



Archi-Technology<sup>LLC</sup>

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## **DIVISION 17**

*(Proposed addition to the  
CSI MasterFormat<sup>™</sup>)*

prepared by

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# Division 17 Overview

A smart way to organize a Technology Infrastructure.

## HISTORY

This [Division 17](#) Organizational Model has been developed to effectively integrate the planning, estimating and design of inside and outside copper and fiber cable plants, data, voice, video and other low voltage systems.

Division 17 effectively allows an organization to maximize the benefits of a common, facility based infrastructure, establish meaningful budgets, allocate space and more effectively plan how technology is integrated into a construction project or existing facility.

This Division 17 Organizational Model and associated specifications are structured in the same manner as the existing *CSI – Construction Specifications Institute, Divisions 1 - 16 MasterFormat™*.

The major organizational sections are:

- 17000 - Administrative
- 17100 – Cable Plant
- 17200 – Data Requirements
- 17300 – Voice Systems
- 17400 – Video/Audio Systems
- 17500 – WAN Requirements
- 17600 – Architectural, Mechanical and Electrical Requirements
- 17700 – Intra-Building Communication Systems (\* new in this Version 2 Draft)
- 17800 – Building Automation and Control (\* new in this Version 2 Draft)
- 17900 – Security, Access and Surveillance (\* new in this Version 2 Draft)

## DRAWINGS

A **(T)** - Series of Technology Drawings has also been established to show technology specific information. The drawings are organized to show backbone information on full building drawings, drop locations on serving zone drawings and rack and backboard elevations on Communication Equipment Room drawings. Also included in the **T** series drawings are logical system drawings and detail drawings.

The drawing structure was established to accomplish two objectives; First was to create a set of technology drawings that could be plotted out and used to effectively bid out the required work. The second objective was to then use these same drawings in an electronic format to manage the technology infrastructure.

MasterFormat™ is a trademark of The Construction Specifications Institute and the Construction Specifications Canada.

Archi-Technology is publishing this document in an effort to help establish an industry standard method for organizing technology infrastructures. A web site has also established at [www.division17.net](http://www.division17.net) to facilitate ongoing development and dialog. Industry wide input and feedback is requested to further enhance this document and enable Division 17 to evolve into a national standard.

or

Contact us at Archi-Technology toll free at **(877)DIV-1700** or at (716)424-1952. Our web site is located at [www.archi-technology.com](http://www.archi-technology.com). Please feel free to give us a call with your ideas or stop by our web site or the Division 17 web site.

*\* Titles that currently exist in the Masterformat are shown with the existing numbers for reference.*

Front End		
<b>Section 17000 - General (Division 1)</b>		
17000	Project Summary/Overview	
17010	Basic Communications Requirements	
17020	Not used	
17030	Administrative Requirements	
17040	Not used	
17050	Site Specific Requirements	
17060	Not used	
17070	Not used	
17080	Project Management & Quality Assurance	
17090	Technology Documentation	
<b>Section 17100 - Cable Plant (16710)</b>		
17100	Cable Plant Overview	
17110	Communication Equipment Rooms	
17120	Main Distribution Frames and Service Entrances	
17130	Interior Communication Pathways	
17140	Exterior Communication Pathways	
17150	Backbone Cabling Requirements	
17160	Horizontal Cabling Requirements	
17170	Testing, Identification and Administration	
17180	Cutover & Training	
17190	Support & Warranty	
<b>Section 17200 - Data &amp; LAN's (16730)</b>		
17200	LAN Overview	
17210	Switches, Hubs and Routers	
17220	Servers	
17230	Workstations	
17240	Printers	
17250	Software and Supplies	
17260	Miscellaneous Equipment	
17270	Testing, Identification and Administration	
17280	Cutover & Training	
17290	Support & Warranty	
<b>Section 17300 - Voice Systems (16720)</b>		
17300	Voice Overview	
17310	PBX	
17320	Telephone Sets, Faxes and Modems	
17330	Voice Messaging System	
17340	Call Accounting Requirements	
17350	ACD/Call Center Requirements	
17360	Miscellaneous Items	
17370	Testing, Identification and Administration	
17380	Cutover & Training	
17390	Support & Warranty	
<b>Section 17400 - Video/Audio Systems (16810)</b>		
17400	Video/Audio Overview	
17410	Control and Headend Equipment	
17420	Production Equipment /Teleconferencing	
17430	Monitors, VCR's & Projection Equipment	
17440	Audio Equipment	
17450	Satellite System	
17460	Software and Supplies	
17470	Testing, Identification and Administration	
17480	Cutover & Training	
17490	Support & Warranty	
<b>Section 17500 -WAN &amp; Dial Tones</b>		
17500	WAN Overview	
17510	Hardware - Routers, CSU/DSU's	
17520	Local Dial Tone/Centrex	
17530	Long Distance	
17540	Dedicated Circuits	
17550	Internet Access	
17560	Cable Service	
17570	Private Microwave and Wireless	
17580		
17590		
<b>Section 17600 - Architectural, Electrical, HVAC</b>		
17600	AMEP Overview	
17610	CER and Access Point Requirements	
17620	AV Control Room Requirements	
17630	MDF Requirements	
17640	Telephone Specialties	10750
17650	Computer Labs and Classrooms	
17660	Tele-Conferencing Rooms	
17670	Auditoriums and Large Group Rooms	
17680	Workstation Furniture	
17690	Exterior Requirements	
<b>Section 17700 Intra-Building Communication Systems</b>		
17700	Other Systems Overview	
17710	Time & Attendance	
17720	Patient Monitoring Systems	
17730	Intercom and Nurse Call	
17740	Public Address	
17750	Paging Systems	
17760	Master Clocks	
17770	Networked Copiers	
17780	Bar Code Systems	
17790	Dictation Equipment	
<b>Section 17800 - Building Automation and Control (13800)</b>		
17800	Building Automation Overview	
17810	Energy Monitoring	
17820	Lighting Control	
17830	Environmental Control	
17840	Elevator Monitoring	
17850	Door Controls	
17860	Detection & Alarm	13850
17870		
17880		
17890		
<b>Section 17900 - Security Access and Surveillance (13700)</b>		
17900	Security and Access Overview	
17910	Security	
17920	Card Access	
17930	Surveillance Systems	
17940		
17950		
17960		
17970		
17980		
17990		

NUMBER	TITLE	EXPLANATION
<b>FRONT END</b>		
	Title Page	<p><b>Includes</b></p> <p>This section includes schedules, lists, bid forms, instructions, terms and conditions, general conditions and a project overview.</p>
	Certification Page	
	Table of Contents	
	Bid Solicitation	
	Preliminary Schedule	
	List of Drawings	
	List of Schedules	
	Bid Forms	
	Schedule of Values	
	Experience	
	References	
	Warranties	
	Certificates of Compliance	
	Registration Certification	
	Vendor Questionnaire	
	Financials	
	Insurance	
	Bid Bond	
	Performance Bond	
	Non-Collusive Bidding Certification	
	Signature – Notary Public	
	Instructions to Bidders	
	Terms and Conditions/Agreement	
	General Conditions	
	Supplementary Conditions	
	Objective of Project	
	Summary Description	
	Role Descriptions	
	Specification Organization	
	Drawing Organization	
		<p><b>See</b></p> <p>This section usually is managed and prepared by an architect in a full design project. However, with technology only projects, the lead professional will likely need to coordinate this section.</p>

NUMBER	TITLE	EXPLANATION
<b>17000</b>	<b>GENERAL</b>	
<b>-010</b>	<b>Basic Communication Requirements</b>	
	Regulations and Code Compliance	<i>Includes</i>
	Glossary	
	Definitions	
	Basis of Design	
	Intent of Drawings	
	Equipment and Materials Minimum Requirements	
	Workmanship, Substitutions, Warranty	
	Factory-Assembled Products	
	Compatibility of Related Equipment	
	Special Tools	
	Lifting Attachments	
	Miscellaneous Supports	
	Fire Stopping	
	Coordination Drawings	
	Storage and Protection of Materials	
	Rough-in	
	Cutting and Patching	
	Concealment	
	Chases	
	Waterproofing	
	Supports	
	General Installation Requirements	
	Painting	
	Additional Engineering Services	
		<i>See</i>
		Division 1, if one exists
<b>-020</b>	<b>Not Used</b>	
		<i>Includes</i>
		<i>See</i>

NUMBER	TITLE	EXPLANATION
<b>-030</b>	<b>Administrative Requirements</b>	
	Project Meetings	<i>Includes</i> Contractual, legal, compliance, process and other administrative requirements.
	Coordination with Owner	
	Submittals	
	Coordination Drawings	
	Shop Drawings and Manufacturer's Data	
	Submittal List	
	Manuals & Technical Documents	
	Statement of Warranty	
	Record Drawings	
	As-Built Drawings	
	Contract Administration	
	Permits, License Inspections and Fees	
	Right of Ways	
	Alternates	
	Substitutions	
	Field Order/Change Order/Change Order Request	
	Project Documentation	
	Photographs	
	Scheduling	
	Periodic Field Observation Report	
	Special Procedures	
	Cleanup	
	Project Closeout	
	Operations and Maintenance	
	Acceptance	
	Quality Assurance	
	Inspection and Tests	
	Continuity of Services	
	Use of Cable Prior to Acceptance	
	Record Documents	
		<i>See</i>
<b>-040</b>	<b>Future</b>	
		<i>Includes</i>
		<i>See</i>
<b>-050</b>	<b>Site Specific Requirements</b>	
	Emergency Facilities	<i>Includes</i> Unique Site and Project requirements
	Safety of Persons and Property.	
	Safety Precautions and Programs	
	Location and Protection of Utilities	
	Asbestos	
	Confined Spaces	
	Vehicular Access & Parking	
	Identification	
	Product Delivery Requirements	
	Product Storage Requirements	
	Acces to Site	
	Coordination with Occupants	

NUMBER	TITLE	EXPLANATION
	Use of Site Project Trailors and Bathrooms Temporary Utilities Sineage Temporary Construction Protecting Installed Systems and Construction Deinstallation Abandoned Equipment and Materials	<i>See</i>
<b>-060</b>	<b>Not Used</b>	<i>Includes</i>  <i>See</i>
<b>-070</b>	<b>Not Used</b>	<i>Includes</i>  <i>See</i>
<b>-080</b>	<b>Project Management and Quality Assurance Requirements</b> On Site/Off Site Full Time/Part Time Weekly Meetings Progress Reports Quality Assurance Reports Field Order/Change Order Management Sequencing and Scheduling Cutover Planning and Management Training Planning Management Record Copy and As-built Documentation Migration or Move Planning and Management	<i>Includes</i> Services required to manage project installation and construction process and to provide quality assurance for all aspects of the project. <i>See</i> All Division 17 sections and front end requirements
<b>-090</b>	<b>Cable Documentation System</b> Hard Copy Line Cards Electronic copies CAD Standards Ongoing Maintenance Database Systems Web Based Systems Initialization	<i>Includes</i> Requirement for cable documentation including hard copy and electronic requirements as well as hardware and software systems. <i>See</i>

NUMBER	TITLE	EXPLANATION
		17030 for coordination with Administrative Requirements - Submittals
		17170 for coordination with testing Identification and administration
		17270 for coordination with testing Identification and administration
		17370 for coordination with testing Identification and administration
		17470 for coordination with testing Identification and administration
		17570 for coordination with testing Identification and administration
		17190 for coordination with support
		17290 for coordination with support
		17390 for coordination with support
		17490 for coordination with support
		17590 for coordination with support

NUMBER	TITLE	EXPLANATION
<b>17100</b>	<b>CABLE PLANT</b>	
<b>-110</b>	<b>Communication Equipment Rooms</b>	
	Equipment Racks/Cabinets/Shelves	<b>Includes</b>
	Cable management – Vertical & horizontal	Equipment and materials required to fit out the CER to allow it to support all associated serving zones and connect it to a CERB and/or Star Center.
	Patch Panels	
	Optical Fiber Panels	
	Termination Blocks	
	Aluminum Ladder Rack	
	Tie Wraps	<b>See</b>
	D rings and T Posts	17130 for coordination with interior pathways and riser paths
	Grounding Bars	17150 for coordination with backbone requirements
	Power Strips	17160 for coordination with horizontal cabling
	Rack Mounted UPS	17120 for coordination with entrances and demarcations
	Copper Patch Cords	17200 for coordination with LAN requirements
	Fiber Patch Cords	17300 for coordination with voice requirements
		17400 for coordination with video requirements
		17500 for coordination with WAN & Dial Tone requirements
		17600 for coordination with CER & WS AMEP Requirements
		17700 for coordination with other low voltage system requirements
		17800 for coordination with other commodities
<b>-120</b>	<b>Main Distribution Frames and Service Entrances</b>	
	Lightning Protection	<b>Includes</b>
	Special Grounding Requirements	Equipment and Materials required at a building entrance and at a main distribution frame.
	Distribution Frames	
	Steel Ladder Rack	
	Optical Fiber Splice Bays and Trays	
	Fiber Pigtailed	<b>See</b>
	Demarcation Requirements	17110 for Coordination with CER's
		17300 for coordination with voice requirements
		17500 for Demarcations
		17140 for Entrance Locations
		17150 for Backbone Cabling
		17130 for interior pathways
<b>-130</b>	<b>Interior Communication Pathways</b>	
	Conduits	<b>Includes</b>
	Wireways	Interior pathway and opening requirements to support technology cable plant and systems.
	Sleeves	
	Metallic Surface Raceways	
	Non-Metallic Surface Raceways	
	Cable Trays	
	Cable Hangers and Supports	
	Tie Wraps	
	Supporting Strand	
	Measuring tapes and pull lines	
	Innerduct - Corrugated	

NUMBER	TITLE	EXPLANATION
		<i>See</i>
		17790 for fire systems
		17160 for coordination with horizontal cabling
		17150 for coordination with backbone cabling
		17200 for coordination with LAN requirements
		17300 for coordination with voice requirements
		17400 for coordination with video requirements
		17500 for coordination with WAN & dial tone requirements
		17700 for coordination with other low voltage systems
		17800 for coordination with commodities
<b>-140</b>	<b>Exterior Communication Pathways</b>	
	Conduits – PVC, fiberglass, metal and aluminum	<i>Includes</i>
	Manholes	Aerial Pathway and duct bank requirements
	Manhole Racking and ladders	<i>See</i>
	Hand-holes	17150 for coordination with backbone requirement
	Utility Poles	17400 for coordination with video requirements
	Tunnels	17500 for coordination with demarcation requirements
	Supporting Strand	17700 for coordination with other low voltage systems
	Conduit Supports (Private/DOT Bridges)	17790 for coordination with fire systems
	Heavywall InnerDuct	17800 for coordination with commodities
	Restoration Requirements	
	Permits and Right of Ways	
	Concrete and Reinforcements Requirements	
	Warning Tape	
	U Guard	
	Anchoring Requirements	
	Conduit plugs and caps	
<b>-150</b>	<b>Backbone Cabling Requirements</b>	
	Fiber Backbone- Inside Plant	<i>Includes</i>
	Copper Backbone –Inside Plant	Copper, fiber and coax, inside and outside plant requirements
	Fiber Backbone Outside Plant	<i>See</i>
	Copper Backbone Outside Plant	17120 for coordination with Building Distribution Frame
	Multi-pack cable for Satellite Downlink	17130 for coordination with interior pathways
	Coax Backbone	17140 for coordination with exterior pathways
	Taps	17800 for coordination with commodities
	Fiber Connectors	17500 for coordination with demarcations
	Coax Connectors	17210 for coordination with data requirements
	Splice Cases and Vaults	17310 for coordination with voice requirements
	Splicing Modules	17400 for coordination with voice requirements
	Splicing Tape	
	Splicing tie wraps	
	Grounding Connectors (bonding)	
	Bonding and Splicing consumables	
	Straps and Supports	
	Cable Cleaner	
	Cable pulling lubricants	

NUMBER	TITLE	EXPLANATION
-160	<b>Horizontal Cabling Requirements</b> CAT 5/3 Plenum Cable CAT 5/3 PVC Cable Connectors/Couplers/Adapters Faceplates/Jacks Horizontal Fiber Cable RG6 Cable Horizontal Fiber Copper Station Cords Fiber Station Cords Coax Station Cords Baluns Adapters	<p><b>Includes</b></p> <p>CER to Workstation or Device cable plant from existing CER termination equipment</p> <p><b>See</b></p> <p>17110 for coordination with CER 17800 coordinate with commodities 17230 for coordination with data requirements 17240 for coordination with data requirements 17320 for coordination with voice devices 17400 for coordination with video requirements 17500 for coordination with dedicated circuits 17700 for coordination with other low voltage systems 17650 for coordination computer labs 17660 for coordination with teleconferencing rooms 17670 for coordination auditoriums 17690 for coordination with exterior service requirements</p>
-170	<b>Testing, Identification and Administration</b> Testing CAT 5 OTDR requirements Large Cable count test results Light Meter and Source Labeling Documentation/As-builts/Records Line Cards	<p><b>Includes</b></p> <p>Labeling and documentation requirements for cable plant infrastructure and pathways.</p> <p><b>See</b></p> <p>17150 for coordination with Backbone Cabling 17160 for coordination with Horizontal Cabling 17920 for coordination with Cable Management System 17130 for coordination with Interior Conduits 17110 for coordination with CER's 17140 for coordination with exterior pathways</p>
-180	<b>Cutover &amp; Training</b> Cutover Training	<p><b>Includes</b></p> <p>Requirements for migration and first use.</p> <p><b>See</b></p> <p>17150 for coordination with backbone cabling 17160 for coordination with horizontal cabling 17170 for coordination with labeling and documentation</p>

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NUMBER	TITLE	EXPLANATION
-190	<b>Support &amp; Warranty</b> Support Warranty Data Spare Parts	<i>Includes</i>  Defines support and warranty requirements for components and systems <i>See</i> All of section 17100

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NUMBER	TITLE	EXPLANATION
<b>17200</b>	<b>DATA &amp; LAN EQUIPMENT</b>	
<b>-210</b>	<b>Switches, Hubs and Routers</b>	
	ATM and Ethernet Switches	<b>Includes</b>
	Ethernet Hubs	LAN electronics and other data equipment to support the data system backbone, device and circuit ports.
	Token Ring	<b>See</b>
	Work Group Hubs	17110 for coordination with CER
	Routers	17150 for coordination with backbone cable plant
	Firewalls	17160 for coordination with horizontal cable plant
		17400 for coordination with Video Requirements
		17500 for coordination with WAN
		17600 for coordination with AMEP requirements
		17800 for coordination with commodities
<b>-220</b>	<b>Servers</b>	
	Processor	<b>Includes</b>
	Disk Storage	File servers, printer servers, fax servers and mail servers.
	Memory	<b>See</b>
	Network Interface Cards	17110 for coordination with CERs
	Monitors	17210 for coordination with Switches, hubs and routers
	CD Rom	17800 for coordination with commodities
	3.5" Disk Drive	
	Tape Backup	
	Anti-Virus Protection	
	Keyboard and Mouse	
	Server License	
	NOS Management Station	
<b>-230</b>	<b>Workstations</b>	
	Processor	<b>Includes</b>
	Disk Storage	Product and performance requirements for PC's and terminals.
	Memory	<b>See</b>
	CD Rom	17160 for coordination with horizontal cabling
	3.5" Disk Drive	17430 for coordination with monitors
	Network Interface Cards	17680 for coordination with work station layout AMEP
	Fax/Modems	17250 for coordination with printers
	PCM/CIA Cards	17350 for coordination with modems
	Sound Card	17800 for coordination with commodities
	Scan Converters	
	Monitors	
	Keyboard and Mouse	
	Operation System / License	
	Anti-Virus Software	

NUMBER	TITLE	EXPLANATION
-240	<b>Printers</b> Ink Jets Laser Jets Plotter Color Printers Printer Cartridges Paper	<b>Includes</b> Product and Performance for printers and other output devices. <b>See</b> 17160 for coordination with horizontal cabling 17230 for coordination with work stations 17800 for coordination with commodities
-250	<b>Software and Supplies</b> Office Suite – Word Processor, Spreadsheet, Database, Presentation Software Contact Manager Internet Browser and Plugins Imaging/Publishing Client Software Backup Tapes	<b>Includes</b> Product, version, quantity of user licenses requirements <b>See</b> 17220 for coordination with Servers 17230 for coordination with Workstations 17280 for coordination with training
-260	<b>Miscellaneous Equipment</b> Scan Converters Portable LCD Projection Unit Scanner CD Writer UPS (less than 10 KVA) Transceivers Media Converters	<b>Includes</b> Internal and External devices not included with typical workstation. <b>See</b> 17220 for coordination with Servers 17230 for coordination with Workstations 17280 for coordination with training
-270	<b>Testing, Identification &amp; Administration</b> Asset/Inventory Management and Tagging Bar Coding Licenses Testing Naming Conventions Workstation Management Software Network Management Software	<b>Includes</b> Device, port and asset documentation requirements <b>See</b> 17210 for coordination with Switches, Hubs and Routers 17220 for coordination with servers 17230 for coordination with workstations 17240 for coordination with printers 17250 for coordination with software 17260 for coordination with misc. data equipment

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NUMBER	TITLE	EXPLANATION
-280	<b>Cutover and Training</b> Network Management Workstation Management Application Training Operating System Training Server Administration Training	<b>Includes</b> Acceptance Criteria and Training requirements for data and LAN systems. <b>See</b> 17210 for coordination with Switches, Hubs and Routers 17220 for coordination with servers 17230 for coordination with workstations 17240 for coordination with printers 17250 for coordination with software 17260 for coordination with misc. data equipment
-290	<b>Support and Warranty</b> On Site Advance Replace Spare Parts Staffing Experience Location	<b>Includes</b> Ongoing support and warranty requirements <b>See</b> All of section 17200

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NUMBER	TITLE	EXPLANATION
<b>17300</b>	<b>VOICE SYSTEMS</b>	
<b>-310</b>	<b>PBX and Remote Nodes</b>	
	Trunk/Circuit Ports	<b>Includes</b>
	Backbone Ports (INL)	Product, Performance and capacity requirements for telephone devices, backbone (INL connections) and circuits.
	Device Ports	<b>See</b>
	Music on hold	17110 for coordination with CERs
	Special Services	17150 for coordination with backbone cabling
		17320 for coordination with voice devices
		17330 for coordination with voice messaging system
		17500 for coordination with WAN and Circuits
		17700 for coordination with other low voltage systems
		17800 coordinate with commodities
<b>-320</b>	<b>Telephone Sets, Faxes and Modems</b>	
	Attendant Station	<b>Includes</b>
	DSS	Requirements for all voice system devices – digital and analog and interior and exterior.
	Telephone	<b>See</b>
	Faxes	17130 for coordination with interior pathways
	Modems	17140 for coordination with exterior pathways
	Dedicated Dial-in Support Modem	17160 for coordination with horizontal cabling
	DDC Controls - Modems	17220 for coordination with servers
	Security and fire system Dial Tones	17230 for coordination with work stations
	Elevator Phones	17330 for coordination with voice mail
	Blue Lights Security Phones	17340 for coordination with call accounting
	Door Phones	17500 for coordination with WAN
	Parking Lot Gate Phones	17800 for coordination with commodities
	Temporary Trailer Phones	
	Pay Phones	
	Kiosk	
	Automated Teller Machines	
	Connection to Paging System	
	Wireless	
	Cellular	
	Conference Phones	
	PSC	
<b>-330</b>	<b>Voice Messaging Systems</b>	
	Auto Attendant	<b>Includes</b>
	Voice Mail Boxes	Performance and capacity requirements for hardware and software for voice messaging and fax back systems.
	Fax Back System	<b>See</b>
	Message on hold	17320 for coordination with telephone sets
		17800 for coordination with commodities

NUMBER	TITLE	EXPLANATION
-340	<b>Call Accounting Requirements</b> Hardware Software Reporting requirements output	<b>Includes</b> Hardware and/or software for call accounting application <b>See</b> 17310 for coordination with PBX interface
-350	<b>ACD/Call Center Requirements</b> ACD Control Cabinet ACD Console ACD Sets	<b>Includes</b> Performance, functionality, features and Port capacity for ACD sets, console and main cabinet. <b>See</b> 17200 for coordination with Data system interface 17500 for coordination with WAN Circuits and Dial Tone 17610 for coordination with CER AMEP requirements 17680 for coordination with Workstation Space
-360	<b>Miscellaneous Items</b> Headsets Radio for Music on Hold Refurbishing requirements	<b>Includes</b> Attachments and other commodity based items and service for voice devices. <b>See</b> 17320 for coordination with telephone sets 17250 for coordination with applications
-370	<b>Testing, Identification and Administration</b> Testing Labeling Administration ADA Sineage Directory Services – Organization White Pages Yellow Pages	<b>Includes</b> Testing for PBX, voice messaging, auto attendant, ACD and set templates and other labeling requirements and ADA Signage requirements and publishing of phone numbers. <b>See</b> 17310 for coordination with PBX installation and crossconnect documentation 17320 for coordination with telephone sets 17330 for coordination with voice messaging 17350 for coordination with with ACD

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NUMBER	TITLE	EXPLANATION
-380	<b>Cutover and Training</b> Cutover – Parallel or Flash Telephone Use Voice Mail System Use ACD Set Training Dial tone and Circuit Cutover	<b>Includes</b> Device and System Training and Cutover Requirements <b>See</b> 17310 for coordination with PBX installation 17320 for coordination with telephone sets 17330 for coordination with voice messaging 17350 for coordination with with ACD
-390	<b>Support and Warranty</b> Follow-up Training Spare Parts On-Site Support Warranty	<b>Includes</b> Support, response time, spares for systems and devices. <b>See</b> All sections in 17300.

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NUMBER	TITLE	EXPLANATION
<b>17400</b>	<b>VIDEO/AUDIO SYSTEMS</b>	
<b>-410</b>	<b>Control and Headend Equipment</b>	
	Signal Processor	<b>Includes</b> Centralized control and processing equipment.
	Modulators	<b>See</b>
	Demodulators	17110 coordination with CER
	Combiners	17130 coordination with interior pathways
	Amplifiers	17140 coordination with exterior pathways
	Fiber Optic Transmitters/Receivers	17150 coordination with backbone cabling
	Control Systems Chassis, Cards, Programming	17160 coordination with horizontal cabling
	Control Panels	17560 for coordination with WAN services
	Rack, Cabinets Patch Panels, Connectors and Cables	17610 for coordination with CER electric
	Auto Playback equipment	17640 for coordination with CER UPS requirements 17800 coordination with commodities
<b>-420</b>	<b>Production and Teleconferencing Equipment</b>	
	Cameras	<b>Includes</b> Active use devices for dynamic production and connections.
	Channel Elimination Filters	<b>See</b>
	Codec for Video Teleconferencing	17430 for coordination with monitors
	Intercom set	17440 for coordination with Audio 17450 for coordination with downlink and uplink
<b>-430</b>	<b>Monitors, VCR's and Projection Equipment</b>	
	Televisions	<b>Includes</b> Playback and Projection and Display equipment
	Monitors	<b>See</b>
	Scan Converters	17680 for coordination with workstation layout
	Mounting Brackets	17130 for coordination with interior pathways
	VCR's	17160 for coordination with horizontal cabling
	Laser Disks	17230 for coordination with workstation
	DVD's	17420 for coordination with production equipment
	Video Graphics Projector	17660 for coordination with teleconferencing rooms
	Slide Projectors	17670 for coordination with auditoriums
	Video Projection Units and Mirrors	17800 for coordination with commodities
	Line Doublers	
	Flat Screen Monitors	
	Movie Projectors	
	Overhead Projectors	
	Portable Carts	

NUMBER	TITLE	EXPLANATION
-440	<b>Audio Equipment</b>	
	Amplifiers	<i>Includes</i>
	Audio Distribution Amps	Sound and Audio Requirements
	Ceiling Speakers	<i>See</i>
	Equalizers	17130 for coordination with interior pathways
	Feedback Eliminator	17160 for coordination with horizontal cabling
	Wireless microphones (Lavaliere and Hand Held)	17410 for coordination with control and headend
	Microphone stands	17420 for coordination with production equipment
	Lectern Microphones	17430 for coordination with monitors and playback
	Listening assistance transmitter/emitter	17620 for coordination with AV control room AMEP
	Listening assistance receivers	17660 for coordination with teleconferencing room
	Program Speakers	17670 for coordination with auditoriums
	Surround Speakers	17690 for coordination with exterior services
	Subwoofers	
	Surround Sound Processors	
	Automatic gain control	
	Remote controlled Switches	
	Buffer Amplifiers	
	Mixers	
-450	<b>Satellite System</b>	
	Receiver	<i>Includes</i>
	De-Scramblers	Downlink and Uplink facilities.
	Satellite Dish	<i>See</i>
	Motor Arm	17110 for coordination with CER
	Feed Horn	17130 for coordination with interior pathways
	C Band LNB's	17140 for coordination with exterior pathways
	Ku Band LNB's	17150 for coordination with backbone cabling
	Servo Motor	17410 for coordination with control and headend
	Uplink Location Requirements	17420 for coordination with production equipment
		17690 for coordination with exterior services
		17800 for coordination with commodities
-460	<b>Software and Supplies</b>	
	Retrieval Systems	<i>Includes</i>
	Titles	System management tools and video/audio tapes, libraries and
	System management consoles	media storage
	Audio Cassettes	<i>See</i>
	Video Cassettes	17860 for coordination with Media Storage
	Training Videos	
	Educational Programs	

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NUMBER	TITLE	EXPLANATION
-470	<b>Testing, Identification and Administration</b> Testing Labeling As-Built and System Documentation	<b>Includes</b> System and device testing, labeling and documentation requirements <b>See</b> 17920 Cable Management System
-480	<b>Cutover and Training</b> Cutover Training	<b>Includes</b> System activation, first use, system training and device training for 17400 <b>See</b> All 17400 Sections
-490	<b>Support and Warranty</b> Support Warranty Spare Parts Response	<b>Includes</b> Response time, spare parts, help numbers and warranty requirements <b>See</b> All 17400 Sections

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NUMBER	TITLE	EXPLANATION
<b>17500</b>	<b>WAN AND SERVICE</b>	
<b>-510</b>	<b>Hardware – Routers, etc.</b>	
	Routers	<b>Includes</b>
	CSU/DSU's	Hardware and components for public or private, dedicated or dial up
	Multiplexers	Wide Area Network connections
	FRAD	<b>See</b>
	WAN Bridges	17110 for coordination with CER
		17120 for coordination with building distribution frame
		17150 for coordination with backbone cabling
		17210 for coordination with LAN electronics and chassis
		17310 for coordination with PBX
		17420 for coordination with teleconferencing requirements
		17640 for coordination with UPS requirements
		17700 for coordination with other low voltage systems
		17800 for coordination with other commodities
<b>-520</b>	<b>Local Service / Centrex</b>	
	DID Trunks	<b>Includes</b>
	Metered Business Lines	Local dial tone service requirements
	Centrex Lines	<b>See</b>
	ISDN	17110 for coordination with CER
		17120 for coordination with building distribution frame
		17130 for coordination with horizontal pathways
		17140 for coordination with exterior pathways
		17150 for coordination with backbone cabling
		17160 for coordination with horizontal cabling
		17310 for coordination with PBX
		17700 for coordination with other low voltage systems
<b>-530</b>	<b>Long Distance Service</b>	
	Intra-Latta (Regional)	<b>Includes</b>
	Inter-Latta	Long distance dial tone services
	International	<b>See</b>
	ISDN	17310 for coordination with PBX
		17420 for coordination with teleconferencing requirements
		17700 for coordination with other low voltage systems

NUMBER	TITLE	EXPLANATION
-540	<b>Dedicated Circuits</b> 56K Fractional T1's T1's T3's Frame Relay ISDN	<b>Includes</b> Dedicated circuit requirements for point to point or multi-point connections. <b>See</b> 17120 for coordination with entrance requirements 17210 for coordination with LAN 17310 for coordination with PBX 17420 for coordination with teleconferencing requirements 17510 for coordination with WAN hardware 17700 for coordination with other low voltage systems
-550	<b>Internet Access</b> Dial up Dedicated Hosting Services Co-Locating Services E-mail accounts Web Site Development Extranets	<b>Includes</b> Connection and service requirements related to the internet. <b>See</b> 17220 for coordination with Server requirements 17230 for coordination with LAN workstations 17250 for coordination with Software 17310 for coordination with PBX 17420 for coordination with teleconferencing requirements 17520 for coordination with local dial tone 17540 for coordination with dedicated circuits 17800 for coordination with other commodities
-560	<b>Cable Service</b> Basic Standard Tier Premium Channels Ala Carte	<b>Includes</b> Video programming requirements <b>See</b> 17120 for coordination with Service Entrances 17450 for coordination with Satellite Systems 17410 for coordination with Control and Headend Equipment

NUMBER	TITLE	EXPLANATION
-570	<b>Private Microwave and Wireless Systems</b> Towers Transmitters Receivers Dishes Power Modulation and Demodulation Equipment Spread Spectrum Transmitters and Receivers Antennae Requirements Licensing Requirements Zoning Issues – Permits and Fees	<b>Includes</b> Towers, transmission equipment for private microwave systems. <b>See</b> 17210 for coordination with LAN electronics 17310 for coordination with PBX 17410 for coordination with Control and Headend equipment 17500 for coordination with WAN requirements 17690 for coordination with exterior services. 17510 for coordination with hardware 17520 for coordination with local dial tone listing 17530 for coordination with long distance (800, 888, 877) – listing 17540 for coordination with dedicated circuits – testing, listing 17550 for coordination with internet testing and listing (email address)
-580		<b>Includes</b>  <b>See</b>
-590		<b>Includes</b>  <b>See</b>

NUMBER	TITLE	EXPLANATION
<b>17600</b>	<b>ARCHITECTURAL, ELECTRICAL &amp; MECHANICAL REQUIREMENTS</b>	
<b>-610</b>	<b>CER and Access Point Requirements</b>	
	Riser and Horizontal Backboards	<i>Includes</i>
	Floor Rating	AMEP for CER's and AP requirements to support Division 17 systems
	Floor Tile	<i>See</i>
	Card Access	17110 for coordination with CER
	Sleeves – Vertical and Horizontal	17130 for coordination with interior pathways
	Doors	17140 for coordination with exterior pathways
	HVAC	17150 for coordination with backbone cabling
	UPS	17160 for coordination with horizontal cabling
	Electric Panels	17210 for coordination with LAN
	Lighting	17220 for coordination with Servers
	Grounding Components	17310 for coordination with PBX
	Equipment Outlet – location and type	17330 for coordination with voice messaging system
	Courtesy Outlets – testers etc.	17350 for coordination with ACD
	Displacement Issues	17510 for coordination with WAN electronics
	Access Issues	17640 for coordination with UPS requirements
	Emergency Power	17700 for coordination with other low voltage systems
<b>-620</b>	<b>AV Control Room Requirements</b>	
	Doors Frames	<i>Includes</i>
	Door Swings	AMEP requirements specific to control rooms and spaces
	Card Access	<i>See</i>
	Sleeves – Vertical and Horizontal	17410 for coordination with Control and Headend Equipment
	Doors	17420 for coordination with Production and Teleconferencing
	HVAC	17450 for coordination with Satellite Systems
	UPS	17640 for coordination with UPS and Battery Backup
	Electric Panels	
	Lighting	
	Grounding	
	Equipment Outlet – location and type	
	Courtesy Outlets – testers etc.	
	Displacement Issues	
	Access Issues	

NUMBER	TITLE	EXPLANATION
-630	<b>MDF Requirements</b> Demarcation and Riser Backboards Distribution Frame Floor Rating Floor Tile Card Access HVAC UPS, Battery Backup and Rectifiers Electric Panels Lighting Grounding Requirements Equipment Outlet – location and type Courtsey Outlets – testers etc. Displacement Issues Access Issues Raised Floor Workspace Emergency Power Generators	<b>Includes</b> AMEP requirements specific to Main Distribution Rooms <b>See</b> 17110 for coordination with CER 17130 for coordination with interior pathways 17140 for coordination with exterior pathways 17150 for coordination with backbone cabling 17160 for coordination with horizontal cabling 17310 for coordination with PBX 17330 for coordination with voice messaging system 17350 for coordination with ACD 17510 for coordination with WAN electronics 17520 for coordination with local dial tone 17530 for coordination with long distance 17540 for coordination with dedicated circuits 17550 for coordination with internet 17560 for coordination with cable service 17640 for coordination with UPS requirements 17700 for coordination with other low voltage systems
-640	<b>Telephone Specialties</b> Telephone Directory Units Telephone Enclosures Telephone Shelving ADA Requirements	<b>Includes</b> Manufactured telephone enclosures, stalls, booths and alcoves for installation of telephones. <b>See</b> 17200 for Telephone System Requirements
-650	<b>Computer Labs and Classrooms</b> Power Cable Management Conduits and boxes CPU Space Monitor Space Key Board and Mouse Space Printer Spaces Teaching station	<b>Includes</b> AMEP requirements to support computer labs and other high density workstation spaces. <b>See</b> 17130 for coordination with interior pathways 17150 for coordination with backbone cabling 17160 for coordination with horizontal cabling 17210 for coordination with LAN electronics 17230 for coordination with workstations 17430 for coordination with Monitors and Projection Equipment 17550 for coordination with internet 17560 for coordination with cable service 17640 for coordination with UPS requirements

NUMBER	TITLE	EXPLANATION
<b>-660</b>	<b>Tele-Conferencing Rooms</b>	
	Control rooms	<i>Includes</i>
	Camera and Microphone Locations	AMEP infrastructure required to support data, voice and video communications over a WAN.
	Acoustical Requirements	<i>See</i>
	Seating	17130 for coordination with interior pathways
	Finishes	17160 for coordination with horizontal cabling
	Equipment Storage	17210 for coordination with LAN electronics
	Lighting	17230 for coordination with workstations
	Table top services	17320 for coordination with Telephone Sets
	Wire Management	17420 for coordination with Production /Teleconferencing Equipment
	Security	17430 for coordination with Monitors and Projection Equipment
	HVAC	17440 for coordination with Audio Equipment
		17450 for coordination with Satellite Systems
		17520 for coordination with Local Dial Tone
		17550 for coordination with Internet
		17560 for coordination with Cable service
		17830 for coordination with Furniture
<b>-670</b>	<b>Auditoriums and Large Group Rooms</b>	
	Projection Rooms and Mirrors	<i>Includes</i>
	Control Rooms	AMEP infrastructure required to support data, voice and video presentations for a large audience.
	Projection Screens	<i>See</i>
	Conduits and Access boxes	17130 for coordination with interior pathways
	Floor Boxes and access points	17160 for coordination with horizontal cabling
	Stage Requirements	17210 for coordination with LAN electronics
	Lectern Requirements	17230 for coordination with workstations
	Multi-use Configurations	17320 for coordination with Telephone Sets
	Cable management and Power at Seats	17420 for coordination with Production Equipment
		17430 for coordination with Monitors and Projection Equipment
		17440 for coordination with Audio Equipment
		17450 for coordination with Satellite Systems
		17520 for coordination with Local Dial Tone
		17550 for coordination with Internet
		17560 for coordination with Cable service
		17830 for coordination with Furniture

NUMBER	TITLE	EXPLANATION
<b>-680</b>	<b>Workstation Locations and Furniture</b>	
	Power	<i>Includes</i>
	Cable Management	Workstation specific requirements to support voice, data and video at the desktop
	Conduits and boxes	
	CPU Space	<i>See</i>
	Monitor Space	17130 for coordination with interior pathways
	Key Board Trays and Mouse Space	17160 for coordination with horizontal cabling
	Printer Spaces	17170 for coordination with labeling
	Power Strips	17240 for coordination with workstations
		17250 for coordination with printers
		17270 for coordination with labeling
		17320 for coordination with telephone sets, faxes and modems
		17350 for coordination with ACD sets
		17370 for coordination with labeling
		17430 for coordination with video monitors
		17680 for coordination with work station power requirements
		17800 for coordination with commodities
<b>-690</b>	<b>Exterior Service Requirements</b>	
	Satellite Downlink/Uplink Locations	<i>Includes</i>
	Parking Gates	Infrastructure required to support voice, data and video services at exterior locations.
	Door Phones	
	Blue Light Security	<i>See</i>
	Exterior Security Cameras	17130 for coordination with interior pathways
	Power	17140 for coordination with exterior pathways
	Control Cable Conduits and Boxes	17160 for coordination with horizontal cabling
		17320 for coordination with Telephone Sets
		17420 for coordination with Production Equipment (cameras)
		17450 for coordination with Satellite Systems
		17710 for coordination with Public Address System
		17760 for coordination with security

NUMBER	TITLE	EXPLANATION
<b>17700</b>	<b>INTRA-BUILDING COMMUNICATION SYSTEMS</b>	
<b>-710</b>	<b>Time and Attendance</b> Card Swipe Locations RS232 and/or Ethernet Connections	<b>Includes</b> Product and performance requirements for human resource systems <b>See</b> 17160 for coordination with horizontal cabling 17210 for coordination with LAN electronics 17220 for coordination with Servers 17680 for coordination with "workstation" layout AMEP
<b>-720</b>	<b>Patient Monitoring System</b>	<b>Includes</b> Product and performance requirements for patient monitoring systems <b>See</b>
<b>-730</b>	<b>Intercom and Nurse Call Systems</b>	<b>Includes</b> Product and performance requirements for nurse call systems <b>See</b>
<b>-740</b>	<b>Public Address System</b> Speakers Ports Control Center Cable	<b>Includes</b> Requirements for public address and paging systems. <b>See</b> 17110 for coordination with CER 17130 for coordination with interior pathways 17160 for coordination with horizontal cabling 17310 for coordination with PBX 17320 for coordination with telephone sets 17610 for coordination with CER AMEP 16690 for coordination with exterior services

NUMBER	TITLE	EXPLANATION
-750	<b>Paging Systems</b> Amplifiers ReDistribution Systems Leaky Cable Systems	<b>Includes</b> Intra-building paging systems. <b>See</b> 17150 Backbone Cabling Requirements
-760	<b>Master Clock</b> Clocks Master Control Power Supply/Booster Cable Secondary Clocks	<b>Includes</b> Requirements to support wide master clock system. <b>See</b> 16000 Electrical Power requirements 17110 coordination with CER 17130 for coordination with interior pathways 17710 for coordination with Public Address System
-770	<b>Networked Copiers</b> Network Interface Requirements Client Software	<b>Includes</b> Connection and application requirement to enable networked copiers.  <b>See</b> 17160 for coordination with horizontal cabling 17680 for coordination with "workstation" layout AMEP 17250 for coordination with printers 17350 for coordination with modems 17210 for coordination with LAN electronics 17230 for coordination with workstations 17530 for coordination with local dial tone 17800 for coordination with commodities
-780	<b>Bar Code</b> Main Control Center Junction Box Custom Cable Connector interface Scanner/Readers Printers	<b>Includes</b> Product and performance requirements for bar code systems <b>See</b> 17110 coordination with CER 17130 for coordination with interior pathways 17160 for coordination with horizontal cabling 17210 for coordination with LAN requirements 17220 for coordination with server requirements 17610 coordination with CER power requirement 17800 for coordination with commodities

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NUMBER	TITLE	EXPLANATION
-790	Dictation System	<i>Includes</i> Product and performance requirements for dictation systems <i>See</i>

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NUMBER	TITLE	EXPLANATION
<b>17800</b>	<b>BUILDING AUTOMATION AND CONTROL</b>	
-810	Energy Monitoring and Controls	<i>Includes</i> Integrated equipment for energy monitoring and control. <i>See</i>
-820	Lighting System Control	<i>Includes</i> Integrated equipment for lighting system control. <i>See</i>
-830	Environmental Monitoring and Controls	<i>Includes</i> Integrated equipment for environmental monitoring and control. <i>See</i>
-840	Elevator Monitoring and Controls	<i>Includes</i> Integrated equipment for elevator monitoring and control. <i>See</i>

NUMBER	TITLE	EXPLANATION
-850	<b>Door Monitoring and Controls</b>	<p><i>Includes</i> Integrated equipment for door monitoring and control.</p> <p><i>See</i></p>
-860	<b>Detection and Alarm</b> Fire Alarms Gas Detection Leak Detection Smoke Alarm	<p><i>Includes</i> Signaling equipment and automated fire, smoke, gas and leak detection and warning systems. Monitoring and recording of fire protection devices and fire suppression systems; audio and/or visual warning systems for inhabitants of buildings and for fire fighting authorities; activation of elevators and air handling systems to a predetermined fire mode and other fire protection functions Local signaling equipment such as annunciators, bells and buzzers.</p> <p><i>See</i> 13800 for building automation and control systems 13900 for fire suppression and protection 16560 for hazard warning lighting</p>
-870		
-880		
-890		

NUMBER	TITLE	EXPLANATION
<b>17900</b>	<b>SECURITY, ACCESS AND SURVEILLANCE</b>	
<b>-910</b>	<b>Security</b>	
	Primary Control and Software	<b>Includes</b>
	Main Control Panels	Requirements for security and monitoring systems.
	Dial out Requirements	<b>See</b>
	Infrared/Motion Sensors	17110 for coordination with CER's
	Glass break Sensors	17130 for coordination with interior pathways
	Window Bars	17150 for coordination with backbone cabling
	Door and Window Contacts	17160 for coordination with horizontal cabling
	Cameras	17210 for coordination with PBX
		17520 for coordination with local dial tone
		17610 for coordination with CER AMEP requirements
		17620 for coordination with AV control rooms
		17630 for coordination with MDF requirements
		17650 for coordination with computer labs
		17740 for coordination with time and attendance
		17750 for coordination with card access
<b>-920</b>	<b>Card Access</b>	
	Door Frame	<b>Includes</b>
	Controllers	Requirements for a card access system and access points
	Card Swipe Units	<b>See</b>
	Power	17110 for coordination with CER layouts
	Lock sets	17150 for coordination with backbone cabling
	Magnetic Locks	17610 for coordination with CER AMEP requirements
		17760 for coordination with Security
<b>-930</b>	<b>Surveillance Systems</b>	
	Video Surveillance	<b>Includes</b>
		<b>See</b>
		17300 for Telephone Requirements

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NUMBER	TITLE	EXPLANATION
-940	Not Used	<i>Includes</i> <i>See</i>
-950	Not Used	<i>Includes</i> <i>See</i>
-960	Not Used	<i>Includes</i> <i>See</i>
-970	Not Used	<i>Includes</i> <i>See</i>
-980	Not Used	<i>Includes</i> <i>See</i>
-990	Not Used	<i>Includes</i> <i>See</i>

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## **(T) Series Drawing Organizational Model**

**A1** – Building Architectural Floor Plans

**T0** – System and pathway drawings at the Site perspective.

**T1** – Layout of complete building per floor. The drawing indicates location of serving zones, communication equipment rooms, access points, pathways and other systems that need to be viewed from the complete building perspective.

**T2** – The building is divided up by it's serving zones. Drawing indicates drop locations, communication equipment rooms, access points and detail call outs for communication equipment rooms and other congested areas.

**T3** – Detailed look at communication equipment room. Drawing indicates technology layout (racks, ladderacks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. May also be an enlargement of a congested area.

**T4** – Detailed drawings of "typicals" such as faceplate labeling, faceplate types, installation procedures, detail racking, and raceways.

**T5** – Schedules (spreadsheets) to capture information to be entered into database for cutovers and cable plant management.