

The fastest,  
most powerful  
and flexible  
**digital cinema  
mastering system**  
in the world!

**QUBE**  
MASTER *Pro*

Encoding



Qube Cinema has an entire suite of products required for a practical, commercially viable, end-to-end implementation of Digital Cinema. Qube Cinema is 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.

**QubeMaster Pro** is a uniquely flexible and powerful Digital Cinema encoding and packaging solution designed to integrate fully into the modern post environment. It is a database-driven software solution for the Microsoft Windows™ platform with an intuitive and familiar user interface that is simple to understand, yet provides virtually unlimited power and flexibility for digital cinema content creation. For power users, the software provides fast keyboard-based control over nearly all operations.

## QubeMaster Pro's DCI Object Model

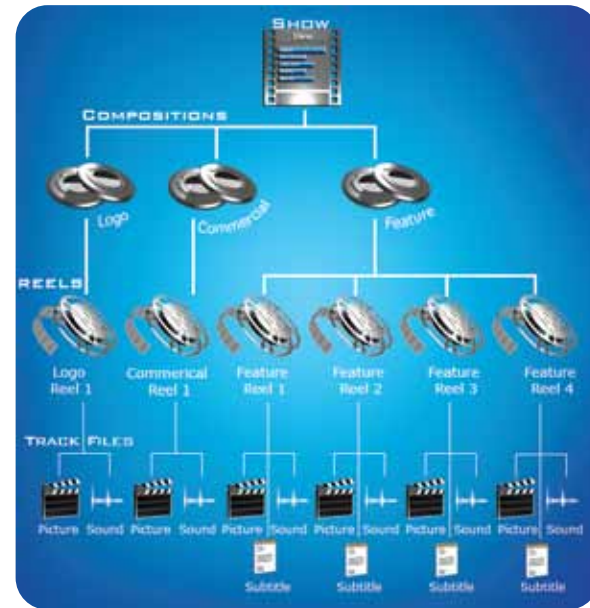
The architecture of QubeMaster Pro closely mirrors the Digital Cinema Initiatives (DCI) Object Model with a hierarchy of Shows, Compositions, Reels and Track Files. It is this design that makes QubeMaster Pro unarguably the best choice for every digital cinema mastering application.

While QubeMaster Pro has been designed from the ground up to conform to the DCI Specification and is the ideal product to go from a Digital Cinema Distribution Master (DCDM) to a Digital Cinema Package (DCP), it has also been designed to operate in the real world where workflows don't always represent the ideal.

## The Virtual DCDM

QubeMaster Pro has powerful pre-processing capabilities that allow it to crop, scale and add borders to the image, and to combine multiple audio files with flexible channel assignments. QubeMaster Pro can perform Log to Linear conversions, handle 1 D and 3 D Lookup Tables as well as convert between XYZ, RGB and YCbCr color spaces with user defined R, G, B and White Point colour coordinates. For more advanced pre-processing, QubeMaster Pro includes Color Transform Language (CTL) Script Processing. The software handles all pre-processing calculations with the highest internal precision to preserve every bit of image quality.

Together, these pre-processing capabilities allow QubeMaster Pro to work directly on the Digital Intermediate data where there is insufficient time or budget to create a DCDM – a concept that we refer to as the Virtual DCDM! And since the DCDM is the ideal archival format for a film, QubeMaster Pro can also generate a standards-compliant DCDM even as it encodes, thus saving considerable time and money.



QubeMaster Pro's DCI Object Model

## Flexible Source File Formats

The software supports multiple methods of bringing in picture and sound elements including digitizing from tape-based sources, file import and image sequence import. Numerous picture formats are supported including TIFF, DPX, Cineon, TGA and BMP image sequences apart from MXF, Quicktime, QT Reference and AVI based sources. Since QubeMaster Pro works with any existing local or shared storage, its flexible support of multiple file formats will quickly become a boon in a post facility without the need to copy or convert.

## Simple, Intuitive Workflow

QubeMaster Pro provides a very powerful mastering interface which allows picture, sound and subtitle Track Files to be added to the database by a simple drag-and-drop operation. These files are then synced accurately using a Sync Point such as the 2-Pop to form Reels. Sync Points are marked for each Track File using the Clip Editor as are In and Out Points representing the First Frame of Action (FFOA) and the Last Frame of Action (LFOA) of each Reel.

Subtitles are xml files in the CineCanvas™ format and can be created by the QubeMaster Pro application from plain text files in multiple popular formats or the system can directly use xml files created in other applications.

Multiple Reels are ordered and chained together to form a Composition along with additional metadata that is entered by the user. The Composition is the basic unit of distribution in the digital cinema world and QubeMaster Pro produces standards compliant Digital Cinema Packages (DCPs) and Key Delivery Messages (KDMs) for distribution to digital screens.

Encryption



Packaging



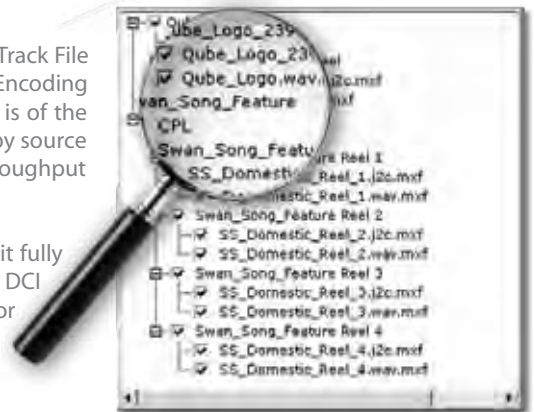
**"A deceptively simple user interface that hides the fact that QubeMaster Pro has an answer to every digital cinema packaging problem one can think of!"**



## Encoding, Encryption and MXF Wrapping

In order to retain maximum flexibility, QubeMaster Pro allows MXF wrapping and encryption at the Track File level while one-step encoding, encryption and MXF wrapping is performed at the Composition level. Encoding of Compositions into JPEG2000, MPEG-2 and VC-1 can be performed in software and, where speed is of the essence, optional distributed processing capability is available to achieve performance limited only by source file throughput. QubeMaster Pro fully utilizes every CPU in a multi-core system and processing throughput increases linearly with the number and speed of the processors.

While QubeMaster Pro has the capability to encode into all supported image compression formats, it fully supports MXF wrapping and/or 128-bit AES encryption of already encoded material to the DCI specification. This allows post-houses to take advantage of their custom encoding solutions for JPEG2000 or to continue to utilize their fast and dependable hardware MPEG-2 encoders, whether these output Elementary Streams or MXF files with unencrypted essence.



The Packager's Asset Map

## Control Over Every Asset in the DCP

One of QubeMaster Pro's most powerful features is its versioning capability. Not only can multiple Reels refer to the same Track File and multiple compositions refer to the same Reel, but making copies of Reels and Compositions is also quick and easy. The software also has very powerful Packaging features including the ability to merge multiple items into a single DCP and to include or exclude every element of one or more Compositions in a DCP.

## The Clip Editor

Another powerful tool in the application is the Clip Editor. This is used throughout the QubeMaster Pro application to mark Sync Points and In & Out Points, and to check Reels and Compositions for Sync and Transitions. The Clip Editor uses familiar icons and keyboard commands that will make the user instantly comfortable with the system.

## Real-time Playback of JPEG2000 with 3D LUT and Subtitles

Thanks to its high efficiency JPEG2000 codec, the QubeMaster Pro system can also play JPEG2000 and MPEG 2 files in real-time within the Clip Editor or the new Preview Window. Best of all, both the Clip Editor and the Preview Window also support industry standard 3D LUTs for viewing XYZ and Log material with accurate color rendition on computer monitors. And when a Reel includes Subtitles, the system will render these on-screen with accurate fonts, positions and colors to provide you with as high quality a viewing experience as is possible on a non-DCI display device.



The Clip Editor

## Speed, Speed and more Speed

QubeMaster Pro was designed and engineered for speed. Harnessing every iota of power in today's powerful workstations, it can manage ~20 fps 2K encoding from a DSM even while performing cropping, scaling, applying a 3D LUT, JPEG2000 encoding, encryption and MXF wrapping, all in one single step! And the system performs at a mind-boggling 27 fps when working from a 2K DCDM and performing JPEG2000 encoding, encrypting and MXF wrapping! Best of all, QubeMaster Pro's performance is designed to scale nearly linearly with the number of CPU cores and their processing speed so you can fully expect it to do more and more each year, thanks to Moore's Law.

## Powerful Localization Capability

QubeMaster Pro also allows for Compositions to be edited for censorship or localization requirements of different territories. Existing Compositions may be loaded into the system along with a valid KDM using the Qube Ingestion Controller and then modified with total control of all parameters.

Whatever your digital cinema mastering application, QubeMaster Pro is one system that has the power and flexibility to support it!

### System Requirements:

*Microsoft Windows 7 or Windows Vista™ based Workstation (Windows 7 x64 OS preferred), Intel Core 2 Duo 2 GHz or faster CPU (16-core Workstation with 2 x 3GHz Intel Nehalem CPUs preferred), 2 GB RAM minimum (8 GB preferred), 200 MB available Storage, separate Media Storage and a high-performance NVIDIA Graphics Adapter capable of a screen-resolution of 1280x1024 or higher (1920x1080 or 2048x1536 preferred).*

QubeMaster Pro is part of an entire suite of products for an end-to-end implementation of digital cinema.

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 storage bring a high level of reliability to the system, while a detachable Qube Remote Panel provides familiar operational controls. The system is based on the modular Microsoft Windows Embedded™ Operating System to maximize reliability and security while deriving benefit from Microsoft's powerful DirectShow™ architecture. The second generation Qube software is also database driven for the highest level of flexibility. Qube XP-D has CineLink™ 2 equipped dual-link HD-SDI outputs and AES3 audio outputs apart from providing optional analog audio outputs. Designed to conform to the DCI Specification, the base system handles JPEG2000, MPEG 2 and VC-1 picture. Qube XP systems can be managed and operated locally and remotely via a powerful web-based UI. This interface 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 are digitally signed for verification of authenticity.



**QubeCentral** is a web-based digital cinema network control, management and reporting system that also provides secure and auditable KDM Management. An option in QubeCentral is central scheduling of commercials and consolidated reports of as-run logs from networked units.

**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.



### Europe

Nigel Dennis

Tel: +44 (208) 144-5661 | Mobile: +44 7878717548  
email: nigel@qubecinema.com

### USA

4640 Lankershim Boulevard, Suite 601, North Hollywood, CA 91602-1844, USA  
Tel: +1 (818) 392-8155 | Fax: +1 (818) 301-0401 | email: info@qubecinema.com  
www.qubecinema.com