School District of Osceola County
Technology Standards and Specifications
October 2007

The intent of this document is to assist certified designers such as Professional Engineers and RCDDs in the preparation of telecommunications/technology documents in the appropriate CSI format that will accompany a complete set of Telecommunications drawings for new construction, retrofit, major/minor renovation projects and all other installations under the jurisdiction of the School District of Osceola County (SDOC) facilities. Further, this document is to be utilized, strictly adhered to and considered the standard by which all low voltage telecommunications/technology infrastructure and equipment shall be installed district wide regardless of the application or department supervising and or managing said installations with no exception.

Suggested changes to this document or variances from these standards and specifications must be coordinated for approval through the Technology Services Department (TSD) project manager at (407)870-4037.

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SECTION 17000
DESIGN REQUIREMENTS

Communication technologies are a critical element in the design of virtually all new and renovation building projects. Whether it be voice, data, and video transmission, security and fire alarm systems, audio/visual systems, or other communications technologies, it is important that a team of experienced professionals be involved in the design of these complex systems.

A Structured Cabling Plant (Premise Distribution System) is a key concept in enabling Information Technology for SDOC's community of staff, teacher's and students. In order to maximize network functionality and to minimize labor and material costs, a common set of network codes and standards shall be complied with. To accomplish, this SDOC has adopted a policy in which these codes and standards are managed and administered centrally. SDOC's TSD is charged with this responsibility.

General: Designers shall verify that all applicable portions of these standards and specifications are incorporated into the project's design, drawings, specifications, and final construction. Requests for variances from these standards shall be submitted in writing to SDOC's project manager within the Technology Services Department, using the TSD Variance Request Form found at the end of this document.

It is the responsibility of the Project Engineer and Construction Manager to ensure that any awarded systems contractor meets all applicable requirements defined in this document. The requirements include but are not limited to:

- The awarded communications contractor shall be a certified installer for the solution chosen. Contractor shall provide appropriate proof of current certification.
- The PDS (Premise Distribution System) solution shall be one of the following, Panduit, Ortronics, or Amp/Tyco "ONLY". All cabling and components shall meet the chosen manufacturer's list of approved partners and be certified by the manufacturer for a minimum warranty of 15 years. Documentation to be provided at completion of each project.
- The awarded communications contractor shall have an RCDD assigned as the project manager. Contractor shall provide appropriate proof of current certification.

Telecommunications Projects Eligibility Requirements: All projects designed by a consulting architect/engineer, shall have the telecommunications infrastructure design by a qualified consultant team. Such a team shall include an electrical engineer and an RCDD (Registered Communications Distribution Designer). The Premise Distribution System shall be installed by a qualified communications contractor. This infrastructure shall include all pathways, cabling, terminations, testing, and telecom room construction related to the telecommunications systems. The designer shall provide these services in

accordance with these standards and specifications, and as directed by the School District of Osceola County's Technology Services Department.

School District of Osceola County's Final Provisioning Work for all Projects: For all construction projects for the School District of Osceola County, Construction budgets are required to fund all internal and external telecommunications assets. This includes all wiring, connectivity products, electronics, handsets, etc. Further, the construction budget is required to pay for any additions to outside plant infrastructure that is needed to support the operation of the building. Designers and Contractors shall be required to develop construction schedules that allow adequate time for SDOC TSD to complete this final provisioning work, prior to Substantial Completion and the Owner's occupancy of each part of a project.

Contractors shall be required to cooperate with SDOC TSD personnel and allow them equal access to the jobsite to inspect and complete any work necessary in the completion of the project, concurrent with other work underway by the Contractor. TSD may be contacted by calling (407)870-4037

Codes and Standards: SDOC's communications systems shall follow the codes and standards set forth in the latest ratified version of the following: NEC, NESC, NFPA, ANSI/TIA/EIA Telecommunications Infrastructure Standards, FCC, IEEE and BICSI'S Telecommunications Distribution Methods Manual. These codes and standards are to be used as references when designing telecommunications systems.

The Technology Services Department promotes the use of widely accepted industry standards in deploying the district's telecommunications infrastructure. Employees of the district, consultants and contractors working on behalf of the district should have a working knowledge of these standards prior to performing work for the district and shall follow the district's preferred standards and practices while deploying telecommunications infrastructure. District employees, consultants and contractors should contact TSD for clarification and interpretation of these standards. The following standards are practiced at the School District of Osceola County:

- ANSI/TIA/EIA-568-B.1.2.3 Commercial Building Telecommunications Cabling Standard
- ANSI/TIA/EIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA-606-A Administration Standard for the Telecommunications Infrastructure See Appendix 1 for the current UF Labeling standard based on ANSI/TIA/EIA-606-A
- ANSI/TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications
- ANSI/TIA/EIA-758 Customer-Owned Outside Plant Telecommunications Cabling Standard

These standards can be obtained through BISCI at www.bicsi.com as well as www.tiaonline.org .
These standards are NOT to be used as the final specification or bid document for any specific new construction. It is to be used as a starting point in a process of collaboration between the architect/designer, the occupant, and TSD.

Detailed specific requirements for the particular project at hand will depend on the unique purpose of the space(s) of that project and shall be supplied during the design phase of the space in that collaboration.

The design team shall include the resources needed to fully develop a complete scope of work for all telecommunications, I/T, and audio/visual systems and components (including BICSI or RCDD qualified staff). The design team shall include a Professional Engineer (PE) and Registered Communications Distribution Designer (RCDD).

The architect/engineer shall coordinate with SDOC-TSD to eliminate conflicts with other utilities, landscaping, etc., shall include all such work "by others" in the construction documents, and shall ensure that no gaps exist between the contractors' scope of work and the scope(s) of work "by others." Building interior telecommunication installation must be preformed by a contactor who is qualified by SDOC-TSD. SDOC-TSD maintains a list of pre-qualified Low-Voltage Contractors; this list can be obtained from the SDOC Purchasing Department: Lisa Kesecker (407)870-4622.

Interior voice & data work shall be designed, specified, packaged, and competitively procured, as are other trades. TSD shall have approval authority in the bidder pre-qualification process. All such work shall be included in the construction documents and coordinated by the architect/engineer.

Bid Documents: It is expected that the result of this collaboration shall be the creation by the design team of a bid-quality document that contains commonly accepted and standard language of the industry. These documents are to include a set of appropriate division specifications (e.g. Division 17 for older CSI formats or Divisions 25, 27, and 28 for the new CSI Master Format) as well as Telecommunications Drawings or Sheets (a.k.a. T-Drawings or T-Sheets) and Telecommunications Electrical Drawings or Sheets (a.k.a. TE-Drawings or TE-Sheets).

SECTION 17010
BASIC TECHNOLOGY SYSTEMS REQUIREMENTS

PART 1- GENERAL REQUIREMENTS

1.01 SUMMARY

A. It is the responsibility of the School District to separately direct purchase the following equipment for voice, video, data and security communications.

1. Media Retrieval Equipment. (See SECTION 3- VIDEO- MEDIA RETRIEVAL & CCTV)
2. Television Headend including television mounts, VCR & DVD players and TV's. Television mounts shall be contractor installed. School District Personnel (IMC Dept.) will install TV's.
3. Intercom Headend only. Wiring, speakers, call-buttons, volume controls, surge protection, labor to install equipment, etc. shall be contractor provided.
4. Network Electronics for data and VOIP systems (TS Dept.).
5. Satellite Antenna. Owner shall purchase the Satellite Antenna and the School District Representative shall manage the installation.
6. Video Surveillance and Burglar Detection Devices. Owner shall purchase the Video Surveillance and Burglar Detection Devices and the School District Representative shall manage the installation of these devices. Cabling, conduit pathways and the SDOC specified sensors shall be contractor provided.

B. This section outlines the quality, type and installation of the building premise wiring systems to include voice, video, data and security. Included in this Section the contractor shall provide all labor, equipment, and materials necessary for a complete, tested and operational system.

C. The installation shall be based on the equipment and systems as specified herein. The Project Engineer and the School District Representative must approve any alternate system.

D. If the Contractor wishes to submit alternate equipment, the Contractor shall submit to the Project Engineer and the School District Representative, the equipment proposed to provide a precise functional equivalent system to meet or exceed specifications. Contractor shall also be prepared to provide documentation to support the proposed alternate system as being an equal or superior system. Contractor shall provide adequate information prior to bid date such as specification sheets, working drawings, shop drawings, and demonstration of the system. Alternate supplier-contractor must also provide a list to include three installations of a system similar to that proposed which have been in operation for a period of two years. SDOC retains final autonomy over the approval or disapproval of all alternative systems.

E. Final approval of the alternate system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternate system at the Contractor's expense.

F. The Contractor shall provide a complete, tested and operational Premise Distribution Wiring System (PDS). All wiring, accessories, hardware, equipment, terminations, etc. necessary for a complete and operational system shall be provided. All wiring, patch panels, jacks and other related equipment will be rated and tested to meet EIA 568A, Category 6 or above requirements. The testing of all UTP cabling and terminations are to be tested to pass 350 MHz or above as required. The Contractor shall provide to the Project Engineer and the School District Representative, shop drawings, equipment lists and specifications for all equipment, cabling, terminations, labeling and accessories prior to installation of any equipment.

G. All work associated with the installation of the PDS and all other systems outlined in this document shall be performed in accordance with, but not limited to the latest ratified version of the following:

- National Electrical Code latest ratified
- Florida Dept. of Education, Retrofit for Technology Guidelines
- EIA/TIA 568, 569, 607
- IEEE Standards 802.3, ANSI, NFPA &NESC
- EIA/TIA-TSB-36, 40 & EIA/TIA-492
- Division 16000 of the specifications
- BICSI TDMM
- BICSI ITS Installation Manual
- BICSI COSP Design Manual
- BICSI Electronic Safety & Security Reference Manual (ESSDRM)
- Underwriter's Laboratories
- Local Codes and Ordinances
- The School District of Osceola County Technology Standards and Specifications (latest ratified)

(Should conflicts exist, the authority having jurisdiction for enforcement shall have responsibility for making interpretations.)

1.02 CONTRACTOR QUALIFICATIONS

It is the responsibility of the Project Engineer and Construction Manager to ensure that any awarded systems contractor meets all applicable requirements defined in this document. The requirements include but are not limited to:

- The awarded communications contractor shall be a certified installer for the solution chosen.

- The PDS (Premise Distribution System) solution shall be one of the following: Panduit, Ortronics, or Amp/Tyco. All cabling, components and solution installation practices shall meet the chosen manufacturer's list of approved partners and be certified by the manufacturer for a minimum warranty of 15 years.
- The awarded communications contractor shall have an RCDD assigned as the project manager.

A. The Contractor shall have a minimum of (3) three years experience satisfactorily installing systems such as described in this document.

B. A resume of qualification shall be submitted with the Contractor's bid indicating the following:

1. A list of all completed projects for the past year of similar type and size with contact names and telephone numbers for each.

2. A list of test equipment proposed for use in verifying the installed integrity of metallic cable or fiber systems on this project. The following is a list of required test equipment necessary for certifying the installation of the Premise Wiring System.

   a) OTDR for MM Fiber
   b) OTDR for SM Fiber
   c) Light Source Power Meter
   d) Field Strength Meter
   e) TDR for Coax
   f) Volt Meter
   g) LAN Cable Meter- 350 MHz

3. A technical resume of experience for the company and on-site installation foreman assigned to this project. The project foreman for communications installations shall be an RCDD. Copy of certification shall be provided to the Engineer and School District Representative.

4. Similar documentation shall be provided for any sub-Contractor who will assist the Contractor in performance of any and all SDOC project work.

5. Previous experience with similar projects for the School District of Osceola County. (If any.)

6. Required installation certification from chosen vendor/manufacturer.

C. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

D. The Communications or Security Contractor shall be an established operated business for at least (3) three years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

E. Intercom cabling and required intercom equipment (including but not limited to call buttons, volume controls, speakers, horns, surge protection, etc…) shall be provided and installed by Rauland-Borg of Florida.

F. The Contractor shall show satisfactory evidence, upon request, that they maintain a fully equipped service organization **with a full time staffed office** capable of furnishing adequate inspection and service to the system in contracted SDOC specified timeframes. The Contractor shall maintain at this facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

G. The Contractor shall be a responsible service and installation provider, showing evidence of properly operating systems in Florida Schools. A list of these schools, including any Osceola County Schools, shall be submitted in the Contractor's bid.

1.03 STORAGE

All Contractor activities shall be coordinated with the Project Engineer, School District Representative, and/or the General Contractor in order to properly utilize the available space upon the property.

1.04 PROGRESS MEETINGS

Progress meetings shall be held on the first day of construction and each week thereafter on a pre-determined date. This date and time shall be agreeably arranged at the first construction meeting. At this meeting, all concerns of the Contractor, Project Engineer and the School District Representative shall be addressed. At this time a review of the specifications and blueprints shall be completed. Any questions, concerns and verification needed shall be addressed at this time.

1.05 WORK SCHEDULE

Work hours shall be coordinated with the approval of the School District Representative and on site Construction Manager.

SECTION 17020
PREMISE DISTRIBUTION SYSTEMS
CABLING INFRASTRUCTURE

PART 1 – GENERAL REQUIREMENTS

1.01 SUMMARY

The concept is an infrastructure standard designed to enable educators to move to technological centered models of teaching and learning. The philosophy is such that school initiated implementations of various technologies would seek their own time and would not be hindered by facility-based constraints. These specifications are designed to permit the most flexible connections and integration of different types, brands, and models of computing, multimedia, and communications equipment. Basic assumptions include, but are not limited to, voice communications (PA, Intercom, and Telephone), data networking and security systems.

1.02 VOICE/DATA INFRASTRUCTURE

A. The Voice/Data infrastructure is based on the ability to wire a campus to provide flexibility not only for the present, but also for the future.

B. Communication equipment rooms (MDF/IDF) shall be located in the interior of the building. Access doors to the communication closets shall not open to the exterior of the building.

C. MAIN DISTRIBUTION FACILITY (MDF) - In normal situations there will only be one (1) MDF location per campus with multiple IDF locations feeding back to this MDF. The MDF is normally where feeds such as the CATV, telephone DEMARC and other signals from outside the campus originate, terminate and are distributed through out the campus as needed. The MDF shall be a minimum 10’ x 20’ area. The size of the MDF shall be based on the size of the building it services, the number of buildings it serves, as well as the amount of technologies installed. The access door to the MDF shall swing out. Additional MDF size requirements shall be coordinated with the District Representative to comply with the Outside Service Provider fiber optic installation requirements where applicable.

1. The location of the MDF shall be such that the 295' distance limitation for the Communication Outlet cabling is not exceeded. The MDF shall also be located adjacent to the Media Center.

2. If necessary an Intermediate Distribution Facility (IDF) shall be added to adhere to the 295' requirement.

3. The MDF houses the telephone system, outside service point for telephone, data lines, and primary data communications equipment. The MDF is also the room for connection of voice and data services for the administrative functions. All voice and data backbone links are terminated in the MDF.

4. The PA/Intercom system, IDS control panel, video surveillance DVR(s) and Server Rack are typically located in the MDF or another IDF/Equipment room within the same building.

5. Dedicated clean power receptacles shall be mounted behind the equipment racks at 80" A.F.F., U.O.N. Location of these receptacles shall be coordinated with the School District Representative and Project Engineer. There shall also be two (2) **208VAC NEMA-L6-30R receptacles** for every three (3) racks installed. Each power receptacle shall be dedicated, clean power. There shall also be one (1) additional **208 VAC NEMA-L6-30R receptacle** at 80" A.F.F., U.O.N. at the server rack location. These outlets shall be spaced between the ladder racks and shall be used for the connection of a multi-outlet surge suppression device and/or UPS. In addition to meeting the power requirements of the network electronics there shall also be the installation of 20-AMP clean power receptacles strategically located every 8' (minimum of one (1) per wall) to accommodate the installation of the phone switch and any other necessary electronics also at 80" A.F.F, U.O.N. (Telephone Switch, CATV Distribution, and Intercom, etc.) The Design Engineer and a School District Representative shall determine final design requirements.

6. All MDF / IDF walls shall be covered with sheets of READY SPEC BACKBOARD of appropriate color. All sheets shall be ¾" A-C grade plywood coated with two coats UL Classified Intumescent fire retardant latex on all sides with Backboard Certification label. Plywood Grade & use of UL Classified Fire Retardant Latex shall be detailed on product label. System area designation labeling shall be stenciled on with paint. All systems equipment must be mounted on the designated sheets for that system. The T-Drawing shall reflect this. The color code for each system shall be as follows.

    - Fire alarm system– Red
    - Security systems – Orange
    - HVAC/Auxiliary system – White (no border)
    - Intercom system - Blue
    - TV Distribution/CATV carrier service entrance – Green
    - Voice/Data cabling - Yellow
    - Voice/Data carrier service entrance - Violet

7. The MDF shall be environmentally controlled 24 hours a day, 7 days a week. These systems must automatically restore to their original settings after a power failure. The HVAC, janitorial or non-telephone/data communications equipment such as radio repeaters shall not reside in this room. Nor shall any

piping exist or extend through or above this room. The floor shall be smooth and finished with a covering that will not generate dust. Carpet is not acceptable.

8. To Facilitate HVAC controls and security camera installations, a **24**-strand multi-mode fiber optic cable shall be installed between the rack-mounted Fiber Distribution Center (FDC) and a wall-mounted FDC. The wall mounted FDC shall be installed on the HVAC/Auxiliary system backboard. The HVAC/Auxiliary system backboard shall be adjacent to the Security system backboards. Also, a dual Category 6 or above cable run shall be installed between designated ports on a patch panel within the rack to a dual jack interface mounted on the backboard **in the vicinity of the Telephone Demarc**.

9. There shall be a minimum 5' clearance maintained from the rear base of the equipment racks from the footer's outer edge to the finished systems backboard. Verify with the Design Engineer and the School Board Representative this measurement and placement.

10. In the MDF, Velcro cable wraps or approved equivalent shall be used to bundle all PDS wiring below ceiling. Cable ties will not be accepted.

D. INTERMEDIATE DISTRIBUTION FACILITY (IDF) - The IDF shall be a minimum 8' x 10' area. The size of the room shall be based on the size of the building it services as well as the amount of technologies installed. The minimum specified distance between the systems racks and the systems backboard shall be maintained in all instances.

1. IDF Closets are to be located in each wing, house, floor, pod, etc., within the campus. The access door to the IDF shall swing out. The location of the IDF Closet shall be such that the 295' distance limitation for the Communication Outlet cabling is not exceeded. If necessary additional IDF Closets shall be added to adhere to the 295' requirement.

2. The IDF houses the connections for telephone backbone, intercom backbone, network backbone, and the individual PDS wiring runs to each faceplate at each workstation location.

3. Dedicated duplex clean power receptacles shall be mounted behind the equipment racks at 80" A.F.F., U.O.N. Location of these receptacles must be coordinated with the School District Representative and Project Engineer. There shall also be one (1) **208 VAC NEMA-L6-30R power receptacle** which shall be dedicated, clean power. These outlets shall be spaced between the ladder racks and shall be used for the connection of a multi-outlet surge suppression device and/or UPS. In addition to meeting the power requirements of the network electronics there shall also be the installation of 120 VAC 20-AMP clean power receptacles strategically placed every 8',

minimum of one (1) per wall also at 80" A.F.F., U.O.N, to accommodate the installation of the phone switch and any other necessary electronics. (Telephone Switch, CATV Distribution, Intercom, etc.) The Design Engineer and a School District Representative shall determine final design requirements.

4. Each IDF shall be environmentally controlled 24 hours a day, 7 days a week. These systems must automatically restore to their original settings after any power failure. The HVAC, janitorial or non-telephone/data communications equipment such as radio repeaters shall not reside in this room. Nor shall any piping exist or extend through or above this room. The floor shall be smooth and finished with a covering that will not generate dust. Carpet is not acceptable.

5. To facilitate HVAC controls and security camera installations, a **12**-strand multi-mode fiber optic shall be installed between the rack-mounted Fiber Distribution Center (FDC) and a wall-mounted FDC. Also, a dual Category 6 or above cable run shall be installed between designated ports on a patch panel within the rack to a dual jack interface mounted on the systems backboard.

6. There shall be a minimum 5' clearance maintained from the rear base of the equipment racks from the footer's outer edge to the finished systems backboard. Verify with the Design Engineer and the School Board Representative this measurement and placement.

7. In the IDF, Velcro cable wraps or approved equivalent shall be used to bundle all PDS wiring below ceiling.

E. WORKSTATIONS - Workstations are characterized into two categories, Administrative and Classroom.

1. The administrative workstation is defined as any work site not based in a classroom or a work site that is not used for student based instructional purposes (typically front office, dean's area, cafeteria, stage, etc.).

2. The classroom workstation is defined as a work site that directly involves student based instruction (classrooms, teacher work areas, labs, library, media center, etc.). Classrooms shall have one faceplate typically located at the teacher's work area (to accommodate a teacher workstation). There shall be a minimum of (2) two additional faceplates in each classroom for student use. Teacher work areas adjacent to the classrooms shall have one faceplate for every two teachers. Common teacher work areas or lounges shall have a minimum of two faceplates each. The labs, library, media center, etc. shall require faceplates based on the educational needs of the school.

F. FACEPLATES - At each workstation location, a four position modular faceplate shall typically be installed to accommodate both voice and data. The faceplates shall consist of four (4) Category 6 or above; RJ45 Non-keyed jacks terminated 568A. An additional requirement of the installation of one (1) RG6 Coaxial Cable shall be installed in faceplates as and where designated by Owner for areas such as administrative office spaces. This requirement shall be coordinated with the School District Representative and Design Engineer.

G. POWER RECEPTACLES- General use power receptacles shall be gray or ivory with stainless steel faceplates. The computer power receptacles shall be black with stainless steel faceplates.

H. COMMUNICATION OUTLETS - Data communication outlet boxes shall be a minimum 2.5" deep. All Category 6 or above cabling shall terminate in the MDF and IDF rooms with no intermediate splices and so as not to extend the cabling over the maximum distance limited by the EIA/TIA standard of 295 feet.

I. All clean/general power receptacles and communication outlets shall be located at 18" A.F.F., U.O.N.

1. A special note follows for all general contract superintendents, electrical contractors and systems contractors and sub-contractors regarding the placement and installation location of the aforementioned clean power receptacles and communication outlets.
2. No clean power receptacle and associated communication outlet shall be installed in, cutout or covered by the installation of modular furniture or cabinetry unless specifically designed for installation in such a manner.
3. Clean power receptacles and associated communication outlets intended for installation in this manner shall be noted as such on all plans and specifications. Otherwise it is understood that no other clean power receptacles and associated communication outlets are intended to be installed in this manner with no exception.
4. Otherwise, in all circumstances where this becomes an issue it is mandatory that each instance be immediately addressed and resolved by the Facilities Project Manager, Technology Construction Manager, Project Engineer and Site Construction Superintendent.
5. The clean power receptacle and the associated communication outlet in question shall be relocated to a useable location above, beside or to a new location away from the counter or furniture being installed.
6. In cases where this is not identified and resolved prior to the counter or furniture being installed and thus the receptacle is covered and or cutout in the furniture impeding it at it’s intended location from proper operability and use it shall be the responsibility of the general contract superintendent, their electrical contractors and systems contractors and sub-contractors to disconnect, relocate and install the clean power receptacle and the associated communication outlet in question to a location suitable for use that is satisfactory with the Technology Construction Manager or appropriate SDOC Representative with no exceptions.

J. Typically, each classroom shall have a dedicated clean power circuit. Administrative locations shall have a dedicated clean power circuit for workstation connections based on functionality, but not to exceed normal requirements. Teacher workrooms with at least one workstation must also have dedicated clean power. A dedicated duplex clean power receptacle shall be provided, not closer than 12" nor further than 24", adjacent to the workstation faceplate. Computer power systems shall be separated using "K-13" rated isolation transformers in each building feeding surge protected clean power panels. Additionally, each circuit shall have it's own neutral, oversized to handle the additional neutral current. Each branch circuit feeding computer power receptacles shall not exceed (3) three duplex receptacles. All dedicated power circuits must be surge protected. (Refer to the Retrofit for Technology Guidelines, latest revision.)

K. In the Cafeteria, the Point of Sale System (P.O.S.) shall have the following additional requirements for terminations between the cash registers and the Food Service Managers Office.

1. Install four (4) Category 6, cables at each P.O.S. location. Two (2) of the four cables shall terminate in the respective IDF (as normal D2 data connections) and two (2) of the four cables shall terminate in the Food Service Managers Office (as normal point of sale connections). Label accordingly as shown on Point of Sale (P.O.S.) Detail section on systems plan pages.

2. For external ringer connections, at a designated location install one (1) D1 port to the local IDF location to allow the external ringer to be installed from the telephone number designated for the Food Service Managers Office for the food preparation area. This D1 shall be installed at a minimum eighty-four (84) inches A.F.F. U.O.N.

L. The telephone infrastructure shall consist of shielded/flooded PE89 level 3 copper backbones from the MDF to each IDF (wing, house, floor, pod, etc.) and Category 6 or above copper from the IDF to the workstation location faceplate.

M. Copper voice cross-connects shall be provided in the MDF and each IDF. The voice trunk cable shall terminate on 66 blocks on the outer pins on the left side only on the Voice/Data Backboard. Additionally, to allow cross-connect between the voice trunk cable and user stations a 25 pair indoor voice cable, shall be terminated on a set of separate 66 blocks on the outer pins on the left side only on the Voice/Data Backboard. The other end of this cable shall terminate on one (1) "voice" 48 port patch panel, as required, on each rack/cabinet. Terminations shall be one (1) pair per port terminated sequentially on the blue pins of each sequential port one through twenty-four on this patch panel with pair number twenty-five coiled or neatly secured as approved by the Technology Construction Project Manager. The MDF and each IDF shall have a minimum one (1) 48-port patch panel each dedicated for copper voice connections only.

N. Intercom infrastructure and protection shall consist of the following:

1. Cabling between the MDF and each IDF shall be West Penn AQC369. One (1) cable "only" installed for each **classroom circuit** and one (1) cable "only" installed for each indoor and or outdoor speaker zone. Classroom circuits consist of one (1) call button and typically only one speaker. Indoor speaker zones shall consist of no more than five (5) speakers per circuit. Outdoor speaker zones shall consist of no more than two (s) speakers per circuit.

2. Cabling between the IDF and each classroom Call-Button shall be West Penn 355.

3. Cabling between the Call-Button and the speaker in the classroom shall be West Penn 291.

4. Cabling between the IDF and the designated indoor and outdoor speaker zones shall be West Penn 291. No more than 5 speakers per **indoor speaker** circuit **no more than 2 speakers per outdoor speaker/horn circuit is acceptable.**

5. Intercom cross connects shall be provided in each MDF and IDF location. All Intercom cabling shall terminate to 66 blocks in each MDF and IDF location. All conductors on each intercom cable shall be terminated. The intercom trunk cables shall be terminated on 66 blocks on the outer pins on the left side only, leaving the right side of each 66 block open for cross connection and bridging. The intercom field cables shall terminate on the outer pins on the right side only of the same 66 blocks. The 66 block center pins shall be bridged with bridging clips only. The use of wire scrap or other items not SDOC approved to complete these connections is unacceptable. Primary connections at and to the intercom head end location shall be bridged with approved voltage surge suppression protectors in lieu of bridging clips.

6. All Intercom 66 block terminations shall be labeled reflecting far end termination points in the field such as classroom number, corridor etc. Spare cabling shall be labeled spare to MDF or IDF as applicable with pair numbers.

7. In the MDF all shields shall be looped together on the Intercom side of the 66 blocks. The shields shall all be bridged to the field wiring.

8. The MGB ground bars shall be mounted behind the 66-block mounting brackets to allow the PB-CLN and PB-SPK protectors, as required to sit flush on the 66-blocks. The MGB Ground Bars shall be mounted on the same side as the outside plant trunk cables.

9. The labeling on all 66-blocks shall correspond with a location in the field. Identify all circuits by room number, and type of equipment (Call-Button,

Speaker, Hall Zone or Outdoor Zone). All Intercom cabling shall be labeled at both ends with an SDOC approved labeling system. The Intercom Cable labeling shall correspond with the Intercom physical port number on both ends.

10. The system circuit numbers shall be permanently identified on the left side of the 66-blocks. The location of the field device shall be identified on the right side of the 66-blocks. This labeling shall also be an SDOC approved typewritten labeling system.

11. At all IDF locations, bridge the shields through on all 66-blocks.

12. The intercom system shall be balanced for All-Call and Call-In.

13. Room (FISH) numbers shall be properly programmed. (SEE 1.12 LABELING)

14. Zones shall be properly programmed.

15. The intercom system shall be fully programmed with all features operational.

16. Intercom cable shall not be installed in the same raceway/pathway as data cable.

17. Voice/Intercom equipment protection shall be as follows:

    a. CO Lines- EDCO HCO
    b. Analog telephones- EDCO HAE as required by the manufacturer.
    c. Digital telephones- EDCO HDE as required by the manufacturer.
    d. Speakers- EDCO PB-SPK
    e. Call-Button- EDCO PB-CLN

1.03 CABLING, RACEWAY, WIRE MANAGEMENT & FLOORBOXES

A. All workstation locations will have data communication access. The data infrastructure will consist of a minimum twenty-four (24) strand multi-mode fiber and a twelve (12) strand single-mode fiber backbone between the MDF and each IDF. Four (4) Category 6 copper lines from the respective IDF to each Communications Outlet.

B. If raceways are used between the IDF's, the data and intercom/telephone cables must be separated from other systems so as to not have electronic interference or crossover. Intercom cabling shall not be installed in the same path as the data cable.

C. If raceways are used from the IDF to the workstation, the data and backbone telephone cables must be separated from other systems so as to not have electronic interference or crossover. Intercom cabling shall not be installed in the same path as the data cable.

D. The power contractor shall install all sleeves as identified on the plans. The power contractor shall fire-stop around all sleeves and stub-ups as identified on the plans. The systems contractor shall be responsible for providing the proper fire stopping material inside all sleeves. The systems prints shall show the recommended, minimum size and location of all sleeves. It is the responsibility of the systems and power contractors to coordinate the final size, location and quantity of sleeves. All conduit stub outs and sleeves shall be provided with couplers and/or bushings. All sleeves shall be adequately supported on both sides of the penetration to the satisfaction of the SDOC Representatives.

E. In the event ceiling tiles are damaged during any systems project installation it is the responsibility of the contractor to obtain and replace the affected ceiling tile. For existing installations (not of a new construction nature) within reason damaged tiles may be obtained from the SDOC Maintenance Department. Notify the Technology Construction Project Manager of the issue and arrangements will be made to obtain and provide a replacement tile for installation by the identified contractor. In the event there are no tiles available or, if the tile is a special tile not readily supported in all instances it is the contractor's responsibility to replace the tile before final completion of the installation. All locations where ceiling penetrations are made through ceiling tiles for all systems projects the penetration shall be cut, notched and neatly fit to seat around the sleeve or other penetration installed. In no instance shall breaking or chipping of tiles be an acceptable practice for providing access on systems installations from a space into a ceiling cavity. Further, in instances where speakers or other devices are contractor installed in a ceiling tile the speaker or other device shall always be installed with an appropriate manufacturer recommended support device appropriately fastened to the adjacent ceiling grid. Finally, where deemed necessary for safety issues by SDOC Representatives it shall be the responsibility of the contractor to install additional ceiling grid hangar wire for added support at any location where new speakers or devices are installed.

F. It is the responsibility of all SDOC contractors both systems and electrical to insure the environment of the work site at both the interior and exterior locations is maintained in a clean, orderly and safe manner on a daily basis. No unsightly conditions shall exist more than on a same day basis. All ceiling tiles shall be closed on a daily basis. The contractor shall remove all materials and debris both interior and exterior from the site upon completion of the installation. Absolutely no unsafe condition such as open trenches, manholes or other hazards shall be left unattended at anytime during the work in progress and shall not remain open longer than the period of the day these hazards are being opened for work. Where possible all affected hazards shall be closed and or filled at close of business on

the same day the work occurred. In the special circumstance where closing said trench or other hazard were not possible on the same day, it is the responsibility of the contractor to make the Technology Construction Project Manager aware of this issue with enough advance notice to permit proper notification for school administration. In all instances where this is necessary, it is the responsibility of the contractor to appropriately stake off, rope off and flag all effected hazardous areas with the appropriate caution or danger tape to the satisfaction of the Technology Construction Project Manager.

G. The Electrical Contractor shall provide conduit between the Intercom, Video Surveillance and Burglar Detection Head ends and the device locations to include drilling of door frames and concrete walls for the installation of flush door contacts. Minimum size of the conduit shall be 3/4" EMT with bushings on all stub outs. It is the responsibility of the systems and power contractors to coordinate the final size, location and quantity of stub outs.

H. On exterior sleeves the portion of the sleeve on the outside wall shall be attached to either a single or double gang junction box installed and secured to the building. The interior portion of the sleeve shall have a bushing installed. All exterior and interior wall penetrations shall be sealed around the exterior portion of the sleeve and after all cable is installed the interior of each sleeve shall be packed with an approved material. The School District Representative shall approve conduit and sleeve placement. All exterior conduit connections and boxes shall be weatherproof. All conduits and boxes on the exterior of any building shall be painted to match the building shell or trim, as required by the Owner's representative. All cable runs shall be properly supported with approved devices.

I. Provide cable ladder rack, above the "MDF" extending from the backboard to each equipment rack frame for proper cable management. Also, provide conduit stub-ups from the MDF and each IDF location to allow a clean transition of cabling into the ceiling space.

J. Provide cable tray, cable guides, "D" Rings, J-hooks, posts, wire management devices, cable tray, cable ties, etc. as required to provide a neat, clean and professional installation. The contractor shall adhere to the requirements as described in the BICSI TDMM. Cable ties will not be accepted as primary means of supporting horizontal cabling.

K. Provide specified horizontal wire management devices for all equipment racks/cabinets. Install wire management devices between each patch panel, fiber optic inter-connect center, proposed hub, switch and router. Horizontal wire management devices shall start at the top of each rack/cabinet. Additionally provide (3) three wire management devices for each rack/cabinet. Install all management provided in the racks.

L. Provide vertical, wire management devices on each side of all freestanding equipment racks. (1) one equipment rack shall have (2) two vertical wire

management devices and (2) two equipment racks shall have (3) three vertical wire management devices. Insure all RMU screws provided with the racks and management are delivered with the installed equipment.

M. CONDUIT SYSTEM

1. The conduit system between MDF and IDF locations shall consist of the necessary quantity of 4" conduit with (3) three 1-1/4" inner-ducts, 3" conduits and 2" conduits for the delivery of the backbone system.

2. All ends of each conduit run shall be permanently labeled. Provide sample of labeling to the Engineer and School District Representative for approval.

3. The electrical contractor shall install all conduit and inner-duct. The contractor who installs the conduit and inner-duct shall also install a heavy-duty pull line. All unused/spare conduit and inner duct shall be sealed with an approved device or substance.

4. Fiber-optic and telephone backbone cable systems may be run in the same conduit system. No other types of cables shall be run with the fiber-optic and telephone backbone cables.

5. Industry standard pull boxes and or pedestals shall be installed sized and placed accordingly. Follow all industry guidelines for sizing and placement.

6. Proper bend radius shall be used when placing conduit with sweeps for the installation of fiber cabling. No more than 2 sweeps or 90-degree bends between pull points or pull boxes shall be accepted.

7. For CATV, Voice and Data access from outside entities, as a minimum, (2) two 4" conduits shall be provided between the MDF and the street. Each 4" conduit shall have (3) three 1-1/4" inner-ducts with install pull-line.

8. Based on site requirements, present and future, spare conduit shall be placed between all communication closets and buildings.

9. All Fire Alarm cabling shall be installed in a separate conduit and pull box system. Fire Alarm cabling and termination points shall be separated from the all other communications cabling systems. In an instance where that would not be feasible and it is an unavoidable necessity (the exception rather than a rule) to share the same manhole with other communication cabling, the Fire Alarm System feeders must be installed in corrugated, flexible, non-metallic conduit when they transit within the manhole with no fire alarm conductors exposed at any point. Insure the use of the appropriate connectors to fasten and terminate this conduit run within the confines of the manhole.

10. Floor Boxes for all locations, inclusive of computer labs, multi-purpose room, Media Center, etc. shall be Walkerbox, Fully Adjustable Floor Box (RESOURCE RFB Multiservice Shallow Steel Recessed Floor Box, Part #RFB4 or RFB4-CI-1 as required). Please note that the cast Iron box may be required depending on whether or not the slab is poured above or below grade.

    a. Cast Iron Configuration-

    Floor Box
    RFB4-CI-1
    This boxes comes with 2 brackets for 2 duplex power receptacles.

    Communications Bracket- (order 1 for each box)
    CILT-2-RT

    Blank- (order 2 for each box)
    CIH/LT-B

    Aluminum Cover w/flange for installation for VCT- (order 1 for each box)
    S36BBTCAL

    b. Steel Box Configuration-

    Floor Box-
    RFB4
    This boxes comes with 2 brackets for 2 duplex power receptacles.

    Communication Bracket- (order 1 for each box)
    DTB-2-2RT

    Blank- (order 1 for each box. this one will cover the extra power receptacle location.)
    RFB-B

    Blank- (order 1 for each box. this one will cover the extra communications receptacle location.)
    DTB-2-2-TKO (do not remove knockouts when used as a blank.

    Aluminum Cover w/flange for installation for VCT- (order 1 for each box). S36BBTCAL

    All conduits for floor boxes shall be home run to all stub out locations. No looping of conduit between floor boxes shall be accepted.

    All floor box conduit shall be minimum one (1) inch in diameter conduit for all floor box installations to the stubout locations.

The contractor shall install flooded data cabling in all floor box conduit installed below slab. Data cabling from the floor box location to the stubout location above slab shall properly transition from flooded data cabling to indoor data cabling to the nearest MDF or IDF closet for termination at the patch panels. All such data cabling installed to all floor box locations shall be tested and pass certification with written and electronic format test results provided for the owner's retention. All such data cabling installed to all floor box locations shall be labeled on each cable and at all points of termination throughout the entire path.

11. Exposed conduit installed outdoors and not direct buried shall be installed per **last ratified revision of NEC**. Insure the applicable schedule and type of conduit appropriate for the project is installed for exposed conduit runs. In addition, 6" expansion fittings shall be properly installed in all long conduit runs and 2" and 4" expansion fittings shall be properly installed between junction boxes and conduit termination points. Insure all such installations are installed with strict compliance to the guidelines of NEC, BICSI specifications, the manufacturer's installation procedures and all other applicable codes and standards.

1.04 PORTABLE CLASSROOMS

A. An appropriately sized conduit system shall be installed dependant on the number of connections to be provided. A minimum 4" conduit with (3) three 1-1/4" inner-ducts shall be installed between the nearest IDF and a pull-box located in the vicinity of the proposed site for portable classrooms. This conduit shall be the path for the communications cabling to include fiber for data and multiple pairs of intercom cabling as required to support existing and future needs. A 2" conduit shall be installed for the installation of .500 hard-line for CCTV. An additional 4" conduit with (3) three 1-1/4" inner-ducts shall be installed for the installation of a flooded, shielded voice cable. A 2" conduit shall also be installed between the fire alarm panel located in the main building and the portable site. Fire alarm cable shall not be installed in the same conduit, pedestal or pull box as the voice, video, data and intercom cabling.

Summary:

Install (1) one 4" conduit with (3) three 1-1/4" inner-ducts.
a. Fiber Optic Cable for Data sized accordingly
b. Multiple Pairs of Intercom Cable
c. SPARE

Install (1) one 4" conduit with (3) three 1-1/4" inner-ducts.
a. Voice Cable sized accordingly
b. Voice Cable sized accordingly

c. SPARE

Install (1) one 2" conduit for .500 hardline for CATV.

Install (1) one 2" conduit for Fire Alarm. This conduit shall be installed between the designated Fire Alarm Panel and its own Pedestal or Cabinet.

Typically, the conduit system shall originate from an IDF or the MDF located within a building nearest a proposed portable site. There will be an appropriate transition point between the portables and the IDF or MDF location. This transition point shall be a weatherproof, communications equipment pedestal or an outdoor, weatherproof, Hoffman style terminal cabinet with hinged lockable door mounted on or near the side of the building.

Install READY SPEC BACKBOARD of appropriate color in all pedestals to accommodate the installation of systems hardware and grounding bus. All sheets shall be ¾" A-C grade plywood coated with two coats UL Classified Intumescent fire retardant latex on all sides with Backboard Certification label. Plywood Grade & use of UL Classified Fire Retardant Latex shall be detailed on product label. For all Portable Systems IDF Cabinets install the SDOC specified Hubbell REKBB20 backboard of SDOC selected color to accommodate the installation of systems hardware and ground block.

Consideration of all site requirements shall be reviewed before final decision is made for conduit placement and quantity of cable pairs.

See section 17090 of this document for detailed portable classroom instructions.

1.05 CABLE (Voice/Data)

A. Data fiber backbone from between the MDF and each IDF is FDDI grade, 24-strand fiber, color coded, multi-mode, 62.5/125 micron tight buffered design, rated for indoor/outdoor use. Also, a (6) strand fiber, color-coded, single-mode, 9-micron shall be installed. (Corning Cable Systems or approved equal only.) Refer to plans for exact quantities.

B. Data fiber Patch Cords are FDDI grade, duplex, multi-mode /single-mode, as required. (Corning Cable Systems or approved equal only.)

C. The voice cable between the MDF and IDFs shall be a multi-pair, flooded, and shielded Level 3 cable with sufficient pairs for 25% growth. Install separately sheathed trunk cables for analog and digital signals between buildings.

D. Voice/Data copper from the IDF to the workstation faceplates shall be (BLUE) Category 6 or above Unshielded, Twisted Pair (UTP), 24 AWG, 4 pair for each RJ45 data line jack. All RJ45 data line jacks shall be terminated 568A.

E. Media Retrieval Data Ports: Additional single Category 6 or above Unshielded, Twisted Pair (UTP), 24 AWG, 4 pair cables shall be installed at designated television outlet locations and terminated at their own patch panel in the respective MDF/IDF room. This patch panel must be labeled to distinguish between the Voice, Data and Auxiliary use. All ports on the patch panel shall be used in sequence. No ports on the patch panel shall be skipped.

F. Wireless Access Point Data Ports: Additional single Category 6 or above Unshielded, Twisted Pair (UTP), 24 AWG, 4 pair cables shall be installed at select designated locations on the interior of each campus building and each floor in each campus building. These Category 6 or above cables shall be terminated in the respective local MDF/IDF room.

G. RJ45 Patch Cords are to be Unshielded Twisted Pair (UTP), stranded, Category 6 or above, 4 pair terminated 568A. (Approved Manufacturer Only)

H. Plenum rated cabling shall be installed in all plenum ceiling and other plenum spaces or locations where applicable and where required. Installation of Riser cabling in Plenum spaces is an NEC violation. It is the responsibility of the assigned project engineer to make the determination and insure the proper type of systems cabling is installed whether Plenum or Riser to include all backbone and infrastructure cabling.

1.06 TERMINATIONS

A. Backboards: Install READY SPEC BACKBOARD of appropriate color to accommodate the installation of systems hardware and grounding bus. All sheets shall be ¾" A-C grade plywood coated with two coats UL Classified Intumescent fire retardant latex on all sides with Backboard Certification label. Plywood Grade & use of UL Classified Fire Retardant Latex shall be detailed on product label. (School District personnel shall assist with the locations of these backboards.)

B. Voice terminations and cross-connects shall be 66-style with adequate spools for wire management. Minimum two (2) spools per 66-block.

C. Category 6 Patch Panels: 24 or 48 port only, as required. Panduit, Ortronics, or Tyco as required to meet the required 15-year warranty.

D. Fiber Termination units – Superior Modular or approved equal.

E. Fiber Cable Termination Connectors: SC duplex type, multi-mode and single-mode, as required.

1.07 PATCH CORDS

Copper and Fiber patch cables are project specific for type and quantity. The type and quantity for each project will be determined by the district representative and the project engineer. The Contractor shall provide the appropriate number, type, and length of patch cords as required by the contract documents. The patch cords provided shall be 4 pair, #24AWG, stranded, Category 6 or above patch cords as required wired for EIA/TIA 568A sequence. The project engineer must estimate the necessary quantities of the following types of cords based on potential equipment to be installed:

Category 5E or greater 3’ UTP patch cords

Category 5E or greater 5’ UTP patch cords

Category 5E or greater 7’ UTP patch cords

Category 5E or greater 14’ UTP patch cords

Category 5E or greater 25’ UTP patch cords

6' Multi-mode duplex fiber patch cords (SC to ST).

6' Multi-mode duplex fiber patch cords (ST to ST).

6' Multi-mode duplex fiber patch cords (SC to SC).

6' Single-mode duplex fiber patch cords (SC to SC).

6’ Multi-mode duplex fiber patch cords (SC to MTRJ).

6' Multi-mode duplex fiber patch cords (SC to LC).

1.08 RACKS/CABINETS/WIRE MANAGEMENT DEVICES

A. Floor Mount 19" by 84" Equipment Racks: CHATSWORTH PRODUCTS INC., CPI Horizontal Manager Part Number #30130-719 (19” X 2 RMU Managers), CPI Vertical Manager Part Number #30164-703 (7’ HIGH X 3.65” WIDE X 6” DEEP Managers). (Include necessary isolation pads, insulator kits and ladder racks) Install vertical wire management between and at the end of all equipment racks in the MDF and each IDF. All items shall be black in color.

B. Soundolier #320-61B w/304-61B cabinet w/door (Television Distribution System).

C. Wire management devices shall be CPI Horizontal Manager Part Number #301130-719 (19" X 2 RMU Managers) for the Cabinets and Floor Mount Equipment Racks.

D. Server Rack - Floor mount (1) APC NetShelter SX42U Cabinet, part number #AR3100 in the MDF. (Include necessary ladder rack w/ end caps and grounding)

1.09 LABELING

A. Equipment Racks, cables and terminations shall be identified at all locations using an alpha-numeric sequence. Spare cables (if any) shall be terminated and identified as "SPARE" at each location.

B. Communications outlets shall be identified using white with black lettering, permanent, clean, typewritten labels. Provide a label that fits within the designated area on the faceplate, as one continuous piece. Before installation, submit sample for approval by an Osceola County School District Representative.

C. The patch panels in the MDF and each IDF shall be using white with black lettering, permanent, clean, typewritten labels. Panels shall be labeled as Patch Panel "A", Patch Panel "B" as required by the number of patch panels in each communications closet/cabinet. Therefore, the Communication Outlet shall be labeled to identify the IDF it is being served from as well as the patch panel and port number it is being served from. Before installation, submit sample for approval by an Osceola County School District Representative. Identify the Main Distribution Closet as the MDF. Identify each Intermediate Distribution Closet/Cabinet as an IDF. Each IDF shall be labeled to match the building in which it is housed. A Communication Closet or Cabinet within building #800 shall be labeled as IDF#8.

D. All cabling and terminations shall be labeled at each end with permanent markings. **NO HANDWRITTEN LABELING WILL BE ACCEPTED!** Submit a sample to the Engineer and School District Representative for approval.

E. All 188/110 protectors and all 66-block terminations shall be permanently labeled with type written labels. All Intercom terminations/66-blocks shall be labeled as Speaker circuit, Call-In Circuit, etc.

F. All Communications Cabinets shall be permanently labeled with an engraved plate.

1.10 GROUNDING/SURGE SUPPRESSION

A. All equipment racks and terminations shall be properly grounded using jacketed ground cable as follows:

   1. The power contractor shall install a minimum #4 THNN stranded, green jacketed ground cable between the Computer/clean power panel and each ground bar located in the MDF, each IDF and any other communications room. This #4 THNN stranded, green jacketed ground cable must be installed in conduit and the conduit must be grounded with the same size conductor as is in the conduit. The power contractor shall also install a minimum #6 THNN stranded, green jacketed ground cable between building steel and each ground bar located in the MDF, each IDF and any other communications room. A separate ground bar shall be installed on each wall in the MDF and IDFs that have communication cabling terminations. Security and Surveillance Systems shall be grounded on a buss bar bonded back to the TMGBB.

   2. In any building having more than one (1) communications room, there must be a grounding backbone between each Telecommunications Ground Bus Bar as per ANSI/TIA/EIA-607. Grounding wire must be sized in accordance with specifications.

   3. The Systems Contractor shall terminate the ground cable by installing a copper ground bar 1/4"D x 4"H x 20"W. Harris/Dracon #10622-020.

   4. Install a single ground wire under a single ground lug. There shall be no stacking of ground cables under ground lugs. Use approved devices only.

   5. Each section of ladder rack and each equipment rack shall be grounded using a minimum #6 stranded, green jacketed ground cable.

B. Provide lightning and surge voltage protection for all lead in video cables. Also include lightning and surge voltage protection on all A/C power connections. Protection of the following locations is imperative:

   1. The CATV input to the building.

   2. The TV Antenna Tower and coaxial leads entering the building.

   3. The Satellite Antenna and its cables entering the building.

   4. All trunk lines between buildings.

C. Ground all devices with a minimum #6 stranded, green jacketed ground cable.

D. Voice cabling shall be grounded as follows:

1. Each end of all Voice trunk cable shall be grounded with a Ground Bond Connector. Each Ground Bond Connector shall have a protective sheath installed between the bond connector and the voice cable pairs. Use a minimum #6 stranded, green jacketed ground cable.

2. Install a 3M TELCOM "ONLY" PN# 4460-S SHIELD BOND CONNECTOR KIT to PE89 voice cables as follows:

    a. Measure where the shield bond connector is to be installed on the PE89 voice cable. Insure you have enough length on your conductors to properly punch them down once finished. Carefully cut and remove the unneeded portion of the sheath and shield insuring no conductors are cut or damaged in the process. Split the PE89 sheath and shield approximately 1-1/2 inches from the top down. Do this parallel to the conductors insuring not to cut the conductors in the process.
    b. Make a hole through the sheath and shield in the same location approximately ¼-inch from the top of the sheath. Make this hole large enough only to insert the connector post through. Insert the connector post through the hole from the inside where the body of the connector is against the metal shield.
    c. With the post of the connector still inserted through the sheath and shield place the post of the connector through the piece of the connector with the hole in it placing this piece against the outer sheath.
    d. Clamp this assembly together with one of the 2 threaded-nuts provided. Tighten the outer connector piece to the inner connector piece clamping the sheath and shield between the 2 shield-bond connector pieces.
    e. Insert a plastic insulating boot between the conductors of the cable and the back of the metal connector portion with the post on it. Install the plastic boot far enough down the assembly that no metal from the connector will be in contact with the cable conductors.
    f. Close this assembly tightly together and tape it with electrical tape. Tape the outside of the sheath to include the entire exposed outside portion of the metal connector. Tape from approximately ¼-inch below the bottom of the cut in the sheath, to approximately ¼-inch above the end of the sheath tightly winding the electrical tape. Insure the top of the installed threaded nut and the threaded post of the connector assembly are the only exposed metal items on the outside portion of the sheath.
    g. After taping the assembly, install a ground connector lug on the shield bond connector post and butt the ground lug up against the first threaded nut installed using the second threaded nut on the shield bond connector post to securely fasten the ground connector lug to the assembly.
    h. Avoid stripping the cellophane and ribbons from the cable conductors at this point and your cable conductors will be less likely to unravel causing you to have to tone them to make them match.

3. All ground wire shall be no smaller than #6 stranded, green jacketed ground cable. All ground wire shall be home-run. There shall be no looping of ground wire. All ground wire shall be installed in as straight a line as possible to the main ground bus.

4. There shall be no intermediate ground bus between the devices and the main ground bar.

E. Install a Rack Mount six (6) outlet surge suppression power strip with a 6' cord in each IDF Cabinet and in each rack in the MDF and each IDF. PANAMAX RACMAX #GRM0600, Homaco PSS series or approved equal.

1.11 INSTALLATION

A. Prior to installation, the Contractor shall verify with the School District Representative all device locations, eg., racks and communications outlets.

B. All cables shall be homerun installed in continuous runs between the communications outlets and patch panels, between the patch panels and communication closets and between the MDF and IDF locations without intermediate splices. Provide adequate service slack at all termination locations as follows: Ten (10) foot slack at the MDF and all IDF locations and three (3) foot slack at all Communication Outlets.

C. The installation path for all cables shall be carefully planned to minimize the total length of each cable run. Cables shall be bundle wrapped every 24" and structurally supported every five (5) feet. Existing ceiling/grid support wires shall not be used as structural support. Contractor is to install a separate support system. Cabling shall run above the corridor ceiling and shall be installed within 4" of side wall to allow unobstructed access to the ceiling space. Cabling shall maintain 24" clearance from all fluorescent light fixtures. Cable shall not be tie-wrapped to existing conduit. Cabling shall not lay on ceiling tiles**, HVAC duct, building steel, conduits, tubing, etc…**

D. All drawings provided are diagrammatic only! All material to complete the operational system may not be shown, but shall be provided.

E. Contractor must adhere to all applicable codes and standards regardless of design.

1.12 SUBMITTALS

A. Specification Sheets shall be submitted on all items including cable types for approval by the Owner at time of Bid opening. Any Contractor not supplying submittals on all items shall be subject to being rejected at time of Bid Opening.

B. Submit outline drawing of equipment racks showing relative position of all major components if placement of equipment is other than what is on the drawings provided in the Bid Document.

C. Submit wiring diagrams showing typical connections for all equipment.

D. Submit a certificate of completion of installation and service training from the system manufacturer.

E. Submit labeling examples as specified in Section 1.09 Labeling.

1.13 TESTING

A. Each outlet shall be tested to demonstrate the Category 5E transmission capability and to verify the integrity of the cabling and termination process. Testing shall be performed between the modular jacks at the communications outlet and the panels at the MDF and each IDF. Provide test results to the Owner for approval. Provide printed results of all tests. Testing of the UTP shall be performed in accordance with the guidelines outlined in the Florida Department of Education, Retrofit for Technology Guidelines, Revised January 30,1995 and in strict accordance to meet the Category 5E requirement.

B. Fibers within the Fiber Optic Cabling shall be tested using an "OTDR" to verify the integrity of the cabling, termination process and the overall transmission loss. Provide test results to the Owner for approval. The OTDR trace output shall become a part of the as-built documentation.

1.14 SERVICE AND MAINTENANCE

A. The Contractor shall provide a (15) fifteen-year warranty of the installed system against defects in workmanship. All labor and materials shall be provided at no expense to the Owner during normal working hours. The warranty period shall begin on the date of acceptance by the Owner/Engineer. Warranty notices shall be addressed as soon as possible but, no later than (2) two business days.

B. It is the responsibility of the Contractor to arrange and submit all necessary paperwork to ensure the (15) fifteen-year vendor warranty.

C. The Contractor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

D. The system manufacturer shall maintain Engineering and service departments capable of rendering advise regarding installation and final adjustment of the system.

E. One of the following warranty packages shall be provided:
   - Panduit Certification Plus
   - Ortronics
   - Tyco

   Other Category 5E Certified Systems with a minimum (15) fifteen year warranty shall be considered but must be submitted before the bidders' questions are due for prior approval.

F. The Contractor shall provide the School District Representative with 20 spare dual jacks, 20 blanks and 20 matching faceplates.

1.15 COMPLETION

A. Documentation and as-builts shall be provided in accordance with the guidelines outlined in the Florida Department of Education, Retrofit for Technology Guidelines, Revised January 30,1995.

B. Upon completion of all testing and before system commissioning, actual Communications Outlet (CO) testing shall be performed. The tests shall be performed on a sample basis (10% installed COs) on various portions of the network as determined by the Osceola County School District Representative. The Contractor and an Osceola County School Representative shall witness the test. All Communications Outlets including the existing outlets shall be tested.

C. It shall be the responsibility of the Contractor to verify the ceiling tiles before performing this installation. The Contractor shall replace any broken or damaged ceiling tiles found at the end of this project before final payment is made.

SECTION 17030
MEDIA RETRIVAL & TELEVISION DISTRUBUTION SYSTEM

PART 1 – GENERAL REQUIREMENTS

1.01 DESCRIPTION

A Television Distribution System (TDS) is to be installed throughout the school. The channel modulators are to be used to accept base-band audio and video from selected VCRs located in the headend rack. This system shall support the transport of the RF signal from the source equipment controlled manually or via the Media Retrieval System.

1.02 MEDIA RETRIEVAL SYSTEM REQUIREMENTS

A. A Media Retrieval System shall be installed terminating with the television headend. The School District standardized media retrieval system is the Rauland-Borg Telecenter IP system. An area designated by the School District Representative and the Design Engineer shall accommodate the installation of up to (5) 7' equipment racks that will house all of the Media Retrieval and distribution equipment for the TDS System.

B. Additional requirements to supply the equipment racks with clean power shall be fed through power poles into the top of the racks. To accommodate the power requirements within the rack the Electrical Contractor shall install (2) dedicated circuits from a clean power panel into the equipment racks. The Electrical Contractor shall coordinate the installation of the circuits with the Media Retrieval/Television Headend Contractor. Each equipment rack shall require the installation of power poles or masts to not only accommodate power, but also necessary voice, video and data cabling as well.

1.03 TELEVISION DISTRIBUTION SYSTEM

A. Cables at terminal locations shall be neatly formed to prevent kinks or other discontinuities. Cables showing evidence of abuse or physical damage shall be replaced.

B. All Data/TV outlets specified shall have minimum one (1) RG-6 coaxial cable homerun without splices to the associated IDF/MDF and other locations as determined and shall be terminated with “F” type connectors. All “F” connectors shall be installed in strict accordance with manufacturers instructions. All “F” connectors shall be ULTIMATE SNAP-N-SEAL “F” SERIES COMPRESSION CONNECTORS. All dielectric residue shall be removed from surfaces of center conductors to insure proper electrical contact. Contractor shall provide a sample connector for inspection by the Engineer and the School District Representative.

C. The distribution of the signal from the Headend out to the designated areas is to be home-run design and must be able to accommodate a return sub-channel system. The cabling transport to each of the classrooms from their respective Communications Closet shall also be home-run. Distribution Amplifier- Blonder Tongue BIDA Series or approved equal. (Use BIDA 750-30)

D. Trunk line cables shall be a minimum .500, hardline coaxial cable for the distribution of signals between Communication Closets. All cables shall be 100% shielded, certified 5-750 MHz sweep tested and UL approved with an indoor fire rating, as required. Trunk lines are defined as cables that transport the signal from the headend to splitters and directional couplers at main distribution points. All underground cables shall be jacketed and flooded, in conduit. All hardline terminations shall be properly heat shrinked with gel filled heat shrink covering the entire connector and including the jacket where it has been stripped back. Trunk cable- Commscope or approved equal.

E. Drop line cables shall be RG6 type, all cables shall be certified sweep tested, 100% shielded, 5-750mhz (minimum) sweep tested and UL approved with an indoor fire rating. Drop lines are defined as cables that transport the signal from the directional couplers to the room outlets. Contractor shall provide a sample piece of cable for inspection by the Engineer and the School District Representative. Drop Cable- Commscope or approved equal.

F. The directional couplers to be installed should be of die-cast construction, 75 ohm, 5-750 MHz bandwidth and 100 dBmV minimum RF shielding. Directional Coupler- Blonder Tongue CRL/DMT Series or approved equal.

G. The splitters to be installed should be of die-cast construction, 75 ohm, 5-750 MHz bandwidth and 100dBmV minimum RF shielding. Blonder-Tongue or equal.

H. Line amplification shall be provided as necessary to meet strength specifications. These amplifiers shall also be able to provide two-way capability with either a passive or active sub-channel return path. Sub-band amplification must be installed. Amplification- Blonder Tongue BIDA Series or approved equal. (750 MHz) (Use BIDA 750-30).

I. The designated locations for the individual television installations shall consist of one single outlet television and an Owner provided, contractor installed wall mount bracket mounted not less than 6'8". Each wall mount bracket shall be able to support the weight of a 19" or 27" television as required. Placement of the Television mounts must be coordinated with the placement of black boards, corkboards and any other wall-mounted equipment. Typically, separation of black boards is necessary to accommodate the proper placement of the television mounts not less than 6'8" with a duplex power receptacle and coax/data faceplate. Wall-mount Brackets- Peerless only.

J. The television outlet for each TV shall be located at 96" A.F.F., U.O.N. level in classrooms, offices and other workspaces. Television outlets located in spaces with ceiling heights of 10' and more shall be identified on the blueprints.

K. A 120 VAC general power receptacle shall be located adjacent to each TV outlet.

L. The television outlet in each room shall be provided with a RG6 coaxial cable 36" minimum in length with two "F" type connectors.

M. In each classroom and/or designated instructional area an Audio/Video connection shall be installed under each television location, at 18" A.F.F, U.O.N.. This will allow the use of a source device for delivering Audio and Video to the wall mounted TV. A 120 VAC power receptacle shall be located adjacent to each Audio Video Outlet. Provide labeling at both A/V receptacles to identify ports. **The homerun coax cabling feeding these outlets from the associated MDF/IDF shall** be split and connected at the stub-out location using a Blonder-Tongue DSV diplex splitter mounted to the wall above ceiling at the stub-out location to allow the use of sub-band **from the lower outlet in** the classroom.

N. Each television faceplate shall also accommodate the installation of (1) one RJ45 connector allowing Category 5E or above cable to be installed between the MDF/IDF Room on their own separate labeled patch panel and each designated Television location.

O. Provide all attenuators, filters, traps and other accessories for a complete**, balanced** and operational system.

P. Provide a duplex power power receptacle at each television distribution point for the powering of additional distribution equipment amplification.

1.04 SYSTEM PERFORMANCE

A. System bandwidth shall be 0-750 MHz, flat within 1 dBmv across any 6 MHz part of the spectrum. At no point in the system shall the signal level between channels vary more than 6 dBmv.

B. The minimum signal level at any outlet shall be no less than +5 dBmv, the maximum signal level at any outlet shall not exceed +10 dBmv.

C. Cross modulation shall be -57 dBmv or better.

D. Signal to noise at the most remote outlet of any leg shall be at least +46 dBmv.

1.05 SURGE SUPPRESSION

Surge Suppression -Surge suppression shall be installed on all trunk cable at each building entrance. Attach to ground using a homerun #6 stranded, green jacketed ground cable. Surge Suppression- EDCO CATV-145 or approved equal.

1.06 COMPLETION

A. The system will be considered complete when all of the following requirements have been met:

1. All ending cable leads and unused ports are terminated.

2. All equipment is installed to manufacturers' specifications.

3. Indoor/Outdoor cabling in each enclosure, cabinet or closet is to be appropriately labeled as outlined in section 17020.

4. Copy of the blueprints showing all cabling and any changes to the "initial design layout" has been provided to the Owner.

5. All channels in the system have been properly balanced with an audio/video signal passing through each channel.

6. The sub-channel system has been tested from various locations in the building with satisfactory results.

7. All pictures shall be clear of any interference caused by cross-modulation, distortion, or adjacent signal levels.

8. Documentation and as-builts shall be provided in accordance with the guidelines outlined in the Florida Department of Education, Retrofit for Technology Guidelines, Revised January 30,1995.

9. Upon completion of all testing and before system commissioning, actual Communications Outlet (CO) testing shall be performed. The tests shall be performed on a sample basis (10% installed COs) on various portions of the network as determined by the Osceola County School District Representative. The test shall be witnessed by the Contractor and an Osceola County School Representative. All Communications Outlets including the existing outlets shall be tested.

10. It shall be the responsibility of the Contractor to verify the ceiling tiles before performing this installation. Any broken or damaged ceiling tiles found at the end of this project shall be replaced by the Contractor before final payment is made.

1.07 ACCEPTANCE INSPECTION

A. Be prepared to demonstrate to Engineer/Owner compliance of these specifications by all major items or pieces of equipment, as well as compliance with specifications for entire system at time of turn over. The Contractor shall demonstrate the operation of the system to the Engineer during the final inspection in the following manner:

1. Measure signal levels with a calibrated field strength meter at all outlets and record the High and Low channel levels selected by the Engineer.

2. Observe picture quality at outlets selected by the Engineer/District representative using a 17" (diagonal screen size) color television receiver.

3. Test the last outlet on every cable run via a spectrum analyzer for carrier level, carrier to noise ratio, hum, modulation, and system frequency response.

4. Any other test the Engineer deems necessary to establish the system is operating properly.

5. The above tests and measurements shall be documented in the operation and maintenance manuals as the as-built conditions.

6. Provide a technician to instruct Owner personnel in operation and maintenance procedures of system.

7. Instruction scheduled at Owner's convenience.

1.08 TEST EQUIPMENT REQUIRED

A. 17" minimum diagonal screen size color receiver in good working order. Signal level meter capable of measuring peak carrier levels within the 5 MHz to 750 MHz spectrum.

B. Formal instruction shall be given to Owner designated key personnel at a time selected by Owner. Such instruction shall consist of no less than 6 hours delivered in two (2) separate sessions. Training shall cover operation, programming, troubleshooting and maintenance.

C. A written report, signed by the instructor, shall be submitted to the Owner with copies to the Architect, and Engineering Consultant, detailing subjects covered, names of persons instructed, dates and amount of instruction each person received. This report shall be submitted within one week following the instruction.

1.09 WARRANTY

A. All television system equipment and wiring shall be guaranteed by the installing contractor to be free of defects in materials and workmanship for a period of one year from the date of substantial completion of the system.

B. Any system component, which shows evidence of failure or incorrect operation during the manufacturer's warranty, shall be repaired or replaced by the Contractor at no expense to the Owner.

1.10 ASBUILT DRAWINGS

A. General: Complete system as-built drawings shall be provided with the following information:

1. A block diagram of the entire system indicating all cables, cable types, active and passive components.

2. Aural and visual carrier levels on all channels at off-air antenna leads and the headend output.

3. Measured signal level on all visual carriers at:

a. input and output to all active devices.
b. Each tap.
c. Each feeder termination.
d. Each building service. (CATV, Satellite, etc.)
e. Each TV location

SECTION 17040
SATELLITE ANTENNA

PART 1 – GENERAL REQUIREMENTS

1.01 REQUIREMENTS

A. Owner shall purchase the Satellite Antenna and the School District Representative shall manage the installation. The Electrical Contractor shall provide conduit between the Television Headend and the Satellite Antenna location. Minimum size of the conduit shall be 1-1/2" with pull boxes at mid span or every 200' as applicable. The School District Representative shall approve conduit placement. All conduit connections and pull boxes shall be weatherproof. All conduits on the exterior of any building shall be of appropriate schedule & type, according to code and painted to match the building shell or trim, as required by the Owner's representative.

1.02 All civil work and the concrete foundation designed for the antenna supplied, including all conduit work, and all wiring from within the building to the foundation.

A. Conduits, if used, shall be water-tight.

B. All hardware shall be galvanized.

C. A soil test report related to the construction of the nearby building will be provided if available

D. The Contractor shall provide a foundation design sealed by a registered professional Engineer.

E. Contractor shall obtain all permits that may be required for the work.

F. Completion of TVRO Site Survey Form. (See Attachment B)

G. Options that may be accepted from the Form of Proposal.

1.03 INSPECTIONS

A. Inspections will be made prior to accepting the equipment/installation. Contractor shall provide a one-day notice to Owner's representative when ready for the following inspections.

B. Upon completing the preparation of the site to be ready for pouring the concrete foundation, but <u>prior to</u> pouring the concrete.

C. Upon completion of the system installation and when ready for final testing, Contractor shall complete the installation and all adjustments, including sufficient preliminary tests to verify that the final measurements will meet all specifications in advance of Owner's Representative arriving on-site. A PVC conduit set into the concrete foundation with a sweep EL shall be used to route the cable from the motor drive and LNBs to the trench used to route the cables in PVC conduit to the building. Supply the top of the conduit at the antenna with appropriate weatherproof cap. **Verify with Owner's representative.**

1.04 The successful bidder shall deliver, set in place, install, make ready to run, and test (test to be accomplished in the presence of an authorized representative of the School District of Osceola County, Florida) a C/Ku Analog and Ku Digital Television Receive-Only Satellite Earth Station as specified herein. The bidder shall provide a qualified person, at no extra cost, to assure performance of the item(s) and to make sure the initial start-up and successful testing is achieved. Upon completion of the successful testing of the item(s), the School District's authorized representative shall accept it.

1.05 SERVICE REQUIREMENTS

The successful bidder shall provide sufficient staff, resources and facilities to ensure that the School Board's business is handled in a timely manner.

1.06 The School District will not provide any materials, tools, equipment, or labor that may be associated with this project.

DEVIATION FROM SPECIFICATIONS

- Any deviations from specifications must be clearly stated in writing in the bid package; if not, it will be considered that all items are in strict compliance with the specifications and the successful Bidder will be held responsible for meeting the specifications

- If a vendor has any exceptions to these specifications, such exceptions must be stated in writing, described in detail, and reference to the corresponding paragraph number. There is no intention to disqualify any bidder who can meet the intent of these specifications without necessarily being in compliance with minor details.

- Where the bidders proposal cannot meet the bids mechanical or environmental specifications for the equipment as given in the Technical Specifications, the bidders proposal shall state the following:
    1. The extent of the deviation (s).

    2. The parameters the Vendor is prepared to meet.

    3. The reason why the Vendor's parameters can be considered sufficient for this application.

- Item(s) installed that do not meet the specifications as specified herein will not be accepted and if the successful bidder can not bring the item(s) up to specifications within the contracted period for each project, the Contractor shall compensate the District for the cost to bring the equipment up to specifications.

1.07 MATERIALS AND WORKMANSHIP

All materials & equipment shall be new and shall meet or exceed UL requirements and be UL listed as required.

1.08 The successful bidder shall use the manufactures' recommended methods of installation, use of equipment and training.

1.09 UPDATES TO PRINTED MATERIALS (MANUALS)

The successful bidder shall for the term of this contract, provide the District with any and all updates to any and all printed material for the equipment specified herein. These updates shall be provided to the District at no additional charge.

1.10 TESTS AND ACCEPTANCE MEASUREMENTS

1. Bidders shall explain in detail the test and acceptance procedures proposed for this station.

2. Bidder shall state the time required for test and acceptance, and what test equipment the Vendor will be using for the aforementioned tests.

3. If in-plant tests are intended to suffice for certain items of equipment, the Bidder will state what equipment falls into that group, and what rationale has been used for that decision. In-plant tests will suffice for the following equipment:

   A. Receive patterns for ± 7 degrees of azimuth and ± 7 degrees of elevation.

   B. Receive cross-polarization pattern for ± 1.5 degrees of azimuth and ± 1.5 degrees elevation.

1.11 It is the bidders responsibility to determine ceiling space requirements for the installation of conduit as needed.

2. TECHNICAL SPECIFICATIONS

2.01 PRIMARY PURPOSE OF EQUIPMENT

The primary purpose of the equipment herein specified is to receive NTSC analog/digital video and associated audio channel(s) transmitted on the domestic satellite transponders in the domestic arc.

2.02 The station(s) shall consist of C/Ku analog and Ku digital systems for the reception of television signals from satellites in the domestic arc with a motorized positioning system remotely controlled from the location of the electronic equipment.

2.03 SATELLITE INFORMATION

1. Ku-Band Frequencies: 11.7 to 12.2 GHz
2. C-Band Frequencies: 3.7 to 4.2 GHz
3. Primary Positions: Steerable (motorized positioning system) to all satellites in the domestic arc.

2.04 STATION INFORMATION

1. One (1) antenna and polar mount
2. One (1) C-Band LNB
3. One (1) Ku-Band LNB
4. Two (2) two-way, high frequency power dividers
5. One (1) C/Ku feed assembly with cover
6. One (1) actuator positioner
7. One (1) analog integrated receiver de-scrambler
8. One (1) digital integrated receiver de-scrambler
9. One (1) software package for programming of the receiver
10. One (1) 20 dB distribution amplifier
11. One (1) two-way splitter
12. One (1) a/b switch
13. Lightning/surge protection
14. Concrete foundation
15. Miscellaneous hardware, cabling, conduit runs etc.

2.05 Conduits, if used by the contractor, shall be watertight.

2.06 The contactor shall use galvanized hardware where necessary.

2.07 CONCRETE FOUNDATION - Concrete foundation shall be as follows:

1. 3’ X 3’ pad, 5’ deep
2. Schedule 80 pipe shall be set 4’ in concrete and extend 5’ above the pad.
3. Pipe shall have a minimum 2 weldments or approved rods at the base.
4. Fill the schedule 80 pipe with concrete.
5. Check with manufacturer for outside diameter requirements of the pipe. 1-800-627-9443

2.08 INSPECTION

The successful bidder shall provide the District Representative, Bill Myers – Technology Services at (407) 518-2950 with a one-day notice for the following inspections:

1. Upon completing the preparation of the site to be ready for pouring the concrete foundation, but prior to pouring the concrete. Note: The District will not accept the project unless the District Representative has completed a satisfactory inspection. Any work performed beyond the required inspection checkpoint without a satisfactory inspection, will be removed by whatever means necessary in order that the required inspection be performed, at the bidders expense. Upon completion of a satisfactory inspection work may continue.

2. Upon completion of the system installation and when ready for final testing, Vendor shall complete the installation and all adjustments, including sufficient preliminary tests to verify that the final measurements will meet all specifications in advance of Owner's site coordinator arriving on-site.

2.09 SYSTEM TESTING

1. Testing: The awarded Vendor shall perform test procedures as specified by the equipment manufacturers. A field strength meter shall be used for alignment.

2. Test Equipment: The Vendor must have on hand proper equipment to allow a trained operator to perform all tests to verify that the installed TVRO system meets the specifications. The Vendor shall program all current satellites (WestSat or Keystone guide) into the receiver.

3. Base one set of measurements on Telstar 4, 89 degrees West, vertical polarization.

4. Receive C/N measurement.
5. Operation of the motorized positioning system.

2.11 FUNCTIONAL CHECKOUT - TRAINING

1. A minimum of one (1) hour, or as long as needed to complete the training, shall be allowed for each training session.

2. Training shall include hands-on experience for operations and maintenance personnel for hardware and software where applicable.

3. Remote & console programming of the satellite receiver.

4. The Vendor, upon completion of all phases of the contract, shall provide the Owner's representative with the necessary manpower, tools, equipment and training for the representative to perform a functional checkout of all systems installed under this contract.

5. Upon completion of the functional checkout, the Owner's site coordinator will certify that the site is operational and the installer conducted training of a minimum of two (2) people.

6. The Owner's site coordinator will certify job completion by signing a site release form. Refer to ATTACHMENT "A" for a sample site release form. The Vendor shall forward a copy of the site release form along with his invoice to Dan Olson – Technology Services for authorization of payment.

The School District of Osceola County
817 Bill Beck Blvd.
Kissimmee, FL 34744
Phone # (407) 870-4020

2.12 AS-BUILT DRAWINGS

1. The Vendor shall furnish two (2) copies of the project "as-built" drawings per site upon completion.

2. "As-built" drawings shall show all details of the system as installed, including interfaces and any modifications to existing equipment.

2.13 TECHNICAL/INSTRUCTIONAL MANUALS

1. The Vendor shall provide a set of technical/instructional manuals for all equipment purchased upon completion of the TVRO site installation. The instructional/technical manuals shall reflect the equipment as designed and built.

2. The technical/instructional manuals shall contain, but not be limited to:

- A specification section defining the capabilities of the equipment.
- A section describing the technical operations of the equipment.
- A section describing major malfunction identification and subsequent trouble-shooting procedures.
- A section describing the installation and operation of the equipment.

2.14 CODES AND COMPLIANCE

All equipment proposed shall comply with the current versions of the following documents where applicable as specified herein.

1. National Electrical Code 1993, ANSI/NFPA 70, Chapter 8 – Communications Systems

2. UL Listed (Underwriters Laboratories, Inc.) as appropriate

3. EIA-441-A and EIA/TIA-RS-222-E. (foundation design)

4. Building Code Requirements for Reinforced Concrete, ACI 318-89. (concrete mixing, placing, curing and reinforcing cover)

5. Specifications for Structural Concrete, ACI 301-84. (concrete mixing, placing and curing)

6. ASTM A615 (S1) grade 60 (reinforcing bars)

7. Manual of Standard Practice for Detailing Reinforced Concrete Structures, ACI 315-80 (fabrication of reinforcing steel)

8. Occupational Safety and Health Act of 1976

9. State, County and Local ordinances

10. Florida State Board of Education for Educational Facilities Construction; Chapter 6A-2

11. Reference to specific standards, manuals or codes shall be interpreted by the Vendor to mean the latest version of that reference or the rule, code or specification in effect at the time of receipt of the bid package.

12. BICSI TDMM

2.15 SYSTEM PERFORMANCE REQUIREMENTS

1. C/N Final, the combination of C/N Uplink and C/N Downlink, shall be equal or greater that 12 dB and 4 dB above the receiver threshold, whichever is greater.

2. Specifications Dictate – Even though a system with components having characteristics other than those specified in these Technical Specifications may meet the C/N Final required, the equipment shall also meet all of the Technical Specifications of this bid document.

2.16 EQUIPMENT REQUIREMENTS

1. Antenna System Description: The antenna system shall be DH or approved equivalent and consist of the following:

- Minimum Antenna Size: 3.0 meters diameter.
- Antenna shall be of one-piece construction, solid and painted with a white, off-white, or gray heat diffusing paint.
- Antenna surface accuracy shall be < 0.030 inch static.
- Antenna shall be capable of avoiding objectionable interference with adjacent satellites at 2 degree spacing and meet FCC 2 degree spacing requirements.

2. Antenna Pattern: Proposals submitted shall contain an actual antenna pattern taken on the proposed antenna either on a suitable antenna range or in use with a satellite for both C-Band and Ku-Band frequencies.

3. Antenna Mount: The antenna mount system shall be a DH Satellite polar mount or approved equivalent:

   - Conform to the manufacturer's recommendation.
   - Be capable of motorized positioning for reception of all satellites within the domestic arc.
   - Be capable of maintaining an operational pointing accuracy in winds up to 45 mph and capable of surviving winds up to 110 mph.

4. Antenna Ground Mount shall conform to the manufacturer's recommendations and meet all of the Technical Specifications listed herein. (see paragraph 5.07)

   - Standard ground mount, extended pole mount and tall pole mount shall consist of a steel shaft of appropriate dimensions to meet the manufacturer's recommendations and the operational and survival requirements of these Technical Specifications.
   - The pole shall be environmentally protected by priming with a rust resistant paint followed by two (2) coats of a weather resistant paint such as Black Rust Oleum or equal.

5. Actuator/Positioner: Shall be Thompson Saginaw, 36" or approved equal.

   - Shall be capable of high resolution positioning of the antenna for acceptable reception of all satellites within the domestic arc via pre-programmed satellite locations in the receiver.

6. Foundation – All pole mounts shall:

   - Be set in concrete with the top surface tapered up toward the base of the pole at least 2 inches above grade to prevent standing water or ground moisture from corroding the metal pole. Bracing may be used if

necessary to meet the operational survival requirements of these Technical Specifications.

- A PVC conduit set into the concrete foundation with a sweep EL shall be used to route the cable from the motor drive and LNBs to the trench used to route the cables in PVC conduit to the building. Supply the top of the conduit at the antenna with appropriate weatherproof cap. Verify type of weatherproof cap with Owner.

7. Ground System – The electrical ground system shall consist of:

- One #6 ground wire connected to the earth station, then continuing through a separate PVC conduit adjacent to the pole mount through the foundation and underneath the foundation to a new ground rod driven within one (1) foot of the edge of the foundation.

Materials and Methods

The "ground" shall be an independent system. Antenna mount hardware shall not be used for securing the ground wire. Secure the ground to an approved grounding device on the antenna feed, antenna mount and the mount support. The Owner's representative shall make the final approval of all grounding systems.

- Ground Wire: Not less than #6 AWG solid copper wire.
- Ground Rod(s): Minimum 5/8" diameter, 8 foot long copper clad steel.
- The ground wire shall be as short as possible without any sharp bends.
- All connections shall be made using approved connectors.
- Under no circumstances shall any ground system components be imbedded in the concrete foundation.

IFL Requirements: The IFL system shall consist of the following:

- Three (3) RG-6 coaxial cable, sweep tested for 1450 MHz.
- Two (2) conductor 14 AWG stranded control wires.
- Three (3) conductor 22 AWG stranded shielded actuator sensor wires.
- Three (3) conductor 18 AWG stranded shielded polarity sensor wires.
- The cables connecting the receiver with the LNBs, the polarization motor drive, and the actuator shall be integrated and shall be continuous without splice.
- For cable runs equal or greater than 300 feet, a RG11 cable (Belden 8213 or approved equivalent) with THHN-12 AWG stranded control and sensor wires will be required.
- All external connections shall be protected form the environment by a silicon grease sealant.
- The cables shall meet or exceed all electrical building codes. The cables shall be placed in PVC conduit when buried or in metallic conduit when

exposed or required. Install cable to provide adequate service loop at the antenna and receiver location, confirm with the Owner's representative the actual lengths for each site.

- Conduit: Minimum size of the conduit shall be 1½" with pull boxes at mid span or every 200' as applicable. The School District Representative must approve the placement of any conduit. All conduit connections and pull-boxes shall be weatherproof. Conduit on the exterior of any building shall be painted to match the building shell or trim, as required by the Owner's representative.
- Cabling extending into the building shall be properly supported by contractor supplied devices. If necessary, the cabling shall be installed in contractor supplied EMT. Owner shall make the final determination as to whether or not a conduit system shall be installed.

10. Analog Satellite Receiver:
The receiver shall be Chaparral Monterey 100C Plus or approved equivalent.

- Fully integrated single-housing receiver, antenna actuator and de-scrambler.
- Rack Mount
- Basic operational functions of the satellite receiver shall be accessible through the receiver's front panel, a full-functioned infrared remote control, and an on-screen graphics menu and sub-menus.
- Operable without the remote.
- Videocipher II Plus de-scrambling module.
- Capable of utilizing other de-scrambling methods.
- External 70 MHz loop mandatory.
- Automatic C/Ku-Band switching.
- Half transponder analog capability (Ku-Band only).
- External connections for RF output, video output and audio output.
- The satellite receiver shall have video-out without menu display.
- The receiver shall be capable of being controlled by computer interface software from a remote site.

11. Digital Satellite Receiver:
Shall be General Instruments DSR-4200V Digicipher II, or approved equivalent. The receiver system shall consist of:

- Fully integrated single housing receiver/de-scrambler.
- Rack mount
- Basic operation functions of the receiver shall be accessible through the receiver's front panel, full functioned remote control, and on-screen graphic menus and sub-menus.
- Operable without the remote.

- Digicipher II and MPEG II compatible.
- MCPC and SCPC compatible. (Audio capabilities)
- Automatic C/Ku-Band switching.
- External Connections for RF output, video output and audio output.
- The satellite receiver shall have video-out without menu display.
- The receiver shall be capable of being controlled by computer interface software from a remote site.

12. Digital C-Band LNB: Shall be Norsat 8215 or approved equivalent

13. Digital Ku-Band LNB: Shall be Norsat 4207 or approved equivalent

14. Feed Assembly: Shall be Chaparral Corotor II or approved equivalent and consist of:

- Dual-band Feedhorn.
- Frequency range: C-band 3.7 – 4.2 GHz; Ku-band 11.7 – 12.7 GHz.
- f/D range: .32 to .45
- Cross polarity isolation: 25 dB.
- SWR: 1.3
- RF ports: Compatible with LNBs.
- Servo motor with infinite skew adjustment.
- Feed cover.

15. High Frequency Splitter: Shall be Blonder-Tongue or approved equivalent and shall consist of:

- Two-port.
- Frequency: 900 – 1500 MHz.
- One port DC power passing.

16. Two-Way Splitter: Shall be Blonder-Tongue or approved equivalent and shall consist of:

- Frequency: 54 – 450 MHz.

17. A/B Switch: Shall be PICO AB-4 or approved equivalent.

18. Distribution Amplifier: Shall be Blonder-Tongue or approved equivalent and shall consist of:

- Single output.
- Gain: 20 dB.
- Frequency: 54 – 450 MHz.

19. Surge Protection – The surge protection shall consist of the following:

- Panamax Max SAT Allpath- GTM0603 or approved equivalent.
- Minimum of four (4) AC outlets.
- Capable of protecting 75-ohm coaxial cables for one LNB with DC path to power LNB.
- Bandwidth: 950 – 1450 MHz.
- VSWR: maximum 1.3 to 1
- Capable of protecting Power Line.
- A single integrated unit is preferred.

2.17 WARRANTY REQUIREMENTS

1. During the warranty period, the Vendor shall furnish replacement parts and material for defective equipment for the period of one (1) year at no additional cost to the School District.

2. During the one (1) year warranty period, the Vendor shall furnish labor to maintain, repair and/or replace defective equipment or software at no additional cost to the School District.

3. The Vendor shall be liable to each school site for supplying information and materials necessary for mandatory revisions determined by the manufacturer at no additional cost to the School District during the one (1) year warranty period.

4. The Vendor's mandatory one-year warranty shall not void other extended Manufacturer's warranties, which exceed one year for parts, materials, electrical and defects in workmanship.

5. The Vendor shall act as sole point of contact in all matters affecting maintenance and repair for all components of the TVRO system for at least one (1) year or as long as the system's components are covered under the Vendor's warranty, if longer.

6. The warranties must begin and become effective the date the system is accepted and signed off by the Owner's site coordinator, not at the award date for this contract.

7. Comply with the response time for warranty repairs as specified by the Vendor on the Price Sheet. Telephone confirmation must be made within two (2) working hours, on-site inspection within twenty-four (24) hours and repair completion within five (5) working days.

8. The bidder shall provide ready availability of parts and service to maintain all items. If the repairs cannot be made at the school or location where the

item is located, the bidder must pick-up the item, repair the item and later return the item to the location where it is being used. If requested by the District the awarded Vendor shall supply a replacement item at no additional cost.

9. Bidder is not responsible for any services required due to damage caused by acts of God or operator errors.

2.18 OPTIONAL FENCE

1. Provide and install a fence around the earth station.

2. The fence shall be at least six (6) feet high, galvanized chain link fabric. The line posts shall be galvanized and set in concrete a minimum of three (3) feet deep, maximum spacing ten (10) feet on center.

3. The fence enclosure shall have a three (3) foot wide gate with a latching device, which will accommodate a padlock. The padlock shall be a Master 6125 or equivalent.

4. The wall of a building(s) may be one (or more) side of the required fence.

5. The fence shall be spaced at least three (3) feet from the outside edge of the concrete pad and far enough from the antenna to avoid blocking the antenna from all satellites.

SECTION 17050
VIDEO SURVEILLANCE SYSTEM

PART 1 – GENERAL REQUIREMENTS

1.01 SUMMARY

A. A Video Surveillance System (VSS) is to be installed in each individual school as designed by the School District Representative. These systems will consist of one (1) Digital Video Recorder (DVR) or Network Video Recorder (NVR) and up to 16 cameras. The DVR shall be located within the school's Main Distribution Facility (MDF) where a powered rack will receive signals from color cameras located inside and outside the facilities. For video retrieval or live video surveillance, the DVR shall be connected to the school district's Wide Area Network using the Internet Protocol method (IP addressing) provided by the School District IT department. At the individual school, the School District Representative shall designate those personnel who will have access to the video and software will be installed on their personal computer systems. The School District is responsible for deciding and granting permission levels.

B. Security systems are critical in assuring life and property protection. Therefore, it is imperative that they perform their function properly and reliably. This specification has been prepared to assure that all installations of these systems do their job well.

C. This section outlines the quality, type and installation of the building video surveillance system. Included in this Section the contractor shall provide all labor, equipment, and materials necessary for a complete, tested and operational system. The scope of these specifications is to insure the delivery of a complete unit, ready for operations. Omission of any essential detail from these specifications does not relieve the supplier from the furnishing of a complete unit.

D. Approval of samples, cut sheets, shop drawings, and other matter submitted by the contractor shall not relieve the contractor's responsibility for full compliance with the specifications, unless the attention of the School District Representative is called to each non-complying feature by letter accompanying the submitted matter.

E. All equipment must be new, of current manufacture and carry standard warranties. At least two complete shop repair manuals and parts lists must be furnished with each type of equipment at the time of delivery.

F. Typical camera locations include but shall not be limited to: Reception, Main lobby, Cafeteria, bus drop-off/pick up, parent drop-off/pickup, courtyards, play

areas, stair towers, parking areas, hallways, entrance gates and as specified by the principal and School District Representative. The exact number, type and location of cameras shall be dependent on the site plan as approved by the Project Engineer and School District Representative .

1.02 CONTRACTOR QUALIFICATIONS

A. The contractor must be a qualified systems integrator with local service facilities within 25 miles of the School District offices located at 817 Bill Beck Blvd in Kissimmee, Florida.

B. The contractor must have sufficient personnel and facilities to be able to provide 2 hour on-site response to any and all situations involving the video surveillance system. The contractor must provide 24 hour on-call service via a toll free number.

C. The contractor must have performed work of comparable scope at educational facilities within the last 2 years with proof of exemplary performance. Should the School District Representative require it, the contractor must facilitate site visits.

D. The contractor must have the ability to provide Auto CAD drawings of the system design and as-built drawings upon project completion.

1.03 EQUIPMENT - The system shall include but not be limited to the following:

A. **Digital Video Recorder (DVR) –** Specification is for the Pelco DX8000 series DVR or VMX300 video management system. Digital Video Multiplexer Recorder with Ethernet connectivity (DVR) shall meet the following minimum performance specifications: allow up to 4CIF (720X480) recording, allow up to 480 NTSC frames per second recording at CIF (320X240), 16 looping camera inputs and outputs with audio termination, 640 GB internal storage capacity, multiple displays for live viewing or playback while recording, continuous motion detection + alarm + scheduled recording, ability support 5 simultaneous clients, network bandwith throttling, digital zoom on playback, pre-motion and pre-alarm recording, on-screen PTZ control with dome programming capability, and include Remote PC + Web + Handheld client software. The DVR shall require minimal training for the end user. The unit shall operate like a conventional multiplexer and VCR with local display monitors for live and playback viewing while the system continues to record new images. It shall be an integrated security system, capable of time division multiplexing multiple cameras and storing their digitized and compressed images on integral hard disk drives for fast search and retrieval either locally at the unit, or from a remote workstation using a Graphical User Interface (GUI). Software/Graphic User Interface. The system GUI is dependent on the DVR equipment used and must be from the same manufacturer.

B. **Cameras -** General Requirements: The monochrome/color camera, as required, shall use a high-resolution 1/3-inch format, interline transfer, CCD image sensor containing 768 Horizontal by 494 Vertical active picture elements. Typical horizontal picture resolution produced by this camera shall be a minimum of 570 TV lines monochrome and 480 TV lines color as measured on an EIA 1956 Test Pattern Chart. The camera shall include, but not to be limited to, the following features: electronic iris, backlight compensation, automatic gain control, 24V AC/DC power, four white balance modes, line lock with phase adjust, C/CS lens mount, digital signal processing elected by Owners Representative for each project, electronic light control, and selectable automatic white balance. Cameras shall be lined-locked to the power line zero crossing to ensure roll-free vertical interval video switching and recording. Approved models are listed below.

1. **Vandal Resistant, Color, Indoor/Outdoor, Fixed Dome Camera -** The product specified shall be the Model LTC 146x Series FlexiDome^{XT} Vandal Resistant Color Camera manufactured by Bosch Security Systems or an approved equal. The product specified shall be a full-featured, vandal resistant, fixed dome camera designed for indoor or outdoor applications. The camera shall be a 470 TVL resolution, high sensitivity integral color camera using a ¼-inch format CCD imager prepackaged in an impact-resistant cast aluminum housing with a clear polycarbonate dome. As required by the application, the camera shall come equipped with an integral 2.8 to 6mm, F1.4; 3 to 6mm, F1.2; or 4 to 9mm, F1.4 DC-iris lens. The camera shall be sealed for outdoor use and provide protection against water and dust to NEMA-4 (IP66) standards. The camera shall provide immunity to shock and vibration and be virtually vandal-proof by being able to withstand the equivalent of 120 lbs. of force. The camera specified shall incorporate technology that extends the sensitivity of the camera by a factor of 3X when the camera is operating in the monochrome mode. Typically installed for general purpose use indoors or outdoors. Also required for areas of probable vandalism to camera.

2. **Indoor High Light Sensitivity Color Camera -** The product specified shall be the Extreme Dynamic Range Color Camera model CCC5100-H6 manufactured by PELCO or an approved equal. The digital single instruction, multiple data (SIMD) color camera shall consist of a 1/3-inch, super wide dynamic range SIMD imaging chip. The digital SIMD color camera shall utilize an imaging system such that when light strikes the imager it is converted to a digital signal at the pixel level, enabling the processor to analyze the scene and correct the exposure by pixel. The imager shall use progressive scanning to use every pixel on every field, resulting in doubling the vertical resolution of a CCD imager and, thus, decreasing digital distortion. Typically installed for areas where varying lighting extremes are present simultaneously, such as a shaded subject strongly backlit briefly.

3. **Indoor Day/Night Color Camera -** The product specified shall be the Digital CCD Day/Night, Color/B-W Camera, model CC3770-OH6 manufactured by PELCO, or an approved equal. The high resolution camera shall consist of a 1/3-inch imager and switch from color to black and white mode, depending upon available light. The camera shall us an IR cut filter in color mode and an optical low pass filter in black and white mode. The camera shall have a sensitivity of 0.7 lux in color mode and 0.9 lux in black and white mode. Typically installed in areas where interchangeable lenses are needed for more flexibility.

C. **Outdoor Camera Housing -** All exterior cameras shall be installed in an approved weatherproof housing. The product specified shall be EH3512-2HD manufactured by PELCO or an approved equal. All outdoor camera housing shall be provided with a sunshield. All cameras installed below 10' shall be installed in vandal proof housings.

D. **Fiber Optic Converter/ Transmitter/ Receiver –** The Product specified shall be Fiber options models S700VT-MST and S7011/2R-RST manufactured by GE Security. Receivers shall be rack mounted at the MDF in a 515R1, 15 slot card chassis, with an appropriately rated power supply. The card chassis shall be installed in the same equipment rack as the DVR.

E. **Power Supply -** Appropriately sized, wall mounted, multi-camera power supplies are to be used. The specified product shall be the MCSx-xE series power supply manufactured by PELCO or an approved equal. The use of individual transformers will not be accepted. A centralized Low Voltage power supply with Low Voltage wiring distribution to cameras for each building shall be included. Designs may vary and will need to be District approved. These power supplies shall be located in the appropriate MDF/IDF room in each building having surveillance cameras.

1.04 CABLING, RACEWAY, CONDUIT, SUPPORT AND LABELLING

A. All cabling, conduit, support and labeling shall comply with the requirements as outlined in Section 17020 of this document.

B. Video Cables: Video cables shall be RG59U equivalent or better up to 500FT, RG6 up to 750FT and RG11 up to 1500FT. All video cabling shall have 95% copper braid shielding and a solid copper center conductor. All coaxial connectors shall be ULTIMATE SNAP-N-SEAL "F" COMPRESSION CONNECTORS.

C. All coaxial cabling for cameras mounted on the same building as the MDF room is housed in shall be home-run to the MDF to be connected to the DVR.

D. All coaxial cabling for cameras mounted on buildings other than where the MDF room is housed shall be home-run to the nearest IDF room. There the video signal

will be converted to run over fiber optic cabling to be connected back to the MDF. Existing fiber optic backbone cables may be used for this purpose. If this will completely utilize all available spare fiber optic cabling strands the School District Representative shall be notified in writing.

E. All system cabling shall be neatly routed. Do not lay cables across joists. Security and/or Surveillance cable shall take the highest point available to ensure no interference with other types of required cable. All cabling shall be a minimum of 18" off joist. No system cabling shall be run across any electrical fixture or within 18" of any florescent lights. System cable shall not lay on or against any HVAC equipment, ducting, conduit system or plumbing system. No fastening devices shall be clamped to any existing equipment, threaded rods, ceiling hangars, straps, etc.

F. Cables of similar signal level shall be bundled together and kept physically separate from power cords, plug strips or other circuits with a difference of potential. All cabling must be supported with Bridle Rings or J-Hooks every 5 feet (Bridle Rings or J-Hooks must be at the highest point of the Building). If you have 2 or more cables in a run they must be tie wrapped every 2 feet. Cable bundles or individual cables shall be neatly secured with self-clinching nylon cable ties (Thomas & Betts or equal). **Lacing of cables shall not be permitted.**

G. Service loops at equipment panels shall be 5' and at the device location shall be 3'. All service loops shall be neatly secured above ceiling.

H. All cabling shall be pulled from central location to each building, even though all cameras for that building may not be installed. Contractor must take every precaution to protect all existing equipment, wiring, fixtures and building materials from damage during installation of equipment required in this bid. All cabling installed and not placed into operation must be properly terminated and protected. There will be no splicing of any cabling on these systems.

I. Connector Tooling: Tooling used to provide connectors shall be specifically designed for the connector being used. Utilization of non-specified tools shall be considered as grounds for cease and desist as well as possible grounds for termination of contract. Coaxial Cable Terminals shall be bayonet style two-piece connectors matched to the coaxial cable wire diameter in use. Twist on style connectors may NOT be used. Fiber Optic Connectors should be Anaerobic ST connectors.

J. All cabling entering an existing communications closet or electrical room shall be sleeved in EMT conduit. The conduit shall be carefully reamed and terminated with plastic bushings on both ends.

K. Equipment panels or equipment racks shall have EMT conduit installed between the panel and the ceiling space. The conduit shall be carefully reamed and terminated with plastic bushings on both ends.

L. All penetrations shall be properly sleeved and sealed according to applicable codes. Upon completion of project, a certified statement is to be submitted by the Contractor assuring the District that all penetrations have been sleeved and sealed. Example: Fire Wall penetration must be resealed using a Fire Proof/Resistant material to ensure the Fire Wall maintains original fire rating.

M. All cable exposed to the exterior shall be installed in the appropriate size conduit. (PVC/EMT as required). All conduit sleeves and raceways shall be carefully reamed to remove all burrs and sharp edges. Plastic bushings shall be used at all terminations and properly sealed.

N. All video connectors exposed to the weather at camera locations shall be filled with an insert of silicon 'grease' equal to Dow Corning DC #5 compound before mating with opposite connector half. The connection shall then be completely covered with heat shrink tubing.

O. System Labeling:

1. Cameras: all system cameras, housings, cables, power supplies, video adapters, and monitors shall be labeled with numbers corresponding to camera numbers shown on the contract drawings.

2. Console: A typewritten schedule of all camera numbers and their locations shall be laminated in clear plastic and fastened where directed in each operator's station with a suitable adhesive.

3. A campus map identifying each camera location shall be laminated and fastened where directed in each operator's station with a suitable adhesive.

4. Provisions: The exact description of each location shall be obtained from the Owner.

1.05 SURGE SUPPRESSION

A. Surge suppressors shall be provided for the video cable at each exterior mounted camera and for power cables to all cameras and associated equipment. All video cables and power circuits exiting any building must be protected. Where camera cables enter a building a surge protection device must be installed. Another protector shall also be installed at the headend location. Both ends of the power and video cable must be protected.

B. Surge suppressors shall be designed specifically for video surveillance use with BNC connectors. Suppressers located at the camera where the suppressor is not grounded shall utilize a suppresser that isolates the shield from ground during normal installation. Design selection; Ditek DTK-iBNC or equal.

C. Power/Video Protector shall protect as required the independent video and power cables to and from a particular camera. Design selection: Ditek DTK-PVP or equal.

D. As required at the headend location where all coaxial cables terminate, install a rack -mountable unit that supports the connections of up to 16 cameras with a single point ground. Design Selection: Ditek DTK-RM8/9/16 or equal.

E. Power surge suppression shall be provided for all 120V power supplying video surveillance equipment. Ditek DTK-8F-S or equal.

F. All surge suppressors required to be grounded shall be bonded to a ground buss bar by a home-run #10 stranded copper, green jacketed cable. Crimp style terminal lugs shall be used as required. The buss bar shall be bonded to a properly grounded telecommunications ground buss bar by a #6 stranded copper, green jacketed cable. No 'looping' of bonding cables will be accepted.

1.06 SYSTEM PERFORMANCE

A. The DVR shall be configured to support (3) three capture rates for archived video.

1. Alarm Mode – As triggered by an alarm from the intrusion detection system.

2. Event Mode – As triggered by motion detection sensed through pixelation.

3. Time Lapse Mode – Standard rate of capture for archived video.

B. The camera image quality and capture rates shall be optimized for the highest quality of archived video possible while maintaining a minimum 40 day archive. A return visit shall be required 45 days after substantial completion of the system. At that time the quality of archived video and storage capacity will be evaluated. Adjustments shall be made to ensure highest possible quality of video and to meet minimum archive capacity.

C. The DVR shall support five seconds of pre-alarm recording, maintained in a buffer, and shall append this buffer to the beginning of all recorded alarms. The DVR shall continue to record at the alarm rate until the alarm is reset, times out, or is acknowledged as determined by the alarm menu.

D. The DVR shall support from five seconds of pre-event recording, maintained in a buffer, and shall be append this buffer to the beginning of all recorded events. The

DVR shall continue to record at the event rate until the programmed post-event duration of 15 seconds expires.

E. Each camera shall be titled in the programming with an appropriate, easily understood name as well as the camera number.

F. Integrity: A time domain reflectometer (TDR) shall be used to verify the integrity of all installed video cables and connectors. Any cables or connection which exhibits a structural return loss characteristic of less than 26db (reflection coefficient of 5.1%) shall not be considered acceptable and shall be replaced.

G. Charts: A strip chart for each cable tested shall be provided to the owner for future diagnostic use. Each chart shall be marked with the following data.

1. Description of cable being measured.

2. At what point on the cable the TDR was attached.

3. The footage to each anomaly.

4. The reflection coefficient of each anomaly.

5. The overall length of the cable or circuit being measured.

H. The FM Systems Camera Master shall also be used for fine-tuning each camera. The CM-1 Camera Master shall be used to measure the five attributes of each camera's video signal:

1. SYNC to measure the amplitude of the video synchronizing pulse and thus can be used to establish correct video level, coaxial cable continuity and correct termination impedance.

2. LUMINANCE to measure the "white level" of video, thus is used to adjust the camera IRIS to the correct setting for the existing lighting conditions.

3. COMPOSITE to measure the overall amplitude of the video signal (the peak to peak level).

4. COLOR BURST to measure the Color Burst amplitude of a Color Camera and is used to correctly slope equalize coaxial cable runs for best transmission of detail and color.

5. FOCUS to set the Focus ring on the camera for the sharpest picture.

6. Provide results of tests for each camera.

1.07 COMPLETTION

A. The system will be considered complete when all of the following requirements have been met:

1. All ending cable leads and unused ports are terminated.

2. All equipment is installed to manufacturers' specifications.

3. All cabling in each enclosure, cabinet or closet is labeled.

4. Copy of the blueprints showing all cabling and any changes to the "initial design layout" shall be provided to the owner.

5. It shall be the responsibility of the Contractor to verify the ceiling tiles before performing this installation. Any broken or damaged ceiling tiles found at the end of this project shall be replaced by the Contractor before final payment is made.

6. Cleaning: Upon completion, all exterior surfaces of equipment shall be cleaned of fingerprints, paint splatters, and other foreign substances.

7. Repair: Any exposed surface, which has been scratched or damaged, shall be restored to like-new condition.

8. Debris: All wire trimmings, mortar, and foreign debris shall be removed from equipment areas and any area directly affected during the installation or service of equipment.

9. The contractor must provide a bound document complete with as-built drawings, programming, cut-sheets of the equipment used and training information.

1.08 ACCEPTANCE INSPECTION

A. Be prepared to demonstrate to Engineer or School District Representative compliance of these specifications by all major items or pieces of equipment, as well as compliance with specifications for entire system at time of turn over. The Contractor shall demonstrate the operation of the system to the School District Representative during the final inspection in the following manner:

1. Observe picture quality at all monitor locations and where software interfaces are installed. All cameras must be clear, focused and directed at the appropriate target.

2. Any other test the Engineer deems necessary to establish the system is operating properly.

3. The above tests and measurements shall be documented in the operation and maintenance manuals as the as-built conditions.

4. Formal instruction shall be given to owner designated key personnel at a time selected by owner. Such instruction shall consist of no less than 2 hours delivered in two (2) separate sessions. Training shall cover operation, programming, troubleshooting and maintenance.

5. A written report, signed by the instructor, shall be submitted to the owner with copies to the Architect, and Engineering Consultant, detailing subjects covered, names of persons instructed, dates and amount of instruction each person received. This report shall be submitted within one week following the instruction.

1.09 WARRANTY

A. All video surveillance system equipment and cabling shall be guaranteed by the installing contractor to be free of defects in materials and workmanship for a period of one year from the date of substantial completion of the system.

B. Any system component, which shows evidence of failure or incorrect operation during the warranty period, shall be repaired or replaced by the contractor at no expense to the owner.

1.10 ASBUILT DRAWINGS

A. General: Complete system as-built drawings shall be provided with the following information;

1. A block diagram of the entire system indicating all cables, cable types, active and passive components.

SECTION 17060
INTRUSION DETECTION SYSTEM

PART 1 – GENERAL REQUIREMENTS

1.01 SUMMARY

A. All schools within the district shall have an Intrusion Detection System (IDS). The basic system will consist of door contacts on exterior doors, dual technology motion detectors in key areas and keypads at main employee entrances. All devices will connect to a master control panel located in the school's Main Distribution Facility (MDF). It shall be each individual school's decision to have the system monitored, and to grant arm/disarm privileges to employees. The school's principal shall determine acceptable pass-codes, which shall be provided to the School District Representative. The School District has selected Digital Monitoring Products as their single-source manufacturer of Intrusion Detection Systems. No substitute is allowed.

B. Security systems are critical in assuring life and property protection. Therefore, it is imperative that they perform their function properly and reliably. This specification has been prepared to assure that all installations of these systems meet the District's security needs.

C. This section outlines the quality, type and installation of the building intrusion detection system. Included in this Section the contractor shall provide all labor, equipment, and materials necessary for a complete, tested and operational system. The scope of these specifications is to insure the delivery of a complete unit, ready for operations. Omission of any essential detail from these specifications does not relieve the supplier from the furnishing of a complete unit.

D. Approval of samples, cut sheets, shop drawings, and other matter submitted by the contractor shall not relieve the contractor's responsibility for full compliance with the specifications, unless the attention of the School District Representative is called to each non-complying feature by letter accompanying the submitted matter.

E. All equipment must be new, of current manufacture and carry standard warranties. At least two complete shop repair manuals and parts lists must be furnished with each type of equipment at the time of delivery.

F. Contractor shall be responsible for all false alarms reported and invoiced by the local Police and Sheriff's Office during the time of installation, until the system is accepted and signed off on by the School District Representative.

G. Contractor shall be responsible for the demolition, removal and disposal of obsolete/unused IDS cabling and equipment on any replacement/retrofit projects.

H. Typical locations to be monitored by the IDS include but shall not be limited to: Administration Offices, Media Centers, Computer Labs and as specified by the School District Representative. The exact number, type and location of sensors shall be dependent on the site plan as approved by the Project Engineer and School District Representative

I. All control or zone expansion panels shall be installed in the local MDF/IDF room at a location accessible without a ladder. No equipment shall be installed above ceiling.

1.02 CONTRACTOR QUALIFICATIONS

A. The contractor must be a qualified systems integrator with local service facilities within 25 miles of the School District offices located at 817 Bill Beck Blvd in Kissimmee, Florida.

B. The contractor must have DMP factory trained technicians on staff.

C. The contractor must have sufficient personnel and facilities to be able to provide 2 hour on-site response to any and all situations involving the intrusion detection system. The contractor must provide 24 hour on-call service via a toll free number. Additionally, the contractor must be able to provide full alarm monitoring at a UL certified Central Station.

D. The contractor must have performed work of comparable scope at educational facilities within the last 2 years with proof of exemplary performance. Should the School District Representative require it, the contractor must facilitate site visits.

E. The contractor must have the ability to provide Auto CAD drawings of the system design and as-built drawings upon project completion.

1.03 EQUIPMENT - The system shall include but not be limited to the following:

A. **Intrusion Detection Control Panel –** The IDS control panel with Ethernet connectivity shall be DMP XR500NL as manufactured by Digital Monitoring Products. The IDS control panel shall be of modular design for ease of future system extension and/or modification. Zones shall be configured for ease of operation and servicing.

B. **Motion Detectors -** Motion Detectors shall be dual-technology employing microwave motion detection combined with passive infra-red heat detection to minimize false alarms. Individual motion detectors may be corner mounted or 360 degree ceiling mounted units. Motion detectors intended for use outdoors

must be designed for external use and must be mounted using industry standard weather-resistant materials and methods. The contractor shall mount motion detectors according to manufacturers recommendations. The motion detector must be Rokonet 150T, Rokonet 125T, Rokonet 115T, Protech or an approved equal.

C. **Door Contacts –** Door contacts shall be flush mounted where possible. All new school installations will be designed to incorporate flush mounted contacts. For existing facilities, the contractor shall use recessed contacts whenever possible. The exception shall be when it is cost prohibitive to get cabling to the connection point or the installation would require substantial labor. The School District Representative shall be contacted to grant permission on an as-needed basis. For flush-mounted door contacts, the contact shall be the Sentrol 1078C or an approved equal. For surface mounted contacts, the contact shall be a Sentrol 2505A or an approved equal. For roll-up doors, the contact shall be the Sentrol 2207AU-L or an approved equal.

D. **Keypads –** The Product specified shall be DMP models 690 or 793 manufactured by Digital Monitoring Products. Keypads shall be located at primary entrances determined by the School District Representative. The keypad shall be mounted at a height that is convenient to read the LCD and meets all applicable codes.

E. **Power Supply -** Power supplies shall be manufactured by DMP unless otherwise approved by the School District Representative in writing. The power supply shall have a continuous rating adequate to power all zones and functions in full alarm indefinitely. Contractor shall be responsible for the mating of the transformer to the power receptacle. If the power receptacle will not allow for the proper mounting of the transformer then the contractor must supply an approved receptacle replacement. (Electrical Contractor required).

1.04 CABLING, RACEWAY, CONDUIT, SUPPORT AND LABELLING

A. All cabling, conduit, support and labeling shall comply with the requirements as outlined in Section 17020 of this document.

B. Cabling in metal conduit or surface metal raceway shall have copper conductors, sized in accordance with the equipment manufacturer's recommendations, but in no case shall detection circuits be less than 22 AWG stranded/solid, or alarm circuits less than 18 AWG. All junction boxes that are visible or accessible shall be marked, unless in finished areas.

C. All devices (keypads, motion detectors, etc.) shall be installed with the cabling concealed in the wall. If cabling cannot be concealed in the wall the contractor shall submit a method of concealment to the School District Representative for approval.

D. All cabling to devices shall be home-run back to the local MDF/IDF room. The keypad and LX buss cabling between buildings shall be 18 gauge 4 conductor wet location cables minimum. The product specified shall be West Penn AQ244 manufactured by CDT or an approved equal.

E. All wiring shall be appropriately color-coded, and permanent wire markers shall be used to identify the terminations for each circuit at the control panel.

F. All system cabling shall be neatly routed. Do not lay cables across joists. IDS cabling shall take the highest point available to ensure no interference with other types of required cable. All cabling shall be a minimum of 18" off joist. No system cabling shall be run across any electrical fixture or within 18" of any florescent lights. System cable shall not lay on or against any HVAC equipment, ducting, conduit system or plumbing system. No fastening devices shall be clamped to any existing equipment, threaded rods, ceiling grid hangars, straps, etc.

G. Cables of similar signal level shall be bundled together and kept physically separate from power cords, plug strips or other circuits with a difference of potential. All cabling must be supported with Bridle Rings or J-Hooks every 5 feet (Bridle Rings or J-Hooks must be at the highest point of the Building). If two or more cables are ran together they must be tie wrapped every 2 feet. Cable bundles or individual cables shall be neatly secured with self-clinching nylon cable ties (Thomas & Betts or equal). **Lacing of cables shall not be permitted.**

H. Service loops at equipment panels shall be 3' and at the device location shall be 1'. All service loops shall be neatly secured above ceiling.

I. All cabling shall be pulled from central location to each building, even though all devices for that building may not be installed. Contractor must take every precaution to protect all existing equipment, wiring, fixtures and building materials from damage during installation of equipment required. All cabling installed and not placed into operation must be properly terminated and protected. There shall be no splicing of any cabling on these systems.

J. All cabling entering an existing communications closet or electrical room shall be sleeved in EMT conduit. The conduit shall be carefully reamed and terminated with plastic bushings on both ends.

K. Equipment panels or equipment racks shall have EMT conduit installed between the panel and the ceiling space. The conduit shall be carefully reamed and terminated with plastic bushings on both ends.

L. All penetrations shall be properly sleeved and sealed according to applicable codes. Upon completion of project, a certified statement is to be submitted by the Contractor assuring the District that all penetrations have been sleeved and sealed.

Example: Fire Wall penetration must be resealed using a Fire Proof/Resistant material to ensure the Fire Wall maintains the original fire rating.

M. All cable exposed to the exterior shall be installed in the appropriate size conduit. (PVC/EMT as required). All conduit sleeves and raceways shall be carefully reamed to remove all burrs and sharp edges. Plastic bushings shall be used at all terminations and properly sealed.

N. System Labeling:

1. All system devices, housings, cables and power supplies shall be labeled with numbers corresponding to zone/room numbers shown on the contract drawings.

2. Control Panel: A typewritten schedule of all device zone numbers and their locations shall be laminated in clear plastic and fastened in each IDS control/expansion panel with a suitable adhesive.

3. A campus map identifying each device location shall be laminated and fastened at the IDS control panel with a suitable adhesive.

4. The exact title/description of each location shall be obtained from the Owner.

5. Identification of individual devices is required, by assigning each a unique number on the plans as follows: (Zone # - Device #). This number shall also be permanently noted on the device.

1.05 SURGE SUPPRESSION

A. The system must be equipped with protective devices to prevent damage or false alarms by nearby lighting strikes, stray currents, or line voltage fluctuations.

1. On AC Input: Ditek DTK-1FS or equal.

2. On DC Circuits Extending Outside Building: Ditek DTK-LVLP Series or equal.

B. All surge suppressors required to be grounded shall be bonded to a ground buss bar by a home-run #10 stranded, copper, green jacketed cable. Crimp style terminal lugs shall be used as required. The buss bar shall be bonded to a properly grounded telecommunications ground buss bar by a #6 stranded, copper, green jacketed cable. No ‘looping’ of bonding cables will be accepted.

1.06 SYSTEM PERFORMANCE

A. The DMP intrusion detection system may either be auto-armed according to a schedule determined by the school principal and the School District Representative, or, armed and disarmed via access code. Alternatively, the school district may elect to use proximity technology to eliminate the use of access codes.

B. When armed, the system must respond immediately to an alarm activation. No dialer delay is acceptable. Upon activation, the system will cause blue siren/strobes located on the school's exterior façade to power up. If the system is monitored, a Central Station shall call the district based on the information provided at installation completion.

C. All Systems shall be installed, configured and made ready for remote programming capability via Ethernet.

D. The panel shall be programmed to require a closing code to prevent false alarms due to unauthorized arming of the system.

E. Each zone shall be titled in the programming with an appropriate, easily understood name as well as the zone number. See 1.04 – N – 5.

1.07 COMPLETTION

A. The system will be considered complete when all of the following requirements have been met:

1. All devices are installed as per the drawings.

2. The system notes and responds to alarm activations by all connected devices.

3. The system activity is logged and visible at the School District Representative's central monitoring server.

4. All applicable personnel at the school have been trained and a document noting the training, date, trainer and attendees has been signed and forwarded to the School District Representative.

5. All ending cable leads and unused ports are terminated.

6. All equipment is installed to manufacturers' specifications.

7. All cabling in each enclosure, cabinet or closet is labeled.

8. Demolition of any pre-existing cabling or equipment has been accomplished.

9. Copy of the blueprints showing all cabling and any changes to the "initial design layout" shall be provided to the owner.

10. The contractor must provide a bound document complete with as-built drawings, programming, cut-sheets of the equipment used and training information.

11. It shall be the responsibility of the Contractor to verify the ceiling tiles before performing this installation. Any broken or damaged ceiling tiles found at the end of this project shall be replaced by the Contractor before final payment is made.

1.08 ACCEPTANCE INSPECTION

A. Be prepared to demonstrate to the Project Engineer or School District Representative compliance of these specifications by all major items or pieces of equipment, as well as compliance with specifications for entire system at time of turn over. The Contractor shall demonstrate the operation of the system to the School District Representative during the final inspection in the following manner:

1. Observe the arming and disarming of the system with no zone faults. Observe the activation of an alarm. Observe verification that the system is transmitting to the monitoring station.

2. Any other test the Engineer deems necessary to establish the system is operating properly.

3. The above tests and measurements shall be documented in the operation and maintenance manuals as the as-built conditions.

4. Formal instruction shall be given to owner designated key personnel at a time selected by owner. Such instruction shall consist of no less than 2 hours delivered in two (2) separate sessions. Training shall cover operation, programming, troubleshooting and maintenance.

5. A written report, signed by the instructor, shall be submitted to the owner with copies to the Architect, and Engineering Consultant, detailing subjects covered, names of persons instructed, dates and amount of instruction each person received. This report shall be submitted within one week following the instruction.

1.09 WARRANTY

A. All intrusion detection system equipment and cabling shall be guaranteed by the installing contractor to be free of defects in materials and workmanship for a period of one year from the date of substantial completion of the system.

B. Any system component, which shows evidence of failure or incorrect operation during the warranty period, shall be repaired or replaced by the contractor at no expense to the owner.

1.10 ASBUILT DRAWINGS

A. General: Complete system as-built drawings shall be provided with the following information:

1. A block diagram of the entire system indicating all cables, cable types, active and passive components.

2. A block diagram of the building or campus indicating the zone/area layout of the system.

3. If the site already has CAD drawings available the contractor shall update them as requested by the District Representative.

SECTION 17090
PORTABLE CLASSROOMS SYSTEMS CABLING, HARDWARE AND EQUIPMENT INSTALLATION

PART 1 – GENERAL REQUIREMENTS

1.01 SUMMARY

A. Although portable systems installation layouts will vary dependant upon the age or re-use of the original systems installation within each portable the basic cabling and hardware scheme should remain reasonably constant. Installation locations may vary within each portable dependent upon the physical characteristics of each respective portable. However, as a general rule all systems equipment, cabling, hardware and the receptacles and outlets for data, telephone, television and intercom systems signals should normally be installed at basically the same location, as will be the data IDF cabinet. All standard portable installations will include one IDF Cabinet complete with duplex power receptacle, ground block and all connecting systems hardware, three D4 data outlets (one D4 data outlet also having one TV "F" connector connection) and one intercom call button and speaker assembly.

B. All cabling, conduit, support, labeling and testing shall comply with the requirements as outlined in Section 17020 of this document.

1.02 PORTABLE DATA/IDF CABINET INSTALLATION

A. The Portable IDF Cabinet is installed as the common point for cross-connection of incoming head end signals originating or connecting from the local MDF or IDF location ultimately connecting to the appropriate D4 data outlet, CCTV and intercom cabling or other end user termination points installed within each portable.

B. In each portable at a pre-determined location shall be installed one (1) data/systems IDF Cabinet. The specified cabinet shall be the Hubbell REBOX brand cabinet P/N# IDF32. The interior of each IDF Cabinet shall have a Hubbell Backboard P/N# REKBB20 and a CHATSWORTH equipment cooling fan installed, model: CPI 13051-001 installed. SDOC Representative shall dictate the specific location of the of each IDF Cabinet consult SDOC Representative prior to installation.

C. In instances where the Portable Systems IDF cabinet would require additional wall support the following shall be accomplished: Install READY SPEC

BACKBOARD of appropriate color to accommodate the installation of the Systems IDF Cabinet, hardware and grounding bus. All sheets shall be ¾" A-C grade plywood coated with two coats UL Classified Intumescent fire retardant latex on all sides with Backboard Certification label. Plywood Grade & use of UL Classified Fire Retardant Latex shall be detailed on product label. (School District personnel shall assist with the location of these backboards.)

D. On the interior of all IDF Cabinet locations shall be installed one (1) general power duplex receptacle and one (1) systems ground block. From the general power receptacle location homerun install the electrical wiring and from the ground block homerun install one (1) #6 stranded copper green jacketed ground wire both to the portable electrical panel. The electrical cabling, conduit and ground cabling shall be properly supported throughout each run strictly adhering to SDOC support specifications. SDOC Representative shall dictate the specific location of the general power duplex receptacle and systems ground block for the interior of each IDF Cabinet consult SDOC Representative prior to installation.

E. All systems IDF Cabinets to include their ground cable and power receptacle will normally be installed where permissible at minimum 80 inches above finished floor or as high as the portable ceiling will permit installation. However, height may vary with each installation dependent upon the physical characteristics of the specific portable.

F. All systems cabinets shall be homerun grounded to the systems ground block and by installation of the dedicated duplex general power receptacle.

1.03 SYSTEMS GROUNDING BLOCK INSTALLATION

A. Installed at the systems IDF Cabinet shall be an installed grounding block with a homerun #6 stranded copper green-jacketed ground connection installed to the space electrical panel.

B. All grounding connections for the incoming systems cabling will be individually homerun installed from each device to this ground block.

C. Normally three devices apply. These are one (1) CATV 145 voltage / surge suppression device, the shielded sheath of the incoming PE89 voice cable and the MGB (main grounding bar) installed on the voice / 66 block. Other items not listed may apply dependant upon the installation.

1.04 VOICE AND DATA OUTLET INSTALLATION

A. For the normal portable classroom installation configuration there shall be installed three (3) Category 6 or above data outlets at pre-determined locations. These outlets will normally be four (4) port D4 type outlets. Consult authorized district representative for exact locations.

B. The “BLUE ONLY” Category 6 or above cable used for all voice and data outlet installations shall be homerun installed from each outlet location to a patch panel installed within the systems IDF Cabinet internal at each portable.

C. All infrastructure cabling shall be labeled on both ends with type written labels with the appropriate number of the port that cable is terminated on for ease of location in patching or troubleshooting.

D. The top of each voice and data outlet shall be installed at a height of eighteen inches above finished floor or installed to match existing power and data outlets and within twelve to twenty-four inches distance from an installed dedicated duplex general power receptacle. Any unused ports of the data outlets will be blanked off with an appropriate faceplate blank.

1.05 CLOSED CIRCUIT TELEVISION (CCTV) INSTALLATION

A. For the normal portable classroom installation there will be installed one (1) Closed Circuit Cable Television coaxial outlet “F” connection. This connection shall be traditionally installed in the same outlet as one of the three D4 data outlets with possible exceptions. Consult authorized district representative for exact location.

B. The coaxial cable connection (interior cable) shall be homerun installed from the CCTV outlet location to the output side of one (1) CATV 145 voltage / surge suppression device located at the data shelf or systems data cabinet at each portable. Each coaxial “F” connector shall be properly trimmed and crimped with an appropriate crimp tool and have a clean tight connection. All “F” connectors shall be ULTIMATE SNAP-N-SEAL “F” SERIES COMPRESSION CONNECTORS.

C. A #6 stranded copper green jacketed ground connection shall be homerun installed from a lug attached to the center post of the CATV 145 voltage / surge suppression device to the installed systems ground block located in the portable systems IDF cabinet.

D. The incoming coaxial cable (flooded outdoor cable) shall be homerun installed from the pedestal location to the input side of the installed CATV 145 voltage / surge suppression device. Each coaxial “F” connector shall be properly trimmed and crimped with an appropriate crimp tool and have a clean tight connection.

E. In the case of a separate CCTV outlet the top of each CCTV outlet shall be installed at a height of eighteen inches above finished floor and or installed to match existing power and data outlets and within twelve to twenty-four inches distance from an installed dedicated duplex general power receptacle. Any unused ports of the CCTV/data outlets will be blanked off with an appropriate faceplate

blank. Any CCTV splitters installed that have open ports shall have a 75OHM terminator cap installed on each port.

1.06 INTERCOM SPEAKER AND CALL BUTTON INSTALLATION

A. An intercom speaker shall be installed at minimum eighty-inches above finished floor where permissible in conjunction with a call button usually installed at 48 inches above finished floor. The intercom speaker taps shall be set at ½ watt if this tap setting is available if not set the tap at 1 watt. In no case higher than 1 watt for portable classroom settings.

B. The main indoor intercom cable shall be homerun installed from the location of the intercom speaker and call button assembly and terminate on the top five (5) outer pins on one side only of the installed voice / 66 block.

C. Terminated on the same five opposite intercom 66 block pins will be the outdoor intercom feeder cable. Bridge clips will be installed between the adjacent pins allowing the intercom signal path to be completed from outdoor to indoor to the installed speaker and call button assembly.

1.07 TELEPHONE INSTALLATION

A. A PE89 telephone cable (shielded flooded outdoor cable) usually containing not more than six (6) phone pairs shall be terminated to the top six pairs of pins and shall be installed to one side only of the voice 66 block.

B. One (1) - #6 stranded copper green-jacketed ground connection shall be homerun installed from a lug attached to the PE89 telephone cable shielded jacket to the installed systems ground block located at the data shelf or systems data cabinet at each portable.

C. One (1) - #6 stranded copper green-jacketed ground connection shall be homerun installed from a lug attached to the MGB (main grounding bar) installed on the voice / 66 block bracket to the installed systems ground block located at the data shelf or systems data cabinet at each portable.

D. The first or blue/white pair of leads on the PE89 cable shall terminate on the first pair of on side of 66 block pins. On the pins adjacent to the outdoor cable will usually be the blue/white terminated pair of a category 5E or above patch cord (consisting of indoor cable) or an installed cross connect wire and RJ11 connector carrying the telephone signal to the patched in port of a data outlet where the telephone shall be installed.

E. An EDCO voice voltage / surge suppression device (protector) usually either marked HAE or HDE (until superceded) shall be installed to complete the connection between the indoor and outdoor cables thus completing the path for

dial tone to the installed telephone. The EDCO Protector shall fasten to the 66 block pins and to **the MGB (main grounding bar), which shall be installed on the same side of the 66 block as the outdoor phone cable, has been installed.**

1.08 FIBER OPTIC MULTIMODE CABLE INSTALLATION

A. A minimum of two (2) connectors on each end of an indoor/outdoor six strand tight buffered multi-mode fiber optic data cable shall terminate to an installed fiber block and barrels with either "SC" or "ST" type connectors. Normally only the first two strands - blue and orange in color will be terminated to these connectors.

1.09 OUTDOOR / INCOMING BACKBONE CABLE INSTALLATION

A. A systems cable access point shall be installed to supply the building feeds to each portable. The usual installation shall include a homerun 1-¼ inch PVC conduit from a nearby pedestal location. This 1-¼ inch PVC conduit will normally stub out into a 12X12 inch PVC box. Out of this 12X12 inch PVC box will stub a 1-¼ inch PVC conduit sweep to the under side of each portable.

B. The location of this box and conduit may or may not be near the location of the entrance to the portable shelf or systems cabinet within the portable. Regardless of the location of the conduit the outdoor cable will be adequately supported and cable tied from the box and stub out to the access point / entrance into the portable for each portable shelf or cabinet location.

C. At the access point all cabling will have a minimum five foot service slack properly cable tied and supported usually but not always located near the box and stub out. These cables will be labeled at the portable shelf or cabinet location indicating the location of the far end point of termination.

D. Where all systems cables enter the portable there shall be installed a PANDUIT T-70 or other approved raceway that will cover all exposed cable from the entrance point to the point of termination at the data shelf or systems data cabinet in each portable.

1.10 OVERALL SYSTEMS CABLE INDOOR AND OUTDOOR TO OUTLET / EQUIPMENT INSTALLATION

A. For all cable run installations to include the outdoor feeder cables consisting of shielded flooded PE89 telephone and flooded coaxial cable, indoor/outdoor rated intercom and fiber optic cable as well as the indoor cable normally blue Category 5E or above cable, indoor coaxial cable, indoor/outdoor rated intercom and fiber optic cable whether the cable runs are above ceiling or underneath the portable, all cabling will be adequately supported and cable tied from the outlet or space equipment to the point of termination at the systems cabinet or shelves.

B. Supports should be placed approximately every four to five feet with tie wraps installed approximately every two feet. However, the distance of the supports and tie wraps may vary more or less dependently upon the installation. Under no circumstance shall systems cable runs of any type be strapped to portable straps, anchors, EMT conduit or supports not intended for systems wiring support. Consult authorized district representative for clarification if an issue arises. Authorized district representative shall have final say in all aspects of the installation.

1.11 CABLE STUB OUT / OUTLET LOCATIONS

A. At each EMT type data stub out whether located above ceiling or underneath the portable there shall always be a bushing or coupler installed on the conduit and a minimum one-foot of service slack for all types of cable installed.

B. All cable will be properly cable tied and supported. In no circumstance is electrical or other tape or any type of wire or string a suitable or acceptable substitute for cable tie wraps.

C. No cable support device shall be attached to any grid hangar or threaded rod not intended for cable system support.

At the portable access point stub out / entrance to each data or coaxial CCTV outlet cabling installation the cable run will have a minimum one (1) foot service slack properly dressed.

Appendix A

SDOC MDF/IDF CAT 5
Patch Cable
Color Standard

Yellow/Blue – Data

Orange – Safety/Security (Video Surveillance, Intrusion & Fire alarm systems only)

Black – VoIP

Pink – Wireless

Red – Crossover

Violet/Purple – Servers

Green – IPTV

Gray – Printer

White – HVAC

Appendix B

Standards Variance Form

Technology Standards Variance Request Form

To request an exception to the School District of Osceola County's Technology Standards, complete this form and turn it over to the Facilities Planning Project Coordinator for the project involved. The SDOC Technology Services Department Project Manager will review your request within one week of receipt, approve or deny and contact the Project Coordinator. Deviation from the School District of Osceola County's Technology Standards will not be allowed without the SDOC TSD's approval.

Project Coordinator _____
Project involved _____
Date Variance Requested _____
Requesting Agency _____

Variance Requested:

_____
_____
_____
_____
_____

Reason for Variance Request:

_____
_____
_____
_____
_____

SDOC TSD Approval:

_____
_____

TSD Signature: _____

Date Approved: _____