

Manual



VILLAGE ISLAND

VF-REC

Version 3.4.7

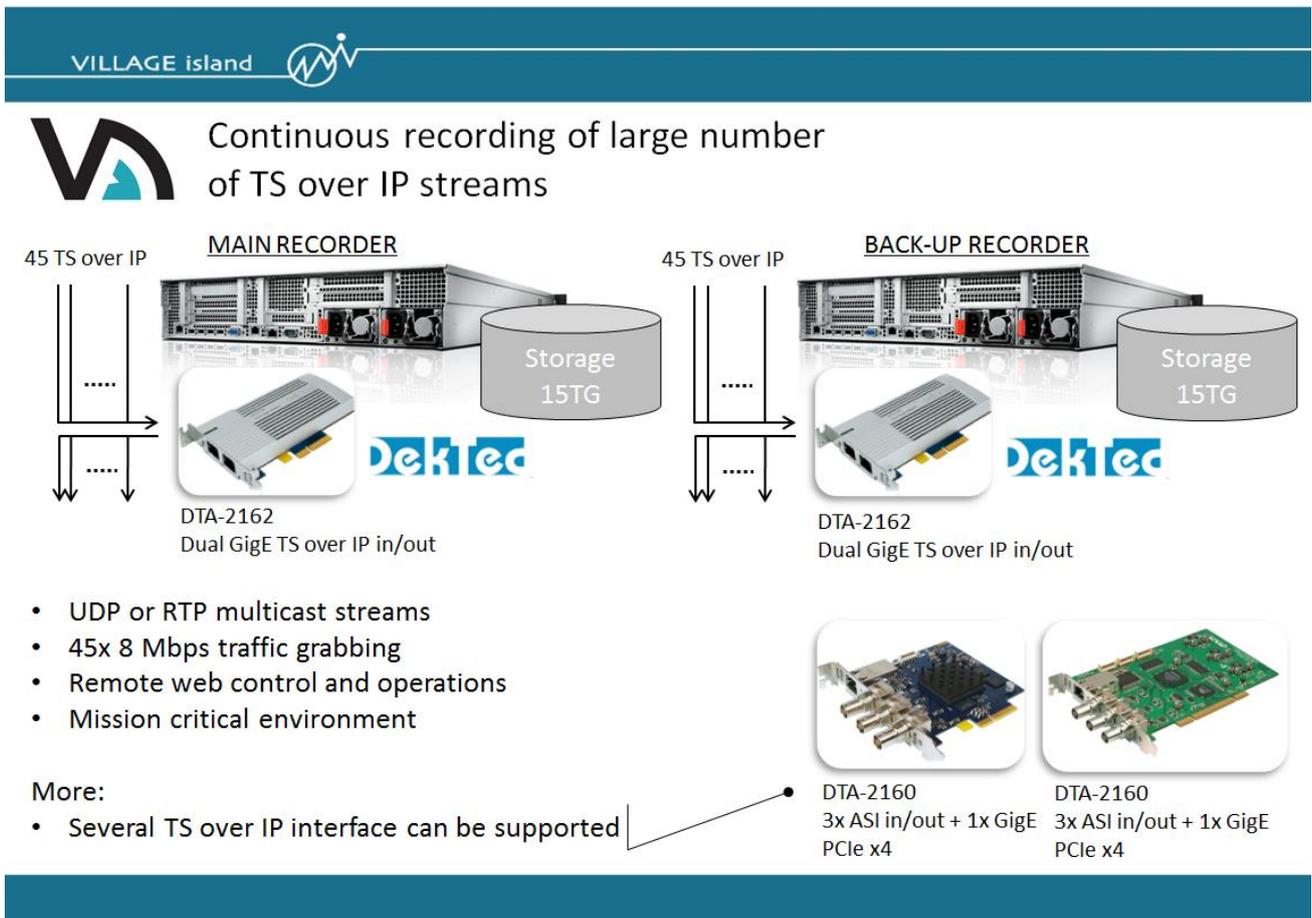
# Contents

1	INTRODUCTION	3
2	SYSTEM REQUIREMENTS	6
3	VERSION HISTORY	9
4	INSTALLATION	10
5	USAGE OVERVIEW	11
5.1	Monitor view	13
5.2	Settings view	14
5.3	Logs view	18
5.4	Scheduler view	18
5.5	Extractor view	19
6	STREAMER OVERVIEW	20
7	ALL RECORDED FILES	22
8	LIST OF DEVICES	23
9	USER PREFERENCES	24
10	TROUBLESHOOTING	25
11	CONTACT INFORMATION	26

# 1 Introduction

VF-REC is the default and cost-effective software solution to record Transport Streams and SDI signals. Thanks to its ability to use standard and affordable PC hardware, and its wide range of supported video broadcast interfaces, VF-REC (formerly DtGrabber+) has been adopted by thousands of users. It will keep evolving continuously, according to customer needs and new generations of broadcast services.

This new version 3 of VF-REC receives a major GUI overhaul using web-based technology and client/server architecture. This enables high-end users to integrate easily the VF-REC within their professional environment, while enabling multiple session management and control from remote stations.



**Figure 1. Sample user case: Massive TS over IP recording for 24H/7D operations with VF-REC v3**

VF-REC v3 also brings along the capacity to record real-time 4K (up to 4K 4:2:2 10bit, 60fps) live SDI streams in visually lossless quality by using the JPEG 2000 ("J2K") compression standard, powered by affordable NVIDIA or AMD GPUs.

Without such J2K acceleration feature, recording and playout of uncompressed 4K video streams in a PC would be nearly impossible, due to the high bitrate (12Gbps) involved and would require special and over-expensive hard-disk investments. To overcome this problem, VF-REC v3 uses JPEG 2000

compression technology from Comprimate ([www.comprimato.com](http://www.comprimato.com)). It applies real-time visually lossless compression of 4K video, reducing the data rate sufficiently to cope with affordable SSD drives.

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## VF-REC v3: 4K Record / Playout server

GPU (AMD, NVIDIA)

Storage

4 x 3G-SDI

4 x 3G-SDI

**JPEG 2000**

- Can be recorded as Op1a (.MXF) file format
- Web User Interface
- Continuous recording in multiple files
- Schedule playout function
- Supports various UHD interfaces

**DekTec**

12G-SDI in + out + HDMI 2.0 out

12x 3G-SDI in/out (8K DG + 4K)

2x 10GE in/out

**Figure 2. 4K (J2K) Recording / Playout with VF-REC v3**

VF-REC v3 stores the JPEG 2000 compressed 4K signal as MXF (OP1a) files. This mode requires the usage of a 4K capable DekTec adapter, such as the current flagship 4K product, the DTA-2174 (Quad 3G-SDI/ASI input/output adapter), with multiple other new 4K products on the roadmap. As they appear, support for these cards will be added to VF-REC. A playout application for streaming out the recorded MXF files using DTA-2174 is also included in VF-REC.

JPEG 2000 recording captures the following content from the SDI:

- Video: interlaced and progressive, HD and 4K formats supported by DTA-2174
- Audio: stereo 24 bit PCM 48 kHz. Support for other audio formats will be added in the future.
- Ancillary data, including timecode, captions and other data.

Ancillary data is stored in the MXF file as SMPTE 436 packages. As a general rule, the recorded ancillary packets are later reproduced unchanged on the SDI when the file is streamed using the included VF-REC Streamer application. However, please note that there are some exceptions:

- Currently the application records only ancillary packets with DIDs and SDIDs which are

commonly used in broadcasting industry. Recognition of other DIDs and SDIDs can be added upon request – in such case please contact Village Island.

- The SMPTE 436 standard does not define how to store ancillary data of multilink SDI systems, for instance 4K over 4 cables, as it is in case of DTA-2174. Consequently only ancillary data from the first link is recorded. This is typically sufficient because ITU requires all ancillary packets to be present on the first link, unless they don't fit. Similar limitation applies to recording of ancillary data in 3G level B format: only packets from the first "virtual" link of level B can be stored in the MXF, even if recording is performed using single 12G cable of DTA-2195.
- Information about the order in which ancillary packets appear on a certain SDI line cannot be stored in MXF. Consequently when multiple ancillary packets are present on a single line the VF-REC Streamer may order them differently from the original positioning.
- There are some limitations in processing of SDI input streams that contain more than one timecode in each progressive frame or interlaced field. If recording of such streams is required, please contact Village Island.

## 2 System requirements

	ASI, IP, uncompr. SDI	JPEG 2000 1x HD-SDI	JPEG 2000 2x HD-SDI	JPEG 2000 4x HD-SDI	JPEG 2000 4K 60p
<b>CPU</b>	64 bit Intel Celeron or equivalent	Intel i5-2400 or equivalent	Intel i7-3770 or equivalent	Intel i7-3770 or newer i7 <sup>1</sup>	Intel i7-6700 or newer i7 <sup>1</sup>
<b>GPU</b>	Not needed	Nvidia: GTX 1050 AMD: RX 460 <sup>2</sup>	Nvidia: GTX 1060 3 GB AMD: not supported <sup>3</sup>	Nvidia: GTX 1080 AMD: not supported <sup>3</sup>	Nvidia: GTX 1080 Ti AMD: Vega 64 <sup>2</sup> or Frontier Edition <sup>2</sup>
<b>RAM</b>	4 GB Single Channel	8 GB Dual Channel	8 GB Dual Channel	8 GB Dual Channel	8 GB Dual Channel DDR4-2133
<b>Disk</b>	HDD / SSD	HDD / SSD 25 MB/s	SSD 50 MB/s	SSD 100 MB/s	SSD 200 MB/s
<b>OS</b>	64 bit Windows 7 or newer				

**Table 1. General requirements.**

The disk must have sufficient **sustainable writing** speed. HDD and SSD manufacturers often either don't provide this information or advertise high speeds that cannot be achieved in practical workloads. Instead, it is recommended to use HD Tune Pro benchmark for speed measurement. Results for popular disks can be found on the internet, a trial version of the application can be also downloaded for free (see Figure 3).

For ASI, IP and uncompressed SDI recording the required speed can be computed knowing the total bitrate of input signals:

$$\text{speed [MB/s]} = (\text{bitrate1} + \text{bitrate2} + \dots + \text{bitrateN}) * 1.25$$

The last element in the equation is a correction coefficient: speed measurement with HD Tune Pro doesn't take into account overhead introduced by the NTFS filesystem. To compensate for this, 25% margin is added.

In case of JPEG2000 encoding please refer to the minimum speed requirements presented in the table

<sup>1</sup> Processors other than i7 are currently not supported in this mode. Support for select Xeon processors will be added in the future.

<sup>2</sup> AMD graphic boards may require a monitor display connected to them and turned on. Otherwise the GPU would encode at a fraction of its capability. If operation without display is needed then Nvidia board should be used instead.

<sup>3</sup> AMD driver is very efficient when encoding one stream at a time but doesn't perform well with multiple simultaneous recordings.

above. An HDD / SSD is suitable for recording if the **minimum** recording speed reported by HD Tune Pro is higher than values from the table. If the desired JPEG2000 recording mode is not listed in the table, the speed can be also estimated using the following equation:

$$\text{speed [MB/s]} = 40 * \text{framerate} / 60 * \text{multiplier} * 1.25$$

Multiplier is equal 1 for HD and 4 for 4K. In case of interlaced formats framerate is half of the field-rate, for example framerate of 1080i60 is equal 30.

Additionally, please take into consideration the following facts:

- Operating system constantly uses the disk to read and write data. These operations can slow down disk response and consequently negatively affect VF-REC recording. To avoid this interference it is strongly recommended to use dedicated disk (i.e. other than the OS disk) as a VF-REC file recording destination.
- Maximum recording speed decreases with time due to disk fragmentation. It is recommended to perform disk formatting once in a while if large amount of data is being written continuously to the disk (data must be backed-up, formatting removes everything). NOTE: removing all files from the disk manually does not give the same effect as formatting it. In order to regain original writing speed the disk must be formatted.
- The speed of HDD decreases as it gets full. This is in contrary to SSDs which maintain almost constant speed regardless of the remaining free space (unless disk is heavily fragmented).

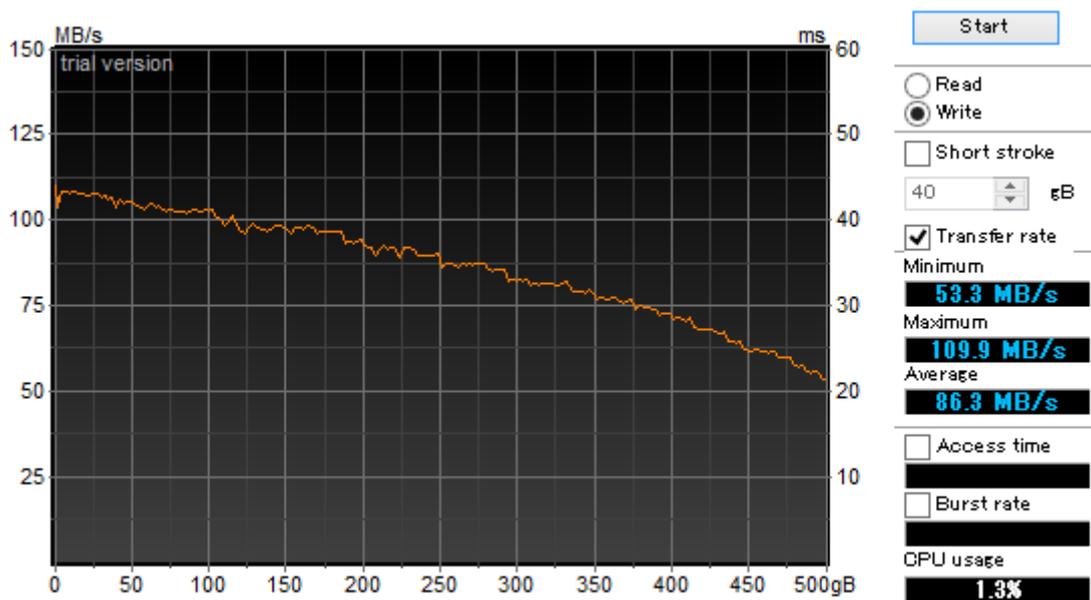


Figure 3. HD Tune Pro benchmark result for Toshiba MQ01ABD050.

It is not a trivial task to select proper storage so let's try here to evaluate disk suitability by reviewing some benchmark results. In this example 2.5 inch 500 GB Toshiba HDD model MQ01ABD050 was used.

The benchmark results presented on Figure 3 show that this hard drive can practically sustain about 50 MB/s of recording **right after being formatted**. The initial speed is higher but it drops quickly as the HDD gets full. If the user removes afterwards some or all files from the hard drive and keeps recording new ones the speed of writing will further decrease because of ongoing data fragmentation (much below 50 MB/s, after thousands of recorded gigabytes it may drop to 20 MB/s or so). As mentioned before the only way to have the original performance back is formatting of HDD. The conclusion is that the hard drive presented in this example can be used only for recording of low bitrate TS streams.

### 3 Version history

Version	Date	Remarks
3.4.7	2019-02	Updated Dektec drivers that fix a crash in old PC
3.4.6	2019-02	Added DtPcie driver to support new boards
3.4.5	2019-02	Fixed wrong header when writting dtsdi file
3.4.4	2019-02	Fixed dropping frame when recording dtsdi files
3.4.3	2019-01	Added a button to enable/disable scanning of GPU
3.4.2	2018-11	Fixed license bug for the streamer Now support non ASCII characters in the filenames In the GUI now shows all the licenses for all the device
3.4.1	2018-07	IQ and T2MI is now part of the base product no extra licenses are required
3.4.0	2018-06	Now can use any device if there is a valid license
3.3.7	2018-04	Fixed recorder crash when using motherboard NIC
3.3.6	2018-03	Added support for DTA-2180.
3.3.3	2017-12	Fixed capture with motherboard network adapters.
3.3.2	2017-11	Added support for DTA-2195 recording. Added ancillary data capture.
3.2.3	2017-05	Fixed to run under Windows 10 "Creators Update".
3.2.2	2017-05	Added support for DTA-2195 streaming.
3.2.1	2017-05	Various bug fixes.
3.2.0	2017-04	Added support for RF capture devices.
3.1.6	2017-03	Added support for motherboard NICs.
3.1.5	2017-02	Fixed default directories.
3.1.2	2016-12	First release.

# 4 Installation

Please download DtInfo utility from [www.dektec.com](http://www.dektec.com) and confirm that device which is going to be used with VF-REC has the latest firmware (Figure 4).

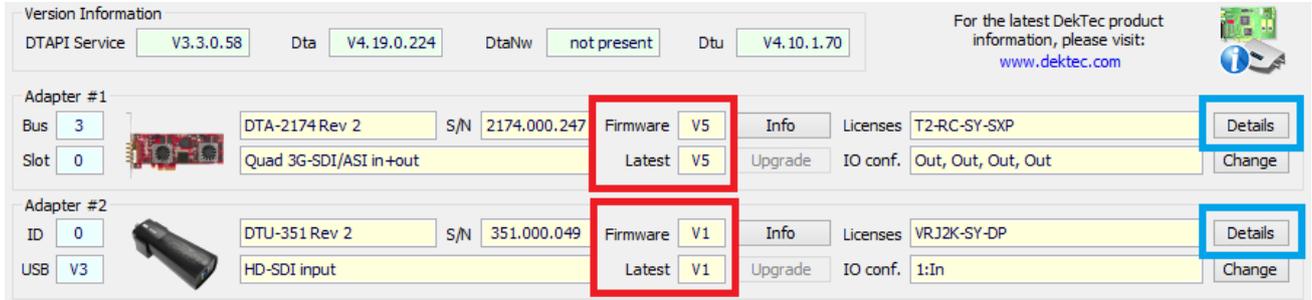


Figure 4. DtInfo utility.

Furthermore, please click on the *Details* button and confirm that device has sufficient bandwidth for communication with the PC (Figure 5).

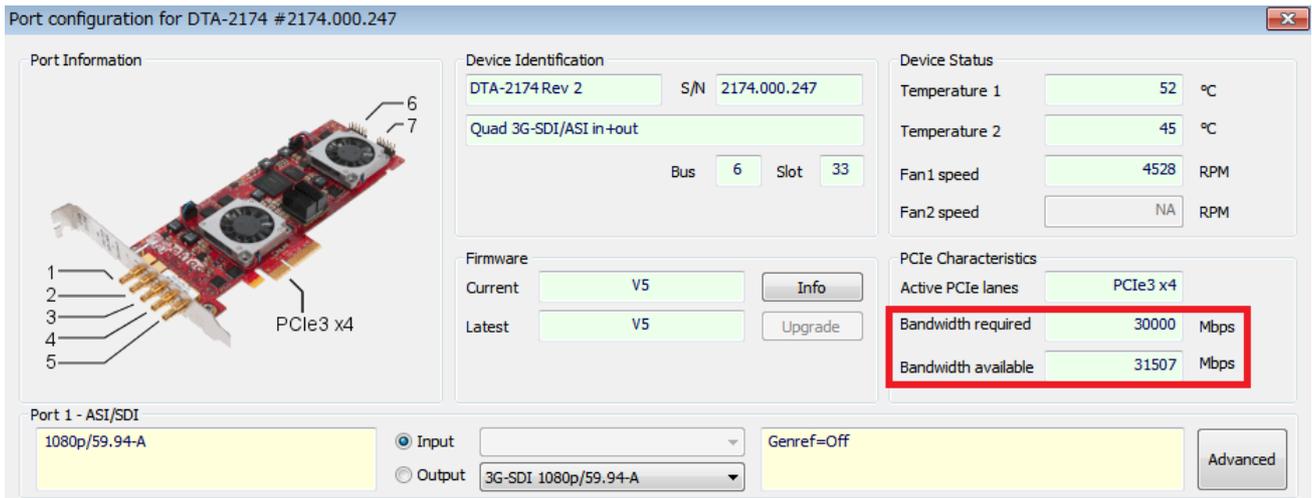


Figure 5. Details view in DtInfo utility.

Windows Sleep and Hibernation mode shouldn't be used on the PC, they are not supported. Also, for unattended operation, please make sure that there are no other tasks that could affect the speed of the PC at some point, for example Windows Update, scheduled antivirus disk scan, etc.

The following applies only if JPEG2000 recording / streaming is used:

- A graphics board should be inserted into a proper slot of the motherboard. The slot must have at least 8 active lanes of PCI express Gen3. Please download and install the latest GPU drivers. Drivers automatically installed by Windows are not suitable.
- The processor's Hyper-Threading must be disabled in the BIOS. Hyper-Threading decreases significantly the speed of JPEG2000 processing.

## 5 Usage overview

During the installation of VF-REC a shortcut on a desktop and an entry in Start Menu are created. The application's interface is displayed in an internet browser. The window is divided into three regions: the title bar, the recorders list, and the selected recorder's control panel.

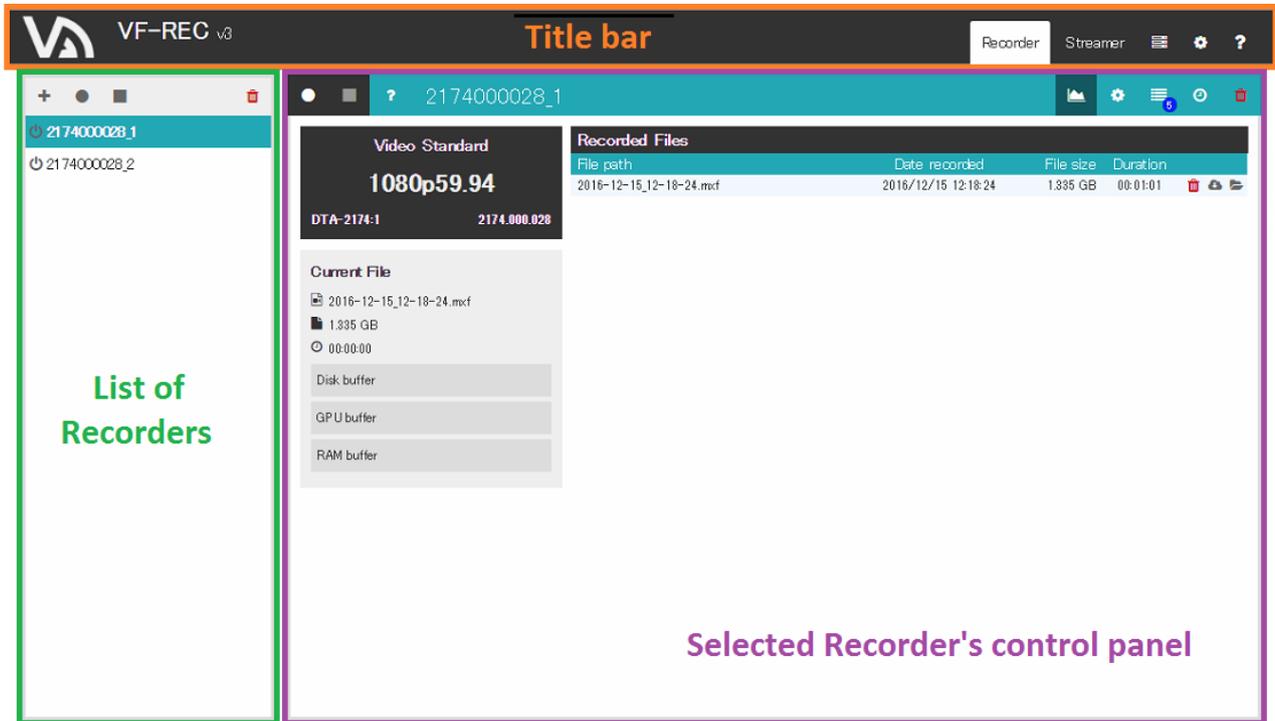


Figure 6. Elements of application window.

The configuration of recording starts with creation of a recorder instance. To do that, please click on the plus (+) icon on top of the left frame. In the pop-up window please choose input type (ASI, TS over IP, SD/HD/3G SDI or 4K) and select one of the available devices. A recorder will be added to the list with default name consisting of device's serial number and port number.

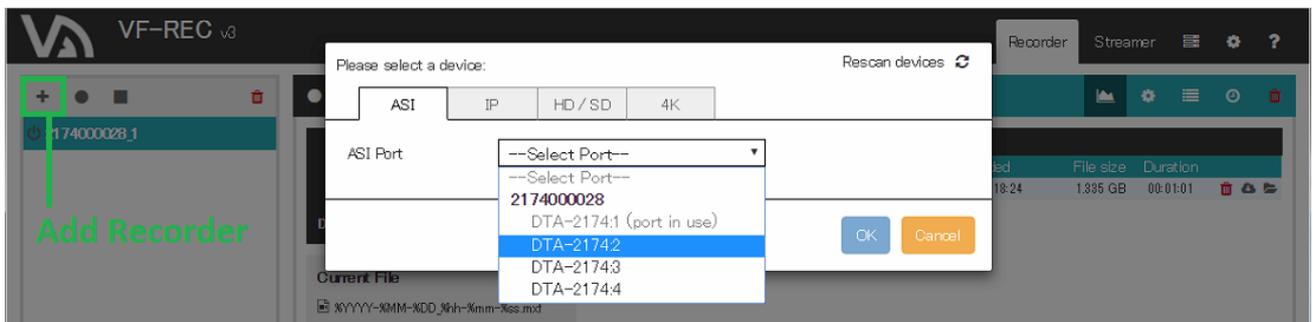
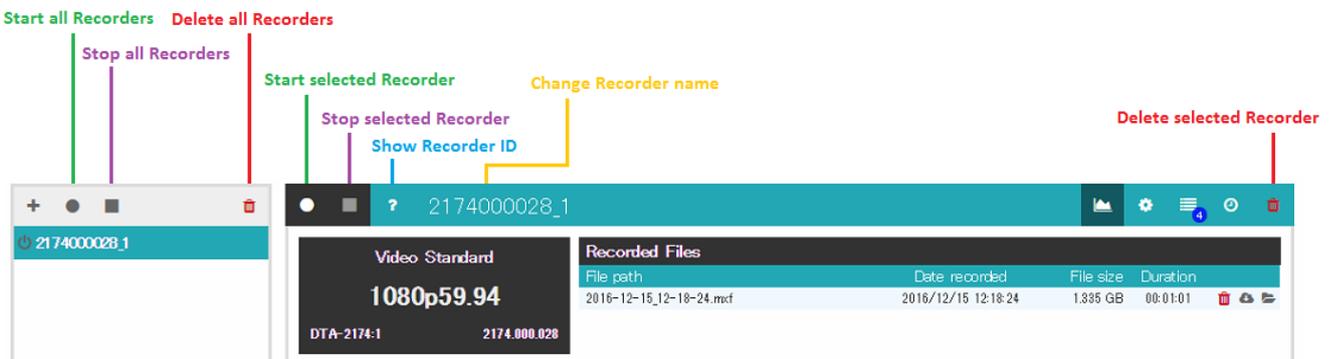


Figure 7. Device selection window.

The name of a Recorder can be changed by clicking on it in the control panel on the right side. Two buttons on the left side of the recorder’s name are used for starting and stopping the recording process. A trash bin button on the far right is used for deletion of recorder. If multiple recorders are present, it is also possible to start/stop/delete them simultaneously using similar buttons on top of the recorders list.

Closing the browser’s window doesn’t stop the applications; they will still keep running in the background. All ongoing recordings will continue without interruption.

Two Recorder instances could potentially have the same name; in that case, the user can press the ‘?’ (question mark) icon on the left of the Recorder name in order to verify the unique ID corresponding to that Recorder.



**Figure 8. Buttons for control of recording.**

Each recorder in the list has action buttons, as well as status indicators, as shown in Figures 7, 8 and 9.

Each recorder will show a red “Recording” indicator next to it while recording is in progress.

When a recorder process is active, the “Detach recorder resources” button will be available (figure 7), in order to release the DekTec device (and, if applicable, GPU), so that it can be used by other applications. When a process is inactive, the “Restart recorder process” button will be shown instead (figure 9).

If a recorder process logs an error or warning while another recorder is being monitored, the “Unobserved error/warning” indicators will turn on. If clicked, they will take the user directly to its corresponding Logs view.



**Figure 9: Recorder buttons and indicators**



Figure 10: Recorder buttons and indicators (2)



Figure 11: Recorder buttons and indicators (3)

The recorder’s control panel is made up of several views. The default view which is shown upon creation of encoder is called “Monitor view”. To switch between the views, please use the buttons located on the right side of the recorder’s name.

Note: the File merger view and functionality is only available for TS recordings.

Note: when a process has been detached, the Settings and Scheduler views are unavailable.

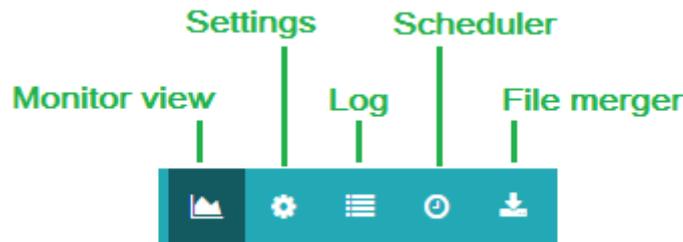


Figure 12. Views available in control panel.

## 5.1 Monitor view

The Monitor view shows the status and progress of the ongoing recording, as well as the list of previously recorded files. The recorded files are stored in sessions, which are defined when a recorder starts to when the recorder is stopped. It is possible to delete individual recorded files or complete sessions from the file system and the database using the trash can icon. Individual files can also be downloaded to the local PC that is connected to the VF-SREC server, using the download button next to each recorded file within the session.

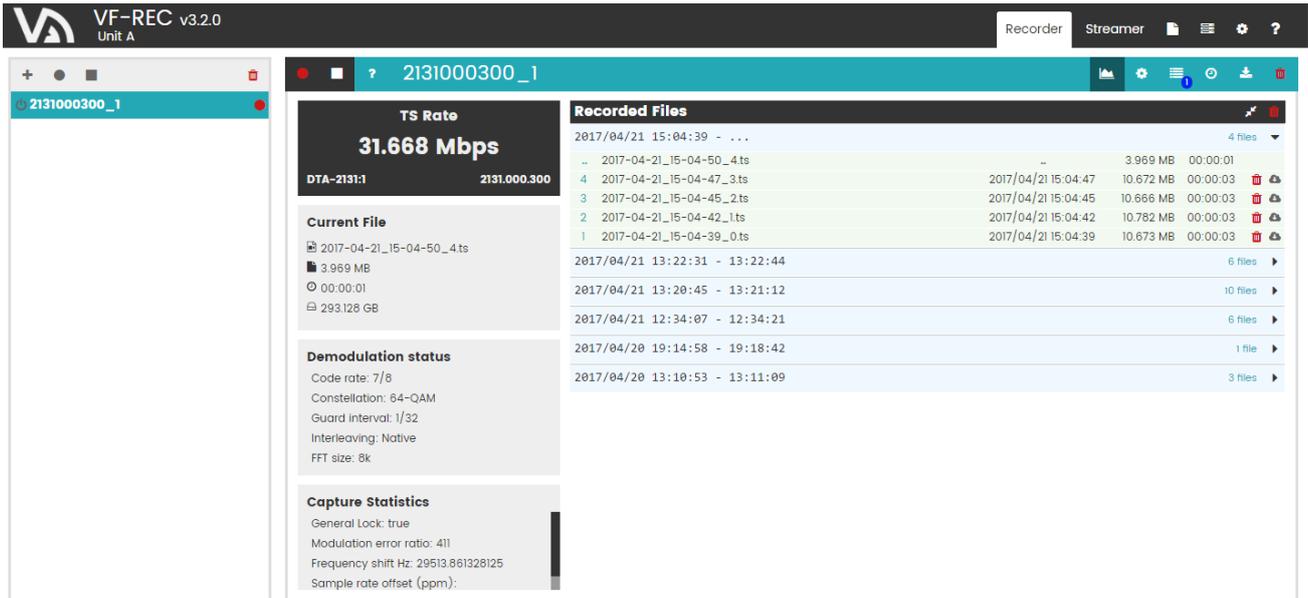


Figure 13. Monitor view.

## 5.2 Settings view

The settings view offers different configuration parameters, depending on the input type.

Parameter	Description
File Path	Path to the TS file to be recorded. A timestamp can be added to the file name, using the following placeholders (all or part of them): %YYYY-%MM-%DD_%hh-%mm-%ss
File Chunk Option	Rule for automatically chunking into multiple files. This option can be used to prevent creation of large files which are difficult to handle. The options are: <i>No chunking</i> , <i>Size</i> , <i>Time</i> .
Chunk Size/Duration	If chunking is enabled: size or time limit for each file.

Table 2. TS settings (ASI, IP)

Parameter	Description
Port Number	Local port number for IP reception.
Multicast Address	If checked, the multicast group address specified in the text box is joined.
Source Filter Address	Source-specific multicast filtering by IP address.
Source Filter Port	Source-specific multicast filtering by port number.

Table 3. IP specific settings

Parameter	Description
Bit Depth	10-bit mode recommended. 8-bit mode reduces overall quality.
4K Mapping	Switches between 2SI and quadrants mapping of 4K signals over SDI. Note: Applicable for 4K recordings only.
Encoding quality	Default value of 70 translates into PSNR equal ~50, which is considered visually lossless. It is not recommended to increase this value in case of 4K 60p because it increases GPU load and may cause instability. The value should be decreased when encoding on a low-end GPU.
Rate limit	SSD speed and RAM memory bandwidth are both limited, therefore a limit must be imposed on the maximum video data rate. 160 MB/s is a default value recommended for visually lossless compression with 4K 60p. This corresponds to 7.5 : 1 video compression. Lower frame rates don't require so much bitrate, so this value may be decreased when recording, for instance, 4K 30p. An equation similar to the one presented in paragraph 2 can be used to compute the optimal bit rate value: $\text{speed [MB/s]} = 40 * \text{frame rate} / 60 * \text{multiplier}$ Multiplier is equal 1 for HD and 4 for 4K. In case of interlaced formats, frame rate is half of the field-rate; for example, the frame rate of 1080i60 is equal 30.
GPU Memory Limit	The amount of GPU memory is limited, and it has to be distributed among all applications using its resources. Unchecking this option will disable the memory limit, and this application will have free access to all the resources of the GPU; therefore, <b>it should only be unchecked when doing only one simultaneous recording / streaming.</b> Note: The amount of memory used by a Recorder will only be reported once a valid input stream is detected. The amount of memory used by a Streamer will only be reported once a file has been opened. Regions shown in the memory usage bar: <b>blue</b> is the amount of memory in use by the current application; <b>red</b> is the amount of memory in use by other Recorder/Streamer applications; <b>grey</b> is the amount of memory reserved for other tasks, such as desktop rendering.
File Path	Path to the MXF file to be recorded. Note: file chunking is not available for MXF format.
Timecode source	The master MXF timecode can be either taken from the SDI input signal or generated according to the user settings. If "SDI" option is selected but timecode is not detected, then the starting value will be set to 10:00:00:00 and the "drop flag" won't be used. If "PRESET" option is selected, user can

	<p>define both starting timecode address and the drop flag. No matter which timecode source is selected, the original timecode, if present on the SDI, will be stored additionally in the MXF file in ancillary data packages according to the SMPTE 436. VF-REC Streamer reads these packages and plays out the timecode unchanged.</p> <p>NOTE: MXF master timecode must be continuous. If “SDI” mode is used and input signal has discontinuities, then the master timecode will not be the same as the original timecode stored in SMPTE 436 packages (they will be equal only till the point of signal discontinuity).</p>
Timecode start address	Starting value of user-defined timecode. Available in “PRESET” mode.
Timecode drop flag	Defines whether “drop flag” should be used or not. Available in “PRESET” mode.

Table 4. Encoded 4K / HD settings

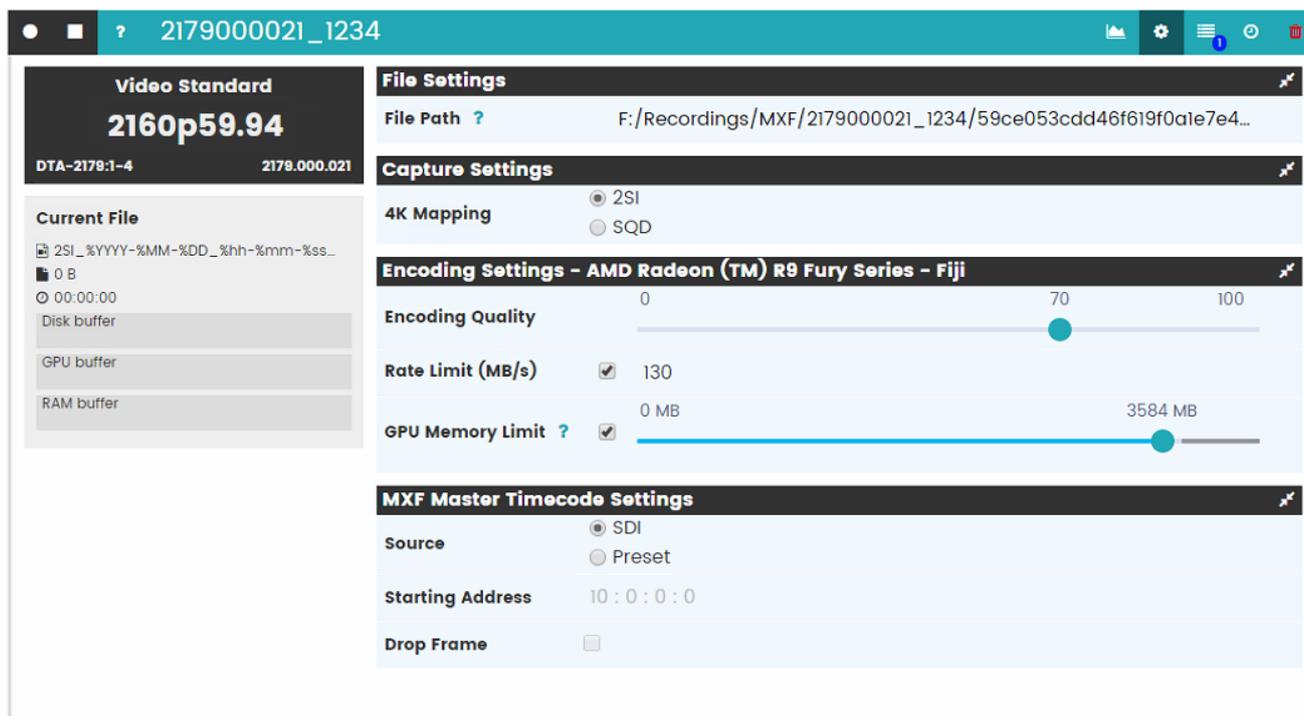


Figure 14. Encoded 4K stream settings.

The screenshot displays the VF-REC software interface for a recording session. The window title is "213700021\_1". The interface is divided into several sections:

- TS Rate:** 35.485 Mbps, DTA-2137:1, 2137.000.021
- Current File:** %YYYY-%MM-%DD\_%hh-%mm-%ss.ts, 0 B, 00:00:00
- Demodulation status:** Modulation: DVB-S2 QPSK, Code rate: 3/4, Spectral inversion: 0, Symbol rate: 24995292
- Capture Statistics:** General Lock: true, Packet lock: true, Viterbi lock: false, FEC lock: true, First Agc value: 45444, Second Agc value: 1061
- Capture Settings:**
  - Modulation Type: DVB-S(2)
  - Frequency: 1000 MHz
  - LNB Settings: Disabled
  - RX Mode: MP2
  - APSK:
- Record Settings:**
  - File Path: C:/workspace/VF4\_TRUNK/Recordings/213700021\_1/58f9a9bb21...
  - File Chunk Option: No chunking

Figure 15 DVB-S2 Settings.

The screenshot displays the VF-REC software interface for a recording session. The window title is "2131000300\_1". The interface is divided into several sections:

- TS Rate:** 63.216 Mbps, DTA-2131:1, 2131.000.300
- Current File:** %YYYY-%MM-%DD\_%hh-%mm-%ss.ts, 0 B, 00:00:00
- Capture Statistics:** General Lock: true, DVB-C2 Data slice discontinuity count: 0, DVB-C2 L1 preamble header count: 0, DVB-C2 L1-Part 2 error count: 0, Frequency shift Hz: 28839.84765625, Receiver re-lock count: 0, Signal to noise ratio: 411, Sample rate offset (ppm): -2.007501279877033, Rf level channel: 197
- Capture Settings:**
  - Modulation Type: DVB-C2
  - Frequency: 490.018 MHz
  - Bandwidth: 8 MHz
  - Selected Data Slice: 0
  - Selected PLP: 0
- Record Settings:**
  - File Path: C:/workspace/VF4\_TRUNK/Recordings/2131000300\_1/58f834c099...
  - File Chunk Option: Size
  - Chunk Size (MB): 10

Figure 16. DVB-C2 Settings.

### 5.3 Logs view

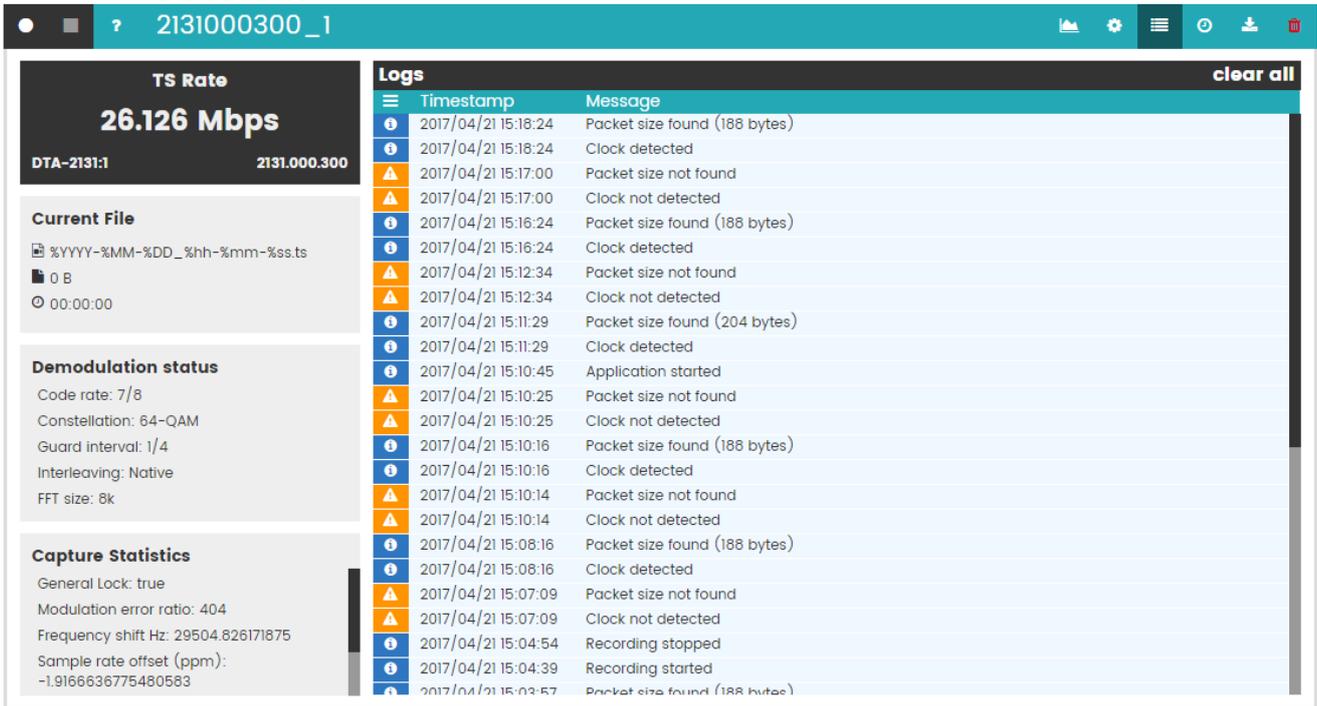


Figure 17. Logs view.

Messages from the application are listed here. It is possible to filter them by type (warning, alarm etc.) by clicking on the header of the first column. In order to search for a particular text in all messages please type it in the “Search message” field.

### 5.4 Scheduler view

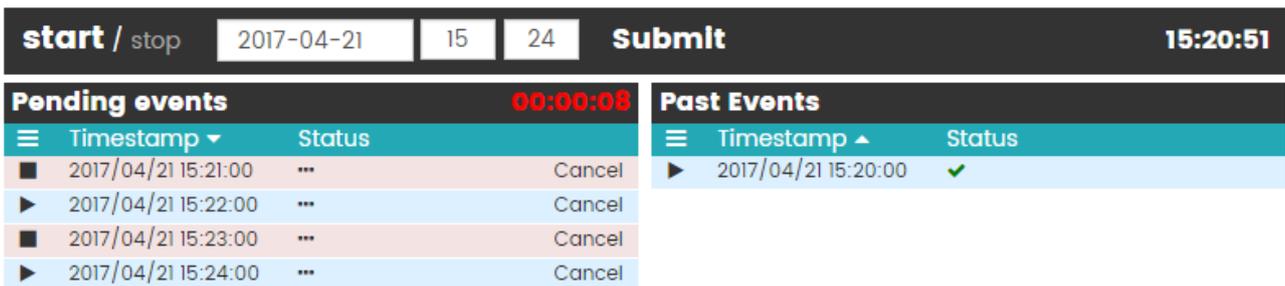


Figure 18. Scheduler view.

Recordings can be scheduled in this view. Typically recording consists of two events: start and stop. In order to add an event, select the date and time, and specify whether it has to “start” or “stop” by clicking on either button. Then finish configuring the event by pressing the Submit button. If a stop event is not defined, a recording session will continue until it is manually stopped.

## 5.5 Extractor view

**TS Rate**  
**26.126 Mbps**  
DTA-2131:1      2131.000.300

Select files from: 2017-04-21 14 21 to 2017-04-21 15 21  
Set a file name: **MergedFile.ts** and **Submit**

**Current File**  
%YYYY-%MM-%DD\_%hh-%mm-%ss.ts  
3.559 MB  
00:00:00

**Demodulation status**  
Code rate: 7/8  
Constellation: 64-QAM  
Guard interval: 1/4  
Interleaving: Native  
FFT size: 8k

**Capture Statistics**  
General Lock: true  
Modulation error ratio: 406  
Frequency shift Hz: 29523.0078125  
Sample rate offset (ppm): -2.0642987692554016

File path	Date recorded	File size	Duration
2017-04-21_15-04-39_0.ts	2017/04/21 15:04:39	10.673 MB	00:00:03
2017-04-21_15-04-42_1.ts	2017/04/21 15:04:42	10.782 MB	00:00:03
2017-04-21_15-04-45_2.ts	2017/04/21 15:04:45	10.666 MB	00:00:03
2017-04-21_15-04-47_3.ts	2017/04/21 15:04:47	10.672 MB	00:00:03
2017-04-21_15-04-50_4.ts	2017/04/21 15:04:50	10.669 MB	00:00:03
2017-04-21_15-04-53_5.ts	2017/04/21 15:04:53	4.378 MB	00:00:01
2017-04-21_15-20-00_0.ts	2017/04/21 15:20:00	10.486 MB	00:00:03
2017-04-21_15-20-03_1.ts	2017/04/21 15:20:03	10.762 MB	00:00:03

File path	File size	Duration
MergedFile.ts	61.724 MB	00:00:16

Figure 19. Extractor view.

The Extractor view allows the user to select a start date/time and an end date/time, to concatenate recorded files that have been recorded within that time.

## 6 Streamer overview

In addition to MXF recording capability, VF-REC also includes a simple tool for streaming MXF files out using compatible DekTec boards. The tool can be accessed by clicking on the “Streamer” tab.

Create a streamer instance by clicking on the plus (+) button on top of the list of Streamers. In the file selection view, select a file to be played using the file explorer control, or select one of the 5 most recent HD or 4K MXF files, which are directly selectable.

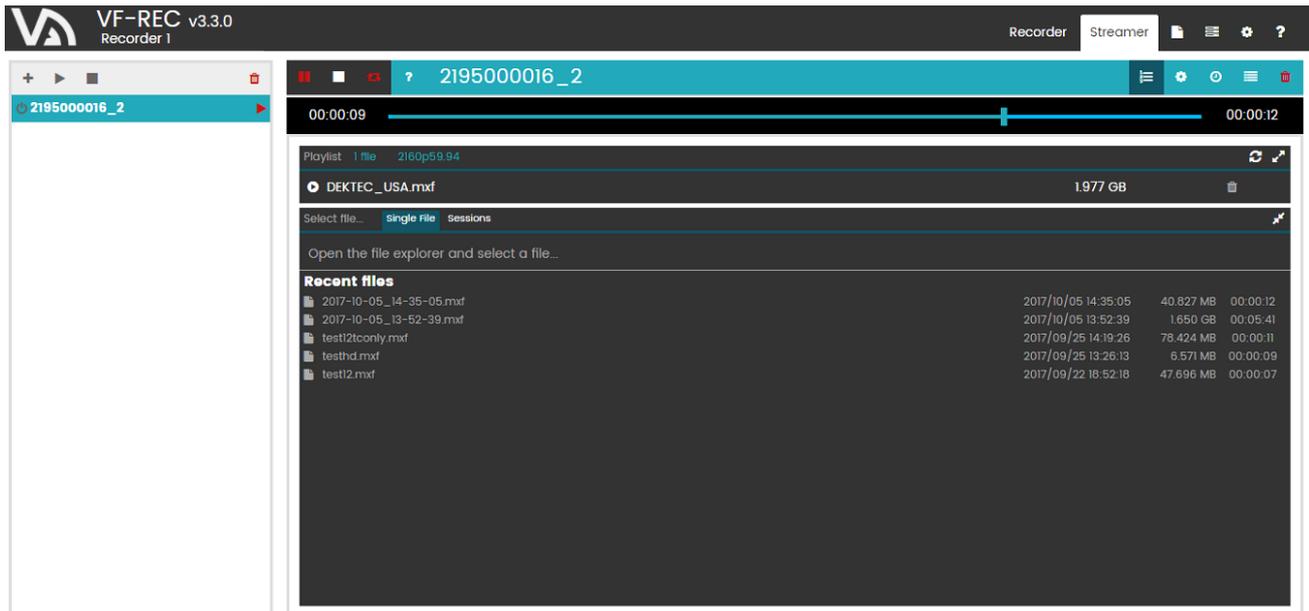


Figure 20. Streamer file selection.

The GPU memory limit to be used can be configured in the Settings view, just as when using the HD / 4K configuration of a Recorder. Additionally, the SDI level (A or B) to be used by the output can also be selected.

MXF files may contain several timecodes and application needs to know which one should be embedded in the output SDI signal. The “Master MXF timecode” is always present and continuous. Additionally, original timecode (present in the SDI input when file was recorded) may be stored in ancillary data structures inside of MXF. The original timecode is preferred and used by default, it doesn’t require any configuration. Application automatically includes it in the SDI output along with all other ancillary data. However, user has an option to use “Master MXF timecode” instead. All settings are explained in the table below.

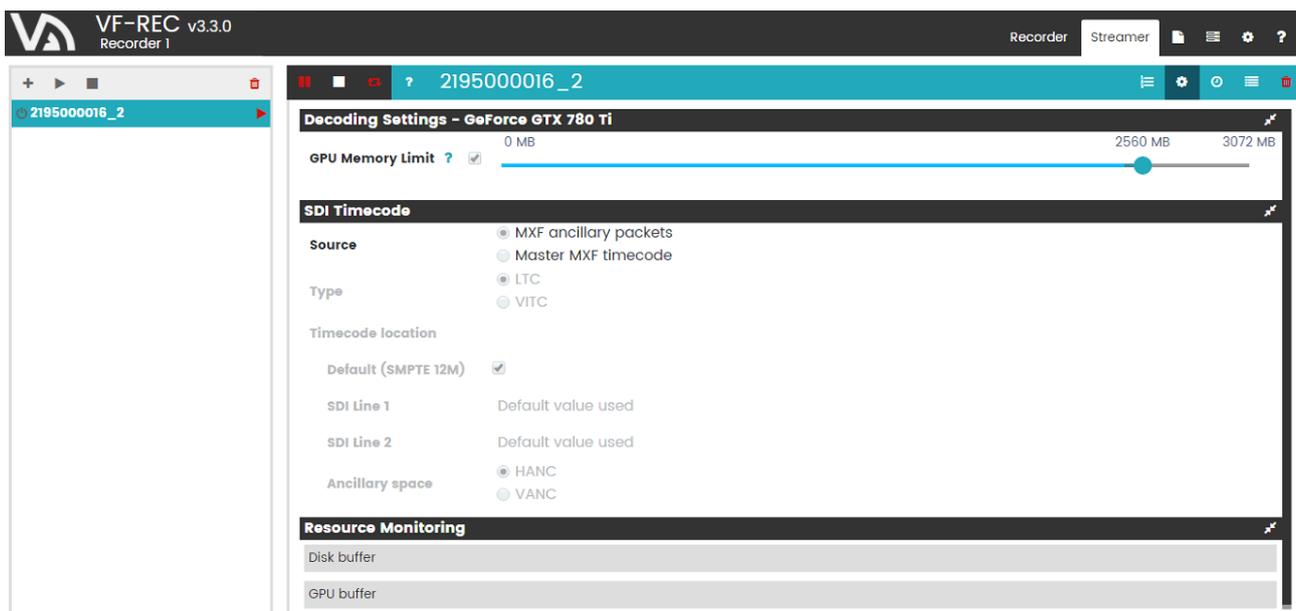


Figure 21: Streamer settings view

Parameter	Description
Source	Timecode stored in MXF ancillary packets or Master MXF timecode. If ancillary packets are selected as source but timecode packets are not found, then no timecode will be present in the output signal.
Type	LTC or VITC. Available when Master MXF timecode is used.
Default (SMPTE 12M) timecode location	When selected, application will position timecode packets on SDI lines defined in SMPTE 12M. Available when Master MXF timecode is used.
SDI line	SDI line of timecode packet, either for progressive frame or the field 1 of interlaced frame. Available when default timecode location is not used.
SDI line field 2	SDI line of timecode packet for the field 2 of interlaced frame. Not used in streaming of progressive video. It is required when timecode has VITC format. In case of LTC the field can be left empty and application will not embed timecode in field 2. Available when default timecode location is not used.
Ancillary space	HANC or VANC. It defines timecode packet location. Available when default timecode location is not used.

Table 5. SDI Timecode configuration

The built-in Streamer supports only JPEG2000 MXF files. For streaming of recorded TS and DTSDI files please use other applications, such as DekTec’s StreamXpress.

# 7 All Recorded Files

The all recorded files view displays every file located in the database, regardless of the recorder that they are linked to. The recorded files are displayed by session and it is also possible to delete files / sessions from the database / file system.

Recorded Files						
?		2131000300_1	2017/04/21 15:24:00 - 15:25:56		35 files	
?		2131000300_1	2017/04/21 15:22:00 - 15:23:00		19 files	
19	2017-04-21_15-22-59_37.ts		2017/04/21 15:22:59	2.940 MB	00:00:01	[Delete] [Refresh]
18	2017-04-21_15-22-55_36.ts		2017/04/21 15:22:55	10.768 MB	00:00:03	[Delete] [Refresh]
17	2017-04-21_15-22-52_35.ts		2017/04/21 15:22:52	10.768 MB	00:00:03	[Delete] [Refresh]
16	2017-04-21_15-22-49_34.ts		2017/04/21 15:22:49	10.768 MB	00:00:03	[Delete] [Refresh]
15	2017-04-21_15-22-45_33.ts		2017/04/21 15:22:45	10.768 MB	00:00:03	[Delete] [Refresh]
14	2017-04-21_15-22-42_32.ts		2017/04/21 15:22:42	10.852 MB	00:00:03	[Delete] [Refresh]
13	2017-04-21_15-22-39_31.ts		2017/04/21 15:22:39	10.684 MB	00:00:03	[Delete] [Refresh]
12	2017-04-21_15-22-36_30.ts		2017/04/21 15:22:36	10.486 MB	00:00:03	[Delete] [Refresh]
11	2017-04-21_15-22-32_29.ts		2017/04/21 15:22:32	10.768 MB	00:00:03	[Delete] [Refresh]
10	2017-04-21_15-22-29_28.ts		2017/04/21 15:22:29	10.768 MB	00:00:03	[Delete] [Refresh]
9	2017-04-21_15-22-26_27.ts		2017/04/21 15:22:26	10.486 MB	00:00:03	[Delete] [Refresh]
8	2017-04-21_15-22-23_26.ts		2017/04/21 15:22:23	10.768 MB	00:00:03	[Delete] [Refresh]
7	2017-04-21_15-22-19_25.ts		2017/04/21 15:22:19	10.768 MB	00:00:03	[Delete] [Refresh]
6	2017-04-21_15-22-16_24.ts		2017/04/21 15:22:16	10.768 MB	00:00:03	[Delete] [Refresh]
5	2017-04-21_15-22-13_23.ts		2017/04/21 15:22:13	10.768 MB	00:00:03	[Delete] [Refresh]
4	2017-04-21_15-22-09_22.ts		2017/04/21 15:22:09	10.768 MB	00:00:03	[Delete] [Refresh]
3	2017-04-21_15-22-06_21.ts		2017/04/21 15:22:06	10.486 MB	00:00:03	[Delete] [Refresh]
2	2017-04-21_15-22-03_20.ts		2017/04/21 15:22:03	10.768 MB	00:00:03	[Delete] [Refresh]
1	2017-04-21_15-22-00_19.ts		2017/04/21 15:22:00	10.490 MB	00:00:03	[Delete] [Refresh]
?		2131000300_1	2017/04/21 15:20:00 - 15:21:00		19 files	
?		2131000300_1	2017/04/21 15:04:39 - 15:04:54		6 files	
?		2131000300_1	2017/04/21 13:22:31 - 13:22:44		6 files	
?		2131000300_1	2017/04/21 13:20:45 - 13:21:12		10 files	

Figure 22. All Recorded Files.

## 8 List of devices

The view lists all available capture and output devices, as well as GPUs that can be used for Jpeg2000 encoding and decoding. The GPU devices will also show the amount of memory in use by each Recorder / Streamer application.

The licenses held by each device are also listed next to its name.

The devices that are displayed grayed out are already in use by an application, be it VF-Rec Recorder, Streamer, or any other application.

The screenshot shows the VF-REC v3.3.0 Recorder 1 interface. At the top, there are tabs for 'Recorder' and 'Streamer'. Below the tabs, the 'I/O devices' section is active, displaying a table of devices. The table has columns for 'Port', 'Types', 'Input', and 'Output'. There are two device groups: 'DTA-2195 - 2195.000.016' (Basic, J2K (demo)) and 'DTU-351 - 351.000.047' (Basic, J2K). The first group has ports 1, 2, 3, and 5. Port 1 is active (green checkmark for input, red X for output), while ports 2, 3, and 5 are grayed out (red X for both). The second group has port 1, which is active (green checkmark for input, red X for output). Below the I/O devices, the 'GPU devices' section is visible, showing a table with columns for 'Total Memory', 'Total Memory Usage', and 'Memory Usage per Application'. The GPU listed is 'GeForce GTX 780 Ti' with 3072 MB total memory and 2560 MB usage. The usage is attributed to 'Streamer - 2195000016\_2 - 2560 MB'.

Port	Types	Input	Output
<b>DTA-2195 - 2195.000.016</b> Basic, J2K (demo)			
1	ASI, SDI	✓	✗
2	ASI, SDI	✗	✓
3	SDI	✗	✗
5	SDI	✗	✗
<b>DTU-351 - 351.000.047</b> Basic, J2K			
1	SDI	✓	✗

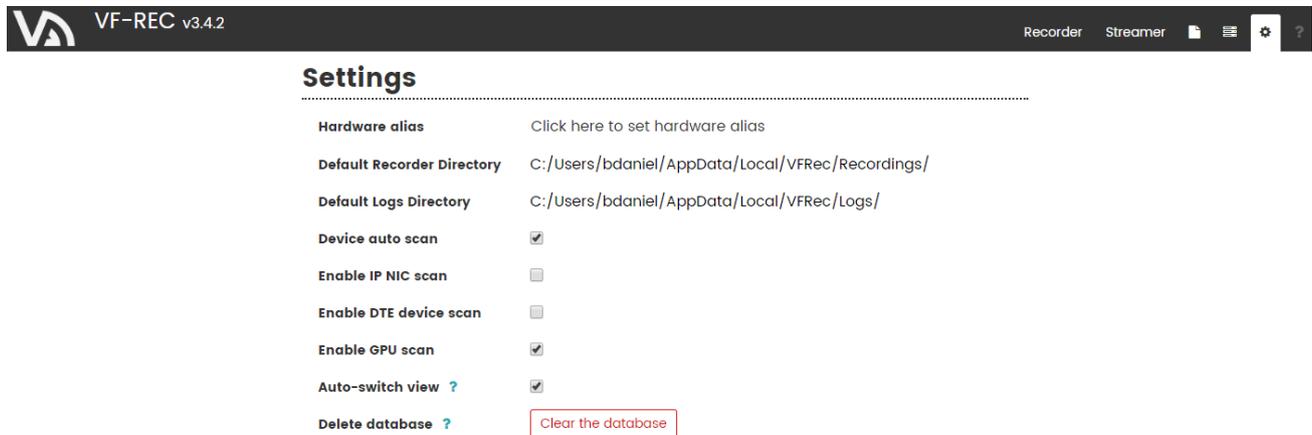
  

Total Memory	Total Memory Usage	Memory Usage per Application
<b>GeForce GTX 780 Ti</b>		
3072 MB	2560 MB	Streamer - 2195000016_2 - 2560 MB

Figure 23. List of devices.

## 9 User preferences

This view lists application-wide fields that can be configured according to user preferences.



**Figure 24. User preferences.**

The specified *Hardware alias* will be shown under the label of “VF-REC v3” in the title bar.

The default directory for recorded files, which is initially set to

*C:/Users/<user\_name>/AppData/Local/VFRec/Recordings*

can be changed to any other preferred directory.

The default directory for application log files can be configured as well.

*Device auto scan* enables an automatic update of the available devices and GPUs when adding a new Recorder / Streamer application.

*Enable IP NIC scan* enables motherboard network controllers to be used for recording. However, bear in mind that these devices are only usable with a USB license dongle.

*Enable DTE device scan* similarly enables the usage of DekTec DTE devices.

*Enable GPU scan* similarly enables the usage of GPU for J2K

*Auto-switch view* enables automatically switching to the Monitor view whenever the Start button is pressed, for both Recorders and Streamers.

*Delete database* clears all the information in the VF-Rec database: Recorder and Streamer instances, as well as the recorded files’ information, and user preferences. Note that the physical files are NOT deleted from your computer, but the information about them in the VF-Rec database will be lost. This option should only be used in extreme cases when the database seems to have been corrupted by unexpected errors.

# 10 Troubleshooting

## **GPU buffer indicator reaches 100%**

The GPU is unable to encode the stream in real time. Please set the encoding quality to a lower value. Using 8 bit pixel format or setting smaller bitrate limit may also improve performance.

## **Disk buffer indicator reaches 100%**

The disk (HDD / SSD) is too slow for recording. Please set a smaller bitrate limit so that the size of output files is smaller.

# 11 Contact information

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