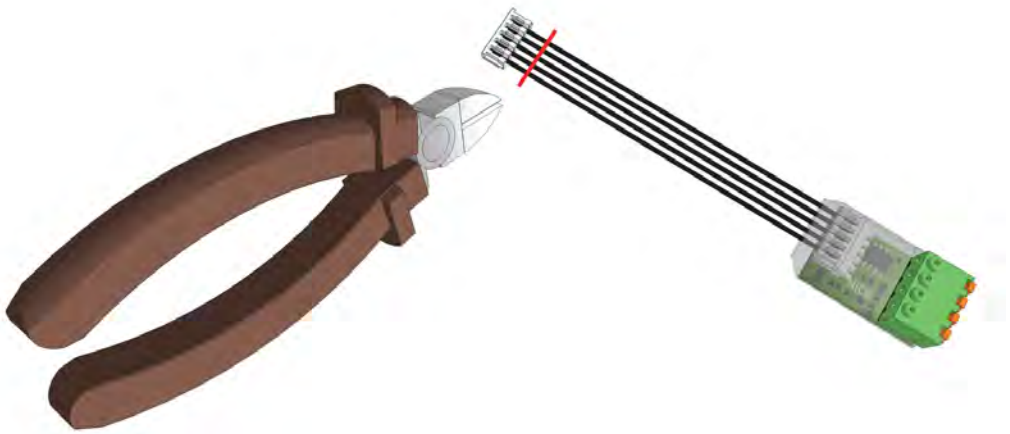
***Note:*** *The 8-pole connector terminal which is required to connect the room bus and the external bus to the NICB module must be ordered separately. The article number is R180732.*

### 7.8.1 Connecting to the NICB

The NICB cross cable needs to be prepared to be connected to the 8-pole screw terminal before connecting to the Room Display module.

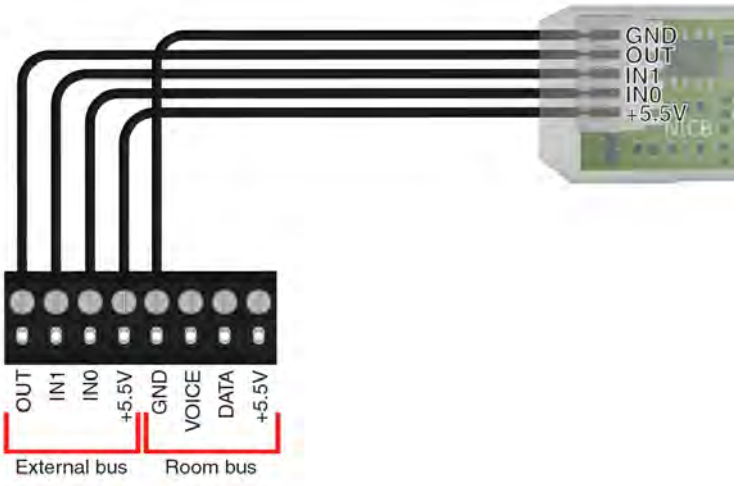
***Note:*** *The cross cable wires are not solid and cannot be used with the NICT8-AA 8-pole connector.*

- Cut off the end of the cross cable.

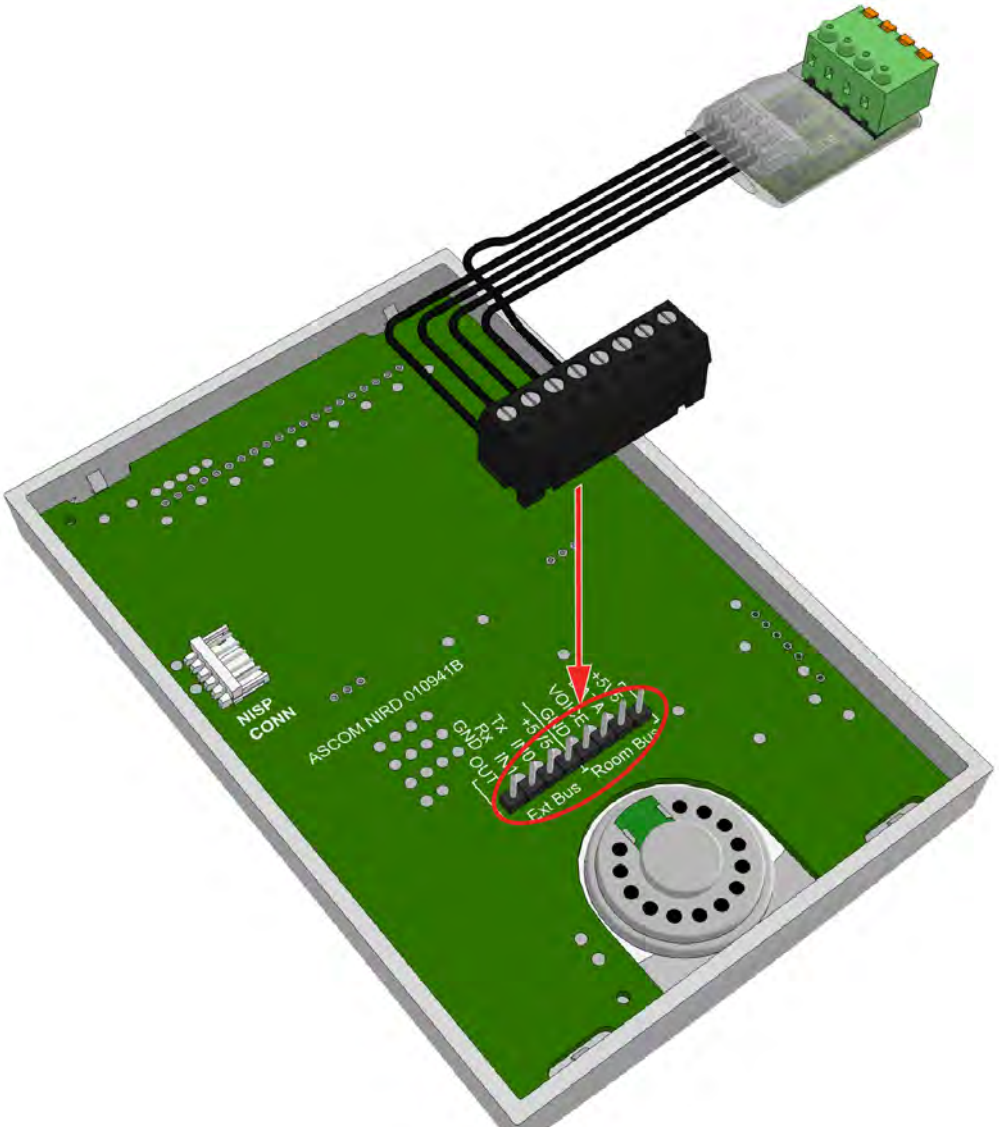


- Strip the insulation from the end of each wire over 5mm (3/16in).


- Connect the wires to the 8-pole screw connector as shown below.



- Place the 8-pole connector on the switch module.



DRAFT

# 8 Wireless Functionality

## 8.1 General

teleCARE IP with wireless functionality is intended for use in nursing homes and in assisted living facilities.

teleCARE IP is able to support wireless functionality through the NIRC3 teleCARE IP room controller combined with the NIRX transceiver, which is piggy-back mounted on the circuit board of the NIRC3. For detailed information refer to "Principle of the teleCARE IP with Wireless Functionality" on page 127.

teleCARE IP also supports a wireless infrastructure based on a wireless gateway and multiple wireless repeaters. The wireless gateway consists of the NIRC3 connected via USB to a wireless repeater NUREP. For detailed information refer to "Wireless Infrastructure" on page 138.

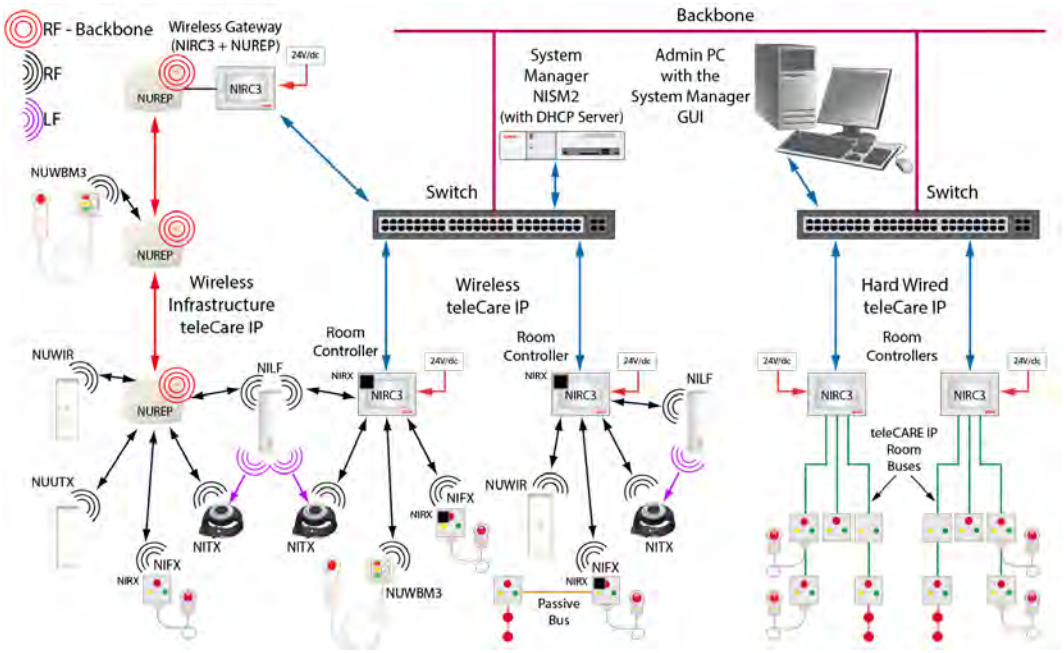



*Figure 166. Wireless teleCARE IP and hard-wired teleCARE IP Example*

The wireless call peripherals consist of the NUWBM3 wireless bedside module, NUUTX universal transceiver, NUWIR wireless passive infrared module, NIFX fixed transceiver, the NITX mobile transceiver, NITX Staff transceiver, and an optional low frequency beacon NILF.

The wireless bedside module (NUWBM3) is a customizable three-button wall mounted switch module. It comes with an Ascom SafeConnect socket used for the connection of the bedside handset. It contains a 916 to 921 MHz transceiver. The wireless bedside module can be powered by two AA disposable alkaline batteries, or connected to an external 5VDC power supply. "NUWBM3 Wireless Active Bedside Module" on page 149.

The universal transceiver module (NUUTX) is designed to be mounted on walls or onto window/door posts. It contains a 916 to 921 MHz transceiver, two inputs for the connection of external contacts and a magnetic window/door alarm detector. The NUUTX universal transceiver is powered by two AA disposable alkaline batteries. "NUUTX Universal Transceiver" on page 162.

The wireless passive infrared module (NUWIR) is a motion detector designed to be mounted on walls. It contains a 916 to 921 MHz transceiver and a passive infrared sensor with a range of approximately 6 meters / 20 feet with a three level selectable sensitivity. The NUWIR wireless passive infrared module is powered by two AA disposable alkaline batteries. "NUWIR Wireless PIR Module" on page 166.

The NIFX fixed wireless transceiver is a three-button wall mounted switch module. It comes as a socket version used for the connection of a handset or equipped with a pull-cord. Both variants of the NIFX include a 125 kHz LF receiver and an NIRX 916 to 921 MHz Class 1 transceiver which is piggy-back mounted on the circuit board of the NIFX. The fixed wireless transceiver switch modules can be powered by two AA disposable alkaline batteries, or connected to an external 24VDC power supply. "NIFX Fixed Transceiver" on page 156

The NITX mobile call transceiver can be attached to a wrist strap, or to a neck pendant. The NITX is powered by an internal three volt replaceable lithium battery. It includes a 916 to 921 MHz transceiver and a 125 kHz LF receiver for receiving the location update information from LF beacons. "NITX Mobile Transceiver" on page 158

The NITX staff transceiver is identical to the NITX mobile call transceiver except for the button functionality. The staff transceiver is carried by staff members and allows the staff member to cancel calls initiated from wireless transceivers (NITX-BAB, NIFX-1AB and NIFX-1BB) through an LF transmission when in close proximity of the wireless transceiver and provides the identification of the staff member cancelling the call.

The NILF low frequency beacon includes a 125 kHz transmitter and can be extended with the piggy-back mounted NIRX 916 to 921 MHz transceiver. The LF Beacon NILF is contained in a white plastic enclosure with a slim design that is suitable for surface mounting on walls or at a door post. "NILF Low Frequency Beacon" on page 173. The NILF can be powered by three C size disposable alkaline batteries, or connected to an external 24VDC power supply (chapter 4, 'System Power" on page 10)

## 8.2 Principle of the teleCARE IP with Wireless Functionality

The system is configured using the teleCARE IP System Manager - NISM2. The wireless server is a Unite application on the NISM2 serving as the central controller for all wireless devices in the teleCARE IP system with wireless functionality.

The wireless server has similar functions to those found in the teleCARE IP room controller, such as event handling, assignment handling and linking, with additional functions such as signal strength comparison. The main difference between the wireless server and the teleCARE IP room controller is that the wireless server controls all wireless devices in the system, whereas each room controller is responsible for only the devices which are hard-wired to it.

The NIRC3 room controller requires the piggy-back mounted NIRX transceiver module to give it wireless compatibility. When combined with the NIRX the room controller also serves as a base station and portal for the wireless devices.

The NIFX fixed transceiver has a piggy-back mounted NIRX transceiver, whereas the NITX mobile transceiver has its' own internal transceiver.

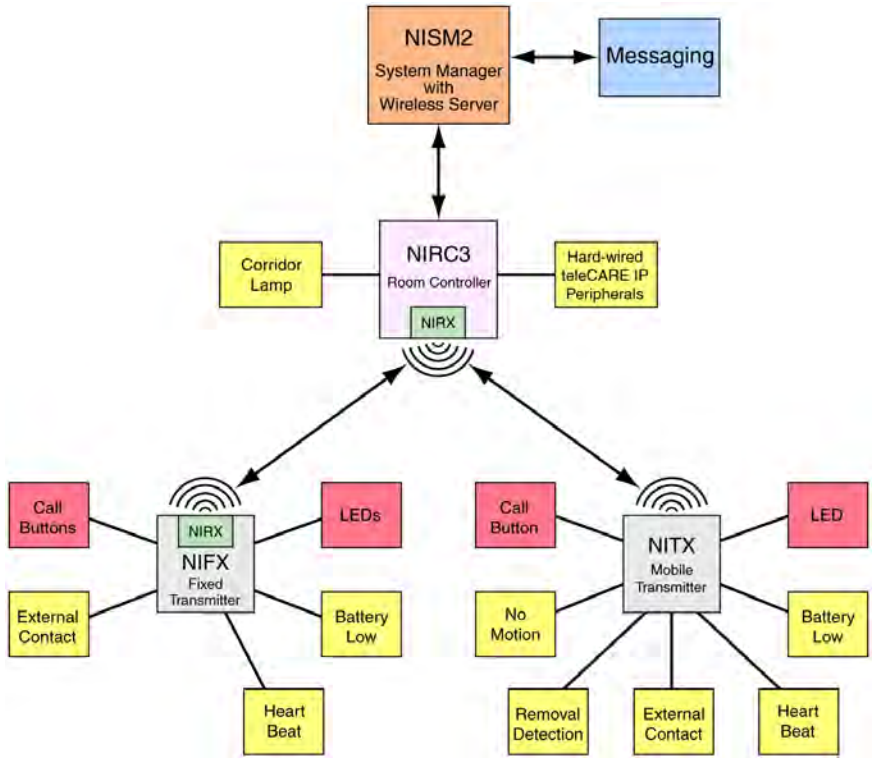



*Figure 167. Principle diagram of teleCARE IP wireless functionality*

Compatible with the NU style wireless modules.

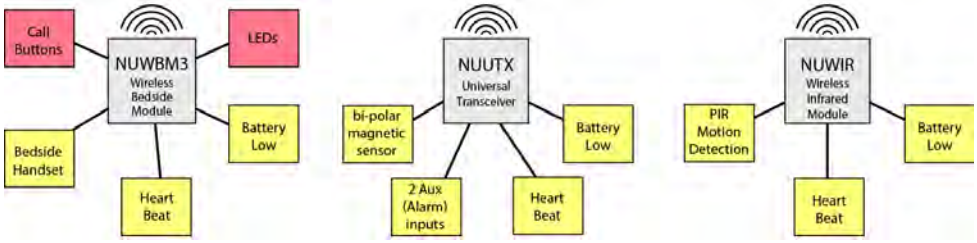



*Figure 168. Compatible with the NU style wireless module*

### 8.2.1 Location Based - Using LF Beacons

The addition of the NILF low frequency beacons gives location based wireless functionality available including access control. The NILF will send out its ID, including location information, at regular intervals using a low frequency 125 kHz signal that will be picked up by the wireless transceiver modules that pass by the NILF.

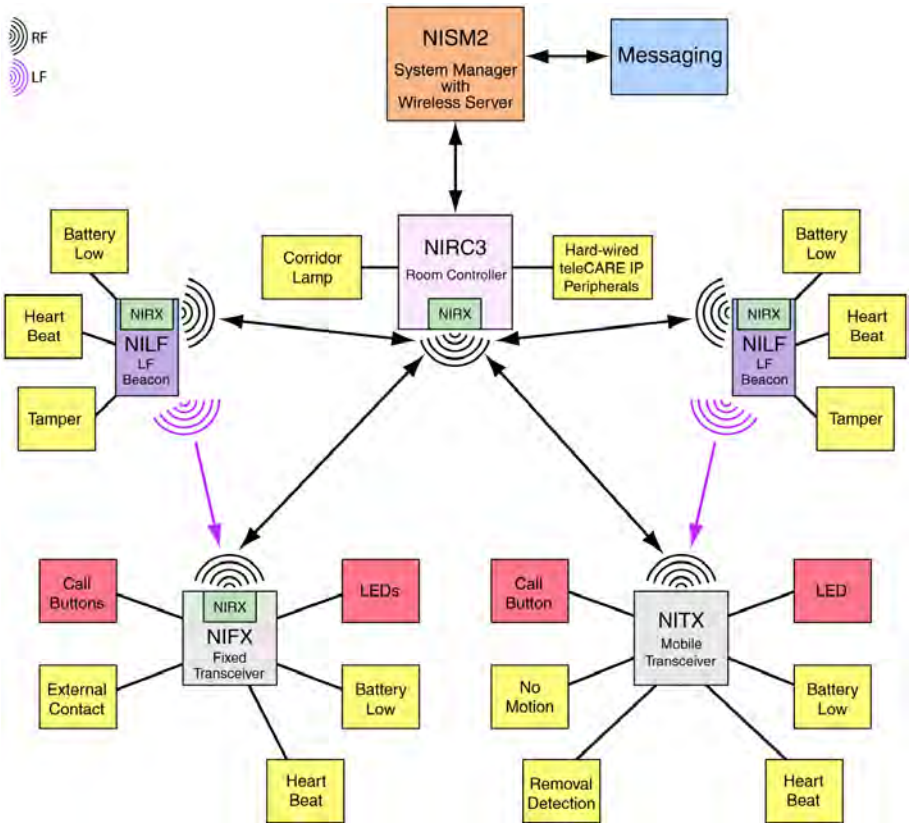



*Figure 169. Location based wireless functionality*

The range of an LF beacon is adjustable and can be up to approximately 8.86 feet (2.7 meters).

When a wireless device comes within range of a passive NILF location beacon it will receive the beacon ID with the location information. It then stores the location as the last known location. The stored last known location will be added to the next event that is transmitted from the wireless device, like a button press, battery low alarm, etc.

When a mobile wireless device comes within range of an active NILF location beacon, it sends a location update message to the wireless server. In addition, based on the received location information, the wireless server can check to see if the person carrying the wireless device is allowed to access that location. Doors can be opened or stay closed depending on the access rights. Automatic alarms can be generated when a person leaves or enters a certain location.

Whenever a call is made from a mobile wireless device, the location will be transmitted to the wireless server. When the wireless device is not in range of an LF beacon the last two known locations will be transmitted.

## 8.3 teleCARE Wireless with Speech

The room controller (NIRC3) is required for speech in teleCARE IP Wireless and each NIRC3 must include a voice piggyback module (NIVP). In order to achieve the required RF coverage some of the NIRC3s must include a transceiver module (NIRX). Refer to "RF Planning Considerations" on page 132 for details.

The wireless mobile transceiver (NITX) is required. The NITX is carried by residents and staff and used to generate calls and other signals that are sent as RF transmissions and received by the NIRC3s.

A speech module (NISP), hard-wired to the NIRC3, must be installed in each room which requires speech. Each NISP is assigned a telephone number in the system configuration. That telephone number is automatically dialled when a staff member responds to a call and selects to speak.

In dynamic location mode an LF beacon (NILF) is needed at each room (see "Dynamic Mode" on page 130) in order to identify the location of the NITX. The NILF is also needed if access control is required at entrance doors.

### 8.3.1 "Static" and "Dynamic" Modes

teleCARE IP with speech can function in "Static" or "Dynamic" modes depending on the configuration in the system manager of the of the mobile transceivers (NITX). Refer to the teleCARE IP Configuration Manual TD93019US) for full details.

#### Static Mode

In "Static" mode, speech is always linked to the location that is set in the configuration of the mobile transceiver (NITX) and speech communication is always directed to the speech module (NISP) at that location.

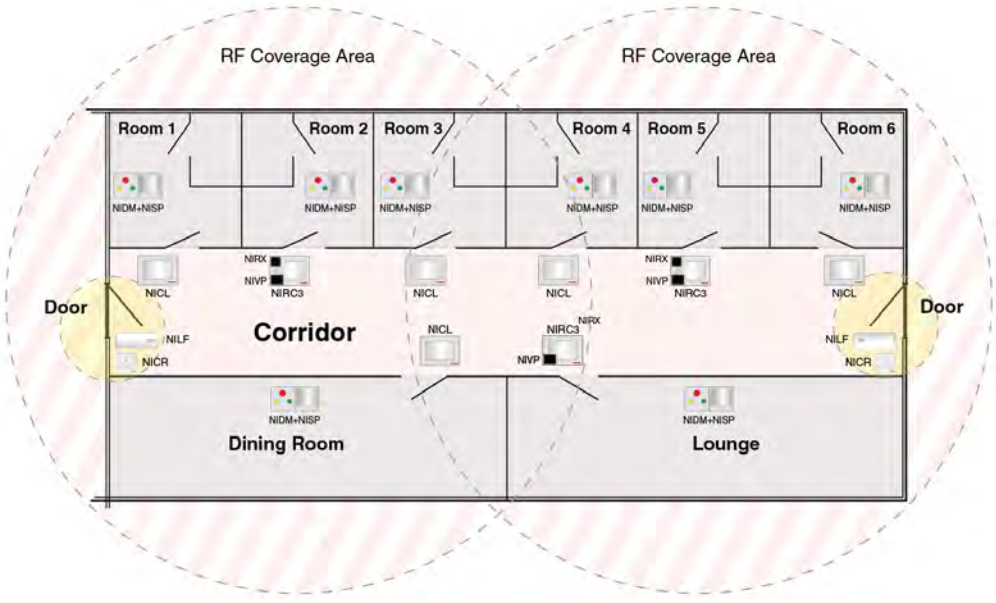



*Figure 170. Wireless nurse call example with speech - static mode*

The example consists of three room controllers (NIRC3). Each NIRC3 includes a voice piggyback module (NIVP) and two NIRC3s include a transceiver module (NIRX). There are five corridor lamps and each room has a doorside module (NIDM) combined with a speech module (NISP). The two main entrance doors have a passive location beacon (NILF) and a card reader module (NICR) for access control (yellow area).

### Dynamic Mode

In "Dynamic Location" mode, the NITX can move around the coverage area and speech will be automatically directed to the current location of the NITX when a call is received.

The real-time location of the NITX is determined by LF beacons (NILF) mounted at the entrance to each room. The NILF transmits an LF location signal which is received by the NITX. The NITX memorizes its' current location until it receives a new LF location signal. The memorized (last known) location information is included in all transmissions from the NITX. The telephone number to be called is automatically updated to the current location of the NITX with each call received so the speech response will be sent to the telephone number of the NISP at the location of the call.

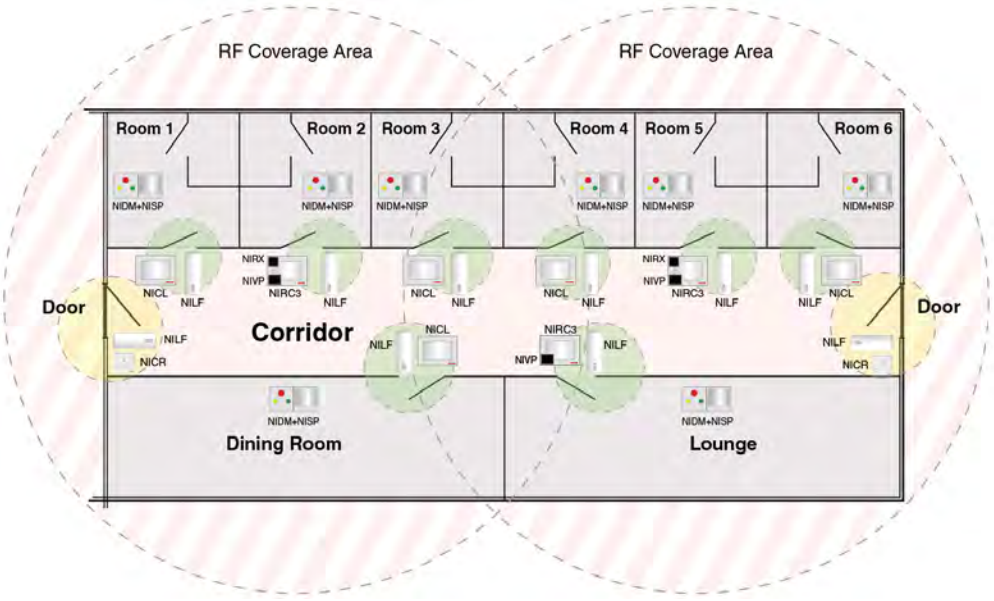



*Figure 171. Wireless nurse call example with speech - dynamic mode*

The example consists of three room controllers (NIRC3). Each NIRC3 includes a voice piggyback module (NIVP) and two NIRC3s include a transceiver module (NIRX). There are five corridor lamps and each room has a doorside module (NIDM) combined with a speech module (NISP).

At the door to each room an active LF location beacon (NILF) is mounted. The active LF location coverage (green area) includes the door to the room. The two main entrance doors have a passive location beacon (NILF) and a card reader module (NICR) for access control (yellow area).

## 8.3.2 NILF Beacon Modes

The LF beacon (NILF) can be configured as a "Passive" beacon or an "Active" beacon using DIP switches situated in the NILF housing (as described in "Beacon Mode" on page 183).

### Passive Location Beacon

When passive mode NILF beacons are used the NISP telephone number will not be updated if the NITX subsequently moves between passive locations after a call is received. The speech location will remain at the location where the call was first received.

### Active Location Beacon

When dynamic mode NILF beacons are used the NISP telephone number will be updated and the speech location will change to the new location if the NITX subsequently moves between passive locations after a call is received.

### Speech Handling Overview

The table below shows the speech handling based on their static or dynamic location mode setting in combination with passive or active location beacons.

| Transceiver location mode | LF beacon mode | Location at the start of a new call | Speech location change update | | |
|---|---|---|---|---|---|
| | | | Before speech | During speech | After speech |
| Static | NA | Configured location | No | No | No |
| Dynamic | Passive | Last known | No | No | No |
| | Active | Last known | Yes | No | No |

## 8.4 teleCARE IP Wireless Planning

### 8.4.1 RF Planning Considerations

The room controller NIRC3 (with transceiver module NIRX installed) functions as a base station and must be situated where it can reliably receive the RF signals of the wireless devices in the designated coverage area. The optimum indoor coverage area is approximately 100 feet from the NIRC3 base station (depending on the environment).

The designated area must have complete RF coverage to ensure that any event triggered by a wireless device in that area will be received, therefore more than one NIRC3 base stations might be required to achieve full coverage of an area. At all possible locations, an NITX must be seen by at least one NIRC3 base station. To avoid an overload of RF messages being sent to the wireless server, for example in overlapping areas, an NITX must not be seen by more than a maximum of three NIRC3 base stations.

The NIRC3 base station should be installed away from metal objects such as beams, cable conduits and pipes.

Background RF noise will affect the NIRC3 base station, therefore it is important to install the NIRC3 base station as far away as possible from sources of RF interference such as transmitters, wireless telephone system repeaters, large electrical motors, electronic ballasts, microwave ovens and air conditioning units.

The signals transmitted from the wireless devices can penetrate obstructions such as walls, ceilings and doors but the signal received by the NIRC3 base station will be reduced and can be blocked completely depending on the materials and characteristics of the obstruction.

With medium or heavy wall construction, such as concrete and metal, the penetrated signal strength from the wireless device can be significantly reduced or totally blocked. Therefore, where constructions of these types are relevant, it is important to check the signal strength to determine the locations and quantity of NIRC3 base stations which will be required to ensure adequate coverage.

The following diagram shows an example of the NIRC3 base station coverage area in the vertical plane. Depending on the type of construction signals could be received through floors and ceilings, as shown in the following illustration:

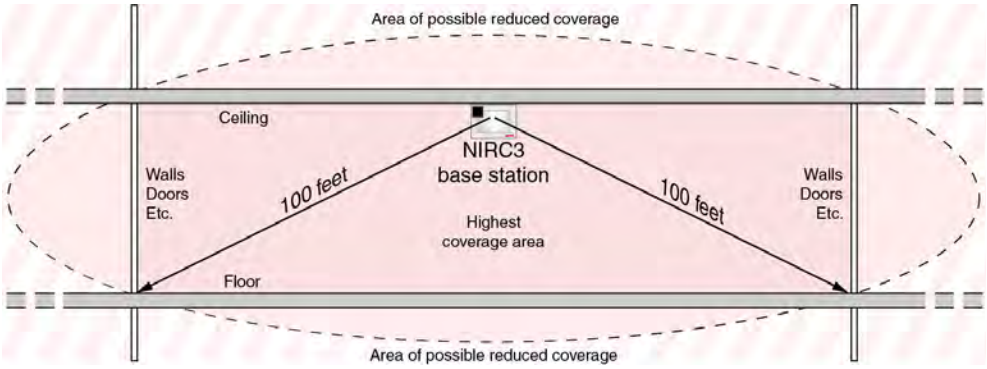



*Figure 172. NIRC3 base station vertical coverage*

The NIRC3 base station has a circular coverage distribution pattern in the horizontal plane. The optimum indoor coverage area is within approximately 100 feet of the NIRC3 base station, as shown in the following illustration.

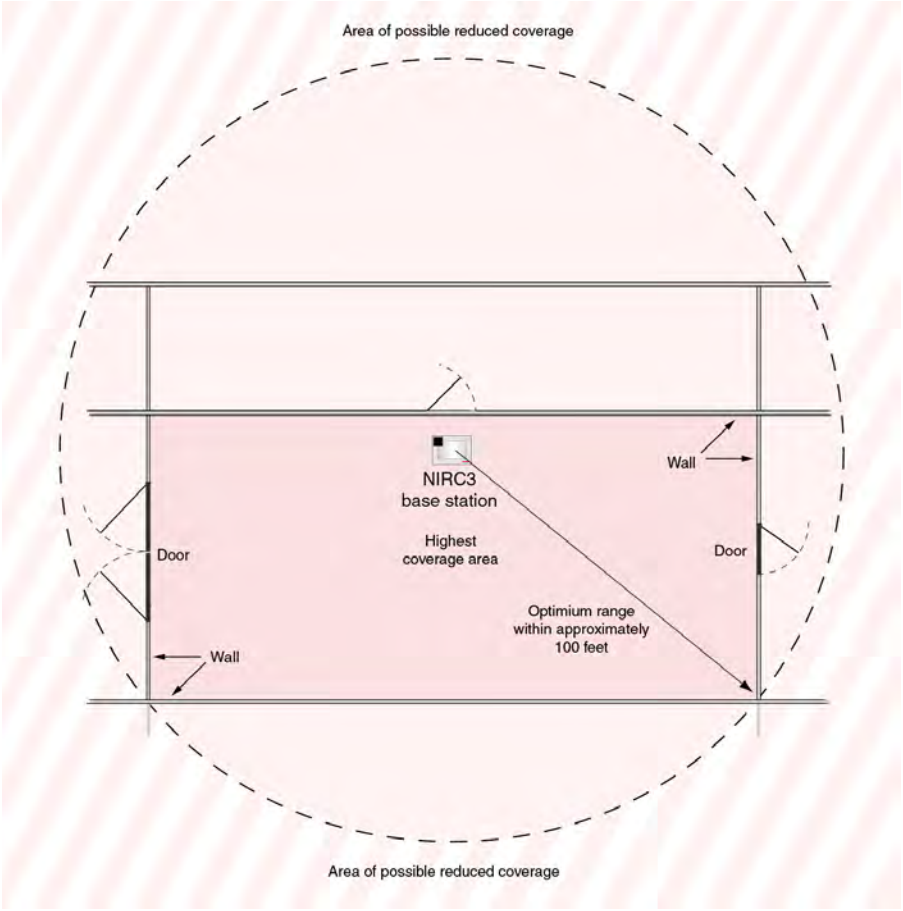



*Figure 173. NIRC3 base station horizontal coverage*

***Note:*** *The size and shape of the NIRC3 base station coverage areas in the above illustrations are theoretical. In practice the coverage can be distorted by environmental influences such as metal objects, strong magnetic fields and other sources of RF radiation.*

**Testing the NIRC3 base station Coverage Area**

To perform an RF coverage test the following equipment is required:

- An NIRC3 room controller.
- An NIRX RF transceiver module (mounted on the NIRC3).
- A USB stick containing a dedicated configuration file required for RF coverage testing.
- An NITX or NIFX that is set to "Storage" or "RF test" mode.

To set up the equipment for the RF coverage test, plug the USB stick into the NIRC3 room controller and power on the NIRC3.

***Note:*** *A module that is set to "Storage" mode will be automatically configured to operate in the "RF test" test mode when the call button is pressed for the first time. For detailed information on how to put the NITX or NIFX in RF test mode manually, refer to "Appendix - Wireless Planning Considerations" of the teleCARE IP Configuration Manual "TD 92610EN".*

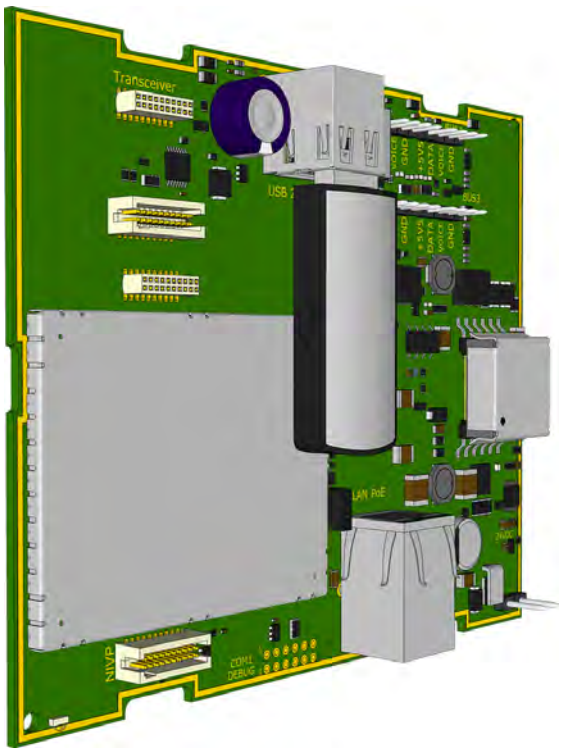
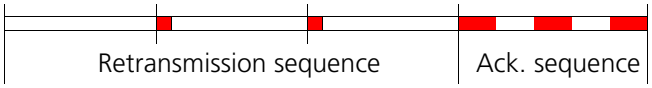



*Figure 174. NIRC3 with USB stick for RF coverage testing*

**Coverage Test Procedure**

To start coverage testing press on the call button of the NITX (or NIFX) that is operating in the RF test mode. If the NITX (or NIFX) is in range of an NIRC3 base station it will receive an acknowledgment. The LED on of NITX (or NIFX) will confirm the acknowledgment by 3 flashes within approximately 1.25 seconds.


When the NITX (or NIFX) does not receive an acknowledgment from the base station it will retransmit the message up to 4 times. The time between the retransmissions depends on the device ID and will be indicated on the NITX (or NIFX) by a series of short LED flashes with an interval of about one second.




***IMPORTANT:*** *When performing a coverage test try to avoid having retransmissions to ensure the best coverage with a minimum risk of missing RF transmissions. When retransmissions occur, plan for an additional base station (NIRC3 with NIRX) at the required location.*

Follow this RF coverage test procedure at all locations of a site to ensure complete RF coverage.

### 8.4.2 LF Planning Considerations

The NILF has an LF transmitter with a maximum transmissions range of approximately 9 feet radius, but this will vary depending on the environment. Therefore an area to be covered must be within a maximum of 9 feet of the NILF. The NILF is best mounted on a wall or at a door post at approximately 4 feet above the floor.

***Note:*** *The shape of the NILF coverage area in the following illustrations are theoretical and in practice the coverage area could be distorted by environmental influences such as metal objects, strong magnetic fields and electric motors.*

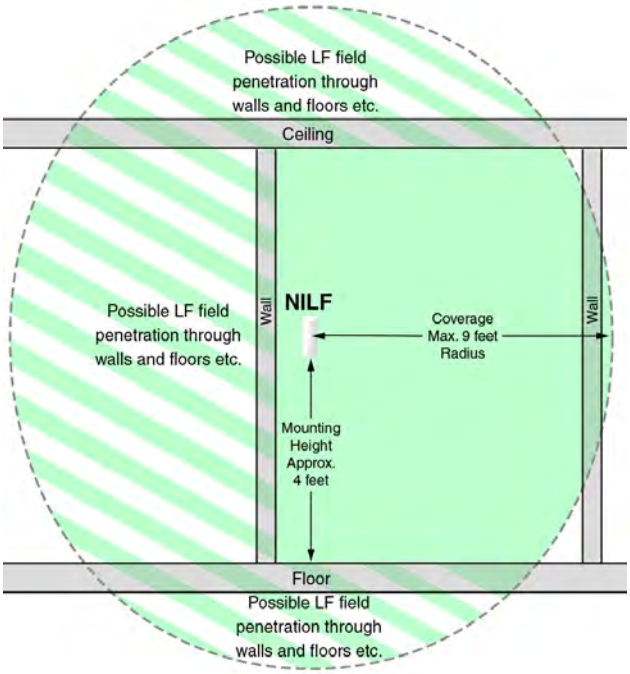



*Figure 175. Wall Mounted NILF vertical coverage*

When setting up the LF power of the NILF be aware that penetration of the LF signal to adjacent floors can cause a disturbance on the adjacent floors. Adjust the output power of the LF field to minimize the risk of disturbance to adjacent floors.

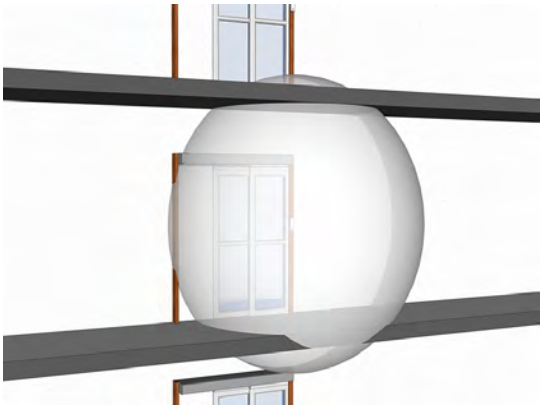


*Figure 176. Reduced LF coverage minimizing disturbance.*

***Note:*** *Refer to "NILF DIP Switch Settings" on page 180 in order to adjust the configuration of the NILF to suite the requirements.*

The NILF has a circular coverage distribution pattern in the horizontal plane. The coverage area has a radius 9 feet radius from the NILF (free of obstructions), as shown in the following illustration. Reduced signal strength is possible through walls of light weight construction.

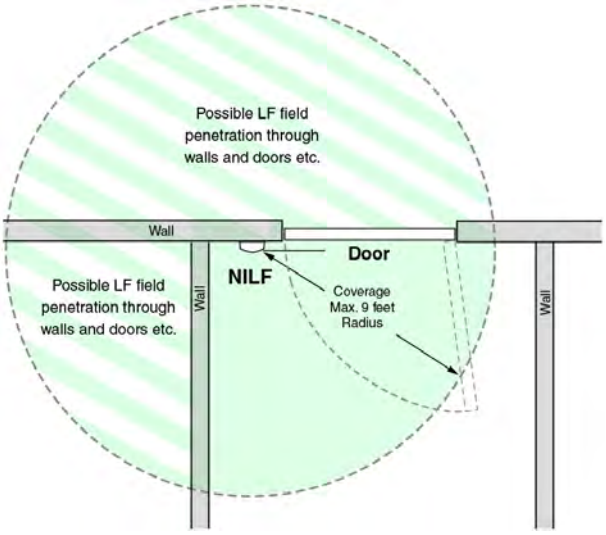



*Figure 177. Wall Mounted NILF horizontal coverage*

***Note:*** *The LF signal can penetrate certain building materials which means the signal might be detected through walls, doors and ceilings etc.*

If an LF coverage area is to be over 9 feet wide (radius), a combination of "Master and Slave" NILF beacons should be used. The maximum separation between the master and slave beacon is approximately 16 feet.

The following diagram shows an example of the measurements which should be considered when positioning "Master and Slave" NILFs.

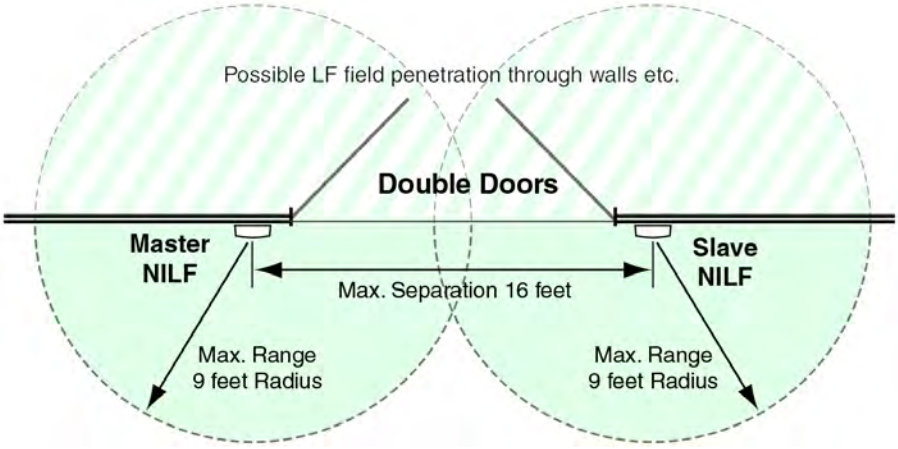



*Figure 178. Master and slave NILF coverage*

**NILF range test**

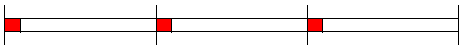
To perform an LF range test the following equipment is required:

- An NILF location beacon.
- An NITX or NIFX with LF functionality that is set to "LF test" mode.

***Note:*** *For detailed information on how to put the NITX or NIFX in LF test mode, refer to "Appendix - Wireless Planning Considerations" of the teleCARE IP Configuration Manual "TD 93019US".*

To set up the equipment for the LF range test, mount the NILF at the required location and insert the batteries.

When the wireless module (NITX or NIFX) is in range of the LF field of the NILF the LED will flash shortly once every second for as long as it is in range of the LF field.



1 second interval between flashes

## 8.5 Wireless Infrastructure

The use of a full wireless infrastructure is an extension on the existing wireless functionality and is intended for use in nursing homes and in assisted living facilities.

In an environment consisting mainly of wireless devices, a full wireless infrastructure can be achieved using a wireless gateway (NIRC3 + NUREP) in combination with wireless repeaters (NUREP).

The wireless gateway can serve up to 12 repeaters divided into three subnets each containing a maximum of four wireless repeaters (nodes). In a subnet, a node must always be installed in such a way that it is able to contact the next and previous node in the subnet in sequential order of installation / configuration. The first node added to a subnet must be able to contact the wireless gateway.

***Note:*** *A wireless repeater (node) can only communicate with the previous and next node in a subnet, communication from node to node between subnets is not possible.*

***IMPORTANT:*** *Before commissioning a system using a wireless infrastructure, make sure to test that the repeats (hops) are functioning correctly all the way from the last node in the subnet towards the wireless gateway. In systems where multiple wireless gateways are used, repeat this step for each wireless gateway configured.*

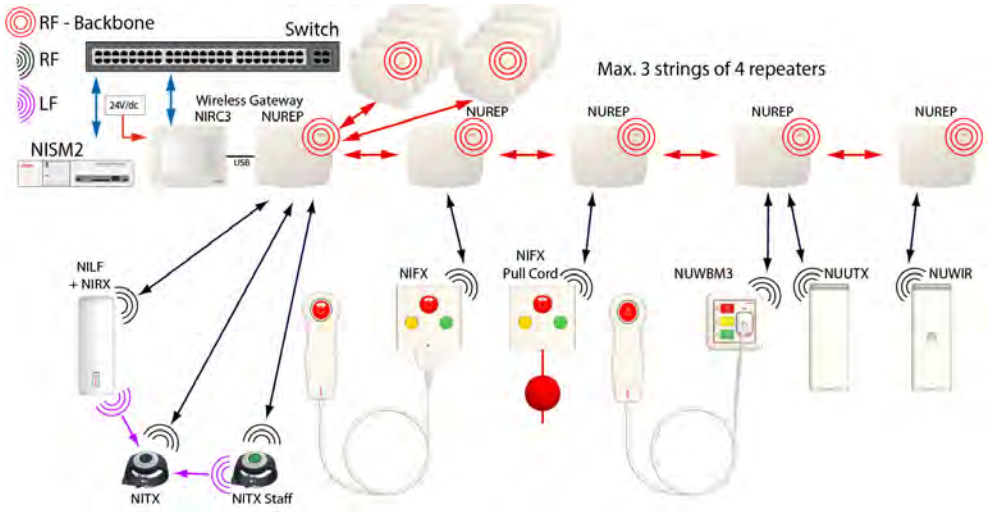



*Figure 179. Full wireless infrastructure example*

The wireless repeaters communicate with each other through a secondary transceiver operating on the 2.4GHz band (IEEE 802.15.4).

***Note:*** *Note: To minimize the risk of interference with other wireless networks in the 2.4GHz range, for example Wi-Fi, a site survey should be performed to evaluate the RF environment.*

For Wi-Fi the 802.11b standard recommends the use of non-overlapping operating channels 1, 6 and 11 for North America. Although this operating practice is not mandatory, it is often employed where multiple access points are in use. In the US and Canada, Wi-Fi channels 13 and 14 are not used, therefore the wireless repeater channels 25 and 26 can be used for operation clear of Wi-Fi interference.

When deploying a teleCARE wireless infrastructure in an environment where resource planning and bandwidth allocation can be guaranteed, a proper wireless repeater channel clear of Wi-Fi interference can be selected to ensure acceptable co-existence with Wi-Fi.

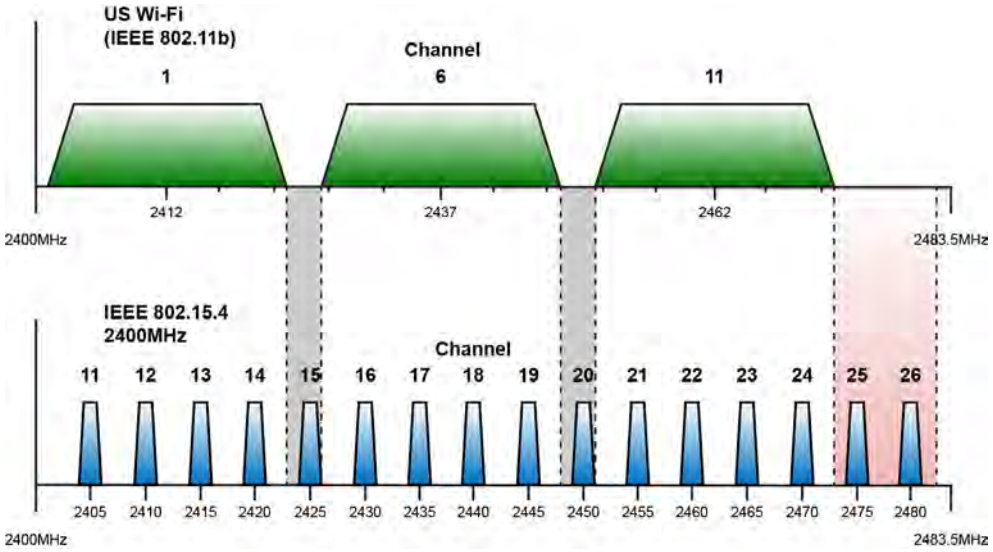



*Figure 180. IEEE 802.15.4 versus 802.11 (Wi-Fi)*

The wireless call peripherals consist of the wireless bedside module (NUWBM3), wireless universal transceiver module (NUUTX), wireless passive infrared module (NUWIR), fixed transceiver (NIFX), mobile transceiver (NITX), Staff transceiver (NITX) and an optional low frequency beacon (NILF) as described in the general section, see "General" on page 125.

Wireless Repeaters can be mounted outdoors using a suitable weatherproof enclosure that meets local electrical code. Outdoor boxes can be used to place a repeater (NUREP) in an outdoor environment, protecting the repeater from the outdoor elements. By placing a repeater in an outdoor box, the range of a wireless system can be extended outdoors, for example at a campus style facility or when outdoor coverage is required to capture calls from residents when outside. "Outdoor Box" on page 145.

## 8.6 Principle of the Wireless Infrastructure

In an environment consisting mainly of wireless devices, a full wireless infrastructure can be achieved using a wireless gateway (NIRC3 + NUREP) in combination with wireless repeaters (NUREP), To create a wireless gateway, a wireless repeater (NUREP) is connected via a USB cable to a room controller (NIRC3).

The wireless gateway is located at a central location. Around the central location repeaters (NUREP) will be used to relay the wireless messages towards the wireless gateway in three subnets containing a maximum of four repeaters per subnet.

Key advantages of using a wireless infrastructure over a wired infrastructure are:

- Reduced installation costs because less cabling and labour are required.
- Higher flexibility during system planning.
- Easier to expand.
- Less or no disturbance of residents in case of renovation.

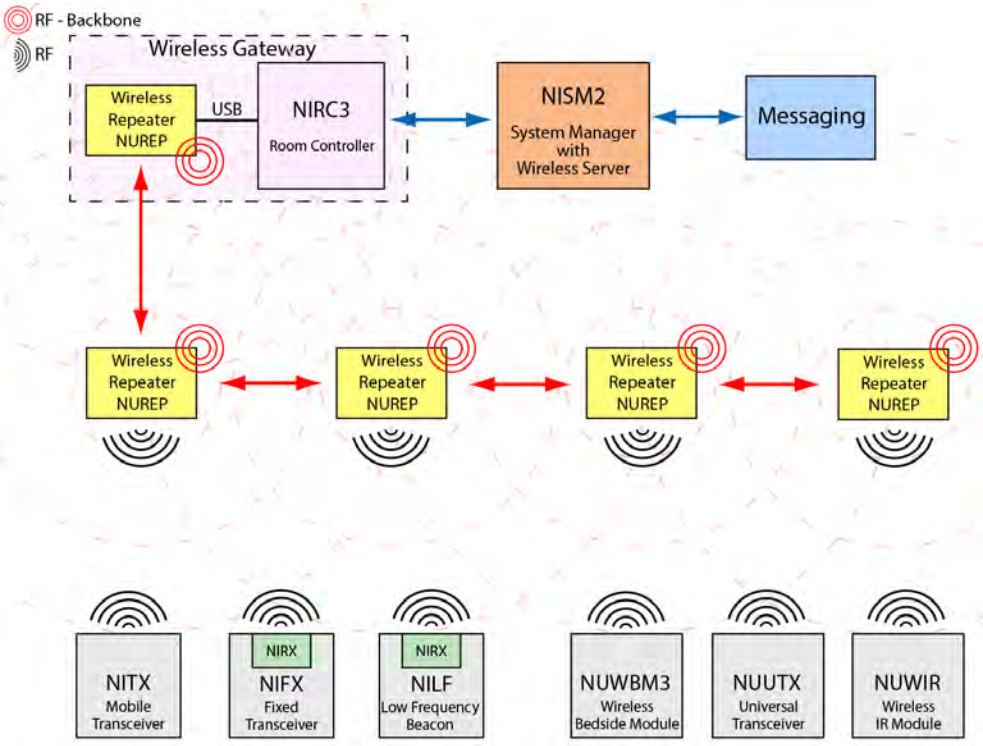



*Figure 181. Wireless infrastructure principle*

***Note:*** *The wireless infrastructure is compatible with the teleCARE IP wireless functionality using room controllers (NIRC3) with NIRX mounted. Be aware that wanderer/access control requires hard wired devices to function, therefore wanderer control will not function when using a full wireless infrastructure only.*

### 8.6.1 Wireless Infrastructure RF Planning Considerations

At all possible locations, an NITX must be seen by at least one wireless repeater. To avoid an overload of RF messages being sent to the wireless server, for example in overlapping areas, an NITX must not be seen by more than a maximum of three wireless repeaters.

Also a wireless repeater must be able to see the next and the previous wireless repeater in the subnet at all times, all the way up to the wireless gateway. The status of the wireless repeaters in a wireless infrastructure are constantly monitored and an error message will be sent if a section fails to respond.

## 8.7 teleCARE IP Wireless Components

### 8.7.1 NUREP Wireless Repeater

The wireless repeater (NUREP) is the wireless infrastructure building-block of the wireless system. Wireless repeaters receive the signals from the wireless modules from residents and all the wireless modules in the resident room. Wireless repeaters also retransmit these signals to the central equipment (wireless gateway), via other wireless repeaters. Therefore a wireless repeater must be able to reach the previous and next wireless repeater in the chain.

Wireless repeaters are dual RF transceivers. One RF transceiver (916 to 921 MHz) is used for the local traffic, events from the resident pendant, wrist transceiver or the fixed wireless modules in the room. The other RF transceiver (IEEE 802.15.4) is used for transmitting the events to the other wireless repeaters, thereby creating a wireless backbone that is capable of handling high traffic.

Repeaters are supervised by the central equipment. Repeaters deliver a complete 2-way radio infrastructure, from the wireless device at the resident or room, to the central equipment.

Repeaters are mains powered via a 5VDC Class II power adapter that comes included with the repeater. it also has a battery backup source providing power for **> 5 hours**, in case of mains power failure.


*Figure 182. Wireless Repeater - NUREP*

### NUREP Electrical Connections

The figure below shows the electrical connections of the wireless repeater (NUREP).

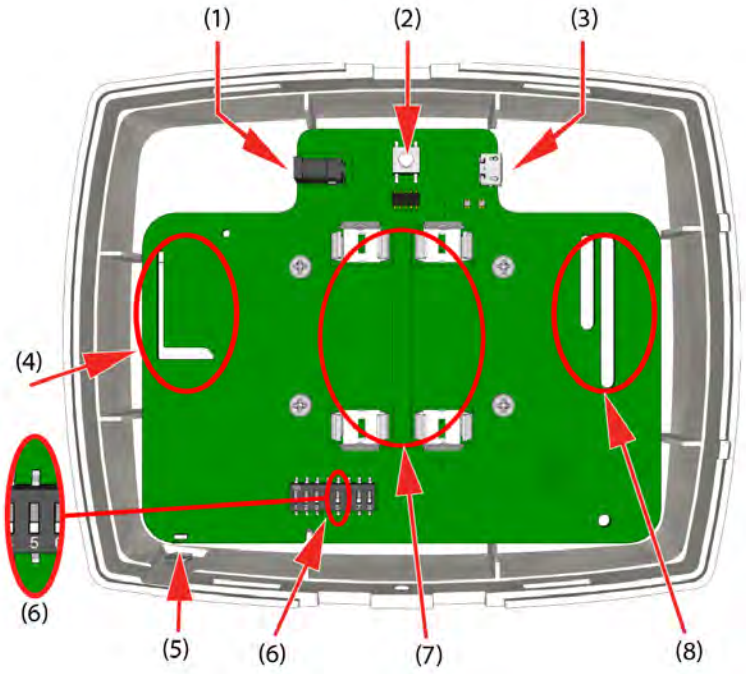



*Figure 183. NUREP electrical connections*

(1) 5VDC power connector - For connecting the supplied 5VDC Class II power adapter

(2) Reset switch

(3) Micro USB connector - Not applicable

(4) Internal RF antenna section - For RF (916 to 921 MHz) communication with wireless modules

(5) Multi color status LED, see the "Status LED colors" table below

(6) 8 pole DIP switch - Mode:
SW5 off - Wireless Repeater
SW5 on - Wireless Gateway

(7) Battery connection - Optional, for placing two AA type 1.5V alkaline batteries

(8) Internal RF antenna section - For RF (IEEE 802.15.4) communication between repeaters

| NIRC3 - Status color | Status |
|---|---|
| Steady blue | Normal operation |
| Steady green | Searching for 2G4 network |
| Steady Red | Error |

*Table 9. Status LED colors*

### NUREP External Power Supply Connection

Connect the supplied 5VDC Class II power adapter to the wireless repeater.

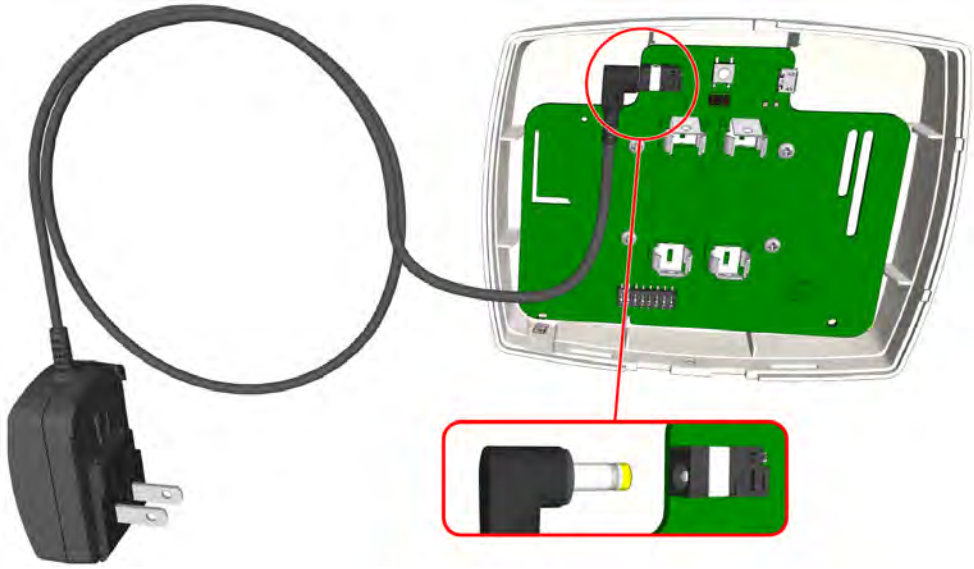


*Figure 184. Connect the external power supply.*

### NUREP Battery Placement (Optional)

It is possible to place two batteries as backup power in case the mains power fails. Place the two AA type 1.5V alkaline batteries according the image below, observe polarity.

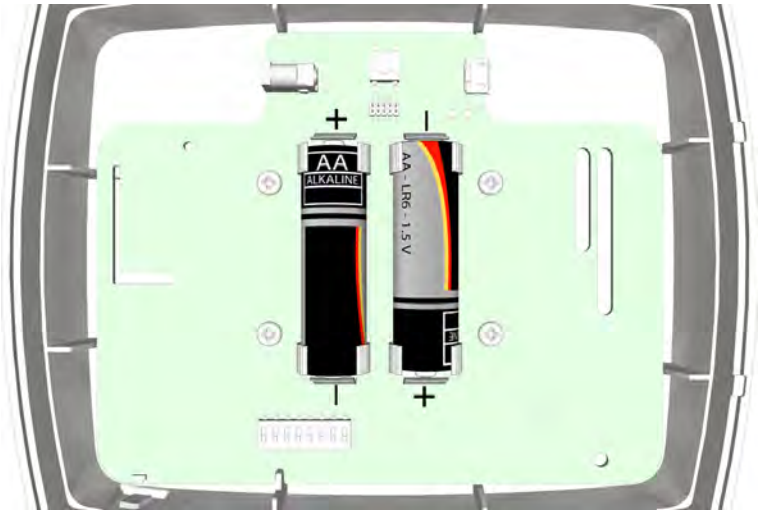



*Figure 185. Insert the batteries*

### 8.7.2 Outdoor Box

Wireless Repeaters can be mounted outdoors using a suitable weatherproof enclosure that meets local electrical code.

An outdoor box protects the repeater from the outdoor elements, for example at a campus style facility or when outdoor coverage is required to capture calls from residents when outside.

An example of an outdoor box is shown below.


*Figure 186. Example of an outdoor box with repeater.*

### 8.7.3 Wireless Gateway

The wireless gateway (NIRC3 + NUREP) is the interface between the wireless infrastructure and the teleCARE IP central equipment (system manager). The wireless gateway is the central receiver receiving the RF signals of the repeaters and the RF signals of the wireless devices that are in the direct vicinity of the wireless gateway.


*Figure 187. Wireless repeater consisting of an NIRC3 and a NUREP*

The wireless gateway is a combination of two products:

- The repeater (NUREP). To receive the RF signals from the repeaters.
- A room controller (NIRC3) to relay the signals from the repeater to the local area network and the system manager (NISM).

### Wireless Repeater Electrical Connections for Wireless Gateway Usage

The wireless repeater is connected to the room controller via a USB cable. This cable takes care of the data and the power of the repeater. The room controller is powered by the 24VDC system power.

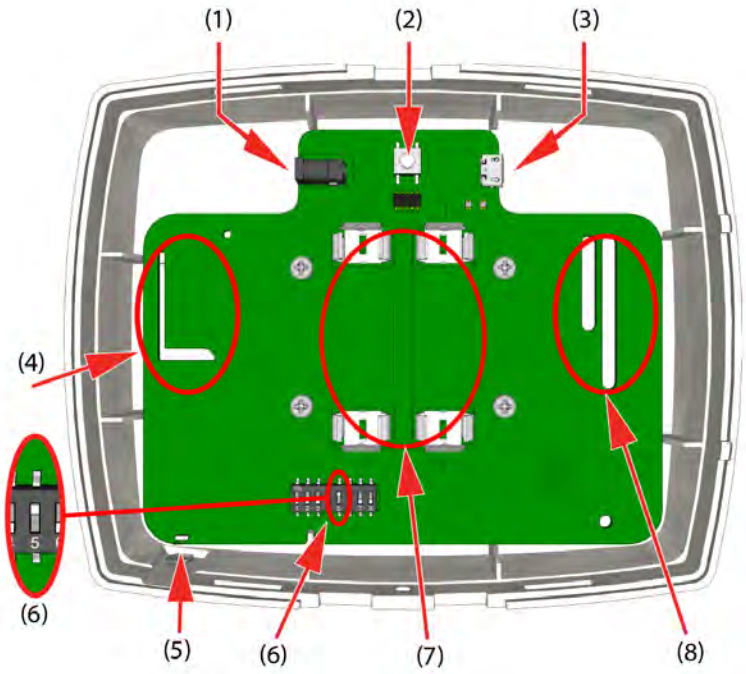



*Figure 188. NUREP electrical connections for wireless gateway usage*

Legend:

(1) 5VDC power connector - Not applicable for the wireless gateway

(2) Reset button

(3) Micro USB connector - For 5VDC power supply and data connection to NIRC3 using a USB to micro USB connection cable (Article number 660464).

(4) Internal RF antenna section - For RF (916 to 921 MHz) communication with wireless modules

(5) Multi color status LED, see the "Status LED colors" table below

(6) 8 pole DIP switch - Mode:
SW5 off - Wireless Repeater
SW5 on - Wireless Gateway

(7) Battery connection - Not applicable for wireless gateway functionality.

(8) Internal RF antenna section - For RF (IEEE 802.15.4) communication between repeaters

| NIRC3 - Status color | Status |
|---|---|
| Steady blue | Normal operation |
| Steady Red | Error |

*Table 10. Status LED colors*

**NUREP - NIRC3 Interconnection**

Wireless gateway NUREP - NIRC3 Interconnection using a USB to micro USB cable (Article number 660464).

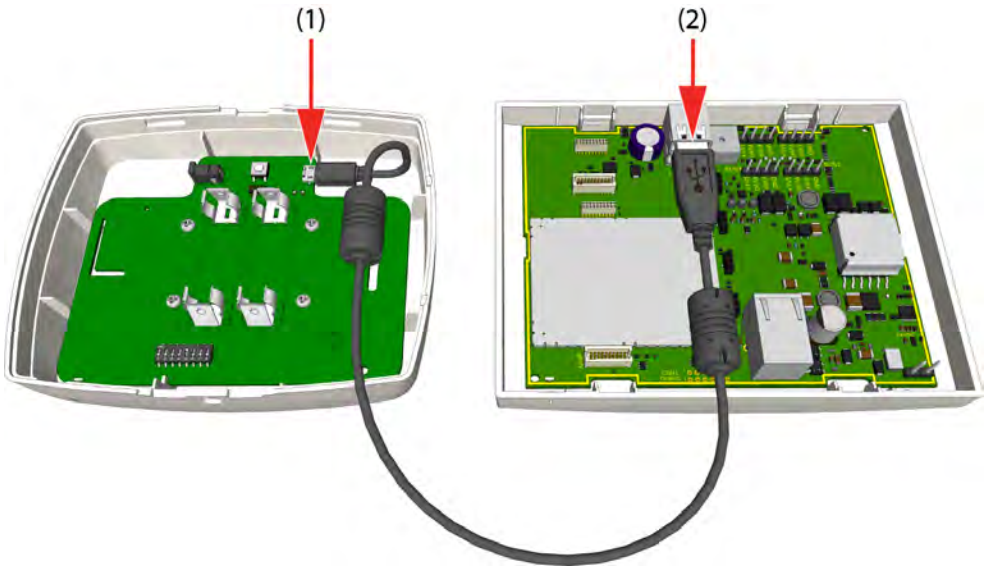



*Figure 189. USB connection between NIRC3 and NUREP*

(1) Plug the micro USB connector into the socket on the wireless repeater NUREP.

(2) plug the USB connector into the top slot of the USB 2.0 socket on the NIRC3

*Figure 190. Example of the USB connection from NIRC3 to NUREP*

Use the cutouts on top of both spacers to guide the USB cable from the NIRC3 to the NUREP.

### 8.7.4 NUWBM3 Wireless Active Bedside Module

The wireless bedside module (NUWBM3) is a wall mounted switch module. It has three customizable buttons with LEDs, a white plastic body and includes a spacer for surface mounting. It comes with an Ascom SafeConnect socket used for the connection of the bedside handset. see "NUHS1B Handset Connection" on page 153


*Figure 191. NUWBM3*

**NUWBM3 Electrical Connections**

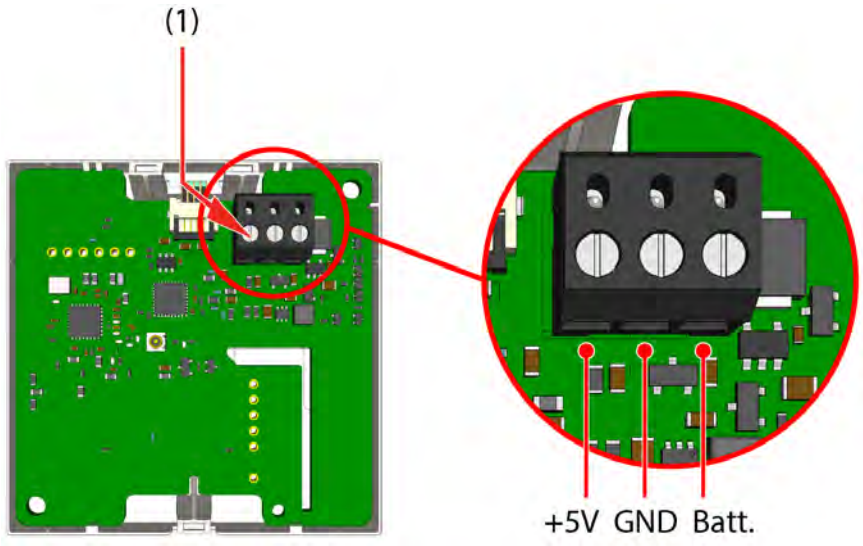



*Figure 192. NUWBM3 electrical connections*

(1) Power connector - For connecting the batteries or a an optional 5 VDC Class II power adapter (CE, UL approved)

**NUWBM3 Battery Connections**

Connect the battery leads of the battery holder to the 3-pole screw terminal connector..

2 - Battery lead ground connection
3 - Battery lead +V connection


*Figure 193. NUWBM3 battery connection*

Insert two AA alkaline batteries, observe polarity

*Figure 194. Batteries inserted into battery holder*

Assemble the NUWBM3.

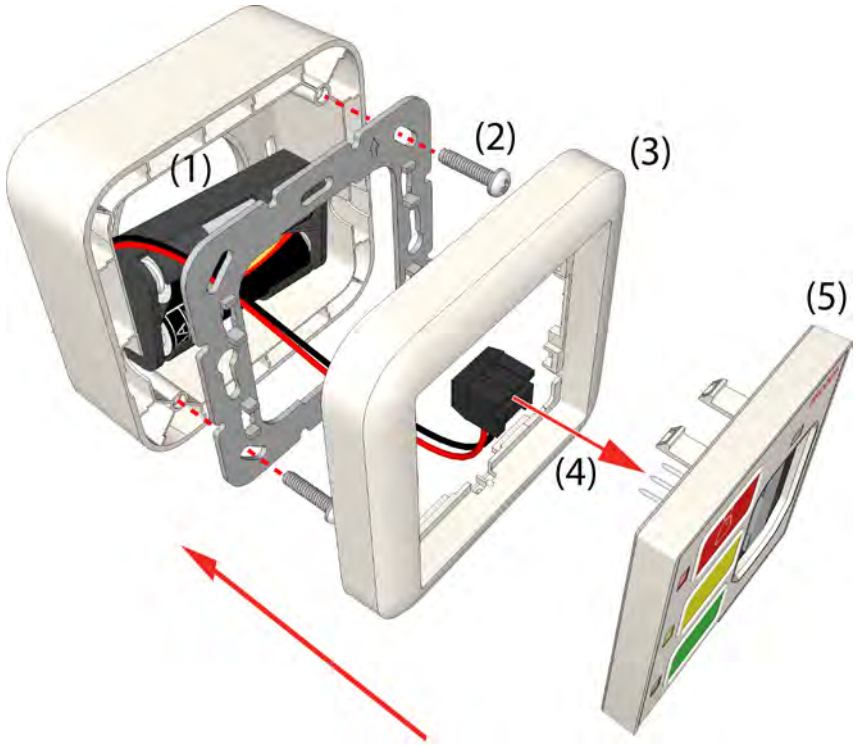



*Figure 195. NUWBM3 assembly*

Mount the NUWBM3 onto the spacer:

(1) Insert the battery holder into the spacer

(2) Screw the metal adapter onto the spacer

(3) Slide the frame onto the adapter

(4) Connect the 3-pole screw terminal connector to the NUWBM3 circuit board

(5) Insert the NUWBM3 into the frame till it snap fits

Back view of an assemble NUWBM3.

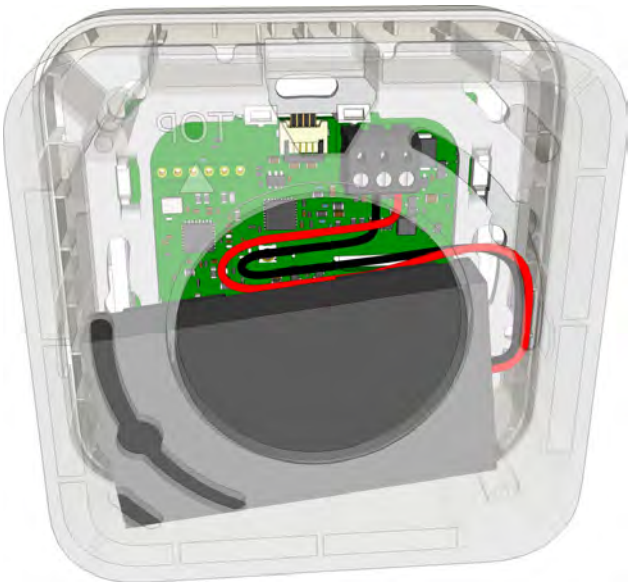


*Figure 196. NUWBM3 assembled*

**NUWBM3 External Power Supply Connection (Optional)**

Connect the Class II power adapter (CE, UL approved) to the 3-pole screw terminal connector.

1 - Power supply lead +5 VDC connection
2 - Power supply lead ground connection


*Figure 197. External 5 VDC connection*

### Remove the NUWBM3 from the Spacer

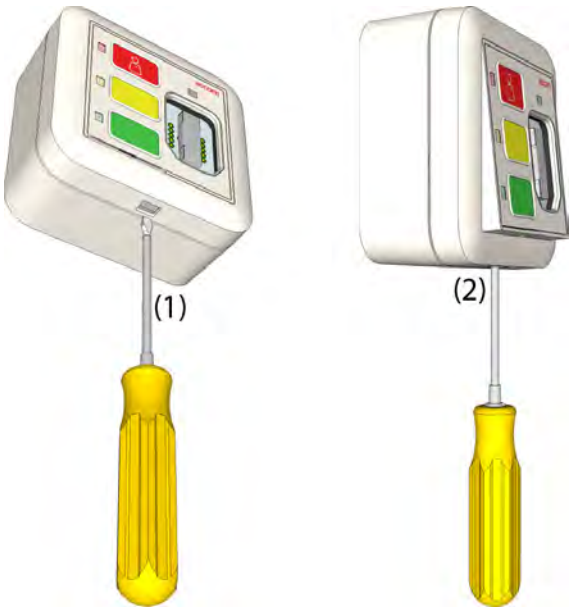



*Figure 198. Remove the NUWBM3 from the spacer*

To remove the NUWBM3 from a spacer, for example to change the batteries:

(1) Insert a flat blade screwdriver into the bottom of the frame

(2) Gently push the screwdriver upwards until the NUWBM3 is released from the metal adapter.

### NUHS1B Handset Connection

The Ascom SafeConnect socket is used for connecting the NUHS1B 1-button handset with handset disconnect alarm functionality. 3, 7 and 14 button handsets are not supported.

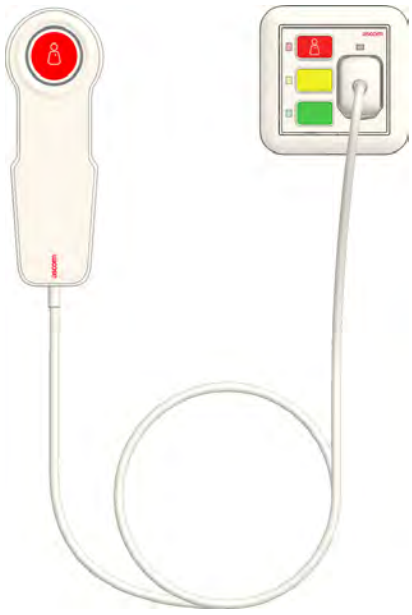


*Figure 199. NUHS1B handset connected to the NUWBM3*

### 8.7.5 NIRX teleCARE IP Transceiver

The NIRX transceiver is a printed circuit module which is piggy back mounted on the NIRC3 room controller and the NIFX fixed transceiver. The NIRX will adds wireless call functionality to the NIRC3 room controller and the fixed transceiver. Optionally the NIRX can also be mounted on the NILF location beacon for actively monitoring the state of the NILF, such as tamper and low battery alarm conditions.

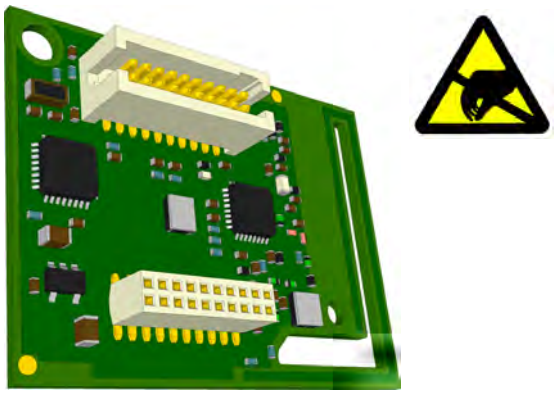


*Figure 200. Transceiver piggyback module (NIRX)*

### 8.7.6 Connecting the Transceiver Module

The NIRX is piggyback mounted on the NIRC3 room controller, on the NIFX fixed transceiver and on the NILF low frequency beacon printed circuit boards:

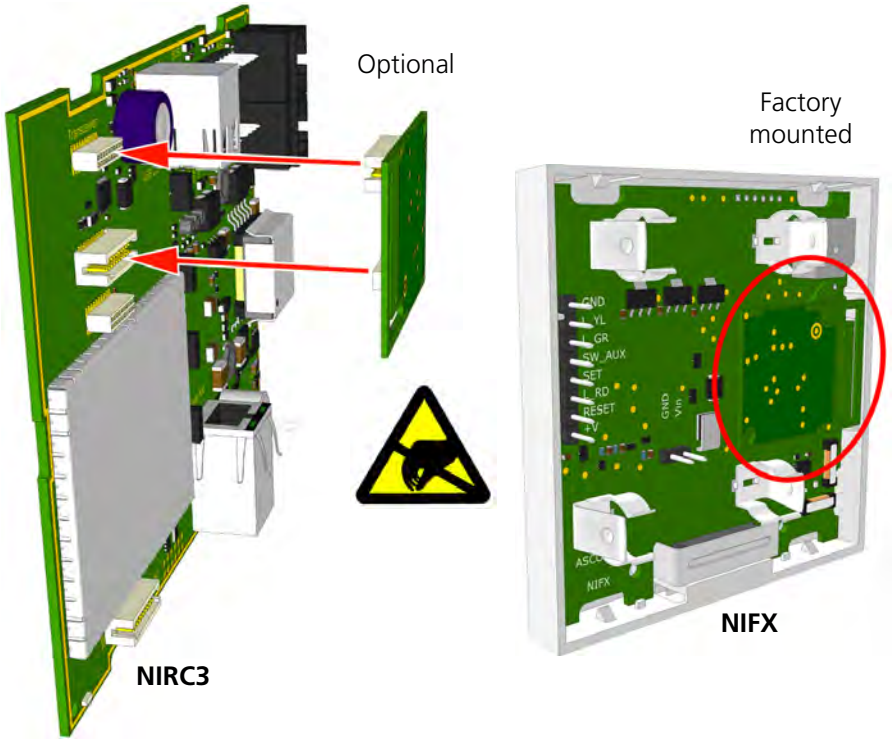



*Figure 201. Piggyback mounting of the transceiver module on the NIRC3 and NIFX*

***Note:*** *The NIFX is delivered with an NIRX mounted from the factory.*

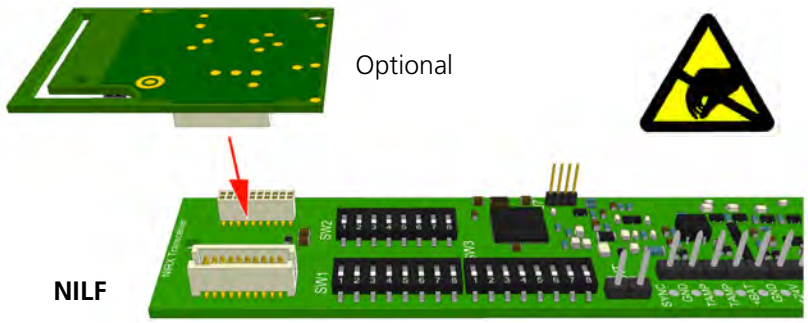



*Figure 202. Piggyback mounting the transceiver module on the NILF*

### 8.7.7 NIVP Voice Piggyback Module

The NIRC3 can be extended with an optional voice piggyback module (NIVP) to include speech and with an optional transceiver module (NIRX) for wireless functionality.

#### Connecting the NIVP Module

The NIVP is piggyback mounted on the NIRC3 room controller, plugging into the two connectors:

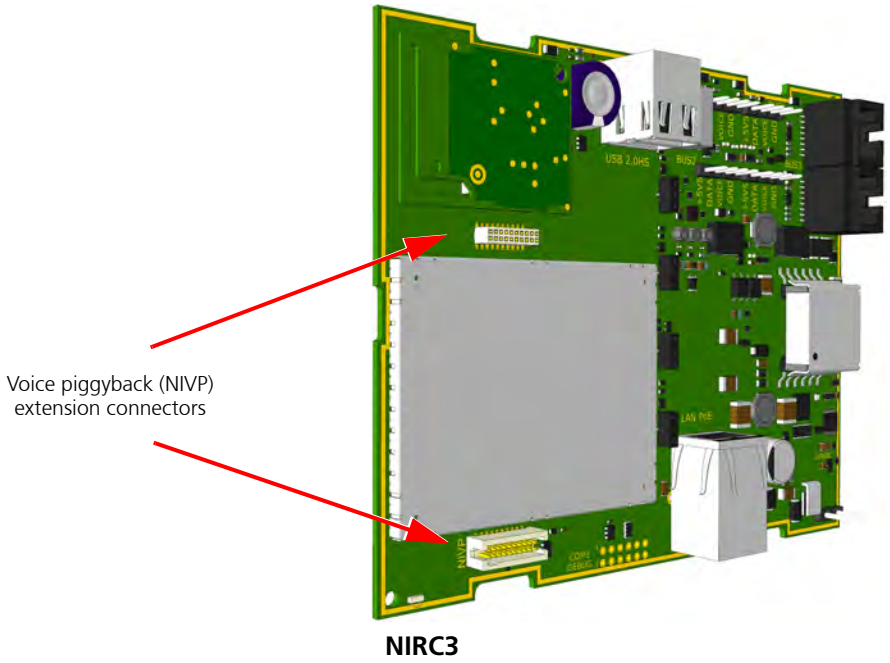



*Figure 203. Voice piggyback (NIVP) extension connectors*

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### 8.7.8 NIFX Fixed Transceiver

The NIFX series fixed transceiver is a wireless teleCARE IP switch module which is available as socket module or pull cord module. It has 3 function buttons, a white plastic body and includes a spacer for surface mounting. The pull cord version includes the cord with two red balls but no socket.

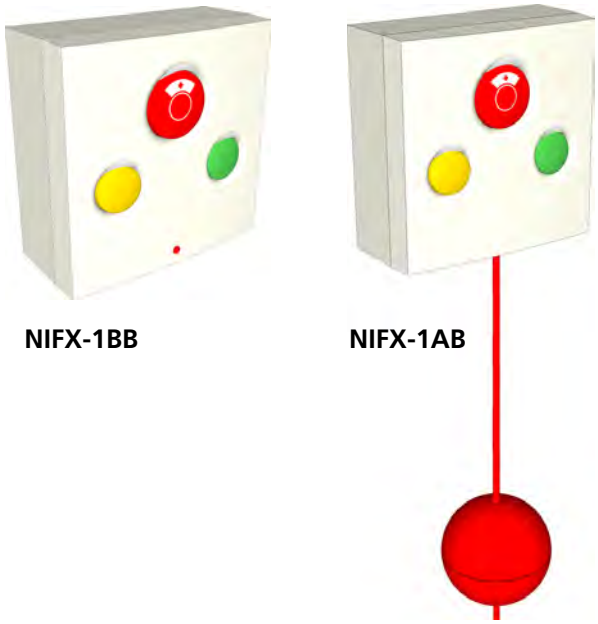



*Figure 204. NIFX wireless socket module and pull-cord module*

The NIFX socket variant (NIFX-1BB) supports the connection of a passive patient handset, see "Handset Connection" on page 157.

#### Connecting an External Alarm

The fixed transceiver includes an 8-pole teleCARE bus connector for the hard wiring of an external alarm contact. Only the SW_AUX and +V pins are used. The external alarm contact should be normally open. The external alarm call is cleared when the contact opens.

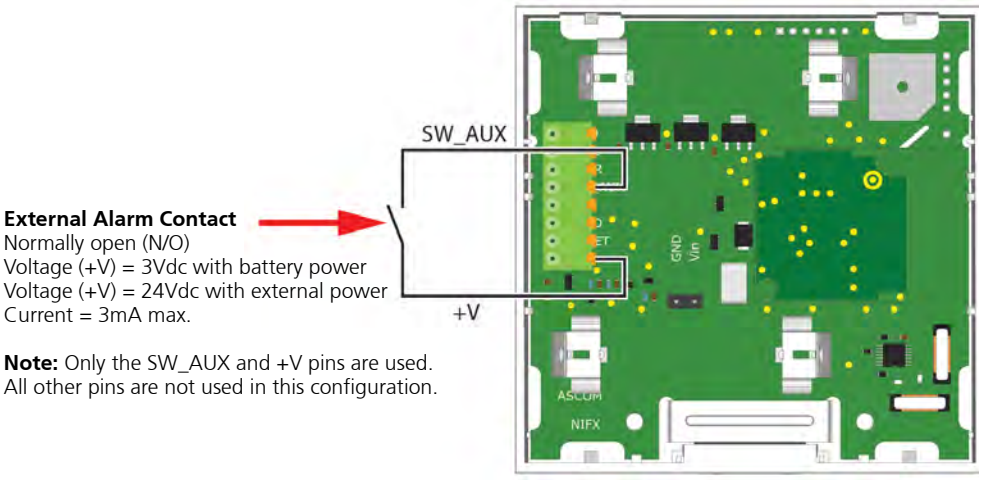



*Figure 205. Connecting an external alarm contact to the NIFX*

### Replacing the Batteries

The NIFX fixed transceiver requires 2 x 1.5V AA disposable alkaline batteries. The battery voltage is continually monitored and if low voltage is detected a “low battery” alarm is transmitted.

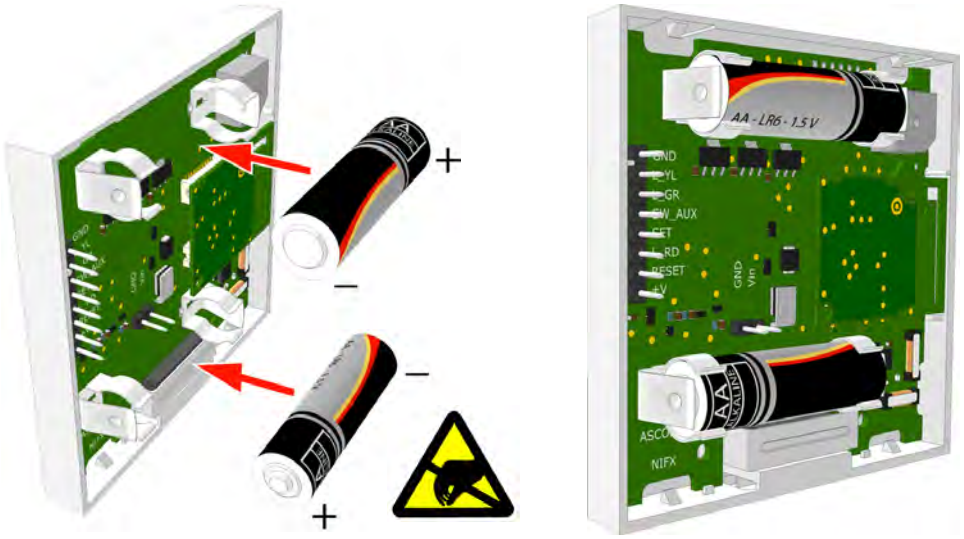



*Figure 206. Replacing the batteries*

The low battery status is included in every heartbeat transmission of the unit. Under normal circumstances the battery life is 1 to 1½ years.

When battery powered, the fixed transceiver LEDs stay active for a period of 30 seconds after a call has been made. When externally powered the red, yellow and green LEDs will permanently emit a low intensity light for locating and identification in the dark.

### Handset Connection

The socket module version of the fixed transceiver (NIFX-1BB) includes a teleCARE Safe Release socket for connecting the NIPH2-A1A handset with handset disconnect alarm functionality. Speech/Entertainment handsets are not supported.

*Figure 207. NIPH2-A1A handset connected to the NIFX-1BB*

### 8.7.9 NITX Mobile Transceiver

The NITX-AAB and NITX-BAB mobile transceivers are wireless call units for residents. The NITX-BBB is a staff transceiver for staff and caregivers. They are robust and water resistant (IP 67).

The units NITX-AAB and NITX-BAB contain a 916 to 921 MHz RF transceiver, a call button and a reassurance LED. The NITX-BAB also include a 125 kHz LF receiver used for remote call cancellation by a staff transceiver (NITX-BBB) and for location determination using LF beacons. Each mobile transceiver has a unique identity (ID) which is transmitted with every event from the transceiver.

*Figure 208. teleCARE IP mobile transceiver*

The transceivers can be fitted with a wrist strap so that it can be worn like a wrist watch. Alternatively, it can be attached to a lanyard so that it can be worn around the neck. The wrist strap and lanyard must be ordered separately.

**Using the NITX-AAB Transceiver**

- A single short button press places a normal call. "Normal call" is displayed on the NIRD that is configured for that room.
- A single long button press places an assistance call. "Assistance" is displayed on the NIRD.
- A single long button press followed by three short button presses cancels the call.
- Calls can be remotely canceled by a suitably configured doorside module or room display.

**Using the NITX-BAB Transceiver**

- A single short button press places a normal call. "Normal call" is displayed on the NIRD.
- A single long button press places an assistance call. "Assistance" is displayed on the NIRD.
- A single long button press followed by three short button presses cancels the call.
- A call can be canceled from an NITX-BBB staff transceiver by a short press on the staff transceiver button when it is within 12 inches of the NITX-BAB.
- Calls can be remotely canceled by a suitably configured doorside module or room display.

***Note:*** *When the NITX-BAB enters the room, "Enter" will be displayed on the NIRD that is configured for that room.*

### Using the NITX-BBB Transceiver

The NITX-BBB may be used by the staff and caregivers to cancel calls initiating from a NITX (BAB) and NIFX (1AB or 1BB) or to call for assistance.

- A single short button press cancels a call when the staff transceiver is within one foot of the NITX or NIFX which initiated the call.

If additional assistance is needed:

- A single Long button press places an Assistance call. "Assistance" is displayed on the NIRD that is configured for that room.
- A single Long button press followed by three Short button presses cancels the "Assistance" call.

### Removing the Rear Cover

Removing the rear cover of the transceiver is necessary when replacing the battery.

Remove the four torx screws at the back of the transceiver using A special screwdriver (T3) or bit (IP-3). When the screws are removed, gently pull off the rear cover.

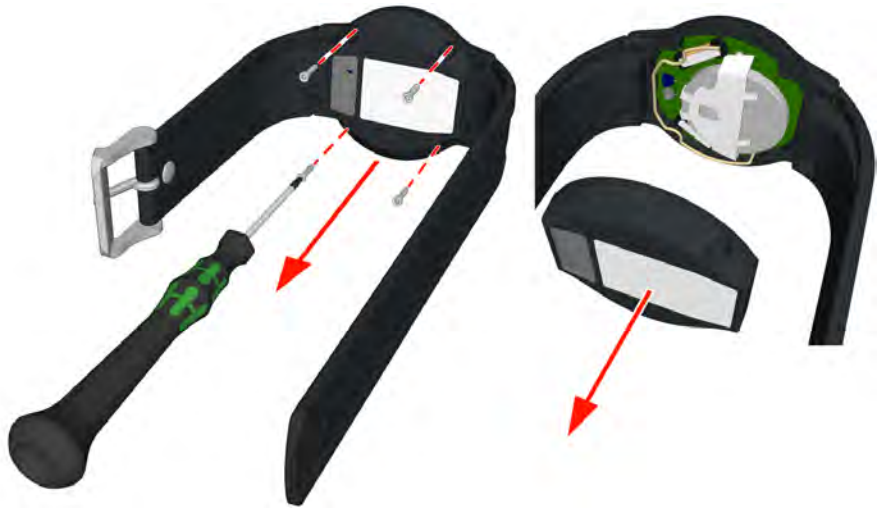


*Figure 209. Removing the rear cover*

***Note:*** *Removing the rear cover will wear out the screw holes of the front cover, therefore the transceiver can be opened and closed approximately three times.*

### Replacing the Battery

The transceiver is powered by a 3 volt lithium replaceable battery (type CR2450 or equivalent). The battery voltage is constantly monitored and if low voltage is detected a "low battery" alarm is transmitted as part of the heartbeat transmission of the unit. Under normal circumstances the battery life is 1 to 1½ years.

Start by removing the rear cover, see "Removing the Rear Cover" on page 159, then remove the printed circuit board by pulling it out of the body of the transceiver.

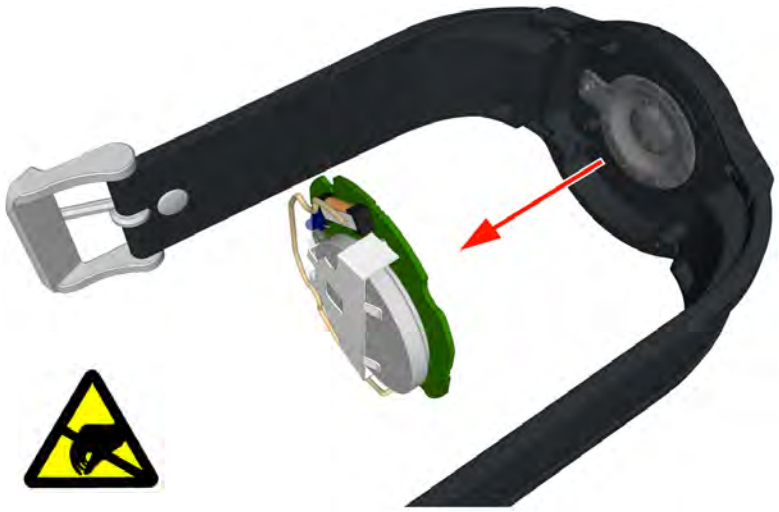


*Figure 210. Remove the circuit board*

Remove the battery from the circuit board by sliding it in the direction of the arrow. Place the new battery with the positive"+" terminal facing upwards and slide it into place.

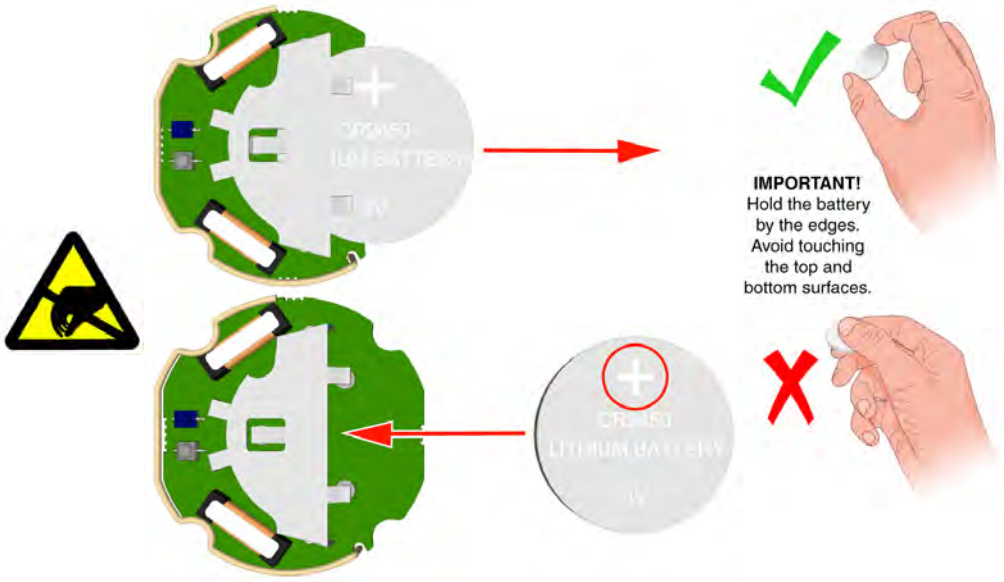



*Figure 211. Removing the old and placing the new battery*

### Transceiver Accessories

Interchangeable rings, buttons and strap loops make it possible to customize the transceiver body. The four rings and six buttons including a ring mounting tool are available as customization kit and the five strap loops including a rivet are available as an accessory kit.

*Figure 212. Transceiver accessories*

### 8.7.10 NUUTX Universal Transceiver

The universal transceiver (NUUTX) is a wireless interface point for all sorts of sensors and detectors. The NUUTX has two independent inputs and a magnetic window/door alarm detector. The NUUTX is battery operated with a battery lifetime of > 5 years.

*Figure 213. NUUTX Universal Transceiver*

**NUUTX Components**

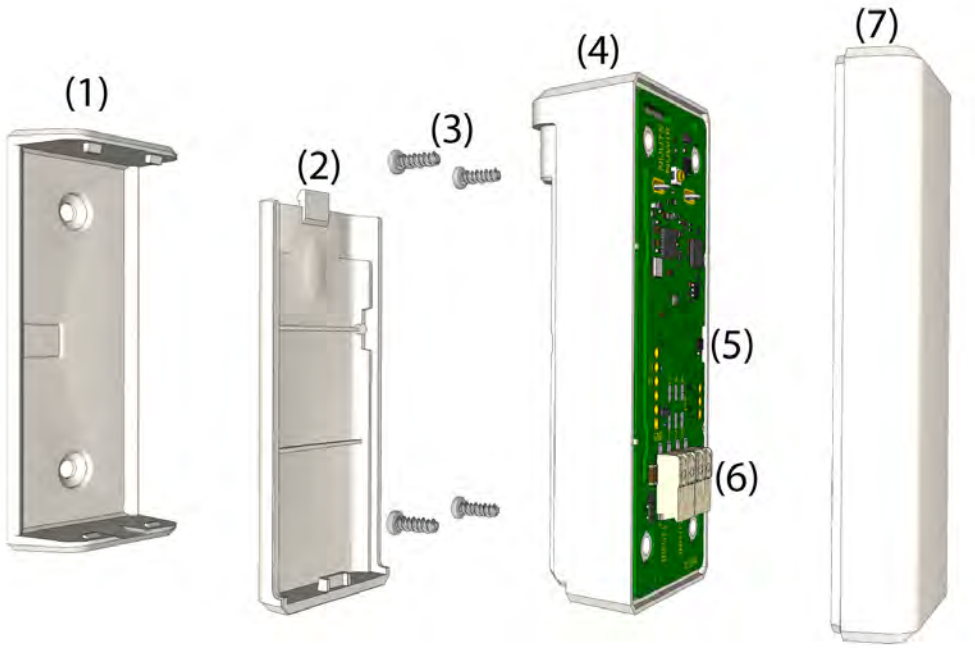



*Figure 214. NUUTX Universal Transceiver exploded view*

NUUTX components:

(1) Bracket for mounting the NUWIR on walls or window/door posts

(2) Battery lid

(3) Screws

(4) Case (lower halve) with circuit board mounted

(5) Location of magnetic field sensor

(6) Two 2-pole spring loaded wire clamp connectors for the connection of external contacts

(7) Case (upper halve)

**NUUTX Window - Door Alarm Monitoring**

The NUUTX can be used to detect the state of a window or door using a (hall effect switch) which is mounted on the NUUTX circuit board. The NUUTX can be mounted on a door or window post and a magnet can be mounted on the door or window which should be aligned to the center of the NUUTX as shown in the picture below.

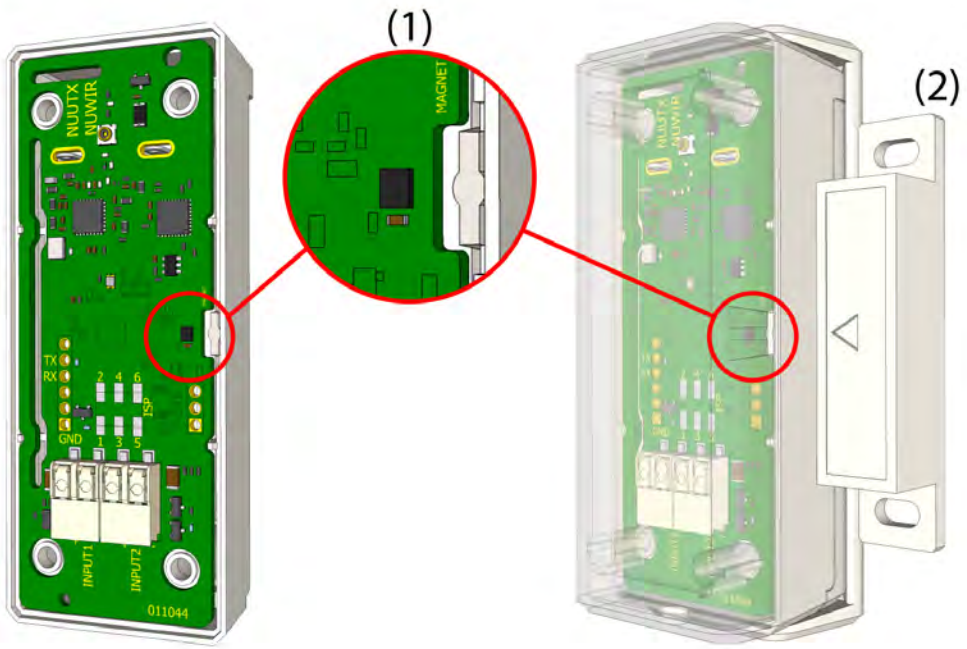



*Figure 215. Window - door alarm monitoring.*

Legend:

(1) Hall effect switch for detecting the magnetic field of the magnet

(2) Magnet mounted on the door or window aligned to the center of the NUUTX at the side of the hall effect switch

***Note:*** *For windows or doors that open in the opposite direction, the NUUTX can be rotated 180 degrees to make sure that the magnet is aligned to the side of the NUUTX where the hall effect switch is mounted on the circuit board.*

Alternatively in situations where existing window or door contacts are available or when integrated into a window or door post, the outputs can be connected to one of the NUUTX inputs. See “NUUTX Inputs” on page 165.

### NUUTX Inputs

The NUUTX has two inputs that can be used to interface external alerts coming from a wide variety of detectors. For example:

- Fire detectors
- Window/door open detector
- Low pressure switches to generate an alert from a resident
- Bed exit sensor
- Chair sensor
- Alerts from the building management system

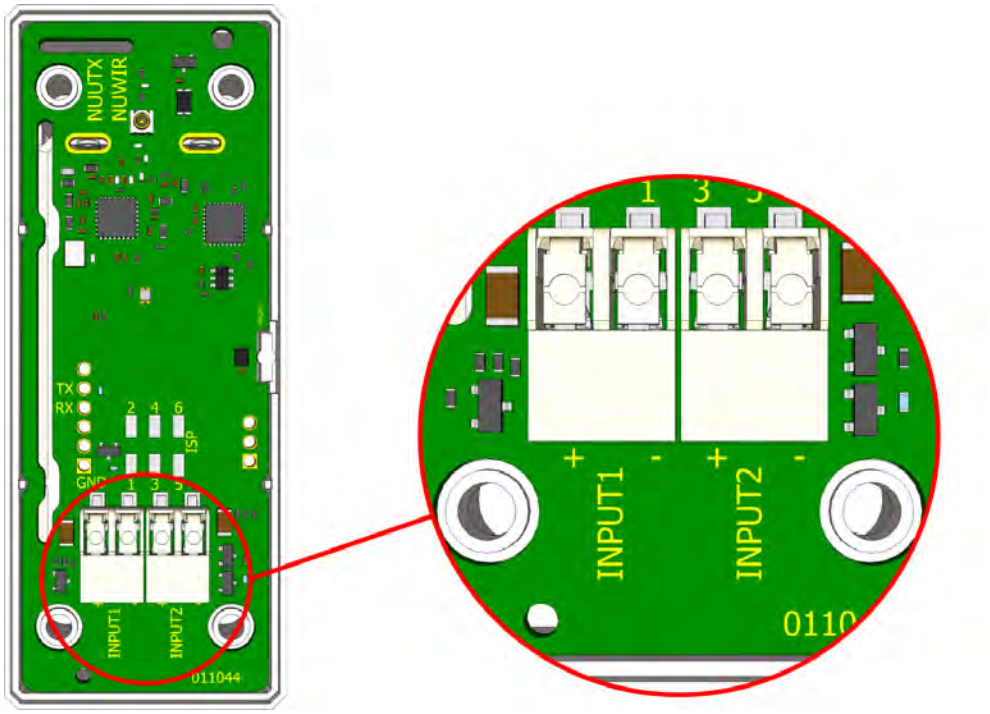



*Figure 216. NUUTX inputs*

The NUUTX features two independent inputs, supporting:

- Normally open (with line monitoring) and normally closed contacts
- Flashing contacts from 1 Hz
- A DC voltage from 10VDC to 30VDC

### 8.7.11 NUWIR Wireless PIR Module

The motion sensor or PIR (passive infrared) sensor (NUWIR) is used to detect resident movement. For example the NUWIR can be used in the toilet, to indicate that a resident is in the toilet. Software will determine when to alert the caregivers. The NUWIR is battery operated with a battery lifetime of > 3 years.

*Figure 217. NUWIR PIR (Passive Infra-Red) sensor*

The NUWIR can be used with the automated check-in functionality to automatically perform a resident check-in based on the residents movement.

**NUWIR Components**

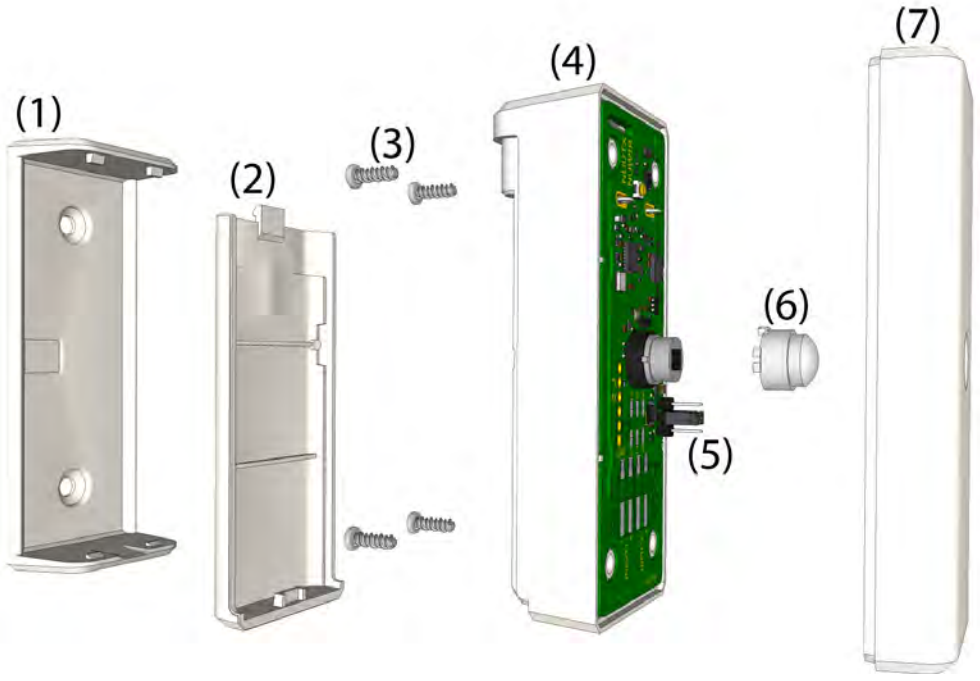



*Figure 218. NUWIR exploded view*

NUWIR components:

(1) Bracket for mounting the NUWIR on walls or window/door posts

(2) Battery lid

(3) Screws

(4) Case (lower halve) with circuit board mounted

(5) 3-pin header used to set the sensitivity of the PIR module

(6) Fresnel lens, adjust orientation depending on horizontal or vertical mount

(7) Case (upper halve)

**NUWIR Orientation**

The default orientation for mounting the NUWIR is vertical. The NUWIR can also be mounted horizontally, however note that the orientation of the fresnel lens should be adjusted when mounted horizontally.

To change the orientation of the fresnel lens, remove the fresnel lens from the PIR sensor and reorient the lens depending on the required orientation for mounting.

The graphic below shows the required orientation of the fresnel lens when mounting the NUWIR vertically.

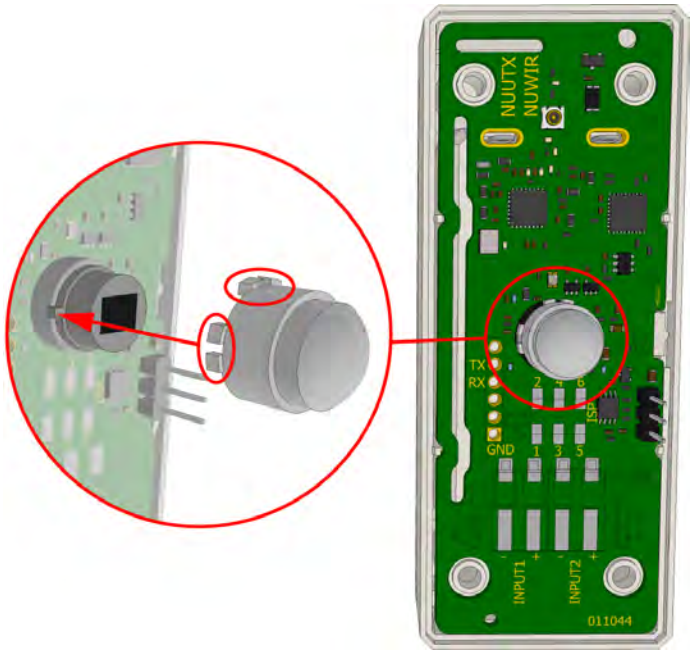



*Figure 219. Fresnel lens (default) orientation for vertical mount*

The graphic below shows the required orientation of the fresnel lens when mounting the NUWIR horizontally.

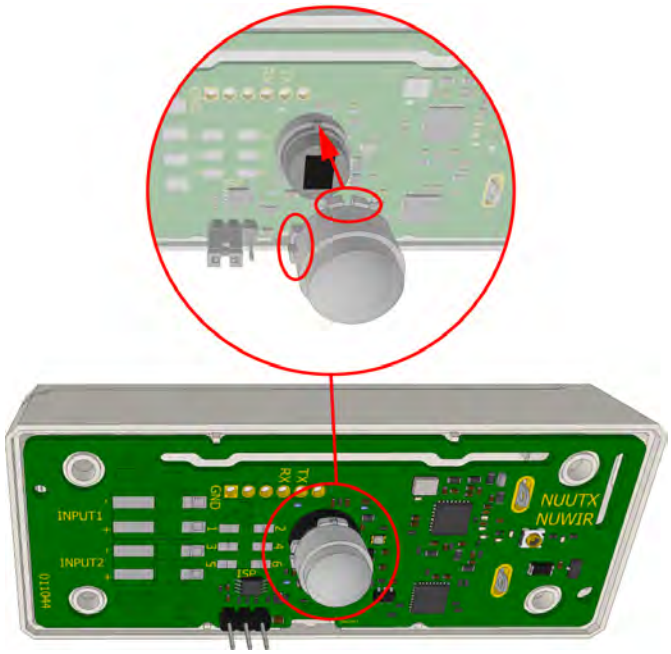



*Figure 220. Fresnel lens orientation for horizontal mount*

**NUWIR Sensitivity**

The sensitivity of the NUWIR can be set to low or high by adjusting the setting of the 3-pole pin header that is located on the circuit board. To change the sensitivity of the NUWIR, position a shunt on the 3-pole header according to the image below.

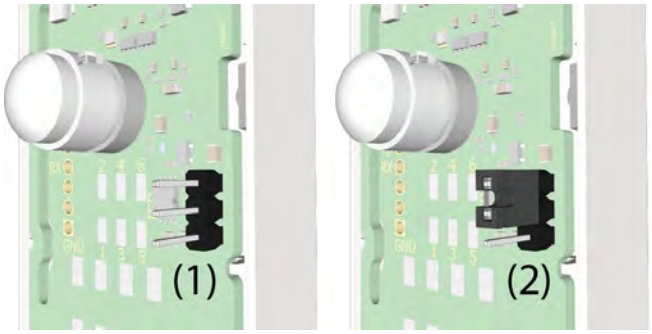



*Figure 221. Changing the NUWIR sensitivity.*

NUWIR sensitivity:

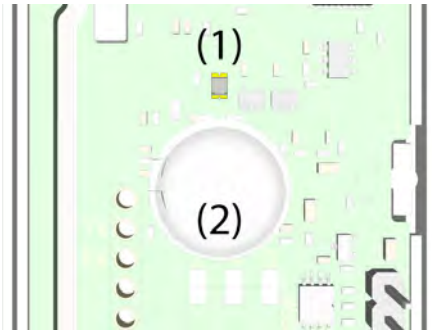
(1) Low 13 feet (4 meters) - No shunt placed (default)

(2) High 20 feet (6 meters) - Shunt placed on the top and middle pin

### 8.7.12 IR Range Test

Perform an IR range test before starting with the final assembly of the NUWIR.

Located directly above the passive infrared sensor (PIR) is a motion detected status LED which lights up when motion is detected. For range testing purposes the LED will only function for 60 seconds after inserting the batteries. In order not to disturb the residents, this LED will not function during normal operation.




(1) Motion detected status LED

(2) Passive infrared (PIR) sensor

Adjust the NUWIR sensitivity if required, see "NUWIR Sensitivity" on page 168.

### 8.7.13 NUUTX NUWIR Battery Placement

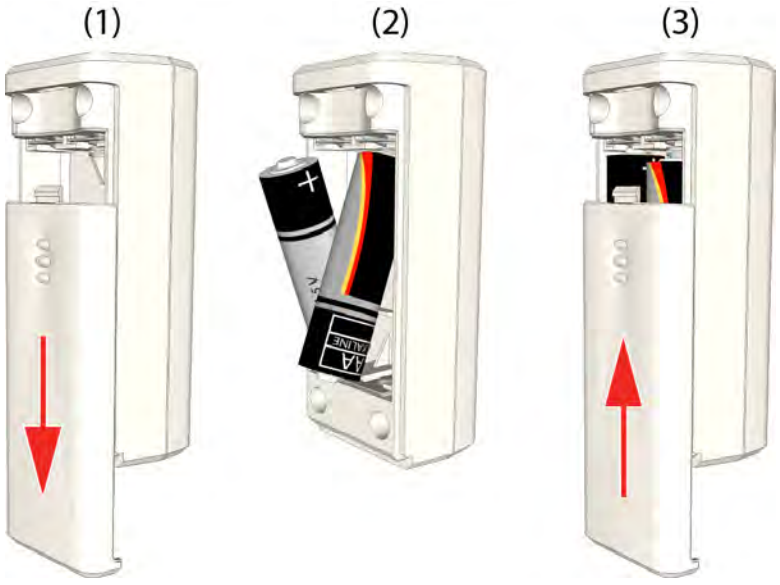



*Figure 222. Place the two 1.5V alkaline batteries*

To place the batteries in the NUUTX NUWIR:

(1) Remove the battery lid by sliding it downwards until it releases

(2) Insert the two alkaline 1.5V AA batteries

**8.7.14** (3) Slide the battery lid back into place until it snap fits.**NUUTX NUWIR Mounting Instructions**

The NUUTX and the NUWIR are designed to be mounted on walls or onto window/door posts. They can be mounted both vertically and horizontally.

Place the NUUTX NUWIR onto a post or the wall and mark the holes for drilling with a sharp pencil. The NUWIR should be placed at approximately 4 feet (1.2 meters) from the ground, the NUUTX can be placed wherever suitable.

Screws with a diameter of 1/8 in. (3.8mm) should be used to mount the NUUTX NUWIR to the window/door post or the wall. Two suitably sized holes should be drilled at the marked spots. In a wooden post holes should be drilled that are slightly smaller than the size of the screws that are used. When mounting the NUUTX NUWIR on a wall, holes should be drilled that accept a suitable wall plug for using screws with a diameter of 1/8 in. (3.8mm).

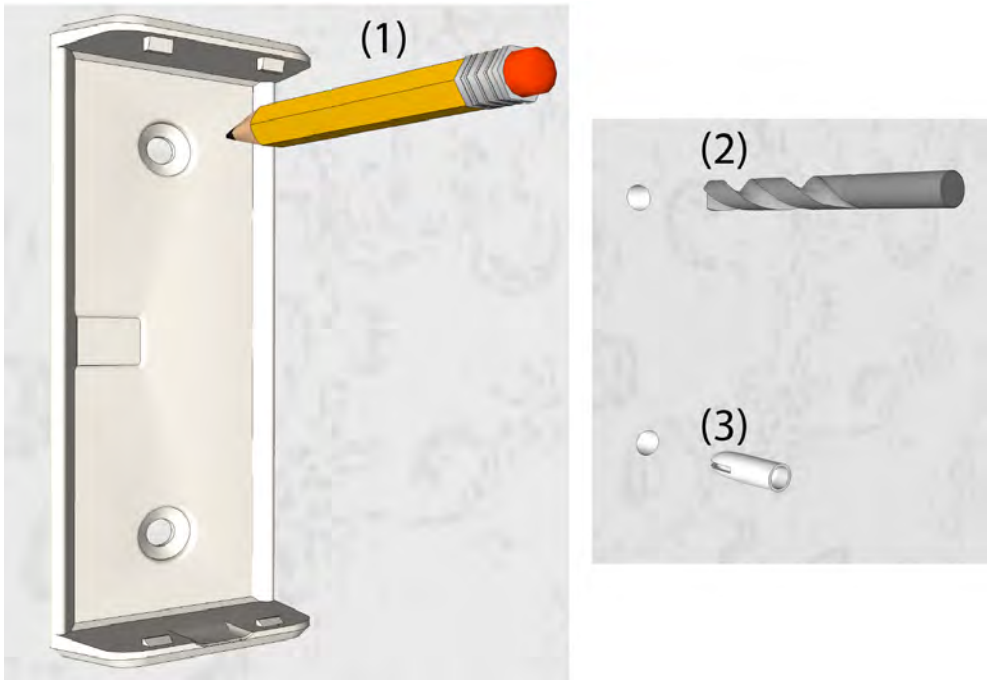



*Figure 223. Mark the location of the mounting holes*

(1) Mark the holes for drilling with a sharp pencil

(2) Two holes must be drilled in the wall surface

(3) Suitable wall plugs must be fitted if required

Mount the bracket on the wall with the two larger sized snap fittings at the top.

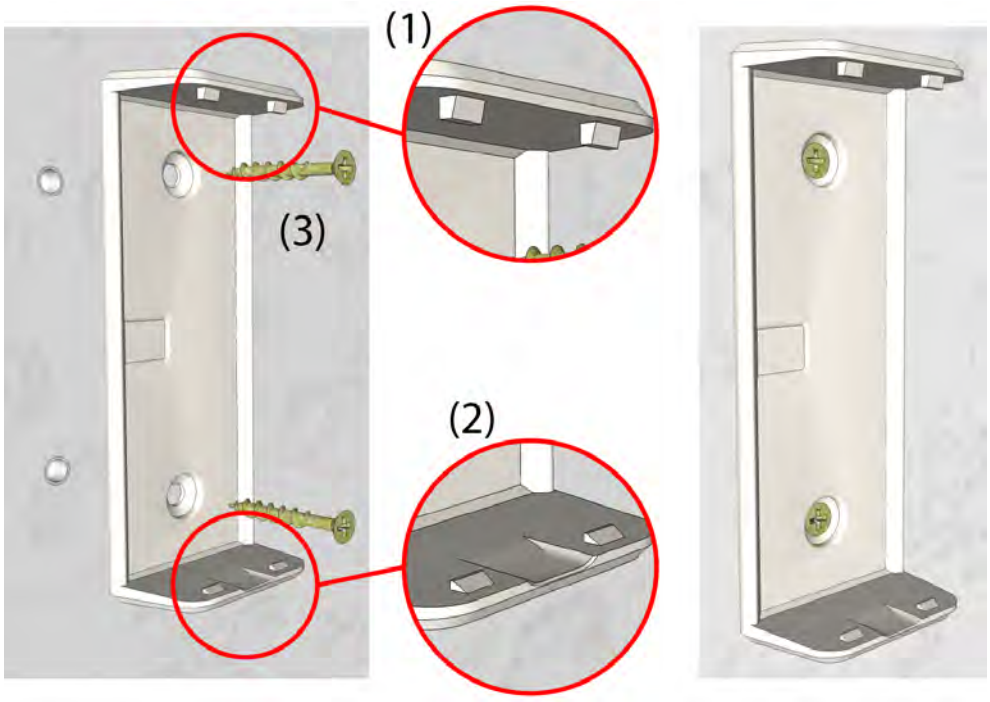



*Figure 224. Orientation of the bracket*

(1) Larger sized snap fittings on top

(2) Smaller sized snap fittings at the bottom

(3) Screw the bracket onto the wall

Place the NUUTX or NUWIR into the bracket by aligning the two holes on top of the module with the two fittings on top of the bracket.

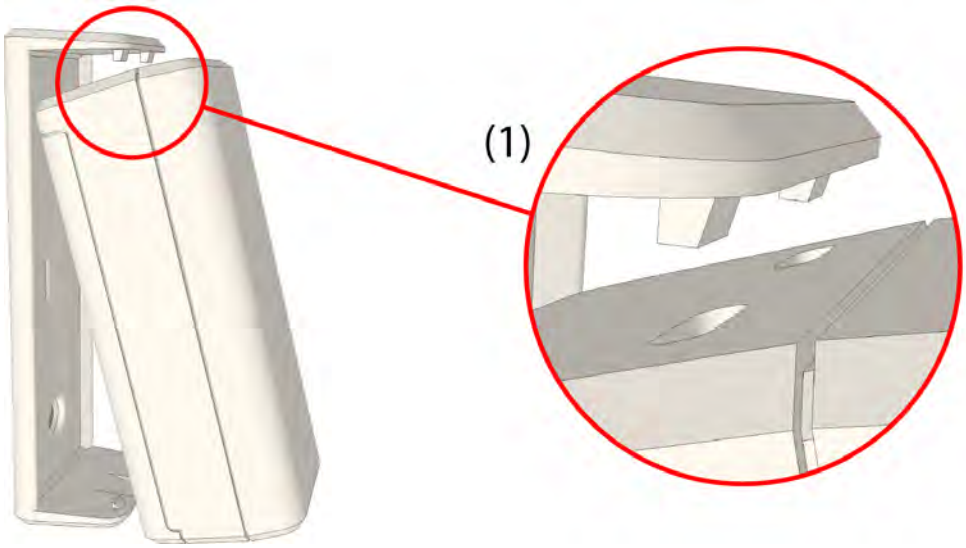



*Figure 225. Align the NUUTX or NUWIR to the top of the bracket.*

(1) Align the two slots on top of the module with the top fittings of the bracket.

Finally rotate the module until it snap fits on the lower halve of the bracket.

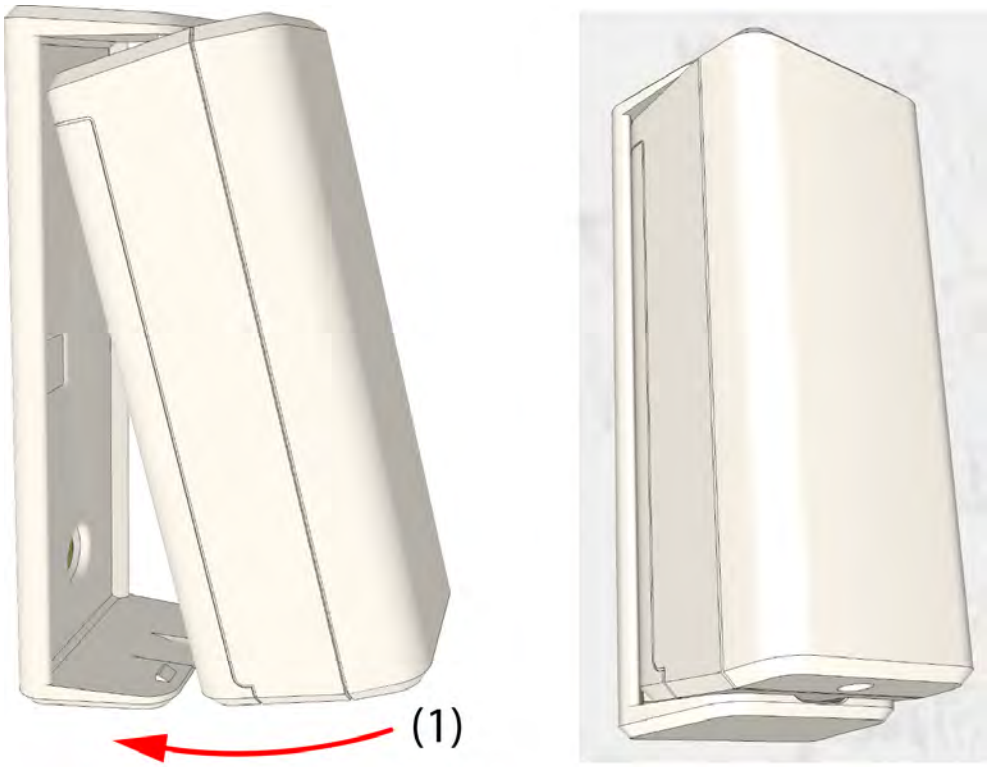



*Figure 226. Snap fit the NUUTX or NUWIR onto the bracket.*

(1) Rotate the module until it snap fits on the lower halve of the bracket

### 8.7.15 NILF Low Frequency Beacon

The low frequency beacon NILF is contained in a white plastic enclosure with a slim design that is suitable for surface mounting on walls or at a door post. The NILF is powered by three 1.5V "C" alkaline batteries. In situations where battery power is not suitable the unit can be powered by certified ECS power supplies (see Section 4.)

An optional NIRX transceiver module can be mounted onto the NILF circuit board to monitor the NILF through a heartbeat signal. The NIRX will send out a tamper alarm upon front cover removal detection or send a low battery alarm.


*Figure 227. NILF - Low Frequency Beacon*

The NILF operates at 125 kHz producing a spherical magnetic field with a range of up to 8.86 feet (2.7 meters). The magnetic field strength can be adjusted to suit the requirements. A master/slave configuration can be used to extend the range of the LF field See "Master / Slave Beacon Interconnection" on page 182.

DIP switches are used to set the 12bit ID code, to select the transmission rate allowing a suitable interval between 0.1 - 2s and to set the output power, ranging from 0.30m to 3m.See "NILF DIP Switch Settings" on page 180.

#### NILF Installation

The slim design makes the NILF suitable for surface mounting on walls or at a door post at approximately 4 feet (1.2 meters) from the ground.

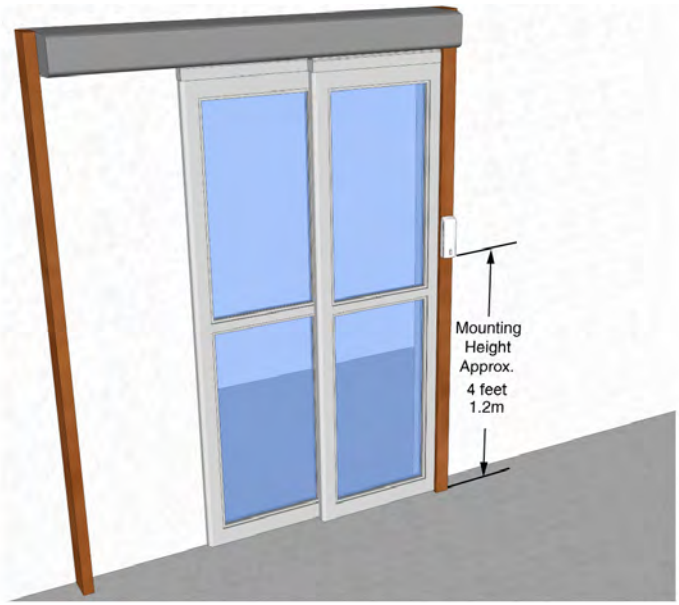



*Figure 228. NILF installation example*

***WARNING:*** *The NILF produces a low frequency magnetic field. Installing the NILF in proximity of metal objects or electrical cables can negatively influence the magnetic field which reduces the LF field coverage.*

Open the NILF by removing the screw that is located at the bottom of the housing. To remove the front cover slightly lift it up and gently pull it off of the rear cover.

*Figure 229. Removing the front cover of the NILF*

Place the NILF onto the door post or the wall at approximately 4 feet (1.2 meters) from the ground and mark the holes for drilling with a sharp pencil.

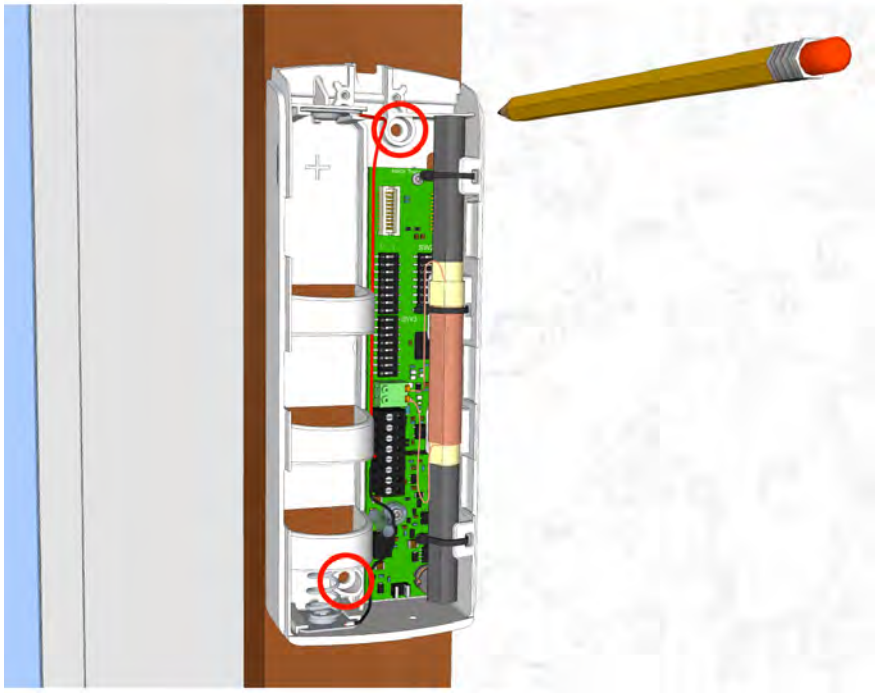


*Figure 230. Mark the holes for drilling*

Screws with a diameter of 1/8 in. (3.8mm) should be used to mount the NILF to the door post or the wall. Two suitably sized holes should be drilled at the marked spots. In a wooden door post holes should be drilled that are slightly smaller than the size of the screws that are used. When mounting the NILF on a wall, holes should be drilled that accept a wall plug suitable for using screws with a diameter of 1/8 in. (3.8mm).

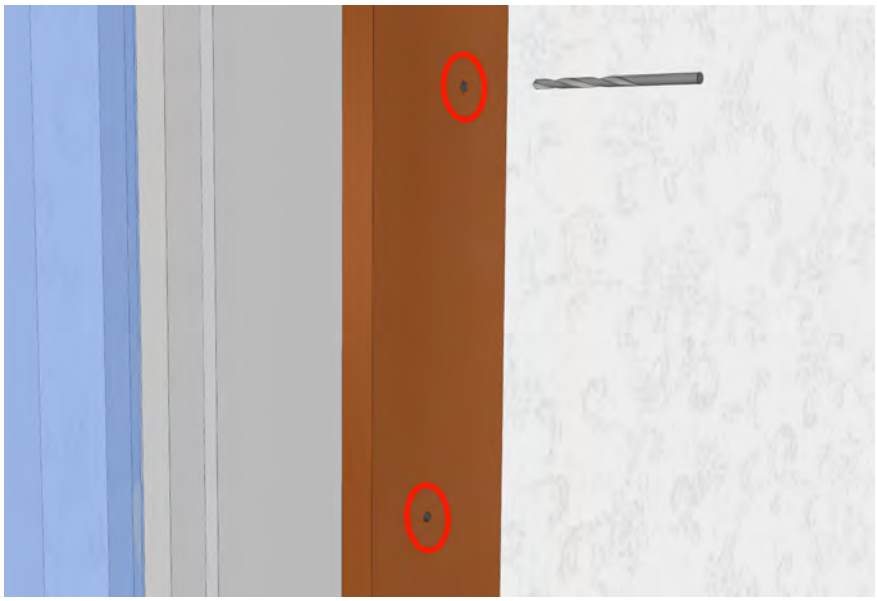


*Figure 231. Drill the two holes with the proper drill*

Mount the NILF on the door post or wall.

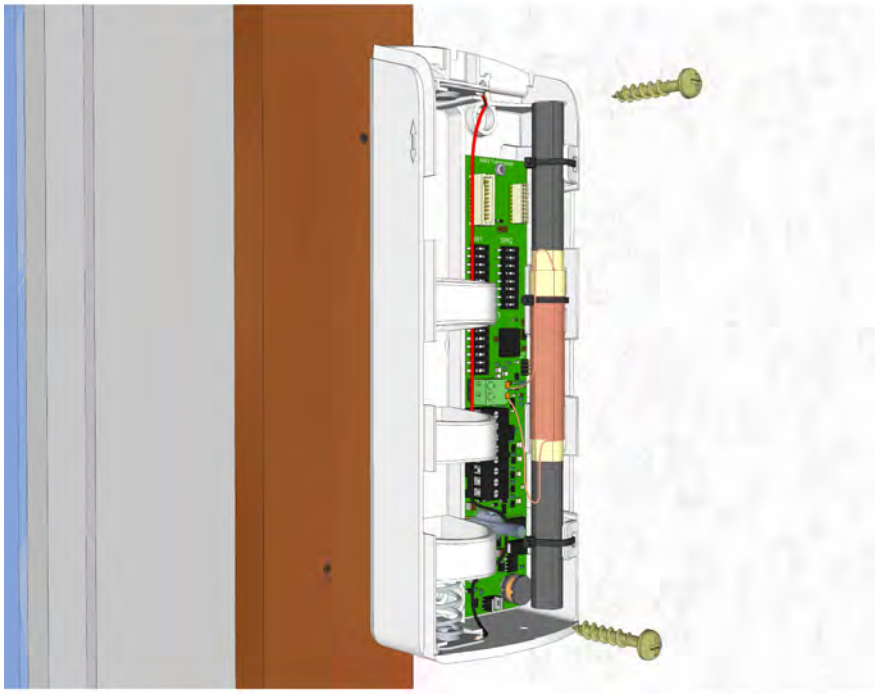


*Figure 232. Placing the NILF on the door post*

The two screws should be tightened carefully using the appropriate screwdriver. Make sure that the NILF does not bend when tightening the screws.

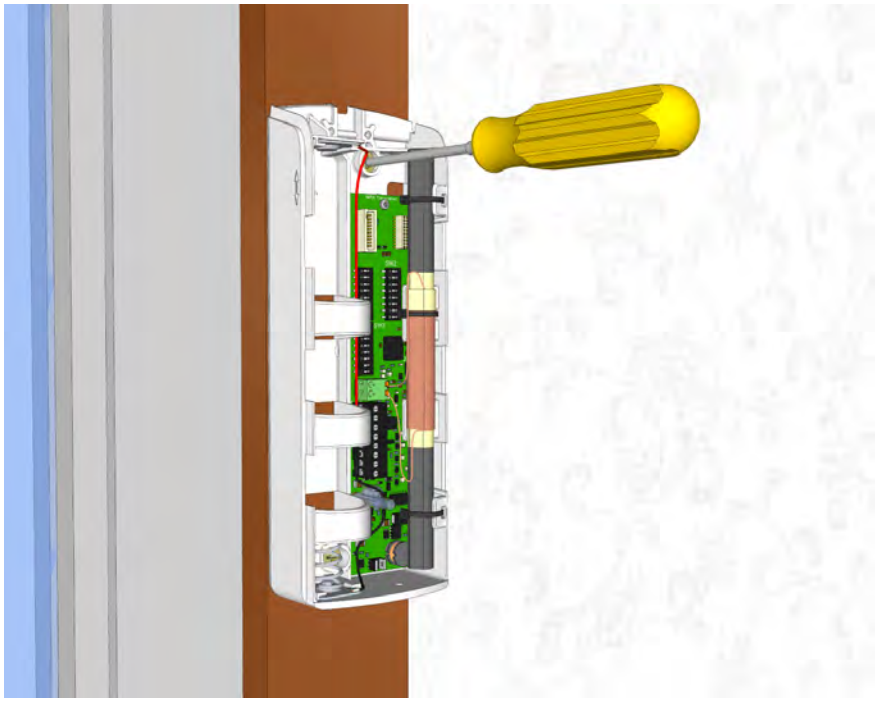


*Figure 233. Tightening the two screws.*

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### Mounting an NILF with NIRX

***IMPORTANT:*** *Do not attempt to mount the NILF onto the wall when the NIRX is placed onto the NILF circuit board.*

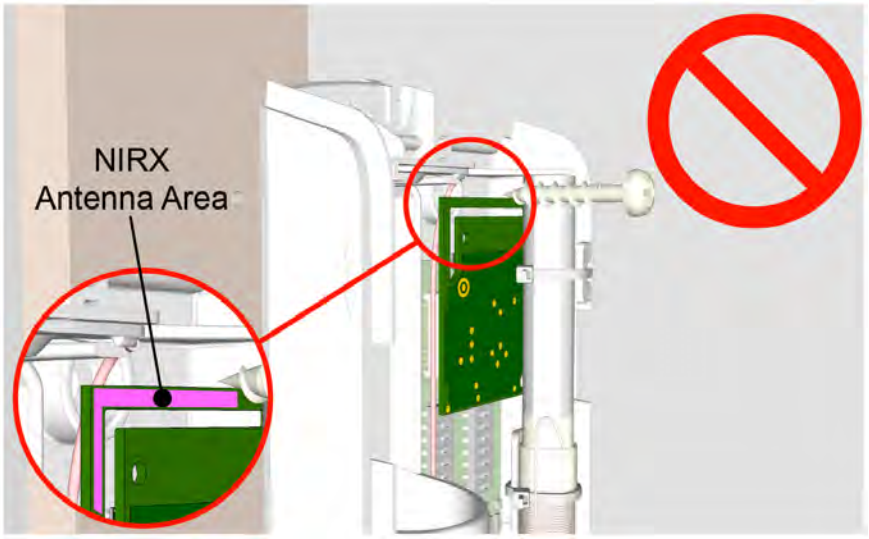



*Figure 234. Do not mount the NILF to the wall while the NIRX is placed*

Because the NIRX covers the top hole of the NILF case, the NIRX antenna area will get damaged when trying to mount the NILF to the wall while the NIRX is in place. It is important to remove the NIRX from the NILF circuit board before mounting the NILF to the wall. See sequence below.

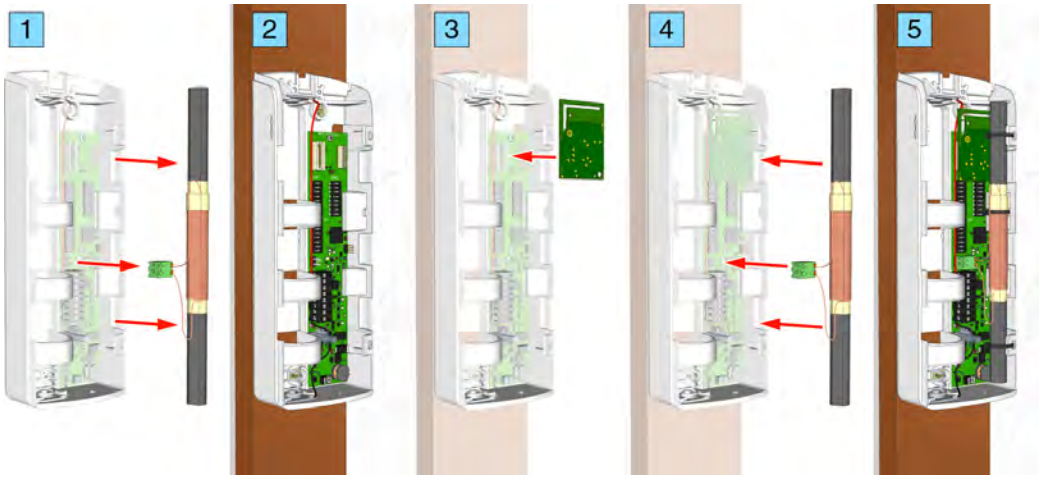



*Figure 235. Correct sequence for placing an NIRX onto the NILF circuit board.*

*1* Remove the LF antenna.

*2* Mount the NILF onto the wall.

*3* Place the NIRX.

*4* Place the LF antenna.

*5* NILF + NIRX mounted onto the wall.

### 8.7.6 NILF Electrical Connections

The electrical connections on the component side of the low frequency beacon printed circuit board are shown in the following drawing of the NILF circuit board.

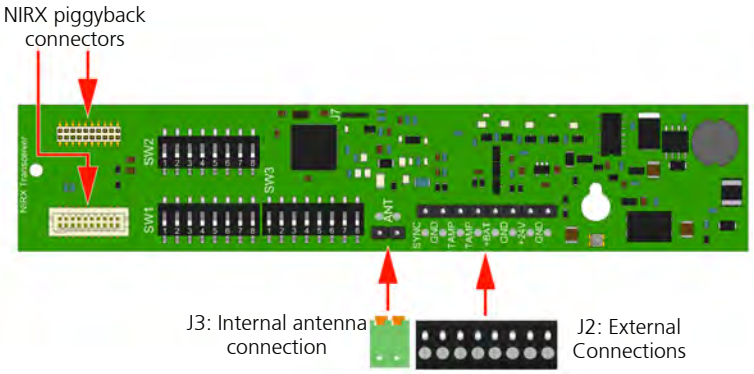



*Figure 236. Low frequency beacon NILF electrical connections*

**NIRX Placement**

An NIRX RF transceiver module can be piggyback mounted in the NILF to enable remote supervision signalling of a heartbeat, low battery warning and tamper warning. The NIRX transceiver module is piggyback mounted on the "NIRX Extension" connectors, as shown below:

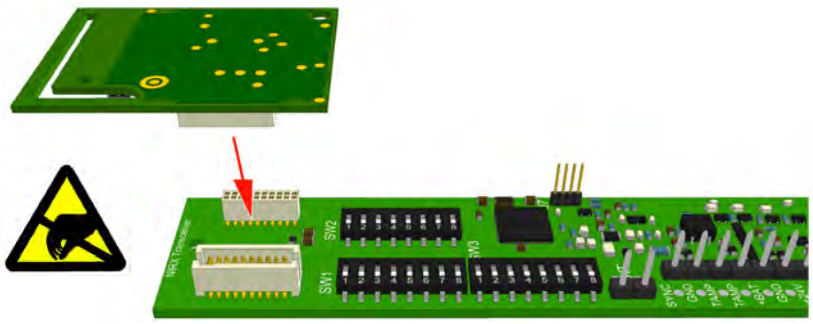


*Figure 237. Placing the NIRX on the NILF board*

***Note:*** *To place an NIRX module it is necessary to remove the internal LF antenna*

***IMPORTANT:*** *When placing the NIRX onto the NILF circuit board, the top mounting hole of the NILF case will be covered. Therefore the NIRX must be installed after the NILF has been mounted onto the wall.* *See "Mounting an NILF with NIRX" on page 177.*

DRAFT

### Antenna Connection

The 2-pole antenna connection (J3) is connected to the internal LF antenna.

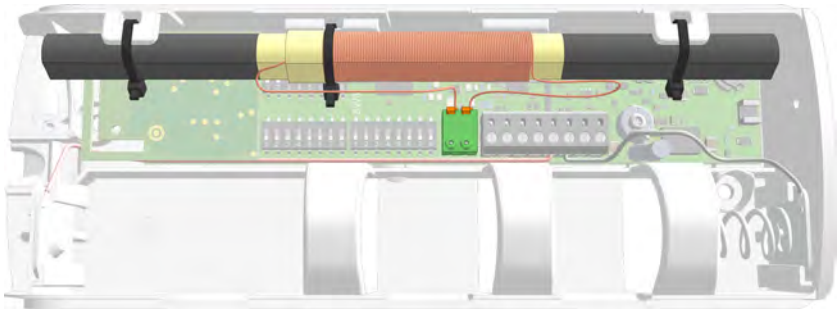


*Figure 238. NILF internal antenna connected*

### External Connections

The 8-pole external connector (J2) has connections for a second beacon (used for range extending in a master/slave configuration), a galvanically separated tamper alarm relay output, the internal battery and connection of an alternative external 24Vdc power supply.

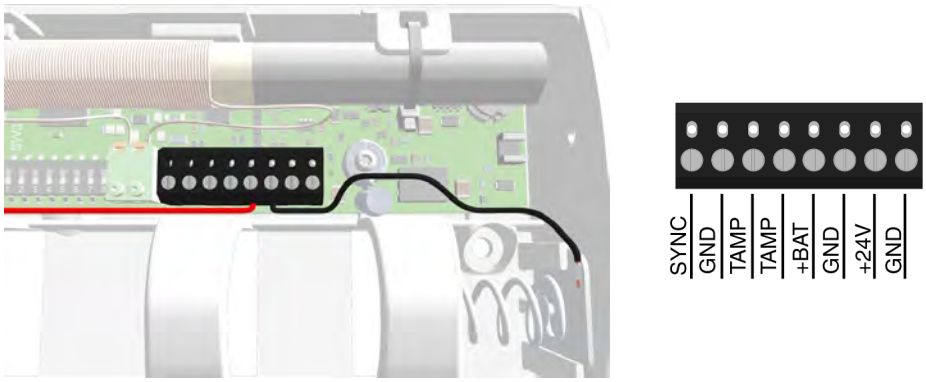



*Figure 239. External connections - J2*

| External Connector | | Description |
|---|---|---|
| 1 | SYNC | Master / Slave interconnection<br>Beacon synchronization |
| 2 | GND | |
| 3 | TAMP | Tamper alarm relay output<br>(galvanically separated) |
| 4 | TAMP | |
| 5 | +BAT | Battery connection |
| 6 | GND | |
| 7 | +24V | External 24Vdc power supply<br>connection |
| 8 | GND | |

For master / slave connection see “Master / Slave Beacon Interconnection” on page 182.

For tamper alarm relay connection see “Tamper Alarm” on page 184.

For 24Vdc external power supply, use only a certified ECS power supply (see Section 4.).

### 8.7.7 NILF DIP Switch Settings

The NILF uses three sets of 8-pole DIP switches to set the ID, output power and transmission rate, master/slave mode and the active location functionality.

#### NILF ID

DIP switches SW1 (1-8) and SW2 (1-4) are used to set the 12 bit ID code of the NILF.

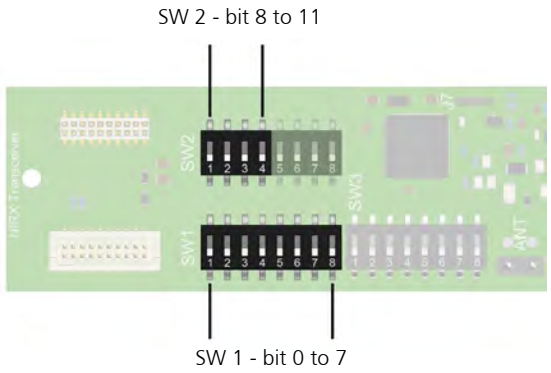



*Figure 240. NILF 12 bit ID - DIP switch settings*

| NILF ID Settings | | | |
|---|---|---|---|
| **SW 1** | **Low byte** | **SW 2** | **High nibble** |
| 1 | Bit 0 | 1 | Bit 8 |
| 2 | Bit 1 | 2 | Bit 9 |
| 3 | Bit 2 | 3 | Bit 10 |
| 4 | Bit 3 | 4* | Bit 11 |
| 5 | Bit 4 | | |
| 6 | Bit 5 | | |
| 7 | Bit 6 | | |
| 8 | Bit 7 | | |

* When the highest bit (bit 11) of the NILF ID is set the NILF will function as an active location beacon. See “Beacon Mode” on page 183. for detailed information.

### Output Power and Transmission Rate DIP Switch Settings

With the 4 bit output power DIP switch SW3 (1-4) selection the range of the LF field can be adjusted. In relation with the output power, the repetition rate of the low frequency transmissions can be set to normal, high, low and very low using 2 bit DIP switch setting on SW2 (5 and 6).

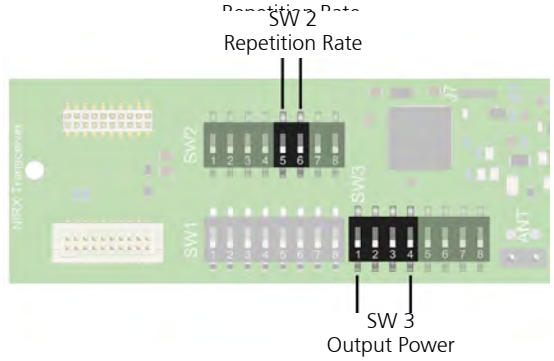



*Figure 241. Output Power and Repetition Rate DIP switch settings*

Lowering the output power to decrease the range of the LF field will increase the repetition rate of the transmissions. The table below shows the relation between the output power and the repetition rate:

| **Output Power** | | **Repetition Rate (transmissions/s)** | | | | |
|---|---|---|---|---|---|---|
| | | **Normal** | | **High** | **Low** | **Very Low** |
| **SW3 (4 - 1)** | **Range (m)** | **SW2 (6 - 5)** | | | | |
| | | 00 | Battery Life (years) | 01 | 10 | 11 |
| 0000 | 0.3 | 10 | 3.7 | 20 | 5 | 1 |
| 0001 | 0.31 | 8 | | 16 | 4 | 0.8 |
| 0010 | 0.36 | 6.7 | | 13.4 | 3.35 | 0.67 |
| 0011 | 0.49 | 5.0 | | 10 | 2.5 | 0.5 |
| 0100 | 0.63 | 4.0 | 4.8 | 8 | 2 | 0.4 |
| 0101 | 0.76 | 3.3 | | 6.6 | 1.65 | 0.33 |
| 0110 | 0.94 | 2.7 | | 5.4 | 1.35 | 0.27 |
| 0111 | 1.08 | 2.4 | 6.2 | 4.8 | 1.2 | 0.24 |
| 1000 | 1.21 | 2.1 | | 4.2 | 1.05 | 0.21 |
| 1001 | 1.44 | 1.8 | | 3.6 | 0.9 | 0.18 |
| 1010 | 1.53 | 1.7 | 5.5 | 3.4 | 0.85 | 0.17 |
| 1011 | 1.71 | 1.5 | | 3 | 0.75 | 0.15 |
| 1100 | 1.93 | 1.3 | 4.1 | 2.6 | 0.65 | 0.13 |
| 1101 | 2.16 | 1.2 | | 2.4 | 0.6 | 0.12 |
| 1110 | 2.43 | 1.1 | 2.2 | 2.2 | 0.55 | 0.11 |
| 1111 | 2.7 | 1.0 | 1.5 | 2 | 0.5 | 0.10 |

Battery life indication is only applicable for “Normal” repetition rate settings.

The repetition rate in the red marked areas are only applicable for “Passive” location beacons. “Active” location beacons will always have a repetition rate of at least 2 transmissions a second. Note that this also has an impact on the battery life.

### Master / Slave Mode DIP Switch Settings

With DIP switch SW2 (8) the master / slave mode of the NILF can be set.

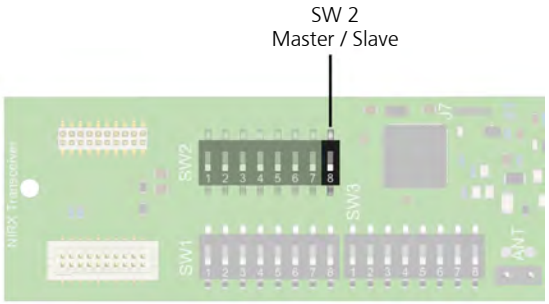



*Figure 242. Master / Slave DIP switch settings*

| NILF Master / Slave Settings | |
|---|---|
| **SW2 (8)** | **Mode** |
| Off = 0 | Master |
| On = 1 | Slave |

A master/slave configuration can be used to extend the range of the LF field (when master and slave use same ID) or to synchronize LF transmissions between two beacons when there is an overlap in the LF fields (when master and slave use different IDs).

Refer to "NILF ID" on page 180 for setting the ID of the slave NILF.
Refer to "Beacon Mode" on page 183 for setting the mode of the slave NILF.
Refer to "Output Power and Transmission Rate DIP Switch Settings" on page 181 to set the output power of the slave NILF. Note that the transmission rate is decided by the master synchronization, and setting this option on the slave will have no effect.

### Master / Slave Beacon Interconnection

Connector J2 pin1 (SYNC) and pin 2 (GND) are the interconnection pins used for beacons operating in master / slave mode. Interconnect the "Sync / GND" connections between the master and slave beacon as depicted below.

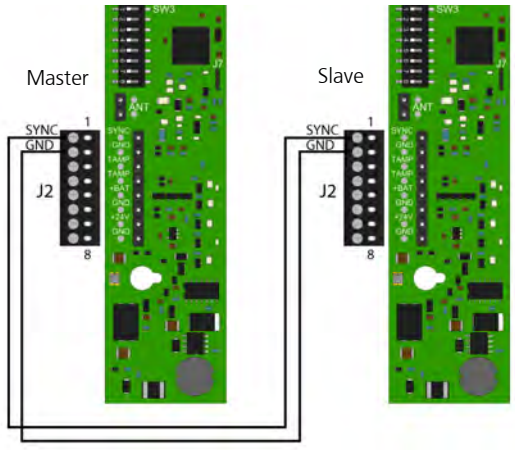



*Figure 243. NILF master / slave interconnection*

***Note:*** *Minimum recommended cable requirements: (twisted pair) 26 AWG. Length <100m.*

### Beacon Mode

With DIP switch SW3 (5) the mode of the LF location beacon can be set to passive or active.

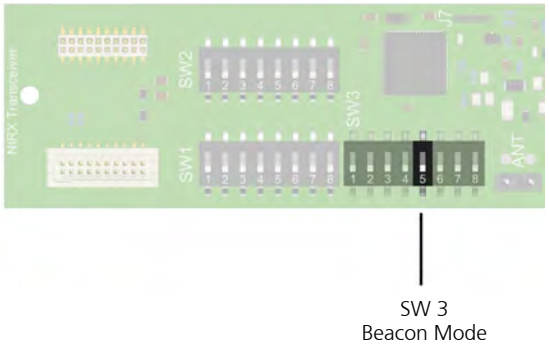



*Figure 244. Beacon Mode DIP switch settings*

| NILF Location Beacon Mode | | |
|---|---|---|
| **SW3 (5)** | **Mode** | **NILF ID** |
| Off = 0 | Passive | 000 - 7FF |
| On = 1 | Active | 800 - FFF |

***Note:*** *Setting the beacon mode to "Active" will automatically set the most significant bit (bit 11) of NILF ID, therefore the ID range for active location beacons will be from 800 to FFF,* see "NILF ID" on page 180.

### Passive Location Beacon

Wireless devices that enter the LF field of a passive location beacon will receive a location update message that is stored locally by the wireless device as the last known location. When a call is made the last known location will be added to the message for linking and messaging.

### Active Location Beacon

Wireless devices that enter the LF field of an active location beacon will be triggered to send out the location update message directly to the wireless server whenever the wireless device enters or leaves an LF field. Depending on the system configuration the location update messages can be used for access control, wanderer control and automatic location updates when moving from one active location to the other.

### Tamper Alarm

The tamper alarm output has a galvanically separated normally closed contact. The tamper alarm output can be connected to a third-party system for generating an alarm when the NILF is tampered with. This contact has a maximum rating of 300 mA at 30 Vdc.

> ***IMPORTANT:*** *The tamper alarm output is only functional when an external 24Vdc power supply is used to power the NILF. The solid state relay is disabled when only batteries are used.*

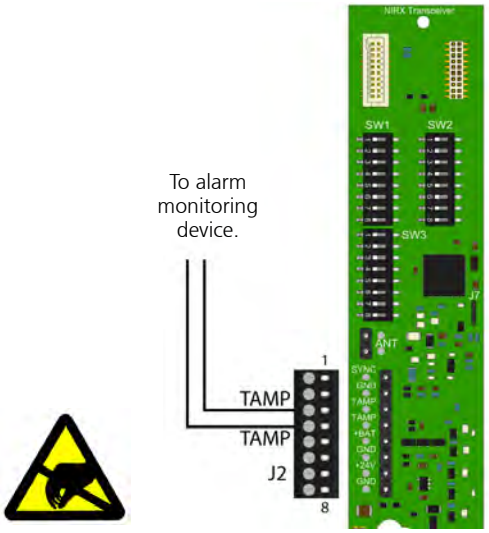



*Figure 245. Galvanically separated normally closed tamper alarm output*

### 8.7.8 NILF Power Supply

The NILF can be powered by batteries or by an external 24Vdc power supply.

For 24Vdc external power supply, use only a certified ECS power supply (see Section 4.).

**Placing the Batteries**

The NILF requires three 1.5V "C" (R14) alkaline batteries. The battery voltage is continually monitored. A red LED will indicate low battery status (1 flash per minute) and tamper alarm (continuous rapid flashing). Under normal circumstances the battery life is minimum one year.

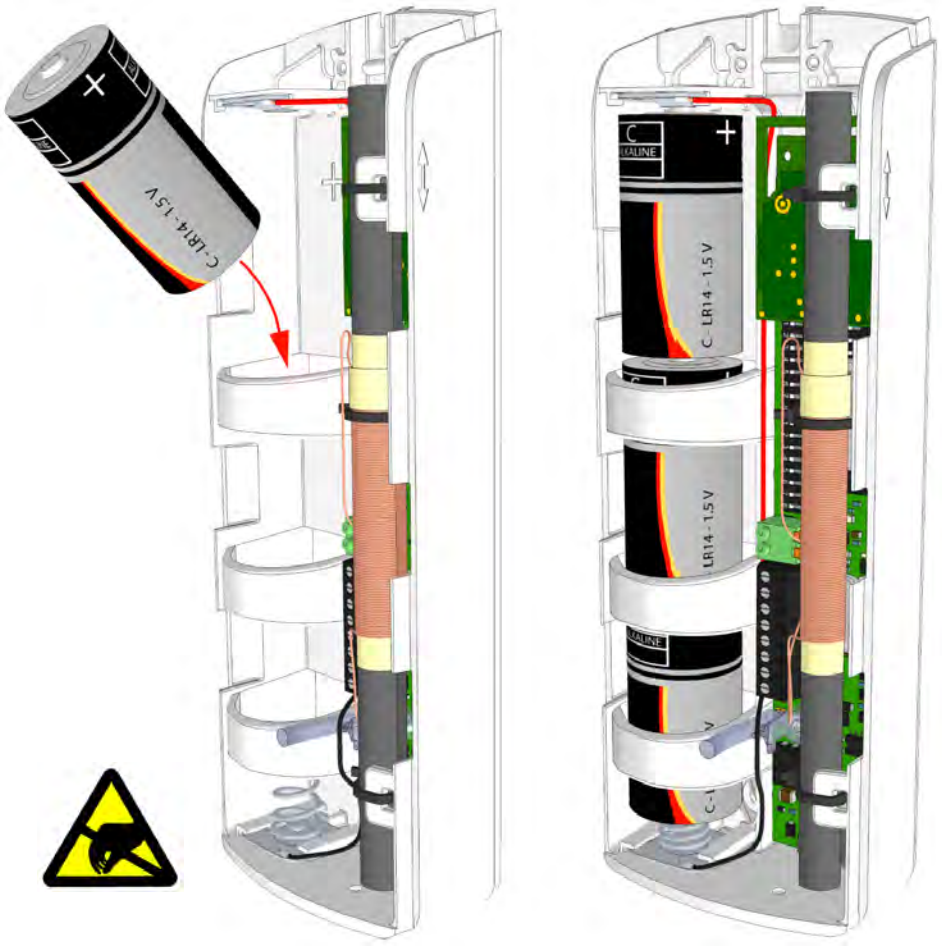



*Figure 246. Placing the three 1.5V "C" (R14) alkaline batteries*

***WARNING:*** *When NILFs are fitted with batteries do not store them within range of NITXs as this will result in continuous transmissions of location messages which could drain the batteries and cause the NITXs to eventually lock up. For this reason, it is best not to fit the batteries in the NILFs until after they are installed.*

### External Power Supply Connection

Alternatively an external ECS certified 24Vdc power supply can be connected to power the NILF.

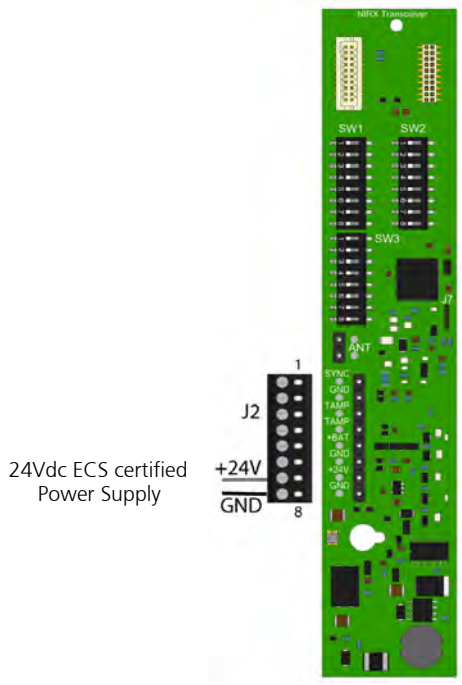



*Figure 247. External 24Vdc power supply connection*

# 9 Installation Examples

***Note:*** *1). All references to the NISE socket extension module and NIMS medical rail socket do not apply for UL 2560 systems.*

***Note:*** *2). References to the NISE socket extension module can be interpreted as applying to the speech module (NISP) instead.*

## 9.1 2-Bed Room with Active Toilet Cancel and Active Pull Cord Peripherals

A typical basic installation of a teleCARE IP system consists of one room controller with integrated corridor lamp (NIRC3) to which the peripherals are connected. The room controller offers four room buses which connect the peripherals to the room controller

The example shown in the Illustration below is a 2-bed room with active peripherals for the toilet and shower. Each bed is equipped with a bedside module, and a handset.

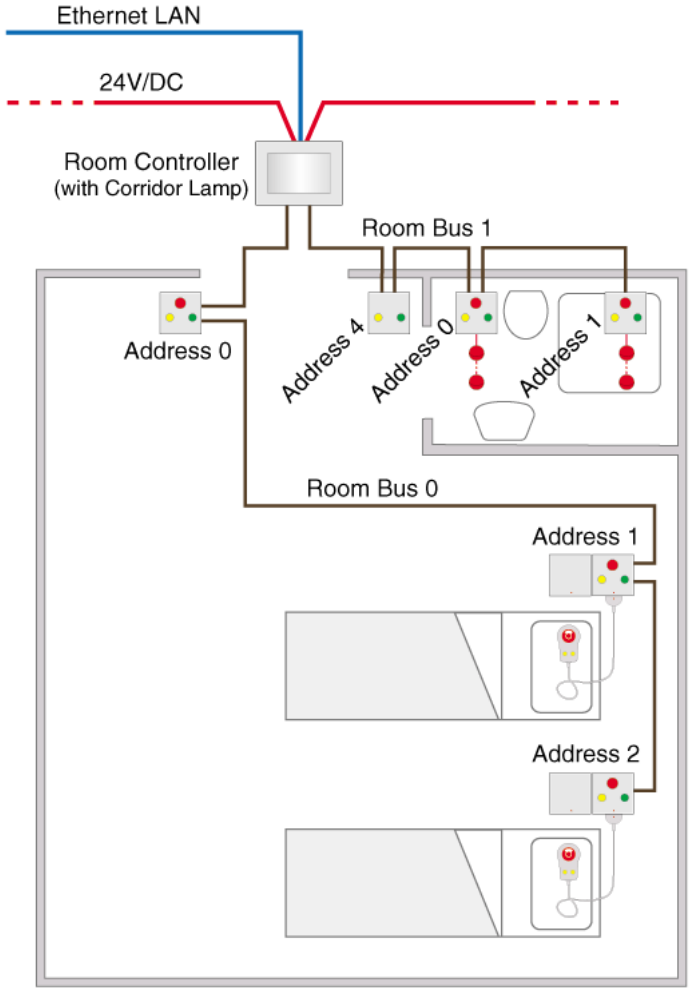



*Figure 173. Typical 2-bed room with active toilet and shower peripherals*

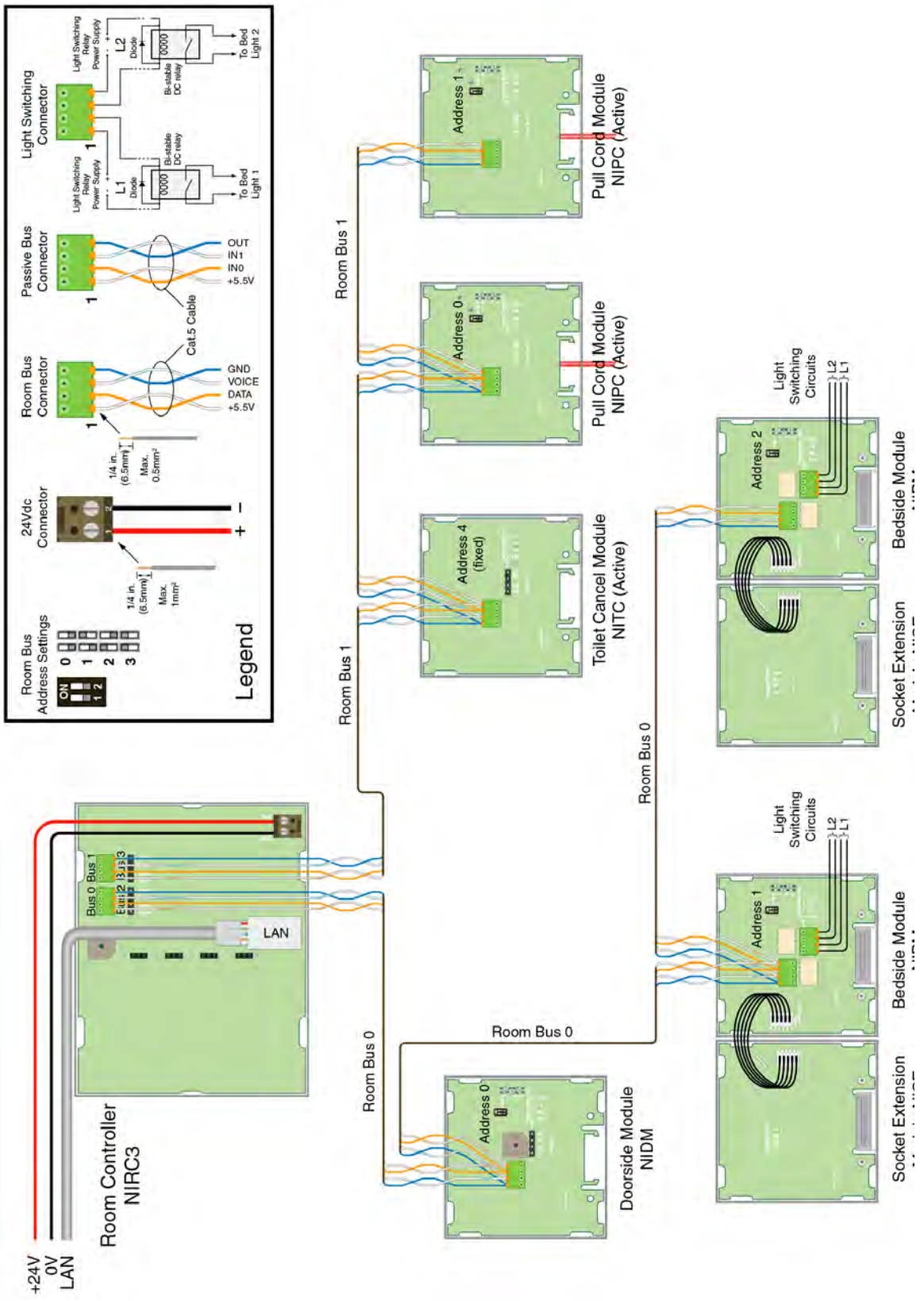



*Figure 174. Wiring for 2-bed room with active toilet and shower peripherals*

## 9.2 2-Bed Room with Passive Toilet Cancel and Passive Pull Cord Peripherals

The following installation of a teleCARE IP system consists of one room controller with integrated corridor lamp (NIRC3) to which the peripherals are connected. The room controller offers four room buses which connect the peripherals to the room controller

The example shown in the Illustration below is a 3-bed room with a toilet and shower. Each bed is equipped with a bedside module, and a handset.

Passive peripherals are used for the toilet and shower. These peripherals are connected to a passive bus from the door side module.

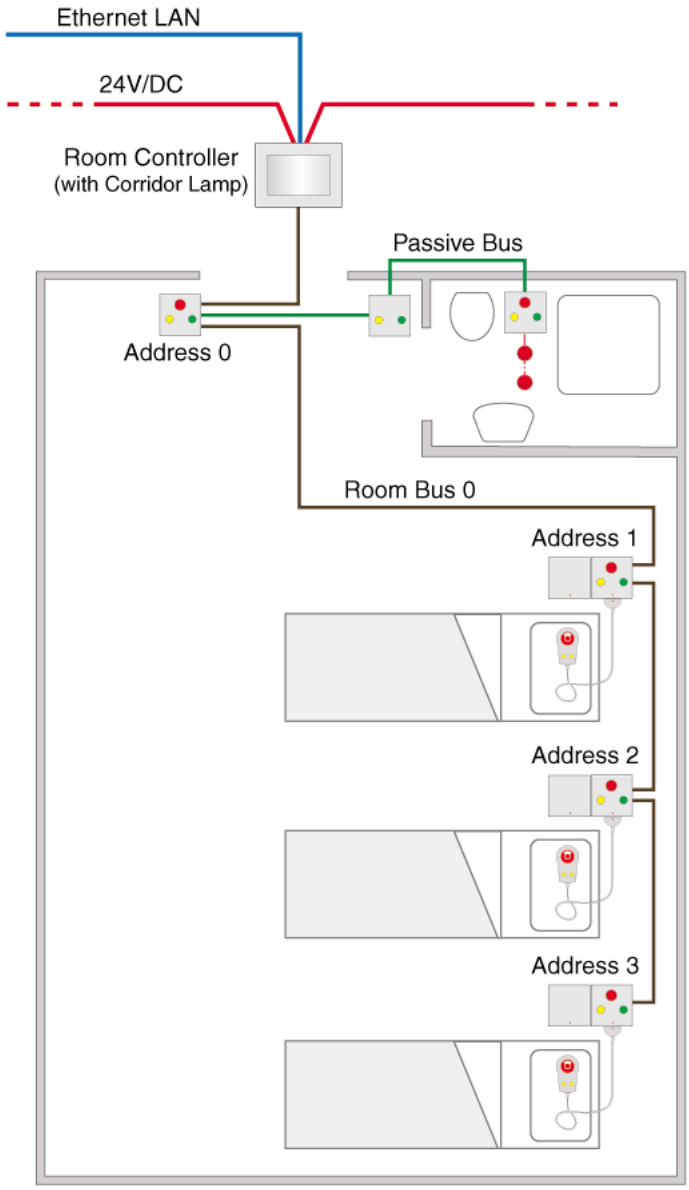



*Figure 175. Typical 2-bed room with passive toilet and shower peripherals*

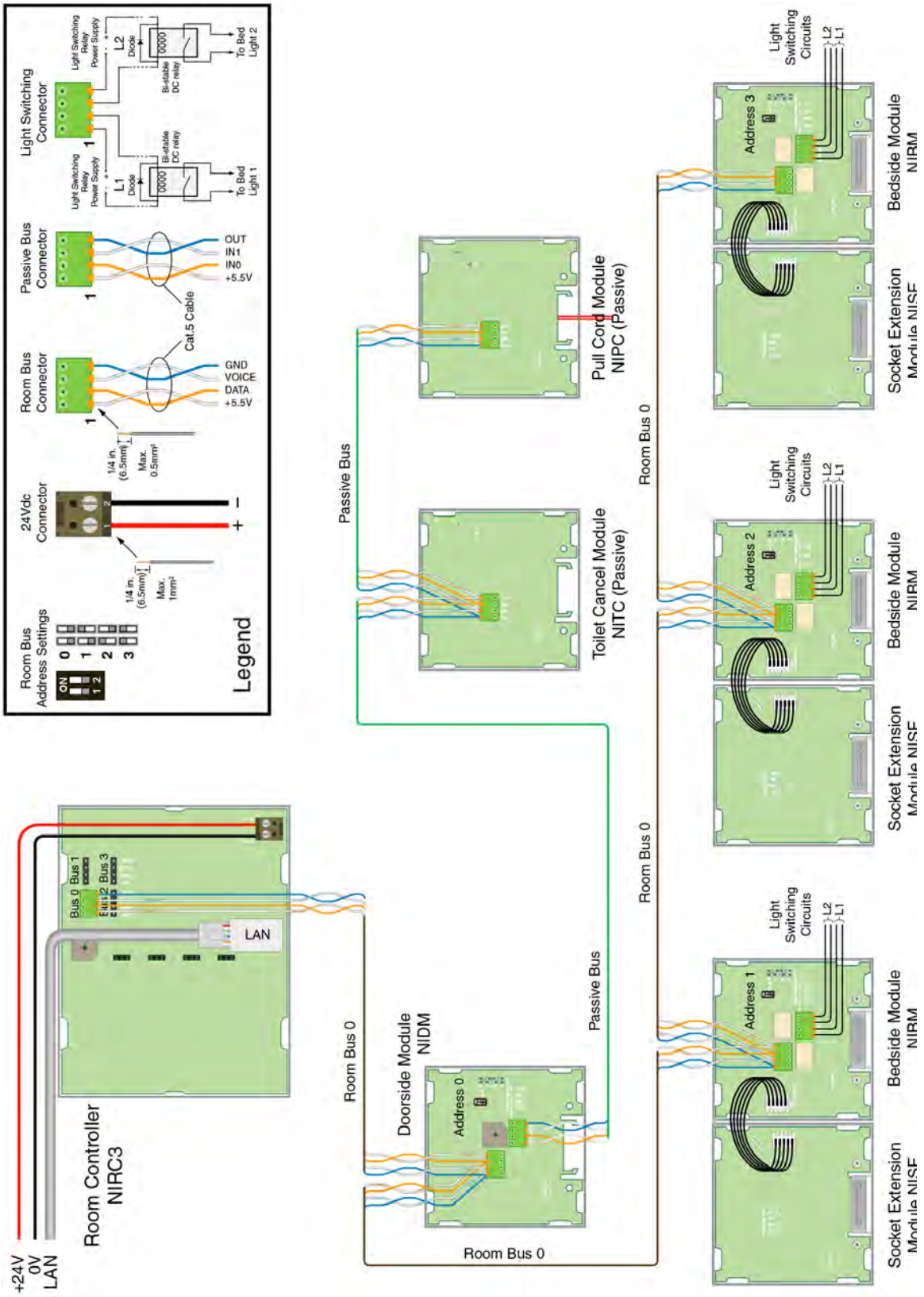



*Figure 176. Wiring for 3-bed room with passive toilet cancel and passive pull cord*

## 9.3 2-Bed Room with a Medical Rail Socket at each Bed

The example shown in the Illustration below is a 2-bed room with peripherals for the toilet and shower. Each bed is equipped with a medical rail socket (which is usually installed in the medical rail above the bed) and a handset.

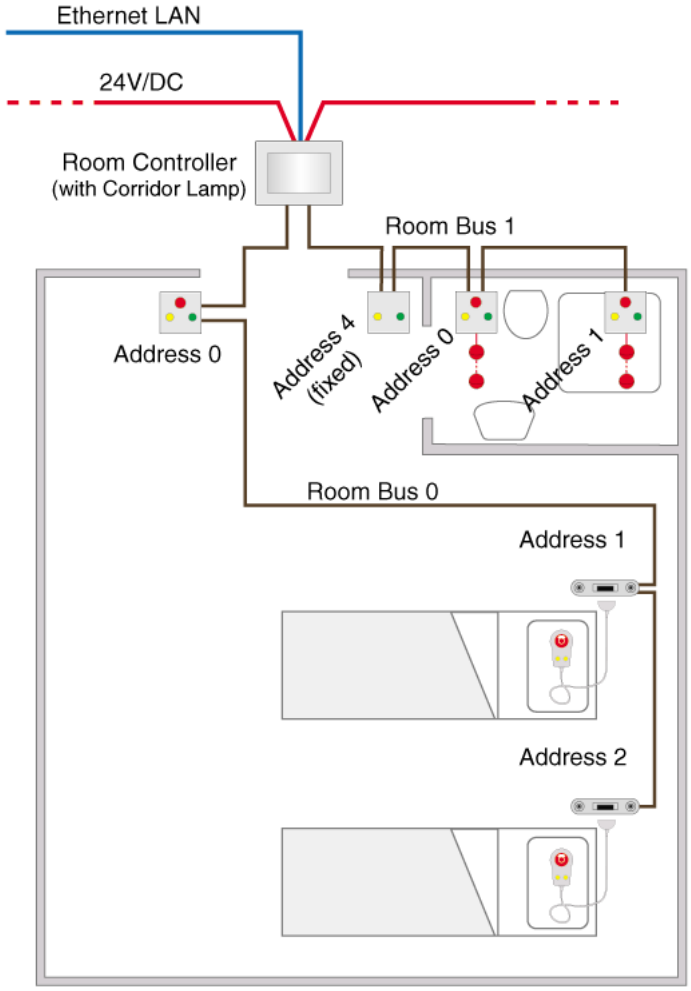



*Figure 177. 2-Bed Room with medical rail sockets*

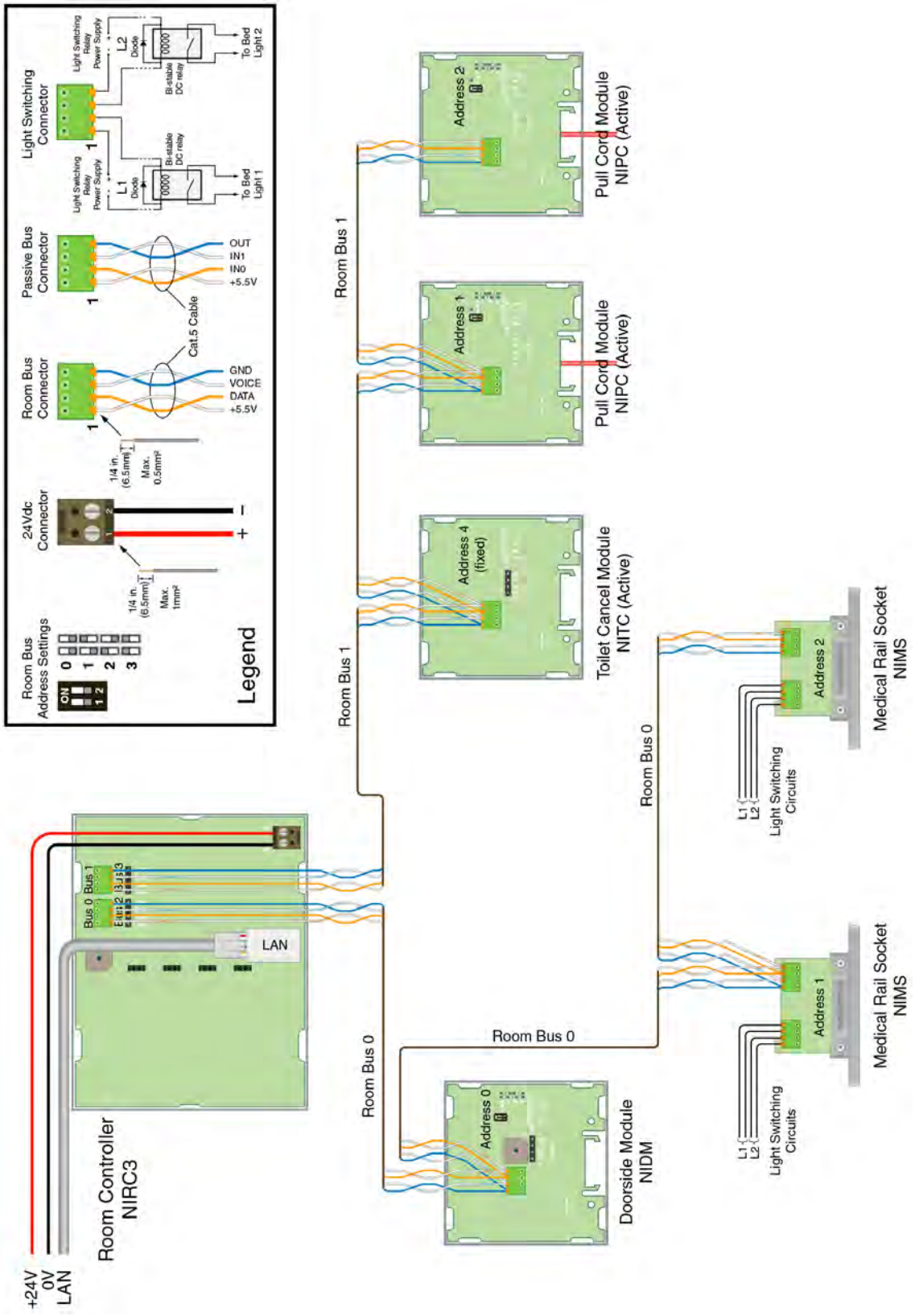



*Figure 178. Wiring for a 2-bed room with medical rail sockets*

## 9.4 Room Controller with Corridor Lamps (Master/Slave)

The example below shows the combination of a room controller and 2 corridor lamps. In the example there are three resident rooms, each containing 3 beds and a toilet with shower.

One of the rooms is connected to the room controller and each of the other rooms is connected to a corridor lamp. Each corridor lamp is connected to one of the room buses of the room controller.

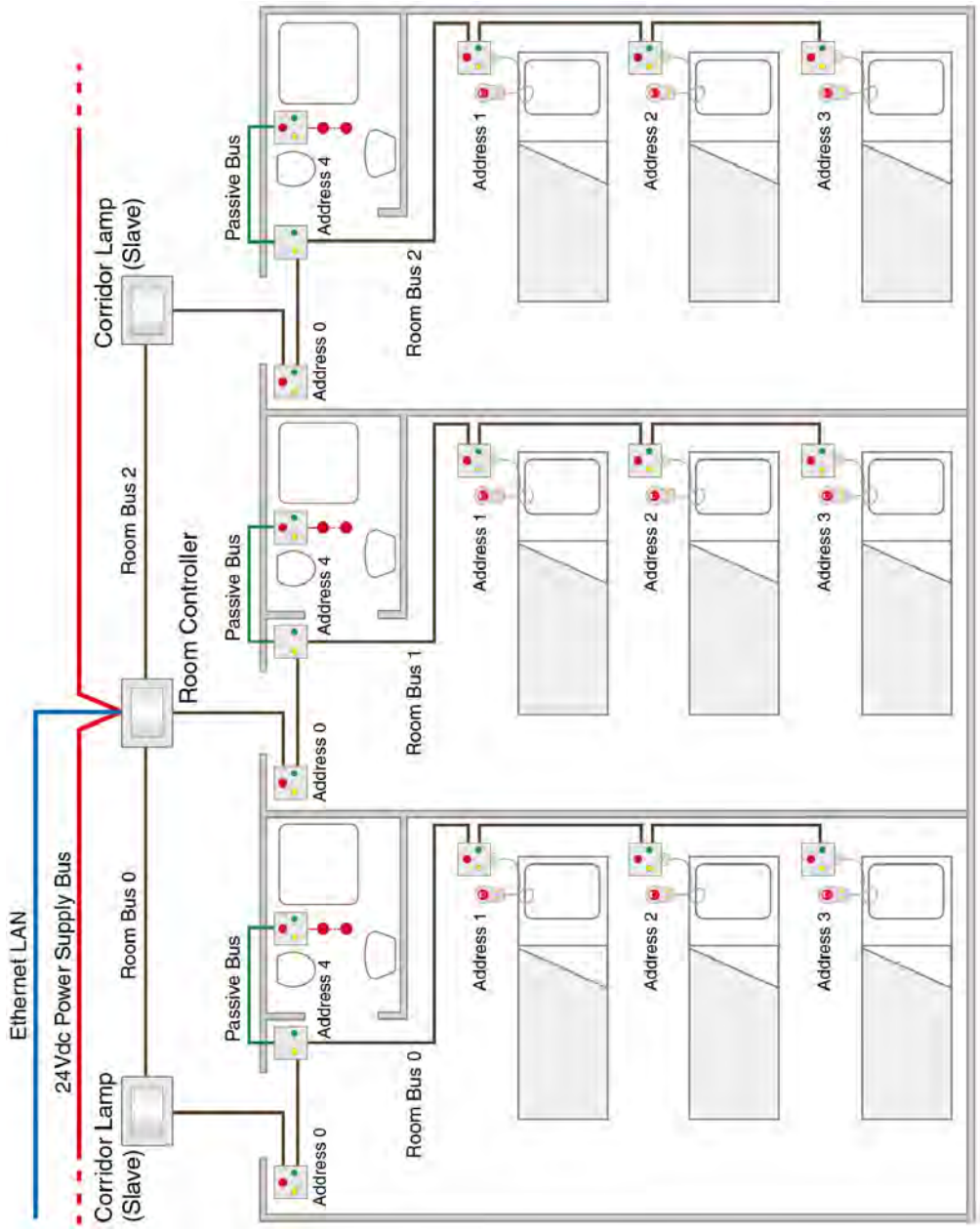



*Figure 179. Room controller with corridor lamps installation*

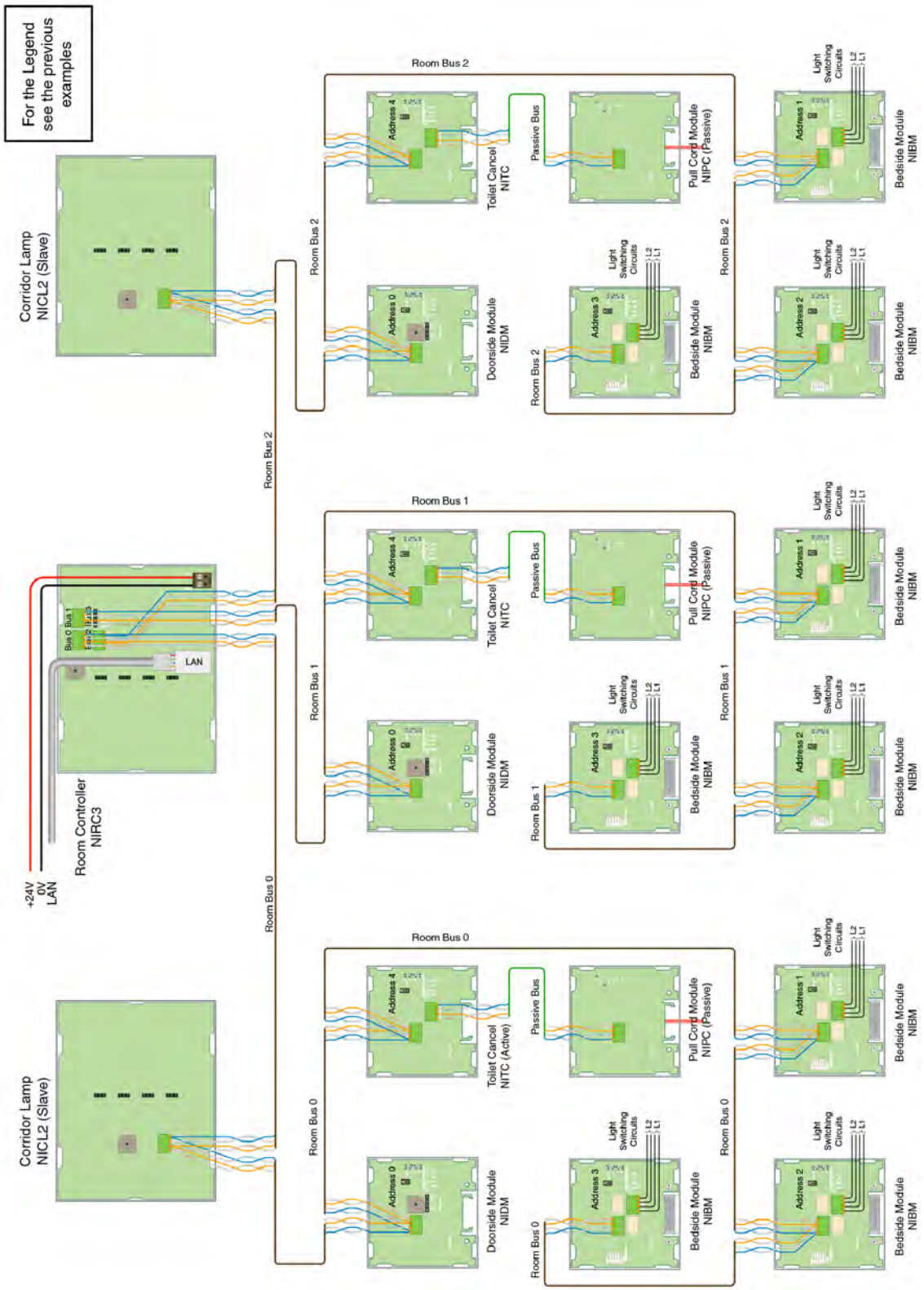



*Figure 180. Wiring for three rooms with a room controller with two corridor lamps*

## 9.5 4-Bed Room with Speech

The installation of a teleCARE IP system with speech is basically the same as without speech except that the teleCARE IP Speech Module is added at each active peripheral where speech communication is required.

The speech module can only be used in combination with the following active teleCARE IP peripherals: the door side module (NIDM), the bedside module (NIBM), the medial rail socket, active pull cord module (NIPC-XXA), and the room display (NIRD).

The example shown consists of one room controller with integrated corridor lamp to which only active peripherals are connected. The room controller handles the speech communication and all the signaling of the related room. Each bed location has a speech module.

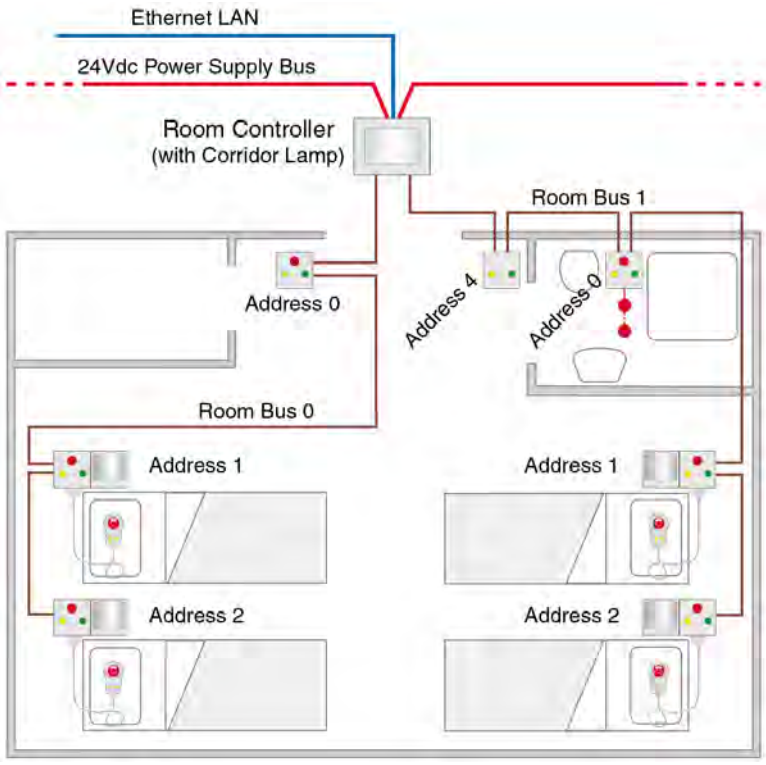



*Figure 181. 4-bed room with speech*

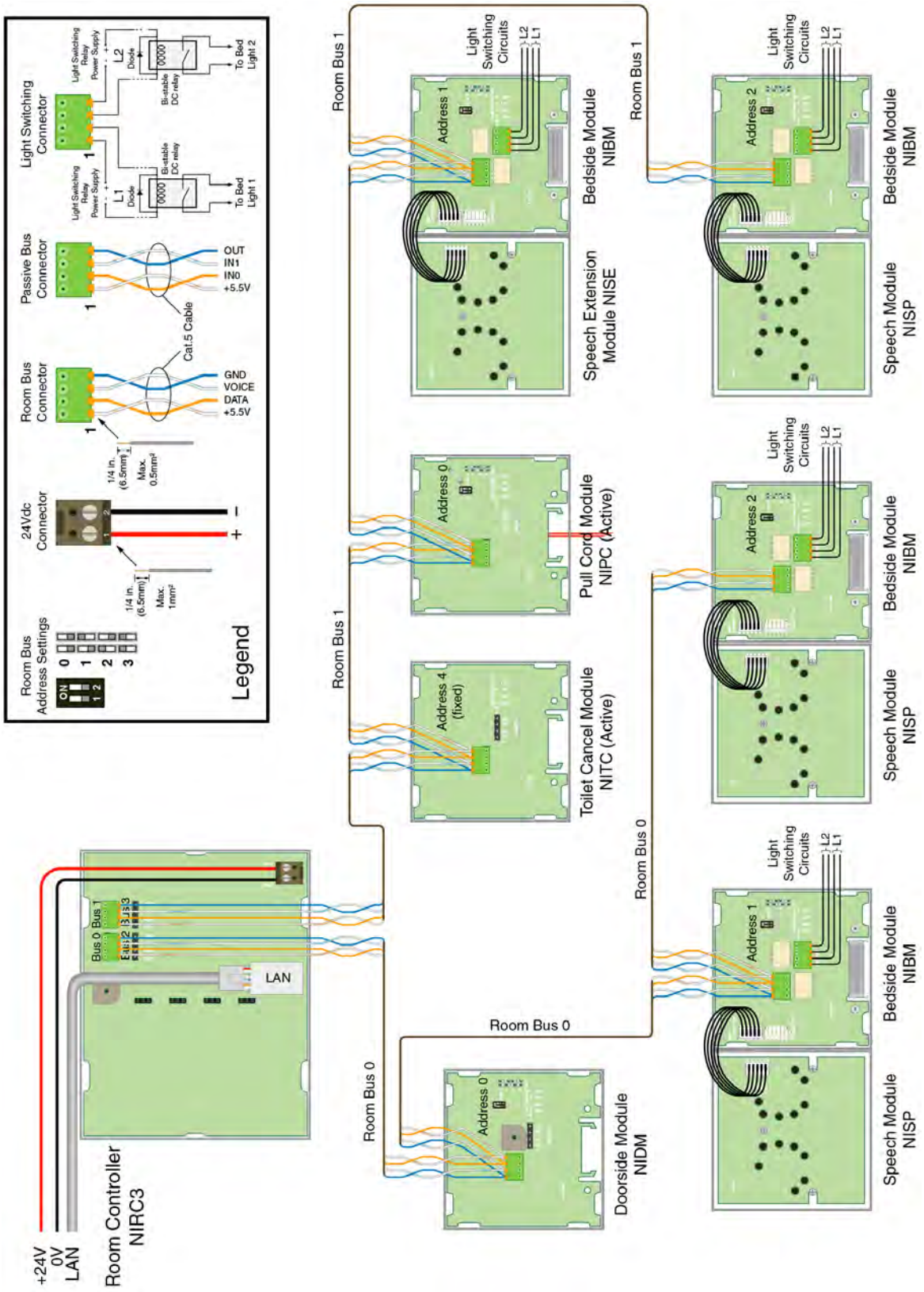



*Figure 182. Wiring for 4-bed room with Speech at each bed*

## 9.6 Duty Selector at a staff Station

The Duty Selector is an peripheral which can be connected to any one of the four room buses from the room controller. It has a fixed address number 5 on the room bus which cannot be changed.

It also has two inputs and two galvanically isolated outputs via relays. The two input circuits and the two output circuits are available as interfaces to external devices. These inputs and outputs can be controlled over the LAN via the room controller.

The duty selector is typically located at the staff station (as shown in the illustration below) where it is used to select the call forwarding groups and response sequences according to the duty configurations which have been configured in the system setup.

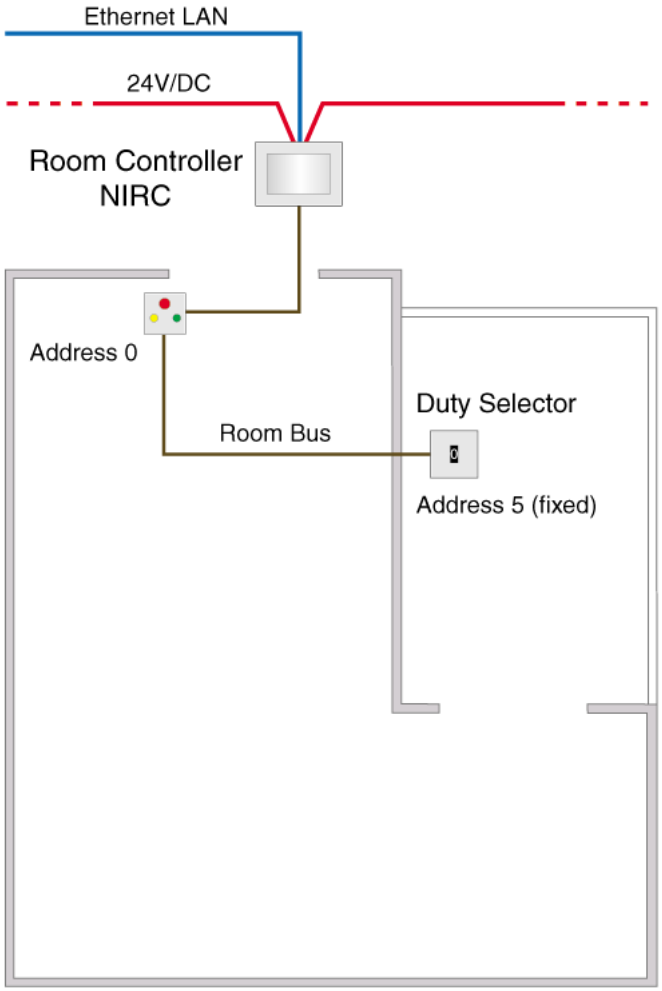



*Figure 183. Staff station with duty selector and door side module*

***IMPORTANT:*** *A room controller (not a corridor lamp) must be installed at the staff station for room fault and LAN fault signaling.*

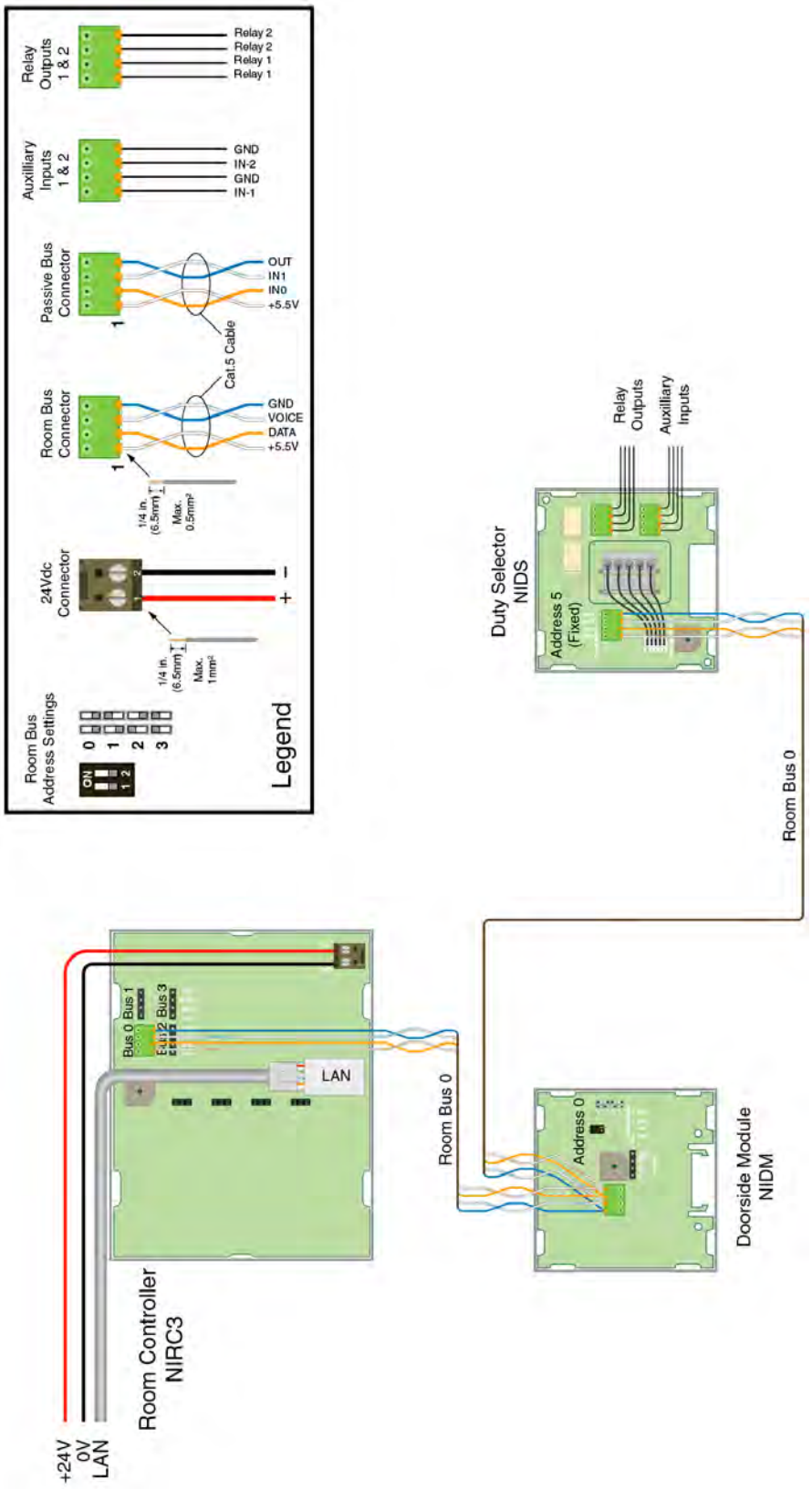
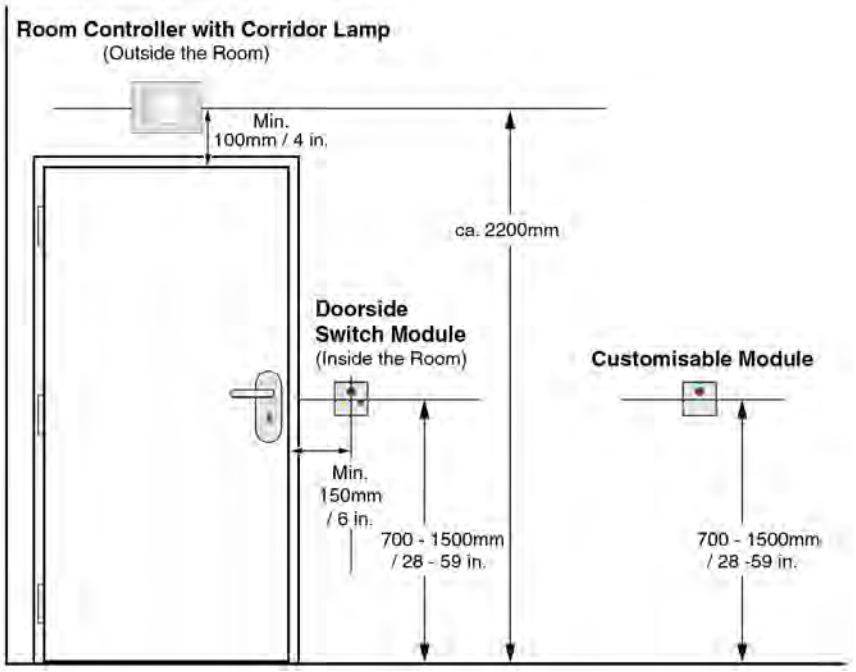



*Figure 184. Wiring for staff station with duty selector and door side module*

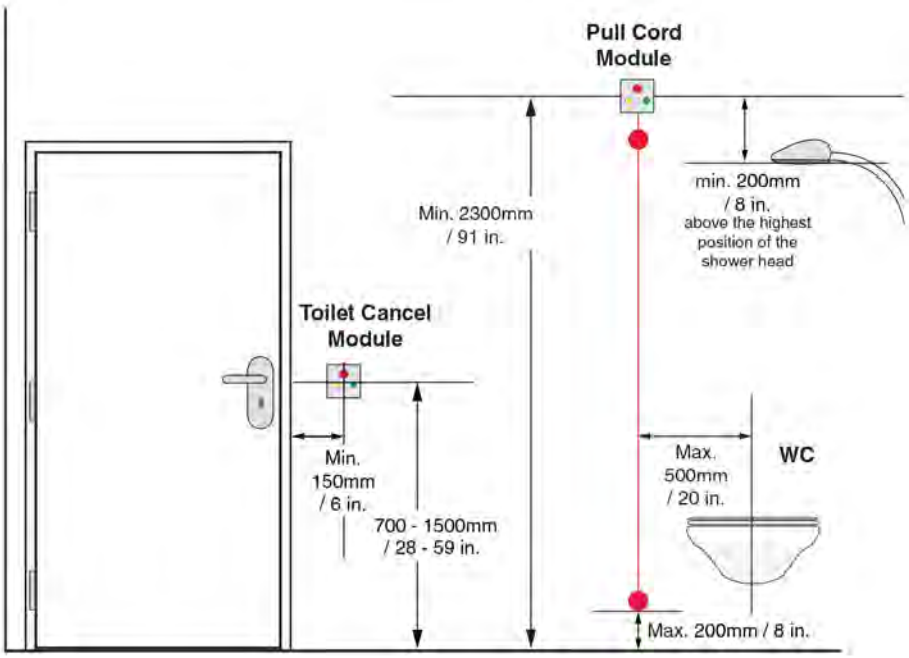
## 9.7 Positioning of the teleCARE IP Peripherals

The following illustrations show typical room installations with recommended locations for the teleCARE equipment.

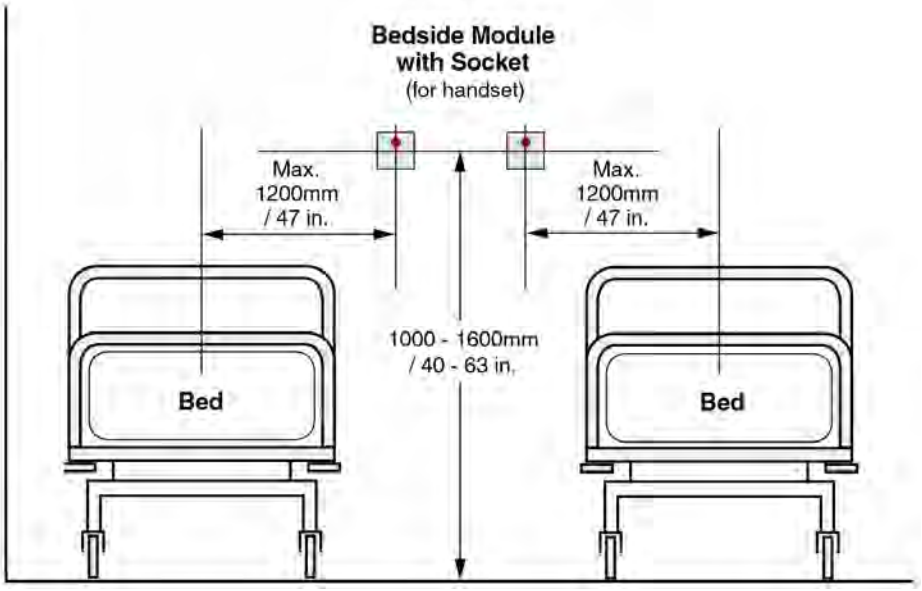
### 9.7.1 Room Controller, Door side Module and Customizable Module:




### 9.7.2 Toilet Cancel Module and Pull Cord Module:



### 9.7.3 Bedside Module:



## Document History

| Version | Date | Description |
|---|---|---|
| A | 21 August 2014 | • First US release |
| B | 12 February 2015 | • Product images Update<br>• Disabling the LEDs if only the relay contact is required, see "Disabling the LEDs" on page 39<br>• Connection of an ESPA (or a TAP) paging system added, see "System Manager (NISM2)" on page 51<br>• Content referring to NIRC, NICL and NILD has been removed.<br>• NISM2 Electrical Connections updated: on page 52 through 53<br>• Connecting a Paging System added, see "Connecting a Paging System" on page 54 |
| C | 2015-12-08 | • NILF Tamper alarm output functions only with external power connected. See "Tamper Alarm" on page 156.<br>• Important statement added to remove the NIRX from the NILF before mounting the NILF onto a wall. *See "Mounting an NILF with NIRX" on page 149.* |
| D | 07 June 2016 | • Added chapter "External Inputs". See "External Inputs" on page 114. |
| E | 23 January 2017 | • Assembling and Attaching the Pull Cord, image has been updated. See "Assembling and Attaching the Pull Cord" (details on page 79)<br>• Ethernet LAN and room bus cabling updated to reflect NIRC3 (4 Room Buses) See "Ethernet LAN and room bus cabling" on page 7. |
| F | | • Regulatory Compliance (EU/EFTA) updated.<br>• Wireless chapter extended with wireless infrastructure. See "Wireless Infrastructure" on page 138.<br>Wireless modules added:<br>NUREP - See "NUREP Wireless Repeater" on page 140.<br>Outdoor Box, using a suitable weatherproof enclosure that meets local electrical code - See "Outdoor Box" on page 143.<br>Wireless Gateway (NIRC3 + NUREP) - See "Wireless Gateway" on page 144.<br>NUWBM3 - See "NUWBM3 Wireless Active Bedside Module" on page 147.<br>NUUTX - See "NUUTX Universal Transceiver" on page 158.<br>NUWIR - See "NUWIR Wireless PIR Module" on page 161. |