

Commissioning

Date of Review:

Tests Performed by:

Test	Commissioning Test Description	Results & Supplementary Notes
6.1	Physical	
6.1.1	All exceptions from the "Staging" checklist have been successfully completed.	
6.1.2	The full complete inventory is all new equipment, in full compliance with the specification, or as modified by approved submission. Record all equipment not present, and why.	
6.1.3	Any power receptacles accessible to the user are safe, and there are no stray AC voltages on any equipment accessible to a user relative to ground.	
6.1.4	There are no sharp or jagged surfaces accessible to a user, and equipment mounting all mounting appears mechanically stable under all conditions.	
6.1.5	The thermal gradient of all equipment mounted in the rack and deployed in the room (including wall plates, floor box plates, credenzas, etc.) is operating within manufacturers' guidelines. Record the highest measurement and where it was found.	
6.1.6	The system is serviceable. This includes accessibility to equipment to be easily pulled for repair by one person, neatly dressed cables, bundled in forms (refer to Giddings, Davis and Davis, InfoComm), there are no excessive pressure on cables at termination points and connectors, utilize service loops, and each cable number is in agreement with the as-built drawings. This includes the equipment rack itself. All switches and receptacles are logically and permanently labeled.	
6.1.7	The cable installation has acceptable cable dress, signal separation (cables carrying voltages differing by 20 dB or more must be separated by 4 inches), cable stress, serviceability, and cable management. All cable labeling is positioned and oriented in a consistent manner, is legible and unambiguous. Cable supports are used when unsupported lengths exceed 12 inches (depending on size and stiffness of cables), and that all terminations are free from stress due to gravity acting on the form.	
6.1.8	Terminations have sufficient service loop, allowing at least two re-terminations without having to open a form to lay in a new cable.	
6.1.9	All cables are within manufacture's recommended bend radius specification, usually given as a multiple of a cable's diameter.	
6.1.10	CatX or twisted pair cables have hook and loop fasteners, and there is no cable deformities caused by poor dress or fasteners being too tight; patch cables between the equipment cabinet and wall or floor receptacles are stranded and flexible, have a "home" near the panel, and are properly identified; any color convention used by the building/integrator, or used to identify POE, proprietary video or data cabling is conforming to plan.	
6.1.11	RJ terminations are solid in their connectors.	
6.1.12	All fiber cables have hook and loop fasteners, and have been properly identified in an unambiguous manner; unterminated spares have dust caps; they are loosely dressed, and any color convention used by the building/integrator is labeled by the patch panel.	
6.1.13	Screw terminals have spade or ring lugs on wires.	
6.1.14	Rack elevation and flow drawings, cable labels and engravings are an accurate paper model of the furnished system, and in compliance with latest revised specifications. All nomenclature is consistent: drawings, touch screen, wall plates, floor boxes, patch panels, equipment, etc.	

EXHIBIT 27 40 00-12 AV COMMISSIONING TESTING AND CHECKLIST

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6.1.15	All inputs and outputs of switchers are labeled (wherever possible), so that users can easily make manual routes quickly, without having to refer to the system drawings.	
6.1.16	All channels on amplifiers, especially on multi-channel amplifiers are properly labeled, so users can make quick adjustments without having to refer to the system drawings.	
6.1.17	All equipment in the rack is labeled in an appropriate and reasonable manner, and the labels match those on the drawings (equipment symbols and/or description), control system, field plates, patch panels, and any labels associated with the system. This allow sfor easy serviceability, as well as prevent confusion in systems with multiples of similar equipment.	
6.1.18	Capture a representative sampling of the wiring practices of the System Under Test using digital photographs	
6.1.19	All unbalanced and balanced terminations are in agreement with the equipment manufacturer's recommendations.	
6.1.20	All connectors on input and output plates are identified in a discernible, consistent manner (i.e., there is only one "MIC 1" in the system), and in agreement with all other labels in the system.	
6.2	Audio	
6.2.1	No power amplifier has its rated load exceeded. Record the impedance (and at what frequency) of each loudspeaker line on each power amplifier at 63, 250, and 1,000 Hz. ("Loudspeaker Impedance Test").	
6.2.2	There is a "test plan", locating a representative sampling of all listener positions, with at least "center" and "corner" locations, and describe the identity and location of these positions.	
6.2.3	The ambient noise, A-weighted, slow, at each location on the test plan is recorded, along with the highest measurement and its location.	
6.2.4	At each location on the test plan a nominal operating level of __ (66) dB SPL (Sound Pressure Level) for conference speech, __ (60) dB SPL for program material, "A" weighted at all listeners' ears +/- __ (2) dB ("Uniformity of Coverage") (or at least __ (15) dB above the ambient noise, A-weighted, whichever is greater), with the control system volume control indicating "normal" or default setting, has been recorded.	
6.2.5	The average STI-PA measurement has been recorded at each location on the test plan, and is greater than 0.62 for all listeners.	
6.2.6	The sound system is capable of producing an additional __ (14) dB above this level (__ (80) dB SPL) for each audio source, with less than 0.5% THD (Total Harmonic Distortion) plus noise. Measure THD plus noise when source is at __ (15) dB above nominal operating level at each "destination", for all sources selected. Record results for each source tested.	
6.2.7	The electrical noise levels for all audio channels are __ (55) dB below the normal operating level for all audio sources. "Noise" refers to hum, electrostatic noise, RF interference, etc. Record results for each source tested.	
6.2.8	Program loudspeakers and speech loudspeakers are all connected in the same polarity ("Polarity Test").	
6.2.9	The System Under Test has no more than a __ (1) dB variance in program source levels, when each program source is playing a calibrated media (CD, video tape, setup test tone, etc.).	
6.2.10	There is no audible vibration caused by improper mechanical installation when using a 16 second continuous sweep signal at headroom level. Audible devices are identified and at what frequencies. ("Buzzes and Rattles Test").	

EXHIBIT 27 40 00-12 AV COMMISSIONING TESTING AND CHECKLIST

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6.2.11	The speech reinforcement system is stable (no feedback) for the entire talker and listener areas specified.	
6.2.12	For audio conference systems, the microphone input gain settings are such that the "standard talker" (60 dB SPA at 1 m, IEC 60268-16), positioned at each talker position in the room, produces a nominal "0 dB" level at the input of the mixer bus of the audio conference DSP device. If there is local reinforcement ("mix-minus"), AGC and ALC may need to be restricted. Inspect DSP mixer telephone line levels, both transmit and receive, when normal speech is encountered in the room.	
6.2.13	For conferencing mode, at the __ (65) dB SPL listening level, the system can demonstrate full duplex operation, with no reports of echo or "speech trails" (as detected from the far end).	
6.2.14	The equalizers are adjusted for best intelligibility, and in accordance with the preferred acoustic level response curves.	
6.2.15	Wireless microphone systems, with all wireless microphones turned on, there are no dropouts, intermodulation interaction between wireless systems, or RF caused artifacts throughout the specified operating area for the transmitter. There is little or no RF activity on a receiver's "S" meter when the designated microphone transmitter is off.	
6.2.16	There is RF immunity at areas where users are expected to operate cell phones, mobile devices, smart phones, etc.	
6.3	Video	
6.3.1	The system has been configured in accordance with the client's EDID needs, and the designer's EDID Plan, where applicable, and that the system performs as intended (resolutions, displayed images, audio formats, etc.)	
6.3.2	If there are any composite video sources, the system displays optimum brightness, contrast, and color in displays using SMPTE source with PLUGE (Picture Line Up Generation Equipment) display, and that each display (or "sink") receives 1 volt peak-to-peak +/- 10% (or 1dB). If several displays are visible in the same place, there is consistency in colors across all of them.	
6.3.3	There is consistency in colors when several displays are visible in the same space. For RGB and digital video signals use a colorimeter and test color signal software to confirm consistent images. Confirm +/- __ (5%) tolerance in brightness, black levels and color temperature.	
6.3.4	For RGB sources, there is 700 mV +/- 10% (or 1 dB) at each destination. (If requested only) record results using a flat-field pattern signal at the highest resolution specified, or at least 1024 by 768 resolution (VESA 8). For RGB sources measure and record peak-to-peak voltage for peak white signal, and record "peak" and "Level" control settings on any interface at the positions whereby the 700 mV voltages were attained.	
6.3.5	Displays are focused, centered, and evenly illuminated. If requested, confirm using the calibrated light meter that the brightest measurement locations shall be no more than +10% above average, and the dimmest locations no less than -5% below average measurement. Also if requested, document that geometric distortion is within 2% tolerance. Take actual measurements if necessary (top, bottom, left, right dimensions of white portion of screen) and photograph if necessary.	
6.3.6	The system displays stable images, with no scaling-related visual artifacts when switching between, at a minimum, ____ (1024 x 768), (1280 x 1024), (1920 x 1080) and (1280 x 720) sources, and/or all those specified in the performance criteria for this system. Record test results.	

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6.3.7	Displays can switch between different color spaces and resolutions. Show a BluRay or TV (YUV) signal, then show a laptop (RGB) signal, and then switch back to the BluRay/TV (YUV) signal. The source should always display properly.	
6.3.8	Automatic CEC controls do not affect the displays. With the displays powered on, power off each source in the system. The displays should remain on (no Power Off command sent from a source).	
6.3.9	All sources can be routed to all expected destinations. Disregard any routes that are not permitted by design, as described in the narrative, such as HDCP sources routed to a codec.	
6.3.10	All HDCP sources can be routed to all expected destinations at the same time. There are some devices with a limited capability to display on multiple displays. The system requires that each source can display on the required number of displays in the system.	
6.3.11	Using an appropriate HDMI generator, with HDCP enabled, the following resolutions and timings, as required in the design can be displayed(check all that apply): _1920x1200@60 _1920x1080@60 _1600x1200@60 _1280x720@60 _1280x768@60 _1280x800@60 _1024x768@60 _800x600@60 _640x480@60 _1080P @ 60 _1080P @ 59.9 _1080@30 _720@60 _720@59.9 (base default, in case the PC has issues and boots up in default mode). Leaving the signal on for several seconds does not present "sparklies". – Appropriate HDMI Generator required.	
6.3.12	A report is obtained when the switcher makes available a system status report with information regarding each source and destination signal integrity, EDID and CEC status information, etc. If a printed or 'pdf' report is not included, a screen print showing the status of the system (including source and destination communications with the switcher) is obtained and it is included.	
6.3.13	A BluRay movie plays. Sometimes HDCP is not enabled during the menus and previews, but only during the movie. BluRay disc required.	
6.3.14	Typical client laptops have been successfully used with the system, inclusive of default resolution (works with switcher EDID), any adapters, etc. Client laptop required.	
6.3.15	Analog audio is satisfactorily distributed for laptops with digital outputs and the audio is not embedded in an HDMI connection, or if the user connects to his audio output. Client laptop required.	
6.3.16	The displayed image height relative to furthest viewer ratio has been measured: ____ (1:6) Record each, compare to recommended ratio.	
6.3.17	The TV levels are acceptable, and any channel presets are accurate.	
6.3.18	On-Screen Displays/Menus are disabled, or not if specified by the user.	
6.3.19	Video projectors, if any, have 'blue screen' or 'no image screen' disabled, or not if directed by the user.	
6.3.20	There are no lost or stuck "on" pixels when Full White Test signal is displayed (follow manufacturer's specification). Note number and location of lost pixels, if any.	
6.3.21	Motion video has satisfactory lip sync. While observing each display using a video of someone clapping their hands, confirm that there are no objectionable latency issues	

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6.3.22	The Contrast Ratio is obtained for front projection systems, and the ambient lighting in the vicinity of the screen when the lighting is set for projection is as intended. Also, the intended contrast ratio (using the 16 box checkerboard pattern is verified. Take the ratio of averaged white squares divided by the averaged black squares when the light meter faces the projector) and confirm contrast levels have been meet the client's needs and/or performance specification noted in the design (7:1-Passive Viewing, 15:1-Basic Decision Making, 50:1-Analytical Decision Making, 80:1-Full Motion Video).	
6.3.23	AV equipment configuration and control system programming has been optimized for the least switching time when selecting different sources. In the event switching time goes beyond a reasonable time (__ (5) seconds), the User receives a visual message with the estimated time to execute the command. Record the maximum switching time experienced.	
6.4	Control and Network Configuration	
6.4.1	The Control System performs all the functions as indicated on the function list ("control system specification") provided, with stability, and in sync with the equipment being controlled without the need to reset any item of equipment. Every single button on every panel has been pressed and the system provided the expected results.	
6.4.2	When system is powered down, system "up" sequence presents the system in a desirable state with no objectionable anomalies.	
6.4.3	All IP information provided by client is loaded into the system, including IP address, network ID's, subnet masks, default gateway, timeserver, Gatekeeper, alias, hostnames, etc. All network functions specified by the customer are shown to function properly on customer's LAN. These settings are listed in a report that will remain with the system.	
6.4.4	Any web-based system control or monitoring features, and other IP functionality of system (time servers, system-generated e-mail, etc.) are functioning.	
6.4.5	Measurements were taken of the total power consumption used by the AV system in standby mode, and in "full on" mode. Identify conditions for the highest power consumption.	
6.5	VTC (Video Teleconferencing)	
6.5.1	VTC Camera(s) are able to capture a clear shot of the presenter at the appropriate location (lectern, table, DAIS, etc.)	