



JOINT CIRCULAR

STATE OF NEW JERSEY

DEPARTMENT OF THE TREASURY

NO.: 14-15-DPMC/OIT	ORIGINATING AGENCY: DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION OFFICE OF INFORMATION TECHNOLOGY	PAGE: 1 OF 6
EFFECTIVE DATE: 06/30/2014	EXPIRATION DATE: INDEFINITE	SUPERSEDES: N/A
SUBJECT: MINIMUM COMMUNICATIONS WIRING REQUIREMENTS FOR STATE-OWNED AND STATE-LEASED SPACE		
ATTENTION: DEPARTMENT HEADS, CHIEF INFORMATION OFFICERS, TELECOMMUNICATIONS COORDINATORS, DIRECTORS OF ADMINISTRATION AND DEPARTMENT TECHNICAL OFFICERS		
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I. PURPOSE

This Circular provides the general minimum communications (telecom and data) closet and wiring requirements for State-owned and leased facilities. Any specific project that has technological requirements that exceed those outlined in this circular must be reviewed and approved by the Office of Information Technology's (OIT) Infrastructure Support Services & Telecommunications' Telecom Contracts Unit. This review is required for all State-owned and leased buildings prior to any work commencing. OIT authorizes the Division of Property Management and Construction (DPMC) in Treasury to modify/alter and approve requirements related to projects directly under DPMC control.

II. AUTHORITY

This policy is established under the authority of the State of New Jersey N.J.S.A. 52:18a-230 b. This order defines the New Jersey Office of Information Technology's role with regard to technology within the community of the Executive Branch of State Government.

OIT reserves the right to change or amend this Circular.

III. SCOPE

This policy in its entirety applies to all Departments, Commissions, Authorities, State entities and affiliated organizations under the Executive Branch of State government. Other branches of State government can adopt these standards. If they do so, they must abide by the rules and stipulations set forth in this Circular

IV. DEFINITIONS

- A. ANSI (American National Standards Institute) – A voluntary membership organization (run with private funding) that develops national consensus standards for a wide variety of devices and procedures.
- B. CCH – A Closet Connector Housing is a device used to provide interconnect or cross-connect capabilities between opto-electronic devices. It allows cable routing with strain relief, provides the capability for port labeling, and reduces the risk of damage to fiber-optic cabling.
- C. Conduit – A rigid or flexible metallic or non-metallic raceway of circular cross section in which cables are housed for protection and to prevent burning cables from spreading flames or smoke in the event of a fire.
- D. Crosstalk (XT) – In electronics, the term crosstalk means any phenomenon by which a signal transmitted on one circuit or channel of a transmission system creates an undesired effect in another circuit or channel.
- E. DPMC (Division of Property Management and Construction) – The State Agency responsible for operations and maintenance of State-owned facilities, leasing of office and warehouse space, sale and acquisition of real property, and the procurement and project administration of all Architecture and Engineering (A/E) and construction services for State-owned facilities.
- F. EIA (Electronic Industry Alliance) – An association of manufacturers and users that establishes standards and publishes test methodologies in these and other major technical areas: electronic components, consumer electronics, telecommunications, electronic information, and Internet security.
- G. Fiber Optics – The technology in which communication signals in the form of modulated light beams are transmitted over a glass fiber transmission medium. Fiber-optic technology offers high bandwidth, small space needs, and protection from electromagnetic interference, eavesdropping and radioactivity.
- H. IDF – An Intermediate Distribution Frame is a frame, patch panel, or cable rack that interconnects cabling between the Main Distribution Frame (MDF) and the end-user device.
- I. LC (Lucent Connector, Little Connector, Local Connector) – High density optical fiber snap connector used to connect Single-mode and Multimode optical cables to a patch panel or a device where connect/disconnect capability is required.
- J. MDF – The Main Distribution Frame is a frame or cable rack used to interconnect and manage wiring between the carrier (outside plant) and a number of Intermediate Distribution Frames (IDF) within the customer's premise (inside plant).
- K. MTC – The main entry telecommunications (MC) closet serves as the demarcation location for the building. It is the transitional point from the voice, data and video building outside feeds to house cable running to the IDFs. The main telecommunications closet contains electronic equipment and can double as the telecommunications closet for the area of the building around it.
- L. NEC – The National Electrical Code or NFPA 70, is the standard for the safe installation of electrical wiring and equipment in the United States.
- M. Raceway – Is any channel designated for holding wires or cables. Raceways may be metallic or non-metallic and may totally or partially enclose the wiring, e.g. conduit, cable trough, cellular floor, electrical metallic tubing, sleeves, slots, under floor raceways, surface raceways, lighting fixture raceways, wire ways, bus ways, auxiliary gutters, and ventilated flexible cableways.
- N. SOW (Scope of Work) – The Scope of Work describes the work that must be done in detail and specifies the activities, deliverables, hardware, and software involved and the exact nature of the work that must be done.

- O. TIA (Telecommunications Industry Association) – TIA represents providers of information and communications technology products and services for the global marketplace through its core competencies in standards development, domestic and international policy advocacy, and facilitating member business opportunities. This body authored the TIA/EIA 568-A "Commercial Building Telecommunications Wiring Standard" in conjunction with EIA.
- P. Twisted Pair Cable – A common form of wiring in which two conductors are wound around each other for the purpose of canceling out electromagnetic interference that can cause crosstalk.
- Q. UTP (Unshielded Twisted Pair) – Typical telephone wires used in the U.S.A. UTP may be used for computer-to-computer communications, e.g. using a version of Ethernet or LocalTalk, and UTP is less expensive than standard, full-specification Ethernet cable. UTP types come in seven categories.
- R. VCT (Vinyl Composition Tile) - is a finished flooring material used primarily in commercial and institutional applications. Vinyl tiles are composed of colored vinyl chips formed into solid sheets of varying thicknesses (1/8 inch is most common) by heat and pressure and cut into 12-inch squares. Vinyl Composition tiles have high resilience to abrasion and impact damage and can be repeatedly refinished with chemical strippers and mechanical buffing equipment.

V. POLICY

A. Telecommunications Closet

1. The State or lessor shall provide a Main Distribution Frame (MDF) room also known as the building's main demark. This is a closet/room where all street service is terminated for all tenants of the building. This includes both copper and fiber connections.
2. On each floor the State is a tenant, a secured room exclusively for the sole use of the State shall be constructed. This room will be known as the Intermediate Distribution Frame (IDF). Each IDF shall be located in the best location suitable to the State's operation and in consideration to each building's footprint. IDF's ideally shall be vertically stacked throughout a building directly above or below the MDF (when possible), and core drills/conduits must be installed between each, (core drills/conduits are normally 4 inches round, and one extra shall be provided beyond the initial installation for the State's future wiring needs). In addition, fire stopping must be installed and maintained. For large buildings, another item to consider in the placement of the IDFs is that there is a maximum distance limitation on the wiring of 328 feet that includes both the horizontal and vertical distance from the patch panels to workstation/office terminations. This limitation on wiring length may require the IDF to be centrally located.
3. One of the IDFs will serve as the State's Main Telecommunication Closet (MTC). Within this room, the street service from the MDF for both copper and fiber must be extended to enable all the State's equipment to run securely from other tenants within the building. In some cases where the State is the sole tenant of a single story building, the MDF may serve as the State's MTC and the IDF. This room and any IDF will require supplemental cooling that runs 24 hours a day, seven days a week. A 2-ton unit is recommended to provide adequate cooling for the MTC. An IDF requires approximately 1–1.5 tons of cooling. Maintenance of units is the responsibility of the State/lessor.
4. From the street service to the State's MTC, the State or lessor must provide sufficient copper pair counts, including minimally 20 percent additional capacity for future use by the State. Also minimally one, 2-inch conduit with pull line should be run from the street to the MTC. This will be dedicated to the installation of fiber from the service provider. The State understands that not all buildings are located where fiber now exists in the street. Even if street service is not easily accessible, State guidelines recommend that a conduit be installed to enable the use of this technology once it becomes available.

5. Both the MDF and each IDF shall have three walls lined horizontally with ¾-inch thick, fire-rated plywood. The plywood shall start 30 inches above the VCT floor and go 78 inches high. If the plywood is painted, the manufacturer's fire rating label must not be painted over and should be plainly visible after patch panels and the State's equipment are installed. Attached to the plywood shall be a minimum ¼-inch square by 2 inches high by 10 inches-long solid copper bus bar with ¼-inch stud holes for standard size lugs grounded to a separate building ground utilizing a No. 6 gauge wire. The maximum resistance to ground shall be 3 Ohms or less. Each rack installed shall be grounded to this bus bar. Grounding shall be done in accordance with ANSI-J-STD-607-A-2002 and all other applicable codes.
6. The MDF and IDF rooms shall be provided with sufficient quantities of wire management devices such as racks, cable trays/ladders, D-rings, jumper wire, brackets, bridging clips, spools, etc., to assure neat and orderly cable and wire paths throughout the installation. The State or lessor shall provide and install all of the distribution conduits and the related sleeves necessary for complete installation of the low-voltage requirements. All components should be new and of first quality. They need to meet all NEC, ANSI, EIA and TIA requirements as well as be listed by UL.

B. Risers/Backbone

1. Between the MTC and each IDF, at a minimum, a 50/125 OM3 fiber of six strands must be installed. The State may require Riser-rated fiber or Armored Plenum-rated fiber depending on the building infrastructure. Six, 4-pair Cat6A riser wires for data communication must also be installed. In addition, between the MTC and each IDF, four pairs of Cat3 riser wire must be installed for each voice termination on the floor plus an additional 20 percent for future use. The fiber shall be terminated on a 19-inch by 72-inch rack at the top position utilizing a CCH with LC standard patch panels. A 25-foot service loop shall be left properly supported above the rack-mounted interconnect housing. A six-port 110/RJ45 patch panel for Cat6A wires must be provided in the same rack in the second position from the top. A patch panel must be provided for voice in the IDF (or MTC as defined in Section 1, paragraph C) in the third position. All Cat3 wiring for voice must be terminated on the patch panel using the 110 termination. In existing facilities where current voice circuits are terminated on wall-mounted wiring blocks (66 or 110 style), the existing circuits shall be extended to a 19-inch, rack-mounted patch panel (with eight-pin modular ports of the RJ-45 type) to allow cross connection of circuits to station cable patch panels through the use of standard RJ-45 to RJ-45 style patch cords. Each voice pair shall terminate onto Pins 4 & 5 of the patch panel. In facilities where new voice cable (risers or backbone) is to be installed into the wiring closet, all new voice circuits shall be terminated directly onto a 19-inch, rack-mounted patch panel (with eight-pin modular ports of the RJ-45 type) to allow cross connection of circuits to station cable patch panels through the use of standard RJ-45 to RJ-45-style patch cords. Each voice pair shall terminate onto pins 4 & 5 of the patch panel.
2. Again, these are the minimum requirements. Larger offices or above-normal technical demands may require the installation of additional wiring that would be at the State's or lessor's expense and would be identified within the SOW.

C. Workstation/Office Wiring

1. All wiring to office and workstations locations shall be four-pair Unshielded Twisted Pair (UTP), Category 6 (22-24 AWG) cable or Cat6A cable with legible color coding of conductors. Cat6 cable must exceed 250MHz usable bandwidth/extended headroom beyond the ANSI/TIA 568-C.2 Category 6 and ISO 11801 2nd Edition Class E standards. Plenum-rated wiring is only required with plenum ceilings, and the wiring does not need to run in conduits to offices and workstations unless code dictates otherwise. Voice/data wiring shall have a minimum 12-inch clearance between electrical junction boxes, light fixtures, and fan coil units. All wires in the ceiling are to be neatly bundled and suspended and shall not be closer than 6 inches to the ceiling tile. All wire runs shall be continuous "home runs," with no factory or field splices, and shall be installed with sufficient bending radius to eliminate kink, shear, stretching or damage to binders or conductor strands.

2. From each IDF, the lessor must run one Cat6 or Cat6A wire for voice and one Cat6 or Cat6A wire for data to all offices and workstations. Locations labeled printer or fax at the end of workstation clusters or in copier areas will require two Cat6 wires for voice and two Cat6 wires or Cat6A wires for data. For ease of identification, wiring for voice shall be one color and the wiring for data another color. All office and workstation wiring must have a unique cable identification label attached to within 6 to 8 inches on both ends of each termination sheath so that the identifier is visible when the jack is unmounted.
3. Wires will be terminated in Sheetrock locations with flush-mounted Cat6 or CAT6A RJ45 (RJ45 refers to 8P8C) jacks utilizing double-gang faceplates. Workstations provide a raceway where the voice/data wiring will run adjacent to the segregated electrical harness. The state/lessor must terminate the wiring in screwed, surface-mounted boxes with Cat6 RJ45 or CAT6A jacks utilizing double-gang faceplates. Each double-gang faceplate needs to be clearly labeled with a single jack number that corresponds to a jack number in the telephone closet. The telephone jack must be clearly labeled "voice," and the data jack shall clearly be labeled "data." The State will typically supply split power poles or empty power poles to workstations not located near a wall or column to enable the State or lessor to run the voice/data wiring from above the ceiling to the raceway. The State or lessor's contractor shall use "White" or "Yellow" for voice and "Blue" for data jacks.

D. Cable Terminations

1. Two, 19-inch x 72-inch racks must be installed. One rack will be for voice circuits and the second will be for Cat6 or Cat6A data workstation/office wiring and fiber. With small offices of under 50 people, the State or lessor may need to provide only one rack to handle both voice and data needs. In each rack, 24 or 48 110/RJ 45 port patch panels shall be installed to accommodate voice and data circuits. The Voice and Data racks must be clearly labeled to identify each service. All wiring shall be terminated on the patch panel via the 110 type termination. In cases where wiring is already delivered to an existing, wall-mounted 66 block cabling must be connected from the 66 block to the 110 termination on the patch panel. The patch panels shall be labeled starting with the top left RJ 45 jack in ascending order going from the left to the right. Both the voice and data numbering shall correspond to each other for each workstation/office location and to the position on the rack patch-panel. For instance, on a second-floor installation, the first jack is installed in an office. The rack number would be 200. On the voice rack, the top left RJ 45 port should be labeled 200 as well as the top left RJ 45 on the data rack. Cat6A RJ45 jacks and patch panels terminations shall be configured to TIA/EIA 568C.2 wiring standards to meet 10G Base-T performance.

E. Testing

1. All Cat6A Cabling shall be tested in two phases and meet test parameters that are specified in the TIA/EIA-568C.2 and ISO 11801 2nd Edition Standards. The cabling must meet 10Gbase-T requirements.
2. In the first phase that is required for Cat6 and Cat6A cable, parameters tested include: Insertion Loss, Near End Crosstalk (NEXT), Power Sum Near End Crosstalk (PS NEXT), Attenuation to Crosstalk Ration – Near End (ACR-N), Power Sum Attenuation to Crosstalk Ratio-Near End (PSACR-N), Far End Crosstalk (FEXT), Attenuation to Crosstalk Ratio-Far End (ACR-F), Power Sum Attenuation to Crosstalk Ratio-Far End (PSASCR-F), Return Loss (RL), Wire Map, Propagation Delay, Delay Skew and Length. All Cat6A must be tested up to 500MHz. Cat6, Cat5e, or other cabling is tested up to 250MHz.
3. A second test phase will be required for all Cat6A. This phase encompasses certification of the cabling system for compliance with the Alien Crosstalk (AXTALK) performance requirements. Alien Crosstalk certification for 10GBASE-T should include sample testing of some links in a bundle to verify compliance with AXTALK test parameters.
4. Fiber testing must include attenuation (insertion loss) and return loss as per ANSI/TIA/EIA-526-14A Method B (power meter light source test).

F. Documentation

1. The State's contractor or lessor shall compile, provide, and submit – within seven calendar days after job completion – an electronic medium format Testing Document containing all test results. Three (3) copies of a 1/8 inch-scaled floor plan must be provided and show all jack locations and numbers. In addition, a Cable Documentation sheet identifying all cable sheaths and the corresponding terminal block unique identification number for all workstation/office locations needs to be provided within 14 days after the job completion.

G. Warranty

1. The State's contractor or lessor shall perform all work such that the manufacturer's warranty shall be valid for the full term documented by the manufacturer. This implies that all work and testing shall be performed by certified installers.

H. Quality Assurance

1. The State or lessor shall hire a contractor that is an authorized installer of the cabling system purchased and shall have worked satisfactorily for a minimum of five years on systems of this type and size.
2. Upon request by the State or lessor, telecommunications contractors may be required to furnish a list of references with specific information regarding type of project and involvement in providing of equipment and systems.
3. Equipment and materials of the type for which there are independent standard testing requirements, listings, and labels, shall be listed and labeled by the independent testing laboratory.
4. Where equipment and materials have industry certification, labels, or standards (i.e., NEMA – National Electrical Manufacturers Association), this equipment shall be labeled as certified or complying with standards.
5. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

VI. EXCEPTIONS AND NON-COMPLIANCE

Failure to comply with this policy may result in a potential loss of funding.

Requests for exceptions to this policy shall be made to the Chief Technology Officer through the Chief Fiscal Officer of a Department/Agency.



Steve Sutkin, Director
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E. Steven Emanuel, Chief Technology Officer
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