

# KT-NCS

## OPERATOR'S MANUAL

### Smart Nurse Call System



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This guide describes all features and functions of Wireless Nurse Call system product of Kahroba Tarasheh Company ( ISO 9001/13485 certified by the IQ-NET member certification body ( C.B.) CISQ/IMQ which is accredited by International Accreditation Forum (IAF) member Accredia ) under the brand “KT-NCS”.

Your Nurse Call System is highly customizable and may not have some of the features given in this manual.

## Manual Purpose:

This manual provides the instructions necessary to operate Kahroba Tarasheh Wireless Nurse Call System in accordance with its intended use. It also describes all parameters and options that your system may have depending on the way it has been customized.

Study of this manual is a prerequisite for proper operation and ensures patient and operator safety. If you have any question about the Wireless Nurse Call System, please contact our customer service. This manual is an essential part of the system and should always be kept close to it to be used whenever necessary.

## Intended Audience:

This manual is provided for facility staff members and the patients. The users of this manual are expected to have working knowledge of simple button-based devices and English language.

## Product Lifetime:

Since electric parts have lifetime of 10 years and recommended maintenance interval of the device is 1 year and its mandatory maintenance interval is 2 years, the expected lifetime of the device is 10 years.

## Version Information:

This manual has a version number. The version number changes whenever the manual is updated due to software or technical specification changes. The version information of this manual is as follows.

Release Date	June 2023
Version Number	SMART-NCS-user-ver-02

## Explanations of the used expressions in this Manual



A **WARNING** symbol advises against certain actions or situations that could result in personal injury or equipment damage.



A **NOTE** symbol provides useful information and recommendations about device function.

## Explanation of Symbols used on modules

• This symbol means that consult user manual of the system and pay attention to the warnings and cautions.	• This symbol indicates that the equipment shall be disposed of in an environmentally friendly manner.	• Risk of Electric Shock	100-240 V AC 0.4 A 50/60 Hz	• AC POWER SUPPLY	• Protection fast fuse	S/N	• Serial number

## Patient Safety:

KT-NCS Nurse Call Systems are designed to comply with the international safety standard requirements for medical electrical equipment with UMDNS code 15614.

KT-NCS Wireless Nurse Call System is categorized as “ Low Risk” or “Type I “ ( EU, Canada, USA) or “ Type A” ( CHTF) device in IAF Medical Devices Risk Classification.

KT-NCS Wireless Nurse Call System is in Compliance with IEC 60601-1 standard ( Basic safety and essential performance requirements of medical electrical equipment).

### According to IEC 60601-1 standard:

- KT-NCS Wireless Nurse Call System is evaluated as “Type II” in Electric Shock criteria and Type “B” in safety of applied parts as there is no floating contact to the patient.
- Operation in Oxygen-rich and in the vicinity of flammable anesthetics for KT-NCS Wireless Nurse Call System is considered as Not Applicable.
- The sterilization of KT-NCS Wireless Nurse Call System modules can be done using Gamma Ray when applicable.
- KT-NCS Wireless Nurse Call System has “Fixed” installation and “ Permanent” mode of usage and “Continuous” Mode of operation .

KT-NCS Smart Nurse Call System has obtained the product standard IEC 60601-1-2 Certificate ( collateral standard applying to electromagnetic compatibility of medical electrical equipment and medical electrical systems specifying general requirements and tests for electromagnetic compatibility) certified by EPIL company (accredited calibration & testing Laboratory member of International Laboratory Accreditation Cooperation ( ILAC) )

KT-NCS SMART Nurse Call System also has compliance to UL-1069 product standard ( UL Standard for Safety of Hospital Signaling and Nurse Call ) tested by “Behineh Sanjesh Sadra” company accredited by National Accreditation Center of IRAN ( NACI) which is a member of International Accreditation Forum ( IAF).

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**This guide describes all features and functions of Kahroba Tarasheh Company Wireless Nurse Call System under the brand “KT-NCS” .**

**Your Nurse Call System is highly customizable and may not have some of the features given in this manual.**


## 1 INTRODUCTION

### 1.1 GENERAL WARNINGS



Before use, carefully read this manual, directions for use of any accessories, all precautions, and all specifications.



There could be hazard of electrical shock by opening the system casing. Watch for the sign  to avoid risk of electric shock. All servicing and future upgrading to this equipment must be carried out by personnel trained and authorized by manufacturer.



The operator must check that system and accessories function safely and see that it is in proper working condition before being used.



Alarm must be set according to different situations of individual patient. Make sure that audio sounds can be activated when an alarm occurs.



Do not use cellular phone in the vicinity of this equipment. High level of electromagnetic radiation emitted from such devices may result in strong interference with the wireless modules of the wireless NCS performance.



There will be some risks of polluting the environment associated with the disposal of the device and cables at the end of their useful lives. The device and accessories shall be disposed in accordance with national laws after their useful lives. Contact your municipality to check where you can safely dispose of old batteries.



Do not expose the system near any local heating item such as the direct radiation.



To prevent EMC effect on the Nurse Call System, it should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.



If any liquid is spilled on the system or accessories, immediately turn off the system and wipe up it by a soft cloth.



Make sure that cables and accessories are not under tension during operation.

### 1.2 GETTING STARTED

#### ✓ CONNECT THE POWER CABLES

Connection procedure of the AC power line:

- Make sure the AC power supply complies with following specification: 100-240 VAC, 50 / 60Hz
- Plug the power cable to power supply socket of the terminal box module. Connect the other end of the power cable to a grounded power receptacle.





Make sure that the power indicator lights. If it does not light, check your local power supply and power cable connection. If the problem still exists, contact the local After Sale Service.

#### ✓ POWER ON THE TERMINAL BOX

Press POWER key on the Terminal box to power on the system. Please check the red indicators light on the switch to verify if the power is On. After a few seconds the LCD of the staff console module will turn on indicating that the system is powered on.



Check all the functions of modules that may be used and make sure that the system is fully operational.



If any sign of damage is detected, or the system seems not have normal function, do not use it. Contact technical staff in the hospital or local After Sale Service immediately.

## 1.3 GENERAL INFORMATION

### 1.3.1 ENVIRONMENT

Temperature working	5~40° C
Temperature of Transport and Storage	-25 ~60° C
Humidity	20~90 %
Altitude	-200 to 3500m
Power Supply	100-240 VAC 60VA, 50/60 Hz

### 1.3.2 DEFINITION

Nurse Call system is an assembly of electronic devices, integrated within a facility infrastructure and/or wireless network, designed to provide an audio/visual signal to summon help when activated in response to a patient's need for (urgent) assistance. It typically consists of and/or interacts with user- or sensor-activated signal transmitters (e.g., patient-worn pendant, push-buttons, microphones, speakers, fall sensors, smoke alarm, door sensors), a network communicator, and alert communication devices (e.g., server computer, phone, dome lights, audible alarm). The device notifies medical professionals and caregivers and is intended for use in the healthcare facility.

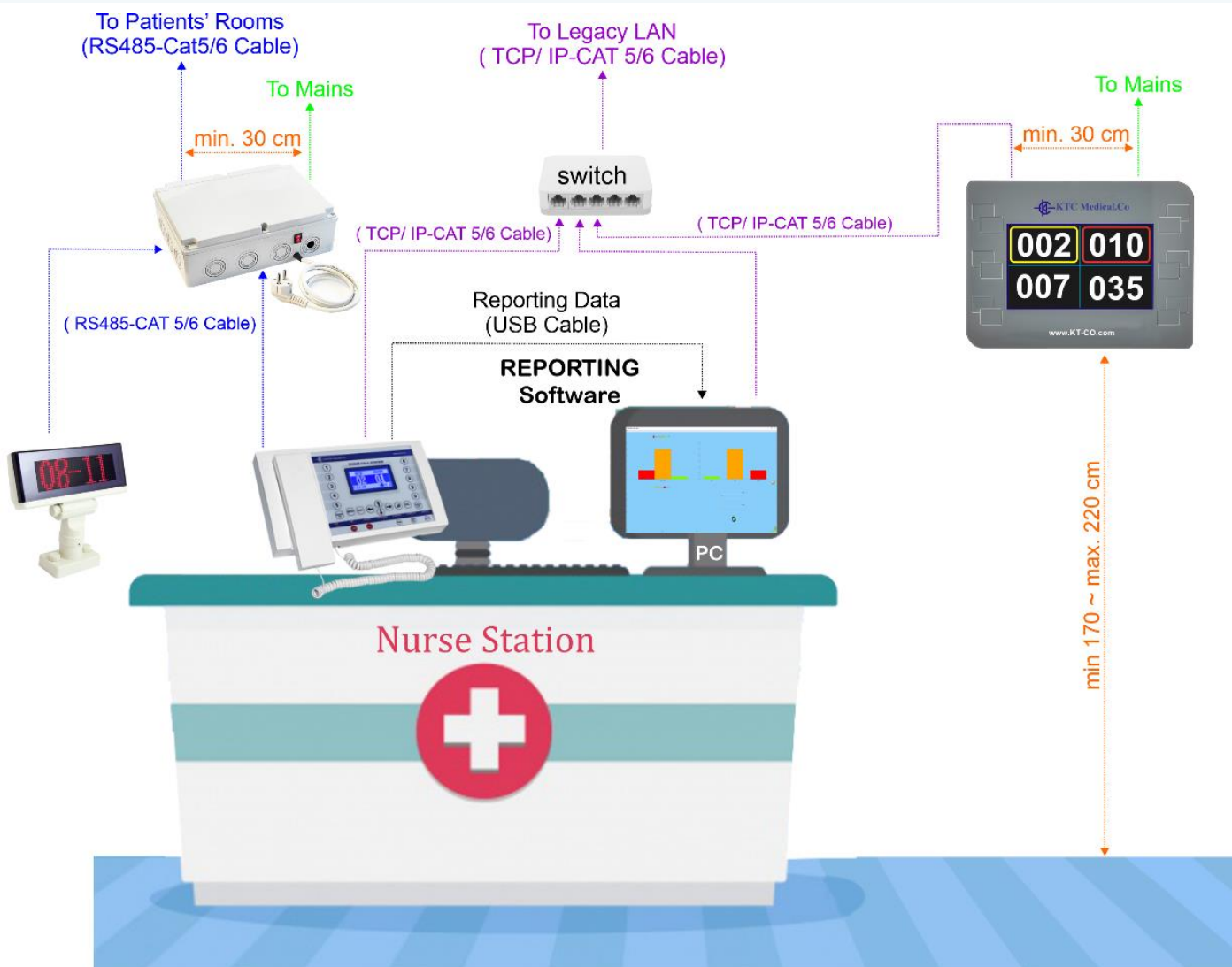
The patient uses the pear-push call switch from his bed or pull-cord switch from the washroom to initiate a call which will be presented on the staff console by vocal and visual annunciation. The staff will have to press the cancel switch at the calling point for deactivation of the initiated call.

### 1.3.3 MAIN FEATURES

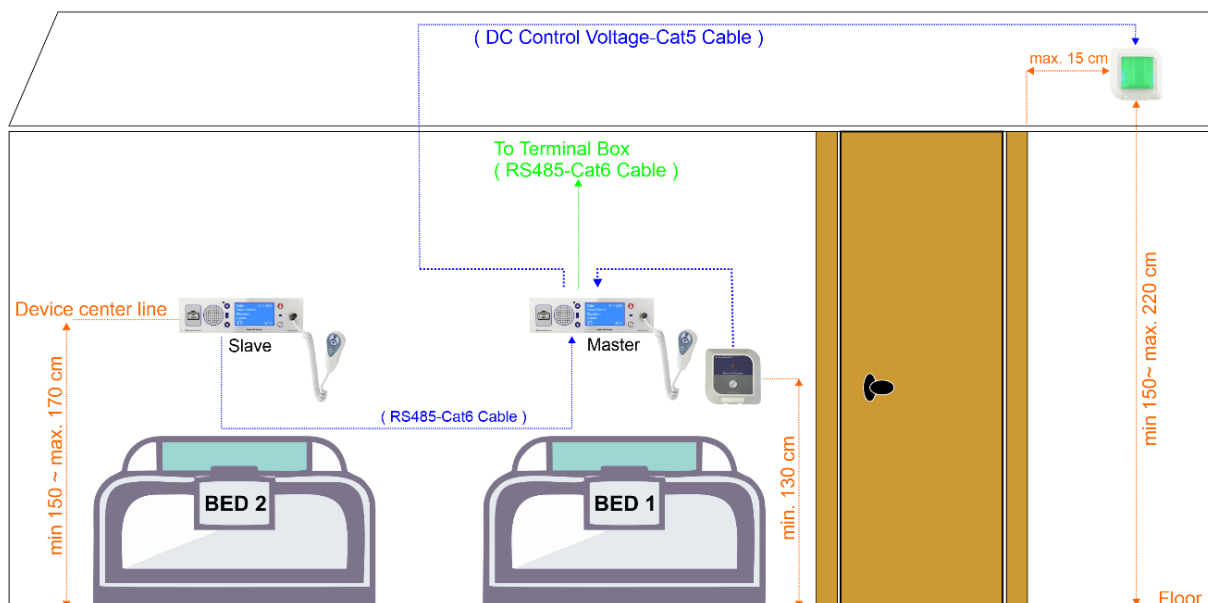
- Patients' Console Work Flow Interaction by the staff
- Patients' Panel Code Initiation Feature by the Staff
- Patients' Panel HIS integration for Patient's Particulars Display
- RFID Feature for Staff Presence
- Two-way full duplex Patient-Staff voice communication b

- Four-level call prioritization
- Maximum 64 calling points support
- Queue management on all 64 calls
- Timed Call Escalation
- Targeted/Collective paging announcement
- Chronological priority for same priority level calls
- IP X5 for washroom switches and IP 54 for pear push switches
- Anti-disinfectant / Washable module compound
- LCD highest-priority call visual alert staff display
- Reassurance LED on Call switches
- Non-volatile memory option for user settings
- Unlimited Local non-volatile storage of the call logs
- Non-Editable call statistics reporting log
- Outlier/Breaching staff tracking
- Not adversely affected by a shorted cord

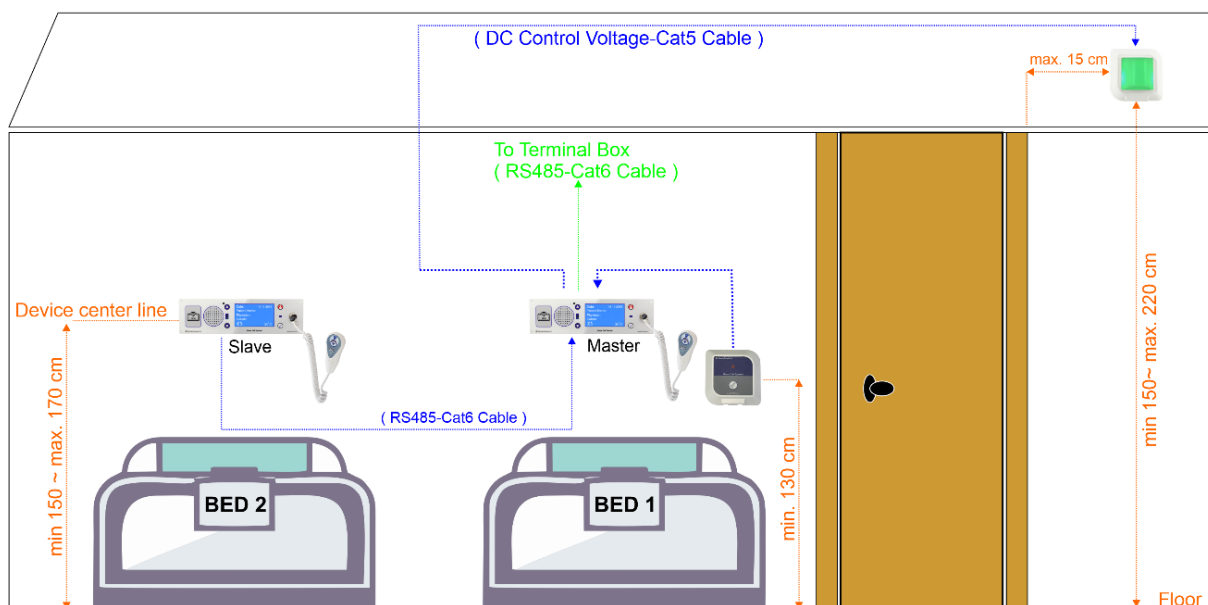
## 1.4 MOUNTING / WIRING / CLEARANCE / LAYOUT



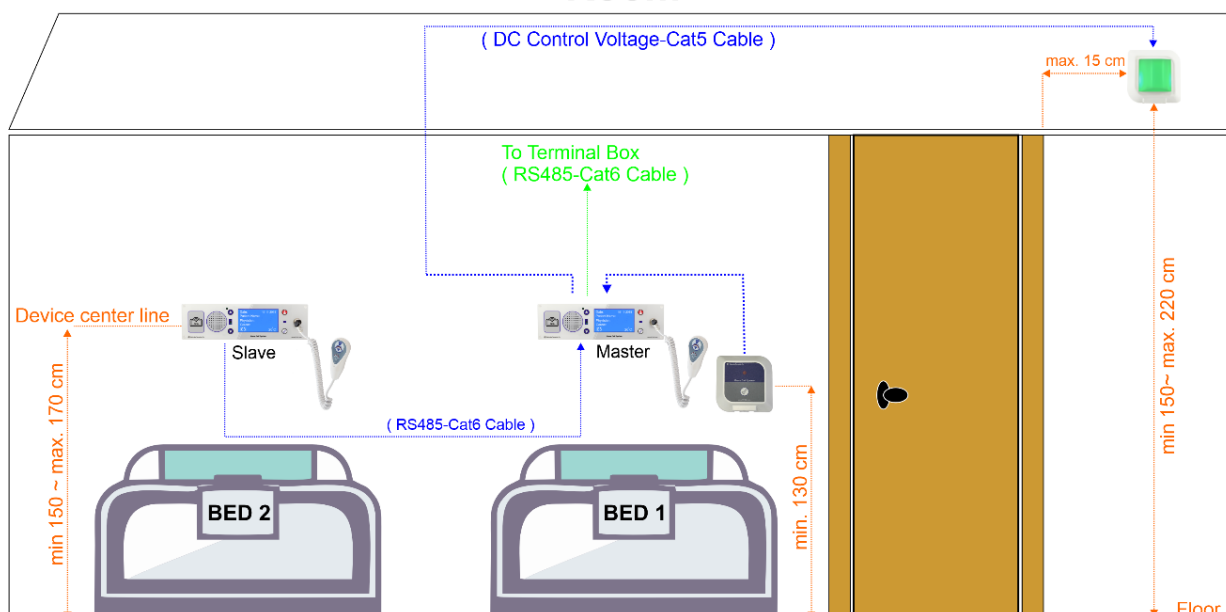
## Room



## Room






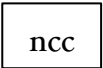





## Room





- Minimum clearance of data cables to the 220 V power cables is 30 cm.
- Minimum vertical clearance of the Pull cord switches from the highest water tap is 20 cm.
- Maximum horizontal clearance of the pulling cord from the toilet seat/shower is 30 cm.
- Maximum clearance of the end of the pulling cord from the bathroom floor is 20 cm.
- Patient call switches clearance from floor is between 150 ~ 170 cm.
- Maximum horizontal clearance for corridor light from the corresponding door is 15 cm.
- Corridor light clearance from the floor is 150 ~ 220 cm.
- Corridor display clearance from the floor is 170 ~ 220 cm.
- The power mains should have emergency power backup ( UPS/Redundant Generator).
- Reporting is done via the legacy LAN of the hospital ( TCP/IP protocol)
- Nurse calling is done via CAT5/6 cables network under RS485 protocol provided by KT-NCS technicians.
- The table below shows the features to be used when making the layout in ACAD.

Nurse Call Related Feature in AutoCAD	
Discipline	Electrical
Designator	EY
Description	Electrical Interior Auxiliary System
Major Group Layer Name	NURS
Minor Group Layer Name	CIRC : Nurse call system circuits
Minor Group Layer Name	CLNG: Nurse call system ceiling
Minor Group Layer Name	CNMB: Nurse call system numbers
Minor Group Layer Name	EQPM: Nurse call system equipment
Minor Group Layer Name	WALL: Nurse call system wall
Pen/Color/Line	3 / Green / Dashed
Patient Nurse Call Panel Symbol	
Emergency Pull Cord Station Symbol	
Nurse Call Annunciator Symbol	
Duty Station Symbol	
Staff Station Symbol	
NCS Central Cabinet Symbol	
Dome Light with Tone Symbol	
Floor Duplex Receptacle Symbol	
Data Outlet Symbol	

## 2 STAFF CONSOLE (CUI-32)

### 2.1 INTRODUCTION

CUI-32 is a desk unit with integral operating elements. It can make Direct Audio Call to each Patient Consoles {BCU-34}. it can also initiate 12 emergency codes by touching the associated programmed icon or by long-pressing 4 dedicated buttons on the console through connection to hospital Emergency /Group Summon System.

The Staff console forwards the unanswered Nurse Calls to the Nurse dedicated radio pagers after an adjustable delay if connected to the Emergency code call system.

The Touch LCD can show up to 8 color coded Nurse Calls on the screen in Priority Order:

1. Normal: Lowest Priority,
2. Emergency: Third to highest priority,
3. Service: Second to highest priority
4. Critical: Highest priority.

A patient intercom panel and the connected handset/pear push can be set to "Critical" priority level using the menus on the staff console.

The incoming calls lit corresponding indicator lamps on the console along with playing the related sound alarm for notification of the staff away from the console. Patients can also initiate a 2-way Audio call to CUI-32 through their Service Console {BCU-34} It also connects to Hospital Information System {HIS}, Hospital Digital Signage, Emergency Code Calling system and Management corridor Display Unit {NDP-02} IP addresses via the Hospital legacy TCP/IP network.

The unfinished calls are posted on the touch LCD until they are queried (Normal priority) or attended ( Emergency/Service/Critical priorities) by the staff.

Weight	827 g		
Dimensions	W: 280 mm	H: 48mm	D: 160 mm
Raw Material	Polycarbonate-ABS		
Power Supply	12 VDC		
Color	White		
Port1	RJ45 Connector to Terminal Box (TBX-31)		
Port2	Rj45 to Hospital Emergency/Group Summon System		
LCD Type	7-inch Touch TFT		
Speaker	8 Ohms , 0.5 Watt		
Operating Temperature	-10°C ~ +50°C		
Operating Humidity	30% ~ 80% RH		
Ingress Protection	20 or Better		
Mounting	Desk / Surface		



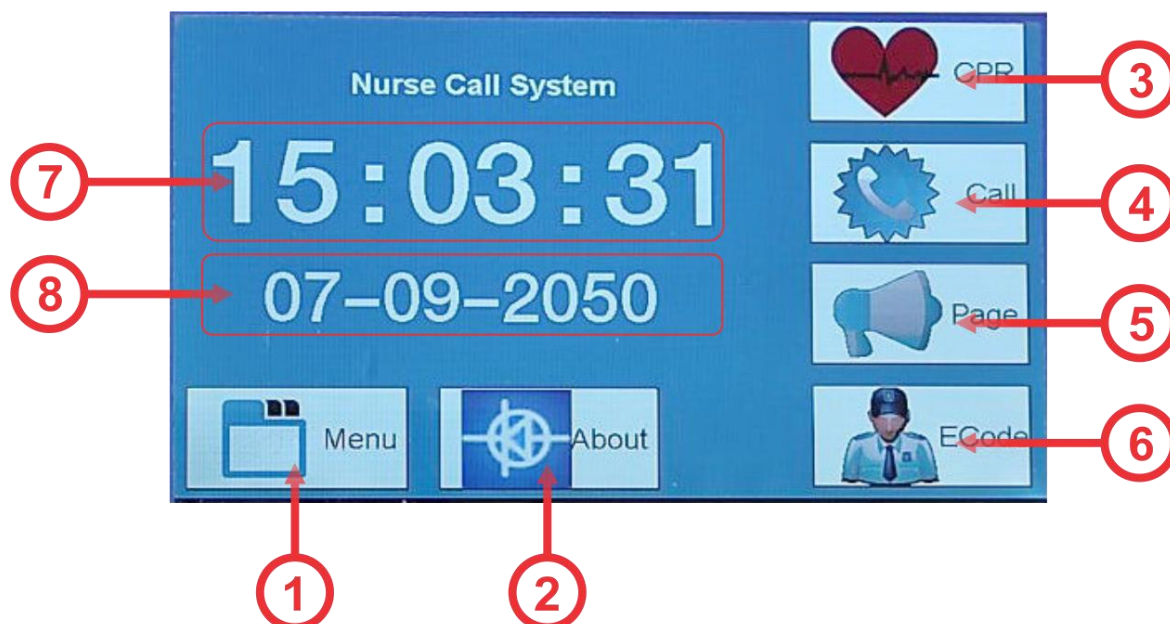
Number	Item	Description
①	7-inch Touch TFT LCD	Check Sec.2-1
②	Indicator Lamp Group	Check Sec.2-2
③	Emergency Code Call Buttons Group	Check Sec.2-3
④	“Page” Button	Check Sec.2-4
⑤	“Menu” Button	Check Sec.2-5
⑥	“Escape” Button	Check Sec.2-6
⑦	Handset	Check Sec.2-7
⑧	Ethernet Port	Check Sec.2-8
⑨	RJ45 Power Socket-NCS Network	Check Sec.2-9
⑩	12VDC Power in Socket	Check Sec.2-10
⑪	Mini USB Port	Check Sec.2-11
⑫	Speaker	Check Sec.2-12
⑬	RJ11 Socket	Check Sec.2-13
⑭	Unit Stand	Check Sec.2-14

## 2.2 SEVEN-INCH TOUCH TFT LCD

This is the main user interface between the Nurse Call System and the management staff in the facility. It makes many functions of the staff console possible through providing the interfacing means of the touch screen.

The “Home Screen” of the LCD touch of CUI-32 is as follows:





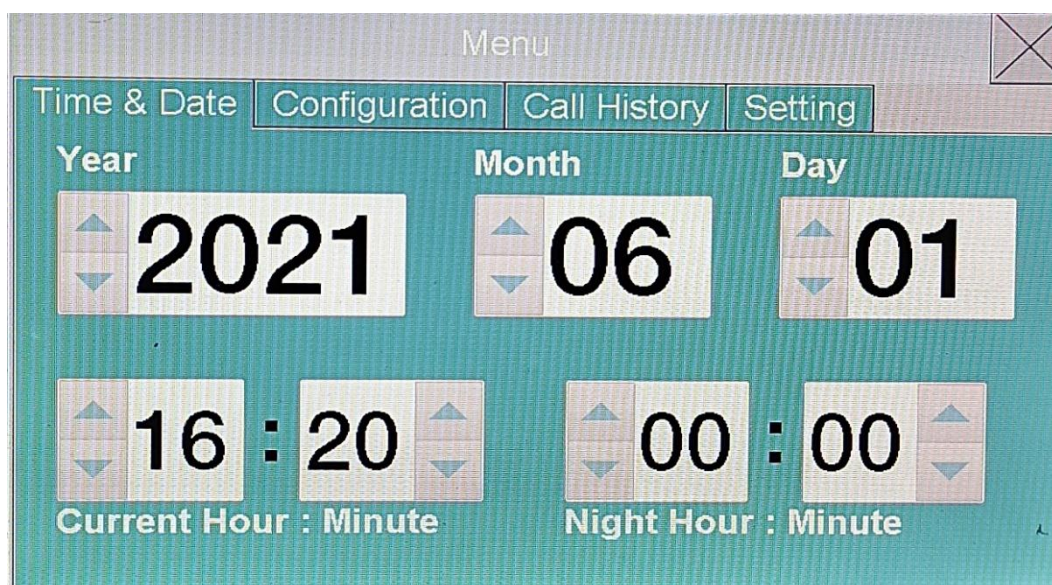
Number	Item	Description
①	Menu	Please refer to section 2-1-1
②	About	Pressing this tab momentarily shows the Hardware/Firmware version of the device
③	CPR	Dedicated tab to initiate a Hospital Medical Emergency (Blue code)
④	Call	Please refer to section 2-1-2
⑤	Page	Please refer to section 2-1-3
⑥	E Code	Please refer to section 2-1-4
⑦	Time	Shows the current local time
⑧	Date	Shows the current Gregorian calendar date

### 2.2.1 MENU

This tab in the home screen gives access to general settings in the system in 4 different groups as explained below:

#### 2.2.1.1 TIME AND DATE

This tab is used to set the current date and time for the staff console as illustrated below:





The night hour is set to distinguish the working staff activities in the reporting feature of smart NCS.

#### 2.2.1.2 CONFIGURATION

This tab will bring the screen to set the call priority for each patient supervised by the staff console. Pressing each present bed will toggle the state between normal ( Normal priority) and Critical ( Highest priority) as illustrated below:

Type	Node	Master	Room	Bed	TBX
Normal	1	1	1	1	0
Normal	2	2	2	2	0
Normal	3	3	3	3	0
Normal	9	9	9	9	0

Buttons: Add, Delete, Codes, Permission, Save

#### 2.2.1.3 CALL HISTORY

The “Call History” log is part of reporting feature of the Smart NCS and therefore addressed by the Reporting Software Chapter later in this manual.

The Call History tab is obsolete and discarded at the moment.

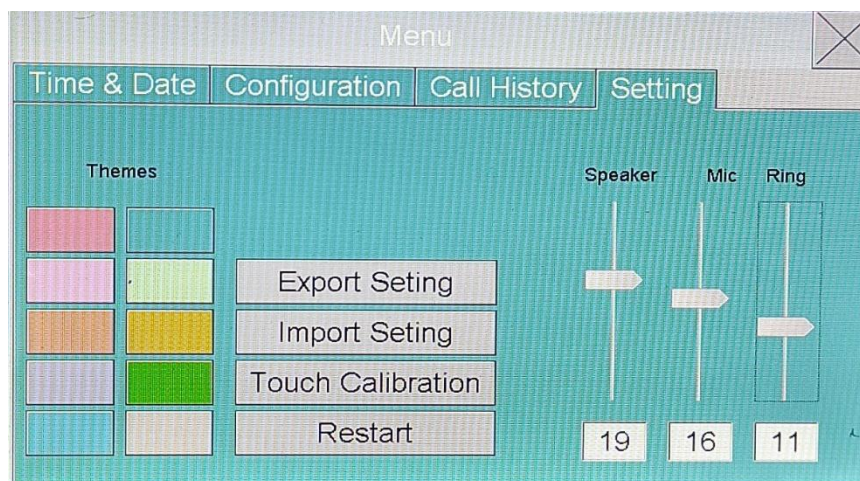
#### 2.2.1.4 SETTING

This tab enables the simple users to adjust the volume of the speaker /Ring tone or the sensitivity of the microphone. They can also choose the color of the theme.



The other tabs in the setting are merely used by the technicians and discarded in this manual.





### 2.2.2 CALL

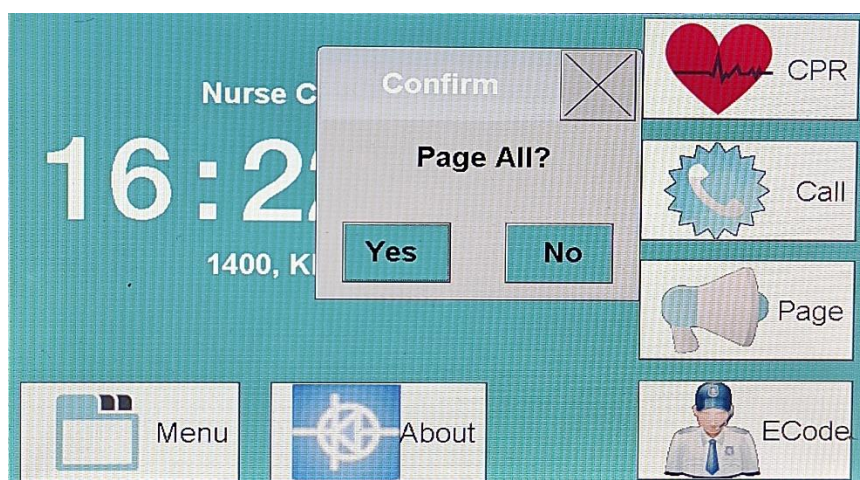
This tab ( or simply picking the handset) will bring the menu for initiating a vocal communication between the staff console and a specific patient intercom panel as illustrated below:



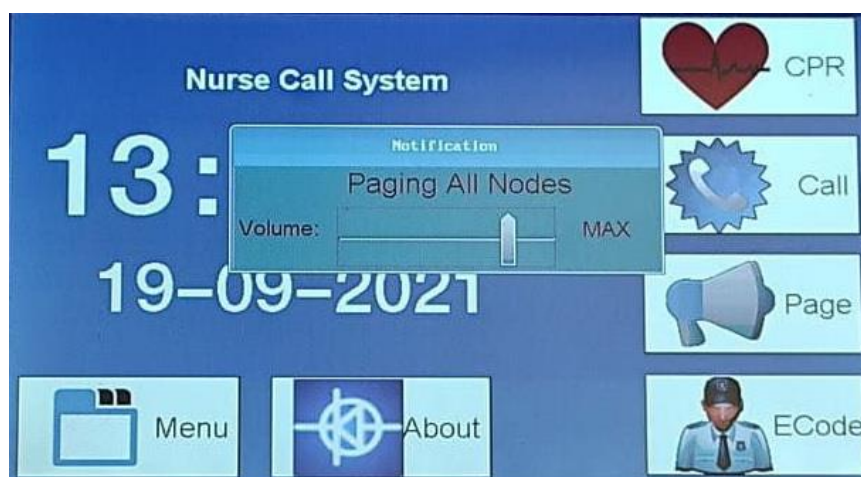
### 2.2.3 PAGE

This tab is used to announce a general message to all patients through the speaker on the Patient Intercom panel as illustrated below:

After Picking up the handset and pressing the Page tab:



After Confirmation of the intension to page all beds the same announcement:



#### 2.2.4 E CODE

This tab brings the screen for 12 emergency codes which can be initiated by pressing on the corresponding tab on the screen as illustrated below:



The Smart NCS MUST be connected to the KT-NCS “Emergency code call system” through the ethernet cable to be able to activate the Emergency codes.



The harmonization of the color of the codes between the smart NCS and the KT-NCS “Emergency code call system” should be done by the technicians at the time of installation.



The “plain language” or “Code” announcement for each category of incident ( Medical-Security-Facility) is set in the KT-NCS “Emergency Code call System”.

## 2.3 INDICATOR LAMP GROUP

These red color LED notifying indicator lamps provide the visual alarming of the staff in case of missing other means of notifications like Chimes:

### 2.3.1 NET

This notification LED becomes steady illuminated when the Smart NCS is connected to the Emergency Code Calling System through the Ethernet port.

### 2.3.2 ACK

This notification LED becomes blinking illuminated for a about a minute as a visual assurance for the initiation of one of the 12 Emergency codes.

### 2.3.3 CRITICAL

This LED becomes blinking illuminated if there is an unattended Critical call (From beds defined as critical in the staff console). The LED turns off if all Critical calls have been attended using the corresponding Cancel/Presence buttons.

### 2.3.4 SERVICE

This LED becomes blinking illuminated if there is an unattended Service (W.C./Shower) call. The LED turns off if all Service calls have been attended using the corresponding Cancel/Presence buttons.

### 2.3.5 EMERGENCY

This LED becomes blinking illuminated if there is an unattended Emergency call. The LED turns off if all Emergency calls have been attended using the corresponding Cancel/Presence buttons.

### 2.3.6 NORMAL

This LED becomes steady illuminated if there is an unfinished Normal Call. The LED turns off if all the Normal priority calls are queried.

### 2.3.7 LINE

This LED becomes steady illuminated when the handset is picked up showing the staff console is engaged in some activity.

## 2.4 EMERGENCY CODE CALL BUTTONS GROUP

The four buttons can be set to initiate 4 different more frequent emergency codes ( out of 12) and should be set by the technicians at the time of installation.

The “Ack” LED indicator blinks for 1 minute as a visual assurance for initiating the code.



The Smart NCS **MUST** be connected to the KT-NCS “Emergency code call system” through the ethernet cable to be able to activate the Emergency codes.





The “plain language” or “Code” announcement for each category of incident ( Medical-Security-Facility) is set in the KT-NCS “Emergency Code call System”.

### 2.5 “PAGE” BUTTON

This tab is used to announce a general message to all patients through the speaker on the Patient Intercom panel. It has the same function as the tab on the home screen and has been implemented in hardware as a redundant option for a frequently used feature.

### 2.6 “MENU” BUTTON

This button opens the main menu of the system similar to the “Menu” tab on the home screen. It has been implemented in hardware as a redundant option for a frequently used feature.

### 2.7 “ESC” BUTTON

This button takes the screen one step back to the current state.

### 2.8 HANDSET

The handset is used when either the nurse makes a direct connection to a bed or to query a call made by a patient.

### 2.9 ETHERNET SOCKET

This RJ45 socket connects the staff console to local network in the facility providing services like emergency code initiation ( in case of presence of KT-NCS emergency code system in the network) or patient particulars display ( in case of presence of Hospital Information System in the network).

### 2.10 RJ45 POWER SOCKET-NCS NETWORK

This RJ45 connects the NCS network to the staff console. It also provides the 24 V DC power from the terminal box ( Chapter 4 ) to the staff console in case of absence of the 12V DC external adapter.

### 2.11 TWELVE VOLT DC POWER SOCKET

This socket can be used to power the staff console through an external adapter as an alternative for the RJ45 power socket when the Staff Console is far from the terminal box and the voltage drop due to distance occurs on the RJ45Power socket.

### 2.12 MINI USB SOCKET

This socket provides serial connection to the PC through its USB port.

### 2.13 SPEAKER

This speaker broadcasts the alarm chime for vocal notification of the staff away from the console.

### 2.14 RJ11 SOCKET

This socket connects the handset to the staff console

### 2.15 UNIT STAND

The staff console can be wall/Surface-mounted. The stand is used for placing the unit on the desk of the staff console with proper positioning.

### 3 STAFF DISPLAY UNIT (NDP-31)

#### 3.1 INTRODUCTION

NDP31 is the display unit installed in the nurse station. It is used to display the highest priority call in the ward by showing the corresponding bed and room numbers.

The Alarm for a new call is played by an internal speaker with melodies stored on a local Micro-SD card.

It is connected to the Legacy LAN in the hospital through the RJ45 socket.

Weight	885 g		
Dimensions	W: 240mm	H: 160mm	D: 60mm
Raw Material	Plexiglass + Plexi print		
Color	Black		
Power Supply	5 V via external AC adapter		
Display Type	7-inch TFT		
Internal Speaker	2 W, 8 Ohms		
Port	RJ45		
Operating Temperature	-10°C ~ +50° C		
Operating Humidity	30% ~ 80% RH		
Ingress Protection	20 or Better		
Mounting	Surface		



Number	Item	Description
①	Display Room Number	From 00 to 99 can be displayed in the right side of the display as the room number
②	Display Bed Number	From 00 to 99 can be displayed in the left side of the display as the bed number
③	Cat 5/6 Cable Knockout	The connection to other modules under RS485 protocol is made via the CAT5/6 cable connecting this module to terminal box.
④	Input DC power Socket	5 V DC Power from the external adapter
⑤	Micro SD Socket	To store the Chimes
⑥	Melody/Volume Dip Switch	Switches 1-3 to set the chime melody & 4-6 to set the volume

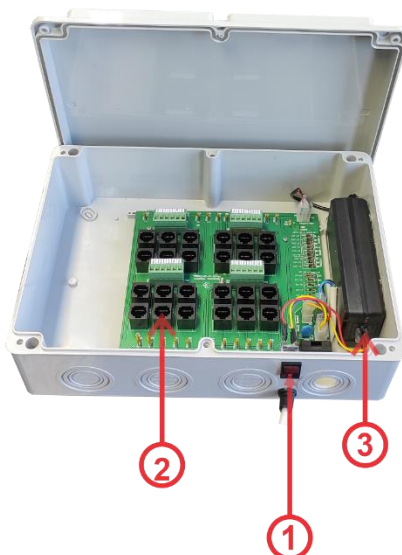
## 4 TERMINAL BOX (TBX-31)

### 4.1 INTRODUCTION

TBX-31 is the interface between Patients' Intercom Panels (BCU-34/BCU-34N) via RJ45 and Phoenix ports and the staff console (CUI-32) via RJ45 port under RS-485 communication protocol.

TBX-31 provides the 24VDC power for the staff console.

Weight	1726 g
Dimensions	W: 300mm      H:95 mm      D: 220 mm
Raw Material	ABS
Power Supply	220 ~ 240 VAC , 0.2 A ( 50 HZ)
Output Power	240 W (24 VDC)
Color	Grev
Port 1	24 X RJ45
Port 2	4 x 6-pin Phoenix
Operating Temperature	-10°C ~ +50°C
Operating Humidity	30%~80%RH
Ingress Protection	20 or Better
Mounting	Surface (Max. 3 meters from Staff Console)



Number	Item	Description
①	ON/Off Switch	This is the one and only way to Turn the Nurse Call System ON and OFF.
②	Cat 5/6 Rooms Cables Knockouts	The cables coming from different rooms in the facility are connected to the Terminal box through this knockout.
③	Mains Cable	This cable knockout connects the terminal box to the 220 VAC

## 5 PATIENTS' INTERCOM PANEL (BCU-34/N)

### 5.1 INTRODUCTION

BCU-34/N is the bedside Patient's panel with a speaker to enable 2-way communication between the patient and the management staff using the microphone on the pear push switch or handset (NCB- 33/35). It has 2 buttons to adjust the volume of the speaker.

It is equipped with an 8-pin military connector to ensure constant connectivity of the panel to Patient's Handset/ Pear push Button (NCB- 33/35) despite probable jolts.

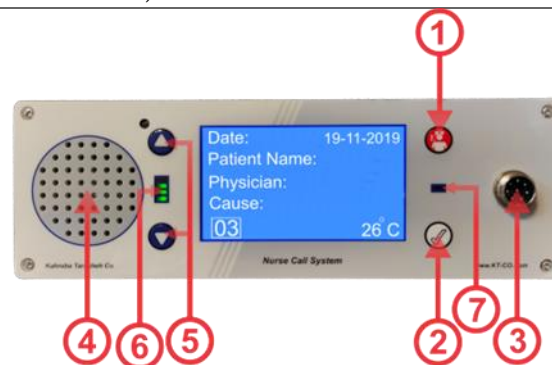
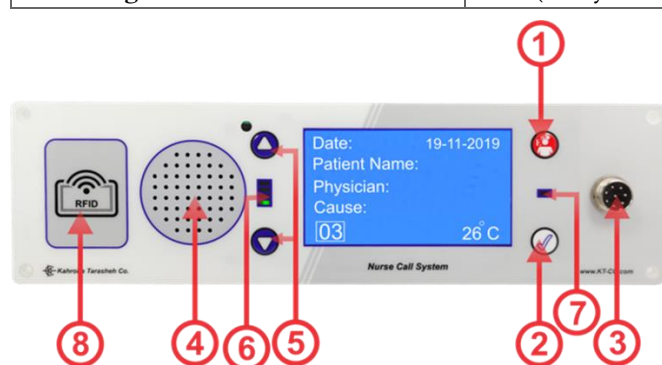
BCU-34/N also has an Emergency Nurse Call and a Cancel/Presence Switch and can initiate 5 different emergency code calls by pressing any of the nurse call or Cancel or one of the volume rocker buttons while pressing the other volume rocker button as given in the table below:

Combination of Buttons on the Panel	Initiated Code
Volume up + Volume Down	Blue-Medical- Adult Emergency
Cancel While pressing on Volume up	Grey-Facility-Loss of Utility
Cancel while pressing on volume Down	White –Security-Aggression
Emergency Call While pressing on Volume up	Pink-Medical Child Emergency
Emergency Call while pressing on Volume down	Red-Facility-Fire

BCU-34/N comes with a 4.3-inch LCD which normally displays the Patient particulars from Hospital Information System (HIS) through Staff Console (CUI-32).along with the date and room temperature.

BCU-34 come with RFID card reader whereas BCU34/N lacks this option.

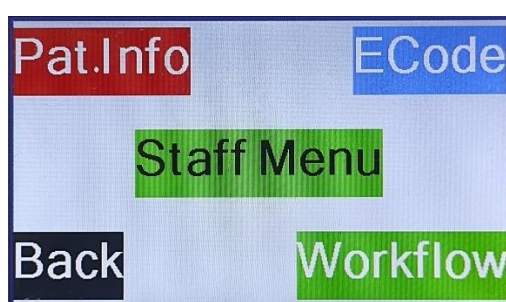
Weight	BCU34 :400g BCU34/N:377 g
Dimensions	BCU34 : W: 300 mm H: 85 mm D:40 mm BCU34/N: W:255 mm H: 85 mm D:40 mm
Raw Material	Polycarbonate, Plexiglass
Power Supply	12 V DC (via an external Power Adaptor)
Color	White
Port 1	RJ45 Connector to Layout Ring Wiring
Port 2	8-pin, Military male connector to Patient's Handset
RFID Reader/Tag	Range: 1 ~ 4 cm, Frequency: 125 KHz , Data: 40-bit ID
LCD Type, Size	TFT, 4.3"
Speaker	8 ohms, 0.5 Watt
Operating Temperature	-10° C ~ +50° C
Operating Humidity	30% ~ 80% RH
Ingress Protection	20 or Better
Mounting	Flush (Cavity Dimension:275mm x 78 mm x 100 mm)



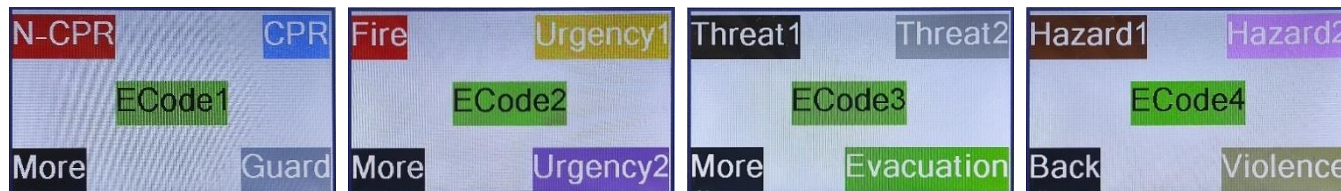
Number	Item	Description
①	Emergency Call Button	To be pressed in emergency conditions
②	Cancel/Presence Button	To annulate an emergency call or declare presence following an emergency call
③	Patient Handset Connector Socket	Male socket to connect the handset/pear push switch
④	Speaker	To play the staff voice during the 2-way full duplex communication
⑤	Volume Control Buttons	To adjust the volume of the sound played by the speaker
⑥	Volume Level LEDs	To provide the visual assurance for the level of the volume of the speaker
⑦	Nurse Call LED	To provide the visual assurance for the state of calling the nurse (Steady red for Normal and blinking red for Emergency calls)
⑧	RFID Module	To provide the RFID feature when an RFID tag is present.

## 5.2 STAFF MENU

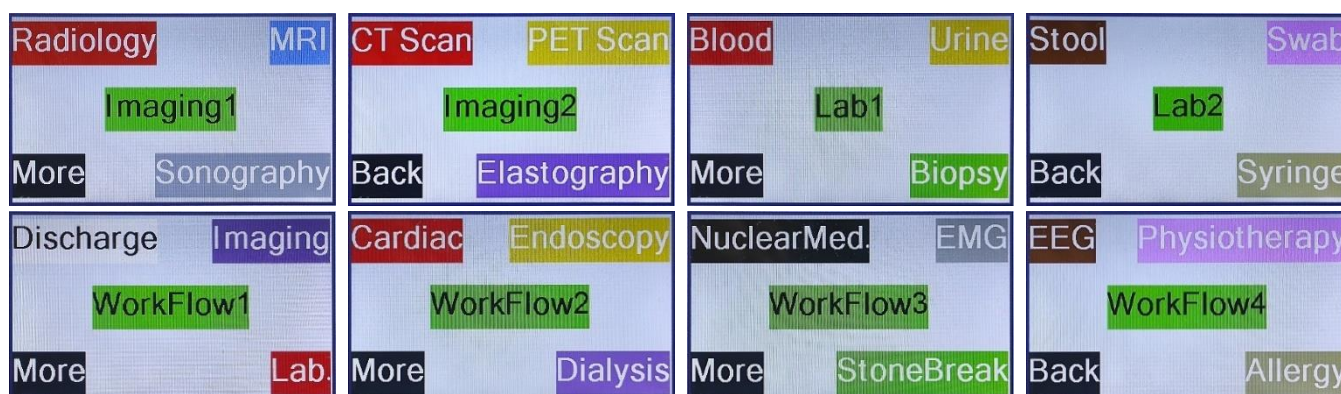
By presenting the RFID card or simultaneously pressing Both Volume rockers and the Cancel/Presence Button, the LCD on BCU34/N toggles to the staff menu making it possible to initiate more than 5 emergency codes or handle work flow tasks as shown in the following pictures:



### 5.2.1 EMERGENCY CODE CALL MENU



### 5.2.2 WORK FLOW MENU



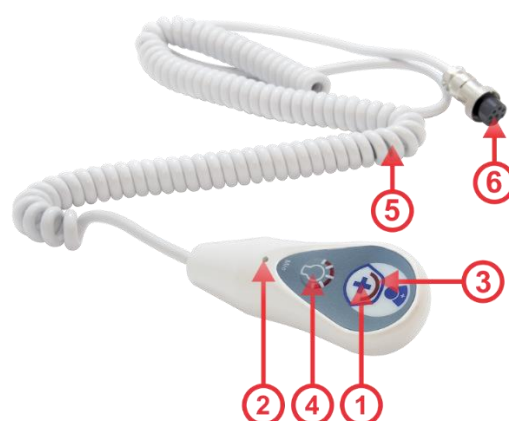
The LCD on BCU34/N will exit the “Staff Menu” showing the patient’s particulars by repeatedly pressing the back button.



## 6 PATIENT HANDSET/ PEAR PUSH SWITCH (NCB-33/35)

### 6.1 INTRODUCTION

NCB-33 is the pear push nurse call switch attached to the patient's intercom panel (BCU-34) via a coiled cord secured by an 8-pin military socket preventing detachment from the panel by any jolt. NCB-33 also has a microphone for a 2-way communication to the staff console (CUI-32) in combination with the speaker in the patient's panel (BCU-34). NCB-33 has a switch to turn on/off the reading light in the Patient's console.



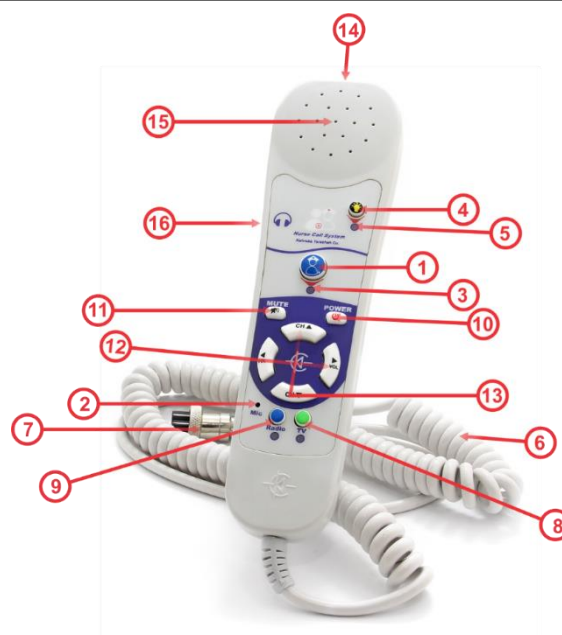
Weight	150 g
Dimensions	W:40 mm      H:100 mm      D: 28 mm
Raw Material	Body: Polycarbonate +ABS    Coiled Cable: PUR
Power Supply	12 VDC
Color	White
Connection	8-Pin Gx16 (Female)
Cable Length	4 m
Operating Temperature	-10°C ~ +50°C
Operating Humidity	30-% ~ 80% RH
Ingress Protection	54 or Better
Mounting	Tabular at the bedside/Wall

Number	Item	Description
①	Nurse Call Switch	To initiate a normal nurse call ( it can initiate a Critical call if the bed has been tagged as Critical)
②	Microphone	To speak to the staff in full-duplex 2-way communication
③	Call Assurance/Back Illumination LED	To provide the back illumination for patient's ease of operation and bright red illumination for reassurance when call is activated
④	Study Light On/Off Switch	To turn on/off the study light in bed head unit
⑤	Coiled Medical Grade Cord	Extendable to 5 meters with no risk of detachment with higher endurance compared to normal phone cords
⑥	8-pin GX16 Female Plug	To provide the means for fastening the cord securely against any jolt introduced by patients during use.

NCB-35 is the advanced patients' handset with a Nurse Call switch attached to the patient's intercom panel (BCP-18) via a coiled cord secured by an 8-pin military plug preventing detachment from the panel by any jolt.

NCB-05 also has a microphone for a 2-way communication to the staff console (CUI-32) in combination with the speaker in the patient's panel (BCU-34). It also has a speaker for radio FM and T.V./Radio channel and volume control keys along with a 5mm headphone jack.

NCB-35 has a switch to turn on/off the reading light in the Patient's console



Weight	245 g
Dimensions	W: 55 mm                      H: 200 mm                      D: 23mm
Raw Material	Body: Polycarbonate +ABS    Coiled Cable: PUR
Color	White
Connection	8-pin Gx16 (Female)
Port1	Headphones 5mm Jack
Speaker	0.5 W / 8 Ohm
Keypad	Membrane
Cable Length	4 m
Remote T.V./Radio Control	Yes
Operating Temperature	-10°C ~ +50°C
Operating Humidity	30-% ~ 80% RH
Ingress Protection	54 or Better
Mounting	Tabular at the bedside/Wall

Number	Item	Description
①	Nurse Call Switch	To initiate a normal Nurse call ( Critical nurse call if the bed has been tagged as critical)
②	Microphone	To provide the means to have a 2-way full duplex communication with the staff
③	Call Assurance LED	To provide the visual assurance for an activated nurse call
④	Study Light On/Off switch	To turn on/off the study light in bed head unit
⑤	Study Light Indicator LED	To provide the visual assurance for the status of the study light
⑥	Coiled Medical Grade Cord	Extendable to 5 meters with no risk of detachment with higher endurance compared to normal phone cords
⑦	8-pin Gx-16 Female Plug	To provide the means for fastening the cord securely against any jolt introduced by patients during use.
⑧	T.V. Selection Button	To toggle the functions of the membrane keypad to radio
⑨	Radio Selection Button	To toggle the functions of the membrane keypad to Television
⑩	T.V./Radio On/Off Button	To turn on/off the radio or T.V.
⑪	T.V. /Radio Mute Button	To mute/unmute Radio or T.V.
⑫	Volume Control Buttons	To control the volume of T.V. or Radio
⑬	Channel Display Buttons	To change the channel in Radio/T.V.
⑭	InfraRed (IR) Lamp	To be pointed towards the T.V. IR receiver
⑮	Radio Speaker	To listen to the Radio
⑯	3.5 mm Audio Jack	To connect the earphones for listening to the radio
⑰	Handset Cradle	To keep the handset next to the bed

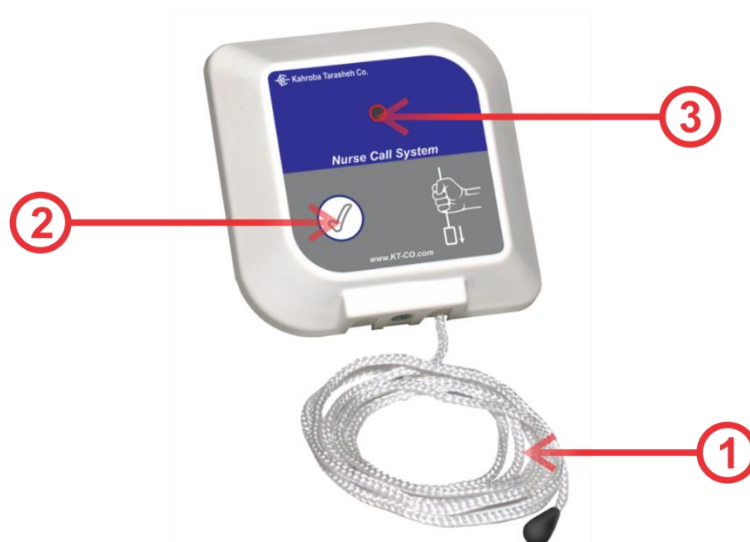
## 7 PULL CORD NURSE CALL SWITCH (TB-31)

### 7.1 INTRODUCTION

TB-31 is used in patient's bathroom, shower or similar areas making the call easier by pulling the cord. It activates a service call in the management center which has a higher priority than normal or emergency nurse calls.

TB-31 normally comes with a Cancel/Presence switch on the panel.

Weight	58g		
Dimensions	W: 80mm	H: 80mm	D:20 mm
Raw Material:	Polycarbonate + ABS		
Color	White		
Power Supply	12 V		
Cord Capacity	Max20Kg		
Operating Temperature	-10°C ~ +50°C		
Operating Humidity	30-% ~ 80% RH		
Ingress Protection	X4 or Better		
Mounting	Surface/Flush		



Number	Item	Description
①	Plastic Cord	To be pulled to initiate a Service Call
②	Cancel/Presence Button	To annulate an emergency call initiated or declare presence by the staff after an emergency call has been initiated
③	LED indicator	To provide the visual assurance of an activated emergency call (Blinking)

## 8 CANCEL / PRESENCE SWITCH (CB-31)

### 8.1 INTRODUCTION

CB-31 is a Cancel/Presence switch usually installed by the door of the patients' room. It can cancel any Normal/ Emergency or Critical Nurse Call activated from the room.

The nurse will use CB-31 after a call has been taken care of and there is no more activated call associated with the room.

Weight	58 g
Dimensions	W: 80mm                      H: 80mm                      D: 20mm
Raw Material	Polycarbonate + ABS
Color	White
Power Supply	12 V
Operating Temperature	-10°C ~ +50° C
Operating Humidity	30%~80%RH
Ingress Protection	20 or Better
Mounting	Surface/Flush



Number	Item	Description
①	Cancel/Presence Button	To annulate an initiated call or declare presence by the staff after an emergency call has been initiated
②	LED Indicator	To provide the visual assurance for an activated emergency call ( Blinking)

Number	Item	Description
①	Staff Console I.P Setting Tab	Check Section 08-1
②	Staff RFID Card Setting Tab	Check Section 08-2
③	Work Shift Time Setting Tab	Check Section 08-3
④	Access Level Setting Tab	Check Section 08-4
⑤	Intercom Tab	Check Section 08-5
⑥	Graphical Chart Intercom Tab	Check Section 08-6

## 9 CORRIDOR STATUS LIGHT (ODL-34/35/36)

### 9.1 INTRODUCTION

ODL-34 is a wedge-shape dome light noticeable from 5 angles which is installed above the patients' room or external washroom door in the corridor.

ODL-34 has 4 different LED Light colors that will illuminate showing the following states:

1. Steady Green: To visually alert the Normal Nurse Call
2. Blinking Red: To visually alert the Emergency/Service/Critical Nurse Call
3. Steady Yellow: To visually alert the Nurse-Present state
4. Steady Blue ( For 10 seconds ) : To visually alert the Emergency Code Call

The light is OFF when no Call has been activated.

It is also possible to set the colors for the 4 states customized through either flexible (changeable by the customer) 12-Bit switches (ODL-35) or fixed (one-time set by the technician) 12-Bit H.W integrated jumpers (ODL-36), each rendering 4'000 colors.

Weight	75g		
Dimensions	W: 80 mm	H:80 mm	D: 60 mm
Raw Material	ABS		
Color	White		
Power Supply	12 V		
Light Type	LED		
LED Colors	Green/Red/Yellow		
Operating Temperature	-10°C ~ +50°C		
Operating Humidity	30-% ~ 80% RH		
Ingress Protection	20 or Better		
Mounting	Flush/Surface		



Number	Item	Description
①	Green LED	To make the visual notification for the staff for an initiated Normal call (Steady Green)
②	Red LED	To make the visual notification for the staff for an initiated Emergency/Service/Critical call (Blinking Red)
③	Yellow LED	To make the visual notification for the staff of the "Nurse-Present" State
④	Blue LED	To make the visual notification for the staff for an initiated Emergency Code call (Blinking Blue)
⑤	Dome	To provide the wedge shape for the light to be observed from 5 angles

## 10 EXTERNAL SERVICE CONTROL BOARD (BCU-31-S)

### 10.1 INTRODUCTION

The external washrooms in the ward needs an external control panel to connect them as a separate node in the Nurse call System configuration.

Each external washroom needs one BCU-31-S module and a Cat5/6 cable connects it to the terminal box under RS485 protocol.



Weight	385 g
Dimensions	W:202 mm      H: 77 mm      D: 45 mm
Raw Material	ABS
Color	White
Power Supply	220 VAC (2-pin Phoenix Connection)
Port1	Phoenix 6-pin ( to Rj45 of the Terminal Box)
Port 2	Phoenix 5-pin (To Pull cord, Corridor Light and Cancel Switches)
Operating Temperature	-10°C ~ +50° C
Operating Humidity	30% ~ 80% RH
Ingress Protection	00 A
Mounting	Surface

## 11 REPORTING SOFTWARE (CUS)

### 11.1 INTRODUCTION

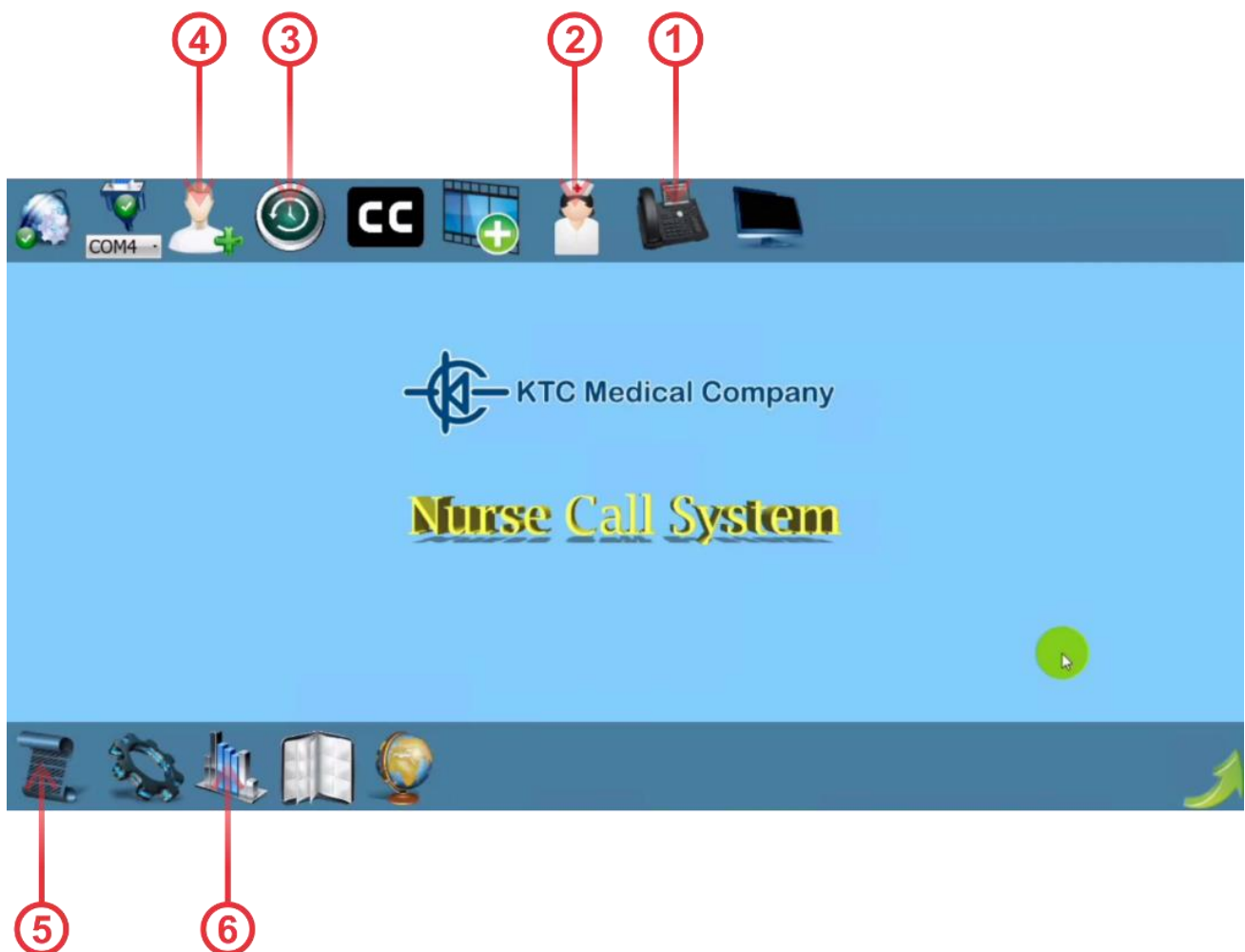
CUS is the management software connecting one or several management consoles to the management report displaying unit over IP via the legacy network of the facility.

It can Record, Monitor and Analyze Call types, Staff Performance, Call Response Delay and Call Breaches for managers in any given time period. The reports can be in PDF format or column charts. It also provides the means to associate the RFID tags to the staff for reporting purposes. CUS-33 can also connect to LCD display units to both run as the facility signage system and show the calls in priority order and in corresponding colors (Red for critical, Yellow for emergency or Green for Normal) to alarm the staff away from the management console

Required Operating System	Windows 10/Server
Required H.D.D.	Min. 120 GB
Required RAM	Min 4G
Required Hardware	Ethernet Port
Required Processor	Min Core i3 or equivalent
Centralized Database	MSSQL



The useful tabs of the home screen are given in the following table. The remaining tabs are used by the technicians at the time of installation of the system.



Number	Item	Description
①	Staff Console I.P Setting Tab	Check Section 11-1
②	Staff RFID Card Setting Tab	Check Section 11-2
③	Work Shift Time Setting Tab	Check Section 11-3
④	Access Level Setting Tab	Check Section 11-4
⑤	Reporting Tab	Check Section 11-5
⑥	Graphical Chart Reporting Tab	Check Section 11-6

## 11.2 STAFF CONSOLE I.P. SETTING TAB

This Tab enables adding new staff console units in the facility to be considered for logging and reporting means. The operator needs to add the corresponding I.P. of the unit in the pop up screen as illustrated below:

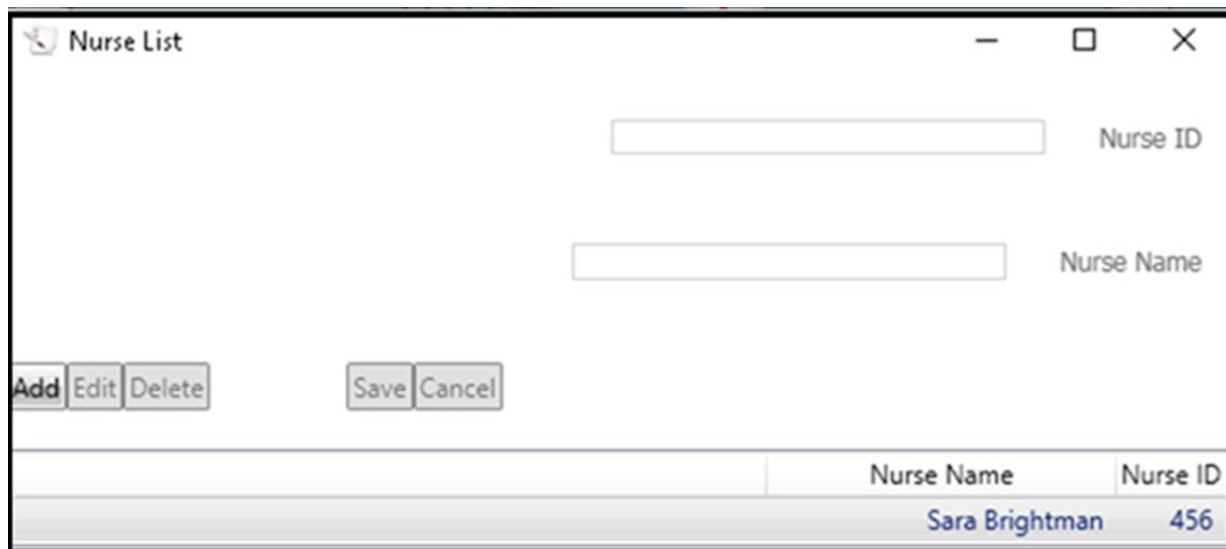
The screenshot shows a window titled "CU List" with standard window controls (minimize, maximize, close). Inside the window, there is a form with two input fields: "IP" and "Ward Name". Below the "Ward Name" field is a button labeled "Current Ward". At the bottom left of the form are three buttons: "Add", "Edit", and "Delete". At the bottom center are two buttons: "Save" and "Cancel". Below the form is a table with two columns: "Ward Name" and "IP". The table contains one row with the values "CCU" and "192.168.111.210", which is highlighted in pink.

Ward Name	IP
CCU	192.168.111.210

## 11.3 STAFF RFID CARD SETTING TAB

This tab will associate each RFID tag to one of the staff members so that the activity of the work force using RFID cards can be logged and reported accordingly as illustrated below:





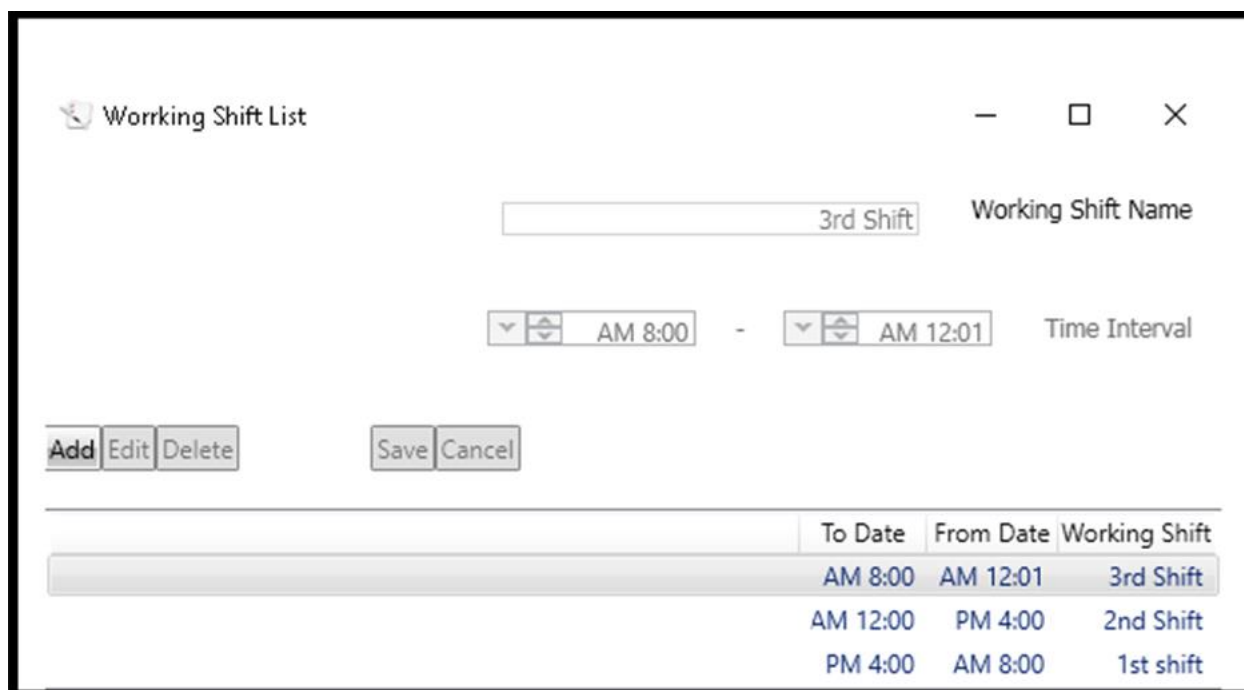
The 'Nurse List' window contains two input fields: 'Nurse ID' and 'Nurse Name'. Below these fields are two groups of buttons: 'Add', 'Edit', 'Delete' on the left, and 'Save', 'Cancel' on the right. At the bottom, there is a table with two columns: 'Nurse Name' and 'Nurse ID'.

Nurse Name	Nurse ID
Sara Brightman	456

This tab will only be used if the Patient panels are equipped with RFID tag reader

#### 11.4 WORK SHIFT TIME SETTING TAB

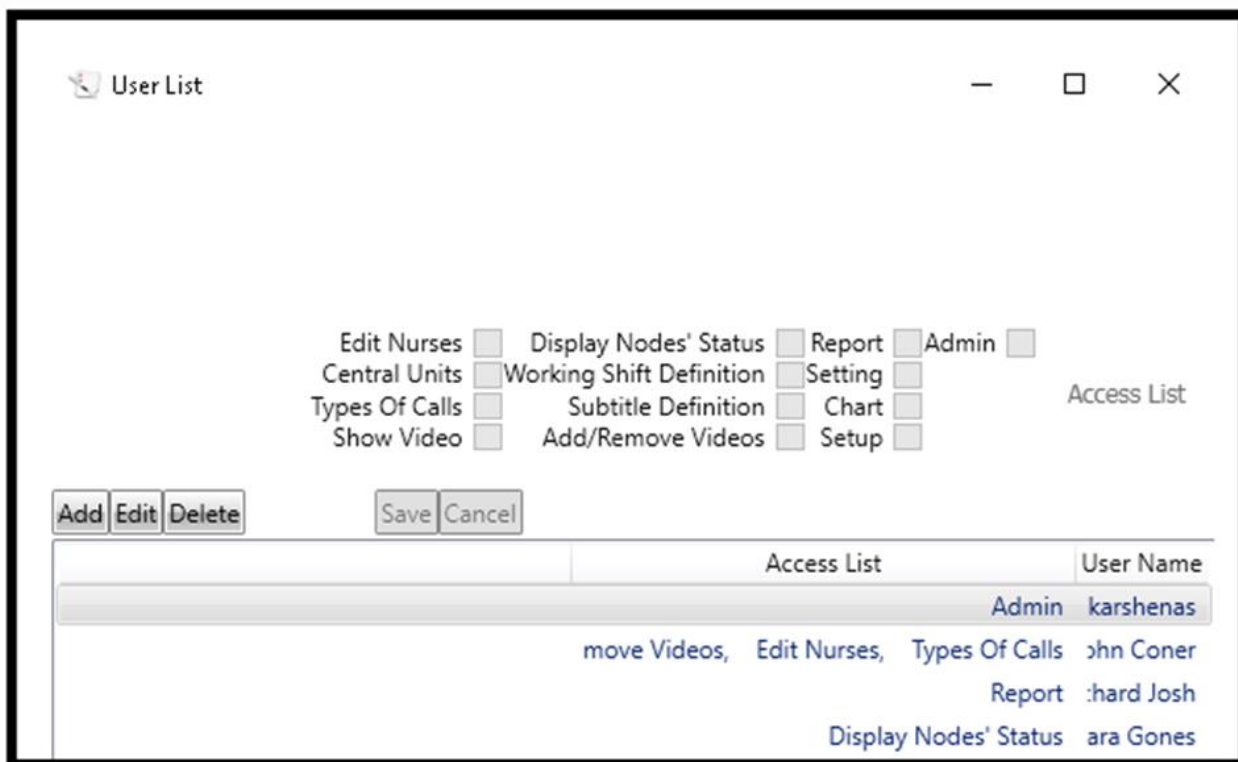
This tab enables setting the timings for different working shifts in the facility for shift filtering purposes of the report based on the time of an incident as illustrated below:



The 'Working Shift List' window includes a 'Working Shift Name' input field (containing '3rd Shift') and a 'Time Interval' section with two time pickers (AM 8:00 and AM 12:01) separated by a minus sign. Below these are 'Add', 'Edit', 'Delete', 'Save', and 'Cancel' buttons. The bottom section features a table with three columns: 'To Date', 'From Date', and 'Working Shift'.

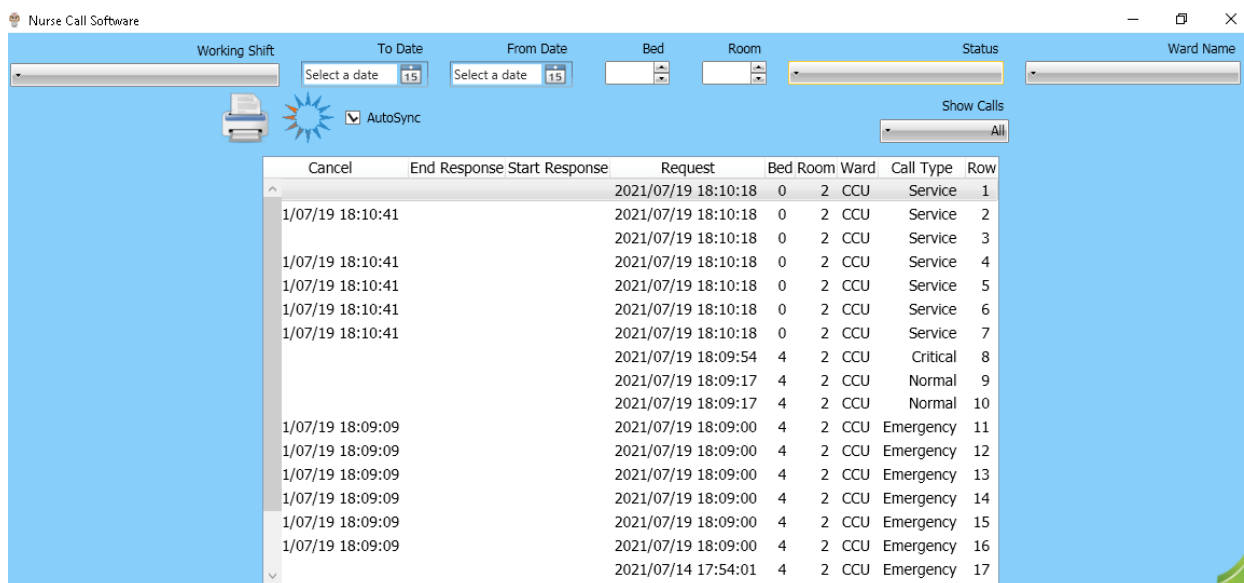
To Date	From Date	Working Shift
AM 8:00	AM 12:01	3rd Shift
AM 12:00	PM 4:00	2nd Shift
PM 4:00	AM 8:00	1st shift

#### 11.5 ACCESS LEVEL SETTING TAB



## 11.6 REPORTING TAB

This tab gives a chronological report of the incidents in the facility along with the related staff activity as illustrated below:



## 11.7 GRAPHICAL CHART REPORT TAB

The reports can be presented in graphical chart for better analysis of the type of incidents and staff response characteristics using this tab as illustrated below:



## 12 CARE AND CLEANING

### 12.1 SYSTEM CHECK

Before using the Nurse Call System,

- Check if there is any mechanical damage in the system and accessories.
- Check if all the power cable and accessories are firmly connected.
- Check all the functions of keyboard and modules to make sure that the monitor is in proper condition.

If you find any damage on any module in the system stop using it and contact the biomedical engineer of the hospital or local After Sale Service.

The overall check of the system, including the safety check, should be performed only by qualified personnel.

All checks which need any module to be opened and safety and maintenance checks should be performed by After Sales Service.

### 12.2 CLEANING AND DISINFECTION

#### 12.2.1 GENERAL POINTS

Use only the substances approved by us and methods listed in this chapter to clean or disinfect your equipment.

Manufacturer makes no claims regarding the efficacy of the listed chemicals or methods as a means for controlling infection. For the method to control infection, consult your hospital's Infection Control Officer or Epidemiologist. See also any local policies that apply within your hospital.

KT-NCS SMART Nurse Call System elements fall in the following Ingress Protection groups:

- o CUI32/ODL35/NDP31/TBX31/BCU34-N/CBN31: IP 20 or better
- o NCB35/NCB33: IP 54 or better
- o TB31: IP X4 or better.



1. Sterilization may cause damage to the device and is therefore not recommended.
2. If you see any signs of damage or deterioration in the device and its accessories, do not use it, and if necessary, contact the after-sales service company.
3. Allow the modules of the system to dry completely before making connections. And please make sure all connectors tightly connected to the system before using the system.



#### **Please pay special attention to the following items:**

- All the modules in the system shall be kept dust-free.
- Do not use strong solvents such as acetone or ammonia.
- Most cleaning agents must be diluted before use.
- Don't use rough or sharp material or your fingernail to remove stubborn stains.
- Do not let the cleaning agent enter into the chassis of the system.
- Do not leave the cleaning agents on any part of the equipment.



**Do not use ETO gas to disinfect any module in the system.**

#### 12.2.2 EXTERNAL SURFACES

In-between patients and as required:

For cleaning: wipe gently using a moist cloth for disinfection use Alcohol 70%

### 12.2.3 DISPLAY SCREEN

Use clean and soft cloth with screen cleaner or moist with Isopropyl alcohol may be used for cleaning and disinfection.



- Take extra care when cleaning the screen of the staff console because it is more sensitive to rough cleaning methods than the housing.
- Don't spray a liquid directly on the screen.

### 12.2.4 ACCESSORIES

Accessory holders and extension cables should be cleaned and disinfected after each patient or when necessary, using a soft, clean cloth soaked in mild soapy water and, if necessary, Isopropyl alcohol, and then wiped with a soft and dry cloth.



1. To avoid damaging of the cable, probe, sensor or connector, do not immerse it in any liquid.
2. Disposable accessories shall not be sterilized or reused.
3. To prevent environmental pollution, the disposal of any part shall be done in accordance with the policies of the hospital.

The following table summarizes the methods of cleaning, disinfecting and sterilizing different parts of the device:

Device parts	Cleaning	Disinfection	Sterilization
External surface of device	In-between patients and as required wipe gently using a moist cloth and warm soapy water or mild detergent.	In-between patients and as required with: <ul style="list-style-type: none"> <li>• Alcohol 70%</li> <li>• Isopropyl Alcohol</li> <li>• N-Propanol</li> </ul>	If needed, can be done using Ultra-violet or gamma ray methods.
Holders of accessory, Extension cables		In-between patients and as required with: <ul style="list-style-type: none"> <li>• Isopropyl Alcohol</li> </ul>	
Display screen	In-between patients and as required: Clean and soft cloth with screen cleaner.		

## 12.3 PREVENTIVE MAINTENANCE (PM)

To ensure that the device is kept in the best condition, it shall be kept clean and all points related to the maintenance of the system shall be observed. There are no repairable parts in the system and all repairs shall be done by the manufacturer.

### 12.3.1 STORAGE

The storage environment shall be clean and dry. If possible, use the original packaging of the device.



If any module falls from a height and is damaged or in the vicinity of a very high temperature and high humidity, contact the company's after-sales service at the earliest opportunity to ensure the correct operation.

Thoroughly clean the system before and after the system is not used for a while.

## 12.3.2 WEEKLY CHECKS

- Device cleanness
- Visual inspection of device (case, screen, keys and indicators)
- Visual inspection of accessories
- Function of accessories

## 12.3.3 MONTHLY CHECKS

- Visual inspection of device
- Device cleanness
- Function of keys and indicators
- Visual inspection of accessories

The preventive maintenance (PM) checklist # KT-NCS-PM-CHK-WIRLSS-NCS should be completed by responsible individuals of healthcare center. It should be noted that PM checklist only is used to perform systematic inspection of the equipment and will not guarantee their correct function.

## 12.4 PREVENTIVE MAINTENANCE (PM) CHECKLIST

KT-NCS Co Form # KT-NCS-PM-CHK WIRLSS-NCS.						
City:		Facility:		Ward:		
Bedside:		Corridor/Ward/Room:		Management Center:		
Model:		Serial Number:		Installation Date:		Inspection Date:
No.	Test and Inspection Item			OK	NOT OK	N/A
1	Visual inspection	No damage or breakage in the back case and panel				
		Cleaning and disinfection according to the user manual				
2	Display screen	Correct display of information				
3	Alarms	Alarm activation				
		Clarity of alarm sound				
		Correct function of alarm LEDs				
4	Setup	Saving date & time settings				
5	Switches	Correct function				
6	Connectors	Firmly fastened				
7	Pull Cords	Correct function				
8	Assurance LEDs	Correct function				
9	Speakers	Clarity of sound				
Final Decision:				PASS:		FAIL:
Recommendation:						
Name and signature of responsible individual				Name and signature of expert:		



## 13 TROUBLESHOOTING

Repairing the internal parts of any module in the system must be only done by trained and authorized personnel of “After Sale Service”; otherwise manufacturer will not take any responsibility for any possible hazard to the patient and the monitor.

Troubleshooting guide is intended to help users to solve minor problems caused by incorrect use of any module.

When you face any problem, please make sure that you have followed all procedure mentioned in Correct Action column before contacting “After Sale Service”.

For symptoms not mentioned in the table, please turn OFF the system and contact “After Sales Services” department.

Fault Symptom	Possible Cause	Correct Action
Staff Display is OFF	12 V DC adapter not connected	Connect the 12 V DC adapter to the mains
	12 V DC adapter Broken	Replace the 12 V DC Adapter
No Nurse Calling Function from all rooms in the ward	Staff display not programmed	Contact the technician to set the staff display
No Nurse Calling function from a specific room	The adaptor not connected/broken	Connect/replace the adapter
	The battery depleted	Replace battery
Self-triggering	Another transmitter at 433 MHz present	Intermittent problem, contact the technician
Service room Alarm Self Triggering	The unit has been exposed to water	Dry the Unit and check the sealing /Replace the unit
One of the Nurse call panels in a room not working	No Power to the panel	Connect the power supply
		Replace the Battery
No Chime from staff console	Broken staff console	Replace the unit /Factory Reset the unit
	Volume down	Raise the volume
Bed/Room wrong numbering	Wrong initial setup / Change of bed number after setup	Contact the technician to do the setup
Call/Cancel switch on the Nurse call panel not working	No Power to the unit	Replace the battery/Connect the adapter
Pull cord switch not working	No Power to the unit	Replace the battery/

