

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HUMAN SERVICES

INFORMATION TECHNOLOGY STANDARD

Name Of Standard: Voice and Data Cable Specifications	Number: STD-ENSS003
Domain: Network	Category: Physical Media and Mechanisms
Date Issued: 5/02/2001	Issued By Direction Of: 
Date Reviewed: 03/04/2016	Clifton Van Scyoc, Chief Technology Officer

Abstract:

The Department of Human Services (DHS) uses voice and data cable in the Telecommunications Equipment Room. Various parties are involved in installing the voice and data cable.

General:

The purpose of this document is to provide specifications for voice and data cable installation for the Telecommunications Equipment Room at DHS, including the responsibilities of the parties involved.

Standard:

Responsibilities

The Lessor will be responsible for providing the total voice and data requirements included in this specification. The Lessor will provide and install the entrance conduit bringing the telephone service into the building, and any required conduit and feeder cable within the building, to bring service to the Telecommunications Equipment Room.

The Telecommunications Equipment Room will be used exclusively by DHS.

The local telephone company will be responsible for installing the facilities (cable and/or fiber) from the telephone company's central office (providing dial tone) to the facility where they will terminate the cable and/or fiber at a demarcation point.

In Verizon territory, the demarcation point shall be referred to as the Network Interface Device (NID) in single-tenant buildings only. In the case of multi-tenant buildings and local telephone companies other than Verizon territory, the telephone company's central office will terminate the cable and/or fiber at the RJ21X, and then run to the Network Interface Device for DHS.

From this demarcation point the Lessor and/or his or her designated subcontractor will be responsible for providing and installing all voice and data facilities and material within the building, except for the telephone system and data equipment. This includes, but is not limited to, the following:

- Telecommunications Equipment Room.
- Main Cross-Connect (MC), also known as Main Distribution Frame (MDF).
- Modular patch panel equipment with associated patch cords.
- Voice and data wiring and hardware, including cross-connecting blocks.
- Power poles where required.
- Modular single and/or duplex jacks as required.
- Necessary wiring and telephone in each elevator.

NOTE: Electrical, voice/data outlets must be placed in a location where they do not interfere with modular furniture placement.

General Requirements

All wiring or cable for this specification is classified as "Communication Circuits" (voice and data) and is installed and maintained under the strict guidance of the National Electric Code (NEC) Provision as found in Article 800-Communications Circuits.

The current version, unless otherwise noted, of the EIA/TIA-568 Commercial Building Wiring Standard contains the required installation standards of this specification. The minimum characteristics permitted for category 5 cable installation are in Technical Service Bulletins (TSB) 36 and 40.

All cable or wiring referred to by this specification **MUST** be EIA/TIA/TSB-36 compliant for category 5 cable. All four pairs of every station cable, both voice and data shall be terminated (wired for T568B specifications) providing continuity of all pairs from every workstation back to the appropriate MC in the telecommunications equipment room.

All hardware **MUST** be EIA/TIA/TSB-40 compliant for category 5 cable installation. Termination at the MC shall be onto category 5 compliant eight-pin (wired for T568B specifications) patch panel equipment.

Required voice and data locations are not presented on the typical plans. However, all voice and data jack locations are identified on the drawings provided by DHS.

Telecommunications Equipment Room

The telecommunication equipment rooms shall be as centrally located as possible on each floor. **This requirement is critical to ensure that no voice or data location exceeds the 100-meter rule of the EIA/TIA standards. The door will be equipped with a lockable passage set.**

NOTE: The telecommunications room will be used exclusively for DHS voice and data communications. With the exception of the normal service power requirements identified herein, no electric/power equipment or panels will be housed in this room. **No other tenants may use or have access to the Telecommunications Room.**

Telecommunications Equipment Room Size

- Buildings having up to 10,000 square feet:
 - Single floor buildings: Room Size 8'x10'
 - Buildings with more than one floor: Main equipment room size 8'x10'. The Lessor will also provide an 8'x10' equipment room for each of the other floors.
- Buildings having over 10,000 square feet:
 - Single-floor buildings: Room Size 12'x14'
 - Buildings with more than one floor: Main equipment room size 12'x14'. The Lessor will also provide an 8'x10' equipment room for each of the other floors.

These rooms shall be constructed and finished in the same way as the general office area and maintained with the same HVAC and lighting requirements as the general office area.

The Lessor will install either tile or anti-static carpeting on the floor of each telecommunication equipment room.

The Lessor will ensure that a vertical chase (open area for cable runs between floors) is installed between the main telecommunications equipment room and all other telecommunication equipment rooms.

- Entrance door shall be 36" wide and key lockable.
- Service power shall be 120V, 60HZ, 20 amperes.
- There shall be no water or drain pipes located in these rooms.

Main Cross-Connect (MC)

The MC will be located in the telecommunications equipment room. If requested, the Lessor will provide and install 66-type, 110-type, or other cross-connecting blocks. The Lessor will also provide and install eight (8) point modular jack patch panel equipment. **All equipment must be in compliance with EIA/TIA/TSB-40 for category 5 hardware.**

The patch panel equipment shall be no larger than standard size 48 port, no high density space saver patch panels will be used without prior approval from the telecommunications office. The patch panel equipment will be of sufficient size to accommodate all existing voice/data requirements and at least 15% spare patch panel ports for growth.

The Lessor must provide and install all the patch panel hardware required to make the system operational, including the patch cords and the wire management panels used to dress the patch cords between the patch panels in a neat and orderly fashion.

Also included will be four pair category 5 compliant patch cords, in various lengths, to accommodate the total number of telecommunications jacks installed (both Voice and Data locations) plus 15% spare cords for growth. The patch cords will be sized to insure a neat and orderly appearance.

Voice Requirements

On one wall to the right or left of the entrance door, two 4'x 4' sheets of 3/4" plywood will be attached for mounting the MC in the telecommunications equipment room (or additional floor telecommunication equipment rooms) for voice. The plywood will be attached in such a way that the top of the highest patch panels shall not be higher than six foot two inches (6'2") and the bottom of the lowest patch panel shall be no lower than two foot (2') from the floor.

Where required, the voice MC will consist of category 5 compliant 66-type, 110-type, or other cross-connector blocks and two sets of category 5 compliant eight (8) point modular jack patch panel equipment (wired for T568B specifications). The Lessor will contact the DHS Telecommunications Office to find out whether or not this equipment is required at this location. The maximum size of the patch panel equipment used shall be no larger than standard 48 ports. No high-density space saver patch panels will be used without prior approval from the telecommunications office.

The patch panels will be mounted so they are centered on the wall. The top of the highest patch panels shall not be higher than six foot two inches (6'2") and the bottom of the lowest patch panel shall be no lower than two foot (2') from the floor.

The first set of patch panel equipment will be designated as the line side patch panel. Each available port will be connected to the Network Interface Device (NID), RJ21X or, where appropriate, the 66-type, 110-type, or other cross-connecting blocks. From these cross-connecting blocks, all existing telephone lines will be cross connected to the telephone company demarcation point.

The second set of patch panel equipment will be designated as the station-side patch panel and will have all four pairs wired to the appropriate station jacks as required.

Two (2) duplex electrical outlets on a dedicated circuit shall be located directly below each piece of plywood.

Data Requirements

The data MC will be installed on a floor mounted frame and located at the opposite end of the wall which is adjacent to the voice MC. Mounted on the frame will be category 5 compliant eight (8) point modular jack patch panel equipment (wired for T568B specifications).

Mounted on the extreme lower portion of the data frame will be eight duplex electrical outlets serviced by two (2) dedicated circuits with an isolated ground. The outlets should be arranged to accommodate transformer connections (which frequently are larger than a standard plug) without blocking access to other outlets.

This metal floor mounted data frame will be equipped with a #6 AWG solid copper ground wire attached to an approved water pipe ground.

Two (2) duplex electrical outlets on a dedicated circuit shall be located on the wall adjacent to the floor mounted frame for data.

A modular voice jack will be installed in close proximity to the data frame to support a dial-up modem for diagnostic trouble shooting.

One other modular voice jack will be installed in the telecommunications equipment room for use with the intercom paging system.

Station Wiring

All cable for both voice and data will be (4) pair, category 5 compliant, Type CM communications cable, 24 AWG, solid conductor, unshielded twisted pair, meeting the electrical and corresponding distance requirements of EIA/TIA 568 Commercial Building Wiring Standard and meet or exceed the standards of EIA/TIA/TSB-36 for category 5 cable.

All station wiring for both voice and data will be home run, no intermediate cut downs or splices, to the appropriate telecommunication room and terminated directly onto category 5 compliant patch panel equipment. All four pair must be physically terminated at the category 5 compliant (8) pin modular telecommunication outlet and at the appropriate patch panel equipment port.

All cable shall be concealed either above a suspended ceiling, in conduit, in wire mold or behind partitions. Enough slack wire will be left at the MC to accommodate terminating wires on their respective voice or data patch panel connectors.

Conduits, Power Poles and Plenum Runs

All wiring not in conduits and run in air handling plenums will have Type CMP communication plenum cable, low-smoke, heat resistant Halar type insulation.

All conduits will be metal (EMT) type conduit or raceways.

All access holes through floors, walls, and so on, that must be drilled for the installation of voice and data facilities must be provided by the Lessor. These access holes must be equipped with a sleeve and bushings at both ends.

Wire mold, conduits or power poles will be required to those voice and data locations where the wiring cannot be concealed or readily fished through walls, and so on. All exposed voice cable attached to office walls, ceilings or floors will be concealed using approved metal molding.

Jacks

Both voice and data wiring will be terminated on category 5 compliant duplex voice/data jacks, or single voice or data jacks, as required, at the workstation location (wired for T568B specifications). All station jacks must be in compliance with EIA/TIA/TSB-40 standards for Unshielded Twisted Pair Connecting Hardware for category 5 cable.

Duplex voice/data connecting blocks will have two (2), eight (8) conductor (wired for T568B specifications) modular jacks labeled by the manufacturer as "voice" and "data," with a single faceplate. The inserts of the jacks shall be color coded - blue inserts for voice and orange inserts for data.

Coding, Records and Training

All eight (8) pin modular locations both at the duplex and single outlets at the voice/data terminal end and at the patch panel equipment will be labeled by the Lessor for identification by Department staff. The numbering scheme should be kept constant and consecutive throughout the entire site.

A cable record of all pairs at the MC will be prepared by the Lessor. One copy of this record must be submitted to DHS's telecommunications office before final acceptance of the facility.

The Lessor shall provide training in the proper use of the cable records and the patch panel equipment. The method and depth of the training will be sufficient to train the users to correct deficiencies as rapidly as possible and also allow the user to readily make voice/data station location changes via the patch cords.

Testing

The Lessor and/or his designated subcontractor will be responsible for performing testing of all voice and data wiring and hardware to assure compliance with equipment specifications. All voice and data wiring and hardware must meet or exceed all the specifications of EIA/TIA/TSB-36 and EIA/TIA/TSB-40 for category 5 cable installation. The Lessor and/or his designated subcontractor must provide the telecommunication office a complete copy of all test results before final acceptance of the facility.

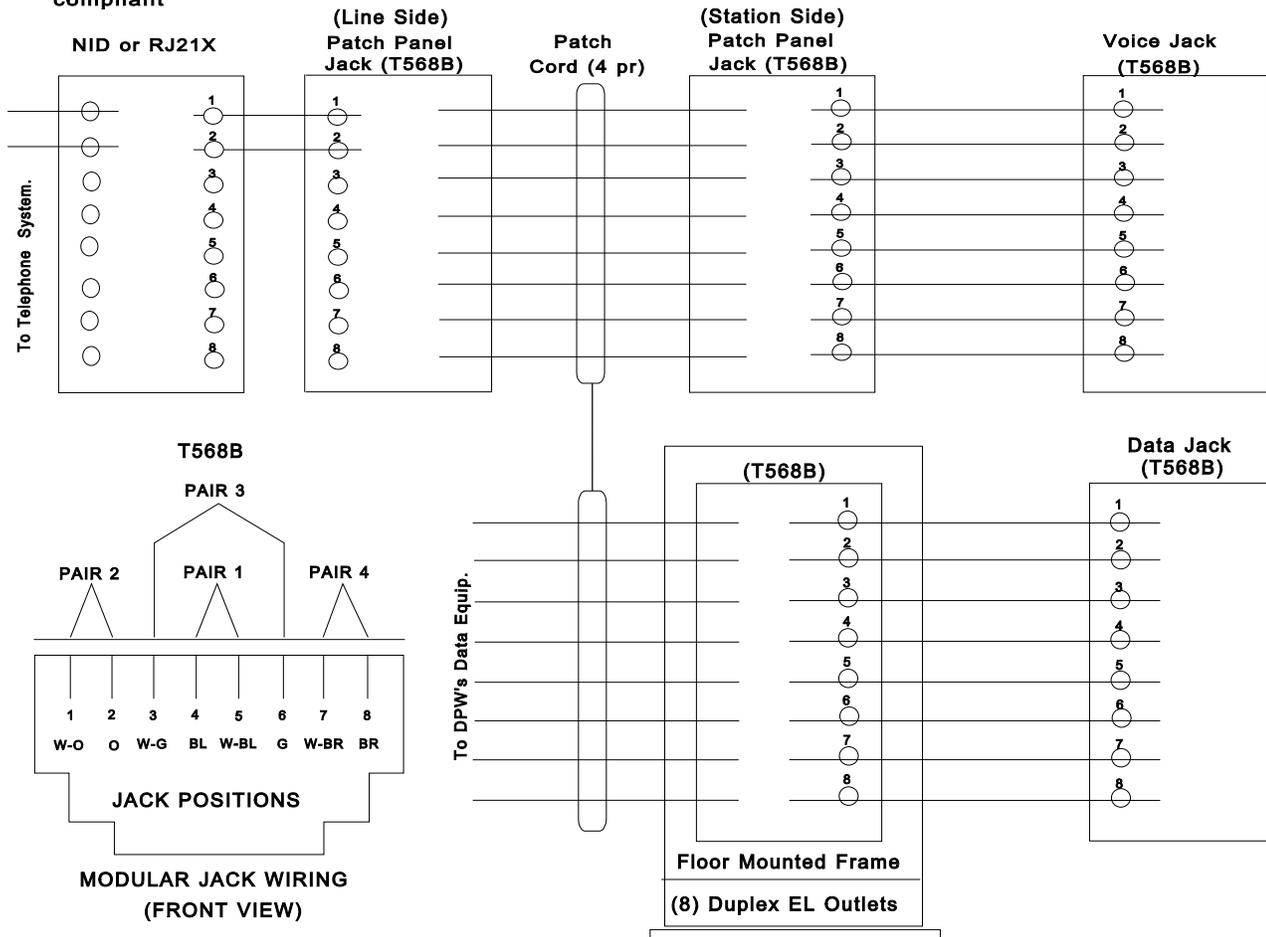
At a minimum the test results for each jack, voice and data, must contain:

- Jack Number
- Cable Length
- Wire Map
- Attenuation
- NEXT (Near End Cross Talk)
- Cable Impedance

Terminations

DPW's CAO Wiring Diagram

Patch Panels, Patch Cords, Cross Connecting Blocks, Station Jacks and Station Cable must be Category 5 compliant



The 8-pin modular connectors for voice/data and the patch panel modular jacks shall be terminated to T568B specifications.

Intercom Paging Systems

The Lessor will provide and install a paging system consisting of speaker assemblies (speakers, transformers, grills, and so on), speaker back boxes, bridge supports, volume controls, equipment rack and any other accessory required to provide a fully operational system. The amplifier will be of sufficient wattage to ensure that it can adequately power the number of installed speakers with sufficient space wattage to handle a 25% increase in the number of speakers. Most speakers will require 1 watt of power for satisfactory operation.

The paging intercom must include an adequate number of speakers throughout the building to ensure coverage to all areas designated by the facility director. The system must be equipped to provide a maximum of four (4) zones and an all call and must have the capability of being activated from any designated telephone. Paging speakers located in the conference room and multi-purpose rooms must have volume controls.

All wiring will be 18-gauge stranded, twisted, shielded pair. Steel or aluminum wire molding will be used wherever the cable cannot be concealed.

Maintenance and repair of this paging system will be the responsibility of the Lessor.

NOTE: The total number of speakers required should be based on providing one (1) speaker for every three hundred (300) square feet of area provided under this project.

Exemptions from this Standard:

There will be no exemptions to this standard.

Refresh Schedule:

All standards and referenced documentation identified in this standard will be subject to review and possible revision annually or upon request by the DHS Information Technology Standards Team.

Standard Revision Log:

Change Date	Version	Change Description	Author and Organization
05/02/2001	1.0	Initial Creation	Deloitte Consulting
08/14/2002	1.1	Edited for style.	Beverly Shultz
02/10/2005	1.1	Reviewed	Doug Rutter
12/05/2007	1.2	Reviewed and Reformatted	Doug Rutter
06/25/2010	1.3	Reviewed and updated	Doug Rutter
02/22/2011	1.4	Reviewed content – No changes	Doug Rutter
03/25/2015	1.5	Changed DPW references to DHS	Bob Gordon, BIS-DTE
03/04/2016	1.6	Updated Director's name	Aamir Qureshi, BIS-DTE

