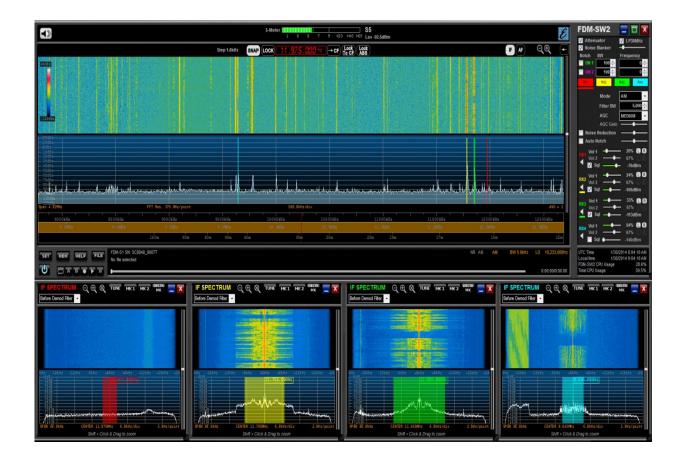


ELAD FDM-SW2



USER MANUAL

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Revision History

Revision	Date	Description
Rev 1.3	02/2018	Added this table.
		Various corrections.
		 Added information related to the latest software versions.
		 Added cross-references to titles, e.g. Overview.
		 Updated FDM-DUO section. FDM-DUO(r) means both FDM-DUO and FDM-DUOr. Added an example of using preselectors.
		Revised annexes.



1 Overview

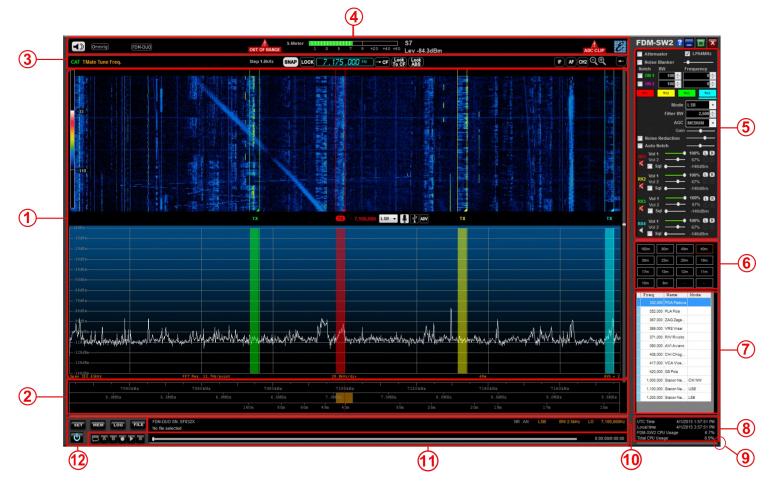
FDM-SW2 is a SDR software (Software Defined Radio) that is intended to be used with the FDM-Sx receivers family, the FDM-DUOr receiver and the FDM-DUO transceiver. It manages up to two different acquisition channels, on each one four virtual receivers can be activated. In this way, the user can analyze more than one signal together.





2 User Interface

The picture below shows the different parts of the user interface.

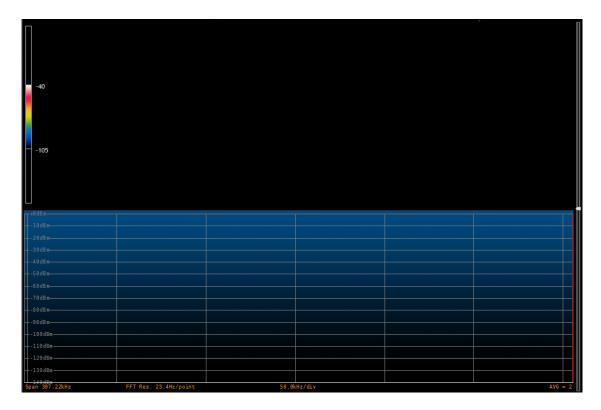


The different parts of the user interface are :

- 1. the Main Window,
- 2. the **Tuning Bars**,
- 3. the Tuning Commands Panel,
- 4. the Signal Control Panel,
- 5. the Receiver Commands Panel,
- 6. the Preset Buttons Panel,
- 7. the Station Memory Panel,
- 8. the System Information Panel,
- 9. the **Resize Corner**,
- 10. the Status Bar,
- 11. the Recorder/Player Panel,
- 12. the **Buttons Panel**.

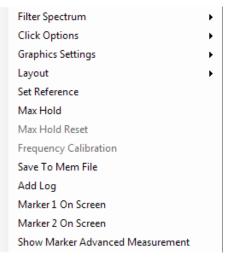
2.1 Main Window

The Main Window displays the spectrum and the waterfall of the input signal.



The sliding bar on the right side allows the user to change the area portions assigned to the two types of graphics. The waterfall palette control on the left side allows the user to adjust the minimum and the maximum value displayed on the waterfall. On the lower part, information about the current setting of "Span", "FFT Res", "kHz/div" and "AVG" is displayed.

When right-click is performed on the Main Window the software displays a pop-up menu that contains advanced options.





2.1.1 Advanced options - Filter Spectrum

Allows the user to select which information is displayed on the spectrum area.

Filter Spectrum	•	~	View Filter
Click Options	•		View Notch1
Graphics Settings	•		View Notch2
Layout	•		
Set Reference			
Max Hold			
Max Hold Reset			
Frequency Calibration			
Save To Mem File			
Add Log			
Marker 1 On Screen			
Marker 2 On Screen			
Show Marker Advanced Measurement			

2.1.2 Advanced options - Click Options

Allows the user to select which kind of operation can be done when left-click is performed on the Spectrum area.

Filter Spectrum	×		
Click Options	•	~	Set Tune Frequency
Graphics Settings	×		Set Marker 1
Layout	•		Set Marker 2
Set Reference			Set Notch 1 Frequency
Max Hold			Set Notch 2 Frequency
Max Hold Reset			
Frequency Calibration			
Save To Mem File			
Add Log			
Marker 1 On Screen			
Marker 2 On Screen			
Show Marker Advanced Measurement			

2.1.3 Advanced options - Graphics Settings

Allow the user to open the Display Settings to configure the parameters of the Spectrum/Waterfall graphics displayed in the Main Window. Moreover the Color Settings option allows to change the colors used in the Main Window.

Filter Spectrum	•	
Click Options	•	
Graphics Settings	•	Display Settings
Layout	•	Color Settings
Set Reference		
Max Hold		
Max Hold Reset		
Frequency Calibration		
Save To Mem File		
Add Log		
Marker 1 On Screen		
Marker 2 On Screen		
Show Marker Advanced Measurement		

2.1.4 Advanced options - Layout

Allows the user to select the Main Window visualization mode.

Filter Spectrum Click Options	+		
Graphics Settings	•		
Layout	•		Spectrum
Set Reference		~	Spectrum + Waterfall
Max Hold			Waterfall
Max Hold Reset			
Frequency Calibration			
Save To Mem File			
Add Log			
Marker 1 On Screen			
Marker 2 On Screen			
Show Marker Advanced Measuremen	nt		

2.1.5 Advanced options - Set/Reset Reference

When "Set Reference" is clicked, the software displays as a reference trace the input spectrum available at the moment of the click. "Reset Reference" disables the visualization of the reference trace.

2.1.6 Advanced options - Max Hold

When "Max Hold" is selected, the software displays the "max hold" of the input spectrum together with the real-time input spectrum trace. Click "Max Hold Reset" to reset the max hold trace. Unselect "Max Hold" to remove the "Max Hold" visualization.

2.1.7 Advanced options - Frequency Calibration

This option allows the user to modify the factory frequency offset of the FDM receivers. Normally this operation is not needed.

lesses a signal at the same frequency of the less less lister			
Insert a signal at the same frequency of the local oscillator, then place the marker at the peak frequency.	Reset Offset	Set Offset	EXIT

As described in the picture above, a reference signal has to be provided at the antenna input of the receiver to perform the frequency calibration. Once done, place the marker on the peak value of the reference signal, press Set Offset and then EXIT .

Clicking on Reset Offset , the software resets the sampling frequency offset to zero.

NOTE:

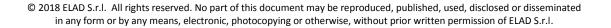
This operation will cause the loss of the factory calibration. Perform this operation only if you are sure to accomplish the operation in the right way and to use a precise frequency reference.

2.1.8 Advanced options - Save to Mem File

When "Save To Mem File" is clicked, the "Add to Memory File" window is displayed.

Add To Memory File	_	
File	Frequency	9,850.000 🗲 kHz
C:\Users\UT96\AppData\Roaming\ELAD\ELAD FDM C:\Users\UT96\AppData\Roaming\ELAD\ELAD FDM	Name	Voice Of Russia
	Mode	DRM -
		SAVE

This window allows to add a new station in memory file (see the dedicated section further on in this manual). The user can select the memory file and save the frequency, name and a default demodulation mode for the station.



2.1.9 Advanced options - Add Log

When "Add Log" is clicked the "New Log" window is displayed.

New Log				E
Date	4/ 2/2015	Time	9:21:21 AM	
Freq. (MHz)	7.150000	 Mode	LSB	
Call		Name		
QTH		Locator		
Notes				
Freq. (MHz) Call QTH Notes			ОК	Cancel

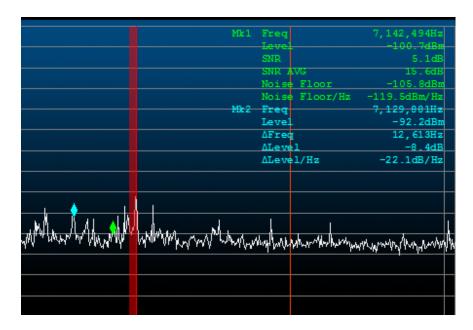
This window allow the user to add a new contact in the current logbook.

2.1.10 Advanced options - Marker 1 on Screen / Marker 2 on Screen

This option enables the visualization of the markers on the spectrum. The frequency and amplitude value (in dBm) of the Marker 1 is displayed on top-right corner of the Main Window. The Marker 2 includes the "Marker Delta" feature to display the frequency and the amplitude difference between the markers.

2.1.11 Advanced options - Show Marker Advanced Measurement

If this option is selected, signal to noise ratio (SNR) measurement are performed and displayed.



2.2 **Tuning Bars**

These innovative tuning bars (Patent Pending) allow the user to perform fast tuning over the whole receiver bandwidth. Each bar is characterized by different frequency spans. By performing drag-and-drop or scrolling with the mouse wheel over the different bars, the user can easily select the desired frequency using the lower bar to select the frequency band, the middle bar to make a coarse tuning and the higher bar to do fine positioning.

L.	10640)kHz	10660kHz	10680kHz	107003	Hz :	10720kHz	10740kHz	1076010	Hz
්	3.5MHz	9.0MHz	9.5MHz	10.0MHz	10.5MHz	11.0MHz	11.5MHz	12.0MHz	12.5MHz	13.0MHz
		16	0m 80m	40m	30m		20m	17m	15m	12m

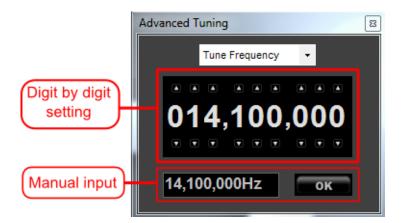
The span of the higher bar corresponds to the frequency range of the spectrum, and can be modified using the zoom buttons in the **Tuning Commands Panel**. The frequency step of the higher bar (displayed in the Tuning Commands Panel) can be changed using the $\uparrow \downarrow$ arrows on the PC keyboard, while $\leftarrow \rightarrow$ keys decrease or increase the tuning frequency by one step respectively (see **Tuning Tab** section for keyboard shortcut configuration). The yellow segment on the middle bar represents the portion of the spectrum displayed by the software in the **Main Window**.

2.3 Tuning Commands Panel

The main function of this panel is to display the tuning frequency.

CAT TMate Tune Freq. Step 1.0kHz	SNAP LOCK 7,070,000 Hz	→ CF Lock Lock ABS	
----------------------------------	------------------------	--------------------	--

Double click on the frequency viewing 7,070,000 Hz or press space bar to open the "Advanced Tuning" panel.



In the "Digit by digit" section it is possible to modify the tuning frequency or the local oscillator frequency by moving the mouse over each digit and then scroll with the mouse wheel to increase or decrease the digit value. Alternatively the user can click on the small arrow button over and below each digit. In the "Manual input" section it is possible to modify the tuning frequency or the local oscillator frequency inserting manually the desired value using the PC keyboard (Note: "+" key allow to insert "000").

If the with the spectrum is selected the tuning frequency corresponds to the center frequency of the Spectrum (that is the L.O. frequency). Otherwise it's possible to select different demodulation frequencies by clicking on the desired point on the Spectrum/Waterfall. Use the mouse scroll wheel over the Spectrum/Waterfall area to move the tuning frequency.

If the is button is selected the tuning frequency remains constant even if the local oscillator frequency is changed (until the tuning frequency falls within the selected frequency span; otherwise the tuning frequency will be set according to the frequency span limits).

If the **button** is selected, all the settings except the volume controls are disabled.

Clicking on button equal to the software forces the L.O. frequency to be equal to the current demodulation frequency.

Use the **swp** button to enable/disable the rounding of the tuning frequency at multiples of the frequency step.

Use the **IF** button to open the **IF Spectrum Window**. Left click on this button to open/close the IF window. If the IF window is open, right click on this button to move to foreground the IF window.

Use the **W** button to open the **Audio Spectrum Window**. Left click on this button to open/close the AF window. If the AF window is open, right click on this button to move to foreground the AF window.

Use the Determinant of the Channel 2 Spectrum Window. Left click on this button to open/close the Channel 2 Spectrum Window. If the Channel 2 Spectrum Window is open, right click on this button to move to foreground the Channel 2 Spectrum Window. Note: this feature is available only if the connected FDM supports "2 channels" mode in the "Device Configuration" menu of the Advanced Tab in the Setup Window. FDM-S2 and FDM-DUO(r) support the "2 channels" mode.

Buttons Q Q Q implement "zoom in", "zoom out" and "zoom reset" respectively. Use the arrows that appear on the Main Window (Q) when zoom function is active to move left/right the visualization.

The button 🔄 hide the receiver setup.

Moreover, the **Tuning Commands Panel** shows the **TMate** label when a TMate is connected and the **CAT** label when the CAT protocol is enabled.

2.4 Signal Control Panel

In this area, the FDM-SW2 software displays the level of the input signal.

	S.Meter S.Meter <t< th=""></t<>
OUT OF RANGE	appears when the local oscillator is tuned in a frequency range not implemented in the pre- selection filters (FDM-S2 only). notifies an ADC saturation.
	allows to activate or deactivate the Mute function.
Omnirig	presents if Omnirig is active, click on it to open the Omnirig control panel.
(FDM-DUO)	if the device connected is a FDM-DUO(r), click on this button to open the FDM-DUO(r) Control Panel.



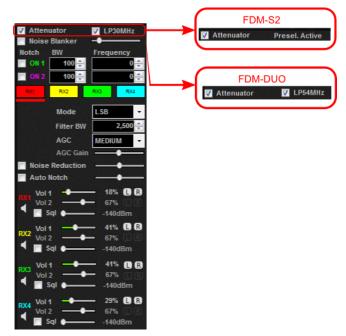
allows to manage user profiles.

Clicking on the user profile icon opens the profiles management window which allows to create, delete, load and save user profiles. The picture bellow shows this window.

User Profile 🛛 🔼							
User Profile A	User Profile Active n.2: Profile2						
¹ Profile1	² Profile2	³ free	⁴ free				
⁵ free	⁶ free	⁷ free	⁸ free				
Delete	Save	Load	Exit				

2.5 Receiver Commands Panel

The receiver commands panel allows the user to control the FDM receiver and the virtual receivers.

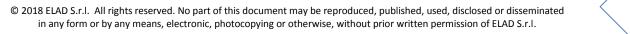


Controls allow to :

- switch On/Off the anti-aliasing filter, only for FDM-S1 (30 MHz Low Pass) and FDM-DUO (54 MHz Low Pass);
- switch On/Off the 20 dB attenuator (12 dB for FDM-S2 and FDM-DUO);
- switch On/Off the noise blanker and modify its level;
- switch On/Off the two notch filters (at IF stage) and set their parameters (frequency and bandwidth);
- turn On/Off and select () the four virtual receiver (RX1 ... RX4) available for each channel;
- select the demodulation mode for the selected RX (CW, CW SH+, CW SH-, USB, LSB, DSB, AM, SAM, FM, WB FM Stereo, DRM is available only for RX1 of Channel 1);
- set the bandwidth of the demodulation filter for the selected VRX (virtual receiver);
- set the AGC type for the selected VRX; if "AGC OFF" is selected, the user could adjust the AGC Gain manually and the software displays a warning (
- switch On/Off the "Noise Reducer" and modify its speed for the selected RX;
- switch On/Off the "Auto Notch" reducer and modify its speed for the selected RX.

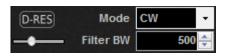
For each virtual receiver it is possible to :

- set the volume of the main audio output (Vol 1 18%);
- set the volume of the auxiliary audio output (vol 2 --- •-- 67%);
- switch On/Off the squelch and set its level (sql ----- -140dBm);
- mute the VRX with <a>(only for main audio output);
- send the audio, with the **DR** buttons, to the left/right or both channels of main or auxiliary audio output.



2.5.1 CW / CW SH+ / CW SH- / CW NW Settings

If a CW demodulation mode is selected it is possible to activate a digital resonator filter.



The filter is activated/disabled with the **DRES** button, with the slide bar under the button it is possible to adjust the filter bandwidth.

2.5.2 SYNC AM Settings

If the SYNC AM mode is selected it is possible to set some parameters to improve the signal locking.

	Mode	SYNC AM	•
FMS Lock BW	Filter BW	5,000	*
	AGC	MEDIUM	•
738Hz	Gain	•	_

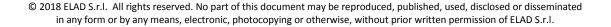
- If the we button is clicked the initial locking filter bandwidth is set to the "Filter BW" value, when a signal is locked, the locking filter bandwidth is set to the "Lock BW" value.
- If the 🔳 button is clicked the locking filter bandwidth is set to the "Lock BW" value.
- With the **FIMIS** buttons it is possible to set a Fast/Medium/Slow locking speed.
- With the "Lock BW" slide it is possible to adjust the locking filter bandwidth.

2.5.3 ECSS Settings

If the ECSS mode is selected it is possible to select the upper side / lower side band and to set some parameters to improve the signal locking.

LDU	Mode	ECSS	•
	Filter BW	2,500	*
	AGC	MEDIUM	•
	500Hz Gain		_

- If the we button is clicked the initial locking filter bandwidth is set to the "Filter BW" value, when a signal is locked, the locking filter bandwidth is set to the "Lock BW" value.
- If the 🔟 button is clicked the locking filter bandwidth is set to the "Lock BW value".
- With the **FIMIS** buttons it possible to set a Fast/Medium/Slow locking speed.
- With the "Lock BW" slide it is possible to adjust the locking filter bandwidth.



2.5.4 DRM Info Window and DRM Schedule

If the DRM mode is selected two buttons allows to show the DRM info window and the DRM schedule window.

		Mode	DRM	-
	Info	Filter BW	10,	000 ≑
Clicking on Info	the DRM info window i	is displayed	d.	
	DRM			8
	SYNC	FAC	SDC	MSC
	D	RM RU	/R 2A	
	ist eine	marginale E	irscheinur	ng
	Interl: 0.4	S	SDC: 4	QAM
	Mode: B		MSC: 16	QAM
	Band: 10.0) kHz	Protect	: STD
		SNR: 22.	06 dB	
	A+M			

Clicking on $\boxed{1}$ button, if an internet connection is available, causes the software to automatically downloads and displays the last DRM schedule from $\frac{ftp:}{216.92.35.131}$.

Start Stop Time UTC	Days	Frequency	Target	Power	Programme	Language	Site	Country	
0459-0758	Daily	13730	Pacific	25	RNZI	English	Rangitaiki	New Zealand	
0500-0530	Daily	17870	China	90	RRI	Chinese	Tiganesti	Romania	
0500-0700	Daily	1296	Europe	35	BBC WS	English	Orfordness	Great Britain	
0500-0800	Daily	3955	Europe	100	BBC WS	English	Skelton	UK	
0500-0900	Daily	9780	Europe	100	REE	Spanish	Noblejas	Spain	
0530-0600	Daily	6175	E Europe	90	RRI	Russian	Tiganesti	Romania	
0600-0630	Daily	9650	Europe	90	RRI	French	Galbeni	Romania	
0600-1000	Daily	11635	Europe	40	VoR	R/E	Taldom	Russia	
0630-0700	Daily	9600	Europe	90	RRI	English	Galbeni	Romania	
0700-0730	Daily	9450	Europe	90	RRI	German	Tiganesti	Romania	
0700-0800	Daily	5875	Europe	40	BBC WS	English	Moosbrunn	Austria	
0700-0800		6015	Europe	60	TDPradio	English	Issoudun	France	
0700-1610	-TWTFS	1611	Europe	25	Vatican Radio	various	Santa Maria	Vatican	
0759-1058	Daily	9870	Pacific	25	RNZI	English	Rangitaiki	New Zealand	
0800-0900	T	6015	Europe	60	TDPradio	English	Issoudun	France	
0800-0900	Daily	5790	Europe	100	BBC WS	English	Skelton	Great Britain	
0800-0900	Daily	5875	Europe	100	BBC WS	English	Woofferton	Great Britain	
0800-1000	Daily	7325	Europe	15	VoR	R/E	Bolshakovo	Russia	
0900-1000	W	6015	Europe	60	TDPradio	English	Issoudun	France	

2.5.5 WBFM Settings

If the WB FM mode is selected it is possible to display some RDS decoding information and, by using the button, force a mono decoding mode.

RDS	Mode	WB FM	•
MONO	Filter BW	192,000	*
STEREO	AGC	SLOW	÷
	Gain		F

Click on RDS button to open the RDS Window.

RDS Ch1 RX1			
PI Code: 521	9		
	CAP	ITAL	
RADIO CA	APITAL		

Use the 🔼

button to Show/Hide the RDS constellation graphic.

2.6 **Preset Buttons Panel**

Use this buttons to quickly recall a preset containing the local oscillator frequency, RX1 tuning frequency, mode and bandwidth. By default, the commons radio amateur and broadcast bands are assigned to this buttons. However the user can modify every settings in the **Tuning Tab** of the **Setup Window**.

160m	80m	49m	40m
30m	25m	20m	19m
17m	15m	12m	11m
10m	6m		

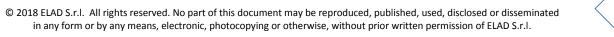
Note: if the **User Interface** size is set to the default size, this panel is not visible. Use the **Resize Corner** to increase the window height and make visible the Preset Buttons Panel.

2.7 Station Memory Panel

In this panel, each station memory, frequency, name and mode are displayed. Clicking on a line of the table implies that the receiver is tuned at the selected frequency and the mode is set at the value saved in the file.

Freq	Name	Mode
332,000	PDA Padova	
352,000	PLA Pola	
367,000	ZAG Zaga	
369,000	VRS Vrsar	
371,000	RIV Rivolto	
390,000	AVI Aviano	
408,000	CHI Chiog	
417,000	VCA Vice	
420,000	GS Pola	
1,000,000	Station Na	CW NW
1,100,000	Station Na	USB
1,200,000	Station Na	LSB

Note: if the **User Interface** size is set to the default size, this panel is not visible. Use the resize corner to increase the window height and make visible the preset buttons panel.



2.8 System Information Panel

This panel displays the system time (UTC and local) and the CPU usage.

UTC Time	2/4/2014	10:14:52 AM
Local time	2/4/2014	11:14:52 AM
FDM-SW2 CPU Usa	ige	9.4%
Total CPU Usage		17.2%

2.9 Resize Corner

Drag-and-drop the bottom-right corner to resize the User Interface.

2.10 Status Bar

The picture bellow shows the Status Bar.

FDM-S1 SN: SC0848_0007	PAN	VQ Swap	NR	AN	SYNC AM	BW-	LO 400,065,000Hz
------------------------	-----	---------	----	----	---------	-----	------------------

The Status Bar displays the following information:

- the serial number of the connected FDM receiver;
- the selected demodulation mode and filter bandwidth;
- the status of Noise Reducer and Auto Notch (On or Off);
- the status of the Panadapter Mode (see "Advanced Tab" section):
 - if Panadapter Mode is activated, the PAN label is showed;
 - if AOR AR8600 Control is activated the AR8600 label is showed;
 - if Swap I/Q option is selected, the VQ Swap label is showed;
- the status of the Downconverter Mode (see "Advanced Tab" section):
 - if Downconverter Mode is activated, the **DW CONV** label is showed;
 - if Swap I/Q option is selected, the VQ Swap label is showed;
- the Local Oscillator frequency.

2.11 Recorder/Player Panel

The FDM-SW2 software embeds an advanced player/recorder.



When the recorder is activated, the RF input signal or the audio output signal is stored in a .wav file (see **Recording Tab** section for details). Some information regarding the settings used during the recording (file creation date, L.O. frequency, demodulation frequency, demodulation mode, filter bandwidth, etc...) is stored in the file header.

When the file is played, the stored information is loaded by the software. When the playback is finished, last demodulation settings (demodulation frequency, demodulation mode and filter bandwidth) are stored again in the .wav header.

Six button function are available		(Loop, A, B, Rec, Play	y/Pause, Stop).
-----------------------------------	--	------------------------	-----------------

After placing "A" and "B" (when the reproduction is stopped), user can create a new file with the samples included between the two markers by right-clicking the file button and then clicking on this label $save A \rightarrow B$ selection as new file

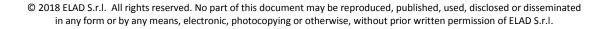


When a right-click is performed on the Rec button, the "REC Options" window is displayed.

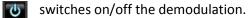
EC Options							
Default recording directory	C:\Users\U	T96\Documents	ELAD\FDM-SW2	Recordings		Chang	je
Default filename (max. 73	chars) Sw2_#D_	¥Т_#M_ТОН					
	System Da	te: #D Freq	uency: #F Se	erial Number: #N	System Time: #T	Mode: #M	
Default recording mode	Full Span I	nput Spec 👻	Apply reco	rded file settings wh	ien play file		
Maximum file size (MByte)	1728	Мах	imum file number	46	Disable low disk sp	ace check	
Schedule							
	al Time 👻	Repeat	Demod	LO Freg.	TuneFreg	File Prefix	_
4/2/2015 12:14:14 PM 4/	•		CW	▼ 7,100,000	7,100,000	SchedRec	
					.,,		
			ADD	REMOVE			
					[OK Cano	cel

This window allows the user to set the recording options and schedule the recording of the input spectrum or the audio output signal.

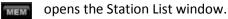
The user can set the start and stop time of recording (UTC Time or Local Time), the repetition mode (one time or daily), the demodulation mode, the local oscillator frequency, the tuning frequency and the file name prefix.



2.12 Buttons Panel



SET opens the Setup Window.





opens the Logbook management window.

opens the Windows dialog box to allows the user to select the file to play.



3 Setup Window

When the **set** button is clicked, the FDM-SW2 software displays the Setup window. This window contains several settings that control the behavior of the software.

The Setup window consists of 13 tabs:

- 1. the Tuning Step Tab,
- 2. the External HW Tab,
- 3. the Tuning Tab,
- 4. the Audio Tab,
- 5. the Graphics Tab,
- 6. the Demod Settings Tab,
- 7. the Remote Ctrl Tab,
- 8. the Advanced Tab,
- 9. the TMate/TMate2 Tab,
- 10. the Station Memory Tab,
- 11. the **Recording Tab**,
- 12. the Server Tab,
- 13. the About Tab.

3.1 Tuning Step Tab

In the Tuning Step tab the user can configure the frequency steps that the software sets when the arrows on the PC keyboard are pressed; these frequency steps are configurable under "Step Presets" area. Moreover, the user can compile a table containing custom settings (frequency step, demodulation mode, attenuator, low pass filter (FDM-S1 only), down converter mode) that the software automatically applies if the tuning frequency falls within the user-defined frequency ranges: to make this, check "Use tuning frequency related settings table" on the top of the tab.

	External HW	Tuning		Graphics	Demod Set	tings Advanced	I TM	ate/	TMate2	Station Memory	Recording	Server	About	
Start Free	ig frequency re		eq. (Hz)	e	Step (Hz)	Use Def. Mode	Mod	e	Att	Offset (dB)		DW Conv.	Mode	
		-		1,830,000	1,000	V	AM	-			0.0			
	1,830,000	0		1,850,000	1,000	V	LSB	•			0.0			
	1,850,000)		3,500,000	1,000	V	AM	-			0.0	[[]]		
	3,500,000)		3,650,000	1,000	V	LSB	-			0.0			
	3,650,000	0		7,000,000	1,000	V	АМ	•			0.0			
	7,000,000			7,200,000	1,000		LSB	-			0.0			
				10.100.000	1.000	V	AM	-			0.0			
	7,200,000	2		10,100,000										
Use Def	10,100,000	0		10,150,000	1,000	Disable All	USB able S	elec		Reorder	0.0 Add Row	Remo	ve Row	
Use Def	10,100,000 ault Step	Use Defa	ult Mode	10,150,000	1,000 ble AL 💿 [-			Reorder				
Step Prese Step (Hz	10,100,000 ault Step	Use Defa Select arrow	ult Mode with Left	10,150,000	1,000 ble AL 💿 [-					Remo		
Step Prese Step (Hz	10,100,000 ault Step ts) Enabled	Use Defa Select arrow	ult Mode with Left keys or function	10,150,000	1,000 ble AL 💿 [-					Remo		
Step Prese Step (Hz	10,100,000 ault Step ts 0 Enabled	Use Defa Select arrow	ult Mode with Left keys or function Add	10,150,000	1,000 ble AL 💿 [-					Remo		
Step Prese Step (Hz	10,100,000 ault Step ts b Enabled 5 V 0 V	Use Defa Select arrow	ult Mode with Left keys or function Add Delete	10,150,000	1,000 ble AL 💿 [-					Remo		
Step Prese Step (Hz 2 5	10,100,000 ault Step ts 0 22 5 5 22 0 0 22 0 0 22 0	Use Defa Select arrow	ult Mode with Left keys or function Add	10,150,000	1,000 ble AL 💿 [-					Remo		

3.2 External HW Tab

This tab allows the user to set frequency related settings for the ELAD SFE expansion board and the ELAD SPF-08 pre-selector filter board.

If the SFE model is selected, the user can compile a table containing the Ext/IO settings that the software automatically applies if the tuning frequency falls within the user-defined frequency ranges.

Setup													1000		
Tuning Step	External HW	Tuning	Audio	Graphics	Der	mod S	etting	s A	dvanc	ed	TMate/TMate2	Station Memory	Recording	Server	About
SFE	•	SFE	Setup Fi	ile: C:\User	s\UT	96\Do	cumen	its\E	LAD\F	DM-S	W2\FDMDSW2SI	FE.xml			
Start Freq	St	top Freq		SW	D1	D2	D3	D4	D5	D6	D7	Add Row			
0	54	000000													
												Remove Row			
												Reorder			
							oad			_	Cours.				
						LC	bad				Save				
												ОК	Αρι	oly	Cancel

If the SPF-08 board is selected, the user can enable/disable each pre-selector and set pre-selector high pass and low pass frequency.

			ng Audio	Graphics	Demod Settings		TMate/TMate2	Station Memory	Recording	Server	About
SPF-08	•]	SPF-08 Setu	ıp File: C:\U	sers\UT96\Docum	ents\ELAD\F	DM-SW2\FDMDSW	2Presel.xml			
Filter ID	Enabled	Hij	gh Pass Fre	9	Low Pa	ss Freq		Add Row			
	YES	• 1,0	00,000		2,000,0	00					
	NO	• 0						Remove Row			
	NO	• 0			54,000,						
	YES	• 4,0	00,000		5,000,0	00		Reorder			
	NO	• 0			54,000,						
		• 0			54,000,						
		• 0			54,000,						
	YES	• 0			54,000,	000					
					Load		Save				

Note: High Pass Freq refers to the lower frequency and Low Pass Freq to the higher one.

3.3 Tuning Tab

The Tuning tab allows the user to customize the **Preset Buttons Panel**. Each button defines a frequency range highlighted with to vertical lines in the spectrum graphic (if the "Show Band Start and Stop" option is checked). When a preset button is clicked, the stored local oscillator value, the RX1 tuning frequency, mode and bandwidth are applied.

	External H	W Tuning	Audio	Graphics	Demod Settings	Remote C	trl	Advanced	TMate/TMate2	Station /	Memory	Recording
eset Butto	ins											
Enabled	Color	Start	Stop	Ch1 LO	Ch1 Tune	Ch1 M	ode	Ch1 BW	Button Text	Note	^	Move Up
V	ffff AF	1.830.000	1.850.000	1.849.000	1.849.000	USB	•	2.500	160m	160m		
V	ffff AR	3.500.000	3.800.000	3.512.050	3.512.050	RTTY	-	3.800	80m	80m	=	Move Dw
V	ffff AE	5.730.000	6.300.000	6.015.000	6.015.000	AM	•	5.000	49m	49m		Show Ch
V	15	7.000.000	7.200.000	7.100.000	7.100.000	LSB	•	2.500	40m	40m		0
>	ffff AE	10.100.000	10.150.000	10.138.000	10.138.000	cw	•	500	30m	30m		Show Ch:
>	ffff AE	11.600.000	12.100.000	11.850.000	11.850.000	АМ	•	5.000	25m	25m		
>	ffff 45	14.000.000	14.350.000	14.000.000	14.000.000	cw	•	500	20m	20m		
		45 400 000	******	15 150 000	45,450,000		_	000	40	**	+	Default
nd Bar E Mouse Wh)isplayed S eel Scroll S		30.000 \$ 25 \$	1		Displayed S heel Scroll S			000 🐳 Hz	C	hange Ti	uning Direction
yboard sh	ortcuts			1								
yoour a 511		iguration B	•									
UP:	Incr	ease tuning	step (pre	set list)								
DOWN:	Red	uce tuning s	tep (prese	et list)								
	Tun	e down one	step									
LEFT:	_	e up one ste										

The Tuning tab allows also the user to customize the frequency span and step of the "Band" and "Middle" tuning bars, change the mouse wheel tuning direction (with the "Change Tuning Direction" checkbox) and the keyboard shortcuts configuration.

3.4 Audio Tab

The Audio tab allows the user to set the AGC and audio output settings.

uning St	ep Exte	ernal HW	Tuning	Audio	Graphics	Demod Settings	Advanced	TMate/TM	late2 St	tation Memor	y Recording	Server	About
Fast A Mediu	ettings Attack (m m Attack Attack (m	(ms)	1 束 5 丈 10 文	Decay Decay Decay	(ms)	1,000 * 2,000 * 4,000 *							
hided		idcard au Device		s (Realte	< High Def	1 -	Volume Gair			• tatus			
_	Output							Spectrum (Keyed stat					
	nannel 1 RX1 🔽	Channel Enable A	-	Output	Device	Line 2 (Virtual Au	dio Cable) 🔹	Mode	Audio	•			
v	RX2 📄	Enable A	UX Out	Output	Device	Line 2 (Virtual Au	dio Cable) 🕞	Mode	Audio	Ŧ			
	RX3 📄	Enable A	UX Out	Output	Device	Speakers (Realter	High Defi	Mode	Audio	Ŧ			
V		Enable A	UX Out	Output	Device	Speakers (Realtek	KHigh Defi 🖄	Mode	Audio	w			
	RX4 📄	-											
v			er Size (ms	;) [300 🜩			ute the VR	X not sele	ected			

On the "Audio Out" section the user can select the main audio output device and an auxiliary output device (for example a virtual audio cable) for each of the virtual receivers. When the "AUX Out" is enabled, the user can select the data type that will be reproduced on this device:

- Audio (48 kHz),
- IF (192 kHz),
- IF (48 kHz),
- WBFM MUX.

"Soundcard Play Buffer Size" allows the user to set the soundcard buffer time used when a recorded file is reproduced.

Other settings allow the user to :

- mute the virtual receiver not selected,
- mute during TX/Keyed status,
- freeze the main window during TX/Keyed status.

3.5 Graphics Tab

The Graphics tab allows the user to customize several parameters related to the Main Window visualization.

uning Step Tuning Audio Graph	ics Demod Settings	Remote Ctrl Ac	Ivanced TMate/TMate2	Station Memory	Recording Serve	er About
interval (ms) 60 Tr Frequency Hz		cy n terfall solution and	IF Window IF Spectrum Plot X Axis Max Hz/Div 5(Y Axis dB/Div Divisions Ref.Level (dB) Plot Averaging Enable waterfall ave Fill the region unde Peak Persistence Enable Disable Average Decay time Enable Multi-Plot Form	0.000 x 10 x 10 x 10 x -60 x 20 x erage r the trace	udio Spectrum Wind Audio Spectrum Plot X Axis Max Hz /Div Y Axis dB/Div Divisions Ref.Level (dB) Fill the region un	5.000 × 10 × 14 × 0 ×
	Fall Constant 10 /indow Blackman - H	▼ Harris ▼		Edit Color Settir	ngs	

Moreover, in this tab the user can also customize the visualization of the **IF Spectrum Window** and the **Audio Spectrum Window**.

General Settings section allows to change, obviously, some general settings of the User Interface related to refresh times and visualization methods.

If the "Edit Color Settings" button is clicked, the color settings window is opened. This window allows the user to change the colors used in the graphical user interface and the waterfall color palette.

Color Setting			
Receiver 1 Color	255, 0, 0 💌	Opacity	50
Receiver 2 Color	255, 255, 0 💌	Opacity	50
Receiver 3 Color	0, 255, 0 💌	Opacity	50
Receiver 4 Color	0, 255, 255 💌	Opacity	50
Main Window Color			
Spectrum trace	245, 245, 245 💌	Station Info	135, 206, 235 💌
Max Hold trace	192, 192, 192 💌	Plot Info	255, 140, 0 💌
Spectrum trace when MH active	245, 245, 220 💌	Nyquist freq. lines	135, 206, 235 💌
Reference trace	135, 206, 250 💌	Fill under trace	128, 135, 206, 💌
Grid	128, 128, 128 💌		 50
Grid Labels	128, 128, 128 💌	Cursor Color	135, 206, 235 💌
Notch 1 line	0, 255, 0 💌	Opacity	 50
Notch 2 Line	255, 0, 255 🗨	Opacity	 50
Tuning Bars Grid Color	128, 128, 128 💌		
IF Window Color			
Spectrum trace	245, 245, 245 💌	Filter Rectangle	50
Grid	128, 128, 128 💌	Opacity	
Grid Labels	128, 128, 128 💌	Tune line	255, 0, 0 🗨
Station Info	135, 206, 235 💌	Fill under trace	128, 135, 206, 💌
Plot Info	255, 140, 0 💌	Opacity	 _ 50
Audio Window Color			
Spectrum trace	245, 245, 245 💌	Filter Rectangle	 _ 50
Grid	128, 128, 128 💌	Opacity	
Grid Labels	128, 128, 128 💌	Fill under trace	128, 135, 206, 💌
Plot Info	255, 140, 0 💌	Opacity	50
Default Palette	Edit 0	. 0, 0	0 * Remove
Load Save		/hite 💌	50 🚔 Add
Restore Default		Apply	Close

3.6 Demod Settings Tab

The Demod Settings tab allows the user to customize several parameters related to the demodulation algorithms.

ning Step	External HW	Tuning	Audio	Graphics	Demod Settings	Advanced	TMate/TMate2	Station Memory	Recording	Server	About
SW Presets			CW Sett	ings		F	M Settings				
BW (Hz)	Enabled	~	CW BFO	Freq. (Hz)	10	00 🖨 🛛 🖸	efault Audio LP Fill	ter (Hz) 2,	500 🚔		
10	0		CW SH D	elta Freq. ((Hz) 10	00 🚔					
20	0 🗸										
30	0 🗸	=		Settings art frequen	ICV (Hz)	Local Distance	VB FM Settings	_			
50	0 🔽			ove filter)		00 🗘 🛛 🖸	e-emphasys time o	onstant 50µ	s 🔻		
80	0 🔽			uning							
1,00	0 🔽		frei	quency							
1,25	0 🔽				Filter						
1,50	0 🔽										
1,75	0 🔽			 Filter sta 							
2,25	0 🔽			frequenc							
2,50	0 🗸										
2,75	0 🗸	-									
	"Z"and "X" key	/s or	RTTY Set	ttings O Freq. (Hz	:) 1,9	00 ≑					
	Add										
	Delete										
	Sort										
Rest	ore Default										

3.7 Remote Ctrl Tab

The Remote Ctrl tab allows the user to set some of the remote control functionalities of the FDM-SW2 software.

Setup						
Tuning Step	Tuning	Audio	Graphics	Demod Settings	Remote Ctrl	rl Advanced TMate/TMate2 Station Memory Recording Server About
CAT	CAT Channel	T Mode	Standard	¥		Omnirig Enable Omnirig Control Enable Split (TX on Selected RX)
RX1 RX2 RX3 RX4	Serial Po Serial Po	rt	* * *	Baudrate 4800 Baudrate 4800 Baudrate 4800 Baudrate 4800	Y Y	Poting Time (ms) 20(2)
	Server W	y IP Adre 1893 🜩 0.11 eb Serve	ess er (any IP ad	• Idress)		
Port	2	181 🜩				OK Apply Cancel

In the CAT section the user can configure the serial communication settings. When the CAT control is active, the Tuning Commands Panel displays the CAT label. The FDM-SW2 software implements the commands set of the Yaesu FT-897 transceiver.

When Enable Omnirig Control checked, the FDM-SW2 software can control two transceivers using the Omni-Rig technology. Please go to website <u>http://dxatlas.com/OmniRig/</u> for more information about Omni-Rig. Note that Omnirig must be installed on your PC.

In this tab you can also activate the TCP and Web servers to remotely control the FDM-SW2 software.

3.8 Advanced Tab

In this tab the user can select the advanced options of the software.

Setup									
Tuning Step Tuning Audi	o Graphics	Demod Settings	Remote Ctrl	Advanced	TMate/TMate2	Station Memory	Recording	Server	About
Device Configuration	ExtIOmc_ELA	D_FDMDUO_192k	_v1_20.dll defa	ult stand-al	one and single cha	annel data acquisit	tion at 192kHz	configu	urati 👻
Show HW Setup For Display aliasing free		Auto-start der							
Downconverter Mode		Config.	ansverter mode Enable Trans		Load Config.				
Frequency Shift (Hz)			requency Shif		Save Config.				
Level Offset (dB)			.evel Offset (d .evel Offset (d		+1 v 0,0 A				
Swap I/Q			Swap I/Q						
Special Modes Normal -]	Load Co	onfig. Sav	e Config.			ngs Profile at Star status on exit		ont Profile
IF Tune AM (Hz)	10.700.		pI/Q Level (Offset (dB)	0,0			c in curr	enceronie
IF Tune CW (Hz)	10.700	AOR AR	8600			N1MM settin	gs trum To N1MM	N sw	
IF Tune LSB (Hz)	10.700.		Enable Contro	k		IP N1MM 1			
IF Tune USB (Hz)	10.700.	Ser	ial Port	Baudra	te	Lock Mode			
IF Tune FM (Hz) IF Tune WFM (Hz)	10.700. 10.700.		Ŧ	9600	-	All Panel	Only Lo	ocal Osci	illator
						ОК	Appł	y I	Cancel

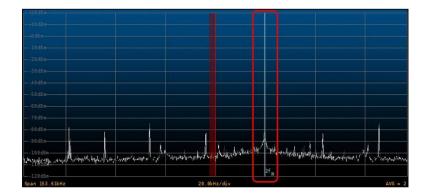
The combo box "Device Configuration" allows to change the device sampling frequency and if the connected device allow it, it is possible to select a two-channel configuration.

If the connected device is a FDM-S1, if the Receiver Mode Aximum LO Frequency 30MHz checkbox is selected, the software operates in "Receiver Mode" and limits the maximum tunable frequency at the Nyquist frequency (half of the ADC sampling rate). If the checkbox is deselected, the software operates in "Sampler Mode" and unlocks the limitation.

If the connected device is a FDM-S2, if the Receiver Mode Maximum LO Frequency 160MHz checkbox is selected, the software operates in "Sampler Mode" and unlocks the limitation.

If the Bypass Mode (Exclude Preselector) checkbox is selected, the pre-selection filters are excluded. This option is disabled by default.

If the "Sampler Mode" is activated, the user can force the software to highlight the multiples of the Nyquist frequency on the Spectrum by checking the Display aliasing frequencies checkbox.



Checking the Show HW Setup Form At Startup checkbox, the Hardware Setup Window is loaded at software startup.

To enable the DC offset correction feature of the ADC, check the ADC DC Offset Correction checkbox. This option removes ADC offset at 0 Hz.

Activating the "Panadapter Mode" in the "Special Modes" section (the Status Bar displays the PAN label), the user can configure the IF frequency for the different demodulation modes and the amplitude offset that allows the right visualization. Moreover, the spectrum flip around L.O. frequency can be enabled by check "Swap I/Q" option (the Status Bar displays the VOSWAP label). This configuration parameters can be saved/loaded using the buttons Save Config. and Load Config. respectively. Enabling the AOR AR8600 Control (the Status Bar displays the AR8600 label), the software can directly control this radio through serial communication.

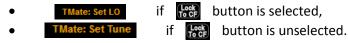
If "Downconverter Mode" or "Transverter Mode" is activated (the Status Bar displays the relative label), the user can configure the IF frequency shift and the amplitude offset that allows the right visualization. Moreover, the spectrum flip around L.O. frequency can be enabled by check "Swap I/Q" option (the Status Bar displays the VOSWAP label).

3.9 TMate/TMate2 Tab

If a TMate is connected, the "TMate" panel is activated.

							-				
uning Step	Tuning	Audio	Graphics	Demod Settings	Advanced	TMate/TMate2	Station Memory	Recording	Server	About	
TMate											
🔽 Enab	le TMate	Control									
Configur	ation	Config 1	-								
Knob: Se	t IO. Fi	requency									
F1: Step											
F2: Step											
F3: BW P	reset -										
F4: BW P	reset +										
TMate2											
Enable	TMate2	Control									
								05			
Backlight				Refresh Time	2		Count Trans 1	35	hannar"		
Backlight Backlight				Incr Step 1		1 🔹 Step	Count Trans 2	50	×		
DACKIIGHT				Incr Step 2		5 🔹 Step	Count Eval Time	500	×		
Contrast			_ 0	Incr Step 3		10 ≑					
Concredent	0										

In this panel, the user can choose among the proposed configurations of TMate button functions. When the TMate control is active, the Tuning Commands Panel displays the following labels :



If a TMate2 is connected, the TMate2 panel is activated. In this panel, the user can set the display backlight color, the refresh time, the increment steps of the tree knobs and others timing parameters.

3.10 Station Memory Tab

Here below a picture of the Station Memory tab.

ning Step Ex	ternal HW	Tuning	Audio	Graphics	Demod S	ettings	Advanced	TMate/TMat	e2 Station Mer	mory Re	ecording	Server	About
Default stati	on memory	director	/	C:\Users	UT96\D	ocument	ELAD/FDM	N-SW2\Memorie	s				Change
Station Mem	ory Source	File	•	- File:	C:\Users	UT96\De	cuments\EL	AD\FDM-SW2\	Memories\sked-b	014.csv			Browse
				File:	C:\Users	UT96\Do	cuments\EL	AD\FDM-SW2\	Memories\B14_1	41123_23	330G_CS\	V.csv	Browse
Enable CW	Skimmer T	elnet Inte	rface	RX S	ync with	CW Skin	mer RX	(1 👻					
File				Enable	d Colo	r		Freq. (Hz)	Name	Mode	File		
C:\Users\U	T96\Docum	ents\ELAD	NFDM-S.	🔽		ff87ceel	>	332,000	PDA Padova		C:\U	sers\UT9	6\Docum
C:\Users\U	F96\Docum	ents\ELAD	\FDM-S.	🔽		ff87ceel	>	352,000	PLA Pola		C:\U	sers\UT9	6\Docum
								367,000	ZAG Zagabria		C:\U	sers\UT9	6\Docum
								369,000	VRS Vrsar		C:\U	sers\UT9	6\Docum
								371,000	RIV Rivolto		C:\U	sers\UT9	6\Docum
								390,000	AVI Aviano		C:\U	sers\UT9	6\Docum
Load File		Jnload File		Edit File		New Fi	le	408,000	CHI Chioggia		C:\U	sers\UT9	6\Docum
								417,000	VCA Vicenza		C:\U	sers\UT9	6\Docum
DXCluster								420,000	GS Pola		C:\U	sers\UT9	6\Docum
								1,000,000	Station Name	CW NW	C:\U	sers\UT9	6\Docum
Host	ik4icz.dynd	ins.org	N	Max Contact	Number		10 📩	1,100,000	Station Name2	USB	C:\U	sers\UT9	6\Docum
Port		8000	× E	Expire Timeou	ıt	10 min	-	1,200,000	Station Name3	LSB	C:\U	sers\UT9	6\Docum
Show Log	g Time	ЛС	-	1	Show Ex	pire Time	out						
Station info dis	play mode	If in free	uencv r	ange	•	Labels (Drientation	Horizontal	- Show	abels on	Main +	IF Specti	rum

In the FDM-SW2, four types of memory source are available :

- Xml memory file;
- DX Cluster Connection;
- EIBI Database;
- SWSkeds.

3.10.1 Xml memory file

Select "File" as Station Memory Source.

Press the New File button to create a new memory file.

When a new file is created or when Edit File button is pressed, FDM-SW2 visualizes an "Edit" window (represented in the figure below). User can add or delete stations from the editor to create or change a memory file.

Freq. (kHz)	Name	Mode		*	Add Row
332	PDA Padova	CW SH+	-		
352	PLA Pola	CW SH+	-		Add Current Freq.
367	ZAG Zagabria	CW SH+	-	=	
369	VRS Vrsar	CW SH+	-	=	Remove Row
371	RIV Rivolto	CW SH+	-		<u></u>
390	AVI Aviano	CW SH+	-		Sort Table
408	CHI Chioggia	CW SH+	-		L
417	VCA Vicenza	CW SH+	-		
420	GS Pola	CW SH+	-		
549	Radio Koper (SLO)	AM	-		
819	Radio 1 (Montera	AM	-		Save Table
918	Radio Slovenia	AM	-		
936	Radio 1 (Campalt	AM	-		
981	Radio 1 Slo (Mont	AM	-		
999	Radio 1	AM	-		
1.035	Radio 1 (TS)	AM	•	Ŧ	Close

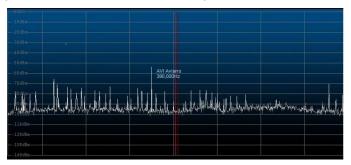
Press Load File or Unload File to load or unload a memory file respectively (more than one memory file can be loaded at the same time).

ing Step	Tuning	Audio	Graphics	Dem	od Settings	Advanced	Station M	emory Re	cording	g About		
Default s	tation m	emory d	irectory		C:\Users\U	T96\AppDa	ta\Roaming\	ELAD\ELAD	FDMSW	V1\1.0.0.0\Memories	Chang	ge
Station N	emory Se	ource	File	-	File: C:	\Users\UT9	6\Desktop\sl	ed-a12.cs	v		Brows	se
File					Enabled]		Freq. (ki	łz)	Name	Mode	*
C:\User:	;\UT96\A	opData\	Roaming\EL	AD\E	. 🔽	Load F	ile		936	Radio 1 (Campalto - VE)	AM	
C:\User:	UT96\A	opData\	Roaming\EL	AD\E	. 🗸	Unload	File		981	Radio 1 Slo (Monteradio - TS)	AM	
						Edit F			999	Radio 1	AM	
									1,035	Radio 1 (TS)	AM	
						New F	ile		1,062	Radio 1 (TS)	AM	
									1,152	Radio Romania Actualitati	AM	
									1,170	Radio Capodistria (ITA)	AM	
									5,875	BBC Dig	DRM	
									7,355	BBC Digital	DRM	
									8,439	RTTY 850/75 NUM	RTTY	
								•	8 458	PTTY 8450	PTTY	
DXCluste							-					
Host	ik4icz	.dyndns	org	N	ax Contact №	lumber	10 📩	J St	now Log	I UTC		
Port			8000 🜲	E	xpire Timeou	t 1	0 min 👻	V St	now Exp	bire Timeout		
ation info	display	mode /	louse posit	ion	-	Labels O	rientation	Vertical	Ŧ	Show labels on Main + IF Sp	ectrum	

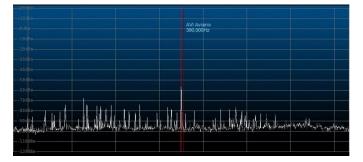
The table on the right side of the tab displays all the stations that are stored in the selected memory files.

The "Station info display mode" combo-box allows the user to choose 4 types of memories visualization on the Spectrum graphic:

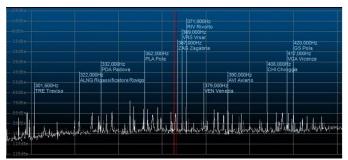
- "None";
- "Mouse position": a label containing the station info is displayed when the mouse is positioned over a frequency included in the selected memory files;



• "L.O. Frequency": a label containing the station info is displayed when the L.O. frequency corresponds to a frequency included in the selected memory files;



• "If in frequency range": a label containing the station info is displayed for each frequency included in the selected memory files that falls within the spectrum frequency range.



If the option "If in frequency range" is selected, the "Labels orientation" combo-box, allow the user to select three types of visualization : Horizontal, Oblique or Vertical.

Finally, the combo-box "Show labels on", allows the user to enable the station memory label display on the **Main Window** spectrum, on the **IF Spectrum Window** or on both the windows.

When the button is clicked, FDM-SW2 displays the "Station List" form. Clicking on a line of the table implies that the receiver is tuned at the selected frequency and the mode is set at the value saved in the file.

Station List			X
Freq.(kHz)	Name	Mode	^
367	ZAG Zagabria	CW SH+	
369	VRS Vrsar	CW SH+	
371	RIV Rivolto	CW SH+	
390	AVI Aviano	CW SH+	
408	CHI Chioggia	CW SH+	
417	VCA Vicenza	CW SH+	
420	GS Pola	CW SH+	
549	Radio Koper (SLO)	AM	
819	Radio 1 (Monteradio - TS)	AM	
918	Radio Slovenia	AM	
936	Radio 1 (Campalto - VE)	AM	
981	Radio 1 Slo (Monteradio - TS)	AM	
999	Radio 1	AM	1
1,035	Radio 1 (TS)	AM	
1,062	Radio 1 (TS)	AM	1
1,152	Radio Romania Actualitati	AM	1
1,170	Radio Capodistria (ITA)	AM	
5,875	BBC Dig	DRM	-

3.10.2 DX Cluster connection

Select "DX Cluster" as Station Memory Source: all options for "DXCluster" source are available on the bottom area of the tab. Select a cluster from the "DXCluster" combo-box or insert manually the cluster settings. The "Station info display mode" combo-box displays the same options described in the previous paragraph.

Setup		- 10 A					-	
Tuning Step External HW Tuning Audio	Graphics D	emod Settings	Advanced	TMate/TMat	e2 Station Men	nory Reco	ording Server	About
Default station memory directory	C:\Users\U	IT96\Document	s\ELAD\FDM	-SW2\Memorie	s			Change
Station Memory Source DX Cluster 👻	File: C	:\Users\UT96\D	ocuments\EL	AD\FDM-SW2\	Memories\sked-b	14.csv		Browse
	File: C:	:\Users\UT96\D	ocuments\EL	AD\FDM-SW2\	Memories\B14 14	41123 233	0G CSV.csv	Browse
Enable CW Skimmer Telnet Interface	RX Svn	ic with CW Skir	mmer RX	1 🗸	_	_	_	
File	Enabled			Freq. (Hz)	Name	Mode	File	
C:\Users\UT96\Documents\ELAD\FDM-5		ff87cee		332,000	PDA Padova		C:\Users\UT	06\Docum
C:\Users\UT96\Documents\ELAD\FDM-5	v	ff87cee	b	352,000	PLA Pola		C:\Users\UT	06\Docum
				367,000	ZAG Zagabria		C:\Users\UT	06\Docum
				369,000	VRS Vrsar		C:\Users\UT	06\Docum
				371,000	RIV Rivolto		C:\Users\UT	06\Docum
				390,000	AVI Aviano		C:\Users\UT	06\Docum
Load File Unload File	Edit File	New F	ile	408,000	CHI Chioggia		C:\Users\UT	06\Docum
	Edicinic			417,000	VCA Vicenza		C:\Users\UT	06\Docum
				420,000	GS Pola		C:\Users\UT	06\Docum
DXCluster			•	1,000,000	Station Name	CW NW	C:\Users\UT	06\Docum
Host ik4icz.dyndns.org Ma	x Contact N	umber	10 🌲	1,100,000	Station Name2	USB	C:\Users\UT	06\Docum
Port 8000 🗮 Ex	pire Timeout	10 mir	ו ד	1,200,000	Station Name3	LSB	C:\Users\UT	06\Docum
Show Log Time	V St	now Expire Tim	eout		1	1	I	
Station info display mode If in frequency ra	nge 🔻	Labels	Orientation	Horizontal	▼ Show la	abels on (Main + IF Spect	rum 🔻
					0	Ж	Apply	Cancel

When the **week** button is clicked, FDM-SW2 displays the "DX Cluster Interface" window and the "Contacts" form.

DXCluster		v			
Host ik4ic:	z.dyndns.org Port	8000 Connect	Clos	e [Clear
FDMSW2 de SKI	MMER 2015-04-02 13:23Z	CwSkimmer >			
	MMER 2015-04-02 13:23Z				
DX de -#:	14028.5 SP5GKN	23 dB 29 WPM		1324Z	
DX de -#:	14026.0 9A19RBM	16 dB 23 WPM	cõ	1324Z	
DX de -#: DX de -#:	14028.7 YO2LAN 14028.9 RM8L	25 dB 24 WPM 8 dB 29 WPM		1324Z 1324Z	
DX de -#: DX de -#:	14026.0 K5JTH	15 dB 24 WPM		13242 1324Z	
DA GE +.	1402010 83010	15 GB 24 #EM		10215	
iw3sqt	Send Callsign				
					Send
					Send
					Send

Press connect or close button of the "DX Cluster Interface" window to open or close the link with the Cluster, and use send to send the string entered in the "Send" area.

If the *Connect* button is clicked, the software automatically opens a link with the telnet interface generated by the CW Skimmer software.

The "Contacts" window displays the users connected to the cluster. Double-clicking on a line of the table implies that the L.O. is tuned at the selected frequency. Use the "Show Log UTC" and "Show Expire Timeout" checkboxes to enable or disable the visualization of this information in the "Contacts" form.

Contacts				
ALL Bands			Ш	
160m 8	0m 4	Om 3	0m	
20m 1	7m 1	5m 1	2m	
10m (Sm			
Freq.	ID	UTC	Timeout	1
14,028,500Hz	SP5GKN	1:24 PM	0:09:23	
14,026,000Hz	9A19RBM	1:24 PM	0:09:30	
14,028,700Hz	Y02LAN	1:24 PM	0:09:37	
14,028,900Hz	RM8L	1:24 PM	0:09:45	
14,026,000Hz	K5JTH	1:24 PM	0:09:56	

Use the **II** button to pause/resume the contact list update process.

Press ALL Bands to display all the contacts from the cluster or press a band button to display only the contacts from the selected radio-amateur band(s).

3.10.3 EIBI Database

Select "EIBI Database" as Station Memory Source. The "Station info display mode" combo box displays the same options described in the previous paragraphs.

Default station memory directory	C:\Users\U	T96\AppData\Roaming	ELAD ELAD FOMSW	/1\1.0.0.0\Memories	Change
Station Memory Source BI Database 👻	File: C:\	Users\UT96\Desktop\s	ked-a12.csv		Browse
File	Enabled		Freq. (kHz)	Name	Mode ^
C:\Users\UT96\AppData\Roaming\ELAD\E		Load File	77.5	DCF77 CW	
C:\Users\UT96\AppData\Roaming\ELAD\E	. 🗸	Unload File	124.5	DGPS?	
		Edit File	129.1	DCF39/49 340 200BAUD INV	
			135.6	DCF39/49 340 200BAUD INV	
		New File	139	DCF39/49 340 200BAUD INV	
			147.3	DDH47 85 50BAUD	
			332	PDA Padova	CW SH+
			352	PLA Pola	CW SH+
			367	ZAG Zagabria	CW SH+
			369	VRS Vrsar	CW SH+
			371	RIV Rivolto	CW (H+ *
DXCluster					
DXCluster		Ŧ			
Host ik4icz.dyndns.org M	ax Contact N	umber 10	Show Log	UTC	
Port 8000 👘 E	xpire Timeout	10 min 👻	Show Exp	ire Timeout	
ation info display mode Mouse position	•	Labels Orientation	Vertical 👻	Show labels on Main + IF Sp	ectrum

Download the CSV database file from <u>www.eibispace.de</u>. Click the Browse button and select the downloaded .csv file.

When the **week** button is clicked, FDM-SW2 displays the "Station List" form. Clicking on a line of the table implies that the receiver is tuned at the selected frequency and the mode is set at the value saved in the file.

Station List			
Freq.(kHz)	Name	Mode	*
367	ZAG Zagabria	CW SH+	
369	VRS Vrsar	CW SH+	
371	RIV Rivolto	CW SH+	
390	AVI Aviano	CW SH+	
408	CHI Chioggia	CW SH+	
417	VCA Vicenza	CW SH+	
420	GS Pola	CW SH+	=
549	Radio Koper (SLO)	AM	
819	Radio 1 (Monteradio - TS)	AM	
918	Radio Slovenia	AM	-
936	Radio 1 (Campalto - VE)	AM	
981	Radio 1 Slo (Monteradio - TS)	AM	
999	Radio 1	AM	
1,035	Radio 1 (TS)	AM	
1,062	Radio 1 (TS)	AM	
1,152	Radio Romania Actualitati	AM	
1,170	Radio Capodistria (ITA)	AM	
5,875	BBC Dig	DRM	-



3.11 Recording Tab

Here below a picture of the Recording tab.

Tuning Step External HW Tuning	t Audio Graphics Demod Settings Advanced TMate/TMate2 Station Memory Recording Server	r About
Default recording directory	C:\Users\UT96\Documents\ELAD\FDM-SW2\Recordings	Chang
Default filename (max. 73 chars)	Sw2_#D_#T_#M_TOH	
Default recording mode	System Date:#D Frequency:#F Serial Number:#N System Time:#T Mode:#M Full Span Input Spec + I I Apply recorded file settings when play file	
Maximum file size (MByte) Maximum file number	1728 😓 00:00:00 Disable low disk space check	
Soundcard Rec Buffer Size (ms)	100 (2)	

The Recording Tab allows the user to configure :

- the default directory for the recorded .wav files;
- the default filename format, use the following codes to customize the file name :
 - #D to insert the system date,
 - #IF to insert the tuning frequency,
 - #N to insert the receiver serial number,
 - #T to insert the system time,
 - #M to insert the demodulation mode.

The software automatically appends to the filename a prefix containing the data type (RF for "Full Span Input Spectrum" or AF for "Audio Frequency") and a numeric suffix that represents the incremental index within a recording section;

- the default recording mode :
 - Full Span Input Spectrum (the sampling rate of the RF I/Q datastream depends on the HW configuration DII loaded, see Hardware Setup section),
 - Audio Frequency;
- the maximum allowed size for each recorded .wav files;
- the maximum allowed number of .wav file for each recording session,
- the "Soundcard Rec Buffer Size" that allows the user to set the soundcard buffer time used when a file is recorded.

As explained in Recorder/Player Panel section, some information regarding the settings used during the recording and the playback of a .wav file (demodulation frequency, demodulation mode and filter bandwidth) is stored in its header.

If the Apply recorded file settings when play file checkbox is checked, the stored information is automatically loaded by the software at the beginning of the playback of every file even though the files belong to the same recording session. This may cause an unwanted change of configuration in the transition between a file and the subsequent. If the checkbox is unchecked, the software loads the information stored in the header of the first file of the recording session and keeps this configuration unchanged until the end of the reproduction of the whole session.

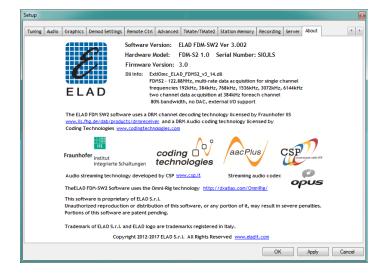
3.12 Server Tab

In this tab it is possible to activate the Audio Streaming & Web Control functionality. Please see the Annex B for details.

Setup												
Tuning Step	External HW	Tuning	Audio	Graphics	Demod Settings	Advanced	TMate/TMate2	Station Memory	Recording	Server	About	
Tuning stop	Externation	Turing	AUGIO	Orapines	Demod Sectings	Auvanceu	Indie/ Indies	Station memory	Recording	1.00.00	ADOOR	
The second second	treaming serve											
AUGIO S	treaming serve	er enabled										
Server To	cp Port		3031	-								
Audio str	reaming configu	uration	Conf 0		•							
Server ri	oot directory		C:\User:	s\UT96\Loca	al_Prj\ELAD-FDM-S	SW2\USBWet	serverFDM\USBW	ebserverFDMV003	3\8.5\rc	Change		
											_	
		_	_									_
								OK	Арр	ply	Cance	el

3.13 About Tab

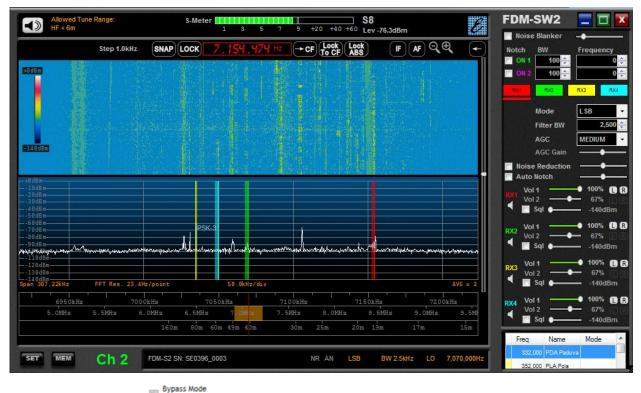
The About tab displays useful information about Software and Hardware.





4 Channel 2 Spectrum Window

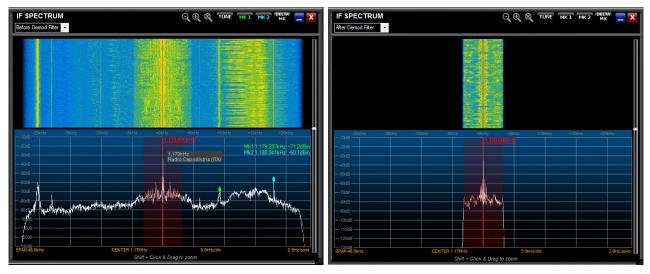
If the connected FDM supports "2 Channels" configuration, click on with button to open the Channel 2 spectrum window.



Note: if the option (Exclude Preselector) in the Advanced Tab of the Setup Window is not selected, the local oscillator of the second channel can be tuned only in the "Allowed Tune Range" displayed in the upper left corner of the window. This range depends on the frequency of the local oscillator in the Main Window.

5 IF Spectrum Window

This window displays the Spectrum/Waterfall of the IF frequency of the software. The frequency span is set to 192 kHz when the "WB FM" demodulation mode is selected, 48 kHz for the other modes. The user can select to visualize the Spectrum/Waterfall of the IF signal "Before Demod Filter" or "After Demod Filter".



To zoom in or out the area of the tuning frequency, click on \square button or on \square button.

To zoom a desired area, press the "Shift" button of the keyboard while operating the drag-and-drop action over the Spectrum.

Use the arrows \checkmark when zoom function is active to move left/right the visualization and click the button to reset the zoom.

User can perform three types of click function :

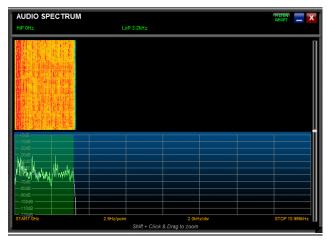
- set tuning to the selected frequency if **tune** is selected;
- set "Marker 1" if **matheta** is selected. Note that the label is green when the marker is enabled and when the click function is active the label is green and underlined;
- set "Marker 2" if **INC2** is selected. Note that the label is cyan when the marker is enabled and when the click function is active the label is cyan and underlined;

If both markers are enabled, user can activate the function that displays the frequency and amplitude difference between the markers.

Drag-and-drop the bottom-right corner to resize the "IF Spectrum" form.

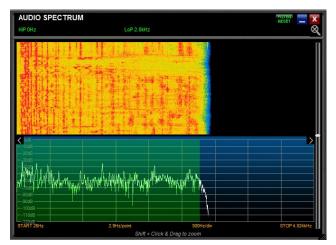
6 Audio Spectrum Window

This window is loaded by default when the player is active and the data type of the reproduced .wav file is "Audio Frequency" (see **Recording Tab**). The frequency span is set to 16 KHz for all demodulation modes.



To zoom a desired area, press the "Shift" button of the keyboard while operating the drag-and-drop action over the Spectrum. Use the arrows \checkmark when zoom function is active to move left/right the visualization and click the \bowtie button to reset the zoom.

In CW, CW SH+, CW SH-, USB, LSB, AM, FM, SYNC AM and DSB mode an audio filter is inserted at the end of the demodulation chain (audio filter is omitted in WB FM and DRM demodulation). This filter is represented by the green area drawn over the audio Spectrum. User can modify the bandwidth of the audio filter by drag-and-drop the borders of this area. Note that the higher frequency of the audio filter is limited to the bandwidth of the demodulation filter.



Drag-and-drop the bottom-right corner to resize the "Audio Spectrum" form.

Press

7 Hardware Setup Window

If the option Show HW Setup Form At Startup of the Advanced Tab is selected, the FDM-SW2 Hardware Setup Window is loaded at software startup.



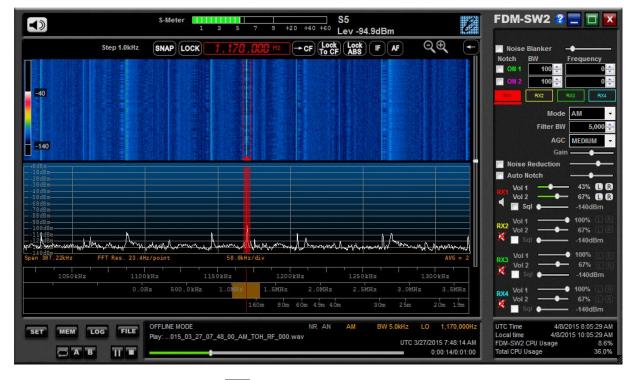
button to start the FDM-SW2 software.

Press **OFFLINE** button to start the FDM-SW2 software in **Offline Mode**.

Press button to open a Windows dialog box that allows to manually choose the hardware configuration file (named ExtIOmc_ELAD_FDMSx_yyy.dll for FDM-Sx receivers). Use this functionality only if you understand it.

8 Offline Mode

If the **OFFLINE** button of the **Hardware Setup Window** is pressed, FDM-SW2 starts in OFFLINE MODE. In this case, no connection with the hardware is established and only the playback of recorded files is available.



As shown in the picture above, the **w** button is not available in OFFLINE MODE.

9 Connect to Server

Press the **SERVER** button of the **Hardware Setup Window** to connect the software to a remote FDM device through a server software. Note : at the moment the server software is under development.

10 Using the FDM-DUO(r)

10.1 Control Panel

Click on the **FDM-DUO** button on the **Signal Control Panel** to open the FDM-DUO Control Panel. The picture below shows the Control Panel for the FDM-DUO (on the left) and for the FDM-DUOr (on the right). Some features are not available for the FDM-DUOr, primarily those related to the transmission.

ode		- Mode	
7 RX1 = Stand Alone (C	CF) 🔽 RX = TX	☑ RX1 = Stand Alone (C	CF) ☑ RX = TX
tenna Automation		Antenna Automation	
Use only RTX/TX An	tenna	Use only RTX/TX An	
Use both RTX/TX an	nd RX Antenna	 Use both RTX/TX ar 	
olume	0	Volume	45
olume AUX	50	Volume AUX	 55
MILLION			
(Power 0.3W		TX Power	Υ.
.GC		AGC	
GC Gain OFF	-	AGC Gain FAS	
MACRO-	• 10	- MACRO	4
VHF-APRS	HF	VHF-APRS	HF
MEM 1	MEM 2	MEM 1	MEM 2
MEM 3	MEM 4	MEM 3	MEM 4
MEM 5	7070	MEM 5	7070
LSB	USB	LSB	USB
CW	FM	CW	FM
AM 3KHz	АМ 6КН2	AM 3KHz	AM 6KHz
VFO A	УЕО В	VF0 A	VFO B
	A CONTRACTOR OF	A DESCRIPTION OF A DESC	

The Control Panel allows to set some parameters of the FDM-DUO(r) without do it directly with its buttons and encoders. Features are :

- Mode : allows to synchronize the RX mode of the FDM-DUO(r) with FDM-SW2 software,
- Antenna (only for FDM-DUO) : allows to switch between one antenna mode (RTX) and two antennas mode (RX/TX),



- Volume : these two sliders allow to control the main volume (FDM-DUO(r) internal speaker) and the auxiliary volume (AUX OUT connector of the FDM-DUO(r) front panel),
- Tx Power (only for FDM-DUO) : this menu allows to set the output power of the FDM-DUO. Reminder that the FDM-DUO has two output power settings, this one (Tx Power) and another one dedicated to the tune function. Please, refer to the FDM-DUO user manual for details.
- AGC & AGC Gain: choosing OFF you can set manually the Gain with the slider bellow. Choosing SLOW, MEDIUM or FAST activates the Automatic Gain Control.
- MACRO : macros allow the user to associate a list of CAT commands to a button press. They are managed with a simple text file. Click on the button to open the Options window, then clicking on the button you can eventually change the MACRO folder.

To modify the macros :

- open the Options window and locate the MACRO Folder,
- > go to the MACRO Folder using Windows Explorer and locate the "FdmDuoMacro.txt" file,
- do a copy of it to avoid non-recoverable issue,
- > open it and analyze its structure (E.g. VFO B 6m;FR1;FB0005000000;MD3;) :
 - the row 1 corresponds to the first button, the row 2 to the second button and so on,
 - ';' acts as delimiter character,
 - the first part of the row is the button text (E.g. VFO B 6m),
 - the other parts are CAT commands (E.g. FR1;FB0005000000;MD3;),
- modify the text file as wanted, save it and close it. Restart the FDM-SW2 software for the changes to take effect. Refer to the FDM-DUO(r) user manual for a complete list of the CAT commands.
- TUNE (only for FDM-DUO) : allows to put the FDM-DUO in TUNE MODE. See FDM-DUO user manual for details.

10.2 Manager

The Manager allows to set some stand-alone mode parameters like Memories, CW Messages, LCD Backlight and Preselectors. From the FDM-DUO(r) **Control Panel** it is possible to access to the FDM-DUO(r) Manager clicking on the button. This operation needs to connect the computer to the FDM-DUO(r) through the CAT USB connector situated on the rear panel of the FDM-DUO(r).

When the window shown below appears, choose the COM port and the current baud rate of the FDM-DUO(r). Go to the Windows Device Manager to find the correct COM port number. Use the menu 70 "CAT BAUD" on the FDM-DUO(r) to find the current baud rate. Clicking on "Start" the loading process begins.

FDM-DUO I	Manager	x
CAT Port	COM18	•
Baudrate	38400	•
	Start	

Like for the **Control Panel** some parameters are not available for the FDM-DUOr. In anyway, parameters are :

- Memories,
- Backlight,
- CW Messages (only for the FDM-DUO),
- Preselectors.

10.2.1 Memories

The Memories tab shows and allows to manage the 200 memories of the FDM-DUO(r). User can :

- load the memories from the FDM-DUO(r) using the "Load" button,
- sort the memories with "Move UP" and "Move Down" buttons,
- edit the labels, set the mode, change the frequency,
- save the memories to the FDM-DUO(r) using the "Save" button.

eq (Hz) Name		Mode	File	Index	Freq (Hz)	Label (max 22 chars)	Mode		Status		1	•	Load
332.000 PDA P			C:\Users\utente\Do	177	7.070.000	177 MEMORY LABEL	AM	-	Free	-			
352.000 PLA P			C:\Users\utente\Do	178	7.070.000		AM		Free	-			
367.000 ZAG Z	-		C:\Users\utente\Do	179			AM	-	Free	-		10	Move U
369.000 VRS V	sar		C:\Users\utente\Do	180	1.850.000		LSB	-	Used				more e
371.000 RIV R	olto		C:\Users\utente\Do	181	3.600.000		LSB	_	Used	•			Move D
390.000 AVI Av	ano		C:\Users\utente\Do	182				-	<u> </u>	_		1	
408.000 CHI CH	oggia		C:\Users\utente\Do		7.070.000		LSB	-	Used	•			
417.000 VCA V	cenza		C:\Users\utente\Do	183	10.125.000		LSB	-	Used	-			Update i
420.000 GS Pol			C:\Users\utente\Do	184	14.070.000		USB	-	Used	•		19	
				185	18.100.000		USB	_	Used	-			
				186	21.070.000	15m	USB	•	Used	•			
				187	24.920.000	12m	USB	-	Used	-			
				188	28.070.000	10m	USB	•	Used	•			
				189	50.115.000	Gm	LSB	-	Used	•			Save To
				190			AM	-	Free	-		10	
				191			AM	-	Free	•			
				192			AM	-	Free	•			Load Fr File
				193	7.070.000		AM	-	Free	•		1	
				194	7.070.000		AM	-	Free	-			
				195			AM	-	Free	-		-	Save

It is also possible to save the FDM-DUO(r) memories to an Xml file and load them from an Xml file.

On the left part of the Memories tab appears the stations memorized on FDM-SW2. It is possible to copy the content of an FDM-SW2 memory (left side) to an FDM-DUO memory (right side) simply selecting the memories positions and clicking on the button, see the pictures below.

Freq (Hz)	Name	Mode	File 🔺	Index	Freq	Label (max 22 chars)	Mode	Status		•	Load
9,850,000	DRM RUVR 1A	DRM	D		(Hz)	Labor (max 22 origin)					
10,000,000	time	USB	D	122	1,000,000		AM	▼ Free	-		
11,635,400	DRM RUVR 2A	DRM	D	123	1,000,000		AM	▼ Free	-		
12,095,000	BBC	AM	D	124	1,000,000		AM	▼ Free	-		Move UF
12,690,450	FUX 4285 600L 5N1	USB	D	125	1,000,000		AM	▼ Free	-		Move Dow
13,527,750	SLB 'D'	cw	D ≡	126	1,000,000		AM	▼ Free	-		
15.334.750	RCI Radio China International	AM	D	127	1,000,000		AM	▼ Free	-		
15,380,000	Radio Romania International	AM	D	128			AM	▼ Free	-		Update Ro
		AM	D	129			AM	▼ Free	-		opulation
	CRI China Radio Internationa	SYNC AM	D	130			AM	▼ Free			
15,670,000		AM	D	131		48 49	AM	▼ Free			
15,720,000		DRM	D	132		4< 4=	AM	▼ Free	-		
	CRI China Radio International	AM	D	133		4@ X	AM	▼ Free	-	Ξ	
	Saudi Radio	AM	D	134		ХХ	AM	▼ Free	-		Save To F
		AM	D	135	1,000,000	ХХ	AM	▼ Free	•		
17,650,000		AM		136	1,000,000	X X	AM	▼ Free	-		
	RADIO IRAN ITAL???		D	137	1,000,000	ХХ	AM	▼ Free	-		Load From File
17,830,000		AM	D	138	1,000,000		AM	▼ Free	-		
	RFA Radio Free Asia	AM	D	139	1.000.000		AM	▼ Free	-		
87,600,000	EASY NETWORK	WB FM	D	140	1.000.000		AM	▼ Free	-		Save

Memories selection

		08 Preselect			-									
Freq (Hz)	Name	Mode	File 1	Î	ndex (Hz)	Lat	el (max	22 chars)	Mode		Status		^	Load
	DRM RUVR 1A	DRM	D	12	2 1,00	00,000			AM	-	Free			
10,000,000		USB	D	12	3 1.00	00.000			AM	-	Free	•		
	DRM RUVR 2A	DRM	D	12	4 1.00	00.000			AM	-	Free	•		Move U
12,095,000		AM	D	12		00.000			AM	-	Free	•		
12,690,450	FUX 4285 600L 5N1	USB	D	12		00.000			AM	-	Free	-		Move Do
13,527,750	SLB 'D'	CW	D E			0.000			AM	•	Free			
15,334,750	RCI Radio China International	AM	D			0.000			AM	-	Free	_		
15,380,000	Radio Romania International	AM	D	12						•		-		Update R
15,650,000	Voice of Greece	AM	D	12		00,000			AM	•	Free	-		
15,665,016	CRI China Radio Internationa	SYNC AM	D	13		00,000			AM	-	Free			
15,670,000	VOA Radiogram	AM	D	13					AM	-	Free	-		
15,720,000	RNZI	DRM	D	13			4< 4=		AM	_	Free	•		
17.540.050	CRI China Radio International	AM	D	13	3 1,00	00,000			AM	-	Free	•	Ξ	
17.615.000	Saudi Radio	AM	D	13	4 1,00	00,000	х х		AM	-	Free	•		Save To I
17 650 000	CRI CHina Radio International	AM	D	13	1,00		х х		AM	-	Free	-		
	RADIO IRAN ITAL???	AM	D	13	6 17,65	50,000 CRI	CHina F	Radio International	AM	-	Used	•		Load Fro
	Radio Pakistan	AM	D	13			х х		AM	-	Free	-		File
	RFA Radio Free Asia	AM	D	13					AM	-	Free	-		
	EASY NETWORK	WB FM		13	9 1,00	00,000			AM	-	Free	•		
	EASY NETWORK	WBFM	D	- 14	0 1.00	00.000			AM	-	Free	•	-	Save

Memory copy

As mentioned before, press the "Save" button to store the memories of the right side of the tab inside the FDM-DUO(r).

Freq (Hz)	Name	Mode	File 🔺	Index	Freq	Label (max 22 chars)	Mode		Status		•	Load
9,850,000	DRM RUVR 1A	DRM	D		(Hz)	Label (max 22 chars)		_	r			
10,000,000	time	USB	D	122	1,000,000		AM	_	Free	•		
11,635,400	DRM RUVR 2A	DRM	D	123	1,000,000		AM	-	Free	•		
12,095,000	BBC	AM	D	124	1,000,000		AM	•	Free	•		Move UP
12,690,450	FUX 4285 600L 5N1	USB	D	125	1,000,000		AM	•	Free	•		Move Dow
13.527.750	SLB 'D'	CW	D ≡	126	1,000,000		AM	•	Free	-		
	RCI Radio China International	AM	D	127	1,000,000					-		
	Radio Romania International	AM	D	128	1,000,000	Saving da	ta			•		Update Ro
15 650 000	Voice of Greece	AM	D	129	1,000,000					-		
	CRI China Radio Internationa	SYNC AM	D	130	1,000,000					•		
	VOA Radiogram	AM	D	131	1,000,000		AM	-	Free	-		
15,720.000		DRM	D	132		4< 4=	AM	-	Free	-		
	CRI China Radio International	AM	D	133		4@ X	AM	-	Free	-	Ξ	
	Saudi Radio	AM	D	134		ХХ	AM	-	Free	•		Save To Fi
17,650.000		AM	D	135		ХХ	AM	•	Free			
	RADIO IRAN ITAL???	AM	D	136	17,650,000	CRI CHina Radio International	AM	-	Used	-		
	RADIO IRAN ITAL??? Radio Pakistan	AM	D	137	1,000,000	ХХ	AM	-	Free	-		Load From File
	Radio Pakistan RFA Radio Free Asia	AM		138	1,000,000		AM	-	Free	•		
			D	139	1,000,000		AM	-	Free	-		
	EASY NETWORK	WB FM	D +	140	1.000.000		AM	-	Free	•	Ŧ	Save



10.2.2 Backlight

FDM-DUO Manager	
Memories Backlight CW Messages SPF-08 Preselectors	
Load Configurations	
Configuration RX Stand Alone	
Backlight R Set Color	
Backlight G 100	
Backlight B 100 Store Selected Configuration	
Default	
Save All Configurations	

In this tab the user can configure the backlight color for each modality of the FDM-DUO(r).

The "Load Configurations" button allows to read the current backlight settings from the FDM-DUO(r).

The "Configuration" menu allows to select the modality to manage :

- RX Stand Alone : this is the modality that is running when you power up the FDM-DUO(r),
- RX Remote : the FDM-DUO(r) run this modality when you choose another "Device Configuration" than the default one in the Advanced Tab of the Setup Window,
- TX AM/SSB MIC : this modality is activated when going in transmission (not in CW mode) with the microphone as audio input source,
- TX AM/SSB PC Data : this modality is activated when going in transmission (not in CW mode) with the USB TX connector as input source,
- TX CW : this modality is activated when going in transmission in CW mode.

The FDM-DUOr manages only the first two modalities.

The sliders "Backlight R", "Backlight G" and "Backlight B" allow to adjust the red, green and blue components of the color for the selected configuration/modality.

The "Set Color" button allows to try the slide bars settings. The backlight color is applied to the FDM-DUO(r) but not save inside its memory.

The "Store Selected Configuration" button allows to save the settings of the selected configuration/modality inside the memory of the FDM-DUO(r).

The "Default" button allows to set all configurations/modalities to the default values. Using this button the default settings will be saved inside the memory of the FDM-DUO(r).

The "Save All Configurations" button allows to save the settings of all the configurations/modalities inside the memory of the FDM-DUO(r).

10.2.3 CW Messages

This tab allows to manage the FDM-DUO CW messages. You can load the current messages saved inside the FDM-DUO with the "Load" button; modify the messages; save them one by one with the "Save" buttons or all together with the "Save All" button.

FDM-DUO Manager		
Memories Backlight CW Messages SPF-08 Preselectors		
	Load	
1		Save
2		Save
3		Save
4		Save
5		Save
6		Save
7		Save
8		Save
9		Save
10		Save
	Save All	

10.2.4 Preselectors

Preselectors tab differs from the FDM-DUOr to the FDM-DUO.

When managing an FDM-DUOr this tab allows to set the FDM-DUOr internal preselector filters. The user can enable and disable each preselector slot and set preselector high pass and low pass frequencies. The "Load" button allows to read the configuration stored inside the FDM-DUOr. The "Save" button allows to save the configuration inside the FDM-DUOr.

FDM-DUO Manager		ю -			e n e	_ _ ×
Memories Backlight Preselectors						
Internal Preselectors				Load		
	Filter ID	Enabled		High Pass Freq	Low Pass Freq	
	1	NO	•	0	1	
	2	NO	•	0	0	
	3		•		0	
	4	YES	•	13.600.000	21.500.000	
	5	YES	•	21.500.000	35.000.000	
	6	YES	-	1.700.000	54.000.000	
	7	YES	•	0	1.700.000	
	8	NO	•	0	0	
	9	NO	•	0	0	
	10	NO	•	0	0	
				Save		

When managing an FDM-DUO this tab allows to set the preselector filters of two accessories : the SPF-08 and the QSF-06. The user can enable the preselectors management, enable and disable each preselector slot and set preselector high pass and low pass frequencies. The "Load" button allows to read the configuration stored inside the FDM-DUO. The "Save" button allows to save the configuration inside the FDM-DUO.

FDM-DUO Manager		_						
Memories Backlight CW Messages Preselectors								
External Preselectors								
QSF-06 Table	Filter Enabled High Pass Freq Low Pass Freq							
SPF-08 Table	1	YES NO		1.800.000 0	2.000.000			
	3				1			
	4	YES	•	14.000.000	14.350.000			
	5	NO			1			
	6			50.000.000	54.000.000			
	7	NO			1			
	8	YES	•	0	54.000.000			
Save								

10.2.4.1 Example of using the Preselectors tab

This example is an extract of the QSF-06 user manual. It explains how to use the **Preselectors** tab of the FDM-DUO **Manager** when using a QSF-06 preselector. However, it can be used as a guideline also when using SPF-08 with FDM-DUO and the FDM-DUOr internal preselectors.

FDM-DUO Manager	-					
Memories Backlight CW Messa es Pr	reselectors					
External Preselectors	5	3 Ena	able	Load Presel QSF-06 Table YES	-	
QSF-06 Table	Filter ID	Enabled		High Pass Freq	Low Pass Freq	
SPF-08 Table 4	1	YES	•	1.800.000	2.000.000	
•	2		•	-	1	
	3		-		1	
	4			14.000.000	14.350.000	-
	5		-	-	1	-
	6	110	-	0	54.000.000	
	8	NO	_	0	0	
				5 Save	6 Mess	Configuration Saved

Follow these steps to configure the QSF-06 preselector.

- 1. Select the "Preselectors" tab.
- 2. Choose the "QSF-06" option.
- 3. Enable the QSF-06 management if not already done.

The "Load" button allows you to retrieve from the FDM-DUO the current configuration.

- 4. Set a filter. The settings table is formed by 6 rows, one for each filter slot of the QSF-06 board. Each row contains 4 fields :
 - the filter ID / slot number : from 1 to 6,
 - the state of the filter/slot : enabled or not,
 - the beginning frequency of the filter use, otherwise called "high pass frequency",
 - the end frequency of the filter use, otherwise called "low pass frequency".

For each row choose the "Enable" state and if enabled, enter the desired High Pass and Low Pass frequencies which specify the activation band of the filter.

- 5. Press the "Save" button to store the configuration in the FDM-DUO internal memory.
- 6. A message box appears to confirm the operation or indicate a negative outcome.

Some rules to keep in mind :

- the frequency to enter is in Hertz,
- the High Pass frequency must be strictly slower than the Low Pass frequency,
- in the same way the Low Pass frequency must be strictly higher than the High Pass frequency,
- in case of use of the FBPY bypass module, insert it to the last slot (number 6).

Filter ID	Enabled		High Pass Freq	Low Pass Freq
1	YES	•	1.800.000	2.000.000
2	NO	Ŧ	0	1
3	NO	•	0	1
4	YES	•	14.000.000	14.350.000
5	NO	•	0	1
6	YES	Ŧ	0	54.000.000
7	NO	•	0	0
8	NO	Ŧ	0	0

For example, considering the configuration of the screenshot above, you can insert this filters :

- filter ID/slot 1 : band pass 160 m, FBP160-1 filter module,
- filter ID/slot 2 : none,
- filter ID/slot 3 : none,
- filter ID/slot 4 : band pass 20 m, FBP20-1 filter module,
- filter ID/slot 5 : none,
- filter ID/slot 6 : bypass, FBPY module.

To select the right filter the FDM-DUO analyses the configuration following the ascending order of the slots. If the current tuning frequency is inside the frequency range the filter is selected, if not it passes to the next slot. It is recommended to place the bypass module in the last slot and to enable it in the frequency range which is not covered by the others filter modules.

Some cases with the above screenshot :

- tuning frequency set to 1MHz : the filter on the sixth slot is selected,
- tuning frequency set to 1.9MHz : the filter on the first slot is selected,
- tuning frequency set to 14.070MHz : the filter on the fourth slot is selected,
- tuning frequency set to 30MHz : the filter on the sixth slot is selected,
- tuning frequency set to 50MHz : the filter on the sixth slot is selected.

10.3 Transmitting

The RX and TX parts of the FDM-DUO are separated, so the FDM-SW2 software take advantage of this to implement the SPLIT mode. The SPLIT mode is used by the FDM-SW2 software to manage the transmission with the FDM-DUO. In SPLIT mode, the VFO A is used for receiving while the VFO B is used for transmitting. Take care, the FDM-DUO has two SPLIT modes :

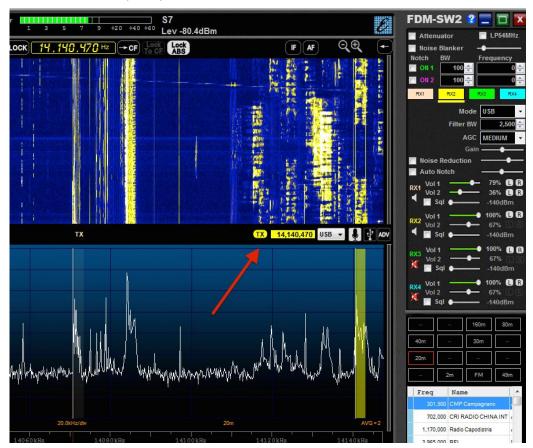
- the Stand-Alone SPLIT : activated by the FDM-DUO itself,
- the Remote SPLIT : activated by the FDM-SW2 software.

To activate the Remote SPLIT mode, click on the "TX" label of a virtual receiver as shown on the picture bellow. Note that the FDM-DUO displays the "SP" label when a SPLIT mode is activated.

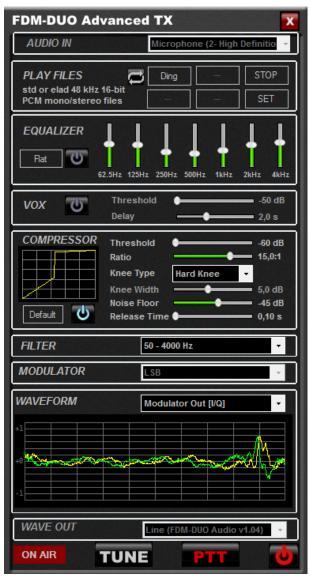


In the picture above the virtual receiver 4 is used. The center frequency is 14.070.691Hz and the FDM-DUO VFO A frequency is set to the same value. The frequency of the virtual receiver 4 is set to 14.018.487Hz and the FDM-DUO VFO B frequency is the to the same value.

Clicking on the "TX" button of another virtual receiver change the virtual receiver selected to manage the Remote SPLIT mode. In the picture bellow, the virtual receiver 2 is now selected and its frequency is set to 14.140.470Hz, the frequency of the FDM-DUO VFO B is also set to this value.



You can change the mode used for transmitting choosing another mode with the related combo-box. If the mode selected is CW TO TOBOLO CW THE , you can choose between key and paddle as input source. Try to change the setting and see the result on the FDM-DUO display. If the mode selected is USB, LSB, AM or FM TO TOBOLO LSB TO CHARGE , you can choose between these input sources : microphone TO TOBOLO LSB TO CHARGE AND Advanced TX panel TY to change the setting and see the result on the FDM-DUO display. The FDM-DUO Advanced TX panel allows you to add digital processing to the transmission source. Choose the audio input (AUDIO IN menu), it can be a microphone connected to the computer or an internal or external soundcard. <u>If displayed, do not choose "FDM-DUO Audio" as input source as the "Line (FDM-DUO Audio)" device corresponds to the auxiliary audio output (the AUX OUT connector of the front panel of the FDM-DUO) and the "Microphone (FDM-DUO Audio)" device doesn't correspond to the microphone connected to the FDM-DUO trough the MIC/PTT connector of the rear panel. Instead, for the WAVE OUT menu, choose the "Line (FDM-DUO Audio)" device to send the processed signal to the TX USB connector situated on the rear panel of the FDM-DUO. It is also possible to send the processed signal to another audio device.</u>



Features of the FDM-DUO Advanced TX panel are : files playing, equalization, vox feature, compression, setting of filter and mode, tune feature. It is also possible to choose the signal displayed in the waveform graphic. Press the **to** button to start the digital processing and the **pres** button to start the transmission.

Annex A - FDM-SW2 CAT Protocol

Protocol Description

The FMD-SW2 software implements a subset of the CAT commands of the Yaesu FT-897 transceiver. The parameters of the serial port are listed in the following table.

Baud rate	38400
Data Size	8
Parity	None
Start Bits	1
Stop Bits	2

The command sent to FDM-SW2 consists of 5 bytes and is structured as follows:

 Data 1
 Data 2
 Data 3
 Data 4
 Command

FDM-SW2 software implements the following commands derived from the command set of FT-897:

Command Description	Data 1	Data 2	Data 3	Data 4	Command	Remarks (see following command descriptions)
Set LO Frequency	100/10MHz	1MHz/100kHz	10/1kHz	100/10Hz	0x01	This command sets the current frequency
Set operating mode	Mode Byte	x	х	х	0x07	-
Read Receiver Status	х	х	х	х	0xE7	This command returns one byte containing receiver status
Read Frequency and mode	х	х	х	х	0x03	This command returns five bytes
Read EEprom Data	Address MSB	Address LSB	x	х	OxBB	This command causes two bytes of EEPROM data to be returned, beginning with the address in data bytes 1 and 2. (Approximately 6.25k of EEPROM data may be accessed)
Read TX Metering	Х	x	x	х	OxBD	This command returns one byte (00) when in receive. When in transmit, this command returns two bytes (in BCD format) indicating Forward power, VSWR, ALC, and Modulation.
Read Transmitter status	х	х	х	х	0xF7	This command returns one byte containing transmitter status
Set PTT ON	x	x	x	x	0x08	This "keys" the FT-817. In CW, this sets the radio to transmit mode, but does key the transmitter. Keying and unkeying the PTT line will cancel the transmit mode (i.e. put it back into receive.) This command returns 00 if the '817 was unkeyed, and F0 if already keyed.
Set PTT Off	Х	х	х	х	0x88	This command puts the FT-817 into receive mode. This command returns 00 if the '817 was keyed, and F0 if already unkeyed.

Command Descriptions

Command 0x01 - set local oscillator frequency: the local oscillator frequency is set by the transmission of 4 Binary Coded Decimal (BCD) bytes. For example, to set the frequency at 435.12345 MHz the bytes to be sent are: **[43][51][23][45]** followed by the byte command **[01]**. The command returns 1 byte set to **[00]**.

Command 0x03 - read local oscillator frequency and mode: this command returns 5 bytes. The first four bytes contain the local oscillator frequency in the same format of the command **0x01** (4 BCD bytes), while the last byte contains the operating mode encoded as follows:

Mode	Value
LSB	0x00
USB	0x01
CW, CW SH+, CW SH-	0x02
AM, SYNC AM	0x04
FM, WB FM	0x06
DRM	0x07

Command 0x07 - set operation mode: the first byte contains the operating mode that is encoded as follows:

Mode	Value
LSB	0x00
USB	0x01
CW	0x02
AM	0x04
WB FM	0x08
FM	0x88

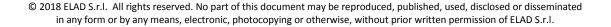
The command returns 1 byte set to [00].

Command 0xBB - read EEPROM data: this command returns 2 bytes. To simulate the behavior of the FT-897, the software replies to "EEprom read" request as follows:

Address	Data 1	Data 2
0x006A	0xC4	0x20
0x00A9	0x00	0x05
0x006B	0x20	0x59
0x008C	0x00	0x00
0x00A8	0x00	0x18
0x008E	0x40	0x00

For example, if the software receive the command [00] [6A] [00] [00] [BB] the answer must be [C4] [20].

Command 0xBD - read TX metering: this command returns 1 byte set to **[00]** when receive mode is enabled, while it returns 2 byte set to **[00] [00]** when transmit mode is enabled.



Command 0xE7 - read receiver status: this command returns 1 byte. The 4 least significant bits indicate the current reading of S-METER. Some examples are reported in the following table:

Retuned Byte	S-METER
0x00	S0
0x04	S4
0x09	S9
0x0A	S9+10
0x0B	S9+20
0x0F	S9+60

Command 0xF7 - read transmitter status: this command returns 1 byte. If *"keyed"* the byte is set to **[7f]** otherwise **[ff]**.

Specific Command Descriptions

In addition to the controls derived from the command set of FT-897, the CAT protocol include specific commands for the FDM-SW2:

Command Description	Data 1	Data 2	Data 3	Data 4	Command	Remarks (see following command descriptions)
Set FDM- SW2 operating mode	Mode Byte	х	х	х	0xC7	-
Read Tuning Frequency and mode	х	х	х	х	0xC8	This command returns five bytes
Set Tuning Frequency	100/10MHz	1MHz/100kHz	10/1kHz	100/10Hz	0xC9	This commands sets the current frequency
Read Locked Mode	х	х	х	х	0xCA	-
Set Locked Mode	Locked Mode Byte	х	х	х	0xCB	-
Read FDM-SW2 Status	Х	Х	х	Х	0xCF	This command returns 10 bytes containing the FDM-SW2 status.

Command 0xC7 - set FDM-SW2 operating mode: the first byte contains the operating mode that is encoded as follows:

Mode	Value
CW	0x00
CW SH+	0x01
CW SH-	0x02
USB	0x03
LSB	0x04
AM	0x05
FM	0x06
DRM	0x07
WBFM	0x08
SYNC AM	0x09
DSB	0x0A

The command returns 1 byte set to [00].

Command 0xC8 - read tuning frequency and mode: this command returns 5 bytes. The first four bytes contain the tuning frequency in the same format of the command **0x01** (4 BCD bytes), while the last byte contains the operating mode encoded as in command **0xC7**.

Command 0xC9 - set tuning frequency: the tuning frequency is set by the transmission of 4 Binary Coded Decimal (BCD) bytes For example, to set the frequency at 435.12345 MHz the bytes to be sent are: [43][51][23][45] followed by the byte command [C9].

The command returns 1 byte set to [00].

Command 0xCA - read locked mode: this command returns 1 byte containing the receiver locked status:

Mode	Value
Unlocked	0x00
Locked to CF	0x01
Locked ABS	0x02
LOCK	0x03

Command 0xCB - set locked mode: this command returns 1 byte.

Mode	Value			
Unlocked	0x00			
Locked to CF	0x01			
Locked ABS	0x02			

Command 0xCF - read FDM-SW2 global status: this command returns 10 bytes containing the status of the FDM-SW2 :

- byte 0 : locked mode (encoded as in command 0xCA), -
- byte 1-4 : LO frequency (4 BCD), _
- byte 5-8 : tuning frequency (4BCD), -
- byte 9 : operating mode (encoded as in command 0xC7).

Annex B - Audio Streaming & Web Control

Starting USB Web Server

Go to <u>sdr.eladit.com/FDM-sw2 Software/</u> and download the web server. Open the folder "USBWebserverFDMVxxx\USBWebserver v8.5\8.5" and launch the file usbwebserver.exe.

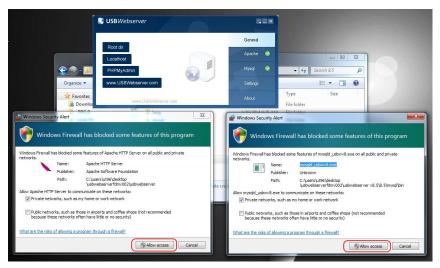
Organize 👻 Include in libra	- A		D. 1. 177 1	Ŧ	· · · · · · · · · · · · · · · · · · ·
🔆 Favorites		Name	Date modified	Туре	Size
🐌 Downloads	=	퉬 apache2	1/29/2014 9:24 AM	File folder	
퉬 _PRG_8		퉬 lang	1/29/2014 9:25 AM	File folder	
퉬 Local_Prj		鷆 mysql	1/29/2014 9:25 AM	File folder	
🗐 Recent Places		鷆 php	1/29/2014 9:25 AM	File folder	
📃 Desktop		鷆 phpmyadmin	1/29/2014 9:26 AM	File folder	
💝 Dropbox		鷆 root	1/29/2014 9:26 AM	File folder	
Documents		settings	1/29/2014 9:26 AM	File folder	
🌸 iCloud Photos		usbwebserver.exe	5/10/2013 10:58 AM	Application	664 KE
🝊 SkyDrive					

If a security warning appears, click on "Run".





When the web server starts for the first time, two Windows security warning appears, click "Allow access" in both windows.



FDM-SW2 Settings

In the FDM-SW2 software, open the setup window by clicking on "SET" button and select the "Server" tab. Enable the check box "Audio streaming server enabled". Read carefully the warning and then click "OK".

	ning Audio	Graphics	Demod Settings	Advanced	TMate/TMate2	Station Memory	Recording	Server	About
Audio streaming server en	abled								
Server Tcp Port	3031	A V							
Audio streaming configurat	Warning					×	.5\rc	Change	
		make shun to all mate necessary p Prima di at assicuratev per tutto il le necessar Avant d'ac assurez-vo les autres c	ie autorizzazioni tiver le service d us de posséder l	opyrights ai or that you di streamin copyright c esso oppure streaming es droits d'a tenus infor	nd other rights obtanied all g audio, altri diritti e di aver ottenuto audio, nuteur et tous matiques que voi				

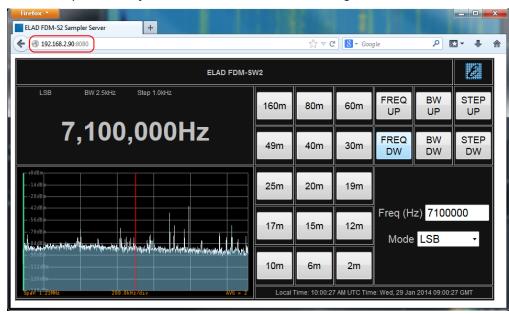
Select the same "Server Tcp Port" used by USBWebServer. Click on "Change" to select the USBWebserver root directory. Select the folder : USBWebserverFDMVxxx\USBWebserver v8.5\8.5\root In the "Audio streaming configuration combo box" select "Conf 0".

Once the setup is saved, when the FDM device start the acquisition, a Windows security warning appears, click "Allow access".

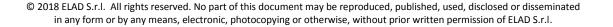


Use with Browser

The Audio Streaming & Web control feature works only with Firefox web browser. Open Firefox and type in the address bar : *"ip address of the PC where FDM-SW2 is running"*:8080.



If you are interested to only hear the audio stream, type in the address bar : *"ip address of the PC where FDM-SW2 is running"*:1412.



Audio Streaming Configuration Description

- Conf 0 :
 - Codec : OPUS
 - Input Bitrate : 48kHz
 - Bitrate : 32kHz
 - Audio encoding frame size : 2.5ms
 - Maximum band-pass : 20kHz

• Conf 1 :

- Codec : OPUS
- Input Bitrate : 48kHz
- Bitrate : 6kHz
- Audio encoding frame size : 10ms
- Maximum band-pass : 4kHz

• Conf 2 :

- Codec : PCM
- Bitrate : 48kHz
- Conf 3 :
 - Codec : PCM
 - Bitrate : 8kHz

Annex C - Configuration Files

Filenames

The FDM-SW2 software configuration is stored in some files located in <u>"local drive"\Users\"your user</u> <u>name"\Documents\ELAD\FDM-SW2</u>, common files are :

- **FDMSW2SwSetup.xml** : contains FDM-SW2 general settings like main windows position and size, graphics settings, default directory for save the recordings, ...
- **FDMSW2SwSetup_XXXXX :** specific settings for the connected FDM device (where XXXXX is the FDM serial number, Offline for the offline mode),
- **FDMS2RxSetup_XXXXX** : specific settings for the virtual receiver,
- **FDMDS1Config.xml** : frequency related settings.

Restore to Factory Default

If the files are corrupted or contain invalid data, the software can stop working correctly. However it is possible to restore the FDM-SW2 software in a stable state doing the following procedure :

- close the FDM-SW2 software,
- open the FDM-SW2 configuration files directory : <u>"local drive"\Users\"your user</u> <u>name"\Documents\ELAD\FDM-SW2</u>,
- move the following files to another directory, <u>by moving these files, you will lost all the user</u> settings such as the last tuning frequency, demodulation mode, frequency related settings,
- restart the FDM-SW2 software.

FDM-DUO(r) **Maximum Frequency**

The factory default maximum frequency of the FDM-DUO is 54MHz. However, for experimental purposes, user can extend the frequency range up to 165MHz setting the FDM-DUO as follows : menu 2 "RX LP" on OFF and menu 33 "TX OUT" on 0dBm. But if the FDM-SW2 software is connected to the FDM-DUO it blocks the frequency at 55MHz. For experimental purposes, this limitation can be unlocked : close the FDM-SW2 software, go to the configuration files directory (*"local drive"*\Users\"your user <u>name"\Documents\ELAD\FDM-SW2</u>), open the **FDMSW2SwSetup.xml** file, search for the **UnlockDUOt** label and set it to '1'. Save and close the file, restart the FDM-SW2 software. If you are using profiles (see **Signal Control Panel**), there is a copy of the FDMSW2SwSetup.xml file in each "ProfileX" directory. If you created profiles before editing the main FDMSW2SwSetup.xml file, it will have the UnlockDUOt label set to '0'. If necessary edit the UnlockDUOt labels in these files too.

The maximum frequency of the FDM-DUOr depends on the maximum frequency set into the **Preselectors** tab of the **Manager** window. However, like for the FDM-DUO there is a limitation from the FDM-SW2 software at 55MHz. To unlock this limitation proceed in the same way as for the FDM-DUO with the difference that the label to edit is **UnlockDUOr**.