Service Manual: Connection Guide

Integrated Digital Surgical Suite

Prepared by: Matthew Gonsalves
Client: Massachusetts General Hospital – GI
Rev: 1.0 | February 2012

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IDSS Rack Layouts

The IDSS rack is comprised of 4 customizable modules (Video, Audio, Print/Record and Video Teleconferencing), all controlled by an intuitive touch-panel interface. The components included in your customized versions of Black Diamond Video's IDSS solution are depicted below.

Pedi- Endoscopy Rack / GI Rack

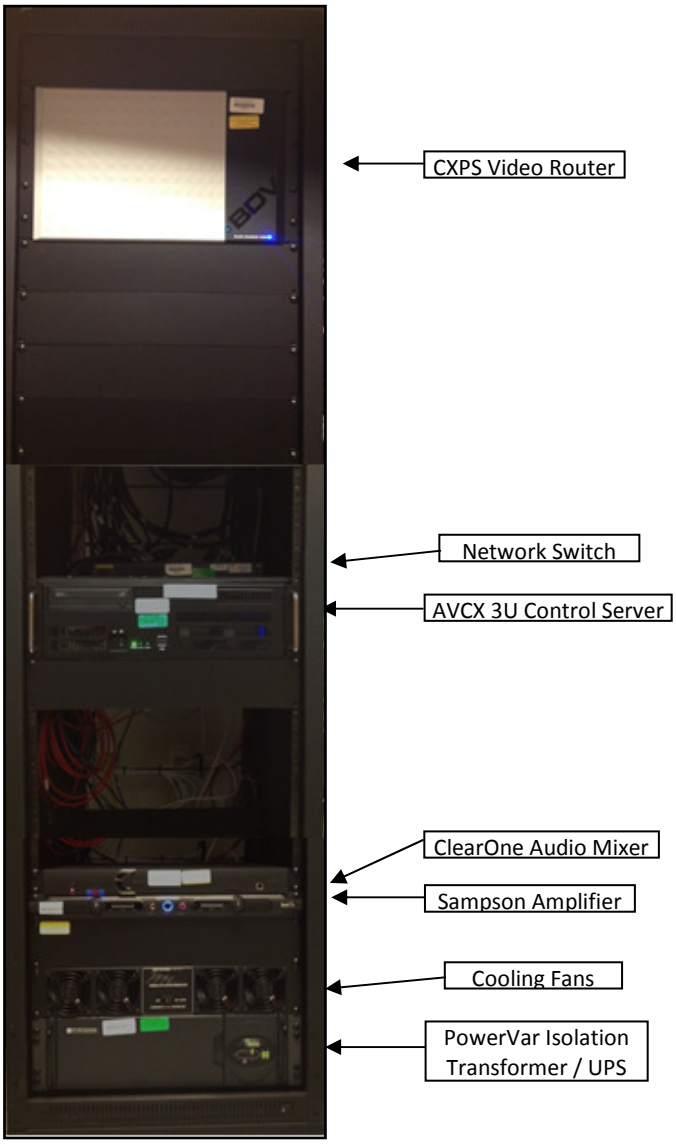

Figure 1: Example IDSS Rack Layouts at MGH - Endoscopy

Hospital PC Video Integration

Each hospital provided PC that is integrated as an input into a Black Diamond equipped room is connected as depicted below. The video output signal from each PC is split with one signal connecting to a designated PC display and the other feeding into an input port on the CXPS video router. Network and power supply are connected at ports located underneath the workstation desk.

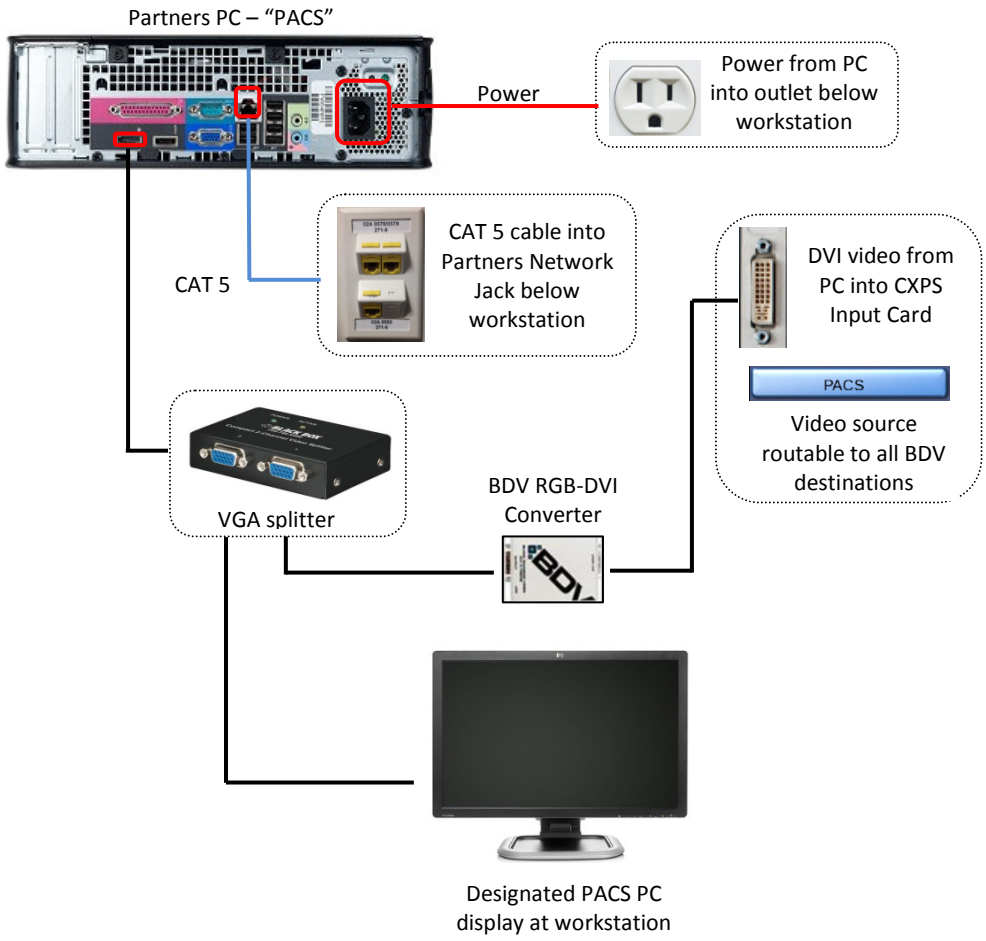

Figure 2: Partners PC Installation & Integration in BDV

Provation PC Integration

The Provation PC supplies an input to and receives an output from the CXPS video router. After a series of signal conversions, the CXPS output enters as the video input to the PC video capture card and can then be utilized to grab and document images via the Provation software. The video output from the PC, which includes the video capture card input (Provation software), is split in two using a VGA splitter. One signal enters into a CXPS input port as a routable video source and the other is feed directly to the designated PC workstation display.

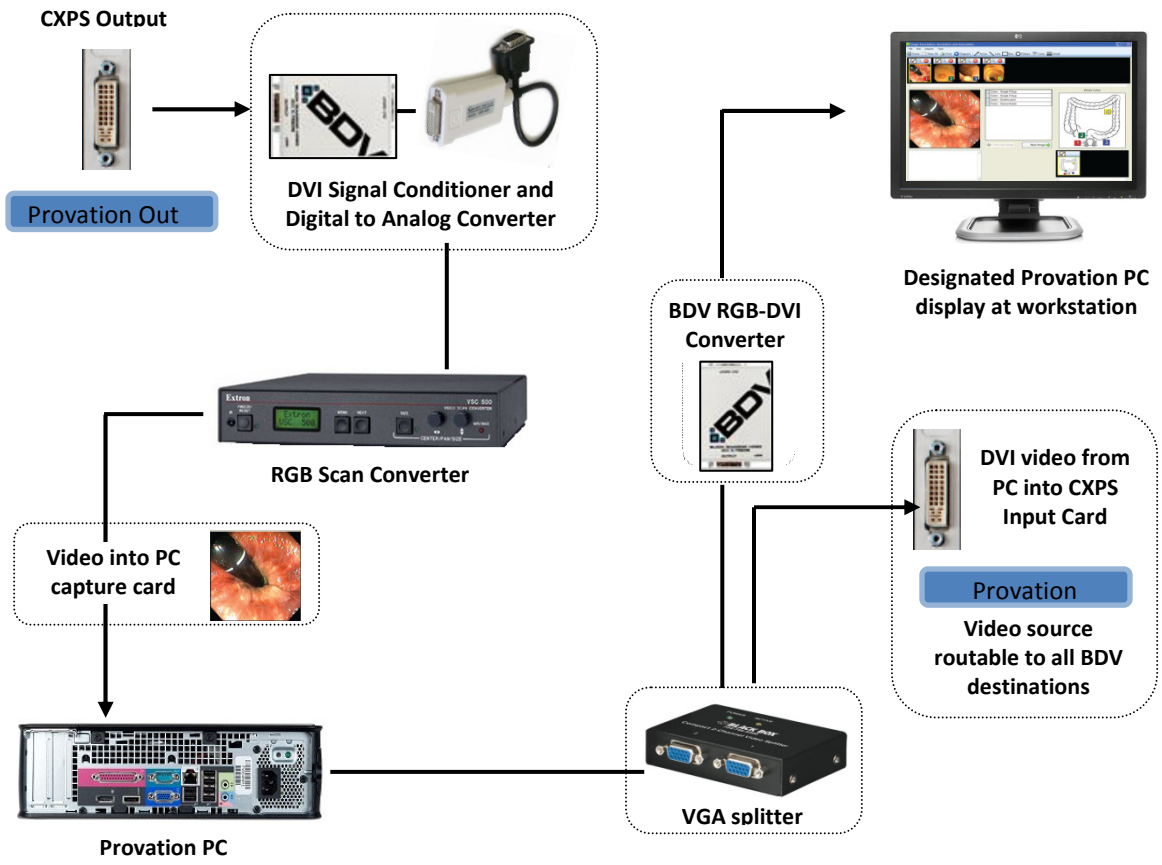

Figure 3: Provation PC Input / Output Video Integration

USB Touch Screen & Printer Extension

All touch screen and printer communication is provided over CAT 5 by the single USB port Icron 2101 extender. Each touch enabled display is connected to a regional extender (REX) that is powered from the rack. The remote extender is connected to a local extender (LEX) and terminates at the application server providing the control interface video to the display.

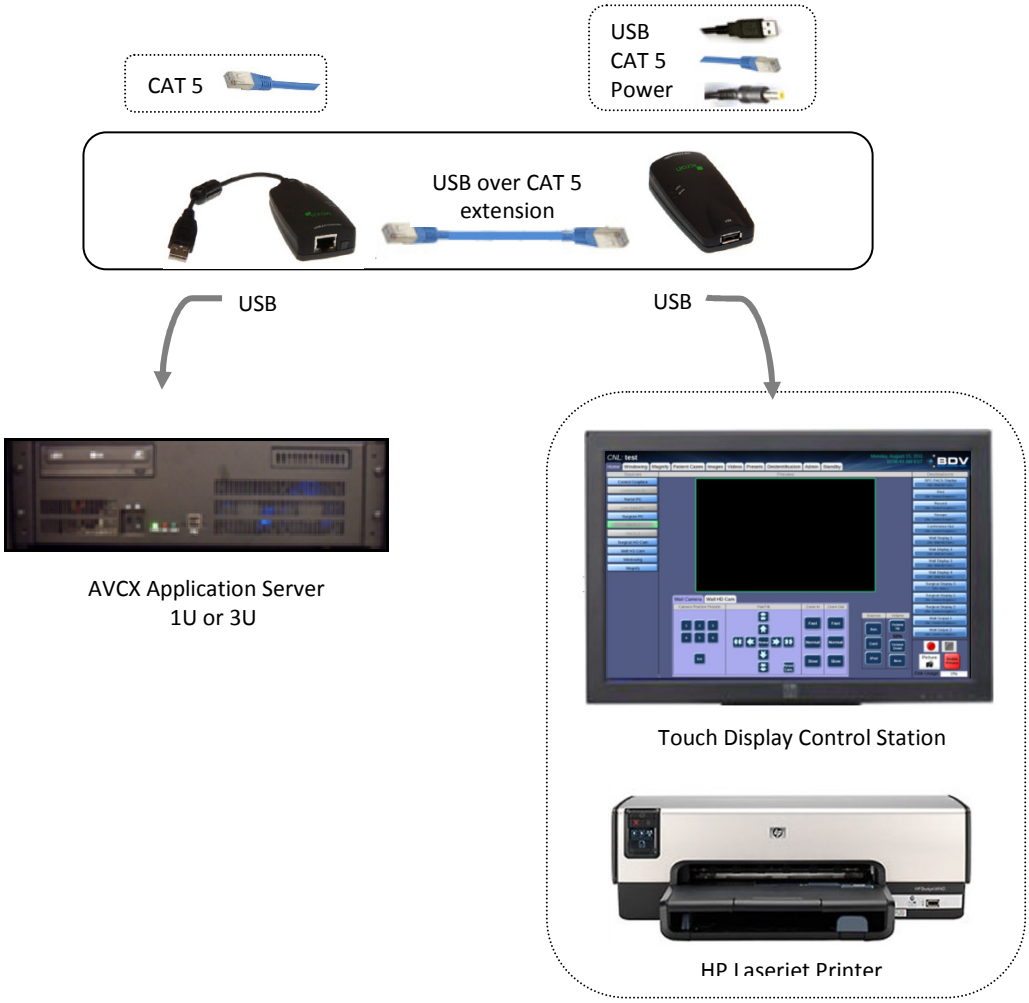

Figure 4: Touch Screen & Printer Extension via CAT 5

Server / Device Communications

Communication and control of applicable devices is achieved via an 8-port serial breakout cable and card installed in the AVCX 3U control server. Each device is connected to a specific breakout cable and controlled /communicated to through an RS-232 port and protocols. Noted below are the serial breakout cable numbers (P#) connected to each device.

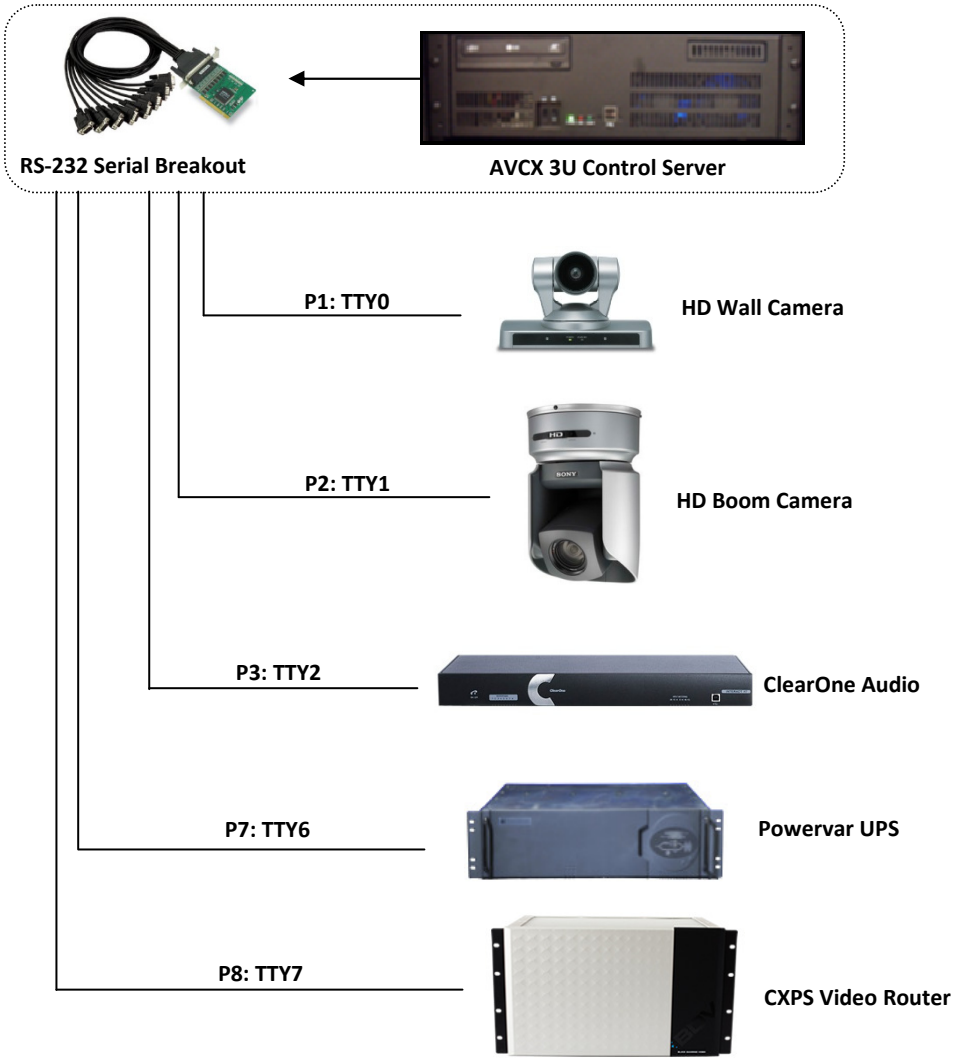

Figure 5: Serial Breakout Cable Connection Diagram

OR Camera Integration

Room 1A has a HD boom mounted and HD wall camera available to view, route, and control from any of the BDV user control stations. The video output feed from each camera is input into the CXPS router and appears on the user interface as a routable source. Please note that the HD boom camera video output is RGB and requires conversion to DVI via a BDV RGB-DVI converter. Camera control is achieved via RS-232 connections from the device to a serial breakout cable on the AVCX 3U server.

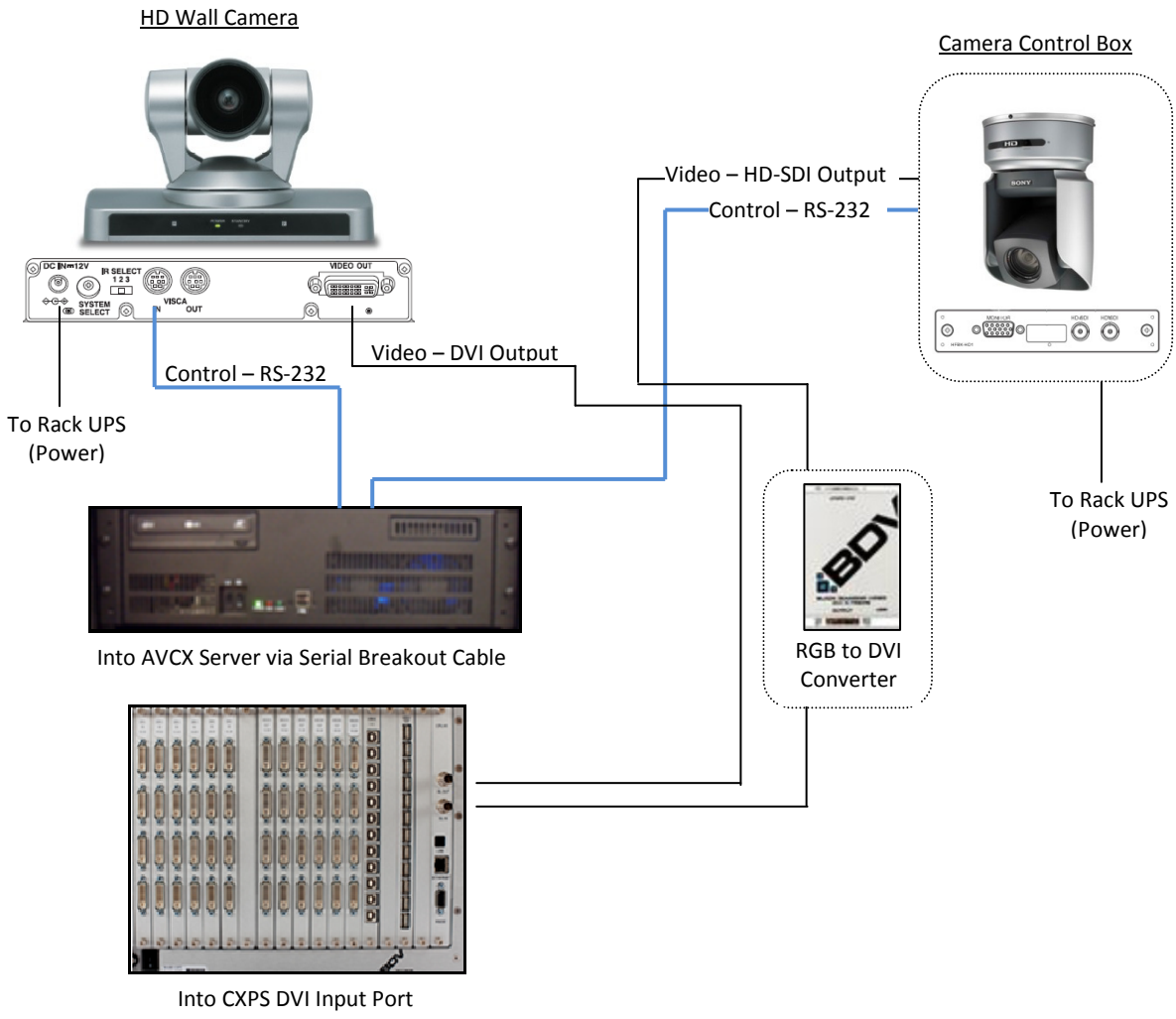

Figure 6: Camera Control / Video Connections

Picture and Video Capture

Active video sources can be sent to either the print destination for capturing stills or the record destination for recordings. The print and record destinations correspond to specific output ports on the CXPS that feed into capture cards located inside the AVCX 3U server. The capture cards are programmed specifically for the incoming CXPS output and store the image and video files on a local 1 Tb hard drive. Capturing stills and recordings can also be remotely trigger via 3.5 mm stereo cables from the trigger enabled device to BDV accessory inputs located on the boom.

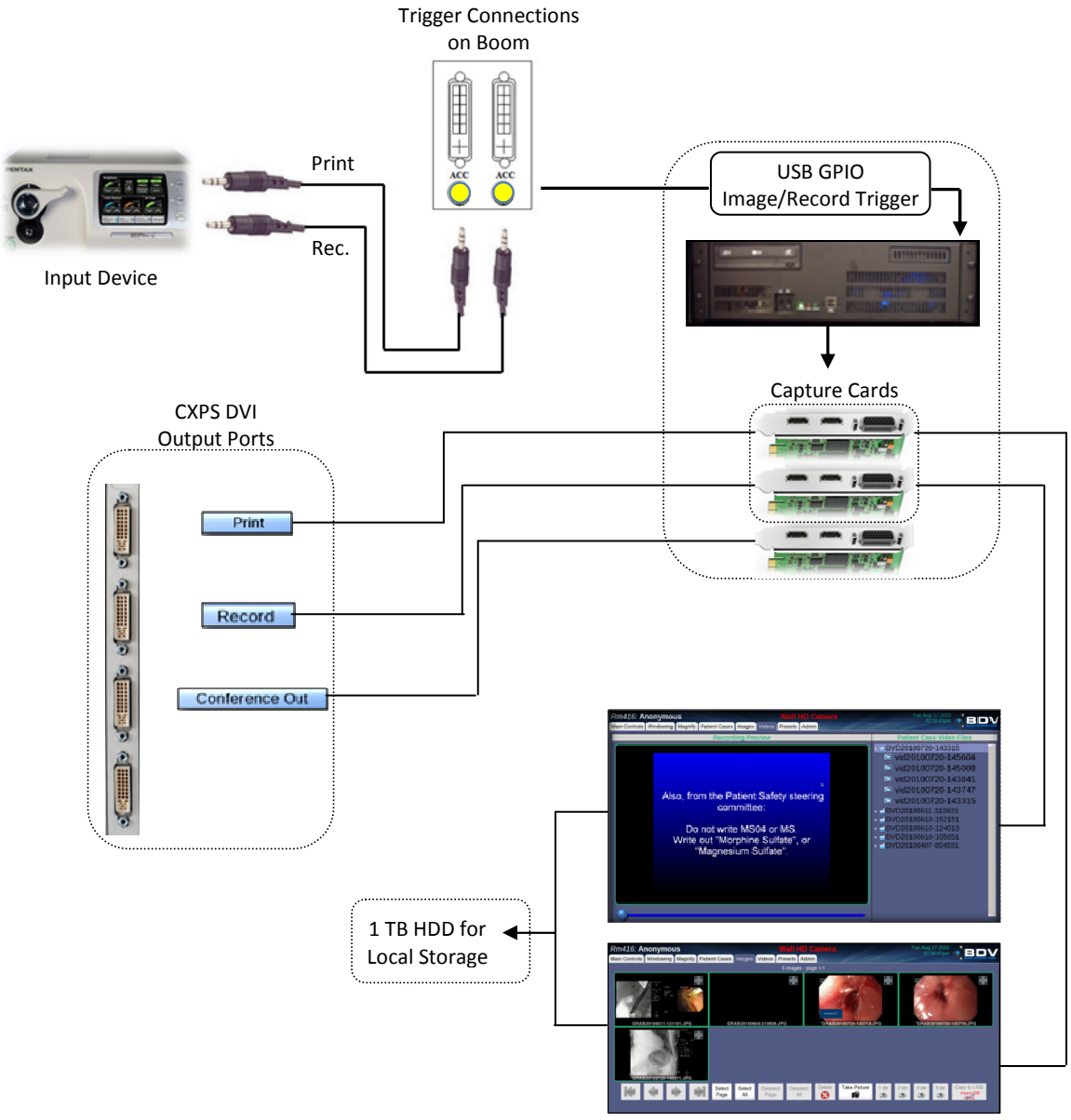

Figure 7: Capturing Stills / Recording Video with Remote Trigger

Audio Matrix Connections

Audio inputs and outputs are all connected to a central audio mixer. The mixer comes with software that enables programming of inputs/output gating as seen below. To access matrix gating controls click the ClearOne mixer icon in the center of the screen after connecting to and launching device software. The provided software, Interact, can be downloaded on the product website www.clearone.com. The diagram below depicts audio connections and channel gating in Pediatric Endoscopy room 1A

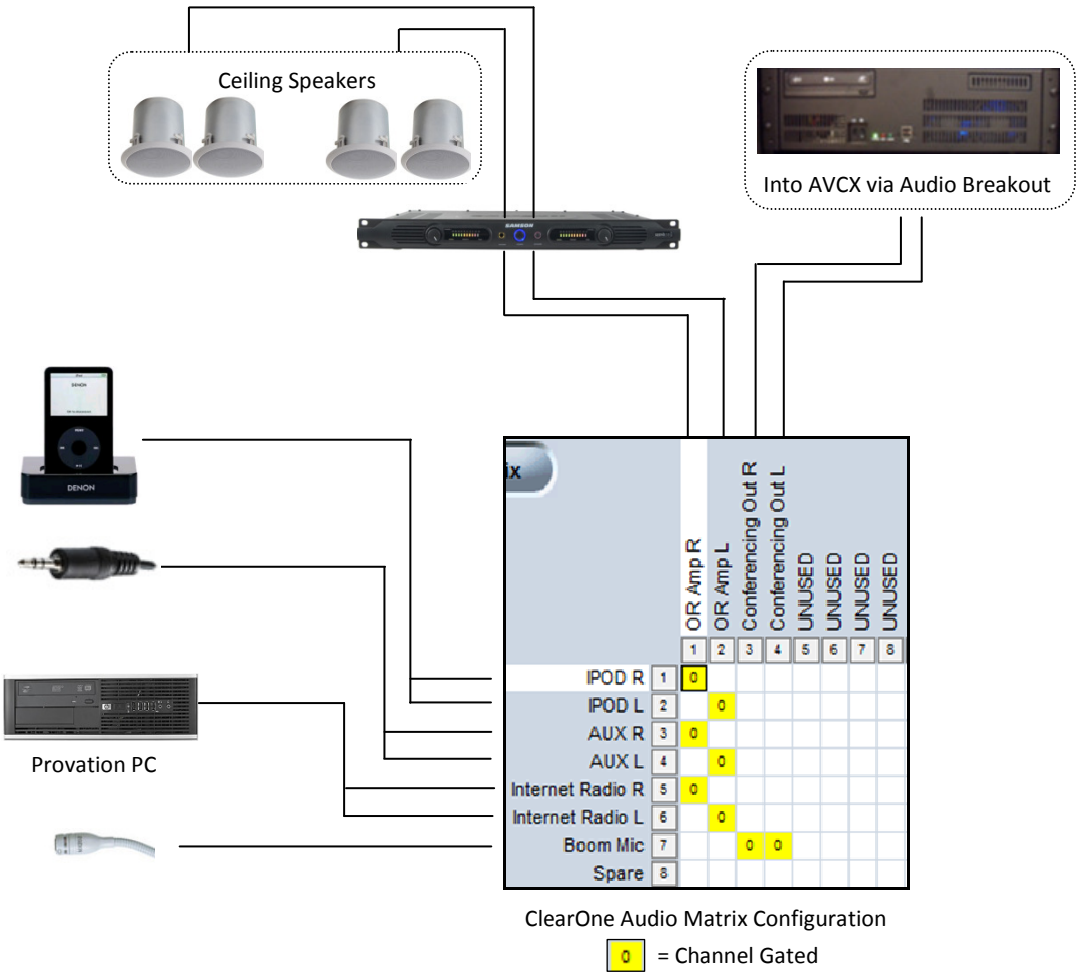

Figure 8: Audio Mixer Connections and Gating Diagram

ClearOne Audio Matrix Configuration

Further adjustments can be made to the in-room audio via the provided audio mixer software. Input audio course and fine gains, processing, power, and gating can be adjusted by clicking on the microphone icon next to the list of available inputs. Output audio levels can also be adjusted by clicking on the output icon located next to the list of available outputs.

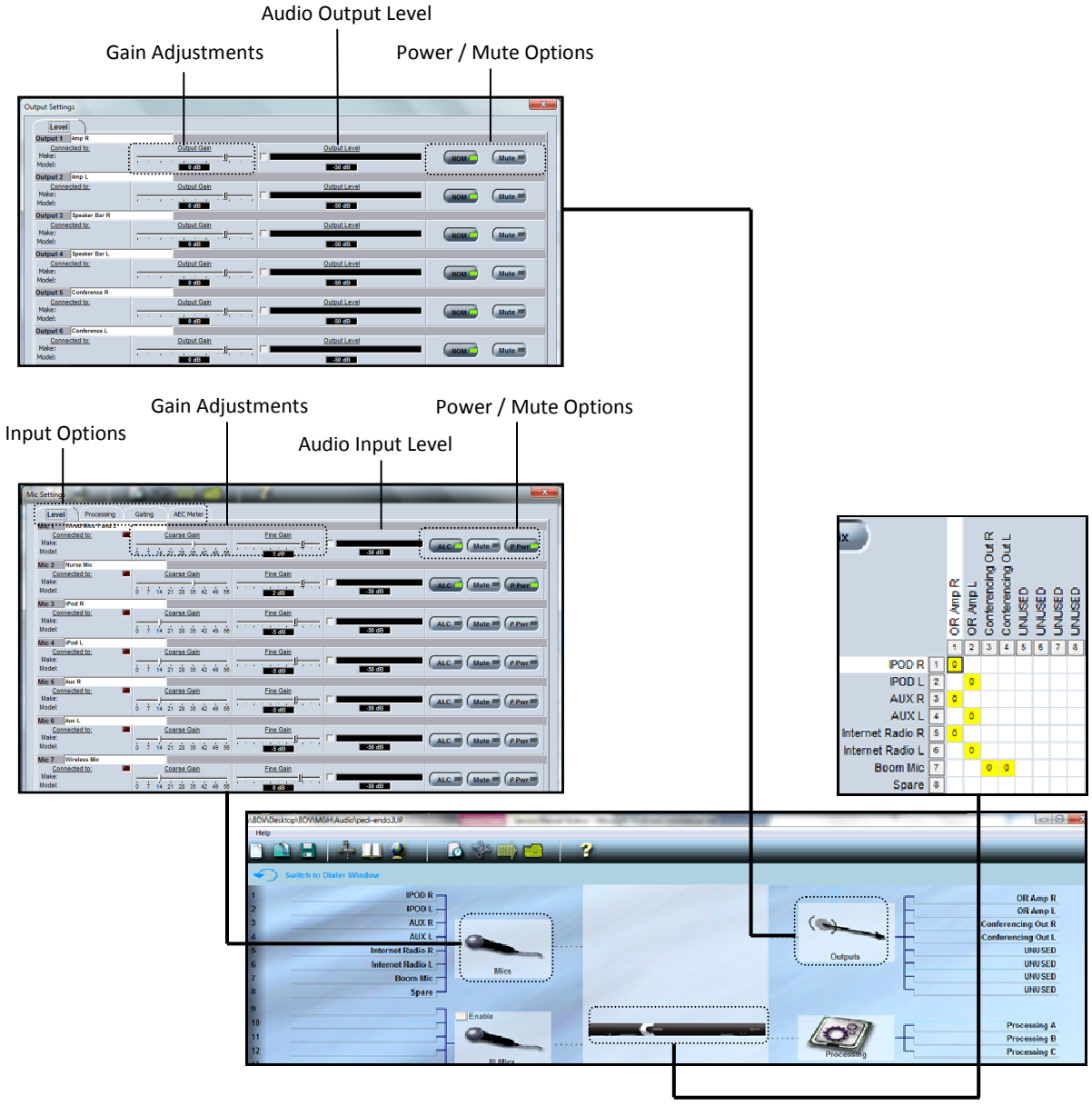

Figure 9: Audio Mixer Configurations via Interact Software

Windowing Video Sources

Image processing for multi-source windowing occurs at the output end of the CXPS router. The constructed windowed image is then feed back into an input of the CXPS where it can then be routed to any chosen destination (CXPS output). Any alterations of the windowing configuration will take place immediately and seamlessly, affecting any destination in which windowing is currently routed to.

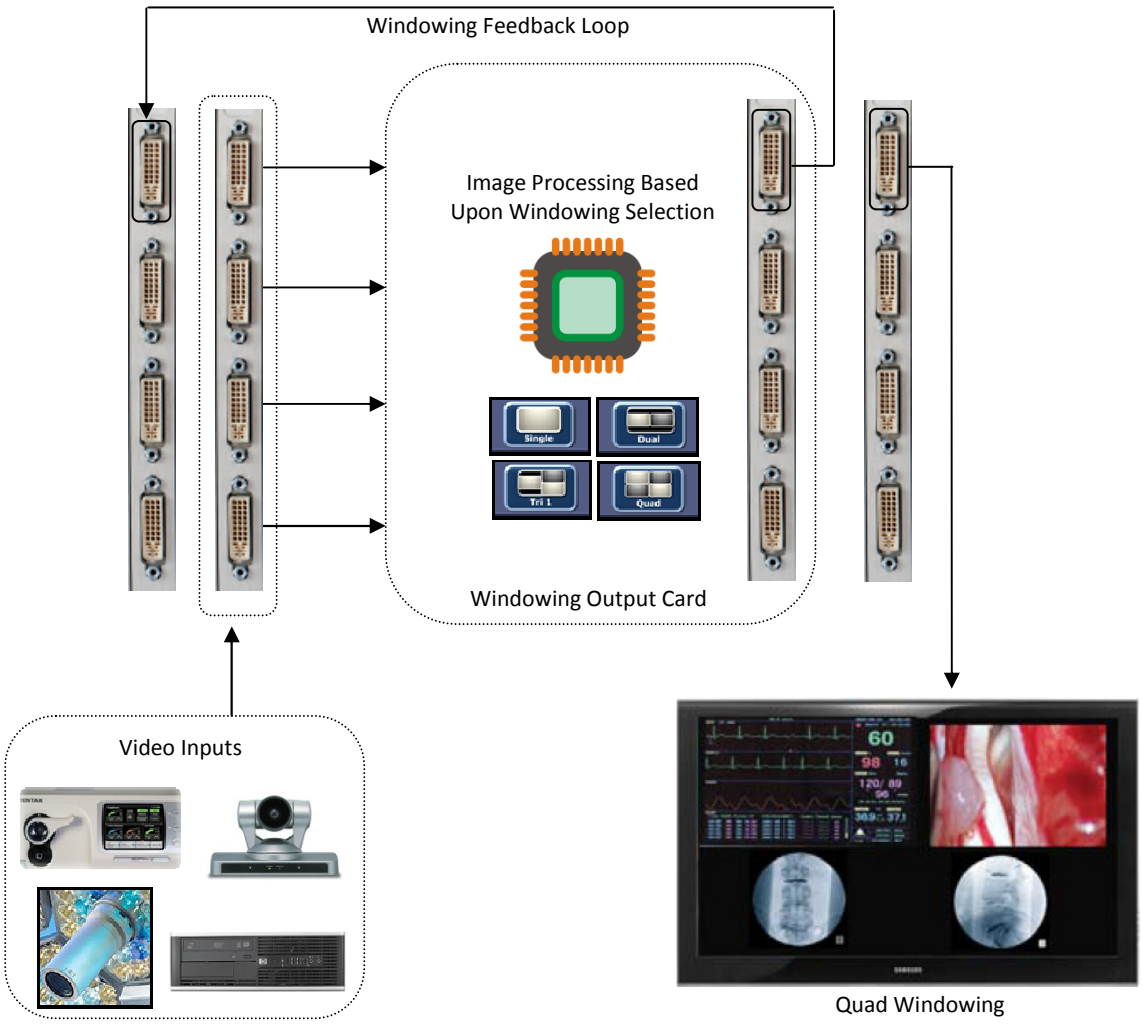

Figure 10: Multisource Windowing Processing and Display

Video Conferencing

Audio and video to be conferenced out are input to the AVCX 3U server containing BDV's Sapphire conferencing solution. Sapphire-QHD1 is compatible with all major conferencing systems that can support SIP and H.323 protocols, including Polycom, Tandberg, Codian, and Sony. Audio and video communications are achieved over the hospital IS network.

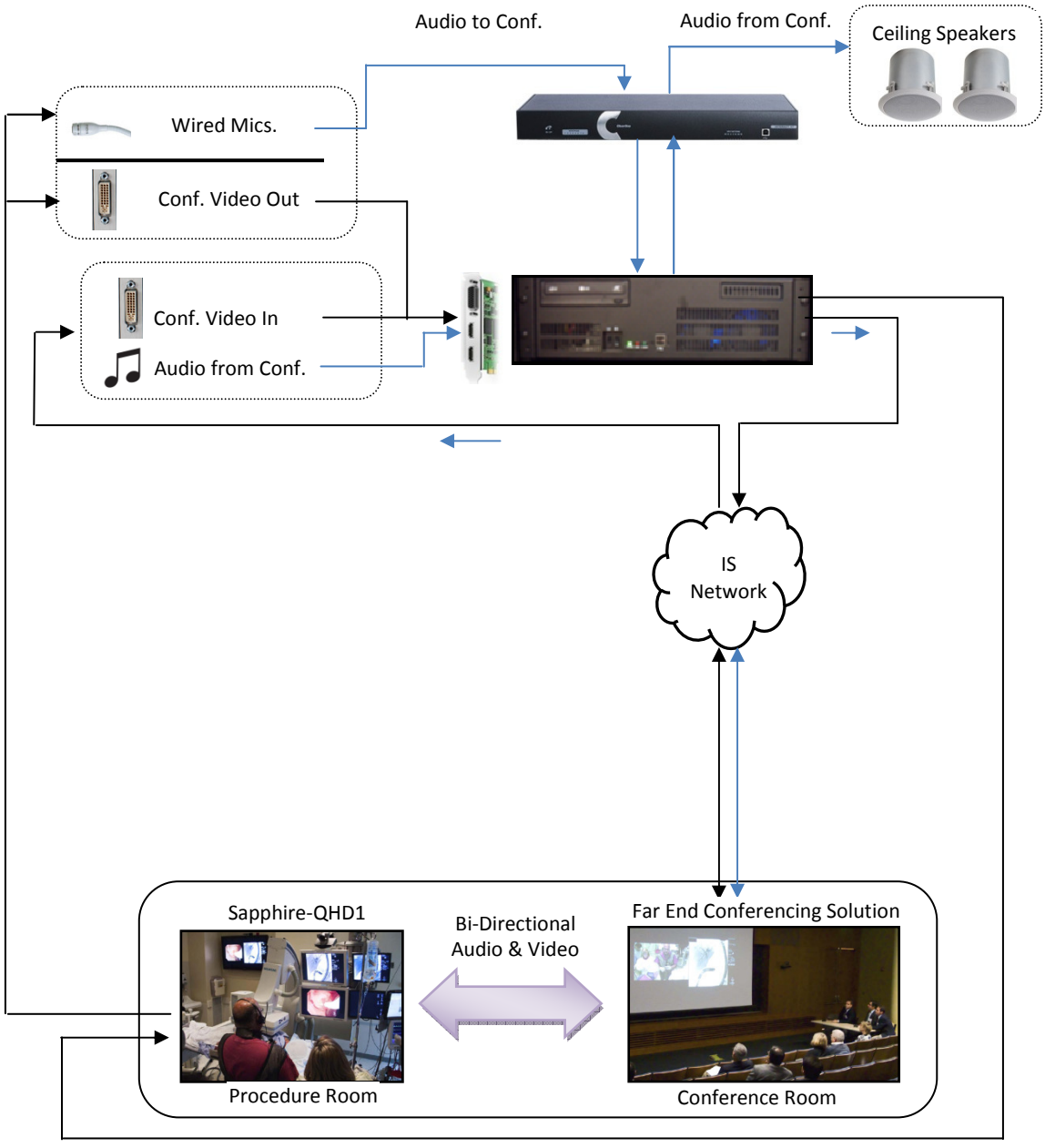

Figure 11: BDV Video Conferencing Connection Diagram

Surgical Display Settings

All Foreseeson 26'' surgical touch and non-touch displays have adjustable display, input, and viewing properties. To access the display adjustment interface press the MENU button on the lower front right side of the display. Below is a listing of the default settings used by BDV for all Foreseeson displays. Due to the length of video cable to the displays a signal conditioner box is installed prior to DVI signal termination at the display.

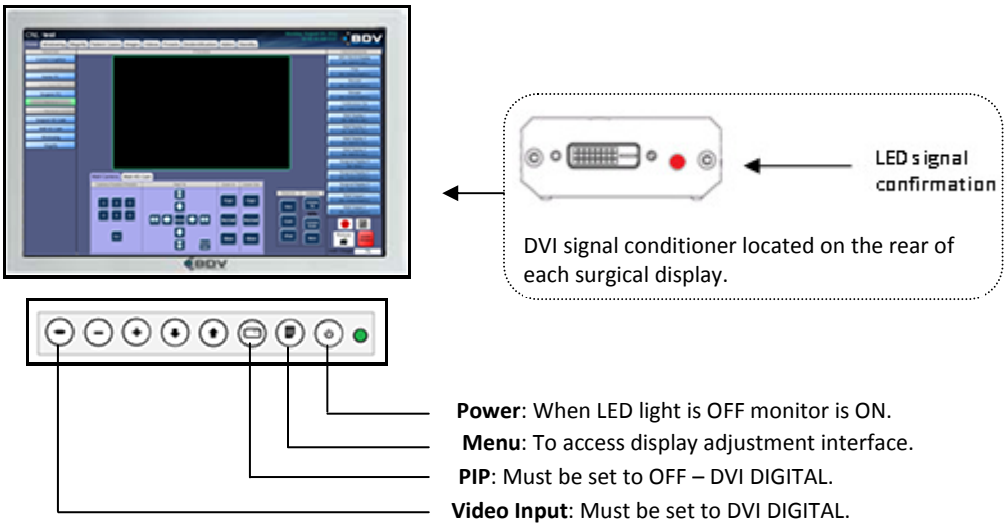

Figure 12: Foreseeson Surgical Display Settings

MENU: ADJUST

Brightness: 50
Contrast: 50
Backlight: 100

MENU: COLOR TEMP

Color Temp: C1

MENU: IMAGE

Red: 50
Green: 50
Blue: 50

MENU: SETTINGS

Image Size: Full
Gamma: 2.2
Filter: Normal
Over Scan: 0
Image Setting: Preset 1
Zoom/Pan: -
Freeze Frame: OFF

MENU: PIP

PIP Mode: Single

Wall Display Settings

All Samsung 55'' wall displays have adjustable display, input, and viewing properties. To access the display adjustment interface press the MENU button on the lower front right side of the display or on the provided remote control. Below is a listing of the default settings used by BDV for all Samsung wall displays. Due to the length of video cable to the display a signal conditioner box is installed prior to DVI signal termination at the display.

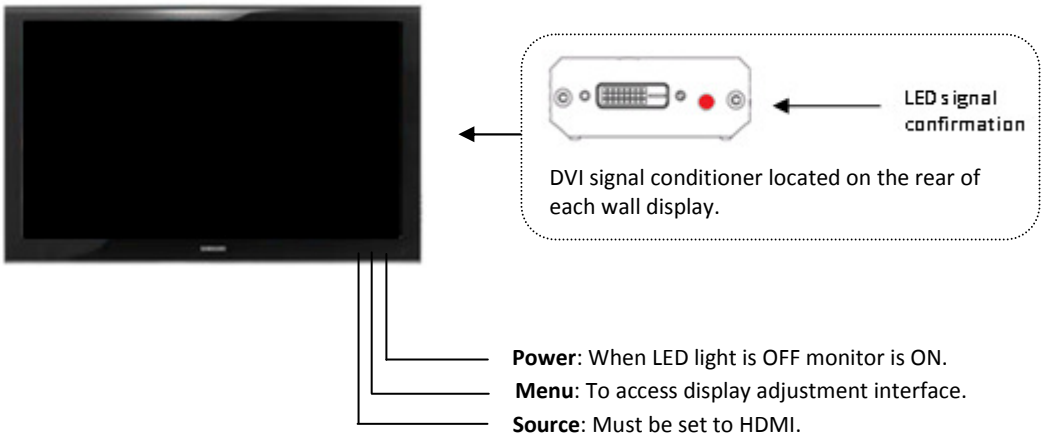

Figure 13: Samsung Wall Display Settings

MENU: MODE: ADVANCED SETTINGS

Black Tone: OFF
Dynamic Contrast: OFF
Shadow Detail: 0
Edge Enhancement: OFF
Expert Pattern: OFF
RGB Mode: OFF
Color Space: Native
Flesh Tone: 0
LED Motion: OFF
Gamma: 0

MENU: MODE: PICTURE OPTIONS

Digital Noise Filter: OFF
MPEG Noise Filter: OFF
HDMI Black Level: LOW

MENU: PICTURE

Brightness: 45
Sharpness: 0
Contrast: 100
Backlight: 20
Color: 50