Wafian HR-F1

Setup and User Guide

1.3.0

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⚠ CAUTION: Safety Instructions: Wafian HR-F1

Use the following safety guidelines to help ensure your own personal safety and to help protect your HR-F1 and working environment from potential damage.

SAFETY: General

To help prevent electric shock, plug the HR-F1 and device power cables into properly grounded electrical outlets. These cables are equipped with 3-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.

To help avoid the potential hazard of electric shock, do not use your HR-F1 during an electrical storm.

To help avoid the potential hazard of electric shock, do not connect or disconnect any cables or perform maintenance or reconfiguration of this product during an electrical storm.

Before you clean your HR-F1, disconnect the HR-F1 from the electrical outlet. Clean your HR-F1 with a soft cloth dampened with water. Do not use liquid or aerosol cleaners, which may contain flammable substances.

To help avoid possible damage to the system board, wait 5 seconds after turning off the HR-F1 before disconnecting a device from it.

To avoid shorting out your HR-F1 when disconnecting a network cable, first unplug the cable from the network adapter on the back of your HR-F1, and then from the network jack. When reconnecting a network cable to your HR-F1, first plug the cable into the network jack, and then into the network adapter.

To help protect your HR-F1 from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).

Ensure that nothing rests on your HR-F1's cables and that the cables are not located where they can be stepped on or tripped over.

Do not push any objects into the openings of your HR-F1. Doing so can cause fire or electric shock by shorting out interior components.

Keep your HR-F1 away from radiators and heat sources. Also, do not block cooling vents. Avoid placing loose papers underneath your HR-F1; do not place your HR-F1 in a closed-in wall unit or on a bed, sofa, or rug.

SAFETY: When Using Your HR-F1

As you use your HR-F1, observe the following safe-handling guidelines.

⚠ **CAUTION: Do not operate your HR-F1 with any cover(s) removed.**

⚠ **CAUTION: Do not attempt to service the HR-F1 yourself, unless you are a trained service technician or as explicitly approved and instructed by Wafian.**

Refer all servicing to qualified servicing personnel. Servicing is required when the HR-F1 has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the HR-F1, the HR-F1 has been exposed to rain, moisture, extreme temperatures, does not operate normally, or has been dropped.

⊙ **NOTICE:** To help avoid possible damage to the system board, wait 5 seconds after turning off the HR-F1 before disconnecting a device from the HR-F1.

In addition, take note of these safety guidelines when appropriate:

- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

- Handle components with care. Do not touch the components or contacts on a card.

SAFETY: Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside your HR-F1. To prevent static damage, discharge static electricity from your body before you touch any of your HR-F1's electronic components. You can do so by touching an unpainted metal surface on the HR-F1 chassis.

⚠ **CAUTION: Any changes or modifications not expressly approved in this manual could void your warranty.**

WAFIAN HR-F1

Thank You for choosing Wafian®. This document will help you setup and use the Wafian HR-F1. For additional information please visit us at www.wafian.com/Support.htm.

Table of Contents

1.　　Introduction

Congratulations, you now have one of the industry's most powerful High Definition tools available. The Wafian HR-F1 is a direct-to-disk high definition video disk recorder with HD-SDI and component inputs and outputs for field use. The HR-F1 can record Standard Definition or High Definition 4:2:2 10-bit video for 10+ hours. It can record 8 channels of embedded audio and 2 channels of analog or EBU/AES audio. It records at resolutions up to 1920x1080 at different frame rates. The HR-F1 offers Ethernet, IEEE 1394 and USB2 ports for data sharing and DVI/VGA connectivity for monitoring.

With the HR-F1 recorder, your video is recorded in one of the highest quality formats available. The HR-F1's easy operation allows you view the footage as it is recorded and to immediate review the footage via its touch-screen interface.

If you have any questions regarding the HR-F1 that are not answered in this manual, please visit www.wafian.com/Support.htm or contact Wafian Customer Support at support@wafian.com.

2.　　In the Box

Please verify that you have received the following components along with your HR-F1 recorder.

The Wafian HR-F1 HD-SDI & Component-HD Video Field Recorder.

An Accessory Pack with:
- AC/DC adaptor
- Power cable
- Stylus pen
- External hard drive tray
- Users Guide

3. Connections

With the power disconnected:

- To record from component or composite sources, securely connect to the Y/Pr/Pb inputs in the back panel of your HR-F1.

- To record from an HDSDI source, connect the HDSDI input cable to the top BNC connector on the rear panel. The bottom two BNC connectors are HDSDI output ports.

4. Power and Front Panel Features

AC Power

Make sure the power cable is plugged in and the power switch on the back of the unit is in the on position. Press the Power button below the LCD to turn on the unit. To turn off the system, press and hold the same Power button below the LCD for five seconds.

DC Power

The HR-F1 can be operated using DC power through external 24 volt XLR battery packs. A single Anton Bauer Cine VCLX battery pack will allow operation of the HR-F1 for approximately 6 hours while idle, or 4 hours while recording continuously. Note that if the power supply is overloaded, it will stop all output voltages. Once the problem has been resolved, it will automatically reset itself and the power off switch will be cycled, allowing normal operation. If this does not occur, please contact Wafian Support at support@wafian.com.
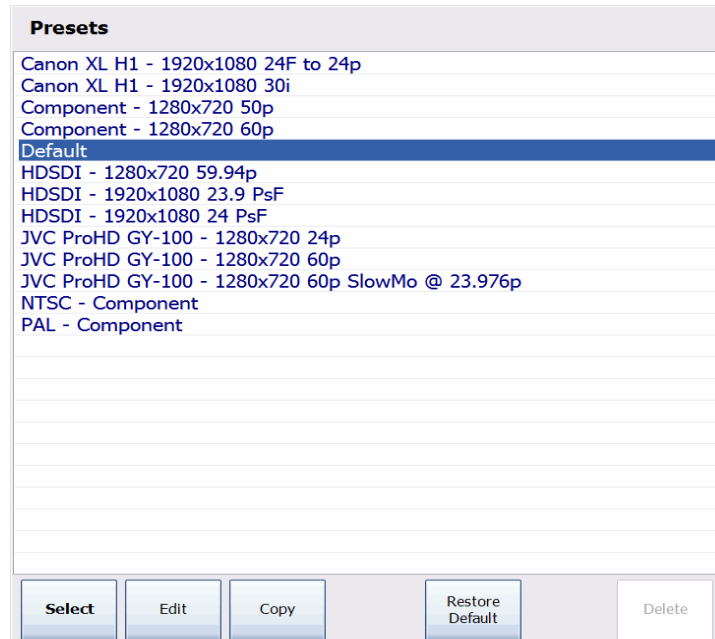
Front Panel Features

The removable media drive can be disconnected from the HR-F1 while power is on. The drive's enclosure offers USB II, eSata, and Firewire outputs.

NOTE: Do not remove the HR-F1 media drive while recording or playing back clips.

For easy access to your media, the HR-F1 front panel also offers standard USB II, Firewire (IEEE 1394), and audio in/out ports.

5. Settings

Before you record, your system must be setup to match your desired video settings. Access the Presets window to select preset settings, or to specify your own settings. To do so click on the media path and record settings link on the record mode window, which will open the Presets dialog. Note that users may select the Keyboard button to type in text within any of the available fields within the Presets.

Presets

| Canon XL H1 - 1920x1080 24F to 24p |
| Canon XL H1 - 1920x1080 30i |
| Component - 1280x720 50p |
| Component - 1280x720 60p |
| Default |
| HDSDI - 1280x720 59.94p |
| HDSDI - 1920x1080 23.9 PsF |
| HDSDI - 1920x1080 24 PsF |
| JVC ProHD GY-100 - 1280x720 24p |
| JVC ProHD GY-100 - 1280x720 60p |
| JVC ProHD GY-100 - 1280x720 60p SlowMo @ 23.976p |
| NTSC - Component |
| PAL - Component |

Select   Edit   Copy   Restore Default   Delete

Presets dialog

Within the Presets window chose any of the available presets by selecting it and pressing Select. Users may also choose to copy a preset and then customize their configuration further by selecting their preset and pressing Edit. To restore the Default preset back to its original (out of the box) state, simply press Restore Default.

Preset configurations "out of the box"

Settings for 720p60 Recording Via HD Component

Setting	Value
Input Source	ComponentAnalog
HDSDI Video Format	HDSDI_720p_5994
Component Video Input	AnalogIn_720p_5994
Component Video Output	AnalogOut_720pSMPTE
Input Color Bit Depth	10-Bit YCbCr
Encoder Quality	High
Record Type	AudioAndVideo
Final Framerate	None
Pull Down Removal	None

Settings for 720p24 Recording Via HD Component

Setting	
Input Source	ComponentAnalog

Setting	Value
HDSDI Video Format	HDSDI_720p_5994
Component Video Input	AnalogIn_720p_5994
Component Video Output	AnalogOut_720pSMPTE
Input Color Bit Depth	10-Bit YCbCr
Encoder Quality	High
Record Type	AudioAndVideo
Final Framerate	None
Pull Down Removal	**Extract24pFrom60p**

Settings for 720p60 SlowMo @24p Recording (2.5x Slow-Mo Effect) Via HD Component

Setting	Value
Input Source	ComponentAnalog
HDSDI Video Format	HDSDI_720p_5994
Component Video Input	AnalogIn_720p_5994
Component Video Output	AnalogOut_720pSMPTE
Input Color Bit Depth	10-Bit YCbCr
Encoder Quality	High
Record Type	AudioAndVideo
Final Framerate	**FPS_23_976**
Pull Down Removal	**None**

Settings for 1920x1080 23.976psf Recording Via HD-SDI

Setting	Value
Input Source	HDSDI
HDSDI Video Format	**HDSDI_1080psf_2398**
Component Video Input	AnalogIn_1080i_30
Component Video Output	AnalogOut_1080psfSMPTE
Input Color Bit Depth	10-Bit YCbCr
Encoder Quality	High
Record Type	AudioAndVideo
Final Framerate	None
Pull Down Removal	**None**

Settings for 1920x1080 30i Recording Via HD-SDI

Setting	Value
Input Source	HDSDI
HDSDI Video Format	**HDSDI_1080i_2997**
Component Video Input	AnalogIn_1080i_30
Component Video Output	AnalogOut_1080iSMPTE
Input Color Bit Depth	10-Bit YCbCr
Encoder Quality	High
Record Type	AudioAndVideo
Final Framerate	None
Pull Down Removal	**None**

Settings for 1920x1080 w/Pulldown Removal (24p) Recording Via HD-SDI

Setting	Value
Input Source	HDSDI
HDSDI Video Format	**HDSDI_1080i_2997**
Component Video Input	AnalogIn_1080i_30
Component Video Output	AnalogOut_1080iSMPTE
Input Color Bit Depth	10-Bit YCbCr
Encoder Quality	High
Record Type	AudioAndVideo
Final Framerate	None
Pull Down Removal	**Extract24FramesFrom30i**

Once you have selected to edit an existing preset, or to create a new one, the Edit Preset window will display.

Recorder tab

Within the recorder tab you may select to record .AVI or .MOV files. The wrapper format should be determined by your workflow. However, most video editing tools understand both wrapper formats. When you take the files onto a computer you will need to have a CineForm Intermediate decoder installed on that system. The decoders are available for free from www.wafian.com/Support.htm.

You can also specify name rules for the clips that you will record as well as their location. Clip filenames are automatically built from a name rule. The default name rule will create clips named Scene-1-Take-###.mov in the Scene-1 folder under the Media Path. Users may specify their own recording path, and create their own name rules using the following guidelines.

Name Rules
Name rules are a flexible and powerful way for the HR-F1 to create unique clip names without constant user interaction.

When starting to record, the HR-F1 creates the clip name from the text in the Name Rule field and replaces variables (text enclosed in curly brackets, {variable}) with their current value. Variables allow you to provide meaningful clip names, specify sub-directories, and uniquely identify clips. If a clip name is not unique, the HR-F1 will increment the right most numeric field or append "-001" to the end of the name.

Sub-directories
Name rules can specify sub-directories within the media directory for clips by naming the directory followed by the backslash (\) character. The sub-directory will automatically be created if it does not exist.

Variables
You can use the following variable names with the HR-F1:

      {date} - The current system date (YYYY-MM-DD)
      {datetime} - The current system date and time (YYYY-MM-DD_HH-MM-SS)
      {extension} - AVI
      {scene} - The value of the Scene field
      {serialnumber} - This unit's serial number
      {take} - The value of the Take field
      {time} - The current system time (HH-MM-SS)
      {recordertakenumber} – The number of times this particular recorder has started recording

Examples:

> WF-{serialnumber}-{datetime}.{extension}
> {Scene}\{Scene}-{Take}-001.{extension}

Legal characters

Name Rules should not include characters that are invalid in filenames (<>\/:?*|").

Freeze Frame

Within the Recorder tab of the presets you can also specify the path and name rules to apply in recording freeze frames. The same guidelines that apply for creating clip name rules, apply for creating freeze frame name rules. Please see the Recording section of this document for details regarding freeze frame capturing.

Video tab

You need to set the HR-F1's record settings to match your input source.

Input Source

Depending on the hardware connected to the HR-F1, users may choose to record using HDSDI (digital video) or Component Analog.

HDSDI Video Format

The selection of this field determines the mode of input for the video format coming into the HR-F1 (the board's frame buffer geometry or RAM on the input board). Users may select Standard Definition or High Definition settings within this field.

Component Video Input

Within this field users specify the format of the component or composite video coming into the recorder via its BNC connectors. For composite or component analog recording, both this field and HDSDI Video Format need to be set to the correct resolution and frame rate.

Component Video Output

This setting controls the resolution and frame rate on the component/composite video outputs of the recorder.

Down Conversion Mode

When recording HD Video, you can set the Component Video Output field to the appropriate SD resolution to monitor the video with a SD component monitor.

The down conversion settings control how the HD image is scaled to SD as follows:

Setting	Description
LetterBox	Scale frame to fit screen, maintains aspect ratio (black borders).
Crop	Crop into frame, do not scale.
Anamorphic	Stretch frame to fill screen, does not maintain aspect ratio.

The following HD → SD conversions are supported:

HDSDI Video Input	Down-converted SD Output
720p 5994	NTSC (480i)
1080i 5994	NTSC (480i)
720p 50	PAL (576)
1080i 50	PAL (576)
1080p 25	PAL (576)
1080 25psf	PAL (576)

Input Color Bit Depth

Within the Input Color Bit Depth field users select 8 bit or 10 bit color depth for HDSDI input.

Reference Source

Option	Description
External	Use Ref-In connection on the rear panel for reference
Input1	Use HDSDI signal reference
FreeRun	Do not use a reference source

In general the operator should use Input1 for this field. When linking one HR-F1 to another, be sure to set the reference source of the second HR-F1 to Input1.

Up convert 8-bit source to 10-bit (Cineform Intermediate Only)

Users select this check box only when using a camera that outputs an 8 bit image. When selected, the HR-F1 compresses 8 bit video with the 10 bit video codec in order to increase precision and preserve quality. This mode increases the bit rate and disk consumption.

Encoder Quality

Settings within this field determine the bit rate of each recorded clip. The default and the recommended setting is High. Custom_ChromaKey is used to preserve chroma information around the edges of what is being recorded, and is the best setting when recording footage that will be used for green screening. Note that lowering the encoding quality will allow you to record continuously for longer durations. Please visit www.cineform.com for more detailed information regarding these settings.

Encoder PreEmphasis

This field controls encoder noise roll-off. The different selectable values can help reduce your bit rate by telling the HR-F1's encoder to roll off more or less noise.

Option	Result
Half	Default – Normal setting for a good balance between noise and bit rate
Third	More noise but still high quality
Quarter	More noise but less quality than Third
Fifth	More noise but less quality than Quarter
Sixth	More noise but less quality than Fifth
Off	Turns this feature off – no pre-emphasis

Final Frame Rate (Slow-Mo)

Within this field users select the frame rate in which recorded clips are played out. Depending on this setting, the HR-F1 performs real-time undercranking that provides the user with 2.5, 2.x, 1.5x slow motion effects among others, a powerful special effect for recording at one frame rate and playing out at another.

Example: Results from 720p 60:

Option	Motion Effect
FPS_23_976	Used to play out clips at 2.5x (slow motion)
FPS_29_97	Used to play out clips at 2.0x (slow motion)
FPS_48	Used to play out clips at 1.25x (slow motion)

Pulldown Removal

This field tells the HR-F1 to remove duplicate fields (pulldown) from the incoming video signal. In addition the standard 2:3 pulldown, this field allows recording true 24p clips from cameras such as the Canon XL H1 and JVC Pro HD 250. For example:

Camera & Mode	Pulldown Removal Setting	Result
Canon XL H1 / F2 (24F)	Extract24FramesFrom30i	1080 23.976p
JVC ProHD GY-250 24/48p	Extract48pFrom60p	720 48p
JVC ProHD GY-250 24/48p	Extract24pFrom60p	720 23.976p
JVC ProHD GY-250 60p	Extract30pFrom60p	720 30p

De-Interlace Input Video (SD Only)

Selecting this feature will de-interlace the interlaced fields in SD input such that they become progressive.

Crop Input NTSC to 640X480

Selecting this feature will scale 720X486 input into 640X480. This is only active with NTSC input.

Drop Every Other Frame

When this checkbox is selected, every other frame coming into the HR-F1 is dropped and the rest are recorded.

Flip Video Frame

Select this checkbox to flip the video being recorded. For example, this option is useful when using a Redrock Micro 35mm lens adapter with your camera.

Audio tab

Record Type

Select video only, audio-only, or both. Note that audio-only still required video input to record.

Audio Source

Users select whether they are recording audio from an AES-EBU (digital audio), HDSDI embedded, or XLR balanced analog source. The HR-F1 rear panel includes inputs for two-channels for both AES-EBU and balanced XLR audio.

Embedded Audio Channels

Within this field users select the number of channels being used for audio recording. The HR-F1 supports two channels at 48k when using AES or Analog audio, and eight channels at 48k when using embedded HDSDI audio. It is important to mention that the eight channel audio requires Prospect HD build 2.2.86 or newer for editing, and that Adobe Premiere Pro 2.0 only currently supports six channels of audio.

Note that the option ChannelsAllMixedDownToTwo only mixes down channels one through six, it does not include channels seven and eight. Also note that the mixdown is equal for all channels. In other words, back channels are not lowered more than front channels.

Analog Audio Level

Users may select to record audio at 18dBU or 24dBU. This field deals with headroom and affects the audio precision when converting to/from analog, the higher the number, the higher the precision.

Time Code tab

Users may select to record the time code embedded in the HDSDI input signal. Alternatively, time of the day may be used to generate a time code, or the HR-F1's recording time code may be selected. Note that Record Run is a global setting stored by the system for any presets. In other words, this time code will be consistent across presets and when reset or modified, the changes will apply to all presets.

When selecting Time Of Day or Record Run time code, users may select to use drop-frame time code for 29.97 or 59.95 frame rates. Time code for video is displayed in drop frame coding as HH;MM;SS;FF format. The semi-

colon denotes drop frame coding. Note that frames are not dropped when selecting drop-frame time code, only the count of frames 01 and 02 is dropped after the first minute of recording, with the exception of every tenth minute. In other words, the time code for the first minute goes from 00;00;59;29 to 00;01;00;02. The next 9 minutes are similar. The 10th minute time code goes from 00;09;59;29 to 00;10;00;00. The cycle repeats as if it was at time code 00;00;00;00.

By default, the HR-F1 stores the time code of the first frame it records on every capture. This information is appended to the end of the files it generates. The HR-F1 recognizes this information and regenerates a time code based on the clock for the given file during playback. User bits are not saved. Also note that AVI clip's time code is only readable in Adobe Premiere using Prospect HD. Please visit www.cineform.com for more information.

Optional LTC Time Code

Optionally, the Wafian HR-F1 can be ordered with its LTC time code in/outputs enabled. This ad-on allows you to jam in time code into the recorder in order to sync to an external time code source. Please ask about upgrading your HR-F1 to include LTC time code capability.

Player tab

Within this field Playback Format, Reference Source during playback, and different loopback playback options may be selected.

Reference Source

Reference sources can be selected for playback of your clips, which is independent from the reference source specified within the Video tab of your preset. In general the operator should use FreeRun for this field.

Option	Description
External	Use Ref-In port in the rear panel for reference
Input1	Use HDSDI signal reference
FreeRun	Do not use a reference source

Play all clips consecutively

When selecting this checkbox, all clips displayed in the media bin will play back consecutively. When the last clip has been played back, playback will stop. If Loopback Playback is also selected, all clips will be played consecutively and after the last clip has been played back, the first clip will begin to play back in again. This playback pattern will continue until playback is stopped manually.

Loopback Playback

When selecting this checkbox, selected clips will be played back in a loop. If Play all clips consecutively is also selected, all clips will be played consecutively and after the last clip has been played back, the first clip will begin to play back in again. This playback pattern will continue until playback is stopped manually.

Device Control tab

To enable device control, connect your RS422 controller to the back panel of the HR-F1. Within the Device Control tab select the Allow Remote Control checkbox and select the Communication Port that your controller will be communicating with, in most cases COM1. Note that currently only the Record, Stop, Playback, and Pause commands are enabled. Other device control features will be available in the future as a software upgrade.

System Settings tab

Within the System Settings tab users may specify a port to use on the recorder for network device control over an Ethernet connection. Basic authentication can also be established by specifying a User Name and Password for remote users to enter before connecting to the recorder remotely. Please contact Wafian Customer Support at support@wafian.com for the API to use this function.

Within the Operations section of the System Settings tab, users may choose to empty the contents of their media folder, restart the HR-F1 system, or restart the Interface. Within the Media Library section, users can select to sort the clips in the media bin based on their creation date, or their file name. Access to the HR-F1's Event Log is also present in this tab.

HR-F1 Event Log
Selecting to view the Event log displays the Event Viewer window. Within this window, selecting Wafian from the tree on the left displays all logged events on the right panel. Double clicking on each of these event logs displays their details. Note that the exact time codes of dropped frames are logged as individual events, which can be viewed by selecting the Warning log for such event.

6.   Recording

Press the Record button on the top left of the screen to start recording. The system will show the record duration on the bottom of the screen. Pressing this button again will stop recording and add the clip to the media bin on the bottom of the screen.

Other Recording Features

Buffer Indicators
The two progress meters next to the Record button indicate the amount of memory buffer space used by the recorder. The meter on the top indicates the amount of memory coming in from the HDSDI input into the system. The one on the bottom indicates the amount of memory being used to write to disk. In other words, frames come in from the HDSDI input, get buffered, go through the compressor, and then get written to disk, which is the slowest of the above processes. Hence, the meter on the bottom (disk buffer) will get full before the one on the left is triggered.   These meters are helpful for tuning and diagnosing settings that may cause frame dropping. Because the HR-F1 is a tool for professionals pushing the hardware's performance, there are setting options that the hardware may not be able to sustain.

Error Indicators
- **DF** - Drop Frames – Turns red if the system falls behind and drops a frame. If you are dropping frames, try adjusting the encoder quality settings of your preset. Extreme temperatures is another possible reason for the CPU to slow down and cause the system to drop frames.

- **System Error** – A System Error dialog will display if the system detects an internal error. If you have adjusted your settings to minimize the stress on the system and the errors persist, please report the problem to support@wafian.com. When reporting a system error, please include:

- Wafian HR-F1 serial number
- Steps to reproduce the problem, including the error message displayed and the resulting problem
- Manufacturer and model number of the camera/system that you were using to connect to the HR-F1
- Media format, resolution, and frame rate

Clip Properties

To view the properties of any of your clips, click and hold (or right click if you have a mouse) on the desired clip's thumbnail in the Thumbnail Bin and select Properties… Currently the clip's path, resolution, time code, bit rate, date of creation and size are displayed in this window. Click and hold again to delete or rename clips.

AUTO Recording

To start and stop recording at specific time codes embedded in the incoming HDSDI video, click the AUTO button and specify in point and out point time codes. **AUTO**

As soon as you click OK, the recording time code settings will go into effect. The AUTO button will turn orange when auto recording is enabled. **AUTO**   To disable it, simply click on the AUTO button once again and deselect Auto Record.

Keyboard Controls

If you have a keyboard connected to your HR-F1, pressing Ctrl+r will cause recording to start, while pressing Ctrl+s will cause recording to stop.

Freeze Frames

To record freeze frames while previewing or recording, press the freeze frame button in the upper right corner of the screen. You may press this button as many times and as frequently as you wish. Freeze frames are recorded into the JPG format and using the name rules and location specified in the Recorder tab of your preset.
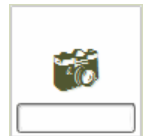
7.   Playback

- Press the clip's thumbnail on the media bin to go into playback mode
- Press the Play button on the top left corner to start playing the clip
- While playing back a clip, you can press the Pause button on the top left of the screen. Pressing it again resumes playback
- Select anywhere within the progress bar (above the video display area) to skip to any part of the clip. While paused, you may also click the Next Frame and Previous Frame buttons above the progress bar to skip back or forward one frame at a time. Also see Keyboard Controls below
- Click the time code just right of the progress bar to toggle between the clip's duration, and the clip's end time code
- To delete a clip, click and hold (or right click if you have a mouse) on the clip's thumbnail in the Thumbnail Bin and select Delete Clip
- To rename a clip, click and hold (or right click if you have a mouse) on the clip's thumbnail in the Thumbnail Bin and select Rename
- To return to record mode, press the Switch to Record Mode button -
- The media path for the clips being displayed within the media bin is above the media bin
- To browse other folders, click the icons on the bottom right side of the media bin

Freeze Frames

To record freeze frames while playing back, press the freeze frame button in the upper right corner of the screen. You may press this button as many times and as frequently as you wish. Freeze frames are recorded into the JPG format and using the name rules and location specified in the Recorder tab of your preset.
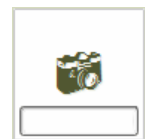
Keyboard Controls

If you have a keyboard connected to your HR-F1, pressing certain shortcut keys will allow you to skip to different parts of your clips. The right or left arrow keys on your keyboard will display the next or previous frame. You can

also press the Home or End keys to go to the beginning or the end of a clip. Lastly, press Ctrl + left/right keys to skip one full second back/forward.

8.   System Configuration

Accessing Your Media Remotely
The Wafian HR-F1 can show up as a node on your local network. Each Wafian HR-F1 is given a unique name based on its serial number. For example, if your serial number is HRF1-0003, the system name will be Wafian-HRF1-0003. Computers on your network can access your recorder with that name. To use the HR-F1 on a network, a DHCP server must be available to assign an IP Address. Alternatively, you may configure the unit to use a fixed IP address, please consult the Windows documentation for instructions.

By default, the recorded media is stored in M:\Media. This folder is also shared for read access on the network, so that computers can access the recorded media with the following path:

\\wafian-hrf1-0003\media

Replace hrf1-0003 in the name above with your HR-F1's serial number.

Copying Your Media onto an External Drive
Once you have recorded footage, you can copy your media onto an external drive. To do so simply connect your IEEE 1394A (Firewire) or USB 2 drive to a corresponding port on the front panel of the HR-F1. Open an Explorer window and notice that your external drive will now appear as an available drive on the system. Simply drag and drop your AVI or MOV media files from their location within M:\Media onto your drive. Once the copying process is complete, disconnect your external drive and continue normal operation of the HR-F1.

Swapping Removable Drives
The HR-F1 removable hard drive can be hot swapped while the system is in operation, or while the system is turned off. To remove the hard drive from its bay simply pull its gray lever and extract the drive. If the hard drive is removed while the recorder is in preview or playback mode, a Media Offline label will display at the bottom of the screen, and normal operation will be limited until a hard drive is connected to the recorder once again. After securely inserting a hard drive into the removable drive bay, select Disk Scan, the system will automatically detect the hard drive, map its volume letter to match the recording path of your current preset, and it will allow you to continue recording. If hard drives are swapped while the system is off, when it is powered up again the Media Offline label will display until you select Disk Scan to map the new drive to the recording path of the currently selected preset.

Note that recording to an external hard drive via USB or Firewire is always possible. While the removable hard drive bay is empty, you may connect an external drive to the system. The recorder will automatically detect it and after selecting Disk Scan, the recorder will map the external drive to the recording path of the currently selected preset.

NOTE: This functionality applies to both standard removable hard drives as well as removable solid state drives.

IMPORTANT: Do not extract the removable hard drive while recording, as you may lose the clip being recorded at that time. If you accidentally remove the drive while recorded and you wish to recover your clip, please contact Wafian at support@wafian.com.

Monitoring Video with External Monitors

To connect your Wafian HR-F1 to a VGA or DVI monitor for external monitoring, use the VGA port in the rear panel. For DVI monitoring, simply connect your monitor using a DVI to VGA adaptor. This will mirror the control video interface displayed on the HR-F1 front panel at 1024x768 resolution. For connecting to a monitor via HD-SDI, connect your monitor to the HD-SDI Out ports in the rear panel of the HR-F1. Note that video going into your recorder is simply looped out onto the HD-SDI Out ports, so it is possible to monitor video via HD-SDI while in preview, record, or playback mode.

NOTE: The VGA signal coming out of the HR-F1 can be transmitted up to 10 feet. For monitoring at longer distances, please use a VGA amplifier to strengthen the video signal.

9.   System Specifications

HDSDI:	HDSDI: 1 Input, 2 Output BNC
Component and Composite:	HD Component In & Out SD Component/Composite in & Out
Video Formats:	**SDI, HDSDI** 1920x1080: 23.98p, 24p, 25i, 25p, 29.97i, 29.97p, 30i, 30p 1920X1080: 23.98psf, 24psf, 25psf 1280X720: 50p, 59.94p, 60p NTSC PAL 4:2:2 - 8 or 10 bit color Time code RP188, generated, time-of-day, LTC (optional)
	Component Analog 1920X1080: 25i, 30i 1280x720 50p*, 60p NTSC PAL 4:2:2 - 8 or 10 bit color Time code RP188, generated, time-of-day, LTC (optional)
Audio Formats:	2 channel 48 kHz AES/EBU or Analog 8 channel 48 kHz HDSDI Embedded
Recording Formats:	CineForm Digital Intermediate™ AVI & MOV YUV 4:2:2 (8 or 10 bit) VBR 12-25 MB/s
Storage Configurations & Capacity:	~10 Hours – Hot swappable 750 GB SATA II (15MB/s) External bay with Firewire (IEEE 1394), eSata, USB II outputs (optional)
Interfaces:	IEEE 1394A USB 2 Gigabit Ethernet RS 422
Dimensions:	368 mm (W) x 267 mm (D) x 254 mm (H)
Case:	Ruggedized Steel Chassis 8.4in touch-screen color display (1024x768)
Power:	AC: 100 - 240 volt

	DC: 24 volt 3-pin XLR (optional)
Operating Temperature:	32-104° F or 0-40° C

NOTE: Specifications are subject to change.
* currently 6 missing horizontal lines at the bottom of each frame.

10.   Notes and Troubleshooting

Thank you for using the Wafian HR-F1, please know that we always appreciate your feedback regarding the current features and functionality of the HR-F1, as well as suggestion for future improvements. Be sure to visit our knowledgebase at www.wafian.com/Support.htm or contact us at support@wafian.com.

Recording Length and Storage Capacity

The length of uninterrupted recording that the HR-F1 is capable of performing varies depending on the format that you select, as well as other variables such as remaining disk capacity and environmental conditions. For example, under normal conditions and using a 1920 X 1080 23.97psf preset, the HR-F1 can record up to 8 hour clips. For other formats such as 720p60 the HR-F1 can record up to 6.5 hour clips. However, recording length may vary if the HR-F1 is exposed to extreme heat, or if its disks are close to being full. For longer continuous recording duration, lower the encoding quality.   Please contact our Customer Support group at support@wafian.com or visit our website at www.wafian.com for more information regarding recording duration capabilities for different configurations.

The HR-F1 can store and play back 10+ hours of footage at full resolution 1920 X 1080 24P 10 bit clips. Please contact our Customer Support group at support@wafian.com or visit our website at www.wafian.com for more information regarding storage capacity for different configurations. Note that the system will stop recording and display a warning message when it has only 500 MB of storage capacity left on disk.

IMPORTANT DISCLAIMERS

GOOD ADVICE FOR DIGITAL ACQUISITION: As with any form of digital acquisition, it is recommended that you back up your media frequently. There are various ways of extracting your media from the recorder, the HR-F1 can be connected to an external storage device via Firewire, USB 2, or Ethernet. Your footage is your most valuable asset, keep multiple copies of it at all times.

Third party software and system configuration changes: We don't recommend and cannot support installing and running 3rd party software on the HR-F1 as that may affect the performance of the Wafian HR-F1. Because of the broad range of configuration changes that can be made to the Operating System and its components, we do not recommend that you make any configuration changes to your HR-F1 system.   We cannot support HR-F1 systems where the original configuration has been modified. Do so at your own risk.

Playback of media generated by other tools: While in most cases the HR-F1 will play back media generated by a variety of professional video/audio tools, we currently only support the correct playback of media generated by the HR-F1.

Internet use and vulnerability: Because it is possible to connect the Wafian HR-F1 to a network and/or the Internet, it can become vulnerable to viruses, spyware, and other harmful programs. Please be aware that protecting the HR-F1 from such risks is the responsibility of its user. Addressing problems that may derive from this risk is not covered by the product's warranty or any Support agreement.

Rough handling: Even though the HR-F1 has been designed to work out in the field, as with any electronic equipment we recommend the use of caution when moving the HR-F1 while in use and transporting the system. As an additional safety measure please inquire about the HR-F1's custom Pelican case.

Temperature range: Operate the HR-F1 in proper temperature environments (32-104° F or 0-40° C). As a result of extreme temperatures and overheating the system may perform poorly, including dropping frames.

Bit rate modifications: Because of the variable bit rate, the codec will expand to preserve quality, which may cause to overload the system and consequently it may drop frames. To reduce this risk lower the gain on your camera to reduce noise, or change the encoder quality settings within the Recording Format tab of the Application Preferences window. Selecting the default setting of High is recommended, Custom_FilmScan1 and Custom_FilmScan2 should only be used for special circumstances. Please contact our Support team if you would like additional information at support@wafian.com. You can also select to stripe your disks rather than mirror them. For optimal performance, the highest bit rate at which your media files should be recorded is 30 MB/sec average or less. To view the bit rate of each recorded media file, right click (or click and hold) on its thumbnail within the media bin and select "Properties…" Some of the factors that will affect the bit rate of your footage are level of detail in your images, light, gain on your camera, and encoder quality settings among others. Please visit www.wafian.com for further information.

Power source and cabling: Before operating the HR-F1, be sure that it is connected to a proper (clean) source of power, and that each of your cables, barrels (tubes), and converters are in proper working condition. Please know that the quality of the image that the HR-F1 receives can be affected if you are connected to an irregular source of power or if your peripherals have been damaged.

11.   Software License Agreement

1. This is an agreement between Wafian Corporation ("Wafian") and Licensee, who is being licensed to use the Wafian HR-F1 software and accompanying user documentation ("Software"). Use of the Software constitutes acceptance of this agreement.

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9. License acknowledges that Licensee purchased a license to use the Software as part of an overall hardware and software solution that includes system components from third parties. Use of the Wafian HR-F1 system

requires accepting license agreements and hardware terms from multiple vendors. Licensee agrees to adhere to all other relevant vendor license agreements that are applicable to third party components of the system.

10. This agreement shall be governed by and shall be interpreted in accordance with the laws of the state of California (excluding its conflict of laws provisions) except that Wafian may enforce its intellectual property rights before the competent courts of any jurisdiction where an act of infringement has occurred. Licensee agrees that the courts located in the county of San Diego, California, USA, will constitute the sole and exclusive forum for the resolution of any and all disputes arising out of or in connection with this agreement and Licensee hereby irrevocably consents to the personal jurisdiction and venue of such courts and irrevocably waives any objections thereto. The United Nations Convention on Contracts for the International Sale of Goods is expressly excluded from this agreement. In the event of any dispute between the parties to this agreement, the prevailing party shall be entitled to recover attorneys' fees and costs of suit from the other party in addition to such other relief as may be granted.

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12. Wafian HR-F1 One (1) Year Limited Warranty

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Wafian Corporation ("Wafian") warrants the hardware product against defects in materials and workmanship for a period of ONE (1) YEAR from the date of original purchase. If a defect exists, Wafian will, at its option, (1) repair the product at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is at least functionally equivalent to the original product. A replacement product/part assumes the remaining warranty of the original product or ninety (90) days from the date of the replacement or repair, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Wafian's property.

Prior to returning a product to Wafian, you must request a RMA number. Please contact Wafian at 858-863-4166 option 2 or support@wafian.com to explain the problem and request an RMA number. The RMA number must be included with the package and be labeled on the box. Upon receiving the RMA number, deliver the product at your expense to Wafian.

When you contact Wafian for warranty service, please be prepared to provide your name, address, telephone number, and a copy of the bill of sale bearing the appropriate Wafian serial numbers as proof of date of the original purchase. In addition, you will need to include the RMA number for processing and tracking as mentioned above.

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NOTE: Before delivering your product for warranty service, it is your responsibility to keep a separate backup copy of the software and data, and disable any security passwords. Data recovery is not included in the warranty service and Wafian in not responsible for data that may be lost or damaged during transit or repair.

13.   Contact Wafian

Wafian Corporation Technical Support
3525 Del Mar Heights Rd. #417
San Diego, CA 92130
858-863-4166 option 2
support@wafian.com
www.wafian.com/Support.htm