Nurse Call System Specification

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Part 1. Nurse Call System

1.1 Overview

The Nurse Call System (NCS) is an efficient and flexible hub for patient information and staff activity, from the moment of admission to discharge. The system's features provide the functionality to reduce staff response time to patient calls by effectively managing staff, call types, and communications between both patient and staff utilizing either VoIP or analog audio. All system data is captured and stored in real-time in a robust database and is accessed by user interface software programs.

1.2 General

The system must:

A. Be an IP-based system that is field programmable and configurable.

B. Have the ability to interface with a computer display terminal.

C. Have user-configurable software for nurse console system computers.

D. Provide noninterrupted high quality, full duplex audio communication between patient/staff stations and nurse console station handset.

E. Have hot-swappable field devices.

F. Follow UL guidelines for network connectivity.

G. Conform to UL 1069 standards and equipment and be UL listed under NBRZ Hospital Signaling and Nurse Call Equipment. Submitting the UL listing cards describing the equipment by model number shall be proof of such listing.

H. Be manufactured and assembled in the United States and designed by the manufacturer to operate as a complete system. Items of equipment include wire and cable. All systems should state "Made in America".

These requirements must be met:

I. Provide a catalog of designs and materials with the system. The supplier is required to submit the manufacturer's complete service notes and drawings detailing all interconnections.

J. Consider alternate equipment only when submitted for approval by the hospital 10 days prior to opening of the bid.

K. Include a five-year warranty for all manufactured components and a one-year warranty for labor. A maintenance contract is not required from a factory-authorized distributor after the warranty is expired. Factory technical training shall be available on an on-going basis for facility employees at every facility in which the equipment is installed.

L. Factory technical training is available for the life of the system at no cost. Travel and per diem is the responsibility of the facility.

M.   Written confirmation on the type of speech offered includes full duplex, high quality speech (uninterrupted two-way speech).

N.   Systems using VOX circuitry (Voice Operated Switching) or push-to-talk audio are not acceptable. VOX systems that incorporate microphones in pillow speakers to simulate true duplex audio shall not be allowed.

1.3 Functionality

The system must have:

A.   Capability to utilize either SIP or analog audio.

B.   The ability to interface to VoIP.

C.   System must not require or rely on an owner furnished PBX for functionality to comply with UL 1069.

D.   Unlimited field expandability.

E.   Programmable priority levels for patient calls such as Routine, Priority, and Emergency.

F.   Programmable priority levels for staff calls such as staff emergency and code blue.

G.   Devices that are supervised and provide system failure alarms.

H.   Capability to immediately report the failure of any field device's microprocessor to a computer display.

I.   Capability to program the system to remotely cancel calls. See local code.

J.   Capability to configure all call types with assignable priorities, lights, and flash rates.

K.   The means to escalate a call to proper staff levels with specific request, with single touch at console system.

L.   Functionality to answer a call and send specific request to appropriate level of staff from console system.

M.   Capability to swing (move) patient calls between console systems.

N.   Password protection for critical and noncritical levels of system setup, allowing access to authorized personnel only.

O.   Call tone volume control (password protected) with automatic volume decrease at designated time of day (Quiet Mode). Quiet Mode can also affect radio pager beeping sequence.

P.   Capability to connect to a VPN connection for shop/factory troubleshooting, maintenance, reprogramming, and downloading future software upgrades.

Q.   Capability for patient calls to report to any master configured on the nurse call system.

R.   Allow all masters configured on the same network to operate independently of each other.

S.   Field programmable station functions that can be modified by factory certified technician.

System must have the ability to:

T.   Interface with a wireless communication system, such as (Vocera, Voalté, Polycom, etc. and pagers.)

U.   Support patient stations for controlling the patient room TV and lights.

V.   Interface with computerized system(s) to receive external equipment alarms and optionally report such alarms to the facility EMR/EHR.

W.   Create productivity reports.

X.   Support two-way signaling and text messaging between console systems.

Y.   Support two-way signaling and audio communication between console systems and audio-enabled devices.

Z.   Create unlimited audio paging zones.

AA.   Program any call type to transmit an automatic text message to any wireless pager, phone, or other wireless device.

BB.   Activate unlimited number of auxiliary signaling devices (ASD), connected to the system (i.e., zone dome lights or duty stations).

CC.   Interface with hospital ADT system via HL7 to automatically populate patient information.

DD.   Interface with infant security systems, IV pumps/medical devices, telemetry systems, etc., to receive calls and send emergency pages to appropriate levels of staff.

1.4   Nurse Console Station

The computer interface must:

A.   Include an on-screen keyboard in the software platform for sites with limited space requirements and/or when a desktop keyboard is absent.

B.   Provide map mode customization to allow an entire unit to be graphically viewed by staff. Calls to be displayed in each room with no limit on the number of simultaneously displayed calls. Patient requests, staff presence, and admitted patients may be visually displayed on the map.

C.   Display simultaneous and constant patient requests and staff location in either a list or graphical (map) format. Multiple staff level location displays should be separate and designated by unique colors.

D.   Display incoming calls by room number, bed number and call type. Call type to be differentiated by audible tone and screen color. Patient name may be configured to display on screen with each call. Hospital should designate

field programmable tones, colors, and flash rates. Settings can be changed at any time by factory-certified technician.

E.   Display recalled patient calls and service request not answered within an allotted amount of time. An elapse timer should indicate the length of time the call is in the system. The hospital should have the ability to set recall time limits for all individual call types and tasks for all levels of staff.

F.   Display original request upon recall with the ability to use the same or add additional requests as required.

G.   Display at all times the hospital name, floor/unit name, time of day, and system status indicators.

H.   Differentiate between male and female patients using color for the patient information screen and bed icons on the map.

I.   Allow on-site configuration of room numbers, zone paging, patient priority, zone lights, and duty station assignments. Any combination of alphanumeric room configurations are allowable to a maximum of nine characters.

J.   Provide auto-page feature (where applicable) to allow assigned staff to be paged automatically when any patient call is placed. The message on the wireless device must indicate location (room and bed) and the call type (Routine, Bath, etc.).

The computer interface must have the ability to:

A.   Place a call on hold while answering a higher priority call. Any number of calls can be placed on hold with an on-screen indicator of ON HOLD status while the elapsed timer continues to run.

B.   Support location mapping on all master models.

C.   Register and locate staff by constant display in either a list or graphical (map) format.

D.   View active staff requests on a monitor in either a list or graphical (map) format.

E.   Set patient status at the console system to be Routine, Priority, or Emergency. Call should display on-screen based on status and have unique tones and colors for each call type.

F.   Mute calls for a predetermined amount of time to allow staff to assist patients without annunciating the call at the console system.

Part 2.   General Overview

A. All nurse call system wiring must be in accordance with NEC and local codes. All components must be provided with plug-in connections to system wiring.

B. NEC or local codes must apply to all cables for support or installation in plenum spaces.

C. All cables must be labeled at termination or splice points.

D. Alternate equipment shall be considered only when submitted for approval by the hospital 10 days prior to opening of the bid.

E. Items of equipment supplied by a U.S. manufacturer must be acceptable for use in this nurse call system.

F. Part numbers designated may change according to the manufacturer's new product releases. The equipment specified must meet or exceed the specifications as outlined.

G. No deviation from the equipment specified in this document is acceptable.

H. The manufacturer has at least six installations of comparable systems and must supply a complete list of references with the bid.

I. All system service must be performed by an authorized factory servicing company. Emergency service installer to be on-site within four hours. General service to occur within a 24-hour window.

J. Where union rules or local ordinances prohibit the selling company to install the defined system, the selling company must have at least one factory-certified technician assigned to supervise the project.

K. Selling company must have at least one factory-certified installer for the installation.

2.2 Proposal Standards

Alternate proposals shall not be acceptable. All proposals must include the following:

A. Manufacturer's name, model numbers, and factory specification sheets for each equipment item supplied by the factory authorized distributor.

B. All function variations of equipment clearly indicated in written form and preapproved by the architect/owner 10 days prior to bid date.

2.3 Scope

A. Hospital is responsible for providing 120VAC outlets from the critical branch of the emergency power at designated locations.

B. Standard back-boxes are not provided.

C. System conforms to UL 1069 standards.

D. Local factory authorized distributor is responsible for code compliancy.

Part 3.   Head End Equipment

3.1 Voice over Internet Protocol (VoIP)

A.   General Description

The nurse call system must offer operation as either VoIP-based or traditional analog audio system. For a VoIP-based installation, the following specifications must apply:

1. Full duplex audio.
2. No external PBX required for operation.

Note: Systems that rely on a connection to an external, owner provided PBX is not acceptable. They are in direct violation of the system's UL 1069 listing.

3. PoE or external DC power source.
4. Downstream Ethernet port for additional devices (non-PoE).
5. DTMF generation, TIA 464B
6. Programmable call progress tones
7. SIPP: RFC 3261, 3262, 3263, 3264, 2327
8. Voice codecs: G.711, G.723, G.726, G.729A/B, iLBC
9. Wideband codecs: G.722.2, G.711.1
10. Echo canceller: G.167 (128ms tail length)
11. VAD, CNG, packet loss concealment (PLC)
12. Adaptive jitter buffer
13. Noise reduction
14. Equalizer
15. RTP/RTCP packetization: RFC 3550, 3551, 2198
16. DTMF relay: RFC 2833, RFC 4733
17. SRTP (Secured RTP) per RFC 3711, 128 bit AES
18. SIP TLS
19. STUN
20. Embedded Web
21. TFTP
22. Domes and nurse stations are VoIP devices
23. SIP proxy and call controller, typically one per floor
24. Ability to integrate with third-party VoIP PBX for call capability with wireless phone systems

3.2 Distribution Panel Networking

A.   General Description

The distribution panel is used with the nurse call system and consists of up to eight controller boards, audio controller, and network switch. All nurse call distribution panels must:

1. Have the ability to be networked.
2. Use standard network cabling.
3. Communicate over IP-based network.
4. Be able to run networked or independently from the network.
5. Support unlimited number of distribution panels to be networked together.
6. Support remote or local network-based configuration.

B.   Functionality

The distribution panel must have the ability to support:

1. Up to 128 dome lights.
2. Up to eight nurse console stations.
3. Notification of system failures.
4. Reporting for up to eight nurse console stations.
5. Eight external audio connections.
6. Full duplex audio.
7. Expansion by networking additional distribution panels.
8. Either surface or flush mount.
9. Notification of system failures.

3.3 Power Supply Module

A.   General Description

Power supply modules provide low voltage power to the nurse call system distribution panel.

Power supply modules must:

1. Provide low voltage power to all signaling field units for the nurse call system.
2. Provide independent replaceable power supplies and a 120VAC power outlet for plug-in type power connections.
3. Include high frequency switching, solid-state circuitry, electronic circuit breaker overload protection and a power LED.

B.   Functionality

A power supply module must have the ability to support:

1. Up to five individual power supplies.
2. An Uninterruptible Power Supply (UPS) to protect against power fluctuations and power outages.
3. Connectivity to the facility's critical branch of emergency power.
4. Maximum load of 80 dome lights.
5. Either surface or flush mount.

3.4   Home Run Module

A.   General Description

The remote Home Run Module (HRM) is responsible for the communication between the dome light network and the nurse console stations. The HRM must have:

1. Voltage test points.
2. Minimal mounting area.
3. **12"x12"** wall mount electrical enclosure.
4. LED status indicators.
5. Integrated power supply.

B.   Functionality

A Home Run Module must have the ability to support:

1. Up to 16 dome lights or 63 devices per HRM.
2. Unlimited networking capability.
3. Up to eight nurse console stations.
4. Notification of system failures.
5. Reporting for up to eight nurse console stations.
6. Eight external audio connections.
7. Full duplex audio.
8. Expansion by networking additional distribution panels.
9. Connection to an Uninterruptible Power Supply (UPS) to protect against power fluctuation and power outages.

Part 4. Nurse Console Station Equipment

4.1 Nurse Console Stations

A. General Description

Nurse console stations are available in multiple configurations, ranging from 10″ to 21″ display size. Each nurse console station is capable of displaying active calls, service requests, and staff locations in either graphical area map or list format. Nurse console stations must have:

1. Touch screen with integrated handset.
2. Graphical user interface.
3. Full duplex, high quality, two-way voice communication with adjustable volume.
4. Staff assignment and patient information.
5. Call list and active call list display, service request, and staff location capability via software.
6. Highly customizable features to meet nursing unit's needs.
7. Routine, priority, and emergency call annunciation throughout the NCS.
8. Unlimited call tones with adjustable volume level and repeat interval for each call type.
9. Capability for facility to control time and volume levels for Quiet Mode feature.
10. All functions and features listed in in Part 7 of this specification.

Nurse console stations must have the ability to support:

11. Information exchange of patient, staff, and other data between nurse consoles.
12. Cancellation of emergency and code calls only at the originating calling device.
13. Cancellation of routine calls from the device where the call originated, from any nurse console system assigned to receive call, or at a designated remote locator station.
14. Full messaging capability for pagers, text paging, and wireless devices with messaging interface software.
15. Ability to interface with the facility ADT information system with optional interface software.
16. Keyboard and mouse.
17. Active call LED to match dome light colors.
18. One-button switching between a call list mode and a graphical floor map mode.
19. Staff location mapping in either graphical floor map or list format.

4.2 Computer Display Terminal

A. General Description

The display terminal is used as a supplemental display with a 15″ touch screen monitor and is typically placed in a PBX room or other location where audio is not required from the patient room. The display terminal provides visual call display and sound only. The computer display terminal must have the ability to:

1. Configure call annunciation.
2. Configure call priority to determine call order.
3. Mute active calls so that new incoming calls produce sound.
4. Interface with paging system(s) to send alert pages to staff.
5. Use same .wav files as the nurse call system softwares applications for call tones and priorities.
6. Send staff information from another master or be manually entered.
7. Receive patient information from the database management application via ADT or be manually entered.
8. Support a mouse and keyboard.

4.3 Visual Indicator Panel

A. General Description

Used as an optional audible and visual annunciator for a facility or unit where audio communication to patient rooms is not required. The Visual Indicator Panel must have:

1. Ability to be an auxiliary/remote signaling device in areas that are not near the nurse's station or in another area where only the highest priority calls must annunciate.
2. Thirty-two segment, 4-gang annunciation panel.
3. IP-addressable on-board processor.
4. Front panel indicator windows with LEDs for 32 rooms.
5. Power/Status indicator LED.
6. Configurable LED flash rates, dome color, call priority, sound, and illumination patterns.
7. Ability to emulate nurse console station tones.
8. Ability to process up to 100 simultaneous calls.
9. Ability to annunciate up to 16 different alert types, from up to 64 unique addresses and 32 individual controllers.
10. Unlimited number of visual indicator devices on one nurse call network.
11. Ability to annunciate broad-area alerts similar to a duty station.
12. Capability of accepting calls from assigned controllers or centrals on the nurse call network.
13. Ability to adapt to one 1-, 2-, or 3-gang back-box using adapter ring.

4.4 Sequencer Device

A. General Description

The sequencer device is used to provide flow solution in coordination with i-Dome devices. The sequencer must support:

1. Up to 64 i-Dome devices.
2. Visual notification for workflow sequence.
3. IP-addressable, on-board processor.
4. Priority override feature for *next to be seen* mode.

Part 5. Patient Room Equipment

5.1 Dome Light

A. General Description

The dome light provides clear visual notification to staff members of a room's status. The dome light must have:

1. Long-life RGB LED lamps displaying up to 15 colors selections from a palette of approximately one million colors.
2. Ability to customize LED colors and flash rates on a per call type basis.
3. Solid, slow and fast flashing, and scrolling indications.
4. Built-in buzzer configurable for any call type.
5. Normal and emergency calls distinguished by different visual signals for positive identification of call priority.
6. Multisegmented luminary that allows multiple colors to be displayed simultaneously.
7. Adjustable LEDs through white balance control.
8. Power-up test sequence to verify proper LED illumination.
9. Wall or ceiling mounts for increased visibility from most angles.
10. Translucent lens sections, which allow maximum visibility in all directions under high ambient lighting conditions.
11. Optical contact closure input, configurable to any type of alarm.
12. Programmable contact closure output relay.
13. Ability to be used as zone light.
14. Automatic detection of attached devices during initial configuration.
15. Ability to report multiple connected devices as unique locations.
16. Network supervision.

5.2 Patient Stations

A. General Description

Patient stations are available in both a single or dual patient configuration. Patient stations must have:

1. Routine and Cancel buttons, with optional ¼" auxiliary input(s), Code Blue and Staff Emergency button(s) (4-gang single and dual patient stations).
2. An internal Mylar cone speaker (4-gang single and dual patient stations).
3. An internal two-way audio system to ensure communication if a pillow speaker or bed disconnects (4-gang single and dual patient stations).
4. Ability to adapt to one 1-, 2-, or 3-gang back-box using adapter ring.
5. Ability to be flush mounted directly to the back-box.
6. Ability to incorporate an easy-to-mount solid faceplate with station circuit boards attached.
7. Sub plates that can be removed or unsnapped only with the use of a tool.
8. Ability for full duplex audio when a pillow or external speaker is attached (1-gang single patient station).
9. Standard configuration of Routine, Cancel and Staff Emergency buttons. Code Blue option replaces Staff Emergency button (1-gang single patient station).
10. Compatibility with both VoIP and analog systems.
11. Cleaning mode to prevent accidental call placement.
12. Call assurance LED.
13. Unique call assurance tone based on button pressed.
14. Connectivity to the dome light.
15. Cord-out override without requiring dummy plugs.
16. External speaker connection.
17. Compatibility with patient bed interfaces.
18. Remote jack capabilities (except 1-gang single patient station).
19. Privacy LED that illuminates whenever microphone is active.
20. Support for television and room light controls.
21. Network supervision.
22. Configurable alert types.
23. Ability to accept requests from nurse console station.
24. Compatibility with side rail bed communications and bed exit emergency alarms.

5.3   Staff Station

A.   General Description

Used for voice communication between the nurse station and other nonpatient occupied areas such as nurses' lounge, waiting rooms, locker rooms, and break rooms. The Staff Station must have:

1. Standard configuration of Routine and Cancel buttons, with additional ¼" auxiliary input, Code Blue and Staff Emergency button options.
2. An internal Mylar cone speaker.
3. Buzzer to annunciate assigned duties.
4. An internal two-way audio system to ensure communication if a pillow speaker or bed disconnects.
5. Ability to adapt to one 1-, 2-, or 3-gang back-box using adapter ring.
6. Ability to be flush mounted directly to the back-box.
7. Ability to incorporate an easy-to-mount solid faceplate with station circuit boards attached.
8. Sub plates that can be removed or unsnapped only with the use of a tool.
9. Compatibility with both VoIP and analog systems.
10. Cleaning mode to prevent accidental call placement.
11. Call assurance LED.
12. Unique call assurance tone based on button pressed.
13. Connectivity to the dome light.
14. Cord-out override without requiring dummy plugs.
15. External speaker connection.
16. Compatibility with patient bed interfaces.
17. Remote jack capabilities.
18. Privacy LED that illuminates whenever microphone is active.
19. Support for television and room light controls.
20. Network supervision.
21. Configurable alert types.
22. Ability to accept requests from nurse console station.
23. Compatibility with side rail bed communications and bed exit emergency alarms.

5.4 Visual Patient Station

A.   General Description

The 1-gang Visual Patient Station is a standalone, nonaudio patient station. The Visual Patient Station must have:

1.   Standard 1/4" phono receptacle for call cord.
2.   Standard configuration to include Routine, Cancel, and Staff Emergency buttons. Code Blue option replaces Staff Emergency Button.
3.   Call assurance LED when call is placed.
4.   Flexibility to connect to other devices, dome lights, or controller.
5.   Unique call assurance tone based on button pressed.
6.   Ability for patient use of the call cord to signal for assistance.
7.   Automatically placed cord-out call when the cord set is unplugged from a receptacle.
8.   Fault call displayed if malfunction or disconnect occurs.
9.   Network supervision.
10. Support for a cord-out call override feature to eliminate the need for dummy plugs.
11. Field configurable contact closure output relay.

5.5 i-Dome Touch

A. General Description

This is a touch-screen device used outside of patient rooms. The i-Dome Touch interfaces with nurse call systems, patient beds, and wireless devices. The i-Dome Touch must have:

1. A mini-dome LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.
2. Flexibility to connect to other devices, dome lights or controller.
3. Ability to display patient and room status while maintaining privacy.
4. Unique call assurance tone based on button pressed.
5. Capability to be used as a standalone or integrated into a nurse call system
6. 4.5" color touch screen displaying patient and staff information.
7. Built-in speaker for call annunciation and feedback.
8. Three-gang mounting style with ability to mount to a 1-, 2-, or 3-gang box with optional adaptor plate.
9. Up to six rounding timers with visual status to remind staff to check on a patient or room state.
10. Up to six status timers with visual status for staff reminders.
11. Ability to show status from other devices, such as beds.
12. Environmental Services control of room state.
13. Ability to cycle between colors to show multiple status issues.
14. Capability to set patient attributes (NPO, fall risk, etc.) from device.
15. Optional Code Blue stat timer triggered by external event.
16. Network supervision.
17. Transport request paging function.
18. Lockout screen to prevent unauthorized access.
19. Field or remote configurable contact closure output relay.
20. Two configurable optically isolated inputs.

5.6 i-Dome, NV i-Dome2

A.   General Description

One-gang device used to alert staff to a variety of urgent conditions by displaying patient and room status via the mini-dome. The i-Dome must have:

1. A mini-dome LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.
2. Easy-to-operate, color-coded push buttons.
3. Three configurable switches for dome light color assignments.
4. Easy to clean, sealed, switches for infection control.
5. Flexibility to connect to other devices, dome lights or controller.
6. Ability to display patient and room status while maintaining privacy.
7. Unique call assurance tone based on button pressed.
8. Capability to be used as a standalone or integrated into a nurse call system.
9. Timer activation to remind staff to check on a patient or room status.
10. Ability to show status from other devices, such as beds.
11. Support for multiple states for each button.
12. Ability to cycle between colors to show multiple conditions.
13. Ability to display either patient or room status.
14. Network supervision.
15. Field or remote configurable contact closure output relay.
16. Two configurable optically isolated inputs.
17. Ability to duplicate all buttons and LED functions on a secondary device.

5.7 i-Status

A. General Description

Used when the functionality of an i-Dome is desired without the mini-dome on the front. The i-Status must have:

1. Ability to activate a remote LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.
2. Easy-to-operate, color-coded push buttons.
3. Three configurable switches for dome light color assignments.
4. Easy to clean, sealed, switches for infection control.
5. Flexibility to connect to other devices, dome lights or controller.
6. Ability to display patient and room status with remote LED.
7. Ability to show status from other devices with remote LED.
8. Ability to cycle between colors to show multiple conditions with remote LED.
9. Unique call assurance tone based on button pressed.
10. Capability to be used as a standalone or integrated into a nurse call system.
11. Timer activation to remind staff to check on a patient or room status.
12. Support for multiple states for each button.
13. Network supervision.
14. Field or remote configurable contact closure output relay.
15. Two configurable optically isolated inputs.
16. Ability to duplicate all buttons and LED functions on a secondary device.

5.8 Locator Station

A. General Description

Used in-room to illuminate the dome light to indicate that staff is present in the room. The Locator Station must have:

1. Easy-to-operate, color-coded push buttons.
2. Flexibility to connect to other devices, dome lights, or controller.
3. Flexibility to provide two to three levels of staff location (buttons).
4. Capability to remotely cancel associated patient station calls.
5. Unique call assurance tone based on button pressed.
6. Network supervision.
7. Field or remote configurable contact closure output relay.
8. Two configurable optically isolated inputs.
9. Ability to duplicate all buttons and LED functions on a secondary device.
10. Ability to activate a remote LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.

5.9   Push/Pull Station

A.   General Description

Used in patient rooms and other areas where priority calls require immediate and emergency attention. The Push/Pull stations must have:

1.   Visible call assurance LEDs indicating a call is placed.
2.   Large CANCEL button for cancellation of calls.
3.   Yellow push-for-assistance button and pull cord allow for two call types from the same device.
4.   Adjustable length pull cord for emergency calls.
5.   Water-resistant gasket for shower stations.
6.   Ability to connect to a remote water-resistant pull cord.
7.   Ability to utilize multiple pull cord options, such as antimicrobial, glow in the dark.
8.   Flexibility to connect to other devices, dome lights, or controller.
9.   Unique call assurance tone based on button pressed.
10. Network supervision.
11. Field or remote configurable contact closure output relay.
12. Two configurable optically isolated inputs.
13. Ability to duplicate all buttons and LED functions on a secondary device.
14. Ability to activate a remote LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.

5.10 Emergency Pull Cords

A. General Description

Used to alert staff members of the location where prompt emergency
 help is required. These devices must have:

1. Large color-coded labels for placement of calls.
2. Ability to display a visible call assurance LED when call is placed.
3. Large color-coded CANCEL or CANCEL AT TOILET label for cancellation of calls.
4. Flexibility to connect to other devices, dome lights, or controller.
5. Adjustable length pull cord that extends to the floor.
6. Ability to connect to a remote water-resistant pull cord.
7. Water-resistant gasket for shower stations.
8. Ability to utilize multiple pull cord options, such as antimicrobial, glow in the dark,
9. Unique call assurance tone based on button pressed.
10. Network supervision.
11. Field or remote configurable contact closure output relay.
12. Two configurable optically isolated inputs.
13. Ability to duplicate all buttons and LED functions on a secondary device.
14. Ability to activate a remote LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.

5.11 Remote Pull Cords

A.   General Description

This is a remote pull cord and LED used to alert staff members of the location where prompt emergency help is required. These devices must have:

1. Call activation location without requiring an additional address.
2. Large color-coded labels for placement of calls.
3. Ability to display a visible call assurance LED when call is placed.
4. Large color-coded CANCEL or CANCEL AT TOILET label for cancellation of calls.
5. Flexibility to connect to other devices, dome lights, or controller.
6. Adjustable length pull cord that extends to the floor.
7. Ability to connect to a remote water-resistant pull cord.
8. Ability to utilize multiple pull cord options, such as antimicrobial, glow in the dark.
9. Water-resistant gasket for shower stations.
10. Unique call assurance tone based on button pressed.
11. Network supervision.
12. Field or remote configurable contact closure output relay.
13. Two configurable optically isolated inputs.
14. Ability to duplicate all buttons and LED functions on a secondary device.
15. Ability to activate a remote LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.

5.12 Push Button Stations

A.   General Description

The push button stations are designed for placing specific staff initiated alarms. These devices must have:

1. Large color-coded descriptive buttons for placement and cancellation of calls.
2. Large CANCEL label for cancellation of calls, with exception of the emergency/code blue station.
3. Standard color coded buttons to include but not limited to: Help, Staff Emergency, Emergency, Code Apgar, Code Baby, Code ALS, Code Blue, Code Pink, Code White, Staff Call, Assist, combined Staff Emergency and Code Blue.
4. Capability for custom button verbiage and language.
5. Visible call assurance LED(s).
6. Flexibility to connect to other devices, dome lights, or controller.
7. Dry contact closure activated when button is pressed. Deactivated when the Cancel button is pressed.
8. Capability for all calls to annunciate locally at assigned nurses stations.
9. Defined call types that report to pagers and at PBX with programming.
10. Unique call assurance tone based on button pressed.
11. Network supervision.
12. Field or remote configurable contact closure output relay.
13. Two configurable optically isolated inputs.
14. Ability to duplicate all buttons and LED functions on a secondary device.
15. Ability to activate a remote LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.

5.13 Enhanced Duty Station

A. General Description

For remote call annunciation in areas such as nurse lounges, locker rooms, break rooms, soiled utility, clean utility, and med rooms. The duty station must have:

1. Multicolor LED.
2. Support for 16 different tone patterns.
3. Same call tones as nurse console configuration. Excludes custom tones.
4. Capability to temporarily silence using mute button.
    (Available with no mute button.)
5. Flexibility to connect to other devices, dome lights, or controller.
6. Network supervision.
7. Availability for value engineered option without same call tones as nurse console configuration.
8. Adjustable volume level for each call tone.
9. A mini-dome LED configurable for 15 dome colors and 7 flash assignments with ability to connect an additional remote lamp.

5.14 Bed Connectors

A. General Description

Bed connector devices are 1-gang stainless steel faceplates, each featuring a 37-pin receptacle. Each bed connector must have:

1. Dual color LED indicator display for current device status: standby mode, bed connected, bed disconnected.
2. Stainless steel faceplate.
3. Modular disconnect capabilities.
4. Ability to replace in field without termination changes.
5. Ability to connect with patient stations via 12-pin Panduit connectors.
6. Network supervision (excludes WC-BED2).
7. Ability to support for Stryker® iBED™ awareness features and interface license to Stryker iBED (NV-iBED2 only).
8. Support for standard 37-pin operation. Support cord-out override feature with no dummy plugs needed.
9. Support an optically isolated connection for the low voltage light controller.
10. Call assurance tone via connected patient station.

5.15 Optical Isolated Jack

A.   General Description

The optical isolated jack connects auxiliary hospital equipment such as IV pumps, exit pads, and ventilator alarms to the nurse call system. The device protects the nurse call system from high or rapidly changing voltage. The Optical Isolated Jack must have:

1.   Cord-out override without requiring dummy plugs.
2.   **Three standard ¼" phono** jacks.
3.   Multicolored port status LEDs for each jack.
4.   Unique identifier for each jack.
5.   Independently configurable jacks.
6.   Supervised jacks for cord-out alarm.
7.   Network supervision.

5.16 Speaker

A.   General Description

The speaker is a 1-gang device to provide enhanced audio away from a patient station or as an additional speaker.

5.17 Audio Extension Ring

A.   General Description

The audio extension ring is installed in conjunction with an in-room, 1-gang device for remote audio from patient station. The audio extension ring must have:

1.   Microphone for two-way communication (NV-AER only).
2.   One-gang remote audio device.
3.   Ability to install in-line a 1-gang device.

5.18 Pillow Speakers

A.   General Description

Used for conveniently contacting hospital personnel and managing patient room entertainment features. The pillow speaker is not required for two-way audio. The pillow speaker must have:

1.   Nurse call button.
2.   Three buttons, for use by patient, for special needs such as pain, water, and toilet.
3.   Ability to assign the appropriate care level to each pillow speaker button.
4.   Provision for enhanced model pillow speakers for digital television control.
5.   Television buttons for up/down channel, must, close caption, and on/off.
6.   Keypad for manually entering television channel numbers.
7.   Mylar coned speaker.
8.   10-pin modular plug.
9.   Ability to easily clean and sterilize.
10. UL-1069 listing with nurse call system.

B.   Optional Functions

1.   Room light controls.
2.   Numerical keypad for television control.
3.   Twelve-pin breakaway connector available.
4.   Headset feature for private listening of entertainment.
5.   TV (on/off/channel change) buttons.
6.   Volume control for incoming television audio.
7.   Pain Med and Bed Pan call buttons with universal symbols.
8.   Variety of controls governing patient entertainment systems (radio and television).

5.19 Strain Relief

A.   General Description

The strain relief extends the connection point from the patient station for the pillow speaker and provides a quick disconnect. The strain relief must have:

1.   10-pin male RJ-45 connector to patient station.
2.   10-pin female RJ-45 socket to pillow speaker.
3.   P-clip to attach cable portion of strain relief to patient.

5.20 Break-Away Cord

A.   General Description

The break-away cord extends the connection point from the patient station for the pillow speaker. Rated at seven pounds of pull. The break-away cord must have:

1.   RJ-45 style 10-pin connector to patient station.
2.   Medical style 12-pin connector to pillow speaker.
3.   Ability to not affect cord-out function when disconnected.
4.   P-clip to attach cable portion of strain relief to patient station.

Part 6. System Interfaces

6.1 Wireless Messaging Interface

The nurse call system can interface with wireless messaging systems that include, but are not limited to, pagers and wireless phones.

A. The Wireless Messaging Interface must have the ability to:

1. Simultaneously interface with multiple wireless device types.
2. Accept alerts and text messages from nurse console stations.
3. Accept alerts and text messages from external systems through web or custom interfaces.
4. Interface to to the nurse call system software.
5. Interface with standard paging systems using standard TAP (v1.8), ESPA 4.4.4.
6. Interface with third-party wireless communication systems, such as Vocera, Voalté, Spectralink, and Ascom.
7. Interface with third-party middleware, such as Emergin, Extension, and Amcomm.
8. Support additional output protocols, such as SMTP and SNPP. For example, automatically generates email to management for code blue alert.
9. Support either IP or RS-232 protocols.
10. Accept and route incoming voice communications from external systems.
11. Support passing priority and distinct tone to connected interfaces.

6.2 Local Positioning System Interface

The Local Positioning System interfaces with multiple Real Time Locating System (RTLS) vendors. The Local Positioning System software must have the ability to:

1. Light a patient room dome light to indicate staff presence by illuminating the assigned color lamp (up to four) when a staff member wearing a badge enters a patient room.
2. Allow Routine, Bed Pan, or Pain Med patient calls to be automatically canceled when staff of assigned level enters a patient room.
3. Support the nurse call system to have automatic location features such staff location display on the onscreen map, as low battery indication and badge log file.
4. Store staff location information in the reporting database for generating productivity reports on all patient calls.
5. Automatically escalate a routine call placed while staff present in room.
6. Interface with multiple RTLS vendors, such as AeroScout, Centrak, Sonitor, Versus, Visonic.

6.3   ADT Gateway Interface

The ADTGateway server software provides an interface between a hospital's admission/discharge/transfer system and the nurse call system.

ADTGateway must have the ability to:

1. Receive information from the hospital's Admit-Discharge-Transfer system in real-time.
2. Receive information using HL7, Version 2.x.
3. Receive information through a TCP/IP connection.
4. Support filtering.
5. Automatically populate predefined information in the appropriate patient information profile in the nurse call system.

Part 7. Nurse Call System Software

Nurse call system software is a combination of server programs and user interface software that together deliver a complete nurse call management system.

7.1 User Interface Software

The user interface software that runs on the nurse console station must have:

1. Ability to display all calls and staff locations via interactive map mode.
2. Ability to import and display custom floor plan.
3. Configurable menu task bar.
4. Ability to set user-defined call tones, colors, and verbiage.
5. Ability to set user-defined quiet mode parameters.
6. Ability to accept ADT HL7 input.
7. Ability to show, at all times, detailed patient attributes such as gender, fall risk, isolation requirements, etc., via icon or text.
8. Method to manually input detailed patient attributes into the nurse console station. (Not dependent on additional workstation.)
9. Ability to input staff and set assignments directly into the nurse console station. (Not dependent on additional workstation.)
10. Ability to accept staff information, scheduling, and assignments from an external system.
11. Call answer screen for all incoming alerts and requests which includes multiple one-touch task selection, patient information, acuity level, alert type, and other user-defined parameters.
12. Store unlimited preset alphanumeric messages sent to any combination of specific staff member(s), team(s) or individual pager numbers.
13. Use an auto-page mode to direct all call levels to the pager assigned to the bed placing the call. Hospital must have the ability to determine which level(s) of calls go to any or all of the pagers assigned to the bed.
14. Enable assigned staff member(s) to be paged automatically, using an auto-page feature, when any patient call is placed. Page message shows source of call (room, bed) and call type placed (Routine, Bath, Staff Emergency, etc.).
15. Automatic escalation allowing a support staff member to be paged if a primary staff member does not respond to call/request in a specified time period.
16. Supervisor Page feature allowing supervisory staff members to be automatically paged when a patient request is not completed the primary staff or support staff in a specified time period.
17. Ability to manually message desired staff member by team, room assignment, name, or wireless device ID.
18. Store the last eight manually input transmitted messages and recipients for easy repaging.

19. Assign any staff member to any wireless device or team.

20. Assign an unlimited number of staff to any patient bed.

21. Send an unlimited number of stored messages to any wireless device from any nurse console system in the system.

22. Ability to schedule user-defined messages.

23. Have patient alert routed directly to the staff member(s) or team(s) assigned to the patient. The nurse call system must continue to indicate the alert until the assigned staff member cancels the alert in the room or the patient alert is answered at the nurse console system. The wireless device must display: alert type, room and bed number of the alert, and patient need in plain English format.

24. Capability to swing (move) patient calls between console systems.

25. Password protection for critical and noncritical levels of system setup, allowing access to authorized personnel only.

26. Call tone volume control (password protected) with automatic volume decrease at designated time of day (Quiet Mode). Quiet Mode can also affect radio pager beeping sequence.

27. Automatic notification to Environmental Services on patient discharge.

28. Display at all times the room state on graphical floor map (clean, dirty, out-of-service).

29. Audio capabilities to provide simultaneous communication to configurable groups of rooms.

30. View and the ability to print real-time reports, such as staff assignment and patient information.

B.   Nurse Call System Web Interface

The nurse call system Web interface is a Web-based server software that provides access to many functions of the nurse console systems. This interface has the ability to:

1. Send text-based messages to wireless devices.

2. View and edit the patient room housekeeping status.

3. View staff members and edit profiles and room assignments.

4. View and edit patient profiles.

5. View the location of medical equipment (if used with a Real Time Locating System).

6. Apply security features to manage roles and accessibility.

C.   Data Management Application

D.   Data Management server software provides common functionality and data sharing across the facility network and nurse call network. This software has an automatic backup feature for disaster recovery and stores data and configurations for quick and easy updating or replacement of masters or other system server applications.

E.   FocusCare Manager

FocusCare Manager Server software controls scheduled events, such as clearing assignments for staff, pagers, badges, and support staff at a predetermined time after a shift ends. Manager also is used for setting i-Dome and i-Status attributes which include bed status, fall risk, isolation and NPO settings.

F.   Wireless Integration System

Wireless Integration system server software provides a general purpose, flexible interface between external products, services, data, and nurse call system software. It has the ability to interface to a paging system and/or a two-way wireless device system such as Spectralink, Ascom, or Vocera and accepts inputs from third-party systems to distribute to wireless devices.

See *Section 6.1* for software capabilities.

G.   Local Positioning System

The LPS is an automatic locating system server software that uses ultrasonic signals to provide extraordinarily accurate, real-time location of staff members and hospital equipment.

See *Wireless Messaging Interface* for software capabilities.

H.   ADTGateway

The ADTGateway server software provides an interface between a hospital's admission/discharge/transfer system and the nurse call system.

See *ADT Gateway* for software capabilities.

I.   Reporting and SQL Logging Application

TQI Logger is a server database tool that interfaces with an MS-SQL database and the report management application. The data is accessed by reporting software to generate management, patient, area, and call distribution reports.

TQI Logger has the ability to:

1. Receive data from all connected nurse console station on the nurse call system.
2. Process the data into individual files and store them on the MS-SQL database.
3. Provide a direct data link from a local positioning system, which feeds all locating data directly to the database.

J.   Report Management Application

Report Management software is a server application and Web-based reporting system featuring data gathering and reporting tools for users of the nurse call system. This application interfaces with an MS-SQL database and must have:

1. Ability to define, schedule, and run management, staff, patient, area, and call distribution reports based on nurse call events.
2. Ability to define reports based on call distribution by alert types, number of calls by alert type, and call response times.
3. Security features to manage roles and accessibility.
4. Ability to define reports based on time or date ranges.
5. Support for email notification, chart format, and printing.

K.   CareBoard Software

A Web-based software program that provides access to an online form for entering and updating patient-related information that displays on a monitor in each patient room.

FC CareBoard must have the ability to:

1. Automatically populates configurable patient and staff information from the nurse call system software.
2. Display active alerts from patient room.
3. Display the schedule for therapy, diagnostics, etc.
4. Display the patient's pain level.
5. Add important notes regarding patient care.
6. Display the status of personal items such as hearing aids and dentures.
7. Adjust the monitor brightness for day or night mode.

L.   FocusCare WhiteBoard Software

Used to display current status information for a set of beds and patients via a large-format display, typically in hallways or nursing areas.

FC WhiteBoard must have the ability to:

1. Fully integrates to the nurse call system software suite and optional Web interfaces.
2. Display changes made from the system software in real-time.
3. Support Stryker® iBed™ status directly from each bed.
4. Customize the color, font, number of rows, empty beds, and refresh delays.
5. Define the desired fields or headings to show on the monitor display.

M.   FocusCare PatientFlow Software

A Web-based software that provides access to functions for managing the intake process, patient flow, appointments, patient location, and staff assignments within a clinic facility.

FC PatientFlow must have the ability to:

1. View daily appointments.
2. View a care provider's patients.
3. View providers and edit their profiles.
4. Change a patient exam room.
5. Sort the day's appointments by patient, provider, time, or by room/lab.
6. See the location of a provider (an automatic locating system is required).
7. Apply security features to manage roles and accessibility.

Part 8. Training

8.1 In-Service Training

A.   All in-service training must include necessary handouts or user manuals.

B.   Nurse call system installing vendor must supply one in-service per year, minimum, at no additional charge to the hospital. Facility is responsible for scheduling one month in advance (minimum).

C.   The in-service must be coordinated with the nursing education department of the hospital and signed off by the nursing administration.

D.   Nursing staff of the facility must be thoroughly instructed in the use of the system by factory authorized distributor personnel. Such in-service must be provided in conjunction with the installation of the system equipment.

E.   Maintenance staff of the facility must have an introductory review of the system and installed components by factory authorized distributor personnel.

F.   Factory certified technician shall provide on-site training.

8.2 Factory Training

A.   A factory technical training seminar is provided at no additional cost to the facility. Travel and per diem is the responsibility of the facility.

B.   Training seminars are held at the nurse call system's manufacturing facility. Seminars are scheduled as needed and offer a minimum of two days of hands-on training to all hospital engineering and/or biomedical staff.

C.   Hospital personnel have access to this school for the life of the system.

D.   Factory provided on-site training must be available for an additional fee.

8.3 Warranty

A.   Full five (5) year warranty on all manufactured field equipment, and one (1) year on labor.

B.   Non-WestCall manufactured equipment warranty is based on equipment manufacturer's warranty.

Part 9. Contractor Requirements

9.1 The contractor must:

A. Be an authorized distributor for product supplied.

B. Produce an authorized distributor letter from manufacturer upon request of specifying authority.

C. Furnish all equipment, accessories, and material in strict accordance with specifications and applicable drawings as required for a nurse call system.

D. Ensure that the system meets or exceeds all requirements for states' health planning and development regulations, and state fire marshal building codes.

E. Ensure that the local system is installed per plans and specifications.

F. Have at least one factory certified installer responsible for the installation.

G. Hold all applicable state and local licenses. Copies must be available upon request.

H. Hold current manufacturers certification for system being installed.

I. Provide copy of technician certification upon request.

J. Have a four-hour response time for catastrophic system failures. Service must be offered 24 hours a day, 7 days a week, and 365 days a year.

Glossary

The terms and acronyms in this table are used in this specification.

Term	Definition
ADT	Admit-Discharge-Transfer
ASD	Auxiliary Signaling Device
Call assurance	A light or a beep tone indicating that the system recognizes that a call has been placed.
CNG	Comfort Noise Generation
DTMF	Dual Tone Multi-Frequency
ESPA 4.4.4	Serial data interface for paging equipment
HL7	Health Level Seven International
IDC	Insulation Displacement Connection
Jitter Buffer	Hardware device or software process that eliminates jitter caused by transmission delays in a VoIP network
NCS	Nurse Call System
OAI	Open Applications Interface
PBX	Private Branch Exchange
PoE	Power over Ethernet
RTCP	Real-Time Control Protocol
RTP	Real-Time Transport Protocol
SIP	Session Initiation Protocol
SOAP	Simple Object Access Protocol
SPDT	Single pull, double throw
SQL	Structured Query Language
STUN	Session Traversal Utilities for NAT
TAP	Telelocator Alphanumeric Protocol
TCP/IP	Transmission Control Protocol over Internet Protocol
TFT	Thin Film Transistor
TFTP	Trivial File Transfer Protocol
TLS	Transport Layer Security
VAD	Voice Activity Detection
Value engineered	The ability to provide the necessary functions in a product at the lowest cost, without sacrificing functionality.
VDC	Voltage Direct Current
VESA	Video Electronics Standards Association
VLN	Vocational Licensed Nurse
VOIP	Voice Over Internet Protocol
VOX	Voice Operated Switching
VPN	Virtual Private Network

Keywords

This addendum describes the keywords to indicated requirement levels in this specification. Interpret these keywords appearing in this specification document as described in the following table.

Term	Description
Ability	Able to perform this function. May require additional equipment and/or software.
Must Shall	These are absolute requirements.
Must Not Shall Not	These are absolute prohibitions.
Should Recommended	There may exist valid reasons in particular circumstances to ignore a particular item. However, the full implications must be understood and carefully weighed before choosing a different course.
Should Not Not Recommended	There may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful. However, the full implications must be understood and the case carefully weighed before choosing implementing any behavior described with these terms.
May Optional	An item is truly optional. Example: A vendor could choose to include an item because a certain marketplace requires it, or because a vendor feels it enhances a product, while another vendor may omit the same item.
Required	Capable of being expanded to include a feature, but not part of the standard product. May require additional equipment or software.
Unlimited	In all practical use, such as a typical installation, there is no limitation on quantity that can be used.