

Specification Control Document of Network Devices

1. DEFINITION

Network facilities are spaces and secured rooms housing telecommunication and network equipment consisting but not limited to Data, Voice, Cable Television (CATV), and Closed Circuit Television (CCTV) components and their associated wiring. Secured rooms have stringent requirements due to the expense and complexity of the equipment in them and to its role supporting the University's telecommunications and network infrastructure. The types of network facilities are:

Main Distribution Frame (MDF) is the main telecommunications service entrance into the building. It may or may not be where the BDF is located.

Building Distribution Frame (BDF) is the area where the demarcation between the interbuilding and intra-building cabling systems is affected. This securable room is to be dedicated to this purpose, with no other building services sharing the space.

Intermediate Distribution Frame (IDF) provides for demarcation between the per-floor horizontal customer service cabling and the building's video, data, and voice backbone cabling. This room contains the electronic equipment that transitions between the building backbone and the end user's telecommunications equipment. This securable room is to be dedicated to this purpose, with no other building services sharing the space.

IDFs are allocated to each floor of a building and house the communications equipment and related wiring that serves that specific floor. Several IDFs may be located on a single floor in order to maintain the cable length limitations specified within particular standards.

Main Cross-Connect (MC) is the cross-connect normally located in the BDF for cross-connection and interconnection of entrance cables, first-level backbone cables, and equipment cables.

Horizontal Cross-Connect (HC) is a group of connectors (e.g., patch panel or punch-down block) that allows equipment and backbone cabling to be cross-connected with patch cords or jumpers.

Telecommunication Enclosure (TE) is a secured case, cabinet, or housing for telecommunications equipment, cable terminations, and cross-connect cabling.

Network Facilities (NF) is the term used to describe rules that apply to all three types of distribution facilities on campus (MDF/BDF/IDF).

2. REQUIREMENTS

2.1. GENERAL

All work associated with IDFs will comply with the National Electrical Code, and with state and local building codes. Follow the guidelines developed by ANSI/TIA/EIA and BICSI in both design and construction. UITNS must approve all variances.

IT network equipment will not be installed in the IDF/BDF until they are completely built, cleaned, and secured with the IT-approved key. To facilitate the proper installation, routing and placement of cables, NFs will be located to comply with TIA/EIA distance limitations, and stacked one above the other whenever possible. The total distance of the cable path between the telecommunication outlet and its termination in the NFs will be less than 90 meters.

No plumbing, HVAC, or electrical conduit will pass through or above the IDF, except for sprinkler systems. Sprinkler heads will be caged and rated high temperature. Under no circumstances will electrical or any other utility panels be located in an IDF.

Doors and Locks for NFs — A windowless, solid core door measuring 36" wide by 80" tall and swinging open out of the room is the minimum requirement. Locks are to be cored with a campus standard BEST system to accept the IDF standard keying of 3IL119 as provided by the University of Houston Lock Shop. Keys for NFs will be available from UITNS as needed. Equip all doors with an online card reader system.

NFs — Secure NFs to ensure all areas in which information technology resources is stored remain protected from environmental concerns, hazards, and theft. Coordinate the security of the NFs with UITNS. All NFs must have full path access for UIT staff.

Floors — Floor loading must be at least 50 pounds per square foot (50 lb/ft²). Floors will be vinyl composition tile or sealed concrete. Carpet is prohibited.

Conduits and Sleeves — To facilitate frequent additions, moves, and changes to the telecommunication systems, communications conduits are generously sized and labeled on both sides (to and from locations).

- Conduits entering the building are usually 4" with some type of sub-space partitioning.
- Conduits between building telecom rooms are also usually 4".
- Conduits outer diameter will be located within 4" of room walls.
- Conduits servicing end user spaces are usually 1". Exceptions are made for outlets for wall phones, payphones, etc. where only one cable is needed. This conduit may be 3/4".
- The use of flexible conduit is discouraged. If it is the only solution, increase its size by one trade size.

- Conduits between floors that interconnect telecom rooms are stubbed 2" into the rooms.
- The 1" conduits servicing end users' information outlets are usually "stubbed" to above the ceiling, and from there to the nearest corridor/hallway telecommunications horizontal pathway leading to the IDFs.
- Minimum radii for conduit bends are:
 1. Internal diameter of less than 2" — bending radius is 6 times the internal diameter.
 2. Internal diameter of 2" or more — bending radius is 10 times the internal diameter.
- All sleeves must be fire sealed. Initial sealing of the sleeve penetration is to be completed by the sleeve installer.
- To prevent cable damage, all sleeves will be reamed and grommets placed before cable installation.

Building Riser — The building backbone riser system connects IDFs to each other and to the BDF room. UH specifies separate cable systems to provide data, video, and voice needs. Riser (plenum) rated multi-pair twisted pair copper cables, and single-mode fiber cables, along with their termination systems, are specified.

Ceilings — There will be no suspended ceilings in the IDF. Suspended ceilings in existing IDFs shall be removed whenever large cable projects require the installation of new cable trays or overhead conduits and sleeves.

Cable Trays — Basket tray of 12" width shall be installed on three (3) walls at a height of 7' whenever possible with minimum clearance of 4" from ceiling. Basket tray spanning the width of the room shall be installed on top of the telecommunication racks. Radius drop-outs are to be used where the cable exits the tray to a lower elevation.

Walls — Interior walls should be covered, floor to ceiling, with fire rated $\frac{3}{4}$ " plywood and painted with 2 coats of a neutral color fire retardant paint; the fire rated stamp must be visible. Have the Fire Marshall's Office inspect and approve before painting. Paint should be (or be equal to): Flame Control Coatings, LLC. Flame Control NO. 20-20A. Fire Hazard Classification, ATSM E-84 (NFPA 255) Class "A".

Fire Wall Identification — Fire walls should be painted with a neutral color fire retardant paint; the fire rated stamp must be visible.

Lighting — Lighting should be maintained at 500 lumens, measured at 3 feet above floor level. Use timer- or motion-type light switches, placed immediately inside the door. Use LED bright white lighting.

Cable Entrance — Riser or distribution cables entering/exiting the IDF shall be via four-inch (4") conduits, sleeved cores or cable tray. Include two additional conduits, sleeved cores, or cable trays above the current requirement to allow for future growth.

2.2. ROOM SIZING

BDF

Minimum size for all buildings — 9' x 12'

Minimum ceiling height is 9' 6"

BDFs cannot have any water pipes within the room's interior space, routing horizontally on the floor directly above the room, or within the floor slab

IDF

Minimum size for all buildings 8' x 10'

Minimum ceiling height is 9' 6"

IDFs cannot have any water pipes within the room's interior space, routing horizontally on the floor directly above the room, or within the floor slab.

2.3. ENVIRONMENTAL CONTROL

HVAC should be ducted in and designed to maintain a room temperature of 68 to 70 degrees with 30 — 55 percent humidity control with the full complement of equipment in the room. UITNS shall provide the HVAC contractor with equipment BTU information. In keeping with the University of Houston's energy conservation program, ambient control temperature within all IDFs will be reviewed and accepted by UITNS.

2.4. ELECTRICAL

For an IDF, all convenience electrical outlets shall be installed to a side wall in order that power cables can be run along the telecommunication racks. This will minimize the possibility of tripping hazards. There should be, at a minimum, one duplex convenience outlet on every wall immediately to the left and right of the door for general purpose use. These should be installed at industry standard height. All outlets will be backed up via the building wide UPS or on emergency generator if there is no building UPS.

At a minimum, one 240 volt 30 AMP dedicated circuit with a NEMA L6-30R receptacle will be installed at a height of 7 feet. Conduit and outlets shall be connected to the outside of the basket tray facing the rear of the equipment racks. At a minimum, there must be four 120-volt 20-Amp NEMA 5-20R dedicated outlets with each pair on a dedicated circuit with emergency generator back-up. These outlets must be located at a height of 7 feet. Conduit and outlets shall be connected to the outside of the basket tray facing the rear of the equipment racks.

3. OPTICAL FIBER CABLE INSTALLATION

Aerial installation of fiber optic cable is prohibited unless written approval is received from UITNS management. Cable runs will be installed in one continuous length, and without splices unless required by standard, from bulkhead connector to bulkhead connector, including service loops and repairs.

All cable shall be installed in a one inch ID inner duct when transitioning into conduit. A pull string shall be run in addition to the cable in order to provide access for future growth. All fiber cable installations are to be 100 percent terminated. Plastic dust caps will be installed on all unused fiber terminations.

Terminated fiber strands will be installed in rack-mounted optical fiber distribution shelves. A Dow Corning 2U-CCH-02U or Uniprise #RFE-SLG-EMT/2U distribution shelf will be used in all IDFs. A Dow Corning RFE-FXD-EMT-BK/4U or Uniprise #RFE-FXD-EMT-BK/4U distribution shelf will be used in all BDFs.

Cable installation shall not exceed manufacturer specifications for tensile load, bend radius, and vertical rise. All pulled cables shall be monitored during installation to assure that tension and torsion do not exceed manufacturer specifications.

4. OUTSIDE PLANT (INFRASTRUCTURE CABLES)

When installing fiber optic cable in manholes between buildings, there shall be a minimum of two (2) complete loops in each manhole. It shall be pulled in an inner-duct inside the manhole to prevent damage to the cable. No splicing is allowed in fiber cables between buildings.

A copper tracer line should be run with all fiber that is in a non-metallic conduit. All manhole/pull boxes shall have GPS locations recorded and submitted to UITNS. All inner-ducts shall be spliced according to the manufacturer's approved methods.

Single-mode fiber patch cables will be terminated with 'LC' connectors on one end and as required on the other end. At a minimum, a 48-strand, single-mode fiber of size 9/125 micron shall be installed to a UITNS designated Core location.

A minimum number of single-mode fiber shall be installed to a secondary building. This number is determined by the number of IDFs/BDF in the given building plus one spare multiplied by two. UITNS must approve final strand counts. Single-mode fiber size will be 9/125 micron. All single-mode cables are not to exceed 0.4 dB/km attenuation at 1310nm wavelength.