ΩMEGA HD

DIGITAL VIDEO RECORDER

Fast Forward Video

1901 Carnegie Avenue, Santa Ana, CA 92705, USA
Phone: (949)852-8404 FAX: (949)852-1226
http://www.ffv.com

Revision 6.0 • Oct 2014

User's Manual

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Maintenance

PRECAUTIONS: The Omega HD Deck has been built to meet the demands of a studio environment; however, the hardware is subject to the same dangers from static as any other electronic device. Use care when connecting or disconnecting cables.

IMPORTANT: Take care not to introduce any moisture into the unit. Electronic assemblies are sensitive to static electricity, due to the electrostatically sensitive devices used within the circuitry. All semiconductors, as well as some resistors and capacitors, may be damaged or degraded by exposure to static electricity. The hard drives and the video card must receive adequate ventilation, and be kept as cool as possible. A bracket with fans has been designed and already installed into each Omega HD Deck. This device will help prevent overheating the drive and the video card. Overheating will most likely cause the unit to malfunction and possibly damage the video card.

If you experience any problems with the unit please call Fast Forward Video's service department. DO NOT ATTEMPT to repair or modify the unit as this might cause further damage, which could void your warranty. A technician can decipher whether your problem is caused by a faulty component, and determine whether you need to return the unit for evaluation and/or repair.

Cleaning: The chassis should only require dusting with a soft cloth. Solvents may harm the painted surface and leak to the inside causing severe damage. If you work in a dusty environment, periodic dusting within the unit using forced air is recommended to ensure the life of the fan and power supply.

Operation and Storage Environment: Due to the nature of the hard drives used with this device THE UNIT MUST BE USED IN A WELL VENTILATED AREA. Do not cover or block the ventilation area and try to avoid areas with excessive heat, which may cause the video card to malfunction.

PACKAGE CONTENTS (May vary depending on model)

1 Omega HD Deck
1 CD (includes user manual and MAC/PC component)
1 POWER CABLE a standard 3-pin power cable
1 SET of RACK EARS and 4 screws. The Omega HD Deck is rack mountable
1 PACK OF ASSORTED HARD DRIVE SCREWS
1 DB-9 Cable (KEEP IT HANDY FOR FIRMWARE UPDATES)
1 RS-232/422 CONVERTER (KEEP IT HANDY FOR FIRMWARE UPDATES)
1 Gender changer used with converter (KEEP IT HANDY FOR FIRMWARE UPDATES)

PLEASE RETAIN THE ORIGINAL SHIPPING CARTON AND FOAM. If you need to return the unit for service or upgrade it is STRONGLY recommended that you use the original carton and foam, which were specifically designed to protect it from damage while in transit. IF RETURNED IN SOMETHING OTHER THAN ORIGINAL PACKAGING, A FEE WILL BE ASSESSED FOR THE USE OF NEW SHIPPING MATERIALS WHEN RETURNED BACK TO YOU. A PROTECTIVE METAL SHIPPING CASE IS ACCEPTABLE.

FCC information to the user:
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2). This device must accept any interference received, including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a class a digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at his/her own expense.

Overview

The OMEGA HD Deck by Fast Forward Video is a high definition broadcast quality Digital Video Recorder based on JPEG2000 compression. Available in either dual channel or simultaneous play and record configurations, it delivers all the advantages of HD images and the random access non-linear benefits of hard disk media.

Single and dual channel units offer removable, hot swappable 2.5" SATA drives compatible with Elite HD and features a USB port for video download.

The Simultaneous Playback and Record (SPR) configuration allows you to replay that slow motion clip while recording the action without missing an second. It is capable of up to 18 hours of record time based on two 500 GB drives and it includes a USB 2.0 port to easily download video files. The Omega HD is the ideal replacement for standard definition DVRs and analog tape decks.

Features:

- Front Panel Touch Screen Control
- RS-422 Machine Control
- Records JPEG2000.mov file in HD or SD
- Data rates up to 100 Mbit/s per channel
- 4:2:2 Sampling
- 10 bit quantization
- 8 embedded audio channels per HD video channel
- Up to 4 channels AES audio per video channel
- Genlock input
- SMPTE/EBU Longitudinal time code
- Chase Lock
- Discrete access to every frame
- Uses 2.5" SATA drives
- Loop Record Feature
- Instant Cueing, Clip Recall
- Variable Speed Noise-Free Playback Forward and Reverse

Omega HD Simultaneous Playback/Record (SPR) Menu Settings Set-up

Time Delay application w/out QuickTime Files:

SETTING MENU – Both Channel 1 & 2

Standard = change to video format needed

TIME CODE MENU – Both Channel 1 & 2

Output = SOURCE TO
SMPTE Format = DROP

RECORD MENU – Channel 1 Only

Loop Record = OFF

PLAYBACK MENU – Both Channel 1 & 2

Loop Play = OFF
Play Speed = 30 FPS

DISK CONFIGURATION – Channel 1 Only

Disk Format = NATIVE MOE
File Format = NATIVE MOE **Always format drives after changing disk configuration**

Time Delay application w/ QuickTime Files:

SETTING MENU – Both Channel 1 & 2

Standard = change to video format needed

TIME CODE MENU – Both Channel 1 & 2

only accessible when time code is present

Output = SOURCE TO
SMPTE Format = DROP

RECORD MENU – Channel 1 Only

Loop Record = OFF

PLAYBACK MENU – Both Channel 1 & 2

Loop Play = OFF
Play Speed = 30 FPS

DISK CONFIGURATION – Channel 1 Only

Disk Format = DOS FAT32
File Format = QUICKTIME **Always format drives after changing disk configuration**

We recommend that you have the drives installed, formatted and tested by Fast Forward Video. However, you may install the drives by following the procedure below. We ONLY recommend specific hard drives - see www.ffv.com

2.5" Drive Removal/Replacement Procedure:

1. Open the front panel door by rotating the ¼ turn knob counter-clockwise on the lower left corner of the door.
2. Each tray has a black push button drive release located on the right of the drive bay.
3. To install a drive remove the two screws from the rear panel of the drive enclosure.
4. Remove the circuit board from the drive enclosure.
5. Attach the 2.5" SATA hard drive to the circuit board, and fasten it to the board using drive mounting screws.
6. Once the hard drive has been secured on the circuit board, replace the circuit board (with hard drive attached) in the drive enclosure (drive facing up). Fasten the rear panel of the drive enclosure, using the screws that were removed in step #3.
7. Slide the drive back into the enclosure bay.

Formatting Drives

Formatting Drives (Dual Channel or SPR):

1. Install the drives (see page 5)
2. Turn on power and wait for the deck to recognize drives %.
3. Touch “Disk %” located in upper left hand corner on either channel (see figure 1).
4. Touch “Disk” within the Main Menu.
5. Touch “Clear Disk” within the Disk Menu.
6. Touch “Yes” to Clear Disk.
7. Touch “Yes” to Confirm Clear Disk.
8. Repeat process for channel two.

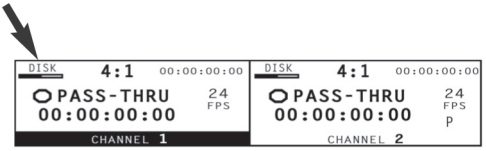


Figure 1

Figure 2

Rear Panel Connections

VIDEO Ch 1 and VIDEO Ch 2

IN = SD/HD-SDI input BNC connectors.

OUT = SD/HD-SDI output BNC connectors.

RS:422 Ch 1 and **RS:422 Ch 2 =** Machine Control (DB9 CONNECTOR) - This connector is for controlling the deck or updating firmware from an external RS-422 device or PC (using RS-422 to RS-232 converter). Please note when using the RS-422 with a controller it is recommended to lock the front panel (see page 11 Settings – Front Panel).

TIME CODE 1 and TIME CODE 2

IN = Input BNC connectors for longitudinal time code.

OUT = Output BNC connectors for longitudinal time code.

REFERENCE INPUT = Use this connector for Genlock. The signal must conform to broadcast specifications which is RS-170 for NTSC. Composite video or black burst are acceptable. DO NOT connect non-standard signals to the Omega HD Deck, or the picture WILL distort.

Please NOTE:

When using the Simultaneous Playback / Record (SPR) configuration -

Channel 1 is RECORD only

Channel 2 is PLAYBACK only

Front Panel Controls

POWER: Switch that turns the unit on / off. Please allow at least 30 seconds after turning the unit on for it to boot-up and recognize the disk.

PASS-THRU (in the Touch Screen): The red LED above the record button will light up indicating that it is in digital pass-thru mode, which indicates it is record ready. A corresponding message will be displayed in the mode indicator area located in the center of the LCD touch-screen panel.

RECORD (REC): To start recording press and hold the red record button and then press the play button. A RECORD message and the time code sequence will be displayed in the main menu screen to indicate the recording process has been initiated and video data is being recorded onto the storage media.

PLAY : To PLAY from the beginning, press the "<<" button (notice that in NATIVE mode, it is instantaneous, no waiting for shuttle back). The time code display will indicate that you are at 00:00:00:00 and the reference monitor hooked up to the Omega HD Deck will jump to the beginning of the disks recorded video material. Press the play button to view the recorded video material.

STOP: Terminates both the play and record functions but will not clear the screen. Please note that when recording long clips wait 30 seconds before selecting another command - to allow for the clip to close.

CHASE LOCK (in the Touch Screen): To enable this feature, simply press and hold the PLAY and STOP buttons simultaneously for 2 seconds and a corresponding message will be displayed in the mode indicator area located in the center of the LCD touch-screen panel. If feeding time code into the Omega HD Deck, that channel will lock to the incoming time code during playback.

SHUTTLE / SCAN SELECT: This allows you to choose between a variety of noise-free slow motion speeds as well as fast motion scans. Press this button to select the corresponding LED to change modes. The orange light places Omega HD Deck in scan mode and the green light in slow motion. Once you have selected the desired mode use the forward and reverse buttons located to the left and right of the select button.

STEP BACK < : Press to step the Omega HD Deck backward one frame. Each subsequent press equals one frame.

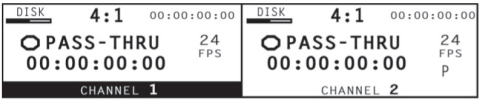
STEP FORWARD > : Press to step the Omega HD Deck forward one frame.

REWIND (START POINT) << : Press to jump back to the first frame of a selected clip. Press and hold to jump back to the first frame of video on the hard drive.

FAST FORWARD (END POINT) >> : Press to jump forward to the last frame of a clip. Press and hold to jump to the last frame of video on the hard drive.

JOG / SHUTTLE WHEEL: Similar to a traditional analog tape deck, this wheel acts and feels the same. In addition to machine control, this wheel is also used for selecting various options in some of the menus accessed from the front panel's touch screen.

Touch Screen Menus



Dual CH & SPR LCD Touch Screen

Single CH LCD Touch Screen

An LCD touch-screen panel with a menu of options and a variety of parameters used to operate the Omega HD Deck's functions. To lock both channels together for simultaneous control, simply touch the vertical line that separates the two channels, until they are both highlighted. Either channel is selectable by touching "Channel 1/2" at the bottom of the LCD touch screen.

1. TIME CODE DISPLAY: Displays the assigned Time Code for the frame in use.
2. MODE INDICATOR: The current transport mode will be displayed directly above the Time Code in the center of the touch screen, such as: RECORD, PASS-THRU, PLAY, REV, FWD, STOP, etc.
3. DISK CAPACITY INDICATOR:
   This icon is located on the top left of the touch screen and displays the percentage of disk space used.

4. FIRMWARE:
   Firmware information is located in main menu which is accessed by touching the disk capacity indicator.

5. SETUP MENU
   Access the "Setup" menu by touching the disk capacity indicator located at the top left corner of each channel.

6. GO TO ICON

   Press the time code located in the upper right hand corner of the recording channel to mark one frame of video to jump back to immediately upon request. You can store only one selection per channel.

7. HOME ICON

   The Omega symbol is the home icon located in the upper right hand corner of each channel. Pressing the home icon will return you to the main display from any other screen.

   "S" OR "P" Indicates whether deck is currently in a Source list (S) or a Play list (P)

   A letter 'S' in the bottom right corner of the touch screen indicates that you are playing back material from the source list. A 'P' indicates that a play list is loaded.

To access the menu and adjust any of the settings on the Omega HD Deck, Each of the choices listed on the main menu have sub-menus.

← Menu Icon

MAIN MENU: (Dual Channel and SPR shown — Single Channel has no firmware menu)

SETTINGS - Lets you choose the personality and the video standard of deck.

RECORD - a variety of settings affecting the acquisition of video data.

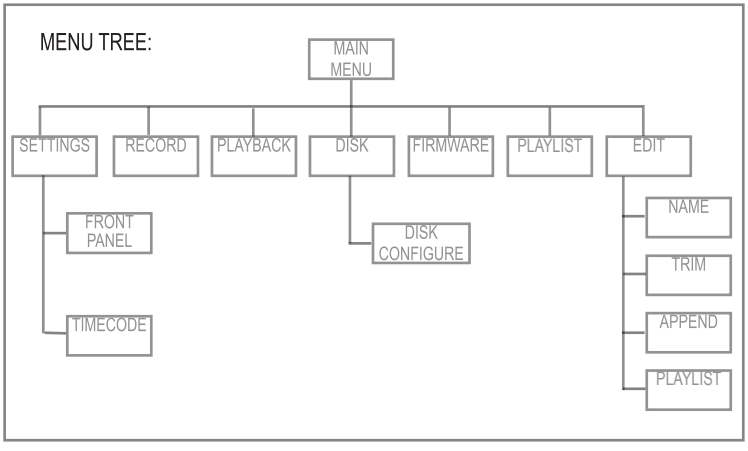
PLAYBACK - options for playing back video including loop playback and play speed.

DISK - menu buttons for clearing individual files or the whole disk.

FIRMWARE - used for updating the unit's firmware version.

PLAYLIST - create and manage groups of clips.

EDIT - Trim and name clips. (Dual Channel Only)



STANDARD: Allows you to choose the recording format being received by pressing the box to scroll through the supported resolutions.

Note: It will take longer to configure unit when changing HD to SD. Also, commands may stop working if the video format is not matched with the camera or sources video feed.

RECORDING IN NATIVE MODE: Native mode is the most natural state for the Omega HD Deck to operate in as it utilizes the random access capabilities of the hardware most effectively.

As you record material to the Omega HD Deck it stores the material in the available space on the storage media. When it gets to the time code point you have selected for the inserted material, it jumps to that point on the drive--wherever that may be--plays it, then returns to the original section.
NOTE: Play list functionality is only available in Native mode

Time Code Menu (Settings Menu continued)

OUTPUT:

SOURCE TO: Timed with source video.

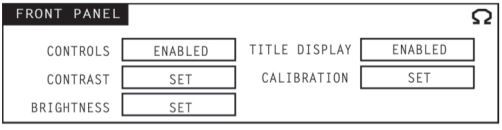
PLAYLIST: Time code is associated with playlist video.

SMPTE FORMAT:

DROP: Supports drop-frame time code input.

NON-DROP: Uses non drop-frame time code input.

Front Panel Menu



FRONT PANEL: This sub menu allows you to access the front panel's brightness/contrast setting capability, and to disable the front panel controls for uninterrupted record or play.

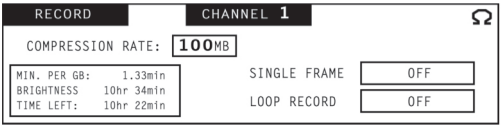
CONTROL: "Enable" allows you to control deck using the LCD touch screen and "Disable" allows you to turn off the front panel controls for uninterrupted recording or playing.

CONTRAST: Gives you the option to increase or decrease the contrast on the LCD touch screen by turning the Jog/Shuttle Wheel. Choose "OK" to save your changes or "Default" to go back to manufacturer setting.

TITLE DISPLAY: Shows the title of the clip being played.

CALIBRATION: Allows you to align the menu within the LCD touch screen. Please be careful when changing the calibration because it my be difficult to re-align if you miss the line indicators.

Record Menu



COMPRESSION LEVEL: The JPEG2000 compression is set at 100 Mbit/s for HD. Please note that SD records at 50Mbit/s even though the unit displays 100 Mbit/s.

MIN. PER GB: This screen gives you a basic reading of the minutes of storage generally available with the corresponding compression setting.

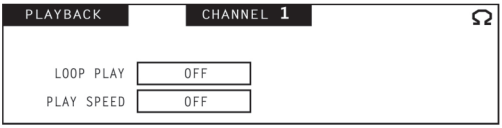
TOTAL TIME: This number relates to the amount of time available for recording, based on the approximate minutes per gigabyte and the size of the storage media.

TIME LEFT: This figure will give a quick reading of approximately how much time is left for recording.

TIME LAPSE: Enables the unit to record a single frame at a time, typically used in animation and time lapse recording.

LOOP RECORD: This function loops across available space when current recording starts.

Playback Menu



LOOP PLAY: Allows you to play a segment of designated video in Loop mode, repeating the segment endlessly.

PLAY SPEED: By touching the play speed box the play speed menu will be displayed, press the arrows to change the frames per second. Press OK to save the selection.

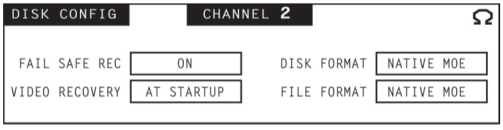
Disk Menu

CLEAR DISK: This will erase all data and format the drive for the selected channel.

ERASE – CLIP/FRAMES: Allows individual clips to be deleted or trimmed. The trim will permanently remove frames from the specified clip.

ERASE – PLAY LISTS: Allows individual play lists to be deleted.

Disk Configuration

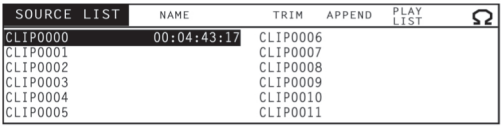


DISK FORMAT: Gives you the options, when formatting disks, of Native MOE (FFV's proprietary Media Operating Environment, essential for immediate playback) or DOS FAT 32 (for creating QuickTime files to transfer to NLEs).

FILE FORMAT: Gives you the file format options of NATIVE MOE or QuickTime, for recording video data.

****PLEASE NOTE:** when recording video to QuickTime files, the disk format **MUST** be set to DOS FAT 32.

Edit Menu



In order to access the Edit Menu you must be in STOP Mode (Press << on the front panel).

SETTING UP A PLAY LIST: (Available on Dual Channel Model only)

Play list = Is a series of clips you designate to play in a specific order taken from the master source list.
Source list = Is the master footage recorded on the Omega HD.

1. Enter the Edit Menu - which will display the source list and a sequence of clips. Please note that you may have more than one file per clip depending on the size of the recorded material (2 GB file size limit).

2. Choose the appropriate clip by turning the shuttle wheel.

3. Choose the APPEND selection located on the touch screen LCD.

4. Choose the PLAY LIST selection located on the touch screen LCD to move from the source list to the play list menu.

5. Choose the UNTITLED PLAY LIST to rename the play list of your choice.

6. Choose the UNTITLED PLAY LIST to erase the name and enter a new name using the alphabet provided (see figure 1). Please note to change between the alphabet and numbers choose the box area of the rectangle located to the right of the OK selection.

7. Choose OK to save name.

8. Choose REMOVE to remove clips from the play list highlight the clip using the shuttle wheel.

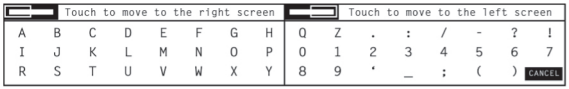
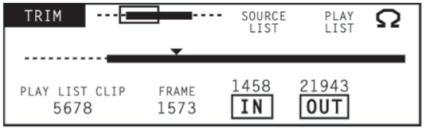


Figure 1

Edit Menu (Continued)

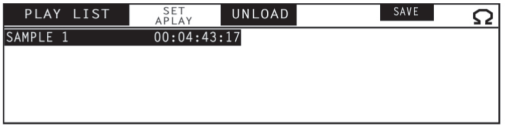


9. Choose TRIM to edit a clip in the designated play list. You may review the clip by pressing play, turning the shuttle wheel, or using the step forward/back buttons located on the front panel. Select the desired start point by pressing the IN button and the end point by pressing the OUT button. Note that the thick dark line in the middle of the screen is now a shorter line, which indicates the size of the clip you have just created. If you have a large clip and wish to scroll through it quicker you can use the zoom feature located at the top of the screen near the upper left corner of the window. Choose PLAY LIST to save designated footage. Choose DISCARD CHANGES to go back to original footage.

10. Exit Edit Menu by choosing the Omega Symbol in the upper right corner.

11. Enter the Play List menu and choose SAVE to save the play list.

Play List Menu



Once you have created a play list within the Edit Menu the final step will be to enter this menu and save the play list (see Edit Menu for step by step instructions). Please note the Play List option is only available if you are using Native mode.

PLAY LIST: Lists all the saved play list set-up within the Edit Menu.

SET APLAY/CLEAR APLAY: Configures the Omega HD to automatically play a chosen play list on power up.

LOAD/UNLOAD: In the upper left portion of the play list menu, there is a feature named aplay load. With this feature, you can designate one play list to automatically begin to play on power up, as soon as the hard drive is initialized.

ACTIVE SAVE: When you add to, change, or rename your play list, you need to save it. To save your play list, select play list from the main menu, notice the word SAVE is highlighted, press it and the play list is saved.

STORING MULTIPLE PLAY LISTS: If you wish to make a new play list with another name, choose an existing play list and remove all or part of the clips from it. You can make the necessary changes to the new play list, re-name it and you now have multiple play lists to choose from. Once you have more than one play list you must select play list from the main menu and activate the one you wish to use by loading it.

DELETING A CLIP AND / OR A PLAY LIST: See Disk Menu options. Please note that you must UNLOAD a play list before deleting.

Connect the Omega HD to your computer:
1. Connect gender changer to RS-422 side of converter
2. Connect DB-9 cable to RS-232 side of converter
3. Connect gender changer side to the Omega HD
4. Connect other side of DB-9 cable to serial port of computer

(If the computer does not provide a 9 pin serial port, a USB to Serial converter is necessary – Keyspan (part number USA-19HS) makes an inexpensive one that works well. If using a USB to serial converter please make sure the driver has been downloaded onto your computer)

Once the Omega HD is connected to your PC or MAC please use one of the four methods to upload the firmware.

Hyper Terminal compatible with Windows
ZTerm - MAC compatible

HYPER TERMINAL

Program is PC compatible with Windows XP or below

1. On the Omega HD, go to menu - firmware - touch "Update at 57600 Baud" - the LCD will display "Waiting for Firmware Update".

2. Open HyperTerminal program on your PC
   Start Menu – Accessories – Communications – HyperTerminal

3. Optional message – "Default Telnet Program?" select NO

4. CONNECTION DESCRIPTION: FFV, choose an Icon, OK (see figure 1).

5. CONNECT TO: Connect using: COM** (see figure 2)

   This will display the COM port that the unit is currently connected to, which may vary - if no COM port is listed check connections and make sure Serial to USB drivers have been downloaded) – click OK.

6. COM* Properties (see figure 3)
   BITS PER SECOND: 57600
   DATA BITS: 8
   PARITY: NONE
   STOP BITS: 1
   FLOW CONTROL: NONE
   Click APPLY & OK

7. HyperTerminal will display “Firmware Update Utility” is ready for update when “CCCC…” is displayed.
8. Select TRANSFER Menu – “Send File”
9. Browse and select the unzipped fud file – change Protocol to “Xmodem” – SEND
10. The “Xmodem file send for FFV” menu will show the update progression
11. Update complete close program.
12. Cycle Omega HD power OFF then ON for update to take effect
13. Repeat steps for front panel and video channel firmware updates

ZTERM

Program is MAC compatible

1. On the Omega HD, go to menu - firmware - touch “Update at 57600 Baud” - the LCD will display “Waiting for Firmware Update”.
2. Open ZTerm program on your MAC - this will scan for the appropriate COM port and connect with the Omega. If this fails check all the connections and make sure any necessary drivers have been downloaded.
3. ZTerm Local screen will display “pooooo…”
4. Settings – Connection - change to:

   DATA RATE: 57600

   DATA BITS: 8

   PARITY: NONE

   STOP BITS: 1

   FLOW CONTROL: Xon/Xoff

   Click OK
5. ZTerm Local screen will display “CCCCC…”
6. Go to “File”- “Transfer Covert” and select “Binary Data”
7. File – Send Files – Xmodem-1K
8. Browse and select the unzipped fud file – open
9. Xmodem Send menu will show the update progression
10. Update complete close program.
11. Cycle Omega HD power OFF then ON for update to take effect
12. Repeat steps for front panel and video channel firmware updates

Viewing JPEG 2000 with computers

Before you can view the JPEG 2000 mov file you must install one of the below components. Just extract them from their archives and copy to their proper location (see below). Please note if you are updating from a previous component version you will need to delete the older component before installing. If you are unable to delete please log off and log back into your computer which will unlock the component from your system.

QuickTime Component for Windows

QuickTime_Win_DATE.zip

Extract and copy it to the QuickTime system directory - "C:\Program Files\QuickTime\QTSystem".

QuickTime Component for OS X (Intel based Macs only)

QuickTime_MAC_DATE.zip

Extract and copy it to the QuickTime system directory - "/Library/QuickTime".

Moving Clips to NLE System

1. Connect drive enclosure to computer using a USB cable. Please note to efficiently move the clips use the USB located on the hard drive tower.

2. Once your computer recognizes the drive - open the drive and a list of 2GB clips will be displayed in the appropriate order. Please note all drives must be formatted in FAT32. Helpful Hint - another sorting method would be to set-up the internal clock (see Setting Clock instructions).

3. Move the selected clips to your computer. Please note it is more efficient to edit clips from your computer than directly from the drive.

4. Place clips within NLE system and edit accordingly.

Specifications

VIDEO INPUT

Digital Input:	SD/HD-SDI
Standards:	SMPTE 274M (1080i) SMPTE 296M (720p) SMPTE 347M (NTSC & PAL) SMPTE 334M-1 SMPTE 334M-2 SMPTE RP188
Genlock Input:	60 HZ: Blackburst SMPTE 170M; 50 Hz: ITU-R BT.470; 75ohm
Supported Resolutions:	1080i / 60 / 59.94 / 50 / 24 psf (1920 x 1080i / 60 / 59.94 / 50 / 2:1 Interlace) 1080s / 23.98 / 24.00 720p / 60 / 59.94 / 50 (1280 x 720 / 60 / 59.94 / 50 / Progressive) 720p / 23.98 / 24.00 NTSC (720 x 486 / 59.94 / 2:1 Interlace) PAL (720 x 576 / 50 / 2:1 Interlace) Supports 4:3 or 16:9 aspect ratio
Connections:	BNC 75 ohms

AUDIO INPUT/OUTPUT

Digital Input/Output:	8 Channels embedded HD-SDI 4 Channels embedded SD-SDI
Connections:	BNC connectors unbalanced

AUDIO SPECIFICATIONS

Resolution:	24 bits
Audio Channels:	HD embedded 8 in / 8 out SD embedded 4 in / 4 out 4 channels AES/EBU optional; these replace embedded channels

COMMUNICATION INTERFACE

RS-422 Interface:	38400 baud
Protocols:	Sony Remote -1 (9 Pin) Odetics Fast Forward Video Native

HARD DRIVES

Supported Hard Drive for 1-2 Channel:	2.5" SATA
Enclosure:	supports 9.5mm drive height

TIME CODE

SMPTE/EBU	Longitudinal (LTC)

VIDEO COMPRESSION

Method:	Motion JPEG2000
File Format:	QuickTime or Native
Maximum Bit Rate:	HD:100Mbit/s SD: 50 Mbit/s

WARRANTY 1 Year

GENERAL

Physical Dimensions:	3.5"H x17" W x 14" D 2RU
Power Consumption:	125 Watts
Operating Temperature:	0c to 50c
Humidity:	90% relative to humidity with no visible condensation

Limited Warranty

12 – MONTH LIMITED WARRANTY
FFV System LLC. warrants to the original purchaser that the product (Hardware and components) shall be free from defects in material and workmanship for a period of 1 year from the date of purchase. If a defect covered by this warranty occurs during this 1 year period, FFV Systems LLC. will repair or replace the defective product or component, at its option, free of charge.

WARRANTY LIMITATIONS
THIS WARRANTY SHALL NOT APPLY IF THIS PRODUCT: (a) IS DAMAGED BY NEGLIGENCE, ACCIDENT, MISUSE, OR BY OTHER CAUSES UNRELATED TO DEFECTIVE MATERIALS OR WORKMANSHIP; OR (b) HAS HAD THE SERIAL NUMBER ALTERED, DEFACED, OR REMOVED.

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