

Thomas Holme Elementary School
Request For Proposals
ADDENDUM #2
October 11, 2022

On behalf of the School District of Philadelphia and the Philadelphia Authority for Industrial Development (PAID), this Addendum shall modify and become part of the referenced Request for Proposal. Any items not mentioned herein, or affected by, shall remain strictly in accordance with the original documents

QUESTIONS AND ANSWERS

A. GILBANE: 10/03/22

1. QUESTION: Please confirm the intended occupancy (student capacity) and size (gross square feet) for the proposed school. Exhibit C sets target enrollment at 700 students, but lists a Total Capacity (@90%) of 1,103 students. This results in an anticipated building at 127,116 GSF. However, Exhibit D references links to the adopted Educational Design Standards. Page 95 of the Design Standards include sample PORs for PreK-8 schools of various sizes. This standards suggests that Total Gross Area of 106,164 GSF for a school with an enrollment of 700 students. Please clarify.
 - a. ANSWER: Sample POR's from Exhibit D are theoretical examples only. The Exhibit C Program of Requirements has been developed specifically for this job and supersedes that information.
2. QUESTION: SDP requires access to the building up to 2 months in advance to install furniture and technology hardware (Smartboards, WAP, etc.). Please provide clarification relative to what items are DISTRICT PROVIDED AND INSTALLED – and what TIME accommodations need to be made VS. what items are DEVELOPER PROVIDED AND INSTALLED (or SDP PROVIDED/DEVELOPER INSTALLED). This is vaguely referenced on Page 9 of the RFP under Substantial Completion description.
 - a. ANSWER: SDP will provide at minimum the items described in the attached SDP IT Standards document. The time period is as stated - up to 2 months. The Developer provided and installed items are limited to the FF&E items included in the Allowance.

3. QUESTION: Please confirm that the Project is fully funded by ARPA funds, and that PIDC/School District will produce evidence of such funding prior to execution of Agreements.

a. ANSWER: In Spring 2021, President Biden signed the American Rescue Plan Act (ARPA), which allocated federal funds for school districts to use to address impacts of the COVID-19 pandemic. The School District of Philadelphia was awarded \$1.1 billion in ARPA Federal Funding. <https://www.philasd.org/arp/>

The funding approval for this project was provided by the SDP Board on March 24, 2022. Item No. 19. Authorization to Enter into Agreement with Leases with the Philadelphia Authority for Industrial Development (PAID) to Fund, Contract and Sublease with one or more Developers or Construction Managers for the Development, Construction, and Equipping of one or more Capital Projects for the School District (\$145,000,000) - Added 3.3.2022 (Updated 3.22.2022)

4. QUESTION: Relative to the availability for ARPA funds, please provide the contract award amounts for both the Cassidy and Amy 5 schools issued by PIDC and a summary of remaining available ARPA funds after those two schools are fully funded.

a. ANSWER: At this time neither Cassidy or AMY 5 contracts have been finalized.

5. QUESTION: Only a Phase I Environmental Site Assessment was provided in Exhibit E. Please provide other environmental documentation within the School District's possession, including but not limited to AHERA Asbestos reports, lead-based paint test reports and underground storage tank tightness testing report.

a. ANSWER: SDP is not in possession of any additional environmental documentation. It is the responsibility of the successful bidder to finalize and perform any environmental SOW.

6. QUESTION: Please confirm what FF&E items in general the School District will leave behind once they vacate the building.

a. ANSWER: SDP will relocate at minimum 25% of existing furniture, as well as all educational materials (i.e. books, posters, toys).

7. QUESTION: Please confirm that the Developer is not required to provide construction commitments to M/WBE subcontractors at the time of RFP response. It is not possible for the M/WBE subcontracting community to commit at RFP response time without definitive construction plans. This is a design-build project where construction documents are not available at response time.

- a. ANSWER: Proposer is not required to provide commitments at the time of RFP response. However, proposers must achieve the MWBE engagement targets through the course of the project and are responsible for modifying their team as required to fulfill their engagement plan.
- 8. QUESTION: Please confirm that obtaining LEED Gold Certification is a requirement of the Project. The RFP just states "The construction must meet or exceed the standards of certification.." which is different from actually obtaining certification. There will be a substantial additional cost to obtain actual LEED Gold Certification.
 - a. ANSWER: Certification is not a requirement of the RFP at this time. However, the construction and design must meet or exceed the standards.
- 9. QUESTION: In the Fee Proposal, item #B6 is titled "Furnishing". Please explain what trade this is referring to.
 - a. ANSWER: This line item refers to work included in CSI Division 12 including but not limited to art, casework, other furnishings, window treatments, furnishings and accessories, and multiple seating. Note that school furniture is not included in this line item and is covered by the FF&E allowance.
- 10. QUESTION: In the Fee Proposal, Item #F is titled "FF&E and Instructional Technology", with a value of \$4.5 million. Please confirm the \$4.5 million is an allowance for equipment and labor that will be adjusted either upward or downward, based upon final cost.
 - a. ANSWER: Allowance may be adjusted upward or downward at the discretion of PIDC and SDP.
- 11. QUESTION: In the Fee Proposal, Item #H is titled "Abatement Contingency", with a value of \$3 million. Please confirm the \$3 million is an allowance for all environmental remediation required for the Project that will be adjusted either upward or downward, based upon the final cost.
 - a. ANSWER: Allowance may be adjusted upward or downward at the discretion of PIDC and SDP.
- 12. QUESTION: Is the School District planning to design and install their own network system?
 - a. ANSWER: Proposer shall design the network system in collaboration with SDP Department of IT and in conformance with the attached Guidelines . Proposer shall be responsible for installation of the network.
- 13. QUESTION: Does the School District require a Distributed Antenna System (DAS) for first responders and cell phone coverage?

- a. ANSWER: SDP does not require or support DAS.
14. QUESTION: What size is the existing underground storage tank? Please confirm there is only one (1) tank.
- a. ANSWER: The site contains no less than (1) tank, which is no smaller than 10,000 gallons. Reference Exhibit E.
15. QUESTION: Please confirm that the SF330 should only be submitted for the Architectural firm team member.
- a. ANSWER: Proposer shall provide the appropriate form of qualifications for each party involved.
16. QUESTION: What is the estimated Project budget?
- a. ANSWER: Proposer shall submit their proposal with a guaranteed maximum price based on the contents of the RFP.
17. QUESTION: Please confirm we will be able to submit partial design packages for approval to meet schedule.
- a. ANSWER: Proposer must indicate contents of partial design packages and anticipated dates of submission as part of their proposal.
18. QUESTION: What percentage of students us School District busing to arrive and depart this school?
- a. ANSWER: 550 of the 672 students that are listed in COMPASS are eligible for bus transportation
19. QUESTION: The +/- 14-month schedule from start to substantial completion is very tight. Please confirm a proposer can submit an alternate schedule.
- a. ANSWER: Proposer shall submit their most competitive schedule.
20. QUESTION: The response document is very extensive. We are requesting a one (1) week extension to the 10/18/22 response date. Please confirm.
- a. ANSWER: An extension may be granted. See Clarification section above for revised date.

B. VERDANTAS: 10/05/22

1. QUESTION: In reviewing the RFP for the above referenced project, it is noted that an environmental scope of work is provided in Exhibit E. Exhibit E only contains the Phase I ESA report. Was an environmental scope of work provided elsewhere?

- a. ANSWER: No, the environmental scope is the responsibility of the proposer to develop based on the information included in the Phase 1 ESA report.

ATTACHMENTS

The following shall be considered attachments to the RFP:

1. SDP IT Standards
2. SDP Safety Technology Standards

End of Addendum #2

SCHOOL DISTRICT OF PHILADELPHIA TECHNOLOGY DESIGN STANDARDS

This document is not intended to be a comprehensive construction specification.

It is a guide for architectural and engineering consultants that applies to ALL design projects: the design of a new building project, a major renovation of an existing school, a classroom modernization in an existing school, or any “turnkey” schools where SDP Tech Services is expected to maintain the network systems upon completion. A full set of construction documents and specifications **MUST** be submitted to SDP Tech Services for review and approval prior to being sent out to bid.

All electronics required to activate the IT infrastructure described herein shall be accounted for in **SDP Capital Programs’ overall project budget**, in order for SDP Tech Services to procure and install said electronics at the final fit-out stage of the project.

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1. EXPECTATION OF RESPONSIBILITIES

The design of a school building is a collaborative process in which various stakeholders participate, particularly with regard to technology and IT infrastructure. To clarify the various roles and responsibilities within the design as well as construction processes, the following is a list of expectations of each party involved.

A. ARCHITECT AND ENGINEER shall provide:

1. All IT design and construction plans shall be provided to SDP Tech Services prior to being sent to bid. A “kick-off” meeting to acquaint all parties with the design and requirements shall be scheduled. SDP Tech Services will provide feedback that must be incorporated into the final set.
 - a. If any “Value Engineering” takes place, it is expected that SDP Tech Services will be notified and another meeting to discuss changes will take place prior to final documents being submitted.
2. All drop count numbers and closet locations shall be provided to SDP Tech Services and Capital Programs **prior to budget finalization and/or 120 days prior to project completion** (whichever occurs first). Without these drop counts, SDP Tech Services cannot accurately price and order network equipment, and cannot guarantee installation prior to building opening. This includes:
 - a. Data drop counts, and their respective closet locations
 - b. Voice drop counts, and their respective closet locations
 - c. WiFi drop counts, and their respective closet locations
 - d. Speaker counts and locations
3. Sufficient electrical support for all technology shall be included in the design. Minimum power requirements have been suggested in various sections below; however, it shall be the Architect and Engineer’s responsibility to calculate the proper electrical loads and ensure sufficient support for all technology needs.

B. SDP CAPITAL Department to provide:

1. A final fit-out BUDGET THAT INCLUDES COSTS FOR ALL ITEMS BELOW:
 - a. Network equipment
 - b. Wireless access points and necessary antennas
 - c. Phones
 - d. Speakers
 - e. Badge readers and related access control equipment and hardware
 - f. Construction costs related to running a new outside fiber connection via SDP’s designated contracted fiber leasing company
 - g. Rack mounted UPS for MDF equipment and PBX equipment
 - h. Any and all other equipment provided by SDP Tech Services upon project completion.

SDP Tech Services will use the quantities of drop counts provided by the Architect and Engineer to determine equipment needs, and then provide Capital with a cost to include in their budget. SDP Tech Services will leverage its existing contracts to provide the most cost sensitive pricing.

C. CONTRACTOR to provide:

1. All infrastructure wiring and conduit (if necessary), between and including classroom faceplate or termination, and closet patch panel termination.

2. All cut sheets for Fiber Optic cable, copper UTP cable, patch panels, station jacks, speakers, phone faceplates, and Wireless Access Point enclosures for approval by SDP Tech Services.
3. Patch cables on both ends of each termination must be provided (but not installed) by the Contractor. SDP Tech Services will install Contractor-provided patch cables once the project is complete. Patch cord counts should include:
 - a. For every patch panel termination in a closet, one patch cord in the 5-7 foot length. Closet-side patch cord colors shall be as follows:
 - i. Data & Voice: Gray
 - ii. Wifi: Yellow
 - iii. Speaker: Green
 - b. For every data drop on the classroom side, one patch cord in the 10 foot length.
 - c. For every wireless drop on the AP side,
 - i. At a location WITH an enclosure: one patch cord in the 2 foot length
 - ii. At a location WITHOUT an enclosure: one plenum-rated patch cord in the 15 foot length
 - d. For every speaker drop on the speaker side, one plenum-rated patch cord in the 5 foot length.
4. Wireless Access Point enclosures shall be provided and installed for every AP location with the exception of any spaces with a drop ceiling at 12 feet high or less (classrooms, hallways, etc).
5. Metal faceplates for all wall phones shall be provided.
6. Material and installation of all speakers shall be provided.
7. **TERMINATION, LABELING, and TESTING** of all copper and fiber wiring. Test results must be submitted to SDP Tech Services prior to SDP installation of equipment. Without acceptable test results, SDP Tech Services cannot install network equipment. See additional details on labeling and testing in further sections of this document.
8. Final warranty on all products and installation of said products.

D. SDP TECH SERVICES to provide:

1. Installation of network equipment:
 - a. Network switches
 - b. Wireless Access Points and necessary antennas
 - c. Phones
 - d. Configuration of all equipment, including setting up speaker paging zones
2. All costs associated with this network equipment will be calculated using the quantities of drop counts provided to SDP Tech Services by the Architect and Engineer. SDP Tech Services will provide this cost to Capital Programs to include in their final fit-out budget.
3. Once Tech Services receives all drop counts, network equipment, and acceptable test results for all wiring, technicians will be deployed to install and troubleshoot the network equipment listed above. This process requires a minimum of one full week before building occupancy, or if during school opening or other high volume work time, can take up to 2 weeks to complete.

2. DESIGN REQUIREMENTS BY SPACE

A. CLASSROOMS

Every classroom or educational space intended to hold +/- 34 students shall have the following:

1. 4 CAT6A data drops (at a minimum) around the room at +/- 18" above the floor, preferably 2 at the teacher's station and 2 on an opposite wall. More drops are welcome provided there is space in the MDF/IDF to accommodate them.
2. 2 CAT6A data drops at the ceiling for a Wireless Access Point.
 - a. If the classroom has drop ceiling tile 12' high or less, these two lines should run to the center of the room at the ceiling and terminate in an RJ45 biscuit jack, where SDP Tech Services technicians will clip the AP to the ceiling grid. No AP enclosure is needed.
 - b. If the drop ceiling is higher than 12', or the classroom does NOT have drop ceiling tile, these two lines should be run to the wall with the classroom door, and terminate on an RJ45 biscuit jack within a wall-mounted AP enclosure provided by the Contractor.
3. 1 CAT6A data drop for a speaker
 - a. If the classroom has drop ceiling tile 12' high or less, this line should be run to the center of the room for a ceiling speaker.
 - b. If the drop ceiling is higher than 12' or the classroom does NOT have drop ceiling tile, this line should be run to the wall with the classroom door, and terminated at a wall box speaker.
4. 1 CAT6A data drop for a wall phone by the classroom door, terminated with a METAL faceplate as specified in this document. **Do not include phone enclosures.**
5. 4 quad electrical outlets around the room, as well as 1 duplex for dedicated laptop cart charging.
6. Any additional data & electrical requirements for AV, smartboard, or projector technology as specified by the Educational Technology team, if desired.
7. Refer to the Appendix in this document for additional classroom layout information.

B. COMPUTER LABS

Every school shall have a minimum of 1 computer lab. This room will be intended to house +/- 34 desktop computers in accordance with any state, local occupancy limits/requirements for computer learning environments. **In addition to the IT requirements for classrooms as listed above**, the computer lab shall have:

1. A minimum of one (1) hardwired CAT6A data drop per computer workstation.
2. Any additional data drops needed for scanners, printers, or specific computer lab equipment needs as requested by the Principal.
3. At least one electrical outlet per computer. Circuit sizing should be based on current electrical standards.
4. A teacher's station configuration.
5. If temperature and heat dissipation from the computers is a concern, an optional independent air conditioning system shall be installed (24k BTU wall-mounted mini-split or window AC unit), not ducted from the building's HVAC system.

C. LARGE CONGREGATION SPACES

Every large space intended for the congregation of more than a classroom-size of students (Auditorium, Cafeteria, Gymnasium), should have a higher density of both speakers and wireless APs.

1. AP density should be calculated as 1 AP per approximately 50 students, and maximum occupancy values for these spaces shall be used. Due to typically higher ceilings and lack of drop ceiling tile in these spaces, all APs should be wall-mounted in AP enclosures, mounted no higher than 12' above floor level. Additional external antennas may be required. **Specific AP layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**
2. All large congregation spaces shall have ubiquitous speaker coverage of the entire space. **Specific speaker layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**
3. PA speakers shall be independent of any AV system that uses speakers for audio visual presentations in these areas. **No mixed use of speakers shall be permitted.**

D. BUILDING ENTRANCE/ VESTIBULE

All school buildings are moving towards having both a Visitor Management kiosk as well as a Student ID check station at the main building entrance or at the Main Office. To accommodate these devices, the Building Entrance/ Vestibule shall require:

1. 2 CAT6A drops (minimum) - 4 preferred
2. 2 duplex electrical outlets
3. 1 CAT6A drop for a speaker

The specific locations of the data drops and outlets shall be coordinated with the Principal as to the design of their Visitor/Student management plan. In the event that the Principal shall choose to locate the Student Entrance in a different area than the main Visitor Entrance - or in the case of large scale events that shall be held in any congregation spaces, which may need additional Visitor Management kiosks for attendance tracking in various other locations - those entrances shall also have the above listed requirements.

E. MAIN OFFICE

The Main Office layout and design shall be coordinated with the Principal. Minimum infrastructure requirements are as follows:

1. 2 CAT6A data drops (minimum) for every staff workstation
2. 1 duplex electrical outlet for every staff workstation
3. 1 CAT6A drop per ceiling or wall speaker. Speaker coverage shall be ubiquitous throughout the Main Office.
4. 1 CAT6A POE data drop shall be provided for a Kronos time clock, no higher than 48" above floor level. The specific location of this drop in the Main Office shall be coordinated with the Principal, but shall be located such that all teachers will have access to clock in and out every day, it is not blocking a walkway or in a high traffic area, and it is in view of either a security camera or the Main Office staff.
 - a. Additionally, 1 CAT6A POE drop shall be provided for a time clock in the Building Engineers' Office, no higher than 48" above floor level.
5. 1 CAT6A data drop and 1 electrical outlet for a Visitor Management kiosk (should the Principal choose to locate this in the Main Office).

F. STAFF OFFICES

Every staff member office shall have:

1. A minimum of 2 CAT6A data drops at +/-18" above floor level
2. 2 duplex electrical outlets
3. 1 CAT6A drop for a speaker

G. BUILDING ENGINEER'S OFFICE

In addition to the IT requirements for Offices as listed above, the BE's office shall include:

1. 1 CAT6A POE drop for a Kronos time clock, no higher than 48" above floor level.

H. STORAGE SPACES

Any storage space larger than 15 sq.ft. in size, including those within classrooms, shall have:

1. 1 CAT6A drop for a speaker
2. 1 CAT6A data drop (minimum)
3. 1 duplex electrical outlet

I. GENERALLY THROUGHOUT THE BUILDING

1. There shall be ubiquitous WiFi coverage throughout the building, including hallways, boiler rooms and mechanical spaces, and storage rooms. The only exceptions are elevators. Any location that has a drop ceiling 12' or lower, may be installed without an AP enclosure. **Specific AP layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**
2. Additionally there shall be ubiquitous speaker coverage throughout the building, as well as every 30ft in hallways. **Specific speaker layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**

J. OUTDOOR AREAS

All outdoor areas adjacent to the school building that are used as outdoor educational spaces, as well as locations where students, faculty, and staff congregate, shall have WiFi coverage as well as an outdoor PA speaker. All such locations shall require:

1. 2 CAT6A data drops, terminated on biscuit jacks on the AP end, coiled up on the **inside** wall behind each outdoor AP location.
 - a. SDP Tech Services will follow up with external AP installation.
2. 1 CAT6A drop for each outdoor wall-mounted speaker horn.
 - a. Bogen part SPT15A

K. TRAILERS

Any trailer that is used as a classroom shall have the same interior infrastructure requirements as a typical classroom (see description above). In addition, as it is assumed that trailers will be detached from the main building and farther than 300 ft. from the closest network closet, they shall have:

1. A wall-mounted network rack within the trailer.
2. 12-strand Singlemode armored fiber between the trailer and MDF, terminated on LC connectors on both ends.
3. Four (4) CAT6A tie cables between the trailer rack and the MDF, terminated on patch panels on both ends.
 - a. If these tie cables are an aerial suspension (as opposed to an underground line), they shall be rated for outdoor use, and installed with lightning protectors rated for 90 volts on both ends.
4. All copper drops within the trailer will then be terminated on patch panels in that rack.

L. DETACHED BUILDINGS

Any detached buildings such as Annexes, Modular Buildings, Little School Houses, Stadiums, or Field Houses, shall be treated as their own IDF's. They shall have:

1. A wall-mounted network rack within the building in an enclosed space as outlined in the IDF section in this document.
2. 24-strand Singlemode armored fiber between the building rack and the MDF, terminated on LC connectors on both ends.
3. Four (4) CAT6A tie cables between the building rack and the MDF, terminated on patch panels on both ends.
 - a. If these tie cables are an aerial suspension (as opposed to an underground line), they shall be rated for outdoor use, and installed with lightning protectors rated for 90 volts on both ends.

M. ENTRANCE FACILITY

The Entrance Facility (EF, or also known as the Demarcation point or Demarc) is the location where any incoming fiber-based data services physically enter the building. This area can usually be found in the basement of existing schools, but may be located elsewhere as preferred in new construction. It is recommended that the EF be a dedicated and enclosed space with an allocation of 8' x 8'.

If the EF service conduit is brought directly to the MDF via Rigid Metal Conduit (RGS) or Intermediate threaded steel conduit (IMC), then all services can be demarcated at the MDF. Otherwise there must be an Entrance Facility.

The EF shall include the following:

1. Incoming utility surge protection shall be provided for copper and any CATV services.
2. Grounding for telecom services shall be provided.
3. A plywood backboard of at least 4' x 4' shall be dedicated to CATV service demarcation.
4. A plywood backboard of at least 4'high x 8'wide shall be dedicated to incoming telephone service terminals and lightning protection and demarcation.
5. A plywood backboard of at least 4' x 4' shall be dedicated to incoming fiber based services for the SDP WAN.
6. Provide 24 strand, OM3 or better, 50µ Multimode fiber from the Entrance Facility to the MDF, terminated on a fiber patch panel with **LC connectors**.
7. Provide four (4) CAT6A tie cables from the Entrance Facility to the MDF, **terminated on a dedicated 1U copper patch panel at both ends**. This dedicated patch panel shall be labeled LEGACY TIE CABLES.
8. If there is active equipment in an EF, such as carrier-based equipment for delivering telcom services, the EF must be air conditioned for the added heat load.

N. MDF

The MAIN DISTRIBUTION FRAME (MDF) is the location within a building or complex of buildings, where the entire telecommunications system originates. It may include: the physical location of the enclosure, wire and cable management hardware, termination hardware, distribution hardware, and patching and equipment racks. EIA/TIA-569 refers to the room housing the MDF as the "Equipment Room."

The MDF shall be or include the following:

1. A fully enclosed room approximately 240 sq.ft. in size, and a minimum dimension of 12'x20' inside. It must be above grade (first floor or higher).
2. At least one (1) 84" four-post floor standing rack. Floor standing racks shall be installed to ensure 36" of free space behind and in front of racks, as well as located in such a way

- as to not block access to any other floor-standing or wall-mounted equipment.
3. Provide 24 strand, OM3 or better, 50 μ Multimode fiber from the MDF to each IDF, terminated on a fiber patch panel with **LC connectors**.
 4. Provide four (4) CAT6A tie cables from the MDF to the EF, as well as to each IDF, **terminated on a dedicated 1U copper patch panel at both ends**. This dedicated patch panel shall be labeled LEGACY TIE CABLES.
 - a. If tie cable count exceeds 1U panel capacity, additional panels shall be installed.
 5. Electrical power should include a minimum of eight (8) quad-plex outlets, each served by a 20 amp dedicated circuit.
 6. Provide two (2) plywood backboards of at least 4' x 4', one on each of two different walls in the MDF, that shall each be 3/4" thick, AC or better, and painted with two coats of fire retardant paint. Ensure 36" of free space in front of all plywood.
 7. An independent air conditioning system must be provided (i.e. 24k BTU wall-mounted mini-split), not ducted from the building's HVAC system.
 8. An access control badge reader should be located outside at the entrance door to the MDF. See the Badge Reader section in this document for more details.
 9. Racks in the MDF are intended specifically for Voice, Data, WiFi equipment, and speakers. Security equipment (Head End, CCTV, etc.) should be located in a separate closet. If another location is not possible, the MDF must be large enough to separate and partition the equipment, and power requirements must increase to accommodate additional equipment.
 10. No MDF nor IDF shall be installed or retrofitted into a space with a water source or excess humidity (i.e. janitors' closets, bathrooms, kitchens, etc.) nor in a location that can be accessed by students.
 11. No water sprinkler system nor other fire suppression system is warranted in either MDF nor IDFs. A smoke detector in each closet shall be sufficient.

O. IDFs

The INTERMEDIATE DISTRIBUTION FRAME (IDF) is the location in a building where a transition between the backbone or vertical riser system and the individual drop distribution system occurs. It may include: the physical location of the enclosure, wire and cable management hardware, termination hardware, distribution hardware, and patching and equipment racks. The IDFs provide the interface location between fiber distribution cable (backbone) and the station cable (horizontal distribution).

The IDF shall be or include the following:

1. A fully enclosed room approximately 100 sq.ft., and a minimum dimension of 10'x10' inside.
2. Floor standing racks shall be installed to ensure 36" of free space behind and in front of racks, as well as located in such a way as to not block access to any other floor-standing or wall-mounted equipment.
3. Provide 24 strand, OM3 or better, 50 μ Multimode fiber from each IDF back to the MDF, terminated on a fiber patch panel with **LC connectors**.
4. Provide four (4) CAT6A tie cables from each IDF back to the MDF, **terminated on a dedicated 1U copper patch panel at both ends**. This dedicated patch panel shall be labeled LEGACY TIE CABLES.
5. Wall mounted racks, where appropriate, must be a minimum of 18" deep and mounted on 3/4" plywood. They should also be installed to ensure 36" of free space in front of the rack.

6. Electrical power should include a minimum of one (1) quad-plex outlet per each pair of 48-port patch panels (96 drops), each served by a 20 amp dedicated circuit.
7. Provide one plywood backboard of at least 4' x 4' in the IDF, which shall be 3/4" thick, AC or better, and painted with two coats of fire retardant paint. Ensure 36" of free space in front of plywood.

3. DESIGN REQUIREMENTS BY DEVICE

A. PHONES

All phones shall be Voice Over Internet Protocol (VOIP) phones, and shall require one CAT6A drop per phone.

There shall be no differentiation between a typical data drop and a voice drop. All voice cabling shall be terminated on a patch panel in the MDF, and terminated as a RJ45 data jack on the classroom or office side. All voice labeling shall also be consistent with data drop labeling.

The only differentiation shall be whether a phone is wall-mounted or a desktop set.

1. For all desktop sets in locations such as offices, conference rooms, work desks, etc, no Contractor action is required. SDP Tech Services will install desktop phone sets where requested, using typical data drops provided.
2. For all wall-mounted phones, the following shall apply:
 - a. Every classroom and educational space shall have one (1) wall-mounted phone installed by the room entry door. Do not include phone enclosures.
 - b. **All wall-mounted phones must be installed on metal faceplates**, as specified here. See additional details in attached Appendix.
 - i. CommScope M10LW4SP 1-port Single Gang Stainless Steel Telephone Faceplate, part #760100891
 - c. Plastic wall faceplates are **not acceptable**.
3. Contractor to provide all infrastructure, terminations, and faceplates for phones. SDP Tech Services shall provide all phone sets.

B. SPEAKERS

All speakers shall require one CAT6A drop per speaker, each individually home run back to the MDF or nearest IDF. All speaker cabling shall be terminated on a patch panel at the closet, terminated on a RJ45 jack at the speaker, and shall be labeled at both ends according to the labeling guidelines in this document.

Speaker-side installation shall be as follows: **Use a patch cord** to connect the RJ45 end to the jack in the ceiling, strip the opposite end, and use the blue pair of the CAT6A to terminate - white to the common, blue to the watt.

Every space throughout the entire school shall have speaker coverage. This includes: all classrooms, all offices, common areas, stairwells, entrance vestibules, elevator vestibules, mechanical areas, storage rooms larger than 15 sq.ft. (including those within classrooms),

hallways, outdoor spaces used for educational or congregation purposes, trailers, and any other locations utilized by staff and/or students. **Specific speaker layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**

1. Contractor shall provide all speakers, equipment, cabling, and installation required for the speaker system.
2. SDP Tech Services shall perform all speaker programming and paging zoning.
3. SDP Facilities is responsible for all clocks and bell schedules. The clock & bell system has a hand-off to the paging controller.

All speakers and associated equipment shall be **Bogen or Quam** products as specified here. See additional details in attached Appendix.

1. Bogen Amp TPU 250
2. Bogen Controller PCM2000
 - a. SDP Tech Services requires the CPU (central processing module), TIM (telephone interface module), and three (3) ZPM's (zone paging module). SDP does not require the TBM (talkback module).
3. For a typical classroom, office, or hallway WITH a drop ceiling: Bogen Drop Ceiling Speaker S86T725PG8WVR
 - a. Tile ceiling bracket is also required: Bogen part number TB8
 - b. Classroom and office speakers shall be tapped at 2 Watts. Hallway speakers shall be tapped at 4 Watts.
 - c. Hallway speakers shall be spaced at approximately every 30 feet. All specific speaker layouts shall be submitted to SDP Tech Services for review.
4. For locations WITHOUT a drop ceiling: Bogen box speaker part MB8TSQVR
5. For large indoor spaces such as gyms, auditoriums, and cafeterias, where a louder speaker is preferred but a horn may not be appropriate: Quam SYSTEM 6VPS
 - a. Quam speakers shall be tapped at 8 Watts.
 - b. Quam speaker installation shall be as follows: Remove the exposed silver ends of the other leads/taps and tape them together. Ensure that the bare wire ends are not touching each other, as this will create a short and cause issues.
 - c. PA speakers shall be independent of any AV system that uses speakers for audio visual presentations in these areas. **No mixed use of speakers shall be permitted.**
6. For all outdoor areas where staff and students congregate or outdoor learning occurs, a wall-mounted horn is required: Bogen part SPT15A
 - a. Outdoor horn speakers shall be tapped at 8 Watts.
7. Paging is integrated into the phone system. No external microphones are needed.

In such locations where multiple school programs are located in the same building and will need separate bell schedules and announcements, the following is also required:

1. An additional Bogen Amp TPU250
2. Bogen Multiple Tone Generator TG4C
 - a. Tone Generator also requires Power Supply PRS40C, sold separately
3. An additional clock system provided by SDP Facilities.

C. WIRELESS ACCESS POINTS

All Wireless Access Points shall require two (2) CAT6A drops per AP location. All wireless cabling shall be terminated on a patch panel at the closet, terminated on a RJ45 **biscuit jack** at the AP side, and shall be labeled at both ends according to the labeling guidelines in this document.

Every space throughout the entire school shall have ubiquitous WiFi coverage. This includes: all classrooms, all offices, common areas, entrance vestibules, elevator vestibules, mechanical areas, storage rooms larger than 15 sq.ft. (including those within classrooms), hallways, outdoor spaces used for educational or congregation purposes, trailers, and any other locations utilized by staff and/or students. **Specific AP layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**

All Wireless Access Points shall be installed in a protective AP enclosure, with the exception of locations such as classrooms and hallways that have a drop ceiling at 12' or lower. In those locations, APs shall be clipped into the drop ceiling grid without the need for an enclosure.

1. **Contractor must order, modify, and install all Wireless Access Point Enclosures,** as specified in the attached Appendix. SDP Tech Services will install the AP equipment into the enclosures once construction is complete.
2. Wireless Access Points shall NOT be installed higher than 12' above floor level in ANY space. If in any area it is not feasible to locate an AP lower than 12' high, **SDP Tech Services must be notified, and a scissor lift MUST be provided** and available for SDP Tech Services for all future routine AP maintenance.

It is apparent that automated technology has become more prevalent in a wide variety of school systems. In the event that any Mechanical, Electrical, Plumbing, or other non-IT systems being installed in a school require wireless communication, SDP Tech Services shall be notified for coordination and approval. Any such systems shall NOT create an independent network that use the following frequencies:

- a. 2.4 GHz (2401-2473 MHz)
- b. 5 GHz (5150-5835-5.895 GHz)
- c. 6 GHz (5.925-7.125 GHz)
- d. 60 GHz (57.24GHz-70.20 GHz)

D. BADGE READERS

All access control badge readers shall require one (1) composite cable West Penn AC251822B or similar per badge reader location.

1. Composite cable shall be left coiled up at each badge reader location with a 2 foot slack loop. SDP Tech Services shall install all badge readers following construction completion.
2. All badge reader cabling shall be run back to the headend controller. Headend controller **MUST** be located in the MDF or in an IDF, and shall be wall-mounted on 3/4" plywood backboard. The maximum distance between the controller and any badge reader shall be no more than 500 feet.

3. The headend controller shall manage a maximum of thirty-one (31) badge readers. If more badge readers are needed that would require an additional controller, **SDP Tech Services MUST be notified.**
4. Contractor shall provide two (2) CAT6A cables run to the headend controller, coiled up with a 2 foot slack loop. SDP Tech Services will do the final terminations and all programming following construction completion.
5. All doors with badge readers shall need electrified door locks and hardware. As the design and location of electrified doors within a project may vary widely, **SDP Tech Services must be contacted for coordination.** High current crash bars or other door hardware that requires a separate power supply is discouraged.

For all NEW CONSTRUCTION, badge readers shall be installed at the entry door of the following locations:

1. Main Building Entrance
2. Employee Building Entrance
3. Main Office
4. MDF
5. IDFs

For all RENOVATIONS to existing buildings, badge readers shall be at the discretion of the design team and Principal. If the decision is made to include ANY new badge readers in the renovation project, then the five above mentioned locations shall also be included. **Specific badge reader layout shall be submitted to SDP Tech Services for review prior to being sent out to bid.**

E. SMARTBOARDS/ AV EQUIPMENT

SDP Tech Services does not manage Smartboards nor any AV Equipment. Please contact the SDP Educational Technology Group for more information.

F. SECURITY CAMERAS/ CCTV/ AI PHONES

SDP Tech Services does not manage any security cameras, CCTV connections, nor AI phones. Please contact the SDP Security Department for more information.

G. CLOCKS/ BELLS

SDP Tech Services does not manage synchronized clocks nor bell schedules. Please contact the SDP Facilities Department for more information.

4. INFRASTRUCTURE GUIDELINES

A. COPPER UTP

All copper cabling shall be CAT6A UTP, cable type CMP. This includes all data, voice, wireless, speaker, and alarm cabling, as well as all patch cords. Copper Clad Aluminum, CCA cable variants are not acceptable.

All copper cabling shall be terminated on a patch panel on the network closet side, in neat and logical consecutive order with appropriate labels as described in this document. All field terminations in all other spaces shall be an RJ45 jack, orange in color, also labeled as described.

All CAT6A drops shall be routed in cable trays, conduit, j-hooks, and/or chases and sleeves as required. A minimum ten (10) foot slack loop shall be provided in each IDF or MDF for each copper cable run to avoid any cinching of cables. See General Installation Provisions section of this document for more detailed installation information.

For any renovations of existing buildings, **all copper cabling that is being replaced or is no longer in use shall be REMOVED** from all conduit, cable trays, j-hooks, closets, and patch panels. **Under NO circumstances shall discarded copper lines remain in ANY location.**

CAT6A Electrical Specifications shall meet or exceed the following:

1. Transmission Standards ANSI/TIA-568.2-D | ISO/IEC 11801 Class EA
2. dc Resistance Unbalance, maximum 4 %
3. dc Resistance, maximum 8 ohms/100 m | 2.438 ohms/100 ft
4. Dielectric Strength, minimum 1500 Vac | 2500 Vdc
5. Mutual Capacitance at Frequency 6.0 nF/100 m @ 1 kHz
6. Nominal Velocity of Propagation (NVP) 65 %
7. Operating Frequency, maximum 550 MHz
8. Operating Voltage, maximum 80 V
9. Remote Powering Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2, CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

On the rare occasion that CAT6 must be installed in an existing building, the CAT6 Electrical Specifications shall meet or exceed the following:

1. Transmission Standards ANSI/TIA-568.2-D, CENELEC EN 50288-6-1, ISO/IEC 11801 Class E
2. dc Resistance Unbalance, maximum 5 %
3. dc Resistance, maximum 7.61 ohms/100 m | 2.32 ohms/100 ft
4. Dielectric Strength, minimum 1500 Vac | 2500 Vdc
5. Mutual Capacitance at Frequency 5.6 nF/100 m @ 1 kHz
6. Nominal Velocity of Propagation (NVP) 69 %
7. Operating Frequency, maximum 300 MHz
8. Operating Voltage, maximum 80 V
9. Remote Powering Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2, CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

Testing of CAT6A and CAT6 cabling shall include those tests outlined in TIA standard (TIA-568-B.2, Addendum 1 for CAT6A and CAT6 cabling and for CAT6A and CAT6 connecting hardware) for each installed and terminated cable and an electronic and printed version of the report will be provided to the District.

1. Insertion Loss (IL)
2. NEXT, Near End Crosstalk, Loss (pair to pair)
3. FEXT, Far End Crosstalk loss
4. ELFEXT (pair to pair)
5. Return Loss
6. Propagation Delay (PD)
7. Delay Skew (DS)
8. Longitudinal Conversion Loss (LCL)
9. Longitudinal Conversion Transmission Loss (LCTL)

Any cable not passing testing requirements shall be repaired and tested again until it meets or exceeds requirements.

B. FIBER

All fiber cabling shall be cable type CMP, suitable for installation in Innerduct or encased in protective armored sheathing, and shall be terminated on fiber patch panels with **LC connectors**. A minimum thirty (30) foot service loop shall be provided at each fiber backboard terminal location. **See General Installation Provisions section of this document for more detailed installation information.**

All fiber cable types and quantities shall adhere to the following:

1. Fiber between the MDF and any IDF shall be 24 strand, OM3 or better, 50 μ Multimode.
2. Fiber between any computer lab rack and the MDF shall be 12 strand, OM3 or better, 50 μ Multimode.
 - a. **All computer lab fiber MUST be run to the MDF**, not any IDFs.
3. Fiber between any outside location (Little School House, PEC, Annex, building that is not physically connected to main school or which needs aerial or underground cable) shall be 24 strand Singlemode.

50 μ Multimode Fiber Optic Cabling should meet or exceed the following characteristics:

1. Type CMP, OM3 or better
2. Minimum Bandwidth 850 nm ONLY 2000 MHz.km
3. Minimum Bandwidth 850 and 1300 nm 1500 MHz.km and 500 MHz.km
4. Attenuation at 850 nm \leq 2.3 dB/km
5. Attenuation at 1300 nm \leq 0.6 dB/km
6. Macrobend Loss at 15 mm at 2 turns \leq 0.1 dB at 850 nm and \leq 0.3 dB at 1300 nm
7. Macrobend Loss at 7.5 mm at 2 turns \leq 0.2 dB at 850 nm and \leq 0.5 dB at 1300 nm
8. Refractive Index Difference 1%
9. Effective Group Index of Refraction (N_{eff}) at 850 nm 1.482
10. Effective Group Index of Refraction (N_{eff}) at 1300 nm 1.477
11. Fatigue Resistance Parameter (N_d) 20
12. Chromatic Dispersion
13. Zero Dispersion Wavelength (λ_0): 1295 nm \leq λ_0 \leq 1315 nm
14. Zero Dispersion Slope (S_0): \leq 0.101 ps/(nm²*km)

Singlemode Fiber Optic Cabling should meet or exceed the following characteristics:

1. Type CMP
2. Indoor/Outdoor rated cable
3. Attenuation at 1310 nm \leq 0.35 dB/km
4. Attenuation at 1383 nm \leq 0.35 dB/km
5. Attenuation at 1490 nm \leq 0.24 dB/km
6. Attenuation at 1550 nm \leq 0.20 dB/km
7. Attenuation at 1625 nm \leq 0.23 dB/km
8. Macrobend Loss at 5 mm at 1 turn \leq 0.1 dB at 1550 nm and \leq 0.3 dB at 1625 nm
9. Effective Group Index of Refraction (N_{eff}) at 1310 nm 1.4670
10. Effective Group Index of Refraction (N_{eff}) at 1550 nm 1.4677
11. Fatigue Resistance Parameter (N_d) 20
12. Dispersion Wavelength (λ_0): 1550 nm $\leq \lambda_0 \leq$ 18.0 ps/(nm*km)
13. Dispersion Wavelength (λ_0): 1625 nm $\leq \lambda_0 \leq$ 23.0 ps/(nm*km)
14. Polarization Mode Dispersion Value: \leq 0.06 ps/(nm²*km)

Testing of Fiber Optic Cabling shall adhere to the following:

1. Perform continuity testing using a visual fiber tracer, visual fault locator, or OLTS power meter and source. Test with appropriate laser sources to ensure that tests verify performance with that type of source.
2. Perform tests at 850 and 1310 nm for multimode. Perform tests at 1550 and 1625 nm for singlemode. See above section for characteristics requirements to meet or exceed.
3. Test all fiber cable on the reel before installation to ensure continuity and no factory defects.
4. Perform insertion Loss tests.
5. Perform end-to-end loss testing for each fiber termination.

Any cable not passing testing requirements shall be repaired and tested again until it meets or exceeds requirements.

IMPORTANT:

For any new building location, AN OUTSIDE FIBER CONNECTION MUST BE SECURED from SDP's dedicated contracted fiber provider. This includes initial construction costs that shall be included in SDP Capital's construction budget, and must be initiated up to **SIX MONTHS PRIOR** to building opening. Not notifying the fiber provider of new building fiber needs will result in the building not having ANY functional network services, including data, wireless, phone, paging, and security cameras.

C. RACK INSTALLATION GUIDELINES

Contractor shall provide network racks in all telecommunication closets to accommodate fiber and copper patch panels, network backbone and distribution hardware, as well as all necessary power supplies and distribution devices. SDP Tech Services requires a combination of floor-standing and wall-mounted racks as described below. All racks must be a min. of 24" deep.

All network racks, fiber and copper patch panels, and any cable management (if applicable), must be installed following the guidelines listed herein. Any racks, panels, or other miscellaneous

materials **not installed according to this document shall not be accepted** by SDP Tech Services and must be re-installed correctly.

1. For **NEW CONSTRUCTION**, Contractor shall provide the following:

MDF - The MDF shall have a minimum of one (1) primary 84" tall four-post floor standing rack, and one (1) secondary 25" high wall mounted rack installed. All racks must be a minimum of 24" deep, and maintain the required 36" of clear space in front of each rack.

A. Primary Rack in MDF:

- a. Patch panels in the Primary four-post floor standing rack shall be installed top down, in the following order:
 - i. Outside Plant Fiber Optic Panel at the top
 - ii. Fiber Optic Panels to IDFs, computer labs, and external buildings such as annexes, trailers, field houses, etc.
 - iii. 24-port 1U Copper UTP patch panel for copper Legacy Tie Cable connections
 - iv. 48-port 2U Copper UTP patch panels for WiFi Connections
 - v. 2U free space for each installed 48-port WiFi Patch Panel
 - vi. 48-port 2U Copper UTP patch panels for data and voice connections
- b. The total number of patch panels, both fiber and copper, including the Outside Plant Fiber Optic panel, **shall not exceed 18U**.
- c. All patch panels MUST be labeled as specified in this document.
- d. Below the patch panels, SDP Tech Services shall install network hardware. For every 48-port copper UTP patch panel, installers shall leave an additional 2U of open space below panel section to accommodate said hardware.
 - i. For example, if there are seven (7) copper UTP 48-port patch panels at the top, installers shall leave 14U of open space in the hardware section of the rack.
- e. Additionally, below the open hardware space, installers shall leave an additional 12U of open space to accommodate installation of network backbone equipment, power supplies, power distribution hardware, and possible expansion.

B. Secondary Rack in MDF:

- a. Patch panels in the secondary rack shall be installed from the top down.
- b. A maximum of four (4) 48-port patch panels shall be installed in a wall mounted rack, leaving enough free space below to accommodate installation of network hardware, power distribution hardware, and future expansion.
- c. In the event that the drop count exceeds the (4) 48-port panel limit in a wall mounted rack, a second floor standing rack must be installed alongside the primary data rack (in lieu of a wall mounted rack). All racks must be a minimum of 24" deep, and maintain the required 36" of clear space in front of each rack.

IDFs - The size and quantity of data racks installed in each IDF shall be determined by the number of network connections needed in the areas serviced by that closet. Wherever possible, each IDF shall have at least one (1) 84" high floor standing rack installed. All racks must be a minimum of 24" deep, and maintain the required 36" of clear space in front of each rack.

- A. IDF Floor Standing Rack:
- a. Patch panels in the Primary floor standing rack shall be installed top down, in the following order:
 - i. Fiber Optic Panel from MDF at the top
 - ii. Fiber Optic Panels to computer labs
 - iii. 24-port 1U Copper UTP patch panel for copper Legacy Tie Cable connections
 - iv. 48-Port 2U Copper UTP Patch Panels for Wifi connections
 - v. 2U free space for each installed 48-port WiFi Patch Panel
 - vi. Additional 4U free space for expansion
 - vii. 48-Port 2U Copper UTP Patch Panels for Data connections
 - viii. 2U free space for each installed 48-port Data Patch Panel
 - ix. 4U free space for power distribution devices
 - b. All patch panels **MUST** be labeled as specified in this document.

B. IDF Wall Mounted Racks:

In the event that a floor standing rack will not properly fit in an IDF closet, multiple wall mounted racks may be installed instead.

- a. This solution can accommodate a **maximum** of 192 drops per rack.
- b. Patch panels in the wall mounted racks shall be installed from the top down.
- c. A maximum of four (4) 48-port patch panels shall be installed in each wall mounted rack, leaving enough free space below to accommodate installation of network hardware, power distribution hardware, and future expansion. All racks must be a minimum of 24" deep, and maintain the required 36" of clear space.

2. For **RENOVATIONS**, it is expected that all new wiring shall be retrofit into the school's existing closets. As many of SDP's existing school buildings were built, renovated, and then further modernized at varying points throughout the last century, it is expected that the state of each network closet within these buildings shall vary greatly.

It is the Architect and Engineer's responsibility to determine within existing school:

1. How much space is available in each patch panel for additional drops
2. How much space is available in each rack for additional patch panels (if needed)
3. How much space is available in each closet for additional racks (if needed)

The verification of this information MUST be done before the completion of design, as it will affect the layout and quantity of new network connections.

All new cabling shall be grouped in kind, as designated in the descriptions above. New copper and fiber cabling may be terminated on respective existing panels, provided that all installation complies with manufacturer recommendations and applicable industry standards. All new terminations shall be installed in a neat, logical, and sequential fashion, and comply with all labeling guidelines in this document.

If existing network hardware must be lowered to accommodate new patch panels in the existing patch panel section of the rack, Contractor shall notify SDP Tech Services prior to construction. SDP Tech Services shall be responsible for all network hardware installation and changes.

Under no circumstances shall Contractor remove any network switches, network backbone equipment, power supplies, or power distribution hardware.

If the existing closet space is too limited to accommodate the proposed new network connections, an entirely new IDF closet must be created, and shall follow the guidelines for IDF Design above as well as New Construction in this section.

D. LABELING GUIDELINES

All copper and fiber network cabling shall be labeled on both ends - at the classroom/ workstation termination end, as well as the network closet patch panel termination end. All labels shall be comprised of a sequential numbering scheme that meets TIA/EIA-606 requirements, and shall include room location numbers as described herein.

All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or type written onto adhesive labels, with legible block characters that are at least one-eighth inch (1/8") in height. The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the width of the tape shall not exceed 3/8".

CLASSROOM/ WORKSTATION TERMINATIONS

1. All copper cable terminations on the classroom/ workstation side shall be labeled in logical order with the respective network closet number, room location number, drop type, and drop number. The numbering and abbreviation scheme shall be as follows:

CLOSET# - ROOM# - TYPE INITIAL - DROP#

- a. For example, in room 205 there may be 8 Data drops which all terminate in IDF3. Those drops shall be labeled in sequential order as such:
 - i. "IDF3-205-D1"
 - ii. "IDF3-205-D2"
 - iii. "IDF3-205-D3", etc...
 - b. If data drops are grouped together on a multi-port faceplate, and label space on each faceplate is limited, the network closet label may be shown once per group, provided that all drops in that group run to the same closet. Using the example above, if the 8 data drops in room 205 are grouped into (2) 4-port faceplates, they shall be labeled as such:
 - i. Faceplate 1 label: "IDF3"
 1. Data drop 1: "205-D1"
 2. Data drop 2: "205-D2"
 3. Data drop 3: "205-D3"
 4. Data drop 4: "205-D4"
 - ii. Faceplate 2 label: "IDF3"
 1. Data drop 5: "205-D5"
 2. Data drop 6: "205-D6", etc...
2. Type initials shall be designated as follows:
 - a. Data: "D"
 - b. Wireless: "W"
 - c. Speaker: "S"
 - d. Alarm: "A"

- e. Voice: Any voice cabling shall not be differentiated from any data cabling, and shall be grouped in with the “D” designation for Data.
3. Room initials for non-numbered locations shall be as follows:
 - a. Auditorium: “AUD”
 - b. Cafeteria: “CAF”
 - c. Gym: “GYM”
 - d. Library: “IMC”
 - e. Hallway: “HALL”
 - f. Main Office: “MO”
 - g. Any other locations not listed here which do not have a numerical room designation shall be abbreviated logically.
 4. Other classroom/workstation side labeling examples are as follows:
 - a. 2 WiFi drops at the ceiling of classroom 104, which run back to the MDF:
 - i. “MDF-104-W1”
 - ii. “MDF-104-W2”
 - b. 8 speakers in the Cafeteria, which run back to IDF2:
 - i. “IDF2-CAF-S1”
 - ii. “IDF2-CAF-S2”, etc...
 - c. 4 phones in the Main Office, which run back to IDF1:
 - i. “IDF1-MO-D1”
 - ii. “IDF1-MO-D2”, etc...

NETWORK CLOSET TERMINATIONS

1. All cable terminations on the network closet side shall be terminated on patch panels and grouped together by type, as described in the Rack Installation section above.
 - a. **All patch panels shall be labeled by drop type** in order as follows:
 - i. “OUTSIDE FIBER” (if applicable - only in MDF)
 - ii. “FIBER”
 - iii. “LEGACY TIE CABLES”
 - iv. “WIRELESS”
 - v. “DATA” (Data includes all: network data, voice, speaker, alarm, and headend controller drops.)
 - b. All copper cable terminations on those patch panels shall be labeled in logical order with the respective room location number, drop type, and drop number. The numbering and abbreviation scheme shall be as follows:

ROOM# - TYPE INITIAL - DROP#

2. For example, all non-Wireless copper cabling from classroom 201 and classroom 202, including 4 data drops each, 1 wall phone each, and 1 speaker each, shall be terminated on the DATA patch panel. Those drops shall be labeled sequentially as such:
 - a. “201-D1”, “201-D2”, “201-D3”, “201-D4”, “201-D5”, “201-S1”, “202-D1”, “202-D2”, “202-D3”, “202-D4”, “202-D5”, “202-S1”
3. Additionally, in that same example, the Wireless Access Point cabling from both classrooms 201 and 202 shall be terminated in the WIRELESS patch panel in that same closet, and labeled sequentially as such:
 - a. “201-W1”, “201-W2”, “202-W1”, “202-W2”

FIBER TERMINATIONS

1. Optical fiber cable segments shall be labeled at each end with the respective closet or classroom/lab identifier, as well as the cable type, as follows:

ROOM# - TYPE INITIAL

- a. For example, a 24 strand, OM3, 50 μ Multimode fiber cable between the MDF and IDF1 shall be labeled as follows:
 - i. In the MDF: "IDF1-MM"
 - ii. In IDF1: "MDF-MM"
 - b. For example, a 12 strand, OM3, 50 μ Multimode fiber cable between the MDF and a computer lab in room# 305 shall be labeled as follows:
 - i. In the MDF: "Lab 305-MM"
 - ii. In the computer lab: "MDF-MM"
 - c. For example, a 24 strand Singlemode fiber cable between the MDF and the Annex shall be labeled as follows:
 - i. In the MDF: "Annex-SM"
 - ii. In the Annex: "MDF-SM"
2. Additional fiber cable labeling shall include Warning Tags:
 - a. At each location where the fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain the warning: "CAUTION FIBER OPTIC CABLE." The text shall be permanent, black, block characters, and at least 3/16" high.
 - b. A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not more than five (5) feet. Any section of exposed cable which is less than five (5) feet in length shall have at least one warning tag affixed to it.

Any additional labeling questions not addressed in this document shall be sent to SDP Tech Services for further clarification.

5. GENERAL INSTALLATION PROVISIONS

All IT infrastructure installation shall adhere to the following:

1. Where fiber or copper cable enters an MDF or IDF it shall be supported on horizontal or vertical cable support structures.
2. All fiber and copper cable in exposed areas shall be installed in conduit (Panduit or equivalent) or EMT as determined by installation location. Acceptable conduit types shall match existing sites as closely as possible. While many sites have existing conduit, Contractor should assume existing conduit is or will be full at time of installation, and thus should assume that new conduit will need to be installed where required.
 - a. Copper cabling may be run outside of conduits and above T-Bar suspended ceilings only when between the cable tray and the conduit wall stub-up, as per current electrical building code.

7. If any Fiber Innerduct is required for non-armored fiber cable, the following innerduct installation guidelines shall apply:
 - a. All fiber innerduct shall be installed in accordance with manufacturer's instructions and industry standards.
 - b. Innerduct shall be riser rated, pre-lubricated, ribbed, 1-1/4" optical fiber Innerduct with all necessary accessories. Use plenum rated Innerduct only where required.
 - c. From the MDF to each IDF, segments of optical fiber innerduct shall be installed and surface supported in chases and in dropped ceilings (if applicable) in the existing building.
 - d. Innerduct runs do not have to be continuous throughout - breaks are expected at the pull boxes/pulling points - although couplings shall be installed to keep Innerduct as continuous as possible for each run. Contractor is responsible for determination of actual lengths of innerduct required.
 - e. Enough innerduct shall be provided and installed to extend from the fiber service loop in the MDF to the fiber service loop in each IDF or classroom/lab. If the route passes through a pull box, the segments of innerduct shall extend twelve inches into the pull box.
 - f. If the route passes through an enroute IDF, each segment of innerduct shall extend at least twelve inches beyond the end of the service conduit.
 - g. DO NOT exceed manufacturers bend radius of the innerduct. Care shall be taken to avoid kinking the innerduct or applying excessive tension during the installation process.
 - h. At termination locations innerduct shall extend from the end of conduit to four (4) feet above the floor and shall be affixed to the backboard/wall by means of clamps designed for that purpose.

6. GENERAL WORK GUIDELINES

1. Contractor shall provide installation materials and equipment for all necessary components, whether directly mentioned in this document or not, to install cabling components to create or complete a functional Structured Cabling System (SCS) in accordance with all applicable standards, as well as the guidelines contained in this document.
2. Installation materials and equipment shall be of high quality, and be installed with products that are approved/ recommended by the original manufacturer for such use. These include but are not limited to all cabling (optical fiber and UTP copper) and where required: innerduct, interconnect/ patching equipment (fiber and copper), racks, cabinets, cable trays, cable runway, fire stops, core bores, sleeves, supports (vertical and horizontal), cable management, connectors (fiber and copper), fan-out kits, wiring blocks, telecommunications outlets, and any other equipment required to support the physical SCS.
3. Material quantities are not given. Contractor shall provide appropriate quantities of all materials.
4. Contractor shall provide labor and any incidental material required for a neat, quality, and standards compliant installation. All installers must be authorized/ trained/ certified for the installation of all cable products being installed.
5. Contractor must certify the SCS and provide the manufacturer's warranty on the SCS before the District will accept the installation, including all as-builts and all test reports for the new fiber and copper connections.

7. APPLICABLE STANDARDS

All work shall comply with the following standards:

1. All current TIA/EIA Telecommunications Cabling standards and guidelines related to installation, testing and termination of Singlemode and Multimode fiber.
2. All current TIA/EIA Telecommunications Cabling standards and guidelines related to installation, testing and termination of UTP CAT6 and CAT6A.
3. BICSI – Information Transport Systems Installation Manual current edition.
4. BICSI – Data Centre Design Manual current edition.
5. BICSI – Network Design Reference Manual, latest edition.
6. NFPA-70-NEC Compliance: Comply with NEC requirements as applicable to construction, installation and color coding of both power type wires/cables and control/signal transmission media.
7. Products shall be UL-listed and labeled meeting or exceeding:
 - a. UL Standards 83, "Thermoplastic - Insulated Wires and Cables"
 - b. UL 486A-486B, "Wire Connectors"
 - c. UL 2043, "Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces"
8. ASTM compliance with applicable requirements of D-2219 and D-2220. Provide copper conductors with conductivity of not less than 98% at 20°C (68°F).
9. FCC compliance with U.S. Federal Communications Commission Class 8 standard for allowable radiation from network equipment and wiring.
10. Most current NECA (National Electrical Contractors Association) Standards of Installation.
11. Electrical Code Compliance: Comply with all current applicable local and code requirements of the authority having jurisdiction.

8. CONTACT INFORMATION

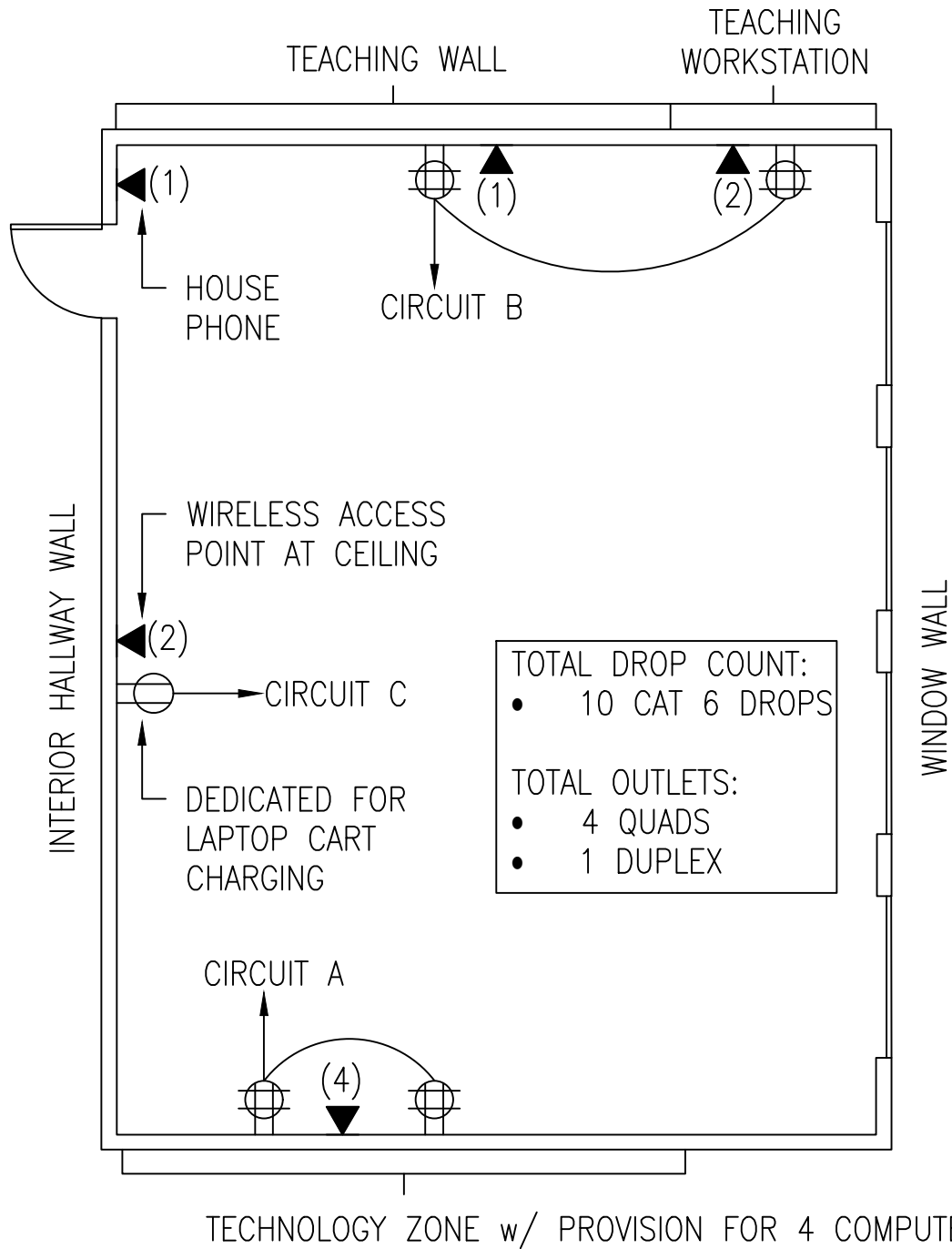
SDP Technology Services: it-infrastructure@philasd.org

9. APPENDIX

Refer to the following pages for additional detailed information, including:

1. Typical Classroom Layout diagram
2. Specifications for Wireless AP Enclosure
3. Metal Faceplates for Wall-Mounted Phones
4. Ceiling and Box Speaker Specifications

THE SCHOOL DISTRICT OF PHILADELPHIA – 2019
 STANDARD TECHNOLOGY REQUIREMENTS & CLASSROOM INFRASTRUCTURE LAYOUT



KEY:

	<p>TAMPER RESISTANT DUPLEX ELECTRICAL OUTLET</p>	<p>NOTES:</p>
	<p>TAMPER PROOF QUAD ELECTRICAL OUTLET</p>	<p>1. DRAWING NOT TO SCALE</p>
	<p>AMOUNT OF CAT 6 DATA CABLE DROPS</p>	<p>2. INDIVIDUAL CLASSROOMS WILL VARY BY SHAPE AND LOCATION OF WINDOWS AND DOORS. COUNTS AND TYPES OF INFRASTRUCTURE TO REMAIN THE SAME.</p>

SPECIFICATIONS FOR ACCESS POINT MOUNTING ENCLOSURE

Each wireless access point and associated antenna(s) must fit and securely mount within the District's standard wireless access point enclosure – the nVent Hoffman Model #. AB811-A12106CHSCFG is an RF-transparent fiberglass enclosure containing a solid front hinged access door with key lock, and approximate exterior dimensions of 12 x 10 x 6 inches. Each enclosure contains four (4) internal screw mounts on the inside rear panel to accommodate a mounting bracket or other fabricated mounting solution for the access point hardware. Please refer to Figure 1 of the modified nVent Hoffman Model # AB811-A12106CHSCFG enclosure used throughout all District facilities.

To assist with heat dissipation and airflow, each nVent Hoffman enclosure has been modified by the District to include six (6) plastic vented plugs – Heyco® 2559 Louvered Plugs Black, oriented as three (3) vent plugs on opposing sides of the enclosure.

SPECIFICATIONS FOR ACCESS POINT MOUNTING ENCLOSURE

1. Each AP enclosure box will be mounted vertically, lock side up, on the designated wall. Maximum installation height will be 13' from top of box to the floor.



Figure 1. Front view



M10LW4SP 1-port Single Gang Stainless Steel Telephone Faceplate, 4.00 in lug spacing

Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Portfolio	CommScope®
Product Type	Faceplate kit

General Specifications

Application	Used with M Series modular information outlet
Mounting	Flush
Total Ports, quantity	1

Dimensions

Height	115.824 mm 4.56 in
Width	71.374 mm 2.81 in
Depth	7.366 mm 0.29 in

Material Specifications

Material Type	Stainless steel
----------------------	-----------------

Environmental Specifications

Safety Standard	UL
------------------------	----

Packaging and Weights

Packaging quantity	1
---------------------------	---

Regulatory Compliance/Certifications

Agency	Classification
---------------	-----------------------

760100891 | M10LW4SP

CHINA-ROHS

Below maximum concentration value

ISO 9001:2015

Designed, manufactured and/or distributed under this quality management system

REACH-SVHC

Compliant as per SVHC revision on www.commscope.com/ProductCompliance

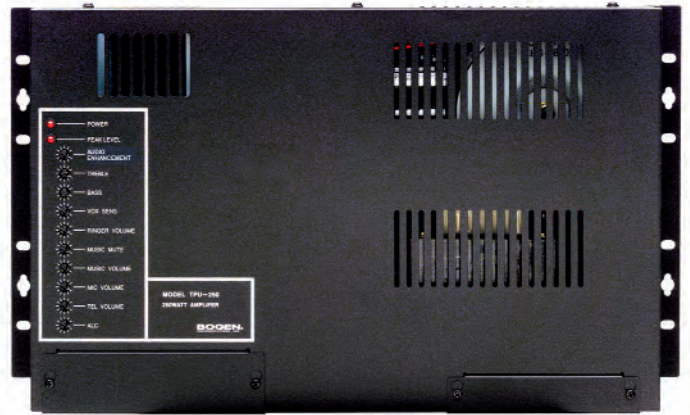
ROHS

Compliant



Telephone Paging Amplifiers

Models
TPU35B, TPU60B,
TPU100B, & TPU250



TPU250 pictured

Description Bogen models TPU35B, TPU60B, TPU100B, and TPU250 are wall-mounted telephone paging amplifiers rated at 35, 60, 100, and 250 watts, respectively. All models can also be rack-mounted*. These TPU amplifiers permit paging from telephone and/or microphone; music input through an RCA jack or screw terminals; and voice-activated, variable level, music mute with fade back after page. These TPU amps include a night ringer which sends an electronic ringing tone signal through all speakers, alerting personnel of incoming calls. Jacks are also provided to bridge two TPU amplifiers to double the number of inputs and output power.

* B-Models require accessory kit.

- Features**
- 35, 60, 100, and 250-watt models
 - Inputs for 600-ohm balanced telephone line, Lo-Z balanced microphone, and background music
 - Music input (RCA jack or screw terminals)
 - Integral automatic level control (ALC) circuit for controlling pages made by persons with varying voice levels and paging techniques
 - Page from telephone and/or microphone
 - Signal-activated paging channel automatically mutes background music
 - Adjustable background music muting level during a page
 - Music gradually returns to its normal level after a page
 - Audio Enhancement circuit increases intelligibility, improves perceived loudness (with no increase in power), and reduces listener fatigue
 - Separate controls for page volume, music volume, night ringer, music mute, and Audio Enhancement
 - Bass and treble controls
 - Built-in night ringer activated by contact closure or by 90V ring signal
 - Balanced or unbalanced 16-ohm, 25V, 25V CT, and 70V outputs are available for the TPU35B/60B/100B models; 25V and 70V outputs are available on the TPU250
 - VOX sensitivity level control eliminates accidental transmission of background noise from a paging telephone
 - Thermal and electronic overload protection
 - Jacks provided for bridging additional TPU amplifiers
 - Brackets are attached to each model for easy wall mounting; the TPU250 can also be rack-mounted with included brackets; TPU-B models can be rack-mounted with RPK82 mounting kit (sold separately)
 - Peak level indicator lights when amplifier is driven into clipping
 - 120V AC, 60 Hz power source
 - Listed to UL Standard 60065 for U.S. & Canada

BOGEN

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Part No. 54-7836-02E 1101

Technical Specifications

Power Output:	<i>TPU35B</i> : 35W RMS; <i>TPU60B</i> : 60W RMS; <i>TPU100B</i> : 100W RMS; <i>TPU250</i> : 250W RMS
Frequency Response:	70 Hz to 15k Hz ± 1 dB
Distortion:	Less than 1%
Hum & Noise:	(20 Hz to 20 kHz) <i>MUSIC</i> : -70 dB; <i>TEL</i> : -70 dB; <i>MIC</i> : -55 dB
Sensitivity:	<i>MUSIC</i> : 85mV; <i>TEL</i> : -20 dBm (77mV); <i>MIC</i> : 600 μ V
Tone Control:	<i>BASS</i> : ± 9 dB @ 100 Hz; <i>TREBLE</i> : ± 9 dB @ 10 kHz
Regulation:	2 dB
Inputs:	<i>TEL</i> : 600-ohm balanced line, transformer-isolated <i>MUSIC</i> : Hi-Z source, RCA jacks or screw terminals <i>MIC</i> : Lo-Z balanced, screw terminal connection (dynamic only) <i>MUSIC MUTE</i> : Mutes music when shorted <i>CONTACT RING</i> : Sounds night ringer tone when customer-supplied dry contacts are closed <i>TEL RING</i> : Sounds night ringer in response to 90V ring signal <i>BRIDGING</i> : Permits bridging of two amplifiers
Outputs:	25V, 25VCT, and 70V, 16 ohms balanced or unbalanced for 35/60/100-watt models; 25V and 70V for TPU250. Provision for WMT1A line-matching transformer
Controls & Indicators:	POWER & PEAK LEVEL LED indicators. ENHANCE, TREBLE, BASS, VOX SENS, RINGER VOLUME, MUSIC MUTE, MUSIC VOLUME, MIC VOLUME, TEL VOLUME, ALC controls (screwdriver-adjustable)
Overload Protection:	All models have thermal and electronic overload protection. <i>TPU35B</i> : 1.0A, 120V AC circuit breaker; <i>TPU60B</i> : 1.6A, 120V AC circuit breaker; <i>TPU100B</i> : 2.5A, 120V AC circuit breaker; <i>TPU250</i> : 6.0A slow blo fuse, 120V AC circuit breaker
Power Requirements:	(120V AC, 60 Hz) <i>TPU35B</i> : 0.75A; <i>TPU60B</i> : 1.5A; <i>TPU100B</i> : 2A; <i>TPU250</i> : 5A
Thermal Emissions (Full Power):	<i>TPU35B</i> : 166.3 BTU/hr.; <i>TPU60B</i> : 211.7 BTU/hr.; <i>TPU100B</i> : 396.2 BTU/hr.; <i>TPU250</i> : 853.8 BTU/hr.
Finish:	Black with silver lettering
Dimensions:	<i>TPU35/60/100B models</i> : 14-1/4" W x 8-3/8" H x 3-5/8" D <i>TPU250</i> : 19" W x 10-1/2" H x 3-7/8" D
Product Weight:	<i>TPU35B</i> : 12 lb.; <i>TPU60B</i> : 15 lb.; <i>TPU100B</i> : 18 lb.; <i>TPU250</i> : 28 lb.

Architect and Engineer Specifications

The telephone paging amplifier shall be a Bogen Model ____, with a full power rating of ____ watts. (Specify: TPU35B/35 watts, TPU60B/60 watts, TPU100B/100 watts, TPU250/250 watts.) The amplifier shall provide a frequency response of ± 1 dB from 70Hz to 15kHz, and shall deliver rated power at less than 1% distortion.

The amplifier shall permit paging from telephone and/or microphone. The signal-activated paging channel shall automatically mute background music during a telephone page, eliminating the need for manual activation of switches and the use of external relays. Provision shall be included to set to mute the level of background music during a page. Music level shall be returned to its normal level after a page.

The telephone paging channel shall have a VOX sensitivity adjustment to eliminate transmission of background noise, and automatic output leveling (ALC) to compensate for varying voice levels and paging techniques of persons using the system.

An Audio Enhancement circuit shall be included to regenerate the harmonics lost during the amplification process and improve intelligibility. A control shall be provided to set the level of this effect.

A night ringer shall be included to alert personnel of incoming calls. The night ringer shall be activated by a contact closure or by 90-volt ring signal from the telephone line.

Input terminals shall be furnished for a telephone line and Lo-Z balanced microphone. A choice of RCA jack or screw terminals shall be provided for the music source.

Terminals shall also be provided to control music muting, typically during a mic page, and for contact closure or ring signal activation of the night ringer. Bridging jacks shall be provided to bridge two TPU-series amplifiers.

Balanced or unbalanced outputs shall be provided for 16-ohm, 25V, 25VCT, and 70V speaker lines (for TPU250, 25V and 70V only). Provision shall be included to drive a 600-ohm telephone line, using an accessory line-matching transformer (Model WMT1A).

Individual controls shall be provided to set the telephone and mic page volume, music volume, night ringer volume, VOX sensitivity, and music mute level. Bass and treble controls shall permit tonal adjustments. An automatic level control (ALC) and VOX sensitivity control shall be included. A peak level indicator shall illuminate when the amplifier is driven into clipping. A power indicator shall also be provided. The amplifier shall operate from a 120V AC, 60Hz source, and shall be equipped with a resettable circuit breaker and thermal and electronic overload protection (TPU250 has a 6A slow-blo fuse).

Installation shall be facilitated by flanges with keyhole slots for mounting on a suitable backboard. Dimensions for the 35, 60, and 100 models shall be 14-1/4" W x 8-3/8" H x 3-5/8" D. Dimensions for the TPU250 shall be 19" W x 10-1/2" H x 3-7/8" D.

The amplifier shall carry the necessary safety agency listings for both U.S. and Canada.

BOGEN
COMMUNICATIONS, INC.

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201-934-8500 • Fax: 201-934-9832

www.bogen.com



Zone Paging System

PCM2000



Features

- One zone to 99 zones of simultaneous high-power and low-power paging
- Up to 32 paging zone groups
- Universal analog telephone interface designed for direct connection to loop start and ground start trunks, to PBX or KEY paging ports which supply DTMF capability, and to analog T/R lines
- Modular integration assures reconfiguring and expansion with minimum time and expense
- Optional talkback paging and time-triggered signaling events with PCMTBM module
- Field programmable using DTMF and switches
- Signaling features include night ringer zone group, emergency/shift change zone group, code call zone group
- Emergency All-Facility Override Paging
- Background music assigned per zone; Local Background music sourcing capability
- Relay drivers and AUX contacts included
- Allows total system amplifier power of up to 250W
- Mounting Kit for 2 to 6 modules available as an accessory (RPK84)
- Mounting Kit for up to 10 modules available as an accessory (RPK88)

Technical Specifications

Registered under Part 68 of FCC Rules

Ringer Equivalence:	1.0B
Operating Voltage:	12V DC
Operating Current (max.):	1.5A (9-zone system)
Audio Power Capability:	250W
Operating Temperature:	25 to 100°F
Operating Humidity:	0 to 90% non-condensing
Dimensions (single module):	1-1/2" W x 7-1/2" H x 4-1/4" D
Shipping Weight (each module):	Approximately 1-2 lb.



Specifications subject to change without notice.

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54-7833-03E 1701

Description

The Bogen **PCM2000** is a modular telephone zone paging and control system. By integrating unique, multi-function modules, the PCM2000 offers both incredible flexibility and capability for future expansion.

The Bogen PCM2000 Zone Paging System is designed for direct connection to loop start and ground start trunks, to PBX or KEY paging ports which supply DTMF capability, and to analog T/R lines. The unit allows total system amplifier power of up to 250W.

The PCM2000 is a fully-integrated zone paging and signaling system with an extensive list of features:

- Simultaneous high- & low-power paging
- Zone and zone group paging (32 paging zone groups, each with up to 99 zones)
- Talkback capabilities (requires PCMTBM module)
- Background music assigned per zone
- Local BGM sourcing capability
- Night ringer zone group
- Emergency zone group with choice of built-in tones or outside tone source
- Emergency all-facility page override
- Eight daily time-triggered signaling events (requires PCMTBM module)
- Pattern & echo code calling
- Daily master clock synchronization
- Relay driver per zone
- Auxiliary contacts

The PCM2000 allows for the design of a system that is specifically tailored to the requirements of the facility owner. The basic system supports up to three paging zones and consists of only three modules:

PCMCPU – Central processor

PCMTIM – Telephone interface

PCMZPM – Zone module (3 zones)

The **PCMCPU** module includes a set of DIP switches to set the system ID, a Program/Run switch that allows system programming, a Power jack for 12V DC power, and audio connections for central amplifier, low-power BGM, high-power BGM, emergency/shift change trigger, and auxiliary trigger.

The **PCMTIM** telephone interface module incorporates a universal interface so that connection to any telephone system is rapid and trouble-free. The module connects to the telephone system via a standard RJ11 plug and port type is selected simply by using slide switches. All other connections are made to built-in terminal blocks.

Setup is also easy. Zone group programming, selection of all signaling functions, and all other parameters are set by simply dialing in with a touch-tone telephone.

The telephone interface module is equipped with three RJ11 jacks for Override, Page Port/Trunk, and 90V Night Ring/Station. The Night Ringer feature can be activated from 90V ring signal or contact closure. The Page Port/Trunk jack can be used to program the system locally and provides 48V talk battery. The Override feature permits all-zone override paging from a dedicated telephone, trunk, or microphone (with suitable pre-amp).

The **PCMZPM** zone paging module can operate high-power or low-power paging to self-amplified paging systems (only one type per PCMZPM module). For high-power paging, a single amplifier can be used for paging and supplying background music (when not paging). Background music can also be continuously supplied to all zones not being paged with the addition of a second amplifier. For low-power operation, background music is always supplied to zones not being paged. Each module can also be disconnected from the background music bus and connected to a local background music source.

Two additional zone modules can be added to the basic system to increase capacity to 9 zones. When more than 9 zones are required, a central processor module with power supply and up to 3 zone modules can be assembled as a satellite system. Ten additional 9-zone satellite systems can be installed to bring total capacity to 99 zones.

A talkback module (PCMTBM) can also be added to the system to provide hands-free talkback capability. Only one talkback module is required regardless of the number of zones or satellite systems on the PCM2000 system.

Relay driver outputs are provided for each zone. Two C-form contact sets are also provided to control the activation of accessory equipment.

DTMF Programmable Features:

- | | | |
|--|--|--|
| <ul style="list-style-type: none">• Privacy Beep• Pre-announce Tone• Confirmation Tone• Emergency Override Tone• All-Call• Dialing Timeout• Trunk Disconnect | <ul style="list-style-type: none">• 1 Amp BGM• Default Timer• VOX Timer• Zone Groups• Emergency/Shift Change | <ul style="list-style-type: none">• Night Ring• Code Call• Clock Set• Clock Sync.• Time Trigger 1-8• Reset Default• Setup Tone |
|--|--|--|

Modules Required For Zone Paging Applications:

		Total Number of Zones in System										
		3	6	9	12	15	18	21	24	27	More Than 27 Zones	99 Zones
PCMTIM		← 1 Module Required For Each Total System →										
PCMCPU*		1			2			3			1 PCMCPU for every 9 Zones	11
PCMZPM		1	2	3	4	5	6	7	8	9	1 PCMZPM for every 3 Zones	33
PCMTBM		← 1 Module Required For Each Total System (optional module for talkback or time tone options) →										

*Note: One PCMPS2 Power Supply (not included) is required for each PCMCPU Module.

Architect & Engineer Specifications

The zone paging system shall be the Bogen PCM2000 Zone Paging System, designed for direct connection to loop start and ground start trunks, to PBX or KEY paging ports which supply DTMF capability, and to analog T/R lines. The unit shall allow total system amplifier power of up to 250W.

The unit shall include flanges with keyhole slots for wall-mounted installation. Operation shall require a 12V (1.5A) DC power supply. A suitable power supply shall be provided (PCMPS2 power supply).

The system shall consist of the appropriate modules as specified and shall be registered under Part 68 of FCC rules.

Modules

All modules shall be designed for wall-mount installation. All modules shall be equipped with a ribbon cable and connector and power cable with connector to permit them to be interconnected to each other. The face plates of each module shall be finished in black, with each control/connector clearly labeled in white. Each face plate shall have knockouts to facilitate cable and wire dressing. All connections shall be made using a small regular screwdriver or common jacks (RJ11 or RCA).

The following modules shall be available:

PCMTIM - Telephone Interface Module. One PCMTIM module shall be provided per PCM2000 system. The module shall provide for telephone interface selection via slide switches. It shall include a volume control for tone and BGM source, and RJ11 jacks for Override, Page Port/Trunk, and 90V Night Ring/Station inputs. A connector block, using screw terminal connections, shall be provided for BGM source, and two (2) C-form relay contact sets. A power-on LED indicator shall be provided to indicate power-applied status.

PCMCPU - Central Processing Module. One PCMCPU module shall be provided for the first nine (9) zones in the system. One PCMCPU module shall be needed for each satellite system.

The module shall provide for satellite system identification via built-in DIP switches. It shall include a locking program/run selector switch (with program LED), satellite data link RCA jack, and 12V DC power source jack. A connector block, using screw terminal connections, shall be provided for paging amplification connection, low-power and high-power BGM connections, emergency/shift change signal activation, AUX contact closure, and 12V DC power source connection. A power-on LED indicator shall be provided to indicate power-applied status.

PCMZPM - Zone Paging Module. One PCMZPM module shall be provided for each three (3) paging zones in the system. Up to three (3) PCMZPM modules may be connected to the master system, for a total zone capacity of 9 zones. Up to three (3) additional PCMZPM modules may be connected with a PCM-CPU module to form a satellite system to further increase zone capacity.

The PCMZPM module shall provide built-in DIP switches to set talkback on/off for each zone. It shall include a power-on LED, low-power background music volume control, background music out/in jumper field, local BGM selection jumpers, and high-power/low-power operation selector switch. A connector block, using screw terminal connections, shall be included to connect local background music, zone wiring, and relay driver outputs.

PCMTBM - Talkback Module. One PCMTBM talkback module shall be provided per system (including any satellite systems). The module shall provide for talkback operation in centrally-amplified zones (only). The module shall provide a power-on LED, talkback volume control, and talkback switching delay control. A connector block, using screw terminal connectors shall be included for paging amplification wiring.

Architect & Engineer Specifications, cont.

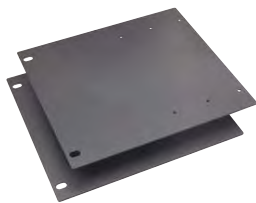
The PCM Zone Paging System shall supply the following features and functions:

1. Simultaneous high-power and low-power paging. Total system high-power audio capacity of 250W.
2. A minimum of three paging zones and maximum zone capacity of ninety-nine (99) paging zones. The system shall be expandable in groups of three zones.
3. Up to 32 field-programmable paging zone groups, each consisting of 1 to 99 zones.
4. Field-programmable Night Ringer Zone Group, consisting of from 1 to 99 zones. This feature shall be activated by high-voltage ring signal or contact closure.
5. Field-programmable Emergency/Shift Change Zone Group, consisting of from 1 to 99 zones. This feature shall require activation by a customer-supplied contact closure, and sound a user-selected tone. The user shall have the choice of no tone (allowing use of outside tone source), tone burst (1-7 sec. duration, user-selected), single chime, or quad beep.
6. Emergency All-Facility Page Override. This feature shall be activated through a loop start trunk or through contact closure and dry audio input. It shall override the normal paging features of the system, sound a user-defeatable alert tone in all zones, and open an audio channel for a voice page.
7. Built-in, talkback amplification of central-amplified zones. This feature shall require the addition of the PCMTBM module.
8. Background music assigned per zone and local background music sourcing capability.
9. Field programmable Code Call Zone Group, consisting of from 1 to 99 zones. The user shall have the choice of pattern or echo code calls, and repeat functions.
10. Eight daily time-triggered signaling events. This feature requires the use of the PCMTBM module.
11. Two (2) C-form relay contact sets for activating external equipment. The contacts shall change state when the unit is activated.
12. Capability of providing uninterrupted background music to all zones not being paged.
13. Non-volatile RAM shall be included to allow for retention of programming information during power interruptions
14. Screwdriver-adjustable volume control of confirmation, pre-announce, error, and shift change/emergency-call tones.

Mounting Accessories

RPK84 Rack Mount Kit

- Holds up to 6 Modules in one assembly
- Fits in a standard rack, 4 rack spaces high



RPK88 Rack Mount Kit

- Flush mounts up to 10 Modules in two assemblies
- Fits in a standard rack, 6 rack spaces high
- Includes wiring saddles and knockouts for wire management



BOGEN
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www.bogen.com

Ceiling Speaker Grille Assemblies



S86T725PG8WBR



S86T725PG8WVK

Description

Bogen's Ceiling Speaker Assemblies consist of an 8" Cone Speaker (S86 or S810) pre-assembled onto a 13" steel ceiling grille painted with off-white (PG8W) or bright white (PG8U) enamel. Options for these assemblies are recessed volume control (VR), volume control with knob (VK), and rear-mounted screw terminal strip for power taps (BR).

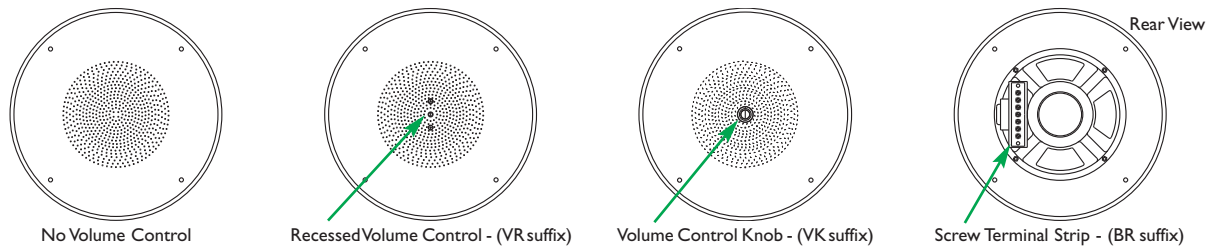
Features

- 4-watt capacity
- 8" cone speaker for excellent audio quality
- 6 different power taps available (4, 2, 1, 1/2, 1/4, 1/8W)
- T725 4-watt transformer
- Off-white enamel over steel grille ("W" versions)
- Bright white enamel over steel grille ("U" versions)
- Pre-assembled for faster installation
- Works with both 70V and 25V amplifier outputs
- Available with volume control – recessed or with knob (VR and VK models only)
- Screw terminals (BR models only)
- 6 oz. or 10 oz. magnet weights

Technical Specifications

Model	Power Taps (in Watts)	Frequency Response	Sensitivity (4 ft./1W)	Magnet Weight	No Volume Control	Recessed Volume Control (VR)	Volume Control w/Knob (VK)	Screw Terminals (BR)	Off-White (W)	Bright White (U)	Shipping Weight (6/Carton)	Dimensions			
S86T725PG8W	4, 2, 1, 1/2, 1/4, 1/8 @ 25 & 70V	50 Hz-12 kHz	95 dBspl	6 oz.	●				●		27 lb. / carton	13" Dia x 3-1/4" D			
S86T725PG8WVR						●				●					
S86T725PG8WVK							●			●					
S86T725PG8WBR									●		●		●	28 lb. / carton	
S86T725PG8WBRVR									●		●		●		
S86T725PG8WBRVK										●	●		●		
S86T725PG8U									●					●	27 lb. / carton
S86T725PG8UVR										●				●	
S86T725PG8UVK											●			●	
S86T725PG8UBR									●				●	●	28 lb. / carton
S86T725PG8UBRVR										●			●	●	
S86T725PG8UBRVK											●		●	●	
S810T725PG8W		70 Hz-15 kHz	96 dBspl	10 oz.	●				●		30 lb. / carton				
S810T725PG8WVR						●			●						
S810T725PG8WVK							●			●					
S810T725PG8U								●				●			
S810T725PG8UVR									●			●			
S810T725PG8UVK										●		●			

Ceiling Speaker Assembly Variations



No Volume Control

Recessed Volume Control - (VR suffix)

Volume Control Knob - (VK suffix)

Screw Terminal Strip - (BR suffix)

Architect and Engineer Specifications

S86T725PG8W & Variations The loudspeaker assembly shall be a Bogen model **S86T725PG8W** (or **S86T725PG8WVR**, **S86T725PG8WVK**, **S86T725PG8WBR**, **S86T725PG8WBRVR**, or **S86T725PG8WBRVK**), or equivalent, 8" cone-type loudspeaker, having a frequency response of at least 50 Hz to 12 kHz. Axial sensitivity shall be 95 dB, measured at 1-watt/4 feet. The loudspeaker shall have a 6 oz. ceramic magnet and a 3/4" voice coil. A transformer, capable of matching an 8-ohm loudspeaker to a 25-volt or 70-volt line, and providing power taps of 4, 2, 1, 1/2, 1/4, and 1/8 watts shall be included. The loudspeaker shall be assembled on a 13" steel ceiling grille, finished in off-white semi-gloss enamel. Assembly depth shall be 3-1/4". (For **S86T725PG8WVR** add) A recessed volume control shall be included.

(For **S86T725PG8WVK** add) A volume control knob shall be accessible from the front of the grille.

(For **S86T725PG8WBR** add) A terminal strip shall be included for connection of the audio line.

(For **S86T725PG8WBRVR** add) A terminal strip shall be included for connection of the audio line. A recessed volume control shall be included.

(For **S86T725PG8WBRVK** add) A terminal strip shall be included for connection of the audio line. A volume control knob shall be accessible from the front of the grille.

S86T725PG8U & Variations The loudspeaker assembly shall be a Bogen model **S86T725PG8U** (or **S86T725PG8UVR**, **S86T725PG8UVK**, **S86T725PG8UBR**, **S86T725PG8UBRVR**, or **S86T725PG8UBRVK**), or equivalent, 8" cone-type loudspeaker, having a frequency response of at least 50 Hz to 12 kHz. Axial sensitivity shall be 95 dB, measured at 1-watt/4 feet. The loudspeaker shall have a 6 oz. ceramic magnet and a 3/4" voice coil. A transformer, capable of matching an 8-ohm loudspeaker to a 25-volt or 70-volt line, and providing power taps of 4, 2, 1, 1/2, 1/4, and 1/8 watts shall be included. The loudspeaker shall be assembled on a 13" steel ceiling grille, finished in bright white semi-gloss enamel. Assembly depth shall be 3-1/4".

(For **S86T725PG8UVR** add) A recessed volume control shall be included.

(For **S86T725PG8UVK** add) A volume control knob shall be accessible from the front of the grille.

(For **S86T725PG8UBR** add) A terminal strip shall be included for connection of the audio line.

(For **S86T725PG8UBRVR** add) A terminal strip shall be included for connection of the audio line. A recessed volume control shall be included.

(For **S86T725PG8UBRVK** add) A terminal strip shall be included for connection of the audio line. A volume control knob shall be accessible from the front of the grille.

S810T725PG8W & Variations The loudspeaker shall be a Bogen model **S810T725PG8W** (or **S810T725PG8WVR**, or **S810T725PG8WVK**), or equivalent, 8" cone-type loudspeaker, having a frequency response of at least 70 Hz to 15 kHz. Axial sensitivity shall be 96 dB, measured at 1-watt/4 feet. The loudspeaker shall have a 10 oz. ceramic magnet and a 1" voice coil. A transformer, capable of matching an 8-ohm loudspeaker to a 25-volt or 70-volt line, and providing power taps of 4, 2, 1, 1/2, 1/4, and 1/8 watts shall be included. The loudspeaker shall be assembled on a 13" steel ceiling grille, finished in off-white semi-gloss enamel. Assembly depth shall be 3-1/4".

(For **S810T725PG8WVR** add) A recessed volume control shall be included.

(For **S810T725PG8WVK** add) A volume control knob shall be accessible from the front of the grille.

S810T725PG8U & Variations The loudspeaker shall be a Bogen model **S810T725PG8U** (or **S810T725PG8UVR**, or **S810T725PG8UVK**), or equivalent, 8" cone-type loudspeaker, having a frequency response of at least 70 Hz to 15 kHz. Axial sensitivity shall be 96 dB, measured at 1-watt/4 feet. The loudspeaker shall have a 10 oz. ceramic magnet and a 1" voice coil. A transformer, capable of matching an 8-ohm loudspeaker to a 25-volt or 70-volt line, and providing power taps of 4, 2, 1, 1/2, 1/4, and 1/8 watts shall be included. The loudspeaker shall be assembled on a 13" steel ceiling grille, finished in bright white semi-gloss enamel. Assembly depth shall be 3-1/4".

(For **S810T725PG8UVR** add) A recessed volume control shall be included.

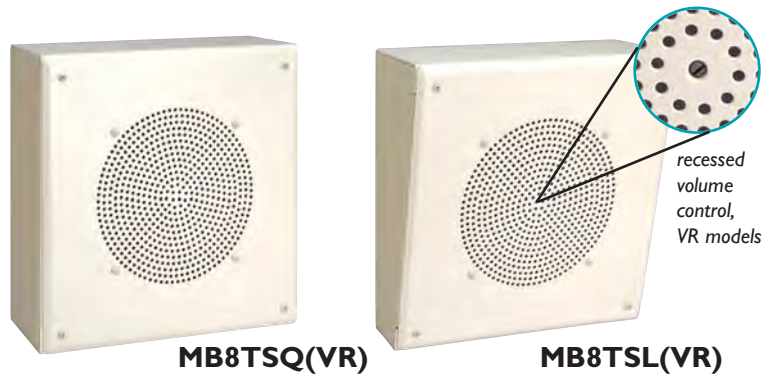
(For **S810T725PG8UVK** add) A volume control knob shall be accessible from the front of the grille.

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Metal Box Speakers

Models **MB8TSQ**, **MB8TSL**, **MB8TSQVR**, and **MB8TSLVR**



Description

Bogen's MB8TSQ and MB8TSL speakers feature an all-steel surface-mounted enclosure with an 8" cone loudspeaker and multi-tap 4-watt 70V/25V transformer. The MB8TSQ speakers are suitable for ceiling or wall mounting. The MB8TSL speakers are designed primarily for wall mounting, with front face angled downward by 12.5 degrees. Models with VR suffix have a recessed volume control at the center of the grille (see inset).

Features

- Rugged all-steel surface-mounted enclosure
- Full range 8" cone speaker for excellent intelligibility
- Compatible with 25V or 70V amplifier systems
- Multiple taps at 4, 2, 1, 1/2, 1/4, 1/8 watts
- 4-Watt maximum output power
- Mounting hardware included (toggle bolts, wood screws and wire crimps)
- Knockouts for Wiremold®
- VR Models feature recessed volume control at the center of front speaker grille

Technical Specifications

Cone Diameter:	8" (paper)
Magnet Weight:	6 oz.
Power Rating (max.):	4 Watts
Transformer Power Taps:	4, 2, 1, 1/2, 1/4, 1/8 Watts
Constant Voltage Amp Type:	70V or 25V
Frequency Response:	110 Hz -15 kHz
Sensitivity (min.):	96 dBspl (1W @ 1m on axis)
Dispersion (min.):	100°
Product Weight:	9 lb.
Enclosure Size:	MB8TSQ(VR) - 11-5/8" W X 11-5/8" H X 4-1/4" D; MB8TSL(VR) - Top: 11-5/8" W X 11-5/8" H X 5-3/8"; - Bottom: 11-5/8" W X 11-5/8" H X 3-1/8" D
Construction:	Painted steel enclosure

Architect & Engineer Specifications

The speaker shall be a Bogen Model _____ (specify MB8TSQ, MB8TSQVR, MB8TSL, or MB8TSLVR). The unit shall include an 8" paper cone speaker with 6 oz. magnet. The frequency response shall be 110 Hz to 15 kHz. Dispersion angle shall be no less than 100°. Sensitivity, measured 1 watt @ 1 meter on axis, shall be a minimum of 96 dBspl.

The unit shall incorporate a transformer with tap selection wires corresponding to power settings of 4, 2, 1, 1/2, 1/4, and 1/8 watts for both 70V and 25V constant voltage speaker systems.

Models with VR suffix shall feature a recessed volume control centered in the front speaker grille.

The speaker enclosure shall be full steel construction and allow for surface mounting. The enclosure shall be painted off-white and measure ____ [specify 11-5/8" W X 11-5/8" H X 4-1/4" D for MB8TSQ(VR) or 11-5/8" W X 11-5/8" H X 5-3/8" D (top) and 11-5/8" W X 11-5/8" H X 3-1/8" D (bottom) for MB8TSL(VR)]. The speaker enclosure shall also provide Wiremold® knockouts.

Front face of models MB8TSL(VR) shall be angled by 12.5 degrees downward. Product weight shall be 9 lb.

Specifications subject to change without notice.
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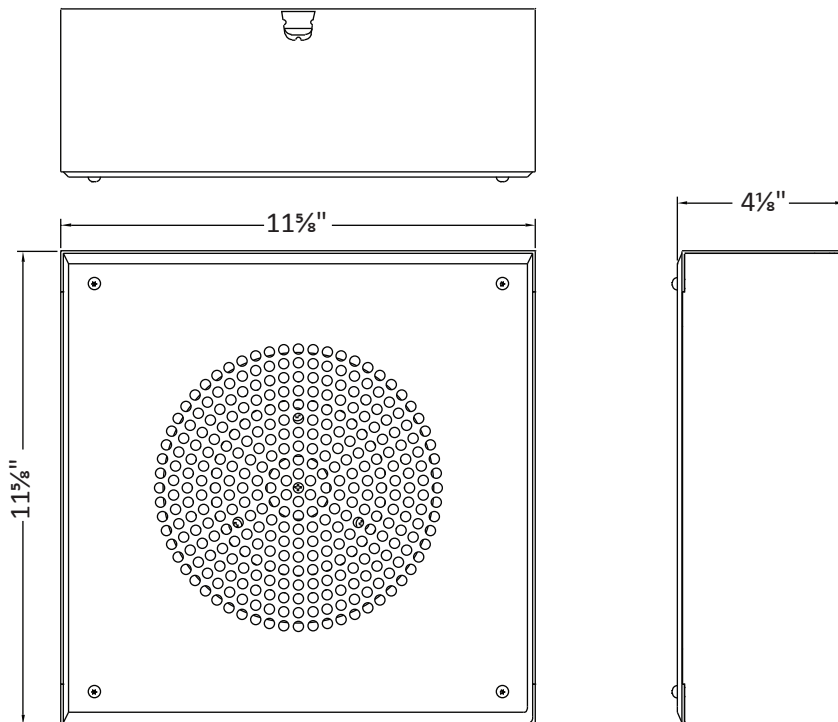
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Quam SYSTEM 6VPS

The SYSTEM 6VPS is a complete, vandal resistant horn assembly featuring a double re-entrant, compression horn with an integrated 16W, 25/70V, multi-tap transformer that is mounted on a vandal resistant, stainless steel baffle. It also includes a square, heavy gauge stainless steel, surface mount enclosure with four (4) threaded inserts for baffle attachment, a single 1/2" conduit entrance and a Wiremold entrance on the top and bottom. Tamper resistant, 8-32 x 1", 'pin-in-torx' screws are included. It has a high durability, white, powder coat finish.



APPLICATION	Intended Use: Program Material: Installation:	Indoor or protected outdoor environment Signal tones, and voice Vertical or horizontal surface mount
AUDIO PERFORMANCE	Average Sensitivity: Loudspeaker Power Rating: Calculated Output: Magnet Type & Weight: Frequency Response: Nominal Coverage Angle: Audio Connection:	110dB SPL, 1W/1M 16W RMS, EIA 426A Standard 121dB SPL, 16W/1M BeFe Ceramic, 5 oz. Nominal 350Hz - 10kHz, EIA 426A Standard 90° Included Angle, -6dB/2kHz, Half Space 7", Color-coded, Pre-tinned Leads
COMPONENT	Dimensions: Weight: Loudspeaker Model: Loudspeaker Specs: Transformer: Baffle: Enclosure: Finish: Other:	11 5/8" (H) x 11 5/8" (W) x 4 1/8" (D) 12 lbs. H16 Double re-entrant horn 16W, 25/70V, with 5 taps (1W, 2W, 4W, 8W, 16W) BS8VPS: square, stainless steel SE1WVPS, stainless steel White powder coat finish Tamper resistant, 8-32x1" 'pin-in-torx' hardware included



Reentrant Horn Loudspeakers

Models SPT15A and SP158A



Description

The Bogen SPT15A and SP158A are compact, high intelligibility, reentrant type loudspeakers, designed for one-way or two-way sound and communication systems. Their sturdy, weatherproof, all-metal construction is ideal for indoor and outdoor use in industrial plants, warehouses, schools, construction sites, transportation terminals, and recreational areas.

The Model SPT15A has a built-in, rotary impedance selector switch for matching the speaker power requirements to a 25V or 70V constant-voltage line. The model SP158A has an 8-ohm impedance only.

Features

- High intelligibility and efficiency; ideal for both one-way and talk back applications
- Weatherproof, all-metal construction
- 15 watts; 25/70 volt (SPT15A) or 8-ohm (SP158A) operation
- Tap settings for 70V: 15, 7.5, 3.8, 1.8, 0.9 watts; for 25V: 15, 7.5, 1.8, 0.94, 0.46 watts
- Rotary tap impedance selector on SPT15A
- Tilt and swivel base for easy positioning
- Screw terminals make installation fast and easy
- All-purpose mounting bracket
- Self-aligning, field replaceable diaphragm
- Mocha enamel finish
- Limited lifetime warranty
- Mountable to I-beam flange using Bogen's BC1 Beam Clamp (sold separately)
- Mountable to electrical box using Bogen's HSES10 mounting strap (sold separately)
- Terminal Cover (TCSPT1) allows connection of conduit fittings to horn speakers (sold separately)

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Technical Specifications

Power Rating (RMS): 15 watts continuous, 20 watts equalized

Frequency Response: 275 Hz to 14 kHz

Impedance:

SPT15A — 25/70 volts

SP158A — 8 ohms

Sound Pressure Level: 121 dB @ four feet on axis with 15 watt input @ 1000 Hz

Dispersion: 110°

Sensitivity as Microphone: -22 dBm [Ref: 10 dynes/cm²]

Dimensions: 9" Diameter x 9-1/4" D

Product Weight:

SPT15A — 4 lb.

SP158A — 3 lb.

Finish: Textured mocha enamel

Impedance Selector Switch Settings (SPT15A only): 25V @ 15, 7.5, 1.8, 0.94, 0.46 watts
70V @ 15, 7.5, 3.8, 1.8, 0.9 watts

Sound Pressure Level in dB @ 1000Hz:	Watts	Feet on Axis				
		4	8	16	32	64
Input:						
15		121	115	109	103	97
7.5		118	112	106	100	94
3.8		115	109	103	97	91
1.8		112	106	100	94	88
0.9		109	103	97	91	85
0.46		106	100	94	88	82

Architect and Engineer Specifications

The loudspeaker shall be a Bogen Model ____ (specify SPT15A or SP158A), or approved equal, reentrant type horn loudspeaker. The frequency response shall be 275 Hz to 14 kHz. Rated power output shall be 15 watts, RMS continuous. Dispersion shall be 110°. Sound pressure level, measured four feet on axis with 15 watt input @ 1000 Hz, shall be at least 121 dB.

Use for SPT15A. The unit shall incorporate a seven-position weather-sealed switch, to allow matching the loudspeaker to a 25V or 70V constant-voltage line. Power handling capacity shall be adjustable at 70V to 0.9, 1.8, 3.8, 7.5, or 15 watts, and at 25V to 0.46, 0.94, 1.8, 7.5, or 15 watts.

Use for SP158A. The unit shall have an impedance of 8 ohms.

The loudspeaker shall be of weatherproof, all-metal construction, with driver enclosed within a weatherproof housing. The loudspeaker shall include a self-aligning, field-replaceable diaphragm.

Screw terminals shall be provided for connection to the audio line. A plastic cover shall be provided to protect the connectors and impedance selector switch, and provide strain relief for the audio line.

An all-purpose mounting bracket shall provide precise positioning in the vertical and horizontal planes with a single adjustment. The bracket shall include banding slots to permit mounting the loudspeaker on beams or pillars. Bracket and loudspeaker shall be finished in textured mocha enamel. The unit shall measure 9" diameter by 9-1/4" D. Product weight shall be _____ (insert 4 lb. for SPT15A, 3 lb. for SP158A).

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School District of Philadelphia - SAFETY TECHNOLOGY STANDARDS

PART 1 – General

1.1 SUMMARY

- A. The following specifications are intended for the installation of Safety Technology including Video Surveillance Systems, Intrusion Alarms and Video Intercoms. They are intended to provide a set of instructions and materials needed to install a system in primarily new and renovated facilities, within parameters set by industry standards and by the SDP Office of School Safety
- B. Installer Qualifications: An experienced installer with a minimum of five (5) years experience in the installation of the specified systems or devices of similar type, size, and scope.
- C. Manufacturer's Representative: Systems shall be provided and commissioned by the authorized Manufacturer's Local Representative. This representative shall provide documentation that the organization is factory certified on the system. This organization shall maintain a qualified technical staff to program and service the system.
- D. Design and operation of the system shall conform to the following referenced codes, regulations, and standards as applicable:
 - 1. National Fire Protection Association – NFPA-70 National Electrical Code (NEC)
 - 2. Underwriters Laboratory - UL 294, UL864, UL 1950, UL 1076 and UL 60950.
 - 3. Federal Communications Commission - Part 15
 - 4. NEMA - Section 250 (Enclosures for Electrical Equipment)
 - 5. International Organization for Standardization – ISO 9001
 - 6. Interference-Causing Equipment Standards – ICES-003
 - 7. International Electrotechnical Commission – IEC product Safety Standards
 - 8. All applicable Federal, State, and Local laws, regulations, and codes.

1.2 SAFETY AND ENVIRONMENTAL STANDARDS

- A. All work requires Safety & Health analysis during the design phase. This may include:
 - a. Furnishing the Office of Environmental Safety (OEMS) with completed contract drawings
 - b. Performing walk-throughs of the physical spaces where work is to occur with an OEMS representative.
- B. All work, including but not limited to drilling into walls, floors and the disturbance of any paint requires prior written approval from OEMS.
- C. Safety concerns or hazards identified by OEMS will require remediation as outlined by the same office prior to the commencement or resuming of work.
- D. Areas that are identified as containing Asbestos require the usage of a HEPA vacuum to complete the work in addition to any other precautions or remediations outlined by OEMS as a result of their assessment.
- E. Special permits may be needed for hazardous work recognized to require additional controls (eg. OSHA's confined space standard, 29 CFR 1910.146).
- F. Supervisors, foremen, OEMS representatives or other safety coordinators have authority to

stop work due to imminent danger to workers, equipment and property and to ensure unsafe conditions are corrected before work can resume.

Part 2 - CCTV Systems - General

2.1 SUMMARY

- A. The following are components of a Digital Video Surveillance Closed Circuit Television (CCTV) System including all wiring, cables, raceways, terminal cabinets, pull boxes, outlet and mounting boxes, cameras, digital video recorders, UPS's, patch panel, power supplies, mounting hardware, testing, and all other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described.
 - a. At the start of the project the Office of School Safety will determine what equipment will be purchased by the School District and what will be purchased by the contractor. Such items include, but may not be limited to, the following:
 1. IP Cameras and housings
 2. Camera licenses. Licences should last a minimum of three years.
 3. Camera arms and mounts
 4. Power over Ethernet (PoE) switches
 5. Rack-mounted UPS units
 6. Servers and System software
 7. Network Video Recorders
 8. System workstations
 9. Remote viewing monitors
 - b. The Contractor shall furnish and install all other equipment and accessories required for a complete and operable surveillance system, including, but not limited to:
 1. Back boxes
 2. Conduit and raceways
 3. Pull boxes, junction boxes, and outlet boxes
 4. System cabling
 5. Ethernet and PoE Extenders
 6. Network Switches
 7. Patch panels
 8. Headend equipment rack
 9. 120 VAC and 208/240 VAC power and receptacles

2.2 MANUFACTURERS

- A. See subparagraphs below for list of Preferred Manufacturers for each specific type of item or equipment.
- B. The Office of School Safety will not require that specific equipment manufacturers be used during installation, however all cameras must have ONVIF compatibility and adhere to the 2019 National Defense Authorization Act (NDAA) & sanctions, and all equipment must meet the Office of School Safety's quality standards.
- C. All equipment must be approved by the Office of School Safety prior to installation.
- D. The equipment to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:
 - a. The supplier shall furnish evidence that the proposed or alternate system performance is equal or superior to the system operation stated in the specification.
 - b. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written, and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided.

- c. The acceptability of any alternate proposed system shall be the sole decision of the SDP Office of School Safety.

Part 3 - CCTV Systems - Design

3.1 CABLES, WIRES, AND MISCELLANEOUS ACCESSORIES

- A. Conduit must be installed in all visible and accessible areas. Armored cable is required in areas above ceilings and in pipe chases.
- B. Wiring must consist of cat 6/6a for POE cameras
- C. One 220V 30A dedicated circuit (L6-30P outlet) & one standard 120V 20A dedicated circuit outlet is to be installed to power the head end equipment.
- D. All cameras are to be landed directly back to the head end or to a dedicated POE switch that has been designated for CCTV use only, then landed back to the head end.
- E. Provide sufficient quantities of unshielded twisted pair (UTP) cable rated for low voltage camera power, and control systems required for a complete and fully functional system.
- F. Provide all necessary parts and accessories, including but not limited to adapters and connectors, required to guarantee a complete and fully functional closed circuit video surveillance system within this facility.
- G. Category 6 UTP Copper Cable:
 - a. Comply with NFPA 70, NEMA WC 63.1, ANSI/ICEA S-80-576 and performance characteristics in ANSI/TIA/EIA-568-B.
 - b. UTP (unshielded twisted pair), 100 ohm. Provide four each individually twisted pair, 24 AWG conductors, NFPA 70 CMG rated, with a blue PVC jacket. NFPA 70 type CMP or CMR may be substituted for type CMG. Individual pairs shall be constructed to contain a minimum two twists per foot per each pair. Overall diameter of four pair cable shall not exceed 0.25 inches (6.32 mm). Ultimate breaking strength shall be minimum 90 pounds (40.82 kg). Four pair cable shall withstand a bend radius of one inch (25.4 mm) minimum at a temperature of minus 20 degrees C maximum without jacket or insulation cracking. Conductors shall be color coded and polarized in accordance with ANSI/TIA/EIA-568-B. Jacket sequentially marked at two-foot intervals. Shall conform to Category 6 requirements and be 1000BASE-T compliant.
 - c. Acceptable Manufacturers:
 - i. Belden.
 - ii. CommScope.
 - iii. General Cable.
 - iv. Hubbell Premise Wiring.
 - v. HCM (Hitachi Cable Manchester, NH)
 - vi. Or Approved Equal.
- H. Connectors for UTP Cable:
 - a. Connectors shall comply with FCC Part 68.5, and ANSI/EIA/TIA-568-B. UTP outlet/connectors shall be UL 1863 listed, non-keyed, 4-pair, constructed of high impact rated thermoplastic housing and shall comply with Category 6 requirements and be 1000BASE-T compliant. Connectors shall be terminated using a 110-style PC board connector, color-coded for both T568A and T568B wiring. Each jack shall be wired T568B. UTP connectors shall comply with EIA-455-21A for 500 mating cycles.
 - b. Acceptable Manufacturers:
 - i. The Siemon Company.
 - ii. Hubbell Premise Wiring.
 - iii. Cooper B-Line
 - iv. Or Approved Equal.
- I. Patch Panels for UTP Copper Cabling Systems:
 - a. Panels shall be constructed of 0.09 inch (2.2 mm) minimum aluminum and shall be compatible with an EIA 19 inches (480 mm) equipment rack.

- b. Panel shall be equipped with the indicated quantity of non-keyed, RJ-45 ports, wired to T568B. Patch panels shall terminate the building cabling on 110-style insulation displacement connectors and shall utilize a printed circuit board interface color-coded for both T568A and T568B wiring. Panels shall have each port factory numbered and be equipped with laminated plastic nameplates above each port.
 - c. The rear of each panel shall have incoming cable strain-relief and routing guides and shall accommodate top, bottom or side cable entry.
 - d. Panel shall conform to performance requirements of ANSI/TIA/EIA-568-B for Category 6 and be 1000BASE-T compliant.
 - e. Acceptable Manufacturers:
 - i. The Siemon Company.
 - ii. Hubbell Premise Wiring.
 - iii. Cooper B-Line
 - iv. Or Approved Equal.
- J. Patch Cords for UTP Copper Cabling Systems:
- a. Factory assembled and tested, constructed with stranded wire, equipped with 8-pin modular connectors and strain relief boots, and conforming to Category 6 requirements and being 1000BASE-T compliant.
 - b. Furnish patch cords in quantities and length(s) as required for interconnections between patch panel ports and CCTV network switches.

3.2 ETHERNET AND POE EXTENDERS

- A. Where CAT6 cable lengths exceed 300 ft between camera locations and headend equipment, Contractor shall furnish and install PoE Extenders as needed and they shall be located in technology closets throughout the building.
- B. Cable runs believed to require extenders should be indicated on the CCTV One-Line Diagram on the Contract Drawings; additional extenders may be required, however, due to actual installed lengths of cable runs, which may vary from design assumptions due to field conditions, routing determined by Contractor, etc.
- C. Contractor shall confirm all cable lengths and provide cable extenders where and as required, regardless of quantity indicated on the drawings.
- D. Extenders shall be an environmentally-hardened solution allowing for UTP cable infrastructure to transmit data from IP cameras, along with power (PoE) to operate these networked devices, over an extended distance.
- E. Extenders shall allow for distances of up to 1900 ft via standard Category 6/6a copper cabling and support 10/100 Base-T and Power over Ethernet (PoE) protocols.
- F. Each "cable extender" consists of a pair of devices, one installed at the camera end of the cable, and the other at the headend. Connections shall be via standard RJ45 connectors.
- G. The devices shall operate via PoE obtained from the connected CAT6 cable; a separate power supply shall not be required.
- H. Operating temperature range shall be from minus 40 degrees C to plus 75 degrees C.
- I. Install cable extenders within appropriately-rated NEMA enclosures, for protection of the devices.
- J. Acceptable Manufacturers:
 - a. NiTek USA, "EtherStretch" EL1500U (Basis of Design)
 - b. Or Approved Equal.

3.3 CAMERA SPECS AND PLACEMENT

- A. Interior Cameras are to be placed so as to capture all hallways, stairwells, exit doors and administrative spaces. Currently cameras are not to be placed in classrooms or other areas occupied by personnel full-time.
- B. Hallway cameras are to be placed every 75 feet. This number is based on a standard minimum resolution of 5 megapixels. Adjustments to these standards are only to be made with the approval of Office of School Safety project representatives.
- C. Exterior Cameras are to be installed at the highest level possible to avoid human reach from the ground.

The height placement will depend on building design but where possible should be placed at a minimum of 15ft.

- D. Exterior Cameras are to be placed so as to capture all exterior spaces with standard minimum resolution 10 megapixel panoramic cameras and 5 megapixel fixed cameras. Adjustments to these standards are only to be made with the approval of the Office of School Safety.
- E. Fixed cameras can be installed to capture one way stretches of space as in hallways or exterior building entryways.
- F. Usage of 180, 360, 270 degree cameras should be used to cover wider areas - eg. 360 cameras to be used where hallways intersect. 270 cameras to be used on exterior building corners and 180 cameras to be used on exterior building walls.
- G. Standard 90 degree IR cameras should be used to cover the following areas:
 - a. Exterior doors
 - b. Labs (entrance)
 - c. Main office (entrance)
 - d. Principal's office (entrance)
- H. IR cameras should never face each other or they will wash each other out. The opposing camera should be a standard non-IR camera.
- I. Camera frame rates should be set to adequately capture content while allowing for apx. 30 days worth of storage on the server. Optimal frame rates can vary by manufacturer. Exterior cameras generally require a higher frame rate than interior cameras. Final framerate settings must be approved by the Office of School Safety during final acceptance testing if not before.
- J. To maximize storage space, interior cameras should be programmed to record on motion detection.
- K. Exterior Cameras should be programmed for continuous 24 hour recording
- L. All cameras must have ONVIF compatibility and adhere to the 2019 National Defense Authorization Act (NDAA) & sanctions, and all equipment must meet the Office of School Safety's quality standards.
- M. All camera placement must be approved by the Office of School Safety during the design phase.

3.4 EQUIPMENT RACKS

- A. Servers, UPS's and headend switches are to be installed in a lockable equipment rack cabinet where possible and all keys given to the SDP Office of School Safety.
- B. Provide a standard 19-inch equipment rack, modular floor or wall mounted type, constructed of 16-gauge steel with black powder coat finish.
- C. Provide each rack with a rack-mounted power strip, equipped with six (6) simplex receptacles and Level 3 surge protection.
- D. Provide racks with required type and number of patch panel(s), as indicated on the drawings; vertical and horizontal cable management channels where needed; top and bottom cable troughs; and grounding lugs.
- E. Acceptable Manufacturers:
 - a. The Siemon Company.
 - b. Hubbell Premise Wiring.
 - c. Cooper B-Line
 - d. Or equivalent approved by the Office of School Safety

3.5 SPACE(S) GUIDELINES

- A. Headend Location
The headend and all related equipment and materials including but not limited to the switch and cable drops are to be installed in a closet reserved for the SDP Office of School Safety that has appropriate air flow and regulated temperatures to maintain the integrity of the equipment.
- B. Cabling for remote monitors shall be installed from servers to a predetermined internal office for live viewing.

Part 4 CCTV Systems - Execution

4.1 GENERAL

- A. Examine areas to receive devices and notify the Project Manager of adverse conditions affecting installation and/or subsequent operation prior to proceeding. Do not begin installation until unacceptable conditions are corrected.
- B. Protect devices from damage during construction. Ensure operating temperature and humidity are within the range accepted and recommended by the manufacturer.

4.2 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.
- B. Installation shall be performed by qualified service personnel.
- C. The contractor shall be responsible for the correct knowledge of all electrical codes and requirements for installation of both high and low voltage wiring.
- D. All electrical and conduit work shall be properly grounded as well as CCTV cabinets and racks with a minimum of #6 AWG copper.
- E. Headend Equipment
 - a. Central server room equipment shall be rack mounted in one lockable wall mounted or floor cabinet furnished by the District if possible and located in a room reserved for security. All equipment shall be protected by grounding to an approved electrical ground. All equipment shall be installed as to be accessible for maintenance and shall be located so as not to interfere with the servicing of other nearby equipment. Fill unused rack space with matching blank panels.
 - b. Server will be installed with the appropriate keyboard/mouse/monitor. The monitor will be a maximum 19" screen to facilitate administration but not monitoring of the system. Deviation from this plan must go through the SDP Office of School Safety prior to installation.
 - c. The interior cameras should be set to record on motion detection
 - d. The exterior cameras should be set to continuous 24 hour recording.
- F. The Monitoring Station will be outfitted with a minimum 38" monitor to facilitate monitoring of multiple camera streams at one time.
- G. All cabling and wiring shall be installed in conduit of required size. Minimum conduit size shall be 3/4-inch.
 - a. Each camera shall be provided with a dedicated Category 6 UTP cable, which is continuous from end to end, without intermediate splice points, and "homerun" back to the CCTV equipment rack location.
 - b. CAT 6 camera cables may share conduits/raceways, where feasible. Contractor shall upsize conduits and raceways accordingly.
- H. Provide PoE Extenders for all CAT6 cable runs that exceed 300 feet from the camera location to termination in the headend equipment rack.
 - a. Install extenders in accordance with manufacturer's instructions.
 - b. Install extenders within appropriately-rated NEMA enclosures, for protection of devices.
- I. Cable Installation in Conduits and Raceways: During installation of cables in conduits and raceways, do not exceed the cable manufacturer's recommended pulling tension. A suitable lubricating medium, harmless to the cable jacket, may be utilized where necessary. No oil or grease substances not specifically manufactured for cable installation will be permitted for such use on this project.
- J. Cable Attachment and Support: Lengths of cables which are not installed in conduits and are run inside equipment rooms shall be secured to CCTV dedicated cable trays or cable ladders using nylon cable ties and attached to walls and backboards using nylon cable clamps or hangers or using a plastic wiring

system such as manufactured by Panduit, or Approved Equal. Cables shall be attached or otherwise supported at intervals not to exceed 18-inches.

- K. Strain Relief: Provide sufficient strain relief (slack) in all cables, cable conductors, and wiring to avoid stress on all cables, wires, and wiring connections.
- L. Bends: Cables shall not be bent to a radius less than ten (10) times the diameter of the cable, or less than the manufacturer's recommended minimum bending radius, during installation or as finally installed.
- M. Continuous Cable Sections: All cable runs shall be continuous, without splices, between cable terminating locations.
- N. Conduit/Cable Entrances to Equipment Rooms: All conduit and cable entrance openings into equipment rooms shall be sealed with a pliable sealing compound after the cable is in place. Sealing compounds for rooms, walls, or other partitions shall be fire retardant per ASTM E 814. Sealing compound shall be used to seal the area around the cable where the cable emerges from the end of a conduit or raceway. All spare conduits shall be sealed or plugged in an approved manner.
- O. Fire retardant pliable sealing compound shall be an intumescent firestop putty, reusable and impenetrable, conforming to ASTM E 814 and UL 1479, Nelson FSP Firestop Putty, or Approved Equal.
- P. Conduit Bushings: At all transition points where a cable runs from inside a conduit into a cable trough; or onto a cable tray or plywood backboard, the end of the conduit shall be fitted with a plastic bushing to prevent abrasive damage to the cable.
- Q. Protection of Cables: Provide appropriate special protection for cables in areas where the cables are unavoidably exposed to hazardous conditions, such as sharp corners on equipment. Cables damaged due to neglect by the Contractor, during installation, shall be replaced by the Contractor, at no additional cost to the School District.
- R. Cable Continuity and Integrity: All cables shall be continuous and without splices between the specified termination locations. Cable termination points shall be located within the CCTV equipment rack and the camera mounting or termination back box, as indicated on the Drawings and/or described in the Specifications.
- S. Cable Shield Continuity and Integrity: The shield of each section of communication cable shall be electrically continuous for the entire cable length.
- T. Cable and Wiring Identification: All cables shall be terminated in standard order, according to the EIA/TIA and ICEA color codes. Individual cables shall be identified at each cable termination with self-adhesive labels. All spare pairs in each cable shall be terminated and identified.
- U. Provide pull boxes as required. Conduit runs shall be restricted to not more than the equivalent of two (2) 90-degree bends without a pull box.
- V. Maintain minimum bending radius of changes in direction as follows:
 - a. Conduits 4" and larger: 10 times conduit diameter.
 - b. 6 times conduit diameter for conduits smaller than 4-inches.
- W. Maintain minimum 6-inch separation of CAT6 cabling and pathways from parallel runs of electrical power wiring, flues, and steam or hot water pipes.
- X. Cabling and pathways with copper media shall be installed in accordance with the following criteria to avoid potential electromagnetic interference between power and telecommunications equipment.
 - a. The interference ceiling shall not exceed 3.0 volts per meter measured over the usable bandwidth of the telecommunications cabling.
 - b. Pathways shall be installed in accordance with the following minimum clearance distances of 4 feet from motors, generators, frequency converters, transformers, or uninterruptible power system; 12

inches from power conduits and cable systems; and 5 inches from fluorescent or high frequency lighting system fixtures.

- Y. Install CAT6 cabling and pathway system as detailed in ANSI/TIA/EIA-568-B and -569-A. Screw terminals shall not be used except where specifically indicated on plans. Use an approved insulation displacement connection (IDC) tool kit for copper cable terminations. Do not untwist Category 6 UTP cables more than one-half inch from the point of termination to maintain cable geometry. Provide a service loop on each end of the cable: 6 ft at the headend equipment rack, and 12 inches at the camera location. Do not exceed manufacturers' cable pull tensions for copper and optical fiber cables. Provide a device to monitor cable pull tensions. Do not exceed 25 pounds (110 N) pull tension for four pair copper cables. Do not chafe or damage outer jacket materials. Use only lubricants approved by cable manufacturer. Do not over cinch cables, or crush cables with staples. For UTP cable bend radii shall not be less than four times the cable diameter.
- Z. Grounding:
 - a. Provide per ANSI/TIE/EIA-607.
 - b. Bond racks, conduits, raceways, etc. in accordance with requirements of ANSI/ TIA/EIA standards, NFPA 70 National Electrical Code, and Section 26 05 26.
 - c. Protect all grounding and bonding conductors from physical damage.
 - d. Individually and properly ground all equipment cabinets, racks, back boxes, etc. and cable shields, wherever the cable leaves the sheath. Grounding shall conform to EIA/TIA-607 and NEC Articles 250 and 800.
- AA. Provide identification and labeling of cables, outlets and equipment per ANSI/TIA/ EIA-606.
 - a. All cables shall be labeled at least at each end of each cable section, using cable tags or labels. Inside plant cables shall be labeled using self-adhesive waterproof labels; outside plant cables shall be labeled using approved waterproof cable tags.
 - b. Proposed Plan
 - i. Each cable shall be labeled with the Rack, Patch Panel, Port Number (i.e. Rack No. 01, Patch Panel No. 03, Port No. 14 would be labeled as 01-03-14).
 - ii. Each Patch Panel port shall be labeled with the Camera Number (per the Camera Schedule utilized on the Contract Drawings) or as otherwise directed by the Office of School Safety.
 - c. A cable labeling table shall be developed based on this project. The table shall be submitted for approval by the Office of School Safety prior to cable installation.
 - d. Cable Tags
 - i. Attach to cable using two nylon cable ties through holes in the tag.
 - ii. Use pre-printed plastic tags marked with a durable, abrasion resistant, waterproof ink.

4.3 FIELD QUALITY CONTROL

- A. Protect all installed items of work throughout construction.
- B. Visually inspect cabling jacket materials for UL or third-party certification markings.
- C. Inspect cabling terminations in equipment rooms and at camera locations to confirm color code for pin assignments, and inspect cabling connections to confirm compliance with ANSI/TIA/EIA-568-B.
- D. Visually confirm Category 6 marking of connectors and patch panels.
- E. Perform testing after cables are terminated, but not cross-connected.

4.4 CLEANING AND TESTING

- A. After wiring and cable terminations are complete, vacuum out interiors of equipment enclosures and wipe enclosures clean of all foreign material.
- B. Perform cabling inspection, verification and performance test in accordance with ANSI/TIA/EIA-568-B.

- C. Verification Tests:
 - a. UTP backbone copper cabling shall be tested for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after terminated but not cross connected. Perform 1MHz to 100MHz scan attenuation test for Category 6 systems installations.
- D. Performance Tests:
 - a. Category 6 Links: Perform UTP permanent link tests in accordance with ANSI/TIA/EIA-568-B. Tests shall include wire map, length, attenuation, NEXT, Power Sum NEXT, ELFEXT, Power Sum ELFEXT, return loss, propagation delay and delay skew. Each and every link shall be tested and shall pass the requirements of ANSI/TIA/EIA-568-B for Category 6.
 - b. Any failing link shall be diagnosed and corrected. The corrective action shall be followed by a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation.
- E. Prior to the acceptance test of the project by the Office of School Safety, the contractor shall inspect, test, and adjust the complete CCTV System.
- F. Test snugness of mounting screws of all installed equipment. Test proper operation of all video system devices. Determine and report all problems to the manufacturer's customer service department.
- G. Demonstrate that the video management system and devices function properly. Demonstrate camera's functionality and video recording capabilities.
- H. The Office of School Safety's acceptance test will only be made after the above inspection, testing and adjusting of the complete CCTV System is performed, and the test report results are turned over to the Office of School Safety for evaluation. The Office of School Safety's test will be the same as the above Contractor's tests. The Contractor shall perform these tests in the presence of the Office of School Safety or the Office of School Safety's representative.

4.5 FIELD ADJUSTMENTS AND TRAINING

- A. Repair or replace, at no cost to the Office of School Safety, any defective devices, equipment or wiring, and again perform any and all testing required to demonstrate that the system is in full compliance with the drawings and specifications.
- B. Make proper adjustments to video system devices for correct operation. Make any adjustment of camera settings, fields of view, etc. to comply with specific customer needs.
- C. Upon the completion of all work and of all tests, the Contractor shall furnish the necessary skilled labor for providing operating instructions of all systems and equipment. The training should be up to four hours and be a documented formalized instruction for the Office of School Safety, detailing the proper operation and maintenance of the installed system.
- D. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.

Part 5 CCTV - Cable and Wire Management

5.1 GENERAL

- A. Where cable can be run above accessible ceilings(or in crawl spaces/attics, and in basements as shown) all video cable shall be supported by Cat. 6 rated J hooks, Cable Tray, conduit, or other District approved means. In no case shall CAT 6 cable ever be tie- wrapped unless such tie-wraps are velcro type(only for use in wire management in IDF's/MDF's) that will ensure that the cable is

- not too tightly cinched.
- B. All CAT. 6 cable shall be supported by J-hooks(CAT. 6 rated only) or other approved means(surface raceway, primarily cable tray in all corridors, conduit, wireway, wire trough) and shall never be supported by any tie-wraps to process pipes or structural steel. Bridle rings are not acceptable for CAT. 6 installation.
 - C. Cabling shall be installed according to the general requirements, as detailed below, and as shown on the drawings or in an attached addendum.
 - a. No more than 50 UTP cable drops per run can be installed in Category 6 two inch "J- hooks" as called out herein (if necessary).
 - b. Fiber Cable, installed in innerduct, shall be installed in cable tray and supported where required only in Category 6 "J-hooks," only 2-1" innerducts per 2" J-hook, or 4-1" per 4" J-hook.
 - c. Station Cable drops from work area outlet will be installed in conduit, Category 6 "J- hooks," from outlet stub up to the cable tray.
 - d. Exposed Innerduct in corridors (NOT IN TRAY ONLY) shall be run as high as possible and be supported by 2" J-hooks every 4 feet max. Innerduct shall be tie-wrapped to the J-hook for securing.
 - e. Use Vertical Wire runway to support any /all risers between floors in closets or accessible locations; in no case shall any cable risers be unsupported.
 - f. Cables entering server room shall be supported with Cable runway as shown on the drawings, from entrance to rack/cabinet location.
 - g. All cabling must be installed on cable management separate from IT (J-hooks, conduit, etc.) and be clearly labeled.
 - h. Wire rod cable tray shall be provided in all corridors with minimum size 12" x 4" deep, with a minimum of at least 6" clear AFC and 12" clear above.

5.2 PRODUCTS AND INSTALLATION

- A. WIRE ROD TYPE CABLE TRAY-INSTALL IN ALL CORRIDORS AND FOR ALL MAIN RUNS OF security CABLE
- B. Description:
 - a. Welded wire mesh cable management system.
- C. Material: Carbon Steel
- D. Finish: Electro-plated Zinc Galvanizing: ASTM B 633, Type III, SC-1
- E. Construction: Cable trays shall be constructed with high strength welded steel wire mesh. Wire rod tray is to have a continuous safety edge wire lip. Wire rod tray sections shall be mechanically connected with ends finished to protect installers and cables.
- F. Inside Width: Products should be available in 6 inch, 8 inch, 12 inch and 24 inch widths. G. Inside Depth: Products should be available in 1- ½ inch, 2 inch and 4 inch depths. 1. Provide cable tray in 4 inch depths unless otherwise noted on the project drawings. H. Tray sections shall be supplied in nominal 10 foot lengths.
- G. Mesh Spacing: 4 inches x 2 inches.
- H. All tray section splices shall use connectors designed for that purpose from the same manufacturer. Connectors must protect cables from sharp edges to prevent damage.
- I. Provide manufacturer's standard clamps, hangers, brackets, splice plates, blind ends, barrier strips, connectors, grounding straps, and all other apparatus is required.
- J. Cable Tray – Wire-rod type:
 - a. GS Metal Flex Tray series
 - b. Triangle Electrical Products. Co.
 - c. Cooper FB – Line Systems

5.3 TROUGH TYPE CABLE RUNWAY

- A. Description: 1 ½ inches Tubular Stringer/Style
- B. Material: Steel
- C. Minimum Loading: 95 pounds/feet with 5 feet support spacing

- D. Finish: Telecom Gray Powder Coat
- E. Construction: Cable Runway shall be constructed with 2 tube stringers 3/8 inch x 1 ½ inches x 1 inch rungs. Rungs shall be mechanically connected to square trunks with ends finished to protect installers and cables.
- F. Width: Cable runway shall be available in 6 inch, 12inch, 18 inch, and 24 inch widths. Provide widths as indicated on the project drawings.
- G. Inside Depth: Provide cable runway without sides unless otherwise indicated on the project drawings.
 - a. If trough type cable runway is indicated, then provide fixed or removable side posts. 2. Side posts shall be a minimum of 5 inches in height, and tall enough to provide support for the dressed cable bundles.[ONLY IF INDICATED ON DRAWINGS]
- H. Straight sections shall be supplied in nominal 10 inch lengths.
- I. Straight Rung Spacing: 9 inches
- J. Provide runway with rounded edges and smooth surfaces.
- K. End caps are to be used at all butt ends of the runway.
- L. All splices shall use connectors designed for that purpose from the same manufacturer. Connectors must protect cables from sharp edges to prevent damage.
- M. Radial drop-out sections and corners are required on each runway section. Vertical drop outs are used at each relay rack or telecommunications cabinet. Horizontal corners are radial to protect the cables from exceeding maximum bend radii.

Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier or divider strips, connectors, grounding straps, and all other apparatus as required.

- N. Runway Manufacturers:
 - a. B-Line (Saunders) – Type SB series
 - b. Chatsworth Products, Inc. – Type 11252 series
 - c. Newton Instrument Company – Type 2003 series
- O. J-HOOKS:
 - a. J-hooks shall be the ERICO CADDY Fastener "Cable Cat J-Hook System" specifically designed for CAT. 6 and Fiber Optic Cables. Provide the 2" diameter hook, Cat. # "CAT 32" or 4" diameter hook, Cat.# " CAT 64" as required between the tray and conduit stub-ups, or in other areas as required; furnish and install hanger brackets/assemblies/hooks as required to support all voice/data/video cable (above accessible ceilings or as indicated on the drawings) at no greater than 48" with no greater than 12" sag between supports. Do not install more than 50 cables per 2" hook or 100 cables per 4" hook. Separation from light fixtures shall be minimum 6" and from power conduits minimum 12," minimum 48" from fan motors/transformers. All wiring in the J-hooks shall be securely clamped using the plenum rated tie-wrap, Part # "CATTRC," number as required.
 - b. Support from conduit stub-ups to the Cable Tray and in other areas to supplement tray system.
- P. SURFACE RACEWAY is not to be used as part of CCTV cable management.

Part 6 CCTV - Acceptance of System

6.1 WORK DESCRIPTION -TYPICAL

- A. Contractor shall provide materials for and install a complete, functional CCTV system in accordance with these guidelines and the related drawings Contractor shall be responsible for providing a complete, functional system including all necessary components, whether included in this guideline document or not. **The Contractor is responsible for the entire installation project: including workmanship, standards of quality, adherence to these guidelines and the design documents, testing, final documentation, labeling, and final warranty and performance of the**

System.

- B. The intended function of the CCTV system is to transmit data signals from a distributed camera network to a centralized server as well as monitoring station. Upon completion of the work outlined in this specification, the system shall be capable of transmitting data signals at a rate of 1000 Mbps minimum over Category 6 cable
- C. The work performed under these guidelines shall be of good quality and performed in a workmanlike manner. In this context "good quality" means the work shall meet industry technical standards and quality of appearance. The Office of School Safety reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds. "Rats Nest" wiring and poor workmanship is not acceptable.

6.2 SUBMITTALS

- A. Submit to the Office of School Safety Project Manager the following information as pertains to completed CCTV system..
 - a. Product Data: Manufacturer's data, user, and installation manuals for all equipment and software programs including computer equipment and other equipment required for complete video management system.
 - b. Shop Drawings: Include system device locations on architectural floor plans; full schematic of system, including wiring information for all devices.
 - c. Provide complete submittals, which shall include schematic wiring drawings and specification sheets for all equipment. Partial submittals will not be accepted.

6.3 OPERATION AND MAINTENANCE DATA

- A. Submit to the Office of School Safety Project Manager the following operation and maintenance information.
 - a. Instruction books and/or leaflets
 - b. Recommended renewal parts list
 - c. Maintenance requirements
 - d. Final as-built drawings
 - e. Complete Wiring diagrams
 - f. Electronic manual, software, and tools

6.4 RECORD DOCUMENTS

- A. The Operation and Maintenance Manual shall include a complete set of equipment, component and device specification and data sheets, and the name and address of the installer. The manual shall be bound in a black three-ring loose leaf binder with dividers and a table of contents. Three (3) duplicate sets are required.
- B. All documents and items described above shall be submitted for approval and turnover prior to the final system testing.

6.5 ACCEPTANCE OF SYSTEM

Total acceptance of the system will only be made after the required tests, complete record document package, and the instruction period have been provided.

6.6 GUARANTEE

The Contractor shall guarantee labor, materials, and equipment provided under this contract against system defects for a period of no less than 2 years after the date of final acceptance of this work by the Office of School Safety.

Part 7 - Alarm Standards

7.1 Alarm Panel:

- A. The standard manufacturer we use is Honeywell. Most of our standard buildings (most older buildings) use the panel model Vista 20P; for smaller buildings that require less zones (Modular buildings, etc...) we use Vista 15P panels, and for larger buildings with individualized zone assignments (High schools, larger new elementary school construction, etc...) we use either Vista 128BP or Vista 256BP.
- B. Any keypads and zone expanders used should be compatible with these panels.

7.2 Devices:

- A. Any manufacturer can be used for motion detectors or contacts can be used, except in the case if the motion detectors have built in individual zone expanders; in which case they should be compatible to communicate across Honeywell polling loops.
- B. Also, any manufacturer for door contacts can be used as well. We have generally moved away from using contacts in newer installations/upgrades, but there are some situations where they may be necessary.

7.3 Alarm Wiring:

- A. We use 18/4 gauge stranded wire to carry loop voltage/device power across the system. Also, It is recommended that shielded 18/4 solid wiring be used for keypad and/or polling loop lines to prevent signal interference.
- B. All wiring above ceiling should be suspended, and all wiring ran below the ceiling should be covered with wire molding or ran in conduit.

7.3 Zone Layout

- A. Zone layout for standard 8 zone installations (Used with our Vista 20P's in the field; should be used for any current system upgrades):
 - a. Zone 1 - Best lock door/first floor
 - b. Zone 2 - Basement
 - c. Zone 3 - Main office complex
 - d. Zones 4 and 5 - Open (can be used for anything)
 - e. Zone 6 - Gym
 - f. Zone 7 - Second floor
 - g. Zone 8 - Third floor
- B. Most larger building installations should use Honeywell Vista 128BP or 256BP panels with zone expansion; this allows for individualized device zoning. This has been the standard for most of new school construction projects.