

**PART 1 GENERAL**

1.1 Section Includes

- .1 Telephone service entrance raceway.
- .2 Equipment and terminal backboards.
- .3 Telephone cabinets.
- .4 Premises wiring and outlets.
- .5 Firestopping Requirements
- .6 Electrical General Requirements
- .7 Conduits, Conduit Fastenings, and Conduit Fittings
- .8 Outlet Boxes, Conduit Boxes and Fittings

1.2 Related Sections

- .1 Conduit Section 26 05 34
- .2 Wiring Devices: Telephone outlet jacks Section 26 27 26

1.3 References (Latest Edition)

- .1 EIA/TIA-568 - Commercial Building Telecommunication Cabling Standard.
- .2 EIA/TIA-569 - Commercial Building Standard for Telecommunication Pathways and Spaces.
- .3 EIA/TIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications (Refer to CAN/CSA T527)
- .4 NBC National Building Code
- .5 CAN/CSA-22.1 Canadian Electrical Code, Part One
- .6 CAN/CSA-22.1 Canadian Electrical Code, Part One Section 60 “ Electrical Communication Systems”
- .7 CAN/CSA-22.2 No.0-M91 General Requirements - Canadian Electrical Code, Part Two
- .8 NRC-CNRC National Building & Fire Codes of Canada
- .9 IEEE STD 1100 – 1992 IEEE Recommended Practice for Powering & Grounding Sensitive Electronic Equipment “Emerald Book”

1.4 System Description

- .1 Telephone Service Entrance Pathway: Conduit to conform with Manitoba Telecom Services (MTS) requirements from point of telephone utility connection at manhole or property line or overhead pole to building service terminal backboard.
- .2 Telephone Premises Wiring: Installed by MTS under directions of City of Winnipeg Corporate Information Technology (CIT). Complete from telephone equipment to each outlet, except for outlet boxes and fish cords to be supplied and installed as per drawings.
- .3 The data horizontal cabling pathway shall consist of the conduit raceway, a cable tray system.
- .4 Backbone Pathway: Conform to EIA/TIA 569 using conduit as indicated.

- .5 Horizontal Pathway: Conform to EIA/TIA 569, using raceway, backboards, and cabinets as indicated.
- .6 All backboards, cable support hardware, clamps, bonding clamps, and grounding to provide a complete system as specified.
- 1.5 Project Record Documents
  - .1 Submit to Section 01 73 03.
  - .2 Record actual locations and sizes of pathways and outlets for all telephone and data outlets.
  - .3 Submit five (5) sets of As-built drawings and Operation and Maintenance Manuals.
- 1.6 Quality Assurance
  - .1 Telephone Utility: MTS. City of Winnipeg Corporate Information Technology (CIT) acceptance.
  - .2 Data: See drawing, Category 6 Cabling Specifications
- 1.7 Qualifications
  - .1 Telephone Utility: MTS. City of Winnipeg Corporate Information Technology (CIT) acceptance.
  - .2 Data: See drawing, Category 6 Cabling Specifications
- 1.8 Regulatory Requirements
  - .1 Provide Products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.
- 1.9 Maintenance Service
  - .1 Provide service and maintenance of premises wiring for one year from Date of Substantial Completion.
- PART 2 PRODUCTS**
- 2.1 General
  - .1 All equipment and materials to be new CSA certified, where applicable. Equipment and materials not CSA approved shall be noted and formally submitted for approval.
  - .2 Equipment schedules are shown on the drawings.
  - .3 All telephone wiring and components from the interior building to wall jacks shall be supplied and installed by Manitoba Telecom Services (MTS) Incorporated, unless otherwise noted. City of Winnipeg, Corporate Information Technology, Communications Systems Branch shall administer and coordinate for the three types of phone systems (Local, Centrex and PBX).
- 2.2 Telephone Termination And Data Backboards
  - .1 Material: Softwood plywood.
  - .2 Size: 1.2m x 2.4 m x 19 mm thick.
  - .3 Qty: 2
  - .4 Location: Basement Electrical Room, as shown on drawing.
  - .5 All backboards shall be rigidly secured and painted with an ASA #61 industrial gray

nonconductive fire-retardant overcoat.

**PART 3 EXECUTION**

**3.1 Installation**

- .1 Install data cable as per drawing, Category 6 Cabling Specifications.
- .2 Install polyethylene pulling string (fish cord) in each empty telephone conduit over ten feet in length or containing a bend.

**3.2 Identification Of Equipment**

- .1 Identify equipment, receptacles, switches with nameplates and labels as follows, unless otherwise noted on drawing.
- .2 Nameplates:
  - .1 Lamacoid plastic engraving sheet shall be 3mm thick x 10mm high x 50mm wide. Colour shall be white with 3mm high black letters and mechanically attached with aluminum rivets.

**3.3 Conduit, Outlet Boxes And Cable Identification**

- .1 Identify cable with permanent indelible identifying markings on both ends of cable.
- .2 Colour code conduits, boxes, and cables. Paint at points where conduit enters wall, ceiling, or floor and at 15m intervals.
- .3 Colours: 225mm wide x 100mm long

Up to 250V (UPS)	yellow & red
Telephone	green
Paging/Intercom	green/blue
Data	blue
Fibre Optic	orange
- .4 Colour outlet box covers to colour designated and show circuit numbers in black felt markers on inside of covers.

**3.4 Conduit**

- .1 Rigid galvanized steel threaded conduit.
- .2 Electrical Metallic Tubing (EMT) with couplings and plastic end bushings. Minimum size shall be 19mm.

**3.5 Conduit Fastenings**

- .1 One hole steel straps to secure surface conduits 50mm and smaller. Two-hole steel straps for conduits larger than 50mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 U-channel type supports for two or more conduits at 1500mm O/C. Surface mount or suspended as close as possible to surface.
- .4 Support to suspended channel shall be 6mm diameter galvanized threaded rod.

3.6 Conduit Fittings

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory “ells” where 90 degree bends are required for 25 mm and larger conduits.
- .3 Steel set screw connectors and couplings. Insulated throat liners on connectors.

**PART 1 GENERAL**

- 1.1 Section Includes
  - .1 Amplifier and control equipment.
  - .2 Input equipment.
  - .3 Reproducer equipment.
  - .4 Sound system cable.
- 1.2 Related Sections
  - .1 Boxes Section 26 05 34
- 1.3 System Description
  - .1 Public address system for voice.
  - .2 Input components:
    - .1 Microphone.
  - .3 Features:
    - .1 Interface to telephone system.
    - .2 One-way paging.
    - .3 Emergency paging override.
    - .4 Selective speaker talkback.
- 1.4 Submittals
  - .1 Submit to Section 01 33 00.
  - .2 Shop Drawings: Indicate electrical characteristics and connection requirements. Indicate layout of equipment mounted in racks and cabinets, component interconnecting wiring, and wiring diagrams of field wiring to speakers and remote input devices.
  - .3 Product Data: Provide electrical characteristics and connection requirements for each component.
  - .4 Test Reports: Indicate satisfactory completion of each test recommended by the manufacturer.
  - .5 Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
  - .6 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.
  - .7 Manufacturer's Field Reports: Indicate that installation is complete and system performs according to specified requirements.
  - .8 Submit five (5) sets of As-built drawings and Operation and Maintenance Manuals.
- 1.5 Project Record Documents
  - .1 Record actual locations of speakers, control equipment, and outlets for input/output connectors.
  - .2 Submit five (5) sets of As-Built drawings and Operation and Maintenance Manuals.

- 1.6 Operation And Maintenance Data
  - .1 Operation Data: Include instructions for adjusting, operating, and extending the system.
  - .2 Maintenance Data: Include repair procedures and spare parts documentation.
- 1.7 Qualifications
  - .1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience, and with service facilities within 160km of Project.
  - .2 Supplier: Authorized distributor of specified manufacturer with minimum three years experience.
  - .3 Installer: Authorized installer of specified manufacturer with service facilities within 160 km of Project.
- 1.8 Regulatory Requirements
  - .1 Provide Products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.
  - .2 Conform to requirements of Federal Communications Commission.
- 1.9 Maintenance Service
  - .1 Provide service and maintenance of public address system for one year from Date of Substantial Completion.
- PART 2 PRODUCTS**
- 2.1 Amplification And Control Equipment
  - .1 Manufacturers:
    - .1 TOA. As indicated on drawing, Paging Equipment Schedule.
    - .2 Substitutions: Not permitted.
  - .2 Microphone Inputs: Two. As indicated on drawing, Paging Equipment Schedule.
  - .3 Auxiliary Inputs: As indicated on drawing.
  - .4 Output Noise shall be 90dB below rated output when all gain controls are off.
  - .5 System Output Power: 120 watts at less than 0.5%THD from 20 to 20k Hz (direct output) or 50 to 20k Hz (transformer output).
  - .6 Load impedance: 4, 8, 5.2 (25 V line) or 40.8 (70.7 V line) ohms.
  - .7 Plug-in accessory modules designed for use with the mixer/amplifier shall utilize the latest in surface mount component technology and shall include microphone, line and special function models.
  - .8 The mixer/amplifier shall be rack-mounted using a rack-mounting bracket.
  - .9 System Cabinet: As indicated on drawing, Paging Equipment Schedule.
- 2.2 Microphone
  - .1 Manufacturers: As indicated on drawing, Paging Equipment Schedule.
- 2.3 Speakers
  - .1 Manufacturers: As indicated on drawing, Paging Equipment Schedule.

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- 2.4 Equipment Rack
- .1 Manufacturer: As indicated on drawing, Paging Equipment Schedule.
    - .1 Substitutions: Not permitted.
  - .2 Description: Wall mounted equipment rack.
  - .3 Equipment Mounting Width: 483 mm
  - .4 Equipment Mounting Height: As indicated on the drawing, Paging Equipment Schedule.
  - .5 Finish: standard finish.
- 2.5 Microphone Cord
- .1 Manufacturers: To interface with specified mixer/amplifier.
    - .1 Substitutions: Refer to Section 01 61 00.
  - .2 Description: 20 AWG stranded copper conductor, 600 volt insulation, rated 60 degree C, two conductor shielded cable with rubber jacket.
- 2.6 Input Cable
- .1 Manufacturers: To interface with specified mixer/amplifier.
    - .1 Substitutions: Refer to Section 01 61 00.
  - .2 Description: 22 AWG copper conductor, 300 volt insulation, rated 60 degree C, paired conductors twisted together, shielded, and covered with a PVC jacket
- 2.7 Speaker Wire And Cable
- .1 Manufacturers: To interface with specified mixer/amplifier.
    - .1 Substitutions: Refer to Section 01 61 00.
  - .2 Description: 18 AWG copper conductor, 300 volt insulation, rated 60 degree C, paired conductors twisted together, shielded, and covered with a PVC jacket.
- 2.8 Plenum Cable For Speaker Circuits
- .1 Manufacturers: To interface with specified mixer/amplifier.
    - .1 Substitutions: Refer to Section 01 61 00.
  - .2 Description: 18 AWG copper conductor, 300 volt insulation, rated 200 degrees C, paired conductors twisted together, shielded, and covered with a non-metallic jacket; suitable for use for Class 2 circuits in air handling ducts, hollow spaces used as ducts, and plenums.
- PART 3 EXECUTION**
- 3.1 Installation
- .1 Install to manufacturer's instructions.
  - .2 Mounting Heights: Coordinate locations of outlet boxes as indicated on drawings.
    - .1 Wall-mounted Speakers: As indicated on drawing, Paging Equipment Schedule.
    - .2 Microphone Outlets: As indicated on drawing.
  - .3 Splice cable only in accessible junction boxes or at terminal block units.
  - .4 Make cable shields continuous at splices and connect speaker circuit shield to equipment ground only at amplifier.

- .5 Install input circuits in separate cables and raceways from output circuits.
  - .6 Leave 450mm excess cable at each termination at microphone, volume pad, speaker, and other system outlet.
  - .7 Leave 1.8m excess cable at each termination at system cabinet
  - .8 Provide protection for exposed cables where subject to damage.
  - .9 Support cables above accessible ceilings to keep them from resting on ceiling. Use spring metal clips to support cables from structure. Include bridle rings or drive rings.
  - .10 Use suitable cable fittings and connectors.
  - .11 Connect reproducers to amplifier with matching transformers.
  - .12 Install equipment racks in location shown; arrange to provide adequate ventilation and access.
  - .13 Ground and bond equipment and circuits to Section 26 05 26.
- 3.2 Field Quality Control
- .1 Measure and record sound power levels at designated locations.
- 3.3 Manufacturer's Field Services
- .1 Include supervising final wiring connections, inspection and adjusting of completed installation, and systems demonstration.
  - .2 Certify that installation is complete and performs according to specified requirements.
- 3.4 Adjusting
- .1 Adjust transformer taps for appropriate sound level, consult with Contract Administrator.
  - .2 Adjust devices and wall plates to be flush and level.
- 3.5 Demonstration
- .1 Provide systems demonstration to Section 01 61 00.
  - .2 Conduct walking tour of Project. Briefly describe function, operation, and maintenance of each component.
  - .3 Use submitted operation and maintenance manual as reference during demonstration.
- 3.6 Owner Personnel Training
- .1 Provide detailed operation and maintenance instruction and training.
  - .2 Use submitted operation and maintenance manual as reference during training. Supplement with training materials as required.

**PART 1 GENERAL**

- 1.1 Section Includes
  - .1 Intercom equipment.
  - .2 Intercom cable.
  - .3 Accessories.
- 1.2 Submittals
  - .1 Submit to Section 01 33 00.
  - .2 Shop Drawings: Indicate cable routing and connections.
  - .3 Submit product data for each item of equipment.
  - .4 Submit manufacturer's installation instructions.
- 1.3 Project Record Documents
  - .1 Accurately record actual locations of devices and wiring.
  - .2 Submit five (5) sets of As-built drawings and Operation and Maintenance Manuals.
- 1.4 Operation And Maintenance Data
  - .1 Operation Data: Include instructions for routine operation of master and remote stations.
  - .2 Maintenance Data: Include instructions for minor troubleshooting, preventive maintenance, and cleaning.
- 1.5 Qualifications
  - .1 Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.
  - .2 Supplier: Company authorized by manufacturer and specializing in supplying products specified in this Section with minimum three years experience.
  - .3 Installer: Company specializing in installing the products specified in this Section with minimum three years documented experience.
- 1.6 Maintenance Service
  - .1 Provide service and maintenance of intercom system for one year from Date of Substantial Completion.

**PART 2 PRODUCTS**

- 2.1 Intercom System
  - .1 Description: Private voice communication between locations indicated on Drawings.
  - .2 Configuration: Direct-connected, keyed, multiple conversation path intercom system.
  - .3 Sequence of Operation: Any station calls any other station by dialing the two digit number associated with that station.
- 2.2 Manufacturers
  - .1 As shown in the drawing, Intercom System Schedule.

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**PART 3            EXECUTION**

- 3.1            Examination
  - .1            Verify that surfaces are ready to receive work.
  - .2            Verify field measurements are as shown on Drawings.
  - .3            Verify that required utilities are available, in proper location, and ready for use.
  - .4            Beginning of installation means installer accepts conditions.
- 3.2            Installation
  - .1            Install to manufacturer's instructions.
- 3.3            Field Quality Control
  - .1            Perform operational test on completed installation to verify proper operation.
  - .2            Replace equipment, components, and wiring to eliminate audible noise, clicks, pops, or hum when system is in standby or operation.
- 3.4            Manufacturer's Field Services
  - .1            Prepare and start systems to Section 01 61 00.
  - .2            Make final connections to units.
  - .3            Perform field inspection and testing.
  - .4            Demonstrate system operation.
- 3.5            Adjusting
  - .1            Adjust work to Section 01 61 00.
  - .2            Adjust controls and configuration switches for operation as indicated.
- 3.6            Demonstration
  - .1            Provide systems demonstration and instructions to Section 01 61 00. Allow minimum of 2 hours.
  - .2            Conduct walking tour of Project and briefly describe function, operation, and maintenance of each component.
  - .3            Use submitted operation and maintenance manual as reference during demonstration and training.