

EDIROL F-1

Video Field Recorder Introductory Guide





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Background of Field Recording

With the introduction of DV format video cameras in 1995 came the outstanding benefits of digital imaging technology, which until then could only be experienced in professional applications. DV gained widespread acceptance with the average consumer. To take full advantage of digital technology consumers needed a way to edit the content that was captured in the DV format. Computer non-linear video editing software was developed to address this growing market and the need to edit digital content.

As non-linear applications and digital content grew, networked systems with large storage mediums were put into place so that material could easily be shared. It was commonplace to network multiple non-linear editing systems to a central video server.

After solving the network and storage challenge, capturing content from DV tape and other forms of digital video materials became the bottleneck. While industrial-scale systems could improve transfer efficiency by including several dedicated capture stations, smaller-scale businesses were confronted by a real restriction

when it came to transferring tape-based data in real-time. In the news gathering sector, one reason that non-linear technology made so little headway was because it was quicker to edit tape than to wait for content to be captured.

The field recorder emerged as a means of resolving this issue. Using the IEEE1394 interface from camera to hard disk, made it possible directly record the video stream. The hard disk can then be mounted in a non-linear workstation where editing can begin immediately and thereby eliminating the capture process entirely.

■ Shift to HD

With the introduction of HD broadcasting, there has been a large investment in HD infrastructure. At the outset, the capabilities for dealing with HD content in non-linear editing systems were inadequate and expensive, therefore broadcasting companies re-invested in tape-based systems.

After regressing temporarily to a tape-based workflow, HD content is returning to a non-linear based workflow as we saw previously in the DV era. However, the bottleneck continues to be



capturing and recording HD content. Naturally, the Panasonic P2 and the Sony XDCAM lines moved into HD but because users were unfamiliar with the workflow benefits they also saw no reason to throw away expensive cameras just because they record to tape.

Companies realized that camera and lens assets can still be retained and improved workflow could be achieved from acquisition to delivery using tapeless Field Recorders. In particular, HDV cameras benefit greatly by using Field Recorder because they dramatically improve workflow by providing tapeless content acquisition while not taking away from any other features.

Using tape based camcorders along with field recorders provides redundancy for data storage. Some users were suspicious of the new hard drive based media because if it failed, they would lose their data. Once the footage was on tape,

users were confident that it would not be easily lost. The only downside was that the maximum recording time was limited by the physical length of the tape.

When used in tandem with a field recorder, however, recording simultaneously to both tapes and Field Recorder compensate for the weakness of either technology. Using both makes it possible to offload data for editing from the field recorder, and recorded tapes can be sent straight to the archive shelf/room for backup.

In the future, solid-state memory recording will become mainstream for camcorders. However, because hardware and codecs are still evolving, it is too early to adopt for many applications.

Field Recorder Line-up

Well-known as a musical instrument manufacturer, Roland Corporation has established itself as leaders in the audio field recording segment with a number of hit products. The company's first field recorder, which came out in 2004, was the EDIROL R-1 portable audio recorder designed to record uncompressed audio to solid state media - all in the palm of your hand. With subsequent model upgrades and new features Roland continues to lead the way among followers in a growing live digital recording market.

In 2005, the EDIROL R-4, a four-channel

model was developed for commercial applications strengthening the lineup. In 2006 it was followed by the EDIROL R-4 Pro with time code capabilities for the location sound and post markets. The R-4 Pro has been widely accepted in the Radio, TV Broadcast, and post markets. Early 2008 marked the release of the EDIROL R-44, a four-channel, solid-state SDHC memory card audio field recorder.

Meanwhile, for the consumer market, successors to the R-1 were launched. In 2006, the substantially more compact R-09 was favorably received and spawned the development of similar

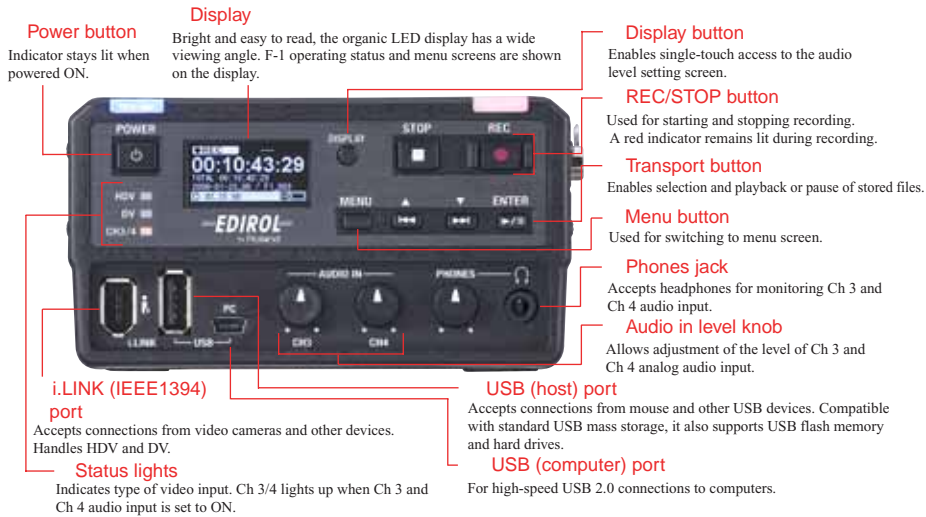
	R-09 	R-09HR 
WAVE format Recording/Playback	44.1/48kHz	44.1/48/88.2/96kHz
MP3 format Recording/Playback	16/24-bit Rec 64/128/160/192/224/320kbps Playback 32-320kbps or VBR(Variable Bit Rate)	16/24-bit Rec 64/128/160/192/224/320kbps Playback 32-320kbps or VBR(Variable Bit Rate)
Channels	2	2
Internal Stereo Microphone		
Analog Input	Stereo Miniture phone type, plug-in powered mic	Stereo Miniture phone type, plug-in powered mic
Digital In	-	-
Digital Output	Optical	-
Phantom Power	-	-
Recording Media	SD Memory Card	SD/SDHC Memory Card
USB	USB 2.0	USB 2.0
USB Host	-	-
WAVE Editing Function	-	-
Time Code	-	-
Effects	Reverb (Playback Only)	Reverb (Playback Only)
Power Supply	AA Battery x2, AC Adaptor	AA Battery x2, AC Adaptor
R-4 	R-4 Pro 	R-44 
44.1/48/88.2/96kHz	44.1/48/88.2/96/192kHz	44.1/48/88.2/96/192kHz
16/24-bit	16/24-bit	16/24-bit
-	-	-
4	4 (Limited to Stereo x1 at 192kHz)	4 (Limited to Stereo x1 at 192kHz)
XLR/TRS Combo type	XLR type	XLR/TRS Combo type
Coaxial x 1	AES/EBU x 1	Coaxial x 1
Coaxial x 1	AES/EBU x 1	Coaxial x 1
HDD(40GB)	HDD(80GB)	SD/SDHC Memory Card
USB 2.0	USB 2.0	USB 2.0
-	USB 2.0	-
-	-	-
3-Band EQ, Graphic EQ, Noise Gate, Enhancer, Comp&DeEsser AA type battery x8, AC Adaptor	3-Band EQ, Graphic EQ, Noise Gate, Enhancer, Comp&DeEsser, MS Mic Mixing AA type battery x8, AC Adaptor, External Battery	3-Band EQ, Graphic EQ, Noise Gate, Enhancer, Comp&DeEsser, MS Mic Mixing AA type battery x4, AC Adaptor, External Battery

Current lineup of Roland audio field recorders.

products from other manufacturers. Released mid 2008 was the latest version called the R-09HR.

Roland designed the F-1 using core technology and experience acquired from their extensive audio field recorders combined with their

numerous years of product development for the video industry. One of the most important technologies developed for it's Field Recording line up found in the F-1 is the shock resistant and impact proof hard drive system.



Unique Features of the F-1

So let's take a look at the special hardware features of the F-1. On a body somewhat bigger than a V-mount battery, the controls are on the front panel. This follows the general function design of the R-09 and earlier models, menu operation on the F-1 is simple to navigate using the up and down arrows and the enter keys to make settings.

On the side of the F-1 there are input jacks for two audio channels in addition to the two channels

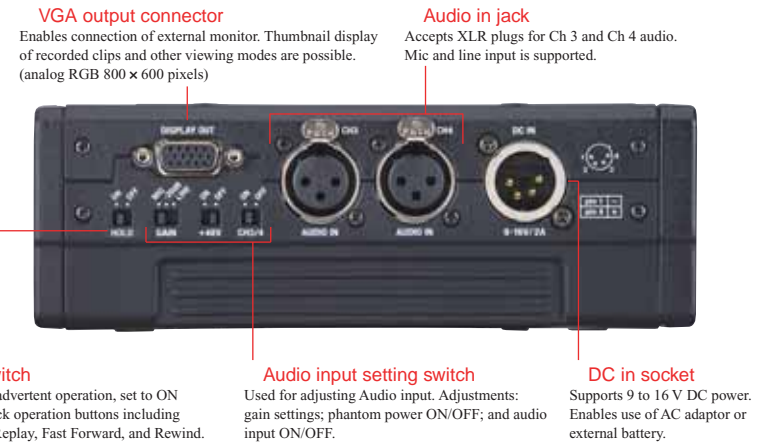


A removable 120 GB hard drive is used for recording video/audio data.

included from the camera, providing a total of four audio channels. These two independent audio channels record in linear PCM audio format providing much higher quality sound than the audio channels from the camera. When recording music, it is better to use these channels as the main audio. Adjustment and monitoring of sound levels for these channels can be done using the front control panel.

The F-1 is designed with a removable hard drive for storing video and audio content making this unique to most other field recorders. Ordinary field recorders have USB or other connectors that need to be used to offload their stored video for non-linear editing. This means that every time transfer or editing work has to be done, the recorder has to be disconnected from the camera. Having your field recorder always coupled with the hard drive limits usability.

The F-1 uses a 120 GB hard drive unit that can



be removed from the recorder and connected to a non-linear system via USB. Because it is powered through the USB connection, the hard drive does not need its own power supply. Using an additional removable hard drive allows you to continue shooting in the field while the other content is being edited in a non-linear system. In situations where several film crews are working, this can be very advantageous for improving workflow.

The F-1 uses several unique power options to operate the system. The first is a power pack that is inserted into the back of the unit that contains eight AA batteries. As with its earlier audio field recorders, Roland has remained committed to designing devices that use standard batteries so that users can easily find replacement batteries just about anywhere in the world.

A dedicated battery would require a recharging system, and in some shooting situations, AC power is just not available. Results achieved in remote areas and the positive feedback from Roland users has proven the enduring value of this product design feature.

Secondly, the F-1 can receive external power



The F-1 can be powered by a battery unit (left) that holds eight AA batteries or external power (right) including an AC adaptor.

by using the AC adaptor socket. Lastly, the F-1 can be powered by plugging in large-format batteries. As a fail safe option when it is operating on external power and the external power runs out or is cut for any reason, the F-1 automatically switches to internal power. In effect, the internal battery pack functions as a back-up power supply. Because the shooting time is only limited by the remaining capacity of the hard drive, the F-1 can be used for extended non-stop recording. This capability makes it well suited for use in documentary film making and other special shooting situations.

Shooting & Recording

■ F-1 and tape: simultaneous recording

The F-1 is mostly used for recording with an HDV or DV camcorder. To record, simply connect an i.Link (IEEE 1394) cable to the camera. Activate the Synchronize setting in the Sync recording menu screen, to enable simultaneously recording to both tape and the F-1 when the record button on the camera is pressed. When the stop button is pressed on the camera, the F-1 will simultaneously stop recording.

The F-1 can be mounted to larger shoulder-mount types of camcorders using a V-mount adapter making it easy and secure for mobile recording. Using the dedicated V-mount adaptor kit, you can use a V-mount battery along with the F-1 to provide many hours of recording time.

For use with smaller, palm-sized camcorders the F-1 comes with an optional carrying bag to provide belt or shoulder transportation with access to connection jacks, LCD Display and transport controls.

■ Tapeless recording

It is also possible to bypass tape recording in the camcorder and record only to the F-1. Recent camcorders send a signal stream to the i.Link (IEEE 1394) interface as long as it is switched on.



Example of an F-1 mounted on a Sony HVR-S270 HDV Camcorder.

Simply connect the F-1 and control recording by pushing the REC button off and on.

When tape is not being used, no time code is generated from the tape. Instead, you have to activate the “FreeRun” mode on the camcorder. When using FreeRun, it is usually best to set the time code value to the current time.

■ Previewing recorded clips

When the Play button is pressed, the video signal is streamed to the i.Link (IEEE 1394) interface. To check recorded video and audio, set the connected camera to VCR mode and press the play button on the F-1. It is normal for HDV and DV camcorders, when in VCR mode, to receive a signal stream via the i.Link (IEEE 1394) interface and to automatically switch to displaying the stream on the camera’s viewfinder and LCD monitor. This allows you to preview the recorded clips on the F-1.

Additionally, most camcorders have external input/output capabilities. If you connect a monitor to the external monitor jack of the camcorder, you can review the video footage on a larger screen.



Example of an F-1 mounted on a JVC GY-HD100 720p camcorder.



Using the F1-VMK1 V-mount accessory (left), it is possible to mount the F-1 on a camcorder along with a V-mount battery providing power (right).



CB-F1 accessory carrying bag for the F-1.

■ Backup the recorded clips

If the footage is recorded only to the F-1, data backup is an important step. Data on the hard drive can be copied to flash memory inserted in the USB port on the front panel. Currently, 8 GB sticks of USB memory cost less than \$50 and can be used for backing up 30 to 40 minutes of video clips - a very affordable solution. With larger capacity USB sticks coming soon, backup will be even easier and more affordable.

If greater capacity is needed, the recorded files can be transferred, via USB cable, to a laptop computer. This is a convenient part of your workflow for storing footage over the long term. As always, it is a good idea to make a back of your laptop a daily routine task.



Example of an F-1 mounted on a Canon XL H1S, an HDV 1080 capable camcorder.



Example of shooting with a shoulder-mounted camcorder in combination with an F-1 and V-mount battery.

Checking Footage and Transferring Data

■ Keeping tabs on content

In the picture below you will notice that the F-1 is connected directly to a computer monitor. In effect, the F-1 acts like a small computer when you plug in a standard VGA monitor via the D-Sub analog video port and a mouse into the USB port. This gives access to a built-in graphical user interface that displays the thumbnails of files stored on the hard drive.

Although you cannot watch the playback of the video files on the VGA screen you can see thumbnails as well as file names, file size, shooting mode, and other information. If you have the 1394 cable connected to a camera or deck, clicking on a thumbnail or file name will play that clip through the LCD display as mentioned previously.

The F-1 also has an RJ-45 port for network connectivity. If you connect through a hub or directly with a LAN cable, you can check the same information discussed above but using a dedicated browser. It is very easy to setup because it allows manual configuration of the IP address along with DHCP compliancy. Once you confirm

the unit's IP address on the built-in LCD, all you have to do is enter the address in the browser's URL to access that particular F-1.

■ Content organization

Before editing you usually need to organize the available clips and preview them. To make this easy, EDIROL provide free F-1 Utility software. Using the F-1 Utility you can play back clips from the F-1 hard drive simultaneously with four-channel audio as well as move clips, delete or



You can directly plug an analog RGB monitor and a USB mouse into the F-1.



On the right of the F-1 there is an RJ45 LAN port.



A typical browser screen displayed by the F-1 Utility, which is downloadable from www.rolandsystemsgroup.net.



The hard drive from the F-1 can be removed and plugged directly into a computer USB port.



F-1 Utility - Editor Mode

* Edit Mode will be available in 2008 4Q

copy files. The F-1 Utility provides more than simple browsing, it facilitates organization of content.

■ Capturing

For video editing, it is necessary to connect the F-1 or the F-1's HDD to a non-linear editing system. You can use the following three methods to capture recorded clips.

- (1) Connect F-1 itself via USB
- (2) Connect F-1 itself via LAN
- (3) Connect F-1's Removable hard drive via USB

The most convenient is the third choice: directly connecting the removable hard drive via USB. Normally, video material is handled using a computer's internal hard drive. In this case, the computer recognizes the removable hard drive as an external drive, so the content of each clip can be read directly into the non-linear editing application and editing can begin immediately.

Previously, capturing the data from lengthy clips with non-linear software has been an issue. In some cases, limited by the hard drive file format, the length of files has been limited to 2 or 4 GB resulting in long clips being chopped up into pieces. This often leads to confusion in

distinguishing between the clips and requires utility applications to connect multiple video clips during transfer to the non-linear editing system.

The hard drive in the F-1, however, is formatted using NTFS, which is the same as format used in servers. Long clips are handled as single files.

■ Editing

The F-1 records HDV data as an .M2T file extension. Since this is a regular MPEG 2 program stream, these files are widely compatible with most non-linear editing applications. The time codes of the separately recorded two channels of linear PCM audio can be matched with the time code of the video data, which is initiated when recording starts. Using the timeline, it is straight forward synchronizing the start of the separate audio clip with the start of the video.

Coming soon will be updates for the F-1 Utility software which will include editing functionality. While it will not provide sophisticated effects, it will support DV/HDV video and four-channel audio editing making it useful for rough editing of clips prior to final editing.

Proving the EDIROL F-1 in the Field

■ Live recording of an opera performance

Using a F-1 with Canon's new XL H1S, we filmed an opera performance located in a hall in Tokyo. The performance consisted of two halves of about 50 minutes each. The VMK-1 optional V-mount kit enabled use of a V-mount battery with the F-1. Mounting on the back of the XL H1S was simple and very compact.

We used three cameras for filming. Long shots were taken with a Canon XH G1, close ups with a Sony HVR-Z, and medium shots with the Canon XL H1S / F-1 combo.

- Convenient workflow using F-1 and XL H1S

PA audio line signal from the venue is recorded to the F-1 which is mounted on the XL-H1S. One of the weaknesses of the HDV stream is the MPEG-1 Audio Layer II, a compressed audio format, that compromises the audio quality. The F-1, however, can record two channels of uncompressed 16-bit, 48 kHz wav audio. The F-1 handles a total of four audio channels. Two channels of high quality uncompressed audio from inputs 3 and 4 of the F-1 and two channels of MPEG-1 audio from the HDV stream on the camera. The F-1 audio input is switchable between line and mic input and supplies +48 V phantom power as required. To date, no other field recorder stands out like the F-1 for its high quality audio and durability.

- Checking content on a RGB monitor

When the F-1 and V-mount battery are used in combination with the XL H1S, it is easiest to check the audio level meters and files status by using a display monitor. Using the RGB output



The F-1 was used in combination with the Canon XL H1S to film an opera performance.

connector and USB port on the F-1, you can plug in a small monitor and USB mouse. You can also manage file operations. In effect, the F-1 is equipped with the same functions as a small computer.

The recording of the first and second halves of the performance, a total of two hours of recording time, were completely smooth and no problems were encountered. From the workflow perspective, the data recorded on the F-1 was the main focus. In an ideal working situation, the footage on the XL H1S would be considered useful primarily for backup and archiving purposes. In addition, because the line audio from the mixing console was recorded by the F-1 as uncompressed PCM data, it could be used to provide higher quality audio.

Until now, issues had arisen with some products where hard disc stuttering or stopping occurred while shooting in loud locations, such as concerts. However, the removable hard drive in the F-1 is insulated in a floating structure that protects it from powerful vibrations.

In the opera application, only one F-1 was



Using the F1-VMK1 V-mount accessory, the F-1 and V-mount battery can be mounted on the back of a camera.



Line audio from the mixing console was fed to the F-1 mounted on the rear of the XL H1S.

used. However, with a single computer, it could have been possible to operate recording and stop controls for up to four units via the F-1 LAN ports. This kind of setup can save costs by enabling multiple cameras to be operated by fewer people.

■ Shooting wild birds and recording bird song

We went on an outdoor shoot using the Sony HVR-Z7J with the F-1 and a shotgun mic. Two years ago, through the changing of the seasons, we did a year long HDV shoot featuring the natural scenes of the Pacific Island of Japan. At that time we filmed the habitats of birds, animals, and plants. This time, using the F-1



The F-1 / Canon XL H1S setup was used for medium shots.



The display showing the status of all operations.

with the HVR-Z7J, which takes interchangeable lenses, our main purpose was to get footage with exceptional audio recording of birds singing.

The F-1's optional carrying bag is ideal for use in the field. However, the bag did not arrive in time, so during handheld recording we used another camera bag to carry the F-1 along with a V-mount battery (mounted using the F-1 VMK-1 accessory).

We used a Sennheiser MKH-416, which is considered an industry standard for shotgun mics. From the F-1 we selected the mono (x2) setting. Then, after setting up the camera on a back road, we pointed the mic at the Japanese bush warblers, whose calls were captured on the F-1 hard drive.



Because a standard computer display can be connected to the F-1, regardless of the position of the display on the F-1, you can keep an eye on audio levels and file status.

After that, we took the F-1 with us in the camera bag and did some handheld shooting as we climbed a dormant volcano. There was no way we could avoid shock and motion on the mountain path, however we were able to record without any problems. Although the six-pin connector is a lot more robust than a 4-pin, you still have to be careful ensuring that the cable does not become dislodged. The optional carrying bag comes with a cable clip that prevents the plug from coming out.

■ Field editing

After our two shooting expeditions, we used a laptop computer to edit the content recorded by the F-1. Using the F-1 Utility software you



Sony HVR-Z7 used with the F-1 and a shotgun mic enables clear recordings of even such things as a wild bird song.



During actual shooting we used two monitors. The display on the left was for monitoring the recorded footage and the display on the right for monitoring the status of the F-1.

can switch between browser mode and editor mode, allowing you to preview the recorded clips and execute simple cut editing. Editing the native HDV m2t files made it quick and easy and eliminated the need for capturing or importing the content.

After connecting the F-1 to the Dell Precision M90 laptop using a USB cable, it was recognized as an external drive. Higher level editing of the m2t clips positioned above the timeline was simple. The wav audio clips recorded with the Sennheiser MKH-416 could also be saved in a separate folder from the video. You can complete further audio editing using, wave editing applications, and other software programs.



The HVR-Z7 has a six-pin IEEE 1394 port that can be connected to the F-1 using this six-pin cable.



■ Wrap up

While there is much talk of using hard drives and memory cards as recording media for high-definition cameras, core low-cost commercial equipment still uses tape for HDV recording. With the introduction of the F-1, higher quality audio has been added, networking has become possible and the limitations of tape have been overcome. Depending on your needs, the F-1 can be used in a variety of applications. It has already

stimulated my creativity and accelerated my workflow.

(hamapro / Syuzo Hamatani)



Editing the content recorded on the F-1 was done via Canopus Edius Pro. The m2t clips positioned above the timeline, containing wav audio captured using the Sennheiser MKH-416, could be saved in a separate folder as audio clips.



Connected to a laptop computer via USB cable, the removable hard drive from the F-1 was treated as an external drive.

Flexible Network Capabilities

As already mentioned, the F-1's network capabilities allow footage to be checked via LAN and content can be managed using the F-1 Utility application. In addition, the F-1 has two other unique features that can be used over a network.

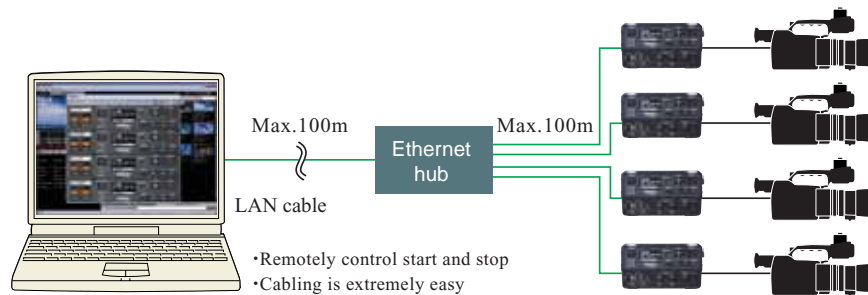
First is the ability to transfer files across the network. This eliminates the need to take the F-1 hard drive to the location of the non-linear editing system every time you need to edit or transfer files. For example, using a network cable, you can acquire footage from the F-1 in a studio directly to a non-linear video editing system. While the speed is slower than a direct USB connection, network transfer has advantages when it comes to content management. With a network, there is no need for the separate device-to-device connections that USB requires. Once an F-1 is plugged into a LAN, the files on the hard drive can be acquired

by several non-linear editing systems. Thus, file sharing also becomes possible.

The second key feature is remote control of recording via the network. Using the F-1 Net Control application, the operation of up to four F-1 recorders can be controlled. In effect, you can control simultaneous recording on four units and monitor what each of them is doing. If you use an Ethernet hub, you can remotely control F-1's located up to 200 meters away. Besides allowing control of multiple cameras, networking may provide solutions for shooting situations that have, until now, been challenging.

• Studio deck application

EDIROL makes a converter called the VC-300HD. It is a multi-format converter capable of bi-directional and cross conversions between most types of video formats. Used in combination



• Footage taken with multiple cameras can be easily acquired



Concert

Event

Wedding

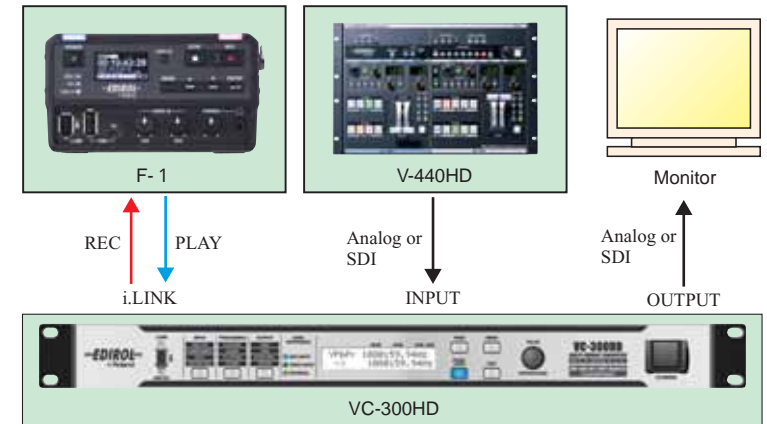
Up to four F-1 recorders can be remotely controlled through a network.

with the VC-300HD, the F-1 can be used as a studio deck.

First, connect multiple cameras to a video switcher and take the video output to feed a VC-300HD. You can connect using as an SDI, component or DVI signal. Set the video output format of the VC-300HD to 1080i or 720p and connect the iLink (IEEE 1394) port to the F-1. Functions that previously required a studio

deck can now be accomplished using the VC and F-1 together. Now small scale video studios that don't have a dedicated conversion room can take advantage of the professional studio recording features offered by the compact and affordable F-1 Video Recorder.

Screen shot of the F-1 Net Control software application. Control all F-1 operations over a network in real-time, and monitor operational functions during the video shoot.



Connected to a VC-300HD multi-format converter and a V-440HD multi-format video mixer, the F-1 can be used as a studio deck.

Specifications



Video Recording Format	HDV (.m2t), DV (.dv)	
Video Recording Format	WAV (Supports BWF) Sampling : 16-bit/48kHz	
Audio Control	Switch: Gain (MIC/-20dB/LINE), Phantom Power +48V (ON/OFF) Volume: Ch.3 Input, Ch.4 Input, Headphones	
Audio Input Impedance	4 k ohms	
Headphones Output Impedance	16 ohms	
Headphones Output Level	45 mW	
Recording Media	Hard Disk Drive (120 GB) * removable unit	
Max Recording time	Approx 9 hours (HDV 1080i/DV) Approx 12 hours (HDV 720p) * F1-HD120 as recording media, without audio	
Input/ Output Jacks	Front Panel	i.LINK : 6-pin type conforms to IEEE1394 USB A Type (For USB Storage device, USB Mouse) * Supports 2.0 Hi-Speed USB mini B Type (For Computer) * Supports 2.0 Hi-Speed
	Right Side Panel	Display Output : 15-pin mini D-sub Type (Analog RGB, 800x600 fixed resolution) Audio Input (Ch3/4) : 3-pin XLR Type x 2 DC Input : 4-pin XLR Type
	Left Side Panel	LAN : RJ45 Type (Ethernet 10/100Base-Tx)
Display	128 x 64 dots (Organic LED)	
Power Supply	DC 9 V (AC Adaptor) * 9-16V 2.0A or HR15/51 x 8 or LR6 (AA) x 8	

Max Operation time	Max Operation time Nickel Metal Hydride Battery x 8 : Approx 2 hours External Battery (IDX Endura10 Li-Ion Battery) : Approx 10 hours * These operation times are approximate. Actual time may vary somewhat.
Current Draw	1,500 mA
Dimensions	111 (W) x 179 (D) x 61 (H) mm 4-3/8 (W) x 7-1/6 (D) x 2-3/8 (H) inches
Weight	Weight 870 g / 1 lb 15 oz (including HDD, excluding AC Adaptor and batteries)

Utility Software and Accessories

Free Software (downloadable from www.rolandsystemsgroup.net) * Edit Mode will be available 2008 4Q	F-1 Utility / F-1 Remote Control System Requirements : OS : Windows XP / Vista CPU : Core2Duo 2GHz or higher RAM : 2GB or larger Display Resolutions : 1024 x 768 pixels or higher Others : USB Ports
Accessories	Owner's manual, AC Adaptor (PSB-1U), Conversion cable (AC Adaptor ↔ 4pin XLR type), Power Cord, F1-HD120 removable HDD (120GB) x 1, Battery Pack, USB Cable (Y type), Ferrite Core x 2

Optional Items

F1-VMK1 (V-Mount Kit) 	F1-HD120 (120GB Removable HDD) 	CB-F1(Carrying Bag) 
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