

# **Qube XP-E Digital Cinema Server**

## *Operations Manual*

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## **Introduction**

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Thank you for purchasing the Qube Digital Cinema Server.

Qube Cinema's end-to-end solutions for Digital Cinema provide the ultimate combination of quality, reliability, ease-of-use, security and flexibility. Designed from the ground up to operate in mission-critical applications, the architecture of the Qube product family has been conceived with the future in mind and provides an integrated workflow, from mastering to distribution to playback to reporting to archival. Being almost entirely software based allows the Qube system to leverage developments in the computer industry to bring to market format independent, powerful and flexible products.

Qube Cinema is an entire suite of products that are required for a practical, commercially viable end-to-end implementation of Digital Cinema from a company that has proven expertise in managing complex technology transformations in traditional workflows, a company with a passion for cinema and a thorough understanding of film, video, audio and computer technology as well as the production, post-production and exhibition industries.

It is this passion and deep understanding of this complex domain that reflect in every aspect of our path-breaking products.

The **Qube XP Digital Cinema Server** is the core component of the Qube system that plays picture and sound and provides theatre-automation support. Redundant power supplies and RAID 1,0 hard drives bring a high level of reliability to the system while a detachable Qube Remote 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 Qube Remote 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 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.

**Qube XP-D** is aimed at the D-cinema market and has CineLink™ 2 equipped SMPTE 292M dual-link HD-SDI outputs and AES3 audio outputs apart from providing analog audio outputs and optional automation support through GPI inputs and outputs.

The Qube XP-D server is standards-based, DCI Compliant 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, high bit-rate MPEG-2 and Windows Media 9 picture while also being expandable with additional software codecs. Audio is uncompressed 16-bit or 24-bit at 48 KHz and 96 KHz.

**Qube XP-E** is aimed at the E-cinema and Pre-show market and has a HDCP enabled HDMI picture output and analog audio outputs.

The Qube XP-E server is also standards-based and designed for interoperability. The system 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 is optionally available for MPEG-2 content.

The base system handles high bit-rate MPEG-2 pictures and also supports Windows Media 9 and is expandable with additional software codecs. Audio is uncompressed 16-bit or 24-bit at 48 KHz and 96 KHz.

The **QubeMini** Digital Cinema Server is a powerful solution for high definition cinema in alternative venues and for pre-show applications in a quiet, reliable, miniature package.

QubeMini has a HDCP equipped HDMI picture output and stereo analog and S/PDIF digital audio outputs as well as an optional 5.1 Surround Sound interface. Like the rest of the Qube family, the system is standards-based and designed for interoperability. It 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.



The base system handles high bit-rate MPEG-2 and Windows Media 9 pictures and is expandable with additional software codecs. Audio can be uncompressed 16-bit at 48 KHz or Windows Media 9.

All Qube XP servers support subtitling in the TI CineCanvas™ file format. Subtitles can be internally rendered or in the case of the Qube XP-D, can be sent along with timing information to a DLP Cinema™ projector over Ethernet.

Media transport is possible using portable eSATA, USB-2 or 1394a/b hard drives, high-speed data lines and optionally, satellite multicast transmissions.

Qube XP 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.

Qube XP systems can be managed and operated locally and remotely via a powerful web-based UI which shows status and, with the proper login

credentials, allows transport control, scheduling, content ingest, key management as well as setup and maintenance. System logs can also be viewed over the web interface and are signed for verification of authenticity.

**QubeShare** is a shared storage solution for multiplexes with 4 TB of RAID 5 storage and Gigabit Ethernet connectivity. Multiple Qube XP Servers can be connected to a single QubeShare and directly play shared media. Designed to be housed in a secure central location such as the Manager's office or in an IT server room, QubeShare is managed remotely and is a high-availability system that requires virtually no maintenance.

**QubePlex** is the central management system with status monitoring and control for every digital screen in the multiplex. QubePlex can be installed on any computer in the network and provides all technical personnel in the theatre instant feedback on the status of all screens while providing the manager or projectionist remote control over each individual screen.

**QubeCast** is a unique media transmission system which uses Digital Fountain's patented wirespeed delivery technology to securely move media over satellite and broadband networks much more efficiently than conventional IP based technologies such as ftp. QubeCast can handle both multicast and point-to-point transfers and is simply the best solution on the market for digital cinema networks.

**QubeCentral** is a web-based digital cinema network control, management and reporting system that also provides movie-on-demand download scheduling and transparently and securely transmits access control keys. The system can also be used to centrally schedule commercials and provides password-protected online access to as-run logs and the health status of units in the field.

**QubeMaster** is a software-based Digital Cinema packaging solution designed to integrate fully into a modern post environment. QubeMaster imports or digitizes picture and sound and encodes into all supported image compression formats including JPEG2000, MPEG-2 and Windows Media 9. The system can also perform DCI specified encryption simultaneously. QubeMaster provides a very powerful mastering interface

which allows *Track Files* to be added to the database, picture, sound and subtitles to be synced accurately to form *Reels*, Reels to be chained together to form *Compositions* and *Shows* to be created using one or more Compositions. The system produces standards compliant *Digital Cinema Packages (DCPs)* and *Key Delivery Messages (KDMs)* for distribution to digital screens. QubeMaster also allows for Compositions to be edited for censorship or localization requirements of different territories.

## **Qube Cinema Terms and Concepts**

---

It is useful to understand some of the concepts of Qube Cinema's internal architecture when working with the system.

The basic unit of content that can be played by the Qube Digital Cinema Server is the **Track File**. A Track File is either a picture, sound or subtitle file in one of the supported compression *and* container formats. Qube 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 negative or a sound negative 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 **Package** or DCP that can be ingested or loaded into the Qube Server as described later in this manual.

A **Show** is a *Playlist* consisting of various Compositions and Reels to be played in order along with associated *Automation Events*. 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 Qube Server as described later in this manual.

The Qube 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 cannot *Ingest* media nor delete any files manually though automatic ingest of media may still be possible if permitted by a configuration setting.

The *Manager* is the normal operational role on the system for Ingest of Media and content management including the deletion of content. 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.

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

## **Powering Up the Qube Digital Cinema Server**

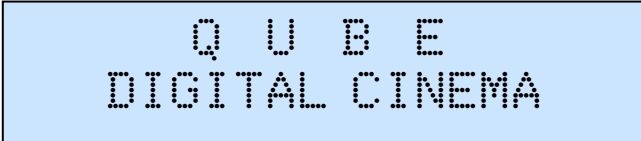
The Qube Digital Cinema Server is best powered up in the sequence described below. Following this sequence strictly ensures that the audience has the best possible viewing experience and minimizes any possibility of connected systems such as the Digital Projector, the Cinema Processor and the amplifiers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

- ▶ 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 key to power up and power down the Projector.
- ▶ Press the Projector's soft Power On key to trigger its start up sequence.

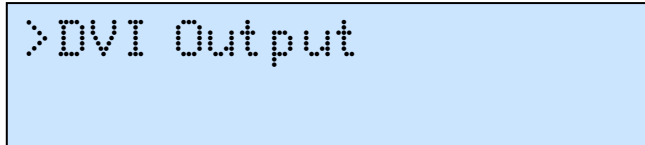


- ▶ Wait until the Projector is warmed-up and fully operational. Digital Projectors require a warm-up period to perform self-tests and to illuminate their lamps before they are ready to display images on-screen. Many projectors also require the Xenon lamps to be manually *struck* or turned on once the 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 Qube Digital Server is powered-up and ready to show content.
- ▶ Switch on the Qube Digital Cinema Server by pressing the power button on the front panel of the system.
- ▶ Observe the Remote Panel till the system boots. Initially, the Remote Panel will not be lit. After a few seconds of powering up the Qube Digital Cinema Server, the Remote Panel will display the following message:




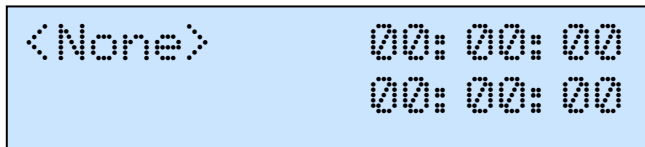
Q U B E  
DIGITAL CINEMA

- ▶ When the Qube Digital Cinema Server has successfully initialized, the Remote 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:



```
>DVI Output
```

- ▶ If you see this message, press the  key to select the DVI 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.

## **Using the Qube Remote Panel**

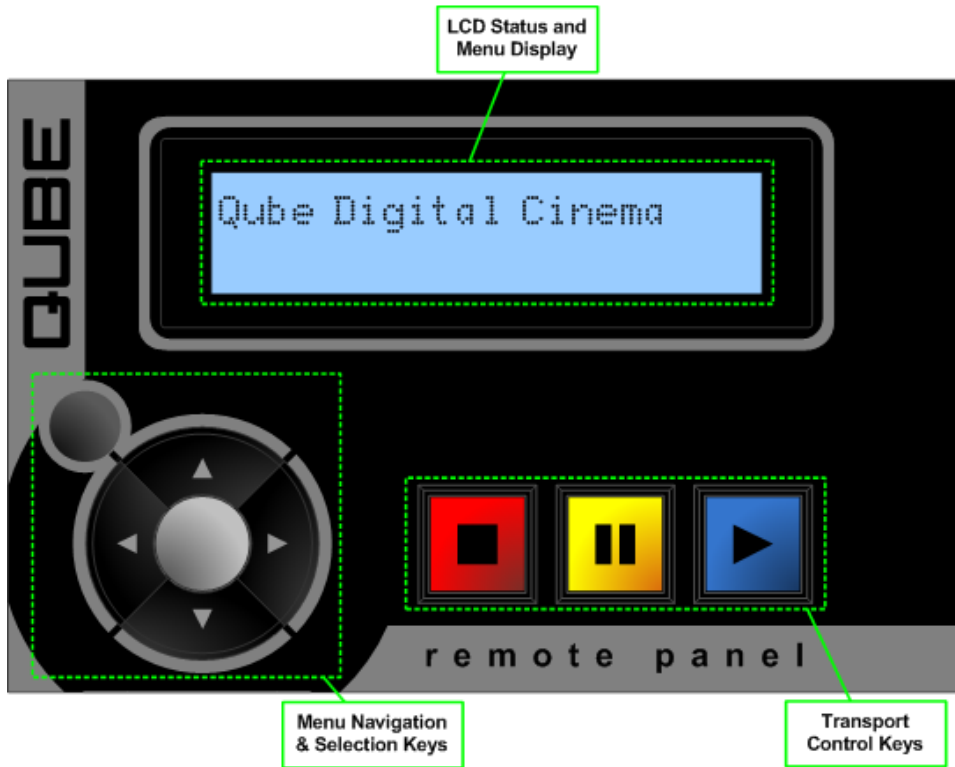
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The Qube Remote Panel is the main operational interface to the Qube Digital Cinema Server. The Remote Panel connects to the Qube Server over a USB connection and provides operators with familiar and easy-to-use Transport Control and Menu Keys along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

The Qube Remote Panel provides access only to a subset of the functions of the Qube 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 Panel alone and the system is not expected to be connected to a monitor, keyboard or mouse for routine use by the Projectionist.

The Qube Remote 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. Qube Remote Panels are interchangeable across Qube Servers.






### The Qube Remote Panel










The Qube Remote 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 and 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 CD or DVD player or a tape recorder.

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.

### Qube Remote Panel Keys

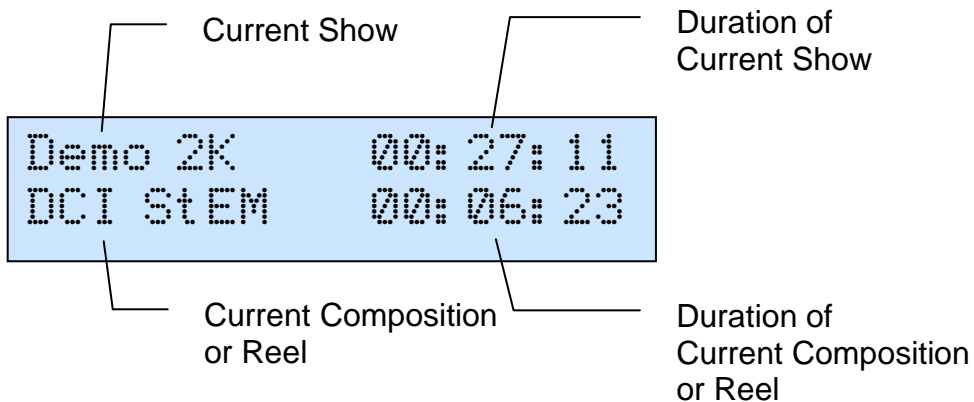
Transport Control Keys	
	The <b>Stop Key</b> is used to stop the item currently being played. The Stop, Pause and Play Transport Control Keys are active only when the system is in Transport Mode. These keys cannot be used when the system is in Menu Mode.
	The <b>Pause Key</b> is used to pause playback 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 as described in other Qube documents.
	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 as described in other Qube documents.
	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.

## Understanding the Remote Panel Status Display



When the Qube Server is in Transport Mode, the Display on the Remote 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.



## Accessing Menus on the Qube Remote Panel

The Qube Remote 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
  - > 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.

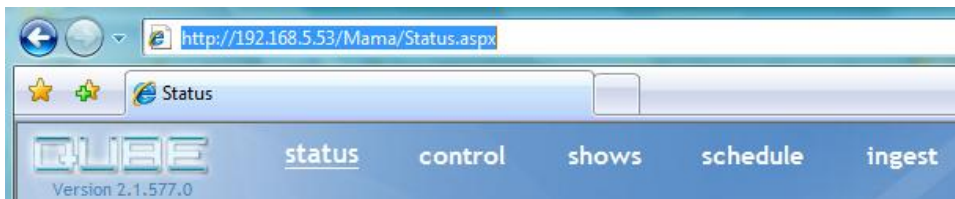
## Using the Mama Web User Interface

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The Qube 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 Qube Server's machine name or IP address must be substituted for <ServerName>. When accessing the Web User Interface from within the same system, "*localhost*" 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 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 screenshot displays the 'status' page of the Mama Web User Interface. At the top, a navigation menu includes 'status', 'control', 'shows', 'schedule', 'ingest', 'keys', 'logs', 'setup', and 'maintenance'. The main content area is divided into several sections:

- current show:** POTC3, with a clapperboard icon and a progress bar showing 00:00/03:00.
- current ingest:** <no ingest>, with a server icon and a progress bar.
- Time and Date:** 13:21 (+01:00), Wednesday June 6th 2007.
- Storage:** 29% free, 114 / 391 GB free, accompanied by a server icon and a green progress bar.
- newly added:** A list of compositions including RATATOUILLE\_TLR-I07\_S\_EN..., PIRATES-3\_FTR\_S\_EN-XX\_US..., WGME\_Spid3\_Promo\_SCP\_RW, VV\_Test, and Stomp\_Short, with a film reel icon.

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 newly ingested Compositions.

## **Loading Content and Keys**

---

The Qube 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 modified or extended by a new *Key*.

The content for Qube 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 Qube Server can ingest Media and Keys in multiple ways:

- ▶ from a set of CD-ROM or DVD-ROM discs
- ▶ from USB-2 or IEEE-1394 (FireWire™) hard drives and USB Memory Sticks
- ▶ from a Network Location
- ▶ from a Multicast Data Transmission

Ingesting content into the Qube 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 FireWire 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 *Digital Cinema Package or DCP* that is placed on a hard drive or network location.

Ingesting requires the *Manager* to be logged into the system using the Windows Graphical User Interface or using the Mama Web User

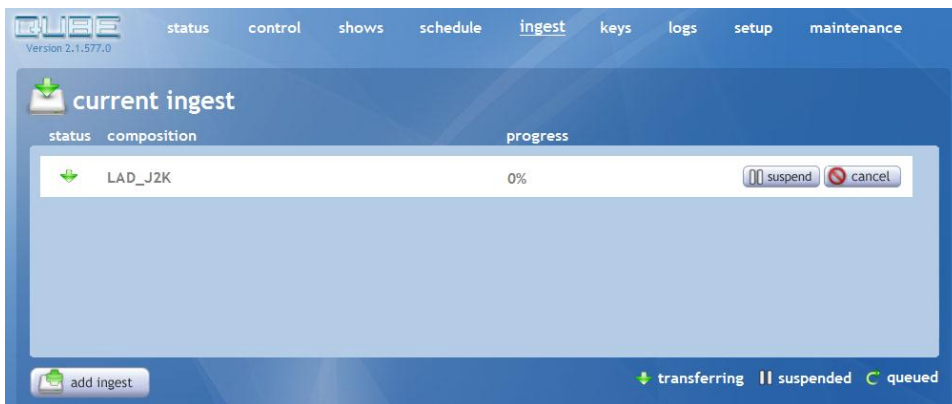
Interface. Ingesting is not possible when the system is in its default login of *Projectionist*.

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 Qube 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 port on the Qube Server. These ports are available on the front and rear panels 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 Qube 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 Qube system or an external system.
- ▶ Login to the system as Manager with the appropriate password.

- ▶ 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.



The screenshot shows a dialog box titled "add ingest" with a blue background. It contains two radio buttons: "local" (selected) and "network". To the right of the "network" radio button is a text input field with the placeholder text "Local drive & path or blank to auto-detect". Below the radio buttons are four labels: "username", "password", and "domain", each followed by a text input field with placeholder text: "enter username", "enter password", and "enter domain if applicable". At the bottom right is a button labeled "ingest" with a green folder icon.

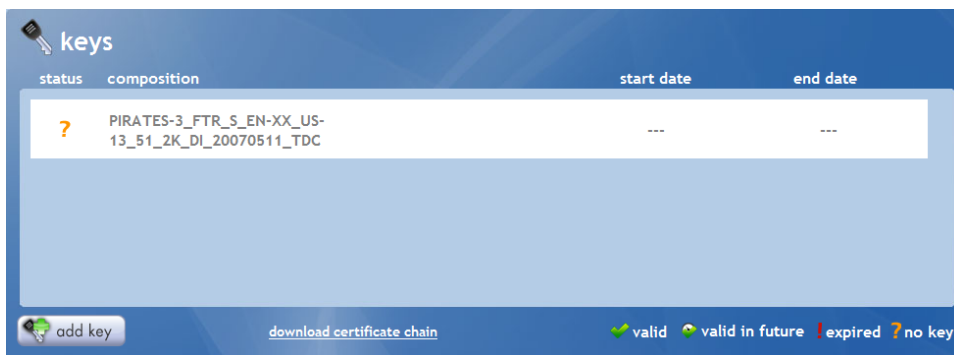
- ▶ When ingesting from a hard drive connected locally to the Qube system, leaving all the fields blank and clicking on the *Ingest* button will auto-detect any valid DCPs in the connected drive and bring up a dialog box listing the different Compositions that are a part of this DCP.
- ▶ By default, 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, passwords and domains as necessary.
- ▶ 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. The application will try to delete the least used and the oldest Packages. Where sufficient space cannot be made available, an error will be reported.
- ▶ Where automated media management is disabled, other content must be deleted manually 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.

- ▶ Each Qube 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 Chain* of that system is required to be provided to the content supplier or content management company. The *Download Certificate Chain* link at the bottom of the Keys Page allows you to access this file quickly and easily.

## **Building a Show**

---

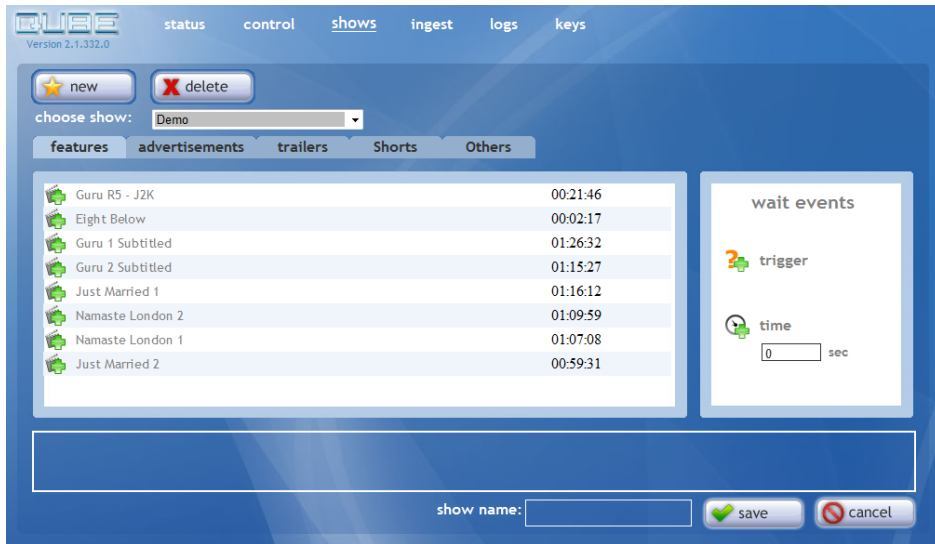
Usually, various types of *Compositions* are ingested into the Qube system including feature films and pre-show material such as advertising commercials and trailers. In order to sequence the different *Compositions* in the desired order for a particular cinema, a *Show* must be created. Only *Shows*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

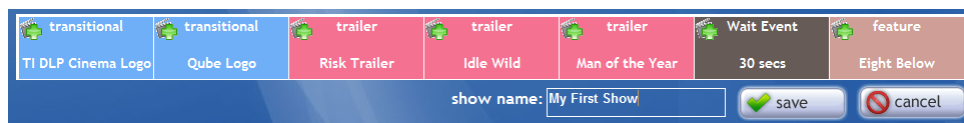
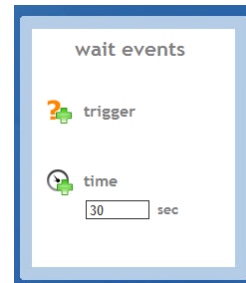
- ▶ Login to the system as Projectionist or Manager with the appropriate password.



- ▶ 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.
- ▶ 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 *Time Wait Event*, the duration of the pause in seconds should be entered first before the Icon is dragged onto the Timeline. The *Trigger Wait Event* creates an indefinite pause until the User resumes the Show.
- Once a Show has been sequenced, it can be saved by entering a name in the *Show Name 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 Show Name Text Box and this can be modified to create a different version of this Show without modifying the original.




- Immediately after a Show is saved, it is available to be picked and loaded from the Qube Remote Panel.















## **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
  - > 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.

## Viewing System Logs

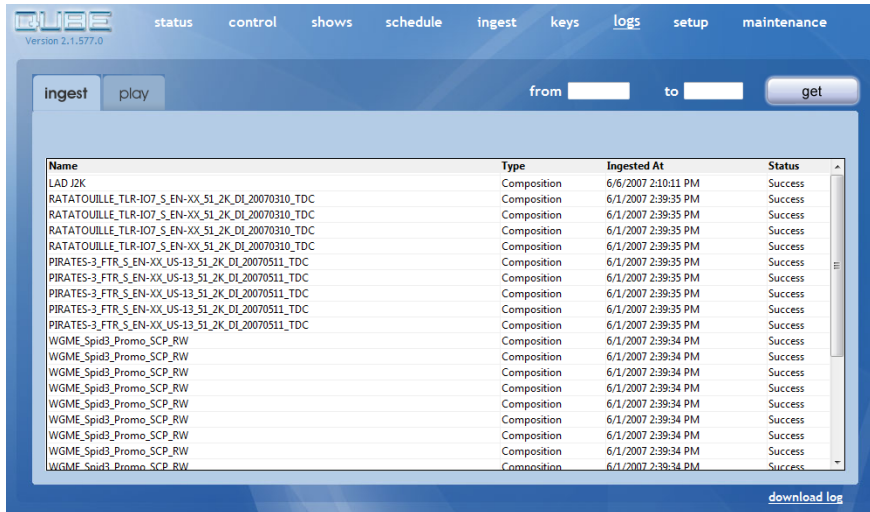
---

The Qube 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 log 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 Qube 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*.

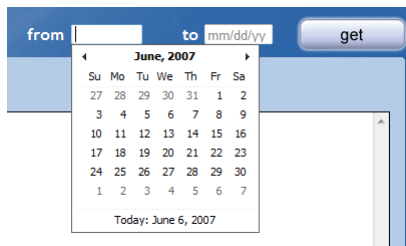
- ▶ The *Play Log* and the *Ingest Log* can be viewed by clicking on the appropriate Tab.



The screenshot shows the 'logs' tab in the Qube XP-E interface. The interface has a blue header with navigation tabs: status, control, shows, schedule, ingest, keys, logs, setup, and maintenance. Below the header, there are two tabs: 'ingest' (selected) and 'play'. To the right of the tabs are 'from' and 'to' date input fields and a 'get' button. The main area displays a table with the following columns: Name, Type, Ingested At, and Status. The table contains 20 rows of log entries, all with a 'Success' status. At the bottom right of the table area, there is a 'download log' link.

Name	Type	Ingested At	Status
LAD J2K	Composition	6/6/2007 2:10:11 PM	Success
RATATOUILLE_TLR-107_S_EN-XX_S1_2K_DL_20070310_TDC	Composition	6/1/2007 2:39:35 PM	Success
RATATOUILLE_TLR-107_S_EN-XX_S1_2K_DL_20070310_TDC	Composition	6/1/2007 2:39:35 PM	Success
RATATOUILLE_TLR-107_S_EN-XX_S1_2K_DL_20070310_TDC	Composition	6/1/2007 2:39:35 PM	Success
RATATOUILLE_TLR-107_S_EN-XX_S1_2K_DL_20070310_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
PIRATES-3_FTR_S_EN-XX_US-13_S1_2K_DL_20070511_TDC	Composition	6/1/2007 2:39:35 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success
WGME_Spid3_Promo_SCP_RW	Composition	6/1/2007 2:39:34 PM	Success

- ▶ 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.




The screenshot shows a close-up of the date selection interface. It features 'from' and 'to' input fields with a 'get' button to the right. Below the input fields is a calendar for June 2007. The calendar shows the days of the week (Su, Mo, Tu, We, Th, Fr, Sa) and the dates from 1 to 30. The current date, June 6, 2007, is highlighted. The text 'Today: June 6, 2007' is displayed at the bottom of the calendar.




- ▶ 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.

## Checking System Information

---

The following procedure explains how you can check system information such as the version of the software currently loaded in the Qube 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 Qube 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.



## **Setup Options for the DVI Output Media Block**

The Setup Menu allows some options to be set on the Qube Server. The available setup options vary depending on the selected Media Block. This section looks at the various options available for setup of the DVI 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
  - > 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 DVI Output in this case:

```
> Projector
> Monitors
> Loop:
> Network Adapters
```

- ▶ The options available on the **Projector Menu** are:

```
> Output
> Lens
> ActiveAspect
```

- ▶ The **Output** option allows the selection of the appropriate DVI Output Port that is attached to the Digital Projector in systems fitted with more than one DVI Output. This option has a default value of “1”. If you enter this Menu Item, it will list all available output ports. Even if there are multiple DVI Ports on a system, these ports will not be listed as options unless they are connected to an active device such as a Digital Projector.
- ▶ The **Lens** option allows the selection of the type of Anamorphic Lens attached to the Digital Projector. An Anamorphic Lens is used to modify the Aspect Ratio of the Digital Projector to fit the required Aspect Ratio of the content on-screen without any electronic cropping and squeezing which can reduce the resolution and brightness of the image. The Anamorphic Factor of the lens is the ratio by which it expands the image on-screen. This option has a default value of “Flat” which means that there is no Anamorphic Lens attached to the Digital Projector. The available lens options are:

› Flat

- › Ana 1. 24
- › Ana 1. 26
- › Ana 1. 32
- › Ana 1. 33
- › Ana 1. 34
- › Ana 1. 42
- › Ana 1. 48
- › Ana 1. 88
- › Ana 1. 91

- ▶ The **ActiveAspect** option allows the selection of the Active Area of the Digital Projector's imaging device that is used to cover the full area of the screen in the theatre. This option is used in practice for screens where the image has been cropped and squeezed electronically to fill the screen. In order for the Qube Server to avoid using the area of the Digital Projector's imaging device that has been cropped or masked, the Active Area of the imaging device must be setup. This option defaults to the full Aspect Ratio of the imaging device as setup under the Monitors Menu. Available options are:

```
> Auto
> 5: 4
> 4: 3
> 1. 37: 1
> 1. 66: 1
> 16: 9
> 1. 85: 1
> 2. 0: 1
> 2. 2: 1
> 2. 35: 1
> 2. 37: 1
> 2. 39: 1
> 2. 76: 1
```

- ▶ The **Monitors Menu** allows the selection of the output resolution of each active DVI Port on the system. Depending on the number of Active Devices attached to the DVI Ports on the system, the Monitors Menu will have one or more sub-menus. The available options depend on the resolutions available on the attached Digital Projector and are listed as in the sample format shown here:



> 1: 1920x1080/32, 24Hz

The format is:

**Output : Horizontal x Vertical / Colors , FrameRate Hz**

The *Horizontal* and *Vertical Resolutions* selected should ideally match the native resolution of the Digital Projector's imaging device which can be found in the Projector's manual. The *Frame Rate* should match that of the content or be a simple multiple of the content's frame rate. The *Colors* should always be set at 32 bits.

- ▶ 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.

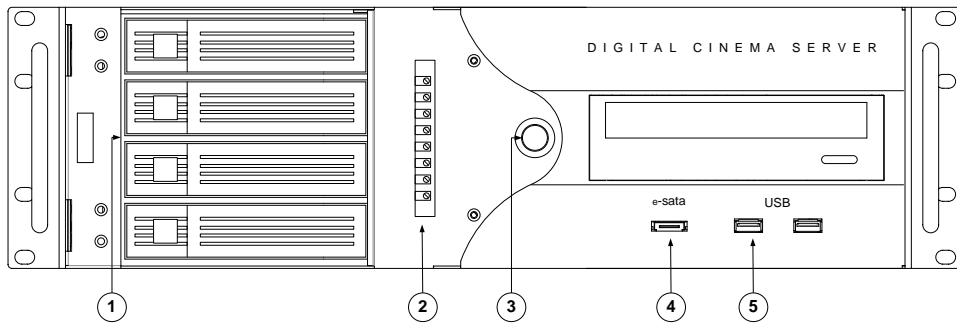
- ▶ The **Network Adapters Menu** lists the available network adapters on the system and allows each adapter to be setup. DHCP (or *Dynamic Host Configuration Protocol*) can be turned On or Off. If DHCP is turned On, the Network Adapter attempts to automatically obtain an IP Address from a DHCP server 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 Qube Server is installed.

## Installation

---

The diagram below shows the Front and Rear Panels of the Qube XP-D Digital Cinema Server along with descriptions of the features.

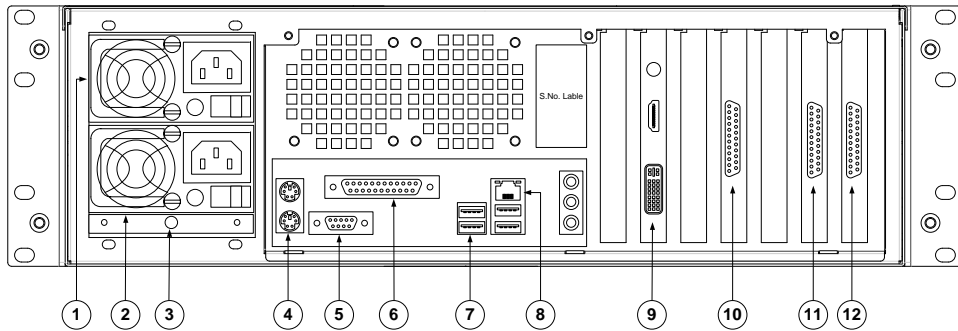
### Qube XP-E Front Panel View (Door Opened)



<b>1</b>	Removable SATA Drives Bays x 4
<b>2</b>	Analog Audio Level Trims
<b>3</b>	Power Switch
<b>4</b>	eSATA Connector
<b>5</b>	USB-2 Connectors x 2



### Qube XP-E Rear Panel View



<b>1</b>	Redundant Power Supply 1
<b>2</b>	Redundant Power Supply 2
<b>3</b>	Power Supply Warning Reset
<b>4</b>	PS/2 Keyboard & Mouse Ports
<b>5</b>	RS-232 Com Port
<b>6</b>	Parallel Printer Port
<b>7</b>	USB-2 Ports x 4

<b>8</b>	Gigabit Ethernet LAN
<b>9</b>	HDMI & DVI/VGA Ports
<b>10</b>	Analog Audio Output
<b>11</b>	Automation Input (option)
<b>12</b>	Automation Output (option)

The connections required to setup the Qube XP-E are given below.

- ▶ The Qube Remote Panel should be connected to any available USB Port on the Qube 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 HDMI or DVI Output should be connected to the DVI input in the Digital Projector. The Projector should have HDCP decoding capability in order to display images from the Qube Server.
- ▶ The Analog Audio Output should be connected to a Cinema Processor.
- ▶ The Ethernet port can optionally be wired to a computer, the Cinema's local area network or to an Ethernet Router.

## Product Specifications

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Digital Image Output:	DVI & HDMI with HDCP Encryption
UI Monitor Output:	DVI-I and HDMI connectors (monitor optional)
Audio Output:	25-pin D-sub Connector for 8-chan Analog Audio Output
Image Compression:	MPEG-2 4:2:0 & 4:2:2 Windows Media 9 4:2:0
Image Resolution:	Variable from SD PAL/NTSC to HD 1080P to 2K
Frame Rates:	23.97, 24, 25, 29.97, 30, 50, 59.94 & 60 fps
Audio Compression:	Linear PCM Audio Windows Media Audio
Audio Sampling:	44.1 KHz, 48 KHz and 96 KHz, 16 and 24-bit
File Formats:	MXF packaging for track files xml packaging for compositions and shows
Subtitling:	Multi-lingual subtitling in the TI CineCanvas™ format
I/O Ports:	Gigabit Ethernet Port, RJ-45 x 1 RS-232 Serial Port, 9-pin D-sub x 1 USB 2.0 Ports x 6 eSATA Port x 1 Mouse/Keyboard ports
GPI:	optional, 8 opto-isolated inputs and 8 relay outputs
Storage:	500 GB RAID 1,0 storage
Security:	128-bit AES Encrypted Content Start/End Date control by 2048-bit RSA Encrypted Keys
Picture Watermarking:	optional Thomson NexGuard™ on MPEG-2 content

Projectionist Interface:	USB Controller with Play, Pause, Stop and Menu Buttons with 40 char x 2 line LCD Status Display
Management Interface:	Multi-function web-based Interface with System Status, Transport Control, Show Builder, Scheduling, Content Ingest, Key Management, Log Viewer and System Setup/Maintenance
Power Supply:	100-240V AC 50/60Hz, 450W dual-redundant power supply standard
Operating Temperature:	10 to 40 degrees C
Operating Humidity:	20% to 90% non-condensing
Size:	Main Unit – 48.5 cm (W) x 13.8 cm (H) x 67.5 cm (D) 3U Rack Mountable Unit Remote Panel – 9.5 cm (W) x 4.0 cm (H) x 14.8 cm (D)
Weight:	Main Unit – 20.30 Kg Remote Panel – 0.56 Kg Packed – 30.00 Kg

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

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