System Description
teleCARE IP
Emergency Call System

9 May 2019 / Ver. I

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Terms used in this manual	Specialized terms are used throughout this manual. The first time a term is used it is defined in the text.
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1 Introduction

1.1 General

The purpose of this document is to give you a general overview of the teleCARE IP system, including the basic system infrastructure, the most important devices and services, and typical installation examples. Throughout this document you will find cross-references in the text which indicate further details that can be found in other sections of this document. The cross-references are colored blue and linked to the relevant place in the document. Positioning your cursor over the cross-reference text and clicking the left mouse button will take you to the relevant section. Example: see "Switch Modules" on page 23. To return to the original page after viewing a cross-referred page, click on the "Previous View" arrow of Adobe Acrobat or Adobe Reader (or).

We advise that you view this document using the latest version of Adobe Acrobat or Acrobat 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.*

1.2 teleCARE IP Intended Application Area

The intended application area for teleCARE IP emergency call systems is in assisted living and independent living facilities.

The primary functions of the teleCARE IP system include the generation, transmission and the signaling of calls made by residents and staff.

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

teleCARE IP components are not to be installed in areas where the air pressure is below 850 millibar (approximate maximum altitude 2000m/ 6560 ft).
teleCARE IP components, including all handsets, are not intended for use in oxygen enriched environments.
teleCARE IP components, including all handsets, are not intended for use in rooms where flammable (anesthetic) gases are used.

Ascom cannot accept any responsibility nor liability for teleCARE IP systems and components used in situations other than those stated above.

1.3 System Structure

teleCARE IP is a Local Area Network (LAN) system, based on Internet Protocol (IP) built on a 10/100 Mbit/s IP network.

A teleCARE IP system is centrally managed by the teleCARE IP system manager. The system manager contains an on-board Java based web application which can be remotely accessed over the IP network using a web browser (The latest version of Microsoft Internet Explorer is recommended, check www.microsoft.com for more details).

The decentralized nature of a teleCARE IP system makes it fail safe in such a way that in case of IP network failure the system will continue locally functioning at room level.

teleCARE IP systems are versatile and scalable to any required system layout.

1.4 Integration With Other Ascom Systems

1.4.1 Ascom Communications Platform

The teleCARE IP system is part of the Ascom Communications Platform. By combining the various Ascom communication systems a customer specific system solution can be provided which can include speech, interactive messaging, local positioning, personal alarm and emergency call services. The Ascom communication systems integrate through UNITE.

1.4.2 UNITE

The UNITE system integrates the ACP devices by offering an application level integration layer. UNITE adds messaging, alarm handling, positioning, logging, fault handling, supervision, message routing, group handling, number planning and other mission critical services.

UNITE allows the integration of third party equipment. Third party integration can be done via a defined open access protocol on IMS or event detection via several configurable input alternatives on XGate.

UNITE also allows third parties to develop their own customer-specific applications to be integrated into the Ascom communications platform through Ascom open server solutions like Open Access Server (OAS) for the MS Windows Common Object Model (COM) and the Open Java Server (OJS) for the Java development platform.

System Enhancement

The features of a teleCARE IP system can be enhanced using the Unite Connectivity Manager (UNITE CM) module. The UNITE CM module adds features like remote management, system supervision, error logging, and message routing.

1.5 Typical Installation

1.5.1 Room Bus

A typical teleCARE IP installation consists of a teleCARE IP System Manager (NISM2 and later) and a number of teleCARE IP Room Controllers (NIRC3 and later). Each room controller provides four 4-wire digital room buses. Each room bus has 8 addresses for connecting up to 8 active peripherals such as: corridor lamps, doorside modules, bedside modules, pull cord modules, toilet cancel modules and medical rail modules.

One wire in the room bus is used for data, with a data rate of 2kbps. Another wire is reserved for speech communication, and one pair of wires is used for the required power supply from the room controller to the peripheral modules. The peripheral modules on the room bus are constantly monitored and all outputs are short circuit protected.

1.5.2 Passive Bus

Several teleCARE IP active peripherals are equipped with a passive bus connector for the connection of additional passive peripherals. See “Passive Peripherals” on page 24. for an overview of all the interconnections that can be made between active and passive peripherals.

1.5.3 Power Supply

The system power supply requirement is 24Vdc distributed on a 24Vdc two-wire power supply network. The cable size, cable length and system load will influence the effective voltage around the system. Therefore the power supply capacity, cable types and wire size must be calculated for each installation.

1.5.4 Security

teleCARE IP supports UDP for performance with security aspects handled in the application, the allocation of static IP addresses from a DHCP server in reservation mode and encryption of all data, using a 128 bit algorithm.

1.5.5 Modularity

The modularity of teleCARE IP allows for extension and addition of new services to already installed systems. The IP technology allows easy installation of new room controllers and peripheral modules so to extend the existing teleCARE IP system.

1.6 System Configuration

The functionality and configuration of a teleCARE IP system are set up using the teleCARE IP System Manager. The teleCARE IP Configuration Manual (TD 93019US) gives full details of how to set up the system using the teleCARE IP System Manager.

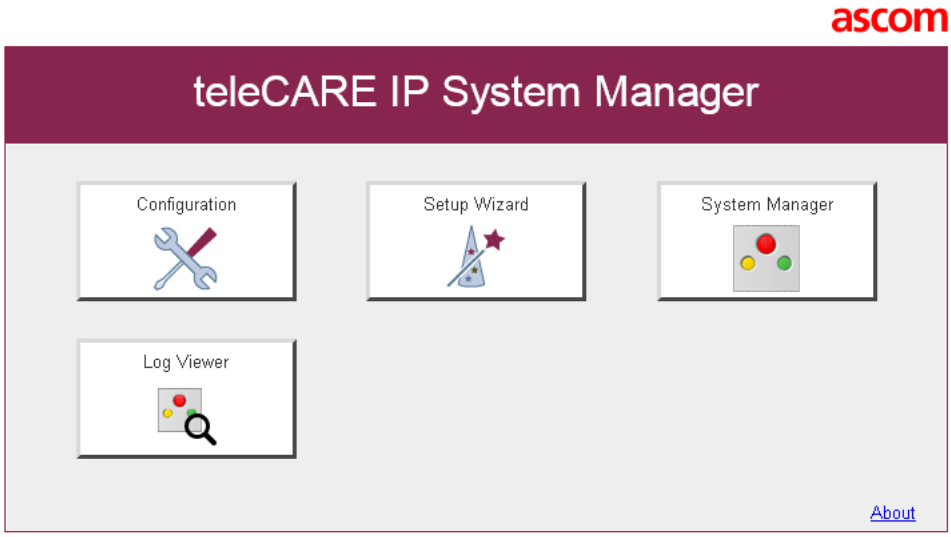

Figure 1. teleCARE IP System Manager graphical user interface (GUI)

2 Practical Engineering Parameters

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

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

2.1 General Limitations

Practical engineering parameters (hardwired)	**Min.**	**Max.**	**Unit**
NIRC3s per NISM		200	**#**
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		100/30	feet/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)		100/30	feet/meters
NIFX		100/30	feet/meters
NUWBM3		100/30	feet/meters
NUUTX		100/30	feet/meters
NUUTX input voltage	10	30	VDC
NUUTX distance to magnet from center		0.2/5	inch/mm
NUWIR 916 to 921 MHz		100/30	feet/meters
NUWIR PIR angle	20	90	degrees
NUWIR PIR range	13/4	20/6	feet/meters
NUREP 2.4GHz (indoor)		100/30	feet/meters

Practical engineering parameters (wireless)	Min.	Max.	Unit
NUREP 2.4GHz (outdoor)		985/300	feet/meters
NILF (for LF)		9/2.7	feet/meters
NILF (for NIRX in NILF)	1/0.3	100/30	feet/meters
Planning and capacity			
Number of wireless PD's per NISM **Note:** This includes NIRX units in an NILF as well		500	#
Number of NIRX's per NISM		50	#
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	#

2.2 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

2.3 Network Expectations

Network Expectations
The LAN installation must be certified and tested in accordance with ANSI/TIA/EIA-568-A

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
Existing customer LANs must be assessed by Ascom before committing
For details of the teleCARE IP load and performance see document TD92636EN, (IP Infrastructure Requirements)

2.4 VoIP Requirements

VoIP Considerations
An Innovaphone VoIP Gateway is required for teleCARE IP with speech, as the interface to the PBX.
An inter-operability test between the VoIP Gateway and the 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:*

2.5 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.*

2.6 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.

2.7 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.

3 System Structure

3.1 System infrastructure

The teleCARE IP system is part of the Ascom Communication Platform providing emergency call services. The figure below shows the infrastructure around the teleCARE IP system.

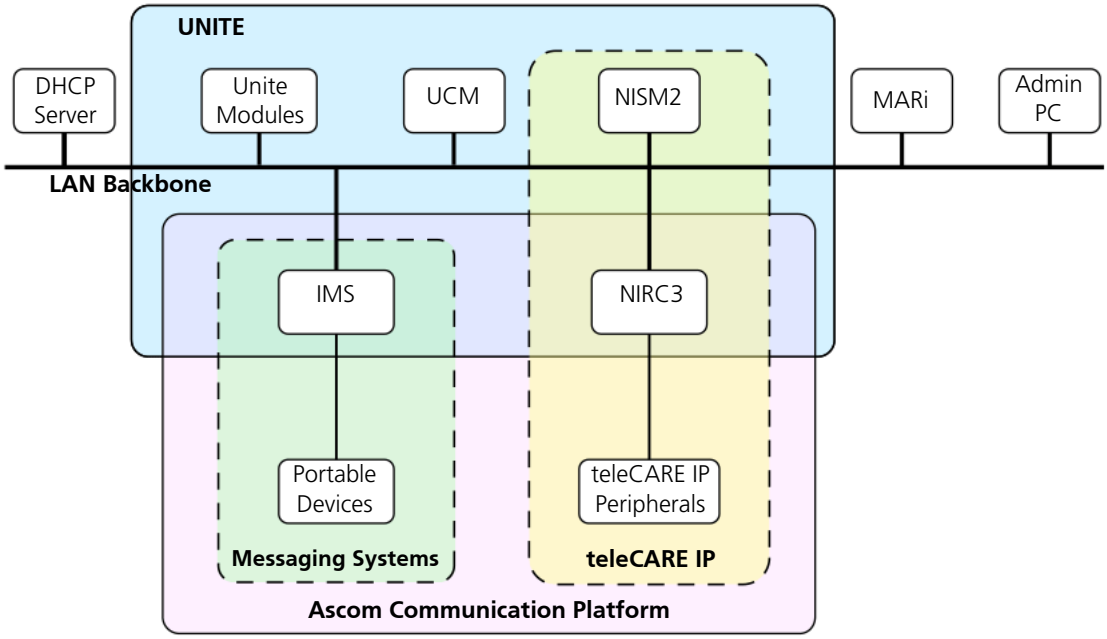

Figure 2. teleCARE IP system infrastructure

In a typical configuration the infrastructure comprises the teleCARE IP system and one or more messaging systems of the Ascom communications platform. The teleCARE IP carrier devices (NISM and NIRC3) integrate with the other carrier devices through UNITE. All carrier devices require an appropriate IP medium for carrying data, voice and messages.

teleCARE IP end user devices (doorside modules, bedside modules etc.) connect as active and passive peripherals to the teleCARE IP room controllers (NIRC3).

In the teleCARE IP infrastructure the Unite Connectivity Manager (UNITE CM) module adds remote management, system supervision, logging, fault handling, group handling, number planning, message routing capabilities and other system services. The logged information can be viewed by accessing the UNITE CM log viewer application.

The Messaging, Assignment, Reporting interface (MARi) web application is an enhancement to the existing graphical user interface. It is designed to improve the efficiency of the caregivers' work.

The teleCARE IP system requires a Dynamic Host Configuration Protocol (DHCP) server for the assignment of IP addresses to the carrier devices.

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

3.1.1 IP Medium

teleCARE IP requires a dedicated LAN network. The physical connection of NISM and NIRC3 is Ethernet LAN using Cat-5 (or above) 10/100 Base-T or Unshielded Twisted Pair wiring (UTP).

3.1.2 DHCP Server

The teleCARE IP network infrastructure requires a Dynamic Host Configuration Protocol (DHCP) server to operate in reservation mode. In DHCP reservation mode the DHCP server assigns to each IP client a permanent IP address.

3.1.3 UNITE

Ascom's unified IP-based telecommunication environment (UNITE) serves to integrate the various systems of the Ascom communications platform. UNITE offers system level services such as emergency call, messaging, alarm handling, logging, fault handling, supervision, message routing, group handling, number planning, and other mission critical services.

3.1.4 Messaging Services

Messaging services can be provided to a teleCARE IP system by adding Ascom messaging systems such as IP-DECT, VoWiFi and System 900 to the system infrastructure. The NIRD Room Display serves as an Ascom interactive messaging device which can be included as part of any teleCARE IP system. The resulting integrated infrastructure provides the emergency call system with speech, interactive messaging and alarm services.

3.1.5 System Management

The teleCARE IP system is centrally managed by the teleCARE IP System Manager (NISM). This is an Elise module that contains the configurations of all teleCARE IP controllers that are part of the teleCARE IP system. The NISM contains a Java based client web application. The client web application is retrieved over the IP medium and runs inside a web browser.

3.1.6 Scalability

The scalability of teleCARE IP gives significant freedom when deciding the mix of system services. The options range from basic emergency call, with light guidance and call forwarding, up to hunting chain, attendant and staff assignment services.

3.1.7 Decentralized System Intelligence

The teleCARE IP system intelligence is decentralized and contained in teleCARE IP controllers that connect as autonomous nodes to the IP medium. Each teleCARE IP controller has an interface with UNITE. teleCARE IP controllers have a MAC and associated IP address giving them a unique identity at room level in the teleCARE IP system.

3.1.8 Fail Safe

In case of failure of the IP network the teleCARE IP controllers will continue locally controlling the connected peripherals. During an IP network failure all existing calls will continue to be locally registered and signaled. As soon as the IP network is available to the teleCARE IP controller again the decentrally stored calls will be fully restored.

3.1.9 ESPA and TAP

teleCARE IP can interface with an ESPA or TAP paging system via either of the RS232 com ports (COM 1 or COM 2) which are located on the rear side of the System Manager (NISM). Licences are required for support of ESPA and TAP.

3.2 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.

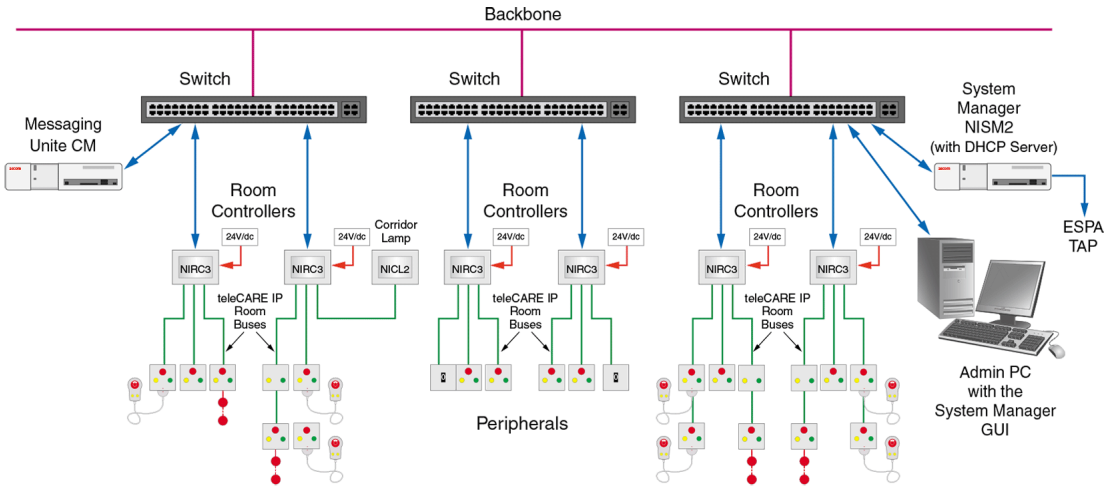

Figure 3. teleCARE IP system overview without speech

teleCARE IP without speech is designed to work with Ascom Interactive Messaging, which includes the Ascom interactive handsets and pagers.

The system is configured with the project specific requirements using the teleCARE IP System Manager (see the teleCARE IP Configuration Manual TD93019US).

3.3 teleCARE IP With Speech

The basic installation for a teleCARE IP system with speech is the same as for teleCARE IP without speech. To have the speech functionality the room controllers (NIRC3) require a voice piggyback module (NIVP) and each location where speech is required must have a teleCARE IP speech module (NISP). The speech module can only be used in combination with the teleCARE IP doorside module (NIDM), the bedside module (NIBM) and the active pull-cord module (NIPC).

The teleCARE IP Room Display (NIRD) can also be combined with the speech module to give speech with interactive messaging.

3.3.1 Compatible Ascom IM Handsets

teleCARE IP with speech is designed to work with Ascom Interactive Messaging using the Ascom handsets which support multi-layer interactive messaging. For a list with compatible handsets, see “teleCARE IP Compatible Ascom Handsets” on page 8.

3.3.2 System Overview teleCARE IP with Speech

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

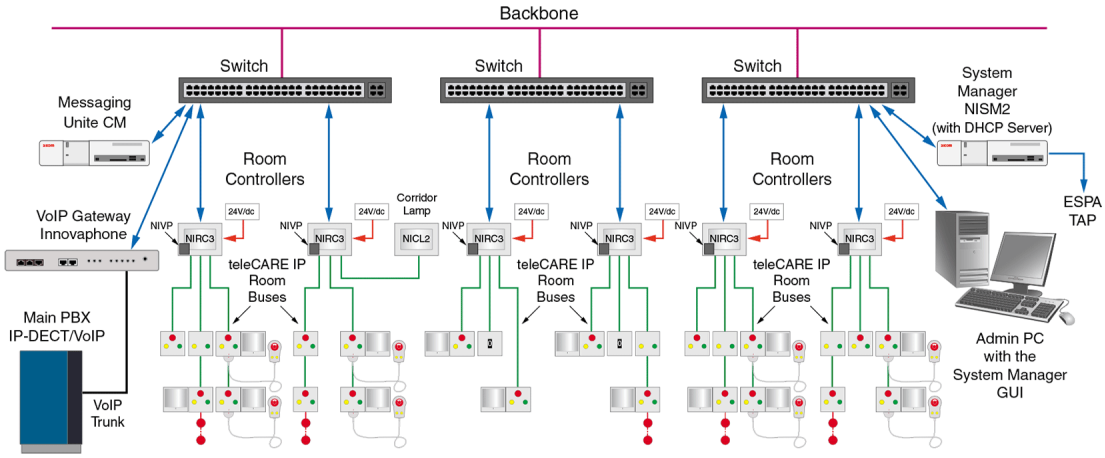

Figure 4. teleCARE IP system overview with speech

3.3.3 VoIP Gateway

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 Gateway is an IP based gateway providing the VoIP based solution which supports all the features of a traditional PBX. For the teleCARE IP VoIP the SIP Trunk must be used for the interface to the main PBX. The SIP trunk must be set to “Early offer”.

When used with teleCARE IP each model of the Innovaphone Gateway can support a specific maximum number of objects (subscribers). In the Innovaphone 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 Innovaphone 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 (TD 93019US).

A license is required for the Innovaphone Gateway which requires an activation code that has to be ordered from Ascom through the Ascom Partner Website before downloading the license from the Innovaphone Customer Portal.

4 System Power

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

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

4.1 24Vdc / 3 Amp Power Supply (Standard)

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

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

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

5 Control Equipment

This section describes the installation instructions for the following products:

- "Room Controller (NIRC3)" (details on page 15)
- "Voice Piggyback (NIVP)" (details on page 17)
- "Blank Front Cover for the Room Controller" (details on page 18)
- "Corridor Lamp (NICL2)" (details on page 18)
- "System Manager (NISM2)" (details on page 21)

5.1 Room Controller (NIRC3)

The Room Controller (NIRC3) has a translucent dome cover which accepts up to four LED boards which must be ordered separately. The LEDs are used for the signaling of calls, attendant presence and faults. The LED board is available in five colors: red, green, yellow, white and blue (see "LED Lamp Board (NILD2)" on page 19).

Figure 5. Room controller (NIRC3)

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

The NIRC3 is compatible with all the existing teleCARE IP peripherals.

The NIRC3 has a high speed 10/100 Base-T Ethernet communication interface.

The input power supply requirement for the NIRC3 is 24V DC ± 10%.

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

Each room bus of the NIRC3 supports eight addresses. The room bus address applications are summarized in the following table:

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

Table 1. Room bus addresses and applications

The room controller (NIRC3) is supplied as a kit consisting of a housing, a printed circuit board, a front cover with translucent dome.

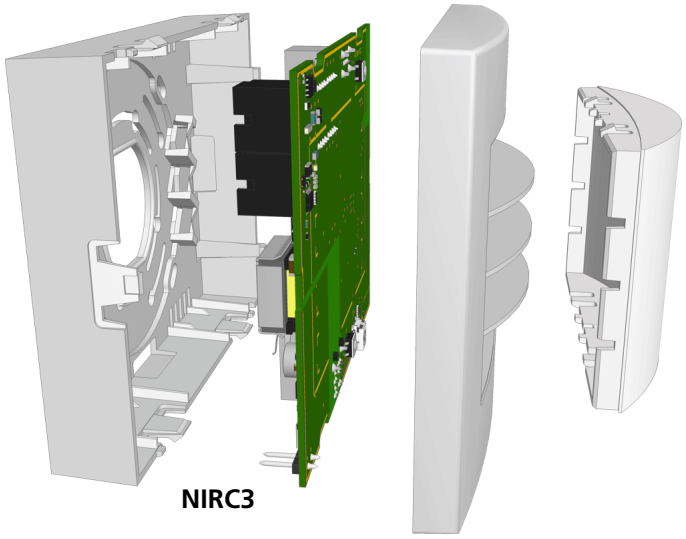

Figure 6. Room controller (NIRC3) parts

5.2 Voice Piggyback (NIVP)

The teleCARE IP Voice Piggyback module (NIVP) is a printed circuit module which is piggyback mounted on the teleCARE IP Room Controller 3 (NIRC3).

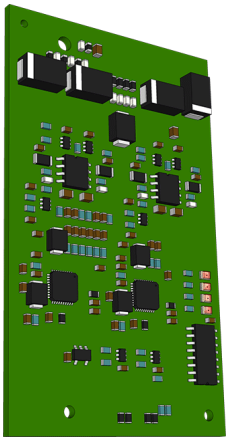

Figure 7. NIVP Voice Piggyback

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.

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

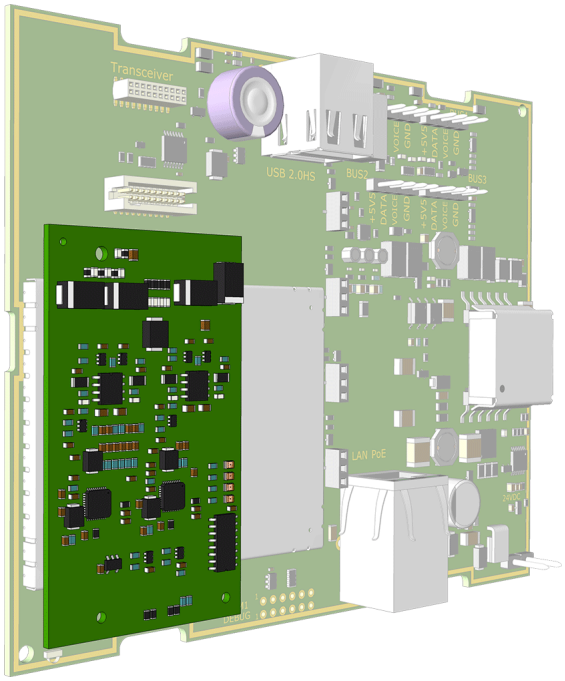

Figure 8. NIVP voice piggyback module mounted on the NIRC3

5.3 Blank Front Cover for the Room Controller

A blank solid plastic front cover for the room controller is available in gray 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 9. Room controller with blank front cover

5.4 Corridor Lamp (NICL2)

The corridor lamp has the same appearance and has the same signalling function as a teleCARE IP room controller with integrated corridor lamp.

Figure 10. Corridor lamp (NICL2)

The Corridor Lamp (NICL2) is an active peripheral and has fixed address 5 on the room bus. The Room Controller (NIRC3) can be the master of up to three NICL2 slave corridor lamps.

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:

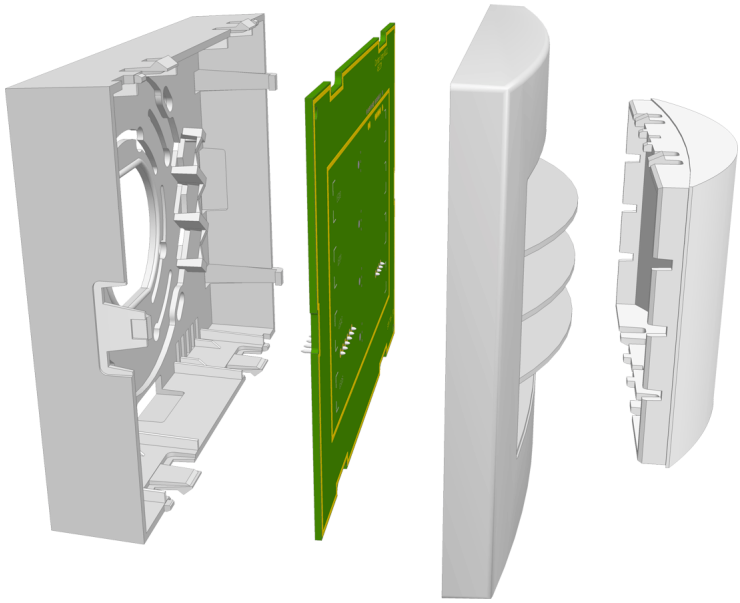

Figure 11. NICL2 - Corridor lamp parts

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

5.5 LED Lamp Board (NILD2)

The NILD2 contains four high intensity LED lamps which are used in the corridor lamp of the room controller (NIRC3) and the corridor lamp (NICL2). The three pins on the back of the NILD2 are used to connect the LED board through holes in the room controller or corridor lamp printed circuit board. The room controller and the corridor lamp each accept up to four NILD2 Boards.

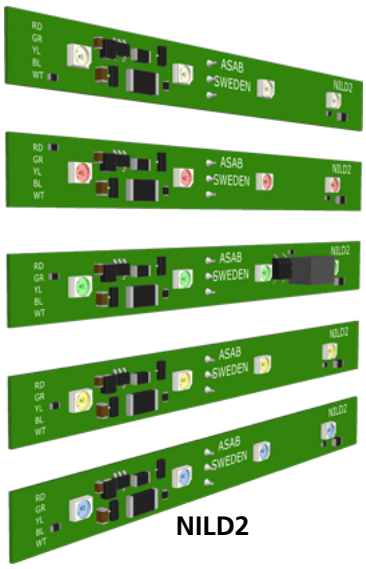

Figure 12. LED lamp boards: white, red, green, yellow and blue

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

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.

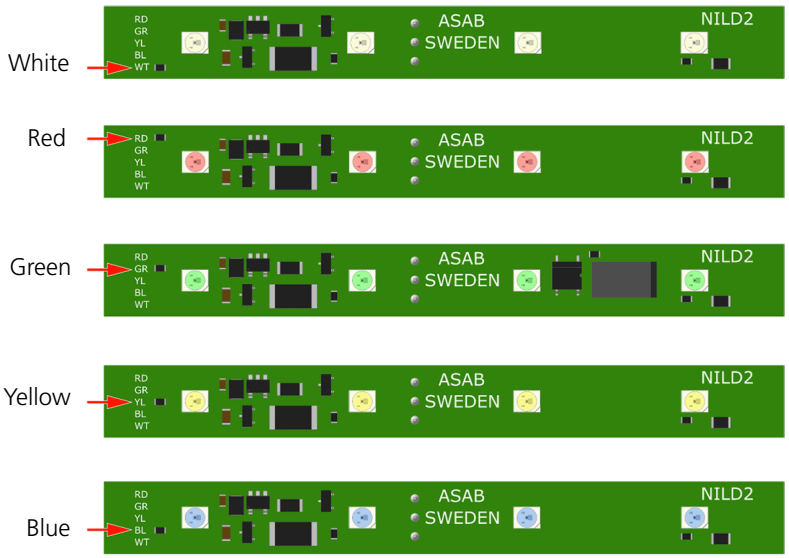

Figure 13. NILD2 - LED lamp boards: white, red, green, yellow and blue

The colour of the LEDs is determined during manufacturing 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:

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

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

5.6 System Manager (NISM2)

The teleCARE IP System Manager (NISM2) is an Ascom ELISE application built on the ELISE3 module.

The NISM2 is the tool for centrally managing the teleCARE IP system through a graphical user interface (GUI). It is used to configure, install, maintain and monitor the system.

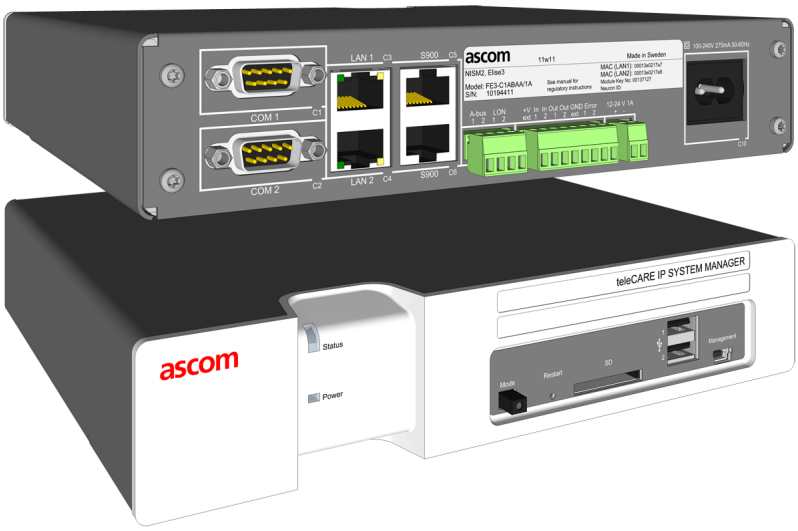

Figure 14. teleCARE IP System Manager (NISM2)

The NISM2 contains a Linux based web server which functions as the interface to a 100Base-T Ethernet LAN. The NISM2 contains a client web application which enables the NISM2 to be managed from a (remote) client.

The NISM2 is connected to the IP network and stores the configurations for each of the teleCARE IP Room Controllers that are connected to the IP network. The data stored by the NISM2 can be retrieved over the IP medium and run inside a web browser on a remote client.

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.

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

IMPORTANT: *For UL 2560 installations, the NISM2 can only be connected to the systems external 24Vdc power supply (see "System Power" on page 14).*

5.6.1 NISM2 Graphical User Interface (GUI)

The NISM2 is supplied with a Java based graphical user interface (GUI). 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.

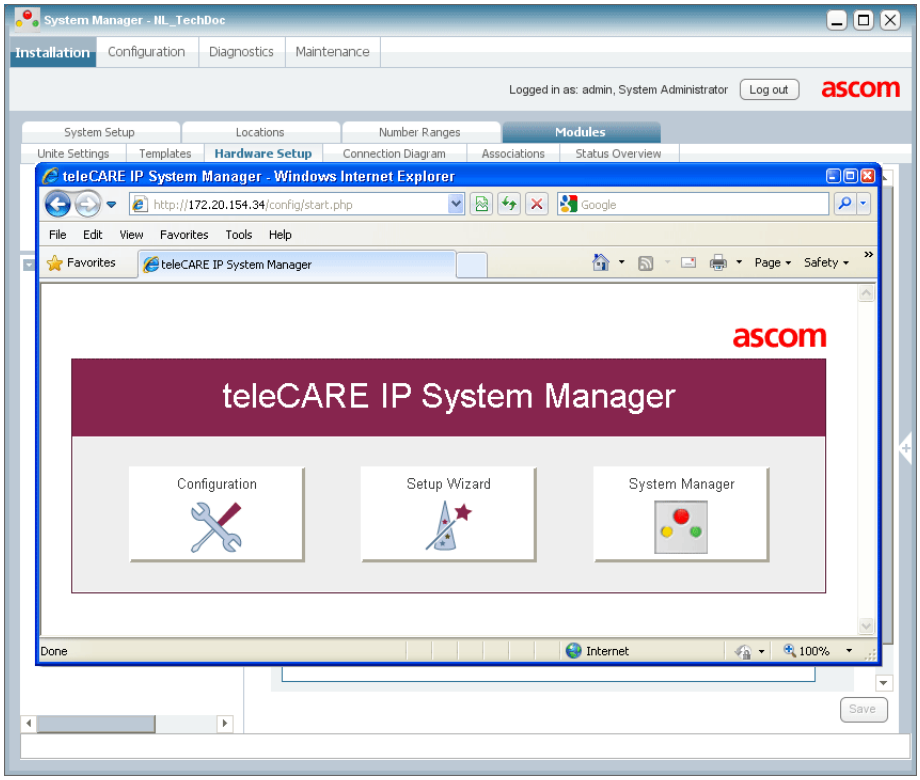

Figure 15. teleCARE IP System Manager (NISM2) GUI

Note: *A detailed explanation of how to use the teleCARE IP System Manager (NISM2) is available in the teleCARE Configuration Manual (TD 93019US).*

6 Peripherals

6.1 General

A peripheral is an end user device that can be part of teleCARE IP System. This section describes the following peripheral devices:

6.2 Switch Modules

Switch modules are available in a three button, two button, one button, or blank layout. The button colors of a three button switch module are red, yellow and green. The button colors of a two button switch module are yellow and green. The button color of a one button switch module is red. A blank module has no buttons. All the buttons are assigned a reassurance LED which permanently emits a low intensity light for night-time locating and identification in the dark.

The function of the buttons on a teleCARE IP switch module is freely programmable using the teleCARE IP system manager. However, in a typical installation the red, green and yellow buttons are respectively used for making emergency calls, reporting attendant presence and calling for assistance.

Note: *For cleaning instructions, see chapter C, 'Cleaning the Switch Modules' on page 110.*

6.2.1 Active Peripherals

Active peripherals are connected to one of the three room buses of a teleCARE IP room controller. Each room bus provides eight addresses for the connection of teleCARE IP active peripherals as described in the table below:

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

Table 2. Room bus addresses and applications

6.2.2 Passive Peripherals

Passive peripherals can be connected to those active peripherals which are equipped with a passive bus connector. Passive peripherals do not require an address on the room bus as they are connected to an active peripheral and therefore share the same address.

The table below shows an overview of all the interconnections that can be made between active and passive peripherals.

Active Peripherals with Passive Bus Connector	Passive Peripheral Modules		
	Passive Pull Cord NIPC-G/W3P	Passive Pull Cord NIPC2-G/WAA	Passive Toilet Cancel NITC-G/W2P
Doorside Module NIDM	•	•	•
Room Display NIRD	•	•	•
Toilet Cancel Module NITC	•	•	•

Table 3. Active and passive peripherals interconnection scheme

Note: *Only one Passive Pull-cord module can be connected per passive bus.*

6.3 Bedside Module (NIBM2)

The Bedside Module (NIBM2) is designed for use in the teleCARE IP system. It is an active switch module connected to room bus addresses 0, 1, 2 or 3. The address is set by an on-board DIP switch. The room bus includes the 5.5 Vdc power supply for the NIBM2.

The NIBM2 supports speech and entertainment in teleCARE IP.

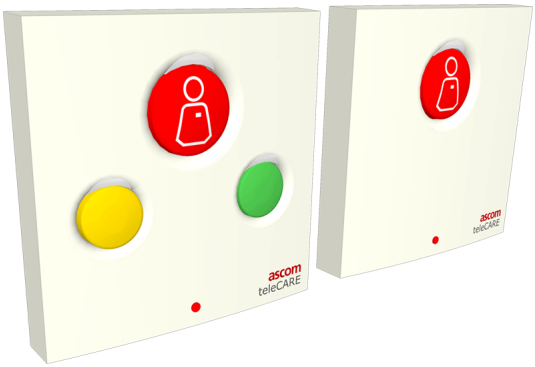

Figure 16. Bedside Modules NIBM2

The NIBM2 has three function buttons (red, green and yellow). The red button is for call. The functions of the yellow and green buttons depend on the configuration. Each button has an LED which illuminates to indicate the activated condition and permanently emits a low intensity light for location and identification in the dark.

The NIBM2 includes a Safe Release socket for connecting a handset. A red dot on the cover plate indicates the location of the Safe Release socket. See "Connecting and disconnecting the Safe Release Plug" on page 108.

The NIBM2 has two bidirectional solid state relays for control of two light switching relays. A four-pin connector facilitates two sets of normally open contacts for control of two light switching relays.

The NIBM2 supports the following external inputs and outputs:

- Control outputs for 2 light switching relays
- Stereo TV audio input
- External call input with an open-collector LED output
- NISP speech module

The NIBM2 has on-board diagnostics. When a room bus failure is detected all the button LEDs will flash intermittently.

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.

6.4 Doorside Module (NIDM)

The NIDM is an active switch module connected to room bus addresses 0, 1, 2 or 3. The address is set by an on-board DIP switch. Each door side module contains a passive bus connector for the additional (parallel) connection of at maximum two passive peripherals (NIPC or NITC + NIPC). Doorside modules are equipped with a buzzer for the acoustic signaling of forwarded calls.

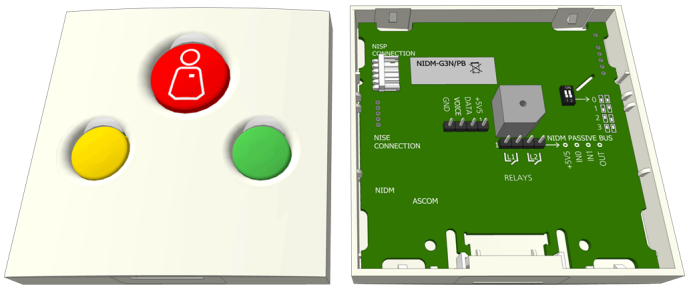

Figure 17. Doorside Module (NIDM)

The door side module includes a 5-pin connector for the connection of a speech module (NISP). For details of the speech module refer to See "Speech Module (NISP)" on page 33.

6.5 Pull Cord Module (NIPC)

The pull cord module is an active switch module connected to room bus addresses 0, 1, 2 or 3. The address is set by an on-board DIP switch.

The pull cord integrates a safety break mechanism accomplished with two red plastic balls. Pull cord modules are designed for use in humid areas like bathrooms and toilets.

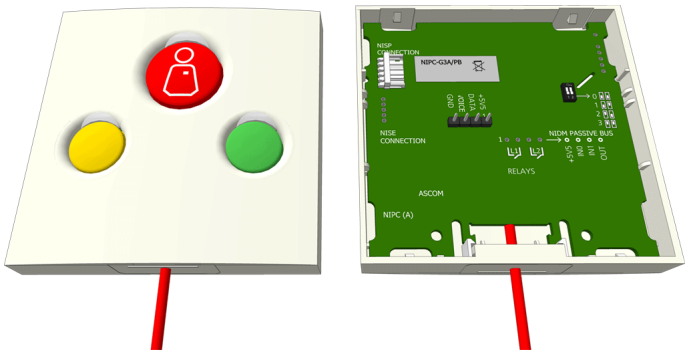

Figure 18. Pull Cord Module (NIPC)

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

The pull cord module includes a 5-pin connector for the connection of a speech module (NISP). For details of the speech module refer to See "Speech Module (NISP)" on page 33.

6.6 Toilet Cancel Module (NITC)

The toilet cancel module is an active switch module connected to a fixed room bus address 4. A toilet cancel module contains a passive bus connector for the additional connection of 1 passive pull cord module (NIPC).

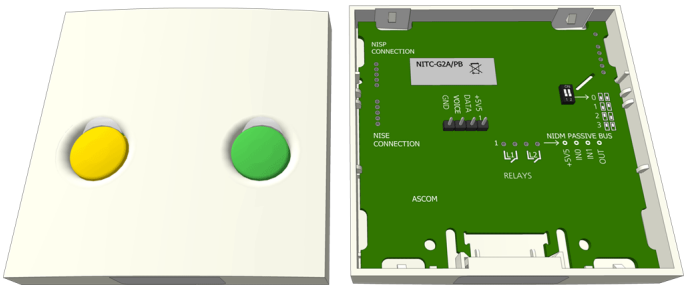

Figure 19. Toilet Cancel Module (NITC)

6.7 Pull Cord Module - Passive (NIPC)

The passive pull cord module is a passive switch module which must be connected to the passive bus connector of a doorside module (NIDM) or toilet cancel module (NITC).

The pull cord integrates a safety break mechanism accomplished with two red plastic balls. Pull cord modules are designed for use in bathrooms and toilets.

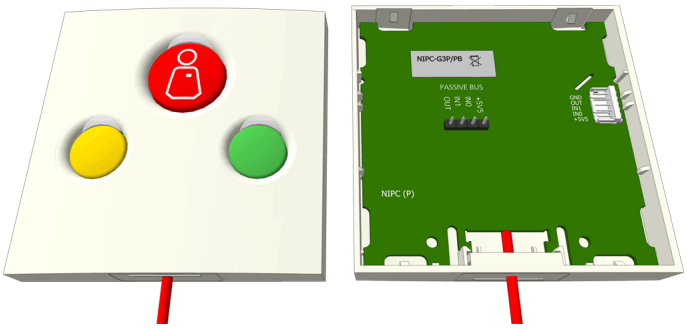

Figure 20. Pull Cord Module (NIPC-passive)

Note: *In passive pull cord modules only the red LED is supported.*

6.8 Toilet Cancel Module - Passive (NITC)

The passive toilet cancel module is a passive switch module. A passive toilet cancel module can connect to the passive bus connector of a Doorside Module (NIDM).

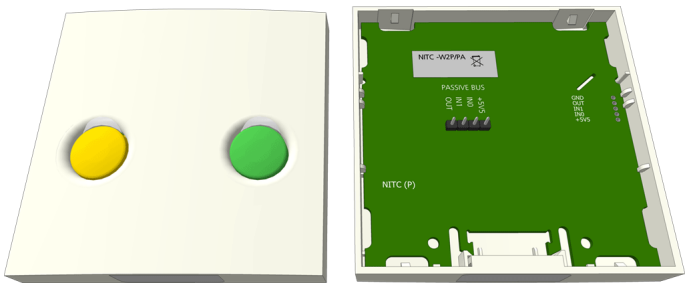

Figure 21. Toilet Cancel Module (NITC-passive)

Note: *In passive toilet cancel modules only a red LED is supported, it is located above the green button.*

6.9 Pull Cord Module - IP44 (NIPC2)

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 or baths and similar wet areas. It is available as an "active" module and a "passive" module.

The NIPC2 is available in gray 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 22. 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. The room bus address is set by DIP switches.

The passive version must be connected to the passive bus connector of a doorside module or of an active toilet cancel module. It has a 4-pin connector for the connection of the passive bus.

The NIPC2 Pull Cord Module includes a special backplate with two urethane foam gaskets which give the NIPC2 splash water protection to IP44 standard. In order to attain the IP44 splash water protection the backplate must be mounted on a smooth and flat wall surface using the four corner holes in the backplate.

The NIPC2 module is fixed on the backplate by two latches and two screws through the cover plate.

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.*

6.10 Medical Rail Module (NIMS2)

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

The NIMS2 supports speech and entertainment in teleCARE IP.

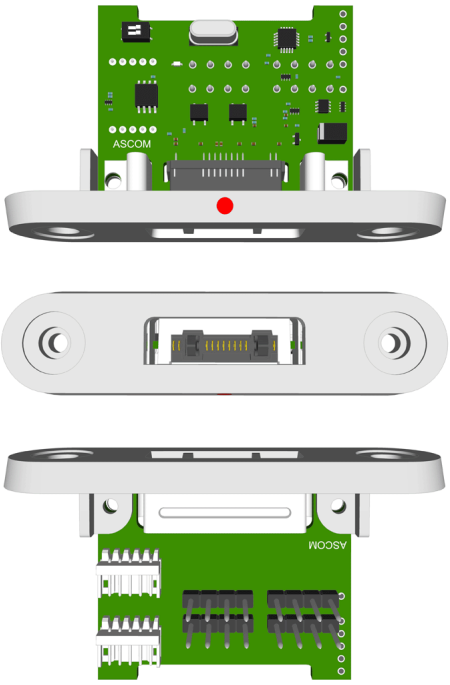

Figure 23. Medical Rail Module NIMS2 (top, front, bottom)

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

The NIMS2 includes a Safe Release socket for connecting a handset. A red dot on the mounting flange indicates the location of the Safe Release socket. See "Connecting and disconnecting the Safe Release Plug" on page 108.

The NIMS2 has two bidirectional solid state relays for control of two light switching relays. A four-pin connector facilitates two sets of normally open contacts for control of two light switching relays.

The NIMS2 has on-board diagnostics with an LED which will illuminate if a room bus failure is detected.

The NIMS2 supports the following external inputs and outputs:

- Control outputs for 2 light switching relays
- Stereo TV audio input
- External call input with an open-collector LED output
- NISP speech module

6.11 Duty Selector (NIDS)

The duty Selector (NIDS) is an active peripheral with a push button selector switch used for selecting one out of ten (0 to 9) duty configurations.

The duty selector is connected to the teleCARE room bus, in the same way as all other peripherals but it has the fixed room bus address of 5.

A duty selector contains an internal buzzer AND two digital inputs. The buzzer can be used to signal calls. The two digital inputs and the two output circuits are available as interfaces to external devices.

The duty selector enables calls from rooms or beds to be organized in predetermined service groups. Groups or combinations of groups can be assigned to certain positions of the duty selector. Depending on the position selected by the push button, emergency calls from the associated groups are forwarded and reported to the assigned nursing staff.

An explanation of the functions of the duty selector is given in "Duty Selector Functions" on page 107.

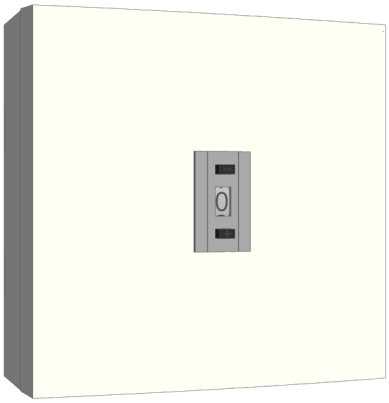

Figure 24. Duty Selector (NIDS)

IMPORTANT: *An NIDS module must be installed adjacent to the primary NIRD annunciator display.*

The duty selector has the same basic housing as the teleCARE IP single switch modules but it must be mounted on a surface mounting spacer which is delivered with the duty selector.

6.12 Card Reader Module (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 in the 13.56 MHz frequency range used in combination with contactless smartcards. It is connected to the teleCARE room bus,
in the same way as other peripherals and it has a fixed room bus address of 6.

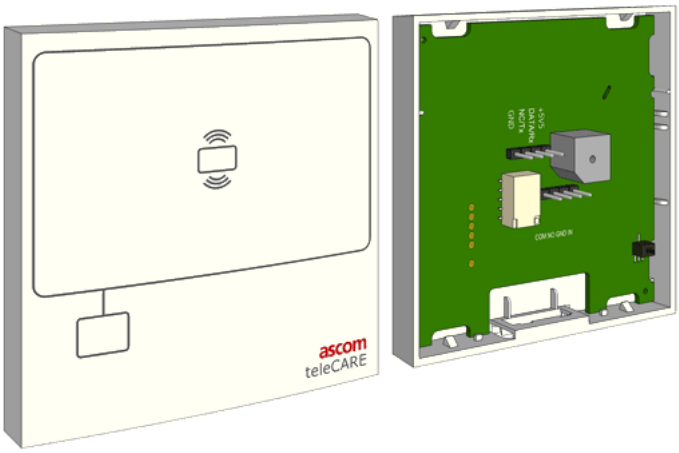

Figure 25. Card Reader (NICR)

The NICR is used in combination with a doorside module to allow attendants and staff members to register their presence through the smart card. It can also be used for access control using authorized smartcards to open electrically locked doors.

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

The NICR will read the smartcard when it is at a distance of up to 3/4 in. (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 when an authorized card is detected and the red LED shows when an unauthorized card is detected. A continuously flashing red LED indicates that an error has been detected by the watchdog.

The NICR offer two auxiliary functions: a relay circuit for switching an external device, such as an electrically operated door lock, and a pair of connections for monitoring, such as door open detection. The relay connection is a "normally open" volts-free contact and the monitoring connections consist of ground (GND) and a return 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 requires a single backplate which must be ordered separately. A spacer with installation kit is also available for surface mounting the NICR.

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

6.13 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 gray or white plastic body, a printed circuit board and a perforated anodized aluminum face plate.

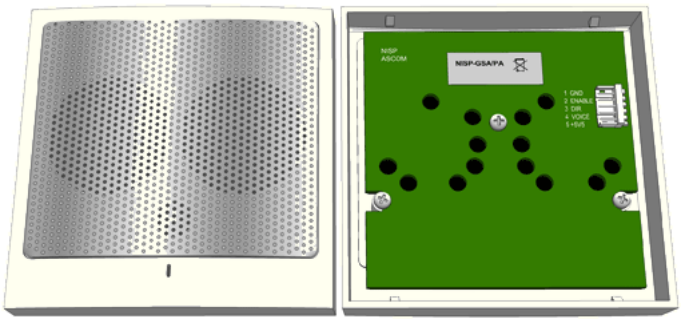

Figure 26. Speech Module (NISP) front and back view

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

The NISP can only be used in combination with the teleCARE IP Doorside Module (NIDM), the Room Display (NIRD), the bedside module (NIBM) and the Pull Cord Module (NIPC).

Figure 27. Speech Module double combination

Figure 28. Speech Module triple combination

Note: *A 5-wire cable with two 5-pole plugs is available to connect the speech module to the switch module. This cable is available in three lengths: 6 5/8 in. (170mm) (R190192), 7 7/8 in. (200mm) (R190193) and 15 3/4 in. (400mm) (660313). The 15 3/4 in. (400mm) cable allows the speech module to be mounted separately from the associated switch module.*

6.14 Acoustic Monitoring

Acoustic monitoring is the automatic activation of a call (Acoustic Call) by the detection of sound. Acoustic monitoring is a functionality of the teleCARE IP Room Controller (NIRC3-WMN) with the Voice Piggyback Module (NIVP-AAA) and the Speech Module (NISP-WSA). Refer to chapter 6.13"Speech Module (NISP)" on page 33 for details of the teleCARE IP Speech Module.

Acoustic monitoring can be included in teleCARE IP systems with speech and without speech, but in both cases the room controller with voice piggyback module and the speech module are required.

The functionality is enabled in the system setup. Each room bus can support one speech module with acoustic monitoring. In speech systems numerous speech modules can be on the same room bus as the acoustic monitoring speech module.

Speech functionality is not affected by acoustic monitoring. The acoustic monitoring is interrupted during speech and announcements to speech modules which are on the same room bus as a speech module with acoustic monitoring.

The acoustic monitoring capability of each enabled speech module is turned on or off in the Staff GUI. The sound level and sound duration values needed to trigger the acoustic call can be adjusted to suit the requirement and environmental conditions. These sensitivity settings are adjusted in the Staff GUI.

The acoustic call has a template in the teleCARE IP System Manager (NISM). The template is configured in the same way as other calls (see teleCARE IP Configuration Manual TD93019US for details of setting up call categories and call type templates).

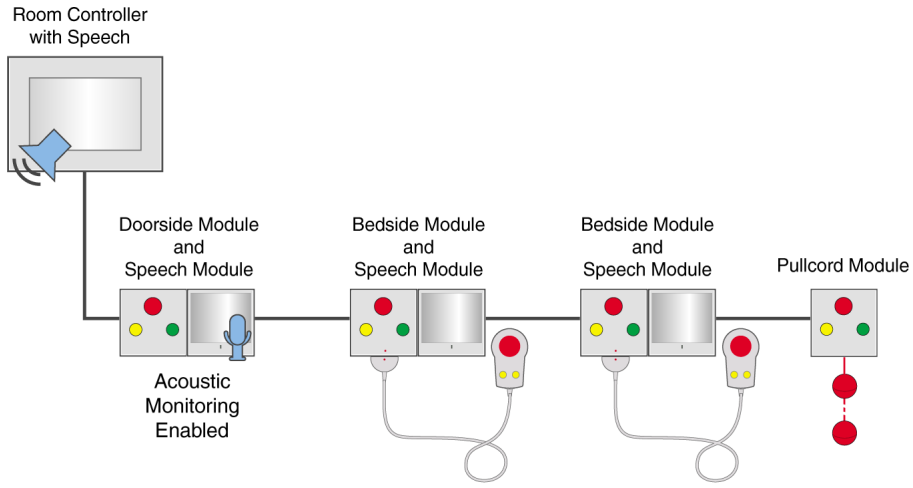

Figure 29. Example of a room with speech and acoustic monitoring

6.15 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 resident rooms and staff rooms. It has an EBA polyester film membrane which covers the display and incorporates the buttons, keys and the LEDs.

Figure 30. Room Display

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

6.15.1 System Requirements for the NIRD

- A teleCARE IP System Manager (NISM) is always required.
- An IP 302 is required when speech is included
- Interactive Messaging requires an Unite CM
- A messaging gateway is required to include messaging devices other than the NIRD

6.15.2 General

The NIRD is an Ascom messaging device using Interactive Messaging (IM), in the same way as the Ascom phones.

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

The LCD screen measures 2 1/2 x 1 3/8 in. (63mm x 35mm). It displays large, easy to read characters showing calls and the locations of attendants. Above the LCD screen is a three-color LED which illuminates to emphasis the type or category of calls received.

The NIRD LCD display has two states:

- Active = bright (back-lit) when attendant presence is on
- Idle = dim when attendant presence is off

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, is used in combination with contactless smartcards.

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

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.*

6.15.3 Room Display Combined with the Speech Module

The NIRD can be combined with the NISP Speech Module in teleCARE IP systems with speech. (For details of the Speech Module refer to chapter 6.13"Speech Module (NISP)" on page 33.)

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.

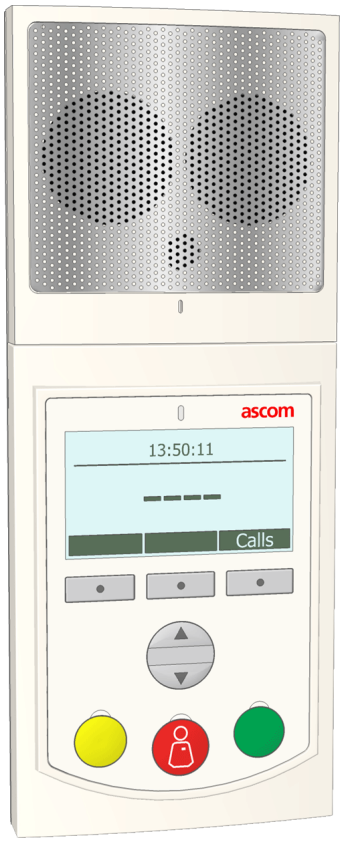

Figure 31. Room display combined with the speech module

6.15.4 Room Display Backplates

There are two backplates which are used exclusively for the NIRD consisting of a short versions for mounting the NIRD as a single module, and as a long version for combining the NIRD with the NISP speech module.

The backplate is not supplied with the NIRD therefore it must be ordered separately.

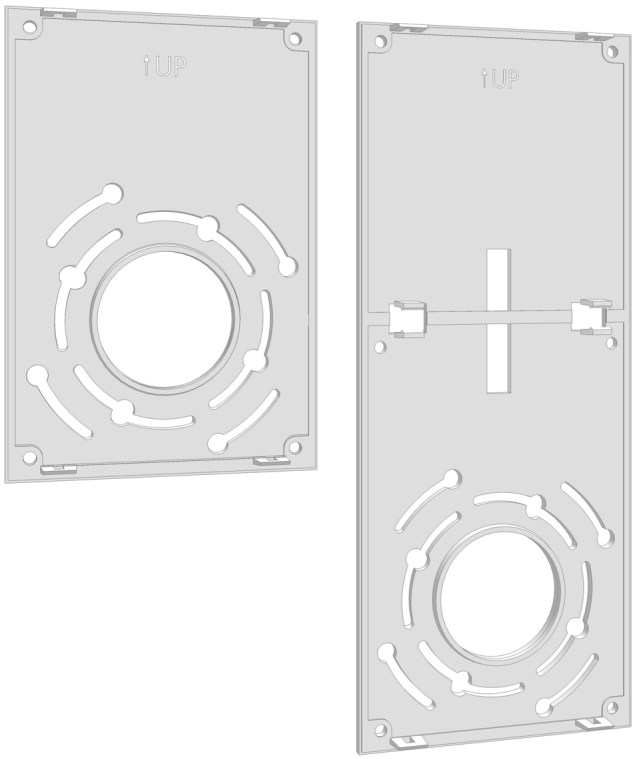

Figure 32. Room display backplates

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

6.16 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.

The television interface module shall be mounted on the supplied surface mounting spacer.

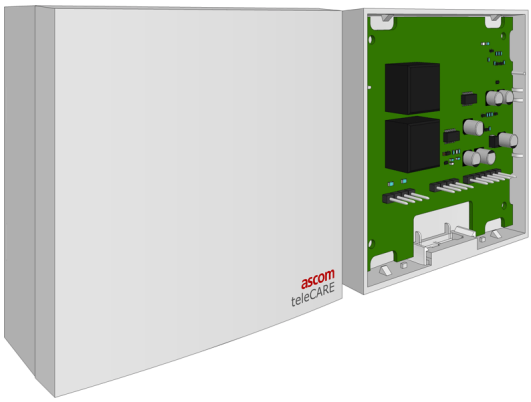

Figure 33. Television interface module: front and back view

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. The output of the television interface module is connected to the "Audio" connector of the NIBM2 bedside module.

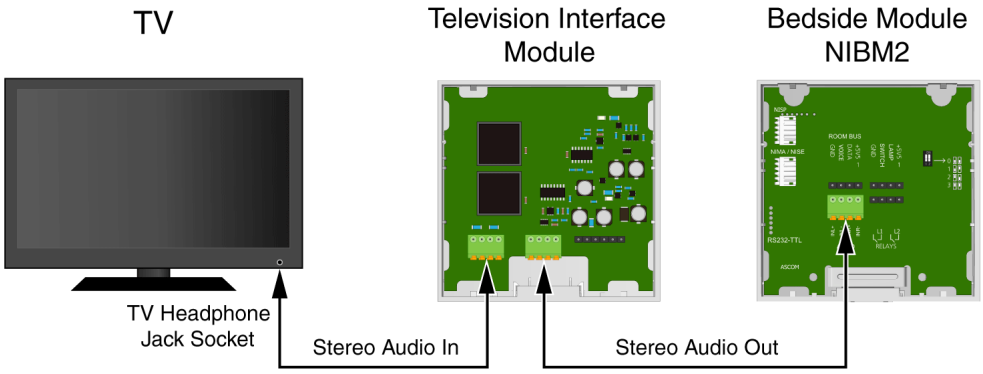

Figure 34. Television audio connections

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

6.17 Sunblind Control Module

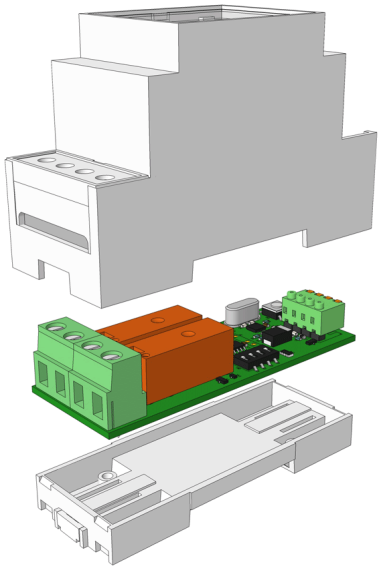

Figure 35. Sunblind Control Module

The Sunblind Control Module is a passive device on the teleCARE IP room bus. It is used in combination with the NIPH3-A7A and NIPH3-AES handsets, in combination with the bedside module NIBM2 and the medical rail socket NIMS2, to raise or lower sunblinds.

The sunblind control module includes two heavy duty relays, with normally open contacts, to control sunblind up and down motors. The maximum current through the relay contacts is 5 Amps. The sunblind control module prevents the up and down activation of the sunblind motor at the same time.

The sunblind control module provides galvanic isolation between the teleCARE system and the sunblind motor electrical supply.

The sunblind control module must be connected to the same room bus as the bedside module (or medical rail socket) and handset which require sunblind control capability.

The sunblind control module can be connected to one or two room buses from the same room controller. It only responds to the room bus addresses 0 to 3 of the connected room buses. Numerous sunblind control modules can be combined to control one sunblind motor.

On the circuit board of the sunblind control module there are two green LEDs which continuously flash when the module is correctly connected to the room bus and ready for use. Also on the circuit board there are two red LEDs, one for each relay. The red LED comes on when the corresponding sunblind up or down button on the handset is pressed.

The sunblind control module has two DIP switches which are used to prevent the sunblind control module from responding to specific room bus addresses.

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

7 External Inputs

7.1 General

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 an NICB and how it fits in with the system.

7.2 Switch modules compatible with NICB

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

The compatible switch modules are:

- Bed Module (NIBM2) and Pull Cord Module - Active (NIPC-XXA)
- Door Side Module (NIDM) and Toile Cancel Module (NITC-XXA) - - normally open (N.O.) contacts only
- Room Display (NIRD)

Note: *The NICB can handle two inputs independently. The NIBM2 and the NIPC-XXA can only use one of these inputs.*

7.3 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 Module (NIMS2)" (details on page 30)
- "Duty Selector (NIDS)" (details on page 31)
- "Card Reader Module (NICR)" (details on page 32)
- "NIFX Fixed Transceiver" (details on page 65)
- "NITX Mobile transceiver" (details on page 66)

7.4 Connection Board (NICB)

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

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

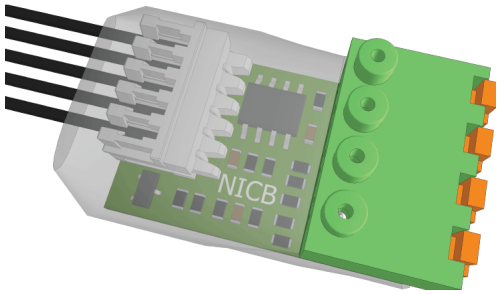

Figure 36. Connection Board (NICB)

The connection board supports up to two external inputs. These inputs are normally open (N.O.) or normally closed (N.C.) dry relay contacts.

7.4.1 External Contacts

The external contacts must be normally open (N.O.) or normally closed (N.C.) dry relay contacts.

Examples of external contacts:

- Door contacts
- Window contacts
- Passive Infra Red (PIR) detectors
- Floor sensors
- Adaptive switches
- Puff switches
- Smoke detectors

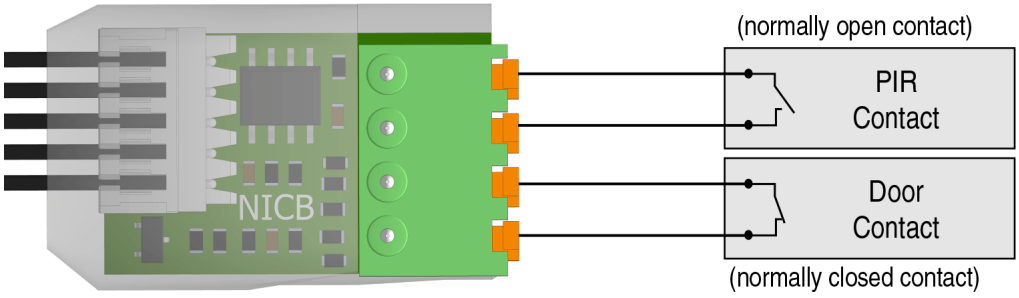

Figure 37. Connection Board (NICB) with external contacts

7.4.2 Connection designation

The pin designation of the NICB is shown below.

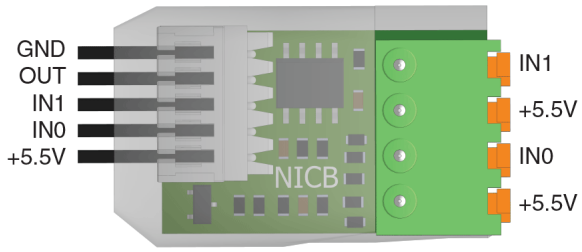

Figure 38. Connector pin designation.

7.4.3 Configurable parameters

The configuration manager (NISM2) is used to configure the functionality of the inputs. The inputs can be configured independent from each other. The following parameters are configurable:

- Jitter suppression:

  Input fluctuations of contacts that open and close within a given time period generate one signal. This can be used for PIR detectors that do not filter the movement signals. Or it can be used to filter movements in the bed on bed sensors.

- Delay time:

  When the input is still present after the given time generates a signal. This is used to prevent transient inputs to generate a signal.

- Duration time:

  After the input deactivates, the signal is extended. This can be used to extend a (door) button press to generate a longer (door bell) signal.

- Name/description of the notification

7.4.4 System limitations

The Configuration Manager (NISM2) supports up to 4 inputs per room (location).

The Configuration Manager supports Resident Profiles. A Resident Profile defines what sensors and parameters are used. This simplifies the configuration process for a system. Up to 16 Resident Profiles can be defined.

7.5 Fixed external input switch modules

The NIBM2 and NIPC-xxA switch modules are capable of handling one external input, using IN0/+V of the NICB. The second input cannot be used and must remain open. These switch modules detect the NICB by the inactive IN1 contact. If IN1 is used, these switch modules will not recognize the NICB correctly and the software will interpret this as if the NISE (socket extension module) is present.

The NIDM, NITC-xxA, and NIRD switch modules are capable of handling two external inputs. The inputs can be configured independently.

7.5.1 Fixed external inputs example

In the following example, a room has several fixed external inputs. These inputs are:

- A bed mat sensor to detect that a person is in or out of the bed. This contact is connected to IN0 and +V of the NICB, which is connected to the NIBM2.
- A door contact to detect that the door is open or closed. The contact is connected to IN1 and +V of the NICB, which is connected to the NIDM.
- A Passive Infra Red (PIR) detector for movements within the field of the sensor. The contact is connected to IN0 and +V of the NICB, which is connected to the NIDM.

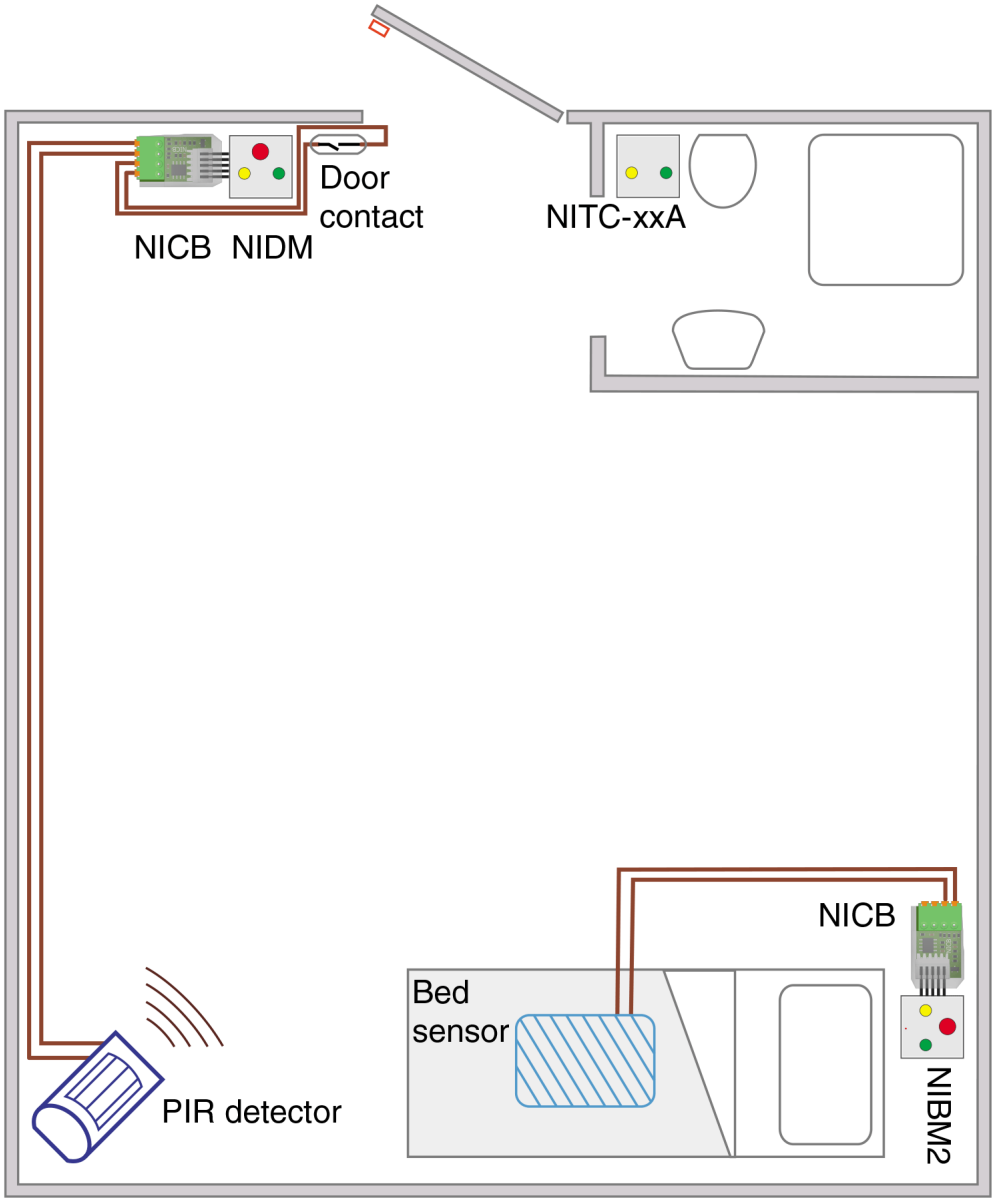

Figure 39. Room with several fixed external inputs.

8 Handsets

8.1 Handset NIPH2 and NIPH3

The NIPH2 and NIPH3 handsets are suitable for use in the teleCARE IP system.

The tables below give an overview of the NIPH2 and NIPH3 handset features and the backward compatibility of the each model of handset.

Handset Features

	NIPH2-A1A	NIPH2-A3A	NIPH2-A3L	NIPH3-A7A	NIPH3-AES
Call Button	•	•	•	•	•
2 Light Buttons		•	•	•	•
Service Call				•	•
Flashlight				•	•
Sunblind Control				•	•
TV and Radio					•
Speech					•

8.1.1 Handset NIPH2

The NIPH2 handsets are suitable for use in the teleCARE IP system and can be used with all teleCARE IP bedside module (NIBM2) and the medical rail socket (NIMS2).

The available accessories consist of a linen clip, which fixes to the handset cable, and a parking bracket which can be fixed to a wall or other convenient location.

Figure 40. NIPH2 Handsets

The NIPH2 has a white body with a large red backlit call button with call reassurance LEDs and 3 raised dots to aid identification for the visually impaired.

NIPH2-A1A and NIPH2-A3A Features:

- The NIPH2-AIA has only a call button.
- The NIPH2-A3A has a call button and two light switching buttons.
- The NIPH2 has a teleCARE Safe Release plug and a flexible connection cable. The cable length for the NIPH2-A1A and NIPH2-A3A is 8 ft. (2.5m), for the NIPH2-A3L it is 10ft. (6m).
- Rated IP67 waterproof with a silicone membrane over the face of the handset which is easily wiped clean.

8.1.2 Handset NIPH3-A7A

The NIPH3-A7A handset is designed for use in the teleCARE IP system.

Figure 41. NIPH3-A7A Handset

In teleCARE IP the NIPH3-A7A handset requires the bedside module NIBM2 or medical rail socket NIMS2.

NIPH3-A7A Features:

- A call button with reassurance light and 3 raised dots to aid identification for the visually impaired.
- Two light switching buttons which are permanently backlit.
- A service call button with a reassurance light.
- A flashlight button which operates a bright LED in the top of the handset.
- Two sunblind control buttons which work with the NISB sunblind interface module to raise and lower the sunblinds.
- An integrated RFID tag which can be used to aid handset inventorying and sterilization routines.
- A teleCARE Safe Release plug and a flexible cable of length 8 ft.
- Rated IP67 waterproof with a silicone membrane over the face of the handset which is easily wiped clean.

8.1.3 Handset NIPH3-AES

The NIPH3-AES handset with speech and entertainment is designed for use in the teleCARE IP and teleCARE M systems. In teleCARE M it is fully compatible with the previous generation of teleCARE M speech and entertainment handsets.

In teleCARE IP the NIPH3-A7A and NIPH-AES handsets requires the bedside module NIBM2 or medical rail socket NIMS2.

Figure 42. NIPH3-AES Handset

The TV and radio sound is broadcast through the built-in speaker of the handset, or through head-phones plugged into the jack socket on the handset cable.

The available accessories consist of a linen clip, which fixes to the handset cable, and a parking bracket which can be fixed to a wall or other convenient location.

NIPH3-AES Features:

- A call button with reassurance light and 3 raised dots to aid identification for the visually impaired
- A speaker and microphone for support of speech.
- Two light switching buttons which are permanently backlit.
- A service call button with a reassurance light.
- A flashlight button which operates a bright LED in the top of the handset.
- Two sunblind control buttons which work with the NISB sunblind interface module to raise and lower the sunblinds.
- An FM radio receiver with 8 preset or scanned channels. The cable of the handset serves as the antenna for the radio.

- An infrared television controller and support of 8 preset TV protocols which can be changed to suit requirements.

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.*

- Channel up and down buttons for controlling the TV and radio.
- Volume up and down buttons for TV and radio.
- TV select button.
- Radio select button.
- Off button for TV and radio.
- An integrated RFID tag which can be used to aid handset inventorying and sterilization routines.
- A teleCARE Safe Release plug and a flexible cable of length 8 ft.
- Rated IP65 waterproof with a silicone membrane over the face of the handset which is easily wiped clean.

9 teleCARE IP with Wireless Functionality

9.1 General

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

teleCARE IP is able to support wireless functionality through the NICR3 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 52

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 See "Wireless Infrastructure" on page 54..

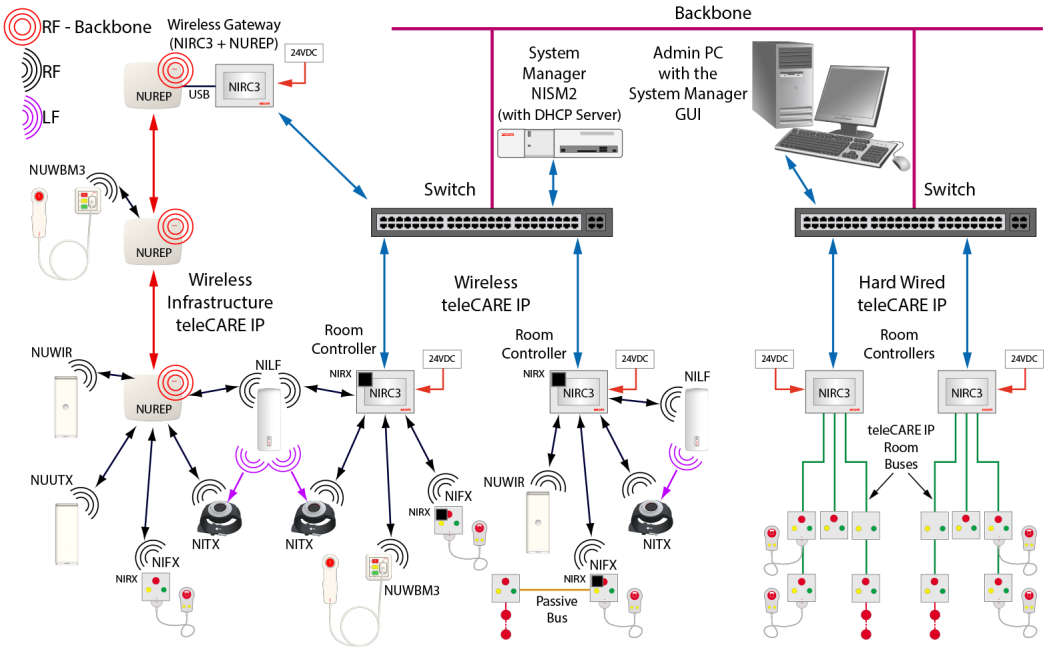

Figure 43. Wireless teleCARE IP and hard-wired teleCARE IP

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

The wireless bedside module (NUWBM3) is a customizable three-button wall mounted switch module. It comes with an Ascom SafeConnect socket used for the connection of the bedside handset. It contains a 916 to 921 MHz transceiver. The wireless bedside module can be powered by two AA disposable alkaline batteries, or connected to an external 5VDC power supply. "NUWBM3 Wireless Active Bedside Module" on page 62.

The universal transceiver module (NUUTX) is designed to be mounted on walls or onto window/door posts. It contains a 916 to 921 MHz transceiver, two inputs for the connection of external contacts and a magnetic window/door alarm detector. The NUUTX universal transceiver is powered by two AA disposable alkaline batteries. "NUUTX Universal Transceiver" on page 70.

The wireless passive infrared module (NUWIR) is a motion detector designed to be mounted on walls. It contains a 916 to 921 MHz transceiver and a passive infrared sensor with a range of approximately 6 meters / 20 feet with a two level selectable sensitivity. The NUWIR

wireless passive infrared module is powered by two AA disposable alkaline batteries. “NUWIR Wireless PIR Module” on page 71.

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 resident handset or equipped with a pull-cord. Both variants of the NIFX include a 125 kHz LF receiver and an NIRX 916 MHz to 921 MHz Class 1 transceiver which is piggy-back mounted on the circuit board of the NIFX. The NIFX can be powered by two AA disposable alkaline batteries, or by an external 24V DC power supply. “NIFX Fixed Transceiver” on page 65.

The NITX mobile call transceiver can be attached to a wrist strap, or to a neck pendant. The NITX is powered by an internal three volt replaceable lithium battery. It includes a 916 MHz to 921 MHz transceiver and a 125 kHz LF receiver for receiving the location update information from LF beacons. “NITX Mobile transceiver” on page 66

The NILF low frequency beacon includes a 125 kHz transmitter and can be extended with the piggy-back mounted NIRX 916 MHz to 921 MHz transceiver. The LF Beacon NILF is contained in a white plastic enclosure with a slim design that is suitable for surface mounting on walls or at a door post. The NILF can be powered by three C size disposable alkaline batteries, or connected to an external 24V DC power supply. “NILF Low Frequency Beacon” on page 72.

9.2 Principle of the teleCARE IP with Wireless Functionality

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

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

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

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

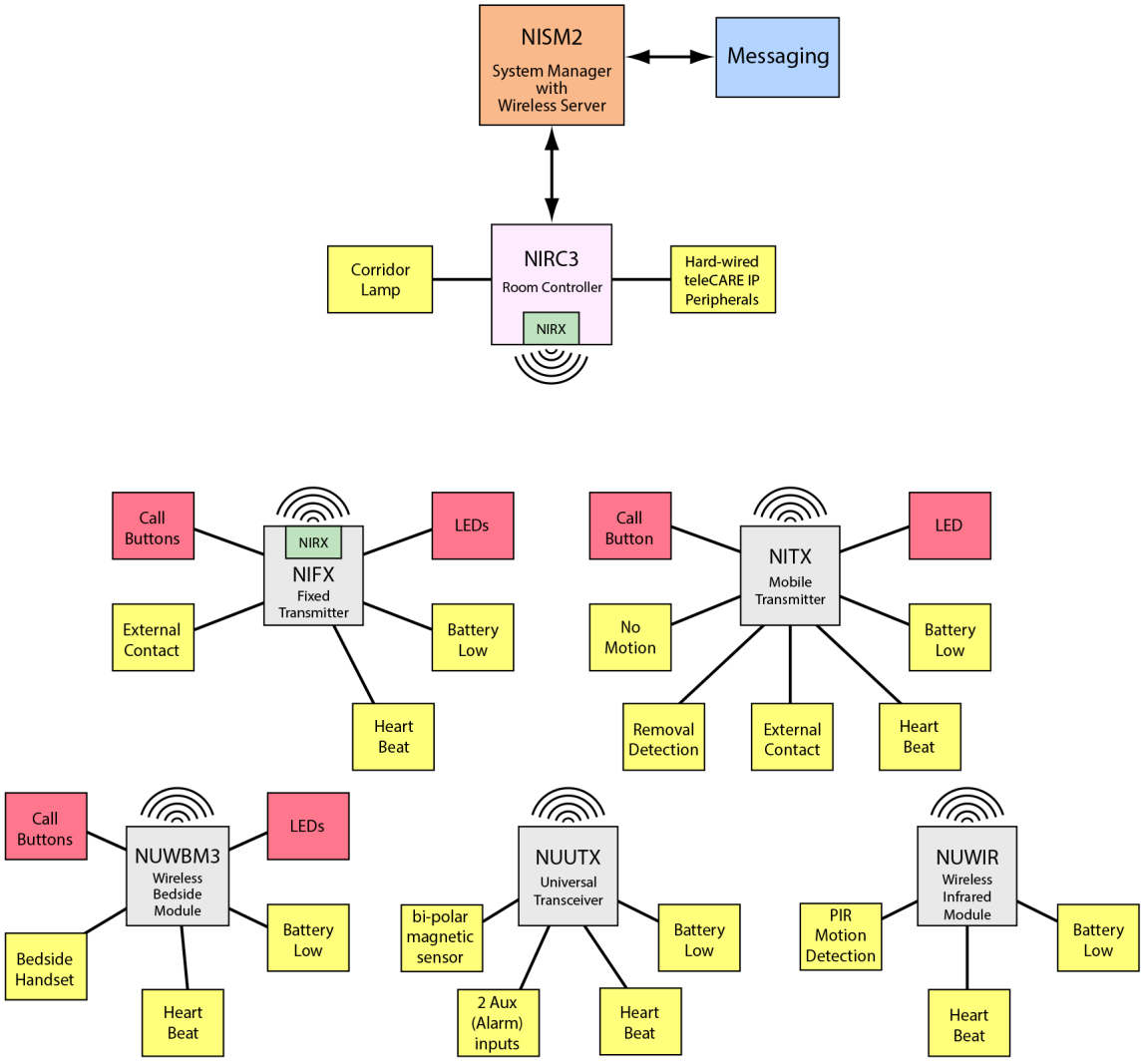

Figure 44. Principle diagram of teleCARE IP with wireless functionality

9.2.1 Location Based teleCARE IP Wireless Using LF Beacons

The addition of the NILF low frequency beacons gives location based wireless functionality available including wander management. 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.

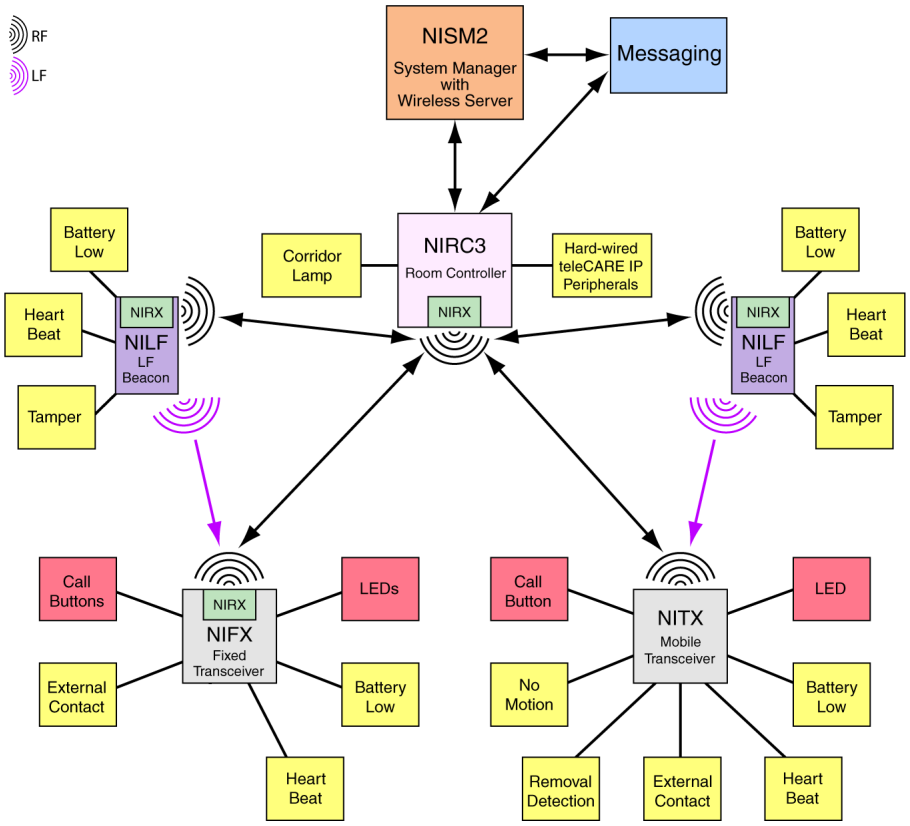

Figure 45. Location based wireless functionality

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

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

9.3 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.*

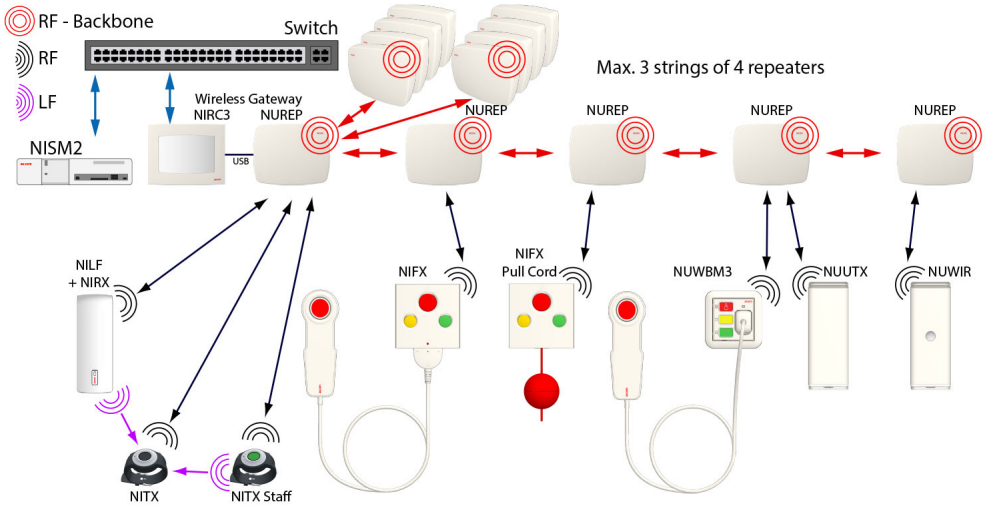

Figure 46. Full wireless infrastructure example

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

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

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

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

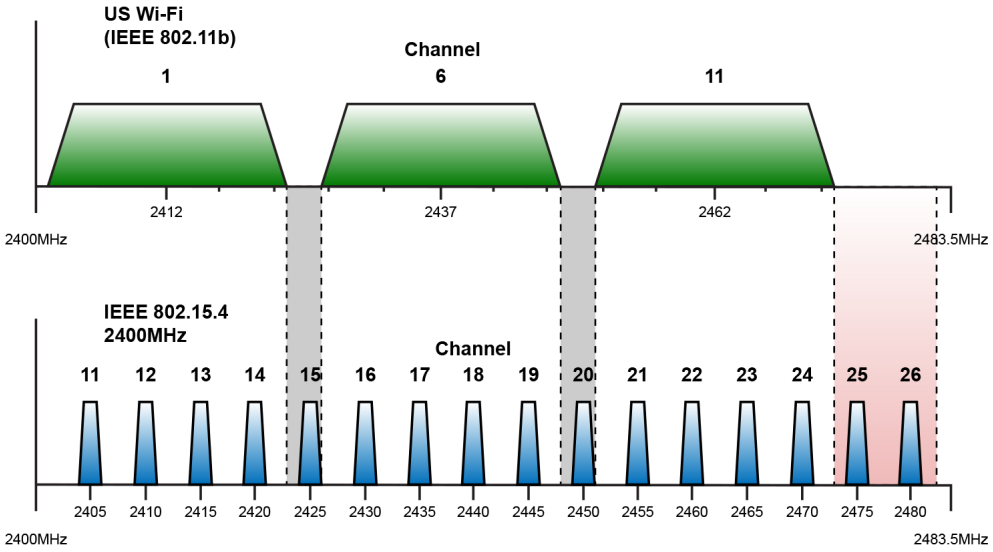

Figure 47. IEEE 802.15.4 versus 802.11 (Wi-Fi)

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.

9.4 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.

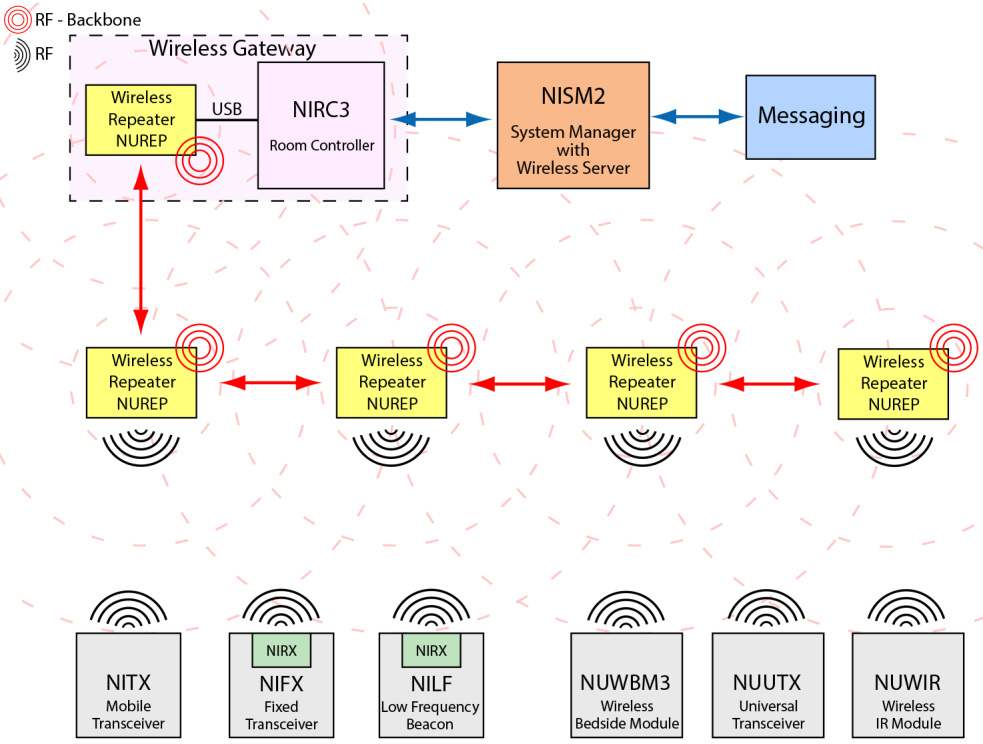

Figure 48. Wireless infrastructure principle

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.*

9.5 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 Emergency Call System Configuration Manual TD 93019US 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.

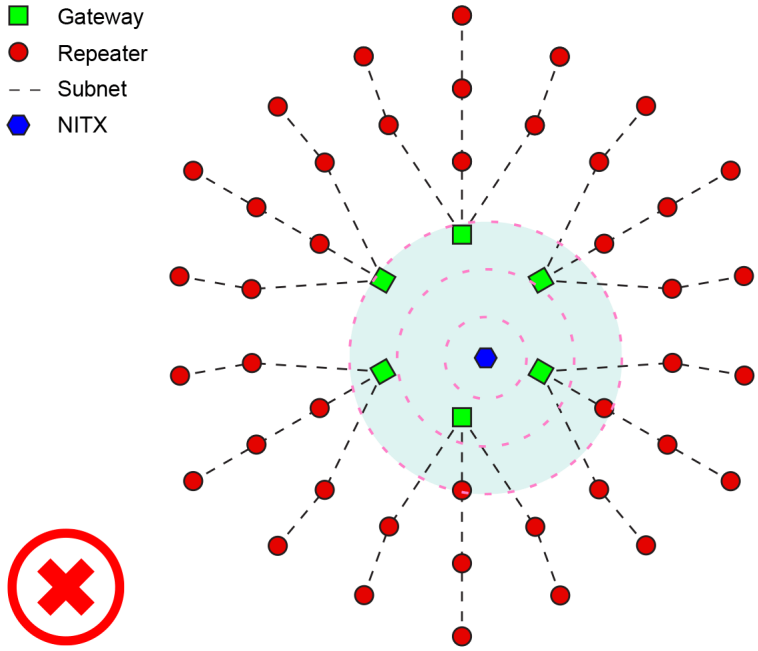

Figure 49. Wireless gateways mounted too close to each other

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.

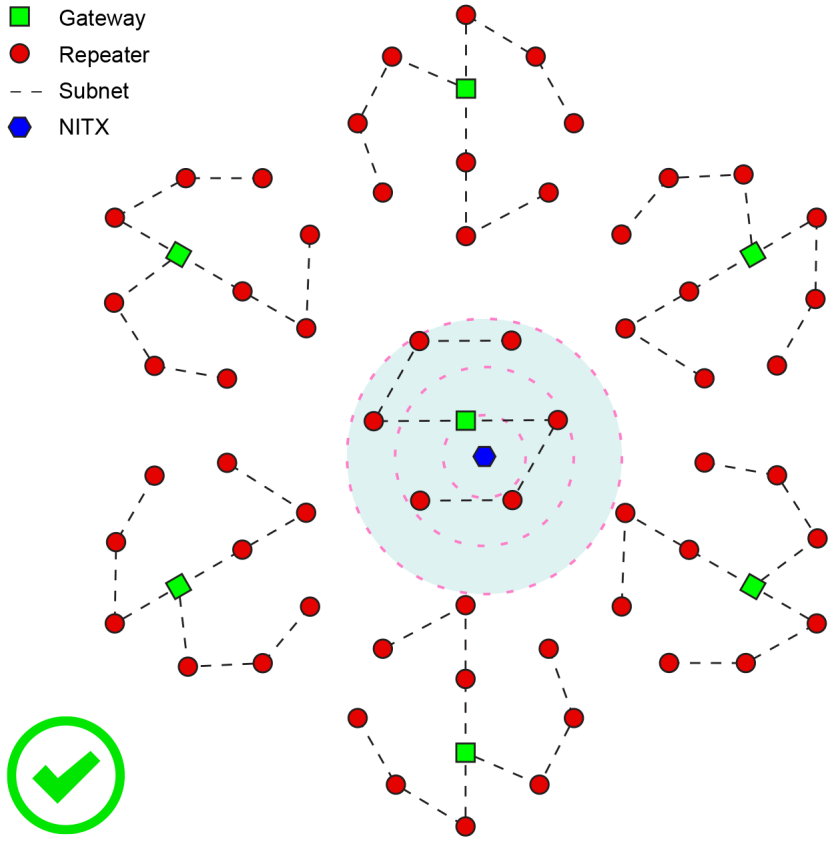

Figure 50. Correctly mounted wireless gateway segments

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.

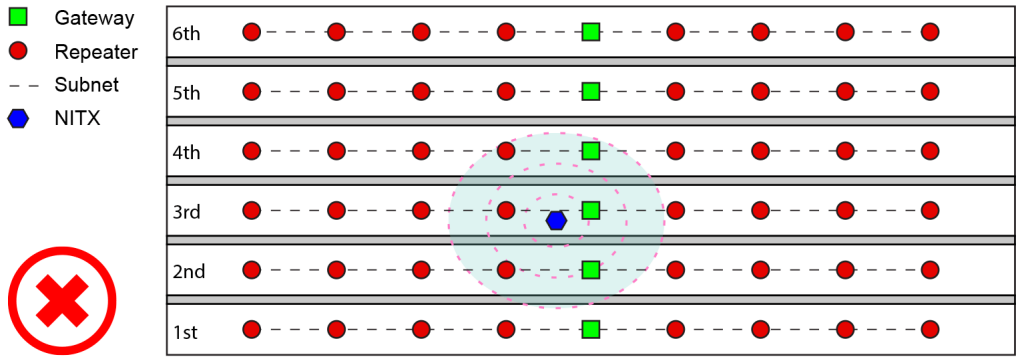

Figure 51. Wireless gateways sections mounted too close to each other

Spreading the repeaters connected to a single gateway across multiple floors will result in less traffic being forwarded towards the wireless server.

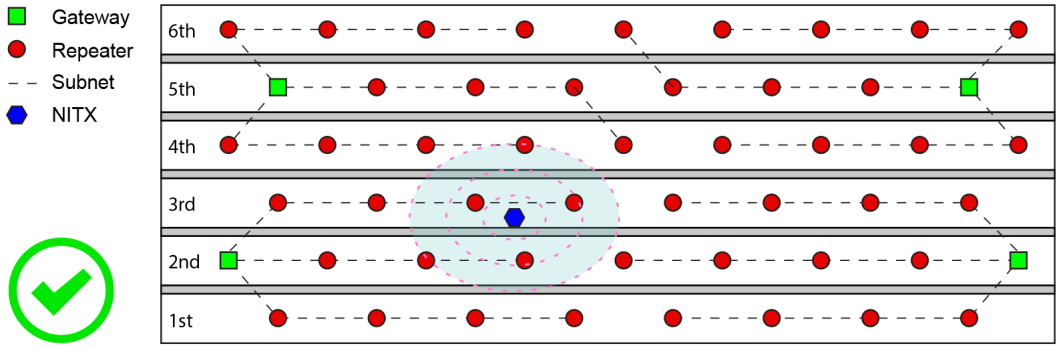

Figure 52. Correctly mounted wireless gateway segments

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.*

9.6 teleCARE IP Wireless Components

9.6.1 NUREP Wireless Repeater

The wireless repeater (NUREP) is a surface (wall) mounted teleCARE IP wireless infrastructure building-block. 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.

Wireless repeaters are dual RF transceivers. One RF transceiver (916 to 921 MHz) is used for the local traffic, events from the resident pendant, wrist transceiver or the fixed wireless modules in the room. A 2.4 GHz IEEE 802.15.4 transceiver (supporting channels 15, 16, 20, 21 and 25) is used for transmitting the events to the other wireless repeaters, thereby creating a wireless backbone that is capable of handling high traffic.

Wireless repeaters are used to create a wireless infrastructure that covers the whole site. Wireless repeaters are mainly used indoors, however when using a suitable weatherproof enclosure that meets local electrical code, outdoor use is possible.

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.

Wireless repeaters are DC-powered via a 5 VDC Class II power adapter that comes included with the repeater. Wireless repeaters also have a battery backup source providing power for approximately three days, in case of mains power failure.

Figure 53. Wireless Repeater - NUREP

9.6.2 Wireless Gateway

The wireless gateway, consisting of a combination of the 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 54. 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).

9.6.3 NUWBM3 Wireless Active Bedside Module

The wireless bedside module (NUWBM3-HU) is a wall mounted teleCARE IP wireless peripheral containing a 916 - 921 MHz RF transceiver. It comes with a spacer and installation kit for surface mounting.

The NUWBM3 has 3 customizable function buttons with configurable color button inserts and a magnetic SafeConnect socket. Each button has a customizable color-matching LED that lights up when pressed, for reassurance. When an (optional) 5 VDC power supply is used the LEDs are permanently back-lit for easy location in the dark. Based on the chosen configuration the buttons can activate a normal, assistance, emergency call and a staff presence.

The wireless bedside module includes a SafeConnect socket for the connection of the NUHS1B (one-button) handset. A handset connected status LED lights up for a couple of seconds to indicate that the handset is properly connected. When the bedside handset is disconnected, a disconnect alarm is generated to inform the staff.

Note: *3, 7 and 14 button handsets are not supported.*

The wireless bedside module requires 2 x 1.5V AA Alkaline batteries (not included). An automatic low battery warning is transmitted if the battery voltage falls below 2.4V. Under normal circumstances the battery life is approximately two years. Alternatively, a 5 VDC Class II power adapter (UL approved) can be used. When battery powered the LEDs stay active for a period of 36 seconds after a call has been made. When externally powered the LEDs stay active until the call has been cancelled.

The wireless bedside module is suitable for use in senior care homes and other healthcare facilities.

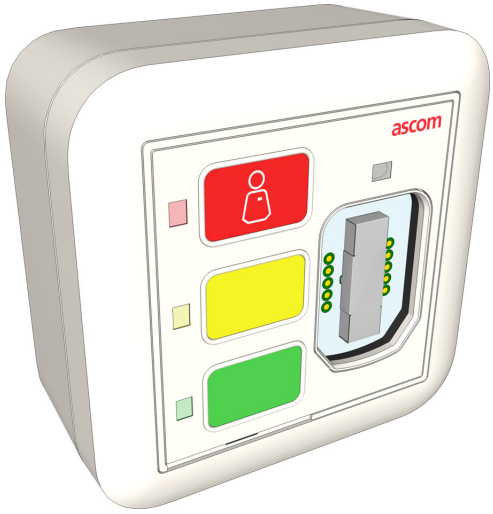

Figure 55. NUWBM3

9.6.4 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 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.

The NIRX has a 916 MHz to 921 MHz transceiver and each NIRX has a unique identity (ID) which is transmitted with every event.

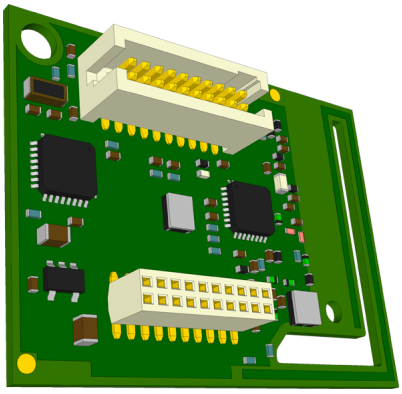

Figure 56. NIRX transceiver

The Location of the NIRX on the NIRC3

The piggyback mounting the NIRX on the NIRC3 room controller to enable wireless functionality.

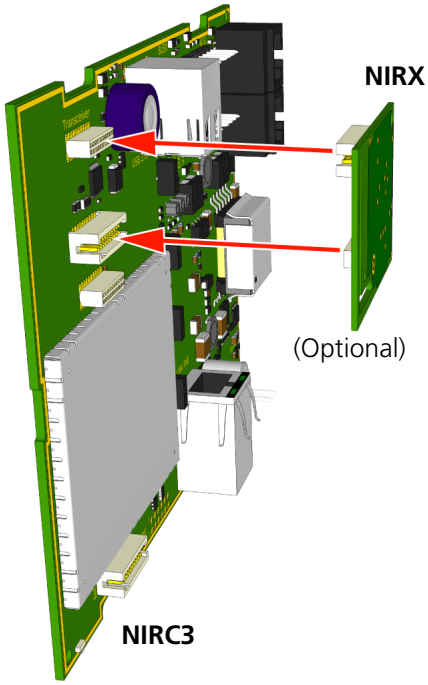

Figure 57. The location of the NIRX transceiver on the NIRC3 and NIFX

The Location of the NIRX on the NITX

The piggyback mounting the NIRX on the NIFX room controller enables wireless functionality.

Note: *The NIFX is delivered with an NIRX mounted from the factory.*

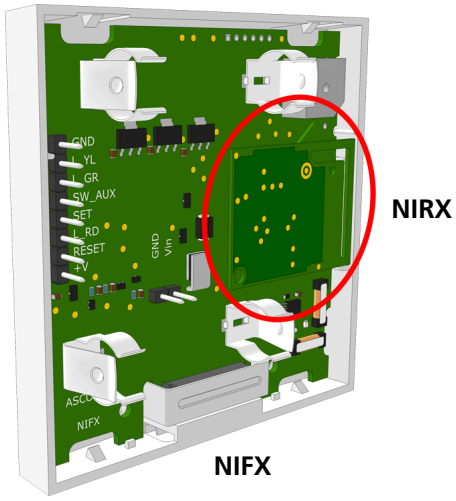

Figure 58. The Location of the NIRX on the NITX

Mounting the NIRX on the NILF

If monitoring the LF beacon (NILF) through an RF heartbeat signal is required then the NIRX must be mounted on the NILF circuit board. The NIRX can also send an alarm upon front cover removal detection (tamper alarm) or to send a low battery alarm.

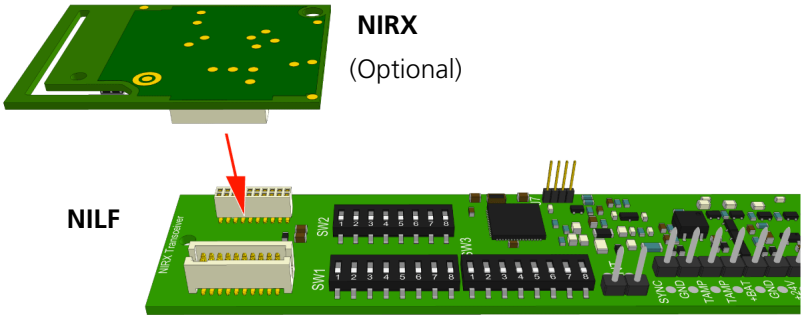

Figure 59. Piggyback mounting the NIRX module on the NILF

9.6.5 NIFX Fixed Transceiver

The NIFX series fixed transceiver is a wireless teleCARE IP switch module which is available as socket module or pull cord module. It has 3 function buttons, a white plastic body and includes a spacer for surface mounting. The pull cord version includes the cord with two red balls but no socket. It is capable of functioning as a stand-alone fixed transceiver or in combination with standard hard-wired teleCARE IP switch modules when external power supply is used.

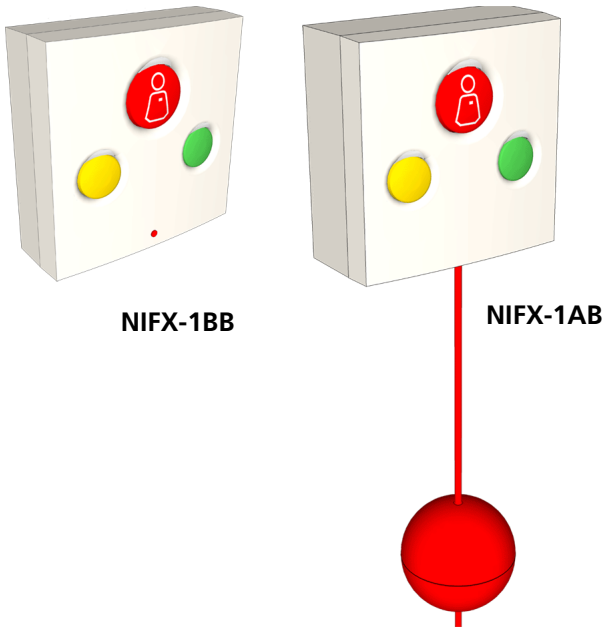

Figure 60. NIFX wireless switch module and pull-cord module

Every fixed transceiver requires an NIRX transceiver which is piggyback mounted on the NIFX board. Each NIRX has a unique identity (ID) and this ID is transmitted with every event from the fixed transceiver.

The fixed transceiver requires 2 x 1.5V AA disposable batteries. An automatic low power warning is transmitted by the fixed transceiver if the battery voltage falls below an acceptable level of 2.4V.

The battery voltage is continually monitored and if low voltage is detected a “low battery” alarm is transmitted as part of the heartbeat transmission of the unit. Under normal circumstances the battery life is approximately one year.

The fixed transceiver sends a “Heartbeat” signal at 4 minute intervals. If the wireless server does not receive the heartbeat signal within a predetermined period then it is assumed that the transceiver has failed or is missing and an alarm will be automatically generated.

The fixed transceiver includes 1 red button, 1 yellow button, 1 green button and 1 pull cord switch. The buttons can activate a normal, assistance, emergency call and a staff presence.

The pull cord version generates a bathroom call and is supplied with a permanently attached 50mm length of pull cord. The pull cord is supplied as a kit consisting of a 2m length of red plastic covered nylon cord and two red balls.

The pull cord balls are designed so that the two halves of the ball break apart if the cord is pulled with excessive force. This prevents injury and damage to the switch. The two halves of the ball can be simply snapped back together.