Cinedeck

RX3G - ZX [20, 40, 45] - MX

USER GUIDE - Version 5.0

Contacting Cinedeck

General Information:

For non-support general inquiries, please contact us at: info@cinedeck.com
You can also call: +1 888-390-4460
Some international locations do not allow dialing a US toll free number, in that case call: +1 646-642-6985

Additionally, the Cinedeck website has a significant array of resources including brochures, where to buy, video tutorials and technical documents.

Support:

Technical Support office hours are 9am-6pm US Eastern Time, but we generally respond to support requests from 8am to midnight, 7 days a week, and at odd hours of the night. Response time is generally within minutes during business hours.

To initiate a support request, it is preferred that you fill out the support form on the Cinedeck website: http://cinedeck.com/support/

The direct support email address is: support@cinedeck.com

Phone support can be reached at +1 888-390-4460 (option 2). If you do not reach us, please do leave a message, indicate your version number and as much relevant informations as possible and use the above noted support form as we do endeavor to respond ASAP within the expanded hours noted above.
Some international locations do not allow dialing a US toll free number, in that case call: +1 646-642-6985

Please Note! It is essential and helpful to have as much information as possible about the nature of the problem and the setup involved, including; Cinedeck model, Cinedeck software version {Prefs page}, the relevant log files {C:\cinedeck\logs} or {C:\cinedeck_x64\logs}, Cinedeck settings such as codec, wrapper, storage in use and all related equipment being used; source/camera settings, audio embedders, timecode source, etc.
If you are using an esoteric piece of equipment in the signal chain, it is critical that we know so we can make a correct diagnosis.

Is it plugged in? Often the simplest things can make life difficult... Always check the basics! Are power, cabling and signal paths all confirmed to be good?

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1.0 Introduction

1.1 Cinedeck Product Overview

In the most basic sense, Cinedecks are video production ingest and playout appliances. They can initially be described as tape deck replacements in that you can drop one in place of a tape deck, use the existing connections and put it to work but your Cinedeck's features and functions go far beyond what traditional tape decks have ever offered.

Multi-channel ingest and playback using the storage destinations, native codecs and file types which best fit your workflow are a core benefit of Cinedeck recorders however simplicity is key in todays' demanding production environments. Cinedecks Plug & Play nature supported by an intuitive, easy to navigate user interface with a full array of analysis tools allow you to quickly setup and manage your sessions. This is enhanced by the project orientation of your Cinedeck. Leveraging this project based design allows you to have, as needed, full channel flexibility allowing completely separate settings between channels or uniform and simultaneous changes across multiple channels. And Cinedeck projects can be saved, recalled, exported and imported, providing continuity between sessions.

CODECS

Cinedecks provide native support for the widest variety of codecs and file wrappers in the industry and the development team is continuously adding to the list.
Of course where appropriate you can optionally select from multiple file wrappers such as; true native Avid OP-Atom MXF, MOV and MXF OP1a and others.

Additionally, Cinedeck MX, ZX and RX3G handle 422 or 444 color sampling and bit depths of 8bit and 10bit to render your content as accurately as possible.

STORAGE

Cinedecks offer the ability to write both master and proxy files for each input and when it comes to writing your files, no other product comes close to Cinedecks flexibility of recording; internally, to local attached drives and to network storage.

Cinedeck Product Overview / cont...

For internal recording, Cinedeck relies on standard 2.5" SSDs mounted in 'dual drive' removable and hot swap-pable carriers or sleds. You have the option of utilizing one or more internal drives as needed for your particular production and the available desktop and installable docks with SATA connectivity give you instant high-speed access to your content. Of course additional drive carriers or sleds are available and installing drives in the sleds is simply a matter of a few screws.

Before going further with the many other storage options it is important to understand Cinedecks redundant record capability.

For each input, Cinedeck can not only write a Master and a Proxy, the file writes can be redundant meaning two copies of each file can be written wherever you need them. And by redundant we don't mean a copy, we mean two concurrent and totally separate file writes of each file.

By leveraging this redundant capability you can, for example, have a safe copy in the machine and a network copy, instantly available for editing or a customer take away copy as soon as "Stop" is pressed. The options are virtually limitless.

Additionally, all Cinedecks support 'roll-over' recording where two media (identical or dissimilar) can be desig-nated and combined as 'primary' and 'secondary' record destinations, significantly increasing record time.

As discussed, SSD drives are recommended for internal recording.

Each Cinedeck also has a multitude of USB and SATA connections allowing the use of direct attached storage so for example recordings can be made to USB2 or USB3 drives as well as external eSATA devices such as RAID arrays.

Network recording is one of the most important Cinedeck features.

Cinedecks run on Windows7 embedded. One of the advantages to being on a Windows platform is Cinedeck can leverage the internal networking capability and where appropriate, 3rd party support for Windows so if you have a SAN system which provides a Windows client, that client can likely be run on the Cinedeck, allowing direct to SAN recording with all of the advantages of being a true SAN client.

Cinedeck Product Overview / cont...

Whether it is Avid ISIS, Harmonic MediaGrid, Facilis Terablock or any number of other storage solutions, the advantages and efficiencies realized for multi-cam and other edit hungry productions by providing instant access to new content can easily be measured in real and significant cost savings.

Especially when recording to external destinations, it is important to understand bitrate and bandwidth and to thoroughly test your environment before deploying your workflow on a production.

In general, when recording across a dedicated network for recording video (V-LAN) to an appropriate destination, standard gigabit is fine for the normal compressed formats such as ProRes or DNxHD. Conversely, it goes without saying that you will never achieve the maximum theoretical throughput to any destination or device and recording an uncompressed HD stream across a standard gigabit network will not be successful however there are many more subtle and not so subtle variables when selecting an external destination such as pipe size, protocol, network traffic, multiuser and multi-read/write capability, etc., so thorough testing cannot be emphasized enough.

Cinedecks provide dual 1Gb LAN connections which can be “teamed” if your network supports that. Some Cinedeck models also have an available PCIe slot and the option of installing a 10Gb Ethernet card, 8 or 16Gb Fiber Channel card or direct attached storage adapter, to support high bitrate sessions.

1.2 About This Manual

Note: This manual primarily reflects the state of Cinedeck hardware and software as of the date and version number noted on the cover and in the page footers however, because of the many customer specific customizations and minor updates, some sections will vary slightly from your system and the stated version. This manual will be updated as new features are implemented and will not necessarily reflect legacy information.

What's in the manual:

This user manual describes the functions available in the Cinedeck software, as well as relevant information regarding upgrades, hardware information such as pin definitions for connectors, interaction with 3rd party software such as NLEs, and further technical information of interest to users.
For a good initial understanding, there are several overview sections which should be reviewed:
"1.1 Cinedeck Product Overview" on page 29
"3.0 Installation" on page 40
"5.1 Introduction" on page 77

How to use this manual:

The manual is divided into multiple sections. The first two chapters after the table of contents (which, in PDF form, employs hyperlinks) are an introduction and overview of what comes with each machine.
The following chapters, which include physical descriptions for each deck and user interface details, make extensive use of captions for each control and connection. Captions include a caption ID and page numbers, directing the reader to descriptions and operational explanations. When viewed as a PDF, the captions employ hyperlinks to provide direct navigation to the relevant details. Additionally, Pressing "*ALT+Left Arrow*" or "*ALT+Right Arrow*" will navigate backwards and forwards through previously viewed pages. Towards the end of the manual are several sections with specifications, appendices of useful information and a section describing each feature and frequently asked questions.

1.3 Copyright and Trademarks

All trademarks are the property of their respective owners.

Cinedeck is a trademark of Cine Design Group LLC
ProRes is a trademark of Apple Computer Corporation
Avid Media Composer is a trademark of Avid Technology, Inc.
DNxHD is a trademark of Avid Technology, Inc.
Windows is a trademark of Microsoft Corporation
Premiere is a trademark of Adobe Corporation

All other tradenames referenced are service marks, trademarks, or registered trademarks of their respective companies.

1.4 Safety Information

WARNING: Treat your Cinedeck as you would cameras and other sensitive electronic equipment. Take care especially to keep water and moisture away from the unit. Getting your Cinedeck wet will void the warranty and **COULD CAUSE ELECTRIC SHOCK!**

WARNING: Your Cinedeck needs ventilation for safe operation. **DO NOT** block the front or rear of the unit as this will restrict airflow, causing it to overheat, potentially damaging the unit and voiding the warranty.

1.5 FCC and CE Information

Caution: The Federal Communications Commission warns the user that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Class B Statement: This equipment has been tested and found to comply with limits for Class B digital device pursuant to Part 15 of Federal Communications Commission (FCC) rules.

CC and CE Compliance Statement: This equipment has been tested and found to comply with the limits of the European Council Directive on the approximation of the law of the member states related to electromagnetic compatibility (89/336/EEC) according to EN 55022 Class B.

These limits are designed to provide reasonable protection against frequency interference in residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed or used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in television reception, which can be determined by turning the equipment off and on. The user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which receiver is connected

1.6 QuickTime Notice

! The QuickTime for Windows media player and multimedia platform is no longer supported by Apple. As a result, according to many sources, the software is vulnerable to malicious attacks and should be removed. For additional details, see: https://www.us-cert.gov/ncas/alerts/TA16-105A

Apple provides Cinedeck core encoder and decoder libraries (DLLs) directly to use with Cinedeck's own MOV wrapper implementations based on Apple's documentation, direction and testing. Per Apple's 2010 recommendation, Cinedeck systems do not use or rely on any part of the QuickTime framework or APIs.

Cinedeck owners may safely remove QuickTime for Windows using the standard uninstall procedure. For additional information and the removal process, see "Uninstall or change a program": http://windows.microsoft.com/en-us/windows/uninstall-change-program#uninstall-change-program=windows-7

2.0 What's in the Box

2.1 Cinedeck RX3G

Cinedeck RX3G is the solution for productions where space and weight are at a premium. Taking its cue from fully loaded MX, the rugged, milled-aluminum case is built to withstand environments that are on-the-move like OB vans or flight packs.
Weighing around 12lbs (5.5kg) and measuring 4RU at half-rack width, RX3G brings tons of functionality in a small footprint.

Built-in to the front panel are;

- User interface touch display which can be tilted
- A eSATA and USB port
- Two removable drive trays, each of which can hold two SATA drives
- A headphone jack

Internally, RX3G provides two full duplex 3G channels, a full selection of master formats, accompanied by an H.264 proxy and most of the available Cinedeck features.
In HD and SD mode, RX3G can record master and proxy for each channel.
With the 4K mode option, RX3G can play a single channel of 4K.

RX3G comes with;

- Two AC to DC power supplies with localized power cables
- A touch screen stylus
- One USB software installation disk (Restore disk)
- If you purchased accessories such as media drives or a rack kit with your Cinedeck, they will be included in a separate box

Please check to ensure that all expected contents are included. In the event something is missing, please immediately contact your reseller or Cinedeck Support: See "Contacting Cinedeck" on page 2

2.2 Cinedeck MX

MX is the flagship four-channel recorder. Built in to the front panel are;

- User interface touch display which can be tilted
- Solid state memory card readers for P2, SxS and compact flash
- A eSATA and USB ports
- A tactile jog/shuttle control
- Touch panel controls
- Four removable drive trays, each of which can hold two SATA drives
- Dual mini and ¼" headphone jacks
- Dual headphone volume controls

Internally, MX provides four full duplex 3G channels with the full selection of master and proxy formats, high-bandwidth network capabilities and most of the available Cinedeck features.
In HD and SD mode, MX records master and proxy for each channel.
With the 4K mode option, MX simultaneously records 4K files, HD master files, HD proxy files and h.264 streamable files, with or without LUT applied.

MX comes with;

- Localized power cables
- A touch screen stylus
- One USB software installation disk (Restore disk)
- If you purchased accessories such as media drives or a rack kit with your Cinedeck, they will be packed separatly.

Please check to ensure that all expected contents are included. In the event something is missing, please immediately contact your reseller or Cinedeck Support: See "Contacting Cinedeck" on page 2

2.3 Cinedeck ZX

ZX is a modular design based on MX. Primarily for rack-mount installations, Cinedeck ZX lets you choose from a broad selection of software toolsets and hardware configurations, to build a cost effective system that meets your specific ingest, playback and transcoding needs. As a result, not all ZX systems have the same features but you always have the ability to add extra capabilities.

Built-behind the front panel are;
- Two USB ports
- Four removable drive trays, each of which can hold two SATA drives

ZX is available in three base models:
- ZX[20] is a two channel system
- ZX[40] is a four channel system which, when fully loaded, most closely matches MX
- ZX[45] is a four channel system, which in terms of pure processing power, is a step above MX

Internally, ZX provides two or four full duplex 3G channels, with an optional selection of master and proxy formats and high-bandwidth network capabilities.
In HD and SD mode ZX records master and proxy for each channel.
With the appropriate options, ZX records 4K files up to 60p, along with HD master files, HD proxy files and h.264 streamable files, with or without LUT applied.

ZX comes with;
- Localized power cables
- If you purchased accessories such as media drives or a rack kit with your Cinedeck, they will be packed separately.

Note: ZX does not ship with a USB software installation disk (Restore disk) See "9.25 Create USB restore key" on page 324

Please check to ensure that all expected contents are included. In the event something is missing, please immediately contact your reseller or Cinedeck Support: See "Contacting Cinedeck" on page 2

2.4 Features

HARDWARE

The overall design and build of each Cinedeck model is oriented towards professional video production and while the current Cinedeck generation comes in different forms with some hardware differences, at their heart they are all very similar. Much of the hardware is “off-the-shelf” which allows Cinedeck designers to quickly respond as improved technology comes available. Starting at the basics, there are many options available for video input and output processing but the quality of the actual image which comes through today’s cards differers significantly. The current Cinedeck generation are all based on Bluefish video I/O processing cards which were selected for their clean video I/O, access to the complete signal path and their responsive and active interest in supplying a quality product.
There are also some custom hardware elements; not so visible electronic components such as the RS-422 board and very visible parts like the touch displays, control panels and the stainless steel back panels.

SOFTWARE

The user interface is what really makes a Cinedeck unique. The interface has been in development since 2010 and most users agree that it is very effective and easy to navigate, making what can be quite a complicated process, quick and easy.
It is also important to note that the Cinedeck application is running on top of a Windows 7 embedded installation. The discussion will go on forever as to the plus and minus points of Windows but for the purposes of a versatile system such as a Cinedeck, there are significant advantages in terms of storage flexibility and the capability to be integrated into larger system environments.

FOR A COMPLETE OVERVIEW OF THE MANY FEATURES AVAILABLE IN YOUR CINEDECK, PLEASE REFER TO: “10.0 FAQ & FEATURES” ON PAGE 329.

Cinedeck hope your experience with our decks is positive and appreciate any comments you may have so please feel free to contact us. See “Contacting Cinedeck” on page 2

3.0 Installation

3.1 Important

Storage: Cinedecks are primarily SOLID STATE recorders; recording should always be to Solid State Drives (SSDs) mounted in the internal removable drive bays. Currently Cinedeck support the Samsung 840pro, 850pro and EVO SSD drives. USB and eSATA are available for media offload but due to the vast number of variables involved in different mechanical hard drives and external enclosures, Cinedeck do not recommend recording to these external drives.

Network connectivity may be used for recording, but performance will vary depending on network topology, network storage device performance, network and server traffic, etc. It is critical that an IT professional be involved in the configuration and support of any network infrastructure.

Performance claims are based upon recording to internal SSD media.

It is very strongly recommended that any workflow be thoroughly tested before use in a mission-critical production environment.

While "spinning drives" and network recording may be used, Cinedeck does not in any way guarantee that performance of such recording media (including SANs, external RAID arrays, etc.), will be adequate to take advantage of the features of a Cinedeck.

It is up to the end user to understand the risks and to have the technical expertise on hand to properly take advantage of recording media other than the internal SSDs.

3.2 Connecting your deck

In many respects, the initial setup of a Cinedeck is no different than a traditional tape deck and like a tape deck, some care needs to be taken during the installation process.

Cinedecks are not terribly heavy but the physical location is still very important.
Install the Cinedeck in a protected and stable environment, such as in a rack, on a table, etc., where the deck can not fall or be otherwise susceptible to undesirable environmental or hazardous conditions. As with any electronic equipment, it is important that the area have sufficient ventilation and be a reasonable temperature. Use common sense; if you are not comfortable because of the temperature or humidity, the environment is likely not appropriate for your equipment either so special care should be taken.

Assure there is a stable and clean power source. Because Cinedeck recorders use auto switching redundant power, it is preferred to have power coming from two independent sources. The use of a UPS (uninterruptible power supply) is also highly recommended to help prevent data loss.

Cinedecks use standard professional video and IT interconnects.
Make any appropriate video, audio, reference, network and control connections, assuring that the cables are in good operational condition. This is of particular importance as digital signals are very susceptible to intermittent data loss caused by cable issues which can greatly complicate troubleshooting.

Refer to the rest of this chapter to learn about the various external parts of your Cinedeck.

For best results, see "9.1 Best practices" on page 269.

3.2.1 Audio connections

Your Cinedeck can utilize several different audio sources.

Most common is recording “embedded“ audio which is coming into the deck on a SDI BNC connection. In this situation the system can accept up to 16 audio channels with each video.

AES is also commonly utilized and each channel pair can accept up to 8 AES channels, also on BNC connections.

It is possible to use unbalanced analog audio connected via the motherboard rear mounted unbalanced mini jack. See the appropriate rear panel description for your deck and “374- audio” on page 181 in the user interface input menu setup section.

There are also a number of ways to connect balanced audio sources.
The best and often lowest cost solution is to use an analog to digital AES adapter. There are many on the market but one example is the AJA ADA4 4-Channel A/D & D/A Converter. In all cases, these small converter boxes provide a simple and fairly foolproof direct connection for analog audio sources.

Another excellent but more expensive option would be an analog to SDI embedder. These small converter boxes accept analog audio and SDI video sources and merge the audio into the video ancillary data. They are also simple and fairly foolproof and there are also many of these on the market.

Lastly, a XLR or TRS balanced audio pair can be introduced to the system using a Focusrite 2i2 USB audio adapter.

Keep in mind that, especially when your audio is traveling via a different path from the video, audio<>video timing issues can arise. This can generally be managed internally via Cinedeck’s audio delay. See “5.30.1 Audio delay” on page 186

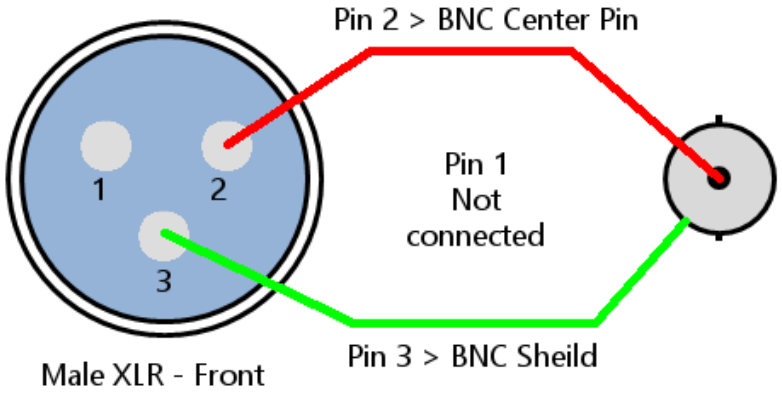
For additional information on any of these solutions, contact Cinedeck support.
See “Contacting Cinedeck” on page 2

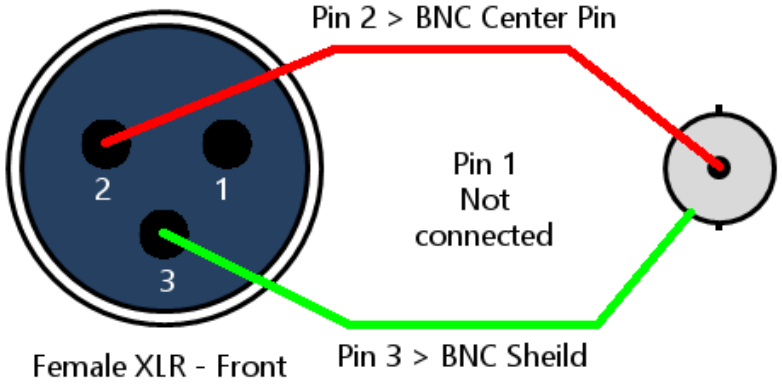
3.2.2 XLR to BNC conversion

Cinedecks utilize unbalanced 75 Ohm BNC coaxial connections for house timecode and AES in and out while some of your other equipment may use XLR connectors. It is very simple to make up basic interconnect or adapter cables to go from XLR to BNC.

Coaxial cable should be used in place of twisted pair for these cables - The theory is that, although unbalanced, the high density coaxial shield acts as a Faraday cage, protecting the signals. The pin connections are shown below.

Especially for longer distance balanced connections, you may consider using XLR to BNC (110 ohm>75 ohm) impedance matching transformer / adapters, similar to the Neutrik NADITBNC, NADITBNC-MX and Canare BCJ-XJ-TRB or other more specialized transmitter/ receiver modules.





3.3 Media drives & storage

All Cinedecks can write video and audio recordings as files to low cost and commonly available non-proprietary 2.5" NTFS formatted SSD SATA drives.
Cinedeck SSD drives are mounted in removable, hot-swappable, dual drive cartridges or 'sleds' (RX and newer). Additional sleds as well as portable and installable receiving chassis are available to enable easy 'sneaker-net' workflows. (See "4.1 Drive docks" on page 73)
Currently, Cinedeck only recommend and support Samsung 840 Pro, 850 Pro and EVO series SSD drives.

For recording and playback, all Cinedecks can also utilize external USB* and / or eSATA* and / or network storage including NAS (network attached storage) and SAN (storage area network) systems requiring client software. Additionally, the Cinedeck operating system can be setup to support iSCSI file systems.
Cinedecks are Windows 7 Embedded based so fully support SMB shares and client software is often available for SAN installations.

Some Cinedeck recorders have an available PCIe slot for 8Gb / 16Gb fiber or 10Gb Ethernet cards as well as direct attached storage such as the drive arrays from Dulce Systems.

Important: All external and network recording devices and plans should be extremely well tested before utilizing in a production environments.

***Note:** Drive assemblies of the same model from the same manufacturer can differ in firmware and internal hardware used so successful tests are drive specific and as such do not guarantee successful recordings with other units.

3.3.1 SSDs

Don't skimp on drives to save a few cents: The use of unsupported drives to save a little money per GB has a poor cost-benefit ratio when what is at stake is generally the recording of an extremely costly production.
Make a backup recording. Even if it's just to the in-camera recording card.
If a shoot is important, always have a backup plan.

For the reasons outlined above and below in this manual, NTFS formatted SSDs are the only supported recording media and currently Cinedeck only recommend recording internally to the Samsung SSDs listed below. (See also "9.4 Important drive information" on page 274)

The Cinedeck development team can absolutely confirm that not all SSDs are created equal and SSD specifications as advertised by manufacturers can be extremely misleading. Real-time video recording, especially multi-stream writing, is unlike any other use-case and in general, most SSD drives are not optimized for best performance in this very specific case. Also, some drives have appalling failure rates. For instance, Cinedeck had drives provided from a manufacturer for testing which had a 100% failure rate within 6 months. This does not mean they all necessarily completely stopped working but they could no longer reliably record video.

In our very extensive experience, as of this writing the only thoroughly reliable SSDs are the Samsung drives noted. They are competitively priced and have a very low failure rate even compared to so-called "enterprise-level" SSDs which tend to cost 3-10 times as much per GB.

Some customers have used other drives with success, but Cinedeck will not warrant or support issues arising from use of SSDs other than the Samsung drives listed.

Supported SSDs:
Samsung 840 Pro series (excellent price/capacity)
Samsung 850 Pro series (highest performance, longest warranty)
Samsung EVO (best price/capacity)

3.3.2 USB & eSATA

The use of external hard drives should be undertaken with extreme caution for a few reasons:

- "Traditional" spinning disks are extremely poor at recording video, especially more than one stream at a time, and "disk speed tests" like those from Black Magic and AJA are largely meaningless since they only test raw throughput to one file for a relatively short period.

  Spinning hard disks have a physical head that moves around the platter when writing a file. If the drive is fragmented or more than one file is being written, it must jump around constantly to keep updating the file(s). With a format like MXF OpAtom where there are many individual files being written for each clip, the write head can very quickly become overwhelmed and be unable to update all the files quickly enough to keep up, even if the individual data rates are low.

  A good example is XDCAM HD OpAtom and a JFIF proxy, each with 8ch of audio, with a total data rate of about 60Mbps. Two inputs with 20 files per input equals 40 files being written to the same drive. Despite the fact that the total data rate being written is only around 14MB/sec, far less than the sustained file transfer speed of a modern 7200RPM spinning disk, the physical head will be incredibly stressed as it attempts to keep up with updating 40 individual files in real time, pushing it close to or over the edge.

- External hard disk performance is also heavily dependent on the hardware controller (and its firmware). Some manufacturers' controllers are much better than others at handling the kind of sustained data rates and file system overhead required for video recording. Thus the same physical hard drive in two different enclosures may perform with very different results.

  RAID arrays can mitigate I/O and throughput issues by spreading file writes across two or more physical drives so if experimenting with external drives, a RAID can be a better approach however extensive testing is still required.

- Hard drive enclosure manufacturers also change the specifications and internal components of their products without necessarily making such changes obvious with a change in product model name or in the product documentation. In short, Model X may have different hardware controllers, firmware, drive interfaces, and drives depending on when or where it was manufactured or simply by component availability at the time. In practice this means that two of the "same" drive may not have the same performance despite outward appearances.

Media drives & storage / USB & eSATA cont...

- Lastly, the Windows system can contribute to drive performance or lack thereof. In earlier years, both USB3 and eSATA were plagued by issues in firmware, drivers and controller hardware. Most of those early issues have been resolved however, in general, USB3 is still not as responsive as eSATA. Throughput is about the same but latency and multi-write capability is still better on eSATA. However, eSATA can be more easily disturbed by connector and cable issues. The eSATA connector design is less than perfect so extreme care must be taken to assure they are well seated and that they are not disturbed while connected.

As a result of the above...

Cinedeck do not recommend recording to USB and eSATA external drives. While many customers use them regularly or even exclusively without issues, problems resulting from their use are not covered by support.

With these clear warnings in mind... Based on customer experience and internal testing, The following drives have been found to perform well:

Avastor HDX 1500
CalDigit AVPro , AV Drive or VR2 Drive
Drobo 5D USB3/Thunderbolt

If your workflow requires using these external drive systems, Cinedeck suggest reviewing the “Spinning Disk Drive Guide“ available on the Cinedeck website.

3.3.3 Network Storage

Recording to a SAN or other network-based solution requires adequate infrastructure and staff with the IT knowledge and experience with each system to configure and maintain it properly. Your Cinedeck supports 1Gb networking and many Cinedecks can be configured with a Fibre Channel or 10Gb Ethernet host adapter for use with higher-speed networks.

A simple network “How To” can be found here: “9.10 Mount network share” on page 289

About network Storage

SAN-based recording can be extremely efficient and cost-effective, especially for long-form multi-camera shows with tight editing deadlines, or in a facility where direct access to recorded media is required.

Because the various Cinedeck platforms are Windows 7-based, generally very little setup is required on the Cinedeck side for operation with a SAN. The network environment and any SAN client software, needs to be installed and configured properly by an IT professional.

There are some important issues to keep in mind:
1) recording over a network can create a large single point of failure.
2) network topology and 3rd party software (SAN clients and managers) add additional levels of maintenance, support and knowledge requirements.

The list grows constantly however, some NAS and SAN solution manufacturers whose products are known to be used with Cinedeck products include:
Avid ISIS
Drobo
Facilis TerraBlock
Harmonic Omneon Mediagrid
SNS Storage Network Solutions

3.3.4 DAS Storage

If you have a need for local attached removable storage but need higher bandwidth than USB or eSATA and would prefer a system designed for higher performance, another option may be DAS (Direct Attached Storage).

DAS utilizes a custom PCIe adapter card which connects directly to an external drive system. Because the card is tied directly to the PCIe bus, the bandwidth can be very high. DAS generally utilizes a RAID array, leveraging the high bus bandwidth to deliver high I/O performance accompanied by excellent file security.
Additionally, some DAS systems such as those from Dulce can also integrate a network adapter so while the Cinedeck may only have one available PCIe slot, the installation of the DAS adapter will not necessarily eliminate the addition of a network card.

The list too will grow however one manufacturer with DAS products known to be used with Cinedecks is Dulce Systems.

3.4 RX3G front panel

LCD SCREEN CAN BE TILTED DOWN FOR HIGH RACKMOUNT POSITIONS

8- LCD DISPLAY - (P.51)

7- DRIVE LOCK & EJECTOR - (P.51)
CAN BE KEY OR TWIST LOCK

6- DRIVE TRAY - (P.51)

DRIVE EJECTOR

5- FUTURE USE - (P.51)

1- HEADPHONE - (P.51)

2- eSATA PORT - (P.51)

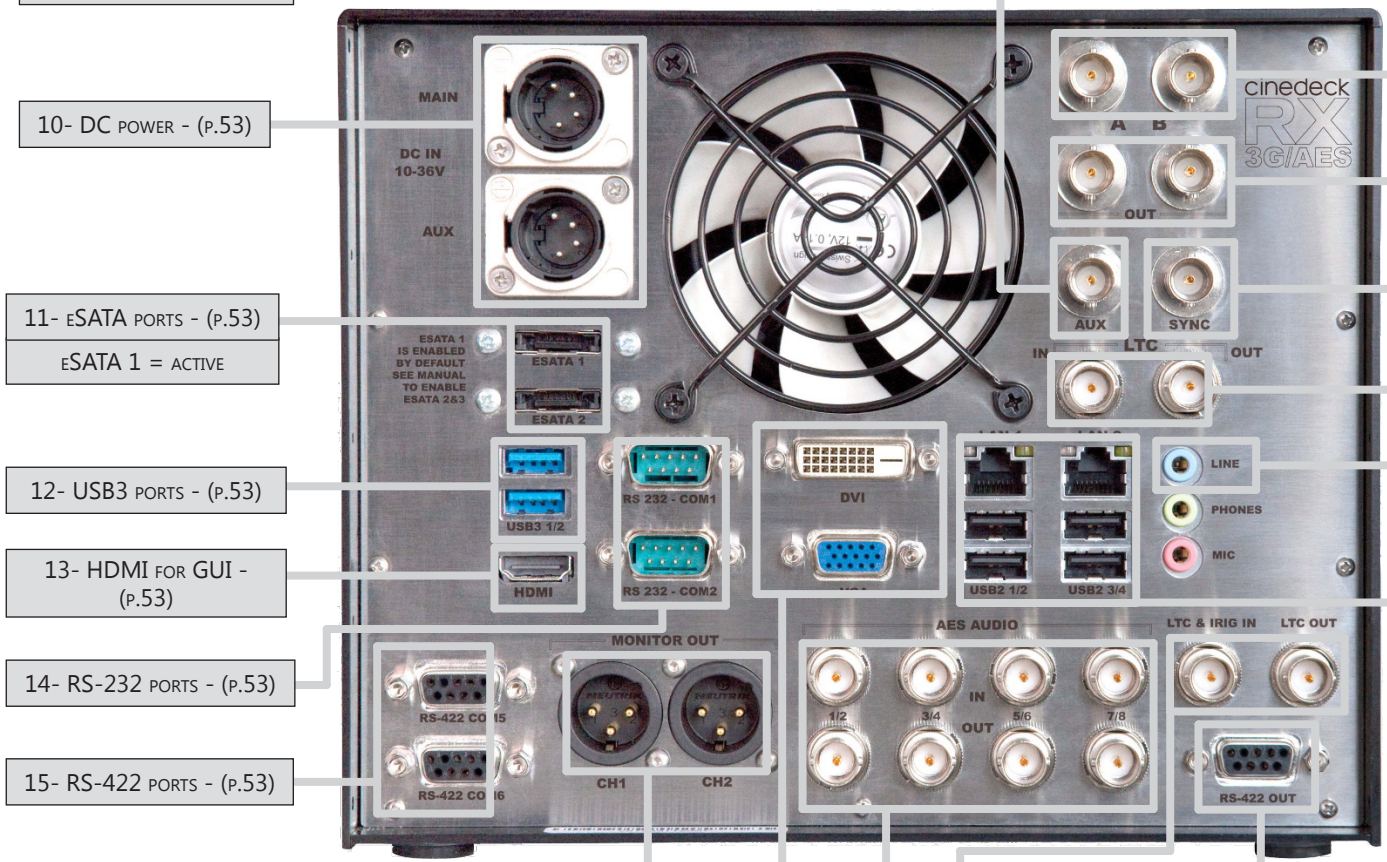
3- USB PORT - (P.51)

4- POWER BUTTON - (P.51)

RX3G front panel / - cont...

Name	Location	Description
1- Headphone	3.4 RX3G front panel - (p.50)	1/8" mini jack for use with standard stereo headphones.
2- eSATA port	3.4 RX3G front panel - (p.50)	*** In the default factory configuration, this front port is disabled.** RX3G has a total of five internal SATA ports, the first four of which are by default used for the SSD drive trays. The fifth SATA port is connected to eSATA 1 on the rear panel. The front eSATA and rear eSATA 2 connectors can be enabled by swapping cables internally. Please contact Cinedeck Support for more information.
3- USB port	3.4 RX3G front panel - (p.50)	Standard USB2 data port
4- Power button	3.4 RX3G front panel - (p.50)	In the default configuration, the power button requires a momentary push for turning the RX3G on and off and glows blue when the system is running. The systems can also manually be placed into Windows sleep mode. In this state, the power button will blink slowly. Pressing the power button will wake the system.
5- future use	3.4 RX3G front panel - (p.50)	Six pin Lemo connector for future features
6- Drive tray	3.4 RX3G front panel - (p.50)	RX3G can hold two removable drive trays. All current Cinedecks utilize these removable drive trays, sometimes called sleds or carriers. Each tray can hold two SATA SSD drives. See "3.11 Inserting & ejecting drives" on page 71 and "3.3.1 SSDs" on page 45 The trays are also available separately.
7- Drive lock & ejector	3.4 RX3G front panel - (p.50)	Cinedecks are configured by default with twist-lock drive retainers but key-lock retainers are available upon request with your initial order. See "3.11 Inserting & ejecting drives" on page 71
8- LCD Display	3.4 RX3G front panel - (p.50)	1024 x 600 Touch Screen Display for user interface manipulation and video preview of record and playback signals. This screen can be tilted to allow better viewing at low angles. The same signals see on this screen can simultaneously be displayed on a monitor connected to any one of the GUI display ports. You may need to access the Windows "Screen Resolution" settings to properly configure your external display.

3.5 RX3G back panel



9- AUX 1/2 OUT - (P.53)

10- DC POWER - (P.53)

11- ESATA PORTS - (P.53)

ESATA 1 = ACTIVE

12- USB3 PORTS - (P.53)

13- HDMI FOR GUI - (P.53)

14- RS-232 PORTS - (P.53)

15- RS-422 PORTS - (P.53)

16- MONITOR OUT - (P.53)

17- DVI FOR GUI - (P.53)

18- VGA FOR GUI - (P.53)

19- AES IN & OUT - (P.53)

20- TIMECODE OPTION - (P.54)

21- RS-422 OUT - (P.54)

22- GB LAN / USB2 PORTS - (P.54)

23- ANALOG IN - (P.54)

24- LTC IN/LOOP - (P.54)

25- REFERENCE IN - (P.54)

26- VIDEO OUT - (P.54)

27- VIDEO IN - (P.54)

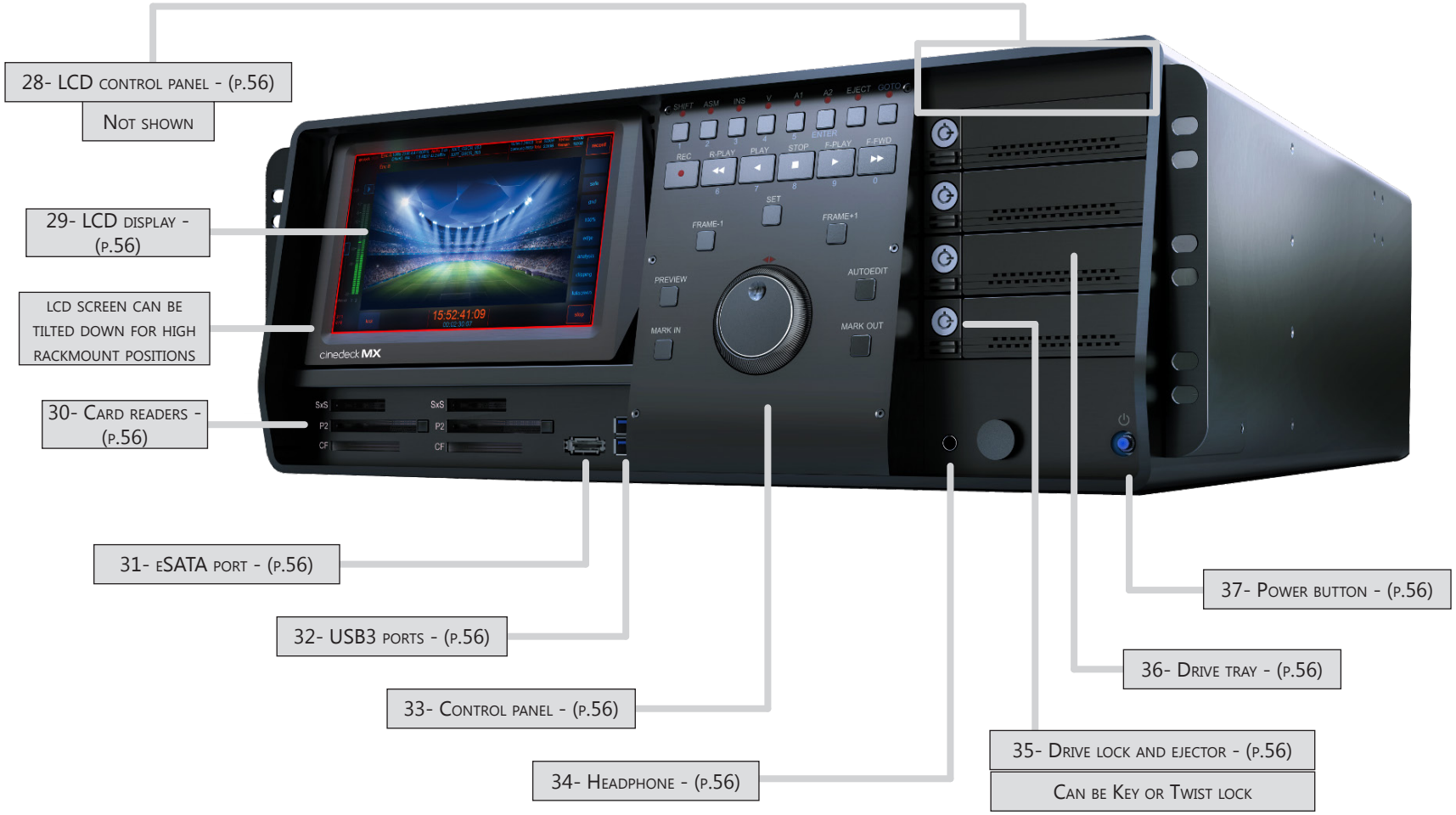
RX3G back panel / - cont...

Name	Location	Description
9- AUX 1/2 OUT	3.5 RX3G back panel - (p.52)	AUX video out is a secondary output of either channel 1 or channel 2. The signal source selection can be defined on the "prefs" page of some systems.
10- DC POWER	3.5 RX3G back panel - (p.52)	RX3G has dual, wide range, DC inputs via XLR male connectors. Either input can be used to operate the deck as they are auto switching. It is recommended to always have power supplied to both inputs from separate power sources.
11- eSATA PORTS	3.5 RX3G back panel - (p.52)	*** In the default factory configuration, eSATA 2 on the back panel is disabled.** RX3G has a total of five internal SATA ports, the first four of which are by default used for the SSD drive trays. The fifth SATA port is connected to eSATA 1 on the rear panel. The front eSATA and rear eSATA 2 connectors can be enabled by swapping cables internally. Please contact Cinedeck Support for more information.
12- USB3 PORTS	3.5 RX3G back panel - (p.52)	Standard USB3 data ports. It is recommended to use USB2 ports when restoring a system from the USB restore key.
13- HDMI FOR GUI	3.5 RX3G back panel - (p.52)	The RX3G user interface can simultaneously be displayed on most HDMI monitors. You may need to access the Windows "Screen Resolution" settings to properly configure your external display.
14- RS-232 PORTS	3.5 RX3G back panel - (p.52)	For remote control of most "broadcast" equipment, RS-422 will be used. These ports can be used for connections between a Cinedeck and another computer workstation such as an Avid or FCP system, eliminating the need for a RS-422 adapter.
15- RS-422 PORTS	3.5 RX3G back panel - (p.52)	One port per HD/SD channel. Each port can be used for remote control between a tape deck or other professional device and a Cinedeck channel. The ports are bi-directional allowing "master mode" for the Cinedeck to control attached devices or "slave mode" allowing external devices to control the Cinedeck.
16- MONITOR OUT	3.5 RX3G back panel - (p.52)	3-pin XLR Line-Level analog audio monitor output. One output per channel.
17- DVI FOR GUI	3.5 RX3G back panel - (p.52)	The RX3G user interface can simultaneously be displayed on most DVI monitors. You may need to access the Windows "Screen Resolution" settings to properly configure your external display.
18- VGA FOR GUI	3.5 RX3G back panel - (p.52)	The RX3G user interface can simultaneously be displayed on most VGA monitors. You may need to access the Windows "Screen Resolution" settings to properly configure your external display.
19- AES IN & OUT	3.5 RX3G back panel - (p.52)	BNC AES audio in and out connectors where each connection carrys two AES channels.

RX3G back panel / - cont...

Name	Location	Description
20- Timecode option	3.5 RX3G back panel - (p.52)	The RX3G timecode option provides three additional features. • **Jam Sync** - Similar to a camera, a timecode source can be momentarily connected to this LTC input and RX3G will sync the internal generator to that timecode. • **Timecode Out** - With the timecode option, RX3G can generate and send timecode to other connected devices such as cameras, eliminating the need to have a separate timecode generator, for example in a fly-pack type of configuration. • **IRIG-B Timecode support** - Allows RX3G to receive a IRIG-B timecode source from an external IRIG-B timecode generator (not included) and use that timecode data internally as a replacement for standard SMPTE timecode. You can confirm if your RX3G has the Timecode option if the BNC connectors are included on the back panel and by checking in Windows Device Manager. If "AEC Time Code device' is listed, the deck has the option.
21- RS-422 out	3.5 RX3G back panel - (p.52)	Unused
22- Gb lan / USB2 ports	3.5 RX3G back panel - (p.52)	Two standard Gb Ethernet ports. Ports can be teamed in networks which support teamed connections. Four standard USB2 data connections.
23- Analog in	3.5 RX3G back panel - (p.52)	An unbalanced analog line level audio input which can be used for recording stereo scratch audio.
24- LTC in/loop	3.5 RX3G back panel - (p.52)	LTC (linear time code) input for use with a house supplied timecode signal. Signals which are input are passed to the out connector.
25- Reference In	3.5 RX3G back panel - (p.52)	For external reference, Cinedecks will lock to either standard color burst/black burst or Tri-level sync. In "Auto" mode, if no external reference is available, the deck will default to internal sync or video input. In dual-link, when referencing to incoming video, reference can be selected from the A or B input.
26- Video Out	3.5 RX3G back panel - (p.52)	Channel 1 and 2, 3G video outputs. Can be paired and function as dual-link output. Can optionally carry a video super with transport status, etc.
27- Video In	3.5 RX3G back panel - (p.52)	Channel 1 and 2, 3G video inputs. Each video input can accept up to 16 channels of SDI embedded audio. Can be paired and function as dual-link input.

3.6 MX front panel

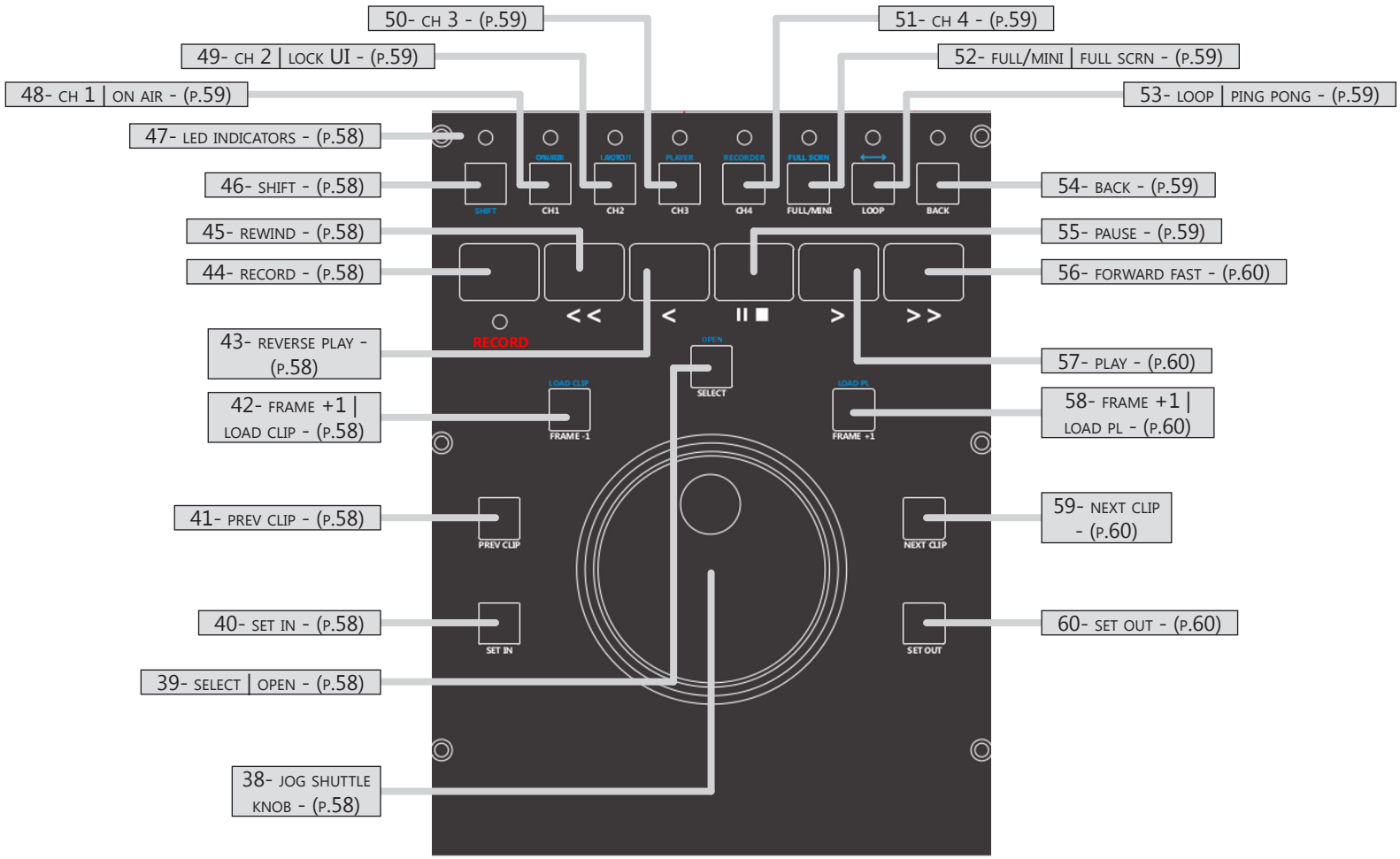


MX front panel / - cont...

Name	Location	Description
28- LCD CONTROL PANEL	3.6 MX front panel - (p.55)	The MX LCD control panel has a LCD dimmer control and three pushbuttons; display off/on toggle, menu access, selection and adjustment for size, etc..
29- LCD DISPLAY	3.6 MX front panel - (p.55)	1024 x 600 Touch Screen Display for user interface manipulation and video preview of record and playback signals. This screen can be tilted to allow better viewing at low angles. The same signals see on this screen can simultaneously be displayed on a monitor connected to any one of the GUI display ports. You may need to access the Windows "Screen Resolution" settings to properly configure your external display.
30- CARD READERS	3.6 MX front panel - (p.55)	Sony SxS, Panasonic P2 and Compact flash cards may be inserted for direct playback and file management tasks such as copying data to local or network storage. The Cinedeck will not write data to these cards with compatible file and folder structures seen on natively written camera cards.
31- eSATA PORT	3.6 MX front panel - (p.55)	MX has a total of four eSATA ports, three on the rear panel, one on the front panel.
32- USB3 PORTS	3.6 MX front panel - (p.55)	Standard USB3 port. It is recommended to use a rear USB2 port when restoring a system from the USB system key.
33- CONTROL PANEL	3.6 MX front panel - (p.55)	Tactile machine interface control panel for transport control and channel selection. See MX control panel for more information.
34- HEADPHONE	3.6 MX front panel - (p.55)	The image shown may not match your unit. Most MX systems have two mini and two 1/4" headphone jacks and two volume controls for audio monitoring.
35- DRIVE LOCK AND EJECTOR	3.6 MX front panel - (p.55)	Cinedecks are configured by default with twist-lock drive retainers but key-lock retainers are available upon request with your initial order. See "3.11 Inserting & ejecting drives" on page 71
36- DRIVE TRAY	3.6 MX front panel - (p.55)	MX can hold four removable drive trays. All current Cinedecks utilize these removable drive trays, sometimes called sleds or carriers. Each tray can hold two SATA SSD drives. See "3.11 Inserting & ejecting drives" on page 71 and "3.3.1 SSDs" on page 45 The trays are also available separately.
37- POWER BUTTON	3.6 MX front panel - (p.55)	In the default configuration, the power button requires a momentary push for turning the RX3G on and off and glows blue when the system is running. The systems can also manually be placed into Windows sleep mode. In this state, the power button will blink slowly. Pressing the power button will wake the system.

3.7 MX control panel

MX is a recording and playback appliance which provides the familiarity of a traditional tape machine by including a full tactile jog-shuttle control panel and marries that with all of the unique Cinedeck capabilities. The control panel three access methods: direct or single button commands such as play, and shuttle, assignment functions such as first selecting Ch1 and then pressing stop to stop a recording and shift functions (labeled in blue) like “shift + loop” to activate “ping pong” playback.



MX control panel / - cont...

Name	Location	Description
38- JOG SHUTTLE KNOB	"3.7 MX control panel" on page 57	The MX jog /shuttle knob has two rotating parts, an inner disc with finger dent which can be a continuously rotated and an outer ring which moves about ninety degrees in each direction from the middle parked position. View video frames slowly, frame by frame, by rotating the inner jog disc clockwise and counter-clockwise. Clockwise rotations move forward in time. Shuttle forward and reverse, to 20x speed, by rotating the outer ring clockwise and counter-clockwise. Rotating in a clockwise direction moves forward in time.
39- SELECT | OPEN	"3.7 MX control panel" on page 57	A dual function button. When shift is pressed first, opens selected clip or playlist.
40- SET IN	"3.7 MX control panel" on page 57	When playing a clip or playlist and when working in the clip editor, in-points can be directly set using "set-In".
41- PREV CLIP	"3.7 MX control panel" on page 57	When viewing a playlist or multiple clips are loaded for playback, pressing "prev clip" moves the playhead to the previous clip.
42- FRAME +1 | LOAD CLIP	"3.7 MX control panel" on page 57	A dual function button. In play mode, "frame + 1" moves playback of the current file forward one frame at a time. If shift is pressed first, clip manager is opened.
43- REVERSE PLAY	"3.7 MX control panel" on page 57	Plays the current file in reverse at 1x speed.
44- RECORD	"3.7 MX control panel" on page 57	Starts recording on the assigned channel. It is required to press a channel number on the top row and then press record to trigger recording on that channel.
45- REWIND	"3.7 MX control panel" on page 57	Rewinds at 20x
46- SHIFT	"3.7 MX control panel" on page 57	The "shift" button must be pressed first to access any of the blue shift functions.
47- LED INDICATORS	"3.7 MX control panel" on page 57	There are LED lamps positioned above the buttons to indicate which are active.

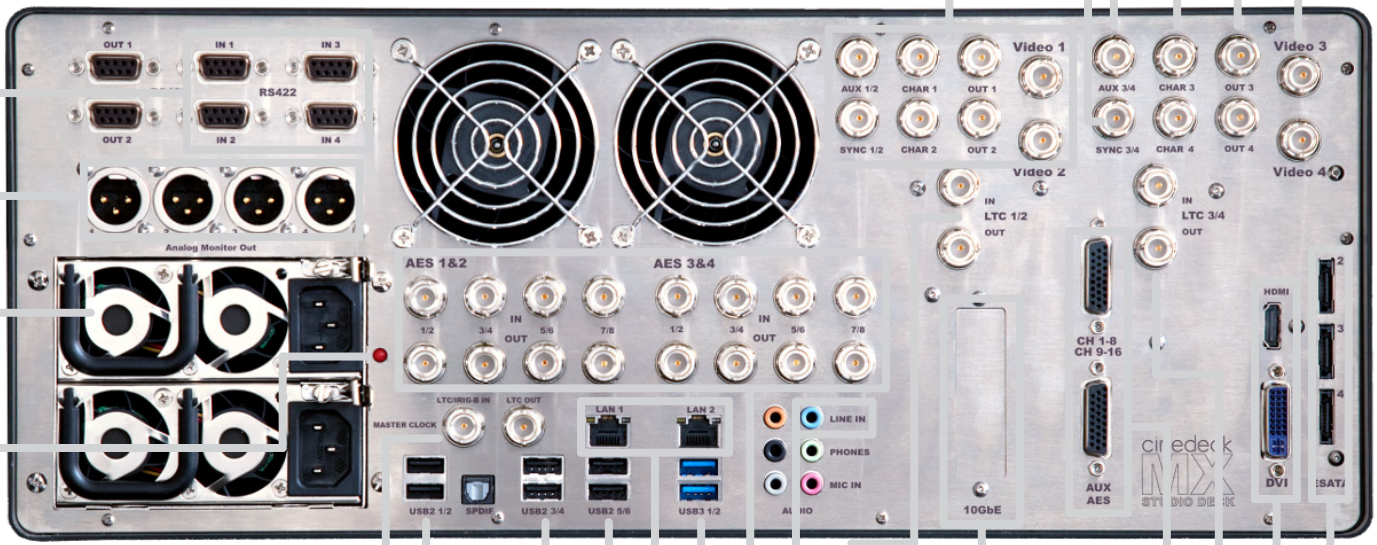
MX control panel / - cont...

Name	Location	Description
48- CH 1 | ON AIR	"3.7 MX control panel" on page 57	A dual function button. In normal mode, pressing "ch 1" assigns that channel to the control panel. Once assigned, recording can be triggered and all transport controls are active for this channel. If "shift" is pressed before pressing "ch 1", "on-air" mode can be toggled on and off. When "on air" is active, no changes to channel settings are possible except headphone monitoring selections. Any other screen or control panel actions will trigger an "on air" warning message.
49- CH 2 | LOCK UI	"3.7 MX control panel" on page 57	A dual function button. In normal mode, pressing "ch 2" assigns that channel to the control panel. Once assigned, recording can be triggered and all transport controls are active for this channel. If "shift" is pressed before pressing "ch 2", the touchscreen interface can be locked or unlocked. If locked, touching the screen will trigger an on screen "locked" warning. Lock mode is primarily for use with the MX control panel which allows switching channels while in lock mode.
50- CH 3	"3.7 MX control panel" on page 57	Pressing "ch 3" assigns that channel to the control panel. Once assigned, recording can be triggered and all transport controls are active for this channel.
51- CH 4	"3.7 MX control panel" on page 57	Pressing "ch 4" assigns that channel to the control panel. Once assigned, recording can be triggered and all transport controls are active for this channel.
52- FULL/MINI | FULL SCRN	"3.7 MX control panel" on page 57	A dual function button. Pressing this button or pressing shift and then pressing this button, toggles the user interface between multi channel view and single channel view.
53- LOOP | PING PONG	"3.7 MX control panel" on page 57	A dual function button. Pressing "loop" toggles loop playback mode on and off. Loop playback plays a file, files or playlist continuously in the selected play direction. Pressing shift and then "loop", toggles ping pong playback on and off. Ping pong playback plays the loaded file, files or playlist continuously from start to end to start.
54- BACK	"3.7 MX control panel" on page 57	Goes back to the previous screen
55- PAUSE	"3.7 MX control panel" on page 57	Pause stops playback but keeps the file loaded.

MX control panel / - cont...

Name	Location	Description
56- FORWARD FAST	"3.7 MX control panel" on page 57	Fast forwards the loaded file at 20x.
57- PLAY	"3.7 MX control panel" on page 57	Plays the current file forward at 1x speed.
58- FRAME +1 | LOAD PL	"3.7 MX control panel" on page 57	A dual function button. In play mode, "frame + 1" moves playback of the current file forward one frame at a time. If "shift" is press first, playlist manager is opened.
59- NEXT CLIP	"3.7 MX control panel" on page 57	When viewing a playlist or multiple clips are loaded for playback, pressing "next clip" moves the playhead to the next clip.
60- SET OUT	"3.7 MX control panel" on page 57	When playing a clip or playlist and when working in the clip editor, out-points can be directly set using "set-out".

3.8 MX back panel



61- Video in 3&4 - (p.62)

62- Video out 3&4 - (p.62)

63- Super out 3&4 - (p.62)

64- Aux out 3/4 - (p.62)

65- Reference in 3 & 4 - (p.62)

66- Video I/O 1 & 2 - (p.62)

67- RS-422 ports - (p.62)

68- Monitor out - (p.62)

69- Redundant power - (p.62)

70- Power supply alarm ignore - (p.62)

71- Master timecode in & out - (p.63)

72- USB2 ports - (p.63)

73- Gb Ethernet - (p.63)

74- USB3 ports - (p.63)

75- AES in & out 1-16 - (p.63)

76- Analog line in - (p.63)

77- Optional network - (p.63)

78- AES in & out 17-32 - (p.63)

79- LTC 1 & 2 in/loop - (p.63)

80- LTC 3 & 4 in/loop - (p.64)

81- DVI/HDMI for GUI - (p.64)

82- eSATA ports - (p.64)

MX back panel / - cont...

Name	Location	Description
61- Video in 3&4	3.8 MX back panel - (p.61)	3G video inputs. Each video input can accept up to 16 channels of SDI embedded audio. Can be paired and function as dual-link input. All 4 inputs can be combined as 4K/UHD input.
62- Video out 3&4	3.8 MX back panel - (p.61)	3G video outputs. Can be paired and function as dual-link output. All 4 outputs can be combined as 4K/UHD output.
63- Super out 3&4	3.8 MX back panel - (p.61)	HD/SD video outputs. Can carry video super with machine status, etc.
64- Aux out 3/4	3.8 MX back panel - (p.61)	AUX video out is a secondary output of either channel 1 or channel 2. The signal source selection can be defined on the "prefs" page of some systems.
65- Reference in 3 & 4	3.8 MX back panel - (p.61)	For external reference, Cinedecks will lock to either standard color burst/black burst or Tri-level sync. In "Auto" mode, if no external reference is available, the deck will default to internal sync or video input. In dual-link, when referencing to incoming video, reference can be selected from the A or B input.
66- Video I/O 1 & 2	3.8 MX back panel - (p.61)	Same layout as Video 3 & 4, 38-42.
67- RS-422 ports	3.8 MX back panel - (p.61)	One port per HD/SD channel. Each port can be used for remote control between a tape deck or other professional device and a Cinedeck channel. The ports are bi-directional allowing "master mode" for the Cinedeck to control attached devices or "slave mode" allowing external devices to control the Cinedeck.
68- Monitor out	3.8 MX back panel - (p.61)	3-pin XLR analog audio monitor output. One output per channel.
69- Redundant power	3.8 MX back panel - (p.61)	Dual, multi-voltage AC to DC power supplies. Either power supply can be used to operate the deck as they are auto switching. It is recommended to always have power supplied to both inputs from separate power sources.
70- Power supply alarm ignore	3.8 MX back panel - (p.61)	If the deck is powered up with just one power supply connected or if a power supply fails, a high pitch alarm will sound. Pressing the button will quiet the alarm.

MX back panel / - cont...

Name	Location	Description
71- Master timecode in & out	3.8 MX back panel - (p.61)	The master timecode input provides four functions: • **Single timecode source** - When selected on the master encode page of the user interface, timecode fed to the master timecode input is directed to all 4 channels. • **Jam Sync** - Similar to a camera, a timecode source can be momentarily connected to this LTC input and MX will sync the internal generator to that timecode. • **Timecode Out** - MX can generate and send timecode to other connected devices such as cameras, eliminating the need to have a separate timecode generator, for example in a fly-pack type of configuration. • **IRIG-B Timecode support** - Allows MX to receive a IRIG-B timecode source from an external IRIG-B timecode generator (not included) and use that timecode data internally as a replacement for standard SMPTE timecode.
72- USB2 ports	3.8 MX back panel - (p.61)	Standard USB2 ports. It is recommended to use a USB2 port when restoring a system from the USB system key.
73- Gb Ethernet	3.8 MX back panel - (p.61)	Two standard Gb Ethernet ports. Ports can be teamed in networks which support teamed connections.
74- USB3 ports	3.8 MX back panel - (p.61)	Standard USB3 data ports. It is recommended to use USB2 ports when restoring a system from the USB restore key.
75- AES in & out 1-16	3.8 MX back panel - (p.61)	8 AES channels per channel pair. Each BNC connection carries two AES channels.
76- Analog line in	3.8 MX back panel - (p.61)	An unbalanced analog line level audio input which can be used for recording stereo scratch audio.
77- Optional network	3.8 MX back panel - (p.61)	PCIe slot for installation of a 10Gb Ethernet card, 8 or 16Gb Fiber Channel card or direct attached storage adapter.
78- AES in & out 17-32	3.8 MX back panel - (p.61)	An additional 16 AES channels can optionally be addressed via D-sub connectors.
79- LTC 1 & 2 in/ loop	3.8 MX back panel - (p.61)	LTC (linear time code) input to channels 1 and 2 for use with a house supplied timecode signal. Signals which are input are passed to the out connector.

MX back panel / - cont...

Name	Location	Description
80- LTC 3 & 4 IN/ LOOP	3.8 MX back panel - (p.61)	LTC (linear time code) input to channels 3 and 4 for use with a house supplied timecode signal. Signals which are input are passed to the out connector.
81- DVI/HDMI FOR GUI	3.8 MX back panel - (p.61)	The MX user interface can simultaneously be displayed on most DVI or HDMI monitors. You may need to access the Windows "Screen Resolution" settings to properly configure your external display.
82- eSATA PORTS	3.8 MX back panel - (p.61)	MX has a total of four eSATA ports, three on the rear panel, one on the front panel.

3.9 ZX front panel

83- Power and drive access door - (p.66)

84- Door lock - (p.66)

85- Drive trays - (p.66)
behind door

86- Power button - (p.66)
behind door

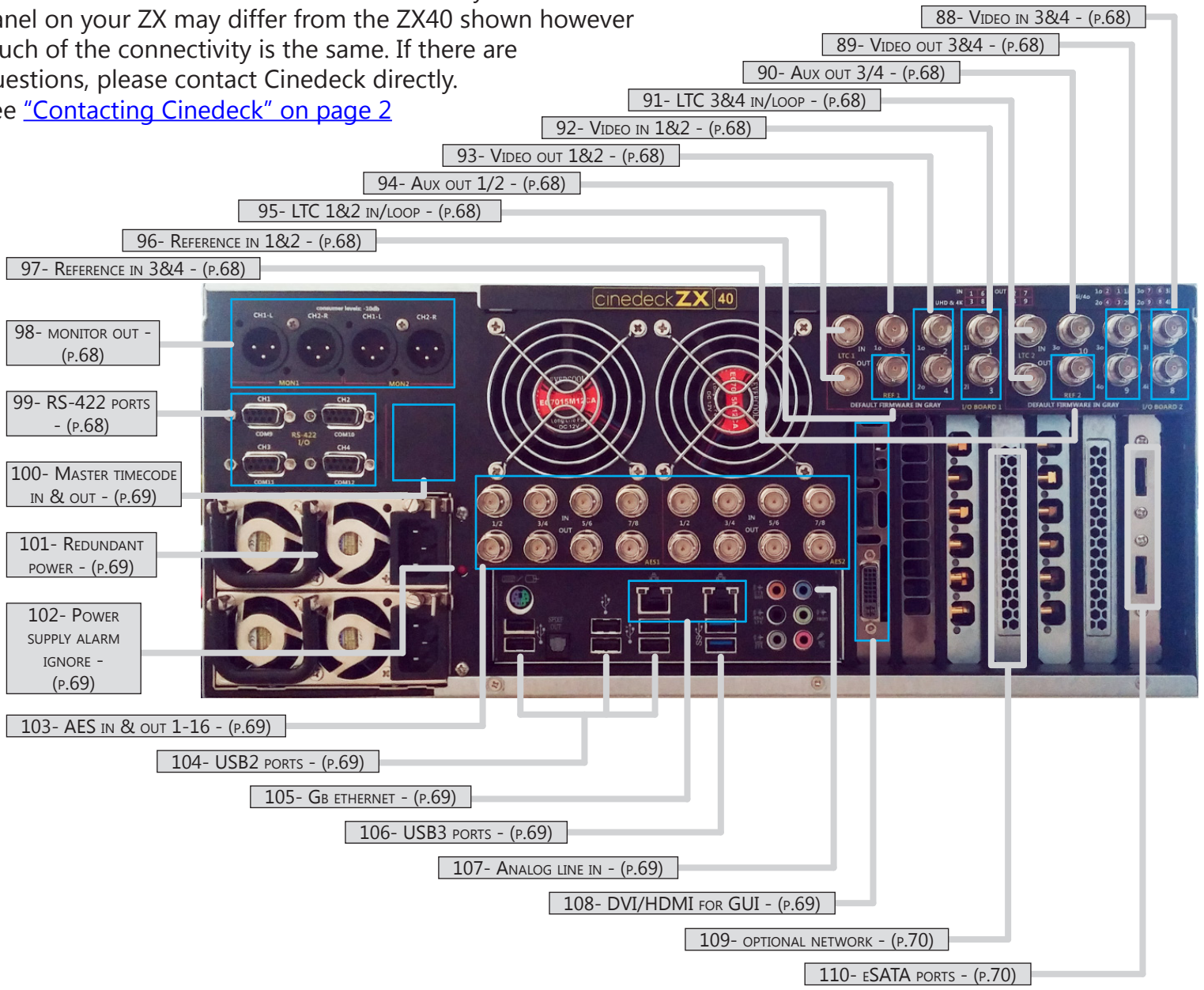
87- USB port - (p.66)
behind door

ZX front panel / - cont...

Name	Location	Description
83- Power and drive access door	3.9 ZX front panel - (p.65)	The right hand door covers the power rocker switch and provides access to the drive trays and a USB port.
84- Door lock	3.9 ZX front panel - (p.65)	Key lockable latch. Turn to the right to open.
85- Drive trays	3.9 ZX front panel - (p.65)	ZX can hold four removable drive trays. All current Cinedecks utilize these removable drive trays, sometimes called sleds or carriers. Each tray can hold two SATA SSD drives. The trays are also available separately. See "3.11 Inserting & ejecting drives" on page 71 and "3.3.1 SSDs" on page 45 The trays are also available separately.
86- Power button	3.9 ZX front panel - (p.65)	In the default configuration, the spring loaded power rocker switch requires a momentary push down for turning ZX on and off. The lamps below the power button glow when the system is running
87- USB port	3.9 ZX front panel - (p.65)	Standard USB2 port.

3.10 ZX back panel

ZX has three base models and is a modular system so the back panel on your ZX may differ from the ZX40 shown however much of the connectivity is the same. If there are questions, please contact Cinedeck directly.
See "Contacting Cinedeck" on page 2



ZX back panel / - cont...

Name	Location	Description
88- Video in 3&4	3.10 ZX back panel - (p.67)	3G video inputs. Each video input can accept up to 16 channels of SDI embedded audio. Can be paired and function as dual-link input. All 4 inputs can be combined as 4K/UHD input.
89- Video out 3&4	3.10 ZX back panel - (p.67)	3G video outputs. Can be paired and function as dual-link output. All 4 outputs can be combined as 4K/UHD output.
90- Aux out 3/4	3.10 ZX back panel - (p.67)	AUX video out is a secondary output of either channel 1 or channel 2. The signal source selection can be defined on the "prefs" page of some systems.
91- LTC 3&4 in/ loop	3.10 ZX back panel - (p.67)	LTC (linear time code) input to channels 3 and 4 for use with a house supplied timecode signal. Signals which are input are passed to the out connector.
92- Video in 1&2	3.10 ZX back panel - (p.67)	3G video inputs. Each video input can accept up to 16 channels of SDI embedded audio. Can be paired and function as dual-link input. All 4 inputs can be combined as 4K/UHD input.
93- Video out 1&2	3.10 ZX back panel - (p.67)	3G video outputs. Can be paired and function as dual-link output. All 4 outputs can be combined as 4K/UHD output.
94- Aux out 1/2	3.10 ZX back panel - (p.67)	AUX video out is a secondary output of either channel 1 or channel 2. The signal source selection can be defined on the "prefs" page of some systems.
95- LTC 1&2 in/ loop	3.10 ZX back panel - (p.67)	LTC (linear time code) input to channels 1 and 2 for use with a house supplied timecode signal. Signals which are input are passed to the out connector.
96- Reference in 1&2	3.10 ZX back panel - (p.67)	For external reference, Cinedecks will lock to either standard color burst/black burst or Tri-level sync. In "Auto" mode, if no external reference is available, the deck will default to internal sync or video input. In dual-link, when referencing to incoming video, reference can be selected from the A or B input.
97- Reference in 3&4	3.10 ZX back panel - (p.67)	For external reference, Cinedecks will lock to either standard color burst/black burst or Tri-level sync. In "Auto" mode, if no external reference is available, the deck will default to internal sync or video input. In dual-link, when referencing to incoming video, reference can be selected from the A or B input.
98- monitor out	3.10 ZX back panel - (p.67)	3-pin XLR analog audio monitor output. One output per channel.
99- RS-422 ports	3.10 ZX back panel - (p.67)	One port per HD/SD channel. Each port can be used for remote control between a tape deck or other professional device and a Cinedeck channel. The ports are bi-directional allowing "master mode" for the Cinedeck to control attached devices or "slave mode" allowing external devices to control the Cinedeck.

ZX back panel / - cont...

Name	Location	Description
100- Master timecode in & out	3.10 ZX back panel - (p.67)	The master timecode input provides four functions: • **Single timecode source** - When selected on the master encode page of the user interface, timecode fed to the master timecode input is directed to all 4 channels. • **Jam Sync** - Similar to a camera, a timecode source can be momentarily connected to this LTC input and MX will sync the internal generator to that timecode. • **Timecode Out** - MX can generate and send timecode to other connected devices such as cameras, eliminating the need to have a separate timecode generator, for example in a fly-pack type of configuration. • **IRIG-B Timecode support** - Allows MX to receive a IRIG-B timecode source from an external IRIG-B timecode generator (not included) and use that timecode data internally as a replacement for standard SMPTE timecode.
101- Redundant power	3.10 ZX back panel - (p.67)	Dual, multi-voltage AC to DC power supplies. Either power supply can be used to operate the deck as they are auto switching. It is recommended to always have power supplied to both inputs from separate power sources.
102- Power supply alarm ignore	3.10 ZX back panel - (p.67)	If the deck is powered up with just one power supply connected or if a power supply fails, a high pitch alarm will sound. Pressing the button will quiet the alarm.
103- AES in & out 1-16	3.10 ZX back panel - (p.67)	8 AES channels per channel pair. Each BNC connection carries two AES channels.
104- USB2 ports	3.10 ZX back panel - (p.67)	Standard USB 2 ports
105- Gb ethernet	3.10 ZX back panel - (p.67)	Two standard Gb Ethernet ports. Ports can be teamed in networks which support teamed connections.
106- USB3 ports	3.10 ZX back panel - (p.67)	Standard USB3 ports
107- Analog line in	3.10 ZX back panel - (p.67)	An unbalanced analog line level audio input which can be used for recording stereo scratch audio.
108- DVI/HDMIfor GUI	3.10 ZX back panel - (p.67)	The ZX user interface can be displayed on most DVI or HDMI monitors. You may need to access the Windows “Screen Resolution” settings to properly configure your external display.

ZX back panel / - cont...

Name	Location	Description
109- OPTIONAL NETWORK	3.10 ZX back panel - (p.67)	PCIe slot for installation of a 10Gb Ethernet card, 8 or 16Gb Fiber Channel card or direct attached storage adapter.
110- eSATA PORTS	3.10 ZX back panel - (p.67)	ZX can have a total of six, rear mounted eSATA ports.

3.11 Inserting & ejecting drives

Before removing media drives from a Cinedeck, they should first be ejected from the operating system. This can be done from the user interface via “clip manager” or from the Windows desktop via HotSwap.

To eject drives when the Cinedeck application is running:
Press “play” on the main multi or single screen view of the user interface to access “clip manager”. In “clip manager”, select the drive to be ejected and select

from the “manage disk” menu.
(For additional details, see “5.16 Clip manager” on page 128)

To eject drives from the Windows desktop:

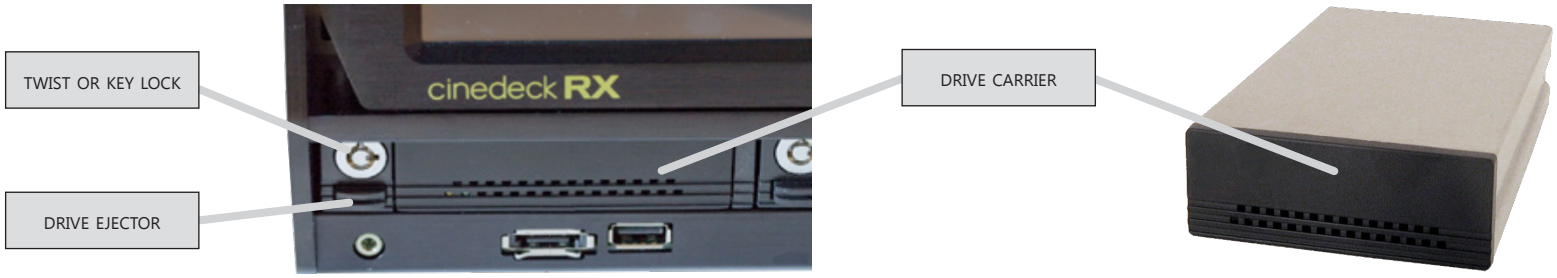
Click the HotSwap! icon in the System Tray and select the drive you want to eject. After a few moments, a message will appear indicating “Safe to Hotswap” which means the drive can be removed.
(For additional details, see “5.5.3 HotSwap!” on page 90)

Remember that Cinedeck SSDs are often installed in pairs, two drives in a sled, so be sure to check and if necessary eject both drives before removing the drive carrier.

The lock assembly consists of a twist or key lock and a drive ejector button. A twist lock is shown right and a key lock is shown below. Your system may have either.

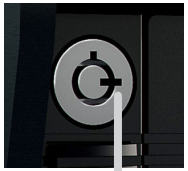
To remove a drive:

- If your system has twist locks, press the knob in gently, turn to the left until the knob clicks into the vertical position and release the knob.



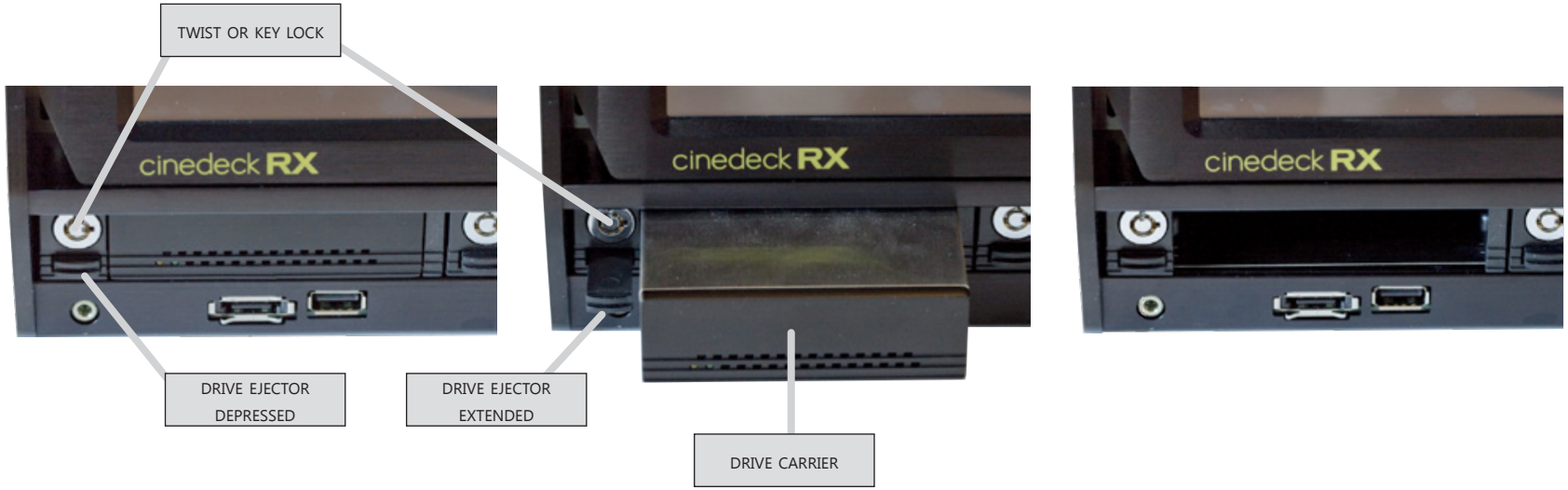
Inserting & ejecting drives / - cont...

- If your system has key locks, insert the key with the small pin locater pointing to the right, press the key in and gently, turn to the left until the key is vertical.
- Gently press the drive ejector until a click is heard.
- Release the drive ejector, allowing it to extend out fully.
- Press the drive ejector in again, firmly but slowly to eject the drive from the deck.



To install a drive:

- If your system has twist locks, press the knob in gently and assure it is fully turned to the left and vertical.
- If your system has key locks, assure the locater slots are vertical or insert the key with the locater pin pointing to the right, press the key in and gently, turn to the left until the key is vertical.
- Push the drive tray into the slot firmly, until it is flush with the front panel of the deck.
- If your system has twist locks, press the knob in gently, turn to the right until the knob clicks into the horizontal position and release the knob.
- If your system has key locks, insert the key with the small pin locater pointing up, press the key in and gently, turn to the right until the key is horizontal.



4.0 Accessories

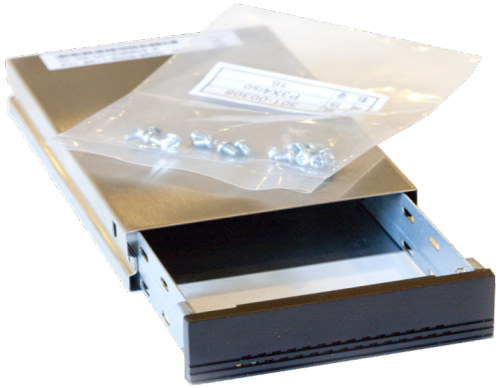
4.1 Drive docks

For use in “sneaker-net” and other mobile applications, all Cinedecks make use of hot-swappable drive carriers. Each carrier can hold two SSD drives.

The #15001 carriers are available separately and there are several receiving docs which connect to computer workstations via SATA;

- 15000 Internal dock - Designed to fit a standard 3.5” drive bay in a typical PC workstation has two SATA connections and a power connection.
- 15002 Drive carrier and internal dock set - Includes the above dock plus a drive carrier
- 15003 Rugged dock kit - Includes a drive carrier, power supply and two eSATA cables

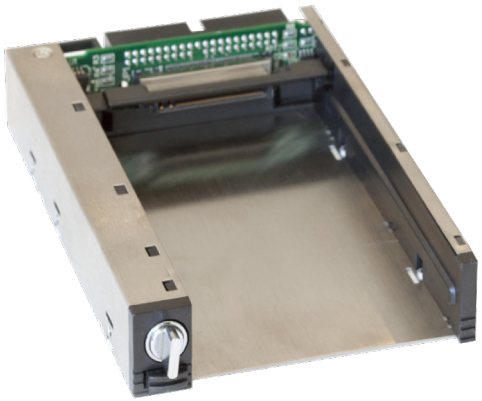
The docks are all available with twist lock (shown) or key lock.
Contact Cinedeck for additional information.



15001 Drive carrier

15002 Drive dock & carrier

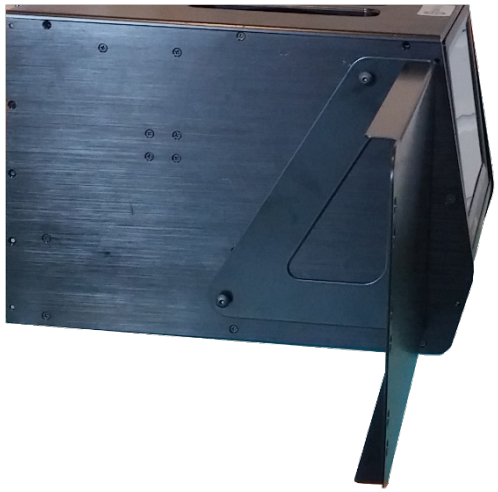
15000 Drive dock



15001 Rugged dock kit

4.2 Rack mount kits

RX3G, MX and ZX can all be mounted in standard 19" equipment racks with optional rack kits.
For RX, two rack kits are available, a single machine kit with blank panel (shown) and a dual, side by side kit.



The MX and ZX rack kits come with rack ears and side rack rails.

4.3 Control panels

Cinedecks can be controlled by an array of remote panels connected by USB and RS-422. Additionally, ZX can be optionally equipped with a surface mount version of the MX tactile control panel.

Third party controllers include;

X-Keys Jog-Shuttle XK-12 controller by PI Engineering (www.xkeys.com)

Shuttle Xpress and ShuttlePro V2 by Contour Designs (www.contourdesigns.com)

Logitech R800 remote (www.logitech.com)

RS-422 Device controllers include DNF ST100 and ST400 and those by JLCooper, Lance Design, etc.

X-KEYS XK-12

CONTOUR DESIGNS SHUTTLE XPRESS

LOGITECH R800

DNF ST300

4.4 ZX specific accessories

The popularity of the price effective ZX platform brings interest from diverse production environments. Many do not need the built-in touch screen of MX and RX or the Jog / Shuttle on MX but for some uses they can be extremely useful. To address these needs, ZX can be outfitted with an optional touch screen and Jog / Shuttle.

5.0 Using a Cinedeck

5.1 Introduction

The Cinedeck user interface is uniquely designed to provide ease of access and operation for professional and novice alike. After connecting and powering on your Cinedeck, Presuming a standard HD/SD YUV environment, there are generally just three things you must do before you can make a recording;

1. Set the input to match your source - this is generally done using “auto detect” on the input setup page
2. Select a master and optionally proxy codec with wrapper and
3. Designate a file destination drive - both of which are accomplished on the master and proxy setup pages.

Of course, Cinedeck systems go far beyond simply recording and they encompass multiple modes such as 4K or UHD, various RGB modes and modes which alter the I/O to provide more inputs or outputs. For specifics on the various UI Modes, see “6.0 User Interface Mode” on page 230.

Those operators who have traditional video workflow experience combined with an understanding of the IT aspects of modern video technology such as codecs, wrappers and network access, will have no problem navigating and setting up a Cinedeck however, it is useful to have a basic understanding of the system...

The user interface is designed to be used by touchscreen or mouse. Operation is the same whether you are using the built-in display or an external monitor and mouse. A USB keyboard is also helpful for data entry and system operation and there are a multitude of keyboard shortcuts. (See “5.3 Keyboard shortcuts” on page 80)

Most important is that Cinedecks are project-centric meaning that for setup, everything you do is related to a project which is associated to one or more channels. For example, if all four channels of a MX are associated to one project and you change the channel 3 codec to ProRes, all four channels are switched to ProRes. Conversely, if all four channels need different codecs, you assign each channel to its own project.

The other important aspect is that while there is a default naming convention, Cinedecks impose virtually no limitations on folder and file naming. To streamline setup, names which are editable such as “project” and “input” are represented as “wildcards” (variables) which can be easily integrated into your folder and file naming structure along with various run-time date and time elements.
A good understanding of the Project window, which is accessed via the main “overview” screen, is key to acquiring files which fit your desired workflow.

5.2 User Interface explained

Cinedecks utilize a GUI (graphical user interface) which consists of several basic areas;

- The main / multi view screen which, depending on the Cinedeck model and mode, can be one, or multiple quadrants.
- A single channel view.
- Multiple setup pages, primarily accessed by tabs across the top of the setup screen.
- A clip manager screen.
- The playlist manager and associated playlist editor.

Some color generalizations:

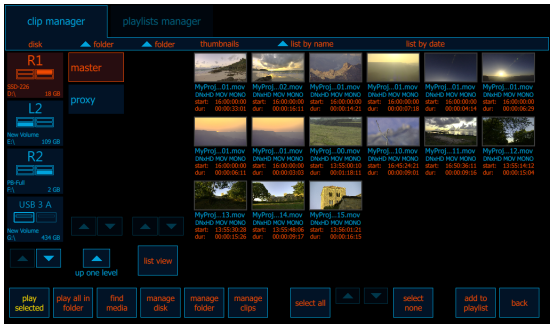
- Bright orange items and bright orange **bordered** buttons are active.
- Bright aqua-green items and bright aqua-green bordered buttons are inactive but available.
- Yellow items are informational.
- Dim items and buttons are not available or not relevant.

MULTI CHANNEL VIEW

SINGLE CHANNEL VIEW

SETUP

CLIP MANAGER



PLAYLIST MANAGER

PLAYLIST EDITOR

User Interface explained / - cont...

Beyond touching or clicking, the Cinedeck user interface also makes use of long presses, you might call these shift functions. Screen hot spots are also used and there are a number of keyboard shortcuts and bar-code readers can be utilized for data entry.

The most notable long press action is to stop a recording. When a system is recording and setup with the default “prefs” configuration, simply clicking stop will have no effect. A long press of about 2 seconds is required to stop the recording. This eliminates accidental stops, particularly with touch screen systems. There are other long press functions which will be noted throughout the manual.

Screen hot spots are areas of a screen which, when touched, will direct the operator directly to a related setup area or which display additional information. Both will be detailed more fully in this manual but as an example, touching the file information at the bottom of this screen, changes the display from showing the selected master and proxy encode details and file names to the folder path and duration. Touching that area again will toggle to show the current project name, scene and sub-scene names.

If your facility uses bar-codes and, for example, are transferring tapes to files, an appropriate HID compatible bar-code reader can be used to enter data into selected fields such as file name, directly from the bar-code information.

5.3 Keyboard shortcuts

The Cinedeck user interface can be driven to a great extent using shortcut key presses on an attached USB keyboard.
Press control plus K “Control+K” to open an on-screen listing of available shortcuts.

As can be seen from this screen, the available shortcuts are different based on the operating mode and visible screen but some general shortcuts such as “Enter” to save and return to the previous screen and “Escape” to cancel changes and return to the previous screen remain available across most screens.

Keyboard shortcuts / - cont...

User Interface General Shortcuts	Available in:	Description
Control+K	most screens	Toggle the display of the keyboard shortcuts overview screen
Alt+K	"	Toggles between using the on-screen keyboard or direct field typing, for data entry areas such as creating file names (See "496- misc" on page 228)
Control+Enter	"	Toggles showing or hiding the mouse cursor
Alt+Enter	"	Toggles the user interface window mode. Normally the Cinedec interface runs full screen, pressing Alt+Enter puts the interface into a standard MS Windows re-sizable frame
Number keys 1, 2, 3 4,	"	Directly selects the active and visible channel by number. The numbers above the QWERTY keys or the numeric keypad can be used
Tab	"	Select / display the next channel
Control+Tab	"	Select / display the previous channel
F1	"	Switch all channels to playback mode
F2	"	Toggle gang mode 'normal' On/Off for all channels
F3	"	Switch all channels to preview - EtoE mode
F4	"	Toggle gang mode 'staggered' On/Off for all channels
Enter	"	Save any changes and return to the previous screen
Escape	"	Cancel any changes and return to the previous screen
Right and Left arrow	Setup screens	Switch to next or previous tab in setup screens

Keyboard shortcuts / - cont...

Project Settings Shortcuts	Available in:	Description
Control+N	Project manager	Create new project
Control+R	"	Rename current project
Control+M	"	Edit project metadata such as director and director of photography
Control+I	"	Import current project
Control+E	"	Export current project
Alt+W	"	Open 'user wildcards' management
Alt+G	"	Open 'global wildcards' management
Control+L	path & filename templates	Lock current selected project
Control+U	path & filename templates	Unlock current selected project
DEL	Project manager	Delete selected project

Scenes List Shortcuts	Available in:	Description
Arrow keys and mouse scroll wheel	Scene list manager	Navigate scenes list
Del	"	Delete selected scene
Control+N	"	Create new scene
Control+M	"	Edit scene metadata
Control+I	"	Import scenes list
Control+E	"	Export scenes list

Keyboard shortcuts / - cont...

Record / Preview Shortcuts	Available in:	Description
Control+S	Record View	Stops recording on all channels
Alt+P	"	Open project manager main page
Alt+N	"	Open path & templates screen for folder and file naming
Alt+S	"	Open scenes list manager
Alt+U		Open sub-scenes list manager
Alt+W		Open 'user wildcards' manager
Alt+G		Open 'global wildcards' management
Ctrl+E		Opens EDL Editor
N		Switch naming to next scene name
P		Switch naming to previous scene name
Ctrl+N		Switch naming to next sub-scene name
Ctrl+P		Switch naming to previous sub-scene name
Ctrl+R		Increment naming to next roll number
Ctrl+Shift+R		Increment naming to previous roll number
Ctrl+D		Delete last recorded clip on all channels
S		Go to Setup
F8		Start recording on all channels
Ctrl+F8		Stop recording on all channels
Alt+1, 2 or 3		Open list manager for user list 1, 2 or 3 respectively

Clip & Playlist Manager Shortcuts	Available in:	Description
Control+A	Clip & Playlist manager	Select all clips
Control+D	"	Select no clips
F5	"	Scan selected drive or folder for media

Keyboard shortcuts / - cont...

Playback Shortcuts	Available in:	Description
Space bar	Playback view	Toggle play and pause
Left arrow or "-" key	"	Step backwards one frame
Left arrow (long press)	"	Play 1x speed backwards
Alt + Left arrow	"	Step backwards one field (Only for interlaced content)
Right arrow or "=" key	"	Step forwards one frame
Right arrow (long press)	"	Play 1x speed forwards
Alt + Right arrow		Step forwards one field (Only for interlaced content)
Shift+<	"	Step backwards 10 frames
Shift+>	"	Step forwards 10 frames
Up arrow	"	GoTo previous clip
Down arrow	"	GoTo next clip
; (semi-colon)	"	GoTo start of content loaded to play
' (apostrophe)	"	GoTo end of content loaded to play
I	"	Set in-point
Alt+I		Clear in-point
Ctrl+I		Go to in-point
O	"	Set out-point
Alt+O		Clear out-point
Ctrl+O		Go to out-point
J		Play in reverse (Multiple presses increases speed)
K		Pause playback
L	"	Play forward (Multiple presses increases speed)
T	"	Enable / disable touch transport
Control+Alt+P	Playback/Playlist	Show playlist settings

Keyboard shortcuts / - cont...

Playlist Shortcuts	Available in:	Description
Left Arrow	Playlist Editor	Move selected clip left
Right Arrow	"	Move selected clip to right
W	"	Add clip asset before selected clip
E	"	Add clip asset after selected clip
Y	"	Switch to playlist preview screen

5.4 Powering on

For the location of the power button on your specific Cinedeck, please refer to the appropriate front panel description in chapter "3.0 Installation" on page 40.

Current Cinedecks run a Windows 7 embedded operating system, installed on a separate SSD, set as drive c:\. After pressing the power button, the Cinedeck will go through several internal BIOS and hardware related checks and then boot into Windows. New Cinedecks do not require a password and most boot to the Windows desktop however, RX3G may automatically load the Cinedeck application. If your system has for example, been setup to operate in your facilities domain, you may need a password in to access the desktop or start the Cinedeck application. If a password is required, contact your engineering or IT staff responsible for your production systems.
If no keyboard is available, see "5.5.1 On-screen keyboard" on page 87

All Cinedeck desktops look similar and from here, many of the standard Windows programs such as Windows Explorer are available.

If you need to setup network connections, it is best to do so before starting the Cinedeck application.

To start the Cinedeck from the desktop, locate and double click the Cinedeck short cut.

If this is your first experience with a Cinedeck,
please review the next section first before starting the Cinedeck application.

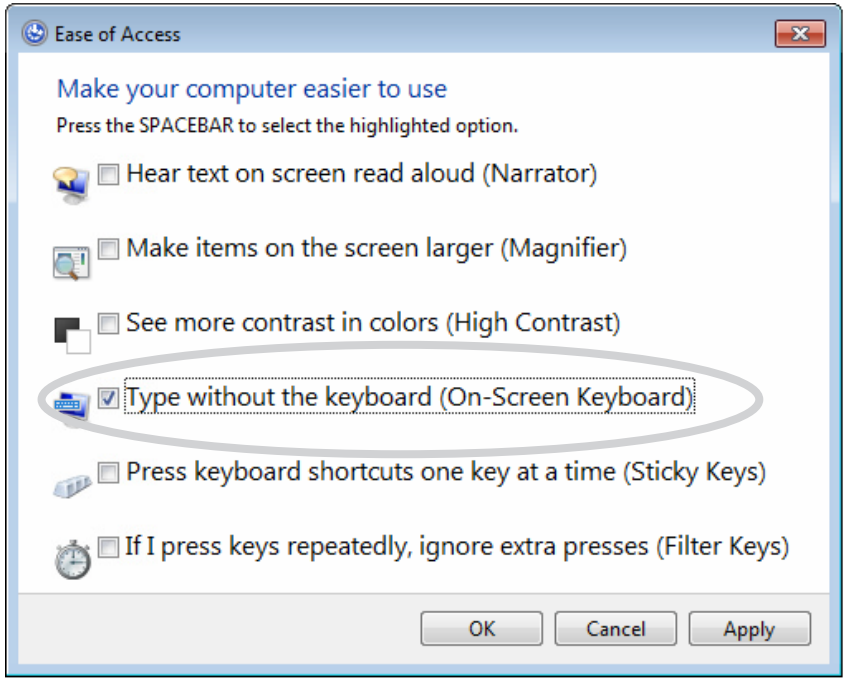
5.5 Desktop details

5.5.1 On-screen keyboard

Your system may have additional options but all systems include several useful links on the desktop.

First, if you have a touch screen system and are stuck at the Windows login without a USB keyboard on hand,

Click the “Ease of Access” icon found at the lower left of the Windows log-in screen.



From the Ease of access menu, touch “Type without keyboard” and select “OK”. The keyboard will open.

Touch to select the password field and then use the keyboard to fill in the data.

Once you are at the Windows desktop...

This shortcut starts the on-screen keyboard which is usable across the Windows environment. As noted above, for systems with touch screens, the keyboard can also be accessed from the Windows log-on screen to allow the entering of a password without a USB keyboard attached.

5.5.2 Touchscreen

RX and MX systems as well as some ZX systems, incorporate a touchscreen that enables full access to the user interface for setup as well as preview display of video signals. Generally they require no maintenance but on occasion, recalibration may be needed.
Note, the Cinedeck application and the Cinedeck touch displays are all 1024 x 600.

On RX3G and MX, the touchscreen shortcut opens the properties and adjustment application for calibrating the built-in user interface touch display.
See "9.2 Touchscreen calibration RX & MX" on page 272

ZX can optionally also have a touch screen installed but it uses different hardware and software.

The Windows System tray on touch screen equipped ZX systems has two extra icons:

Right click or click the "Mimo" 3G icon for access to basic screen settings such as mirroring two connected displays or extending the desktop across two displays.

Right click or double click the "Pointing Device Settings" icon to access setup and calibration settings.
See "9.3 Touchscreen calibration ZX" on page 273

5.5.3 HotSwap!

All removable drives should be electronically ejected before being disconnected and removed. The system Tray located in the Windows Task Bar (usually at bottom right) includes several items including access to the SATA drive hot-swap system.

SATA HotSwap allows easy disconnect and removal of SATA drives connected to the Cinedeck system from the Windows desktop.
(Drives can also be ejected from within the Cinedeck user interface. (See "244- manage disk" on page 131)
To remove a drive from the system, click the HotSwap! icon and select the drive you want to eject. After a few moments, a message will appear indicating "Safe to Hotswap" which means the drive can be removed.
When preparing to remove a SSD, keep in mind that your Cinedeck may have two drives installed in the tray you want to remove so be sure to eject both drives.

When inserting a formatted SATA drive into a powered deck, the system will generally automatically detect it however occasionally, it may be necessary to force the system to rescan the bus to make the drive visible.
To do this, right click the HotSwap icon and select "Scan for hardware changes".

USB drives should be properly ejected using the standard Windows "Safely Remove Hardware" utility. They can also be ejected from within the Cinedeck user interface. See "244- manage disk" on page 131.

Important! If you do not see the HotSwap! icon in your system tray, please contact Cinedeck support as this is an important background service which should be running on all systems.

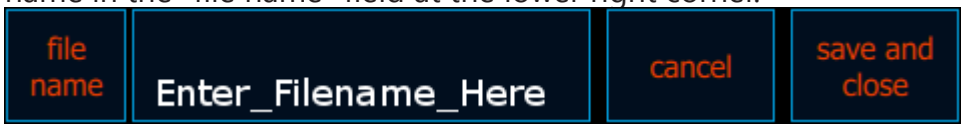
5.6 Settings - exporting / importing

In many areas of the Cinedeck system such as projects, scene names and EDLs, it is possible to save, export and/or import data. While the specifics of the data can change the procedures remain the same.

Some settings are by default saved in a sub folder of the Cinedeck install folder; c:\cinedeck or c:\cinedeck_64. For example, projects are by default saved in UI mode specific folders under c:\cinedeck(_x64)\projects, the projects folder under the main Cinedeck folder. By default, LUT files are looked for in the "LUT" folder under the main Cinedeck folder.
All of the files you might need to work with can also be exported to or imported from your preferred location such as one of your media drives, a network folder or a USB memory stick. To save a file ***to*** a user selected destination you must use export or manually copy the file from the main Cinedeck folder. To use a previously saved file such as a project that requires write access, as opposed to a LUT that is 'read-only', it cannot simply be copied to the appropriate cinedeck folder, it must be imported.

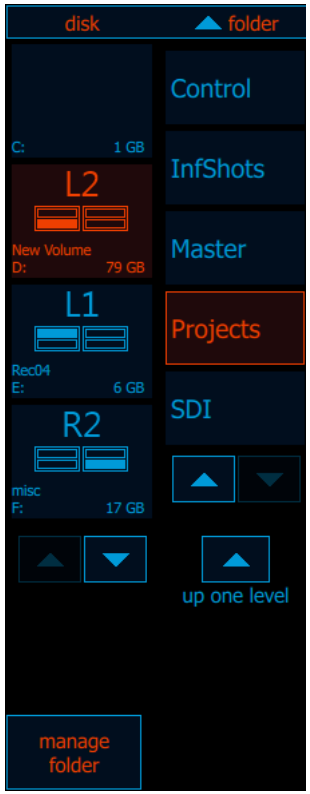
Most often, you access the save functions via a menu located at the lower left of the screen. These are the functions available from "manage projects".
All options will not be available on every menu but they are all similar.

Whether you select "save as" or "export", the procedure is the same and is made in two steps however, "save as" can only place the file in the default folder location while export provides access to other destination drives and folders.
1. At the next dialog, after you select "save as" or "export", you must enter a name in the "file name" field at the lower right corner.



This can be any standard name acceptable to Windows. *For word separation it is recommended to use "_" or "-" and not spaces.*

Once you have entered a name with either the on-screen or USB keyboard and selected "save and close",



2. Select a destination drive and folder at the left and once the file destination drive and folder are determined, select save at the bottom right and you are done.

Importing files such as projects or opening files like LUTs is the same procedure in reverse.

- Select “import” or “open”
- Navigate to the source drive and folder and select the required file
- Select open or import

There are a few important things to note;

- When importing lists such as scenes, import will overwrite any existing list items.
- When using LUT files, first copy the required files onto a drive which will always be available to the system. Easiest is to use the default location, c:\cinedeck(_64)\LUT as this is the location which will first open when you look for LUT files.

Cinedecks use several file name extensions for their data files but other applications on your system may use the same extension. This not an issue unless you tell Windows to always use a particular application for opening that file type. In that case, files may no longer automatically open in that other application. For example, if you tell Windows to always open .txt files with Excel, Notepad would no longer automatically be used.

The main file extensions used within the Cinedeck system are:

- *.cdl - Cinedeck EDL (Cinedeck edit decision list) - plain comma delineated ASCII text file
  CMX 3600 EDLs can also be imported
- *.csv - can be imported as EDL
- *.csl - Cinedeck scenes and sub-scenes list (XML format)
- cinedeck.db - a sql databased used to track content
- *.dmp - Crash dump files
- prefs.ini - holds basic system and mode parameters (If deleted, this file will be rebuilt on restart)
- *.xml - XML formatted project files, channel files, etc
- *.txt - Log files are saved as txt files
- *.cube - Cinedecks currently only recognize .cube LUT files

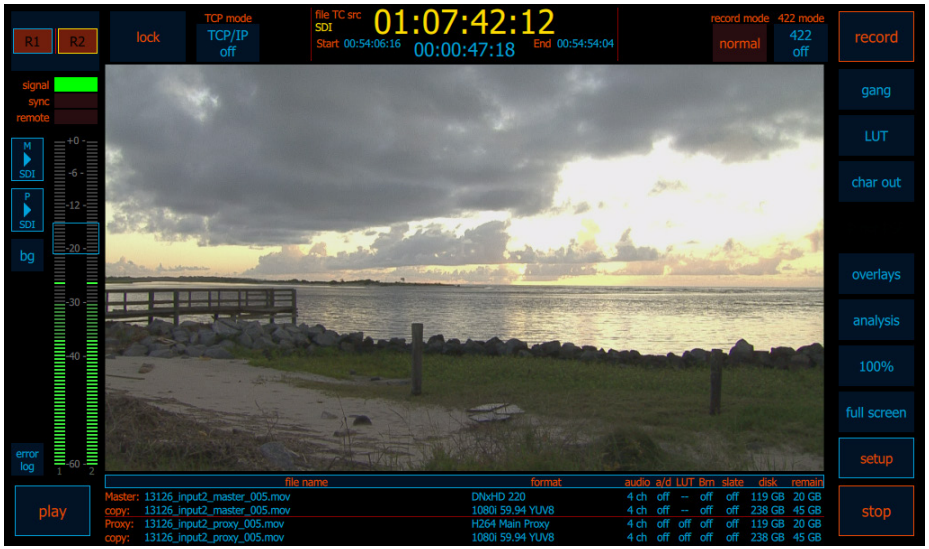
5.7 Preview screens description

To start the Cinedeck from the desktop, locate and double click the Cinedeck short cut.
In standard SD/HD mode there are two primary views, mult-view and single channel view. Normally the system will open at the main, multi view preview screen with the channels in standby. In some modes, for example 4K/UHD where there is just one channel available, the system will start with just a single channel view.

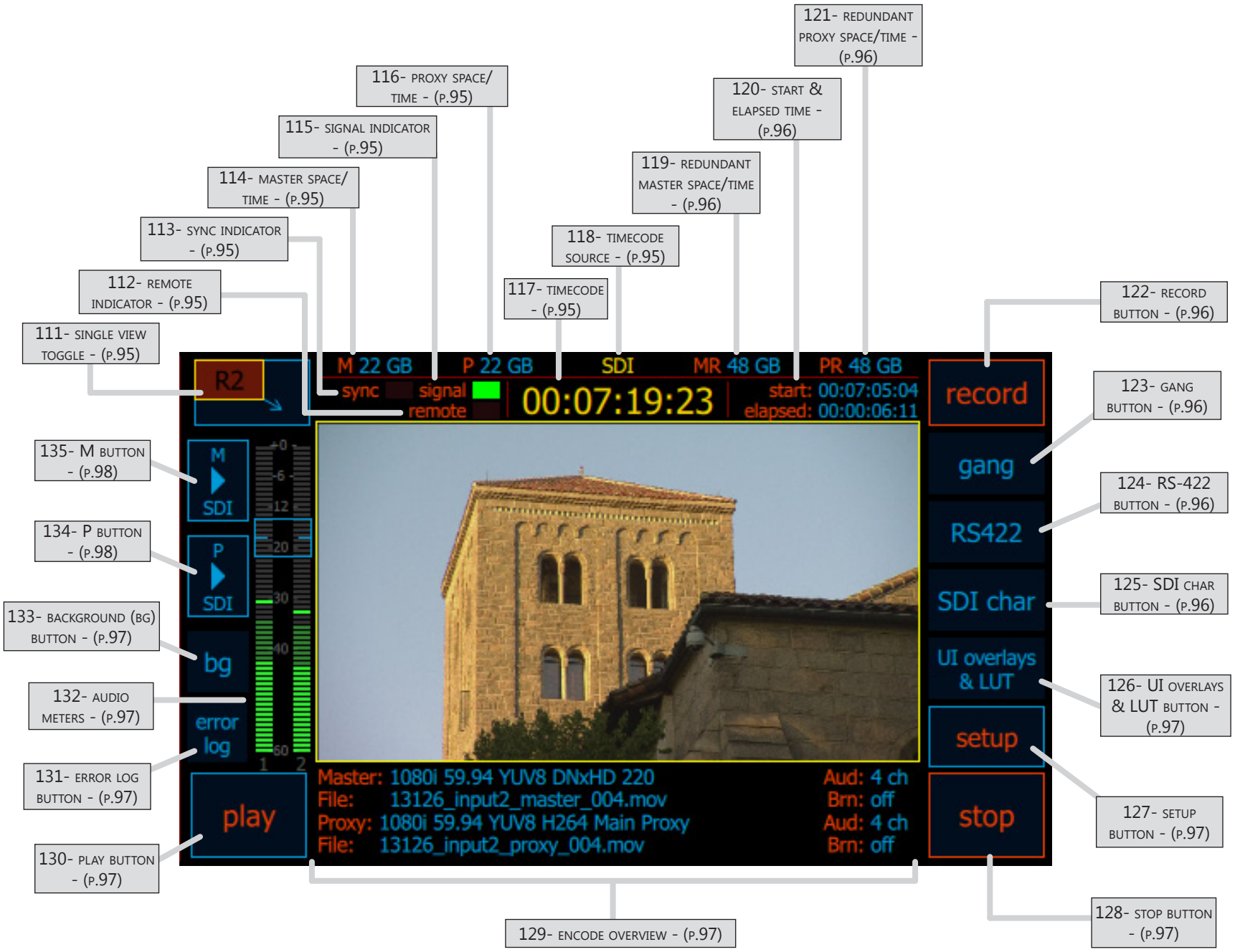
In multi-view there is one quadrant for each channel so depending on your Cinedeck model, there will be two or four quadrants. There is also an eight channel mode available on some models with a somewhat different interface (See "6.2 Eight channel mode" on page 235).

Surrounding each channel preview in multi and single channel view, are multiple data areas for immediate access to the most important details and buttons for accessing the most important functions.

Note the yellow border around the right channel of the multi-view. This indicates it is the selected channel, the channel with the focus.



5.8 Multi view screen



Multi view screen / - cont...

Name	Location	Description
111- SINGLE VIEW TOGGLE	5.8 Multi view screen - (p.94)	The single view toggle, switches the user interface between multi view and single channel view. Additional information and tools such as waveform and vectorscope are available in single channel view. Additionally, because of the increased screen space, setting up on-screen overlays such as aspect ratio is easier in single view.
112- REMOTE INDICATOR	5.8 Multi view screen - (p.94)	The remote indicator will light green when the associated channel detects a RS-422 connection.
113- SYNC INDICATOR	5.8 Multi view screen - (p.94)	The sync indicator will light green when an external a black-burst or tri-level sync reference signal is detected. The sync settings are available on the input page of the setup screen. For normal operation, sync is set to auto. In auto mode, internal reference is used unless the external signal is detected. See "379- sync" on page 183
114- MASTER SPACE/ TIME	5.8 Multi view screen - (p.94)	In standby mode, master space/time displays the available space on the designated destination drive. When recording, the display will auto toggle between remaining space and approximate remaining time, based on the selected encode bitrate. Note; the system is unaware if other channels are being written to the same destination drive so the available time estimate may need to be divided to accurately reflect remaining time.
115- SIGNALINDICATOR	5.8 Multi view screen - (p.94)	The signal indicator will light green when the system detects and is set properly to match an incoming signal.
116- PROXY SPACE/ TIME	5.8 Multi view screen - (p.94)	In standby mode, proxy space/time displays the available space on the designated destination drive. When recording, the display will auto toggle between remaining space and approximate remaining time, based on the selected encode bitrate. Note; the system is unaware if other channels are being written to the same destination drive so the available time estimate may need to be divided to accurately reflect remaining time.
117- TIMECODE	5.8 Multi view screen - (p.94)	The primary timecode display shows the current timecode which will be recorded.
118- TIMECODESOURCE	5.8 Multi view screen - (p.94)	Timecode source indicates where the timecode is coming from. Possible sources include, SDI (serial digital embedded timecode), GEN (internal generated timecode, LTC (linear timecode fro external source)

Multi view screen / - cont...

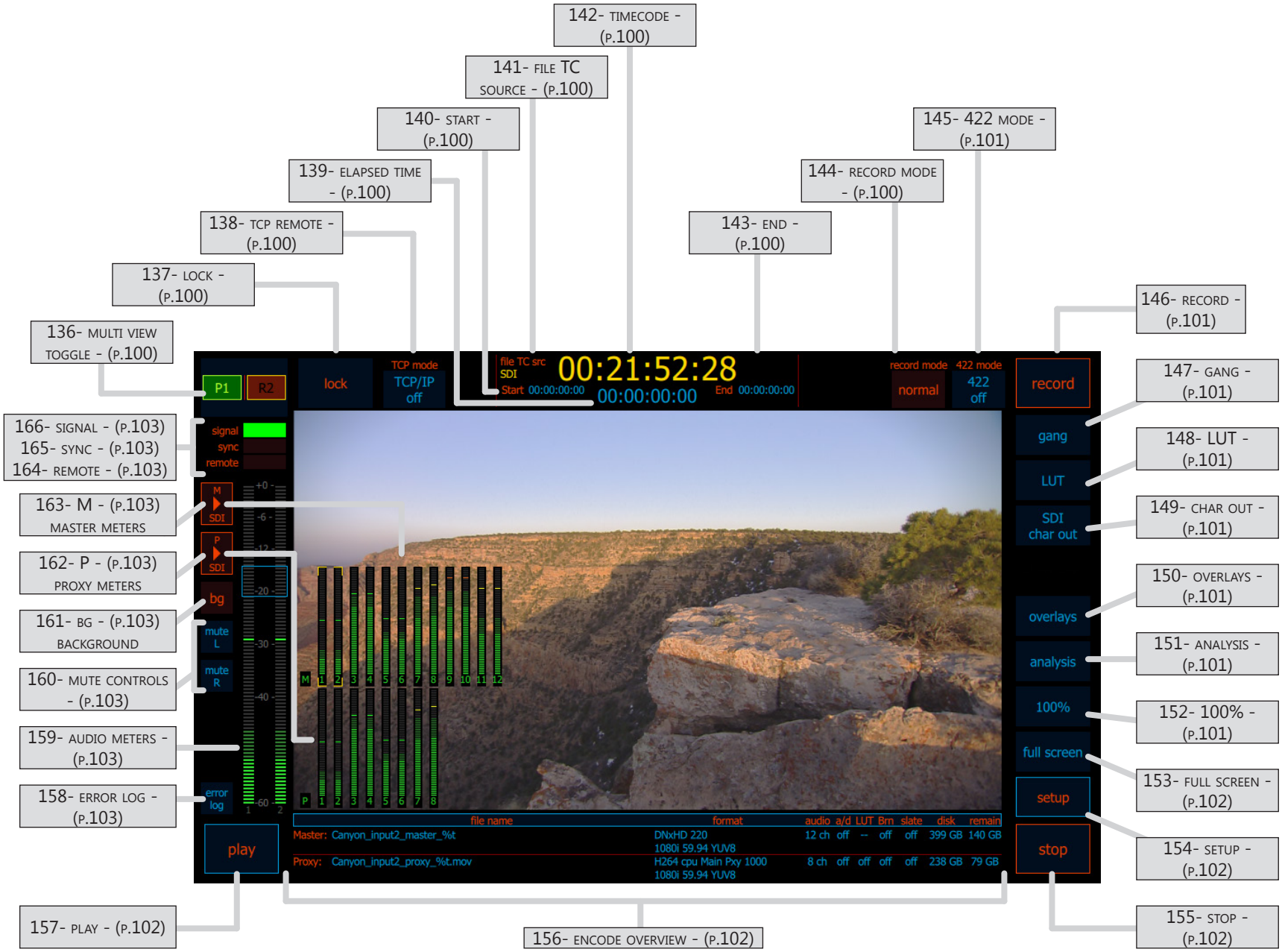
Name	Location	Description
119- REDUNDANT MASTER SPACE/TIME	5.8 Multi view screen - (p.94)	In standby mode, redundant master space/time displays the available space on the designated secondary destination drive. When recording, the display will auto toggle between remaining space and approximate remaining time, based on the selected encode bitrate. Note; the system is unaware if other channels are being written to the same destination drive so the available time estimate may need to be divided to accurately reflect remaining time.
120- START & ELAPSED TIME	5.8 Multi view screen - (p.94)	Indicates the start timecode of the current recording and the elapsed time of the current recording.
121- REDUNDANT PROXY SPACE/TIME	5.8 Multi view screen - (p.94)	In standby mode, redundant proxy space/time displays the available space on the designated secondary destination drive. When recording, the display will auto toggle between remaining space and approximate remaining time, based on the selected encode bitrate. Note; the system is unaware if other channels are being written to the same destination drive so the available time estimate may need to be divided to accurately reflect remaining time.
122- RECORD BUTTON	5.8 Multi view screen - (p.94)	Activates recording. • In Gang mode, recording will be triggered on multiple channels. • In EDL record mode, this button will display and load the first EDL event. • Depending on the mode, after recording starts, the button name can change.
123- GANG BUTTON	5.8 Multi view screen - (p.94)	Besides off, Gang record mode has two modes, normal which simultaneously triggers all selected channels and staggered which triggers each selected channel separately after a user defined time delay. This is primarily used when writing to spinning disc systems to allow the drive heads time to recover between I/O requests.
124- RS-422 BUTTON	5.8 Multi view screen - (p.94)	RS-422 selects remote control modes between off, master, slave and VDCP slave. RS-422 modes can be set independently for each channel. • Select master mode to control a connected device from the Cinedeck. • Slave and VDCP slave, allow external systems to control the selected channel.
125- SDI CHAR BUTTON	5.8 Multi view screen - (p.94)	SDI char toggles the character and information overlay output on and off for the user interface video display and the SDI out. Setup opens a setup screen for customizing the character output. (See "5.24 Character out customization" on page 153)

Name	Location	Description
126- UI OVERLAYS & LUT BUTTON	5.8 Multi view screen - (p.94)	UI overlays & LUT accesses on/off toggle and setup buttons for selecting an on-screen color LUT. LUT files can be loaded from any connected drive. When active, this preview LUT has no effect on recorded video. This control also accesses on/off toggle buttons for on screen overlays; **aspect** ratio borders, aspect ratio **letterbox** shading, **safe area** borders, **grid**/crosshairs. Setup for these on-screen overlays can be accessed from single channel view. (See "111- single view toggle" on page 95 and "5.25 Overlay customization" on page 154)
127- SETUP BUTTON	5.8 Multi view screen - (p.94)	Setup takes you to the initial channel overview page and all setup screens. (See "5.27 Setup tabs explained" on page 156)
128- STOP BUTTON	5.8 Multi view screen - (p.94)	Pressing stop ends a current recording. Note that by default, stopping a recording requires a long press of about 3 seconds which helps prevent accidental stops. If gang is in use, all selected channels will stop.
129- ENCODE OVERVIEW	5.8 Multi view screen - (p.94)	When touched or clicked, the encode overview region shows one of three screens; 1. The default view displays current input, codec and file name settings for the master and proxy with the number of audio channels and character burn status. 2. The second view displays the destination folder path and when recording, the approximate encode data rate for the master and proxy are shown. 3. View three shows the current project and list names such as scene and sub scene.
130- PLAY BUTTON	5.8 Multi view screen - (p.94)	The play button will load and play the most recently recorded clip. If nothing is in the "last play" memory, pressing play will go directly to the clip manager. If a clip is loaded for playback, the play button is renamed "open" and when pressed will open the clip manager.
131- ERROR LOG BUTTON	5.8 Multi view screen - (p.94)	Error log opens a sub-menu with controls for; • dismissing the most recent warning for the selected channel • dismissing all warnings for the selected channel • opening the log of recent errors • dismissing all errors on all channels
132- AUDIO METERS	5.8 Multi view screen - (p.94)	The audio meters reflect the average audio levels for the selected channel pair.
133- BACKGROUND (BG) BUTTON	5.8 Multi view screen - (p.94)	The bg button toggles a dark background on and off to better separate the on-screen audio meters from the underlying video.

Multi view screen / - cont...

Name	Location	Description
134- P BUTTON	5.8 Multi view screen - (p.94)	The P button toggles the on screen overlay of the proxy encode audio channels. When this overlay is active it is possible to select a different channel pair for monitoring. A long press opens the headphone monitor control screen (see "5.19 Headphone monitor controls" on page 148).
135- M BUTTON	5.8 Multi view screen - (p.94)	The M button toggles the on screen overlay of the master encode audio channels. When this overlay is active it is possible to select a different channel pair for monitoring. A long press opens the headphone monitor control screen (see "5.19 Headphone monitor controls" on page 148).

5.9 Single channel view



Single channel view / - cont...

Name	Location	Description
136- MULTI VIEW TOGGLE	5.9 Single channel view - (p.99)	The multi view toggle, switches the user interface between single view and multi channel view. Additional information and tools such as waveform and vectorscope are available in single channel view. Additionally, because of the increased screen space, setting up on-screen overlays such as aspect ratio is easier in single view.
137- LOCK	5.9 Single channel view - (p.99)	Locks/Unlocks touch screen. Primarily for use in conjunction with MX tactile control panel which provides direct access to other channels, whether locked or unlocked.
138- TCP REMOTE	5.9 Single channel view - (p.99)	Future function.
139- ELAPSED TIME	5.9 Single channel view - (p.99)	Although not labeled, this timecode display indicates the elapsed time of the current recording.
140- START	5.9 Single channel view - (p.99)	Indicates the start timecode of the current or most recent recording.
141- FILE TC SOURCE	5.9 Single channel view - (p.99)	File TC source indicates where the timecode is coming from which will be written to the file. Possible sources include, SDI (serial digital embedded timecode), GEN (internal generated timecode, LTC (linear timecode fro external source)
142- TIMECODE	5.9 Single channel view - (p.99)	The primary timecode display shows the current timecode which will be recorded.
143- END	5.9 Single channel view - (p.99)	Indicates the end timecode of the previous or most recent recording.
144- RECORD MODE	5.9 Single channel view - (p.99)	Selects between recording modes: (See "5.20 Record modes" on page 149) • "normal" - Used for standard recording • "pause" - Ingest stops but the file is not closed. • "pause & seek" Ingest stops, file is not closed, in-points can be set • "insert baseband" - Allows inserting audio and video into a flat file

Single channel view / - cont...

Name	Location	Description
145- 422 MODE	5.9 Single channel view - (p.99)	RS-422 selects remote control modes between off, master, slave and VDCP slave. RS-422 modes can generally be set independently for each channel. • Select master mode to control a connected device from the Cinedeck. • Slave and VDCP slave, allow external systems to control the selected channel.
146- RECORD	5.9 Single channel view - (p.99)	Activates recording. • In Gang mode, recording will be triggered on multiple channels. • In EDL record mode, this button will display and load the first EDL event. • Depending on the mode, after recording starts, the button name can change.
147- GANG	5.9 Single channel view - (p.99)	Besides off, Gang record mode has two modes, normal which simultaneously triggers all selected channels and staggered which triggers each selected channel separately after a user defined time delay. This is primarily used when writing to spinning disc systems to allow the drive heads time to recover between I/O requests.
148- LUT	5.9 Single channel view - (p.99)	LUT accesses on/off toggle and setup buttons for selecting an on-screen color LUT. LUT files can be loaded from any connected drive. When active, this preview LUT has no effect on recorded video.
149- CHAR OUT	5.9 Single channel view - (p.99)	Char out toggles the character and information overlay output on and off for the user interface video display and the SDI out. A long press provides access to "setup" which opens a setup screen for customizing the character output. (See "5.24 Character out customization" on page 153)
150- OVERLAYS	5.9 Single channel view - (p.99)	The overlays button accesses on/off toggle buttons and settings for on screen overlays; aspect ratio borders, aspect ratio letterbox shading, safe area borders, grids and crosshairs. (See "5.25 Overlay customization" on page 154)
151- ANALYSIS	5.9 Single channel view - (p.99)	The analysis button accesses on/off toggle buttons and settings for the on screen video tools; waveform , vectorscope, histogram, clipping, edge detect and setup for the clipping level. The waveform display can be switched between a 0-255 digital scale, -20-120 IRE scale and a 0%-100% percentage scale. The waveform and histogram displays can be switched between Y - luminance, R - Red, G - Green, B - Blue and full RGB parade modes. All of the scopes can be viewed as full screen or 1/4 screen overlay. (See "5.26 Video analysis tools" on page 155)
152- 100%	5.9 Single channel view - (p.99)	100% toggles the on screen video preview between full image and zoom mode. Normally the entire image from the source is displayed however at just 1024 wide, the Cinedeck on-board display is not a native HD panel. Zoom mode provides 4x image magnification which allows more accurate visual analysis of image detail, focus, etc.

Single channel view / - cont...

Single channel view / - cont...

Name	Location	Description
158- ERROR LOG	5.9 Single channel view - (p.99)	 Error log opens a sub-menu with controls for; • dismissing the most recent warning for the selected channel • dismissing all warnings for the selected channel • opening the log of recent errors • dismissing all errors on all channels
159- AUDIO METERS	5.9 Single channel view - (p.99)	The audio meters reflect the average audio levels for the selected channel pair.
160- MUTE CONTROLS	5.9 Single channel view - (p.99)	The L (left) and R (right) mute toggle buttons allows the listener to independently turn the left or right monitor audio output off or on.
161- BG	5.9 Single channel view - (p.99)	The bg button toggles a dark background on and off to better separate the on-screen audio meters from the underlying video.
162- P	5.9 Single channel view - (p.99)	The P button toggles the on screen overlay of the proxy encode audio channels. When this overlay is active it is possible to select a different channel pair for monitoring. A long press opens the headphone monitor control screen (see "5.19 Headphone monitor controls" on page 148).
163- M	5.9 Single channel view - (p.99)	The M button toggles the on screen overlay of the master encode audio channels. When this overlay is active it is possible to select a different channel pair for monitoring. A long press opens the headphone monitor control screen (see "5.19 Headphone monitor controls" on page 148).
164- REMOTE	5.9 Single channel view - (p.99)	The remote indicator will light green when the associated channel detects a RS-422 connection.
165- SYNC	5.9 Single channel view - (p.99)	The sync indicator will light green when an external a black-burst or tri-level sync reference signal is detected. The sync settings are available on the input page of the setup screen. For normal operation, sync is set to auto. In auto mode, internal reference is used unless the external signal is detected. See "379- sync" on page 183
166- SIGNAL	5.9 Single channel view - (p.99)	The signal indicator will light green when the system detects and is set properly to match an incoming signal.

5.10 Recording

With setup complete, you can begin recording by pressing record at the upper right of the appropriate channel. If gang mode is active, you can press record on any of the ganged channels to start recording on all ganged channels.

The RX3G below is redundant recording master and proxy on two channels.
The red border indicates recording is in progress. Note that the red border will flash when a channel is in pre-roll before a record. Red border flashing “pre-roll” mode is seen when staggered gang is in use and when using auto-record modes such as editing.

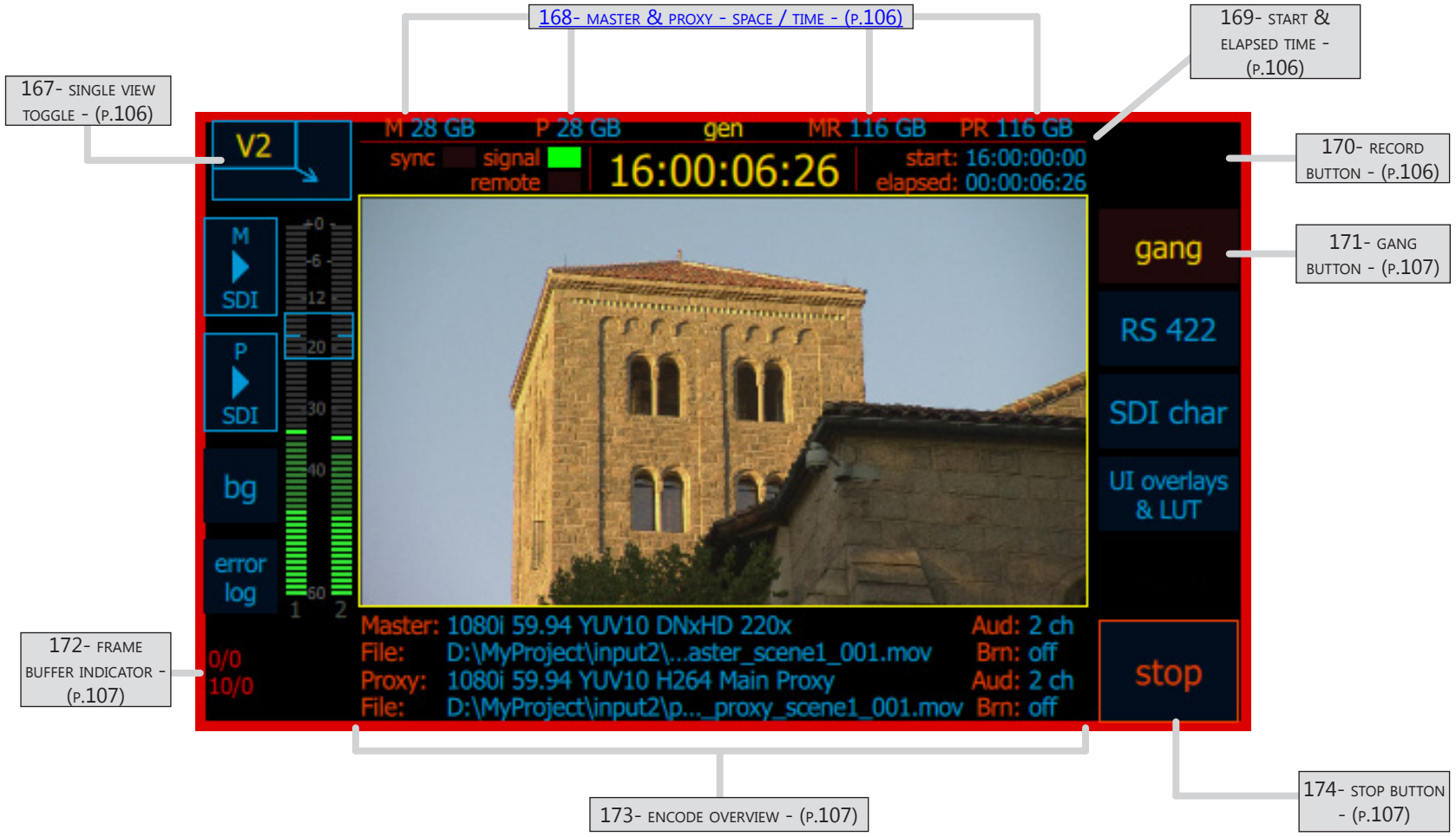
Specific multi-view controls and screen information available while recording are discussed on the next pages. Other generally available controls not detailed here are discussed in: “5.8 Multi view screen” on page 94 and “5.9 Single channel view” on page 99.

5.11 Recording, multi view

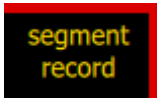
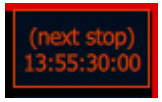
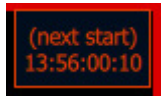
Below is one of the multi view quadrants.

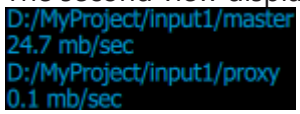
As in standby mode, the selected channel (the channel which has the focus) is indicated by a yellow border around the video preview an yellow timecode.

The key information items while recording are; drive space & time, start & elapsed time and the frame buffer indicator.



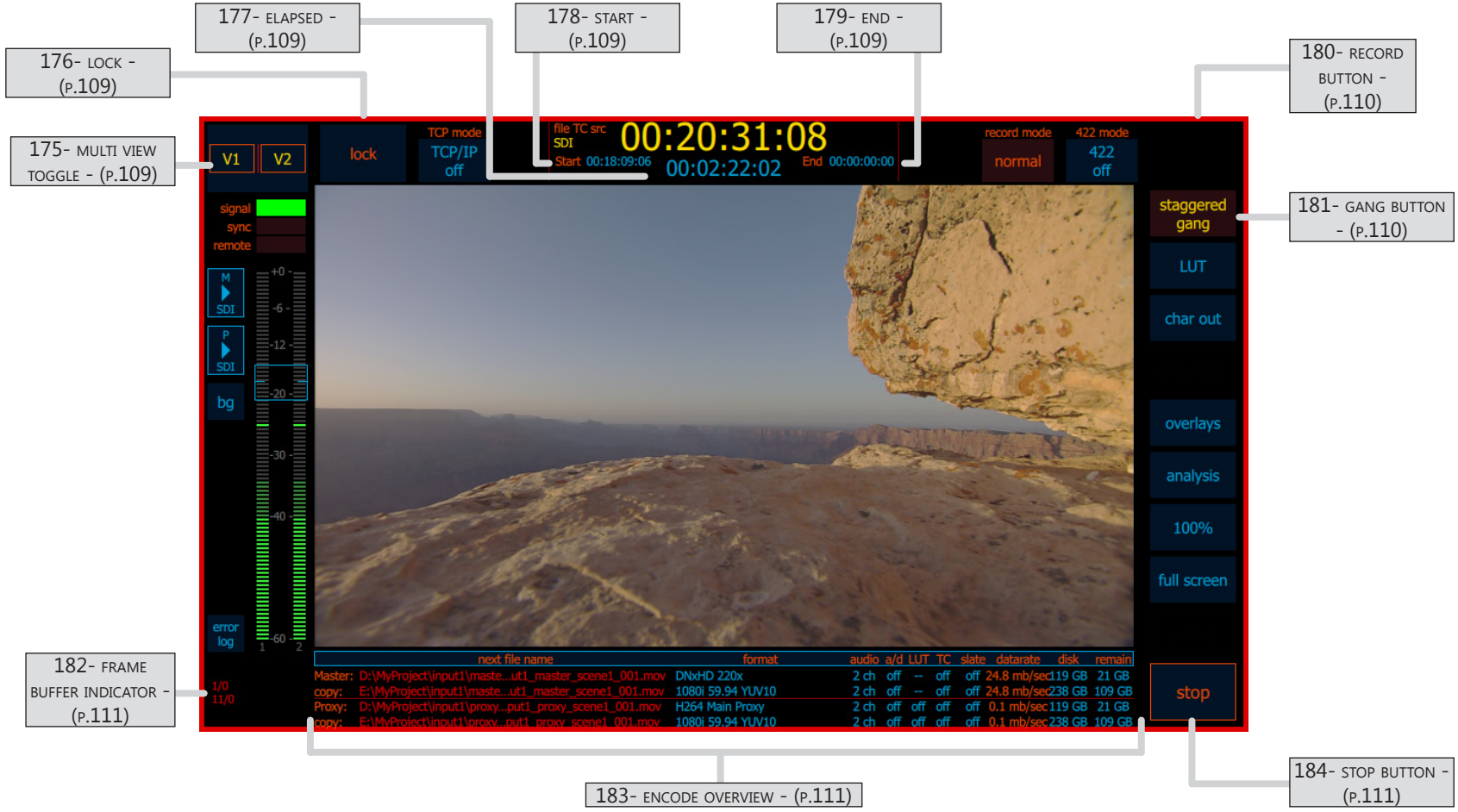
Recording, multi view / - cont...

Name	Location	Description
167- SINGLE VIEW TOGGLE	"5.11 Recording, multi view" on page 105	The single view toggle which switches the user interface between multi view and single remains active during recording.
168- MASTER & PROXY - SPACE / TIME	"5.11 Recording, multi view" on page 105	When recording, the primary and redundant, master and proxy space/time displays will auto toggle between approximate remaining space and time, based on the selected encode bitrate. *Note; the system is unaware if other channels are being written to the same destination drive so the available time estimate may need to be divided to accurately reflect actual space and time available.*
169- START & ELAPSED TIME	"5.11 Recording, multi view" on page 105	During recording, the "start" and "elapsed" time display indicates the timecode the recording started and a running elapsed time of the current recording.
170- RECORD BUTTON	"5.11 Recording, multi view" on page 105	In normal mode, once recording starts, the record button disappears however, if one of the special record modes is active, the record button will be replaced by other record related buttons.  When "increment" segment mode or "TC break" segment mode are active, the system will automatically close the current recording segments based on the incoming timecode. When "break" segment mode is active, the operator can press this button to close the current recording segment. When "pause"is active, pressing this button stops the encoding process but the file remains open until stop is pressed. For EDL recording, the button will change states depending on the current activity, "load edl" means an EDL is in ready but recording has not been activated. Press to start. "preroll" indicates EDL mode is active. The system is waiting for the first event.  "next stop" means a file is recording. The system is waiting for a stop trigger.  "next start" means the system is waiting for the next event start time.

Name	Location	Description
171- GANG BUTTON	"5.11 Recording, multi view" on page 105	Gang mode is also in effect for stopping a recording. If staggered mode is in use, stopping each channel also happens sequentially, one by one after the user defined time delay.
172- FRAME BUFFER INDICATOR	"5.11 Recording, multi view" on page 105	The frame buffer indicator provides very useful real-time details on recording and drive performance. The top row indicates the master encode. The second row indicates the proxy encode. The numbers to the left of the "/" indicate frame buffer usage for encoding and will be different for different codecs. In this case the counter for the master is zero. Low numbers like "0" or "1" are common for "I" frame (intra frame) encoding. The proxy indicates "10" which is indicative of a long GoP recording, in this case H.264. The numbers after the "/" indicate frame buffer usage for file writing. Generally, the write buffer should be at zero. It may bump up occasionally, especially when segment mode file break is triggered. If the buffer constantly climbs or constantly pulses, that is indicative of more serious file write issue. This could be a failing drive, a drive controller which cannot handle the contrinious data stream, bandwidth issues, etc.
173- ENCODE OVERVIEW	"5.11 Recording, multi view" on page 105	When touched or clicked, the encode overview region shows one of three screens; 1. The default view displays current input, codec and file name settings for the master and proxy with the number of audio channels and character burn status. 2. The second view displays the destination folder path and when recording,  the approximate encode data rate for the master and proxy are shown. *Note: Although the data rate is in lower case, it is actually MB (Megabytes per Second)* 3. The third view shows the current project name, scene and sub scene names.
174- STOP BUTTON	"5.11 Recording, multi view" on page 105	Pressing "stop" ends a current recording. Note that by default, stopping a recording requires a long press of about 3 seconds to prevent accidental stops. If gang is in use, all selected channels will stop.

5.12 Recording, single channel view

Specific single channel view controls and screen information available while recording are discussed on the next pages. Other generally available controls not detailed here are discussed in: "5.8 Multi view screen" on page 94 and "5.9 Single channel view" on page 99.

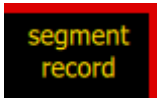


Recording, single channel view / - cont...

Name	Location	Description
175- MULTI VIEW TOGGLE	"5.12 Recording, single channel view" on page 108	The multi view toggle which switches the user interface between multi view and single remains active during recording.
176- LOCK	"5.12 Recording, single channel view" on page 108	This slider can be used to lock and unlock the display. On MX, it is still possible to toggle the channel view using the tactile control panel while on other systems nothing can be done until the screen is unlocked. Touch and slide the control to the right to lock and unlock.
177- ELAPSED	"5.12 Recording, single channel view" on page 108	During recording, this displays a running elapsed time of the current recording.
178- START	"5.12 Recording, single channel view" on page 108	During recording, "start" indicates the timecode the recording started.
179- END	"5.12 Recording, single channel view" on page 108	During recording, "end" indicates the timecode the recording ends.

Recording, single channel view / - cont...

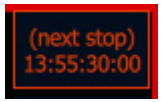
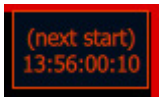
<table>
<tr><th>Name</th><th>Location</th><th>Description</th></tr>
<tr><td>180- RECORD BUTTON</td><td>"5.12 Recording, single channel view" on page 108</td><td>
In normal mode, once recording starts, the record button disappears however, if one of the special record modes is active, the record button will be replaced by other record related buttons.



When "increment" segment mode or "TC break" segment mode are active, the system will automatically close the current recording segments based on the incoming timecode.

When "break" segment mode is active, the operator can press this button to close the current recording segment.

When "pause"is active, pressing this button stops the encoding process but the file remains open until stop is pressed.

For EDL recording, the button will change states depending on the current activity,
<table>
<tr><td>
</td><td>
</td><td> 
</td><td> 
</td></tr>
<tr><td>"load edl" means an EDL is in ready but recording has not been activated. Press to start.</td><td>"preroll" indicates EDL mode is active. The system is waiting for the first event.</td><td>"next stop" means a file is recording. The system is waiting for a stop trigger.</td><td>"next start" means the system is waiting for the next event start time.</td></tr>
</table>
</td></tr>
<tr><td>181- GANG BUTTON</td><td>"5.12 Recording, single channel view" on page 108</td><td>Gang mode is also in effect for stopping a recording. If staggered mode is in use, stopping each channel also happens sequentially, one by one after the user defined time delay.</td></tr>
</table>

Recording, single channel view / - cont...

Name	Location	Description
182- FRAME BUFFER INDICATOR	"5.12 Recording, single channel view" on page 108	The frame buffer indicator provides very useful real-time details on recording and drive performance. The top row indicates the master encode. The second row indicates the proxy encode. The numbers to the left of the "/" indicate frame buffer usage for encoding and will be different for different codecs. In this case the counter for the master is zero. Low numbers like "0" or "1" are common for "I" frame (intra frame) encoding. The proxy indicates "10" which is indicative of a Long GoP recording, in this case H.264. The numbers after the "/" indicate frame buffer usage for file writing. Generally, the write buffer should be at zero. It may bump up occasionally, especially when starting, stopping and when segment mode file break is triggered. If the buffer constantly climbs or constantly pulses, that is indicative of more serious file write issue. This could be a failing drive, a drive controller which cannot handle the continuous data stream, bandwidth issues, etc.
183- ENCODE OVERVIEW	"5.12 Recording, single channel view" on page 108	As noted, the one difference between standby mode and recording when in single channel view is that when recording, the area between "slate" and "disk" opens up to reveal a data rate display for each encode. See "156- encode overview" on page 102 for additional details.
184- STOP BUTTON	"5.12 Recording, single channel view" on page 108	Pressing "stop" ends a current recording. Note that *by default, stopping a recording requires a long press of about 3 seconds to prevent accidental stops*. If gang is in use, all selected channels will stop.

5.13 Playback

Because the Cinedeck playback engine automatically detects the specifications of a file, playing a file requires no special setup meaning content can be played without regard to the settings of the selected channel.
If recording has just completed and “play” at the lower left of that channel on the multi or single channel view is pressed, the last recording will be loaded into that channel and playback transport controls are displayed below the video preview.
If play is pressed on a channel which has not recently recorded a file, “clip manager” will open where you can navigate between drives and folders to select content to play. When a clip is loaded for playback, “clip manager” can be accessed by pressing open at the lower left of the channel view. (See “5.16 Clip manager” on page 128)

Below is the two channel view on a RX3G. Channel one on the left has a clip loaded for playback. The right channel is in standby.

Many of the controls remain the same between standby and play mode so as with the previous section covering recording, only playback specific controls are discussed in this section.

It should be noted that if a standard USB keyboard is connected, the common J-K-L keyboard controls can be used in playback mode

5.14 Playback, multi view

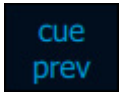
Cinedecks are full duplex I/O systems meaning each channel can perform activities independently from other channels. In the multi view image above, channel 1 is in play mode while channel 2 is in standby and could record when needed.

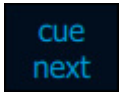
Below, is the closeup of channel 1 in playback mode from the multi-view.

Playback, multi view / - cont...

Name	Location	Description
185- MULTI VIEW TOGGLE	"5.14 Playback, multi view" on page 113	The multi view toggle which switches the user interface between multi view and single remains active during recording and playback.
186- START | END	"5.14 Playback, multi view" on page 113	The start and end timecodes of the clip loaded for playback are displayed. If multiple clips are loaded, the start timecode of the first clip and the end timecode of the last is displayed. If a playlist is loaded, the start and end timecodes of the loaded playlist are displayed.
187- ELAPSED TIME	"5.14 Playback, multi view" on page 113	Whether a single clip, multiple clips or a playlist is loaded, elapsed time shows the time duration between the start and the current play head position.
188- IN | OUT	"5.14 Playback, multi view" on page 113	"In" and "Out" initially show the start and end timecodes of the loaded clip, clips or playlist. When an in-point and/or out-point have been set, those timecodes are displayed.
189- TOUCH TRANSPORT	"5.14 Playback, multi view" on page 113	The Cinedeck interface supports touch and mouse drag transport actions on the video preview part of the screen. Above, the "touch transport" button is activated, noted by the orange border. See "5.15.1 Playback, touch transport" on page 126
190- RECORD VIEW	"5.14 Playback, multi view" on page 113	Pressing "record view" returns the interface to the previous record standby mode.

<table>
<tr><th>Name</th><th>Location</th><th>Description</th></tr>
<tr><td>191- TRANSPORT CONTROLS</td><td>"5.14 Playback, multi view" on page 113</td><td>Playback in multi view includes a full array of transport controls.

<table>
<tr><th>Goto Start</th><th>Rewind</th><th>Play-Pause</th><th>Forward Fast</th><th>Goto End</th><th>Loop / Ping-Pong</th><th>In / Out</th></tr>
<tr><td>Pressing here will move the playhead to the start of the loaded clip. (* See note below)</td><td>By default, rewind is 4x. Press again to pause. A long press displays additional slow and fast options.</td><td>Press to play. Press again to pause</td><td>By default, fast forward is 4x. Press again to pause. A long press displays additional slow and fast options.</td><td>Pressing here will move the playhead to the end of the loaded clip. (* See note below)</td><td>Press to activate continuous looping playback. Long press to select continuous ping-pong playback.</td><td>Press to set, clear or goto in and out points.</td></tr>
</table>
* When multiple clips or a playlist are loaded, the "goto" buttons change their mode.


Press "cue prev" to move the playhead to the previous clip


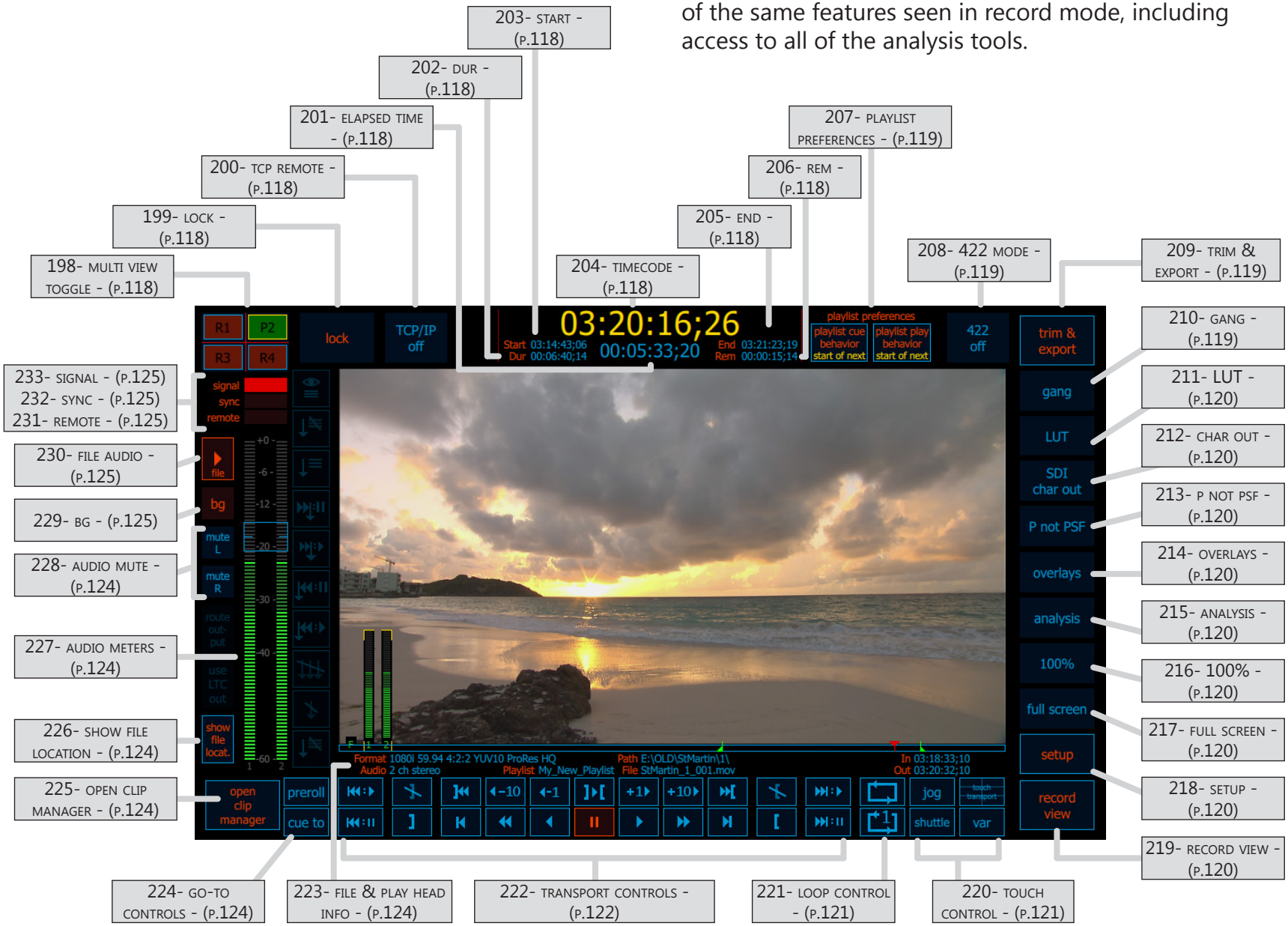
Press "cue next" to move the playhead to the next clip.</td></tr>
<tr><td>192- CLIP MANAGER</td><td>"5.14 Playback, multi view" on page 113</td><td>Press "clip manager" to access "clip manager" and "playlists manager".
See "5.16 Clip manager" on page 128 and "5.17 Playlist manager" on page 138</td></tr>
<tr><td>193- FILE INFO</td><td>"5.14 Playback, multi view" on page 113</td><td>The file info region shows the format and file name for the current file. If multiple files or a playlist are loaded, the display will change to reflect the file being played.</td></tr>
</table>

Playback, multi view / - cont...

Name	Location	Description
194- PLAY HEAD	"5.14 Playback, multi view" on page 113	The orange inverted triangle play head marker is always located at the currently displayed video frame. The play head can be clicked and dragged to scrub the video. Note that if play mode is active, audio can be heard during scrubbing but scrub performance is better when playback is stopped. Additionally, scrub performance is better with I frame codecs than GoP codecs.
195- IN-POINT	"5.14 Playback, multi view" on page 113	Indicates the edit in point or play start point for loop playback.
196- OUT-POINT	"5.14 Playback, multi view" on page 113	Indicates the edit out point or play stop point for loop playback.
197- FILE	"5.14 Playback, multi view" on page 113	Although named differently than ("P" & "M") on the standby view, the "file" button also toggles the on screen overlay of the audio channels, in this case, the audio channels present in the loaded file. When this overlay is active it is possible to select a different channel pair for monitoring. A long press opens the audio monitor control screen where the headphone level can be adjusted, monitored channel pair can be selected and a custom monitor mix can be setup.

5.15 Playback - Single channel view

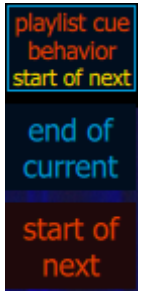
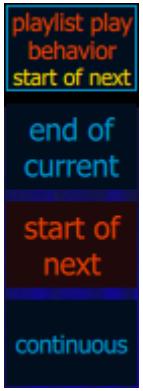
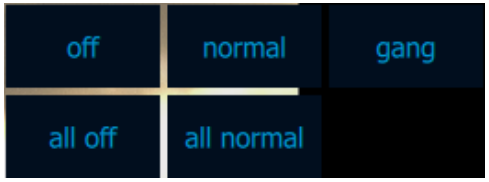
When in playback mode, the interface provides many of the same features seen in record mode, including access to all of the analysis tools.



Playback - Single channel view / - cont...

Name	Location	Description
198- MULTI VIEW TOGGLE	5.15 Playback - Single channel view - (p.117)	The multi view toggle, switches the user interface between single view and multi channel view. Additional information and tools such as waveform and vectorscope are available in single channel view. Additionally, because of the increased screen space, setting up on-screen overlays such as aspect ratio is easier in single channel view.
199- LOCK	5.15 Playback - Single channel view - (p.117)	Locks/Unlocks touch screen. Primarily for use in conjunction with MX tactile control panel which provides direct access to other channels, whether locked or unlocked.
200- TCP REMOTE	5.15 Playback - Single channel view - (p.117)	Future function.
201- ELAPSED TIME	5.15 Playback - Single channel view - (p.117)	Although not labeled, this timecode display indicates the elapsed time of the current recording.
202- DUR	5.15 Playback - Single channel view - (p.117)	Displays the duration of the clip or playlist currently loaded for playback.
203- START	5.15 Playback - Single channel view - (p.117)	Indicates the start timecode of the current or most recent recording.
204- TIMECODE	5.15 Playback - Single channel view - (p.117)	The primary timecode display shows the current timecode location of the play head.
205- END	5.15 Playback - Single channel view - (p.117)	If a file is loaded, this display indicates the end timecode of the current file. If a multiple files are loaded, this display indicates the end timecode of the last file. If a playlist is loaded (depending on the playlist's settings), end can indicate the end time of the playlist based on the total duration or the end timecode of the last clip. (See "274- playlist settings" on page 143)
206- REM	5.15 Playback - Single channel view - (p.117)	Remaining playback time of all content currently loaded.

Playback - Single channel view / - cont...

Name	Location	Description
207- PLAYLIST PREFERENCES	5.15 Playback - Single channel view - (p.117)	Selecting one of the preferences buttons provides options for how playlists behave during playback.  "playlist cue behavior" determines what happens when next or previous clip is selected, ie, if "start of next" is active and next clip is pressed, the play head will move to the first frame of the next clip in the playlist.  "playlist play behavior" determines if a playlist plays continuously to the end or if it automatically pauses, either at the end of the clip currently playing or at the start of the next clip.
208- 422 MODE	5.15 Playback - Single channel view - (p.117)	RS-422 selects remote control modes between off, master, slave and VDCP slave. RS-422 modes can generally be set independently for each channel. • Select master mode to control a connected device from the Cinedeck. • Slave and VDCP slave, allow external systems to control the selected channel. The remote indicator (Top Left) will be green when a RS-422 connection is detected.
209- TRIM & EXPORT	5.15 Playback - Single channel view - (p.117)	Provides direct access to the Trim File utility to adjust the start TC, end TC and play length of a file by physically changing its header metadata or by applying changes while creating a copy of the file. See "8.6 Trim File" on page 267
210- GANG	5.15 Playback - Single channel view - (p.117)	 In playback, gang just has "normal" on and off. To gang all available channels or turn gang off for all available channels, select one of the "all" buttons. *Note: When multiple ganged channels have clips with matching / overlapping timecode, to sync playback, momentarily drag the play head to sync all clips to the timecode of the selected channel.*

Playback - Single channel view / - cont...

Name	Location	Description
211- LUT	5.15 Playback - Single channel view - (p.117)	LUT accesses the on/off toggle and setup buttons for selecting an on-screen color LUT. LUT files can be loaded from any connected drive. This preview LUT has no effect on recorded video.
212- CHAR OUT	5.15 Playback - Single channel view - (p.117)	Char out toggles the character and information overlay output on and off for the user interface video display and the SDI out. A long press provides access to "setup" which opens a setup screen for customizing the character output. (See "5.24 Character out customization" on page 153)
213- P NOT PSF	5.15 Playback - Single channel view - (p.117)	Select this during playback if your files contain true progressive frames vs the more common progressive segmented frames (PsF - progressive frames divided and interlaced for compatibility with a broader range of video equipment)
214- OVERLAYS	5.15 Playback - Single channel view - (p.117)	The overlays button accesses on/off toggle buttons and settings for on screen overlays; aspect ratio borders, aspect ratio letterbox shading, safe area borders, grids and crosshairs. (See "5.25 Overlay customization" on page 154)
215- ANALYSIS	5.15 Playback - Single channel view - (p.117)	The analysis button accesses on/off toggle buttons and settings for the on screen video tools; waveform , vectorscope, histogram, clipping, edge detect and setup for the clipping level. The waveform display can be switched between a 0-255 digital scale, -20-120 IRE scale and a 0%-100% percentage scale. The waveform and histogram displays can be switched between Y - luminance, R - Red, G - Green, B - Blue and full RGB parade modes. All of the scopes can be viewed as full screen or 1/4 screen overlay. (See "5.26 Video analysis tools" on page 155)
216- 100%	5.15 Playback - Single channel view - (p.117)	100% toggles the on screen video preview between full image and zoom mode. Normally the entire image from the source is displayed however at just 1024 wide, the Cinedeck on-board display is not a native HD panel. Zoom mode provides 4x image magnification which allows more accurate visual analysis of image detail, focus, etc.
217- FULL SCREEN	5.15 Playback - Single channel view - (p.117)	Full screen toggles between single channel view with controls around the perimeter to a view which allows the preview video to take the entire display. The on-screen controls switch to a momentary mode and fade out after a few seconds. Touching the screen brings the controls into view again.
218- SETUP	5.15 Playback - Single channel view - (p.117)	Setup takes you to the initial channel overview page and all setup screens. (See "5.27 Setup tabs explained" on page 156)
219- RECORD VIEW	5.15 Playback - Single channel view - (p.117)	Pressing record view toggles the channel UI back to E-to-E stand-by mode.

Playback - Single channel view / - cont...

Playback - Single channel view / - cont...

Name	Location	Description
222- TRANSPORT CONTROLS	5.15 Playback - Single channel view - (p.117)	Transport controls - **Upper row** (note: orange controls are active)

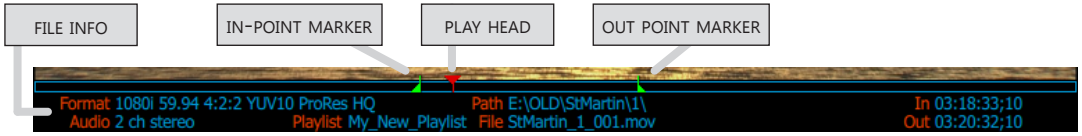
	Cue to previous clip and play. *This function is only available when a playlist or multiple clips are loaded and a previous clip is available.*
	Delete in-point. *This function will only be available after an in-point has been set.*
	Cue to in-point. *This function will only be available after an in-point has been set.*
	Step 10 frames in reverse.
	Step 1 frames in reverse.
	Play from in to out. *This function will only be available after both an in-point and out-point have been set.*
	Step 1 frames forward.
	Step 10 frames forward.
	Cue to out-point. *This function will only be available after an out-point has been set.*
	Delete out-point. *This function will only be available after an out-point has been set.*
	Cue to next clip and play. *This function is only available when a playlist or multiple clips are loaded and a next clip is available.*

Playback - Single channel view / - cont...

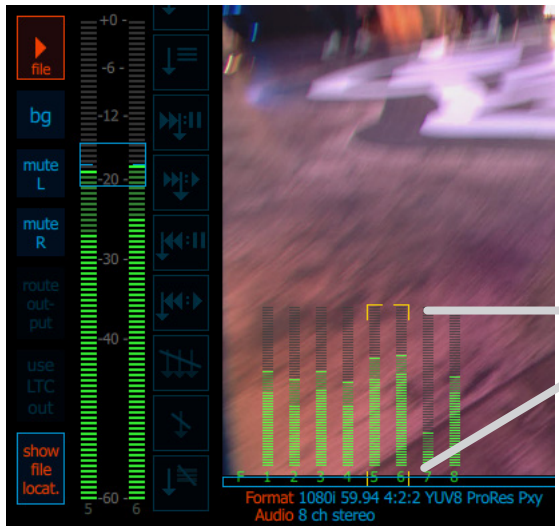
<table>
<tr><th>Name</th><th>Location</th><th>Description</th></tr>
<tr>
<td>219- TRANSPORT CONTROLS CONT...</td>
<td>5.15 Playback - Single channel view - (p.117)</td>
<td>
Transport controls - Lower row (note: orange controls are active)

<table>
<tr><td> </td><td>Cue to previous clip and pause. This function is only available when a playlist or multiple clips are loaded and a previous clip is available.</td><td rowspan="11">RW & FF Speed options:
 </td></tr>
<tr><td> </td><td>Mark in-point.</td></tr>
<tr><td> </td><td>Cue to start. Moves the play head to the beginning of any loaded content.</td></tr>
<tr><td> </td><td>Rewind. The default is 4x speed. A long press will reveal other speeds that can be selected. (shown at right)</td></tr>
<tr><td> </td><td>Play in reverse.</td></tr>
<tr><td> </td><td>Pause.</td></tr>
<tr><td> </td><td>Play forward.</td></tr>
<tr><td> </td><td>Forward fast. The default is 4x speed. A long press will reveal other speeds that can be selected. (shown at right)</td></tr>
<tr><td> </td><td>Cue to end. Moves the play head to the end of any loaded content.</td></tr>
<tr><td> </td><td>Mark out-point.</td></tr>
<tr><td> </td><td>Cue to next clip and pause. This function is only available when a playlist or multiple clips are loaded and a next clip is available.</td></tr>
</table>
</td>
</tr>
</table>

Playback - Single channel view / - cont...

Name	Location	Description
223- FILE & PLAY HEAD INFO	5.15 Playback - Single channel view - (p.117)	 The information area above the transport controls displays current file, playhead and edit point details. When multiple clips or a playlist are loaded, some file text details will update as the playhead moves. The available file information includes: • "Format" - Frame size, Framerate, color depth, codec and encode quality • "Audio" - The number of audio channels in the file • "Path" - The drive and folder path where the file is stored • "File" - The file name • "In" - Displays the in-point if one has been set • "Out" - Displays the out-point if one has been set • "Playlist" - Displays the playlist name - *only visible when a playlist is loaded*
224- GO-TO CONTROLS	5.15 Playback - Single channel view - (p.117)	preroll cue to • Pre-roll is a short lead time before the start of an event such as an edit. When the preroll button is selected, the playhead will jump to a position just before the in-point. The default is 5 seconds. The amount of pre-roll can be adjusted on the timecode & automation settings page. (See "5.35 TC & Automation tab" on page 210) • Cue to is used to jump to a specific timecode. When a cue to is selected a numeric keypad is opened. Enter the destination timecode and press the Enter key or Save & Close.
225- OPEN CLIP MANAGER	5.15 Playback - Single channel view - (p.117)	Press "open clip manager" to access "clip manager" and "playlists manager". See "5.16 Clip manager" on page 128 and "5.17 Playlist manager" on page 138
226- SHOW FILE LOCATION	5.15 Playback - Single channel view - (p.117)	Opens Windows Explorer (often called "My Computer" to the folder containing the current clip.
227- AUDIO METERS	5.15 Playback - Single channel view - (p.117)	The audio meters reflect the average audio levels for the selected channel pair.
228- AUDIO MUTE	5.15 Playback - Single channel view - (p.117)	Select "mute L" to mute the left audio monitor output Select "mute R" to mute the right audio monitor output

Playback - Single channel view / - cont...

Name	Location	Description
229- BG	5.15 Playback - Single channel view - (p.117)	The bg button toggles a dark background on and off to better separate the on-screen audio meters from the underlying video.
230- FILE AUDIO	5.9 Single channel view - (p.99)	 The file button toggles the on-screen meters overlay of the available file playback channels. When this overlay is active it is possible to directly select a different channel pair for monitoring by clicking the desired audio pair. CLICK THE DESIRED AUDIO PAIR TO SELECT. THE YELLOW BRACKETS IDENTIFY THE SELECTED AUDIO PAIR BEING MONITORED. A long press opens the headphone monitor control screen (see "5.19 Headphone monitor controls" on page 148).
231- REMOTE	5.9 Single channel view - (p.99)	The remote indicator will light green when the associated channel detects a RS-422 connection.
232- SYNC	5.9 Single channel view - (p.99)	The sync indicator will light green when an external a black-burst or tri-level sync reference signal is detected. The sync settings are available on the input page of the setup screen. For normal operation, sync is set to auto. In auto mode, internal reference is used unless the external signal is detected. See "379- sync" on page 183
233- SIGNAL	5.9 Single channel view - (p.99)	The signal indicator will light red when in playback mode.

5.15.1 Playback, touch transport

When the “touch transport” button at the lower right is pressed to toggle touch control on, a momentary overlay is displayed which shows the available on-screen touch functions and the region where they are active.

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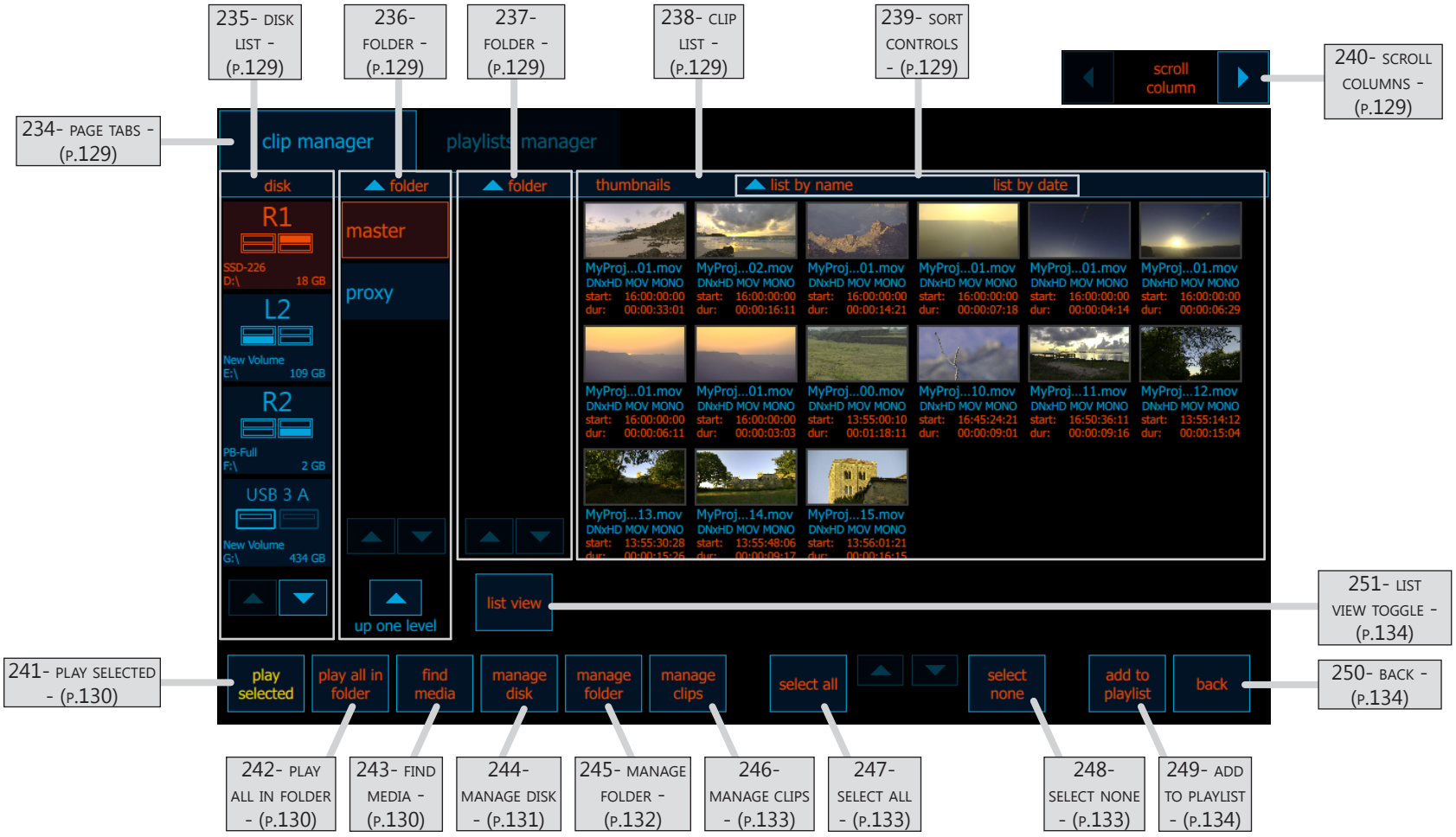
5.16 Clip manager

Clip manager provides access to clips for playback and file management. The view is filtered left to right. First select a drive at the left, then select folders in the middle and then files can be viewed selected.

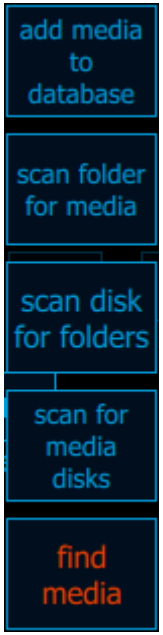


Important! Cinedecks maintain a sql database of media content. New recordings are automatically added to the database. Previously recorded content and files generated by other systems can be added to the database so they also are visible in clip manager. See "243- find media" on page 130

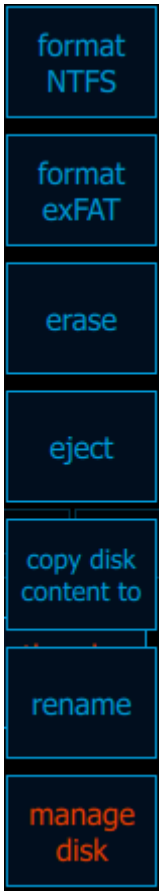
Clip manager / - cont...

Name	Location	Description
234- PAGE TABS	5.16 Clip manager - (p.128)	The page selector tabs are always visible in the clip manager area. These can be clicked to provide direct access to each section.
235- DISK LIST	5.16 Clip manager - (p.128)	The disk listing displays all of the media drives available to the Cinedeck. Below the disk list, as with most lists, are navigation arrows which become active for moving through lists which contain more entries than can be displayed on one screen.
236- FOLDER	5.16 Clip manager - (p.128)	The “folder” and “sub”-folder columns work the same way and in conjunction with each other to allow better folder navigation and visibility. Press a folder to select it. Press “up one level” to move to a level higher in the folder hierarchical structure and press a “sub” folder to navigate down one level in the folder hierarchical structure.
237- FOLDER	5.16 Clip manager - (p.128)	The “folder” and “sub”-folder columns work the same way and in conjunction with each other to allow better folder navigation and visibility. Press a folder to select it. Press “up one level” to move a level higher in the folder hierarchical structure and press a “sub” folder to navigate down one level in the folder hierarchical structure.
238- CLIP LIST	5.16 Clip manager - (p.128)	The “clip list” displays all of the Cinedeck accessible media files within the selected folder. The default is “thumbs”, a thumbnail view but there is also a list view available with more content information, see “251- list view toggle” on page 134 Below the clip list are navigation arrows which become active for moving through lists which contain more entries than can be displayed on one screen. **(Note: clip manager only shows media files recognized by the Cinedeck. It is possible that folders contain other non media files which are not shown)**
239- SORT CONTROLS	5.16 Clip manager - (p.128)	There are several list sorting controls located above the clip list in “thumbs” and “list” view,. Press a sort name to sort the list by that data. Press the same sorting name again to sort the list in reverse order. The selected sort and sort direction is indicated by the green arrow
240- SCROLL COLUMNS	5.16 Clip manager - (p.128)	This control is only visible when list view is active. See “251- list view toggle” on page 134

Clip manager / - cont...

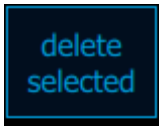
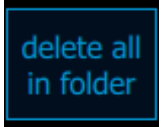
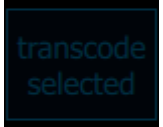
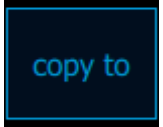
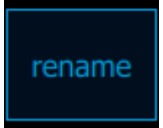
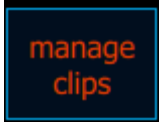
Name	Location	Description
241- PLAY SELECTED	5.16 Clip manager - (p.128)	Press "play selected" to load the selected clip or clips into the channel player and go back to the previous multi or single channel playback view.
242- PLAY ALL IN FOLDER	5.16 Clip manager - (p.128)	Select "play all in folder" to load all of the clips in the current folder for playback and return to the previous multi or single channel playback view.
243- FIND MEDIA	5.16 Clip manager - (p.128)	Cinedecks maintain a sql database of media content. New recordings are automatically added to the database while previously recorded content and files generated by other systems can be added to the database so they also are visible in clip manager. The find media menu contains several search methods for loading content into the media database. Important to note is the database is not aware of content being removed using applications outside the Cinedeck environment so if, for example, folder content is changed using Windows Explorer, performing a scan will refresh the view, removing deleted clips, to only show content actually available.  The recommended method for adding or refreshing folder views is "add media to database" which opens a folder and file viewer. Select a disk, navigate to the folder containing the required content and press scan at the lower right of the viewer screen. For smaller drives, "scan folder for media" can be used. First select a drive and then select "scan folder for media". Use "scan disk for folders" to only populate the database with folders containing media. Use "scan for media disks" to force the system to rescan the hardware ports for drives.

Clip manager / - cont...

Name	Location	Description
244- MANAGE DISK	5.16 Clip manager - (p.128)	Use “manage disk” to perform tasks such as drive formatting. Destructive functions will be grayed out and unavailable if “disable file delete and disk erase” is enabled on the prefs page. See “492- prefs” on page 226  Use “format NTFS” to format the selected drive using the recommended NTFS file system format. Formatting drives is recommended when setting up for a new recording session. “format exFAT” is available on some systems. exFAT is convenient for Apple computers however it is not recommended. Better, is for the Apple computers to have NTFS read and if needed, write capabilities. (See “9.4 Important drive information” on page 274) Use “erase” to delete all of the content from the selected disk. This can be a bit faster but formatting is recommended. If you want to remove a drive from the system, first select it and then press “eject”. Remember that Cinedeck SSDs are often installed, two drives in a sled, so be sure to check and eject both drives. Use “copy disk content” to copy the entire contents of a drive to another disk. Use rename to rename the disk to say something other than the default “New Volume”.

Clip manager / - cont...

Name	Location	Description
245- MANAGE FOLDER	5.16 Clip manager - (p.128)	Use "manage folder" to perform tasks such as manually creating new folders. Destructive functions will be grayed out and unavailable if "disable file delete and disk erase" is enabled on the prefs page. See "492- prefs" on page 226 Use "delete" to delete the selected folder. Folders which contain content cannot be deleted unless the content is first removed. Use "new: to create a new folder (sub-folder) under the selected folder. Use "copy folder to" to copy the selected folder to another location. Use rename to rename the selected folder.

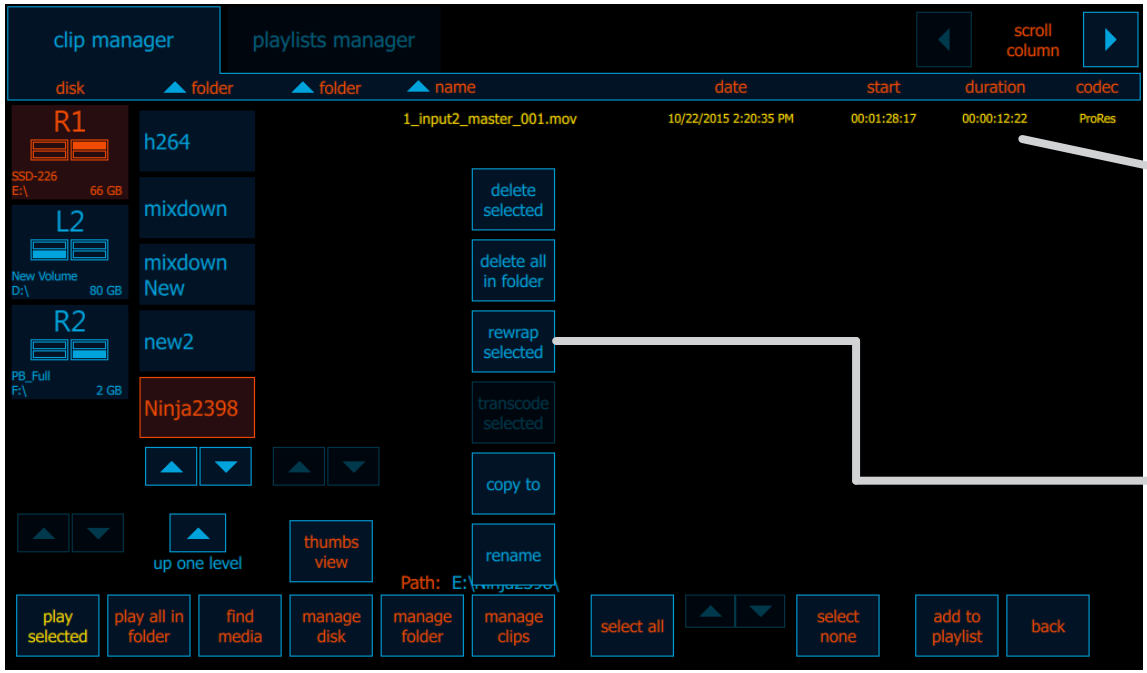
Name	Location	Description
246- MANAGE CLIPS	5.16 Clip manager - (p.128)	Use "manage clips" to perform tasks such as deleting or copying clips. Destructive functions will be grayed out and unavailable if "disable file delete and disk erase" is enabled on the prefs page. See "492- prefs" on page 226  Use "delete selected" to delete selected clips.  Use "delete all in folder" to delete all of the clips in the current folder. "rewrap selected" provides tools to put video and audio essence into different file wrappers. Currently only active for ProRes VBR<>CBR conversion. (See "5.16.1 Rewrap" on page 135)  "transcode selected" is an upcoming feature.  Use "copy to" to copy the selected clips to another destination.  Use "rename" to rename a selected clip 
247- SELECT ALL	5.16 Clip manager - (p.128)	Press the "select all" button to select all of the clips in the current folder.
248- SELECT NONE	5.16 Clip manager - (p.128)	Press the "select none" button to deselect all of the clips in the current folder.

Name	Location	Description
249- ADD TO PLAYLIST	5.16 Clip manager - (p.128)	Cinedecks have a simple, non-linear editing interface (playlist manager), for compiling clips and sub-clips into a single (virtual) container for playout. Press here to add selected clips to a new or existing playlist. Note that all clips must be the same frame rate and color bit depth to be included in the same playlist. See "5.17 Playlist manager" on page 138 If you choose "new playlist from selected"; • Select the drive where you want to save the playlist • Select the "file name" field (right of the "file name" label and enter a file name • Press "save and close and press "OK" • Playlist manager opens and you can navigate to the location where the playlist was saved and open it in the playlist editor or play it out. If you choose "add to existing playlist"; • Select the drive where the destination playlist is saved and navigate to and select the desired playlist. • Press "select" from the bottom of the screen. • Playlist manager opens and you can navigate to the location where the playlist was saved and open it in the playlist editor or play it out.
250- BACK	5.16 Clip manager - (p.128)	Select "back" to close clip manager and return the the previous single or multi channel view.
251- LIST VIEW TOGGLE	5.16 Clip manager - (p.128)	Press the thumbs/list toggle to switch the clip manager view between thumbnail view and the more detailed, list view. In list view there is a column scroll control at the top right corner to bring additional data into view.

5.16.1 Rewrap

File wrappers are probably the most misunderstood aspect of file-based production. Simply put, the file wrapper is the container which carries your video, audio and closed caption essence.
For more information, see "10.3. What is a wrapper:" on page 330.

Because of the unique qualities of compressed video and the way it is encoded into a file, for file-based insert editing, it is necessary for each frame to be the same size. This is called constant bit rate encoding or CBR.
Prores is normally encoded as a variable bit rate (VBR) stream so ProRes files which were not originally created as CBR on a Cinedeck, need to be rewrapped as CBR.
It is important to understand that the rewrap process is not a re-encode, it is essentially a file copy and happens just about as fast. The original encoded essence is not touched, there is just additional invisible space or zeros added between frames to make every frame the same size, matching the original quality or bitrate. While the resulting file will be somewhat larger, there is no visible difference to any receiving application, including file analysis systems such as Baton, Cerify or Aurora.
Additionally, after any inserts are completed, if file size is an issue, the capability to rewrap it back to VBR is included in the Trim Tool. (See "8.6 Trim File" on page 267)
Depending on the content, there is about a 10-30% difference in size between the same file when VBR and CBR.



To access the rewrap tool, locate and select the clip in clip manager.

SELECTED CLIP

To locate files generated elsewhere, you will need to first "add media to database" (See "243- find media" on page 130)

REWRAP SELECTED

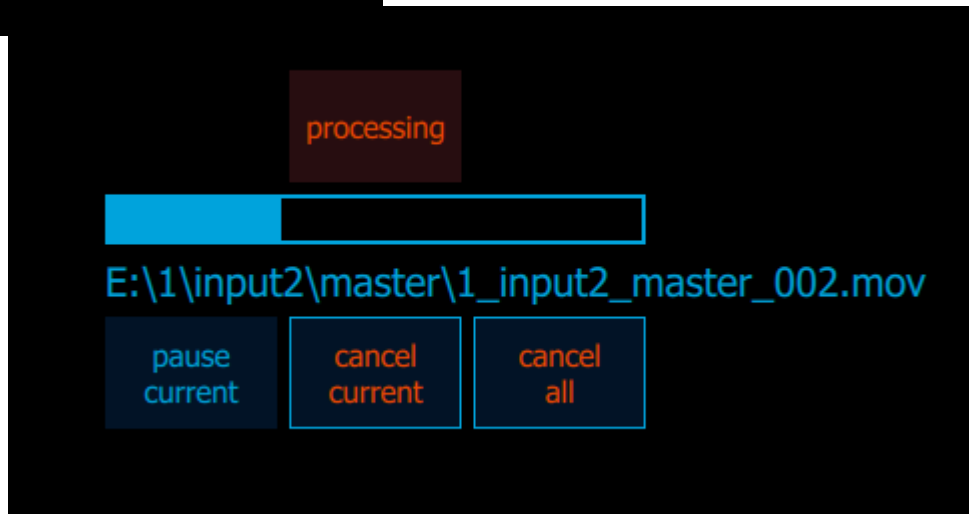
From the manage clips menu select "rewrap selected" to open the rewrap tool.

Clip manager / Rewrap cont...

The rewrap tool is currently only setup for ProRes conversion from VBR (variable bit rate) to CBR (constant bit rate) but upcoming versions will give you the ability to re-containerize content into different wrappers as well as the ability to concatenate or combine multiple clips into one container.

Press “select folder” to set a destination drive and folder for the copied file. A different location is required as the new file will have the same name as the original, After the destination is set, select “start”.

The dialog at the right will appear, giving the options to pause or cancel. When the copy is complete, the dialog automatically closes.



To access the newly created file, it may be necessary to again use “add media to database” (See “243- find media” on page 130)

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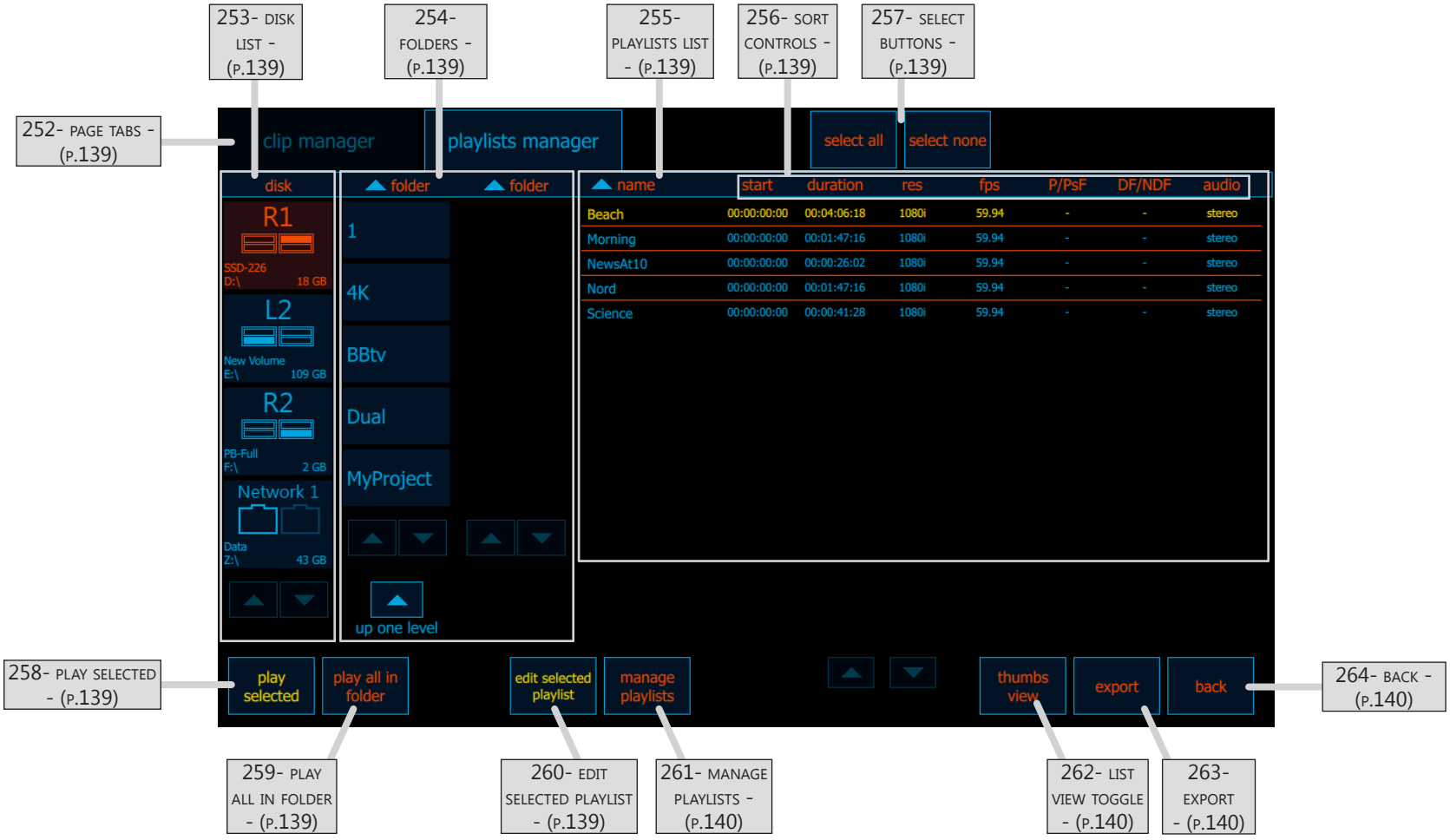
5.17 Playlist manager

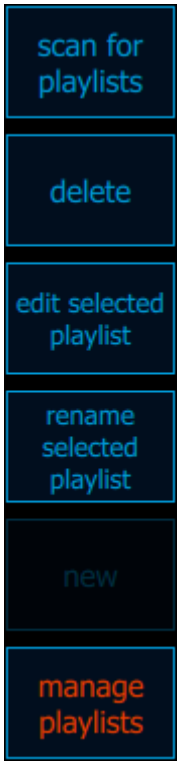
A playlist is a virtual clip which contains multiple clips and sub-clips. In fact, a playlist is nothing more than an XML file which points to clips and portions of clips to allow various sequential playback and export functions and the playlist manager provides access to opening and managing playlists..



Playlist manager / - cont...

Name	Location	Description
252- PAGE TABS	5.17 Playlist manager - (p.138)	The page selector tabs are always visible in the clip manager area. These can be clicked to provide direct access to each section.
253- DISK LIST	5.17 Playlist manager - (p.138)	The disk listing displays all of the media drives available to the Cinedeck. Below the disk list, as with most lists, are navigation arrows which become active for moving through lists which contain more entries than can be displayed on one screen.
254- FOLDERS	5.17 Playlist manager - (p.138)	The "folder" and "sub"-folder columns work the same way and in conjunction with each other to allow better folder navigation and visibility. Press a folder to select it. Press "up one level" to move to a level higher in the folder hierarchical structure and press a "sub" folder to navigate down one level in the folder hierarchical structure.
255- PLAYLISTS LIST	5.17 Playlist manager - (p.138)	The "playlists list" displays all of the Cinedeck accessible playlists within the selected folder. The default is "thumbs", a thumbnail view but the list view (as shown above) displays more content information. See "262- list view toggle" on page 140 Below the clip list are navigation arrows which become active for moving through lists which contain more entries than can be displayed on one screen. **(Note: playlist manager only shows media files recognized by the Cinedeck. It is possible that folders contain other non media files which are not shown)**
256- SORT CONTROLS	5.17 Playlist manager - (p.138)	There are several list sorting controls located above the playlist in "thumbs" and "list" view. Press a sort name to sort the list by that data. Press the same sorting name again to sort the list in reverse order. The selected sort and sort direction is indicated by the green arrow
257- SELECT BUTTONS	5.17 Playlist manager - (p.138)	Use "select all" and "select none" to select all or none of the playlists in the current folder
258- PLAY SELECTED	5.17 Playlist manager - (p.138)	Press "play selected" to load the selected playlist into the channel player and go back to the previous multi or single channel playback view.
259- PLAY ALL IN FOLDER	5.17 Playlist manager - (p.138)	Select "play all in folder" to load all of the playlists in the current folder for playback and return to the previous multi or single channel playback view.
260- EDIT SELECTED PLAYLIST	5.17 Playlist manager - (p.138)	Select a single playlist and press "edit selected playlist" to load the playlist into the playlist editor.

Playlist manager / - cont...

Name	Location	Description
261- MANAGE PLAYLISTS	5.17 Playlist manager - (p.138)	Select “manage playlists” to perform tasks such as deleting Destructive functions will be grayed out and unavailable if “disable file delete and disk erase” is enabled on the prefs page. See “492- prefs” on page 226  If the expected playlist is not shown, select “scan for playlists” to rescan the current folder for playlists and add them to the media database. To delete the selected playlist, press “delete”. To edit the selected playlist, press “edit selected playlist”. Access to editing a playlist is also availble on the main screen. Use rename selected playlist to rename the selected playlist.
262- LIST VIEW TOGGLE	5.17 Playlist manager - (p.138)	Press the thumbs/list toggle to switch the playlists manager view between thumbnail view and the more detailed, list view.
263- EXPORT	5.17 Playlist manager - (p.138)	This menu is for future use
264- BACK	5.17 Playlist manager - (p.138)	Select “back” to close playlists manager and return the the previous single or multi channel view.

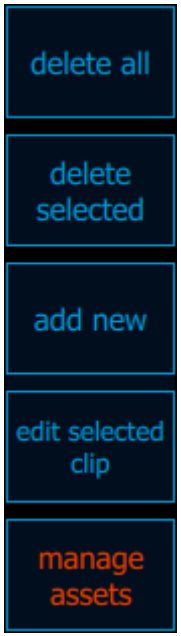
5.17.1 Playlist editor

The playlist editor is a basic non-linear editing interface, designed primarily to create simple compilations of clips and sub-clips for playout. Additionally, the playlist editor is used for performing insert edits into existing media files.

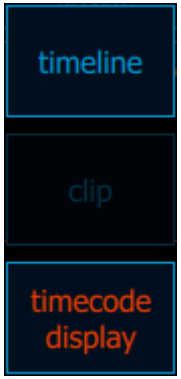
Playlist manager / Playlist editor cont...

Name	Location	Description
265- EDITOR VIEW	5.17.1 Playlist editor - (p.141)	The edit view selector button displays the name of the playlist currently loaded into the playlist editor and acts as a toggle button in conjunction with the “preview” button to switch between editing and playback preview screens.
266- PREVIEW	5.17.1 Playlist editor - (p.141)	The preview button activates a single channel player to view the edited playlist.
267- CLIP - POSITION TIMECODE	5.17.1 Playlist editor - (p.141)	This timecode display shows the playlist timecode where the clip starts.
268- CLIP NAME	5.17.1 Playlist editor - (p.141)	Display of the clip name.
269- CLIP THUMBNAIL	5.17.1 Playlist editor - (p.141)	The clip thumbnail displays the frame of the clip.
270- CLIP TIMECODE	5.17.1 Playlist editor - (p.141)	The clip timecode display indicates the current start and end timecode and duration of the clip as determined by the in and out points set for the clip. The timecode shown can be actual clip timecode or playlist position timecode based on the timecode display selection. See “278- timecode display” on page 144
271- CLIP THUMBNAIL SCROLL	5.17.1 Playlist editor - (p.141)	When many clips are included in a playlist, the left and right thumbnail scroll buttons provide access to additional clips which come before or after the visible clips.
272- PLAYLIST TIMECODE	5.17.1 Playlist editor - (p.141)	The start timecode, end timecode and duration of the loaded playlist are displayed.

Playlist manager / Playlist editor cont...

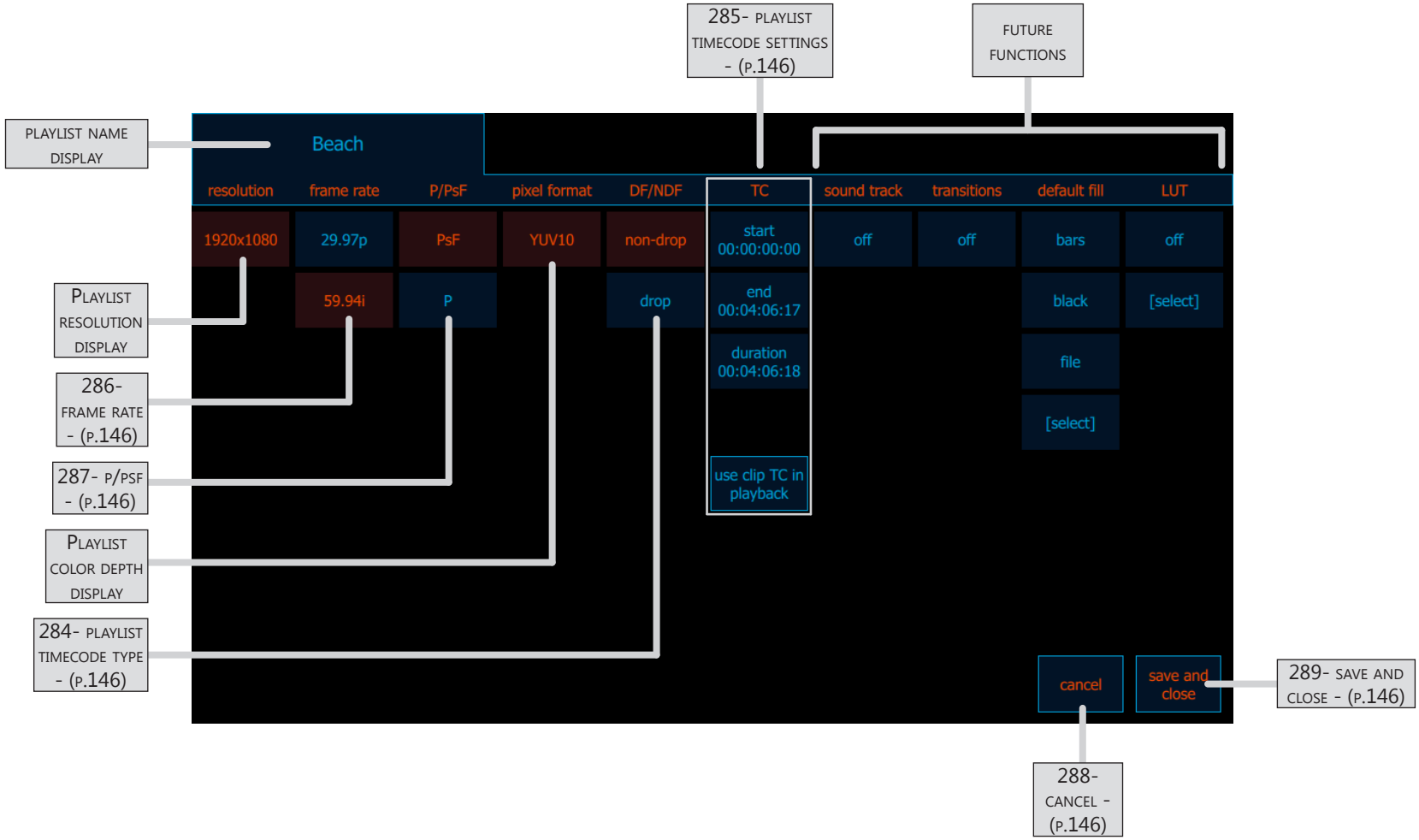
Name	Location	Description
273- MANAGE ASSETS	5.17.1 Playlist editor - (p.141)	Use "manage assets to perform tasks such as deleting a clip from the loaded playlist. Destructive functions will be grayed out and unavailable if "disable file delete and disk erase" is enabled on the prefs page. See "492- prefs" on page 226  Choose "delete all" to remove all clips from the loaded playlist. Choose "delete selected" to remove just selected clips from the loaded playlist. Select "add new" to open clip manager and add additional clips after the selected clip. If no clip is selected, the additional clips will be added to the end of the playlist. "edit selected clip" opens the selected clip in the clip editor and is the same as "275- edit selected clip" on page 143.
274- PLAYLIST SETTINGS	5.17.1 Playlist editor - (p.141)	Pressing "playlist settings" opens the properties screen to adjust settings such as timeline time code for the loaded playlist. See "5.17.2 Playlist settings" on page 145
275- EDIT SELECTED CLIP	5.17.1 Playlist editor - (p.141)	Press "edit selected clip to change the start and end timecode for that clip. If more than one clip is selected, this control will be grayed out.
276- DUPLICATE SELECTED	5.17.1 Playlist editor - (p.141)	If you need to add additional sections of an existing clip, select the required clip and press "duplicate selected". The duplicate loaded will be the full length original clip, without regard to edit points set in the original.
277- MOVE SELECTED	5.17.1 Playlist editor - (p.141)	To move one or more clips earlier or later in the playlist, select the clips which should be moved. Clips can be selected in any order and do not need to be adjacent to each other. Press the arrows to move the selected clips to the left or right.

Playlist manager / Playlist editor cont...

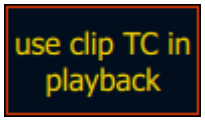
Name	Location	Description
278- TIMECODE DISPLAY	5.17.1 Playlist editor - (p.141)	 To show playlist position timecode in the “clip timecode” display with each clip thumbnail at the top of the screen, select “timeline”. To show actual clip timecode in the “clip timecode” display with each clip thumbnail at the top of the screen, select “clip”.
279- EXPORT	5.17.1 Playlist editor - (p.141)	Use “export” to export the playlist as an EDL. Additional capabilities will be added in future Cinedeck releases.
280- CANCEL	5.17.1 Playlist editor - (p.141)	Select “cancel” to undo any changes made and return to playlist manager.
281- SAVE AND CLOSE	5.17.1 Playlist editor - (p.141)	Select “save and close” to confirm any changes and return to playlist manager.
282- OUTPUT 23.98 AS 59I	5.17.1 Playlist editor - (p.141)	Indicates that a true 23.98 progressive playlist will play out as psf.
283- PLAYLIST SETTINGS OVERVIEW	5.17.1 Playlist editor - (p.141)	A complete overview of the playlist settings are displayed here.

5.17.2 Playlist settings

Use “playlist settings” to adjust the properties of your playlist such as timeline time code and the use of drop or non-drop timecode.



Playlist manager / Playlist settings cont...

Name	Location	Description
284- PLAYLIST TIMECODE TYPE	5.17.2 Playlist settings - (p.145)	Select drop or non-drop timecode.
285- PLAYLIST TIMECODE SETTINGS	5.17.2 Playlist settings - (p.145)	Click “start” to set the starting timecode and automatically calculate the end and duration, based on the clips included in the playlist. Click “end“ to set the ending timecode and automatically calculate the starting and duration times, based on the clips included in the playlist.  Select “use clip TC in playback” to change the timecode which is output from the Cinedeck from the default playlist timecode to clip based timecode.
286- FRAME RATE	5.17.2 Playlist settings - (p.145)	Select the appropriate output frame rate from the options.
287- P/PSF	5.17.2 Playlist settings - (p.145)	Select P or PSF depending on the content of the playlist and the desired output format.
288- CANCEL	5.17.2 Playlist settings - (p.145)	Select “cancel” to undo changes and return to the playlist editor.
289- SAVE AND CLOSE	5.17.2 Playlist settings - (p.145)	Select “save and close” to accept changes and return to the playlist editor.

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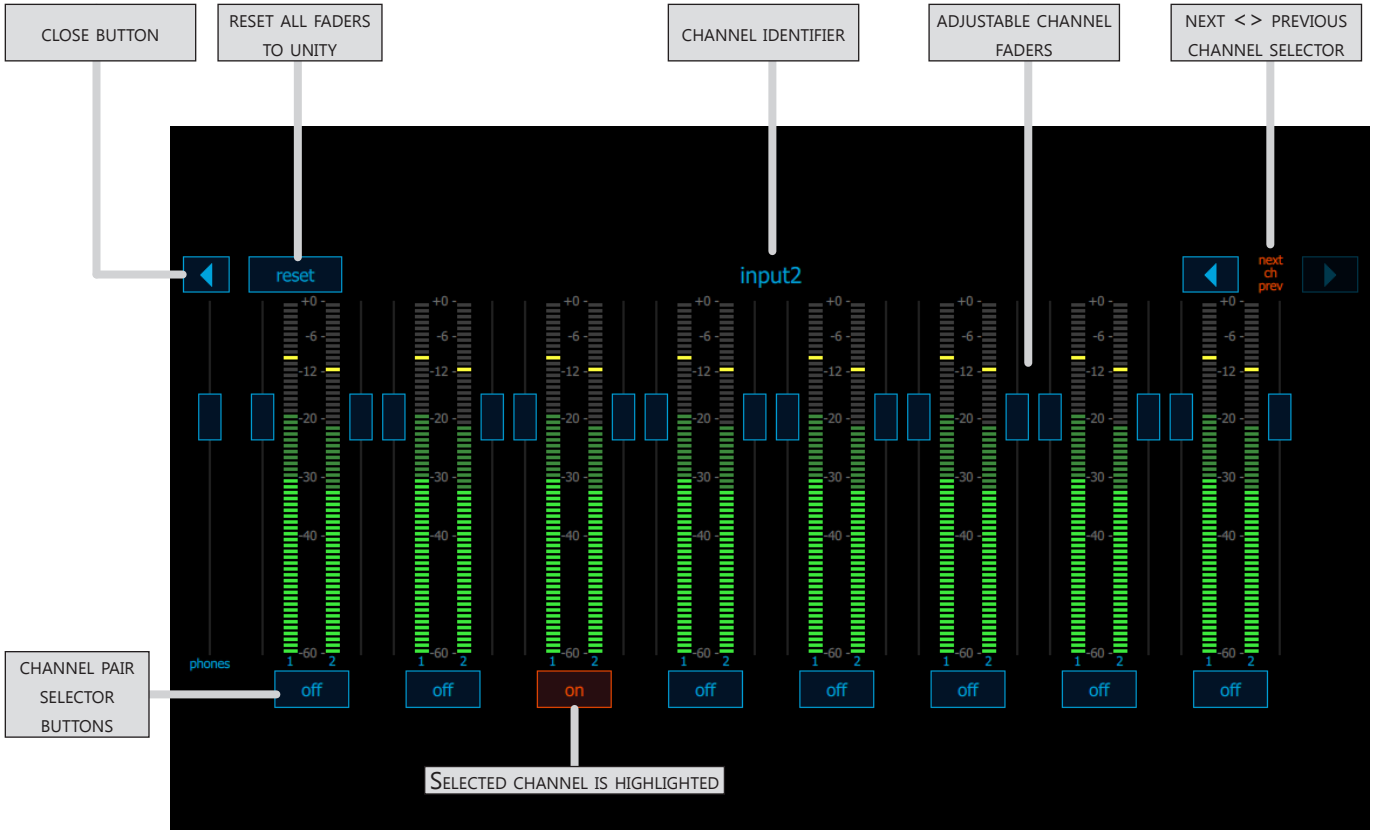
5.19 Headphone monitor controls

The headphone monitor control panel is used to select the channel pair being monitored and adjust left and right audio levels.



5.20 Record modes

Record mode selects between the different recording capabilities such as pause and insert. This should not be confused with "UI mode", the selection between different basic I/O settings such as YUV HD and 4K. For additional information on UI mode, see "6.0 User Interface Mode" on page 230

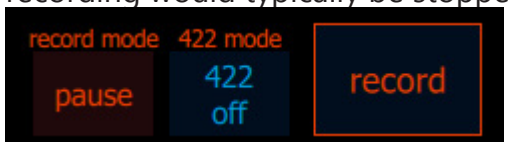
- "normal" - Used for standard recording
- "pause" - Ingest stops but the file is not closed.
- "pause & seek in file" Ingest stops, the file is not closed, in-points can be set
- "insert baseband" - Allows inserting audio and video into a flat file.

5.21 Normal

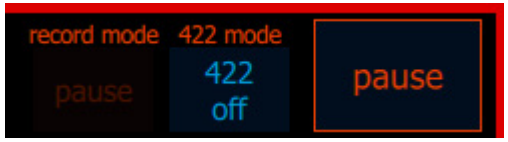
Normal is the default, standard record mode used for typical single and multi-channel recording and playback tasks.

5.22 Pause

Pause mode is used for long recordings that will be broken by periods with no useful action. In such situations recording would typically be stopped but each stop/start generates a new file which may be undesirable.

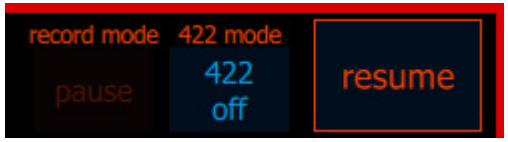


In pause mode, before initial recording starts, the record button is in its normal condition.



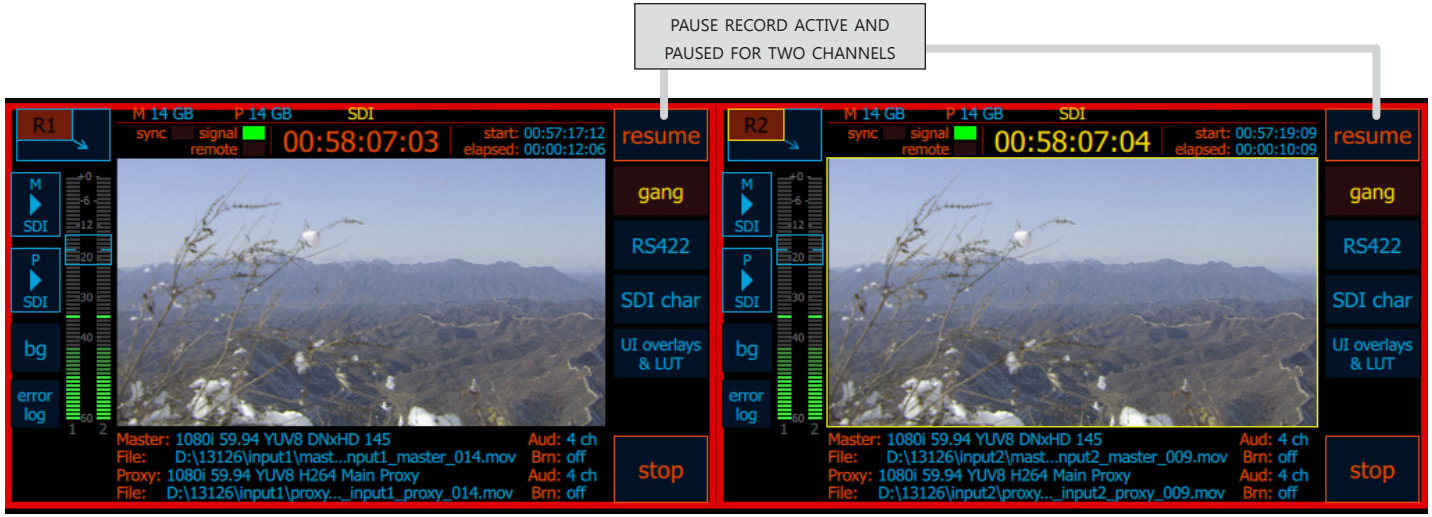
After recording starts, the record button changes to a “pause” button and functions much like a traditional analog tape recorder.

When “pause” is pressed and activated, ingest is halted. The file remains open but static and the record/pause button changes name to “resume”.



When in resume, the record indicator **(red border)** will blink on and off, indicating that record mode is still active but ingest has been paused.

It is important to understand that when “pause” is active, it applies to all channels in the current project. Also, “pause” can be used in conjunction with gang mode so you can control multiple channels simultaneously.



5.23 Pause & Seek in File

Pause & Seek in File is similar to “pause” mode but pause & seek in file adds the capability to set in-points, mimicking the “assemble edit mode” commonly used on a tape machine. In “pause & seek”, when pause is pressed, ingest is halted and the file remains open like in standard “pause” mode. Then, the recently recorded portion of the file is loaded into a special play mode window with active transport controls and edit point control.

Multiple channels can be controlled in Pause & Seek mode making it possible for example, to simultaneously build a show master while keeping a few ISO channels in sync with the master or for creating multiple masters with different codec and wrapper combinations.

Pause & Seek in File operation is straightforward:

- Put the channel(s) in gang record mode and start recording
- Pause the recording(s)
- Put the channel(s) into play or gang play
- Once loaded in play mode, it is possible to play and scrub the file to select a starting point in the recording

Note: Pause & Seek in File is supported with the MOV (quicktime) wrapper recording ProRes, DNxHD and AVC-Intra. Additional wrappers and codecs will be added in future releases.

PAUSE & SEEK IN FILE - STANDBY
TRANSPORT CONTROLS INACTIVE

PAUSE & SEEK IN FILE - RECORDING
TRANSPORT CONTROLS INACTIVE

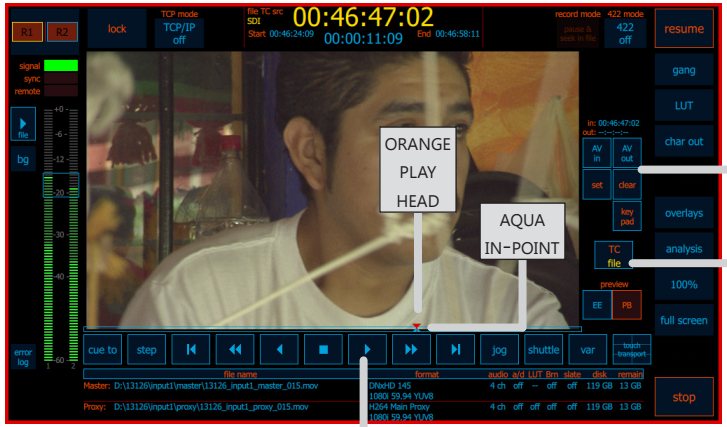
Pause & Seek in File / - cont...

- Set an in-point
- After the in-point is selected, “resume” can be pressed to continue recording from that in-point.

This pause and seek process can be repeated many times. When the final recording is complete, stop is pressed to close the file.

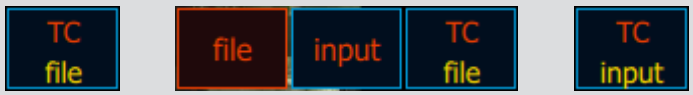
Remember: Just like assemble edit on tape, resuming a recording in Pause & Seek mode after an in-point is set will permanently replace all of the content after the in-point with new content.

PAUSE & SEEK IN FILE - PAUSED
TRANSPORT CONTROLS ACTIVE, IN-POINT SET



WHEN “PAUSE” IS ACTIVE, THE TRANSPORT CONTROLS CAN BE USED TO PLAY THE FILE AND THE PLAY-HEAD CAN BE DRAGGED TO SCRUB THE CLIP. USE ON-SCREEN BUTTONS OR KEYBOARD SHORTCUTS TO CONTROL TRANSPORT AND SET EDIT POINTS.

PAUSE & SEEK IN FILE - RECORDING
RESUMED FROM NEW IN-POINT

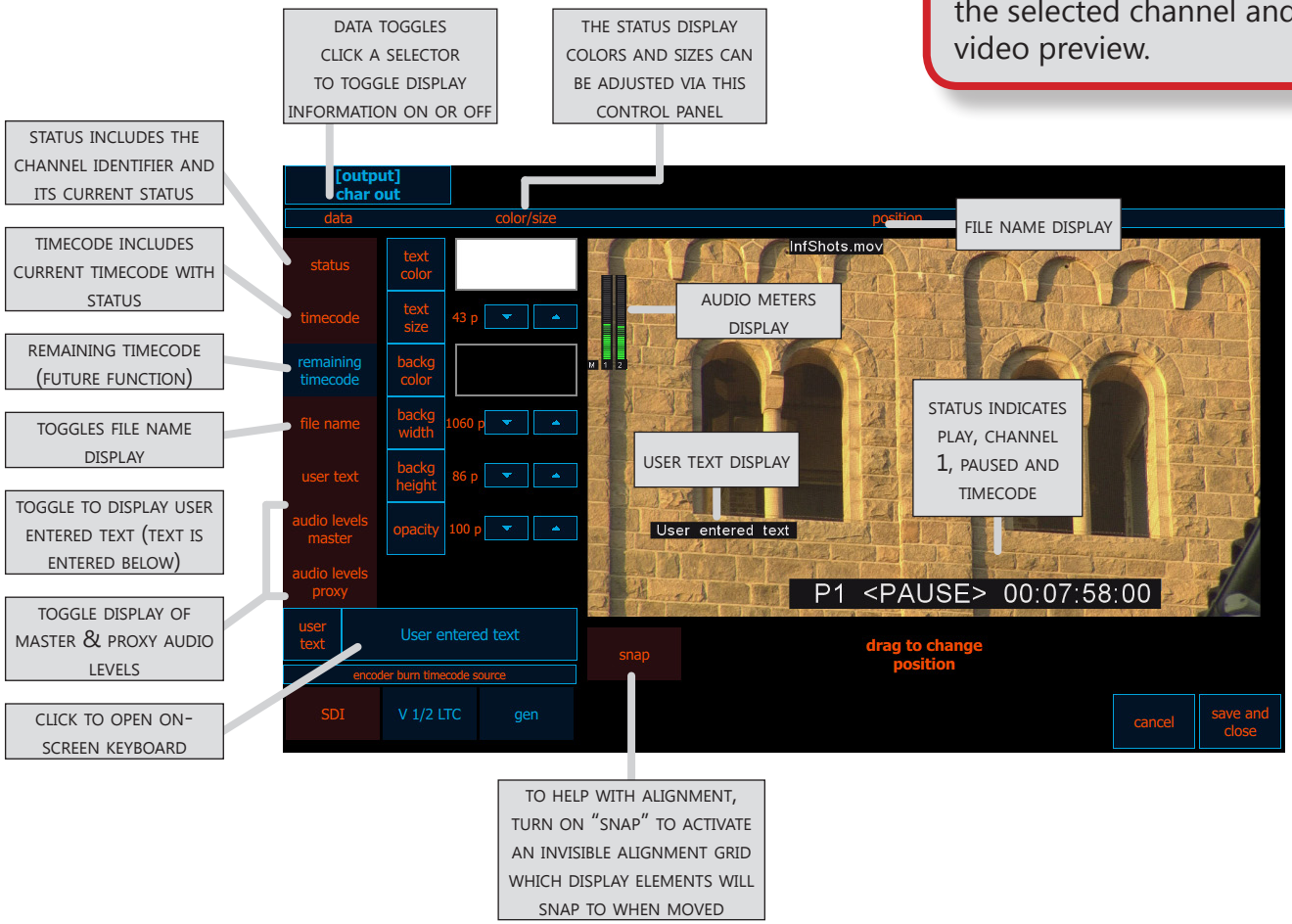


DIFFERENT WRAPPERS CAN HANDLE TIMECODE DIFFERENTLY - MOST ONLY NOTATE THE STARTING TIMECODE AND THE DURATION OR TOTAL NUMBER OF FRAMES WHICH MEANS TIMECODE WILL NORMALLY BE CONTIGUOUS ACROSS EDITS. MOV (QUICKTIME) INCLUDES A TIMECODE TRACK SO CAN CONTAIN NONCONTIGUOUS TIMECODE. IF NONCONTIGUOUS (SOURCE TIMECODE) IS REQUIRED INSTEAD OF CONTIGUOUS (RECORD TIMECODE), SELECT INPUT FROM THE TIMECODE SELECTOR MENU.

5.24 Character out customization

Access for customizing the character overlay output can be found via the SDI character/character out buttons on the multi and single channel view. Character output can be customized for each channel independently. From here you can add or remove metadata and system information from the overlay.
Data display blocks can be dragged with a mouse to any area on the screen.

Note: The character overlay output is displayed both on the SDI output of the selected channel and the Cinedeck video preview.



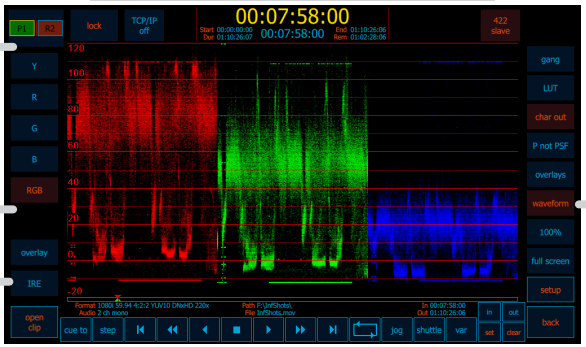
5.25 Overlay customization

This feature is currently disabled.

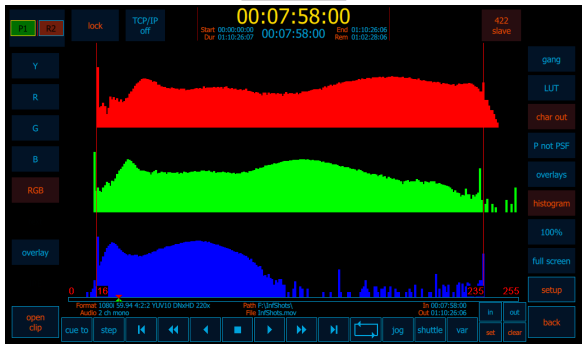
5.26 Video analysis tools

Access to the video analysis tools is only available from the single channel view but the tools are available during record and playback. Tools include; waveform, vectorscope, histogram, edge detect and clipping

WAVEFORM - Y, R, G, B OR PARADE (AS SHOWN)



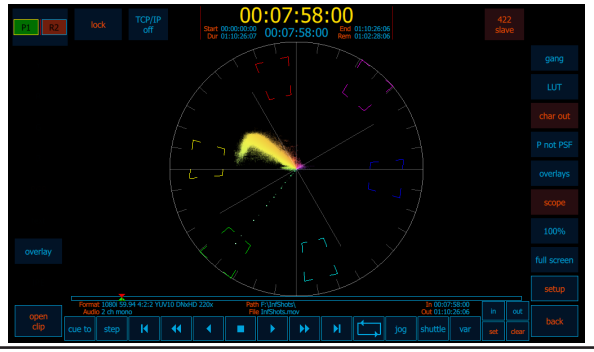
HISTOGRAM



SCOPES CAN BE FULL SCREEN OR OVERLAY

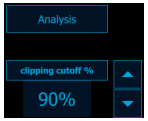
EDGE DETECT (AKA FOCUS ASSIST)

VECTORSCOPE



CLIPPING

CLIPPING SETUP



5.27 Setup tabs explained

System setup is managed via a series of tabbed screens, accessed via the “setup” button found on both the multi view and single-channel screens. When setup is opened, settings for the current channel are displayed and the initial screen which appears is the “overview” tab.

It bears repeating that Cinedeck setup is project centric so most changes on the various setup screens are saved as part of the current project and effect whichever channels are associated to the current project. Additionally, setup tends to be a left to right process, starting on the Overview page where the project is selected and then stepping through “input”, “master” codec selection, “proxy” codec selection, and possibly some specific timecode and record trigger changes made on the “TC & automation” page.
Lastly, it should be noted that previous settings (changes you have already made) filter what is available for the settings you are currently adjusting.

An example; you have already selected 1080i 59.94 10bit as the input and you want to select XDCAM HD as the master codec but you find that the quality settings are not available. This is because XDCAM HD is an 8bit only codec. Had 8bit been selected as the color depth of the input, the quality settings would be available.

Additional tabs not necessarily directly related to a specific project but which certainly effect deck operation are the “prefs” tab (See “5.36 Prefs tab” on page 223) and the V1 signal generator (See “6.4 Signal Generator tab” on page 240).

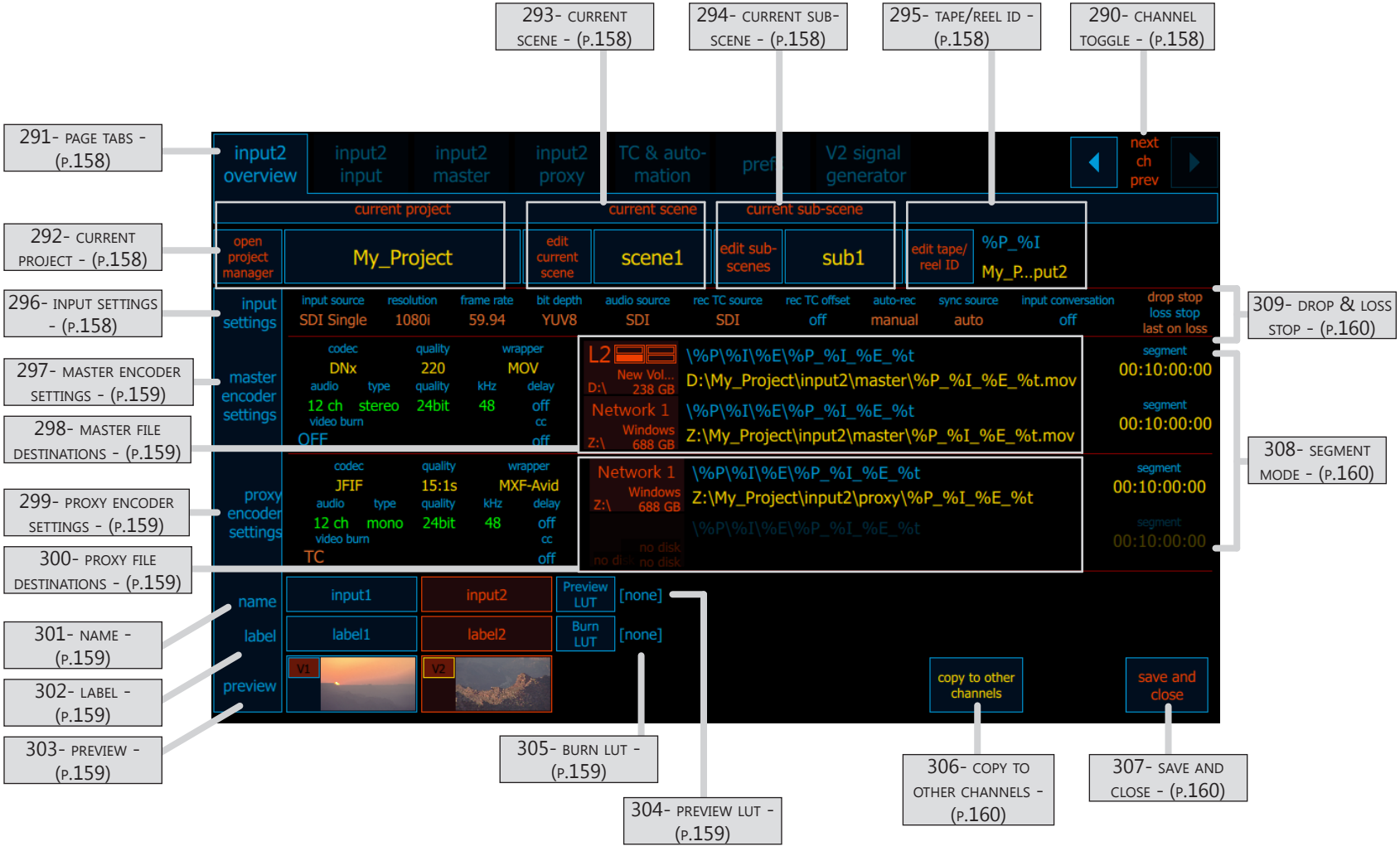
As a final point, there are some settings which are not necessarily recalled with the project settings and there are a few settings which are channel specific and so can be changed for each channel independently. The most important settings to check are the destination drive selections because drive letters can change at startup.

Important! Microsoft Windows assigns drive letters at system startup based upon what is connected at the time so it is always necessary to confirm the drive destination for each encode.

5.28 Overview tab

The overview page plays two important roles, it provides a full overview of the setup for the selected channel (there is a channel selector at the top right) and it provides access to project management for adjusting folder and file naming and scene / sub-scene management.

Click the current project name to access project and scene management.



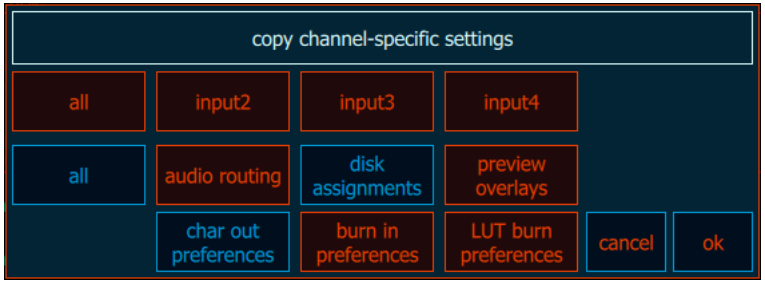
Overview tab / - cont...

Name	Location	Description
290- CHANNEL TOGGLE	5.28 Overview tab - (p.157)	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The "input", "master" and "proxy" tab names reflect the change, displaying the names associated to the selected channel.
291- PAGE TABS	5.28 Overview tab - (p.157)	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
292- CURRENT PROJECT	5.28 Overview tab - (p.157)	Current project displays the name of the active project for the selected channel and is a variable often used in folder and file names. Click the project name or "open project manager" for access to project manager where projects are assigned to channels, new projects can be created and projects can be imported and exported. This is also where folder and file naming is managed. Additionally, user lists, scenes and sub-scenes are accessed via project manager. (See "5.29 Project manager" on page 161)
293- CURRENT SCENE	5.28 Overview tab - (p.157)	Current scene displays the active scene name for the selected channel and is a variable often used in folder and file names. Clicking the scene name or "edit current scene" provides direct access to the active list where scenes can be selected and managed; new scenes can be created, scene lists can be imported and exported, etc. (See "5.29 Project manager" on page 161)
294- CURRENT SUB-SCENE	5.28 Overview tab - (p.157)	Current sub-scene displays the active sub-scene name for the selected channel. Clicking the sub-scene name or "edit sub-scenes" provides direct access to the active sub-scenes list where sub-scenes can be selected and managed; new sub-scenes can be created, sub-scene lists can be imported and exported, etc. (See "5.29 Project manager" on page 161)
295- TAPE/REEL ID	5.28 Overview tab - (p.157)	Displays the tape/reel ID variables and value for the selected channel and is a variable, often used in folder and file names. Clicking the name or "edit tape/reel ID" takes you directly to the "path & file names" settings associated with the active project for the selected channel, where the tape/reel ID can be adjusted. (See "5.29 Project manager" on page 161)
296- INPUT SETTINGS	5.28 Overview tab - (p.157)	Displays all of the input settings for the selected channel. Clicking the various data areas provides direct access to the relevant settings page, ie, touching "resolution" switches to the input page where input settings can be adjusted and touching "auto-rec" switches to TC & automation.

Overview tab / - cont...

Name	Location	Description
297- MASTER ENCODER SETTINGS	5.28 Overview tab - (p.157)	The master encoder region displays all of the settings related to the master encode. Clicking in this area switches to the master encode setup page.
298- MASTER FILE DESTINATIONS	5.28 Overview tab - (p.157)	The master file destinations section displays the selected destination drive, folder and file naming variables and text related to the master primary and redundant encodes. Clicking in this area switches to the master encode page.
299- PROXY ENCODER SETTINGS	5.28 Overview tab - (p.157)	The proxy encoder region displays all of the settings related to the proxy encode. Clicking in this area switches to the proxy encode setup page.
300- PROXY FILE DESTINATIONS	5.28 Overview tab - (p.157)	The proxy file destinations section displays the selected destination drive, folder and file naming variables and text related to the proxy primary and redundant encodes. Clicking in this area switches to the proxy encode page.
301- NAME	5.28 Overview tab - (p.157)	Name reflects the channel name variable or wild-card shown also at the top of the setup screen in the page tab bar. The input name variable can also be used in folder and file names. By default these are sequentially named, input 1, input 2, etc. Click here to open an on-screen keyboard to change the name.
302- LABEL	5.28 Overview tab - (p.157)	Label is an additional channel specific metadata field which can be used in folder and file naming. By default these are sequentially named, input 1, input 2, etc. Click here to open an on-screen keyboard to change the name.
303- PREVIEW	5.28 Overview tab - (p.157)	Preview is a thumbnail of that channels active video. The thumbnails can also be clicked to toggle between channels displayed. The orange bordered channels is the selected channel.
304- PREVIEW LUT	5.28 Overview tab - (p.157)	Preview LUT indicates if a LUT is active on the Cinedeck user interface video preview for the selected channel and if so, displays the LUT name.
305- BURN LUT	5.28 Overview tab - (p.157)	Burn LUT indicates if a LUT is being used to color process the recorded proxy for the selected channel and if so, displays the LUT name.

Overview tab / - cont...

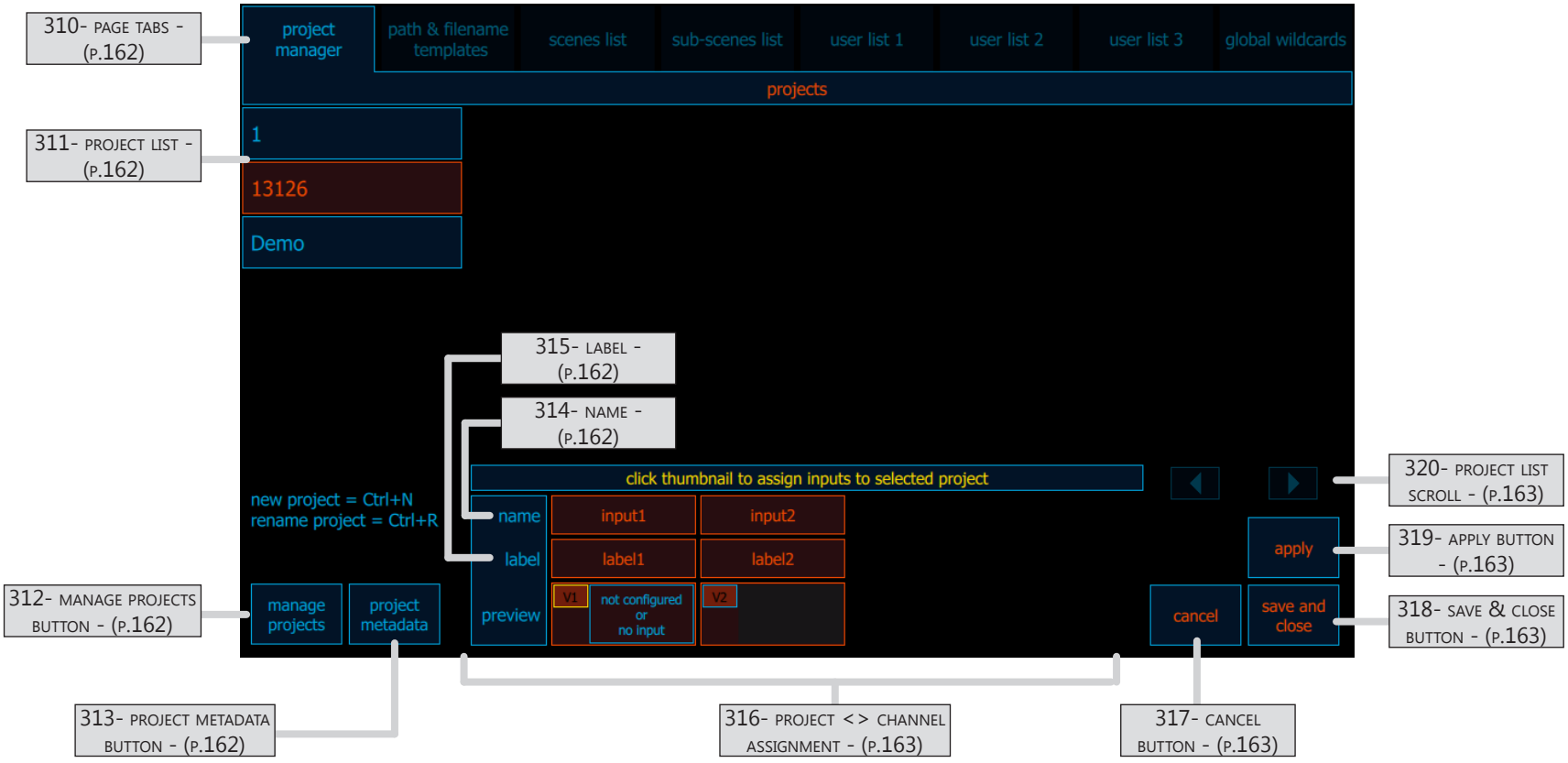
Name	Location	Description
306- COPY TO OTHER CHANNELS	5.28 Overview tab - (p.157)	 Copy to other channels allows copying channel independent settings such as audio channel selection and routing and file destination drive from the selected channel to one or more other channels.
307- SAVE AND CLOSE	5.28 Overview tab - (p.157)	Pressing save and close, confirms any changes, closes the setup screens and returns to the previous multi or single channel view.
308- SEGMENT MODE	5.28 Overview tab - (p.157)	Segment mode indicates if one of the file segment modes is active for that channel and encode and if increment mode is selected, displays the preset segment duration.
309- DROP & LOSS STOP	5.28 Overview tab - (p.157)	The orange text in this area indicates what will occur if the system detects a dropped frame. If “drop stop” is orange the system will stop recording. Otherwise it will ignore the dropped frame and continue. When orange, “last on loss” indicates that if the input signal is lost, recording will continue.

5.29 Project manager

Cinedecks are project-centric meaning that settings are saved to a project which is associated to one or more channels. Multiple channels which require the same settings would normally be associated with a single project while channels requiring unique settings would be associated to their own independent projects.

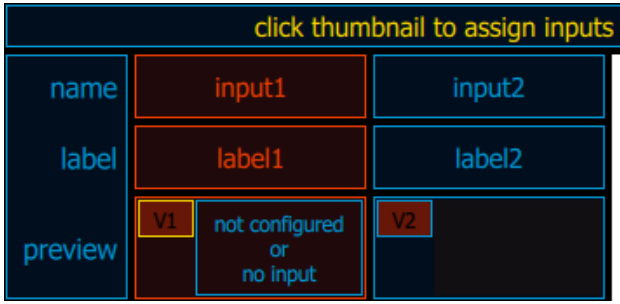
In other words, if all four channels of a deck are associated to the same project and you change the codec on one channel, the codec for the other three channels is simultaneously changed. To change settings for just a single channel, that channel would need to be associated to its own project.

Project Manager is accessed from the overview page by clicking the project name or “open project manager”. (See “292- current project” on page 158).



Name	Location	Description
310- PAGE TABS	5.29 Project manager - (p.161)	The selector tabs are always visible in the project manager setup area. These can be clicked to provide direct access to each setup section.
311- PROJECT LIST	5.29 Project manager - (p.161)	The project list displays all of the currently available projects. The selected project is colored and bordered orange.
312- MANAGE PROJECTS BUTTON	5.29 Project manager - (p.161)	Manage products provides access to; • Creating a new project - Projects are by default automatically saved in the "projects" folder located in the Cinedeck install folder. This is usually; c:\cinedeck[_x64]\projects. • Deleting the selected project • Renaming the selected project • Exporting the selected project - Exporting a project is simply saving the project in a user selected destination with the current name. • Saving the selected project with a new name • Importing a previously saved project Note that projects can not be deleted or renamed if there is content associated with the project.
313- PROJECT METADATA BUTTON	5.29 Project manager - (p.161)	The project metadata button opens a small pop-up window for entering/editing project related metadata.
314- NAME	5.29 Project manager - (p.161)	The name reflects the channel name variable or wild-card shown also at the top of the setup screen in the page tab bar. The input name variable can also be used in folder and file names. By default these are sequentially named, input 1, input 2, etc. Click here to open an on-screen keyboard to change the name. (This name can also be changed on the project overview page)
315- LABEL	5.29 Project manager - (p.161)	The label is an additional channel specific metadata field which can be used in folder and file naming. By default these are sequentially named, input 1, input 2, etc. Click here to open an on-screen keyboard to change the name. (This name can also be changed on the project overview page)

Project manager / - cont...

Name	Location	Description
316- PROJECT <> CHANNEL ASSIGNMENT	5.29 Project manager - (p.161)	 This critical section which is visible on all project management related screens is where you can see which channels are associated to the currently selected project and assign one or more channels to a selected project. To associate channels to projects; 1. Select a project in the project list 2. Select one or more channels by clicking the video preview thumbnail (orange indicates a channel is selected, aqua-blue is available but not selected) In this image, channel 1 is assigned to the current project while channel 2 is not 3. Press Apply or Save & Close to assign the selected channel(s) to the selected project
317- CANCEL BUTTON	5.29 Project manager - (p.161)	Cancel any changes and return to the previous screen
318- SAVE & CLOSE BUTTON	5.29 Project manager - (p.161)	Pressing save and close, confirms any changes, closes the project setup screens and returns to the main setup area.
319- APPLY BUTTON	5.29 Project manager - (p.161)	Confirms any changes and stays on the current screen.
320- PROJECT LIST SCROLL	5.29 Project manager - (p.161)	The project screen can display thirty projects. If more than thirty projects are on a system the project list scroll arrows will be available to scroll the list left and right.

5.29.1 Path & file names explained

Folder and file names are made from a broad selection of wildcards such as “project” (%P) and/or user entered text. Some wildcards are maintained by the system such as “take number” %t. Others contain project or settings based data such as “input”. There are also user and global wildcards that contain user created info. (See the next page for more on wildcards)

Cinedeck places no restrictions on how or what you name your content however there are some good practices, recommendations and Windows system limitations.

It can be technically argued to be a slightly different count but for our purposes, the Windows operating system effectively restricts the total path and file name to a maximum of 255 characters after the drive letter, ie; X:\a_maximum\of_255_characters\and_system_characters\including_name_and_file.extension.ext

It is recommended to always use an auto incrementing element in your file name such as take number to assure each clip gets a unique name during recording. Duplicate names will not overwrite existing content however they will prevent recording. The default naming template includes the incrementing take number.

For readability and future manageability, its a good practice to keep the folder and file length as short as is practical by using abbreviations and phonetics while still maintaining a human readable name. Careful use of upper and lower case characters can also help. Additionally, it is recommended to not use spaces in file or folder names. Spaces in folder and file names may be incompatible with systems that interact with your content in the future. Use underscore (_) and hyphen (-) as space replacements. By default, the Cinedeck system will allow spaces however it is recommended to turn that behavior off on the “prefs” setup page. Turning “allow spaces in file/folder names” off will force underscore characters into any names where you type a space. (See “5.36 Prefs tab” on page 223)

Project manager / Path & file names explained cont...

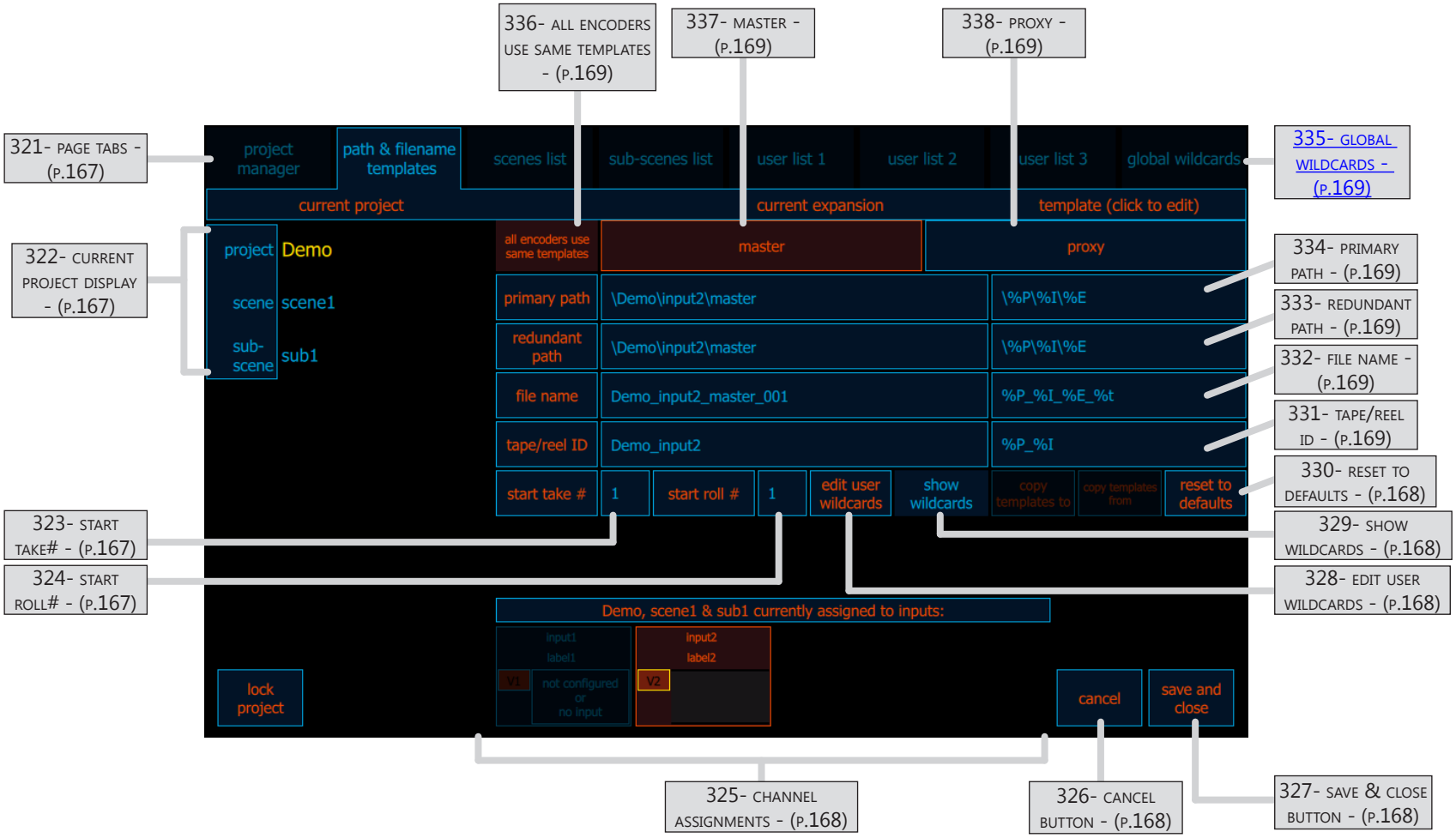
As noted above, wildcards are the primary naming element. The pop-up below is available in project manager as a reminder and wildcards shortcut keys are available on the path and file name editing pages.

The default file name template is made up of %P_%I_%E_%t (project, input, encoder, take number) which, for a project named "Demo", would generate a clip name such as: Demo_input3_master_009. Listed below are a few of the available wildcards with a more detailed description explaining what they represent and how they work.

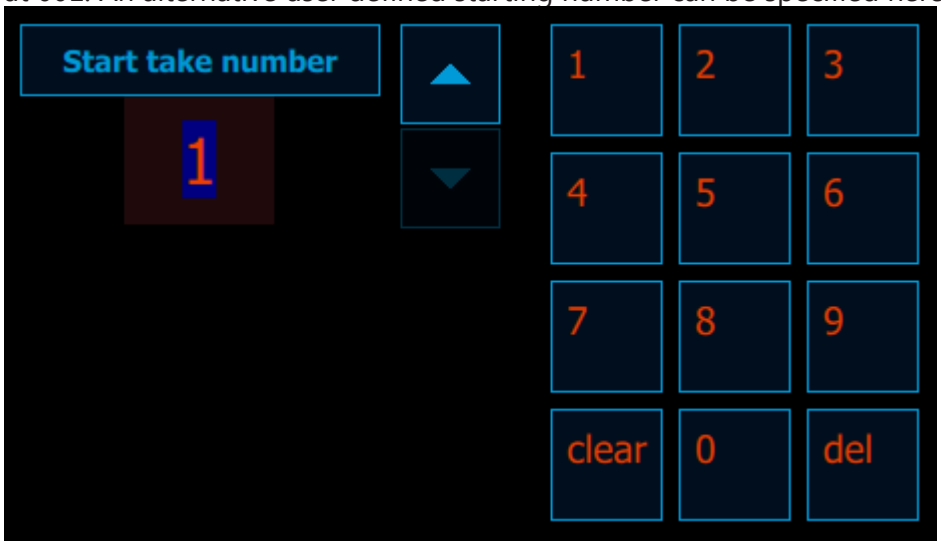
Wildcard	Name	Description
%P	project	Contains the name of the project which the selected channel is assigned to and is automatically populated when a channel is assigned to a project.
%I	input	The default input names are input1, input2, etc. Each channels input name wildcard can be independently renamed in project manager or on the overview page, to better identify the channel source such as Cam01, VTR6, etc.
%E	encoder	Default is master or proxy. Each can be changed on the respective master or proxy encoder settings page so you might rename them to something more specific like DNx220 and DNx45.
%t	take number	This is a system generated automatic counter which increments based on system data, in this case clip names in the target folder. Each new clip that uses the same name template as existing clips will get the next number. (System variables like take number or date cannot be edited)
%4 - %9	user wildcard	These special wildcards include a name and user generated text and are a project specific. They normally contain regularly used project based data such as a show number or directors name.
%A, B, F, J, K, L	global wildcard	These special wildcards (not shown above) include a name and user generated text. Global wildcards are available across all projects and might contain data like a facility ID.
%S, %U	scene & sub-scene	These wildcards pull data from the scene and sub-scene lists created in project manager. They can have an unlimited number of items and can be toggled through using keyboard shortcuts from the main multi and single channel view.
%1 - %3	user lists	Like scenes, user lists are unlimited items but the active list item must be selected in the list.

5.29.2 Path & file name templates

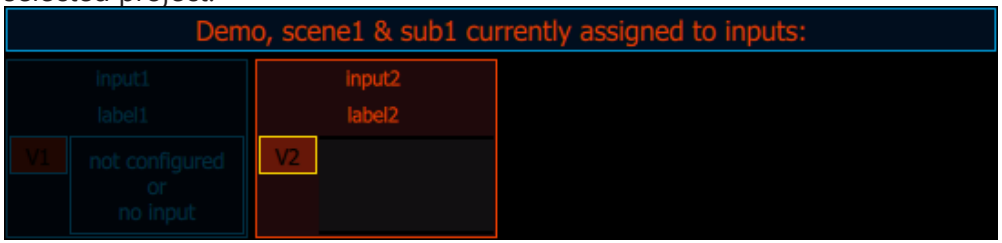
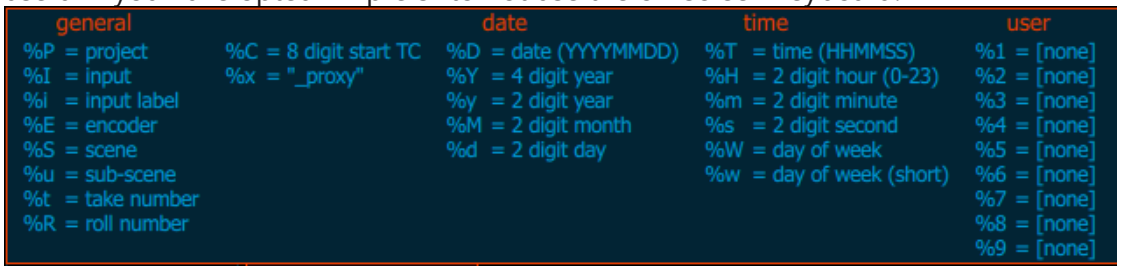
The path and file naming templates page is where you manage folder and file naming for your project. It is important to note that the various lists; scenes, sub-scenes and user lists 1, 2 & 3, are project based elements that can be included in your names. They can then be toggled through during your recording session to quickly and accurately name specific content. There are also six user generated "global wildcards" (available across all projects) and six user generated project based wildcards.



Project manager / Path & file name templates cont...

Name	Location	Description
321- PAGE TABS	5.29.2 Path & file name templates - (p.166)	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
322- CURRENT PROJECT DISPLAY	5.29.2 Path & file name templates - (p.166)	The current project display indicates the selected project for which you would be changing folder and file naming. Although they may not be included in the current naming structure, this display also indicates the current selected scene and sub-scene.
323- START TAKE#	5.29.2 Path & file name templates - (p.166)	By default, Cinedeck file names leverage an auto-incrementing take number which, when no identically named content is in the destination folder, will start at 001. An alternative user defined starting number can be specified here.  Click the up >< down arrows to increment or directly enter a number with the keypad. Press save and close at the lower right of the screen to confirm and close the keypad.
324- START ROLL#	5.29.2 Path & file name templates - (p.166)	Cinedeck file names can leverage an auto-incrementing roll number which, when no identically named content is in the destination folder, will start at 001. An alternative user defined starting roll number can be specified here using the same procedure as for start take#. See "323- start take#" on page 167

Project manager / Path & file name templates cont...

Name	Location	Description
325- CHANNEL ASSIGNMENTS	5.29.2 Path & file name templates - (p.166)	The channel assignment display shows which channels are associated to the currently selected project.  (Orange indicates the channel is associated to the selected project. Dim channels are assigned to other projects)
326- CANCEL BUTTON	5.29.2 Path & file name templates - (p.166)	Cancel any changes and return to the previous screen.
327- SAVE & CLOSE BUTTON	5.29.2 Path & file name templates - (p.166)	Pressing save and close, confirms any changes, closes the project setup screens and returns to the main setup area.
328- EDIT USER WILDCARDS	5.29.2 Path & file name templates - (p.166)	Along with the many system provided wildcards or variables, users can also create six of their own project based wildcards for regularly used data such as a show number or program ID. User wildcards have a title or name which is displayed in the wildcard list and an expansion, the actual data associated to the name which is inserted into a name at record time. See "5.29.5 Edit user & global wildcards" on page 174
329- SHOW WILDCARDS	5.29.2 Path & file name templates - (p.166)	Opens a pop-up window with a list of wildcards or variables. Especially useful if you have opted in "prefs" to not use the on-screen keyboard. 
330- RESET TO DEFAULTS	5.29.2 Path & file name templates - (p.166)	Pressing here will reset all of the path and file naming templates to the standard layout and wildcard selections.

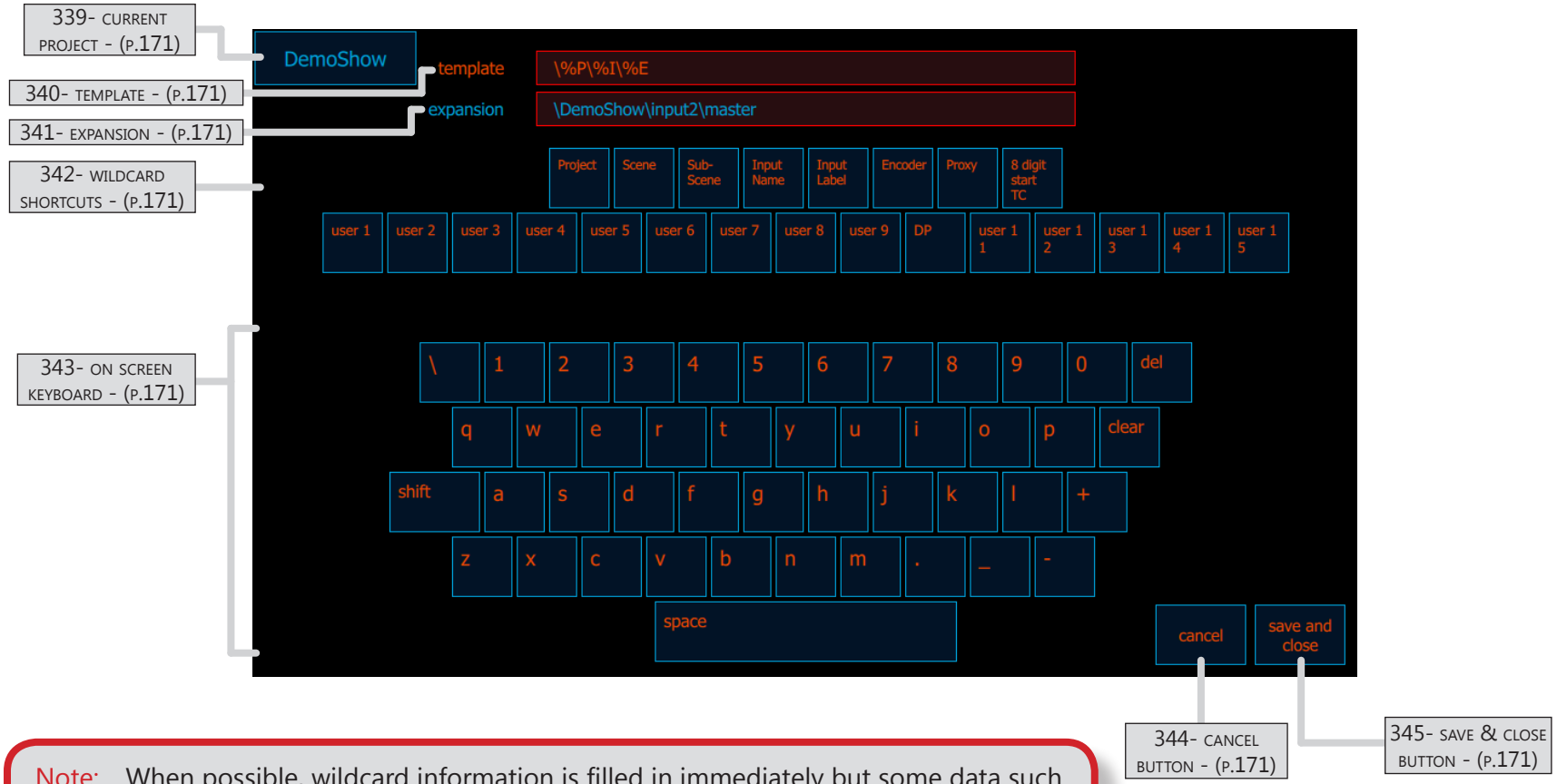
Project manager / Path & file name templates cont...

Name	Location	Description
331- TAPE/REEL ID	5.29.2 Path & file name templates - (p.166)	Displays the current name template for the tape or reel ID. Click here to customize the tape or reel ID name associated with each recorded clip. Note that tape/reel ID uses the same procedures and variables available for file names. See "5.29.4 File name editor" on page 172
332- FILE NAME	5.29.2 Path & file name templates - (p.166)	Displays the file name and file name template. Click here to customize the file name to be used for each recorded clip. See "5.29.4 File name editor" on page 172
333- REDUNDANT PATH	5.29.2 Path & file name templates - (p.166)	Displays the folder structure (path) and path template which will be used for redundant files if redundant file writing is active. Click the template area to customize the redundant folder structure. See "5.29.3 Path editor" on page 170
334- PRIMARY PATH	5.29.2 Path & file name templates - (p.166)	Displays the folder structure (path) and path template which will be used for primary files. Click the template area to customize the primary file folder structure. See "5.29.3 Path editor" on page 170
335- GLOBAL WILDCARDS	5.29.2 Path & file name templates - (p.166)	Accompanying the many system and project based wildcards, the Cinedeck system also has six global wildcards which are static, meaning they are available for regularly used data that is common between projects such as a facility or department ID. Like user wildcards, global wildcards have a title which identifies the wildcard in the wildcard list and an expansion, the data associated to the title which is inserted into a name at record time. See "5.29.5 Edit user & global wildcards" on page 174
336- ALL ENCODERS USE SAME TEMPLATES	5.29.2 Path & file name templates - (p.166)	When this button is orange (active), file naming for related slave encodes such as a proxy, follow the master file naming template. When inactive, (aqua), all related encodes can have their own file naming template.
337- MASTER	5.29.2 Path & file name templates - (p.166)	This switches the template overview to display the master file path and name details. If "all encoders use same templates" is active, the other tabs are not relevant.
338- PROXY	5.29.2 Path & file name templates - (p.166)	When "all encoders use same templates" is active, these additional tabs are not relevant as the master template dictates all path and file names. When "all encoders use same templates" is not active, this and other related encoder tabs which are visible in other modes, switch the template overview to display and allow editing the proxy and other related encode file path and name details.

5.29.3 Path editor

You use the path editor to create the folder structure where your files will be written. The interface for naming folders and files uses the same basic procedure, the difference being that some variables or wildcards may not be available.
The upper “template” field is where you enter the wildcards and text which forms the name.

Select wildcards using the “wildcard shortcut” buttons or directly type them in along with any other required text using the on-screen or an attached USB keyboard. You can also utilize Windows copy & paste in the template field.



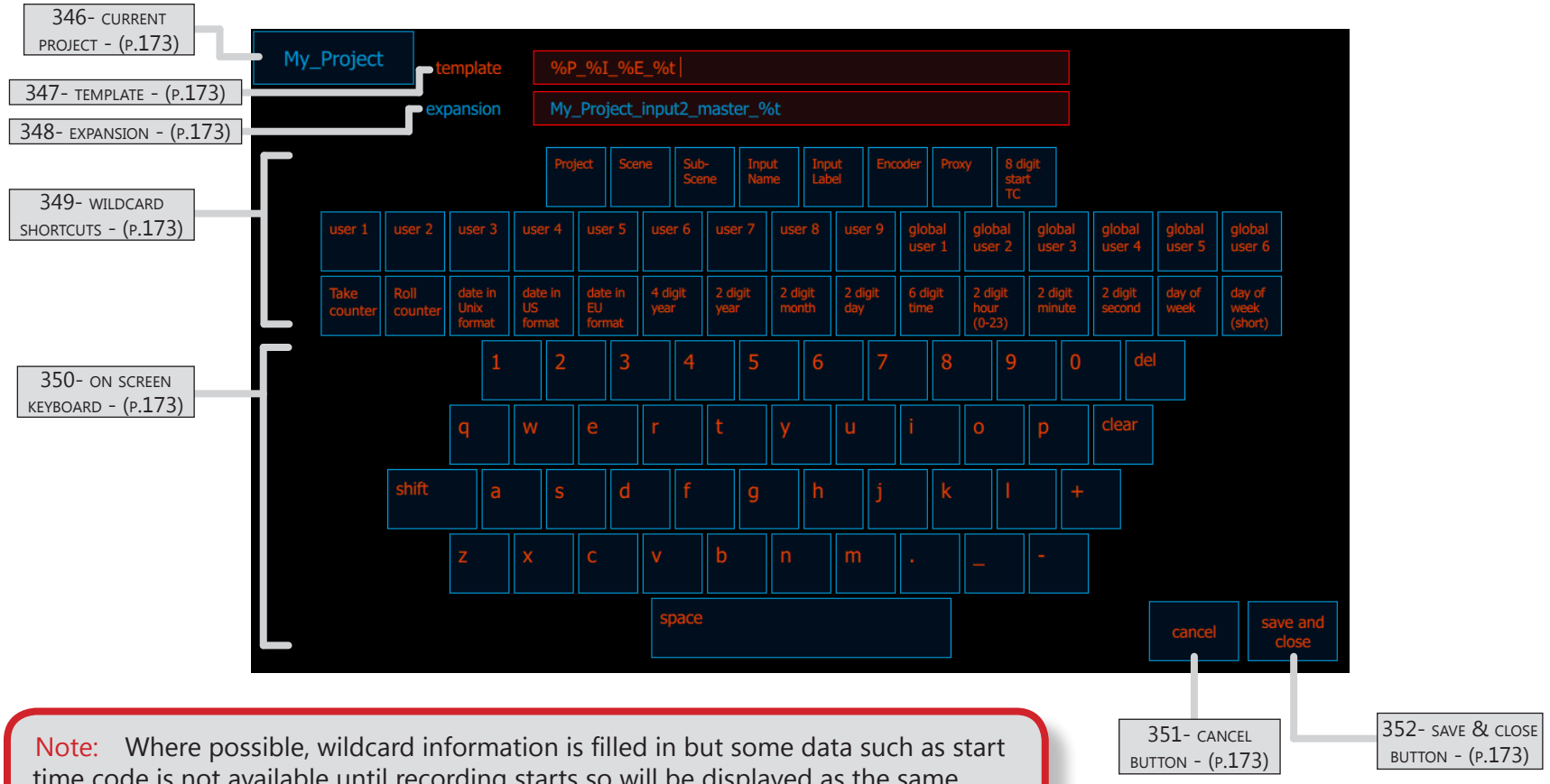
Note: When possible, wildcard information is filled in immediately but some data such as start time code is not available until recording starts so just displays the variable.

Project manager / Path editor cont...

Name	Location	Description
339- CURRENT PROJECT	5.29.3 Path editor - (p.170)	Displays the project name you are currently editing.
340- TEMPLATE	5.29.3 Path editor - (p.170)	This is an editable field which displays the text template used to form the name you are creating. Any letter proceeded by the "%" symbol is a wildcard or variable which will be filled in when recording is activated.
341- EXPANSION	5.29.3 Path editor - (p.170)	The expansion display shows the full name as described by the template above. Where possible, wildcard information is filled in but some data such as start time code is not available until recording starts so will be displayed as the same variable entered in the above template.
342- WILDCARD SHORTCUTS	5.29.3 Path editor - (p.170)	The wildcard shortcut buttons provide easy access to the various record-time wildcards. Press a button and the appropriate variable is inserted into your template at the current cursor position.
343- ON SCREEN KEYBOARD	5.29.3 Path editor - (p.170)	The on-screen keyboard can be used with a mouse or by presses when a touch screen is available. It works in a similar fashion to a standard USB keyboard with the following exceptions: • The "del" key functions as backspace, deleting characters to the left of the cursor • The "clear" key deletes all text in the current field • The "shift" key functions as a shift lock toggle; On is all caps, Off is all lower case • Depending on the preference set on the "prefs" setup page, space bar will place a underscore character in place of a space
344- CANCEL BUTTON	5.29.3 Path editor - (p.170)	Cancel any changes and return to the previous screen.
345- SAVE & CLOSE BUTTON	5.29.3 Path editor - (p.170)	Pressing save and close, confirms any changes, closes the project setup screens and returns to the main setup area.

5.29.4 File name editor

The file name editor is where you create the structure to determine your file names. All naming of folders, files, etc. uses the same basic procedure, the difference being that some variables or wildcards may not be available. The upper “template” field is where you enter the wildcards and text which forms the name.
You may select wildcards using the “wildcard shortcut” buttons or directly type them in along with any other required text using the on-screen or an attached USB keyboard. You can also utilize Windows copy & paste in the template field.



Note: Where possible, wildcard information is filled in but some data such as start time code is not available until recording starts so will be displayed as the same variable entered in the above template.

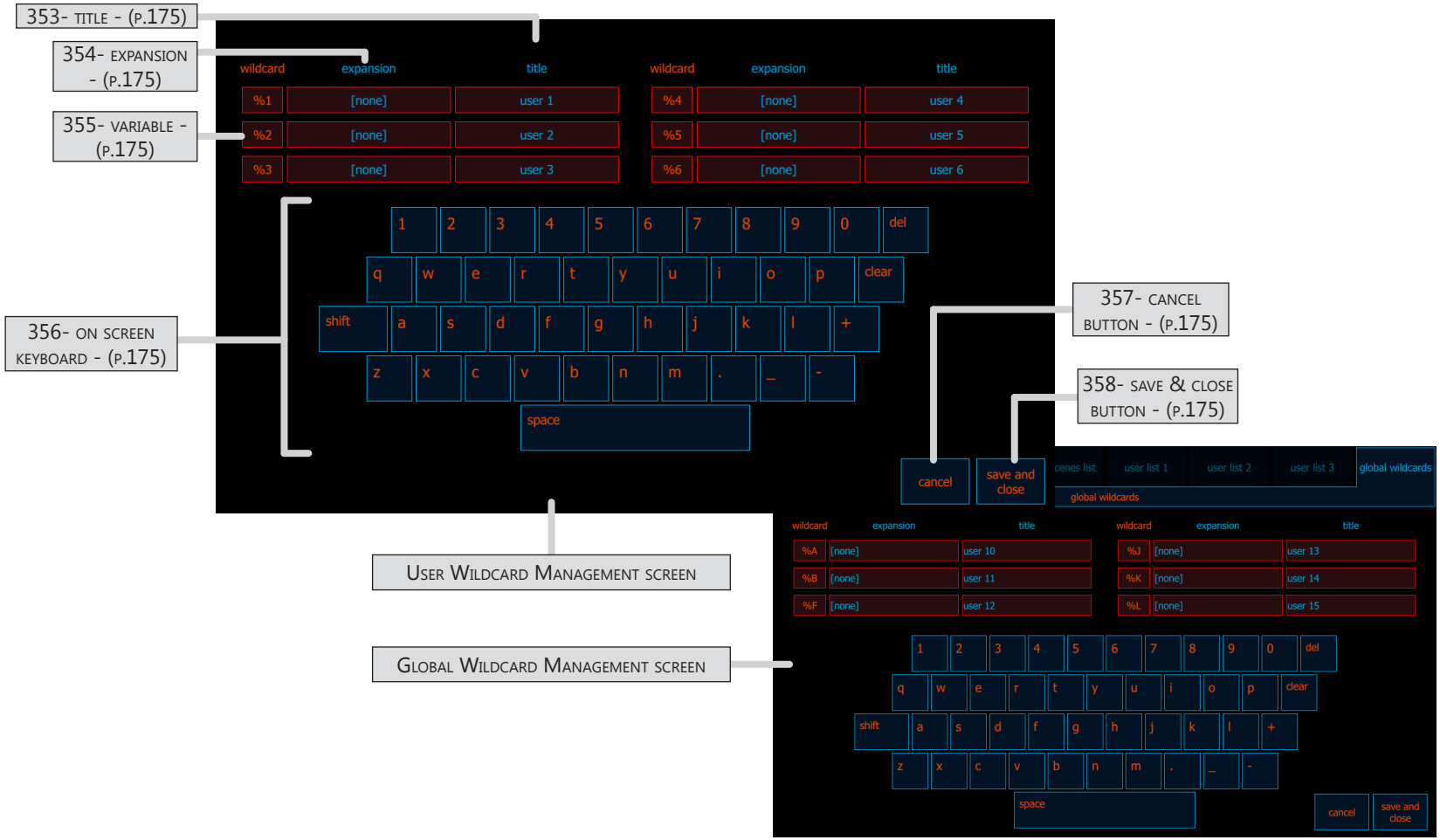
Project manager / File name editor cont...

Name	Location	Description
346- CURRENT PROJECT	5.29.4 File name editor - (p.172)	Displays the project name you are currently editing.
347- TEMPLATE	5.29.4 File name editor - (p.172)	This is an editable field which displays the text template used to form the name you are creating. Any letter proceeded by the "%" symbol is a wildcard or variable which will be filled in when recording is activated.
348- EXPANSION	5.29.4 File name editor - (p.172)	The expansion display shows the full name as described by the template above. Where possible, wildcard information is filled in but some data such as start time code is not available until recording starts so will be displayed as the same variable entered in the above template.
349- WILDCARD SHORTCUTS	5.29.4 File name editor - (p.172)	The wildcard shortcut buttons provide easy access to the various record-time wildcards. Press a button and the appropriate variable is inserted into your template at the current cursor position.
350- ON SCREEN KEYBOARD	5.29.4 File name editor - (p.172)	The on-screen keyboard can be used with a mouse or by presses when a touch screen is available. It works in a similar fashion to a standard USB keyboard with the following exceptions: • The "del" key functions as backspace, deleting characters to the left of the cursor • The "clear" key deletes all text in the current field • The "shift" key functions as a shift lock toggle; On is all caps, Off is all lower case • Depending on the preference set on the "prefs" setup page, space bar will place a underscore character in place of a space
351- CANCEL BUTTON	5.29.4 File name editor - (p.172)	Cancel any changes and return to the previous screen.
352- SAVE & CLOSE BUTTON	5.29.4 File name editor - (p.172)	Pressing save and close, confirms any changes, closes the project setup screens and returns to the main setup area.

5.29.5 Edit user & global wildcards

The Cinedeck system has many wildcards which can insert real-time data into your folder and file names. User wildcards answer the need for project specific data which is repeatedly required while the similar global wildcards contain data which would be used across many projects. Any text can be added to these wildcards such as a show ID, program number, directors name, facility or department name or ID, etc.
You can select wildcards with shortcut buttons at the top of the path and file name editors.

The wildcard title field is used to name a wildcard and is shown on the on-screen keyboard to identify the wildcard and the expansion is the text you want inserted in your folder or file name.



Project manager / Edit user & global wildcards cont...

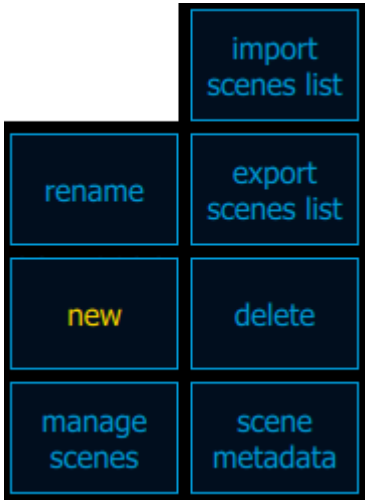
Name	Location	Description
353- TITLE	5.29.5 Edit user & global wildcards - (p.174)	The title is the text which will be displayed on the shortcut button in the path and file name editing interfaces. These buttons are not terribly large so this text needs to be short and concise yet still give meaning. You might for example use ShowID. If you find you don't like the name you have selected, you can change this at any time.
354- EXPANSION	5.29.5 Edit user & global wildcards - (p.174)	The expansion field is where you enter the text you want inserted into your folder or file names. Using the above example, the show ID might be Ep21NY which would mean Episode 21 New York.
355- VARIABLE	5.29.5 Edit user & global wildcards - (p.174)	The % symbol and the number 1 through 6 are the variables which actually carry the expansion text so when you use %1 in a file name, the text "Ep21NY" is inserted.
356- ON SCREEN KEYBOARD	5.29.5 Edit user & global wildcards - (p.174)	The on-screen keyboard can be used with a mouse or by presses when a touch screen is available. It works in a similar fashion to a standard USB keyboard with the following exceptions: • The "del" key functions as backspace, deleting characters to the left of the cursor • The "clear" key deletes all text in the current field • The "shift" key functions as a shift lock toggle; On is all caps, Off is all lower case • Depending on the preference set on the "prefs" setup page, space bar will place a underscore character in place of a space
357- CANCEL BUTTON	5.29.5 Edit user & global wildcards - (p.174)	Cancel any changes and return to the previous screen.
358- SAVE & CLOSE BUTTON	5.29.5 Edit user & global wildcards - (p.174)	Pressing save and close, confirms any changes, closes the project setup screens and returns to the main setup area.

5.29.6 Scenes list

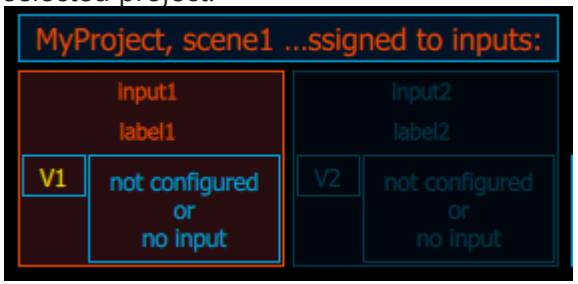
The scenes list page is used for creating, editing, importing and exporting scenes, name elements that can optionally be used in folder and file names. They are particularly useful in that multiple scene names can be created in advance and then, during a production, the current scene can be quickly selected by toggling through the list using keyboard shortcut keys. Projects can effectively have an unlimited number of scenes and sub-scenes. See "5.29.7 Sub-scenes & User Lists" on page 179

Each scene and sub-scene can also have metadata associated to it such as day, night, etc. This metadata is primarily meant for "slate" burn-in, an upcoming feature for automatically adding a slate at the head of each clip recording for a user defined number of frames.

Project manager / Scenes list cont...

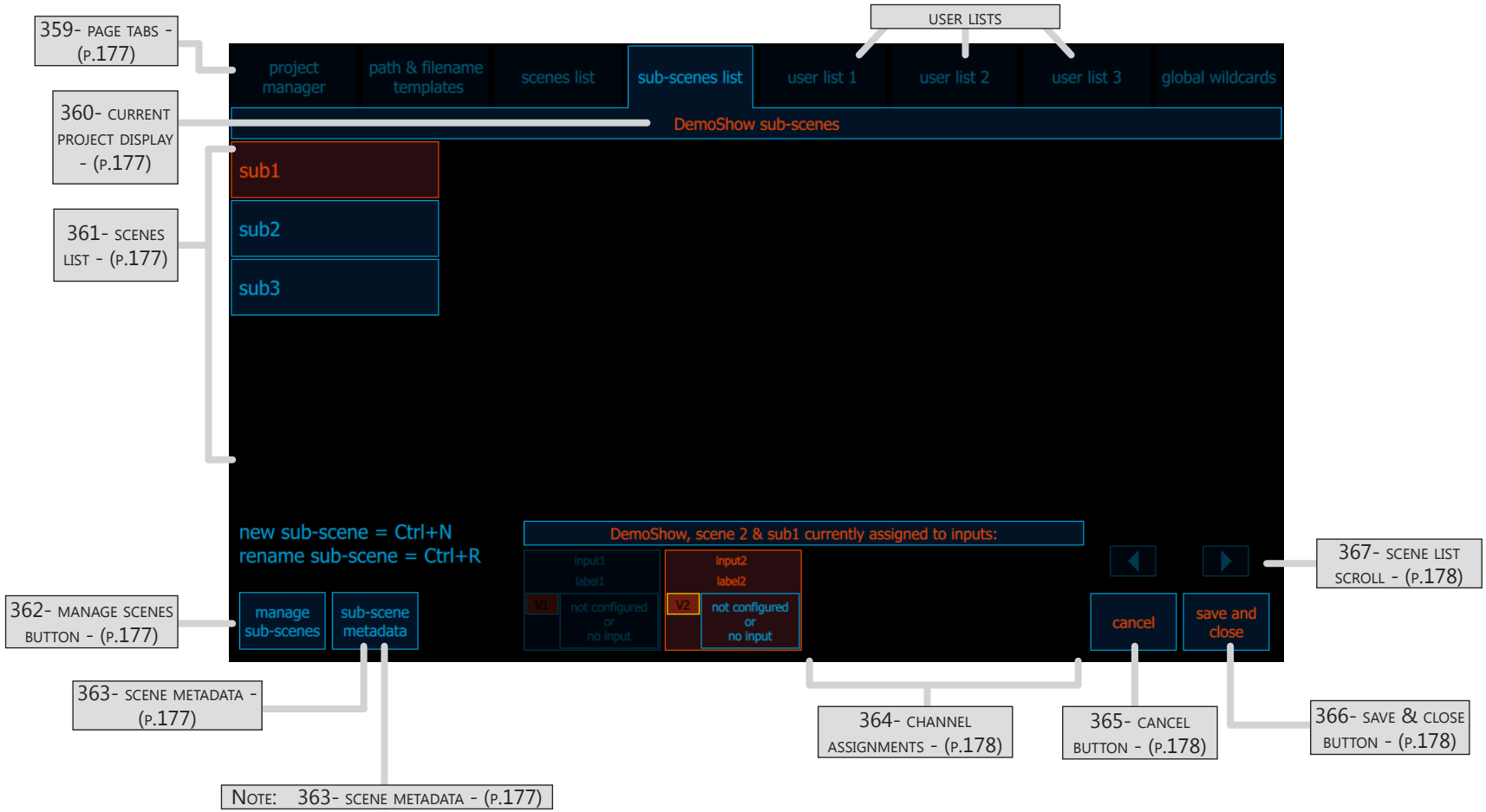
Name	Location	Description
359- PAGE TABS	5.29.6 Scenes list - (p.176)	The selector tabs are always visible in the project manager setup area. These can be clicked to provide direct access to each setup section.
360- CURRENT PROJECT DISPLAY	5.29.6 Scenes list - (p.176)	The current project display indicates the selected project for which you would be managing scenes.
361- SCENES LIST	5.29.6 Scenes list - (p.176)	The scenes list displays all of the currently available scenes. The selected scene is colored and bordered orange. If you are using the scene wildcard in your folder or file naming, select a scene and then "save and close" to designate that scene as the current scene to be used in the name of the next recording. Scenes can also be selected using shortcut keys on a USB keyboard from the main multi view and single channels views. See "5.3 Keyboard shortcuts" on page 80
362- MANAGE SCENES BUTTON	5.29.6 Scenes list - (p.176)	 Manage scenes provides access to; • Creating new scenes • Deleting the selected scene • Renaming the selected scene • Exporting the current scenes list - When exporting a scenes list, you can save it in any destination and you must provide a name. Scenes lists use the .csl extension • Importing scenes list - Scenes lists are actually xml files with a .csl extension. Standard ASCII text files which contain just scene names, one on each line, with the .txt extension can also be imported.
363- SCENE METADATA	5.29.6 Scenes list - (p.176)	The scene metadata button opens a small pop-up window for selecting/changing preset scene related metadata such as slate number, day, night, etc.

Project manager / Scenes list cont...

Name	Location	Description
364- CHANNEL ASSIGNMENTS	5.29.6 Scenes list - (p.176)	The channel assignment display shows which channels are associated to the currently selected project.  (Orange indicates the channel is associated to the selected project. Dim channels are assigned to other projects)
365- CANCEL BUTTON	5.29.6 Scenes list - (p.176)	Cancel any changes and return to the previous screen.
366- SAVE & CLOSE BUTTON	5.29.6 Scenes list - (p.176)	Pressing save and close, confirms any changes, closes the project setup screens and returns to the main setup area.
367- SCENE LIST SCROLL	5.29.6 Scenes list - (p.176)	The scene list can display thirty scenes. If more than thirty scenes are on in a project, the scene list scroll arrows will be available to scroll the list left and right.

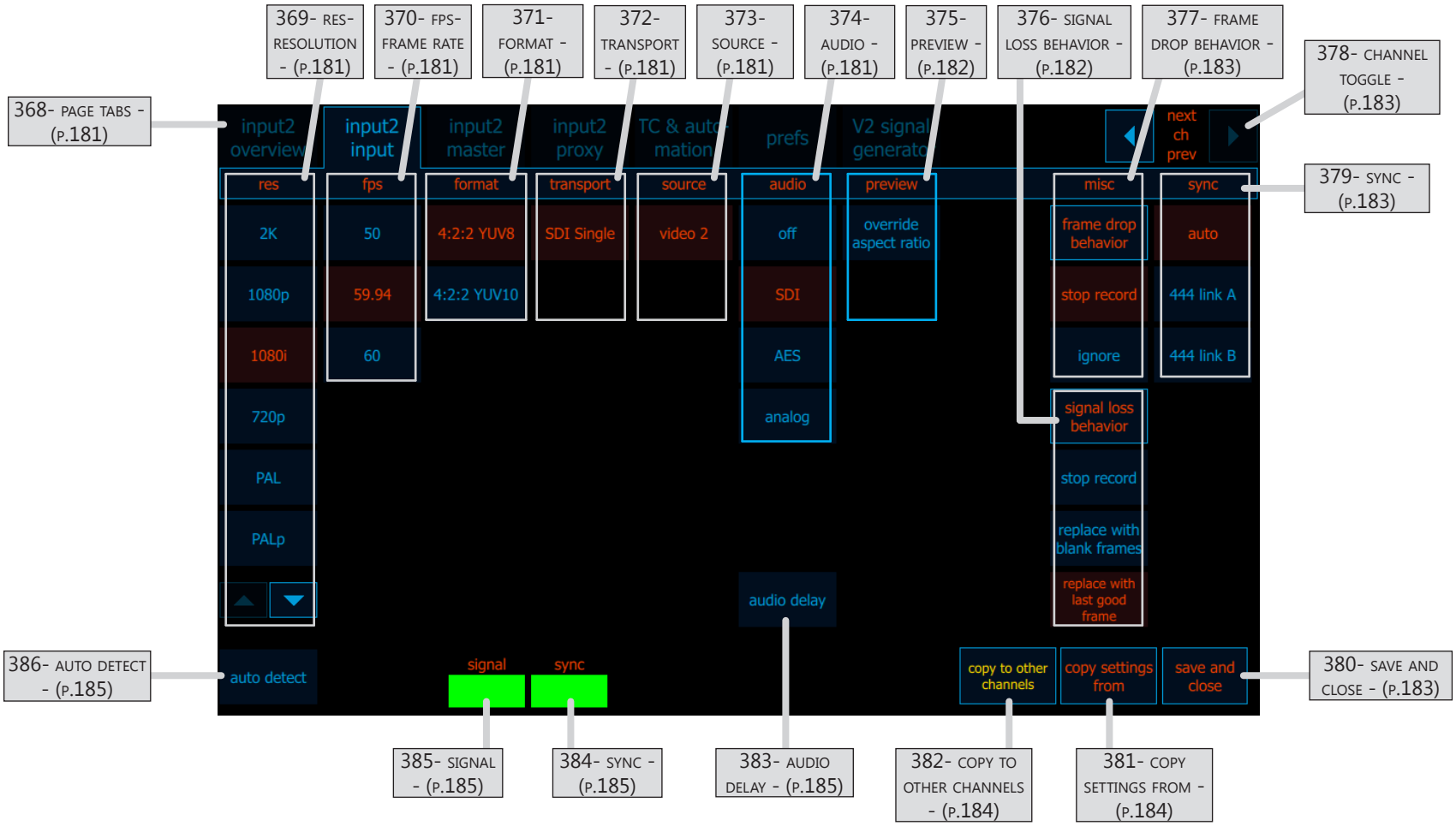
5.29.7 Sub-scenes & User Lists

In addition to scenes, project manager includes sub-scenes (that also can be selected using keyboard shortcuts) and user lists, additional name elements to optionally use in folder and file names. The layout and usage of user lists, sub-scenes and scenes is identical except user lists do not have metadata options and cannot be toggled through via keyboard shortcuts.
The metadata for sub-scenes is primarily meant for "slate" burn-in, an upcoming feature for automatically adding a slate at the head of each clip recording for a user defined number of frames. Projects can effectively have an unlimited number of sub-scenes.



5.30 Input tab

The input page is the first real setup screen in the left to right setup sequence and the settings you change here are for all channels associated to the current project. If you have all channels associated to the current project, you will just do this once. Otherwise, you will perform these steps for each project.
To begin setup, your cables should already be connected;
Press “auto detect” - This will provide initial input settings. You can then make fine adjustments such as selecting 10bit if you know you have 10bit source and select your audio source; SDI, AES, Analog. See the specific control descriptions for details.



Input tab / - cont...

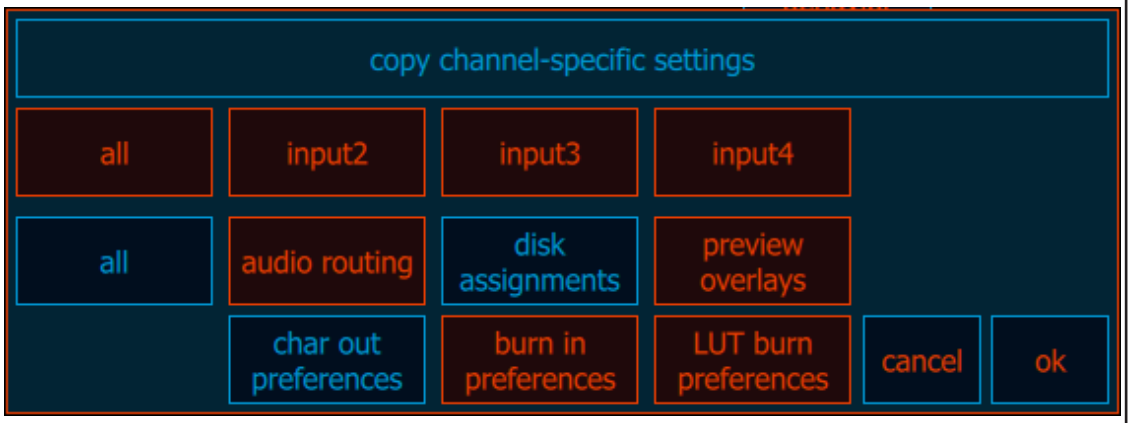
Name	Location	Description
368- PAGE TABS	5.30 Input tab - (p.180)	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
369- RES-RESOLUTION	5.30 Input tab - (p.180)	You can view and select the input resolution in this vertical listing. When you selected "auto detect" the input resolution should have been detected and a green lamp should be illuminated at the bottom of the screen. If not, confirm that there is actually a signal and that the BNC connection is good. For situations where you do not yet have an active source, you can manually select the appropriate resolution.
370- FPS-FRAME RATE	5.30 Input tab - (p.180)	Cinedecks support all standard video frame rates and as with resolution, this too should have been detected by "auto detect".
371- FORMAT	5.30 Input tab - (p.180)	The format or color bit depth can be adjusted as needed however do keep in mind that not all codecs support all bit depths. For example, although your video source may be 10bit, if you plan to encode XDCAM HD, this must remain as 8bit as XDCAM HD is an 8bot only codec.
372- TRANSPORT	5.30 Input tab - (p.180)	The input type or signal transport should also have been detected and will normally be SDI however this too can be adjusted to your specific needs and different settings will be available in different modes.
373- SOURCE	5.30 Input tab - (p.180)	Displays the local input number based on the system mode, ie, 1.5g, Dual Link, etc.
374- AUDIO	5.30 Input tab - (p.180)	Audio source can be switched between off, SDI, AES and on some systems, Analog. Cinedecks support up to 16 channels of embedded SDI audio, 8 AES channels for each video pair and analog audio can be sourced from the rear mounted motherboard line-level mini jack or a Focusrite 2i2 Analog > USB adapter.

Input tab / - cont...

Name	Location	Description
375- PREVIEW	5.30 Input tab - (p.180)	The preview setting drives two distinctly different functions. 1) It forces the Cinedeck user interface video preview to format the displayed image with a particular aspect ratio. 2) When recording, it sets a flag in the recorded file to tell systems such as editors that the content is actually that aspect ratio. Both of these are particularly useful when working with SD video that is 16x9 and not 4x3.
376- SIGNAL LOSS BEHAVIOR	5.30 Input tab - (p.180)	It is also possible that during a session, the video input will be lost. This is also most commonly caused by external factors such as a broken cable, power being lost at the source equipment, unstable on uncontrolled satellite sources and so on. You can also select the behavior in the case of lost video; The recording can be stopped which might be used in a monitored siltation where there are many incoming lines and only a few source devices. More common however would be to force the recording to continue so images will immediately be recorded when the picture is restored. In this case you can select to record black while there is no source or to record a freeze frame of the last good captured frame. The recommended setting is black to make it clear to any observer that there is no useful signal being recorded.

Input tab / - cont...

Name	Location	Description
377- FRAME DROP BEHAVIOR	5.30 Input tab - (p.180)	It should not happen on a system that is running properly in a good environment but it is possible that during a session, a frame of video will be lost. Although not common with a clean system, dropped frames can be caused by many factors. The most common are external such as poor video cables and connections, unstable video sources, power surges and dirty power, unstable sync and so on. It is also possible that the Cinedeck has a more local issue such as a storage problem, failing I/O card or a card which has worked itself loose in transport. You have an option as to how you want your Cinedeck to respond if a dropped frame is detected, it can stop recording or not. It is generally recommended to set the system to "ignore". You will still receive a warning so can always manually stop but in general, one dropped frame should not halt a production.
378- CHANNEL TOGGLE	5.30 Input tab - (p.180)	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The "input", "master" and "proxy" tab names reflect the change, displaying the names associated to the selected channel.
379- SYNC	5.30 Input tab - (p.180)	Cinedecks are capable of using tri-level or black burst reference or sync sources. When set to "auto" and no external reference is connected, the system will lock to the incoming video source. When set to auto and there is either tri-level sync or black burst, the system will lock to the external source and the "sync" light on the main display will light green, indicating a external reference is in use. Additionally, for using the input a reference when the source is dual-link, the user can manually select whether the A input or B input should be used as the reference source.
380- SAVE AND CLOSE	5.30 Input tab - (p.180)	Pressing save and close, confirms any changes, closes the setup screens and returns to the previous multi or single channel view.

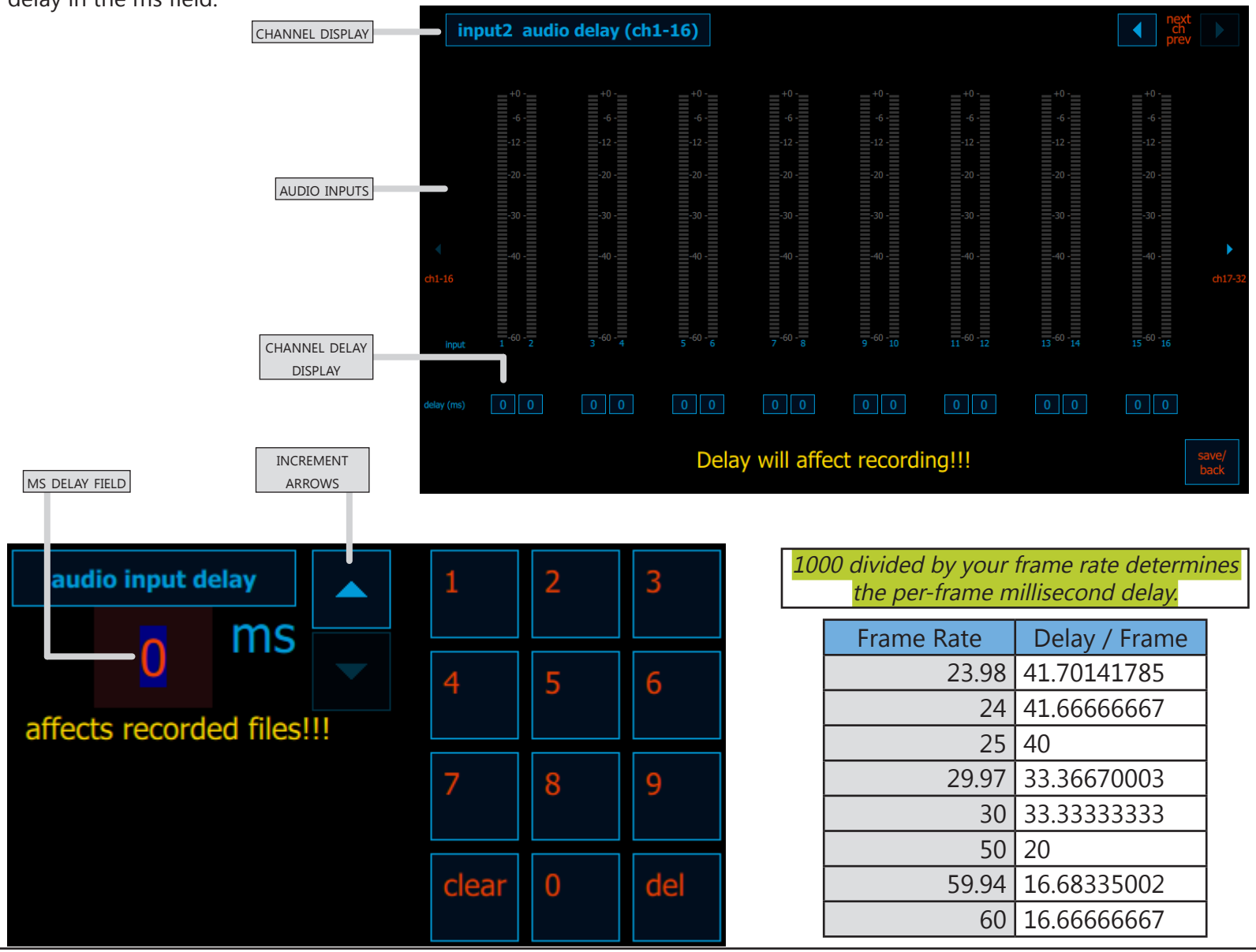
Name	Location	Description
381- COPY SETTINGS FROM	5.30 Input tab - (p.180)	"copy settings from" provides a quick process for duplicating the settings from one channel to the currently selected channel. This method is essentially the reverse of the more flexible "copy settings to other channels", the description of which follows.
382- COPY TO OTHER CHANNELS	5.30 Input tab - (p.180)	 "copy to other channels" opens this sub-menu which allows copying or pushing, channel independent settings such as audio channel selection & routing and file destination drive, from the selected channel to one or more other channels. In the above image, the orange highlighted channel 1 settings will be copied to channels 2, 3 and 4. If for example, you also wanted to copy drive destinations from channel 1, you would press disk assignments to include them.

Input tab / - cont...

Name	Location	Description
383- AUDIO DELAY	5.30 Input tab - (p.180)	It is not uncommon to route the source video through one or more processing systems before directing it to the recording. Each step along the way can significantly delay the arrival of the video at the recorder. In contrast, the audio may not be processed at all. This can result in a noticeable timing difference between the video and audio. While technically a video issue, correcting it requires delaying the audio. The Cinedeck has the ability to independently delay each incoming audio channel by up to 999 milliseconds (about one second). The "audio delay" button opens an audio delay overview screen where each audio channel can be delayed. Divide 1000 by your frame rate to determine the needed per frame millisecond delay. See "5.30.1 Audio delay" on page 186.
384- SYNC	5.30 Input tab - (p.180)	The sync lamp will be green when the Cinedeck detects an appropriate reference signal at the sync connection.
385- SIGNAL	5.30 Input tab - (p.180)	The signal lamp will be green when the Cinedeck detects an appropriate input signal.
386- AUTO DETECT	5.30 Input tab - (p.180)	When pressed, the channel input will automatically be configured for the source.

5.30.1 Audio delay

Each incoming audio channel can be independent delayed by up to 999 milliseconds (about one second). Clicking on the delay display below each channel opens the audio delay interface. Click the arrows to increment or type the required delay in the ms field.

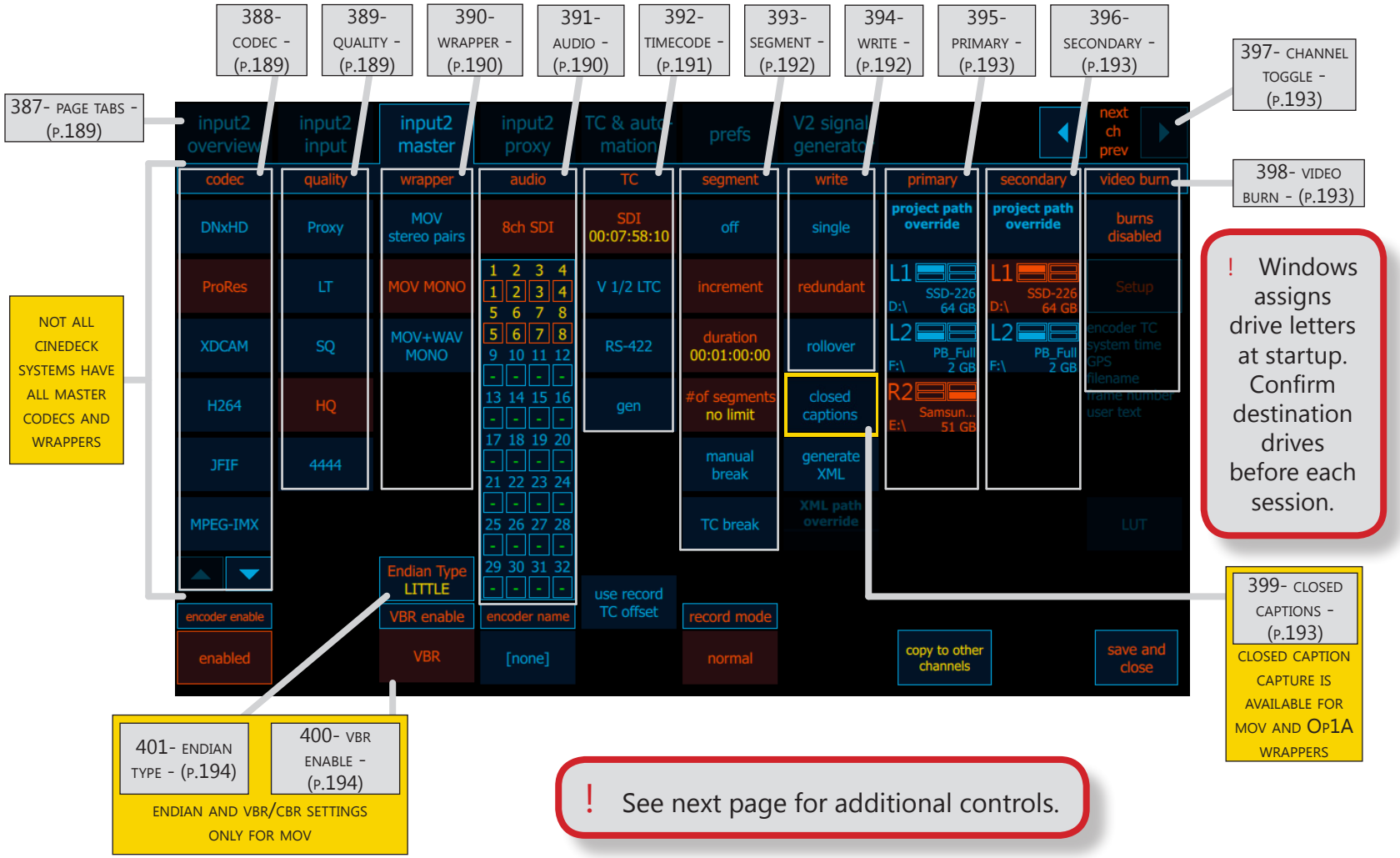


1000 divided by your frame rate determines the per-frame millisecond delay.

Frame Rate	Delay / Frame
23.98	41.70141785
24	41.66666667
25	40
29.97	33.36670003
30	33.33333333
50	20
59.94	16.68335002
60	16.66666667

5.31 Master tab

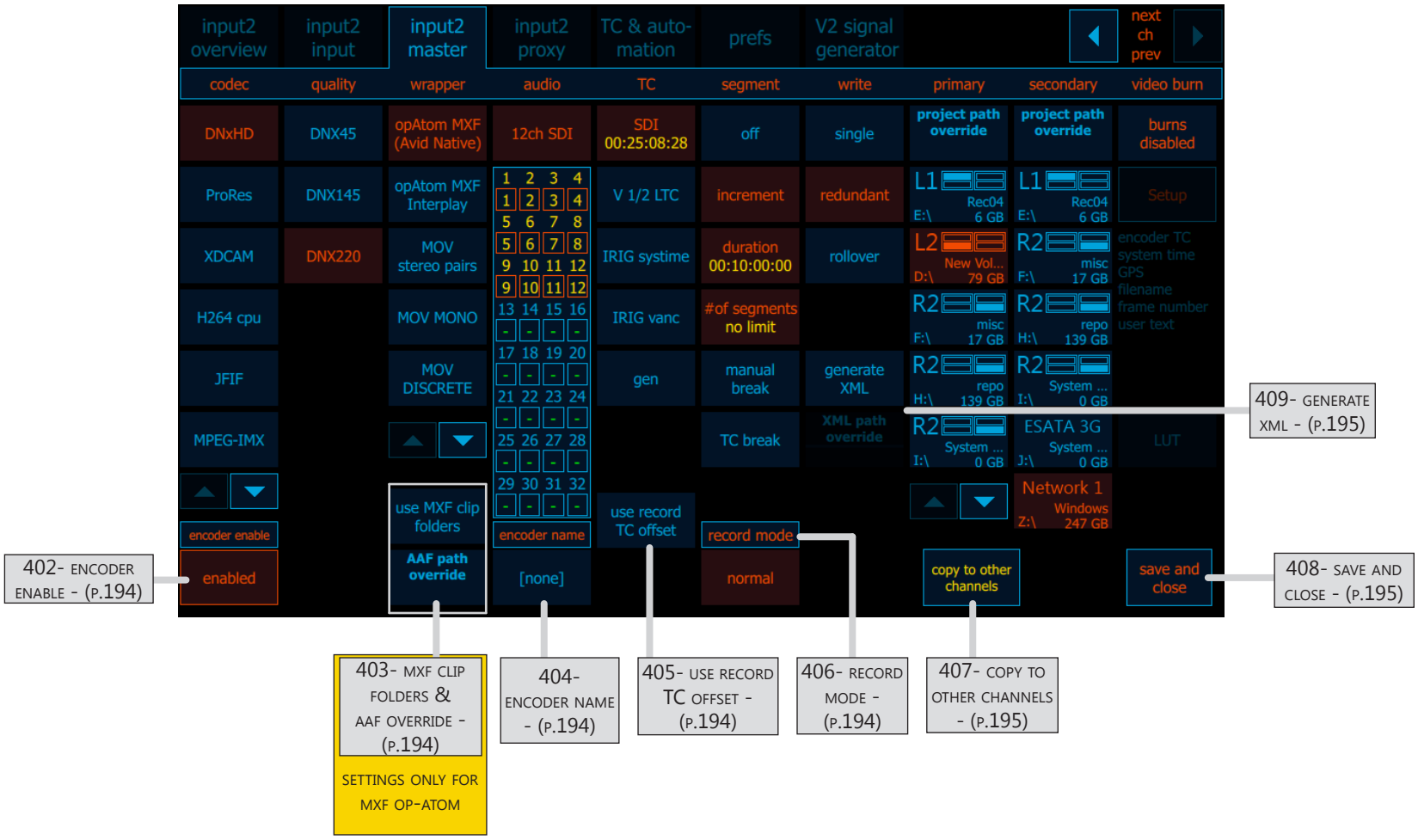
The master page is where you set all of the master file encode parameters such as codec, wrapper, timecode source, etc. To do so it is very important to understand the difference between the codec, the quality or bit rate and the wrapper. See "10.1 FAQ > Features" on page 329.
Generally you make selections starting at the left as each selection can have a filtering effect on the available options.
See the screen shots on this and the next page to locate specific controls.



Master tab / - cont...

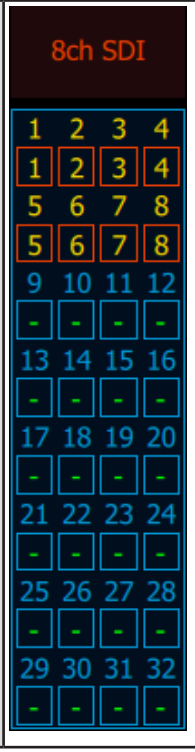
The upper portion of the master page contains the key settings for your master encode while the lower half adds several modifiers and utility functions.

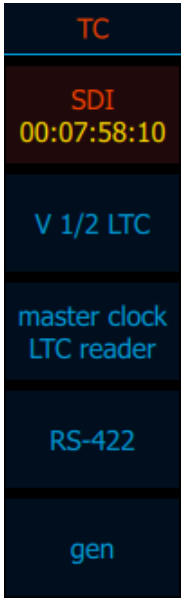
! See previous page for additional controls.

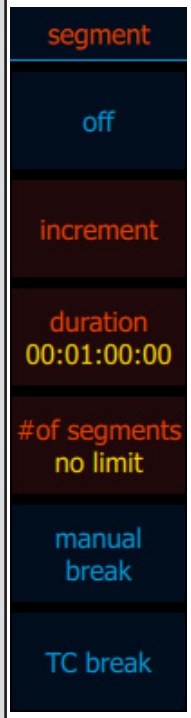


Master tab / - cont...

Name	Location	Description
387- PAGE TABS	5.31 Master tab - (p.187)	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
388- CODEC	5.31 Master tab - (p.187)	A great Cinedeck feature is native codec recording and workflow flexibility but selecting the right codec for the workflow is critical. There are no defaults and every codec has its advantages and disadvantages. If you do not know what edit system will be used or which codec is required, a fairly safe bet will be ProRes or DNxHD but really, you need to stop and consult with whomever will be editing the files. To select a codec, simply touch the one you need. If the required codec does not appear to be in the list, there may be more that will be visible if you use the arrows or your mouse scroll wheel to move through the list. Additionally, it is important to understand that the input format has an impact on what encoding is available. Not all codecs support all input types and frame rates so again, it is important to know the full workflow. See “10.1 FAQ > Features” on page 329. It should be noted that Cinedecks support most commonly used codecs but not all Cinedeck systems have all codecs. This is especially true for ZX which is a modular system, often purchased with a limited set of codecs. Additional workflow packages with additional codecs and wrappers are available.
389- QUALITY	5.31 Master tab - (p.187)	Once you have selected your desired codec, you usually need to select a quality level or bitrate. This will not be the case, for example if you select uncompressed as there is only one quality for uncompressed. Cinedeck encoders use the most common designations for encode quality so you should find the options familiar. Select the appropriate quality setting and move on to select a wrapper. If the only information visible in this column is “not available” it is because the input you are using is not supported by the selected codec. This is because, not all codecs and wrappers support all input types and frame rates so again, it is important to know the full workflow. See “10.4. What is bitrate/quality:” on page 330

Name	Location	Description
390- WRAPPER	5.31 Master tab - (p.187)	Last of the basic encode selections is the wrapper and again, Cinedecks support those most commonly used in production workflows. Again it is best to confirm the requirements with whomever will be editing but some generalizations can be made; If you are working in an Avid post environment, you would normally select "Avid MXF" as these files are wrapped in Avid's native OpAtom MXF. If you are working in Final Cut, you will normally want MOV wrapped files and MOV mono is generally the most useful for an edit environment. If you are working in an Adobe environment you might prefer MXF Op1a but MOV is also very common. For more information, see "10.2. What is a codec:" on page 329
391- AUDIO	5.31 Master tab - (p.187)	 This matrix view displays the number of audio channels selected for recording and indicates the source and destination audio channels. If the matrix is gray, the audio source selection on the input page is off. While SDI only supports 16 channels, some files can support up to 32 audio tracks, hence the encode settings give you direct access for creating those tracks. These tracks can be inserted into at a later point using Cinedeck's Insert-Edit. Click the matrix to open and adjust audio track selections and routing. Basically, the upper meters in the router matrix editor show the incoming audio channels for the selected source. The boxes below each channel indicate the destination tracks. Click a box below the channel 1 meter to select a source track for channel 1 and so on. For more detail, see "5.33 Audio routing" on page 203

Name	Location	Description
392- TIMECODE	5.31 Master tab - (p.187)	There are multiple timecode options for your recording.  • Select "SDI" if you want to record the timecode coming into the recorder, embedded in the source video. • Select "LTC" 1-2 (linear time code) to record a house time code source connected to the LTC 1-2 input BNC connector. On 4 channel machines ch 3 and 4 use the LTC 3-4 input BNC connector. • Select "master LTC" to use house timecode on the master LTC BNC connection. **(Note; master LTC is optional on ZX and not applicable to RX)** • Select RS-422 to record timecode from the RS-422 connection to a slave device (see ** below) • Select "gen" to use internally generated timecode. See "5.35 TC & Automation tab" on page 210 for details on setting the timecode generator. *** RS-422 timecode is only available as a timecode source, for channels set to master RS-422 mode and that have an active RS-422 connection to a slave device set to remote mode.* *If the channel requiring RS-422 timecode is sharing a project with other channels, the other channels must also be set to master RS-422 mode. Also, the RS-422 remote link must be active to transmit the timecode* (See "124- RS-422 button" on page 96 and "145- 422 mode" on page 101 for more information about setting RS-422 master and slave mode)

Name	Location	Description
393- SEGMENT	5.31 Master tab - (p.187)	 Some workflows, especially those with very long recording times, can benefit from breaking recordings into smaller files. SOME IMPORTANT DETAILS: A SEGMENT IS A CLOSED, FULLY SELF CONTAINED FILE. SEGMENTED FILE NAMING INCLUDES AUTOMATIC NUMBERING TO INDICATE THE RELATION TO OTHER SEGMENTS. TIMECODE CONTINUITY IS MAINTAINED BETWEEN SEGMENTS MEANING, THE TIMECODE OF EACH SEGMENT STARTS ON THE NEXT FRAME AFTER THE PREVIOUS SEGMENT BREAKING FILES CAN BE USEFUL FOR MAKING CONTENT WHILE RECORDING IS STILL PROCEEDING, WHEN FILES ARE EVENTUALLY DESTINED FOR DRIVES WHICH HAVE FILE SIZE LIMITS, TO PROTECT CONTENT IN THE CASE OF MAJOR SYSTEM FAILURES. • Select “increment” to break files at pre-determined time intervals. Click on “duration” to open the on-screen panel and set the clip segment length. The shortest interval possible is 30 seconds. *If you set a limit to the number of segments, recording will stop when the segment count reaches the preset amount.* • Select “manual break” to allow manual breaking of files by pressing the break button on the main screen. The break button replaces the record button after recording starts. • Select “TC break” to have the system automatically generate a new file at any incoming timecode break.
394- WRITE	5.31 Master tab - (p.187)	There are several options for writing media files; • “Single” writes the selected encode to a single destination drive • “Redundant” writes the selected encode to two drives simultaneously • “Rollover” writes the selected encode to the first selected drive and when that destination is full, it switches to the second selected destination drive. See “10.54. Redundant Files:” on page 341 and “10.57. Roll-over Recording:” on page 342

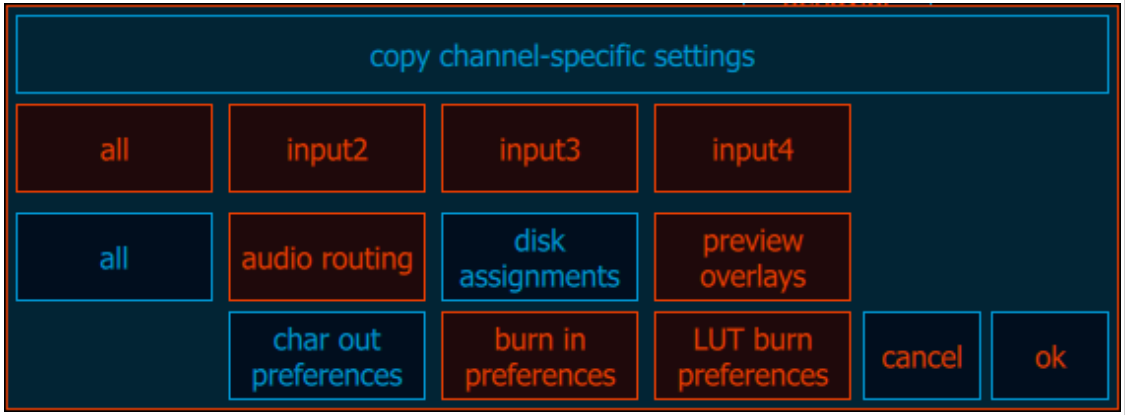
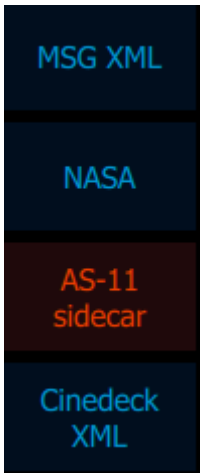
Master tab / - cont...

Name	Location	Description
395- PRIMARY	5.31 Master tab - (p.187)	At a minimum, "single" (see "write" above) and a primary drive must be selected for an encode to be created. This column can display many destination drives. If your preferred destination is not visible, additional drives can be moved into view with the selection up/down arrows. Alternatively, you can select a drive with a preexisting folder structure and override the project folder path structure (See "5.29.1 Path & file names explained" on page 164) To override project settings and manually select a drive and destination path; Press "project path override" at the top of the drive list Navigate to the desired drive and folder Press "save" to return to the master encode setup page.
396- SECONDARY	5.31 Master tab - (p.187)	For redundant recording, both primary and secondary destination drives must be selected. If your preferred destination is not visible, additional drives can be moved into view with the selection up/down arrows and note that any drive already selected as the primary destination, will not be available. As with the primary files, "project path override" is also available for secondary files.
397- CHANNEL TOGGLE	5.31 Master tab - (p.187)	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The "input", "master" and "proxy" tab names reflect the change, displaying the names associated to the selected channel.
398- VIDEO BURN	5.31 Master tab - (p.187)	Burn-in is primarily used on proxy files though in some cases it is also possible to apply a character burn-in to a master file. For additional information see "5.34 Video burn settings" on page 207. **Remember, a burn-in is a permanent part of the video and can not be removed!**
399- CLOSED CAPTIONS	5.31 Master tab - (p.187)	 This toggles capture of close caption data on and off and provides selection for the specific VANC position where CC data will be inserted. Closed caption data capture is available for MOV and Op1a wrapped encodes.

Master tab / - cont...

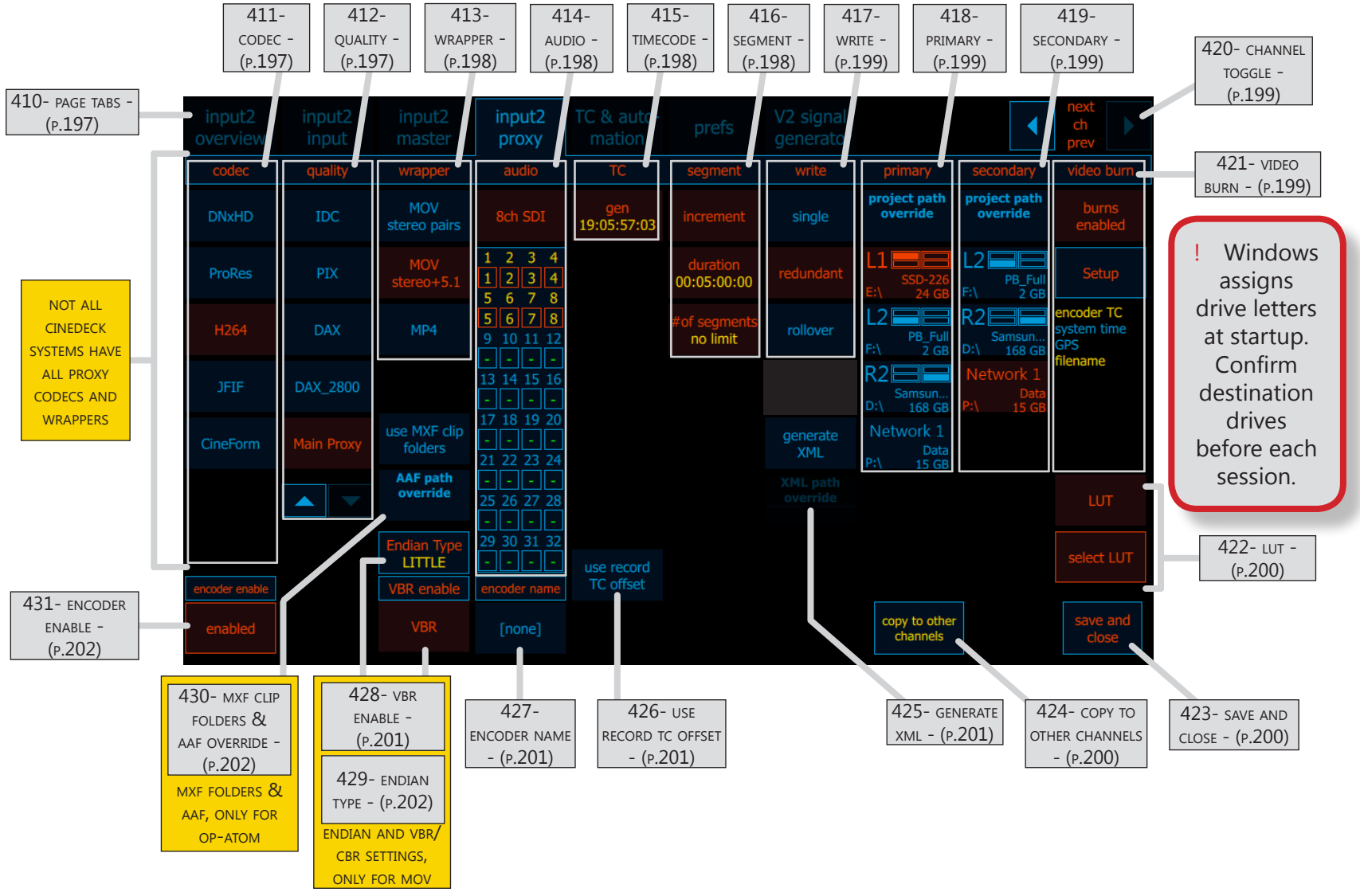
Name	Location	Description
400- VBR ENABLE	5.31 Master tab - (p.187)	Some codecs available on the Cinedeck can be encoded as either VBR (variable bit rate) or CBR (constant bit rate). This can be an important selection so if available, you should confirm with whomever will be editing or further processing the files when recording is complete. This setting will only be visible when a VBR codec is selected. See "10.4. What is bitrate/quality:" on page 330
401- ENDIAN TYPE	5.31 Master tab - (p.187)	Endian type refers to the byte order of multi-byte PCM audio samples. Big means the data is stored big-end first, little (the more common of the two) means the data is stored little-end first. Unless you know big endian is needed, leave this set to little.
402- ENCODER ENABLE		Each master and proxy encoder can be independently enabled or disabled as needed. If there is no requirement for a particular master or proxy encode, this is the way to disregard it.
403- MXF CLIP FOLDERS & AAF OVERRIDE	5.31 Master tab - (p.187)	When recording OpAtom which creates independent files for each video and audio track, you have the option of placing all the files in a single folder or, for organizational purposes, placing the clips for each start/stop in separate folders. The default is to use a single folder. Note that recording to separate folders also means loading clips separately for playback.
404- ENCODER NAME	5.31 Master tab - (p.187)	Like the "name" and "label" fields, editable on the overview page, "encoder name" reflects the encoder name variable or wild-card displayed in the page tab bar. The encoder name wild-card can also be used in folder and file names. The default names in 4 channel mode are master and proxy but as with all the variables, they can be changed to meet your specific requirements. Click "encoder name" to open an on-screen keyboard to change the name.
405- USE RECORD TC OFFSET	5.31 Master tab - (p.187)	Record timecode offset provides an easy way to adjust or reset the incoming timecode but unlike generating new timecode, the recorded timecode remains based on the source timecode, keeping all of the breaks and changes. For example, your source may be arriving with timecode starting at 0:00 but because it is the fourth in a set, you want it to start at hour 4. With this setting you can apply a 4 hour offset. Another example might be a source which was recorded with time of day in a different timezone and you want the timecode to reflect GMT or your local time zone. Record timecode offset can be set independently for master and proxy encodes.
406- RECORD MODE	5.31 Master tab - (p.187)	The record mode toggle switches between the various recording modes. See "5.20 Record modes" on page 149

Master tab / - cont...

Name	Location	Description
407- COPY TO OTHER CHANNELS	5.31 Master tab - (p.187)	 "copy to other channels" opens this sub-menu which allows copying channel independent settings such as audio channels & routing from the selected channel to one or more other channels. In the above image, the orange highlighted channel 1 settings will be copied to channels 2, 3 and 4. If for example, you also wanted to copy drive destinations from channel 1, you would press "disk assignments" to include them. Master settings are copied to masters, proxy settings are copied to proxies.
408- SAVE AND CLOSE	5.31 Master tab - (p.187)	Pressing save and close, confirms any changes, closes the setup screens and returns to the previous multi or single channel view.
409- GENERATE XML	5.31 Master tab - (p.187)	 Each recording session can be accompanied by clip specific *.xml files. The completed *.xml files contain clip specific metadata which can be imported into asset managements systems and the like. After selecting an xml type, xml path override can be selected to designate a specific destination folder for the xml files. • MSG xml generates an xml format for use by MSG • NASA is a format for use at for NASA's Orion launch system. • AS-11 sidecar generates a AS-11 compatible xml • Cinedeck xml generates a full generic xml with all data

5.32 Proxy tab

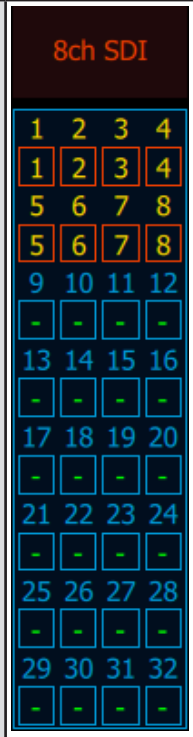
The proxy page is where you set all of the proxy file encode parameters such as codec and wrapper. Note although visible, some of the encode settings made for the master such as timecode, control the proxy encode so cannot be changed on this page.



Proxy tab / - cont...

Name	Location	Description
410- PAGE TABS	5.32 Proxy tab - (p.196)	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
411- CODEC	5.32 Proxy tab - (p.196)	An advantage of Cinedeck is native codec recording and workflow flexibility but selecting the right codec for the proposed workflow is critical. There are no defaults and every codec has its advantages and disadvantages. If you do not know what edit system will be used or which codec is required, a fairly safe bet will be ProRes or DNxHD but really, you need to stop and find out what is needed. To select a codec, simply touch the one you need. If the required codec does not appear to be in the list, there may be more that will be visible if you use the arrows or your mouse scroll wheel to move through the list. Additionally, it is important to understand that the input format has an impact on what encoding is available. Not all codecs support all input types and frame rates so again, it is important to know the full workflow. See “10.1 FAQ > Features” on page 329. It should be noted that Cinedecks support most commonly used codecs but not all Cinedeck systems have all codecs. This is especially true for ZX which is a modular system, often purchased with a limited set of codecs. Additional workflow packages with additional codecs and wrappers are available.
412- QUALITY	5.32 Proxy tab - (p.196)	Once you have selected your desired codec, you usually need to select a quality level or bitrate. Cinedeck encoders use the most common designations for encode quality so you should find the options familiar. Select the appropriate quality setting and move on to select a wrapper. If the only information visible in this column is “not available” it is because the input you are using is not supported by the selected codec. This is because, not all codecs and wrappers support all input types and frame rates so again, it is important to know the full workflow. See “10.4. What is bitrate/quality:” on page 330

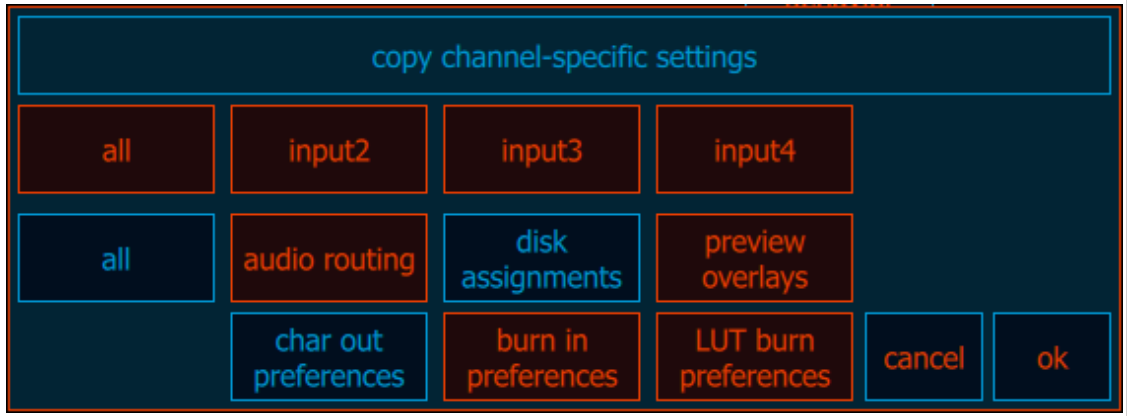
Proxy tab / - cont...

Name	Location	Description
413- WRAPPER	5.32 Proxy tab - (p.196)	Last of the encode selections is the wrapper and again, Cinedecks support those most commonly used in production workflows. Again it is better to confirm the requirements with whomever will be editing but some generalizations can be made; If you are working in an Avid post environment, you would normally select "Avid MXF" as these files are wrapped in Avid's OpAtom MXF. If you are working in Final Cut you will normally want MOV wrapped files. If you are working in an Adobe environment, MOV is also very common. For more information, see "10.2. What is a codec:" on page 329
414- AUDIO	5.32 Proxy tab - (p.196)	 This matrix view displays the number of audio channels selected for recording and indicates the source and destination audio channels. If the matrix is gray, the audio source selection on the input page is off. While SDI only supports 16 channels, some files can support up to 32 audio tracks, hence the encode settings give you direct access for creating those tracks. These tracks can be inserted into at a later point using Cinedeck's Insert-Edit. Click the matrix to open and adjust audio track selections and routing. Basically, the upper meters in the router matrix editor show the incoming audio channels for the selected source. The boxes below each channel indicate the destination tracks. Click a box below the channel 1 meter to select a source track for channel 1 and so on. For more detail, see "5.33 Audio routing" on page 203
415- TIMECODE	5.32 Proxy tab - (p.196)	Displays the timecode selected on the master page.
416- SEGMENT	5.32 Proxy tab - (p.196)	Displays the segment mode selected on the master page.

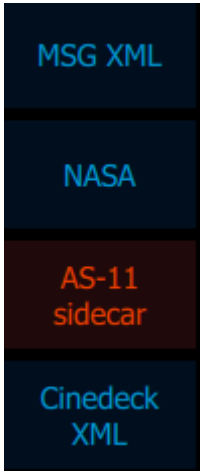
Proxy tab / - cont...

Name	Location	Description
417- WRITE	5.32 Proxy tab - (p.196)	There are several options for writing media files; • "Single" writes the selected encode to a single destination drive • "Redundant" writes the selected encode to two drives simultaneously • "Rollover" writes the selected encode to the first selected drive and when that destination is full, it switches to the second selected destination drive. See "10.54. Redundant Files:" on page 341 and "10.57. Roll-over Recording:" on page 342
418- PRIMARY	5.32 Proxy tab - (p.196)	At a minimum, "single" (see "write" above) and a primary drive must be selected for an encode to be created. This column can display many destination drives. If your preferred destination is not visible, additional drives can be moved into view with the selection up/down arrows. Alternatively, you can optionally select a drive with a preexisting folder structure and override the folder path structure designed in "5.29.1 Path & file names explained" on page 164, in the project manager. To select a drive and destination path; Press "project path override" at the top of the drive list Navigate to the desired drive and folder Press "save" to return to the master encode setup page.
419- SECONDARY	5.32 Proxy tab - (p.196)	For redundant recording both primary and a secondary destination drives must be selected. If your preferred destination is not visible, additional drives can be moved into view with the selection up/down arrows and note that any drive already selected as the primary destination will not be visible. "project path override" is also available for the redundant files.
420- CHANNEL TOGGLE	5.32 Proxy tab - (p.196)	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The "input", "master" and "proxy" tab names reflect the change, displaying the names associated to the selected channel.
421- VIDEO BURN	5.32 Proxy tab - (p.196)	It is possible to apply a character burn-in to proxy files during recording. The burn-in can be timecode, system time, file name, etc. To apply a character burn, enable burns and follow the prompts. Press setup to customize the selection and position. For additional information see "5.34 Video burn settings" on page 207. **Remember, a burn-in is a permanent part of the video and can not be removed!**

Proxy tab / - cont...

Name	Location	Description
422- LUT	5.32 Proxy tab - (p.196)	LUT is an on/off toggle to record files with or without LUT based color correction. Press setup to navigate to the drive / folder to select your saved LUT file. See "5.6 Settings - exporting / importing" on page 91 **LUT correction is a permanent part of the video and can not be removed!**
423- SAVE AND CLOSE	5.32 Proxy tab - (p.196)	Pressing save and close, confirms any changes, closes the setup screens and returns to the previous multi or single channel view.
424- COPY TO OTHER CHANNELS	5.32 Proxy tab - (p.196)	 "copy to other channels" opens this sub-menu which allows copying channel encode independent settings such as audio channel selection & routing and file destination drive from the selected channel and encoder to one or more other channels. In the above image, the orange highlighted channel 1 settings will be copied to channels 2, 3 and 4. If for example, you also wanted to copy drive destinations from channel 1, you would press disk assignments to include them. Master settings are copied to masters and proxy settings are copied to proxy settings.

Proxy tab / - cont...

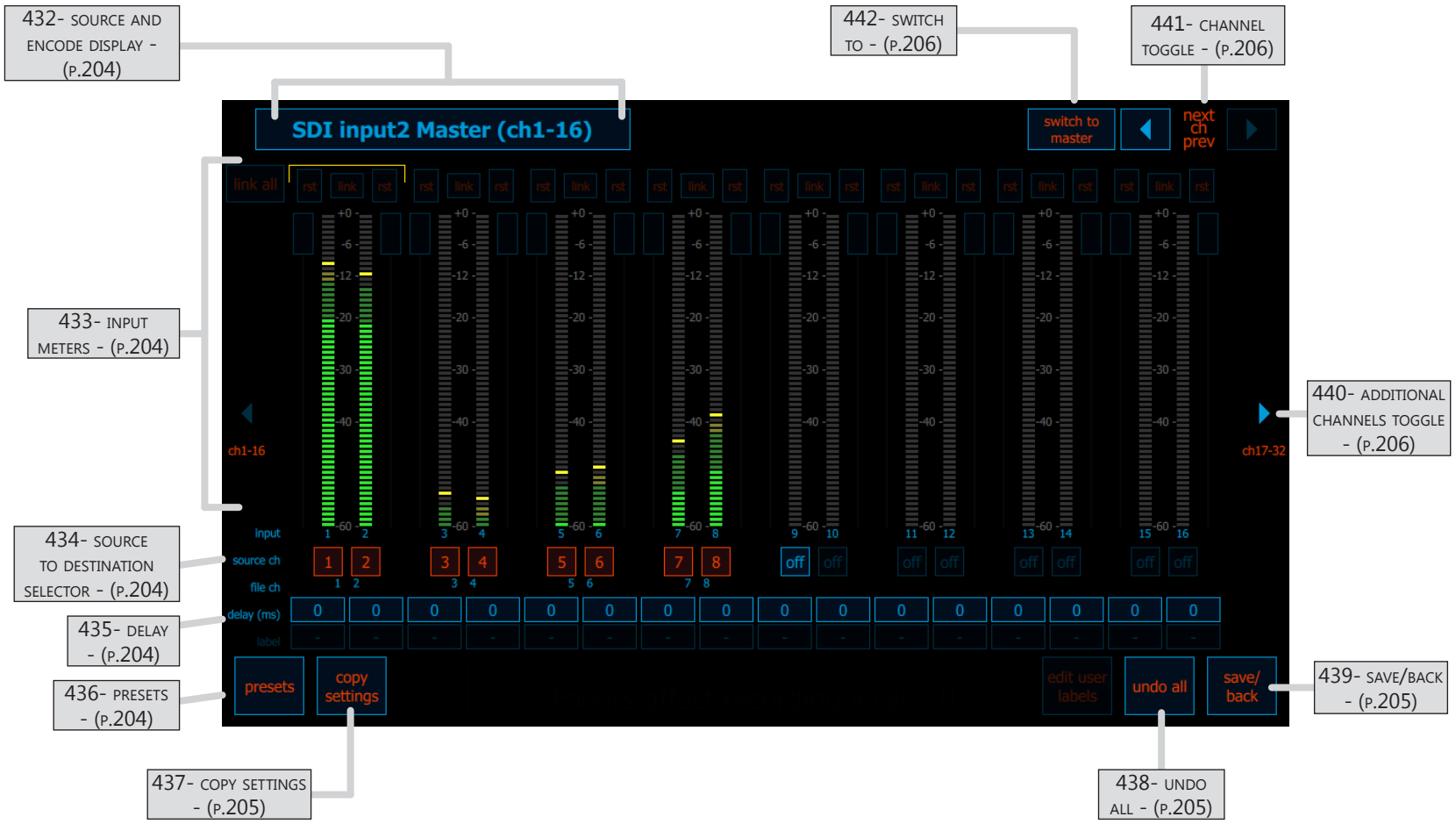
Name	Location	Description
425- GENERATE XML	5.32 Proxy tab - (p.196)	 Each recording session can be accompanied by clip specific *.xml files. The completed *.xml files contain clip specific metadata which can be imported into asset managements systems and the like. After selecting an xml type, xml path override can be selected to designate a specific destination folder for the xml files. • MSG xml generates an xml format for use by MSG • NASA is a format for use at for NASA's Orion launch system. • AS-11 sidecar generates a AS-11 compatible xml • Cinedeck xml generates a full generic xml with all data
426- USE RECORD TC OFFSET	5.32 Proxy tab - (p.196)	Record timecode offset provides an easy way to adjust or reset the incoming timecode but unlike generating new timecode, the recorded timecode remains based on the source timecode, keeping all of the breaks and changes. For example, your source may be arriving with timecode starting at 0:00 but because it is the fourth in a set, you want it to start at hour 4. With this setting you can apply a 4 hour offset. Another example might be a source which was recorded with time of day in a different timezone and you want the timecode to reflect GMT or your local time zone. Record timecode offset can be set independently for master and proxy encodes.
427- ENCODER NAME	5.32 Proxy tab - (p.196)	Like the "name" and "label" fields, editable on the overview page, "encoder name" reflects the encoder name variable or wild-card displayed in the page tab bar. The encoder name wild-card can also be used in folder and file names. The default names in 4 channel mode are master and proxy but as with all the variables, they can be changed to meet your specific requirements. Click here to open an on-screen keyboard to change the name.
428- VBR ENABLE	5.32 Proxy tab - (p.196)	Some codecs available on the Cinedeck can be encoded as either VBR (variable bit rate) or CBR (constant bit rate). This can be an important selection so if available, you should confirm with whomever will be editing or further processing the files when recording is complete. This setting will only be visible when a VBR codec is selected. See "10.4. What is bitrate/quality:" on page 330

Proxy tab / - cont...

Name	Location	Description
429- ENDIAN TYPE	5.32 Proxy tab - (p.196)	Endian type refers to the byte order of multi-byte PCM audio samples. Big means the data is stored big-end first, little (the more common of the two) means the data is stored little-end first. Unless you know big endian is needed, leave this set to little.
430- MXF CLIP FOLDERS & AAF OVERRIDE	5.32 Proxy tab - (p.196)	When recording OpAtom which creates independent files for each video and audio track, you have the option of placing the clips in separate folders or of placing all the media in a single folder.
431- ENCODER ENABLE	5.32 Proxy tab - (p.196)	Each master and proxy encoder can be independently enabled or disabled as needed. If there is no requirement for a particular master or proxy encode, this is the way to disregard it.

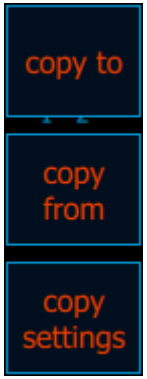
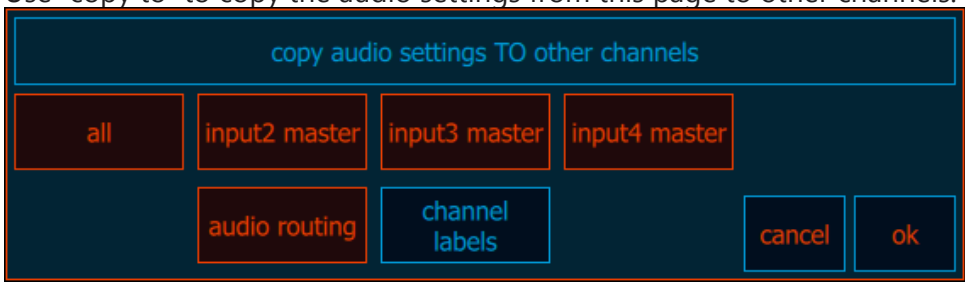
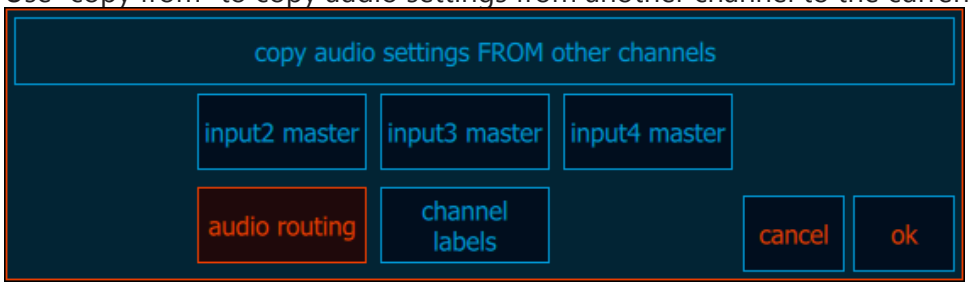
5.33 Audio routing

Audio routing works the same for master and proxy files. The only differences are the number of available audio source channels can change with the audio source and some file wrappers support fewer audio channels than others.
The upper meters indicate the sources and the row below the meters is used to select source channels to be assigned to a record channel



Audio routing / - cont...

Name	Location	Description
432- SOURCE AND ENCODE DISPLAY	5.33 Audio routing - (p.203)	This text display indicates three things; The audio source type; SDI, AES, Analog The channel source, ie input 1, input, 2, etc. The currently selected encode receiving routing adjustments. This case shows the audio routing for the first 16 channels of the master encode for input 2 which is using embedded SDI audio.
433- INPUT METERS	5.33 Audio routing - (p.203)	The input audio meters show real-time activity for any channels receiving audio. Note the yellow highlight at the top of the first audio pair, this indicates the audio channels currently being monitored.
434- SOURCE TO DESTINATION SELECTOR	5.33 Audio routing - (p.203)	These boxes represent each available record channel. Each record channel can record any of the source audio channels. Click the box to open this screen for selecting a source channel to be recorded.
435- DELAY	5.33 Audio routing - (p.203)	If audio delay has been set on the input page, the amount of delay will be displayed here. See "383- audio delay" on page 185
436- PRESETS	5.33 Audio routing - (p.203)	 The presets menu allows easy selection of 2, 4, 6, 8, 12 or 16 channels to be recorded. When you select a preset, the destinations are set as pairs in sequential order so incoming channel 1 is recorded on channel 1, incoming channel 2 is recorded on channel 2 and so on up to 32 channels or the maximum number of channels supported by the currently selected file wrapper. Additionally, it is possible to copy the routing as already set by the related master or proxy encode and you can always manually change any of the destinations.

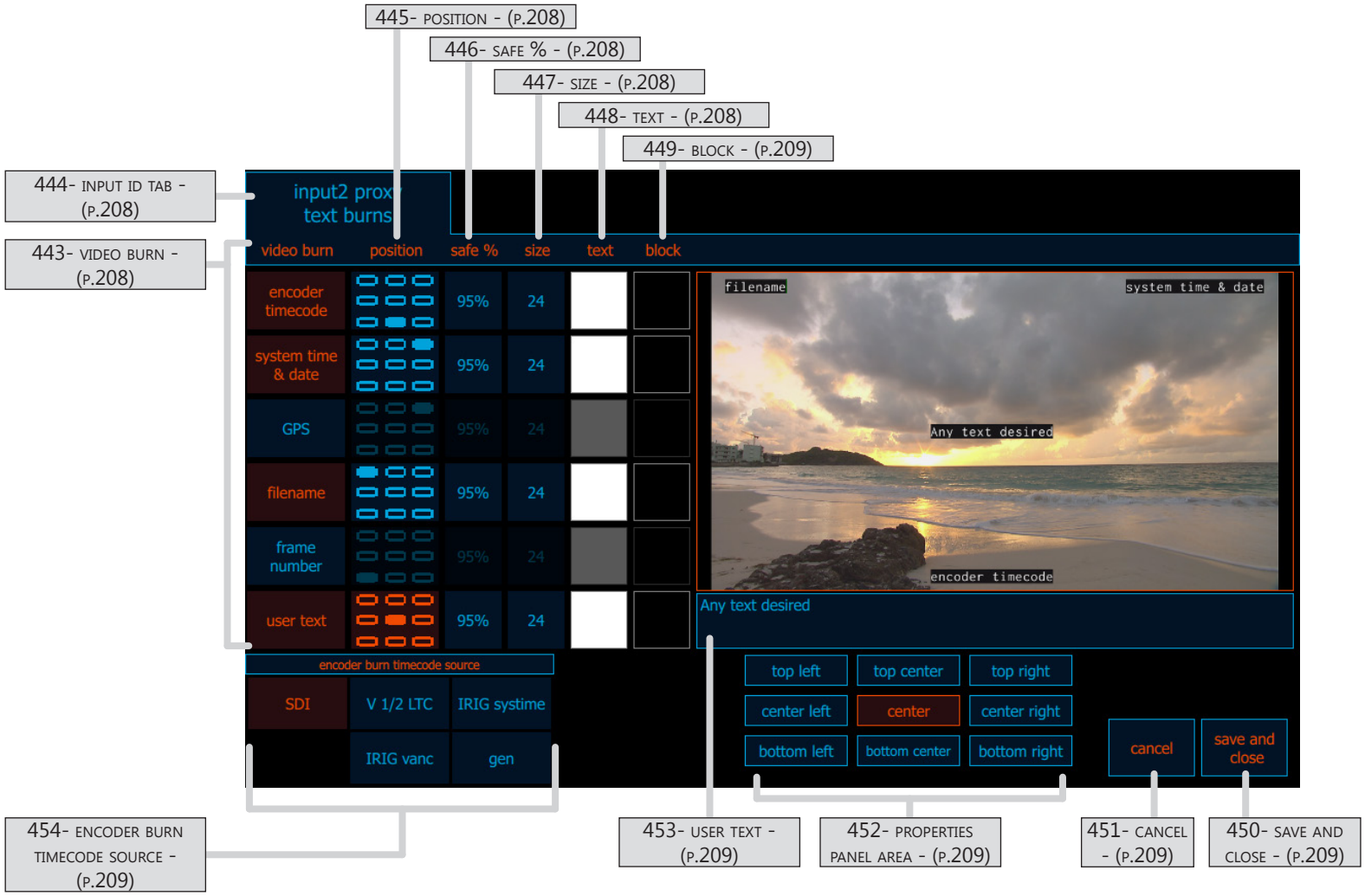
Name	Location	Description
437- COPY SETTINGS	5.33 Audio routing - (p.203)	 Audio channel routing can be selected and set independently for each channel and for each encode. To simplify setting audio for multiple channels, its is possible to copy setting to or from selected channels. Use “copy to” to copy the audio settings from this page to other channels.  Use “copy from” to copy audio settings from another channel to the current channel. 
438- UNDO ALL	5.33 Audio routing - (p.203)	Undo all cancels all changes and returns to the encode page.
439- SAVE/BACK	5.33 Audio routing - (p.203)	Save/Back saves all changes and returns to the encode page.

Name	Location	Description
440- ADDITIONAL CHANNELS TOGGLE		This control switches between the first 16 channels and the second 16 channels of audio which can be encoded. While SDI only supports 16 channels, some files can support up to 32 audio tracks, hence the router gives you direct access for managing all 32 tracks.
441- CHANNEL TOGGLE	5.33 Audio routing - (p.203)	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The “input”, ”master” and “proxy” tab names reflect the change, displaying the names associated to the selected channel.
442- SWITCH TO	5.33 Audio routing - (p.203)	Switch to is a toggle which provides direct access to either the master or the proxy for the current channel, allowing easy access for setting audio.

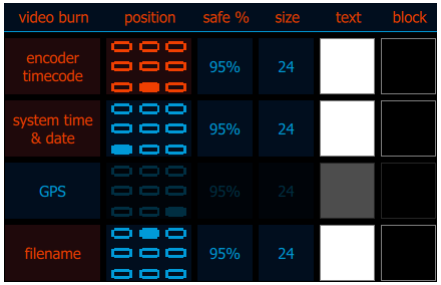
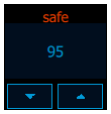
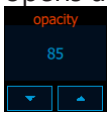
5.34 Video burn settings

It is possible to apply several different character burn-ins to files during recording. The burns can be timecode, system time, file name, etc. To apply a character burn, enable burns on the encoder page.
Press setup to access this screen for customizing the selection, size, color and position of the burn elements.

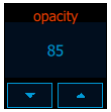
Remember, a burn-in is a permanent part of the video and can not be removed!



Video burn settings / - cont...

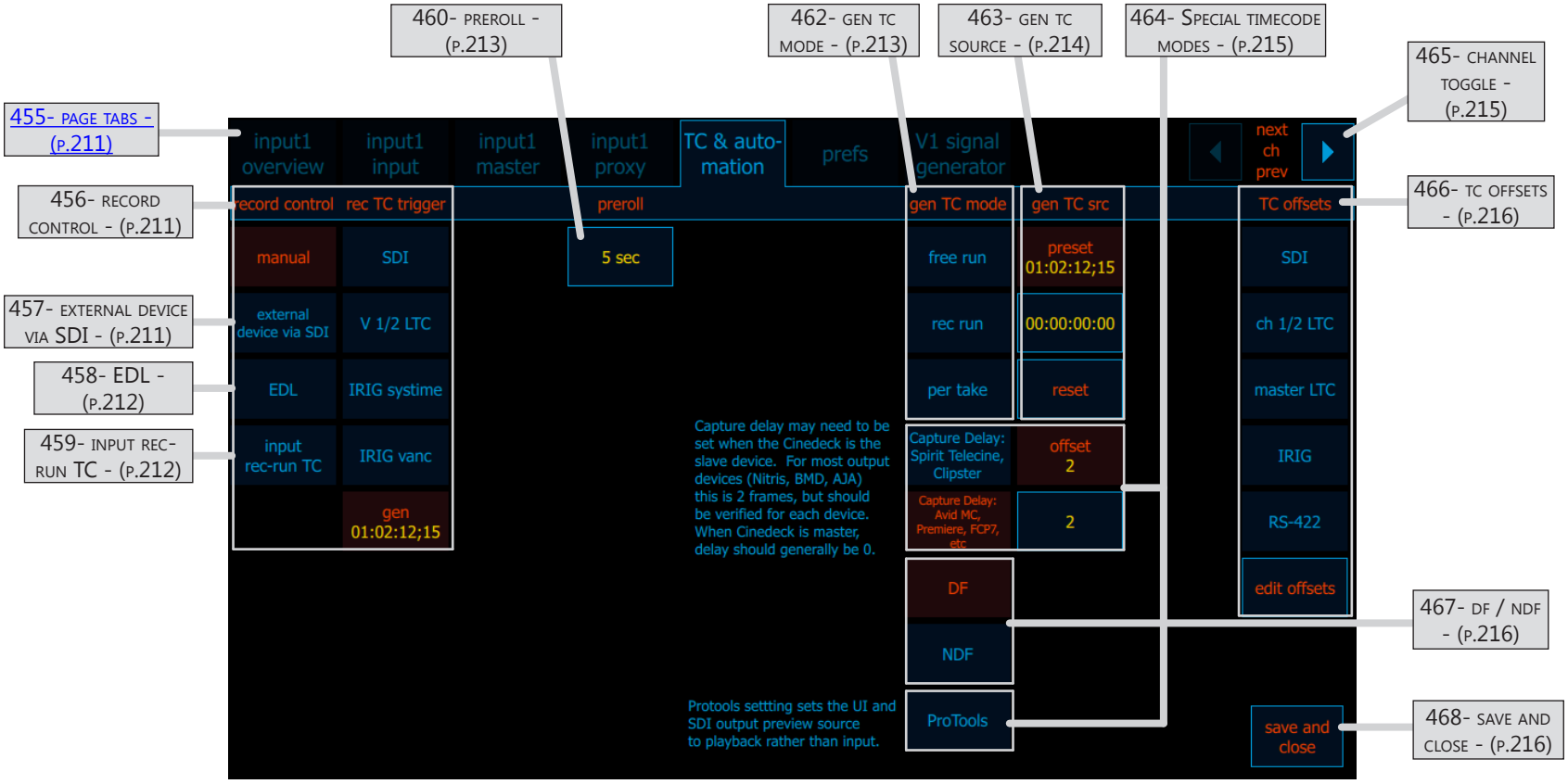
Name	Location	Description
443- VIDEO BURN	5.34 Video burn settings - (p.207)	 The video burn selection panel is a button grid, 6 across and 4 down. In all cases, orange indicates a control is active and selected, aqua-blue indicates settings that are active and dim aqua-blue indicates settings that are off. The first column contains on/off toggles for the selected burn data. *The other buttons toggle various properties panels on & off for setting the selected burn property.* *(Changes can be observed on the video preview - An active signal is required)* *(Properties panels are displayed at the lower right of the setup screen)*
444- INPUT ID TAB	5.34 Video burn settings - (p.207)	Displays the relevant channel and encoder names to identify which recording the burn-in is setup is associated to.
445- POSITION	5.34 Video burn settings - (p.207)	Select the "position" button to open this properties panel to place a burn into one of 9 screen positions.
446- SAFE %	5.34 Video burn settings - (p.207)	 Select "safe %" to adjust the title safe position relative to the edge of the video image.
447- SIZE	5.34 Video burn settings - (p.207)	Select "size" to adjust the font size for a burn.
448- TEXT	5.34 Video burn settings - (p.207)	The text color of a burn can be adjusted by clicking the respective "text" button. This opens a standard Windows color picker pop-up.  Text also activates an opacity control in the properties panel.

Video burn settings / - cont...

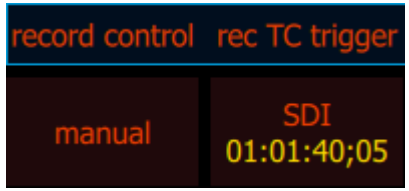
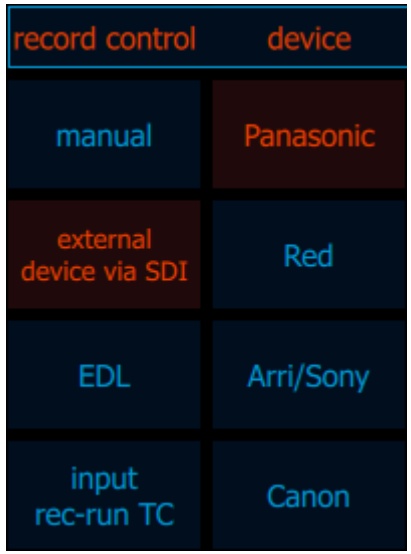
Name	Location	Description
449- BLOCK	5.34 Video burn settings - (p.207)	The background color of a burn can be adjusted by clicking the respective “block” button. This opens a standard Windows color picker pop-up.  Pressing “block” also activates an opacity control in the properties panel.
450- SAVE AND CLOSE	5.34 Video burn settings - (p.207)	Pressing save and close, confirms any changes, closes the burn setup screen and returns to the previous encoder setup screen.
451- CANCEL	5.34 Video burn settings - (p.207)	Cancel any changes and return to the previous screen
452- PROPERTIES PANEL AREA	5.34 Video burn settings - (p.207)	This screen region will be populated by one of several properties panels selected in the “video burn” control panel at the upper left.
453- USER TEXT	5.34 Video burn settings - (p.207)	Clicking the user text field opens the on-screen keyboard where text can be entered. The text display is limited to whatever fits on a single line.
454- ENCODER BURN TIMECODE SOURCE	5.34 Video burn settings - (p.207)	This control allows specific selection of the timecode source to be used for the timecode burn-in. The Cinedeck system can leverage multiple timecode sources and there are occasions where the burn-in should reflect a different time than the embedded timecode. Also, file wrappers like MP4 do not support timecode so selecting the timecode burn source allows MP4 files to contain a viewable timecode.

5.35 TC & Automation tab

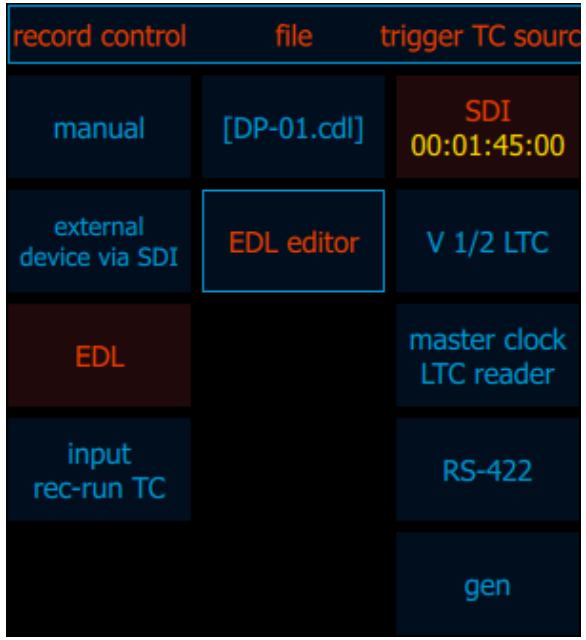
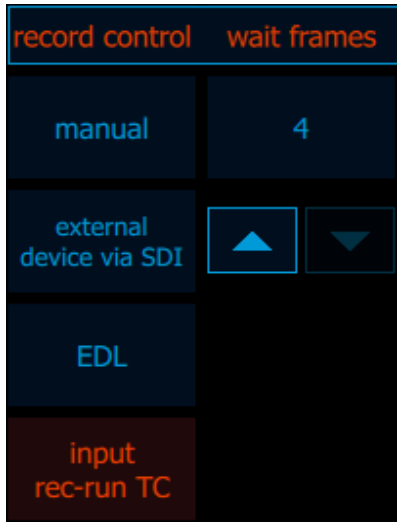
Timecode and automation includes settings for the internal timecode generator, various record trigger controls including EDL management and fine timecode offsets for each timecode source.
In free run, the internal timecode generator can start with a user defined (preset) or it can be initiated by the Windows clock and follow local time or UTC (GMT).
Record-run timecode can be traditional, contiguous timecode or, when set to “per take”, automatically restart at the user defined time, often used for drama scenes where matching timecode can be useful.



TC & Automation tab / - cont...

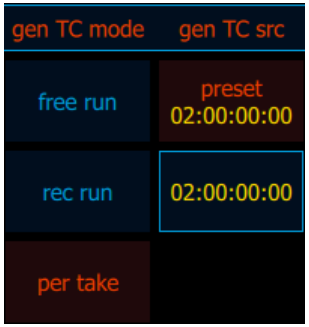
Name	Location	Description
455- PAGE TABS	5.35 TC & Automation tab - (p.210)	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
456- RECORD CONTROL	5.35 TC & Automation tab - (p.210)	 Manual mode can be considered "normal" mode with basic front panel control. The TC trigger selection determines what timecode source is referenced in conjunction with preset start/ stop times. Record control has several additional modes that are described below.
457- EXTERNAL DEVICE VIA SDI	5.35 TC & Automation tab - (p.210)	 When set to "external device via SDI", the deck is set to receive record start / stop commands embedded in the SDI ancillary data stream coming from a camera. This allows recording to be controlled from the camera. If your camera is not supported, you can may also control recording by using "459- input rec-run TC" on page 212

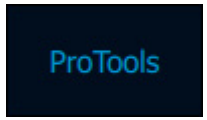
TC & Automation tab / - cont...

Name	Location	Description
458- EDL	5.35 TC & Automation tab - (p.210)	 When set to EDL, the deck can record and stop based on the events in the selected EDL. The selected "trigger TC source" is the timecode source used to trigger the EDL events. When a channel is set to RS-422 master mode, RS-422 is available as a trigger. In addition, when in RS-422 mode, EDL mode can drive a connected tape machine, essentially operating as master in an auto-conform session. For additional EDL information, see "5.35.2 EDL editor" on page 218 Also see: "460- preroll" on page 213
459- INPUT REC-RUN TC	5.35 TC & Automation tab - (p.210)	 When set to "input rec-run TC", the channel will automatically record whenever the timecode source selected on the associated encode page(s) is incrementing at normal speed. This mode can be used with cameras and other devices when another mode such as "external device via SDI" is not possible but slave recording is desired. It is also useful for simple tape to file transfers. A delay of a few frames is set to help prevent false triggers. In this example, the deck will wait to see 4 frames of sequential, contiguous timecode before starting a recording.

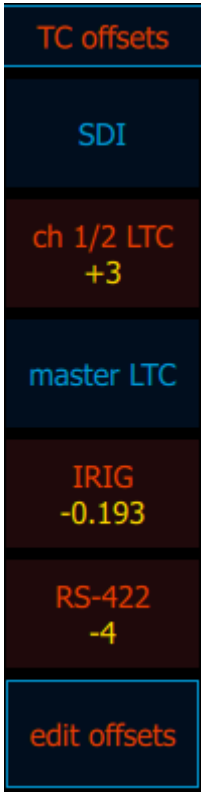
TC & Automation tab / - cont...

Name	Location	Description
460- PREROLL	5.35 TC & Automation tab - (p.210)	The global preroll setting used in edit modes when the session is controlled by the Cinedeck.
461- MASTER CLOCK MODE	5.35 TC & Automation tab - (p.210)	 This an optional section for systems with a multi-function master timecode input in addition to the standard LTC input. • In "LTC reader" mode, the master timecode input is a basic LTC input which drives all channels vs the standard LTC inputs which drive pairs of channels. • In "IRIG mode", master timecode input feeds the signal from an IRIG-B timecode source to all channels. • In "LTC jam-sync" mode, the internal timecode clock can receive a temporary external timecode source via the master timecode input and regenerate that timecode for one or more channels, in the same way a camera might be jam-synced to match other cameras.
462- GEN TC MODE	5.35 TC & Automation tab - (p.210)	The internal timecode generator has several modes, all of which depend on the associated "gen TC source" selection, see: "463- gen tc source" on page 214. • In "free run" mode, continuous timecode will be sequentially generated starting at a user preset time such as 03:00:00:00 or based on local / UTC (GMT) time that reference the system clock. (*Note: To allow easy adjustment, Local and UTC time are offset by the preset time. The preset must be 00:00:00:00 to reflect the actual system time*) • In "rec run" (record run) mode, timecode will only be sequentially generated when recording. Timecode can start at any user selected "preset" time. The reset button will set the generator to the original preset. • "per take" mode functions the same as record run however each time recording is stopped, the timecode is automatically reset to the preset starting timecode. Also see "464- Special timecode modes" on page 215

Name	Location	Description
463- GEN TC SOURCE		**Free run** timecode immediately starts incrementing based either on the system clock as a starting point or on a user entered start time while **record run** timecode is based on a user defined preset and increments only when recording. **Per take** timecode is record run timecode that resets to the preset time for each recording. In "**free run**" mode, select "local system time" to have free running timecode based on the current internal system clock time. Select "UTC system time" to offset the internal clock to UTC (GMT). (*Note: To provide additional time adjustment, local and UTC time can be offset by the preset time so the preset must be set to 00:00:00:00 to use actual system local or UTC time*) In "**free run**" mode, select "preset" to define the internal generator a start time manually. Preset also displays a reset button to allow restarting the free running timecode. To set the "**rec run**" starting timecode, press the middle (highlighted) timecode to open a setting panel. To reset "rec run" timecode to the previously selected time, press "reset".  To set the "**per take**" starting timecode, press the lower (highlighted) timecode to open a setting panel. "per take" timecode resets to the selected time for each recording. For special case information about using timecode with Avid, telecine, Pro Tools, etc, see "464- Special timecode modes" on page 215.

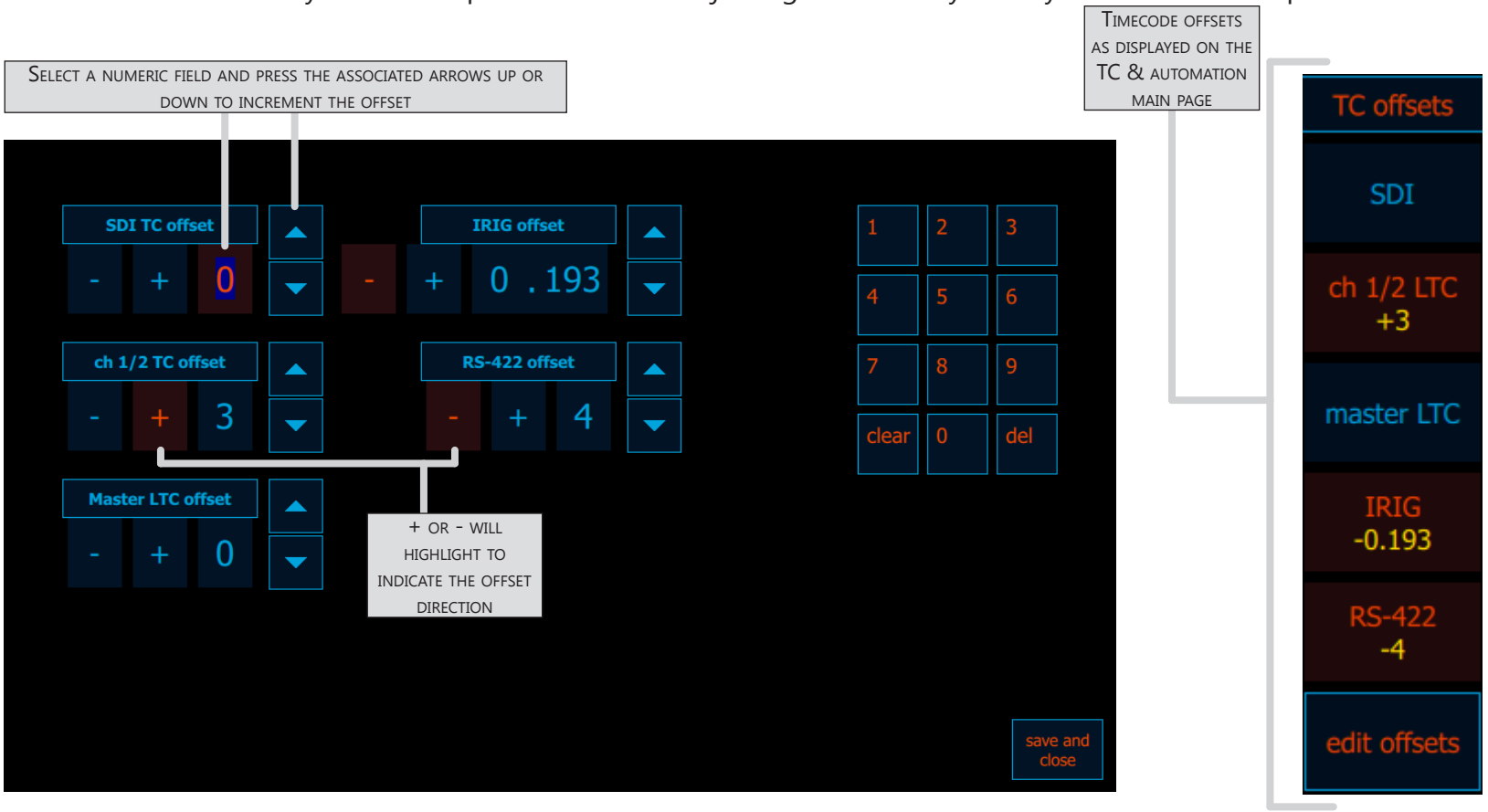
Name	Location	Description
464- SPECIAL TIMECODE MODES	5.35 TC & Automation tab - (p.210)	Cinedecks have some specialized timecode modes for control by Spirit telecine systems, DVS Clipster workstations, Avid Media Composer, etc. The functionality is similar to record run mode however a critical offset is included, to fine tune the relation between the Cinedeck and the connected system. This offset adjusts the recording start point and its relation to the recorded timecode to assure frame accuracy. When you record or perform inserts controlled by these external systems, the Cinedeck regenerates the sequence/source timecode for alignment. The best way to determine the offset and assure accuracy is to record/edit video that includes a sequence or source timecode burn-in. The recorded (file) timecode should match the burn-in timecode. If the file timecode is later, add that many frames to the offset. If its earlier, subtract that number of frames from the offset. Once set, the offset is saved with the project settings. *For Avid Media Composer and Nitris, the offset is generally 2. Other I/O devices may be different.* MC is further discussed here: "8.1 Avid Digital Cut" on page 254. *For Cinedeck RS-422 channel to channel editing, Avid mode should be selected and the offset set to 9.*  Because ProTools use requires video playback, turn on the Pro Tools setting to switch video output to file instead of source E-toE. If you need specifics about use with Telecine, Clipster or other outboard equipment, feel free to contact Cinedeck: "Contacting Cinedeck" on page 2
465- CHANNEL TOGGLE	5.35 TC & Automation tab - (p.210)	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The page tab names reflect the change, displaying the names associated to the selected channel.

TC & Automation tab / - cont...

Name	Location	Description
466- TC OFFSETS	5.35 TC & Automation tab - (p.210)	 Timecode offsets provide frame based fine tuning for each timecode source to compensate for video delay and other latency issues between systems. The “timecode offsets” column shows any active offsets for the current channel. To adjust the offsets, click “edit offsets”. For details, see “5.35.1 TC offsets” on page 217
467- DF / NDF	5.35 TC & Automation tab - (p.210)	Drop frame (DF) or non-drop-frame (NDF) timecode can be selected for any internally generated timecode. Non-drop frame is indicated with all colons “**:**” **02:21:13:05** Drop-frame is indicated with a semi-colon between the seconds and frames “**;**” **02:21:13;05**
468- SAVE AND CLOSE	5.35 TC & Automation tab - (p.210)	Save and close saves all changes and returns to the TC & automation page.

5.35.1 TC offsets

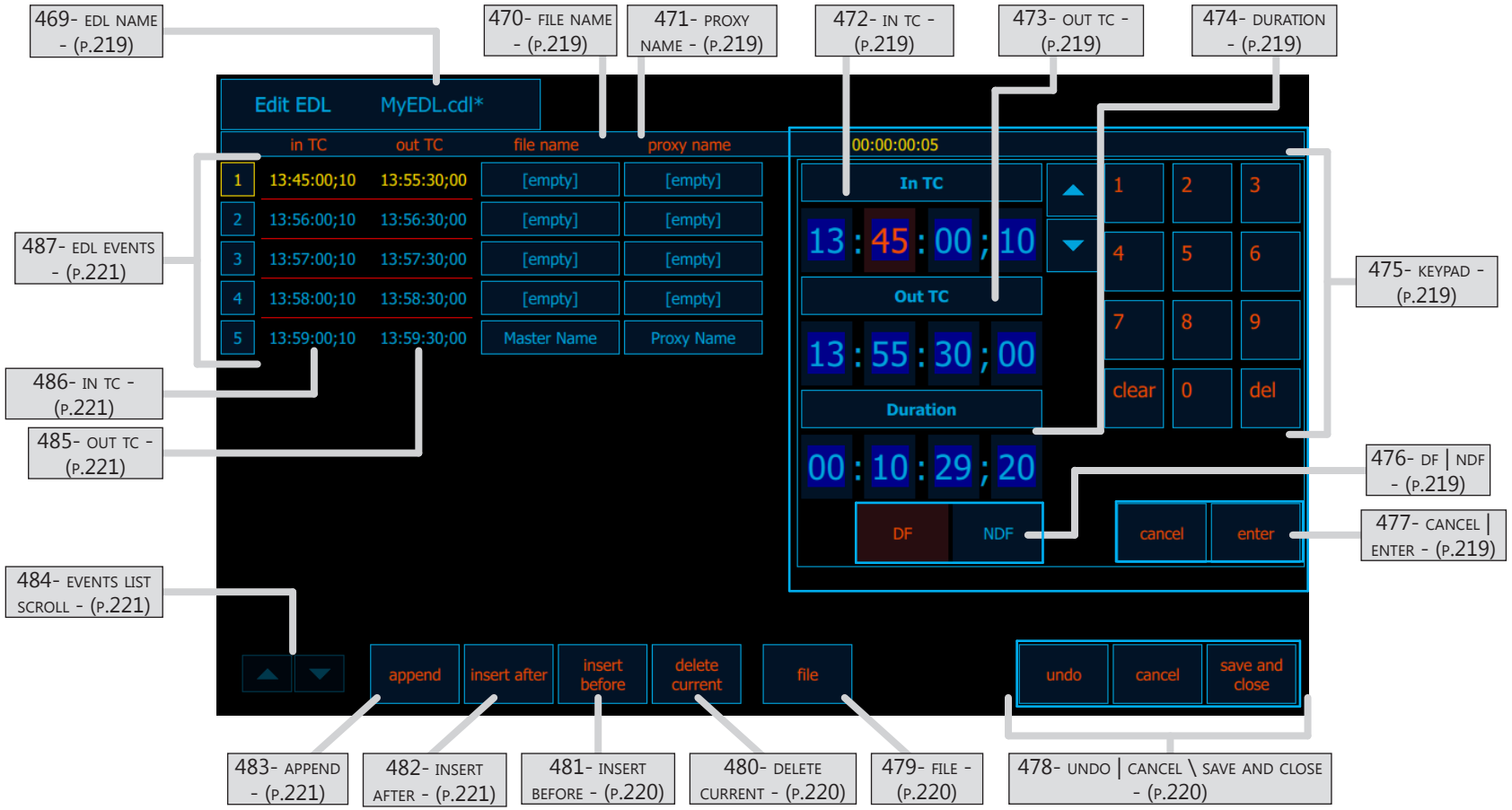
With “TC offsets”, (timecode offsets) it is possible to fine tune each timecode source connected to each channel of the Cinedeck to compensate for frame based timing errors such as an incoming video signal which is first being passed through a frame synchronizer where the desired timecode is not or where multiple related sources are receiving different amounts of processing, taking them out of sync with each other. In these cases you can delay or advance the timecode by the required number of frames so the timing issue can be compensated for.
Select the desired timecode source and enter the offset using a USB keyboard or press the arrows to increment the timecode offset by one frame plus or minus. If adjusting IRIG offset you may find the numeric pad easier.



5.35.2 EDL editor

The EDL (edit decision list) editor is used to edit or create EDLs. It is made up of two sections, the events list (left) and the event editor (right). When you select an event in the list, its time data is automatically loaded into the event editor. To change that events details, make the changes and press “enter”.
If you want to insert an event into the list; first select an event above or below where the new event should go. Then edit the data for the new event and press “insert before“ or “insert after“.
To add an event to the end of the list, set the data in the event editor and press “append“.

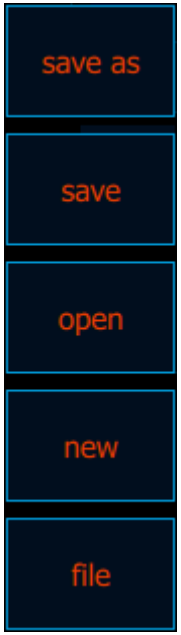
Cinedeck EDLs contain start and end times and optionally a master and or proxy file name. For a sample EDL, see “5.35.3 Sample EDL” on page 222



TC & Automation tab / EDL editor cont...

Name	Location	Description
469- EDL NAME	"5.35.2 EDL editor" on page 218	Displays the name of the EDL loaded into the editor. If a new EDL is created, the display shows [new file] until the edl is saved with a name. When an EDL has been changed and not saved, an '*' is appended to the name like MyEDL.cdl*
470- FILE NAME	"5.35.2 EDL editor" on page 218	File name is an optional field which can be filled in with a clip specific file name for the master encode.
471- PROXY NAME	"5.35.2 EDL editor" on page 218	Proxy name is an optional field which can be filled in with a clip specific file name for the proxy encode.
472- IN TC	"5.35.2 EDL editor" on page 218	The EDL event editor "in TC" will initially display the starting timecode of the event selected in the event list. This time can be adjusted incrementally by highlighting the digits you want to change and using the up down arrows which appear to the right of the selected fields. The keypad at the right can be used to directly enter time data into the selected fields.
473- OUT TC	"5.35.2 EDL editor" on page 218	The EDL event editor "out TC" will initially display the ending timecode of the event selected in the event list. This time can be adjusted incrementally by highlighting the digits you want to change and using the up down arrows which appear to the right of the selected fields. The keypad at the right can be used to directly enter time data into the selected fields.
474- DURATION	"5.35.2 EDL editor" on page 218	The duration automatically updates to display the duration of the selected or edited event. The duration can also be edited. Editing duration changes the "out TC" to make the event match the duration.
475- KEYPAD	"5.35.2 EDL editor" on page 218	The keypad can be used to enter data into any selected hour, minute, second or frame time field. The highlight automatically moves to the next pair of numbers to the right as you enter each pair.
476- DF | NDF	"5.35.2 EDL editor" on page 218	The timecode format of the EDL can be toggled between "DF" (drop-frame) and NDF (non-drop-frame) by selecting DF or NDF.
477- CANCEL | ENTER	"5.35.2 EDL editor" on page 218	The keypad "cancel" button is a local undo for events loaded in the event editor. Pressing cancel will revert the loaded event to its original event list data. The keypad "enter" button overwrites the selected event in the events list with the data in the event editor.

TC & Automation tab / EDL editor cont...

Name	Location	Description
478- UNDO | CANCEL \ SAVE AND CLOSE	"5.35.2 EDL editor" on page 218	 "Undo" has a multi-level memory to remove changes and additions to EDLs one at a time. To undo all changes to the loaded EDL and close it without saving it, use "cancel". Use "save and close" to save the loaded EDL and return to the TC & automation screen.
479- FILE	"5.35.2 EDL editor" on page 218	The file menu provides access to saving, opening and creating new EDLs.  Use "save as" to save the loaded EDL with a new name Use "save" to save the loaded EDL (note a '*' next to the file name at the top left indicates a file which has not been saved) Use "open" to open an existing EDL or import a CMX 3600 EDL Use "new" to create a new EDL EDLs are saved by default in c:\cinedeck[_x64]\EDL however you can save and open EDLs from any accessible drive.
480- DELETE CURRENT	"5.35.2 EDL editor" on page 218	To delete the currently selected event, press "delete current".
481- INSERT BEFORE	"5.35.2 EDL editor" on page 218	New events can be added in several ways; "insert before" will insert a new event before the selected (highlighted) event using the data in the event editor.

TC & Automation tab / EDL editor cont...

Name	Location	Description
482- INSERT AFTER	"5.35.2 EDL editor" on page 218	New events can be added in several ways; "insert after" will insert a new event after the selected (highlighted) event using the data in the event editor.
483- APPEND	"5.35.2 EDL editor" on page 218	New events can be added in several ways; "append" will add a new event to the end of the list using the data in the event editor, regardless of the selected event.
484- EVENTS LIST SCROLL	"5.35.2 EDL editor" on page 218	When there are more events in a list than can be displayed on the screen, the scroll arrows can be used to move up and down through the list.
485- OUT TC	"5.35.2 EDL editor" on page 218	Each line in an EDL represents a single EDL event. Out TC displays the end timecode of the event.
486- IN TC	"5.35.2 EDL editor" on page 218	Each line in an EDL represents a single EDL event. In TC displays the starting timecode of the event.
487- EDL EVENTS	"5.35.2 EDL editor" on page 218	This list displays each EDL event where each line is a single event. An event is selected when the character color is yellow.

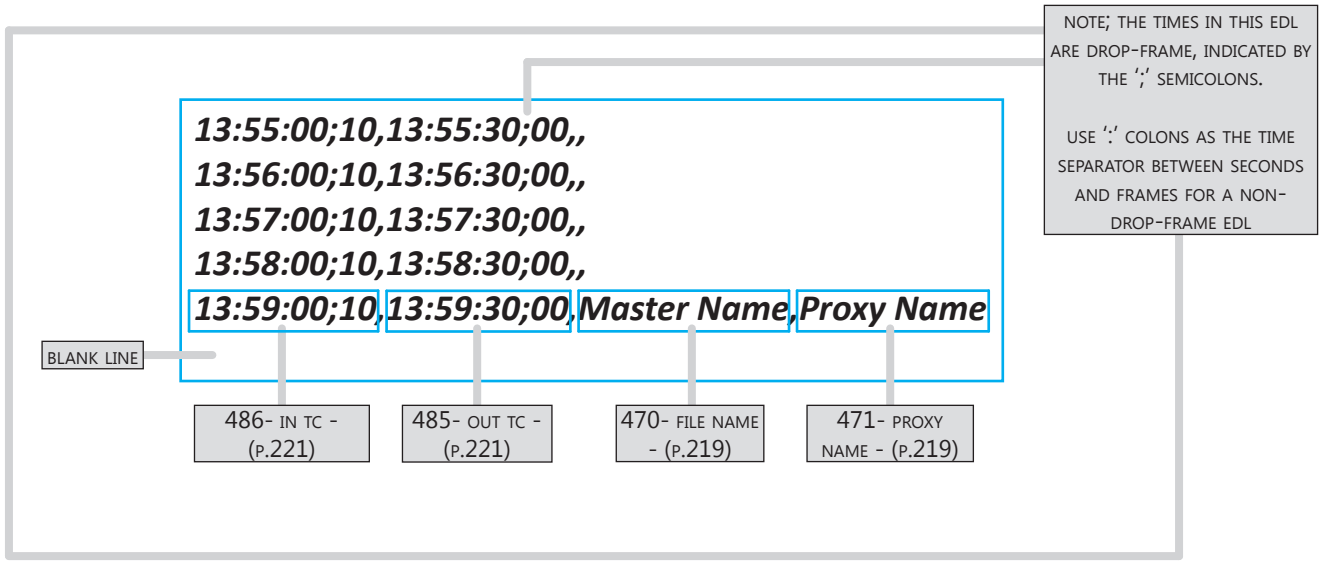
5.35.3 Sample EDL

Cinedeck EDLs are basic ASCII comma delineated files.
Each line in a EDL file represents a single event
Each event element is separated from its neighbor by a comma.
No leading or trailing commas or spaces should be used and no commas should be used within any text.
Additionally, the file must end with a blank line.

Each event line has a start timecode, an end timecode and optionally can have a master file name and a proxy file name. (*For events which do not have names included, the active project naming templates will be used to name the files as they are created*).

You can use the Cinedeck built-in editor for creating and editing EDLs (See: "5.35.2 EDL editor" on page 218) or any plain text editor such as notepad in Windows.

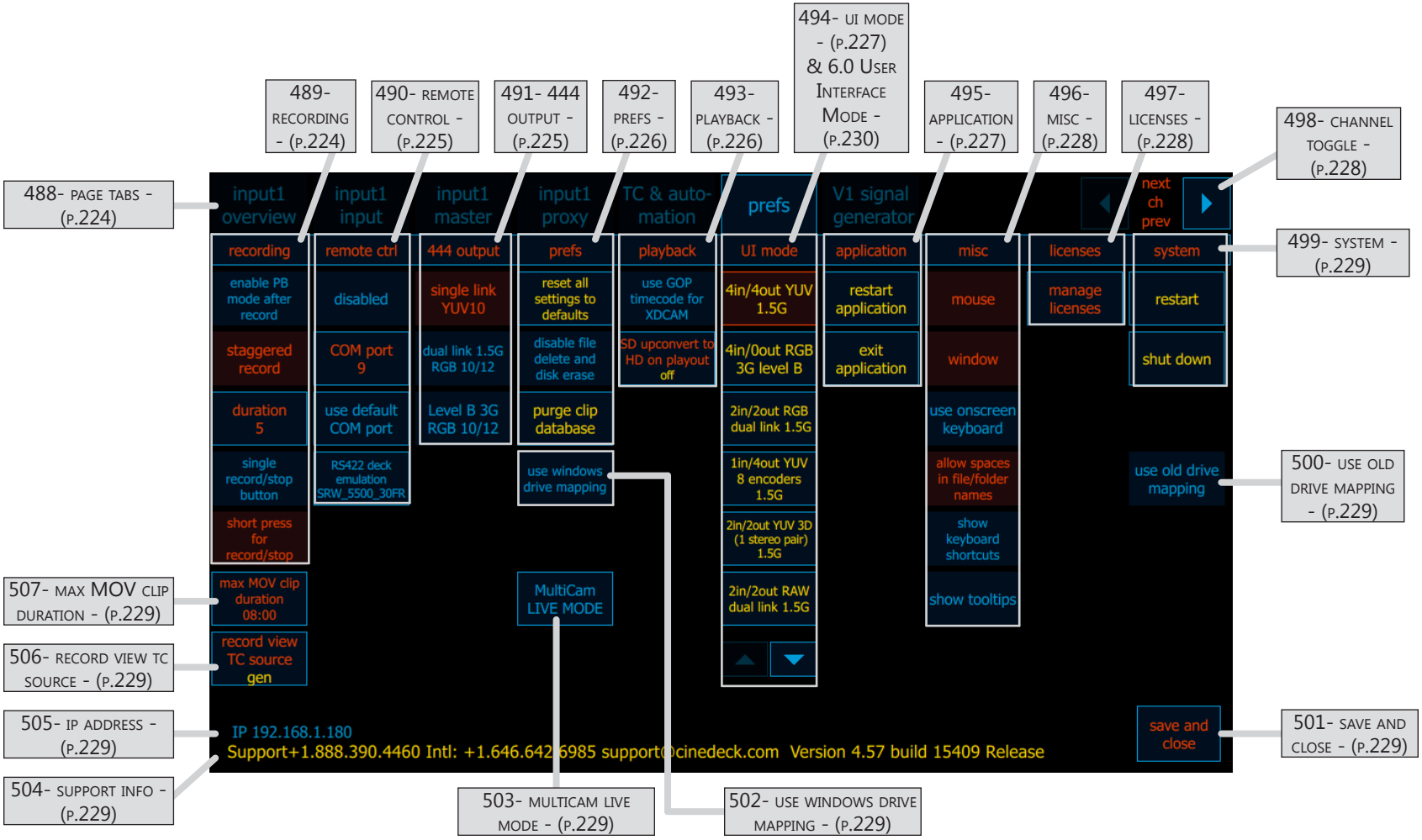
The sample EDL below has 5 events, the last of which also has the optional file names included.



5.36 Prefs tab

Basic system configuration settings are on the preferences page. Perhaps most important is “UI mode” selection which sets the the I/O operational mode. The modes available can differ depending on the hardware and software installed however all systems have two or four channel YUV which is the standard mode for multi-channel SD/HD recording and playback.

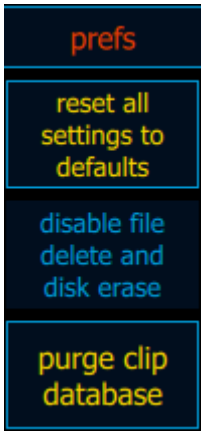
If your system is busy recording or playing, most settings on the “prefs” page will not be available. Stop record and playback activity on all channels for preferences access.

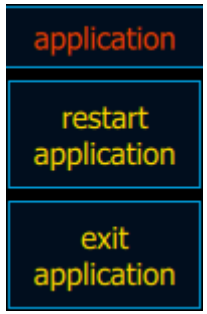


Prefs tab / - cont...

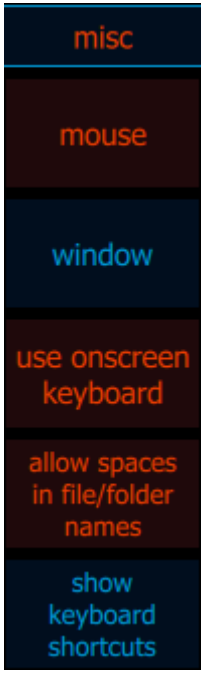
Name	Location	Description
488- PAGE TABS	"5.36 Prefs tab" on page 223	The page selector tabs are always visible in the main setup area. These can be clicked to provide direct access to each setup section.
489- RECORDING	"5.36 Prefs tab" on page 223	The "recording" column adjust aspects of how a recorder starts and stops recording. • Normally, when a insert recording is completed, the recording channel switches to E-to-E mode to pass through the source signals. With "PB mode after record" enabled, instead of E-to-E, the file remains visible and in pause. • When staggered record is off, all ganged channels will be triggered simultaneously. When on, "staggered record" triggers recording and stopping sequentially, based on the user defined delay. • The multi view and single channel view have separate record and stop buttons located at the top and bottom of the screen. When "single record/stop button" is active, only a single button at the top is used and the available function of the button changes. • Because many Cinedecks have touch screens which can accidentally be accessed, the default setting is that stopping a recording requires pressing stop for a few seconds. Activating "short press for record/stop" allows a momentary press to stop recordings immediately. Note; orange indicates setting is active.

Name	Location	Description
490- REMOTE CONTROL	"5.36 Prefs tab" on page 223	Optional serial remote control can be enabled or disabled for each channel. • Use the COM controls to enable/disable and adjust the active port for the current channel. See "7.2 RS-422 - COM port setup" on page 244 for additional information on COM port settings. • Click "use default COM port" to set the current channel to the Cinedeck defaults: COM 5 for Ch1 and COM 6 for Ch2 on RX COM 9, 10, 11, 12 for Ch1, 2, 3, 4 respectively on MX and ZX • Click RS422 deck emulation to change how the Cinedeck presents itself to connected devices. This setting is useful for example when connecting to an Avid. Depending on input and deck settings, the Cinedeck will automatically select a emulation mode but the selection can be manually overridden. There are several SRW and BVW modes available based on the frame rate family, specifically; 30 includes 29.97, 59.94 & 60; 25 includes 50; 24 includes 23.98.
491- 444 OUTPUT	"5.36 Prefs tab" on page 223	 The 444 output selector forces the video output from standard single link 1.5/3G YUV to the selected DualLink mode. Note; orange indicates the active item.

Name	Location	Description
492- PREFS	"5.36 Prefs tab" on page 223	 • To set the project to the default '1' and clear many settings, press "reset all settings to default" • To prevent users from easily or accidentally deleting data in "clip manager", turn on "disable file delete and disk erase". • Cinedecks maintain a sql database of all content known to the system. If you are starting a new session or regularly move or delete content, it can be useful to clear the database. Content can be reentered into the database by scanning folders or discs from "clip manager". See "243- find media" on page 130
493- PLAYBACK	"5.36 Prefs tab" on page 223	 • XDCAMHD MXF Op1a files can have additional timecode information written in the MPEG GoP headers, "use GOP timecode for XCDAM" reads this timecode instead of the more common wrapper timecode during playback. • When playing SD files, the SDI output of each channel can be independently set to up-convert the SD signal to HD. Selecting the "SD upconvert" button opens the menu below. Anamorphic expects the original SD source to be 16x9 and stretches the SD up-converted image to fill the HD 16x9 aspect ratio while pillar keeps the original 4x3 aspect ratio and displays pillars at each side.

Name	Location	Description
494- UI MODE	"5.36 Prefs tab" on page 223	Cinedecks multiple modes makes "UI mode" probably the most important selection under "prefs" as it can completely change the capabilities of the deck. Available modes can differ depending on the model, hardware and software installed. For example, the two channel RX and ZX20 do not have 4K or UHD recording. Based on the number of I/O cards, all systems do have either two or four channel YUV. This is considered 'Normal' mode and is used for multi-channel SD/HD operation. *Changing modes generally requires a quick application restart while some modes also require different firmware to be installed to change the I/O designation.* See "6.0 User Interface Mode" on page 230 for more information.
495- APPLICATION	"5.36 Prefs tab" on page 223	 For extended production sessions, for example a reality program which is recording 24/7, it is highly recommended to restart the Cinedeck interface once a week if not more often. To do so in a few seconds, use "restart application". It is also recommended to restart the entire system at least one a week. "exit application" closes the current Cinedeck session, allowing full access to the MS Windows environment.

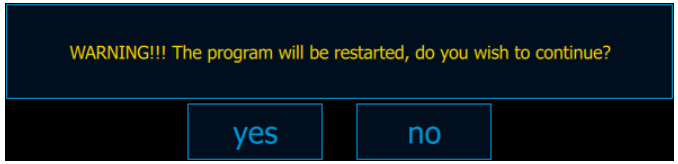
Prefs tab / - cont...

Name	Location	Description
496- MISC	"5.36 Prefs tab" on page 223	The miscellaneous section contains several interface functions; Note; orange indicates an active item.  • Press "mouse" to toggle mouse cursor visibility on and off. This can also be done using the "Ctrl+Enter" keyboard shortcut. • To place the Cinedeck UI into a Windows frame which can be moved and minimized, use "window". Window mode can also be toggeled using "Alt+Enter". • By default, "use onscreen keyboard" is on. This setting forces visibility of the on-screen keyboard when an appropriate data entry field has the focus. A connected USB keyboard can be used simultaneously with the on-screen keyboard however, if "use onscreen keyboard" is off, data can only be typed directly into the data fields via a USB keyboard. • To maintain the best cross system compatibility, using spaces in file and folder names is not recommended as some computer systems do not work well with them. When on, this setting will replace any "space" entered with an "_" underscore character so if you require the use of spaces, turn this setting off. • Press "show keyboard shortcuts" to bring up an overlay screen with a full list of available shortcuts. This overlay can also be accessed from anywhere in the Cinedeck user interface by pressing "Ctrl+K".
497- LICENSES	"5.36 Prefs tab" on page 223	Additional licenses may be required to activate some newly added features. Click here to manage your system licenses.
498- CHANNEL TOGGLE	"5.36 Prefs tab" on page 223	The channel toggle (next ch prev) is available on all main setup pages. Clicking the right or left arrow allows easy switching to the next or previous channel. The "input", "master" and "proxy" tab names reflect the change, displaying the names associated to the selected channel.

Name	Location	Description
499- SYSTEM	"5.36 Prefs tab" on page 223	It is recommended to properly close the Cinedeck application before restarting or shutting down your system. Pressing "restart" or "shut down" provides easy access to closing the Cinedeck application before automatically restarting or shutting down. **If your system is busy recording or playing, most settings on the "prefs" page will not be available. Stop all activity on all channels to restart or shut down.**
500- USE OLD DRIVE MAPPING	"5.36 Prefs tab" on page 223	First generation MX systems utilize a different drive connection scheme which will result in connected SSDs being improperly listed in the user interface. If you find the position display on your MX of your installed SSD drives does not match their actual position, this function should be turned on. For additional information, contact support. See "Contacting Cinedeck" on page 2
501- SAVE AND CLOSE	"5.36 Prefs tab" on page 223	Settings on the "prefs" page are all independently saved when pressed. Click "save and close" to close setup and go back to the main screen.
502- USE WINDOWS DRIVE MAPPING	"5.36 Prefs tab" on page 223	Turn on "use windows drive mapping" to show all available drives shown in Windows. (See "9.9 Drive not visible" on page 285) *Enabling this function requires a restart of the cinedeck application.*
503- MULTICAM LIVE MODE	"5.36 Prefs tab" on page 223	A special mode that disables simultaneous recording of XDCAM HD and CPU h264, which are incompatible in 4ch mode. The limitations set by this button may change so check with Customer Support before enabling.
504- SUPPORT INFO	"5.36 Prefs tab" on page 223	The phone number for Cinedeck support and the current software version are displayed here. Please see "Contacting Cinedeck" on page 2 before calling.
505- IP ADDRESS	"5.36 Prefs tab" on page 223	The current IP addresses for the Cinedeck system are displayed here. If multiple LAN connections are available, they will all be listed.
506- RECORD VIEW TC SOURCE	"5.36 Prefs tab" on page 223	Normally in record mode, the timecode display on each multi-view and single channel view indicates the timecode source selected on the master encode page. This control changes the display for the selected channel to show any of the available timecode sources. Timecode display during Playback is not affected.
507- MAX MOV CLIP DURATION	"5.36 Prefs tab" on page 223	MOV quickstart files are designed to be immediately available for playback while recording. This capability is supported by the wrapper/header data being set to an arbitrary maximum file size of 8 hours. A file larger than this setting can have playback issues so if you need to record content into a single MOV file of more than 8 hours, increase this setting to match your expected recording length. The better and recommended solution is to activate Segment Mode and break recordings into pieces of less than 8 hours. See "393- segment" on page 192

6.0 User Interface Mode

User Interface Mode or "" selection, found on the prefs setup page ("5.36 Prefs tab" on page 223) is used to set the basic operation of your Cinedeck. Available modes can differ depending on the model, hardware and software installed. Based on the number of I/O cards, all systems do have either two or four channel YUV. This is considered 'Normal' mode and is used for multi-channel SD/HD operation and is also the base which this guide uses.



Note: You will be prompted to restart the Cinedeck application to change modes. Press "No" to cancel.
Additionally: Modes such as 8 channel mode, require different I/O firmware to first be installed and may require a different application version.

UI mode	
4in/4out YUV 1.5G	4in/4out or 2in/2out YUV input mode is the standard operational mode for a Cinedeck. It allows SD and HD master and proxy encoding for each input up to 1.5G (1080-30p/60i).
4in/0out RGB 3G level B	4in/0out RGB 3G level B is a mode for full RGB 1080p 444 over 3G connections. Because of the input bandwidth required, the outputs are disabled in this mode preventing EtoE and playback over SDI. Playback is still available on the Cinedeck user interface.
8in/0out YUV 1.5G	8in/0out YUV 1.5G - only available on ZX45. Eight input record requires a firmware change and provides HD master encode only. Simultaneous proxy encoding is not available. Because of the input bandwidth required, the outputs are disabled in this mode preventing EtoE and playback over SDI. Playback is still available on the Cinedeck user interface. See "6.2 Eight channel mode" on page 235
2in/2out RGB dual link 1.5G	2in/2out or 1in/1out RGB dual link 1.5G - is a setting for source devices which output RGB images across two BNC cables.
1in/4out YUV 8 encoders 1.5G	1in/4out YUV 8 encoders 1.5G or 1in/2out YUV 4 encoders 1.5G - allows connection of a single 1.5G source to input #1. The source is available to all encoders allowing multiple master/proxy encodes of a single source. For example a single input on a MX could be simultaneously encoded as Uncompressed, Apple ProRes, Avid DNxHD and AVC-Intra.
2in/2out YUV 3D (2 stereo pairs) 1.5G	2in/2out YUV 3D 1.5G or 1in/1out YUV 3D 1.5G - one or two pairs of locked stereo YUV signals can be connected and encoded in any appropriate codec.
2in/2out RAW dual link 1.5G	development of raw recording is on hold but may be supported in an upcoming release.
1in/1out YUV 4K or UHD 1.5G	1in/1out YUV 4K or UHD 1.5G - the four primary inputs of a MX or ZX are combined and the incoming quad image is stitched together into a single image before encoding. Because the incoming signals are dependent on each other, it is often easier to troubleshoot image issues in standard YUV mode and then switch to 4K mode for production. See "6.1 4K / UHD mode" on page 231
2in/2out 50/60p	2in/2out 50/60p or 1in/1out 50/60p - is specifically for recording HD at 50 or 60p.

6.1 4K / UHD mode

There are generally two 4K formats available from production digital sources, full 4K and Ultra HD. While they can be cropped for various aspect ratios, for our purposes, 4K is measured as four 2K images (2048x1080) which add up to 4096 pixels x 2160 rows while UHD is measured as four HD images (1920x1080) which add up to 3840 pixels × 2160 rows. Not technically 4K but certainly close enough and a more important point is that Ultra HD, as the UHDTV-1 specification, is recommended by SMPTE, the ITU and others, to be the international broadcast format while full 4K would be the digital cinema base format.

4K and UHD YUV are really just big video images, four times the size of HD to be sort of exact. There are in fact actually four separate 2K or HD signals coming from the source which are "stitched" together as part of the recording process to form the full 4K image. And because this is standard video, post-production can be quite straight forward.

UHD SOURCE SIGNALS

Four channel Cinedeck systems can optionally record full 4K and UHDTV-1 images simply by changing the operation mode.

To set the system mode, see "5.36 Prefs tab" on page 223.

The appearance and operation in 4K mode is virtually identical to single channel view so only differences are noted in the following descriptions.

UHD SOURCE STITCHED

4K / UHD mode / - cont...

When in standby and record mode, the 4K and single channel views only have three differences.

- Because there is only one channel, there is no multi view toggle.
- The frame buffer indicator has four lines, one each to display the 4K, HD, Proxy and H.264 file writes.
- The encode overview at the bottom changes from master and proxy to a quad listing with information, again about the 4K, HD, Proxy and H.264 files being written. The links below in the captions all connect to the single channel record view chapter here: "5.12 Recording, single channel view" on page 108
  And for the full single channel view description see: "5.9 Single channel view" on page 99

4K / UHD mode / - cont...

When in playback mode, the 4K and single channel views only have one difference.

- Because there is only one channel, there is no multi view toggle.

For full details of single channel playback view, see: "5.15 Playback - Single channel view" on page 117
For all of the common features available in single channel view see: "5.9 Single channel view" on page 99

MULTI-VIEW TOGGLE IS NOT AVAILABLE IN 4K MODE

4K / UHD mode / - cont...

6.2 Eight channel mode

Note: Eight channel mode is only for HD master recording up to 30p/60i. Simultaneous proxies are not available and some codecs such as AVC-Intra and XDCAMHD are limited to six channels.

8 Channel Mode Setup:

Eight input mode is only an option for HD recording on ZX45 and requires a firmware and sometimes a driver change, to switch the SDI outputs to operate as inputs. Because all of the SDI I/O is set to operate as input, SDI out is disabled, preventing EtoE and playback over SDI. Playback is still available on the Cinedeck user interface.

Currently, switching between normal HD/SD YUV mode and 8 channel mode also requires changing the active Cinedeck application folder. This is because the Cinedeck application is transitioning between 32bit and 64bit and a 64bit version is needed for 8 channel mode.
The 64bit application folder, located on the c: drive, should be named similar to cinedeck_64 and have a 64bit identifying sub-folder or file in the main application folder to differentiate it from the 32 bit version.

1. Rename c:\cinedeck to c:\cinedeck_32 or similar and rename c:\cinedeck_64 to c:\cinedeck

2. Locate the Bluefish firmware and driver folder. The folder should be named similar to BlueFishOemDriver_ Vxxx and be located at the top of the c: drive.
   The required firmware is a .exe installer located under the firmware sub-folder and will be named something like “Supernova QuadIn” or “4i0o” meaning 4-in, 0-out. Run the installer and note that after updating the two cards, a full shutdown power cycle is required and after the firmware is installed another restart is required.
   For details on installing Bluefish firmware, see “9.21 Bluefish firmware” on page 316.

3. Bluefish firmware and drivers go as a pair meaning that when firmware is changed, it is important to confirm that the driver included with the firmware package is the active driver. If it is not, the driver needs to be updated as well. The driver will normally be located with the firmware in a “release” sub folder under “driver”. For the installation procedure, see “9.22 Bluefish driver” on page 318.

(For additional assistance see: “Contacting Cinedeck” on page 2)

Eight channel mode / - cont...

As noted, eight input mode is an option for HD recording on ZX45. Because the firmware changes SDI outputs to inputs, SDI out is disabled, preventing EtoE and playback over SDI. Playback is still available on the Cinedeck user interface.

General setup and operation is essentially the same as normal HD mode so users comfortable with normal operation will have no problems with 8 channel mode but some screens are slightly different.
The following images and descriptions only cover items that are different from normal operating mode.

MASTER ENCODE ONLY, PROXY ENCODING IS NOT AVAILABLE

Eight channel mode / - cont...

EIGHT CHANNEL MODE IN STANDBY - CHANNEL 1 IN PLAYBACK

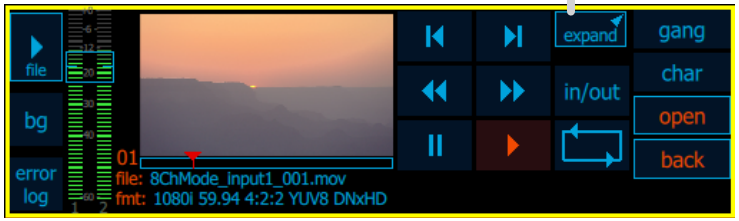
EIGHT CHANNEL MODE IN RECORD

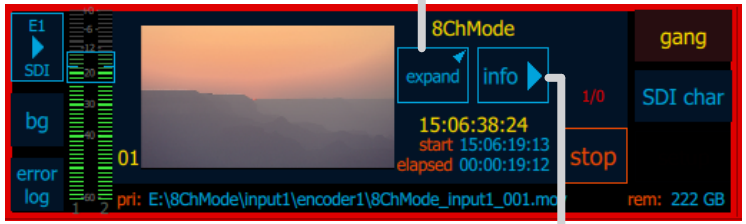
By necessity, the eight channel multi-view screen does not display as much detail as the standard multi-view. The additional 'info' display will be activated in a future release. For now the easiest access to additional detail is to temporarily switch to single channel view via the "expand" button. Other than that, the on-screen controls work the same as in the standard multi and single channel views.

CLOSE UP OF A CHANNEL IN PLAYBACK

CLOSE UP OF A CHANNEL IN RECORD

EXPAND - TOGGLES TO SINGLE CHANNEL VIEW





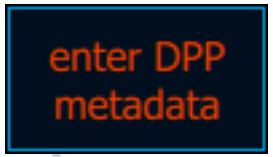
CLOSE UP OF A CHANNEL IN STANDBY

INFO WILL BE ACTIVATED IN AN UPCOMING RELEASE

6.3 DPP metadata

In May 2010, UK broadcasters, ITV, Channel 4 and the BBC formed the Digital Production Partnership to help "smooth and accelerate the move to end-to-end digital". Since that starting date, additional broadcasters have joined the partnership including, BSkyB, BTSport, Channel 5, ITV and S4C.

A large part of the DPP is the development and maintenance of a set of "Technical Standards For Delivery Of Television Programmes" which were implemented in the UK in October 2014. Details can be found on the DPP website (www.digitalproductionpartnership.co.uk). Part of the DPP standards cover metadata to be included in delivery files and Cinedeck has integrated a user interface for entering all of the DPP specific metadata.



When an appropriate format, codec and wrapper combination is selected on the master encode page, such as 1080i 50, AVC-Intra, MXF Op1a DPP, access is available to enter DPP metadata.

The DPP metadata screens consist of a summary page (shown at right) and six subsequent data entry pages (shown on the next page):

- descriptive
- video
- timecode
- audio
- access service
- additional info

DPP metadata / - cont...

The Cinedeck metadata is DPP compatible. If changes or additions to the initially created metadata are required after recording is completed, the content can be edited with the DPP Metadata Application.

DESCRIPTIVE METADATA CAN BE IMPORTED, EXPORTED AND EDITED USING AN ON-SCREEN OR USB KEYBOARD

VIDEO METADATA PARAMETERS CAN BE ADJUSTED WITH THE VARIOUS ON-SCREEN SELECTOR BUTTONS

TIMECODE PART METADATA CAN BE IMPORTED, EXPORTED AND ENTERED USING THE ON-SCREEN CALCULATOR

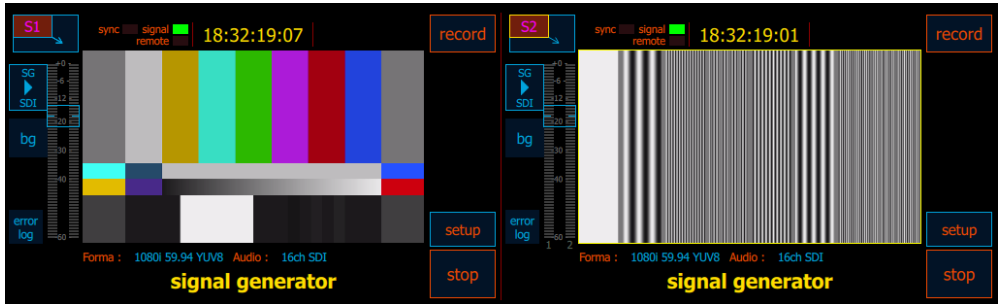
AUDIO METADATA PARAMETERS CAN BE ADJUSTED WITH THE VARIOUS ON-SCREEN SELECTOR BUTTONS. THERE IS ALSO A COMMENT FIELD FOR USER ENTERED DATA

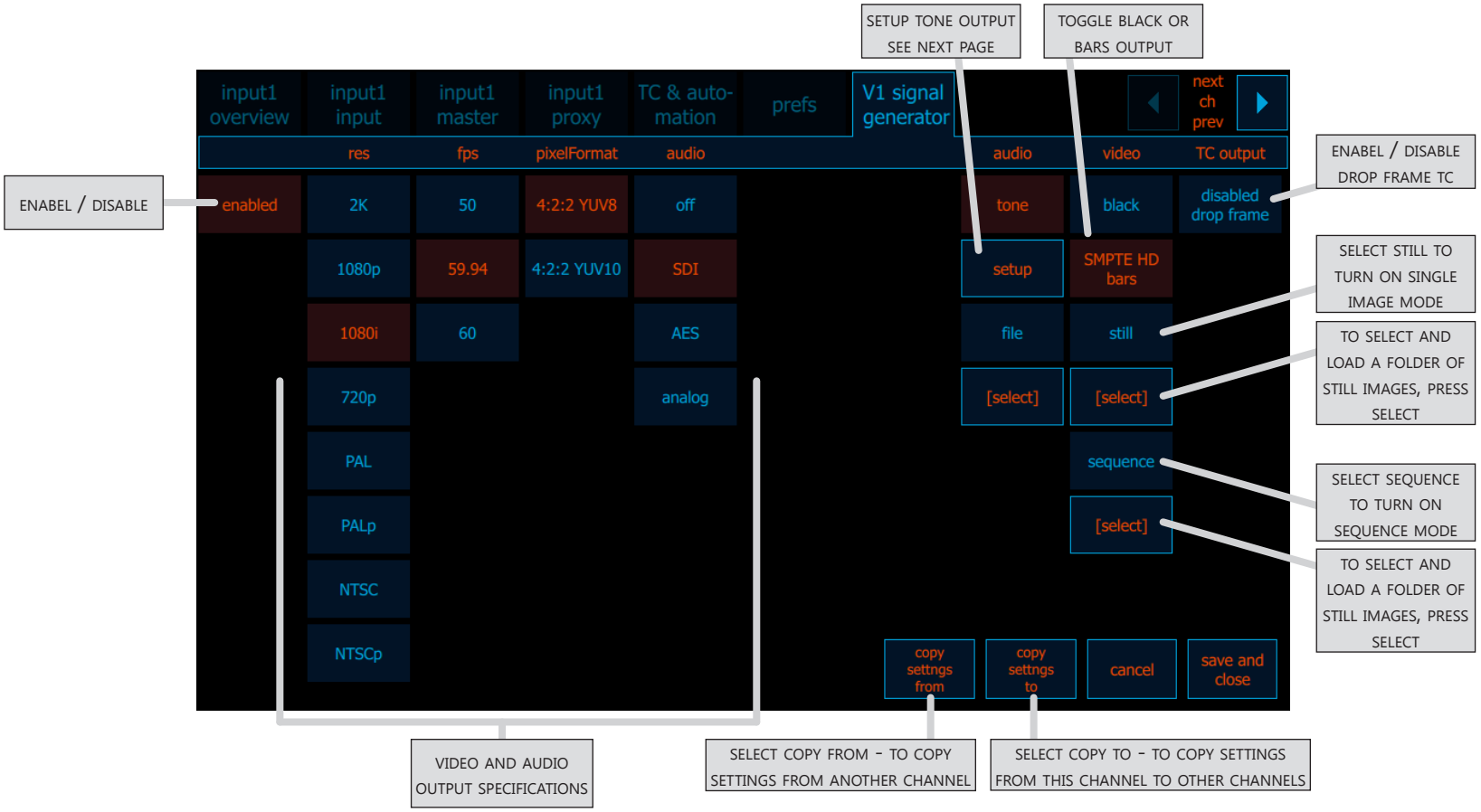
ACCESSIBILITY SERVICES CAN BE NOTATED USING THE VARIOUS ON-SCREEN SELECTOR BUTTONS.

THE LAST PAGE IS FOR ADDITIONAL, MISCELLANEOUS METADATA

6.4 Signal Generator tab

Cinedecks with the “signal generator” are able to output various test patters and audio signals for testing downstream connections.
Click “enable” to turn on signal generator output for the selected channel and then set the required output settings.





V1 SDI/AES tone setup
next ch prev
ch 1 ch 2 ch 3 ch 4 ch 5 ch 6 ch 7 ch 8 ch 9 ch 10 ch 11 ch 12 ch 13 ch 14 ch 15 ch 16
silence
200 Hz
400 Hz
600 Hz
800 Hz
1 kHz
1.2 kHz
break
save ch1 settings to all
set break duration & frequency
cancel
save and close
SELECT APPROPRIATE TONE FREQUENCY AND CHANNEL
CLICK TO ACTIVATE BREAKS IN AUDIO TONE GENERATION
CLICK TO APPLY SETTINGS TO ALL CHANNELS
CLICK TO ADJUST BREAK FREQUENCY

7.0 Remote control

Cinedecks can be remote controlled using a broad variety of systems; RS-422, Cinedeck MCC, AMP commands over IP, KVM, VNC and via USB devices. Please note however that **Windows "Remote Desktop Connection" should not be used with the Cinedeck** as it can cause inconsistent operation and errors.

RS-422 is supported in slave and master mode.

- When in master mode, the Cinedeck can take full control of other devices using Sony BVW/SRW commands such as tape machines and the user interface provides a full set of status indicators.
- In Slave mode, the Cinedeck accepts standard commands and specifically the Cinedeck responds as a Sony SRW 5500 or BVW 75. See the next pages for COM port setup and "490- remote control" on page 225.

(*Cinedeck's multi channel controller is no longer fully supported*) **Cinedeck MCC** is a Windows based application which can be connected to up to 24 channels of Cinedeck. From the remote interface you can setup all aspects of a channel including project settings, push settings to multiple channels, control any selected channels for recording and playback including loading clips into selected channels for playback.

Cinedeck MCC utilizes the **AMP protocol** from Grass Valley which is a well documented enhancement of the Odetics command set. The AMP API can be used for complete management and control of multiple Cinedecks from other systems such as those for media asset management. (See "7.4 AMP protocol" on page 249)

For additional information about using AMP or Cinedeck MCC, contact Cinedeck support.
See "Contacting Cinedeck" on page 2

For use with **KVM systems**, Cinedeck recorders have USB and every deck has at least two types of monitor ports (VGA, DVI, HDMI, Display port) (See the specifics for each deck in "3.0 Installation" on page 40)

VNC applications such as Teamviewer and Real VNC offer an excellent way to gain full access to the complete user interface, from the next room or the next country. See "7.6 Using VNC applications" on page 251.

USB control panels such as X-Keys can be used and on a more basic level, a USB mouse an keyboard can be connected. *It may be necessary to install device specific drivers for your controller and setup shortcut key mapping*. (See "5.3 Keyboard shortcuts" on page 80)

For RS-422 specifics, see the next few pages:

7.1 Device Manager

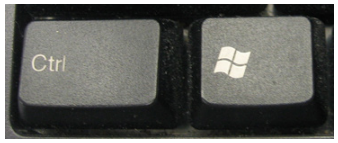
To assure proper RS-422 connectivity and performance, the COM port settings should be confirmed. The procedure for all decks is the same however the settings are a bit different for each deck.

It is recommended to connect a USB keyboard and mouse to make navigation within the Windows environment easier.
Exit from the Cinedeck user interface, “prefs” menu “exit application” See “495- application” on page 227.

For those familiar with Windows systems, open Device Manager and then locate and open Ports (COM & LPT). For port details, goto “7.2 RS-422 - COM port setup” on page 244

There are several ways to open Windows Computer Management and access Device Manager and Disk Management, this is just one:

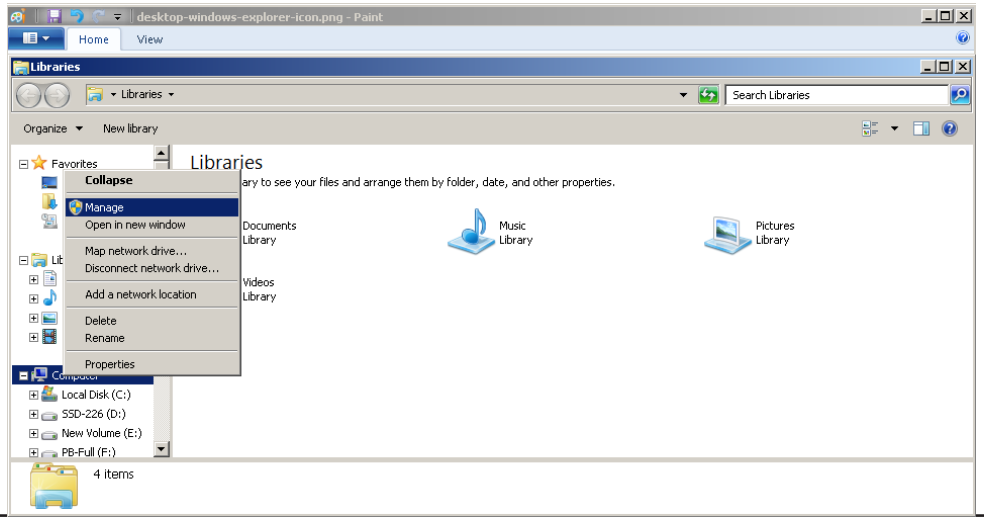
From the Windows desktop, click on the Windows Explorer icon, which should be just to the right of the Windows Start menu at the lower left of the screen.



If the icon is not there, another easy way to open Windows Explorer is by simultaneously pressing the Windows key and the “E” key. The Windows key is next to the left Control key.

Once Windows Explorer is open, from the list at the left side of the screen, right click “Computer”, to open the properties menu.

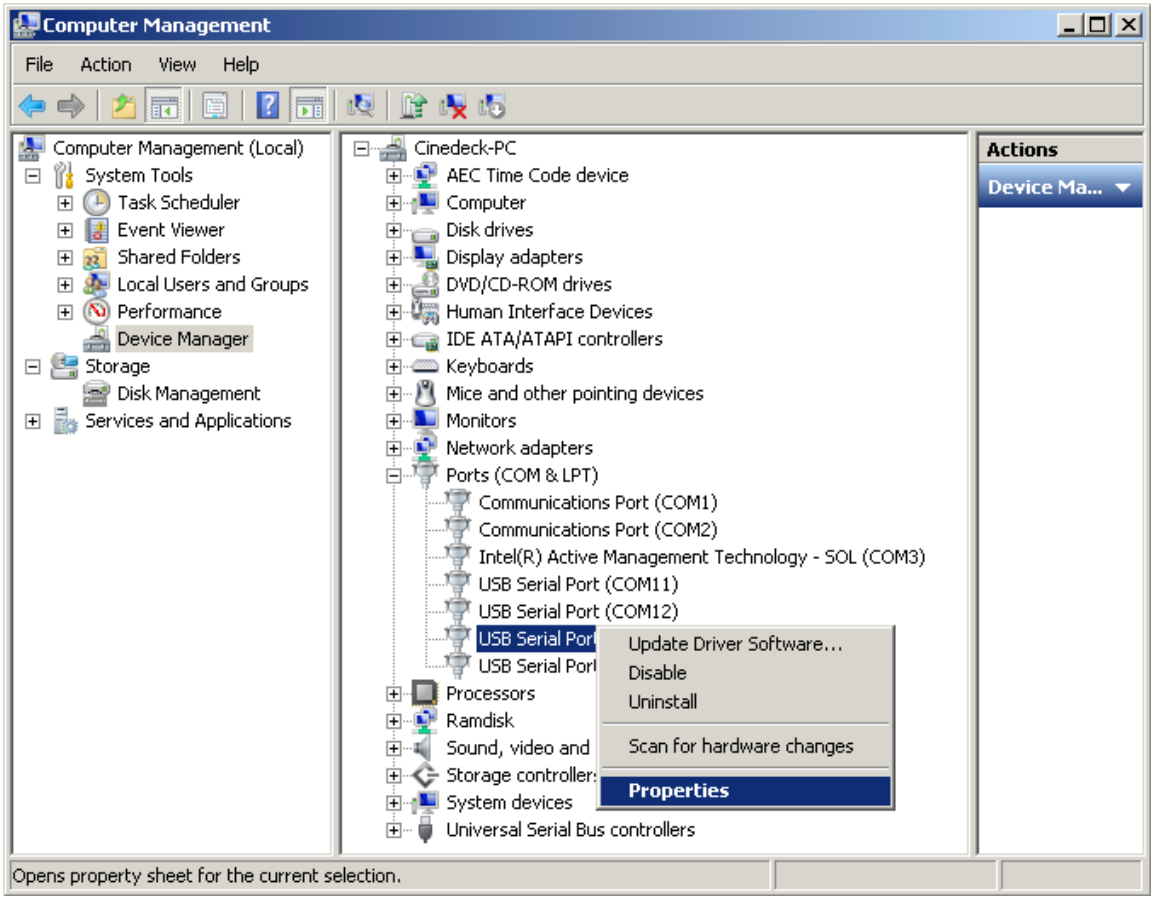
Click on “Manage” to open Computer Management.



7.2 RS-422 - COM port setup

Once Computer Manager is open (See "7.1 Device Manager" on page 243), from the list at the left, select "Device Manager" and from the list which opens in the middle, locate Ports (COM & LPT) and click the "+" to open the list of devices.

Each deck has several USB COM ports. The settings for each port can be accessed by right clicking and selecting "properties" from the context menu.



The standard RS-422 COM ports for RX3G are:

- COM 5 = RX3G CH 1
- COM 6 = RX3G CH 2

The standard RS-422 COM ports for MX and ZX are:

- COM 9 = MX-ZX CH 1
- COM 10 = MX-ZX CH 2
- COM 11 = MX-ZX CH 3
- COM 12 = MX-ZX CH 4

- COM 8 on newer systems is reserved for RS-422. (See "multi-mode RS-422 control board" on page 247)

RS-422 - COM port setup / - cont...

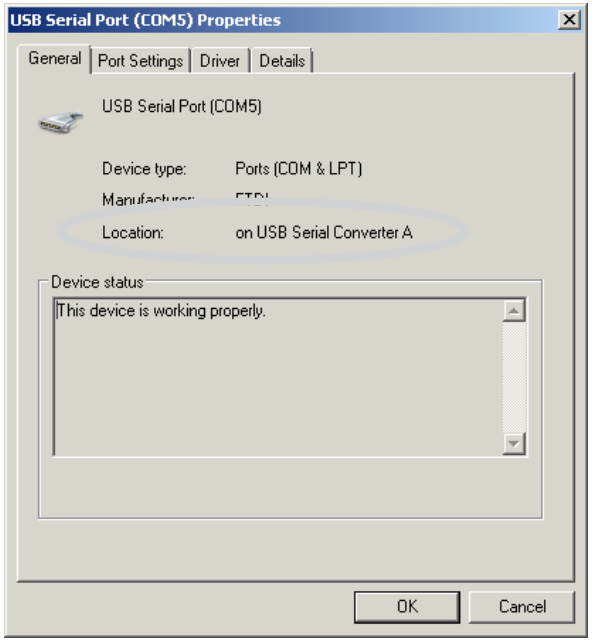
Open the properties for the first COM port.

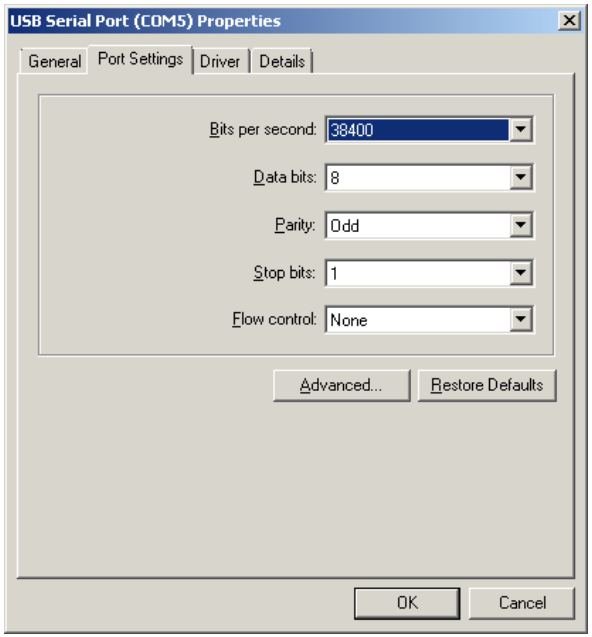
There are four tabs across the top.
Note the location on this first page.

“Serial Converter A” is for the first I/O channel and needs to be assigned to the COM port for the first RS-422 channel.

“Serial Converter B” needs to be assigned to the COM port for the second channel and so on.

The specific COM port number is not important at this point as it can be changed in the next steps.





Click on the “Port Settings” tab and confirm that all of the settings are as shown.

Bits per second	38400
Data bits	8
Parity	Odd
Stop bits	1
Flow control	None

RS-422 - COM port setup / - cont...

Click on "Advanced" to open the Advanced Settings for the selected COM port and confirm that the settings match the screen on the right and those itemized below.

Referring to the Serial Converter letter, set the appropriate COM port number.

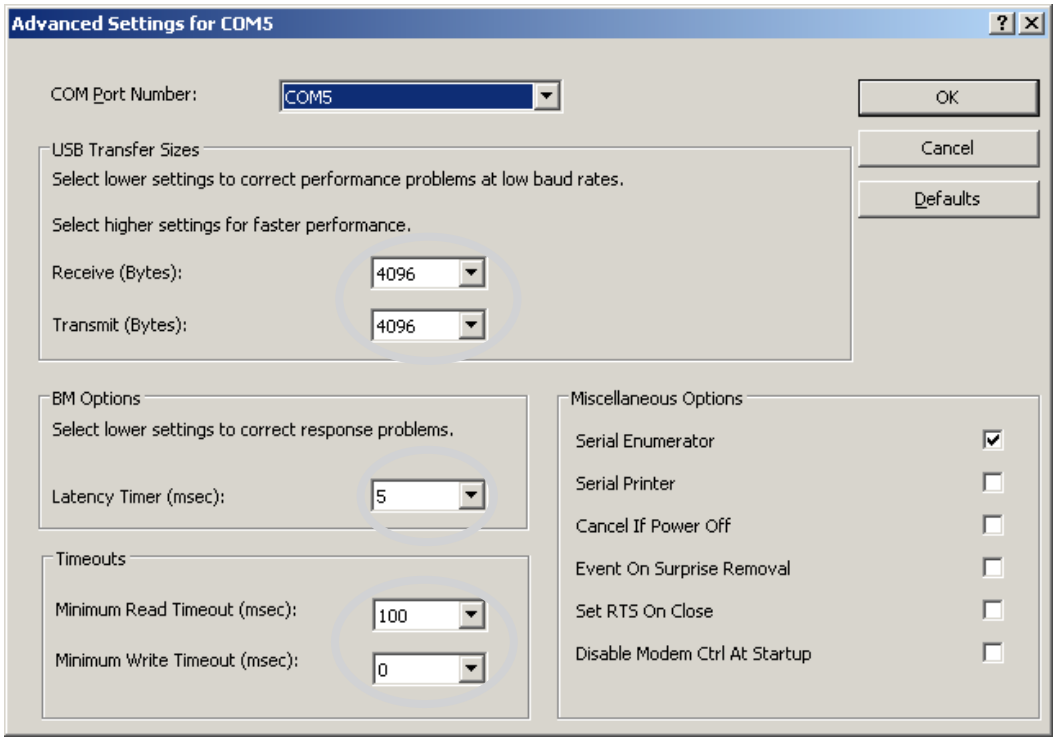
For RX3G:
- A = COM 5 = RX3G CH 1
- B = COM 6 = RX3G CH 2

For MX and ZX:
- A = COM 9 = MX-ZX CH 1
- B = COM 10 = MX-ZX CH 2
- C = COM 11 = MX-ZX CH 3
- D = COM 12 = MX-ZX CH 4

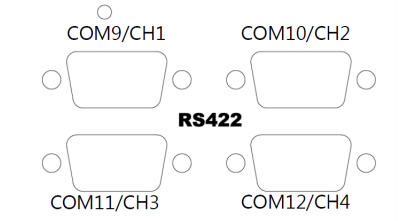
For all decks, the USB Transfer Sizes for Receive and Transmit should both be 4096 bytes.

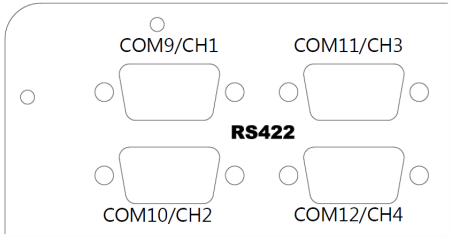
The BM latency timer should be set to 5ms however if there are performance issues with the connected device, the value can be reduced.

Lastly, the Minimum Read Timeout should be set to 100. The Minimum Write Timeout is 0.



Note: Some early MX units had RS-422 ports installed in a different sequence. If the COM ports for ch2 and ch3 are not working, try another port as they may be mounted as in the right diagram.

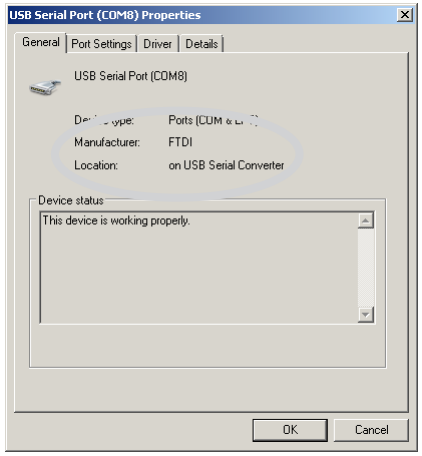




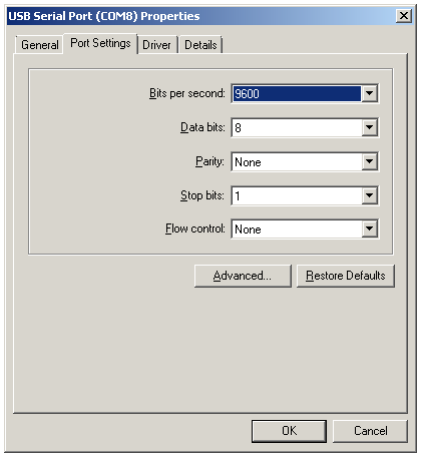
RS-422 - COM port setup / - cont...

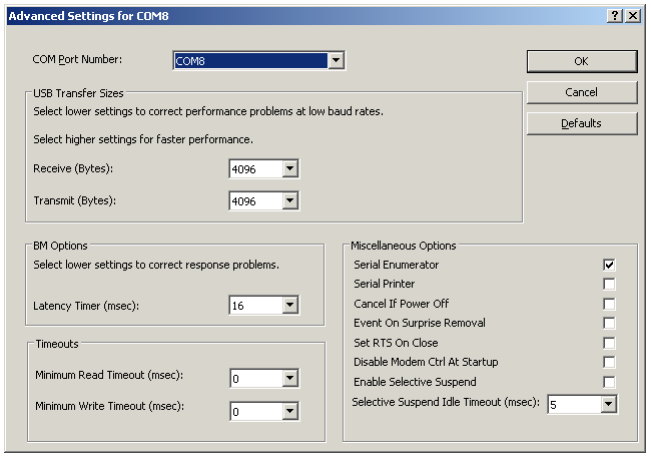
Additionally, all Cinedecks manufactured after November 2014 utilize a newer, **multi-mode RS-422 control board**, which provides bidirectional RS-422 ports.

To locate this device, note that the location properties for one of the USB Serial Ports listed in Device Manager, will not indicate a letter location such as A or B. It will still show the manufacturer as FTDI but the location is "on USB Serial Converter". This is the RS-422 control board. It uses the settings shown below.



Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None





And for all decks, under Advanced, the COM port number needs to be 8.

The USB Transfer Sizes for Receive and Transmit should both be 4096 bytes.

The BM latency timer should be set to 16ms.

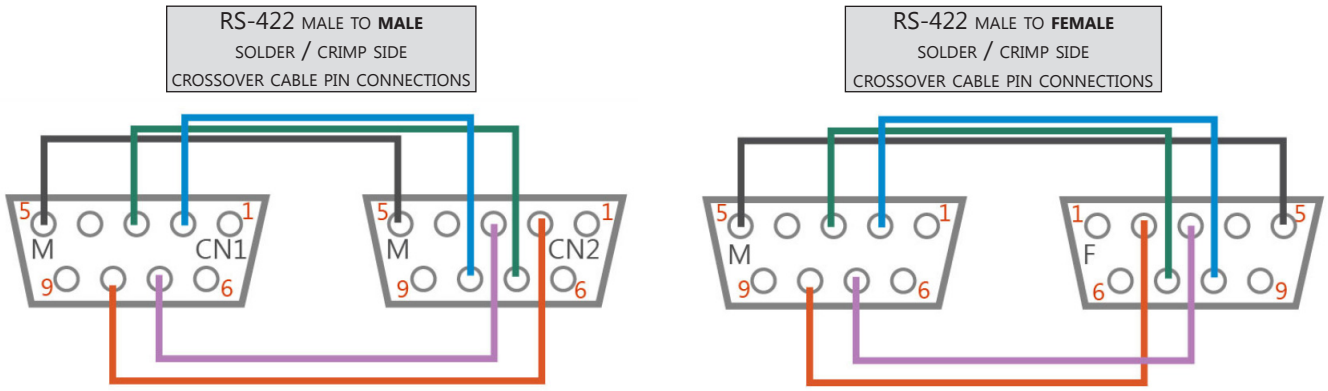
The Minimum Read & Write Timeouts should both be set to 0.

7.3 RS-422 Cables & pin-outs

All Cinedecks manufactured after December 2014 utilize multi-mode RS-422 control boards and can be connected for master or slave RS-422 control using standard (straight through) male<>male, 9pin RS-422 serial data cables. These later boards have their own specific COM port settings. See "multi-mode RS-422 control board" on page 247.

Earlier model decks (including RX3G and MX decks from before December 2014) utilize single mode RS-422 boards. When connected using a standard (straight through) male<>male RS-422 cable, the channels on these Cinedeck models are generally wired to be in slave mode, that is, to be controlled by the device to which it is connected. If it is desired to use the Cinedeck in master mode from a slave port, for example if a tape machine should be controlled from the Cinedeck, a RS-422 crossover cable is required. (See the diagrams below for the proper pin connections)
It is also possible to have the pin outs on the deck changed by Cinedeck support, for example to have all ports wired as master ports.
If any assistance is required, contact Cinedeck support. See "Contacting Cinedeck" on page 2

If there is a need to occasionally switch between slave and master modes, it is recommended to use a male>female crossover adapter cable. This will provide slave mode by directly connecting the standard male RS-422 cable to the deck while placing the adapter between the standard cable and the deck will change the connection to master mode.



7.4 AMP protocol

The AMP protocol from Grass Valley is a complete API which can provide full access to the Cinedeck, from a simple start stop remote controller up to total asset management. AMP connectivity is by RS-422 or TCP/IP. LAN based remote control using AMP requires TCP port 3811 to be open. The Cinedeck MCC application (multi-machine controller) utilizes AMP for communicating with the decks so also requires TCP port 3811 to be open,
The complete AMP documentation is available separately (See "Contacting Cinedeck" on page 2). but for those interested in developing their own control interface, some basic examples using the Putty Client or a similar telnet client are below.

- Telnet to port 3811 on the Cinedeck.
- Set up a connection to channel 1 by sending the following: CRAT0007204Vtr1
  (Replace the trailing 1 with 2, 3 or 4 to open connection to other channels.)
- You should see an ACK response from the Cinedeck, which is simply: 1001
- Send the record command (20.02): CMDS00042002
- The Cinedeck will ACK on response: 1001
  and start to record
- Send the stop command (20.00): CMDS00042000
- The Cinedeck will ACK: 1001
  and stop the recording

7.5 VDCP

VDCP (Video Disk Control Protocol) is a serial communications protocol designed originally to control early hard disk recorders. Originally developed by Louth Automation, VDCP is an extension of Sony RS-422 and also utilizes standard 9 pin serial data cables.

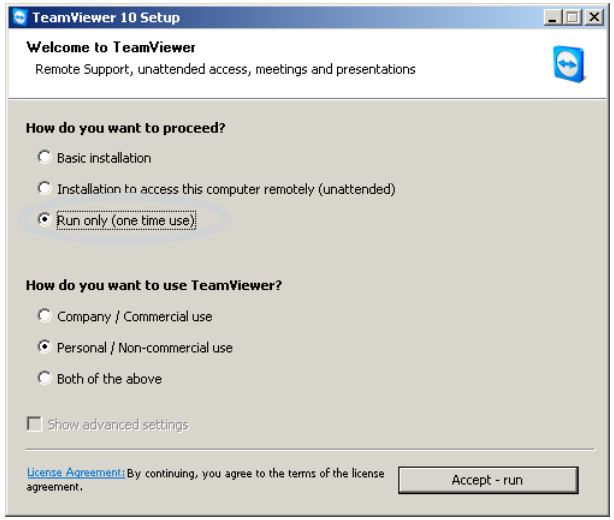
Complete VDCP documentation is available separately (See “Contacting Cinedeck” on page 2).

7.6 Using VNC applications

All Cinedecks can be controlled using standard VNC (Virtual Network Computing) remote access software. These applications provide the full user interface at a remote workstation in the next room or miles away. Most VNC applications provide direct, point-to-point access using the ip address while some like Teamviewer can provide coordinated connections via an Internet server. This can simplify installation and connection, especially for long distance remote sessions. According to Teamviewer, after installation, their application will always work if full Internet access is available, which means there are no firewall issues. For facilities with security concerns, as an alternative to the standard port 80, Teamviewer also evidently monitors port 443. Teamviewer state that "it is also possible to open only port 5938 TCP on the outgoing side. Data traffic should then be able to pass through on this port without any problems."

Note: Windows "Remote Desktop Connection" should never be used with the Cinedeck as it can cause inconsistent operation and errors.

For Cinedeck live system support, Teamviewer is often used so it recommended that your system already have it installed. Multiple versions are available from www.teamviewer.com. Cinedeck support generally use version 10 found here: http://download.teamviewer.com/download/version_10x/TeamViewer_Setup.exe. If you prefer to use another version, please contact Cinedeck support ("Contacting Cinedeck" on page 2).



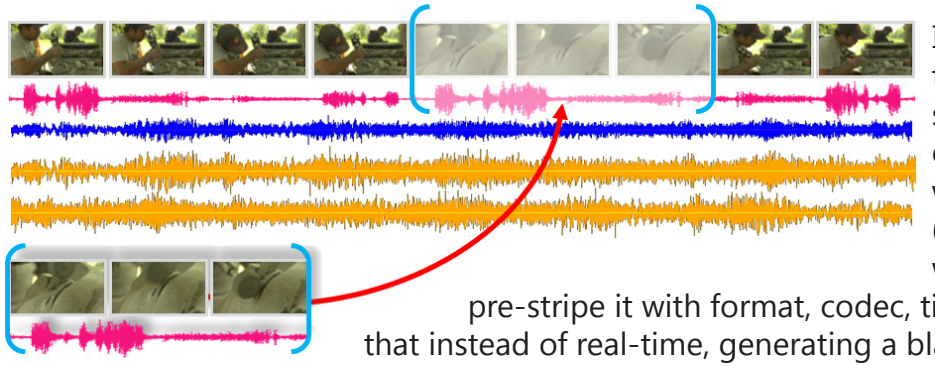
To eliminate some future security concerns, it is not necessary to have Teamviewer automatically start when the system powers on, nor is it necessary to install it at all. The Teamviewer installer can also be used in a run once "Run only" mode.

Of course Teamviewer is not the only VNC application available. For your internal use, other options include Tight VNC, Ultra VNC and RealVNC. None of these applications come pre-installed and Cinedeck provides no support so to use any of them, they will need to be installed and configured to work within your environment by a knowledgeable IT person.

8.0 Insert Edit

Insert Baseband mode allows the replacement of content in any selected region of many closed file types. You can open a file on the Cinedeck, set edit points, along with the appropriate tracks , video and or audio and or closed captions that need replacing and trigger insert recording to fill in the selected area, with whatever is coming into the SDI input..

Cinedeck Insert Edit currently supports ProRes, DNxHD, AVC-Intra, XDCAM HD and JPEG 2000 in a MOV (quicktime), MXF Op1a, or MXF OpAtom wrapper. Target files can be Cinedeck generated or come from elsewhere however, ProRes files which were generated elsewhere, likely need to be rewrapped as ProRes is normally VBR (variable bit rate) and the insert process requires the content to be CBR (constant bit rate). This is a fast file copy process which is done from Cinedeck's clip manager. (See "246- manage clips" on page 133 under Clip Manager) Additionally, some XDCAMHD files such as those created on EDIUS are incompatible.



Inserting into a prerecorded file is analogous to inserting into a prerecorded tape and the same analogy of working with a pre-blacked or pre-striped tape, also exists in the file world with Cinedeck's ability to create VMM (Virtual Mastering Media). Just like a tape, when you create a VMM "blacked file", you pre-stripe it with format, codec, timecode, audio tracks, etc. A big difference is that instead of real-time, generating a black file is fast. For example, it takes about six minutes to create a one hour ProRes blacked file. You can also have VMM files on disk and simply copy one to your workspace. Then, just like with a blacked tape, you use Cinedeck insert editing to fill in the blanks. (See: "8.5 Create black file - VMM" on page 265)

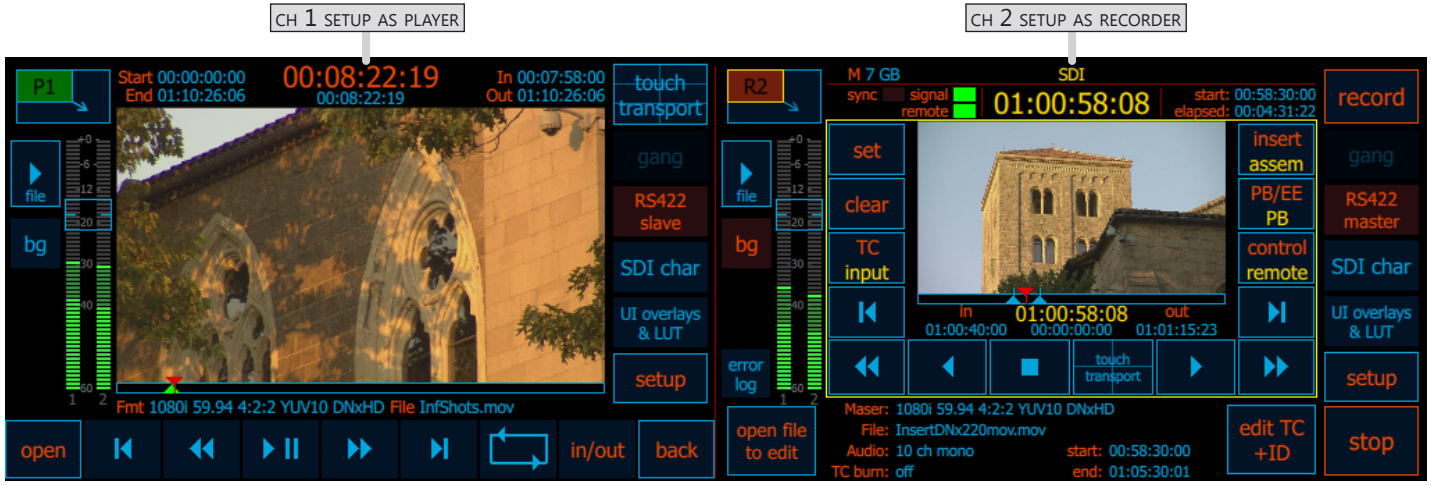
When building a show "live-to-file", there are three advantages to working with a pre-striped file as compared to Pause & Seek.

- With Pause & Seek there is no pre-roll. You can easily count down to the start but baseband insert mode does pre-roll like tape, which will be very familiar to studio personnel.
- When using the pre-striped file, you can start and stop your work anytime, while Pause & Seek requires the deck to stay on and the file to remain open.
- Because the file already exists on disk, play while insert record is available. This allows full transport control for confidence - play, shuttle, etc. (See "8.7 Confidence Monitoring" on page 268)

Insert editing can be done between two Cinedeck channels (source channel to record channel) or with the Cinedeck connected to an external source such as a VTR or edit system (remote player/source to Cinedeck recorder). In both situations, the target file that will receive the insert is opened on the Cinedeck.

Whether working channel-to-channel or from a separate source machine, the operator can control everything via RS-422, using the controls provided on the (master) Cinedeck target channel interface.
In the case of a non-linear system like Media Composer, editing can be controlled entirely from the Digital Cut tool, exactly as with a tape machine, except you are creating or inserting into files instead of tape.

Note: An important aspect of editing with the Cinedeck is the timecode offset. For all scenarios, see "464- Special timecode modes" on page 215



8.1 Avid Digital Cut

Like a VTR, your Cinedeck can be utilized as a Digital Cut destination with Avid editing systems that have SDI and RS-422 capabilities. For hardware connections, see "8.1.4 Avid Hardware Setup" on page 257.
For Avid deck selection and configuration see "8.1.5 Avid Deck Selection" on page 258.

There are two ways to generate a Digital Cut with a Cinedeck; create a new file during the Digital Cut or insert into a blacked file, pre-striped VMM (Virtual Mastering Media). All codecs can be used when generating new files while VMM use is restricted to codecs which support insert editing. ProRes, DNxHD, AVC-Intra, JPEG2000 and XDCAM HD files, wrapped as MOV, MXF Op1a and MXF OpAtom, can be inserted into.

Inserting into a blacked file is the recommended procedure, particularly for long form Digital Cuts and is also the same procedure used when performing insert changes to pre-recorded files.
Note: Inserting changes into flat pre-recorded files is the same as inserting into VMM blacked files and is easiest if your target file timecode is the same as your timeline.
Additionally, inserts can only be done on one file at a time.
(See "8.5 Create black file - VMM" on page 265)

Once you have an appropriately formatted target file, set your Cinedeck system as below:

For basic record or insert editing:

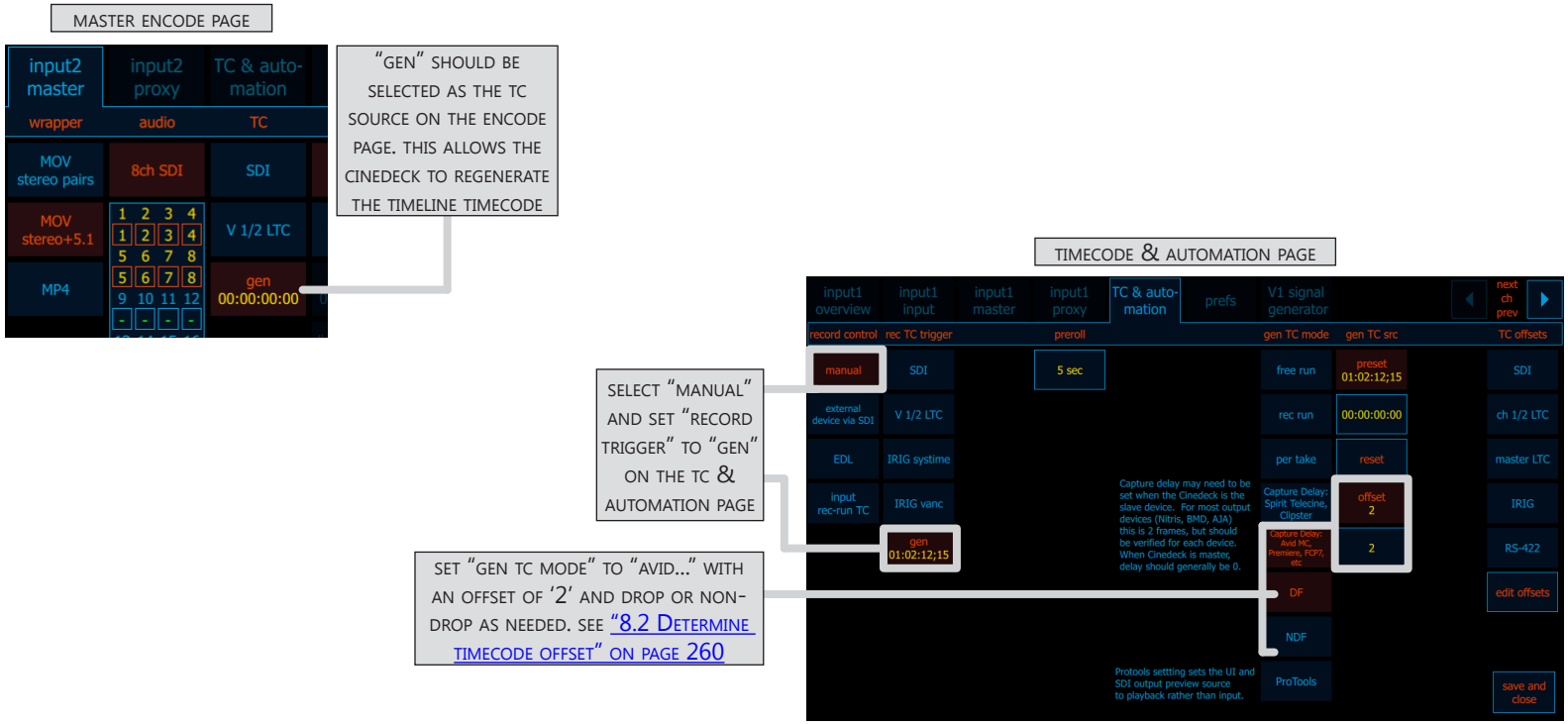
1. Set "TC" to "gen" on the master encode page
   - Set "record mode" to "Normal" for generating new files
   - Set "record mode" to "Insert Baseband" to insert into existing files
2. On the TC & automation page, set "record control" to "manual", "record TC trigger" to "gen" and TC mode to "free run".
3. Assure the timecode generator is set to 00:00:00:00
4. Set the Drop / Non-Drop timecode selector appropriately

The above steps are detailed on the next few pages.

8.1.1 General Settings

Regardless of whether you are creating new files, using insert edit to make changes or insert edit recording into a black file, these settings are required.
It is useful to understand that the Cinedeck receives timecode via the RS422 connection and uses that data to regenerate the timecode used for the recording.

Use the following settings on the slaved Cinedeck channel.



8.1.3 Avid Insert Edit Settings

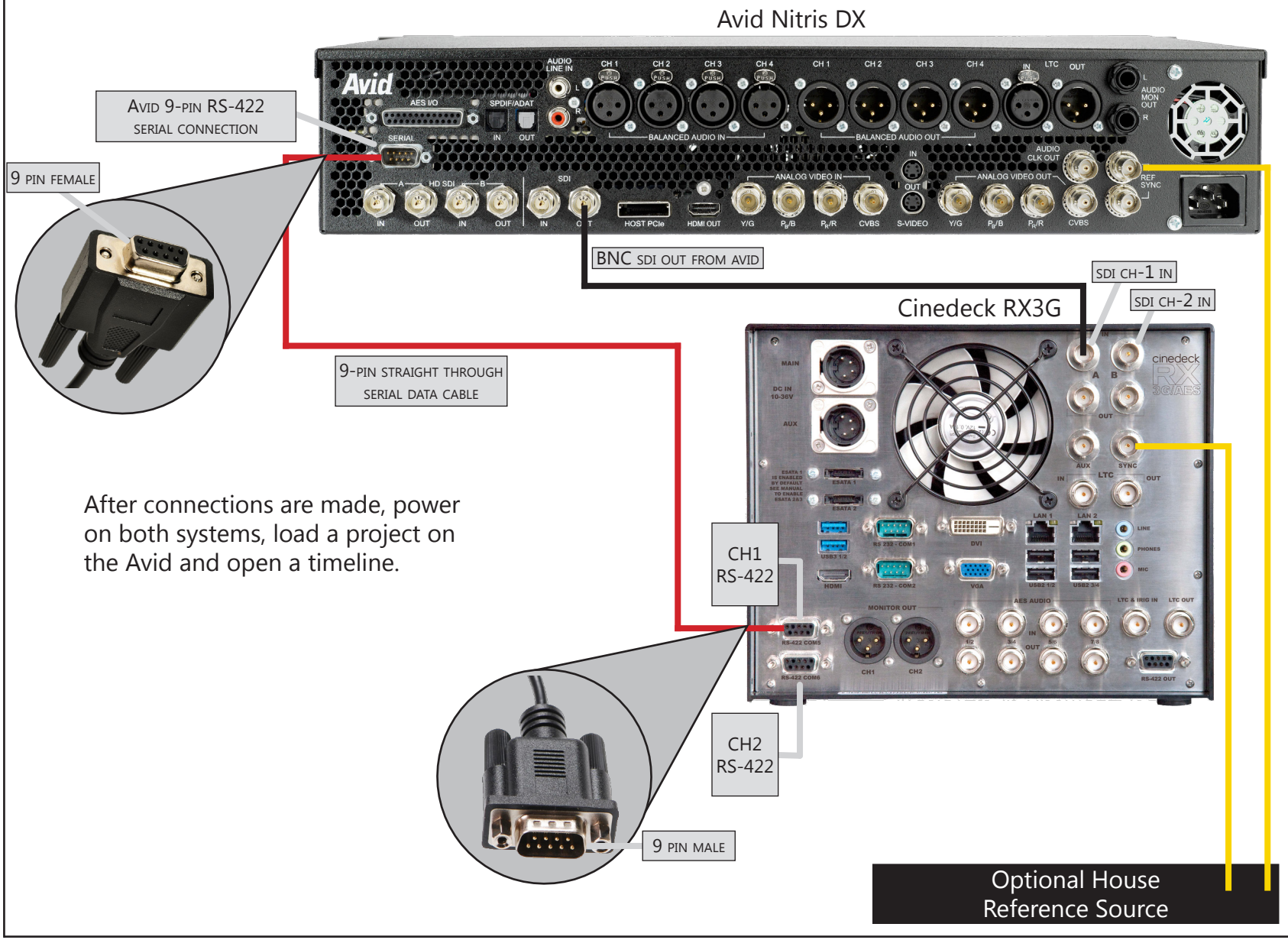
For inserting into blacked VMM files, "insert baseband" is used for the "record mode".

Remember, ProRes files must be CBR to accept video inserts.
See "8.0 Insert Edit" on page 252

8.1.2 Avid Settings for New File

If you prefer to create a new file, for record mode select "normal" instead of "insert baseband". Assure your project input and encode settings are set for the appropriate format, codec and number of audio channels.

8.1.4 Avid Hardware Setup

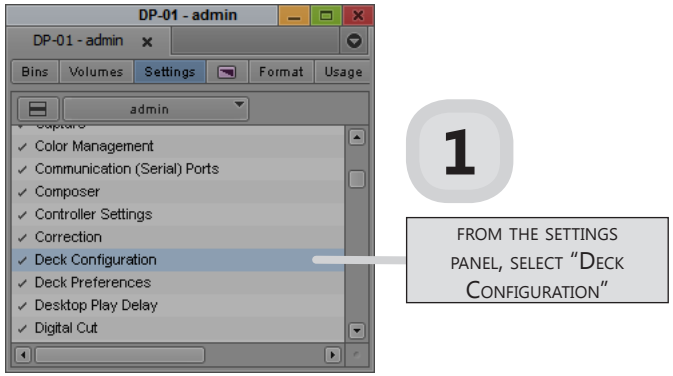


After connections are made, power on both systems, load a project on the Avid and open a timeline.

8.1.5 Avid Deck Selection

Avid Media Composer provides several ways to select and configure a connected deck. If your system is already setup for RS-422 control you can likely skip to the Digital Cut Tool on the next page.

To create a new connection follow the steps below:

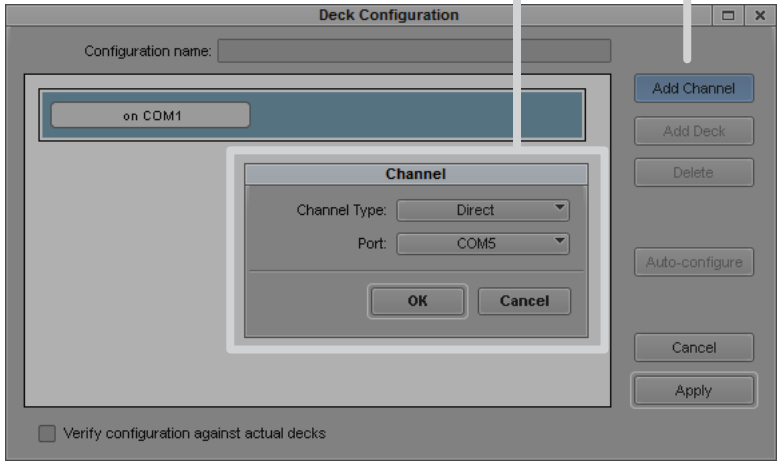


1

FROM THE SETTINGS PANEL, SELECT "DECK CONFIGURATION"

2

FROM THE DECK CONFIGURATION PANEL, SELECT "ADD CHANNEL". FOR THE CHANNEL TYPE SELECT "DIRECT" AND SELECT THE APPROPRIATE PORT NUMBER AND "OK"

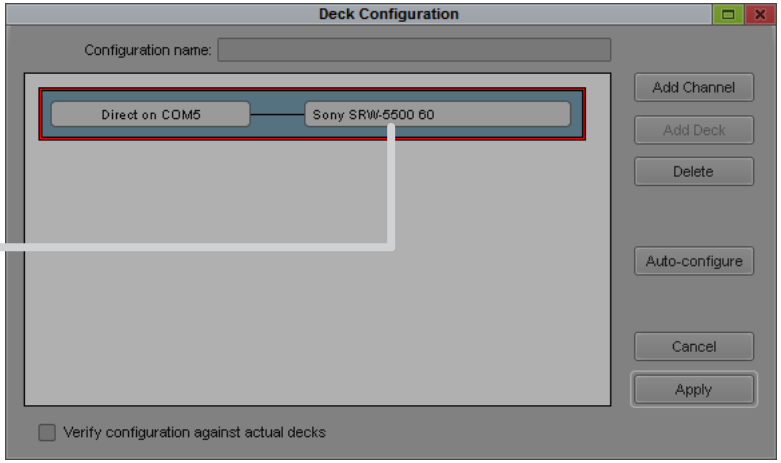


3

WHEN ASKED IF YOU WANT TO AUTO CONFIGURE, SELECT YES

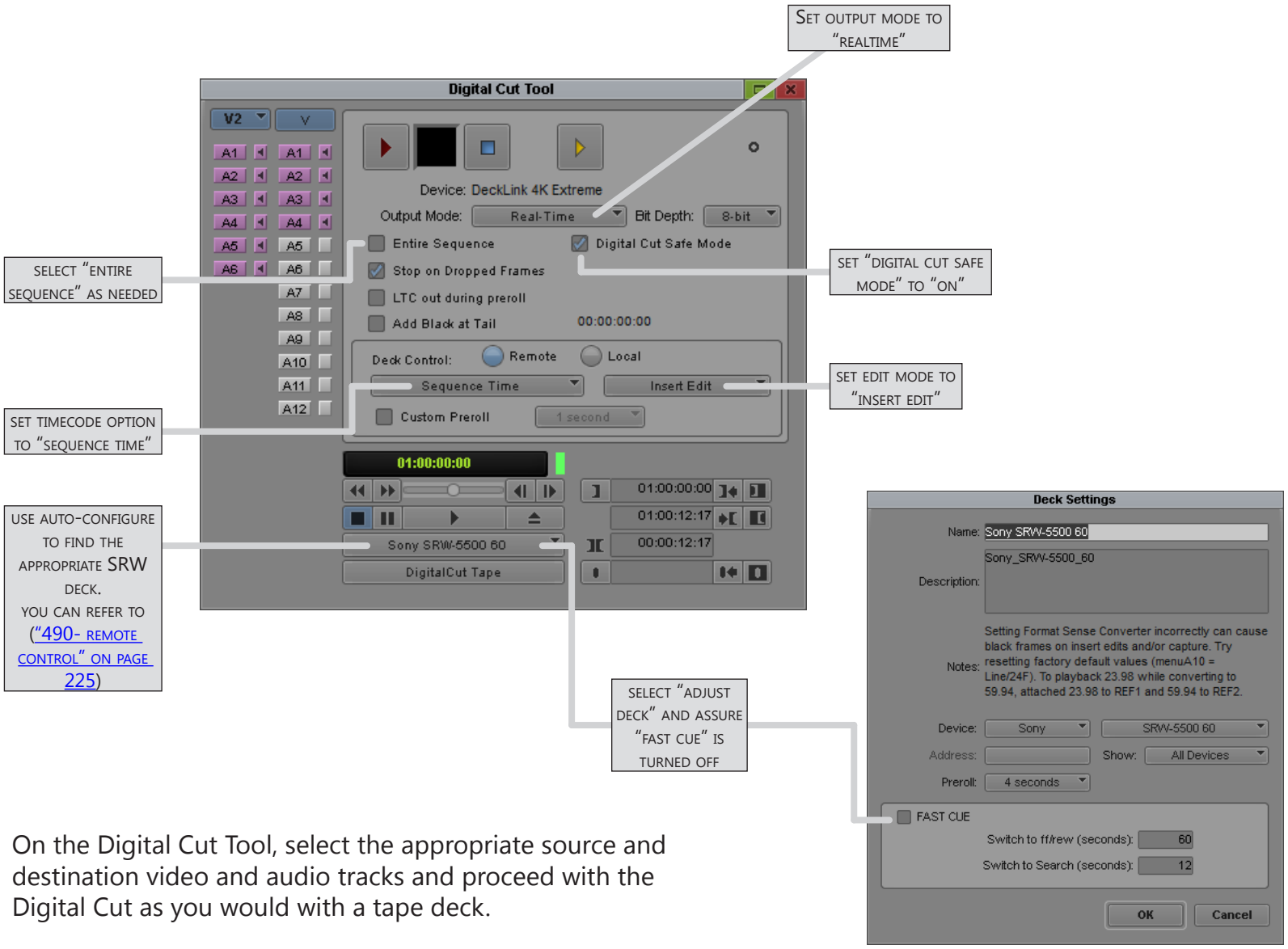
4

THE AVID SHOULD DETECT AND AND LOAD ONE OF THE SRW 5500 VTR PROFILES. SELECT "APPLY"



8.1.6 Digital Cut Settings

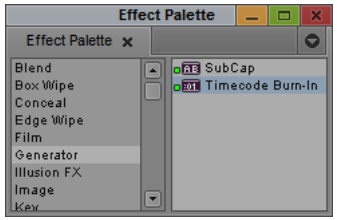
The Cinedeck can be controlled from the Digital Cut Tool exactly as if it were a tape machine. In fact, when you use auto-configure, the Avid will detect a SRW 5500 VTR.



On the Digital Cut Tool, select the appropriate source and destination video and audio tracks and proceed with the Digital Cut as you would with a tape deck.

8.2 Determine timecode offset

When a Cinedeck is slaved for controlled recording or editing from an edit system, the Cinedeck receives timecode information over the RS-422 connection and then regenerates the timecode for the recording process. Regardless of what edit system or hardware you are using, there will likely be a slight latency between the NLE and the Cinedeck. Compensation for this “Capture Delay” is set on the “timecode & automation” page. (See “5.35 TC & Automation tab” on page 210)
The capture delay is set in one frame increments. The easiest way to determine what delay is required is to capture some video that has a timecode burn-in from the source.

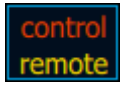


On the NLE, create a timeline with some video and apply a Timecode Generator effect from the Effect Palette to the timeline.

Perform a short basic Digital Cut or a Digital Cut using Cinedeck’s Insert Baseband mode. When the recording is complete, on the Cinedeck, compare the file timecode with the burn-in timecode. If they are not identical, adjust the Capture Offset by the difference between the two and do another short capture test.
The Capture Delay setting is memorized as part of the Cinedeck project.

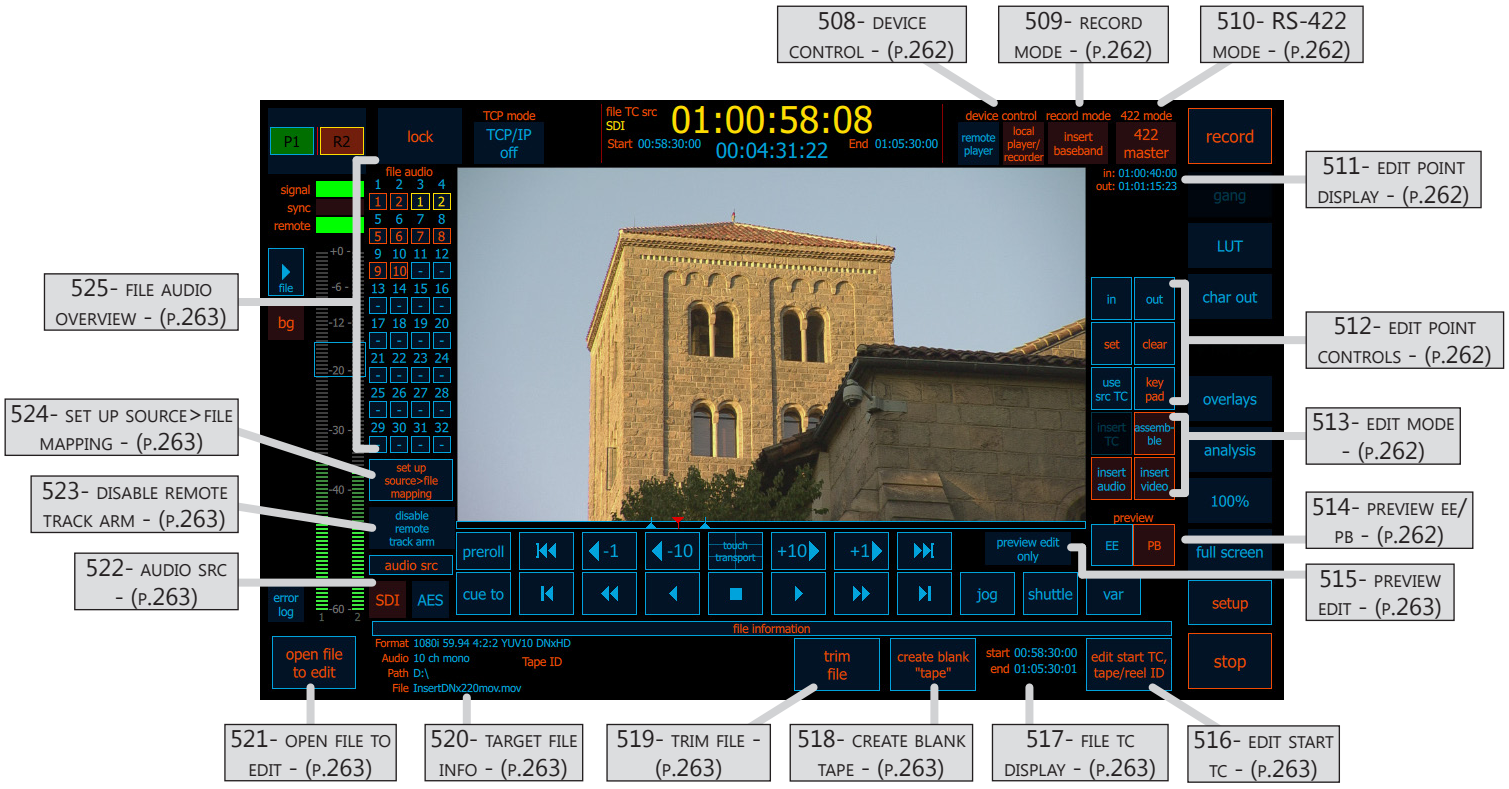
8.3 Insert Baseband master

Insert editing from a Cinedeck channel or from other devices such as a VTR, can be controlled from the Cinedeck in single channel view or multichannel view but there are a few important things to remember:

- Assign each edit channel to a separate project, paying attention to the master encode settings.
- While any transport controls can be used for playing, shuttling, etc., edit points for the source should be set via the controlling Cinedeck record channel, either using a keyboard or the on-screen buttons.
- When in single channel view and you want to look at a local Cinedeck source channel directly, it is easiest to use the TAB key on a keyboard to switch screens.
- 

To some users, the on-screen master channel indicators for local and remote seen in multi channel view, may seem reversed. Just remember, the text indicates the channel you will view if you click the button, not what is currently selected, so “control remote“ will switch to the remote device.

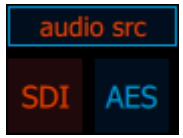
ONLY THE UNIQUE CONTROLS SEEN IN SINGLE CHANNEL VIEW DURING INSERT MODE ARE DESCRIBED HERE. SEE “5.9 SINGLE CHANNEL VIEW” ON PAGE 99 FOR OTHER DESCRIPTIONS) . EDIT OPERATION IS THE SAME IN MULTI-CHANNEL VIEW BUT BECAUSE OF THE REDUCED SCREEN SPACE, THERE IS LESS DETAIL.



Insert Baseband master / - cont...

Name	Location	Description
508- DEVICE CONTROL	"8.3 Insert Baseband master" on page 261	The device control selector is used to designate whether the user interface is focused on and controlling the local master / recorder or the source player. The orange highlighted selection is active.
509- RECORD MODE	"8.3 Insert Baseband master" on page 261	Selects between recording modes: (See "5.20 Record modes" on page 149) • "normal" - Used for standard recording • "pause" mode - Ingest stops but the file is not closed. • "pause & seek in file" Ingest stops, the file is not closed, an in-point can be set • "insert baseband" - Allows inserting audio and video into a flat file.
510- RS-422 MODE	"8.3 Insert Baseband master" on page 261	RS-422 selects remote control modes between off, master, slave and VDCP slave. RS-422 modes can be set independently for each channel. • Select master mode to control a connected device from the Cinedeck. • Slave and VDCP slave, allow external systems to control the selected channel.
511- EDIT POINT DISPLAY	"8.3 Insert Baseband master" on page 261	Shows the in and out points set for the target file.
512- EDIT POINT CONTROLS	"8.3 Insert Baseband master" on page 261	The on-screen edit point controls can be used for setting and clearing the edit points for the target file loaded in the master channel. Click "set" and then "in" to set the in-point Click "set" and "out" to set the out-point Click clear and the respective in or out to delete that point To manually set edit points, click keypad Select "use src tc" to optionally write the source timecode into the destination file
513- EDIT MODE	"8.3 Insert Baseband master" on page 261	Use the edit mode controls to select between inserting video, audio or video plus audio. Unlike a tape machine, "assemble" in this context simply simultaneously selects both video and audio to be inserted. The only tape like assemble edit function with files is pause and pause & seek. (See "5.22 Pause" on page 150 and "5.23 Pause & Seek in File" on page 151)
514- PREVIEW EE/PB	"8.3 Insert Baseband master" on page 261	The preview button toggles the master preview display between the playback target file view to the incoming source video and audio (EtoE = electronics to electronics).

Insert Baseband master / - cont...

Name	Location	Description
515- PREVIEW EDIT	"8.3 Insert Baseband master" on page 261	Select preview edit to disable file write mode and view a simulation of the proposed edit.
516- EDIT START TC	"8.3 Insert Baseband master" on page 261	Select edit start TC, tape reel ID to rewrite (re-stripe) the target file timecode based on a user entered timecode or back-timed based on the position of the playhead. For example, if the current file starts at 0:00:00 but you would prefer it to start at 58:30:00, simply change the timecode display and click save.
517- FILE TC DISPLAY	"8.3 Insert Baseband master" on page 261	Indicates the start and end timecode for the loaded master (target) file.
518- CREATE BLANK TAPE	"8.3 Insert Baseband master" on page 261	Creating a blank file is analogous to blacking or pre-striping a tape. Open the dialog and select the appropriate settings and number of audio channels required for your edit/recording session. (See "8.5 Create black file - VMM" on page 265)
519- TRIM FILE	"8.3 Insert Baseband master" on page 261	Trim File provides three functions (For details see "8.6 Trim File" on page 267): 1. Change the header information in a file to restrict playback to a specific section 2. Copy and optionally truncate a file, removing portions of the head and or tail 3. Change a file from VBR to CBR or from CBR to VBR
520- TARGET FILE INFO	"8.3 Insert Baseband master" on page 261	Displays the name and format details of the loaded target file.
521- OPEN FILE TO EDIT	"8.3 Insert Baseband master" on page 261	Like the play button, this opens clip manager for selecting and opening the target file. Only one clip can be opened at a time.
522- AUDIO SRC		 Provides direct selection to the SDI or AES inputs to be used for the audio portion of any insert edits.
523- DISABLE REMOTE TRACK ARM		Some external systems such as Avid Media Composer can select which channels are active for inserting. Disabling Remote Track Arm prevents this external control.
524- SET UP SOURCE>FILE MAPPING		Similar to the audio matrix on the encode pages, this button accesses a control panel for enabling or disabling independent tracks in the target file and selecting which source channels are directed to which tracks in the target file. (See "8.4 Insert audio matrix" on page 264 for detail)
525- FILE AUDIO OVERVIEW		This matrix display shows the current audio channel selections. Highlighted channels are available to be used. Yellow highlighted channels are currently active.

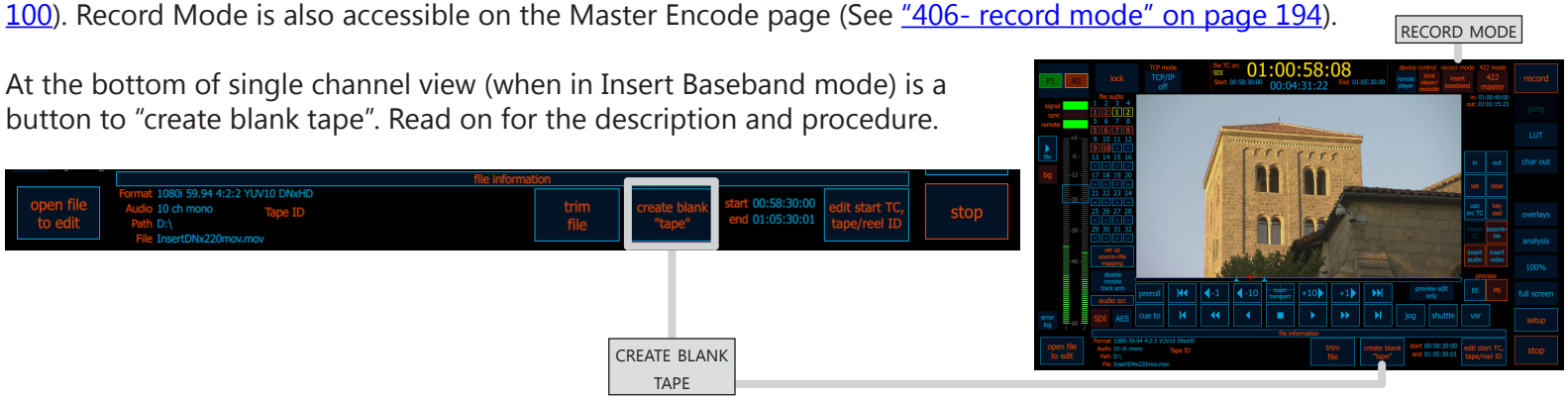
8.4 Insert audio matrix

The Insert edit source to file mapping screen is used to route incoming channels to file channels as well as to activate or deactivate file channels, controlling whether they are available to be inserted into.

8.5 Create black file - VMM

Because blacked files are directly related to insert editing, *Insert Baseband mode must be active to gain access to the VMM creation utility.*. The interface must also be in single channel view. Insert Baseband Mode can be turned on most easily using using the Record mode control at the top right of single channel view. (See "144- record mode" on page 100). Record Mode is also accessible on the Master Encode page (See "406- record mode" on page 194).

At the bottom of single channel view (when in Insert Baseband mode) is a button to "create blank tape". Read on for the description and procedure.



Creating black files or VMM (Virtual Mastering Media) is analogous to blacking or pre-striping a video tape and the usage is similar as well.

In the past, tape workflows were the most streamlined process in post finishing for delivering content. All of this suddenly changed with the tragic 2011 tsunami in Japan as the ensuing tape shortage forced the industry to quickly adopt file-based workflows. Today, almost all program deliverables are file-based and while there are definite benefits to file-based production, there are also limitations. The greatest frustration stems from the inability to change the master flat file once it's been exported or rendered. Generally for any changes or fixes, you need to re-render/re-export the entire program and then QC each file. By applying the capabilities of tape, Cinedecks eliminate this issue for many file types.

Deliverable flat ProRes, DNx, AVC-Intra, H264 and JPEG2000 files can be inserted into. Replacing specific sections of audio and or video (just like tape), reduces the time required for changes and fixes to minutes instead of hours and Cinedeck's VMM with insert edit provides two concurrent solutions...

- First, (just like on tape) when editing with VMM you can work non-linearly, inserting to any portion of that flat file.
- Simultaneously and very unlike tape, you have the ability to scrub and playback any part of that same single flat file while you are inserting to it, resulting in the ultimate file flexibility and recording confidence.

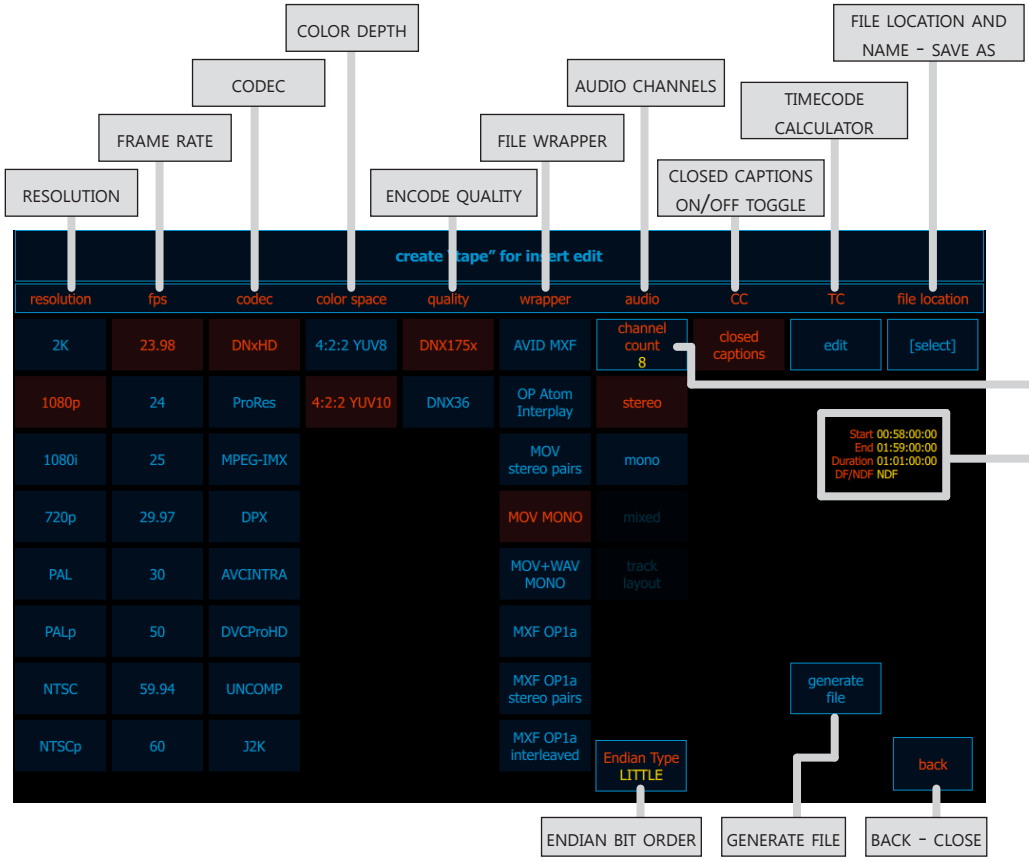
Note that Prores files not generated on a Cinedeck will need to be rewrapped to make them compatible with Insert Edit. (See "246- manage clips" on page 133)

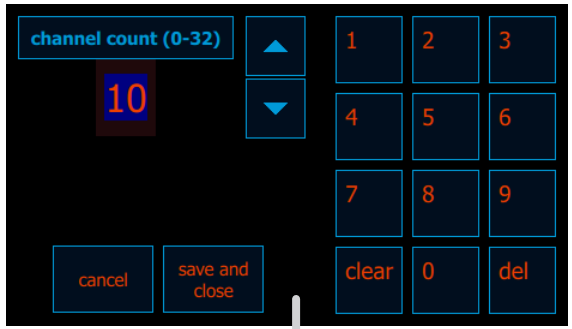
An additional capability is, black files can be created in advance. A VMM library is analogous to a shelf of pre-striped black tapes but you only create your VMM files once. Thereafter you simply copy the VMM you need to your local work-space. In addition, depending on codec and bandwidth, VMM creation can be as fast as 1/10th real-time.

Create black file - VMM / - cont...

Much like a master encode, to create a “blacked file”, you pre-stripe it with format, codec, audio tracks, etc.

- Working from left to right, select resolution, frame rate, codec, wrapper, etc.
- Select “channel count” to add up to 32 audio channels.
- You must use the TC calculator to set the timecode parameters for your blacked file.
- Select a “file location” to select a destination drive & folder and to give your new file a name.
- Finally, press “generate file” to create the black file





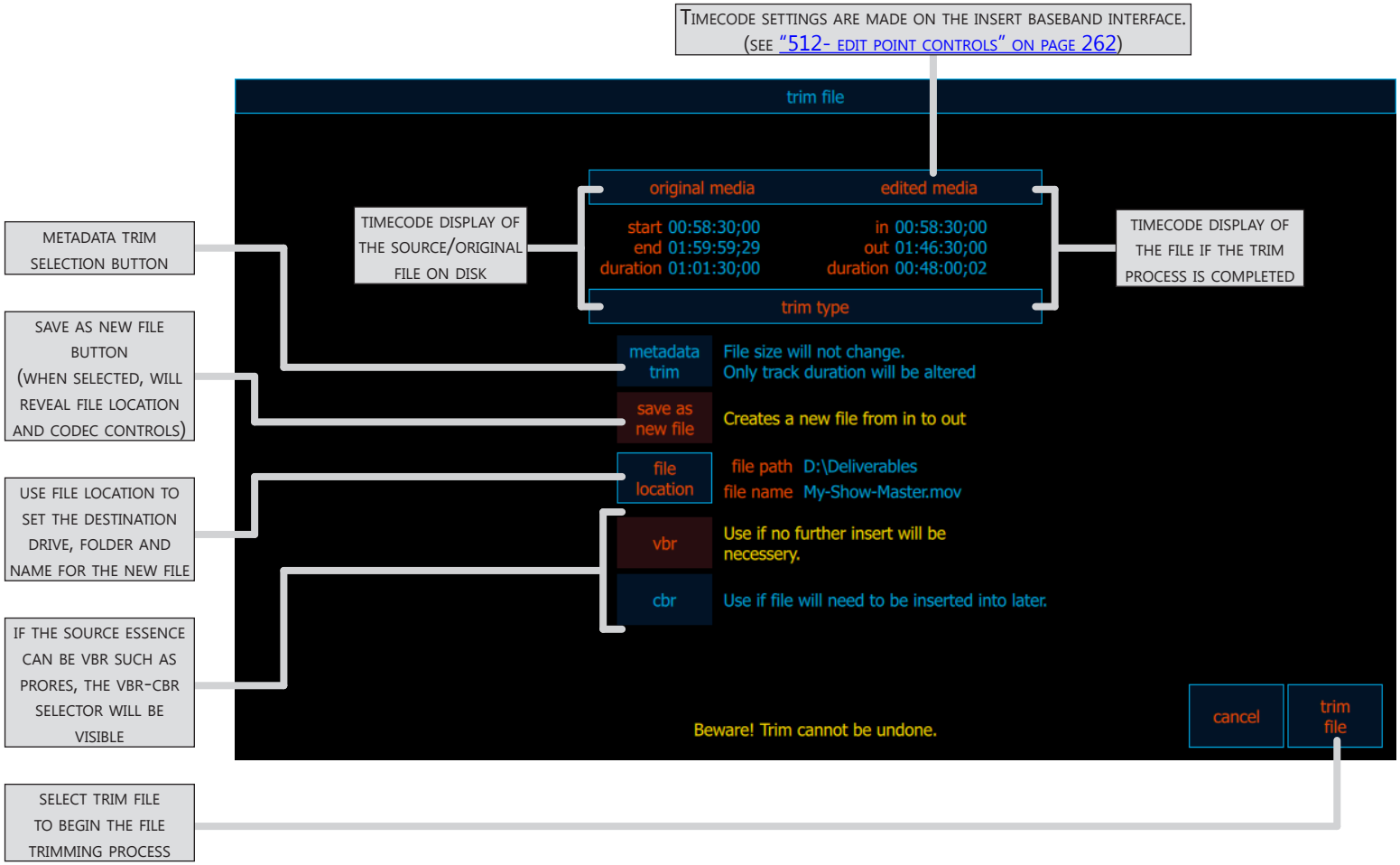
For file timecode, you set two parameters in the calculator:

- Set the start timecode and set either the end timecode or the duration.
- You also have an option to select between drop or non-drop frame timecode.

8.6 Trim File

Trim File *(accessible from insert mode)* ***Trim & Export*** *(accessible from play mode)*
Allows you to adjust the start TC, end TC and play length of a file by physically changing its header metadata or by applying changes while creating a copy of the file. Trim is commonly used when using VMM (pre blacked virtual mastering media) that was not created with the specific required length. Additionally, ProRes files earlier rewrapped to CBR to allow insert edits can be rewrapped back to VBR to reduce file size.

- Metadata trim just changes the header information to adjust where in the file, playback begins and or ends.
- Save as new file creates a copy of the original and applies changes to the new file rather than the original.



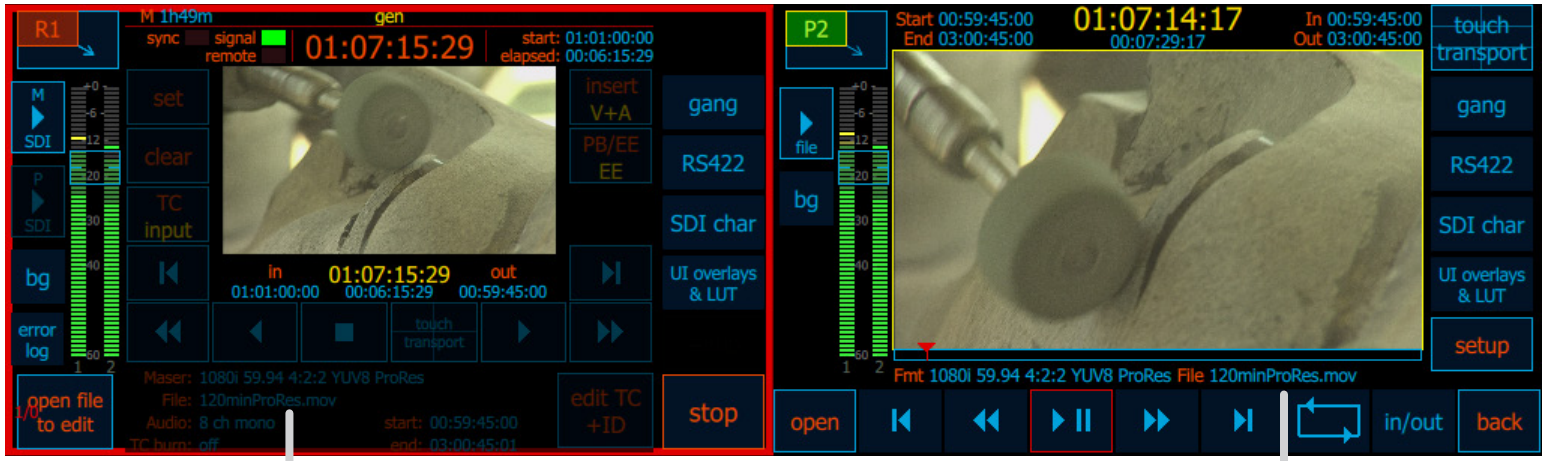
8.7 Confidence Monitoring

Whether for small inserts or complete programs, an advantage of utilizing Insert Baseband mode for recording, is that the entire file is available to playback, while recording.

This means for example, after an insert recording is started on one channel, the file can be opened in another channel and played. This mode provides full transport control; play, forward fast, rewind, etc.
In the below example, RX3G channel 1 is recording while channel 2 is playing the same file.

Playback during insert can also be used during Avid Digital cut ("8.1 Avid Digital Cut" on page 254).
For basic record and confidence playback, for the channel which will be recording using Insert Baseband mode:

- Set "TC" to "gen" on the master encode page
- Set "record mode" to "insert" or "insert baseband"
- For TC & automation, set "record control" to "manual", "record TC trigger" to "gen" and TC mode to "free run"
- Open the file which will be inserted into and start the recording
- That same file can be loaded into another channel and played back



9.0 Service & Trouble

9.1 Best practices

Not surprisingly, modern recorders like the Cinedecks do not require much in the way of maintenance or particular care in handling compared to the needs of a tape machine with daily head cleaning, transport alignment and regular replacement of parts which wear out like the heads, drum and capstan but there are still things you can do to help assure good operation and successful recordings.

- **Redundant Power:** When connecting the power to your systems, it is always best to use power from two sources. Although your deck has dual power supplies with internally controlled auto-fail-over, having both power inputs connected to the same power circuit does nothing to prevent power loss when the circuit fails.

- **Uninterruptible Power Supply:** Electronics are not terribly happy with fluctuating power or power loss so connect your gear using a voltage regulating UPS. The regulation will smooth out the ups and downs of the voltage and the battery in the UPS can easily supply enough power to properly and cleanly power the system down so there are no issues.

- **Connect With Power Off:** As with all electronic systems, it is better to make all of the interconnections before powering the system on. Connecting with all systems up and running generally does not cause issues however if there are ground differences or static electricity buildup, they can have a negative effect on your electronic gear.

- **Format SSDs Before Recording:** When you are starting a recording session, it is best to work with cleanly formatted or preferably, freshly initialized SSDs. This is especially true for SSDs which have been moved between machines or operating systems as different operating systems leave residual traces which are not necessarily helpful. Formatting can be easily and quickly done from the Cinedeck application (See: "244-manage disk" on page 131) as well as from Windows (See: "9.8 Formatting drives" on page 284)
  SSDs can be reinitalized using the manufacturers secure erase application or, almost as good, DiskPart.exe from the Windows 7 or higher operating system.
  See "9.15 Secure erase" on page 299 and "9.7 Reinitializing SSDs" on page 281

- **Test recording:** Make a few test records, at lease one short record and a long record, before the actual session. Its always best to confirm everything is working properly before the session begins and unlike a

VCR, there is essentially no wear and tear so record some more. And while it may be superstition, there are users who feel it is also wise to make a short recording after the session ends. It requires little effort so, why not.

- **Properly Eject Drives:** Use the eject function from "clip manager" or "HotSwap!" from the Windows desktop to unmount drives before removing them. The Cinedeck system should assure that recording data has been properly flushed out to the drives but be safe and eject the drives first and remember that each SSD drive carrier can have two drives so be sure to eject both.
  For ejecting drives from the user interface, see: "244- manage disk" on page 131.
  To eject drives using HotSwap!, see: "5.5.3 HotSwap!" on page 90.

- **Restart to Clear Memory:** Computer based systems do function best when given an opportunity to fully flush the active memory so for situations where the deck needs to run for days or weeks continuously, an occasional restart of the application and or operating system is recommended. At a minimum, an application restart once a week is a good idea (See "495- application" on page 227). Microsoft also recommends to fully restart the operating system at least once a week. It doesn't take long so if the time is available, do so. However when necessary, full system restarts can occur every couple of weeks.

- **Calculate Recording Time:** In advance of any recording it is important to assure there is enough space to store not only the planned session but it is also recommended to calculate at least 10% extra space. For estimating the required storage, the back of the manual has a listing of data rates for various codecs and qualities and you can use the calculator here: "10.4 Storage Calculator" on page 380.
  Remember also that the recorder is not aware if you are writing multiple channels to the same physical destination drive so when you are calculating and observing remaining space and remaining time, remember to divide by the number of channels being written to that destination. For example, if all four channels are writing to Drive H: and the interface says there is 40 minutes remaining, there is really only 10 minutes remaining.

- **Secure Erase:** While SSDs are not technically effected by data fragmentation like spinning drives and you should absolutely **not** use a defragmentation utility on a SSD drive, SSDs do have their own peculiar issues which can develop over time, issues which can be enhanced when SSDs are moved between machines and especially when they are moved between operating systems. If you find that a SSD is not performing well even after a format, there are two things you can do, delete the partition and re-create and format the

partition (See "9.7 Reinitializing SSDs" on page 281) or, really the best is to use the SSD manufacturers secure erase application. Secure erase essentially resets the drive, clearing all memory and partition data. For details on Samsung's Secure Erase, see: "9.15 Secure erase" on page 299. For additional information about secure erase, see the SSD manufacturers website.

- **System Reset:** If your recorder is acting erratically, there are a few things you can do to get back on track.
  1) Presuming the Cinedeck interface is accessible, the first and fastest is to go to the "prefs" page and select "reset all settings to default".
  2) If "setup" and or "prefs" is not accessible, from the Windows desktop, navigate to C:\Cinedeck and delete prefs.ini. This removes some basic system parameters and forces the system to rewrite the prefs file.
  3) If deleting "prefs.ini" is not helpful, navigate again to C:\Cinedeck and delete the following files: cinedeck.db, prefs.ini. Also delete or move the folder: C:\cinedeck[_x64]\projects to a location on another drive.

  If this last procedure allows you access, you will first need to create a new project before continuing. You may also try importing your project from the previously saved location

- **Recall a Windows System Restore Point:** Automatic Restore Point creation is generally turned off on Cinedecks but if you manually created a Restore Point, for example after an update, you can use it to reset your system back to that point.

- **System Restore:** If the the above described reset or Restore Point recall do not resolve the problem and Cinedeck Support is unavailable, the next step is to perform a full system restore from the USB restore disk. (See: "9.23 Restore factory image" on page 322). The system restore clears and rewrites the system drive with a fresh copy of the operating system and program files stored on the USB. Before performing a full restore, please save the most recent log files and dump files to a safe place and note any system changes you have made to your Cinedeck so you can recreate them after the restore.

- **System Drive Cleanup:** The C: drive on your Cinedeck is a separate SSD for the Windows Embedded operating system and the Cinedeck program. Normally the system drive will have several gigabytes of available space but over time, deleted files, saved installs, logs, temporary files, etc., can fill it up so periodically, it is good to clean it up. See "9.20 System drive cleanup" on page 313.

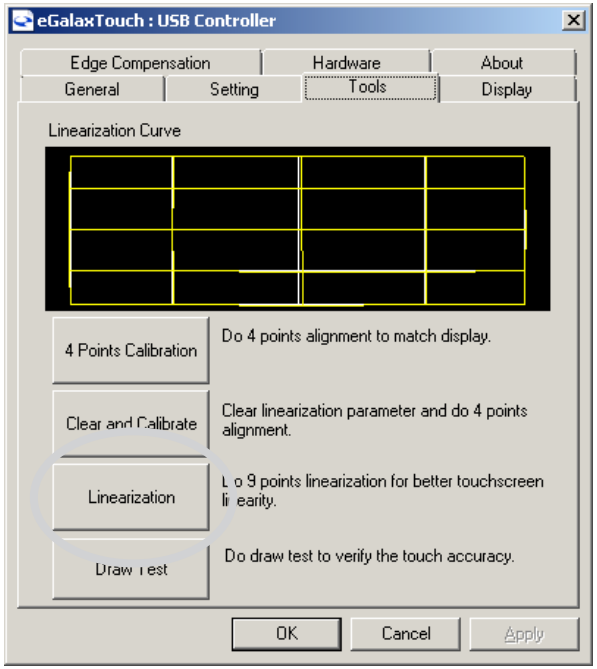
9.2 Touchscreen calibration RX & MX

On occasion, the built-in touch screens on MX and RX need to be re-calibrated. The issue will be apparent as you will have difficulty touching the control you need. This is a normal occurrence but if it happens very regularly, it can be a sign of a failing display system.

If the calibration is far out of adjustment, you may need a mouse to reach the desktop icon and gain access to the calibration tools.

Navigate to the touchscreen icon to start the touchscreen tools

Select the "Tools" tab from the dialog which opens and select "Linearization" to start the 9 points calibration. This only takes about two minute so is well worth the benefits over the basic "4 points calibration".



LCD screens can be damaged by sharp objects!

Follow the prompts and when the targets appear, use a proper screen stylus or similar screen safe pointer to select the mid point of each of the nine targets. The edge of a pencil eraser will do in a pinch.

A small timer runs next to the targets, indicating the time left before the process self-cancels.

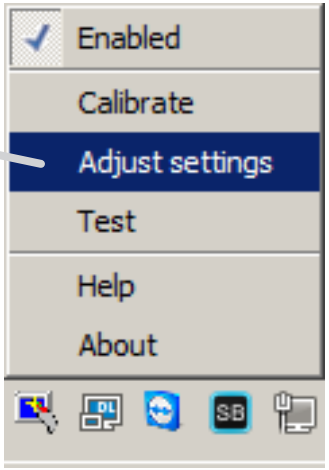
When the last target is done, the system will recalibrate and indicate when the process is complete.
Select OK and the main dialog can be closed.

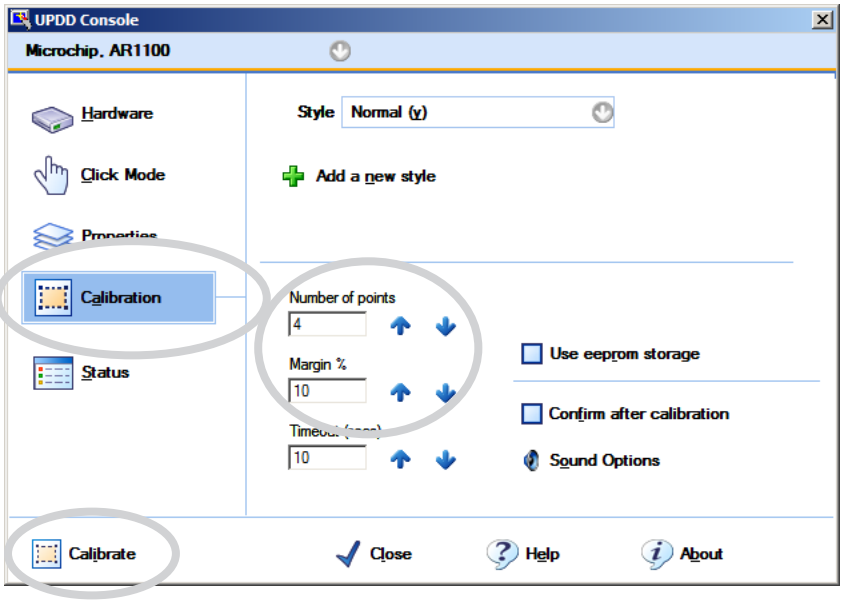
9.3 Touchscreen calibration ZX

On occasion, the optional built-in touch screen on ZX may need to be re-calibrated. The issue will be apparent as you will have difficulty touching the control you need. This is a normal occurrence but if it happens very regularly, it can be a sign of a failing display system.

If the calibration is far out of adjustment, you may need a mouse to gain access to the calibration tools.

Click the "Pointer Device Settings" icon in the system tray to access the menu and for best results, select "Adjust Settings" to open the Console panel.
From the Console panel, select the "Calibration" menu on the left.





Use the up arrow to change "Number of points" to 9 instead of 4. A 9 point calibration will provide better accuracy and does not take much longer to complete. The margin setting determines the screen area used for calibration.

Select "Calibrate" at the lower left and using an appropriate screen safe pointer, tap the mid point of each of the nine targets that appear. The edge of a pencil eraser will do in a pinch.

Remember, LCD screens can be damaged by sharp objects!

As you tap each pointer, a check will appear, confirming the point has been acquired.

When the last target is done, calibration will complete and the calibration screen will close.

9.4 Important drive information

Important: Most issues that arise during recording are media related. Improper formatting, including incorrect file system or cache settings, use of drives on other file systems before recording (eg offloading media on a Mac), formatting on a system other than Windows7, and improper removal of the drives after recording can all affect the state and performance of drives and negatively impact recording.

Local SSD disks must be:

1. MBR volumes, partitioned on a Windows 7 or newer system
2. Formatted as NTFS or EXFAT*
3. Formatted as a single volume

And for Samsung SSDs, Windows disk-caching settings must be set to "on".

Note: Disks should be freshly formatted before recording, especially if used with another system such as a Mac or if improperly removed. In both cases, the file system index can be corrupted which can cause various I/O errors and write failure during record.

*** EXFAT:** Using exFat formatted drives is convenient for workflows where drives need to be mounted on Apple machines for offload however, the use of exFat formatted drives is at your own risk. The exFat file system is not as robust as NTFS so the better solution is to install NTFS read and possibly write capability.

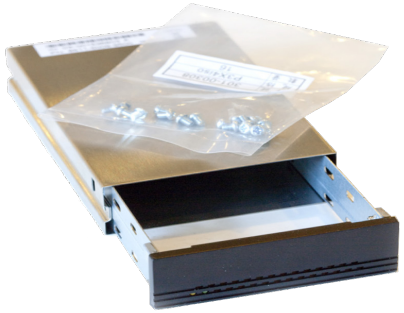
If you are primarily a Mac user, don't panic. Aesthetic differences aside, Windows Explorer is very similar to Mac Finder... they both do exactly the same thing. The Windows Disk Management Console is similar to the Mac Disk Utility... they both do the same thing. In fact the paradigms are all the same since the people in Bellingham do their best to imitate the people in Cupertino and vice versa. The only real difference is appearance.

If you get stuck because something doesn't look exactly like the pictures, don't panic, we are here to help.
See "Contacting Cinedeck" on page 2

9.5 Installing SSDs

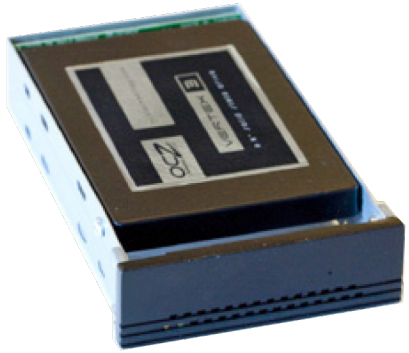
Local SSDs are installed in removable sleds or carriers.

Each carrier can hold two drives



To install the SSDs, open the carrier and remove the screws.

Before mounting in the carriers, note the serial numbers on the underside of the drives for later use.



Noting the orientation of the connectors at the back of the carrier, carefully fit one or two SSDs into the carrier SATA connectors
Secure each SSD at the edges with at least two screws.
Replace the carrier into the stainless cover, and secure with at least one screw.

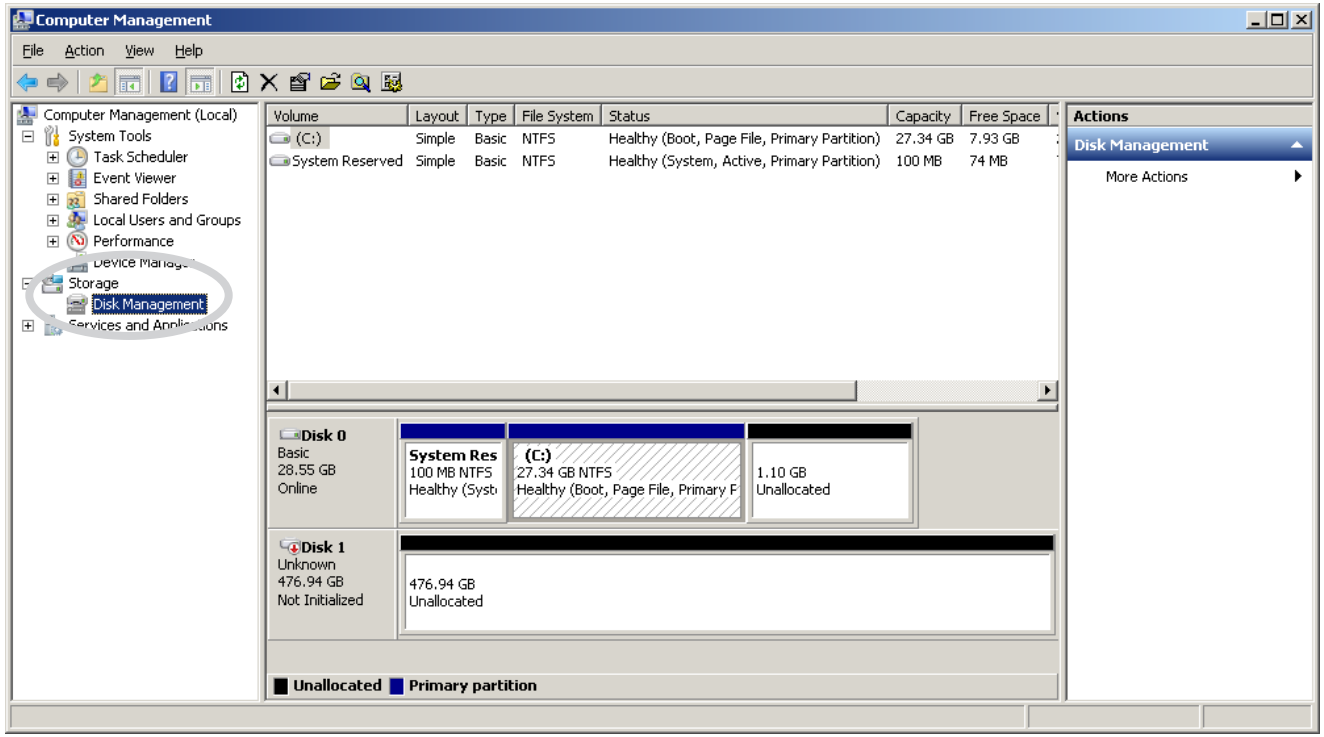
9.6 Initializing new drives

Partitioning of SSDs must be done on a Windows 7 or newer system for proper partition alignment.

Install the new disk in a carrier: "9.5 Installing SSDs" on page 275
Install the drive carrier in the Cinedeck: "3.11 Inserting & ejecting drives" on page 71
Power on the Cinedeck and allow to load fully.
Exit the Cinedeck software application: "495- application" on page 227

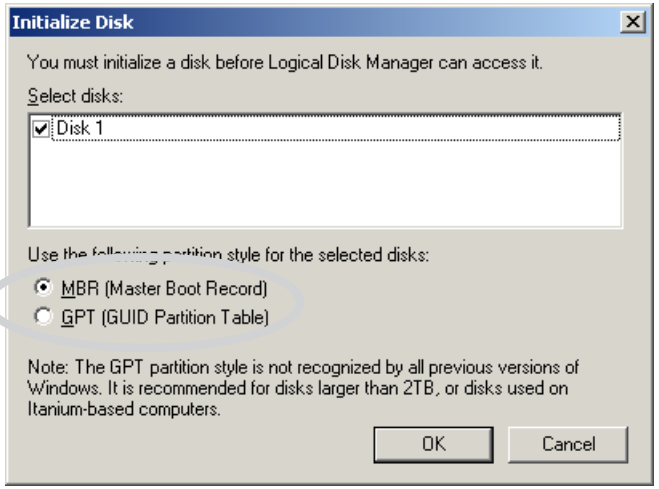
Open Windows Computer Management:
Press "Start"
Right-click "Computer"
Select "Manage" from the context menu.
For more info on opening Computer Management, see "7.1 Device Manager" on page 243

From the management console, select "Disk Management" from the list at the left.



Initializing new drives / - cont...

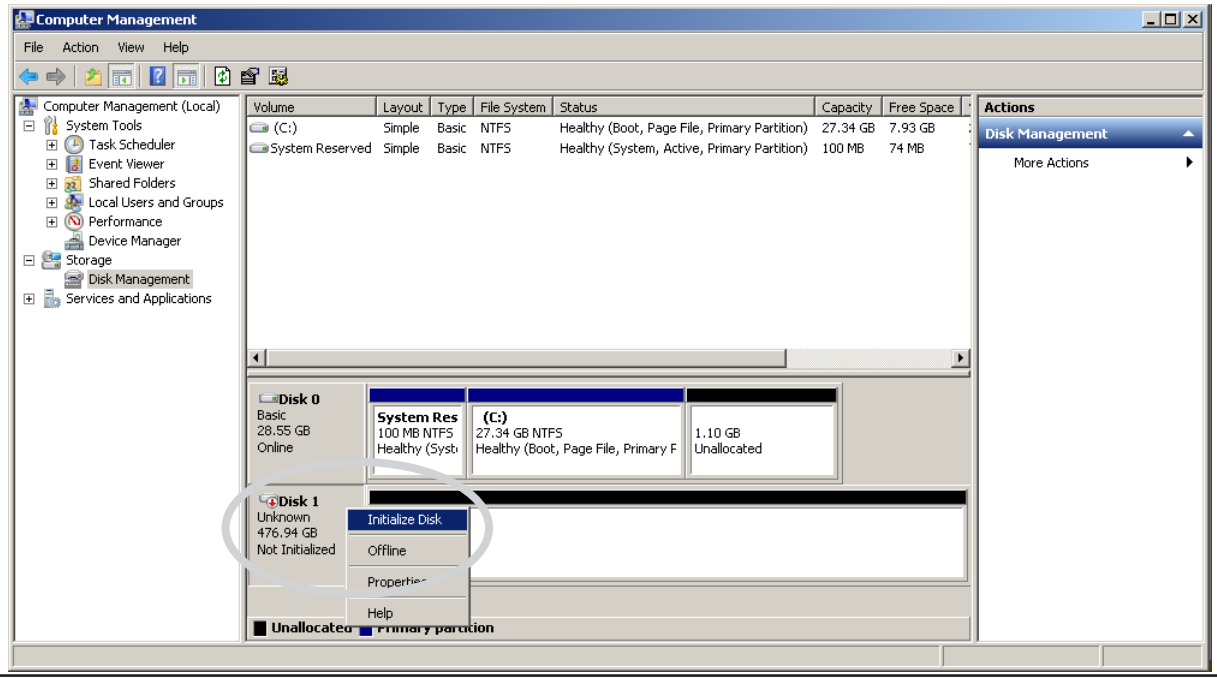
The first time a new drive is detected, Windows may request that the disk be initialized. Some drives will not require this step and this dialog will not display. If this is the case, proceed from the next figure.



When initializing a disk for use with a Cinedeck, the default MBR partition type should be used.

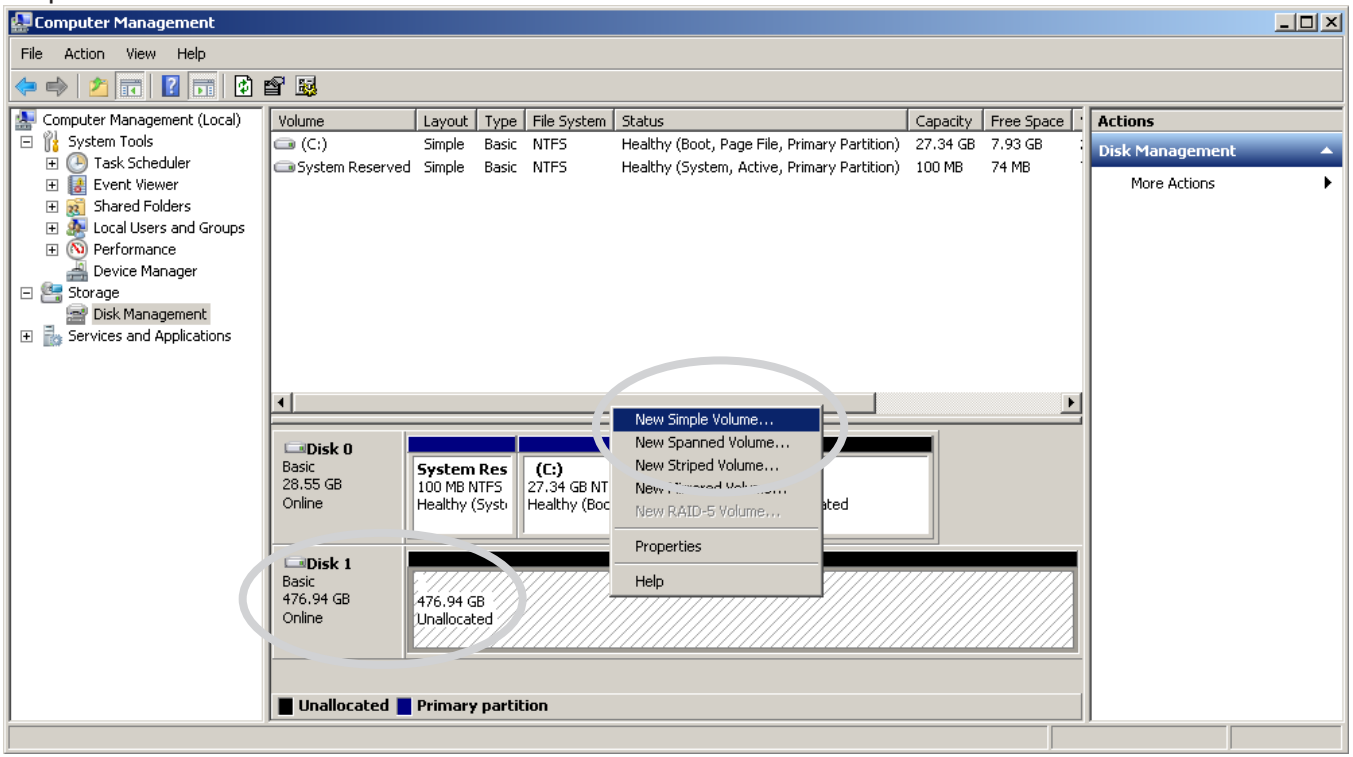
Press OK

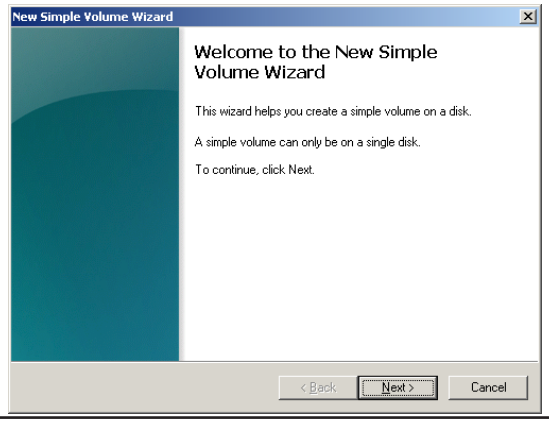
If the dialog did not display but the drive is listed on the right as “Unknown”, you can manually open the initialize dialog by right clicking “Unknown” and selecting “Initialize Disk”.



Initializing new drives / - cont...

After initializing, the disk will be listed as “Basic” and “Unallocated”.
Right-click the drive to open the “new volume” context menu and select “New Simple Volume...” to start the “New Simple Volume Wizard.

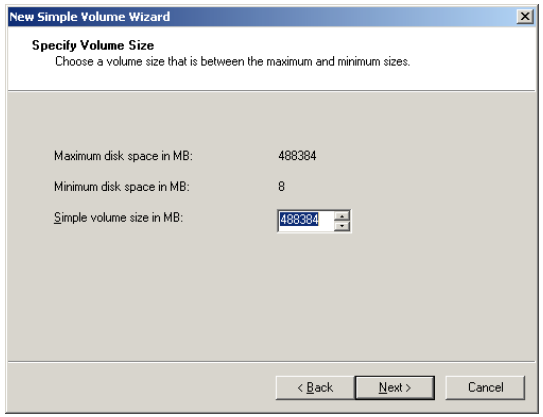




Press “Next

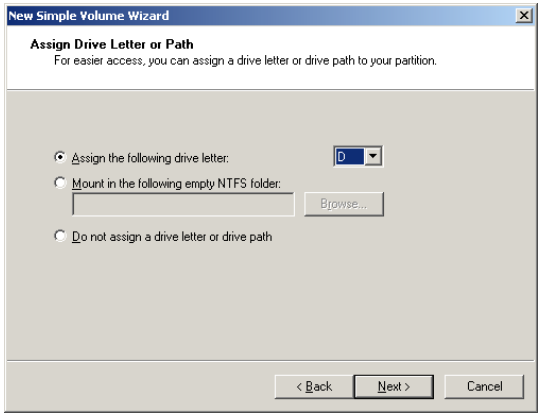
Initializing new drives / - cont...

After initializing, the disk will be listed as “Basic” and “Unallocated”.
Right-click the drive to open the “new volume” context menu and select “New Simple Volume...” to start the “New Simple Volume Wizard.



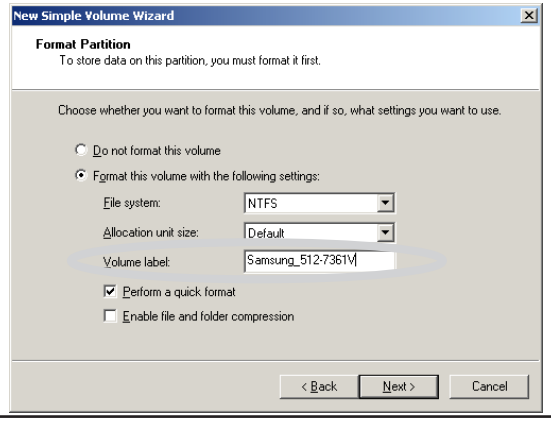
Leave the volume settings as defaults and select “Next”.

Cinedeck drives should only contain one volume or partition.



Leave the drive letter settings as default unless you know what you are doing and prefer specifying a drive letter.

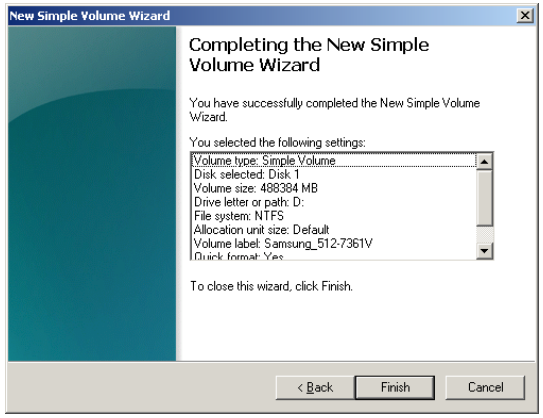
Select “Next”.



Select the NTFS file format:
exFAT should only be used if the intention is to offload media on a Mac OSX machine which does not have the preferred NTFS read capability.
(Important, see “9.4 Important drive information” on page 274)

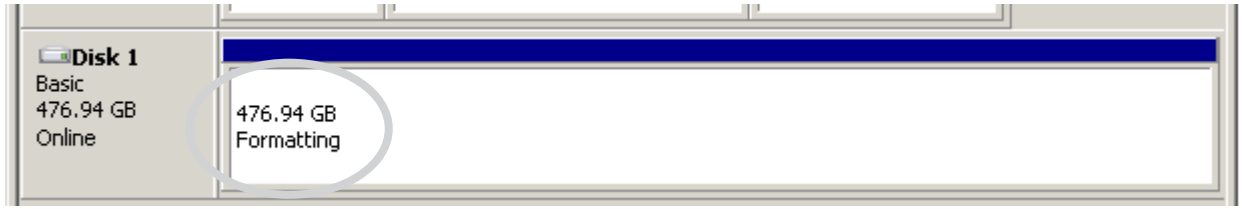
Rename the drive to something meaningful in the “volume label” field, for example [850pro512_1234] where 512 is the size and “1234” are the last few digits of the disk serial number.
Leave all other settings at defaults, asuring “quick format” is checked, then select “Next”.

Initializing new drives / - cont...

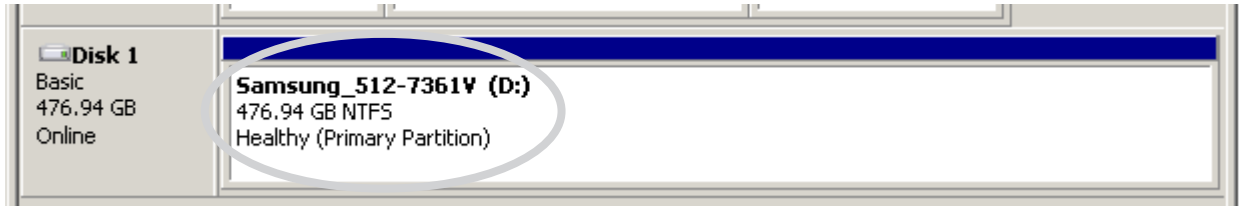


Press “Finish” at the “Completing” dialog.

Formatting a SSD will only take a short time.



When formatting is complete, the drive should look something like this.



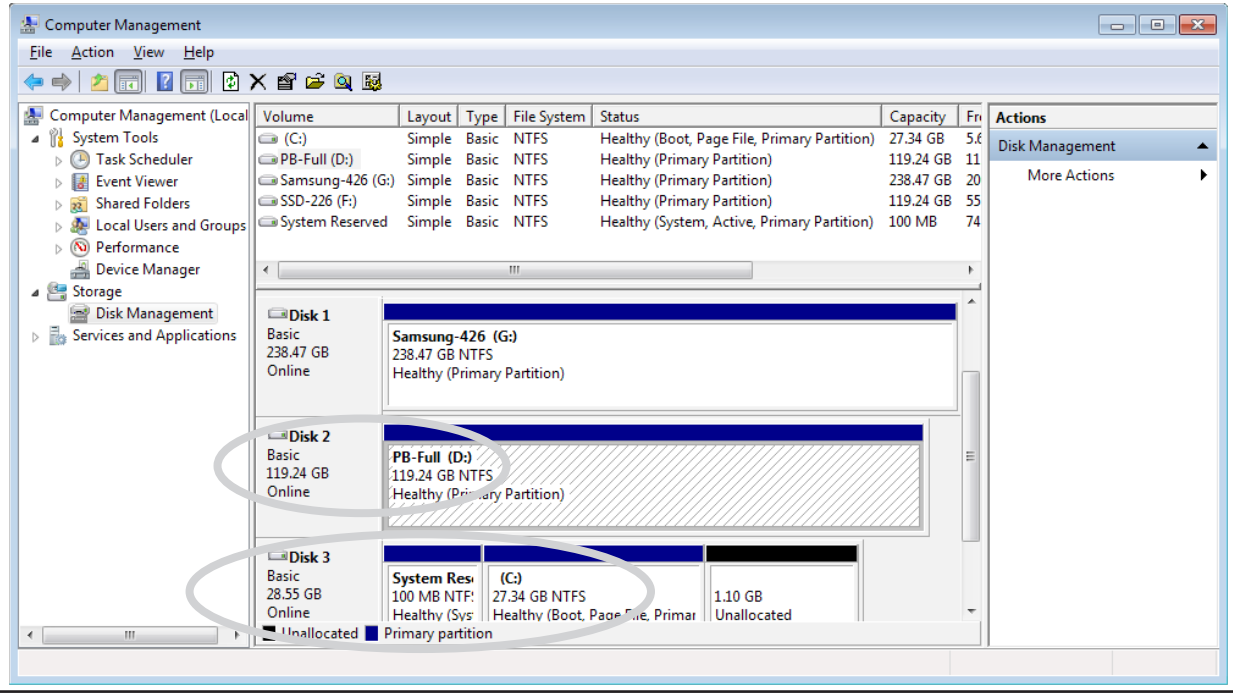
Note: After this new drive initialization and formatting procedure, you can if needed, format drives from Windows Explorer using the procedure on the next pages however, it is much easier to format your drives from within the Cinedeck application.

9.7 Reinitializing SSDs

For top performance, SSDs used in Cinedeck recorders need particular care. This is especially true if the disks are shuttled between Cinedecks and non-Cinedeck systems such as Final Cut Pro edit systems. Apple's operating system deals with disks differently than Windows which can result in a performance reduction and they leave behind files which are not helpful in the Windows environment. "Secure Erase" (factory resetting) using the SSD manufacturers specific utility, is the best method for restoring a SSD to peak performance (For additional information about Secure Erase see: "9.15 Secure erase" on page 299. However, the Secure Erase procedure can be somewhat cumbersome and time consuming. The next best option is fully deleting the volume which will allow the Windows operating system to repartition and format the drive as if it were new.

This reinitialization is a two step process. The first step is cleaning - removing all partition information. This is followed by initializing the drive - creating a new volume and formatting it.

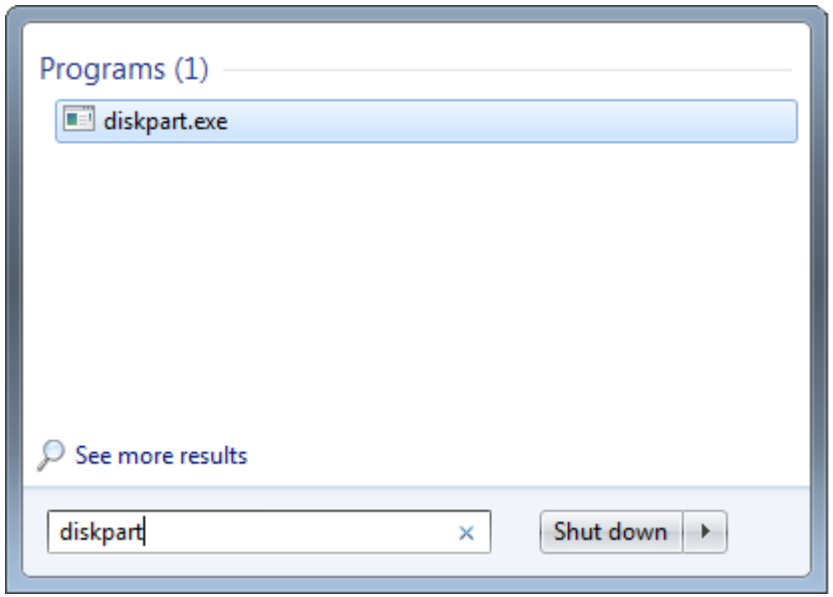
First you need to determine the disk number for the drive you want to reinitialize. One way to discover this information is via "Disk Management". See "9.6 Initializing new drives" on page 276 to open Disk Management".



In Disk Management, locate the drives needing maintenance in the list at the right and note their respective drive numbers. Disk 2 which is mounted as D:\ will be used in this example.

At the same time, note the number for the OS drive which should **NOT** *be deleted*. This is usually C:\ and noted as the boot partition.

Reinitializing SSDs / - cont...

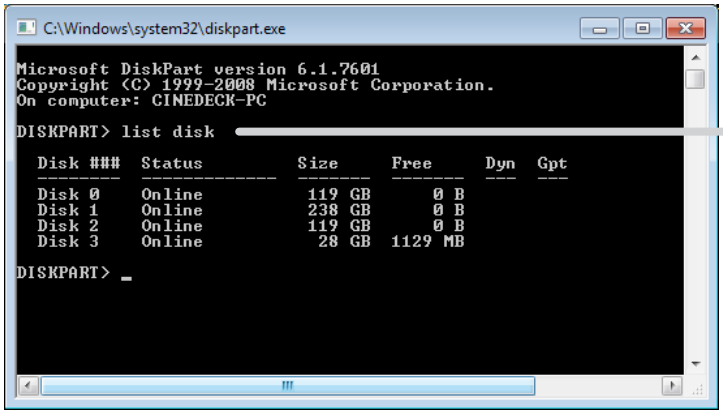


After locating the disk numbers, DiskPart.exe can be used to remove the existing partition from a disk.

DiskPart is a Windows command line program which can be run from within Windows.

Type diskpart.exe into the search field at the bottom of the Windows Start Menu and the program will appear in the file list above.

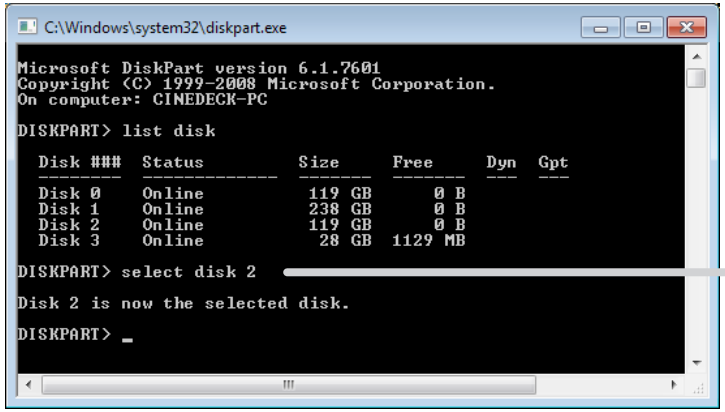
Press “Enter” to start the program.



At the command line, type “list disk” (without the quotes) and press “Enter”.

DiskPart will list all of the disks currently available to the Windows system by disk number.

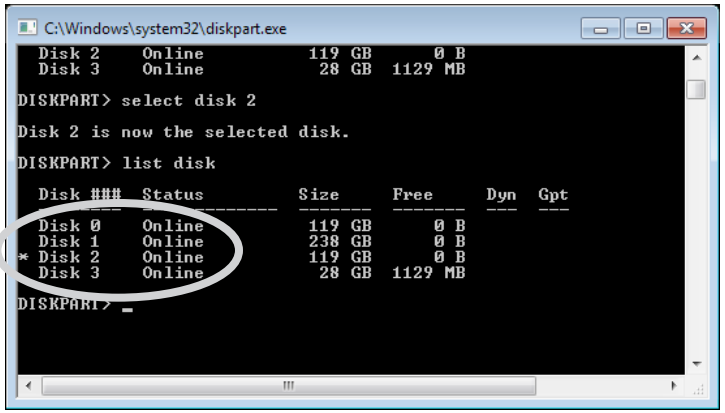
Reinitializing SSDs / - cont...



As noted previously, Disk 2 will be used in this example.

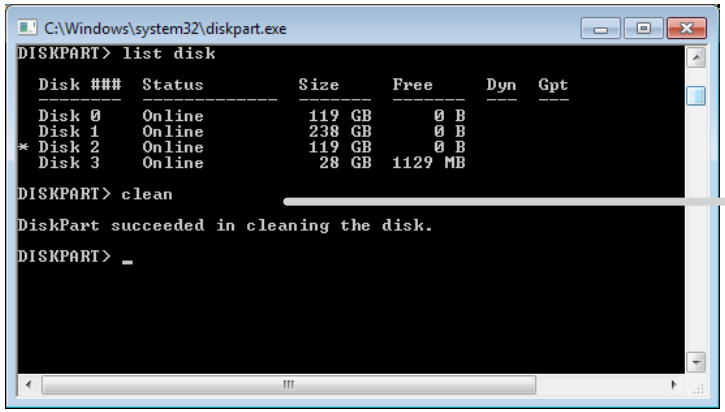
Find the drive needing maintenance in the list and type "select disk n" where n is the number of the disk you want to clean and press "Enter".

A message should be displayed indicating the currently selected disk.



Just for safety, type "list disk" again and press enter to confirm that the selected disk is the disk you want to clean.

An asterisk "*" is used to indicate which disk is selected.



Type "clean" at the command line to remove the partition from the selected disk.

DiskPart should display a message saying "DiskPart succeeded in cleaning this disk.

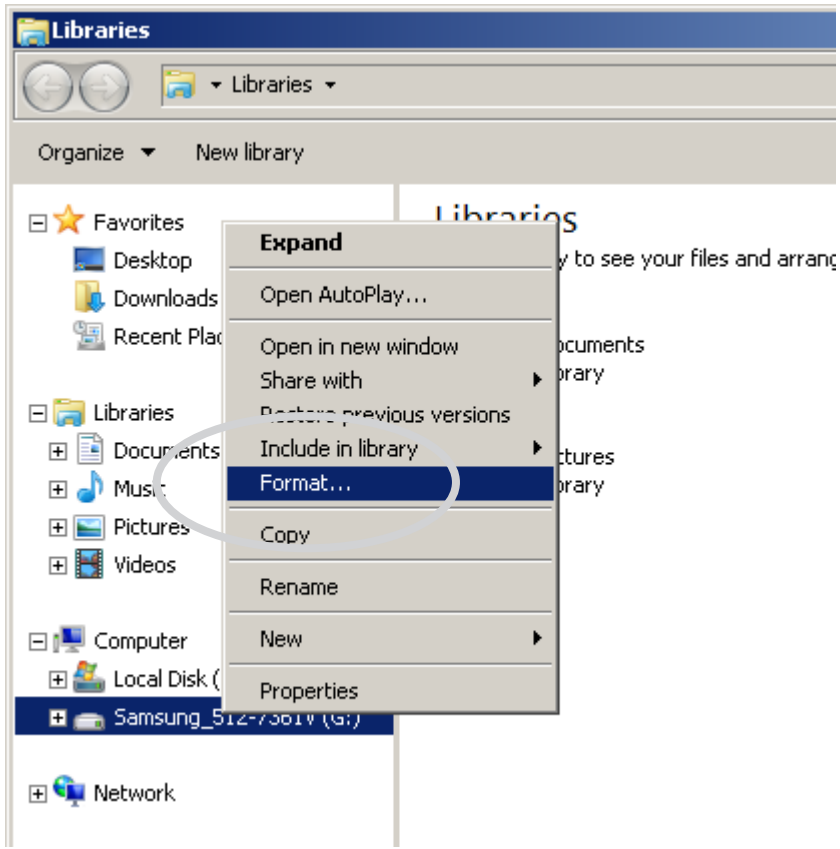
Type "exit and press "Enter" to close DiskPart.

Using "Disk Management", you can now initialize the disk.
See "9.6 Initializing new drives" on page 276.

9.8 Formatting drives

Perhaps the easiest and fastest route for clearing a drive is to format it from "clip manager". See "244- manage disk" on page 131
SSDs can also be formatted from Windows using "Quick Format" however, if you are formatting because you feel the SSD is not performing properly, use the manufacturers "secure erase" procedure (See "9.15 Secure erase" on page 299) and then repartition the drive. (See "9.6 Initializing new drives" on page 276)

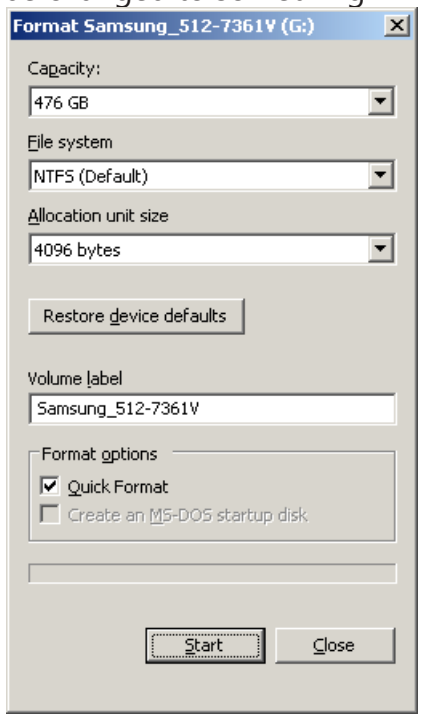
To use Quick Format, open Windows Explorer (For info on accessing Windows Explorer, see "7.1 Device Manager" on page 243)



Right click the drive which should be formatted and select "Format" from the context menu.

All of the default settings should be accepted.

The Volume label can be changed to something meaningful, for example [850pro512_1234] where 512 is the disk size and "1234" are the last few digits of the disk serial number.



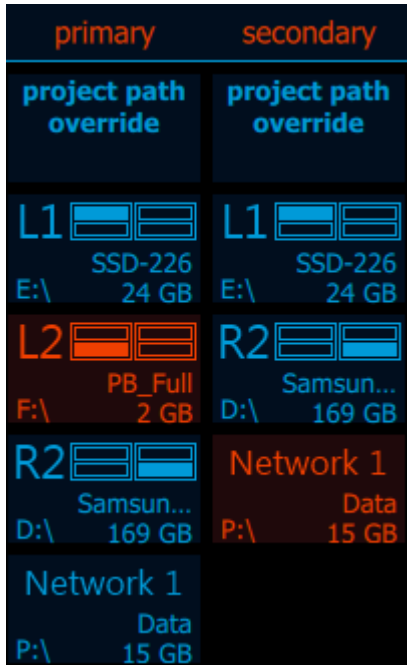
Select "Start" and follow the dialogs.

9.9 Drive not visible

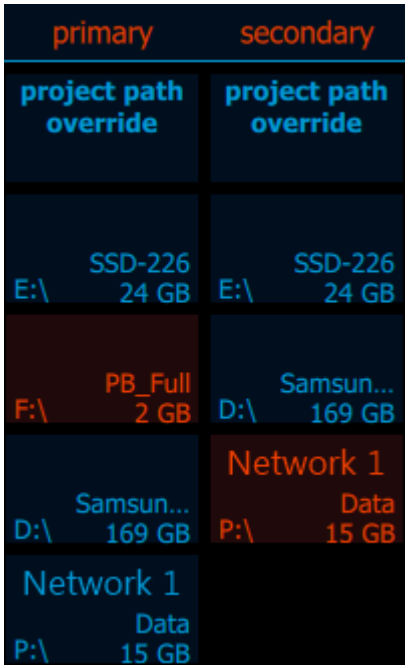
Generally, all drives that are available to the Windows operating system will be available to the Cinedeck application however, there are exceptions, particularly because the Cinedeck user interface depends on Windows for specific details about each disk in order to display the drive position icons.

As a result, drives that contain multiple partitions or volumes, may not appear in the Cinedeck application and because of the way some controllers present to the Windows operating system, some USB and eSATA drives also may not appear. This relates both to RAID arrays as well as single disk systems. There are several ways to enable access to these 'invisible' drives.

USING DETAILS SUPPLIED FROM WINDOWS, THE CINEDECK RX INTERFACE SHOWS DISK L2 IN THE LOWER POSITION OF THE LEFT DRIVE TRAY (EXAMPLE BELOW).

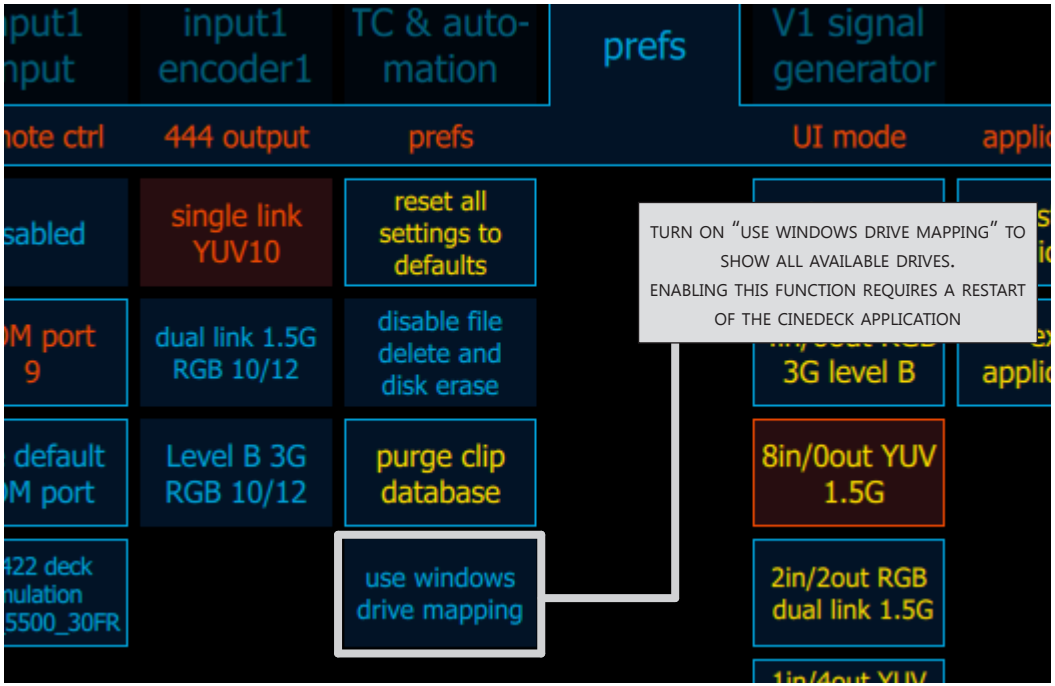


WHEN "USE WINDOWS DRIVE MAPPING" IS ACTIVE, DRIVES ARE DISPLAYED WITH THEIR WINDOWS SUPPLIED DRIVE LETTER. (EXAMPLE BELOW)



Drive not visible / - cont...

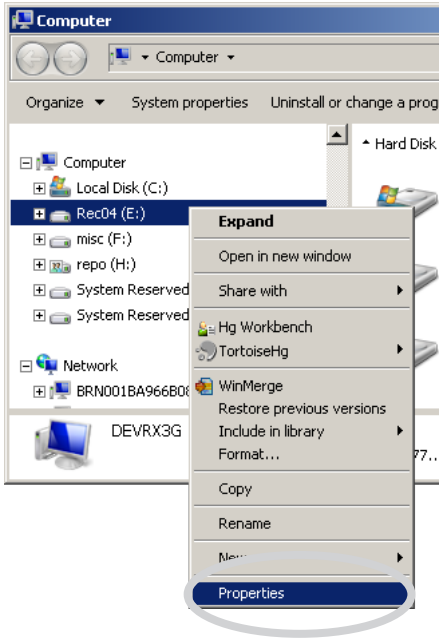
The easiest is to turn on “use windows drive mapping” found on the “prefs” page.
(See “5.36 Prefs tab” on page 223) When turned on, “use windows drive mapping” changes the drive buttons. Instead of displaying drive position icons, all available drives are only listed with their Windows supplied drive letters.



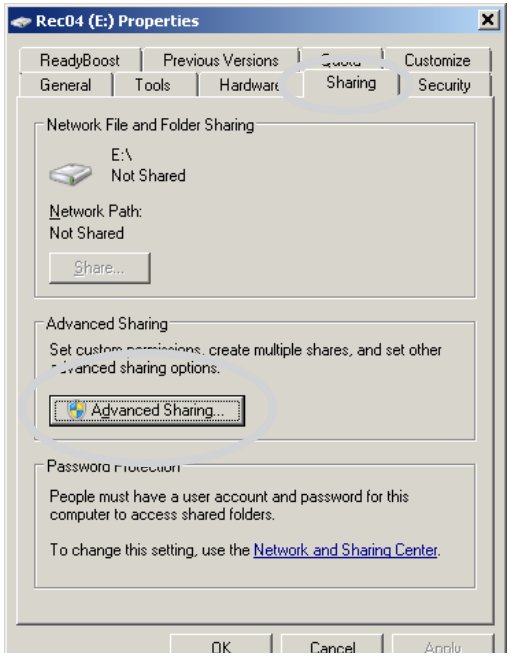
Drive not visible / - cont...

The SSD drive position icons can be very convenient, especially in situations where drives are regularly being swapped in and out, If you prefer to keep the drive position icons while still gaining access to drives that are not visible, an alternative is to share local drives as network resources and then (similarly to other network drives) map them back in with a second drive letter.
In this case you can map the drive using \\localhost\ShareName. This way ip address and computer name are unimportant and performance is optimized because the network hardware is bypassed.

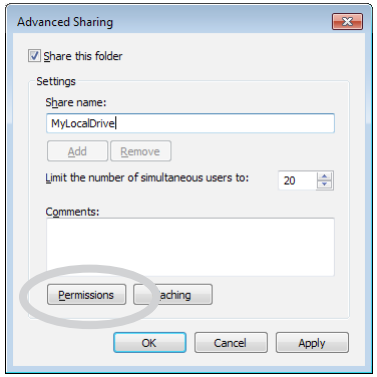
First, in Windows Explorer, right click the drive you need to share and select “Properties”.



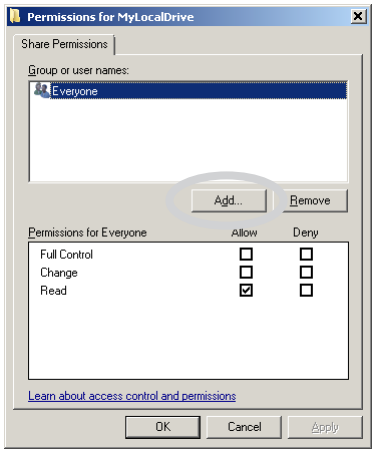
Select the “Sharing” tab From the properties dialog and choose “Advanced Sharing”.



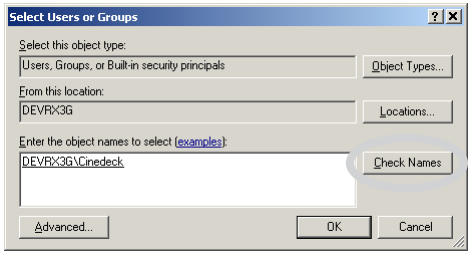
Drive not visible / - cont...



In the Advanced sharing dialog, check the “Share this folder” check box and type in a share name for the drive. The name can be anything you prefer.
Click permissions.

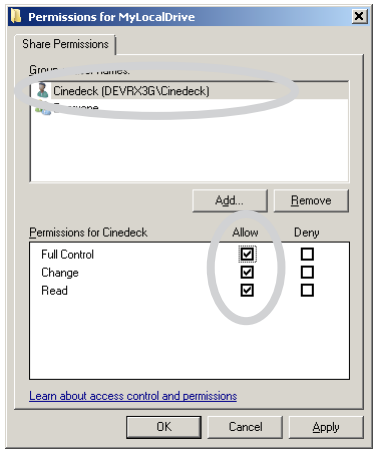


By default, “Everyone” has read access to a share but you need read & write access and its better to specify a user so in the Permissions dialog select “Add”



In the permissions dialog, enter a local system user name that has administrator rights.

For an unmodified Cinedeck system, you can use the name “Cinedeck”.
Click “Check Name” and after the name is recognized, select OK.



With the newly added user name selected in the upper window of the Permissions dialog, click the “Full Control” check box in the lower window to give that user full access to the shared drive.

Select OK, OK and Close to finalize the settings and close all of the dialog boxes.

The drive is now available as a network resource.
See

9.10 Mount network share

Networking is a science and art that falls outside the scope of this manual but because one of the benefits of a Cinedeck is its ability to leverage network shared storage, some basic “How To” information is still appropriate.

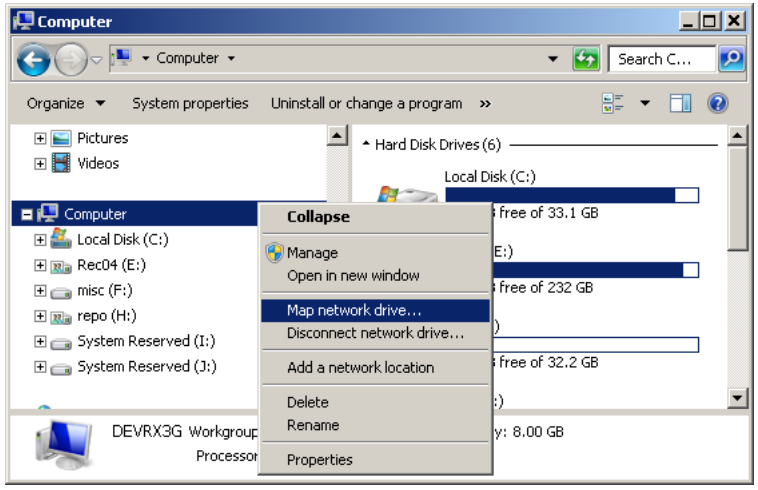
Generally, there are two parts of network storage, the client (in this case the Cinedeck) and the server (the system holding the shared folders). There are also generally two categories of network storage; NAS (Network Attached Storage) and SAN (Storage Area Network).

In an over simplified definition, NAS is the sharing of folders and files while SAN is the sharing of drives. Probably the biggest practical difference from the client point of view is that in most NAS environments, the client connects directly to the shared content while most SAN environments require special software installed on the client to manage access to the shared resources. Additionally, SAN performance tends to be better.

As noted, connecting to a SAN requires client software and more configuration. Also, each SAN configuration and connection procedure is different so they cannot be addressed here.

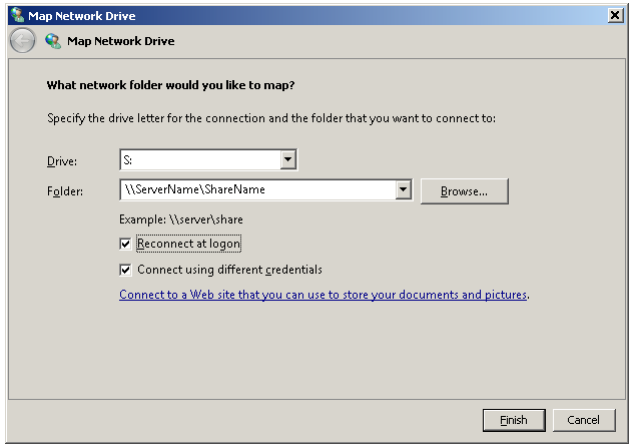
For NAS, Cinedecks rely on the Windows Embedded operating system to manage the connections using the SMB (Server Message Block) protocol. Usually, if you are connecting to content shared from another Windows system there is nothing to think about. If however, the server is an Apple or Linux computer, you must first assure the SMB networking protocol is supported and turned on.

Map a network drive:



This is just one of many ways to mount a network share. *In most cases you will need a user name and a password to access the network shared resources.*

From Windows Explorer (My Computer), right click “Computer” and select “Map network drive”



There are multiple settings you can change in the "Map network drive" dialog:

• Drive is a drop down list where you select an available drive letter to associate with the shared resource.
• Folder is where you tell the Cinedeck where the share can be found. This is the most important setting and must be spelled and formatted correctly with the backslash characters as shown.
"\\ServerName" is the name or ip address of the computer providing the resources and "\ShareName" is the actual name of the shared resource.

Note: If you are mapping an invisible drive as described in *"9.9 Drive not visible" on page 285*, *enter \\localhost\ShareName* where "ShareName" is the name you gave to the shared folder or drive you created.

- If you will regularly connect to this same share, you can check "Reconnect at logon" to have Windows automatically try to connect to the share at startup.
- You will almost always need a user name and password to access the share, "Connect using different credentials" presumes the password and current user logged into the Cinedeck do not match the server where the shared content resides so forces the ID and password dialog to open.
Thus, if you are mapping a localhost drive you can skip this and select "Finish".

In the Windows Security dialog, enter the user name and password associated to the shared resource.
Select "Remember my credentials" to allow Windows to save the login and password so the share can be automatically opened next time the system tries to access the share.

Select OK to start the connection.
Mounting the drive should only take a few seconds, If it takes longer, either the credentials are incorrect or the network share is not available.

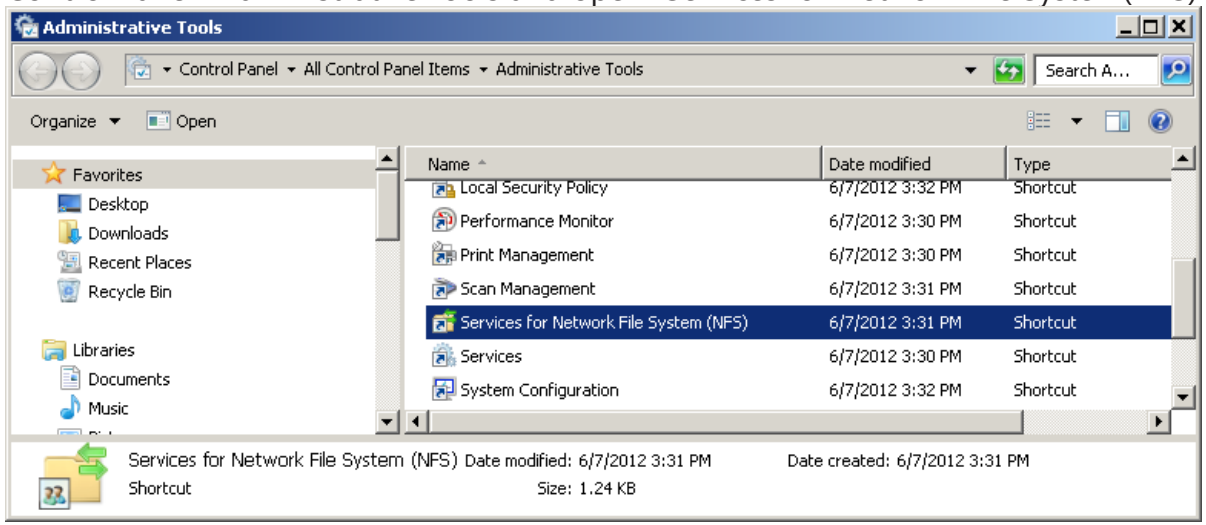
You can use the Windows command line "Ping" function to help investigate the network connection.

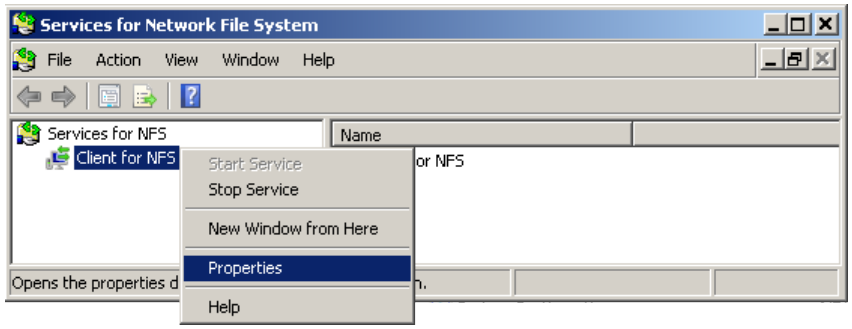
9.11 Mount NFS share

Note: Cinedeck has only done limited testing with NFS shares so any information you have that may help others is most welcome.

Windows does not have great read / write performance with NFS. When connected via 1Gb Ethernet, they will generally only be useful as asynchronous repositories (Storage only used for copy and paste access). When connected with 8Gb or faster, you may find performance is good enough for real-time recording and playback.

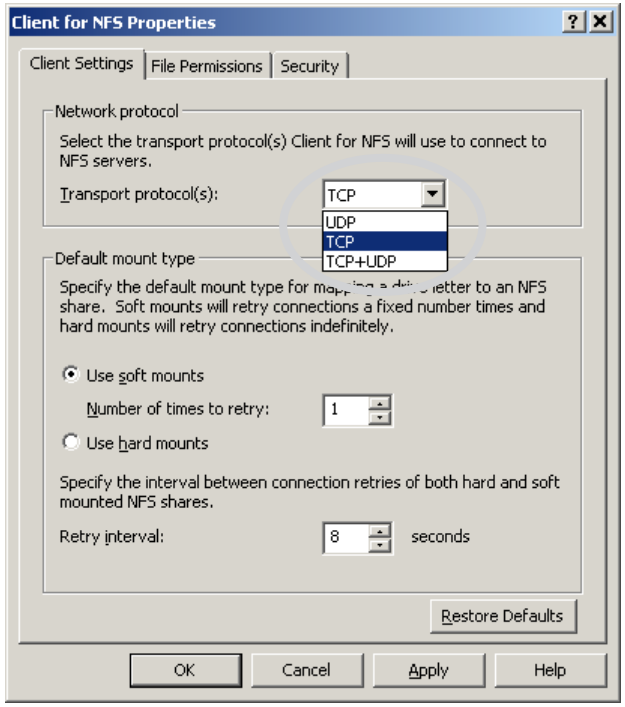
The first thing is to confirm the NFS Service is running and is only using TCP/IP. Go to:
Control Panel>Administrative Tools and open "Services for Network File System(NFS)".





Right click on client for NFS and select "Properties".

Mount NFS share / - cont...



In the Properties dialog, assure Transport Protocol is set to TCP, not UDP or UDP+TCP.

If needed, disconnect your nfs mounted drive and reconnect.

The most efficient way to then mount an NFS share is via the command line:
Press the Windows Start button and type “cmd” in the search field. cmd.exe should appear, press Enter
In the command dialog, type: mount ip address:/share-name drive letter:
For example: **mount 192.168.1.100:/MyNFSdrive N:**

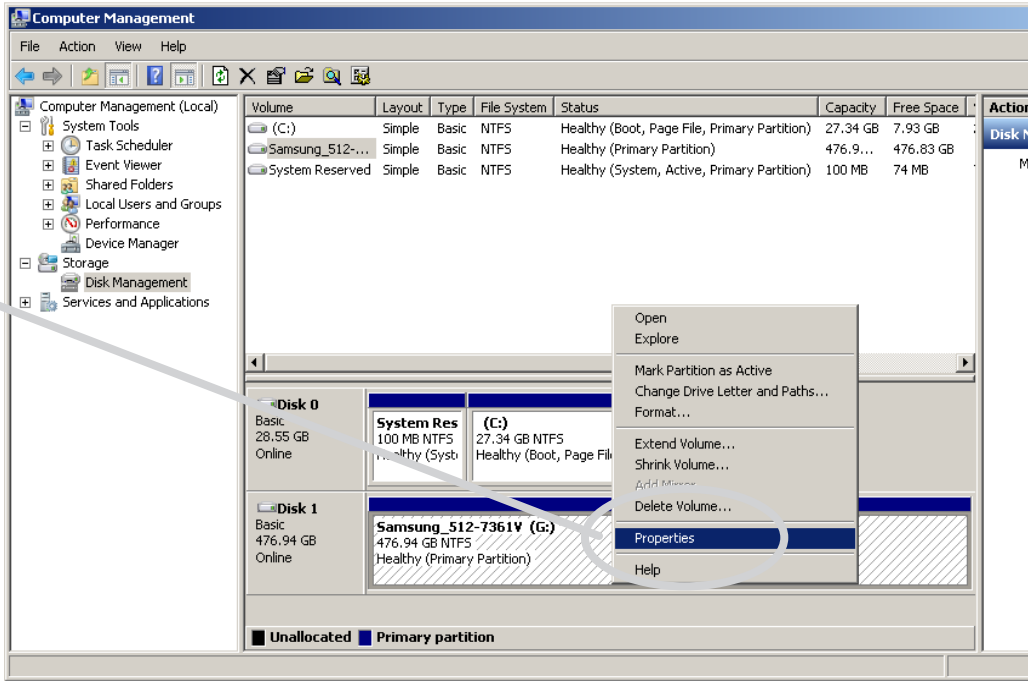
If you later want to disconnect the drive, in the command dialog, type “unmount N:”

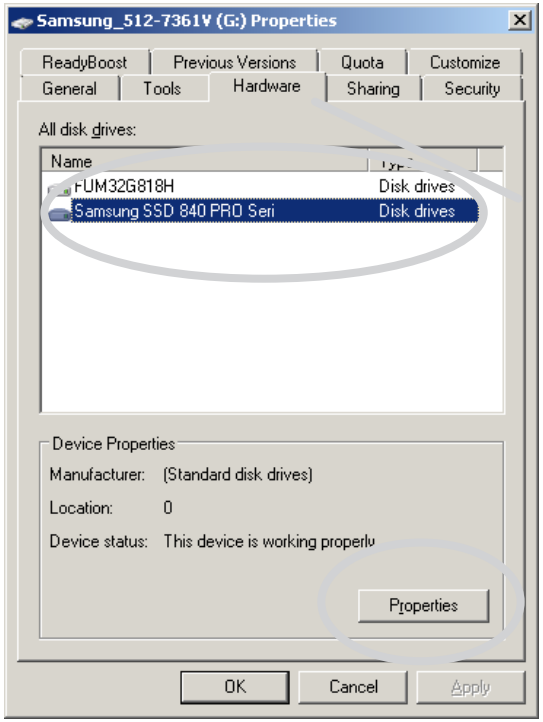
Some other options include:
•mount the /Media/Clips nfs shared on server to S:drive
mount 192.168.1.100:/Media/Clips S:
•same as above with user1 as username and passwd as password
mount -u:user1 -p:passwd 192.168.1.100:/Media/Clips S:
•same again but instead of having the password in clear text (e.g in a logon script), you will be prompt to enter the password
mount -u:user1 -p:* 192.168.1.100:/Media/Clips S:
•again... but without explicitly defining the drive letter, instead we use the *(variable/wildcard) for the OS to use the first available drive letter
mount -u:user1 -p:* 192.168.1.100:/Media/Clips *

9.12 Disk caching settings

For proper performance on most SSDs, Windows Disk Caching should be “on”. A notable exception are the previously supported Vertex drives from OCZ. For those, Disk Caching should be set to “off”.
To check or set Disk Caching, access the properties for the disk in question. There are several way to get to the disks properties, one way is to open “Disk Management” in “Computer Management” (See “7.1 Device Manager” on page 243)

Right click any disk and select “Properties” from the context menu.





Select the “Hardware” tab at the top of the dialog and select the disk in question from the list of disks.

Select “Properties” at the lower right of the dialog to open disk specific properties.

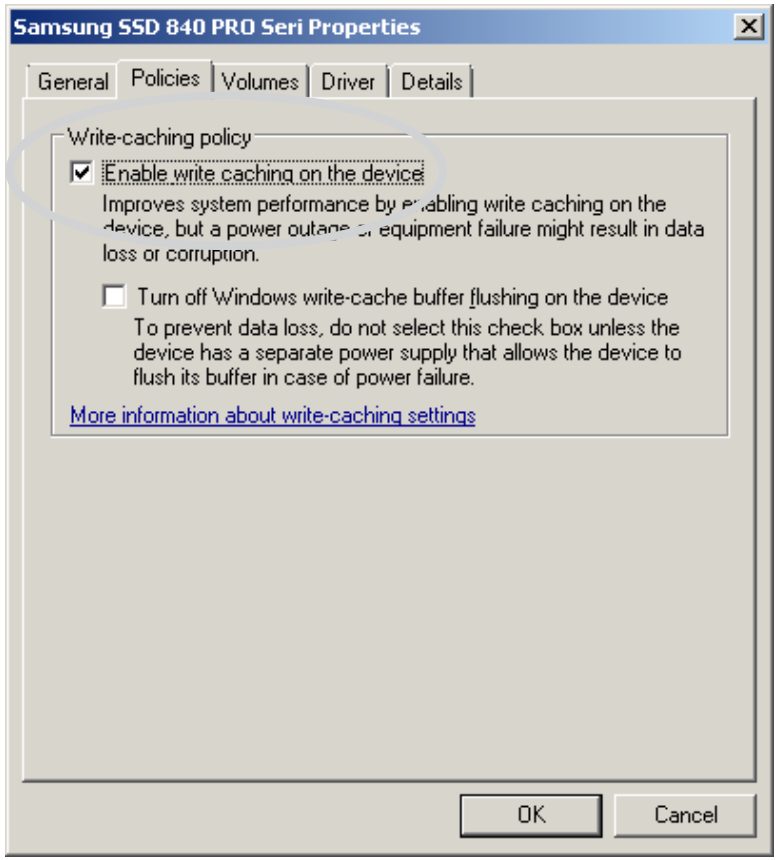
Disk caching settings / - cont...

For the cache settings, click the “Policies” tab at the top of the dialog.

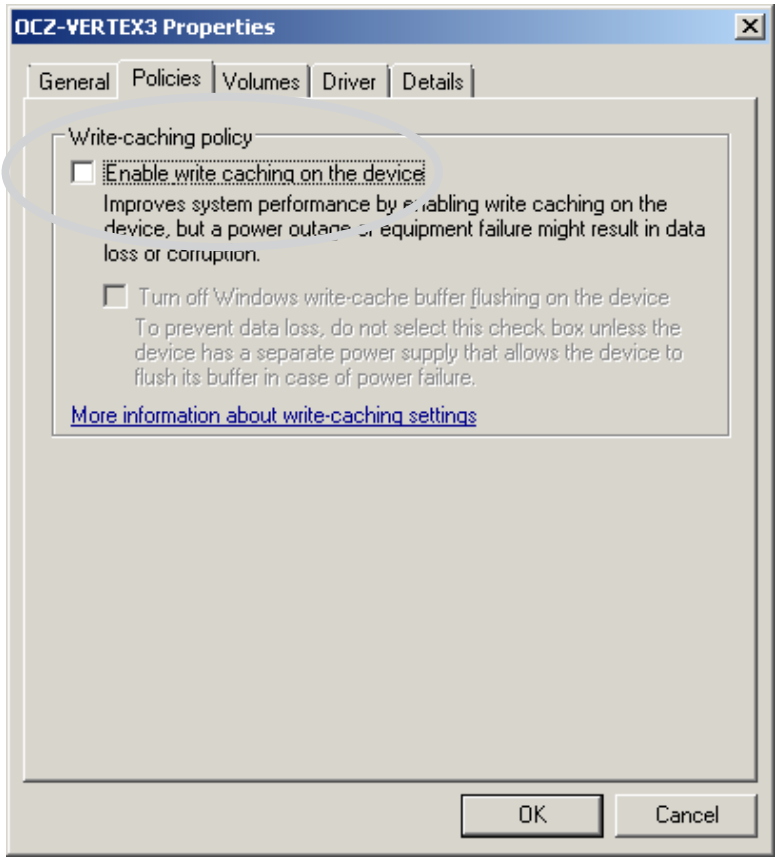
For Samsung drives, assure “Enable write caching on the device” is checked.
For OCZ drives, assure “Enable write caching on the device” is NOT checked.

Select OK, to confirm your settings and close the dialog.

SAMSUNG CACHE SETTINGS



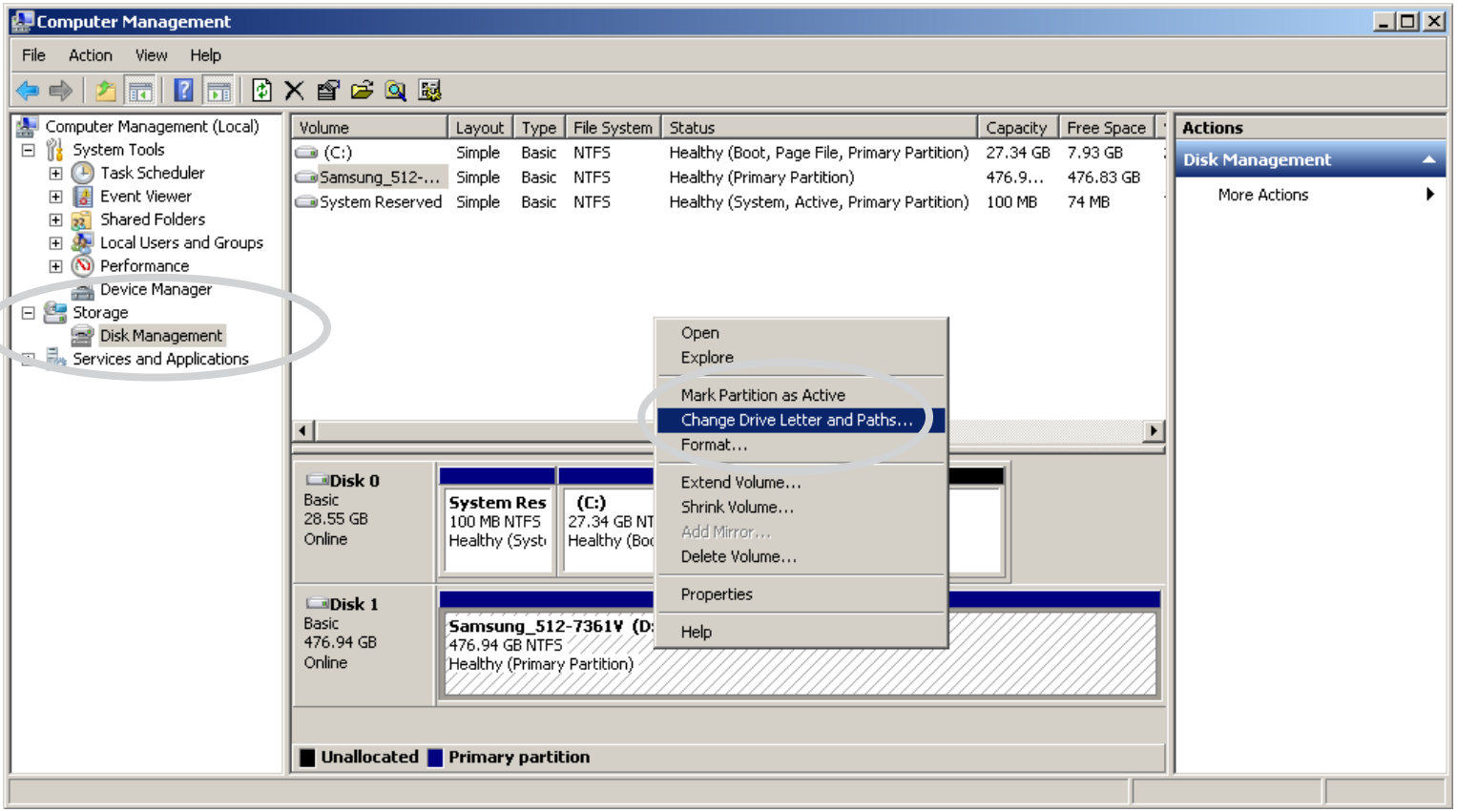
OCZ CACHE SETTINGS



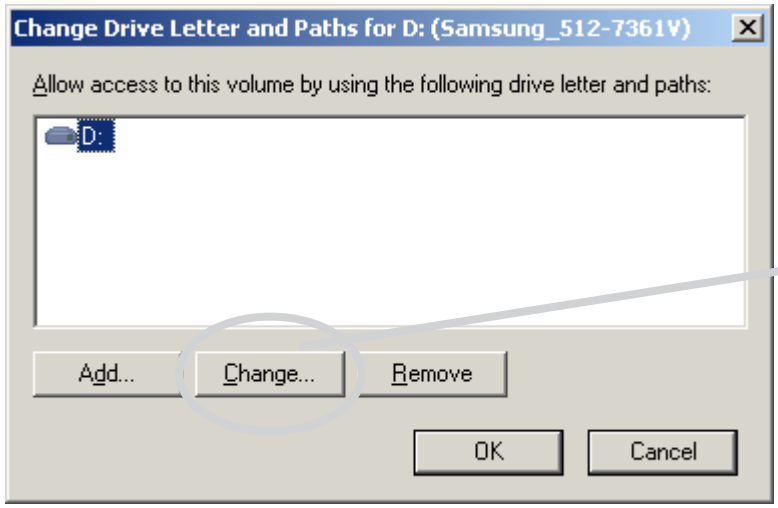
9.13 Changing drive letters

For environments with control over drives, it can sometimes be helpful to predetermine the drive letters assigned by Windows. Again there are several ways to access the dialog for assigning drive letters, one way is to open “Disk Management” in “Computer Management” (See “7.1 Device Manager” on page 243)

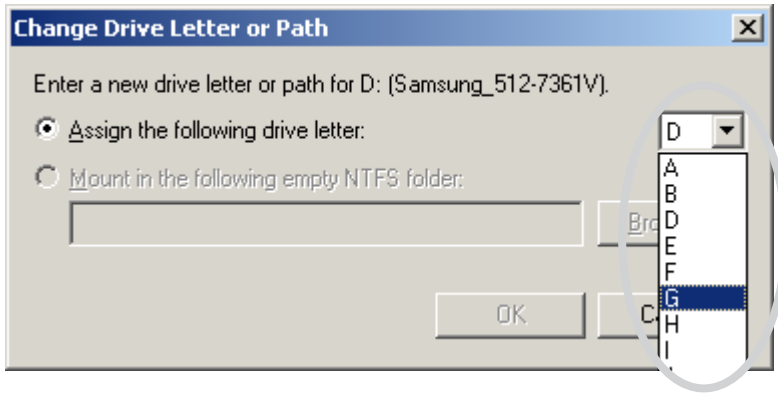
Right click the drive for which a drive letter should be assigned and select “Change Drive letter and path...”.



Changing drive letters / - cont...



From the first dialog, select “Change” to change the drive letter.



From the drop down list, select an available letter.

Only letters which are currently unassigned will be available in the list.

Select “OK”

9.14 Error checking

If a drive has been mounted on another machine or file system, or has been removed without being properly ejected, either from the Cinedeck UI or via “Hotswap!” in the windows task bar, corruption of the file indexes can occur which may cause problems with recording, including write failures or prevent files from being found.

Before using the drive, it is strongly recommended to format or secure erase the drive to ensure file system integrity.

- Formatting a SSD makes all space available on a drive and clears any record of previously saved files.
  See: “9.8 Formatting drives” on page 284
- Secure erase returns drives to “factory new” state. There is no possible recovery of user files.
  See: “9.15 Secure erase” on page 299

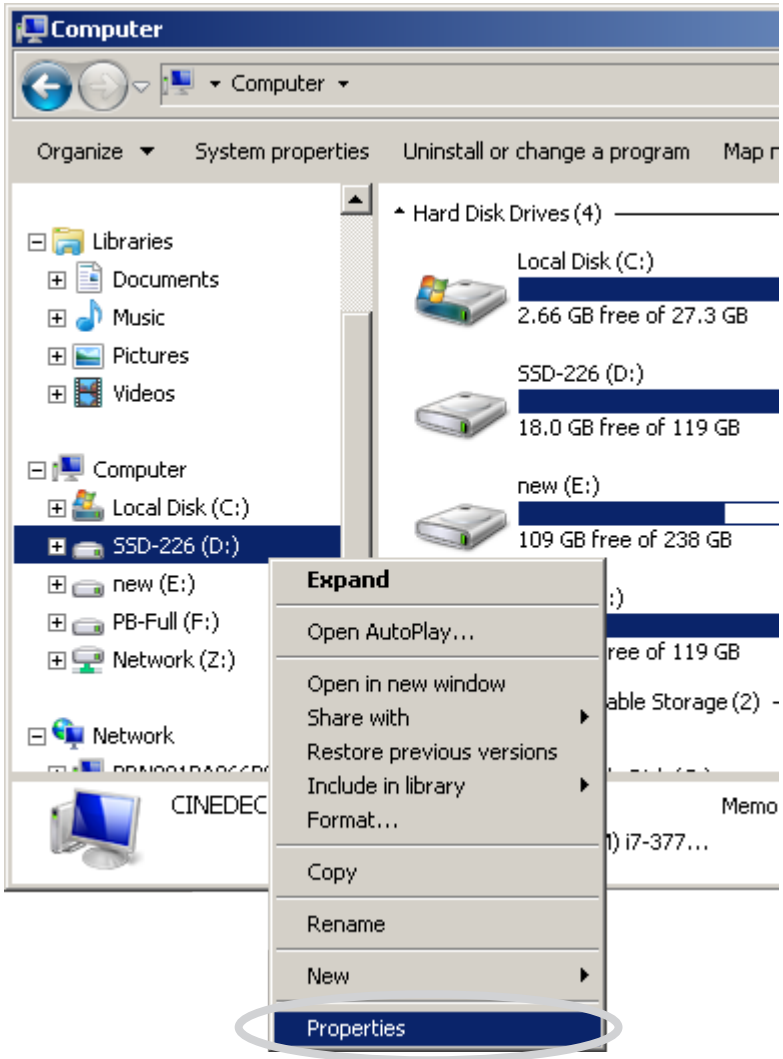
If formatting or secure erase are not options because the disk contains data, run Windows error checking.

Windows may automatically start the error checking dialog if it detects a disk which was not properly removed. (If Windows activated Check Disk automatically, skip to step 5 below)

To manually access the Check Disk utility:

1. Open Windows Explorer.

2. Right click the disk in question and select “Properties”

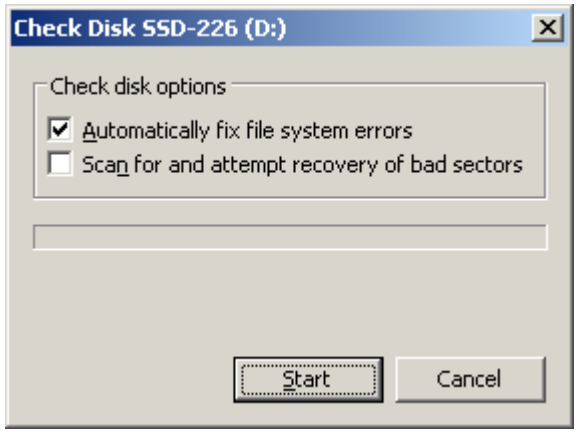


Error checking / - cont...

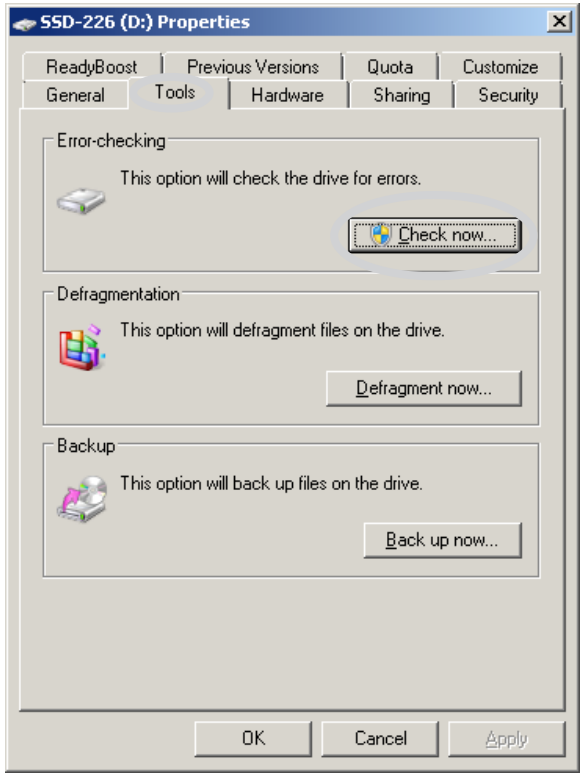
3. Select the "Tools" tab from the Properties dialog.

4. Select "Check Now" to open the Check Disk dialog.

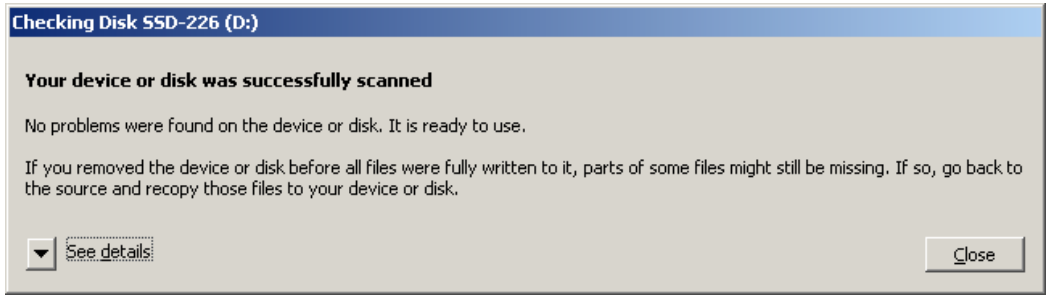
5. Whether automatically or manually started, at the Check Disk dialog, assure "Automatically fix file system errors" is checked and



assure "Scan for and attempt recovery of bad sectors" is **not** checked. (This settings is for non-SSD disks)



6. When complete, a dialog similar to this will appear, indicating if errors were found and fixed.



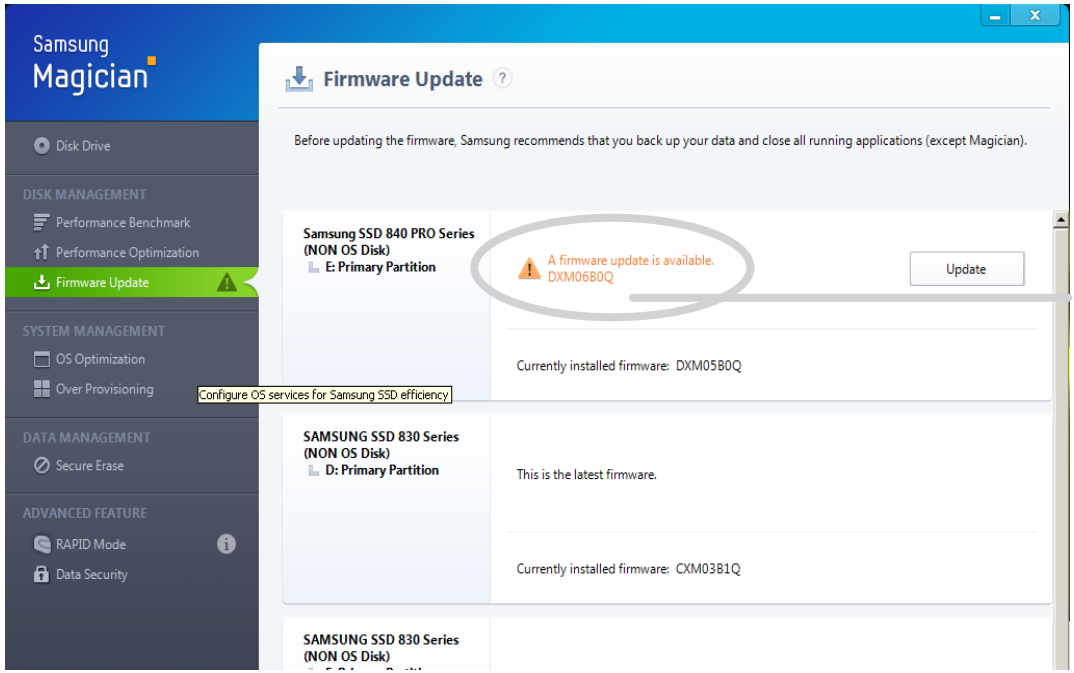
9.15 Secure erase

SSD drives are not like traditional spinning disks in that repartitioning does not fully clear the drives. For SSDs, its an issue of blocks vs pages known as “Garbage Collection”. There is a lot of information on the web regarding SSD performance and secure erase but simply put, secure erase will come as close as is technically possible to restoring an SSD to factory-fresh condition.

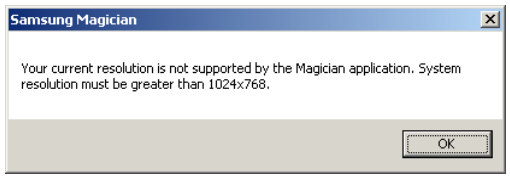
The manufacturers secure erase application will also provide a way to update the drive firmware. This generally should be done prior to secure erasing a disk.

While secure erase can be started from within Windows, the SSD will often be in a frozen state which will prevent secure erase access from completing. There are several possible procedures to get around this however the most effective method is to run the manufacturers secure erase from a bootable disk. It is recommended that you create one in advance to have ready when you need it.

For Samsung drives, go to www.samsung.com/samsungssd to download and install the latest Samsung Magician Software. This is a Windows application which includes a utility for creating a bootable version onto a USB drive or CD.



Once installed, Samsung Magician may display an error:



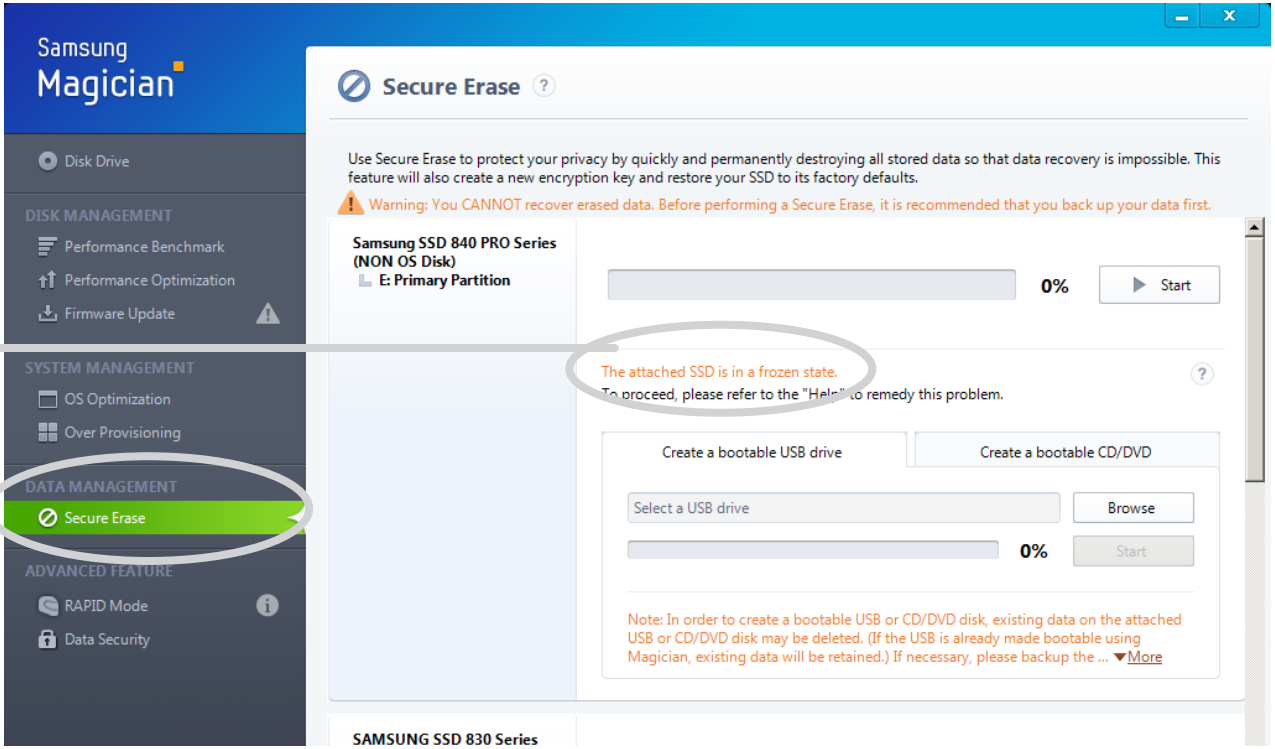
This error may be ignored.

The left portion of the Samsung Magician screen contains the menu while the right provides drive details.

Select “Firmware Update” from the left and if firmware is available, update the drive.

Secure erase / - cont...

After the firmware is updated, select “Secure Erase” from the left.
The right screen again contains disk details including whether they are frozen.



To create the bootable secure erase drive, insert either; a USB drive which can be erased, a blank CD or a blank DVD.
Based on the drive inserted, create either a bootable USB or bootable CD/DVD and follow the prompts.

Once complete, shutdown the Cinedeck and remove any drives you do not want to secure erase.

Assure the new bootable disk is connected and restart the Cinedeck.
At the BIOS, press F7 to activate the boot menu.

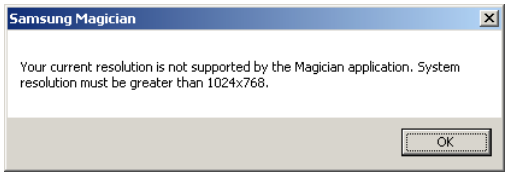
From the list of drives, select the disk you previously created. If it is a USB and there are two options, select the one that does not mention UEFI.

Once Samsung Magician is running again, select “Secure Erase” and follow the prompts.

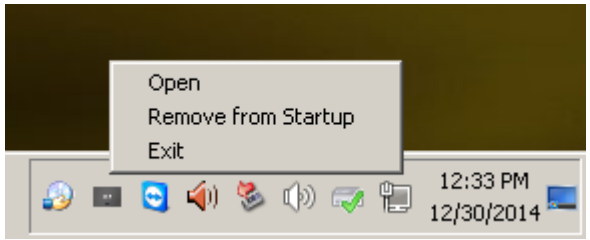
Remember, all data on the SSD will be erased!

Secure erase / - cont...

When you restart your Cinedeck after installing Samsung Magician, you may find that it has been setup to run at startup. If so, this icon will be visible in the system tray at the lower right of the screen. Also, on touch screen systems, Samsung Magician may display this error at startup: Generally the program will run and this resolution error can be ignored.

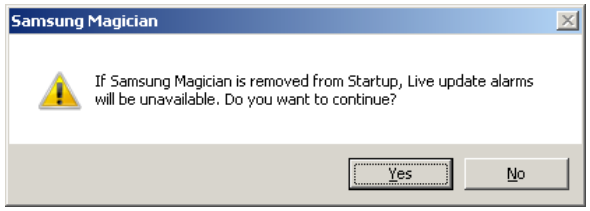


Running Samsung Magician at startup is not necessary and if desired, you can change this behavior.

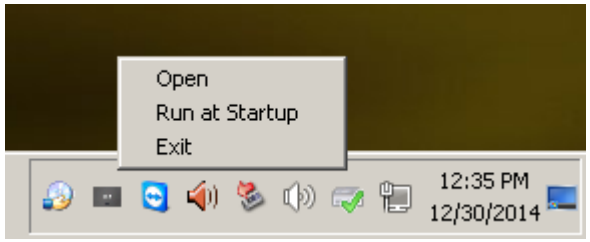


Right click the “Samsung Magician” icon in the system tray to open the context menu and select “Remove from Startup”.

Also note that you can exit from the application using this menu as well.



Selecting “Yes” means that the software will not be able to automatically notify you when SSD firmware updates are available but unless your system is always connected to the Internet, that information will not be available anyway.



You can always manually run the software to check for updates and, if desired in the future, you can again opt to have the software automatically start by running the program and again, opening the System Tray context menu and selecting “Run at Startup”.

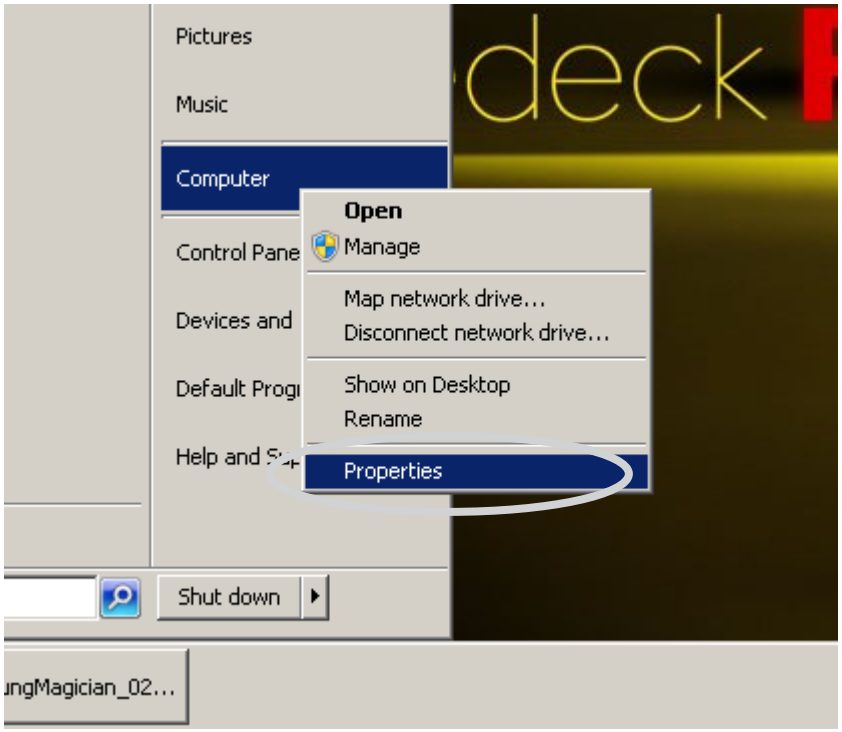
9.16 Updates

Updating the Cinedeck is very easy and takes about two minutes.

Download the update installer which will be about 250MB in size to a convenient location such as the Desktop. Contact Cinedeck for the current file location. (See "Contacting Cinedeck" on page 2)

It is always wise to save a copy of the file on your computer or server as well as in an "updates" folder located on the USB restore key which came with your Cinedeck.

It is optional but also recommended to create a system restore point. A Restore Point is a stored or memorized state of your system from a previous time.
It is possible, especially if you have installed 3rd party applications such as SAN client software or other tools, that new drivers installed in a software update may be incompatible with that software and cause issues with startup or operation. Restoring a system from a point just before an update can make recovery a relatively painless exercise.
If you encounter such an issue, please contact us with a complete description of the software/ hardware involved so we can investigate the cause of the incompatibility.
(See "Contacting Cinedeck" on page 2)



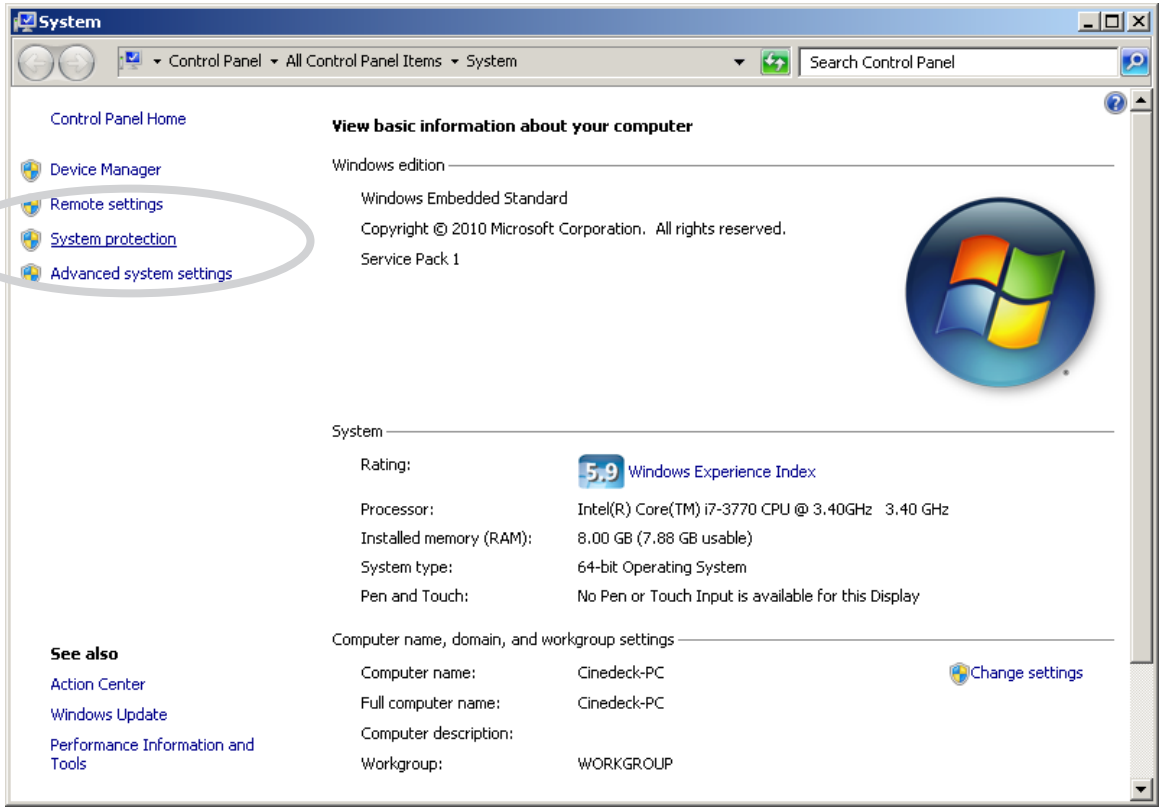
9.17 Create a Restore Point

To update and skip creating a restore point, goto; "9.18 Cinedeck update installation" on page 306

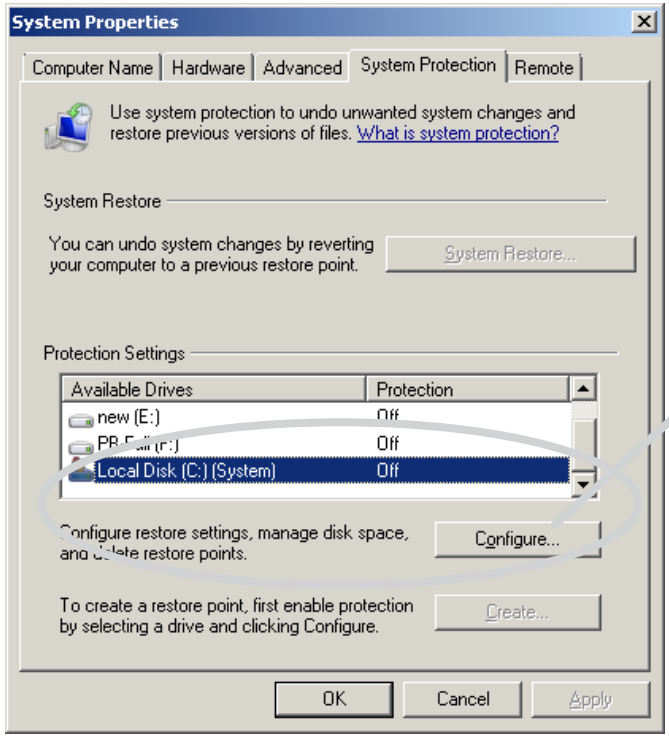
Connect a USB mouse and keyboard
Power on the Cinedeck
On RX, exit the Cinedeck, "setup">"prefs">"exit application" (See "495- application" on page 227)
From the desktop, select "Start"
Right click "computer" and select "properties" from the context menu.

Create a Restore Point / - cont...

In the properties dialog, select “System Protection” to open the System Protection tab in the “System Properties” dialog.

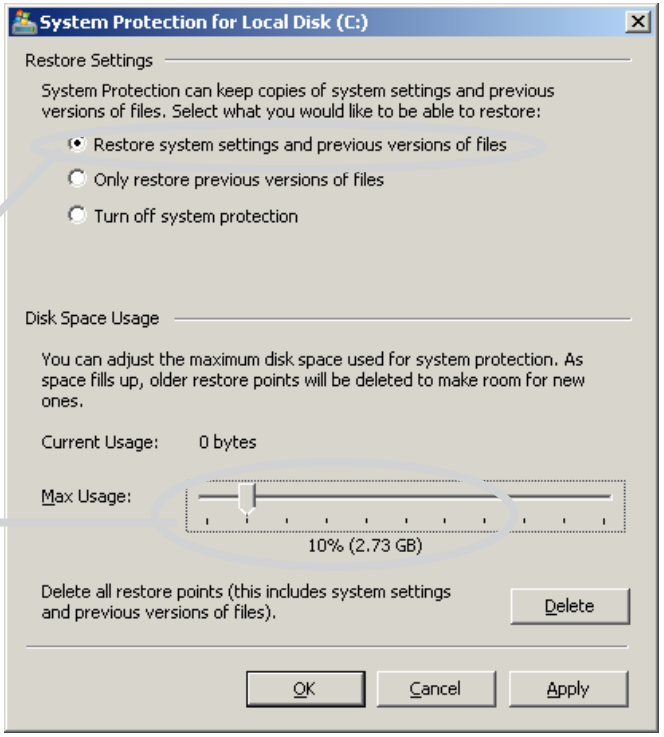


Create a Restore Point / - cont...



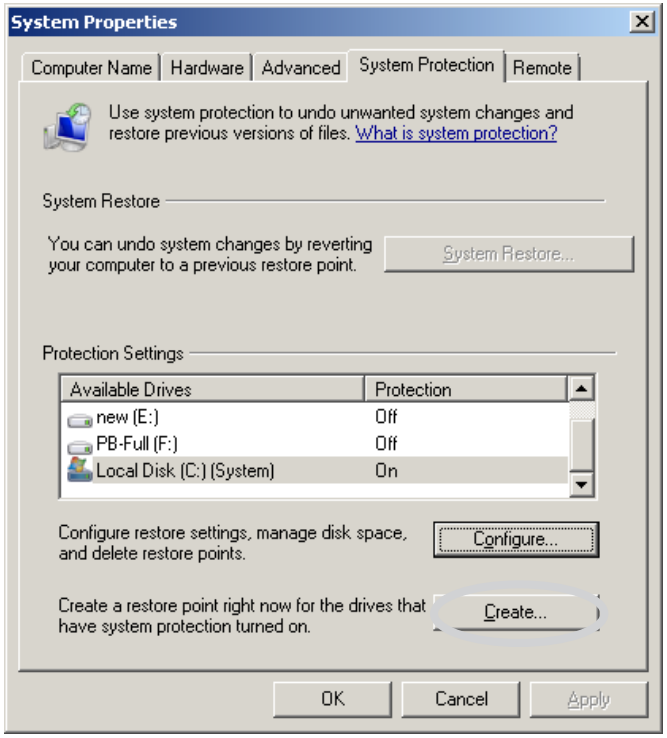
Highlight "Local Disk C: System" from the Protection Settings drive list.

1. Select Configure



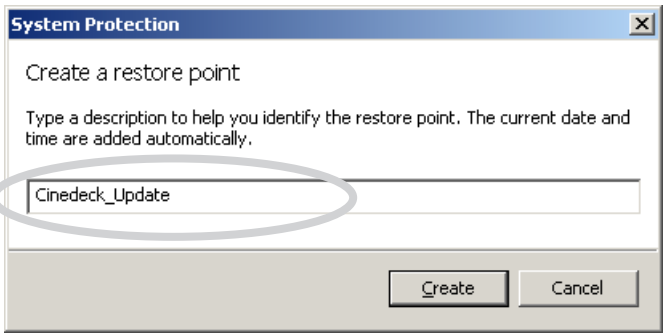
2. Under "Restore Settings" select the radio button "Restore system settings and previous versions of files"
3. Below, under "Disk Space Usage", slide the "Max Usage" indicator to allow a minimum of between 2 and 3GB.
4. Select "OK"
5. Select "Create"

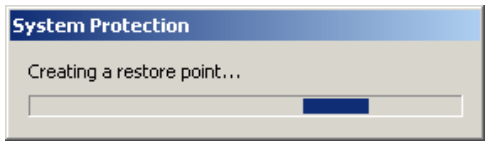
Create a Restore Point / - cont...

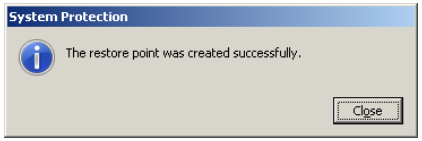


6. At the following dialog, you can give this new restore point a user friendly name, select “Create”.
   Note that when you open restore mode, the date and time are automatically included with the information displayed.

7. Follow the prompts as the restore is created and close all of the windows when the process finishes.





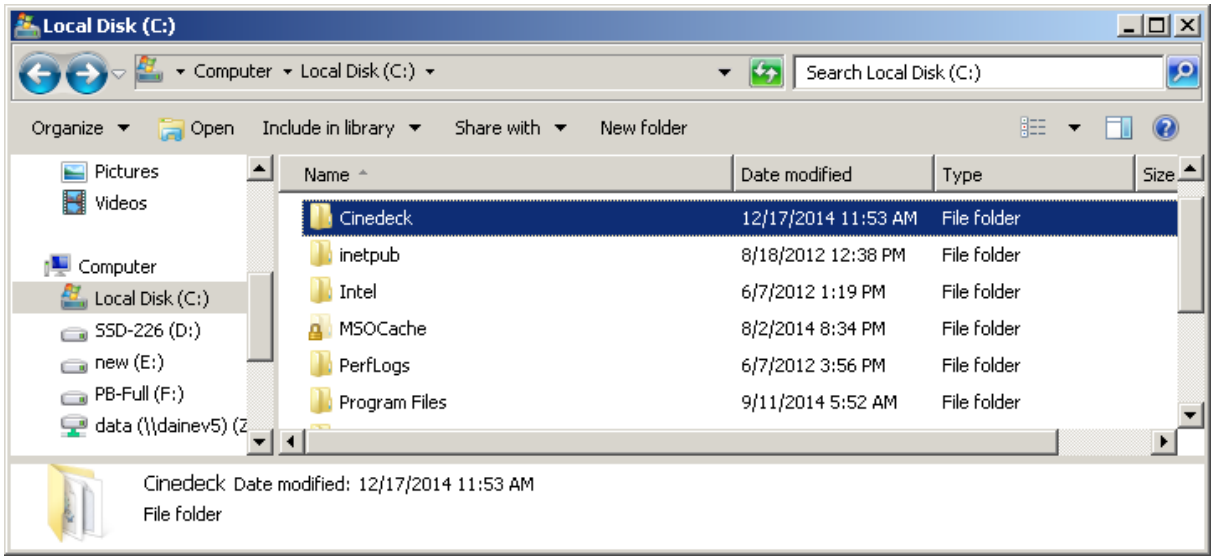


9.18 Cinedeck update installation

Before you begin: Remember that operators hate surprises. If you are in the middle of a production and everything is working, apply the logic of "if it ain't broke, don't fix it".
Wait until AFTER the show wraps to play with new things.

Also, You may want to preserve the old version of software. The easiest way to do that is simply to make a copy of the cinedeck folder on a thumb drive and rename the folder to something like Cinedeck_45-13126. You can always copy this folder back as c:/cinedeck to roll-back if needed.

1. Connect a USB mouse and keyboard
2. Power on the Cinedeck and allow it to load fully. Exit the Cinedeck application if it starts automatically;
   - To exit, press "setup">"prefs">"exit application" (See "495- application" on page 227)
3. Download the update installer, which will be about 250MB, to a convenient location such as your USB drive. Contact Cinedeck for the current file location. (See "Contacting Cinedeck" on page 2)
   It is always wise to save a copy of the installer file on your computer or server as well as in an "updates" folder located on the USB restore key which came with your Cinedeck.



4. Open Windows Explorer. Navigate to the c:\cinedeck folder and open it.

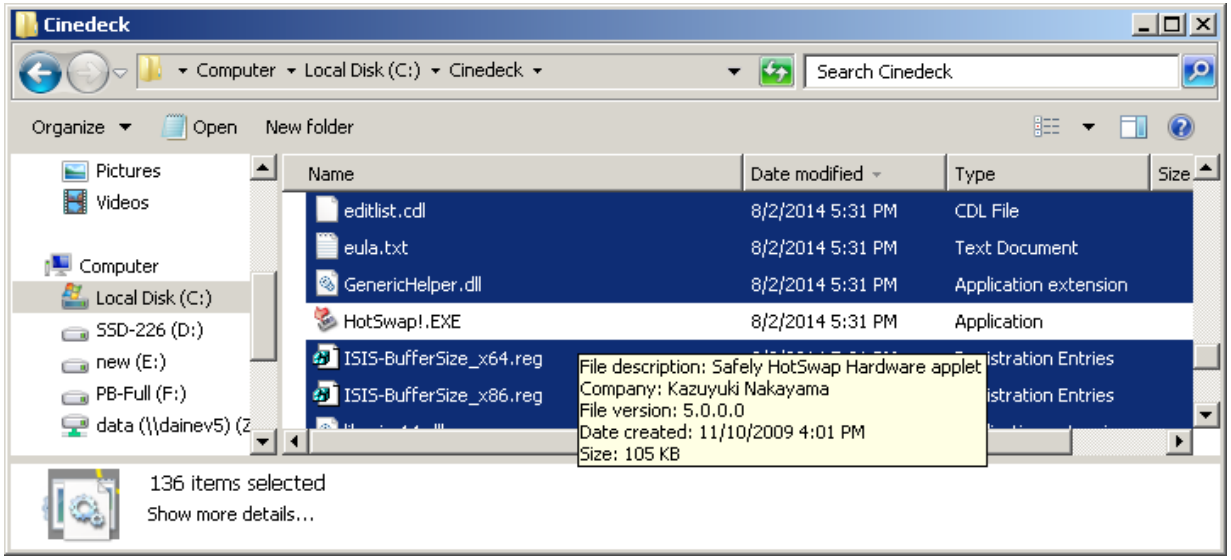
Copy and safely store in another folder, any files such as LUTs which you will need after the update.

Cinedeck update installation / - cont...

5. Once in the Cinedeck folder, locate HotSwap!.exe

6. Press "Control+A" to select all files and then press the Control key and click HotSwap!.exe to deselect it.

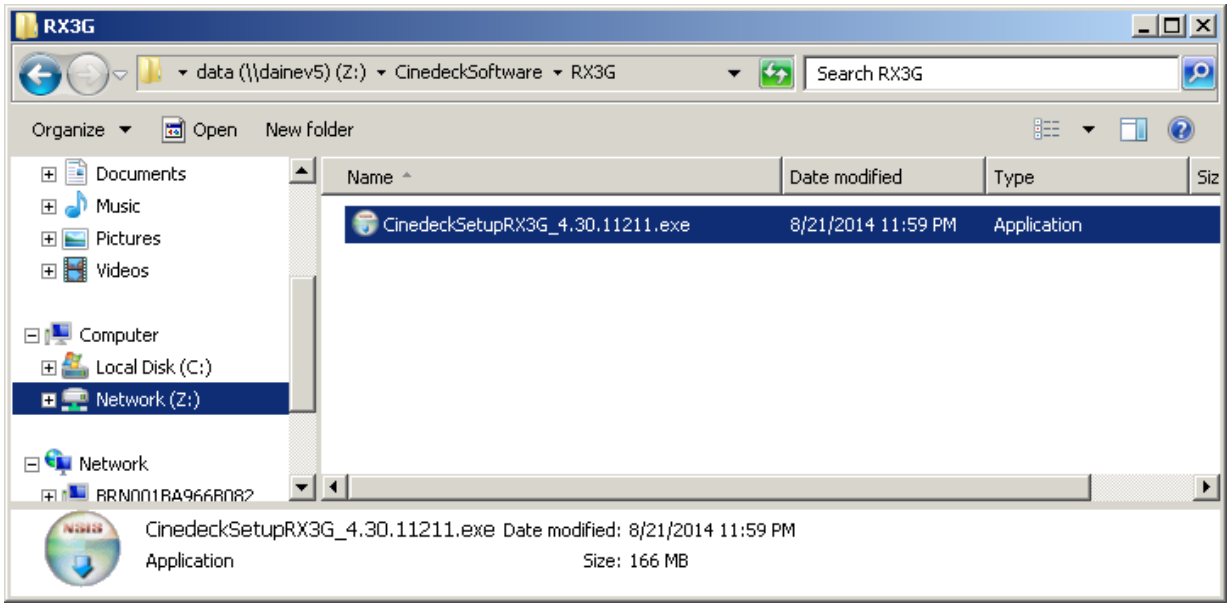
7. Press the "Delete" key to delete all of the selected files.



Make note of any instructions which came with the update as there are occasionally additional steps which need to be taken during the install process.

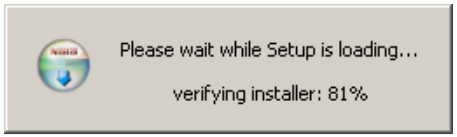
8. Updates can be run from any local drive. Insert the USB drive into one of the USB ports or locate the update file in Explorer.

9. Double click the file to run the update and follow the prompts.

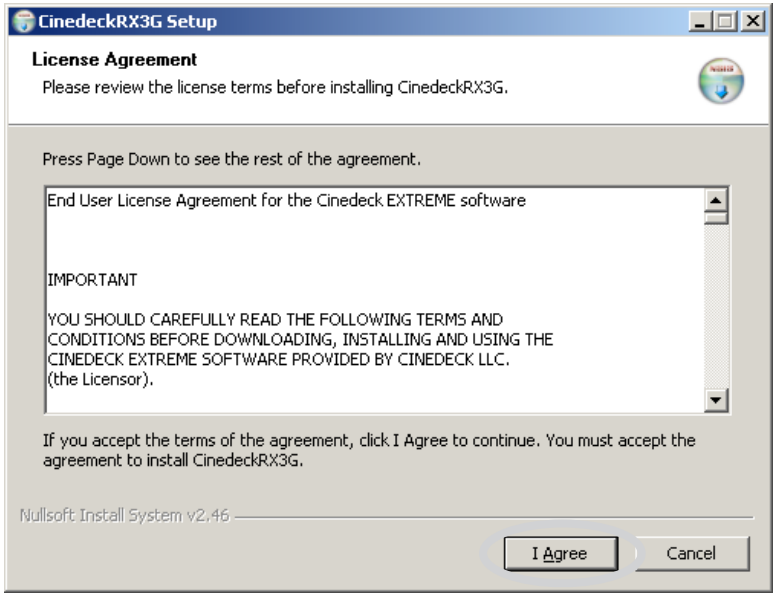


Cinedeck update installation / - cont...

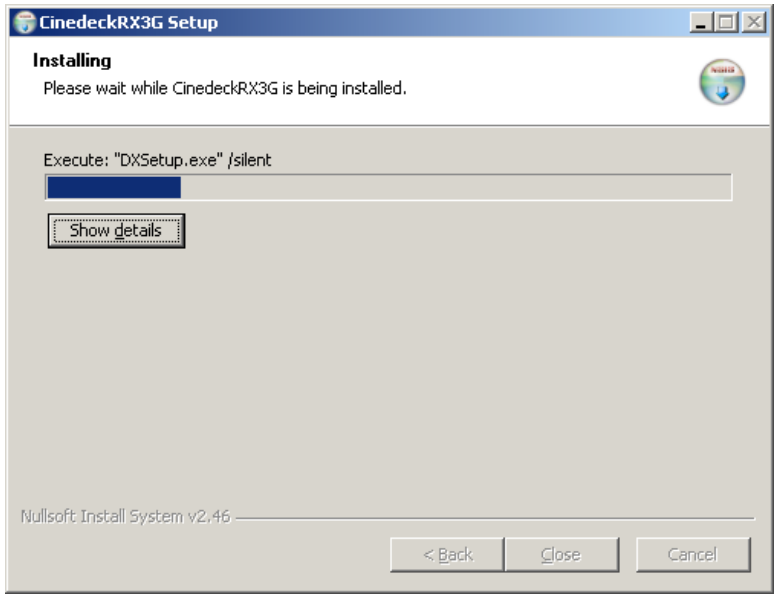
10. Windows may pop up a warning message stating that “The publisher could not be verified”. Press “run” to continue setup.



11. You must agree to the terms and conditions to continue the installation.
Select “I agree” to continue and follow the prompts.

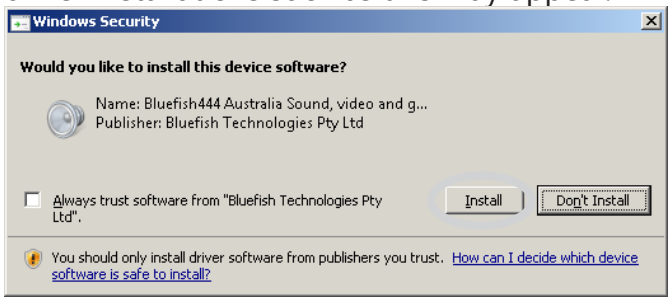


Cinedeck update installation / - cont...

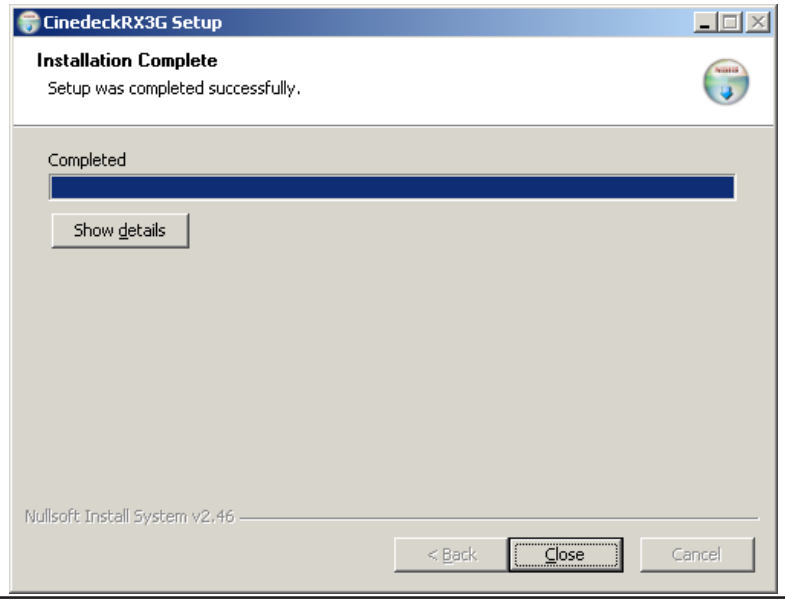


12. The install will start.

13. Depending on the nature of the update and the system you are updating, dialog boxes for other driver installations such as this may appear.



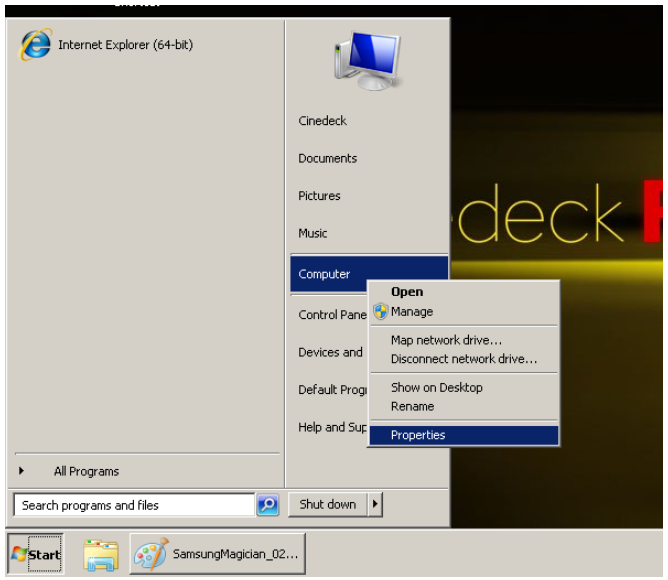
Unless otherwise stated in the release notes, follow the prompts to install everything.

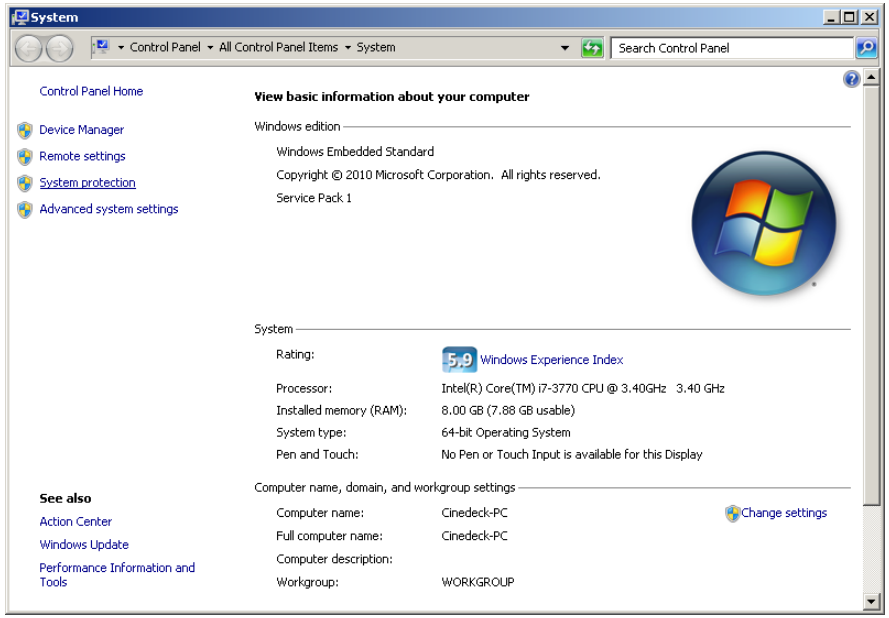


14. *When the installation has completed, it is mandatory to reboot the deck.*

15. On first restart, additional update notifications may appear. Allow the firmware updates to run, then restart again when prompted by the installer.

9.19 Using a Restore Point





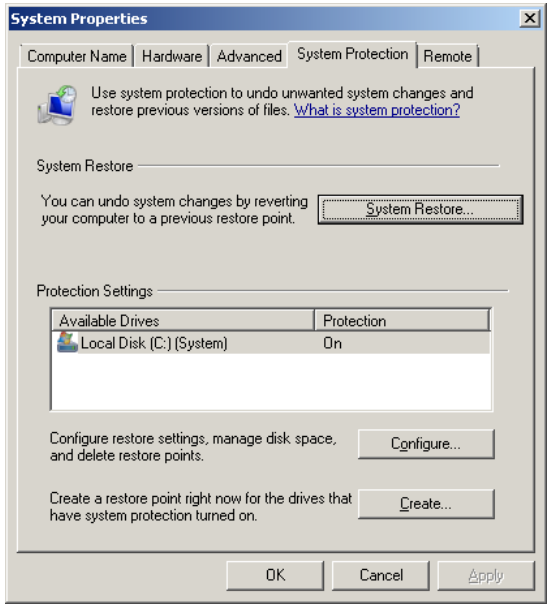
The Windows operating system can create a Restore Point, the stored or memorized state of your system from a previous time. If you created a restore point, you can use it to reset your system back to that point.

1. Connect a USB mouse and keyboard
2. Power on the Cinedeck
- On RX, exit the Cinedeck, “setup”>”prefs”>”exit application” (See “495- application” on page 227)

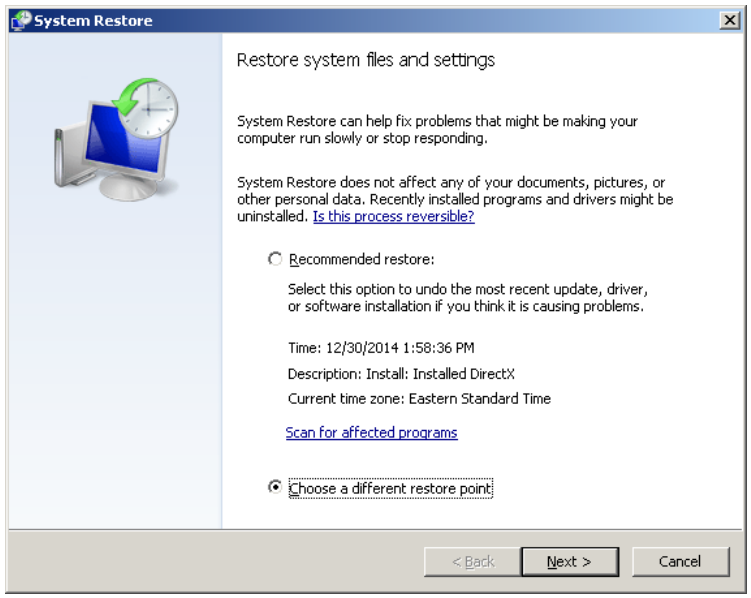
3. From the desktop, select “Start”
4. Right click “computer” and select “properties” from the context menu.

5. In the properties dialog, select “System Protection” to open the System Protection tab in the “System Properties” dialog.

Using a Restore Point / - cont...



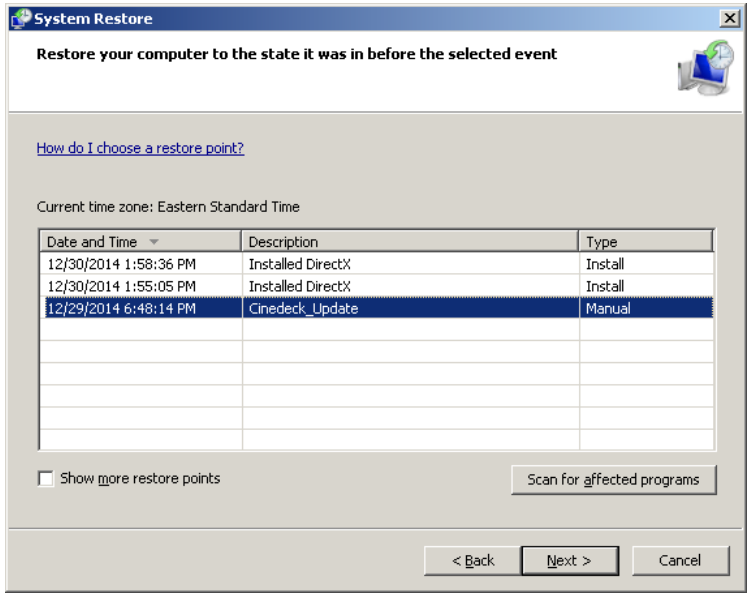
6. Select the “System Restore” button.



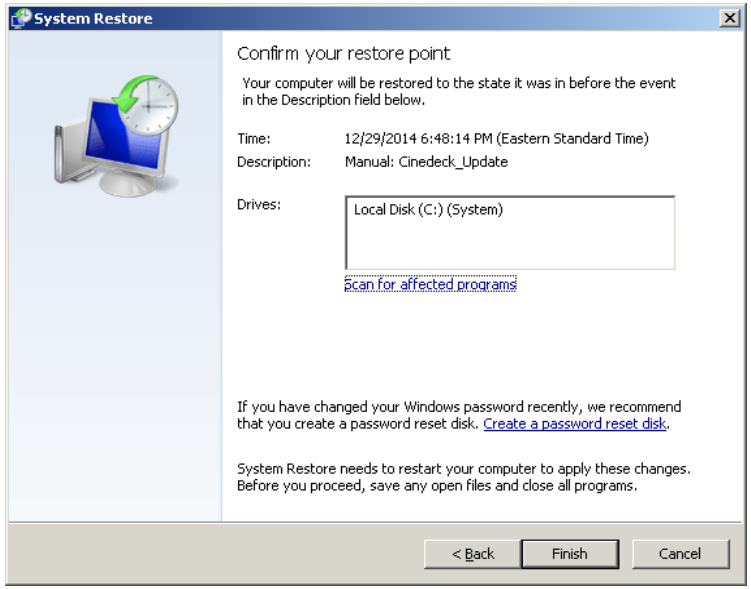
7. Depending on the circumstances, you may see this screen with two options, a “Recommended restore” or “Choose a different restore”.

   Select “Choose a different restore” to view all of the available restore points.

Using a Restore Point / - cont...

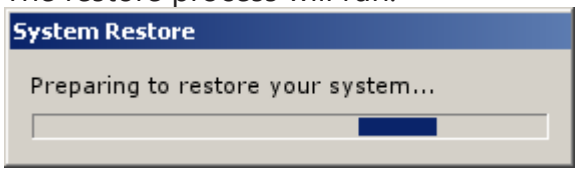


8. Select the restore point you want to use and press "Next".



9. This last dialog is simply a confirmation before the process begins.
   Press "Finish" to restore the system.

10. The restore process will run.



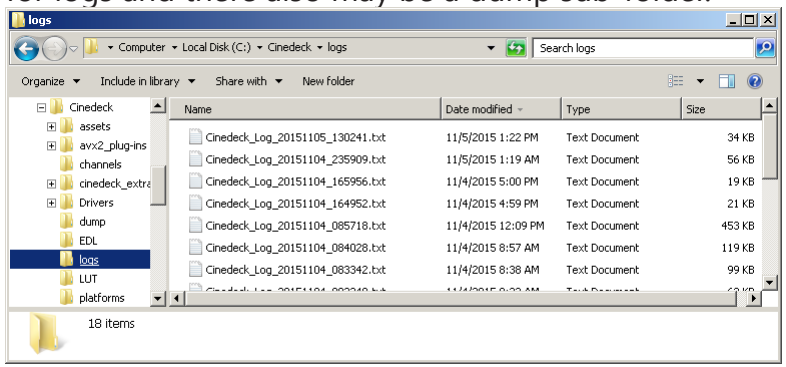
When the restore is complete, the system will be automatically restarted.

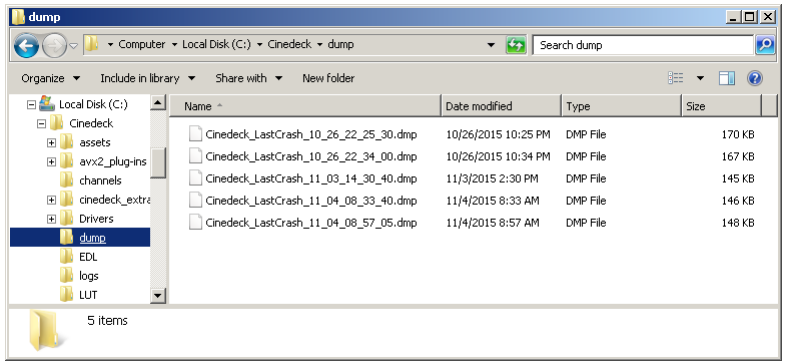
9.20 System drive cleanup

Over time, deleted files, saved installs, logs, temporary files, etc., will slowly fill up the C: system drive on your Cinedeck so it is a good idea to periodically check the remaining space and if necessary, clean it up. While systems can run fine, even with a C: drive that is almost full, it is recommended to maintain at least a gigabyte of free space.

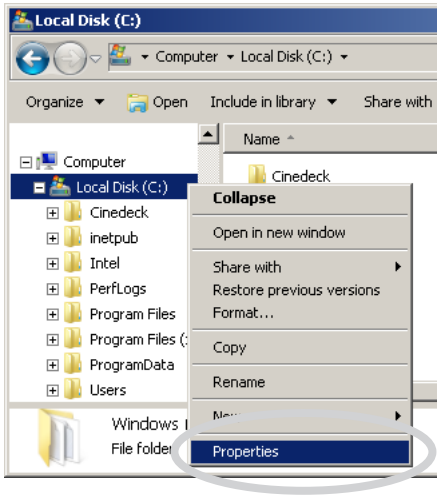
The first step is to simply delete unnecessary old files:

Delete Old Logs:
C:\cinedeck is the main folder for the Cinedeck application. Included in the cinedeck folder will be a sub-folder for logs and there also may be a dump sub-folder.





If it has been weeks, months or more since the last cleanup, you can freely delete all of the files in these two folders. However, generally these files are quite small so if desired, you can also keep a few of the most recent files for reference.

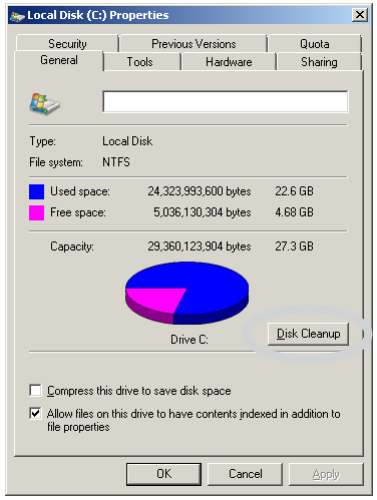


Run Disk Cleanup:
Disk Cleanup is a utility built into Windows for deleting unneeded and residual files including files which were previously deleted and placed in the Recycle bin, Temporary Internet files and more.

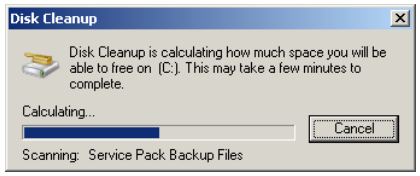
You can access Disk Cleanup in several ways. One way is to right click the C: drive in Windows Explorer and select properties.

System drive cleanup / - cont...

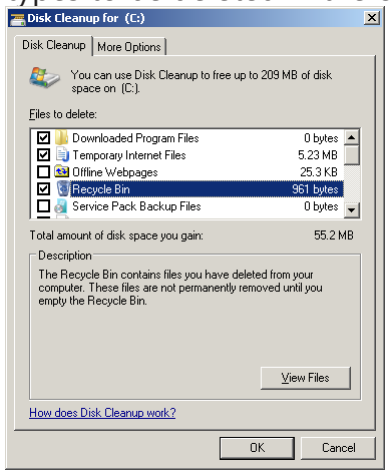
Select Disk Cleanup from from the lower right of the c:\drive Properties dialog.



The system will first scan the c: drive to establish what files are available to be deleted and how much space will be recovered by deleting them.

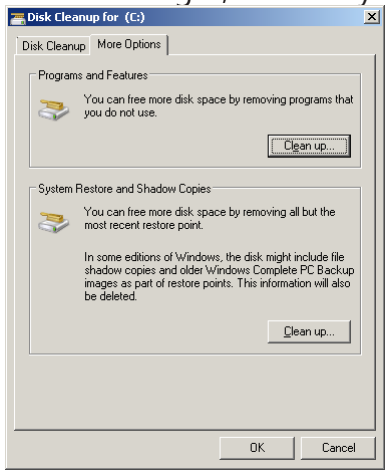


In the following dialog you can use the check boxes to independently select file types to be deleted in the cleanup process.



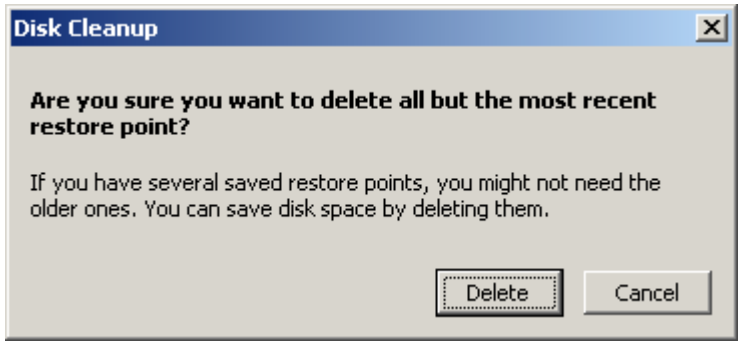
Unless there is something specific about your system, you can actually delete everything though unless a selection at least represents several hundred MB, deleting it will obviously not save much space.

Although relatively small compared to true restore images, another potential space hog are unneeded System Restore points. (See "9.17 Create a Restore Point" on page 302). To delete all but the most recent restore point, select the More Options tab. Then, at the lower right, under "System Restore and Shadow Copies", select "Clean up"

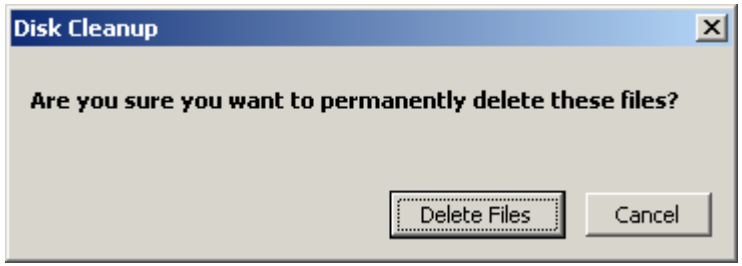


System drive cleanup / - cont...

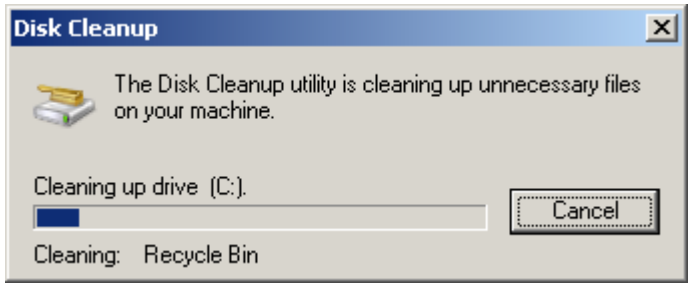
Select OK and follow the prompts.



You will be asked first to confirm the deletion of restore points.



That is followed by a confirmation to delete the other files selected at the start of the cleanup process.



Lastly a progress dialog will appear.
Once completed, you should have recovered a significant amount of space.

As a last note, there may also be older or alternative Cinedeck application installs on your system. These are generally in folders named as a version number such as “Cinedeck_4.3.2_1234”. If you know one or more of these is no longer needed, they can be deleted or, to save them, the entire folder can be zipped and removed for safe keeping. Contact support if there are any doubts. (See “Contacting Cinedeck” on page 2)

9.21 Bluefish firmware

All current Cinedeck systems utilize Bluefish cards for the primary video and AES inputs and outputs. Reconfiguring system I/O (for example to switch a ZX45 to 8 channel mode) and some updates, require a separate manual firmware installation.

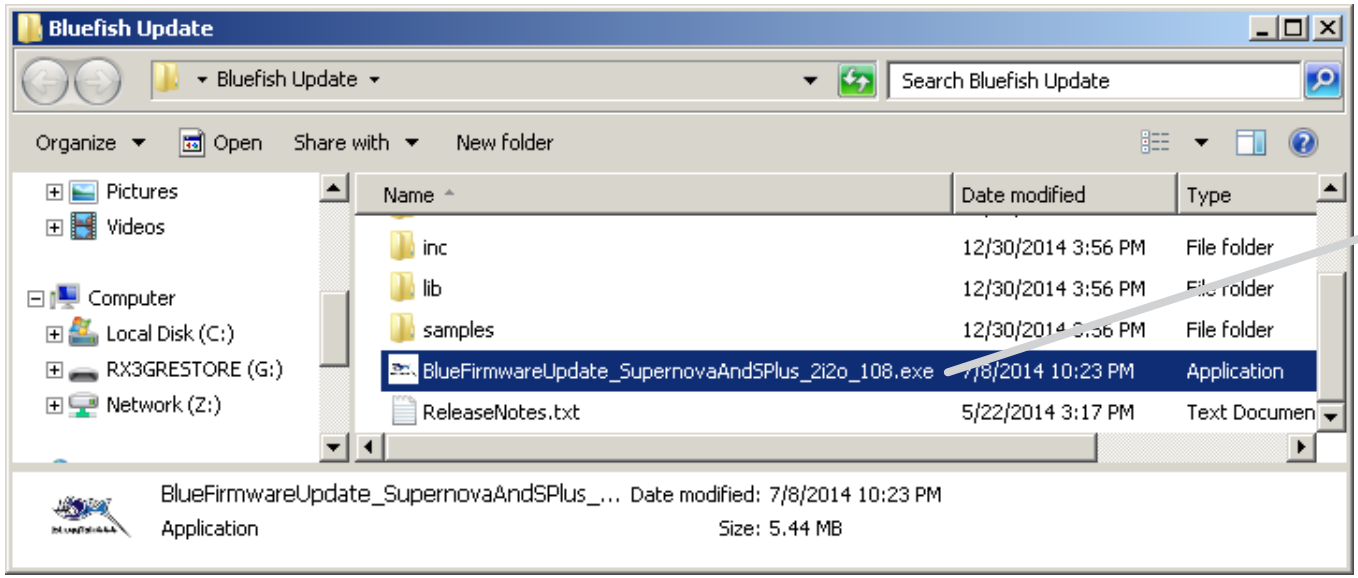
1. Connect a USB mouse and keyboard
2. Power on the Cinedeck and allow it to load fully. Exit the Cinedeck application if it starts automatically;

- To exit, press "setup">"prefs">"exit application" (See "495- application" on page 227)

3. Some Cinedeck versions come with the Bluefish update installer in the c:\cinedeck\redist folder while some systems may have firmware located in a separate directory. If unsure, contact Cinedeck for the current file location.. (See "Contacting Cinedeck" on page 2)
   It is always wise to save a copy of the file on your computer or server as well as in an "updates" folder located on the USB restore key which came with your Cinedeck.

4. Open Windows Explorer.
   Navigate to the Bluefish files and unzip the contents to a convenient location such as the Desktop if needed.

5. Locate the Supernova update .exe file and double click it to start the install.



NOTE:
THE FIRMWARE VERSION NUMBER WILL VARY BUT IT IS USUALLY NOTED AT THE END OF THE FILE NAME.

2i2o INDICATES STANDARD
2 INPUT - 2 OUTPUT
4i0o OR QUAD-IN INDICATES ALL INPUTS, NO OUTPUTS, ETC

Bluefish firmware / - cont...

! Do not power off the system during firmware updates!

6. The Card Info - "Card Select" drop-down should indicate a Supernova card and the current firmware.

7. If available, the "New Firmware" drop-down list will indicate the various firmware types.

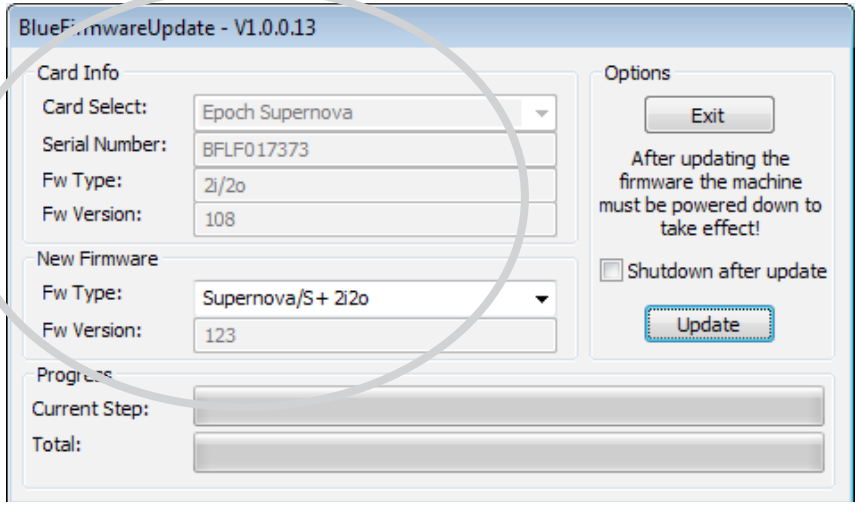
   Note that if your system has multiple cards, you will repeat this procedure once for each card, selecting each card from the drop-down. Note the serial number under Card Info.

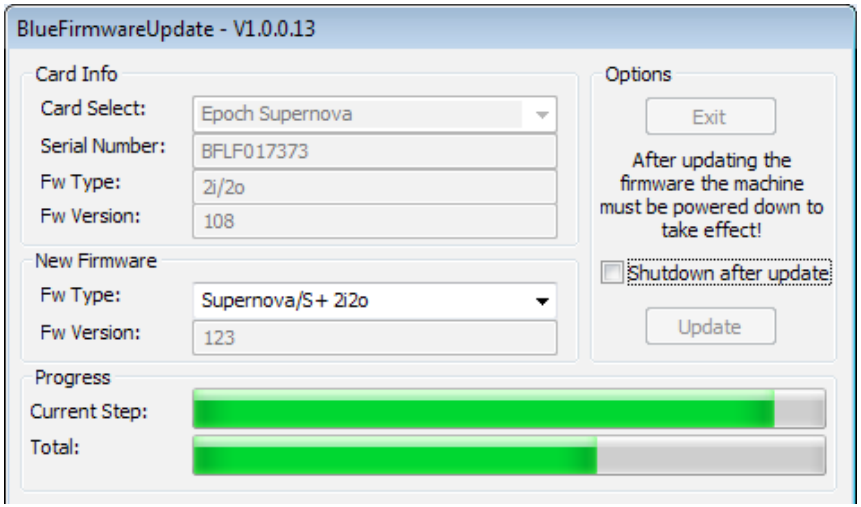
8. After making selections, click "Update" at the right of the dialog to start the install and note that the "Exit" button becomes gray and unavailable during the update process.

9. The progress bars at the bottom will slowly move right during the update.

10. When the update has completed, the "Exit" button will again be available.
    Repeat for any additional cards.

11. Fully shut the system down and restart to complete the install. It may be necessary to restart the system again to properly identify and sequence the input or output channels.



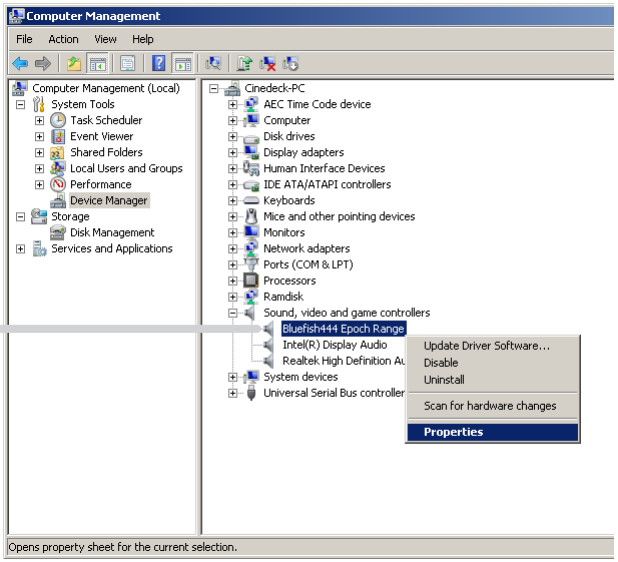


Remember: The system must be fully powered off after firmware updates! Also firmware and driver must match so be sure the driver is the same version accompanying the selected firmware.

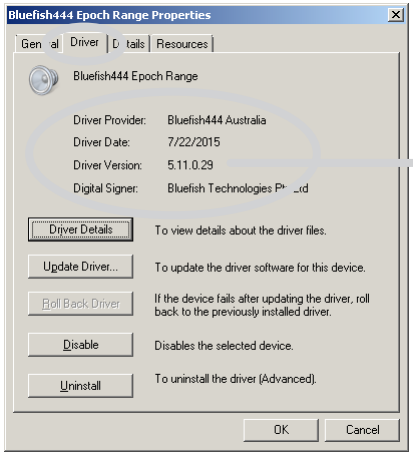
9.22 Bluefish driver

In some circumstances it is necessary to change or update the Bluefish video I/O card driver manually so this procedure can be used to both update and revert to an older device driver.

Open Windows Device Manager
Navigate to and select the Bluefish444 card or cards located under Sound, Video and Game Controllers and right click or “Enter” to select Properties.



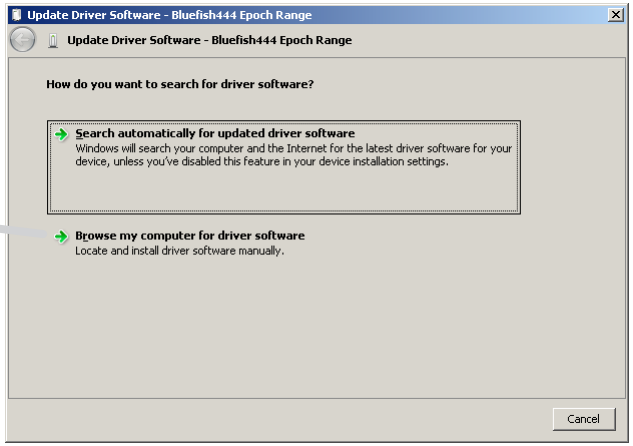
In the Properties dialog, select the driver tab at the top.



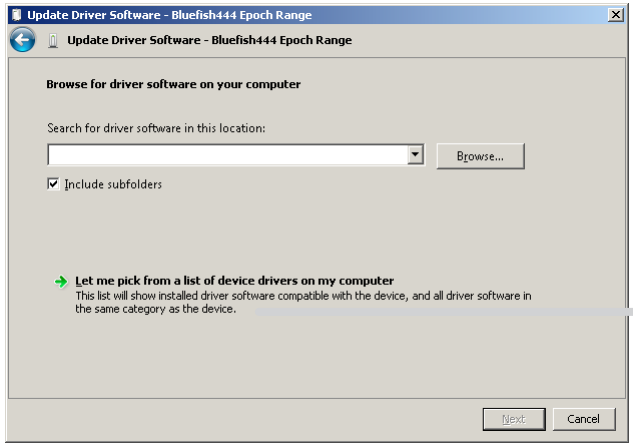
Note the current driver version and date for future reference.

Select “Update Driver”.

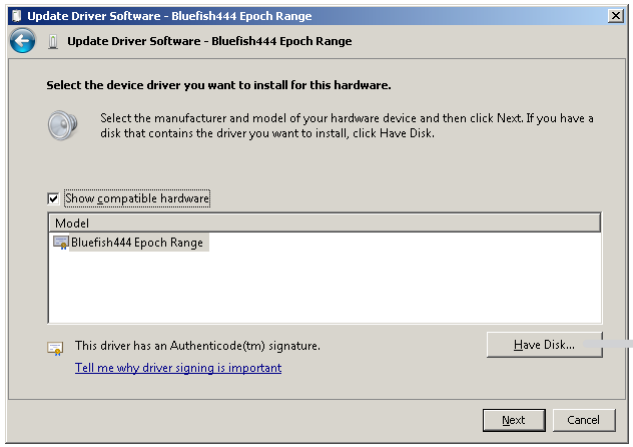
From the “Update Driver Software” dialog, select “Browse my computer for driver software”.



Bluefish driver / - cont...



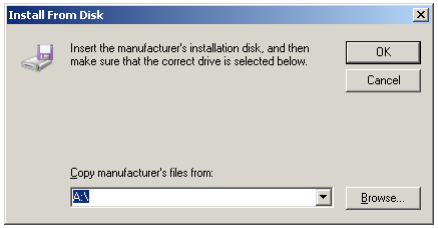
From this next “Update Driver Software” dialog, select “Let me pick from a list of device drivers on my computer”.



If you are reinstalling a driver used previously, it can be selected from this list of available drivers.

Select “Next” to start the install and skip to the last page of this Bluefish Driver section.

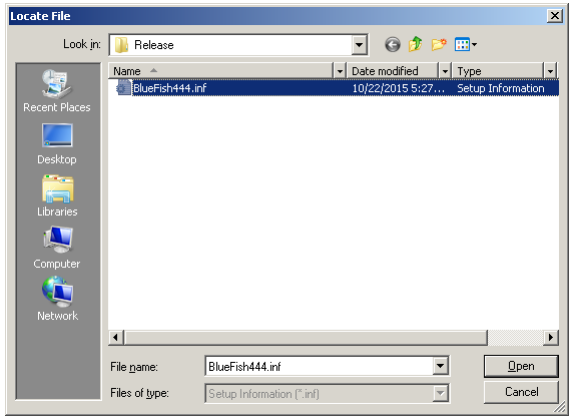
From the third “Update Driver Software” dialog, select the “Have Disk button”.



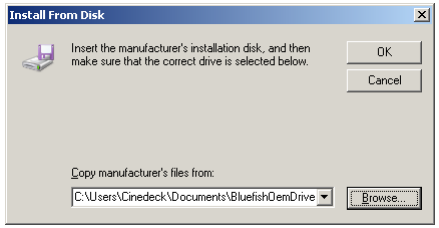
And select “Browse” to open a file manager window that will allow you to navigate to the appropriate Bluefish folder.

Bluefish driver / - cont...

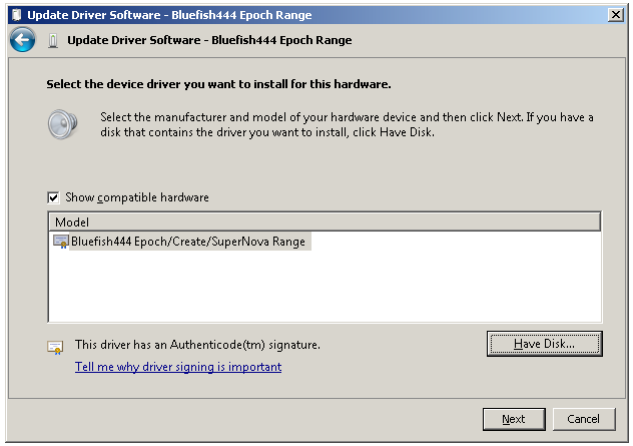
Navigate to the required driver release folder in the Bluefish folder that contains the .inf driver file.



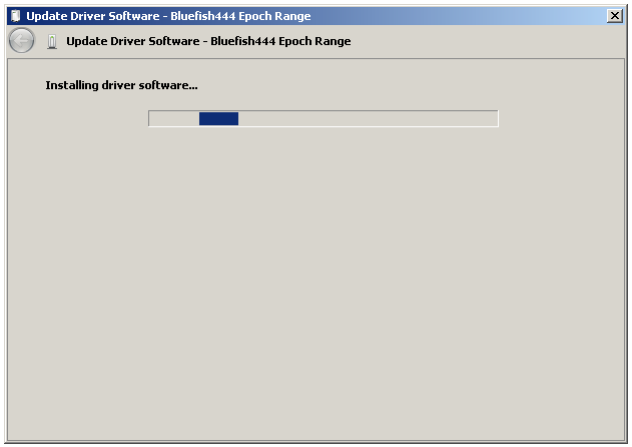
Select “OK” to confirm the location of the selected driver file.



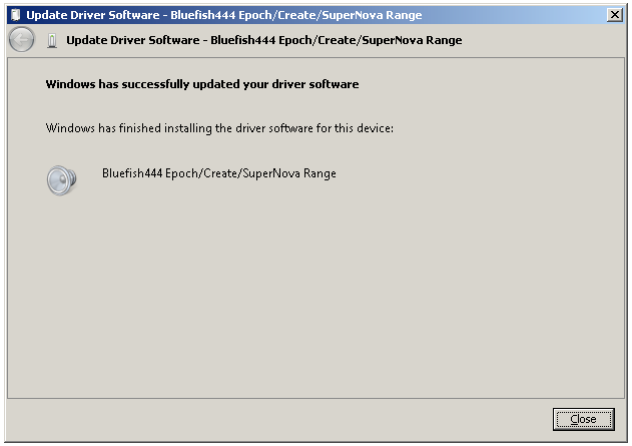
Select “Next” to install the selected driver file.



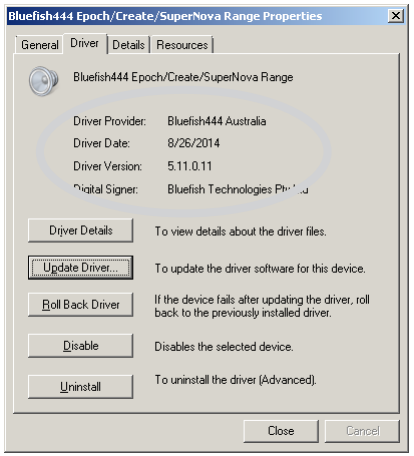
Bluefish driver / - cont...



The “Installing driver software” information dialog will appear while Windows is installing the new driver



Followed by a confirmation dialog that the driver has been installed.



At the driver Properties window, confirm the new driver version and date.

Remember: Bluefish driver and firmware must match so be sure the firmware installed is the same version accompanying the selected driver.

9.23 Restore factory image

Cinedecks run Windows 7 embedded from a separate SSD system drive. Each system ships with a USB restore disk. This Linux bootable disk includes Clonezilla and several image files with the complete Windows OS and Cinedeck software. *This USB should be kept accessible and updated in the event the system must be restored.*

You should always copy any system updates to a folder on the USB key and it is a good idea to download updated image files a few times per year. This is usually done after a major update ships. See "9.24 Update a USB restore key" on page 323.
If the restore USB is damaged or misplaced, a replacement can be purchased or you can download the files needed to create a new restore key. See "9.25 Create USB restore key" on page 324.

Regular restores are recommended for facilities to clean machines which are rented out or are otherwise often not under their direct control. Restoring is also useful for troubleshooting. If a machine has an issue which cannot be quickly diagnosed, it is often faster to restore than to search. Generally, if the problem persists after the restore, it is more serious and support should be contacted. See "Contacting Cinedeck" on page 2.
Before performing a full restore, please save the log files, dump files to a safe place and note any system changes you have made to your Cinedeck so you can recreate them after the restore.

There are generally two steps, perform the full base restore and then install the most recent version.

A - Restore your Cinedeck:

1. Shut the deck down and remove / disconnect any media drives.
2. Insert the Cinedeck restore key into a rear USB port and connect a keyboard to a rear USB port.
3. Power on the Cinedeck and;

- For RX3G, keep tapping the F7 key until you enter the startup menu.
- For MX or ZX, keep tapping the F8 key until you enter the startup menu.

4. Select the USB flash drive (not the one with UEFI in the name), press enter.

- The restore process is fairly automated and takes about 10 minutes.
- Some systems may present additional prompts. To confirm the restore, type "y" and press "enter".

5. When finished, the screen will display "press enter to continue". Press enter.
6. Select 0 to power off the system. remove the restore USB stick.
7. Power on the Cinedeck and the system has been restored.

B - Install any recent software update. See "9.16 Updates" on page 302

9.24 Update a USB restore key

Updating a restore key is simply a matter of replacing a few image files however, they are several gigabytes in size so should be downloaded with a proper FTP application such as Filezilla when time is not of the essence.

Ideally the following will be done on a Windows PC or directly on the Cinedeck.

For the FTP location of the current restore disk updates for your system, contact Cinedeck.
See "Contacting Cinedeck" on page 2

For RX;
- Download XPE-full.zip to the local computer, preferably using an FTP application such as Filezilla.
- Extract the contents of the zip file to a convenient location such as the desktop.
- You should now have a folder named "xpe-full" containing upwards of 6GB.
- Insert the Cinedeck restore USB.
- Navigate to home\partimag\ and delete the folder "xpe-full" on the USB.
  If desired, you can first copy the older files to a folder on your computer for safe keeping.
- Copy the new "xpe-full" folder you extracted earlier from the downloaded zip file to home\partimag\ folder on the USB.

MX and ZX use the same source files;
- Download the "MXRestore.zip" to the local computer, preferably using an FTP application such as Filezilla.
- Extract the contents of the zip file to a convenient location such as the desktop.
- Delete the MXRestore folder at the root directory of the MX or ZX Restore USB stick.
  If desired, you can first copy the older files to a folder on your computer for safe keeping.
- Copy the new MXRestore folder to the root directory of the MX or ZX Restore USB.

Once the files are copied, you can safely eject the USB from the computer and if needed, proceed to "9.23 Restore factory image" on page 322.

9.25 Create USB restore key

The USB restore key is a Linux boot environment which contains several GB of Clonezilla image files for restoring a Cinedeck system. New restore disks can be purchased or created as needed.

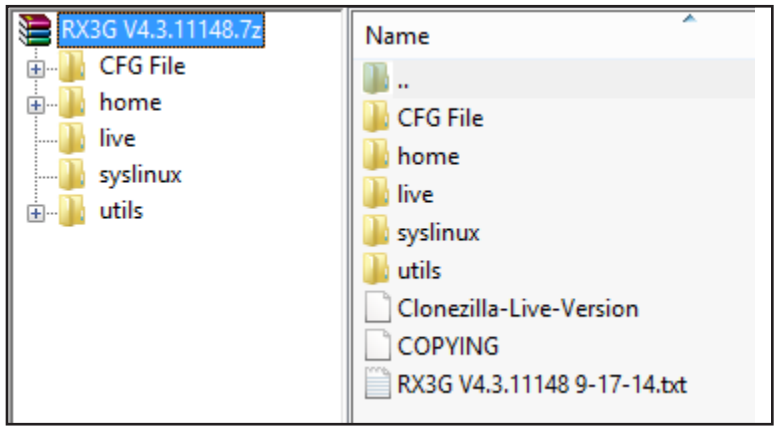
To create a new USB restore key, two sets of files are required, the latest system image files for your Cinedeck model and the USB boot files. These files can be downloaded separately so if you already have recent image files, all you need is the boot files download. If you need everything, you can download the full restore zip. Note that the image files are several gigabytes so should be downloaded with a proper FTP application such as Filezilla and when time is not of the essence.
For the FTP location of the restore disk updates for your system and the USB boot files, contact Cinedeck.
See "Contacting Cinedeck" on page 2

Before starting, you need at least a 16GB USB disk. *Note; some USB memory sticks will not be recognized at boot time so while not guaranteeing compatibility, you should first test the USB disk with a Cinedeck.*

1. Shut the deck down and remove / disconnect all media drives.
2. Insert the new flash drive into a rear USB2 port and connect a keyboard to a rear USB port.
3. Power on the Cinedeck and;

- For RX3G, keep tapping the F7 key until you enter the startup menu.
- For MX or ZX, keep tapping the F8 key until you enter the startup menu.

4. You should see two or three drives listed, the internal OS SSD and the USB flash drive which will usually be listed with its brand name and possibly again with "UEFI" and the brand name.
5. Presuming the drive was listed, it should work as a restore key.

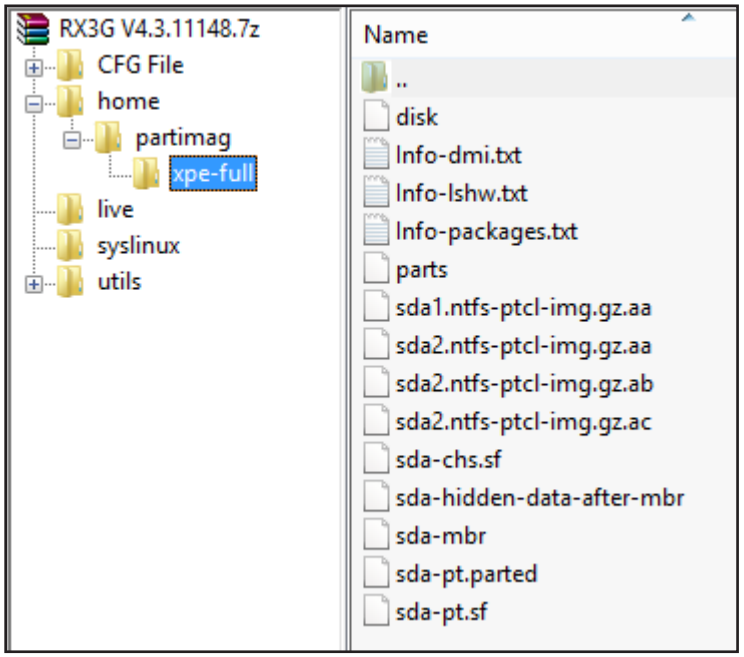


Creating the RX USB restore key:

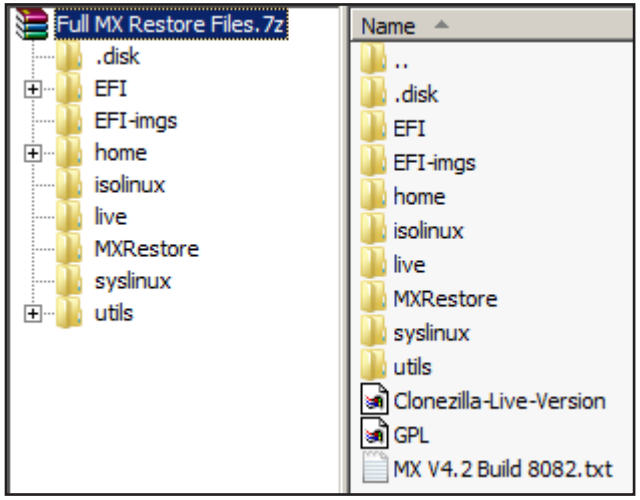
The following should be done on a Windows PC or directly on the Cinedeck.

- Extract the contents of the zip file(s) to a convenient location such as the desktop
- Format the 8GB+ USB as fat32. Use quick format.
- If using the full restore zip for RX3G, you will have 5 folders and 2 or 3 files, similar to the image at the left. (MX/ZX files and folders are slightly different)
- Copy everything over to the USB stick.

Create USB restore key / - cont...



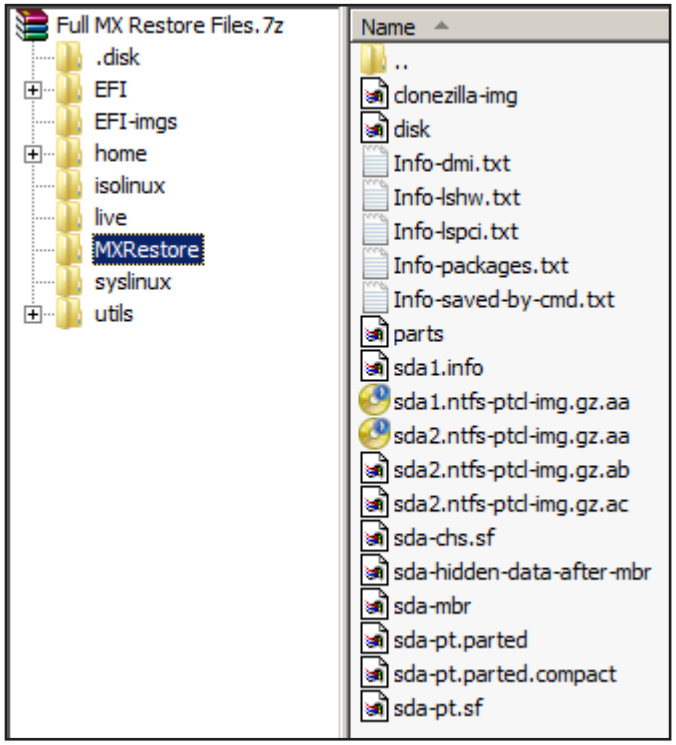
• If you have separate zip files for the "xpe-full" folder and the "restore usb files", copy the "restore usb files" folders and files to the USB key.
• Create a "home" folder on the USB key and inside the "home" folder, create a "partimag" folder.
• Navigate to home\partimag\ on the USB stick and copy the "xpe-full" folder to there.
• When finished, you should have a structure similar to the image at the left.



Creating the MX ZX USB restore key:

The following should be done on a Windows PC or directly on the Cinedeck.
• Extract the contents of the zip file(s) to a convenient location such as the desktop
• Format the 8GB+ USB as fat32. Use quick format.
• If using the full restore zip for MX or ZX, you will have 9 folders and 2 or 3 files, similar to the image at the left.
• Copy everything over to the USB stick.

Create USB restore key / - cont...



- If you have separate zip files for the "MXRestore" folder and the clonezilla "boot files", copy the "boot files" folders and files to the USB key.
- Copy the "MXRestore" folder to the USB.
- When finished, you should have a structure similar to the image at the left.

Making the USB bootable:

After the folders are copied over, you need to make the USB bootable using the Command Prompt:
To open the Command Prompt on a Windows 7 or 8 machine, click on the Windows "Start" button.

In Windows 7, type "cmd" in "search programs and files". Under programs, cmd.exe will appear.
In Windows 8, type "cmd" and "Command Prompt" should show in the search list.

Right click "cmd.exe" or "Command Prompt" and select "Run as Administrator." (This is true even if you are already logged in as an administrator)

- Type: D: (or whatever the USB key drive letter is) and press Enter (this selects the USB drive)

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\system32>f:

F:\>
```

Create USB restore key / - cont...

- Type: CD UTILS\WIN32 and press Enter (this changes the current folder)

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\system32>f:

F:\>cd utils\win32

F:\utils\win32>
```

- Type: MAKEBOOT.BAT and press Enter (this runs some commands to make the USB bootable)

```
-----------------------------------------------------------------
This batch file will prepare drive F: for boot using syslinux!
-----------------------------------------------------------------


--------------------- WARNING!: ---------------------------------

Run this file from your portable USB device ONLY.
Running this file from your hard drive may overwrite your current
Master Boot Record (MBR) and render your Windows Operating System
un-bootable. YOU HAVE BEEN WARNED!

This batch file is offered in hopes that it will be useful and
comes with absolutely no warranty. USE AT YOUR OWN RISK!

-----------------------------------------------------------------


Press any key to make drive F: bootable
or close this window to abort...
```

Press any key and follow the instructions to make the USB bootable.

```
~~~~~~~~~~ Congratulations ~~~~~~~~~

The hidden file ldlinux.sys has been installed
Your F: drive should now be bootable.


Press any key to exit this window!
```

Once the procedure is done, close the command prompt window and safely eject the USB from the system.

Continue to "9.23 Restore factory image" on page 322 to restore your Cinedeck with the new restore key.

9.26 Create system image

The Cinedeck USB key can also be used to create a new image of your system as you have it set up and save it to the USB. This can be quite useful if you have, for example, installed SAN software or made other permanent changes to the system which you would like restored if a clean system restore is required.

The procedure is essentially the same as restoring the system from the USB however the active Clonezilla automation script needs to be changed.

The Cinedeck system image must be deleted from the USB drive so it should be saved elsewhere:
For RX, copy the "xpe-full" folder from home\partimag\ on the USB to a safe location on your computer.
For MX and ZX, copy the "MXRestore" folder from the USB drive to a safe location on your computer.

Navigate to the syslinux folder on the USB
For RX, rename "syslinux.cfg" to "syslinux deploy.cfg". Rename "syslinux save.cfg" to "syslinux.cfg".
For MX/ZX rename "syslinux.cfg" to "syslinux deploy.cfg". Rename "syslinux save.cfg" to "syslinux.cfg".

- For the MX USB, delete the MXRestore folder.
- For the RX USB, delete the "xpe-full" folder from home\partimag\.

As with a restore, to create a new image of the existing system drive you boot the deck with the Restore USB:
1. Shut the deck down and remove / disconnect all media drives.
2. Insert the USB flash drive into a rear USB2 port and connect a keyboard to a rear USB port.
3. Power on the Cinedeck and;
- For RX3G, keep tapping the F7 key until you enter the startup menu.
- For MX or ZX, keep tapping the F8 key until you enter the startup menu.
4. Select the non "UEFI" version of the USB drive.
5. After the system boots, you will be prompted to save the image to USB. Type 'y' for yes and press enter. Actual OS size and drive speeds vary but it takes about 20 minutes to save a system image to USB.

After the image is saved you need to set the USB flash drive script back to deploy mode.
6. Go to the syslinux folder on the USB and rename the syslinux.cfg file to syslinux save.cfg
7. Rename syslinux deploy.cfg to syslinux.cfg

Referring to the folder names above, its a good idea to also save your custom image to another drive.

10.0 FAQ & Features

10.1 FAQ > Features

Questions are often asked about what certain functions are or do so included as part of the FAQ is an index and description of each feature available on Cinedeck systems. (Note: not all features are available on all systems.)

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10.2. What is a codec:

Codecs, wrappers and bit-rate all work hand in hand but they are three distinctly separate things. For our purpose in video, a codec is generally a compression algorithm with which video is processed to reduce the size of the resulting video file, while maintaining a certain quality level. Examples of Codecs are Avid DNxHD, Apple ProRes and MPEG. Quicktime and MXF are not codecs, they are wrappers, which are discussed in the next paragraph. Each codec has its advantages and disadvantages. Some like JPEG 2000 maintain very high image quality at relatively low bit-rates and file sizes but are computationally challenging, requiring

significantly more processing power than others. A codec like XDCAM HD has quite a low data rate but its LongGoP structure will not always render motion as well as some would like. Just as important is that not every codec is supported by every video system so it really is critical to assure that the correct codec is selected for the planned workflow.

10.3. What is a wrapper:

File wrappers are probably the most misunderstood of these three but simply put, a wrapper is a container which carries something. Examples of wrappers are AVI, MOV (Quicktime), MP4, MXF, etc. The container can be equated as the can which contains some soup and like a soup can, the wrapper includes information identifying the ingredients or, in the video world, the essence. So MyVideo.mxf might contain a track of video and 4 tracks of audio. Along with that "essence" will be information identifying what that video and audio essence actually is. It could for example be XDCAMHD 50Mbit video with 24bit PCM audio. Of course, there could be timecode data and a slew of other bits of information related to the contents. Just like codecs, not all systems support all file wrappers so while you might select a codec which is supported, if the wrapper is not supported, your system has no way to dig in and get to that video and audio content. Again, it is important to know in advance what the preferred workflow is.

10.4. What is bitrate/quality:

Bit-rate is the rate data is used to capture content and can be expressed in several ways; Mbit/s (megabits per second) and MB/s (megabytes per second) are the most common[1]. Generally a higher bit-rate will mean higher quality but because of compression, it is absolutely possible to achieve the same visual quality at different data rates. It should also be noted that most video compression schemes are lossy, meaning that visual data is thrown away in the compression process which can to some degree visually degrade the image. There are also some codecs like JPEG 2000 which offer a "mathematically lossless" quality meaning that, when compared to an original "uncompressed" version of the same image, there is no difference between the two even though one file is smaller. There are many opinions as to what quality level is acceptable but it comes down to balancing factors like visual quality, performance and storage space, which is why it is again critical to know what the requirements are.

1 - To convert megabits per second to megabytes per second, multiply by .125

10.5. 4K & UHD:[1]

Cinedeck MX and ZX[2] support 4K YUV (4096x2160) and UHDTV-1 YUV (3840x2160) recording while simultaneously writing HD master files, proxy files and streamable H.264 files, all with associated metadata and the file naming you choose, to smooth the process of match-back between the various files. RX3G and ZX20 support 4K/UHD playback only. **{Final development and release of RAW recording is on hold}**

- MX supports one 4K YUV or one UHD YUV source and delivers;
  - 4K / UHD files
  - HD master files
  - HD Proxy files
  - Streamable h.264 files which can be delivered live by a streaming server

- ZX40[2] and ZX45 support one 4K YUV or one UHD YUV source and deliver;
  - 4K / UHD files
  - HD master files
  - HD Proxy files
  - Streamable h.264 files which can be delivered live by a streaming server
- RX3G and ZX20 support a single playback channel for 4K YUV or UHD YUV

(note: In some instances, internal recording of full 4K and UHD may require setting SSDs into a RAID configuration. Additional information will be available with the 4K releases.)
1 - Optional on all systems. Support on ZX20 and RX3G is for 4K / UHD playback only up to 30P
2 - ZX40 and ZX45, ZX20 supports playback only of a single channel of 4K / UHD up to 30P

10.6. AES Audio:

RX3G (and newer) recorders can accept 8 AES audio channels per input pair with the ability to selectively toggle on & off and map the destination channels. All 8 channels can be recorded by both video inputs of that channel pair but the sources are currently not routable to other channel pairs. MX has an optional additional 16 channels of AES which can be activated in an upcoming release for a total of 32 AES inputs.

10.7. Analog Audio:

For legacy analog audio situations, probably the best and often lowest cost solution is to use an analog to digital AES adapter. There are many on the market but one example is the AJA ADA4 4-Channel A/D & D/A Converter. Cinedeck (RX and newer) decks also support the Scarlett 2i2 USB audio interface from Focusrite which provides two mic/line balanced XLR / TRS audio inputs through high quality preamplifiers. For scratch audio tracks, RX can also accept two channels of unbalanced audio via the rear line level mini jack connection. Additional USB audio adapters with different input choices are being considered for inclusion in the future.

10.8. Analysis Tools:

Cinedeck (RX and newer) decks provide digital peak audio meters, adjustable monitor levels and monitor channel selection as well as a complete set of video analysis tools including;

- Waveform
- Vector scope
- Histogram
- 1:1 pixel picture zoom
- Adjustable video peak detect
- Focus assist
- User selectable aspect ratio, safe area and grid overlays.

10.9. AS-02, AS-11 / DPP:[1]

Cinedecks support several types of Op1A file wrapping. These profiles are added to and adjusted as our customer requirements change.

- AS-02 and AS-11 are MXF Op1a file format recommendations from AMWA - the Advanced Media Workflow Association.
- AS-02 is specifically oriented towards addressing “the problem of having a common file format in a facility that has to handle many input formats and make many output formats.”
- AS-11 was further developed to specify “a vendor-neutral subset of the MXF file format to use for delivery of finished programming from program producers and program distributors to broadcast stations” while the UK-DPP (Digital Production Partnership) has designed a set of delivery standards, procedures and technical requirements, which conform to the AS-11 v1.0 specification and are constrained in the UK DPP AS-11 shim. Cinedecks running version 4.3 and later software can record AS-02 and AS-11 / DPP compliant MXF content and more recent versions of the software provide a complete DPP metadata editing and import interface.

1 - Optional on ZX

10.10.Assemble/Pause Rec:

The Cinedeck user interface from later 4.5 releases can very closely mimic and in some ways surpass the assemble editing capability of tape systems. Because of this, Cinedecks are very applicable for tasks such as Live-to-File and compilation recording. All of these Cinedeck recordings result in a single flat file.

- With “Pause Record”, recording can be temporarily halted and resumed as needed to combine various content into one file. The transitions or edits between sections are clean like an assemble edit. During recording, the operator can press the ‘Pause’ button whenever needed. Recording does not continue but the file remains open. Pause can be released as needed and when the full event has concluded and the user selects Stop, the file is finally closed.
- “Pause & Seek” is virtually identical to assemble editing. It is based on “Pause Record” but has the added ability for setting an edit-in-point to start the subsequent recording at a timecode point within the already existing content. “Pause & Seek” can be used on several channels simultaneously.
- While not strictly “assemble recording”, editing to a blacked file is similar to working with a blacked tape but there is the added advantage of having full play access to the file while recording is occurring. Particularly the ability to shuttle or scrub backwards and forwards and review any section, provides complete confidence during a recording.

10.11.Audio Delay:

Version 4.3 and newer includes audio delay in milliseconds which can be added {per channel} to SDI, AES and Analog audio sources. Each channel can be delayed up to 999 milliseconds.

10.12.Audio Mapping:

Version 4 added the ability to selectively toggle on & off and map the destination channels of incoming audio i.e., a system could be setup to record incoming channels 1 & 2 and 7 & 8 to channels 1, 2, 3 & 4. Audio mapping will be enhanced in future versions of the system software.

10.13.BNCs:

For traditional infrastructure, Cinedecks are connected using industry standard HD/SD-SDI cabling allowing the decks to be easily integrated in place of standard video recorders.

10.14.Burn-in:

Later versions of Cinedeck 4.5 provide a broad selection of text metadata elements that can be burned into the video image of a file while its recording. Data selection can include any combination of user selectable timecode, system time and date, GPS coordinates*, file name, frame numbers and user defined text. The position, size and color of each element is adjustable.

*** GPS coordinates require the use of a Garmin model 18x GPS USB receiver**

10.15.Channel Overview:

Version 4.1 added a full 'Overview' of the complete state of each channel on a system with the ability to import, export and copy settings between channels. The channel overview is also the access point to project manager.

10.16.Character Overlay:

Cinedeck (RX and newer) decks provide control of character out as an overlay on the user interface and the SDI video output and or as a burn-in to the encoded video with fully adjustable position, size and color.

- Channel overlays can be independently setup with different content, character styles, sizes, positions and colors. User selectable content can be included in the different super overlays such as audio meters, timecode, file name, transport status and user defined text.
- MX[1] has dual outputs for each SD/HD channel allowing simultaneous clean and character overlay output.

1 - Secondary outputs are optional on ZX

10.17.Closed Captioning:[1]

Cinedecks support recording and playback of CC Closed Caption data with any codec wrapped as MOV or one of the MXF Op1a profiles.

1 - Optional on ZX

10.18.Codecs Supported:[1]

Cinedeck RX3G (and newer) recorders currently support native SD and HD with the following codecs using a wide choice of bitrates (quality settings) and file wrappers:

- Apple ProRes
- AVC-Intra
- Avid DNxHD
- Avid JFIF
- VC-5 {Cineform} (optional)
- DPX
- DV
- DVCProHD
- H.264 (streamable)
- IMX (D-10 MPEG)
- JPEG 2000 (optional)
- XDCamHD
- Uncompressed

1 - ZX supports all codecs but generally ships with only user specified codecs

10.19.Color Depth:

All Cinedecks support true 8bit and 10bit inputs and recording.

10.20.Color Sampling:

All Cinedecks support YUV 422 sub-sampling and in some cases RGB 444 recording.

10.21.Confidence Record

High end VTRs provide a layer of assurance with their confidence record mode, the ability to display a playback signal off-tape while recording. When using Cinedeck's Insert Edit capability, it is also possible to leverage Total Confidence Record. Total Confidence Record means you can fast forward, rewind, play and scrub, any portion of a file, on any player, while still recording to that file. Playback can be on another Cinedeck channel or via other file based applications such as QuickTime Player, VLC media player, etc. This allows you to check and double check, any part of a file, anytime, making the QC process much more efficient.

10.22.Cross Conversion:[1]

Version 3 Cinedecks have a wide selection of up and down resolution conversion at the input and output which can be combined to provide full cross conversion i.e., up convert SD to HD on record or down convert HD to SD for monitoring, etc. Cross conversion is limited in version 4 and newer versions to some specific exceptions. Inclusion of additional cross conversion capability is being addressed on a case by case basis.

1 - Optional on ZX

10.23.Edit While Record:

See "Growing Files:1" on page 336

10.24.EDL Auto-record:[1]

Each Cinedeck channel (RX and newer) supports auto-record through the use of a simple ASCII text EDL to control the starting and stopping of recording events based on an incoming timecode. Version 4.3 enhanced EDL record with deck control providing tape transport control during auto-record from a VTR. Included in the Cinedeck interface is an EDL editor for creating and modifying EDLs for each channel. Additionally, Cinedecks running the latest 4.3 version or later support importing CMX 3600 EDLs.

1 - Optional on ZX

10.25.Embedded Audio:

RX3G (and newer) recorders can accept 16 SDI embedded audio channels per input in a single pass. Additionally, when a file is created with space allocated, the decks support up to 32 channels of audio in a single file. Audio content can be inserted into the allocated audio tracks at ant time.

10.26.External Reference:

Cinedeck (RX and newer) decks accept external house reference (Tri-Level sync or Black Burst).

- Cinedeck MX and the 4 channel ZX models are designed to accept external LTC and house reference for each pair of channels so you can optionally dedicate each channel pair to different tasks.
- All decks primarily utilize an 'Auto' mode where internal reference is used. If an external reference is detected, internal reference is overridden.

10.27.File Naming:

Cinedeck version 4 and later provides an extremely flexible and powerful project based setup and naming system which allows the integration of user entered text and real-time data (wildcard variable substitution) such as the current time or starting timecode in file names. This system allows users to generate virtually any file name and folder structure.

- There are no Cinedeck restrictions on folder locations or the depth of nested folders.
- Alternatively, an already existing destination folder can be navigated to and selected per encode.
- The on-screen keyboard or a USB keyboard can be used along with copy & paste for user entered text.
- Easy to use template buttons for the real-time variables are available via the on-screen keyboard.
- Several user created lists can be used for quickly changing name elements during production
- Multiple user created project-based and global variables can also be used in file and folder names.

10.28.Formats:[1]

Cinedeck RX3G and newer decks can record and play the following formats:

- 2K (2048 X 1080) - 23.98, 24, 25, 29.97, 30, 50*, 59.94*, 60*
- 1080i (1920 X 1080) - 50, 59.94, 60
- 1080i (1440 X 1080) - 50, 59.94, 60

- 1080p - 23.98, 24, 25, 29.97, 30, 50*, 59.94*, 60*
  RX3G and ZX20 record one channel at 50/60p
  MX and ZX40 record two channels at 50/60p
  ZX45 can record four channels at 50/60P
- 720p - 50, 59.94, 60
- NTSC - 23.98, 59.94
- PAL – 25, 50
- MX and ZX support recording 4K YUV (4096x2160) and UHDTV-1 YUV (3840x2160) from quad 2K or quad HD sources, for example from a Sony F55 camera.
  MX and ZX40 record one full 4K or UHDTV-1 channel up to 30p
  ZX45 records one full 4K or UHDTV-1 channel up to 60p
  RX3G and ZX20 support one channel of 4K / UHDTV-1 playback only up to 30p

  1 - 4K and UHDTV-1 YUV are optional

10.29.Gang Mode:

Cinedecks (RX and newer) running version 4 and later, allow the user to easily gang together two or more internal channels from the user interface for simultaneously triggering record and/or playback. To reduce the strain on spinning disc file systems, these decks also support a user defined staggered gang, allowing channels to be triggered sequentially with a specified time delay instead of simultaneously.

10.30.GPS:

All Cinedecks accept data from an 'off the shelf' Garmin model 18x GPS USB receiver and can record the data with the incoming video and audio and or burn the data into the video image.

10.31.Growing Files:[1]

(Also known as "Edit while record") - Support on Cinedeck (RX and newer) decks for growing files is available from release 4.3 with "QuickStart" MOV and Op1A wrappers and is being refined. In Adobe Premiere, XDCamHD Op1A can be recorded to a destination which is accessible by the edit system and content can be imported, refreshed and edited while recording is still underway. Final Cut Pro growing files support depended on a discontinued plug-in. Growing files support in Avid systems requires a 3rd party intermediary system such as Medway from Marquis Broadcast. The editing of live recordings is currently only supported when external edit systems are used and is not supported by AMA (Avid Media Access). Support for editing of live recordings by the Cinedeck playlist manager will be added in a future release.

1 - Optional on ZX

10.32.H.264:[1]

Cinedecks provide the capability to encode h.264 at bitrates and frame sizes appropriate for viewing on iPhone, iPad, full screen and others. From version 4.3, RX and newer models offer streamable H.264 files as well. Custom profiles can be implemented by Cinedeck at the customers request.

1 - Optional on ZX

10.33.I-Frame & GoP:

Cinedeck (RX and newer) decks support I-Frame recording as Uncompressed, DNxHD, ProRes and more. Additionally Cinedecks support Long GoP recording with XDCamHD and h.264 at various bit rates.

10.34.Insert Editing:

Simple, replacement of video and or audio in an existing file, similar to a traditional tape-to-tape insert edit, can be done with ProRes, DNxHD, AVC-Intra, JPEG 2000 and XDCAM HD content wrapped as MXF OpAtom, Op1a or MOV files. Inserts can be performed directly from non-linear editors such as Avid Media Composer and Final Cut Pro, using the same procedures as if editing to tape. Directly on the Cinedeck, users can insert a live source into a file or perform frame accurate inserts of one file into another. All of these processes will often be more efficient than recreating the entire original destination file.

Additionally, pre-stripped or blacked files (Cinedeck VMM - Virtual Mastering Media), can be created in advance and used as an insert edit destination for recording or editing in a non-linear fashion. These black files can be recorded into while providing full random play access on another Cinedeck channel or they can be played with a third-party viewers such as QuickTime or VLC Media Player. All Cinedeck files, including pre-striped black files, can support up to 32 channels of audio.

10.35.Interplay Check-in:

When utilizing Op1a and MOV file wrapping, Cinedeck (RX and newer) recorded content can easily be checked into an Avid Interplay environment using Medway from Marquis Broadcast. Medway can automatically check content in or users can manually select specific clips or sub-clips to process. Additionally, Cinedeck expects to have a direct Interplay check-in option available in an upcoming release.

10.36.IRIG Timecode:[1]

Cinedeck recorders (RX and newer) can accept an external IRIG-B timecode input and display the data on screen and optionally burn the data into the recorded video while recording the data with the incoming source.

1 - Optional on RX & ZX

10.37.IT & Connectivity:

Cinedecks can have a variety of IT connections including; USB2, USB3, eSATA, VGA, DVI, HDMI, Ethernet and Display Port. MX and ZX also include a PCIe slot for optional 8Gb, 10Gb and 16Gb networking adapter cards and direct attached storage.

All ports are not available on all decks

10.38.Jam Sync:[1]

The ability to momentarily apply a running timecode source to a deck, have it remembered and used as the record timecode.

1 - Optional on RX & ZX

10.39.LUTs:

Cinedeck (RX and newer) recorders provide support for 3D LUTS (Look-Up Tables) which are particularly applicable to RAW and Log recording environments.

- Traditional video cameras process the video signal all the way through the camera path from the sensor(s) to the BNC output or recording. The very nature of that processing throws data away and permanently alters the images in order to fit certain specifications and limitations which put restrictions on the ability to modify the images later.
- Cameras that output a RAW or S-Log signal are delivering images with reduced pre-processing to realize the highest quality images possible and allow much greater flexibility in post-production but the native camera output looks flat and lifeless.
- A LUT is a filter, generally created in a color grading application, which is loaded and applied to an image to alter and refine its appearance in terms of color, contrast, etc.
- With Cinedeck, the on-board display can have a non-destructive, real-time LUT loaded and applied to the images so the viewers (Director, Producer, etc.) will have a pretty good idea of what they are really working with. Additionally, software versions after 4.3 support recording of proxy and H.264 files with a LUT applied to the recorded image.
- The 4K release allows the LUT to be optionally applied to the SDI output for “video village” monitoring and additionally provides the ability to make proxy recordings with the LUT applied.

10.40.Master & Proxy:[1]

MX and ZX can record all (2K-HD-SD) inputs with the users’ choice of available master and proxy codec (for example ProRes HQ and ProRes proxy or uncompressed with H.264 proxy) while RX3G can record two sources with a user selected master and h.264 proxy codec.

1 - Workflow package selection determines codec availability on ZX

- By sending the same signal to multiple channels, all Cinedeck (RX and newer) recorders can be configured to record a source with two or more codecs of any sort such as; uncompressed, ProRes, AVC-Intra and JFIF.

10.41.MOV Flexibility:[1]

Cinedecks provide support for recording content as MOV files with a choice of standard interleaved audio pairs, mono audio tracks or MOV wrapped video accompanied by audio encoded in separate WAV (wave) files.

1 - Optional on ZX

10.42.Non Cinedeck Clips:[1]

Cinedecks can play content created on many systems such as Sony SxS, Panasonic P2, GoPro and nanoFlash (including the non-standard nanoFlash XDcamHD 100). Playback of QuickTime files with mono audio channels and support for playback of QuickTime files generated by Avid and Final Cut editing systems is also supported.

1 - Workflow package selection determines codec availability on ZX

- Utilizing external readers, all Cinedecks can read solid state card media such as SxS and CF.
- MX has SxS, P2 and CF card readers built-in.

10.43.Path Override:

When continuing work on a current project and especially when utilizing network storage, it is common to have an existing folder structure where new content should be placed. Setting the appropriate destination folder can be pre-programmed in Project Manager but often easier is using “Path Override” from the encoder settings pages. This feature provides a simple method for navigating through a drive to click and select the required destination folder for new recordings.

10.44.Play Multiple Clips:

Cinedeck (RX and newer) decks can play an entire folder of clips with a single click and provide an easy way to select one or more clips to play sequentially. In addition, playlists can be created and edited that contain multiple clips and/or sub-clips.

10.45.Play While Record:

Play While Record, what some might call delayed playback or true confidence recording, is achieved by leveraging a preallocated file space or blacked-file. A file with the users selection of format, codec, duration, etc., is created and then recording is done by inserting the needed video and audio into the file. Playback of the file is completely flexible in that any portion can be accessed at any time.

10.46.Playback:

The I/O channels of Cinedeck RXB and newer are full duplex, allowing independent control and activities on each channel. They support multiple playback/record channels which, as of version 4, are capable of playing or recording any content at its original resolution and frame rate, independent of what the other channel(s) are playing or recording.

(note: The previously available RXC is designed for frame synced/3D inputs and does not support full duplex control)

10.47.Playlisting:

The Playlist Manager available from version 4.2 is effectively a basic non-linear editing interface built into the Cinedeck environment.

- Playlisting allows adding clips from any source folder to a new or existing playlist.
- Clips can be used in their entirety or can be trimmed using in and out points to restrict playback to a portion (sub-clip).
- Clips encoded with different codecs can be mixed but need to be the same format, color depth and frame rate, for example; all 1080p 23.98 10bit.

- Playlists support TV standard sized still images and still image sequences (PNG, JPG. BMP).
- Single or multiple clips can be reordered.

10.48.Presets:

Version 4 and later of the Cinedeck interface includes an expanded capability for saving and restoring user preferences and project settings in an XML format. Version 4.5 and newer moved to being completely project centric with settings saved and recalled for whichever channels are assigned to a projects. Projects can be saved, imported and exported as needed.

10.49.Projects:

All Cinedecks use a project based interface design for managing setup but in later version of 4.5, a completely project centric environment was introduced. All settings including folder and file naming, codec, wrapper, timecode, etc. are saved with a project. Projects can be set and saved, imported, exported and recalled for a single channel or multiple channels. As part of a projects settings, particular emphasis is put on an extremely flexible and powerful naming system which allows the integration of user entered text and real-time data.

10.50.Project Locking:

Version 4.5 and later versions of the Cinedeck interface support project locking. A locked project prevents users from accidentally changing any operational settings except destination drives. A locked project also still allows users to create, edit and select name elements such as scene names. Projects can be intentionally unlocked to allow full access to all settings.

10.51.Pro Tools:

The Cinedeck environment released in late 2015 added support to allow Pro Tools users to directly insert audio into video files using a three-point-edit or by chasing and punching-in as they did with tape. Particularly unique is the final deliverable file can contain up to 32 tracks of audio.

10.52.RAID Attached Drives:

Cinedeck MX and ZX have an available PCIe slot for the addition of network adapter cards as well as custom HBA (Host Bus Adapter) cards to support high-speed local attached RAID storage such as the removable RAID modules from Dulce Systems. The Dulce Systems HBA is essentially a PCIe extender enabling fast access to multiple terabytes of removable storage for Cinedeck recordings and also allowing the Dulce drive chassis to contain a network adapter to provide the Cinedeck with fast 8Gb or 10Gb network connections. In addition, although not needed for normal operation, internally mounted SSDs can be combined into one of several RAID configurations if desired.

10.53.Record Time:

For practical purposes, record time on Cinedeck recorders is only limited by the size of the destination drive so for example, when recording to a SAN or NAS, record time could be calculated as days or weeks instead of minutes or hours. All Cinedecks also support 'roll-over' recording, utilizing two drives for a single recording.

10.54.Redundant Files:

Each Cinedeck RX3G or MX input can be written as master and proxy file(s) and the decks can write redundant files per input/encoder to multiple destinations, providing the media and connection support the selected bit rate and I/O needs. For example, a 4 channel MX can write a ProRes master and proxy file for each input giving you four primary masters and four primary proxies. Activating redundant record can provide up to four additional or secondary masters and four secondary proxies for a total of sixteen files. Redundant recording can be set on a per-encoder basis.

10.55.Redundant Power:

Cinedeck (RX and newer) decks are supported by redundant power sources with auto switching between power sources when one is disabled or removed.

- Cinedeck RX has two redundant DC inputs and is supplied with two AC>DC power supplies.
- MX and ZX have two redundant AC power supplies.
- MX and ZX will sound an audible alarm when only one power supply is active.

10.56.Remote & Control:[1]

Cinedecks (RX and newer) provide many options for remote control;

1 - RS-422 is optional on ZX

- All RX and newer decks allow independent RS422 control of each channel.
- RX and newer decks can be the master or slave in a RS422 relationship, allowing control in either direction.
  - With Cinedeck as master over a tape machine, the user is presented with a full array of controls and status indicators from the slave deck. Recordings can be made on either machine, i.e. using the Cinedeck as the source or as the recorder.
  - As slave, a Cinedeck can be controlled from a partner machine or via a separate control panel.

    (note: Cinedeck models with RS-422, manufactured before Dec 2014, require a RS-422 crossover cable for master mode. Slave mode requires a straight through RS-422 cable. Newer Cinedeck models come with bi-directional RS-422 ports.)
- Cinedecks utilize the Grass Valley **AMP protocol** for control over IP by external devices such as asset management systems and switchers.
- **VDCP** is supported on decks running version 4.5 and newer.
- Up to 24 channels of RX and or MX can be simultaneously managed using the IP (AMP protocol) based Cinedeck MCC, multi-machine control interface. **(As of mid 2015, MCC compatibility has been reduced - a more capable remote interface is planned)**

- All Cinedecks can be controlled using standard VNC remote access software such as Teamviewer which provide the full user interface at a remote workstation in the next room or miles away.
- Cinedecks can be driven using several different USB control devices while MX has a built-in tactile control panel. The MX tactile control panel can optionally be added to the front panel of ZX.
- All Cinedecks can have an external data display, USB mouse and keyboard attached so a common setup is to connect the decks into a KVM switcher for central control of multiple machines.

  (note: The KVM system must provide DDM (Dynamic Device Mapping) which maintains the connection to all connected devices, regardless of the active device.)

10.57.Roll-over Recording:

All Cinedecks support 'roll-over' recording where two media (identical or dissimilar) can be designated and combined as 'primary' and 'secondary' record destinations, significantly increasing record time.

10.58.Scene Names & Lists:

All Cinedeck versions have some support for scene names. From version 4.5, scene names could be created in advance and easily edited and cycled through, to quickly respond to on-set production requirements. The more recent 4.5 versions added multiple project-based user lists to accompany the scene and sub-scene lists, along with a selection of global wildcard options.

10.59.Scheduling:[1]

Cinedeck (RX and newer) decks support the scheduling of multiple recording events, up to twenty four hours in advance, allowing unattended activation on a channel by channel basis using the EDL function. Enhanced multi-event date & time schedules and an advanced scheduling interface will be developed in combination with an upcoming release.

1 - Optional on ZX

10.60.Segment Record:

Segment Record, also known as user-defined 'chunking', allows long recordings to be split into clip segments of shorter duration. During recording, each time the user specified duration is reached or the manual 'break' button is pressed, the current file is closed and the next segment file begins. Previous segments can be fully-accessed for playing and copying, etc. Additionally, breaking large recordings into smaller pieces allows content to be easily transferred to storage with file size limits such as DVDs or FAT32 drives. Each segment is automatically sequentially numbered.

10.61.Signal Generator:

Version 4.5 and later versions of the Cinedeck interface provide a multi-purpose signal generator for test image and tone generation. Test patterns, test pattern sequences, tone with breaks and solo tone for each channel can be used between channels as well as fed downstream for testing connected equipment.

10.62.Stereo - 3D:[1]

Later version 4.5 releases provide 3D recording allowing RX3G (and newer) recorders to use any supported codec. The various 3D display modes to be reintroduced in a later release include: Anaglyph Flip-Flop, and vertical/horizontal side-by-side viewing of 3D images.

1 - Optional on ZX
(note: RXC with version 3.5 supports 3D recording with the above noted display modes)

10.63.Storage Options:

All Cinedecks write video and audio recordings as files to low cost and commonly available non-proprietary 2.5" SSD SATA drives.

- Cinedeck SSD drives are mounted in removable, hot-swappable, dual drive cartridges or 'sleds'. (RX and newer)
- Additional sleds as well as portable and installable receiving chassis are available to enable easy 'sneaker-net' workflows.
- Currently, Cinedeck only recommend and support Samsung 840/850 Pro and EVO series SSD drives. All sizes are supported.
- For recording and playback, all Cinedecks can also utilize external USB* and / or eSATA* and / or network storage including NAS (network attached storage) and SAN (storage area network) systems requiring client software. Additionally, the Cinedeck operating system can be setup to support iSCSI file systems.
- Cinedecks are Windows 7 Embedded based so fully support SMB shares and client software is often available for SAN installations.
- Cinedeck MX and ZX have an available PCIe slot for 8Gb, 10Gb or 16Gb network cards as well as direct attached storage such as the drive arrays from Dulce Systems.

(*note: All external and network recording devices and plans should be extremely well tested before utilizing in a production environment.)
(*Drive assemblies of the same model from the same manufacturer can differ in firmware and internal hardware so successful tests are drive specific and as such do not guarantee successful recordings with other units.)

10.64.Telecine Control:[1]

With the advanced control option, each Cinedeck channel can be tethered with a Telecine such as the Spirit and the TimeLogic Controller for film to file transfers. The control system takes RS-422 control of both the Cinedeck and the film scanner to manage the ingest process, shuttle and cue the film and trigger recording of single clips, multiple clips as well as single "assemble edited" clips containing multiple film segments.

1 - Optional on ZX

10.65.Timecode:[1]

Cinedecks (RX and newer) provide internally generated timecode, can accept embedded SDI timecode or external 'LTC' and display the data on screen and optionally burn the data into the video of selected files while recording the data with the incoming source. IRIG-B timecode is also supported.

1 - IRIG support is optional on RX & ZX, Per channel pair timecode input is standard on ZX, Master timecode input is optional on ZX

10.66. Timecode offset:

Cinedeck versions 4.5 and newer support several timecode offset options. The main input timecode offset can be used to change or correct large timecode differences such as changing the hour of a source timecode from 1:00:00:00 hour to 7:00:00:00 or local time to GMT. There are also multiple fine timecode offset adjustments which can be made to each timecode source to compensate for small latency issues when using the Cinedeck with other devices. In addition, several special timecode modes are available for use with systems such as DVS Clipster and various non-linear editors.

10.67. Timecode Re-stripe:

Cinedecks with the Insert Edit option can re-stripe timecode in existing files, providing a way to reset the start time and change between drop-frame and non-drop-frame timecode.

10.68. Touch Display:

Many Cinedecks come standard with a 7” LCD touch display for viewing video and manipulating the user interface. All Cinedecks can have an external display attached for viewing video and manipulating the system. RX and newer recorders can be configured to use a Windows 7 certified HID compatible external touch display.

10.69. Transcoding:

The full duplex, independent channel control of Cinedeck RXB and newer recorders allows selecting content to play and simultaneously encode in any other format in real-time. For example, some uncompressed source content on a RXB could be transcoded in real-time, to AVC-Intra.

10.70. Upcoming Features:

- Avid DNxHR recording and playback
- Enhanced FIFO Loop Record / Time Delay
- Advanced scheduling and remote control
- Expanded transcoding
- Watermarking

10.71. Updates:

Cinedeck recorders are expressly designed to be enhanced with new features and functions, extending the life and relevance of the systems and Cinedeck delivers various major, minor and custom updates throughout the year. Additionally, the modular ZX allows selectively designing a system with the option of adding many current and new hardware and software features in the future.

- Updates come as *.exe files which are generally about 250MB, downloadable and usually take about two minutes to apply.

- Each Cinedeck ships with a system restore disc to use for resetting the deck back to a complete clean factory state. The re-imaging process takes about 10 minutes.
- Some optional and upcoming features may require the purchase of additional licenses.
- Cinedecks are designed from the ground up to allow system and interface customizations as well as completely custom OEM products. Being customer and engineering oriented means the Cinedeck engineering team is always open to and interested in, discussing specialized integration, additional features and feature modifications.
- Extended hardware warranties with priority support and software maintenance including all major updates are available to extend factory warranty and support beyond the first year.

10.72. UpRez SD > HD > 4K:[1]

Systems with the 4K/UHD YUV option have the ability to directly uprez HD source inputs to UHDTV-1 and 2K source inputs to full 4K. There are specialized real-time scaling algorithms which provide excellent results for uprezzing cell style animation and live action video sources.

All systems have the ability to selectively uprez SD to HD when playing SD files.

1 - HD to 4K UpRez included in MX & ZX 4K option.

10.73. VBR/CBR encoding:

Some codecs such as H.264 and ProRes support both CBR (constant bitrate) and VBR (variable bitrate) encoding. The Cinedeck interface allows selection of CBR or VBR on a per encode basis. CBR can be especially important in the Cinedeck environment as the Cinedeck insert editing function requires using CBR encoded source and destination content.

10.74. VMM - Master Media:

Cinedeck VMM or Virtual Mastering Media are pre-blacked or pre-stripped files that work exactly like a blacked tape. Content can be inserted anywhere, any time. These black files can be recorded into while simultaneously providing full random play access on another Cinedeck channel or they can be played with third-party viewers such as QuickTime or VLC Media Player. Creating VMM is faster than real time and you can build a VMM library, on disk, ready to use, making your work even more efficient. All Cinedeck files, including pre-striped black files, can support up to 32 channels of audio.

10.75. Warranty:

All Cinedeck recorders come with a first year “bumper to bumper” warranty which includes support and full hardware and software coverage. Additional years of full coverage with support can be purchased anytime as long as the machine is still under a current warranty. With some restrictions, a new support contract can be purchased for systems.

10.76.Wrappers:[1]

Cinedecks create files using a variety of wrappers and specifically use Avid Op-Atom MXF and MOV wrappers in combination with the most common use of the appropriate codec, i.e., DNxHD can be wrapped as MXF OpAtom for true Avid native integration but many of the codec options available on every Cinedeck provide a choice of wrappers including;

1 - Workflow package selection determines wrapper availability on ZX

- Avid MXF Op-Atom
- MXF Op-1A (AS-02, AS-11/DPP compliant)
- MOV (Interleaved, Mono/Discrete or MOV video with separate WAVE audio)
- AVI
- MP4

10.77.XML data:

Each recording session can be accompanied by clip specific *.xml files. The completed *.xml files contain clip specific metadata which can be imported into asset managements systems and the like. The destination folder can also be selected for the xml files.

11.0 Specifications

11.1 Basic specifications

Cinedecks have similar specifications and a broad, virtually identical feature set but there are some differences in capability and feature availability. This is particularly true for the modular ZX which can be purchased with a customized feature selection. So although a feature may be noted as supported, your specific system may not have that capability. (Feature descriptions can be found in "10.0 FAQ & Features" on page 329)
Additionally, as everyone knows, specifications are subject to change without notice...

If there is a specific question, feel free to contact us for clarification. See "Contacting Cinedeck" on page 2

		RX3G	MX	ZX 45	ZX 40	ZX 20
	Description	2 Channel HD/SD (Master & H.264 Proxy per channel)	4 channel HD/ SD (Master & Proxy per channel)	4 channel HD/ SD (Master & Proxy per channel)	4 channel HD/ SD (Master & Proxy per channel)	2 Channel HD/SD (Master & Proxy per channel)
	Full Duplex / Mix and Match encode / Play	Y	Y	Y	Y	Y
PHYSICAL	Dimensions	7"x 8.5"x10" 17.8 x 21.6 x 25.5 cm	7"x17.5"x22" 17.8 x 44.5 x 56.8 cm	7"x17"x22" 17.5 x 43 x 56 cm	7"x17"x22" 17.5 x 43 x 56 cm	7"x17"x22" 17.5 x 43 x 56 cm
PHYSICAL	Weight	10 lbs	39 lbs	35 lbs	33 lbs	33 lbs
PHYSICAL	Rackmountable	Yes - 1 or 2 decks Half width, 4RU high	Yes Full width, 4RU high	Yes Full width, 4RU high	Yes Full width, 4RU high	Yes Full width, 4RU high
PHYSICAL	Jog Shuttle	Via external devices	Built-in	Via external devices	Via external devices	Via external devices
PHYSICAL	7" Touchscreen	Yes & external touchscreen support	Yes & external touchscreen support	No - external touch screen optional	No - external touch screen optional	No - external touch screen optional
CODEC SUPPORT	Apple ProRes (Proxy, LT, Normal, HQ)	Y	Y	Y - Optional	Y - Optional	Y - Optional
CODEC SUPPORT	Apple ProRes 4444	Y	Y	Y - Optional	Y - Optional	Y - Optional
CODEC SUPPORT	Avid DNxHD	Y	Y	Y - Optional	Y - Optional	Y - Optional
CODEC SUPPORT	Avid DNx444	Y	Y	Y - Optional	Y - Optional	Y - Optional

Basic specifications / cont...

		RX3G	MX	ZX 45	ZX 40	ZX 20
CODEC SUPPORT	Avid Meridien JFIF	Y	Y	Y - Optional	Y - Optional	Y - Optional
	VC-5 {CineForm} (Filmscan 1, Filmscan2, Keying High, Medium, Low)	Y	Y	Y - Optional	Y - Optional	Y - Optional
	Uncompressed 422 (8 and 10-bit)	Y	Y	Y - Optional	Y - Optional	Y - Optional
	Uncompressed 444	Y	Y	Y - Optional	Y - Optional	Y - Optional
	AVC-Intra 100/50	Y	Y	Y - Optional	Y - Optional	Y - Optional
	DVCPRO-HD	Y	Y	Y - Optional	Y - Optional	Y - Optional
	XDCAM HD 50 / XDCAM EX 35	Y	Y	Y - Optional	Y - Optional	Y - Optional
	H.264	Y	Y	Y - Optional	Y - Optional	Y - Optional
	IMX - D10	Y	Y	Y - Optional	Y - Optional	Y - Optional
	DPX	Y	Y	Y - Optional	Y - Optional	Y - Optional
	JPEG 2000	N	Y - Optional	Y - Optional	Y - Optional	Y - Optional
	RAW Record Capable	Future Option	Future Option	Future Option	Future Option	Future Option
SIGNAL I/O	3G-SDI / HD-SDI / SD-SDI Inputs	2	4	4	4	2
	3G-SDI / HD-SDI / SD-SDI Outputs	2	4	4	4	2
	1.5G Dual Link Inputs	1	2	2	2	1
	1.5G Dual Link Outputs	1	2	2	2	1

Basic specifications / cont...

		RX3G	MX	ZX 45	ZX 40	ZX 20
SIGNAL I/O	AUX outputs	1	2	2	2	1
	Secondary 1.5G outputs	N	4	N	N	N
	Secondary 3G outputs	N	N	4- Optional	4- Optional	2 - Optional
	4K / UHDTV-1 input	N	1 @ 30p	1 @ 60p, 4K option	1 @ 30p, 4K option	N
	4K / UHDTV-1 output	1 @ 30p, 4K option	1 @ 30p	1 @ 60p, 4K option	1 @ 30p, 4K option	1 @ 30p, 4K option
	4K HDMI output	N	N	Optional	Optional	Optional
	Super Out available on Video Out	Y	Y	Y	Y	Y
	Super Out available on secondary Video Out	N	Y	Optional	Optional	Optional
	HD - 50/60P	1 Channel	2 channels	4 channels	2 channels	1 channel
	4K - 50/60P	N	N	Y	N	N
	4:2:2 3D support	Y - Future Option	Y - Future Option	Y - Future Option	Y - Future Option	Y - Future Option
	4:4:4 3D support	N	Y - Future Option	Y - Future Option	Y - Future Option	N
	50/60P 3D support	N	Y - Future Option	Y - Future Option	Y - Future Option	N
AUDIO I/O	AES Audio Channels	8 - 2 per BNC	16 - 2 per BNC, +16 via breakout Optional	16 - 2 per BNC	16 - 2 per BNC	16 - 2 per BNC
	Embedded SDI Audio (per video in)	16	16	16	16	16
	Analog Audio on-board	2ch - unbalanced via mini jack	2ch - unbalanced via mini jack	2ch - unbalanced via mini jack	2ch - unbalanced via mini jack	2ch - unbalanced via mini jack

Basic specifications / cont...

		RX3G	MX	ZX 45	ZX 40	ZX 20
AUDIO I/O	Analog via USB	2ch - balanced via Scarlet 2i2	2ch - balanced via Scarlet 2i2	2ch - balanced via Scarlet 2i2	2ch - balanced via Scarlet 2i2	2ch - balanced via Scarlet 2i2
	XLR Audio Monitor Out	2	4	4	4	2
	Headphone Jack	1 - mini front mounted	2 - mini, 2 - ¼" front mounted	1 - mini rear mounted	1 - mini rear mounted	1 - mini rear mounted
	48Khz audio processing	Y	Y	Y	Y	Y
	24bit audio encoding	Y except where restricted by codec/ wrapper	Y except where restricted by codec/ wrapper	Y except where restricted by codec/ wrapper	Y except where restricted by codec/ wrapper	Y except where restricted by codec/ wrapper
REFERENCE	REF: Analog Color Black or Tri-Level Sync	1 - No loop out	2 Inputs 1 per channel pair No loop out	2 Inputs 1 per channel pair No loop out	2 Inputs 1 per channel pair No loop out	1 - No loop out
ANALYSIS	Waveform	Y	Y	Y	Y	Y
	Vectorscope	Y	Y	Y	Y	Y
	Histogram	Y	Y	Y	Y	Y
	Focus assist	Y	Y	Y	Y	Y
	Zoom	Y	Y	Y	Y	Y
	Clipping	Y	Y	Y	Y	Y
	Preview LUTs	Y	Y	Y	Y	Y
	Audio meters	Y	Y	Y	Y	Y
HARDWARE	CPU	Intel I7	Server Class (2x)	Upgraded Server Class (2x)	Server Class (2x)	Server Class (2x)
	GPU	CPU Graphics Chip	Standard	Upgraded	Standard	Standard
	Motherboard	Mini ITX	Server Class	Server Class	Server Class	Server Class
	Video I/O	Bluefish Supernova (1x)	Bluefish Supernova (2x)	Bluefish Supernova (2x)	Bluefish Supernova (2x)	Bluefish Supernova (1x)
	RAM	8	16	16	16	16

Basic specifications / cont...

		RX3G	MX	ZX 45	ZX 40	ZX 20
STORAGE	Maximum Hot-swappable SSDs	4	8	8	8	8
	Network Recording support	Y	Y	Y	Y	Y
	HBA support	N	Y	Y	Y	Y
	eSATA drives	Y	Y	Y	Y	Y
	USB Drives	Y	Y	Y	Y	Y
	Memory card support: SxS, P2, CF	via external device	Built in readers: SxS (2x), P2 (2x), CF (2x)	Optionally built in or via external device	Optionally built in or via external device	Optionally built in or via external device
CONNECTIVITY	VGA	1	N	N	N	N
	DVI	1	1	1	1	1
	HDMI	1	1	1	1	1
	Display port 1.2	N	N	1	N	N
	USB 2	4 rear, 1 front	6 rear	6 rear, 2 front	6 rear, 2 front	6 rear, 2 front
	USB 3	2 rear	2 rear, 2 front	2 rear	2 rear	2 rear
	eSATA	2 rear, 1 front (1 active, optionally up to 3)	4 rear	Up to 4 Optional	Up to 4 Optional	Up to 4 Optional
	1Gb Ethernet	2	2	2	2	2
	10Gb Ethernet or 8/16Gb Fiber Channel	N	Optional	Optional	Optional	Optional
	WiFi (support for 3rd party devices)	Optional	Optional	Optional	Optional	Optional
	LTC Timecode	In + loop out Master LTC In opt.	In + loop out per channel pair and Master LTC In	In + loop out per channel pair Master LTC In opt.	In + loop out per channel pair Master LTC In opt.	In + loop out per channel pair Master LTC In opt.
	IRIG Timecode / Master Clock / Jam-Sync	Optional	Y	Optional	Optional	Optional

Basic specifications / cont...

		RX3G	MX	ZX 45	ZX 40	ZX 20
RESOLUTIONS	4K / UHDTV-1	Playback only optional	Optional	Optional	Optional	Playback only optional
	2K	Y	Y	Y	Y	Y
	HD - 1080i, 1080p, 1080PsF, 720p	Y	Y	Y	Y	Y
	SD - PAL/NTSC, 480p	Y	Y	Y	Y	Y
FUNCTIONALITY	Realtime Upconvert HD > UHDTV-1 2K > 4K	N	Optional	Optional	Optional	N
	Redundant File Record	Y	Y	Y	Y	Y
	Segment Record	Y	Y	Y	Y	Y
	Burn-in for Proxy & H.264	Y	Y	Y	Y	Y
	User Interface Resolution	1024x600	1024x600	1024x600	1024x600	1024x600
	Operating System	Windows 7 Embedded	Windows 7 Embedded	Windows 7 Embedded	Windows 7 Embedded	Windows 7 Embedded
REMOTE CONTROL	TCP/IP Deck Control App	Y	Y	Y	Y	Y
	AMP API	Y	Y	Y	Y	Y
	VDCP	Optional	Optional	Optional	Optional	Optional
	RS-422 per channel	Y - 2x DB-9 female	Y - 4x DB-9 female	4x DB-9 female Optional	4x DB-9 female Optional	2x DB-9 female Optional
	3rd party USB Jog/shuttle device support	Y	Y	Y	Y	Y
	3rd party VNC applications	Y	Y	Y	Y	Y

Basic specifications / cont...

		RX3G	MX	ZX 45	ZX 40	ZX 20
ENVIRONMENTAL	Operating Temperature	40° to 95°F 5° to 40°C	40° to 95°F 5° to 40°C	40° to 95°F 5° to 40°C	40° to 95°F 5° to 40°C	40° to 95°F 5° to 40°C
	Recommended operating temp	60 - 80°F 15 - 26°C	60 - 80°F 15 - 26°C	60 - 80°F 15 - 26°C	60 - 80°F 15 - 26°C	60 - 80°F 15 - 26°C
	Relative Humidity	20% to 80% (non-condensing)	20% to 80% (non-condensing)	20% to 80% (non-condensing)	20% to 80% (non-condensing)	20% to 80% (non-condensing)
	AC Voltage	100-120 / 220-240 50/60Hz	100-120 / 220-240 50/60Hz	100-120 / 220-240 50/60Hz	100-120 / 220-240 50/60Hz	100-120 / 220-240 50/60Hz
	DC Voltage	Range 10-36 Volts Optimum 19 Volts				
	Power consumption	180 Watts	300 Watts	850 Watts	300 Watts	200 Watts

11.2 Codecs & wrappers

Cinedeck codec availability is wrapper (workflow) based meaning, if a system has the wrapper, it is licensed for all of the standard codecs available with that wrapper. This is particularly true for the modular ZX which can be purchased with a limited wrapper selection. Conversely, RX and MX are licensed for all workflow packages and as such all wrappers but even so, differences in system capability and software version can mean that specific frame rates, codecs or master and proxy combinations, may not be available on a specific system. Additionally, some codecs such as Cineform and JPEG2000 are not standard on any systems.
MOV workflow package includes all MOV wrapped codecs {Common for FCP and Adobe environments}
OpAtom workflow package includes all MXF OpAtom wrapped codecs (Normally for Avid environments)
Op1a workflow package includes all MXF Op1a wrapped codecs (Common for Adobe environments)

The "Quality / Bit rate" noted in this table reflects the common descriptions for the selected codec which is how the codecs are described in the Cinedeck interface. For specific target data rates and a storage calculator, see "11.3 Data rates" on page 381.

If there is a specific question, feel free to contact us for clarification. See "Contacting Cinedeck" on page 2

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080i 50	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080i 50	DNxHD	Y	Y	N	36	Y	Y	Y			
1080i 50	DNxHD	Y	N	N	120	Y	Y	Y			
1080i 50	DNxHD	Y	Y	N	185	Y	Y	Y			
1080i 50	ProRes	Y	Y	Y	Proxy			Y			
1080i 50	ProRes	Y	Y	Y	LT			Y			
1080i 50	ProRes	Y	Y	Y	Normal			Y			
1080i 50	ProRes	Y	Y	Y	HQ			Y			
1080i 50	ProRes	Y	Y	Y	4444			Y			
1080i 50	XDcam HD	Y	N	N	EX 1440	Y	Y	Y	Y		
1080i 50	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
1080i 50	XDcam HD	Y	N	N	50	Y	Y	Y			

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080i 50	H.264	Y	N	N	iPod			Y	Y		
1080i 50	H.264	Y	N	N	iPad			Y	Y		
1080i 50	H.264	Y	N	N	PIX			Y	Y		
1080i 50	H.264	Y	N	N	DAX			Y	Y		
1080i 50	H.264	Y	N	N	DAX_2800			Y	Y		
1080i 50	H.264	Y	N	N	Full HD			Y	Y		
1080i 50	H.264	Y	N	N	350kbs			Y	Y		
1080i 50	H.264	Y	N	N	Main Proxy			Y	Y		
1080i 50	JFIF	Y	N	N	10:1m	Y					
1080i 50	JFIF	Y	N	N	15:1s	Y					
1080i 50	JFIF	Y	N	N	2:1	Y					
1080i 50	JFIF	Y	N	N	20:1	Y					
1080i 50	JFIF	Y	N	N	10:1	Y					
1080i 50	AVC-I	Y	Y	N	50	Y	Y	Y			
1080i 50	AVC-I	Y	Y	N	100	Y	Y	Y			
1080i 50	DVCProHD	Y	Y	N	100	Y		Y			
1080i 50	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080i 50	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080i 50	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080i 50	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080i 50	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080i 50	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080i 50	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080i 59.94	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080i 59.94	DNxHD	Y	Y	N	45	Y	Y	Y			
1080i 59.94	DNxHD	Y	N	N	145	Y	Y	Y			
1080i 59.94	DNxHD	Y	Y	N	220	Y	Y	Y			
1080i 59.94	ProRes	Y	Y	Y	Proxy			Y			
1080i 59.94	ProRes	Y	Y	Y	LT			Y			
1080i 59.94	ProRes	Y	Y	Y	Normal			Y			
1080i 59.94	ProRes	Y	Y	Y	HQ			Y			
1080i 59.94	ProRes	Y	Y	Y	4444			Y			
1080i 59.94	XDcam HD	Y	N	N	EX 1440	Y	Y	Y	Y		
1080i 59.94	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
1080i 59.94	XDcam HD	Y	N	N	50	Y	Y	Y			
1080i 59.94	H.264	Y	N	N	iPod			Y	Y		
1080i 59.94	H.264	Y	N	N	iPad			Y	Y		
1080i 59.94	H.264	Y	N	N	PIX			Y	Y		
1080i 59.94	H.264	Y	N	N	DAX			Y	Y		
1080i 59.94	H.264	Y	N	N	DAX_2800			Y	Y		
1080i 59.94	H.264	Y	N	N	Full HD			Y	Y		
1080i 59.94	H.264	Y	N	N	350kbs			Y	Y		
1080i 59.94	H.264	Y	N	N	Main Proxy			Y	Y		
1080i 59.94	JFIF	Y	N	N	10:1m	Y					
1080i 59.94	JFIF	Y	N	N	15:1s	Y					
1080i 59.94	JFIF	Y	N	N	2:1	Y					
1080i 59.94	JFIF	Y	N	N	20:1	Y					
1080i 59.94	JFIF	Y	N	N	10:1	Y					
1080i 59.94	AVC-I	Y	Y	N	50	Y	Y				
1080i 59.94	AVC-I	Y	Y	N	100	Y	Y				

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080i 59.94	DVCProHD	Y	Y	N	100	Y		Y			
1080i 59.94	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080i 59.94	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080i 59.94	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080i 59.94	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080i 59.94	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080i 59.94	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080i 59.94	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				
1080i 60	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080i 60	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080i 60	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080i 60	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080i 60	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080i 60	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 23.98	Uncompressed	Y	Y	Y	Fixed			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 23.98	DNxHD	Y	Y	N	36	Y	Y	Y			
1080P 23.98	DNxHD	Y	N	N	115	Y	Y	Y			
1080P 23.98	DNxHD	Y	Y	N	175	Y	Y	Y			
1080P 23.98	DNx444	N	N	Y		Y	Y	Y			
1080P 23.98	ProRes	Y	Y	Y	Proxy			Y			
1080P 23.98	ProRes	Y	Y	Y	LT			Y			
1080P 23.98	ProRes	Y	Y	Y	Normal			Y			
1080P 23.98	ProRes	Y	Y	Y	HQ			Y			
1080P 23.98	ProRes	Y	Y	Y	4444			Y			
1080P 23.98	XDcam HD	Y	N	N	EX 1440	Y	Y	Y	Y		
1080P 23.98	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
1080P 23.98	XDcam HD	Y	N	N	50	Y	Y	Y			
1080P 23.98	H.264	Y	N	N	iPod			Y	Y		
1080P 23.98	H.264	Y	N	N	iPad			Y	Y		
1080P 23.98	H.264	Y	N	N	PIX			Y	Y		

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 23.98	H.264	Y	N	N	DAX			Y	Y		
1080P 23.98	H.264	Y	N	N	DAX_2800			Y	Y		
1080P 23.98	H.264	Y	N	N	Full HD			Y	Y		
1080P 23.98	H.264	Y	N	N	350kbs			Y	Y		
1080P 23.98	H.264	Y	N	N	Main Proxy			Y	Y		
1080P 23.98	DPX	Y	Y	Y	Fixed						Y
1080P 23.98	AVC-I	Y	Y	N	50	Y	Y				
1080P 23.98	AVC-I	Y	Y	N	100	Y	Y				
1080P 23.98	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 23.98	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080P 23.98	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 23.98	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 23.98	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 23.98	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 23.98	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 24	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080P 24	DNxHD	Y	N	N	36	Y		Y			
1080P 24	DNxHD	Y	N	N	115	Y		Y			
1080P 24	DNxHD	Y	Y	N	175	Y		Y			
1080P 24	DNx444	N	N	Y		Y		Y			
1080P 24	ProRes	Y	Y	Y	Proxy			Y			
1080P 24	ProRes	Y	Y	Y	LT			Y			
1080P 24	ProRes	Y	Y	Y	Normal			Y			
1080P 24	ProRes	Y	Y	Y	HQ			Y			
1080P 24	ProRes	Y	Y	Y	4444			Y			
1080P 24	XDcam HD	Y	N	N	EX 1440	Y	Y	Y	Y		
1080P 24	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
1080P 24	XDcam HD	Y	N	N	50	Y	Y	Y			
1080P 24	H.264	Y	N	N	iPod			Y	Y		
1080P 24	H.264	Y	N	N	iPad			Y	Y		
1080P 24	H.264	Y	N	N	PIX			Y	Y		
1080P 24	H.264	Y	N	N	DAX			Y	Y		
1080P 24	H.264	Y	N	N	DAX_2800			Y	Y		
1080P 24	H.264	Y	N	N	Full HD			Y	Y		
1080P 24	H.264	Y	N	N	350kbs			Y	Y		
1080P 24	H.264	Y	N	N	Main Proxy			Y	Y		
1080P 24	DPX	Y	Y	Y	Fixed						Y
1080P 24	AVC-I	Y	Y	N	50	Y	Y				
1080P 24	AVC-I	Y	Y	N	100	Y	Y				
1080P 24	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 24	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 24	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 24	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 24	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 24	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 24	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				
1080P 25	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080P 25	DNxHD	Y	N	N	36	Y	Y	Y			
1080P 25	DNxHD	Y	N	N	120	Y	Y	Y			
1080P 25	DNxHD	Y	Y	N	185	Y	Y	Y			
1080P 25	DNx444	N	N	Y		Y	Y	Y			
1080P 25	ProRes	Y	Y	Y	Proxy			Y			
1080P 25	ProRes	Y	Y	Y	LT			Y			
1080P 25	ProRes	Y	Y	Y	Normal			Y			
1080P 25	ProRes	Y	Y	Y	HQ			Y			
1080P 25	ProRes	Y	Y	Y	4444			Y			
1080P 25	XDcam HD	Y	N	N	EX 1440	Y	Y	Y	Y		
1080P 25	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
1080P 25	XDcam HD	Y	N	N	50	Y	Y	Y			
1080P 25	H.264	Y	N	N	iPod			Y	Y		
1080P 25	H.264	Y	N	N	iPad			Y	Y		
1080P 25	H.264	Y	N	N	PIX			Y	Y		
1080P 25	H.264	Y	N	N	DAX			Y	Y		
1080P 25	H.264	Y	N	N	DAX_2800			Y	Y		
1080P 25	H.264	Y	N	N	Full HD			Y	Y		

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 25	H.264	Y	N	N	350kbs			Y	Y		
1080P 25	H.264	Y	N	N	Main Proxy			Y	Y		
1080P 25	DPX	Y	Y	Y	Fixed						Y
1080P 25	AVC-I	Y	Y	N	50	Y	Y				
1080P 25	AVC-I	Y	Y	N	100	Y	Y				
1080P 25	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 25	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080P 25	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 25	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 25	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 25	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 25	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				
1080P 29.97	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080P 29.97	DNxHD	Y	Y	N	45	Y	Y	Y			
1080P 29.97	DNxHD	Y	N	N	145	Y	Y	Y			
1080P 29.97	DNxHD	Y	Y	N	220	Y	Y	Y			
1080P 29.97	DNx444	N	N	Y		Y	Y	Y			

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 29.97	ProRes	Y	Y	Y	Proxy			Y			
1080P 29.97	ProRes	Y	Y	Y	LT			Y			
1080P 29.97	ProRes	Y	Y	Y	Normal			Y			
1080P 29.97	ProRes	Y	Y	Y	HQ			Y			
1080P 29.97	ProRes	Y	Y	Y	4444			Y			
1080P 29.97	XDcam HD	Y	N	N	EX 1440	Y	Y	Y	Y		
1080P 29.97	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
1080P 29.97	XDcam HD	Y	N	N	50	Y	Y	Y			
1080P 29.97	H.264	Y	N	N	iPod			Y	Y		
1080P 29.97	H.264	Y	N	N	iPad			Y	Y		
1080P 29.97	H.264	Y	N	N	PIX			Y	Y		
1080P 29.97	H.264	Y	N	N	DAX			Y	Y		
1080P 29.97	H.264	Y	N	N	DAX_2800			Y	Y		
1080P 29.97	H.264	Y	N	N	Full HD			Y	Y		
1080P 29.97	H.264	Y	N	N	350kbs			Y	Y		

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 29.97	H.264	Y	N	N	Main Proxy			Y	Y		
1080P 29.97	DPX	Y	Y	Y	Fixed						Y
1080P 29.97	AVC-I	Y	Y	N	50	Y	Y				
1080P 29.97	AVC-I	Y	Y	N	100	Y	Y				
1080P 29.97	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 29.97	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080P 29.97	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 29.97	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 29.97	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 29.97	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 29.97	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				
1080P 50	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080P 50	ProRes	Y	Y	Y	Proxy			Y			
1080P 50	ProRes	Y	Y	Y	LT			Y			
1080P 50	ProRes	Y	Y	Y	Normal			Y			
1080P 50	ProRes	Y	Y	Y	HQ			Y			
1080P 50	ProRes	Y	Y	Y	4444			Y			

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 50	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 50	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080P 50	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 50	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 50	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 50	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 50	JPEG 2000*										
1080P 59.94	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080P 59.94	ProRes	Y	Y	Y	Proxy			Y			
1080P 59.94	ProRes	Y	Y	Y	LT			Y			
1080P 59.94	ProRes	Y	Y	Y	Normal			Y			
1080P 59.94	ProRes	Y	Y	Y	HQ			Y			
1080P 59.94	ProRes	Y	Y	Y	4444			Y			
1080P 59.94	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 59.94	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
1080P 59.94	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 59.94	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 59.94	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 59.94	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
1080P 59.94	JPEG 2000*										
1080P 60	Uncompressed	Y	Y	Y	Fixed			Y		Y	
1080P 60	ProRes	Y	Y	Y	Proxy			Y			
1080P 60	ProRes	Y	Y	Y	LT			Y			
1080P 60	ProRes	Y	Y	Y	Normal			Y			
1080P 60	ProRes	Y	Y	Y	HQ			Y			
1080P 60	ProRes	Y	Y	Y	4444			Y			
1080P 60	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
1080P 60	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
1080P 60	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
1080P 60	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
1080P 60	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
1080P 60	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
UHDTV-1 24*	ProRes	Y	Y	Y	Proxy			Y			
UHDTV-1 24*	ProRes	Y	Y	Y	LT			Y			
UHDTV-1 24*	ProRes	Y	Y	Y	Normal			Y			
UHDTV-1 24*	ProRes	Y	Y	Y	HQ			Y			
UHDTV-1 24*	ProRes	Y	Y	Y	4444			Y			
UHDTV-1 24*	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
UHDTV-1 24*	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
UHDTV-1 24*	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
UHDTV-1 24*	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
UHDTV-1 24*	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
UHDTV-1 24*	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
UHDTV-1 25*	ProRes	Y	Y	Y	Proxy			Y			
UHDTV-1 25*	ProRes	Y	Y	Y	LT			Y			
UHDTV-1 25*	ProRes	Y	Y	Y	Normal			Y			
UHDTV-1 25*	ProRes	Y	Y	Y	HQ			Y			

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
UHDTV-1 25*	ProRes	Y	Y	Y	4444			Y			
UHDTV-1 25*	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
UHDTV-1 25*	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
UHDTV-1 25*	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
UHDTV-1 25*	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
UHDTV-1 25*	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
UHDTV-1 25*	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
UHDTV-1 29.97*	ProRes	Y	Y	Y	Proxy			Y			
UHDTV-1 29.97*	ProRes	Y	Y	Y	LT			Y			
UHDTV-1 29.97*	ProRes	Y	Y	Y	Normal			Y			
UHDTV-1 29.97*	ProRes	Y	Y	Y	HQ			Y			
UHDTV-1 29.97*	ProRes	Y	Y	Y	4444			Y			
UHDTV-1 29.97*	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
UHDTV-1 29.97*	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
UHDTV-1 29.97*	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
UHDTV-1 29.97*	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
UHDTV-1 29.97*	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
UHDTV-1 29.97*	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
UHDTV-1 50*	ProRes	Y	Y		Proxy			Y			
UHDTV-1 50*	ProRes	Y	Y		LT			Y			
UHDTV-1 50*	ProRes	Y	Y		Normal			Y			
UHDTV-1 50*	ProRes	Y	Y		HQ			Y			
UHDTV-1 50*	ProRes	Y	Y		4444			Y			
UHDTV-1 50*	VC-5 {Cineform}*	Y	Y		Low			Y		Y	
UHDTV-1 50*	VC-5 {Cineform}*	Y	Y		Medium			Y		Y	
UHDTV-1 50*	VC-5 {Cineform}*	Y	Y		High			Y		Y	
UHDTV-1 50*	VC-5 {Cineform}*	Y	Y		Filmscan 1			Y		Y	
UHDTV-1 50*	VC-5 {Cineform}*	Y	Y		Filmscan 2			Y		Y	
UHDTV-1 50*	VC-5 {Cineform}*	Y	Y		Keying			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
UHDTV-1 59.94*	ProRes	Y	Y		Proxy			Y			
UHDTV-1 59.94*	ProRes	Y	Y		LT			Y			
UHDTV-1 59.94*	ProRes	Y	Y		Normal			Y			
UHDTV-1 59.94*	ProRes	Y	Y		HQ			Y			
UHDTV-1 59.94*	ProRes	Y	Y		4444			Y			
UHDTV-1 59.94*	VC-5 {Cineform}*	Y	Y		Low			Y		Y	
UHDTV-1 59.94*	VC-5 {Cineform}*	Y	Y		Medium			Y		Y	
UHDTV-1 59.94*	VC-5 {Cineform}*	Y	Y		High			Y		Y	
UHDTV-1 59.94*	VC-5 {Cineform}*	Y	Y		Filmscan 1			Y		Y	
UHDTV-1 59.94*	VC-5 {Cineform}*	Y	Y		Filmscan 2			Y		Y	
UHDTV-1 59.94*	VC-5 {Cineform}*	Y	Y		Keying			Y		Y	
720P 50	Uncompressed	Y	Y	Y	Fixed			Y		Y	
720P 50	DNxHD	Y	N	N	115	Y	Y	Y			
720P 50	DNxHD	Y	Y	N	175	Y	Y	Y			
720P 50	ProRes	Y	Y	Y	Proxy			Y			
720P 50	ProRes	Y	Y	Y	LT			Y			
720P 50	ProRes	Y	Y	Y	Normal			Y			
720P 50	ProRes	Y	Y	Y	HQ			Y			

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
720P 50	ProRes	Y	Y	Y	4444			Y			
720P 50	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
720P 50	XDcam HD	Y	N	N	50	Y	Y	Y			
720P 50	H.264	Y	N	N	iPod			Y	Y		
720P 50	H.264	Y	N	N	iPad			Y	Y		
720P 50	H.264	Y	N	N	PIX			Y	Y		
720P 50	H.264	Y	N	N	DAX			Y	Y		
720P 50	H.264	Y	N	N	DAX_2800			Y	Y		
720P 50	H.264	Y	N	N	Full HD			Y	Y		
720P 50	H.264	Y	N	N	350kbs			Y	Y		
720P 50	H.264	Y	N	N	Main Proxy			Y	Y		
720P 50	JFIF	Y	N	N	10:1m	Y					
720P 50	JFIF	Y	N	N	15:1s	Y					
720P 50	JFIF	Y	N	N	2:1	Y					
720P 50	JFIF	Y	N	N	20:1	Y					
720P 50	JFIF	Y	N	N	10:1	Y					
720P 50	AVC-I	Y	Y	N	50	Y	Y				
720P 50	AVC-I	Y	Y	N	100	Y	Y				
720P 50	DVCProHD	Y	Y	N	100	Y		Y			
720P 50	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
720P 50	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
720P 50	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
720P 50	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
720P 50	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
720P 50	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
720P 50	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				
720P 59.94	Uncompressed	Y	Y	Y	Fixed			Y		Y	
720P 59.94	DNxHD	Y	N	N	145	Y	Y	Y			
720P 59.94	DNxHD	Y	Y	N	220	Y	Y	Y			
720P 59.94	ProRes	Y	Y	Y	Proxy			Y			
720P 59.94	ProRes	Y	Y	Y	LT			Y			
720P 59.94	ProRes	Y	Y	Y	Normal			Y			
720P 59.94	ProRes	Y	Y	Y	HQ			Y			
720P 59.94	ProRes	Y	Y	Y	4444			Y			
720P 59.94	XDcam HD	Y	N	N	EX	Y	Y	Y	Y		
720P 59.94	XDcam HD	Y	N	N	50	Y	Y	Y			
720P 59.94	H.264	Y	N	N	iPod			Y	Y		
720P 59.94	H.264	Y	N	N	iPad			Y	Y		
720P 59.94	H.264	Y	N	N	PIX			Y	Y		
720P 59.94	H.264	Y	N	N	DAX			Y	Y		
720P 59.94	H.264	Y	N	N	DAX_2800			Y	Y		
720P 59.94	H.264	Y	N	N	Full HD			Y	Y		
720P 59.94	H.264	Y	N	N	350kbs			Y	Y		
720P 59.94	H.264	Y	N	N	Main Proxy			Y	Y		
720P 59.94	JFIF	Y	N	N	10:1m	Y					
720P 59.94	JFIF	Y	N	N	15:1s	Y					
720P 59.94	JFIF	Y	N	N	2:1	Y					
720P 59.94	JFIF	Y	N	N	20:1	Y					
720P 59.94	JFIF	Y	N	N	10:1	Y					
720P 59.94	AVC-I	Y	Y	N	50	Y	Y				

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
720P 59.94	AVC-I	Y	Y	N	100	Y	Y				
720P 59.94	DVCProHD	Y	Y	N	100	Y		Y			
720P 59.94	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
720P 59.94	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
720P 59.94	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
720P 59.94	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
720P 59.94	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
720P 59.94	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
720P 59.94	JPEG 2000*	Y	Y	?	VL 220Mbit		Y				
720P 60	Uncompressed	Y	Y	Y	Fixed			Y		Y	
720P 60	DNxHD	Y	N	N	145	Y	Y	Y			
720P 60	DNxHD	Y	Y	N	220	Y	Y	Y			
720P 60	ProRes	Y	Y	Y	Proxy			Y			
720P 60	ProRes	Y	Y	Y	LT			Y			
720P 60	ProRes	Y	Y	Y	Normal			Y			
720P 60	ProRes	Y	Y	Y	HQ			Y			
720P 60	ProRes	Y	Y	Y	4444			Y			
720P 60	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
720P 60	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
720P 60	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
720P 60	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
720P 60	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
720P 60	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
PAL (SD)	Uncompressed	Y	Y	Y	Fixed	Y		Y		Y	
PAL (SD)	ProRes	Y	Y	Y	Proxy			Y			
PAL (SD)	ProRes	Y	Y	Y	LT			Y			
PAL (SD)	ProRes	Y	Y	Y	Normal			Y			
PAL (SD)	ProRes	Y	Y	Y	HQ			Y			
PAL (SD)	ProRes	Y	Y	Y	4444			Y			
PAL (SD)	H.264	Y	N	N	iPod			Y	Y		
PAL (SD)	H.264	Y	N	N	iPad			Y	Y		
PAL (SD)	H.264	Y	N	N	350-FCP			Y	Y		
PAL (SD)	H.264	Y	N	N	DAX			Y	Y		
PAL (SD)	H.264	Y	N	N	DAX_2800			Y	Y		
PAL (SD)	H.264	Y	N	N	Full SD			Y	Y		
PAL (SD)	H.264	Y	N	N	Anamorphic Full SD			Y	Y		
PAL (SD)	H.264	Y	N	N	Full SD 3500			Y	Y		
PAL (SD)	H.264	Y	N	N	Anamorphic Full SD 3500			Y	Y		
PAL (SD)	JFIF	Y	N	N	10:1m	Y					
PAL (SD)	JFIF	Y	N	N	15:1s	Y					
PAL (SD)	JFIF	Y	N	N	2:1	Y					
PAL (SD)	JFIF	Y	N	N	20:1	Y					
PAL (SD)	JFIF	Y	N	N	10:1	Y					

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
PAL (SD)	IMX	Y			30	Y	Y	Y			
PAL (SD)	IMX	Y			40	Y	Y	Y			
PAL (SD)	IMX	Y			50	Y	Y	Y			
PAL (SD)	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
PAL (SD)	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
PAL (SD)	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
PAL (SD)	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
PAL (SD)	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
PAL (SD)	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
PAL (SD) 25P	Uncompressed	Y	Y	Y	Fixed	Y		Y		Y	
PAL (SD) 25P	ProRes	Y	Y	Y	Proxy			Y			
PAL (SD) 25P	ProRes	Y	Y	Y	LT			Y			
PAL (SD) 25P	ProRes	Y	Y	Y	Normal			Y			
PAL (SD) 25P	ProRes	Y	Y	Y	HQ			Y			
PAL (SD) 25P	ProRes	Y	Y	Y	4444			Y			
PAL (SD) 25P	H.264	Y	N	N	iPod			Y	Y		

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
PAL (SD) 25P	H.264	Y	N	N	iPad			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	350-FCP			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	DAX			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	DAX_2800			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	Full SD			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	Anamorphic Full SD			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	Full SD 3500			Y	Y		
PAL (SD) 25P	H.264	Y	N	N	Anamorphic Full SD 3500			Y	Y		
PAL (SD) 25P	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
PAL (SD) 25P	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
PAL (SD) 25P	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
PAL (SD) 25P	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
PAL (SD) 25P	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
PAL (SD) 25P	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
NTSC (SD) 23.98P	Uncompressed	Y	Y	Y	Fixed			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
NTSC (SD) 23.98P	ProRes	Y	Y	Y	Proxy			Y			
NTSC (SD) 23.98P	ProRes	Y	Y	Y	LT			Y			
NTSC (SD) 23.98P	ProRes	Y	Y	Y	Normal			Y			
NTSC (SD) 23.98P	ProRes	Y	Y	Y	HQ			Y			
NTSC (SD) 23.98P	ProRes	Y	Y	Y	4444			Y			
NTSC (SD) 23.98P	H.264	Y	N	N	iPod			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	iPad			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	350-FCP			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	DAX			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	DAX_2800			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	Full SD			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	Anamorphic Full SD			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	Full SD 3500			Y	Y		
NTSC (SD) 23.98P	H.264	Y	N	N	Anamorphic Full SD 3500			Y	Y		
NTSC (SD) 23.98P	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
NTSC (SD) 23.98P	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	
NTSC (SD) 23.98P	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
NTSC (SD) 23.98P	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
NTSC (SD) 23.98P	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
NTSC (SD) 23.98P	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	
NTSC (SD) 59.9i	Uncompressed	Y	Y	Y	Fixed			Y		Y	
NTSC (SD) 59.9i	ProRes	Y	Y	Y	Proxy			Y			
NTSC (SD) 59.9i	ProRes	Y	Y	Y	LT			Y			
NTSC (SD) 59.9i	ProRes	Y	Y	Y	Normal			Y			
NTSC (SD) 59.9i	ProRes	Y	Y	Y	HQ			Y			
NTSC (SD) 59.9i	ProRes	Y	Y	Y	4444			Y			
NTSC (SD) 59.9i	H.264	Y	N	N	iPod			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	iPad			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	350-FCP			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	DAX			Y	Y		

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
NTSC (SD) 59.9i	H.264	Y	N	N	DAX_2800			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	Full SD			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	Anamorphic Full SD			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	Full SD 3500			Y	Y		
NTSC (SD) 59.9i	H.264	Y	N	N	Anamorphic Full SD 3500			Y	Y		
NTSC (SD) 59.9i	JFIF	Y	N	N	10:1m	Y					
NTSC (SD) 59.9i	JFIF	Y	N	N	15:1s	Y					
NTSC (SD) 59.9i	JFIF	Y	N	N	2:1	Y					
NTSC (SD) 59.9i	JFIF	Y	N	N	20:1	Y					
NTSC (SD) 59.9i	JFIF	Y	N	N	10:1	Y					
NTSC (SD) 59.9i	IMX	Y			30	Y	Y	Y			
NTSC (SD) 59.9i	IMX	Y			40	Y	Y	Y			
NTSC (SD) 59.9i	IMX	Y			50	Y	Y	Y			
NTSC (SD) 59.9i	VC-5 {Cineform}*	Y	Y	Y	Low			Y		Y	
NTSC (SD) 59.9i	VC-5 {Cineform}*	Y	Y	Y	Medium			Y		Y	

Codecs & wrappers / cont...

Format * = optional	Codec * = optional	8bit	10bit	444 RGB	Quality / Bit Rate	Avid mxf OpAtom	mxf Op1a	MOV	MP4	AVI	DPX
NTSC (SD) 59.9i	VC-5 {Cineform}*	Y	Y	Y	High			Y		Y	
NTSC (SD) 59.9i	VC-5 {Cineform}*	Y	Y	Y	Filmscan 1			Y		Y	
NTSC (SD) 59.9i	VC-5 {Cineform}*	Y	Y	Y	Filmscan 2			Y		Y	
NTSC (SD) 59.9i	VC-5 {Cineform}*	Y	Y	Y	Keying			Y		Y	

11.3 Data rates

Primarily based on the bit rate, different encodes require significantly different amounts of storage. Also, the same codec can use different amounts of storage space depending on the image format, frame rate and whether it uses a variable or constant bit rate.
In general, the bit rate or quality of an encode is quoted as Mbit/s (megabits per second) and many codecs specifically note the data rate in the name like DNx 220 or XDCAMHD 50. In conversation, MB/s (megabytes per second) has also become fairly common.
To convert from Mbit/s to MB/s, divide by 8 so for example 220Mbit / 8 = 27.5 MB/s
To convert from MB/s to Mbit/s reverse that so 27.5 MB/s * 8 = 220Mbit

Use the data rate shown below with the "Storage calculator" on page 392 to determine the estimated required storage for your recordings.

Format * = optional	Codec * = optional	Rate Mbps
1080i 50	Uncompressed Fixed	1037
1080i 50	DNxHD 36	36
1080i 50	DNxHD 120	121
1080i 50	DNxHD 185	184
1080i 50	ProRes Proxy	38
1080i 50	ProRes LT	85
1080i 50	ProRes Normal	122
1080i 50	ProRes HQ	184
1080i 50	ProRes 4444	275
1080i 50	XDcam HD EX 1440	35
1080i 50	XDcam HD EX	35
1080i 50	XDcam HD 50	50
1080i 50	H.264 iPod	0.35
1080i 50	H.264 iPad	0.9

Format * = optional	Codec * = optional	Rate Mbps
1080i 50	H.264 PIX	2.8
1080i 50	H.264 DAX	0.7
1080i 50	H.264 DAX_2800	2.8
1080i 50	H.264 Full HD	3
1080i 50	H.264 350kbs	0.35
1080i 50	H.264 Main Proxy	0.35
1080i 50	JFIF 10:1m	--------
1080i 50	JFIF 15:1s	8
1080i 50	JFIF 2:1	80
1080i 50	JFIF 20:1	16
1080i 50	JFIF 10:1	24
1080i 50	AVC-I 50	50
1080i 50	AVC-I 100	100
1080i 50	DVCProHD 100	100

Format * = optional	Codec * = optional	Rate Mbps
1080i 50	VC-5 {Cineform}* Low	80
1080i 50	VC-5 {Cineform}* Medium	96
1080i 50	VC-5 {Cineform}* High	128
1080i 50	VC-5 {Cineform}* Filmscan 1	160
1080i 50	VC-5 {Cineform}* Filmscan 2	192
1080i 50	VC-5 {Cineform}* Keying	369

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
1080i 50	JPEG 2000* VL 220Mbit	220
--------	--------	--------
1080i 59.94	Uncompressed Fixed	--------
1080i 59.94	DNxHD 45	45
1080i 59.94	DNxHD 145	145
1080i 59.94	DNxHD 220	220
1080i 59.94	ProRes Proxy	45
1080i 59.94	ProRes LT	102
1080i 59.94	ProRes Normal	147
1080i 59.94	ProRes HQ	220
1080i 59.94	ProRes 4444	330
1080i 59.94	XDcam HD EX 1440	35
1080i 59.94	XDcam HD EX	35
1080i 59.94	XDcam HD 50	2

Format * = optional	Codec * = optional	Rate Mbps
1080i 59.94	H.264 iPod	0.35
1080i 59.94	H.264 iPad	0.9
1080i 59.94	H.264 PIX	2.8
1080i 59.94	H.264 DAX	0.7
1080i 59.94	H.264 DAX_2800	2.8
1080i 59.94	H.264 Full HD	3
1080i 59.94	H.264 350kbs	0.35
1080i 59.94	H.264 Main Proxy	0.35
1080i 59.94	JFIF 10:1m	--------
1080i 59.94	JFIF 15:1s	8
1080i 59.94	JFIF 2:1	80
1080i 59.94	JFIF 20:1	16
1080i 59.94	JFIF 10:1	24
1080i 59.94	AVC-I 50	50

Format * = optional	Codec * = optional	Rate Mbps
1080i 59.94	AVC-I 100	100
1080i 59.94	DVCProHD 100	100
1080i 59.94	VC-5 {Cineform}* Low	80
1080i 59.94	VC-5 {Cineform}* Medium	115
1080i 59.94	VC-5 {Cineform}* High	154
1080i 59.94	VC-5 {Cineform}* Filmscan 1	192
1080i 59.94	VC-5 {Cineform}* Filmscan 2	230
1080i 59.94	VC-5 {Cineform}* Keying	442
1080i 59.94	JPEG 2000* VL 220Mbit	220
--------	--------	--------
1080i 60	VC-5 {Cineform}* Low	80
1080i 60	VC-5 {Cineform}* Medium	115

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
1080i 60	VC-5 {Cineform}* High	154
1080i 60	VC-5 {Cineform}* Filmscan 1	192
1080i 60	VC-5 {Cineform}* Filmscan 2	230
1080i 60	VC-5 {Cineform}* Keying	442
--------	--------	--------
1080P 23.98	Uncompressed Fixed	1037
1080P 23.98	DNxHD 36	36
1080P 23.98	DNxHD 115	116
1080P 23.98	DNxHD 175	176
1080P 23.98	DNx444	352
1080P 23.98	ProRes Proxy	36
1080P 23.98	ProRes LT	82
1080P 23.98	ProRes Normal	117
1080P 23.98	ProRes HQ	176

Format * = optional	Codec * = optional	Rate Mbps
1080P 23.98	ProRes 4444	264
1080P 23.98	XDcam HD EX 1440	35
1080P 23.98	XDcam HD EX	35
1080P 23.98	XDcam HD 50	50
1080P 23.98	H.264 iPod	0.35
1080P 23.98	H.264 iPad	0.9
1080P 23.98	H.264 PIX	2.8
1080P 23.98	H.264 DAX	0.7
1080P 23.98	H.264 DAX_2800	2.8
1080P 23.98	H.264 Full HD	3
1080P 23.98	H.264 350kbs	0.35
1080P 23.98	H.264 Main Proxy	0.35
1080P 23.98	DPX Fixed	--------
1080P 23.98	AVC-I 50	50
1080P 23.98	AVC-I 100	100

Format * = optional	Codec * = optional	Rate Mbps
1080P 23.98	VC-5 {Cineform}* Low	80
1080P 23.98	VC-5 {Cineform}* Medium	96
1080P 23.98	VC-5 {Cineform}* High	128
1080P 23.98	VC-5 {Cineform}* Filmscan 1	160
1080P 23.98	VC-5 {Cineform}* Filmscan 2	192
1080P 23.98	VC-5 {Cineform}* Keying	369
1080P 23.98	JPEG 2000* VL 220Mbit	220
--------	--------	--------
1080P 24	Uncompressed Fixed	1037
1080P 24	DNxHD 36	36
1080P 24	DNxHD 115	116
1080P 24	DNxHD 175	176
1080P 24	DNx444	352
1080P 24	ProRes Proxy	36
1080P 24	ProRes LT	82
1080P 24	ProRes Normal	117
1080P 24	ProRes HQ	176
1080P 24	ProRes 4444	264

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
1080P 24	XDcam HD EX 1440	35
1080P 24	XDcam HD EX	35
1080P 24	XDcam HD 50	50
1080P 24	H.264 iPod	0.35
1080P 24	H.264 iPad	0.9
1080P 24	H.264 PIX	2.8
1080P 24	H.264 DAX	0.7
1080P 24	H.264 DAX_2800	2.8
1080P 24	H.264 Full HD	3
1080P 24	H.264 350kbs	0.35
1080P 24	H.264 Main Proxy	0.35
1080P 24	DPX Fixed	--------
1080P 24	AVC-I 50	50
1080P 24	AVC-I 100	100
1080P 24	VC-5 {Cineform}* Low	80
1080P 24	VC-5 {Cineform}* Medium	96
1080P 24	VC-5 {Cineform}* High	128
1080P 24	VC-5 {Cineform}* Filmscan 1	160

Format * = optional	Codec * = optional	Rate Mbps
1080P 24	VC-5 {Cineform}* Filmscan 2	192
1080P 24	VC-5 {Cineform}* Keying	369
1080P 24	JPEG 2000* VL 220Mbit	220
--------	--------	--------
1080P 25	Uncompressed Fixed	1037
1080P 25	DNxHD 36	36
1080P 25	DNxHD 120	121
1080P 25	DNxHD 185	184
1080P 25	DNx444	367
1080P 25	ProRes Proxy	38
1080P 25	ProRes LT	85
1080P 25	ProRes Normal	122
1080P 25	ProRes HQ	184
1080P 25	ProRes 4444	275
1080P 25	XDcam HD EX 1440	35
1080P 25	XDcam HD EX	35
1080P 25	XDcam HD 50	50
1080P 25	H.264 iPod	0.35
1080P 25	H.264 iPad	0.9
1080P 25	H.264 PIX	2.8
1080P 25	H.264 DAX	0.7
1080P 25	H.264 DAX_2800	2.8

Format * = optional	Codec * = optional	Rate Mbps
1080P 25	H.264 Full HD	3
1080P 25	H.264 350kbs	0.35
1080P 25	H.264 Main Proxy	0.35
1080P 25	DPX Fixed	--------
1080P 25	AVC-I 50	50
1080P 25	AVC-I 100	100
1080P 25	VC-5 {Cineform}* Low	80
1080P 25	VC-5 {Cineform}* Medium	96
1080P 25	VC-5 {Cineform}* High	128
1080P 25	VC-5 {Cineform}* Filmscan 1	160
1080P 25	VC-5 {Cineform}* Filmscan 2	192
1080P 25	VC-5 {Cineform}* Keying	369
1080P 25	JPEG 2000* VL 220Mbit	220
--------	--------	--------
1080P 29.97	Uncompressed Fixed	--------
1080P 29.97	DNxHD 45	45

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
1080P 29.97	DNxHD 145	145
1080P 29.97	DNxHD 220	220
1080P 29.97	DNx444	440
1080P 29.97	ProRes Proxy	45
1080P 29.97	ProRes LT	102
1080P 29.97	ProRes Normal	147
1080P 29.97	ProRes HQ	220
1080P 29.97	ProRes 4444	330
1080P 29.97	XDcam HD EX 1440	35
1080P 29.97	XDcam HD EX	35
1080P 29.97	XDcam HD 50	50
1080P 29.97	H.264 iPod	0.35
1080P 29.97	H.264 iPad	0.9
1080P 29.97	H.264 PIX	2.8
1080P 29.97	H.264 DAX	0.7

Format * = optional	Codec * = optional	Rate Mbps
1080P 29.97	H.264 DAX_2800	2.8
1080P 29.97	H.264 Full HD	3
1080P 29.97	H.264 350kbs	0.35
1080P 29.97	H.264 Main Proxy	0.35
1080P 29.97	DPX Fixed	--------
1080P 29.97	AVC-I 50	50
1080P 29.97	AVC-I 100	100
1080P 29.97	VC-5 {Cineform}* Low	80
1080P 29.97	VC-5 {Cineform}* Medium	115
1080P 29.97	VC-5 {Cineform}* High	154
1080P 29.97	VC-5 {Cineform}* Filmscan 1	192
1080P 29.97	VC-5 {Cineform}* Filmscan 2	230
1080P 29.97	VC-5 {Cineform}* Keying	442

Format * = optional	Codec * = optional	Rate Mbps
1080P 29.97	JPEG 2000* VL 220Mbit	220
--------	--------	--------
1080P 50	Uncompressed Fixed	--------
1080P 50	ProRes Proxy	76
1080P 50	ProRes LT	170
1080P 50	ProRes Normal	244
1080P 50	ProRes HQ	368
1080P 50	ProRes 4444	550
1080P 50	VC-5 {Cineform}* Low	160
1080P 50	VC-5 {Cineform}* Medium	192
1080P 50	VC-5 {Cineform}* High	256
1080P 50	VC-5 {Cineform}* Filmscan 1	320
1080P 50	VC-5 {Cineform}* Filmscan 2	384
1080P 50	VC-5 {Cineform}* Keying	738
1080P 50	JPEG 2000*	--------
--------	--------	--------
1080P 59.94	Uncompressed Fixed	--------

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
1080P 59.94	ProRes Proxy	90
1080P 59.94	ProRes LT	204
1080P 59.94	ProRes Normal	294
1080P 59.94	ProRes HQ	440
1080P 59.94	ProRes 4444	660
1080P 59.94	VC-5 {Cineform}* Low	160
1080P 59.94	VC-5 {Cineform}* Medium	230
1080P 59.94	VC-5 {Cineform}* High	308
1080P 59.94	VC-5 {Cineform}* Filmscan 1	384
1080P 59.94	VC-5 {Cineform}* Filmscan 2	460
1080P 59.94	VC-5 {Cineform}* Keying	884
1080P 59.94	JPEG 2000*	--------
--------	--------	--------
1080P 60	Uncompressed Fixed	--------

Format * = optional	Codec * = optional	Rate Mbps
1080P 60	ProRes Proxy	90
1080P 60	ProRes LT	204
1080P 60	ProRes Normal	294
1080P 60	ProRes HQ	440
1080P 60	ProRes 4444	660
1080P 60	VC-5 {Cineform}* Low	160
1080P 60	VC-5 {Cineform}* Medium	230
1080P 60	VC-5 {Cineform}* High	308
1080P 60	VC-5 {Cineform}* Filmscan 1	384
1080P 60	VC-5 {Cineform}* Filmscan 2	460
1080P 60	VC-5 {Cineform}* Keying	884
--------	--------	--------
UHDTV-1 24*	ProRes Proxy	144
UHDTV-1 24*	ProRes LT	328
UHDTV-1 24*	ProRes Normal	468
UHDTV-1 24*	ProRes HQ	704

Format * = optional	Codec * = optional	Rate Mbps
UHDTV-1 24*	ProRes 4444	1056
UHDTV-1 24*	VC-5 {Cineform}* Low	320
UHDTV-1 24*	VC-5 {Cineform}* Medium	384
UHDTV-1 24*	VC-5 {Cineform}* High	512
UHDTV-1 24*	VC-5 {Cineform}* Filmscan 1	640
UHDTV-1 24*	VC-5 {Cineform}* Filmscan 2	768
UHDTV-1 24*	VC-5 {Cineform}* Keying	1476
--------	--------	--------
UHDTV-1 25*	ProRes Proxy	152
UHDTV-1 25*	ProRes LT	340
UHDTV-1 25*	ProRes Normal	488
UHDTV-1 25*	ProRes HQ	736
UHDTV-1 25*	ProRes 4444	1100
UHDTV-1 25*	VC-5 {Cineform}* Low	320

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
UHDTV-1 25*	VC-5 {Cineform}* Medium	384
UHDTV-1 25*	VC-5 {Cineform}* High	512
UHDTV-1 25*	VC-5 {Cineform}* Filmscan 1	640
UHDTV-1 25*	VC-5 {Cineform}* Filmscan 2	768
UHDTV-1 25*	VC-5 {Cineform}* Keying	1476
--------	--------	--------
UHDTV-1 29.97*	ProRes Proxy	180
UHDTV-1 29.97*	ProRes LT	408
UHDTV-1 29.97*	ProRes Normal	588
UHDTV-1 29.97*	ProRes HQ	880
UHDTV-1 29.97*	ProRes 4444	1320
UHDTV-1 29.97*	VC-5 {Cineform}* Low	--------
UHDTV-1 29.97*	VC-5 {Cineform}* Medium	460

Format * = optional	Codec * = optional	Rate Mbps
UHDTV-1 29.97*	VC-5 {Cineform}* High	616
UHDTV-1 29.97*	VC-5 {Cineform}* Filmscan 1	768
UHDTV-1 29.97*	VC-5 {Cineform}* Filmscan 2	920
UHDTV-1 29.97*	VC-5 {Cineform}* Keying	1768
--------	--------	--------
UHDTV-1 50*	ProRes Proxy	304
UHDTV-1 50*	ProRes LT	680
UHDTV-1 50*	ProRes Normal	976
UHDTV-1 50*	ProRes HQ	1472
UHDTV-1 50*	ProRes 4444	2200
UHDTV-1 50*	VC-5 {Cineform}* Low	640
UHDTV-1 50*	VC-5 {Cineform}* Medium	768
UHDTV-1 50*	VC-5 {Cineform}* High	1024

Format * = optional	Codec * = optional	Rate Mbps
UHDTV-1 50*	VC-5 {Cineform}* Filmscan 1	1280
UHDTV-1 50*	VC-5 {Cineform}* Filmscan 2	1536
UHDTV-1 50*	VC-5 {Cineform}* Keying	2952
--------	--------	--------
UHDTV-1 59.94*	ProRes Proxy	360
UHDTV-1 59.94*	ProRes LT	816
UHDTV-1 59.94*	ProRes Normal	1176
UHDTV-1 59.94*	ProRes HQ	1760
UHDTV-1 59.94*	ProRes 4444	2640
UHDTV-1 59.94*	VC-5 {Cineform}* Low	--------
UHDTV-1 59.94*	VC-5 {Cineform}* Medium	920
UHDTV-1 59.94*	VC-5 {Cineform}* High	1232
UHDTV-1 59.94*	VC-5 {Cineform}* Filmscan 1	1536

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
UHDTV-1 59.94*	VC-5 {Cineform}* Filmscan 2	1840
UHDTV-1 59.94*	VC-5 {Cineform}* Keying	3536
--------	--------	--------
720P 50	Uncompressed Fixed	--------
720P 50	DNxHD 115	115
720P 50	DNxHD 175	175
720P 50	ProRes Proxy	19
720P 50	ProRes LT	42
720P 50	ProRes Normal	61
720P 50	ProRes HQ	92
720P 50	ProRes 4444	138
720P 50	XDcam HD EX	35
720P 50	XDcam HD 50	50
720P 50	H.264 iPod	0.35
720P 50	H.264 iPad	0.9
720P 50	H.264 PIX	2.8
720P 50	H.264 DAX	0.7
720P 50	H.264 DAX_2800	2.8
720P 50	H.264 Full HD	3
720P 50	H.264 350kbs	0.35
720P 50	H.264 Main Proxy	0.35
720P 50	JFIF 10:1m	--------

Format * = optional	Codec * = optional	Rate Mbps
720P 50	JFIF 15:1s	--------
720P 50	JFIF 2:1	--------
720P 50	JFIF 20:1	--------
720P 50	JFIF 10:1	--------
720P 50	AVC-I 50	50
720P 50	AVC-I 100	100
720P 50	DVCProHD 100	100
720P 50	VC-5 {Cineform}* Low	--------
720P 50	VC-5 {Cineform}* Medium	--------
720P 50	VC-5 {Cineform}* High	--------
720P 50	VC-5 {Cineform}* Filmscan 1	--------
720P 50	VC-5 {Cineform}* Filmscan 2	--------
720P 50	VC-5 {Cineform}* Keying	--------
720P 50	JPEG 2000* VL 220Mbit	--------
--------	--------	--------
720P 59.94	Uncompressed Fixed	--------
720P 59.94	DNxHD 145	145
720P 59.94	DNxHD 220	220

Format * = optional	Codec * = optional	Rate Mbps
720P 59.94	ProRes Proxy	23
720P 59.94	ProRes LT	51
720P 59.94	ProRes Normal	73
720P 59.94	ProRes HQ	110
720P 59.94	ProRes 4444	165
720P 59.94	XDcam HD EX	35
720P 59.94	XDcam HD 50	50
720P 59.94	H.264 iPod	0.35
720P 59.94	H.264 iPad	0.9
720P 59.94	H.264 PIX	2.8
720P 59.94	H.264 DAX	0.7
720P 59.94	H.264 DAX_2800	2.8
720P 59.94	H.264 Full HD	3
720P 59.94	H.264 350kbs	0.35
720P 59.94	H.264 Main Proxy	0.35
720P 59.94	JFIF 10:1m	--------
720P 59.94	JFIF 15:1s	--------
720P 59.94	JFIF 2:1	--------
720P 59.94	JFIF 20:1	--------
720P 59.94	JFIF 10:1	--------
720P 59.94	AVC-I 50	50
720P 59.94	AVC-I 100	100
720P 59.94	DVCProHD 100	100
720P 59.94	VC-5 {Cineform}* Low	--------

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
720P 59.94	VC-5 {Cineform}* Medium	--------
720P 59.94	VC-5 {Cineform}* High	--------
720P 59.94	VC-5 {Cineform}* Filmscan 1	--------
720P 59.94	VC-5 {Cineform}* Filmscan 2	--------
720P 59.94	VC-5 {Cineform}* Keying	--------
720P 59.94	JPEG 2000* VL 220Mbit	220
--------	--------	--------
720P 60	Uncompressed Fixed	--------
720P 60	DNxHD 145	145
720P 60	DNxHD 220	220
720P 60	ProRes Proxy	23
720P 60	ProRes LT	51
720P 60	ProRes Normal	73
720P 60	ProRes HQ	110
720P 60	ProRes 4444	165
720P 60	VC-5 {Cineform}* Low	--------

Format * = optional	Codec * = optional	Rate Mbps
720P 60	VC-5 {Cineform}* Medium	--------
720P 60	VC-5 {Cineform}* High	--------
720P 60	VC-5 {Cineform}* Filmscan 1	--------
720P 60	VC-5 {Cineform}* Filmscan 2	--------
720P 60	VC-5 {Cineform}* Keying	--------
--------	--------	--------
PAL (SD)	Uncompressed Fixed	--------
PAL (SD)	ProRes Proxy	12
PAL (SD)	ProRes LT	28
PAL (SD)	ProRes Normal	41
PAL (SD)	ProRes HQ	61
PAL (SD)	ProRes 4444	92
PAL (SD)	H.264 iPod	0.35
PAL (SD)	H.264 iPad	0.9
PAL (SD)	H.264 350-FCP	0.35
PAL (SD)	H.264 DAX	0.7
PAL (SD)	H.264 DAX_2800	2.8
PAL (SD)	H.264 Full SD	0.7

Format * = optional	Codec * = optional	Rate Mbps
PAL (SD)	H.264 Anamorphic Full SD	0.7
PAL (SD)	H.264 Full SD 3500	3.5
PAL (SD)	H.264 Anamorphic Full SD 3500	3.5
PAL (SD)	JFIF 10:1m	--------
PAL (SD)	JFIF 15:1s	--------
PAL (SD)	JFIF 2:1	--------
PAL (SD)	JFIF 20:1	--------
PAL (SD)	JFIF 10:1	--------
PAL (SD)	IMX 30	30
PAL (SD)	IMX 40	40
PAL (SD)	IMX 50	50
PAL (SD)	VC-5 {Cineform}* Low	--------
PAL (SD)	VC-5 {Cineform}* Medium	--------
PAL (SD)	VC-5 {Cineform}* High	--------
PAL (SD)	VC-5 {Cineform}* Filmscan 1	--------
PAL (SD)	VC-5 {Cineform}* Filmscan 2	--------

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
PAL (SD)	VC-5 {Cineform}* Keying	--------
--------	--------	--------
PAL (SD) 25P	Uncompressed Fixed	--------
PAL (SD) 25P	ProRes Proxy	12
PAL (SD) 25P	ProRes LT	28
PAL (SD) 25P	ProRes Normal	41
PAL (SD) 25P	ProRes HQ	61
PAL (SD) 25P	ProRes 4444	92
PAL (SD) 25P	H.264 iPod	0.35
PAL (SD) 25P	H.264 iPad	0.9
PAL (SD) 25P	H.264 350-FCP	0.35
PAL (SD) 25P	H.264 DAX	0.7
PAL (SD) 25P	H.264 DAX_2800	2.8
PAL (SD) 25P	H.264 Full SD	0.7
PAL (SD) 25P	H.264 Anamorphic Full SD	0.7

Format * = optional	Codec * = optional	Rate Mbps
PAL (SD) 25P	H.264 Full SD 3500	3.5
PAL (SD) 25P	H.264 Anamorphic Full SD 3500	3.5
PAL (SD) 25P	VC-5 {Cineform}* Low	--------
PAL (SD) 25P	VC-5 {Cineform}* Medium	--------
PAL (SD) 25P	VC-5 {Cineform}* High	--------
PAL (SD) 25P	VC-5 {Cineform}* Filmscan 1	--------
PAL (SD) 25P	VC-5 {Cineform}* Filmscan 2	--------
PAL (SD) 25P	VC-5 {Cineform}* Keying	--------
--------	--------	--------
NTSC (SD) 23.98P	Uncompressed Fixed	--------
NTSC (SD) 23.98P	ProRes Proxy	12
NTSC (SD) 23.98P	ProRes LT	29
NTSC (SD) 23.98P	ProRes Normal	42

Format * = optional	Codec * = optional	Rate Mbps
NTSC (SD) 23.98P	ProRes HQ	63
NTSC (SD) 23.98P	ProRes 4444	94
NTSC (SD) 23.98P	H.264 iPod	0.35
NTSC (SD) 23.98P	H.264 iPad	0.9
NTSC (SD) 23.98P	H.264 350-FCP	0.35
NTSC (SD) 23.98P	H.264 DAX	0.7
NTSC (SD) 23.98P	H.264 DAX_2800	2.8
NTSC (SD) 23.98P	H.264 Full SD	0.7
NTSC (SD) 23.98P	H.264 Anamorphic Full SD	0.7
NTSC (SD) 23.98P	H.264 Full SD 3500	3.5
NTSC (SD) 23.98P	H.264 Anamorphic Full SD 3500	3.5
NTSC (SD) 23.98P	VC-5 {Cineform}* Low	--------
NTSC (SD) 23.98P	VC-5 {Cineform}* Medium	--------
NTSC (SD) 23.98P	VC-5 {Cineform}* High	--------

Data rates / cont...

Format * = optional	Codec * = optional	Rate Mbps
NTSC (SD) 23.98P	VC-5 {Cineform}* Filmscan 1	--------
NTSC (SD) 23.98P	VC-5 {Cineform}* Filmscan 2	--------
NTSC (SD) 23.98P	VC-5 {Cineform}* Keying	--------
--------	--------	--------
NTSC (SD) 59.9i	Uncompressed Fixed	--------
NTSC (SD) 59.9i	ProRes Proxy	12
NTSC (SD) 59.9i	ProRes LT	29
NTSC (SD) 59.9i	ProRes Normal	42
NTSC (SD) 59.9i	ProRes HQ	63
NTSC (SD) 59.9i	ProRes 4444	94
NTSC (SD) 59.9i	H.264 iPod	0.35
NTSC (SD) 59.9i	H.264 iPad	0.9
NTSC (SD) 59.9i	H.264 350-FCP	0.35
NTSC (SD) 59.9i	H.264 DAX	0.7
NTSC (SD) 59.9i	H.264 DAX_2800	2.8

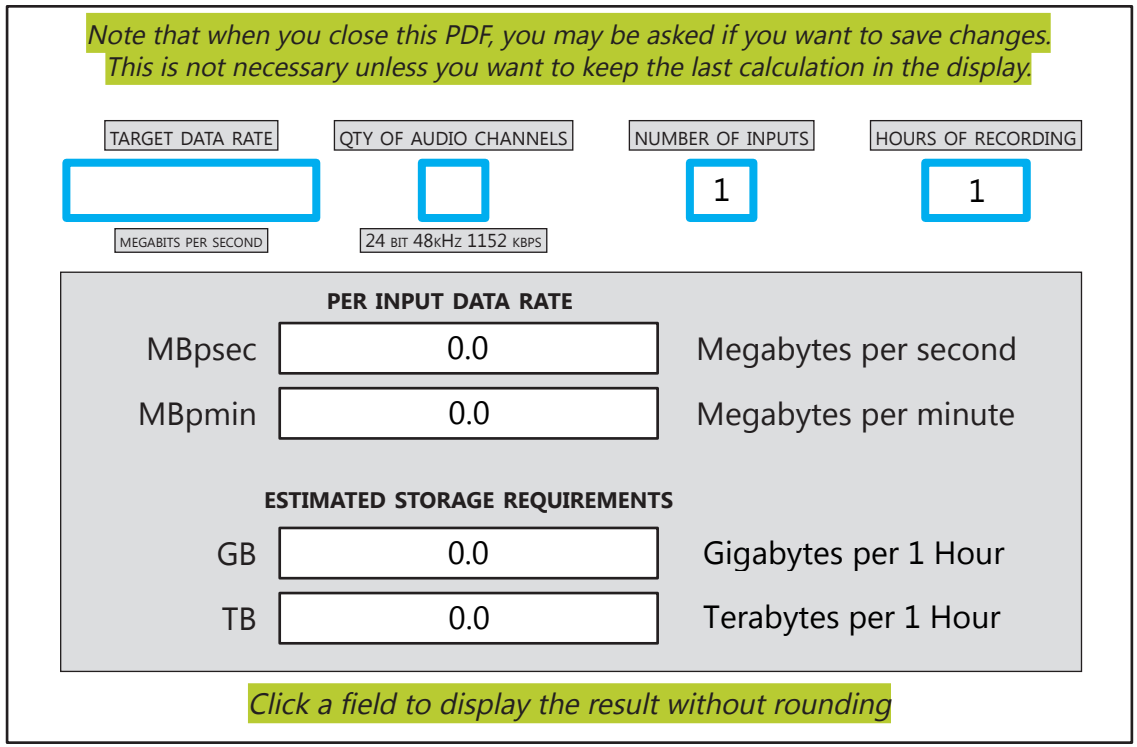
Format * = optional	Codec * = optional	Rate Mbps
NTSC (SD) 59.9i	H.264 Full SD	0.7
NTSC (SD) 59.9i	H.264 Anamorphic Full SD	0.7
NTSC (SD) 59.9i	H.264 Full SD 3500	3.5
NTSC (SD) 59.9i	H.264 Anamorphic Full SD 3500	3.5
NTSC (SD) 59.9i	JFIF 10:1m	--------
NTSC (SD) 59.9i	JFIF 15:1s	8
NTSC (SD) 59.9i	JFIF 2:1	80
NTSC (SD) 59.9i	JFIF 20:1	16
NTSC (SD) 59.9i	JFIF 10:1	24
NTSC (SD) 59.9i	IMX 30	30
NTSC (SD) 59.9i	IMX 40	40
NTSC (SD) 59.9i	IMX 50	50
NTSC (SD) 59.9i	VC-5 {Cineform}* Low	--------
NTSC (SD) 59.9i	VC-5 {Cineform}* Medium	--------

Format * = optional	Codec * = optional	Rate Mbps
NTSC (SD) 59.9i	VC-5 {Cineform}* High	--------
NTSC (SD) 59.9i	VC-5 {Cineform}* Filmscan 1	--------
NTSC (SD) 59.9i	VC-5 {Cineform}* Filmscan 2	--------
NTSC (SD) 59.9i	VC-5 {Cineform}* Keying	--------
--------	--------	--------
--------	--------	--------
--------	--------	--------
--------	--------	--------
--------	--------	--------

11.4 Storage calculator

Codec data rates are generally measured as Mbps (Megabits per second) while storage is often quoted as MB Megabytes, GB Gigabytes, TB Terabytes and as storage costs decrease, Petabytes, Exabytes Zettabytes, Yottabytes and perhaps one day, Brontobytes and Gegobytes. There are several rate and storage calculators available on-line but a local one can be handy so while not very advanced, the calculator below will give you the basic storage requirements for your recordings.

To use the calculator, refer to the data rate chart: "11.3 Data rates" on page 381. Enter a specific rate in "Target Data Rate". To include the space required for audio, enter the number of channels in "Audio channels". Change the inputs and hours fields as needed. Press "Enter" or click elsewhere on the page to update the results.
Any decimal can be used for hours of recording such as .25 to mean 15 minutes, 6 for six hours, etc.
Remember, these are just estimates. Actual results will vary, especially if variable bit rate encoding is employed.



Not all PDF applications can use the built-in formulas. If your calculator does not work, try Adobe's PDF Reader.

12.0 Index

For answers to commonly asked questions and descriptions of the many Cinedeck features and functions, also see "10.0 FAQ & Features" on page 329.

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