DESIGN STANDARD FOR TELECOMMUNICATIONS

Purpose:

The purpose of this document is to standardize the basic elements of the telecommunications systems design process. The design standard has the purpose of creating a consistent application of telecommunications systems design throughout the Solano Community College (SCC) District, therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects. This standard serves as a supporting document part of the overall Solano Community College Technology Plan (2013-2015). Deviations from this standard shall be approved by SCC.

Telecommunications Systems-Related Support Staff and Committees:

Chief Technology Officer
Director, Technology Services & Support
Desktop Services
Network Services
The Strategic Technology Advisory Committee (STAC)

Design Standard:

I. TELECOM IDF/MDF ROOMS

A. Minimum size of the IDF is to be 8’ x 9’.

B. Minimum size of the MDF is to be 10’ x 13’ and shall not be co-located with electrical equipment due to EMI-mechanical noise transmitted from the electrical equipment.

C. IDF should have a hard ceiling for security purposes.

D. IDF/MDF rooms should not have any water sprinklers in the room.

E. Room must be well lit. Lighting fixtures shall be coordinated with any horizontal cable tray or other ceiling mounted equipment.

F. No equipment other than that related to the voice/data network should be located in the IDF’s/MDF’s. This includes but not limited to FACP, lighting control equipment, electrical panels, EMS, etc.

G. Regular 110v receptacles should be located at standard locations around the room.
H. Some form of standalone air conditioning must be provided to adequately cool the space when fully equipped. Cooling capacity shall be calculated taking into account all equipment planned for the room. Rooms should not be on building Air system.

I. There should be 3’ of clear space on all 4 sides of the 2’ x 3.25’ cabinet. If necessary for placement of an additional cabinet or future placement of an additional cabinet this requirement can be modified to 3’ of clear space in the front, rear and one side of the cabinet.

J. Lock to IDF/MDF must be uniquely keyed and only Technology Services & Support staff is to be issued keys. In cases where an IDF is shared with Maintenance & Operation (M&O), only essential M&O staff is to have keys to the IDF/MDF (i.e. Engineers, Director, and Assistant Director). Before issuing a key to anyone for any IDF/MDF the Director of Technology Services & Support must be consulted.

K. Where possible, doors to the IDF/MDF should not have windows or signage other than room numbers (for security purposes). If IDF/MDF doors must have windows, windows are to be blacked out.

L. A phone is to be located on one wall of the IDF/MDF room, typically on the door wall.

II. CABINETS

A. Refer to the document SCC – TSS Telecommunications Cabling Materials List for standard cabinet models and accessories (fan kit).

B. Secure cabinet(s) to floor utilizing CPI brackets and drop-in anchors.

C. Secure top of cabinet(s) utilizing appropriate size ladder rack attached to cabinet with CPI elevation kits.

D. Install CPI vertical wire managers and fan-kits to cabinet. Fans shall be connected to power and operational.

E. Install cabinet provided vertical wire management @ rear of cabinet.

F. Install square punched rails in cabinet; contractor to provide necessary cage nuts and mounting screws for all equipment being installed in rack.

G. Install hardware in cabinet based on 1. = top U holes:
   1. Fiber LIU (with single-mode fiber terminated first left to right and then followed by MM). LIU shall be installed in the top 1U of the cabinet
   2. Wire management shall be installed on the sides of the patch panels as well as between each Data/Voice patch panel
3. Data patch panel(s) shall be KRONE CAT 6 and 568B compliant

4. Copper cable (CAT3) terminated on patch panel. All data patch panels shall be terminated first, and then the CAT 3 cable shall be terminated on a voice patch panel at the end of the data patch panel sequence. There shall be one pair per port (termination on the White/Blue pair for voice) with the Violet/Slate pair un-terminated and left as a spare.

5. District supplied network switches

6. District supplied UPS

7. District supplied PDU (extra outlets for equipment)

H. Two electrical outlets (30amp w/LS-R30 receptacles) to be installed @ top of rack height inside cabinet.

I. Customer provided UPS power cord will be run from UPS on floor of cabinet through rear vertical wire manager to electrical outlet.

III. BACKBOARD LAY-OUT

A. Refer to the document SCC – TSS Telecommunications Cabling Materials List for standard cabling materials.

B. Backboard: 4’ X 8’ X 3/4” plywood should be installed on only one wall (to be determined by cabinet position)

C. Backboard shall be installed starting 4” above the finished floor, shall be fire-rated plywood painted white. Fire rated sticker shall not be painted over.

D. Copper feed cable is to be terminated in appropriate sized protected terminal (50pr, 100pr etc.). Terminal is to be grounded to bus bar.

E. CAT3 copper cable to be terminated on “out” of protected terminal to patch panel in cabinet. (routed overhead on ladder rack)

IV. CABLELING & CABLE ROUTING

A. Refer to the document SCC – TSS Telecommunications Cabling Materials List for standard cabling materials.

B. All drop cables routed into MDF/IDF to be installed through appropriate sized sleeves with bushings.

C. All drop cables to be “split out” by number (ie; 1-12, 13-24) and brought into cabinet on opposing sides of patch panel.
D. All cables will be tested for compliance (using MicroTek or similar device) with results provided to district in printed and in an electronic form acceptable to the district.

E. All ladder rack to be grounded to provided bus bar.

F. Labeling standard is Room#-drop (i.e. 128-10) number starting in left corner of room and moving clockwise around room. Drops number are sequential from room to room (i.e. 128-20, 129-21, etc.).

G. All cables to be terminated 568B.

H. All phone connectivity is to be VOIP with all cables to be ADC blue CAT6.

I. Customer/Architect to determine PVC vs. plenum rated cable.

J. ADC faceplate and jack insert color is typically Ivory.

K. Cable numbering to be determined by sequence: floor, closet #, drop number. Two drop locations to be labeled 1/2 and three plus drop locations to be labeled 1-3. Example: 1st floor closet # 1 would read: 1.1.1/2 or 1.1.1-3.

L. All fiber required to be extended shall match existing hybrid fiber count.

M. All fiber will be tested using OTDR with results provided to district in printed and in an electronic form acceptable to the district.

N. Extended fiber shall be fusion spliced in approved fiber splice case.

O. Single mode patch cords are to be installed from fiber LIU to fire panel. Alarm vendor will plug in @ panel.

P. Copper cable required to be extended can “splice thru” on A110 blocks.

Q. All cabling should be routed according to industry standards and supported in cable hangers or cable trays.

R. Cable hangers will not be attached to ceiling tie wires. The first choice by cabling vendor will be to install their own wires or wall mount hangers. Where this is not possible due to existing conditions, there may be existing wires that are unattached to the grid or utilized for other mechanical support that can be utilized.

S. Industry standards apply to fire stop installation and will be dictated by field conditions.

T. Phones are to be co-located with data and terminated on patch panel in cabinet
U. Need data runs for HVAC (copper) and fire alarms (fiber). A cat 6 drop must be placed near the HVAC controller. A fiber patch cable must be run in conduit from the FACP location to the IDF.

V. Standard is Cat6 cabling

W. Cabinet as well as station patch cords are to be provided by contractor in lengths and quantities as specified by customer (usually the number of ports terminated for cabinet quantity– 3' & 7' lengths).

X. Standard drop count for an employee work location is 3 drops. Standard drop count for a student station is 1 drop plus 1 printer drop for every 20 computers.

Y. Standard materials are to be used as listed on the Solano Community College - Technology Services & Support Telecommunications Cabling Materials List.

Z. All building projects must include above ceiling cabling for installation of PoE wireless access points.

AA. Electronic and printed forms of as built drawings must be provided to IT.

BB. All newly installed cabling must be tested and performance test results shall be submitted to SCC IT.

V. WIRELESS NETWORK

A. All building projects must include installation of wireless access points to cover the interior of the building (location diagram will be supplied by district).

B. All interior wireless access points are Power over Ethernet (PoE) and therefore DO NOT require a power receptacle to be placed near the access point device.

C. All exterior wireless access points have an external antenna and the device MAY REQUIRE a power receptacle to be located in close proximity to the device. Coordinate requirements with SCC IT.

D. Wireless access points require one or two Cat6 cable terminated with an RJ45 connector in a biscuit box to be located per the district supplied drawings and routed to the IDF/MDF. Every effort should be made to keep the wireless access point cables to be terminated in a group on the patch panel and clearly identified. Cabling and termination is vendor supplied (i.e. patch panels, biscuit box, etc.).

E. Access points are to be mounted per manufacturer supplied instructions and are generally surface mounted on the ceiling at district specified locations. Actual placement can vary slightly depending on conditions at the specified locations.
F. All cabling to access points are to be tested per industry standards.

G. All wireless access points are district supplied/contractor installed.

VI. PHONES

A. All phones are to be VoIP phones except where analog lines are necessary (i.e. emergency phones, fax lines, etc.).

B. District standard VoIP phones are CISCO brand.

C. All VoIP phones plug into CISCO PoE (Power over Ethernet) switches.

D. Lines for emergency equipment (emergency phones, fire alarms, security alarms, etc.) are to be 1MB’s provided by the district’s Telco carrier and NOT part of the district phone system.

E. Each building is to have wall mounted courtesy/emergency phones in each hallway.

VII. ACCESS TO TELECOM SPACES

A. Contractors shall contact SCC IT for proper badging and access to telecom spaces. Request for access shall be submitted in writing and follow the District’s guidelines and procedures.

Typical IDF Room Layout
Approved Manufacturers:

Equipment Racks and Cabinets:

1. Middle Atlantic Products
2. CPI – Chatsworth Products
3. Panduit

Wireless Access Points:

1. Refer to SCC IT for list of approved manufacturers

Copper Patch Panels:

1. Panduit
2. Siemen

Fiber Patch Panels:

1. Panduit
2. Siemen

Category Cable / Patch Cords:

1. General Cable
2. Mohawk
3. Berk-Tek

Fiber Cable / Patch Chords:

1. General Cable
2. Mohawk
3. Berk-Tek

Wire Managers:

1. Middle Atlantic Products
2. CPI – Chatsworth Products
3. Panduit

Ladder Rack / Cable Tray:

2. Refer to SCC IT for list of approved manufacturers

**Substitutes Allowed:**

All substitutions must be approved by SCC IT. Requests for substitutions must be submitted in writing prior to design, purchase, and installation.

**Associated Design Standards and Construction Specifications**

**Standards**
- EIA/TIA-568 Commercial Building Telecommunications Wiring Standard
- TIA-569 Telecommunications Pathways and Spaces
- TIA-607 Generic Telecommunications Bonding and Grounding for Customer Premises
- TIA-942 Telecommunications Infrastructure Standard for Data Centers
- ANSI/NECA/BICSO-56-2006 Standard for Installing Commercial Building Telecommunications Cabling
- ANSI/NECA/BISCI-607 Telecommunications Bonding and grounding Planning and Installation Methods for Commercial Buildings
- ANSI/BICSI-002 Data Center Design Standard and Recommended Practices

**Specifications**
- 270500 COMMON WORK RESULTS FOR COMMUNICATIONS
- 271100 COMMUNICATIONS EQUIPMENT ROOM FITTINGS
- 271300 COMMUNICATIONS BACKBONE CABLING
- 271500 COMMUNICATIONS HORIZONTAL CABLING