Model F9-2410MD
Monitoring Downconverter

Instruction Manual

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INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Jun 01
0.2	Added Firmware upgrade instructions Added CrCb DIP switch	Jun 01
1.0	Updated installation instructions. Added changes for version 2 of the hardware	Jul 01
1.1	Updated installation pictures, firmware upgrade section	May 02
1.1.1	Typographical changes in User Control section.	Jul 02
1.2	Updated with features for version 3.0 firmware Updated features to add embedded audio and timecode compatible with HDW-F500 VTR, and support for 4:3 center cut aspect ratio.	Aug 02
1.3	DIP 1now selects output video standard for all input standards	Nov 02

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1. OVERVIEW

The F9-2410MD is an essential tool for your Sony HDW-F900 HDCAM. The F9-2410MD uses the full resolution digital output from the camera to provide full image downconverted composite analog outputs for local and remote monitoring. The F9-2410MD support all the HD video format from the HDW-F900, and in the case of 1080p/24sF will downconvert to 525i/60 with a 3:2 pulldown or 625i/50 with a 24:25 pulldown to allow viewing the signal on standard NTSC or PAL monitors. The F9-2410MD inserts extra fields to create the 3:2 or 24:25 pulldown of the picture content with a random pulldown cadence on the downconverted output.

The F9-2410MD has colour space conversion from ITU rec. 709 to ITU rec. 601, and will provide various down converted formats such as letterbox, side crop and more.

Front panel LEDs indicate signal presence as well as equalization warning and or signal loss warning for broadcast applications.

The rugged, lightweight F9-2410MD attaches directly to the rear of the HDCAM camera and has an integrated battery mount for easy installation and use.

The F9-2410MD is available in different versions that provide various complements of downconverted outputs as well as HD SDI to permit backup recording on another VTR. (See specifications for complete information)

Model	HD 1.5 Gb/s Outputs	Down converted Outputs
F9-2410MD-HN	2	2

Features:

- Mates with the 50 pin connector on the rear of the Sony HDW-F900 camera
- Powered from battery connector or Ext. DC In connector, power is passed on to the camera
- 2 NTSC or PAL outputs.
- 2 HD SDI outputs (optional)
- Letterbox and anamorphic squeeze down conversion formats
- auto video standard detection
- ITU rec. 709 to ITU rec. 601 colour space conversion
- Camera Audio embedded on HDSDI outputs
- Camera timecode embedded as RP188 Ancillary timecode on HDSDI outputs
- Versions available with Anton Bauer, IDX or PAG battery adapters

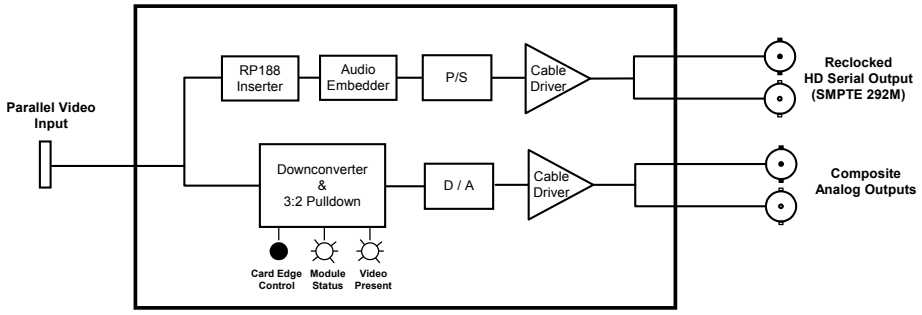

Figure 1: F9-2410MD Block Diagram

2. INSTALLATION

All the F9-2410MD is designed to mount on the rear of the Sony HDW-F900 Camera. It comes fitted with an Anton Bauer Battery adapter standard, and may be ordered with a Sony lithium battery adapter plate.

2.1. ATTACHING THE F9-2410MD TO THE HDCAM CAMERA

Press the F9-2410MD Downconverter against the back of the camcorder, aligning the parallel video connector, and the metal mounting clip to the mating connectors on the camera. Carefully slide the downconverter down until it is fully seated on the camera connector.

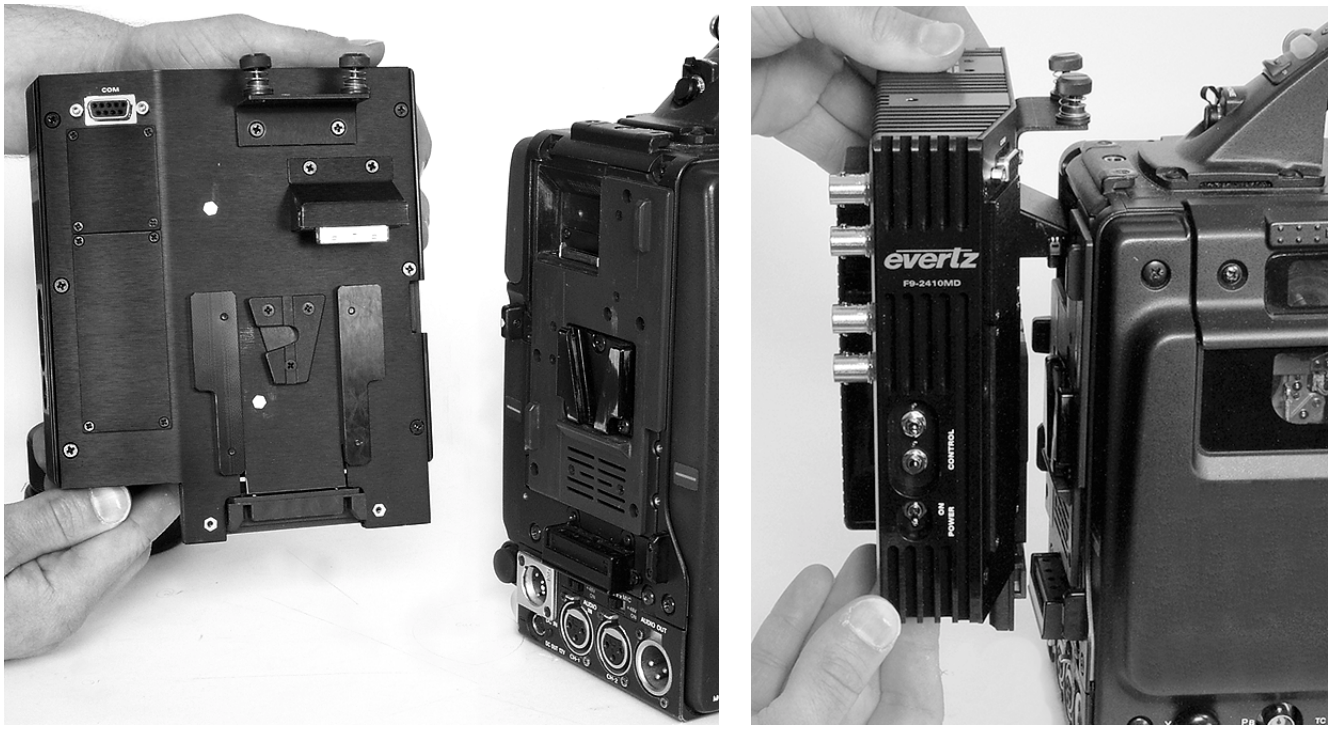

Figure 2: Mounting the F9-2410MD on the Rear of the Camera

The latching button on the side of the camera should snap into position when the module is properly installed. Install two screws at the top of the camera to secure the downconverter to the camera.

Figure 3: Screwing Down the F9-2410MD

Figure 4: F9-2410MD Mounted With Anton Bauer Battery Pack

To detach the module from the camera, remove the screws that fasten it to the camera body. Hold the latching button on the rear of the camera in and carefully pull the module up.

2.2. VIDEO CONNECTIONS

HD OUTPUT (F9-2410MD-HN) These two BNC connectors are used to output a HD SDI copy of the input video, compatible with the SMPTE 292M standard.

ANALOG OUTPUT These two BNC connectors are used to output the downconverted video from the camera as analog composite video. Table 2 shows the downconverter output formats for each video format. See section 5.1 to select the downconverter output format when the camera video format is 1080p/24sF or 1080p/23.98sF.

2.3. FIRMWARE UPGRADE PORT

The **COM** connector is a female 9 pin D connector used for connecting a computer to upload firmware to the F9-2410MD. Table 1 shows the pinout of the male high density DB-15 connector. See section 6 for information on upgrading the firmware.

Pin #	Name	Description
1		
2	TxD	RS-232 Transmit Output
3	RxD	RS-232 Receive Input
4		
5	Sig Gnd	RS-232 Signal Ground
6		
7		
8		
9		

Table 1: COM Port Pinout

2.4. POWER CONNECTIONS

Power is provided to the F9-2410MD from the camera battery or through the EXT DC connector. On earlier versions of the unit, the EXT DC connector is a 2.5 mm center post power jack. On later versions of the unit, the EXT DC connector is a standard 4 pin male XLR. Apply +12VDC to pin 4 and ground to pin 1 of the XLR.

Later versions are equipped with a power switch on the front panel. Press this switch to the ON position to provide power to the unit. Power supplied from the battery or through the EXT DC connector is also passed through to the camera regardless of when the power switch in the On position.

3. SPECIFICATIONS

3.1. VIDEO INPUT

Standard: All standards supported in HDW-F900 camera (See Table 2). Video standard is auto detected
Connector: 50 pin parallel camera connector

Common Name	Frame Rate	Progressive /Interlace	Downconverter Output Format
1080i/60	30	I	525i/60 Monochrome
1080i/59.94	29.97 (30/1.001)	I	525i/59.94 NTSC
1080i/50	25	I	625i/50 PAL
1080p/30sF	30	P (sF)	525i/60 Monochrome
1080p/29.97sF	29.97 (30/1.001)	P (sF)	525i/59.94 NTSC
1080p/25sF	25	P (sF)	625i/50 PAL
1080p/24sF	24	P (sF)	525i/60 Monochrome or 625i/50 PAL
1080p/23.98sF	23.98 (24/1.001)	P (sF)	525i/60 NTSC

Table 2: Supported Video Formats

3.2. HD SERIAL VIDEO OUTPUTS (F9-2410MD-HN ONLY)

Standard: SMPTE 292M
Connectors: 2 BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal
Overshoot: <10% of amplitude
Wide Band Jitter: < 0.15 UI
Embedded Audio: Camera audio embedded in Group 1 according to SMPTE 299M
Timecode: Camera timecode embedded as RP188 VITC Ancillary Timecode

3.3. ANALOG VIDEO OUTPUTS

Number of Outputs: 2
Standards: NTSC or PAL (See Table 2 and Table 5)
Connectors: 2 BNC per IEC 169-8
Signal Level: 1 V p-p nominal
DC Offset: 0V ±0.1V
Return Loss: > 45 dB up to 6 MHz

3.4. FIRMWARE UPGRADE SERIAL PORT

Number of Ports: 1 RS-232
Connector: Female DB-9
Format: 57,600 baud, 8 bits, 2 stop bits, no parity

3.5. INPUT TO OUTPUT VIDEO PROCESSING DELAY

The delay between the input HD video's line 1 and the downconverted output video's line 1 is 50 lines of the SD video when the incoming and outgoing frame rate is the same. Then the incoming frame rate is 24 (23.98) there is an additional frame of delay.

Input Video	Output Video	Delay (lines)	Delay (ms)
1080i/59.94	525i/59.94	50	3.17
1080i/50	625i/50	50	3.2
1080p/23.98	525i/59.94	706	44.87
1080p/24	625i/50	701	44.86

Table 3: Input to Output Processing Delay

3.6. ELECTRICAL

Voltage: + 12VDC – powered from battery Pack adapter
Connector: 4 pin male XLR
Power: 10 watts
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.7. PHYSICAL

Dimensions: 6 " H x 6 " W x 2.25 " D
(150 mm H x 150 mm W x 60 mm D)
Weight: approx. 1.5 lbs. (0.7 Kg)

4. STATUS LED'S

MODULE OK This Green LED will be On when the module powered up.

SIGNAL PRESENT: This Green LED will be On when there is a supported video signal present at the module input.

5. CARD EDGE CONTROLS

The F9-2410MD is equipped with a 4 position DIP switch, located on the bottom of the unit, to allow the user to select various down converted output formats. There is also a toggle switch and pushbutton which are not used at this time. Sections 5.1 to 5.3 show the assigned DIP switch functions. The On position is closest to the camera body. Table 4 gives an overview of the DIP switch functions.

DIP Switch	Function
1	Output Video Standard
2	CrCb to Sync Timing
3	Downconverter Format
4	

Table 4: DIP Switch Functions

5.1. SELECTING THE OUTPUT VIDEO STANDARD

DIP switch 1 is used to set the downconverted output video standard. Refer to the following table to set the output format. The F9-2410MD will insert extra fields of some frames to create a 3:2 or 24:25 pulldown on the output video when 23.98 sF or 24 sF video is input. The relationship of the pulldown sequence to the input video will be random. For other input formats, the F9-2410MD will insert or remove fields of some frames to create the correct number of output frames.

Input	DIP 1 ON	DIP 1 OFF
1080i/60	625i/50 (PAL)	525i/60
1080i/59.94	INVALID OUTPUT	525i/59.94 (NTSC)
1080i/50	625i/50 (PAL)	525i/60
1080p/25sF	625i/50 (PAL)	525i/60
1080p/24sF	625i/50 (PAL)	525i/60
1080p/23.98sF	INVALID OUTPUT	525i/59.94 (NTSC)

Table 5: Output Video Standard Switch Settings

5.2. COMPENSATING FOR INTERNAL CAMERA TIMING

The sync to video timing relationship on the parallel video output of some cameras is different than others. DIP switch 2 is used to set downconverter module so that its CrCb to sync timing matches the camera.

DIP 2	CrCb to Sync
Off	Normal
On	Swap

Table 6: CrCb to Sync Timing Switch Settings

To check if your downconverter is set correctly, look at the colour bar output from the camera. If the red and blue bars are in the normal location, then you do not need to change DIP switch 2. If the red and blue bars are in the wrong locations, then change the setting of DIP switch 2. The red and blue bars should now be correct.

5.3. SELECTING THE DOWNCONVERTER ASPECT RATIO

DIP switches 2 and 3 are used to select one of three down conversion aspect ratios.

DIP 3	DIP 4	Down converted Format
Off	Off	Letter Box
Off	On	Letter box
On	Off	4: 3 Center crop
On	On	4:3 Anamorphic Squeeze

Table 7: Downconverter Format Switch Settings

6. UPDATING THE FIRMWARE IN THE F9-2410MD

The F9-2410MD uses a FLASH memory to to hold its firmware. It can be easily upadted in the field by connecting a PC to its Firmware Update Port.

6.1.1. Requirements

You will need the following equipment in order to update the F9-2410MD Firmware

- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- "Straight-thru" serial extension cable (DB9 female to DB9 male)
- Terminal program that is capable of Xmodem file transfer protocol. (such as HyperTerminal)
- New firmware supplied by Evertz.

6.1.2. Configuring the F9-2410MD for Firmware upgrades

1. Connect the 9 pin male connector on the straight through serial extension cable to the COM connector on the F9-2410MD. Connect the 9 pin female connector on the straight through serial extension cable to the the PCs' RS-232 communications port.

6.1.3. Terminal program Setup

2. Start the terminal program.

3. Configure the port settings of the terminal program as follows:

Baud	**57600**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

4. Apply power to the F9-2410MD. After the unit powers up, a banner with the boot code version information should appear in the terminal window. The cursor to the right of the word "BOOT>" should be spinning for about 5 seconds then the unit will continue to boot.

For example:

```
EVERTZ 7700PB MONITOR 1.0
COPYRIGHT 1997, 1998, 1999 EVERTZ MICROSYSTEMS LTD.
COLD BOOT |
```

5. The following is a list of possible reasons for failed communications:

   - Defective F9-2410MD Serial Upgrade cable.
   - Wrong communications port selected in the terminal program.
   - Improper port settings in the terminal program. (Refer to step 3 for settings).

6. While the cursor is spinning press the <CTRL> and <X> keys on your computer keyboard at the same time, this should stop the cursor from spinning. The spinning prompt will only remain for about 5 seconds. You must press <CTRL-X> during this 5 second delay. If the F9-2410MD continues to boot-up, simply cycle the power and repeat this step.

7. Hit the <ENTER> key on your computer once.

8. Type the word “upgrade”, without quotes, and hit the <ENTER> key once.

9. The boot code will ask for confirmation. Type "y", without quotes.

10. You should now see a prompt asking you to upload the file.

6.1.4. Uploading the new firmware

11. Upload the “*.bin” file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the F9-2410MD Boot code will time out. You can restart the upgrade process by removing and reconnecting power to the F9-2410MD.

12. The boot code will indicate whether the operation was successful upon completion of the upload.

    For Example:

```
UPLOAD OKAY
7700PB COLD BOOT> |
```

13. The following is a list of possible reasons for a failed upload:

    - If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file, then remove and install the module again.
    - The supplied “*.bin” file is corrupt.
    - Wrong file specified to be uploaded.
    - The PCs’ RS-232 communications port can’t handle a port speed of 57600.
    - Noise induced into the F9-2410MD Serial Upgrade cable.

6.1.5. Completing the Upgrade

14. Type the word “boot”, without quotes, and hit the <ENTER> key once or power cycle the unit. The unit should now reboot.

15. You can now close the terminal program and disconnect the RS-232 serial cable.

The update procedure is now completed.