DATE OF THIS VERSION (new)
June 1, 2013

TITLE OF DOCUMENT (new title if applicable): 

DATE OF VERSION BEING SUPERSEDED (old):
October 1, 2006

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):
Voice Communications Switching and Routing Equipment – Extension, 27 31 31

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 3.4
SECTION 27 31 31
VOICE COMMUNICATIONS SWITCHING AND ROUTING EQUIPMENT - EXTENSION

SPEC WRITER NOTES:
1. Contact Department of Veterans Affairs, Veterans Health Administration (VHA), Telecommunications Support Service (TSSO-005N2), Telephone (301/427-3950) for technical assistance.
2. Edit between //---//. Delete if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the remaining paragraphs. Defer to VHA TSSO-005N2 for technical assistance and approval concerning all issues.

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installing, certification, testing, and guaranty of a complete and operating extension of an existing operating Telephone System, and associated equipment (here-in-after referred to as “the System”) and associated equipment to be installed in the VA // Medical Center //, //, Out Patient Clinic // //, Nursing Home Care Unit // //, Domiciliary// //, or ____________________ // here-in-after referred to as “the Facility”. The System shall include, but not be limited to, equipment cabinets, interface enclosures, and relay racks, stand-by battery(s), necessary combiners, traps, and filters; distribution nodes and/or amplifiers; telephone instruments; auxiliary systems; and necessary passive devices such as: protectors, isolators, splitters, couplers, cable “patch”, “punch down”, and cross-connector blocks or devices, cable management items, voice and digital cable distribution system, and associated hardware. The System shall additionally include, but not be limited to: telecommunication closets (TC); telecommunications outlets (TCO); copper and fiber optic //, and analog Radio Frequency (RF) coaxial // distribution cables, connectors, “patch” cables, and/or “break out” devices.

B. The System shall be delivered free of engineering, manufacturing, installation, and operating defects. It shall be designed, engineered and installed for ease of operation, maintenance, and testing.

C. The term “provide”, as used herein, shall be defined as: designed, engineered, furnished, installed, certified, and tested, by the Contractor.

27 31 31 - 1
The Telephone System is defined as an Emergency Critical Care Communication System by the National Fire Protection Association (NFPA). Therefore, if the System connects to or extends the telephone system, the System’s installation and operation shall adhere to all appropriate National, Government, and/or Local Life Safety and/or Support Codes, which ever are the more stringent for this Facility. At a minimum, the System shall be installed according to NFPA, Section 70, National Electrical Code (NEC), Article 517 and Chapter 7; NFPA, Section 99, Health Care Facilities, Chapter 3-4; NFPA, Section 101, Life Safety Code, Chapters 7, 12, and/or 13; Joint Commission on Accreditation of Health Care Organization (JCAHCO), Manual for Health Care Facilities, all necessary Life Safety and/or Support guidelines; this specification; and the original equipment manufacturer’s (OEM) suggested installation design, recommendations, and instructions. The OEM and Contractor shall ensure that all management, sales, engineering, and installation personnel have read and understand the requirements of this specification before the System is designed, engineered, delivered, and provided.

E. The VA Project Manager (PM) and/or if delegated, Resident Engineer (RE) are the approving authorities for all contractual and mechanical changes to the System. The Contractor is cautioned to obtain in writing, all approvals for system changes relating to the published contract specifications and drawings, from the PM and/or the RE before proceeding with the change.

1.2 RELATED WORK
A. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS.
C. Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.
D. Section 27 10 00, STRUCTURED CABLING.
E. Section 26 27 26, WIRING DEVICES.
F. Section 27 05 26, GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS.
G. Section 26 41 00, FACILITY LIGHTNING PROTECTION.
H. Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.
I. H-088C3: VA HANDBOOK DESIGN FOR TELEPHONE SYSTEMS
//J. Section 27 32 41, TWO-WAY RADIO EQUIPMENT. //
//K. Section 27 31 00, VOICE COMMUNICATIONS SWITCHING AND ROUTING EQUIPMENT. //
//L. Section 27 51 16, PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS. //
1.3 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. Except for a specific date given, the issue in effect (including amendments, addenda, revisions, supplements, and errata) on the date the system’s submittal is technically approved by VA, shall be enforced.

B. Joint Commission on Accreditation of Health Care Organization (JCAHO): Comprehensive Accreditation Manual for Hospitals - Volumes One and Two.

C. National and/or Government Life Safety Code(s): The more stringent of each listed code.

D. National Fire Protection Association (NFPA):

<table>
<thead>
<tr>
<th>No. 70</th>
<th>National Electrical Code (NEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 75</td>
<td>Protection of Electronic Computer/Data Processing Systems</td>
</tr>
<tr>
<td>No. 77</td>
<td>Recommended Practice on Static Electricity</td>
</tr>
<tr>
<td>No. 99</td>
<td>Standard for Health Care Facilities</td>
</tr>
<tr>
<td>No. 101</td>
<td>Life Safety Code</td>
</tr>
<tr>
<td>No. 1221</td>
<td>Emergency Services Communication Systems</td>
</tr>
</tbody>
</table>

E. Underwriter’s Laboratories, Inc. (UL):

| 65 | Wired Cabinets |
| 96 | Lightning Protection Components |
| 96A | Installation Requirements for Lightning Protection Systems |
| 467 | Grounding and Bonding Equipment |
| 497/497A/497B | Protectors for Paired Conductors/Communications Circuits/Data Communications and Fire Alarm Circuits |
| 884 | Underfloor Raceways and Fittings |

F. ANSI/EIA/TIA PUBLICATIONS:

| 568B | Commercial Building Telecommunications |
| 569B | COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATIONS PATHWAYS AND SPACES |
598C  Optical Fiber Cable Color Coding
606A  Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
607A  Grounding and Bonding Requirements for Telecommunications in Commercial Buildings
758   Grounding and Bonding Requirements for Telecommunications in Commercial Buildings


H. International Telecommunication Union - Telecommunication Standardization Sector (ITU-T).


J. Federal Communications Commission (FCC) Publication: Standards for telephone equipment and systems.


1.4 QUALITY ASSURANCE

A. The authorized representative of the System’s OEM shall be responsible for the design, satisfactory total operation of the System, and its certification.

B. The OEM shall meet the minimum requirements identified in Paragraph 2.1.A. Additionally, the Contractor shall have had experience with three or more installations of systems of comparable size and complexity with regard to coordinating, engineering, testing, certifying, supervising, training, and documentation. Each of these installations shall have been in successful operation for a minimum of three years after final acceptance by the user. These installations shall be provided as a part of the submittal identified in Paragraph 1.5.

C. The System Contractor shall submit certified documentation that they have been an authorized distributor and service organization for the OEM for a minimum of three (3) years. The System Contractor shall be authorized by the OEM to certify and warranty the installed equipment. In addition, the OEM and System Contractor shall accept complete responsibility for the design installation, certification, and physical support for the System. This documentation, along with the System Contractor and OEM certifications must be provided in writing as a part of the Contractor’s Technical Submittal.
D. The Contractor’s Telecommunications Technicians assigned to the System shall be fully trained, qualified, and certified by the OEM on the engineering, installation, 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 RE before being allowed to commence work on the System.

1.5 SUBMITTALS

A. On-Site Survey: The Contractor shall provide an on-site telephone equipment location, cable pathway, TC, TCO, and interconnection survey with the submittal that is accomplished no later than 18 months prior to the expected completion of the facility.

1. The survey will be accomplished by a physical walk through of the facility and existing locations with the contract drawings (including all approved changes) and existing survey performed by the IRM department. Differences in locations between the two surveys shall be clearly identified and shall be provided to the RE in writing within 30 days of the completion of the survey.

B. Provide submittals in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. The RE shall retain one copy for review and approval.

1. If the submittal is approved the RE shall retain one copy for Official Records and return three (3) copies to the Contractor.

2. If the submittal is disapproved, three (3) copies will be returned to the Contractor with a written explanation attached indicating the areas where the submittal deviated from the System Specifications.

The RE shall retain one copy for Official Records.

C. Documents: The submittal shall be separated into sections for each subsystem and shall contain the following:

1. Title page to include:
   a. VA Medical Center.
   b. Contractor’s name, address, and telephone (including fax) numbers.
   c. Date of Submittal.
   d. VA Project No.

2. List containing a minimum of three (3) locations of installations of similar size and complexity as identified herein. These locations shall contain the following:
   a. Installation Location and Name.
b. Owner’s or user’s name, address, and telephone numbers (including fax).

c. Date of Project Start and Date of Final Acceptance by Owner.

d. System Project Number.

e. Brief (three paragraphs minimum) description of each system’s function, operation, and installation.

3. Narrative: Description of the System as it is expected to be installed.

4. A list of equipment to be furnished. The quantity, make and mode number of each item is required. Select the required equipment items quantities that will satisfy the needs of the System and edit between the // - //. Delete equipment items that are not required, add additional items required, and renumber section as per system design. List format shall be as follows:

SPEC WRITER NOTE: Select the required equipment item quantities that will satisfy the needs of the System and edit between // - //. Delete equipment items that are not required, and renumber the section as per system design.

The following is the minimum equipment required by the System:

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>As required</td>
<td>CSU</td>
</tr>
<tr>
<td>As required</td>
<td>Back-up Battery Power Supply</td>
</tr>
<tr>
<td>As required</td>
<td>AC Power Supply</td>
</tr>
<tr>
<td>As required</td>
<td>Equipment Cabinet(s)</td>
</tr>
<tr>
<td>As required</td>
<td>Environmental Cabinet</td>
</tr>
<tr>
<td>1 ea.</td>
<td>Lightning Protection System</td>
</tr>
<tr>
<td>As required</td>
<td>Distribution/Interface Cabinets</td>
</tr>
<tr>
<td>As required</td>
<td>Stand Alone Relay Rack</td>
</tr>
<tr>
<td>As required</td>
<td>CCS</td>
</tr>
<tr>
<td>As required</td>
<td>Audio Alarm Panel</td>
</tr>
<tr>
<td>As required</td>
<td>Trouble Annunciator Panel</td>
</tr>
<tr>
<td>As required</td>
<td>Wire Management System/Equipment</td>
</tr>
<tr>
<td>As required</td>
<td>Telephone Instruments</td>
</tr>
<tr>
<td>As required</td>
<td>Cable Distribution System</td>
</tr>
<tr>
<td>As required</td>
<td>System Conduits, Cable Duct, and/or Cable Tray</td>
</tr>
<tr>
<td>1 ea.</td>
<td>Installation Kit</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
</tr>
<tr>
<td>1 ea.</td>
<td>Separate Spare Part List</td>
</tr>
<tr>
<td>As required</td>
<td>Telephone Paging Adapter (one each required for PA, Radio Paging and sub-systems)</td>
</tr>
<tr>
<td>As required</td>
<td>Time Out Device (one each required for PA, Radio, and Dial Dictation sub-system)</td>
</tr>
</tbody>
</table>

5. Interface cabinet and each distribution cabinet layout drawing, as each is to be installed.

6. Equipment technical literature detailing the electrical and technical characteristics of each item of equipment to be furnished.

7. Engineering drawings of the System, showing calculated signal levels at the CSU output, each input and output distribution point, proposed telephone outlet values, and signal level at each telephone outlet multipin jack.

8. List of test equipment as per paragraph 1.5.E below.

9. A letter certifying that the Contractor understands the requirements of the Samples paragraph 1.5.F below.

10. A letter certifying that the Contractor understands the requirements of Section 3.2 concerning acceptance tests.

D. Environmental Requirements: Technical submittals shall confirm the environmental specifications for TC areas occupied by the System. These environmental specifications shall identify the requirements for initial and expanded system configurations for:

1. Floor loading for batteries and cabinets.

2. Minimum floor space and ceiling heights.

3. Minimum size of doors for equipment passage.

4. Power requirements: The bidders shall provide the specific voltage, amperage, phases, and quantities of circuits required.

5. Air conditioning, heating, and humidity requirements. The Contractor shall identify the ambient temperature and relative humidity operating ranges required to prevent equipment damage.

6. Air conditioning requirements (expressed in BTU per hour, based on adequate dissipation of generated heat to maintain required room and equipment standards).

7. Main backbone, trunk line, riser, and horizontal cable pathways, cable duct, and conduit requirements between each MTC, TC, and TCO.
E. Test Equipment List. The Contractor is responsible for furnishing all test equipment required to test the System in accordance with the parameters specified. Unless otherwise stated, the test equipment shall not be considered part of the system. The Contractor shall furnish test equipment of an accuracy better than the parameters to be tested. The test equipment furnished by the Contractor shall have a calibration tag of an acceptable calibration service dated not more than 3 months prior to the test. As part of the proposal, a test equipment list shall be furnished that includes the make and model number of the following type of equipment as a minimum:

1. Spectrum Analyzer.
2. Signal Level Meter.
4. Time Domain Reflectometer (TDR) with strip chart recorder.
5. Bit Error Test Set (BERT).

F. Samples. A sample of each of the following items shall be furnished to the RE for approval prior to installation. The samples may be returned to the Contractor at the discretion of the RE.

1. TCO Wall Outlet Box 100 mm x 100 mm x 63 mm (4" x 4"x 2.5") with:
   a. One each telephone (or voice) RJ45 jack installed.
   b. Two each multi pin data RJ45 jacks installed.
   c. Cover Plate installed.
   //d. Fiber-optic ST jack(s) installed. //
   //e. RF (F)/video (BNC)/audio (XL) jack(s) installed. //
2. Data CCS patch panel, punch block or connection device with RJ 45 connectors installed.
3. Telephone CCS system with IDC and/or RJ45 connectors and cable terminal equipment installed.
4. Fiber optic CCS patch panel or breakout box with cable management equipment and "ST" connectors installed.
5. 610 mm (2 ft.) section of each copper cable to be used with cable sweep tags as specified in Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING, and connectors installed.
6. 610 mm (2 ft.) section of each fiber optic cable to be used with cable sweep tags as specified in Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING, and connectors installed.
//7. 610 mm (2 ft.) section of each analog RF, video coaxial, and audio cable to be used with cable sweep tags as specified in Section
//8. Analog video CCS patch panel or breakout box with cable management equipment and “BNC” connectors installed. //
//9. Analog audio CCS patch panel or breakout box with cable management equipment and “XL” connectors installed. //
//10. Analog RF patch panel or breakout box with cable management equipment and “F” connectors installed. //

G. Certifications:
1. Submit written certification from the OEM indicating that the proposed supervisor of the installation and the proposed provider of the contract maintenance are authorized representatives of the OEM. Include the individual's exact name and address and OEM credentials in the certification.

2. Submit written certification from the OEM that the wiring and connection diagrams meet National and/or Local (whichever is the more stringent) Life Safety Guidelines, NFPA, NEC, UL, this specification, and JCAHCO requirements and instructions, requirements, recommendations, and guidance set forth by the OEM for the proper performance of the System as described herein. The VA will not approve any submittal without this certification.

3. Preacceptance Certification: This certification shall be made in accordance with the test procedure paragraph 3.2.B.

H. Equipment Manuals: Ten (10) working days prior to the scheduled acceptance test, the Contractor shall deliver four (4) complete sets of commercial operation and maintenance manuals for each item of equipment furnished as part of the System to the RE. The manuals shall detail the theory of operation and shall include narrative descriptions, pictorial illustrations, block and schematic diagrams and parts list.

I. As-Installed Equipment and Wiring Diagrams. Fifteen (15) working days prior to the scheduled acceptance test, the Contractor shall deliver four complete sets of the Record Wiring Diagrams of the System to the RE. The diagrams shall show all inputs and outputs of electronic and passive equipment correctly identified according to the markers installed on the interconnecting cables, equipment and room/area locations. The drawings shall show the signal levels of the telephone aural carriers of each telephone channel at the input and output of all electronic equipment, beginning and end of each distribution line, and
the telephone outlets. The record wiring diagrams shall be provided in hard copy and two compact disk copies properly formatted to match the Facilities current operating version of Computer Aided Drafting (AUTOCAD) system. The RE shall verify and inform the Contractor of the current version of AutoCAD being used by the Facility. The RE shall submit one hard copy of each as-installed drawing to TSSO-005N2 for review 15 working days prior to the scheduled acceptance test.

J. Ten (10) days prior to the start of the intermediate test, provide a typewritten detailed description of the System testing plan that meets this specification’s performance standards as indicated in paragraph 2.1.C including illustrations and utilizes test equipment specified in paragraph 1.5.C. The test plan will need to be evaluated and approved by the RE before intermediate testing begins.

K. Provide two copies of an OEM developed training video tape presentation (reference paragraph 3.3.B) for evaluation and approval by the RE.

L. Provide a typewritten document that details the complete record program in memory for all associated station assignments.

M. Needs Analysis (required for extension of existing system): The Contractor shall conduct a needs analysis of the existing Facility with representative’s from the IRM and various departments to determine the System’s requirements. The analysis shall depict System features and capacities, in addition to specific site requirements. The analysis shall be typewritten and contain the following information as a minimum:

1. The CSU shall be compatible with the existing or projected EPBX and will:
   a. Initially provide:

<table>
<thead>
<tr>
<th>EQUIPPED ITEM</th>
<th>CAPACITY</th>
<th>WIRED CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Station Lines:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Single Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Multi Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Equipped for DID)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-way DRTL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Exchange (FX)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conference</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27 31 31 - 10
b. Projected Maximum Growth. The Contractor shall identify the projected maximum growth for each item identified in Paragraph 1.5.C.4. as a part of the needs analysis. For this purpose, the following definitions are provided to detail the System’s capability:

1) All software and hardware required to completely equip the CSU with all items listed under equipped capacity, shall be provided and installed by the contractor 30 days prior to system cut-over.

2) "Wired Capacity" is to include all wiring and equipment listed under wired capacity, with the exception of line, data, and trunk cards, and shall be provided, installed, and tested 30 days prior to system cut-over.

3) The System shall be capable of expansion to the projected maximum growth through the use of printed circuit boards and/or modular cabinets which do not require extensive re-wiring and reprogramming.

2. Cable Distribution System: A design plan for twisted pair and fiber-optic //, and analog RF, video, and/or audio coaxial // distribution cable plant requirements is not included in this document. See Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLE, for specific cable distribution system requirements. However, the Contractor is required to formulate a projected cable count that shall coincide with the Maximum Growth items described herein. It is the Contractors responsibility to provide the systems CCS, cable
distribution, and TCO requirements in order to develop a copper and fiber-optic //, and analog RF, video, and/or audio coaxial // distribution requirements plan using the following paragraphs as an example:

a. Twisted Pair Requirements/Column Explanation:

<table>
<thead>
<tr>
<th>Column</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Building</td>
<td>Identifies the building by number or title</td>
</tr>
<tr>
<td>Floor</td>
<td>IDENTIFIES THE FLOOR BY NUMBER (I.E. 1ST, 2ND, ETC.)</td>
</tr>
<tr>
<td>Room Number</td>
<td>Identifies the room, by number, from which cabling shall be installed</td>
</tr>
<tr>
<td>Number of Cable Pair</td>
<td>Identifies the number of cable pair required to be terminated on the floor</td>
</tr>
<tr>
<td></td>
<td>designated or the number of cable pair (VA Owned) to be retained</td>
</tr>
<tr>
<td>Building</td>
<td>Identifies the building by number or title</td>
</tr>
<tr>
<td>Room</td>
<td>Identifies room number</td>
</tr>
</tbody>
</table>

b. Fiber Optic Cabling Requirements/Column Explanation:

<table>
<thead>
<tr>
<th>Column</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Building</td>
<td>Identifies building, by number or location, from which cabling is installed</td>
</tr>
<tr>
<td>Room Number</td>
<td>Identifies the room, by number, from which cabling shall be installed</td>
</tr>
<tr>
<td>To Building</td>
<td>IDENTIFIES BUILDING, BY NUMBER OR LOCATION, TO WHICH CABLING IS INSTALLED</td>
</tr>
<tr>
<td>Room Number</td>
<td>Identifies the room, by number, to which cabling shall be installed</td>
</tr>
<tr>
<td>Number of Strands</td>
<td>Identifies the number of strands in each run of fiber optic cable</td>
</tr>
<tr>
<td>Installed Method</td>
<td>Identifies the method of installation in accordance with requirements as</td>
</tr>
<tr>
<td></td>
<td>designated herein</td>
</tr>
<tr>
<td>Notes</td>
<td>Identifies a note number for a special feature or equipment</td>
</tr>
<tr>
<td>Building</td>
<td>Identifies the building by number or title</td>
</tr>
</tbody>
</table>
3. Telephone Instruments (or Stations). The Contractor shall clearly and fully indicate this category for each telephone instrument and compare the total count to the locations identified above and indicated the projected EPBX port count requirements as a part of the technical submittal. Additionally, the Contractor shall indicate the total number of spares:

<table>
<thead>
<tr>
<th>Column</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSL</td>
<td>Number of Main Station Lines (MSL) to be associated with the instrument.</td>
</tr>
</tbody>
</table>

Instrument and Outlets. All equipment to be installed are assigned the following codes:

- **DS**: Desk type - single line
- **WS**: Wall type - single line
- **DM**: Desk type - multi-line
- **WM**: Wall type - multi-line

- **Jack**: The type of jack shall be the type identified (i.e. wall, single, dual, triplex, etc.).
- **Notes**: Identifies a note number which spells out a requirement for a special feature or function associated with the circuits and equipment on that particular line of the station.
- **SVC**: Identifies the using SERVICE.
- **Position**: Identifies primary user of the instrument by position description or function.

4. Telecommunication Outlets (TCO). The Contractor shall clearly and fully indicate this category for each outlet location and compare the total count to the locations identified and as shown on the drawings as a part of the technical submittal. Additionally, the Contractor shall indicate the total number of spares.

**PART 2 – PRODUCTS**

**2.1 EQUIPMENT AND MATERIALS**

A. System Requirements:

1. The System shall extend the following minimum services generated by the existing telephone system. If these services are not generated by an operating existing telephone system, the System shall be fully compatible and capable of providing them in accordance with and supported by an Original Equipment Manufacturer (OEM), and as specified herein. The System shall provide continuous inter and/or
intra-Facility //, and analog RF // service. The System shall be
capacity sized so that loss of connectivity to an external telephone
system(s) shall not affect the Facilities operation in specific
designated emergency operating locations and instruments. The System
shall:

a. Inter-operate, connect, and function fully with the existing
Local Telephone Exchange (LEC) Network(s), Federal Telephone
System (FTS) Inter-city Network(s), Inter-exchange Carriers,
Integrated Services Digital Network (ISDN), at a minimum.
b. Inter operate with current identified voice mail and automatic
attendant functions, and are required as specified herein. A
universal night answering function from a Facility designated
remote locations shall be provided if not currently in operation
and/or will not be deviated as a result of the system
installation.
c. Be a voice and data cable distribution system that is based on a
physical “Star” //, and/or “Ring”// //, and/or “Bus” // Topology.
//An analog RF coaxial cable distribution system shall be
provided in a “home run” configuration from each associated riser
TC to identified locations and as shown on the drawings. //
d. Be compatible with and able to provide direct digital connection
to trunk level equipment including, but, not limited to: directly
accessing trunk level equipment including radio paging, audio
paging, Federal Information Processing Standards [FIPPS]
publications), Industry Standard “T” and/or “DS” carrier
protocols and external protocol converters. Additionally,
connections to “T” and/or “DS” access/equipment or Customer
Service Units (CSU) that are used in FTS and other trunk
applications, shall be included in the System design.
Additionally T-1 access/equipment (or CSU) shall be used in FTS
and other trunk applications as required by system design if
these functions are not provided by the existing telephone system
and/or will be deactivated by the System. The Contractor shall
provide all T-1 equipment necessary to terminate and make
operational the quantity of circuits designated. The CSU’s shall
be connected to the system’s emergency battery power supply. The
System shall be fully capable of operating in the Industry
Standard “DS” protocol and provide that service when required.
e. Contain attendant and operator consoles, video monitors with keyboards, and printers to provide employee directory access from the Traffic Management System (TMS), as required by system design if not provided by the existing telephone system and/or will be deactivated by the System installation. All additional console positions, video monitors, and keyboards shall have identical capabilities. The System shall accept a mixture of trunk types at each attendant console and extend calls received via these trunks to station users.

f. Be capable of interfacing and operating with Direct-Incoming-dial (DID) service to stations as identified herein. Assignment to DID shall not affect intra-Facility operation. A DID trunk group, which will operate as a separate trunk group from other Central Office (CO) trunks shall be provided as described herein.

g. Contain the designated number of telephone instruments, where each instrument (also referred to as "station") shall have the ability to direct dial other Facility telephone stations, the public telephone network, tie-lines, and FTS telephone numbers without attendant assistance. Each station shall be dual tone multi-frequency (DTMF) for intra-Facility and external-Facility calling. The term DTMF, as used herein, shall be defined as "a dialing operation (e.g., push-button, digit dialing, or tone dialing, other than rotary/pulse dialing).

1) Standard digital telephone instruments shall be provided at the designated TCO(s) and as shown on the drawings.

2) "Special hands free" digital telephone instruments shall be provided at designated TCO(s) and as shown on the drawings.

h. Receive the specified telephone signals acquired from the LEC and FTS contracted carrier, shall process and distribute them to the designated telephone stations as determined by Class-of-Service and indicated on the drawings.

i. At a minimum, one // or _____ // TCO(s) shall be provided on each room wall and on either side of each door opening, and shall be supplied with an associated (within 305 mm (one foot)) or attached active duplex 120 Volts Alternating Current (VAC) outlet (using a quad receptacle box for the TCO and a separate duplex receptacle box for the AC outlet) and as shown on the drawings (The only exception to this general one outlet per wall rule are
specifically identified “special” locations (e.g., surgical suites, radiology, MRI rooms, labs, patient rooms, warehouse, loading docks, storage rooms, etc.) where usually only two //, or _____// active TCos are designated and as shown on the drawings).

1) The Contractor shall provide the TCos that consist of one telephone multipin and two data multipin jacks each meeting Category 5 Level of service. The telephone multipin jack shall be interfaced and connected to the System via a terminal punch block in each associated TC.

2) The telephone system Contractor shall connect each data multipin jack to a separate data system approved terminating patch panel device in each associated TC. The telephone system Contractor is not to install active data distribution equipment to the System or cross connect the data systems.

3) The construction of distribution TCos is found in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

4) The appropriate distribution cable termination methods are found in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

5) The appropriate distribution TC construction is found in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

j. Be able to accomplish adjacent channel operation of the existing telephone system’s local, long distance, and FTS telephone signals. The System equipment shall be installed and interfaced according to the OEM's schematic diagram for adjacent telephone channel operation. The System shall be provided with testing capability in each equipment rack and test ports that provides access for each telephone channel without the need to disconnect distribution cables or equipment. Each telephone channel shall be processed as a single channel. A means of monitoring the complete system along with appropriate printout and computer disk archiving of each processed and distributed channel.

k. The System shall be designed to minimize cross talk, background processor noise, inter-modulation, and other signal interference. The equipment shall be installed and interfaced according to the OEM schematic diagram for adjacent audio channel operation. Each
audio input channel shall be processed as a single separate channel and combined into one output channel. Additionally, if not provided in the existing telephone system or will be deactivated by the System installation, an audio, and visual monitoring panel shall be provided in the telephone switch room to test each converted audio input and distribution channel //, and analog RF channels// transmitted and received signal functions as described herein. The System shall continuously electronically or electrically supervise the EPBX’s Alternating Current (AC) power input, stand by batteries and charger, and internal Direct Current (DC) power supply primary Voltages and/or Currents; each remote control unit, audio //, and analog RF// interface unit, from the telephone switch room. A trouble panel shall be provided in the telephone switch room and at the telephone operator room, Security Service Control Console //, MAS Emergency Room, //, and/or __________// to check the supervisory signals, signal level, audio sound and visual level, and alert personnel to problems as described herein.

2. Refer to Section 1.5 for initial voice sizing requirements.

3. The System shall be capable of interfacing with the existing or future planned EPBX.

4. A system design where “looping” the distribution cables from room to room shall not be permitted. See Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLES, for cable distribution TC and TCO requirements.

5. The following system channels shall be provided:

   SPEC WRITER NOTE: Select and insert required telephone channels. Telephone channel selection should be based on a survey matrix that identifies each location and type of signals approved for the System.

   a. Telephone Channels: // _____ , _____ , _____ , ____ //
   //b. Spare inputs at the EPBX output combiner: minimum of _____ //.

6. Point of Telephone System Interface:

   a. The telephone signals shall be acquired at the existing telephone EPBX equipment cabinet or as designated in the telephone switch room TC. The Contractor is not responsible for the condition of the telephone signals of the existing telephone system. If the
telephone signals at the interface point do not meet the minimum signal level and quality as stated herein, the Contractor shall notify the RE, in writing, detailing the nature of the deficiencies, and the expected effect on the telephone signals in the new extension system. The RE will coordinate with the Facility Engineering Officer so the necessary repairs for the identified deficiencies can be accomplished.

b. The System shall acquire telephone signals at ________________ and as shown on the drawings.

c. A minimum of __________ emergency telephone connections shall be acquired at __________ and connected to ________________ back up circuits as shown on the drawings.

7. EPBX Location Selection. The EPBX cabinets and associated equipment shall be located in the //basement, building ______.// //_______ floor, building ______.// other ______.// and as shown on the drawings.

B. General:

1. All equipment to be supplied under this specification shall be new and the current model of a standard product of an OEM of record. An OEM of record shall be defined as a company whose main occupation is the manufacture for sale of the items of equipment supplied and which:

   a. Maintains a factory production line for the item submitted.

   b. Maintains a stock of replacement parts for the item submitted.

   c. Maintains engineering drawings, specifications, and operating manuals for the items submitted.

   d. Has published and distributed descriptive literature and equipment specifications on the items of equipment submitted at least one year prior to the Invitation for Bid.

2. Specifications of equipment as set forth in this document are minimum requirements, unless otherwise stated, and shall not be construed as limiting the overall quality, quantity, or performance characteristics of items furnished in the System. When the Contractor furnishes an item for which there is a specification contained herein, the item shall meet or exceed the specification for that item of equipment.

3. The Contractor shall produce verification, in writing to the RE at time of installation, that the type of wire/cable actually being
provided is recommended and approved by the OEM and will provide a total system free of undesirable effects. The Contractor is responsible for providing the correct protection cable duct and/or conduit and wiring even though the actual installation may be by another subcontractor.

4. The Telephone Contractor is responsible for interfacing the telephone //, PA // //, Radio Paging // //and, __________// systems with the System. The Contractor shall continually employ interfacing methods that are approved by the OEM and VA. At a minimum, an acceptable interfacing method, requires not only a physical and mechanical connection; but, includes matching of signal, voltage, and processing levels, with regard to signal quality and impedance. Each interface point must adhere to all standards described herein for full separation of the Critical Care, Life Safety, and Emergency systems.

5. The telephone equipment and // PA interface equipment // // Radio interface equipment // shall be the interface points for connection of the // PA // // Radio // interface cabling from the telephone switch via the System telephone interface unit. The telephone interface unit // and PA interface unit // // and Radio interface unit // shall be provided by the Telephone Contractor. // The Telephone Contractor is not allowed to make any connections to the PA, and Radio, Systems. //

6. Active electronic component equipment shall consist of solid state components, be rated for continuous duty service, comply with the FCC standards for telephone equipment, systems, and service.

7. All passive distribution equipment shall meet or exceed -80 dB radiation shielding specifications.

8. All interconnecting twisted pair, fiber optic // or coaxial // cables shall be terminated on equipment terminal boards, punch blocks, breakout boxes, splice blocks, and unused equipment ports/taps shall be terminated according to the OEM’s instructions for telephone cable systems without adapters. The Contractor shall not leave unused or spare twisted pair wire, fiber optic //, or coaxial // cable unterminated, unconnected, loose or unsecured.

9. The System shall utilize microprocessor components for all signaling and programming circuits and functions. Program memory shall be non-
volatile or protected from erasure from power outages for a minimum of two hours.

10. The System shall provide the continuous electrical supervision of each telephone switch cabinet mounted equipment, interconnecting cabling, distribution cable plant, and back up battery and charger to determine change of status and to assist in trouble shooting System faults.

11. All distribution Voltages, except for the primary AC power to the power supply circuits, shall not exceed 30V AC Root Mean Squared (RMS) or 42V direct current (DC).

12. Color code all distribution wiring to conform to the Telephone Industry standard, ANSI/EIA/TIA, and this document, which ever is the more stringent. At a minimum, all equipment, cable duct and/or conduit, enclosures, wiring, terminals, and cables shall be clearly and permanently labeled according to and using the provided record wiring diagrams, to facilitate installation and maintenance. Reference Specification Section 27 10 00, STRUCTURED CABLING and Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.

13. Connect the System’s primary input AC power to the Facility’s Critical Branch of the Emergency AC Power Distribution System as shown on the Drawings or if not shown on the drawings consult with the RE regarding a suitable circuit location, prior to bidding.

14. Verify existing UPS system will support the extensions additional load. If adequate capacity is not present, provide the additional equipment required to support the normal operation and functions of the System including the extension (as if there was no AC power failure) in the event of an AC power failure for a minimum of four hours.

15. All equipment shall function and operate normally from the furnished power source, and also, during input power fluctuations or loss of power for a minimum of four hours.

16. Plug-in connectors shall be provided to connect all equipment, with the exception of interface points. Baseband cable systems shall utilize barrier terminal screw type connectors, at a minimum. Crimp type connectors installed with a ratchet type installation tool are and acceptable alternate as long as the cable dress, pairs, shielding, grounding, connections and labeling are provided the same as the barrier terminal strip connectors. Tape of any type, wire
nuts, or solder type connections are unacceptable and will not be approved.

17. All equipment faceplates utilized in the System shall be stainless steel, anodized aluminum, or UL approved cycolac plastic that matches the equipment item where it is installed. All faceplates shall be constructed of the same material throughout the Facility.

18. Noise filters and surge protectors shall be provided for each equipment interface cabinet, switch equipment cabinet, control console, local, and remote active equipment locations to ensure protection from input primary AC power surges and noise glitches are not induced into low voltage circuits.

C. Equipment Functional Characteristics:

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>105 to 130 VAC</td>
</tr>
<tr>
<td>Power Line Frequency</td>
<td>60 Hz ±2.0 Hz</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 50 degrees (°) Centigrade (C)</td>
</tr>
<tr>
<td>Humidity</td>
<td>80 percent (%) minimum rating</td>
</tr>
</tbody>
</table>

2.2 EQUIPMENT SPECIFICATIONS

A. Customer Service Unit (CSU) Equipment:

1. The CSU shall be fully self contained, electronic, digital in operation, fully compatible with the existing telephone equipment, EPBX, and perform, as a minimum, the following functions:

   a. Intra-Facility: station-to-station four digit direct dialing, including those telephone instruments equipped with the DID features.

   b. Direct-output-dial (DOD): from any unrestricted telephone instrument to any CO trunk or FTS access lines by dialing a pre-designated access code. Also, DOD from any station to tie-lines by dialing a pre-designated access code.

   c. Incoming calls from FTS: access lines and tie-lines shall have the ability to direct dial all stations without attendant assistance.

   d. Restricted telephone instruments: shall have access to outside lines through the operators’ console.
e. Unrestricted telephone instruments: shall have access to all features, functions, CO trunks, FTS access lines, tie-lines, toll free 800 numbers, and long distance directory assistance.

f. Class-of-service (COS): restrictions provided by the existing telephone system shall be provided. These restrictions are to be applied individually or in combination as dictated by individual telephone number service requirements. Technical submittals shall describe the number and type of COS restrictions available.

g. Provide all station users with the feature package provided by the existing telephone system or at a minimum, those listed below. The ability to restrict any of these features on a station by station basis shall be provided:

1) Line Hunt Capability
2) Consultation Hold
3) Shall Transfer
4) Call Pick-Up
5) Call Forwarding
6) Call Queuing
7) Call back/Ring back
8) Music on Hold
9) Conferencing
10) Automatic Number Identification
11) Station to Station Call Waiting
12) Station and System Speed Dialing
13) Call Park
14) Universal Night Answer Service
15) Line Load Control
16) Dual Common Controls
17) Line Lock Out
18) Supervisory Signaling and Ringing

h. Fusing:

1) The CSU shall be equipped with fuses to protect the total telephone system and individual segments of the CSU so that a problem in one segment may be isolated without damaging the total CSU.

2) Fuses shall be of the alarm indicating type and their rating designated by numerical or color code on fuse panels that are easily visible.
i. Equipment Power Supply:

1) The CSU shall be equipped with a complete on-line power supply. The System shall consist of AC surge protection, dual load-sharing rectifiers/chargers, batteries, and inverter.

2) The power supply shall have a capacity sufficient to support the CSU including its projected maximum growth and as required in this specification for interfaced equipment.

3) The UPS w/Battery Back-up or the reserve battery power supply shall have sufficient capacity to supply the CSU for four (4) hours including projected maximum growth and interfaced equipment. The battery power supply shall consist of not less than 24 sealed (dry cells are not acceptable), maintenance-free cells.

4) The system shall be capable of adjustable voltage for float or equalizing batteries. A full redundant system (not including batteries and inverter) shall be provided. Each rectifier or charger shall have the capacity to support the combined load requirements of the existing EPBX as configured including maximum growth and interfaced equipment.

5) The Contractor shall coordinate with the local Facility Telephone Contractor, coordinated through the RE and Facility Contracting Officer, to determine CO trunk, FTS access line, and other required interface unit power requirements and provide power to the GFE telephone company or Facility furnished and installed interface units so they will continue to function in event of a commercial AC power failure.

j. Alarms and Trouble Indicators:

1) The Contractor shall provide visual and audible alarms, equipped with cut-off switches, indicating AC power failure, rectifier failure, major and minor alarms, and temperature/humidity alarms. The Contractor shall be responsible for providing the required sensors for environmental alarms. These alarms shall be remoted to the existing telephone system and one other location to be as specified herein. These alarms shall be separate and in addition to the major and minor alarm functions.

2) The alarm panel(s) shall contain small red indicator lamps for each alarm with cut-off switches or one switch for all alarms.
and a distinctive audible alarm(s) that can be heard over the ambient noise in its respective location. If one cutoff switch is provided for all audible alarms, it shall restore the alarms to the ready status condition for the audible registration of additional alarms.

a) The technical submittal shall describe any other CSU alarms that are remoted.

b) The technical submittal shall describe CSU alarms/indicators of malfunction(s) that are located on the equipment.

k. The CSU shall provide four-digit intra-station dialing.

1) Due to the varied trunk group requirements and possible future trunk group requirements, e.g. audio paging, alternate access codes may be proposed. Grouping of like type trunk group/features, e.g. 5-2 radio paging, 5-3 audio paging is acceptable.

2) The CSU shall provide emergency numbers accessible by all station users. The numbers shall appear on the console or a multi-line instrument and at least one other designated location. There shall be a distinctive audible and visual signal associated with the emergency number to ensure immediate response to calls. The console or multi-line instrument shall have the capability of priority answering the emergency number and extending the call as the situation dictates. A modified trunk circuit may be used for this purpose.

l. The CSU equipment shall have such sensitivity as required to provide satisfactory service up to 3,000 feet for all voice locations.

m. The Contractor shall provide a complete set of EPBX electronic modules and/or cards to be used as on-hand operational emergency spare equipment. One each of T-1, DS-**, interface cards etc. is the minimum required or a compliment as directed by the OEM. Additionally, the Contractor shall confer with the RE to determine other spare items that may be required to equip the system with a fully emergency repair capability completely adhering to the System Guaranty Requirements as described herein.
2. The installed CSU shall be as a minimum, compatible with the existing EBPX or equipped with the following features at a minimum:
   a. AC to DC power supplies.
   b. Emergency battery power supply.
   c. DC to AC inverter power supply (shall be connected to the CSU emergency battery power supply).
   d. Dual common controls.
   e. Redundant signaling supply units, or equivalent.
   f. Cable distribution frame.
   g. Cable distribution system.
   h. Programmable Emergency Telephone Number(s).
   i. An on-site automatic program loading device (tape drives are not acceptable) to reload system memory in case of power or system failure (shall be connected to the CSU emergency battery power supply).
   j. An on-site maintenance administration terminal (MAT) with CRT/keyboard and printer (shall be connected to the CSU emergency battery power supply).
   k. An automatic central office trunk connection to pre-determined stations for emergency trunk by-pass/cut-through service.
      Immediately upon failure of the GFE EPBX, these stations shall have the ability to process calls. If required, each of these stations shall be equipped with automatic ground start for outgoing calls. Single line instruments, if required, shall be provided by the contractor.
3. Voice Mail:
   a. The system shall allow a predetermined number of users to send complete and confidential messages in the user’s own voice and receive complete and confidential messages in the sender’s own voice. The system shall provide 24 hours per day, 7 days per week access. The system shall be integrated into the operation of the existing telephone system and be compatible with the local telephone company central office.
   b. The system shall provide capacity for the following number of ports:

<table>
<thead>
<tr>
<th>Equipped Capacity</th>
<th>Wired Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>31</td>
</tr>
<tr>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>25</td>
</tr>
</tbody>
</table>
c. The voice mail system shall initially provide for 500 mailboxes and 40 hours of storage with growth to 60 hours of storage.

d. Voice Mail Features. The system shall have the following features:

1) Access to the system and its features from any instrument anywhere that provides DTMF signaling.

2) The ability of those leaving a message to review the message and/or edit the message that is being placed in the mailbox.

3) Privacy/Security through the use of a "password".

4) The ability to send messages to users on the voice mail system in the following manner:
   a) To any user on the same voice mail system.
   b) To more than one user on the same voice mail system – an ad hoc distribution list determined by the sender at the time of message transmission.
   c) To a predetermined distribution list.
   d) Broadcast to all users on the same voice mail system.

5) Verification, with Receipt: The ability of a user to request and receive verification of when a message is actually played through the use of a touch-tone command. The system shall indicate the time and date of when a message is played and place that information in the sender's mailbox.

6) Envelope Information: The ability of a user to request and receive time and date information of when specific messages were left in the user's mailbox.

7) Connection to the voice mail system shall be through an extension number of the existing telephone system EPBX or a seven/ten digit telephone number from the LEC.

8) Message "PROMPTS" shall be provided for every transaction. Messages shall be provided for "GREETINGS" and "INSTRUCTIONS FOR RECORDING OR EDITING A MESSAGE".

9) A message waiting tone, lamp, and/or display shall notify the user that messages are in the user's mailbox.

10) A message shall notify the user, upon accessing the system, of how many messages are in the user mailbox.
11) The user, upon accessing the system, shall have the following response alternatives:
   a) Respond or send a reply to another user on the same voice mail system.
   b) Route the message to another user on the same voice mail system.
   c) Delete the message.
   d) Save the message.
12) A "Default Path" shall be provided to allow those callers who do not have touch-tone capability or who need to talk to someone to be routed to an operator or some other predetermined answering position.
13) The system shall the ability to fast forward or rewind recorded messages while being reviewed by the user.
14) The system shall present messages to the user on a "FIFO" basis.
15) User Administration: The system shall provide, as a minimum, management information and statistics in the following categories:
16) Port Usage: Traffic statistics on each of the different access paths into the system.
17) Usage of Storage Capacity - Remaining storage capacity at any one time and during peak periods.
18) Mailbox Usage: Connect time and number of new or saved messages.
19) The user administration terminal shall allow for "Class of Service Controls" in the following areas and for the following parameters:
   a) Initial Authorization:
      (1) Ability to enable a mailbox.
      (2) Record the "OWNER'S" name.
      (3) Set initial PASS NUMBER.
   b) Usage Control:
      (1) Length of personal greeting.
      (2) Length of messages received.
      (3) Number of messages.
      (4) Message retention time.
   c) Feature Authorizations - Allowed or Not:
(1) Group List Creation.
(2) Group List Usage.
(3) Broadcast Messages.

B. Voice Traffic Management System (TMS):

1. A complete and self-contained on-site TMS shall be provided that is fully compatible with and compliments the existing telephone system.

2. As a minimum, the following functions shall be provided:
   a. A 300 characters per second (CPS) letter quality printer, shall be provided. The CSU and/or the maintenance administration terminal may generate some of the reports.
   b. The TMS shall be connected to the CSU emergency battery power supply.
   c. All screen menus shall be standard with access to each category of reports to be provided.
   d. Traffic Accounting and Management Call Detail Recording (CDR) Package shall be provided for all voice circuits. The TMS shall:
      1) Include all necessary hardware, software, and interconnections to the CSU.
      2) Contain a database that shall be stored on non-volatile media. Tape drives are not acceptable.
      3) Contain line numbers, physical locations of equipment by building and room number, the department to which a line is assigned, the name of the person(s) assigned to a particular number, the type of equipment, and any comments regarding CSU features.
      4) Support additional I/O ports for video monitors or other terminals, which will allow a passive display of the data base(s) by, authorized medical center personnel other than those individuals responsible for data input and conducting studies.
      5) Exhibit a method of security that shall be provided by User ID and password to protect the data base(s).
      6) Perform separate voice line reports, on demand and predetermined schedule, for automatic printing. As a minimum, the following reports are required:
         a) Originating trunk traffic by trunk group expressed in CCS.
         b) Terminating trunk traffic by trunk group expressed in CCS.
c) All trunk busy, by trunk group, expressed as blocked call count.

d) All equipment busy, i.e., no dial tone and failure to complete cross office call because of all equipment busy, expressed in blocked call count.

e) List of all equipment alarms, error tables, trouble logs, history files, V & H coordinates etc.

7) Perform the following console measurements for each console:
   a) Incoming calls.
   b) Calls answered.

8) Contain remote video monitors that shall be provided in the immediate vicinity of the telephone operators for use as an on-line directory lookup system of Facility personnel. The Contractor provided monitors shall be compatible with the proposed TMS hardware and software.

9) Produce reports that shall be in English notation and will not require interpretation of abbreviations or codes by the user.

10) Contain sufficient storage on disk shall be provided to prevent a purge of stored data. Call record and facility usage data shall be maintained in the database for a minimum of 30 days. Storage must be capable of accommodating a minimum of 5,000 calls per day.

e. Samples of all reports generated by the TMS are to be submitted with the technical submittal for evaluation of formats and compliance with information field content.

f. Detailed description of the method to be used to measure traffic data shall be included in the technical submittal.

g. Normal system traffic data shall be furnished to the appropriate Facility staff within seven days of a Facility request. A complete and comprehensive traffic study, to include the required traffic data with the Contractor's comments and recommendations, will be prepared and submitted to the appropriate Facility staff quarterly. These studies shall be provided at no additional cost to the VA.

h. Automatic directory service shall generate a telephone directory that includes, name, title, organization, location, extension, and class-of-service. The contractor shall be responsible for loading and maintaining the directory.
i. A Cable plant management function shall be provided with the following requirements, at a minimum:

1) A list of off-premise cable by circuit number, numbers of pairs for each circuit, and circuit definition.

2) Provide a complete cable plant distribution record to identify the location (cable pair) on the MDF, the riser, the size cable, cable pair in-use (main cable feeder and station cable), building and room number of the termination, and the type equipment terminated.

3) Automatically provide when the service order is entered, the cable number and pair assignments.

j. Equipment inventory list shall be provided containing the following minimum requirements:

1) CSU cabinets, cards (active and spares), batteries, current and surge protectors, rectifiers, all peripheral equipment, i.e. radio page, audio page, etc.

2) Quantity of single and multi-line telephones, speakerphones, dial intercom units, speakers, gongs, loud horns, bells, chimes, recorders, etc.

3) A list of equipment as being used or spare; ordered or received; installed date, warranty date, cost, location, serial number, etc.

C. Equipment Cabinet with Internal Mounting Rack:

1. The equipment cabinet shall be lockable, heavy gauge steel with baked on paint finish. It shall be floor or wall mounted with knock-out holes for cable entrance and conduit connection, provided with ventilation ports and quiet fan with non disposable air filter for equipment cooling. Two keys shall be provided for each lock to the RE when the System is accepted.

2. A minimum of one cabinet shall be provided with blank rack space, for additional equipment. Blank panels shall be installed to cover any open or unused rack space. Two 120 VAC power strips connected to surge protectors, cooling fan with non-disposable air filter, and conduit or cable duct interface to adjacent cabinet(s) shall be a part of this cabinet.

3. Blank panels shall be color matched to the cabinet, 3.175 mm (1/8”) aluminum with vertical dimensions in increments of 44 mm (1.75”) with mounting holes spaced to correspond to Electronic Industry...
Association (EIA) 480 mm (19") dimensions. Single standard size blank panels shall be used to fill unused panel or rack spaces in lieu of numerous 44 mm (1.75") types. One blank 44 mm (1.75") high blank panel shall be installed between each item of equipment.

4. AC Power Outlet Strip(s):
   a. A strip shall be provided with an outlet for each item of equipment and a minimum of four spare AC power outlets. Each strip shall be mounted inside and at the rear of each equipment cabinet. It shall contain "U" ground AC outlets for distributing AC power to the installed electronic equipment. The strip shall be self-contained in a metal enclosure with a maximum of 1.8 M (6-foot) connecting wire with three-prong plug.
   b. Technical Characteristics:

<table>
<thead>
<tr>
<th>Power capacity</th>
<th>20 Ampere (AMP), 120 VAC continuous duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire gauge</td>
<td>Three conductor, #12 AWG copper</td>
</tr>
</tbody>
</table>

5. Cabinet AC Power Line Surge Protector and Filter:
   a. Each cabinet containing active electronic equipment shall be equipped with a AC Surge Protector and Filter. The Protector and Filter shall be housed in one single enclosure. The Protector and Filter shall provide instantaneous regulation of the AC input voltage and isolate and filter any noise present on the AC input line. It shall be cabinet mounted and the cabinet AC power strip (two strips maximum) may be connected to it.
   b. Technical Characteristics:

<table>
<thead>
<tr>
<th>Input Voltage range</th>
<th>120 VAC + 15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power capacity</td>
<td>20 AMP, 120 VAC</td>
</tr>
<tr>
<td>Voltage output regulation</td>
<td>+3.0%</td>
</tr>
<tr>
<td>Circuit breaker</td>
<td>15 AMP, may be self contain</td>
</tr>
<tr>
<td>Noise filtering</td>
<td>Greater than 45 dB</td>
</tr>
<tr>
<td>AC outlets</td>
<td>Four duplex grounded types, minimum</td>
</tr>
<tr>
<td>Response time</td>
<td>5 Nano Seconds</td>
</tr>
<tr>
<td>Surge suppression</td>
<td>10,000 AMPS</td>
</tr>
<tr>
<td>Noise suppression</td>
<td></td>
</tr>
</tbody>
</table>
6. Main AC Input Line:
   a. The CSU shall be equipped with AC voltage and current surge protectors to prevent damage to the CSU and rectifiers from power line induced voltage spikes, surges, lightning, etc.
   b. Specific requirements for current and surge protection shall include:
      1) Five nanosecond (ns) response time to the transient.
      2) Voltage protection threshold, line to neutral, starts at no more than 220 volts peak. The transient voltage shall not exceed 300 volts peak. Vendor shall furnish documentation on peak clamping voltage as a function of transient AMP.
      3) Peak power dissipation is 35 joules per phase (minimum), as measured for 1 millisecond at sub branch panels, 100 joules per phase at branch panels and 300 joules per phase at service entrance panels. Vendor shall furnish an explanation of how the ratings were measured or empirically derived.
      4) Surge protector must not short circuit the AC power line at any time:
         a) The primary surge protection components must be silicon semiconductors. Secondary stages, if used, may include other types of devices.
         b) Surge protectors shall incorporate a visual device which indicates whether the surge suppression component(s) is (are) functioning.
         c) Surge protection devices shall be UL listed.
         d) Voltage and current surge protectors shall be provided on all ancillary equipment provided by the Contractor, not powered from the CSU primary power supply and emergency battery, e.g., electronic telephones, service units, custom telephones, speaker phones, modems, data terminal interface, etc.
         e) Power dissipation 12,000 Watts (W) for 1 millisecond (12 Joules).
         f) Voltage protection threshold starts at not more than 110 VAC.
g) Surge protectors must not short-circuit the A/C line at any time.

h) Surge protectors shall be wholly self contained, plug in type for 110/120 VAC, 15 AMP, duplex receptacle.

D. Environmental Cabinet (If Selected):

1. The Contractor shall provide this enclosure in lieu of a standard equipment cabinet identified in Paragraph 2.3.A to meet system design in hostile TC locations as identified on the drawings. The enclosure shall fully sustain the installed, including electronic, equipment in the same manner as the standard cabinet identified in Paragraph 2.3.A. Additionally, the enclosure shall fully support all installed equipment as if they were in a stand alone air handling area regardless of the local area’s air handling capabilities. The enclosure shall be a fully OEM assembled unit. If more than two enclosures are required in any system location, those enclosures shall be OEM assembled for consolidating or combining two or more enclosures in a single unit to meet system space and equipment handling designs.

2. Technical Characteristics:

<table>
<thead>
<tr>
<th>Environmental control</th>
<th>Automatic, heating and/or cooling, as required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature conditions (rated at 1,300 W of install equipment heat generation):</td>
<td></td>
</tr>
<tr>
<td>Internal Range</td>
<td>Maintains 80° to 105° of internal heat conditions, maximum</td>
</tr>
<tr>
<td>External Range</td>
<td>100° + 25°, maximum</td>
</tr>
<tr>
<td>Forced air unit</td>
<td>Required with non disposable air filter unobstructed and uninterruptible</td>
</tr>
<tr>
<td>Air conditioning</td>
<td>As required, fully internal mounted</td>
</tr>
<tr>
<td>Heater</td>
<td>As required, fully internal mounted</td>
</tr>
<tr>
<td>Uninterruptible power supply</td>
<td>As required, fully internal mounted</td>
</tr>
<tr>
<td>Front door</td>
<td>Full length, see through, EMI resistant, and lockable</td>
</tr>
<tr>
<td>Rear door</td>
<td>Full length, non-see through, EMI resistant, and lockable</td>
</tr>
<tr>
<td>Conduit wiring entrance</td>
<td>Top and/or bottom, fully sealed</td>
</tr>
<tr>
<td>Input power</td>
<td>2 ea. minimum 120 VAC @ 20A,</td>
</tr>
</tbody>
</table>
maximum, independent circuit, conduit for fixed or armored cable for moveable installations

Dimensions:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1980 mm (78&quot;)</td>
</tr>
<tr>
<td>Width</td>
<td>635 mm (25&quot;)</td>
</tr>
<tr>
<td>Depth</td>
<td>965 mm (38&quot;)</td>
</tr>
<tr>
<td>Front panel opening</td>
<td>480 mm (19&quot;)</td>
</tr>
</tbody>
</table>

E. Distribution or System Interface Cabinet:

1. The cabinet shall be constructed of heavy 16 gauge cold rolled steel, have top and side panels and hinged front and rear (front door only if wall mounted) doors. It shall have baked-on iron phosphate primer and baked enamel paint finish in a color to be selected by the using Facility Service Chief or the RE, contain integral and adjustable predrilled rack mounting rails or frame that allows front panel equipment mounting and access. When all equipment, doors and panels are installed, snap-in-place chrome trim strip covers are required to be installed that will cover all front panel screw fasteners. It shall be equipped in the same manner as the equipment cabinet.

2. Technical Characteristics:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall height</td>
<td>2180 mm (85 7/8&quot;)</td>
</tr>
<tr>
<td>Overall depth</td>
<td>650 mm (25 1/2&quot;)</td>
</tr>
<tr>
<td>Overall width</td>
<td>535 mm (21 1/16&quot;)</td>
</tr>
<tr>
<td>Equipment vertical mounting space</td>
<td>1960 mm (77 1/8&quot;)</td>
</tr>
<tr>
<td>Front panel horizontal</td>
<td>484 mm (19 1/16&quot;)</td>
</tr>
</tbody>
</table>

F. Stand Alone Equipment (Or Sometimes Called Radio Relay) Rack:

1. The rack shall be constructed of heavy 16 gauge cold rolled steel and have fully adjustable equipment front mounting rails that allows front panel equipment mounting and access. It shall have baked-on iron phosphate primer and baked enamel paint finish in a color to be
selected by the using Facility Service Chief or the RE. It shall be floor or wall mounted or mounted on casters as directed by the RE.

2. Technical Characteristics:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall Height</strong></td>
<td>2180 mm (85 7/8&quot;), maximum</td>
</tr>
<tr>
<td><strong>Overall Depth</strong></td>
<td>650 mm (25 1/2&quot;), maximum</td>
</tr>
<tr>
<td><strong>Overall Width</strong></td>
<td>535 mm (21 1/16&quot;), maximum</td>
</tr>
<tr>
<td><strong>Front Panel Opening</strong></td>
<td>480 mm (19&quot;), EIA horizontal width</td>
</tr>
<tr>
<td><strong>Hole Spacing</strong></td>
<td>per EIA</td>
</tr>
</tbody>
</table>

G. Cross-Connection System (CCS) Equipment Breakout, Termination Connector (or Bulkhead), and Patch Panels:

1. The connector panel(s) shall be made of flat smooth 3.175 mm (1/8 inch) thick solid aluminum, custom designed, fitted and installed in the cabinet. Bulkhead equipment connectors shall be mounted on the panel to enable all cabinet equipment’s signal, control, and coaxial cables to be connected through the panel. Each panel shall be color matched to the cabinet installed.

a. Voice (or Telephone):

1) The CSS for voice or telephone service shall be Industry Standard 110 type punch blocks. This represents the minimum requirement for voice or telephone, and control wiring in lieu of patch panels, each being certified for category six service. IDC punch blocks (with internal RJ45 jacks) are acceptable for use in all CCS and shall be specifically designed for category six telecommunications service and the size and type of UTP cable used as described herein. As a minimum, punch block strips shall be secured to an OEM designed physical anchoring unit located on a wall in the MTC, IMTC, and TC. However, console, cabinet, rail, panel, etc. mounting is allowed at the OEM’s recommendation and as approved by the RE. Punch blocks shall not be used for Class II or 120 VAC power wiring.

2) Technical Characteristics:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of horizontal rows</strong></td>
<td>100, minimum</td>
</tr>
<tr>
<td><strong>Number of terminals per</strong></td>
<td>4, minimum</td>
</tr>
</tbody>
</table>
Terminal protector | required for each used or unused terminal
---|---
INSULATION SPLICING | required between each row of terminals

b. Fiberoptic //, and Analog Audio//:

1) Product reference of a Government Approved (US State Department) type is Telewire, PUP-17 with prepunched chassis mounting holes arranged in two horizontal rows. This panel may be used for fiber optic, audio, control cable, and Class II Low Voltage Wiring installations when provided with the proper connectors. This panel is not allowed to be used for 120 VAC power connections.

2) Technical Characteristics:

<table>
<thead>
<tr>
<th>Size:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>Two RUs, 89 mm (3.5&quot;) minimum</td>
</tr>
<tr>
<td>Width</td>
<td>484 mm (19 1/16&quot;), EIA minimum</td>
</tr>
<tr>
<td>Number of connections</td>
<td>12 pairs, minimum</td>
</tr>
</tbody>
</table>

Connectors:

- **Audio Service**
  - Use RCA 6.35 mm (1/4") Phono, XL or Barrier Strips, surface mounted with spade lugs (punch block or wire wrap type strips are acceptable alternates for barrier strips as long as system design is maintained)

- **Control Signal Service**
  - Barrier strips surface mounted with spade lugs (punch block or wire wrap type strips are acceptable alternates for barrier strips as long as system design is maintained)

- **Low voltage power (class II)**
  - Barrier strips with spade lugs and clear full length plastic cover, surfaced mounted

- **FIBER OPTIC**
  - "ST" STAINLESS STEEL, FEMALE

c. Mounting Strips and Blocks:

1) Barrier Strips:

a) Barrier strips are approved for AC power, data, voice, and control cable or wires. Barrier strips shall accommodate the size and type of audio spade (or fork type) lugs used
with insulating and separating strips between the terminals for securing separate wires in a neat and orderly fashion. Each cable or wire end shall be provided with an audio spade lug, which is connected to an individual screw terminal on the barrier strip. The barrier strips shall be surface secured to a console, cabinet, rail, panel, etc. 120 VAC power wires shall not be connected to signal barrier strips.

b) Technical Characteristics:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal size</td>
<td>6-32, minimum</td>
</tr>
<tr>
<td>Terminal Count</td>
<td>Any combination</td>
</tr>
<tr>
<td>Wire size</td>
<td>20 AWG, minimum</td>
</tr>
<tr>
<td>Voltage handling</td>
<td>100 V, minimum</td>
</tr>
<tr>
<td>Protective connector cover</td>
<td>Required for Class II and 120 VAC power connections</td>
</tr>
</tbody>
</table>

2) Solderless Connectors: The connectors (or fork connectors) shall be crimp-on insulated lug to fit a 6-32 minimum screw terminal. The fork connector shall be installed using a standard lug-crimping tool.

3) Punch Blocks: Industry Standard 110 type punch blocks are approved for data, voice, and control wiring at a minimum. Punch blocks shall be specifically designed for the size and type of wire used. Punch block strips shall be secured to a console, cabinet, rail, panel, etc. Punch blocks shall not be used for Class II or 120 VAC power wiring.

4) Wire Wrap Strips: Wire wrap strips (minimum of 1.65 mm (0.065") wire wrap) are approved for voice and control wiring and shall meet Industry Standards. Wire wrap strips shall be secured to a cabinet, rail, panel, etc. Wire wrap strips shall not be used for Class II or 120VAC power wiring.

H. Wire Management System and Equipment:

1. Wire Management System: The system(s) shall be provided as the management center of the respective cable system, CCS, and TC it is incorporated. It shall perform as a platform to house peripheral equipment in a standard relay rack or equipment cabinet. It shall be arrange in a manner as to provide convenient access to all install
management and other equipment. All cables and connections shall be at the rear of each system interface to IDC and/or patch panels, punch blocks, wire wrap strips, and/or barrier strip.

2. Wire Management Equipment: The wire management equipment shall be the focal point of each wire management system. It shall provide an orderly interface between outside and inside wires and cables (where used), distribution and interface wires and cables, interconnection wires and cables and associated equipment, jumper cables, and provide a uniform connection media for all system fire retardant wires and cables and other subsystems. It shall be fully compatible and interface to each cable tray, duct, wireway, or conduit used in the system. All interconnection or distribution wires and cables shall enter the system at the top (or from a wireway in the floor) via an overhead protection system and be uniformly routed down either side (or both at the same time) of the frame in side protection system then laterally via a anchoring or routing shelf for termination on the rear of each respective terminating assembly. Each system shall be custom configured to meet the system design and user needs.

I. Telephone Instruments:

1. Telephone instruments (or station equipment) that are initially installed shall be configured as indicated herein. Final location of some station equipment shall be coordinated with designated VA official prior to installation.

2. All telephone instruments shall be equipped with the inductive capability to radiate a magnetic field required to activate the hearing aid telecoil and to provide personnel, who use hearing aids, access to all telephones within the Facility.

3. Station equipment shall consist of standard single line instruments, patient bedside instruments, and multi-line digital electronic telephone instruments with digital display, of the latest state-of-the-art design.

4. All telephone instruments except patient bedside phones, shall be equipped with a flash button (or equivalent feature button) with pre-determined timing feature to initiate consultation hold and other features normally initiated by operation of the hook-switch. Flash button shall be distinct from the hook-switch.
5. All telephone instruments, except patient bedside phones, shall be equipped with a laminated faceplate listing the most common user features and their appropriate access codes. The faceplates may be an integral part of the instrument housing or may be an adhesive backed decal that shall be applied over the tone pad area of the housing at the time of telephone set installation.

6. Station instruments shall be feature compatible and have transmission characteristics which are compatible with the proposed system.

7. Telephone instrument signaling shall be by means of standard adjustable, buzzers, chimes, or electronic tone, unless otherwise specified:
   a. Single Line:
      1) Single line instruments may be electronic or 2500-type analog phones.
      2) Single line instruments used must be capable of supporting bridged cabling to allow a single phone number on multiple instruments without using multiple switch ports.
      3) Single line instruments must be capable of supporting auxiliary equipment, such as amplified handsets; external chimes, light, or bells; and other similar equipment without using multiple switch ports.
   b. Multi-Line, Digital and Electronic:
      1) The instruments shall be equipped with a digital read-out display and shall have no less than 14 programmable (lines or features) buttons.
      2) The instruments shall employ only one adjustable ringer, bell, buzzer, chime or electronic tone to announce calls. The signaling device shall detect an incoming call to the multi-button instrument and provide an audible signal only on designated lines.
      3) Each instrument shall be equipped with lights to identify the called line and remain illuminated for the duration of the call.
      4) Telephone intercom systems shall normally be associated with these instruments.
      5) The equipment associated with intercom systems may require special features such as built in microphone and speaker.
Telephone Intercom Systems shall be required to provide secretaries with a means of announcing calls to offices with extensions or pickups on the system. The provision of intercom systems shall be identified during the data base survey required as described herein. Any required intercom systems shall be provided and installed by the contractor.

6) This equipment must be capable of supporting auxiliary equipment, such as amplified handsets; external chimes, light, or bells; and other similar equipment. The use of analog switch ports to provide ringing voltage, if required, is acceptable and these switch ports shall be included in the Equipped Capacity as described herein.

7) Hot Line Telephones shall be provided between two identified points and as shown on the drawings. These hot lines shall be equipped with two-way automatic ring and cut-off controlled by the telephone hook-switch, i.e. when near-end hand set is removed from the hook switch, the far-end telephone shall ring until the hand set is removed from the hook-switch.

8) Hands Free telephone stations shall be required. In this configuration, a speaker shall be used as both transmitter and receiver to answer or initiate a call. These facilities will normally be used as a hot line between two points. Requirements for hands-free operated facilities shall be identified on the drawings.

c. Patient Bedside:

1) Patient bedside instruments shall be maintenance free, sanitized packet, and capable of supporting tabletop, side-rail, top bed-rail, or wall mounting. Each phone should have a self-contained line cord of not less than 4.5 M (15 feet).

2) At the discretion of the facility, patient bedside instruments may be discarded, cleaned for reuse, or given to the patient, as appropriate. The anticipated cost per instrument should not exceed $10.00.

2.3 DISTRIBUTION EQUIPMENT AND SYSTEMS

The System shall be provided with a complete cable backbone and building distribution system consisting of copper, fiberoptic, and other specified cable and connectors, signal closets, cross connection or terminating systems, telecommunication outlets and interface points
as identified in Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING and with technical instructions and approval from the RE.

2.4 INSTALLATION KIT

The kit provided shall include, at a minimum, all connectors and terminals, labeling systems, audio spade lugs, barrier strips, punch blocks or wire wrap terminals, heat shrink tubing, cable ties, solder, hangers, clamps, bolts, conduit, cable duct, and/or cable tray, etc., required to accomplish a neat and secure installation. All wires shall terminate in a spade lug and barrier strip, wire wrap terminal or punch block. Unfinished or unlabeled wire connections shall not be allowed. The Contractor shall turn over all unused and partially opened installation kit boxes, coaxial, fiber-optic, and twisted pair cable reels, conduit, cable tray, and/or cable duct bundles, wire rolls, physical installation hardware to the RE. At a minimum, the following installation sub-kits are required:

A. System Grounding:
   1. The grounding kit shall include all cable and installation hardware required. All radio equipment shall be connected to earth ground via internal building wiring, according to the NEC.
   2. This includes, but is not limited to:
      a. Coaxial Cable Shields
      b. Control Cable Shields.
      c. Data Cable Shields.
      d. Equipment Racks.
      e. Equipment Cabinets.
      f. Conduits.
      g. Cable Duct.
      h. Cable Trays.
      i. Power Panels.
      j. Connector Panels.
      k. Grounding Blocks.

B. Wire and Cable: The wire and cable kit shall include all connectors and terminals, audio spade lugs, barrier straps, punch blocks, wire wrap strips, heat shrink tubing, tie wraps, solder, hangers, clamps, labels etc., required to accomplish a neat and orderly installation.

C. Conduit, Cable Duct, and Cable Tray: The kit shall include all conduit, duct, trays, junction boxes, back boxes, cover plates, feed through
nipples, hangers, clamps, other hardware required to accomplish a neat and secure conduit, cable duct, and/or cable tray installation in accordance with the NEC and this document.

D. Equipment Interface: The equipment kit shall include any item or quantity of equipment, cable, mounting hardware and materials needed to interface the systems with the identified sub-system(s) according to the OEM requirements and this document.

E. Labels: The labeling kit shall include any item or quantity of labels, tools, stencils, and materials needed to completely and correctly label each subsystem according to the OEM requirements, Record Wiring Diagrams, and this document.

F. Documentation: The documentation kit shall include any item or quantity of items, computer discs, as installed drawings, equipment, maintenance, and operation manuals, and OEM materials needed to completely and correctly provide the system documentation as required by this document and explained herein.

//2.5 AUXILIARY SYSTEMS

//A. The CSU shall be compatible with an EPBX that shall provide a minimum of six interfaces with the Radio Paging System identified in Section 27 32 41, TWO-WAY RADIO EQUIPMENT, and with technical instructions from the RE. If the EPBX is not interfaced with a radio paging system the CSU shall be capable of performing this function. The telephone system shall provide a feature to prevent the radio paging system from being "locked up" by a user or an operator putting the system on hold or leaving the receiver "off-hook". The Contractor shall coordinate with the radio paging company and the VA to identify the interface requirements of the EPBX. The VA and contractor shall conduct a test during non-working hours at least 30 days before cutover. The Contractor shall provide and install any required peripheral interface device. The VA shall be responsible for providing the interface device if it is a card or option in the radio paging equipment. //

//B. The CSU shall be compatible with an EPBX that is interfaced to the Public Address System (PA) identified in Section 27 51 16, PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS, and with technical instructions from the RE. If the EPBX is not interfaced with a PA system the CSU shall be capable of performing this function. The console attendants shall have direct access to selected zones and all zone(s) paging. The attendant shall also have "priority access" to all zones. Selected
station users shall have access to appropriate zone(s), by dialing the proper access. The contractor is responsible for providing and installing the required interface device(s) to the PA. The EPBX shall provide a feature to prevent the PA from being "locked up" by a user placing the system on hold or leaving the receiver "off-hook".

PART 3 - EXECUTION

3.1 INSTALLATION

A. Product Delivery, Storage and Handling:

1. Delivery: Deliver materials to the job site in OEM's original unopened containers, clearly labeled with the OEM's name and equipment model and serial identification numbers. The RE may inventory the EPBX and related equipment.

2. Storage and Handling: Store and protect equipment in a manner that will preclude damage as directed by the RE.

B. System Installation:

1. After award of contract, and within the time period specified in the contract, the Contractor shall deliver the total system in a manner that fully complies with the requirements of this specification. The Contractor shall make no substitutions or changes in the system without written approval from the RE and PM.

2. The Contractor shall install all equipment and systems in a manner, which complies with, accepted industry standards of good practice, the requirements of this specification and in a manner that does not constitute a safety hazard. The Contractor shall insure that all installation personnel understands and complies with all the requirements of this specification.

3. The Contractor shall install suitable filters, traps, directional couplers, splitters, telephone outlets, and pads for minimizing interference and for balancing the amplifiers and distribution system(s). Items used for balancing and minimizing interference shall be able to pass telephone channels in the frequency bands selected, in the directions specified, with low loss, and high isolation and with minimum delay of specified frequencies and signals. The Contractor shall provide all equipment necessary to meet the requirements of paragraph 2.1.C and the System performance standards.
4. All passive equipment shall be connected according to the OEM's specifications to insure correct termination, isolation, impedance match and signal level balance at each telephone outlet.

5. Where telephone/data outlets are installed adjacent to each other, install one outlet for each instrument.

6. All lines shall be terminated in a suitable manner to facilitate future expansion of the System. There shall be a minimum of one spare 25 pair cable at each distribution point on each floor.

7. All vertical and horizontal copper and fiber optic lines shall be terminated so shall require modifications of the System CSU or signal closet equipment only.

8. Terminating resistors or devices shall be used to terminate all unused branches, outlets, equipment ports of the System, and shall be devices designed for the purpose of terminating fiber optic or twisted pair cables carrying digital //, and analog // signals in telephone systems.

9. Equipment installed outdoors shall be weatherproof or installed in weatherproof enclosures with hinged doors and locks with two keys.

10. Equipment installed indoors shall be installed in metal cabinets with hinged doors and locks with two keys.

C. Equipment Assembly:

1. Cabinets:
   a. Each enclosure shall be: Floor or wall mounted with standard knockout holes for conduit connection or cable entrance; provide for ventilation of the equipment; have front and rear locking doors (except, wall mounted cabinets that require only a front locking door); power outlet strip(s), connector, and patch panel(s).
   b. Each enclosure shall be equipped with a quiet fan and nondisposable air filter.
   c. Enclosures and stand alone racks shall be installed plumb and square. Each shall be permanently attached to the building structure and be held firmly in place and approved by the RE.
   d. Rack mounted equipment shall be installed in the enclosure’s equipment adjustable mounting racks with equipment normally requiring adjustment or observation mounted so operational adjustment(s) can be conveniently made. Heavy equipment shall be mounted with rack slides or rails allowing servicing from the
front of the enclosure. Heavy equipment shall not depend only upon front panel mounting screws for support. Equipment shall be provided with sufficient cable slack to permit servicing by removal of the installed equipment from the front of the enclosure. A color matched blank panel (spacer) of 44 mm (1.75 inches) high, shall be installed between each piece of equipment (active or passive) to insure adequate air circulation. The enclosure shall be designed for efficient equipment cooling and air ventilation.

e. Provide 380 mm (15 inches) of front vertical space opening for additional equipment. Install color matched blank panels to cover any unused enclosure openings.

f. Signal connector, patch, and connector panels (i.e. PA, telephone, control, RF, TV, etc.) shall be connected so that outputs from each source, device or system component shall enter the panel at the top row of jacks, beginning left to right as viewed from the front. These will be called "inputs". Each connection to a load, device or system component shall exit the panel at the bottom row of jacks, beginning left to right as viewed from the front. These will be called "outputs".

1) Equipment located indoors shall be installed in metal racks or enclosures with hinged doors and be accessible for maintenance without interference to other nearby equipment.

2) Cables shall enter the equipment racks or enclosures in such a manner that allows all doors or access panels to open and close without disturbing or damaging the cables.

3) All distribution hardware shall be securely mounted in a manner that allows access to the connections for testing and provides sufficient room for the doors or access panels to open and close without disturbing the cables.

2. Installation of the CSU:

a. General:

1) The CSU installation shall comply with all laws and codes applying to interconnected telephone installations.

2) In the absence of specifications regarding installation details, standard industry practices shall prevail and first quality material and workmanship shall be provided.
3) All material, installed by the Contractor, shall be new and thoroughly tested. All installation shall be carried out in a professional manner.

4) Installation of all equipment shall be fully coordinated with the RE and Facility staffs. No area shall be left without minimal telephone service as described herein.

5) The Contractor shall provide an outlet with triplex modular jack with stainless steel cover plate for each telephone outlet as shown and verified on the drawings. The Contractor shall provide the appropriate modular jack (single or triplex) with appropriate cover plate for each 'outlet' location identified on the drawings.

6) The Contractor shall install all patient and wall telephone instruments on a single modular jack designed for wall telephone instruments and patient wall or PBPU installations.

7) All permanent telephone cable and wire shall be installed in conduit or an enclosed duct system or be of the type approved for installation, as determined by VA requirements, without conduit or enclosed duct system. Cable and wire not installed in conduit or an enclosed duct system must be installed in cable tray or mechanically supported and separated from other signal cable systems as described herein.

8) Where cable and wire penetrate through fire/smoke partitions, firewalls, or floors, the Contractor shall provide fire/smoke stopping around the outside of any installed conduit/cable tray. The Contractor shall provide and install fire stopping material, type approved by the RE, inside the provided conduit/cable tray after installation is complete.

b. The Contractor Shall:

1) Install the equipment in accordance with the specifications for the CSU as specified and recommended by the OEM.

2) Provide a full time on-site Project Manager effective with VA issuance of the notice to proceed. The Project Manager shall be responsible for fully coordinating and supervising all contractor/sub-contractor personnel in all phases of the installation, training, inspection, cutover, and final acceptance of the System. The Project Manager shall be provided a complete copy of these specifications to include
all amendments prior to the start of installation of the telephone system.

3) Coordinate and conduct the CSU data base survey with the RE and a member of the IRM staff. The Contractor is responsible for identifying all programming of features, classes of service, and equipment to be installed by types and physical locations as specified in this document and all attachments thereto. After the survey is completed, a complete list of equipment shall be provided to the RE and the IRM for approval prior to the start of installation.

4) Be responsible for the removal and replacement of damaged ceiling tiles during installation and maintenance service of the cable and wire distribution system. The Contractor shall be responsible for restoring to original condition any immediate (approximately one meter (three feet) in diameter) areas that were damaged during the installation and maintenance of the systems.

5) Run all cross connects to established circuits during installation and maintenance service for the contract life.

6) Remove, on a daily basis, all debris and scrap generated in the conduct of work.

7) Provide the RE, for review, coordination and approval, a Proof of Performance Test Plan 90 days prior to activation of the CSU. The plan shall be used for testing and acceptance of the System. It shall include sufficient tests to demonstrate the systems capabilities of providing the services outlined in this document. Test equipment required for demonstration shall be Contractor provided and approved by the RE. A list of test equipment required shall be included with the acceptance test plan. Test equipment shall have undergone calibration certification within six months prior to system activation.

8) Provide Contractor personnel (switch technicians, installers, trainers, and the project manager) on premise for seven consecutive days after cut-over to clear any malfunctions which may develop, to assign/reassign any software features/COS, and conduct any additional training as required.

9) Ensure that the project manager and sufficient skilled personnel remain on premise until all items on the punch list,
developed during inspection, cut-over, and acceptance testing of the System are completed, inspected, and accepted by the RE.

10) Be responsible for any and all coordination with the LEC relative to interface with the commercial telephone system. The contractor shall also be responsible for the removal of all voice and/or data equipment and cabling abandoned by the LEC, VA, or other organizations and not retained for exclusive use by VA as a result of this installation.

11) Connect all telephone equipment located in the equipment room to the common signal ground buss that is provided. The common signal ground buss shall be located in all telephone closets and the CSU switch room.

12) Provide system ground between CSU and all interfaced systems such as existing telephone system, PA system equipment chassis, radio paging equipment chassis, etc.

13) Ensure that other dedicated telecommunications systems applications within the Facility (i.e., pay stations, electro-writing equipment, facsimile etc.) that require space within switch room/telephone closets, conduits, and cable pair are accommodated. Coordination between applicable parties will be necessary to ensure accommodation of these systems. It shall be the responsibility of the bidders to determine the requirements and include them in their proposal.

14) All portions of the System installation shall conform to local building and fire codes.

15) The Contractor shall not use gasoline, benzene, alcohol, naphtha, carbon tetrachloride, or turpentine for cleaning any part of the equipment. Flammable materials shall be kept in suitable places outside the building. OSHA safety standards and local Facility safety standards shall prevail.

D. Conduit, Cables and Wiring, Cable Tray, Raceways, Signal Ducts, Etc.:

1. The Contractor shall employ the latest installation practices and materials.

2. All cables shall be installed in conduit and/or signal ducts. Conduits shall be provided in accordance with Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.
3. Ensure that Telephone // and PA // Systems (as identified by NEC Section 517) are completely separated and protected from all systems.

4. All cable junctions and taps shall be accessible. Do not install multi-taps or other distribution equipment items inside cable ducts or raceways. As a minimum, use a 200 mm x 200 mm x 100 mm (8” X 8” X 4”) junction box attached to the cable duct or raceway for installation of distribution system passive equipment. Ensure all equipment and tap junctions are accessible.

5. Cables shall be installed and fastened without causing sharp bends or rubbing of the cables against sharp edges. Cables shall be fastened with hardware that will not damage or distort them.

6. Cables shall be labeled with permanent markers at the terminals of the electronic and passive equipment and at each junction point in the System. The lettering on the cables shall correspond with the lettering on the record wiring diagrams.

7. Cable shall be grouped and shall not change position throughout the cable run.

8. Completely test all of the cables after installation and replace any defective cables.

3.2 TESTS

If this Section is being used in conjunction with Specification Section 27 31 00, VOICE COMMUNICATIONS SWITCHING AND ROUTING EQUIPMENT or Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLELING, the following testing guidelines are in addition to the requirements outlined in these documents. If this document is being used as a “Stand Alone” cable plant installation, the following testing guidelines shall be the standard of measure for the respective system.

A. Interim Inspection:

1. The interim inspection will be conducted in the presence of a Government Representative designated as the VA Contract Coordinator prior to the proof of performance testing. This inspection shall verify that the equipment provided adheres to the installation requirements of this document.

2. The Contractor shall have 50% of the telephone extension system equipment installed to include, but not be limited to: CSU, interface, origination and junction enclosures powered with the
permanent AC wiring, outlets, conduit and cables, before the interim inspection can take place.

3. The Contractor shall notify the RE, in writing, of the estimated date the Contractor expects to be ready for in the interim inspection, at least 7 working days before the requested inspection date.

4. Results of the interim inspection shall be provided to the RE and PM. If major or multiple deficiencies are discovered, a second interim inspection may be required before permitting the Contractor the Contractor to continue with the System installation.

5. The RE in conjunction with PE shall determine if an additional inspection is required, or if the Contractor will be allowed to proceed with the installation. In either case, re-inspection of deficiencies noted during the interim inspection(s), will be part of the proof of performance test. The interim inspection shall not affect the systems’ completion date. The Contracting Officer shall ensure all test documents will become a part of the systems record wiring diagrams documentation.

B. Pretesting: Upon completing the installation of the System, the Contractor shall align and balance the system. The Contractor shall pretest the entire system.

C. Pretesting Procedure: During the System pretest, the Contractor shall verify (utilizing the approved spectrum analyzer and test equipment) that the System is fully operational and meets all the System performance requirements of this document. The Contractor shall measure and record the aural carrier levels of each system telephone, at each of the following points in the system:

1. Local Telephone System Inputs.
2. CSU inputs and outputs.
3. MDU, BIU, amplifiers, channel processor and converter inputs and outputs.
4. CSU output S/NR for each telephone channel.
5. Signal Level at each interface point to the distribution system, the last outlet on each trunk line plus all outlets installed as part of this contract.
6. A copy of the recorded system pretest measurements shall be submitted, along with the pretest certification, to the RE.
D. Pretesting Certification. After pretesting the System, the Contractor shall notify the RE, in writing, that the System is ready for proof of performance testing, and that it meets all requirements stated in this document. The Contractor shall accomplish submission of this notification of system readiness, no later than 20 working days prior to the beginning of the scheduled Government proof of performance test. Failure of the Contractor to comply with these pretest requirements, shall be grounds for canceling the scheduled test.

E. Acceptance Test:

1. After the System has been pretested and the Contractor has submitted the pretest results and certification to the RE, the Contractor shall schedule an acceptance test date and give the RE 20 days advance 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 Life Safety 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.

2. The acceptance test shall be performed on a “go-no-go” basis. Only those operator adjustments required to show proof of performance shall be allowed. The test shall demonstrate and verify that the installed system complies with the operational and technical requirements of this specification under operating conditions. The System shall be rated as either acceptable or unacceptable at the conclusion of the test. Failure of any part of the System the precludes completion of system testing, and which cannot be repaired in four (4) hours, shall be cause for terminating the acceptance test of the System. Repeated failures that result in a cumulative time of eight (8) hours to effect repairs, shall cause the entire System to be declared unacceptable. Re-testing of the entire System shall be rescheduled at the convenience of the Government.

F. Acceptance Test Procedure:

1. Physical and Mechanical Inspection:

   a. The Government Representative will tour all major areas where the System is 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, interim inspection 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: After the Physical and Mechanical Inspection, the Contractor shall perform an operational test to verify that all equipment is properly connected, interfaced and is functionally operational to meet the requirements of this specification. If any sub-system is not functionally ready, that sub-system shall be declared unacceptable and all testing shall be terminated. At this point, the Contractor shall be permitted one hour to correct the deficiencies. It may be mutually agreed upon, at this time, to wait one hour or to commence testing of the next sub-system.

3. Performance Test: After the functional test, each sub-system shall be checked to verify that all performance requirements and standards are met. The performance requirements shall be verified using the necessary test equipment. A spectrum analyzer, signal level meter and BERT shall be used to verify there are no visible signal distortions, such as inter-modulation, beats, etc. appearing on any received or generated telephone channel.

4. Total System Test:
   a. The testing shall proceed until the system and subsystems are functionally tested and accepted. The total system tests shall verify that the requirements have been met for all system signals as described herein.

      1) Existing Telephone System Point of Demarcation: The system output(s) shall be checked to verify that all performance requirements are met.

      2) CSU: This test shall be conducted within 30 days following successful pre-testing of the CSU. In addition to compliance with the technical characteristics and quantities of equipment specified herein, the Final Acceptance Test shall contain the provision that 30 continuous days uninterrupted telephone
service, must be completed prior to the Contractor being deemed to be in compliance with the contract.

b. For the purpose of final acceptance, the telephone service shall be considered interrupted when the failure of any Contractor provided telephone equipment including batteries, results in an interruption of service. This includes a failure of more than 20% of any trunk group, 15% of any number group (15 or more stations), operator console, or telephone service to any area determined to be critical by the Facility Director. Response time to restore service shall have no bearing upon the term "interrupted service".

c. To facilitate the CSU Acceptance Test and to allow familiarization and training of Facility employees, the Contractor shall activate the CSU, including the operator consoles, stations and equipment a minimum of 30 days prior to the acceptance test date. All installed equipment and circuits shall be fully tested prior to the acceptance by VA. During this "burn-in" period, the Contractor shall de-bug the CSU. The Contractor shall make the CSU available for in-house communications and demonstrate to the Facility staff the required features. The Facility Director and Contractor will make designated trunks and tie-line circuits available to the CSU during this "burn-in" period for testing.

d. At the conclusion of the Acceptance Test, the PM, the RE and the Contractor shall jointly agree to the results of the test, and reschedule testing on deficiencies and shortages, if any. When the test show the System performs in accordance with the specifications, the 30 days of uninterrupted service provision shall begin. This provision must be successfully met for contract compliance. If any retests are needed to reach agreement on the results of the tests or to establish compliance with these specifications such retesting will be done at the Contractor's expense.

5. Individual Item Test: The Government Representative may select individual items of equipment for detailed proof-of-performance testing. That item shall meet or exceed the minimum requirements of the specification.

6. Distribution System:
a. To ensure that the System meets all performance requirements, a minimum of 75% of the System outlets shall be checked. Additionally, each distribution system interface, junction and connection point or location will be checked. Each distribution active and passive item of equipment, signal input(s) and output(s) will be tested.

b. For specific distribution testing instructions refer to Specification Section 27 15 00, COMMUNICATIONS HORIZONTAL CABBING, and the RE for technical assistance.

3.3 TRAINING

A. Furnish the services of an OEM trained and certified engineer or technician for a total of two eight hour classes to instruct designated Facility maintenance personnel. Instruction shall include cross connection, corrective, and preventive maintenance of the System and equipment. Training shall be accomplished before the VA can accept the System. Additionally, training will be scheduled at the convenience of the Facility's, Chief Engineering Service.

B. Also, furnish the services of an OEM trained and certified engineer or technician, familiar with the functions and operation of the system and equipment, for two eight hour periods to train designated Facility IRM personnel. Instructions shall be provided for staff personnel in each area where the System is installed under this contract. When multiple areas are involved, classes will be grouped. Periods of training shall be coordinated with the RE or the Facility Contracting Officer. The RE or the Facility Contracting Officer shall coordinate with the Facility to ensure all shifts receive the required training. Each session shall include instructions utilizing “hands-on” operation and functions of the System.

3.4 WARRANTY

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

B. Contractor’s Responsibility: The Contractor shall warranty that all installed 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 VA. The Contractor shall provide OEM’s equipment warranty documents, to the RE and Facility Contracting Officer, certifying that all equipment installed under this document conforms to its published specifications.
C. The Contractor shall provide a written commitment from the System equipment OEM to the supply of parts and on-site engineering support services for the one year warranty service (materials and labor) in the event of default or unsatisfactory service by the Contractor.

1. The OEM certification shall describe, in the event of default or unsatisfactory service by the Contractor, the manufacturer or an authorized distributor shall fully support the contract (initial installation, warranty service for the one year warranty period of the contract).

2. The System equipment OEM’s signatory of the certified written commitment must be of an individual who has the full authority to obligate the OEM to this commitment. Names, corporate addresses, and telephone numbers of the individuals who have this authority shall be provided as a part of the commitment.

D. The Contractor’s maintenance personnel shall have the ability to contact the Contractor and OEM’s central emergency maintenance and request 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.

E. All Contractor maintenance and supervisor personnel shall be fully qualified by the OEM and must provide two (2) copies of their current and qualified OEM training certificates and OEM certification upon request.

F. Additionally, the Contractor shall accomplish the following minimum requirements during the one year warranty period:

1. Response Time:
   a. The RE or the Facility Contracting Officer (if the Facility has taken possession of the building[s]) are the Contractor’s reporting and contact officials for the System trouble calls, during the warranty period.
   b. A standard workweek is considered 8:00 A.M. to 5:00 P.M., Monday through Friday exclusive of Federal Holidays.
   c. The Contractor shall respond and correct on-site trouble calls, during the standard work week to:
      1) A routine trouble call within one working day of its report. A routine trouble is considered a trouble that causes a sub-system to be inoperable.
2) An emergency trouble call within eight (8) hours of its report. An emergency trouble is considered a trouble that causes a system to be inoperable at anytime.
   a) An emergency trouble call shall be deemed appropriate when a failure involves more than 20 voice circuits.
   b) In addition, the failure of a common control unit, power supply, signal generating device or attendant console shall also be deemed as an emergency maintenance call.

3) A catastrophic trouble call within four (4) hours of its report. A catastrophic trouble call is considered a EPBX failure.
   a) If an EPBX failure cannot be corrected within six (6) hours, the Contractor shall be responsible for providing an alternate CSU equipped for a minimum of 100 station lines, 10 CO trunks, 10 FTS access lines and two operator’s consoles.
      (1) This alternate system shall be operational within 12 hours (time to commence at the end of the six-hour trouble shooting period) and shall provide emergency service to critical areas as determined by the Facility Director.
      (2) The alternate system shall be a programmable system and a pre-written compact disk program shall be provided to the Facility Contracting Officer prior to cut-over of the main telephone system.
   b) Failures affecting operation of critical emergency health care facilities (i.e. cardiac arrest teams, intensive care units, etc.) shall also be deemed catastrophic trouble calls if so determined by the Facility Director. The Facility Contracting Officer shall notify the Contractor of this type of trouble call at the direction of the Facility Director.

4) The Contractor shall respond on-site to installation of station or equipment requests or service within:
   a) Eight (8) hours for emergency installations designated by the Facility Contracting Officer, and
   b) Three working days for routine installations designated by the Facility Contracting Officer.
2. Required On-Site Visits During The One Year Warranty Period:
   a. The Contractor shall visit, on-site, for a minimum of eight hours, once every twelve (12) weeks, during the warranty period, to perform system preventive maintenance, equipment cleaning and operational adjustments to maintain the System according the descriptions identified in this specification.  
      1) The Contractor shall arrange all Facility visits with the RE or the Facility Contracting Officer prior to performing the required maintenance visits.  
      2) The Contractor, in accordance with the OEM’s recommended practice and service intervals, shall perform preventive maintenance during non-busy time agreed to by the RE or the Facility Contracting Officer and the Contractor.  
      3) The preventive maintenance schedule, functions, and reports shall be provided to and approved by the RE and Facility Contracting Officer.  
      4) Provide on-site a stock of replacement spare parts and equipment, plus test equipment, as specified herein, ensuring they meet the OEM’s minimum recommended spare parts stock sizing requirements for this specific system.  
   b. The Contractor shall provide the RE or the 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 or the Facility Contracting Officer sample copies of these reports for review and approval at the beginning of the Acceptance Test. The following reports are the minimum required:  
      1) The Contractor shall provide a monthly summary for all equipment and sub-systems serviced during the warranty period to the RE or the Facility Contracting Officer by the fifth working day after the end of each month. The report shall clearly and concisely describe the service rendered, parts replaced and repairs performed. The report shall prescribe anticipated future needs of the equipment and systems for preventative and predictive maintenance.  
      2) 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 to the nature and causes and the emergency steps taken
to rectify the situation and specific recommendations to avoid
such conditions in the future.
c. The RE or the Facility Contracting Officer shall convey to the
Facility Engineering Officer, two (2) copies of actual reports
for evaluation.
1) The RE or the Facility Contracting Officer shall ensure a copy
of these reports is entered into the System’s official
acquisition documents.
2) The Facility Chief Engineer shall ensure a copy of these
reports is entered into the system’s official technical as-
installed documents.
3. Government Furnished Equipment (GFE). GFE that was accepted by the
Contractor and interfaced and installed in this System shall become
part of this System and included in the warranty requirements.

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