STRUCTURED CABLING

Horizontal Cabling

Requirements

- Copper cable shall be Category 6 plenum rated cable (blue in Color) for all work station drops.
- Copper cable shall be Category 6 plenum rated cable (White in Color) for all Security camera drops.
- Copper cable shall be Category 6 plenum rated cable (Yellow in Color) for all Wifi drops.
- Approved Category 6 cables are as follows.

Superior Essex Cat6 Plenum Part #'s	77-240-2B blue 77-240-4B white 77-240-6B yellow 77-240-5B green
Mohawk Cat6 Plenum Part #'s	M58281B Blue M58280B white M58283B yellow M58288B green
Berk-Tech Cat6 Plenum Part #'s	10136226 blue 10136230 white 10136749 yellow 10136748 green
General Cat6 Plenum Part #'s	7131800 blue 7131841 white 7131802 yellow 7131806 green

- Connector shall be Leviton part # 61110-RO6 eXtreme 6 connector for all workstation drops.
- Connector shall be Leviton part # 61110-RW6 eXtreme 6 connector for all Security camera drops.
- Connector shall be Leviton part # 61110-RY6 eXtreme 6 connector for all Wifi drops.
- Contractor shall provide Moore Public Schools, Technology Department, one 5' category 6 patch cord, (blue in color) for each category 6 work station cable installed. To be installed by contractor at the network cabinet.
- Contractor shall provide Moore Public Schools, Technology Department, one 10' category 6 patch cord, (blue in color) for each category 6 work station cable installed. Leave in box at network cabinet. To be installed by MPS Technology Dept.
- Contractor shall provide Moore Public Schools, Technology Department, one 5' category 6 patch cord, (White in color) for each category 6 Security Camera cable installed. To be installed by contractor at the network cabinet.
- Contractor shall provide Moore Public Schools, Technology Department, one 10' category 6 patch cord, (White in color) for each category 6 Security Camera cable installed. Leave in box at network cabinet. To be installed by MPS Technology Dept.
- Contractor shall provide Moore Public Schools, Technology Department, one 5' category 6 patch cord, (Yellow in color) for each category 6 Wifi cable installed. To be installed by contractor at the network cabinet.
- Contractor shall provide Moore Public Schools, Technology Department, one 10' category 6 patch cord, (Yellow in color) for each category 6 Wifi cable installed. Leave in box at network cabinet. To be installed by MPS Technology Dept.
- Each cable shall be terminated on the patch panel in data closets.
- All Category 6 connectors shall be placed into QuickPort faceplates at the workstation end.
- Faceplate shall be Leviton part # 41080-6wp
- No substitutions.

Communications Backbone Cabling

Requirements - Optical fiber

- 1 Optical fiber cable shall be run from the MDF to each IDF.
- Fiber shall be terminated with LC connectors.
- Optical fiber cable shall be plenum rated Laser Optimized 50 micron Multi Mode distribution fiber.
- Optical fiber cable shall be an OM3 rated cable guaranteed to support 10 Gigabit Ethernet for 300 meters using 850 nm wavelength.
- Optical fiber cable shall have 24 strands using industry standard color coding.
- Optical fiber cable shall have a flame retardant and low smoke FEP jacket.
- Optical fiber cable shall support 10GBase-SX applications for the life of the system.
- Optical fiber cable shall be armor jacketed or protected inside plenum rated plastic inner duct orange or aqua in color.

  MIC Tight-buffered 024T88-33180-A3
- No substitutions.

Requirements - Copper backbone

- 6 Cat 6 cables shall be run from the MDF to each IDF.
- 3 Cat 6 cables shall be run from the phone Dmark to the MDF.
- Copper cable shall be Category 6 cable. Green in color
- Connector shall be Leviton part # 61110-RV6 eXtreme 6 connector.
- Each cable shall be terminated on the patch panel in data closets.
- Each cable end shall be terminated using the T568B pin/pair assignment.
- No substitutions.

Cable Installation

- Properly support horizontal cables in ceiling every 4'-5' using J-Hooks or cable tray only. (no slings, pouches, or D rings.)
- Place horizontal cables in pathways and spaces dedicated for communications cables. No pathways shall be in or above the red iron. Data cable will be run in separate pathways from all other cables.
- Provide 30' of slack at station end in ceiling and not inside wall.
- Slack shall be rolled neatly in a 2' loop and hanging from a j-hook in ceiling above drop location.
- Cat 6 data cables are to be terminated using the T568B standard.
- Leviton face plates that support 6 snap in jacks will be used with Leviton snap in blanks in unused slots.
- Ensure terminations are at 180 degrees to the jack with no more than ¼" un-twisting and no more than ½" un-jacketing and are in accordance with manufacturer's recommendations.
- Ensure terminations have no un-twisting and that tower separators are utilized to separate pairs.
- Ensure pulling tensions of cables are not exceeded.
- Maintain proper cable bend radius of 4 times the cable's outer diameter during placement.
- No splices are permitted.
- No link shall exceed 90 meters. Contractor is responsible for verifying proper footages.
- Pull one additional "Mule Tape" or ¼" Nylon rope when pulling cables through any conduit utilizing existing pull string.
- Mule Tape or Nylon rope is to be pulled into conduit separately and after all other cables have been installed.
- Install sleeves when puncturing walls.
- Cable shall not be installed between cinder block walls and roof decking.
- Cable shall not be installed between red iron and roof decking.
- Firestop all sleeves and conduit openings after cable installation.
- Terminate all pairs and conductors at all ends according to manufacturer's instructions following color code sequence.
- No splices are permitted in any fiber optic cable except when terminating connectors
- Terminate all Fiber pairs.
- All optical fiber cable shall be installed in the fiber panels in accordance with the manufacturer's instructions.
- Optical fiber Back bone cable length shall not exceed 300 meters.
- Copper backbone cable length shall not exceed 90 meters.
- All back bone cables (Fiber and Copper) shall have 20' of slack at both ends.
- Corning rack mount fiber patch panels are to be used where applicable.
- Outdoor rated fiber will be used for all outdoor fiber runs.
- Stress relief cable and the appropriate building fastener will be used on all aerial runs.
- All aerial cables will be fastened to the stress relief cables.
- 3" conduit is to be used for all buried runs, accessible at each end, with a pull string inside.
- A trace wire and warning tape will be buried with all buried runs
- All bends in conduit will be made with sweeps.
- Back bone cabling shall utilize a star topology with no more than 2 levels of backbone.
- Utilize Velcro ONLY in all closets.
- Install all components in a neat and workmanlike manner.
- Install all horizontal cables and termination frames in accordance with manufacturer's recommendations.

Labeling

- Label shall be a rap type with number printed multiple times enabling print to be legible from any angle.
- Machine label all termination panels and face plates with cabinet and cable number.
- Termination panels shall be labeled in numerical order.
- A single drop will be labeled a total of four times. The labels will be located on the patch panel in the rack, on both ends of the cable, and on the face plate at the work station end. The labels are to read exactly the same in all four locations.
- All 5' patch cables will be labeled at both ends. 5' cables will be installed at the cabinet.
- Numbering scheme will be 00-000 where the first two digits are the cabinet number and the last three are the drop number. Example, drop number 75 in cabinet 2 will read, 02-075.
- Camera drop labels numerically start at 500 in each cabinet. If camera drops already exist in said cabinet the next available consecutive number will be used.
- WiFi drop labels numerically start at 800 in each cabinet. If WiFi drops already exist in said cabinet the next available consecutive number will be used.

  Example for cabinet 1:
  Data (blue cable orange jacks) 01-001 to 01-499
  Camera (white cable white jacks) 01-500 to 01-799
  WiFi (yellow cable yellow jacks) 01-800 to 01-999
- Label all fiber optic cables at both ends on the cable and in the break out box

Test

- Test results for all Category 6 copper and fiber optic cables shall be provided to Moore Public Schools, Technology department.

End of Section

Communications Equipment Room Fittings

Equipment rack

- Free standing equipment rack shall be Chatsworth #55053-703.
- Free standing racks shall be sized to accept 19" spaced equipment and handle a total weight load of 1, 000 pounds.
- Free standing racks shall have 3" side rails tapped on both sides with universal hole patterns for threaded 12-24 screws.
- No substitutions.

Copper Patch panels

- Patch panel shall be a Leviton #49255-H24 Quick Port 110 panel with cable management bar.
- Patch panel shall have 24 ports taking up 1 rack mount unit.
- No substitutions.

Horizontal cable management

- Horizontal cable manager shall be a 2 RU Chatsworth part #30130-719.
- No substitutions.

Vertical cable management

- Vertical cable manager shall be Chatsworth part #30095-703.
- No substitutions.

Optical fiber patch panel / enclosure

- Optical fiber enclosure shall be Corning LC loaded rack mount panel.

  CCH-04U
  CCH-01U
  CCH-CP24-E4
  SOC-LC-900-OM4
- No substitutions.

Ladder racking

- Ladder racking shall be Chatsworth #10250-718.
- The appropriate Chatsworth mounting hardware shall be used.
- No substitutions.

Power protection power strips

- PDU's are to be placed in all data racks.
- PDU shall have overload protection and easy to reset circuit breaker.
- PDU shall be rack mountable.
- PDU shall be constructed from 18 AWG steel.
- PDU shall have light emitting diodes to indicate "Power On" and "Ground/Polarity OK" feature.
- PDU shall be rated for 20 Amps and have a 12' L5-20P plug and ten 5-20R receptacles.
- No substitutions.

Installation

Free standing racks

- Assemble free standing racks according to manufacturer's instructions. Verify that equipment mounting rails are sized properly for rack-mount equipment before attaching the rack to the floor.
- All racks must be attached to the floor in four places using appropriate floor mounting anchors. When placed over a raised floor, threaded rods should pass through the raised floor tile and be secured in the structural floor below.
- All rack must be secured to the adjacent wall using ladder rack to stabilize the top of the rack and provide a cable pathway from the ceiling to the rack.
- Racks shall be grounded to the telecommunications bus bar using #6 AWG green insulated solid copper wire and any necessary attachment hardware provided by the Communications Contractor.
- Mount rack mount power strips on rack where active equipment will be placed.

Ladder rack

- Ladder rack shall be attached to the top of the rack to deliver cables to the rack. The rack should not be drilled to attach ladder rack. Use appropriate hardware from the ladder rack manufacturer.
- Ladder racking shall be supported every 5' with 3/8" threaded rod anchored and secured to permanent ceiling structure.
- Loading of cable rack shall not exceed 6" depth and should have retainers every 12" to prevent cables from spilling over the sides.
- Where ladder racking butts up against wall the appropriately sized wall mount bracket shall be utilized.
- Ladder rack shall extend vertically up wall and through drop ceiling to gain access to cavity above drop ceiling.
- Ladder racking shall utilize all appropriate radius drop stringers, corner bends and other devices to maintain cable bend radius when entering and exiting racks, cabinets and drop ceilings
- Mating pieces of ladder racking together shall utilize appropriate butt splice and junction splice kits.
- All cut and exposed sharp ends shall utilize a plastic end cap to prevent injury.

Cable management

- Vertical cable manager shall be installed on every rack vertical rail. Where two rack rails will be butted together there shall be two vertical wire managers between the racks.
- Horizontal wire managers shall be utilized above and below every copper and fiber patch panel.
- All cables shall sweep in and out of any cable management product without a deformation of cable jacket.
- Ensure cables are properly supported when using cable management to ensure cables do not sag.
- Utilize Velcro ONLY for securing of cables on cable management.

Copper and Fiber patching panels

- Route all cables to backside of termination panels in an asymmetrical orientation to ensure cable bundles are split evenly.
- Utilize rear wire management bars for supporting cables into point of termination.
- Secure all cables on all panels using Velcro ONLY to prevent cables from pulling away.

End of Section

Quality Assurance

- Install all components as directed by Manufacturer's installation guidelines.
- All products shall bear the mark of UL or ETL for performance level.
- System installation shall meet all applicable Local/State codes and safety requirements where project is located.
- All products shall be new and un-used in original packaging.
- Follow and adhere to installation practices specified by the applicable Telecommunications Industry Association standards.
- Follow and adhere to installation practices specified by BICSI Information Transport System Installation.
- Follow and adhere to installation practices specified by BICSI Telecommunications Distribution Methods.
- Follow and adhere to installation practices specified by NFPA-70 National Electric Code.
- Follow and adhere to installation practices specified by the Manufacturers.
- Contractor shall make available all ceiling and termination work for inspection by Manufacturer's representative or owner's representative.
- Contractor shall replace all defective components.

Bidder/Installer Qualifications

- Bidding Contractor shall be a licensed to install telecommunications systems in the state where work will be performed.
- Bidding Contractor shall be Leviton certified for at least one year
- Bidding Contractor shall have a minimum of 5 years experience installing structured cabling for telecommunications.
- Bidding Contractor shall have the capability to bond project in its entirety.
- Bidding Contractor shall be able to provide insurance at the request of the owner.
- Installer shall have an onsite supervisor and one technician who are certified by the Manufacturer to install the Manufacturer's telecommunications products.
- Communications Contractor shall have an RCDD on staff for at least one year, to certify that the Communications System can support the required applications on the various cabling media.
- Installer shall have obtained Leviton certification from the Manufacturer within 1 year prior to performing the Work.

Delivery, Storage, and Protection

- Communications Contractor shall ensure that materials delivery to work area shall be coordinated with construction site manager responsible for materials distribution to all trades.
- Communications Contractor is responsible for all materials, tools and vehicles left on the job site.
- Communications Contractor shall coordinate a disposal bin for the removal of all trash produced by the Communications Contractor personnel during the project.
- Communications Contractor shall ensure materials are stored in an environmental area where:

  Temperature does not exceed 120 degrees Fahrenheit nor below 32 degrees Fahrenheit.
  Humidity does not exceed 80 %.
  No direct exposure to sunlight.
- Follow Manufacturer's recommendations for handling of materials.

Warranty

- Communications Contractor shall provide a 1 year parts and labor warranty against defective workmanship and/or system component failure.
- Communications Contractor shall execute a Lifetime Applications Assurance Warranty for parts and labor to support stated applications from the connectivity Manufacturer.

End of Section

Intercom System Specifications

Part 1 - General

1.01 System Manufacture

- Intercom System Manufacturer shall be Telecor or Rauland Telecenter U IP (Match existing system.)
- Cable Manufacturer shall be Belden or Equivalent

  Locations where Telecor equipment is required. It may be purchased from the following authorized Telecor dealers
  Advanced Cabling, Inc - 405-418-4322
  High-Tech Tronics, Inc - 405-495-0215

  Locations where TelecenterU Equipment is required. It may be purchased from the following authorized TelecenterU dealer: Endex of Oklahoma Inc - 405-602-0001

1.02a Intercom Systems Equipment Description - Telecor Intercom Equipment

- Intercom call in button shall be momentary close and compatible with existing intercom system
- Intercom ceiling speakers shall be Manufacture Clarity Model # S-522. (Or equivalent approved by MPS must have volume control accessible from the floor)
- Intercom outside paging horn shall be Manufacture Rauland Borg 3601. (Or equivalent approved by MPS)
- Locations where Telecor equipment is required. It may be purchased from the following authorized Telecor dealers
  Advanced Cabling, Inc - 405-418-4322
  High-Tech Tronics, Inc - 405-495-0215

1.02b Intercom Systems Equipment Description - Rauland Telecenter U IP Intercom Equipment

- Classroom Intercom Equipment
  - Call button shall be Part # 603302 Dual Level call switch.
  - Ceiling speakers shall be Part # BAFKIT2X2L8RJ - 8 Ohm ceiling tile replacement speaker with RJ45 connector.
  - IP Classroom Module shall be TCC2011 IP Module (*Module required for each classroom, *Requires POE network drop)
- Hallway/Commons/Outside Intercom Equipment
  - TCC2022-IP Zone page module (*Requires POE network drop)
  - Appropriate size amp for quantity of speakers.
  - BAFKIT2X2L- 25 volt ceiling tile replacement paging speaker (For all classroom & hallway locations)
  - Rauland Borg 3601 - Loud paging horn (For all outside & large area locations such as gymnasiums, etc.)

  Locations where TelecenterU equipment is required. It may be purchased from the following authorized TelecenterU dealer
  Endex of Oklahoma Inc - 405-602-0001

1.03 Systems Installation

- All non-IP cabling shall be shielded and have a minimum of 5 conductors.
- All network IP cabling shall be Cat6 (see structured cabling System Specifications for cabling information)
- All wire shall be shielded and have a minimum of 5 conductors.
- All circuits and wiring shall be labeled at all terminating ends.
- All devices shall be mounted according to the manufactures specifications.
- All devices shall be properly adjusted and tested prior to job completion.
- All room circuits shall run from the intercom system to the call button then to the room speaker.
- All extra speaker wire taps shall be insulated.
- All rooms shall be individually wired and terminated at the intercom system on individual points. (No Doubling)
- All rooms shall be tested to verify proper room number programming and operation.
- All call buttons shall be labeled with their corresponding system point number.
- Protective grommets shall be installed on all conduits to protect wire.
- All wire shall be run in J hooks above ceiling with a minimum space of 4" from ceiling deck. All wire shall be in separate pathways 6" from other system wiring. No wire ties allowed. No wire shall be run between the red iron and roof deck.
- All wire ran between building shall be in conduit and shall be direct burial cable. It shall be a minimum of 5 conductor 18 AWG copper.
- Installer shall supply the electrical and or masonry contractors with specialty back boxes and coordinate with them to ensure that all necessary conduits, back boxes, etc. are installed in the proper locations.
- Follow and adhere to installation practices specified by NFPA-70 National Electric Code, Edition 2008.
- Follow and adhere to installation practices specified by the Manufacturers.

1.04 Quality Assurance

1.03.01 Qualifications

- Install all components as directed by Manufacturer's installation guidelines.
- All products shall bear the mark of UL or ETL for performance level.
- System installation shall meet all applicable Local/State codes and safety requirements where project is located.
- All products shall be new and un-used in original packaging.

1.03.02 Bidder/Installer Qualifications

- Bidding contractor shall have a minimum of 5 years experience installing school intercom systems.
- Bidding contractor shall be able to provide insurance at the request of the owner.

1.05 Delivery, Storage, and Protection

- Contractor shall ensure that materials delivery to work area shall be coordinated with construction site manager responsible for materials distribution to all trades.
- Contractor is responsible for all materials, tools and vehicles left on the job site.
- Follow Manufacturer's recommendations for handling of materials.

1.06 Scheduling

- Contractor shall provide a detailed construction schedule with hard dates for completion of roughing in cables, terminations and testing once scheduling sequence has been determined to the Owner's Project Manager.

1.07 Warranty

- Contractor shall provide a 1 year parts and labor warranty against defective workmanship and/or system component failure.

Part 3 - Execution

3.01 Field Quality Control

- Contractor shall make available all ceiling and termination work for inspection by Manufacturer's representative or owner's representative.
- Contractor shall replace all defective components.

3.02 Adjusting

- No additional work outside of the contract scope of work shall be completed without the approval of the Owner or Owner's representative.

3.03 Protection

- It is the responsibility of the Contractor to ensure equipment is protected from dust and water during the project with appropriate materials.
- Remove all protective covers and protective materials from equipment prior to turnover to Owner.

3.04 Schedules

- Coordinate work with Owner's project manager and follow scheduling sequence as established by Owner's project manager.
- It is recommended that the Contractor schedule closely with any other systems contractor to ensure turnover date is met.
- Contractor bidding will supply the electrical and or masonry contractors with any specialty back boxes such as clock recessed back boxes etc. and coordinate with them to ensure that all necessary conduits, back boxes, etc. are installed in the proper locations.

End of Section

1.04 Submittals

1.04.01 Prior to installation

- Show compete map of system design for approval by Owner.

3.02 System Requirements

Intercom system shall be capable of communicating to all rooms and shall have adequate number of room points as to not double up on any given point.

End of Section

Intercom System Installation
Completion Check List

Part 1 - General

1.01 Section Includes

- Intercom System Completion Check List

1.02 Completion Check List

- Main control panel has a map of the entire system inside and a copy has been given to Jack Phillips with MPS.
- All intercom programming such as bell times, tornado drill alert, etc has been checked and is correct.
- Intercom has been tested for proper operation.
- All rooms have been tested to verify proper description at console.
- All speakers have been tested to verify proper operation and volume.
- All extra speaker wires have been tapped or insulated
- All call buttons are labeled and have been tested for proper operation.

End of Section

Clock System
Specifications

Part 1 - General

1.01 System Manufacture

- Clock Equipment shall match existing system. (Must be compatible with schools existing system.)

  Locations where Telecor equipment is required. It may be purchased from the following authorized Telecor dealers

  Advanced Cabling, Inc - 405-418-4322
  High-Tech Tronics, Inc - 405-495-0215

1.02 Intercom Clock Systems Equipment Description

- Intercom Digital Clocks shall be hard wired and may not use battery power for its primary power source. Clocks shall be 4 inch and be compatible with existing system. Clocks must be compatible with existing clock system.

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MECHANICAL / ELECTRICAL

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date

revisions

MOORE PUBLIC SCHOOLS
BOARD OF EDUCATION
MOORE, OKLAHOMA

MOORE Public Schools
LEARNING FOR LIFE

LOCKER ROOM
ADDITION
MOORE WEST
JUNIOR HIGH SCHOOL

sheet no:

T-501

Salas O'Brien
2600 Van Buren St., Suite 2635
Norman, OK. 73072
Salas O'Brien Registration: CA# 7058
Expiration Date : 6/30/2025
Salas O'Brien Project Number: 2023-04636-00