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# **DC20 Digital Cinema Server**

## **Installation and Operating Guide**

**Version 1.1**

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## Table of Contents

About the DC20 Digital Cinema Server .....	iv
Limited Warranty .....	vi
Contact Information .....	vi
Product Improvements and Upgrades .....	vi
Software License Agreement .....	vi
<b>1. TERMS AND CONCEPTS.....</b>	<b>1</b>
<b>2. POWERING UP THE DC20 DIGITAL CINEMA SERVER .....</b>	<b>1</b>
<b>3. USING THE DC20 REMOTE CONTROL PANEL .....</b>	<b>3</b>
3.1. DC20 Remote Control Panel Keys.....	4
<b>4. UNDERSTANDING THE REMOTE CONTROL PANEL STATUS DISPLAY .....</b>	<b>5</b>
<b>5. ACCESSING MENUS ON THE DC20 REMOTE CONTROL PANEL.....</b>	<b>6</b>
<b>6. USING THE MAMA WEB USER INTERFACE .....</b>	<b>7</b>
<b>7. LOADING CONTENT AND KEYS .....</b>	<b>8</b>
<b>8. BUILDING A SHOW.....</b>	<b>11</b>
<b>9. SELECTING AND PLAYING A SHOW OR COMPOSITION .....</b>	<b>13</b>
<b>10. VIEWING SYSTEM LOGS .....</b>	<b>14</b>
<b>11. CHECKING SYSTEM INFORMATION.....</b>	<b>15</b>
<b>12. SETUP OPTIONS FOR THE HD-SDI OUTPUT MEDIA BLOCK.....</b>	<b>16</b>
<b>13. INSTALLATION .....</b>	<b>18</b>
13.1. Required Connections .....	18
13.2. DC20 Front Panel View .....	18
13.3. DC20 Rear Panel View .....	18
13.4. Connector Pinouts .....	20
<b>14. PRODUCT SPECIFICATIONS .....</b>	<b>23</b>

## About the DC20 Digital Cinema Server

The DC20 Digital Cinema Server is a screen management system (SMS) for the management and playback of D-Cinema content. It plays picture and sound, and provides theatre-automation support. It is designed to meet the requirements outlined in the DCI requirement specifications and to provide cinema operators/exhibitors with a simple but functional management and operating system. The DC20 specifically handles all functions within a cinema screen, from content ingest through to projection/screening.

The DC20 can be used as a standalone digital cinema player system for a single screen, or as a network player system in a multiplex configuration (when used with the DDE Alexandria™ Library Management Server, DDE TMS or similar third party system).

Redundant power supplies and RAID hard drives (RAID 10) bring a high level of reliability to the system. The standard DC20 has a 1 TB of hard drive space for content storage, which is approximately 3-4 full length features. The DC20 may also be ordered with 2 TB of content storage. For even more reliability, the DC20 uses a solid state system hard drive.

A USB Remote Control Panel provides familiar operational controls such as Play, Pause and Stop along with an LCD Display and Menu Keys. Unlike more complex interfaces such as touch-screens or the mouse and keyboard, the DC20 Remote Control Panel is a simple, familiar hardware interface that makes projectionists feel instantly comfortable with the system.

The second generation Qube software is database driven and has a flexible core media architecture that closely follows the DCI Object Model and can work with multiple copies of picture, sound, subtitling and metadata files stored on local and shared central storage systems. Qube Cinema is based on the modular Microsoft Windows XP™ Embedded Operating System to maximize reliability and security while deriving benefit from Microsoft's powerful DirectShow™ architecture.

The DC20 integrates fully and seamlessly with the DDE Alexandria™ Library Management Server and with the DDE Theatre Management System (TMS) to provide a stable, integrated, flexible, reliable and comprehensive system for your D-Cinema requirements. The DC20 is designed for optimum performance with the DDE TMS, but can also be easily integrated into other third-party TMS systems as required.

The DC20 is aimed at the DCI compliant D-cinema market and has two CineLink™ 2 equipped dual-link HD-SDI outputs and 16 channels of AES3 audio output apart from providing 8 channels of analog audio output and powerful automation support over serial, IP and a GPIO module.

The DC20 is standards-based and designed for interoperability. It has been certified to conform to the MXF Interop Specification and utilizes DCI specified MXF containers with 128-bit AES encryption for media, and xml for compositions and shows. 2048-bit RSA encryption is utilized for keys. Watermarking support is optionally available using both Thomson and Phillips technologies.

The base system handles DCI JPEG2000 in both 24 fps and 48 fps frame rates, high bit-rate MPEG-2 and VC1 picture while also being expandable with additional software codecs. Audio is uncompressed 16 bit or 24 bit at 48 KHz and 96 KHz.

DC20 Servers support subtitling in the TI CineCanvas™ file format. Subtitles can be internally rendered or can be sent along with timing information to a DLP Cinema™ projector over Ethernet.

Media transport is possible using portable eSATA or USB-2 hard drives, high-speed data lines and optionally, satellite multicast transmissions.

DC20 Servers can manage media completely automatically by deleting older, unused media when additional space is required to ingest new media. This again makes the system entirely automatic in



operation for the projectionist and theatre manager and considerably simplifies their lives while reducing the possibility of human-error.

DC20 systems can be managed and operated locally and remotely via a powerful, highly interactive web-based UI which shows status and, with the proper login credentials, allows transport control, scheduling, content ingest, key management, media management as well as setup and maintenance. System logs can also be viewed over the web interface and downloaded as xml files that are signed for verification of authenticity.

To get the most out of your DC20, we suggest that you review this manual and keep it available during system installation and initial operation.

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## 1. Terms and Concepts

The basic unit of content that can be played by the DC20 is the **Track File**. A Track File is either a picture, sound or subtitle file in one of the supported compression *and* container formats. DC20 Servers support multiple compression formats including JPEG2000, MPEG-2 and Windows Media 9 and can be expanded to include additional compression formats. Track Files must also be in a container format supported by Qube. The supported container formats include MXF, ASF and AVI. Subtitles are supported in the CineCanvas™ xml format. A Track File is analogous to a roll of picture positive or a sound positive in the film environment.

Picture, Sound and Subtitle Track Files are synced together with Start and End Points to form a **Reel** which can be considered equivalent to a Reel of a Film Print.

Multiple Reels in a specific order go to form a **Composition**. A Composition also has additional *meta-data* associated with it and usually consists of a complete feature film, an advertisement commercial, a documentary or other logical unit of programming. In the film environment, a Composition can be considered equivalent to a complete Film Print. A Composition is the basic unit that can be made into a **Digital Cinema Package** or DCP that can be ingested or loaded into the DC20 Server as described later in this manual.

A **Show** is a *Playlist* consisting of various Compositions to be played in a specific order along with associated *Automation Cues*. A Show can be programmed to Pause automatically at specific points, to wait for a specified duration or until manually re-started. A Show is the basic unit that is played by the DC20 Server as described later in this manual.

The DC20 Server uses the concept of **Roles** in order to enforce certain restrictions on what different people may do on the system. There are three pre-defined Roles on the system.

The **Projectionist** is the most basic role on the system. This is the default state of the system when no one has logged in on the Windows Graphical User Interface or into the Web User Interface. The Projectionist may build Shows as well as load and play existing Shows or Compositions on the system. The Projectionist can *Ingest* media and delete Shows but cannot delete any Compositions though automatic deletion of media may still happen.

The **Manager** is the normal operational role on the system for content management including the deletion of Compositions. In order to login as Manager, the Windows Graphical User Interface or the Web User Interface is necessary. The default password for the Manager account will be provided in a sealed envelope with the system. This password can be changed using normal Windows procedures.

The **Administrator** is a specialized login that allows advanced setup of the system and update of the software. The password for Administrator is not normally available to users of the system.

## 2. Powering Up the DC20 Digital Cinema Server

The DC20 Digital Cinema Server is best powered up in the sequence described below. Following this sequence strictly ensures that the audience has the best possible viewing experience and minimizes any possibility of connected systems such as the Digital Projector, the Cinema Processor and the amplifiers and speakers being damaged.

This assumes that the system has been installed by a qualified technician and that all interconnections have been correctly made as described in the Installation section on page 18 of this manual.

- Switch on the Digital Projector's Mains Power Switch. In normal operation, you may choose to always leave the Mains Power Switch on and use only the Projector's soft Power On function to power up and power down the Projector.

- Press the Projector's Power On key to trigger its start up sequence.
- Wait until the Projector is warmed-up and fully operational. Digital Projectors require a warm-up period to perform self-tests and to illuminate their lamps before they are ready to display images on-screen. Many projectors also require the Xenon lamps to be manually struck or turned on once the projector has completed its self-tests.
- Make sure the Digital Projector's Shutter (also called the Dowser) is closed. This ensures that no images are viewed on-screen by the audience until the DC20 Digital Server is powered-up and ready to show content.
- Switch on the DC20 Digital Cinema Server by pressing the power button on the front panel of the system.
- Observe the Remote Control Panel till the system boots. Initially, the Remote Control Panel will not be lit. After a few seconds of powering up the DC20 Digital Cinema Server, the Remote Control Panel will display the following message:




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- When the DC20 Digital Cinema Server has successfully initialized, the Remote Control Panel may display the following message if this is the first time it has been powered up after installation, after an upgrade or a configuration change:



>HD-SDI Output

- If you see this message, press the  key to select the HD-SDI Output Media Block.
- Now you should see the following screen:



<None>                      00:00:00  
   00:00:00

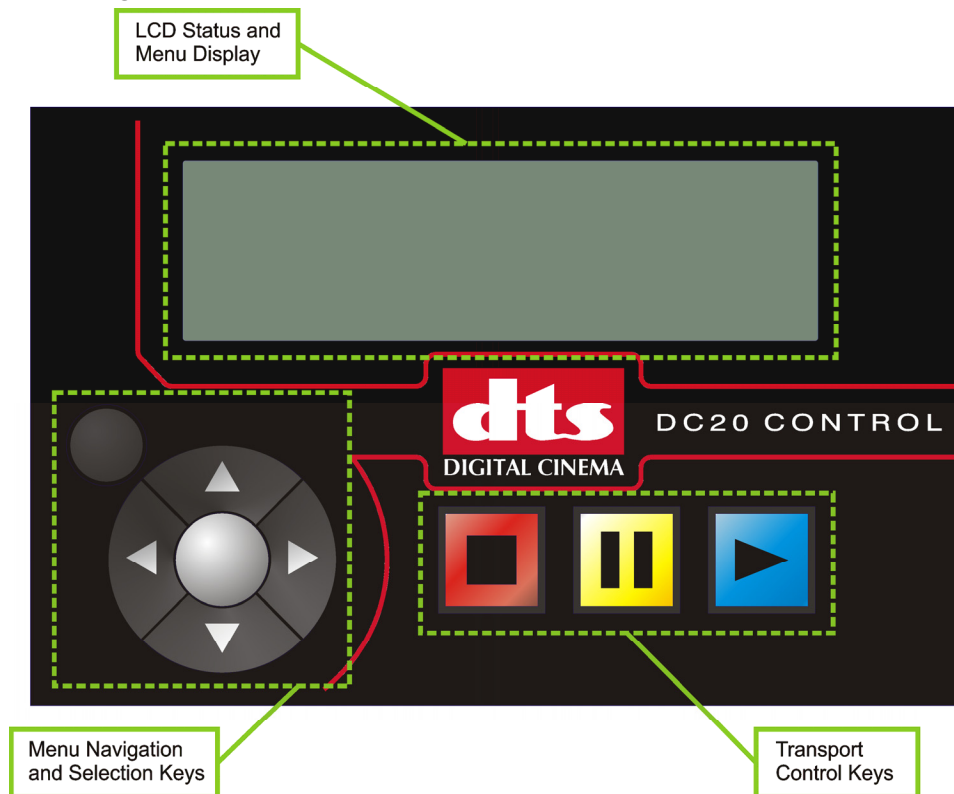
- Open the Digital Projector's Shutter. You are now ready to load and play content.

### 3. Using the DC20 Remote Control Panel

The DC20 Remote Control Panel is the local operational interface to the DC20 Digital Cinema Server. The Remote Control Panel connects to the DC20 Server over a USB connection and provides operators with familiar and easy-to-use Transport Control and Menu Key along with an LCD Status and Menu display.

The DC20 Remote Control Panel provides access only to a subset of the functions of the DC20 Digital Cinema Server. Additional configuration and management features of the system can be accessed using a keyboard, mouse and monitor connected to the system or through the Web User Interface. However, all functions required for the daily operation of the system can be accessed through the Remote Control Panel alone and the system is not expected to be connected to a monitor, keyboard or mouse for routine use by the Projectionist

The DC20 Remote Control Panel is connected to the main system using an extendable USB cable so that it can be placed next to a Viewing Port in the Projection Room giving the operator the ability to view the screen while operating the system. DC20 Remote Control Panels can be freely interchanged across DC20 Servers.












#### The DC20 Remote Control Panel

The DC20 Remote Control Panel uses large keys that are easy to operate. These keys are laid out in two sections, the Transport Control Keys and the Menu Navigation & Selection Keys.

The backlit, colored Transport Control Keys control the playback of the Shows in the system and their functionality will be immediately obvious to anyone who has ever used a consumer video or audio device.

The Menu Navigation and Selection Keys are used to move through the different menu selections available in the system for loading Shows and configuring options.

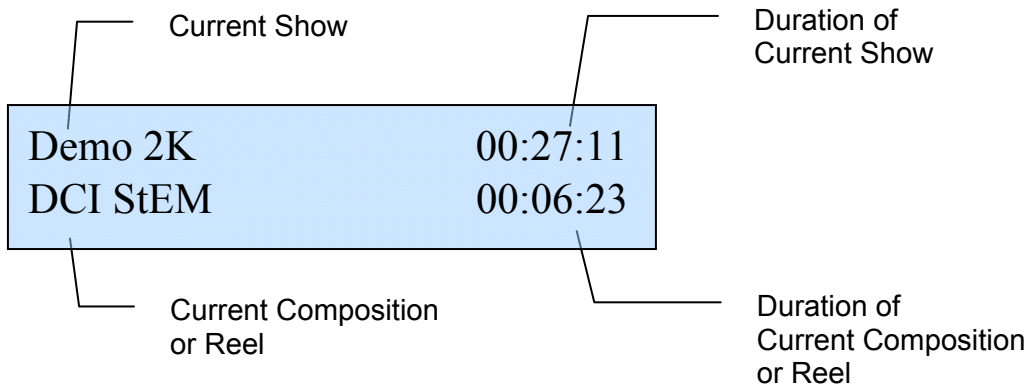
### 3.1. DC20 Remote Control Panel Keys

<b>Transport Control Keys</b>	
	The <b>Stop Key</b> is used to stop the item currently being played. The Stop, Pause and Play Transport Control Keys are active only when the system is in Transport Mode. These keys cannot be used when the system is in Menu Mode.
	The <b>Pause Key</b> is used to pause playback or to resume playback of a paused event. It is also used to pre-cue an item when in the Stop State so that it is ready for an instant start. When in Pause, the system displays a still picture on the screen and mutes audio.
	The <b>Play Key</b> starts playback of an event. It can also be used to resume playback of a paused event. If an event has not been pre-cued by pressing the Pause Key first, there will be a brief delay in starting playback when the Play Key is pressed.
<b>Menu Navigation and Selection Keys</b>	
	The <b>Up Arrow Key</b> is used to scroll up on Menu Items displayed on the LCD Screen. If there are no further Menu Items above the Current Item, this key will perform no action. A >symbol indicates the currently selected Menu Item.
	The <b>Down Arrow Key</b> is used to scroll down on Menu Items displayed on the LCD Screen. If there are no further Menu Items below the Current Item, this key will perform no action. A >symbol indicates the currently selected Menu Item.
	The <b>Left Arrow Key</b> is used to scroll left on the Menu Items displayed on the LCD Screen. This key is not currently used in normal operation but may have special applications.
	The <b>Right Arrow Key</b> is used to scroll right on the Menu Items displayed on the LCD Screen. This key is not currently used in normal operation but may have special applications.
	The center <b>OK Key</b> is active only when the system is in the Stop State. It is used to select a Menu Item displayed on the LCD Screen. A >symbol indicates the currently selected Menu Item. The OK Key is also used to first enter the Menu Mode.
	The <b>Escape Key</b> at the top left of the Arrow Keys is used to cancel a Menu Selection and return to the Previous Menu. If there is no Previous Menu, the Escape Key exits the Menu Mode and re-activates the Transport Mode.



## 4. Understanding the Remote Control Panel Status Display

When the DC20 Server is in Transport Mode, the Display on the Remote Control Panel shows the status of the currently loaded Show and the Composition and Reels that comprise this Show. When the system is playing, the remaining duration of the Show and the Composition or Reel that is currently playing are also shown.


The four elements that comprise the Status Display are shown below:



While the first line of the Status Display shows the Current Show that is loaded along with the Remaining Duration of the Show, the second line of the Status Display shows the Current Composition or Reel along with its Remaining Duration.







When the system is in the Stop State in Transport Mode, the  and  keys scroll through the sequence of Compositions or Reels that comprise the Show. The second line of the Status Display changes to show each Composition or Reel in sequence along with its Total Duration while the time display on the first line changes to show the Remaining Duration from this Composition or Reel to the End of the Show.

Press  to Cue the Current Composition or Reel and press  to Play it.

Press the  key to toggle between showing the count-down of the Remaining Time and showing the count-up of the Elapsed Time. This key can be used to toggle between the two modes when the system is playing.

## 5. Accessing Menus on the DC20 Remote Control Panel

The DC20 Remote Control Panel can either be in Transport Mode or in Menu Mode. In Transport Mode, the Transport Control Keys are active while in Menu Mode, the Menu Navigation and Selection Keys are active.

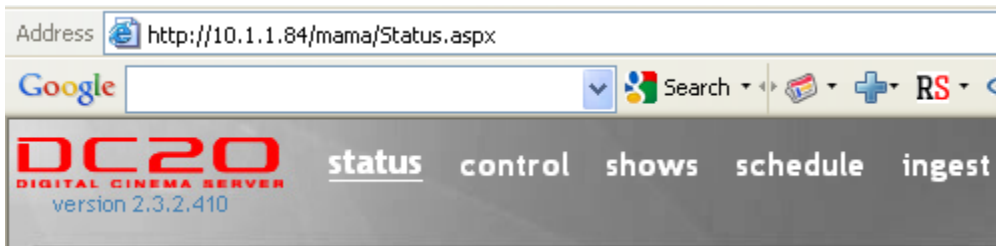
- To enter the Menu Mode, the system must first be in the Stop State. If the system is Playing content or Paused, press the Stop Key to enter the Stop State. Do not try to enter the Menu Mode during a Show!
- When the system is in the Stop State, press the  key to bring up the Main Menu. The options available in the Main Menu are:
  - > Shows
  - > Compositions
  - > Ingest
  - > Setup
  - > Media Blocks
  - > Info
- You can use the  and  Menu Navigation Keys to move to the desired Menu Item. A >-symbol indicates the currently selected Menu Item.
- Press the  key to select a Menu Item.
- A Menu Item can either lead to a sub-menu which will show a further list of menus or to a final list of options to be selected.
- To exit a menu and go back to the previous menu, press the  key.
- Pressing the  key when in the Main Menu exits Menu Mode and returns the system to Transport Mode.

## 6. Using the Mama Web User Interface

The DC20 Digital Cinema Server has a powerful and highly interactive Web User Interface that allows local and remote users to monitor and control the system.

In order to access this Web User Interface, the following url or web address is entered into the web browser. In the address, the specific DC20 Server's machine name or IP address must be substituted for <ServerName>. When accessing the Web User Interface from within the same system, "localhost" or the IP address 127.0.0.1 can be substituted for <ServerName>.

***http://<ServerName>/mama/***



While the default page shows the overall status of the Digital Cinema Server the Web User Interface has multiple Pages for control, building shows, scheduling shows, ingesting content, managing keys, managing media and viewing logs as well as system setup and maintenance tasks.

The Mama Web User Interface requires the User to Login in order to control it. A standard Web Browser Login Dialog will pop-up to authenticate the user when the system is accessed remotely.



The Status Page shows the Current Show that is loaded, any Ingest that is underway, the Server's Time and Date along with Time Zone information, the Total Storage and Free Storage both in absolute and percentage terms and a list of recent events.

## 7. Loading Content and Keys

The DC20 Server needs to load media into its internal storage before it can play any content. The process of loading the media into the system is called **Ingesting**. This process can either be performed manually or completely automated under the control of an external control system such as **QubeCentral**.

If the content is encrypted, the system will also need a **Key** to decode the content. The Key is packaged in a **Key Delivery Message** or **KDM**. The KDM is a small file and can be ingested along with the media or separately. It is important to understand that every system requires a unique Key and that Keys cannot be shared among systems. Keys are also different for different content. The Key controls the validity of the content and allows it to be decoded between specific Start Dates and End Dates. This validity can be extended by a new Key.

The content for DC20 is usually encoded in DCI JPEG2000 or MPEG-2 format. The size of an entire 90 minute feature film could be as high as 300 Gigabytes.

The DC20 Server can ingest Media and Keys in multiple ways:

- from a set of CD-ROM or DVD-ROM discs
- from eSATA or USB-2 hard drives and USB Memory Sticks
- from a Network Location
- from a Multicast Data Transmission

Ingesting content into the DC20 system can take a variable amount of time depending on the size of the content and the source of the content. The fastest ingest will usually be from locally connected hard drives. In the remainder of this manual, where USB hard drives are referred to, the details apply to eSATA and other locally connected media as well.

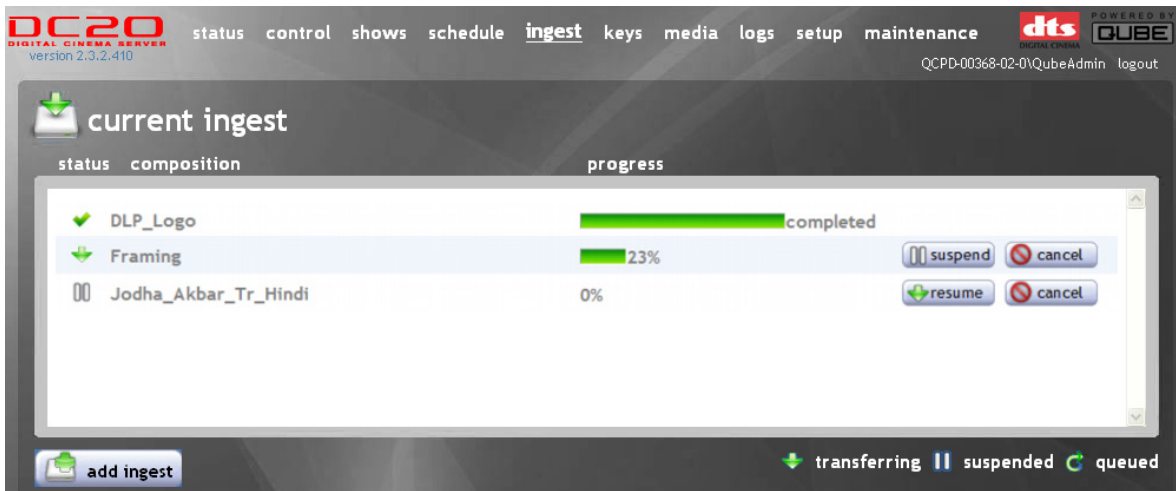
In order for content to be ingested, it should have been prepared by **QubeMaster** or a compatible Digital Cinema Mastering System and made into a standards compliant **Digital Cinema Package or DCP** that is placed on a hard drive or network location.

**Ingesting is best done when the system is in the Stop State since the process is somewhat faster when there is no other activity on the system.**

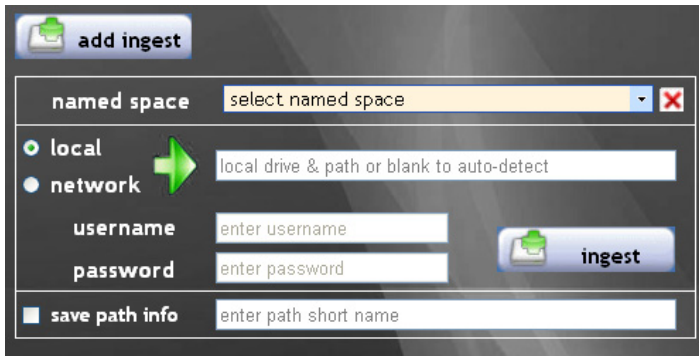
The process of Ingesting Media and Keys into the DC20 Server from DVD-ROM discs, USB hard drives or network locations is described below.

- Connect the hard drive with the Media and/or Key to a free USB or eSATA port on the DC20 Server. These ports are available on the front panel of the system. If the content is on DVD-ROM discs, insert the first disc into the DVD-ROM drive on the front panel of the DC20 Server. You can eject the DVD-ROM by pressing the Eject button on the DVD-ROM drive.
- Bring up the Mama Web User Interface as described earlier in this manual either on the DC20 system or an external system.
- Click on *Ingest* from the items listed on the top of the Mama Web UI.





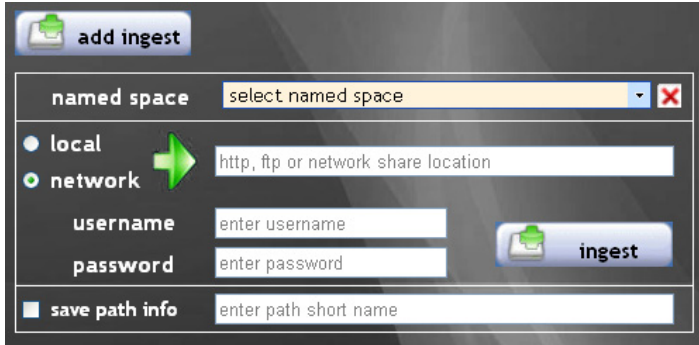
- The Page shows a list of items currently being ingested by the system along with their status.
- You can *Suspend* or *Cancel* other ingest operations that are in progress using the appropriate buttons displayed next to each item displayed on this page. Suspending an ingest will temporarily halt it so that other, perhaps more urgent, operations can be performed while cancelling an ingest will abort it and delete any partially ingested content.
- Click on the *Add Ingest* button at the bottom left of the page. This will open a panel that will allow you to start a local or network ingest.



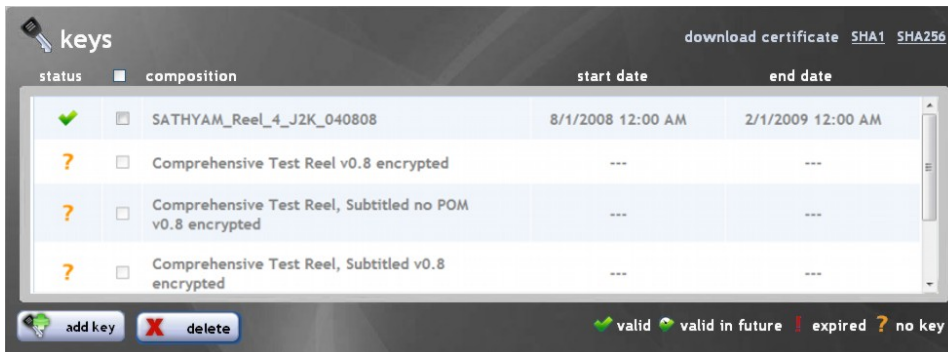
When ingesting from a hard drive connected locally to the DC20 system, leaving all the fields blank and clicking on the *Ingest* button will auto-detect any valid DCPs in the connected drive and bring up a dialog box listing the different Compositions that are a part of these DCPs.

- By default, all Compositions in the DCP will be ingested. Where necessary, you can select or deselect specific Compositions and click on the OK button to close the dialog box and start the ingest operation.

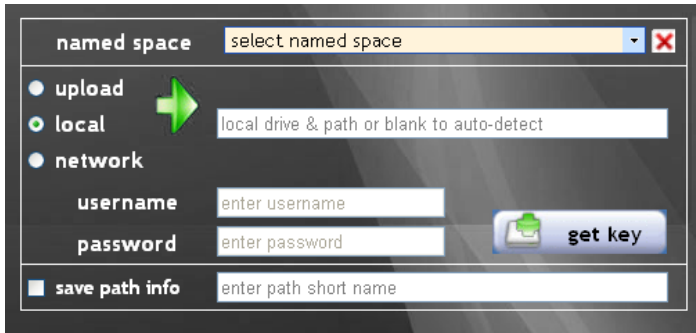
- While the default selection is a *Local* ingest, you can also select a *Network* ingest to load content over Ethernet.



- Network content can be ingested using http, ftp or CIFS (and SMB) protocols by entering valid urls along with usernames and passwords as necessary. Where a domain must be specified, the standard format of *domain\username* must be used in the username field.
- If sufficient space is not available to ingest the entire Package, the application will check to see if additional space can be made free to complete the ingest if automated media management is enabled. Where sufficient space cannot be made available, an error will be reported.
- Where automated media management is disabled, other content must be deleted manually using the media page when sufficient space is unavailable.
- Keys are loaded into the system in exactly the same manner as content. Keys must be delivered as valid Key Delivery Messages or KDMs.



- Click on *Keys* from the items listed on the top of the Mama Web UI.
- This page lists all encrypted content stored on the system with the status of the keys for each item.
- Click on the Add Key button on the bottom left of the page to load KDMs from physical media attached to the system or from a network location using http, ftp or CIFS (and SMB) protocols. Loading KDMs is accomplished in very much the same manner as described above for loading content.



- Using the KDM Upload option, a KDM can also be uploaded directly from the user’s computer browser.
- Each DC20 system will accept KDMs meant only for it and ignore KDMs meant for other systems.
- In order to generate a KDM for a particular system, the *Digital Certificate* of that system is required to be provided to the content supplier or content management company. The *Download Certificate* links at the bottom of the Keys Page allows you to access these files quickly and easily. The SHA1 Device Certificate is available for backward compatibility while the SHA256 or SMPTE Device Certificate is to be used in future.

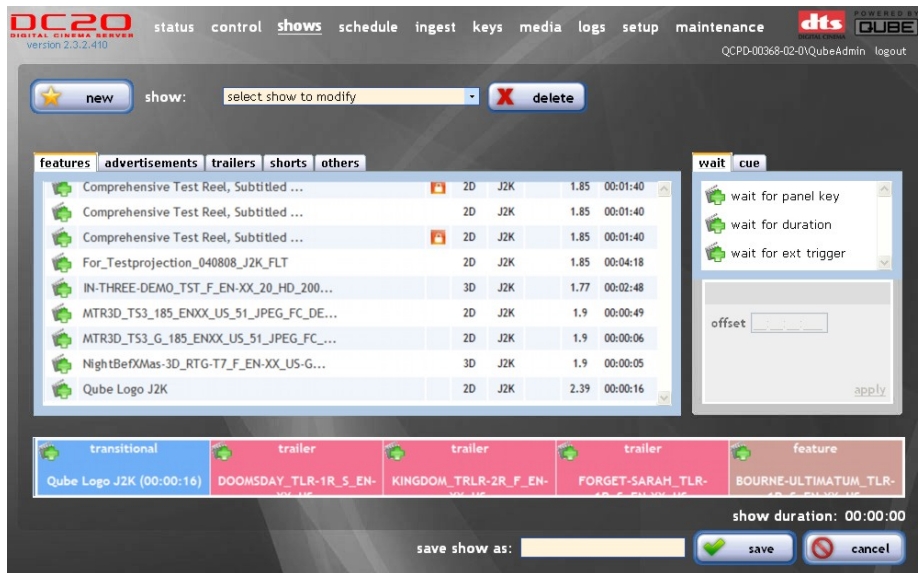
## 8. Building a Show

Usually, various types of **Compositions** are ingested into the DC20 system including feature films and pre-show material such as advertising commercials and trailers. In order to sequence the different Compositions in the desired order for a particular cinema, a **Show** must be created. Only Shows or single Compositions can be played out of the DC20 Server. Where more than a single Composition must be played in sequence, a Show containing the required Compositions must be created.

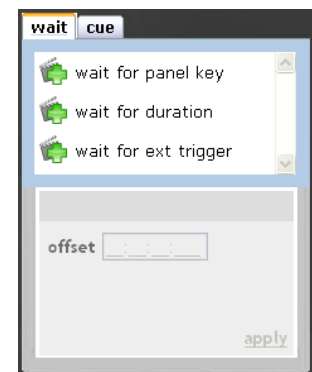
Building a Show requires the *Projectionist* or **Manager** to be logged into the system using the Windows Graphical User Interface or using the Mama Web User Interface. In order to login to the system, a computer monitor, keyboard and mouse are required on the DC20 system. Alternatively, the Web User Interface can be used over the network.

The process of building a Show from previously ingested Compositions is described here.

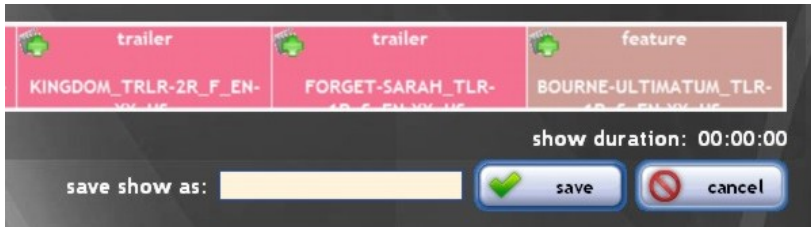
- Bring up the Mama Web User Interface as described earlier in this manual either on the DC20 system or an external system.
- Login to the system as Projectionist or Manager with the appropriate password.
- Click on the *Shows Menu Item* on the top of the Web User Interface. This will bring up the *Shows Page* where new shows can be created and existing shows can be modified.



- The *New Icon* on the Shows Page creates a new show and the *Delete Icon* on the Shows Page deletes an existing show. An existing show can be modified by selecting it in the *Choose Show Drop Down Box*.
- Compositions are listed in a box on this page, classified into *Features*, *Advertisements*, *Trailers*, *Shorts* and *Others* for convenience. Clicking on any of these *Tabs* lists the Compositions of that type. Where there are more than a screenfull of Compositions listed, scroll bars are available to scroll through the list of Compositions.
- The *Timeline* below the Compositions area shows a graphical representation of the Show being edited i.e. the sequence of Compositions that forms this Show.
- Compositions can be inserted into a Show by clicking and holding the Left Mouse Button over the Icon to the left of the Composition name and dragging the Composition onto the Timeline. Where there are already some Compositions in the Timeline, the new Composition's position is determined by where it is dragged to.
- Double-clicking a Composition will automatically add it to the end of the Timeline.
- Compositions can be re-ordered within the Show by dragging them to a new position within the Timeline. Deleting a Composition from the Show being edited is possible by dragging it from the Timeline to any part of the screen area below it.
- *Wait Events* cause a Show to pause. They are listed to the right of the Compositions List and can also be inserted into a Show by dragging the Icon to the desired point in the Timeline. In the case of the *Wait for Duration Event*, the duration of the pause in seconds can be entered after the Icon is dragged onto the Timeline by double-clicking the icon on the Timeline. The *Wait for Trigger* and *Wait for Panel Key Events* create an indefinite pause until the User resumes the Show either by pressing a Remote Control Panel Key or by closing an external GPI trigger.














- Once a Show has been sequenced, it can be saved by entering a name in the *Save Show As* Text Box below the Timeline and pressing the *Save Icon* next to it. If an existing Show is being modified, the name will already be entered in the Text Box and this can be modified to rename the Show.
- Immediately after a Show is saved, it is available to be picked and loaded from the DC20 Remote Control Panel.



## 9. Selecting and Playing a Show or Composition

A Show or Composition can either be played from the start or it can be resumed from the position at which it was last stopped or interrupted before completion. The procedure to select a Show or Composition and Play it is described here.

- To enter the Menu Mode, the system must first be in the Stop State. If the system is Playing content or Paused, press the Stop Key to enter the Stop State. Do not try to enter the Menu Mode during a Show!
- When the system is in the Stop State, press the  key to bring up the Main Menu. The options available in the Main Menu are:
  - > Shows
  - > Compositions
  - > Ingest
  - > Setup
  - > Media Blocks
  - > Info
- You can use the  and  Menu Navigation Keys to move to the Shows Menu Item or the Compositions Menu Item. A >symbol indicates the currently selected Menu Item.
- Press the  key to select the Shows Menu Item or the Compositions Menu Item. This will list all available Shows or Compositions on the system that are valid and can be played.
- You can again use the  and  Menu Navigation Keys to move through the various Shows listed. A >symbol indicates the currently selected Show or Composition.
- Press the  key to select the desired Show or Composition.
- If this Show or Composition had previously been stopped or interrupted before completion, the system will offer the following options:

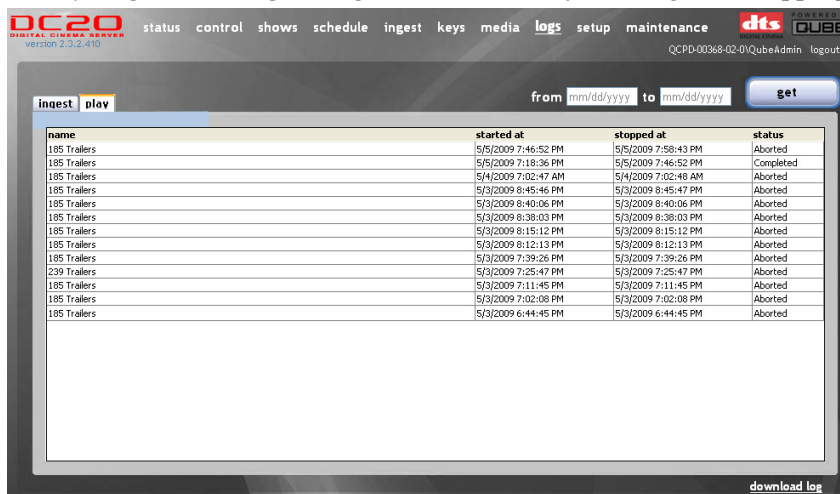
- > Resume
- > Load
- To **Resume a Show** or Composition from where it was last stopped or interrupted, select Resume and press the  key. This will Load the Show or Composition and automatically enter Transport Mode where the system will already be in the Play State.
- To **Load a Show** or Composition and start it from the beginning, select Load and press the  key. This will Load the Show or Composition and automatically enter Transport Mode where the system will be in the Stop State. You can now press the  key to Cue the clip and then press the  key to start playback.

## 10. Viewing System Logs

The DC20 XP Digital Cinema Server logs all activity internally to a secure and tamper-proof database. The system allows access to the Play Log and Ingest Log using the Mama Web User Interface.

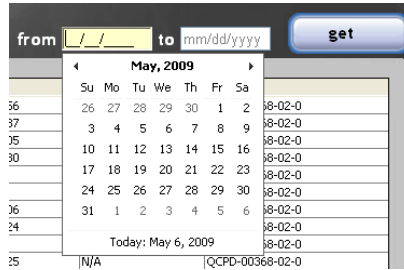
These logs are also available as signed xml files so that authenticity can be verified by an external application.

- Bring up the Mama Web User Interface as described earlier in this manual either on the DC20 system or an external system.
- Login to the system as Projectionist or Manager with the appropriate password.
- Click on *Logs* from the items listed on the top of the Mama Web UI. This will bring up the *Logs Page*.
- The *Play Log* and the *Ingest Log* can be viewed by clicking on the appropriate Tab.



name	started at	stopped at	status
185 Trailers	5/3/2009 7:46:52 PM	5/3/2009 7:58:43 PM	Aborted
185 Trailers	5/3/2009 7:19:36 PM	5/3/2009 7:46:52 PM	Completed
185 Trailers	5/4/2009 7:02:47 AM	5/4/2009 7:02:48 AM	Aborted
185 Trailers	5/3/2009 8:45:46 PM	5/3/2009 8:45:47 PM	Aborted
185 Trailers	5/3/2009 8:40:06 PM	5/3/2009 8:40:06 PM	Aborted
185 Trailers	5/3/2009 8:38:03 PM	5/3/2009 8:38:03 PM	Aborted
185 Trailers	5/3/2009 8:15:12 PM	5/3/2009 8:15:12 PM	Aborted
185 Trailers	5/3/2009 8:12:13 PM	5/3/2009 8:12:13 PM	Aborted
185 Trailers	5/3/2009 7:39:26 PM	5/3/2009 7:39:26 PM	Aborted
239 Trailers	5/3/2009 7:25:47 PM	5/3/2009 7:25:47 PM	Aborted
185 Trailers	5/3/2009 7:11:45 PM	5/3/2009 7:11:45 PM	Aborted
185 Trailers	5/3/2009 7:02:08 PM	5/3/2009 7:02:08 PM	Aborted
185 Trailers	5/3/2009 6:44:45 PM	5/3/2009 6:44:45 PM	Aborted





- The system shows the logs for the last week by default but any desired date range can be selected by entering the *Start Date* and *End Date* in the *From* and *To* date fields on this page and clicking on the *Get* button. An easy to use calendar is available to pick dates.



- You can click the *Download Log* link at the bottom right of the page to download signed xml logs of the data for the desired date range.

## 11. Checking System Information

The following procedure explains how you can check system information such as the version of the software currently loaded in the DC20 Digital Cinema Server, the amount of installed and free storage on the system or the date and time of the secure system clock.








- To enter the Menu Mode, the system must first be in the Stop State. If the system is Playing content or Paused, press the Stop Key to enter the Stop State. Do not try to enter the Menu Mode during a Show!
- When the system is in the Stop State, press the  key to bring up the Main Menu. The options available in the Main Menu are:
  - > Shows
  - > Compositions
  - > Setup
  - > Media Blocks
  - > Info
- You can use the  and  Menu Navigation Keys to move to the Info Menu Item. A >symbol indicates the currently selected Menu Item.
- Press the  key to select the Info Menu Item. This will list the available Menu options:
  - > Version
  - > Storage
  - > Date/Time
  - > Network Adapters
- The **Version** option shows the installed DC20 Software Version and Date of Release.
- The **Storage** option shows the Total Storage available on the system as well as the Free Storage.











- The **Date/Time** option shows the current system Date and Time. The Date and Time are derived from a tamper-proof secure clock.
- The **Network Adapters** option shows a list of available network adapters and their IP addresses, if connected.

## 12. Setup Options for the HD-SDI Output Media Block

The Setup Menu allows some options to be set on the DC20 Server. The available setup options vary depending on the selected Media Block. This section looks at the various options available for setup of the HD-SDI Output Media Block.

- To enter the Menu Mode, the system must first be in the Stop State. If the system is Playing content or Paused, press the Stop Key to enter the Stop State. Do not try to enter the Menu Mode during a Show!
- When the system is in the Stop State, press the  key to bring up the Main Menu. The options available in the Main Menu are:
  - > Shows
  - > Compositions
  - > Ingest
  - > Setup
  - > Media Blocks
  - > Info
- You can use the  and  Menu Navigation Keys to move to the Setup Menu Item. A >symbol indicates the currently selected Menu Item.
- Press the  key to select the Setup Menu Item. This will list the available Menu options for the selected Media Block, the HD-SDI Output in this case:
  - > Projector:
  - > Audio:
  - > Audio Offset:
  - > Loop:
  - > Network Adapters
- The **Projector Menu** lists the available DLP Cinema™ projectors by performing a Network Discovery function over any Ethernet connection. You can use the  and  Menu Navigation Keys to move to the desired projector and press the  key to select it. The name of the selected projector is displayed or “Not Connected” is displayed after the colon.



- The **Audio Menu** allows the selection of either the Analog or AES digital audio outputs on the system. You can use the  and  Menu Navigation Keys to choose and press the  key to select the desired audio output. The selected option is displayed after the colon.
- The **Audio Offset Menu** allows the setup of the audio delay in the system in 24 fps frames. You can use the  and  Menu Navigation Keys to set the desired delay and press the  key to confirm. The selected Audio Offset is displayed after the colon.
- The **Loop Menu** enables a Show of Composition being played to repeatedly loop until stopped. Loop Playback can be turned On or Off and the selected option is displayed after the colon.
- The **Network Adapters Menu** lists the available network adapters on the system and allows each adapter to be setup. DHCP (or *Dynamic Host Configuration Protocol*) can be turned On or Off. If DHCP is turned On, the Network Adapter attempts to automatically obtain an IP Address from a DHCP server on the network, if available. Should a DHCP server not be available, an *Auto-configuration IP* is used. If DHCP is turned Off, the *IP Address*, *the Subnet Mask* and *the Gateway* can be manually entered in the usual IP Address format using the  and  Menu Navigation Keys. Please note that the Network Adapters Menu should be configured by a Systems Administrator who is aware of the details of the network in the location where the DC20 Server is installed.

## 13. Installation

### 13.1. Required Connections

The connections required to setup the DC20 are given below.

- The Remote Control Panel should be connected to any available USB Port on the DC20 Server on the front or rear panel.
- The dual redundant power supplies should be connected to mains power using two IEC Power Cords. The Power Supplies are auto-ranging.
- The two upper HD-SDI Outputs should be connected to HD-SDI Input A and HD-SDI Input B in the Digital Projector respectively.
- Either the Analog Audio Output or the Digital Audio Output should be connected to a Cinema Processor. The connected Audio Output should be selected in the Remote Control Panel Setup Menu or the Mama Web UI Setup Page.
- The Ethernet port can be wired to the Digital Projector, a computer or the Cinema’s Local Area Network. There must be a network connection between the DC20 Server and the Digital Projector, either through a direct Ethernet cable between the two devices or through the Cinema’s Local Area Network.

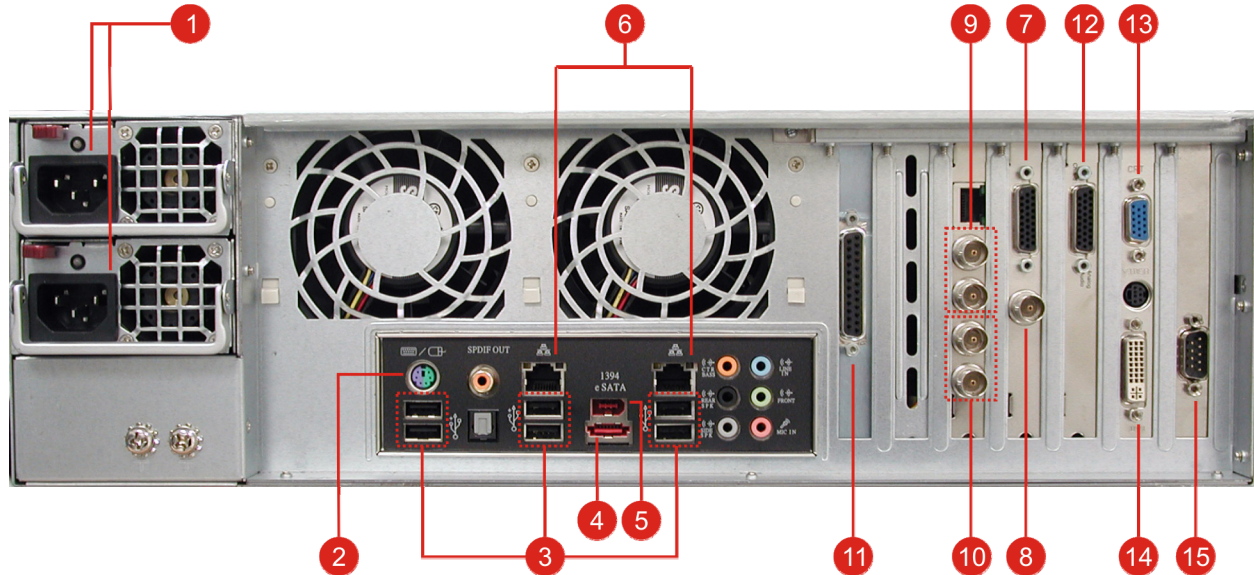
The diagrams below shows the Front and Rear Panels of the DC20 Digital Cinema Server along with descriptions of the features.

### 13.2. DC20 Front Panel View



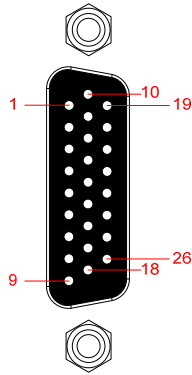
1	DVD-ROM Drive
2	CRU DataPort™ Receiver
3	Power Switch
4	eSATA Connector
5	USB-2 Connectors x 2

### 13.3. DC20 Rear Panel View



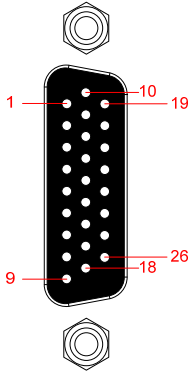
1	Redundant Power Supplies x 2
2	PS/2 Keyboard & Mouse Ports
3	USB-2 Ports x 6
4	eSATA Connector
5	1394 Firewire Port
6	Gigabit Ethernet LAN RJ45 x 2
7	AES3 Digital Audio Outputs
8	Audio Clock
9	Dual-link HD-SDI Outputs 1
10	Dual-link HD-SDI Outputs 2
11	GPIO – 8-Input/Output
12	8-chan Analog Audio Output
13	VGA Port
14	DVI/VGA Port
15	RS-232 Serial Port

### 13.4. Connector Pinouts



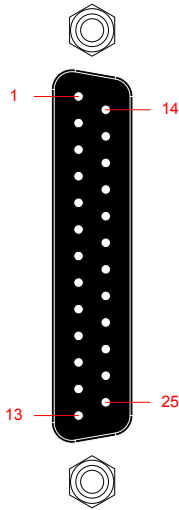
Analog Audio Output  
HD-26 Female Connector  
on system

1	Left
2	Right
3	Center
4	Sub-woofer
5	Left Surround
6	Right Surround
7	Left Center
8	Right Center
9	N/C
10	Ground
11	Ground
12	Ground
13	Ground
14	Ground
15	Ground
16	Ground
17	Ground
18	N/C
19	Ground
20	Ground
21	Ground
22	Ground
23	N/C
24	N/C
25	N/C



AES3 Digital Audio Output  
HD-26 Female Connector  
on system

<b>1</b>	AES3 Output 1 +ve (L/R)
<b>2</b>	AES3 Output 2 +ve (LS/RS)
<b>3</b>	AES3 Output 3 +ve (C/LFE)
<b>4</b>	AES3 Output 4 +ve (7/8)
<b>5</b>	AES3 Output 5 +ve (9/10)
<b>6</b>	AES3 Output 6 +ve (11/12)
<b>7</b>	AES3 Output 7 +ve (13/14)
<b>8</b>	AES3 Output 8 +ve (15/16)
<b>9</b>	N/C
<b>10</b>	AES3 Output 1 -ve (L/R)
<b>11</b>	AES3 Output 2 -ve (LS/RS)
<b>12</b>	AES3 Output 3 -ve (C/LFE)
<b>13</b>	AES3 Output 4 -ve (7/8)
<b>14</b>	AES3 Output 5 -ve (9/10)
<b>15</b>	AES3 Output 6 -ve (11/12)
<b>16</b>	AES3 Output 7 -ve (13/14)
<b>17</b>	AES3 Output 8 -ve (15/16)
<b>18</b>	N/C
<b>19</b>	Ground
<b>20</b>	Ground
<b>21</b>	Ground
<b>22</b>	Ground
<b>23</b>	Ground
<b>24</b>	Ground
<b>25</b>	Ground
<b>26</b>	Ground



GPIO  
DB-25 Female Connector  
on system

Pin	Function	Factory Settings
1	GPO 7	Aux
2	GPO 6	Audio Digital Cinema
3	GPO 5, 6 Common	
4	GPO 3	Mask Scope
5	GPO 2	Lights Up
6	GPO 0	Lights Down
7	GPI 7	
8	GPI 6	
9	GPI 5, 6 Common	
10	GPI 3	Play/Pause Toggle
11	GPI 2	Pause
12	GPI 0	Fire
13	+5V (1/2A max)	
14	GPO 7 Common	
15	GPO 5	Audio Non Sync
16	GPO 4	Mask Flat
17	GPO 3, 4 Common	
18	GPO 1	Lights Mid
19	GPO 0, 1, 2 Common	
20	GPI 7 Common	
21	GPI 5	
22	GPI 4	
23	GPI 3, 4 Common	
24	GPI1	Play
25	Digital Ground	

## 14. Product Specifications

### Content Playback Formats

JPEG2000 2k and pre-show file playback at 2k resolution on dual-link HD-SDI (12-bit 4:4:4 (XYZ, RGB))

MPEG-2 MXF Interop movie, pre-show and alternative content file playback (4:2:0 & 4:2:2)

VC1 4:2:0

3D – JPEG2000 movies and 48p playback via Dual 10-bit 422 (YPbPr / YCxCz)

Image Resolution: 2048x1080P, HD 1080P

Frame Rates: 23.97, 24, 25, 29.97, 30, 48, 50 fps

Stereoscopic Picture: 48 fps Single Track File format

xml packaging for compositions and shows

Subtitling: Multi-lingual subtitling in the TI CineCanvas™ format

### Security

TI's CineLink II™ Strong Link Encryption

Thomson's NexGuard™ Forensic Watermarking (optional)

Philips' CineFence™ Forensic Watermarking (optional)

FIPS 140-2 Level 3 Security Certified

128-bit AES Encrypted Content

Start/End Date control by 2048-bit RSA Encrypted Keys

### Network and Control Interfaces

Gigabit Ethernet port, RJ-45 x 2

RS-422 serial control port

USB 2.0 Ports x 8

eSATA Port x 2

IEEE 1394 Firewire Port

Keyboard & Mouse port

**Projectionist Control** - USB Controller with Play, Pause, Stop and Menu Buttons with 40 char x 2 line LCD Status Display

**Management Interface** - Multi-lingual, Multi-function web-based Interface with System Status, Transport Control, Show Builder, Scheduling, Content Ingest, Key Management, Log Viewer and System Setup/Maintenance.

### Content Storage (Internal)

1 TB RAID 10 Storage (standard)

2 TB RAID 10 Storage (optional).

## Audio

**Digital** - 16 channels, AES-3/EBU format, single 26-pin HD Connector with 8 x AES3 Output Pairs

**Analog** - Balanced or unbalanced 8 channels 26-pin HD Connector for 8-chan Analog Audio Output

Audio Formats: Linear PCM Audio, 48 KHz and 96 KHz, 16 and 24-bit

## Automation

Standard Serial and IP control using open ASCII protocol

Configurable support of Serial and IP devices

**GPIO** 8 optically isolated inputs and outputs

## Video Output

**Digital Image Output:** 2 x Dual-link HD-SDI (2 x SMPTE 292M), 4 x 75 ohms BNC with TI CineLink II™ encryption

**UI Monitor Output:** DVI-I and HDMI connectors (monitor optional)

## Power

Dual-redundant power supply standard 100-240V AC 50/60Hz, 350W

## Physical Dimensions

### Main Unit

3U Rack Mountable Unit

Metric - 48.5 cm (W) x 13.5 cm (H) x 69.2 cm (D) (66.7 cm D behind rack ears)

Imperial - 19" (W) x 5.3" (H) x 27.25" (D) (26.25" D behind rack ears)

Note: When determining rack depth needed, allow approx. 3.8 cm (1.5") additional depth for mating cables

### Remote Panel

Metric - 9.5 cm (W) x 4.0 cm (H) x 14.8 cm (D)

Imperial - 3.8" (W) x 1.6" (H) x 5.8" (D)

## Operating Temperature and Humidity

10 to 40 degrees C

20% to 90% RH (non-condensing)

*Specifications mentioned herein are subject to change without notice due to continuous product development*