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<b>Sheet Information</b>		
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<b>Title</b>		

d) Overload elements in motor starters shall be adjusted and checked for suitability to the motor characteristics. Contractor shall replace any overloading element that is inadequate. The cause of any motor operating above full load rating should be investigated and the cause should be removed instead of increasing the overload relay trip rating. These operational tests shall determine that the installation is correct.

E. After all adjustments are complete, take current readings at full load using a clamp on ammeter and submit to Engineer for review and approval.

F. Check all systems and equipment grounds for proper value of resistance using the Megger ground tester in accordance with manufacturers standard instruction. Test insulation resistance of all new and affected existing feeders prior to energizing.

**21. FIRE STOPPING**

A. Drawings and general provisions of contract, including general and supplementary conditions and division specification sections, apply to work of this section.

B. Provide all required fire-stopping. Work includes fire stopping penetrations of fire-resistance rated floors, walls and partitions in new construction, as well as pre-existing penetrations in renovation areas of existing construction.

C. Product data: Submit manufacturer's product data for each fire-stopping product required, including instructions for substrate preparation and fire-stopping installation.

D. Fire resistant joint sealers: Provide manufacturer's standard fire-stopping sealant with accessories materials, having fire resistance ratings indicated as established by testing identical assemblies per ASTM E114 by Underwriters Laboratory, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction.

E. Materials - Provide the following:

- 1) One-part fire-stopping sealant. One part latex based incompressible sealant formulated for use in a through-penetration fire-stop system for sealing openings around cables, conduit, pipes and similar penetrations through walls and floors. Acceptable product/manufacturers include the following:
  - a) Spec Seal LC150 Series
  - b) HIF FS One

**22. DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS**

A. Submit written certification that electrical systems are complete and operational. Submit certification with Contractor's request for final review.

- 1) At the time of final review of electrical work, demonstrate the operation of electrical systems. Furnish labor, apparatus and equipment for systems' demonstration. The various tests shall be witnessed by the Owner or his Representative.

B. The Contractor shall furnish all test equipment, materials, labor, and temporary power hook-ups to perform start-up and all tests, as required obtaining field acceptance from Owner. All tests shall be conducted in the presence of the Owner or his Representative. All test procedures shall conform to this specification and applicable standards the ANSI, IEEE, NEMA, OSHA, NFPA, etc.

C. The Contractor shall be responsible for all tests and test record. Testing shall be performed by and under the immediate supervision of the Contractor. Test record shall be kept for each piece of equipment. Copies shall be furnished to the Engineer for review and/or approval.

D. A visual inspection of all electrical equipment, to check for the foreign material, tightness of wiring and connection, proper grounding, matching nameplate charts with specification, etc., shall be made prior to actual testing.

E. A complete operational test shall be made on the revised life safety fire alarm system. The Contractor shall consult with the equipment vendors and then submit for approval a step-by-step procedure describing the method of making the tests, the equipment to be utilized and the feature to be checked by the test. All interlocks and protective features shall be checked out.

**23. DESIGN MODIFICATIONS**

A. The drawings show electrical systems that supply, control, and/or monitor systems specified elsewhere. The electrical system shown has been based on specific manufacturers data or information conveyed to the electrical designer. Where any agreement or change is made to supply equipment of larger capacity or different electrical characteristics, the Contractor shall be responsible for providing the electrical system to reflect such changes within the intent of these specifications and to inform the Engineer in writing of such change. For example, if HVAC compressors and/or motors are allowed to be changed to 230 volts rather than the originally specified 208 volts, loadings or busbar transformers shall be supplied, installed, and wired to accommodate the change at no additional cost.

**24. NURSE CALL**

A. Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawing to provide a complete and operating Nurse/Patient Communications System for Maine Medical Center, Portland, ME.

B. All bids shall be based on the hospital's current standard equipment manufacturer mentioned herein. The catalog numbers, model designations and descriptions are the standard of Maine Medical Center, as manufactured by the Rauland Borg Corporation and as distributed by Signal Electronics Systems, Inc. H.C.G. Group, Nowell, MA 1400-444-9914, Fax: (781) 931-4757

C. Acceptable specified nurse call system(s) are as follows:

- 1) Rauland Responder System 4000

D. Furnish and install a "networked" Nurse / Patient Communications System(s) comprised of nurse consoles, patient stations, dome lights, entertainment cords, call cords, pull cord stations, emergency push buttons/codes 93 stations, etc., and wiring as shown on the drawings

E. All necessary equipment required to meet the intent of these specifications, whether or not enumerated within these specifications, shall be supplied and installed to provide a complete and operating nurse/patient communications network. Individual nurse call cabinet/system controllers shall be networked via a single Cat.5e x-bus cable for enhanced flexibility/functionality.

F. The System Supplier shall be an established communications and electronics contractor that has had and currently maintains a locally run and operated business for at least five years. The System Supplier shall hold all applicable state and local licenses.

G. The System Supplier shall employ technicians who have attended and successfully completed the manufacturer's technical certification classes for the proposed system.

H. The System Supplier shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system on a 24-hour 7-day basis. The System Supplier shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

I. All demonstrated equipment must be that of a standard single manufacturer and meet the same required testing and conditions that are applicable to the manufactured equipment. Custom or modified equipment that is not of standard, current manufacture cannot be demonstrated.

J. The owners specifying authority reserves the right to request samples of terminal (station) equipment for the purpose of coordinating colors, aesthetics, tripartite sizing, etc. These samples would be supplied at no cost to the owner.

K. It is the responsibility of the System Supplier to coordinate all work with the other trades for scheduling, rough-in, and finishing all work specified. The owner will not be liable for any additional costs due to missed trades or poor coordination of the supplying contractor with other trades.

L. The System Supplier shall provide a warranty on the system which shall include all necessary labor and equipment to maintain the system(s) in full operation for a period of one year from the date of acceptance.

M. In addition, the equipment (parts) warranty for all core system components including control / switching equipment, power supplies, patient stations, sub-stations, and nurse consoles shall extend to a total of at least five (5) years. Warranty for ancillary devices such as pillow speakers and call cords shall extend to a total of at least two (2) years.

N. Manufacturer shall provide, free of charge, product firmware/software upgrades throughout the warranty period for any product feature enhancements.

O. The owner may choose to have the supplying contractor maintain the system(s). The level of service provided during the maintenance contract period would be the same as the warranty period for routine and emergency service. All labor and equipment costs would be covered under this contract. Supplying contractor must state exact billing amounts, billing periods and all costs associated with this maintenance agreement and list any items that would not be covered under the service/maintenance agreement.

P. The nurse / patient communications system shall be listed by Underwriter's Laboratories under UL Standard 1063 - 5th Edition (or latest edition). Underwriter's Laboratories shall be the only acceptable NRTL for system listing.

Q. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical codes.

- 1) Contractor shall terminate all wiring with manufacturer approved connectors. The use of wire nuts is prohibited.
- 2) System shall employ a structured cable system consisting of standard 4-pair Category 5e cable to service all corridor lamps, and consoles.

- 3) All wiring shall test free from all grounds and shorts.
- 4) Wiring shall be UL listed, NEC and NFPA 70, Article 25 approved.
- 5) Nurse / Patient Communications System wiring shall not be run in the same conduit with other systems (i.e. Class 1 AC power distribution, fire alarm, entertainment systems, lighting controls, etc.).

R. Power Supplies - Provide ample power for control equipment, consoles, patient stations, sub-stations, and corridor lamps. All system power supplies must be UL1589 listed as an integral part of the core system. Power supplies which carry only component listings or are otherwise not part of the core system UL listing are not acceptable.

S. Battery Back-up - Provide battery back-up with ample reserve power to operate the entire system for a minimum of 10 minutes without operational limitations or loss of system functions.

T. Furnish as needed in each area a nurse/patient communications network hub controller. The system as a whole shall be capable of supporting at least 22 hub controllers. Each hub controller shall provide the following:

- 1) Support for at least 10 console clusters consisting of standard LCD consoles or annunciator panels.
- 2) Support for at least 150 rooms.

U. It shall be possible for network hub to act as stand alone controller should loss of network communication occur.

V. System Audio - The system shall be designed to provide audio meeting the minimum standards established by the National Electrical Manufacturers Association standard for nurse call system audio.

- 1) The system shall utilize 25 Volt balanced signal distribution between head end equipment and room stations.
- 2) Audio transmission between hub controllers shall be digital.

W. Call Priorities - The system shall support a minimum of 200 unique, user-definable call priorities.

- 1) Each call priority shall be reported via a user-defined mnemonic of up to 14 alphanumeric characters.
- 2) Selectable call-in tone level, and control light behavior for each type of priority.

X. The system shall support manual or automatic Staff Follow functions. When Staff Follow is enabled, call-tones for a prescribed area will automatically be forwarded to the room station speaker where staff members are located. Staff location may be determined manually by entering the room number into the console or automatically using staff register stations. Pressing the call button on that station shall answer the tones. When a new call is placed, the tones shall automatically be restored.

Y. The system shall allow staff members to audibly monitor selected rooms.

- 1) Manual Monitor - Staff members may listen in a selected room.
- 2) Sequential Monitor - Staff Members may enter a selected group of rooms for monitoring. The system will automatically switch from room to room allowing the staff member to sequentially monitor the rooms.
  - a) During monitoring, the staff member may press a button on the console to stop on the current room to listen longer and then press Return to restart the sequencing.
  - b) The staff member may adjust the line that the system spends on each room.
- 3) During Sequential Monitoring, the number of the room currently being monitored shall appear on the console.

Z. The system shall allow staff members to place a room in Privacy Mode to prevent unwanted or accidental audible monitoring of the room.

- 1) Rooms may be entered into or removed from Privacy by staff members using the console.
- 2) When a room that is in Privacy is dialed from a console or telephone, the staff member may speak into the room but they may not listen to the room.
  - a) Privacy in the room may be temporarily suspended to allow two-way communications by pressing the call-in button in the room. When the conversation is terminated, Privacy shall automatically be restored.
  - b) If a call-in is placed from the room, the call may be answered from the console as normal using two-way communications.
- 3) The rooms in privacy may be reviewed from the LCD console.
  - a) During the review process, rooms may be removed from Privacy mode.

AA. The system shall support audio paging from selected consoles.

- 1) All Page - Paging announcements may be made from a console to all room stations in the system.
- 2) Group Page - Announcements may be made to all room stations within a console's coverage area.
- 3) Staff Page - Announcements may be made to rooms in which staff members are registered.
- 4) Paging Announcements may be made to overhead speakers via a connection to the facility Public Address System.
- 5) To facilitate a low noise patient environment, the system will support the ability to block paging from selected consoles.
  - a) Consoles equipped with dual pads may be configured to allow passover/protection of the paging function to only allow authorized access to audio paging.

BB. System consoles shall be provided as indicated on the plans and drawings. All system consoles shall be UL1059 listed as an integral part of the core system. Telephones, personal computers or other devices which carry only component listings or are otherwise not part of the core system UL listing are not acceptable.

- 1) LCD consoles:
  - a) The LCD console shall be a small self-contained unit, which shall not occupy more than 87 square inches of desk space. The console shall include an easy-to-read 160-character backlit LCD display.
  - b) The console shall provide function selector buttons and a telephone-style T2 button and pad. Selector buttons may be used to access user-configured 24-function menu.
  - c) The console may display up to three incoming calls each with an individual elapsed timer indicating how long the call has been pending. Ability to scroll to see additional pending calls.
  - d) While idle, the console shall display the time of day. Time may be displayed in 12 or 24-hour format. Time display shall be consistent system wide.
  - e) Console shall include capabilities for both open voice (speaker / microphone) and telephone style handset. Audio direction (talk / listen) for speaker / microphone and handset may be accomplished via automatic voice switching (VOX) or manually via a Push-to-Talk button.
  - f) The highest priority (or longest pending) call may be answered automatically by lifting the handset or by pressing the Push-to-Talk button. Calls may be answered out of sequence using line selector buttons or by dialing the desired room number.
  - g) Console shall provide independent volume controls for day-night-in tones. A Mute button shall be provided to temporarily suppress tones for pending calls.
  - h) The console may be desk or wall mounted.
  - i) The console shall employ a modular quick-disconnect connector. It shall be possible to remove and/or replace the console without removing power from the system.

CC. Corridor Lamps (4-L.E.D. style) shall be provided as indicated on the plans and drawings.

- 1) Corridor Lamps shall utilize LEDs for high visibility, long life and low maintenance. Corridor Lamps utilizing incandescent lamps shall not be acceptable.
  - a) The corridor lamp shall make use of multiple colors and programmable flash rates and patterns to indicate pending calls, service requirements and staff presence.
- 2) Corridor Lamps shall serve as the hub for all room wiring. All field wire connections shall be accomplished using modular connectors.
- 3) Any Corridor Lamp shall be able to function as a Zone Lamp that shall visually announce calls from assigned rooms / stations without the use of a Zone Lamp controller such as a duty station.
- 4) The Corridor Lamp shall be equipped with a heat-treated LED to indicate the use of a Zone Lamp controller such as a duty station properly.
- 5) The Corridor Lamp shall accommodate a paper label to indicate the room number. The manufacturer shall provide, at no cost, laser-printing template software to create custom room labels.

DD. Room Stations (single w/ staff assist) shall be provided as indicated on the plans and drawings. Provide Rauland Model RAK145A.

- 1) Room Stations shall be equipped with:
  - a) DIN style receptacle(s) for call cord or pillow speaker.
  - b) Stations in areas requiring two-way communication shall be equipped with a speaker microphone with level matching transformer.
  - c) Minimum speaker size shall be 3.0" / 7.6 cm
  - d) Reset Button to cancel pending calls. Reset button shall be able to cancel calls from other stations in the room if desired.
  - e) Green LED(s) to indicate that audio to the station is active.
  - f) Red LED(s) to indicate call placement from one or both of the call points.
  - g) Built In Red Staff Emergency Button
- 2) Room Station functions shall include:
  - a) Calls from dual stations shall be announced independently.
  - b) Removing a call cord shall place a Cord Out call
  - c) Cord Out calls may be cancelled locally using the Cancel Button. No Cord Plug shall be required.
  - d) Room Stations shall support an optional module for interface to feature beds (Syber, Hill-Rom) side rail control including bed and alarming and entertainment ending.
- 3) Room Stations shall employ modular connectors. It shall be possible to service Room Stations without removing power from the system.
- 4) Room Stations shall support inputs from local equipment alarm contacts (e.g. ventilator, N drip, fire detector, etc.) to notify console of local alarm condition in patient room. There shall be at least four auxiliary call-in identifiers available.

EE. Staff Stations shall be provided as indicated on the plans and drawings. Provide Rauland/RKSS:

- 1) Staff Stations shall be equipped with:
  - a) Pushbutton for call placement.
  - b) Reset Button to cancel pending calls. Reset button shall be able to cancel calls from other stations in the room if desired.
  - c) Speaker microphone with level matching transformer.
  - d) Minimum speaker size shall be 3.0" / 7.6 cm
  - e) Green LED to indicate that audio to the station is active.
  - f) Red LED(s) to indicate call placement.
- 2) Staff Stations shall employ modular connectors. It shall be possible to service Staff Stations without removing power from the system.

FF. Duty Stations shall be provided as indicated on the plans and drawings. Duty Stations shall provide remote announcement of calls from assigned room stations.

- 1) Duty Stations shall be equipped with:
  - a) Pushbutton for call placement.
  - b) Reset Button to cancel pending calls. Reset button shall be able to cancel calls from other stations in the room if desired.
  - c) Speaker microphone with level matching transformer.
  - d) Minimum speaker size shall be 3.0" / 7.6 cm
  - e) Green LED to indicate that audio to the station is active.
  - f) LED's to mimic corridor lamps of assigned room stations.
- 2) Duty Station functions shall include:
  - a) Remote announcement of calls from assigned bedside stations and sub-stations via 4 LED's call tones. Call tones generated at duty station must be in synch with tones produced at closest nurse console.
- 3) Duty Stations shall employ modular connectors. It shall be possible to service Duty Stations without removing power from the system.

GG. Provide Sub-stations as indicated on the plans and drawings. Sub-station types shall include:

- 1) Pull Cord Stations - Pull cord sub-stations shall be water resistant with a PVC (poly-vinyl chloride) pull-cord, membrane reset button and covered call assurance LED. Unit may utilize remote cancel button for ease of nurse cancel when pull cord station is mounted in inaccessible location (e.g. ceiling).
- 2) Single Call Pushbutton Stations - Single Call Pushbutton stations shall be equipped with call button, reset button and call assurance LED.
  - a) Call Button shall be red in color and shall be large (minimum 2.0" / 5.0cm) for easy use.
  - b) Call Button shall be backlit for easy location identification in reduced light settings and shall be labeled to clearly define its function. Station shall be marked for "staff assist".
  - c) Reset button shall be able to cancel calls from other stations in the room if desired.
  - d) Provide clear plastic shroud with lift up cover (stopper cover) over station to prevent accidental station activation.
- 3) Dual Call Pushbutton Stations - Dual Call Pushbutton stations shall be equipped with two color coded call buttons, reset buttons and call assurance LED's.
  - a) Call Button shall be labeled to clearly define its function.
  - b) Call Buttons shall announce independently of one another.
  - c) Call Buttons shall be backlit for easy location / identification in reduced light settings and shall be labeled to clearly define its function.
  - d) Reset button shall be able to cancel calls from other stations in the room if desired.
  - e) Shall be color coded and marked as Code 99 and Staff Assist and be provided at the typical patient headwall.
  - f) Provide clear plastic shroud with lift up cover over station.
- 4) Four Button Room Status Station - Rauland HRMPM4M shall be equipped with (4) colored status touchpoints and status assurance LED's. When activated each button shall light a corridor light and LED annunciator status panel to indicate the room or patient status. Provide as shown on contract drawings.

HH. Patient Entertainment Pillow Speakers shall be provided as indicated on the plans and drawings. All Patient Entertainment Pillow Speakers / Call Cords shall be UL1589 listed as an integral part of the core system. Devices which carry only component listings or are otherwise not part of the core system UL listing are not acceptable.

- 1) Digital Patient Entertainment Speakers - Patient Entertainment Speakers shall be provided for patient call-in and entertainment system control / audio. Provide for every associated hospital grade wall television as shown on plans.
- 2) All control buttons including call buttons shall be raised and textured membrane style. Buttons shall be labeled graphically for easy identification of functions. Control buttons shall be Braille embossed.
- 3) Control buttons shall include:
  - a) Single easy to activate call button
  - b) Television / Radio controls as required.
  - c) Lighting Controls
- 4) The TV control mechanism shall be analog or digital as required by the facility television.
- 5) Cord shall be 10' / 3.00m and shall be modular for replacement by maintenance personnel. A sheet clip shall be attached to the cord.
- 6) Speaker (minimum size 2.25" / 5.7cm) shall be provided. Thumb-wheel volume control shall be provided.
- 7) Call Assurance LED shall be integral to the unit.
- 8) Cord Saver - All Patient Entertainment Speakers shall be provided with a 15' / 3.8m DIN style Cord Saver.

II. The system shall provide continuous self-diagnostics. The system shall also support advanced computer diagnostics by local or remote technical personnel.

- 1) All components in the system shall be continuously supervised for both power and signal to ensure proper operation and in the case of system faults to aid in troubleshooting.
- 2) The system shall be able to diagnose all network active components, controllers, control stations, and sub-station operation from any designated network data interface location, on or off site. Network administrator shall be able to:
  - a) Review system faults reported (i.e. station failure

JJ. System shall be installed, maintained and serviced by or under the supervision of manufacturer certified technicians.

KK. The System Supplier shall provide thorough training of all nursing staff assigned to those nursing units receiving new nurse/patient communications equipment. This training shall be developed and implemented to address two different types of staff. Floor nurses/staff shall receive training from their perspective, and likewise, unit secretaries (or any person whose specific responsibilities include answering patient calls and dispatching staff) shall receive operational training from their perspective.