

# ELAD Application Notes AN-001 rev 1.0 Integrating FDM-DUO Transceiver and CW Skimmer

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# Introduction

These application notes outline basic and advanced options along with required configuration settings to integrate CW Skimmer software with ELAD's FDM-DUO Transceiver (FDM-DUO)

- 1. Basic Configuration: Connecting CW Skimmer via an audio port cable with the FDM-DUO
- 2. Advanced Configuration: FDM-SW2 software allowing CW Skimmer to function in IF mode which provides additional decoders and internal CW Skimmer Cluster connection with SW2 Software for spot display in order to allow wider point and click frequency change to spots

# 1 FDM-DUO with CW Skimmer Basic Operation (3 KHz-Audio Bandwidth)

# **1.1 Requirements**

- FDM-DUO Transceiver and a personal computer running Windows (Win XP, Win 7, Win 8, Win 8.1)
- CW Skimmer software by Afreet Software, Inc. <u>http://www.dxatlas.com/CwSkimmer/</u>
- OmniRig which installs automatically with CW Skimmer. OmniRig is freeware from Afreet Software <a href="http://www.dxatlas.com/OmniRig/">http://www.dxatlas.com/OmniRig/</a>

# **1.2 Hardware Connections**

Section 1.2 outlines required hardware connections for connecting an FDM-DUO to a personal computer The FDM-DUO requires a USB CAT port cable connection in order to function with Omnirig. Follow the procedures in user manual for driver installation. The FDM-DUO also requires a USB cable connection to the TX port for the audio connection.

# **1.3 Software Installation**

### 1.3.1 CW Skimmer CAT Connection

Launch CW Skimmer program and open the settings panel



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Open the CAT TAB	Click or	n Configure	
Settings 🛛 🕅		Omni-Rig Setti	ngs 📃 💌
Radio Audio CAT Misc. Operator Telnet Calls		RIG 1 RIG 2	About
CAT Interface		Rig type	Elad-DUO
C Use Radio 2 Elad-DUO		Port	СОМ 4 💌
Configure		Baud rate	38400 💌
		Data bits	8 🗸
		Parity	None
		Stop bits	1 💌
		RTS	High
		DTR	Low
		Poll int., ms	200 🚖
		Timeout, ms	1000 🗢
0K Cancel		<u> </u>	<u>]</u> K <u>C</u> ancel

Set parameters to match FDM-DUO settings for COM port and Baud rate settings (Menu 70) and click the OK button. When the configuration parameters are properly set the correct frequency will be displayed on CW Skimmer and the FDM-DUO LCD Display as shown in Figure 1.





Open Settings and Radio Panel

Select 3 kHz Radio

	Thataro		Settings 📃
Settings Radio Audio CAT Misc. C Hardware Type G 3kHz Radio C SoftRock C SoftRock-IF C SDR-IQ C QSIR C Mercury C Perseus Sampling Rate G 48 kHz C 96 kHz C 192 kHz	)perator   Tehnet   Calls   LO Frequency, Hz 7025980 € CW Pitch, Hz 500 € Audio IF, Hz 1500 €	Select Line FDM-DUO Audio Device →	Radio       Audio       CAT       Misc.       Operator       Telnet       Calls         Soundcard Driver <ul> <li>MME</li> <li>WDM</li> <li>Signal I/O Device</li> <li>O1</li> <li>Line (FDM-DUO Audio Device)</li> <li>Audio I/O Device</li> <li>O7 Speakers (VIA High Definition A</li> <li>Audio Volume</li> <li>Channels</li> <li>Cheft/Right = 1 / Q</li> <li>Cheft/Right = Q / 1</li> <li>Shift Right Channel Data by</li> <li>C -1 sample</li> <li>O samples</li> <li>+1 sample</li> </ul>
[	OK Cancel		OK Cancel

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# 2 FDM-DUO and CW Skimmer Advanced operation (wide Bandwidth, CLUSTER and tune to Cluster Spots)

# 2.1 Requirements

- FDM-DUO Transceiver and a personal computer running Windows (Win XP, Win 7, Win 8, Win 8.1)
- CW Skimmer software by Afreet Software, Inc. <u>http://www.dxatlas.com/CwSkimmer/</u>
- OmniRig which installs automatically with CW Skimmer. OmniRig is freeware from Afreet Software <a href="http://www.dxatlas.com/OmniRig/">http://www.dxatlas.com/OmniRig/</a>
- Virtual audio cable software to transfer audio (wave) streams between applications and, or devices <a href="http://software.muzychenko.net/eng/vac.htm">http://software.muzychenko.net/eng/vac.htm</a> or equivalent software

# 2.2 Hardware

Section 2.2 describes essential hardware connections required for linking the FDM-DUO with a PC to make the software running correctly.

FDM-DUO need the USB cable connection CAT port, for working with CW Skimmer/Omnirig; follow the procedure in user manual for driver installation.

FDM-DUO requires a USB cable connection to RX port in order to allow FDM-SW2 software to run.

# 2.3 Software Installation

#### 2.3.1 CAT rig connection

Refer to Section 1.3.1 - Page 2

### 2.3.2 Virtual Audio Cable (VAC) Installation

Virtual audio cables for audio playback and recording devices must be created. Configuration panels appear as shown below in the Sound and Line 1 properties panels exhibited below:

😔 Sound 🛛	Line 1 Properties
Playback Recording Sounds Communications	General Levels Advanced
Select a playback device below to modify its settings:	Default Format
FDM-DUO Audio Device Default Communications Device	Select the sample rate and bit depth to be used when running in shared mode.           2 channel, 16 bit, 48000 Hz (DVD Quality)         Test
VIA High Definition Audio Ready	Exclusive Mode
HD Audio HDMI out VIA High Definition Audio Ready	Allow applications to take exclusive control of this device     Give exclusive mode applications priority
Line 1 48KHz Virtual Audio Cable Ready	
Virtual Audio Cable Default Device	
Configure Set Default V Properties	Restore Defaults
OK Cancel Apply	OK Cancel Apply

😌 Sound 😨	Line 1 48KHz Properties
Playback Recording Sounds Communications	General Listen Levels Advanced
Select a recording device below to modify its settings:	Default Format Select the sample rate and bit depth to be used when running in shared mode. 2 channel, 16 bit, 48000 Hz (DVD Quality)
Stereo Mix VIA High Definition Audio Ready Line 1 48KHz Virtual Audio Cable	Exclusive Mode Allow applications to take exclusive control of this device Give exclusive mode applications priority
Line 2 48/01z Virtual Audio Cable Ready	
Virtual Audio Cable Ready	Partore Defaults
Configure Set Default (* Properties OK Cancel Apply	OK Cancel Apply

### 2.3.3 FDM-SW2 Audio IF Installation

In the Setup window Audio Tab check VRX1 Enable AUX Out, Line 1 (Virtual Audio Cable) and Mode IF 48 kHz to feed CW skimmer software in IF mode (*IF-SOftrock*)

Setup		and a			100		
Tuning Step Tuning Audio Graphi	cs Demod Settings	Advanced TMate/TMate2	Station Memory	Recording	Server	About	
AGC Settings							
Fast Attack (ms) 1	Decay (ms) 1.000	0 ≑					
Medium Attack (ms) 5 🚔	Decay (ms) 2.000	0					
Slow Attack (ms) 10 🚔	Decay (ms) 4.000	0 🌩					
Audio Out		Volume Gain A	Aultiplier 1	_			
Main Output Device				•			
Main Output Device Speakers	(VIA High Definitio 👻	Mute On 1	TX or CAT Keyed s	tatus			
ALLY Output Device		Freeze Sp or CAT Ke	ectrum On Mute ved status				
Nox Output Device			,				
Channel 1 Channel 2							
VRX1 📝 Enable AUX Out	Output Device Line	e 1 (Virtual Audio Cable) 🔻	Mode IF 48kHz	z 👻			
VRX2 🔲 Enable AUX Out	Output Device Spea	akers (VIA High Definitic 💌	Mode Audio	-			
VRX3 📃 Enable AUX Out	Output Device Spea	akers (VIA High Definitic 💌	Mode Audio	-			
VRX4 🔲 Enable AUX Out	Output Device Spea	akers (VIA High Definitic 👻	Mode Audio	-			
Soundcard Play Buffer Size (ms)	300 🚔	Mut	e the VRX not sele	ected			
				ОК		Apply	Cancel

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#### 2.3.4 CW Skimmer Audio

Open Settings in CW Skimmer and set Radio as Softrock-IF as shown below:

Radio       Audio       CAT       Misc.       Operator       Tenet       Calls         Hadware Type       LD Frequency, Hz       7024980 \$       Image: Comparison of the tent of t

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After proper CW Skimmer settings are established decoded CW signals display over a 48KHz frequency range.



NOTE: Check alignment of CW skimmer against the FDM-SW2 software display and select options as listed below:

- (1) If your preference for RX1 in FDM-SW2 is SSB (USB or LSB) set the Audio IF in CW Skimmer to 0 (zero)
- (2) If your preference for RX1 in FDM-SW2 is CW the value of pitch set in FDM-SW2 must be the same as the Audio IF in CW Skimmer

Refer to examples exhibited on page 8.

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Setup	E	Settings	<b>—</b> ×
Tuning Step Tuning Audio G	raphics Demod Settings Advanced TMate/TMate2 Station Memory Recording Server About	Radio Audio CAT Misc.	Operator   Telnet   Calls
BW Presets	CW Settings	- Hardware Town	
BW (Hz) Enabled	CW BFO Freq. (Hz) Default Audio LP Filter (Hz) 2.500	Hardware Type	LO Frequency, Hz
100	CW SH Delta Freq. (Hz)		7024980
200 🔽	CIICD // CD Cathings	C SoftRock	
300 🗸 🗧	Filter start frequency (Hz)	SoftRock-IF	CW Pitch, Hz
500 🔽	(DC-remove filter) De-emphasys time constant	C SDB-IQ	500 🚖
800	Tuning	C 0518	
1.000	frequency	U Qoin	Audio IF, Hz
1.250	Filter BW	C Mercury	500 🗢 🗋
1.500	<b>←</b> →	C Perseus	
1.750	Filter start		
2.250	(cquiny)		
2.500		Sampling Rate	
2.750 🗸		48 kHz	
Select with "Z"and "X" keys or Thate function buttons	RTTY Settings	C 96 kHz	
Imace rune cloir baccons	RTTY BFO Freq. (Hz) 1.900	S SO KITZ	
Add		C 192 kHz	
Delete			
Sort			
Restore Default			OK Cancel
	OK Apply Cancel	<i>a</i>	

2.3.5 Setting CW Skimmer as a server cluster

Check Enable Telnet Server box in skimmer Settings

Settings				
Radio Audio CAT Mis	c. Operator	Telnet	Calls	1
✓ Enable Telnet Server Port: 8000 ÷				
Require Password				
Password:				
🔲 Do not send callsigns w	ithout "CQ"			
Allow SKIMMER comma	ands			
🔲 Only to/from this U	ser:			
	ОК	C.	ancel	

#### 2.3.6 Setting FDM-SW2 software to view DX Cluster spots

Open the FDM-SW2 Station Memory panel. Set Station Memory Source to DX Cluster in the pull down menu. Set Station info display mode to If in frequency range and labels Orientation to Horizontal to show the spots on spectrum. Refer to example on page 9.

#### 8

Labels Orienta

Horizontal

tion

SH

Ŧ

w labels on

OK

Close the Setup panel.

Station info display r

Next:

Click on MEM button to set the DX Cluster connection

de If in frequency range



Memory Screen Opens	
DX Cluster Interface	- • ×
DXCluster -	
Host 127.0.0.1 Port 8000 🛫 Connect Close	Clear
IU3ADL Send Callsign	
	Send
	Send
	Send
	Send

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Main + IF Spectrum

Cancel

Apply

In the memory screen window type HOST 127.0.0.1 (*IP address of local host*) - Verify port number is the same as the Telnet port in CW Skimmer (*in this case 8000*) - When the terminal requests a Callsign type your call in the space provided and click Send Callsign.

Once your call is entered the terminal displays each Callsign recognized by CW Skimmer

D)	X Cl	uster	Inte	rface											_ 🗆 🗙
D>	(Clus	ster							-						
н	ost	[	127.	0.0.1			Port	80	00		Cor	inect		Close	Clear
DX	de	IU3Z	ADL-	<b>:</b>	702	5.1	SP9BCH		23	dB	22	WPM	DE	2038Z	<b>^</b>
DX	de	IU37	ADL-	-#:	7020	5.1	II3ICZ		19	dB	23	WPM	CÕ	2040Z	
DX	de	IU37	ADL-	-#:	7020	5.1	DL1JFM		18	dB	23	WPM		2043Z	
DX	de	IU32	ADL-	-#:	7029	5.1	DL6ABB		26	dB	17	WPM	DE	2043Z	
DX	de	IU32	ADL-	-#:	7020	5.0	UXODA		17	dB	24	WPM	DE	2044Z	
DX	de	IU32	ADL-	-#:	7021	1.2	K1WW		15	dB	28	WPM		20442	
DX	de	IU32	ADL-	-#:	7021	1.2	AA3I		15	dB	26	WPM		2046Z	
DX	de	IU32	ADL-	-#:	7025	5.3	G4KJJ		13	dB	17	WPM	CQ	2050Z	
DX	de	1037	ADL-	-#:	7020	5.1	PAOZAV		19	dB	22	WPM	DE	2050Z	
DX	de	1034	ADL-	-#:	7020	5.9	OE4PWW		9	dB	28	WPM		20512	
DX	de	1034	ADL-	-#:	7028	2.2	S54MI		13	dB	17	WPM		20562	
DX	de	1034	ADL-	-#:	7020	5.0	PAIMUC		24	aB	29	WPM	DE	20562	
DX	ae	1034	ADL-	-#:	7021		OE4PWW		18	aB	23	WPM		20562	
DX	de	1034	ADL-	-#:	702:	- 4	N4KW		10	aB	1/	WPM	~~	20572	
DX	ae	1034	ADL-	-#:	/020	5. L	113102		18	aв	23	WPM	υų	20562	-
			_	6			_								
103	SADL				Send (	Callsig	IN								
															Send
															Send
															Send
															Send

The same spot will be shown in the Main spectrum of FDM-SW2 display

DX Cluster Interface						
DXCluster 🗸						
Host 127.0.0.1	Port 8000	Connect	Close Clear			
DX de IU3ADL-#: 7025 DX de IU3ADL-#: 7026 DX de IU3ADL-#: 7026 DX de IU3ADL-#: 7026 DX de IU3ADL-#: 7027 DX de IU3ADL-#: 7027 DX de IU3ADL-#: 7027 DX de IU3ADL-#: 7026 DX de IU3ADL-#: 7026	5.1         SP9BCH         23           5.1         II3ICZ         19           5.1         DL1JFM         18           5.1         DL1JFM         18           5.1         DL6ABB         26           5.0         UXODA         17           7.2         K1WW         15           7.2         AA3I         15           5.3         G4KJJ         13           5.1         PA0ZAV         19           5.2         S4MI         13           5.0         PA1MUC         24           5.1         OE4PWW         18           5.2         N4KW         10           5.4         LV2GZ         18	dB     22     WPM     DE       dB     23     WPM     CQ       dB     23     WPM     DE       dB     17     WPM     DE       dB     17     WPM     DE       dB     28     WPM       dB     22     WPM       dB     22     WPM       dB     23     WPM       dB     23     WPM       dB     17     WPM	2038Z A 2040Z 2043Z 2043Z 2044Z 2044Z 2044Z 2046Z 2050Z 2050Z 2050Z 2051Z 2056Z 2056Z 2056Z 2056Z			
IU3ADL Send C	Callsign		Send Send Send Send Send			

Calls will also be displayed in the Contacts panel. Clicking on spots will tune the FDM DUO to a selected frequency.

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Contacts 🛛							
	ALL Bands						
	160m 80m 40m			30m			
	20m 17m 15m 12m						
	10m 6m						
	Freq.	ID	UTC	Timeor			
	7.025.300Hz	G4KJJ	20:50	0:01			
	7.026.100Hz	PAOZAV	20:50	0:01			
	7.026.900Hz	OE4PWW	20:51	0:03			
	7.025.200Hz	S54MI	20:56	0:07			
	7.026.000Hz	PA1MUC	20:56	0:07			
	7.026.100Hz	OE4PWW	20:56	0:08			
	7.025.200Hz	N4KW	20:57	0:08			
	7.026.100Hz	II3ICZ	20:58	0:09			

Please notify ELAD of recommended additions or changes to this document.

E-mail to <a href="mailto:eladit.com">eladit@eladit.com</a> - Include CW Skimmer in the subject line.