



## **Cisco StadiumVision Video Endpoint (DMP) Design and Implementation Guide**

**Includes Planning, Deployment, Troubleshooting and more**

**Release 2.3**

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# About this Guide

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This document provides guidelines and techniques for designing, planning, implementing, and operating the video delivery component of StadiumVision. It includes information on how to deploy Digital Media Players (DMP) in a StadiumVision venue, best practices for enabling the cable connections that control TVs, and how to configure DMP settings for optimal display.

## Audience

This document is intended for StadiumVision technical engineers and product managers. Additionally, technical sales and marketing people can use this document as a master reference guide when helping customers understand and order the components they need to enable video delivery for their StadiumVision solution.

## Related Documentation

For additional solutions deployment documentation, refer to the documentation on Sharepoint at:

<http://team.cisco.com/sites/stadiumvision/svfield/svdocs/r23/default.aspx>

The Sharepoint site can be accessed only by Cisco internal employees. Contact your primary Cisco StadiumVision representative to obtain additional StadiumVision solutions documentation.

## Document History

Table 1. Revision History

Date	Revision	Author	Comments
9/1/2010	Draft 1	Debbie Morrison	Initial Draft
9/13/2010	Draft 1.1	Debbie Morrison	Incorporated Steve's comments
2/28/11	Final 1.0	Steve Schubert	Updated for StadiumVision Release 2.3
3/3/11	Final 1.0a	Trish McBride	Edited and posted to Sharepoint.
3/7/11	Final 1.0b	Steve Schubert	Updated DMP naming convention section

## What's New in Release 2.3?

Release 2.3 includes enhanced video delivery services and functionality. Refer to the [StadiumVision Release 2.3 Release Note](#) for a description of additional features available in Release 2.3.

## Supported Software and Caveats

Refer to the [StadiumVision Release 2.3 Release Note](#) for information about the supported DMP software and firmware as well a list of caveats.

# Chapter 1 Overview

---

StadiumVision is a proven, end-to-end, high-definition IPTV solution that is implemented on top of a Cisco Connected Stadium network and provides advanced video content management and delivery. It is a centrally managed, video processing and distribution solution that enables the integration and automated delivery of customized and dynamic content from multiple sources to different areas of the stadium in Standard Definition (SD), High Definition (HD), or both.

StadiumVision is purpose-built for sports and entertainment venues, which have extensive video systems deployed throughout, and is designed to enhance the viewing of live events and to provide in-house advertising. In addition, it leverages video systems in restaurants, clubs, and luxury suites to allow fans to view both in-house programming as well as external network channels.

Cisco StadiumVision can help sports executives and venue operators:

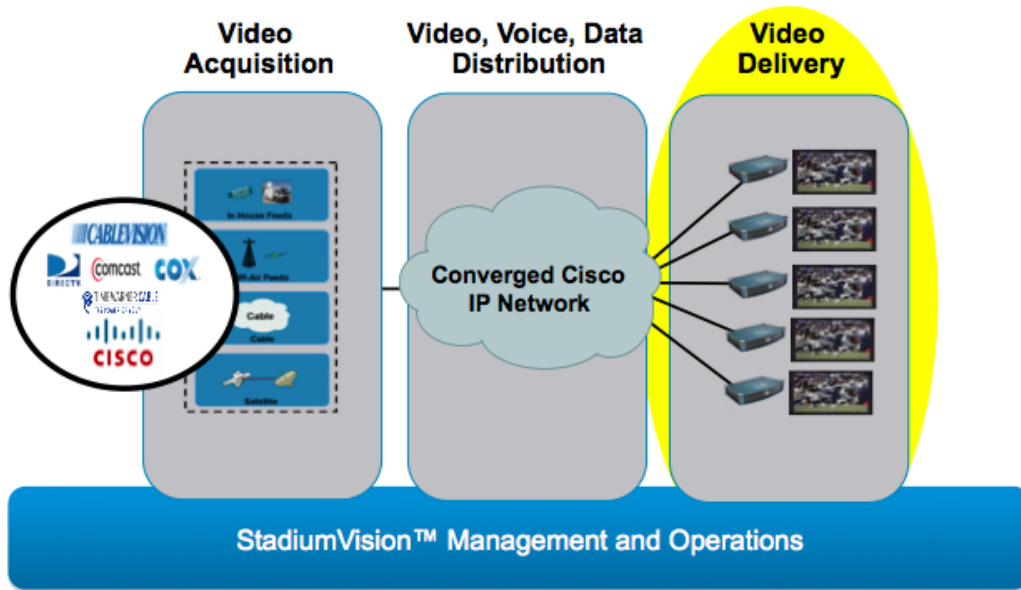
- Create personalized experiences to increase fan loyalty, differentiate the venue, and extend their brand.
- Enable new, revenue-generating applications for advertising, ticketing, merchandising, and concessions.
- Gain the flexibility to easily support new types of events.
- Streamline event-day operations, improving staff productivity and responsiveness.
- Create more secure, efficient, and cost-effective venues.

## StadiumVision Components

StadiumVision comprises four major components, as shown in Figure 1:

- Video acquisition (or video headend)
- Converged voice, video, and data high-speed IP network (Cisco Connected Stadium network)
- Video delivery (and signage playback)
- Centralized management and operations

Figure 1. StadiumVision Major Components



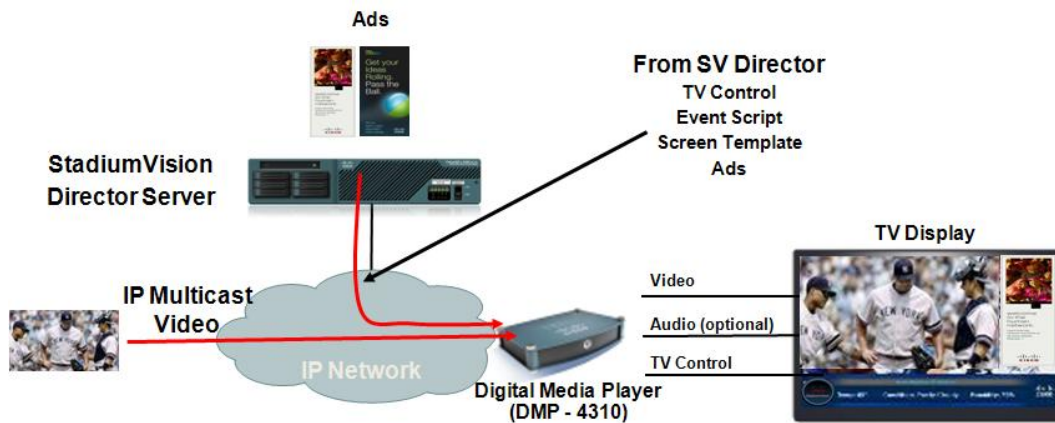
This design and implementation guide focuses on the video delivery component (highlighted in yellow in Figure 1), which is comprised of DMPs and their connections to control TVs. The video delivery component of StadiumVision enables central control of the TVs and other video displays throughout the venue using a Cisco Digital Media Player (DMP).

## Video Delivery Overview

Each TV requires a DMP that is individually addressable for targeted ads and content. The DMP combines HD video and signage, and is centrally controlled by the StadiumVision Director application. The video channel can be MPEG 2 or MPEG 4 video via IP multicast. The specific TV channel, screen template/ads, and the event script control what video is displayed. TV on/off, volume, etc. is controlled via an RS-232 connection between the DMP and TV. The DMP 4310G is powered via Power over Ethernet (POE) from the switch.



Figure 2. Video Delivery



## DMP 4310G Hardware

Each TV in a StadiumVision venue is connected to a Cisco DMP. The Cisco DMP is a highly reliable IP-based hardware endpoint for video decoding and playback of digital media content, including high-definition live broadcasts or on-demand video, flash animations, text tickers, and other Web content-across digital signs. It provides the interface between the local control devices, StadiumVision Director, the IP network, and the TV.

The Cisco DMP provides customized video to attached standard and high definition television displays and also provides administrative functions such as turning televisions on and off to save power.

Each DMP is individually addressable for targeted ads and other content, combining HD video and signage. Using Cisco StadiumVision Director – the centralized management system component of the StadiumVision solution – you can flexibly and remotely publish centralized content to networked digital displays. You can attach the Cisco DMP to virtually any on-premises digital TV at any location across the venue such as a concourse, club, luxury suite, or back office.

The DMP provides the following capabilities:

- High-definition (HD) media playback.
- Serial communication to the attached TV for control operations such as turning power to the TV on and off, volume control, contrast and brightness settings.
- Remote management of digital TVs.
- Full-screen, ad wrapped, and overlay video via multicast channel feeds.
- Advertising playlists, display signage, and ticker information throughout the event.
- RS-232 connections for control of virtually any market-leading digital TV.
- Power over Ethernet, eliminating the need for an additional power outlet and simplifying deployment.

## What Comes in the Box?

- HDMI cable
- RS-232 Cable
- IR Extender Cable
- Audio Cable
- License and safety documents

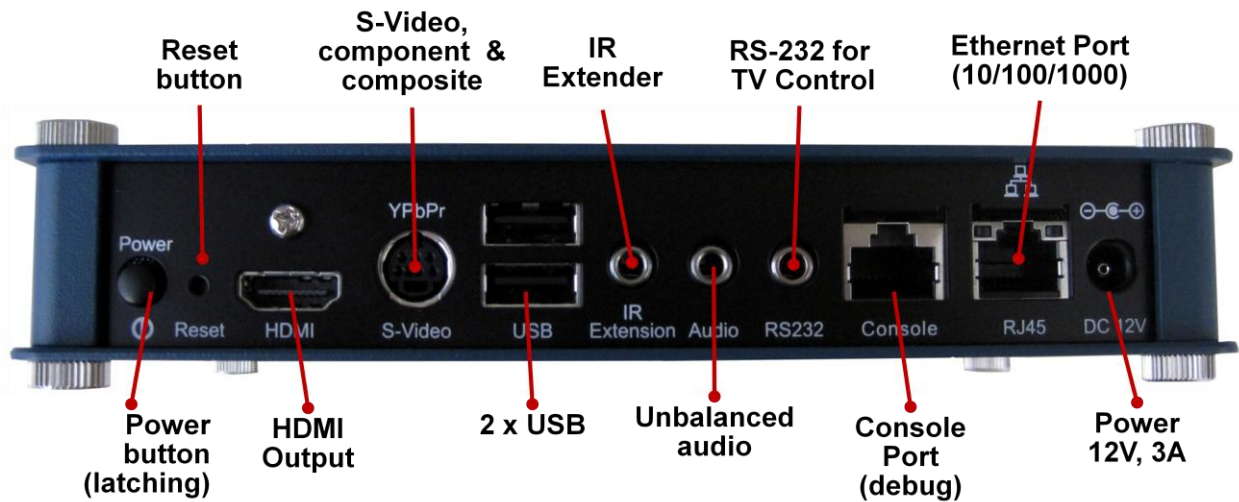
**Note:** Power Supply is sold separately.

Figure 3. Cisco 4310G Digital Media Player & IR remote



## DMP 4310G Rear Panel

Figure 4. Cisco 4310G DMP Rear View



# DMP 4310G IR Remote

Figure 5. Cisco 4310G DMP IR Remote

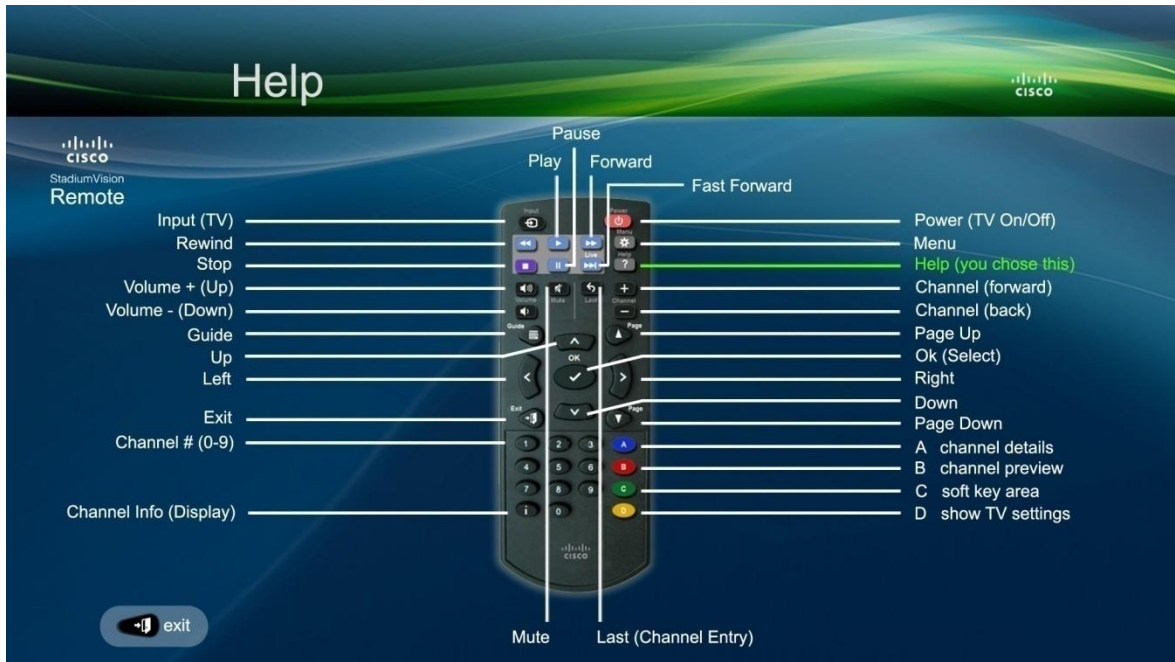


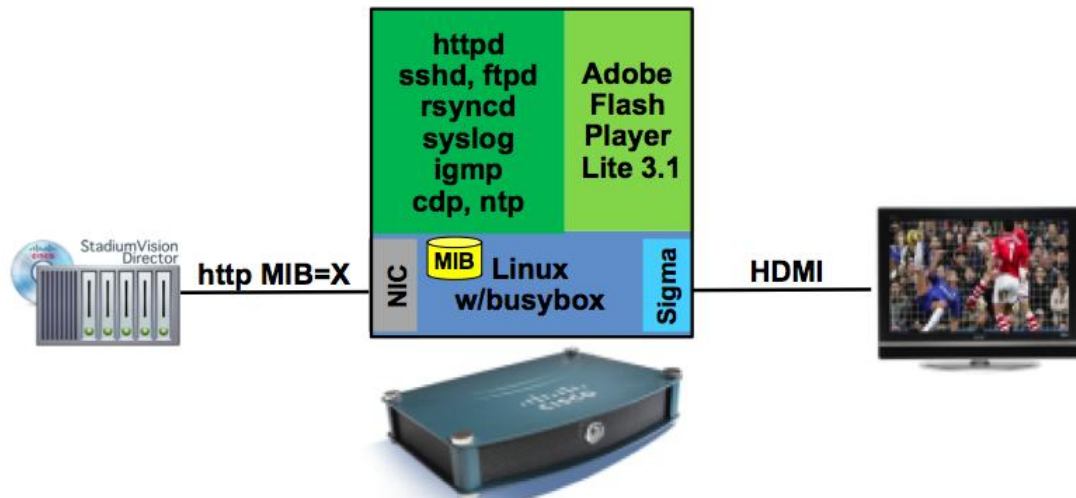
Table 2. IR Remote Button Map

Port	Usage
Power Button	Turns power to the DMP 4310G on/off. This is a latching push button.
Reset Button	Resets the DMP to factory defaults.
HDMI Output Port	19-pin HDMI 1.1, supporting up to 1080 p, progressive and interlaced video
S-Video Component and Composite	7-pin S-Video port supports both S-Video and Component. The S-Video only requires 4 pins. The Component requires 7 pins.
USB Ports	Connect to a USB device for additional ad or other storage. There is 32 GB onboard storage for the DMP 4310G.
IR Extender	3.5 mm IR Receiver Extension. Connects to a USBIR Extender to extend IR control. This is used in situations where the DMP is mounted behind the TV such that the IR sensor is not visible.
Unbalanced audio connector	3.5 mm stereo jack that provides an RS-232 audio connection.
RS-232 Port	3.5 mm jaco RS-232 serial connection for TV control.
Console Port (debug)	RJ-45 serial port for connecting to a console PC terminal. Cisco TAC use only and requires a special cable. The port does not work like a Cisco IOS Router console port.
Ethernet Port	10/100/1000 RJ-45 10/100 BASE-T Ethernet port
Power Port	12V, 3 amp power input. Connects the DMP 4310G to power. Note that the amperage rating for this port is different than the DMP 4305G power port. Do not connect a DMP 4305G power supply to this port.

# DMP 4310G Software Architecture

The DMP4310G is an embedded Linux device that uses a number of protocols for communication with StadiumVision Director and the Adobe Flash Lite player for mixing of the video and graphics that are displayed on the TV.

Figure 6. Cisco 4310G Software Architecture Overview



- **SWF = ShockWaveFlash**
- **SWF files are executable files that run in Adobe Flash Player.**

## Content Delivery

As illustrated in Figure 7, graphics and video are displayed by the DMP as follows:

1. The operator uses StadiumVision Director to push a flash template that is used for framing and displaying the ad graphics and video on the TV. There are two standard templates used: 1920x1080 for the DMP 4310G and 1366x768 for the DMP 4305G.

**Note:** The graphics are created to fit the specified template and are staged on the DMP. See the *Cisco StadiumVision Content Guidelines* document for details on the templates supported by the DMP 4310G and the DMP 4305G.

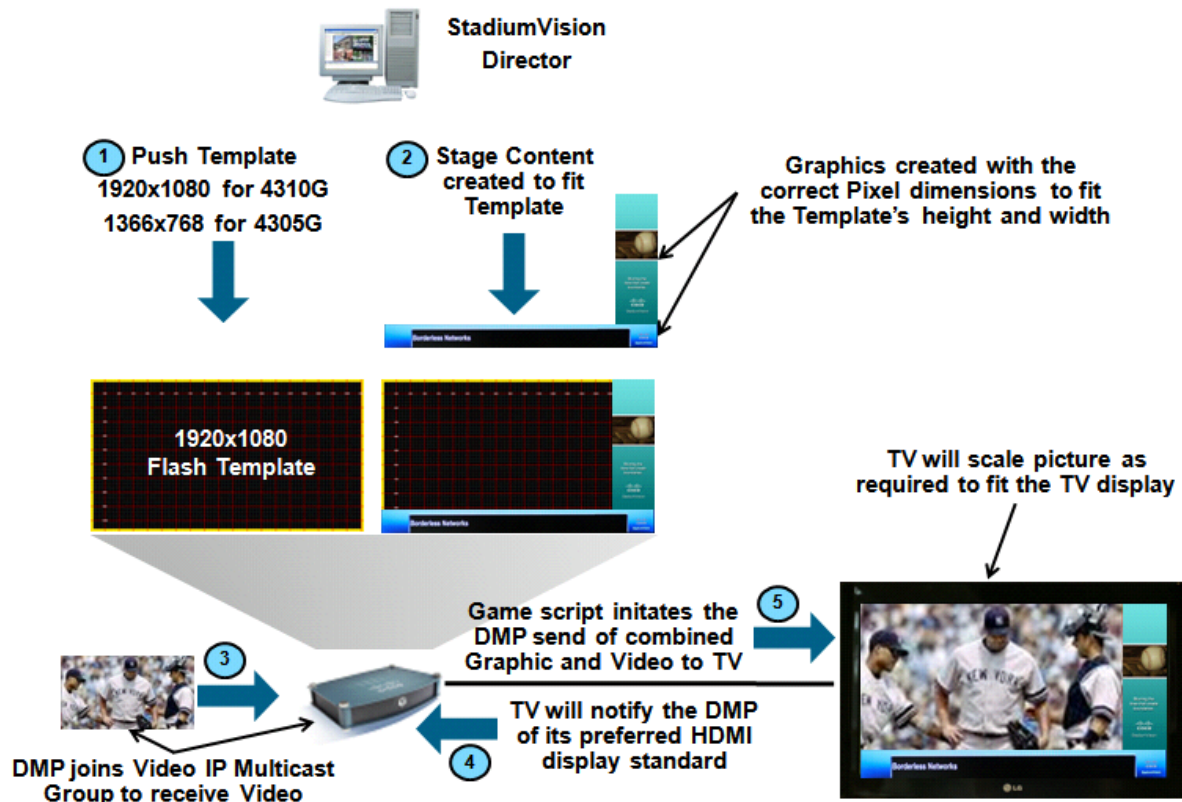
2. An event script is created that includes custom display layouts at different game states (pre-game, post-game, etc.). These display layouts are displayed on the TV during their specified game state.
3. Video channels from the head end are pre-provisioned on multicast groups and are available for playback on the DMP when the DMP joins the associated Multicast group.

- The TV notifies the DMP of its supported HDMI formats with its preferred format (i.e., the native resolution of the TV).

**Note:** The TV may support a format different from its preferred format; however, it will display a resolution no higher than its native resolution. The TV will scale the picture to fit.

- The DMP combines the graphics and video and sends it to the TV for display.

Figure 7. Displaying Graphics and Video on the DMP



# Chapter 2 Planning

This chapter covers recommended TVs for use with StadiumVision, DMP-to-TV connections, DMP mounting specifications, and video wall design considerations.

## TV Recommendations

In most cases, DMPs can use TVs that comply with modern, international standards. The following TV features and characteristics are recommended for a StadiumVision deployment:

- Display Technology: LCD
- Display Size: 32 in. or greater
- Video Input: HDMI or DVI
- TV Control: RS-232 (mandatory)
  - Automatic Volume Control (normalizes channel and commercial volume)
  - Discrete Power ON and Power OFF codes
  - Support for Discrete Volume/Mute Controls
  - Retrieve TV status (on/off, firmware ver., S/N, etc)
- Matrix Support: For Video Wall Support
- Wall Mounting: VESA compatible
- If Suite TV, Front AV inputs for other devices (e.g., Gaming system) and PC input for showing presentations.
- Digital, not analog.
- High-definition, not standard-definition.
- Commercial-grade, not consumer-grade. Digital signs and public IPTV installations run many more hours each day than a consumer-grade TV is engineered to run. A consumer-grade system is likely to fail years sooner than a Commercial-grade system would under these circumstances.



Most often, content is web-based or animated in flash. The nature of these media types means that some pixels are not updated frequently in digital signage. LCDs are less susceptible to burn-in than plasma displays are. Although image persistence is

sometimes a problem on LCD displays, it is almost always self-correcting and is unlikely to occur if you follow manufacturer guidelines for managing your displays correctly.

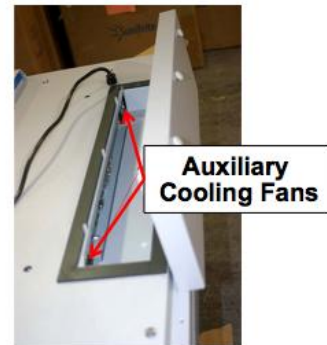
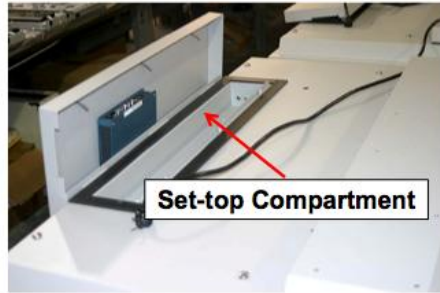
## Considerations When Purchasing a TV

- If using DVI for video and audio is required, you need separate audio wiring to the TV's built-in speakers or to an external sound system.
- If the TV is in a luxury suite and you want to allow customers to plug their PCs into the TV to make presentations, you need a PC input on the TV.
- If the TV is in a suite and you want to allow customers to connect external devices like a gaming system to the TV, purchase a TV that has easily accessible front video and audio jacks.
- If advertisement will be displayed along with video, for best visibility, purchase TVs with at least a 32-inch diagonal display size.
- If the TV is going to be part of a video wall, purchase a TV that has a matrix mode or is designed for use in a video wall and one with a small bezel to minimize the gap between TVs.
- Assuming the TV will be mounted on a wall, purchase TVs that are VESA mounting compliant.
- Remote control is very important when controlling hundreds or thousands of TVs. RS-232 control is recommended and also, the TV should have discrete RS-232 codes associated with operations like power on, power off, and absolute volume settings.
- Some TV displays provide the ability to lock-out control of the physical TV-setting buttons and this may be used to avoid setting errors by non-qualified personnel.
- If the TV will be mounted outdoors, displays that are built to withstand the elements should be purchased. TVs with weatherproof compartments for the DMP is also a way to avoid the cost of an additional enclosure.

# Outdoor TV Options

Figure 8. Outdoor TV Options

## Outdoor TV Options

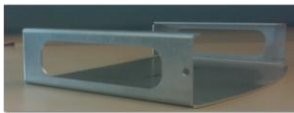


- Sunbrite 4610 – built-in set-top compartment
- Quad-fan Airflow System keeps the unit cool and dry in temperatures up to 122 degrees F.
- Internal Heater protects TV in temperatures as low as -24 degrees F.
- Water-tight Cable Entry System with pass-through design keeps cables dry and allows for easy hook-ups.

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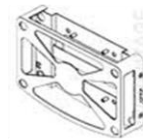
# DMP and TV Mounting Options



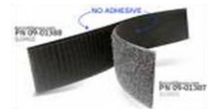
Träger IIa (custom)



Chief FCA100



Cisco DMP mount  
DMP-PRCASE-4305-S1



Velcro

After you have worked out all of the specifics of the connectivity per the instructions in this guide, it is recommended that you create diagrams and instructions that detail the exact mounting of the physical brackets, the DMP housing and the cable connectivity. Cisco works with partners who produce this and supervise union installation of the TV and DMP combination.

You should plan to install the DMP and the TV at the same time since there is often tight fitting and millwork to work around and it is easier and cheaper to do it all at



once. Rigid mounts are preferred to Velcro or other adhesives. If Velcro is used then it must be rated for continuous temperatures of 122 degrees F or higher.

There are four DMP mounting options:

- [Cisco Träger Mounting Bracket \(custom\)](#)
- [Chief FCA100 DMP Mounting Brackets](#)
- [Cisco DMP Mounting Kits](#)
- [Velcro Mounting the DMP](#)

## Cisco Träger Mounting Bracket (custom)

The Cisco Sports and Entertainment group designed a custom “Träger” mounting bracket for attaching the DMP to the TV. The Träger bracket has the following features:

- Inexpensive
- Manufactured from light-weight, but durable, material
- Custom-designed to fit the DMP 43xx form factor
- An optional method to secure the DMP from removal
- Easy access to the TV/DMP rear panel and cabling
- Lateral ventilation slots on three sides to allow airflow through the DMP

You can attach the Träger bracket to the TV using Velcro or another semi-permanent/permanent fastener (see the “Velcro Mounting” section). The Velcro is applied between the rear of the TV and the back of the Träger bracket rather than directly to the DMP. This design securely attaches the DMP to the TV while allowing the TV to easily slide out of the Träger for servicing.

### Notes:

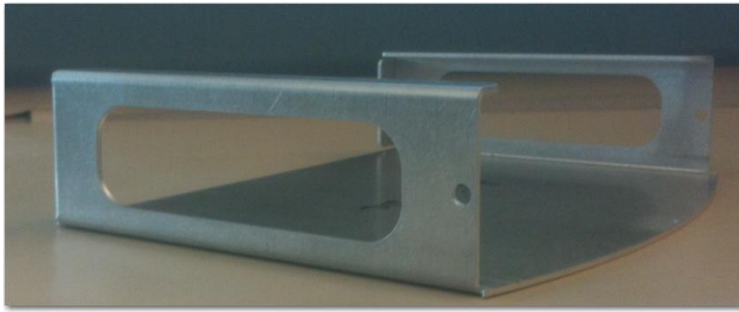
- When using Velcro to mount the Träger bracket to the TV, use three or more strips of Velcro, if possible, in the vertical direction.
- The bracket should be mounted such that the “ears” of the bracket are on the rear side of the DMP. This will prevent the bracket from falling in the event that the Velcro loses its adherence to the TV. Installed this way, the bracket will remain around the DMP that is hanging from the cables, instead of falling and possibly injuring someone that may be under the TV.

## Specifications

Material: 1.59mm (0.0625”) Stainless Steel

Dimensions: 182.778mm (7.196”) x 149.428mm (5.883”) x 41.631mm (1.639”)

Figure 9. Träger IIa Mounting Bracket



## Chief FCA100 DMP Mounting Brackets

The Chief FCA100 mounting brackets shown in Figure 10 have also been proven effective for mounting a DMP to the TV. For instructions on how to install the brackets, refer to the Chief Manufacturing Installation Guide at <http://downloads.chiefmfg.com/MANUALS-I/FCA100-I.pdf>.

Figure 10. Chief FCA100 Mounting Brackets



## Specifications

Part Number: FCA 100

Dimensions: 27.3mm(1.07") x 152.4mm(6") x 47.2mm(1.86)

## Cisco DMP Mounting Kits

Cisco offers a DMP Mount Kit support that supports four different mounting options: wall mount, display mount, ceiling mount, and pole mount. Other features include a security locking option and clear airflow for ventilation. Refer to Figure 11.

Figure 11. Display VESA mount illustration

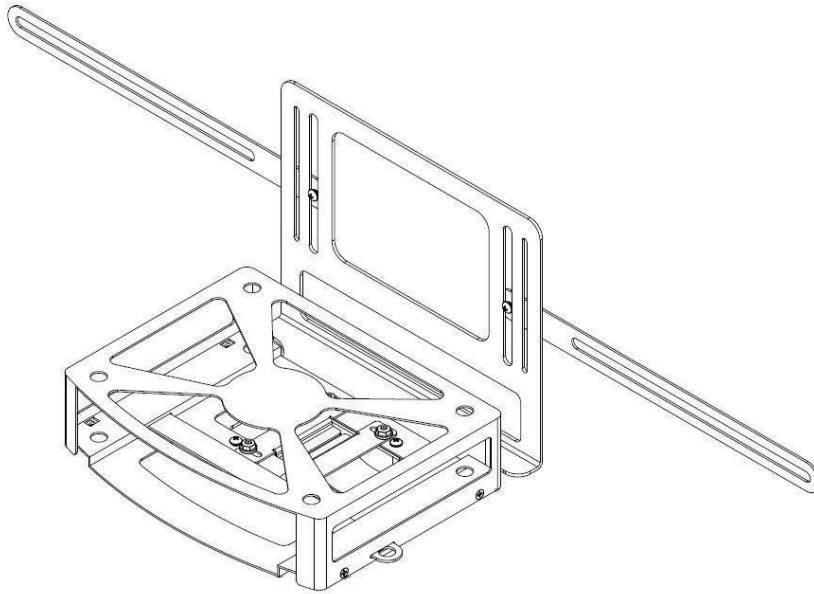
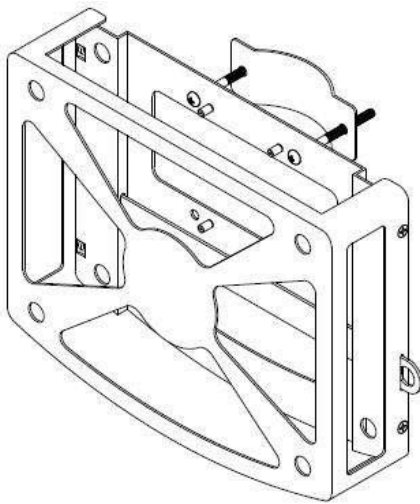


Figure 12. Pole mount illustration



## Specifications

Product Name: Cisco DMP 4305/4310G Protective Case Mount, Series 1

Part Number: DMP-PRCASE-4305-S1

Dimensions: 1.65 x 7.41 x 5.335 in. (4.19 x 18.82 x 13.55 cm)

## Velcro Mounting

You can use Velcro either to mount the DMP directly to the TV or to attach a mounting bracket that holds the DMP to the TV (recommended).

When deciding whether to use Velcro to mount the DMP directly to the TV, consider how much room there will be to maneuver behind the TV and also how much air space there will be around the DMP. It is difficult to re-attach a DMP to Velcro on the rear of a TV in tight-fitting installations. Also, heat generated by the TV can soften the Velcro adhesive thus reducing the effectiveness of the bond. If the Velcro is not securely adhered to the DMP, it may pull away from the rear of the TV when you remove the DMP.

Care must be taken to use the appropriate adhesive and to properly prepare the plastic surfaces to insure a tight Velcro bond. Due to the plastic composition, the appropriate adhesive depends on the TV model. The following 3M Dual Lock™ Reclosable Fasteners have proven to be effective:

- SJ3551 (Type 400)
- SJ3552 (Type 170)
- SJ3550 (Type 250)

These fasteners have a 37 mil white conformable acrylic foam adhesive providing good contact with substrates having a slight texture or surface irregularities. The adhesive is protected with a clear silicone treated liner allowing easy removal from the adhesive.

Many times with molded plastic parts, such as the TV monitors, there is a mould release agent used during the molding process. If that mould release agent is not wiped with a cleaning solution such as a 50/50 solution of isopropyl alcohol and water that 3M suggest, the plastic surface could be contaminated. Of course, this would affect adhesion.

After cleaning the surface, it is suggested that you use 15 psi pressure for proper bonding and allow for a 24 hour curing period before mounting the DMP. Refer to the technical data brochure that is shipped with the 3M Velcro fasteners for proper attachment techniques.

## TV Mount Kits

The type of TV mount kit you use depends upon the TV model/manufacturer and the TV location (fixed, swing arm or tilting wall mount, or a ceiling mount). Chief® Professional Mounting Solutions ([www.chiefmfg.com](http://www.chiefmfg.com)) offers a broad range of universal and custom flat panel TV mounts that are fast and easy to install. Use the Chief's MountFinder Pro feature on their website to quickly find Chief product information and compatible mounts for specific flat panel TVs.

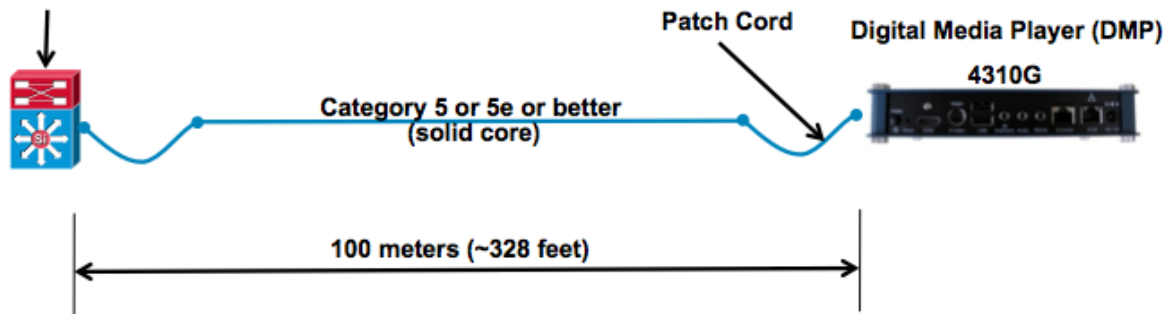
## DMP Power Options

Power over Ethernet (PoE) is the recommended option for powering the DMPs. If you use PoE, ensure that the DMP is connected to a recommended IDF switch, as prescribed in the *Connected Stadium Design and Implementation Guide*.

The following illustration shows options for providing power the DMP.

Figure 13. DMP Power Options

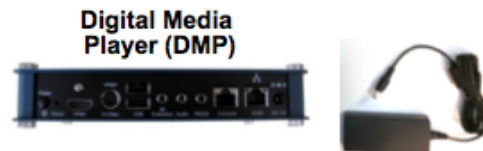
**Recommendation:** Use PoE+ switch to be able to turn up port power for out-of-spec cable runs



**PoE strongly recommended as it allows for remote DMP power cycle**



**Not Recommended**



**120 to 12v Power Adapter (sold separately)**

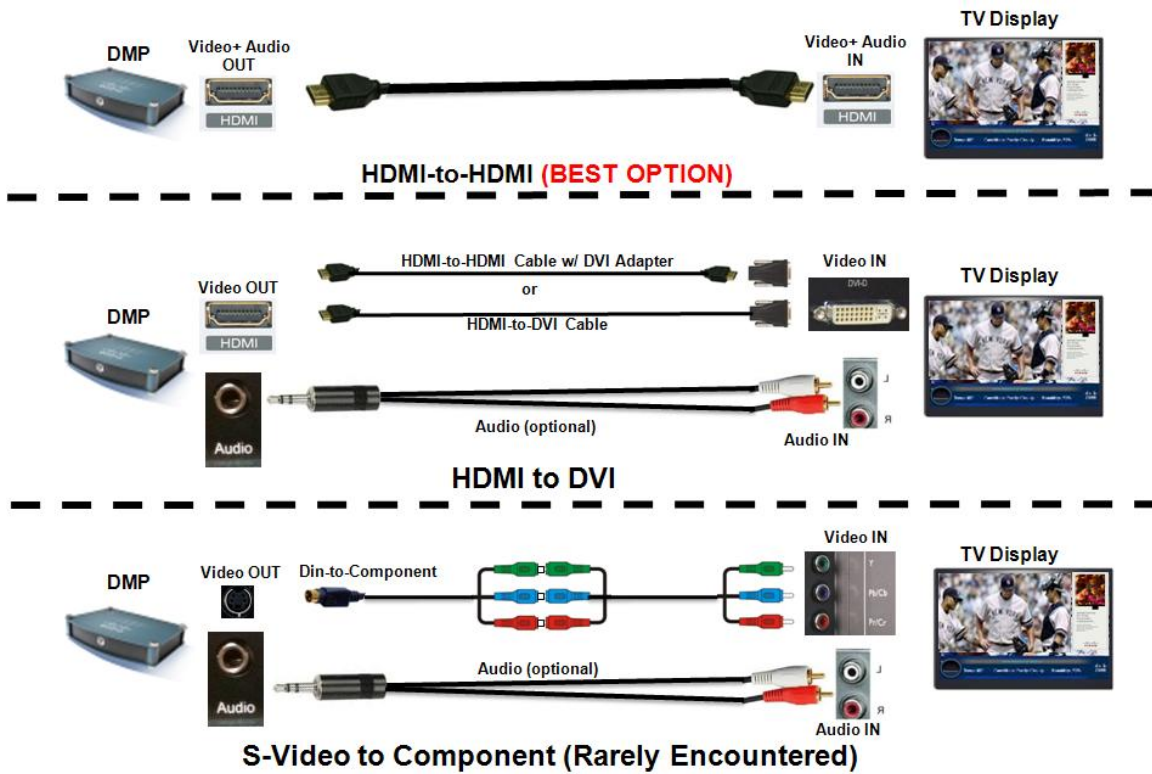
## UTP Cable Runs

The DMP connects to a Cisco Connected Stadium network via a UTP cable connection from the Ethernet RJ-45 port on the rear panel. A minimum quality cable of Category 5 or higher Unshielded Twisted Pair (UTP) should be used for DMP connections with the total cable length not to exceed the IEEE recommended 100 meters. Cable lengths exceeding 100 meters may cause instability when using Power-Over-Ethernet (POE) to power the DMP 4310G.

## DMP to TV Connections

As shown in Figure 14, there are primarily three connections when connecting a Cisco DMP to a TV: video, audio, and TV control. Audio is optional as it may not be required at the TV location or it may be a component of the video stream carried over the HDMI connection.

Figure 14. Real World DMP to TV Video and Audio Connection Options For HD Deployments



## HDMI to HDMI Connection

Figure 15 shows the HDMI-to-HDMI connection. This connection is the simplest of the options where video and audio are carried together over a single HDMI cable.

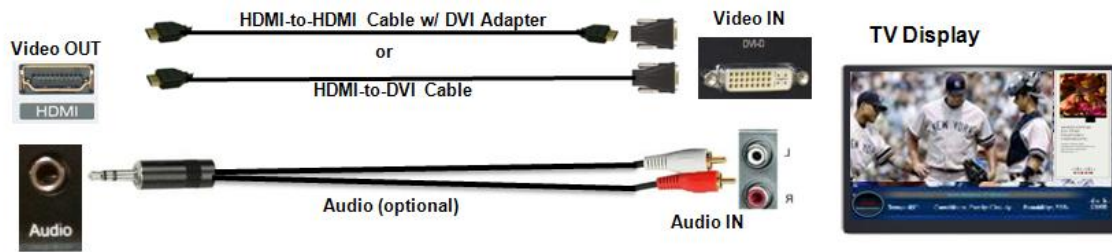
Figure 15. HDMI-to-HDMI



## HDMI to DVI Connection

Some TVs only provide a DVI interface. Therefore, if you plan to use the included HDMI cable, you will need to purchase an HDMI-to-DVI adapter cable to connect to the TV's DVI-D port. Another option is to purchase an HDMI-to-DVI cable as shown in Figure 16.

Figure 16. HDMI-to-HDMI with DVI Adapter



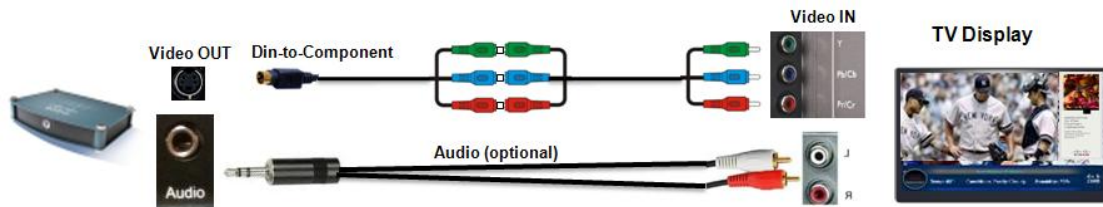
DVI carries only the video signal and therefore, if audio is required and the TV offers audio inputs, separate audio cables between the DMP audio output jacks and the TV's audio output jacks are required.

**Note:** DMP audio output may connect to external audio distribution equipment if audio is to be distributed within an area.

## DMP to TV Component Connection

Venues typically require a small number of component connections to accommodate special devices like projectors or older displays. The DMP uses a Cisco proprietary Din-to-Component cable to support these devices. Contact the S&E Cisco team to find out how to acquire these cables because they are not included with the DMP 4310G.

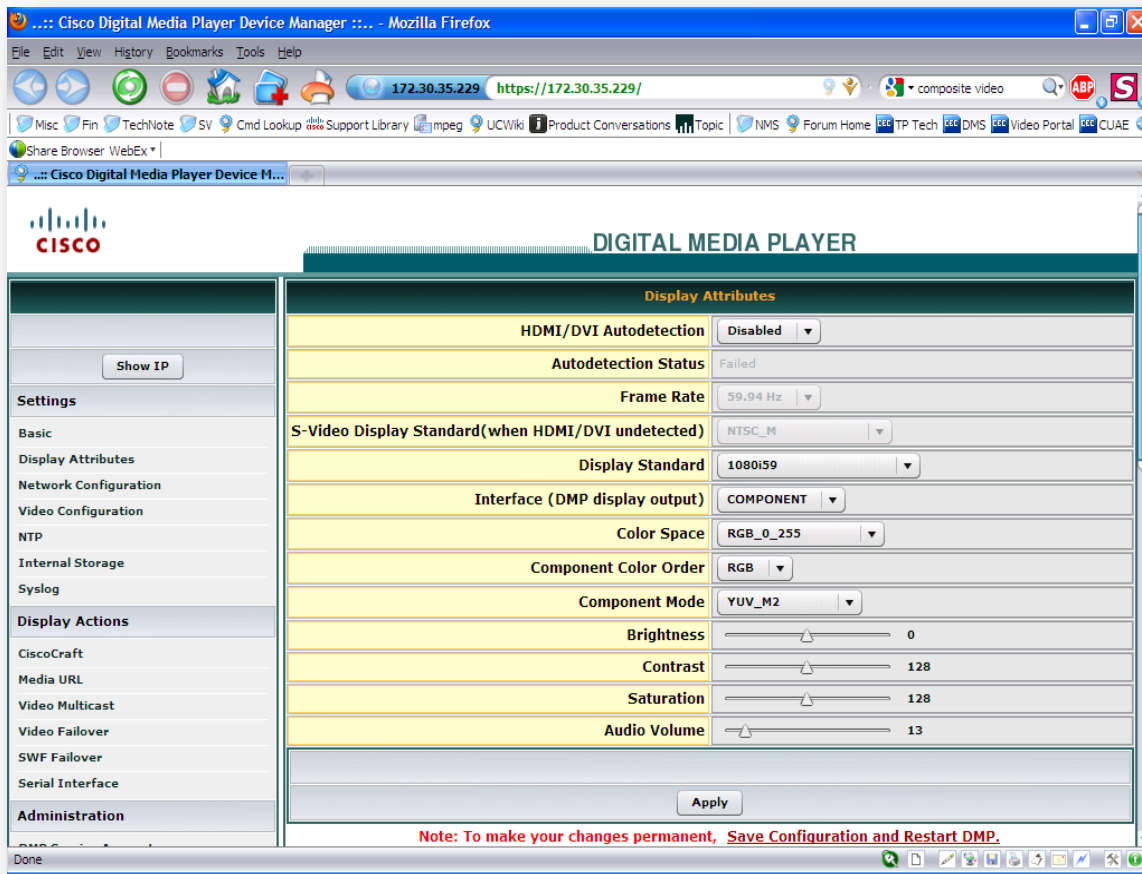
Figure 17. S-Video to Component Connection



If using a DMP S-video output to component convertor cable, you need to configure the DMP to enable the component interface. This is done via the Display Actions web page on the DMPDM interface.

The following screen shows an example configuration of a DMP connected via the component cable with the 1080i59 as its Display Standard. Other Display Standards may be used for different TV models.

Figure 18. Setup to enable 1080i Component Output from the DMP 4310



## DMP to TV Composite Connections

The composite connection shown in Figure 19 is typically deployed in legacy environments with older tube TVs. Full screen video is recommended since ad wrapper graphics display at rather poor quality (4:3 Aspect ratio of TVs will effect Ad Wrapper graphic quality). Note that these older TVs will deliver analog quality video to the TV even if the rest of the venue is in HD.

Figure 19. Composite Connection for Legacy TVs

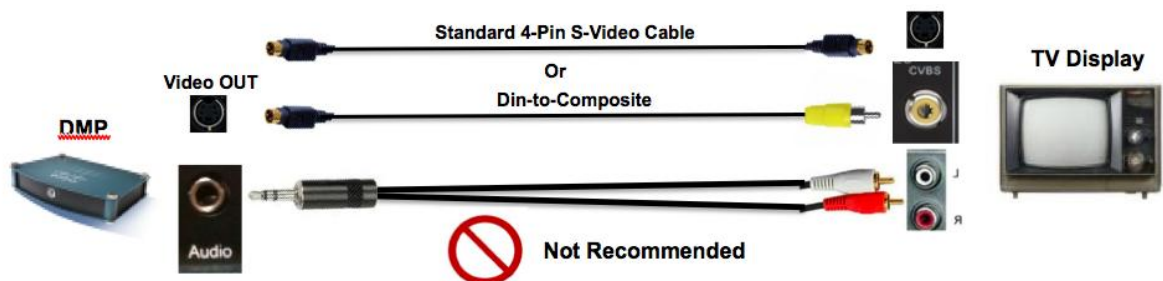




Figure 20. Alternate Composite Connection for Legacy TVs using Din-to-Component Cable on the 4310

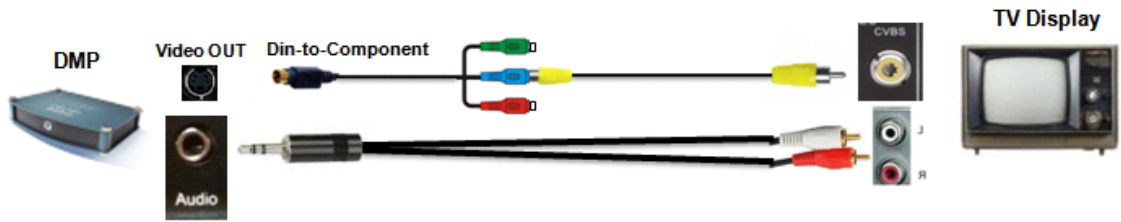


Figure 21. DMP Configuration for S-Video and Composite Connections

DIGITAL MEDIA PLAYER	
Display Attributes	
HDMI/DVI Autodetection	Disabled ▾
Autodetection Status	Failed
Frame Rate	59.94 Hz ▾
S-Video Display Standard(when HDMI/DVI undetected)	NTSC_M ▾
Display Standard	NTSC_M ▾
Interface (DMP display output)	SVIDEO ▾
Color Space	RGB_0_255 ▾
Component Color Order	RGB ▾
Component Mode	YUV_M2 ▾
Brightness	0
Contrast	114
Saturation	151
Audio Volume	13
Changes applied.	
Apply	

## DMP TV Control Connections

StadiumVision Director controls what is displayed on the TVs and also controls the TV settings (e.g., turning the TV on or off, setting volume level, etc.). StadiumVision Director sends commands over the IP network to the DMP. The DMP then sends those commands to the TV via the RS-232 port of the DMP. There are two primary ways to transmit those commands to the TV: a direct RS-232 cable connection or an Infrared connection. The infrared option requires the addition of an RS-232-to-Infrared (IR) adapter to make the command signal conversion from RS-232 to IR.

**Note:** As another alternative for TVs that do not provide an RS-232 port, certain commands (such as volume and mute) can be issued directly to the DMP using the DMP Sigma commands. Refer to [Serial Commands for TV Volume Control](#) in Chapter 4 for details.

## Using a Direct RS-232 Connection

Making a direct RS-232 connection between the TV's RS-232 port and the DMP's RS-232 port provides the simplest and most reliable way to remotely control the TV. RS-232 is typically provided on commercial-grade displays that are recommended for the Cisco StadiumVision solution.

The DMP 4310G provides a 3.5 mm stereo jack for the RS-232 audio connection. The DMP 4305G provides a standard 9-pin D-Sub (male) serial port (DB-9) for the RS-232 connection. The default port configuration is 9600/8/N/1, with no flow control.

## Guidelines for RS-232 Cables

Careful consideration must be made before buying RS-232 cables for connecting the DMP to the TV. Things to note are the gender and type of connector on the TV and wiring configuration for the connector. The TV may have either a DB-9 or RJ-45 connector and be wired as a straight or null modem cable (i.e., TX and RX pins are swapped). Check with the manufacturer of the TVs manual for this information before purchasing cables.

Figure 22 illustrates the two types of 3.5mm stereo port-to-TV connections for the DMP 4310G. Refer to [Appendix A: RS-232 Cable Schematic \(DMP 4310G\)](#) for details about the 3.5mm RS-232 port.

Figure 22. RS-232 for TV Control (DMP 4310G)

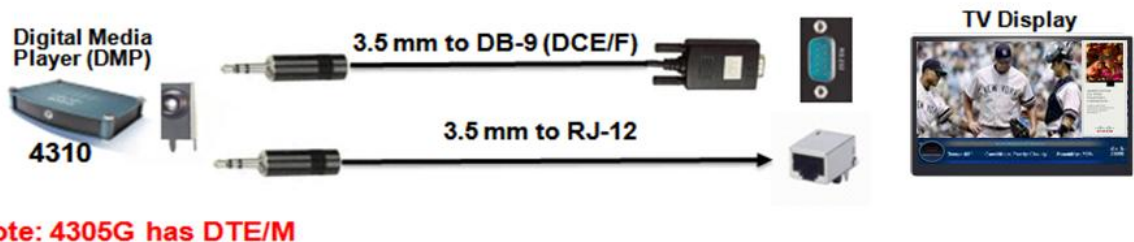
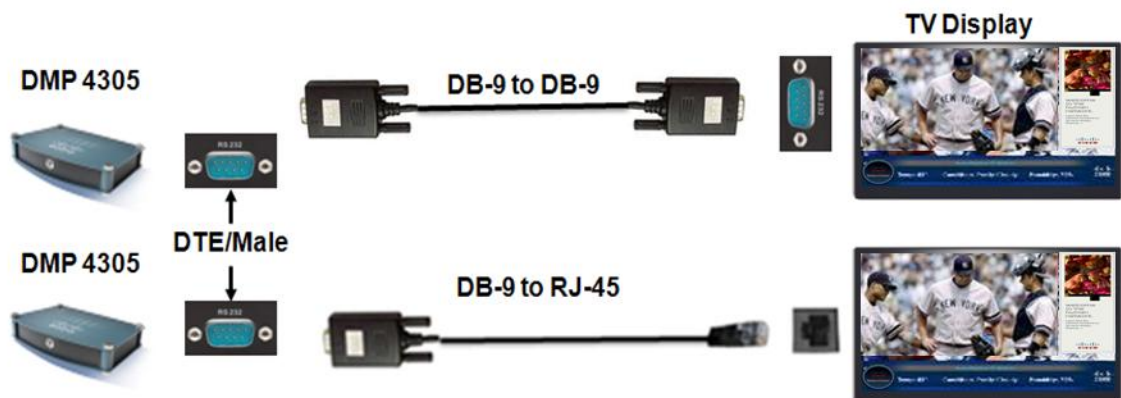


Figure 23 illustrates the two types of DB-9 connections for the DMP 4305G.

Figure 23. RS-232 for TV Control – DB9-to-DB9 (DMP 4305G)



## Using an RS-232-to-IR Adapter Connection

If the TV does not have an RS-232 port, which is typical for consumer grade TVs, an RS-232-to-IR adapter is required. Although this approach is strongly discouraged, you can use the Jafa SCIRTx RS-232 to IR adapter. Figure 24 and Figure 25 illustrate the RS-232-to-IR Adapter connections for the DMP 4310G and DMP 4305G, respectively.

One disadvantage of using an RS-232-to-IR adapter (besides added complexity) is that you must use an adhesive to affix the IR sensor to the TV. There is a good chance that the adhesive, if exposed to weather or due to age, will pull away from the TV's IR sensor. This results in loss of TV control and possibly the use of ladders and personnel to re-adhere the sensor to the TV.

Figure 24. IR for TV Control (DMP 4310G)

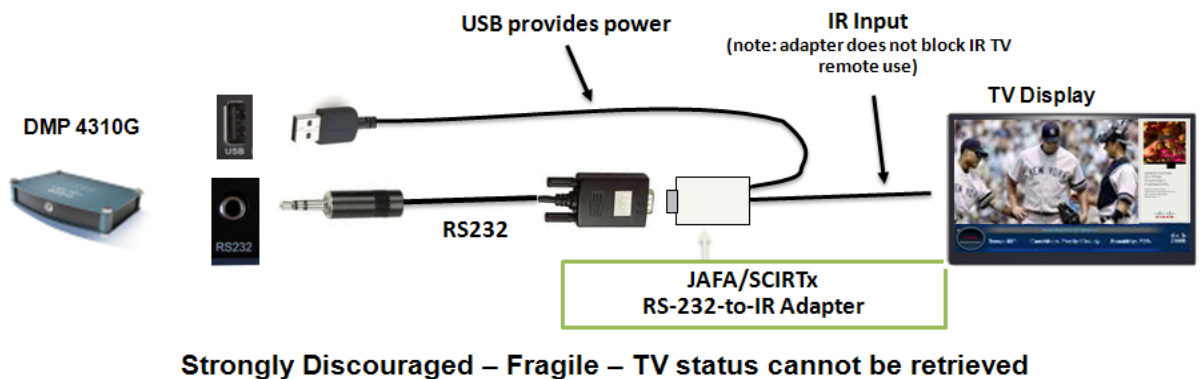
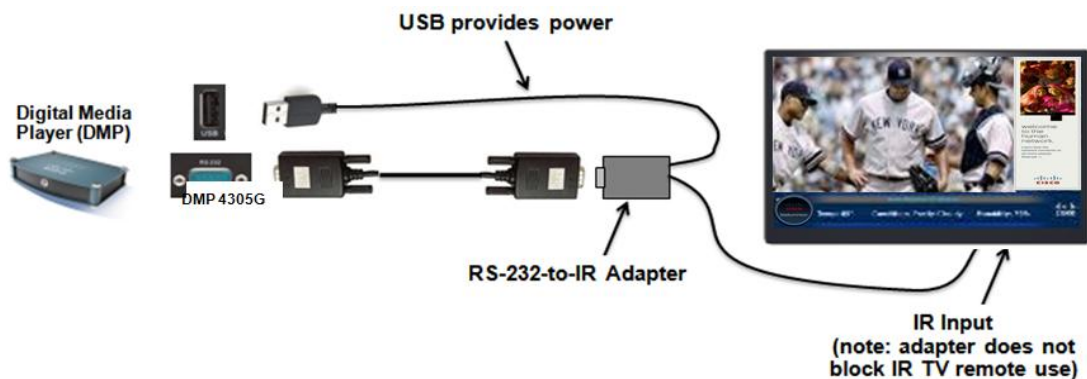


Figure 25. IR for TV Control (DMP 4305G)



## IR Remote Sensor and IR Extender

If the DMP is mounted behind the TV such that the IR sensor is not visible for IR remote control then an USBIR extender may be used to extend IR control.

The USBIR (infrared) extender (Figure 26) is a small device where an IR transmitter at one end of the cable is connected to the DMP IR sensor. The other end of the

cable that has the IR extender sensor is mounted where an IR remote would be in its line of sight. The IR extender connects to the IR extender port (DMP 4310G) or the USB port (DMP 4305G).

Figure 26. USB IR Extender



## Closed Captioning

Support for closed captioning (CC) is provided as per EIA-608-B, now CEA-608-E (VBI line 21 CC data services) and EIA-708-D (DTV CC standard). In addition, per Cisco Sports and Entertainment customer requirements, the proprietary CC specification from Direct TV, “DirecTV proprietary IRDA VC CC Specification Version 1.3,” is also supported. The Sigma SoC will decode and display the CC information as directed by the source encoder. Refer to Figure 27.

These standards are North America centric. Closed Captioning will not work in Europe or anywhere outside of North America.

Figure 27. Closed Captioning



## Video Wall Design

In some cases, teams will want to build a matrix of screens to create a video wall. Usually the desired functionality is to display individual games or channels on each screen in the video wall, or to display a “tile matrix” with one game shown across many screens, creating a jumbo screen effect as shown in Figure 28.

Figure 28. 3X3 Video Wall in Tile Matrix Mode



TVs used for a video wall must support video wall functionality. The tile matrix configuration is configured via RS-232 commands, which specify the overall x and y dimensions of the matrix as well as each TV's position in the video wall.

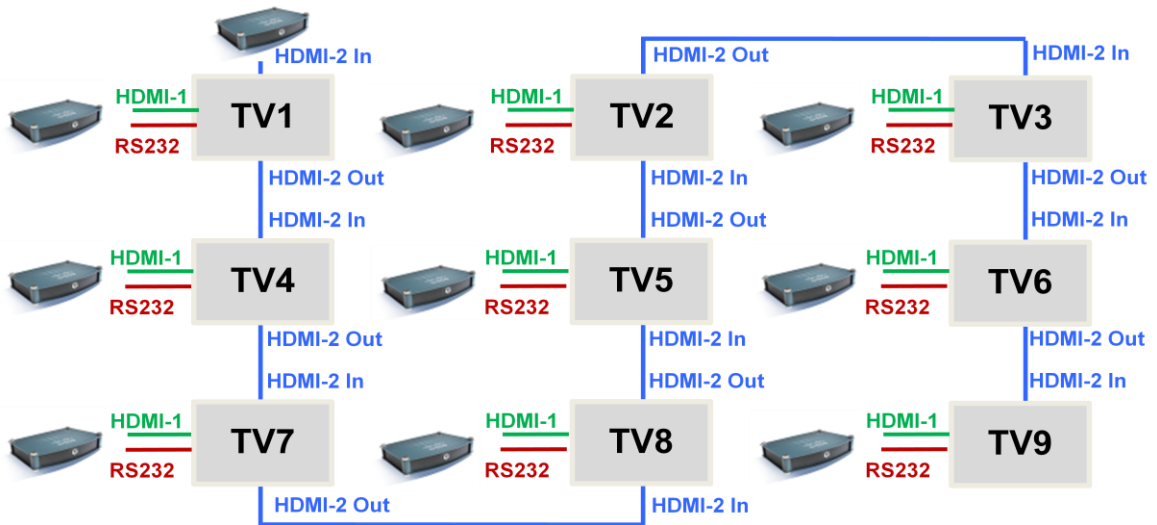
You will need to deploy one DMP per TV with an extra DMP acting as the "video wall controller." This N+1 DMP approach is very flexible, allowing the TVs to be reconfigured in other combinations of video walls with the remaining TVs tuned to different channels. For example, you can go from a 3 x 3 matrix to a 2 x 2 matrix, and break out the other five "L-wrap" displays to show different programming. You can take the TVs out of tile matrix mode and send different programming to each one using RS-232 commands.

The video inputs on each TV are daisy-chained together using component, DVI, or HDMI input/output with the video input of the "first" TV (typically the top left TV) connected to the video output of the video wall controller DMP. For control purposes, the RS-232 port on each DMP is connected to the TV's RS-232 port.

Each TV receives the same video signal from the video wall controller DMP. Based on the TV's tile matrix configuration, the TV knows to first scale input video to the size of the configured x,y dimensions, then to display its "piece" of the overall display based on its configured position within the matrix.

Figure 29 illustrates a video wall using native TV tile matrix functionality.

Figure 29. Video Wall Using NEC TV Tile Matrix



**Note:** One downside to doing a tile matrix is that there is no conditioning of the video signal as it is daisy-chained from TV to TV. Therefore, the signal at the last TV in the chain (usually the lower-right TV) is a little weaker than the others and requires minor tuning of the latency settings on the DMP so that the picture is synchronized with the other TVs.

As an alternative to daisy-chaining from the single DMP, you can achieve the same result by configuring each of the nine individual DMPs to send the same channel to each of the nine TVs, and then set the TVs to tile matrix mode. The risk in doing it this way is that the nine streams must be in perfect synch for the matrix to display properly.

In the example shown in Figure 30, the TVs are taken out of tile matrix mode and each DMP is tuned to an appropriate channel. The only requirement here is that you have one DMP per TV for both control and for the video source.

Figure 30. 3x3 Video wall with different channels per screen



The example shown in Figure 31 is actually the same as the example shown in Figure 30 except that the channels are all tuned to the same video source. Again, for this to look good, perfect synchronization is required. If you switch all the TVs to tile matrix mode, you achieve the result described earlier of having a single tile matrix of one channel coming from nine DMPs.

Figure 31. 3x3 Video wall with the same channel playing on each screen



The example shown in Figure 32 uses screens that have zero bezel so it is visually pleasing. The other difference here is that the 3 x 3 is subdivided into a 2 x 2 matrix along with five individual screen layouts. Also, the 2 x 2 has a content design that includes both a live video feed and a signage wrapper. In this case, there is a DMP for the 2 x 2 tile matrix as well as one each for the other five screens.

Figure 32. 3x3 Video wall with a 2x2 tile matrix and 5 individual screens



## TV Volume Normalization

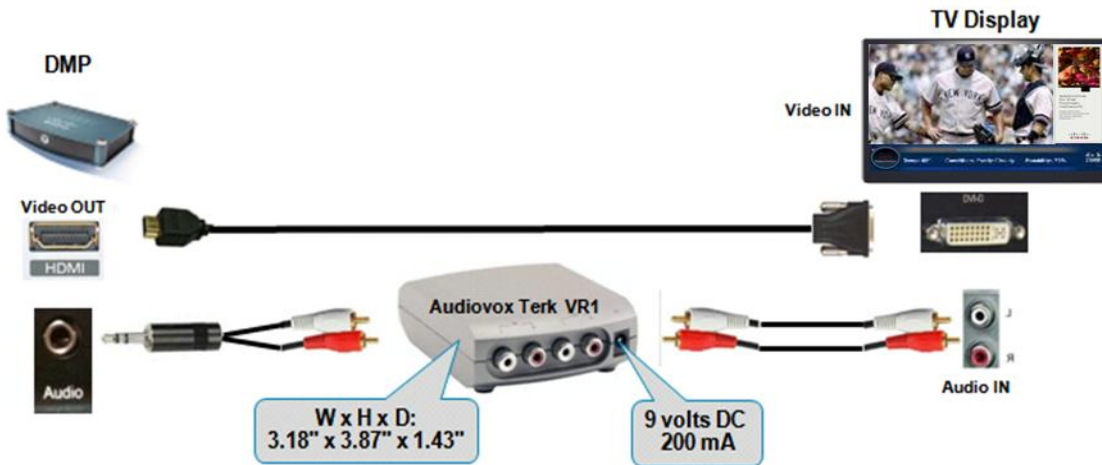
Be sure you plan your volume control strategy upfront since retrofitting at a later date can be expensive.

Loud commercials and varying channel volume levels can be really annoying to fans. There are a couple of ways to address this problem. Some TVs provide automatic volume control (also referred to as “auto volume” and “audio dynamic range”). When using the TV’s automatic volume control, care must be taken to fully understand how it works. For example, some TVs require that the audio feed to the TV be carried over the analog RCA jacks. This is important to note because typically video and audio comes in over a single HDMI.

Another option is to install an Audiovox Terk VR1 Automatic TV Volume Controller between the DMP analog audio port and the analog TV audio RCA jacks. Refer to Figure 33. If you plan to use the Audiovox Terk VR1 box, you will need to separate the video and audio connection between the TV (e.g., HDMI-to-DVI input for video and analog audio).



Figure 33. Using an Automatic TV Volume Controller



## Network Readiness

Before you begin:

1. Provision the StadiumVision Director Server in its production location. See the *Cisco StadiumVision Director Server Hardware Installation Guide*.
2. Install StadiumVision Director on the StadiumVision Director Server. See the *Cisco StadiumVision Director Installation and Upgrade Guide*.
3. Configure a DHCP server for your network so that the DMP can obtain an IP address. The DHCP Server should be configured to allocate IP address leases as indefinite (or permanent). This is required to have the DMP maintain the same IP address throughout the preparation process (e.g., through firmware upgrade reboots, etc.) as well as afterwards.

For an IOS-embedded DHCP Server, see below for an example configuration:

```
ip dhcp pool sv_homenet
import all
network 10.50.1.0 255.255.255.0
default-router 10.50.1.1
dns-server 64.102.6.247 171.68.226.120
domain-name cisco.com
lease infinite
```

As an alternative, you can use the Cisco Network Registrar (CNR). CNR provides a feature-rich DHCP and DNS server that can be used in the Cisco StadiumVision network. For more information about using CNR with StadiumVision, see the *Cisco Network Registrar Best Practices Guide for StadiumVision*.

# Chapter 3 DMP Deployment

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This section describes how to deploy Cisco 4310G Digital Media Players (DMPs) using StadiumVision 2.3. The workflow described includes the auto registration and provisioning of the DMP and how to map the DMP to a physical Location Name within StadiumVision Director. This workflow gets the DMP to the “In Production” state where it is ready to be assigned to its appropriate Groups and Zones where specific content is assigned for display throughout the venue. This DMP assignment to Groups and Zones will be described in another document.

## Installation Prerequisite Steps

1. Enable Auto-Registration and Provisioning in SV Director 2.3.
2. Configure a switch port for DMP (Not covered in this document).
3. Configure a DHCP Server for DMP Auto Registration and Provisioning.
4. Set the Default Video Channel.
5. Configure TV RS-232 Codes for TV Control.
6. Determine the TV location and naming convention.

## Installation Steps

1. Install the TV and DMP. During installation:
  - The DMP gets network information via DHCP.
  - The SV Director learns about DMP (auto-registration or manual CSV upload).
2. Provision the DMP for production (auto or manual provisioning).
3. Link the DMP and Location.
4. Assign the DMP to a specific group/zone.

# DMP Auto Registration and Provisioning

**ONLY the Administrator (admin role) for StadiumVision (SV) Director can perform the procedures in this guide.**

In StadiumVision release 2.3, DMP 4310Gs can auto discover the SV Director server via DHCP and then auto register with SV Director. Once a DMP is registered, SV Director automatically executes the necessary commands to provision the DMP for operation with StadiumVision.

This section describes the DMP auto registration and auto provisioning workflows for preparing SV Director, the DHCP Server, and the DMP to use the auto registration and auto provisioning functionality. It also covers how to view the workflow status throughout the auto registration process.

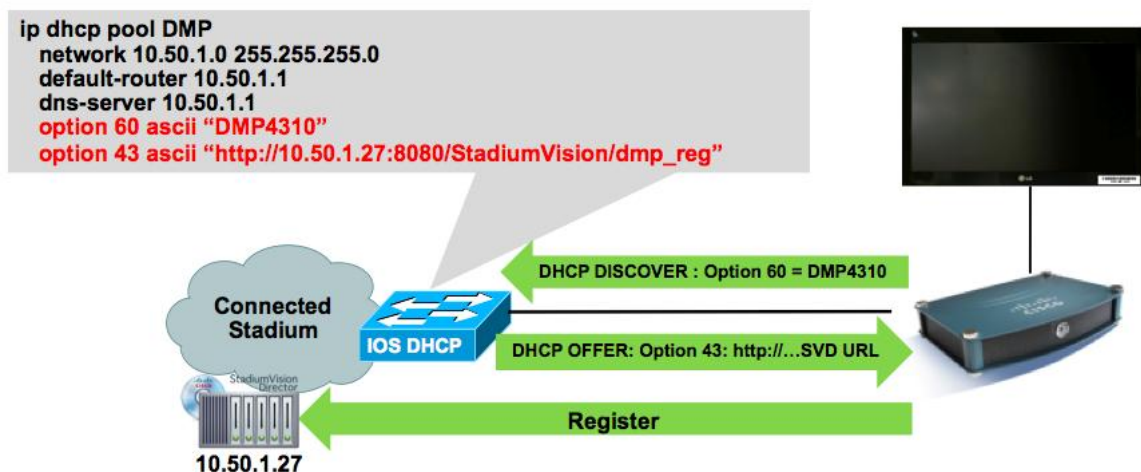
**Note:** Auto registration is not supported for the DMP 4305G.

**Note:** DMP 4310s must have SE2.2.1 build 1932 or later installed to support auto registration.

## Understanding DMP Auto Registration

Figure 34 illustrates the auto registration process. Although the diagram shows the Cisco IOS DHCP Server, you can use any DHCP server that supports the configuration of DHCP Options, for example a CNR (Cisco Network Registrar server) DHCP server. This document will describe how to set up both Cisco DHCP Servers for DHCP options.

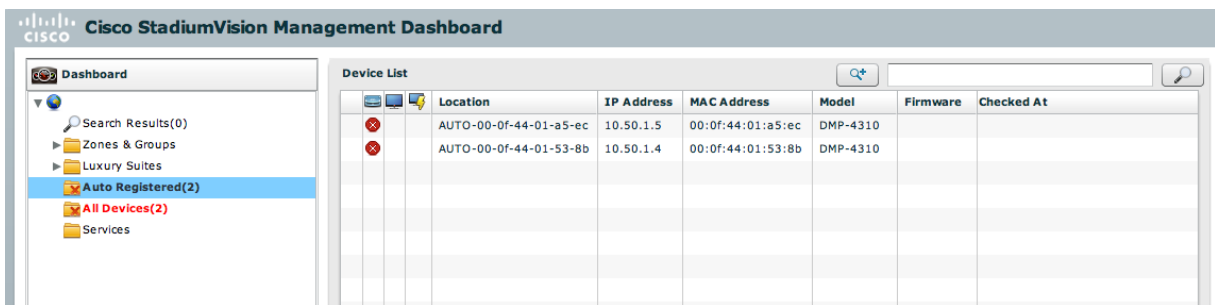
Figure 34. Auto Registration Process



## Auto Registration Workflow

1. Upon boot up, the DMP sends a DHCP DISCOVER message including the Option 60 information to identify itself as a DMP 4310 to the DHCP Server.
2. The DHCP server recognizes the identifier and sends back an OFFER including Option 43 information. This information is the URL that tells the DMP where to register. The URL used for registering is as follows: [http://<SV Director IP Address>/StadiumVision/dmp\\_reg](http://<SV Director IP Address>/StadiumVision/dmp_reg).
3. The DMP sends a registration to the URL and registers with SV Director. This takes about 20 seconds. Figures 35 and 36 show DMPs that have successfully registered with SV Director but are shown in the “Not Ready” state as they have not been provisioned.

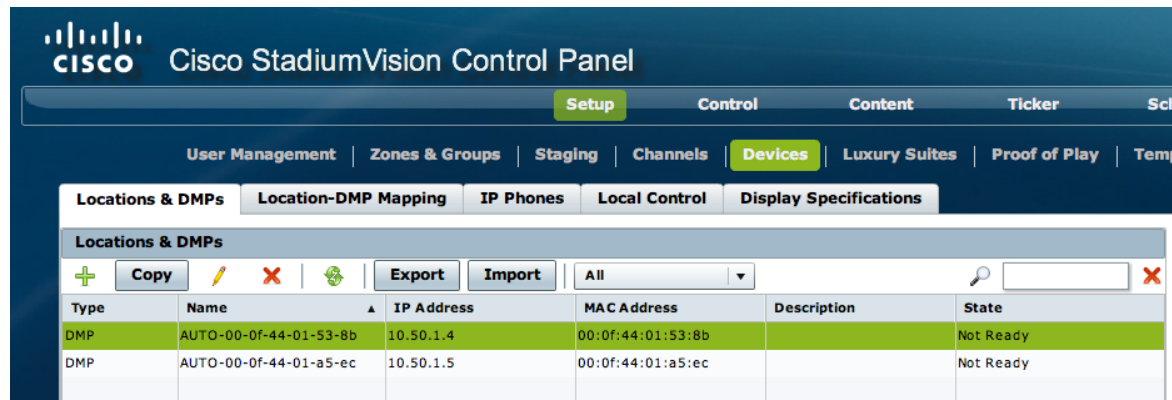
Figure 35. Auto Registered DMPs in the Dashboard



The screenshot shows the Cisco StadiumVision Management Dashboard. On the left is a navigation menu with options like 'Zones & Groups', 'Luxury Suites', 'Auto Registered(2)', and 'All Devices(2)'. The main area displays a 'Device List' table with the following data:

Location	IP Address	MAC Address	Model	Firmware	Checked At
AUTO-00-0f-44-01-a5-ec	10.50.1.5	00:0f:44:01:a5:ec	DMP-4310		
AUTO-00-0f-44-01-53-8b	10.50.1.4	00:0f:44:01:53:8b	DMP-4310		

Figure 36. Auto Registered DMPs in the Control Panel



The screenshot shows the Cisco StadiumVision Control Panel. The 'Devices' tab is selected, and the 'Locations & DMPs' sub-tab is active. A table displays the following data:

Type	Name	IP Address	MAC Address	Description	State
DMP	AUTO-00-0f-44-01-53-8b	10.50.1.4	00:0f:44:01:53:8b		Not Ready
DMP	AUTO-00-0f-44-01-a5-ec	10.50.1.5	00:0f:44:01:a5:ec		Not Ready

## Understanding DMP Provisioning

The DMPs require specific configuration and firmware to be provisioned before the DMP can be placed into production. This section will describe that workflow.

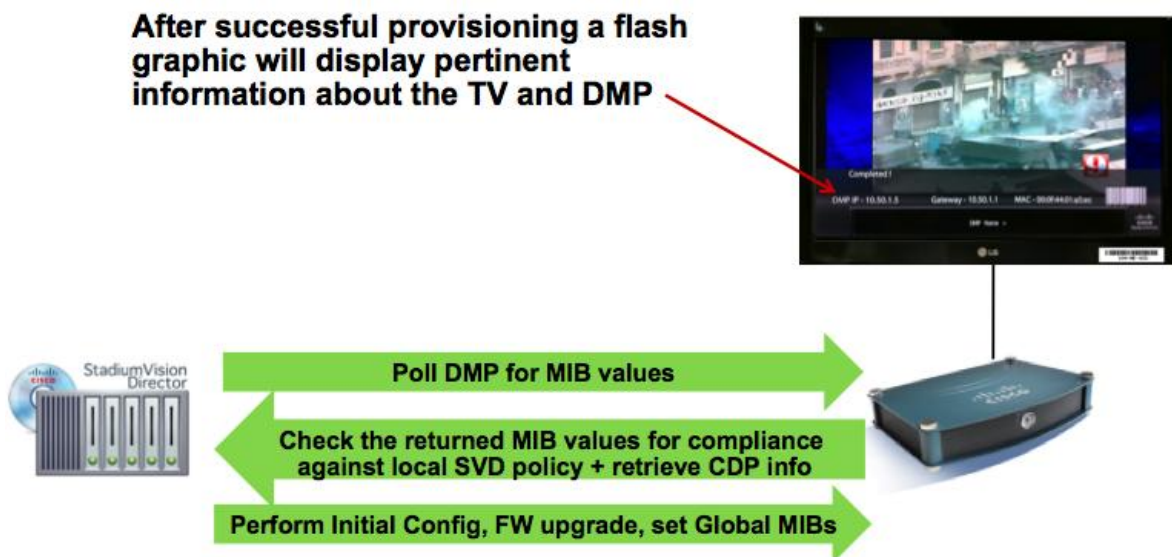
## Provisioning Workflow

Once a DMP is auto registered, SV Director may be configured to perform the provisioning automatically or the operator may choose to perform it manually using the SV Management Dashboard. The DMP provisioning workflow is as follows:

1. SV Director polls the DMP for specific MIB values.
2. The DMP will return the requested MIB variable settings to SV Director for evaluation.
3. Upon determining the DMP's compliance, SV Director will execute the required commands as needed to provision the DMP and place it into the "Ready" state.
4. After provisioning is complete, the DMP displays on the TV an installation flash graphic along with the default video channel. This flash graphic shows the state of completion of the DMP provisioning, DMP IP and MAC addresses, default gateway, firmware version, and other pertinent information.

**Note:** SV Director only sends the provisioning commands to the DMP if the DMP has not yet been provisioned in SV Director. StadiumVision Director performs a check before executing each command.

Figure 37. Provisioning Process



## Provisioning Functional Description

The DMP provisioning is performed by the **Provision DMP** operation in the SV Director Management Dashboard. The **Provision DMP** operation is a collection of Dashboard commands with additional specifications related to timeouts and retries. This command is similar to a macro that is typically created to execute a set of operations in sequence with dependency checking. That is, the commands will be executed only if the previous command was successful.

The **Provision DMP** operation can be initiated automatically or manually. Each time the **Provision DMP** is initiated, one of the following actions occur:

- Create a new instance of the **Provision DMP** operation and execute from Step 1 in the provisioning flow for each of the selected devices, OR
- Advance an already executing **Provision DMP** operation to the next step for each of the selected devices, if applicable.

Either of the above two operations will occur regardless of whether the **Provision DMP** was manually or automatically initiated. Operation instances are created and tracked on the SV Director Server.

Table 3 lists the commands that are part of the **Provision DMP** operation and the sequence in which they are executed. If any step fails, the overall **Provision DMP** operation fails.

Table 3. Provision DMP Provisioning Commands

Sequence Number	Command	Description
1	GetStatus	Retrieve the current settings on the DMP
2	StateTransition	Change the DMP State to 'Not Ready'
3	InitialConfig	Executes the <i>InitialConfig</i> command on the DMP. This command sets the credentials in the DMP and is executed only if the DMP is in the <i>Factory Default</i> state. The DMP is rebooted as part of this command execution. A subsequent DMP registration message will trigger the Workflow to advance to the next step.
4	GetStatus	The <i>GetStatus</i> command retrieves the most current configuration on the DMP. The <i>GetStatus</i> command is executed at various points of the <i>Provision DMP</i> workflow and is intended to refresh the DMP state in SV Director so that the execution of previous Workflow steps are reflected correctly in the SV Director Database.
5	FirmwareUpgrade	The SV Director will upgrade the Firmware on the DMP, if required. A DMP reboot will trigger the Workflow to advance to the next step.
6	GlobalMIB	Deploy the <i>Global DMP Settings</i> on the DMP. This step is performed only if the device is not conforming with the current <i>Global DMP Settings</i>
7	GetStatus	Retrieves the most current configuration on the device. Note that a previously executed <i>FirmwareUpgrade</i> would have changed the version and build strings to match the currently running firmware on the DMP
8	StageTemplate	The Flash Template is staged on the DMP.
9	GetStatus	Retrieves the current configuration from the DMP and saves in the SV Director Database
10	StateTransition	Sets the DMP State to <i>Ready</i>
11	GetStatus	This final GetStatus is issued to get the most current DMP configuration. It is not necessary to issue this final GetStatus. However, this command has been placed in the <i>Provision DMP</i> workflow to work around certain timing issues that may arise when retrieving the Flash Template status

**Note:** You can see more detail about the steps and sub steps being performed by viewing the status messages on the **Console** tab at the bottom of the screen in the Management Dashboard.

## Automatically Executing the Provision DMP Command

The **Provision DMP** operation is automatically initiated if the Enable Auto Provisioning and Enable Auto Registration keys are set to true in the Dashboard. The **Provision DMP** will be skipped if the DMP is in the “Ready” or “In Production” state. Whenever a registration message is received from the DMP, a new instance of this workflow command is created or a previously running instance is advanced. The DMP sends a registration request to the SV Director every time it is rebooted, assuming that DHCP is enabled and the DHCP Server is appropriately configured. Several of the commands in the Provision DMP workflow require the DMP to be rebooted. Such commands will automatically reboot the DMP as needed.

Preparing SV Director and the DHCP Server for auto registration and provisioning will be described in a later section.

## Auto Registering and Auto Provisioning Multiple DMPs

StadiumVision Director can auto register approximately 200 DMPs at the same time. As registrations come in, up to 50 auto-registered DMPs can be provisioned in parallel. The remaining DMPs are queued for provisioning and as DMPs complete the provisioning process, new DMPs are provisioned.

## DMP States During Provisioning

While a DMP is being provisioned, it transitions through three states:

### Not Ready -> Ready -> Production

- **Not Ready:** The DMP is registered in SV Director but has not been provisioned.
- **Ready:** The DMP is provisioned in SV Director but has not been assigned to a Location. Note that all scripting is done on Locations and not on DMPs.
- **In Production:** The DMP is registered, provisioned and assigned to a Location in SV Director.

As the DMP transitions through these states, you can view the progress on the Management Dashboard and Control Panel. See [Viewing the Workflow Status in the Dashboard](#).

## Manually Executing the Provision DMP Command

As an alternative to using auto provisioning, you can manually execute the **Provision DMP** operation to provision one or more DMPs. This operation is executed from the Dashboard just like any of the other Dashboard commands.

Figure 38 illustrates the **Provision DMP** in the Dashboard Device Configuration drawer.

Figure 38. Manually Executing the Provision DMP Command

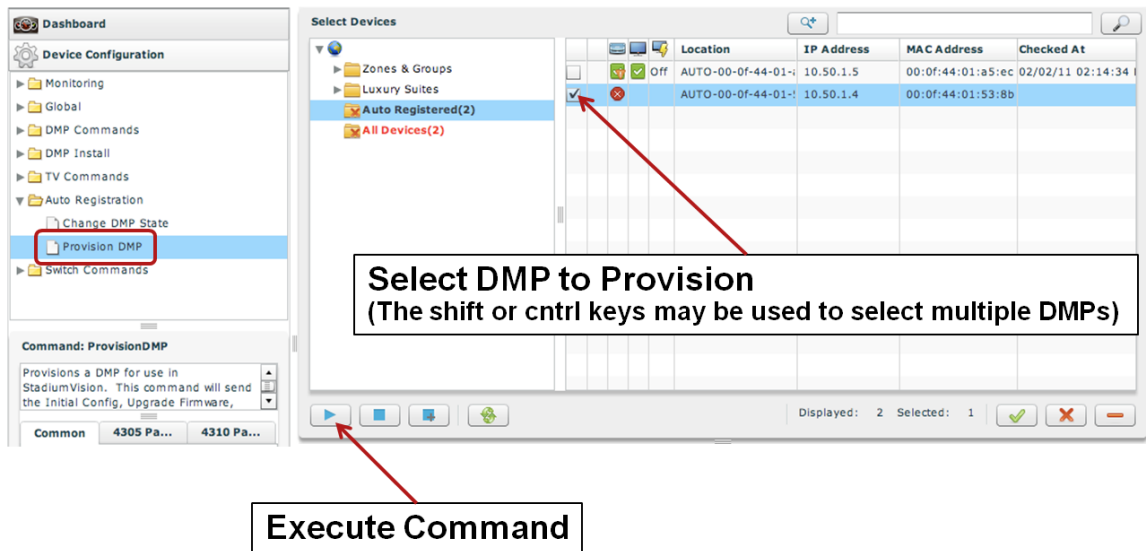
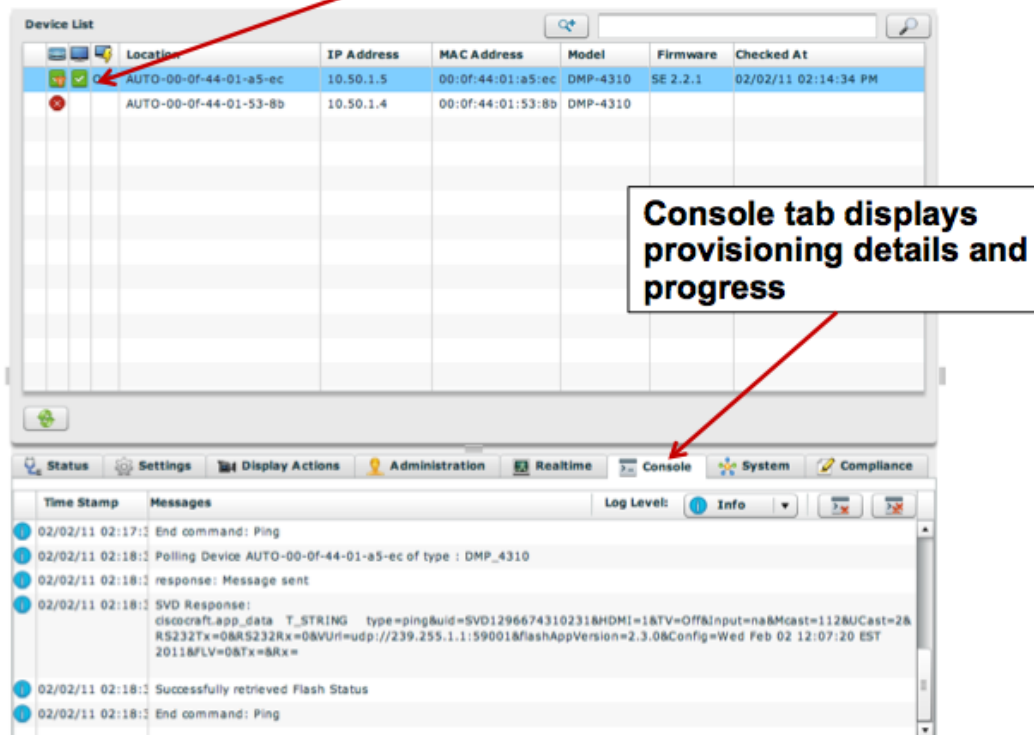


Figure 39. Provisioned DMPs in the Dashboard

**The green checks indicate the DMP and TV are in “Ready” State**





Note: To see the detailed DMP Status, click the Status tab.

Figure 40. Provisioned DMPs in the Control Panel



**After a successful provisioning of the DMP, SV Director moves the DMP into the “Ready” State**

## Preparing SV Director, the DHCP Server, and the DMP for Auto Registration

Perform the following steps to prepare SV Director, the DHCP Server and the DMP for auto registration and auto provisioning.

1. Enable auto registration and auto provisioning in the SV Director Management Dashboard. See the [Enabling Auto Registration and Auto Provisioning in the Dashboard](#) section.
2. Setup the DHCP Server with options that enable the DMP to discover and register with SV Director. See the [Configuring DHCP Options](#) section.
3. If not already installed, install auto registration-capable firmware on the DMP (StadiumVision Release SE2.2.1 build 1932 or higher). This is typically done as part of an upgrade from a previous SV Director release and upgrading DMP firmware is not covered in this document.

**Note:** As of this time, there are two versions of DMP 4310. One ships as a SV specific version (DMP-4310G-SE-K9) and a generic version (DMP-4310G-52-K9). The hardware is identical, but the firmware loaded at the factory is different. The DMP-4310G-52-K9 ships with version 5.2 firmware and supports auto registration. When a DMP-4310G-52-K9 also supports registration and when it registers with SV Director it will be upgraded to the correct StadiumVision firmware version if necessary.

## Enabling Auto Registration and Auto Provisioning in the Dashboard

By default, the auto registration and auto provisioning settings in SV Director are disabled. To use these features, you need to enable them in the Management Dashboard as follows.


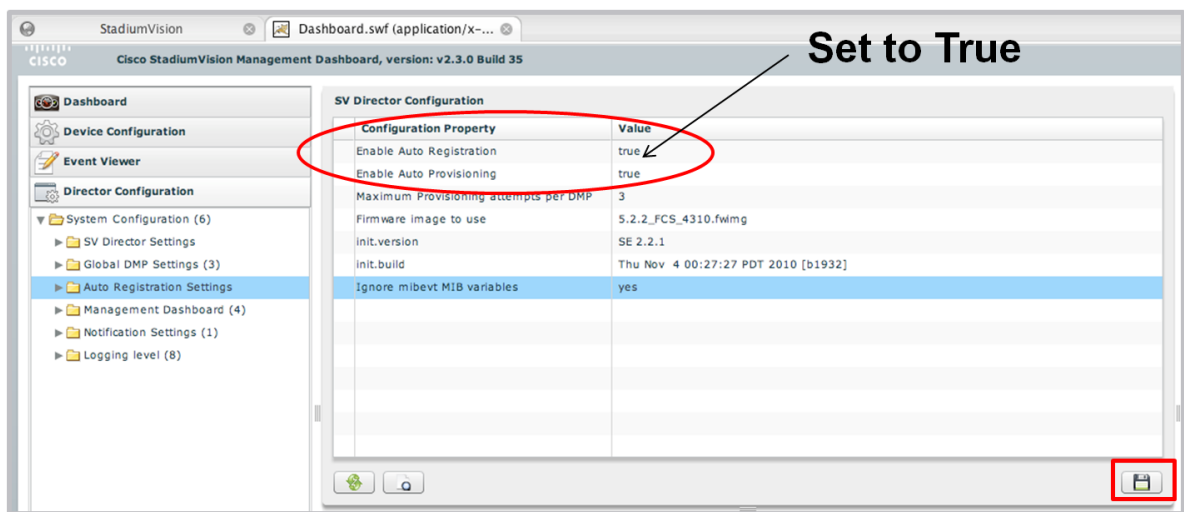
4. Open the Management Dashboard and select **Director Configuration > Auto Registration Settings**.
1. In the SV Director Configuration Property panel, set the values to 'true' for Enable Auto Registration and Enable Auto Provisioning. Refer to Figure 41.
2. Click the save button. 

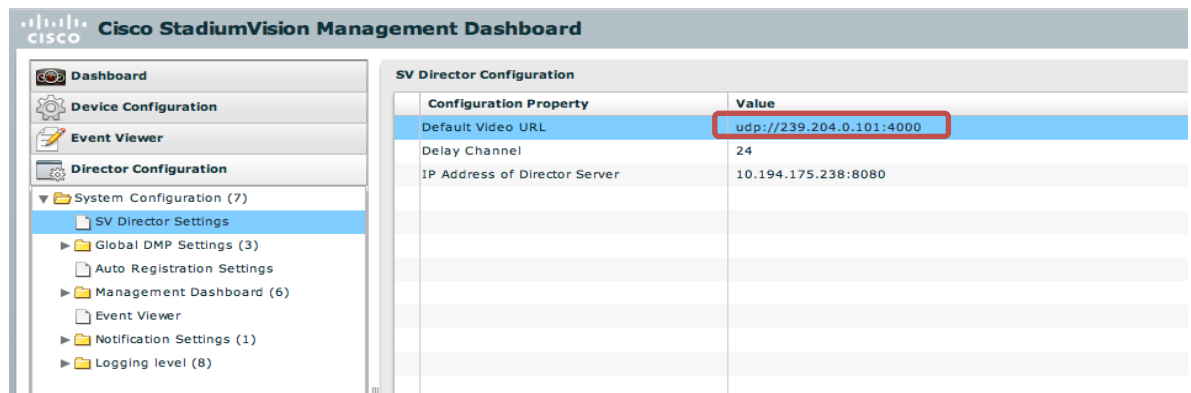
Figure 41. Enabling Auto Registration and Auto Provisioning in the Dashboard



## Configuring the Default Video Channel

To verify video is working properly after a successful provisioning operation, set the default Video Channel in the Management Dashboard.

Figure 42. Configuring the Default Video Channel



## Configuring DHCP Options

The DMP auto discovers the SV Director server via DHCP and then auto registers with SV Director. This discovery process uses Option 60 and Option 43 where Option 60 is used to identify the DMP as the requesting device of Option 43 information. Option 43 is configured with the URL that the DMP will use for registration with SV Director.

### Cisco IOS DHCP Server

To configure the Cisco IOS DHCP Server for Option 60 and Option 43:

1. Access the configuration mode at the Cisco IOS CLI.
2. Configure the ip helper-address on the Video VLAN to point the DHCP server to where this configuration will be done. If the DHCP server is configured on the local switch where the DMPs are connected, this step is not required.

```
interface Vlan200
  ip address 10.50.1.1 255.255.255.0
  ip helper-address 10.131.130.1 ←(Router with DHCP Server Configured)
  ip pim sparse-mode
```

3. Create the DHCP pool, which includes the necessary parameters, such as default router and server name. This is an example DHCP scope:

```
ip dhcp pool <pool name>
network <ip network> <netmask>
default-router <default-router IP address>
```

4. Add the Option 60 line with this syntax:

```
option 60 ascii DMP4310
```

5. Add the Option 43 line with this syntax:

```
option 43 ascii http://<SV Director IP Address>:8080/StadiumVision/dmp_reg
```

**Note:** You do not need to define a sub-option value for the Cisco IOS DHCP server.

For example, to configure Option 43 for Cisco DMP 4310 with the SV Director IP address 10.50.1.27, add this line to the DHCP pool in the Cisco IOS CLI:

```
option 43 ascii http://10.50.1.27:8080/StadiumVision/dmp_reg
```

**Note:** The Cisco IOS DHCP server is limited to one Option 43 for each DHCP pool, so you can only configure a DHCP scope for a single device type. This should not pose a problem since the recommendation is to use separate VLANs per service. For example, Video VLAN for DMPs, Voice VLAN for IP phones, and Wireless VLAN for APs.

## Configuring CNR for Option 43

1. Enter configuration mode at the Cisco IOS CLI.
2. Configure ip help-address on the Video VLAN to point the CNR DHCP server where this configuration will be done. If the DHCP server is configured on the same VLAN where the DMPs are connected then this step is not required.

```
Interface Vlan200
  ip address 10.50.1.1 255.255.255.0
  ip helper-address 10.129.130.1 ←(CNR Server)
  ip pim sparse-mode
```

3. In CNR web interface, select the **Advanced** mode then select **DHCPv4 > Options**.
4. Click the **Add Option Definition Set** button

Network Registrar - Local

Home Administration Administration Clusters Routers DHCP v4 DHCP v6 Hosts Address Space v4 Address Space v6

Profiles Prefix Templates Links Link Templates Reservations Referrals Options Lists LDAP Extensions Traps Search DHCP Server

### List DHCP Option Definition Sets

DHCPv4 Option Definition Sets

Name	Description
SVautoreg	
dhcpc-cablelabs-config	CableLabs v4 DOCSIS 3.0
dhcpc-cisco-config	Cisco Systems, Inc.
dhcpc-config	

DHCPv6 Option Definition Sets

Name	Description
dhcpc6-cablelabs-config	CableLabs v6 DOCSIS 3.0
dhcpc6-cisco-config	Cisco Systems, Inc.
dhcpc6-config	

Add Option Definition Set

### Add DHCP Option Definition Set

Attribute	Value
Name*	SVautoreg
DHCP Type*	DHCPv4
Description	StadiumVision Auto-Registration
Vendor Option String	DMP4310
Vendor Option Enterprise Id	

Add Option Definition Set Cancel

5. Create an Option definition by giving it a Name (e.g., SVautoreg) and choose DHCP Type DHCPv4. The Description is optional but you will have to specify a Vendor Option String. Use "DMP4310" as the string. This string is what is sent to the DHCP server when the DMP sends its DHCP Discover message requesting network setting information (e.g., IP Address, Gateway, etc.)
6. Click the DHCP Option Definition Set you created and then Add DHCP Option. Set the number to 43 and give it a name (e.g., sv\_autoreg). Define this option to use a string as its value.

Basic | **Advanced** | Home | Administration | Servers | Clusters | Routers | DHCP v4 | DHCP v6

Scopes | Scope Templates | Reservations | Networks | Options | Policies | Clients | Client-Classes | VMs | Failover | DNS | LDAP

## List DHCP Option Definition Sets

DHCPv4 Option Definition Sets	
Name	Description
<a href="#">SVautoreg</a>	
<a href="#">dhcp-cablelabs-config</a>	CableLabs v4 DOCSIS 3.0
<a href="#">dhcp-cisco-config</a>	Cisco Systems, Inc.
<a href="#">dhcp-config</a>	
DHCPv6 Option Definition Sets	
Name	Description
<a href="#">dhcp6-cablelabs-config</a>	CableLabs v6 DOCSIS 3.0
<a href="#">dhcp6-cisco-config</a>	Cisco Systems, Inc.
<a href="#">dhcp6-config</a>	

### Add DHCP Option Definition

Attribute	Value
Number*	<input type="text" value="43"/>
Name*	<input type="text" value="sv_autoreg"/>
Description	<input type="text"/>
type*	<input type="text" value="string"/>
repeat	<input type="text" value="[0]"/>

- Be sure to click, Modify Option Definition Set to save the option 43 settings.

### List DHCP Option Definitions

List of Option Definitions for *SVautoreg*

Number	Name
43	<a href="#">sv_autoreg</a>

- Now, add this option to the default policy by going to **DHCPv4 > Policies** and click default. Go to the DHCPv4 Options drop-down menu and choose the Option (e.g., SVautoreg). Select the option 43, (e.g., sv\_autoreg) to set the string. This string should be the following:  
http://<sv\_director\_IP>:8080/StadiumVision/dmp\_reg

The screenshot shows the 'Edit DHCP Policy default' page in the Cisco Network Registrar interface. The page is divided into several sections:

- Attribute:** Name (default), Offer Timeout (2m), Grace Period (5m).
- DHCPv4 Options:** A table with columns for Name, Number, Legacy, and Value. It includes an 'Add Option' button.
- Configured Options:** A table showing existing options:
 

ID	Option	Value
[5]	dhcp-lease-time	(unsigned time) 1w
[5]	domain-name-servers	(IP address) 64.102.6.247, 171.68.226.120
[150]	vop-ftp-server	(IP address) 10.50.1.200
- DHCPv6 Options:** Similar to DHCPv4, with an 'Add Option' button.
- DHCPv4 Vendor Options:** A dropdown menu is set to 'SVautoreg'. Below it, a table shows a vendor option:
 

Name	Number	Value
sv_autoreg* [43] (string)		http://<sv_director_IP>:8080/StadiumVision/dmp_reg

 Red arrows point to the 'Select' button above the table and the dropdown menu.

9. Click Modify Policy at the bottom of the page to save the configuration.
10. Once this configuration is completed and saved, click on the DHCP Server and click the restart icon to restart the DHCP Server.

The screenshot shows the 'Manage DHCP Server' page. At the top, it says 'Page last refreshed: Mon Dec 06 17:14:06 EST 2010'. Below that is a table with the following columns: Name, State, Health, Statistics, View Log, View Startup Log, Start/Stop/Reload, and Commands. The table contains one entry: 'Local DHCP Server' with state 'running', health 'OK', and statistics '10'. A red arrow points to the restart icon in the 'Commands' column for this server.

## Configuring Display Specifications for TVs

The SV Director Control Panel requires that you configure certain commands for the TVs used in the venue. These commands are used in the communications between the DMP and the TV. It is critical that this information is accurate as it will impact the StadiumVision TVs in ways that may not be obvious at first pass.

When you define Locations in StadiumVision Director (later in this process), you will select the “Display Spec” for the type of TV (brand/model) that is physically installed at the defined Location. Therefore, it is recommended that you configure display specifications for all TV types in the venue *prior* to adding the Locations to StadiumVision Director.

You will need to define a different Display Spec for each *unique* TV type based on how images are centered and stretched, and which serial commands are used to control the TVs. In some cases, all TVs from a certain manufacturer can use the same display specs. In other cases different TV models from the same company may have different display specs.

There are two categories of Display Specs for each type of TV: Basic Info and Serial Commands. Display specifications for several TV types are included in the “StadiumVision TV Data” spreadsheet on the Sharepoint site at the following link:

<http://team.cisco.com/sites/stadiumvision/svfield/Reference%20Information/Screen%20RS-232%20Control%20Docs>

If the TV that you are implementing is not listed in this spreadsheet, please refer to the manufacturer’s documentation to obtain the necessary codes. Appendix C provides an example of how to determine the TV commands that are used in the Display Specs within StadiumVision Director.

<http://team.cisco.com/sites/stadiumvision/svfield/ReferenceInformation/Forms/AllItems.aspx?RootFolder=http%3a%2f%2fteam%2ecisco%2ecom%2fsites%2fstadiumvision%2fsvfield%2fReference%2fInformation%2fScreen%2d232%20Control%20Docs&FolderCTID=0x0120007629F1FC1A985648A9D4CFD024A395E7>

To add a display spec for a TV:

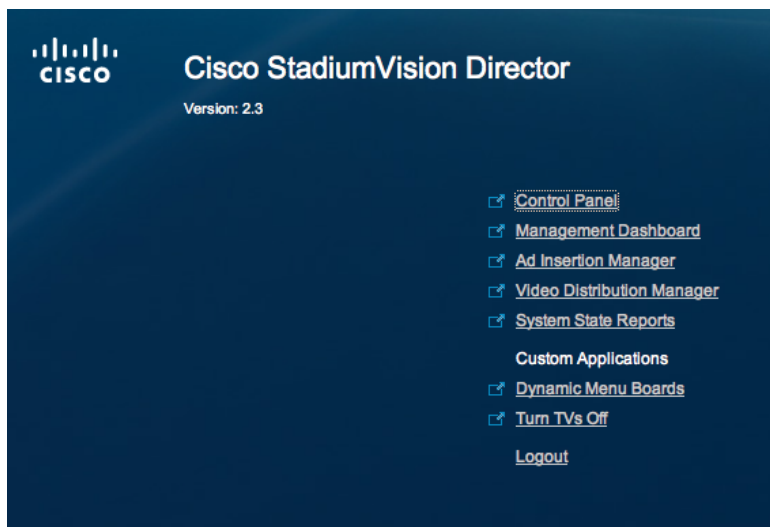
1. Access StadiumVision Director by opening a browser window and entering the following:

[https://SV\\_Director\\_IP\\_addr:8080/](https://SV_Director_IP_addr:8080/)

where *SV\_Director\_IP\_addr* is the IP Address for the StadiumVision Director.

The StadiumVision Director main screen displays, as shown in Figure 43.

Figure 43. Cisco StadiumVision Director Main Screen



2. Click **Control Panel**.
3. Select **Setup > Devices**.
4. Click on the **Display Specifications** tab.
5. Click the “+” at the upper right of the Display Spec list box.

## Configuring Display Specifications: Basic Info

On the Basic Info tab, specify the following information:

Figure 44. Basic Info Screen

The screenshot shows a web interface with a navigation bar at the top containing tabs: 'Locations & DMPs', 'Location-DMP Mapping', 'IP Phones', 'Local Control', and 'Display Specifications'. The 'Display Specifications' tab is active. On the left, a 'Display Spec List' is shown with a scrollable list of items: 'Panasonic-Viera', 'NEC', 'Jays Shop', 'LG' (highlighted in green), 'Panasonic 32', 'Sony', '32 inch Displays', 'Sharp Aquos', 'Panasonic-Viera', and 'IRBlaster'. On the right, the 'Basic Info' tab is selected, showing a form with the following fields: 'Device Name\*' (value: LG), 'Description' (value: LG), 'Make\*' (value: LG), 'Model\*' (value: LG), 'X Position' (value: 0), 'Y Position' (value: 0), 'X Scaling' (value: 0), 'Y Scaling' (value: 0), and 'Volume Strategy' (dropdown menu with 'External' selected). A red arrow points to the 'Volume Strategy' dropdown. Below the arrow is a callout box with the text: 'Click to Set Volume Strategy (Typically set to External)'. At the bottom left of the screenshot, there is a small copyright notice: '© 2006 Cisco Systems, Inc. All rights reserved. Cisco Confidential'.

- **Device Name:** This is the name that will appear in the Display Spec drop-down list when you are adding TV Types to Locations in StadiumVision Director). This name should be unique and descriptive so you can easily identify the type of TV to which this applies.
- **Make:** The TV make or brand name.
- **Model:** The TV Model to which this Display Specification applies. You can enter a unique model type, a group of models, or All to indicate that all TVs of this brand have the same Display Specifications.
- **X and Y** coordinates for positioning and scaling (Optional). You should change these settings *only* if required for older TVs where graphics need to be fitted within the visible area.

These parameters default to (0,0) for position and (0,0) for scaling. The combination of these parameters allows you to position the Flash template application and stretch or shrink it anywhere on the screen to fit on the TV screen.

- **Position Parameters:** The X Position and Y Position parameters represent the starting point of the image. If they are not set correctly, the images will appear off-center. The X Position refers to the horizontal placement and the Y Position refers to the vertical placement. 0,0 is the upper left hand corner, and that is the setting for most TVs. (All numbers are positive numbers, so the Y values represent the distance from Y=0 or the top of the screen).
- **Scaling Parameters:** The X Scaling and Y Scaling parameters set a scaling factor that can be used to shrink or stretch the Flash template application on the TV screen. A scaling factor of 1.0 is equivalent to 100% of the original size, where X Scaling represents the width and Y Scaling represents the height. A scaling factor of 0.5 will shrink the Flash template application down to 50% (or half) of its original size. For most TVs, both scaling factors will be 1. The scaling factors are required for older TVs that do not have settings to control overscan on the TV. By default, some of these TVs overscan, which



causes some of the screen to get clipped off. This may not be noticeable when displaying a full-screen video channel, but it is very noticeable when displaying graphics (for example, a 3-Region template).

If you are uncertain of the correct values for your TV type, check the TV manufacturer's documentation for the correct values. If the information is not available, start with the defaults and adjust the parameters as required until the image fits the screen properly. This will need to be done only once per TV model.

- **Volume Strategy:**

- **External:** The volume on the TV is controlled by sending serial commands from the DMP to the TV (via RS-232). Note: The configuration of the External Volume strategy is recommended because TVs typically have better audio range than the DMP and many TVs provide a visual indicator of the volume level as the volume is being changed.
- **Internal:** The volume on the TV is controlled by changing the volume of the audio feed as it is transmitted from the DMP. This volume strategy would typically be used if the TV does not have RS-232 control and volume is to be controlled by SV Director remotely, the DMP IR remote, IP Phone or Crestron/AMX controller.
- **None:** The volume cannot be adjusted. This is useful for TVs that are used for video only where audio (if any) is provided separately (such as in a bar where an overhead system provides the audio).

6. Click **Save**.

## Configuring Display Specs: Serial Commands

The Serial Commands are used to control the TV and can include, on, off, mute, changes in volume level, and activation of an external input. The on and off serial commands must be supplied for StadiumVision Director to control the TV power.

For TVs that are controlled either by an RS-232 port or an RS-232 to IR adapter, these commands typically start with:

```
rs232.tx_hex=
```

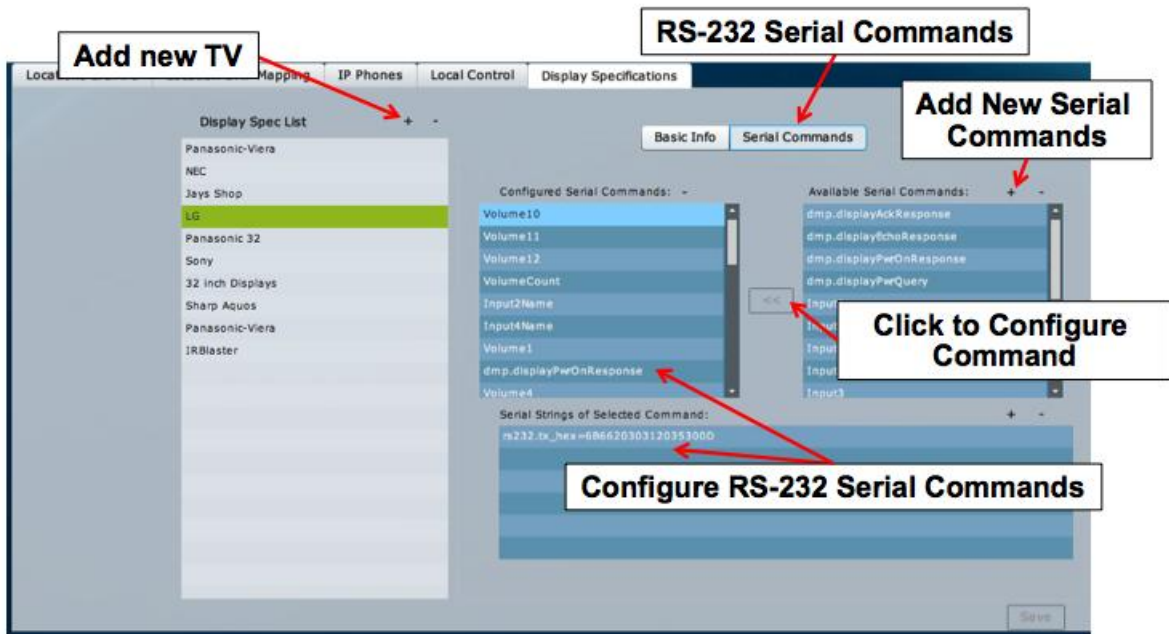
If the TV cannot accept commands via an RS-232 port or an IR adapter, you can use certain commands (such as volume and mute) issued directly to the DMP. These commands typically start with:

```
sigma
```

To configure serial commands:

1. Open the **Serial Commands** tab:

Figure 45. Serial Commands Screen



2. From the Available Serial Commands list, select the command or commands that you wish to add and click <<. This adds the command name to the list of Configured Serial Commands.

If the command you wish to configure is not in the list of Available Serial Commands, click the + at the upper right of the list box and enter the label you wish to use for the new command.

3. Highlight the serial command in the Configured Serial Commands list.
4. Click the + above the Serial Strings of Selected Commands list.
5. Enter the appropriate serial string. This string will now be associated with the highlighted serial command for this device.

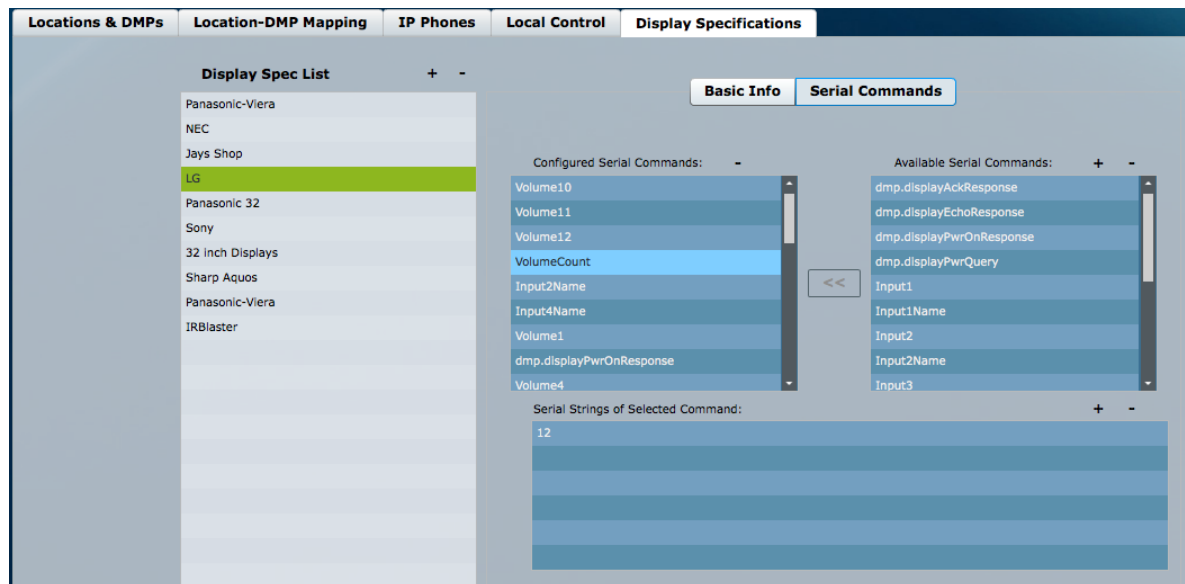
## Defining Volume Commands

StadiumVision Director allows you to define volume controls that are relative (volume up and volume down) or explicit (volume *number*). Relative volume commands depend on the volume increments set in the TV, which may vary widely from model to model. Therefore, the preferred method is to use explicit volume controls.

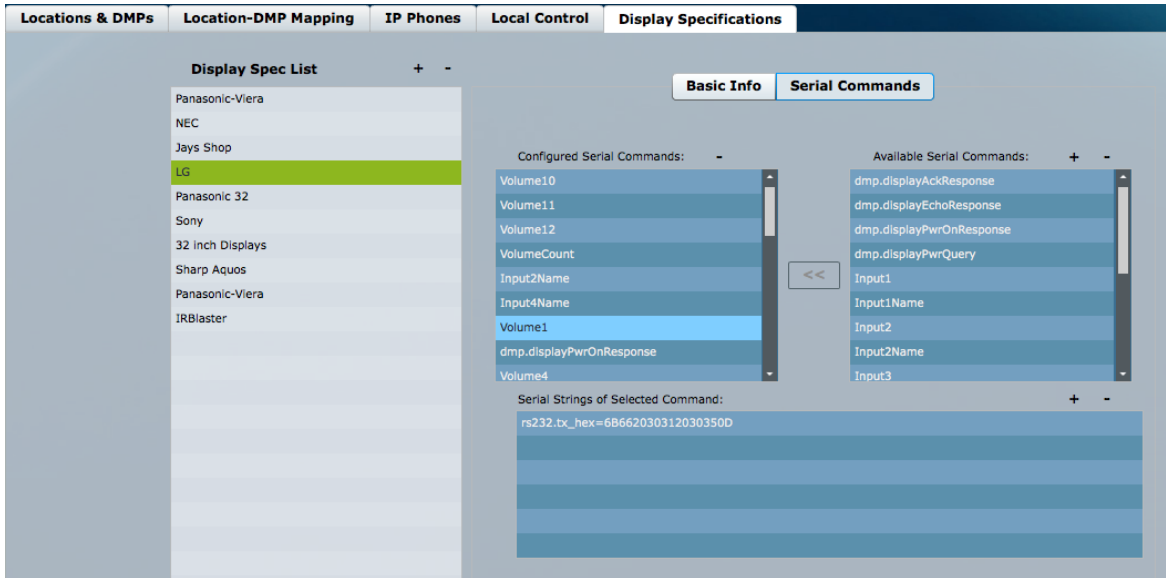
### Explicit Volume Commands

To define explicit volume controls for the attached TV, you must first define the desired number of increments (levels) between minimum and maximum volume, then for each increment define a corresponding serial command.

1. On the Serial Commands tab for the desired TV type, click the + at the upper right of the Available Serial Commands list box.
2. Enter "VolumeCount" as the command name, press return to add the new command.
3. The new command will be highlighted. Click << to move the command to the Configured Serial Commands list box.
4. With VolumeCount highlighted in the Configured Serial Commands list, click the + at the top of the Serial Strings of Selected Commands box.
5. Specify the number of increments (levels) to be used in controlling volume.
6. Press Enter on your keyboard.



7. For each volume increment in the VolumeCount (1 through n):
  - a. Click + at the upper right of the Available Serial Commands box and add a corresponding command called Volumex, where x is a number (1 through n) that identifies the input.
  - b. Select the Volumex command in the available list and click << to add it to the configured list.
  - c. Select the Volumex command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the appropriate RS-232 command for that level of volume.
8. Click **Save**. This string will now be associated with the configured serial command for the selected device.



Below is an example of volume commands for an LG Display with a VolumeCount of 12.

Serial Command	String
Volume1	rs232.tx_hex=6B662030312030350D
Volume2	rs232.tx_hex=6B662030312031300D
Volume3	rs232.tx_hex=6B662030312031350D
Volume4	rs232.tx_hex=6B662030312032300D
Volume5	rs232.tx_hex=6B662030312032350D
Volume6	rs232.tx_hex=6B662030312033300D
Volume7	rs232.tx_hex=6B662030312033350D
Volume8	rs232.tx_hex=6B662030312034300D
Volume9	rs232.tx_hex=6B662030312034350D
Volume10	rs232.tx_hex=6B662030312035300D
Volume11	rs232.tx_hex=6B662030312035350D
Volume12	rs232.tx_hex=6B662030312036300D

Note: It is a best practice to set Volume1 at a value above zero. A zero volume level is considered as a mute and when the user adjusts the volume up, some displays show the status bar as if their volume is turned up, but the display remains muted. Known displays to exhibit this behavior are: Sony Bravia KDL-32S5100, KDL-46S5100 and KDL-52S5100 displays using the MA2 chassis for RS232 control. It may affect other models, which also use the MA2 chassis for RS232 control.

**Relative Volume Commands**

To define relative volume controls for the attached TV:

1. On the Serial Commands tab for the desired TV type, click the + at the upper right of the Available Serial Commands list box.
2. Click + at the upper right of the Available Serial Commands box and add a corresponding command called VolumeUp.
3. Press Enter.  
The VolumeUp will automatically be selected in the available list. Click << to add it to the configured list.
4. Select the VolumeUp command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the appropriate RS-232 command to increase the volume.
5. Press Enter.
6. Repeat steps 1 through 6 to define a command for VolumeDown.
7. Click **Save**.

## Repeating Relative Volume Serial Commands

As previously mentioned, the VolumeUp and VolumeDown commands rely upon the incremental volume settings that are internal to each model of TV. For some TVs, the increase/decrease in volume is very slight, requiring multiple VolumeUp or VolumeDown commands to achieve the desired effect. For these TVs, you can add and define a *serial command* with the label “dmp.RelativeVolumeSteps.”

The value that you specify for dmp.RelativeVolumeSteps represents the number of times the RS-232 command for VolumeUp or VolumeDown will be repeated when you press up or down on the IR remote (or on the phone). For example, if dmp.RelativeVolumeSteps is set to 8, then a VolumeUp command will result in 8 copies of the up string being sent, rather than just one. If dmp.RelativeVolumeSteps is not set, then the default value is 1.

To define the relative volume steps:

1. On the **Serial Commands** tab for the desired TV type, click the + at the upper right of the Available Serial Commands list box.
2. Click + at the upper right of the Available Serial Commands box and add a corresponding command called dmp.RelativeVolumeSteps.
3. Press Enter.
4. The dmp.RelativeVolumeSteps will automatically be selected in the available list. Click << to add it to the configured list.
5. Select the dmp.RelativeVolumeSteps command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the appropriate value for the steps (as described above).
6. Press Enter.

7. Click **Save**.

## Setting a Delay Between Repeated Serial Commands

Some models of TVs discard repeated serial commands that are sent too close together. For those TVs, you can add and define a *serial command* with the label "dmp.SerialDelay." The value that you specify for dmp.SerialDelay represents the delay between sending repeated serial commands from the DMP. By default, the value is 5000 (milliseconds). If the value is set lower, the delay between messages is decreased.

To define the relative volume steps:

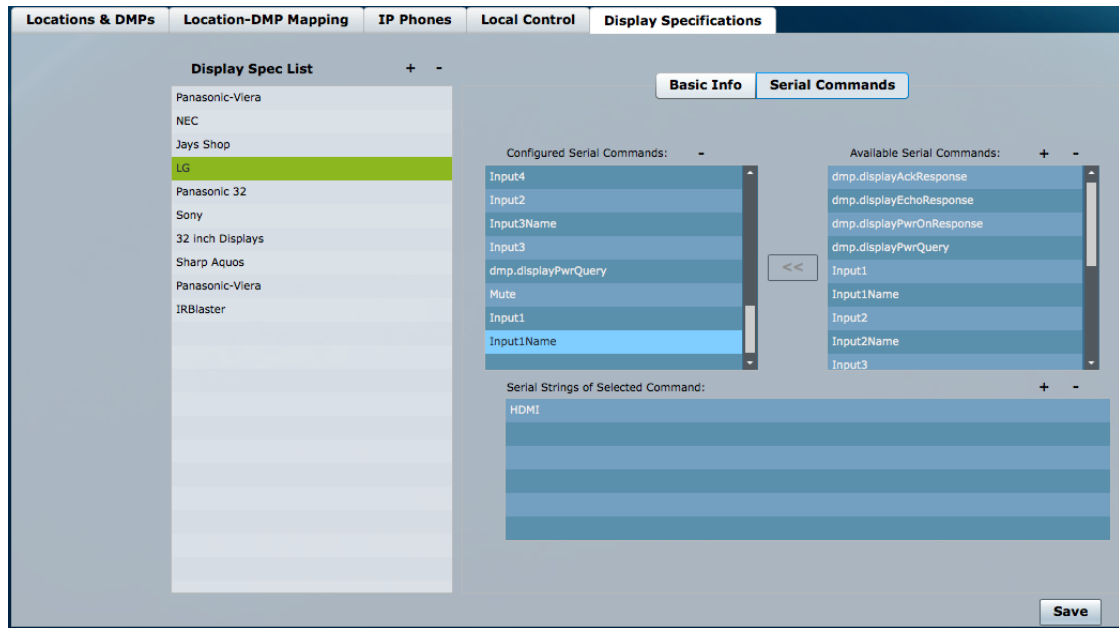
1. On the Serial Commands tab for the desired TV type, click the + at the upper right of the Available Serial Commands list box.
2. Click + at the upper right of the Available Serial Commands box and add a corresponding command called dmp.SerialDelay.
3. Press Enter.
4. The dmp.SerialDelay will automatically be selected in the available list. Click << to add it to the configured list.
5. Select the dmp.SerialDelay command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the appropriate value for the steps (as described above).
6. Press Enter.
7. Click **Save**.

## Defining Input Commands

Most TV types have multiple inputs available. For TVs in public areas, such as concourses, it is likely that only one of these inputs will be used. However, in areas with local TV control (such as clubs, back offices, locker rooms, and luxury suites), additional inputs may be used to provide connectivity to DVD players, PCs, etc. You can define labels and serial commands to control the use of these inputs.

To define input labels and serial commands:

1. On the Serial Commands tab for the desired TV type, click the + at the upper right of the Available Serial Commands list box.



2. For each desired input (1 through 4):
  - a. Select the InputxName command in the available list and click << to add it to the configured list.
  - b. Select the InputxName command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the desired label, such as HDMI or Composite, and press Enter. This label that appears on the Cisco IP Phone when the guest selects the Advanced option.
  - c. Select the Inputx command in the available list and click << to add it to the configured list.
  - d. Select the Inputx command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the appropriate RS-232 command for that input, and press Enter.
3. If the TV has more available inputs:
  - a. Click + at the upper right of the Available Serial Commands box and add a corresponding command called InputxName, where x is a number that identifies the input.
  - b. Select the InputxName command in the available list and click << to add it to the configured list.
  - c. Select the InputxName command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the desired label.
  - d. Click + at the upper right of the Available Serial Commands box and add a corresponding command called Inputx, where x is the number that identifies the input.

- e. Select the Inputx command in the available list and click << to add it to the configured list.
  - f. Select the Inputx command in the configured list and click + at the upper right of the Serial Strings of Selected Commands. Enter the appropriate RS-232 command for that input.
4. Click Save.

## TV Power On/Off Status

Note: The TV must support query operations for the Management Dashboard to report the TV's On/Off status. See the RS-232 command section of the TV's user manual to see if query support is available.

The Management Dashboard provides an aggregate look at the status of the DMP, TV and if the TV supports query commands, the TV power on/off status.

**Aggregate DMP Status**

**Aggregate TV Status**

**TV On/Off**

**Main window**

Power	Location	IP Address	MA
Off	BOULDER-4310-A	10.10.99.11	00:
Off	DMP100	10.1.2.2	
Off	DMP101	10.1.2.4	
Off	DMP200	10.1.2.3	
Off	DMP201	10.1.2.13	
Off	DMP202	10.1.2.23	
Off	TEST BAT	10.10.99.99	

**Detailed window**

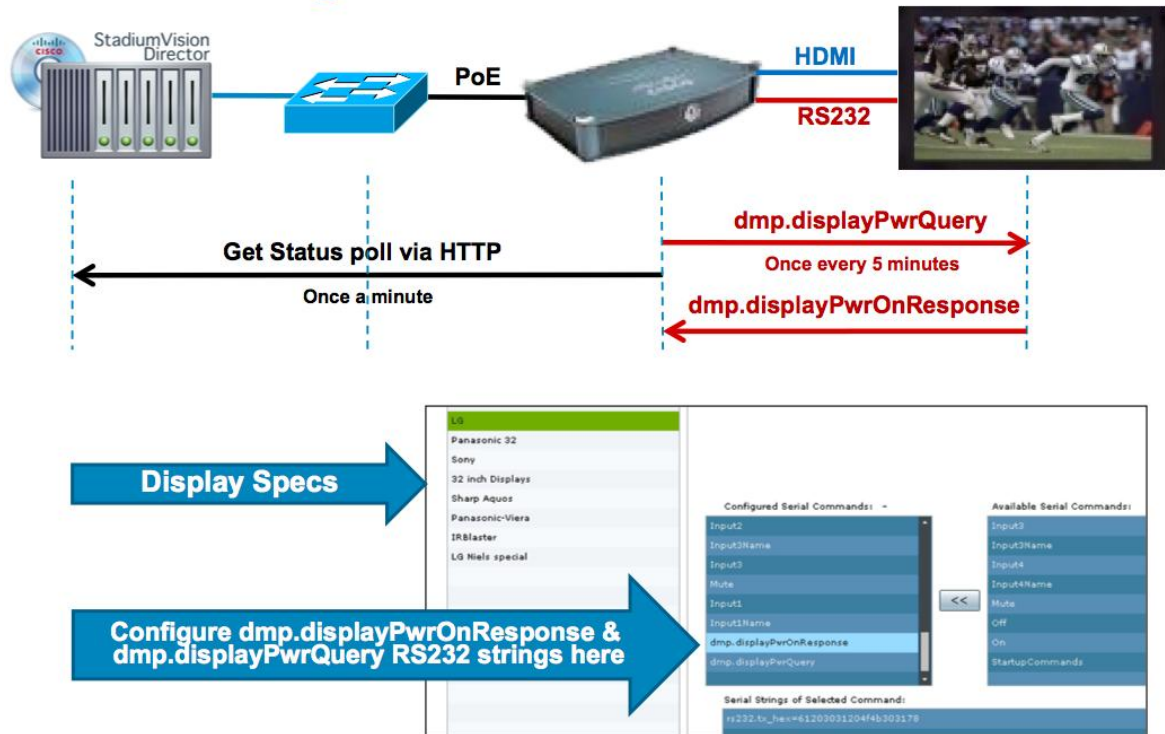
**Alerts**

**Status Refresh**

The DMP collects stats and every 5 minutes sends a syslog message to SV Director. During this collection period, the DMP sends a power query command to the display and waits up to 500 milliseconds for a response. The DMP determines the TV power on/off status by polling the RS-232 receive MIB variable. If a response is received, it compares the results to the configured power on response. If there is a discrepancy between what the DMP thinks the TV status is and what the TV actually reports, a syslog is generated noting the difference and the DMP's TV



status is updated to match the TV. The status log is then dispatched to SV Director containing the TV On/Off status.



The Status Refresh from the dashboard only gets the DMP's view of the TV's on/off status and doesn't actually trigger the above mechanism. If the power to the TV is toggled without the DMP's knowledge, for example using the TV's IR remote, the results in the dashboard could take up to 5 minutes or so before it is updated. If the TV status is altered and the DMP is aware of the change, for example sending a TV on command from the Management Dashboard, this status is available immediately.

If not already configured in the Display Specifications for the particular TV of interest, configure the `dmp.displayPwrQuery` and `dmp.displayPwrOnResponse` strings in the Display Specification screen as shown above.

## Viewing the Workflow Status

There are indicators in the SV Director Management Dashboard, on the TV, and on the Control Panel that provide you information on the DMP auto provisioning status.

### Viewing the Workflow Status in the Dashboard

Once a DMP has auto registered, you can view the auto provisioning status through the Management Dashboard. The Provision DMP workflow progress is displayed in

the Dashboard Console Window for the selected DMP. A summary of the Workflow execution is also displayed in the Checked At column in the Device List.

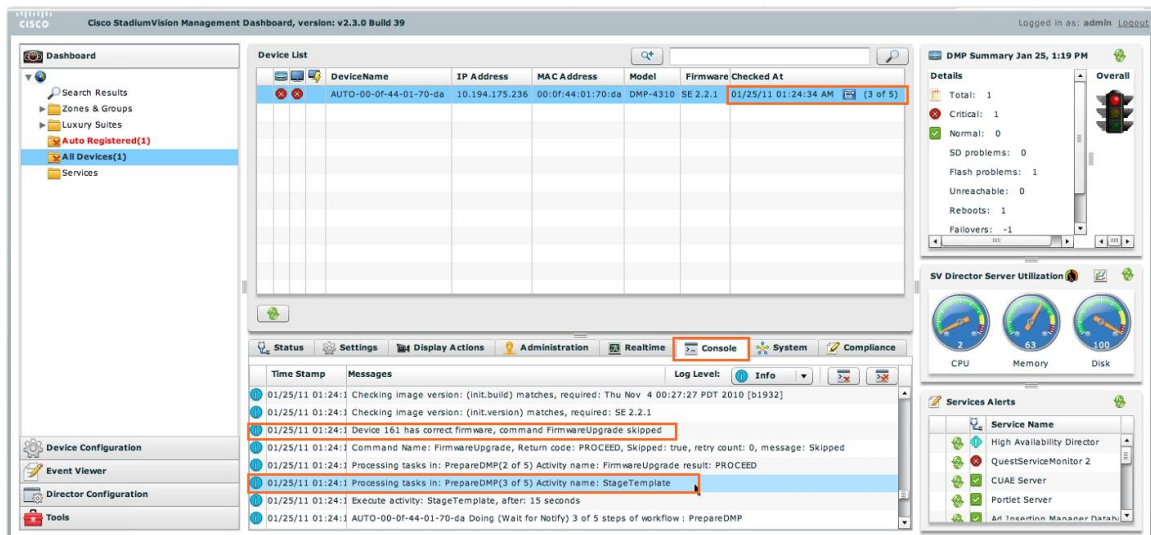
To view the workflow status:

1. Open the Dashboard. The Auto Registered folder should be highlighted in red indicating that there are DMPs that have been auto registered but have not been provisioned. When a number appears next to Auto Registration in the Device List, it indicates that there are DMPs that are registered but do not have any zones or groups assigned.
2. Click the Auto Registered folder and select the DMP of interest.
3. Click on the DMP of interest and then click the **Console** tab below the Device List to view a message log indicating the DMP's transition through the five auto provisioning steps.

In the example shown in Figure 46, the log messages show that auto-provisioning step 3: Stage Template is being executed. The progress is indicated as (3 of 5) in the 'Checked At' box in the Device List.

The status messages also indicate that step 2: Upgrade Firmware was skipped since the DMP already has the correct firmware image.

Figure 46. Viewing the DMP Auto Provisioning Progress



As the auto provisioning completes, three icons in the Device List indicate the status. Refer to Figure 47 and Table 4.

Figure 47. Viewing Status

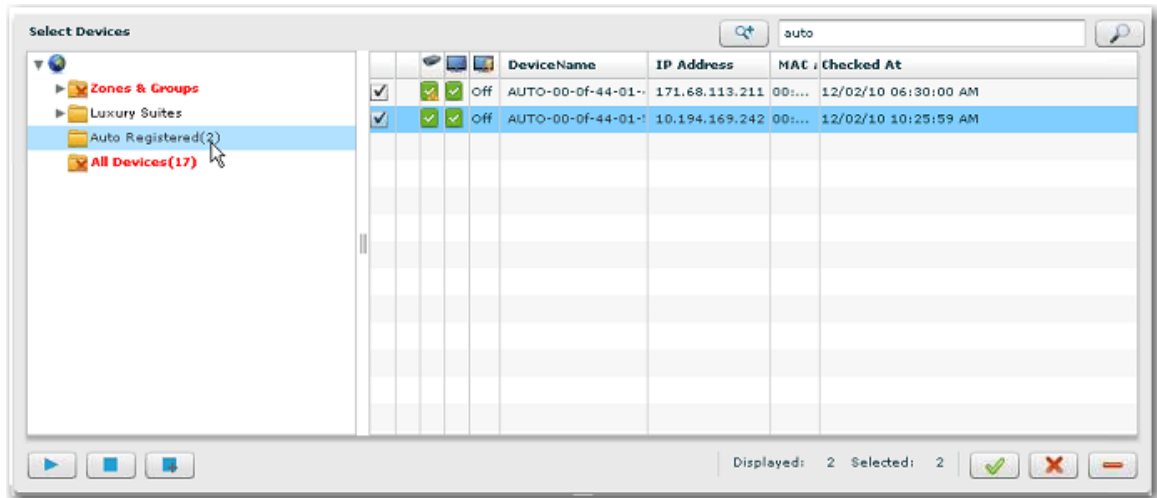





Table 4. Auto Registration Device Status Icons

Icon	Status	Description
	DMP Status	A green check box indicates the DMP status is normal. A gold alert icon over the green check box indicates the DMP is normal but has a minor alert. To view more details about the alert, select the DMP and then click the <b>Status</b> tab below the Device List. View the alert messages in the DMP column. Refer to 0.
	TV Status	Shows red or green TV status. The status is determined by whether the RS232 is enabled (green) or disabled (red), HDMI Auto Detection status succeeded/failed, and HDMI/DVI Auto Detection enabled/disabled. Refer to Figure 49.
	TV State	Indicates TV Power On/Off status if the TV supports query RS-232 codes.

You can view more detailed status on a DMP, select the DMP from the Device List and then click the **Status** tab below the Device List. Refer to Figure 48.

Figure 48. Viewing Detailed Device Status

The screenshot displays a network management interface. At the top, a 'Select Devices' window is open, showing a list of 17 devices. The 'All Devices(17)' group is selected. Below this, a table lists the devices with their names, IP addresses, MAC addresses, and the time they were last checked. The 'prad pc' device is highlighted in blue.

DeviceName	IP Address	MAC	Checked At
AUTO-00-0f-44-01-...	171.68.113.211	00:...	12/02/10 06:30:00 AM
AUTO-00-0f-44-01-...	10.194.169.242	00:...	12/02/10 10:25:59 AM
rcdn 1	64.101.138.104	00:...	12/02/10 06:30:00 AM
rcdn 2	64.101.138.102	00:...	12/02/10 06:30:00 AM
10.24.162.12	64.102.87.133		12/02/10 06:30:00 AM
64.102.87.133	64.102.87.133		12/02/10 06:30:00 AM
64.101.138.105	64.101.138.105		12/02/10 06:30:00 AM
bryan dmp	64.102.87.159		12/02/10 06:30:00 AM
henry dmp	171.69.66.150		12/02/10 06:30:00 AM
mark DMP	64.102.87.190		12/02/10 06:30:00 AM
Dave DMP	64.102.87.202		12/02/10 06:30:00 AM
Wei DMP	64.102.87.201		12/02/10 06:30:00 AM
prad pc	10.65.76.122		12/02/10 06:30:00 AM

Below the device list, the 'prad pc' device's detailed status is shown. The 'DMP Status' section includes: Overall Health (Normal), DMP State (Not Ready), SD Card Status (Normal), Flash Status (Normal), Factory Default (No), Connectivity (Connected), Reboot (No reboot detected), Failover (No failover detected), and Compliance (Non Compliant). The 'TV Status' section includes: HDMI / DVI Auto Detection (Enabled), HDMI Auto Detection Status (Succeeded), and RS-232 Service (Disabled).

## Viewing Detailed HDMI Detection Status

To view details about the HDMI Detection Status, select the DMP from the Device List and select the **Status** tab below the Device List. The HDMI Detection status displays in the TV Status column. Refer to Figure 49.

Figure 49. Viewing HDMI Detection Status

The screenshot shows the 'Select Devices' window with a table of devices. The 'Status' tab is selected, showing the 'DMP Status' and 'TV Status' sections.

DeviceName	IP Address	MAC	Checked At
AUTO-00-0f-44-01-	171.68.113.211	00:...	12/02/10 06:30:00 AM
AUTO-00-0f-44-01-	10.194.169.242	00:...	12/02/10 10:25:59 AM
rcdn 1	64.101.138.104	00:...	12/02/10 06:30:00 AM
rcdn 2	64.101.138.102	00:...	12/02/10 06:30:00 AM
10.24.162.12	64.102.87.133		12/02/10 06:30:00 AM
64.102.87.133	64.102.87.133		12/02/10 06:30:00 AM
64.101.138.105	64.101.138.105		12/02/10 06:30:00 AM
bryan dmp	64.102.87.159		12/02/10 06:30:00 AM
henry dmp	171.69.66.150		12/02/10 06:30:00 AM
mark DMP	64.102.87.190		12/02/10 06:30:00 AM
Dave DMP	64.102.87.202		12/02/10 06:30:00 AM
Wei DMP	64.102.87.201		12/02/10 06:30:00 AM
prad pc	10.65.76.122		12/02/10 06:30:00 AM

The 'Status' tab shows the following details:

**DMP Status**

- Overall Health: Normal
- DMP State: Not Ready
- SD Card Status: Normal
- Flash Status: Normal
- Factory Default: No
- Connectivity: Connected
- Reboot: No reboot detected
- Failover: No failover detected
- Compliance: Non Compliant

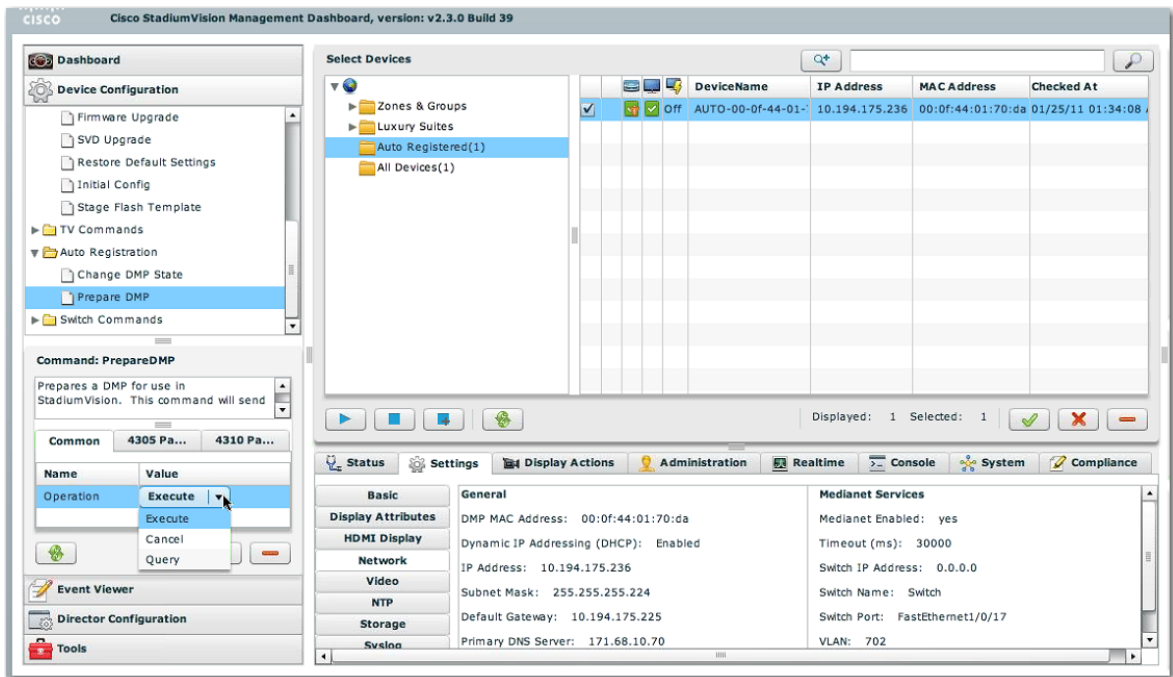
**TV Status**

- HDMI / DVI Auto Detector: Enabled
- HDMI Auto Detection Statu: Succeeded
- RS-232 Service: Disabled

## Querying the Auto Provisioning Status

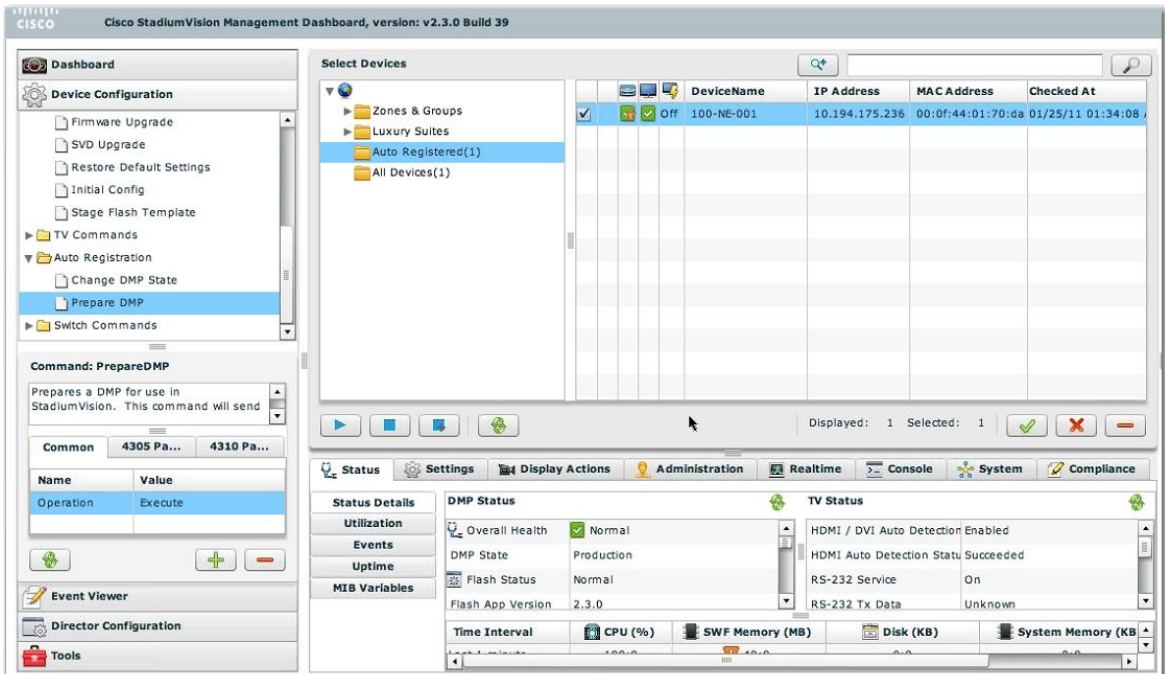
1. Open the Dashboard and select **Device Configuration > Auto Registration**.
2. Click **Provision DMP**.
3. In the command parameters area, click on Value and select Query from the Value drop down menu.

Figure 50. Querying the Auto Provisioning Status



When you run the Query command on a device, the **Console** tab will display which provisioning step has been completed for the selected device.

Figure 51. Viewing the DMP State (Production)



## Viewing Auto Provisioning Status on the TV

During the auto provisioning workflow, the TV screen displays:

- The barcode for the DMP MAC address.
- A ticker showing the MIB variables, IP address, CDP variables, and switch settings.
- Intermediate status of the auto provisioning. This tells you what step you are on in the auto provisioning, what step is next, and what is happening to the DMP (e.g, transitioning to the ready state).

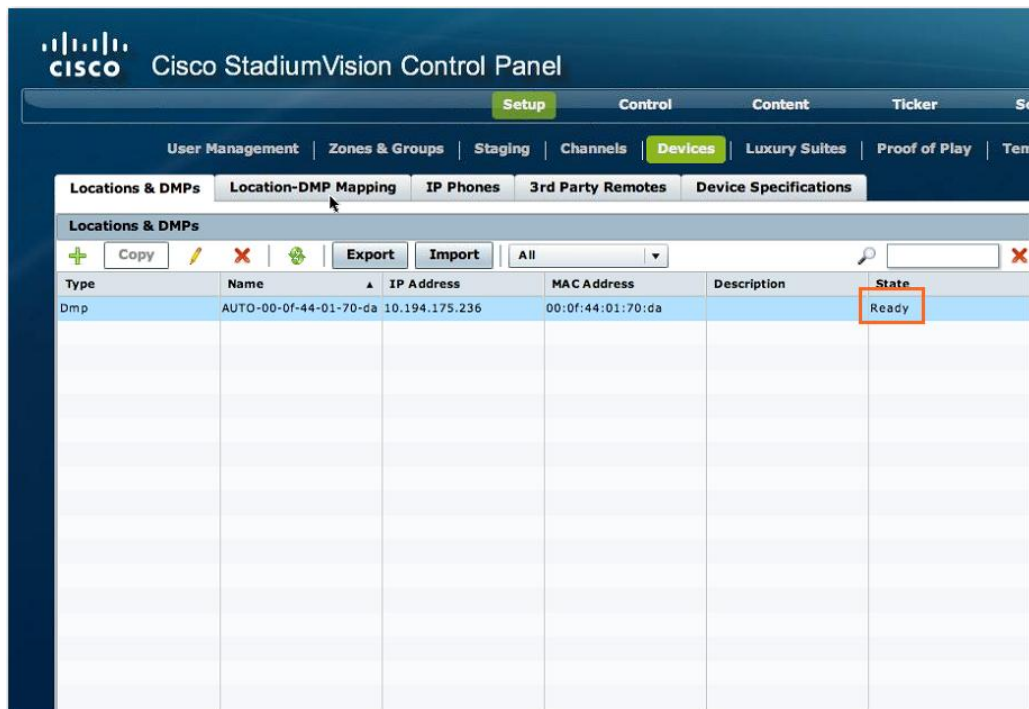
When auto provisioning is finished, a “Completed!” status message and the default video channel displays on the TV. If the Completed! message does not display, auto provisioning was unsuccessful.

## Viewing the DMP Readiness State in the Control Panel

To view which state (Not Ready, Ready, In Production) the DMP is in during auto registration and provisioning:

1. Open the Control Panel.
2. Select **Setup > Devices**.
3. Select the **Locations & DMP** tab to display DMP information, including the current state. The State column will display ‘Ready’ when the DMP is ready to be mapped to a location. Refer to Figure 52.

Figure 52. Viewing the DMP Readiness State



The screenshot shows the Cisco StadiumVision Control Panel interface. The 'Devices' tab is selected, and the 'Locations & DMPs' sub-tab is active. A table displays the DMP information, with the 'State' column highlighted in orange and showing 'Ready'.

Type	Name	IP Address	MAC Address	Description	State
Dmp	AUTO-00-0f-44-01-70-da	10.194.175.236	00:0f:44:01:70:da		Ready

# DMPs and Locations

---

## Understanding DMP and Location Objects

There are three object types that are used in SV Director to track and create relationships between DMPs and their physical location. These object types are as follows:

- **DMP** – This object type describes a DMP with the following information.
  - **Name** – This is the name that describes the DMP. Typically it's name derived from the MAC address (e.g., Unassigned-00-0f-44-01-a5-ec) or the Location Name.
  - **Description** – Optional field for additional description information
  - **IP Address** – DMP IP Address
  - **MAC Address** – DMP MAC Address
- **Location** – This object type defines the physical location where the DMP is located with the following information.
  - **Name** – This is the name used to identify the location and is derived from a naming convention that an operator can easily identify where the DMP is physically located.
  - **Description** – Optional field for additional description information
  - **Location ID** – Optional field for additional location information. Typically this would be where blueprint location IDs would be inserted. This information is not always user-friendly for easy location identification.
  - **Display Spec** – Drop-down menu for choosing the TV Type at the location
- **DMP+Location** – This object type is the summation of the two above objects when linked.

These object types can be created manually in the SV Director web interface or uploaded in bulk using a properly formatted CSV file.

## Location and Using a Naming Convention

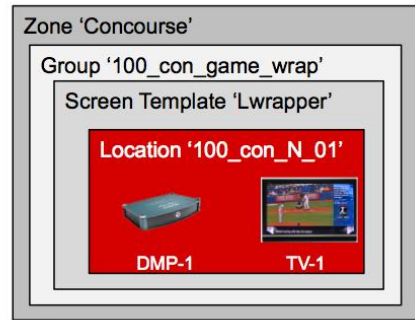
In StadiumVision Director, the concept of Location is the identifying name of the physical location where a TV and DMP is located within the venue. See Figure 53.



Figure 53. Location Definition in StadiumVision Director

## Location

- Specific place in the stadium where a TV and DMP reside



Although, customers typically derive their own naming conventions of how they will identify a physical location within their venue, this section will provide some recommendations based on past experience in deploying large numbers of DMPs.

Below are some basic guidelines that can be used.

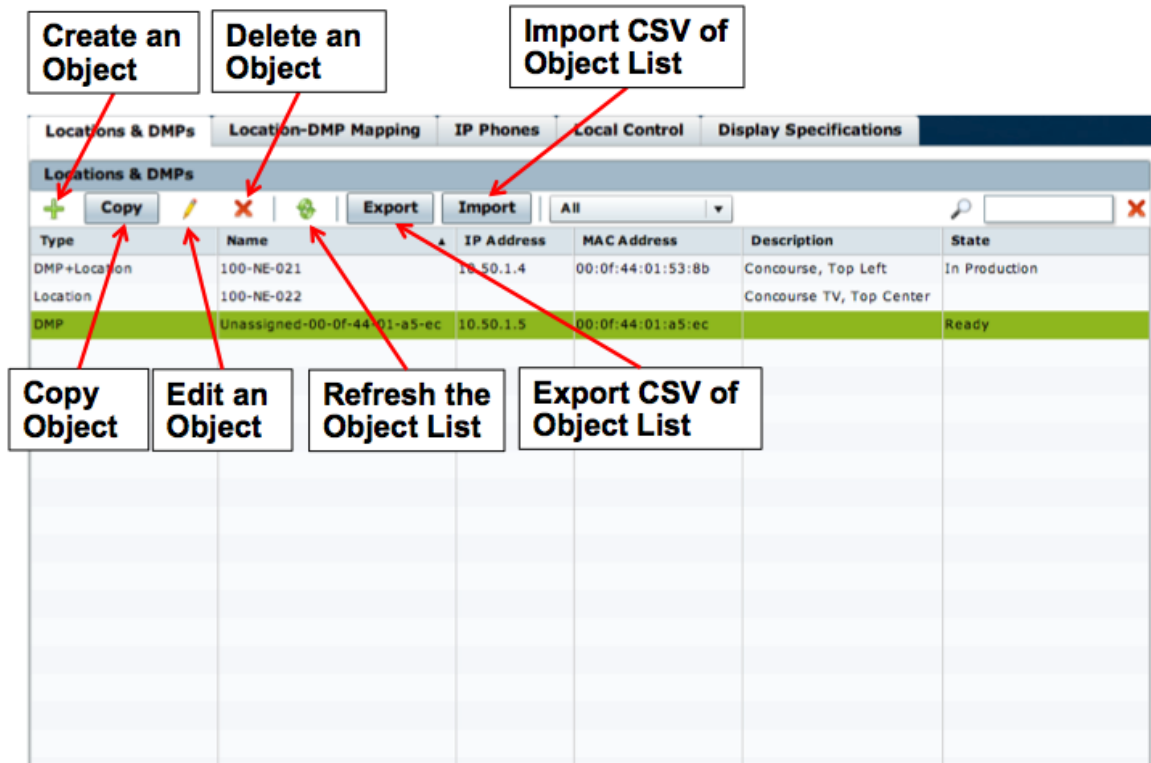
- Use generic names that describe the physical location. That is, it is not recommended to use a club or concession stand name since they may change.
- Use floor levels
- Use absolute references (i.e., North, South, East, West)
- Use 3-digit suffix
- Room name details can be added or modified at any time in the TV Location 'description' field in SV Director.
- It is recommended that labels with the Location Name be attached to each TV in the venue. This simplifies identifying a problem TV and searching for it in the SVD management dashboard. Printing the Location Name in both textual and bar code format allows the label to be scanned during the install process. See the discussion around bar code scanners in the BAT section.
- Names should only use A-Z a-z 0-9 space \_ -
  - Invalid Characters % \* , : ? = / \ " ' [ ] ( ) +

Example Location Name: 100-NE-020

# Creating, Deleting, and Updating DMP and Location Objects

There are two methods that can be used to create, delete and update a DMP or Location. Each of these operations can be done manually in a one-by-one manner or done in bulk by editing and uploading a CSV file. These operations are performed in the **Setup>Devices>Locations & DMPs** web interface.

Figure 54. Navigating the Locations & DMPs Web Interface

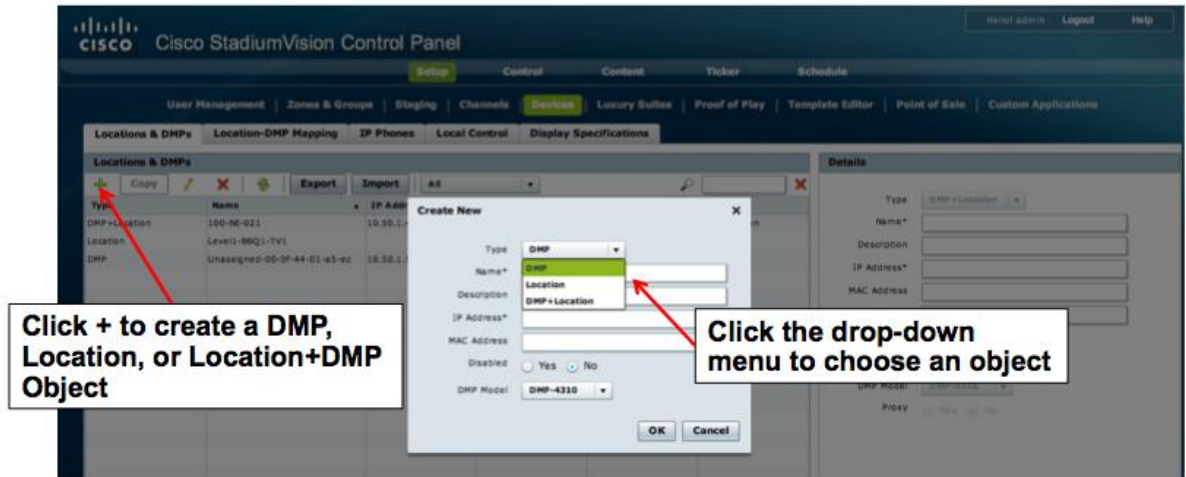


## Manual

To manually add a DMP or Location object:

1. Open the Control Panel.
2. Select **Setup>Devices>Locations & DMPs**.
3. Click the **+** to bring up the Create New menu.
4. Click the drop-down menu to choose the object to be created.
5. Type in the required information highlighted by the asterisk and any additional information as desired.

Figure 55. Manually Creating a DMP, Location, DMP+Location Object



## Bulk Administration (Import/Export)

Due to the high number of DMPs and other devices (e.g., IP Phones, 3<sup>rd</sup> Party devices) CSV files are often used for uploading the device information into SV Director. The CSV file requires a specific set of columns, column title syntax and column order to be compatible with SV Director. The best way to make sure the CSV file is compatible is to export a CSV file from SV Director and use that as a template when building a SV Director compatible CSV file.

Figure 56. Exporting a CSV file from SV Director

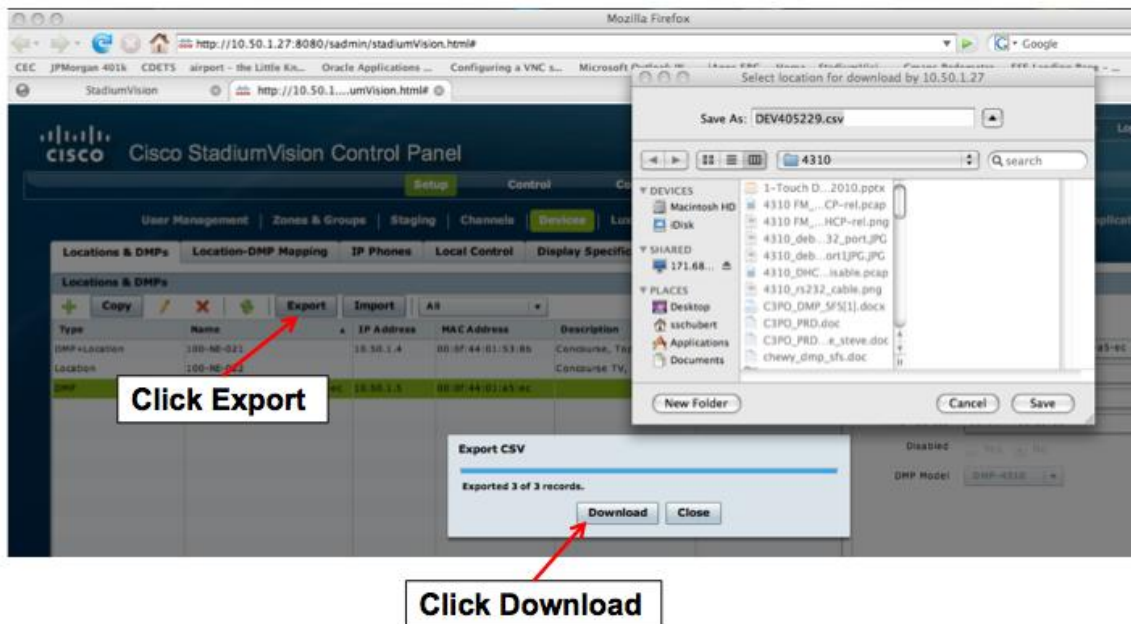


Figure 57. SV Director CSV Defined

The screenshot shows a CSV file with the following columns: Operation Type, Entry Type, MAC Address, IP Address, Name, Old Name, Model Name, LocationID, State, Service Type, Description, TV Type, and Sub. Red arrows point from callout boxes to specific columns: 'Entry Type (aka Object)' points to the Entry Type column; 'Notice Column Titles & Order' points to the header row; 'Operation Type' points to the Operation Type column; and 'Notice MAC Address format' points to the MAC Address column.

1	A	B	C	D	E	F	G	H	I	J	K	L	M
	Operation Type	Entry Type	MAC Address	IP Address	Name	Old Name	Model Name	LocationID	State	Service Type	Description	TV Type	Sub
2		LOCATIONn	00:0f:44:01:53:8b	10.50.1.4	100-NE-021		DHP-4310	1003	Production		Concourse, Top Left	LG	
3		LOCATIONn			100-NE-022				Production		Concourse TV, Top Center	LG	
4		DMP	00:0f:44:01:a5:ec	10.50.1.5	Unassigned-00-0f-44-01-a5-ec		DHP-4310		Ready				
5													
6													
7													

If using an existing CSV from a previous StadiumVision installation then modify the column order, add the Operation Type and Entry Type columns and verify that all columns and column headers are organized the same as the exported CSV. Then use the Operation Type and Entry Type columns for creating, deleting and updating entries in the CSV.

Note: MAC address can be entered in BAT in one of these 3 formats:

- a. aa:bb:cc:dd:ee:ff - SVD format
- b. aabbccddeeff - format on bar code label on bottom of 4310)
- c. aabb.ccdd.eeff - IOS format

Refer to the *Bulk Administration Tool Guide* for details on how to use the Bulk Administration Tool.

### Process Recommendation

Using bar code scanners as part of the installation process can increase the speed and accuracy of DMP deployment. When combined with TV labels that include the Location Name in bar code format, the installation workflow goes something like this.

1. Installer mounts the TV and DMP.
2. Installer cables the TV and DMP.
3. While DMP is auto-registering the installer attaches pre-printed label to TV.
4. Installer then scans the Location bar code on the TV.
5. Installer also scans the MAC address bar code on the DMP.

At the end of their shift, the installer returns the bar code scanner to the supervisor. The supervisor downloads the scanned data and formats it to be compatible with the BAT CSV file format. Part of the data formatting involves aligning MAC address and Location into two columns along side of each other. The scanned timestamp can be used to correlate the DMP MAC to the TV Location.

**Note:** The MAC address bar code on the DMP is very small and is a challenge for some bar code scanners. In particular smartphone based scanners that use the CCD camera generally do not work. The following is a list of sub-\$200 bar code scanners that have been tested and found to work.

[www.motorola.com/CS3000](http://www.motorola.com/CS3000)

<http://www.honeywellaidc.com/promos/3800g/>

Here is an example of a label printer that can print bar code:

<http://www.amazon.com/dp/B000ZHEVZ8>

Figure 58. Using the CSV to Create, Delete and Update Object Entries

	A	B	C	D	E	F	G	H	I	S
1	Operation Type	Entry Type	MAC Address	IP Address	Name	Old Name	Model Name	LocationID	State	
2	delete	LOCATION			200-NW-001				NotReady	
3	update	LOCATIONn	00:0f:44:01:53:8b	10.50.1.4	100-SE-031	300-SW-021	DMP-4310	1003	Production	
4		DMP	00:0f:44:01:a5:ec	10.50.1.5	Unassigned-00-0f-44-01-a5-ec		DMP-4310		Ready	
5	create	LOCATION			300-SW-001					
6	create	LOCATION			300-SW-002					
7	create	LOCATION			300-SW-003					
8	create	LOCATION			300-SW-004					
9	create	LOCATIONn		10.50.2.1	400-NW-001					
10	create	LOCATIONn		10.50.2.2	400-NW-002					
11	create	LOCATIONn		10.50.2.3	400-NW-003					
12	create	LOCATIONn		10.50.2.4	400-NW-004					
13	create	DMP	00:0f:44:01:a5:01	10.50.20.5	500-NW-001					
14	create	DMP	00:0f:44:01:a5:02	10.50.20.6	500-NW-002					
15	create	DMP	00:0f:44:01:a5:03	10.50.20.7	500-NW-003					
16										

**Creating LOCATION, LOCATIONn, and DMPs**

**Hint: Look for the \* for the required entries in the CSV for a particular operation**

- Import the CSV into SV Director and verify the import results match what was intended.

Figure 59. Importing a CSV

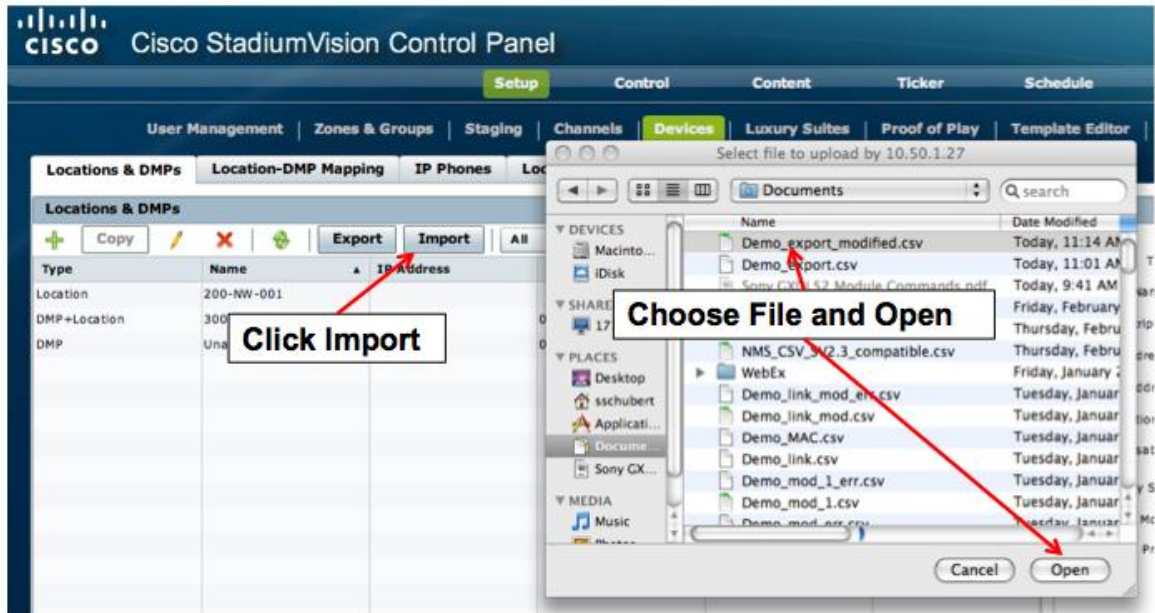
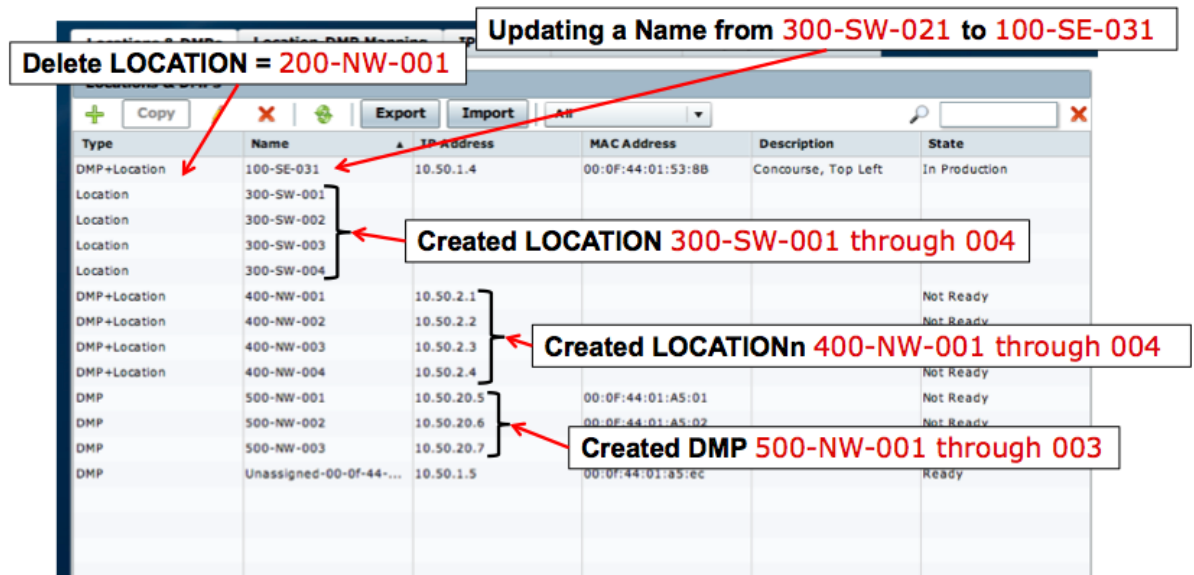


Figure 60. CSV Import Results



If an error occurs during Import, an error report will be generated. Open the report to see where the error occurred.

Figure 61. Download CSV Error Report

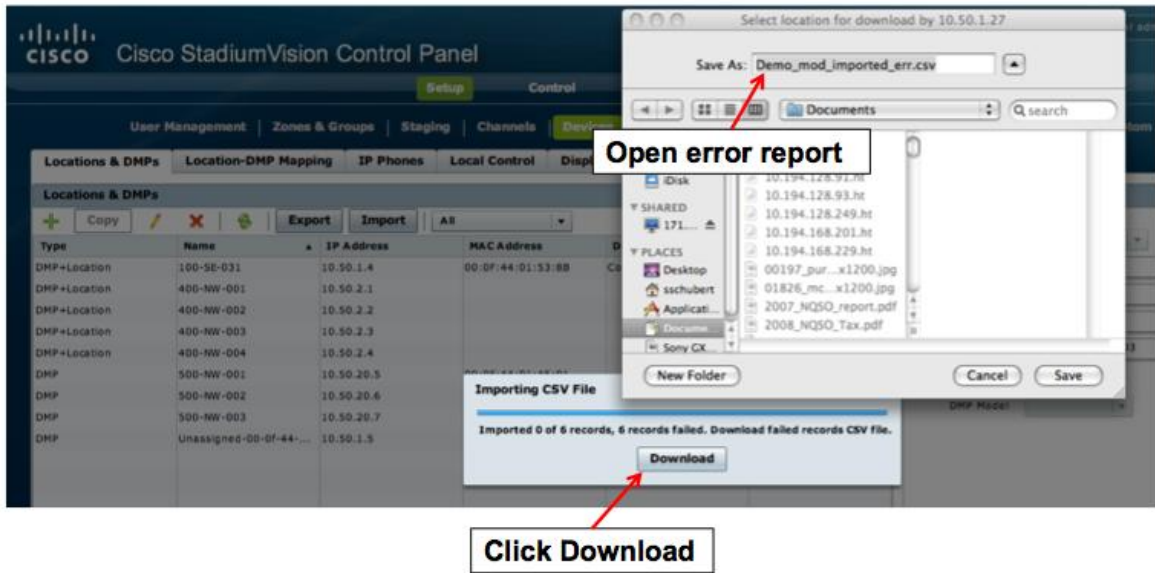


Figure 62. Example CSV Error Report

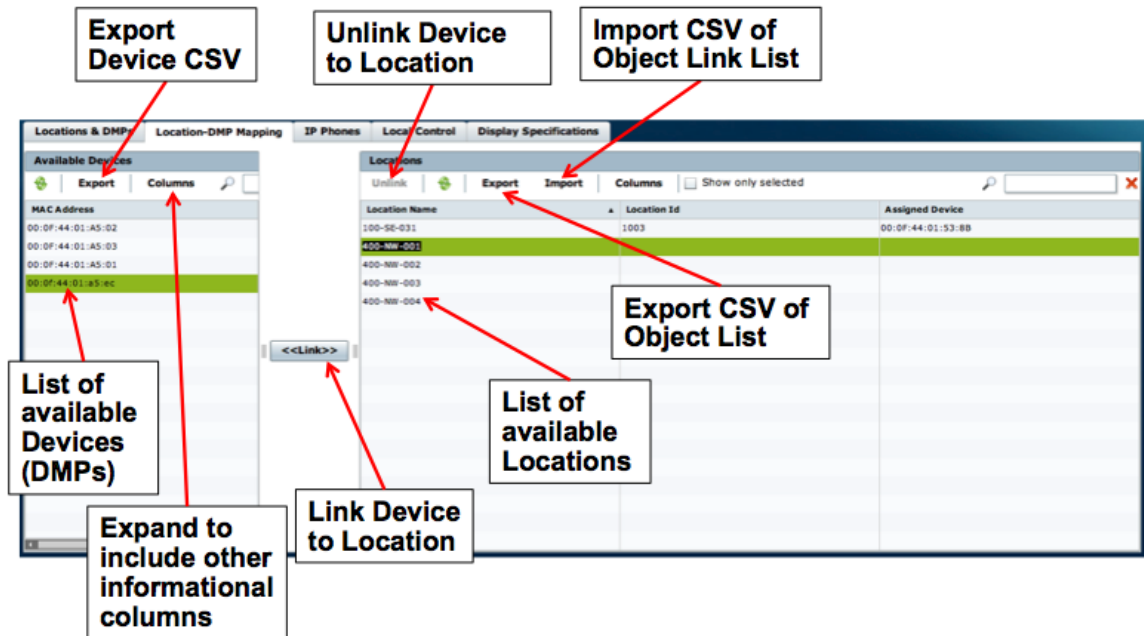
	A	B	C	D	E	F	G	H
1	Error Text	Operation Type	Entry Type	MAC Address	IP Address	Name	Old Name	Model Name
2	Devlce Name is Empty**	create	LOCATIONn		10.100.1.1			
3	Devlce Name is Empty**	create	LOCATIONn		10.100.1.2			
4	Devlce Name is Empty**	create	LOCATIONn		10.100.1.3			
5	Devlce Name is Empty**	create	LOCATIONn		10.100.1.4			
6	Devlce Name is Empty**	create	LOCATIONn		10.100.1.5			
7	Devlce Name is Empty**	create	LOCATIONn		10.100.1.6			
8								
9								
10								
11								
12								
13								
14								
15								

A callout box points to the first column with the text: "1st Column describes the error in the problem rows (e.g., The Name entry is empty and needs to be added to correct the problem)".

## Linking a Location to a DMP

The final step to readying the DMP for production is linking it with a Location. The linking operation can be done manually in a one-by-one manner or done in bulk by editing and uploading a CSV file. These operations are performed in the **Setup > Devices > Locations-DMP Mapping** web interface.

Figure 63. Navigating the Locations-DMP Mapping Web Interface

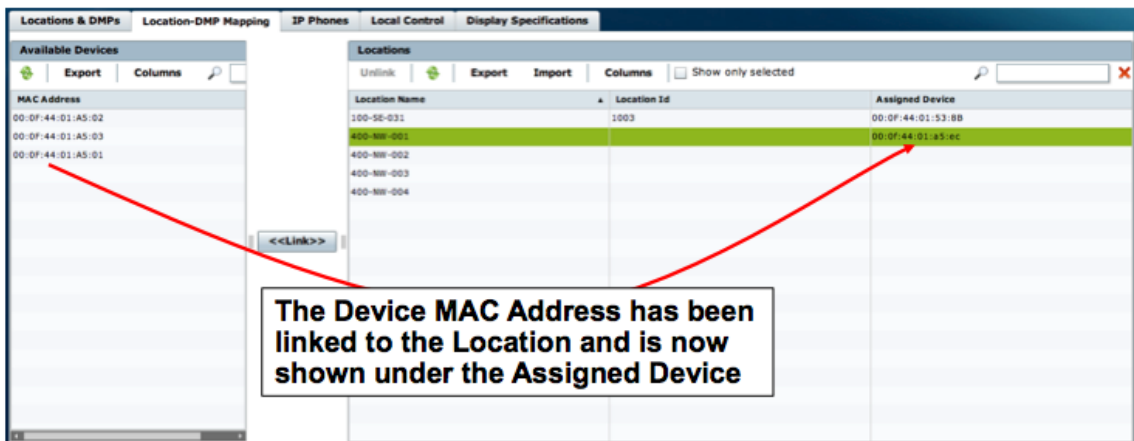


## Manual

To manually link a Location to a DMP object:

1. Select **Setup > Devices > Locations-DMP Mapping**.
2. Click on an available device under the MAC Address listing and click on a Location Name. The two objects should be highlighted (Figure 63).
3. Click on the Link button to link the two objects (Figure 64). The MAC address that was highlighted will move to the Locations listing section of the screen.

Figure 64. Manually Linking a DMP to a Location





## Bulk Import/Export

As mentioned previously, CSV files may be used for uploading the device (i.e., DMP) and Location information into SV Director. The CSV file requires a specific set of columns, column title syntax and column order to be compatible with SV Director. The best way to make sure the CSV file is compatible is to export a CSV file from SV Director and use that as a template when building a SV Director compatible CSV file. Figure 65 shows the two CSV files available for export. Figure 66 shows how the Search utility can be used to filter what will be exported out of SV Director.

Figure 65. Export of Available Devices and Locations CSV Files

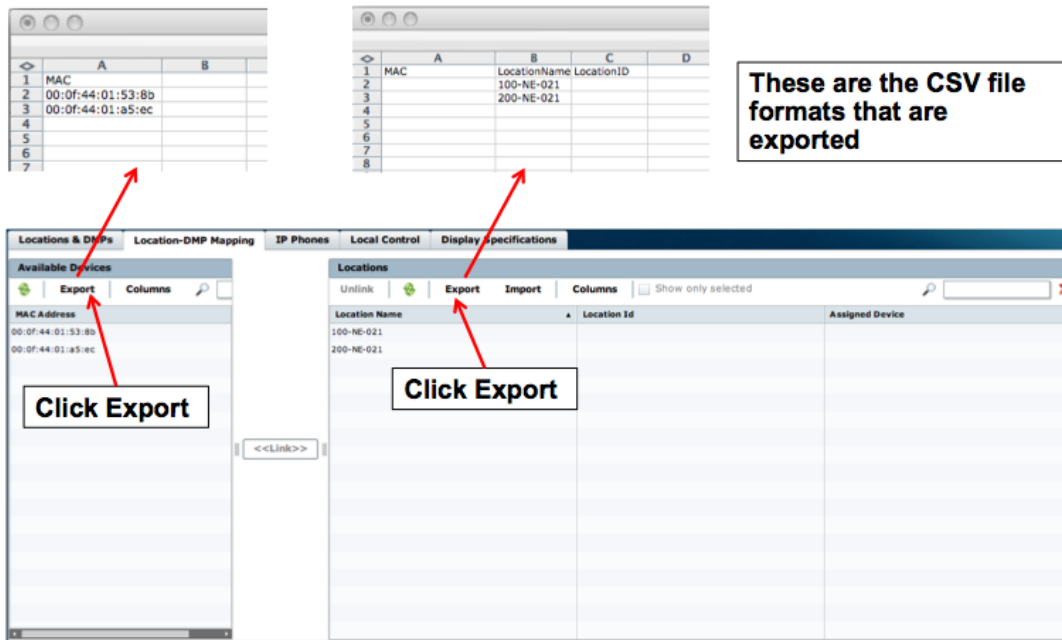
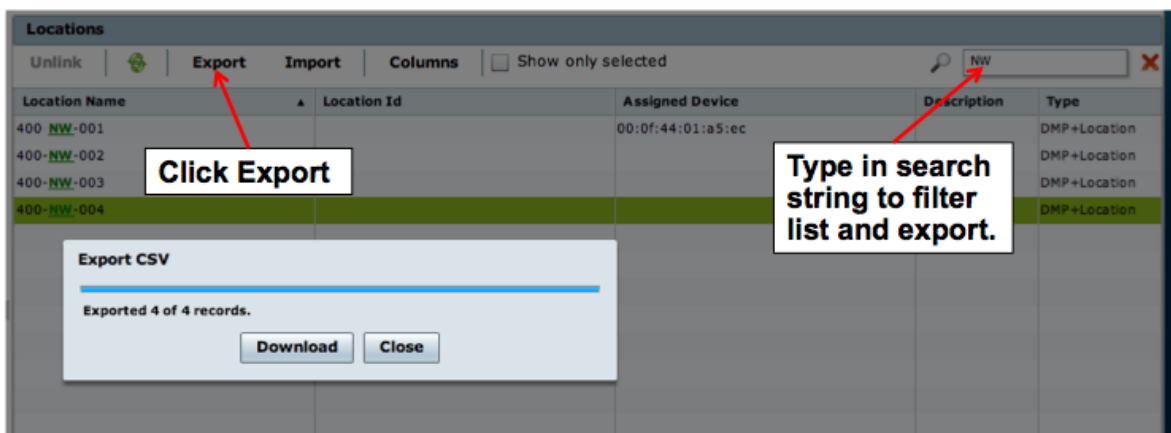


Figure 66. Using the Search Utility to Filter and Export a CSV File



Once Locations and DMP objects are created in the Locations & DMPs screen, a CSV Import may be used to Link or Unlink objects. Notice the insertion of the MAC address creates the Link to Location Name 100-NE-21 and the deletion of the MAC address Unlinks the DMP from Location Name 200-NE-021.

Figure 67. Using the CSV File to Link/Unlink DMP to Locations

**Before**

	A	B	C
1	MAC	LocationName	LocationID
2		100-NE-021	
3	00:0f:44:01:a5:ec	200-NE-021	
4			
5			
6			

**After**

	A	B	C
1	MAC	LocationName	LocationID
2	00:0f:44:01:53:8b	100-NE-021	
3		200-NE-021	
4			
5			
6			

**Type in the MAC address to Link to the Location Name**

**Delete the MAC address to Unlink the DMP from the Location Name**

When a DMP that is in the “Ready” state is linked to a Location, it is then placed into the “In Production” state and is ready to be placed into its appropriate Groups and Zones. Figure 68 illustrates the results of the Link and Unlink operations performed above with the CSV file import.

Figure 68. Results from the CSV File Import on the Locations & DMPs Screen

**Linked DMP and Location are shown as DMP +Location is in the “In Production” state**

**DMP is shown as unassigned and Ready**

Type	Name	IP Address	MAC Address	Description	State
DMP+Location	100-NE-021	10.50.1.4	00:0f:44:01:53:8b		In Production
Location	200-NE-021				
DMP	Unassigned-00-0f-44-01-a5-ec	10.50.1.5	00:0f:44:01:a5:ec		Ready

In summary, the DMPs can be auto-registered with SV Director or uploaded via a CSV file. Provisioning of the DMP can be done automatically or manually to prepare it for production. Once the DMP is provisioned and in the “Ready” state, linking it to

a physical Location Name can be done manually in a one-by-one manner or in bulk via a CSV file import. Once this linking is complete, the DMP is placed into the “In Production” state and it is ready to be assigned to its appropriate Groups and Zones where specific content is assigned for display throughout the venue. This DMP assignment to Groups and Zones is not included in this document and is covered in a separate document.

## Grouping DMPs in the Venue

For information about how to associate DMPs with a particular group or zone, see the *Zones and Groups Guide*.

For information about associating DMPs with a luxury suite, bar, club or restaurant, or other area where local TV control is desired, see the *StadiumVision Local Area TV Control Design and Implementation Guide*.

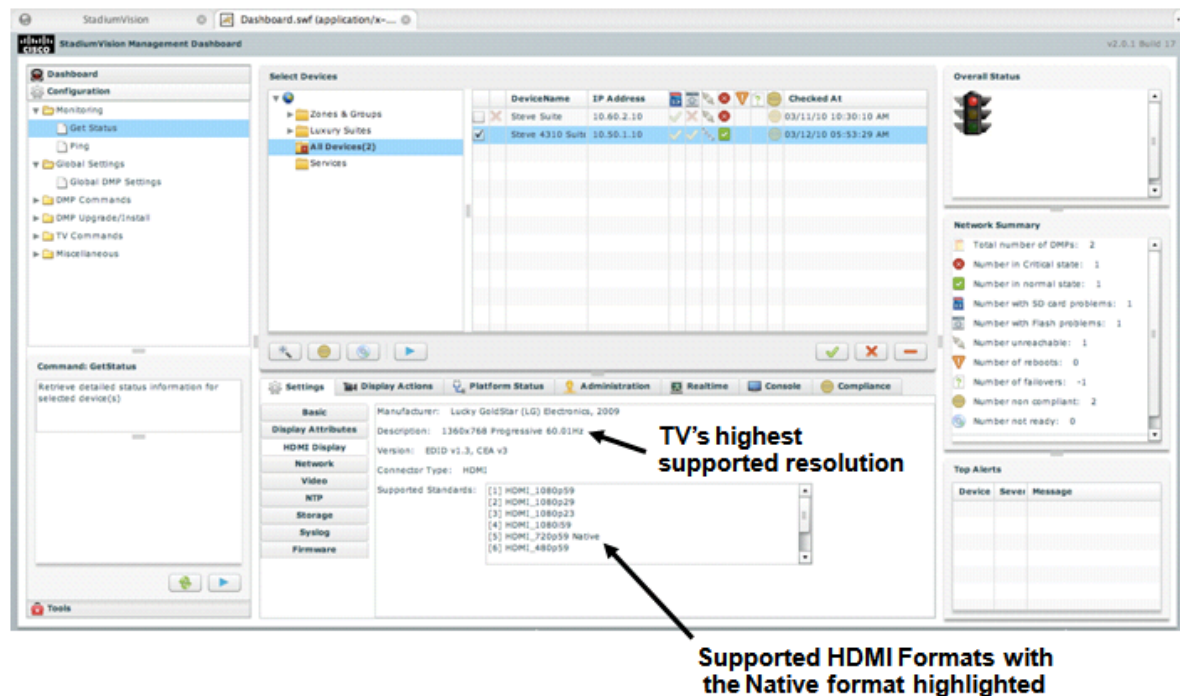
# Chapter 4 Tips and Best Practices

This section contains tips and best practices for StadiumVision endpoint (DMP) operations.

## Verifying the DMP Display Attributes

To verify that the DMP and the TV agree on the most optimal display settings:

1. On the Dashboard, select **Configuration > Monitoring > Get Status**.
2. Select the DMP and execute the **Get Status** command.
3. Under the **Settings** tab at the bottom of the Dashboard screen, click **HDMI Display** and check the settings for the HDMI information the DMP received from the TV.
4. Verify that the native resolution of the TV display matches the HDMI format indicated as “native.”



Once the DMP and TV are properly displaying the desired graphics and video, additional tuning may be required such as setting the aspect ratio of the TV itself. Figure 69 shows an example of how to identify and adjust the TV's Aspect Ratio.

Figure 69. Adjusting the TV's Aspect Ratio



**Note:**

- TVs typically will retain settings made via their Settings menu. However, if an equivalent RS-232 control command is supported, StadiumVision Director may be used to set this on the TV upon script initiation or for doing a bulk setting across a number of DMP-connected TVs. See [Configuring Device Specs for TVs](#).
- Some older TVs do not have the ability to adjust for overscan. If the picture requires adjustment, the DMP provides a way to scale and position the picture. See [Resetting Overscan on Older TVs](#).

## DNS Settings

DNS settings are not required for the DMP to operate in the StadiumVision solution. In fact, if the DMP is configured with a DNS server that is unreachable, the solution will not function properly. Therefore, it is recommended that you disable DNS on the DMPs.

## Setting a Blank TV Channel

**Situation:** For some events (such as concerts), it may be desirable to display content only on certain TVs and have the other TVs black or off.

**Challenge:** StadiumVision Director does not allow for the selective powering of TVs.

**Solution:** As an alternative to selectively turning TVs off, you can tune these TVs to a blank channel, which will result in the same effect – a black screen.

You can tune a TV to blank channel using the DMP Device Manager UI or you can create a blank channel in StadiumVision Director. To tune to a blank channel through the DMP Device Manager:

1. Access the DMP Device Manager main page.
2. In the Display Actions list, click **Video Multicast**.
3. Enter a multicast address, but leave the group port number blank, as shown below.

Video Multicast	
Multicast Group IP Address	239 . 192 . 0 . 50
Group Port Number	
Source IP Address (optional)	

## Verifying the Behaviour of a Replaced DMP

**Situation:** Due to a hardware failure or an optional upgrade, a DMP that is already defined in StadiumVision Director must be replaced.

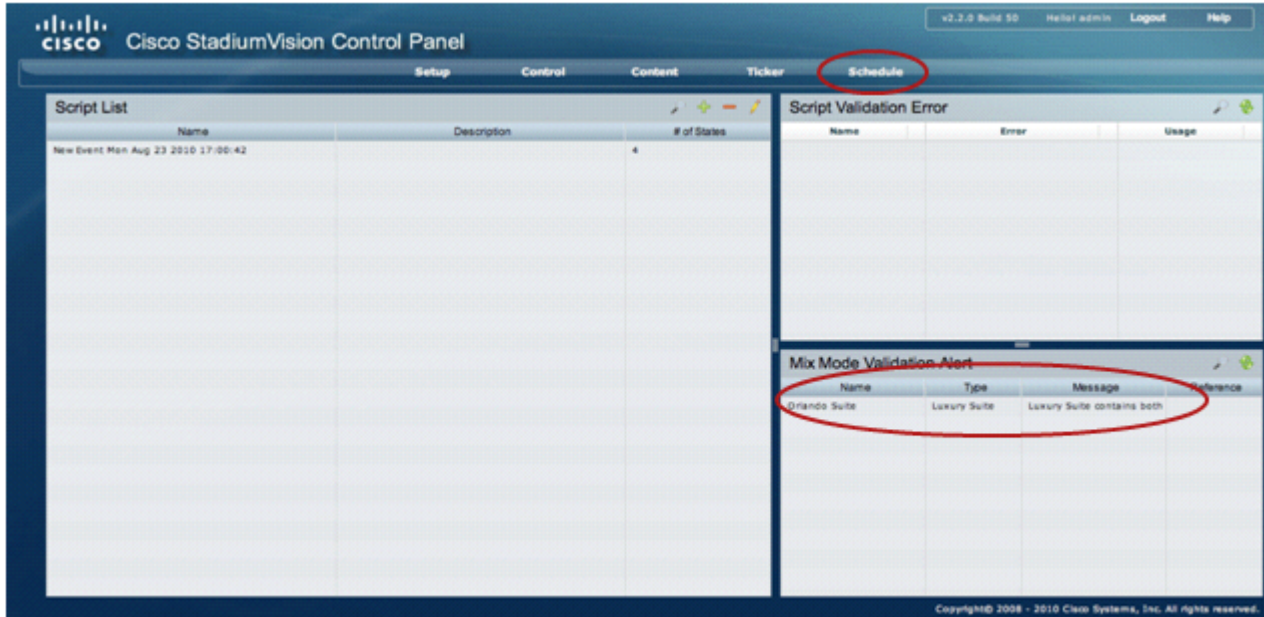
**Challenge:** When you replace a DMP, verify that the new DMP follows the same scripted behavior as the previous DMP. The new DMP should:

- Belong to the same groups and zones.
- React to the zone/group state actions.
- Display the same content as the rest of the group
- Receive and display all proper content that was received and displayed by the old DMP.

**Solution:** To verify that the DMP can be replaced before an event and participate in that event:

1. Unplug the existing DMP and replace it with a DMP that already has the latest firmware and SVD version.
2. Verify the following:
  - The new DMP is active.
  - If static DHCP is used or the new DMP is assigned to the same IP address as the swapped-out DMP, the new DMP resumes the identity of the replaced DMP with the pre-assigned groups, zones, and corresponding state actions.
3. Manually push the Flash Template to the new DMP.
4. Start the event script and make sure the new DMP follows the script.

**Note:** DMP 4305Gs and 4310s should be in separate groups and not mixed. You can verify that no groups contain a mix of 4305G and 4310 by clicking **Schedule** in the Control Panel in StadiumVision Director, as shown below.



## Configuring CDP in the DMP

The DMP as of firmware version SE 2.2.1 build 1932 supports Medianet services, which includes Cisco Discovery Protocol (CDP). This capability allows the switch and DMP to learn about each other by exchanging CDP messages. At the switch CLI, the `show cdp neighbor` command displays the DMPs that are connected to the switch. This information can be very useful when troubleshooting DMP issues.

```

Training_SW#show cdp neighbor
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P -
Phone,
                  D - Remote, C - CVTA, M - Two-port Mac Relay

Device ID          Local Intrfce    Holdtme    Capability  Platform  Port
ID
SEP081735D5E79A   Gig 0/1         173        H P M      IP Phone  Port
1
SEP081735D5E72F   Gig 0/9         174        H P M      IP Phone  Port
1
00:0f:44:01:b5:50
                  Gig 0/7         171        H          DMP 4310G eth0
SEP081735D5E749   Gig 0/6         174        H P M      IP Phone  Port
1
sande-cucm        Gig 0/24        137        H          VMware Vi eth0
SEP081735D5E6DF   Gig 0/8         175        H P M      IP Phone  Port
1
00:0f:44:01:a8:d7
                  Gig 0/10        175        H          DMP 4310G eth0
00:0f:44:01:b6:c3
                  Gig 0/5         167        H          DMP 4310G eth0

```

00:0f:44:01:bf:60

Gig 0/11

177

H

DMP 4310G eth0

CDP information pertaining to the connected switch port can be viewed in the SV Director Management Dashboard.

Location	IP Address	MAC Address	Model	Firmware	Checked At
AUTO-00-0f-44-01-b6-c3	10.194.172.122	00:0f:44:01:b6:c3	DMP-4310	SE 2.2.1	02/13/11 06:20:47 AM
AUTO-00-0f-44-01-b5-50	10.194.172.121	00:0f:44:01:b5:50	DMP-4310	SE 2.2.1	02/13/11 06:21:01 AM
AUTO-00-0f-44-01-a8-d7	10.194.172.123	00:0f:44:01:a8:d7	DMP-4310	SE 2.2.1	02/13/11 06:21:17 AM
AUTO-00-0f-44-01-bf-60	10.194.172.124	00:0f:44:01:bf:60	DMP-4310	SE 2.2.1	02/13/11 06:21:30 AM

**Medianet Services**

- Medianet Enabled: yes
- Timeout (ms): 30000
- Switch IP Address: 10.194.172.1
- Switch Name: Training\_SW
- Switch Port: GigabitEthernet0/5
- VLAN: 10
- Location ID: POD1
- Location URL: 22=POD1&28=Cookie\_Monster&27=2&25=C

## Configuring Civic Location in the Switch

The civic location can be configured in the switch and communicated to the DMP via CDP. This information can also be retrieved and displayed by SV Director as shown above, as well as, seen in the DMP's web interface.

```
Training_SW#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Training_SW(config)#location civic-location identifier 1
Training_SW(config-civic)#? Type ? to see all the options of configuring the location.
Training_SW(config-civic)#additional-location-information POD1
Training_SW(config-civic)#building C
Training_SW(config-civic)#floor 2
Training_SW(config-civic)#room Cookie_Monster
Training_SW(config-civic)#end
Training_SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Training_SW(config)#int g0/5
Training_SW(config-if)#location civic-location-id 1
Training_SW(config-if)#end
```



```

Training_SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Training_SW(config)#location civic-location identifier 1
Training_SW(config-civic)#?
Type ? to see all the options of configuring the location.
Training_SW(config-civic)#additional-location-information POD1
Training_SW(config-civic)#building C
Training_SW(config-civic)#floor 2
Training_SW(config-civic)#room Cookie Monster
Training_SW(config-civic)#end
Training_SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Training_SW(config)#int g0/5
Training_SW(config-if)#location civic-location-id 1
Training_SW(config-if)#end

```

Medianet Services	
MediaNet Enabled	On
Timeout (ms)	30000
Switch IP Address	10.194.172.1
Switch Name	Training_SW
Switch Port	GigabitEthernet0/5
VLAN	10
Location ID	POD1
Location URL	22=POD1&28=Cookie_Monster&27=2&25=C

**Note: The Location feature is only supported in 3xxx switches with IOS 12.2.55SE1 or greater. Currently not supported in 65xx switches.**

**IOS Location information is displayed in SV Director but is not automatically imported**

# Chapter 5 Troubleshooting

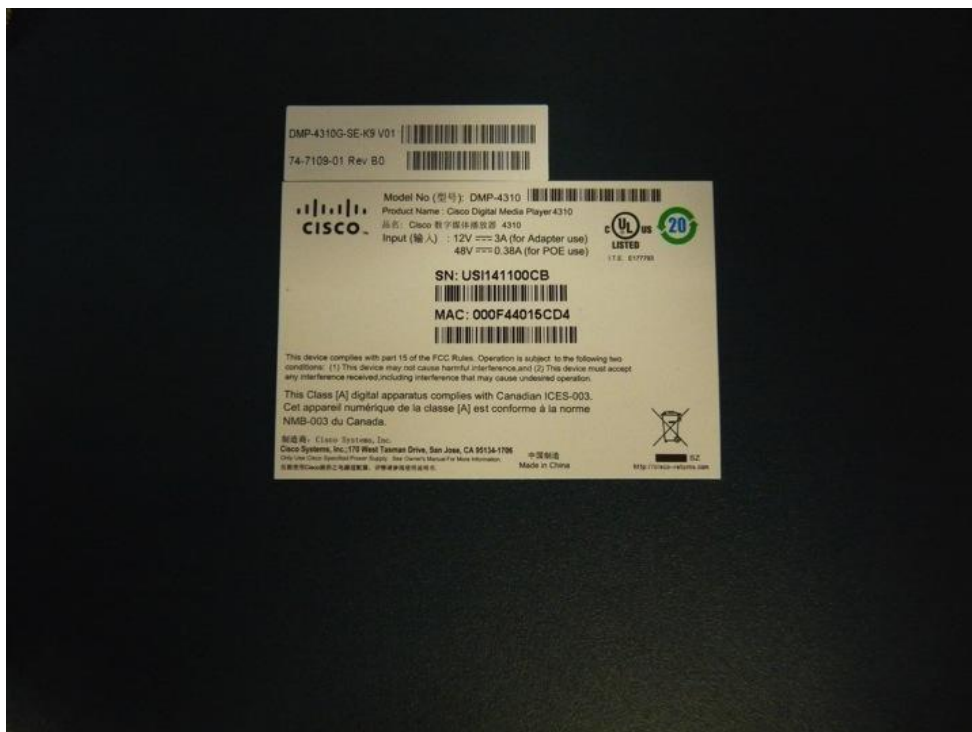
This chapter provides basic troubleshooting information for resolving problems you may encounter with DMPs and the attached TVs.

## DMP POE Issue

With early versions of the DMP 4310G, there is an issue with the negotiation of the correct PoE wattage. The root cause is believed to be that the switch and the DMP-4310 fail to consistently negotiate the correct power class during the (optional) power class negotiation. In some cases, the switch believes that the DMP can operate at a lower power class than the DMP actually requires, resulting in the DMP failing to complete boot up.

Correction of this problem required a hardware change. USI executed an engineering change to the DMP 4310G in response to this issue. DMP 4310Gs with serial numbers **USI1434xxxx** or greater have this engineering change and should not be subject to this issue. DMP 4310Gs with serial numbers less than **USI1434xxxx** may be subject to this issue, and should follow the suggested workaround.

The serial number is located on the back and can only be verified through visual inspection.



## Workaround

The correct workaround depends on the Cisco switch platform that the DMP is connected is enhanced Power over Ethernet (ePoE) capable.

- ePoE Capable Platforms - If there is ample PoE power available in the switch's power budget, apply the **power inline static max 15401** interface-level command to each access switch port connected to a DMP-4310.

The use of "power inline static max 15401" command requires "power inline port max 15401" be configured first.

On an ePoE-capable switch platform, specifying a maximum power level greater than the 802.3af maximum of 15.4W has a side effect of causing the switch port to bypass the optional power class negotiation phase.

The use of the **static** keyword is suggested in order to reserve the required power from the switch's power budget at configuration time. If for some reason the switch's remaining power budget cannot accommodate the port's configured power requirement, the port is placed into error disable state at point of configuration, rather than point of need.

- Non-ePoE Capable Platforms – Because non-ePoE capable switch platforms cannot be configured to deliver more than the 802.3af maximum of 15.4W/port, the suggested workaround is to insert a PoE splitter between the switch port and the DMP 4310G. Generally, a PoE splitter is used to strip the PoE power from a PoE-capable switch port and provide it to a non-PoE capable device in lieu of its usual "power brick". In this case, the PoE splitter is used to circumvent the DMP 4310G PoE class negotiation issue, since the PoE splitter does not attempt to negotiate the PoE class with the switch and simply passes through the available power it receives over the cable run.

The following PoE 12V splitter has been test to operate correctly with the DMP-4310:

Microsemi PD-AS-701/12

<http://www.microsemi.com/PowerDsine/Documentation/datasheets/PD-AS-701.pdf>

## DMP Reboot Behaviour

If you reboot a DMP during an event script, expect the following behavior:

- If the event is not running or the event script does not control the DMP, you will be brought back to full screen video of defaultVideoUrl from the registry.
- If the DMP is controlled by the event script, then you should see the following behavior:
  - During the reboot, you will lose all video / templates / etc.
  - After the reboot has recovered, the DMP will take a few seconds to recover.
  - After recovery has completed, you should see the template from the script. (Full screen / 3 region / etc.), and the non-video playlists will be correct.

However, the video will always be the defaultVideoUrl rather than the specified script.

## DMP Recovery Behaviour

If a DMP does not have connectivity when the state changes, it will only recover the correct template setting and show non-video playlists when the DMP network connectivity is restored. Thus, any other action (including video channel changing, RS-232 commands, Turn On / Turn Off) will not be performed once the DMP's connectivity is restored. If the network outage is brief, the actions may be performed, but this depends on the brevity of the connectivity loss. Delays greater than 30 seconds will not work, as there are cutoffs on how long StadiumVision Director will wait.

As a further variant, if a DMP is offline when the event script starts, and then is reconnected, it will not receive any state changes in the future until a new event is started. This is because the DMP will never receive the initial Reset command that tells it to re-read its event script information. Therefore, when the DMP is reconnected, it will not be aware of the new templates and non-video playlists.

## Common Problems and Resolutions

Symptom	Possible Cause	Action
Script running slow or not running at all on the DMP.	The DNS configuration on the DMP or StadiumVision Director is incorrect.	Verify that DNS is disabled on the DMP. Verify that the DNS server (if used) is configured correctly in StadiumVision Director and that the specified DNS server is reachable. If it is not reachable, disable DNS on StadiumVision Director until the DNS server is back online.
The Welcome screen in a luxury suite shows up on the wrong TV.	The TV is configured incorrectly in StadiumVision.	Determine the IP address of the DMP either by looking at the DMP or by using a Cisco IR Remote. Assure this TV is in the correct group.
In the luxury suite, the wrong TV shows the concessions menu items.	The configuration of the system was done incorrectly.	In the luxury suite configuration, the concessions menu is displayed on Display #1 (or more precisely, Suite DMP Logical ID #1) in a room. Display #1 is connected to the first DMP associated with that luxury suite. See the <i>StadiumVision Commerce Integration Design and Implementation Guide</i> for more information.
After pushing the script, the TV is not on.	The RS-232 cable may not be properly connected	Use the IR remote to turn on the TV. If you see a red LED flash but there is no response to the command, then it is likely that the RS-232 cable is plugged into the wrong port on the DMP. Move the connection to the RS-232 port on the DMP.

Symptom	Possible Cause	Action
The TV is dark.	<ul style="list-style-type: none"> <li>No power to the TV (no lights - either red or green).</li> <li>TV not turned on.</li> <li>TV set to wrong input.</li> <li>DMP is not power on.</li> <li>DMP is not configured in the system</li> <li>DMP does not have an SV Daemon installed (DMP 4305G only)</li> <li>DMP is tuned to a full-screen video channel which has no video</li> <li>DMP has a content problem (e.g. it might be using a message template but the playlist is not loaded on the DMP).</li> <li>There is a cabling issue with the cables connecting the DMP to the switch.</li> <li>The SD card could be bad or missing.</li> </ul>	<ul style="list-style-type: none"> <li>Assure that the TV is plugged in and that the outlet has power.</li> <li>Turn on the TV.</li> <li>Use the TV IR remote to verify the TV is on the correct input.</li> <li>Ensure that the DMP has power (check if DMP LED lamps are lit and if not, make sure the DMP power switch is engaged (4310 only) or the switch port is configured).</li> <li>Add the DMP to StadiumVision Director database.</li> <li>Use DMP IR remote to power on TV. <ul style="list-style-type: none"> <li>If TV does not power on via DMP IR remote, check the RS-232 cable and port connections.</li> <li>If TV does not power on via DMP IR remote, push the Template to the DMP and try again.</li> <li>If TV still does not power on, check the RS-232 commands configured in StadiumVision Director.</li> </ul> </li> <li>Change the DMP channel (if necessary, change the DMP default channel or the failover URL).</li> <li>Download appropriate content to the DMP using the StadiumVision Director Control Panel Setup tab.</li> <li>Make sure the DMP is properly connected to the Ethernet switch and that the cables are good.</li> <li>Verify that the SD card is present and properly seated. If nothing else has worked, try replacing the SD card. Assure that the DMP has a default URL set to a working channel, so that worst case is full screen video instead of a blank screen</li> </ul>
Graphics are "cut off" or do not appear properly on the TV screen.	<ul style="list-style-type: none"> <li>The aspect ratio of the TV is not set correctly.</li> <li>The incorrect template has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>Check the TV Aspect Ratio and Overscan settings. Set Aspect Ratio to Normal and Overscan off.</li> <li>If the above TV settings are not available or do not fix the problem, adjust the X/Y Position or Scaling in <b>Devices&gt;DMP&gt;Display Specs</b>.</li> <li>Ensure that the correct content template is being used for the attached DMP model. (1920x1080 for a DMP 4310G; 1366x768 for a DMP 4305G )</li> </ul>
The TV shows a butterfly.	<ul style="list-style-type: none"> <li>The SV Daemon is not installed.</li> <li>The SD card is missing, improperly seated, or bad (DMP 4305G only)</li> <li>The DMP does not have the Flash template installed.</li> <li>The DMP is not configured in the StadiumVision Director database.</li> </ul>	<ul style="list-style-type: none"> <li>Install the SV Daemon.</li> <li>Install a working SD card. Also, assure that a failover URL is set for this DMP: this will at least insure that in the absence of a working SD card, full screen video is displayed.</li> <li>Install the Flash template.</li> <li>Add the DMP to the StadiumVision Director database.</li> </ul>

Symptom	Possible Cause	Action
When using the IP Phone, there is a delay when using the TV controls (volume, channel selection) and a delay in TV operation.	Either the switch port or the IP phone is not set to 100 Mbps and Full Duplex.	To set the phone to <b>100 Full</b> , touch the <b>Settings</b> button. Select option 2, Network Configuration. Scroll down to SW Port Configuration. If SW Port Configuration says <b>100 Full</b> , the problem is not with the phone settings. Touch exit until you return to the main screen. Then check and reset the switch port. If SW Port Configuration says anything other than <b>100 Full</b> , touch “* * #” to unlock the configuration. Scroll down to <b>100 Full</b> . Select <b>100 Full</b> , save your change, and then touch the exit soft key until you are back to the main screen. Touch “* * #” again to lock the settings. If the problem does not go away, check and reset the switch port.
The channel changed automatically in a luxury suite.	a) There was a state change and the script for this event did not specify No change for the channel. b) A configuration error in StadiumVision defines a controller outside of this suite as the suite controller.	a) If this is not the desired action, go to the script for this or subsequent events and set the action to “No Change” for the channel on this TV. b) Correct the configuration so that only the controller in this suite has control over the DMPs in this suite.
The screen alternates between video and black every few seconds.	This is likely an HDMI handshake issue. The 4305 does not support the High-Bandwidth Digital Content Protection (HDCP) protocol (a proprietary protocol requiring licensing.) If the TV is powered up first, it will do a handshake, determine that the 4305 doesn't support HDCP, and not use it. If the DMP is powered up first, some displays will continually search for a copy protection stream. If they find it (which would happen with network broadcasts) it works fine. However, with some displays, when you run a non-copy-protected stream (in-house feeds) through the HDMI port, the TV gets out of sync with the signal because it is looking for the copy protection stream in the feed.	Power up the TV first, and then the DMP. If this problem persists with certain TVs, then disable DMP auto detection in the DMP Display Attributes.
The screen on one TV didn't change when the other screens changed during a state change.	No action was assigned for this DMP during this state.	Verify that this DMP is in a group that has an action assigned during this state.

Symptom	Possible Cause	Action
There is no video showing in Region 1.	<p>IP multicast settings are incorrect.</p> <p>DMP is tuned to a "blank" channel. This may be a desirable behavior in some situations.</p>	<ul style="list-style-type: none"> <li>• Verify that the channel selected for Region 1 has a valid video feed associated. (Valid IP multicast address and port number configured at the headend.)</li> <li>• Try to ping the multicast group that the DMP should be listening on. This should be the group address specified in MulticastHostPort entry in the registry. The syntax is: ping -t 15 &lt;MC_Address&gt; Any DMPs that are listening to this multicast address will respond. If the DMP is not listening to this multicast address, verify that the settings are correct in the SVD.conf file.</li> <li>• If there is not a constant flashing LED on the DMP Ethernet port, check the multicast configuration at the IDF switch.</li> </ul>
There is nothing in Region 2 of the L-wrapper for a group of displays (the region is either black or blue).	<ul style="list-style-type: none"> <li>• No action was defined for this region during this state.</li> <li>• The DMP does not have the content it needs.</li> <li>• The playlist contains one or more images in an interlaced format.</li> <li>• The L-wrapper is incorrectly configured.</li> <li>• The content synchronization to the DMP failed.</li> <li>• A network problem or a Secure Digital (SD) failure.</li> <li>• The ticker is configured incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>• Assure that Region 2 of the L-wrapper for this group is defined during this state.</li> <li>• Push the content to the DMP again using the Setup tab in the StadiumVision Director control panel.</li> <li>• Assure that the image is of a supported type. No way to easily tell if the image is interlaced. Best to open in Photoshop and save it as non-interlaced format.</li> <li>• If the issue is with the L-wrapper: <ul style="list-style-type: none"> <li>– Check for bad or missing RSS URL</li> <li>– Verify MC ACL is set to allow the RSS Stream</li> <li>– Verify RSS feed is Approved in SV Director</li> <li>– Verify RSS upload task is running on SV Director</li> </ul> </li> <li>• If it is a network problem, try pushing the content to the DMP again.</li> <li>• If it is an SD failure, assure the SD card is securely seated in the DMP or replace the SD card.</li> </ul>
Video playback is choppy.	Cat 5 cabling may be longer than 100 Meters specified.	Use a shorter cable.
DMPs do not seem to change states when the states change in StadiumVision Director	<p>The DMP may not be associated with the correct group.</p> <p>The Flash application may not be running.</p> <p>The MulticastHostPort is not set correctly.</p>	<p>Assure that the DMP is associated with the correct Group in StadiumVision Director.</p> <p>Confirm that the Flash application is running on the DMP.</p> <p>If the application is running, a circle, square and triangle should be displayed in the lower left hand corner of the screen when you start the event script. If you do not see these items, the flash application may not be running.</p> <p>Restart the Flash application using the Management Dashboard.</p> <p>Verify the MultiCastHostPort in the SV Director Registry is correct. If corrected, push the template again to propagate the setting to the DMP.</p>
The TV does not have the correct screens for the current state.	The TV is in the wrong group for this state.	Correct the group setting using the StadiumVision Director control panel.

Symptom	Possible Cause	Action
The delay has ended, but some TVs still have the delay content showing.	These DMPs may not have an action assigned for the state when the delay occurred.	Check the script for this event and make sure the DMPs have an action assigned for every state in the event.
Ticker is not interleaving as defined.	One ticker has more approved content than the other.	When one feed runs out of approved content, only the remaining feed will be displayed until it reaches the end.
The Ticker says "Undefined". The flash image motion is slow or the video quality is degraded.	There are no approved ticker items to display. Flash images may have too many frames per second.	Select the Ticker tab on the StadiumVision Director Control Panel. Either touch <b>Approve All</b> on the middle of the right hand side of the screen, or selectively approve the ticker items you want to display. Modify the flash images so that they have less than 5-6 frames per second.
Invalid RSS Ticker	There is a missing or invalid RSS URL. The Multicast ACL in the network is not configured to allow the RSS MC group. Upload task is not running	Check the URL via a browser to verify that it is valid and providing content.  Check the ACL in the core switch of the Connected Stadium network
TV is frozen (video is not moving and /or region 2 /3 are not moving.)		Hard boot the DMP (power off the DMP and then reboot.)
Jerky/pausing TV on when playing within an L-wrapper	Init.BCNT is set improperly. Verify init.BCNT=40	



# Appendix A: RS-232 Connector Pinouts and Cable Schematic

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Table 5 lists the DMP 4305G connector pinout assignments.



Table 5. 4305G DB9M RS-232 Pinout

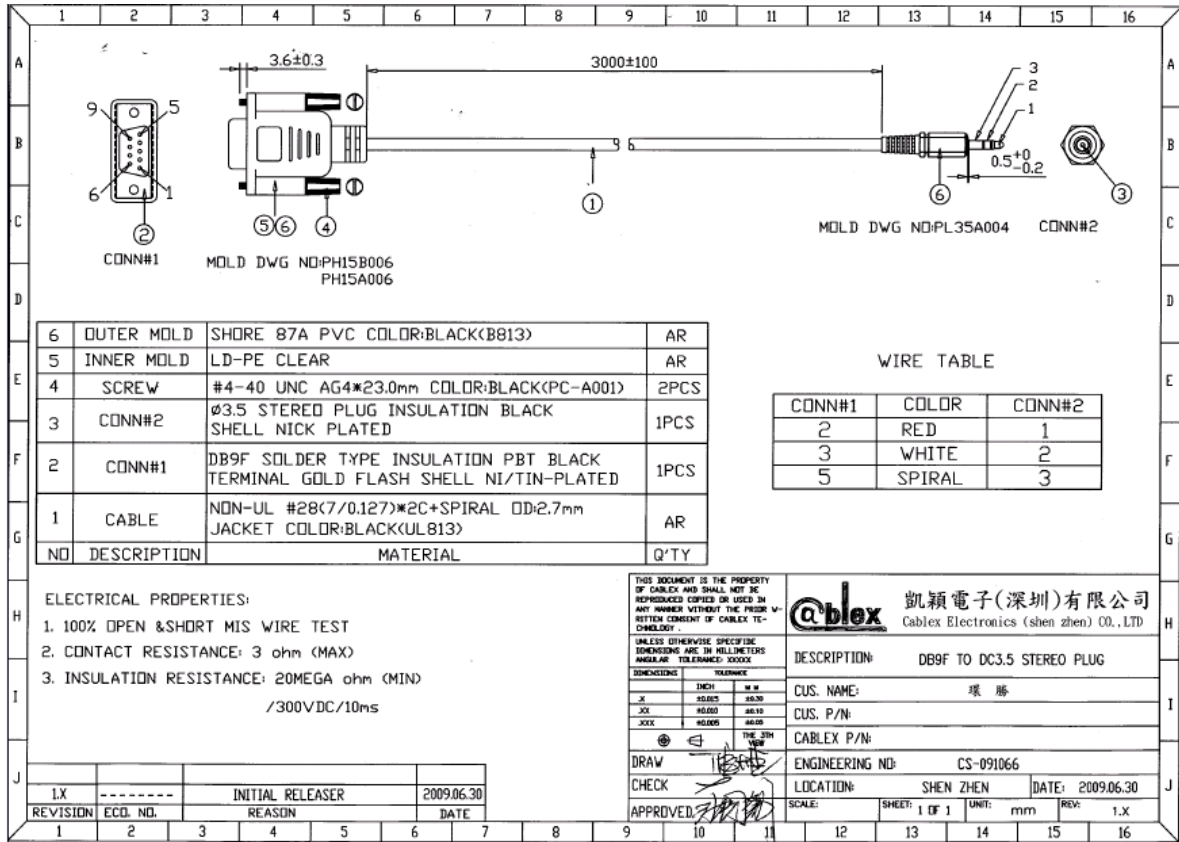
Function	Signal	Pin	I/O
Data	TxD (Transmit Data)	3	O
	RxD (Receive Data)	2	I
Handshake	RTS (Request to Send)	7	-
	CTS (Clear to Send)	8	-
	DSR (Data Set Ready)	6	-
	DCD (Data Carrier Detect)	1	-
	DTR (Data Terminal Ready)	4	-
Common	GND (Signal Ground)	5	-
Other	RI (Ring Indicator)	9	-

Table 6 lists the DMP 4310G connector pinout assignments.

Table 6. 4310G DB9F RS-232 Pinout

Function	Signal	Pin	I/O
Data	TxD (Transmit Data)	2	O
	RxD (Receive Data)	3	I
Common	GND (Signal Ground)	5	-

Figure 70. 4310G Cable Schematic



NO	DESCRIPTION	MATERIAL	Q'TY
6	OUTER MOLD	SHORE 87A PVC COLOR:BLACK(B813)	AR
5	INNER MOLD	LD-PE CLEAR	AR
4	SCREW	#4-40 UNC AG4*23.0mm COLOR:BLACK(PC-A001)	2PCS
3	CONN#2	Ø3.5 STEREO PLUG INSULATION BLACK SHELL NICK PLATED	1PCS
2	CONN#1	DB9F SOLDER TYPE INSULATION PBT BLACK TERMINAL GOLD FLASH SHELL NI/TIN-PLATED	1PCS
1	CABLE	NON-UL #28(7/0.127)*2C+SPIRAL OD:2.7mm JACKET COLOR:BLACK(UL813)	AR

WIRE TABLE

CONN#1	COLOR	CONN#2
2	RED	1
3	WHITE	2
5	SPIRAL	3

ELECTRICAL PROPERTIES:  
 1. 100% OPEN & SHORT MIS WIRE TEST  
 2. CONTACT RESISTANCE: 3 ohm (MAX)  
 3. INSULATION RESISTANCE: 20MEGA ohm (MIN) /300VDC/10ms

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UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS. ANGULAR TOLERANCE: XXXXX

DIMENSIONS	TOLERANCE
X	±0.20
XX	±0.10
XXX	±0.05

THE 3RD VIEW

DRAW: [Signature]  
 CHECK: [Signature]  
 APPROVED: [Signature]

**@blex** 凱穎電子(深圳)有限公司  
 Cablex Electronics (shen zhen) CO.,LTD

DESCRIPTION: DB9F TO DC3.5 STEREO PLUG

CUS. NAME: 環勝

CUS. P/N:

CABLEX P/N:

ENGINEERING NO: CS-091066

LOCATION: SHEN ZHEN DATE: 2009.06.30

SCALE: SHEET: 1 OF 1 UNIT: mm REV: 1.X

REVISION	ECO. NO.	REASON	DATE
1X	-----	INITIAL RELEASER	2009.06.30

# Appendix B: Cisco DMP 4310G Specifications

Product Parameter	Specification	
Supported protocols	FTP HTTP RTP over UDP MPEG-2 - Transport Stream MPEG-4 part 2 and 10 – Transport Stream User Datagram Protocol (UDP) IGMPv3 SSM USB 2.0	
Video codecs	Video MPEG-1 Video MPEG-2: Main Profile at High Level Video MPEG-4 Part 2 and Part 10 AVC (H.264) WMV and WMV9 Main Profile at High Level Aspect ratio: 4:3 and 16:9 HD (up to 1080 at 16:9) progressive and interlace video resolution Video data rate up to 12 Mbps Overall delay 1–3 sec Note: Please consult other Cisco documentation or your local Cisco representative for exact audio codec, video codec, resolution, bit rate, and encapsulation combinations.	
Audio codecs	Audio MPEG-1 Layers 1 and 2 MP3 MPEG-4 AAC Low Complexity AC-3 WAV Audio data rate: 64–320 kbps Note: Please consult other Cisco documentation or your local Cisco representative for exact audio codec, video codec, resolution, bit rate, and encapsulation combinations.	
Physical connectors	Ethernet copper 10/100BASE-T, RCA Video, S-Video, RCA Audio Left, RCA Audio Right, HDMI, and RS-232 and USB 2.0	
	Cable Type*	Maximum Supported Cable Length
	Composite or RCA cable	10 ft
	HDMI 1.3a**	16 ft
	S-Video	10 ft
*Cable quality can be a factor. **An HDMI extender product can be used to extend the cable to 150 ft.		
Remote control	Transmitter Type	Maximum Supported Distance
	Infrared (IR)	15 ft
Video In	MPEG-1, MPEG-2, and MPEG-4 Part 2 and Part 10, WMV and WMV9	
Audio In	Transport stream: Up to 6 audio packet IDs (part numbers) in transport stream	

Product Parameter	Specification
Video Out	Analog video (composite, S-Video) Digital video (HDMI 1.3a with CEC commands)
Audio Out	Analog unbalanced audio (mono and stereo)
Functional	MPEG-1 Layer 2: Selected; packet IDs in transport stream (1 of 6) MPEG-4 AAC and AC-3 MP3 WAV Selected elementary audio (1 of 6)
Power	Input voltage: 12V DC input power and PoE (IEEE 802.3af): Power consumption: Peak: 12.95W; Average: 5W Heat dissipation: 44.2 BTU/hour
Flash memory	32 MB for OS 32 GB for internal storage
Environmental	Operating temperature: 41 to 122°F (5 to 50°C) Passed 500-hour test of the uninterrupted video playback in 125.6°F (52°C) dry-heat environment Humidity: 20 to 80% non-condensing
Compliance	UL/cUL FCC (Class B) CE CB NOM-NYCE S-Mark VCCI CCC C-tick K-mark MIC RoHS 6

## DMP 4310G Video Resolution Specifications

Resolution	Hz	Component	HDMI	S-Video/ CVBS
640x480	60		✓	
	75		✓	
800x600	60		✓	
	75		✓	
1024x768	60		✓	
	75		✓	
1280x1024	60		✓	
	75		✓	
1920x1080	60		✓	
	75	✓	✓	
1280x768	60	✓		
1360x768	60		✓	
CEA 480p		✓	✓	
CEA 720p		✓	✓	
CEA 1080i		✓	✓	
CEA 1080p		✓	✓	
PAL				✓
NTSC-M				✓

# Appendix C: Determining the RS-232 Command Strings

Below is an example of how to determine the commands for controlling a particular TV (i.e. LG in this example).

- 1 Use the TV User Manual to find the RS-232 code for a desired function. For example, Power On
- 2 Typically the TV RS-232 code is described in ASCII and will require the conversion to Hex to be used in the DMP to control the TV (e.g., TV code = ka 01 01[CR=0D])

## 1 From TV User Manual

### 01. Power (Command: k a)

To control Power On/Off of the TV.

Transmission [k][a][ ][Set ID][ ][Data][Cr]

Data 00: Power Off      Data 01: Power On

#### Transmission / Receiving Protocol

##### Transmission

[Command1][Command2][ ][Set ID][ ][Data][Cr]

[Command 1] : First command to control the set.(j, k, m or x)

[Command 2] : Second command to control the set.

[Set ID] : You can adjust the set ID to choose desired TV ID number in Setup menu. Adjustment range is 1 ~ 99. When selecting Set ID '0', every connected the TV is controlled. Set ID is indicated as decimal (1 ~ 99) on menu and as Hexa decimal (0x0 ~ 0x63) on transmission/receiving protocol.

[DATA] : To transmit the command data.  
Transmit the 'FF' data to read status of command.

[Cr] : Carriage Return  
ASCII code '0x0D'

[ ] : ASCII code 'space' (0x20)

\* In this model, TV will not send the status during the standby mode.

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## 2 Hex To ASCII Converter

Hex:

6b:61:20:30:31:20:30:31

Ascii:

ka 01 01

Hex To ASCII

ASCII To Hex



**RS-232 Code Configured in SV Director**

**rs232.tx\_hex=6B612030312030310D**

**Reference the TV Specifications document on the Share Point for a collection of RS-232 codes**