TD 92609EN

Installation Guide teleCARE IP Nurse Call System

24 March 2020 / Ver. AF

COPYRIGHT

DISCLAIMER

TRADEMARKS

ADDRESS

Ascom (Sweden) AB
Grimbodalen 2
SE-417 49 Göteborg
Sweden

Phone: +46 31 55 93 00
Fax: +46 31 55 20 31
www.ascom.com

VDE 0834-1/2 TEST CERTIFICATE HOLDER ADDRESS

Ascom Deutschland GmbH

Kruppstraße 105

60388 Frankfurt

Phone: +49 69 58 00 57 - 0

Fax: +49 69 58 00 57 - 333

Contents

Glossary of Abbreviations and Nomenclature

Reference	Description
ACP	The Ascom Communications Platform (ACP) comprises various technology specific communication systems, such as DECT, IP-DECT, VoWiFi, teleCARE IP and 900 systems for on-site communication purposes.
Ascom-WS System	An Ascom-WS system is an on-site wireless communications infrastructure providing mission critical services.
Assistance Call	A manually generated staff call for assistance. How to make an assistance call is freely configurable from the teleCARE IP system manager.
Base Station	A base station is a carrier device that can be part of an Ascom-WS system. Examples of base stations are the IPBS and 9dWRS base stations.
Bedside Module	The Bedside Module (NIBM) is an active peripheral (switch module) that can be used as an end user device in a teleCARE IP system.
Call	A call is the general term for the various types of alarms that can be generated by patients, staff or equipment.
Call Cancel	The termination of a call and removal of the signals relating to that call.
Call Forwarding	The automatic directing of calls to locations where staff is present.
Call Level	A call level is assigned to a specific event. The teleCARE IP nurse call system supports a maximum of 255 call levels. The assignment of call levels to events is freely programmable from the teleCARE IP system manager.
Call Priority	The priority of a call describes the nature of the call and determines the urgency of the response to the call.
Call Transfer	The (automatic) redirecting of calls that have been unattended for a predetermined period of time.
Carer	A person responsible for the care of residents in a nursing home for the elderly.
Carrier Device	Carrier devices are the top level IP and UNITE enabled components that can be part of an ACP system.
Code Blue Call	A manually or automatically generated call signalling a cardiac arrest or similar critical situation.
Corridor Lamp	The Corridor Lamp (NICL) is an active peripheral that can be used as an end user device in a teleCARE IP system for signalling purposes.
DECT	Digital Enhanced Cordless Telecommunications, a global standard for cordless telephony.
DHCP	Dynamic Host Configuration Protocol. A DHCP server is an IP network device used for the assignment of IP addresses to IP clients.
Doorside Module	The Doorside Module (NIDM) is an active peripheral (switch module) that can be used as an end user device in a teleCARE IP system.
Duty	A duty assigns nursing staff to a group of rooms for a certain period of time. These duty periods, or work shifts, can are defined by the associated duty selector.

Duty Selector	The Duty Selector (NIDS) is an active peripheral (nurse station equipment) that can be used as an end user device in a teleCARE IP system.
Elise	Embedded Linux server, hardware platform for Elise modules.
Elise Module	An Elise module is a carrier device that can be part of an Ascom-WS system. Examples of Elise modules are the IMS-DECT module and the teleCARE IP System Manager (NISM). All Elise modules are UNITE enabled.
Emergency Call	A manually or automatically generated highest priority call signalling an emergency situation. How to initiate an emergency call is freely configurable by the teleCARE IP system manager. An example of an emergency call is the code blue call.
End User Application	An end user application is an end user component offering end user level functionality to portable devices and peripherals. Examples of end user applications are the instant messaging application and the alarm management client.
ESPA	European Selective Paging Manufacturers Association (paging protocol)
Event	In the teleCARE IP nurse call system an event indicates that something has happened. An event can be a call, system fault, medical alarm, technical alarm, or cancellation.
IMS	The Integrated Message Server is an Elise module adding messaging capabilities to a teleCARE IP system. The IMS acts as a gateway between the Ascom communications platform and end user devices.
IP	The Internet Protocol standard is used for communicating data across and beyond the IP network that connects all teleCARE IP devices in the nurse call system.
LAN	Local Area Network
Line Break Detection	Line breaks are detected by the room controllers, signaled on the associated corridor lamp(s) and forwarded to the UNITE CM module.
Linking	Linking of carrier and end user devices is defined in the location tree of the teleCARE IP system manager. Calls will be forwarded to linked devices.
Logging	Logging in the teleCARE IP system is performed by the UNITE CM which centrally logs all calls, faults, alarms and cancellations. All logged information is time stamped and available to authorized staff members.
MAC	A Media Access Control address uniquely identifies the Ethernet network adapter of an IP device.
Medical Alarm	A medical alarm is generated by the automatic closing of the normally open, potential free contacts of a medical device.
Medical Disconnect	A high priority call automatically triggered by the unintentional disconnection of an electromedical device.
Medical Line Break	An alarm automatically triggered at the detection of a break in the connection to an electromedical device.
Medical Rail Module	The Medical Rail Module (NIMS) is an active peripheral (socket module) that can be used as an end user device in a teleCARE IP system.

Messaging	Messaging is the exchange of information using text messages. Messaging in the teleCARE IP system is enabled by applying the required messaging systems of the Ascom Communications Platform (ACP).
Mission Critical Service	Mission critical services require planned and timely responses to events that can happen at a customer's site. An Ascom-
Multi Medical Alarm Module MMA - NIMA	The Multi Medical Alarm Module (NIMA) is the interface between primary medical equipment from third parties and the teleCARE IP nurse call system with four medical alarm inputs for the secure monitoring of four primary medical devices.
Normal Call	A normal call is generated by pressing the red button on a handset or switch module. A normal call is typically a call from a patient or resident.
Nurse	A qualified health care professional looking after patients in a hospital.
Nurse Call System	An electronic system for signalling and handling calls in a hospital or care home.
Paging	Paging is the transmission of information using text messages from the Ascom communications platform to portable pagers.
Patient	A person receiving medical attention or treatment in a hospital.
Patient Handset	A Patient Handset (NIPH) is an end user device that can be connected to the safe release socket of a bedside or medical rail module.
PCB	Printed Circuit Board
Peripheral	A peripheral is an end user device that can be part of an Ascom-WS system. There are active and passive peripherals.
PoE	Power over Ethernet enables a teleCARE IP room controller to retrieve power from the Ethernet network.
Portable Device	A portable device is an end user wireless device that can be part in an Ascom-WS system.
Pull Cord Module	The Pull Cord Module (NIPC) is an active peripheral (switch module) that can be used as an end user device in a teleCARE IP system.
Remote Management	Remote management allows the System Manager (NISM) to be managed via a standard serial interface, modem or VPN from a remote PC or laptop.
Resident	A person in the care of a care home or similar institution.
Room Bus	A teleCARE IP Room Controller (NIRC) provides three digital room buses for the connection of peripherals.
Room Controller	The Room Controller (NIRC) is a teleCARE IP controller device establishing a decentralized node on the IP network.
Room Bus Tester	A Room Bus Tester (NIRT) connects to a digital room bus and is used to test the functionality and address settings of all connected (active) peripherals.
Safe Release Socket	A safe release socket can be found in bedside and medical rail modules. Safe release sockets prevent a module from being damaged by the unintentional and uncontrolled disconnection of a patient handset.
Signalling	Calls generated within the teleCARE IP system can be visually and acoustically signalled on corridor lamps and doorside modules.

Socket Extension Module	The Socket Extension Module (NISE) is a passive peripheral (socket module) that can be connected to the passive bus of a teleCARE IP bedside module. Socket extension modules are equipped with a safe release socket for connection of electromedical or technical devices.
Switch Module	Switch modules are peripherals that can be used as end user devices in a teleCARE IP system.
System Fault	Application status report which is automatically generated by the teleCARE IP system when a line break or system malfunction is detected. The application status is reported to the UNITE CM module allowing for logging and further fault handling.
System Infrastructure	The system infrastructure structure is composed by the ACP systems that participate in an Ascom-WS system solution.
System Manager	The System Manager (NISM) is a teleCARE IP carrier device forming the logistical heart of the teleCARE IP system. The NISM contains control logic and a client web application enabling remote GUI access from a web browser.
System Manager GUI	The teleCARE IP system manager Graphical User Interface is the installation, management and administration tool for the teleCARE IP system.
System Service	A system service adds specific functionality to an Ascom-WS system. A system service integrates into an Ascom-WS system through UNITE.
teleCARE IP	Ascom's IP based nurse call system. teleCARE IP allows for the migration of existing teleCARE M/SC systems.
teleCARE IP controller	A teleCARE IP controller is a carrier device that can be part of an Ascom-WS system. Examples of teleCARE IP controllers are the teleCARE IP room and ward controller.
Technical Alarms	Technical alarms are automatically generated signals from equipment within the building and which are transmitted within teleCARE IP. Technical alarms can be detected by the teleCARE IP room controller. Technical alarms can originate from electrical or mechanical devices such as, for example, a heating system, an elevator, a medical gas monitoring system, or a security system.
Toilet Cancel Module	The Toilet Cancel Module (NITC) is an active peripheral (switch module) that can be used as an end user device in a teleCARE IP system.
Toilet Cancel Module (Passive)	The Toilet Cancel Module (NITC-passive) is a passive peripheral (switch module) that can be connected to the passive bus of a teleCARE IP doorside module.
UDP	The User Datagram Protocol is a standard IP protocol that enables two hosts to establish a connection and exchange data with limited services regarding data delivery.
UNITE	Unified IP-based Telecommunication Environment. Name of the Ascom IP based system for handling system services. UNITE allows third parties to develop their own customer-specific Windows and Java applications to integrate with the ACP systems.
UNITE CM	UNITE Connectivity Manager in an Elise Module
UNITE Module	A UNITE module is a carrier device offering specific system services.

UPS	An Uninterruptible Power Supply can be used for maintaining a continuous supply of electrical power in case the normal power supply fails.
User	A user uses the end user devices of an Ascom-WS system. Examples of teleCARE users are: nursing staff, carers or service personnel.
UTP	Unshielded Twisted Pair
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik. VDE is a German Association for Electrical, Electronic & Information Technologies. VDE standards 0834-1 and 0834-2 describe regulations regarding nurse call systems.
VPN	Virtual Private Network enables the remote connection to the teleCARE IP System Manager (NISM) or to the Enhance System Services (ESS) module by using an Internet browser.
WAC	A Wet Area Cover can be used as a water resistant membrane to protect switch modules against the risk of ingress of water in humid rooms such as bathrooms or toilets.
Ward	A group of rooms in a hospital comprising patient rooms, treatment rooms and staff rooms which form an organisational unit.
Ward Controller	The Ward Controller (NIWC) is a replacement for the teleCARE M/SC Intelligent Address Module (IAM) and serves as an adapter for existing teleCARE M/SC installations, allowing such installations to migrate into the teleCARE IP system.
Voice Module	The Voice Module, in combination with the Ward Controller, allows existing teleCARE M installations to be upgraded to teleCARE IP with speech. The NIVM coverts the teleCARE M analogue speech to VoIP.

1 Introduction

The installation guide covers the mechanical and electrical installation of the teleCARE IP nurse 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 coloured 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. To return to the original page after viewing a cross-referred page, click on the "Previous View" button (or) of Adobe Acrobat or Adobe Reader.

Note: *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.*

1.1 General

teleCARE IP is a Local Area Network (LAN) or Wireless Local Area Network (WLAN) based nurse call system for hospitals and other health care institutions such as nursing homes and clinics. The LAN/WLAN infrastructure is used to communicate the information generated in the nurse call system, such as calls, nurse presence, medical 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 can be a dedicated network, or a third-party network depending on local requirements.

The teleCARE IP system is modular, scalable and built around the Room Controller (NIRC/NIRC3) or the Ward Controller (NIWC). Power can be supplied using Power over Ethernet (PoE) or from a decentralised external 24V/DC power supply network.

teleCARE IP peripherals are connected to the room controller by a digital room bus. Each room controller includes 3 or 4 room buses with 8 addresses per bus.

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/or ward controllers and peripherals in order to extend the existing teleCARE IP system.

Existing teleCARE M systems can easily be adapted to the IP domain using the Ward Controller. The Ward Controller replaces the Intelligent Address Module (IAM) of the teleCARE M system and converts the existing teleCARE M installations to teleCARE IP.

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 applicable regulations, especially DIN VDE 0834 for VDE installations.

The teleCARE IP System cabling needs to comply to the EU Construction Products Regulation (Regulation No. 305/2011) with respect to Fire Safety of Building cabling.

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 and correctly in accordance with the appropriate teleCARE IP installation instructions.

According to DIN VDE 0834 Part 1 transmission paths of other systems may not be used to cover the Call system.

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 0°- 40° centigrade and a maximum of 80% relative humidity (non-condensing).

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

teleCARE IP components, including all patient handsets, are not intended for use in oxygen enriched environments. teleCARE IP components, including all patient handsets, are not intended for use in rooms where flammable (anesthetic) gasses are used.

1.3 Intended Use for MMA

The Multiple Medical Alarm (MMA) module (item numbers NIMA-G4E and NIMA-W4E), in combination with specific Room controller software, is intended to interface with medical devices using relay closure circuits (“primary medical devices”), the Ascom Messaging System and the teleCARE IP nurse call system, in order to provide a secondary means of automated visual and/or audible annunciating and displaying of patient alarm information to healthcare professionals, via display devices (class I).

The MMA (item number NIMA-G4D) is also, in combination with specific Room Controller (NIRC3), Room Controller software, and corridor lights (NICL2), intended to interface with primary medical devices approved for communication of alarm conditions, in order to provide automated, reliable, near real-time visual indication of alarm conditions to corridor lamps in the telecare IP nurse call system (class IIb).

The MMA does not replace or alter the behavior of the primary medical devices. When used for indication of alarm conditions, the MMA does not modify, change or add information to the alarm condition.

The MMA incorporates both hardware and software and is intended to be installed in close proximity of a patient, while the Room controller software is intended to be installed on specified hardware modules located outside the patient area. The MMA is not intended to be used for diagnostic purposes or to come in physical contact with patients.

The MMA is intended for use by professional clinical personnel and relies on proper use, installation and operation of the communication infrastructure at the healthcare facility.

1.4 IP Infrastructure Requirements

For details of the IP infrastructure requirements please refer to the “IP Infrastructure Requirements” document TD 92636.

1.5 System Overview teleCARE IP Without Speech

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

teleCARE IP without speech is designed to work with Ascom Interactive Messaging. The system is configured with the project specific requirements using the teleCARE IP System Manager (see the teleCARE IP Configuration Manual TD92610EN).

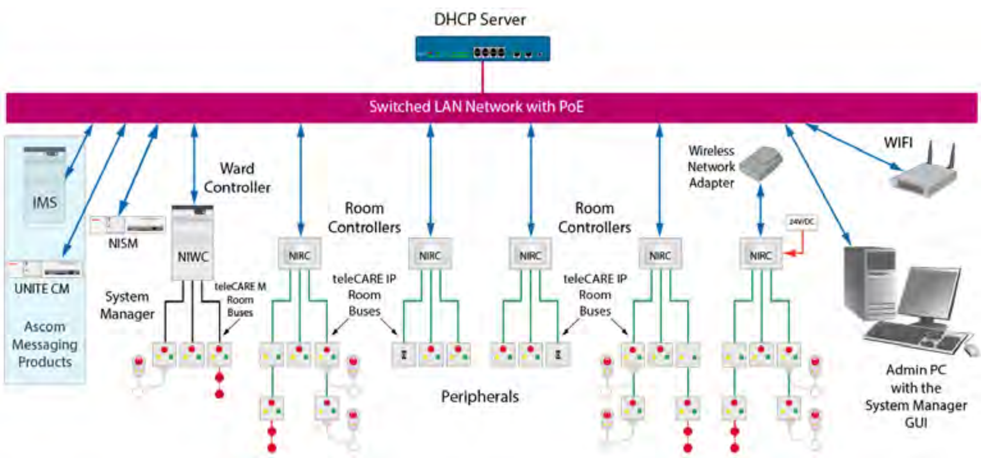


Figure 1. System overview teleCARE IP without speech

1.6 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 an additional VoIP gateway (Innovaphone) are to be installed. 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 doorside module (NIDM), the bedside module (NIBM), the customizable module (NICM) and the pull cord module (NIPC).

1.6.1 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. For a list with compatible handsets, see “teleCARE IP Compatible Ascom Handsets” on page 17.

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

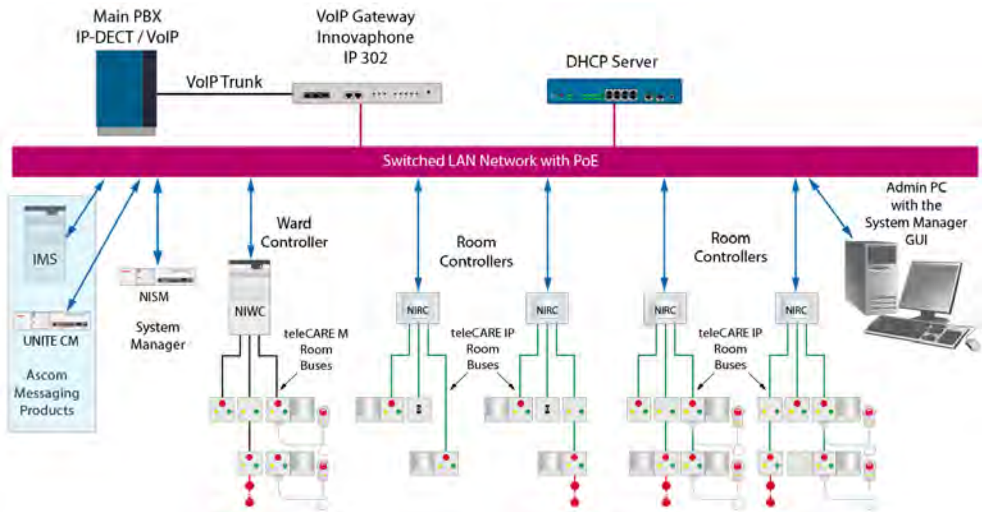


Figure 2. System overview teleCARE IP with speech

1.6.2 Innovaphone VoIP Gateways

The teleCARE IP system has been tested and approved for use with the Innovaphone Gateways to support VoIP speech functionality. It has not been tested with any other VoIP gateway therefore its performance with any other VoIP gateway than Innovaphone cannot be guaranteed and will not be supported by Ascom.

The Innovaphone VoIP gateways are IP based gateways 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".

When used with teleCARE IP, different Innovaphone gateways can support a specific number of objects (subscribers). In the VoIP gateway objects are created when assigning numbers (from the module ranges) to the teleCARE IP modules with speech, when assigning numbers (from the group ranges) to the groups for group announcements and for the automatically selected numbers (from the auto ranges) for the room controller's individual groups created for group announcement. The module, group and auto ranges are defined when setting up the system using the NISM GUI, for more information refer to the teleCARE IP Configuration Manual TD92610EN.

The Innovaphone VoIP gateway power supply can be sourced from the LAN (PoE Class 3 IEEE 802.3af) or by a mains adapter power supply (output 40V/DC 375mA).

The VoIP gateway 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 (see the teleCARE IP Configuration Manual TD92610EN).

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

2 VDE Compliance

2.1 General

teleCARE IP is certified as compliant with the German standards DIN-VDE 0834 part 1 and DIN-VDE 0834 part 2. These standards relate to “call systems for use in hospitals, care homes and similar institutions” and cover all aspects of equipment design, safety, installation, usage and functionality, as well as influences on other equipment and the environment.

The following is based on the requirements as described in VDE 0834, April 2000, Part 1.

2.1.1 DIN-VDE Approved teleCARE IP Devices

To identify the DIN-VDE approved teleCARE IP devices refer to the respective data sheets.

2.1.2 DIN-VDE Compliant System Requirements

In order for a teleCARE IP installation to comply with the requirements of the DIN-VDE:

- The teleCARE IP system must be installed strictly in accordance with the teleCARE IP Installation Guide TD 92609EN and all requirements of VDE 0834 part 1 and VDE 0834 part 2 must be fulfilled.
- The 24Vdc power supply of the teleCARE IP system must be fed from a maintained mains supply or consist of uninterrupted power supply units.
- All teleCARE IP power supply units must be directly connected to the mains input by screw terminations (not by a mains plug).
- The configuration of the peripherals must use the appropriate “VDE” peripheral types in the teleCARE IP system manager (as described in the teleCARE IP Configuration Manual TD 92610EN).

2.1.3 System Configuration

The System is configured through the System Manager (NISM) with a special Software Application accessible through a Web browser. The access to the NISM is made through a dedicated IP-address. The Graphical User Interface (GUI) allows the programming of the system according to the customer requirements.

Every page of the System Manager GUI (Graphical User Interface) shows “Notes” and “Help” in a window, that guide the user through the configuration.

For a complete configuration instruction of the teleCARE IP System, see the document “Configuration Manual for teleCARE IP (TD 92610)”

2.2 Inspections

The following requirements are based on the requirements as described in Section 7, 8 and 9.

2.2.1 Quality Inspection for Acceptance

Before operating the teleCARE IP system an acceptance test must be carried out by a specialist for Nurse call systems. The acceptance test shall comprise:

- A visual and functional test of the teleCARE IP system.
- Review of documents required for teleCARE IP operation, to make sure that documentation is complete and in compliance with clause 6.
- An acceptance certificate signed by the person responsible for the acceptance test.

Quality inspections may also be carried out on individual sections of the teleCARE IP system during the course of the installation.

2.2.2 Visual Inspection

The visual inspection shall cover the appropriate installation and assembly of equipment, the intended use of the devices and comparison of equipment with the technical documentation. Application area A and B as well as protection area A and B are to be considered.

2.2.3 Functional Inspection

The functional inspection shall be in accordance with the proper interaction of the system parts and the Instruction Guide.

2.2.4 Inspection after alteration

An acceptance test shall be done after changes are made to the teleCARE IP system or a scope change. The inspection may be limited to the affected parts of the system if it can be safely assumed that the alterations do not affect the rest of the teleCARE IP system.

2.3 Delivery to the operator

The acceptance certificate, the operating instructions and the system documentation will be handed over to the operator upon the delivery of the teleCARE IP system. The operator or any person authorized by the operator shall be instructed by the installer in the function and operation of teleCARE IP system.

2.4 Operation

2.4.1

The operator of the teleCARE IP system must be a trained person, or appoint a trained person. The operator or the authorized trained person shall take responsibility that functional tests are performed at signs of impairment of permanent readiness or irregularities.

2.4.2

The operator must take appropriate measures such as training for adequate knowledge of its staff on operation and use of telecare IP system. These measures should be repeated as needed.

2.4.3

Connecting of non-teleCARE IP system equipment and resources according to 5.4.5 of VDE 0834 part 1 (eg medical devices) must be performed by specially trained staff.

2.4.4

The operator must instruct the staff to report all irregularities of functions, all failures and malfunctions.

2.4.5

Connectable devices, such as patient handsets, must be checked for proper function after each connection.

2.4.6

All the necessary maintenance and modification of the teleCARE IP system shall promptly be arranged by the operator or by the trained person authorized by the operator.

2.4.7

The teleCARE IP system must be maintained by professionals for teleCARE IP systems. Professionals responsible for teleCARE IP systems shall inspect and repair in case of malfunctions.

The planning and professional execution of this work must be regulated between the operator and maintenance staff, for instance by a maintenance contract. The maintenance engineer must begin with the elimination of faults within 24 hours of notification.

All repair work must be carried out in such a way that the time of interruption to the system is kept as short as possible. After completion of repair work, all repaired equipment shall be subjected to functional inspection.

2.4.8

General inspections shall be performed at least four times a year at approximately identical intervals. During such inspections, the following equipment and systems shall be tested and reviewed:

- Call buttons and movable devices for call release which are intended for patients' use
- Signal lamps and acoustic signal indicators
- Power supply system.

2.4.9

In addition, the following equipment and systems shall be tested for due and proper functionality at least once a year:

- All other equipment intended for call releasing, call cancelling and presence indicating
- All other signalling facilities
- All facilities for call answering

2.4.10

Repairs shall be performed promptly, if impermissible deviations from the nominal condition of the teleCARE IP system are detected during inspection.

2.4.11

Maintenance work shall be performed in accordance with manufacturer's instructions, however at least once a year. Maintenance work includes, if applicable:

- Servicing of system elements
- Replacing of construction elements with limited service life (e.g. batteries)
- Adjustment
- Readjusting and aligning of construction elements and equipment

Note: The 3V Lithium battery of the NISM has a limited lifetime and must be replaced after five years.

2.4.12

Whenever the teleCARE IP system is shut down as a whole or in part, the operator shall arrange for the related rooms to be provided with other control means until the system is switched on again.

2.4.13

Alterations of the teleCARE IP may only be performed by experts of teleCARE IP systems. After each alteration, the nominal condition of the teleCARE IP system shall be re-established, and an inspection after alteration shall be performed as provided in "Inspection after alteration" on page 11.

2.4.14

All events of faults occurring in the teleCARE IP system, including details on the cause and, if applicable, the causer of each fault, as well as all necessary maintenance and alteration activities performed shall be recorded continuously by the operator, the instructed person advised by the operator, or the expert of the teleCARE IP system instructed to perform such activities, in an operations record book kept available with the teleCARE IP system.

3 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.*

3.1 General Limitations

Practical engineering parameters (hardwired)	**Min.**	**Max.**	**Unit**
NIRC3s per NISM		100	#
Active peripherals per room bus (addressable - 0 to 3)		4	#
Active peripherals per room bus (fixed address - 4 to 7)		4	#
Pull cord peripherals on a passive bus		1	#
Toilet cancel peripherals on a passive bus		1	#
Total cable length of an NIRC3 IP room bus		30	meters
Minimum IP room bus voltage	4.5		VDC

Practical engineering parameters (wireless)	**Min.**	**Max.**	**Unit**
Coverage planning			
Number of NIRX's or gateways a wireless PD “should see” (without RSSI locationing)	1	2	#
Number of NIRX's or gateways a wireless PD “should see” (with RSSI locationing)	2	3	#
Range			
NITX (indoor)		30	meters
NIFX		30	meters
NUWBM3		30	meters
NUUTX		30	meters
NUUTX input voltage	10	30	VDC
NUUTX distance to magnet from center		5	mm
NUWIR 916 to 921 MHz		30	meters
NUWIR PIR angle	20	90	degrees
NUWIR PIR range	4	6	meters
NUREP 2.4GHz (indoor)		30	meters
NUREP 2.4GHz (outdoor)		300	meters

Practical engineering parameters (wireless)	Min.	Max.	Unit
NILF (for LF)		2.7	meters
NILF (for NIRX in NILF)	0.3	30	meters
Planning and capacity			
Number of wireless PD's per NISM (This is including NIRX units in an NILF, but excluding the wireless infrared module NUWIR and Universal Transceiver NUUTX) **Note:** When wireless infrared modules "NUWIR" and/or Universal Transceivers (NUUTX) are included, the maximum amount of wireless PD,s that can be connected to the NISM will decrease significantly, depending on the amount of NUWIRs / NUUTXs and the wireless traffic they generate.		1000	#
Number of repeaters per wireless gateway **Note:** gateway requires 1 repeater and supports 3 strings of 4 repeaters each		1+3*4	#
Number of wireless gateways per NISM		50	#
Number of transceivers per NIRC3 (NIRX)		50	#
Number of transceivers per NUREP		50	#
Number of calls per second NISM2		2	#
Supervision heartbeat			
Heartbeat PD's (default)		240	seconds
Heartbeat repeaters (fixed default)		5	seconds
PD lost report timing (default)		60	minutes
Retries			
Number of retries transceivers		4	#
Number of retries repeaters		10	#

3.2 DHCP Requirements

DHCP Requirements
The teleCARE IP system requires a DHCP server
The teleCARE IP system should be in one broadcast domain
When an NISM is not included a permanent IP address assignment is required with DHCP reservation

3.3 Network Expectations

Network Expectations
The LAN installation must be certified and tested in accordance with ANSI/TIA/EIA-568-B
LAN cable type: Category 5 (or higher)
Maximum LAN cable length: 100 metres
The LAN should be completely switched with no hubs or repeaters
A switch port is required for each room controller and ward controller
Existing customer LANs must be assessed by Ascom before committing
For details of the teleCARE IP load and performance see document TD92636GB, (IP Infrastructure Requirements)

3.4 VoIP Requirements

VoIP Considerations
The Innovaphone VoIP gateway is required for teleCARE IP with speech, as the interface to the PBX.
An interoperability test between VoIP gateway and main PBX must be performed
The VoIP gateway should have the same QoS and VLAN settings as the IP DECT or the VoWiFi system.
The connection between the PBX and the Innovaphone can be BRI or SIP Trunk
teleCARE IP only supports CODEC G.711 (a-law)
SIP trunk to the VoIP gateway must be set to “Early offer”
Wherever possible firewalls within the LAN should be avoided
A backbone of at least 100Mb/s is recommended
To ensure the required End-to-End Quality of Service the complete Ascom environment, including all teleCARE IP room controllers and the NISM, should be isolated from all other traffic in a separate VLAN.
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 used for data and voice together should not exceed 75% of the total network capacity
Ascom Testimonials: Delay - less than 50 ms is good Jitter - less than 30 ms is good Packet Loss - 1% is good (up to 4% is acceptable)

Note: *See document TD92636GB (IP Infrastructure Requirements) for complete Ascom network requirements:*

3.5 teleCARE IP Compatible Ascom Handsets

teleCARE IP Compatible Ascom Handsets
9d24 / mkII
d62
d63
d81
i62
i75
Myco

Note: *Always use the latest available software versions for the handsets.*

3.6 Startup Availability Timing

After connecting the teleCARE IP system to the general power supply, the teleCARE IP system needs a certain time to become fully functional.

Given the availability of the network, the network switches, the DHCP server, the teleCARE IP system will be fully functional within 5 minutes of connecting to the general power supply.

3.7 Software Update Timing

Updating the teleCARE IP system with new software will take time during which the teleCARE IP system is not fully functional.

The teleCARE IP system needs to reload the configuration parameters after an update, each Room controller or NISM will be fully functional again within 10 minutes. Depending on the number of Room controllers and the number of NISMs, the teleCARE IP system will be updated and fully functional after the last Room controller has been updated.

4 System Cabling

IMPORTANT: *The teleCARE IP System cabling needs to comply to the EU Construction Products Regulation (Regulation No. 305/2011) with respect to Fire Safety of Building cabling.*

4.1 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 colour 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 extra-low voltage and therefore cabling must be separated from higher voltage systems through the use of separate conduits or divided cable trays.

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

Interference from cabling and other systems must be avoided and therefore teleCARE IP system cables should be suitably separated from power lines and data transmission cables.

Note: *For VDE compliant installations, all devices in protection area B have to be connected to switches that use a glass fibre backbone. If the switches with connections in protected area B are not connected to a glass fibre backbone, the switches have to be connected via a coupling device which provides at least 1 MOPP (Means Of Patient Protection) according to EN 60601-1 for mains.*

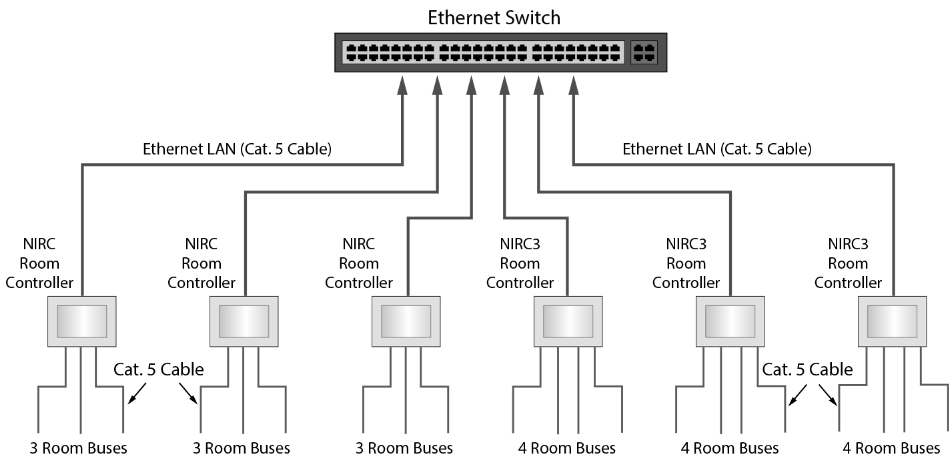


Figure 3. Ethernet LAN and room bus cabling

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

4.1.1 Ethernet LAN Cable

The cable required for the Ethernet LAN must comply with the specification T568-B Category 5 or higher. This is a standard 4 x unshielded twisted pair (UTP) solid bare copper with a diameter of 0.5mm (AWG 23).

Cable Type	Wire Size Diameter / AWG	Max. Cable Length
T568-B, Category 5 or higher (4 x UTP)	0.5mm / 24	100m

Table 1. Recommended Ethernet LAN cable

IMPORTANT: *The maximum length of the Cat 5 (or higher) Ethernet LAN cable is 100 metres.*

4.1.2 Room Bus Cable

The room bus cable connects the room controller to the associated teleCARE IP peripherals. It consists of four wires which carry +5v5, Data, Voice and Ground.

The recommended cable for the room bus is T568-B Category 5 or higher. It is also acceptable to use 2 x twisted pairs of solid copper wires each 0.6mm diameter. The table below shows the recommended cable types with the preferred cable type in bold italics.

Cable Type	Wire Size Diameter / Area	Max. Cable Length
T568-B Category 5 or higher (4 x UTP)	0.5mm / 0.25mm²	30m
JY (ST)Y2x2x0.6 helical twist	0.6mm / 0.3mm²	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 limited to 750mA 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.

In situations where 1, 2 or 3 room buses are connected to the room controller, the sum of the loads on all connected room buses must be considered.

Room Bus Voltage Considerations

The power supply to the room bus at the output from the room controller is >5.5V/DC 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 4.5V/DC.

IMPORTANT: *If third-party devices are connected to the room bus power supply then the load of those devices must be considered in the total load on the room* *bus, together with the teleCARE IP peripherals. Ascom cannot accept any responsibility for third-party devices which are connected to the power supply in the teleCARE IP room bus.*

4.1.3 Room Bus Cable Length and Power Limitations

The IP Room Controller offers up to three room buses (NIRC) or four room buses (NIRC3). The total load of all the connected room buses must not exceed 750mA (NIRC) or 500mA (NIRC3) 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 30 metres, irrespective of the load. Below 30 metres, the maximum acceptable length of the room bus cable depends on the load (including third-party devices).

The following graph is based on using cat 5 UTP cable for the room bus. It shows how to calculate the maximum acceptable length of the room bus cable at various load values in order to ensure the voltage does not drop below 4.5V. The green area of the graph is the safe area (4.5V or higher), the red area is unsafe (less than 4.5V).

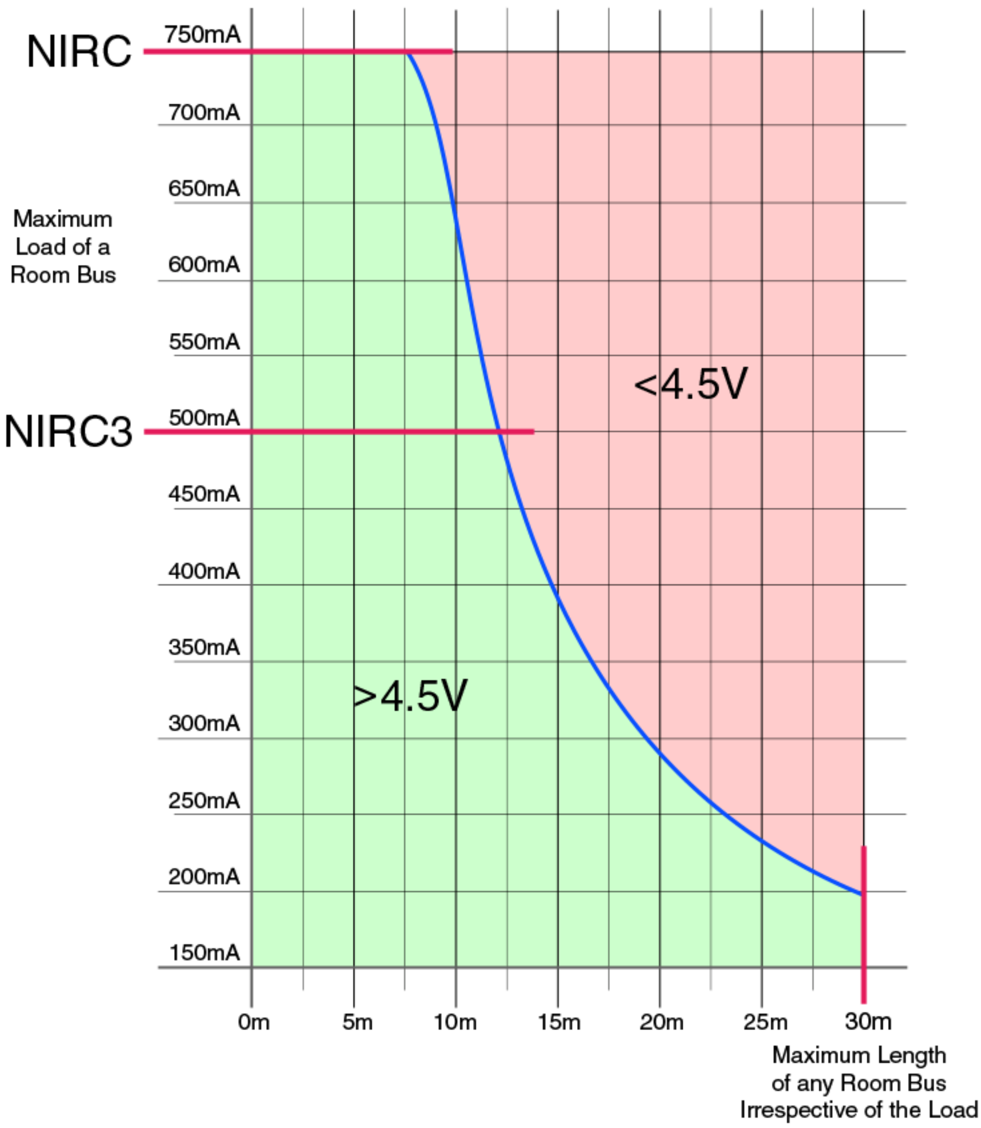


Figure 4. Cable length and room bus load limitations for Category 5 UTP cable.

IMPORTANT: *The graph above relates to the maximum load on a single room bus connected to the room controller. The maximum acceptable load of a single room bus is* ***750mA (NIRC) or 500mA (NIRC3)****. The minimum acceptable voltage at the furthest point of any room bus is* ***4.5 volts****. The maximum length of any room bus is* ***30 metres*** *(irrespective of the load).*

5 System Power Supply

The teleCARE IP system power supply can be sourced from either Power over Ethernet (PoE) or an external 24VDC power supply and a separate 2-wire power distribution bus.

Note: *In compliance with IEEE 802.3af, when T568-B Category 5 (or higher) cable is used the maximum cable length from the switch to the IP Room Controller is 100 metres.*

5.1 Power over Ethernet (PoE)

WARNING: *The PoE module is a class A product which may cause radio interference when used in a sensitive environment.*

In order to use PoE in a teleCARE IP system a Power over Ethernet the PoE extension module (NIPE) is required for each room controller. The PoE extension module is a Class 2 device with a maximum output of 9W at 20V/DC, nominal 6.5W at 24V/DC.

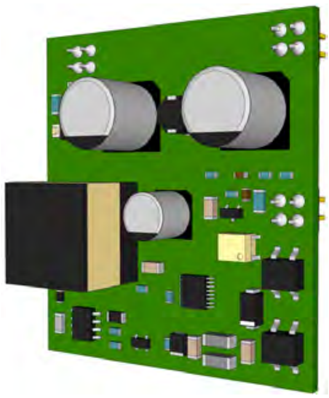


Figure 5. PoE extension module (NIPE) **PHASED OUT**

This module is a PCB which is piggy back mounted on the room controller (see "Power over Ethernet Extension Module" on page 69 for more details).

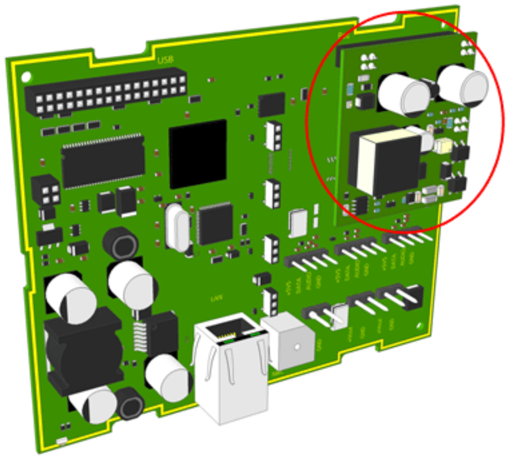


Figure 6. PoE extension module mounted on the IP room controller board

The PoE extension module enables the room controller to be powered from the Ethernet network. Besides powering the room controller, PoE also powers the three room buses including any connected corridor lamps and other peripheral teleCARE modules.

The installation of the ethernet LAN cable must comply with the standard IEEE 802.3af. The input power connection from the network switch can be Mode A (over the data pairs) or Mode B (over the spare pairs) and each input will accept either polarity.

5.1.1 Power over Ethernet Installation

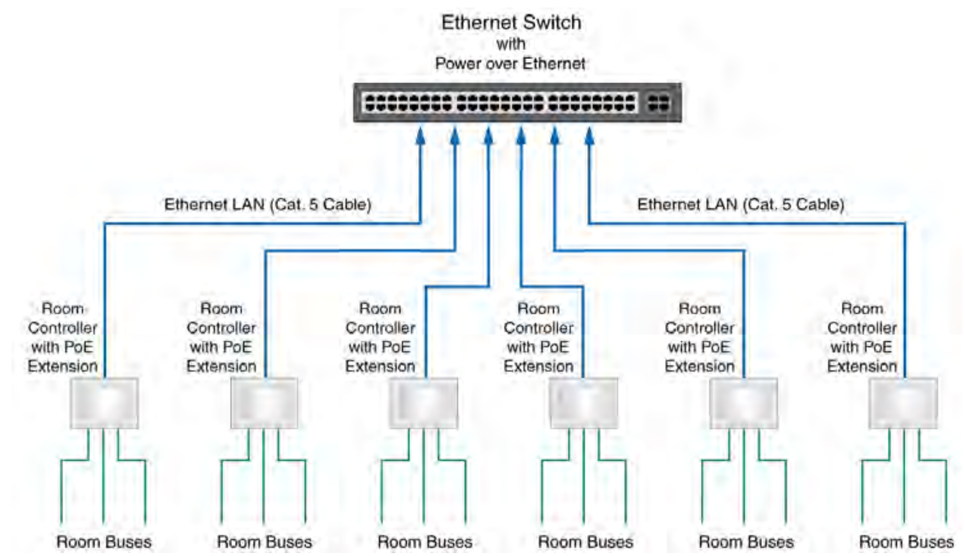


Figure 7. Basic Installation with Power over Ethernet

5.1.2 Power over Ethernet with Corridor Lamps

Each corridor lamp receives its 24V D/C power supply from the associated room controller. The room controller with PoE can support two corridor lamps.

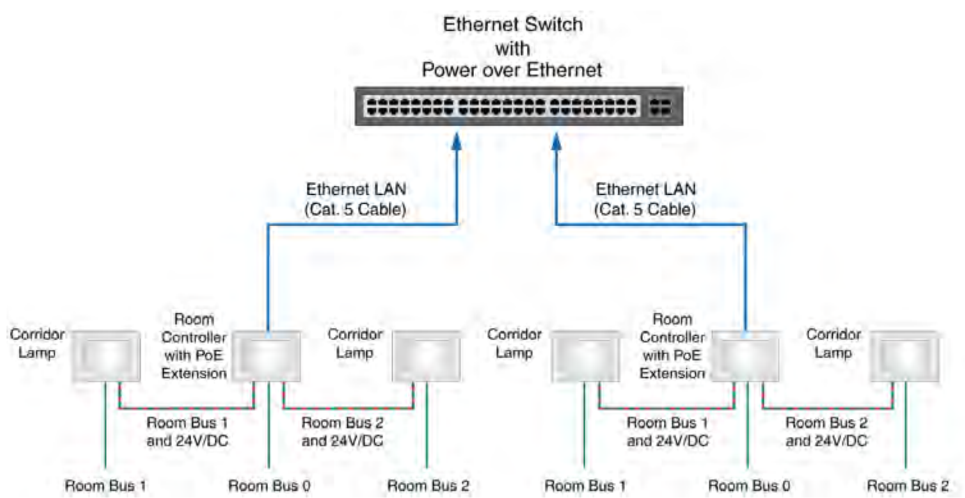


Figure 8. Power over Ethernet for room controller corridor lamp

5.2 External Power Supply

The Ascom 24V/DC power supply unit must be used for external power. The external power requirement for the teleCARE IP system is 24 volt DC. The acceptable range of the power supply voltage is 21.6V to 26.4V.

The Ascom 24V/DC power supply units are EN 60601-1-2 certified and "CE" marked. The input mains power requirement is 230V/50-60HZ. The power supply unit must be plugged into an "Essential" power outlet.

The power distribution is best organised with decentralised power supply units located as close as possible to the rooms which they supply. This minimises the volts drop caused by the length of the power supply wires and the load of the peripheral devices.

Note: *In certain circumstances fuses in the 24V power supply are necessary.*

5.2.1 VDE compliancy

In VDE compliant installations the mains power plug must not be used. The mains power leads should be screw-connected to the "Essential" mains power.

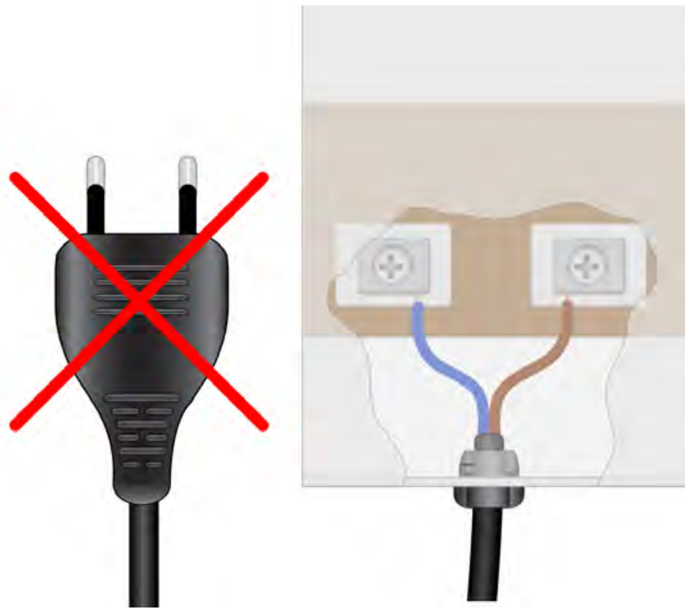


Figure 9. VDE 0834-1 compliance required mains power connection

In VDE compliant installations the power supply shall be connected to an approved UPS in accordance with EN 60601-1. All mains connected devices of the teleCARE IP system shall be connected to the UPS and all these connected devices shall comply with EN 60950-1. The UPS shall take over the power supply of the call system within 15s after failure of normal power supply and maintain normal operation for at least 1hour. Any failure of the normal power supply shall be indicated. An all-pole switching device shall be provided for system shutdown.

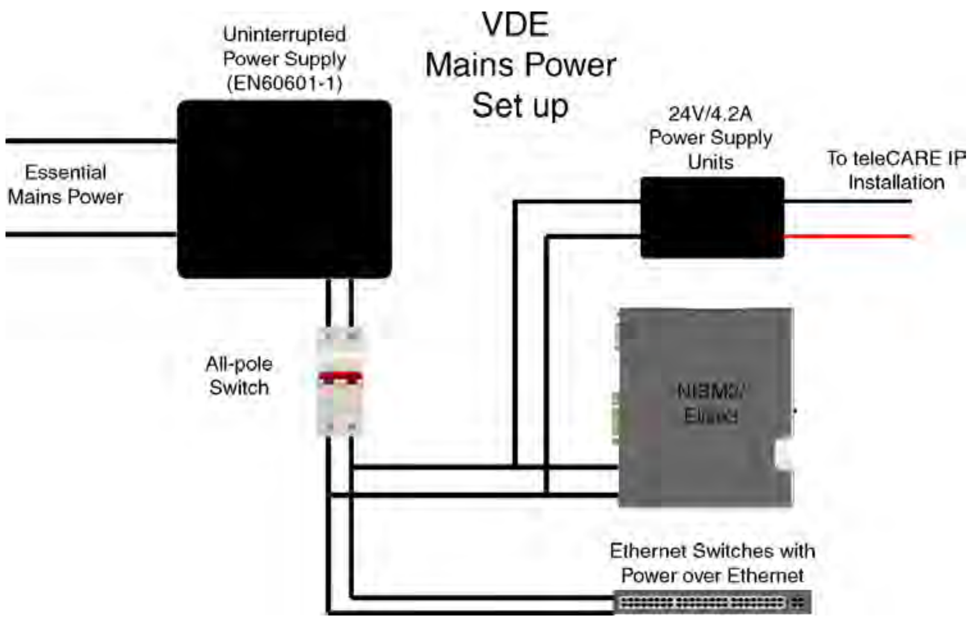


Figure 10. VDE 0834-1 compliant mains power supply

5.2.2 24 Volt DC Power Supply Unit 4.2 Amp

The 24V/4.2A power supply unit suitable for use in all teleCARE systems. It includes a fixed mains cable, a fixed 24V/DC output cable and a mounting bracket.

Figure 11. 24V/4.2A teleCARE power supply unit

5.2.3 24V/4.2 Amp Power Supply Unit Installation

The power output wires of the 24V/4.2A power supply unit are coloured black and black/grey. The black wire is 0v (-) and the black/grey wire is 24V (+).

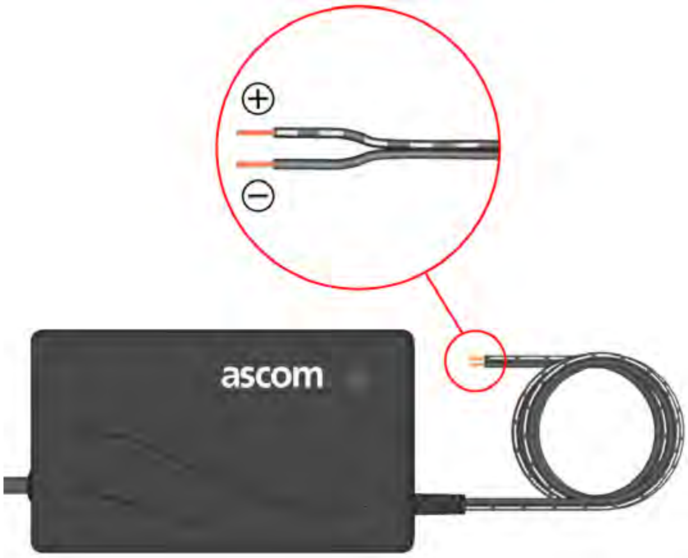


Figure 12. 24V/4.2A power supply unit output wires polarity

Refer to the "Power Supply Unit 24VDC/4.2A" Installation manual TD 92894EN for detailed information about the installation of this power supply Unit.

5.2.4 teleCARE IP Power Supply Wiring and Fusing

It is important to use the correct wire sizes and to consider the length of the 24V power supply wires. The minimum acceptable wire size of the 24V bus is 1mmØ (0.8mm²).

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

For the stub wiring between the 24V bus and the control module wire size 1mmØ (0.8mm²) must be used.

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

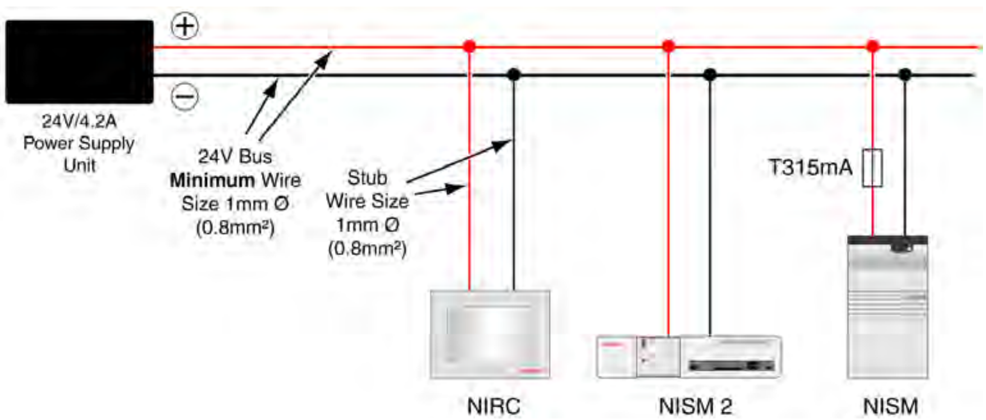


Figure 13. teleCARE IP 24V/4.2A power supply wiring and fusing

Fusing

The NISM (based on the Elise2 module) requires a **FT315mA** (slow-blow) fuse in the 24V power supply input, as shown in the above illustration:

Warning: *Failure to include the required fuse could result in dangerous overheating of the module in fault conditions!*

5.2.5 Power Supply Unit (24V/4.2A) 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.

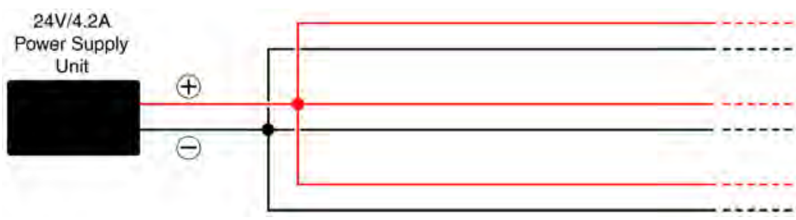


Figure 14. Multiple power buses

5.2.6 Power Supply Monitoring

It is recommendable to monitor the teleCARE IP 24V/DC power supply. A suitable 24V/DC monitoring device should be connected in parallel to the output of the power supply unit.

The monitoring device should detect when the power supply fails or if the voltage drops below an acceptable level. If these conditions occur the monitoring device should generate an alarm signal which can be sent to an independent technical alarm system such as a building services alarm panel.

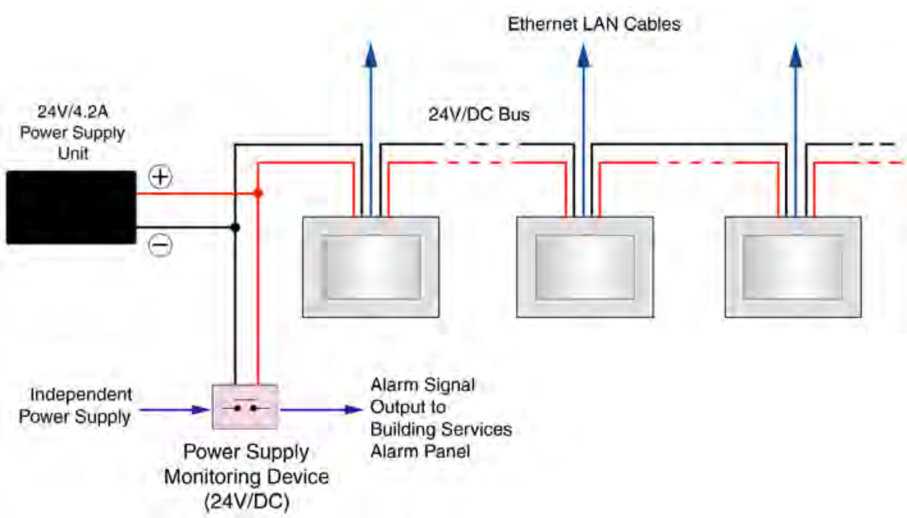


Figure 15. Power Supply Monitoring

IMPORTANT: *The power supply monitoring device must be connected to the output of the power supply unit and before the system components.*

5.2.7 Power Supply Basic Installation

The 24V/DC power is carried on a two-wire bus that loops from room controller to room controller. The minimum wire size for the 24V/DC power supply bus is 1mmØ (0.8mm²).

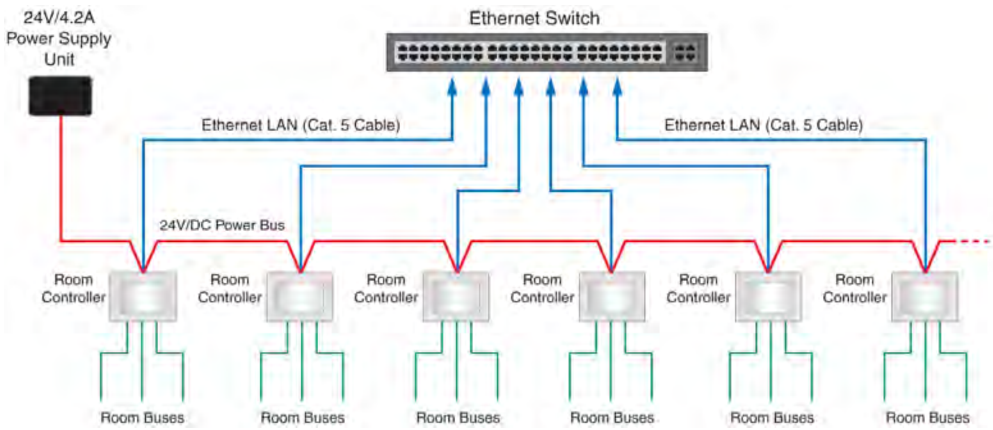


Figure 16. LAN and room bus cables with power supply (24V/4.2A)

Note: *Excessive 24V bus wire length can result in unacceptable voltage drop! The lowest acceptable voltage at any point in the 24V/DC distribution is 21.6 volts.*

5.2.8 Power Supply for Systems with 24V Slave Corridor Lamps

Each slave corridor lamp (NICL) receives its 24V D/C power supply from the power output connections of the associated room controller - not directly from the external power supply bus. The room controller can support two corridor lamps.

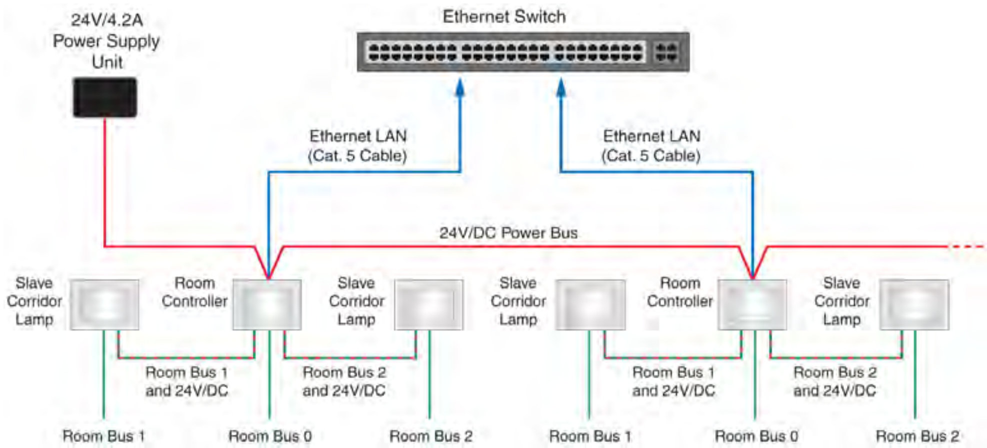


Figure 17. Power supply (24V/4.2A) for room controllers with corridor lamps (NICL)

5.2.9 Power Supply for Systems with Room Bus powered Slave Corridor Lamps

Each Room Bus powered slave corridor lamp (NICL2) receives its 5.5V D/C power supply from the Room Bus of the connected room controller. The room controller (NIRC) can support three corridor lamps, the room controller (NIRC3) can support four corridor lamps.

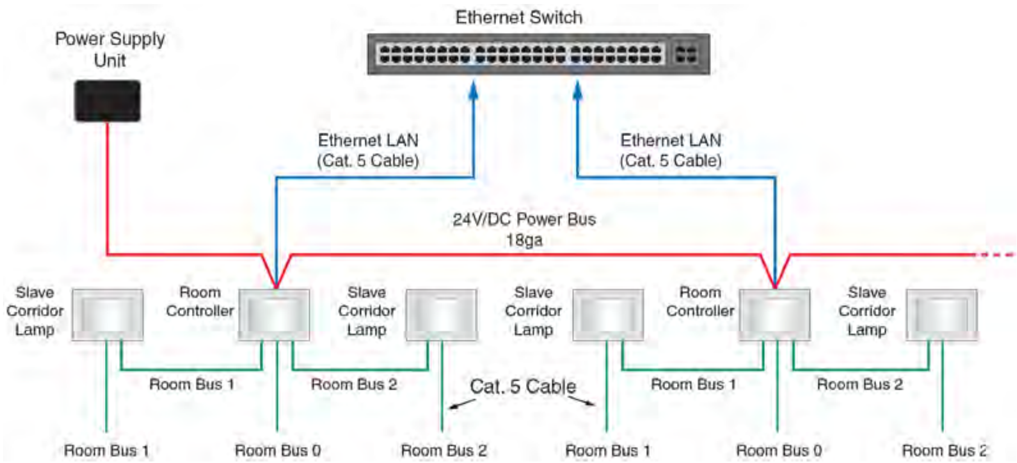


Figure 18. Power supply (24V/4.2A) for room controllers with Room Bus powered corridor lamps (NICL2)

5.2.10 24 Volt DC Power Supply unit 5 Amp PHASED OUT

The 24V/5A power supply unit is obsolete and superseded by the 24V/4.2A module (described above). It is suitable for use in all teleCARE systems.

Figure 19. 24V/5A teleCARE power supply unit

5.2.11 24V/5 Amp Power Supply Unit Installation

Connect the teleCARE IP 24 volt power bus to the + and - contacts on the front of the power supply unit. Be sure not to reverse the polarity of the power bus while connecting.

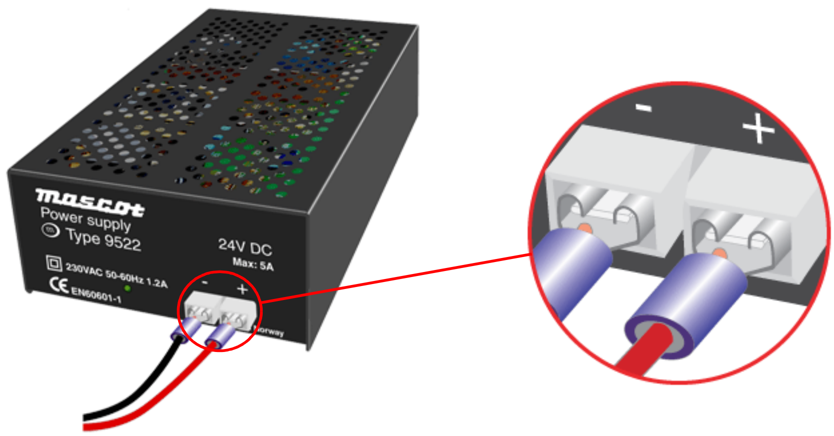


Figure 20. 24V/5A power supply unit output connections

Refer to the "Power Supply Unit 24VDC/5A" Installation manual TD 92234EN for detailed information about the installation of the power supply Unit.

5.2.12 teleCARE IP Power Supply Wiring and Fusing

Wiring

It is important to use the correct wire sizes and to consider the length of the 24V power supply wires. The minimum acceptable wire size of the 24V bus is 1mmØ (0.8mm²). Use wire size 1mmØ (0.8mm²) for the stub wiring between the 24V bus and the module.

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

Fusing

The 5 Amp power supply must have a **F4A** (fast-blow) fuse in the output. The NISM (based on the Elise2 module) requires a **FT315mA** (slow-blow) fuse in the 24V power supply input, as shown in the above illustration:

Warning: *Failure to include the required fuses could result in dangerous overheating of the wiring or the module in fault conditions!*

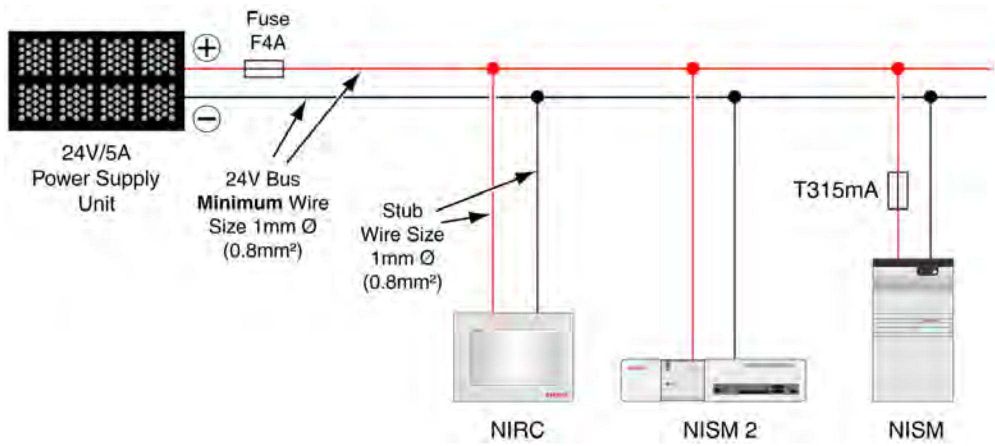


Figure 21. teleCARE IP 24V/5A power supply wiring and fusing

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

5.2.13 One Power Supply Unit with Multiple Power Buses

The output of the power supply unit can be divided over multiple buses with a F4A fuse in each branch. This method is recommended as it will reduce the power cable lengths.

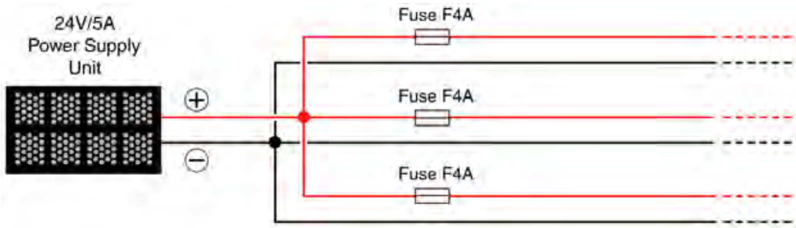


Figure 22. Multiple power buses

5.2.14 Power Supply Monitoring

It is recommendable to monitor the teleCARE IP 24V/DC power supply. A suitable 24V/DC monitoring device should be connected in parallel to the output of the power supply unit.

The monitoring device should detect when the power supply fails or if the voltage drops below an acceptable level. If these conditions occur the monitoring device should generate an alarm signal which can be sent to an independent technical alarm system such as a building services alarm panel.

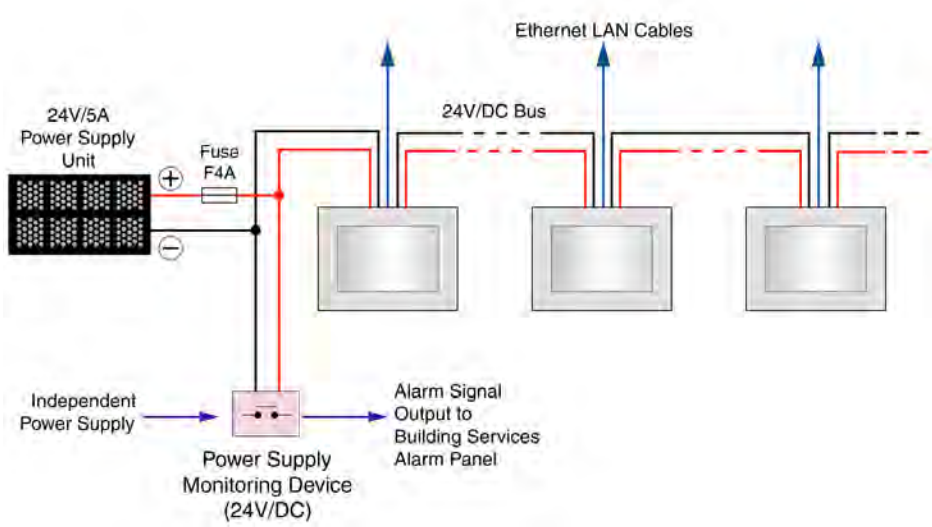


Figure 23. Power Supply Monitoring

IMPORTANT: *The power supply monitoring device must be connected to the output of the power supply unit, after the fuse and before the system components.*

5.2.15 External Power Supply Basic Installation

The 24V/DC power is carried on a two-wire bus that loops from room controller to room controller. The minimum wire size for the 24V/DC power supply bus is 1mmØ ($0.8mm^2$).

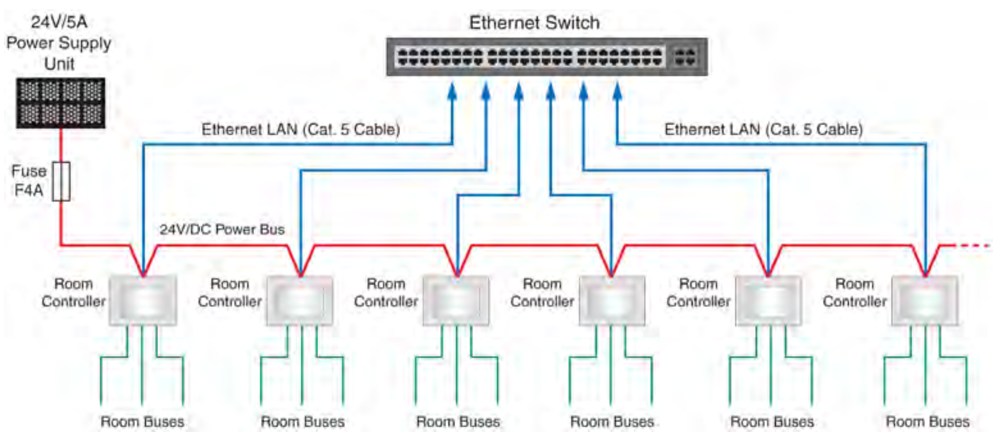


Figure 24. LAN and room bus cables with power supply (24V/5A)

Note: *Excessive 24V bus wire length can result in unacceptable voltage drop! The lowest acceptable voltage at any point in the 24V/DC distribution is 21.6 volts.*

5.2.16 External Power Supply in Systems with 24V Slave Corridor Lamps

Each slave corridor lamp (NICL) receives its 24V D/C power supply from the power output connections of the associated room controller - not directly from the external power supply bus. The room controller can support two corridor lamps.

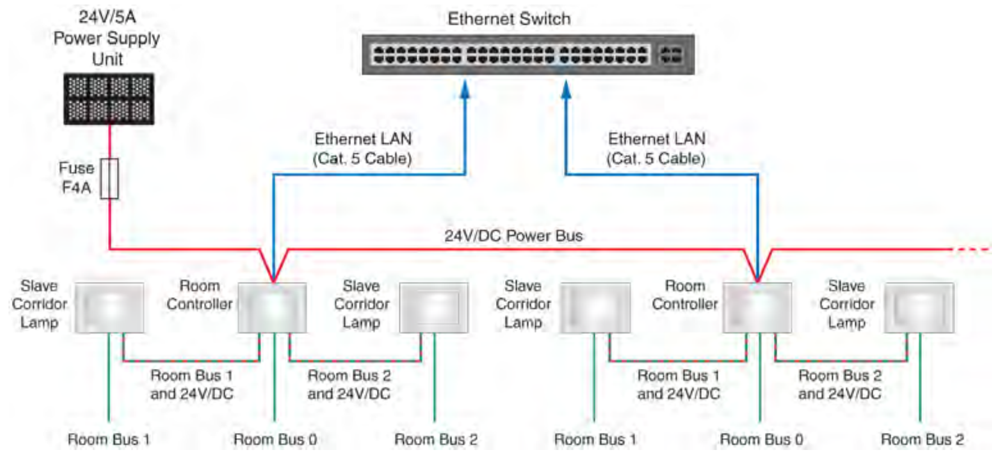


Figure 25. Power supply (24V/5A) for room controllers with slave corridor lamps (NICL)

5.2.17 External Power Supply in Systems with Room Bus powered Slave Corridor Lamps

Each Room Bus powered slave corridor lamp (NICL2) receives its 5.5V D/C power supply from the Room Bus of the connected room controller. The room controller (NIRC) can support three corridor lamps, the room controller (NIRC3) can support four corridor lamps.

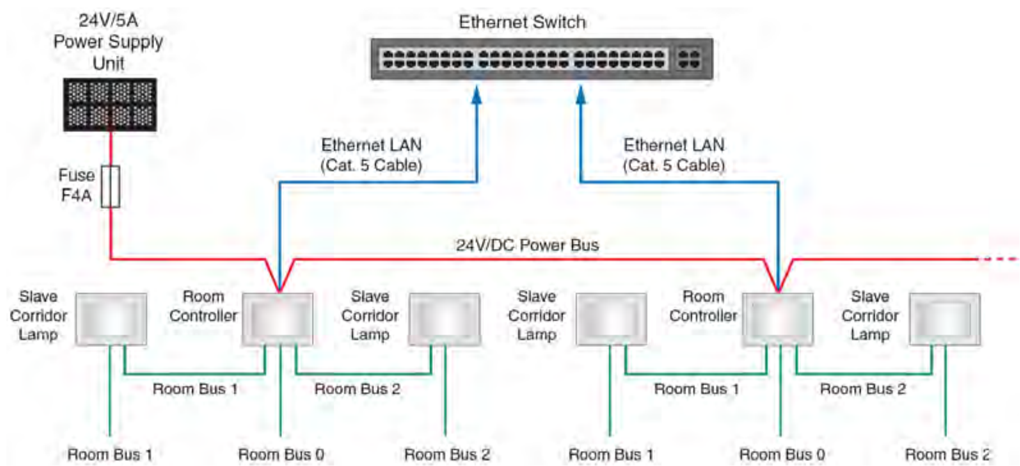


Figure 26. Power supply (24V/5A) for room controllers with Room Bus powered slave corridor lamps (NICL2)

6 Control Equipment

This section describes the installation instructions for the following products:

- "Room Controller" (details on page 34)
- "Voice Piggy Back" (details on page 50)
- "Power over Ethernet Extension Module" (details on page 69)
- "Corridor Lamp" (details on page 71)
- "System Manager (NISM)" (details on page 84)
- "System Manager (NISM2)" (details on page 86)
- "teleCARE IP Gateway (NIGW)" (details on page 91)
- "Ward Controller (NIWC)" (details on page 92)
- "Voice Module" (details on page 95)

6.1 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.

6.2 Room Controller

Note: *Except when specifically mentioned otherwise, the references to "room controller" used in this document are applicable to both the NIRC and NIRC3.*

6.2.1 NIRC PHASED OUT

The Room Controller (NIRC) has been tested and found to comply with the emission levels for a Class B device as described in EN60601-1-2 (2007).

The input power for the NIRC can be supplied over an external 24V/DC power supply bus, or from Power over Ethernet (POE). The external power supply input requirement is 24V / DC ± 10%. The power input has an on-board, self-resetting 750mA fuse. When the power is sourced from the Ethernet a PoE extension (NIPE) is required.

WARNING: *The NIRC + PoE module combined will not comply with the emission levels for a Class B device, but should be handled as a Class A device which may cause radio interference when used in a sensitive environment.*

IMPORTANT: *An Ethernet switch which provides the PoE must be powered down before connecting or disconnecting any (NIRC) Ethernet LAN cables. If not, this could de-stabilize the PoE voltage and damage the connected room controller (NIRC).*

The Room controller is available in speech and non-speech versions. The NIRC-GMN and NIRC-WMN do not support speech. The NIRC-GMS and NIRC-WMS support speech. The electrical connections are the same for the non-speech and speech versions of the NIRC.

Each room bus has four wires, consisting of: data, voice, power (5.5V / DC) and ground (0V). The room bus power output is used for the power supply to the connected peripheral device. Each room bus power output has a self-resetting 750mA fuse.

The NIRC has a 6-pole output connection for 4 external corridor LEDs. These outputs are in parallel to the NIRC's on-board LED connectors. Additionally, the NIRC has an internal buzzer for optional audible signalling of calls and faults.

The NIRC can support up to 3 slave corridor lamps, however, the NIRC is capable of providing the power supply for no more than 2 slave corridor lamps. Each room bus can accept one corridor lamp and each corridor lamp has the fixed room bus address 5.

6.2.2 NIRC3

Improved technology gives the NICR3 more speed and additional functionality. This includes the addition of a fourth room bus and the integrated Power over Ethernet (PoE) capability.

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

The NIRC3 is compatible with all the existing teleCARE IP peripherals except for the corridor lamp (NICL) which cannot be used together with the NIRC3.

IMPORTANT: *The NIRC3 is not compatible with the corridor lamp (NICL). The corridor lamp (NICL2) must be used when connected to an NIRC3 room bus. Therefore it is necessary to replace the NICL with an NICL2 whenever you replace an NIRC with an NIRC3.*

6.2.3 Room Bus Addresses

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

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

<table>
<tr><th>Room Bus Address</th><th>Active Peripheral</th><th>Address Setting</th></tr>
<tr><td>0 - 3</td><td>Doorside Modules
Bedside Modules
Pull Cord Modules
Customisable Modules
Medical Rail Socket</td><td>Set by DIP switch</td></tr>
<tr><td>4</td><td>Toilet Cancel Module</td><td rowspan="4">Fixed</td></tr>
<tr><td>5</td><td>Slave Corridor Lamp
Duty Selector</td></tr>
<tr><td>6</td><td>Card Reader</td></tr>
<tr><td>6 + 7</td><td>Room Display</td></tr>
</table>

Table 3. Room bus addresses and applications

6.2.4 Room Controller with Corridor Lamp

Figure 27. The teleCARE IP room controller with corridor lamp

The room controller printed circuit board has four connectors for LED boards (which must be ordered separately). The LED board is available in five colours: red, green, yellow, white and blue. The LEDs are used for the signalling of calls, nurse presence and faults.

The Room Controller with corridor lamp is available in grey or white and includes a translucent dome cover. Alternatively a blank cover is available if lamps are not required.

The room controller with corridor lamp consists of a housing, a printed circuit board, a cover and a lamp dome, as shown in the following illustration:

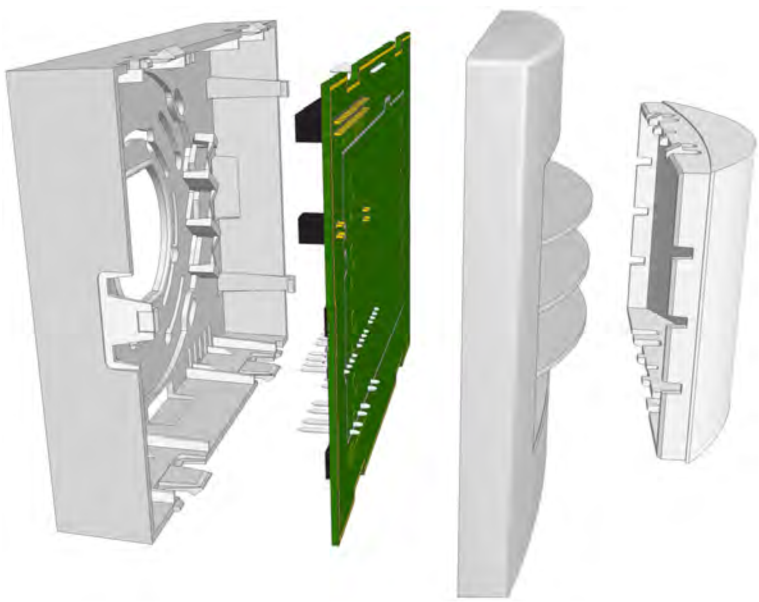


Figure 28. Room controller parts

6.2.5 Blank Front Cover for the Room Controller

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

Figure 29. Room controller with blank front cover

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

6.2.6 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:

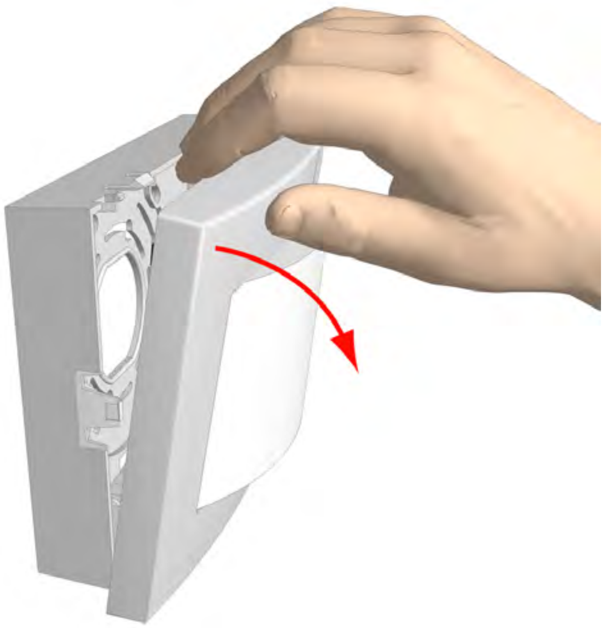


Figure 30. Separating the top section from the housing

6.2.7 Removing the Room Controller Printed Circuit Board

To remove the circuit board from the housing, press the holding clip outwards (1) until it releases the circuit board, as shown in the following illustration:

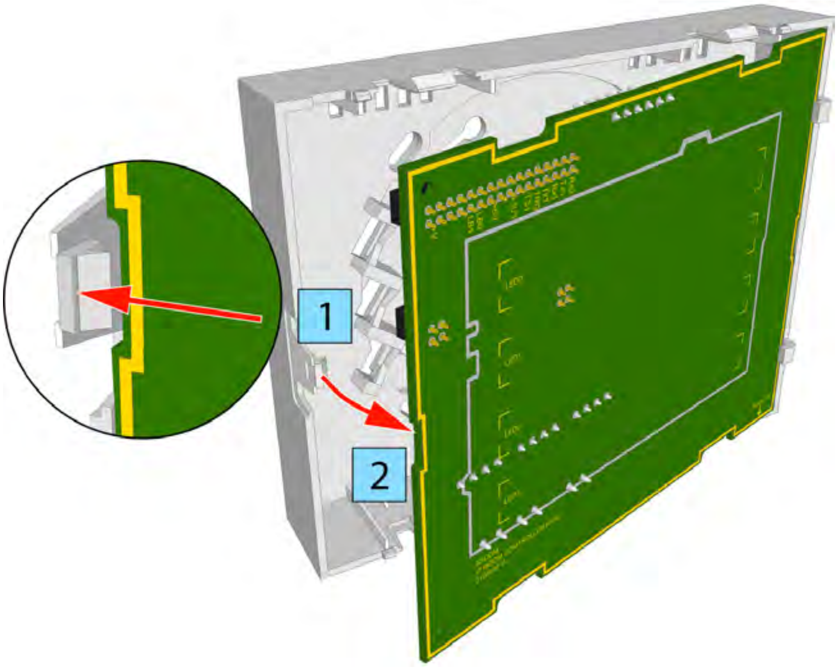


Figure 31. Removing the circuit board from the housing

With the printed circuit board released from the holding clip (2), partly rotate the circuit board and remove it from the housing.

6.2.8 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 room controller with LED lamps and with blank cover and for the corridor lamp.

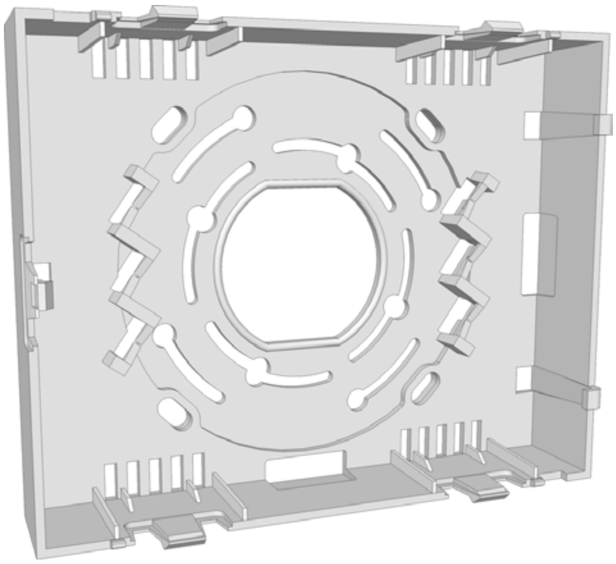


Figure 32. Room controller housing

6.2.9 Mounting the Housing over a Back Box

To mount the housing over a backbox, start by partially unscrewing the fixing screws (1) in the backbox so that they extend at least 5mm outside the wall surface.

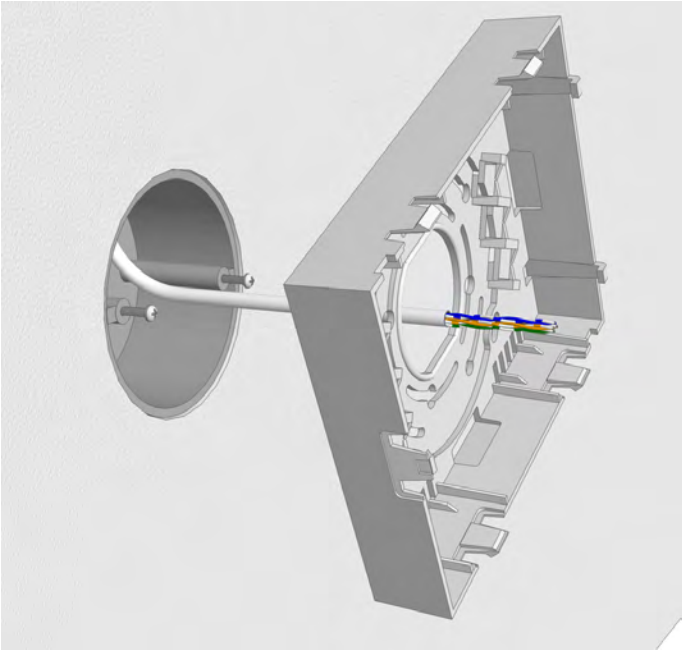


Figure 33. Lining up the housing with a backbox

Place the housing over the backbox so that the long sides are at the top and bottom. Pass the heads of the screws through the appropriate “key-hole” slots (2) in the base of the housing, as shown in the following illustration:

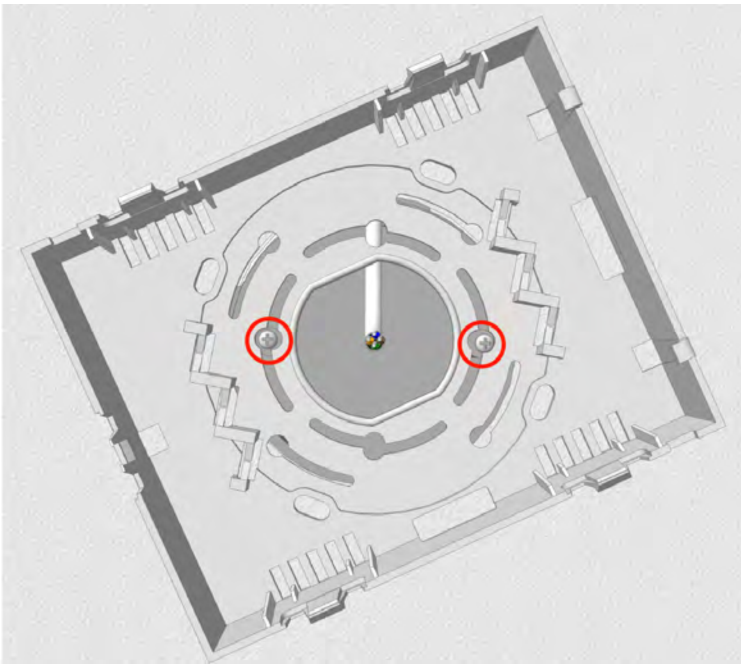


Figure 34. Positioning the screws in the keyhole slots

Turn the housing (3) until the long sides are horizontal, then tighten the backbox fixing screws to secure the housing.

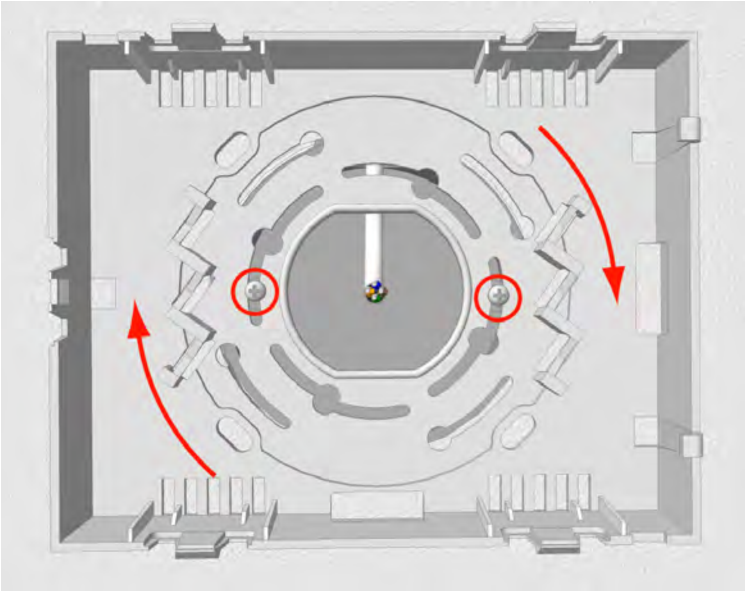


Figure 35. Fixing the housing

6.2.10 Mounting the Housing without a Backbox

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

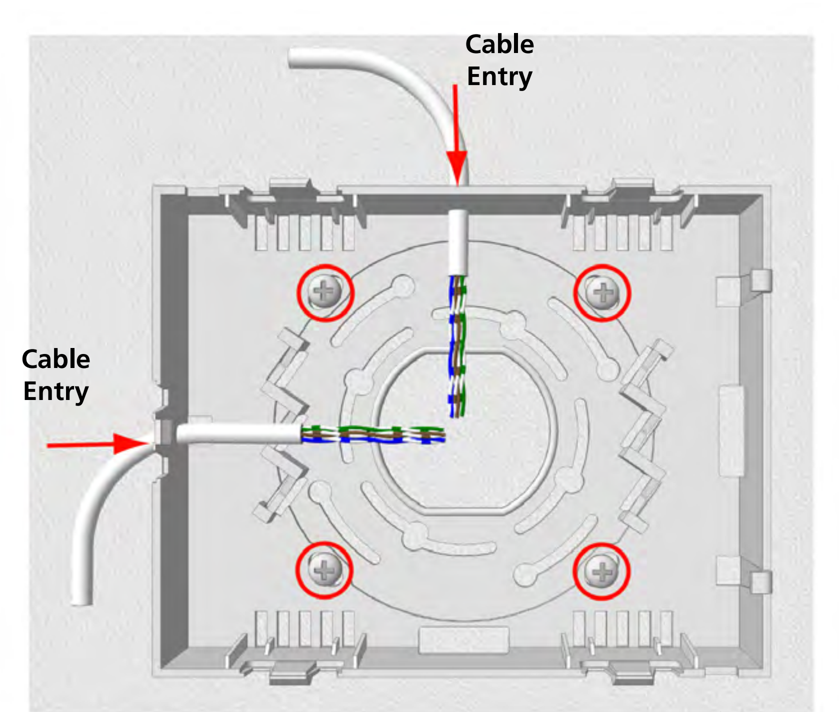


Figure 36. Mounting the room controller housing without a backbox

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

6.3 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.

6.3.1 Stripping the Outer Jacket of the Cables

The first step is to strip the outer jacket of the cables to a length of 150mm, then position the cable in the backbox so that only the stripped wires enter the room controller housing.

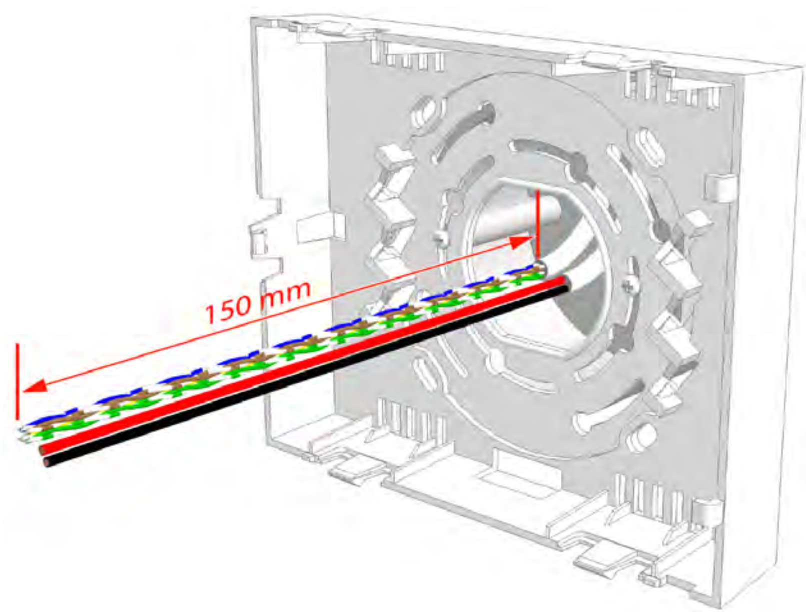


Figure 37. Stripping and positioning the cables for the room controller

Caution: *Each room bus requires four wires. If the cable contains more than four wires the excess wires should be carefully stowed in the backbox, away from the printed circuit board and other components to avoid causing short-circuits.*

6.3.2 Room Controller (NIRC) PCB Connections (without Speech)

NIRC-GMN and NIRC-WMN PHASED OUT

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

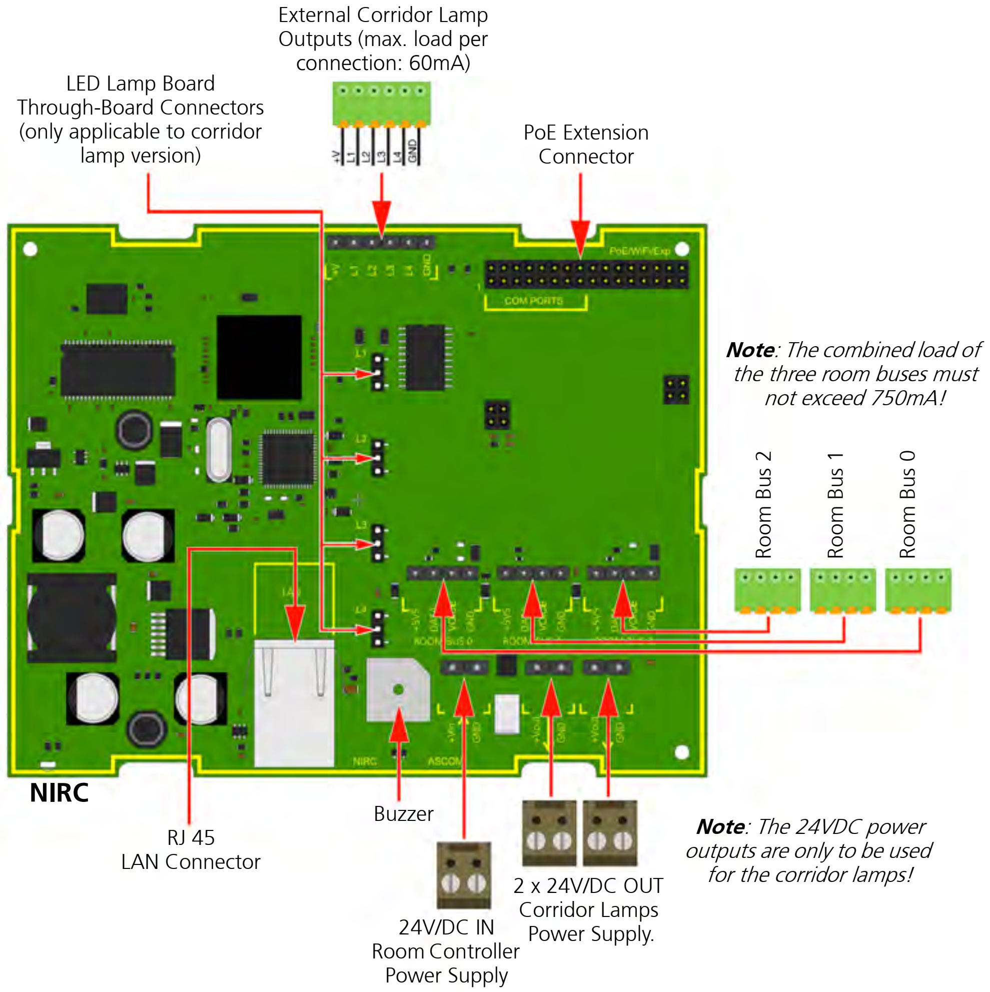


Figure 38. Room controller NIRC (without speech) PCB electrical connections

Details of the room bus connections are given in 6.5.1, 4-Pole Connector Terminal (NICT-4AA), page 51.

Details of the 24V/DC power supply and corridor lamp connections are given in 6.5.2, 2-Pole Connector Terminal (NICT-2BA), page 53.

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 PoE extension module are given in section 6.8, Power over Ethernet Extension Module, page 69.

Details of for connecting the LED lamp boards are given in section 6.7, LED Lamp Boards, page 62.

6.3.3 Room Controller (NIRC) PCB Connections (with Speech)

NIRC-GMS and NIRC-WMS PHASED OUT

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

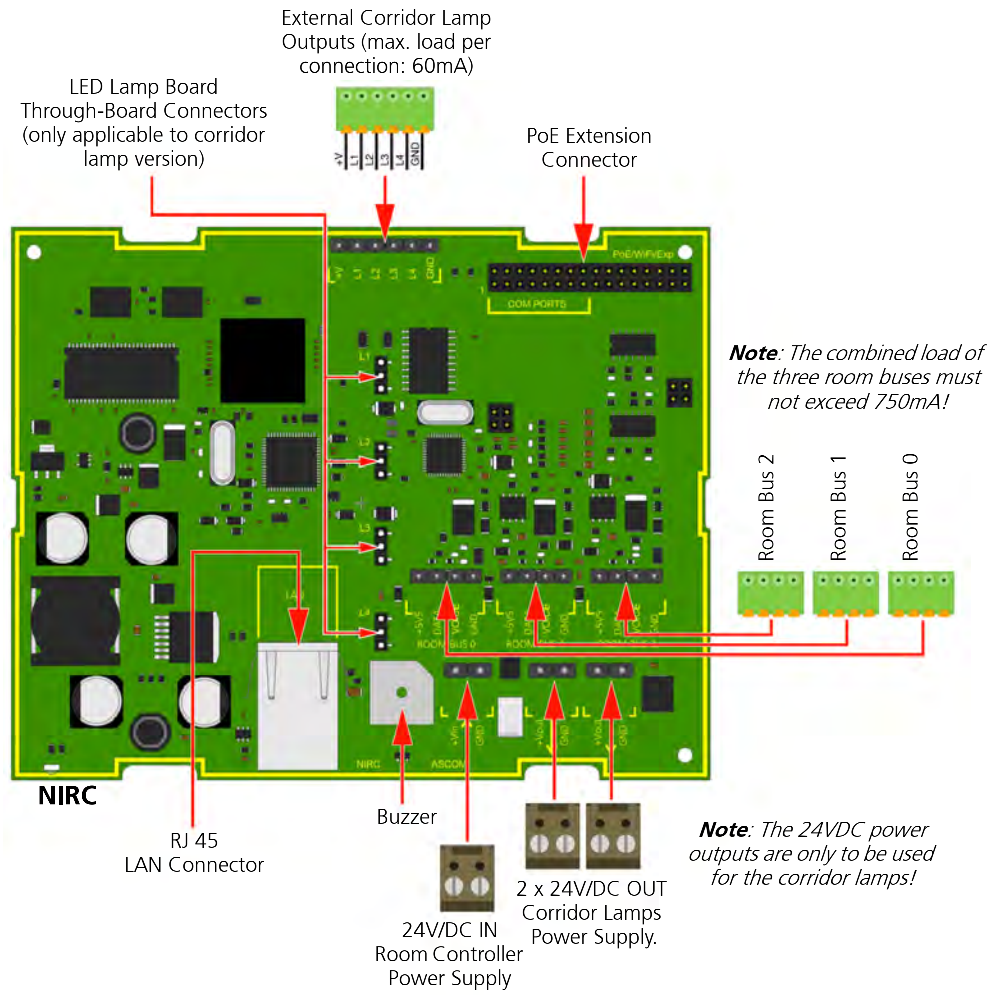


Figure 39. Room controller NIRC (with speech) PCB electrical connections

Details of the room bus connections are given in 6.5.1, 4-Pole Connector Terminal (NICT-4AA), page 51.

Details of the 24V/DC power supply and corridor lamp connections are given in 6.5.2, 2-Pole Connector Terminal (NICT-2BA), page 53

Note: *The 6-pole, 4-pole and the 2-pole connector terminals required for the external corridor LED lamps, 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 PoE extension module are given in section 6.8, Power over Ethernet Extension Module, page 69.

Details of the LED lamp boards are given in section 6.7, LED Lamp Boards, page 62.

Details of for connecting external corridor lamp LEDs are given in section 6.7.5, External Corridor Lamp Connections, page 68

6.3.4 Room Controller (NIRC) Printed Circuit Board Back View

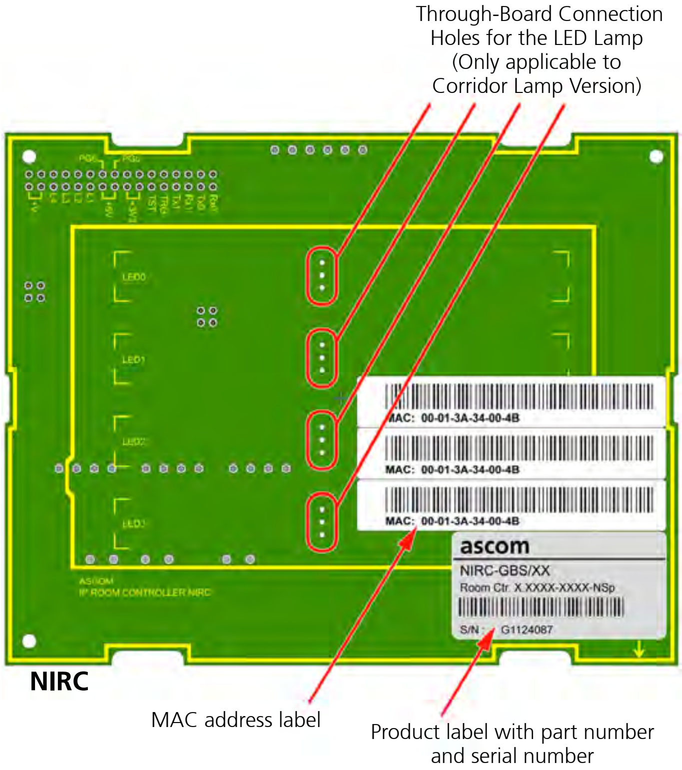


Figure 40. NIRC printed circuit board back view

On the back of the 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 6.7, LED Lamp Boards, page 62.

Note: *The through-board connection holes for the LED lamp boards are only relevant for the corridor lamp version of the room controller PCB.*

Also on the back of the room controller printed circuit board there is a set of three identical MAC address labels and a product label which includes the part number and serial number.

The three MAC labels are self-adhesive and can be removed from the printed circuit board. One of the labels should be left on the room controller printed circuit board. The other two can be removed and one can be stuck on the cover of the room controller, so the board can be identified without opening the room controller. The other can be used in a list of all room controller locations, for example, for administration purposes.

6.3.5 NIRC Status Information

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

Figure 41. NIRC Status LED

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

NIRC - Status color	Status	Remarks
Steady green	Normal operation	
Slow orange flashing	Starting-up	
Fast orange flashing	Application start-up	
Steady orange	Image installation mode	The NIRC 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 NIRC.

Figure 42. Fault indications on the NIRC yellow lamp

Fault - yellow LED	Status	Remarks
	Lamp power failure	
	LAN failure	
	Peripheral lost	

6.3.6 Room Controller (NIRC3) PCB 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.

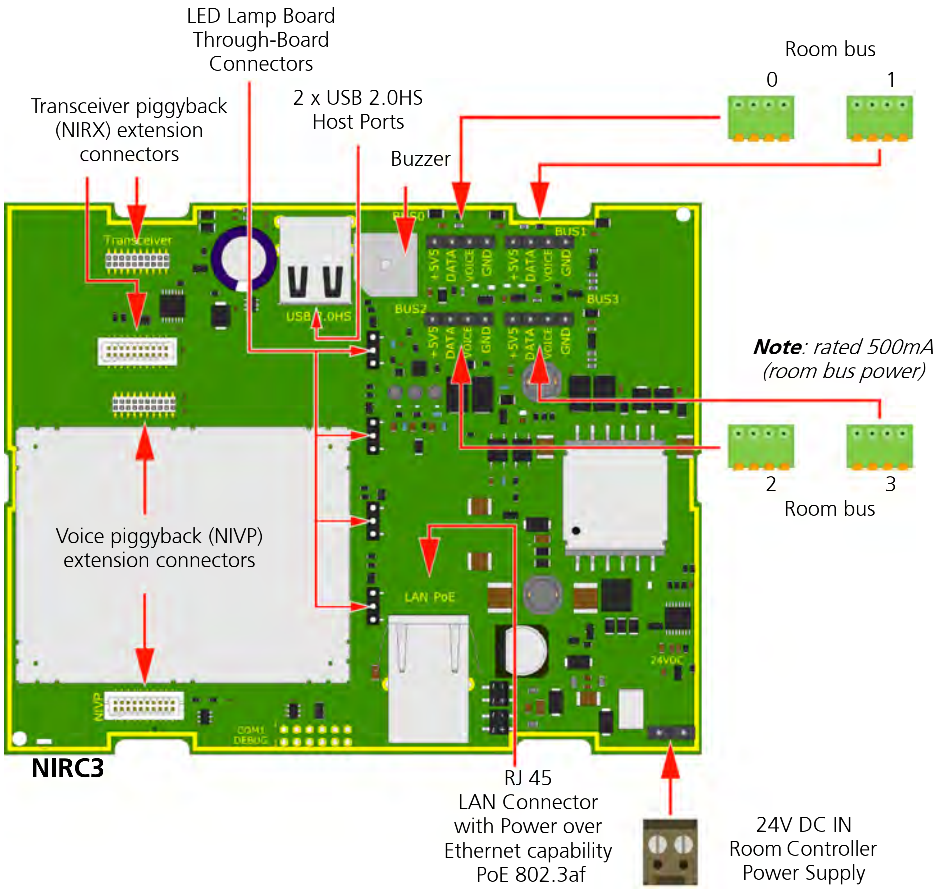


Figure 43. Room controller (NIRC3) PCB electrical connections

Details of the room bus connections are given in 6.5.1, 4-Pole Connector Terminal (NICT-4AA), page 51.

The NIRC3 can be powered directly from a Power over Ethernet (PoE 802.3af or 802.3at) switch or through an external 24V DC power supply.

Details of the 24V DC power supply connections are given in 6.5.2, 2-Pole Connector Terminal (NICT-2BA), page 53

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

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 6.7, LED Lamp Boards, page 62.

Details on how to install the transceiver piggyback module (NIRX) are given in section "NIRX teleCARE IP Transceiver" on page 252.

6.3.7 Room Controller (NIRC3) Printed Circuit Board Back View

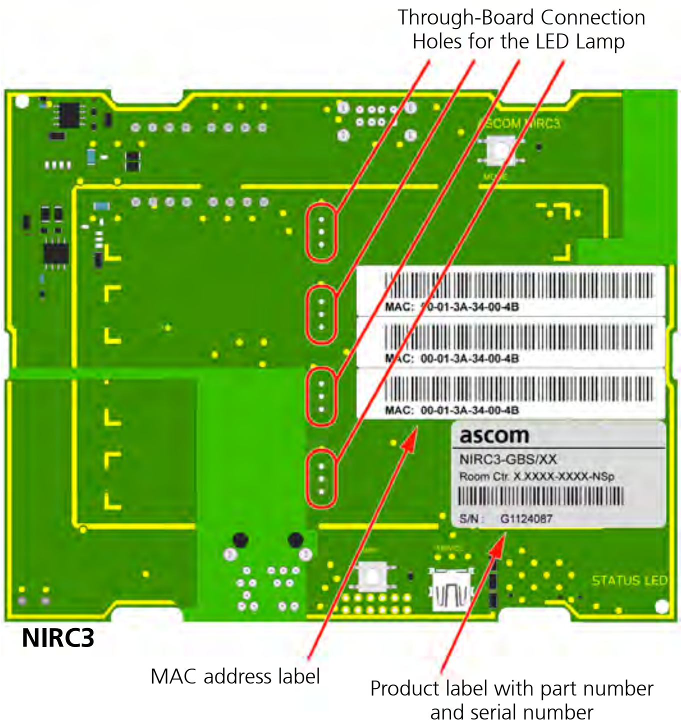


Figure 44. NIRC3 printed circuit board back view

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 6.7, LED Lamp Boards, page 62.

6.3.8 NIRC3 Status Information

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

Figure 45. NIRC3 Status LED

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

NIRC - 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 46. Fault indications on the NIRC3 yellow lamp

Fault - yellow LED	Status	Remarks
	Lamp power failure	
	LAN failure	
	Peripheral lost	

6.4 Voice Piggy Back

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 47. 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 to indicate that the speech direction is switched towards the speech module on the room bus. The NIVP allows existing non speech teleCARE IP installations using the NIRC3 to be upgraded to teleCARE IP with speech.

6.4.1 Connecting the Voice Piggy Back module to the NIRC3

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

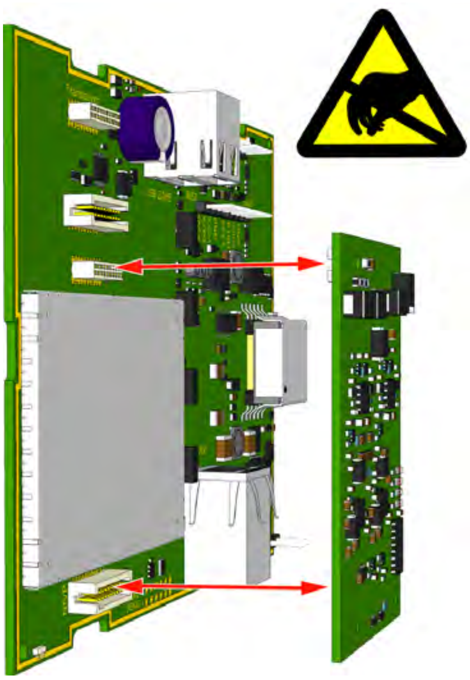


Figure 48. Mounting the voice piggy back module on the NIRC3

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:

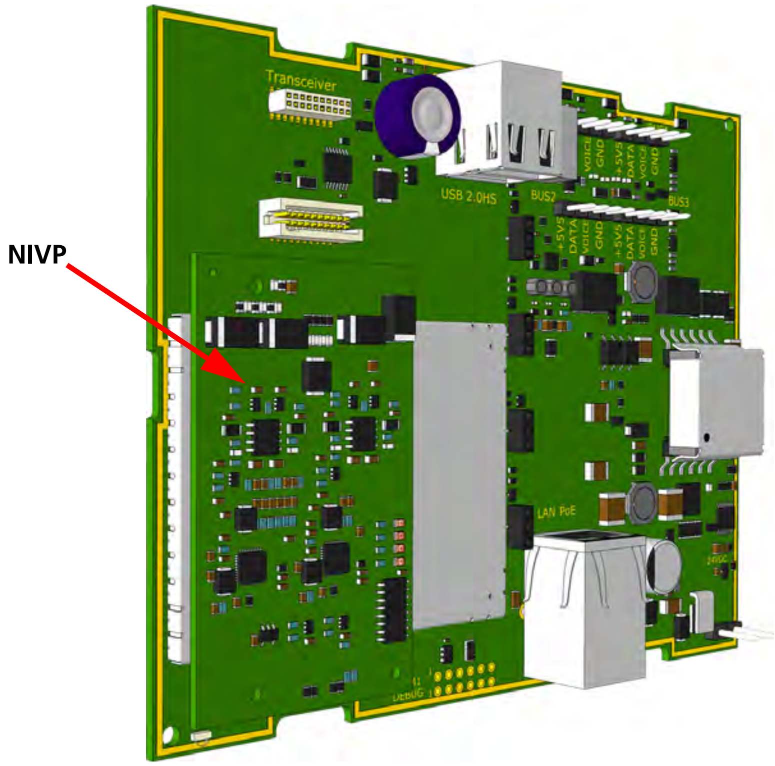


Figure 49. Voice piggy back module NIVP mounted on the NIRC3

6.5 Connection Terminals

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.

6.5.1 4-Pole Connector Terminal (NICT-4AA)

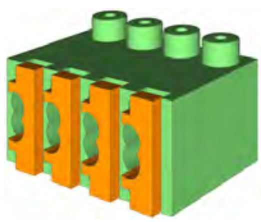


Figure 50. 4-pole connector terminal

The 4-pole connector terminal is used for connecting the room bus. It has a screwless "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.

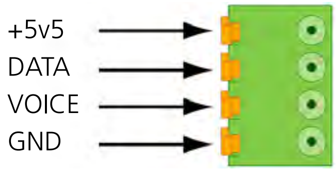


Figure 51. 4-pole connector terminal with the room bus

6.5.1.1 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 0.5MM² (0.8mmØ).

To connect the wires first strip the jacket from the cables and pull the wires through the housing leaving a length of 150mm free, as described in section 6.3, Preparing the Room Bus and Power Cables on page 42. Then strip 6.5mm of the insulation from the end of each wire which is to be connected.

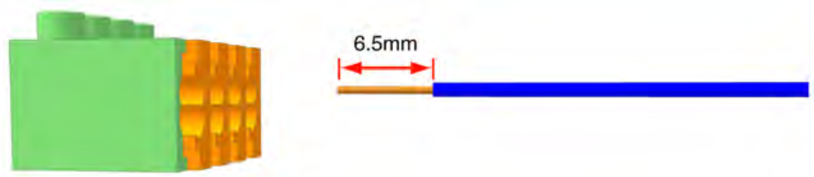


Figure 52. Stripping the wires for insertion in the connection terminal

After stripping the wire to expose 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 0.5MM² (0.8mmØ).*

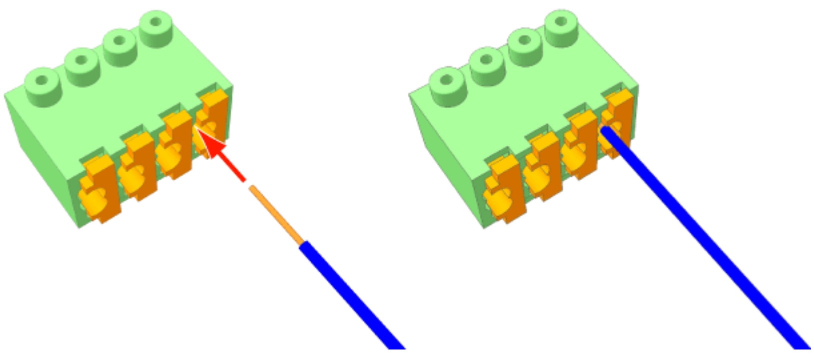


Figure 53. Inserting a wire in the connection point

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.

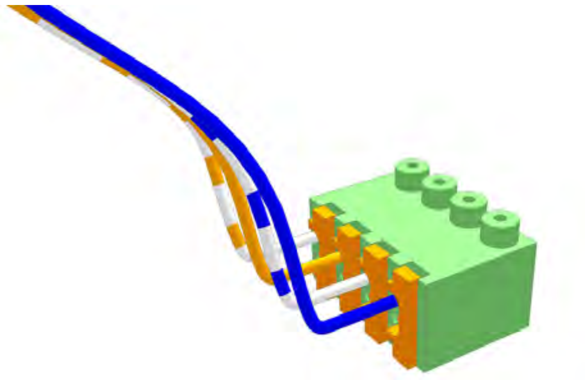


Figure 54. Connector terminal complete with four wires

6.5.1.2 Disconnecting a Wire from the Connector Terminal

First carefully place the point of a small screw driver (point approximately 2.5mm wide) on the relevant orange coloured 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.

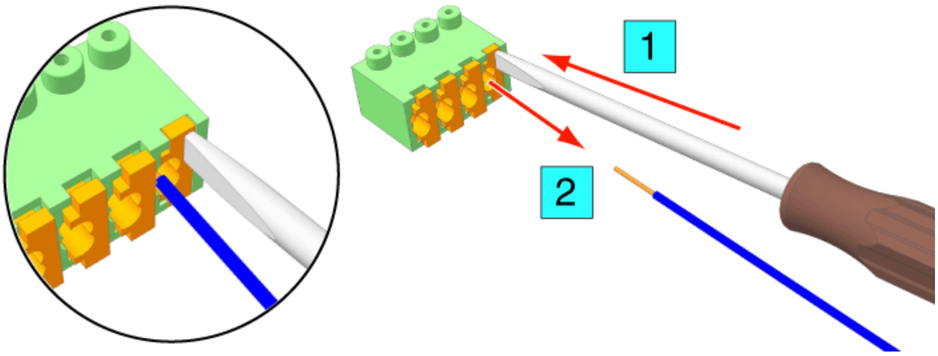


Figure 55. Removing a wire from a connection point

6.5.2 2-Pole Connector Terminal (NICT-2BA)

Figure 56. 2-pole connector terminal

The 2-pole connector terminal is used for connecting the 24V/DC power supply when a separate power supply is used. It is also used for the 24V/DC power supply from the room controller to the corridor lamp (only for NIRC to NICL).

The 2-pole terminal connector has two screw terminals. Each terminal accepts one wire (up to wire size 1.5mm²/1.4mmØ) or two wires (each up to wire size 1mm²/1.15mmØ).

Note: *The recommended maximum wire size for the teleCARE power supply is 1mm² (1.15mmØ).*

Preparing the Wires for the 2-pole Connector Terminal

To connect the wires first pull the wires through the housing leaving a length of 150mm free, as described in section 6.3, Preparing the Room Bus and Power Cables on page 42. Then strip 6.5mm of the insulation from the end of each wire which is to be connected.

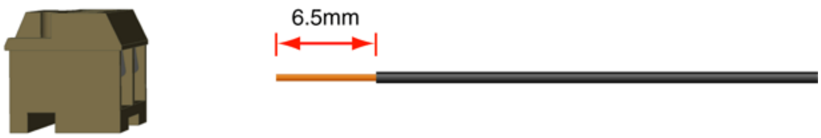


Figure 57. Stripping the wires for insertion in the connection point

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

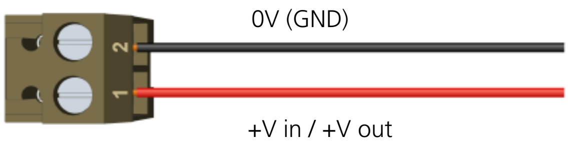


Figure 58. 2-pole connector terminal wiring

Note: *If stranded wire is used for the power supply cabling then a suitable ferrule (barrel outer diameter >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 the incoming and outgoing wires are connected in the same screw terminal, as shown in the following illustration:

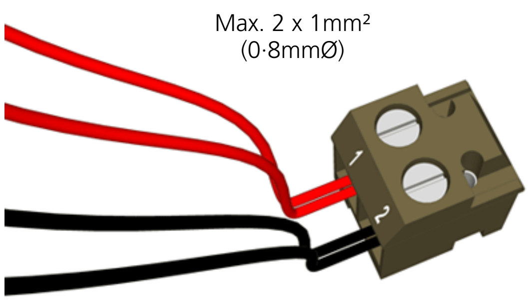


Figure 59. Connector terminal with looped wiring

Note: *The maximum size of each wire when two wires are inserted in one screw terminal of the 2-pole connector terminal is 1 mm² (1,15 mm Ø).*

6.6 Connecting the Room Controller Printed Circuit Board

When preparing the wiring for connecting the printed circuit board of the 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 6.3, Preparing the Room Bus and Power Cables on page 42.

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.

The instructions will include the procedures for both the NIRC and the NIRC3 room controller.

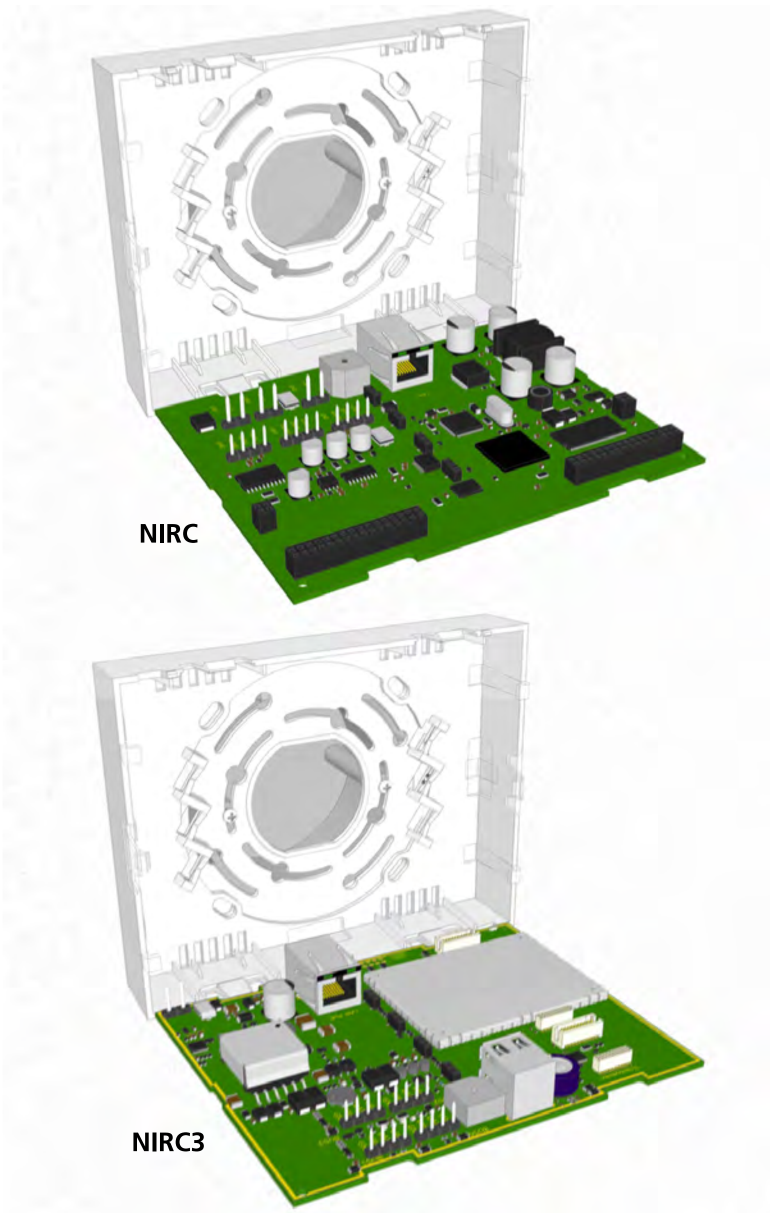


Figure 60. NIRC and NIRC3 circuit boards

6.6.1 Connecting the 24V/DC Power Supply

The 24V DC power supply uses a 2-pole connection terminal as described in section 6.5.2 on page 53. The connection point on the room controller circuit board for the power supply of the NIRC is shown in section 6.3.3 on page 44. 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:

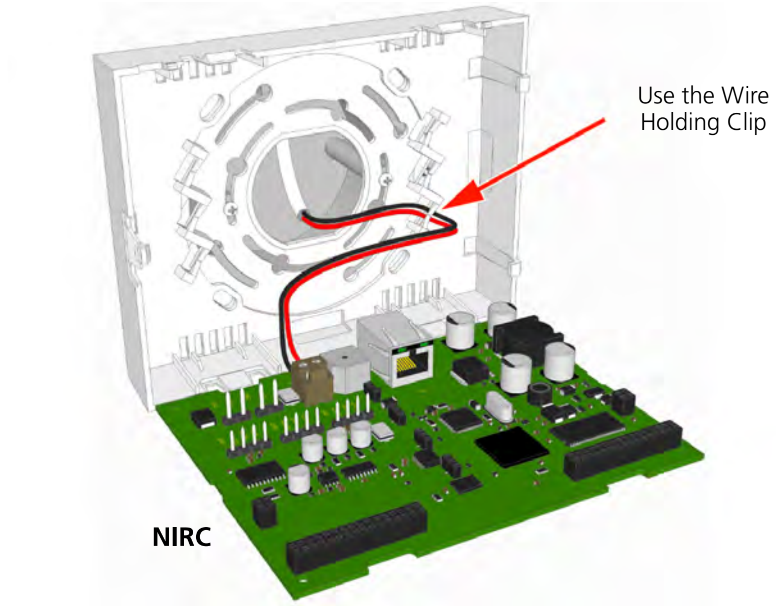


Figure 61. NIRC - Connecting the 24V DC power supply

The connection point on the room controller circuit board for the power supply of the NIRC3 is shown in section 6.3.6 on page 47.

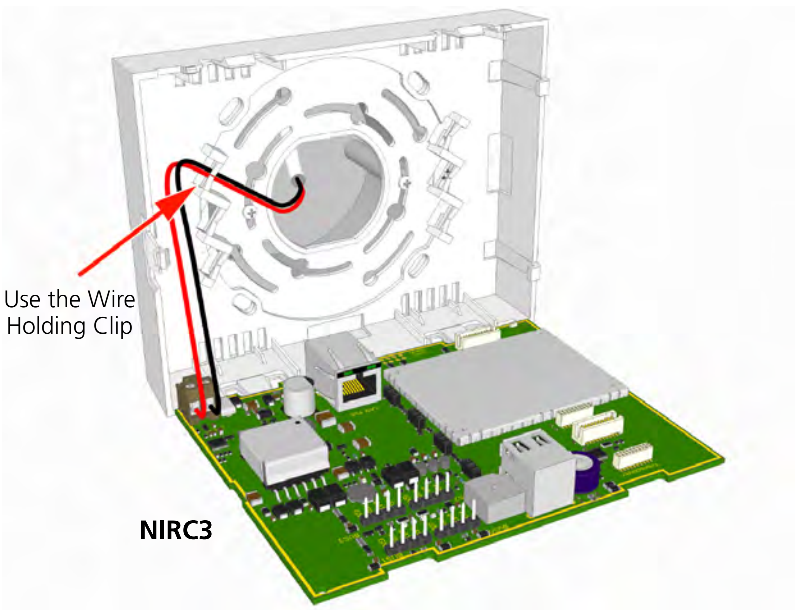


Figure 62. NIRC3 - Connecting the 24V DC power supply

Note: *An external power connection is not required when Power over Ethernet - PoE is used to power the NIRC3.*

6.6.2 Connecting the Power Supply and Corridor Lamp Power Outputs

The room controller (NIRC) supports two corridor lamps (NICL) and each has a 2-pole connector similar to the 24V/DC power supply, as described in section 6.5.2 on page 53. The connection points on the room controller circuit board (NIRC) for the power supply and corridor lamps are shown in section 6.3.3 on page 44.

The power supply wires and the corridor lamp power supply wires (only for NIRC to NICL) 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:

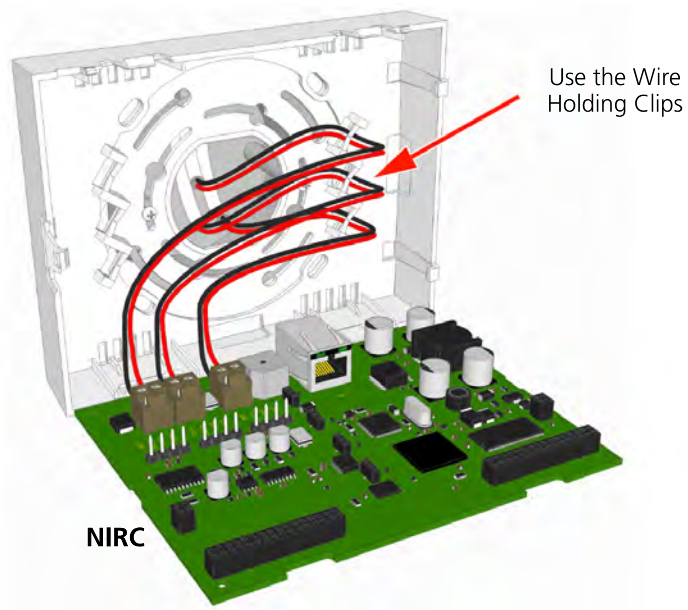


Figure 63. NIRC - Power supply and corridor lamp power connections

NIRC3

The corridor lamp (NICL2) that must be used with the NIRC3 is powered directly from the 5.5V room bus power and does not require a separate 24 volt power connection, therefore the NIRC3 is not equipped with the 24 volt power outputs.

IMPORTANT: *Because the NIRC3 does not have 24V power outputs, the corridor lamp (NICL) should not be connected to the NIRC3. Only connect corridor lamps (NICL2) to the NIRC3 room buses.*

6.6.3 Connecting the Room Bus

The room bus uses a 4-pole connection terminal as described in section 6.5.1 on page 51. The connection point on the room controller circuit board for the room bus of the NIRC is shown in section 6.3.3 on page 44.

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:

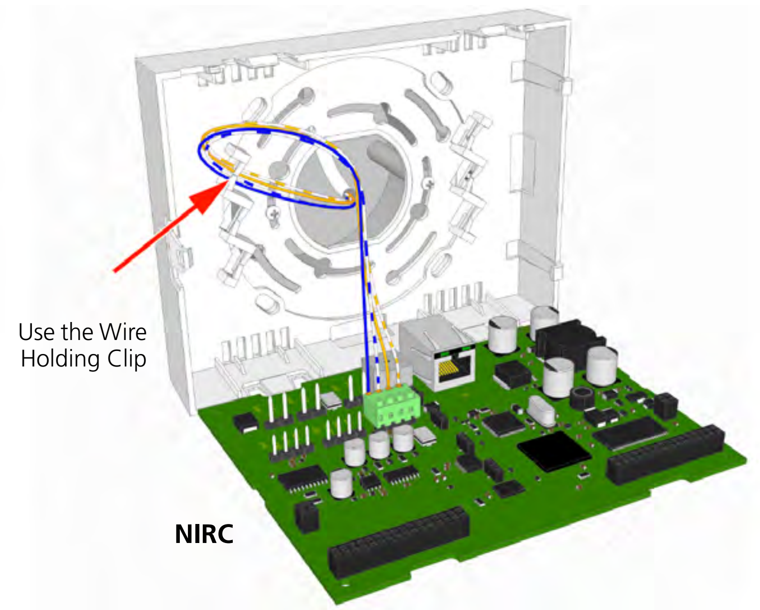


Figure 64. NIRC - Connecting the room bus

The connection point on the room controller circuit board for the room bus of the NIRC3 is shown in section 6.3.6 on page 47

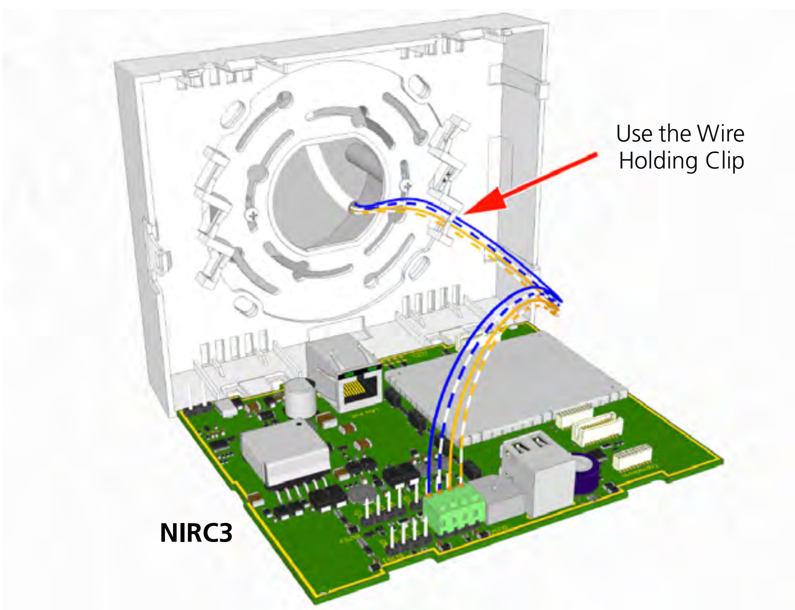


Figure 65. NIRC3 - Connecting the room bus

6.6.4 Connecting Multiple Room Buses

The room controller NIRC supports three room buses and the NIRC3 supports four room buses, each room bus has a 4-pole connection terminal which is wired as described in section 6.5.1 on page 51. The connection points on the room controller PCB for the room buses of the NIRC are shown in section 6.3.3 on page 44.

The room bus 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:

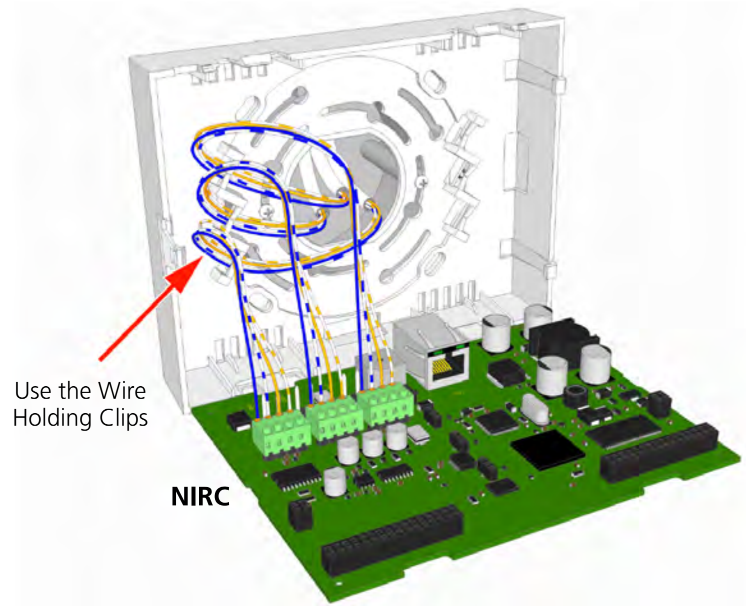


Figure 66. NIRC - Connecting multiple room buses

The connection points on the room controller PCB for the room buses of the NIRC3 are shown in section 6.3.6 on page 47.

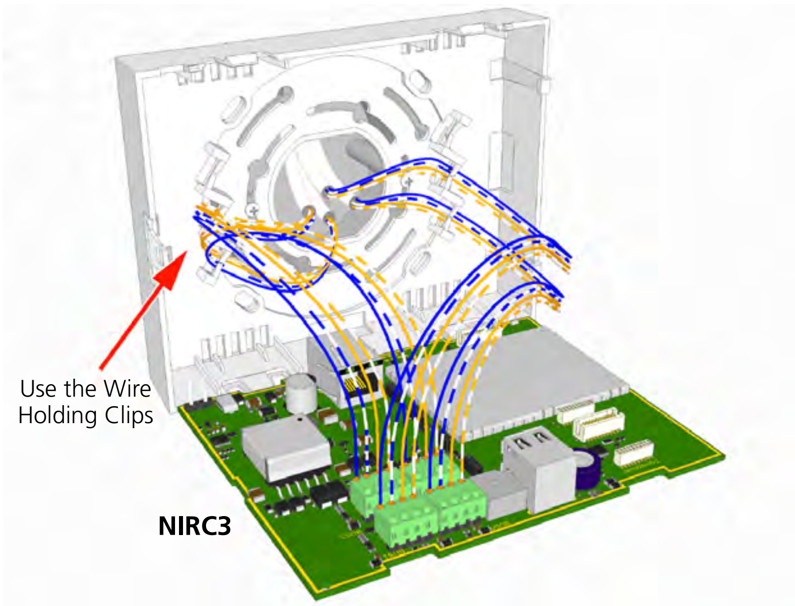


Figure 67. NIRC3 - Connecting multiple room buses

6.6.5 Connecting LAN Cable

The LAN cable has an RJ45 plug which connects to the socket on the room controller printed circuit board of the NIRC as shown in section 6.3.3 on page 44. 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.

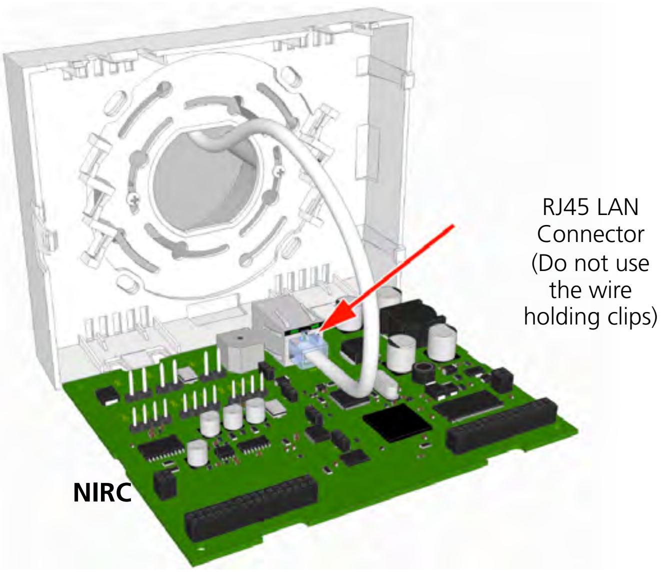


Figure 68. NIRC - Connecting the LAN cable

The location of the LAN connector on the NIRC3 is shown in section 6.3.6 on page 47.

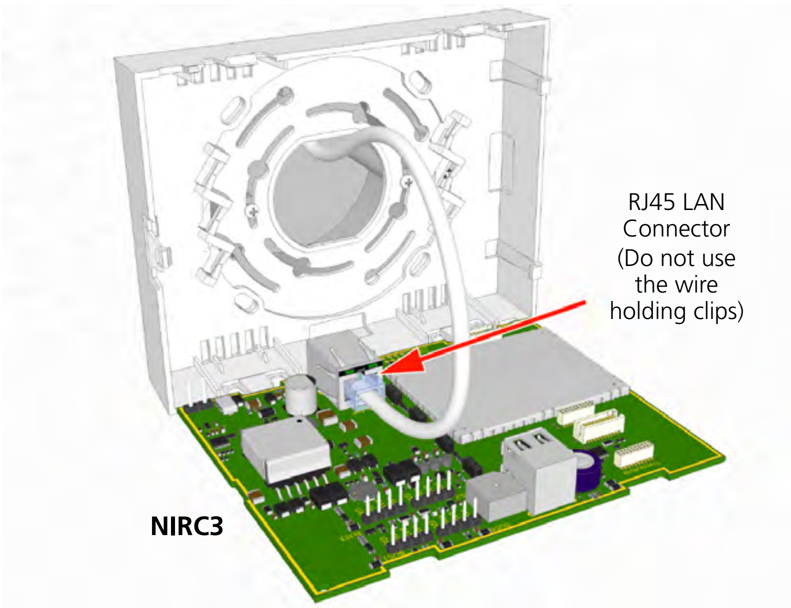


Figure 69. NIRC3 - Connecting the LAN cable

6.6.6 Fully Wired Room Controller

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

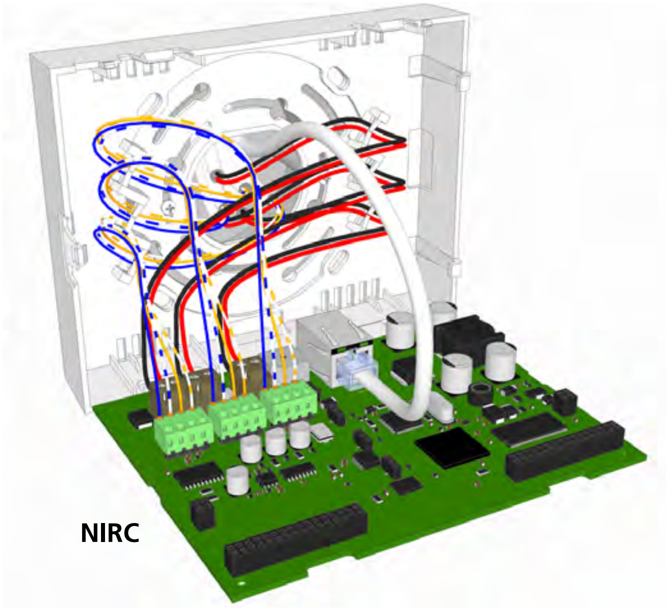


Figure 70. Fully Wired room controller - NIRC

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

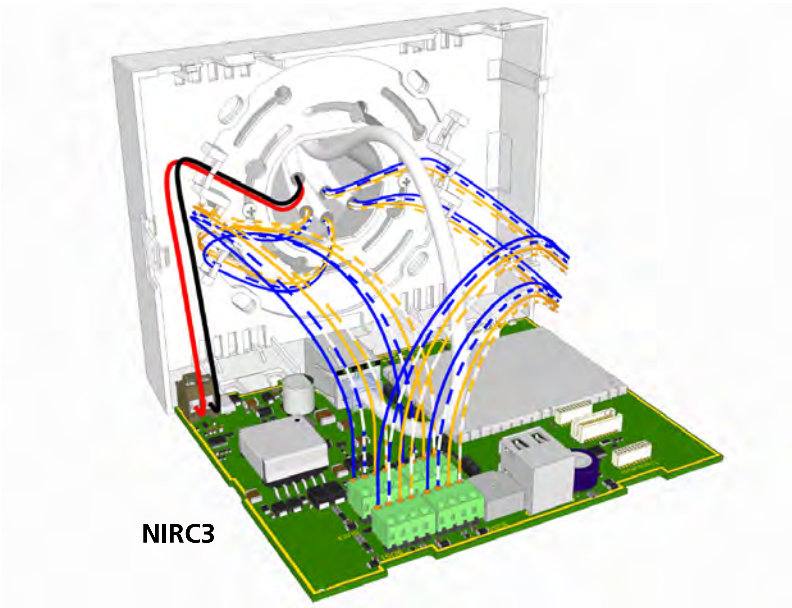


Figure 71. Fully Wired room controller - NIRC3

6.7 LED Lamp Boards

Note: *Except when specifically mentioned otherwise, the references to "LED lamp board" used in this document are applicable to both the NILD and NILD2.*

6.7.1 NILD PHASED OUT

IMPORTANT: *The NILD - LED lamp boards can only be used in the corridor lamp section of the room controller (NIRC) and in the corridor lamp (NICL).*

The LED lamp board contains four high intensity LED lamps. 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 accept up to four LED lamp boards.

Figure 72. NILD - LED lamp board front and back view

The LED lamp board (NILD) is available in five colours: red, green, yellow, white and blue. The LEDs are used for the signalling of various types of calls, as well as nurse presence and faults. The functions of the LEDs are determined by the system setup.

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

Figure 73. NILD - 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 NIRC - room controller board and the NICL - corridor lamp but it is normal to have each colour in the same position in every room controller board. The functioning of the LEDs colours is determined by the system setup.

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

6.7.2 NILD2

The NILD2 LED lamp boards are backwards compatible and can be used in both the corridor lamp section of the room controller NIRC / NIRC3 and in the corridor lamp NICL / NICL2.

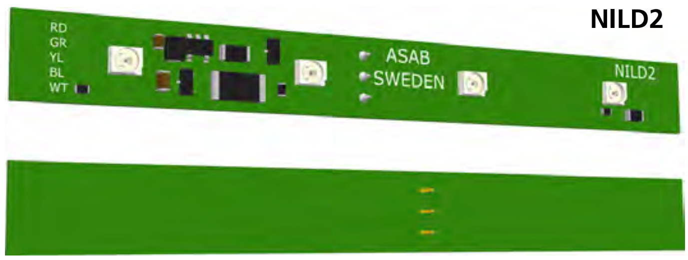


Figure 74. NILD2 - LED lamp board front and back view

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

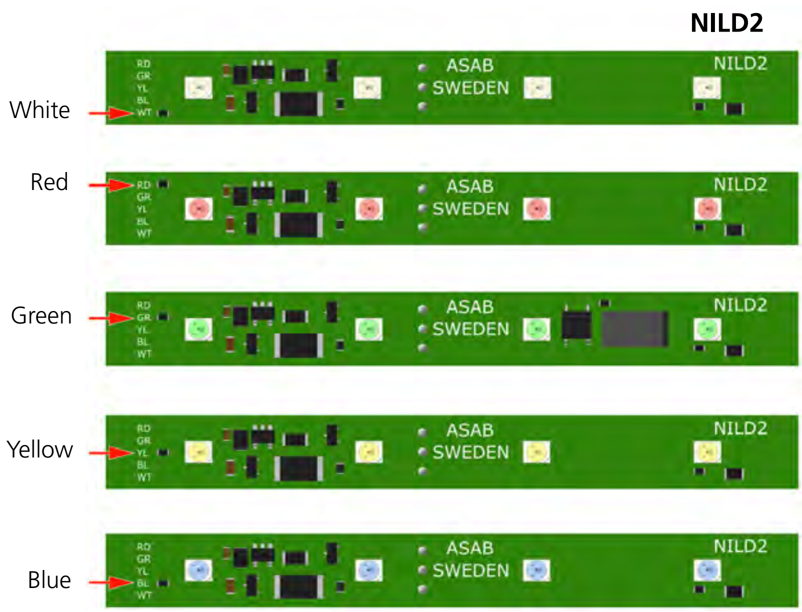


Figure 75. NILD2 - LED lamp boards: white, red, green, yellow and blue

6.7.3 Auxiliary Lamp Connection - NILD2

The green LED board (NILD2-GAA) has a galvanically separated output that can be used to connect to an auxiliary lamp. It has a maximum switching capacity of 0.4A at 60V peak. This functionality works only in combination with the NIRC3 or NICL2.

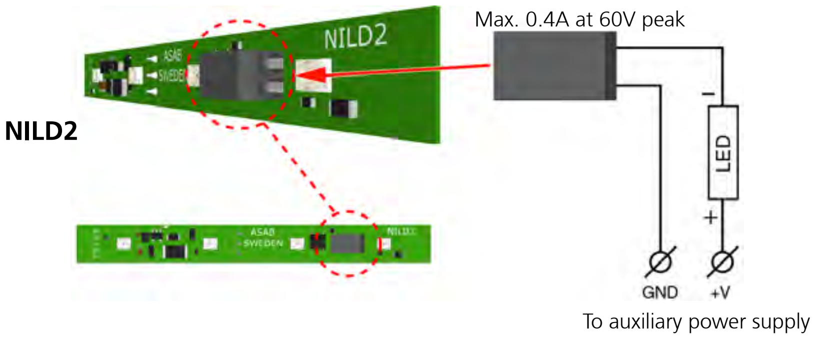


Figure 76. External corridor lamp connections through the NILD2-GAA

IMPORTANT: *In order to retain the galvanic separation, 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:

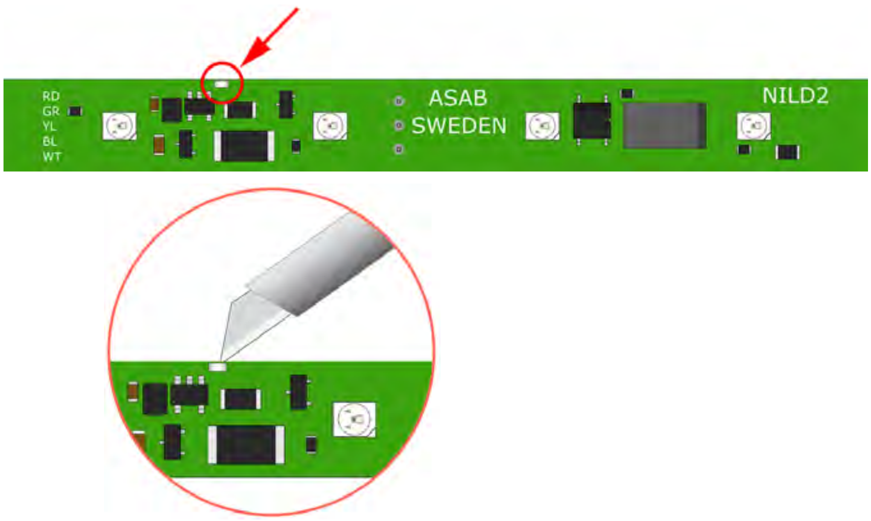


Figure 77. Disabling the LEDs of the NILD2-GAA

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 0.5MM² (0.8mmØ). To connect the wires first strip 6 mm 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:

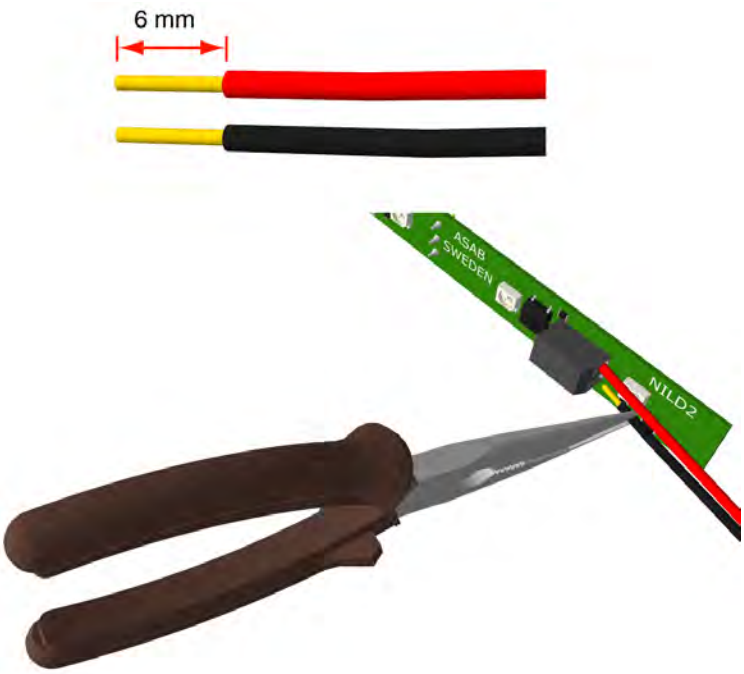


Figure 78. Connecting the wires of an external lamp

Note: *Each connection point in the connector terminal accepts only one solid wire. Maximum wire size 0.5MM² (0.8mmØ).*

6.7.4 Installing the LED Lamp Boards on the Room Controller Board

On the back side of the 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.

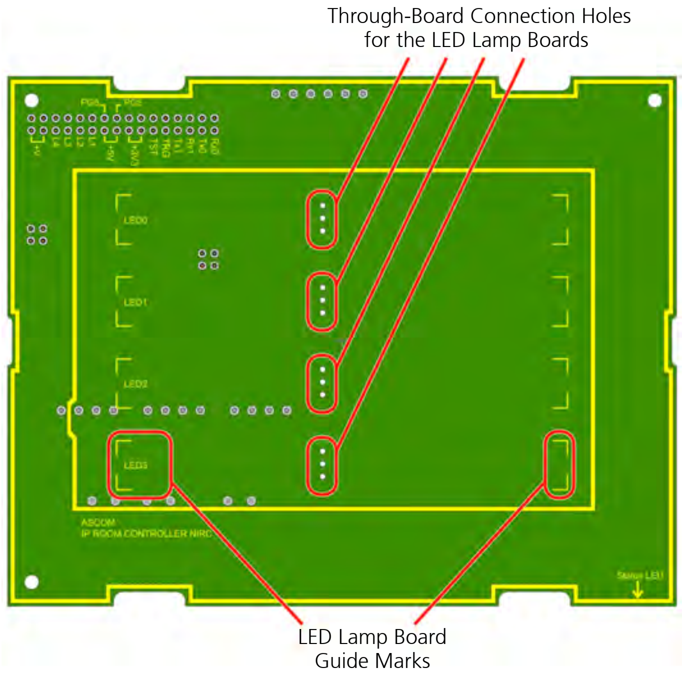


Figure 79. LED through-board connectors and guide marks

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

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

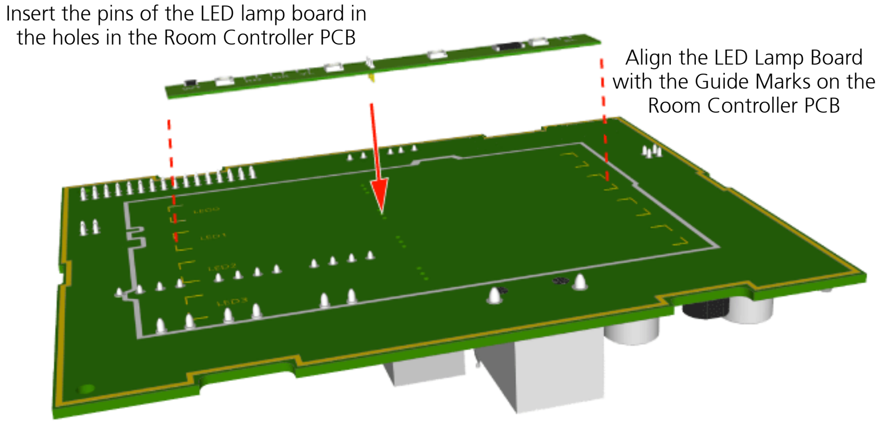


Figure 80. Plugging LED lamp board into the room controller PCB

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

Example of the LED lamp boards (NILD) mounted on the NIRC.

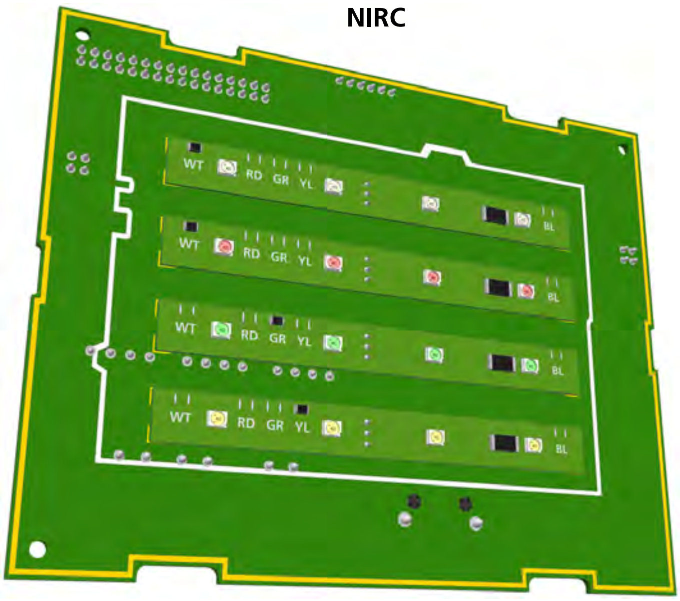


Figure 81. NIRC - room controller PCB with 4 LED lamp boards

Example of the second generation LED lamp boards (NILD2) mounted on the NIRC3.

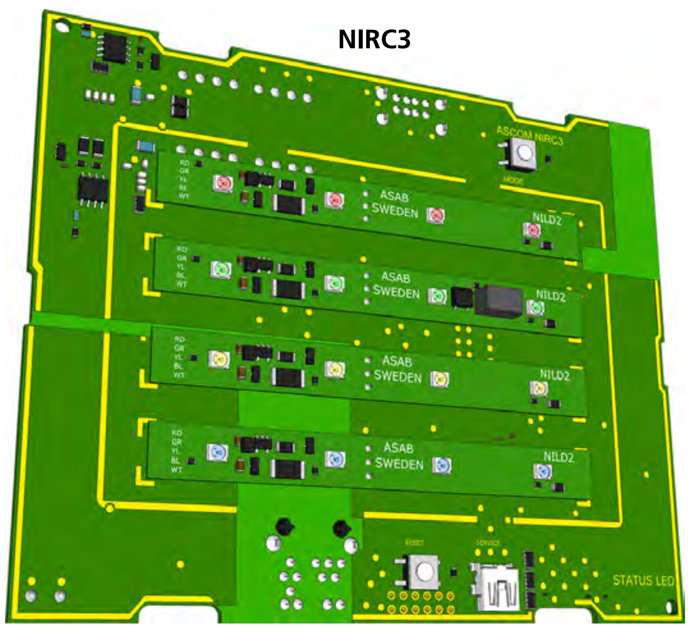


Figure 82. NIRC3- room controller PCB with 4 LED lamp boards

6.7.5 External Corridor Lamp Connections

The NIRC (versions NIRC-GMS, NIRC-WMS) has a 6-pole connector for connection of an external corridor lamp with up to four separate LEDs.

The outputs L1, L2, L3 and L4 are parallel circuits to LED connections on the NIRC printed circuit board. Each external LED must be connected between the lamp connector (L1, L2, L3 or L4) and +V on the 6-pole connector.

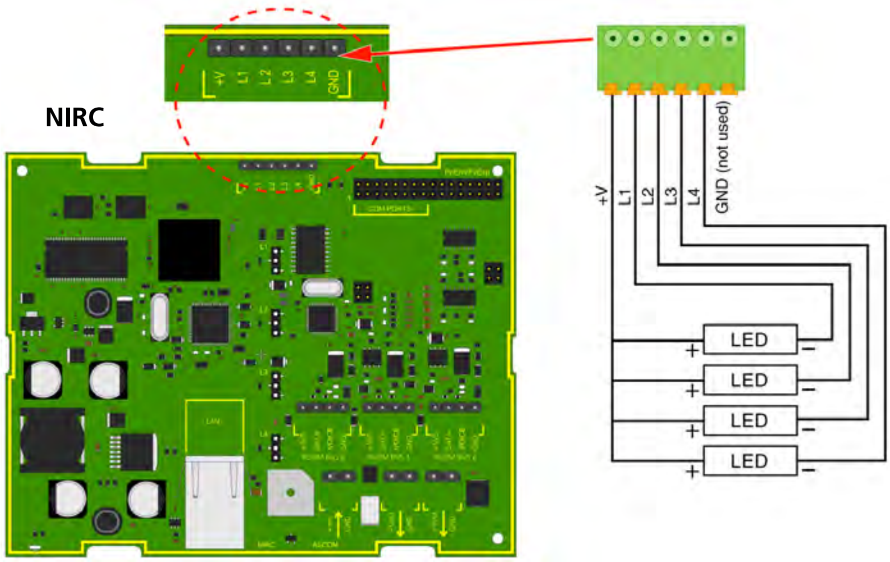
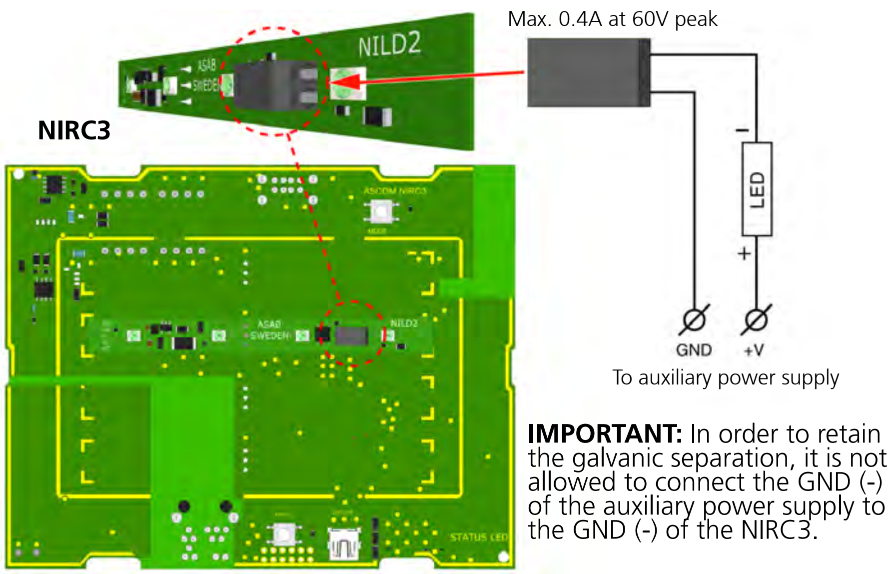


Figure 83. External corridor lamp connections of the NIRC

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

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 separated output with a maximum switching capacity of 0.4A at 60V peak.



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

Figure 84. External corridor lamp connections through the NILD2-GAA

See "Auxiliary Lamp Connection - NILD2" on page 64. for detailed information.

6.8 Power over Ethernet Extension Module PHASED OUT

WARNING: *The PoE module is a class A product which may cause radio interference when used in a sensitive environment.*

The Power over Ethernet Extension (PoE) is a printed circuit module which is piggy back mounted on the teleCARE IP room controller (only NIRC). It allows the power for the teleCARE IP system to be sourced from the network switch and distributed over the ethernet LAN. The PoE module provides the complete power supply for a room controller and the three connected room buses.

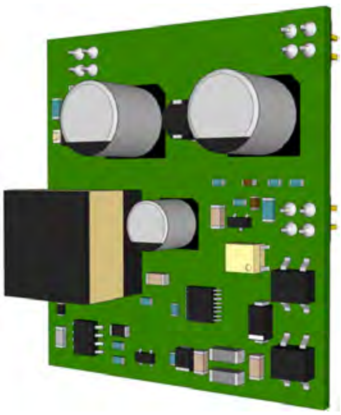


Figure 85. PoE extension module

The PoE module combines an IEEE 802.3af compliant Powered Device (PD) interface with a current mode switching regulator. The input power connection can be Mode A (over the data pair) or Mode B (over the spare pair) and each input will accept either polarity.

The PoE is piggy back mounted on the room controller printed circuit board by plugging it into the two connectors in the top right hand corner of the PCB, as shown in the following illustration:

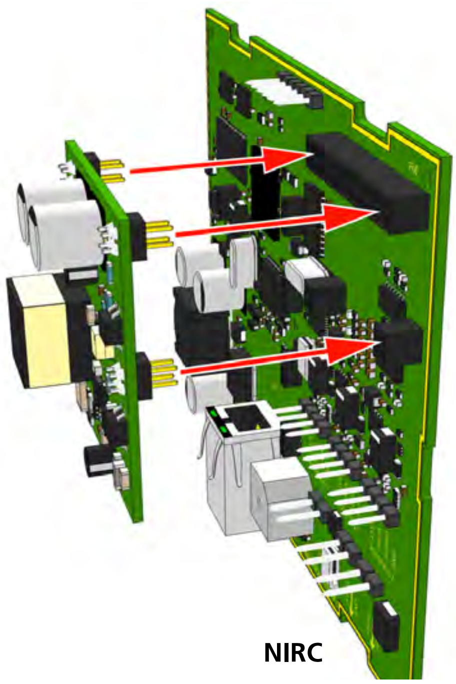


Figure 86. Piggy-back mounting the PoE extension module

The PoE module will automatically detect when power over ethernet is available and it will allow the power to enter the room controller circuit board.

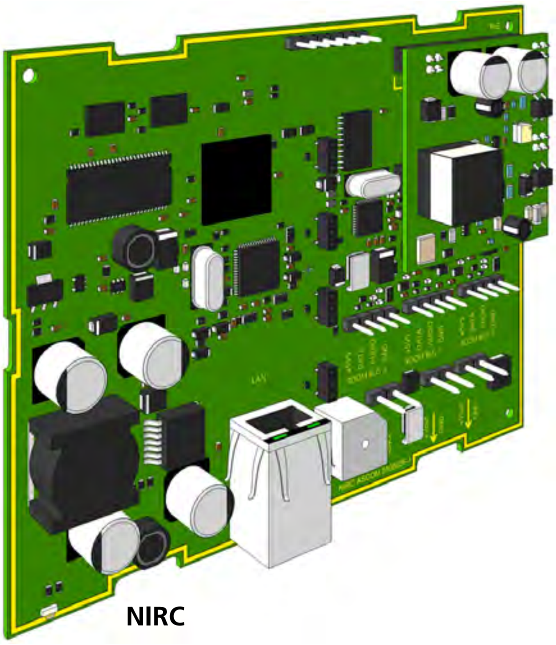


Figure 87. PoE extension module mounted on the NIRC - room controller board

6.9 Corridor Lamp

Note: *Except when specifically mentioned otherwise, the references to "Corridor Lamp" used in this document are applicable to both the NICL and NICL2.*

6.9.1 NICL PHASED OUT

The Corridor Lamp (NICL) is controlled by the room controller (NIRC only) and one room controller (NIRC) can support three corridor lamps. Each Corridor Lamp is connected to one of the three room buses of the Room Controller and it always has the fixed address 5.

IMPORTANT: *The room controller NIRC3 does not support the 24 volt output that is required to power the NICL, therefore the NICL should not be used in combination with the NIRC3.*

Figure 88. The teleCARE IP corridor lamp - NICL

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:

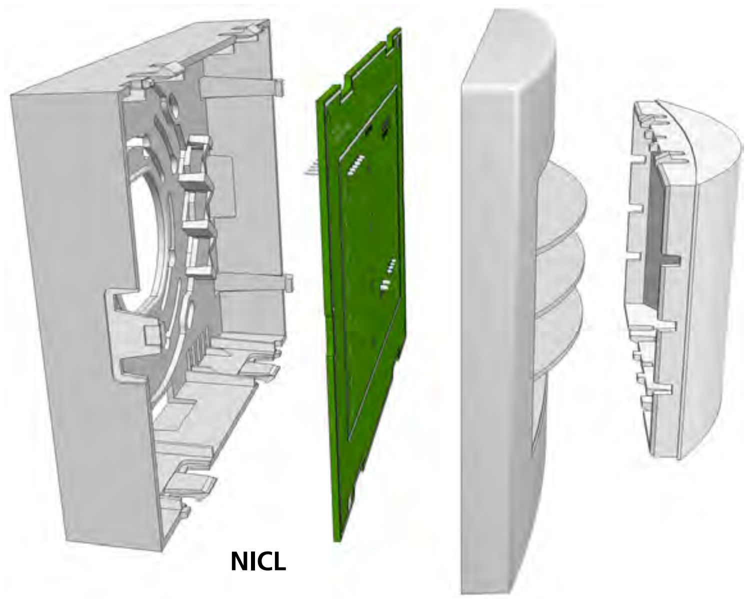


Figure 89. NICL - Corridor lamp parts

6.9.2 NICL2

The Corridor Lamp (NICL2) is backwards compatible and can be controlled by the room controller (NIRC or NIRC3). The room controller (NIRC) can support three corridor lamps and 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.

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

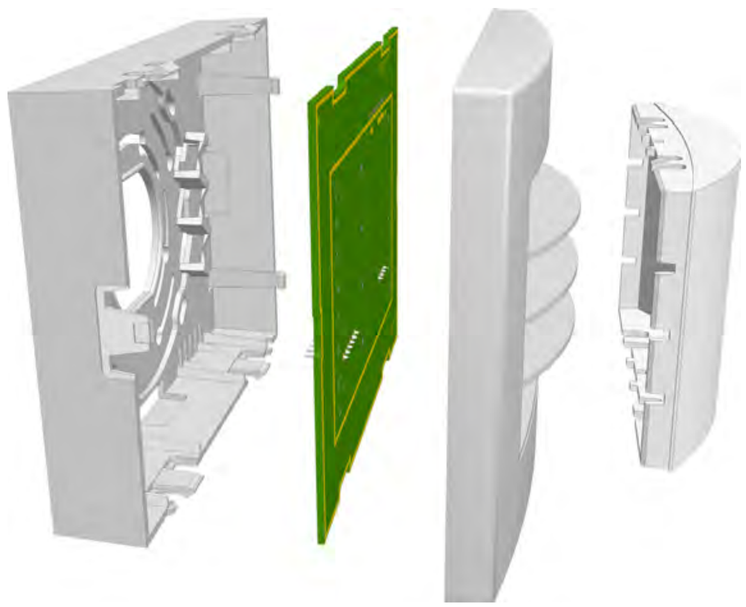


Figure 90. NICL2 - Corridor lamp parts

6.9.3 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:

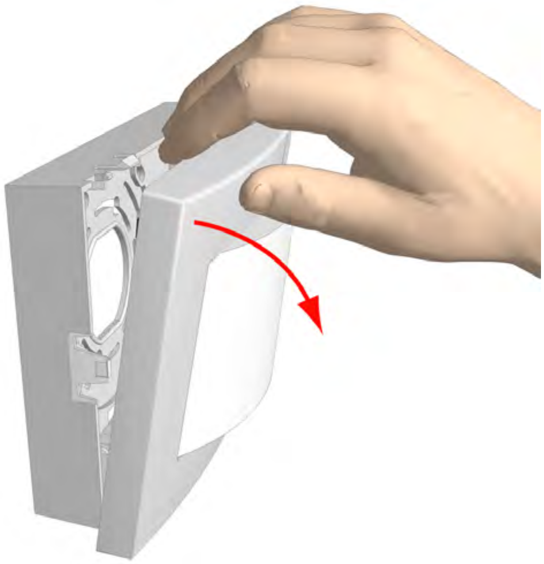


Figure 91. Separating the top section from the housing

6.9.4 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:

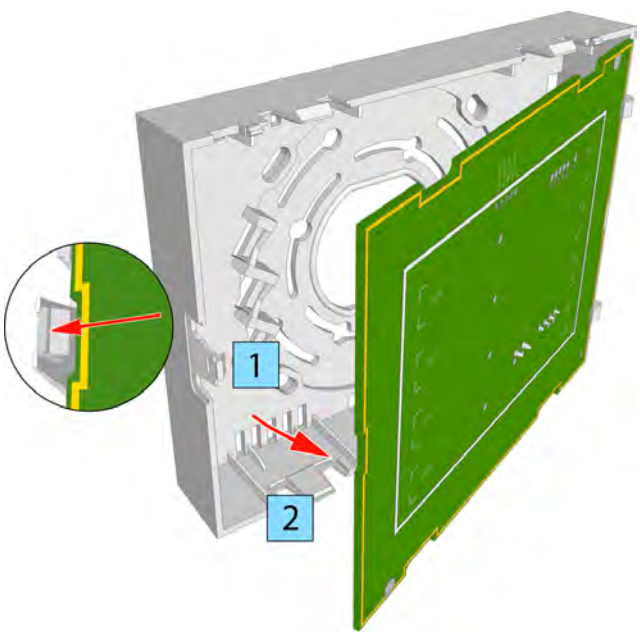


Figure 92. Removing the circuit board from the housing

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

6.9.5 Corridor Lamp Housing

The corridor lamp has the same housing as used for the room controller which is designed to be surface mounted. Refer to section 6.2.8, Room Controller Housing on page 38 for details of mounting the housing.

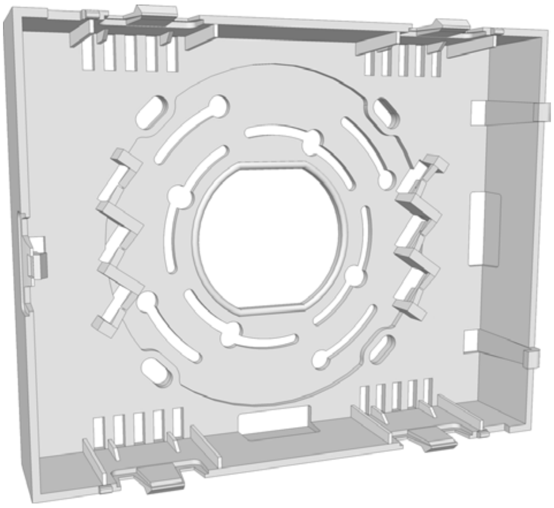


Figure 93. Room controller housing

6.9.6 NICL - Corridor Lamp Electrical Connections

The wiring between Room Controller (NIRC only) and the NICL Corridor Lamp consists of the teleCARE IP four-wire room bus plus two additional wires for 24V/DC to power the corridor lamp LEDs.

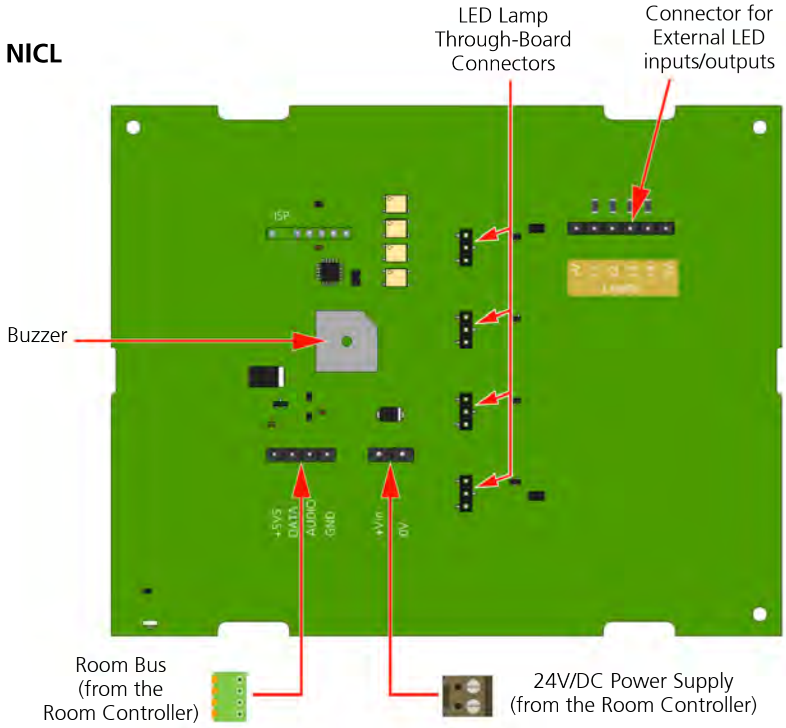


Figure 94. NICL - Corridor lamp PCB component side electrical connections

6.9.7 NICL2 - Corridor Lamp Electrical Connections

The wiring between Room Controller (NIRC or NIRC3) and the NICL2 Corridor Lamp consists of the teleCARE IP four-wire room bus.

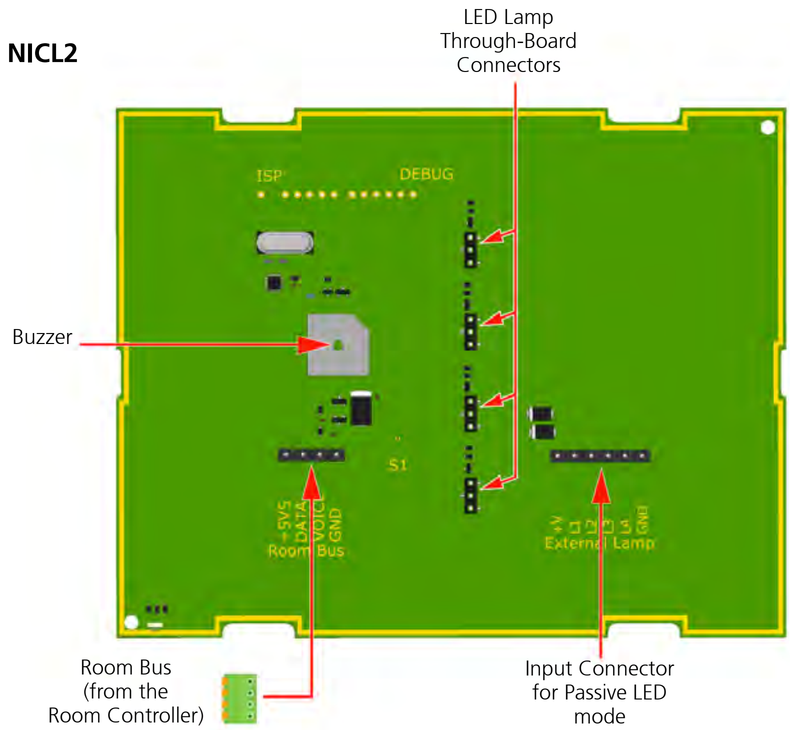


Figure 95. NICL2 - Corridor lamp PCB component side electrical connections

6.9.8 4-Pole Connector Terminal

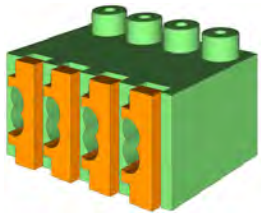


Figure 96. 4-pole connector terminal

The 4-pole connector terminal is used for connecting the room bus. It has a screwless "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.

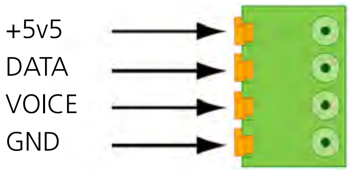


Figure 97. 4-pole connector terminal with the room bus

Preparing the wires and connecting the 4-pole connection terminal is described in section 6.5.1, 4-Pole Connector Terminal (NICT-4AA) on page 51.

6.9.9 2-Pole Connector Terminal

Figure 98. 2-pole connector terminal

The 2-pole connector terminal is used for connecting the 24V/DC power supply from the room controller (NIRC) to the corridor lamp (NICL). The designation of the required power supply wires is as shown in the following illustration.

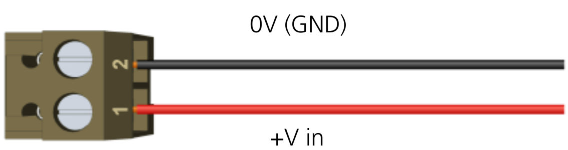


Figure 99. 2-pole connector terminal wiring

Preparing the wires and connecting the 2-pole connection terminal is described in section 6.5.2, 2-Pole Connector Terminal (NICT-2BA) on page 53.

6.9.10 Connecting the Corridor Lamp Circuit Board

When preparing the wiring for connecting the printed circuit board of the corridor lamp make sure that the power supply wires (NIRC only) and the room bus wires are stripped of the cable outer jacket and that the wires are long enough, as described in section 6.3, Preparing the Room Bus and Power Cables on page 42.

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

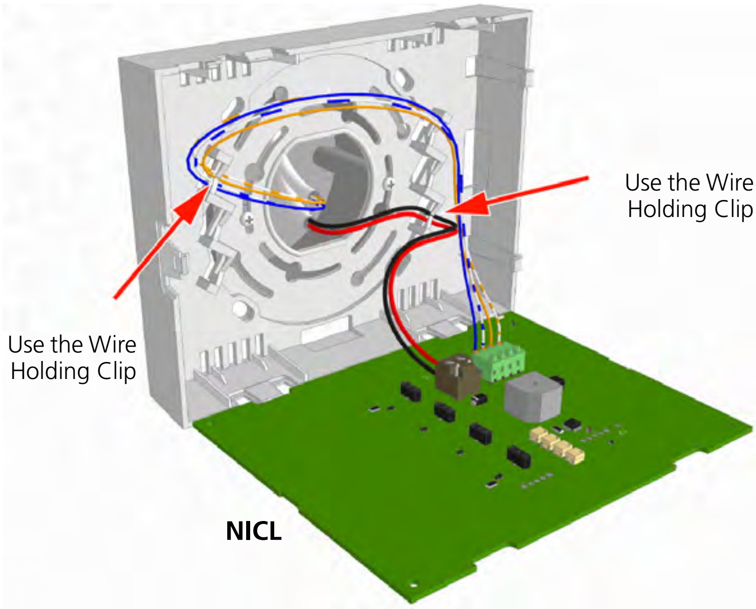


Figure 100. Connecting the NICL - corridor lamp

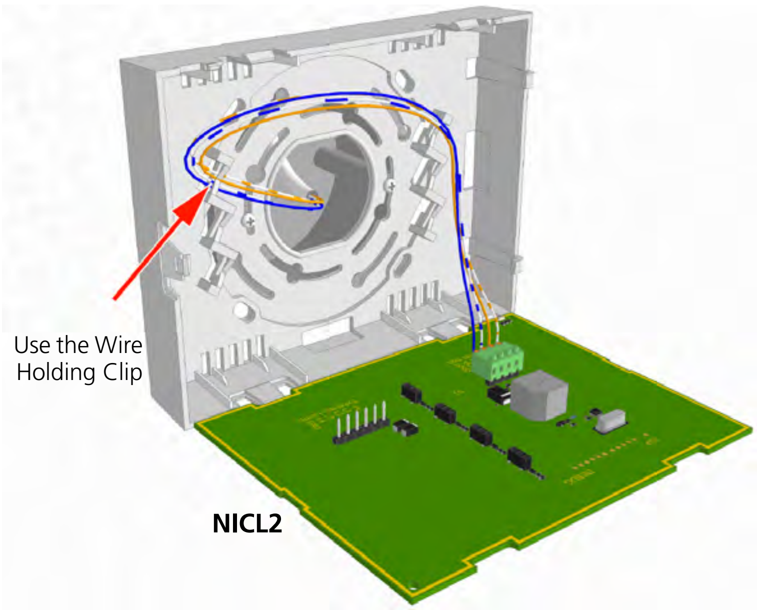


Figure 101. Connecting the NICL2 - corridor lamp

6.9.11 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 signalling of various types of call, as well as nurse presence and 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 labelled LED0, LED1, LED2 and LED3. Any colour LED board can be plugged into any of the connection points on the room controller. The appropriate position of the LED colour is determined during the system setup.

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

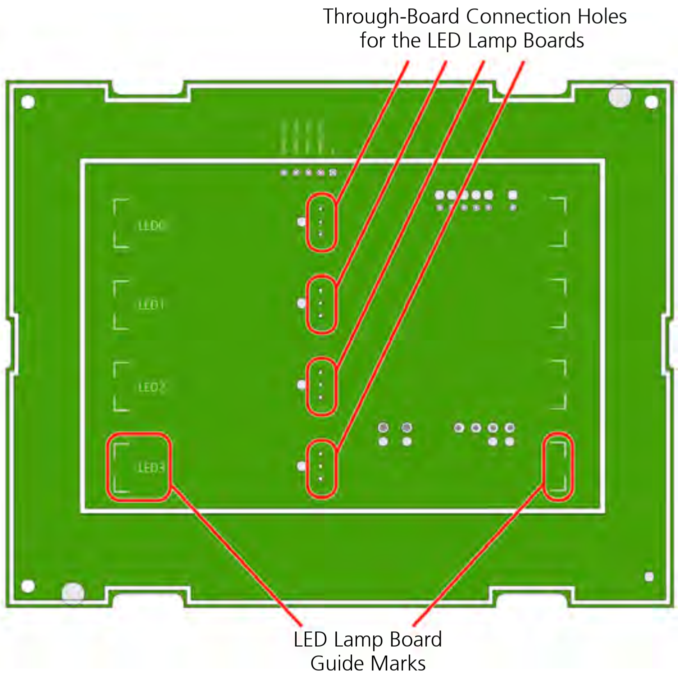


Figure 102. LED through-board connectors and guide marks

For full details of the NILD and second generation NILD2 - LED lamp boards refer to section 6.7, LED Lamp Boards, page 62.

6.9.12 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.

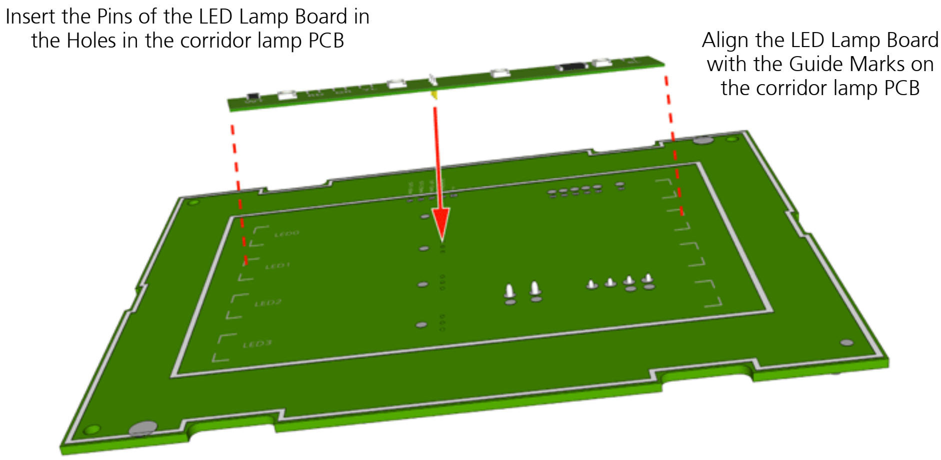


Figure 103. Plugging LED lamp board into the corridor lamp PCB

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.

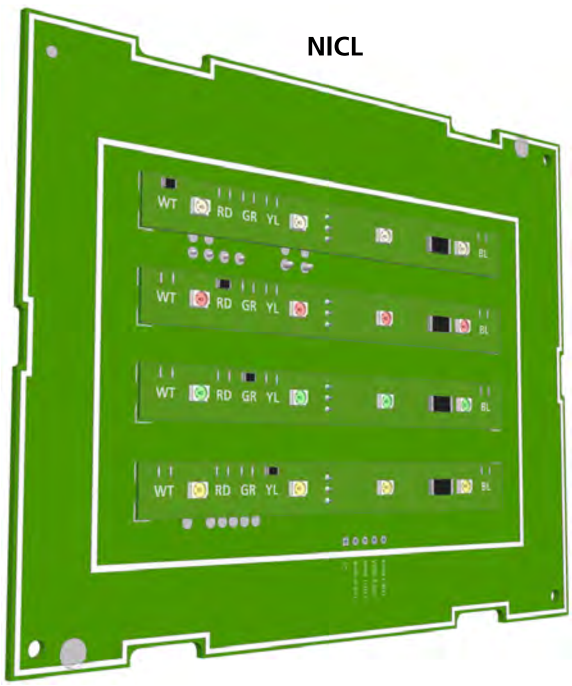


Figure 104. NICL - Corridor lamp PCB with 4 NICD - LED lamp boards

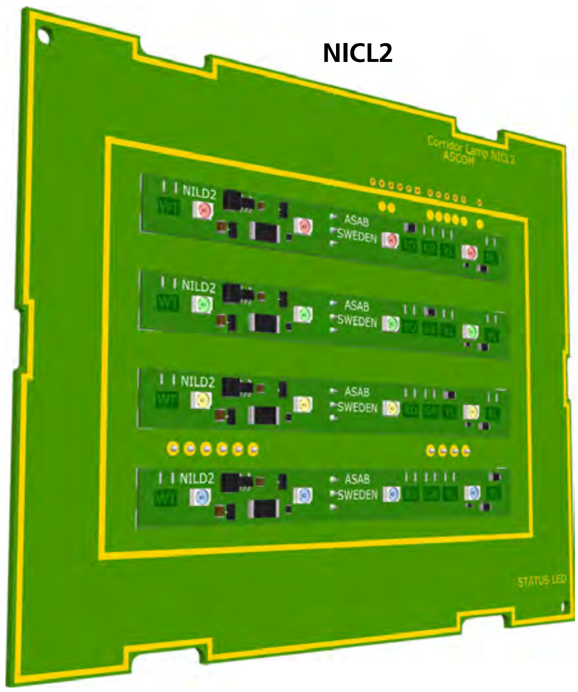


Figure 105. NICL2 - Corridor lamp PCB with 4 NICD2 - LED lamp boards

Note: *The pins on the LED lamp board are not in the centre 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.*

6.9.13 External Corridor Lamp Inputs

The 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 NIWC ward controller).

The LED inputs require 24V/DC constantly on the +V connector with the inputs L1, L2, L3 and L4 switching low to 0 volts.

NICL

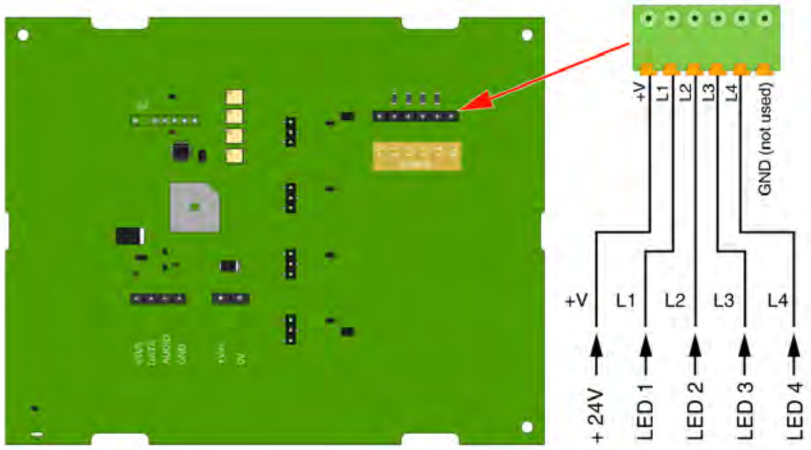


Figure 106. External LED inputs to the NICL - corridor lamp

NICL2

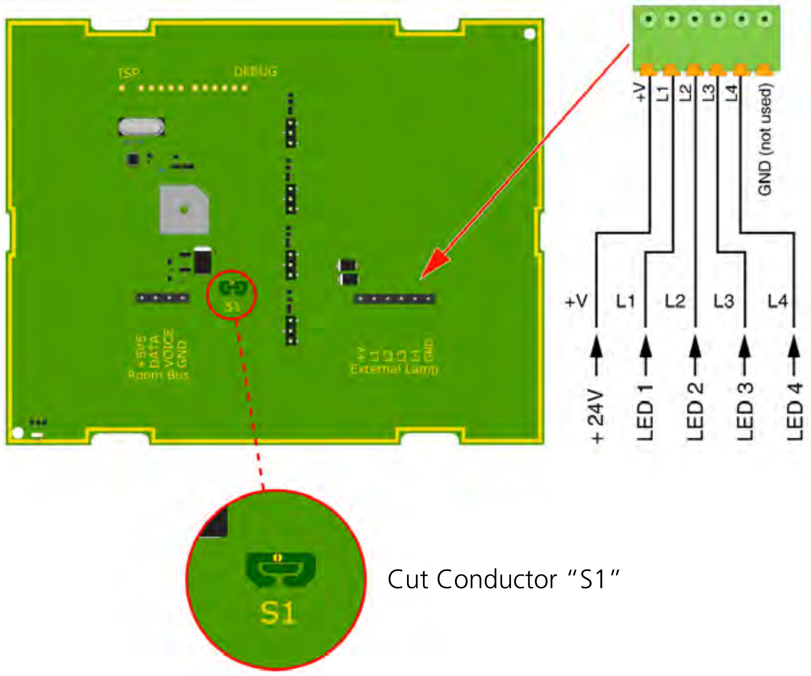


Figure 107. External LED inputs to the NICL2 - corridor lamp

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.

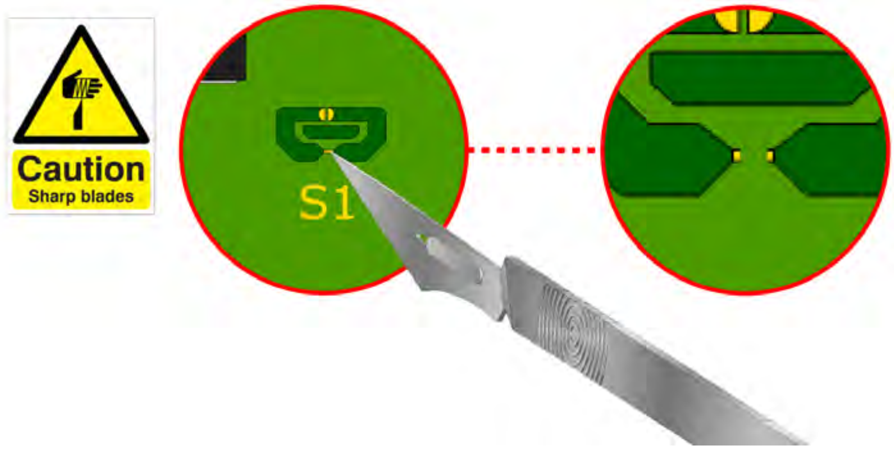


Figure 108. Cut conductor "S1"

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.

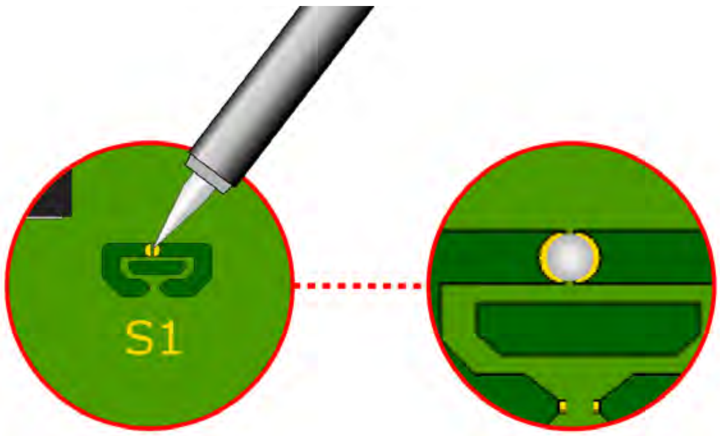


Figure 109. Restoring to the default NICL2 configuration

6.9.14 External Corridor Lamp Outputs

When the corridor lamp is used as a slave to the room controller, the LED outputs of the corridor lamp (NICL only) can be taken from the 6-pole connector to an external passive LED lamp with up to four separate LEDs which operate on 24V/DC (such as a passive LED corridor lamp).

The outputs L1, L2, L3 and L4 are parallel circuits to LED connections on the NICL printed circuit board. Each external LED must be connected between the lamp connector (L1, L2, L3 or L4) and +V on the 6-pole connector.

IMPORTANT: *The maximum load on each external LED output is 60mA.*

NICL

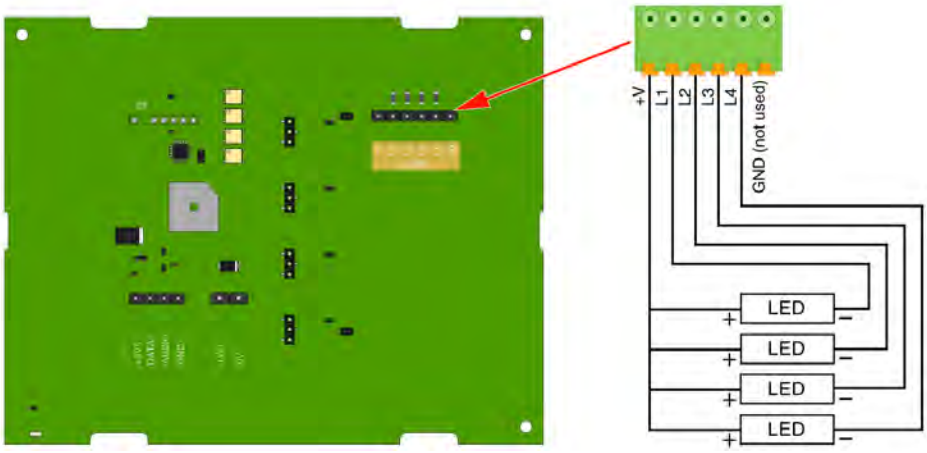


Figure 110. External LED outputs from the NICL - corridor lamp

Note: *This functionality is not supported by the second generation corridor lamp (NICL2).*

6.10 System Manager (NISM) PHASED OUT

The teleCARE IP System Manager (NISM) is an Ascom ELISE2 application. The ELISE2 module serves as the interface to a 100base T Ethernet LAN and it contains a Linux based web server.

The NISM 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 Nurse GUI for creating and maintaining staff assignments.

The NISM is connected to the IP network and stores the configurations for each of the teleCARE IP Room Controllers and / or Ward Controllers that are connected to the IP network.

A Java based graphical user interface (GUI) is supplied with the NISM. 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.

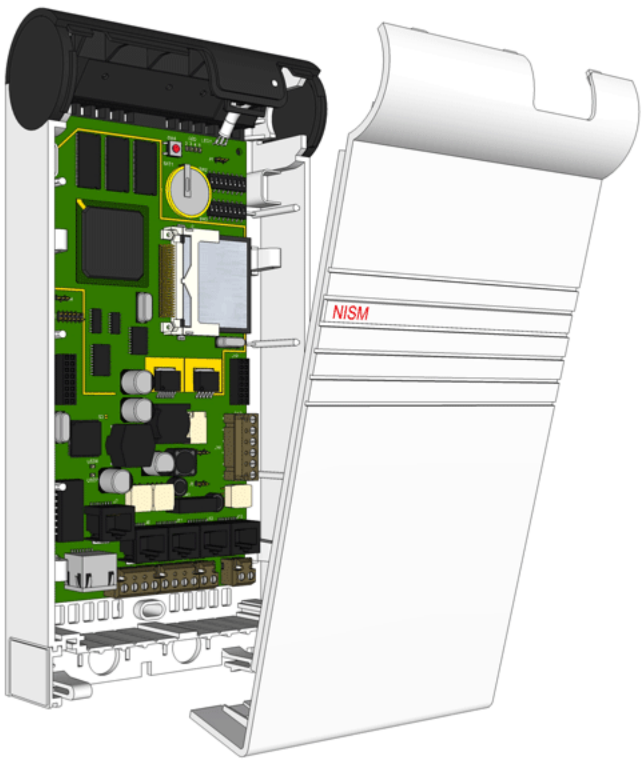


Figure 111. System manager (NISM)

Note: *The NISM power requirement is 12V/DC - 24V/DC, therefore it can be connected to the Ascom power supply (12.5V/DC) or the teleCARE IP power supply (24V/DC).*

The System Manger is contained in a plastic Ascom control unit housing. For details of the housing see “Ascom Control Unit Housing” on page 319.

6.10.1 NISM Electrical Connections

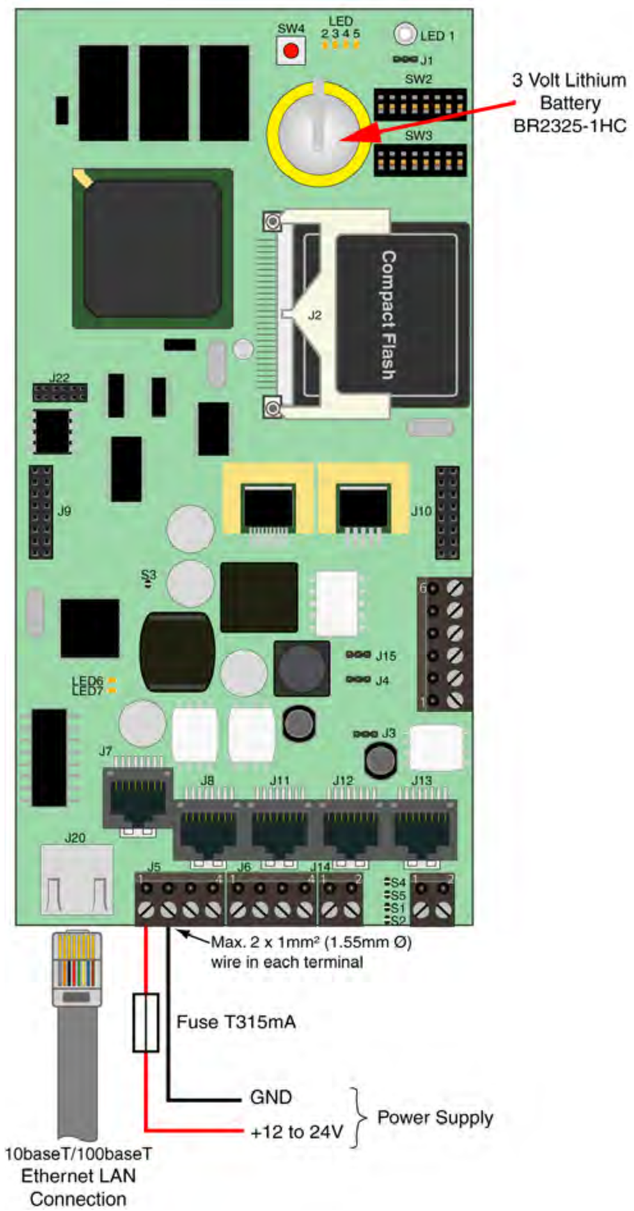


Figure 112. NISM electrical connections

The power supply connectors on the NISM will not accept heavy guage wires, therefore the power supply connection should be made by tapping off the power supply bus with wires of not more than 1.8mmø.

IMPORTANT: *A T315mA fuse (slow-blow) is required at the +V input (pin 1 of J5) to prevent overheating of the NISM printed circuit board in the event of a component failure on the board.*

For the NISM, refer to the ELISE2 Installation Guide (TD92232GB) for the basic ELISE2 installation instructions.

6.11 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 Nurse 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 and / or Ward 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 an ESPA (or a TAP) paging system. A licence is required for support of an ESPA (or a TAP) paging system.

Figure 113. System Manager (NISM2)

The NISM2 power requirement is 100V/AC to 240V/AC 50-60Hz for the internal power supply. Optionally the 12-24V/DC power connection can be used to connect to an external power supply.

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

6.11.1 NISM2 Electrical Connections

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

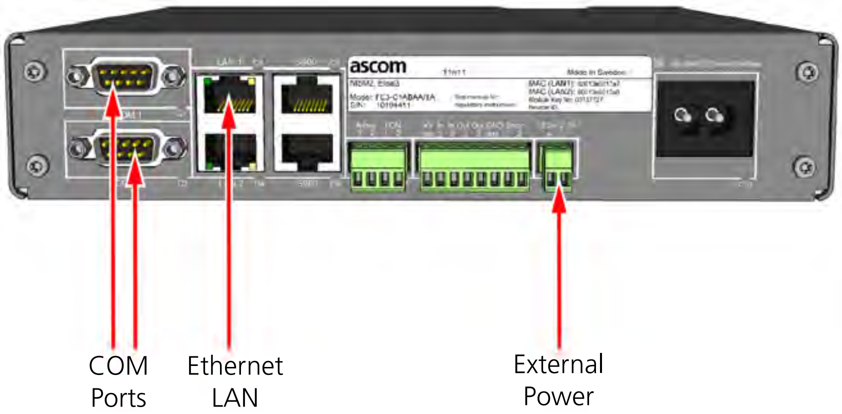


Figure 114. NISM electrical connections

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

6.11.2 Ethernet LAN Cable

Connect the Ethernet LAN cable to the “LAN 1” port.

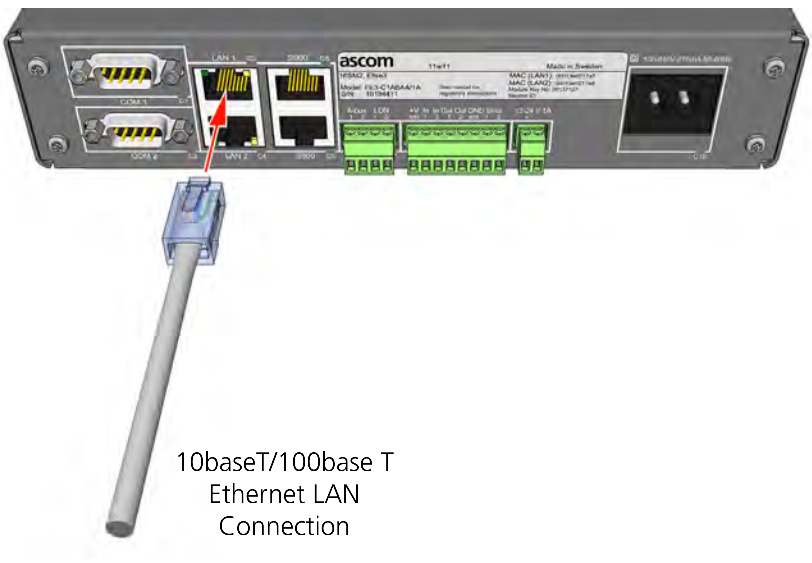


Figure 115. Connecting the Ethernet LAN cable

6.11.3 NISM2 Internal Power Supply

For the NISM2 internal power supply connect the mains power supply to the 100V/AC to 240V/AC 50-60Hz socket at the rear of the NISM2 module.

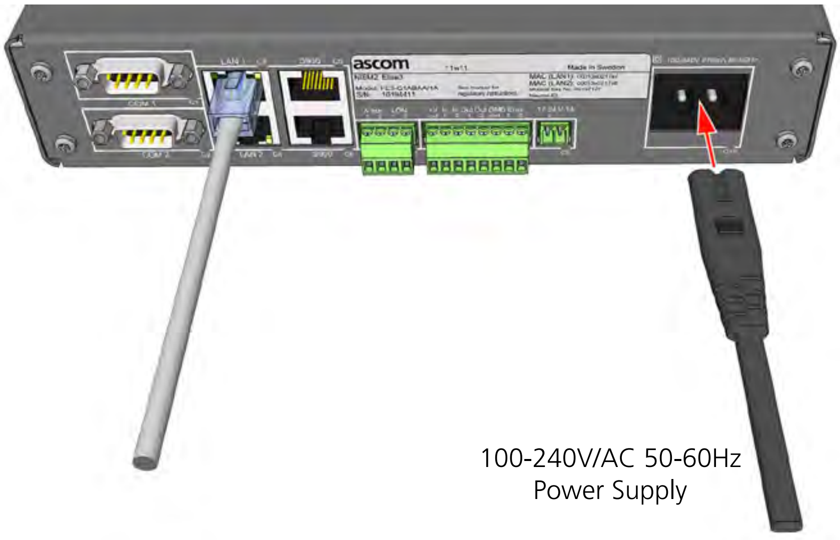


Figure 116. NISM2 electrical connections

IMPORTANT: *Do not use the NISM2 internal power in EN 60601-1 compliant applications. In such cases the Ascom 660376 24V/DC/4.2A external power supply unit must be used.*

6.11.4 External DC Power Supply

In place of the internal power supply, the NISM2 can be connected to an external 12 - 24V/DC power supply.

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

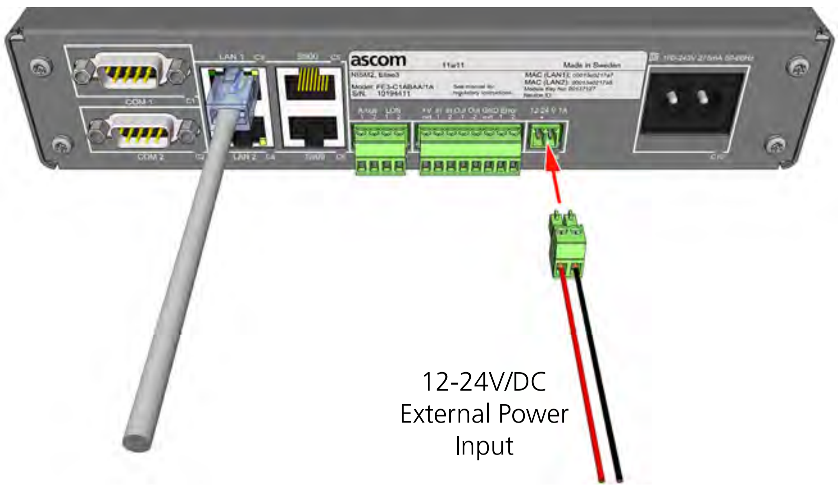


Figure 117. NISM2 with external 12-24V/DC power input

6.11.5 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.

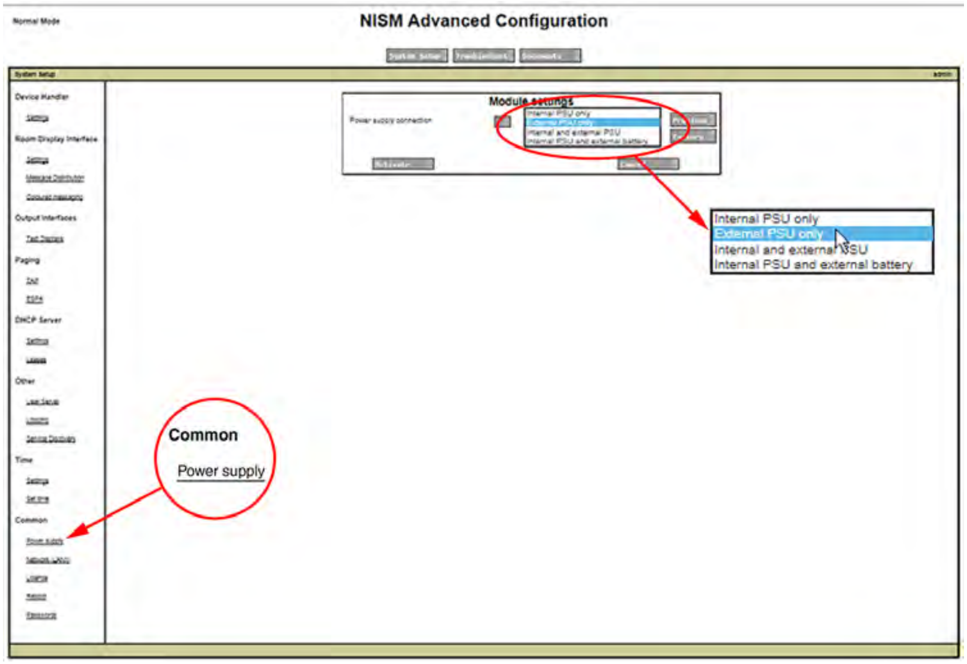


Figure 118. NISM power supply connection settings

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

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

Figure 119. NISM power indicator LED

6.11.6 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 licence is required for support of a TAP or an ESPA paging system.

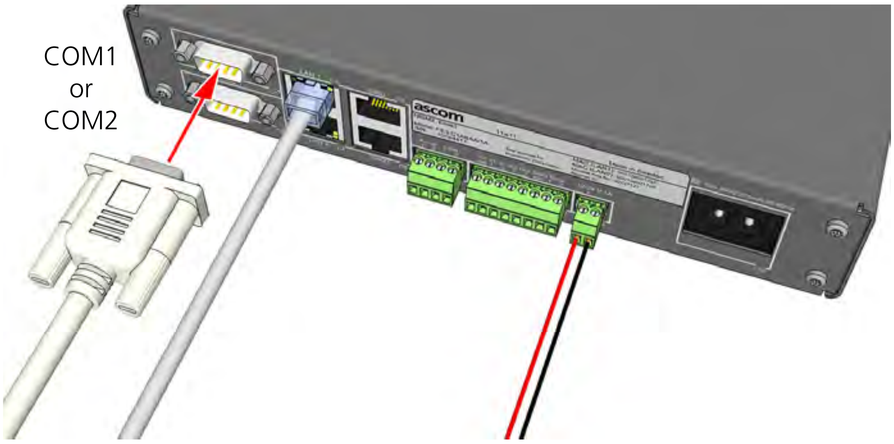


Figure 120. Connecting a paging system to a COM port

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”:

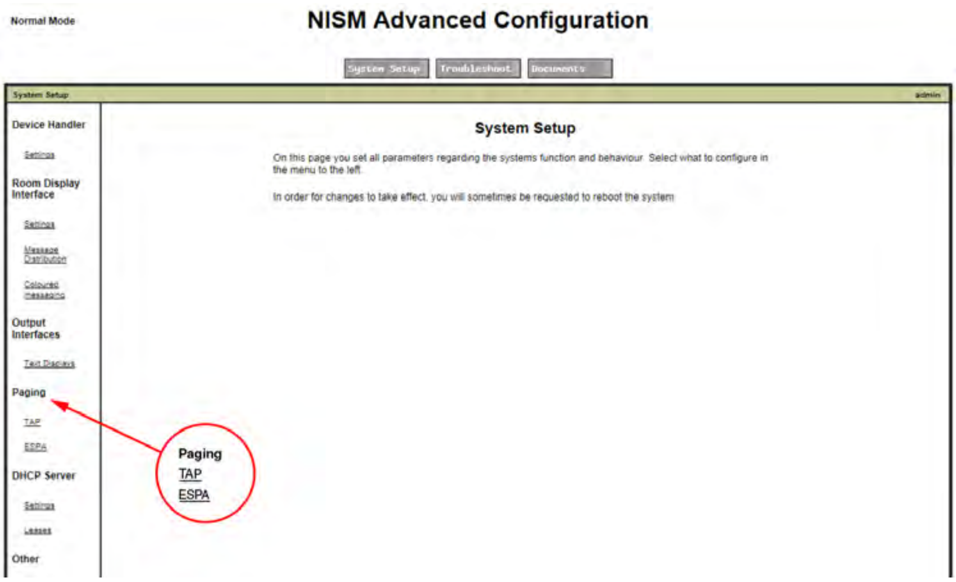


Figure 121. Paging system selection

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

6.12 teleCARE IP Gateway (NIGW)

The teleCARE IP Gateway NIGW is an application on the Ascom ELISE3 module.

ELISE3 serves as the interface to a 100base-T Ethernet LAN.

The teleCARE IP Gateway NIGW is used as the interface between teleCARE IP and Unite Connect. It is required when integrating teleCARE IP within the Ascom Unite Messaging Suite for Healthcare solution.

The teleCARE IP Gateway NIGW provides Unite Connect with the teleCARE IP call information and keeps track of all the events.

Figure 122. teleCARE IP Gateway (NIGW)

Refer to the "NISM2 Electrical Connections" on page 87 for the basic electrical connections of the Elise3 module.

6.13 Ward Controller (NIWC)

The Ward Controller (NIWC) is used to adapt existing teleCARE M installation to the teleCARE IP system. It replaces the teleCARE M intelligent address module (IAM) and allows the existing teleCARE M room buses and the associated peripherals to be fully integrated in the teleCARE IP system.

The NIWC controller is fully compatible with all existing teleCARE M room peripherals and it allows existing teleCARE M installations to be quickly and efficiently adapted to the teleCARE IP system. It has a high speed 10/100 Base-T Ethernet communication interface which enables it to be connected directly to an ethernet LAN.

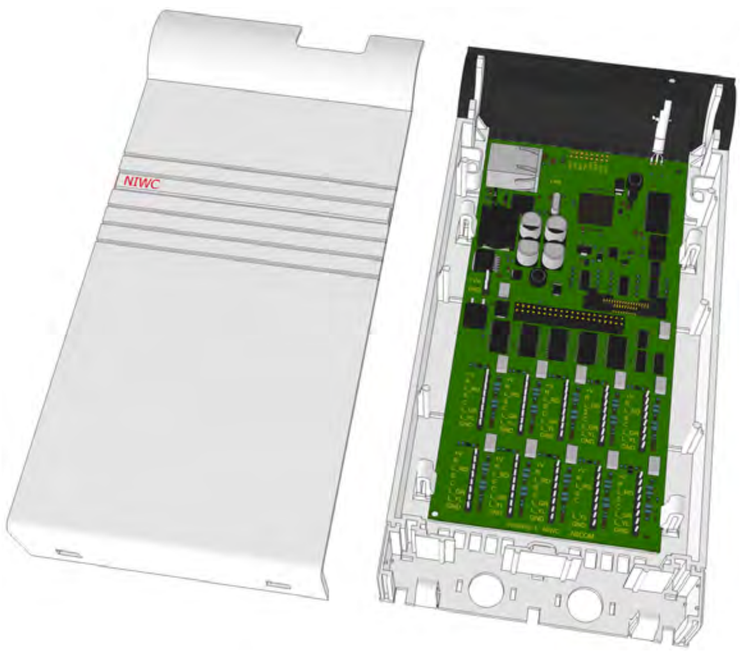


Figure 123. Ward Controller (NIWC)

The NIWC is contained in a plastic Ascom control unit housing. For details of the housing see "Ascom Control Unit Housing" on page 319.

The NIWC has 10 detachable address connectors for up to 10 teleCARE M buses with teleCARE M peripherals. For details of the teleCARE M room bus please refer to the teleCARE M System Description (TD 91876GB) and the Installation Guide (TD 91868GB).

The NIWC has a connector for an optional voice module (NIVM) which enables speech on 8 of the teleCARE M room buses. The voice module is piggy-back mounted on the NIWC.

Note: *The NIWC is not compatible with the teleCARE M Speech Piggyback (SPB)*

The NIWC contains a high speed processor and it has a high speed 10/100 Base-T Ethernet communication interface.

The power supply input is 24V / DC ± 10%, reverse polarity protected and each of the room bus connection is short circuit protected. The power consumption for the ward controller largely depends on the load at the address connectors and can be up to 100W.

Note: *The NIWC is not compatible with Power over Ethernet.*

6.13.1 NIWC Electrical Connections

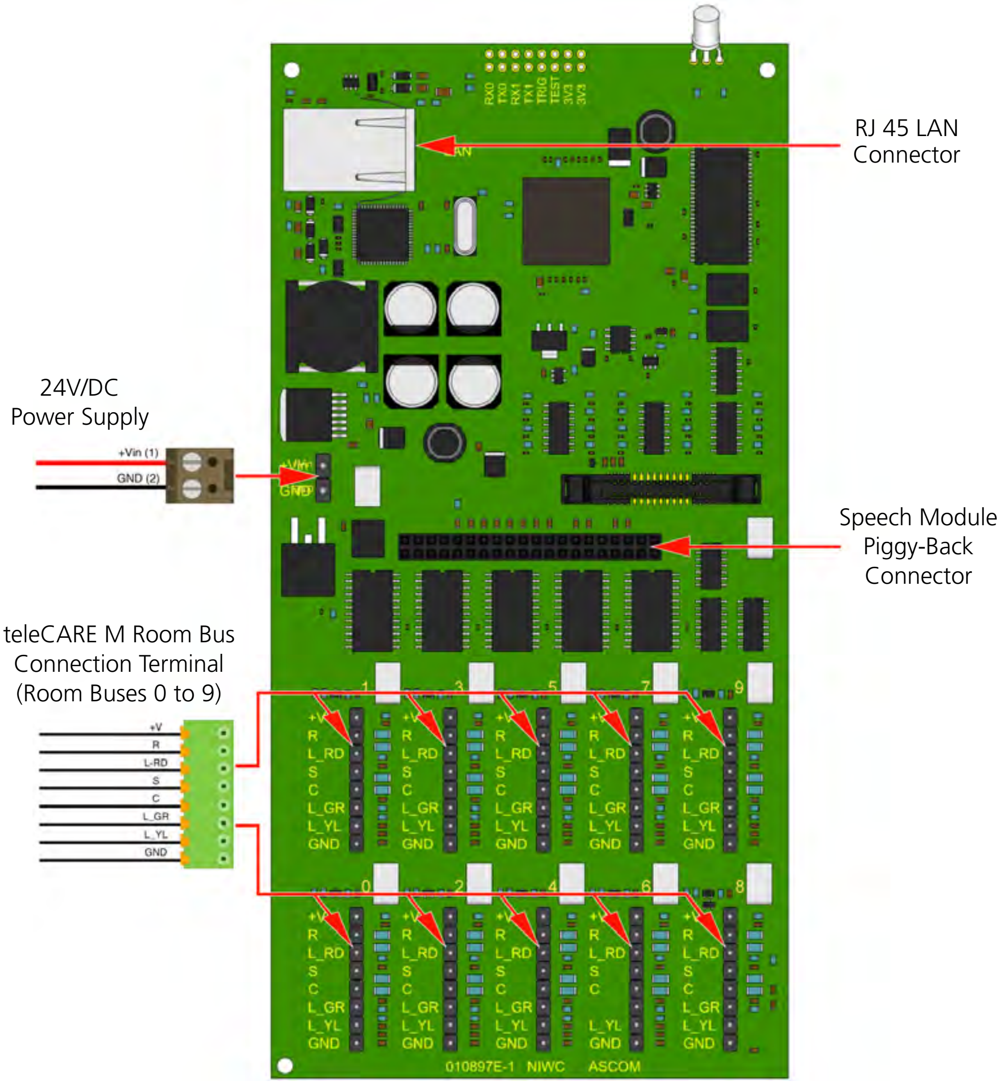


Figure 124. Ward controller electrical connections

Note: *The 8-pole and the 2-pole connector terminals are not supplied with the ward controller. They are available as accessories and can be ordered separately if required. The 8-pole room bus connections on the NIWC printed circuit board accept the existing 8-pole screw connection terminal used with the IAM.*

6.13.2 Room Bus Power Supply Short Circuit Detection

End of Line (EOL) resistors will detect a short circuit between the room bus power line (+V) and ground. The NIWC will signal the short circuit condition in the same way as for a line break (see the teleCARE M Installation Guide TD 91867EN for more information).

WARNING: *We strongly recommend enabling short circuit detection through End of Line resistors. A prolonged short circuit to ground anywhere on a room bus power line (+V) can cause over-heating of certain components on the NIWC printed circuit board with a relatively low risk of a fire inside the housing.*

To ensure short circuit detection between the room bus power line (+V) and ground, a 22kΩ ¼W must be connected between "+V" and "S" and between "+V" and "R" on all room bus connectors on the NIWC.

In installations where line break detection with EOL resistors is implemented, all unused room bus connectors on the NIWC printed circuit board must have a 22kΩ ¼W resistor between "+V" and "S" and between "+V" and "R".

Note: *In order to have line break detection and short circuit detection in systems using the NIWC ward controller, the line break detection option must be enabled in the system configuration set up. This is located under "Templates / Module Definitions", and here all used teleCARE M modules must have the "Ward Controller line break detection" option checked.*

6.13.3 Ward Controller Wiring Arrangement

To be able to guide the wires easily inside the ward controller housing it is best to strip the outer jacket off the room bus cables and the power supply cable so that only the wire cores enter the ward controller housing.

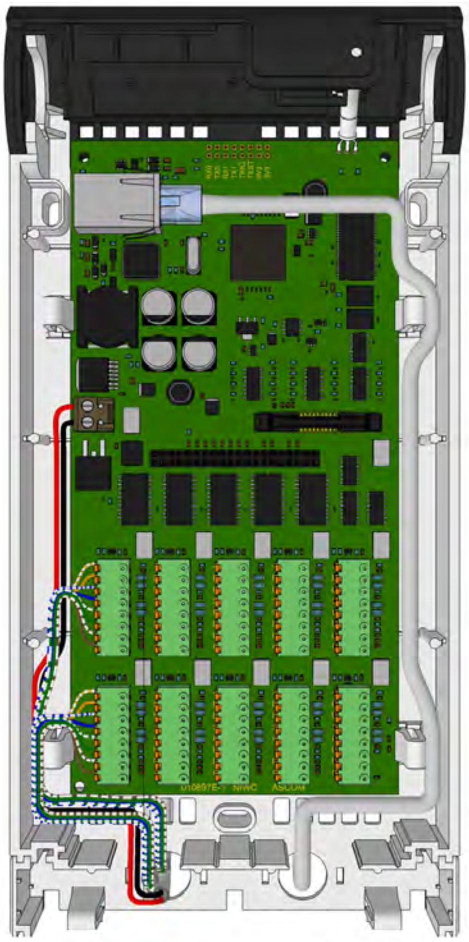


Figure 125. Ward controller wiring arrangement

The power wires, room bus wires and the LAN cable should be guided to the sides of the housing so that the printed circuit board can be easily removed for maintenance etc., as shown in the following illustration.

6.14 Voice Module

The teleCARE IP Voice Module (NIVM) is a printed circuit module which is piggy back mounted on the teleCARE IP Ward Controller (NIWC).

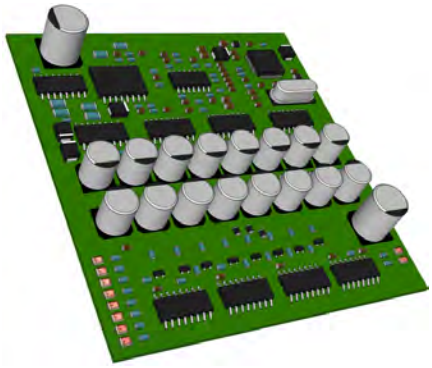


Figure 126. teleCARE IP voice module

The NIVM, in combination with the NIWC, allows existing teleCARE M installations to be upgraded to teleCARE IP with speech. It coverts the teleCARE M analogue speech to VoIP, making it compatible with teleCARE IP.

The NIVM has two speech channels allowing two speech sessions at the same time. Each speech channel has an LED indicator which illuminates when a speech session is in progress. The NIVM supports speech on 8 addresses of the NIWC (addresses 0 to 7). The NIVM has 8 speech session LED indicators that show which addresses have active speech sessions.

6.14.1 Connecting the Voice Module to the Ward Controller

The NIVM is piggyback mounted on the 40-pin connector in the middle of the NIWC:

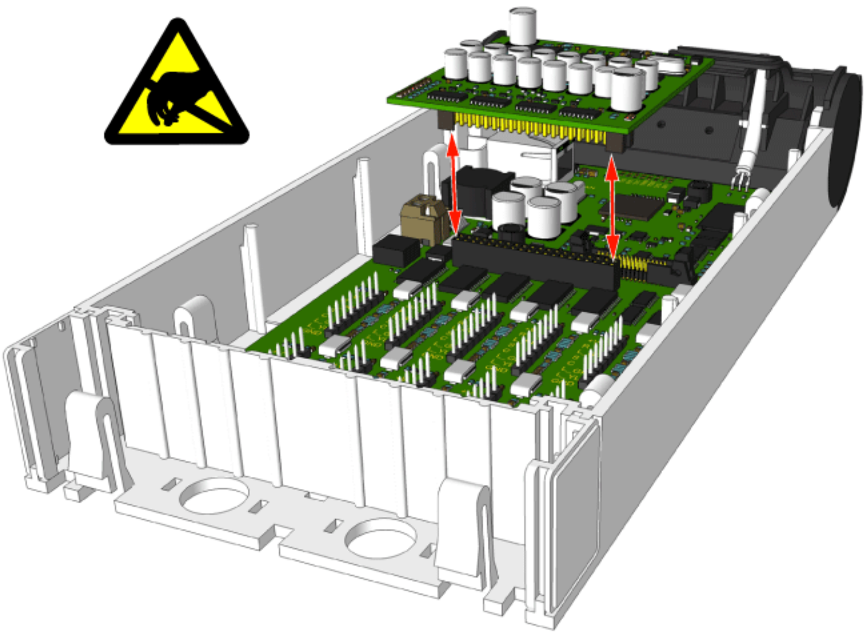


Figure 127. Mounting the voice module on the ward controller

The following illustration shows the NIVM voice module mounted on the ward controller:

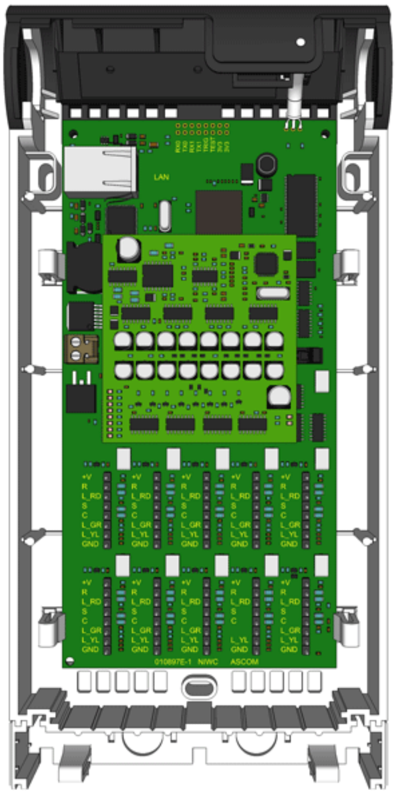


Figure 128. The voice module mounted on the ward controller

7 Peripherals

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

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

7.1 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 35 cm 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.

7.2 Installation Instructions

This section describes the basic installation of the following devices:

- "Bedside Module (NIBM2)" (details on page 108)
- "Bedside Module (NIBM)" (details on page 111)
- "Socket Extension Module (NISE)" (details on page 113)
- "Medical Rail Socket (NIMS2)" (details on page 117)
- "Medical Rail Socket (NIMS)" (details on page 121)
- "Doorside Module (NIDM)" (details on page 123)
- "Customisable Module NICM-A3A and NICM-A1A" (details on page 124)
- "Pull Cord Module - Active (NIPC-G3A and NIPC-W3A)" (details on page 128)
- "Toilet Cancel Module - Active (NITC-XXA)" (details on page 131)
- "Pull Cord Module - Passive (NIPC-XXP)" (details on page 132)
- "Toilet Cancel Module - Passive (NITC-XXP)" (details on page 133)
- "Pull Cord Module (NIPC2) IP44" (details on page 134)
- "Card Reader (NICR)" (details on page 147)
- "Speech Module (NISP)" (details on page 152)
- "Room Display (NIRD)" (details on page 154)
- "Television Interface Module" (details on page 161)
- "Sunblind Control Module" (details on page 163)
- "Multi Medical Alarm Module (NIMA)" (details on page 165)
- "Multi General Alarm Module (NIGA)" (details on page 176)

7.3 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 backbox. 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.

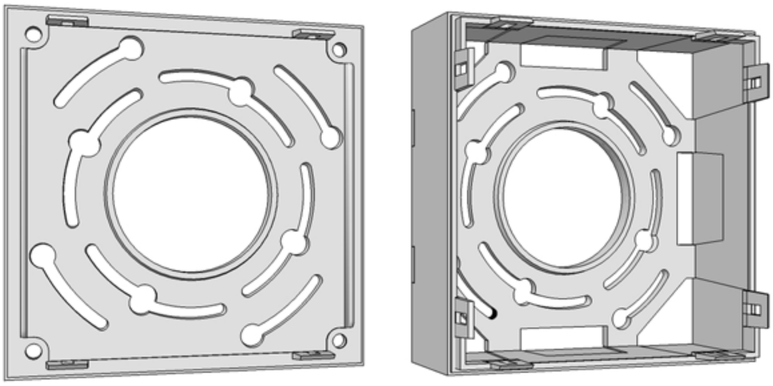


Figure 129. Backplate and surface mounting spacer

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

7.3.1 Mounting the Backplate on a Backbox

To mount the backplate on a backbox the mounting screws in the backbox should not be removed but partially unscrewed to extend at least 5mm above the wall surface.

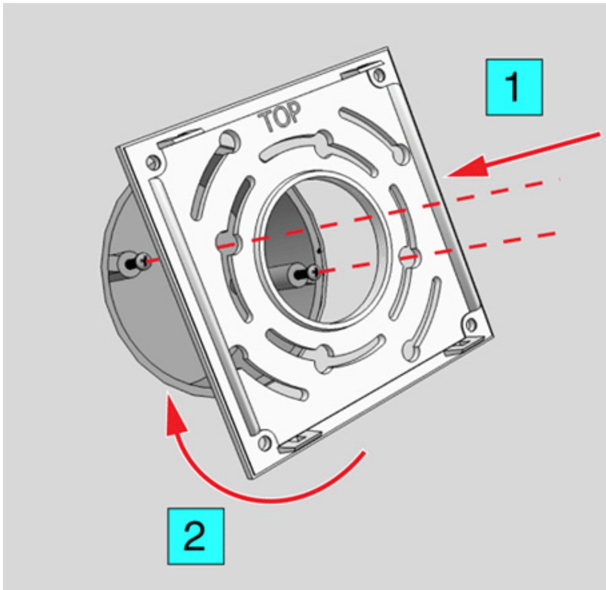


Figure 130. Mounting the backplate (or spacer) on the backbox

The backplate should be placed over the backbox with the side marked "TOP" at the top. Then turn the backplate so that the heads of the screws pass through the eyes of the appropriate "key-hole" slots (1). The backplate must then be turned (2) until the side marked "TOP" is up. Finally the backbox screws should be tightened (3).

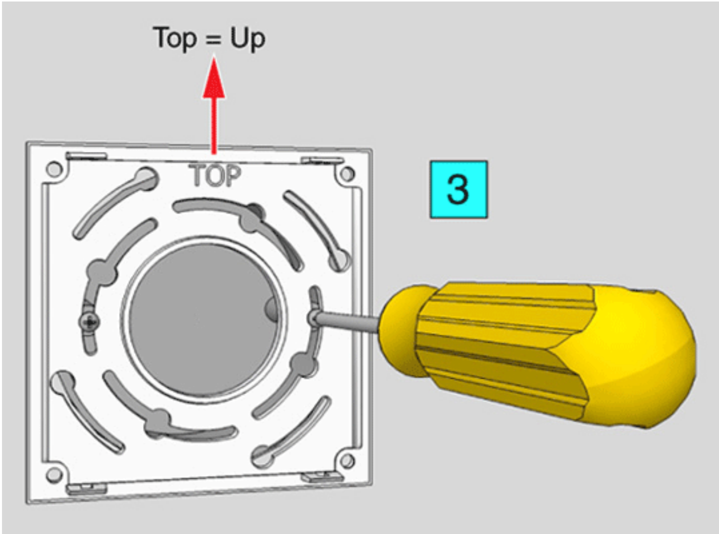


Figure 131. Securing the backplate (or spacer) to the backbox

7.3.2 Surface Mounting Spacer

The surface mounting spacer is available for surface mounting the teleCARE switch modules, with or without a backbox. 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.

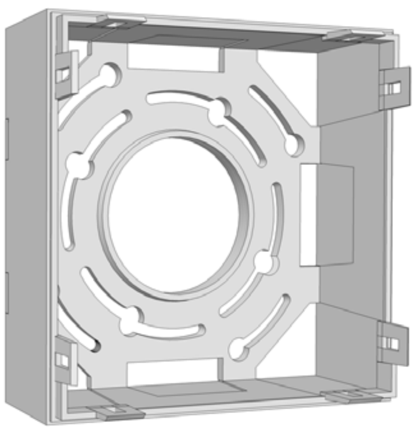


Figure 132. Surface mounting spacer

Note: *When no back box is available it is best to use the screw holes furthest from the centre to mount the spacer on a flat surface.*

7.3.3 Mounting the Spacer on a Backbox

To mount the spacer on a backbox the mounting screws in the backbox should not be removed but partially unscrewed to extend at least 5mm above the wall surface.

The spacer should be placed over the backbox so that the side marked "TOP" will be up. Then pass the heads of the screws through the eyes of the "key-hole" slots in the base of the spacer (1). The spacer must then be turned until the side marked "TOP" is uppermost (2) and finally the backbox screws should be tightened.

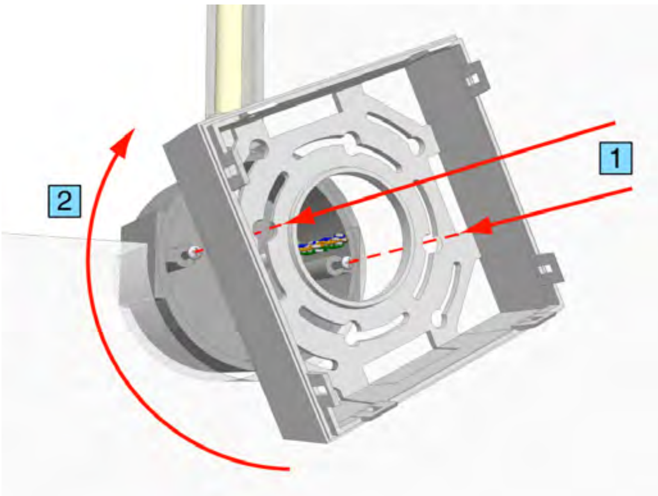


Figure 133. Mounting the spacer on the backbox

7.4 Switch Module Electrical Connections

It is important to ensure that a minimum of 35 cm of free cable is pulled out of the backbox at every location where teleCARE peripherals are to be installed.

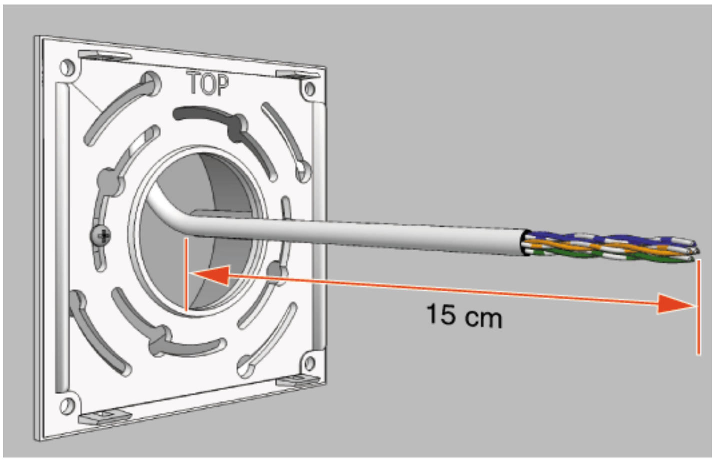


Figure 134. Connecting the switch module

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

7.4.1 4-Pole Connector Terminal

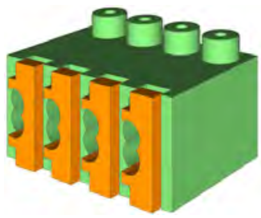


Figure 135. 4-pole connector terminal

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 screwless “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.

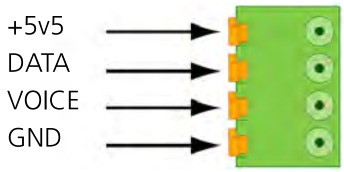


Figure 136. 4-pole connector terminal with the room bus

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

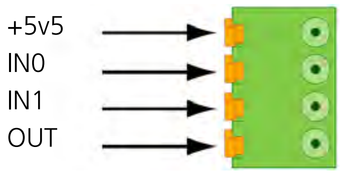


Figure 137. 4-pole connector terminal with the passive bus

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

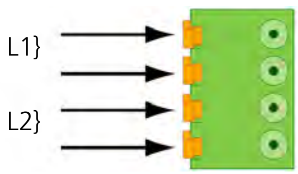


Figure 138. 4-pole connector terminal for the light relay

7.4.2 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 0.5MM² (0.8mmØ).

To connect the wires first strip the jacket from the cables and pull the wires through the housing leaving a length of 150mm free, as described in section 6.3, Preparing the Room Bus and Power Cables on page 42. Then strip 6.5mm of the insulation from the end of each wire which is to be connected.

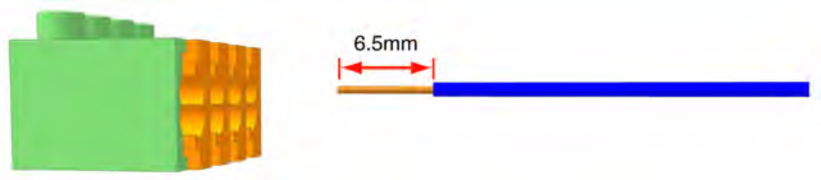


Figure 139. Stripping the wires for insertion in the connection terminal

7.4.3 Connecting the wire in the 4-pole Connector Terminal

After stripping the wire to expose 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 0.5MM² (0.8mmØ).*

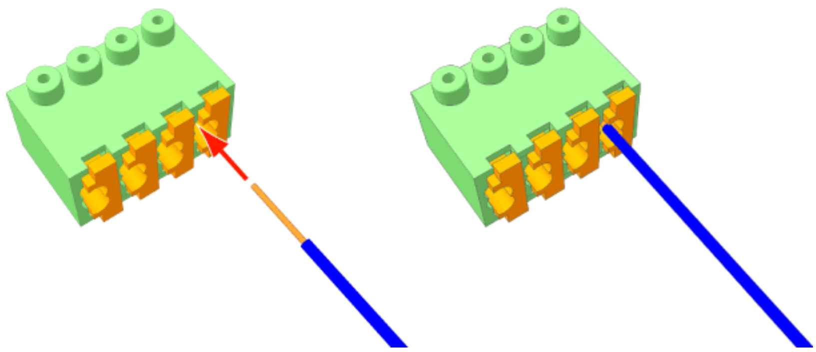


Figure 140. Inserting a wire in the connection point

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.

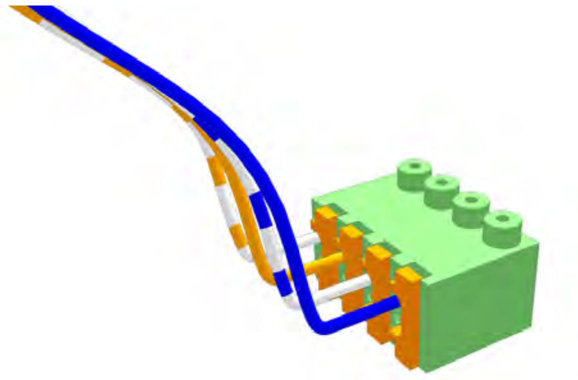


Figure 141. Connector terminal complete with four wires

7.4.4 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:

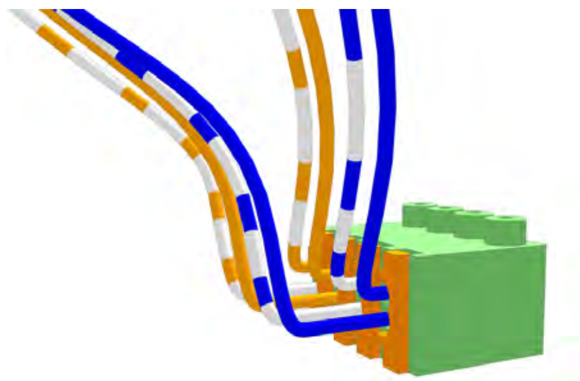


Figure 142. Connector terminal with looped wiring

7.4.5 Disconnecting a Wire from the Connector Terminal

First carefully place the point of a small screw driver (point approximately 2.5mm wide) on the relevant orange coloured 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.

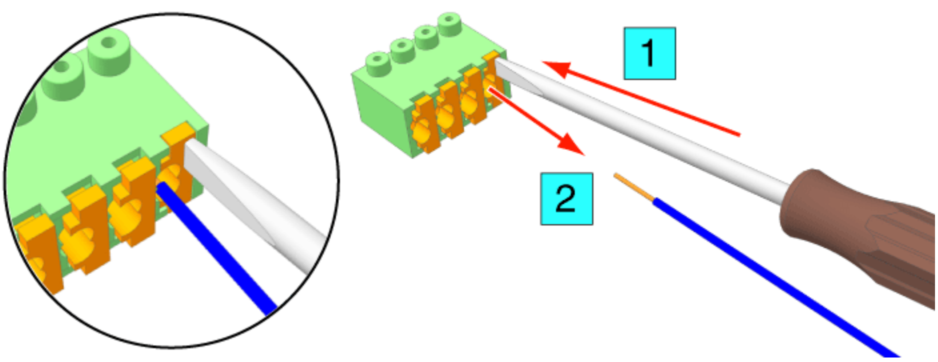


Figure 143. Removing a wire from a connection point

7.4.6 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.

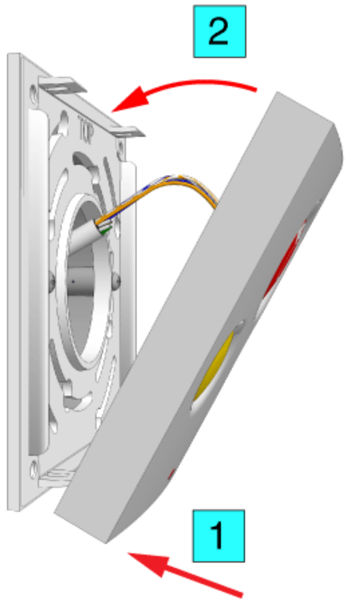


Figure 144. Mounting the switch module on the backplate

7.4.7 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.

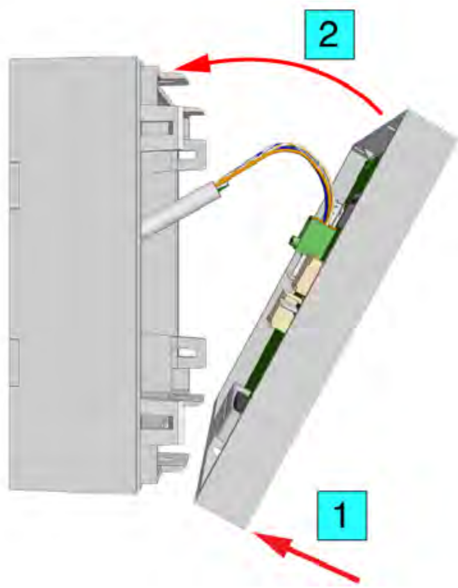


Figure 145. Mounting the switch module on the spacer

7.4.8 Dismantling the Switch Modules

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

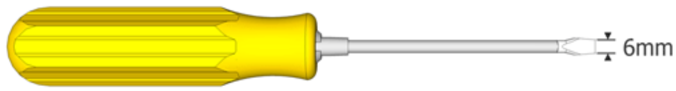


Figure 146. Suitable screwdriver for dismantling switch modules

Insert the point of the screwdriver into the groove at the side of the switch module between the faceplate and the backplate at about 10mm down from one of the top corners.

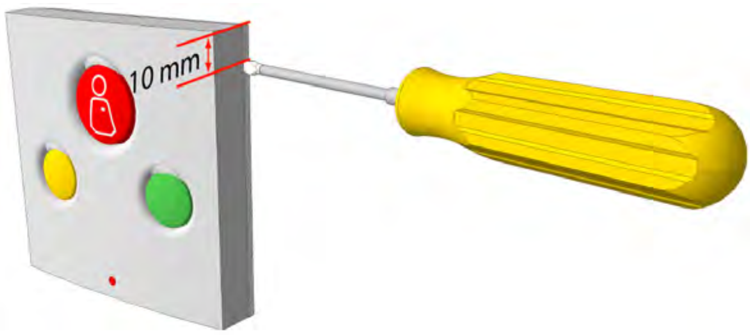


Figure 147. Inserting the screwdriver

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

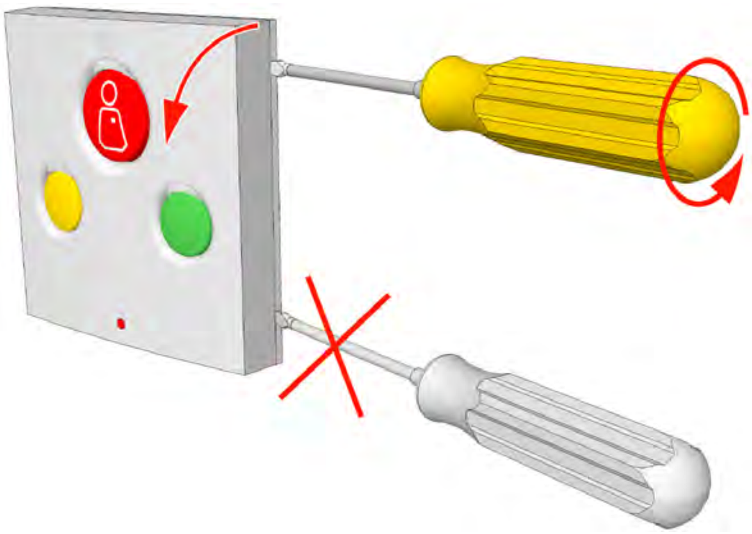


Figure 148. Removing the switch module from the backplate

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

7.4.9 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 10mm down from one of the top corners.

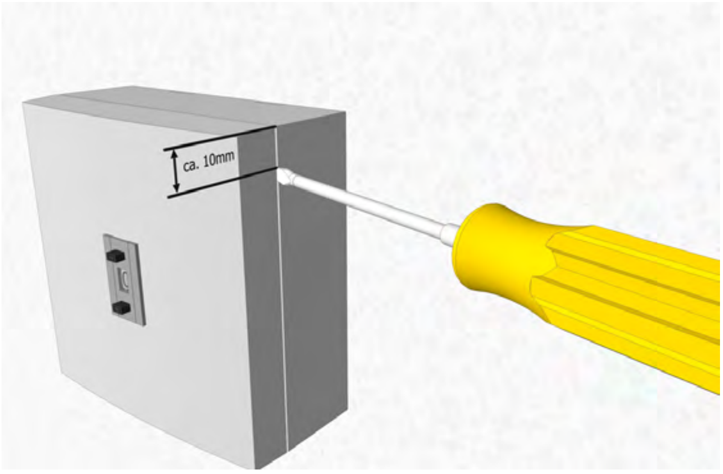


Figure 149. Inserting the screwdriver

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

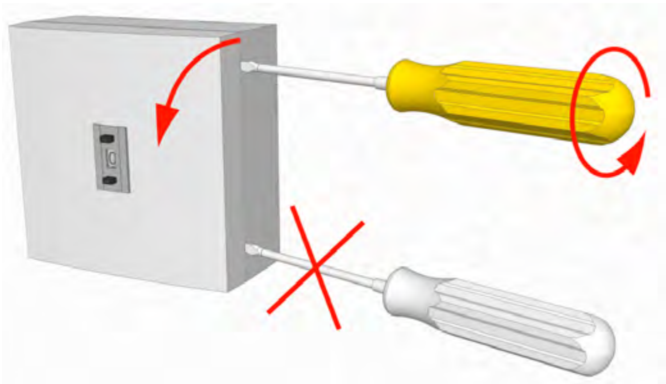


Figure 150. Removing the switch module from the backplate

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

7.4.10 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.

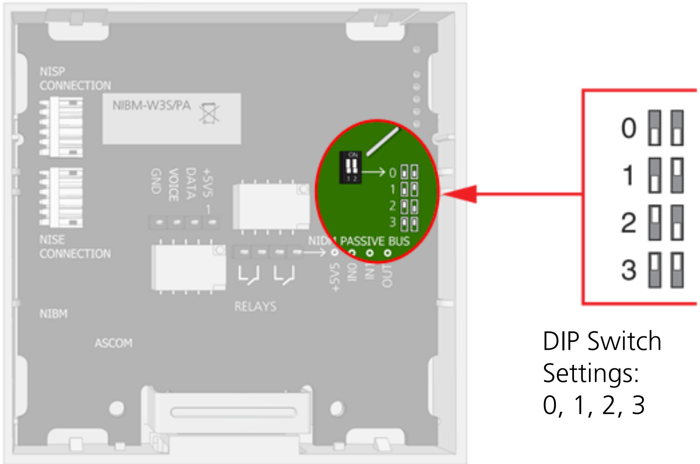


Figure 151. Active switch module DIP switch location

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 and the duty selector. These module have the address fixed and it is not set by a DIP switch. Addresses 6 and 7 are reserved for future extensions.

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

Room Bus Address	**Active Peripheral**	**Address Setting**
0 - 3	Doorside Modules Bedside Modules Pull Cord Modules Customisable Modules Medical Rail Socket	Set by DIP switch
4	Toilet Cancel Module	Fixed
5	Corridor Lamp Duty Selector	Fixed
6	Card reader	Fixed
6 + 7	Room Display	Fixed

7.5 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.

IMPORTANT: *In order to support the bedside module NIBM2 the associated room controller (NIRC) must have firmware 2.70 or higher.*

The NIBM2 has a Safe Release connection socket for the patient 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 152. 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
- Socket extension module or the multi medical alarm module

7.5.1 NIBM2 Electrical Connections and DIP Switch Settings

The Bedside Module (NIBM2) is an “active peripheral” therefore it must be connected to one of the three room buses of a teleCARE IP room controller by the 4-pole room bus connector. The room bus connector includes the 5.5V/DC 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 NIBM requires a single switch module back-plate. Alternatively, a spacer with installation kit is available for surface mounting the NIBM. A double or triple backplate is required when the NIBM is combined with a speech module and/or a socket extension module/multi medical alarm module.

For details of the backplates and surface mounting spacer see 7.3, Backplates and Surface Mounting Spacer on page 98.

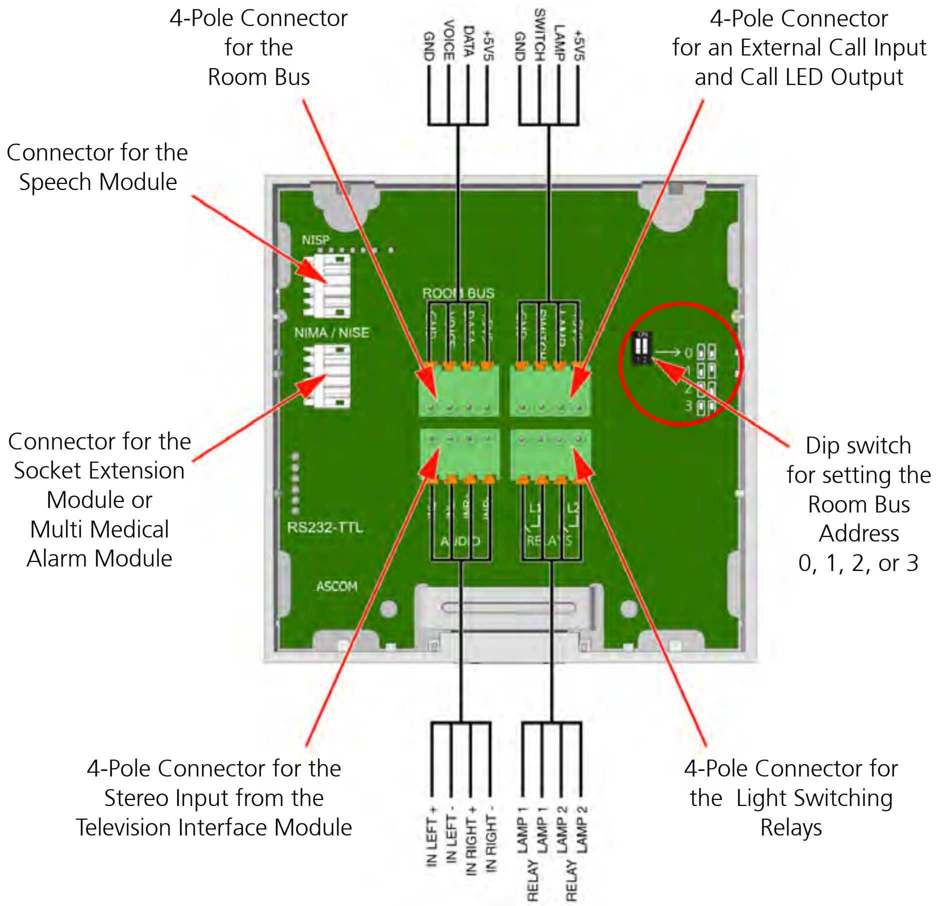


Figure 153. Bedside module NIMB2 electrical connections and address setting

The address is selected using the DIP switch on the switch module printed circuit board. For details of the DIP switch settings see 7.4.10, Dip Switch Settings on page 106.

For details of the 4-Pole connector see 7.4.1, 4-Pole Connector Terminal on page 101.

For light switching relay details see 7.5.2, Light Switching Relay Maximum Load and Surge Damping Diode on page 110.

For details of connecting a speech module see 7.21.1, Connecting the Speech Module on page 152.

For details of connecting the socket extension module see 7.7.1, Socket Extension Module Electrical Connections on page 113.

For details of connecting the multi medical alarm module see 7.25, Multi Medical Alarm Module (NIMA) on page 165.

For details of connecting the external call see 7.5.3, External Call Contact with Call LED Output on page 110.

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.*

7.5.2 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 24 volt DC relay. The maximum switching current for each relay must not exceed 0.4A at max. 30V/DC.

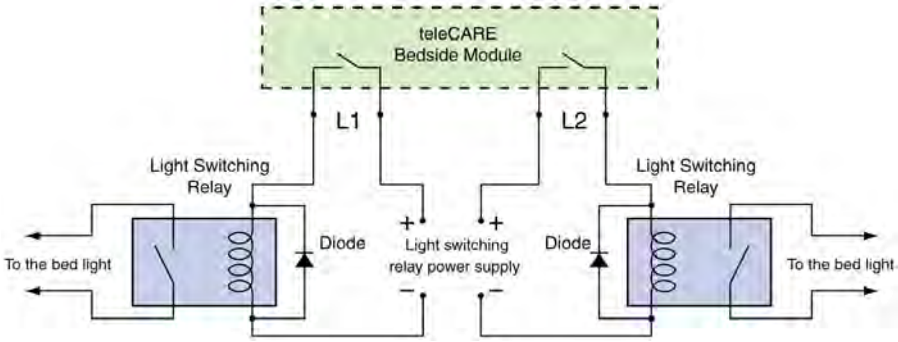


Figure 154. Light switching relay with surge damping diode

IMPORTANT: *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 from interfering with the teleCARE IP system. The following diagram shows a typical example of where to connect the diode:*

7.5.3 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 has a switch contact which is to be connected to a normally open contact. The other side of the normally open contact must be connected to the “GND” terminal of the 4-pole connector.

The call LED output is an open collector output on the “Lamp” connection of the 4-pole connector. The other side of the external LED circuit must be connected to the +5.5V terminal of the 4-pole connector.

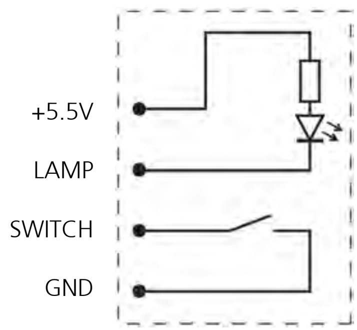


Figure 155. External Call Contact with Call LED

Note: *The maximum acceptable load on the “Lamp” circuit is 50mA.*

Note: *The cable length to the external call device must not exceed 10m and the cable must be appropriately separated from power cables and sources of electromagnetic interference.*

7.6 Bedside Module (NIBM) PHASED OUT

The Bedside Module (NIBM) in available in a single button version and a three button version. Both versions have the same electrical connection requirements. It has a Safe Release connection socket for the patient handset, a 4-pole connector for the room bus, a 4-pole connector for the light switching relay. It also connector for speech module and a connector for a socket extension module.

Figure 156. Bedside module NIBM - 1 button and 3 button front and back view

7.6.1 Bedside Module Electrical Connections and DIP Switch Settings

The bedside module is an "active peripheral" therefore it must be connected to one of the three room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

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 7.4.10, Dip Switch Settings on page 106.

The bedside module has another 4-pole connector for the two sets of relay contact connections which are normally used to control bed lights (see 7.4.1, 4-Pole Connector Terminal on page 101). Both sets of relay contacts (max. switching current: 1A at 30V/DC) are normally open (N/O) and they are potential-free and galvanically isolated.

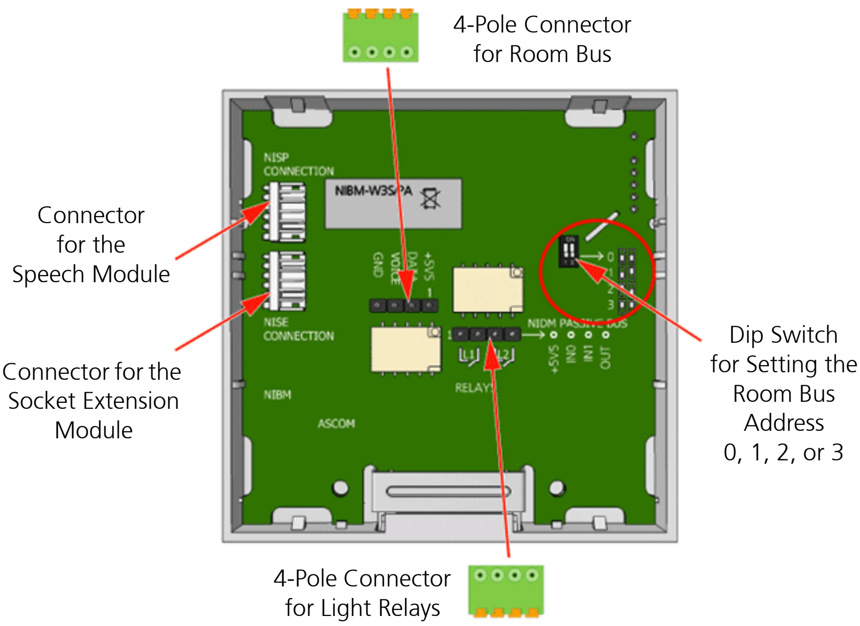


Figure 157. Bedside module NIBM electrical connections and address setting

The bedside module includes a 5-pin connector for the connection of a socket extension module (NISE). For details of the socket extension module refer to "Socket Extension Module Electrical Connections" on page 113.

The bedside module includes a 5-pin connector for the connection of a speech module (NISP). For details of the speech module refer to "Connecting the Speech Module" on page 152.

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

7.6.2 Light Switching Relay Maximum Load and Surge Damping Diode

The teleCARE switch module NIBM with a socket and bed light control include 2 light switching circuits. Each circuit is suitable for switching a bi-stable 24 volt DC external relay. The maximum switching current for each relay must not exceed 1A at max. 30V/DC.

IMPORTANT: *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 from interfering with the teleCARE system. The following diagram shows a typical example of where to connect the diode:*

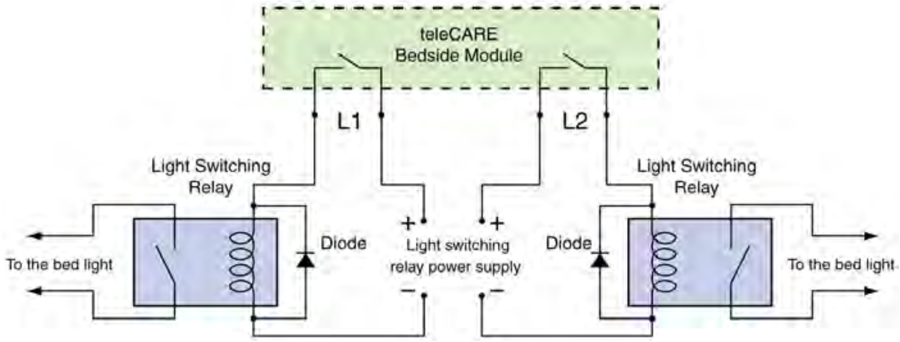


Figure 158. Light switching relay with surge damping diode

7.7 Socket Extension Module (NISE) PHASED OUT

The Socket Extension Module (NISE) is designed to be used in combination with the bedside module. It offers the secure medical alarm function, unintentional disconnect alarm and line break detection. The socket extension module is connected to the bedside module by a modular interconnection cable.

The Socket Extension Module includes a Safe Release Socket for connection of medical or other technical devices. It must be mounted adjacent to a bedside module on a double backplate which must be ordered separately. Alternatively, a spacer with installation kit is available for surface mounting the individual switch modules.

Figure 159. Socket extension module: front and back view

7.7.1 Socket Extension Module Electrical Connections

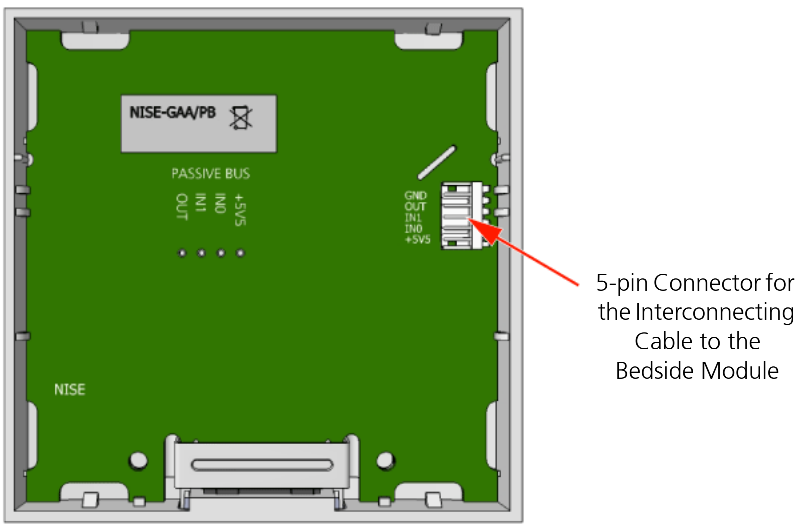


Figure 160. Socket extension module electrical connection

The socket extension module is connected to the bedside module by a 5-wire interconnecting cable which is supplied with the socket extension module.

The following illustration shows how the interconnecting cable is fitted between the bedside module and the extension socket.

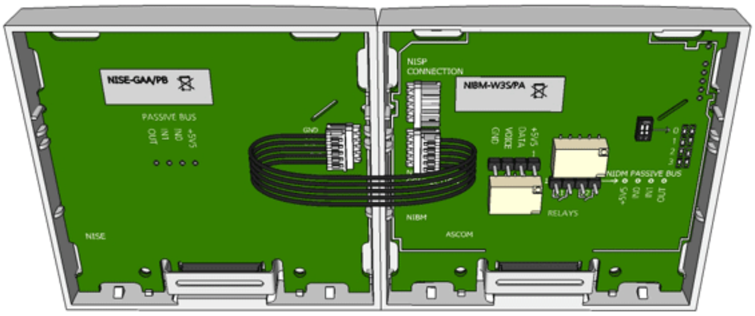


Figure 161. Socket extension connected to the bedside module

7.7.2 Connecting a Medical Device to the Socket Extension Module

The teleCARE Secure Medical Alarm Cable (R190300A or R190301A) is used to connect medical devices which have potential-free, normally open alarm contacts to the socket extension module.

Two of the wires at the open end of the cable are to be connected to the alarm contacts of the medical device and the plug of the medical alarm cable is plugged into the socket extension module.

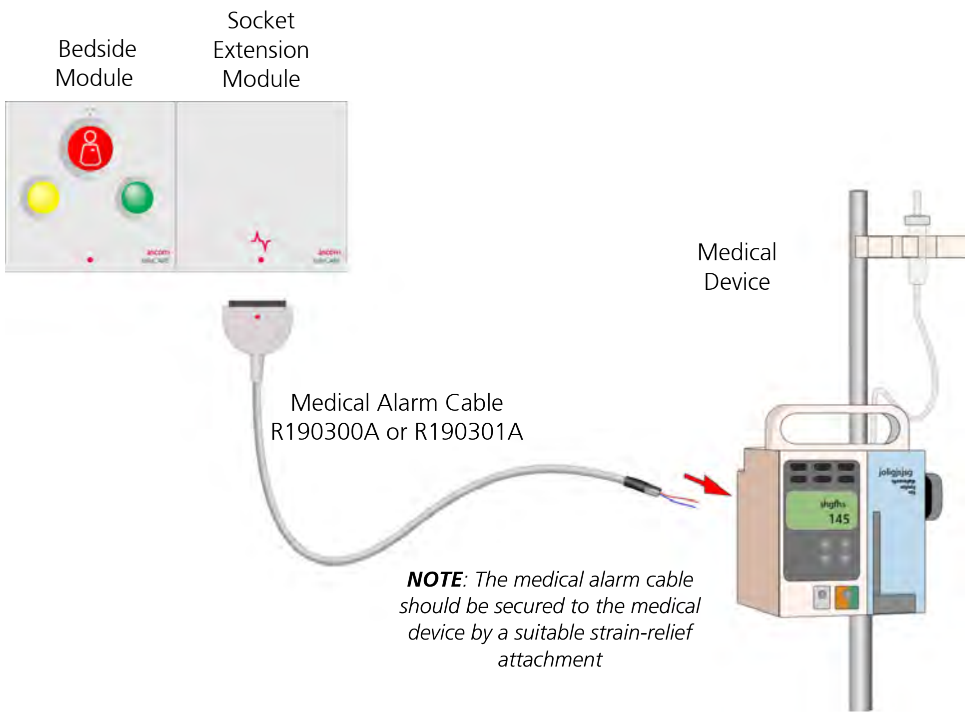


Figure 162. Connecting a medical device to the socket extension module

IMPORTANT: *The medical alarm cable should only be plugged into the socket extension module. It must not be plugged into the bedside module.*

7.7.3 Medical Alarm Cable R190300A or R190301A

The medical alarm cable R190300A (grey) or R190301A (white) must be used to connect medical devices to the teleCARE IP socket extension module.

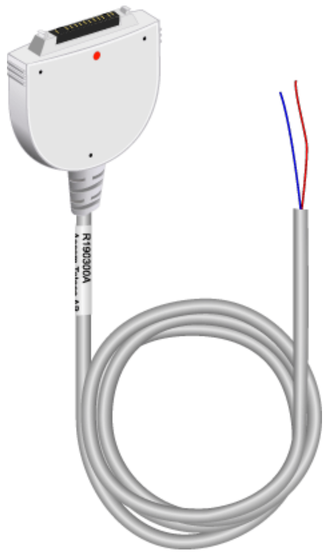


Figure 163. Medical alarm cable R190300A and R190301A

The red and blue wires of the medical alarm cable should be connected across the normally open, potential free, alarm output contact of the medical device.

7.7.4 Line Break Detection

Line break detection requires an end of line resistor to be connected across the potential free alarm contact of the medical device. This resistor monitors the connection to the medical device for line breaks and disconnection.

Line Break Detection using a Change-Over Contact

The end of line resistor with a value of 22KΩ/¼W is connected between the normally open and the normally closed change-over contacts of the medical device. This is the recommended line break detection method because the connection of the medical device is reliably monitored, as well as the medical alarm cable.

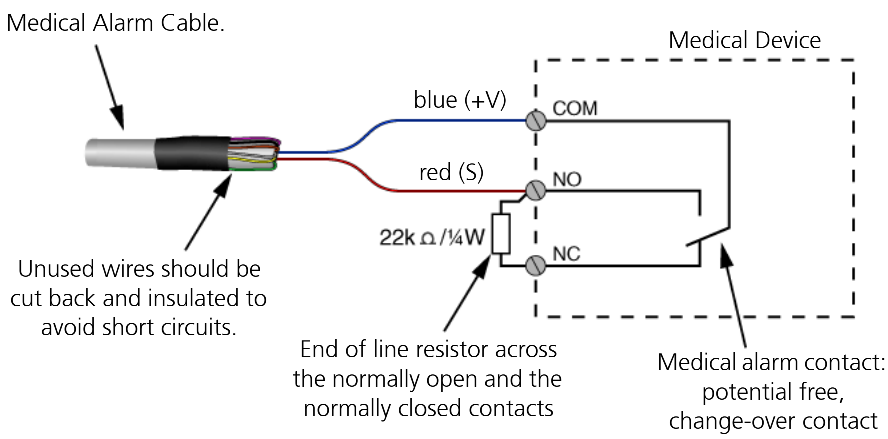


Figure 164. Medical alarm cable and the end of line resistor

Line Break Detection using a Normally Open Contact

The end of line resistor with a value of 22KΩ/¼W is connected across the normally open of the medical device.

WARNING: *This line break detection method offers limited protection because it is possible for the disconnection of the medical device to go undetected.*

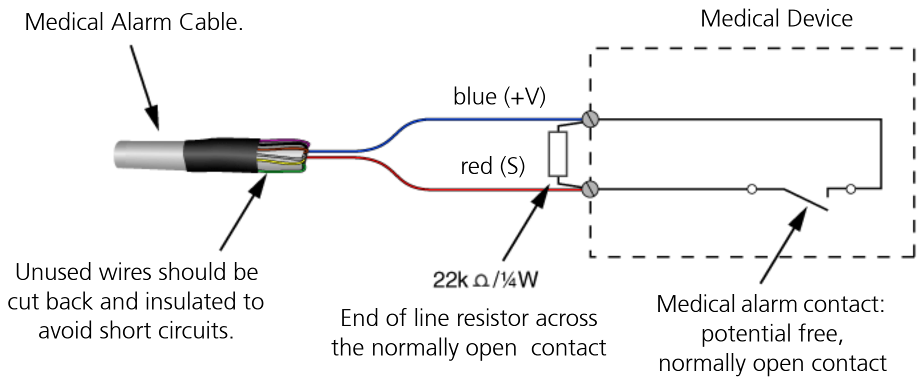


Figure 165. Medical alarm cable and the end of line resistor

7.8 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.

IMPORTANT: *In order to support the medical rail socket NIMS2 the associated room controller (NIRC) must have firmware 2.70 or higher.*

Figure 166. 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 5.5V/DC 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 NIMS2 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
- Socket extension module or the multi medical alarm module

7.8.1 NIMS2 Electrical Connections and DIP Switch Settings

The medical rail socket (NIMS2) is an “active peripheral” which must be connected to one of the three room buses of a teleCARE IP room controller by the 4-pole room bus connector. The room bus connector includes the 5.5V/DC 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 7.4.10, Dip Switch Settings on page 106.

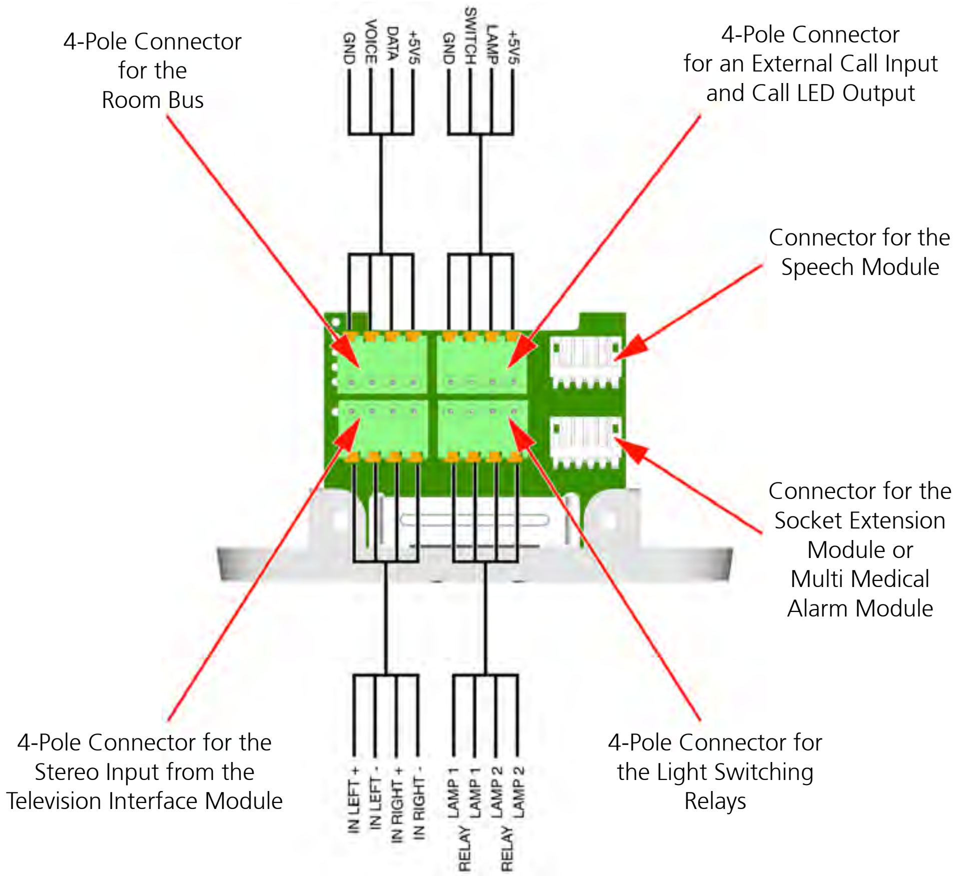


Figure 167. Medical Rail Socket NIMS2 electrical connections and address setting

For details of the 4-Pole connector see 7.4.1, 4-Pole Connector Terminal on page 101.

For light switching relay details see 7.5.2, Light Switching Relay Maximum Load and Surge Damping Diode on page 110.

For details of connecting a speech module see 7.21.1, Connecting the Speech Module on page 152.

For details of connecting the multi medical alarm module see 7.25, Multi Medical Alarm Module (NIMA) on page 165.

For details of connecting the socket extension module see 7.7.1, Socket Extension Module Electrical Connections on page 113.

For details of connecting the external call see 7.5.3, External Call Contact with Call LED Output on page 110.

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.*

7.8.2 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 7.4.10, Dip Switch Settings on page 106.

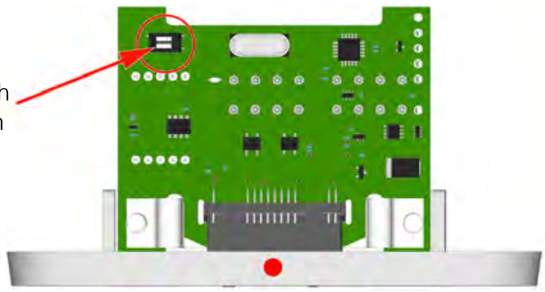


Figure 168. NIMS2 DIP switch

7.8.3 Light Switching Relay Maximum Load and Surge Damping Diode

The medical rail socket NIBM2 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 0.4A at maximum 30V/DC (>60V peak).

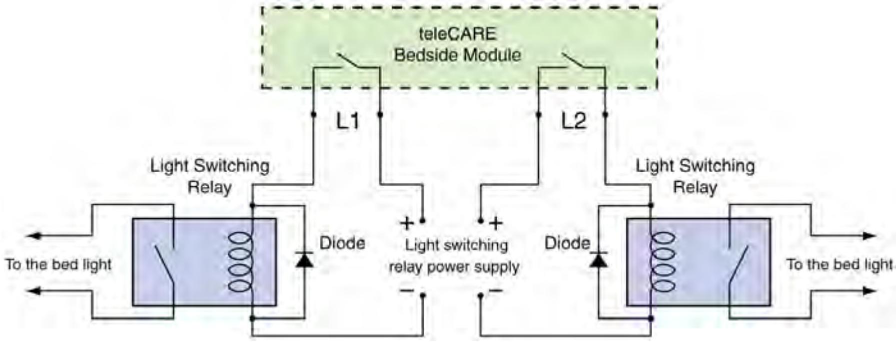


Figure 169. Light switching relay with surge damping diode

IMPORTANT: *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 from interfering with the teleCARE IP system. The following diagram shows a typical example of where to connect the diode:*

7.8.4 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 patient handset.

The 4-pole connector has a switch contact which is to be connected to a normally open contact. The other side of the normally open contact must be connected to the “GND” terminal of the 4-pole connector.

The call LED output is an open collector output on the "Lamp" connection of the 4-pole connector. The other side of the external LED circuit must be connected to the +5.5V terminal of the 4-pole connector.

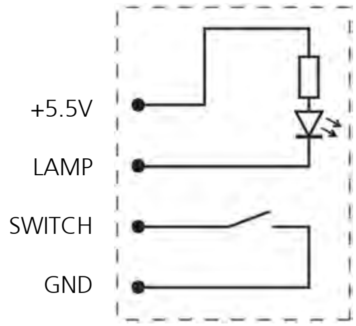


Figure 170. External Call Contact with Call LED

Note: *The maximum acceptable load on the "Lamp" circuit is 50mA.*

Note: *The cable length to the external call device must not exceed 10m and the cable must be appropriately separated from power cables and sources of electromagnetic interference.*

7.8.5 Mounting the Medical Rail Socket

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

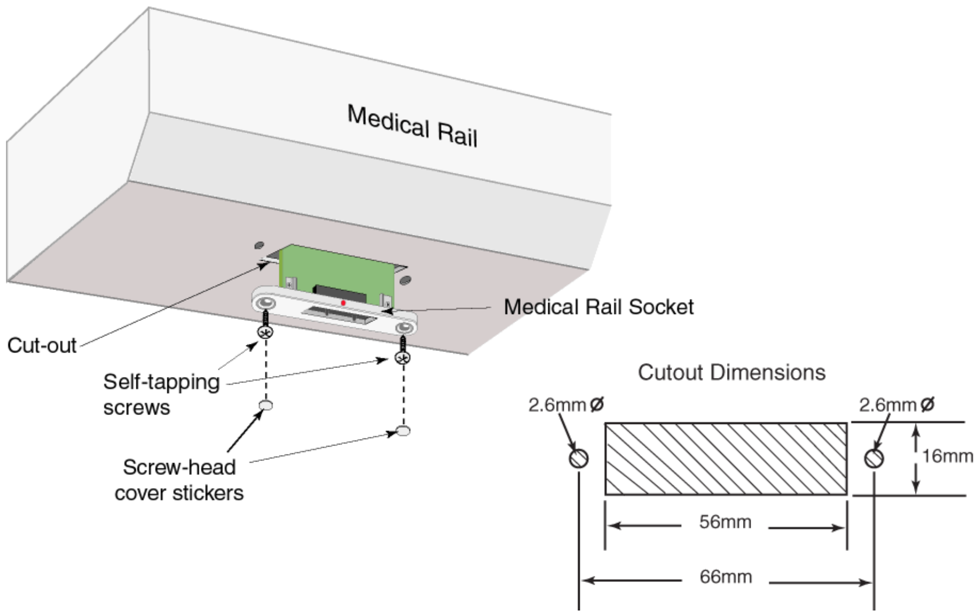


Figure 171. Medical rail socket mounting and cutout dimensions

7.9 Medical Rail Socket (NIMS) PHASED OUT

The teleCARE IP medical rail socket is designed to be flush mounted in medical rails through a cutout in the underside or front of the medical rail.

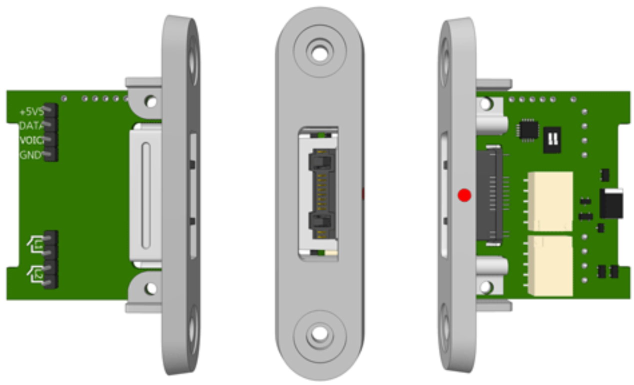


Figure 172. Medical rail socket: top, front and bottom view

The medical rail socket is functionally compatible with the teleCARE IP bedside module. It includes the teleCARE Safe Release Socket and it contains two light switching relays.

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

Note: *The teleCARE IP medical rail socket (NIMS) is not compatible with the teleCARE M medical rail socket (NPMR1)*

7.9.1 Medical Rail Socket Electrical Connections and DIP Switch Settings

The medical rail socket is an "active peripheral" therefore it must be connected to one of the three room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

The room bus address of the medical rail socket is selected using the DIP switch on the bottom side of the printed circuit board. For details of the DIP switch settings see 7.4.10, Dip Switch Settings on page 106.

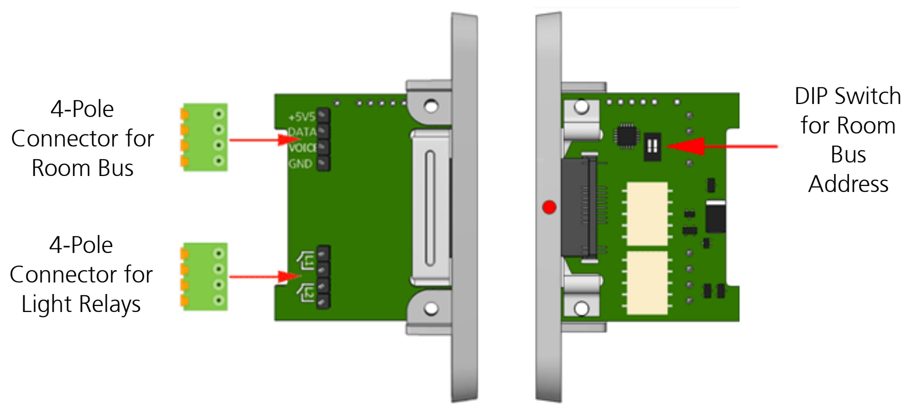


Figure 173. Medical rail socket electrical connections and DIP switch

7.9.2 Light Switching Relay Maximum Load and Surge Damping Diode

The medical rail socket NIBM 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 1A at max. 30V/DC.

IMPORTANT: *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 from interfering with the teleCARE system. The following diagram shows a typical example of where to connect the diode:*

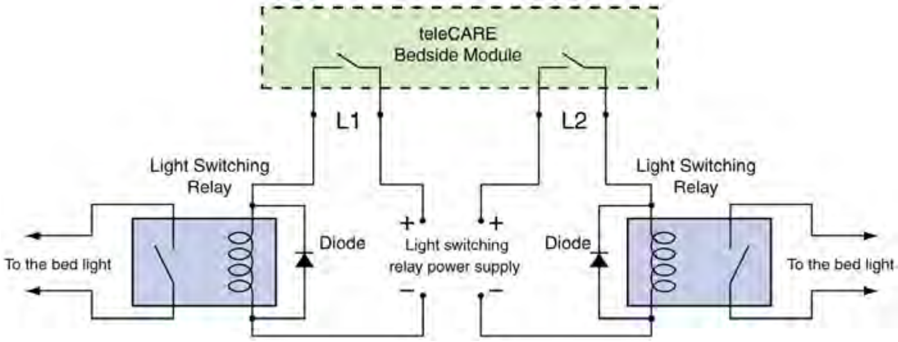


Figure 174. Light switching relay with surge damping diode

7.9.3 Mounting the Medical Rail Socket

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

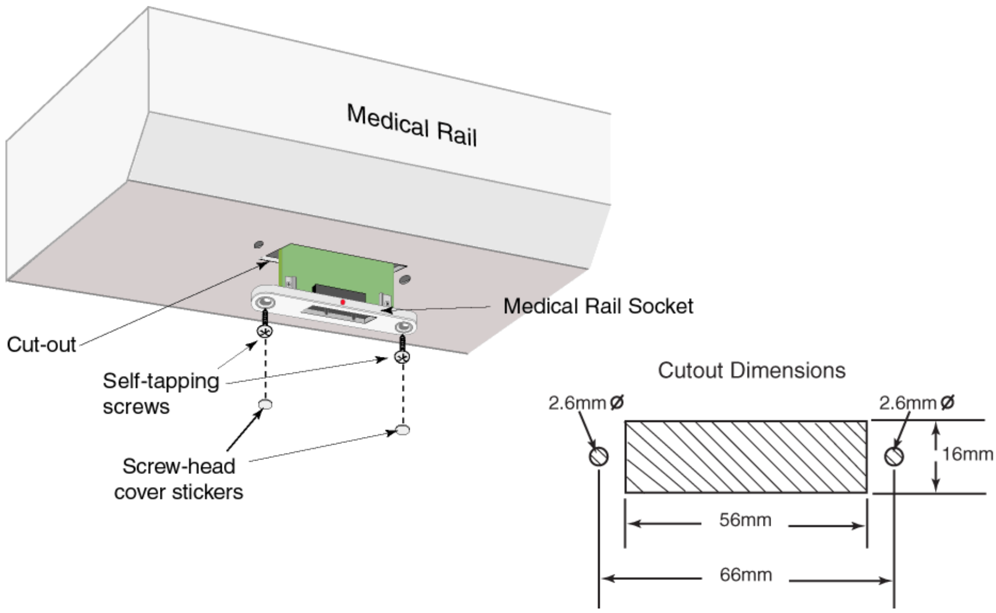


Figure 175. Medical rail socket mounting and cutout dimensions

7.10 Doorside Module (NIDM)

The Doorside 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.

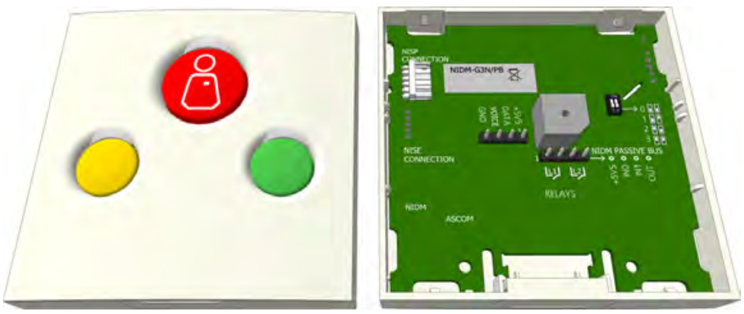


Figure 176. Doorside module: front and back view

7.10.1 Doorside Module Electrical Connections and DIP Switch Settings

The Doorside (NIDM) Module is an “active peripheral” therefore it must be connected to one of the three room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

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 doorside 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.*

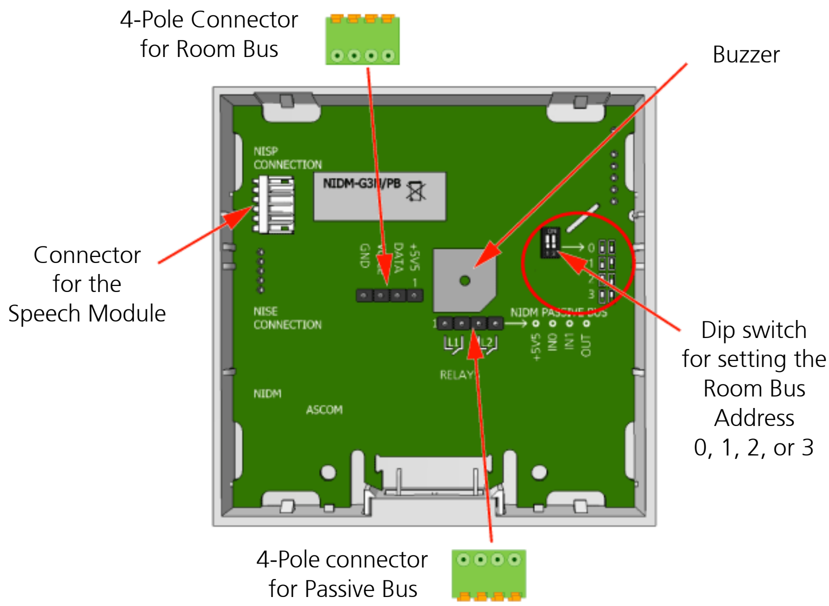


Figure 177. Doorside module electrical connections and address setting

The NIDM has a 5-pin connector for connecting a speech module. Refer to 7.21.1, Connecting the Speech Module on page 152 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.

7.11 Customisable Module NICM-A3A and NICM-A1A

The Customisable Module (NICM) is an active module which can be adapted to suit special requirements. It can be assembled as a 1 button module or a 2 button module. Only the printed circuit board is supplied when the customisable module is ordered. The cover plate and the required buttons must be ordered separately and the parts must assembled before the module is installed.

Each button has an LED which indicates when the button is in the active condition. LEDs also permanently emit a low intensity light for night locating in the dark. All models of the NICM have a connector for a speech module and connector for a socket extension module.

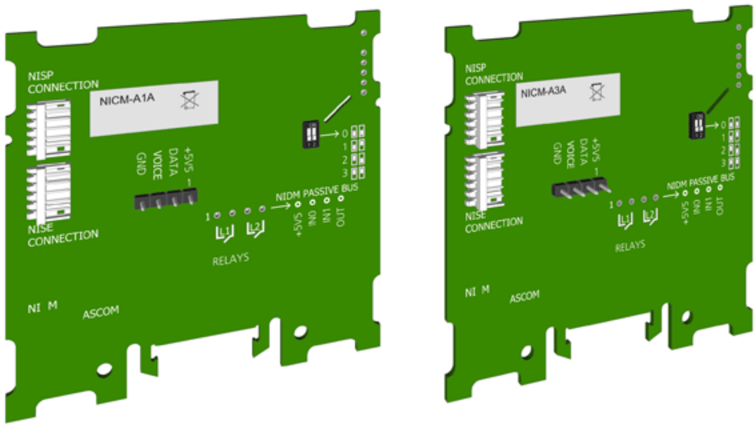


Figure 178. NICM-A1A and NICM-A3A customisable module

The customisable module is connected to one of the room bus of the IP Room Controller. The address is set by a DIP switch on the PCB. There is a 5-pin connector for a speech module and another 5-pin connector for a socket extension module.

The customisable module requires a single backplate which must be ordered separately. The backplate enables this switch module to be mounted over different types of backboxes. Alternatively, a surface mounting spacer with installation kit is available.

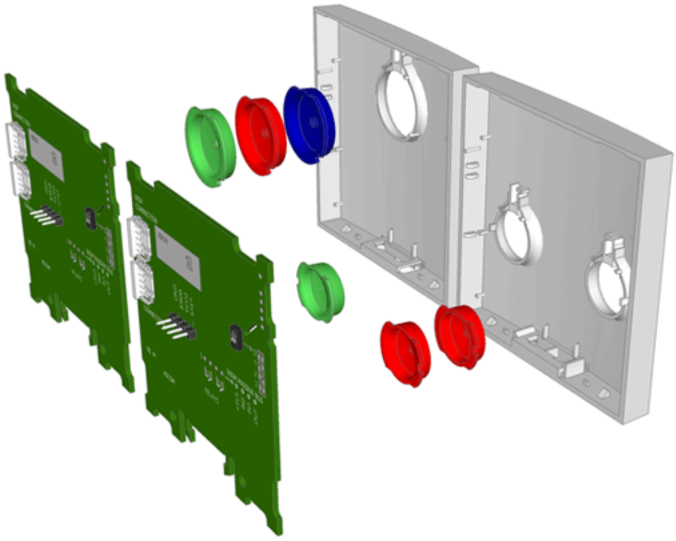


Figure 179. NICM customisable module assembly options

7.11.1 Customisable Module Options

The NICM-A1A has one button at the top with a red LED. The NICM-A1A can be customised as a 1 button module with a large red call button with a red LED or a large code blue button with a red LED. The functions of the buttons are determined by the system configuration.

The NICM-A3A has three buttons with a green LED at the top button, a red LED at the left button and a green LED at the right button. The NICM-A3A can be customised as a 2 button call/cancel module with a red and a green LED or as a 1 button module with a large green cancel button with green LED. The functions of the buttons are determined by the system configuration.

The following illustrations show the various customisable combinations with the article numbers of the required parts. Refer to the Customisable Module data sheet (TD 92577EN) for further details of the article numbers of the items which can be ordered.

Customisable Module with 1 red call button
Articles required:
NICM-A1A = Printed circuit board
660228: Cover 1-button - gray (NCS S2005 - R80B)
660229: Cover 1-button - white (NCS S 0603-G80Y)
660234 = Red button (large with nurse symbol)

Customisable Module with 1 blue call button
Articles required:
NICM-A1A = Printed circuit board
660228: Cover 1-button - gray (NCS S2005 - R80B)
660229: Cover 1-button - white (NCS S 0603-G80Y)
660236 = Blue button (large + white cross)

Customisable Module with 1 green call button
Articles required:
NICM-A3A = Printed circuit board
660228: Cover 1-button - gray (NCS S2005 - R80B)
660229: Cover 1-button - white (NCS S 0603-G80Y)
660235 = Green button (large)

Customisable Module with 1 red call button
and 1 green cancel button
Articles required:
NICM-A3A = Printed circuit board
660230 = Cover 2 button, gray (NCS S2005 - R80B)
660231 = Cover 2 button, white (NCS S 0603-G80Y)
660237 = red button (small + nurse symbol)
660238 = green cancel button

Customisable Module with 1 red call button
and 1 green cancel button
Articles required:
NICM-A3A = Printed circuit board
660230 = Cover 2 button, gray (NCS S2005 - R80B)
660231 = Cover 2 button, white (NCS S 0603-G80Y)
660242 = red button (small + heart beat symbol)
660238 = green cancel button

7.11.2 Customisable Module Electrical Connections and DIP Switch

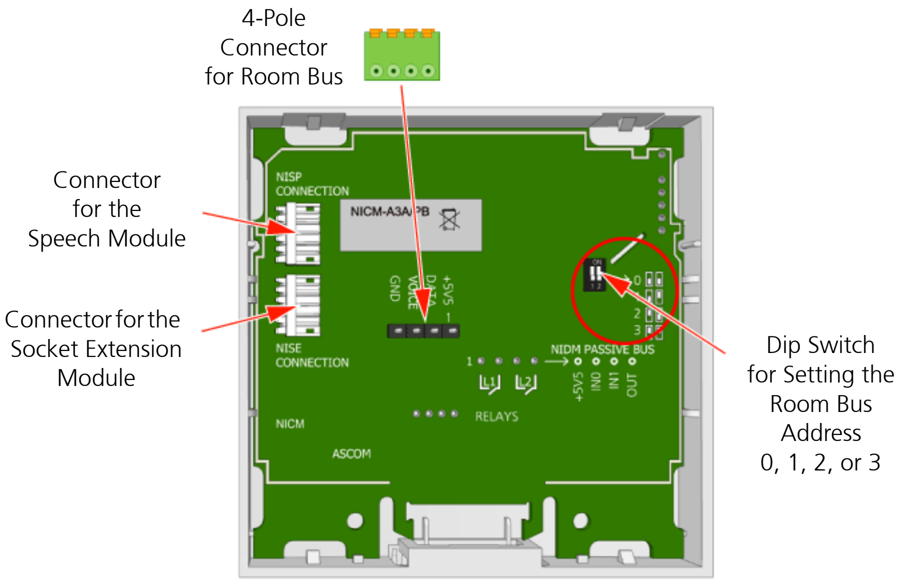


Figure 180. Customisable module electrical connections and DIP switch

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

For details of connecting a speech module refer to 7.21.1, Connecting the Speech Module on page 152

For details of connecting a socket extension module refer to 7.7.1, Socket Extension Module Electrical Connections on page 113

7.12 Pull Cord Module - Active (NIPC-G3A and 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 three room buses of a teleCARE IP room controller.

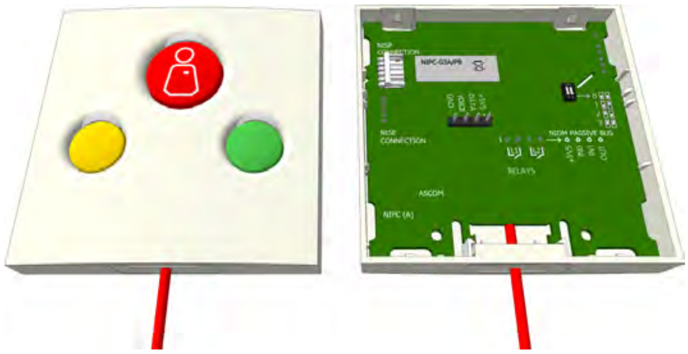


Figure 181. Pull cord module (active)

The NIPC has a 4-pin connector for the room bus, a 5-pin connector for the multi medical alarm module and a 5-pin connector for speech module.

Note: *The 5-pin connector (NISE) is used to connect the multi medical alarm module (NIMA).*

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.

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 backboxes. Alternatively, a spacer with installation kit is available for surface mounting the switch module.

A clear plastic wet area cover (WAC) is available which must be ordered separately. The WAC gives water ingress protection up to IPX3. It fits over the switch module and is sealed with silicone sealant (see 7.13, Wet Area Cover (WAC) on page 130).

7.12.1 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 three room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

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 7.21.1, Connecting the Speech Module on page 152

For details of connecting a multi medical alarm module refer to 7.25, Multi Medical Alarm Module (NIMA) on page 165

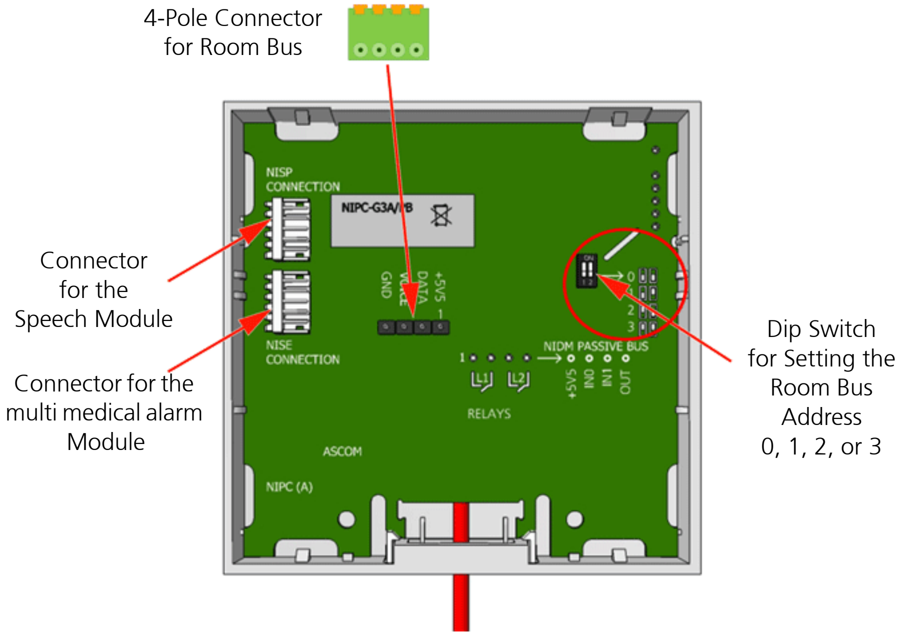


Figure 182. Pull cord module electrical connections and address setting

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.*

7.12.2 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:

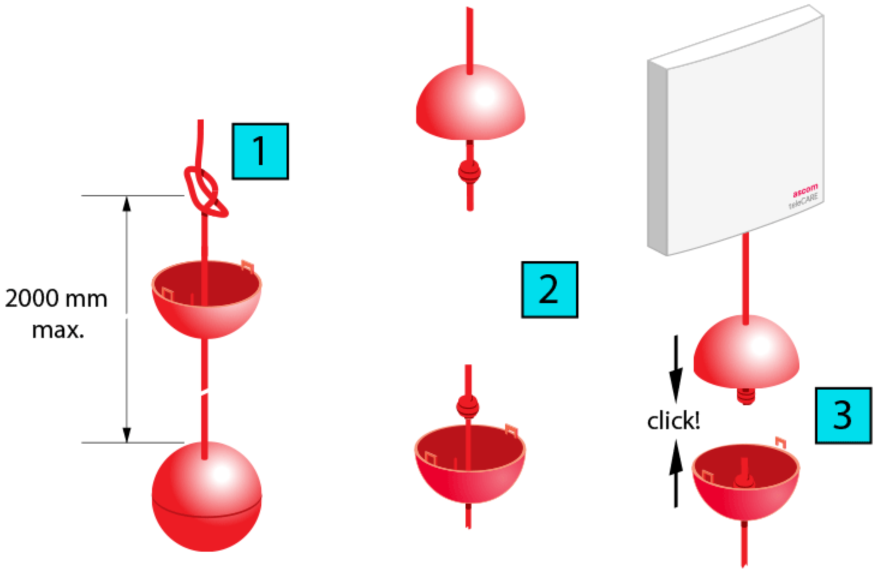


Figure 183. Assembling and attaching the pull cord

7.13 Wet Area Cover (WAC)

The Wet Area Cover (WAC) is used only on single teleCARE switch modules which are used in areas where there is a risk of ingress of water (such as bathrooms).

The WAC is made of transparent, flexible plastic and it serves as a water resistant membrane for switch modules. It can also be used on the pull cord switch modules and for this application this is a small hole and slit on the bottom edge through which the cord can pass. The WAC is placed over the single switch module or pull cord switch and then sealed using transparent silicone bathroom sealant, as shown in the illustration below:

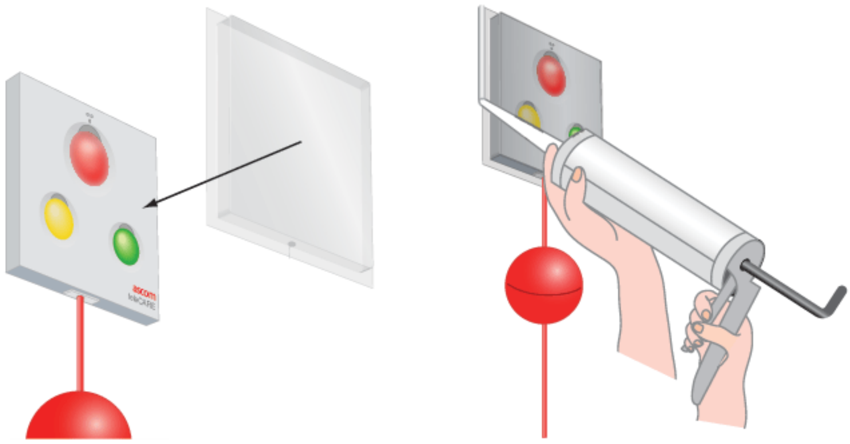


Figure 184. Wet Area Cover (WAC)

Note: *If the WAC is used over doorside switch modules with a buzzer, the loudness of the buzzer will be reduced by approx.-2dB at 1 metre, depending on the surrounding materials. The WAC is not suitable for use on switch modules with a socket and it must not be used on switch modules mounted on a spacer.*

7.14 Toilet Cancel Module - Active (NITC-XXA)

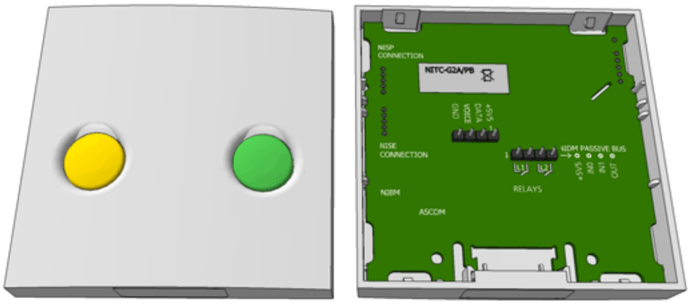


Figure 185. Toilet cancel module (active)

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 backboxes. Alternatively, a spacer with installation kit is available for surface mounting .

7.14.1 Toilet Cancel Module (Active) Electrical Connections

The toilet cancel module is an "active peripheral" therefore it must be connected to one of the three room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

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 7.15.1, Pull Cord Module (Passive) Electrical Connections on page 132).

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

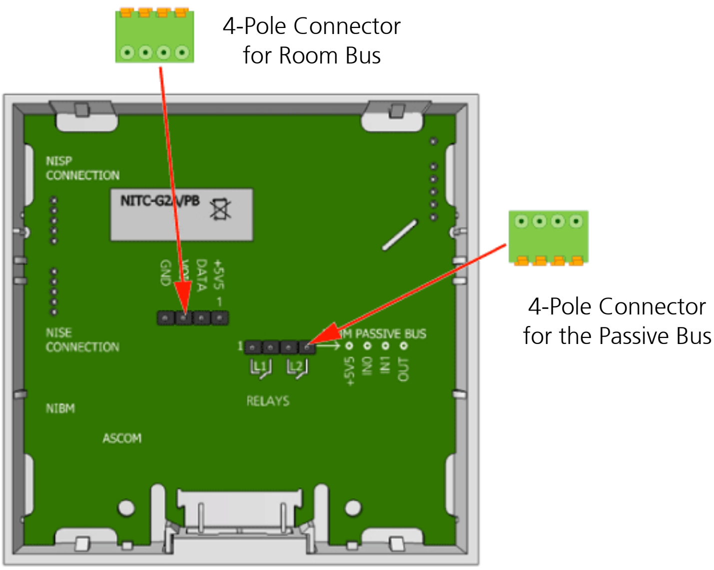


Figure 186. Toilet cancel module electrical connections

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

7.15 Pull Cord Module - Passive (NIPC-XXP)

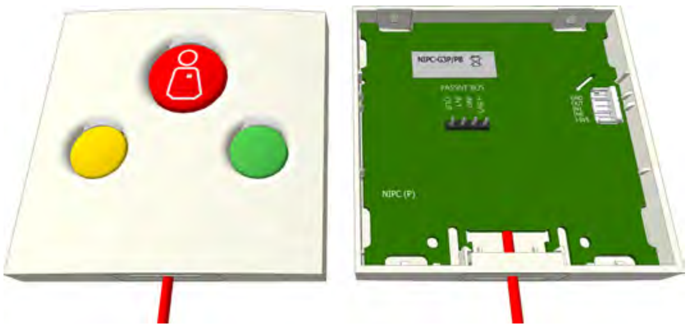


Figure 187. Passive pull cord module 3 buttons

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 doorside module or active pull cord cancel module. When connected to the doorside module, it can be combined with the passive toilet cancel module on the same passive bus. The passive bus consists of four wires (see 7.4.1, 4-Pole Connector Terminal on page 101).

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

For assembly and attaching instructions for the pull cord refer to 7.12.2, Assembling and Attaching the Pull Cord on page 129.

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 backboxes. Alternatively, a spacer with installation kit is available for surface mounting.

A clear plastic wet area cover (WAC) is available which gives water ingress protection up to IPX3. It fits over the switch module and is sealed with silicone sealant (see 7.13, Wet Area Cover (WAC) on page 130) for details.

7.15.1 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 doorside module or active pull cord module by the 4-pole passive bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

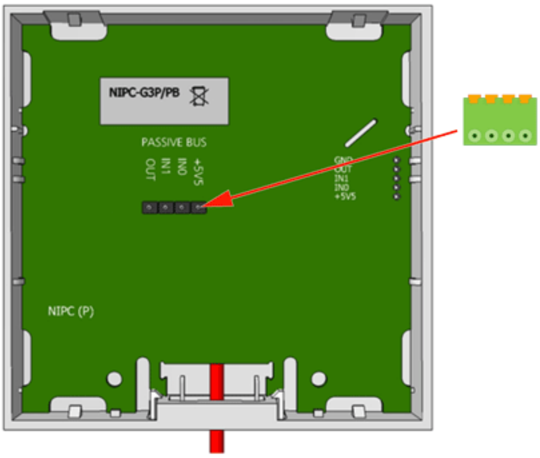


Figure 188. Passive pull cord module electrical connections

7.16 Toilet Cancel Module - Passive (NITC-XXP)

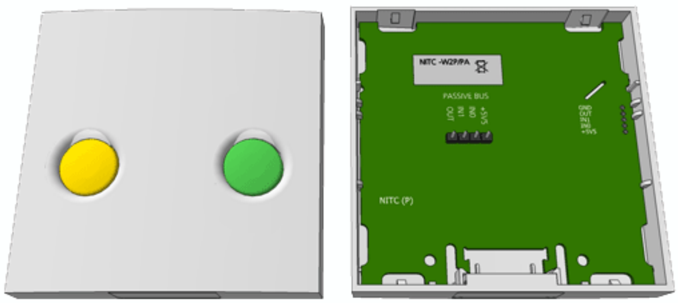


Figure 189. Passive toilet cancel module

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 doorside 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 backboxes. Alternatively, a spacer with installation kit is available for surface mounting the switch module.

A clear plastic wet area cover (WAC) is available which gives water ingress protection up to IPX3. It fits over the switch module and is sealed with silicone sealant (see 7.13, Wet Area Cover (WAC) on page 130) for details.

7.16.1 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 doorside module by the 4-pole passive bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

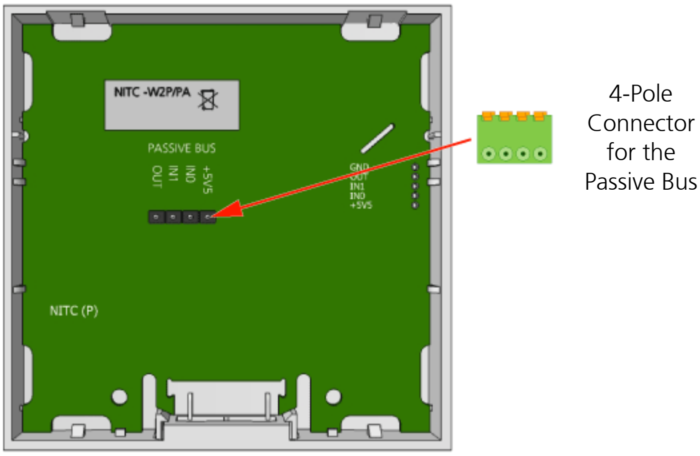


Figure 190. Passive toilet cancel module electrical connections

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.*

7.17 Pull Cord Module (NIPC2) IP44

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

The NIPC2 is available in grey or white and has a pull cord of length 2 meter 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 191. 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: +5V5, 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 doorside module, a room display or a toilet cancel module. It has a 4-pin connector for the connection of the passive bus, consisting of: +5V5, 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.

IMPORTANT: *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.*

7.17.1 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 in the “Zone 3”area 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 patients or staff in an emergency or when assistance is required.

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

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

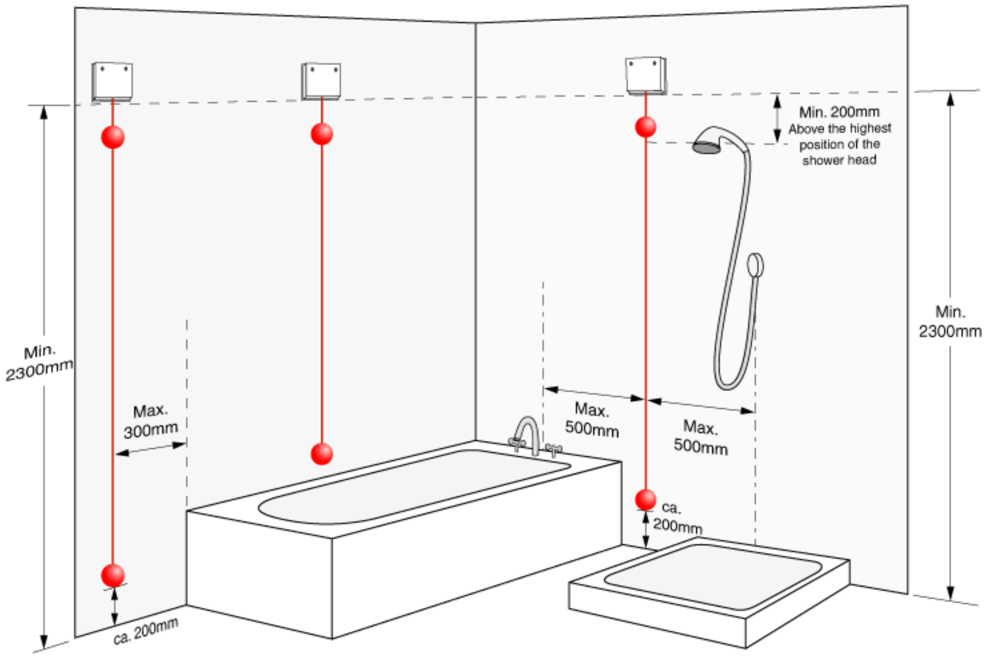


Figure 192. Examples of suitable locations for mounting the NIPC2

7.17.2 Positioning the Backbox 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 centre of a tile so that the pull cord module backplate does not sit over a gap between tiles, as shown in the following illustration:

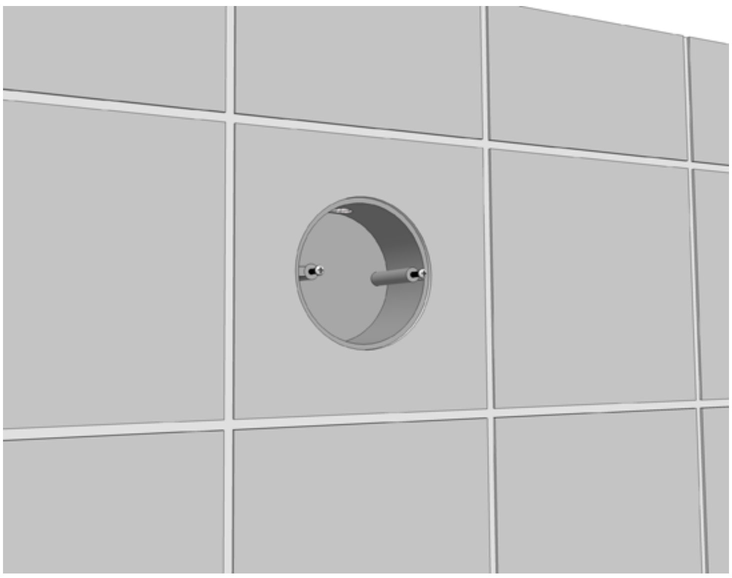


Figure 193. Positioning the back box on a tiled wall

7.17.3 NIPC2 Backplate

The NIPC2 backplate 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 backplate the switch module conforms to the ingress protection rating of IP44.

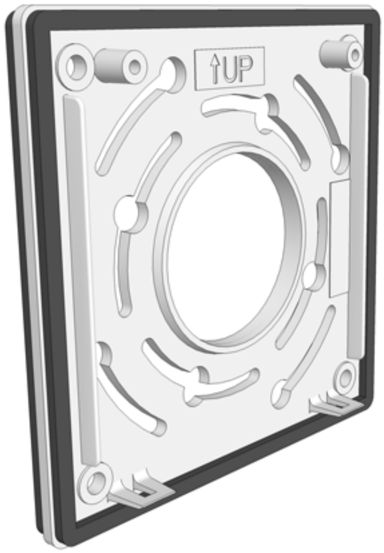


Figure 194. NIPC2 backplate

7.17.4 Mounting the NIPC2 Backplate

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

IMPORTANT: *The screws inside the backbox 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.*

7.17.5 Drilling the Backplate Mounting Holes

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

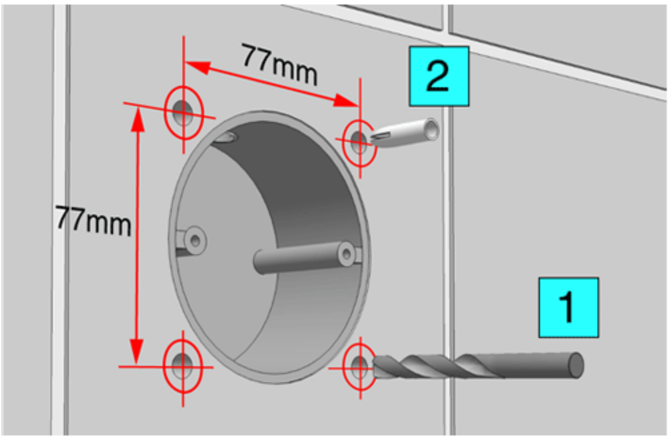


Figure 195. Drilling the backplate mounting holes

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 3.8mm.*

7.17.6 Mounting the Backplate on the Wall

The backplate should be placed over the backbox, 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.

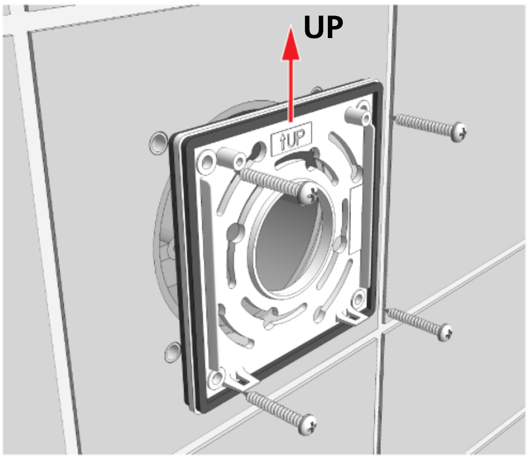


Figure 196. Fixing the backplate to the wall

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.

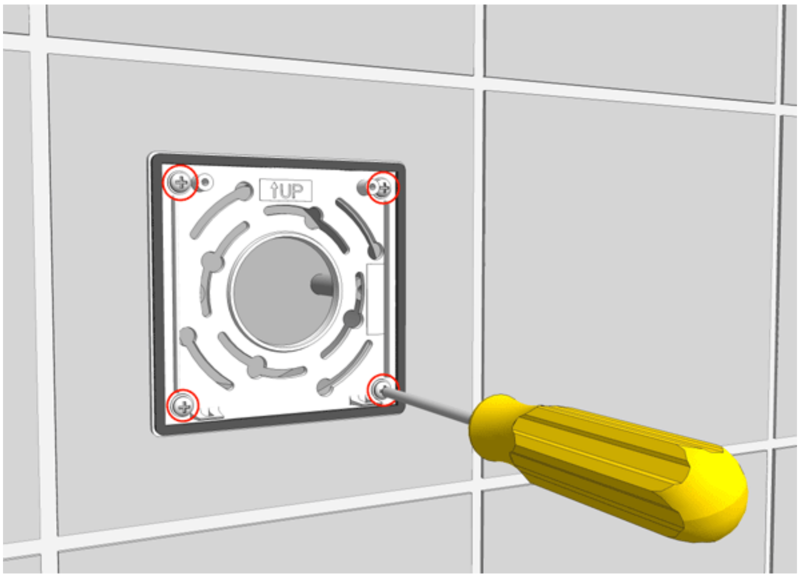


Figure 197. Fixing the backplate to the wall

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

7.17.7 Preparing the Cable for the Pull Cord Module

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

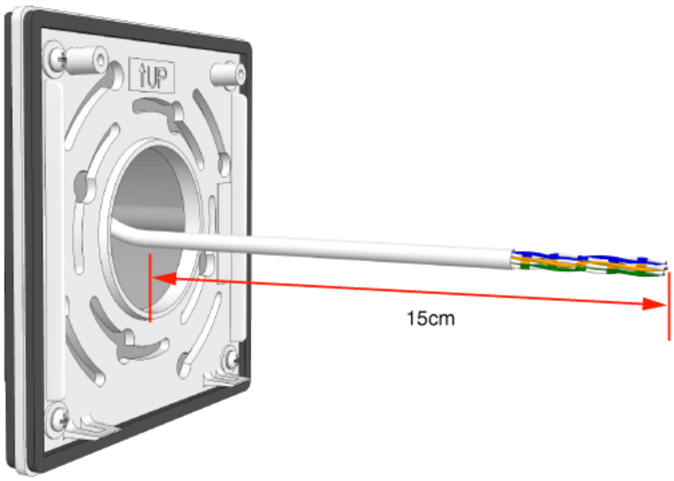


Figure 198. Preparing the cable for the pull cord module

7.17.8 Room Bus Electrical Connections

The NIPC2 GAA and NIPC2 WAA are active teleCARE IP peripherals which must be connected to the 4-pin room bus connector on the switch module.

Refer to section 7.4.2, Preparing the Wires for the 4-pole Connector Terminal on page 102). 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.

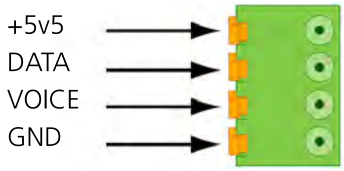


Figure 199. 4-pole connector terminal with the room bus

7.17.9 Room Bus Address DIP Switch Settings

The NIPC2 (GAA and WAA) 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.

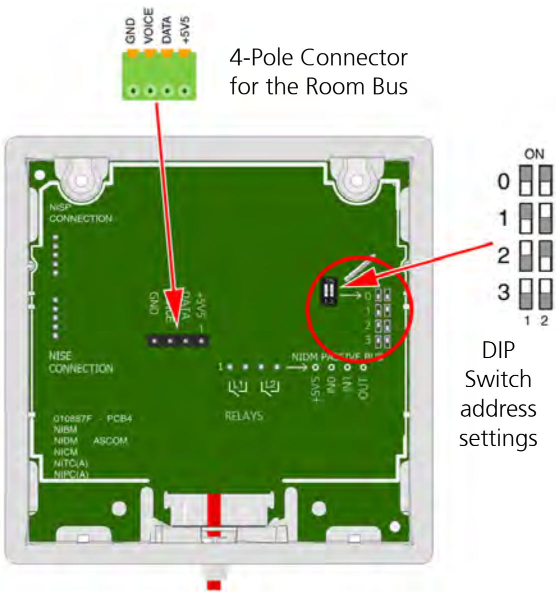


Figure 200. Room bus connector and DIP switch location

7.18 Passive Pull Cord Module Electrical Connections

The NIPC2 GAP and NIPC2 WAP are passive teleCARE IP peripherals which must be connected to the passive bus of a door side module or a toilet cancel module.

Refer to section 7.4.2, Preparing the Wires for the 4-pole Connector Terminal on page 102). 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.

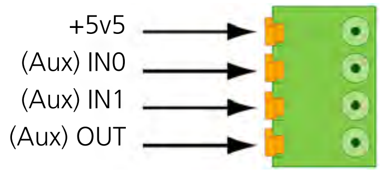


Figure 201. 4-pole connector terminal with the passive bus

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

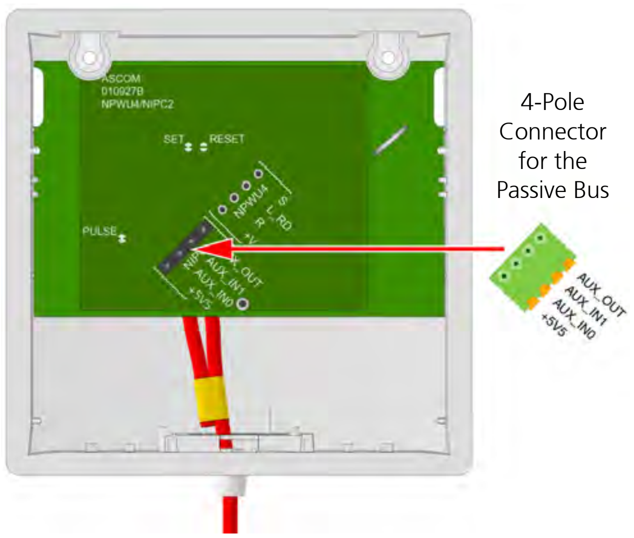


Figure 202. Passive bus connector location

7.18.1 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.

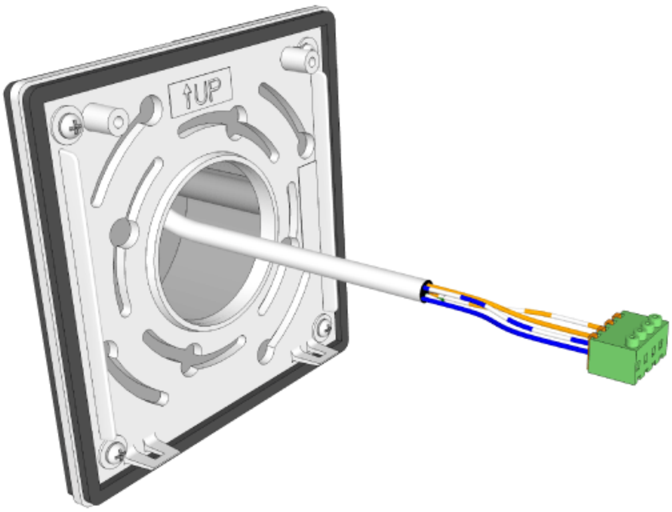


Figure 203. Cable of the pull cord module with the 4-pole connector

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

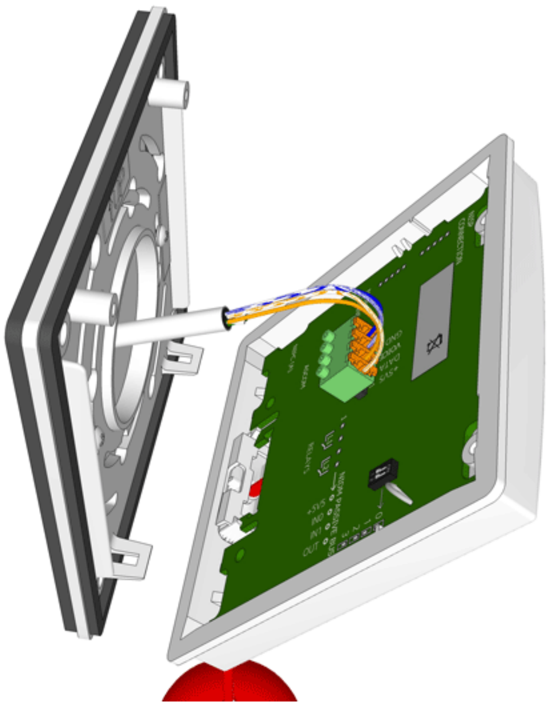


Figure 204. Connecting the room bus to the switch module

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.

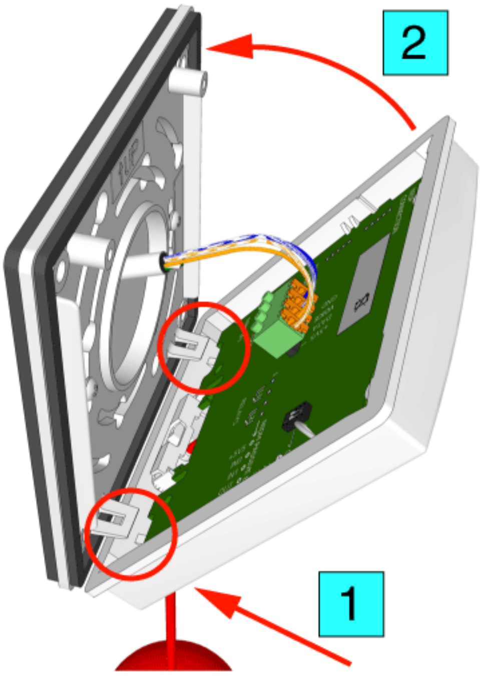


Figure 205. Mounting the switch module on the backplate

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.

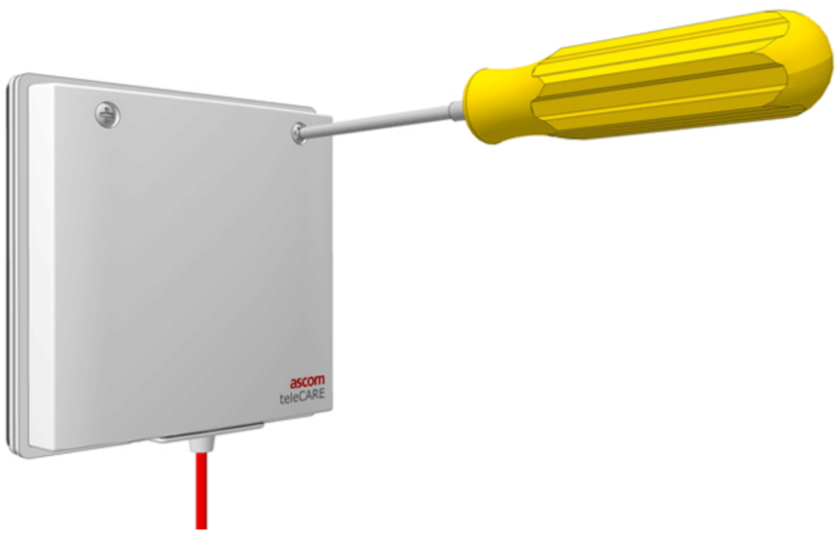


Figure 206. Tightening the pull cord fixing screws

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

7.18.2 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 prepare the pull cord:

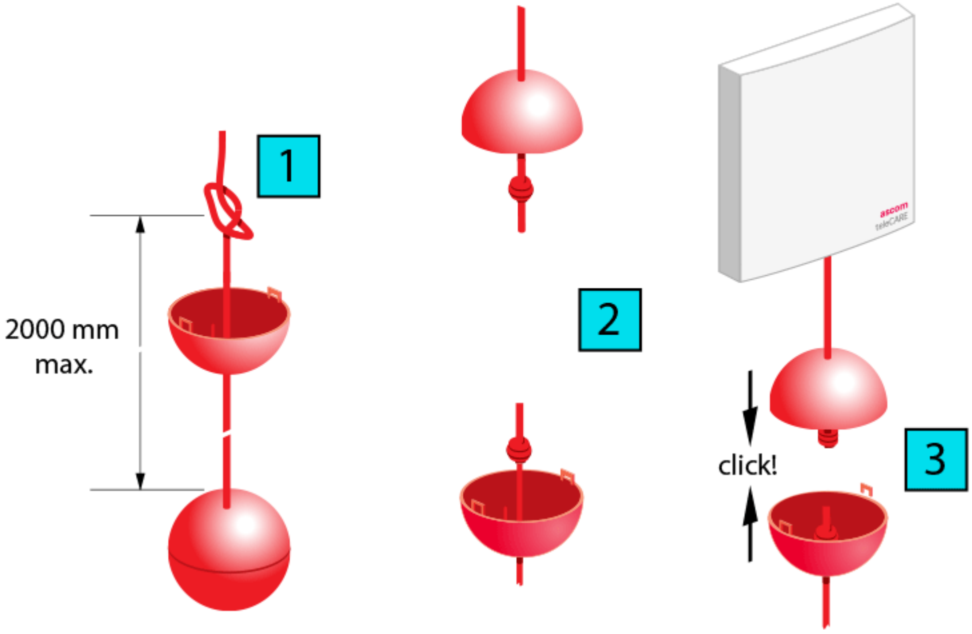


Figure 207. Assembling and attaching the pull cord

7.19 Duty Selector (NIDS)

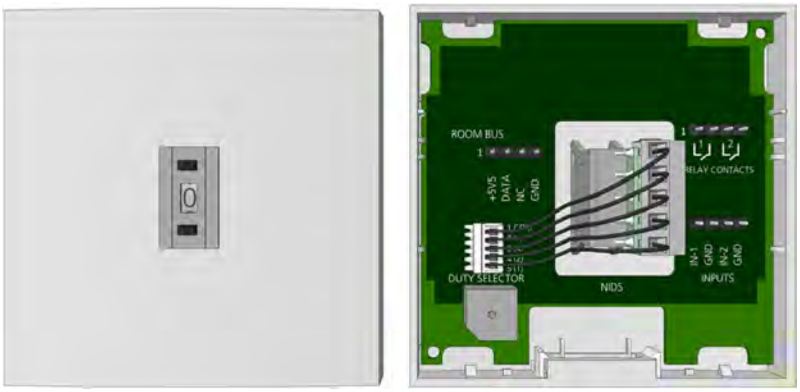


Figure 208. Duty Selector front and back view

The Duty Selector is an auxiliary peripheral which can be connected to any one of the three 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 7.3.2, Surface Mounting Spacer on page 99 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 centre 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: *Only the NIDS GAA / NIDS WAA duty selectors can be used in the teleCARE IP system. The teleCARE M duty selector R414370 is not compatible with teleCARE IP.*

7.19.1 Duty Selector Electrical Connections

The duty selector is an “active peripheral” therefore it must be connected to one of the three 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.

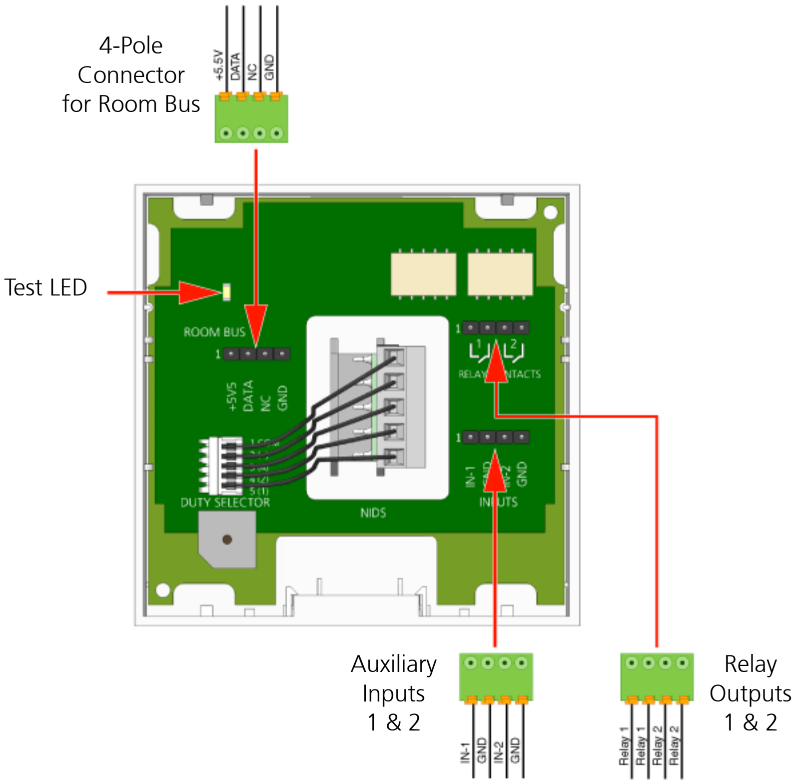


Figure 209. Duty selector electrical connections

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

Relay Outputs

The duty selector has a second 4-pole connector for the two sets of relay contact connections. The control of the relay is done via the LAN depending on the system setup and this allows the relay to control external devices. There are two sets of relay contacts (max. switching current: 1A at 30V/DC), both sets are normally open (N/O), potential free and galvanically isolated.

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. Depending on the system setup these inputs can be use to send external information via the LAN.

The test LED is activated by the room bus tester during room bus testing. (See “Room Bus Tester (NIRT)” on page 298. for room bus testing details.)

7.20 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 at a frequency of 13.56 MHz for use with contactless smart cards (Mifare Classic technology).

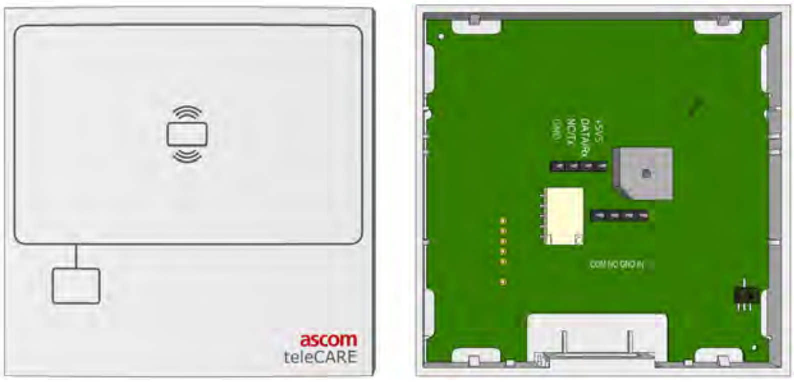


Figure 210. Card reader front and back view

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

The NICR is also required for access control in a wander management configuration, using wireless transmitters (NITX) that support LF. In combination with active location beacons (NILF), an NITX can be used to lock or unlock doors depending on the configuration.

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 nurse or staff member enters or leaves the room.

The NICR will read the smart card when it is at a distance of up to 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 authorised card is detected, the red LED shows for two seconds when an unauthorised 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 and this 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.

The NICR is available in grey or 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 7.3.2, Surface Mounting Spacer on page 99 for details).

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

7.20.1 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 three room buses of a teleCARE IP room controller by the 4-pole room bus connector (see 7.4.1, 4-Pole Connector Terminal on page 101).

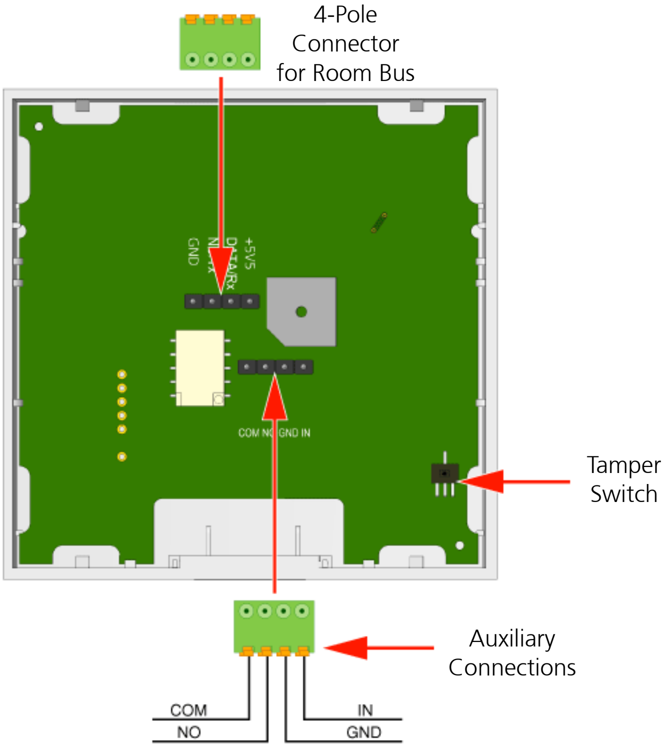


Figure 211. Card reader electrical connections

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, in the same way as all other teleCARE IP peripherals. 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.

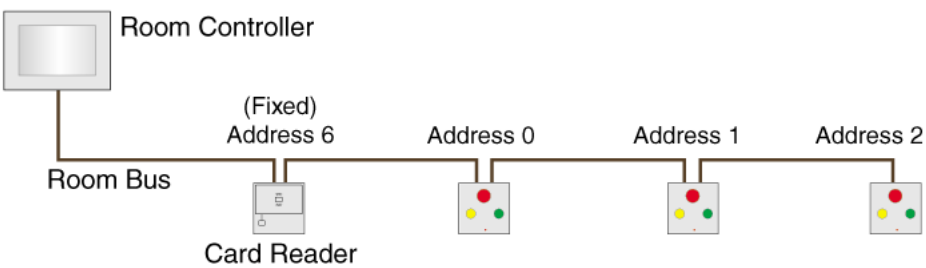


Figure 212. Typical installation with card reader

7.20.2 Card Reader Auxiliary Connections

The NICR has two sets of auxiliary connections which allow the control of such external functions as activating 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 two relay connections (COM and NO) offer 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 30V/DC with a maximum switching current of 1 amp.

IMPORTANT: *When the electric door lock uses a DC power supply a diode (1N4004 or equivalent) must be connected across the door lock coil to prevent surges affecting the teleCARE IP system.*

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).

Note: *When the monitoring contacts are used with a switch that detects the opening of a door, it is best for the switch contacts to be "normally closed" to form a closed-loop monitoring circuit.*

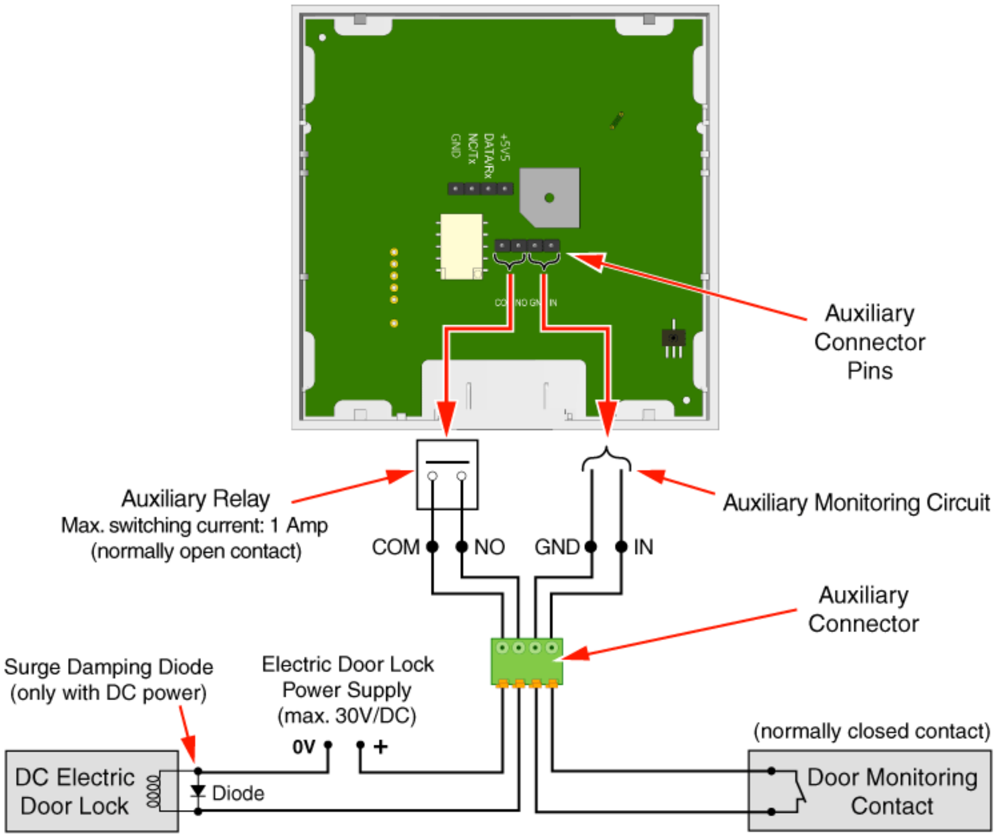


Figure 213. NICR auxiliary connections

Through the NISM configuration using access modules, the NICR supports four different modes for access control.

1 Closed, Granted

2 Closed, Denied

3 Open, Denied

4 Open, Granted

The first section "Closed or Open" refers to the state of the door monitoring contact that is connected to the input contacts (GND, IN) of the NICR.

- Closed: The contact is closed when the door is closed (preferred).
- Open: The contact is open when the door is closed.

The second section "Granted or Denied" refers to the default state of the electric door lock that is connected to the output contacts (COM, NO) of the NICR.

- Granted: The default state of the door is "Unlocked" and activating the NICR output relay (closed contact) will lock the door.
- Denied: The default state of the door is "Locked" and activating the NICR output relay (closed contact) will unlock the door.

Access Module	**Card Reader Auxiliary Connections**			
	Door State Input contact (GND, IN)		**Electric Door Lock Aux. Relay (COM, NO)**	
	Open	**Closed**	**Open**	**Closed**
Closed, Granted				
Closed, Denied				
Open, Denied				
Open, Granted				

Tamper Alarm Detection Backplate Modification

When mounting the NICR on a slightly uneven wall there is a possibility that the tamper alarm detection switch might not function properly.

To ensure that the tamper alarm functionality of the NICR is functioning properly it is required to place a piece of adhesive tape that comes included with the NICR onto the backplate.

Place the adhesive tape onto the backplate at the location depicted in the image below.

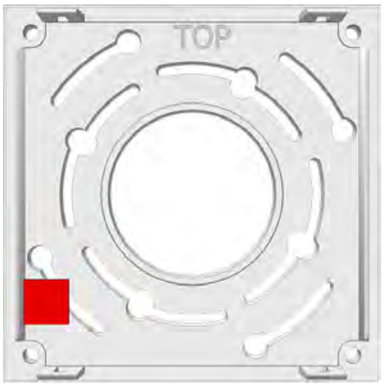


Figure 214. Placement of the adhesive tape onto backplate.

If placed correctly the tamper switch will be aligned at the centre of the tape when the NICR is placed onto the backplate.

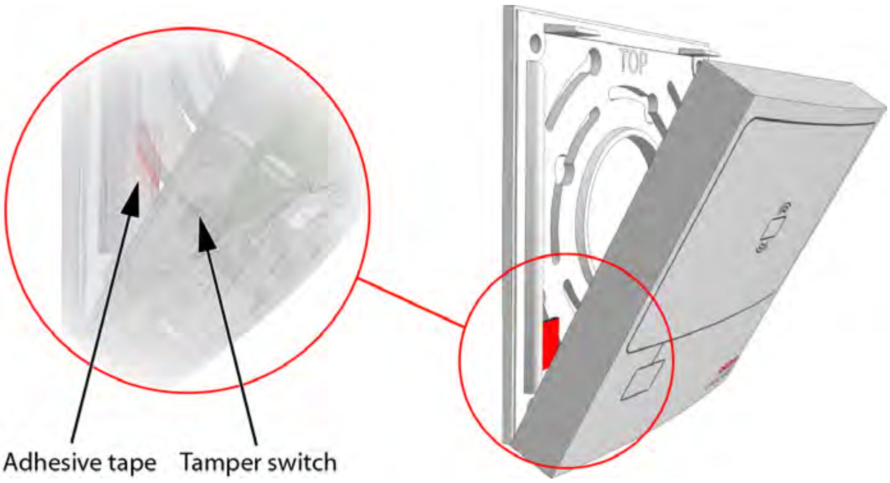


Figure 215. Tamper switch aligned with tape.

7.21 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 grey or white plastic body, a printed circuit board and a perforated anodised aluminium face plate.

Figure 216. Speech Module (NISP) front and back view

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

The NISP can only be used in combination with the teleCARE IP Doorside Module (NIDM), the bedside module (NIBM), the Customisable Module (NICM) and the Pull Cord Module (NIPC). It can also be combined with the switch modules that support the connection of a socket extension module (NISE).

7.21.1 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: 170mm (R190192), 200mm (R190193) and 400mm (660313). The 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 (length170mm) is required.

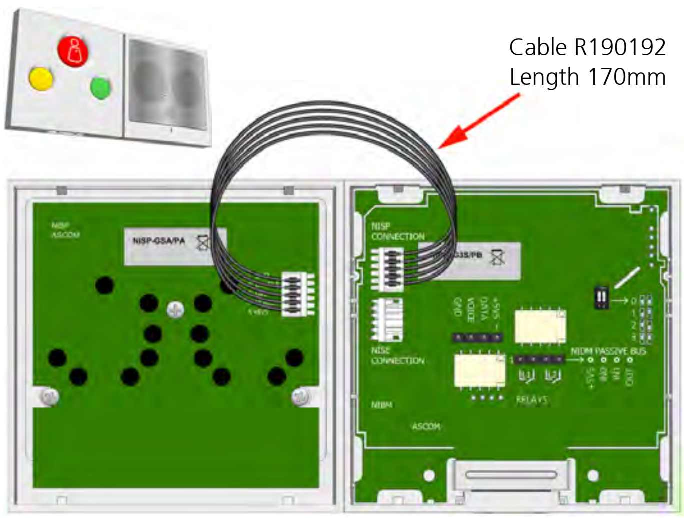


Figure 217. Speech module to the right of the switch module

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 (length200mm) is required .

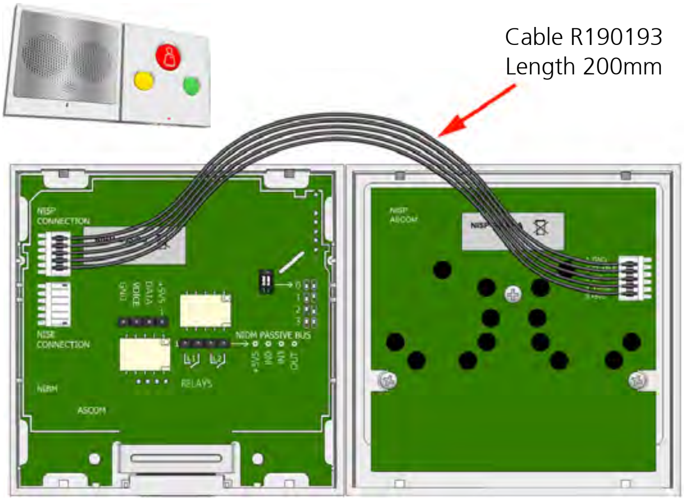


Figure 218. Speech module to the left of the switch module

For a three-module combination the R190192 cable (length170mm) and the R190193 cable (length200mm) are both required .

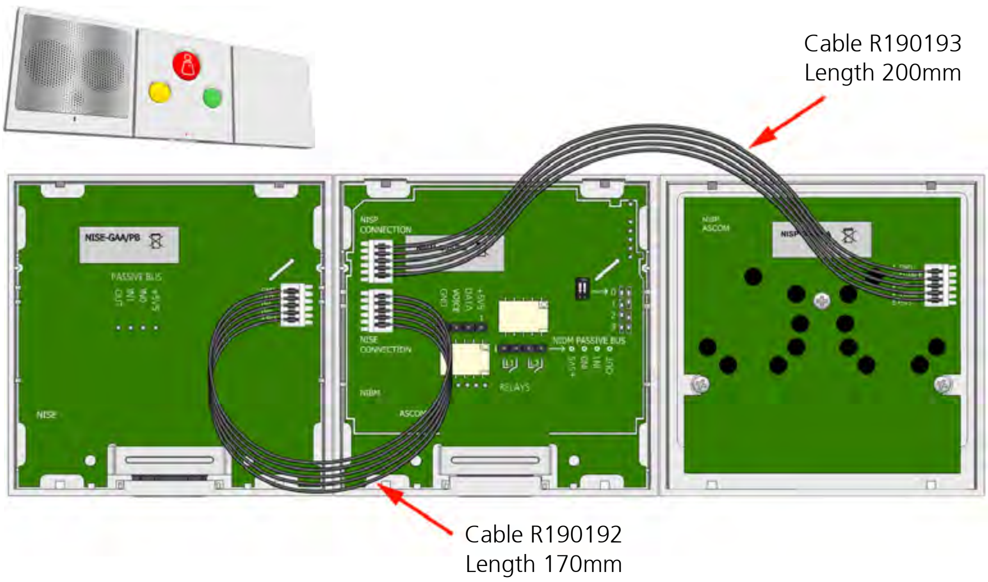


Figure 219. Speech module, switch module and socket extension module

Note: *The above examples show the speech module connected to a bedside module. The same principal applies when connecting the speech module to a doorside module, a customisable module and a pull cord module.*

7.22 Room Display (NIRD)

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

Figure 220. 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 63mm x 35mm. It displays large, easy to read characters showing calls and the locations of nurses. Above the LCD screen is a three-colour LED which illuminates to emphasise 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.*

7.22.1 Room Bus Electrical Connections

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

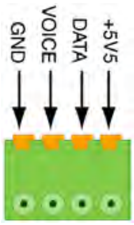


Figure 221. 4-pole connector terminal for the room bus

7.22.2 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, as shown below.

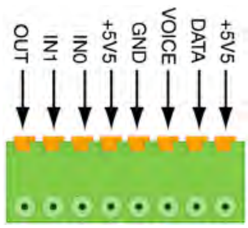


Figure 222. 8-pole connector terminal for the room bus and passive peripheral bus

7.22.3 Connector locations

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

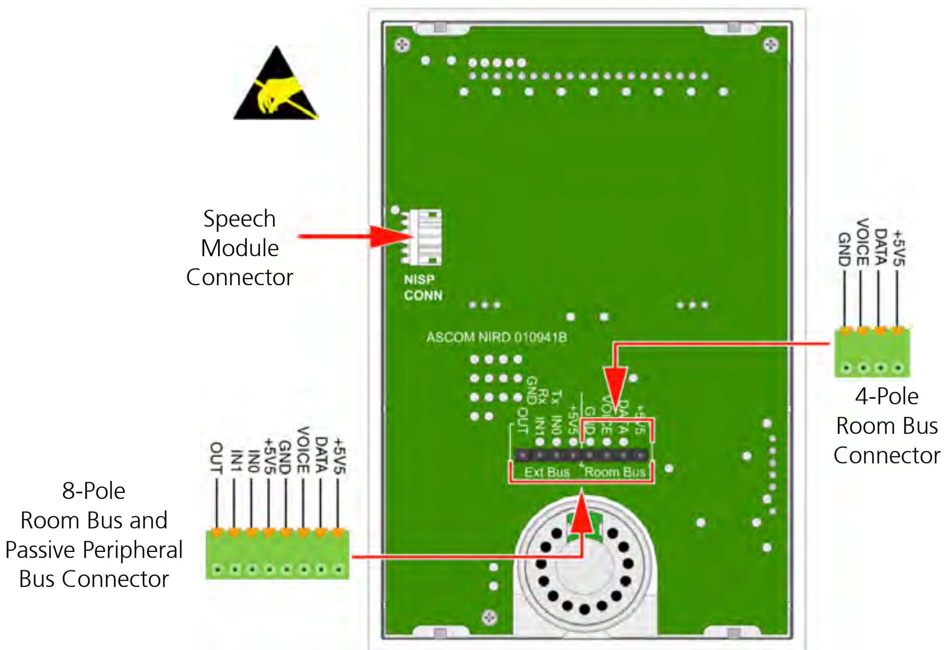


Figure 223. Room display electrical connections

7.22.4 Room Display Backplate (Short)

To mount the NIRD as a single module the short backplate must be used:

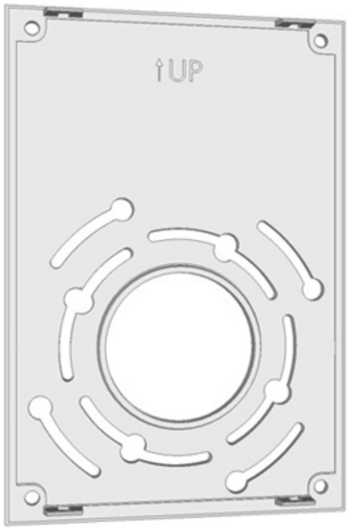
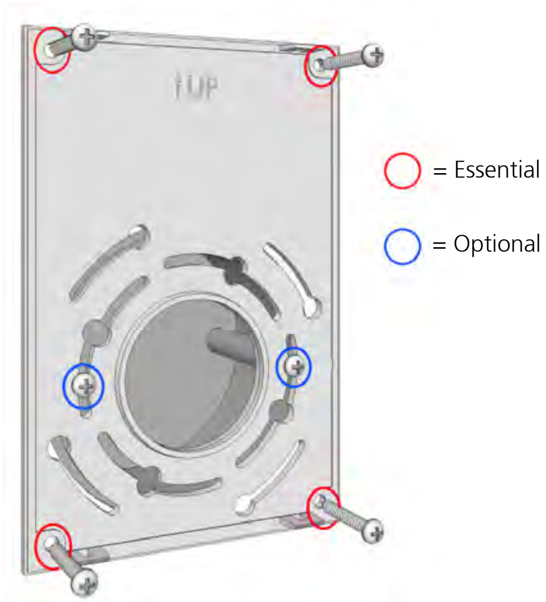


Figure 224. Room display backplate (short)

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 30mm in all directions between the room display and any metal objects to avoid the degradation of the card reader antenna performance.

Figure 225. 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 backboxes.

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

7.22.5 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 7.21 "Speech Module (NISP)" on page 152.)

Figure 226. Room display combined with the speech module

7.22.6 Room Display Backplate (Long)

The long backplate must be used to mount the NIRD combined with the NISP.

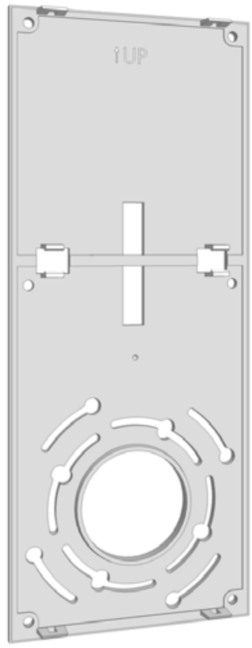


Figure 227. Room display backplate (long)

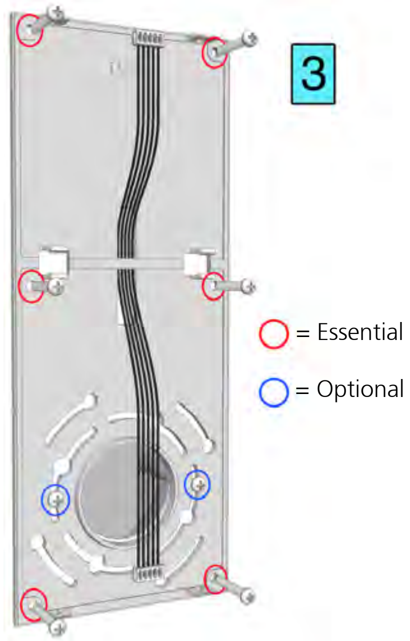
Mounting the Backplate and Installing the NIRD and NISP

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 228. 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 30mm in all directions between the room display and any metal objects to avoid the degradation of the card reader antenna performance.

Figure 229. 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 backboxes.

Note: *Even when the backplate is mounted on a backbox 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 230. 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.

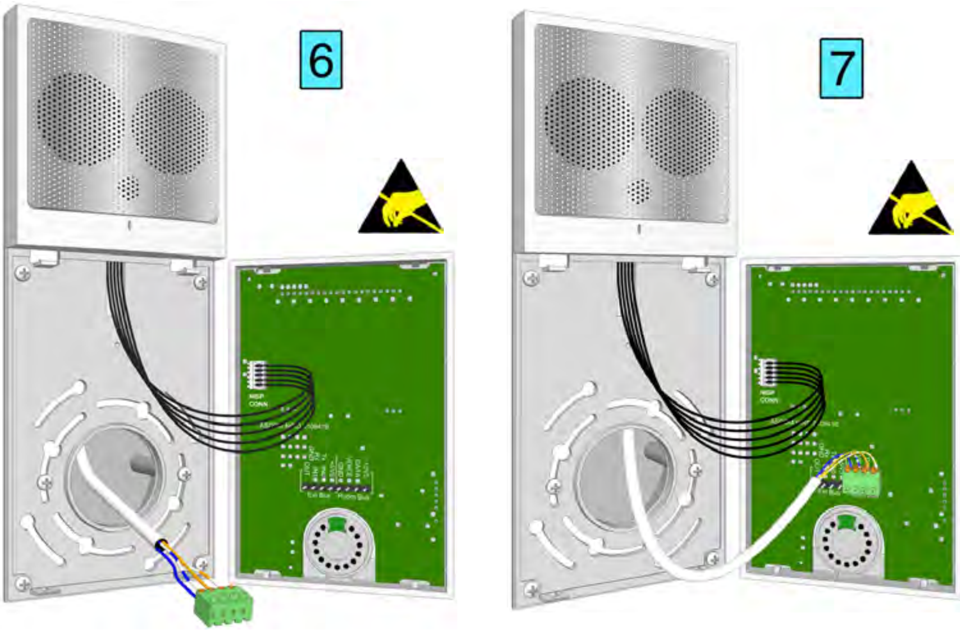


Figure 231. Connecting the NIRD to the NISP and connecting the room bus

Refer to 7.22.1, Room Bus Electrical Connections on page 155 for full details.

Next snap fit the room display to the backplate.

Figure 232. Mounting the NIRD on the backplate

7.23 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 233. Television interface module: front and back view

The television interface module mounted on the supplied surface mounting spacer. See 7.3.2, Surface Mounting Spacer on page 99 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.

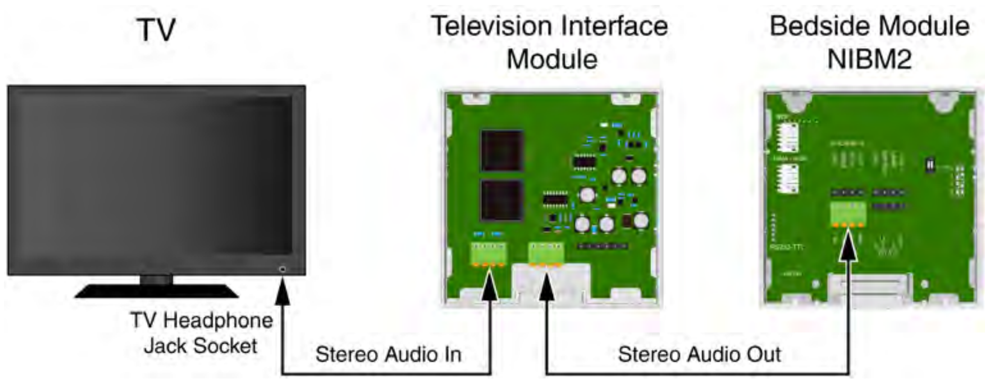


Figure 234. Television audio connections

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

General Considerations

- The maximum audio input voltage is 2Vpp.
- The maximum audio input impedance is 2k ohm.
- Do not connect the television interface module to a teleCARE IP and a teleCARE M systems at the same time.

7.23.1 Television Interface Module Electrical Connections

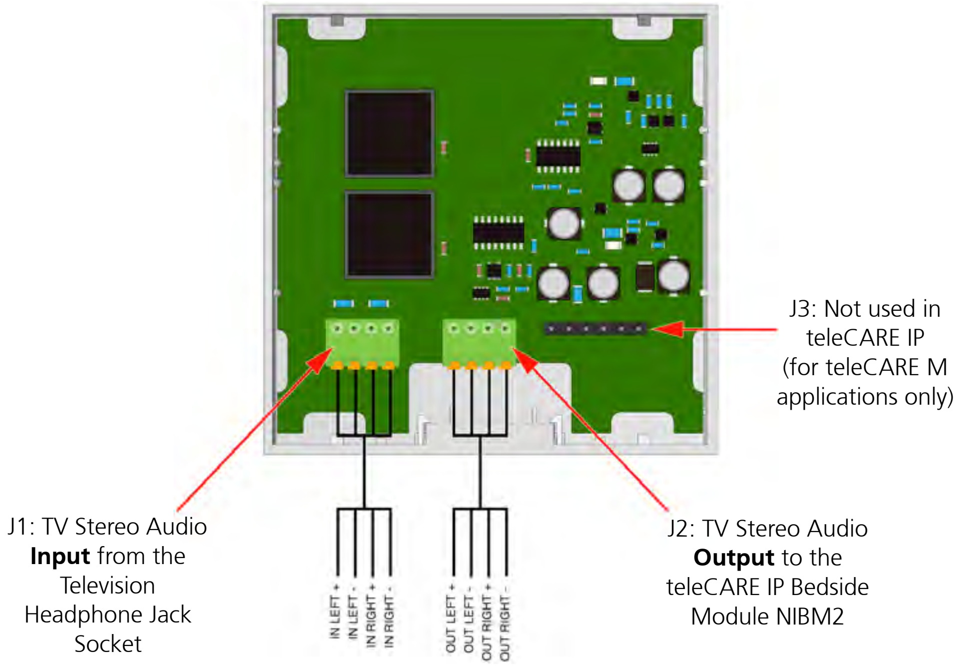


Figure 235. Television interface module electrical connections

Note 1: *Television audio in teleCARE IP requires the bedside module NIBM2. For details of the NIBM2 refer to* chapter 7.5 "Bedside Module (NIBM2)" on page 108.

Note 2: *The 4-pole connector terminals must be ordered separately.*

7.24 Sunblind Control Module

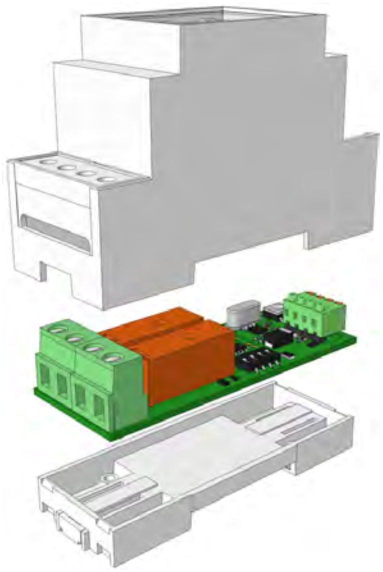


Figure 236. Sunblind Control Module

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 must on the same room bus as the bedside module (or medical rail socket) and patient handset which require sunblind control capability.

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 patient handsets to control the up and down motors of sunblinds.

The sunblind control module can be connected to one or two room buses of the same room controller. It only responds to the room bus addresses 0 to 3 of the connected room buses. It has two DIP switches which are used to prevent the sunblind control module from responding to specific room bus addresses.

7.24.1 Sunblind Control Module Electrical Connections

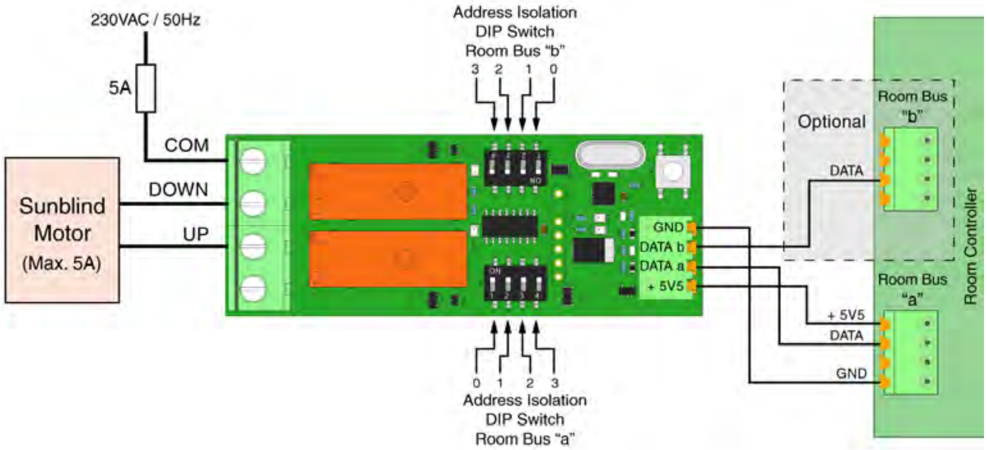


Figure 237. Sunblind control module electrical connections

__IMPORTANT:__ The 230V/AC power to the sunblind motor control relay must be fused at 5 Amps. Appropriate cable for the voltage and current must be used for the sunblind motor control.

7.24.2 One Sunblind Motor with Multiple Sunblind Control Modules

A sunblind motor can be controlled by more than one sunblind control module. In such cases the sunblind control modules must be daisy chained to prevent conflicting control inputs to the sunblind motor. The "OUT" of the first sunblind control module must be connected to the "COM" of the second sunblind control module. This sequence must be repeated when further sunblind control modules are included.

The following diagram shows an example of two sunblind control modules daisy chained to control one sunblind motor.

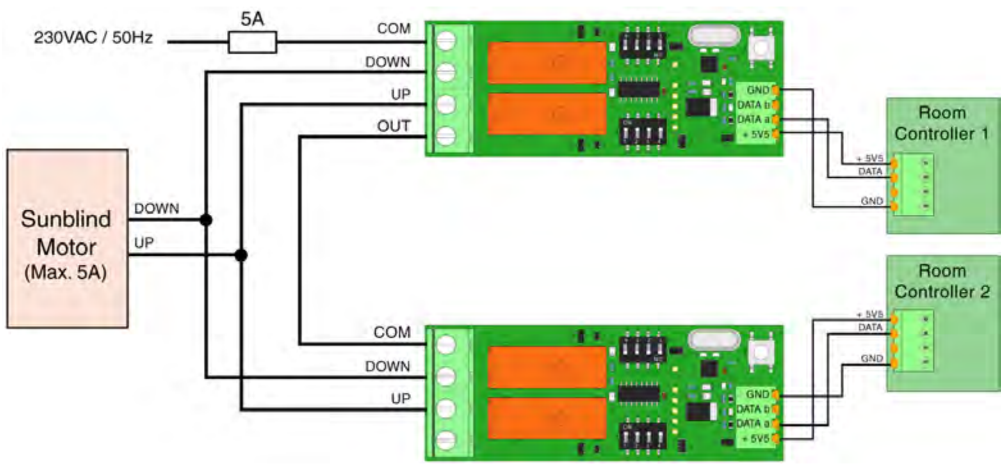


Figure 238. One sunblind motor controlled by two sunblind control modules

7.25 Multi Medical Alarm Module (NIMA)

The Multi Medical Alarm Module (NIMA) is the interface between primary medical equipment from third parties and a teleCARE IP nurse call system.

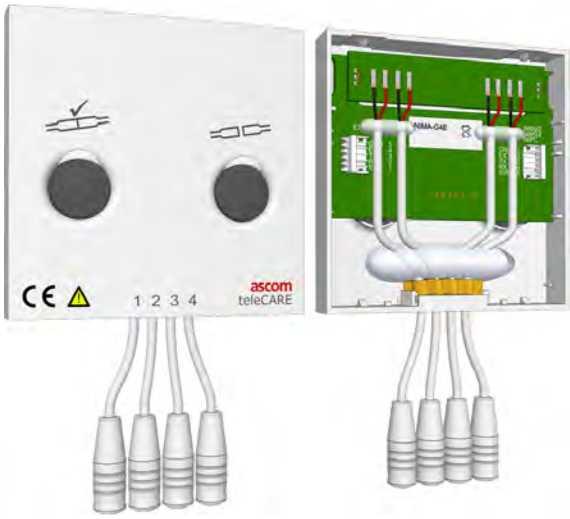


Figure 239. Multi Medical Alarm Module NIMA: front and back view

Note: *The multi medical alarm functionality requires a special license.*

The multi medical alarm Module (NIMA) is a single switch module with two buttons and four medical alarm inputs for the secure monitoring of four primary medical devices. The NIMA has one high priority, one medium priority and two low priority inputs.

The NIMA has the following connectors:

- *NIBM2, NIMS2, NIPC* -> for connecting it to a switch module
- *EXT* -> for connecting a second multi medical alarm module allowing up to eight medical device connections on one single switch module
- Four 2.5mm TRS jack sockets for the connection of the primary medical devices

7.25.1 MDD/MDR Class I compliancy

The NIMA-G4E and NIMA-W4E are MDD/MDR Class I compliant devices.

The NIMA-G4E and NIMA-W4E are designed to be used in combination with the bedside module (NIBM2), the medical rail socket (NIMS2) or the pull cord module (NIPC) version 2.23 or later. It offers the secure medical alarm function, unintentional disconnect alarm and line break detection. The multi medical alarm module is connected to the NIBM2, NIMS2 or NIPC by a modular interconnection cable.

IMPORTANT: *The NIMA-G4E or NIMA-W4E can only be connected to a bedside module (NIBM2), a medical rail socket (NIMS2) or a pull cord module (NIPC) version 2.23 or later.*

IMPORTANT: *It is mandatory to include a corridor lamp (NICL2 or room controller lamp) at the entrance of locations (rooms) where NIMA modules are used.*

7.25.2 MDD Class IIb compliancy

The NIMA-G4D is an MDD Class IIb compliant device.

An MDD class IIb compliant system is formed by using the NIMA-G4D in combination with the room controller NIRC3 and corridor lamp NICL2 for reliable alarm indications from medical devices to a location outside the patient room. The corridor lamp must have a visibility of at least 20 meters and must be directly visible from the nurse station staffed at all times. The NIRC3 or the NICL2 must use colors according to EN60101-1-8 (red, yellow, cyan or yellow).

The NIRC3 power supply must be MDD Class II compliant. Using PoE introduces additional risks.

IMPORTANT: *The NIMA-G4D can only be used in combination with the bedside module (NIBM2) or the medical rail socket (NIMS2) version 2.23 or later.*

IMPORTANT: *The NIMA must be connected to the same Room Controller as the Corridor Lamp on which the alarm is signalled.*

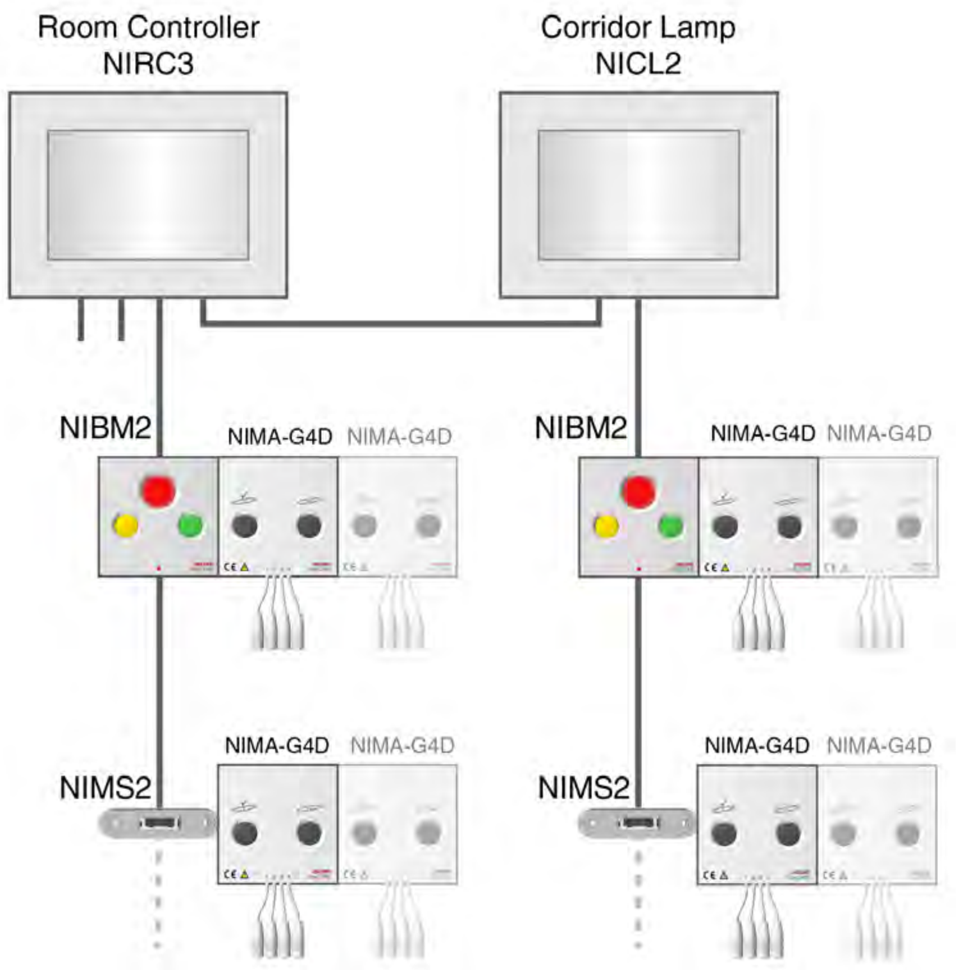


Figure 240. NIMA-G4D typical installation

IMPORTANT: *It is mandatory to include a corridor lamp (NICL2 or room controller lamp) at the entrance of locations (rooms) where NIMA modules are used.*

IMPORTANT: *The corridor lamp must have a visibility of at least 20m and must be visible from the Nurse Staff Station at all times.*

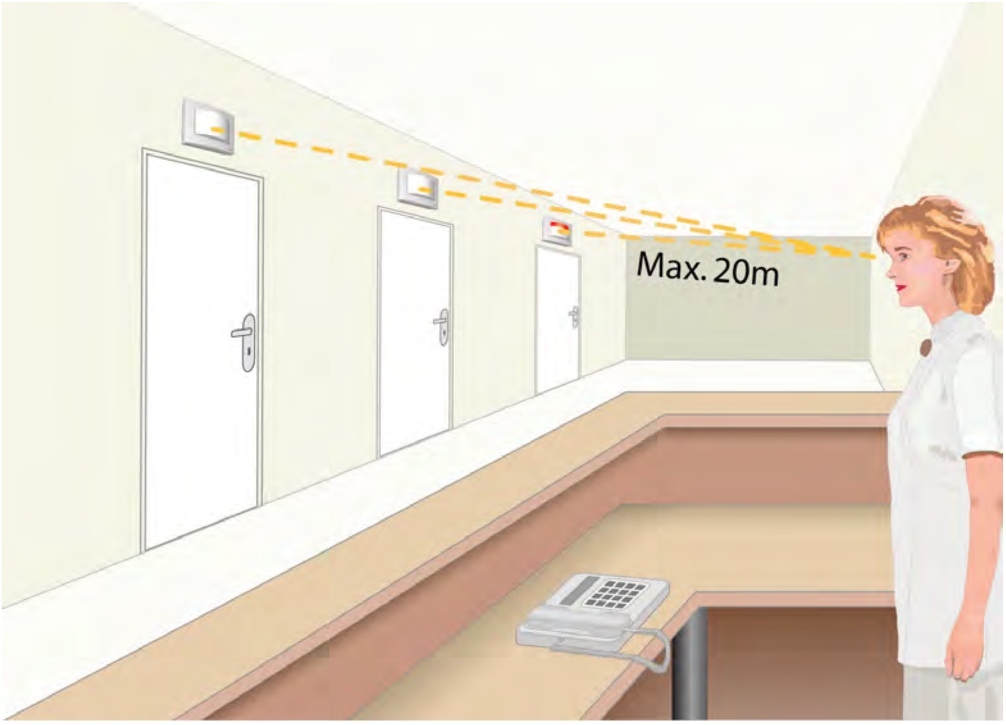


Figure 241. Corridor lamp visibility

7.25.3 NIMA Backplate Mounting Instructions

When mounting the NIMA on a single, double or triple backplate, the array of holes at the top of the backplate cannot be used to mount the backplate onto the wall because the screws might damage the extension board that is fitted on the NIMA main circuit board or create a short circuit between contacts.

Location of the NIMA extension board placed onto the main circuit board.

No screws are allowed to be fitted in the array of holes directly covered by the extension board of the NIMA.

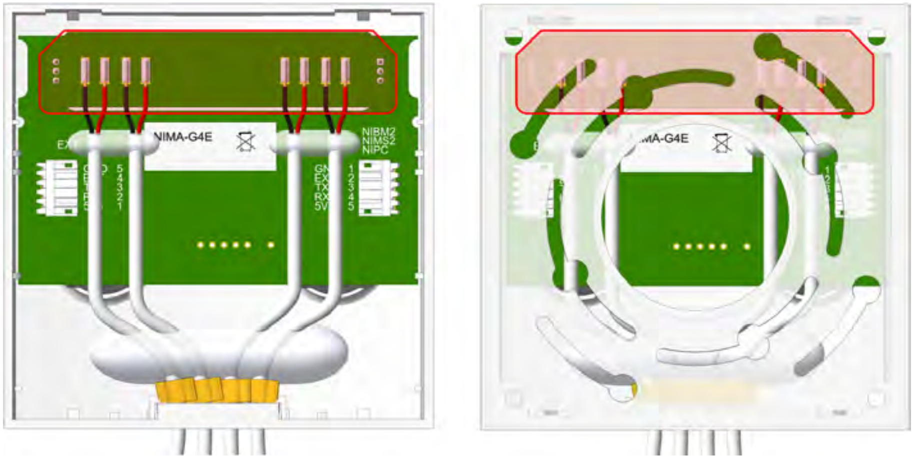


Figure 242. No screws allowed for the array of holes in the marked area

The image below shows a front view of the array of holes that cannot be used to fix the single, double or triple backplate to the wall.

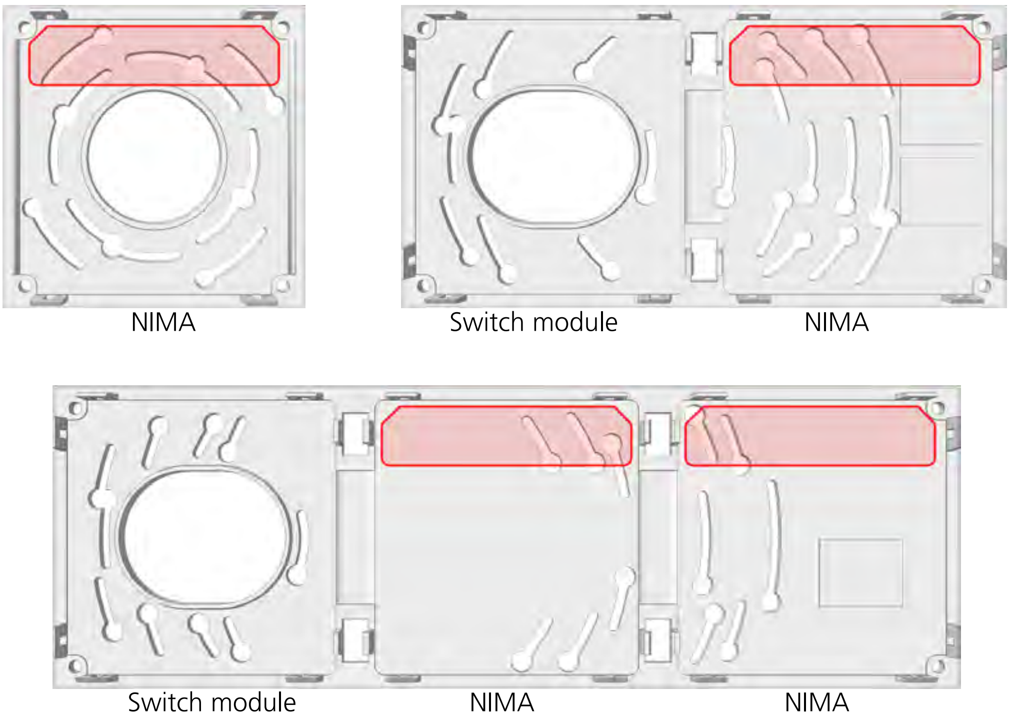


Figure 243. Do not use backplate mounting screws in the marked areas

7.25.4 Multi Medical Alarm Module Electrical Connections

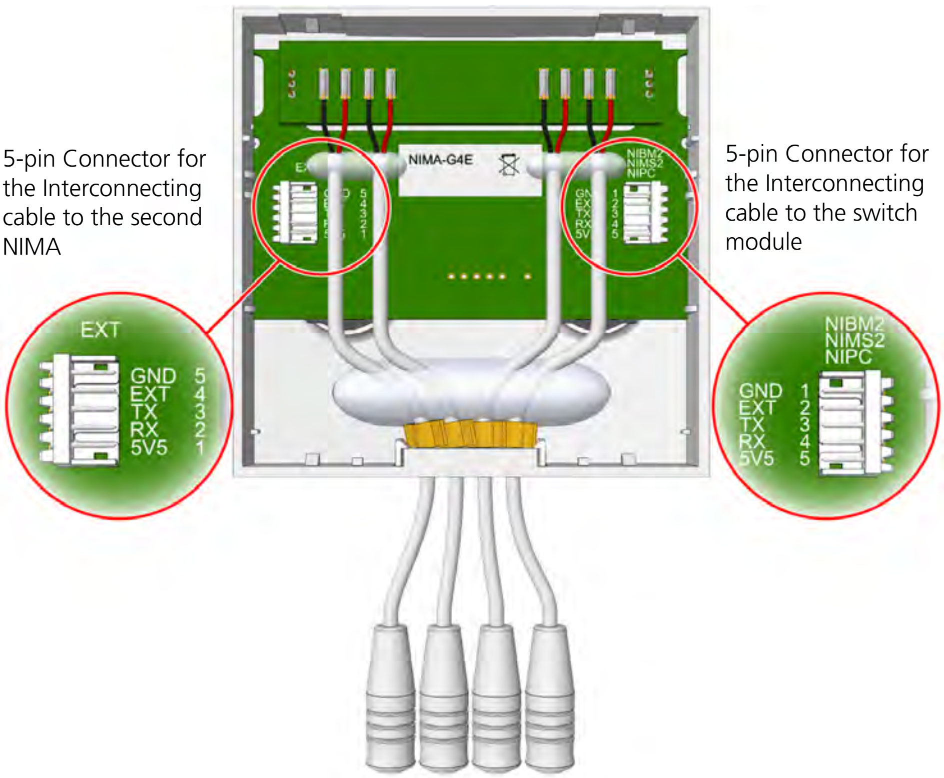


Figure 244. Multi medical alarm module electrical connections

The multi medical alarm module is connected to the switch module by a 5-wire interconnecting cable which is supplied with the multi medical alarm module. Use another 5-wire interconnecting cable to connect a second NIMA to the EXT connector on the first NIMA in order to extend with four more medical alarm inputs.

The following illustrations show how the interconnecting cables are fitted.

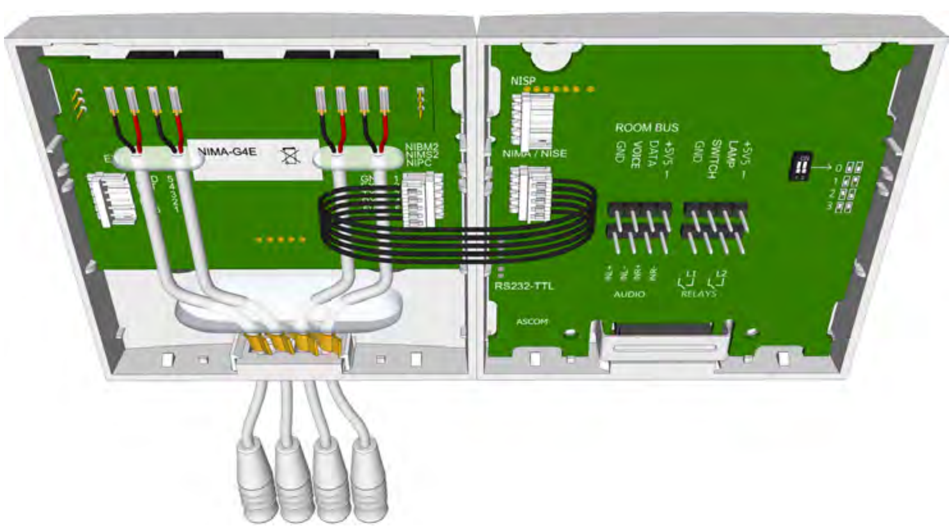


Figure 245. NIMA - NIBM2 interconnection

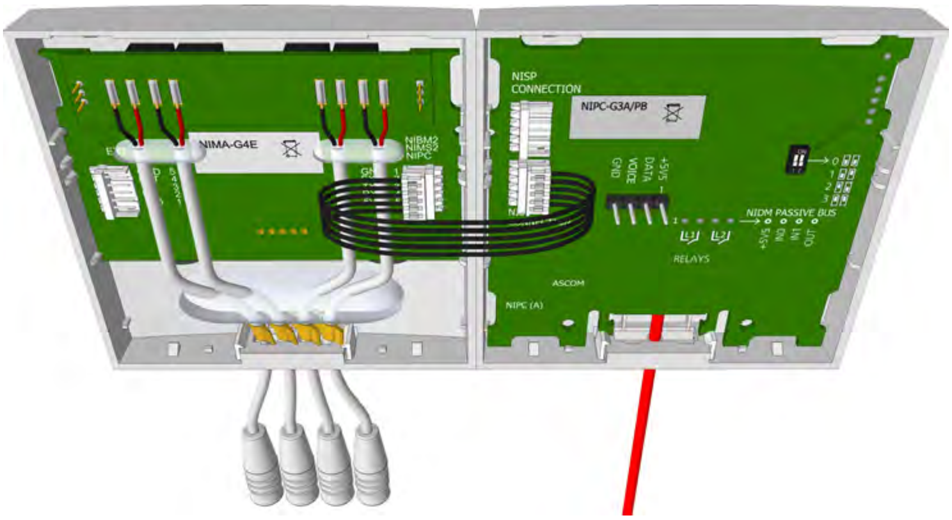


Figure 246. NIMA - NIPC interconnection, only for NIMA-G4E or NIMA-W4E.

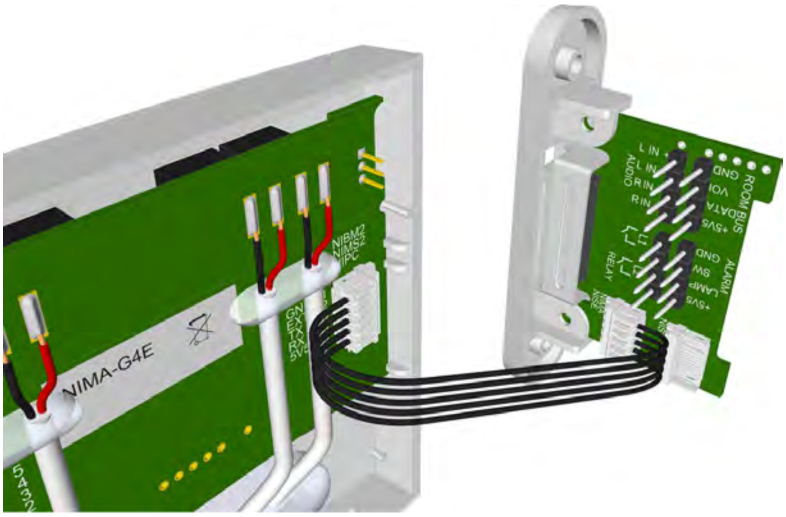


Figure 247. NIMA - NIMS2 interconnection

Note: *A maximum of two NIMAs can be connected to one single switch module.*

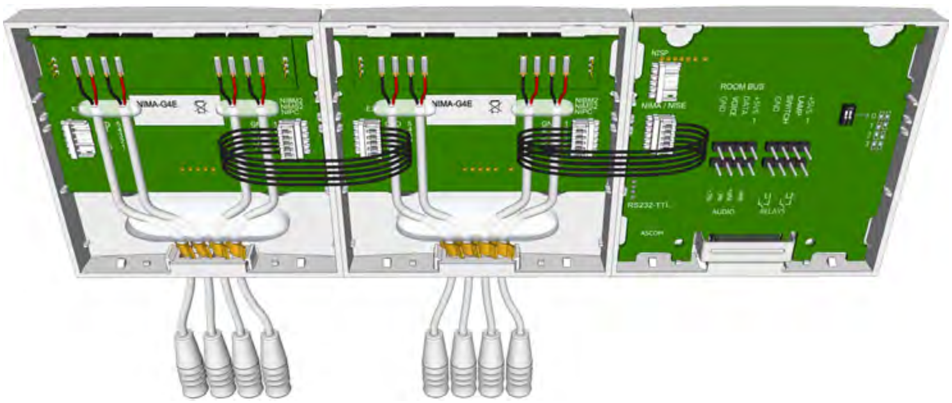


Figure 248. Connecting a second NIMA

7.25.5 Connecting a Primary Medical Device to the Multi Medical Alarm Module

A multi medical alarm module has four medical alarm inputs for the secure monitoring of four primary medical devices.

Medical alarm contact priority:

Figure 249. Medical Alarm Contact Priority

In order to fulfill the requirements of EN60601-1-8, the MMA alarm cable (660393) must be used to connect primary medical devices with a potential-free, normally open alarm contact to the multi medical alarm module and an end of line (EOL) resistor must be connected across the alarm contacts of the medical device to monitor the continuity of the electrical connection to the NIMA module.

The two wires at the open end of the cable (including the 4.7KΩ / ¼W end of line resistor) are to be connected to the alarm contacts of the primary medical device and the plug of the MMA alarm cable is plugged into one of the four inputs depending on the priority. See "Line Break Detection" on page 172.

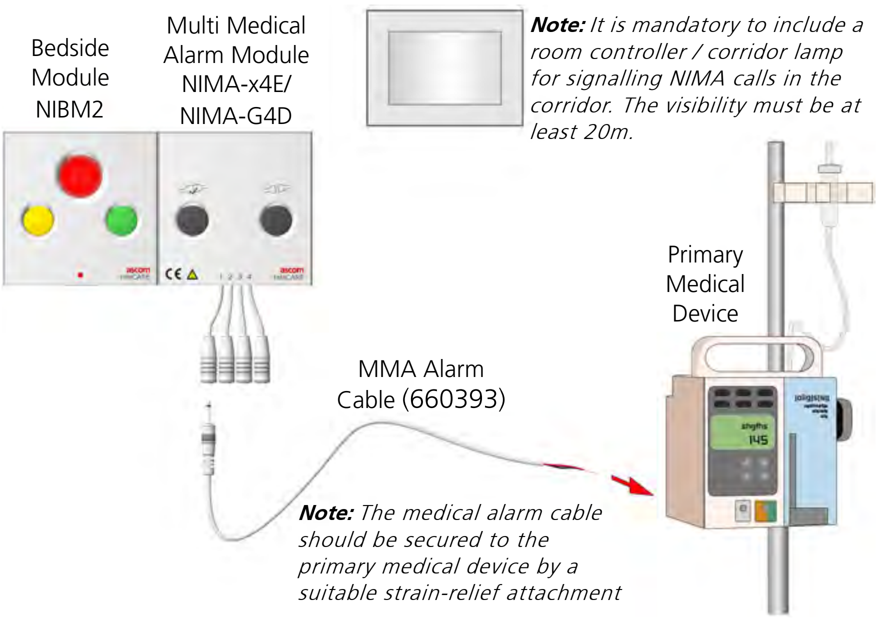


Figure 250. Connecting a primary medical device

7.25.6 MMA Alarm Cable

The MMA alarm cable (660393) must be used to connect primary medical devices to the multi medical alarm module. It consist of a 4 meter cable with a moulded 2.5 mm TS jack on one end and two wires for the connection of the primary medical device at the other end. Included is a 4.7KΩ / ¼W end of line resistor.

IMPORTANT: *When installing the NIMA-G4D make sure that an Ascom representative connects the medical alarm cable and the end of line resistor to the primary medical device (connector). The Ascom representative should consult the hospitals qualified biomedical or medical engineer regarding the technical details of the medical device.*

Figure 251. MMA alarm cable (660393)

The red and black wires of the MMA alarm cable should be connected across the normally open, potential free, alarm output contact of the primary medical device.

7.25.7 Line Break Detection

Line break detection requires an end of line resistor to be connected across the potential free alarm contact of the primary medical device. This resistor monitors the connection to the primary medical device for line breaks and disconnection. A 4.7KΩ end of line resistor will be included in the package of the MMA alarm cable (660393).

Line Break Detection using a Change-Over Contact

The end of line resistor with a value of 4.7KΩ / ¼W is connected between the normally open and the normally closed change-over contacts of the primary medical device. This is the recommended line break detection method because the connection of the primary medical device is reliably monitored, as well as the MMA alarm cable.

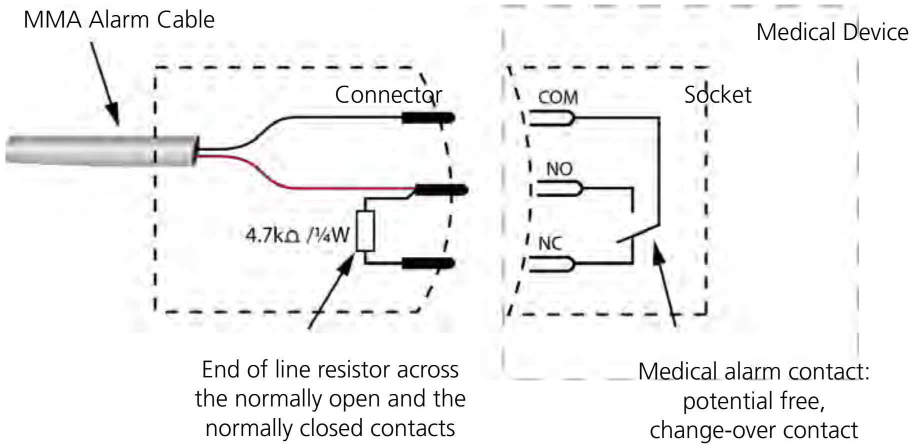


Figure 252. MMA alarm cable and the end of line resistor

Line Break Detection using a Normally Open Contact

The end of line resistor with a value of 4.7KΩ / ¼W is connected across the normally open contact of the primary medical device.

Warning: *This line break detection method offers limited protection because it is possible for the disconnection of the primary medical device to go undetected.*

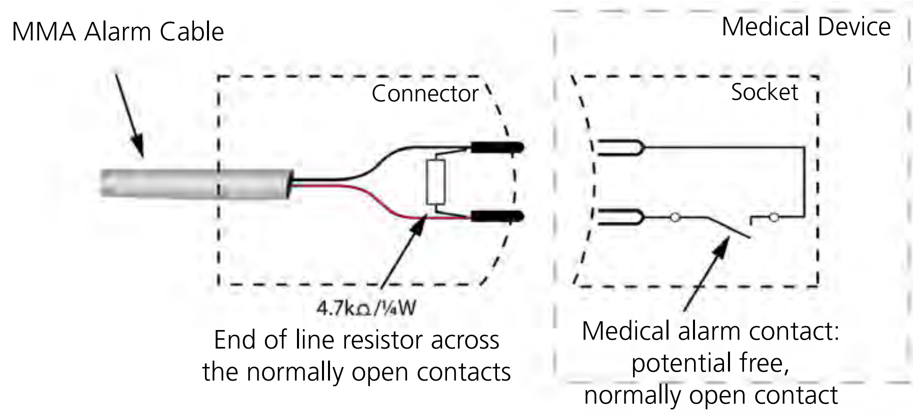


Figure 253. MMA alarm cable and the end of line resistor

MMA Alarm Cable Test Procedure

Each MMA alarm cable that is created for the NIMA-G4D by the Ascom representative must be tested prior to handing it over to the biomedical or medical engineer. Use the ohms test mode of a multimeter to measure the state of the medical device contact. Place the leads of the multimeter on the tip and the sleeve of the 2.5 mm TS jack connector of the medical alarm cable. A resistance of 4.7KΩ should be measured when the medical device is idle (open contact) and a resistance of 0Ω should be measured when the medical device is in an alarm state (closed contact). If no medical device is available when performing the cable test, a continuity test can be performed to test for continuity between the 2.5 mm TS jack connector and the medical device connector.

7.25.8 NIMA Installation Test Procedure

Before handing over the teleCARE IP system it is necessary that the installed NIMAs are tested. All 4 inputs can be tested using a toggle switch with 4.7KΩ / ¼W end of line resistor connected to a test cable.

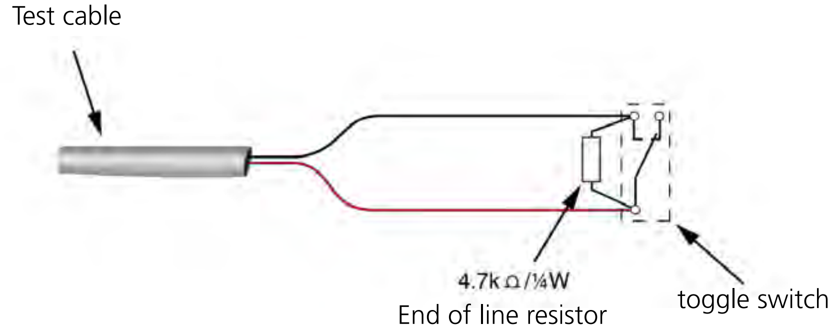


Figure 254. Multi medical alarm test cable

Before you start testing, make sure that in the NISM:

- The NIMA is configured correctly.
- The NIMA is linked to the room controller / corridor lamp.
- Messaging is setup correctly, all messages generated by the multi medical alarm modules must arrive at a portable messaging device.
- Supervision is enabled and working.

A detailed configuration example can be found in the teleCARE IP Configuration Manual TD 92610EN.

The following NIMA functionality must be tested:

Connecting the Test Cable

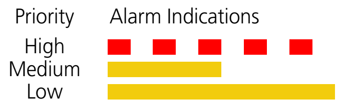
1 Plug the jack connector into the first input of the NIMA

- The LED above the left button should flash green once to indicate that a connection has been established.

Medical Alarm

2 Generate an alarm condition by operating the toggle switch (closing the contact).

- Depending on the priority of the input, the LED above the left button and the LEDs in the room controller / corridor lamp should flash as indicated by the table below.



- A corresponding high, medium or low priority alarm message should arrive at the portable messaging device.
- Cancel the medical alarm by operating the toggle switch (opening the contact).

Medical Disconnect Alarm

3 Generate a medical disconnect alarm by unplugging the jack connector from the NIMA.

- Depending on the priority of the input, the LED above the left button and the LEDs in the room controller / corridor lamp should flash accordingly, see the table in step 2.
- A corresponding high, medium or low priority medical disconnect alarm message should arrive at the portable messaging device.
- Reconnect the test cable to cancel the medical disconnect alarm.

Intentional Disconnect

4 To disconnect the test cable intentionally without generating an alarm:

- Press the right button of the NIMA, the green LED above the button will light up for three seconds.
- Disconnect the test cable within the three seconds.

Repeat steps 1 to 4 above for the three remaining medical alarm inputs.

Supervision Test

5 To test system supervision in the teleCARE IP system for the NIMA, disconnect the NIMA from the switch module.

- Within 20 seconds after disconnection the yellow corridor lamp on the room controller that acts as the supervisor will start blinking.
- A peripheral disconnect alarm will arrive at the corresponding portable messaging device.
- Reconnect the NIMA to cancel the disconnect alarm.

7.26 Multi General Alarm Module (NIGA)

The Multi General Alarm Module (NIGA) is the interface between non-medical equipment from third parties and a teleCARE nurse call system.

The NIGA is designed to be used in combination with the Ward Controller (NIWC). It offers four general alarm inputs with unintentional disconnect alarm and line break detection.

IMPORTANT: *The NIGA is not an MDD/MDR compliant MMA - medical alarm monitoring device, therefore the monitoring of medical alarm contacts from medical devices is not allowed using the NIGA. To monitor medical alarm contacts, the MDD/MDR compliant MMA - Multi Medical Alarm Module (NIMA) must be used.*

The multi general alarm module will take up four addresses on the ward controller.

IMPORTANT: *The NIGA can only be connected to the addresses of a ward controller.*

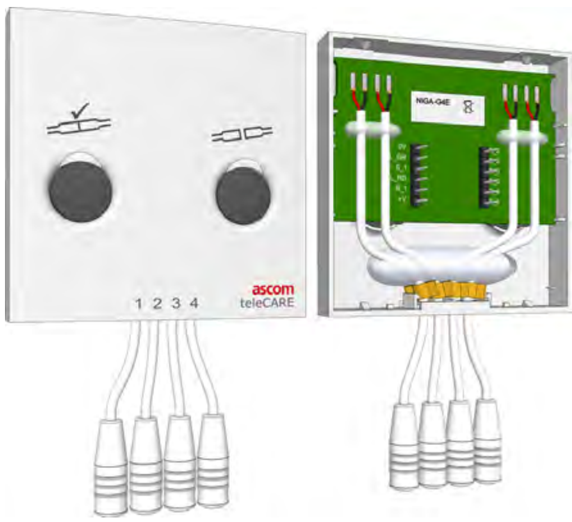


Figure 255. Multi General Alarm Module NIGA: front and back view

The multi general alarm module (NIGA) is a single switch module with two buttons and four general alarm inputs for monitoring up to four normally open (alarm) contacts from non-medical devices.

The NIGA has the following connectors:

- Two 6-pole connectors -> for connection to the four inputs of the ward controller
- Four 2.5mm TRS jack sockets for the connection of the (alarm) contacts.

7.26.1 Multi General Alarm Module Electrical Connections

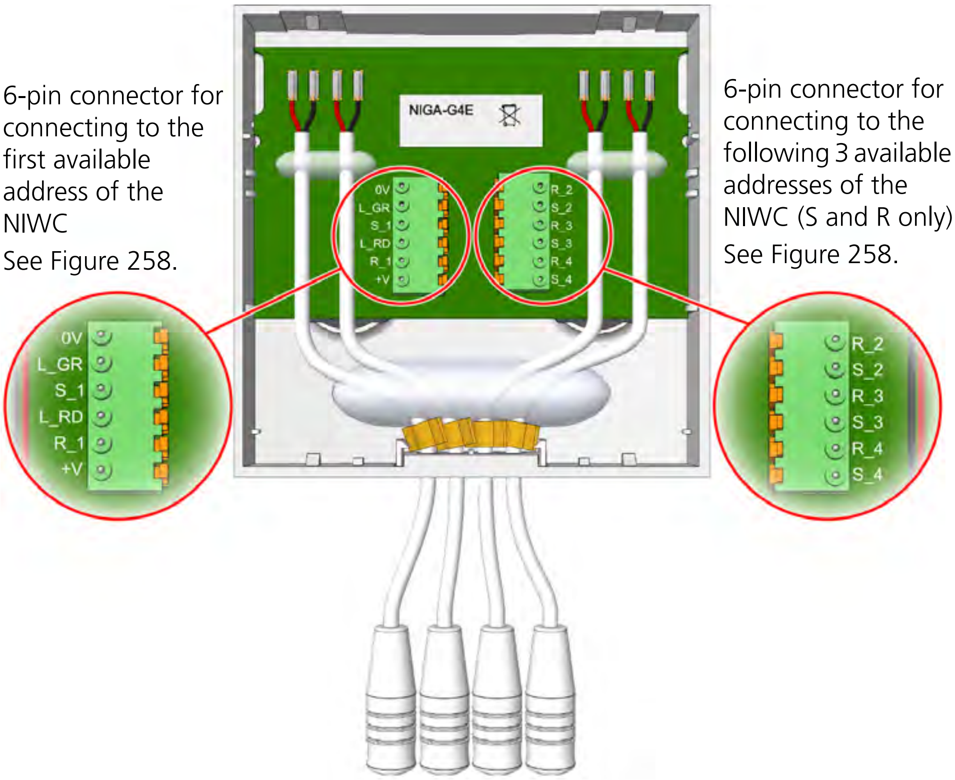


Figure 256. Multi general alarm module electrical connections

The multi general alarm module is connected to four addresses of the ward controller by two 6-pole connectors using two cables. It is best to connect the NIGA to four sequential addresses on the ward controller. The first address will be fully connected with the power lines, lamp lines and set and reset lines. For the following three addresses only the set and reset lines will be connected to the NIGA. Refer to Figure 258. on page 178 for details.

Note: *On the ward controller side, the lamp lines of the addresses 2, 3 and 4 will be interconnected with the lamp lines of address 1. This will make the blinking patterns of all four addresses available on the LEDs of the NIGA.*

For details, refer to Figure 258., “NIGA / NIWC electrical connections,” on page 178

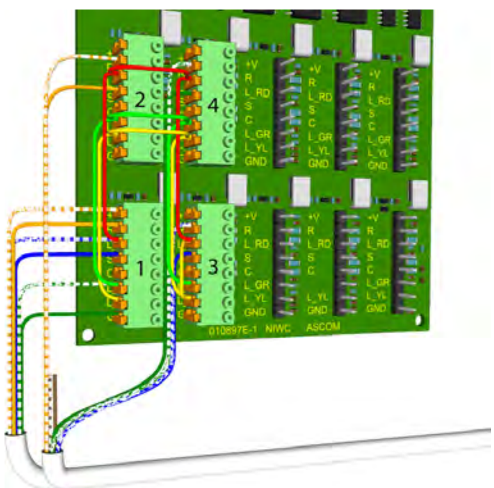


Figure 257. Connection example on the NIWC

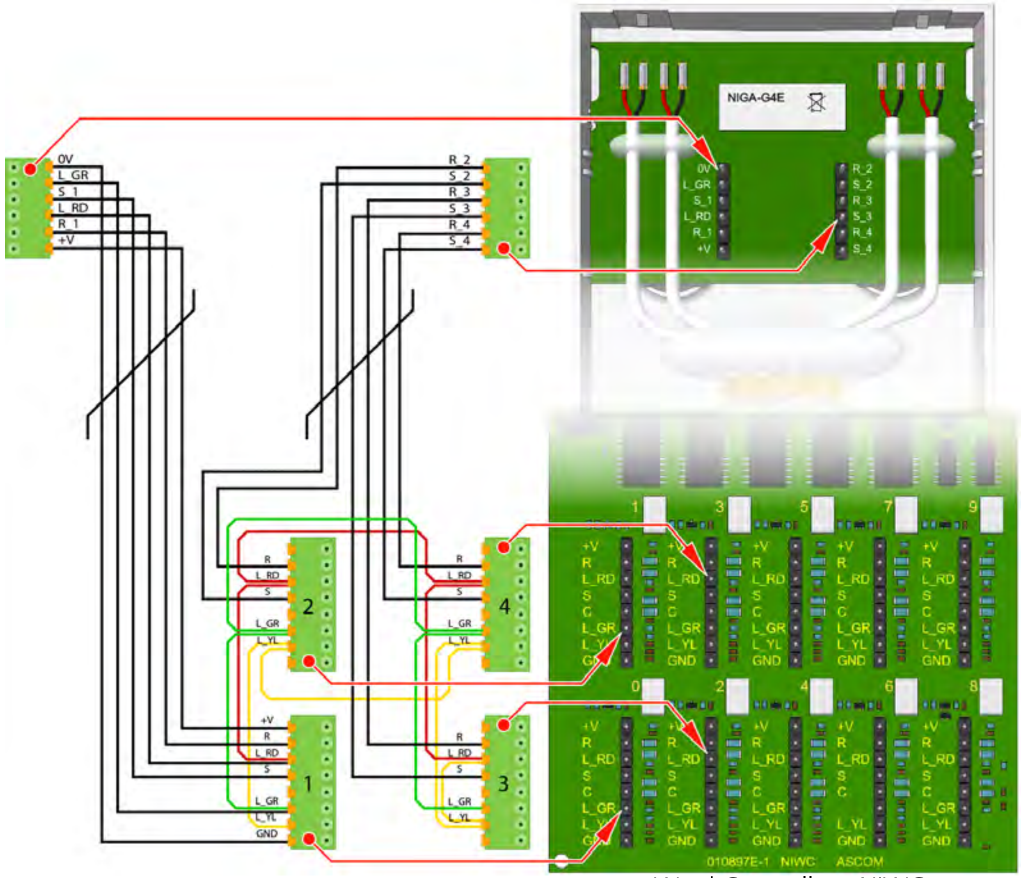


Figure 258. NIGA / NIWC electrical connections

Note that for all four addresses the L_GR lamp lines are connected with each other and that the L_RD + L_YL lamp lines are connected with each other.

7.26.2 Connecting a Device to the Multi General Alarm Module

A multi general alarm module has four alarm inputs for monitoring up to four non-medical devices. To connect a non-medical device, use a cable with on one end a 2.5mm TS jack and an open end with two wires on the other side, for example the MMA alarm cable (660393).

The two wires at the open end of the cable and a 22KΩ / ¼W end of line resistor are to be connected to a potential-free, normally open alarm contact of the non-medical device. The 2.5mm TS jack is plugged into one of the four inputs of the NIGA.

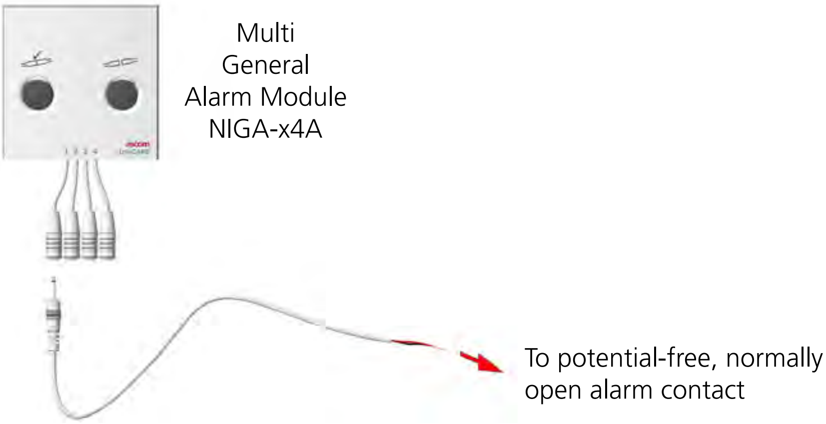


Figure 259. Connecting a general alarm contact

7.26.3 Alarm Cable

The MMA alarm cable, see "MMA Alarm Cable" on page 172 can be used to connect non-medical devices to the NIGA.

7.26.4 Line Break Detection

Line break detection requires an end of line resistor (22KΩ / ¼W) to be connected across the potential free alarm contact of the non-medical device. This resistor monitors the connection to the device for line breaks and disconnection.

Line Break Detection using a Change-Over Contact

The end of line resistor with a value of 22KΩ / ¼W is connected between the normally open and the normally closed change-over contacts of the non-medical device. This is the recommended line break detection method because the connection of the non-medical device is reliably monitored, as well as the alarm cable.

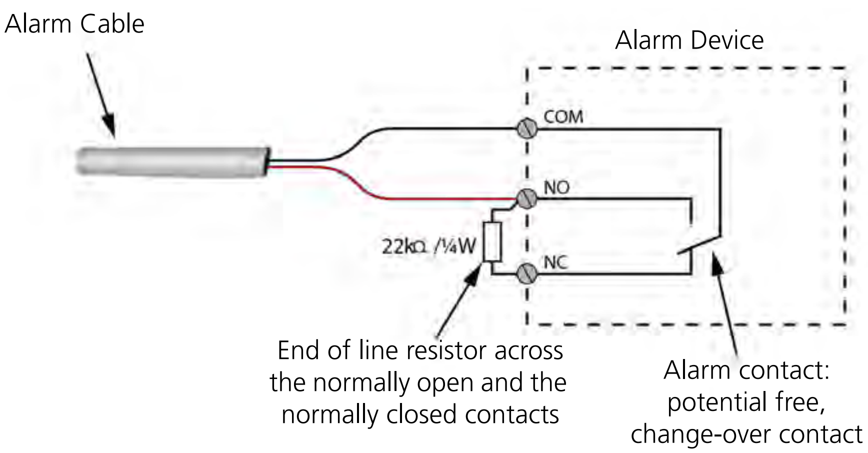


Figure 260. Alarm cable and the end of line resistor

Line Break Detection using a Normally Open Contact

The end of line resistor with a value of 22KΩ / ¼W is connected across the normally open contact of the non-medical device.

Warning: *This line break detection method offers limited protection because it is possible for the disconnection of the non-medical device to go undetected.*

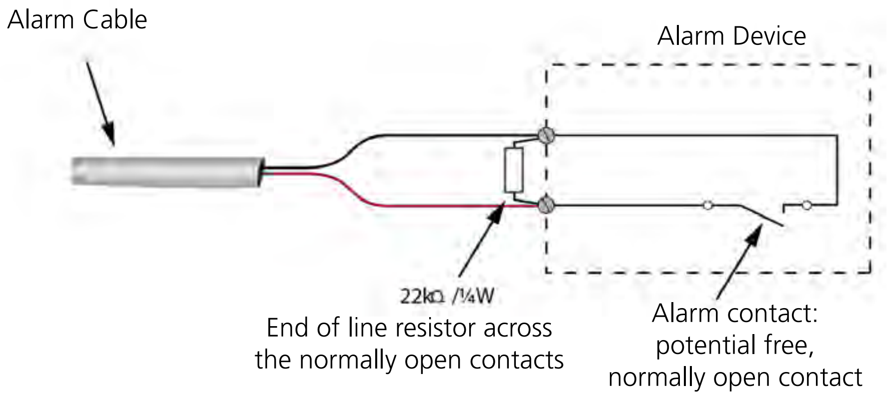


Figure 261. Alarm cable and the end of line resistor

8 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.

IMPORTANT: *Please note that normally closed (NC) contacts cannot be used when using an NICB connected to the Door Side Module (NIDM) or the Toilet Cancel Module - Active (NITC-XXA).*

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

8.1 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)" (details on page 185)
- "Door Side Module (NIDM) and Toilet Cancel Module - Active (NITC-XXA)" (details on page 186) - normally open (N.O.) contacts only
- "Room Display (NIRD)" (details on page 189)
- "Multi General Alarm Module (NIGA)" (details on page 192)

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.

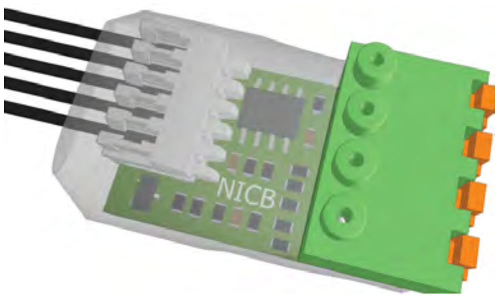


Figure 262. Connection Board (NICB)

8.2 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 117)
- "Duty Selector (NIDS)" (details on page 145)
- "Card Reader (NICR)" (details on page 147)
- "NIFX Fixed Transceiver" (details on page 253)

- "NITX Mobile Transceiver and NITX Staff Transceiver" (details on page 259)

8.3 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 one 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.

8.4 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 263. Connection Board Kit NICB-AAA.

Figure 264. Product label on the Connection Board.

Figure 265. Product label on the NICB-AAA.

8.5 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 266. Connections on the NICB

8.5.1 4-Pole Connector Terminal

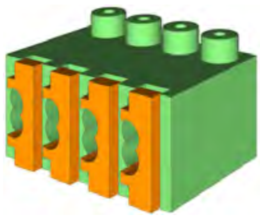


Figure 267. 4-pole connector terminal

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 101.

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

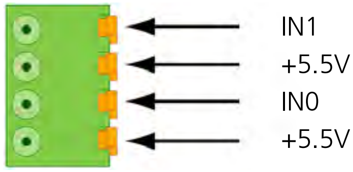


Figure 268. 4-pole connector terminal with the inputs.

8.5.2 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).

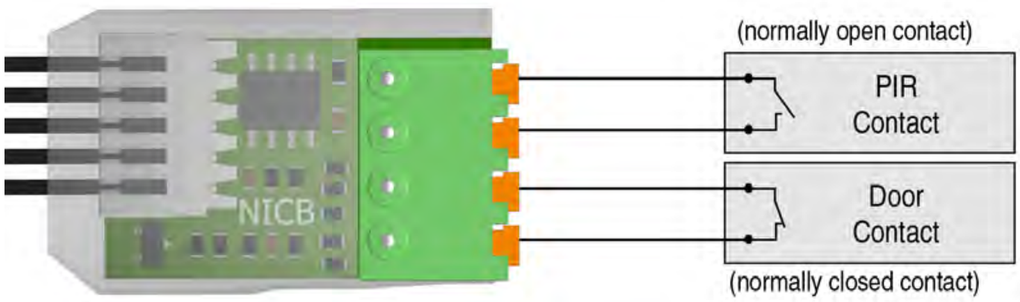


Figure 269. NICB connected to external contacts.

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

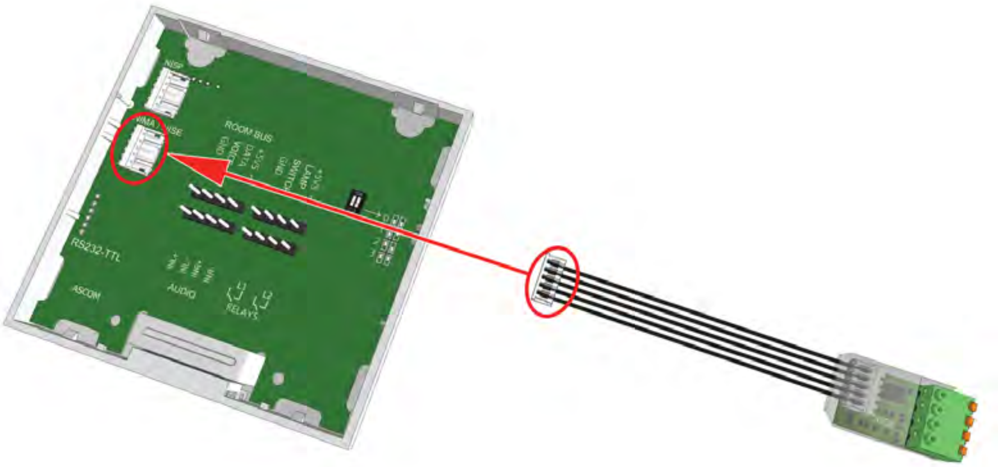
8.6 Bed Module (NIBM2)

The module NIBM2 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 270. Bedside module NIBM2: front and back view

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



Note: *Connecting the NICB to the NIBM2.*

8.7 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.

IMPORTANT: *Please note that normally closed (NC) contacts cannot be used when using an NICB connected to the Door Side Module (NIDM) or the Toilet Cancel Module - Active (NITC-XXA).*

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

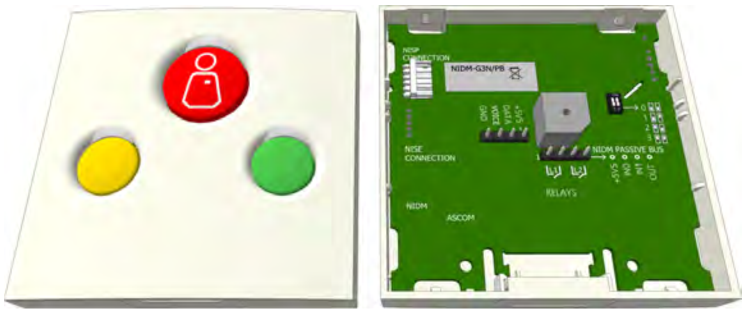


Figure 271. Door side module: front and back view

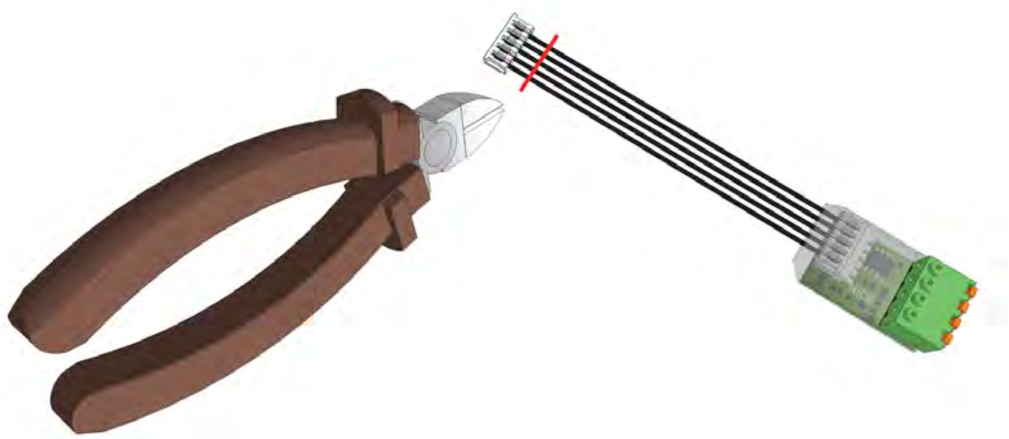
Note: *The two 4-pole screw terminals which are required to connect the room bus and the passive bus to the NICB module must be ordered separately. The article number is R180768.*

8.7.1 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.

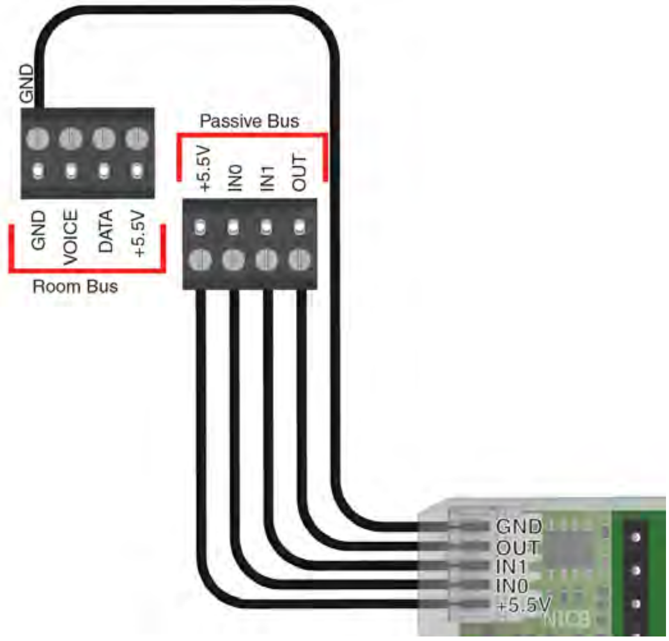
Note: *The cross cable wires are not solid and cannot be used with the NICT4-AA 4-pole connector.*

- Cut off the end of the cross cable.

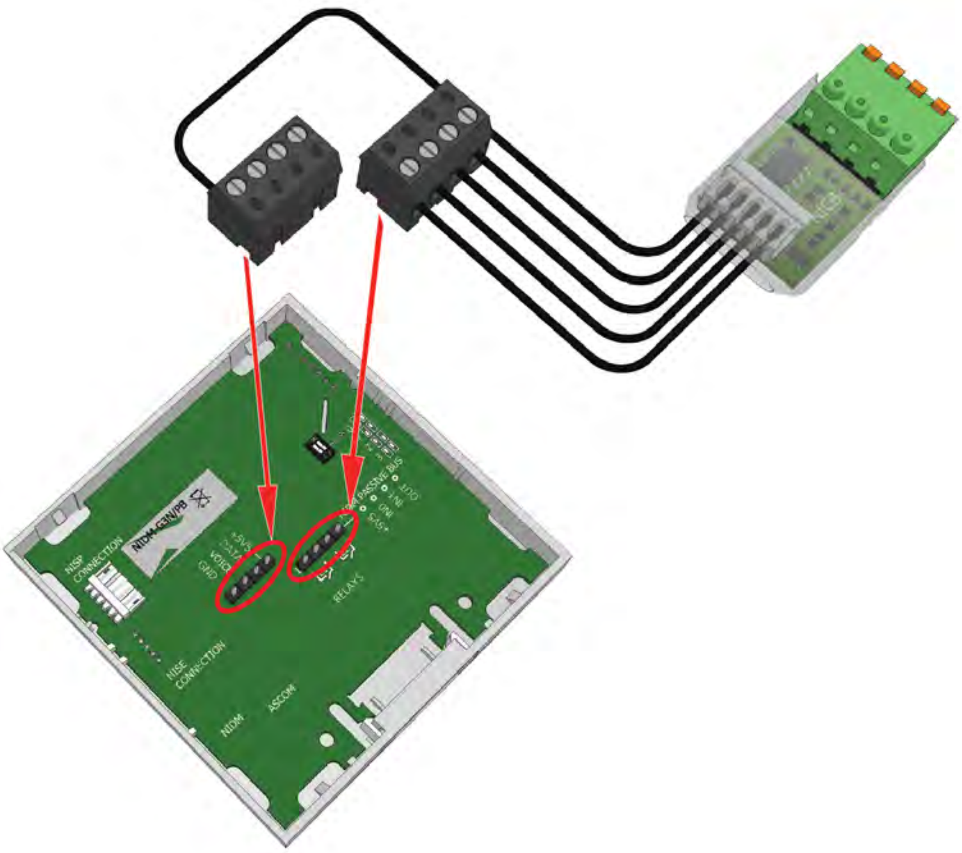


- Strip the insulation from the end of each wire over 5mm (3/16in).

- 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.*

8.8 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 272. Room Display

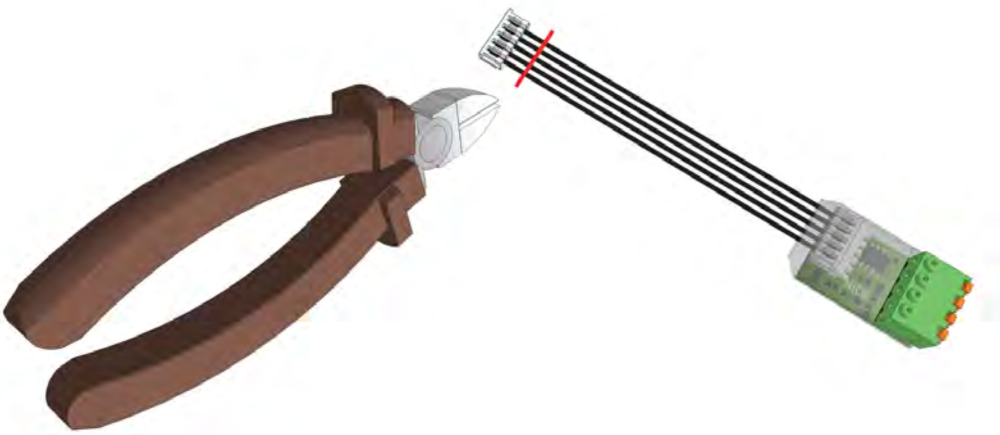
Note: *The 8-pole connector terminal which is required to connect the room bus and the external bus to the NICB module must be ordered separately. The article number is R180732.*

8.8.1 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.

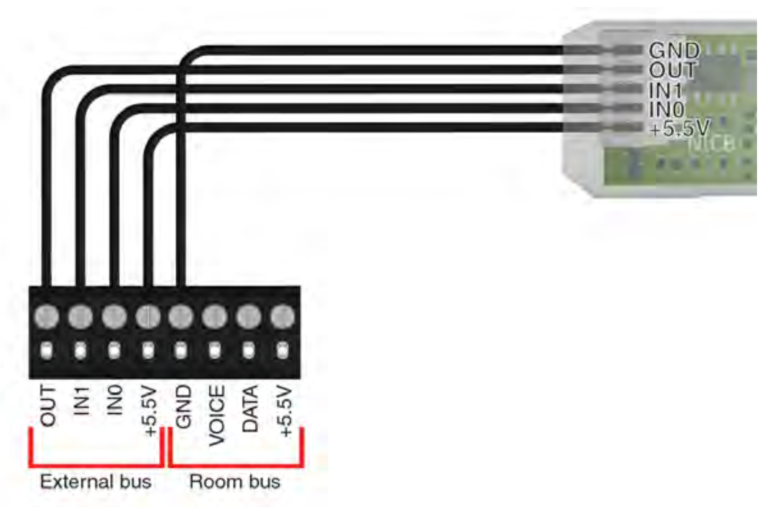
Note: *The cross cable wires are not solid and cannot be used with the NICT8-AA 8-pole connector.*

- Cut off the end of the cross cable.

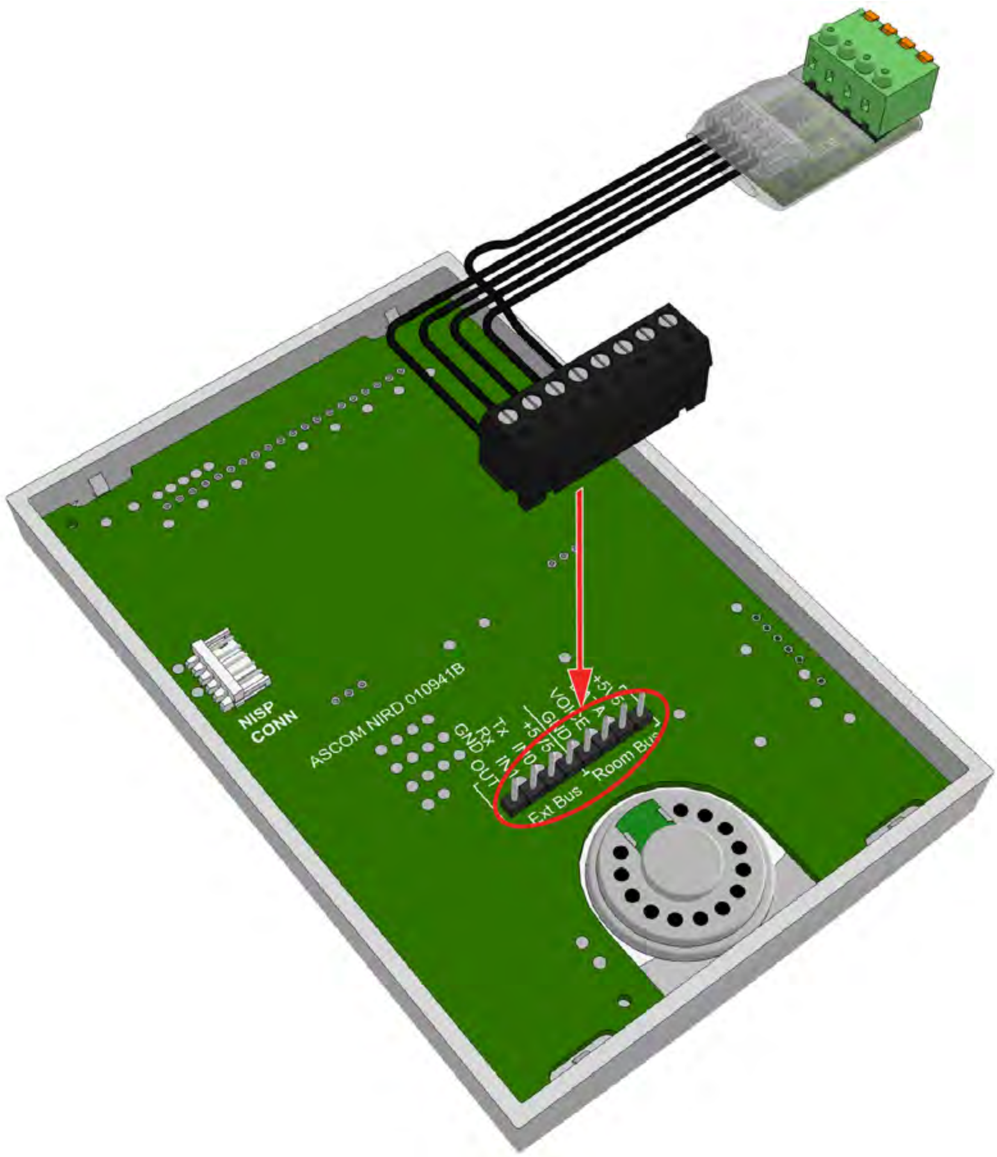


- Strip the insulation from the end of each wire over 5mm (3/16in).

- Connect the wires to the 8-pole screw connector.



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



8.9 Multi General Alarm Module (NIGA)

The Multi General Alarm Module (NIGA) is the interface between non-medical equipment from third parties and a teleCARE nurse call system. The NIGA via the NICB can be connected to one of the following modules:

- NIBM2 or active NIPC
- NIDM or active NITC
- NIRD

Note: *The LEDs and the disconnect button on the NIGA are not in use when connected to the NICB.*

Note: *The test button can be used to test the inputs. The test button can only be used to test normally-open contacts. The response depends on the configuration of the inputs. Refer to the Configuration Manual (TD92610EN) for details.*

IMPORTANT: *The NIGA is not an MDD/MDR compliant MMA - medical alarm monitoring device. Therefore the monitoring of medical alarm contacts from medical devices is not allowed using the NIGA. To monitor medical alarm contacts, the MDD/MDR compliant MMA - Multi Medical Alarm Module (NIMA) must be used.*

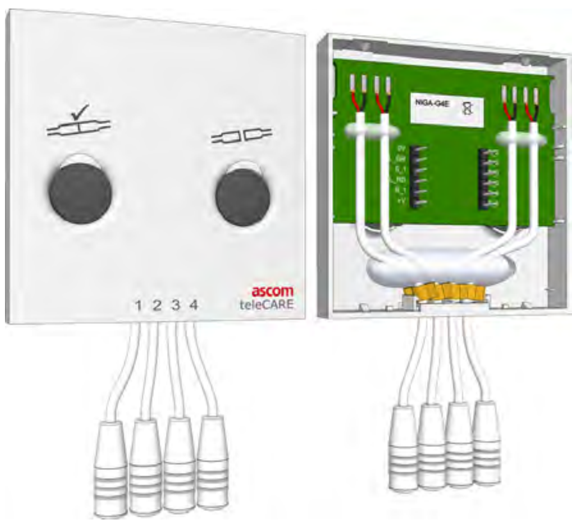


Figure 273. Multi General Alarm Module NIGA: front and back view

The multi general alarm module (NIGA) is comprised of two buttons and four general alarm inputs for monitoring up to four normally open relay contacts from non-medical devices.

The NIGA has the following connectors:

- Two 6-pole connectors -> for connection to the NICB.
- Four 2.5mm TRS jack sockets for connection to external input contacts.

8.9.1 Connection variations

The multi general alarm module has four inputs. The following connection variations are described:

- “Connecting NIGA inputs to one NICB input” (details on page 193)

- "Connecting NIGA inputs to two NICB inputs" (details on page 194)
- "Connecting all NIGA inputs separately" (details on page 195)

8.9.2 Connecting NIGA inputs to one NICB input

When connecting the NIGA to one NIBM2 or NIPC, all inputs of the NIGA must be connected in parallel and are treated as a single input. The NIGA has four inputs connected to the board's two 6-pole connectors. These inputs must be connected together to produce a single input on the NICB.

- Use solid wires, and strip each solid wire over a length of 5mm (3/16in) on both ends.
- Connect S_4 to S_3, S_3 to S_2, and S_2 to S_1.
- Connect S_1 to the IN0 on the 4-pole connector of the NICB
- Connect +V to the +5.5V on the 4-pole connector of the NICB.

The following figure shows the connections.

IMPORTANT: *The inputs to the NIGA must all be normally-open dry relay contacts.*

The outputs S_1 through S_4 are all connected via S_1 to the input IN0 on the NICB. A close up of the connections is shown in the following figure. S_2 is connected to S_1, for clarity this is shown with a blue wire.

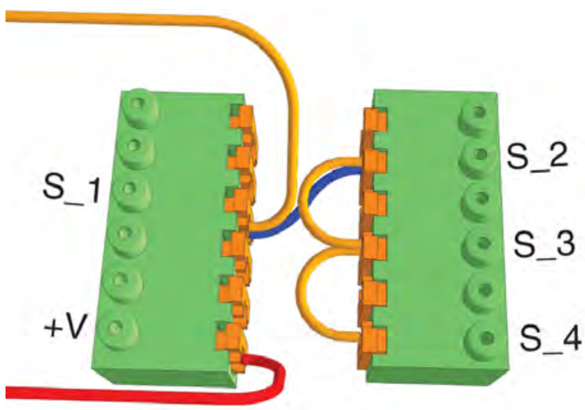
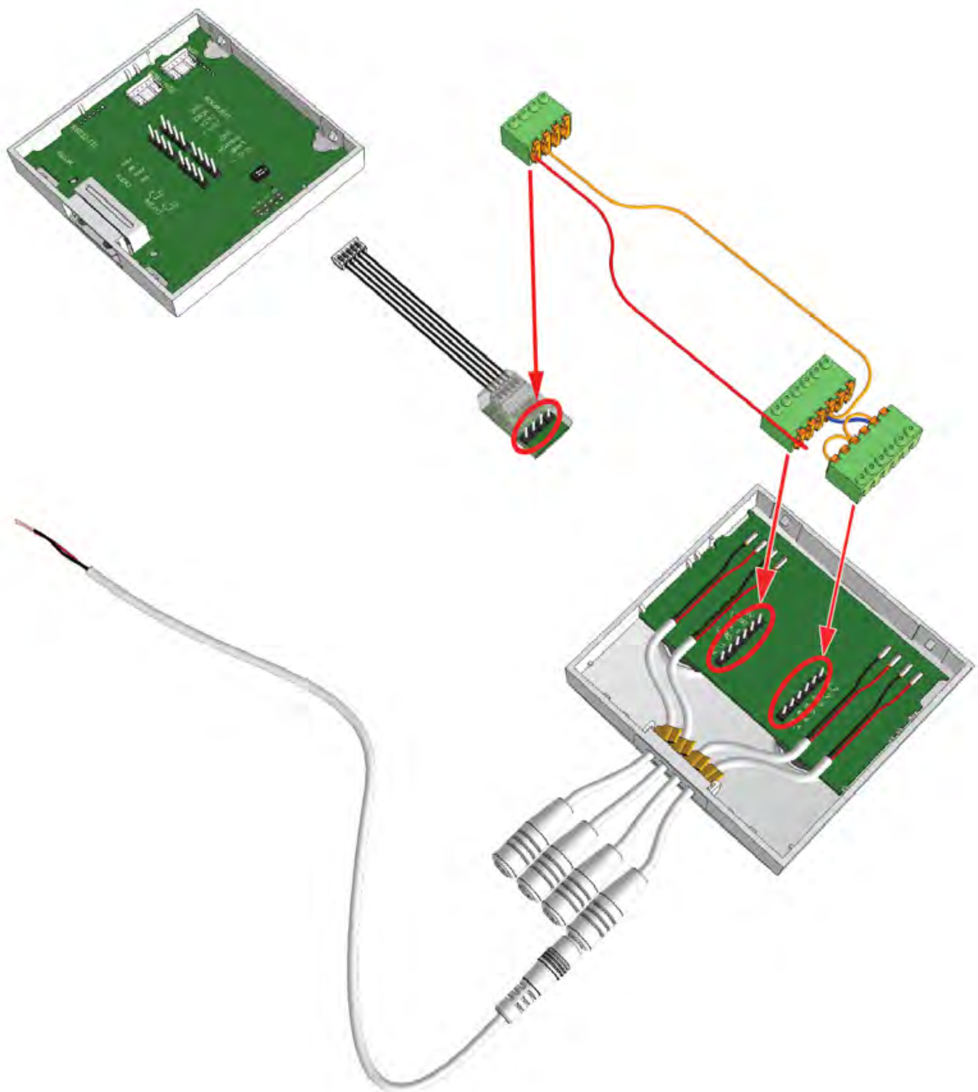


Figure 274. Close up of the NIGA connectors. S_2 connects to S_1.

- Place the 6-pole terminals on the NIGA.
- Place the 4-pole terminal on the NICB.
- Connect the NICB to the switch module.

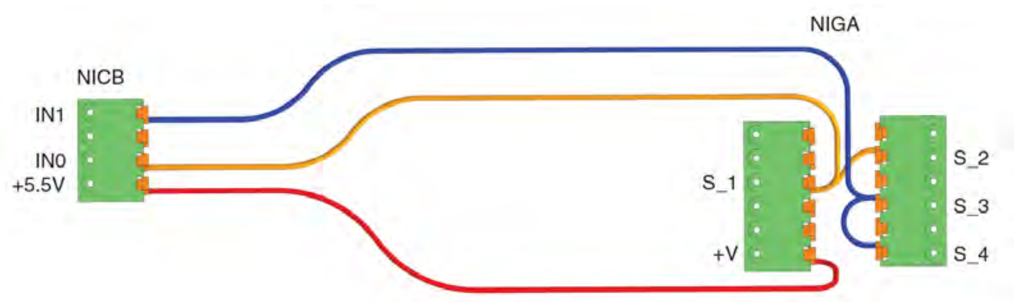


8.9.3 Connecting NIGA inputs to two NICB inputs

Connecting the NIGA to one NIDM/NITC/NIRD, all inputs of the NIGA shall be divided over the two inputs of the NICB. Two of each NIGA inputs are connected in parallel and are treated as a single input.

- Use solid wires, and strip each solid wire over a length of 5mm (3/16in) on both ends.
- Connect S_4 to S_3.
- Connect S_3 to the IN1 on the 4-pole connector of the NICB.
- Connect S_2 to S_1.
- Connect S_1 to the IN0 on the 4-pole connector of the NICB.
- Connect +V to the +5.5V on the 4-pole connector of the NICB.

The following figure shows the connections.



IMPORTANT: *The inputs to the NIGA must all be normally-open dry relay contacts.*

- Place the 6-pole terminals on the NIGA
- Place the 4-pole terminal on the NICB.
- Connect the NICB to the switch module.

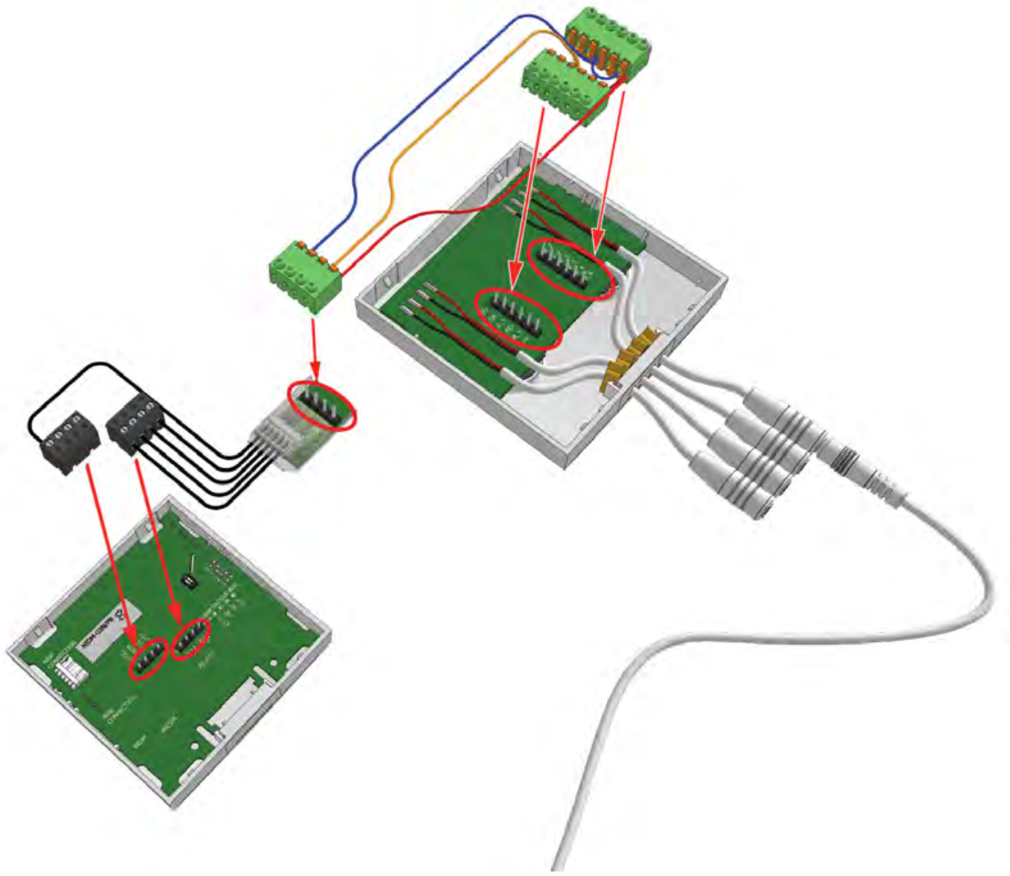


Figure 275. Placing the connectors. Connecting the NICB to an NIDM.

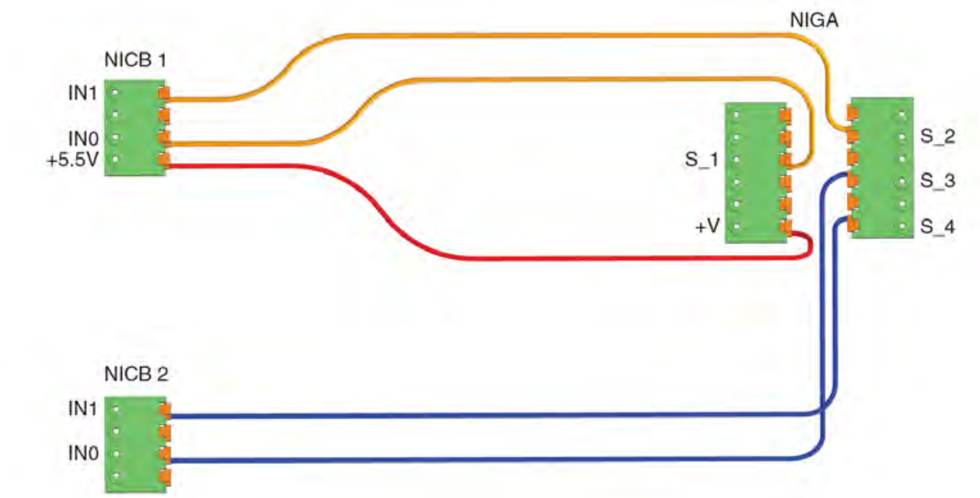
8.9.4 Connecting all NIGA inputs separately

To fully use all the inputs of the NIGA independently, two NICBs must be used. Each NICB output shall be individually connected to the inputs of one of the NIDM, NITC-XXA, or NIRD switch modules.

- Use solid wires, and strip each solid wire over a length of 5mm (3/16in) on both ends.

- Connect S_1 to the IN0 on the 4-pole connector of the 1st NICB.
- Connect S_2 to the IN1 on the 4-pole connector of the 1st NICB.
- Connect +V to the +5.5V on the 4-pole connector of the 1st NICB.
- Connect S_3 to the IN0 on the 4-pole connector of the 2nd NICB.
- Connect S_4 to the IN1 on the 4-pole connector of the 2nd NICB.

The following figure shows the connections.



WARNING: *The switch modules must be connected to the same Room bus.*

Note: *The inputs to the NIGA can be normally open or normally closed dry relay contacts.*

- Place the 6-pole terminals on the NIGA
- Place the 4-pole terminals on the two NICBs.
- Connect the NICBs to the switch modules.

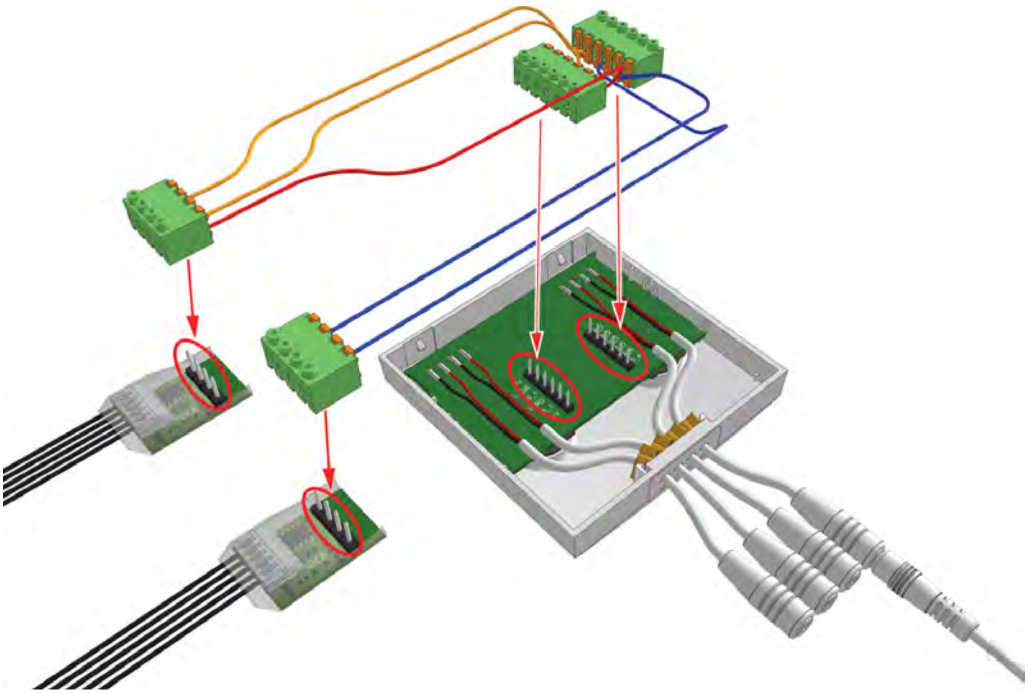


Figure 276. Placing the connectors. on the NIGA and the NICBs.

8.9.5 Connecting an external Device to the Multi General Alarm Module

The multi general alarm module has four alarm inputs for monitoring up to four non-medical devices. To connect the NIGA inputs to a non-medical device, use a cable with a 2.5mm TS jack on one end and an open end exposing two wires on the other side. For example use the Medical Alarm Cable (660393).

The two wires at the open end of the cable shall be connected to a potential-free, galvanically separated, normally open alarm contact of the non-medical device. The 2.5mm TS jack is plugged into one of the four inputs of the NIGA.

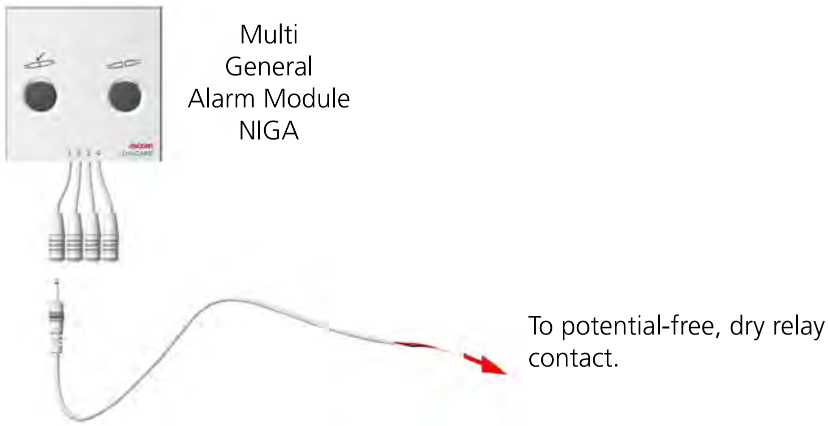


Figure 277. Connecting a general alarm contact

8.9.6 Alarm Cable

The Medical Alarm Cable (660393) can be used to connect non-medical devices to the NIGA.

Warning: *No line break detection is available, so it is possible for the disconnection of the non-medical device to go undetected.*

IMPORTANT: *The use of end-of-line (EOL) resistor is not permitted.*

9 Corridor Equipment

9.1 Corridor Display

Installation instructions for NUCD12IP-H and NICD corridor displays.

The corridor display is suitable for use as a messaging display in Ascom systems. It contains a LAN interface, and is connected directly to the LAN network.

The corridor display NUCD12IP-H and NICD can be powered using Power over Ethernet (PoE) through a PoE switch or through an external 24Vdc power supply using a shielded PoE injector.

Shielded ethernet cables (Cat5e or higher) should be used to connect the corridor display to the network.

From the build-in web interface the basic configuration of the corridor display can be adjusted, for example the IP address, host name and communication port.

General text display settings can be set in the NISM2 or in the Unite Connectivity Manager (UCM). Up to 50 corridor displays can be added to a single NISM2 or UCM. Extend the system with 50 or more corridor displays by adding 1 or more additional Unite Connectivity Managers (UCM).

The NISM2 and/or UCM are used to define such things as message display time, number of stored messages, the colour of the displayed message depending on message priority and buzzer options.

The display mode can be set to constant (with short blank period in between), to scrolling (from bottom to top) when there are two or more active calls to be displayed or to rotate (from right to left) for displaying messages with up to 100 characters. The corridor can display up to 30 different messages. If the maximum number of messages is reached, the oldest message with the lowest priority will be cleared first. When the display is not showing any messages (idle), it can be configured to show the time or any other type of welcome message.

The display can be ceiling mounted using a wire suspension kit, or wall mounted using a special wall mounting bracket.

9.1.1 Corridor Display Network Requirements

- Ethernet 10 BaseT
- half duplex
- no auto-crossing
- no auto-negotiation
- no auto-polarity

Note: *The display will not work on non-standard (reversed polarity) switches using a normal straight cable. Reversed polarity switches require a special Reverse Polarity Cable.*

9.1.2 NUCD12IP-H

The NUCD12IP-H display has a large character (height 50 mm), white LED message display with a large RGB priority color (Red/Green/Amber/Blue/Magenta/Cyan/White) indicator and a signalling buzzer. It is only available as a single sided unit with a 12-character display (up to 14 characters proportional).

Figure 278. 12 character Corridor Display (NUCD12IP-H)

9.1.3 NICD

The NICD has a large character, 3-colour (Red/Green/Amber) message display and a signalling buzzer. It is available as a single or double sided unit with a 6-character or a 12-character display.

Figure 279. 6 and 12 character Corridor Display (NICD)

9.1.4 Preparing Single-Sided Displays Prior to Mounting

Before a single-sided display can be mounted, the LAN cable must be connected to the rear of the display first. The first step is to remove the metal strain reliever plate from the back of the display by unscrewing the 2 screws.

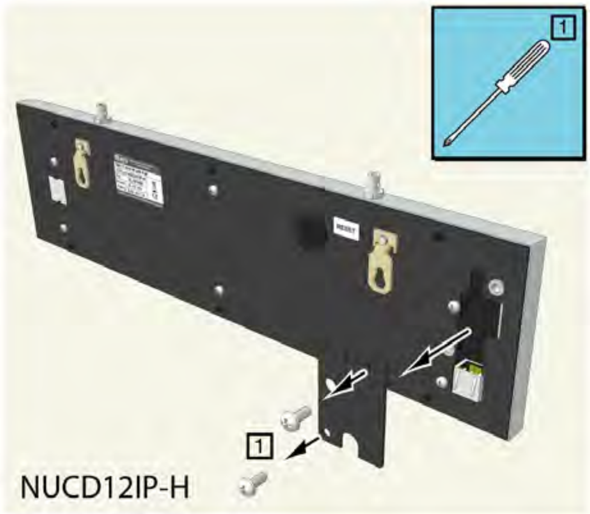


Figure 280. Remove the strain reliever plate from the NUCD12IP-H

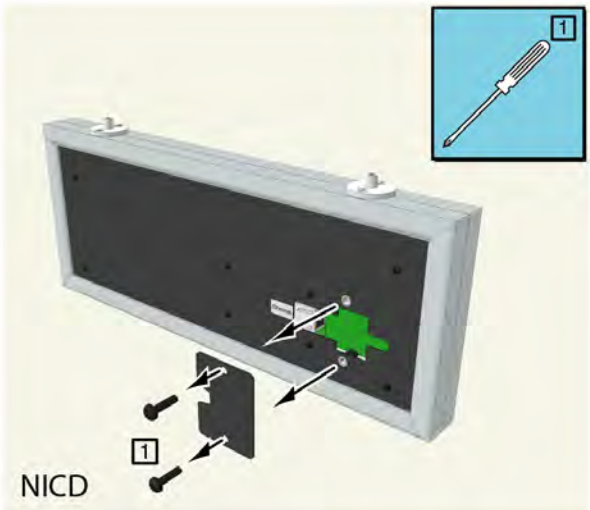


Figure 281. Remove the strain reliever plate from the NICD

Plug the RJ-45 connector of the network cable into the ethernet socket of the display and place the strain reliever plate back in place.

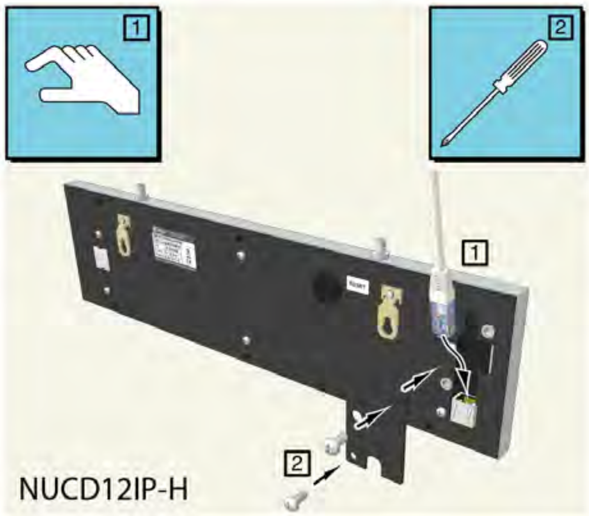


Figure 282. Plug the RJ-45 connector into the NUCD12IP-H

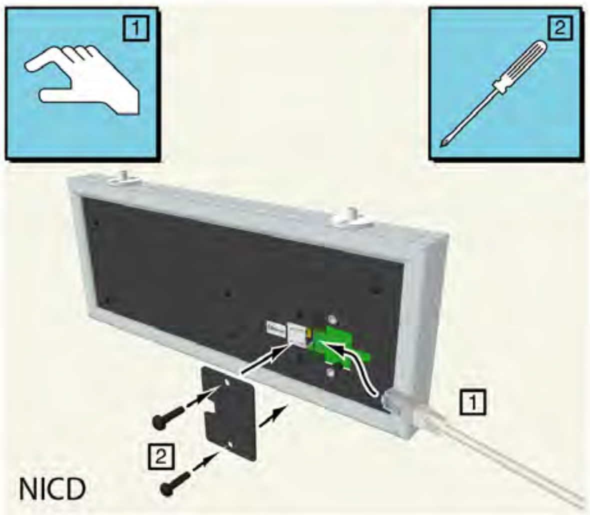


Figure 283. Plug the RJ-45 connector into the NICD

9.1.5 Mounting the Corridor Display

The corridor display is prepared for wall mounting using a special wall mounting bracket which is available as an accessory. It also can be ceiling mounted on wires with a wire suspension kit.

Figure 284. Wall mounted corridor display

Figure 285. Ceiling mounted corridor display

IMPORTANT: *The method of fixing the corridor displays to walls or ceilings must be capable of safely supporting the weight of the corridor display and the mounting accessories (such as the wall mounting bracket).*

The NUCD12IP-H is only available as a single sided display. Two NUCD12IP-H displays can be mounted back to back on a wall mounting bracket, for full details see “NUCD12IP-H Wall Mounting Bracket - Double” on page 207.

IMPORTANT: *Note that when mounting two NUCD12IP-H displays back to back to create a double sided display, two network cables are required to address each display individually.*

NUCD12IP-H Dimensions

Dimensions & Weights

- Weight of the NUCD12IP-H display = 0.9 kg

The method used to fix the NUCDIP12-H to the ceiling or on the wall must be capable of safely supporting the display and the mounting accessories (such as the wall mounting bracket).

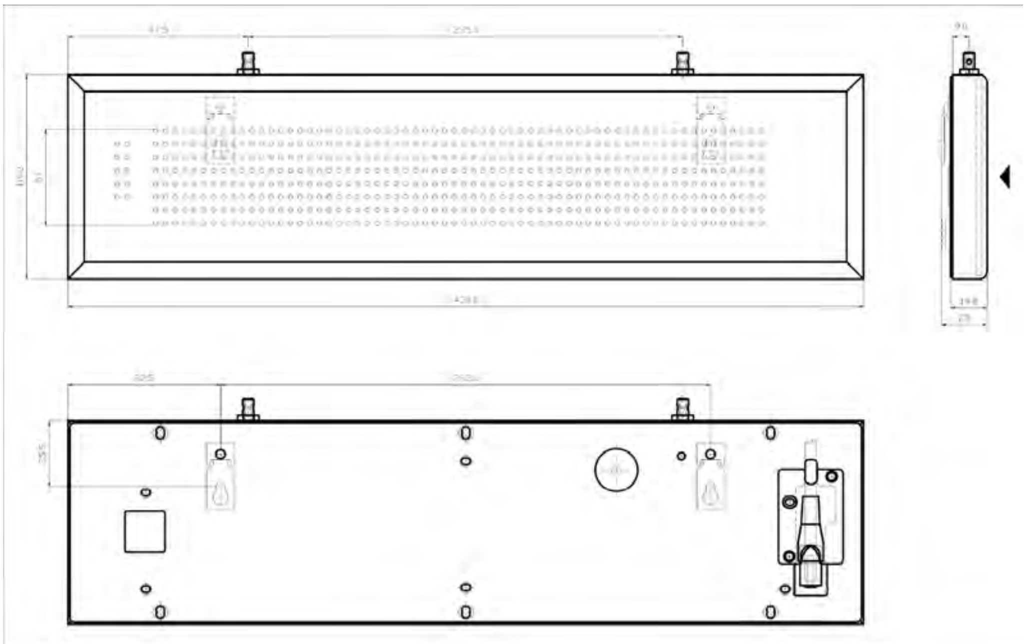
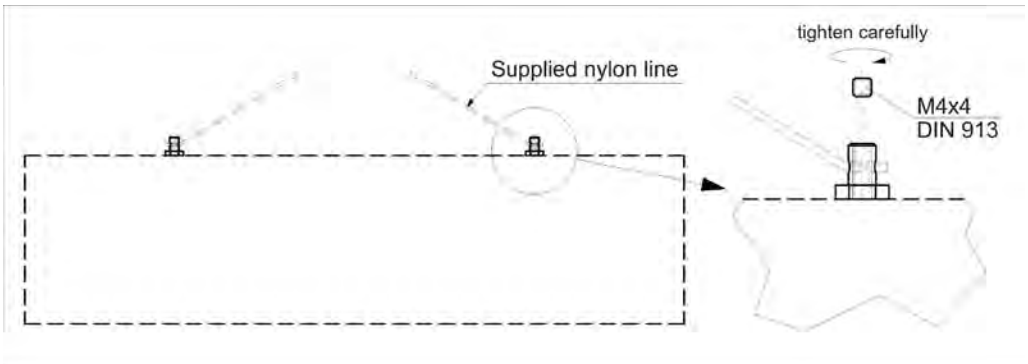
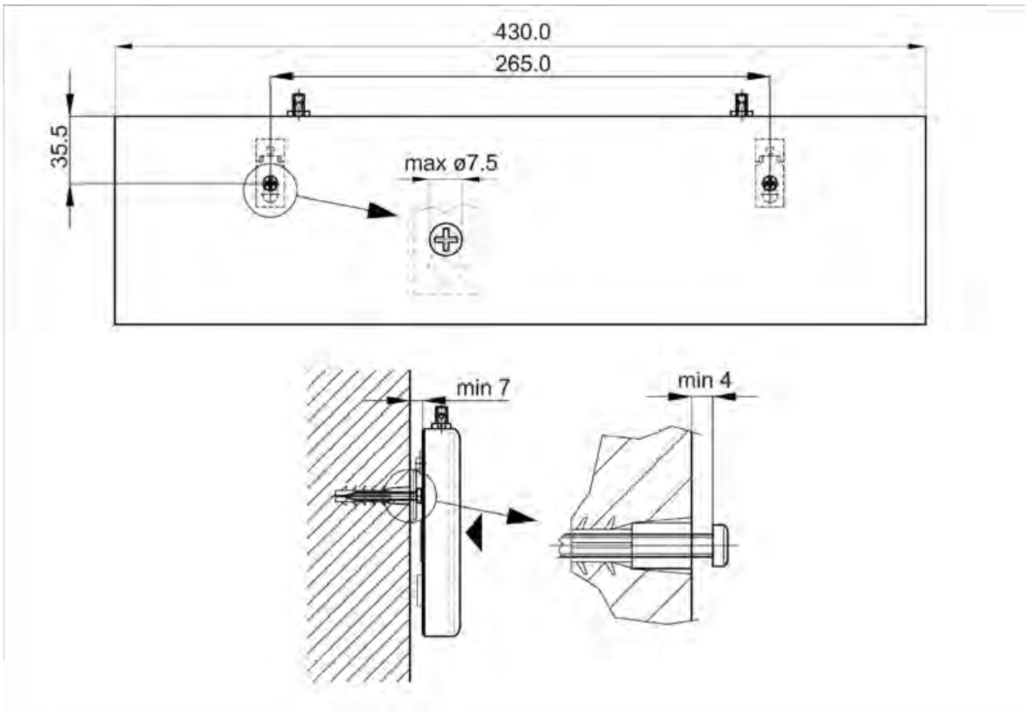


Figure 286. NUCD12IP-H Dimensions

NUCD12IP-H Ceiling Mount



NUCD12IP-H Direct Wall Mount



NUCD12IP-H Wall Mounting Bracket - Single

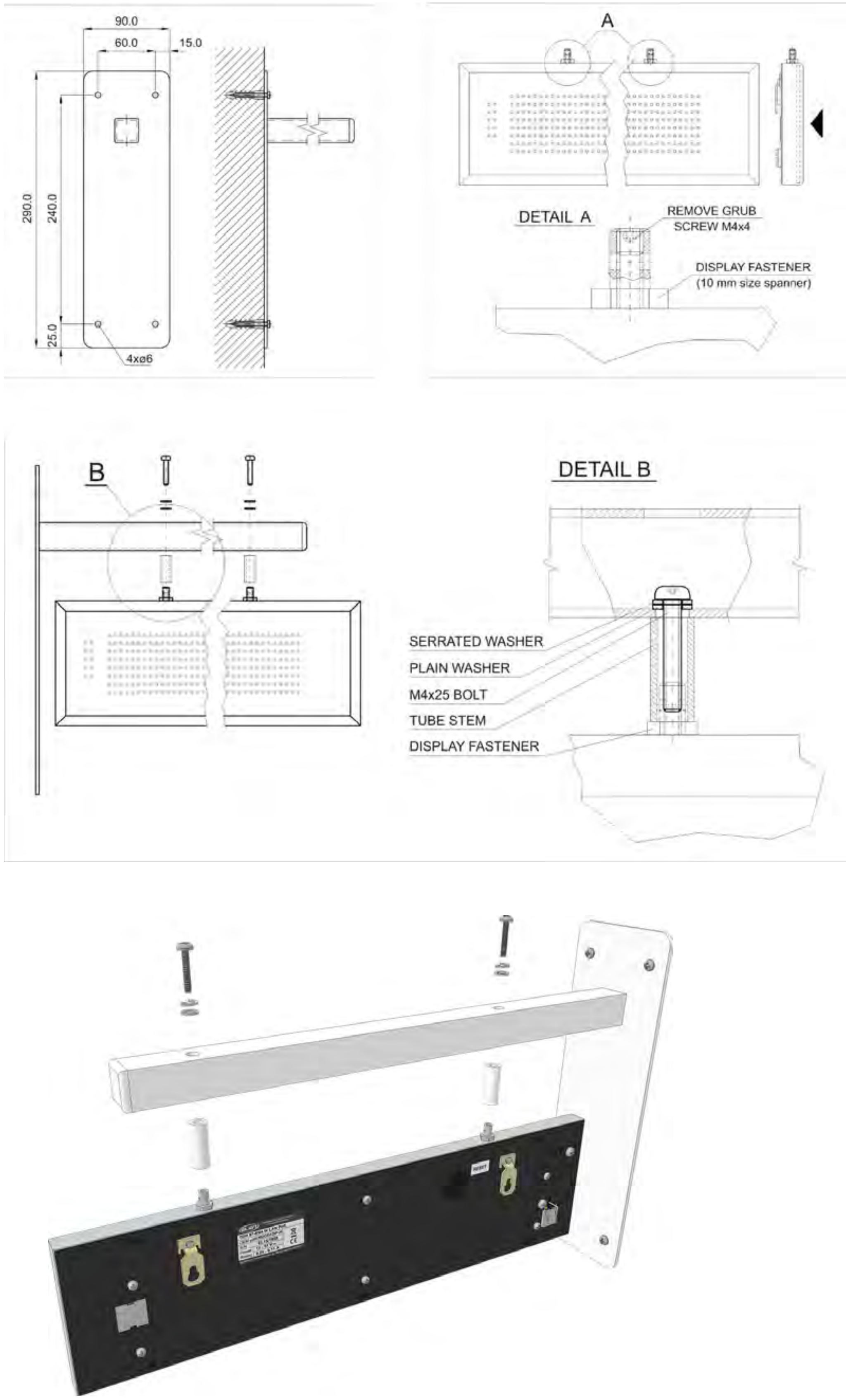


Figure 287. NUCD12IP-H wall mounting bracket - single

NUCD12IP-H Wall Mounting Bracket - Double

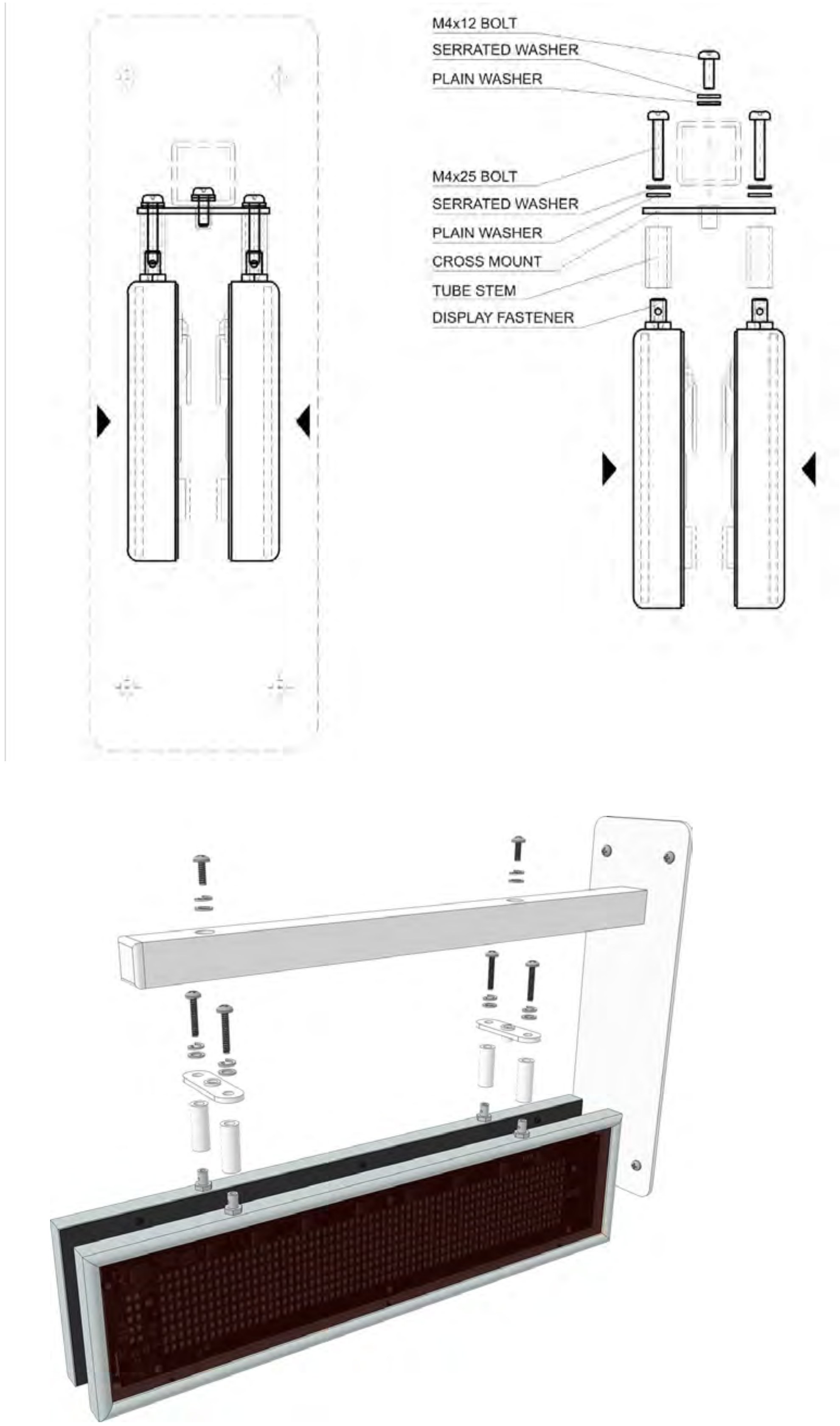


Figure 288. NUCD12IP-H wall mounting bracket - double

NICD Wall Mounting Bracket

The NICD wall mounting bracket is available in two sizes, for the 6-character display and for the 12-character display.

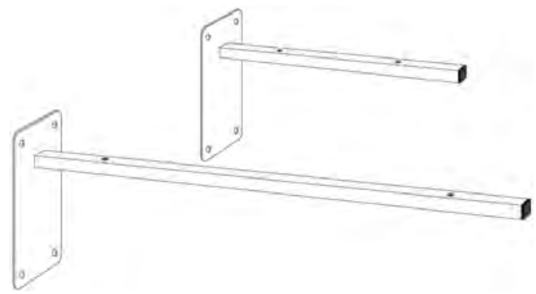


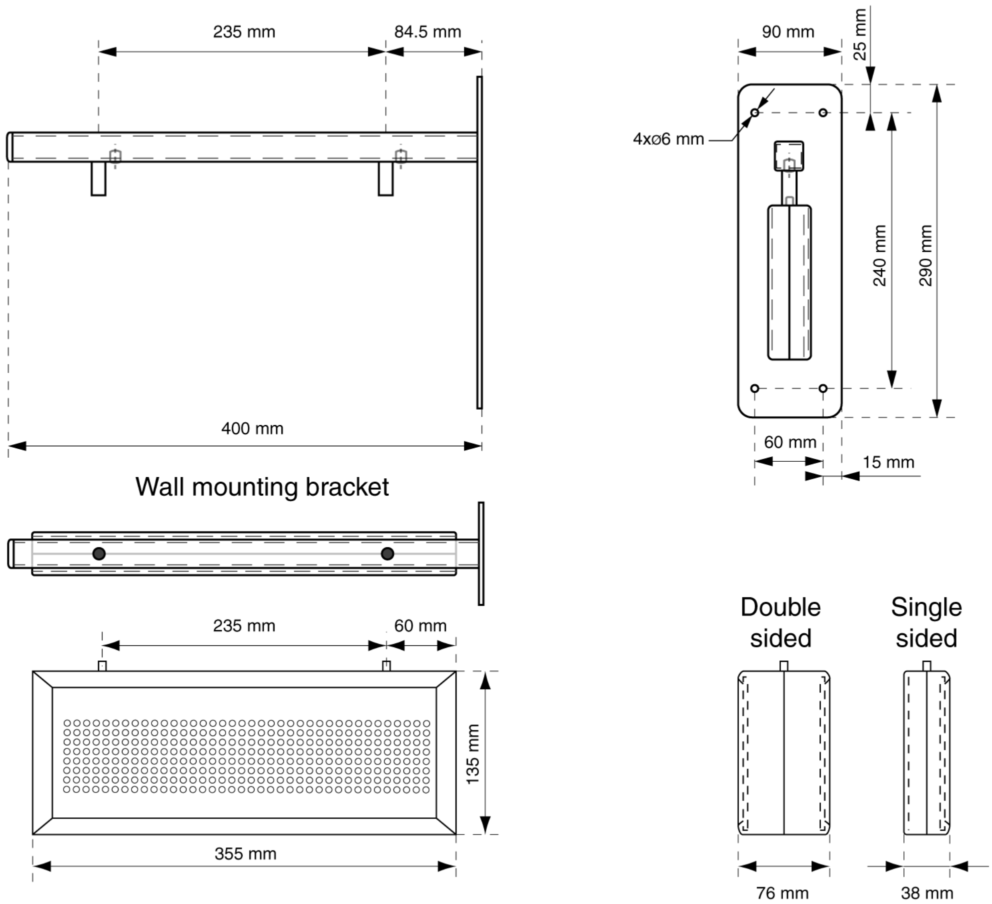
Figure 289. 6 and 12 character mounting brackets

Dimensions & Weights

The method used to fix the mounting bracket to the wall must be capable of safely supporting the combined weight of the NICD and the mounting bracket.

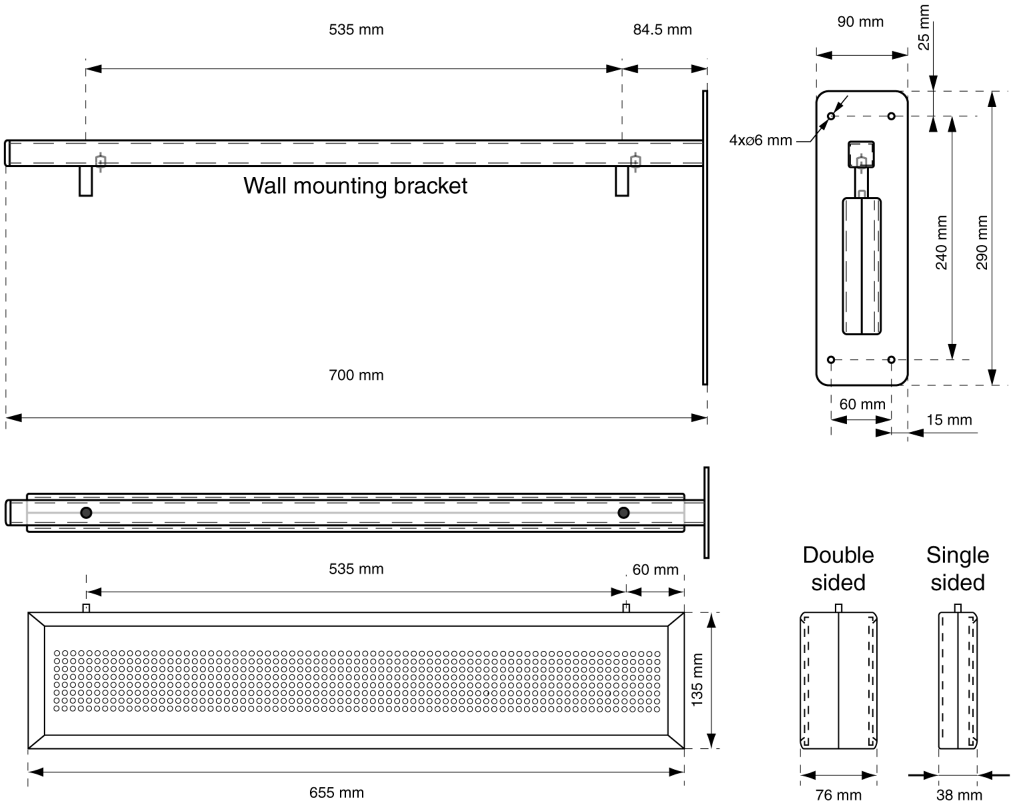
6 Character NICD

- Weight of the 6 character single-sided display = 1.7 kg
- Weight of the 6 character double-sided display = 2 kg
- Weight of the 6 character mounting bracket = 1.5 kg



12 Character NICD

- Weight of the 12 character single-sided display = 2.8 kg
- Weight of the 12 character double-sided display = 3.3 kg
- Weight of the 12 character mounting bracket = 2 kg



Wall Mounting Bracket Installation

When placing the wall mounting bracket on the wall, consider the minimum height at which the display should be mounted. The minimum installation height depends on things like opening a door in the vicinity of a display or an object transported through the corridor. Make sure that in none of these circumstances the object will hit the display.

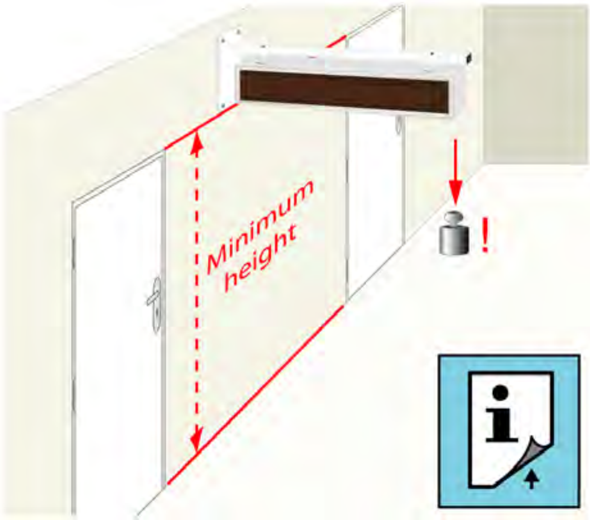


Figure 290. Minimum installation height

To mount the bracket on the wall, drill four holes according to the dimensions of the mounting bracket.

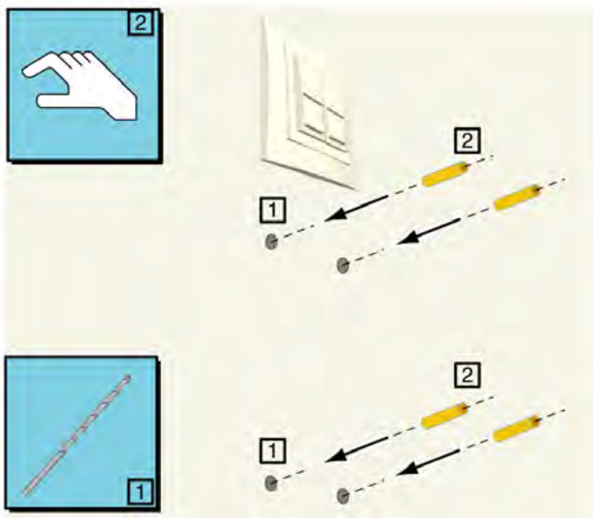


Figure 291. Drilling four holes for mounting the bracket

Fix the mounting bracket on the wall by using four well-fitted screws capable of carrying the weight of the display(s) and the mounting bracket.

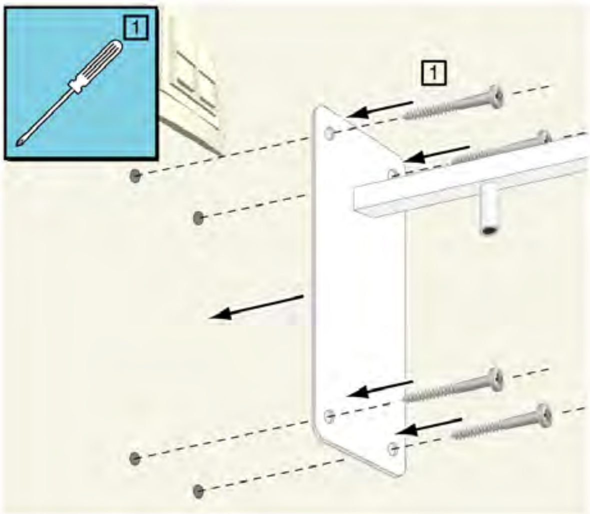


Figure 292. Fixing the wall mounting bracket

The next step is to mount the display on the wall mounting bracket. First start by removing the two hex screws at the top of the display using an allen key (Hex key wrench).

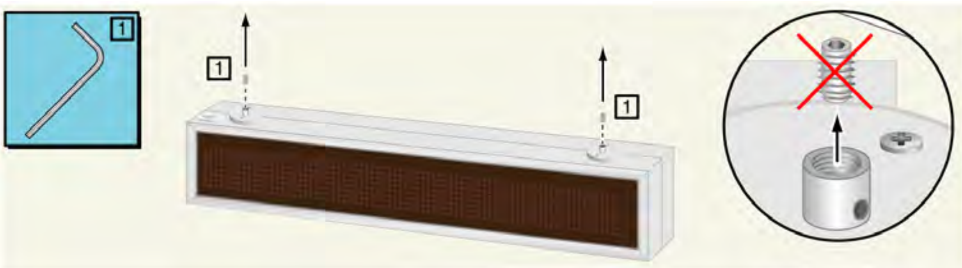


Figure 293. Remove the two hex screws from the display.

Use the included accessories to mount the display on the bracket.

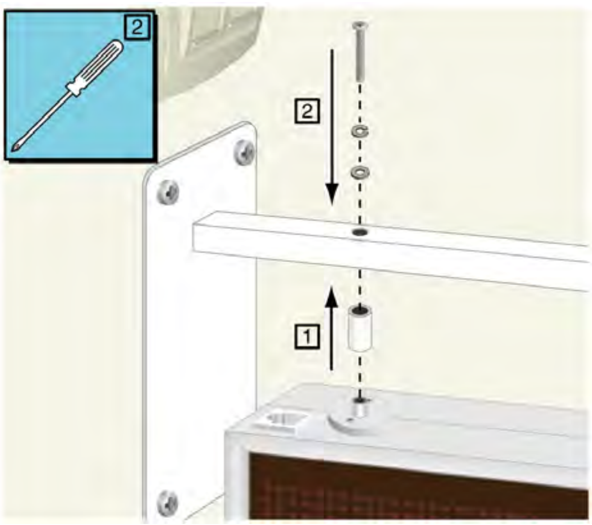


Figure 294. Mount the display on the bracket

Finally connect the ethernet cable from the outlet to the corridor display.

Figure 295. Connecting the displays ethernet cable

Double Sided NUCD12IP-H Display Wall Mount

Two single sided NUCD12IP-H displays can be mounted (back to back) onto the wall mounting bracket using the cross mount plate to create a double sided display.

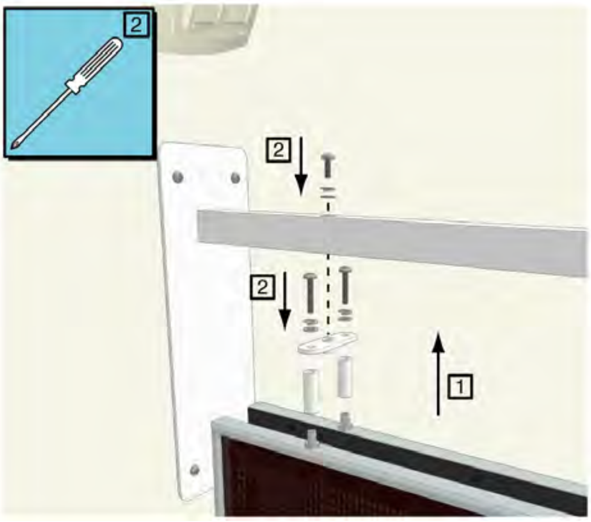


Figure 296. Mount two NUCD12IP-H displays onto the bracket

IMPORTANT: *Note that using a double sided NUCD12IP-H bracket mount requires two network cables to address each display individually.*

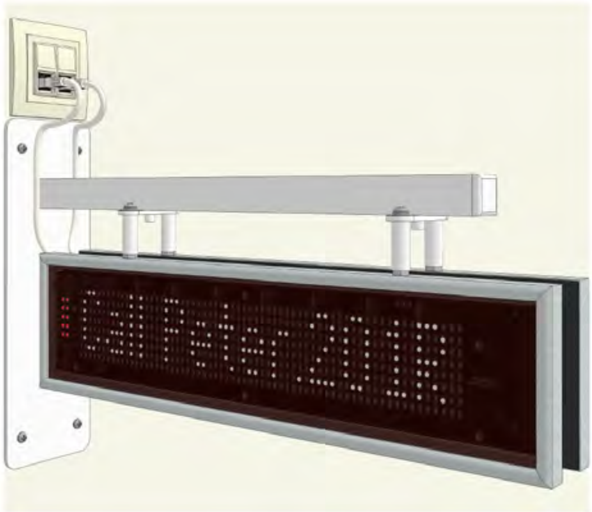


Figure 297. A double sided NUCD12IP-H bracket mount requires 2 network cables

Up to 50 corridor displays can be added to a single NISM2 or UCM.

Using two NUCD12IP-H corridor displays on a wall mounting bracket requires the use of two network cables. The NUCD12IP-H displays have to be addressed individually in the Elise 3 module (NISM / UCM) which will limit the maximum amount of double sided NUCD12IP-H display locations to 25 for each NISM / UCM.

Direct Wall Mounting

With the direct wall mount holder, single sided displays can be mounted directly onto the wall by sliding the displays holding slots onto the wall mount holder that is fixed to the wall.

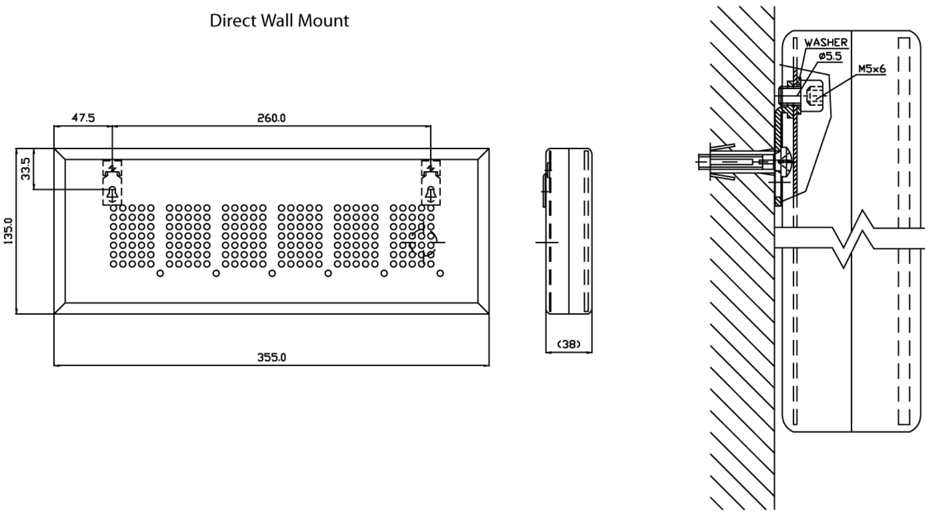


Figure 298. 6 character NICD example

Mount the display with the cable outlet onto a back-box to guide the cable directly into the back-box so no external cabling will be visible.

Corridor Display Ceiling Mounting

With a wire suspension kit the corridor display can be mounted hanging from the ceiling.

IMPORTANT: *The method of fixing the corridor display hanging from the ceiling must be capable of safely supporting the weight of the corridor display. The weight of the corridor display versions are stated in the data sheet TD92916EN (NICD) or TD93114EN (NUCD12IP-H).*

Mount the two eyelet fixtures (not included) in the ceiling. The distance between the eyelet fixtures should be 235 mm for the NUCD12IP-H and the 6 character display (NICD) and 535 mm for the 12 character display (NICD).

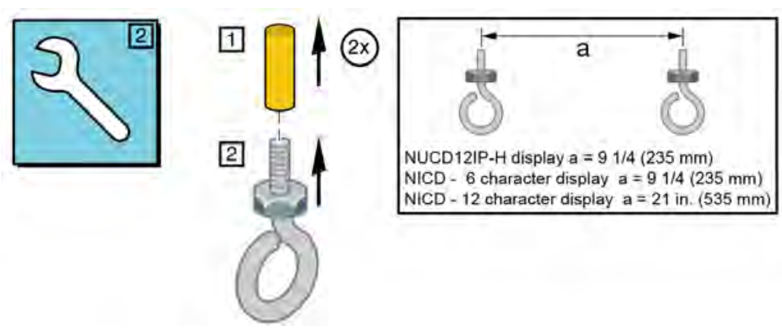


Figure 299. Mounting the eyelet fixtures

On the corridor display fixtures, slightly unscrew the two hex screws at the top, on one end pull the suspension wire through the hole of the display fixture and tighten the hex screw using the allen key (Hex key wrench).

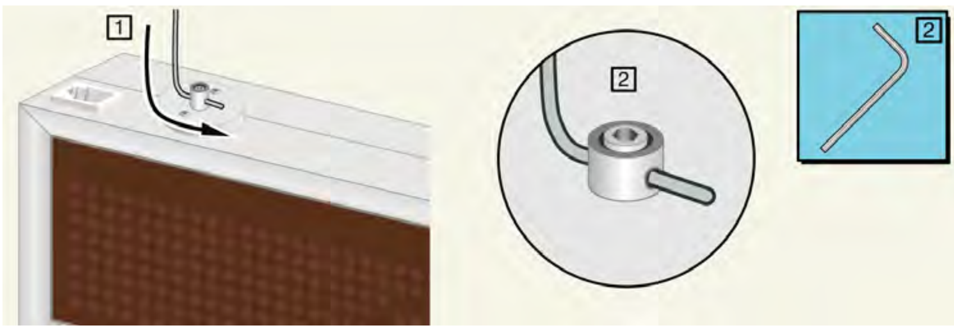


Figure 300. Mount the suspension wire on one end of the display

Pull the suspension wire through the two eyelet fixtures in the ceiling and fix the wire at the other end of the display.

Figure 301. Close the loop and tighten the suspension wire

9.1.6 Corridor Display Electrical Connections

The NICD and the NUCD12IP-H can be powered using Power over Ethernet (PoE) through a PoE switch or through an external 24Vdc power supply using a shielded PoE injector with the 24V negative lead "-" connected to the shield.

A standard T-568B straight-through shielded ethernet cable is used to connect the display to the LAN network.

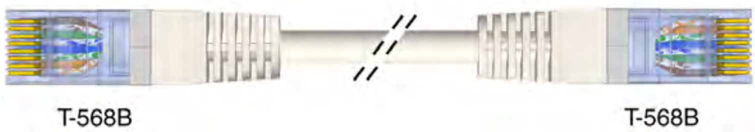


Figure 302. T-568B straight-through shielded ethernet cable

RJ-45	colour (T-568B)	Name	Ext. Power Supply
1	white / orange	TX+	
2	orange	TX-	
3	white / green	RX+	
4	blue	SP1	24 Vdc either polarity
5	white / blue	SP1	
6	green	RX-	
7	white / brown	SP2	24 Vdc polarity opposite to SP1
8	brown	SP2	

Table 4. T-568B cable specification

***IMPORTANT:** The display will not work on non-standard (reversed polarity) ethernet switches using a normal straight cable. A "Reverse Polarity Cable" is required when connecting to a reversed polarity switch.*

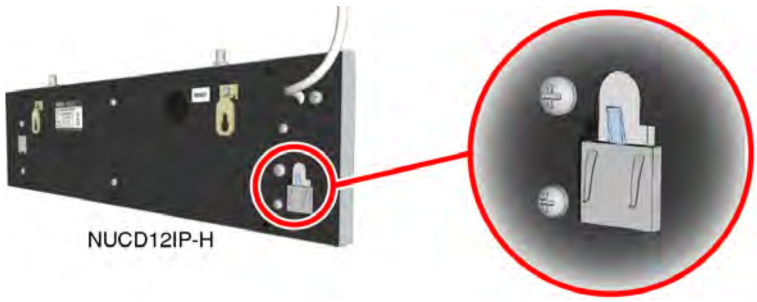


Figure 303. NUCD12IP-H network connection

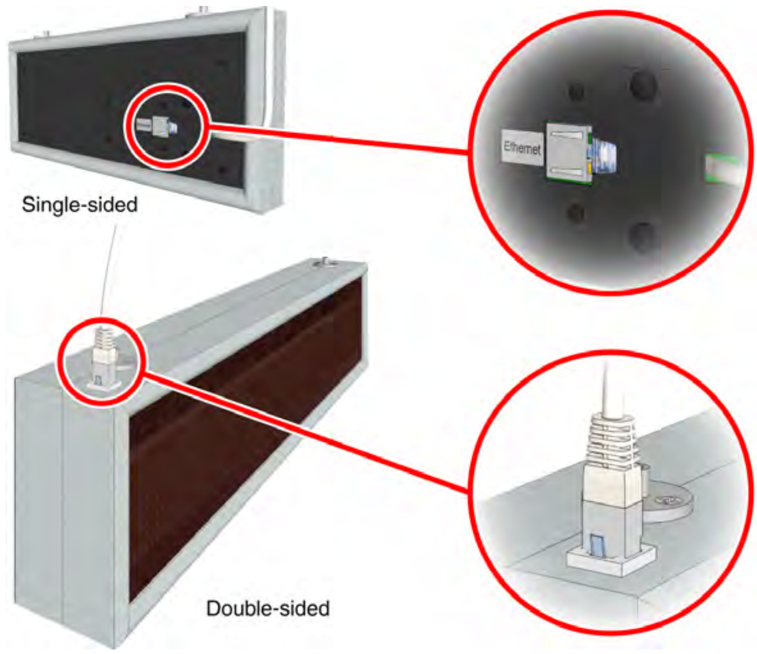


Figure 304. Single and double sided NICD display network connection

Corridor Display Power Requirements

The following table shows the power requirements for the various corridor displays.

Display Type	PoE type	PoE Class	Power Consumption		
			Ext. Supply	PoE Supply	
			24 Vdc	42 Vdc	57 Vdc
NUCD12IP-H Single Sided	PoE (802.3af)	Class 2 < 6.49 W	5.7 W 0.24 A	6 W 0.14 A	6 W 0.11 A
6 character (NICD) Single Sided	PoE (802.3af)	Class 2 < 6.49 W	7.6 W 0.31 A	7.5 W 0.17 A	7.9 W 0.14 A
6 character (NICD) Double Sided	PoE (802.3af)	Class 0 < 12.94 W	15 W 0.62 A	13.8 W 0.32 A	14.0 W 0.24 A
12 character (NICD) Single Sided	PoE (802.3af)	Class 0 < 12.94 W	11.3 W 0.47 A	10.8 W 0.25 A	11.0 W 0.19 A
12 character (NICD) Double Sided	PoE+ (802.3at)	Class 4 < 25.50 W	22.7 W 0.94 A	21.2 W 0.50 A	21.4 W 0.37 A

Table 5. Corridor display power requirements

When using an external power supply to power the display, a shielded PoE injector is required with the 24V negative lead "-" connected to the shield. The 24Vdc from the external supply will be injected on the spare wires of the network cable (SP1 and SP2 pairs).

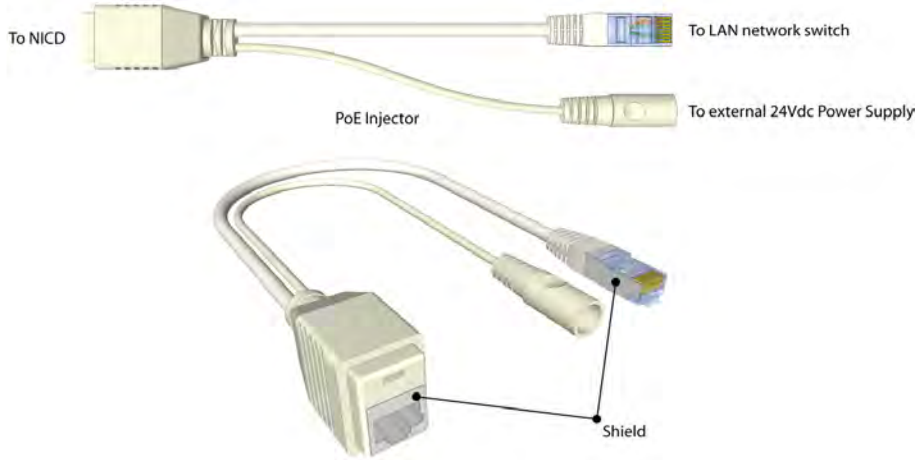


Figure 305. Shielded Power over Ethernet injector

9.1.7 Reset to Factory Default Settings

If required, the corridor display parameters can be reset to the factory default settings.

Caution: *Resetting to factory default will replace all existing parameters, such as IP and port settings, brightness and volume etc., with the factory default settings.*

A small hole in the body of the corridor display gives access to the reset button (see the following illustrations). To reset the corridor display to the factory default settings, carefully insert a suitably sized object (small sized screw driver or paperclip) through the access hole, then press the reset button gently for 4 seconds with the power on. After releasing the button the corridor display will perform a reset and starts working normally with the default settings.

Location of the Reset Button Hole

Figure 306. Reset button hole on the NUCD12IP-H

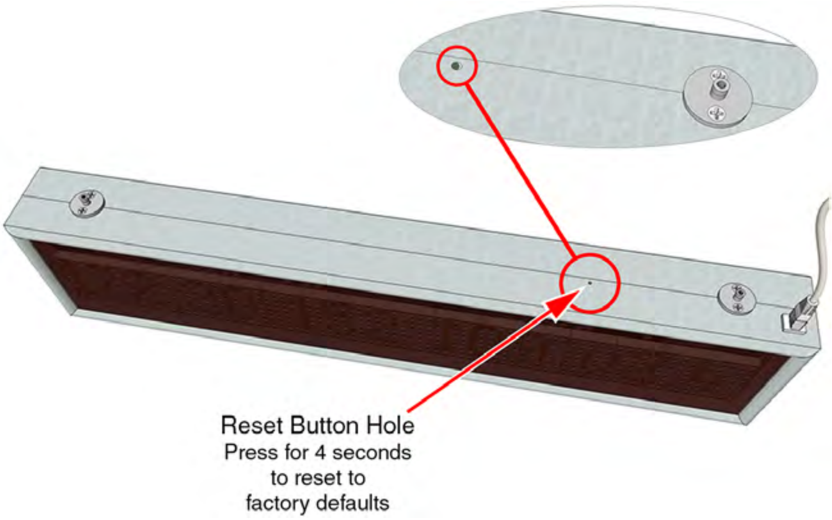


Figure 307. Reset button hole on the double-sided NICD

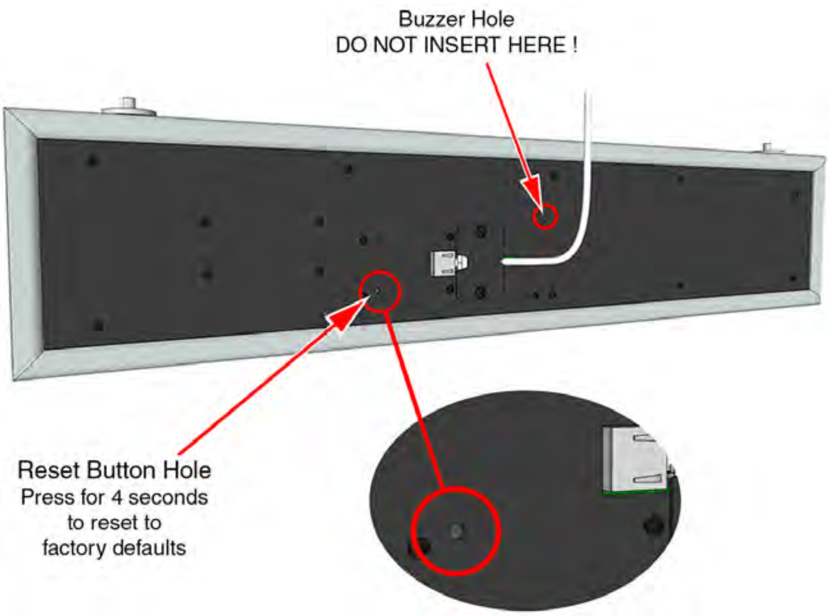


Figure 308. Reset button hole on the single-sided NICD

10 Wireless Functionality

10.1 General

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

Note: *Always refer to the appropriate local standards to determine if wireless nurse call (*869MHz*) is allowed in your country / region.*

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 222.

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 233.

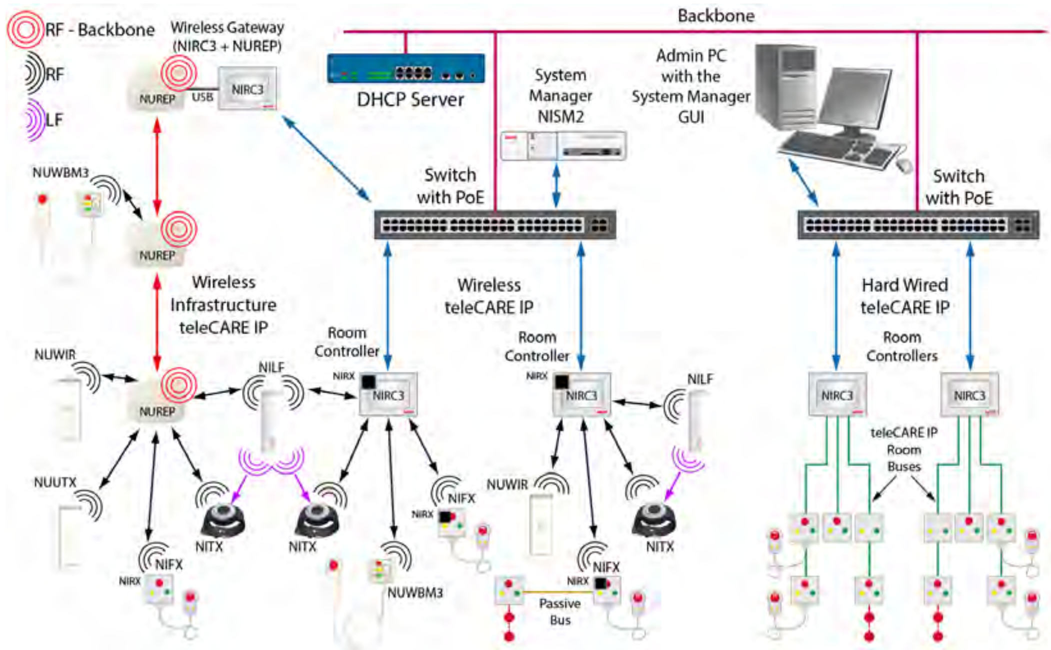


Figure 309. Wireless teleCARE IP and hard-wired teleCARE IP

A wireless call system can 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).

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 an 869 MHz (receiver category 2) 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 246.

The universal transceiver module (NUUTX) is designed to be mounted on walls or onto window/door posts. It contains an 869 MHz (receiver category 2) 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 264.

The wireless passive infrared module (NUWIR) is a motion detector designed to be mounted on walls. It contains an 869 MHz (receiver category 2) transceiver and a passive infrared sensor with a range of approximately 6 meters / 20 feet with a two level selectable sensitivity. The NUWIR wireless passive infrared module is powered by two AA disposable alkaline batteries. "NUWIR Wireless PIR Module" on page 268.

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 869 MHz Class 1 transceiver (receiver category 1) 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 12 - 24VDC power supply. "NIFX Fixed Transceiver" on page 253.

The NIFX fixed wireless transceiver offers an 8 pole connector for the integration of standard teleCARE M switch modules. The teleCARE M switch modules can be hard-wired directly to the fixed transceiver. The functions of the standard switch module then mimic those of the wireless switch module. "teleCARE M Bus Connections" on page 256.

The NITX mobile call transceiver can be attached to a wrist strap, or to a neck pendant. It can also be used as a mobile alarm transmitter connected to third party equipment. The NITX is powered by an internal three volt replaceable lithium battery. It includes an 869 MHz transceiver (receiver category 2) and a 125 kHz LF receiver (receiver category 3) for receiving the location update information from LF beacons. "NITX Mobile Transceiver and NITX Staff Transceiver" on page 259.

The NITX staff transceiver is identical to the NITX mobile call transceiver except for the button functionality. The staff transceiver is carried by nurses or staff members and allows the nurse 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. "NITX Mobile Transceiver and NITX Staff Transceiver" on page 259.

The NILF low frequency beacon includes a 125 kHz transmitter and can be extended with the piggy-back mounted NIRX 869 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 277. The NILF can be powered by three C size disposable alkaline batteries, or connected to an external 24VDC power supply (chapter 5, 'System Power Supply" on page 22).

10.2 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 nurse call 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, NUWBM3 wireless bedside module, NUUTX universal transceiver and NUWIR wireless infrared module have their own internal transceiver.

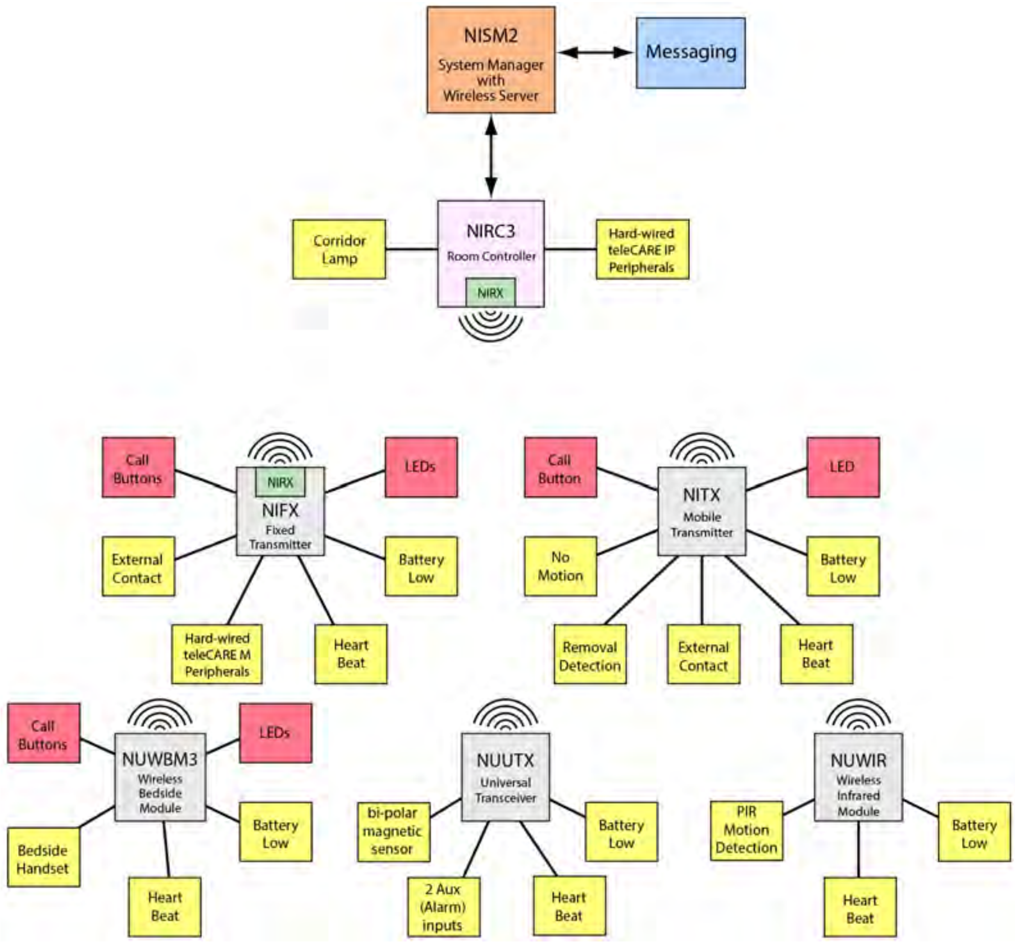


Figure 310. Principle diagram of teleCARE IP wireless functionality

10.2.1 Location Based Wireless Nurse Call Using LF Beacons

The addition of the NILF low frequency beacons gives location based wireless nurse call 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.

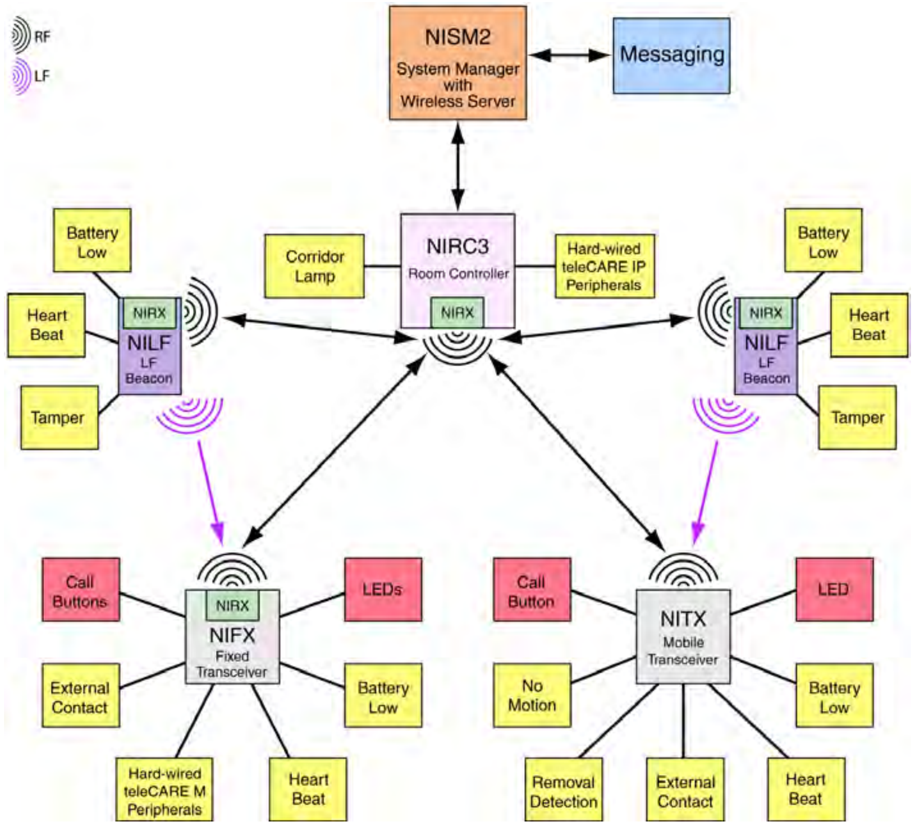


Figure 311. Location based wireless functionality

The range of an LF beacon is adjustable and can be up to approximately 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 etcetera.

When a 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 wireless module the location will be transmitted to the wireless server, when the wireless module is not in range of an LF beacon the last two known locations will be transmitted.

10.3 Wireless Nurse Call 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 227 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 225) in order to identify the location of the NITX. The NILF is also needed if access control is required at entrance doors.

10.3.1 “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 TD92610EN) 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.

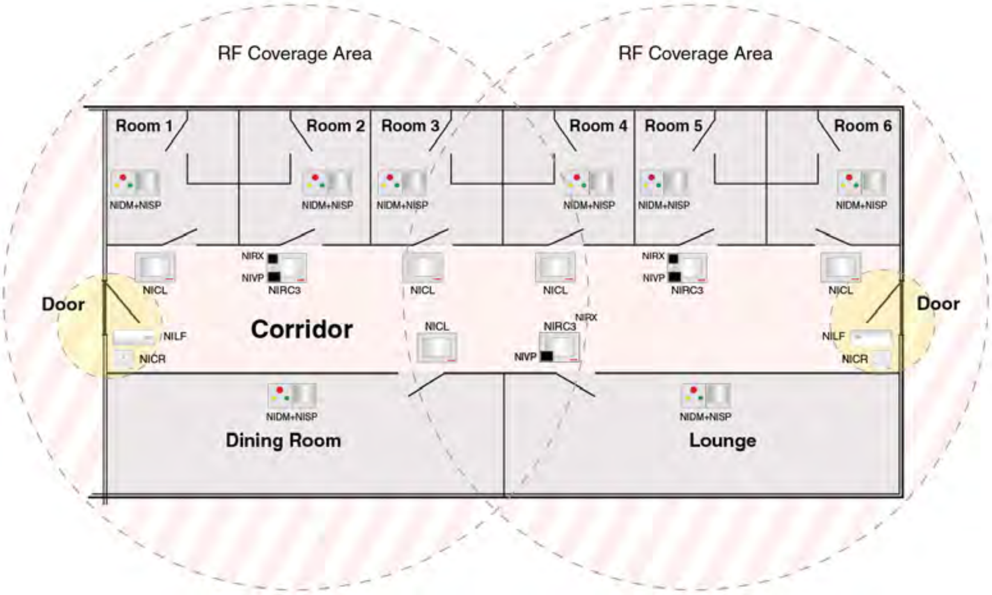


Figure 312. Wireless nurse call example with speech - static mode

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.

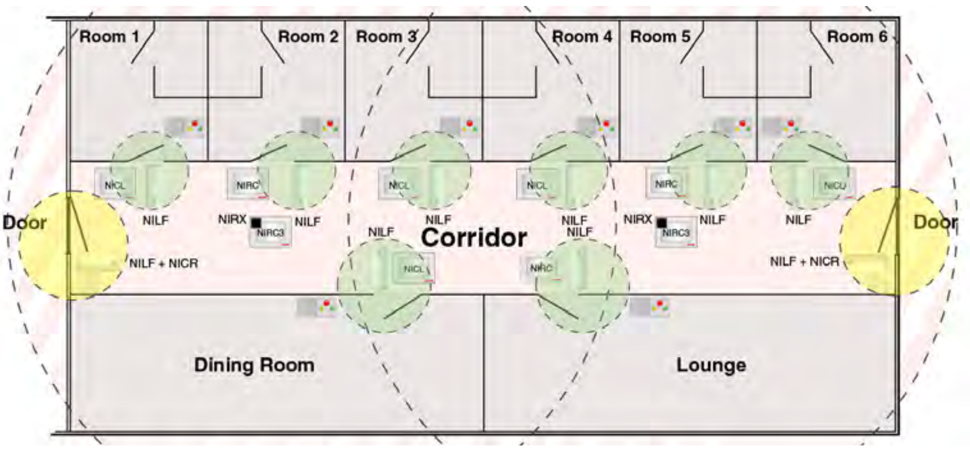


Figure 313. Wireless nurse call example with speech

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).

10.3.2 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 290).

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	Location Beacon (NILF)	Location at the start of a New call	IM "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

10.4 teleCARE IP Wireless Planning

10.4.1 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 30 meters 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.

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:

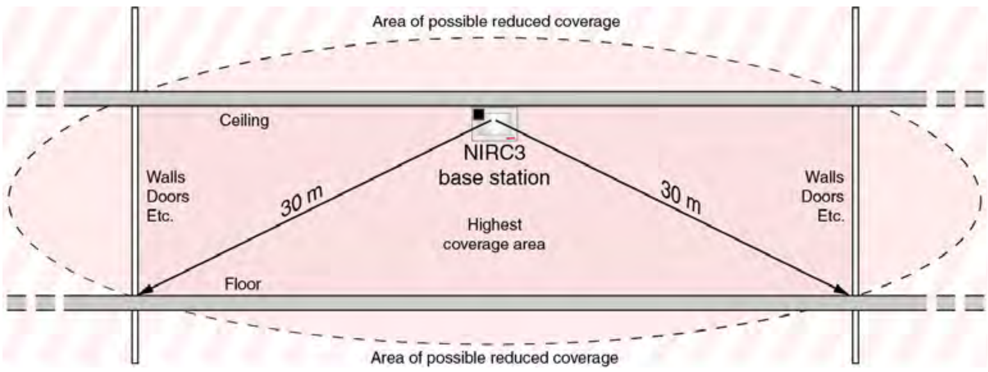


Figure 314. NIRC3 base station vertical coverage

The NIRC3 base station has a circular coverage distribution pattern in the horizontal plane. The optimum indoor coverage area is within approximately 30 meters of the NIRC3 base station, as shown in the following illustration.

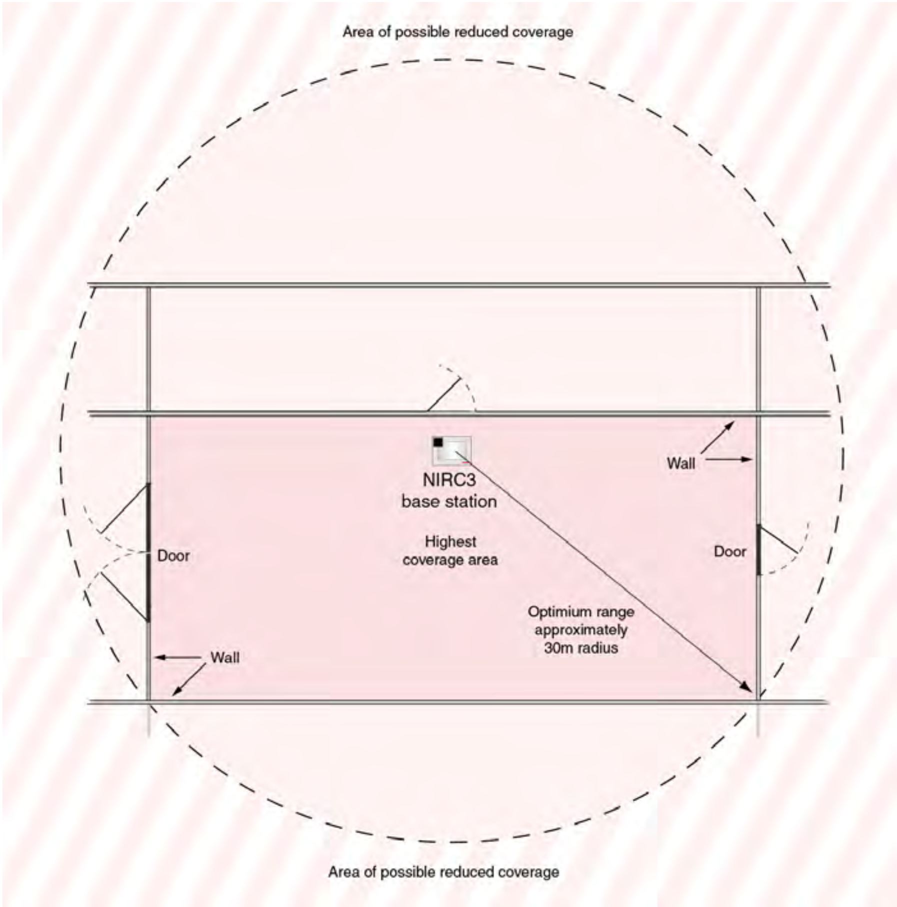


Figure 315. NIRC3 base station horizontal coverage

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. If there is no valid configuration file available on the USB stick, the NIRC3 will automatically place a text file with the name "site-survey-read-me.txt" on the USB stick. Place the USB stick in a PC and open the text file. The text file includes proper instructions on how to create a configuration file that is suitable for your region. Once you have created the configuration file and saved it into the root directory of the USB stick, plug the USB stick back into the NIRC3 and power on the NIRC3 to continue with the RF coverage test.

Note: *A module that is set to "Storage" mode will be automatically configured by the dedicated RF base station 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". Note that this is only required when the module is set to "Normal" or "LF test" mode.*

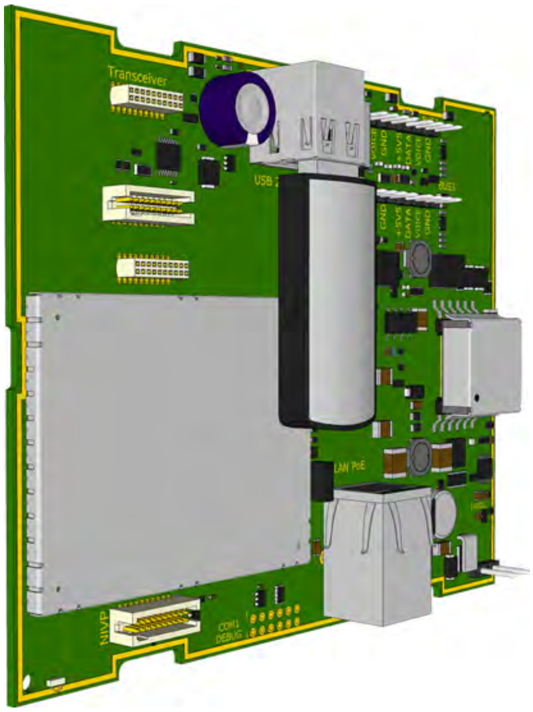
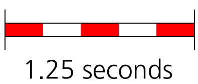
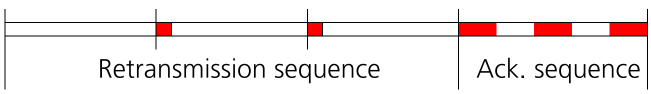


Figure 316. NIRC3 with USB stick for RF coverage testing

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.

10.4.2 LF Planning Considerations

The NILF has an LF transmitter with a maximum transmission range of approximately 2.7 meters radius, but this will vary depending on the environment. Therefore an area to be covered must be within a maximum of 2.7 meters of the NILF. The NILF is best mounted on a wall or at a door post at approximately 1.2 meters 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.*

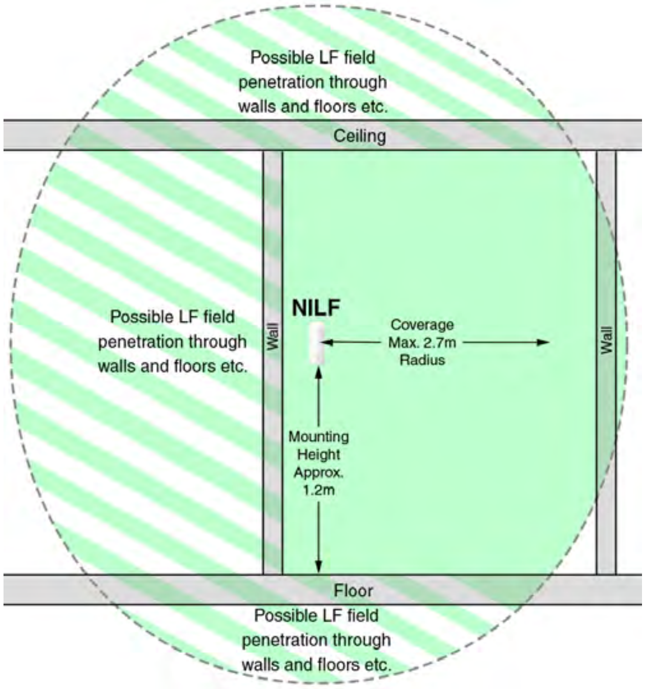


Figure 317. Wall Mounted NILF vertical coverage

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.

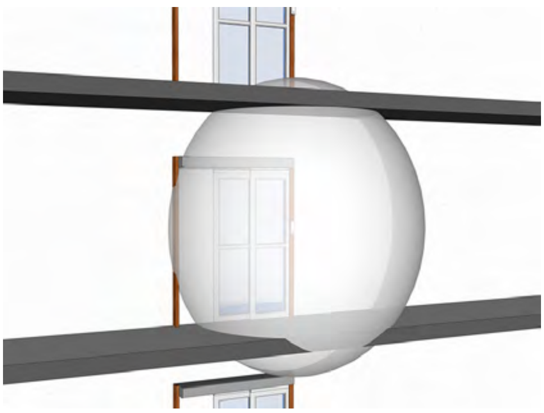


Figure 318. Reduced LF coverage minimizing disturbance.

Note: *Refer to "NILF DIP Switch Settings" on page 287 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 2.7 meters radius from the NILF (free of obstructions), as shown in the following illustration. Reduced signal strength is possible through walls of light weight construction.

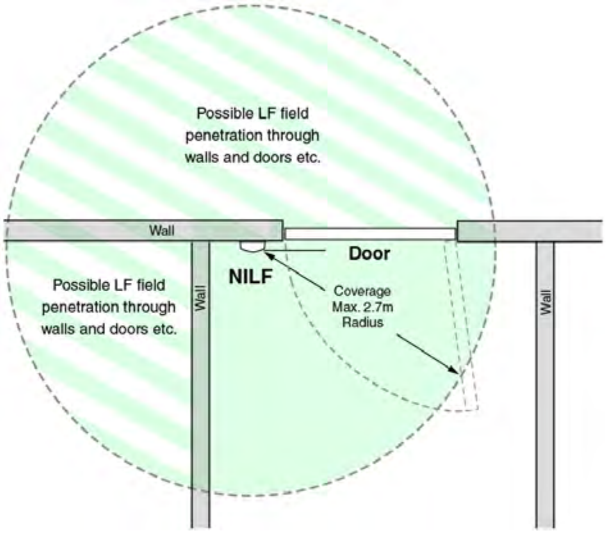


Figure 319. Wall Mounted NILF horizontal coverage

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 2.7 meters wide (radius), a combination of "Master and Slave" NILF beacons should be used. The maximum separation between the master and slave beacon is approximately 5 meters.

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

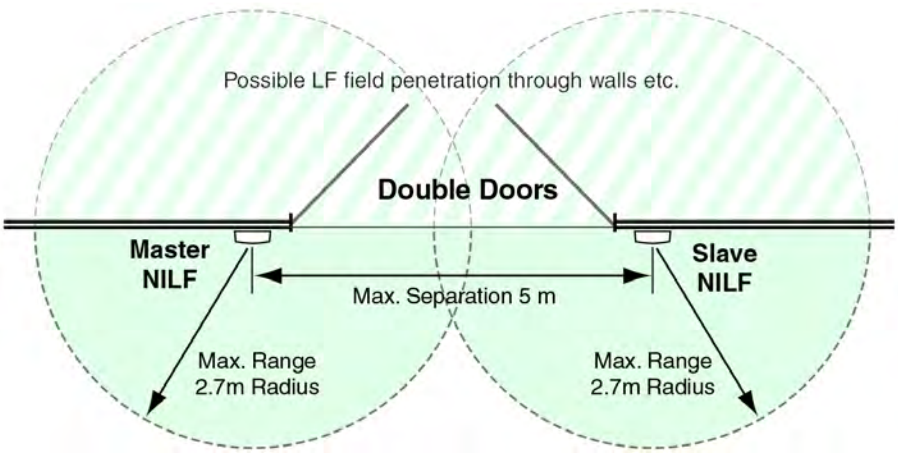


Figure 320. Master and slave NILF coverage

NILF range test

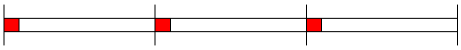
To perform an LF range test the following equipment is required:

- 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 92610EN”.*

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

10.5 Wireless Infrastructure

The use of a full wireless infrastructure is an extension on the existing wireless functionality and is intended for use in independent living 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.*

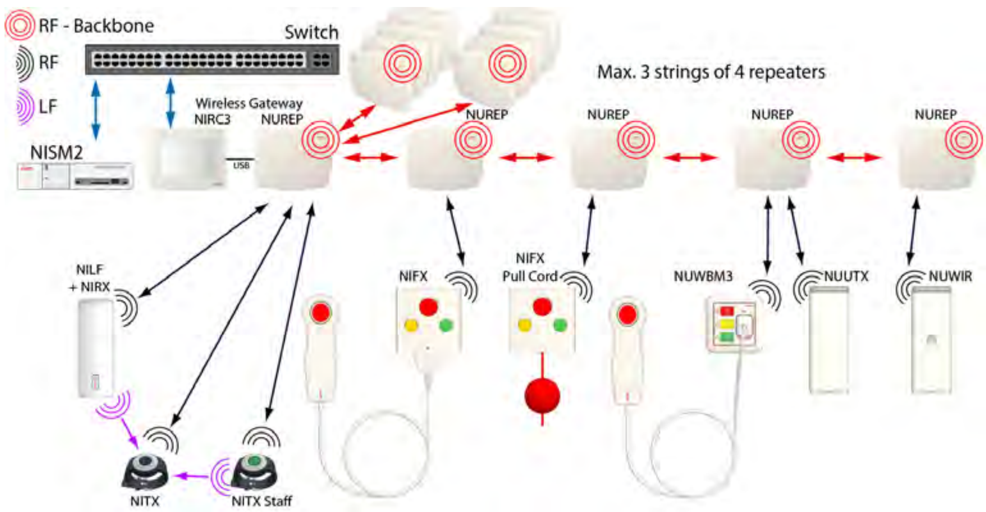


Figure 321. Full wireless infrastructure example

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, 7 and 13 for Europe. Although this operating practice is not mandatory, it is often employed where multiple access points are in use.

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.

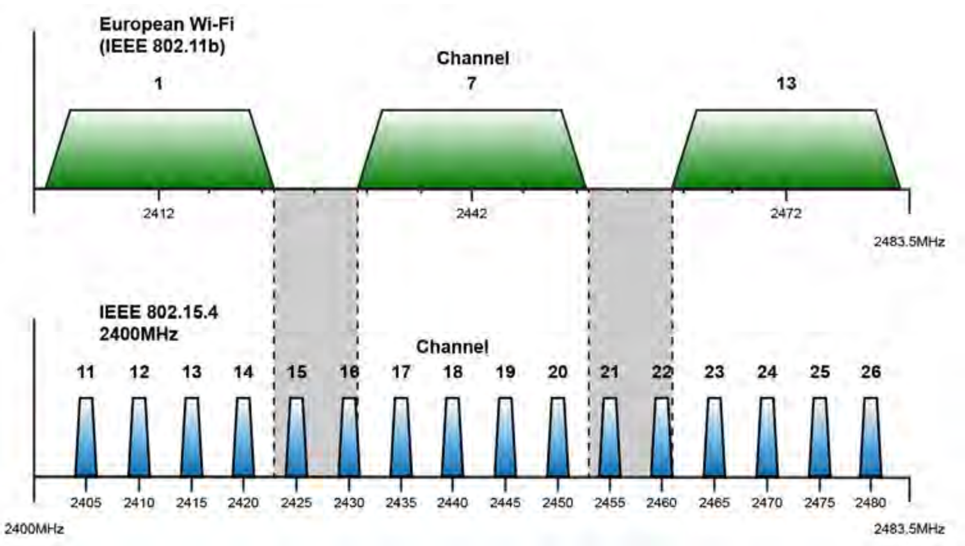


Figure 322. IEEE 802.15.4 versus 802.11 (Wi-Fi)

Wireless Repeaters (NUREP) can be mounted outdoors using a suitable weatherproof enclosure that meets local electrical code. 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 242.

10.6 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 location with access to the IP-network. Surrounding this 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.

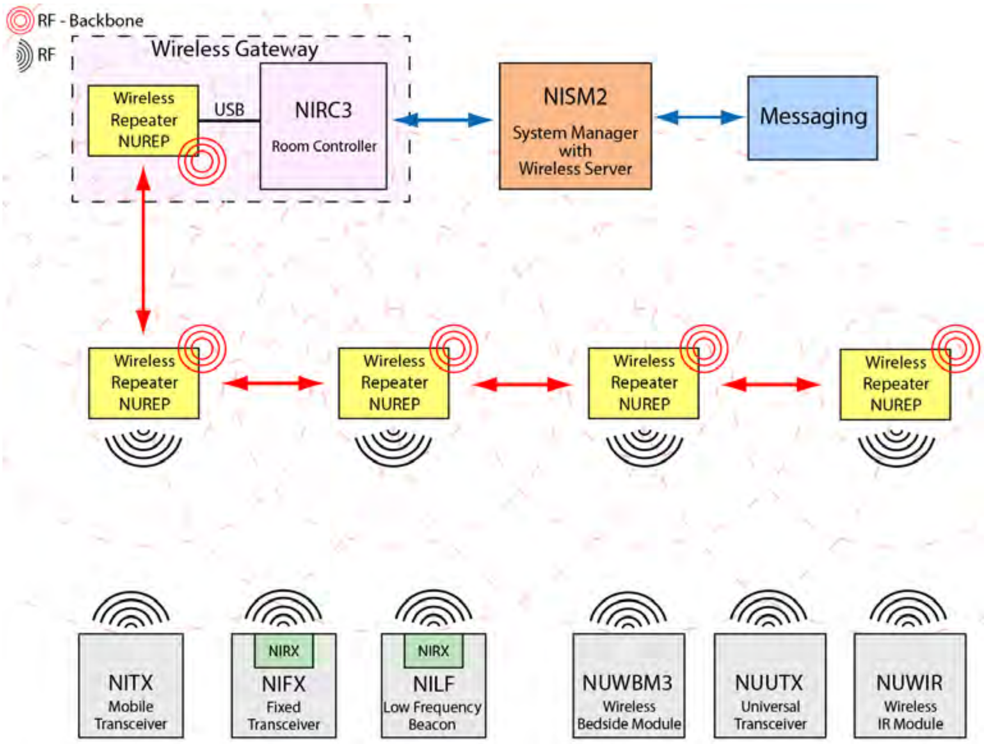


Figure 323. Wireless infrastructure principle

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

10.7 Wireless Infrastructure RF Planning Considerations

A wireless device must be seen at all possible locations. To avoid an overload of RF messages from being sent to the wireless server, a message should (preferably) only end up at one wireless gateway segment, which consists of multiple wireless repeaters and a gateway. At certain overlapping segments it could be possible that a message ends up at multiple gateways, but never more than two (maximum three/four in a worse case scenario).

In each wireless segment, 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 a peripheral lost message will be generated if a section fails to respond. During configuration, the status of wireless gateway(s) and wireless repeaters are also visible through the system overview tab in the NISM, available under “Diagnostics -> System Overview”, refer to teleCARE IP Configuration Manual TD 92610EN for detailed information.

If a valid message is received by multiple repeaters in one or more subnets of a single gateway segment, the gateway will directly transfer the first instance of the message it received towards the wireless server for processing. If afterwards an instance with a higher RSSI value is received, it will be transferred to the wireless server for updating the RSSI location. For RSSI location determination, RSSI values are only updated for mobile transceivers like the NITX, this is not required for fixed wireless transceivers like the universal transmitter NUUTX.

Although the wireless gateway will filter out most of the duplicate messages in its segment, it is important to carefully plan the locations of the wireless gateways and repeaters throughout a site. For example, avoid placing multiple wireless gateways too close to each other around a central location, there this will generate a lot of traffic towards the wireless server, when a wireless message is received by multiple gateways.

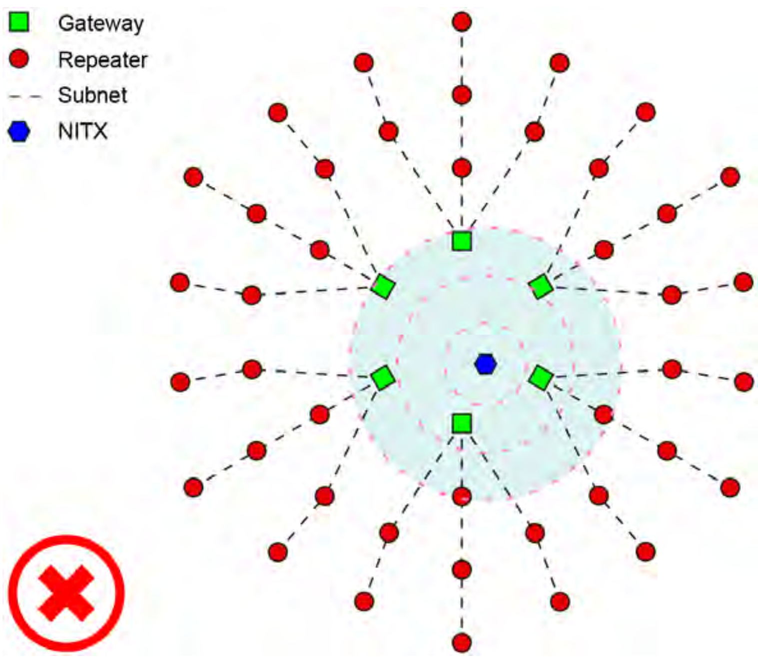


Figure 324. Wireless gateways mounted too close to each other

Setup a wireless segment in such a way that the repeaters are surrounding the gateway. This will result in wireless gateways being mounted further apart, therefore reducing the risk of overloading the wireless server.

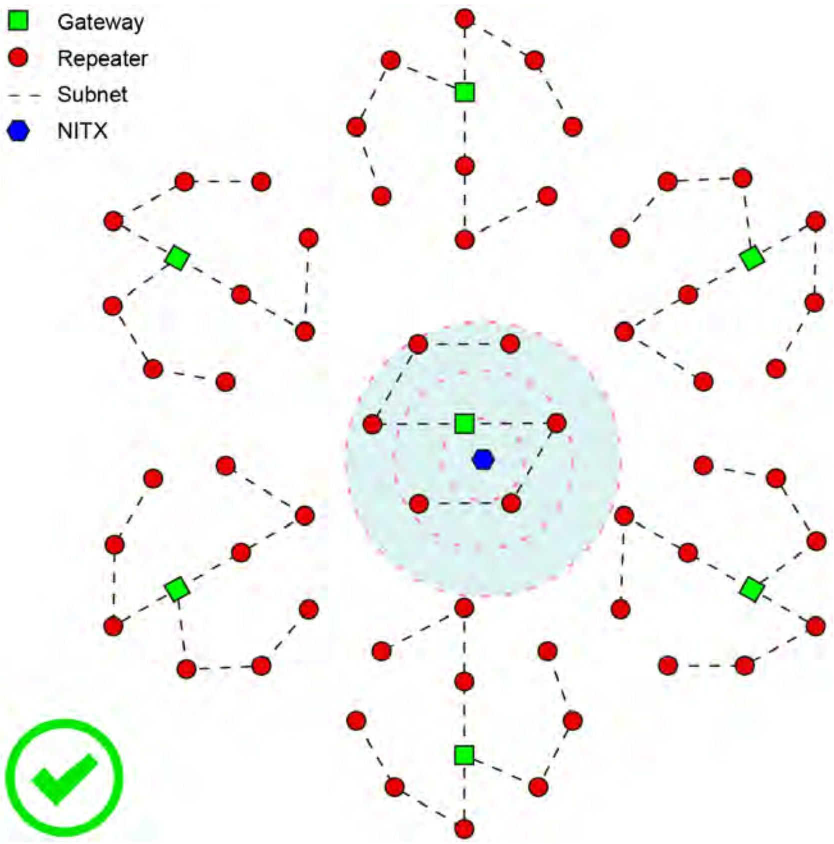


Figure 325. Correctly mounted wireless gateway segments

Multi-storey building configuration

A similar approach should be considered for multi-storey buildings. Mounting wireless gateways directly above each other on the individual floors can result in overloading the wireless server when a wireless message is received by too many gateways at the same time.

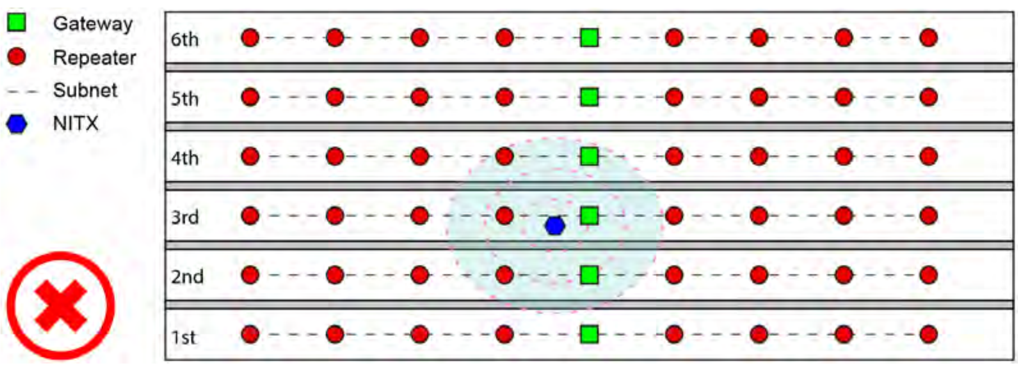


Figure 326. Wireless gateways sections mounted too close to each other

Spreading the repeaters connected to a single gateway across multiple floors will result in less traffic being forwarded towards the wireless server.

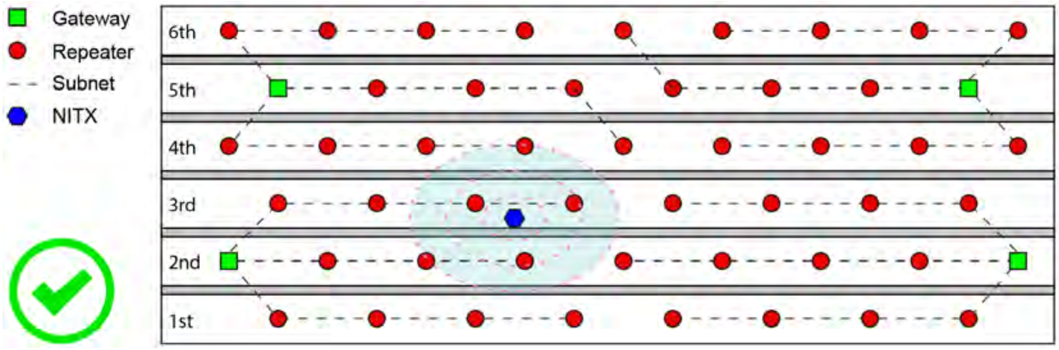


Figure 327. Correctly mounted wireless gateway segments

Note: *Be aware that walls and floor/ceilings will reduce the range of RF transmissions. So make sure that the repeaters in a subnet are able to receive messages from the next and the previous repeater/gateway in the chain.*

10.8 teleCARE IP Wireless Components

10.8.1 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 (869 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 approximately three days, in case of mains power failure.

Figure 328. Wireless Repeater - NUREP

NUREP Electrical Connections

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

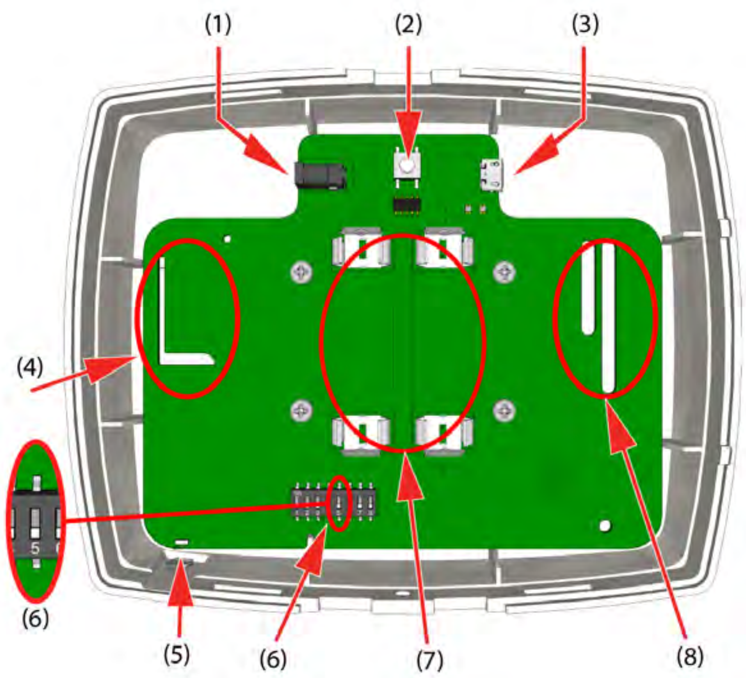


Figure 329. NUREP electrical connections

(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 (869 MHz) communication with wireless modules

(5) Multi color status LED, see the "Status LED colors" Table 6. 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

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

Table 6. Status LED colors

NUREP External Power Supply Connection

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

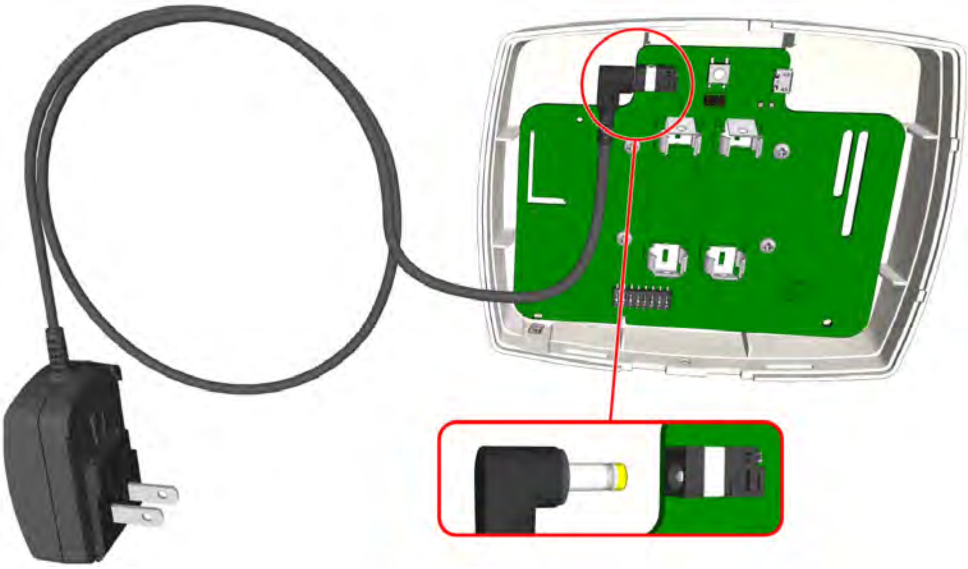


Figure 330. Connect the external power supply.

NUREP Battery Placement

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.

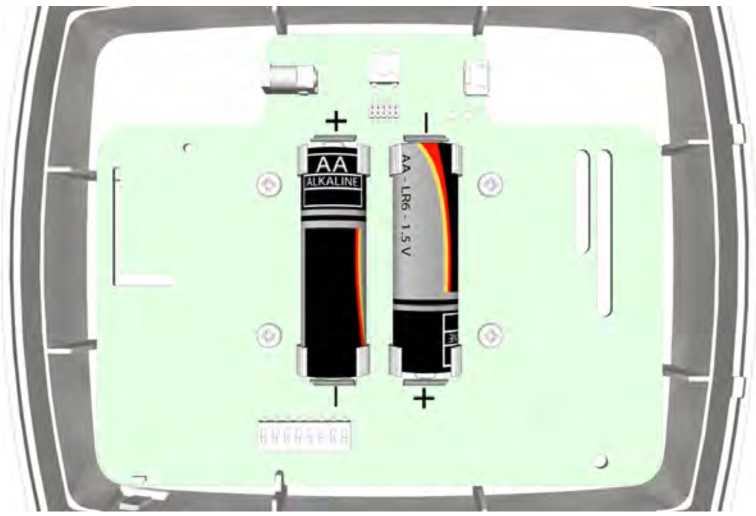


Figure 331. Insert the batteries

10.8.2 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.

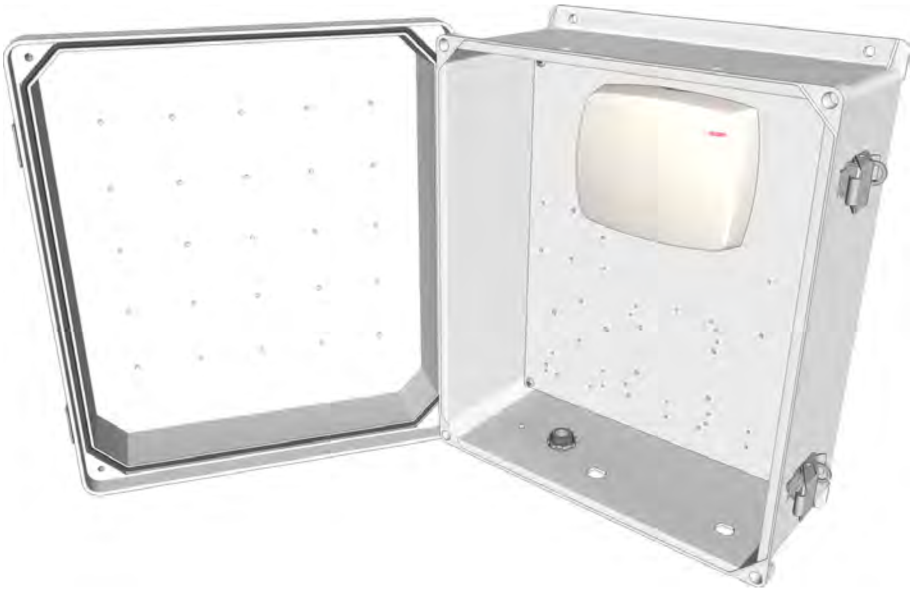


Figure 332. Example of an outdoor box with repeater.

10.8.3 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 333. 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.

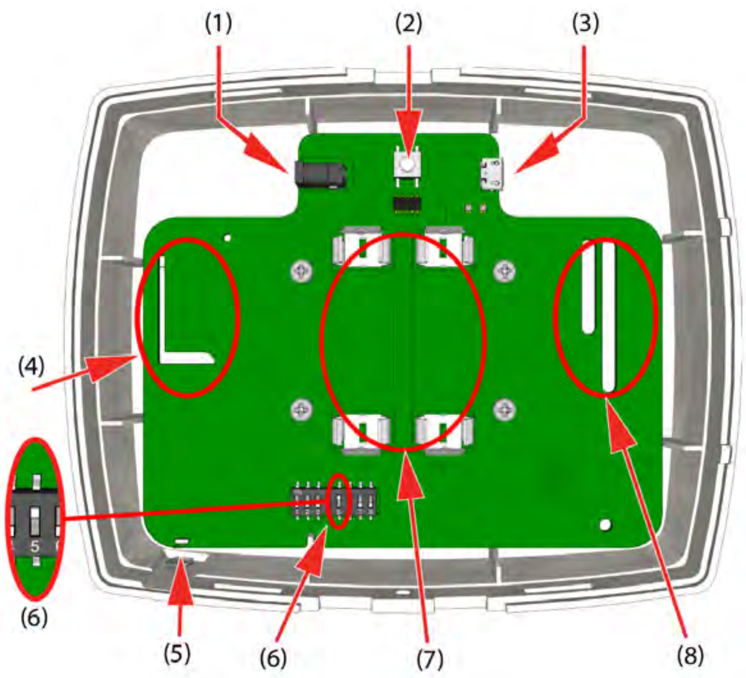


Figure 334. NUREP electrical connections for wireless gateway usage

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 (869 MHz) communication with wireless modules

(5) Multi color status LED, see the "Status LED colors" Table 7. 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

NUREP - Status color	Status
Steady blue	Normal operation
Steady Red	Error

Table 7. Status LED colors

NUREP - NIRC3 Interconnection

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

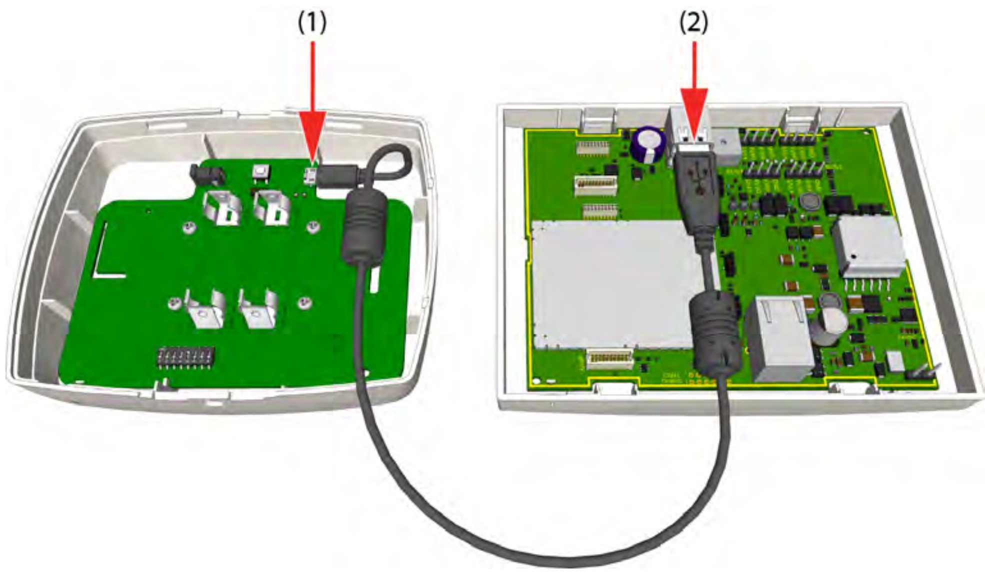


Figure 335. USB connection between NIRC3 and NUREP

(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 336. 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.

10.8.4 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 252

Figure 337. NUWBM3

NUWBM3 Electrical Connections

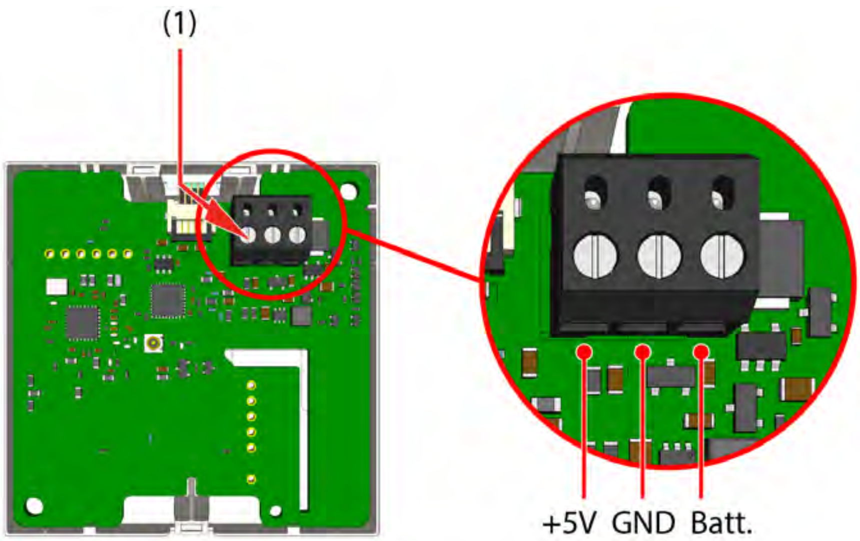


Figure 338. NUWBM3 electrical connections

(1) Power connector - For connecting the batteries or a an optional 5 VDC Class II power adapter (CE, UL approved), DC3-AABA or DC3-AABB.

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 339. NUWBM3 battery connection

Insert two AA alkaline batteries, observe polarity. Under normal circumstances the battery life is approximately two years.

Figure 340. Batteries inserted into battery holder

Assemble the NUWBM3.

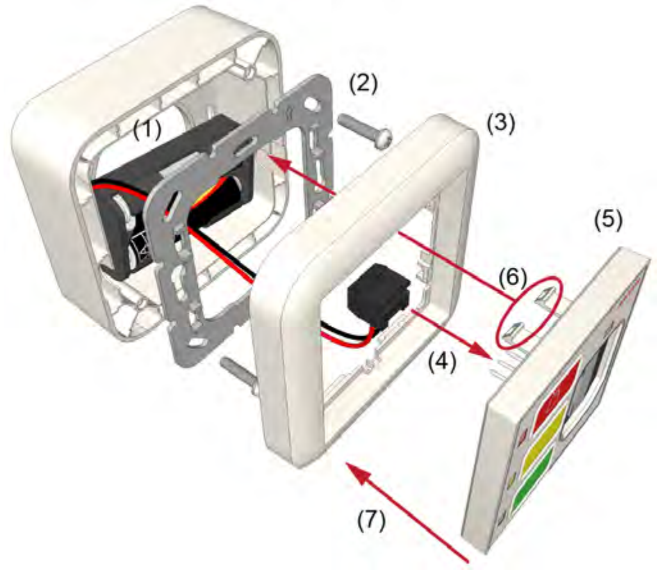


Figure 341. NUWBM3 assembly

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) Place the NUWBM3 against the frame, ensuring that the module is facing up

(6) Place the NUWBM3's upper snap fasteners against the upper edge of the adapter

(7) Press the NUWBM3 firmly against the adapter so that the module's bottom fasteners snap closed on the adapter.

Back view of an assembled NUWBM3.

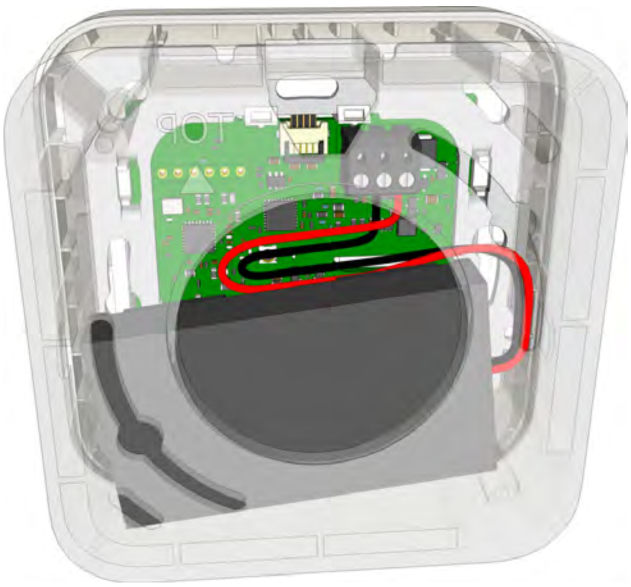


Figure 342. NUWBM3 assembled

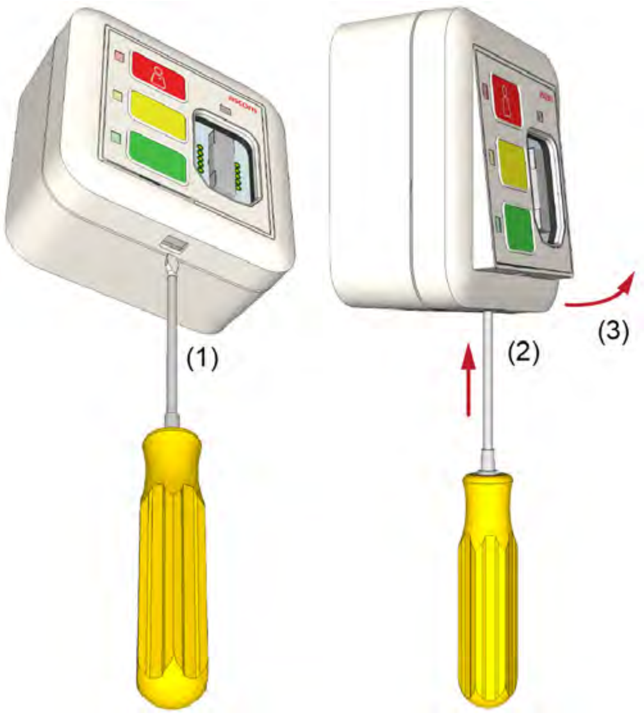
NUWBM3 External Power Supply Connection (Optional)

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 343. External 5 VDC connection

Remove the NUWBM3 from the Spacer

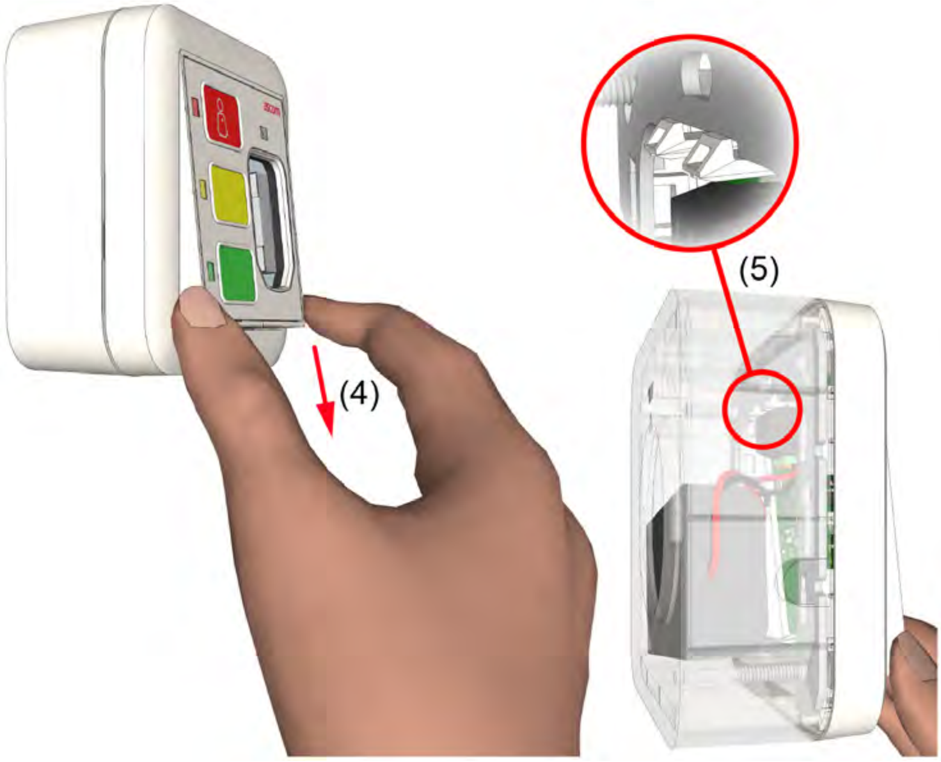


To remove the NUWBM3 from a spacer, for example to change the batteries:

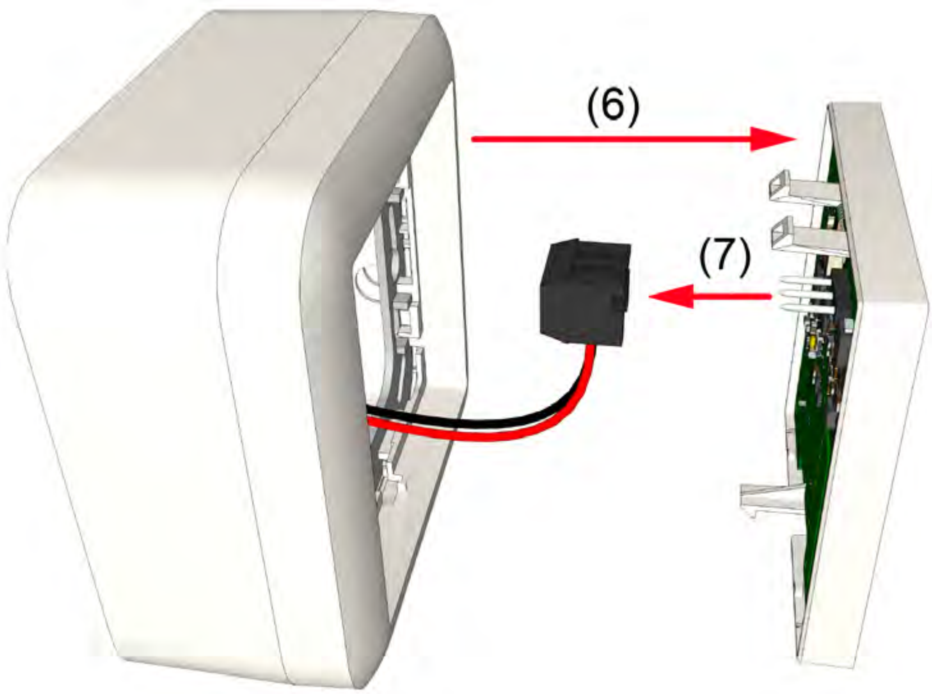
(1) Insert a flat blade screwdriver into the bottom of the frame

(2) Gently push the screwdriver upwards until the lower snap fastener is released from the bottom of the metal adapter

(3) Slightly tilt the NUWBM3 out of the frame



(4) Grab the exposed sides of the NUBM3 and gently pull it down to release the upper snap fasteners (5) from the metal adapter



(6) Take out the NUWBM3

(7) Disconnect the 3-pole screw terminal connector

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.

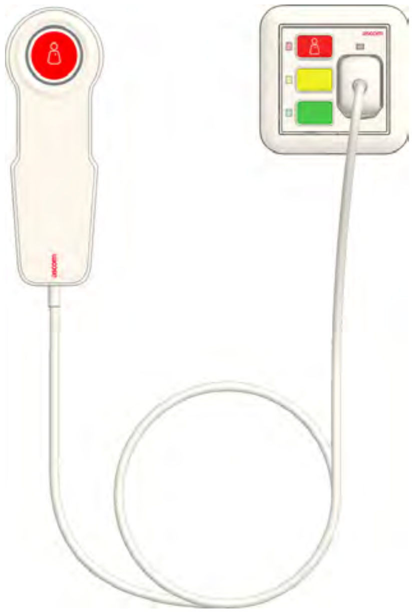


Figure 344. NUHS1B handset connected to the NUWBM3

10.8.5 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. Mounting the NIRX will add wireless nurse 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.

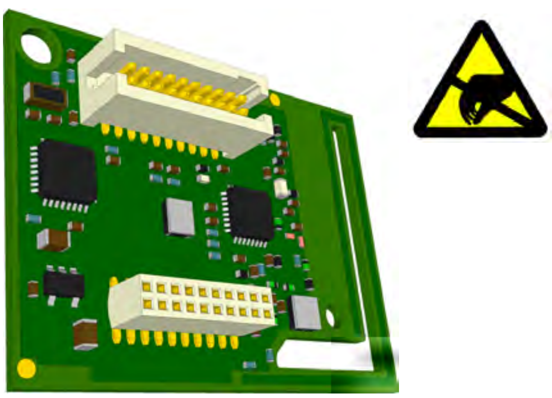


Figure 345. Transceiver piggyback module (NIRX)

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:

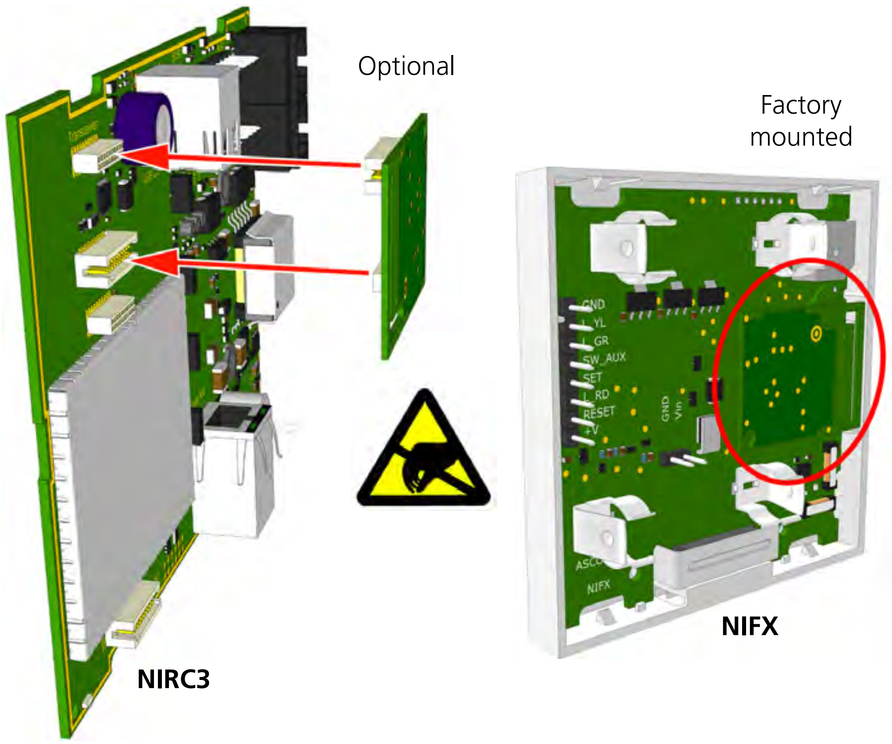


Figure 346. Piggyback mounting of the transceiver module on the NIRC3 and NIFX

Note: *The NIFX is delivered with an NIRX mounted from the factory.*

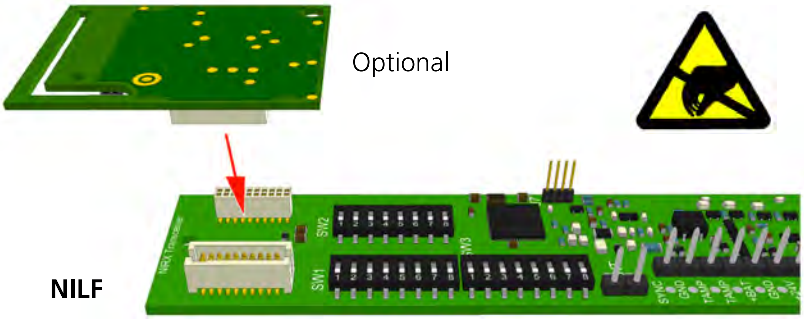


Figure 347. Piggyback mounting the transceiver module on the NILF

10.8.6 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 with LEDs, 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.

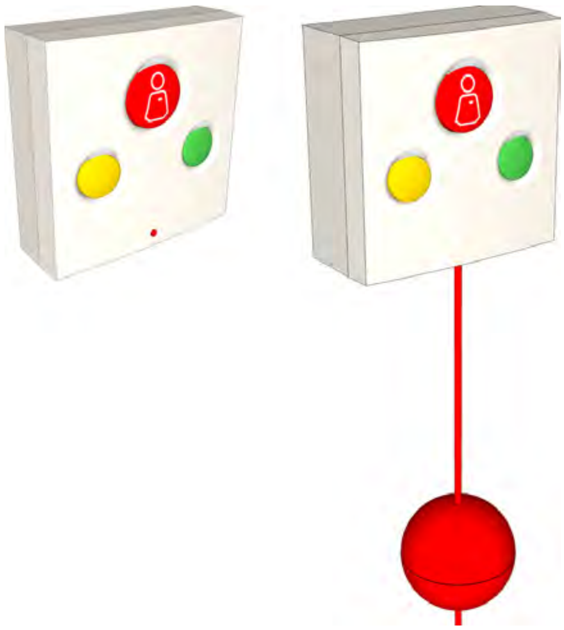


Figure 348. NIFX wireless switch module and pull-cord module

The NIFX socket variant supports the connection of a passive patient handset, see “Handset Connection” on page 258.

The NIFX can be combined with standard hard-wired teleCARE M switch modules, see “teleCARE M Bus Connections” on page 256

Note: *The LEDs in the hard-wired teleCARE M switch modules are only supported when external power supply is used.*

Placing the Batteries

The 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 and the low battery status is included in every heartbeat transmission of the unit. Under normal circumstances the battery life is 1 to 1½ year.

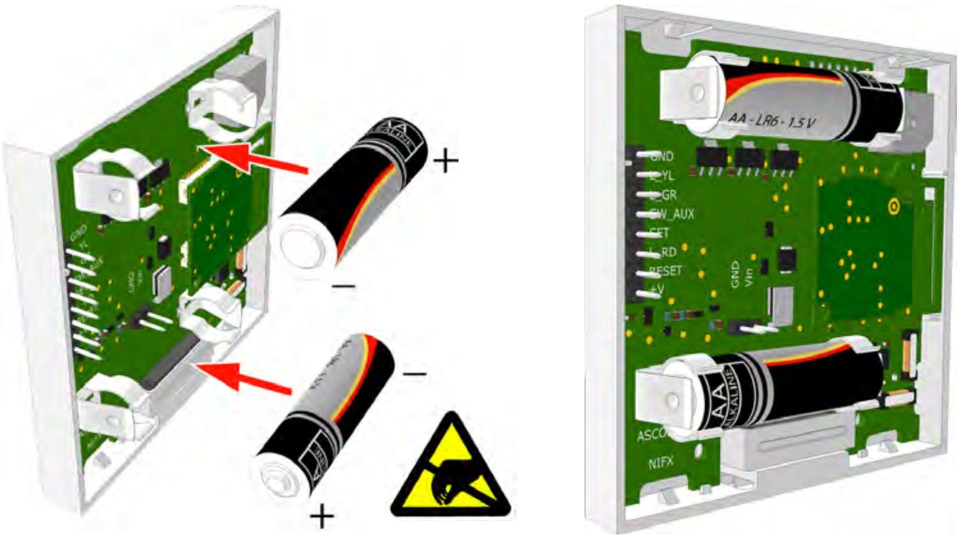


Figure 349. Placing the batteries

When battery powered the fixed transceiver LEDs stay active for a period of 30 seconds after a call has been made.

Connecting a DC Power Adapter (non-VDE)

For non-VDE applications alternatively, an external CE certified 12-24V DC power adaptor can be used.

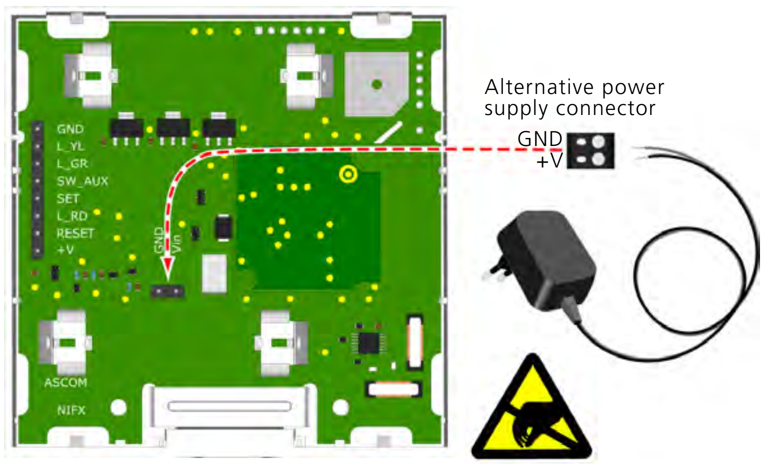


Figure 350. Connecting an external 12-24V DC power adapter

When externally powered the red, yellow and green LEDs will permanently emit a low intensity light for locating and identification in the dark. The LEDs of a hard wired peripheral connected to the teleCARE M bus connector are only supported when the NIFX is externally powered.

Connecting a DC Power Adapter (VDE)

For VDE applications alternatively, an external CE certified 12-24V DC power adaptor can be used. The adapter should comply to DIN EN-60950 for protection area A and should comply to DIN EN-60601-1 for protection area B. The adapter must be hard-wired connected to the "Essential" mains power. See "External Power Supply" on page 24.

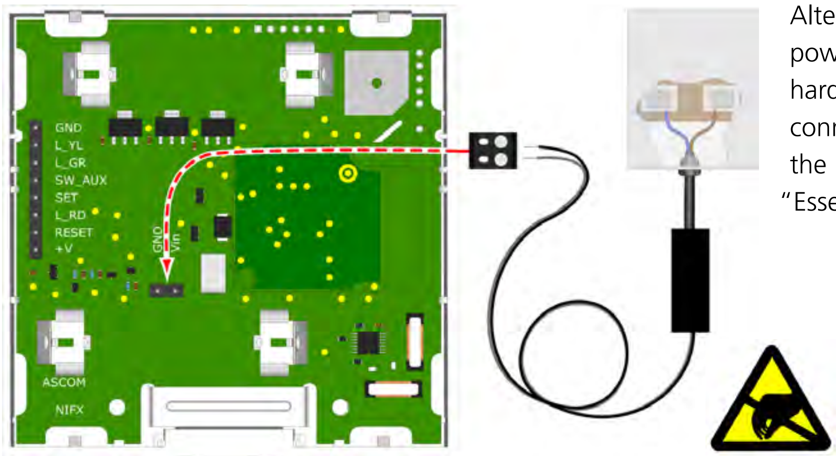


Figure 351. Connecting an external 12-24V DC power adapter for VDE

When externally powered the red, yellow and green LEDs will permanently emit a low intensity light for locating and identification in the dark. The LEDs of a hard wired peripheral connected to the teleCARE M bus connector are only supported when the NIFX is externally powered.

teleCARE M Bus Connections

The fixed transceiver includes an 8-pole teleCARE M bus connector for the hard wiring of conventional teleCARE M switch modules, corridor lamp, or an external technical alarm contact (N/O).

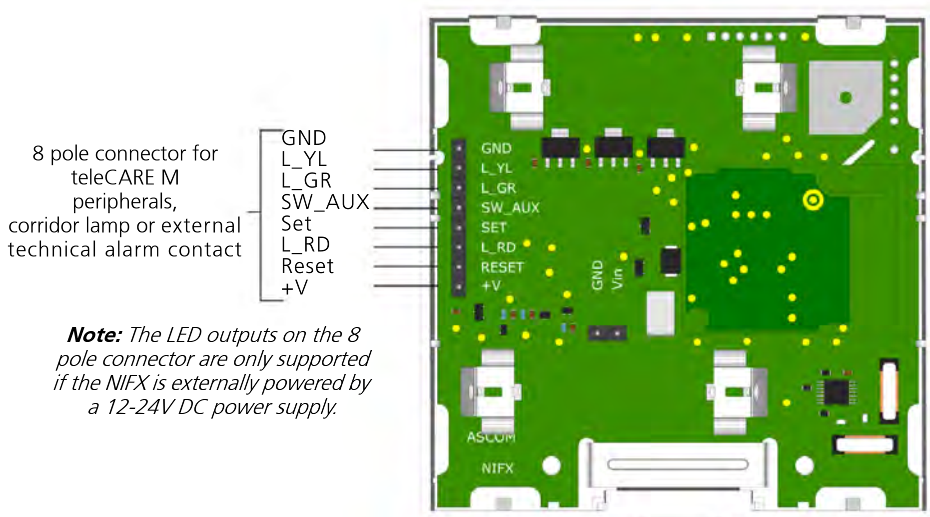


Figure 352. teleCARE Bus Connector

Auxiliary Sensor Contact

The “SW_Aux” on the teleCARE M Bus connector can be used as an external input, for example to connect an external sensor.

The NIFX auxiliary input can process external inputs from normally open (N.O.) or normally closed (N.C.) dry relay contacts.

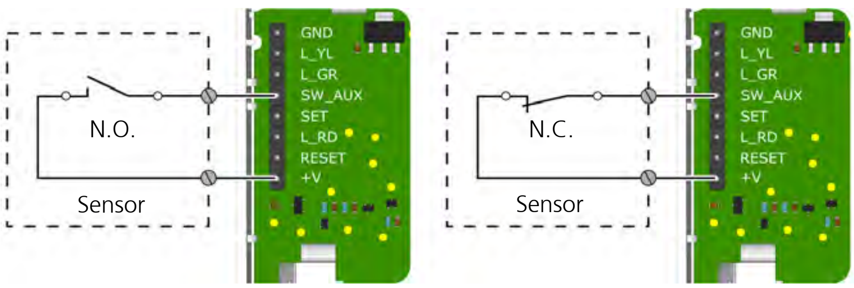


Figure 353. N.O. or N.C. dry relay sensor contact

Connect the normally open (N.O.) or normally closed (N.C.) sensor contacts between “SW_Aux” and “+V” on the teleCARE M Bus connector.

Note: *When battery powered, be aware that connecting a sensor using a normally closed (N.C.) contact will draw more current (by a factor of ± 10) from the batteries and therefore reducing the battery life of the NIFX.*

External Contact

Optionally an external contact can be connected to the safe release socket input of the NIFX. The medical alarm cable R190300A (grey) or R190301A (white) must be used to connect the external contact to the safe release socket of the NIFX.

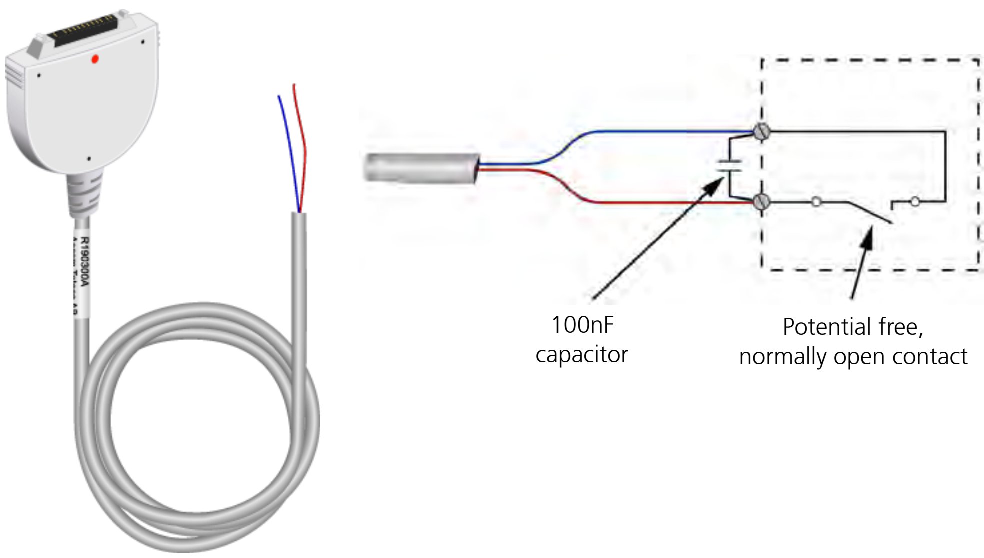


Figure 354. Medical alarm cable and 100nF capacitor

The red and blue wires of the cable together with a 100nF capacitor should be connected across the normally open, potential free contact.

IMPORTANT: *Make sure to place a 100nF capacitor in parallel with the external contact, according to the image above.*

Handset Connection

The socket module version of the fixed transceiver includes a teleCARE Safe Release socket for connecting the NIPH2-A1A handset with handset disconnect alarm functionality. Speech/Entertainment handsets are not supported.

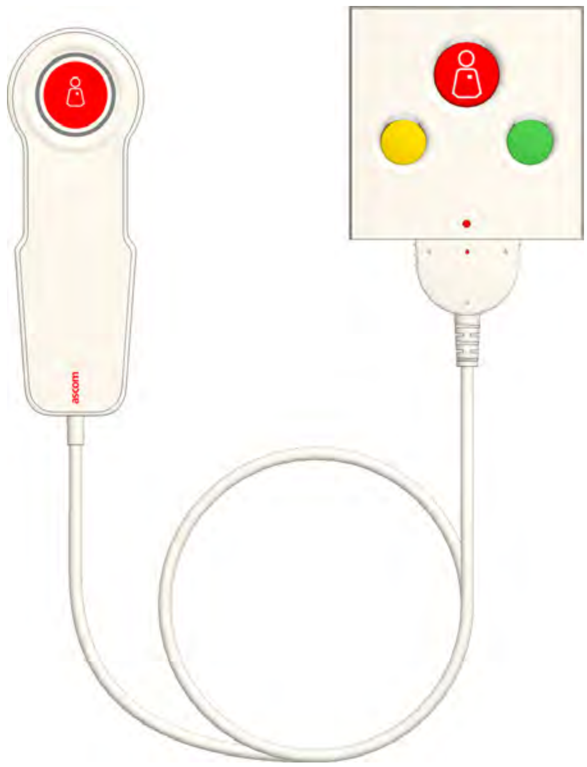


Figure 355. NIPH2-A1A handset connected to the NIFX

10.8.7 NITX Mobile Transceiver and NITX Staff Transceiver

The NITX mobile transceiver is a robust and water resistant (IP 65) wireless call unit. Each NITX has a unique identity (ID) which is transmitted with every event from the mobile transceiver.

The NITX can be fitted with a wrist strap so that it can be worn like a wrist watch. Alternatively, it can be inserted in a pendant holder and attached to a lanyard so that it can be worn around the neck. The wrist strap and pendant must be ordered separately.

The NITX is available in three versions:

- NITX-AAA mobile transceiver for residents or patients
  containing an 869.25 MHz RF transceiver, a call button and a reassurance LED
- NTX-BAA mobile transceiver for residents or patients
  containing an 869.25 MHz RF transceiver, a call button and a reassurance LED. It also contains a 125 kHz LF receiver used for call cancellation by a staff transceiver and for location determination using LF beacons.
- NITX-BBA staff transceiver is for nurses and staff members
  containing an 869.25 MHz RF transceiver, a call button and a reassurance LED. It also contains a125 kHz LF transceiver used for cancelling calls from other NITX (BAA) and NIFX (1AA and 1BA) transceivers and for location determination using LF beacons.

Figure 356. NITX mobile transceiver and staff transceiver

Using the NITX Mobile Transceiver (default configuration)

- A single short button press places a normal call.
- A single long button press (> 3s) places an assistance call.
- A single long button press followed by three short button presses (within 3 seconds) cancels the call.

Using the NITX Staff Transceiver (default configuration)

The NITX staff transceiver may be used by nurses and staff members to cancel calls initiated from NITX (BAA) and NIFX (1AA and 1BA) transceivers or to call for assistance.

- A single short button press cancels a call on an NITX or NIFX when in close proximity.
- A single long button press (within 3 seconds) places an assistance call.
- A single long button press followed by three short button presses (within 3 seconds) cancels the “Assistance” call.

Removing the Rear Cover

Removing the rear cover of the NITX is necessary when replacing the battery or when connecting an external alarm contact to the NITX circuit board.

Remove the four torx screws at the back of the NITX using A special screwdriver (T3) or bit (IP-3). When the screws are removed, gently pull off the rear cover.

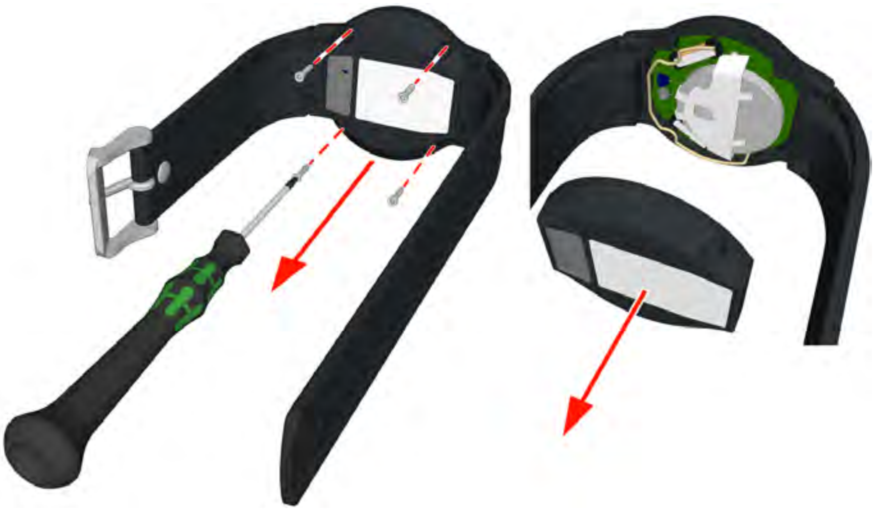


Figure 357. Removing the rear cover

Note: *Removing the rear cover will wear out the screw holes of the NITX front cover, therefore the NITX can be opened and closed approximately three times.*

Replacing the Battery

The NITX is powered by a 3 volt lithium replaceable battery (type CR2450 or equivalent). The battery voltage is continually monitored and if low voltage is detected a "low battery" alarm is transmitted as part of the heartbeat transmission. Under normal circumstances the battery life is 1 to 1½ year.

Start by removing the rear cover, see "Removing the Rear Cover" on page 260, then remove the printed circuit board by pulling it out of the body of the NITX.

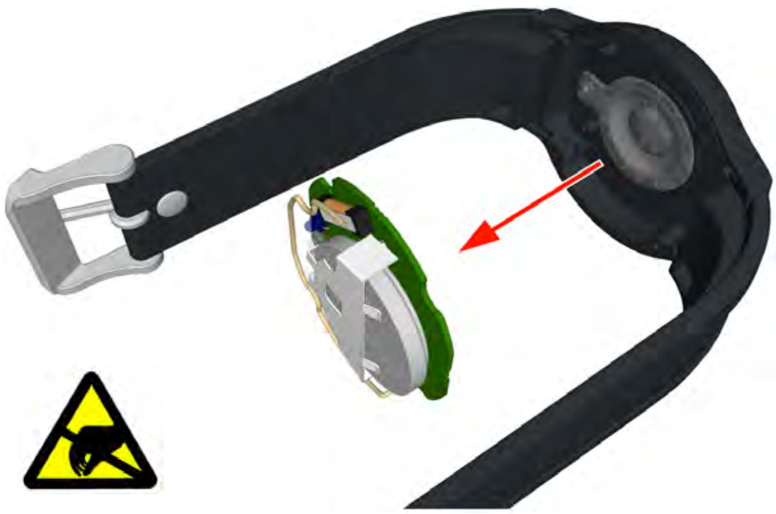


Figure 358. Remove the NITX circuit board

Remove the empty battery from the NITX 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.

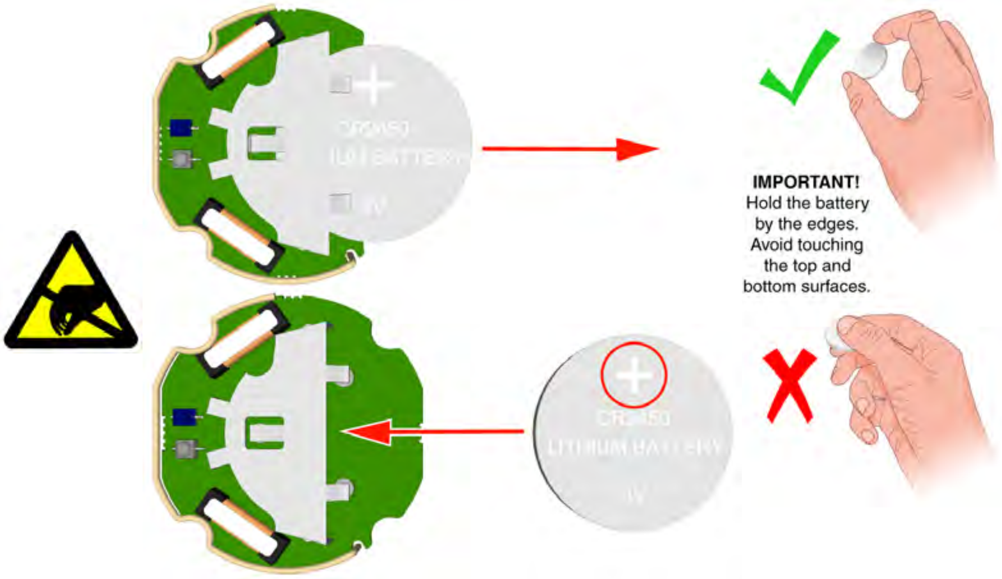


Figure 359. Removing the old and placing the new battery (type CR2450 or equivalent)

Reassemble the NITX using the reverse order of the previous instructions.

External Contact

The NITX has a set of connections that can be used to connect an external alarm contact. The external alarm contact must be a normally open potential free contact. When the contact is closed an alarm message will be sent by the NITX. The alarm condition stays active as long as the contact remains closed. Opening the alarm contact will cancel the alarm condition.

To connect an external alarm contact to the NITX circuit board start by removing the rear cover, see "Removing the Rear Cover" on page 260 and remove the NITX circuit board from the front cover, see "Remove the NITX circuit board" on page 260.

The external alarm contact can be connected to the NITX circuit board as shown in the following illustration.

Note: *Soldering is required to connect the external contact to the NITX circuit board.*

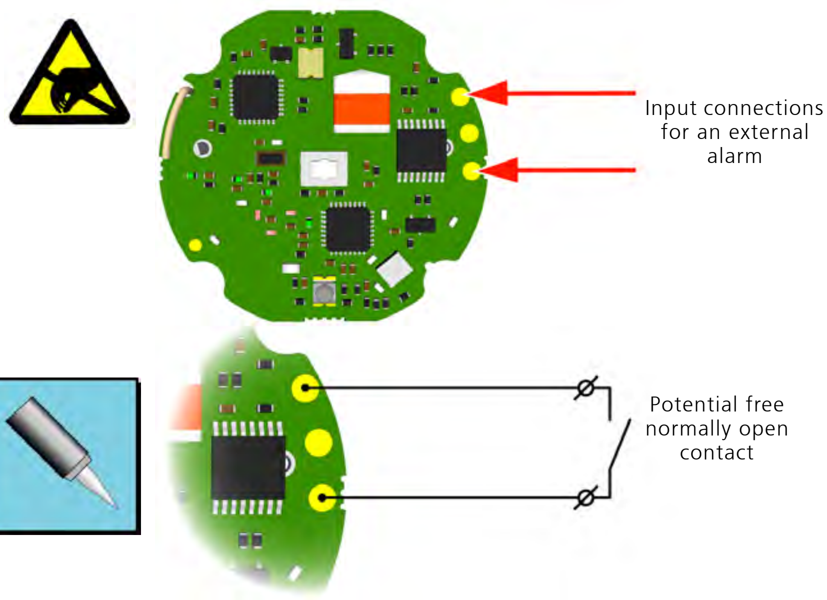


Figure 360. NITX external alarm contact connections

Note: *A closed contact (alarm condition) will draw a relatively higher current from the battery which will reduce the battery lifetime depending on the amount of time the contact stays closed.*

Mobile Transceiver Accessories

Interchangeable rings, buttons and strap loops make it possible to customize the mobile 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 strap locking fastener are available as an accessory kit.

Figure 361. Mobile transceiver accessories

10.8.8 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.

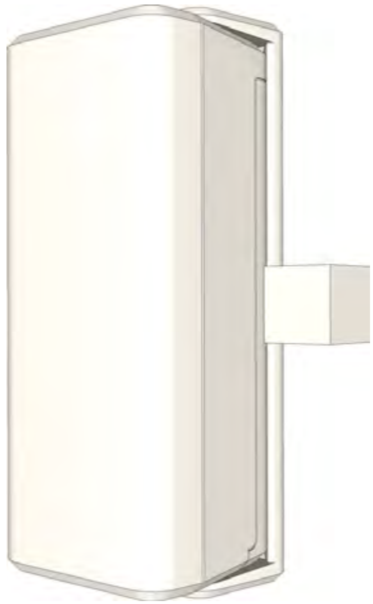


Figure 362. NUUTX Universal Transceiver

NUUTX Components

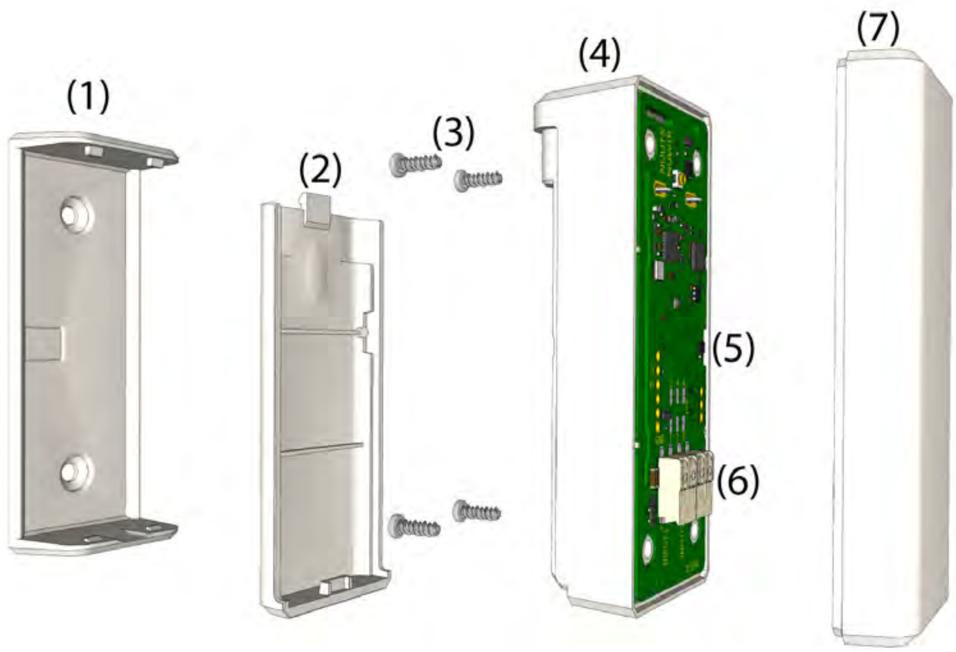


Figure 363. NUUTX Universal Transceiver exploded view

NUUTX components:

(1) Bracket for mounting the NUUTX 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 (bi-polar magnetic sensor) 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.

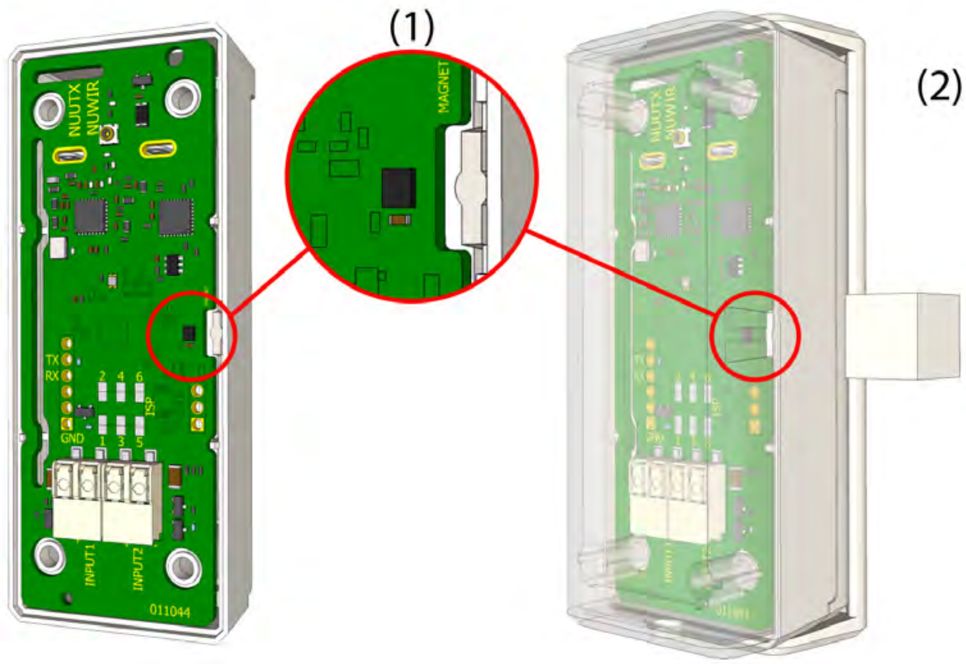


Figure 364. Window - door alarm monitoring.

Legend:

(1) Bi-polar magnetic sensor 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 bi-polar magnetic sensor

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 bi-polar magnetic sensor 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 266.

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

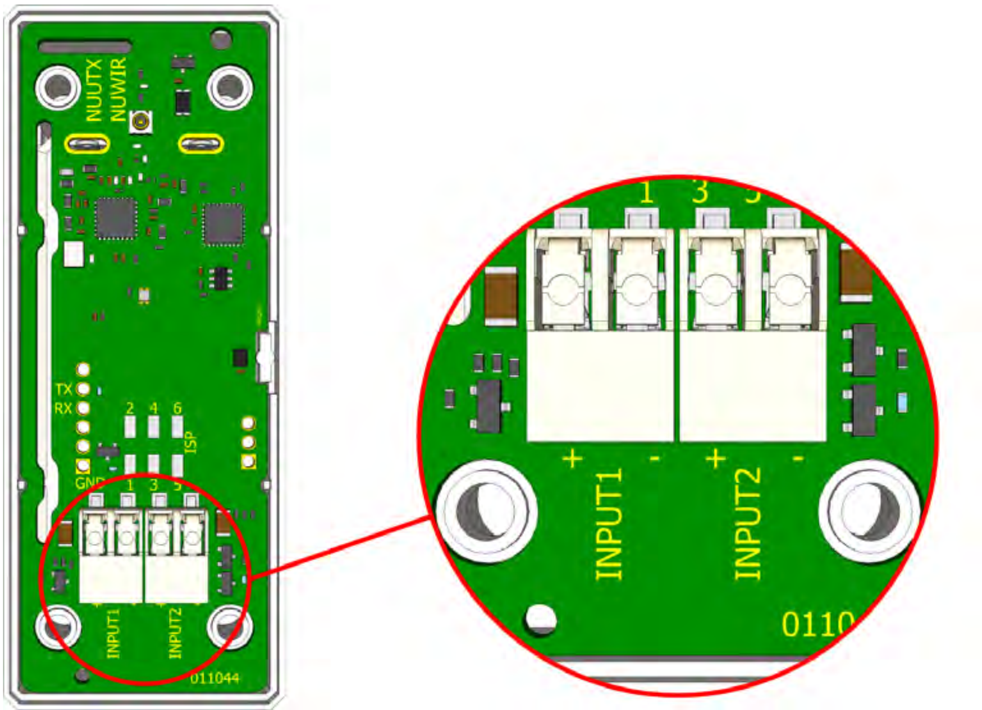
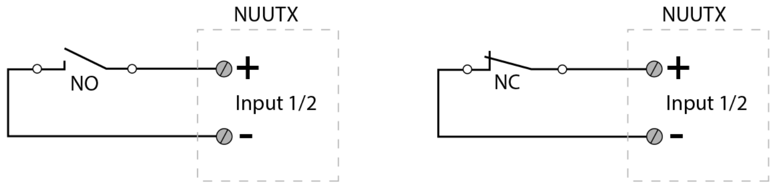


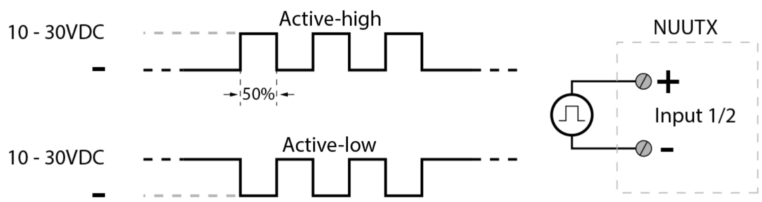
Figure 365. NUUTX inputs

The NUUTX features two independent inputs, supporting:

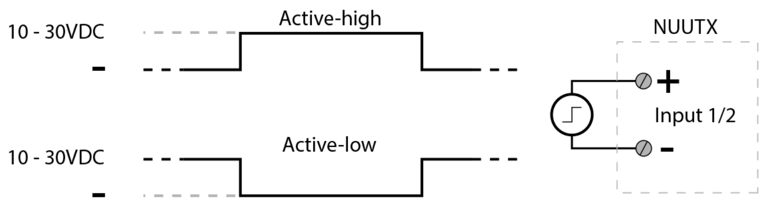
- Normally open and normally closed contacts



- Flashing signals from 1 to 5 Hz at 50% duty cycle



- A DC voltage from 10VDC to 30VDC



IMPORTANT: *The "-" terminal of both inputs share a common ground inside the NUUTX. Be aware that a ground loop or ground shift can occur when the input signals connected to input 1 and input 2 are coming from different systems.*

Be aware that if the external device that is monitored uses an open collector circuit as shown in the image below to supply the voltage to the NUUTX, only one input of the NUUTX can be used if configuration "A: Active High" is used, because the "-" input is floating when the output is in the open collector "High impedance" state. If configuration "B: Active Low" is used, both inputs of the NUUTX can be used.

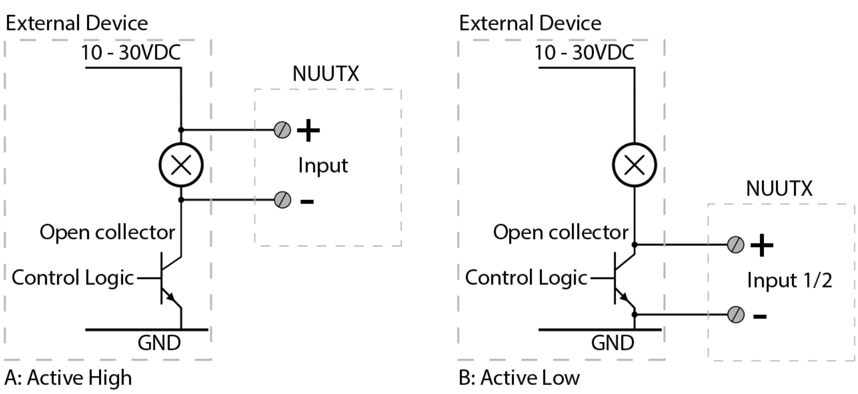


Figure 366. Open collector configuration

10.8.9 NUWIR Wireless PIR Module

The motion sensor or PIR (passive infrared) sensor (NUWIR) is used to detect resident movement, where software will determine when to alert the caregivers. The NUWIR can also be used to perform an automated resident check-in based on the residents movement, for example when motion is detected by a NUWIR that is placed inside the toilet.

Figure 367. NUWIR PIR (Passive Infra-Red) sensor

The NUWIR is battery operated with a battery lifetime of > 3 years.

IMPORTANT: *Please be advised that when mounting a NUWIR in a main living space, a lot of wireless traffic will be generated during the day. This will drastically reduce the life time of the battery and it can cause the wireless system to overload. It is therefore not advised to mount a NUWIR in a main living space.*

NUWIR Components

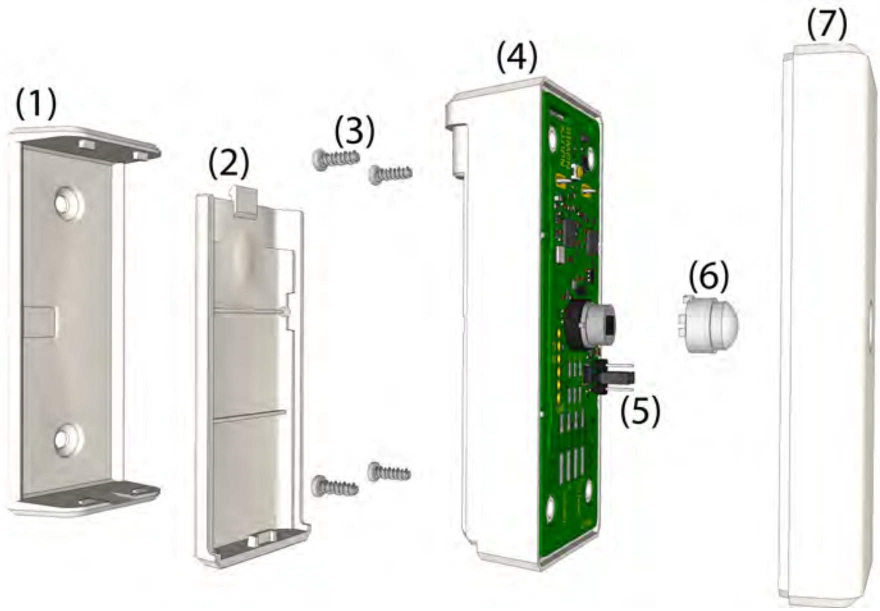


Figure 368. NUWIR exploded view

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 Installation

The NUWIR can only be mounted vertically, see "NUUTX NUWIR Mounting Instructions" on page 274 for detailed information.

IMPORTANT: *The NUWIR cannot be mounted horizontally, the PIR sensor in the NUWIR will not function correctly when the NUWIR is mounted horizontally.*

NUWIR Field of View

The field of view of the NUWIR is determined by the placement of the fresnel lens that is located on top of the PIR sensor. The fresnel lens can be placed to create a narrow (factory default) or a wide field of view.

Narrow Field of View (Factory Default)

A narrow field of view is used to only detect motion when people are close or directly in front of the NUWIR, used for example at an entrance door.

The graphic below shows the required orientation of the fresnel lens for a narrow field of view.

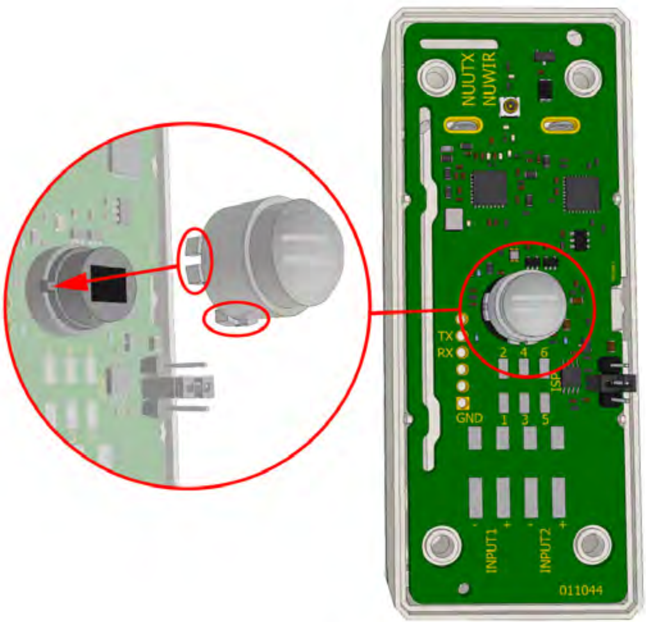


Figure 369. Fresnel lens orientation for a narrow field of view

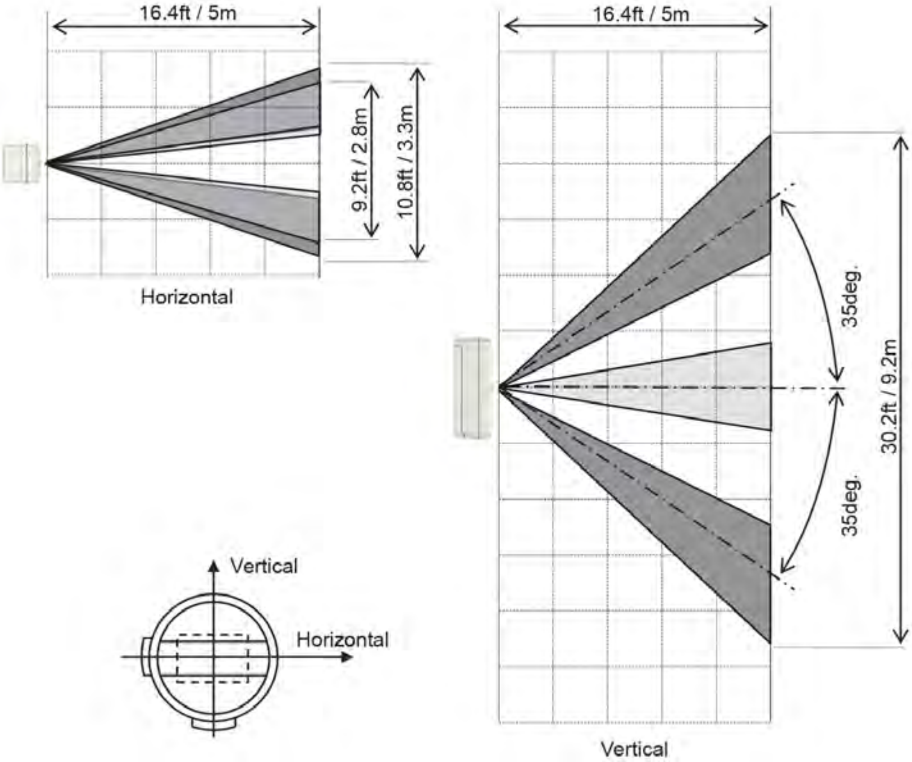


Figure 370. Narrow field of view

Wide Field of View

A wide field of view is used to detect general motion inside a room.

The graphic below shows the required orientation of the fresnel lens for a wide field of view.

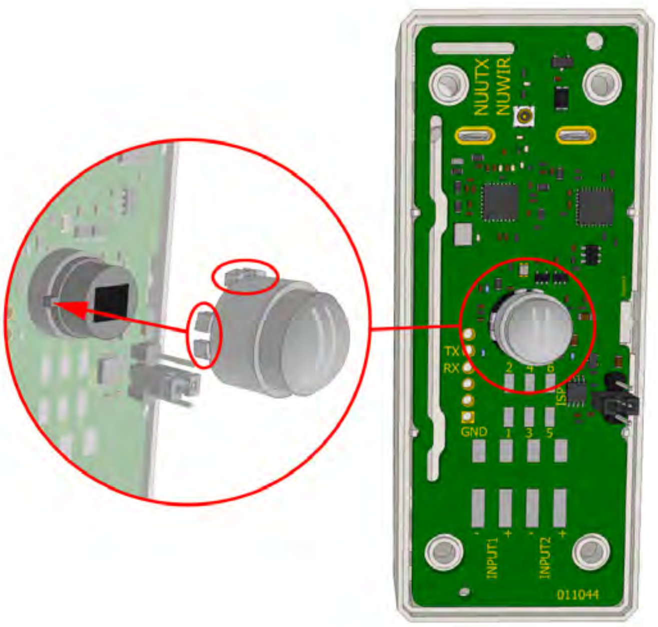


Figure 371. Fresnel lens orientation for a wide field of view

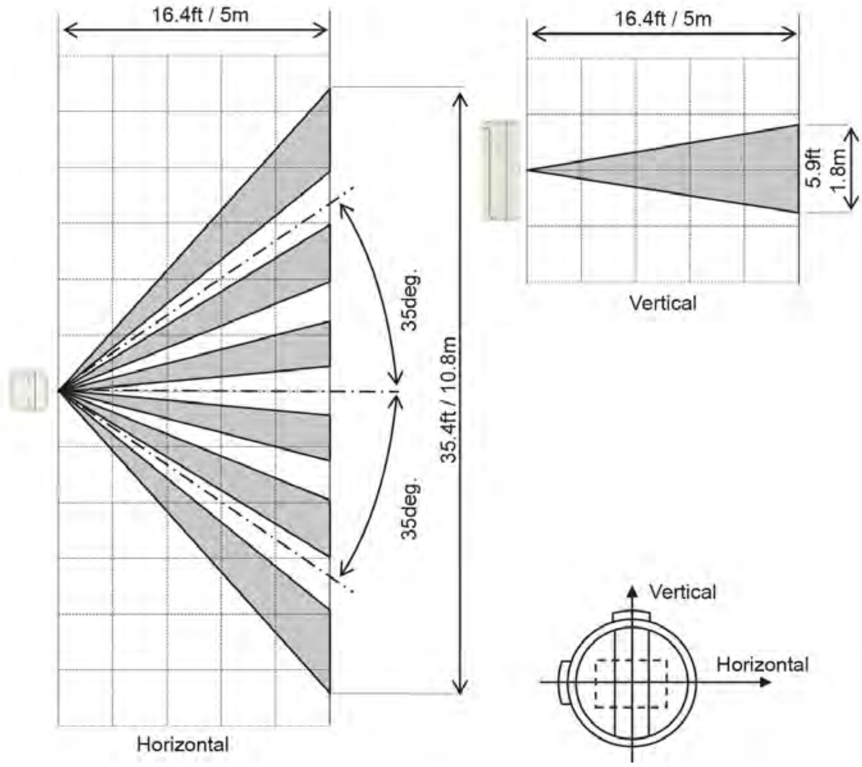


Figure 372. Wide field of view

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.

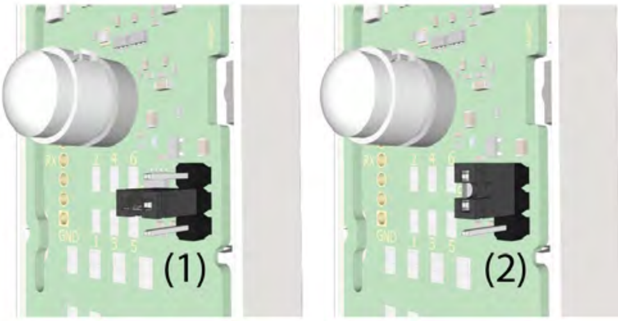


Figure 373. Changing the NUWIR sensitivity.

NUWIR sensitivity:

(1) 13 feet (4 meters) - No shunt placed (default)

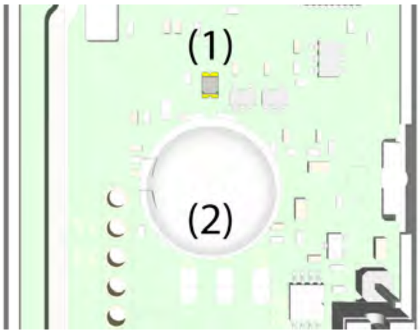
(2) 20 feet (6 meters) - Shunt placed on the top and middle pin

IMPORTANT: *Please note that the IR detection surface of the sensor can become saturated if exposed to direct sunlight or when close to other sources radiating IR, for example high powered incandescent light bulbs or heat lamps. Placing the NUWIR in such conditions will drastically reduce the range of the sensor.*

10.8.10 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 272.

10.8.11 NUUTX NUWIR Battery Placement

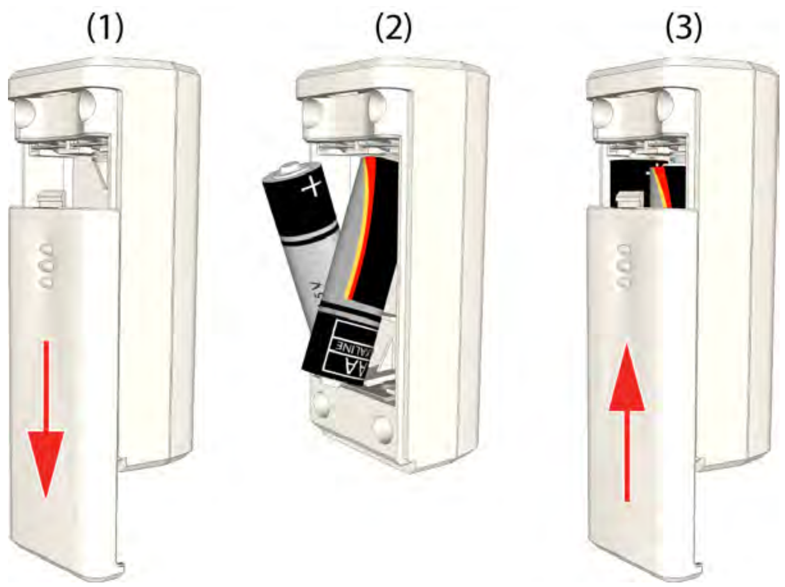


Figure 374. Place the two 1.5V alkaline batteries

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

(3) Slide the battery lid back into place until it snap fits.

10.8.12 NUUTX NUWIR Mounting Instructions

The NUUTX and the NUWIR are designed to be mounted on walls or onto window/door posts. The NUUTX can be mounted both vertically and horizontally. The NUWIR can only be mounted vertically.

IMPORTANT: *Please note that for the NUWIR, the IR detection surface of the sensor can become saturated if exposed to direct sunlight or when close to other sources radiating IR, for example high powered incandescent light bulbs or heat lamps. Placing the NUWIR in such conditions will drastically reduce the range of the sensor.*

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).

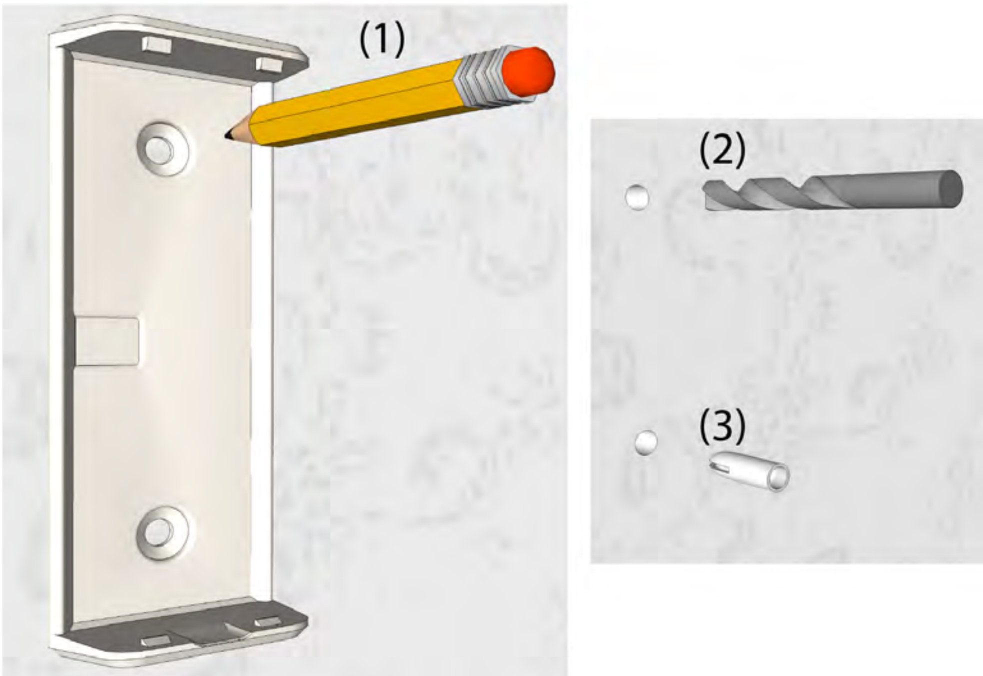


Figure 375. Mark the location of the mounting holes

(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.

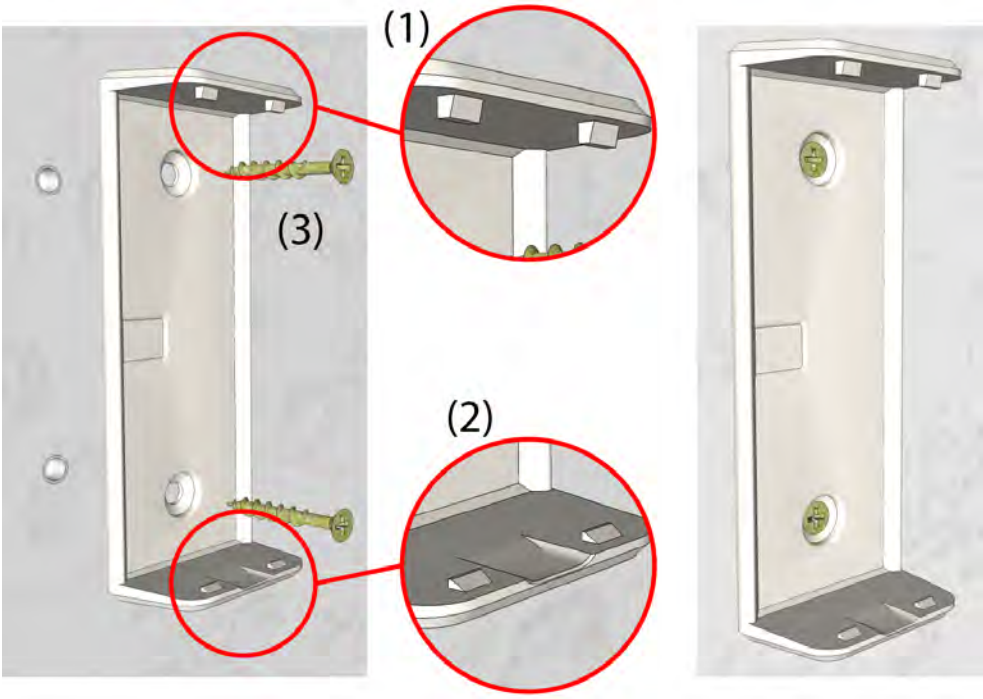


Figure 376. Orientation of the bracket

(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.

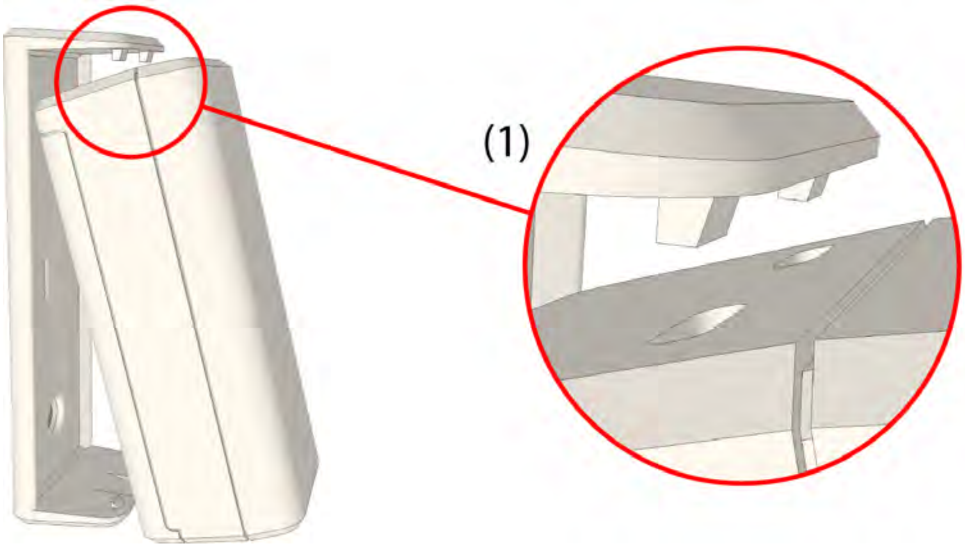


Figure 377. Align the NUUTX or NUWIR to the top of the bracket.

(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.

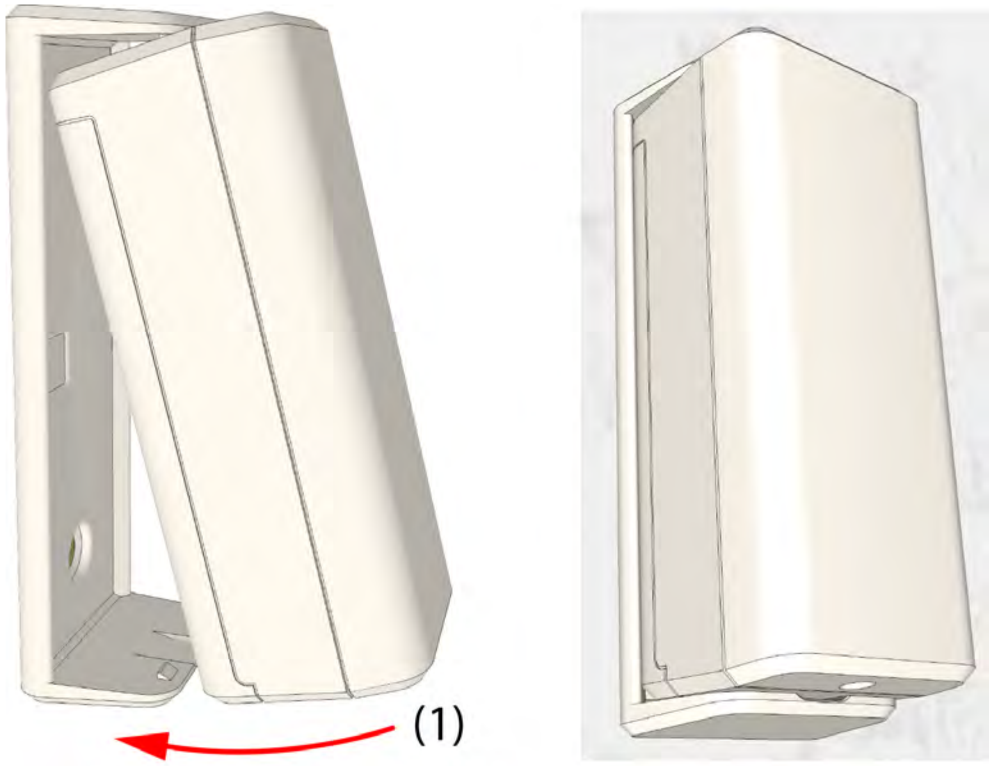


Figure 378. Snap fit the NUUTX or NUWIR onto the bracket.

(1) Rotate the module until it snap fits on the lower halve of the bracket

10.8.13 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” (R14) alkaline batteries. In situations where battery power is not suitable a 12-24Vdc external power supply can be used.

An optional transceiver module NIRX can be mounted on the NILF circuit board used 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 379. NILF - Low Frequency Beacon

The NILF operates at 125 kHz producing a spherical magnetic field with a range of up to 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.

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 2.7m.

NILF Installation

The slim design makes the NILF suitable for surface mounting on walls or at a door post at approximately 1.2 meters from the ground.

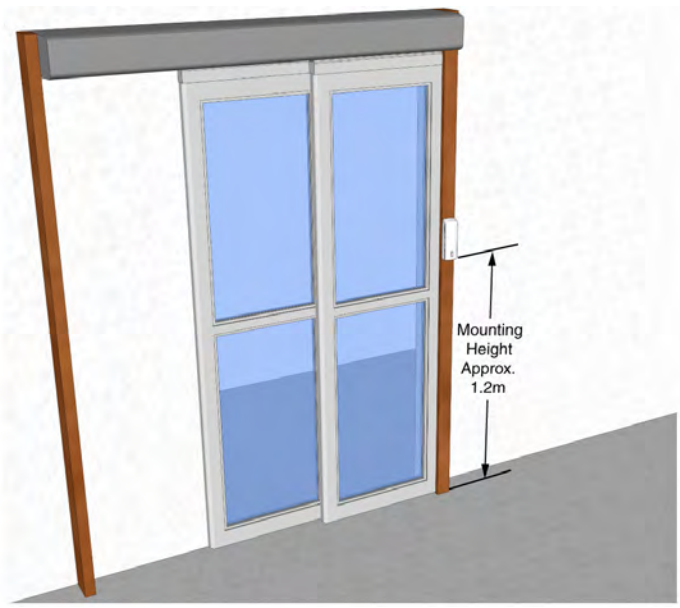


Figure 380. NILF installation example

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 381. Removing the front cover of the NILF

Place the NILF onto the door post or the wall at approximately 1.2 meters from the ground and mark the holes for drilling with a sharp pencil.

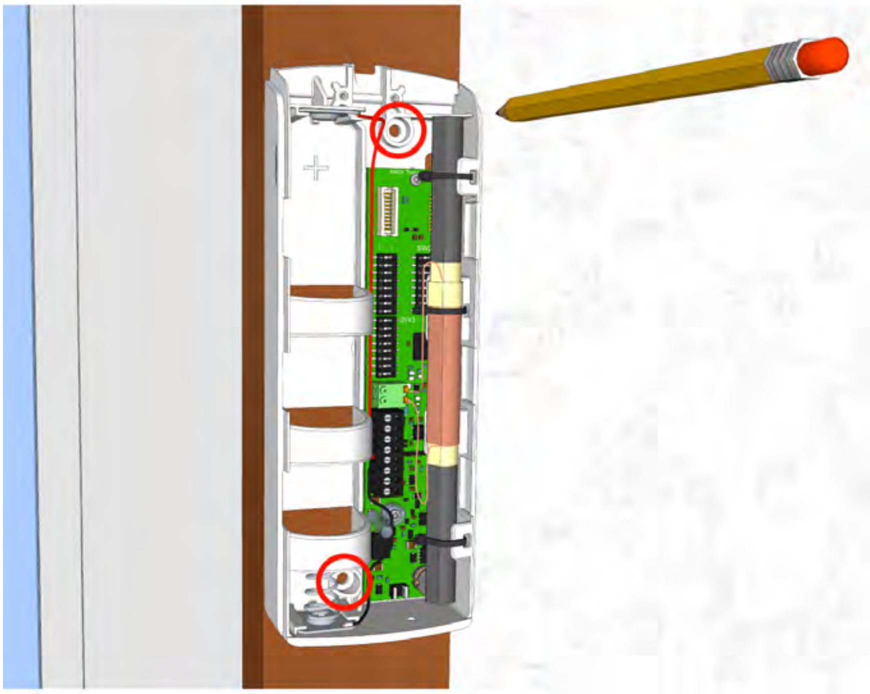


Figure 382. Mark the holes for drilling

Screws with a diameter of 3.5mm to 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 3.5mm to 3.8mm.

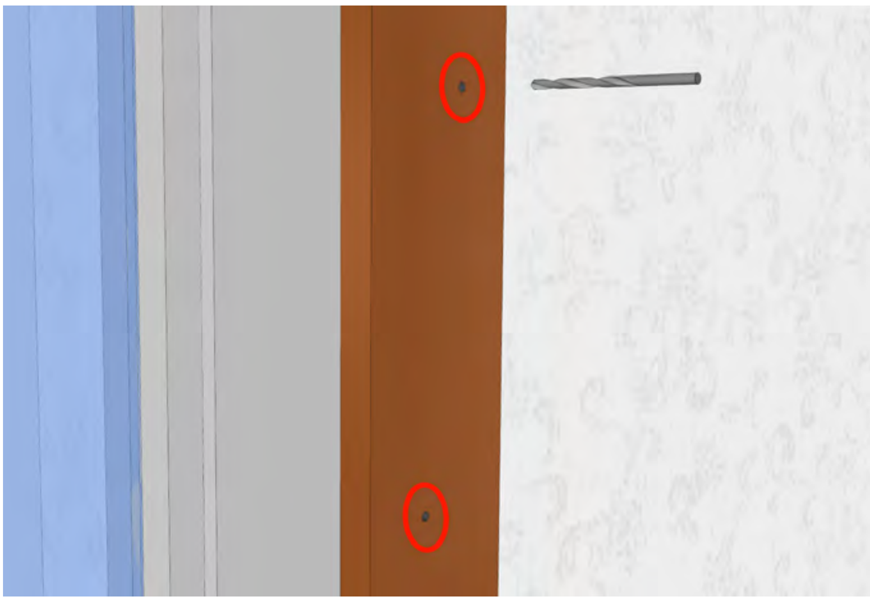


Figure 383. Drill the two holes with the proper drill

Mount the NILF on the door post or wall.

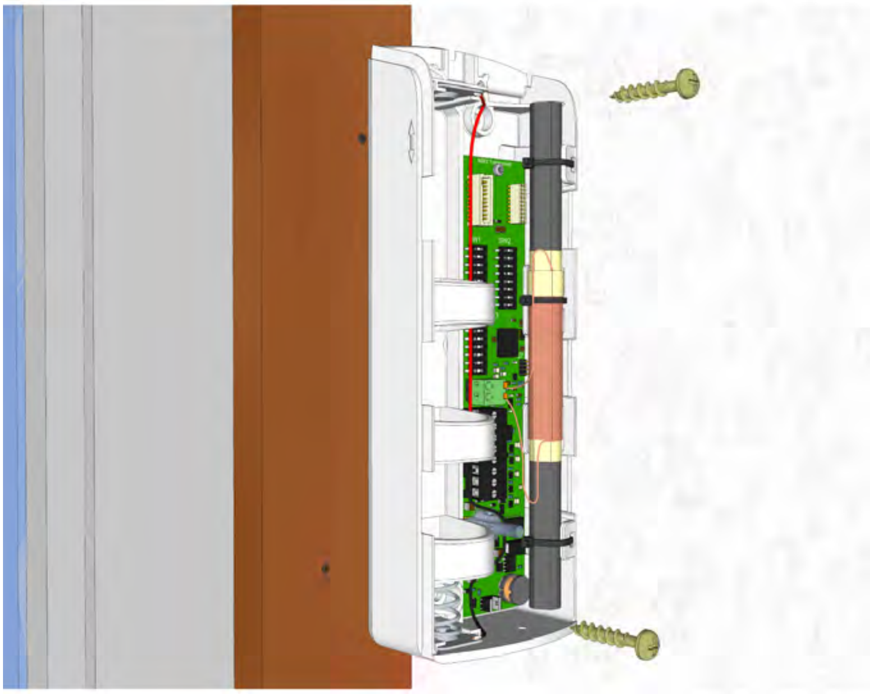


Figure 384. Placing the NILF on the door post

The two screws should be tightened carefully using the appropriate screwdriver. Make sure that the NILF does not bend when tightening the screws.

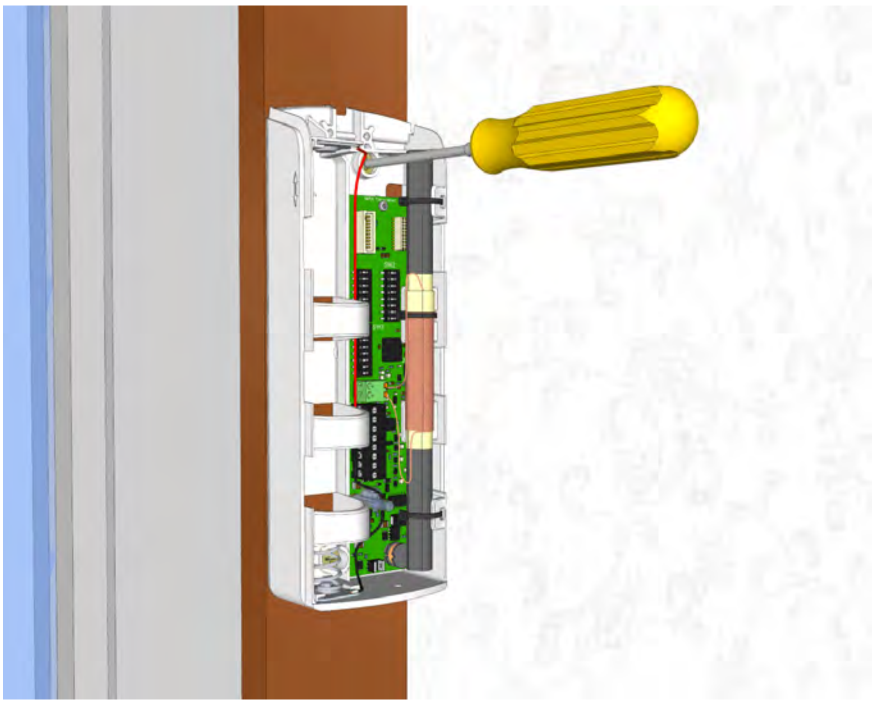


Figure 385. Tightening the two screws.

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.*

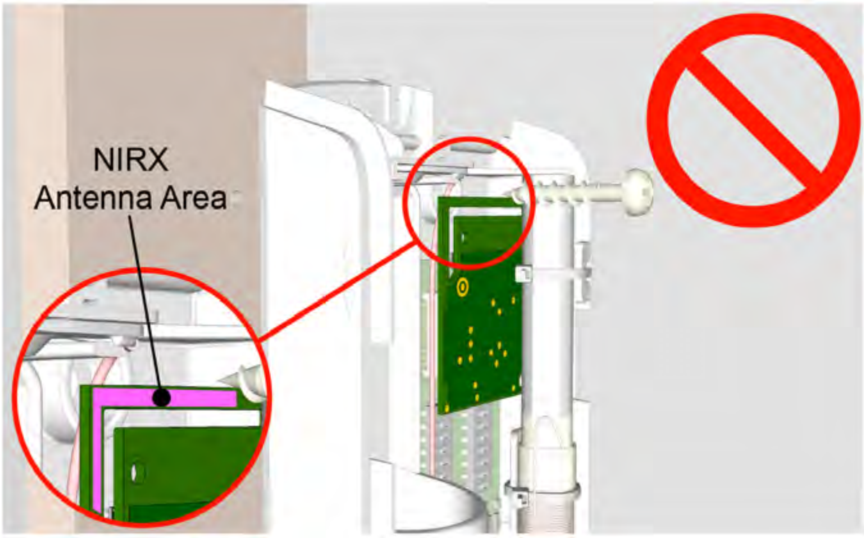


Figure 386. Do not mount the NILF to the wall while the NIRX is placed

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.

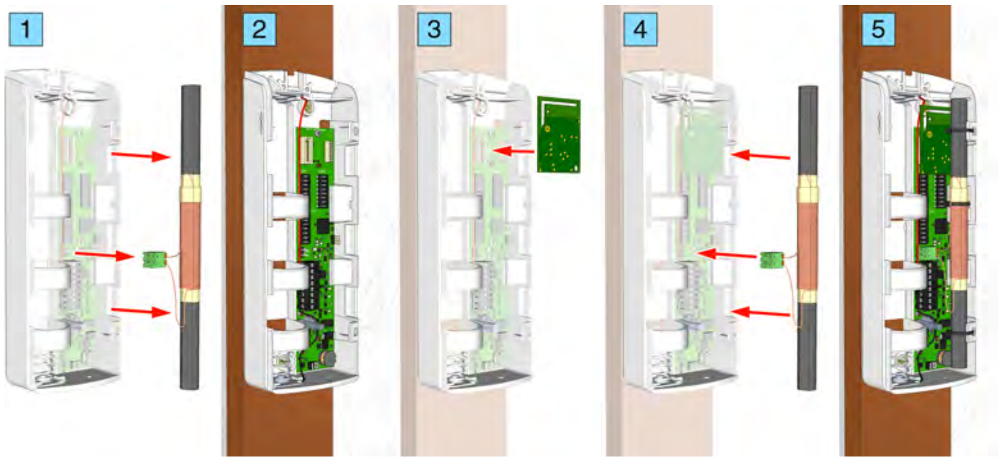


Figure 387. Correct sequence for placing an NIRX onto the NILF circuit board.

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.

10.8.14 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.

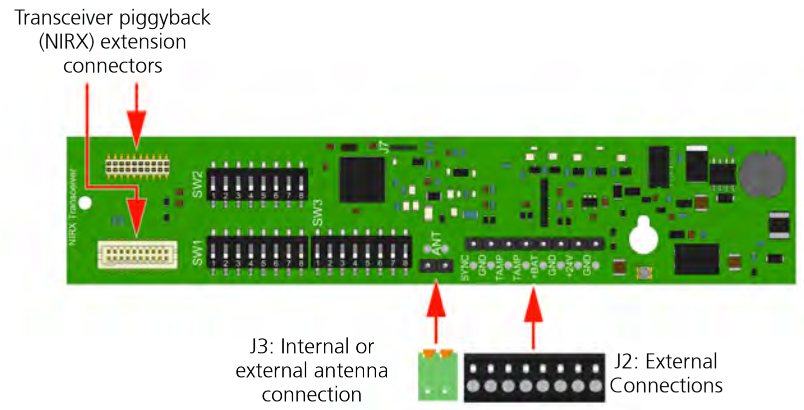


Figure 388. Low frequency beacon NILF electrical connections

NIRX Placement

The NIRX transceiver module can be piggyback mounted on the (NIRX) extension connectors.

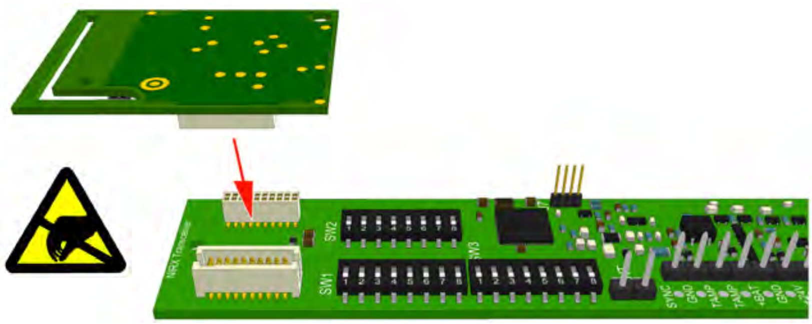


Figure 389. Placing the NIRX on the NILF board

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 282.*

Antenna Connection

The 2-pole antenna connection (J3) is connected to the internal LF antenna.

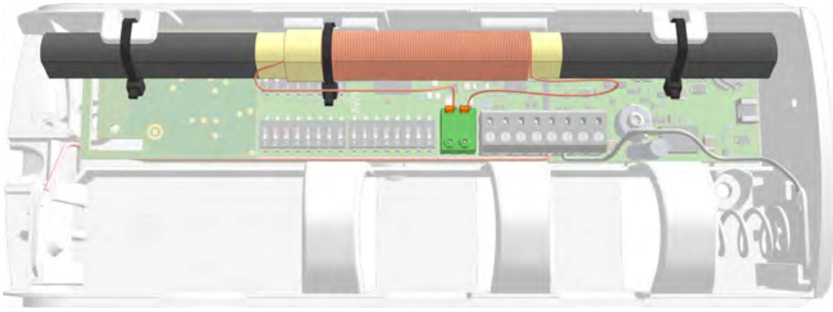


Figure 390. NILF internal antenna connected

External Loop Antenna

The 2-pole antenna connection (J3) can also be used to connect an external loop antenna in order to increase the range of the LF field to cover a larger area.

Proper measurements need to be performed to get the optimal field strength from the loop antenna. Please contact Ascom support for detailed information.

IMPORTANT: *When external loop antennas are mounted outdoors, it is advised to only use batteries to power the NILF. When an external power supply is used to power the NILF, transient protection is required for protection against lightning strikes.*

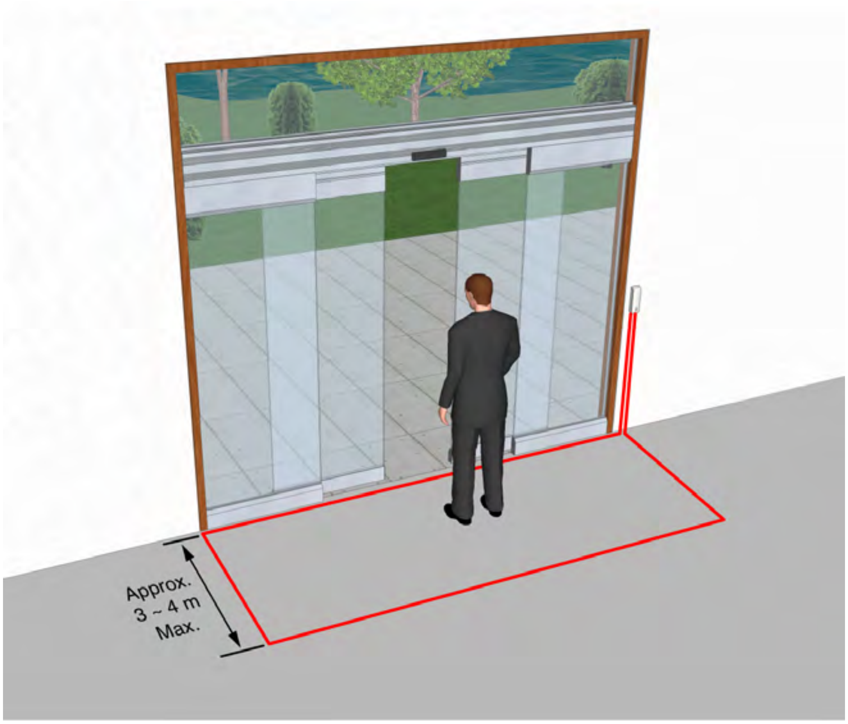


Figure 391. External loop antenna example

For the external loop antenna use a 0.8 - 1.4mm (20 - 16 AWG) wire. The 2-pole antenna connector (J3) only allows solid wires of up to 0.8mm (20 AWG). When using wire sizes above 0.8mm (20 AWG) or stranded wires for the external loop antenna, use a junction box to connect the external loop antenna to the NILF. The distance between the sides / diameter of the loop should be up to a maximum of 3 to 4 meters.

External Loop Antenna Connection

To connect the external loop antenna first disconnect the internal antenna from connector J3. Make sure to isolate the wire ends of the internal antenna or alternatively remove the internal antenna by cutting the cable ties that holds the internal antenna in place.

Next connect the external loop antenna to J3.

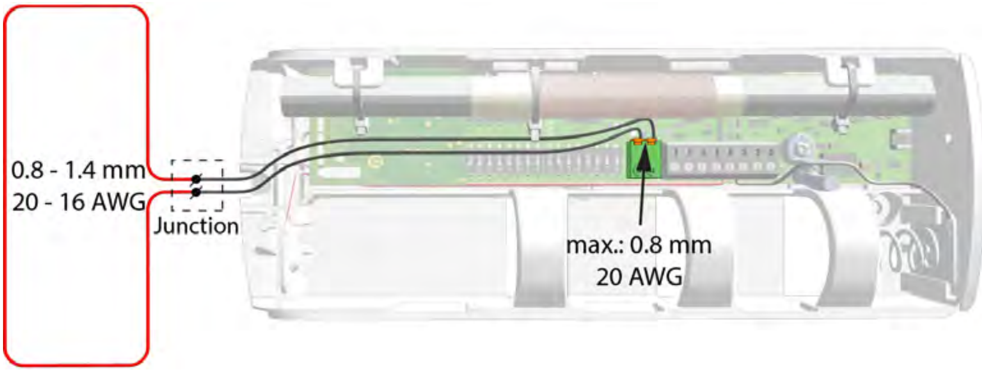


Figure 392. External loop antenna connection

Antenna DIP switch setting

With DIP switch SW3 (8) the antenna selection of the NILF can be set. Set the switch to “On” when using an external loop antenna.

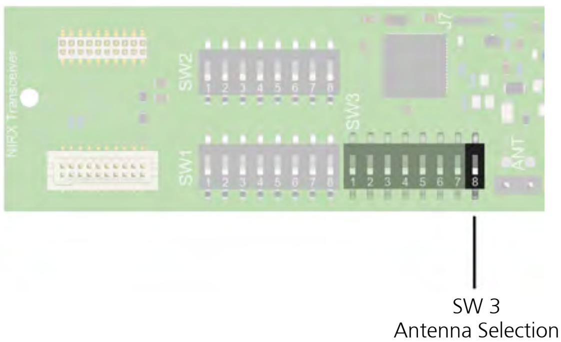


Figure 393. Antenna selection DIP switch setting

NILF Antenna Selection	
SW3 (8)	**Mode**
Off = 0	Internal antenna
On = 1	External antenna

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 an external 12-24 Vdc power supply input.

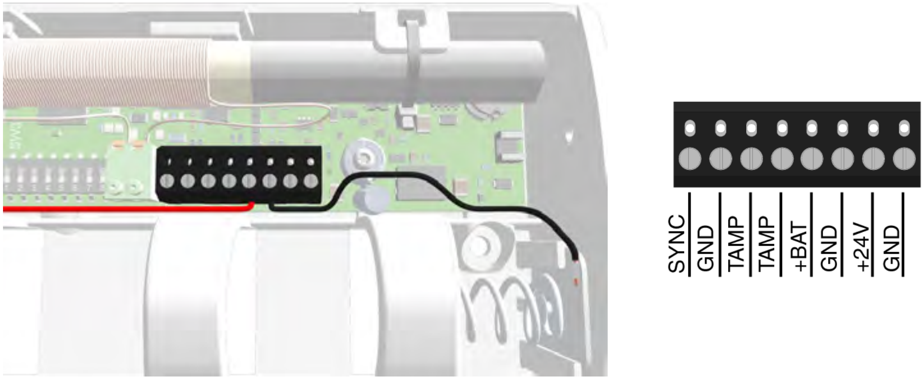


Figure 394. External connections - J2

External Connector		Description
1	SYNC	Master / Slave interconnection Beacon synchronization
2	GND	
3	TAMP	Tamper alarm relay output (galvanically separated)
4	TAMP	
5	+BAT	Battery connection
6	GND	
7	+24V	External 12-24Vdc power supply connection
8	GND	

For master / slave connection see “Master / Slave Beacon Interconnection” on page 289.

For tamper alarm relay connection see “Tamper Alarm” on page 291.

For 24Vdc external power supply connection see “External Power Supply Connection” on page 293.

10.8.15 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.

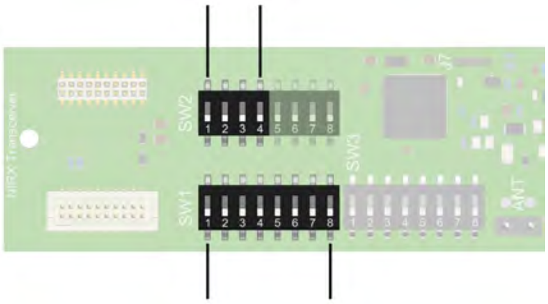


Figure 395. NILF 12 bit ID - DIP switch settings

NILF ID Settings			
SW1	**Low byte**	**SW2**	**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 290. 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 between 0.3 and 2.7 meters. 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).

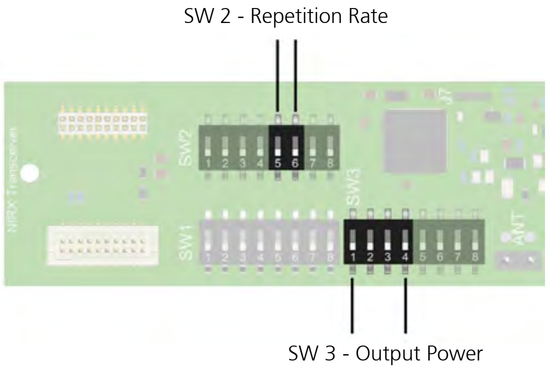


Figure 396. Output Power and Repetition Rate DIP switch settings

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.

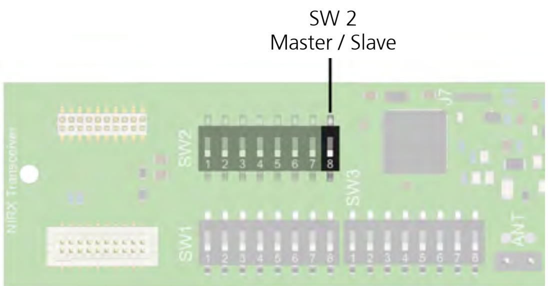


Figure 397. Master / Slave DIP switch settings

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 287 for setting the ID of the slave NILF.
Refer to "Beacon Mode" on page 290 for setting the mode of the slave NILF.
Refer to "Output Power and Transmission Rate DIP Switch Settings" on page 288 to set the output power of the slave NILF. Note that the transmission rate is decided by the master synchronization, setting this 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.

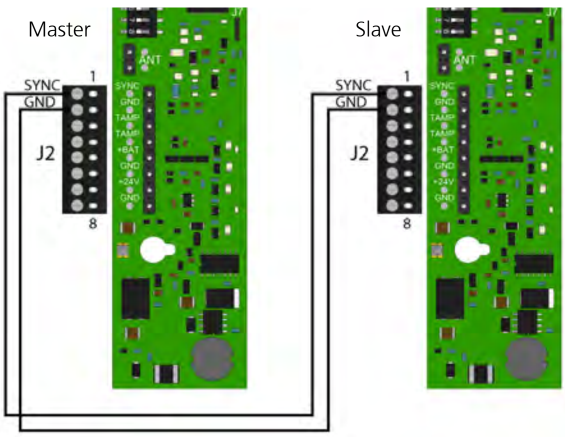


Figure 398. NILF master / slave interconnection

Note: *Minimum recommended cable requirements: twisted pair (for example CAT5) length < 100m.*

Beacon Mode

With DIP switch SW3 (5) the mode of the LF location beacon can be set to passive or active.

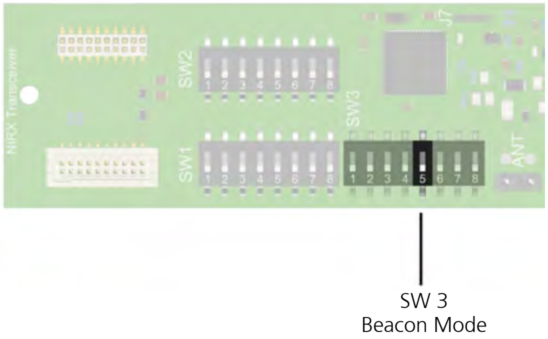


Figure 399. Beacon Mode DIP switch settings

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 287.

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 wander management and automatic location updates when moving from one active location to the other.

Exit Beacon

Exit detection can be used to detect if a wireless module (unsupervised) or a wireless module accompanied by a buddy (supervised) is leaving an area that is covered by the wireless system, for example at the entrance to a site or building.

If configured, the presence status of a wireless module changes to "Absent" after passing an exit beacon. While the wireless module is absent, the following functionality will be temporarily suppressed:

- No peripheral lost
- No resident check-in alert

When the wireless module passes any other active location beacon that is not an exit beacon, the presence status will refer back to "Present".

Exit detection functionality can be enabled for active location beacons (ID 800 to FFF). An exit beacon can only be configured through the system manager configuration during the hardware setup of location beacons, see the Configuration Manual TD 92610EN for detailed information.

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.

IMPORTANT: *The tamper alarm output is only functional when an external 12-24Vdc power supply is used to power the NILF. The solid state relay is disabled when only batteries are used.*

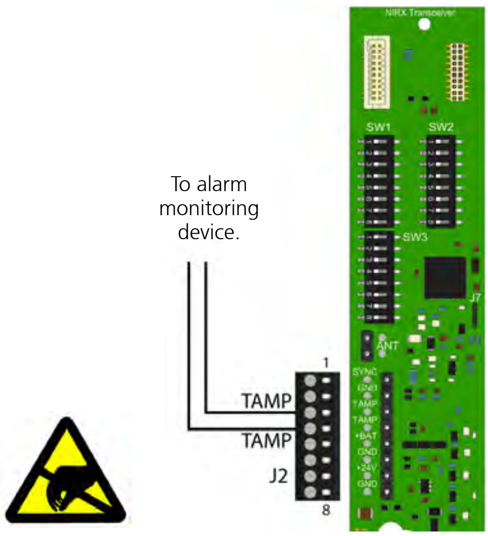


Figure 400. Galvanically separated normally closed tamper alarm output

10.8.16 NILF Power supply

The NILF can be powered by batteries or by an external 12-24Vdc power supply.

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.

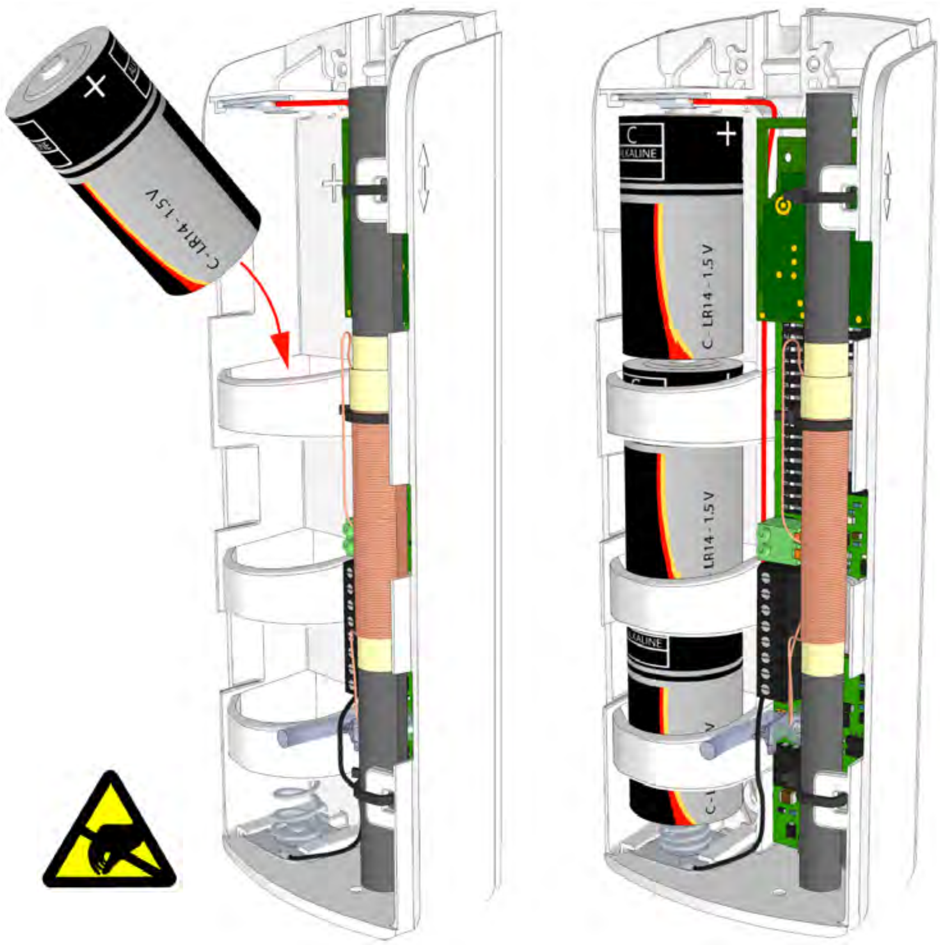


Figure 401. Placing the three 1.5V "C" (R14) alkaline batteries

Note: *Optionally an NIRX transceiver module can be mounted on the LF location beacon - NILF for actively monitoring the state of the NILF like tamper and low battery alarm conditions.*

External Power Supply Connection

Alternatively an external 12-24Vdc power supply can be connected to power the NILF.

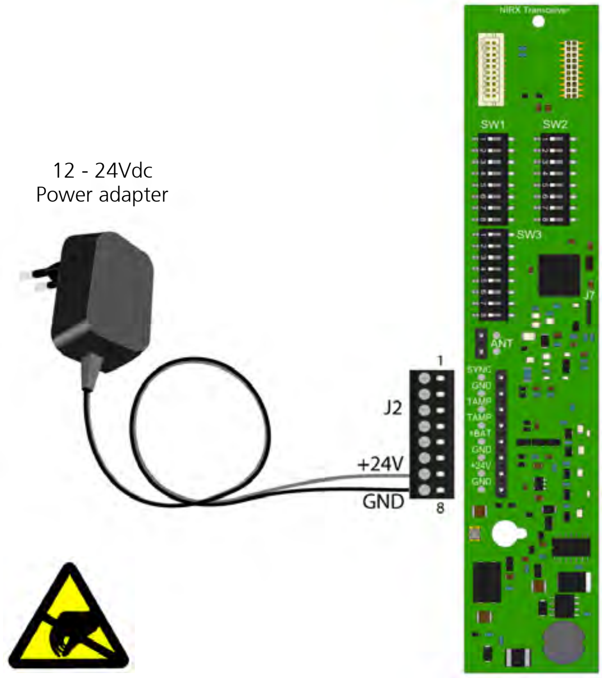


Figure 402. External 24Vdc power supply connection

11 Test and Configuration Equipment

11.1 Patient Handset Programming Interface

For the configuration and/or software upgrading of the patient handsets NIPH3 (7 and 14 button models), dedicated equipment is needed.

The following equipment is required:

- NIBM2 -> Needs some preparation before it can be used to program the NIPH3, see "Bedside Module NIBM2 Preparation" on page 295.
- FTDI - TTL-232R-3V3 - serial converter cable (Farnell order code: 132-9311)
- 6-pin header (Farnell order code: 973-3337).
- Ascom WinPDM - Version 3.9.4 or later

With Ascom WinPDM the handset software can be upgraded and the NIPH3 parameters can be adjusted.

Parameters that can be adjusted are:

7 and 14 Button Models

- Flash light mode
- Bed lights
- Service button

14 Button Models

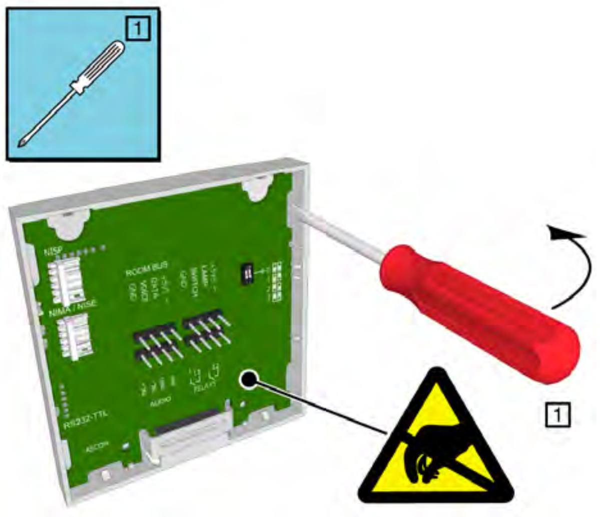
- teleCARE M entertainment setting
- Default speech volume
- Default audio volume
- Radio channel selection using seek mode or 8 channels (frequencies) manually configured.
- Infrared TV control definitions for up to 8 different TV brands.

***IMPORTANT:** Ascom cannot guarantee that the TV control definitions available at the time of release are compatible with the latest TV models produced by the TV manufacturers. Therefore it is important to first test the handsets full TV control functionality on the desired TV (brand) model.*

11.1.1 Bedside Module NIBM2 Preparation

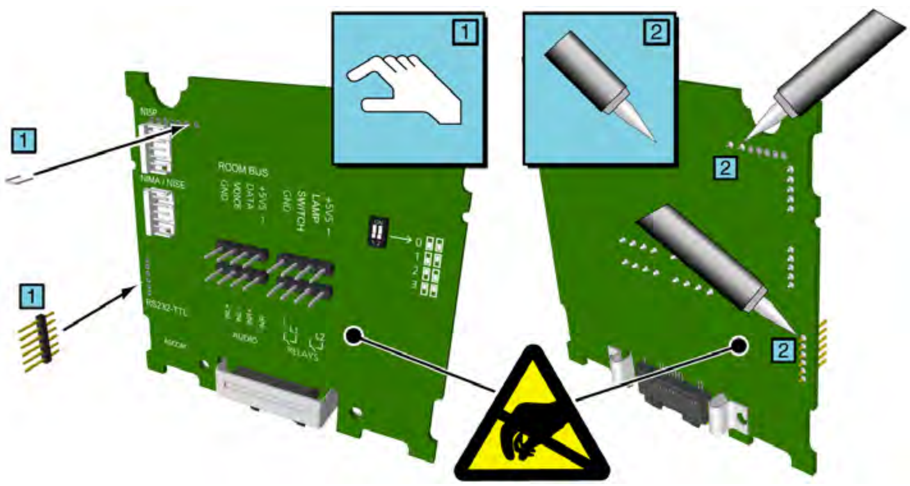
To prepare the dedicated NIBM2 so it can be used to program the NIPH3:

1 *Remove* the NIBM2 circuit board from the plastic housing.

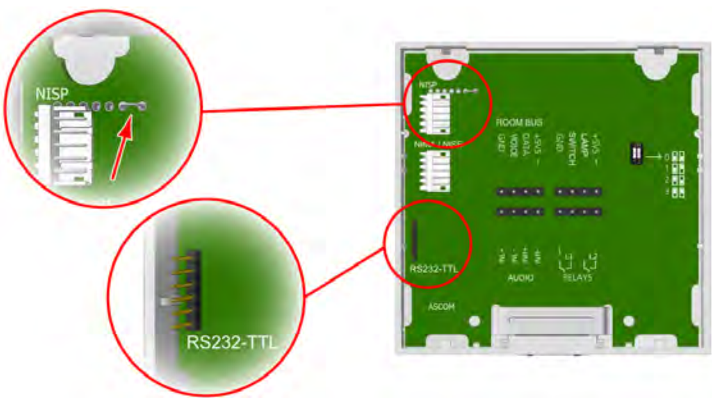


2 Solder the following items on the NIBM2 circuit board

- 6-pin header at the "RS232 - TTL" section.
- bridge between the 2 holes near the "NISP" connector.

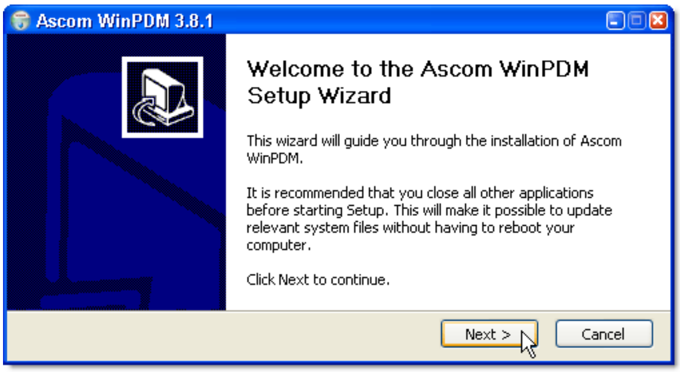


3 Place the circuit board back into the plastic housing



11.1.2 Installing Ascom WinPDM

1. Install Ascom WinPDM version 3.9.4 or later.

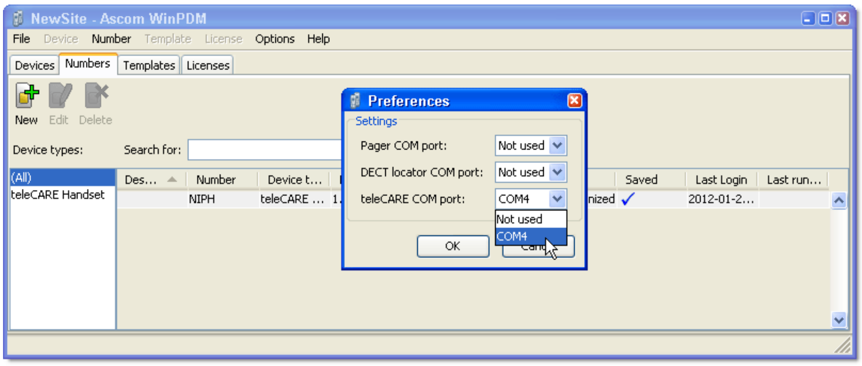


2. Follow the Ascom WinPDM Setup Wizard instructions to setup WinPDM

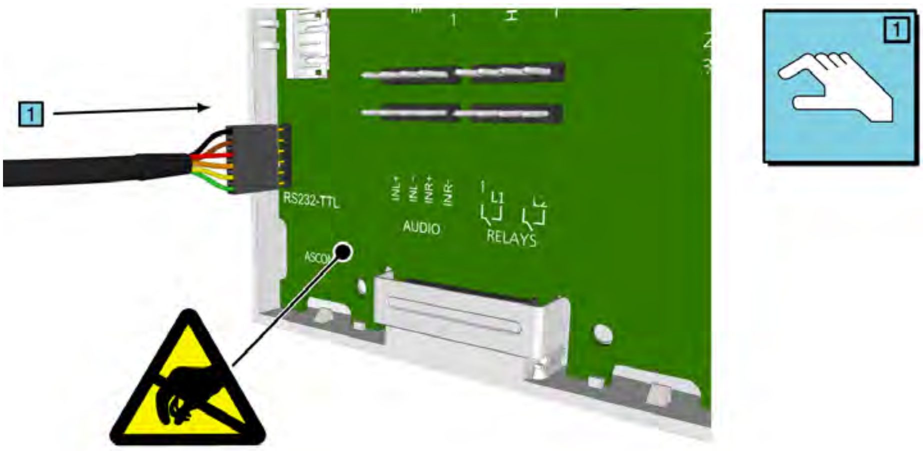
11.1.3 NIPH3 Patient Handset Programming

To program the patient handset (NIPH3):

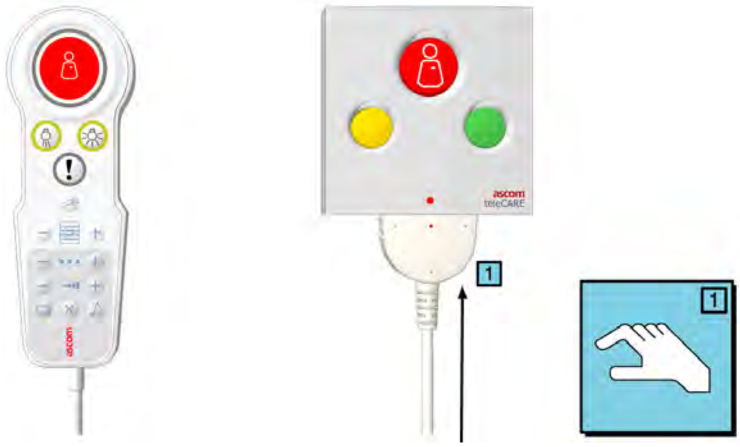
1. Plug in the FTDI - TTL-232R-3V3 - serial converter cable into a USB slot of the PC. Drivers are available to download from the FTDI website http://www.ftdichip.com
2. Start Ascom WinPDM and from the menu select “Options -> Preferences”. In the “Preferences” window set the “teleCARE COM port:” to the com port that has been assigned to the serial converter cable.



3. Connect the FTDI - TTL-232R-3V3 - serial converter to the NIBM2



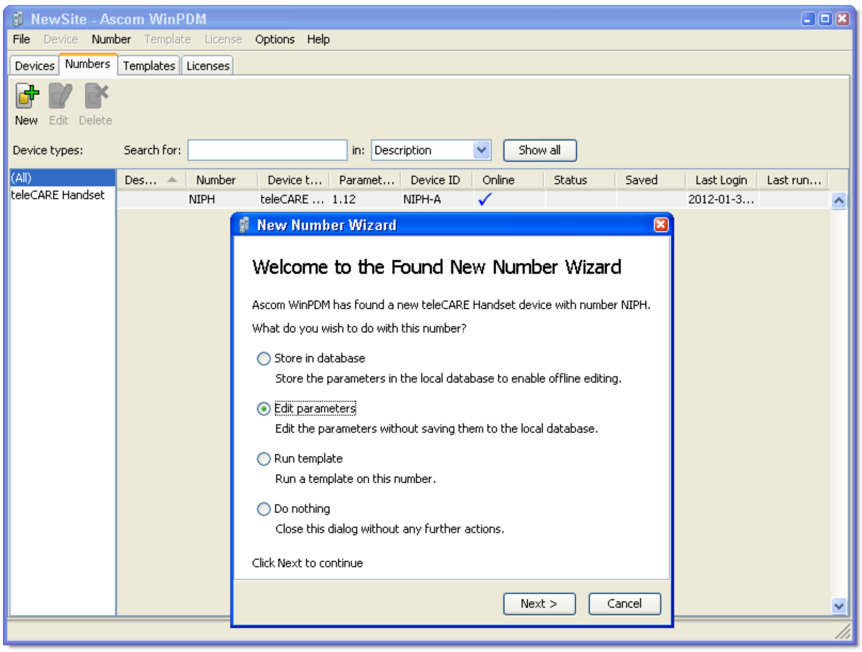
4 Plug the patient handset into the NIBM2



5 Within two seconds after plugging in the patient handset make sure to press the red button on the handset to put the handset in the programming mode.

Note: *The patient handset is in programming mode when both the red nurse call LED and the blue service call LED blink intermittently.*

6 In the Ascom WinPDM application the “New Number Wizard” pops up indicating a successfull connection of the patient handset.



With WinPDM you can now upgrade the NIPH3 software if required or edit the NIPH3 parameters in order to change the handset functionality.

11.2 Room Bus Tester (NIRT)

The Room Bus Tester (NIRT) is used to test the teleCARE IP room bus and the peripheral devices.

The NIRT is contained a teleCARE switch module housing with a blank cover. It includes three test buttons, 6 LEDs, a 4-pole connector for room bus in, a 4-pole connector for room bus out connector, a 2-pole connector external power supply and a buzzer which is used to signal room bus conflicts.

Note: *The 4-pole and the 2-pole connector terminals required for the room busses and the external power are not supplied with the room bus tester. They are available as accessories and which must be ordered separately.*

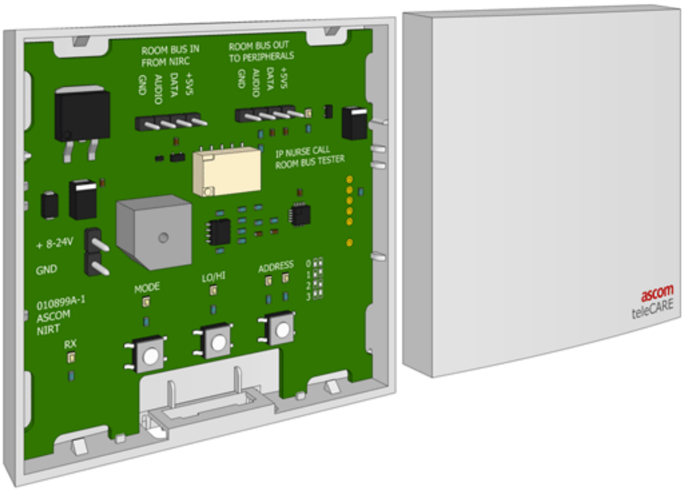


Figure 403. Room bus tester

It can be used with or without an IP room controller. When the room bus tester is connected to a room controller the power supply for the room bus tester is taken from the room bus output of the room controller. When a room controller is not available the room bus tester requires an external power supply with a recommended value of 8V to 12V/DC.

Caution: *An external power supply of up 24V/DC can be used for the room bus tester for a short time (up to 5 minutes). If the room bus tester is powered by 24VDC for a longer time it will become hot and could cause damage or injury.*

11.2.1 Room Bus Tester with Room Controller and Separate Power Supply

When the room bus tester is used in an installation which includes a room controller with a separate power supply unit. The power supply for the room bus tester will taken from the room controller via the room bus.

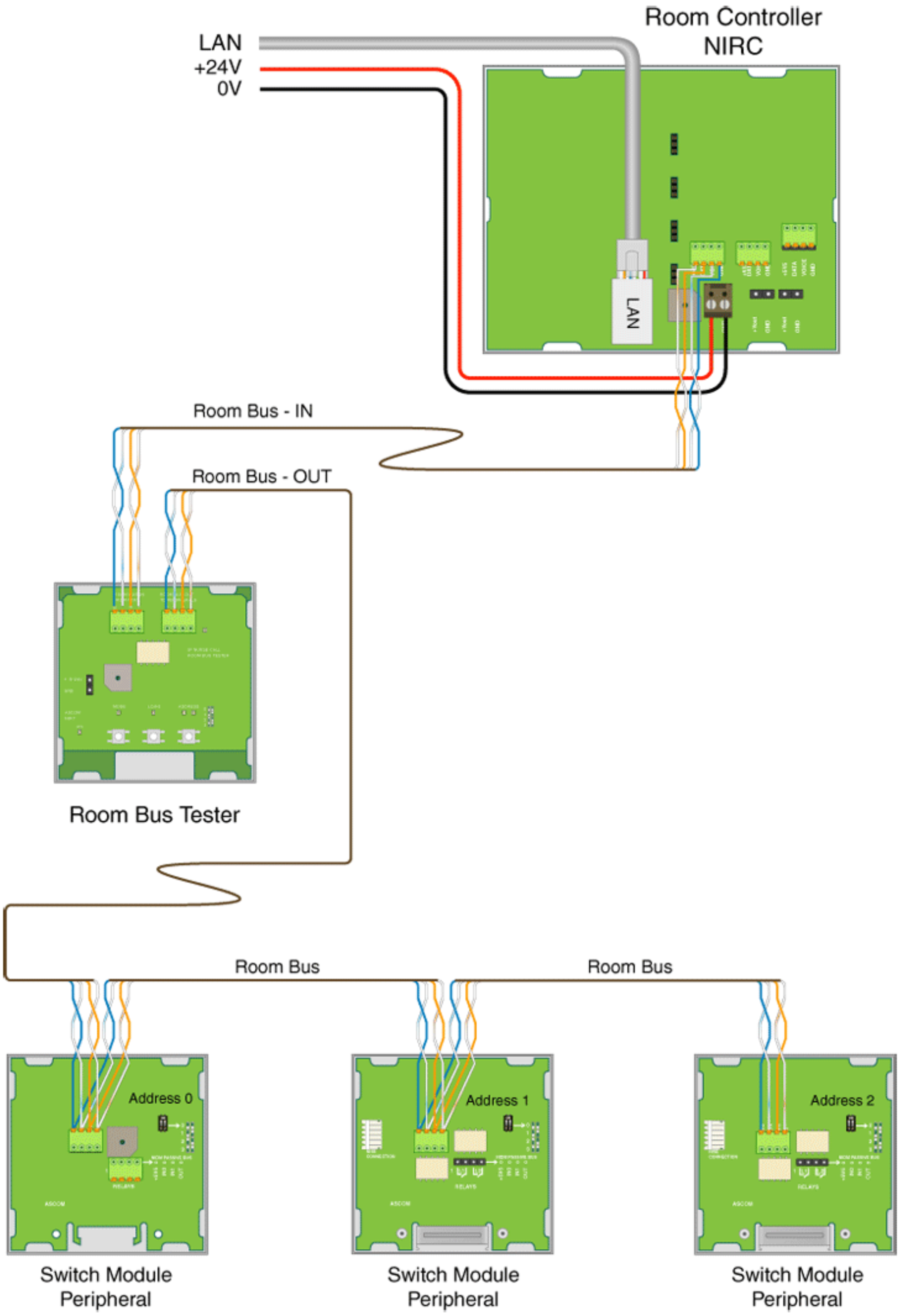


Figure 404. Room bus tester with a room controller and external power supply

11.2.2 Room Bus Tester with Room Controller using Power over Ethernet (PoE)

The room bus tester can be used in an installation which includes a room controller with power over ethernet (PoE). The power supply for the room bus tester will taken from the room controller via the room bus.

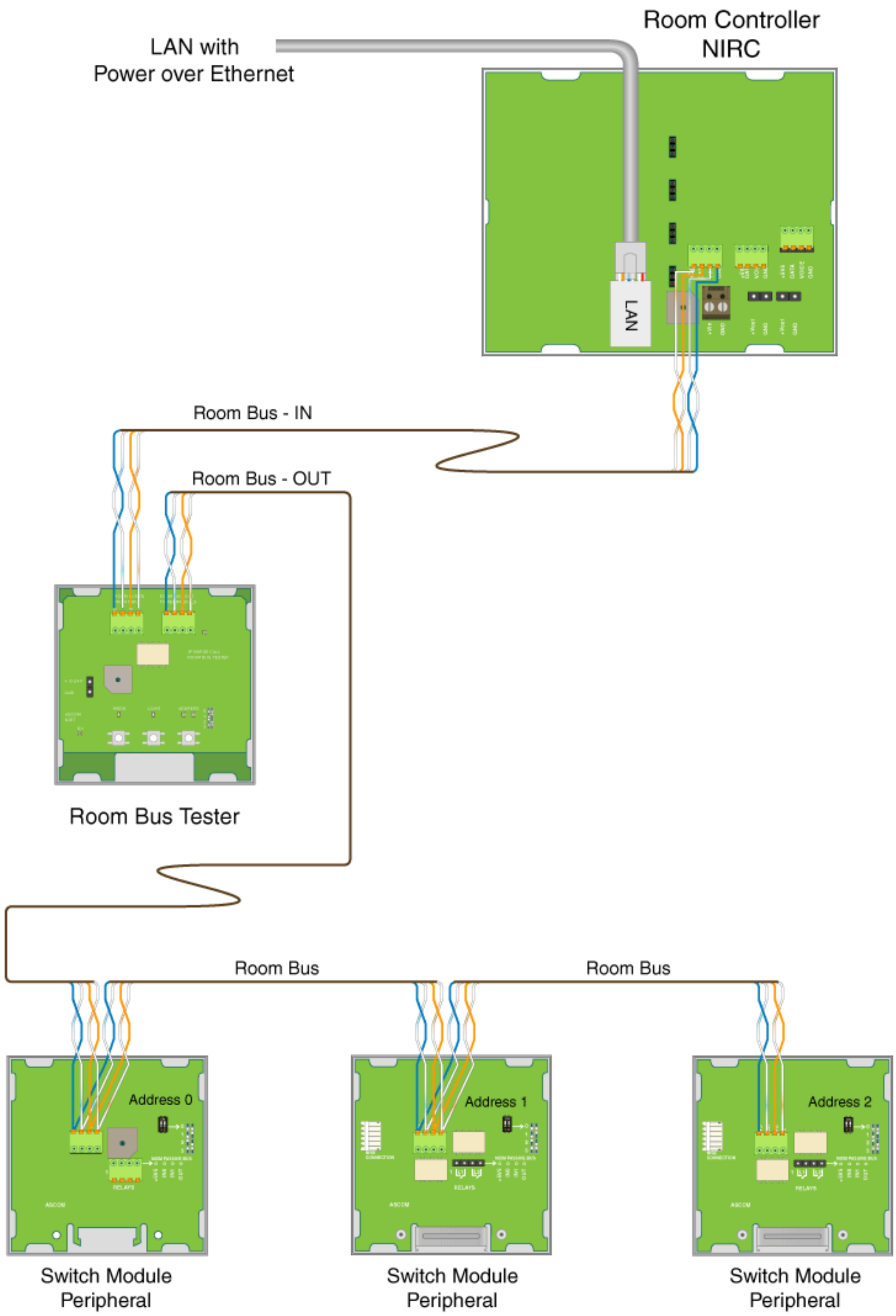


Figure 405. Room bus tester with a room controller and power over ethernet

11.2.3 Room Bus Tester without Room Controller

The room bus tester can be used in an installation which does not include a room controller. Then an external power source is required for the room bus tester. The external power requirement is from 8V to 12V which can be sourced from a DC power supply unit or a suitable battery.

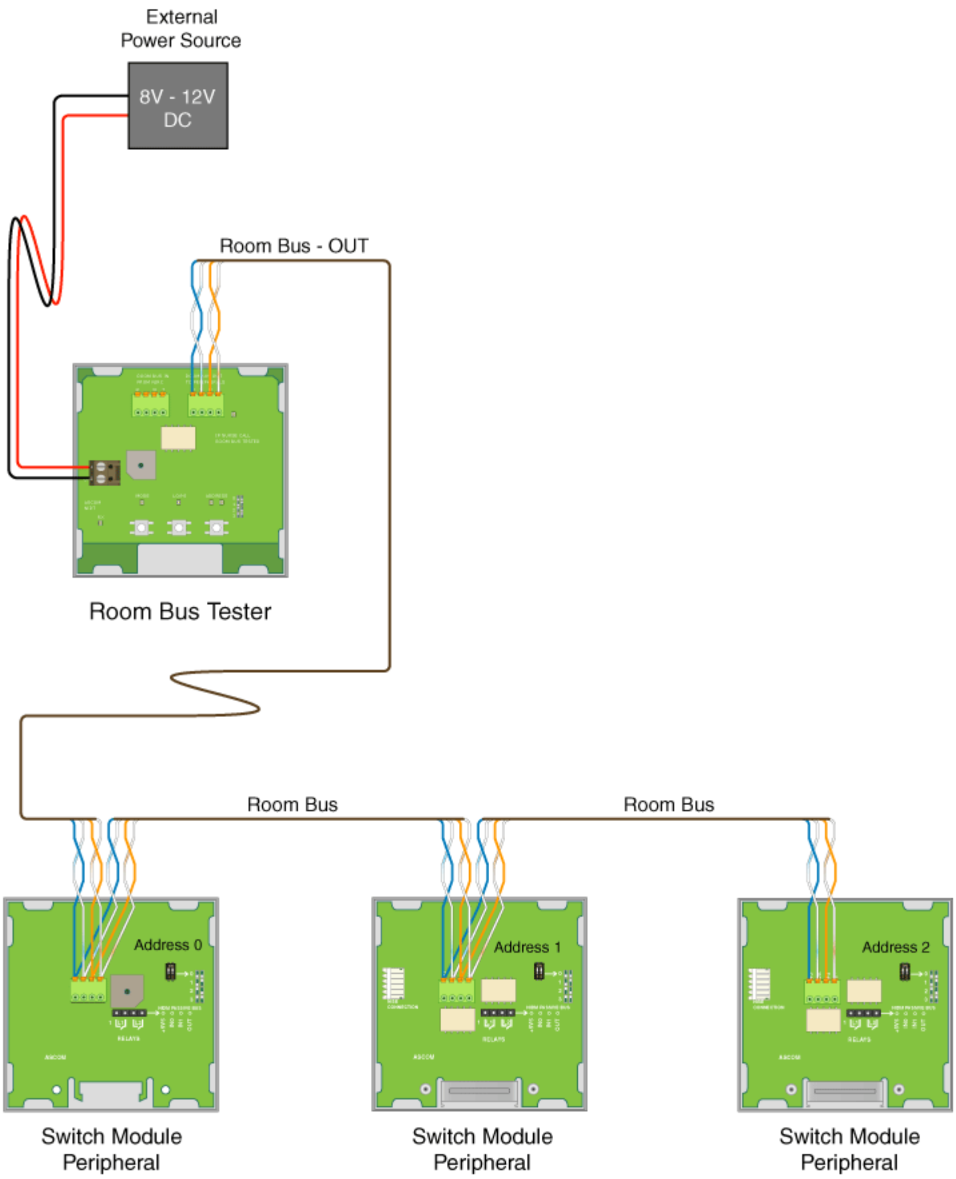


Figure 406. Room bus tester with an external power source and no room controller

***Caution:** An external power supply of up 24V/DC can be used for the room bus tester for a short time (up to 5 minutes). If the room bus tester is powered by 24VDC for a longer time it will become hot and could cause damage or injury.*

11.2.4 Electrical Connections and Operating Elements

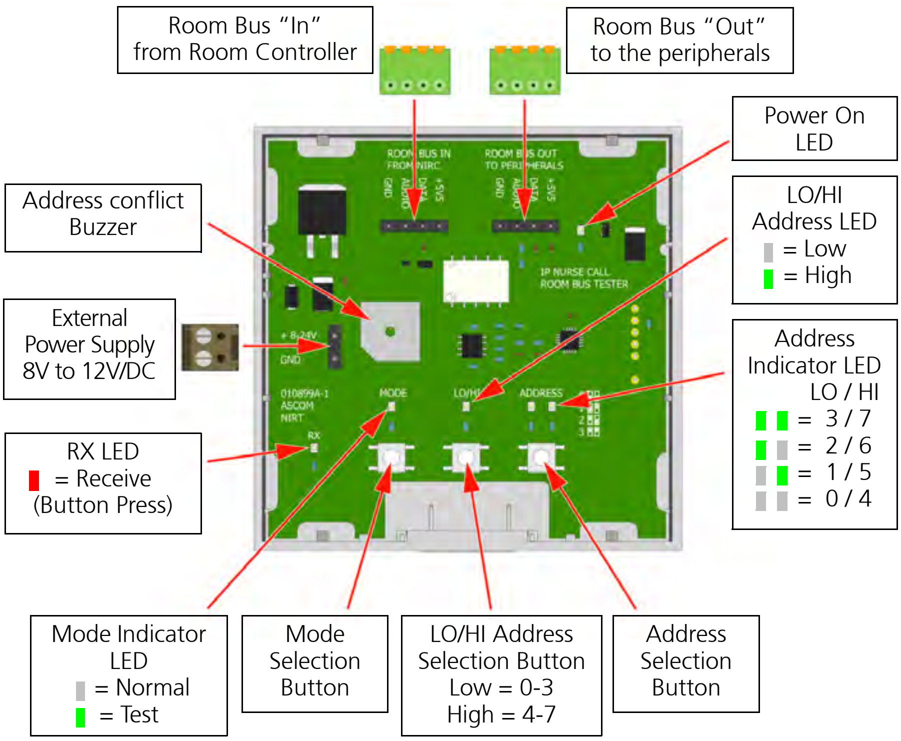


Figure 407. Electrical Connections and Operating Elements

11.2.5 Using the Room Bus Tester

The Mode Selector button is used to select the mode and two selections are available:

Mode LED off = Normal mode:
The room bus tester and the room controller are both connected to the room bus and the room controller is controlling the room peripherals as normal.

Mode LED on = Test mode:
The room controller is disconnected from the room bus by the relay in the room bus tester and only the room bus tester is connected to the room bus.

In the normal mode (LED off) the room bus tester and the room controller are connected to the room bus. In this mode the room bus tester can only be used to detect address conflicts which will be signalled by the room bus tester buzzer sounding when any of the buttons are pressed on a peripheral device which has an address conflict.

Note: *In "Normal" mode the mode LED on the room bus tester will occasionally flash indicating data traffic on the room bus.*

The room bus testing is done with the room bus tester in "Test" mode (mode LED on). The tests as detailed in the following flow charts:

11.2.6 Room Bus Test Procedure for Addresses 0 to 3

The room bus test procedure shown in the following flow chart applies to peripheral devices which have selectable room bus addresses.

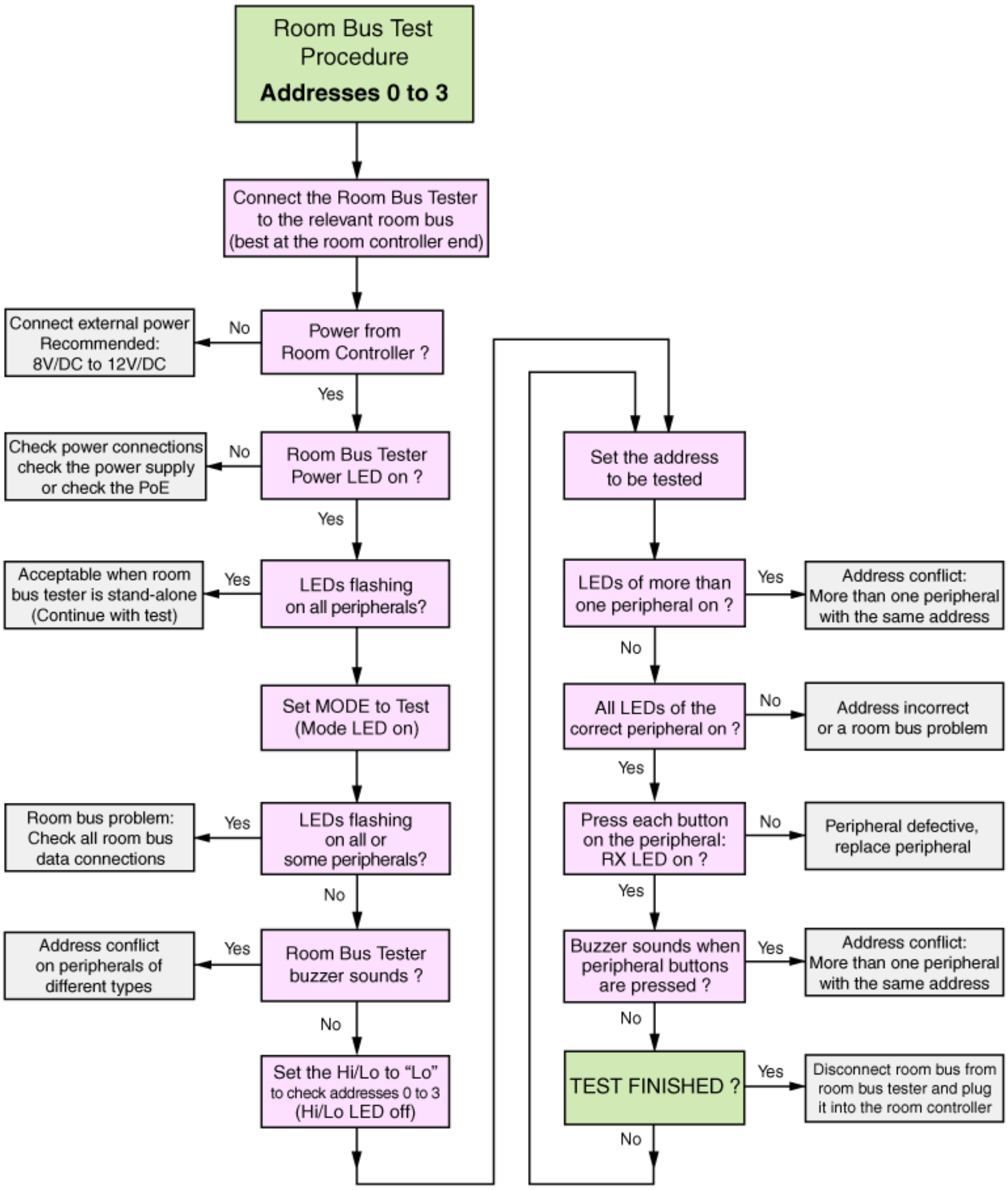


Figure 408. Room bus test procedure for addresses 0 to 3

11.2.7 Room Bus Test Procedure for Addresses 4 to 7

The room bus test procedure shown in the following flow chart applies to peripheral devices which fixed room bus addresses. This includes:

- Active toilet cancel switch module: address 4
- Corridor lamp: address 5
- Duty selector: address 5
- Card reader: address 6

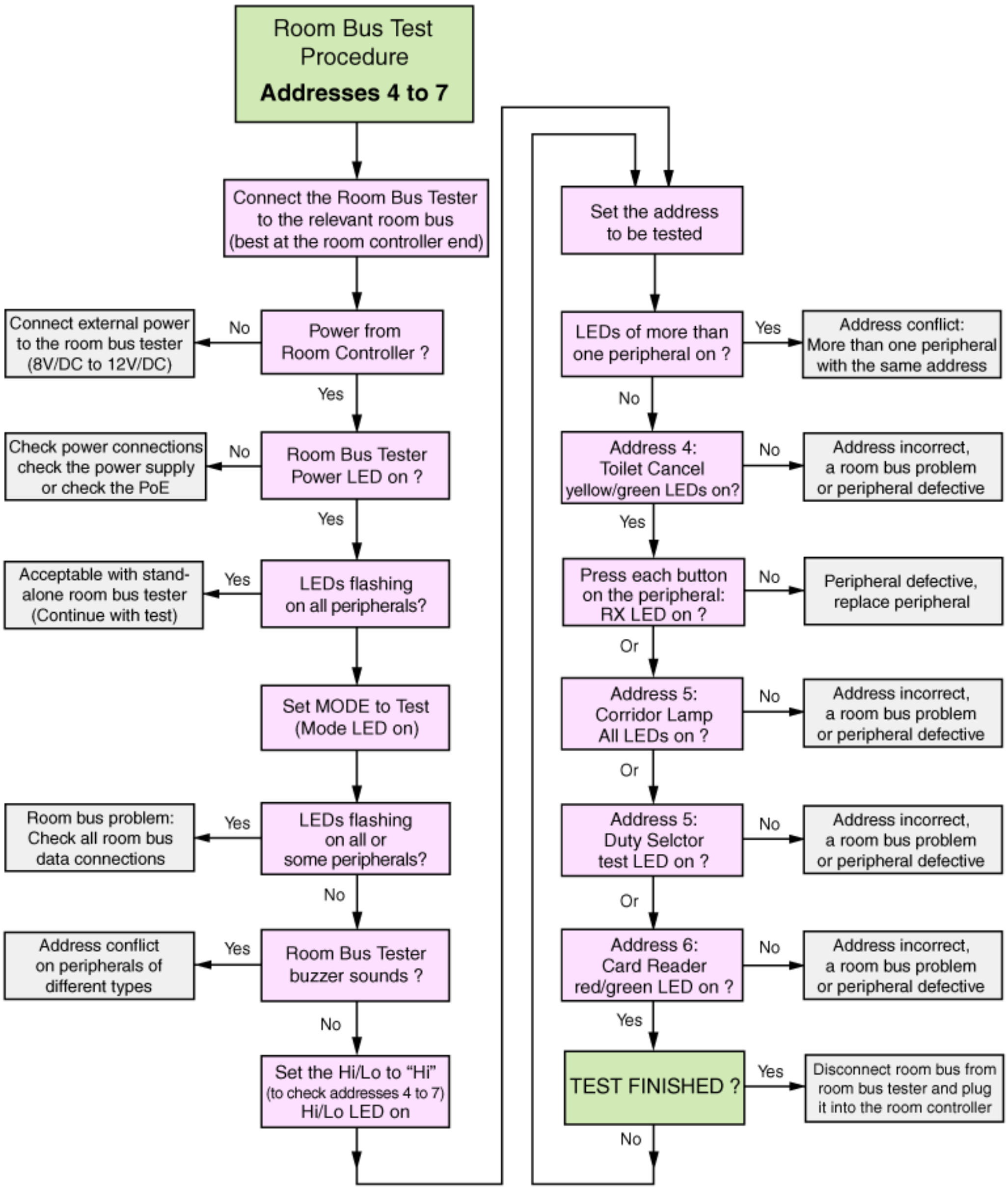


Figure 409. Room bus test procedure for addresses 4 to 7

12 Installation Examples

12.1 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 (NIRC) to which the peripherals are connected. The room controller offers three 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, a patient handset and a socket extension module.

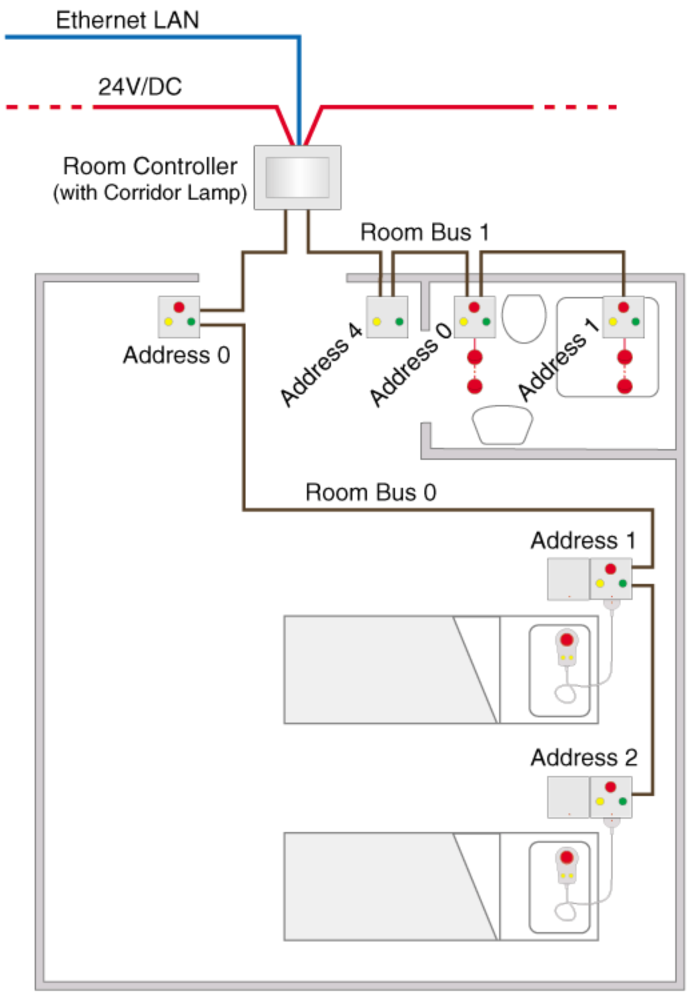


Figure 410. Typical 2-bed room with active toilet and shower peripherals

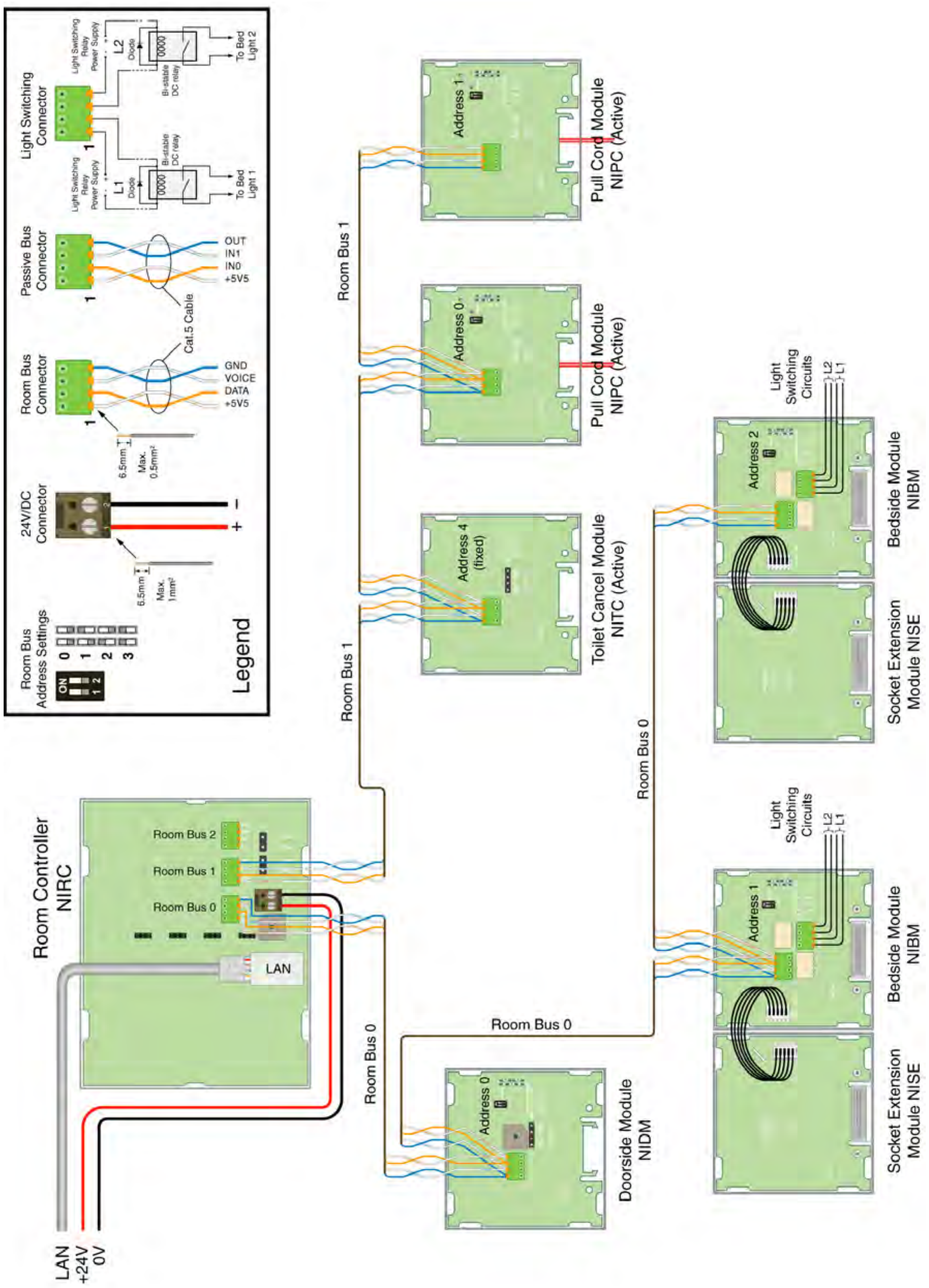


Figure 411. Wiring for 2-bed room with active toilet and shower peripherals

12.2 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 (NIRC) to which the peripherals are connected. The room controller offers three 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, a patient handset and a socket extension module.

Passive peripherals are used for the toilet and shower. These peripherals are connected to a passive bus from the doorside module.

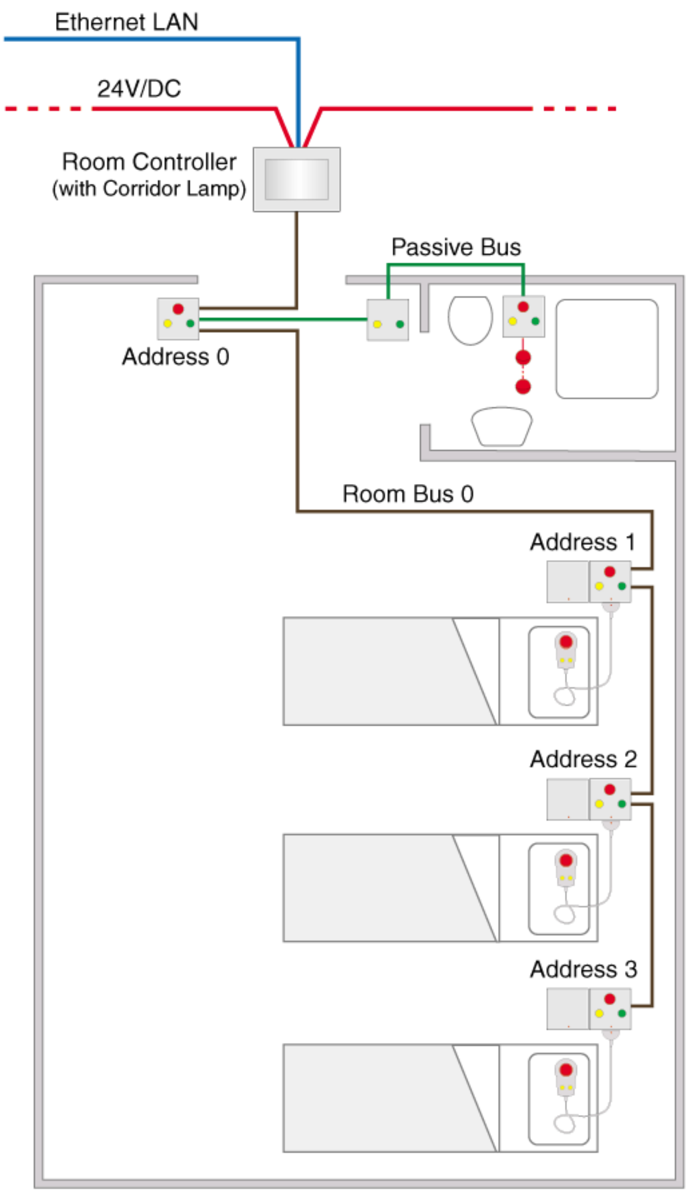


Figure 412. Typical 2-bed room with passive toilet and shower peripherals

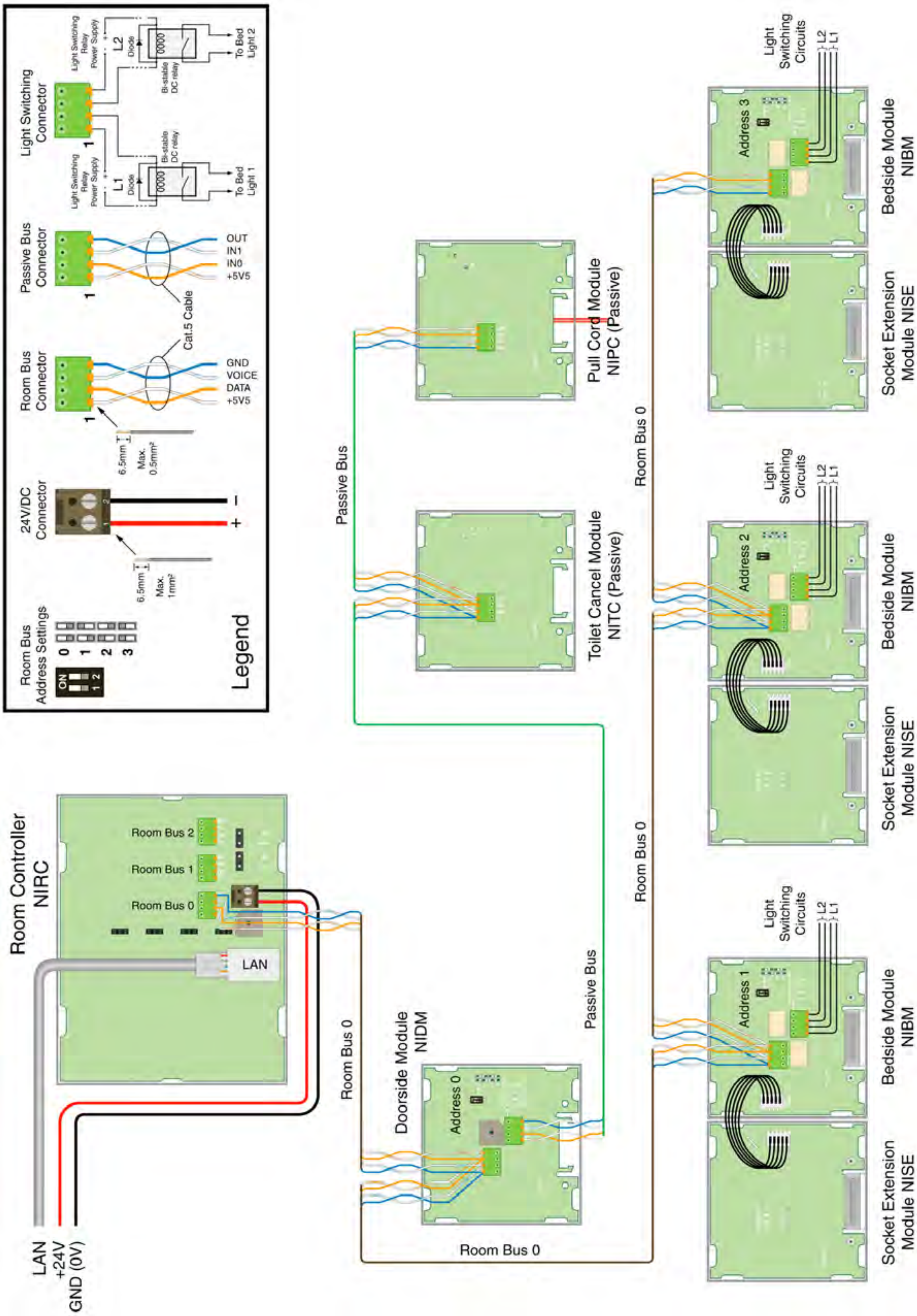


Figure 413. Wiring for 3-bed room with passive toilet cancel and passive pull cord

12.3 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 patient handset.

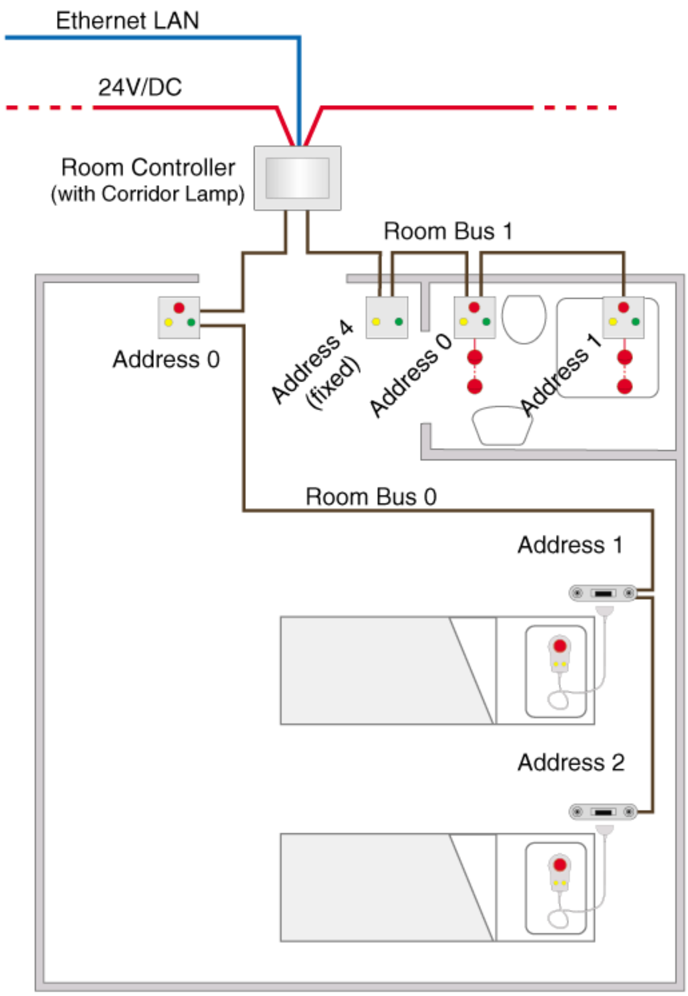


Figure 414. 2-Bed Room with medical rail sockets

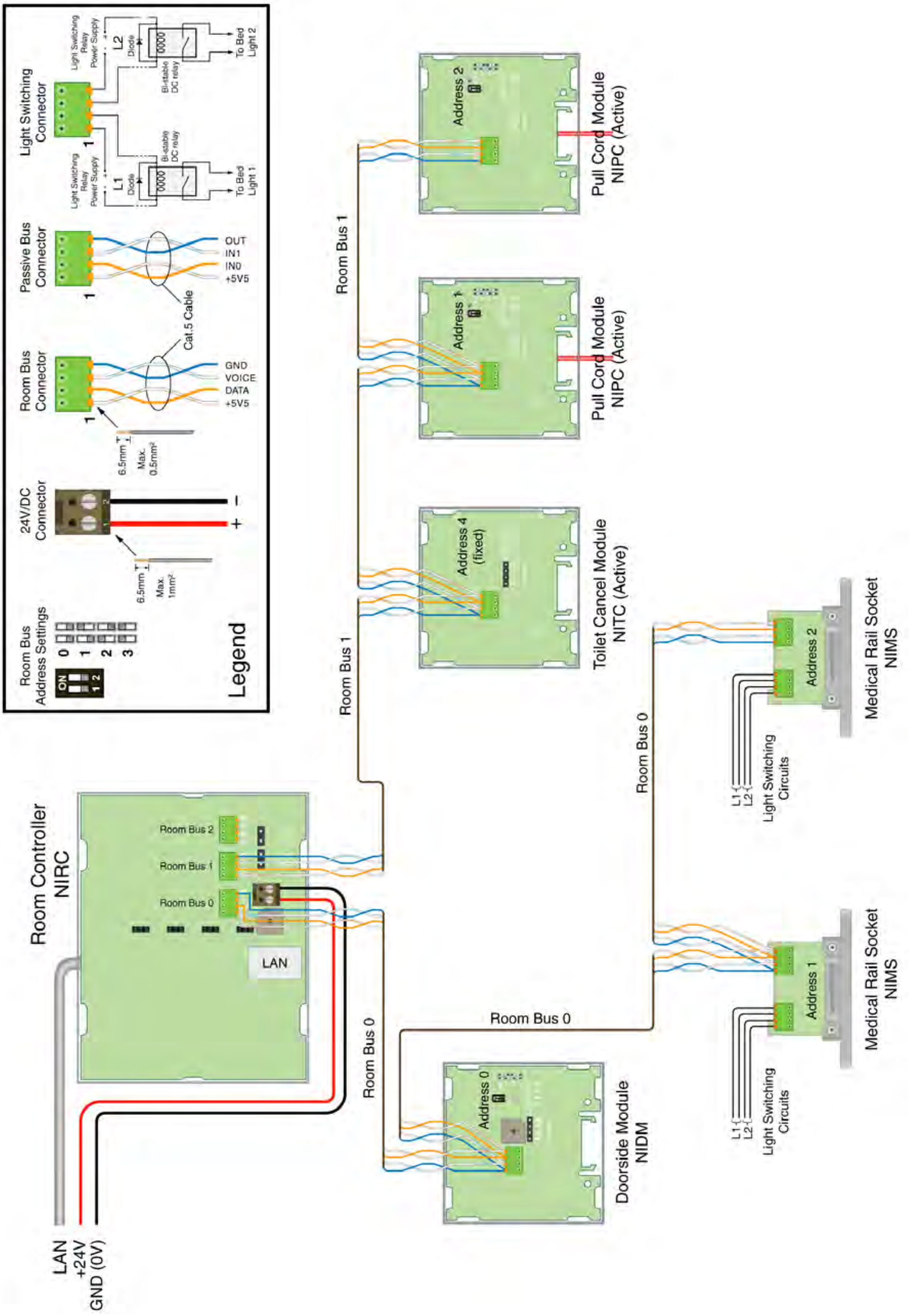


Figure 415. Wiring for a 2-bed room with medical rail sockets

12.4 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 patient 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.

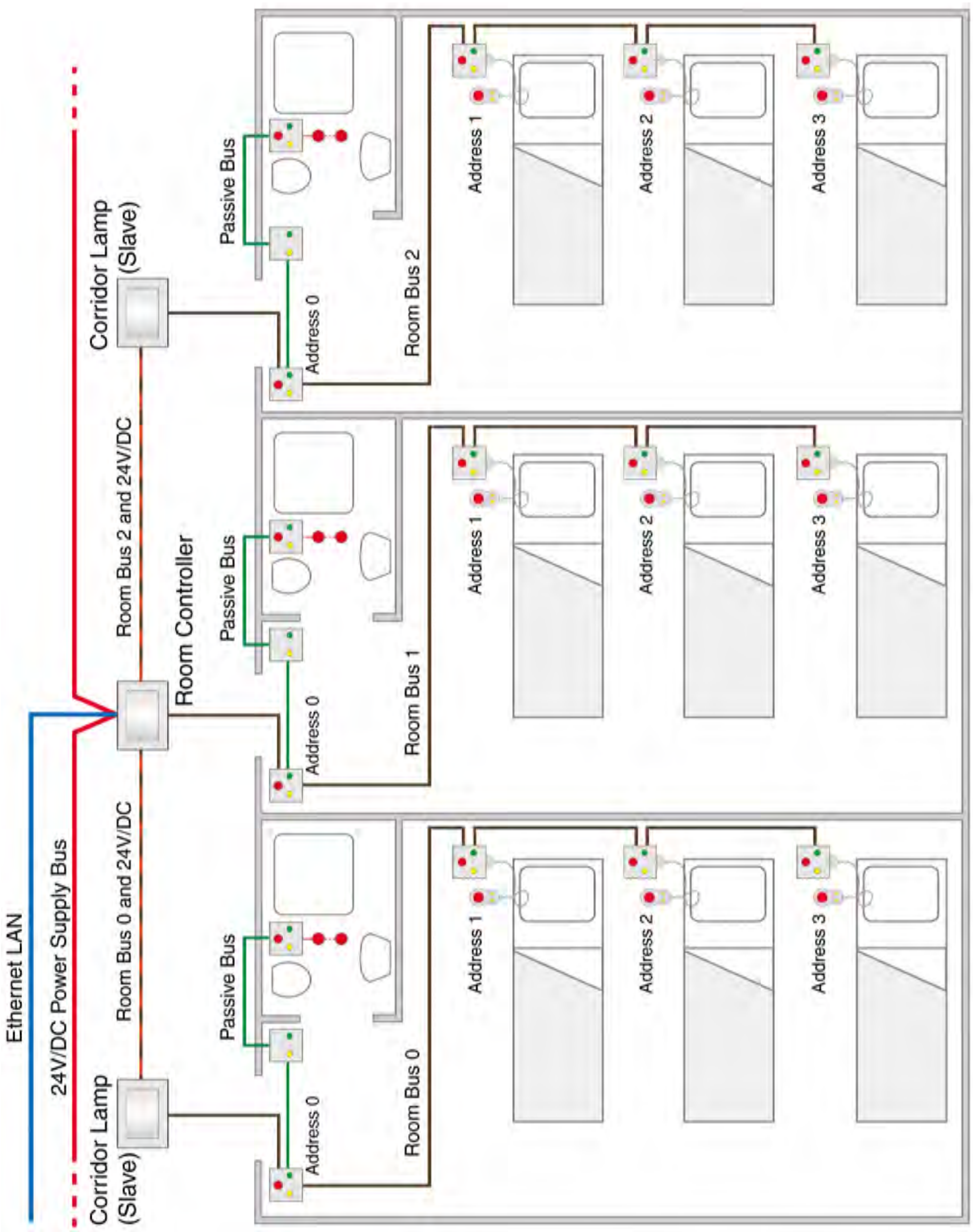


Figure 416. Room controller with corridor lamps installation

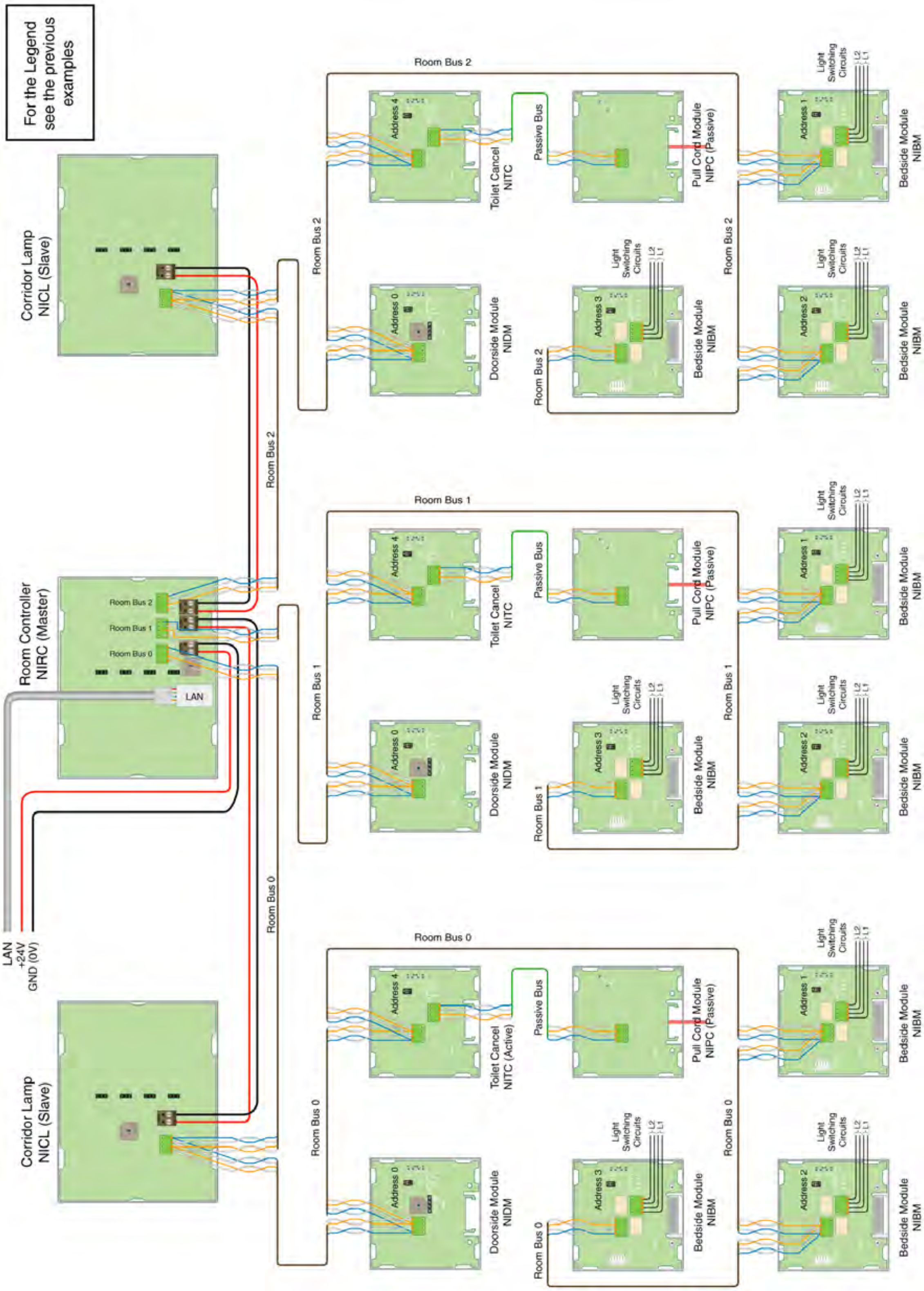


Figure 417. Wiring for three rooms with a room controller with two corridor lamps

12.5 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 doorside module (NIDM), the bedside module (NIBM), the customisable module (NICM) and the pull cord module (NIPC).

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 signalling of the related room. Each bed location has a speech module.

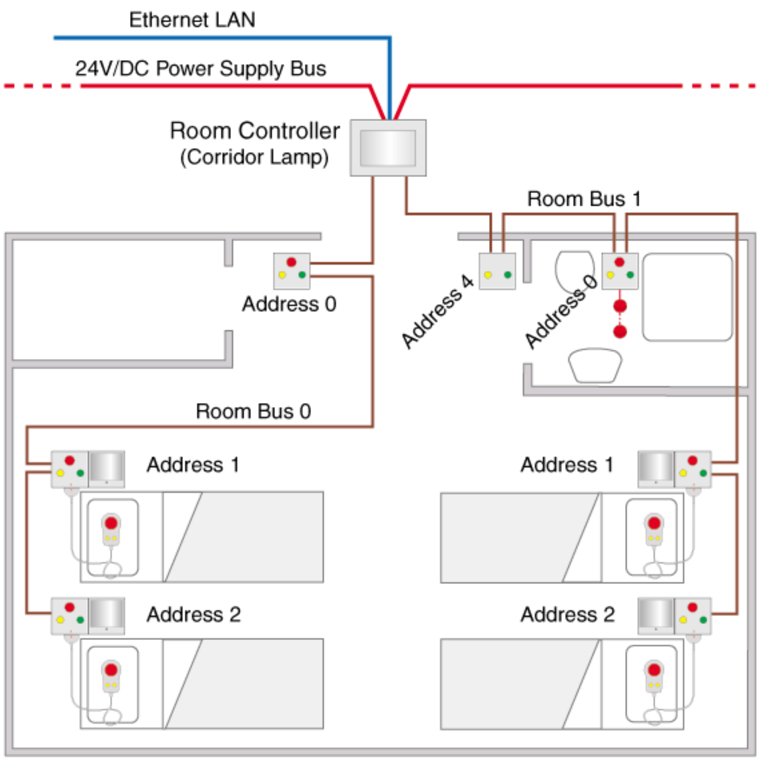


Figure 418. 4-bed room with speech

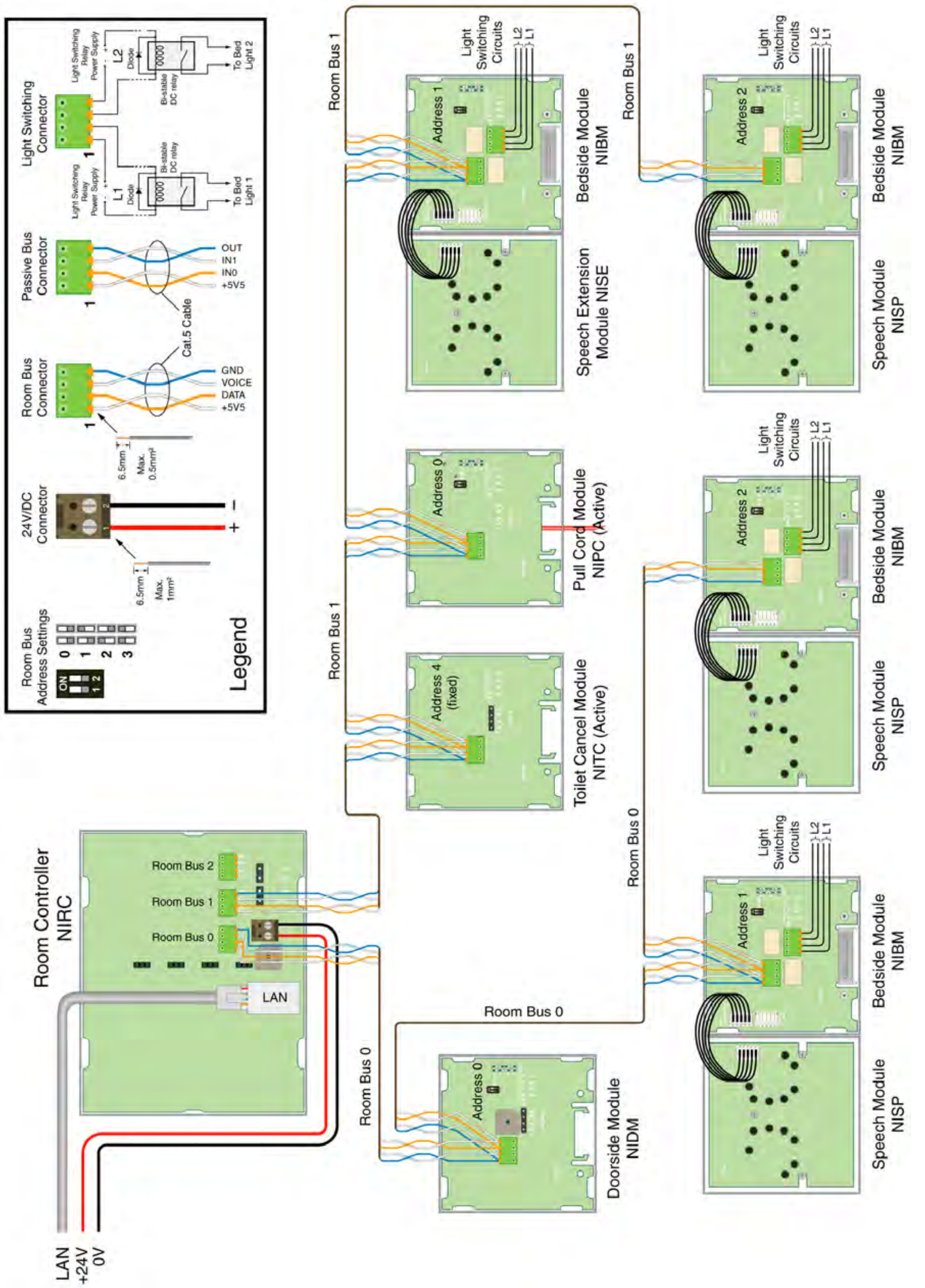


Figure 419. Wiring for 4-bed room with Speech at each bed

12.6 Duty Selector at a Nurse Station

The Duty Selector is an peripheral which can be connected to any one of the three 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 nurse 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.

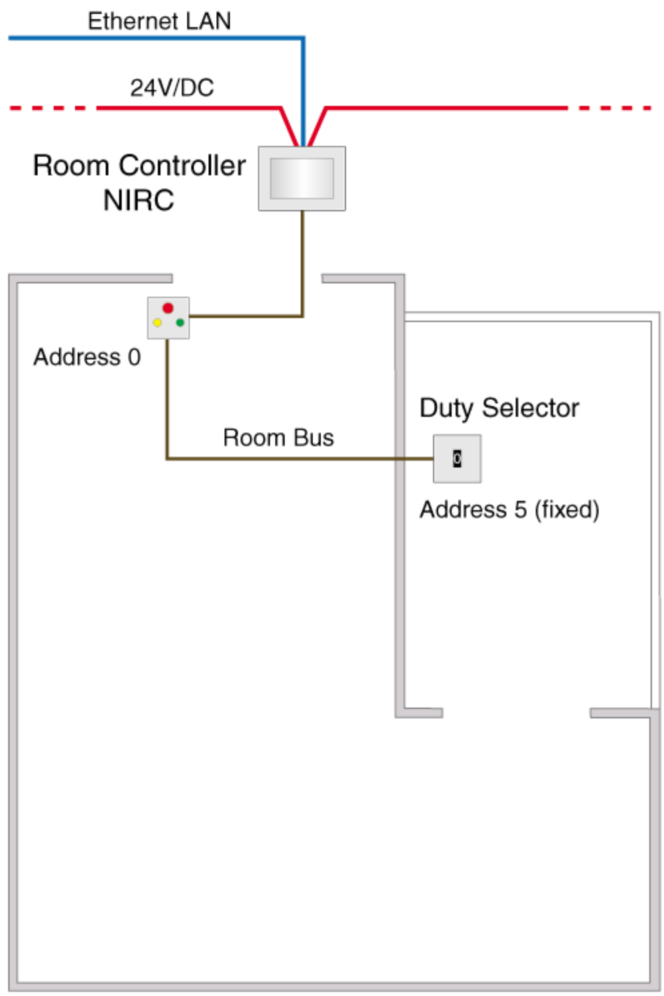


Figure 420. Nurse station with duty selector and doorside module

IMPORTANT: *A room controller (not a corridor lamp) must be installed at the nurse station for room fault and LAN fault signalling.*

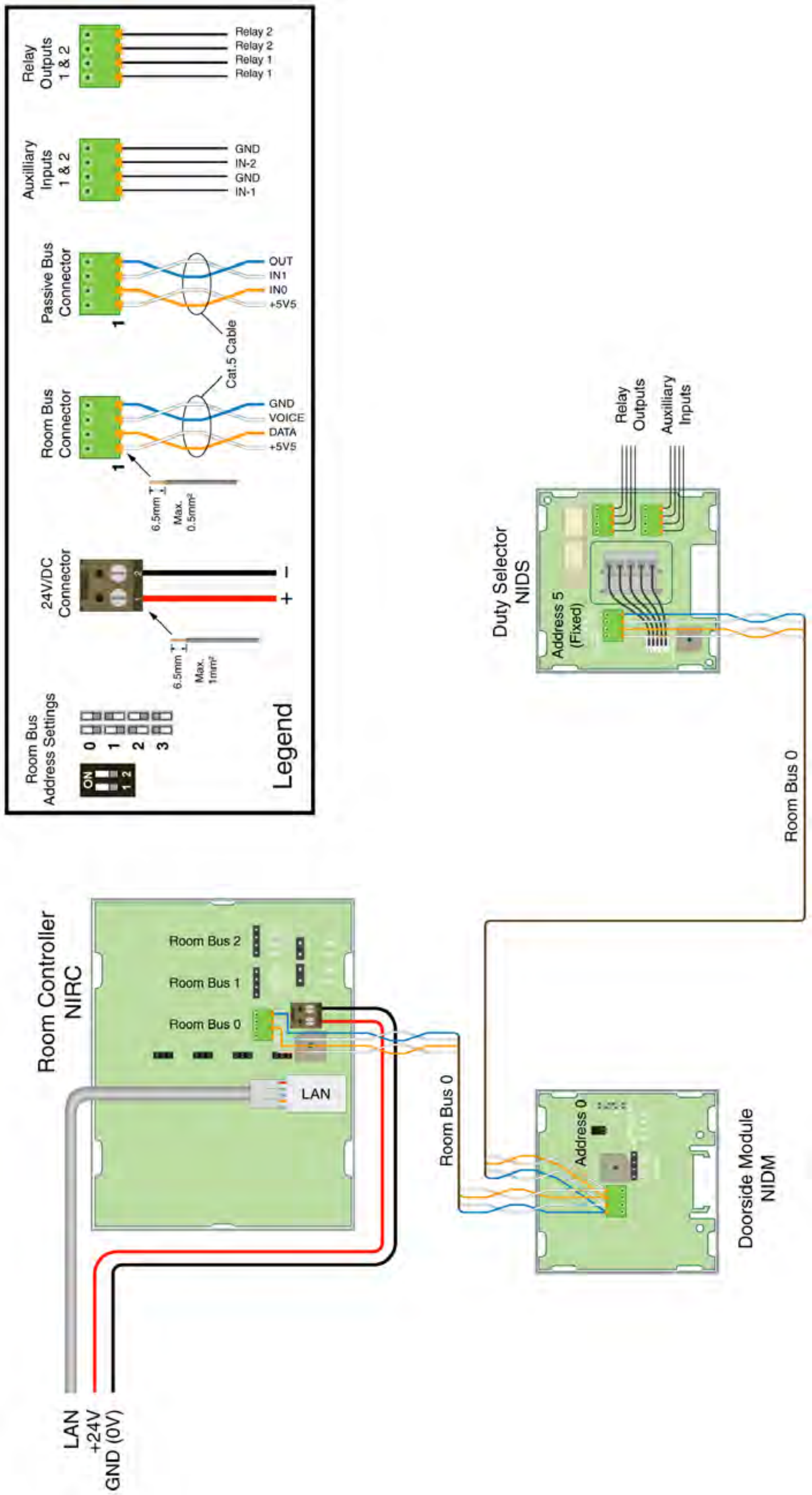
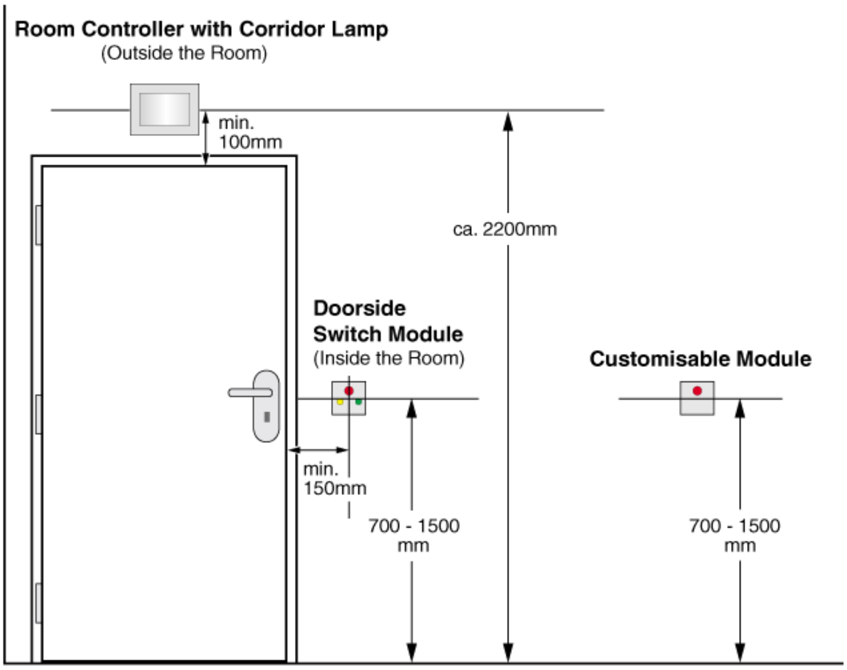


Figure 421. Wiring for nurse station with duty selector and doorside module

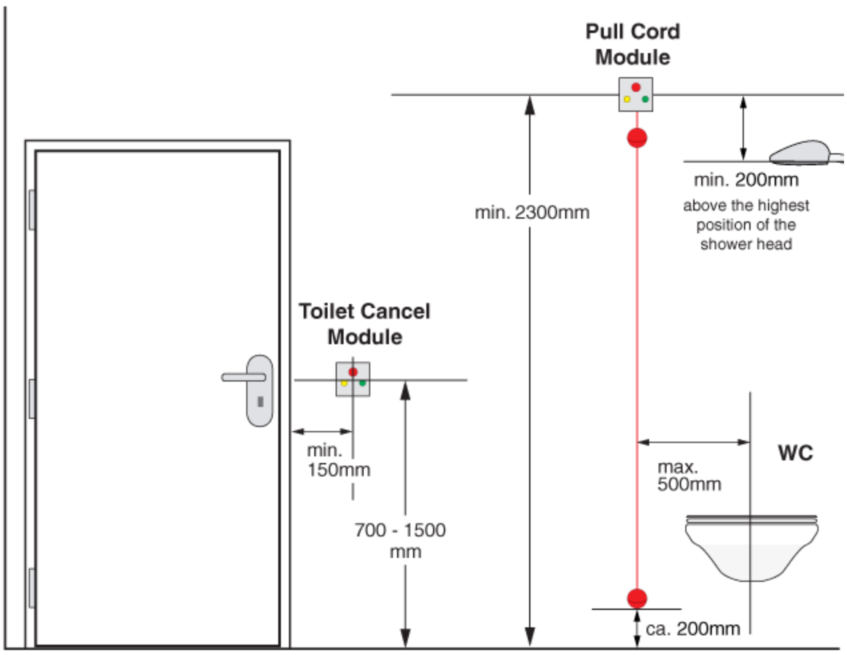
12.7 Positioning of the teleCARE IP Peripherals

The following illustrations show typical room installations with recommended locations for the teleCARE equipment.

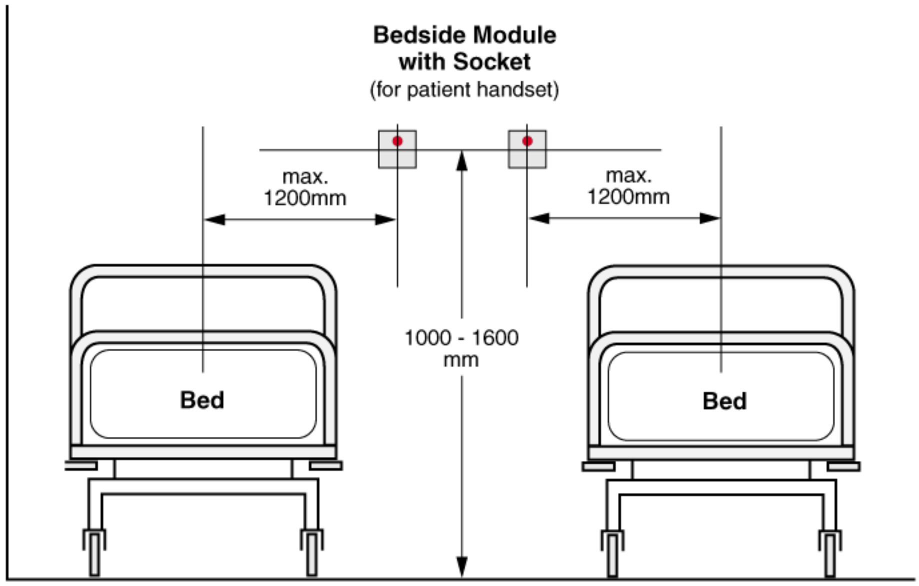
12.7.1 Room Controller, Doorside Module and Customisable Module:



12.7.2 Toilet Cancel Module and Pull Cord Module



12.7.3 Bedside Module



Appendix

Appendix A: Ascom Control Unit Housing

The Ward Controller is contained in a plastic Ascom control unit housing which is designed to be fixed by screws to a suitable vertical surface, such as a wall.

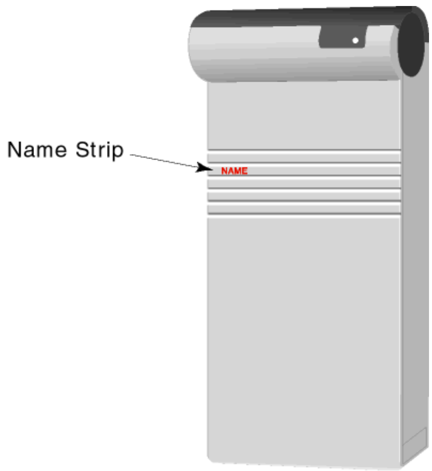


Figure 422. Control unit housing

To identify the type of control module a “name strip” is inserted in the face of the lid with the abbreviated product name (NISM).

Removing the Control Unit Housing Cover

To remove the lid from the housing use a screw driver to apply a light pressure to the two snap catches (1), then lift and remove the cover (2).

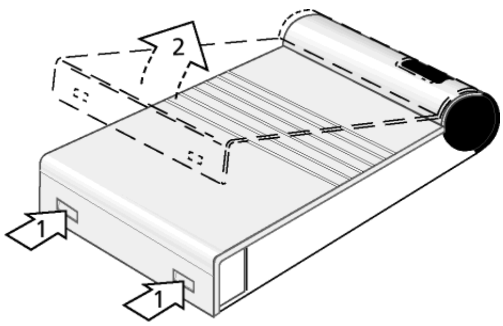


Figure 423. Removing the cover from the housing

Removing the Control Unit Housing Lid from the Front

The Ascom housing has cut-outs in the lid which allow the lid to be removed by inserting a screwdriver from the front rather than from underneath. The cut-out indentations are found on the inside of the housing lid.

This option is necessary if the control unit housing must be mounted without sufficient space below it to allow access for a screw driver, such as against a cable duct. In such cases the cut-out holes in the housing lid should be opened. It is important to open the cut-outs **before** the lid is placed on the control unit.

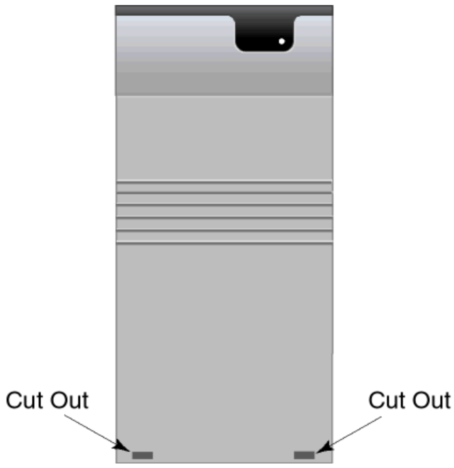


Figure 424. Cut-outs in the lid of the control unit housing

When the holes are open a screw driver can be inserted into each hole and by first applying a slight downward pressure, then gently levering the screw driver outwards, the clips which hold the lid closed will be released enabling the lid to be lifted and removed.

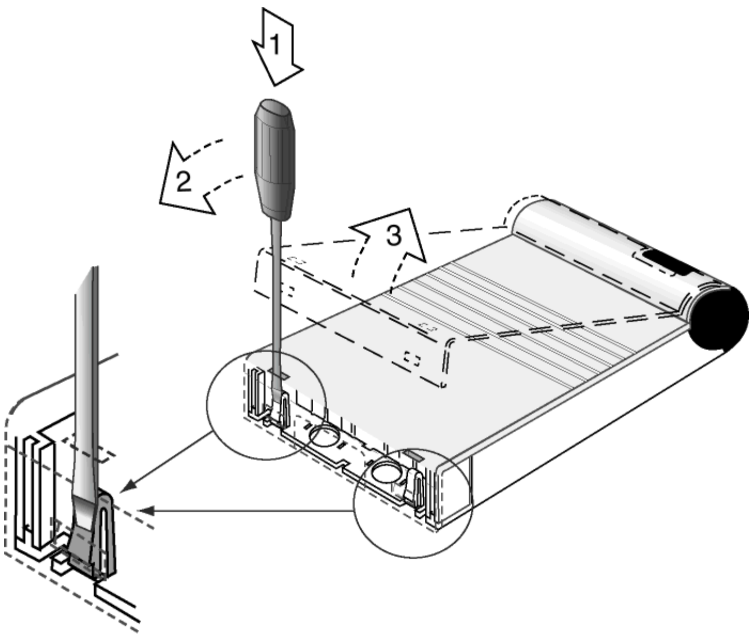


Figure 425. Releasing the housing lid from the front

Mounting the Control Unit Housing

The control unit housing has three mounting holes in its base for fixing on a flat vertical surface using screws.

A free space of around 50mm above and 150mm below the housing should be assured to facilitate service after the unit is installed.

There are two cable inlet openings with removable covers on both sides and two circular cable inlet holes in the base. A cut-out in the end of the housing cover allows cables to enter from below the housing.

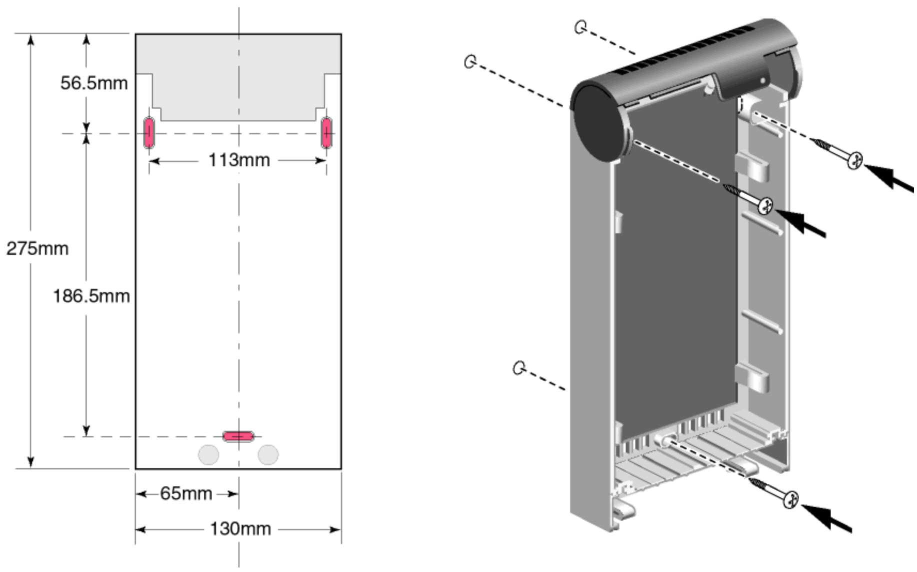


Figure 426. Mounting the control unit housing

Cable Entry Options in the Control Unit Housing

The cables can enter the housing through the sides, by removing the rectangular covers (1), or through the holes in the base (2) or through the cut-out section in the housing lid (3). We recommend that the side openings are used as these allow the most practical arrangement of the cables.

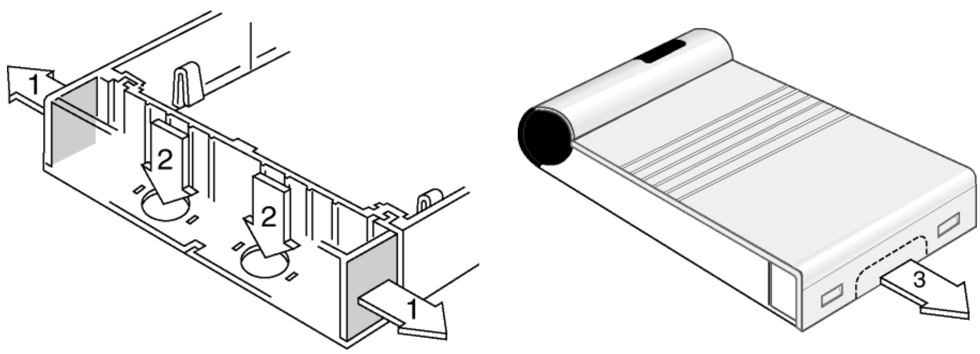


Figure 427. Control unit housing cable entry options

Removing Sections from the Partitioning Inside the Housing

The plastic partitioning inside the housing is grooved to facilitate breaking at convenient intervals. Use pliers to break off sections of the partitioning, as shown in the drawing below. It is best to arranged the wiring neatly around the outside of the printed circuit board to the relevant connection points with sufficient slack in the wiring to allow easy disconnection and removal of the printed circuit board for maintenance purposes.

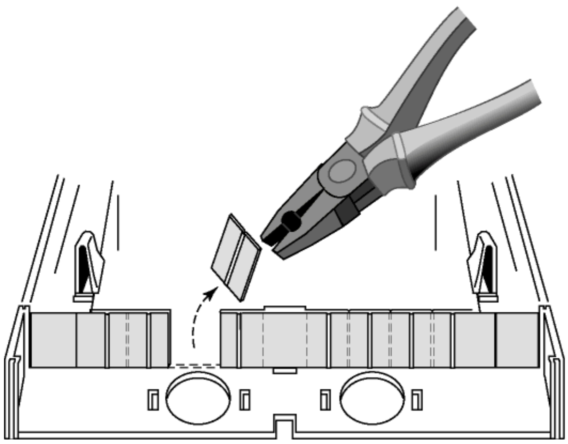


Figure 428. Removing sections from the partitioning

Joining Control Unit Housings

The NIWC housing can be joined together with any other type of Ascom control unit. This can be convenient when numerous teleCARE control units are installed centrally.

The housings should be fasten together before they are mounted. First remove the rectangular (1) and circular (2) covers from the side (sides) of both housings which will be in contact when the housings are joined. Next place the housings together and insert the rectangular covers in the two fastening slots (3 and 4) of the housings.

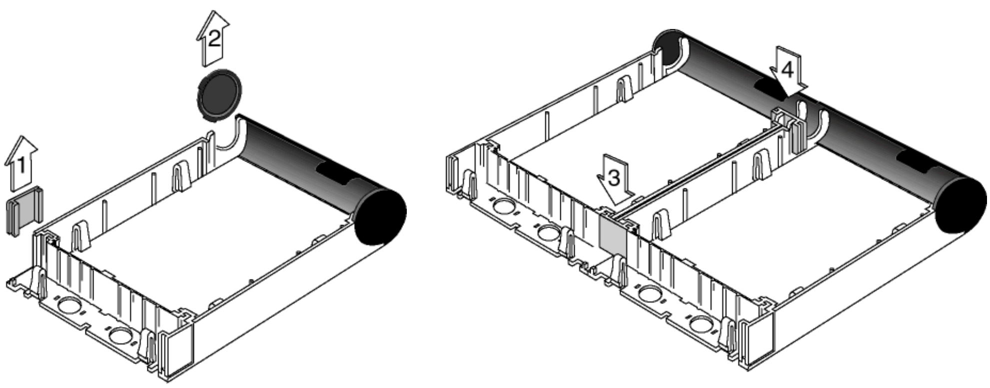


Figure 429. Joining control unit housings

Removing the Printed Circuit Board from the Control Unit Housing

To replace a defective control unit printed circuit board the complete control unit must be ordered. Therefore the complete control unit can be replaced or, alternatively, the new printed circuit board (pcb) can be taken out of the housing and used to replace the defective pcb.

The pcb should only be removed with the power supply and all cables disconnected from the pcb. The sequence shown below (steps 1,2 and 3) should be followed in order to remove the pcb safely.

Note: *When replacing the pcb it is not necessary to remove the "heat sink" but it can be removed from the pcb if required as shown in steps 4 and 5.*

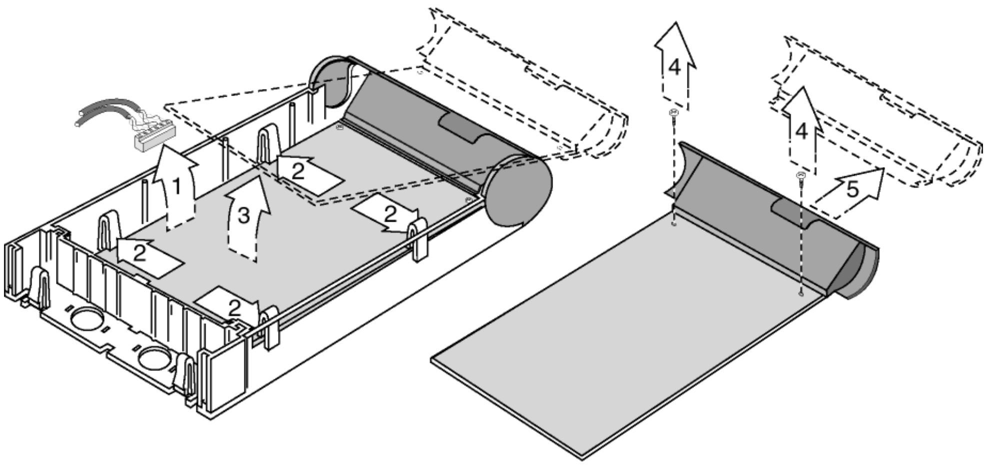


Figure 430. Removing the printed circuit board

To replace the PCB, the procedure described above must be followed in reversed order. Connecting the electrical cables and power should only be done after the new pcb is fixed in the housing.

Appendix B: Kadex Interface Connection

Kadex support is only available for the Benelux and the Kadex equipment is not sourced by Ascom.

The Kadex Interface is an RF receiver that functions as a gateway between the Kadex RF network and the Kadex server application.

The Kadex Interface receives data from various wireless Kadex sensors and it requires an ethernet connection to forward the data towards the Kadex server application.

Figure 431. Kadex system overview

In order to reduce the installation costs in systems that consist of both Kadex and teleCARE IP solutions, the room controller 3, from version 1.11.0 and up, can be connected to the Kadex Interface via a USB connection. The Kadex Interface is powered directly from the NIRC3s power source and will share the NIRC3s ethernet connection to relay the Kadex RF messages to and from the Kadex server application.

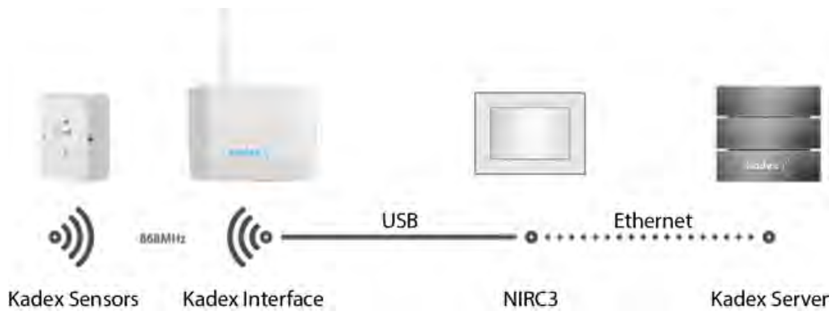
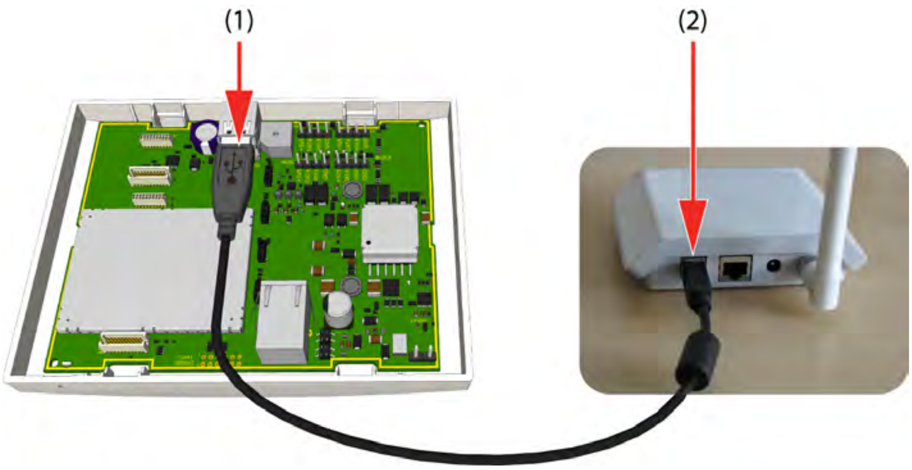


Figure 432. Kadex Interface sharing the NIRC3s power and ethernet connection

Kadex Interface to NIRC3 Connection

Connect the NIRC3 to the Kadex Interface using a USB (type A to Type B) cable.



(1) Plug the USB (Type A) connector into the top slot of the USB 2.0 socket on the NIRC3.

(2) Plug the USB (Type B) connector into the Kadex Interface.

The teleCARE IP system requires no configuration to support the Kadex Interface.

Note: *The Kadex Interface connection is hot swappable and can be connected or disconnected while the NIRC3 is running.*

IMPORTANT: *For Kadex system support, a room controller 3 (NIRC3) with software version 1.11.0 or later is required.*

For detailed Kadex Interface mounting instructions refer to the Kadex documentation.

Kadex Connection Status

The status LED (Kadex logo) lights up to indicate the status of the Kadex Interface.

Kadex Interface Status color	Status
Steady red	Kadex Interface Initializing
Flashing red	No connection to NIRC3
Flashing green	Attempting to setup a connection with the NIRC3
Flashing blue	Connection to NIRC3 established
Steady blue	Connection to Kadex Server established

Document History

Version	Date	Description
A	2009-03-26	• First released version A
B	2010-03-31	• Speech Functionality added
C	2010-06-09	• NIRC updated • NIWC updated • VoIP considerations table added • PoE module changed to Class 2 (6.5W max.) • Cable length/room bus load information updated
D	2010-11-03	• Maximum light switching relay switching current of 1A at on page 112. • Pull Cord Module NIPC2 (IP44) added to peripherals on page 134.
E	2010-11-04	• Power over Ethernet module (PoE) max. output changed to 9W at 20V/DC page 22
F	2011-03-03	• NIRC Room Controller text updated on page 34 • NIRC Room Controller non-speech updated on page 43 • NIVM Voice Module added on page 95
G	2011-03-30	• Room Display updated and Room Display with Speech added on page 154
H	2011-06-24	• NISM2 added on page 86
I	2011-10-13	• 24 Volt DC Power Supply Unit 4.2 Amp on page 25
J	2011-11-23	• Bedside module (NIBM2) added on page 108
K	2012-03-02	• Medical Rail Socket (NIMS2) added on page 117 • TV Interface Module added page 161 • Sunblind Control Module added page 163 • Patient Handset Programming Interface page 294 • Corridor Display NICD page 199
L	2012-07-25	• Intended use, "Intended Use for MMA" on page 7 • Multi Medical Alarm Module (NIMA), "Multi Medical Alarm Module (NIMA)" on page 165 • Multi General Alarm Module (NIGA), "Multi General Alarm Module (NIGA)" on page 176
M	2012-11-05	• NIMA backplate mounting instructions added, "NIMA Backplate Mounting Instructions" (details on page 168) • NIMA Installation Test Procedure added, "NIMA Installation Test Procedure" on page 174 • Regulatory information updated.
N	2013-01-09	• SIP trunk must be set to "Early offer", see "Innovaphone VoIP Gateways" on page 9 and see "VoIP Requirements" on page 16
O	2013-06-18	• Short circuit detection using EOL resistors page 93

Version	Date	Description
P	2013-10-02	• teleCARE IP wireless functionality added, see "Wireless Functionality" on page 219 • Room Controller 3 - NIRC3 added, see "NIRC3" on page 35 • Corridor Lamp 2 - NICL2 added, see "NICL2" on page 72
Q	2013-12-05	• Wireless functionality updated See "Wireless Functionality" on page 219. See "NILF Low Frequency Beacon" on page 277.
R	2013-12-13	• Intended use for MMA updated See "Intended Use for MMA" on page 7.
S	2014-03-12	• Wireless nurse call functionality with speech added, see "Wireless Nurse Call with Speech" on page 224 • NILF range information updated, see "Output Power and Transmission Rate DIP Switch Settings" on page 288
T	2014-07-10	• NIRC status information added, see "NIRC Status Information" on page 46. • NIRC3 status information added, see "NIRC3 Status Information" on page 49 • Optional external contact connected to the safe release socket of the NIFX, see "External Contact" on page 257 • NILF Output Power and Transmission Rate table updated with battery life indication, see "Output Power and Transmission Rate DIP Switch Settings" on page 288 • Voice Piggy Back information added, see "Voice Piggy Back" on page 50 • NITX updated with NITX Staff Transceiver, see "NITX Mobile Transceiver and NITX Staff Transceiver" on page 259 • The use of a corridor lamp is mandatory when using NIMA modules, "Multi Medical Alarm Module (NIMA)" on page 165 • Card Reader (NICR) Backplate modification for tamper alarm. "Tamper Alarm Detection Backplate Modification" on page 151
U	2014-12-11	• Disabling the LEDs if only the relay contact is required, see "Disabling the LEDs" on page 64 • Connection of an ESPA (or a TAP) paging system added, see "System Manager (NISM2)" on page 86 • NISM2 Electrical Connections updated: page 87 through page 89 • Connecting a Paging System added, see "Connecting a Paging System" on page 90 • teleCARE IP Wireless Planning added in chapter 10.4, 'teleCARE IP Wireless Planning" on page 227 • teleCARE IP Gateway (NIGW) added. chapter 6.12, 'teleCARE IP Gateway (NIGW)" on page 91

Version	Date	Description
V	2015-12-07	• VDE compliance added, see “VDE Compliance” on page 10 • Added the VDE 0834-1/2 Test Certificate Holder Address, see “VDE 0834-1/2 TEST CERTIFICATE HOLDER ADDRESS” on page 3 • VDE power requirements added, see “External Power Supply” on page 24. • Room Bus powered Slave corridor Lamps added, see “Power Supply for Systems with Room Bus powered Slave Corridor Lamps” on page 28 and see “External Power Supply in Systems with Room Bus powered Slave Corridor Lamps” on page 33 • VDE compliancy for switch separation added, see “Ethernet LAN and Room Bus Cables” on page 18 • Practical Engineering Parameters added, see “Practical Engineering Parameters” on page 14 • Connecting external power supply to NIFX for VDE applications, see “Connecting a DC Power Adapter (VDE)” on page 256 • Check Infrared TV control compatibility statement for 14 button handset added, see “Patient Handset Programming Interface” on page 294 • Line break detection via End-of-Line resistor for NIGA changed from 4.7k ohm to 22k ohm. See “Line Break Detection” on page 179. • NILF External Loop Antenna installation instructions added. See “External Loop Antenna” on page 284. • Auxiliary Lamp Connection works only in combination with NIRC3 or NICL2. See “Auxiliary Lamp Connection - NILD2” on page 64. • NILF Tamper alarm output functions only with external power connected. See “Tamper Alarm” on page 291. • Drawing added for the VDE compliant mains power setup. See “VDE compliancy” on page 24. • NUCD12IP-H corridor display added. See “Corridor Display” on page 199. • 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 282.*
W	28 June 2016	• Mark phased out products. • Wrong reference to “teleCARE M” replaced with “teleCARE IP” in the NIMS2 description. See “Light Switching Relay Maximum Load and Surge Damping Diode” on page 119. • Added Chapter External Inputs. See “External Inputs” on page 181.

Version	Date	Description
X	14 November 2016	• End of line resistor value for NIGA corrected to 22kΩ. See "Connecting a Device to the Multi General Alarm Module" on page 178 and "Line Break Detection" on page 179 • Assembling and Attaching the Pull Cord, image has been updated. See "Assembling and Attaching the Pull Cord" (details on page 129) • NIAT TV interface module reference to audio input voltage changed to 2Vpp. See "General Considerations" (details on page 161) • Wrong article numbers for the 1 button covers in the Customisable Modules section has been corrected. See "Customisable Module Options" on page 125. • Ethernet LAN and room bus cabling updated to reflect NIRC (3 room buses) and NIRC3 (4 Room Buses) See "Ethernet LAN and room bus cabling" on page 18. • Intended Use for MMA has been updated, see "Intended Use for MMA" on page 7. • Added class IIb compliancy information to the NIMA. See "MDD Class IIb compliancy" on page 166.
Y	26 April 2017	• Intended Use for MMA statement updated: See "Intended Use for MMA" on page 7. • Added Statement: MMA alarm cables must be connected to the medical device by an Ascom representative. See "MMA Alarm Cable" on page 172. • Line break detection examples adjusted: See "Line Break Detection" on page 172. • MMA alarm cable test procedure added: See "MMA Alarm Cable Test Procedure" on page 173.

Version	Date	Description
Z	31 October 2017	• Auxiliary sensor contact description added to the NIFX Fixed Transceiver: See "Auxiliary Sensor Contact" on page 257. • Kadex system support (Only available for Benelux) added to the appendix. See "Kadex Interface Connection" on page 324. • Changed the orientation of the room controller circuit board holding clip. Various images have been updated, see "Removing the Room Controller Printed Circuit Board" on page 38 • Changed wire color of the multi medical alarm cable. See "Line Break Detection" on page 172. • Practical Engineering Parameters updated: See "Practical Engineering Parameters" on page 14. • Wireless chapter extended with wireless infrastructure. See "Wireless Infrastructure" on page 233. Wireless modules added: NUREP - See "NUREP Wireless Repeater" on page 239. Outdoor Box, using a suitable weatherproof enclosure that meets local electrical code - See "Outdoor Box" on page 242. Wireless Gateway (NIRC3 + NUREP) - See "Wireless Gateway" on page 243. NUWBM3 - See "NUWBM3 Wireless Active Bedside Module" on page 246. NUUTX - See "NUUTX Universal Transceiver" on page 264. NUWIR - See "NUWIR Wireless PIR Module" on page 268.
AA	02 February 2018	• Important statement to power down PoE switch before connecting or disconnecting controller modules has been moved from the System Power Supply section to the phased out room controller (NIRC) section. See "NIRC" on page 34. Powering down a PoE switch is not required when connecting or disconnecting the room controller 3 (NIRC3). • Reference to exit detection functionality (Exit Beacon) added to NILF location beacon: See "Exit Beacon" on page 290. • NIPC removed from list of modules supporting sensors. • Please note that normally closed (NC) contacts cannot be used when using an NICB connected to the Door Side Module (NIDM) or the Toilet Cancel Module - Active (NITC-XXA). See "External Inputs" on page 181. and "Door Side Module (NIDM) and Toilet Cancel Module - Active (NITC-XXA)" (details on page 186)

Version	Date	Description
AB	19 September 2018	• Card Reader (NICR) has been updated to include access module configuration. See "Card Reader (NICR)" on page 147. • Wireless Infrastructure RF Planning Considerations added. See "Wireless Infrastructure RF Planning Considerations" on page 236. • Startup Availability Timing added. See "Startup Availability Timing" on page 17. • Software Update Timing added. See "Software Update Timing" on page 17. • NIGA wire colors changed according to the production process. See "Multi General Alarm Module (NIGA)" on page 176. • NUWIR important statement added, it is not advised to mount the NUWIR in main living spaces. See "NUWIR Wireless PIR Module" on page 268. The IR detection surface of the NUWIR sensor can become saturated if exposed to direct sunlight. See "NUUTX NUWIR Mounting Instructions" on page 274.
AC	16 July 2019	• Improved instructions for the installation of the NUWBM3, see "NUWBM3 Wireless Active Bedside Module" on page 246. • Changed maximum number of NIRC3s per NISM2, see "General Limitations" on page 14.
AD	5 November 2019	• Practical Engineering Parameters Updated, the number of wireless PD's per NISM have been updated to "1000" (including NIRX in NILF but excluding NUWIR / NUUTX). See "Practical Engineering Parameters" on page 14. • EU Construction Products Regulation (Regulation No. 305/ 2011) compliance statement added. See "Installation and Commissioning" on page 6. and "System Cabling" on page 18. • System overview drawings updated. See "System overview teleCARE IP without speech" on page 8. and "System overview teleCARE IP with speech" on page 8
AE	20 November 2019	• LED color for the buttons added to the Customisable Module.See "Customisable Module Options" on page 125. • NUWBM3 removal instructions for battery replacement updated. See "Remove the NUWBM3 from the Spacer" on page 250.
AF	24 March 2020	• Changed text MDD to MDD/MDR. See "Multi Medical Alarm Module (NIMA)" on page 165.See "Multi General Alarm Module (NIGA)" on page 176.See "Multi General Alarm Module (NIGA)" on page 192. • Updated LAN cable standard to T568-B