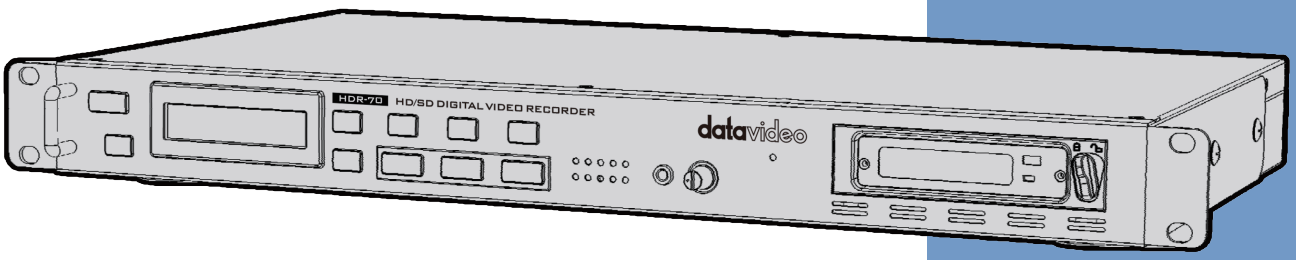
datavideo



HD/SD DIGITAL VIDEO RECORDER HDR-70

Instruction Manual

www.datavideo.com

Contents

Disclaimer of Product & Services

The information offered in this instruction manual is intended as a guide only. At all times, Datavideo Technologies will try to give correct, complete and suitable information. However, Datavideo Technologies cannot exclude that some information in this manual, from time to time, may not be correct or may be incomplete. This manual may contain typing errors, omissions or incorrect information. Datavideo Technologies always recommend that you double check the information in this document for accuracy before making any purchase decision or using the product. Datavideo Technologies is not responsible for any omissions or errors, or for any subsequent loss or damage caused by using the information contained within this manual. Further advice on the content of this manual or on the product can be obtained by contacting your local Datavideo Office or dealer.

FCC Compliance Statement

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.

Warnings and Precautions

1. Read all of these warnings and save them for later reference.
2. Follow all warnings and instructions marked on this unit.
3. Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this unit in or near water.
5. Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage.
6. Slots and openings on the cabinet top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings on the bottom of the cabinet will be blocked. This unit should never be placed near or over a heat register or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your Datavideo dealer or your local power company.
8. Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, or otherwise stressed.
9. If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord rating.
10. Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.
11. Never push objects of any kind into this unit through the cabinet ventilation slots, as they may touch dangerous voltage points or short out parts that could result in risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.
12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked “Do Not Remove” may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.
13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:
    a. When the power cord is damaged or frayed;
    b. When liquid has spilled into the unit;
    c. When the product has been exposed to rain or water;
    d. When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;
    e. When the product has been dropped or the cabinet has been damaged;
    f. When the product exhibits a distinct change in performance, indicating a need for service.

Warranty

Standard Warranty

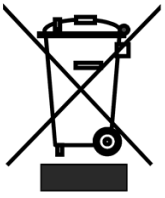
- Datavideo equipment is guaranteed against any manufacturing defects for one year from the date of purchase.
- The original purchase invoice or other documentary evidence should be supplied at the time of any request for repair under warranty.
- The product warranty period beings on the purchase date. If the purchase date is unknown, the product warranty period begins on the thirtieth day after shipment from a Datavideo office.
- All non-Datavideo manufactured products (product without Datavideo logo) have only one year warranty from the date of purchase.
- Damage caused by accident, misuse, unauthorized repairs, sand, grit or water is not covered under warranty.
- Viruses and malware infections on the computer systems are not covered under warranty.
- Any errors that are caused by unauthorized third-party software installations, which are not required by our computer systems, are not covered under warranty.
- All mail or transportation costs including insurance are at the expense of the owner.
- All other claims of any nature are not covered.
- All accessories including headphones, cables, batteries, metal parts, housing, cable reel and consumable parts are not covered under warranty.
- Warranty only valid in the country or region of purchase.
- Your statutory rights are not affected.

Three Year Warranty

- All Datavideo products purchased after July 1st, 2017 qualify for a free two years extension to the standard warranty, providing the product is registered with Datavideo **within 30** days of purchase.

- Certain parts with limited lifetime expectancy such as LCD panels, DVD drives, Hard Drive, Solid State Drive, SD Card, USB Thumb Drive, Lighting, Non-PCIe Card and third party provided PC components are covered for 1 year.
- The three-year warranty must be registered on Datavideo's official website or with your local Datavideo office or one of its authorized distributors within 30 days of purchase.

Disposal



For EU Customers only - WEEE Marking

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

CE Marking is the symbol as shown on the left of this page. The letters "**CE**" are the abbreviation of French phrase "Conformité Européene" which literally means "European Conformity". The term initially used was "EC Mark" and it was officially replaced by "CE Marking" in the Directive 93/68/EEC in 1993. "CE Marking" is now used in all EU official documents.

Product Overview

The Datavideo HDR-70 is a hard drive based video recorder with removable hard drive enclosure. The HDR-70 can be used as a desktop stand alone recorder in the studio or on location.

Record from Standard or High Definition SDI video equipment and use the convenient SDI loop through / pass through for record monitoring. The unit provides SD or HD MPEG-II MXF or MOV files which are compatible with a wide range of HD Non Linear Editing (NLE) and play out solutions. Several choices of video sampling and bit rates are available depending on your preference.

HD-SDI Compatible formats
1080p 23.98 / 24 + 1080i 50 / 59.94 / 60 + 720p 50 / 59.94 / 60
I-Frame only = 4:2:2 sampling either at 100Mbps or 125Mbps
Long GOP = 4:2:2 sampling either at 35Mbps or 65Mbps or 100Mbps
Long GOP = 4:2:0 sampling at 10Mbps or 25Mbps

SDI Compatible formats
NTSC 480i or PAL 576i
I-Frame only = 4:2:2 sampling either at 25Mbps or 50Mbps
Long GOP = 4:2:2 sampling either at 15Mbps or 30Mbps or 50Mbps
Long GOP = 4:2:0 sampling either at 8Mbps

Playback of recorded tracks is from SDI and HDMI outputs. Device control is possible via the front panel transport keys or RS-232 or using a simple GPI trigger.

Once the recording session is finished, simply eject the removable drive enclosure. The drive enclosure can then be connected via a USB 2.0 port to a PC or Mac based HD Non Linear Editing system. You then copy the required video as files across to your HD NLE media drive. As USB 2.0 provides power to the drive enclosure no extra power supply is required, so it is also perfect for laptop use in the field. The recorder can also run on 12V DC power so it is not limited studio use and can be used in an OB van set up too.

That's Datavideo, sharing the value!

Features

- Backlit LCD display and soft keys for track confirmation and menu navigation.
- Normal VTR type transport keys for Play/Pause, Stop, Record, Fast Forward and Reverse.
- LCD Status screen confirms incoming signal and unit settings.
- Removable HE-3 drive enclosure for standard SATA 2.5" laptop drives.
- Front panel 3.5mm stereo audio jack point and volume control for convenient audio monitoring.
- LED based Audio Peak meter for audio confidence.

Input connections:

- SDI / HD-SDI BNC Input with loop through
- Analogue or 8 channel SDI audio input – analogue audio via XLR inputs.

Output connections:

- SDI / HD-SDI BNC output
- HDMI output

File formats supported:

- .MOV, .MXF
- NTFS system allows large files to be created during the record process.

- External Time code input and loop through.
- Genlock and black burst support.
- RS-232 and GPI Control interface.
- 12V DC Operation allowing OB Van compatibility.

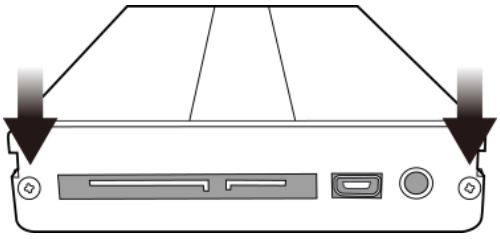
List of Recommended Hard Drives

This list below contains compatible drive information. Please contact your local dealer or Datavideo office should you need more information.

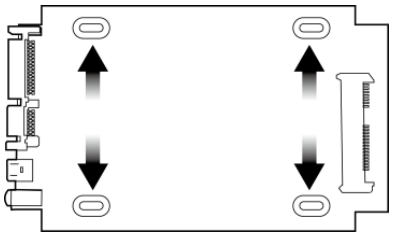
No	Brand / Model	Type
1	WD3200BEKT	HDD
2	HITACHI 7K320-320	HDD
3	WD5000BEKT	HDD
4	WD5000BPKT	HDD
5	WD7500BPKT	HDD
6	WD5000LPLX	HDD
7	SANDISK 120GB SSD (Extreme)	SSD
8	SANDISK 240GB SSD (Extreme)	SSD
9	INTEL 330 SERIES 120G SSD	SSD
10	Transcend SSD320 120G SSD	SSD
11	Silicon Power V30 120GB SSD	SSD
12	EZ Link	SSD
13	Kingston HyperX 128GB SSD	SSD
14	SANDISK 120GB SSD (Extreme II)	SSD
15	SANDISK 240GB SSD (Extreme II)	SSD
16	SAMSUNG 840 PRO 128G SSD	SSD
17	INTEL 520SERIES 120G	SSD
18	SANDISK X110(OEM)	SSD
19	Kingston HYPER X 240G	SSD
20	Crucial MX220 250G	SSD
21	Samsung 850PRO 256GB	SSD
22	SANDISK X300s 512GB	SSD
23	Samsung 840EVO 1TB	SSD
24	UD info 256GB	SSD
25	SANDISK X400 128G/256G/512G	SSD
26	SANDISK ULTRA II	SSD

How to fit a SATA drive to the removable HE-3 enclosure

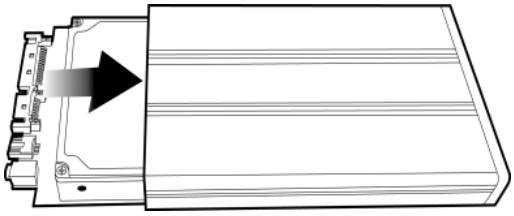
If your unit was delivered without a hard drive inserted, please follow the steps below to insert the hard disk into an HE-3 drive enclosure.



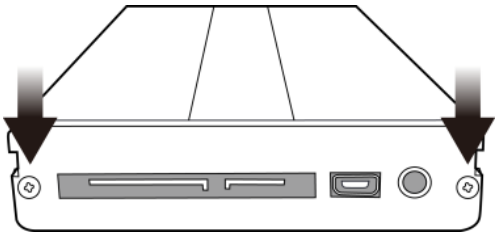
1. Remove the two screws on the back plate of the HE-3 drive enclosure and manually pull out the PCB.



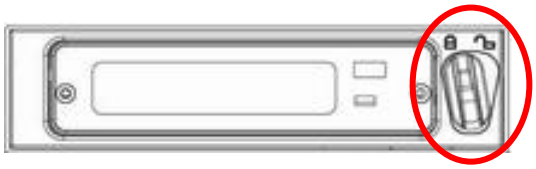
2. Place a 2.5” SATA HDD on the PCB and then turn it over so you can secure the drive to the PCB by screwing the four screws (supplied) into the holes as shown in the diagram on the left.



3. Re-insert the PCB, with HDD mounted, into the enclosure.



4. Re-secure the back plate of the enclosure using the two screws removed earlier.



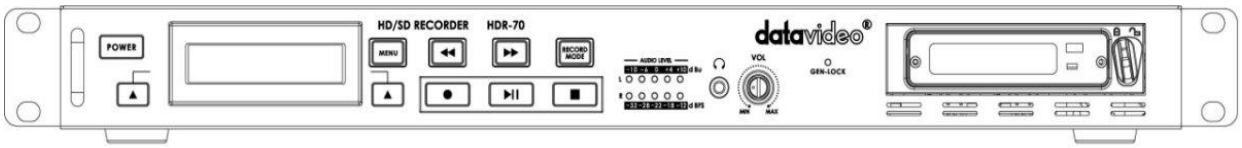
5. Push the removable HE-3 enclosure into recorder as shown. Now move the locking lever from right to left side to secure the HE-3 in place.

6. You are now ready to switch the unit on.

7. New drives will be formatted within the recorder upon first use. The LCD Clip Status display is shown once the recorder becomes available for set up and use.

Connections and Controls

Front Panel



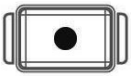
Power On / Off Button.
This is a soft power on / off button which powers the unit on from a state of standby. The main power **on /off switch is on the rear** panel.

Display Panel.
Displays the status of the HDR-70. The display will show Bin Number, time code, or if the Menu Button is pressed the Menu Display.

Menu Button.
This calls up the menu display which is navigated using the Previous / Next Buttons.

Previous / Next Buttons.
These buttons navigate between recorded bins and menu options.

Record Mode Button.
Before recording make sure the Record Mode button is on/back lit.

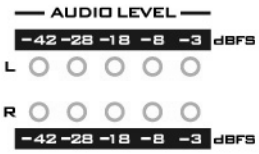


Record Button.
To start recording press the Record and Play buttons together.
N.B. Unit will not record if no video signal is present.

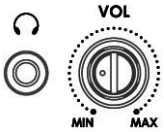
Play / Pause Button.
Starts playback of a bin, or pauses playback of video – the status will be displayed on the LCD Panel.

Fwd / Rew Buttons.
In playback mode these buttons will operate as Fast Forward and Rewind Buttons.

Stop Button.
Stops playback or record functions.



Audio Level / Peak Meter.
The Audio Input Level LEDs show the audio input levels from the selected incoming source. See **pages 19 & 20** also.

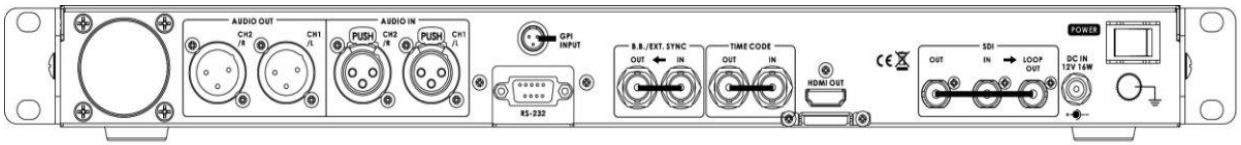


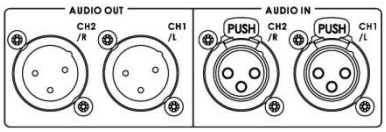
Headphone Audio Monitoring.
Stereo mini jack plug for stereo headphone. The headphone audio level is controlled by the volume [VOL] adjustment.

GEN-LOCK.
When this LED is on GEN-LOCK is present.

2.5" Removable HDD Slot.
Removable HE-3 HDD with SATA & USB interface connection to a computer for fast copy & paste file transfer.

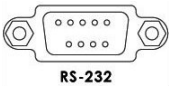
Rear panel



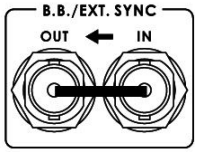


XLR inputs and Outputs for Balanced Audio Connection.
Note: *The recorder needs a video source in order to record files.*
See **page 20** also.

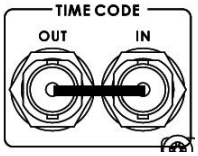
The GPI socket can be used for simple external control. The recorder can accept pulse or level trigger inputs, which can trigger record or playback and pause commands. See **page 21** also.



RS-232/422 user selectable remote control (selection in menu).
See **page 25** onwards.

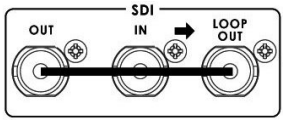


Black Burst input/ output.
Can be used as a video reference source when synchronizing other devices to the recorder.



Time Code input/ output.
The user can select the time code source as internal or external. Set time code source to external when supplying an external Time Code source to this input port.

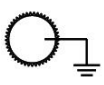
HDMI Out Port.
Port for connecting to HDMI external devices.



HD- SDI input, output and loop-through connectors.
4:2:2 SDI Video data supports SMPTE 292M standard at 1.5Gbps. SDI transfers professional level video signals and can connect to long distance transmission systems.

DC In Socket. Connect the supplied 12V PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to this socket.

Power On/Off Switch.
Depress the dot side of the switch to turn the unit on. See front panel soft power on / off button also.



Grounding Terminal.
When connecting this unit to any other component, make sure that it is properly grounded by connecting this terminal to an appropriate point. When connecting, use the socket and be sure to use wire with a cross-sectional area of at least 1.0mm2.

Switching the recorder On

Ensure the HDR-70 power supply is connected to the rear panel of the recorder and a HE-3 removable drive enclosure is fitted and locked in place.

The HDR-70 has a power ON/OFF switch which is located on the rear panel. To turn the unit ON depress the dot side of this switch.

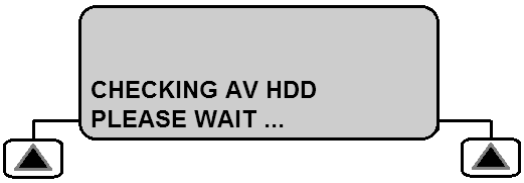
Rear Panel On / Off switch
Switches the power On / Off.

If the unit is already switched ON at the rear panel but has not started it may be in standby mode. Press the Power button on the front panel and LCD display should now become backlit.

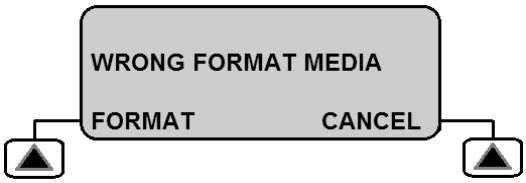
Front Panel Power button
Places the unit in standby mode or soft starts the unit.

Formatting a drive before first use

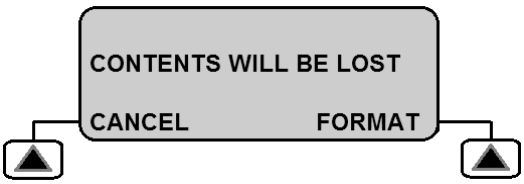
New HE-3 drive enclosures, as described on **page 7**, will need to be formatted in the recorder before first use. The recorder's LCD panel will display options as follows.



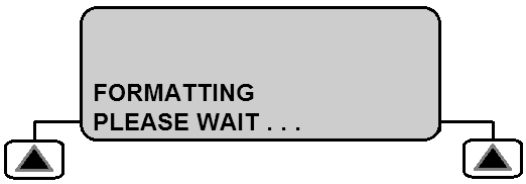
1. The drive is checked by the unit.



2. Choose the FORMAT option.

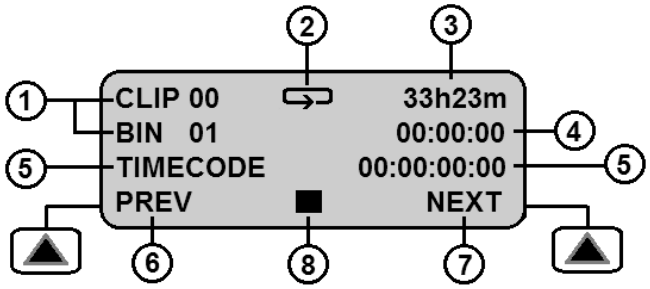


3. Confirm the FORMAT option.



4. The drive is now being made ready for first use.

LCD Clip Status Display explained



1. Current Bin and Clip.
2. Loop playback indicator
   If not present feature is OFF.
3. Remaining recording space in Hours and Minutes.
4. Length of video within current Bin [HH:MM:SS].
5. Current Time Code [HH:MM:SS:FF]
6. Function of left hand soft key.
7. Function of right hand soft key.
8. Record, Pause, STOP, FFWD, FREV and Playback indicator.

Menu Overview and Menu Navigation

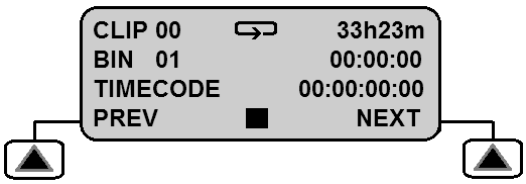
Your HDR unit is a menu driven unit; there are several menus which are used to initially set up the unit. The menu settings are non-volatile, so they are stored even when the unit is switched off. Many of these settings, such as file type and bit rate, may only need to be set once. We will look at each menu in more detail, but here is a quick overview of them.

MAIN MENU	SUB MENUS	
TOOL		
	ERASE THIS BIN	Erases the currently selected recording bin.
	FORMAT MEDIA	Erases the whole contents of the drive and reformats it.
	UPDATE FIRMWARE	See **page 24** for further details on the update process.
	UNLOCK MEDIA	Removes the write protection from the HE-3 drive.
	FIRMWARE REVISION	Displays the current firmware detail.
SETUP		
	RECORD SETUP	See **page 13** for further details
	PLAY SETUP	See **page 18** for further details
	SYSTEM SETUP	See **page 19** for further details
	SAVE SETUP	
	RECALL SETUP	
STATUS		
	LCD displays current recording bit rate and video format	

The following front panel buttons are used to navigate the displayed menus and to change settings.

Menu Button.
This calls up the Menu Display which is navigated using the **Previous and Next Buttons**.

Previous / Next Buttons.
These buttons navigate between menu options or allow you to choose an option value. A selected option will be confirmed by an asterisk [*****] character next to it. Chosen settings are also confirmed in the status menu.



Menu button also acts as an exit button.
Press the Menu button once to exit the current option selection.
Press the Menu button again to exit the current menu level.
If there are no higher level menus then you will return to the **Clip Status Display**.

Record Setup

This menu allows you to configure the HDR-70 so that the unit is ready to record the incoming video signal. The options within this menu are:

MAIN MENU	SUB MENU 1	SUB MENU 2
TOOL		
SETUP		
STATUS	**RECORD SETUP**	
	PLAY SETUP	**SET HD ENCODE FORMAT**
	SYSTEM SETUP	**SET SD ENCODE FORMAT**
	SAVE SETUP	**SET REC FILE TYPE**
	RECALL SETUP	**SET SD ASPECT RATIO**
		TIME-LAPSE SET UP
		PWR ON AUTO-RECORD

SET HD ENCODE FORMAT

This option is used to choose the quality and bit rate of the recording to be made from a High Definition [SDI] source. Options available are:

MAIN MENU	SUB MENU 1	SUB MENU 2	OPTION CHOICE
TOOL			
SETUP			
STATUS	**RECORD SETUP**		
	PLAY SETUP	**SET HD ENCODE FORMAT**	
	SYSTEM SETUP	SET SD ENCODE FORMAT	**HD LONG GOP**
	SAVE SETUP	SET REC FILE TYPE	**HD I-FRAME ONLY**
	RECALL SETUP	SET SD ASPECT RATIO	
		TIME-LAPSE SET UP	
		PWR ON AUTO-RECORD	

			Records at
HD LONG GOP	**options are:**	**4:2:0 10M LONG GOP**	[10 Mbps]
		4:2:0 25M LONG GOP	[25 Mbps]
		4:2:2 35M LONG GOP	[35 Mbps]
Selected setting confirmed with an asterisk *		**4:2:2 50M LONG GOP**	[50 Mbps]
		4:2:2 65M LONG GOP	[65 Mbps]
		4:2:2 120M LONG GOP	[120 Mbps]
HD I-FRAME ONLY	**options are:**	**4:2:2 100M I-ONLY**	[100 Mbps]
		4:2:2 125M I-ONLY	[125 Mbps]

Note: The HDR-70 can only record the following HD-SDI input video formats.

1920x1080p 23.98 / 24
or 1920x1080i 50 / 59.94 / 60
or 1280x720p 50 / 59.94 / 60

SET SD ENCODE FORMAT

This option is used to choose the quality and bit rate of the recording to be made from a Standard Definition [SDI] source. Options available are:

MAIN MENU	SUB MENU 1	SUB MENU 2	OPTION CHOICE
TOOL			
SETUP			
STATUS	**RECORD SETUP**		
	PLAY SETUP	SET HD ENCODE FORMAT	
	SYSTEM SETUP	**SET SD ENCODE FORMAT**	
	SAVE SETUP	SET REC FILE TYPE	**SD LONG GOP**
	RECALL SETUP	SET SD ASPECT RATIO	**SD I-FRAME ONLY**
		TIME-LAPSE SET UP	
		PWR ON AUTO-RECORD	

			Records at
SD LONG GOP	**options are:**	**4:2:0 8M LONG GOP**	[8 Mbps]
		4:2:2 15M LONG GOP	[15 Mbps]
Selected setting confirmed with an asterisk *		**4:2:2 30M LONG GOP**	[30 Mbps]
		4:2:2 50M LONG GOP	[50 Mbps]
SD I-FRAME ONLY	**options are:**	**4:2:2 25M I-ONLY**	[25 Mbps]
		4:2:2 50M I-ONLY	[50 Mbps]

Note: The HDR-70 can only record PAL or NTSC SDI input video formats.

SET SD ASPECT RATIO

This option is used to set the aspect ratio of the recorded SD video.

Use the LCD menu path [MENU] > SETUP > RECORD SETUP > SET SD ASPECT RATIO

The options are 4:3 or 16:9. The selected choice is marked with an asterix[*] symbol.

It is recommended to have the recorder match the aspect ratio of the source equipment being recorded.

Note: If you choose the wrong aspect ratio people or objects within the recorded HDR-70 SD footage may be changed to appear tall and thin or short and fat.

Before recording

Before using your recorder, there are a few actions and options that should be considered.

Transfer old clips from the media

The HDR-70 is primarily a capture device, as opposed to an archiving device, and it is best to start out with a fresh HDR-70 HE-3 drive. If you have video clips already recorded on the HE-3 drive, it is best to transfer them to a computer to free up space on the HE-3 before starting the next project.

See **page 22** for further details.

FORMAT MEDIA

Use the LCD menu path [MENU] > TOOL > FORMAT MEDIA to reformat the removable HE-3 drive and to erase un-wanted old clips ready for the next recording session.

SET REC FILE TYPE

The HDR-70 can record HD or SD video to an .MXF or .MOV file. Choose the file type which is compatible with the edit software you plan to use after the recording is made.

Use the LCD menu path [MENU] > SETUP > RECORD SETUP > SET REC FILE TYPE to confirm your choice.

Set the ENCODE FORMAT

The HDR-70 can record either Standard Definition [SD] or High Definition [HD] video. It also offers a choice of LONG GOP or I-FRAME ONLY recording at various bit rates.

Use the LCD menu path [MENU] > SETUP > RECORD SETUP > SET HD/SD ENCODE FORMAT to confirm your choice.

See **pages 13 and 14** for the available choices.

Select the AUDIO SOURCE

The HDR-70 can record digital audio already in the SDI or HD-SDI video. Or it can record analogue audio using the rear panel XLR audio connections.

Use the LCD menu path [MENU] > SETUP > SYSTEM SETUP > SELECT AUDIO SOURCE to confirm your choice.

Select your time code source

Use the LCD menu path [MENU] > SETUP > SYSTEM SETUP > SET TIME CODE to confirm your choice from:

INTERNAL REC RUN

INTERNAL FREE RUN

EXTERNAL TC IN
When supplying external Time Code using the TC IN BNC connection on the rear of the unit.

EXTERNAL SDI TC
When using the Time Code already embedded within the SDI or HD-SDI video input.

If Time Code [TC] is not present or lost during recording the LCD panel will flash the warning.

EXT TC LOST

Turn RECORD MODE on

Ensure the RECORD MODE button on the front panel of the recorder is on or backlit.

If you try to start a recording with this button off then the LCD panel will flash the warning.

GO REC MODE

Recording

Before starting a new recording ensure the recorder is set up correctly, please read **pages 12 to 15** first.

Select an empty BIN in which to record

You can think of a BIN like a folder for holding a single or group of related video CLIPS. The current BIN and its contents, if any, are shown on the **Clip Status display**, see **page 11**.

Use the right hand soft key labelled **NEXT** to move to the next BIN. You will see the BIN number change each time you select **NEXT** or **PREVIOUS**.

The video length stored within the selected BIN is displayed in the format of Hours, Minutes and Seconds [HH:MM:SS]. So a BIN showing 00:00:00 is empty and a BIN showing 01:35:24 is just over one hour thirty five minutes long. For a new recording select an empty BIN.

Note: A CLIP is automatically started at the beginning of a BIN. If the BIN already contains video the next CLIP is appended after the last CLIP in the BIN. A clip can never be inserted between other clips in a bin. **The minimum length of a CLIP is two seconds**.

Recording

There are several ways of starting a record session depending how the recorder is configured.

1) Manually by holding the **REC button** down and pressing the **PLAY button**.
2) Using the **Remote Serial interface**. See the command protocol at the rear of this manual.
3) Simple **contact closure** circuit using a switch, contact or button wired to the **GPI port** on the recorders rear panel. See **page 21** for more information.

Note: If power is interrupted while recording, up to two seconds of the current video CLIP may be lost.

Record Pause

There are several ways of pausing a record session depending how the recorder is configured.

1) Manually by pressing the **PLAY button**. Press the PLAY button again to resume recording.
2) Using the **Remote Serial interface**. See the command protocol at the rear of this manual.
3) Simple **contact closure** circuit using a switch, contact or button wired to the **GPI port** on the recorders rear panel. See **page 21** for more information.

Note: Each time the recording is resumed a new CLIP will be created within the same recording BIN. A maximum of 99 CLIPS can be created within a single BIN. **The minimum length of a CLIP is two seconds**.

Record Stop

There are several ways to stop a record session depending how the recorder is configured.

1) Manually by pressing the **STOP button**.
2) Using the **Remote Serial interface**. See the command protocol at the rear of this manual.
3) When using the **GPI port** on the recorder first put the recorder into record pause mode then press the **STOP button** on the recorder as you would do if recording manually. See **page 21** for more information

Special Record Functions

Time lapse recording

Time lapse can be a useful I-FRAME only recording option when studying changes in a subject over a long period of time such as in large scale building projects or scientific studies or even to create artistic animations.

Use the LCD menu path [MENU] > SETUP > RECORD SETUP > TIME-LAPSE SETUP to confirm your choice from:

TIME LAPSE ON/OFF
If the setting is OFF then normal recording mode and settings will be used.

If the setting is ON then an I-Frame only recording mode should be chosen and the next record session will be based on the following settings.

SET TIME LAPSE FRAME
This setting controls the amount frames of video captured when the time lapse cycle/interval point is reached. From 1 up to 15 frames can be captured.

Once the required value is selected, press MENU to exit this setting.

SET TIME LAPSE CYCLE
This setting defines the amount/cycle of time elapsed between video being captured. This can be any time value between 1 second and 59 minutes 59 seconds.

Once the required value is selected, press MENU to exit this setting.

Example:

If **SET TIMELAPSE FRAME** is set to 2 frames and **SET TIMELAPSE CYCLE** is set to 15 seconds then the HDR-70 will display:

CYCLE: 02 FRM / 15 S

So 2 frames [FRM] of video will be added to the current BIN after each 15 second [S] cycle until the recording session is stopped.

Note: This mode is saved when power is interrupted. This process resumes if power and video are both restored. See **Power On Auto Record** function also.

Note: A new clip is only created at the beginning of a time lapse recording.

Power on auto record

If this option is enabled when the unit is powered on the recorder will begin recording immediately.

The current BIN and the last record setup used before the recorder was switched off will be used for the next recording.

Playback

Select a recorded BIN to Play back

You can think of a video BIN as being like a folder for holding a single or group of related video CLIPS. The current BIN and its contents, if any, are shown on the **Clip Status display**,
See **page 11**.

Use the right hand soft key labelled **NEXT** to move to the next BIN. You will see the BIN number change each time you select **NEXT** or **PREVIOUS**.

The video length stored within the current BIN is also displayed in the format of Hours, Minutes, Seconds [HH:MM:SS]. So a BIN showing 00:00:00 is empty and a BIN showing 01:35:24 is just over one hour thirty five minutes long.

Before pressing the PLAY button, first select the correct BIN where the required video has been recorded.

Note: If you select an empty BIN then nothing will happen when you press the PLAY button.

Play back

There are several ways of starting play back depending how the recorder is configured.

1) Manually by using the **PLAY button**.
2) Using the **Remote Serial interface**. See the command protocol at the rear of this manual.
3) Simple **contact closure** circuit using a switch, contact or button wired to the **GPI port** on the recorders rear panel. See **page 21** for more information.

When in playback mode the keys **FREV** and **FFWD** will change the playback/shuttle speed to **3x, 6x, 9x or 12x** fast reverse and fast forward.

Repeatedly pressing a soft key will cause the playback to go faster in the chosen direction up to 12x speed. A speed other than 1x is displayed in the bottom line of the LCD panel.

To return to normal play press the Play/Play Pause button.

Playback in BIN or CLIP centric mode

Depending on how the **Play Setup** menu options are set, the recorder will either play back ONLY the last CLIP within the current BIN or play back ALL CLIPS within the selected BIN.

When the **BIN Centric Mode** is enabled [ON] the play back function plays ALL the CLIPS recorded in the current BIN.

When the **BIN Centric Mode** is disabled [OFF] the play back function only plays the current or last CLIP recorded within the selected BIN.

Use the LCD menu path [MENU] > SETUP > PLAY SETUP > SET PLAY CENTRIC

Note that the current selection BIN or CLIP will be marked with an asterisk [*].

Loop Play

When loop play is enabled and the last frame of the clip is reached the unit will start playing over from the first frame instantly.

Use the LCD menu path [MENU] > SETUP > PLAY SETUP > SET LOOP PLAY

Power on Auto Play

When this option is enabled the recorder will immediately begin playing back the current BIN or CLIP when first powered up.

Use the LCD menu path [MENU] > SETUP > PLAY SETUP > POWER ON AUTO PLAY

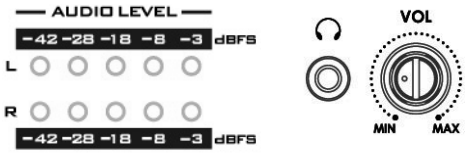
System Set Up

The **SYSTEM SETUP** menu has the following options

MAIN MENU	SUB MENU 1	SUB MENU 2	
TOOL			
SETUP			
STATUS	RECORD SETUP		
	PLAY SETUP		
	SYSTEM SETUP		
	SAVE SETUP	**SET AUDIO MONITOR**	See below section.
	RECALL SETUP	**SELECT AUDIO SOURCE**	See **page 20**.
		SET TIME CODE	See **page 15**.
		SET GPI	See **page 21**.
		SET REMOTE INTERFACE	See **page 25**.
		SET BUZZER	See **page 25**.
		SET LONG TIME STOP	See **page 25**.
		DATE & TIME SET UP	See **page 25**.

Set Audio Monitor

This LCD menu option allows the user to choose which audio channel pair to monitor with the front panel LED audio peak meter and the headphone socket.



Use the LCD menu path [MENU] > SETUP > SYSTEM SETUP > SET AUDIO MONITOR

The default setting is AUDIO CHANNEL 1 & 2.

There are four stereo pair monitoring options:

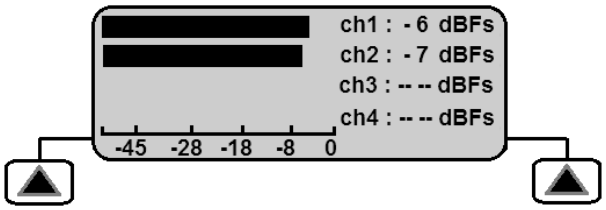
AUDIO CHANNEL 1 & 2, or
AUDIO CHANNEL 3 & 4, or
AUDIO CHANNEL 5 & 6, or
AUDIO CHANNEL 7 & 8

The current selection will be marked with an asterisk [*].

The default setting is AUDIO CHANNEL 1 & 2.

LCD Audio Peak meter

Whilst recording or playing back a CLIP, the front panel RECORD button can be pressed. This changes the LCD panel from the **Clip Status** view to an **LCD Audio Peak Meter** view.



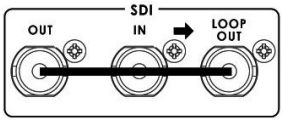
Pressing the record button will cycle the LCD panel view through Audio Channels 1 to 4, Audio Channels 5 to 8 and then back to Clip Status view again.

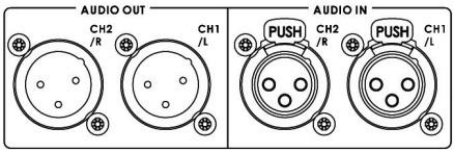
If there are no audio channels present the bars will not move on the LCD display. If audio is present then the level bars will move for that channel and a dBFS value will be shown alongside.

Select Audio Source

Use the LCD menu path [MENU] > SETUP > SYSTEM SETUP > SELECT AUDIO SOURCE

This recorder can accept audio signals which are already embedded in the SDI / HD-SDI video input. The recorder can alternatively accept analogue audio from the rear panel Balanced XLR audio inputs.





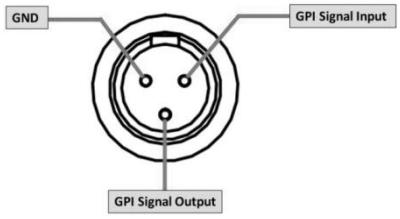
If SDI / HD-SDI embedded audio is selected, the audio channels recorded will match the SDI input.

If Analogue XLR audio is selected, this audio will be recorded into AUDIO CHANNEL 1 & 2 only.

GPI Control

GPI Trigger cabling and circuit

The recorder has a GPI socket on its rear panel. The GPI circuit runs on less than 5V DC. This power is supplied by the recorders GPI port. You will need to manufacture a GPI trigger cable to create a simple 'contact on closure' button or similar trigger.



Depending on the settings of the recorder and the GPI menu option this unit can be configured to **Record / Record Pause** or **Play / Play Pause** with the current video BIN.

SET GPI

Use the LCD menu path [MENU] > SET UP > SYSTEM SET UP > SET GPI.

You can then make a choice between the **PULSE** or **LEVEL** trigger. The selected choice is marked with an asterisk [*].

PULSE trigger Record process

Using the Clip Status Display and soft keys, select an empty video BIN. Make sure the source device is connected and working and the target file type on the recorder has been chosen. Press and hold in the Record button on the front panel and then press the Play button. This should start the record process. The button on the connected GPI cabling is then pressed forcing the unit into record pause mode. The unit is then ready to activate record on the next press of the contact closure button. Each time the recorder starts recording a new clip will be added to the bin [Max 99 CLIPS per BIN]. Press the stop button on the front panel of the recorder to end the recording process.

LEVEL trigger Record process

Using the Clip Status Display and soft keys, select an empty video BIN. Make sure the source device is connected and working and the target file type on the recorder has been chosen. Press and hold in the Record button on the front panel and then press the Play button. This should start the record process. The button on the connected GPI cabling is then pressed forcing the unit into record pause mode for the length of the press. However, when the button is released the recording process starts again. Each time the recorder starts recording a new clip will be added to the bin [Max 99 CLIPS per BIN]. Press the stop button on the front panel of the recorder to end the recording process.

The contact closure button may be working in the opposite way to the type of action you want to perform. A mechanical change to the GPI contact closure trigger should fix this. (**Example:** when pressed down the circuit is broken and recording starts. When released the contact is made causing the pause action.)

Note: You may a have a couple of seconds footage at the beginning of the bin that you may wish to remove later once the footage is transferred to a computer for editing.

PULSE trigger Playback process

Using the Clip Status Display and soft keys, select a pre-recorded video BIN. Make sure the output device /monitor is connected and working with the recorder. Press in the Play button on the recorder's front panel. This should start the playback. The button on the connected GPI cabling is then pressed forcing the unit into play pause mode. The unit is then ready to playback from this point on the next press of the contact closure button. Press the stop button on the front panel of the recorder to end playback of the video.

LEVEL trigger Playback process

Using the Clip Status Display and soft keys, select a pre-recorded video BIN. Make sure the output device/monitor is connected and working with the recorder. Press in the Play button on the recorder's front panel. This should start the playback. The button on the connected GPI cabling is then pressed forcing the unit into play pause mode for the length of the press. However, when the button is released the playback starts again. Press the stop button on the front panel of the recorder to end playback of the video.

The contact closure button may be working in the opposite way to the type of action you want to perform. A mechanical change to the GPI contact closure trigger should fix this. (**Example:** when pressed down the circuit is broken and recording starts. When released the contact is made causing the pause action.)

Transferring files to a computer

Recorder File System limitations

This recorders NTFS format is fully compatible with PCs and is read compatible with Macs. Its main advantage is that results in one large file per recording.

Note: Some editing software packages cannot accept video file sizes greater than 40GB, make sure your edit software is not affected if you plan on shooting one long continuous take greater than this.

File Organization

All bins that contain video will appear to the computer as folders named BINxx. Where xx represents the BIN number ranging from 01 to 99.

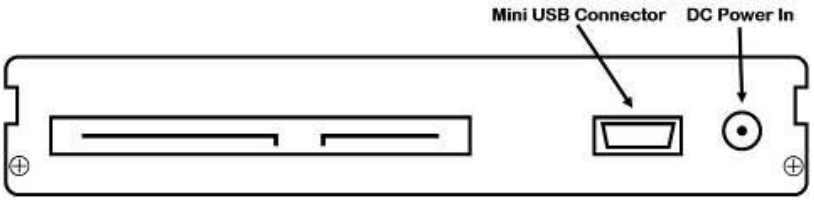
Inside each BIN folder, each clip will be represented as a separate file with an extension name like .MXF .MOV depending on the setting chosen prior to recording.

Each file will be named **B**xx**C**nn where xx represents the BIN number; nn represents the CLIP number ranging from 01 to 99.

Mounting the HE-3 drive enclosure to a Computer

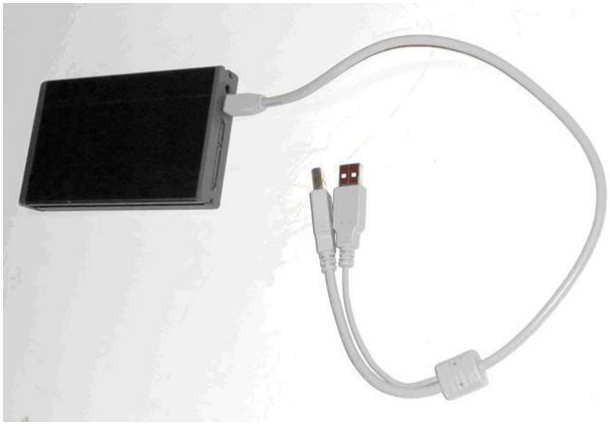
Move the drive lock lever to the right to unlock the HE-3 drive from the recorder. Push the HE-3 into the unit and when released it will pop out a few centimetres. Gently pull the drive enclosure clear of the recorder. You may feel some slight resistance as the drive disconnects internally – this is normal.

The removable HE-3 drive enclosure has a mini USB connector on its rear panel; this can provide power to the HDD, as well as allow the exchange of data.



Note: With some PCs and Laptops the USB bus power may not be enough to power the drive.

Connect the supplied mini USB to USB A cable to the HE-3 drive, and connect the double lead to your computer or Laptop. If the drive does not power up correctly – connect the second USB connector to the computer as well as the first.



The drive will appear on the computer as a volume called **HDR-SERIES**.

Safely dis-mounting the HE-3 drive from a computer

In order not to cause damage to the spinning drive within the HE-3 drive do not immediately disconnect the USB 2.0 cable straight away. Instead use your Computer's drive dis-mounting process first and then physically remove the HE-3 drive after this process has been completed.

Windows 7

Apple Mac OSX

Windows computers have a ***Safely Remove Hardware*** process seen in the System Tray area and Apple Mac computers have an ***Eject Drive/Hardware*** process in the Devices area.

Updating the Firmware

From time to time Datavideo may release new firmware to fix reported bugs in the current recorder firmware or to add a new feature. Customers can update the recorder firmware themselves if they wish or they can contact their local dealer or reseller for assistance should they prefer this method.

This section describes the firmware update process for the recorder, if you have all the items required it should take ***approximately 20 minutes total time to complete***.

Please contact your local dealer or Datavideo office for the latest firmware update ***flash*** file.

WARNING: Once started ***the update process and power should not be interrupted in any way*** as this could result in a non-responsive unit.

To update the firmware:

1. Check firmware version.

Press the **MENU** button, browse to **TOOL** using the **NEXT** button and then press **ENTER** to select.

Locate **FIRMWARE REVISION** in **TOOL** and press **ENTER** to show the current firmware version.

- If your **CODEC** version number starts with **FFF**, contact your Datavideo distributors or sales representatives for device firmware upgrade procedure.
- If your **CODEC** version number starts with **130**, simply follow the procedure below to update the firmware.

2. Follow the link below to download firmware from Datavideo's official website

www.datavideo.com → Products → Recorders → HDR-60 → Downloads → Latest Firmware

After unzipping the downloaded file, you should be able to see two bin files in the "**Disk Update**" folder.

- If CODEC version is **NOT** D10B, use "**HDR70_flash_C3DB_host_C215_codec_C4_ifpga_32_ALL.bin**" to update the firmware.
- If CODEC version is D10B, use "**HDR70_flash_C3DB_host_C215_codec_C4_ifpga_32_no_NTT.bin**" to update the firmware.

3. Use a USB cable to connect the hard disk (**HE-3**) removed from the HDR-60/70 to the PC containing the downloaded firmware file.

4. Rename the latest firmware file to "**flash.bin**" before copying it to the hard disk.

5. Re-insert the hard disk containing the latest firmware file to the HDR-60/70, press the **MENU** button and select "**Upgrade Firmware**" in the **TOOL** option.

6. If the firmware upgrade is successful, the **REC**, **CODEC** and **HOST REV** version numbers displayed on the HDR-60/70 should be the same as the versions recorded in release notes.

WARNING: After the firmware update is complete, the firmware file must be removed from the hard drive as failure to do so may result in errors while the HDR-60/70 is recording.

Set Buzzer

Use the LCD menu path [MENU] > SET UP > SYSTEM SET UP > SET BUZZER

This setting when enabled or selected provides the user with an alarm feature if there is an “un-recoverable” defect detected in the HDR-70.

Set Long Time Stop

Use the LCD menu path [MENU] > SET UP > SYSTEM SET UP > SET LONGTIME STOP

This setting changes the operation of the stop button. When enabled or selected the front panel STOP button must be held in for longer in order to stop the recording or playback in progress. This eliminates the chance of the user accidently performing a stop action when using the other front panel controls.

Date and Time Setup

Use the LCD menu path [MENU] > SET UP > SYSTEM SET UP > DATE & TIME SET UP

Date and Time meta data can be added to recorded files when this menu option is used.

FFWD	moves the cursor to the next Date or Time field.
FREV	moves the cursor to the previous Date or Time field.
PLAY/PAUSE	increases the value of the current field.
RECORD	decreases the value of the current field.

Once complete use [MENU] to exit.

Set Remote Interface

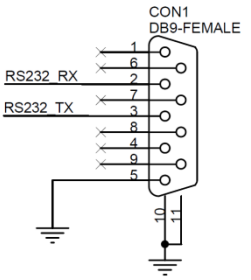
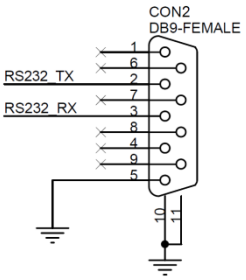
Use the LCD menu path below to choose which protocol will be used to control or talk to the recorder.

MAIN MENU	SUB MENU 1	SUB MENU 2	USER CHOICE
TOOL			
SETUP			
STATUS	RECORD SETUP		
	PLAY SETUP		
	SYSTEM SETUP		
	SAVE SETUP	SET AUDIO MONITOR	
	RECALL SETUP	SELECT AUDIO SOURCE	Selected setting confirmed with an asterisk *
		SET TIME CODE	
		SET GPI	
		SET REMOTE INTERFACE	**RS232** or **RS422**
		SET BUZZER	
		SET LONG TIME STOP	
		DATE & TIME SET UP	

RS-232 Controller Command Set

Connector Pin Assignment

Interface : 9 pin D-Sub female to 9 pin D-Sub female
The pin assignment of the Controller and recorder is shown in the following table:

9 Pin D-Sub	Controller	Recorder	9 Pin D-Sub
	**Pin 2 (Rx)**	**Pin 3 (Rx)**	
	Pin 3 (Tx)	**Pin 2 (Tx)**	
	Pin 5 (GND)	**Pin 5 (GND)**	

Communication Format

Mode: No synchronization
Character Length: 1 start bit + 8 data bits + 1 parity bit + 1 stop bit
Data Rate: 38,400 Baud
Parity: Odd

Command Format

CMD1, CMD2, Data bytes …., Checksum byte

A Command is made up of two address bytes, CMD1 and CMD2, a variable number of Data bytes (Data from 0 up to 15) and a Checksum byte. The Checksum byte is the modulo 256 sum of all preceding bytes. The most significant nibble of the CMD1 byte represents the command group. The least significant nibble represents the number of Data bytes to follow the CMD2 byte.

Command Protocol

CMD1, CMD2, Data bytes …., Checksum byte
Response: ACK [10h, 01h, 11h]

Other than the sense command, the unit will respond to all commands affirmatively by sending a three byte acknowledgement (ACK) if the Checksum is valid. If the Checksum is not valid, the Recorder will ignore the command. Most commands will be responded to within 8 msec. However, a PLAY command from an idle state will result in response delay of up to 700 msec. During this busy time, all commands will be ignored.

Summary List of Commands

Command	Name	Response	Name
System Control			
00h, 11h, 11h	**Device Type Request**	12h, 11h, 00h, 00h, 23h	Device Type
00h, F1h, F1h	**Next Bin**	10h, 01h, 11h	ACK
00h, F2h, F2h	**Previous Bin**	10h, 01h, 11h	ACK
02h, F5h, 08h, 00h, FFh	**Disable Loop Play**	10h, 01h, 11h	ACK
02h, F5h, 08h, 01h, 00h	**Enable Loop Play**	10h, 01h, 11h	ACK
01h, F0h, nn, csum	**Select Bin(1~99)**	10h, 01h, 11h	ACK

System Control

00h, 11h Device Type request
The response is 00, 00 indicating Quick Capture

00h, F1h Next Bin
When this command is issued from the Idle state the next bin is selected. If the present bin is 99 then the next bin is 1.

00h, F2h Previous Bin
When this command is issued from the Idle state the previous bin is selected. If the present bin is 1 then the next bin is 99.

02h, F5h, 08h, 00h, FFh Disable Loop Play
When this command is issued from the Idle state the Loop Play feature is disabled. Loop Play is where the the last play command is repeated from its beginning when the end is reached.

02h, F5h, 08h, 01h, 00h Enable Loop Play
When this command is issued from the Idle state the Loop Play feature is enabled. Loop Play is where the the last play command is repeated from its beginning when the end is reached.

01h, F0h, XX, csum Select Bin XX
When this command is issued from the Idle state bin XX is selected. XX varies between 1 and 99. Illegal bins are ignored.

02h, F3h, 01h, XX, csum Select and Empty Bin XX
When this command is issued from the Idle state bin XX is selected and **all of its content is permanently deleted**. XX varies between 1 and 99. Illegal bins are ignored.

Sense Request

61h, 0Ch, 04h, 71h Current Time Sense
Requests the Time code data. The unit responds with 4 bytes indicating the present time code in Binary-Coded-Decimal. The first byte holds the frame number, the second byte holds the seconds, the third the minutes and the fourth the hour. In the play state, the time code returned is the time associated with the current frame being played, in the record state, the time code returned represents the elapsed time recorded in the present bin.

Command	Name	Response	Name
61h, 20h, 0Fh, 90h	**Status Sense**	7Fh, 20h, [15 bytes], csum	Status
61h, 0Dh, 04h, 72h	**Current Frame Offset**	74h, 0Dh, [4 bytes] , csum	Frame Offset
61h, F1h, 01h, 53h	**Current Bin**	61h, 00h, nn, csum	Bin Number

24h, F1h, nn Play Offset nn
Frame Offset number nn is played. The number nn is made up of 4 binary encoded bytes and sent out with the least significant byte first. This command may be issued from the idle state or any other Play state. ***Note:*** Frame Offset are represented in absolute frame numbers where the first frame of the bin is 0.

24h, F2h, nn Play from Offset nn
Content of the present bin is played at 1x speed starting at Frame Offset nn. This command may be issued from the Idle state or any other Play state.

24h, F3h, bb, nn Select Bin and Play Offset
Bin number bb is selected and Frame Offset number nn is played. This command may be issued from the idle state or any other Play state.

24h, F4h, bb, nn Select Bin and Play from Offset
Content of the bin number bb is played at 1x speed starting at Frame Offset nn. This command may be issued from the idle state or any other Play state.

24h, F5h, nn Play to Offset nn
Content of the present bin is played at 1x speed starting from present Frame Offset until Frame Offset nn at which point it pauses. Frame Offset nn is 4 bytes and starts with the LSB. This command may be issued from the idle state or any other Play state.

25h, F5h, bb, nn Select Bin and Play to Offset
Content of the bin number bb is played at 1x speed starting at Frame Offset 0 to Frame Offset nn then pause. Frame Offset nn is 4 bytes and starts with the LSB. This command may be issued from the idle state or any other Play state.

29h, F5h, bb, nn, ee Select Bin and Play from Offset to Offset
Content of the bin number bb is played at 1x speed starting at Frame Offset nn to Frame Offset ee then pause. Frame Offsets nn and ee are 4 bytes and start with the LSB.

Transport Control

20h, 00h, 20h Stop
The unit enters the idle state. In the A2D, the outputs reflect the video source as selected by the Front Panel.

20h, 01h, 21h Play
Content of the present bin is played at 1x speed. This command may be issued from the idle state or any other Play state.

20h, 02h, 22h Record
The video is recorded from the selected source onto the current Bin. This command may be issued only from the idle state.

20h, 10h, 30h Fast Forward
A play state where video is played at the highest speed of 32x in the forward direction.

20h, 20h, 40h Fast Rewind
A play state where video is played at the highest speed of 32x in the reverse direction.

NOTE: When receiving one of the following commands (JOG, VARIABLE or SHUTTLE), the unit will play forward or backward according to the speed data.
The first data byte may only be a maximum of 80:
Play Speed=10(nn/32-2)
Note that setting nn to 0 will result in pausing the unit.

21h, 11h, nnh Jog Forward
21h, 12h, nnh Variable Forward
21h, 13h, nnh Shuttle Forward
A Play state where video is played at the commanded play speed as described above in the forward direction. **Note: Setting the speed to 0 causes the play to pause.**

21h, 21h, nnh Jog Reverse
21h, 22h, nnh Variable Reverse
21h, 23h, nnh Shuttle Reverse
A Play state where video is played at the commanded play speed as described above in the reverse direction. **Note: Setting the speed to 0 causes the play to pause.**

21h, F0h, nnh Select Bin and Play
Content of the bin number nn is played at 1x speed from the beginning. This command may be issued from the idle state or any other Play state

Command	Name	Response Data
	Common Transport Control	
20h, 00h, 20h	Stop	10h, 01h, 11h
20h, 01h, 21h	Play	10h, 01h, 11h
20h, 02h, 22h	Record	10h, 01h, 11h
	Common Trick Play	
21h, 11h,, 00h, 32h	Play Pause	10h, 01h, 11h
20h, 10h, 30h	Fast Forward	10h, 01h, 11h
21h, 13h,, nn, csum	Shuttle Forward	10h, 01h, 11h
20h, 15h, 35h	Jump Forward	10h, 01h, 11h
20h, 20h, 40h	Fast Rewind	10h, 01h, 11h
21h, 23h,, nn, csum	Shuttle Reverse	10h, 01h, 11h
20h, 25h, 45h	Jump Reverse	10h, 01h, 11h
	Vendor Unique Control	
01h, F0h, nn, csum	Select Bin(1~99)	10h, 01h, 11h
00h, F1h, F1h	Next Bin	10h, 01h, 11h
00h, F2h, F2h	Previous Bin	10h, 01h, 11h
	Common System Control	
00h, 11h, 11h	Device Type Request	12h, 11h, 00h, 00h, 23h
	Vendor Unique Control (External)	
02h, F3h, 01h, nn, csum	Select Bin & Delete(1~99)	10h, 01h, 11h
02h, F3h, 02h, xx, csum	Idle mode select Record/Play	10h, 01h, 11h
02h, F3h, 02h, 00h, F7h	Play Mode	10h, 01h, 11h
02h, F3h, 02h, 01h, F8h	Recorder Mode	10h, 01h, 11h
02h, F3h, 04h, xx, csum	Audio Input Select	10h, 01h, 11h
02h, F3h, 04h, 00h, F9h	Audio Input :SDI	10h, 01h, 11h
02h, F3h, 04h, 01h, FAh	Audio Input :XLR	10h, 01h, 11h
02h, F3h, 05h, xx, csum	HD Rec Format (I-only/LGOP)	10h, 01h, 11h
02h, F3h, 05h, 00h, FAh	HD Long-GOP	10h, 01h, 11h
02h, F3h, 05h, 01h, FBh	HD I frame only	10h, 01h, 11h
02h, F3h, 06h, xx, csum	Bit Rate Select (HD)	10h, 01h, 11h
	LGOP:10/25/35/50/65/120	10h, 01h, 11h
	I-only:100/125	10h, 01h, 11h
02h, F3h, 07h, xx, csum	Bit Rate Select (SD)	10h, 01h, 11h
	LGOP:8/15/30/50	10h, 01h, 11h
	I-only:25/50	10h, 01h, 11h
02h, F3h, 09h, xx, csum	SD Aspect 4x3 or 16x9	10h, 01h, 11h
02h, F3h, 09h, 00h, FEh	SD Aspect :4x3	10h, 01h, 11h
02h, F3h, 09h, 01h, FFh	SD Aspect :16x9	10h, 01h, 11h
02h, F3h, 0Ah, xx, csum	SD Rec Format (I-only/LGOP)	10h, 01h, 11h
02h, F3h, 0Ah, 00h, FFh	SD Long-GOP	10h, 01h, 11h
02h, F3h, 0Ah, 01h, 00h	SD I frame only	10h, 01h, 11h
02h, F5h, 08, xx, csum	Loop Play control	10h, 01h, 11h
02h, F5h, 08h, 00h, FFh	Disable Loop Play	10h, 01h, 11h
02h, F5h, 08h, 01h, 00h	Enable Loop Play	10h, 01h, 11h
	Vender Unique System Control	
21h, F1h, 00h, 12h	Next (Right key)	10h, 01h, 11h
21h, F1h, 01h, 13h	Next Bin	10h, 01h, 11h
21h, F1h, 02h, 14h	Next Clip	10h, 01h, 11h
21h, F2h, 00h, 13h	Previous (Left Key)	10h, 01h, 11h
21h, F2h, 01h, 14h	Previous Bin	10h, 01h, 11h
21h, F2h, 02h, 15h	Previous Clip	10h, 01h, 11h
	Vendor Unique System Commands (External)	
01h, F6h, 00, F7h	Make Media File (Unlock Media)	10h, 01h, 11h
01h, F6h, 01, F8h	Empty Current Bin	10h, 01h, 11h

Command	Name	Response Data
01h, F6h, 02, F9h	Empty All (Format Media)	10h, 01h, 11h
	Sense Control	
61h, 0Ch, 04h, 71h	Start Time code Sense	74h, 00h, TC(3:0), csum
61h, 0Dh, 04h, 72h	Current Frame Offset	74h, 0Dh, [4 bytes] , csum
61h, 20h, 0Fh, 90h	Status Sense	7Fh, 20h, [15 bytes], csum
	Vendor Unique Sense Control	
62h, F2h, 05h, 00h, 59h	Firmware Revision Sense (Recorder)	79h, F2h, 05h, 00h, [7 bytes] , csum
62h, F2h, 05h, 01h, 5Ah	Firmware Revision Sense (Host)	79h, F2h, 05h, 01h, [7 bytes] , csum
62h, F2h, 05h, 02h, 5Bh	Firmware Revision Sense (CODEC)	79h, F2h, 05h, 02h, [7 bytes] , csum

3. Return Data

10h 01h : ACK

10h	01h	csum

When a command from the CONTROLLER is received normally, the DEVICE returns this command as acknowledgment

11h 12h : NAK

11h	12h	Data byte	csum

When a communication error is detected or an undefined COMMAND is received, the DEVICE returns this command as not-acknowledgment. Bit-7 to Bit-0 of Data byte will be set in accordance with the contents.

[Data byte]

Bit-7	Bit-6	Bit-5	Bit-4	Bit-3	Bit-2	Bit-1	Bit-0
0	0	0	Parity Error	INHIBIT	CHECKSUM ERROR	0	UNDEFINED COMMAND

12h 11h : DEVICE TYTPE

12h	11h	Device byte1	Device byte2	csum

The“00h, 11h, 11h : DEVICE TYPE REQUEST” command is used for asking the specifications of the HDR-60/70 used as DEVICE. When the DEVICE receives this command, it attaches 2-bytes specification data to “12h 11h : DEVICE TYPE” and sends the information to the CONTROLLER.
HDR-60/70: 12h , 11h, 00h, 00h, csum,

4. Return Data

21h 13h nn csum : Shuttle Forward
21h 23h nn csum : Shuttle Reverse

nn	speed	Command Forward	Command Reverse
62h	12X	21h 13h 62h 96h	21h 23h 62h A6h
5E h	9X	21h 13h 5E h 92h	21h 23h 5E h A2h
58 h	6X	21h 13h 58h 8Ch	21h 23h 58h 9Ch
4F h	3X	21h 13h 4F h 83h	21h 23h 4F h 93h
40h	1X	21h 13h 40h 74h	21h 23h 40h 84h

5. Return Data

21h, F1h, 02h, 14h : Next Clip
21h, F2h, 02h, 15h : Previous Clip
Note: Only can do clip-change at play-pause

6. Firmware Revision Sense Data[7bytes]

Firmware Revision Sense (Recorder)
Byte[0]: ROM
Byte [1]: FW Major
Byte [2]: FW Minor
Byte [3]: File System
Byte [4]: FPGA
Byte [5]: RBF
Byte [6]: ESP

Firmware Revision Sense (Host)
Byte [0]: FW Major
Byte [1]: FW Minor
Byte [2]: Control CMD Major
Byte [3]: Control CMD Minor
Byte [4]: Bootloader Minor
Byte [5]: 0x00
Byte [6]: 0x00

Firmware Revision Sense (Codec)
Byte [0]: Codec Bootloader Major
Byte [1]: Codec Bootloader Minor
Byte [2]: Codec Host Major
Byte [3]: Codec Host Minor
Byte [4]: Codec Major
Byte [5]: Codec Minor
Byte [6]: 0x00

7. Status Sense Control Command Response Bytes

Status Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Busy	0	Cartridge Out	0	0	0	0	Local enable
1	0	0	Stop	0	Rewind	Fast Forward	Record	Play
2	0	0	0		0	Reverse	Still (Pause)	0
3	0	0	0	0	0	0	Video in	0
4	1	0	0	0	1	0	0	0
5	0	0		0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	Near End of Disk (panic mode)	End of disk	0	0	0	0
9	0	0	0	0	0	0	0	0
10	BIN7	BIN6	BIN5	BIN4	BIN3	BIN2	BIN1	BIN0
11	File Length byte 0	FL0	FL0	FL0	FL0	FL0	FL0	FL0
12	Length Byte 1	FL1	FL1	FL1	FL1	FL1	FL1	FL1
13	Length Byte 2	FL2	FL2	FL2	FL2	FL2	FL2	FL2
14	Length Byte 3	FL3	FL3	FL3	FL3	FL3	FL3	FL3

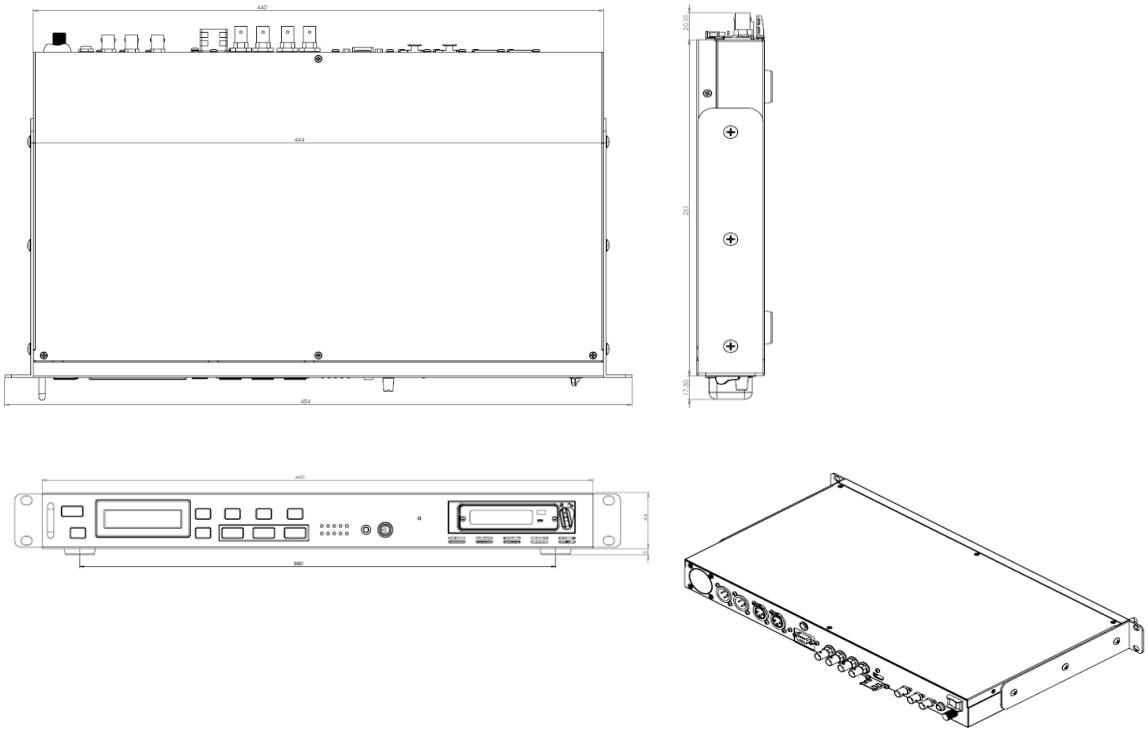
Revision History:

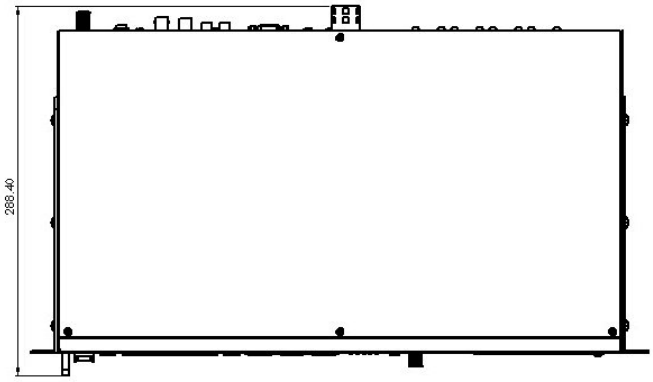
Revision 00 30(01/10/2014)
1. Add HD long GOP 50Mb
2. Add Trick play command
3. Add select clip command
4. Busy bit will be set at change status
5. Add Parity error bit

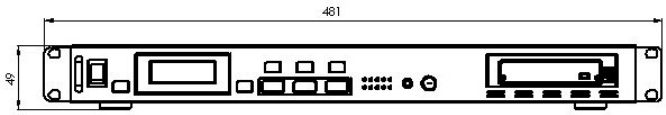
Revision 00 28(10/31/2013)
Revision 00 27(10/29/2013)
Revision 00 02 (08/25/2013)
Revised on 11/14/2012

Dimensions & Weight

Unit: mm







Depth [Front to Rear] : 288.4mm

Width : 481mm / Standard 19” with rack ears

Height : 49mm / Standard 1RU without feet

Gross weight [Packed] : 4.86 Kg / 10.71 lbs

Nett Weight [Unit only] : 3.85 Kg / 8.48 lbs

Specifications

Video Standard	HD & SD
Video Format	1080p 23.97/24Hz , 1080i 50/59.94/60Hz , 720p 50/59.94/60Hz , 576i 50Hz, 480i 59.94Hz
Supported Video Input Signal	1x SDI
Monitoring/ Playback output	1x SDI (input loop thru) 1x HDMI, 1x SDI (Out)
Analog Audio Input & Audio Output	2x Balanced XLR (Stereo pair)
Embedded Audio	Both In & Out (8-CH on SDI/HDMI)
Storage Medium	2.5” Hard Drive / SSD*, Max capacity 1TB
Estimated Record Time (min per 10GB)	SD: 19 (50Mbps) ~ 70 (8Mbps) HD: 8 (125Mbps) ~ 62 (10Mbps)
How to Retrieve Recorded Content	Removable Hard Drive / SSD, transfer data via USB2.0
Storage File System	NTFS (read only)
Recorded File Format	MXF OP1A, MOV
Video Recording Bit Rate/ Color Sampling	MPEG2 Long GOP HD: 1. 10Mbps 4:2:0 1440x1080/1280x720, 2. 25Mbps 4:2:0 1440x1080/1280x720, 3. 35Mbps 4:2:2 1920x1080/1280x720, 4. 50Mbps 4:2:2 1920x1080/1280x720, 5. 65Mbps 4:2:2 1920x1080/1280x720, 6. 120Mbps 4:2:2 1920x1080/1280x720, MPEG2 Long GOP SD 1. 8Mbps 4:2:0 720x480/720x576 2. 15Mbps 4:2:2 720x480/720x576 3. 30Mbps 4:2:2 720x480/720x576 4. 50Mbps 4:2:2 720x480/720x576 MPEG2 I-Frame Only HD 1. 80Mbps 4:2:2 1920x1080/1280x720 2. 100Mbps 4:2:2 1920x1080/1280x720 3. 125Mbps 4:2:2 1920x1080/1280x720 MPEG2 I-Frame Only SD 1. 25Mbps 4:2:2 720x480/720x576 2. 50Mbps 4:2:2 720x480/720x576
Audio Recording Format	Uncompressed PCM Sampling rate 48KHz 24bit
Time code in/out	Yes

External Sync/ Genlock	Black Burst & Tri-level with loop thru
Power failure protection	Content saved up to last 3 seconds or less before power failure
Chassis	1RU 19” rack-mountable

Service & Support

It is our goal to make owning and using Datavideo products a satisfying experience. Our support staff is available to assist you to set up and operate your system. Contact your local office for specific support requests. Plus, please visit www.datavideo.com to access our FAQ section.

Please visit our website for latest manual update.

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