# General School Premise Distribution Specifications

**General Information**

The premise distribution system described herein is the wiring system that provides for the interconnecting of communications and television equipment located in all rooms of the school facility. It is through this Premise Distribution System (PDS) that the LAN (data network), Enterprise Wide Network, CATV and Voice communications are accessed and utilized by students and/or teachers and/or administrators in the school.

Manufacturer and model numbers are given through these specifications with the intention of establishing a standard of quality and operation. It is not the intention of the Board to discriminate against any "approved equal" product of another manufacturer, but is intended that a definite standard be established.

**Scope of Work**

The contractor shall furnish all materials, equipment, labor, and services required for the installation of a complete premise distribution wiring system for video, voice and data.

The contractor will perform all work with regular employees of an organization which has regularly been engaged in the installation and servicing such installations for not less than three years; that can demonstrate the capability to adequately install and service this system within the requirements of the contract documents.

The installation shall be in accordance with the latest requirements of the National Electrical Code, State and local codes, ordinances and regulations of any other governing body having jurisdiction. BICSI Telecommunications Distribution Methods Manual shall be used as a guideline for this installation.

All equipment and materials furnished under this contract shall be new; including wiring and cabling, and shall be warranted by the contractor for a period of 1 year from date of final acceptance of the system against electrical or mechanical defects (except when such defects are caused by misuse.)

Complete sets of "as built" drawings of the system shall be supplied by the installing contractor. One set to be left in the main communications equipment room and one set to be left in each wiring closet in a three-ring binder and two sets delivered to the Telecommunications Department at the District School Board of Pasco County. These drawings shall include all jack & conduit locations, pull boxes, jacks locations and identification marking, cable records, etc. The drawings shall include all pertinent CATV signal levels throughout the system as they were at the system acceptance date.

**PDS Conduit Specifications**

The total number of bends in a conduit section run shall not exceed two 90-degree bends (an offset shall be considered equivalent to a 90-degree bend). All bends must be long, sweeping bends with a radius not less than six times the internal diameter of conduits two inches or smaller, or ten times the internal diameter of conduits larger than two inches.
All conduits will have a pull line after all cabling is installed.
All inter-building conduits will be plugged air tight after all cable is installed.

All intra-building conduits shall be 1 inch and be run to either the main communications equipment room or a wiring closet located in that wing or building. (Intra-building conduit total length shall not exceed 90 meters.) Full-length conduit runs are not required where conduit stub-ups are provided into the ceilings. Stub-ups must be properly supported. All horizontal cabling, if not in conduit, shall be supported every four feet and the total length shall not exceed 90 meters.
All PDS cabling run within walls shall be in conduit.

Two, four inch conduits will be provided for the entrance cables of the operating telephone company, run from the main communications room, to a point of the property line that will be determined by the operating telephone company. These conduits will require pull boxes at 300 foot intervals and/or if more than 180 degree of bends are required pull boxes will be placed between these bends. These conduits are to be stubbed, capped and marked.

Two, two inch conduits shall be provided from the main communications equipment room, to each of the wiring closets.

# General School Premise Distribution Specifications

**A Data/Voice Communications**

A new data / voice telecommunications system front end and new telephone instruments will be provided and installed by the owner. The premise communications cabling and wiring systems as shown on the drawings and required below shall be provided complete with outlets, patch panels, cabling, etc., completely terminated and ready for connection to the telecommunication system. The telephone instruments will be provided and installed by the owner such that they can be plugged into the 8-pin modular (RJ45 type) jacks that will be provided by the contractor. The owner will provide and install the telecommunications system head end and will connect it to the patch panels provided by the contractor in the main equipment communication room and wiring closets. The contractor shall provide all patch panels, cabling, wire hangers, surge protectors, communications outlets, equipment racks, ladder racks, and any other accouterment necessary in accordance with the drawings, wiring schedule and schematic diagrams in all of the wiring closets and in the central equipment room (located in a central location within the site).

The premise distribution system shall adhere to the ANSI/EIA/TIA-568A, ANSI/EIA/TIA-569A Commercial Building Telecommunications Cabling Standard, BICI Telecommunications Distribution Methods Manual, IEEE Std 802.3u 100Base-TX and the National Electric Code (NEC) compliant.

The system must be based on a structured, open distribution architecture so that proposed equipment and facilities, as well as future equipment from other vendors, can be supported by the system.
Unless otherwise specified, the premise distribution system shall be a star topology.
All basic jacks, patch panels, cable, etc. shall be listed by Underwriters Laboratories Inc. and shall be products of a manufacturer of established reputation and experience. The manufacturer shall have supplied similar apparatus to comparable installations rendering satisfactory service.

The setup and design of the main communications room and all wiring closets shall be at the direction of the Board appointed representative (Phil Snyder and/or Thomas R. Whitehall).

**Main Communications Equipment Room Specifications**

The main communications room will need to be one of the first rooms to be 100% complete so that the main telephone system and network headend can be installed and the operating telephone company can install the lines and circuits necessary for the complex. Some of the lines needed are for the HVAC system and elevator inspections.

The main communications equipment shall be located in a central location within the campus.
10-ft. x 20-ft. usable floor space is minimum room size. (200 Sq. Ft.)
3.0 exterior automatic locking door. Door must open outward.
3/4 inch void free AC grade plywood from floor to ceiling on all walls, both sides painted with at least two coats of light colored fire retardant paint. Securely fasten the plywood to wall-framing members. Counter sink fastener heads.
Two, 4 receptacle electrical outlets, on all walls, each group of 4 receptacle to have a separate circuit breaker.

A 208 VAC receptacle shall be provided at the direction of the Board appointed representative (Thomas R. Whitehall).

A 4 Awg stranded copper ground wire with a 20-position bus bar, bonded to the closest building transformer main ground will be required. (If this is not feasible contact the Board appointed representative (Thomas R. Whitehall).

A dedicated air conditioning unit is required that will keep the room at 64 to 75 deg. F. with no more than a 2 deg. temperature change per hour. (The electronic equipment to be placed in this room will put out approx. 14,000 BTU's heat per hour.)

Floor shall be finished with light colored vinyl tile.

Florescent type lighting shall provide uniform lighting equivalent of 540 lux (50 foot candles) when measured 36-inches above the finished floor.

There is to be no water pipes, sprinklers, etc. in the walls or ceiling of the room.

Removable ceiling tile with 18" open space above ceiling tile.

A wall mounted cross connect frame large enough for the termination of all interbuilding cables with a 50% growth capacity shall be provided. Homaco 50M-W series or approved equal.

Porta Systems protection blocks no. 124100-66-M66P will be installed for all pairs of inter-building cables.

Each protection block and cable bond shall have a separate #10 solid conductor to the grounding bus bar. Termination at the block and at the cable shall use an ILSCO 14-6 (or approved equal) grounding lug.

Porta Systems 95BCSDXN-75V red capped protection modules will be needed for all pairs of inter-building cables.

All inter-building cables shall be terminated on the Porta Systems protection blocks and shall terminate to patch panels. Termination will be one pair per jack terminated on the blue punching of each patch panel jack, the violet slate pair of each binder group of the 100 pair cable will be wrapped back to give 24 pairs per binder group to match the patch panels.

All equipment in the wiring closet (i.e., network bridging devices, multi-port repeaters, power supplies, etc.) is to be rack mounted and arranged such that cross-connection activity can be efficiently accomplished. (Contact Thomas R. Whitehall for the design.)

For ease of use and to simplify computer maintenance, terminations for operating equipment hardware shall be made on Category 5E modular to 110 patch panels mounted on open equipment racks. Cable pairs shall be terminated directly to the patch panels in alphanumeric order at the direction of the Board appointed representative (Thomas R. Whitehall). The eight-position pin/pair assignments shall conform to the T568A designation.

All cables shall be neatly secured into place and neatly racked using approved support hardware. All cables shall be labeled as shown on the drawings at both station outlet and equipment rack ends.

**Horizontal Cable**

Four pair, plenum rated, 24 AWG, unshielded twisted pair copper cable, tested to 350MHz exceeding Category 5E requirements. All horizontal cabling shall be a single manufacturer's product.
Berk-Tek LANmark-350 or approved equal

Copper Patch Cable

Provide 100 yellow 24 AWG factory terminated, 350MHz stranded Category 5E patch cables in each of the following lengths: 2 ft., 3 ft., 4 ft., 5 ft. and 6 ft.
Ortronics OR-836GTP800XDE-04 (X = length) or approved equal

Category 5E Modular TO 110 Patch Panel

All patch panels to be rated Category 5e and have permanent front panel jack numbers, removable front panel circuit label tabs, and rear cable support bar. Patch panels are to be high density with 8-port modules.
Ortronics OR-856000354, -851044818, -851044820, -851044821 or approved equal

**Open Equipment Racks**

Open equipment racks shall be secured with proper support hardware at bottom, top, sides, ends and wall so as not to move, shake or wobble during initial installation, further installations or maintenance. Cabling shall be attached to the rack using stand off tie brackets. (Contact Thomas R. Whitehall for design.)
Chatsworth 55053-503 and 10559-100B or approved equal

**Horizontal/Vertical Wire Hanger Assembly**

A horizontal/vertical wire hanger will be required above and below each patch panel.
Ortronics OR-808004410 or approved equal

**Fiber Distribution Panel**

A 12 port rack mounted fiber distribution panel with spice tray that shall incorporate ST type connectors will be furnished and installed at both ends of each fiber run.
Ortronics OR-625MMC-12PB1 Loaded or approved equal

**Wiring Closet Specifications**

7' X 7' usable floor space minimum room size.

The closet must have access to the main HVAC delivery system.
3.0 automatic locking door to open outward. (This room shall be large enough to house all equipment specified, and have ample working space.

Wiring closet shall be provided with 3/4-inch void free AC grade plywood from floor to ceiling on all walls, painted on both sides with at least two coats of, light colored, fire retardant paint. Securely fasten the plywood to wall-framing members. Counter sink fastener heads.

Florescent type lighting shall provide uniform lighting equivalent of 540 lux (50 foot candles) when measured 36-inches above the finished floor.

Porta Systems protection blocks no. 124100-66-M66P will be installed for all pairs of inter-building cables.

Each protection block and cable bond shall have a separate #10 solid conductor to the grounding bus bar. Termination at the block and at the cable shall use an ILSCO 14-6 (or approved equal) grounding lug.

Porta Systems 95BCSDXN-75V red capped protection modules will be needed for all pairs of inter-building cables.

All inter-building cables shall be terminated on the Porta Systems protection blocks and shall terminate to patch panels. Termination will be one pair per jack terminated on the blue punching of each patch panel jack, the violet slate pair of each binder group of the 100 pair cable will be wrapped back to give 24 pairs per binder group to match the patch panels.

All wiring closets will need two, four (4) receptacle 120V AC outlets on each end of the room and one where the electronics will attach. Each set of 4 receptacles will need to be on an independent circuit breaker. (Contact Thomas R. Whitehall for design.)

A 4 Awg stranded copper ground wire with a 10-position bus bar, bonded to the closest building transformer main ground will be required. (If this is not feasible contact the Board appointed representative (Thomas R. Whitehall).

All cables shall be neatly secured and neatly racked using approved support hardware. All cables shall be labeled as shown on the drawings at both station outlet and equipment rack ends.

For ease of use and to simplify computer maintenance, terminations for operating equipment hardware shall be made on Category 5E modular to 110 patch panels mounted on open equipment racks. Cable pairs shall be terminated directly to the patch panels in alphanumeric order at the direction of the Board appointed representative (Thomas R. Whitehall). The eight-position pin/pair assignments shall conform to the T568A designation.

# General School Premise Distribution Specifications

**Category 5E Modular to 110 Patch Panel**

Rack mountable category 5E patch panels shall consist of a minimum of 48; RJ45 jacks with all 8 positions pre-wired to self contained 110 type blocks. All patch panels will be rated for operation at 100 MBPS data rates and clearly marked " category 5E". The patch panels will have marked permanent front panel jack numbers and removable front panel circuit label tabs. There shall be 50 % growth capability after all cables have been terminated.

**Open Equipment Racks**

Open equipment racks shall be secured with proper support hardware at bottom, top, sides, ends and wall so as not to move, shake or wobble during initial installation, further installations or maintenance. Cabling shall be attached to the rack using stand off tie brackets. (Contact Phil Snyder for design.)
Chatsworth 55053-503 and 10559-100B or approved equal

**Horizontal/Vertical Wire Hanger Assembly**

A horizontal/vertical wire hanger will be required above and below each patch panel.
Ortronics OR-808004410 or approved equal

**Fiber Distribution Panel**

A 12 port rack mounted fiber distribution panel with spice tray that shall incorporate ST type connectors will be furnished and installed at both ends of each fiber run.
Ortronics OR-625MMC-12PB1 Loaded or approved equal

**Communication Outlet (CO) Locations**

The typical classroom shall have two (2) communication outlets with four category 5E enhanced cables wired to four RJ45 jacks.

**Data/Voice Outlet Specifications**

The faceplate shall accommodate up to three, front removable, snap in, dual jack assemblies and have removable circuit labels. Faceplate color and size must match surface mount outlet boxes and raceway. Fill empty module spaces with blank faceplate modules. Communication outlet locations and configuration will be coordinated with the Owner's Representative Phil Snyder.
Ortronics OR-40300158 Fog white faceplate or approved equal
Ortronics OR-40300164 blank module or approved equal

Dual, front removable, snap in, ANSI/TIA/EIA 568-A stand compliant 8 position modular (unkeyed) to 110C-type IDC PCB mounted connector module. Jacks shall be designed for T568-A wiring scheme and shall be angled at 45 degrees. The module shall have the manufacturer's performance marking indelibly labeled on the module front and shall be designed to accommodate removable data and voice icons. Provide 4 yellow data icons and one blue voice icon for each faceplate. Icons to be installed by the Owner.
Ortronics OR-60950051 dual jack module or approved equal
Ortronics OR-40300242 yellow data icon or approved equal
Ortronics OR-40300261 blue voice icon or approved equal.

Instructional and work areas shall be provided with two data/voice outlet faceplates. Faceplates located in instructional areas shall contain two wired 8 position modular jacks. Faceplates in offices and other work areas shall contain four wired 8 position jacks.

All inter-building communications cables shall be 100 pair, twenty-four AWG, solid copper, one sheath.

# General School Premise Distribution Specifications

An optical cable will run from the main communications room to each of the wiring closets. The optical cable shall be 12 fiber, indoor/outdoor multi mode 62.5um core diameter/125um cladding diameter, tight buffered design, composed of all dielectric materials and rated for indoor/outdoor use.

**Special Requirements for Cable Routing**

All cables shall be neatly secured into place; neatly racked and secured using approved support hardware. All cables shall be labeled as shown on the drawings at both station outlet and equipment rack ends.

All intra-building (horizontal) cabling between the CO and the modular 110 mounted patch panels shall be wired to the T568A pin/pair configuration.

All horizontal cabling, if not in conduit, shall be supported every four feet.

No more than one (1) inch of jacket insulation may be removed from the horizontal cabling after terminated.

**Installation Inspection**

The Board's representative (Phil Snyder) and the contractor will jointly inspect the final installation, in order to ensure the installed equipment/cable will operate to these specifications and is ready for acceptance testing.

Before this project will be deemed ready for acceptance testing all wiring, cable, protection, etc. and any accouterment needed to make this complex ready for communications operation will be furnished and installed. The setup of wiring closets will be at the direction of the Board's appointed representative (Phil Snyder).

Special Needs

Prior to the bidding process, an overall floor plan for the premise distribution system shall be provided for review and approval by the Board appointed representative (Phil Snyder). The plan will have a section showing the communications premise distribution system as a whole as well as building by building separate from all other sections.

Should any changes take place that may affect any portion of the communications premise distribution system, Phil Snyder will need to be notified.

All setup and design shall be coordinated with a Board appointed representative (Phil Snyder).

Eight weeks prior to occupancy two grand master keys will be provided to the Telecommunications Department for the installation of the telephone system, network electronics, miscellaneous equipment and for future maintenance of electronics and equipment.

All wiring closets and the main communication room shall have as built drawings for all associated cable/equipment in that room, along with as built information dealing with the associated cable/equipment. Complete sets of AS built information for the main communications room as well as, as built information for all wiring closets throughout the site shall be provided. One set is to be located at the main communications room and each wiring closet; two sets are to be delivered to the district office to the Telecommunications Department.

A four, (4) receptacle 120V AC outlet shall be located within 36 inches of all communications outlets and data outlets containing four (4) wired jacks.

A duplex receptacle 120V AC outlet shall be located within 36 inches of all communications outlets and data outlets containing two (2) wired jacks.

All locations that show a cashiers station in the cafeteria will need a quad communications outlet and a duplex electrical suitable for computer usage.

# General School Premise Distribution Specifications

Installation Requirements and Practices

The installation shall adhere to all ANSI/EIA/TIA Commercial Building Telecommunications Cabling Standards 568A, 569A, 606, 607, TSB-67, TSB-72, etc. Unless superceded by a more current ANSI/EIA/TIA specification.

The installer shall use the latest BICSI Telecommunications Distribution Methods Manual for installation practices as a guideline for installation.

Any HVAC, security, etc. equipment needing remote access such as modems will need a communications outlet located within 36 inches of the location where device is to be located.

Provide a single RJ11 jack within 36 inches of the amplifier for the PA system with the cable going to the closest wiring closet and terminated to a patch panel jack and clearly marked "PA SYSTEM".

If elevator(s) are a part of the site, a line will need to be located from the connection point on the elevator equipment to the closest wiring closet and terminated to a patch panel jack and clearly marked elevator.

The main telecommunications room must be one of the first rooms 100% completed in this project.

Preferred Manufacturers

Ortronics
Berk-Tek
Porta Systems

Acceptable Manufacturers

Acceptable optical cable manufacturers: Berk-Tek, Siecor and Belden
Acceptable optical connector manufacturers: Siecor, AMP and 3M
Acceptable copper cable manufacturers: Berk-Tek, Commscope, Belden, Ortronics
Acceptable inter-building protection manufacturer: Porta Systems (No Other Will Be Accepted)
Acceptable patch panel and jack assembly manufacturers: Ortronics, Seimon and Lucent

# General School Premise Distribution Specifications

B - CATV Distribution System

The contractor shall furnish all materials, equipment, labor, and services required for the installation of a complete TV signal distribution system.

The CATV system will utilize the signal feed from a commercial cable franchise as a source for "broadcast" television programming if available to the school site.

The system shall provide for reception of color TV transmission (at every outlet) equal to that obtainable on a single standard receiver connected directly to the system cable feed.

The system shall be capable of two-way communication over a single cable. System losses must be kept to a strict minimum in order to utilize the capabilities of a portable sub-channel modulator to originate a program from any location within the school.

All basic electronic equipment shall be listed by Underwriters Laboratories, Inc. and shall be products of a single manufacturer of established reputation and experience. The manufacturer shall have supplied similar apparatus to comparable installations rendering satisfactory service for at least three (3) years.

Blonder-Tongue TV distribution equipment shall be provided as meeting these specifications.
Unless otherwise indicated, all CATV outlets will be at a level of eighty (80) inches from box center above the finished floor. A standard duplex electrical outlet shall be located within one (1) foot to either side of and at the same height of each CATV outlet.

Upon request the contractor shall show satisfactory evidence that he maintains a fully equipped service organization capable of maintaining the installed system.

The school media center shall utilize three cable ready VHS, VCR's (to be provided by the school district) for distribution of local cable channels on channels 2, 3 and 4 in conjunction with Blonder-Tongue AM60-450 SAW filtered modulators. The VCR's will also double as in-house channels.

A Blonder-Tongue AM60-450 modulator with an output on channel T9 will be used for remote broadcasts originating within the school classrooms or media center. A Blonder-Tongue ESHP processor, located in the head end, will convert the T9 signal to channel 6 for distribution. See figure 1 for desired head end configuration.

Cabling to all CATV outlets shall use the home run method to connect the outlet to the building's wiring closet or main communication equipment room. CATV outlets shall not be daisy-chained or looped.

Provide two RG-6 cables between the communication room (or closet) and the CATV head end cabinet.

Provide four, one-inch empty conduits between the media circulation desk and the CATV head end cabinet.

Figure 2 illustrates the desired home run cabling configuration for CATV outlets located in instructional classrooms, office areas and conference rooms.

Buildings that require a distribution amplifier in order to meet minimum signal level requirements shall incorporate an amplifier with an active internal sub-channel return amplifier and filter set.

All inter-building cabling shall be RG11 and shall have grounding blocks with surge protection at each end.

# General School Premise Distribution Specifications

Functions and Capabilities

The distribution system shall furnish +5 to +10 dBmV, VHF-TV (channels 2 - 13) signals to all CATV outlets shown on the drawings.

The distribution system shall provide for ready attachment of R.F monitor/TV receivers at any outlet and at any time without additional auxiliary equipment.

The system shall meet or exceed the technical standards set forth in the FCC Rules, Part 76.

System radiation shall not exceed the following limits:

No nicks or cuts in any COAX cable will be allowed.

CATV Material & Equipment Specifications

TELEVISION MODULATOR, CATV, FIXED
Blonder-Tongue AM60-450.

TELEVISION MODULATOR, CATV, PORTABLE
The contractor will provide a portable video cart with pneumatic wheels with sub channel capability including VCR and 13 inch color TV. (See figure's 3 & 3A)
Blonder-Tongue AM60-450 option 4 (Ch. T9) and DSV multiplexer

VHF/UHF LOW POWER AMPLIFIER
This is required to boost the incoming cable signal. Minimum 10 dB gain with a noise figure of 4.5 dB on VHF and flat response of + or - .5 dB across the bands.

BROADBAND TWO-WAY DISTRIBUTION AMPLIFIER
Blonder-Tongue BIDA 450-30 amplifier
Blonder-Tongue BIDA-RF Return Filter Set
Blonder-Tongue BIDA-RA Return Amplifier
Blonder-Tongue BIDA-CE Cable Equalizer

HETERODYNE PROCESSOR
Blonder-Tongue ESHP (T9 to 6)

BROADBAND MIXING AND SPLITTING DEVICES
Broadband mixing/splitting devices shall be used in the system as required. These units shall be housed in rugged cast aluminum housing equipped with flanges to permit mounting on any flat surface. Units shall meet FCC specifications on radiation.

All units shall have a frequency response from 5 MHz to 600 MHz. Two-way splitters shall have a maximum splitting loss of 4.2 dB. Four-way splitters shall have a maximum splitter loss of 7.2 dB.
Blonder-Tongue CRS-2, CRS-4, CRS 8.

TERMINATING RESISTOR
Terminating resistor with 75 ohm impedance shall be installed at unused ports and feeder line ends. Terminating resistors shall be designed to cover the frequency range form 5 MHz to 890 MHz.
Blonder-Tongue BTF-TP

BAND SPLITTING FILTERS

One multiplexer will be required at the output of each AM60-450 modulator operating with a sub-channel output, and where else needed.
Blonder-Tongue model DSV.

DIRECTIONAL MULTITAPS
Blonder-Tongue CRT-2A and CRT-4A

FEEDTHROUGH WALL PLATES (SINGLEPORT)
See figure 2.
Blonder-Tongue V-2GF-FT

EQUIPMENT HOUSING
The contractor will provide a 19-inch wide by 70 inches high rack mount equipment housing to mount headend equipment.
Blonder-Tongue 3982 cabinet

EQUIPMENT SHELVING
The contractor will provide a vented, 17 x 14-inch cantilever rack mount shelving that will provide for four VCRs and mounted in the uppermost portion of the cabinet.
VERO Electronics 802-562285

FLEXIBLE COAXIAL CABLE
Two types of cables may be used in the system in RG-11 and RG-6. The RG-11 cable is to be used for long Truck lines with the RG-6 cable for shorter feeder lines. RG-59 cable shall not be used within the system. Coaxial cable shall be of 75-ohm impedance with a return loss of .2 dB minimum from 7 MHz to 806 MHz. All cables must bear the manufacturer's name and part number on the jacket.

Exposed PVC jacketed cable shall not be used in plenum ceilings.

Provide one 4-foot F-to-F (RG-6) connection cable for each distribution wall outlet.

Installation Practices

All equipment shall be installed in a neat and workmanlike manner, in accordance with manufacturer specifications and industry standards and to the satisfaction of the Thomas R. Whitehall or his representative.

Cables shall be adequately supported and connectors specifically designed for the type cable in use shall be installed. Cable connectors shall not be left finger tight but tightened additionally with an appropriate tool to 20 inch-pounds.

Amplifier input cables shall not be bundled with output cables. Physical separation between input and output cables shall be maintained.

All input and output cables shall be tagged as to destination.

All equipment except in-line pads shall be suitably mounted in cabinets or other solid support. Equipment suspended by its coaxial connection is not acceptable.

All outdoor connections shall be weatherproofed through the use of weather boots or other approved methods.

There shall be no splices in audio cable runs.

The total number of bends in a conduit section run shall not exceed two 90-degree bends (an offset shall be considered equivalent to a 90-degree bend). All bends must be long, sweeping bends with a radius not less than six times the internal diameter of conduits two inches or smaller, or ten times the internal diameter of conduits larger than two inches.

Pull boxes shall be installed if the conduit run exceeds 100 feet; the conduit run has more than two 90 degree bends; and at each bend of a reverse bend having an angle from 100 degrees to 180 degrees.

System Proof of Performance

Upon completion of the system installation, it shall be the responsibility of the contractor to perform the necessary adjustments and balancing of all signals and amplifier level controls to insure proper system operation as specified in this document.

Before the contract shall be considered completed, the contractor shall conduct an operating test for approval. The system shall be demonstrated to operate in accordance with the requirements of these specifications. The test shall be performed in the presence of Phil Snyder or his representative. The contractor shall furnish all equipment and personnel required for the test.

Should such a demonstration of performance show that the contractor has not properly balanced the system and that picture degradation is present or that output is not specified, the contractor shall make all necessary changes or adjustments and a second performance demonstration will be arranged. This process will be completed until an acceptable performance level has been reached

Headend Tests

The level of each channel's picture and sound carrier shall be measured and recorded with one copy retained in the headend cabinet and another delivered to the Telecommunications Department located at the district office.

All levels shall be within the design levels specified. In no case shall the levels measured exceed the maximum input / output rating for the headend amplifier (s) employed, but shall fall within the levels recommended by the manufacturer.

The level difference between channel picture carriers shall not exceed 2 dB for adjacent channels or 8 dB between the strongest and weakest channel normally carried.

In system carrying adjacent channels (Note: channels 4 and 5 or 6 and 7 are not considered to be adjacent), the picture carrier to sound carrier level ratio of any lower adjacent channel shall not be less than 12 dB or greater than 18 dB. Each cable feeder line shall be inspected for proper termination.

Using a field strength meter, measure the signal level at the last outlet on each feeder line and other randomly selected outlets. The signal level on each channel shall not read less than +5 dBmV or more than +10 dBmV, unless specified otherwise.

Using a standard TV receiver connected to randomly selected outlets, not less than one per feeder, observe picture quality. No visible components of cross-modulation (windshield wiper effect), ghosting or bear interference shall appear on the screen of a receiver tuned to any normal signal.

Cross-modulation test shall employ a standard TV receiver and an R.F. carrier generator. Insert an unmodulated CW carrier at the system head end in lieu of one of the channels normally carried by the system. With the TV receiver connected at the most remote outlet in one system and tuned to the CW signal, observe that there are no visible components of cross-modulation (windshield wiper effect). For the best results, the artificially generated blank channel should originate with a crystal controlled modulator that is driven by a closed circuit camera with the lens capped to produce sync only for the benefit of the test TV receiver.

Acceptable Manufacturers

Acceptable manufacturer shall be Blonde-Tongue and VERO Electronics (No Other Will Be Accepted)

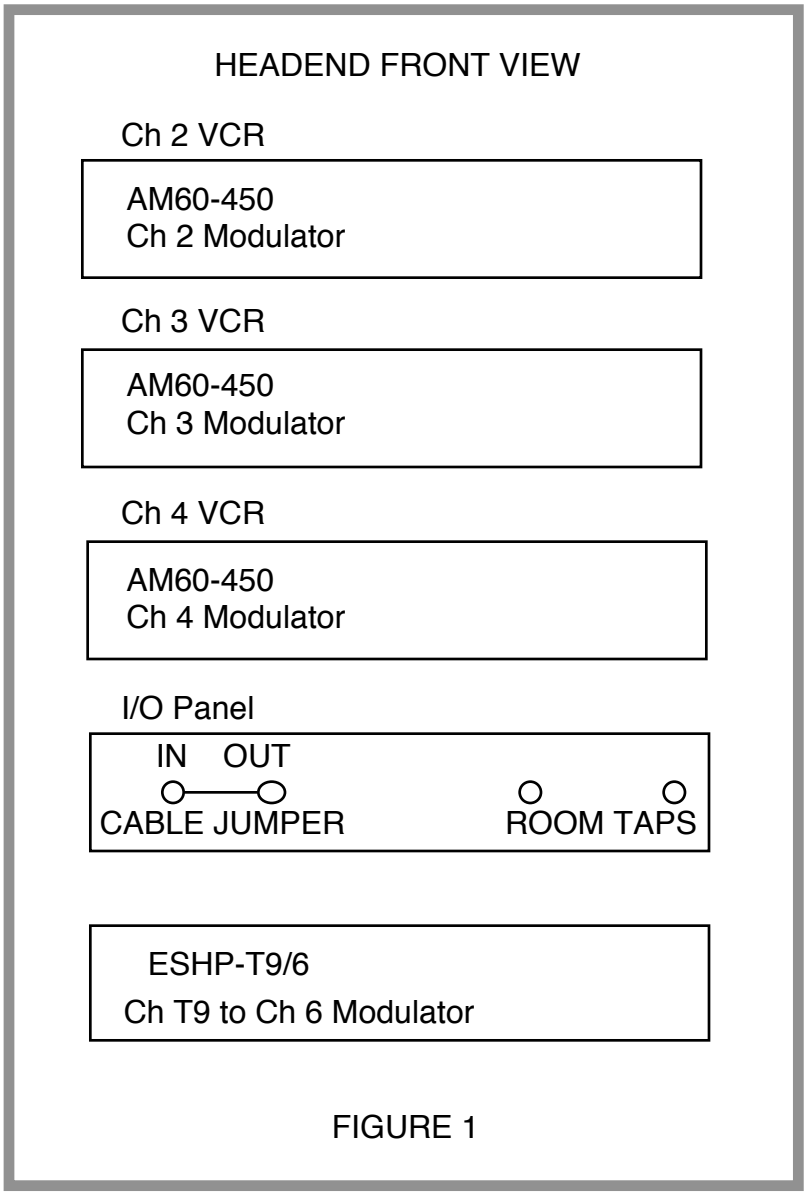
HEADEND FRONT VIEW
Ch 2 VCR
AM60-450
Ch 2 Modulator
Ch 3 VCR
AM60-450
Ch 3 Modulator
Ch 4 VCR
AM60-450
Ch 4 Modulator
I/O Panel
IN OUT
CABLE JUMPER
ROOM TAPS
ESHP-T9/6
Ch T9 to Ch 6 Modulator

FIGURE 1

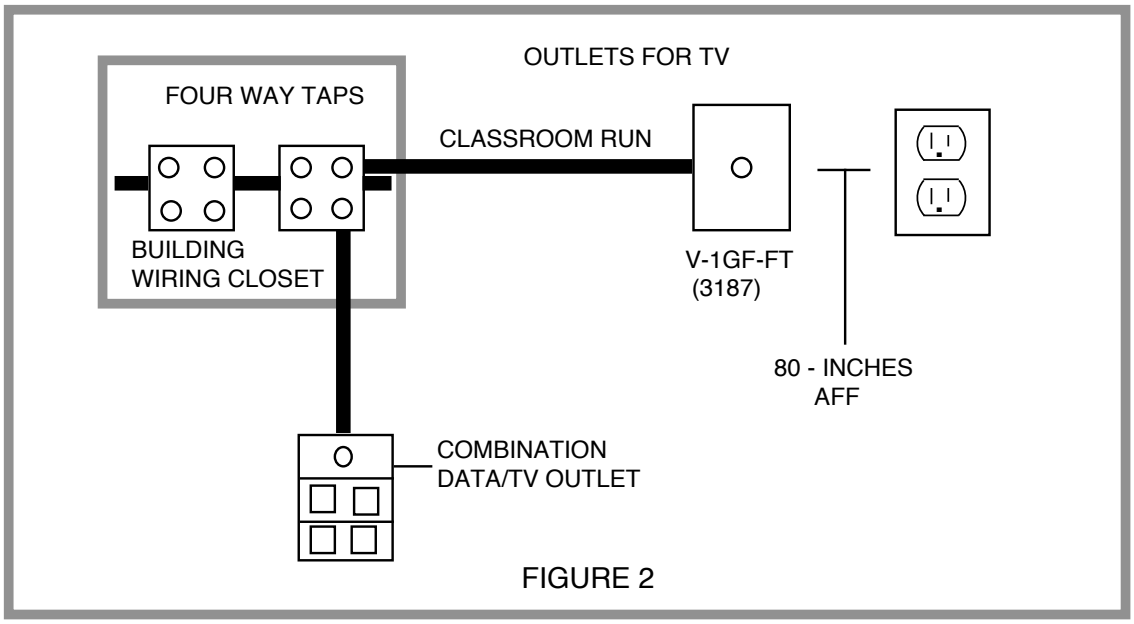
OUTLETS FOR TV
FOUR WAY TAPS
CLASSROOM RUN
BUILDING
WIRING CLOSET
V-1GF-FT
(3187)
80 - INCHES
AFF
COMBINATION
DATA/TV OUTLET

FIGURE 2

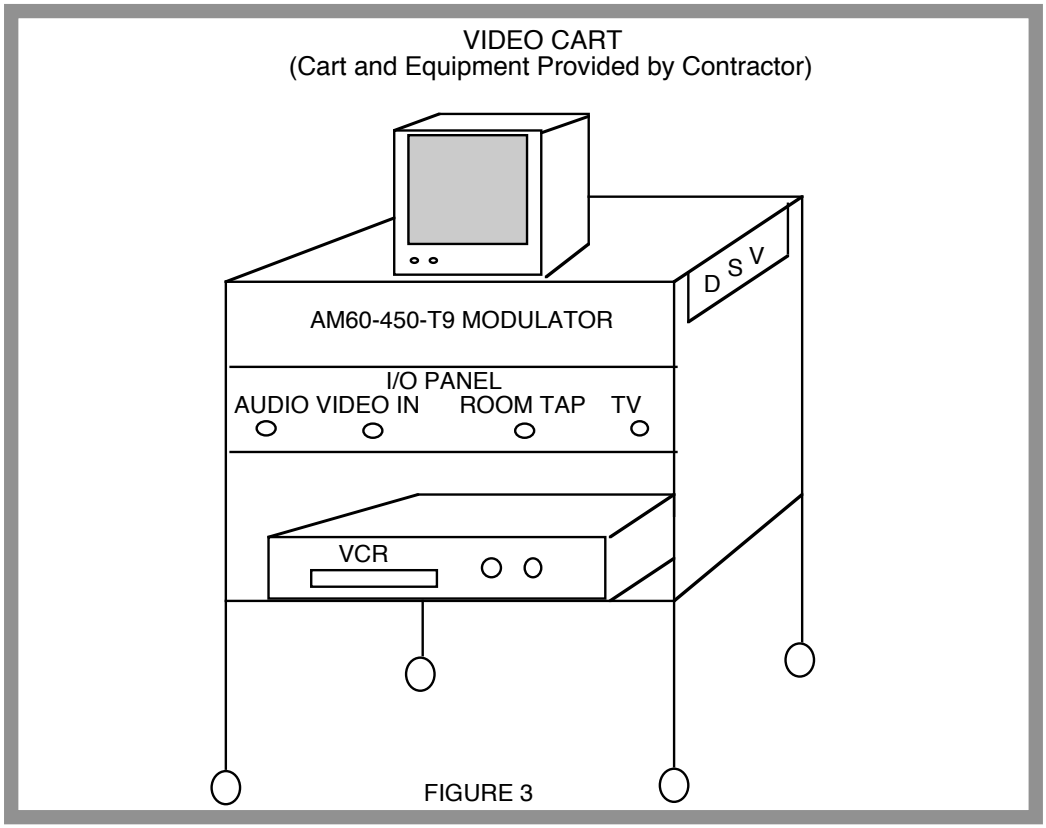
VIDEO CART
(Cart and Equipment Provided by Contractor)
D S V
AM60-450-T9 MODULATOR
I/O PANEL
AUDIO VIDEO IN
ROOM TAP
TV
VCR

FIGURE 3

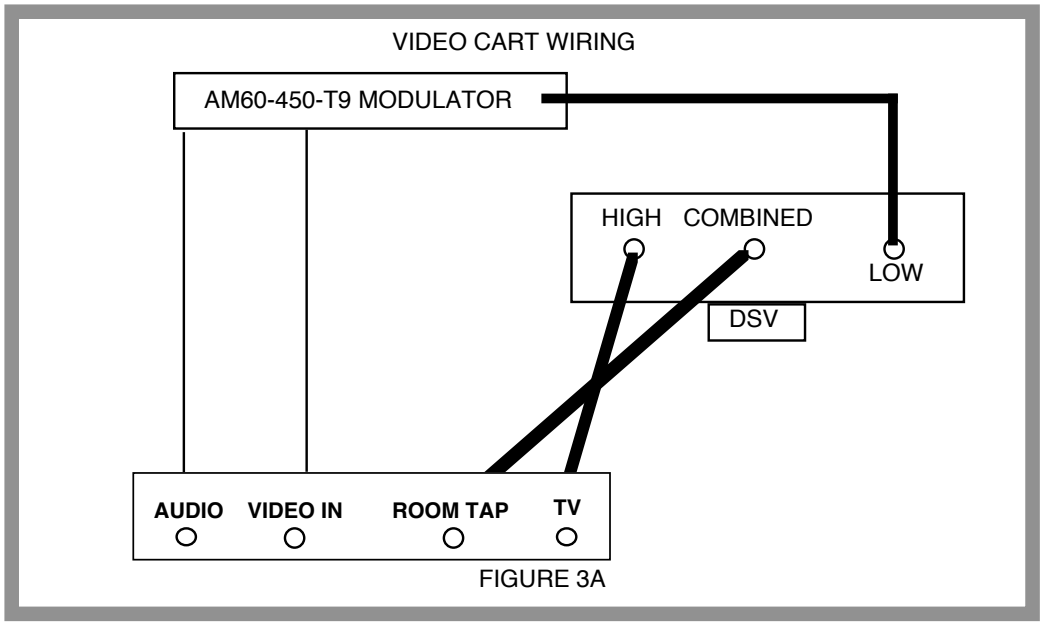
VIDEO CART WIRING
AM60-450-T9 MODULATOR
HIGH
COMBINED
LOW
DSV
AUDIO
VIDEO IN
ROOM TAP
TV

FIGURE 3A

# General School Premise Distribution Specifications

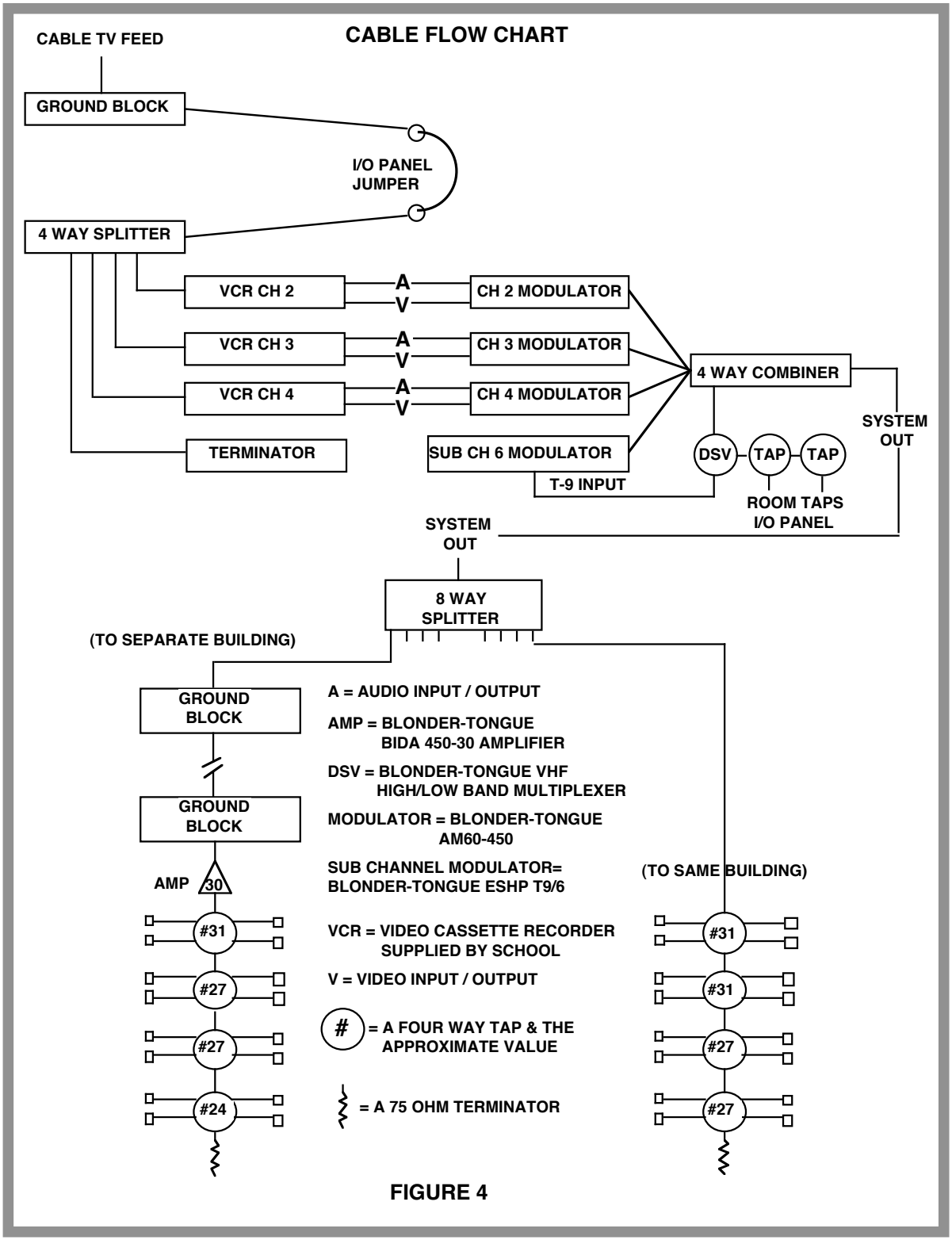


**FIGURE 4**