DATE OF THIS VERSION (new)
June 1, 2013

TITLE OF DOCUMENT (new title if applicable):

DATE OF VERSION BEING SUPERSEDED (old):
February 1, 2009

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):
Intercommunications and Program Systems, 27 51 23

SUMMARY OF CHANGES IN THIS VERSION:

1. The Guarantee Period of Service clause has been removed from this spec. section. It has been replaced with a requirement to comply with FAR clause, Warranty. See Article 4.2.
SECTION 27 51 23
INTERCOMMUNICATIONS AND PROGRAM SYSTEMS

SPEC WRITER NOTES:
1. Edit between //-----// Delete if not applicable to project. Defer to VA TVE (005OP3B – see Paragraph 1.3.D for specific contact info) for technical assistance.
2. Included throughout this specification are references to the system’s interface capability and various related features. The system designer shall verify availability of this system and coordinate associated requirements and subsequent interface(s).

PART 1 - GENERAL

1.1 SECTION SUMMARY
A. Work covered by this document includes design, engineering, labor, material, products, guaranty, training and services for, and incidental to, the complete installation of a new and fully operating National Fire Protection Association (NFPA) Listed Emergency/Public Safety Public Address and Mass Notification communication (PA) system as detailed herein.
B. Work shall be complete, tested, labeled, certified and ready for operation

1.2 RELATED SECTIONS
A. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
B. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 Volts and Below)
C. Section 26 41 00, FACILITY LIGHTNING PROTECTION
D. Section 27 05 26, GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS
E. Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS
F. Section 27 10 00, STRUCTURED CABLES
G. Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING
H. Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS

1.3 DEFINITIONS
A. Provide: Design, engineer, furnish, install, connect complete, test, certify and warranty.
B. Work: Materials furnished and completely installed.
C. Review of contract drawings: A service by the engineer to reduce the possibility of materials being ordered which do not comply with
contract documents. The engineer's review shall not relieve the Contractor of responsibility for dimensions or compliance with the contract documents. The reviewer's failure to detect an error does not constitute permission for the Contractor to proceed in error.

D. Headquarters Technical Review, for National/VA communications and security, codes, frequency licensing, standards, guidelines compliance:

Office of Telecommunications
Special Communications Team (005OP2B)
1335 East West Highway – 3rd Floor
Silver Spring, Maryland 20910
(O) 301-734-0350, (F) 301-734-0360

E. Engineer: //XXXXXXX//
//XXXXXXX//
//XXXXXXX//
//XXXXXXX//
//XXXXXXX//

F. Owner: //XXXXXXX//

G. General Contractor (GC): //XXXXXXX//

H. Contractor: Radio Contractor; you; successful bidder.

1.4 REFERENCES

A. The installation shall comply fully with all governing authorities, laws and ordinances, regulations, codes and standards, including, but not limited to:

1. United States Federal Law and Codes:
a. Departments of:
   1) CFR, Title 15 – Department of Commerce, Under the Information Technology Management Reform Act (Public Law 104-106), the Secretary of Commerce approves standards and guidelines that are developed by the:
b) Chapter XXIII, National Telecommunications and Information Administration (NTIA – aka ‘Red Book’) Chapter 7.8/9

2) CFR, Title 29, Department of Labor, Chapter XVII - Occupational Safety and Health Administration (OSHA), Part 1910 - Occupational Safety and Health Standard:

a) Subpart 7 - Definition and requirements for a National Recognized Testing Laboratory (NRTL - 15 Laboratory’s, for complete list, contact http://www.osha.gov/dts/otpca/nrtl/faq_nrtl.html)
(1) Underwriter’s Laboratories (UL):

<table>
<thead>
<tr>
<th></th>
<th>Standard for Wired Cabinets.</th>
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<tr>
<td>65</td>
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<tr>
<td>468</td>
<td>Standard for Grounding and Bonding Equipment.</td>
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<tr>
<td>1449</td>
<td>Standard for Transient Voltage Surge Suppressors.</td>
</tr>
<tr>
<td>1069</td>
<td>Hospital Signaling and Nurse Call Equipment.</td>
</tr>
<tr>
<td>60950-1/2</td>
<td>Information Technology Equipment - Safety.</td>
</tr>
</tbody>
</table>

(2) Canadian Standards Association (CSA): same tests as for UL.
(3) Communications Certifications Laboratory (CCL): same tests as for UL.
(4) Intertek Testing Services NA, Inc. (ITSNA formerly Edison Testing Laboratory [ETL]): same tests as for UL.

c) Subpart 36, Design and construction requirements for exit routes.
d) Subpart 268, Telecommunications.
e) Subpart 305, Wiring methods, components, and equipment for general use.

3) Title 42, CFC, Department of Health, Chapter IV Health and Human Services, Subpart 1395(a)(b) Joint Commission on Accreditation of Healthcare Organizations (JCAHO) “a hospital
that meets JCAHO accreditation is deemed to meet the Medicare conditions of Participation by meeting Federal Directives:”
All guidelines for Life, Personal and Public Safety; and,
Essential and Emergency Communications.
4) All guidelines for Life, Personal and Public Safety; and,
Essential and Emergency Communications.
6) Public Law No. 100-527, Department of Veterans Affairs:
a) Office of Telecommunications:
   (1) Handbook 6100, Telecommunications.
b) Office of Cyber and Information Security (OCIS):
2. National Codes:
b. American National Standards Institute and Electronic Industries Association/Telecommunications Industry Association (ANSI/EIA/TIA):

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td>568-B</td>
<td>Commercial Building Telecommunications Wiring Standards:</td>
</tr>
<tr>
<td>569</td>
<td>Commercial Building Standard for Telecommunications Pathways and Spaces.</td>
</tr>
<tr>
<td>606</td>
<td>Administration Standard for the Telecommunications Infrastructure of Communications Buildings.</td>
</tr>
<tr>
<td>607</td>
<td>Commercial Building Grounding and Bonding Requirements for Telecommunications.</td>
</tr>
<tr>
<td>REC 127-49</td>
<td>Power Supplies.</td>
</tr>
<tr>
<td>RS 27</td>
<td>Tools, Crimping, Solderless Wiring Devices,</td>
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</tbody>
</table>
Recommended Procedures for User Certification.

c. Institute of Electrical and Electronics Engineers (IEEE):

<table>
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<tr>
<th>SO/TR 21730:2007</th>
<th>Use of mobile wireless communication and computing technology in healthcare facilities - Recommendations for electromagnetic compatibility (management of unintentional electromagnetic interference) with medical devices.</th>
</tr>
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<tbody>
<tr>
<td>0739-5175/08/$25.00©2008IEEE</td>
<td>Medical Grade - Mission Critical - Wireless Networks.</td>
</tr>
<tr>
<td>C62.41</td>
<td>Surge Voltages in Low-Voltage AC Power Circuits.</td>
</tr>
</tbody>
</table>

d. NFPA:

| 70 | National Electrical Code (current date of issue) - Articles 517, 645 and 800. |
| 75 | Standard for Protection of Electronic Computer Data- Processing Equipment. |
| 77 | Recommended Practice on Static Electricity. |
| 99 | Healthcare Facilities. |

3. State Hospital Code(s).
4. Local Codes.

1.5 QUALIFICATIONS

A. The OEM shall have had experience with three or more installations of Public Address Systems of comparable size and complexity with regards to type and design as specified herein. Each of these installations shall have performed satisfactorily for at least 1 year after final acceptance by the user. Include the names, locations and point of contact for these installations as a part of the submittal.

B. The Contractor shall submit certified documentation that they have been an authorized distributor and service organization for the OEM for a minimum of 3 years. The Contractor shall be authorized by the OEM to pass thru the OEM’s warranty of the installed equipment to VA. In addition, the OEM and Contractor shall accept complete responsibility
for the design, installation, certification, operation, and physical support for the system. This documentation, along with the system Contractor and OEM certifications must be provided in writing as part of the Contractor’s Technical submittal.

C. The Contractor’s Communications Technicians assigned to the system shall be fully trained, qualified, and certified by the OEM on the engineering, installation, operation, and testing of the system. The Contractor shall provide formal written evidence of current OEM certification(s) for the installer(s) as a part of the submittal or to the Resident Engineer before being allowed to commence work on the system.

D. Applicable national, state and local licenses.

E. Certificate of successful completion of OEM’s installation and training school for installing technicians of the equipment being proposed.

1.6 CODES AND PERMITS

A. Provide all necessary permits and schedule all inspections as identified in the contract’s milestone chart, so that the system is proof of performance tested and ready for operation on a date directed by the Owner.

B. The Contractor is responsible to adhere to all codes described herein and associated contractual, state and local codes.

1.7 SCHEDULING

A. After the award of contract, the Contractor shall prepare a detailed schedule (aka milestone chart) using “Microsoft Project” software or equivalent. The Contractor Project Schedule (CPS) shall indicate detailed activities for the projected life of the project. The CPS shall consist of detailed activities and their restraining relationships. It will also detail manpower usage throughout the project.

B. It is the responsibility of the Contractor 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 dates or poor coordination of the supplying contractor with other trades.

1.8 REVIEW OF CONTRACT DRAWINGS AND EQUIPMENT DATA SUBMITTALS

A. Submit at one time within 10 days of contract awarding, drawings and product data on all proposed equipment and system. Check for compliance
with contract documents and certify compliance with Contractor's "APPROVED" stamp and signature.

B. Support all submittals with descriptive materials, i.e., catalog sheets, product data sheets, diagrams, and charts published by the manufacturer. These materials shall show conformance to specification and drawing requirements.

C. Where multiple products are listed on a single cut-sheet, circle or highlight the one that you propose to use. Provide a complete and through equipment list of equipment expected to be installed in the system, with spares, as a part of the submittal. Special Communications (005OP3B - herein after referred to as 005OP3B) will not review any submittal that does not have this list.

D. Provide four copies to the PM for technical review. The PM will provide a copy to the offices identified in Paragraph 1.3.C and D, at a minimum for compliance review as described herein where each responsible individual(s) shall respond to the PM within 10 days of receipt of their acceptance or rejection of the submittal(s).

1.9 PROJECT RECORD DOCUMENTS (AS BUILTS)

A. Throughout progress of the work, maintain an accurate record of changes in Contract Documents. Upon completion of Work, transfer recorded changes to a set of Project Record Documents.

B. The floor plans shall be marked in pen to include the following:
   1. All device locations with labels.
   2. Conduit locations.
   3. Head-end equipment and specific location.
   4. Wiring diagram.
   5. Labeling and administration documentation.
   7. System test results.

1.10 WARRANTIES AND GUARANTY

A. The Contractor shall warrant the installation to be free from defect in material and workmanship for a period of 1 year from the date of acceptance of the project by the owner. The Contractor shall agree to remedy covered defects within 8 hours of notification of major failures or within twenty-four (24) hours of notification for individual station related problems.

B. Refer to Part 4 for applicable Warranty requirements.
1.11 USE OF THE SITE
A. Use of the site shall be at the GC’s direction.
B. Coordinate with the GC for lay-down areas for product storage and administration areas.
C. Coordinate work with the GC and their sub-contractors.
D. Access to buildings wherein the work is performed shall be directed by the GC.

1.12 DELIVERY, STORAGE, AND HANDLING
A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft.
B. Store products in original containers.
C. Coordinate with the GC for product storage. There may be little or no storage space available on site. Plan to potentially store materials off site.
D. Do not install damaged products. Remove damaged products from the site and replaced with new product at no cost to the Owner.

1.13 PROJECT CLOSE-OUT
A. Prior to final inspection and acceptance of the work, remove all debris, rubbish, waste material, tools, construction equipment, machinery and surplus materials from the project site and thoroughly clean your work area.
B. Before the project closeout date, the Contractor shall submit:
   1. Warranty certificate.
   2. Evidence of compliance with requirements of governing authorities such as the Low Voltage Certificate of Inspection.
   3. Project record documents.
   4. Instruction manuals and software that is a part of the system.
C. Contractor shall submit written notice that:
   1. Contract Documents have been reviewed.
   2. Project has been inspected for compliance with contract.
   3. Work has been completed in accordance with the contract.

PART 2 – PRODUCTS AND FUNCTIONAL REQUIREMENTS
2.1 GENERAL REQUIREMENTS FOR EQUIPMENT AND MATERIALS
A. Coordinate features and select components to form an integrated system. Match components and interconnections for optimum performance of specified functions.
B. Expansion Capability: Increase number of stations in the future by 25 percent above those indicated without adding any internal or external components or main trunk cable conductors.

C. Equipment: Modular type using solid-state components, fully rated for continuous duty unless otherwise indicated. Select equipment for normal operation on input power usually supplied at 110 to 130 V, 60 Hz.

D. Weather-Resistant Equipment: Listed and labeled by an OSHA certified National Recognized Testing Laboratory (NRTL - i.e. UL) for duty outdoors or in damp locations.

2.2 SYSTEM DESCRIPTION

A. The intercom system shall allow voice communication between wall-mounted intercom stations and a desktop (or wall-mounted) master station.

B. 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 and patient communications network.

C. Systems firmware shall be the product of a reputable firmware OEM of record with a proven history of product reliability and sole control over all source code. Manufacturer shall provide, free of charge, product firmware and software upgrades for a period of two years from date of acceptance by VA for any product feature enhancements. System configuration programming changes shall not require any exchange of parts and shall be capable of being executed remotely via a modem connection (when specifically approved by 005OP3B).

D. The Intercom System (IC) equipment shall be located in room // ____. The IC shall connect rooms(s) // ____. The IC shall provide zoned, one-way voice paging through distributed, wall-mounted units. Voice input into the IC shall be by zone from the main console at the // ____. 

E. When the IC system is approved to connect to a separate communications system (i.e. LAN, WAN, Telephone, Nurse Call, radio paging, wireless systems, etc) the connection point shall meet the following minimum requirements for each hard wired connection (note each wireless system connection MUST BE APPROVED PRIOR TO CONTRACT BID BY VA HEADQUARTERS 005OP3B AND 005OP2B):
1. UL 60950-1/2.
2. FIPS 142.
3. FCC Part 15 Listed Radio Equipment is not allowed.

F. Contractor is responsible for pricing all accessories and miscellaneous equipment required to form a complete and operating system. Unless otherwise noted in this Part, equipment quantities shall be as indicated on the drawings.

2.3 MANUFACTURERS

A. The products specified shall be new, UL Listed, and produced by OEM manufacturer of record.

B. The following equipment items are the salient requirements of VA to provide an acceptable system described herein.

2.4 FUNCTIONAL DESCRIPTION OF SWITCHED SYSTEMS

A. Manually Switched:

1. Master Station:
   a. Communicating selectively with other master and speaker-microphone stations by actuating selector switches.
   b. Communicating simultaneously with all other stations by actuating a single all-call switch.
   c. Communicating with individual stations in privacy.
   d. Including other master-station connections in a multiple-station conference call.
   e. Overriding any conversation by a designated master station.

2. Room Speaker-Microphone Station:
   a. Having privacy from remote monitoring without a warning tone signal at monitored station. Designated speaker-microphone stations have a privacy switch to prevent another station from listening and to permit incoming calls.
   b. Communicating hands free.
   c. Calling master station by actuating call switch.
   d. Returning a busy signal to indicate that station is already in use.
   e. Being free of noise and distortion during operation and when in standby mode.

3. Speakers: Free of noise and distortion during operation and when in standby mode.
B. Microprocessor-Switched:

1. Master Station:
   a. Communicating selectively with other master and speaker-microphone stations by dialing station's number on a 12-digit keypad.
   b. Communicating simultaneously with all other stations by dialing a designated number on a 12-digit key-pad.
   c. Communicating with individual stations in privacy.
   d. Including other master-station connections in a multiple-station conference call.
   e. Accessing separate paging speakers or groups of paging speakers by dialing designated numbers on a 12-digit keypad.
   f. Overriding any conversation by a designated master station.
   g. Displaying selected station.
   h. Volume Control: Regulates incoming-call volume.
   i. Identifies calling stations and stations in use. LED remains on until call is answered.
   j. Momentary audible tone signal announces incoming calls.
   k. Handset with Hook Switch: Telephone type with 18-inch long, permanently coiled cord. Arrange to disconnect speaker when handset is lifted.
   l. Reset Control: Cancels call and resets system for next call.
   m. Equipment Cabinet: Comply with TIA/EIA-310-D. Lockable, ventilated metal cabinet houses terminal strips, power supplies, amplifiers, system volume control, and other switching and control devices required for conversation channels and control functions.
   n. Vertical Equipment Rack:
      1) 28” (16RU) rack space. Welded Steel construction. Minimum 78” usable depth. Adjustable front mounting rails.
      2) Install the following products in rack provided by same manufacturer or as specified:
         a) Security screws w/ nylon isolation bushings.
         b) Textured blank panels.
         c) Custom mounts for components without rack mount kits.
         d) Security covers.
         e) Copper Bus Bar.
f) Power Sequencer- rack-mounted power conditioner and 
(provide as-needed) delayed sequencer(s) with (2) 
unswitched outlets each and contact closure control inputs.

2. Room Speaker-Microphone Station:
   a. Having privacy from remote monitoring without a warning tone 
signal at monitored station. Designated speaker-microphone 
stations have a privacy switch to prevent another station from 
listening and to permit incoming calls.
   b. Communicating hands free.
   c. Calling master station by actuating call switch.
   d. Returning a busy signal to indicate that station is already in 
use.
   e. Being free of noise and distortion during operation and when in 
standby mode.

C. Wireless:
   1. Radio Paging Equipment and Systems:
      a. The IC system shall have the ability to interface ONLY with VA 
Certified and Licensed radio paging system (FCC Part 15 listed 
pagers and transmitters are not allowed for “Safety of Life” 
functions or installed in those specific areas. VA Headquarters 
TVE - 005OPB2 and SM - 005OPB2 are the ONLY approving authorities 
for this function) and must have the following minimum system 
features:
         1) Ability to pass-through location information (such as a room 
number) and call-type as well as other text messages 
simultaneously to shift supervisor identified staff members 
2) System shall allow the operator to select staff members by 
name and pager number and to select a message consisting of a 
room number and a condition code (aka priority level). 
Operator may also choose to type in a unique alpha-numeric 
text message (the text message shall meet or exceed all HIPA 
and VA OCIS Communications Security Guidelines for the 
transmission of Patient or Staff Specific information [aka 
PII] - VA Headquarters TVE - 005OP2B is the approving 
authority for this function) into the system to be read by the 
holder of the pager unit.
3) While a patient station is connected to the nurse’s master 
station, the system shall allow the operator to automatically
page the staff member assigned to that room. An alternate
staff member may be selected for paging purposes in place of
the primary staff member. The system must allow an alternate
staff member to be paged when the primary staff member is
unable to respond to patient’s needs within a specified period
of time. The system must have the ability to assign any bed to
any pager or pager group, and to assign an unlimited amount of
pagers to any patient bed.

4) System shall have the ability to send all code blue calls to
staff members by predetermined group (as required)
automatically by simply pressing one “Code Blue” button. Pager
shall indicate room number of code call, and state “Code Blue”
in plain English format on pagers (FCC Part 15 listed pagers
are not allowed to be use as “Safety of Life” functions or
those specific locations. VA Headquarters TVE - 005OP2B is the
approving authority for this requirement).

2. Personal Wireless Communicator:
   a. The IC system will only be allowed to connect to the personal
      wireless communications system, pass text data and provide a 2-
      way communication between the Telephone Interface and the
      personal wireless communicator as long as it is not a FCC Part 15
      listed device(s), meets or exceeds UL 60950-1/2, meets OCIS Guide
      Lines for FIPS 140-2 certification and the using staff shows an
      extensive training program along with recertification(s)
      according to the Facility Emergency Plan concerning HIPA
      requirements.
   b. VA Headquarters TVE - 005OP3B and SM - 005OP2B are the approving
      authority for this requirement.

3. Other Wireless Equipment/Systems:
   a. Each proposed wireless system and/or equipment to be connected to
      or be a part of the IC system, each shall meet the minimum
      requirements outlines in Paragraph 2.7.A.
   b. Contact TVE - 005OP3B and SM - 005OP2B for specific required pre-
      approvals (full or conditional) as described herein.

2.5 HEAD-END EQUIPMENT

A. Provide all required power supplies, communications hubs, network
   switches, intelligent controllers and other devices necessary to form a
complete system. Head-end components may be rack mounted or wall mounted in a metal enclosure.

B. Provide the head-end equipment in the closed telecommunications closet where the IC system is installed to include at a minimum the equipment listed in Paragraph 2.3.

C. Provide minimum of 15 minute battery back-up to system components.

D. Equipment Cabinet: Comply with TIA/EIA-310-D. Lockable, ventilated metal cabinet houses terminal strips, power supplies, amplifiers, system volume control, and other switching and control devices required for conversation channels and control functions.

E. Vertical Equipment Rack, Wall Mounted (to be included inside of the Equipment Cabinet):
   1. 28” (16RU) rack space. Welded Steel construction. Minimum 20” usable depth. Adjustable front mounting rails.
   2. Install the following products in rack provided by same manufacturer or as specified:
      a. Security screws w/ nylon isolation bushings.
      b. Textured blank panels.
      c. Custom mounts for components without rack mount kits.
      d. Security covers.
      e. Copper Bus Bar.
      f. Power Sequencer- rack-mounted power conditioner and (provide as-needed) delayed sequencer(s) with (2) unswitched outlets each and contact closure control inputs.

2.6 SYSTEM CABLES

A. Refer to OFM approved Master Construction Specification, SECTION 27 10 00, STRUCTURED CABLING for specific installation and testing requirements.

B. Conductors: Jacketed, twisted pair and twisted multipair, untinned solid copper. Sizes as recommended by system manufacturer, but no smaller than No. 22 AWG.

C. Insulation: Thermoplastic, not less than 1/32 inch thick.

D. Shielding: For speaker-microphone leads and elsewhere where recommended by manufacturer; No. 34 AWG, tinned, soft-copper strands formed into a braid or equivalent foil.

E. Minimum Shielding Coverage on Conductors: 60 percent.

F. All cabling shall be // plenum // // riser // rated.
G. Provide one spare 1,000 foot roll of approved system (not microphone) cable only.

2.7 RACEWAYS

A. Intercommunication and Program System Raceways and Boxes: Comply with requirements in Division 26, Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.

B. Each raceway that is open top, shall be: UL certified for telecommunications systems, partitioned with metal partitions in order to comply with NEC Parts 517 and 800 to “mechanically separate telecommunications systems of different service, protect the installed cables from falling out when vertically mounted and allow junction boxes to be attached to the side to interface “drop” type conduit cable feeds.

C. Intercommunication System Cable Infrastructure: EMT or in J-hooks above accessible ceilings, 24 inches on center.

D. Junction boxes shall be not less than 2-1/2 inches deep and 6 inches wide by 6 inches long.

E. Flexible metal conduit is prohibited unless specifically approved by 005OP3B.

F. Install manufactured conduit sweeps and long-radius elbows whenever possible

2.8 SYSTEM CONDUIT

A. The nurse call/code blue system is NFPA listed as Emergency/Public Safety Communication System that requires the entire system to be installed in a separate conduit system.

B. The use of centralized mechanically partitioned wireways may be used to augment main distribution conduit on a case by case basis when specifically approved by VA Headquarters (005OP3B).

2.9 CONDUIT SLEEVES

A. The Engineer has made a good effort to identify where conduit sleeves through full-height and fire rated walls on the drawings, and has instructed the electrician to provide the sleeves as shown on the drawings.

B. While the sleeves shown on the drawings will be provided by others, the contractor is responsible for installing conduit sleeves and fire-proofing where necessary. It is often the case, that due to field conditions, the nurse-call cable may have to be installed through an alternate route. Any conduit sleeves required due to field conditions
or those omitted by the engineer shall be provided by the cabling contractor.

2.10 DEVICE BACKBOXES

A. Furnish to the electrical contractor all backboxes required for the PAS devices.

B. The electrical contractor shall install the backboxes as well as the system conduit. Coordinate the delivery of the backboxes with the construction schedule.

2.11 UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. Provide a backup battery or a UPS for the system to allow normal operation and function (as if there was no AC power failure) in the event of an AC power failure or during input power fluctuations for a minimum of 15 minutes.

B. As an alternate solution, the telephone system UPS may be utilized to meet this requirement at the head-end location, as long as this function is specifically approved by the Telephone Contractor and the RE.

C. The PA Contractor shall not make any attachments or connection to the telephone system until specifically directed to do so, in writing, by the RE.

D. Provide UPS for all active system components including but not limited to:
   1. System Amplifiers.
   2. Microphone Consoles.
   3. System Interface Units.
   4. Head-end Equipment Rack(s).

PART 3 – EXECUTION

3.1 PROJECT MANAGEMENT

A. Assign a single project manager to this project who will serve as the point of contact for the Owner, the General Contractor, and the Engineer.

B. The Contractor shall be proactive in scheduling work at the hospital, specifically the Contractor will initiate and maintain discussion with the general contractor regarding the schedule for ceiling cover up and install cables to meet that schedule.

C. Contact the Office of Telecommunications, Special Communications Team (005OP3B) at (301) 734-0350 to have a VA Certified Telecommunications COTR assigned to the project for telecommunications review, equipment
3.2 COORDINATION WITH OTHER TRADES

A. Coordinate with the cabling contractor the location of intercom equipment in the Telecommunications Closets.

B. Before beginning work, verify the location, quantity, size and access for the following:
   1. Isolated ground AC power circuits provided for systems.
   2. Junction boxes, wall boxes, wire troughs, conduit stubs and other related infrastructure for the systems.
   3. System components installed by others.
   4. Overhead supports and rigging hardware installed by others.

C. Immediately notify the Owner, General Contractor and Consultant in writing of any discrepancies.

3.3 NEEDS ASSESSMENT

Provide a one-on-one meeting with the particular nursing manager of each unit affected by the installation of the new nurse call/code blue system. Review the floor plan drawing, educate the nursing manager with the functions of the equipment that is being provided and gather details specific to the individual units; coverage and priorities of calls; staffing patterns; and other pertinent details that will affect system programming and training.

3.4 INSTALLATION

A. General:
   1. Execute work in accordance with National, State and local codes, regulations and ordinances.
   2. Install work neatly, plumb and square and in a manner consistent with standard industry practice. Carefully protect work from dust, paint and moisture as dictated by site conditions. The Contractor will be fully responsible for protection of his work during the construction phase up until final acceptance by the Owner.
   3. Install equipment according to OEM’s recommendations. Provide any hardware, adaptors, brackets, rack mount kits or other accessories recommended by OEM for correct assembly and installation.
4. Secure equipment firmly in place, including receptacles, speakers, equipment racks, system cables, etc.:
   a. All supports, mounts, fasteners, attachments and attachment points shall support their loads with a safety factor of at least 5:1.
   b. Do not impose the weight of equipment or fixtures on supports provided for other trades or systems.
   c. Any suspended equipment or associated hardware must be certified by the OEM for overhead suspension.
   d. The Contractor is responsible for means and methods in the design, fabrication, installation and certification of any supports, mounts, fasteners and attachments.
5. Finishes for any exposed work such as plates, racks, panels, speakers, etc. shall be approved by the Architect, Owner and 005OP3B.
6. Coordinate cover plates with field conditions. Size and install cover plates as necessary to hide joints between back boxes and surrounding wall. Where cover plates are not fitted with connectors, provide grommeted holes in size and quantity required. Do not allow cable to leave or enter boxes without cover plates installed.

B. Equipment Racks:
1. Fill unused equipment mounting spaces with blank panels or vent panels. Match color to equipment racks.
2. Provide security covers for all devices not requiring routine operator control.
3. Provide vent panels and cooling fans as required for the operation of equipment within the OEM' specified temperature limits. Provide adequate ventilation space between equipment for cooling. Follow manufacturer’s recommendations regarding ventilation space between amplifiers.
4. Provide insulated connections of the electrical raceway to equipment racks.
5. Provide continuous raceway/conduit with no more than 40 percent fill between wire troughs and equipment racks for all non-plenum-rated cable. Ensure each system is mechanically separated from each other in the wireway.

C. Wiring Practice: In addition to the mandatory infrastructure requirements outlined in VA Construction Specification, Section 27 10
STRUCTURED CABLING, the following additional practices shall be adhered to:

1. Comply with requirements for raceways and boxes specified in Division 26, Section 27 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.

2. Execute all wiring in strict adherence to the National Electrical Code, applicable local building codes and standard industry practices.

3. Where raceway is to be EMT (conduit), wiring of differing classifications shall be run in separate conduit. Where raceway is to be an enclosure (rack, tray, wire trough, utility box) wiring of differing classifications which share the same enclosure shall be mechanically partitioned and separated by at least 4 inches. Where wiring of differing classifications must cross, they shall cross perpendicular to one another.

4. Do not splice wiring anywhere along the entire length of the run. Make sure cables are fully insulated and shielded from each other and from the raceway for the entire length of the run.

5. Do not pull wire through any enclosure where a change of raceway alignment or direction occurs. Do not bend wires to less than radius recommended by manufacturer.

6. Replace the entire length of the run of any wire or cable that is damaged or abraided during installation. There are no acceptable methods of repairing damaged or abraided wiring.

7. Use wire pulling lubricants and pulling tensions as recommended by the OEM.

8. Use grommets around cut-outs and knock-outs where conduit or chase nipples are not installed.

9. Do not use tape-based or glue-based cable anchors.

10. Ground shields and drain wires as indicated by the drawings.

11. Field wiring entering equipment racks shall be terminated as follows:
   a. Provide ample service loops at harness break-outs and at plates, panels and equipment. Loops should be sufficient to allow plates, panels and equipment to be removed for service and inspection.
   b. Line level and speaker level wiring may be terminated inside the equipment rack using specified terminal blocks (see “Products.”)
Provide 15 percent spare terminals inside each rack. Microphone level wiring may only be terminated at the equipment served.

c. If specified terminal blocks are not designed for rack mounting, utilize 3/4 inch plywood or 1/8 inch thick aluminum plates/blank panels as a mounting surface. Do not mount on the bottom of the rack.

d. Employ permanent strain relief for any cable with an outside diameter of 1 inch or greater.

12. Use only balanced audio circuits unless noted otherwise

13. Make all connections as follows:
   a. Make all connections using rosin-core solder or mechanical connectors appropriate to the application.
   b. For crimp-type connections, use only tools that are specified by the manufacturer for the application.
   c. Use only insulated spade lugs on screw terminals. Spade lugs shall be sized to fit the wire gauge. Do not exceed two lugs per terminal.
   d. Wire nuts, electrical tape or “Scotch Lock” connections are not acceptable for any application.

D. Cable Installation - In addition to the mandatory infrastructure requirements outlined in VA Master Construction Specification, Section 27 10 00, STRUCTURED CABLING, the following additional practices shall be adhered to:

1. Support cable on maximum 4’-0” centers. Acceptable means of cable support are cable tray, j-hooks, and bridal rings. Velcro wrap cable bundles loosely to the means of support with plenum rated Velcro straps. Plastic tie wraps are not acceptable as a means to bundle cables.

2. Run cables parallel to walls.

3. Install maximum of 10 cables in a single row of J-hooks. Provide necessary rows of J-hooks as required by the number of cables.

4. Do not lay cables on top of light fixtures, ceiling tiles, mechanical equipment, or ductwork. Maintain at least 2’-0” clearance from all shielded electrical apparatus.

5. All cables shall be tested after the total installation is fully complete. All test results are to be documented. All cables shall pass acceptable test requirements and levels. Contractor shall remedy any cabling problems or defects in order to pass or comply
with testing. This includes the re-pull of new cable as required at no additional cost to the Owner.

6. Ends of cables shall be properly terminated on both ends per industry and OEM’s recommendations.

7. Provide proper temporary protection of cable after pulling is complete before final dressing and terminations are complete. Do not leave cable lying on floor. Bundle and tie wrap up off of the floor until you are ready to terminate.

8. Cover the end of the overall jacket with a 1 inch (minimum) length of transparent heat-shrink tubing. Cut unused insulated conductors 2 inches (minimum) past the heat-shrink, fold back over jacket and secure with cable-tie. Cut unused shield/drain wires 2 inches (minimum) past the Heat-shrink and serve as indicated below.

9. Cover shield/drain wires with heat-shrink tubing extending back to the overall jacket. Extend tubing 1/4 inch past the end of unused wires, fold back over jacket and secure with cable tie.

10. For each solder-type connection, cover the bare wire and solder connection with heat-shrink tubing.

11. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.

12. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.

13. Bundle, lace, and train conductors to terminal points without exceeding OEM’s limitations on bending radii. Install lacing bars and distribution spools.

14. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used.

15. Cable shall not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.

16. Separation of Wires: (Refer to Raceway Installation) Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches apart for speaker microphones and adjacent parallel power and telephone wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.
17. Serve all cables as follows:

a. Cover the end of the overall jacket with a 1 inch (minimum) length of transparent heat-shrink tubing. Cut unused insulated conductors 2 inches (minimum) past the heat-shrink, fold back over jacket and secure with cable-tie. Cut unused shield/drain wires 2 inches (minimum) past the Heat-shrink and serve as indicated below.

b. Cover shield/drain wires with heat-shrink tubing extending back to the overall jacket. Extend tubing 1/4 inch past the end of unused wires, fold back over jacket and secure with cable tie.

c. For each solder-type connection, cover the bare wire and solder connection with heat-shrink tubing.

E. Labeling:

1. Clearly, consistently, logically and permanently mark switches, connectors, jacks, relays, receptacles and electronic and other equipment.

2. Engrave and paint fill all receptacle panels using 1/8” (minimum) high lettering and contrasting paint.

3. For rack-mounted equipment, use engraved Lamacoid labels with white 1/8 inch (minimum) high lettering on black background. Label the front and back of all rack-mounted equipment.

4. Where multiple pieces of equipment reside in the same rack group, clearly and logically label each indicating to which room, channel, receptacle location, etc. they correspond.

5. Permanently label cables at each end, including intra-rack connections. Labels shall be covered by the same, transparent heat-shrink tubing covering the end of the overall jacket. Alternatively, computer generated labels of the type which include a clear protective wrap may be used.

6. Contractor’s name shall appear no more than once on each continuous set of racks. The Contractor’s name shall not appear on wall plates or portable equipment.

7. Ensure each OEM supplied equipment has appropriate UL Labels/Marks for the service the equipment is performed permanently attached and marked. Equipment installed not bearing these UL marks will not be allowed to be a part of the PAS System. The Contractor shall bear all costs required to provide replacement equipment with approved UL marks.
3.5 PROTECTION OF NETWORK DEVICES

Contractor shall protect network devices during unpacking and installation by wearing manufacturer approved electrostatic discharge (ESD) wrist straps tied to chassis ground. The wrist strap shall meet OSHA requirements for prevention of electrical shock, should technician come in contact with high voltage.

3.6 CUTTING AND PATCHING

A. It shall be the responsibility of the contractor to keep their work area clear of debris and clean area daily at completion of work.

B. It shall be the responsibility of the contractor to patch and paint any wall or surface that has been disturbed by the execution of this work.

C. The Contractor shall be responsible for providing any additional cutting, drilling, fitting or patching required that is not indicated as provided by others to complete the Work or to make its parts fit together properly.

D. The Contractor shall not damage or endanger a portion of the work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate Contractor the Contractor’s consent to cutting or otherwise altering the work.

E. Where coring of existing (previously installed) concrete is specified or required, including coring indicated under unit prices, the location of such coring shall be clearly identified in the field and the location shall be approved by the Project Manager prior to commencement of coring work.

3.7 FIREPROOFING

A. Where nurse-call cables penetrate fire rated walls, floors and ceilings, fireproof the opening.

B. Provide conduit sleeves (if not already provided by electrical contractor) for cables that penetrate fire rated walls. After the cabling installation is complete, install fire proofing material in and around all conduit sleeves and openings. Install fire proofing material thoroughly and neatly. Seal all floor and ceiling penetrations.
C. Use only materials and methods that preserve the integrity of the fire stopping system and its rating.

3.8 GROUNDING

A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, commonmode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes as specified in Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Do not use “3rd or 4th” wire internal electrical system conductors for ground.

E. Do not connect system ground to the building’s external lightning protection system.

F. Do not “mix grounds” of different systems.

PART 4 – TESTING, GUARANTY AND TRAINING

4.1 PROOF OF PERFORMANCE TESTING

A. Acceptance Test:

1. The Contractor shall schedule an acceptance test date and give the RE 30 days written notice prior to the date the acceptance test is expected to begin. The system shall be tested in the presence of a Government Representative and an OEM certified representative. The system shall be tested utilizing the approved test equipment to certify proof of performance and Emergency compliance. The test shall verify that the total system meets all the requirements of this specification. The notification of the acceptance test shall include the expected length (in time) of the test.

B. Acceptance Test Procedure:

1. Physical and Mechanical Inspection:

   a. The Government Representative will tour all areas where the system and all sub-systems are completely and properly installed to insure they are operationally ready for proof of performance testing. A system inventory including available spare parts will be taken at this time. Each item of installed equipment shall be checked to ensure appropriate UL certification labels are affixed.
b. The system diagrams, record drawings, equipment manuals, Auto CAD Disks, intermediate, and pretest results shall be formally inventoried and reviewed.

c. Failure of the system to meet the installation requirements of this specification shall be grounds for terminating all testing.

2. Operational Test:
   a. The Contractor shall demonstrate the full functionality of the system including:
      1. Station to master calls
      2. Station to station calls
      3. Broadcast calls
      4. Location identification of stations at the intercom master station

3. Test Conclusion:
   a. At the conclusion of the Acceptance Test, using the generated punch list (or discrepancy list) the VA and the Contractor shall jointly agree to the results of the test, and reschedule testing on deficiencies and shortages with the RE. Any retesting to comply with these specifications will be done at the Contractor's expense.
   b. If the system is declared unacceptable without conditions, all rescheduled testing expenses will be born by the Contractor.

4.2 WARRANTY

A. Comply with FAR 52.246-21, except that warranty shall be as follows:

B. Contractor’s Responsibility:
   1. The Contractor shall warranty that all provided material and equipment will be free from defects, workmanship and will remain so for a period of one year from date of final acceptance of the system by the VA. The Contractor shall provide OEM’s equipment warranty documents, to the RE (or Facility Contracting Officer if the Facility has taken procession of the building), that certifies each item of equipment installed conforms to OEM published specifications.

   2. The Contractor's maintenance personnel shall have the ability to contact the Contractor and OEM for emergency maintenance and logistic assistance, remote diagnostic testing, and assistance in resolving technical problems at any time. This contact capability
shall be provided by the Contractor and OEM at no additional cost to the VA.

3. All Contractor maintenance and supervisor personnel shall be fully qualified by the OEM and must provide two copies of current and qualified OEM training certificates and OEM certification upon request.

4. Additionally, the Contractor shall accomplish the following minimum requirements during the two year guaranty period:
   a. Response Time during the Two Year Guaranty Period:
      1) The RE (or Facility Contracting Officer if the system has been turned over to the Facility) is the Contractor’s ONLY OFFICIAL reporting and contact official for nurse call system trouble calls, during the guaranty period.
      2) A standard work week is considered 8:00 A.M. to 5:00 P.M. or as designated by the RE (or Facility Contracting Officer), Monday through Friday exclusive of Federal Holidays.
      3) The Contractor shall respond and correct on-site trouble calls, during the standard work week to:
         a) A routine trouble call within 1 working day of its report. A routine trouble is considered a trouble which causes a pillow speaker or cordset, one master IC control station, room station or emergency station to be inoperable.
         b) Routine trouble calls in critical emergency health care facilities (i.e., cardiac arrest, intensive care units, etc.) shall also be deemed as an emergency trouble call. The RE (or Facility Contracting Officer) shall notify the Contractor of this type of trouble call.
         c) An emergency trouble call within 4 hours of its report. An emergency trouble is considered a trouble which causes a sub-system (ward), distribution point, terminal cabinet, or all call system to be inoperable at anytime.

4) If a IC component failure cannot be corrected within 4 hours (exclusive of the standard work time limits), the Contractor shall be responsible for providing alternate IC equipment. The alternate equipment/system shall be operational within a maximum of 20 hours after the 4 hour trouble shooting time and restore the effected location operation to meet the system performance standards. If any sub-system or major system
trouble cannot be corrected within one working day, the Contractor shall furnish and install compatible substitute equipment returning the system or sub-system to full operational capability, as described herein, until repairs are complete.

b. Required On-Site Visits during the Two Year Guaranty Period

1) The Contractor shall visit, on-site, for a minimum of 8 hours, once every 12 weeks, during the guaranty period, to perform system preventive maintenance, equipment cleaning, and operational adjustments to maintain the system according the descriptions identified in this document.

2) The Contractor shall arrange all Facility visits with the RE (or Facility Contracting Officer) prior to performing the required maintenance visits.

3) Preventive maintenance shall be performed by the Contractor in accordance with the OEM’s recommended practice and service intervals during non-busy time agreed to by the RE (or Facility Contracting Officer) and Contractor.

4) The preventive maintenance schedule, functions and reports shall be provided to and approved by the RE (or Facility Contracting Officer).

5) The Contractor shall provide the RE (or Facility Contracting Officer) a type written report itemizing each deficiency found and the corrective action performed during each required visit or official reported trouble call. The Contractor shall provide the RE with sample copies of these reports for review and approval at the beginning of the Acceptance Test. The following reports are the minimum required:
   a) The Contractor shall provide a monthly summary all equipment and sub-systems serviced during this warranty period to RE (or Facility Contracting Officer) by the fifth (5th) working day after the end of each month. The report shall clearly and concisely describe the services rendered, parts replaced and repairs performed. The report shall prescribe anticipated future needs of the equipment and systems for preventive and predictive maintenance.
   b) The Contractor shall maintain a separate log entry for each item of equipment and each sub-system of the system. The
log shall list dates and times of all scheduled, routine, and emergency calls. Each emergency call shall be described with details of the nature and causes of emergency steps taken to rectify the situation and specific recommendations to avoid such conditions in the future.

6) The RE (or Facility Contracting Officer) shall convey to the Facility Engineering Officer, 2 copies of actual reports for evaluation.
   a) The RE (or Facility Contracting Officer) shall ensure a copy of these reports is entered into the system’s official acquisition documents.
   b) The Facility Chief Engineer shall ensure a copy of these reports is entered into the system’s official technical record documents.

C. Work Not Included:
   Maintenance and repair service shall not include the performance of any work due to improper use; accidents; other vendor, contractor, or owner tampering or negligence, for which the Contractor is not directly responsible and does not control. The Contractor shall immediately notify the RE or Facility Contracting Officer in writing upon the discovery of these incidents. The RE or Facility Contracting Officer will investigate all reported incidents and render

4.3 TRAINING
   A. Provide thorough training of the owner’s engineering and maintenance staff.
   B. Provide the following minimum training times and durations:
      1. // 24 // hours prior to opening
      2. // 24 // hours during the opening week
      3. // 24 // hours for supervisors and system administrators