# Classroom Technology Standards

A Guide for Classroom Planning

Produced by the Office of Technology Services
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Classroom Taxonomy

Overview (CTSG-001)

The Office of Technology Services (OTS) works with stakeholders in the university community, vendors, manufacturers, college/departmental technology staff, and academic leadership including department chairs and deans to develop design standards for the audiovisual technology installed in Towson University’s nearly 500 classrooms that best meet the needs of the university. The goals of standardization aim to:

1. Provide a comfortable, modern, flexible, easy-to-use, and reliable teaching-learning environment that accommodates a variety of instructional methods

2. Design an active, engaging environment for today’s generation of learners

3. Provide a consistent, intuitive interface for controlling audiovisual equipment throughout the campus for faculty, staff, and students

4. Ensure maximum reliability and up-time based on proven designs, components, and installation methods

5. Ensure ease of support and usage by installing standard computer models and audiovisual components

6. Keep the number of makes and models to a minimum so that an inventory of replacement equipment can be maintained

7. Provide a means for easy, intuitive incorporation of end-user devices such as phones, tablets, and laptops

Classroom Audiovisual Architecture & Accessibility (CTSG-002)

1. Digital Architecture

The audiovisual industry has transitioned from an analog to digital audiovisual architecture and OTS adapted our standards to meet these demands. As part of the transition, known as the "analog sunset" in consumer and professional electronics, new devices are shipping with digital outputs only and older analog outputs are being disabled or severely limited by new content. The changes OTS made allow the University to take advantage of the latest technologies, provide better integration of digital devices brought on campus, streamline classroom design, and meet growing instructional needs.

2. Flat Panels vs. Projection

Another trend we have been noticing is flat panels (4K or greater resolution) are beginning to replace traditional projectors and projection screens. This is already happening in spaces that don’t rely heavily on white boards,
such as conference rooms, but we see the trend likely to move to classrooms as well. Flat panels offer brighter, sharper images and are not dramatically affected by ambient light.

3. Accessibility

All systems must be designed with accessibility in mind and meet all current Americans with Disabilities Act (ADA) requirements. This includes but not limited to:

a. Installation of Assistive Listening Devices in rooms with voice reinforcement or where sound is a key part of instruction.

b. Installation of height adjustable podiums

c. Appropriate placement of podiums to provide required clearance

d. Making Xpanels available for all rooms with control systems

Article CTSG-002; Version 1; Last Revised 10/21/2019

Classroom Technology Tiers (CTSG-003)

| ADVANCED LEARNING/INSTRUCTIONAL SPACES AND TECHNOLOGIES: High-end, high-cost, specialty technology and venues. Examples: Simulation models, digital microscopes, observation labs and recording devices, specialty control devices; concert or performance venues in which students physically use the equipment; radio and TV production; advanced distance learning suites.
| CURRICULIZED: Course-specific technology needed for instruction to support a specific academic class, program, major, etc. Students must physically interact with the technology, which is typically not as general purpose as Extended or Foundation. Examples: Speciality monitors with high-resolution drawing capability; unique printers, possibly higher-end 3D and subtractive manufacturing devices; specialty peripherals; ceiling mounted document camera, ultra-high resolution display or projection; specialty collaboration workstations; software categories 6, 7, and 8, including discipline specific applications.
| EXTENDED: Proven general-purpose technologies in which deployment is done in a deliberate, phased, or limited manner or is evolving in adoption but not yet considered foundational. Examples: Mid-range video conferencing/two-way interactive distance learning installations; lecture capture systems; multiple screens or flat-panel displays; interactive solutions (interactive projectors and/or flat panels), fixed wireless projection and collaboration features; software category 5. Students must either directly interact with the technology, or the technology is used by instructors in a way to engage students or enhance the students’ learning experience.
| FOUNDATION: Proven, current-generation general-purpose audiovisual and projection systems and is core for all formal learning spaces. Standard Equipment Includes: projector with screen or flat panel; in-ceiling speakers; wall plate for auxiliary audiovisual input connections; podium with computer and monitor (touch or standard); document camera; Crestron TSW-750 LCD touch panel audiovisual system controller; HDMI and legacy jacks or cables to connect portable devices such as iPads, VCRs, etc.; Cable Cubby with connections for portable devices; software categories 1-4; dual-image multi-window processor to show two different audiovisual sources side-by-side on the projector or monitor. Instructor and student computers, thin clients, and other devices for student use.

See the “STF Project Categories” PDF linked below for information on Foundation, Extended, Curriculized, and ALIST tiers: https://www.towson.edu/technology/facultystaff/support/instruction/classroom/projects/documents/stfprojectcategories.pdf

Article CTSG-003; Version 1; Last Revised 10/26/2019

Projector Configuration Requirements (CTSG-005)

1. Any setting that shuts down a projector based on the loss of signal must be disabled.
Classroom Computer Configuration Requirements (CTSG-006)

1. Overview

A classroom computer is primarily used to present information to classes by using a display and is shared by multiple faculty. Classroom computers are critical to instruction and are configured with security settings and file management measures to preserve system integrity and assure that the computer runs consistently at an optimum level of performance. Because many people share the computer, it is different than a personal computer in an office or home. Personal files must not be stored on this computer but stored using one of the other options outlined in this chart: https://www.towson.edu/technology/facultystaff/documents/storing-data-risks-vs-benefits.pdf. Installation of special software is managed with several options (listed below) to accommodate faculty needs. Software installed on the computer will be upgraded regularly in a timely manner that does not disrupt instruction.

Windows-based PCs will be the primary solution, with interactive monitors in new venues. If there is a need for both Windows and Mac Operating Systems, a dual-boot Mac will be deployed so the faculty member can choose which OS they wish to use when starting the system.

2. Classroom computer standards

a. A base lab image and imaging process is provided by OTS, see the TU Lab Managers SharePoint site for more information: https://tu.sharepoint.com/sites/ctc/tulabs/default.aspx

b. Computers follow classroom Active Directory guidelines

c. Users logon as Users (not Administrators)

d. Classroom-specific group policy is applied

   i. Group Policy is set so shutdown is disabled
   ii. Group Policy is set so that the PC never sleeps.
   iii. Group Policy is set so the monitor doesn’t sleep until after 90 min.
   iv. Group Policy is set so screen saver doesn’t start until 60 min.
   v. Group Policy is set not to show last logged on user:

      Computer Configuration\Windows Settings\Security Settings\Local Policies\Security Options

      Do not display last user name in logon screen = Enabled

   vi. Group Policy is set to delete profiles
   vii. Group Policy is set to disable “Welcome Screen”

e. Classroom PCs are part of their own Configuration Manager collection for managing installation packages, etc.
f. Remote Desktop is enabled

g. BIOS is set to have the computer automatically power on overnight

h. The computer is configured with standard university software (below). If special software is needed, several options are available:

   i. Install software on an office computer and use Remote Desktop to access the software on that computer (recommended)

   ii. Virtual Workspace access

   iii. If software is not available in Run Advertised Programs, please discuss software needs with your department head or technology coordinator.

3. Software Included on Standard Configuration

   a. Microsoft Windows 10 Enterprise and Updates
   b. Microsoft Office 2016 Enterprise (Includes Word, Excel, Access, Outlook, Power Point, & Publisher) and Updates
   c. Microsoft Internet Explorer and Updates
   d. Mozilla Firefox
   e. Google Chrome
   f. .Net Framework
   g. Microsoft System Center Configuration Manager Client
   h. Virtual Workspace Client
   i. Adobe Reader
   j. Windows Media Player
   k. Adobe Flash Player
   l. Adobe Shockwave Player
   m. VLC
   n. Filezilla Client
   o. Microsoft Silverlight
   p. Microsoft VisioViewer
   q. Java

4. Classroom Organizational Unit (OU)

   a. A Classrooms OU exists at: towson.edu/Computer Accounts/Lab and Public/Classrooms and Conference Rooms

   b. Under the \Classrooms and Conference Rooms OU, there are separate OUs for each university building; each building OU will contain the classroom computer accounts, groups, group policy, etc.

   c. Managers of the Classrooms and Conference Rooms OU that can create computer accounts, etc. are in the Smart Classroom Administrators group.

5. Standard Classroom Computer Naming Convention
a. Classroom Computers

To identify classroom computers, a standard naming convention was established as follows: CLS-BuildingRoomNumber-01, 02, etc.

IMPORTANT: room numbers need to use the 4-digit number, used by Facilities.

Example: two computers installed in the Cook-404A classroom would have the following names:
CLS-CK0404A-01
CLS-CK0404A-02

b. Lab - Classroom Computers

Some classrooms are also computer labs that have their own Lab OU and computer naming convention. In these cases the instructor computer can be located in the lab OU but MUST be named using the standard naming convention outlined above.

An example of a lab –classroom instructor computer account is: CLS-ES0107-01

An example of a lab-classroom student computer account is: ES0107-02, ES0107-03, etc.

6. InFocus MondoPad (Retired)

The PC appliance must be treated as a regular classroom PC. There is currently a standard image available that will configure most settings (other than adding a maildrop). The following items must be done for each:

a. Join to domain
b. Install SCCM
c. Install endpoint protection
d. Name properly (CLS-CollectionCode-MOND)
e. Change Mondopad logo to TU logo
f. Enable minimize button for non-admin accounts under Settings>General
g. Set browser homepage to www.towson.edu
h. Install Microsoft Office
i. Install Microsoft Lync, Skype, Flash, Adobe Reader, Citrix, Shockwave, Java, VLC, Firefox, Chrome (with Remote Desktop plugin), Panopto, and Visio Viewer
j. Set up maildrop (CollectionCode-Mondopad@towson.edu). The password must be set not to expire and stored in KeePass. See Knowledge Center Article: https://www.towson.edu/knowledgecenter/admin/adminarticle.aspx?article=823&searchtype=IT

k. Printers can be added by the department like a regular Windows PC
l. Set passcodes (4-pin Admin)
m. SSID must match computer name
n. Add Athena local admin account with same password as the regular image
o. Add short cuts for Lync, Skype, and Office
Classroom Standard Equipment (CTSG-007)

1. Document Cameras
   a. ELMO PX-30E (Standard)
      - The ELMO PX-30E is the university's standard document camera, it can show high-quality 4K images and integrate with other ELMO products or a PC. This document camera is the best choice in the majority of classroom installations.
      
      Manufacturers Link: [http://www.elmousa.com/](http://www.elmousa.com/)
   
b. ELMO P30HD (Previous Standard)
      - The ELMO P30HD is the university's previous standard document camera, it can show high-quality images and integrate with other ELMO products or a PC. This document camera is the best choice in the majority of classroom installations.
      
      Manufacturers Link: [http://www.elmousa.com/](http://www.elmousa.com/)
   
c. WolfVision VZ-8plus4
      - The WolfVision VZ-8plus4 provides a slightly warmer color due to the use of a halogen lamp. In a side by side comparison there was minimal differences in image quality when compared to the standard ELMO P30HD, but it is twice the cost. This document camera is only practical for projects with external funding sources or situations where slight differences in color are vital for teaching, such as an art class.
      
   
d. WolfVision VZ-3
      - The WolfVision VZ-3 is a competitor to the ELMO document camera mentioned above. It offers a smaller footprint, LED lighting, and easy to use one arm design.
      
   
e. WolfVision EYE-14
      - The WolfVision EYE-14 is a Ceiling Visualizer that is mounted above a flat surface and allows everything in it’s field of vision to be projected. This is ideal for situations that call for large objects to be demonstrated to a class.
      
f. **WolfVision vSolution Cam**
   - The WolfVision vSolution Cam is a smaller compact document camera that does not have a base.

2. **Projectors**
   a. **Panasonic PT-RZ570** (Standard)
      - The Panasonic PT-RZ370 is a full HD (1920 x 1080) 5,000 lumen projector that uses a laser light source. This design requires no lamp replacement or filter cleaning and has a virtually instant on/off time.
      Manufacturers Link: [http://panasonic.net/avc/projector/products/rz570/](http://panasonic.net/avc/projector/products/rz570/)
   b. **Sony VPL-FHZ57**
      - The Sony VPL-FHZ57 is a full HD (1920 x 1200) 4,1000 lumen projector that uses a laser light source. This design requires no lamp replacement or filter cleaning and has a virtually instant on/off time.
   c. **Panasonic PT-RZ370** (Previous Standard)
      - The Panasonic PT-RZ370 is a full HD (1920 x 1080) projector that uses an LED/laser-combined light source. This design requires no lamp replacement or filter cleaning and has a virtually instant on/off time.
      Manufacturers Link: [http://panasonic.net/avc/projector/products/rz370/](http://panasonic.net/avc/projector/products/rz370/)
   d. **Panasonic PT-RZ770**
      - The PT-RZ770 is a 7,200 lumen WUXGA resolution (1,920 x 1,200) projector that is perfect for large venues or rooms that require more advanced projection capabilities.
      Manufacturers Link: [http://panasonic.net](http://panasonic.net)
   e. **Epson BrightLink**
      - The Epson BrightLink is an "interactive projector" allowing a pen to be used to control motions and annotations on the screen. The projector is mounted directly above the projection surface so it can fit in many different size rooms.
      Manufacturers link: [www.epson.com/brightlink](http://www.epson.com/brightlink)
f. Epson PowerLite Pro L1300UNL

- The Epson PowerLite Pro L1300UNL features high color output, high lumen output, and WUXGA high definition widescreen resolution. This makes it appropriate for large venues such as large tiered lecture halls, concert halls, theaters, etc. that require 4K emulation.


g. 3D Projection

- Please inquire

3. Speakers

a. Bose EdgeMax EM90 & EM180

- The Bose Edgemax series of in-ceiling speakers offer capabilities of wall mounted speakers with a more aesthetically pleasing design.

Manufacturers link: [https://www.bose.com](https://www.bose.com)

b. Atlas FAP62T

- The Atlas FAP62 is an in-ceiling loudspeaker with 32-watt 70/100V transformer and ported enclosure.

Manufacturers link: [https://www.atlasied.com/fap62t](https://www.atlasied.com/fap62t)

4. Cable Access Enclosure

a. Extron Cable Cubby 500

- The Cable Cubby 500 includes connections for Ethernet, USB, HDMI, 3.5mm audio, and power connections.


b. Extron Cable Cubby 200

- The Cable Cubby 200 is available for smaller form factor podiums.


c. Liberty Adapter Ring

- The Liberty Adapter ring attaches to the HDMI cable and features the following connections:
- Micro HDMI "D" male to HDMI "A" female
- Full sized DisplayPort male to HDMI female
- Mini HDMI "C" male to HDMI "A" female
- Mini-DisplayPort male to HDMI female
- DVI Digital male to HDMI Female
- USB-C to HDMI Female
- VGA to HDMI Female
- Lightning to HDMI Female

Manufacturers link: https://secure.libertycable.com/

5. Computer Monitors

a. Planar PCT2485
   - Standard desktop computer monitor for instructor computers

b. Dell 22" Widescreen Monitor
   - Standard desktop computer monitor for lab computers

c. ViewSonic TD2220
   - This optical touch monitor (can use stylus or finger tips) allows for instructors to bring interactivity to their lecture material. With a 22” display it provides a large workspace that makes it easier to engage students with content like videos and images.

d. SMART Podium SP524 (Previous Standard)
   - The SMART Podium allows for instructors to bring interactivity to their lecture material. With a 24” display it provides a large workspace that makes it easier to engage students with content like videos and images. The SMART Board also integrates seamlessly with the existing technology in classrooms.
   Manufacturers link: http://smarttech.com/us
6. Audiovisual System + Interface

The university standardized on Crestron as the primary audiovisual control system and is currently moving all classrooms onto the university network to allow remote management using Crestron Fusion RV (formerly known as RoomView).

a. Crestron DMPS3-4K-350-C (Standard)
   - The Crestron DMPS3-4K-350-C is an AV control system, switcher, mic mixer, and amplifier.
   Manufacturers link: https://www.crestron.com/products/model/DMPS3-4K-350-C

b. Crestron TSW-760 (Standard)
   - The Crestron TSW-760 is a 7" touch screen with an edge-to-edge glass screen for higher durability. It supports the latest "Smart Graphics" from Crestron and has a 1024 x 600 screen resolution.
   Manufacturers link: http://www.crestron.com/products/model/TSW-760

c. Crestron TPS-6L (Previous Standard)
   - The Crestron TPS-6L Touch panel system allows for high-end performance and simple control over a variety of devices. With 12 optional push buttons the Crestron TPS-6L will give fast access to the most commonly used functions in a classroom.
   Manufacturers link: http://www.crestron.com/resources/product_and_programming_resources/catalogs_and_brochures/online_catalog/default.asp?jump=1&model=tps-6l#

7. Wireless Presenter Remotes

Wireless presenter remotes are commonly used in classrooms to advance PowerPoint slides without having to walk back to the computer. These are not covered under STF funds. Policies for wireless presenters vary by college so please check with local IT providers, chairpersons, or other college leadership before purchasing one since they may require drivers to be installed on classroom PCs. Funding also varies by department but it is usually up to individual faculty to provide their own. OTS does not support these consumer level devices but recognizes they are important in the overall instructional environment. Wireless presenters are available online and at consumer electronics stores such as Best Buy, Staples, etc.

8. Assistive Listening Devices

a. Williams Sound FM-457 Pro
   - This is an RF assistive listening device used to improve hearing ability in spaces with voice amplification.
Manufacturers link: https://www.williamssound.com/

9. Microphones

a. Vaddio EasyMic Ceiling MicPOD
   - This is a ceiling mic that connects to the in-room computer via USB. It is used in smaller spaces such as conference rooms.

Manufacturers link: http://www.vaddio.com/

b. ClearOne 910-001-014-W Ceiling Mic Array
   - This is a ceiling mic that connects to the in-room computer via USB. It is used in medium to large spaces such as classroom and lecture halls.

Manufacturers link: http://www.vaddio.com/

c. Biamp TCM 1 Beamtracking microphone
   - This is a ceiling mic that connects to the in-room computer via USB. It is used in medium to large spaces such as classroom and lecture halls.

Manufacturers link: https://www.biamp.com

10. Cameras

a. Vaddio RoboSHOT 12 QUSB
   - This is a pan/tilt/zoom camera that connects to the in-room computer via USB.

Manufacturers link: http://www.vaddio.com/

b. Vaddio ConferenceSHOT FX
   - This is a fixed wide-angle camera for meeting rooms and huddle spaces.

Manufacturers link: http://www.vaddio.com/

c. Vaddio HuddleSHOT
   - This is an all-in-one speaker bar with built-in camera and microphone.

Manufacturers link: http://www.vaddio.com/

11. Audio Mixers

a. Biamp TesiraForte AVB CI
   - This is a microphone mixer that connects to the in-room computer via USB.
12. Projection Screen

a. Da-Lite 21857LSC - White Case 113 D / 60 x 96
   - This is an electric tensioned HD screen with 0.9 gain.

Manufacturers link: https://www.legrandav.com/products/da-lite

13. Non-Interactive Display

We do not have a specific standard model large display but all must be commercial grade, 4K, and controllable over RS-232.

14. Interactive Display

a. ClearTouch CTI-6065K-UH20
   - This is an 86” 4K interactive (touch) display

Manufacturers link: https://www.getcleartouch.com

15. Wireless Projection

a. Mersive Solstice (Standard) allows clients to wirelessly project material from Windows and Mac computers as well as iOS and Android mobile devices. The following settings must be in place for every Solstice Pod that is added to a TU system.

1. Display Tab
   a. Under “Naming and Discover”
      i. Display Name: Room collection code-SolsticePod (i.e. CK0008-SolsticePod)
   b. Under “Access Control”
      i. Access Control: Check Screen Key (unless moderated mode is desired by the client)
   c. Under “Resource Restriction”
      i. Check everything including “Enable AirPlay Discovery Proxy”
   d. Under “System”:
      i. Set Admin password to standard
      ii. Update host name to match display name

2. Network tab
   a. Under “Wireless Settings”
      i. Uncheck “enable”

3. A “Wireless Input” button must be added to the Crestron touch panel if applicable.
b. **Crestron AirMedia** allows clients to wirelessly project material from Windows and Mac computers as well as iOS and Android mobile devices. The following settings must be in place for every AirMedia that is added to a TU system.

In rooms with Crestron control systems, the programming must be updated to add a button to the source list on the Crestron touch panel labeled “Wireless Input”. The button must have the same size, color, and font size as all other sources.

The network port must be on the Learning Spaces VLAN.

On the management interface of the AirMedia device the following settings must be made:

i. Set Admin Password (See manager for password)

ii. Code must be set to Random (Device Setup>Code>Random)

iii. Host names must consist of the Collection Code with “-AirMedia” added to the end (i.e. CK0006-AirMedia) (Network Setup> Host Name> Collection Code-AirMedia)

iv. The display of the IP address must be turned off (Network Setup>Display of IP address> Off)

**Disable the built-in DHCP server**

- Right click and save the configuration file to your desktop: `am-100_dhcp_server_off.conf` (55 bytes)
- Load the downloaded configuration file to the AirMedia via the 'System Configuration' section of the AM-100 web interface.
- Once completed, the DHCP server will no longer be running on the AM-100.

c. **Apple TV** allows clients to wirelessly project from Apple devices such as MacBooks, iPhones, and iPads. In rooms with Creston control systems, the programming must be updated to add a button to the source list on the Crestron touch panel labeled “Wireless Input”. The button must have the same size, color, and font size as all other sources. Controls must also be added (see image in Appendix A).

The Apple TV must be plugged into a network port on the Learning Spaces VLAN

On the menu interface (accessed by pressing the menu button on the remote) the following settings must be made:

i. The device name must be changed to follow the standard naming convention: Collection Code-AppleTV (i.e. HH0313-AppleTV) (Settings>General>Name>Custom)

ii. The time zone must be set correctly (Settings>General>Time Zone)

iii. The serial number must be collected and entered into the TechInfo database (Settings>General>About)
iv. Set Sleep time to “Never” (Settings>General>Sleep)

v. Set Screen Saver to “Never” (Settings>Screen Saver>Start After)

vi. Set AirPlay security to “Onscreen Code” (Settings>AirPlay>Security)

vii. Turn on Conference room Display (Settings>AirPlay>Conference Room Display)

viii. Turn on Restrictions (Settings>General>Restrictions)

ix. Passcode (set to standard)

x. AirPlay Settings (set to “Ask”)

xi. Turn on Automatic Updates (Settings[System>Software Updates]

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**Stickers (CTSG-008)**

1. STF Stickers

   a. Sticker must be straight.

   b. Stickers must not be in the way of any function, but must be conspicuous to the general observer

   c. Items that must be stickered

      ii. Projectors

         o Will be stickered on side facing down if ceiling mounted, must not cover any other labeling or buttons

         o In future, stickers must be applied prior to mounting for easy access

      ii. Document cameras

         o Sticker must be placed on (WV VZ-3 specific)

            i. On the back of the arm

            ii. On the plate that connects the base to the arm.

            1. Stickers must not be placed on the white base

      iii. Computer – computers include class and lab computers as well as iPad’s purchased with STF

         o Stickers must be placed on

            iii. The front

               1. Stickers placed on the front must not cover any buttons or lights

               iv. The top near the TU tag

      iv. Processor in rack

         o Sticker must be placed on the front of the DMPS3-4K-350C - this is to identify the entire rack

   v. Cameras
d. Stickers must be affixed during QA before photos are taken so they show in the Virtual Tour.
e. After a room is tagged it will be marked as such in COLLECTIONS in the Virtual Tour.

2. Interactive Display Stickers

A. Must be placed on the bottom left hand corner of all interactive touch screen displays including computer monitors.

Distance Learning & Lecture Capture

Standard Equipment (CTSG-009)

Towson University has moved to a software based distance learning & lecture capture model. Depending on the room this will either include USB cameras/microphones or a bridge to convert standard camera/microphones to a format that can be connected to the computer in the room.

a. Cameras must be mounted roughly 7’ above finished floor.
b. Flat panel displays must be mounted 6’ above finished floor to the center of the display.
c. Flat panel displays must be mounted 6” away from fire alarms/annunciators.
d. Microphones used for voice reinforcement must also feed distance learning/lecture capture system.

1. Basic Setup

a. Basic/portable recording can be accomplished in any room with a webcam plugged into the instructor’s PC, TU recommended models can be found here: https://www.towson.edu/technology/facultystaff/hardwaresoftware/hardware.html

b. A Revo Labs wireless USB mic can be added to this setup for more flexible instructor micing. To capture omnidirectional sound, products are available from Blue and Acoustic Magic to capture the entire room audio.

2. Permanent Setup

a. Foundation – This is used to describe the majority of our standard classrooms on campus. These rooms are used for general lectures and would need basic video and mic capabilities to facilitate software-based lecture capture.

   Equipment: Vaddio PTZ USB camera, Vaddio EasyUSB Mixer, and two Vaddio EasyMic Ceiling MicPods. Two displays are also added on the podium to allow for dual monitor functionality.
b. **Extended/Curriculized** – These are rooms that have needs that go above and beyond what is found in a standard room; this could include the need for more advanced microphones, more camera angles, etc.

Equipment: One or more Vaddio HD PTZ cameras, Biamp mixer, Vaddio AV Bridge, Biamp ceiling mic arrays, Shure podium mic & lavalier mic (all cameras and mics connect to the computer). Two displays are also added on the podium to allow for dual monitor functionality. Additional equipment to support specific courses or programs of study may be included in Curriculized rooms.

c. **ALIST**: These are rooms that must contain the highest quality video and audio quality possible with consideration given to room lighting, acoustics, etc. They represent the fewest number of classrooms. Special staffing may be necessary to assist faculty or control equipment in a studio environment. Broadcast or near broadcast quality may be typical, as well as other unique types of technology beyond computers and audiovisual.

Equipment: 2 Vaddio HD PTZ Cameras, Biamp mixer, individual Shure mics at each seat, Shure podium mic & Lavalier mic.

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**Distance Learning Equipment in ALIST/Curriculized Spaces (CTSG-010)**

1. The minimum set of equipment must be installed as follows:
   a. Display 1 in view of instructor
   b. Display 2 in view of students
   c. Camera 1 facing instructor
   d. Camera 2 facing students
2. Each display device must be able to show the following:
   a. Projector: Must be able to show local content (PowerPoint, etc.), camera 1, camera 2, or any content sent from the remote location (remote content, remote camera 1, remote camera 2).
   b. Display 1: Must be able to show local content (PowerPoint, etc.), camera 1, camera 2, or any content sent from the remote location (remote content, remote camera 1, remote camera 2).
   c. Display 2: Must be able to show local content (PowerPoint, etc.), camera 1, camera 2, or any content sent from the remote location (remote content, remote camera 1, remote camera 2).

3. Standard Scenario
   a. Projector: Local content (PowerPoint, etc.) (Must also have the ability to show all media and camera shots)
   b. Display 1: Before call is placed shows local Camera 1 as a confidence monitor for instructor to make sure they are in the shot. After call is placed, shows remote camera 2 (students) (Must also have the ability to show all media and camera shots)
   c. Display 2: Shows content remote location is sending [remote content, remote camera 2 (students), or remote camera 1 (instructor)] (Must also have the ability to show all media and camera shots)
4. Default Display Configuration

If room has 4 displays: One display in back must show remote Camera 2 (remote students) and the other must show local Camera 1 (instructor). One display in front must show remote Camera 2 (remote students) and the other must show local Camera 1 (instructor).

Instructor Stations

Requirements (CTSG-011)

The workstation must not be overpowering in size but large enough to be functional without feeling cramped. The visible technology must be minimal but utilitarian. Too many lights, annunciators, clocks, switches will intimidate, confuse, and be hard to troubleshoot. Each podium must contain the following:
1. Articulating arms must be used for the monitors (or interactive displays). Model Info: Ergotron 45-241-026

2. Dual Monitors must be installed in any room used for instructional recording.

3. Podium casters must be lockable

4. No doors must be over the keyboard compartment

5. At least one (quiet) fan must be present in the cabinet

6. Grommet positions for whip (if applicable)

7. Core drilling must be used for new buildings, in addition to the conduit for a quad electric outlet and 4 network drops, each floor box must have separate conduit for A/V signal and speaker, mic, camera cabling. 3 1” conduits or 2” and a 1” conduit. Otherwise locking wall plates/receptacles must be used [see Locks (CTSG-016)]

8. In large venues where high power projectors are used, a dedicated circuit must be provided to prevent the projector from shutting down if too much power is drawn.

9. If no core drilling is present, AV cables (whip) must be tightly secured to avoid a tripping hazard. If cables must, as a last resort, be run across floors the ADA compliant Legrand OFR Series Overfloor Raceway System must be used. Temporarily, yellow tape provided by OTS is acceptable but only if there is a confirmed date when permanent raceway/core drilling will be completed and the use has been approved by OTS.

10. Gooseneck microphones must be present for all Distance Learning rooms and Lecture Halls

11. Four network ports must be run to the instructor stations (1 PC, 1 Laptop, 1 Crestron, 1 Wireless Input).

12. Wire diagram must be provided in digital format

13. All cables must be labeled

14. Document cameras must have one dry erase overlay at time of install (if available for model)

15. Document cameras must be connected to the podium computer via USB

16. Equipment mounted behind displays and cameras (i.e. power strips, power supplies, USB extenders, DM receivers, etc.) not use velcro to secure it in place. Instead we suggest the use of cable ties, wall mounts, or other methods that do not use an adhesive that easily breaks down.

17. A/V, computers, and other technology devices are not put on timed circuits or sensors. Power should be available to them 24/7.

18. Assistive listening devices must be installed in all rooms with voice reinforcement or where sound is a key part of instruction.
Cable Cubby (CTSG-012)

The Cable Cubby must include Ethernet, USB, HDMI, 3.5mm audio, USB-A/USB-C power outlets, and two electrical outlets. HDMI, Ethernet, and 3.5mm audio must contain pull-through cables with male connectors. USB must contain pull-through cable with female connector.


Lighting

Overview (CTSG-013)

1. Intuitive wall-mounted light switches must be within easy reach of the instructor workstation. They are very reliable, require no training, and will work regardless of the state of the Crestron system.

2. Lighting controls must also be integrated into the Crestron system where possible. These controls are meant to supplement, not replace, the standard wall switches.

3. Additional factors: switches must be installed at wheelchair-accessible height; for multiple switches (zoned lighting), the switches must either be labeled or a reference placard must be mounted next to the switch bank; redundant switches must be located on the wall as close as possible to each entry door to the room.

Lighting and Switching Specifications (CTSG-014)

1. Soft Lights directly in front of projection screen must be able to be turned off (including turning off any motion sensor so they do not come back on inadvertently).

2. Lights in the student seating area of the room must be dimmable to allow for low-level illumination (for note-taking) or completely off (for watching videos, etc., where no note-taking is needed).

3. The "master" bank of light switches that control the entire room must be installed on the wall behind or next to the podium for easy access (unobstructed) when lecturing; the instructor must not have to walk more than two steps to manage the lights during the class.

4. At least one light switch must be placed near the entrance of the room. This will let room users turn on at least a portion of the room lights so you can safely enter the room (and turn off the light when leaving).

5. Any occupancy sensors must have the ability to be overridden using the light switches at the instructor podium so the entire room can be darkened or illuminated during a class, under control of the instructor.

6. Light switches must be labeled, ideally with pocket inserts, so the instructor knows what the switch turns on/off. You mustn't have to use trial and error.

7. A motorized screen switch must also be placed near the podium, and labeled. The switch must have up/down/stop (three buttons). Primary control of the screen will be under Crestron touch-panel control, but the manual wall switch must be able to override the Crestron system to allow for manual control.

8. Sight lines – lighting should be flush to the ceiling – or dropped in a way as to not obstruct projector throw to screen.

Article CTSG-013; Version 1; Last Revised 10/23/2019

Article CTSG-014; Version 1; Last Revised 10/17/2019
Touch Panel

Screen shots must be submitted to Towson University for review prior to project competition

Overview (CTSG-015)

We have transitioned to the Crestron TSW-760 panel which eliminates the hard buttons. The options will still be present in the same locations but as “soft” buttons instead. The Crestron TPS-6L combines 12 "hard" switches on the left and right sides of the device with a touch panel "inner core" that allows the programmer to include other interface components: display messages, selection menus, submenus, status indicators, etc. Hard buttons are permanently etched into the control unit bezel; they cannot be changed once the final design is chosen. When a hard button is clicked, the text in the touch panel area describes the functionality ("behavior") that must follow.

Natural Flow Patterns When Moving Between Controls (CTSG-016)

1. The user begins the experience with the Start button and works their way through the left panel of hard buttons. The Start button tells the user what to do next: step through the other buttons on the left-hand panel and turn on the projector, select their audiovisual source, and lower the screen. When class is done, they'd press the Finish to shutdown the system. This kind of natural flow pattern helps guide the movement of a user through a class session.

2. When deciding on what goes on the left-hand panel of hard buttons vs. the right, we followed people's natural reading style for a two-column presentation: you start at the left-most column, read your way from top to bottom, then move on to the next column, doing the same: top to bottom.

3. Secondary controls, menus, and submenus then appear "on demand" in the touch panel based on choices made by pressing a hard button. This follows people’s natural skimming style: periphery first (the left and right hard-button panels), followed by the content in the central field (the touch panel).

Status Bar (CTSG-017)

The status bar will be always visible at the bottom of the touch panel. It will include the current time of day (12 hour time); and annunciators to show whether No Show or No Sound is selected. Since it's a status bar and non-interactive, small but clear icons are acceptable. Example: the sound volume in Windows has a little speaker icon in the System Tray; when muted, there's a red line through the speaker.

Nesting Menus in Layers (Drilldown) (CTSG-018)

Generally, anything more than one layer deep must be avoided; forcing the user to drill down tends to create confusion in how to get back out. Where possible, a flatter approach is better—provided the interface isn't too cluttered. When a need to nest is warranted, we will explore other options.
If used, there must be a clearly labeled "Previous Page" button, and other things would need to be locked out while the submenu is active.

Article CTSG-018; Version 1; Last Revised 10/16/2019

**Fonts and Colors (CTSG-019)**

1. Colors that carry intuitive meaning for people in other contexts must be used in lieu of trying to showcase the university colors. Examples: for status indicators, red = off/stopped/extreme, green = on/within allowable limits/etc., yellow = borderline/cautionary range. InfoComm provides additional guidance on color usage. It is not absolute, but it is a valuable guide.

2. For multiple button selections with only one permissible choice (e.g., selecting the primary audiovisual source), the button the user selects must appear depressed to be very clear the choice has been made. When one is selected, the non-selected buttons must be raised. Any buttons that are not appropriate for the context or not an allowable option must be grayed out.

3. Flashing text must be used sparingly for imperatives, emphasis, in-transit states, or vital messages.

4. When raising the volume the color must go from green to yellow to red

5. TU Standard Settings:
   a. Font – Arial
   b. Main Titles – 14 Bold
   c. Button Column Titles – 14
   d. Button Text – 11
   e. Other Text – 11
   f. Alias setting: Anti-Aliased

Article CTSG-019; Version 1; Last Revised 5/18/2012

**Hard Buttons (CTSG-020)**

1. The following hard buttons must be present:
   a. Start – Press to begin using the system, wakes up screen. Must be the only button that can be pressed when at the splash screen.
   b. Project – Press to lower screen and turn on the projector
   c. Source – Displays list of sources to select from
   d. Screen – Displays manual screen controls
   e. Finish – Press to turn system off
f. Microphones – Press to select whether to use microphones

g. Volume – Press to change the volume of the system

h. Video Camera (formerly Record) – Press to access the Camera Control Page if room has PC-connected camera.

i. No Show – Press to temporary stop sending image to projector

j. No Sound – Press to temporarily mute the system. If the system is muted, press to unmute the system. Pressing the volume up or down buttons must also unmute the system.

   i. “No Sound” function must mute all audio coming from the system including any microphone currently set to “Use.” All current “Use” or “Don’t Use” states must be cached at this point.

   ii. When "No Sound" is turned off, all microphones should be restored to the cached "Use" or "Don’t Use" state they were in prior to "No Sound" being activated.

   iii. Un-muting any source by pressing the “mute” button or changing the volume must explicitly place “No Sound” to the “not on” state. Cached states are to be overwritten the next time “No Sound” is set to “on”.

2. Hard buttons must display a “feature not available” message if not applicable to the room. See “Recording Control Page” for rooms without cameras in Appendix A.

3. Pressing any hard button (or the screen itself) must wake the screen if the touch panel is in sleep mode.

4. For the TSW-760/752/750 Touch Panel, the hard buttons must control the following functions:

   a. Power Button = emulate the START/FINISH buttons

   b. Home Button = Emulate the SOURCE button
c. Light Button = Title: “Lighting Control Page” Text: “Lighting control is not available in this room”
d. Arrow Up = Main volume up. Pressing the volume up or down buttons must also unmute the system.
e. Arrow Down = Main volume down. Pressing the volume up or down buttons must also unmute the system.

Soft Buttons (CTSG-021)

Please see Appendix A

Defaults on System Start (CTSG-022)

1. No Sound active during system start-up and shut down
2. Mute microphone (“Don’t Use” position) and MP3 by default
3. Volume at default level (Approximately 60-65 decibels when measured from the center of the room).
   Use the following white noise generator to test this: [http://onlinetonegenerator.com/noise.html](http://onlinetonegenerator.com/noise.html).
   Computer and/or individual device volume must be at 100% during this test if applicable.
4. Podium computer must be selected as the source (or laptop if no podium computer)
5. TV must be tuned to CNN unless stated otherwise
6. All buttons (Hard and soft) must be locked out during the startup and shut down of the system.
7. Date and time in lower right hand corner must be in the following format on all pages: July 18, 2012 12:00 (make sure text box is large enough to accommodate September). Time must be synced with the network.
8. Crestron Touch Panel screen must not go to sleep while system is on
9. On system start-up, all flat panel displays must default to the appropriate input setting in order to display the default source (Computer) even if someone manually changes the input on the display

Source Page (CTSG-023)

The Source Page must be laid out like the example below in this exact order:

1. Computer
2. Laptop (VGA)
3. Document Camera
4. DVD
5. Auxiliary
6. TV
7. Auxiliary HDMI
8. Wireless Input’

9. ClearTouch (Added to rooms with ClearTouch displays to access built-in Android OS)

If the podium computer had dual monitors, a “Secondary Monitor” Button must be placed directly below the “Computer” button to allow either image to be shown to any display in the room. There must always be an “Auxiliary HDMI” Button separate from the “Laptop” (VGA) button. All other sources must be hidden unless present in the system. This includes dual display options if dual image is not available. Image Adjust side button must be hidden on digital sources where no adjustments are possible (i.e. HDMI, DVI, other fully digital sources). Fully digital systems (i.e. Crestron DMPS3-4K-350-C) will not have VGA or composite video inputs and no image adjust options available on any source. Left and right image source list must mirror each other (button must be blacked out on opposite source list when selected). On rooms with single source display, “Clear” button must be removed.

Left and right image must be stage left and stage right, meaning the instructor’s left and right while facing the students. (http://plays.about.com/od/basics/ss/stageright.htm)
Security

Locks (CTSG-024)

1. Compartment with A/V rack must lock separately from CPU compartment
2. CPU compartment must not be lockable (unless absolutely needed to be secured)
3. A/V rack lock must be a non-electronic combo lock (no-batteries)
4. Core drilling must be used for new buildings, otherwise locking wall plates/receptacles must be used
   a. OTS has identified the following model to use with A/V wall plates that contain DM, Control, and Speaker cable connections:
   b. The wall box must be labeled “Specialty Ports  Do Not Disconnect”

<table>
<thead>
<tr>
<th>SKU</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI-DBP2</td>
<td>Arlington Industries Medium-Sized, Vertical Mount Dri-Box Adapter w/ Non-Metallic Dual Gang Base- White</td>
</tr>
</tbody>
</table>

   c. Red Crestron network cables must be secured to the networking wall ports using this model of lock:

<table>
<thead>
<tr>
<th>SKU</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAN-PSL-DCPL-RD</td>
<td>Panduit-&quot;Package of 10&quot; Flush Mount RJ45 Plug Lock-in Devices and One Installation/Removal Tool</td>
</tr>
</tbody>
</table>

Sonic Shock (CTSG-025)

1. Sonic Shock alarms must be attached to the following equipment items, unless otherwise specified in a statement of work: projectors, large screen displays, and all podium equipment (document cameras, media players, Crestron processors). For equipment located on or inside a podium a single Sonic Shock alarm must be used and the cable looped through the applicable items.
2. The Sonic Shock must be mounted in document camera drawer (if equipped).
3. DVD/Blu-ray need not be alarmed IF it is rack mounted with security screws.
4. Sonic Shocks must be attached to SMART podiums and all-in-one PCs/Macs.
5. If there is a reason to locate the Sonic Shock elsewhere (e.g. not in the drawer), an exception must be requested through TU.
6. Sonic Shock Stickers must be affixed to projector.
7. Sonic Shock keys must all be keyed to the TU master.

8. BULLETIN 14-1: Regarding Sonic Shock Inclusion for AV Vendor Installations and Replacements

Issued by Michael Bachman 7/30/2013

Background

There has been confusion on when and if Sonic Shock alarm units are to be included in installations. This usually comes into play when TU staff inspect work at the conclusion of a job. This bulletin must clarify the Sonic Shock expectations for both AV Vendor and TU.

Pertinent Contract Language

1. The terms and conditions of the On-Call Contract call for the following in the Security section:
   A. One or more Secure-It Sonic Shock SSA-100 units shall be used to secure the following components in the instruction workstation: computer, monitor(s), visual presenter, Extron or Crestron controller, and Blu-ray/DVD player

2. One or more Secure-It Sonic Shock SSA-100 units shall be used to secure the projector(s), audience flat panel, and other major pieces of equipment not permanently housed in the instructor workstation.

Intention

The intention of the language in the contract, as I wrote it, was that it would apply primarily to these types of jobs:

1. Installation of a new complete system
2. Substantial renewal of an existing system, such as refresh of the AV core
3. New or replacement installations of individual pieces of equipment which would normally be equipped with a Sonic Shock as defined in Security sections A and B.

Example Scenarios

1. TU requests a new classroom system to be designed and installed in a classroom that has no existing system. A Sonic Shock would be expected to be provided in accordance with contract terms in Security, Sections A and B.
2. TU requests a projector replacement; the projector is obsolete and a newer model is desired. A Sonic Shock would be expected to be provided in accordance with contract terms in Security, Section B. The work requested is directly tied to a piece of equipment that requires a Sonic Shock.
3. TU requests a projector replacement as above; when the room is inspected, the TU staff member notices a missing Sonic Shock alarm on another piece of equipment which would be normally alarmed, such as a document camera. A Sonic Shock would still be expected for the projector; however, TU would not expect contractor to provide or install a Sonic Shock for the document camera.
4. AV Vendor’s sole due-diligence expectation would be to report the omission with the document camera if the installer happened to notice it in the course of the projector work; to be clear, a formal inspection of the room is not expected in this case to determine whether all equipment
specified in the On-Call Contract has Sonic Shock alarm(s). That is the duty and responsibility of TU staff in this case—except for the projector.

**Basis of Interpretation**

1. The contract terms and conditions supersede all other interpretations. We expect that products, services, and standards stated in the contract will be applied, whether explicitly quoted or not, to all jobs under the contract.
2. Variances between the contract terms and conditions and TU’s published standards must be worked out and addressed prior to issuance of a quote.
3. If TU or AV Vendor waives something in the preliminary discussions leading up to a quote, it must be specified in the SOW as part of the quote submission. This will prevent surprises and misunderstandings for both parties.
4. Although TUs published standards provide additional guidance, if there is a collision between the standards and the contract, the contract prevails absent prior agreement.
5. The director is the sole person who will interpret the contract within the OTS Classroom and Computer Lab Technologies group.
6. If AV Vendor feels the interpretation is incorrect, the appeal path is TU Procurement.

**Additional Notes**

1. Since the contract’s inception, TU has waived the requirement for Sonic-Shock devices on the Crestron controller (touch panels), and the Blu-ray/DVD player, provided the player is secured in a rack with security screws or otherwise protected in a manner that TU would agree to.
2. TU has rescinded the engraving requirement. The potential damage to equipment and the difficulties it creates in executing warranty returns and replacements outweighed the potential security benefits.
3. TU will publish a bulletin to contractors whenever our published standards change in a substantive way.
4. Bulletins will not be issued for minor things such as correction of typos or grammatical errors, unless they are substantive (e.g., touch panel verbiage) and could affect contractor work or services.

**Classroom (CTSG-026)**

1. It is recommended that swipe Locks must be installed on main classroom entrance
2. All keys (i.e. podium) must be turned over to Manager of Classroom Technology.
3. It is recommended that classrooms that feature computer labs have an alarm that requires a code for access.

**A/V Rack (CTSG-027)**

1. Use security screws to rack-mount equipment
2. Racks that are outside of podiums must have their own keyed locks
3. All rack equipment that is capable of having a password must have one (Crestron controllers, routers, etc.)

Article CTSG-027; Version 1; Last Revised 10/22/2019

Networking

Crestron Network Cables (CTSG-028)
All Crestron processors must be connected to network ports using RED network cables. This will help quickly identify which cable runs to the Crestron for installation and troubleshooting purposes.

Article CTSG-028; Version 1; Last Revised 6/1/2012

Information Needed (CTSG-029)
1. Please see Crestron Worksheet for information needed to add Crestron equipment on the TU Network: Crestron Worksheet
2. Once a port is configured the red Crestron network cable must remain plugged into the same port and port must be labeled with a “C”.
3. All Crestron processors must have the following DNS servers entered in settings: 10.20.1.5 and 10.20.1.6

Article CTSG-029; Version 1; Last Revised 10/22/2019

Routers/Switches (CTSG-030)
1. Any switches being used in the podium must first be approved by Towson University’s network group.
2. Items such as computers and Crestron equipment cannot be plugged into the same switch since they use different VLANs. Only one VLAN can be assigned to a switch/router so all devices must match this VLAN.
3. Red network cables must be used to connect the router/switch to the wall port if a Crestron device is connected to the router/switch.
4. Routers/Switches must not be plugged into any other port besides the one that was specifically configured for it or it could pose a security threat to the TU network.

Article CTSG-030; Version 1; Last Revised 10/22/2019
**VLAN (CTSG-031)**

1. All Crestron processors must be on VLAN 541
2. All video conference equipment (i.e. Cisco C40) must be on VLAN 540
3. All Wireless Input devices must be on VLAN 539
4. All Computers and Cable Cubby network ports must be on the Learning Spaces VLAN.

Article CTSG-031; Version 1; Last Revised 10/16/2019

**Wall Ports (CTSG-032)**

1. All Network ports must be installed with non-user accessible wall plates so that cables cannot be unplugged

2. All DM cables that have RJ-45 style connectors must also have non-user accessible wall plates so that cables cannot be unplugged

Article CTSG-032; Version 1; Last Revised 10/22/2019

**Crestron Fusion RV (CTSG-033)**

1. All Crestron systems must be connected to Crestron Fusion RV

2. All Crestron systems must have an Xpanel loaded on the Crestron Fusion RV server

3. All Crestron systems must have the “device usage” model loaded to report on all sources and “dual image” functionality.

Article CTSG-033; Version 1; Last Revised 10/22/2019

**Crestron Code (CTSG-034)**

1. The latest version of the un-compiled Crestron processor and touch panel code must be uploaded to the Crestron code share (\\customshare\cclt\$) every time a change to the system is made following the guidelines outlined in the instruction document located on the share.

2. A wiring diagram must be uploaded to the Crestron code share (\\customshare\cclt\$) every time a change to the system is made.

3. All serial numbers must be uploaded to the Serial Number SharePoint site: https://tu.sharepoint.com/sites/cclt/Lists/Towson%20University%20Serial%20Number%20Spreadsheet/AllItems.aspx

Article CTSG-034; Version 1; Last Revised 10/22/2019
Appendix A

Crestron Touch Panel: Soft Buttons TSW-760/750/752 (CTSG-035)

TSW-760/750/752 Panels must generally follow the same guidelines as the TPS-6L below

1. Splash Screen

   a. Logo must point to live web graphic located here:
      https://webapps.towson.edu/classroomtechnology/web_documents/TowsonUlogo.png
2. Help Screen

Please call (410) 704-8324 (4TECH) for assistance with the audiovisual system.

3. If button other than “START” is pressed this screen must appear. The extra arrow/message must disappear 10 seconds later if no further action is taken.
4. Welcome screen (If the START button is pressed and the user does not press PROJECT to continue with startup it must return to the splash screen in 30 seconds.)

5. Projector Status (Status bar must be adjusted to go as quickly as possible on a projector by projector basis depending on startup time)
6. **Source Select Page**
   a. **Source Select Page w/ Dual Image Enabled**

7. **Control fly out**
8. Source Select page for rooms with two displays (i.e. projector and LCD). “Computer Secondary” enables extended desktop so windows can move from one screen to another (i.e. dual monitors).

9. Display Select Page (appears when pressing START>PROJECT or “Display Select” on the source page)
   a. If the room has a projector and an Interactive Display (i.e. ClearTouch). The buttons and source select columns must be labeled “Projector” and “Interactive Display”
10. **Display Control Screen** (This replaces the normal source select page for rooms with three or more displays)
   a. Background graphic must be customized to match the layout of the room
   b. Display icons must be located on the layout to match their actual location in the room
   c. Displays must be labeled by number in a clockwise pattern starting with the “main” Display 1
   d. Display 1 must be the default display on system start up (Display 1 must be on and display “Computer”)
   e. The current source must be displayed below the display icon (The text “Off” must be displayed if no source is routed)
   f. Any sources must be routable to any display
   g. Source must not change until a display icon or “Set All” button is pressed
   h. The “No Show” button must put all displays into “No Show” mode (black screen) and return them to the last active source when pressed again.
   i. When a display is cleared through the “Clear” button, the display must switch to AV Mute mode or an empty input on the Crestron so it has a black screen and displays the “Off” text below the display icon since no source is routed. If display is not capable of this, it must turn off.
11. Document Camera controls

- Lamp
  - On
  - Off

- Zoom
  - In
  - Out

- Focus
  - Auto Focus
  - +
  - -

12. Screen Control page (Must not be available if no electric screen)

   a. Buttons must turn green when depressed for feedback. All must return to their normal white color when not being pressed.
13. Touch Panel Cleaning page

Touch Panel Status

Time Remaining

Controls on the panel are now suspended so you can clean it with a soft, dry cloth.

14. Microphones page (must add set of identical buttons titled “Handheld Microphone” if one is present in the room)
15. Microphones page in room without mics (If no Microphones are installed, page must read: "Microphones are not available in this room”. If non-controllable microphones are installed, page must read “Microphone control is not available in this room”)

16. Volume page (when raising the volume the color must go from green to yellow to red). Pressing the volume up or down buttons must also unmute the system.
17. Advanced Volume Control page (when raising the volume the color must go from green to yellow to red). Pressing the volume up or down buttons must also unmute the system.

18. Advanced Volume Control page in room with microphones
19. Video Camera (formerly Record) Page
   a. Presets 1-3 must reset to the following camera positions upon system restart even if a client reprograms them:
      i. Preset 1: Zoomed in view of instructor at podium
      ii. Preset 2: Zoomed in view of projection screen/whiteboard
      iii. Preset 3: Zoomed out view of entire room
   b. Presets 4-6 must remain static even if the system is restarted, these are programmed by holding down the button to save the current camera position.
20. Video Camera (formerly Record) page in room without camera

![Camera Control Page](image1)

Cameras are not available in this room.

April 25, 2018 3:48 PM

21. TV Control Page

![TV Tuner Control Page](image2)

Current Channel: 077-1

PRESETS
- Preset 1
- Preset 2
- Preset 3
- Preset 4
- Preset 5
- Preset 6

Closed Caption Off

September 19, 2017 11:32 AM
22. Finish Page

Finish Page

If no selection is made the system will shutdown in **00:42**
Are you finished using the audiovisual control system?

Yes  No

If you select "Yes" it will take approximately two minutes before the audiovisual control system can be restarted.

March 14, 2016 12:19 PM

23. Power off page (Status bar must be adjusted on a projector by projector basis and go as quickly as safely possible)

Projector Cooling Down

System is powering off

The audiovisual system is powering off...please wait

Please make sure you logoff from the computer and secure the room
24. System Offline Page (Appears if touch panel loses its network connection)

The audiovisual control system is offline. Please call (410) 704-8324 (4TECH) for assistance.
25. For rooms that require an “Audio Only” Option
26. Apple TV Source button

27. Apple TV Controls
1. Splash Screen

2. This screen must appear if a hard button other than START is pressed. The extra arrow must disappear 10 seconds later if no further action is taken.
3. Start (If the START button is pressed and the user does not press PROJECT to continue with startup it must return to the splash screen in 30 seconds.)

4. Projector Power on (Status bar must be adjusted to go as quickly as possible on a projector by projector basis depending on startup time)
5. Projector already on page

6. Source Select Page (Digital sources will not have “image adjust” sub-pages). Note: The “Optional/Dual Image” column must list all sources on systems that use a TV One dual image processor. The screen shot below was taken from a system using the dual image function built into the projector.
7. Screen Control Page (Must not be available if no electric screen)
   a. Buttons must turn green when depressed for feedback. All must return to their normal white color when not being pressed.

8. Image Adjust (Analog systems only)
9. Volume (when raising the volume the color must go from green to yellow to red). Pressing the volume up or down buttons must also unmute the system.

10. Advanced Volume (when raising the volume the color must go from green to yellow to red). Pressing the volume up or down buttons must also unmute the system.
11. Podium Microphone (If no Microphones are installed, page must read: "Microphones are not available in this room". If non-controllable microphones are installed, page must read “Microphone control is not available in this room”)

12. Wireless Microphone (must add third set of identical buttons titled “Handheld Microphone” if one is present in the room)
13. Video Camera (formerly Record) (if no camera present)

Recording Control Page

Recording is not available in this room.

14. Record Password (see manager for code)
15. Record (For Mediasite only) Note: Titles must be bold to match DVD control page

16. Record (For Cisco Only)
17. Camera Control Page (preview of video must appear behind camera controls)

18. Stop Recording (For Mediasite Only)

Confirm Stop for Mediasite Recording

Do you really want to stop Mediasite recording?

Yes  No

Warning: Pressing "Yes" will completely end this session and the presentation will be saved. You will not be able to resume recording. If you just want to pause, press "No" instead
19. Stop Recording (For other solutions)

![Confirm Stop for Recording]

Warning: Pressing "Yes" will completely end
this session and the presentation will be saved.
You will not be able to resume recording.

20. Document Camera Control Page (Only include if doc camera can be controlled by the Crestron)

![Document Camera Control Page]
21. DVD/Blu-ray Control Page

22. DVD/Blu-ray Advanced Control Page
23. Help
   a. The Help button must display the following text:
      
      Please call (410) 704-8324 (4TECH) for assistance with the audiovisual system.
24. Fusion RV (Roomview Message)

25. TV
26. TV Full Screen

27. TV Presets
28. Video Conference (For Polycom Only)

30. VTC Camera Controls
31. Video Conference (For Cisco Only)

![Video Conference Screen](image1)

32. Monitor Control Tab

![Monitor Control Screen](image2)
33. Finish (Note: “Yes” must automatically be selected after 1 minute of inactivity)

34. Goodbye (Status bar must be adjusted on a projector by projector basis and go as quickly as safely possible)
Appendix B

Crestron Push-Button Systems: Hard Buttons (CTSG-037)

1. Current Standard:
   a. Cameo C2N-CBD-P-W-T

2. Previous Standard:
   a. MP-B20 (MPC-M20)
A. Types of Crestron push-button systems
   a. MP-M series require a separate MPS system:
      MP-B10
      MP-B20
   b. MPC-M series do not require a separate MPS system:
      MPC-M10
      MPC-M20
   c. The 10 series has 10 select buttons, two rows
   d. The 20 series has 15 select buttons on three rows and 5 navigational buttons

B. Color of panel
   a. The Crestron push-button systems are available in black or white.
   b. The black system must be used in all cases unless otherwise specified by TU
   c. The body, faceplate and mount must all be of the same color

C. Color of inserts
   a. On black push-buttons the printed inserts must be black with white lettering
   b. On white push-buttons the printed inserts must be white with black lettering
   c. On any buttons not used the insert must be filled with a blank that matches the color of the faceplate

D. Style of inserts
   a. The lettering on the inserts must be in all caps and be centered on space
   b. Two lines are used but only if required by the length of text

E. Screws on faceplate
   a. The screws on the push-button faceplate must be the screws designed for the system and must match in color

F. Which panel to use
   a. The Crestron MP-B20 is the standard that must be used for most installations
   b. The MPC-M20 must only be used when it is not feasible to also install a MPS
   c. MPC-M10, or MP-B10 must only be used in Tier 1 installations where there is only a wall port and no DVD/VCR to be controlled

G. Standard buttons
   First Row
   a. SYSTEM ON/OFF – Turns the system and projector on and defaults to PC as the main source, press again to turn system and projector off. If system is equipped with an electric screen this button must also raise and lower it.
   b. AUX – Switches to the analog composite video source
   c. AUTO IMAGE – Automatically adjusts image on analog sources must be turned into an HDMI source button on digital systems
d. No Sound – Press to temporarily mute the system.
   a. Pressing the volume up or down buttons must also unmute the system.
   b. “No Sound” function must mute all audio coming from the system including any microphone currently set to "Use." All current “Use” or “Don’t Use” states must be cached at this point.
   c. When "No Sound" is turned off, all microphones should be restored to the cached "Use" or "Don’t Use" state they were in prior to "No Sound" being activated.
   d. Un-muting any source by pressing the “mute” button or changing the volume must explicitly place “No Sound” to the “not on” state. Cached states are to be overwritten the next time “No Sound” is set to “on”.

e. No Show – Press to temporary stop sending image to projector

Second Row
f. PC – Switches to the computer source
g. DOC CAMERA – Switches to the document camera
h. LAPTOP – Switches to the laptop connection
i. DVD – Switches to the DVD player
j. VCR – Switches to the VCR

Third Row
k. Play symbol – Press to start playing a DVD or VHS tape, press again to stop
l. Pause symbol – Press to pause a DVD or VHS tape
m. Rewind symbol – Press to skip rewind VHS tape or skip backwards on a DVD
n. Fast Forward symbol – Press to skip forward on a VHS tape or DVD
o. MENU – Brings up the DVD menu
p. Directional buttons control DVD navigation functions

Appendix C

Podium Drawings (CTSG-038)

1. Adjustable Height – Left Shelf
CUSTOMER APPROVAL SHEET (NSDS)

Product Type: Custom
Quote #: 197386/Dalo

Item #: 55178-2012
Phantom Product: Ref Item #: 55179-20103

Description: Honors Lectern, Surround, CC700, 1.75” Dia. Hole, FMPMB

<table>
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<tr>
<th>Variable</th>
<th>Options</th>
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<tbody>
<tr>
<td>Laminiate</td>
<td>Fusion Maple 7900-60 TT</td>
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<tr>
<td>Edgeband</td>
<td>Fusion Maple 3MM</td>
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<tr>
<td>Metal Finish</td>
<td>Black</td>
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<td>Lectern Style/OB Cutouts</td>
<td>Surround</td>
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<tr>
<td>Shelf</td>
<td>Flip Up Shelf Left</td>
</tr>
<tr>
<td>Rack Options</td>
<td>Slide-In Rack Cube</td>
</tr>
<tr>
<td>Logo Panel Option</td>
<td>NONE</td>
</tr>
<tr>
<td>Installed Core Pwr Module</td>
<td>None</td>
</tr>
<tr>
<td>Cove Color</td>
<td>No Core/Color was Selected</td>
</tr>
<tr>
<td>Custom/Additional Cutouts</td>
<td>Worksurface Cutout CUSTOM CC700 &amp; 1.75” Dia. Hole</td>
</tr>
</tbody>
</table>

Cut Out Details(1): CC700
Cut Out Details(2): 1.75” Dia. Hole

Shock Mount for Shure Mic

Logo: n/a

Original Artwork: n/a

Other Notes:
1) Location of CC700 to fit into cutout in secondary worksurface (2018 Lookbacks)
2) 
3) 

**Internal Use Only**

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E-mail: spectrum@spectrumfurniture.com | Web site: www.spectrumfurniture.com

S:\AXAPTA DOCUMENTS\Adapta Document Storage\Customer Approval Sheets00475059

1 of 2 F-720-004-F
By signing the Customer Approval Sheet the customer agrees that all changes listed above are correct.

No orders for non-standard products will be accepted without a signed Customer Approval Sheet.

Please submit both pages of this approval sheet when returning to Spectrum.

**Non-standard products are non-returnable, non-refundable and can require a lead time of up to 6-12 weeks depending on the complexity of the changes and the time of year.**

<table>
<thead>
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2. Left Shelf
3. Right Shelf

![Diagram of Right Shelf]

Article CTSG-038; Version 1; Last Revised 10/22/2019
Appendix C

Non-Standard Rooms (CTSG-040)

1. Towson City Center 209:
   a. Primary image duplicated on 2nd projector.
   b. Dual image button will project secondary image on other projection screen.
   c. Small display on monitor on podium shows instructor camera.
   d. Rear display mirrors primary source.
   e. Rear display shows distance learning location during video conference.
Lecture Capture Scenario for Cisco Codecs (CTSG-041) (Retired)

1. The "Record" hard button will be pressed on the touch panel

2. Client will be prompted for a pass code

3. A screen with a Qwerty keyboard will come up asking the client to "Enter your NetID to start recording:" (the crestron will need to be programmed to add "@video.towson.edu" to the end of whatever is typed). Paul will follow up with exact command. The command for number 3 will be "xCommand Dial Number:netid@video.towson.edu Protocol:Sip CallRate:4000<LF>" where netid will replace by keyboard entry.

4. A back button must be present to go back to keyboard screen if something is miss typed.

5. A stop recording button must be available to hang up the call. There must be a confirm dialog box before actually stopping the recording. The confirmation must use the general design of the message presented to the user when they press Finish to shut down the system. Use “Are you sure you want to stop recording?” for the verbiage and include Yes/No buttons, as with the Finish confirmation.
Tracking Log

11/09/2018 – Updated all instances of DMPS3-4K-300-C to DMPS3-4K-350-C

1/11/2019 – Updated fire alarm/annunciator restrictions

1/24/2019 – Updated logos

2/07/2019 – Updated Adjustable Height Podium documentation

4/08/2019 – More clearly defined “No Sound” functionality

5/15/2019 – New dual image standard

6/20/2019 – New Cable Cubby standard

7/24/2019 – Added Cameo C2N-CBD-P-W-T

8/26/2019 – Updated Display Select Page

11/11/2019 – Added Updated Display Control Page

11/26/2019 – Added camera presets, Interactive Display heading, default source switching, and Cleartouch Source button.