

**RFP No.: APSFL/VCEquipment/309/2018, Dated 30.05.2018**

**Supply, Installation and Commissioning of Video Conferencing Infrastructure & Maintenance**

**Corrigendum 1, Dt: 01/06/2018**

**Bidders may please note that this corrigendum document is part of this RFP. The items listed in the corrigendum will supersede the corresponding clauses in RfP**

<b>S.No</b>	<b>Section</b>	<b>Clause</b>	<b>Brief Description of the clause</b>	<b>Ref Page No in Tender</b>	<b>Revised clause</b>
1	Annexure – III	9	Technical specifications	35	Please refer Annexure B in this RFP

## Annexure A

### 1. Video Endpoint:

The proposed system must support PAL with a PTZ camera. The codec must be based on ITU standards The VC End Point should be a codec based hardware. No software based solution is accepted here. All components of the VC system like Codec, Camera and Microphone should be from the same OEM.			
Sr. No.	Description	Specification Parameter	Compliance
1	Package	Full HD 1080p60 camera, codec, Microphone Array, cables, and remote control	
2	Video Standards and Resolutions	It should support H.323, SIP standards for communications.	
		It should support H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile	
		It should support 1080p 60 fps, 1080p 30 fps, 720p 60 fps and 720p 30fps	
3	Content Standards and Resolutions	It should support content sharing using standard based H.239 and BFCP over SIP.It should also support audio from PC used for content sharing.	
		It should transmit both people and content both simultaneously to the far end location at 1080p 30fps	
4	Audio Standards and Features	It should support G.711, G.728, G.729A, G.722, G.722.1, AAC-LD or better	
		It should support 20kHz or better bandwidth with crystal clear audio and stereo sound.	
		Automatic Gain Control and Automatic Noise Suppression	
		Keyboard noise reduction and instant adaptation echo cancellation	
5	Video and Audio Inputs	1 x HDMI/HDCI input for connecting main HD camera	
		1 x HDMI/HDCI input for connecting secondary HD camera	
		1 x HDMI input for connecting PC/Laptop to share HD content	
		1 x HDMI/Component for connecting VCR/DVD player	
		2 x Microphone Input(Support for minimum 4 mics)	
		2 x RCA line-in	

6	Video and Audio Outputs	2 x HDMI output for connecting main monitor & second monitor.	
		1 x HD output for connecting additional monitor or DVD recorder.	
		1 x RCA pair stereo line-out	
7	Other Interfaces	2 x 10/100/1000 LAN port	
		2 x USB for software upgrade and connecting external devices	
		1 x RS-232 mini-DIN 8-pin or equivalent	
8	Camera	It should support 1080p60fps with 10x optical zoom.	
		It should be capable of enhancing video conferencing experience with advanced face-recognition technology such that it automatically scans the room and seamlessly commands the main camera to appropriately frame the users during a call without any manual intervention from day one	
		It should support PAN Range of +/-90°, and Tilt of +/-20°	
9	Network Features	H.323 and SIP bandwidth up to 6 Mbps	
		IPv4 and IPv6 support from day one	
		Auto Gatekeeper Discovery	
		IP Precedence, QoS	
		H.323 based Packet Lost Recovery	
10	Multisite Feature	It should support atleast 8 sites at 720p in future	
11	Security	Media Encryption (H.323, SIP): AES-128, AES-256	
		The system should also support local recording of an encrypted call	
		Authenticated access to admin menus, web interface and telnet API	
		Local account password policy configuration	
12	Other Standards	H224/H.281, H.323 Annex Q, H.225, H.245, H.241, H.239, H.243, H.460	
		It should support native integration with on premise Lync server & SFB server.	

## 2. Technical Specification of Central Infrastructure:

Technical specifications of central infrastructure			
Sr. No.	Description	Specification Parameter	Compliance
1	Hardware	The MCU must be a dedicated hardware based solution from the same OEM as the end point.	
2	Capacity	The solution must support 100 HD1080p30 ports from day 1. It must be scalable to support 200 HD1080p30 ports on the same box/server by adding additional licenses only & without the need to add hardware and cascading.	
		There must not be any artificial limits imposed in terms of number of conference rooms or number of shared concurrent conferences. Keeping future scalability into consideration, the number of concurrent conferences must be equal to at least the port capacity being asked for. Additionally, it should be possible to pre assign 100 meeting rooms dedicated for end users.	
		It must be possible to see at least 20 sites simultaneously on the screen. The end points must have the capability to change their local video layout from remote control. The MCU must support 25 layouts.	
3	Resolution support	The MCU must support resolutions up to 1080p60.	
4	Other components	The solution must have native support for H.323 & SIP with the ability of 100 devices registration for H.323 gatekeeper and SIP registrar from day 1. The number of concurrent calls supported must be 100 from day 1 and be scalable to 200 on the same server by through software license. This must be a dedicated, physically separate server to avoid a single point of failure.	
		The solution must include a management, scheduling and provisioning component(s) with capacity of at least 100 devices from day 1. This must be a dedicated, physically separate server to avoid a single point of failure. The management system should support provisioning, bandwidth & device management/software upgrade and scheduling of 3rd party video endpoints in addition to the video endpoints of the OEM of the management server.	
		It must be possible to have an Integrated presence-awareness feature that allows users to verify contact availability and status, and seamless enterprise directory integration which simplifies management and ensures contact list accuracy.	
		The solution must include a firewall traversal component for SIP & H.323 video endpoints. It must support at least 5 calls. This must be a dedicate, physically separate	

		server to avoid a single point of failure. Should support firewall traversal solution using the H.460 and SIP protocol.	
		The MCU must support H.320 - 2 x ISDN PRI from day 1 for PSTN based audio users and ISDN video endpoints.	
		The solution must include the ability to allow calls from smart phones, tablets and PCs/laptops.	
5	Protocols	The solution must support H.261, H.263, H.264 AVC, H.264 SVC, H.264 High Profile	
		The MCU should support content sharing using standard based H.239 and BFCP over H.323 & SIP to up to HD1080 30fps resolution.	
		All components of the solution must support H.323 and SIP from day 1.	
		It should support G.711, G.729A, G.722, G.722.1, AAC-LD or better	
		It should support 20kHz bandwidth with crystal clear audio and stereo sound.	
		The MCU must support Lecture Mode, Presentation Mode & Far End Camera Control.	
		Automatic Gain Control and Automatic Noise Suppression	
6	Security	The solution must support encryption on H.323, SIP and H.320.	
7	Interoperability	The solution must be interoperable with standards-based end points, even if they are from a different OEM for all the video ports. Any hardware required to interop should be supplied from day one.	
		The solution must support both dial-in and dial-out of calls.	
8	Recording solution	Records single point and multipoint conferences with full H.239 and BFCP content capture	
		Full High definition (HD) support for 1080p30 H.264 video	
		Playback of recorded video from endpoints and web browsers	
		H.323 standards-based for use with third party conferencing systems	
		Should support 4 concurrent video conferencing recording sessions at HD 1080p30 with full video, audio and content. The system must have internal storage of 2000 hours of Full HD 1080p recording.	
		Multiple methods for recording – direct from a video endpoint, MCU/bridge & from the admin user interface	
		Media download for video editing or distribution must be allowed.	
		There must be a user-friendly portal with thumbnail view of the recorded video sessions.	
		To avoid a single point of failure, this must be on a dedicated, physically separate server.	
9	Streaming solution	High Definition – 1080p live stream, otherwise flexible enough to showcase 2 concurrent HD live streams.	

		Unicast/Multicast up to 10,000 concurrent web viewers	
<b>10</b>	OEM	The solution including MCU, gatekeeper, management server, Firewall Traversal application must be from the same OEM as the end points	
<b>11</b>	Redundancy	The solution including the MCU, Gatekeeper, management application and the firewall traversal application should have the redundant configuration such that at the event of failure, the redundant server should take over the operations. The redundant setup should have the same capacity as the primary setup.	
<b>12</b>	Implementation	The MCU, Gatekeeper, management application and the firewall traversal application including the redundant architecture should be directly implemented by the OEM. Necessary declaration letter from the OEM about the implementation engineer is to be furnished on the letter head	

### 3. DSP – 16 Channel

S.No.	Specifications	Compliance
1	Each input of the device shall provide 22 kHz bandwidth stereo acoustic echo cancellation processing, upto 20dB of ambient noise cancellation, automatic gain control, digital gain and upto one second of audio delay (or better system)	
2	Device should provide minimum 16 microphone/ line AEC inputs shall be provided and all inputs shall have equivalent input processing and support microphone or line level signals	
3	All inputs from the linked devices shall be available to all outputs	
4	The digital audio device shall operate with 22 kHz audio bandwidth (0Hz - 22 kHz) and 48 kHz sample rate and be capable using two simultaneous references for stereo operation on every input	
5	The unit shall provide user selectable amounts of ambient noise cancellation on each microphone input from 0 to 20 dB	
6	The noise cancellation shall effectively cancel steady state ambient noise at all frequencies without causing any perceptible degradation of human voice or other transient sounds.	
7	The DSP should be capable of terminating the Telephone line for making PSTN calls in future	
8	Connectors (or system compatible connectors)	
9	RS -232: DB9F or compatible to proposed system	
10	Power supply	
11	Input voltage of 90-250 VAC; 50-60 Hz	
12	0 to 50 degree C operating temperature	
13	The DSP should be of the same brand quoted as that of the endpoint for better interoperability	

4. VM – 2UHD:

1:2 4K60 4:2:0 HDMI DA		Compliance
Specification :		
<b>INPUT</b>	1 HDMI connector	
<b>OUTPUTS</b>	2 HDMI connectors	
<b>PORT</b>	1 USB for firmware upgrade	
<b>MAX. DATA RATE</b>	10.2Gbps (3.4Gbps per graphic channel)	
<b>COMPLIANCE WITH HDMI STANDARD</b>	Supports HDMI and HDCP	
<b>OPERATING TEMPERATURE</b>	0° to +40°C (32° to 104°F)	
<b>STORAGE TEMPERATURE</b>	-40° to +70°C (-40° to 158°F)	
<b>HUMIDITY</b>	10% to 90%, RHL non-condensing	
<b>POWER CONSUMPTION</b>	5V DC, 800mA	
<b>INCLUDED ACCESSORIES</b>	Power supply	
<b>OTHER HIGHLIGHTS</b>	Max. Data Rate — 10.2Gbps (3.4Gbps per graphic channel).	
	Max. Resolution — 4K@60Hz (4:2:0).	
	HDMI Signal Transmission — HDMI 2.0 and HDCP 1.4 compliant signal, supporting deep color, x.v.Color™, lip sync, 7.1 PCM, Dolby TrueHD, DTS-HD, CEC (OUT 1 only), 2K, 4K, and 3D.	
	Intelligent EDID Processing— An intelligent EDID handling and processing algorithm that ensures Plug and Play operation for HDMI systems.	
	Default EDID — For fast and efficient connection.	
	3D Pass-Through	

5. KDS-EN6:

Description:4K60 4:2:0 HDCP 2.2 Video Encoder		Compliance(Y/N) & Deviations
Specification :		



<b>INPUTS</b>	1 HDMI connector, 1 unbalanced stereo audio, 1 RS-232 , 1 USB (type B) port, 1 IR(Rx)	
<b>OUTPUTS</b>	1 Ethernet (LAN/PoE) on an RJ-45 connector, 1 IR (Tx)	
<b>NETWORK</b>	10M/100M/1000M	
<b>NETWORK SWITCH</b>	1G multicast, IMGP snooping non-blocking, Layer 2	
<b>STREAMING</b>	Unicast and multicast through RTSP (Real Time Streaming Protocol)	
<b>CONTROLS</b>	Reset button, up and down channel buttons, channel 7-segment display, STATUS, LINK and ON LEDs	
<b>VIDEO ENCODING/DECODING</b>	Compression standard MJPEG	
<b>HDCP</b>	HDCP 2.2	
<b>SCALING AND CROPPING</b>	Built in scaling and cropping for flexible display of source content on the decoder output	
<b>BIT RATES</b>	Peak: 850Mbps, 4K average: 350Mbps, 1080p average: 250Mbps	
<b>MAX RESOLUTION</b>	4096x2160@60Hz	
<b>AUDIO ENCODING/DECODING</b>	Compression standard (analog in/out): AAC-LC	
<b>POWER OPTIONS</b>	PoE, external PS	
<b>OPERATING TEMPERATURE</b>	0° to +40°C (32° to 104°F)	
<b>STORAGE TEMPERATURE</b>	-40° to +70°C (-40° to 158°F)	
<b>HUMIDITY</b>	10% to 90%, RHL non-condensing	

6. KDS-DEC6:

Description:4K60 4:2:0 HDCP 2.2 Video Encoder		
Specification :		Compliance(Y/N) & Deviations
<b>INPUTS</b>	1 Ethernet (LAN/PoE) on an RJ-45 connector, 1 IR (Tx)	
<b>OUTPUTS</b>	1 HDMI connector, 1 unbalanced stereo audio, 1 RS-232 , 1 USB (type B) port, 1 IR(Rx)	
<b>NETWORK</b>	10M/100M/1000M	
<b>NETWORK SWITCH</b>	1G multicast, IMGP snooping non-blocking, Layer 2	

<b>STREAMING</b>	Unicast and multicast through RTSP (Real Time Streaming Protocol)	
<b>CONTROLS</b>	Reset button, up and down channel buttons, channel 7–segment display, STATUS, LINK and ON LEDs	
<b>VIDEO ENCODING/DECODING</b>	Compression standard MJPEG	
<b>HDCP</b>	HDCP 2.2	
<b>SCALING AND CROPPING</b>	Built in scaling and cropping for flexible display of source content on the decoder output	
<b>BIT RATES</b>	Peak: 850Mbps, 4K average: 350Mbps, 1080p average: 250Mbps	
<b>MAX RESOLUTION</b>	4096x2160@60Hz	
<b>AUDIO ENCODING/DECODING</b>	Compression standard (analog in/out): AAC–LC	
<b>POWER OPTIONS</b>	PoE, external PS	
<b>OPERATING TEMPERATURE</b>	0° to +40°C (32° to 104°F)	
<b>STORAGE TEMPERATURE</b>	–40° to +70°C (–40° to 158°F)	
<b>HUMIDITY</b>	10% to 90%, RHL non–condensing	

## 7. TP-580Txr:

Description: 4K60 4:2:0 HDMI HDCP 2.2 Transmitter with RS–232 & IR over Long–Reach HDBaseT		
Specification :		Compliance(Y/N) & Deviations
<b>Transmitter inputs</b>	1 HDMI on an HDMI connector, 1 IR link extension, 1 RS–232 on a 9–pin D–sub connector for serial link extension and device firmware upgrade	
<b>Transmitter outputs</b>	1 HDBT on an RJ–45 female connector	
<b>Extension line</b>	HDBaseT 1.0 compliant	
	Up to 100m (330ft) at 4K@60Hz (4:2:0)	
	Up to 180m (590ft) at 1080p	
<b>Video</b>	Up to 10.2Gbps bandwidth (3.4Gbps per graphic channel)	
	Up to 4K UHD @60Hz (4:2:0) 24bpp resolution	

	HDMI 2.0 and HDCP 2.2 signal compliance	
<b>Control RS-232</b>	115200 baud rate	
<b>Operating temperature</b>	0° to 40°C (32° to 104°F)	
<b>0° to 40°C (32° to 104°F)</b>	Storage Temperature	
<b>Storage temperature</b>	–40° to +70°C (–40° to 158°F)	
<b>–40° to +70°C (–40° to 158°F)</b>	Humidity	
<b>Humidity</b>	10% to 90%, RHL non–condensing	
<b>10% to 90%, RHL non–condensing</b>	Included Accessories	
<b>Included accessories</b>	Power supply unit	

8. TP-580rxr:

Description: 4K60 4:2:0 HDMI HDCP 2.2 Transmitter- Receiver with RS–232 & IR over Long–Reach HDBaseT		
Specification :		Compliance
<b>Transmitter inputs</b>	1 HDMI on an HDMI connector, 1 IR link extension, 1 RS–232 on a 9–pin D–sub connector for serial link extension and device firmware upgrade	
<b>Transmitter outputs</b>	1 HDBT on an RJ–45 female connector	
<b>Receiver inputs</b>	1 HDBT on an RJ–45 female connector	
<b>Receiver outputs</b>	1 HDMI on an HDMI connector, 1 IR link extension, 1 RS–232 on a 9–pin D–sub connector for serial link extension and device firmware upgrade	
<b>Extension line</b>	HDBaseT 1.0 compliant	
	Up to 100m (330ft) at 4K@60Hz (4:2:0)	
	Up to 180m (590ft) at 1080p	
<b>Video</b>	Up to 10.2Gbps bandwidth (3.4Gbps per graphic channel)	
	Up to 4K UHD @60Hz (4:2:0) 24bpp resolution	
	HDMI 2.0 and HDCP 2.2 signal compliance	
<b>Control RS-232</b>	115200 baud rate	

<b>Operating temperature</b>	0° to 40°C (32° to 104°F)	
<b>0° to 40°C (32° to 104°F)</b>	STORAGE TEMPERATURE	
<b>Storage temperature</b>	-40° to +70°C (-40° to 158°F)	
<b>-40° to +70°C (-40° to 158°F)</b>	HUMIDITY	
<b>Humidity</b>	10% to 90%, RHL non-condensing	
<b>10% to 90%, RHL non-condensing</b>	Included accessories	
<b>Included accessories</b>	Power supply unit	

## 9. VP-427H2:

Description: 4K60 4:4:4 HDMI HDCP 2.2 Receiver/Scaler with Ethernet, RS-232, IR, & Stereo Audio over Extended-Reach HDBaseT		
Specification :		Compliance
<b>Inputs</b>	1 HDBaseT twisted pair on an RJ-45 connector AND 1 IR	
<b>Outputs</b>	1 HDMI connector, 1 IR , 1 unbalanced stereo audio (1.2Vrms nominal, 100Ω)	
<b>Other ports</b>	1 bidirectional RS-232 port on a 9-pin D-sub connector, 1 Ethernet on an RJ-45 connector, 1 USB (A) for upgrading	
<b>Compliance with HDMI standard</b>	Supports up to HDMI 2.0, and HDCP 2.2	
<b>Max output resolution</b>	Up to 4K@60Hz (4:4:4).	
<b>Max. input resolution</b>	(HDBaseT) 4K@60Hz (4:2:0)	
<b>Max. range</b>	100m (328ft) at 4K	
<b>Output refresh rate</b>	60Hz for computer graphics resolutions, 50/60Hz for HDTV resolutions	
<b>Audio sampling rate</b>	48kHz for analog audio output	
<b>Video latency</b>	Progressive input — 30ms (approx.)	
<b>Embedded audio</b>	HDMI and HDBT support multi-channel audio	
<b>Rs-232 baud rate</b>	115200bps max	
<b>Controls</b>	Front panel buttons, OSD menu	
<b>Operating temperature</b>	0° to +40°C (32° to 104°F)	
<b>Storage temperature</b>	-40° to +70°C (-40° to 158°F)	
<b>Humidity</b>	10% to 90%, RHL non-condensing	
<b>Included accessories</b>	Power supply	
<b>Other highlights</b>	Supports HDMI 2.0 and HDCP 1.4 / 2.2	
	Audio Support — Embedded and analog (supporting LPCM 2CH) for the output.	
	HDBaseT Data Tunneling — Supports Ethernet tunneling and bidirectional tunneling for RS-232 and IR control.	

10. VS-3232DN:

Description: Modular 4x4 to 32x32 Modular Multi-Format Digital Matrix Switcher		Compliance(Y/N) & Deviations
Specification :		
<b>Inputs</b>	12 Twistedpair HDBT with 12 audio embedder and 20nos HDMI with Embedded audio support	
<b>Outputs</b>	16 Twistedpair HDBT with 12 audio de- embedder and 20nos HDMI with de- Embedded audio support	
<b>Max. data rate</b>	10.2Gbps (3.4Gbps per graphics channel)	
<b>1080p, 1920x1200</b>	CONTROLS	
<b>Controls</b>	Front panel buttons,IR remote, RS-232, Ethernet	
<b>Switching</b>	Confirm or At Once for immediate switching	
<b>Operating temperature</b>	0° to +40°C (32° to 104°F)	
<b>Storage temperature</b>	-40° to +70°C (-40° to 158°F)	
<b>Power consumption</b>	100-240V AC, 50/60Hz, 135VA	
<b>Included accessories</b>	Power cord, infrared remote control transmitter	
<b>Other highlights</b>	Second Power Supply — redundant, hot-swappable	
	Test Pattern Module — With 4 output resolutions for troubleshooting video problems and additional monitor port with audio embedding and de-embedding.	
	HDMI Support — 3D pass through, Deep Color, x.v.Color™, Dolby® TrueHD, Dolby Digital Plus, DTS-HD®, and linear PCM 7.1 surround sound, HDCP 1.4 Compliant with supplied moudules.	
	Copies and stores the EDID from a display device.	
	Equalization & re-Klocking technology	
	Optional Fast Switching Support — For fraction of a second switching.	
	Front Panel Control Lockout.	
	Stores multiple switches as presets to be recalled and executed when needed.	

11. SL-240&132eth:

Description: Control Processor for controlling all the connected devices 64 port expansion module		Compliance(Y/N) & Deviations
Specification :		
<b>Bidirectional ports</b>	4 RS-232 serial , 4 GPI/O, 1 Ethernet , 1 mini-USB connector for firmware upgrade	
<b>Inputs</b>	1 built-in IR Learner	
<b>Outputs</b>	4 IR out and 4 relays	
<b>Processor speed</b>	1GHz	
<b>Memory</b>	512MB RAM, 4GB Flash	
<b>Included accessories</b>	Power supply	
<b>Expansion module ports</b>	1 RS-232/RS-485 selectable and 32 RS-232 serial output ports, 8 RS-232 serial input ports, 1 RS-232 serial control port , 1 Ethernet	
<b>Supported serial port baud rates</b>	1200, 2400, 4800, 9600, 19200, 38400, 57600, 15200bps	
<b>Rs-232 communication</b>	Transparent up to 115200bps	
<b>Controls</b>	Serial Select button, RS-485 terminator switch, RS-232, Ethernet	
<b>Indicators</b>	Power, Ethernet, Serial I/O, and DHCP status LEDs	
<b>Operating temperature</b>	0° to +40°C (32° to 104°F)	
<b>Storage temperature</b>	-40° to +70°C (-40° to 158°F)	
<b>Humidity</b>	10% to 90%, RHL non-condensing	
<b>Safety regulatory compliance</b>	CE	
<b>Environmental regulatory compliance</b>	Complies with appropriate requirements of RoHs and WEEE	
<b>Included accessories</b>	Power cord, rack mounting brackets	

### 12. HDMI cables-6:

Description: HDMI (M) to HDMI (M) Cable 6'		Compliance(Y/N) & Deviations
Specification :		
<b>Type</b>	High Speed and Standard Speed HDMI cables	
<b>Max. resolution</b>	4K@60Hz (4:4:4)	
<b>Conductor AWG</b>	28 AWG (7/0.127)	
<b>Shield</b>	Dual overall shield against EMI/RFI interference, (a) Al-Mylar, (b) tinned copper	
<b>Cable OD (mm)</b>	3–35ft: 8 ± 0.19mm	
	50–65ft: 9.5 ± 0.25mm	
<b>Molded connectors</b>	Yes	
<b>Gold-plated connectors</b>	Yes	
<b>Standards compliance</b>	HDR, HDCP	
<b>Flame test</b>	CL2	
<b>Approved make:</b>	CRESTRON/KRAMER/AMX	

### 13. HDMI Cables-10:

Description: HDMI (M) to HDMI (M) Cable 10'		Compliance(Y/N) & Deviations
Specification :		
<b>Type</b>	High Speed and Standard Speed HDMI cables	
<b>Max. Resolution</b>	4K@60Hz (4:4:4)	
<b>Conductor AWG</b>	28 AWG (7/0.127)	
<b>Shield</b>	Dual overall shield against EMI/RFI interference, (a) Al-Mylar, (b) tinned copper	
<b>Cable Od (Mm)</b>	3–35ft: 8 ± 0.19mm	
	50–65ft: 9.5 ± 0.25mm	
<b>Molded Connectors</b>	Yes	



<b>Gold-Plated Connectors</b>	Yes	
<b>Standards Compliance</b>	HDR, HDCP	
<b>Flame Test</b>	CL2	
<b>Approved Make:</b>	CRESTRON/KRAMER/AMX	

#### 14. HDMI cables-3:

Description: HDMI (M) to HDMI (M) Cable 3'		
Specification :		Compliance(Y/N) & Deviations
<b>Type</b>	High Speed and Standard Speed HDMI cables	
<b>Supporting Resolution</b>	480i, 480p, 720p, 1080i, 1080p	
<b>Conductor Awg</b>	28 AWG (7/0.127)	
<b>Shield</b>	Dual overall shield against EMI/RFI interference, (a) Al-Mylar, (b) tinned copper	
<b>Cable Od (Mm)</b>	3–35ft: 8 ± 0.19mm	
	50–65ft: 9.5 ± 0.25mm	
<b>Molded Connectors</b>	Yes	
<b>Gold-Plated Connectors</b>	Yes	
<b>Standards Compliance</b>	HDR, HDCP	
<b>Flame Test</b>	CL2	
<b>Approved Make:</b>	CRESTRON/KRAMER/AMX	

#### 15. HDMI cables-25:

Description: HDMI (M) to HDMI (M) Cable 25'		
Specification :		Compliance(Y/N) & Deviations
<b>Type</b>	High Speed And Standard Speed HDMI Cables	

<b>Supporting Resolution</b>	480i, 480p, 720p, 1080i, 1080p	
<b>Conductor AWG</b>	28 AWG (7/0.127)	
<b>Shield</b>	Dual overall shield against EMI/RFI interference, (a) Al-Mylar, (b) tinned copper	
<b>Cable Od (Mm)</b>	3–35ft: 8 ± 0.19mm 50–65ft: 9.5 ± 0.25mm	
<b>Molded Connectors</b>	Yes	
<b>Gold-Plated Connectors</b>	Yes	
<b>Standards Compliance</b>	HDR, HDCP	
<b>Flame Test</b>	CL2	
<b>Approved Make:</b>	CRESTRON/KRAMER/AMX	

## 16. Cables:

Description: Mono Audio/Control Bulk Cable		
Specification :		Compliance(Y/N) & Deviations
<b>Conductors</b>	20AWG, (10/30) tinned copper conductors.	
<b>Insulation</b>	PVC color coded: red, black.	
<b>Drain Wire</b>	20AWG (10/30) tinned copper (in contact with shield).	
<b>Shield</b>	Aluminum Mylar foil 25% overlap rate.	
<b>Outer Jacket Color</b>	Dark gray with blue lettering.	
<b>Conductor</b>	0.916mm (0.036in).	
<b>Pvc Insulation</b>	0.44mm (0.071in) nominal thickness, 1.8mm diameter.	
<b>Outer Jacket</b>	5.4mm (0.213in).	
<b>Impedance</b>	40 to 100Ω.	
<b>Dc Resistance</b>	34.6Ω/km (10.5Ω/1000ft).	
<b>Mutual Capacitance Conductor-Conductor</b>	89pF/m (27pF/ft).	

<b>Mutual Capacitance Connected To Shield</b>	161pF/m (49pF/ft).	
<b>Temperature</b>	-20° to 75°C (-4° to 167°F).	
<b>UI</b>	CL-2.	
<b>CSA</b>	C(UL) FT4.	
<b>ROHS</b>	In compliance with European directive 2002/95/IEC.	

### 17. STP Cables:

Description: STP Cables and Connectors Optimized for HDBaseT Products		
Specification :		Compliance(Y/N) & Deviations
<b>Conductors:</b>	4 x 2 x 23AWG, annealed copper.	
<b>Outer Diameter:</b>	0.56± 0.01mm (0.022in).	
<b>Insulation Material:</b>	Skin/foam/skin HDPE.	
<b>Outer Diameter:</b>	1.33 ± 0.10mm (0.052in).	
<b>Color:</b>	Per TIA/EIA 568-B.	
<b>Screening:</b>	Alu/PET per pair (Alu side out).	
<b>Drain Wire:</b>	90% tinned copper, outer diameter: 0.4 ± 0.01mm (0.016in).	
<b>Jacket:</b>	LSHF, blue RAL5012.	
<b>Impedance:</b>	1-100MHz : 100 ± 15Ω	
	100-250MHz : 100 ± 20Ω	
	250-500MHz : 100 ± 50Ω.	
<b>Propagation Velocity:</b>	76%.	
<b>Mutual Pair Capacitance:</b>	≤42pF/m.	
<b>Capacitance Unbalanced Pair/Ground:</b>	≤1500pF/km.	
<b>Max. Conductor Dc Resistance:</b>	<79.8Ω/km.	

<b>Pair Resistance Unbalance:</b>	DC <1.5%.	
<b>Dielectric Strength:</b>	2.5kV DC (2s).	
<b>Insulation Resistance:</b>	>5000MΩ/km.	
<b>Voltage Rating:</b>	30V.	
<b>Regulatory</b>		
<b>Electrical:</b>	EIA/TIA 568A, ISO/IEC 11801.	
<b>Fire Performance:</b>	IEC 60332-1.	
<b>Smoke Density:</b>	IEC 61034.	
<b>Halogen Free:</b>	IEC 60754.	
<b>Maximum Pulling Tension:</b>	100N.	
<b>Bending Radius:</b>	Installation 60mm (2.36in), installed 50mm (1.97in).	
<b>Thermal Characteristics:</b>	Storage/transport/installation 0° to 50°C (32° to 122°F), operation -20°to 60°C (-4° to 140°F).	
<b>Thickness:</b>	≥0.5mm (0.020in).	
<b>Diameter:</b>	7.2 ± 0.2mm (0.284in).	
<b>Connector: The shielded RJ-45 connector is designed to fit larger 23AWG cables, but also fits 24AWG cables. All STP cables require a shielded connector.</b>		
<b>Applicable Standards: TIA/EIA-568C.2.</b>		
<b>Max Current/Voltage: 2A/250V</b>		
<b>Contact resistance: 20m ohms</b>		
<b>Insulation resistance: 100M ohms</b>		
<b>Temperature rating (min/max): -25/55 °C Max.</b>		
<b>Insertion/Extractions: 200 mating cycles</b>		
<b>Material/finish:</b>		
<b>(A) Plug Housing: Polycarbonate, UL94-V0</b>		
<b>(B) Contacts: Copper</b>		
<b>(C) Rear Shield: Copper</b>		
<b>(D) Inner Ferrule: Polycarbonate</b>		

Wire AWG min/max (solid/stranded) 24AWG to 23AWG Conductor diameter (min/max) 0.40/0.55mm Cord diameter (max):1.35mm	
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18. VM-214DT:

Description: 2x1:4 4K60 4:2:0 HDMI & Extended-Reach HDBaseT with Ethernet, RS-232, IR & Stereo Audio Switchable DA		Compliance(Y/N) & Deviations
Specification :		
<b>Inputs</b>	1 HDMI connector, 1 HDBT twisted pair on an RJ-45 connector	
<b>Outputs</b>	1 HDMI connector, 4 HDBT twisted pair on RJ-45 connectors	
<b>Max.Data Rate</b>	10.2Gbps (3.4Gbps per graphic channel, HDMI)	
<b>Compliance With HDMI Standards</b>	Supports HDMI and HDCP	
<b>Controls</b>	Input select button, EDID select button, panel lock button, RS-232, local and remote IR controls	
<b>Power Consumption</b>	100-240V AC 50/60Hz 16VA	
<b>Operating Temperature</b>	0° to +40°C (32° to 104°F)	
<b>Storage Temperature</b>	-40° to +70°C (-40° to 158°F)	
<b>Humidity</b>	10% to 90%, RHL non-condensing	
<b>Cooling</b>	Forced air, fan	
<b>Enclosure Type</b>	Aluminum	
<b>Rack Mount</b>	With included rack "ears"	
<b>Vibration</b>	ISTA 1A in carton (International Safe Transit Association)	
<b>Safety Regulatory Compliance</b>	CE	
<b>Environmental Regulatory Compliance</b>	Complies with appropriate requirements of RoHs and WEEE	
<b>Other Highlights</b>	Max. Resolution — 4K@60Hz (4:2:0).	
	HDTV Compatible.	

	HDCP Compliant — Works with sources that support HDCP repeater mode.	
	HDMI Support — Deep Color, x.v.Color™ and 3D.	
	Automatic Live Input Detection — Based on video clock presence.	
	Automatic Analog Audio Detection & De-embedding.	
	Looping HDMI Output — Allow monitoring and cascading to additional DAs.	
	System Range — Up to 130m (430ft) at normal mode (2K), up to 100m at normal mode (4K); up to 180m (590ft) ultra mode (1080p @60Hz @24bpp)	

### 19. VA-102P12:

Description: 10-Output 12V DC Power Supply		
Specification:		Compliance
<b>Outputs</b>	10 12V DC @1A max. current per output	
<b>Indicator</b>	Power ON LED	
<b>Power Consumption</b>	100-240V AC, 2.0A	
<b>Operating Temperature</b>	0° to +40°C (32° to 104°F)	
<b>Storage Temperature</b>	-40° to +70°C (-40° to 158°F)	
<b>Humidity</b>	10% to 90%, RHL non-condensing	
<b>Included Accessories</b>	10 DC to DC cables, 95cm (3.1ft) per cable	
	AC power cord	