datavideo®

HD HDD Recorder

HDR-40

&

HDR-50

Combined Instruction Manual

Rev 180110

www.datavideo-tek.com

Table of Contents

⚠ 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's 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.

Firewire 400 (IEEE-1394) pin power; ensure the cable connector is inserted the correct way around otherwise short circuit damage may result to either the computer or the HDR unit.
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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.
- Damage caused by accident, misuse, unauthorized repairs, sand, grit or water is not covered by this warranty.
- All mail or transportation costs including insurance are at the expense of the owner.
- All other claims of any nature are not covered.
- Cables & batteries are not covered under warranty.
- Warranty only valid within the country or region of purchase.
- Your statutory rights are not affected.

Two Year Warranty

- All Datavideo products purchased after 01-Oct.-2008 qualify for a free one year extension to the standard Warranty, providing the product is registered with Datavideo within 30 days of purchase. For information on how to register please visit www.datavideo-tek.com or contact your local Datavideo office or authorized Distributors
- Certain parts with limited lifetime expectancy such as LCD Panels, DVD Drives, Hard Drives are only covered for the first 10,000 hours, or 1 year (whichever comes first).

Any second year warranty claims must be made to your local Datavideo office or one of its authorized Distributors before the extended warranty expires.

Disposal

For EU Customers only - WEEE Marking.

This symbol on the product indicates that it will not be treated as household waste. It must be handed over to the applicable take-back scheme for the recycling of electrical and electronic equipment. For more detailed information about the recycling of this product, please contact your local Datavideo office.

Packing List

The following items should be included in the box. If any items are missing please check with your supplier.

Item	Description	HDR-40 Q'ty	HDR-50 Q'ty
1	HD/SD HDD Recorder	1	1
2	Power Supply (12V/4.2A)	1	1
3	AC cord 3P	1	1
4	2.5" Removable HDD Enclosure	2	2
5	USB 2.0 Y cable	1	1
6	M3 x 4 m/m Screws	10	10
7	2.0 x 8 m/m Screws	2	2
8	HD Label	2	2
9	Blank Label	4	4
10	Instruction Manual	1	1
11	L Type Rack Ears	0	2

Introduction

The Datavideo HDR-40 or HDR-50 is a hard drive based video recorder and player, with removable hard drive enclosure. The HDR-50 is a 19" rack mountable 1U design that can be easily integrated with other rack mounted equipment or the HDR-40 can be used as a desktop stand alone recorder / player in the studio or on location.

Record from Standard and High Definition video equipment via SDI or HD-SDI with convenient SDI loop through / pass through for record monitoring. Playback of recorded tracks is via HDMI output. Device control is also possible via RS-422, RS-232 or a simple GPI trigger.

Both units provide a choice of SD or HD MPEG-II (.M2T) recording bit rates which work with a wide range of HD Non Linear Editing (NLE) and play out solutions.

Once you have completed your recording, simply eject the hard drive enclosure and use the USB 2.0 port on the rear of the HDD enclosure to connect to a PC or MAC based HD NLE system. As USB 2.0 provides the power no extra power supply is required, so it is perfect for laptop use in the field. You can then copy the required video files across to your HD Non Linear Editing application's media drive. Alternatively you can mount the HDR unit to a computer like a Firewire 400 drive using the IEEE-1394 front panel connection for file transfer to computer.

HDR-40 & HDR-50 Features

Stand Alone SDI / HD-SDI Hard Drive Recorder with Removable Hard Drive enclosure.

Front Connections:
Headphone Mini Jack socket for audio monitoring
Firewire 400 (IEEE-1394) socket for file transfer.

Rear Connections:
1x HD/SD-SDI input (supports SDI embedded Audio)
XLR Balanced audio input connections (CH1/L & CH2/R)

1x HD/SD-SDI loop/pass through (supports SDI embedded Audio)

1x HDMI output with embedded audio

Record:
Unit automatically senses SDI or HD-SDI inputs and records…
Full HD (1920x1080i) via HD-SDI to .m2t files at user selectable bit rates of 20-60 Mbps (HD).
HDV (1440x1080i) via HD-SDI to .m2t files at user selectable bit rates of 20-60 Mbps (HD).
SD (720x576/480i) via SD-SDI to .m2t files at user selectable bit rates of 5, 10 or 15 Mbps (SD).

Control:
Full VTR playback via the front panel buttons (loop playback via a menu option).
RS-422 and **RS-232** control via rear panel Sub D 9pin port.
Simple GPI input to trigger play/pause play or record/pause record actions.

File Transfer to Computer:
From HDR unit in HDD mode via **Firewire 400** (IEEE-1394) connection.
From removable HDD enclosure via **USB 2.0** connection.

Note: *These units cannot be operated as AVC Devices - The AVC Command set is not supported.*
The HDD enclosure may be supplied empty or with a drive already fitted please check with your supplier / dealer.
These units cannot record a camcorder's DV25 or HDV m2t stream via the IEEE-1394 connection. Please use the SDI BNC input connection only to make recordings.

Combined Instruction Manual

This manual is written with the Datavideo HDR-40 and HDR-50 units in mind.

As the units only differ slightly their manuals have been combined into one manual. If a section of the manual can be applied to both units then the equipment will be referred to as the *HDR unit* regardless of whether you purchased a HDR-40 unit or a HDR-50 unit.

However, there are some physical differences between these units so there are separate sections and footnotes too which will only apply to one specific model. Where this happens the model is identified as applying to either the HDR-40 or HDR-50.

How to Assemble the 2.5" HDD in a Removable Rack

1. Remove the screws from the back cover of the enclosure and pull out the PCB board.
    NOTE: DO NOT REMOVE THE SCREWS ON THE FRONT COVER.

2. Place the 2.5" hard drive on the PCB board and slide the drive towards the rear SATA connectors on the board. Turn the PCB over and secure it with four Philips screws (included).
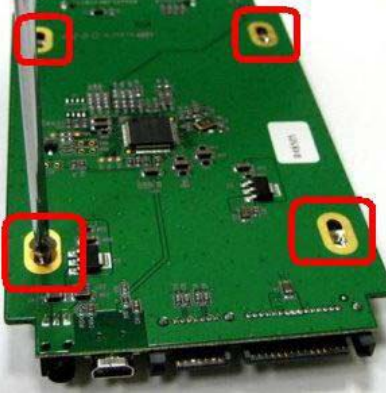
3. Slide the PCB board into the enclosure with the SATA connectors facing outward.

4. Close the back cover and secure it with the two Philips screws (black).

5. Push the hard drive enclosure into the hard drive slot of the recorder and turn the latch to the left (locked position).

Connections & Controls

HDR-40 Front Panel

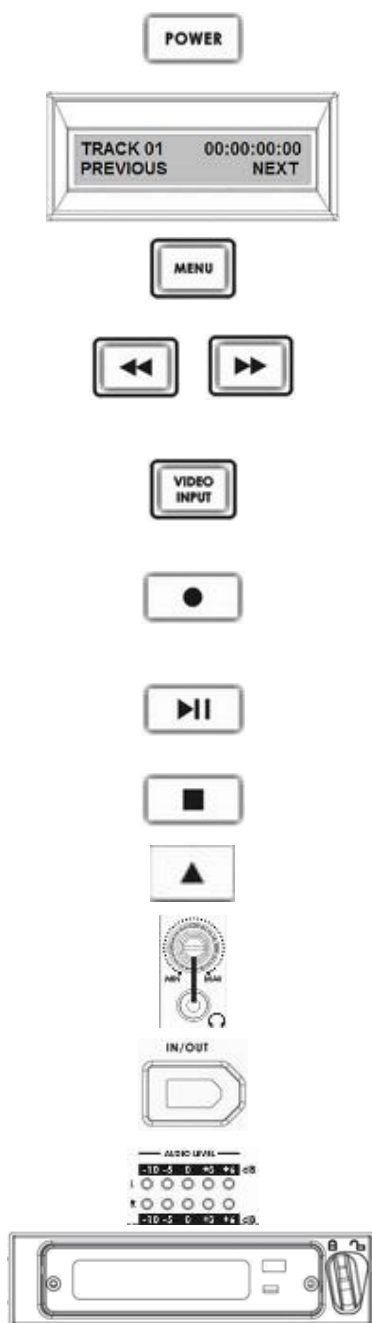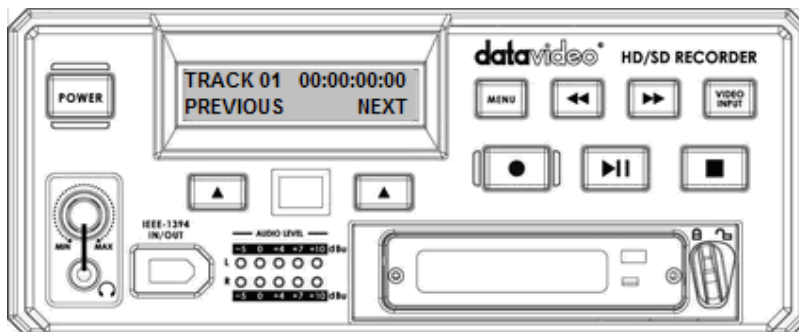**Power On / Off Button.** This is a soft power on / off button which powers the unit on from a state of standby; the main power on / off switch is on the rear panel.

Display Panel. Displays the status of the HDR-40. The display will show Track 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 Fwd / Rew Buttons and Previous / Next Buttons.

Fwd / Rew Buttons. In playback mode these buttons will operate as Fast Forward and Rewind Buttons. If the Menu Button is pressed these buttons will navigate backwards and forwards between the various menu options.

Video Input Button. Switches the HDR-40 to Video Input SDI - Video Inputs can only be recorded in SDI or HD-SDI formats. See *Page 20*

Record Button. Puts the HDR-40 into record mode. To start recording press the Record Button and Play Button simultaneously.
N.B. Unit will not record if no video signal is present.

Play / Pause Button. Starts playback of a track, or pauses playback of a track- status will be displayed on the Display Panel. Also Starts / Pauses a recording when unit is in Record mode

Stop Button. Stops playback or record.

Previous / Next Buttons. These buttons navigate up and down between recorded tracks and menu options.

Audio Level Adjustments allow you to adjust the headphone volume. **Stereo Mini Jack Plug** for stereo headphone. The headphone volume is controlled by the Audio Level Adjustments.

6 Pin DV In/Out Port. This is a convenient front mounted DV / IEEE-1394 Port for connection to a computer for file transfer.

The Audio Input Level LEDs. show the audio input levels from the incoming source.

2.5" Removable HDD enclosure, SATA & USB interface for connecting to a computer for file transfer. **Locking Switch** position left to lock HDD in place and position right to allow removal of HDD.

HDR-40 Rear Panel
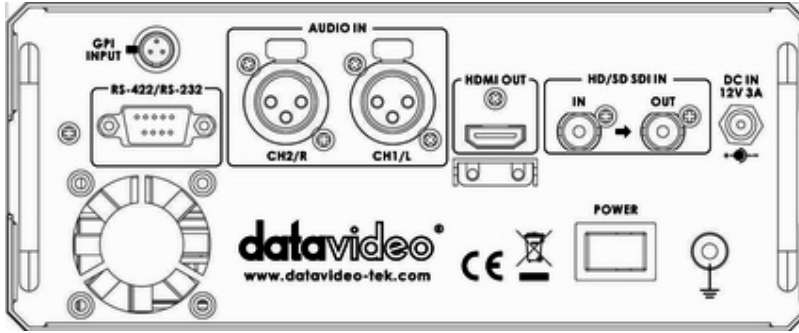
The GPI socket. Can be used for simple external control. The HDR-40 can accept pulse or level trigger inputs, which can trigger record or playback and pause commands *See GPI Mode & Function Menus Page 17*
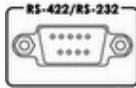
RS-422 / RS-232 Port. The HDR-40 can be controlled via RS-422 from external devices, or via RS- 232 from PC. The HDR-40 uses standard SONY protocol. *For more RS-422 / RS-232 information see Page 25*

XLR Balanced Audio input
For CH1/L and CH2/R audio input.

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

HD/SD-SDI input and Loop-through output connectors.

DC In Socket. Connect the supplied 12V 3A PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.

Power On/Off Switch. Switches the power On / Off.

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 1.0 mm2.

HDR-50 Front Panel
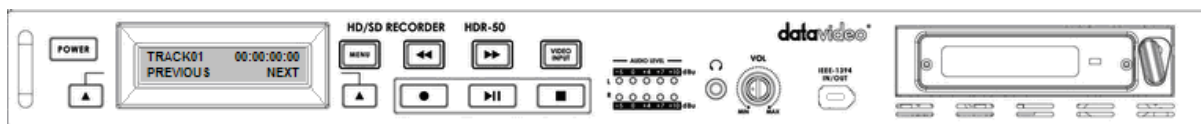
Power On / Off Button. This is a soft power on / off button which powers the unit on from a state of standby; the main power on / off switch is on the rear panel.

Display Panel. Displays the status of the HDR-50. The display will show Track 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 Fwd / Rew Buttons and Previous / Next Buttons.

Fwd / Rew Buttons. In playback mode these buttons will operate as Fast Forward and Rewind Buttons. If the Menu Button is pressed these buttons will navigate backwards and forwards between the various menu options.

Video Input Button. Switches the HDR-50 to Video Input SDI - Video Inputs can only be recorded in SDI or HD-SDI formats. See **Page 20**

Previous / Next Buttons. These buttons navigate up and down between recorded tracks and menu options.

Record Button. Puts the HDR-50 into record mode. To start recording press the Record Button and Play Button simultaneously.
N.B. Unit will not record if no video signal is present.

Play / Pause Button. Starts playback of a track, or pauses playback of a track- status will be displayed on the Display Panel. Also Starts / Pauses a recording when unit is in Record mode

Stop Button. Stops playback or record.

The Audio Input Level LEDs. show the audio input levels from the incoming source.
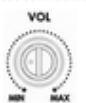
Audio Level Adjustment. This allows you to adjust the headphone volume.

Stereo Mini Jack Plug for headphones. The headphone volume is controlled by the Audio Level Adjustment.

6 Pin DV In/Out Port. This is a convenient front mounted DV / IEEE-1394 Port for connection to a computer for file transfer.

2.5" Removable HDD enclosure, SATA & USB interface for connecting to a computer for file transfer. **Locking Switch** position left to lock HDD in place and position right to allow removal of HDD.

HDR-50 Rear Panel

The GPI socket. Can be used for simple external control. The HDR-50 can accept pulse or level trigger inputs, which can trigger record or playback and pause commands
See GPI Mode & Function Menus Page 17
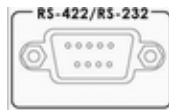
RS-422 / RS-232 Port. The HDR-50 can be controlled via RS-422 from external devices, or via RS- 232 from PC. The HDR-50 uses standard SONY protocol. *For more RS-422 / RS-232 information see Page 25*
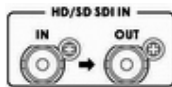
XLR Balanced Audio input
For CH1/L and CH2/R audio input.

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

HD/SD-SDI input and Loop-through output connectors.

DC In Socket. Connect the supplied 12V 3A PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.

Power On/Off Switch. Switches the power On / Off.

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 1.0 mm2.

Powering On

Please ensure the HDR unit's external power supply is connected to the DC in socket and is supplied with power from a wall socket before attempting to switch on and power on the HDR unit.

Switch the power On/Off switch to the ON position

Press the Power Button until it lights up

The LCD display panel should show HDR-40 (or HDR-50) and after a few seconds the track display should appear and then the HDR unit is ready to be operated.

| DATAVIDEO | INITIALIZING........ | TRACK 01 | 00:00:00:00 |
| HDR-40 | MAIN SYSTEM | PREVIOUS | ■ NEXT |

Menu Options

Your HDR unit is a menu driven unit; there are 18 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. So many of the settings, such as date and time, will only need to be set once. We will look at each individual menu in more detail, but here is a quick overview of them. **N.B. *Not all menus appear when the Video Input Button is illuminated.***

The 18 Menus are:

HDD MODE
This mode allows the HDR unit to connect to a computer for drag and drop file transfers via IEEE-1394 cabling to a PC or MAC.
See HDD Mode Menu (Page 13) for more details.

SETUP LOOP PLAY
If set the HDR unit will continuously loop play the selected track until stopped.

FREE SPACE
Displays how much free space is available on the current HDR unit removable drive.

TOTAL SPACE
Displays the total space or maximum capacity of the current HDR unit removable drive.

AUDIO INPUT SOURCE
The HDR unit has two types Audio Input can be set.
- **ANALOG AUDIO** relates to an XLR audio input source, this audio will be embedded into the **HDMI** output.
- **SDI EMBEDDED AUDIO** relates to an SDI input, this audio will also be embedded into the **HDMI** output.

HD MPEG2 BIT RATE
The HDR unit has 9 HD Bit Rate modes
Bit rates of 20, 25, 30, 35, 40, 45, 50, 55, or 60 Mbps can be set.
See HD MPEG2 BIT RATE Menu (Page 14) for more details.

SD MPEG2 BIT RATE
The HDR unit has 3 SD Bit Rate modes
Bit rates of 5, 10 or 15 Mbps can be set.
See SD MPEG2 BIT RATE Menu (Page 15) for more details.

SET I-FRAME ONLY
Set the HDR unit to encode Intra frame only instead of I, P and B frames or Groups Of Pictures.

SET 1080i H-RES.
To select the encoding horizontal resolution while input source is 1920x1080i
- Select **1920**, the record format is 1920x1080i.
- Select **1440**, the record format is 1440x1080i.
See *SET 1080i H-RES. Menu (Page 16) for more details.*

SET GPI TRIGGER MODE
The HDR unit has two GPI trigger modes, Pulse or Level trigger can be set.
See GPI Mode & Function Menus (Page 17) for more details.

SELECT GPI FUNCTION
The GPI function can be set to either Play / Play Pause or Record / Record Pause. *See GPI Mode & Function Menus (Page 17).*

SET DATE & TIME
Sets the date and time on the HDR unit; the setting is non-volatile so it is stored even when the unit is powered off.
See Set Date & Time Menu (Page 18) for more details.

FORMAT HARD DISK
Formats the HDD and erases all files and tracks from the HDR unit.
See Format Hard Disk Menu (Page 18) for more details.

ERASE TRACK
Erases the selected track from the HDR unit.
See Erase Track Menu (Page 19) for more details.

HDD SURFACE SCAN
Checks the HDD for errors / bad sectors. This is only necessary if your HDR unit is not performing correctly, or if you install a new HDD. This will take a long time to process. The unit will create a *result.txt* file in the root directory of the HDD and this can be viewed from a PC.

D-SUB H/W INTERFACE
The 9 pin D-SUB can be set to either RS-422 (differential) or RS-232 (single end) transmission mode
- Select **RS-232** mode, you can control HDR unit RS-232 from PC.
- Select **RS-422** mode, you can control HDR unit via RS-422 from external devices.

FP FIRMWARE UPDATE
To upgrade the front panel firmware.

FIRMWARE VERSION
Display the Revision Number and Firmware Version of the HDR unit

HDD Mode Menu

The HDD Mode Menu will set the HDR unit up as an external IEEE-1394 (FireWire 400) drive, for direct drag and drop file transfer to a PC or MAC. The files appear in the root directory of the HDR unit hard disk, and are numbered with the track number that appears in the LCD display when you are recording or playing back the track.

NOTE: Please ensure the computer and the HDR unit are both powered off before connecting a FireWire cable between these items. *IEEE-1394 6pin Power:* ensure the cable connector is inserted into the port the correct way around otherwise short circuit damage may result to either the computer or the HDR unit's port. *Other IEEE-1394 devices:* connecting 2 or more IEEE-1394 devices to the same computer at the same time may cause problems with the FireWire communication. To avoid this problem please remove any other IEEE-1394 connections from the HDR unit and the computer.

File Structure: The HDR unit uses a FAT32 file structure, so large tracks are broken down into 2 GB files, or roughly 9 minute segments, which are sequentially named:
For example if Track 02 is 1 hour in duration it will appear as follows:

hdv02.m2t   (2 GB)   -   hdv02 is the file name for Track 02
hdv02_01.m2t (2 GB)   -   Each 2 GB section is given a sequential _xx numeric extension
hdv02_02.m2t (2 GB)
hdv02_03.m2t (2 GB)
hdv02_04.m2t (2 GB)
hdv02_05.m2t (2 GB)
hdv02_06.m2t (77 MB) -   The last file in the sequence is likely to be smaller than 2GB.

The Open GOP structure of the 1080 stream requires information contained within all these files to have a truly contiguous video/audio file. Some Non Linear Edit systems do not combine these m2t files when importing clips, so this may need to be done prior to import. Datavideo can provide a utility (M2T_FileCombine.exe) to help you combine these multiple m2t files.

How to use M2T_FileCombine.exe to combine the .m2t files

Step1 - Please connect the HDR unit to PC via IEEE1394 or its removable HDD via USB cable.

Step2 - Open **M2T_FileCombine.exe**

Step3 - Select source hard disk/drive (HDR-40 or HDR-50)

Step4 - Select files **hdv02.m2t, hdv02_01.m2t** …and so on

Step5 - Click START to choose a new file name and then press SAVE combine the files.

NB: Although your PC / MAC may see the HDR unit as an AVC compliant DV Device it is not intended to be operated as such. The AVC command set is not supported.

To set the HDR unit into HDD Mode press Menu button so that it is illuminated.
You will see the display change to the HDD Mode Menu.

Press the Next (▲) Button (right) to select ENTER and the display will show the HDD Enable Confirmation Screen.

Press the Next (▲) Button (right) again to confirm, after a few seconds HDD Mode will be enabled.

The PC / MAC should recognise that an external IEEE-1394 (Firewire) HDD has been connected. The HDR unit can be used just like any external USB 2 drive.

To return the HDR unit to Deck Mode either use "Safely Remove Hardware" with a PC, or with a MAC use "Eject" or Drag the HDR unit Drive to "Trash". Once un-mounted the HDR unit display will return to the Track Display.

Audio Input Source Menu

To select the Audio Input Source:
Press the Menu Button, to enter the menu mode.

HDD MODE
CANCEL   ENTER

Press the FWD (►►) Button to navigate the menus until AUDIO INPUT SOURCE is displayed.

AUDIO INPUT SOURCE
CANCEL   ENTER

Press the Next (▲) Button (right) to enter the AUDIO INPUT SOURCE set up menu.

SDI EMBEDDED AUDIO
CANCEL   SELECT

Press the FWD (►►) Button to select either SDI or Analogue (rear XLR inputs).

SDI EMBEDDED AUDIO
CANCEL   SELECT

ANALOG AUDIO
CANCEL   SELECT

To confirm your selection and exit the menu press the Next (▲) Button (right).

ANALOG AUDIO
CANCEL   SELECT

Then press the Menu Button to leave menu mode.

AUDIO INPUT SOURCE
CANCEL   ENTER

TRACK 01   00:00:00:00
PREVIOUS   ■   NEXT

HD MPEG2 BIT RATE Menu

The HDR unit has user selectable encoding bit rates of 20, 25, 30, 35, 40, 45, 50, 55, 60 Mbps for recording HD tracks or M2T files.

To select the HD MPEG2 BIT RATE:

Press the Menu Button, to enter the menu mode

HDD MODE
CANCEL   ENTER

Press the FWD (►►) Button to navigate the menus until SET MPEG2 BIT RATE is displayed

HD MPEG2 BIT RATE
CANCEL   ENTER

Press the Next (▲) Button(right) to enter the SET MPEG2 BIT RATE menu

HD MPEG2 BIT RATE
CANCEL   ENTER

Use the FWD(►►) or REW(◄◄) Button to select the desired bit rate (20,25,30,35,40,45,50,55,60 Mbps)

60Mbps MPEG2
CANCEL   ENTER

To confirm your selection and exit the menu press the Next (▲) Button (right).

HD MPEG2 BIT RATE
CANCEL   ENTER

Then press the Menu Button to leave menu mode

TRACK 01   00:00:00:00
PREVIOUS   ■   NEXT

Below is a table showing the maximum amount of HD record time with a 120 GB Hard Drive fitted to the unit. The table below is for guidance only when the drive is empty or has just been formatted. All times are approximate maximum values which leave a safety margin for drive read/write times and file overheads. Datavideo do not recommend trying to record to a drive which is over 75% full or trying to record for over 9hrs to one track.

HDD Type	Bit Rate Mode	Maximum Recordable Time
120GB	20 Mbps	675 mins or 11hrs 15mins
120GB	40 Mbps	330 mins or 5hrs 30mins
120GB	60 Mbps	225 mins or 3hrs 45mins

SD MPEG2 BIT RATE Menu

The HDR unit has user selectable encoding bit rates of 5, 10 and 15 Mbps for recording SD tracks or M2T files.

To select the SD MPEG2 BIT RATE:

Press the Menu Button, to enter the menu mode.

HDD MODE
CANCEL   ENTER

Press the FWD (►►) Button to navigate the menus until SET MPEG2 BIT RATE is displayed.

SD MPEG2 BIT RATE
CANCEL   ENTER

Press the Next (▲) Button (right) to enter the SET MPEG2 BIT RATE menu.

SD MPEG2 BIT RATE
CANCEL   ENTER

Use the FWD(►►) or REW(◄◄) Button to select the desired bit rate (5, 10 or 15 Mbps)

15Mbps MPEG2
CANCEL   ENTER

To confirm your selection and exit the menu press the Next (▲) Button (right).

SD MPEG2 BIT RATE
CANCEL   ENTER

Then press the Menu Button to leave menu mode.

TRACK 01   00:00:00:00
PREVIOUS   ■   NEXT

Below is a table showing the maximum amount of SD record time with a 120 GB Hard Drive fitted to the unit. The table below is for guidance only when the drive is empty or has just been formatted. All times are approximate maximum values which leave a safety margin for drive read/write times and file overheads. Datavideo do not recommend trying to record to a drive which is over 75% full or trying to record for over 9hrs to one track.

HDD Type	Bit Rate Mode	Maximum Recordable Time
120GB	5 Mbps	2700mins or 45hrs
120GB	10 Mbps	1350mins or 22hrs 30mins
120GB	15 Mbps	900mins or 15hrs

SET 1080i H-RES. Menu

Press the Menu Button, to enter the menu mode

HDD MODE
CANCEL   ENTER

Press the FWD (►►) Button to navigate the menus until SET 1080i H-RES. is displayed.

SET 1080i H-RES.
CANCEL   ENTER

Press the Next (▲) Button(right) to enter the SET 1080i H-RES. menu

SET 1080i H-RES.
CANCEL   ENTER

Press the FWD (►►) Button to select either 1440 or 1920.

1440   ►
CANCEL   SET

To confirm your selection and exit the menu press the Next (▲) Button (right).

SET 1080i H-RES.
CANCEL   ENTER

Then press the Menu Button to leave menu mode

TRACK 01   00:00:00:00
PREVIOUS   ■   NEXT

1080i is the shorthand name of a format of high definition video modes. 1080 is number of horizontal scan lines, and the letter i stands for interlaced.

1080i is a high-definition television (HDTV) video mode. The term usually assumes a widescreen aspect ratio of 16:9, implying a horizontal resolution of 1920 pixels and a frame resolution of 1920 × 1080 or about 2.07 million pixels.

GPI Mode Menu

The HDR unit can be set to receive either pulse or level GPI triggers, which can be set to activate Play / Pause or Rec / Pause.

To select the GPI Mode:
Press the Menu Button, to enter menu mode.

[MENU]

```
HDD MODE
CANCEL          ENTER
```

Press the FWD (►►) Button to navigate the menus until SET GPI TRIGGER MODE is displayed.

[►►]

```
SET GPI TRIGGER MODE
CANCEL          ENTER
```

Press the Next (▲) Button(right) to enter the SET GPI TRIGGER MODE menu.

[▲]

```
PULSE TRIGGER      ►
CANCEL        SELECT
```

Press the FWD (►►) Button to select either Pulse Trigger or Level Trigger.

[►►]

```
PULSE TRIGGER      ►
CANCEL        SELECT
```
```
LEVEL TRIGGER      ►
CANCEL        SELECT
```

To confirm your selection and exit the menu press the Next (▲) Button (right).

[▲]

```
PULSE TRIGGER      ►
CANCEL        SELECT
```
```
SET GPI TRIGGER MODE
CANCEL          ENTER
```

Then press the Menu Button to leave menu mode.

[MENU]

```
SET GPI TRIGGER MODE
CANCEL          ENTER
```
```
TRACK 01      00:00:00:00
PREVIOUS      ■   NEXT
```

Select GPI Function Menu

Press the Menu Button, to enter the menu mode.

Press the FWD (►►) Button to navigate the menus until SET GPI FUNCTION is displayed.

[►►]

```
SELECT GPI FUNCTION
CANCEL          ENTER
```

Press the Next (▲) Button (right) to enter the SET GPI FUNCTION menu.

[▲]

```
PLAY/PLAY PAUSE    ►
CANCEL        SELECT
```

Press the FWD (►►) Button to select either Pulse Trigger or Level Trigger.

[►►]

```
PLAY/PLAY PAUSE    ►
CANCEL        SELECT
```
```
RECORD/RECORDPAUSE►
CANCEL        SELECT
```

To confirm your selection and exit the menu press the Next (▲) Button (right).

[▲]

```
RECORD/RECORDPAUSE►
CANCEL        SELECT
```
```
SELECT GPI FUNCTION
CANCEL          ENTER
```

Then press the Menu Button to leave menu mode.

[MENU]

```
SELECT GPI FUNCTION
CANCEL          ENTER
```
```
TRACK 01      00:00:00:00
PREVIOUS      ■   NEXT
```

Set Date & Time Menu

To set the Date & Time on the HDR unit.

Press the Menu Button, to enter menu mode.

	HDD MODE
MENU	CANCEL ENTER

Press the REW (◄◄) Button to navigate the menus until SET DATE & TIME is displayed.

	SET DATE & TIME
◄◄	CANCEL ENTER

Press the Next (▲) Button (right) to enter the SET Date & Time menu.

	01 Jan 2009 12:00
▲	CANCEL SET

You will see a flashing cursor on the date value. To set the dates use the Play/Pause Button to increase the value or the Stop Button to decrease the value.

▶II	Increases Value	■	Decreases Value

Use the FWD (►►) Button to move the cursor to the next column to the right i.e. Month / Year / Hours / Minutes or the REW (◄◄) Button to move the cursor back to the left.

►►	Moves the cursor to the right.	◄◄	Moves the cursor to the left.

Once you have set the date & time press the Next (▲) Button (right) to exit the menu.

	16 Jan 2010 14:30	SET DATE & TIME
▲	CANCEL SET	CANCEL ENTER

Then press the Menu Button to leave menu mode.

	SET DATE & TIME	TRACK 01 00:00:00:00
MENU	CANCEL ENTER	PREVIOUS ■ NEXT

Format Hard Disk Menu

Caution: Format Hard Disk will remove all recordings and files from the hard drive.

Press the Menu Button, to enter menu mode.

	HDD MODE
MENU	CANCEL ENTER

Press the REW (◄◄) Button to navigate the menus until FORMAT HARD DISK is displayed.

	FORMAT HARD DISK
◄◄	CANCEL ENTER

Press the Next (▲) Button (right) to enter the FORMAT HARD DISK menu.

	ARE YOU SURE ?
▲	CANCEL ENTER

You will see ARE YOU SURE? Displayed.
Press the Next (▲) Button (right) again to confirm that you want to format the hard disk.

	FORMATTING HARD DISK	FORMAT DONE
▲	WAITING	REBOOT SYSTEM

After a few seconds the HDR UNIT will reboot and the display will return to normal.

INITIALIZING........ MAIN SYSTEM	TRACK 01 00:00:00:00 PREVIOUS ■ NEXT

Erase Track Menu

Erase Track is used for deleting individual tracks from the HDR unit.

Press the Menu Button, to enter menu mode

[MENU]   HDD MODE
CANCEL   ENTER

Press the REW (◄◄) Button to navigate the menus until ERASE TRACK is displayed.

[◄◄]   ERASE TRACK
CANCEL   ENTER

Press the Next (▲) Button(right) to enter the ERASE TRACK menu.

[▲]   TRACK 01   00:00:10:15
CANCEL   ERASE

Use the FWD (►►) or REW (◄◄) Button to select the track that you want to erase - (Track 01 in this case).

[◄◄] [►►]   TRACK 01   00:00:10:15
CANCEL   ERASE

Press the Next (▲) Button(right) to erase the selected track - The track duration will return to 00:00:00:00

[▲]   TRACK 01   00:00:10:15
CANCEL   ERASE   TRACK 01   00:00:00:00
CANCEL   ERASE

Then press the Menu Button to leave menu mode.

[MENU]   TRACK 01   00:00:00:00
CANCEL   ERASE   TRACK 01   00:00:00:00
PREVIOUS   ■   NEXT

HDD Surface Scan Menu

Surface scan is a utility which checks the disc surface for errors and bad sectors. It is not generally necessary to use Surface Scan unless your HDR unit is not performing correctly, or you have changed the HDD. This process can take a long time depending on drive size.

To run the Surface Scan press the Menu Button to enter menu mode.

[MENU]   HDD MODE
CANCEL   ENTER

Press the REW (◄◄) Button to navigate the menus until SCAN HDD SURFACE is displayed.

[◄◄]   HDD SURFACE SCAN
CANCEL   ENTER

Press the Next (▲) Button (right) twice to start the HDD Surface Scan.

[▲]   ARE YOU SURE ?
CANCEL   ENTER   HDD SURFACE SCAN
SCANNING >   1% DONE

The progress of the scan will appear in the LCD display. Once complete the Surface Scan Done message will appear. Press the Next (▲) Button (right) to exit the surface scan.

HDD SURFACE SCAN
SCANNING >   1% DONE   SURFACE SCAN DONE!
CHECK RESULT .T XT OK

A txt file called Result will have been created in the root directory of the HDR unit HDD, this can be accessed via a PC, by connecting the HDR unit as a HDD.

Recording a Track SD or HD

The HDR unit will automatically sense either SD or HD signals on the SDI input connection.

To record from an SDI source you **MUST** press the **Video Input button** so it is **ON**.
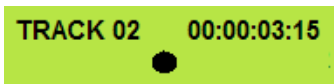
Press the Video Input Button so that it is illuminated. You will see the video source on the HDMI output.

Use the Previous (▲) / Next (▲) Buttons to select the empty track from the HDR unit track list, one that shows a duration of 00:00:00:00 in the LCD display.

 Not suitable - Track has already been recorded

 Suitable – This track is empty
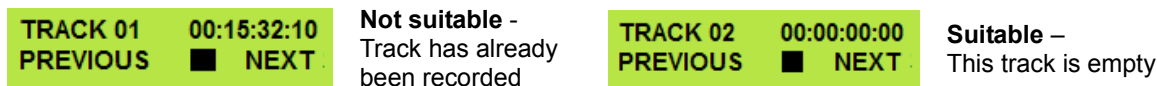
Press both the Record and Play/Pause Buttons simultaneously and the HDR unit should start recording.

  The counter should start counting and the REC symbol should appear

If the HDR unit does not start recording check the following:

That there is an SDI video input signal present.

The Video Input Button is illuminated.

The track you have selected on the HDR unit is empty. The counter next to the track number on the LCD display should be showing 00:00:00:00.

There is some available space on the HDR unit Hard Disk - Go to the **FREE SPACE** Menu and check that the HDR unit is not full.

Check that the SDI cabling from the video source is connected correctly and is not too long or damaged.

Check that the source equipment is operating and set up correctly.

Record Pause
During record you can **Pause** the HDR unit by pressing the **Play/Pause** (►II) button, the counter on the LCD display will stop.
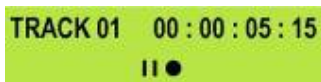
  The counter should stop counting and the REC PAUSE symbol should appear

To release pause press the Play/Pause (►II) button again.

  The counter should start counting again and the REC symbol should return

NOTE: It is not possible to stop recording and then restart on the same track, once a track has been stopped you must select a new empty track from the HDR unit to start recording again.

These units cannot record a camcorder's DV25 or HDV m2t stream via the IEEE-1394 connection. Please use the SDI BNC input connection only to make recordings.

Playing an M2T Track

Playback of M2T tracks to monitors or recorders via the HDMI video & audio output.

Use the Previous (▲) / Next (▲) Button (right)s to select the track you want to play, and then press the Play (►II) Button.

TRACK 02   01:25:12:09
PREVIOUS   ■   NEXT

►II

It is also possible to set the HDR unit to loop play. In loop play the track will seamlessly looped until stopped. To set up loop play press the Menu Button to enter menu mode and then the FWD (►►) Button until SETUP LOOP PLAY is displayed.

MENU   **+**   ►►   SETUP LOOP PLAY
CANCEL   ENTER

Press the Next (▲) Button(right) to enter the setup loop play menu, and then press the FWD (►►) Button to select **ENABLE**

▲   DISABLE   ►   ►►   ENABLE   ►
CANCEL   SET   CANCEL   SET

Press the Next (▲) Button (right) to select SET and then press the Menu Button to return to track display.

▲   SETUP LOOP PLAY   MENU   TRACK 02   01:25:12:09
CANCEL   ENTER   PREVIOUS   ■   NEXT

When you press play the selected track will start playing, and will loop until the Stop (■) Button is pressed. To cancel loop playback, follow the above procedure but select **DISABLE** instead of enable.

Auto Rewind and Playback function

If you want to see the last part of a recorded track it is possible to do this quickly without having to view the whole track.

Use the Previous (▲) / Next (▲) Buttons to select the track you want to play, and then press the Play (►II) and REW (◄◄) Buttons *at the same time*.

▲   TRACK 02   01:25:12:09
PREVIOUS   ■   NEXT

►II   **+**   ◄◄

The HDR unit will then play the last segment of the selected track.

Connecting to a PC

Connect the HDR unit IEEE-1394 output on the front panel to a PC*.
To set the HDR unit into HDD Mode first press the Menu button so that it is illuminated.

You will see the display change to the HDD Mode Menu.

HDD MODE
CANCEL   ENTER

Press the Next (▲) Button (right) to select ENTER and the display will show the HDD Enable Confirmation Screen.

ENABLE HDD MODE?
CANCEL   ENTER

Press the Next (▲) Button (right) again to confirm, after a few seconds HDD Mode will be enabled

PLEASE WAIT…   **HDD MODE ENABLED**

The PC should recognise that an external IEEE-1394 (Firewire) HDD has been connected. Select Open Folder to View Files. The drive should also appear in My Computer as an internal HDD. Once connected the HDR unit can be used just like any HDD. You can select the required files and drag and drop them to the required destination.
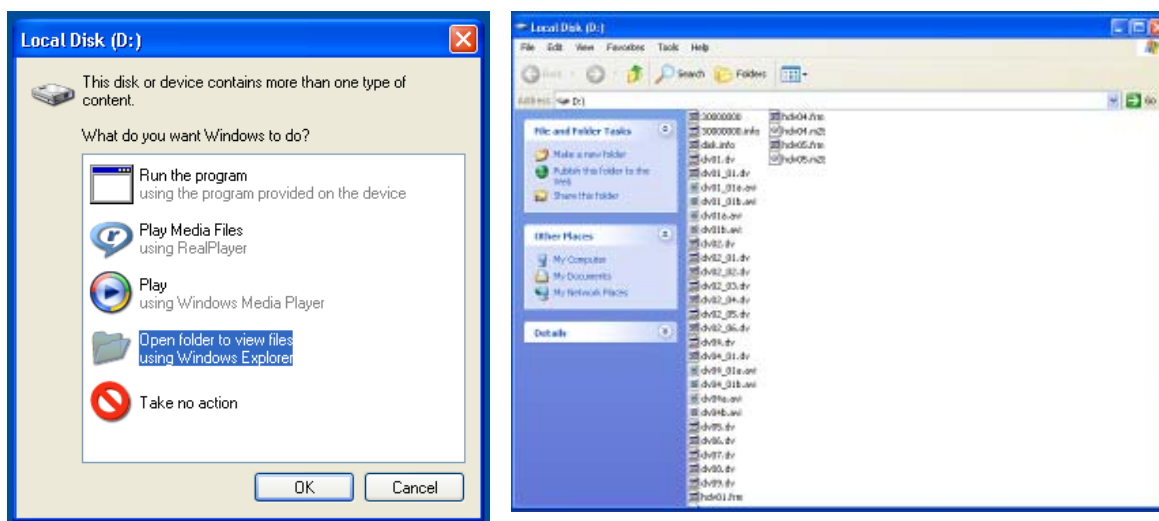
To return the HDR unit to Deck Mode use "Safely Remove Hardware". You will find "Safely Remove Hardware" on the Taskbar.

Double click on Safely Remove Hardware and the dialog box will appear, select the Datavideo HDD IEEE SBP2 Device and click on Stop. A second dialog box will appear.
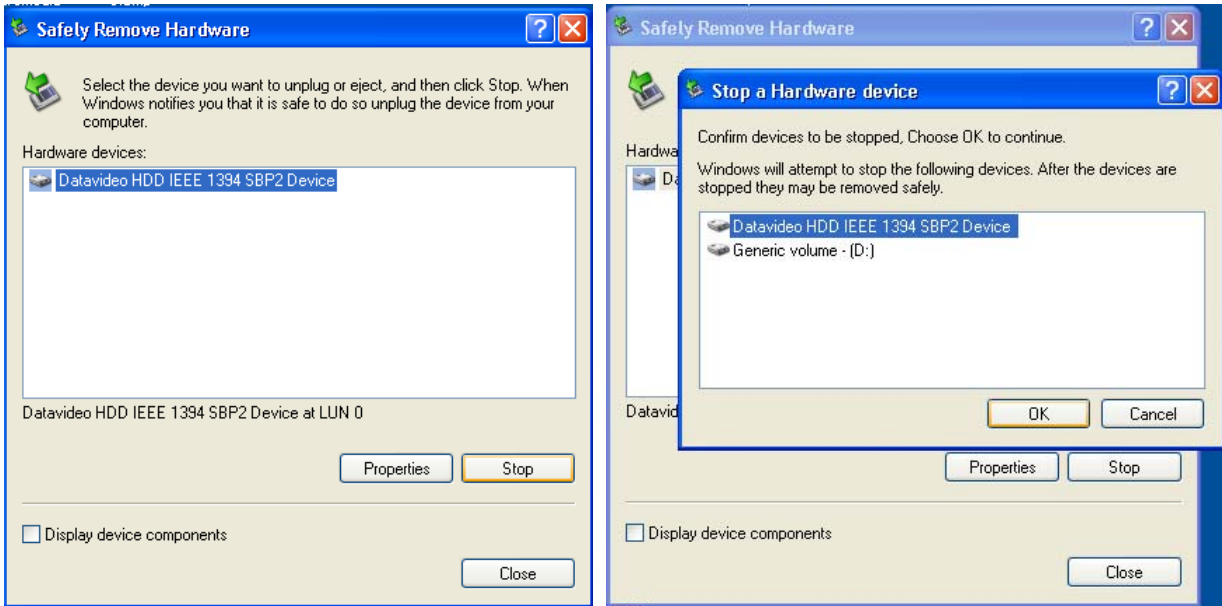
Select Datavideo HDD IEEE SBP2 Device and click on OK. After a few seconds a "**Safe To Remove Hardware**" message should appear above the Taskbar. You can then disconnect the HDR unit.

Once un-mounted from the PC the HDR unit display will leave HDD Mode and return to Track Display.
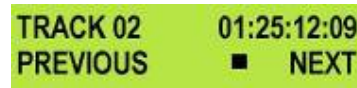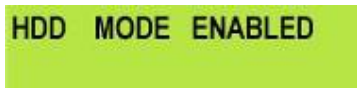
NB: Although a PC may see the HDR unit as an AVC compliant DV Device it is not intended to be operated as such. The AVC command set is not supported. See Page 13 also.

If your PC sees an AVC Device select Take No Action.

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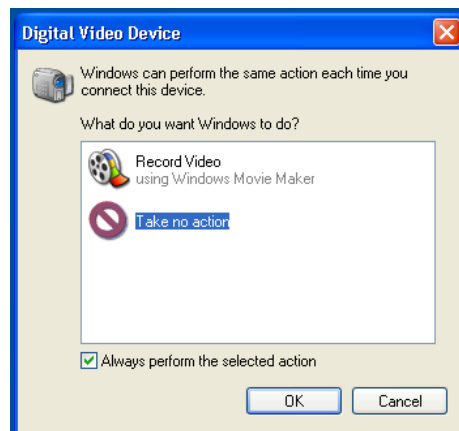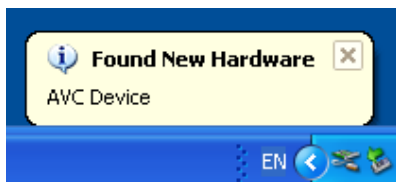
Connecting to a MAC

NB: Although a MAC may see the HDR unit as an AVC compliant DV Device it is not intended to be operated as such. The AVC command set is not supported. See Page 13 also.

Connect the HDR unit IEEE-1394 output to a MAC.
To set the HDR unit into HDD Mode firstly press the Menu button so that it is illuminated.
You will see the display change to the HDD Mode Menu

HDD MODE
CANCEL   ENTER

Press the Next (▲) Button(right) to select ENTER and the display will show the HDD Enable Confirmation Screen

ENABLE HDD MODE?
CANCEL   ENTER

Press the Next (▲) Button(right) again to confirm, after a few seconds HDD Mode will be enabled

PLEASE WAIT...   HDD MODE ENABLED

The MAC should see the HDR unit as a HDD and the files will appear in the root directory of the drive.

You can select the required files and drag and drop them to the required destination.

To un-mount the HDR unit from your MAC either "Eject" the drive, or drag it to the Trash Can. Once the HDR UNIT is un-mounted from the MAC the LCD display will return to normal.

HDD MODE ENABLED

TRACK 02   01:25:12:09
PREVIOUS   ■   NEXT

Datavideo HDR-40/50 422 Protocol Reference V1.2

1.Interface Overview

- Conforming to EIA RS-422A.
- Full duplex communications channel is utilized.
- Data is transmitted asynchronously, bit serial, word serial with data exchange between devices.
- Standard transmission rate on the interface bus is 38400 bits per seconds (bps)
- The data word utilized by the interface system is as follows :

START BIT	D0	D1	D2	D3	D4	D5	D6	D7	PARITY (ODD)	STOP BIT
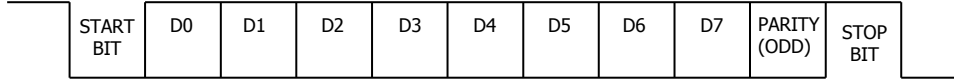
- 1 Start bit + 8 Data bits + 1 Parity bit + 1 Stop bit. Odd Parity

ODD parity : The total of "1"s in D0+D1+ ． ． ． D7+PARITY equals an odd number.

2.Command Block Format

The data communication is composed of the **CMD-1/DATA COUNT** byte, the **CMD-2** byte, optional **DATA** bytes and the **CHECKSUM** byte. Commands are transmitted in order from the MSB (Most Significant Byte) to the LSB (Least Significant Byte). This means that when using the examples in this manual, the order in which the bytes are read is the same order in which they are transmitted. When the **DATA COUNT** nibble is 0, no **DATA** bytes are transmitted or required (the **CMD-1/DATA COUNT** byte, **CMD-2** byte and **CHECKSUM** byte are still transmitted). When the **DATA COUNT** nibble is not 0, the number of **DATA** bytes transmitted must correspond with the **DATA COUNT**. These bytes are inserted between the **CMD-2** byte and **CHECKSUM** byte.

COMMAND BLOCK FORMAT

The data communication between the controller and the device is performed as follows:

Name	CMD-1	Data Count	CMD-2	Data 0~15 (per Data Count)	Checksum
Nibble	MSN	LSN			
Size	1 Byte		1 Byte	0..15 Byte(s)	1 Byte

- MSN stands for Most Significant Nibble (4 bits)
- LSN stands for Least Significant Nibble (4 bits)

COMMAND CONTENTS

CMD-1:

This is the first (Most Significant) nibble of the first byte of the command. The DATA COUNT (below) fills the lower (Least Significant) nibble. It (**CMD-1)** indicates the command or return group to which the command belongs as per the table below

CMD-1	Function	Initiator
0x	System Control	Controller
1x	System Control Return	Device (HDR-40/50)
2x	Transport Control	Controller
4x	Preset And Select Control	Controller
6x	Sense Request	Controller
7x	Sense Return	Device (HDR-40/50)
Ex	DVR Control	Controller
Fx	DVR Return	Device (HDR-40/50)

DATA COUNT:

This is the second (Least Significant) nibble of the first byte of the command. The upper (Most Significant) nibble is filled by the **CMD-1** (above). It indicates the number of data bytes (0-15) that are required to be inserted between the **CMD-2** byte and the **CHECKSUM** byte.

CMD-2:
Designates the exact command within the section specified by **CMD-1**.

DATA 0..15:
If the command requires extended data, the **DATA COUNT** will be set to between 1 and 15 (a 0 indicates that no extra data is required). These bytes will be placed here.

CHECKSUM:
This byte is used to check the data for communication errors. To calculate the checksum, each byte of the command (**CMD-1**+**DATA COUNT**, **CMD-2**, and any **DATA BYTES**) are added together. The least significant 8 bits (1 byte) are then truncated to create a 1-byte checksum.

I.e.: The command "61.0C.03" becomes

	MSB	LSB	
	0110	0001	(=61)
	0000	1100	(=0C)
+)	0000	0011	(=03)
	0111	0001	(=70)

CHECKSUM = "70"
Therefore, the complete command is "61.0C.03.70"

3.Connector Pin Assignment

Interface : 9 pin D-Sub female

The RS-422 pin assignment of the Controller and HDR-40/50 is shown in the following table:

Signal Pin	Controller	HDR-40/50
1	Frame Ground	Frame Ground
2	Receive A(RX-)	Transmit A(TX-)
3	Transmit B(TX+)	Receive B(RX+)
4	Transmit Common	Receive Common
5	Spare	Spare
6	Receive Common	Transmit Common
7	Receive B(RX+)	Transmit B(TX+)
8	Transmit A(TX-)	Receive A(RX-)
9	Frame Ground	Frame Ground

The RS-232 pin assignment of the Controller and HDR-40/50 is shown in the following table:

Signal Pin	Controller	HDR-40/50
1	-	-
2	Receive (RX)	Transmit (TX)
3	Transmit (TX)	Receive (RX)
4	-	-
5	GND	GND
6	-	-
7	-	-
8	-	-
9	-	-

4.Communication Protocol

1. All communications between the CONTROLLER and the DEVICE will be under the direct supervision of the CONTROLLER.

    When the DEVICE (HDR-40/50) receives the COMMAND from CONTROLLER, the following COMMAND is returned.

    - ACK: In case that the DEVICE receives a COMMAND not requiring data
    - COMMAND+DATA: In case that the DEVICE receives a COMMAND requiring data
    - NAK+ERROR DATA: In case that a communication error is detected or an undefined COMMAND is received

2. The CONTROLLER must not transmit additional COMMAND blocks to a DEVICE (HDR-40/50) prior to response to a previous COMMAND block.

3. The CONTROLLER must transmit of bytes in a COMMAND block for with intervals less than 10 milliseconds. If a DEVICE (HDR-40/50) detects an interruption of a byte in a COMMAND block that exceeds 10 milliseconds, it executes a TIME-OUT error sequence, voids the receiving COMMAND block, and transmit a NAK (TIME OUT).

4. When a DEVICE (HDR-40/50) receives a COMMAND block from the CONTROLLER, the DEVICE must transmit a response within 9 milliseconds. Therefore if the CONTROLLER cannot receive the appropriate response from the DEVICE within 10 milliseconds after transmitting the COMMAND block the CONTROLLER detects a communication error, and must execute an appropriate process.

5. When a DEVICE (HDR-40/50) detects a communication error, it must immediately transmit a NAK to the CONTROLLER. (The content of an error is shown on the COMMAND tables.) When the CONTROLLER receives a NAK, if must immediately stop transmission of the block. The DEVICE must not accept a subsequent command within 10 milliseconds after that (except NAK-UNDEFINED command) and must execute a necessary process.

5.Command Table (without Checksum byte)

Command	Name	Response	Name
10h 01h	Acknowledge (ACK) – command succeeded		
12h 11h	Device Return		
11h 12h	Negative Acknowledge (NAK) – command failed		
00h 11h	Device Type Request	12h 11h	Device Type Response
20h 00h	Stop	10h 01h	ACK
20h 01h	Play	10h 01h	ACK
20h 02h	Record	10h 01h	ACK
20h 10h	Fast Forward	10h 01h	ACK
2xh 13h	Shuttle Forward	10h 01h	ACK
21h 13h 00h	Pause	10h 01h	ACK
20h 20h	Fast Rewind	10h 01h	ACK
2xh 23h	Shuttle Rewind	10h 01h	ACK
40h 50h	Next Track	10h 01h	ACK
40h 51h	Previous Track	10h 01h	ACK
40h 54h	Delete Current Track	10h 01h	ACK
40h 62h	Enable HDD mode	10h 01h	ACK
41h 52h nnh mmh	Select Track (Track 01 ~ 99)	10h 01h	ACK
42h 52h nnh mmh	Select Track (Track 001 ~ 999)	10h 01h	ACK
41h 53h nnh	Select Video Input Source	10h 01h	ACK
41h 61h nnh	Select Audio Input Source	10h 01h	ACK
61h 0Ch 01h	Current Time Sense	74h 04h	Current Time
61h 20h	Status Sense	7xh 20h	Current Status
E0h 01h	Get Length of Current Track	F4h 01h	Length of Track
E0h 02h	Video Control Data Sense	F1h 02h	Video Control Data
E0h 03h	Audio Control Data Sense	F1h 03h	Audio Control Data
E0h 04h	Current Track Number Data Sense (Track 01 ~ 99)	F1h 04h	Track Number (BCD)
E0h 05h	Current Track Number Data Sense (Track 001 ~ 999)	F2h 05h	Track Number (BCD)
E6h 06h	Current Encode Bit Rate Sense	F1h 06h	Bit Rate
E2h 10h 01h nnh	Set Loop Play	10h 01h	ACK
E3h 10h AAh 55h 01h	Format Hard Disk	10h 01h	ACK

6.Detailed Description of Commands

00h 11h : DEVICE TYPE REQUEST

Send: 00h 11h 11h

Return: 12h 11h B0h 11h E4h (HDR-40/50)

20h 00h : STOP

Send: 20h 00h 20h

Return: 10h 01h 11h

20h 01h : PLAY

Send: 20h 01h 21h

Return: 10h 01h 11h

20h 02h : RECORD

Send: 20h 02h 22h

Return: 10h 01h 11h

20h 10h : FAST FORWARD

Send: 20h 10h 30h

Return: 10h 01h 11h

2xh 13h : SHUTTLE FORWARD

Send: 21h 13h 01h 35h

Return: 10h 01h 11h

21h 13h 00h : PAUSE

Send: 21h 13h 00h 34h

Return: 10h 01h 11h

20h 20h : FAST REWIND

Send: 20h 20h 40h

Return: 10h 01h 11h

2xh 23h : SHUTTLE REWIND

Send: 21h 23h 01h 45h

Return: 10h 01h 11h

40h 50h : NEXT TRACK

Send: 40h 50h 90h

Return: 10h 01h 11h

40h 51h : PREVIOUS TRACK

Send: 40h 51h 91h

Return: 10h 01h 11h

40h 54h : DELETE CURRENT TRACK

Send: 40h 54h 94h

Return: 10h 01h 11h

40h 62h : ENABLE HDD MODE

Send: 40h 62h A2h

Return: 10h 01h 11h

41h 52h NNh : SELECT TRACK NUMBER (Track 01 ~ 99)

NN = Track Number

Send: 41h 52h 01h 94h (Select Track 1)

Return: 10h 01h 11h

Send: 41h 52h 10h A3h (Select Track 16)

Return: 10h 01h 11h

42h 52h NNh MMh : SELECT TRACK NUMBER (Track 001 ~ 999)

NN = Track Number (Hex) % 100h

MM = Track Number (Hex) / 100h

Set track number to 900(384h):

NN = 384h % 100h = 84h (quotient)

MM = 384h / 100h = 03h

Send: 42h 52h 84h 03h 1Bh (Select Track 900)

Return: 10h 01h 11h

Set track number to 168(A8h):

NN = A8h % 100h = A8h (quotient)

MM = A8h / 100h = 00h

Send: 42h 52h A8h 00h 3Ch (Select Track 168)

Return: 10h 01h 11h

*41*h 53h NNh : SELECT VIDEO INPUT SOURCE

NN = Video Source, 1 = SDI, 2 = Decode MPEG-2

Send: 41h 53h 01h 95h (SDI input)

Return: 10h 01h 11h

Send: 41h 53h 02h 96h (Decode MPEG-2)

Return: 10h 01h 11h

41h 61h NNh : SELECT AUDIO INPUT SOURCE

NN = Audio Source, 0 = Analog audio, 1 = SDI Embedded Audio

Send: 41h 61h 00h A2h (Analog audio input)

Return: 10h 01h 11h

Send: 41h 61h 01h A3h (SDI Embedded Audio)

Return: 10h 01h 11h

61h 0Ch 01h : CURRENT TIME SENSE

Send: 61h 0Ch 01h 6Eh

Return: 74h 04h 01h 02h 03h 04h 82h (Time code 04:03:02:01)

61h 20h : STATUS SENSE

DATA-1 Most Significant Nibble = 1st status data byte number to be returned

DATA-1 Least Significant Nibble = number of status data bytes to be returned

Send: 61h 20h 03h 84h (return data byte 0, 1, and 2)

Return: 73h 20h 00h 81h 80h 94h

Send: 61h 20h A1h 22h (return the current track number)

Return: 71h 20h 99h 2Ah (Current track number is 99)

E0h 01h : TRACK LENGTH SENSE

Send: E0h 01h E1h

Return: F4h 01h 29h 41h 56h 00h B5h (Track Length 00:56:41:29)

E0h 02h : VIDEO CONTROL DATA SENSE

1 = SDI, 2 = Decode MPEG-2

Send: E0h 02h E2h

Return: F1h 02h 01h F4h (SDI Input)

Send: E0H 02h E2h

Return: F1h 02h 02h F5h (Decode MPEG-2)

E0h 03h : AUDIO CONTROL DATA SENSE

0 = Analog audio, 1 = SDI Embedded Audio

Send: E0h 03h E3h

Return: F1h 03h 00h F4h (Analogue Input)

E0h 04h : CURRENT TRACK NUMBER SENSE

Send: E0h 04h E4h

Return: F1h 04h 17h 0Ch (Current Track Number is 17<BCD>)

E0h 05h : CURRENT TRACK NUMBER SENSE (Track 001 ~ 999)

Send: E0h 05h E5h

Return: F2h 05h 17h 01h 0Fh (Current Track Number is 117 <BCD>)

E0h 06h : CURRENT ENCODE BIT RATE SENSE

Send: E0h 06h E6h

Return: F1h 06h 3Ch 33h (I-Frame Only = Disable, Current Bit Rate = 60Mbps)

E2h 10h 01h NNH: Set Loop Play

NN = Disable (00h) or Enable (01h)

Send: E2h 10h 01h 00h F3h (Disable Loop Play)

Return: 10h 01h 11h

Send: E2h 10h 01h 01h F4h (Enable Loop Play)

Return 10h 01h 11h

E3h 10h AAh 55h 01h : Format Hard Disk

Send: E3h 10h AAh 55h 01h F3h

Return: 10h 01h 11h

7.Return Data

10h 01h : ACK

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

11h 12h : NAK

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-1 will be set in accordance with the contents.

[DATA-1]

BIT-7	BIT-6	BIT-5	BIT-4	BIT-3	BIT-2	BIT-1	BIT-0
TIME OUT	FRAMING ERROR	OVERRUN ERROR	PARITY ERROR	INHIBIT	CHECKSUM ERROR	SOFTWARE OVERRUN	UNDEFINED COMMAND

12h 11h : DEVICE TYTPE

The "00h 11h : DEVICE TYPE REQUEST" command is used for asking the specifications of the HDR-40/50 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-40/50:   12h 11h B0h 11h

74h 04h : Current Time Code (BCD)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	0	0	Tens of Frames		Frames			
Data 1	0	Tens of Seconds			Seconds			
Data 2	0	Tens of Minutes			Minutes			
Data 3	0	0	Tens of Hours		Hours			

Send: 61h 0Ch 01h 6Eh

Return: 74h 04h 01h 02h 03h 04h 82h   (Time code 04:03:02:01)

F4h 01h : Length of Current Track (BCD)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	0	0	Tens of Frames		Frames			
Data 1	0	Tens of Seconds			Seconds			
Data 2	0	Tens of Minutes			Minutes			
Data 3	0	0	Tens of Hours		Hours			

Send: E0h 01h E1h

Return: F4h 01h 29h 41h 56h 00h B5h (Track Length 00:56:41:29)

F1h 04h : Current Track Number (BCD) (Track 01 ~ 99)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	Tens of Track Number (BCD)				Track Number (BCD)			

Send: E0h 04h E4h

Return: F1h 04h 17h 0Ch (Current Track Number is 17 <BCD>)

F2h 05h : Current Track Number (BCD) (Track 001 ~ 999)

	Bit 7	Bit	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	Tens of Track Number (BCD)				Track Number (BCD)			
Data 1	0				Hundreds of Track Number (BCD)			

Send: E0h 05h E5h

Return: F2h 05h 17h 01h 0Fh (Current Track Number is 117 <BCD>)

F1h 06h : Current Bit Rate

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	I-Frame Only	Current Encode Bit Rate (Hex)						

Bit 7, I-Frame Only : 0 = Disable, 1 = Enable

Bit 6 ~ Bit 0 : Current Encode Bit Rate (Hex)

Send: E0h 06h E6h

Return: F1h 06h 1Eh 15h (I-Frame Only Disable, Current Bit rate = 30Mbps)

Send: E0h 06h E6h

Return: F1h 06h B2h A9h (I-Frame Only Enable, Current Bit rate = 50Mbps)

If I-Frame Only is enable then Bit Rate will be fixed at

HD: 100Mbps, SD: 50Mbps

8.Status return data

7xh 20h :

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	Busy		Disk Out			Hardware Error		
Data 1			Stop	Eject	Rewind	Fast Forward	Record	Play
Data 2			Shuttle			Reverse	Still	
Data 3								
Data 4								
Data 5								
Data 6		Lamp Still	Lamp Forward	Lamp Reverse				
Data 7								
Data 8				Disk Full				Track is not empty (Rec. Inhibit)
Data 9				HDV Type	HDV Monitor	GPI Mode	GPI Function	Loop Play
Data 10	Tens of Track Number(BCD) 0~9				Track Numbers(BCD) 0~9			
Data 11	0				Hundreds of Track Number (BCD) 0~9			
Data 10								
Data 13								
Data 14			SDI Embedded	Analogue Audio		Decode MPEG-2	Encode SDI	
Data 15								

Data-0

BIT-2 **HARDWARE ERROR**

This bit will set to 1 when a hardware error occurs in the device.

BIT-5 **DISK OUT**

The removable media is not present in the device.

BIT-7 **BUSY**

This bit is set to 1 if the device is currently unable to accept motion commands. Sense commands will be accepted.

Data-1

BIT-0 **PLAY**

This bit will be set to 1 when the device goes into the PLAY mode.

BIT-1 **RECORD**

This bit will set to 1 when the device goes into the REC mode.

BIT-2 **FAST FORWARD**

This bit will be set to 1 when the device goes into the FAST FORWARD mode.

BIT-3 **REWIND**

This bit will be set to 1 when the device goes into the FAST REWIND mode.

BIT-4 **EJECT**

This bit will be set to 1 when the device EJECTs hard disk.

BIT-5 **STOP**

This bit will be set to 1 when the device is in STOP mode.

Data-2

BIT-1 **STILL**

This bit will be set to 1 when the device is paused and displays the current frame.

BIT-2 **REVERSE**

This bit will be set to 1 when the device is outputting its material in reverse of the the normal order. When moving in the normal direction, it will be 0.

BIT-5 **SHUTTLE**

This bit will be set to 1 when the device goes into SHUTTLE command mode.

Data-6

BIT-4 **LAMP REVERSE**

This bit will be set to 1 when the device is searching backwards.

BIT-5 **LAMP FORWARD**

This bit will be set to 1 when the device is searching forwards.

BIT-6 **LAMP STILL**

This bit will be set to 1 when the device has finished searching.

Data-8

BIT-0 **TRACK IS NOT EMPTY (REC INHIBIT)**

If this bit is set to 1, record command will be ignored. (it is not an empty track)

BIT-4 **DISK FULL**

Set to 1 if the device has reached the end of hard disk.

Data-9

BIT-0 **Loop Play Status**

If this bit is set to 1, Loop Play is enable

BIT-1 **GPI Function**

0: RECORD/RECORD PAUSE

1: PLAY/PLAY PAUSE

BIT-2 **GPI Mode**

0: Edge/Pulse Trigger

1: Level Trigger

BIT-3 **HDV Monitor**

0: Disable

1: Enable

BIT-4 **HDV Type**

> 00: 1080 59i

> 01: 1080 50i

> 10: 720 59p

> 11: 720 50p

Data-10

BIT-0 ~ 3   **TRACK NUMBER**

> Track number in BCD.

BIT-4 ~ 8   **TENS OF TRACK NUMBER**

> Tens of Track number in BCD

Data-11

BIT-1 **ENCODE SDI**

> This bit will be set to 1 if the device is encoding SDI source.

BIT-2 **DECODE MPEG-2**

> This bit will be set to 1 if the device is decoding MPEG-2.

BIT-4 **ANALOGUE AUDIO**

> This bit will be set to 1 if the audio input source is analogue.

BIT-5 **SDI EMBEDDED**

> This bit will be set to 1 if the audio input source is SDI embedded audio.

Revision History:

Rev.	Description	Date	FP Rev.	MB Rev.
1.0	1. Initial release		V1.0.0	
1.1	1. Add Delete Current Track	Jan-19-2010	V1.2.0	V1.2.24
1.2	1. Change Status Sense Data-11 (current video/audio source) to Data-14. 2. Add support track number up to 999. 3. New Set Track Number (42h 52h) command to support 999 tracks. 4. New Current Track Number Sense (E0h 05h) command to support 999 tracks. 5. New Current Encode Bit Rate Sense (E0h 06h). 6. New Format Disk (E3h 10h AAh 55h 01h) command. 7. New Set Loop Play (E2h 10h 01h) command. 8. Loop Play Status Sense, Data[9].bit-0 9. GPI Function Status Sense, Data[9].bit-1 10. GPI Mode Status Sense, Data[9].bit-2 11. HDV Monitor Status Sense, Data[9].bit-3 12. HDV type Status Sense, Data[9].bit-4,5	Oct-20-2010	V1.4.0	V1.2.27

Specifications

Inputs Interface	• 1x BNC connector for HD/SD-SDI input • 2x XLR connector for audio input
Outputs Interface	• 1x BNC connector for HD/SD-SDI pass through output • 1x HDMI connector for HDMI output (1.1)
Record format	• Video：MPEG2 (.M2T) • Audio：MPEG1 Layer2 • Audio Bit rate：384Kbps • Audio Resolution：16bit
Other Interface	• 1x Mini XLR connector for GPI remote control • 1x D-Sub(9 Pin) for RS-422 or RS-232 either one • 1x IEEE-1394 Port for connection to PC, MAC and HDV device. • 1x Phone plugs for audio monitor output
Video Input	• HD (1080i/50 - 1080/59.94i – 720p/50 – 720/59.94p) • SD (480/59.94i, 576/50i)
HD SDI signal	SMPTE 292 standard complied with • Output return loss : More than 15 dB (5MHz to 750MHz) More than 10 dB (750MHz to 1.5 GHz) • Output level : 0.8 Vpp ± 10% • Rise time : Less than 270 ps • Fall time : Less than 270 ps • Difference between rise time and fall time within 100 ps • Alignment jitter : Less than 0.2 UI • Timing jitter : Less than 1.0 UI • Eye aperture ratio : More than 90% • DC offset : 0 ± 0.5V • Equalizer use 5C-FB cable support 100 meters
SD SDI signal	SMPTE 259M standard complied with • Output return loss : More than 15dB(5MHz to 270MHz) • Output level : 0.8Vpp ± 10% • Rise time : less than 1.5ns • Fall time : less than 1.5ns • Difference between rise time and fall time less than 0.5ns • Jitter less than : 0.2 UI
Audio	• Bandwidth 20~20KHz < +/- 3dB • S/N Ratio > 70 dB • THD. < 0.1%
Operating Temperature	• 0°C to 40°C **(32°F to 102°F)**
Humidity	• 10% to 90% (non condensing)
Dimension & Weight	• 211mm (W) x 285mm (D) x 87mm (H) / 3Kgs
Power	• Input AC 100 ~ 240V Switching Adaptor, output DC 12V / 3A

Service and Support

It is our goal to make your products ownership a satisfying experience. Our supporting staff is available to assist you in setting up and operating your system. Please refer to our web site www.datavideo-tek.com for answers to common questions, support requests or contact your local office below.

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