



Voice Systems  
Communications Standards and Specifications  
(For New K-12 and Selected Support Sites)

PART 1 – GENERAL

1.01 New Installations

A) Principal items of work should include, but not be limited to the following:

- 1) Nortel Norstar MICS.
- 2) Telephone wiring and jacks.
- 3) Furnishing and installing all blocks, trunk and station cards, rads, and auxiliary equipment as may be required as specified herein.
- 4) Furnishing, installing and connecting all wiring and blocks on IDF and main backboards, necessary to provide for functions and requirements specified herein. All cables should be installed in conduits or raceways.
- 5) Provide engineering design, testing, material, components and supervision necessary to provide a complete operable installation.

1.02 SYSTEM DESCRIPTION

A) System Equipment Requirements: system requirement sheets at end of the Specification shall determine Equipment requirements for each site.

- 1) (Equipped at cutover) This column indicates station and truck capacity that the system should be equipped for.
- 2) (Expandable to) This column indicates total capacity that the system could possibly support.

B) Station Equipment: Telephone equipment shall be standard products of Nortel. Model numbers listed are intended to establish type and quality of equipment and system design as well as operating features required. Manufacturer's specification sheets of each item so listed shall be considered to be a part of these Specifications and binding herein. Any deviation from intended functions of system specified may not be approved, at option of the District Engineer.

1.03 SUBMITTALS

A) Submit in accordance with Section 01300: Submittals.

- 1) Furnish catalog cuts, technical data and descriptive literature on components. Data shall be clearly marked and noted to identify specific ranges, model numbers, sizes and other pertinent data.

- 2) Shop drawings shall indicate equipment locations, wiring and piping schematics, details, panel configurations, sizes and a point-to-point schematics of all circuits. Shop drawings shall indicate interfaces to equipment furnished by others, identifying numbers of wires, termination requirements, voltages and other pertinent details. Responsibility for each end of interfaces shall be noted on shop drawings..
- 3) Entire system shall be supported by engineering documentation including:
  - (a) Floor plans indicating MICS cabinet, all instruments, conduit runs, wire type, terminal cabinet, fill and rough-in requirements.
  - (b) Riser diagrams indicating all devices, cabinets and their point-to-point connections in a manner following floor plan layout.
- 4) Contractor shall verify serving location with the Engineer of the telephone company before submitting bid, and determine work required and material needed to supply street feed.
- 5) Operating and Servicing Manuals and Record Drawings:
  - (a) Deliver required copies of "Operating and Servicing Manual" for each system, and also deliver one set of programming forms with all information entered in pencil. Each manual shall be bound in a flexible binder and data shall be typewritten or drafted.
  - (b) Each manual shall also include as-built cable site plot plan showing all cables, building underground and in building, and as-built coding used on each cable. Building floor plans shall indicate route of all conduit and cable runs. Programming forms of each system shall record all information.
  - (c) Submit a transparency of plot plan and building plans, indicating location of equipment, conduit and cable runs.
  - (d) Contractor shall maintain one set of plot and building plans at site. Contractor shall denote all completed wiring runs in red.

#### 1.04 QUALITY ASSURANCE

- A) Contractor shall warrant and guarantee that all work executed and material furnished be free from defects of material and workmanship for a period of 2 years from acceptance date of Contract Completion, not including specific items of work which require a guarantee or warranty of a greater period of time as set forth in the Specifications. Immediately upon receipt of written notice from the District, Contractor shall repair or replace at expense to the District: Any defective material or work which may be discovered before the final acceptance of work or within guarantee period; any material or work damaged thereby, and all adjacent material or work which may be displaced in repair or replacement required hereunder. Examination of or failure to examine work by the District shall not relieve Contractor from these obligations.
- B) If Contractor fails to repair or replace material or work as indicated above within 15 days of receiving a written notice, the District, with its own personnel or by Contract, may proceed with repair or replacement and assess the cost thereof against Contractor when necessary for keeping school open or safely operating, if Contractor does not respond accordingly.
- C) Ordinances and Regulations:
  - 1) All work of the Section shall conform to CCR, Par 3, California Electrical Code.
- D) Permits and Inspections: Obtain and pay for permits and inspections required and deliver certificates of inspection to the District Inspector.

- E) All work shall be done by a Nortel-certified Communications Contractor holding C-10, C-61 and all licenses required by the legally constituted authorities having jurisdiction over the work. Communications Contractor shall have completed at least 5 projects of equal scope to systems described herein, and shall have been engaged in business of supplying and installing specified type of systems for at least 5 years. Communications Contractor shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.
- F) Installation shall be carried out under direction of a qualified Communications Engineer at the Contractor's expense.
- G) All proposed battery cells shall be covered by a manufacturer's warranty of not less than 5 years.

PART 2 - PRODUCTS

2.01 TYPES OF TELEPHONE INSTRUMENTS:

- A) Desk Telephone Administrative: Nortel Norstar Model M7310, Black.
- B) Classroom Telephones: Nortel Norstar Model M7208.
- C) Provide a desk or wall phone at each designated jack location indicated on drawings. (Most rooms will have multiple jacks.)

2.03 CABLE TYPES

- A) Multi-Pair 25, 50, or 100 Pair Cables, Category 5E, Type C1 (**Indoor/Outdoor Rated**): Multi-pair inside wiring cable shall be 24-gage polyvinyl chloride insulated, solid annealed copper conductors with an overall polyvinyl-chloride jacket to connect IDFs to the MPOE.
- B) Four-Pair Unshielded Cable: Four-pair, Category 5E, 24 gage fully annealed copper wire insulated with high-density polyethylene shall be used to connect station equipment to IDFs.
- C) Most rooms will have two or more jacks. IDF feed must exceed installed jack needs fed by the IDF by 50%.
- D) Wall mount single gang boxes must be attached to frame or stud.
- E) Wall mount faceplates must have screw terminals.

PART 3 – EXECUTION

3.01 SYSTEM PROGRAMMING EKSU SYSTEM-

- A) Contractor shall compile all data needed (room names, room numbers, drawings with station locations, etc.) to program MICS. System programming shall not be limited to features specified in this Specification. Station numbering must comply with the district numbering plan.

3.02 COORDINATING MICS SYSTEMS

- A) Prior to commencing installation of a system, Contractor shall contact the District's telephone systems supervisor to coordinate installation of telephone lines and equipment.
- B) As a minimum, technical support shall be provided on a "tier" basis, where Contractor shall be supported by engineering group of manufacturer.

### 3.03 TESTING, CUTOVER AND ACCEPTANCE OF THE MICS SYSTEM

- A) On date of cutover, the District shall sign, at Contractor's request, an acknowledgement stating that cutover has occurred on that date only if that, in fact, has occurred.
- B) Within thirty days after signing, the District shall either accept installation, equipment and software in writing, or notify Contractor, in writing, specifying, in reasonable detail, those particulars which the District deems unacceptable.
- C) Contractor shall promptly proceed to correct all such defects, following which the District shall accept, in writing, the equipment, software and installation.

### 3.04 MICS SYSTEM TRAINING

- A) A complete description of nature and scope of training program for maintenance technicians, operators, systems users, and management personnel shall be provided. As a minimum, the following shall be covered:
  - 1) Contractor shall provide a complete training program for system users, a training film or videotape, if one is available, and one copy of Station Users Manual for each station installed.
  - 2) In addition, Contractor shall provide a Nortel Training Course (at Nortel's local training facility) for District maintenance personnel. This training is to be provided before the completion date. All costs for instruction shall be paid by Contractor for a minimum of 3 persons.
  - 3) All training shall be scheduled and coordinated by the District's Telecommunication Unit.

### 3.05 INSTALLATION

#### A) Terminal Blocks:

- 1) Furnish terminal blocks, for MICS system, in all terminal cabinets, and where indicated on Drawings, as necessary to provide a termination for each conductor in communication cabinets and backboards.
- 2) Terminal blocks shall be solderless push-on type (20 to 22 AWG solid) with integral fanning strip. Solderless push-on type blocks shall be Split 66 block. All terminals for connections to all external circuits shall be properly labeled. Install required terminal blocks as necessary within each cabinet. Terminal blocks, shall be installed on inside back of cabinets only, not on side. All incoming cables shall be terminated on outside pins of terminal blocks, and all outgoing cables shall be terminated on outside pins of terminal blocks. All connections made with jumper wires or bridge clips. This method shall be used at all satellite terminal locations. At all main or cross connect terminal locations, all incoming, outgoing, or equipment cables shall be terminated on outside pins only with jumper wires terminated on

other pins. All grouped station cables and 200 pair telephone cables shall pass under terminal blocks, and only jumper wire will be used between mounting blocks.

B) Terminal Cabinet Make-Up:

- 1) Lines and cables within cabinets and on main terminal backboards shall be carefully cable strapped. All cables shall be formed in rectilinear configuration. Insulation between conductors, and ground shall be properly maintained. Each cable shall be properly numbered in numerical order and shall maintain same number throughout the site.
- 2) Conductors shall be color-coded and individual cables shall be run out, tagged with code markers equal to W.H. Brady Co. of E-Z Code wire markers. Each cable index strip shall be typed and installed on terminal cabinet door. Each index strip shall be covered with Zellerback #R125, or equal, clear plastic adhesive cover. All terminal cabinet cable codes shall be typed on as-built drawings.
- 3) All terminations and connections throughout system shall be on Split 66 blocks. Cables shall be identified as to buildings and rooms serviced, and terminated in all terminal cabinets and backboards.
- 4) Provide blocks and cables for maximum possible system configuration.
- 5) Cables to satellite terminal locations and classrooms shall be terminated on Split 66 blocks. Provide blocks as needed on job, plus 2 vertical rows of spacers, for future expansion, at main cross-connect locations only.
- 6) Cables from auxiliary equipment shall be terminated on Split 66 blocks. Provide blocks as required on job, plus space for future blocks.
- 7) Feeder cables at remote cross-connect locations shall be terminated on Split 66 block, for jumpering.
- 8) Blocks shall be mounted in vertical rows only. Cable with lowest number shall be terminated on upper left side, with next cable in numerical order just below the first cable and so on. When left side of first row of blocks is full, the next cable in numerical order shall be terminated on upper right side of first row of blocks and so on.
- 9) Do not pass grouped cables in area that is to be used for jumpering. All cables shall enter blocks from top or bottom only, and will not be in same area as jumper wires.

C) Wiring:

- 1) Wiring within communication cabinets and backboards shall be installed to conform to telephone engineering practice, and shall be terminated on terminal strips having a terminal for each required external connection. Wiring shall be cabled, laced and securely fastened in place so that no weight is imposed on any equipment, controls, switches, or terminals. Input circuits and terminal strips shall be installed to provide separation necessary for proper operation. All wires shall be identified by number and chart. All 120V wiring shall be in approved raceway.

D) Cables:

- 1) Install all necessary conductors and cables to all devices indicated on Drawings, and make all necessary conductor terminations to all devices, for complete MICS system to function as specified, or as indicated on Drawing.
- 2) There shall be no splices made in junction boxes. All terminations shall be in communication cabinets or on telephone backboards.

- 3) All conductors and cables shall be installed within conduits, boxes and cabinets for MICS system, in a manner, which shall provide for completely steel enclosed installation, except where specified otherwise. Furnish and install all conductors necessary to connect all incoming and outgoing circuits, including spare conductors, to terminal strips in telephone equipment room.

### 3.06 EXAMINATION

- A) The District's telephone shop supervisor should be called to the site to examine installation of all cable runs not less than 7 working days in advance of proposed time of cut over.