

Education Committee Montgomery Amateur Radio Club Rockville, Maryland

Getting Started with Digital Modes on HF David W2LNX, Robert K3RRR, Bruce WA3SWJ

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Montgomery Amateur Radio Club

The goal of this presentation is to help get you started with digital modes on HF.

- station equipment
 - transceiver
 - computer to radio sound interface
 - rig control cable
- setting up a transceiver
- setting up a sound interface
- setting up a rig control cable
- setting up a digital modes program
- operating digital modes program

station equipment



- transceivers
 - Yaesu FT-857D
 - Icom IC-706MKIIG
- SWR meter MFJ-860
- automatic antenna tuner
 - LDG Z-100Plus 100 W tuner generic
 - LDG tuning cables for Tune button
 - Y-ACC for FT-857D
 - IC-2 for 706MKIIG
- line isolator Radio Works T-4-500
- dummy load MFJ-260C
- antenna

- sound interface Tigertronics SignaLink[™] USB
 - has built-in VOX
 - 6 pin mini-DIN data cable SLCAB6PM
 - matching jumper module SLMOD6PM



• rig control cable – Valley Enterprises

- USB CT-62 FTDI for FT-857D
- USB CT-17 FTDI for IC-706MKIIG

- operating systems:
 - Windows 7
 - Ubuntu Linux 14.04 LTS W2LNX
- digital modes programs:
 - fldigi W2LNX
 - JT65-HF K3RRR
 - Ham Radio Deluxe WA3SWJ

- FT-857D
 - set menu items:
 - 019 CAT RATE: 9600 bps
 - 020 CAT/LIN/TUN: CAT
 - 038 DIG MODE: PSK31-U
 - 075 RF POWER SET: 100 or 10 for QRP
 - 085 TUNER/ATAS: OFF
 - set transceiver MODE: DIG, not USB
 - select display: MFi
 - set button B: MTR ALC DISP



- IC-706MKIIG
 - Initial set mode:
 - 29 9600 MODE: 1200
 - 35 CI-V BAUD: 19200
 - Quick set mode:
 - Q1 RF POWER: H or 1 for QRP
 - set transceiver mode: USB

• Device Manager: look for USB Audio Device



• right click on speaker icon – select Recording devices



• select Microphone USB Audio Device – click Properties



• click Levels tab



• select appropriate microphone gain

General Listen Levels	Advanced	
Microphone	+30.0 dB	

too high



• click Advanced tab - select mono 48000 Hz



• right click on speaker icon — select Playback devices



• select Speakers USB Audio Device – click Properties



• click Advanced tab



• select mono 48000 Hz

General	Levels	Enhanceme	nts	Advanc	ed			
Defa Sele in st	ult Form ct the sa hared mo	at mple rate ar ode.	nd bit	depth	to be u	ised wi	nen rur	nning
16	bit, 4800) Hz (DVD Q	uality)		•		<u>T</u> est
Exclu	sive Mo	le						
VA	llow app	olications to	take	exclusi:	/e cont	rol of t	his dev	lice
V 0	Sive exclu	usive mode a	pplic	ations	oriority			
Res	tore <u>D</u> ef	aults						

• in Configure menu – select Sound Card

Fldigi configurat	on 🕒 🖃 💻	×						
Operator UI Wate	fall Modems Rig Audio ID Misc Web Autostart IO							
Devices Settings Right channel Wav								
⊖oss	Device:							
PortA	Capture: Microphone (3- USB Audio Device)							
	Playback: Speakers (3- USB Audio Device)							
⊖PulseA	udio Server string:							
⊖File I/) only							
Restore defa	Its Save Close							

• set audio output to appropriate level



- transmit PSK31 test message click on CQ macro
 - use dummy load
 - set TX on SignaLink to just before ALC indication
 - SWR power meter should
 - be about half RF power setting
 - wiggle slightly for PSK31

• right click on CQ button

Macro editor - C:/Users/bern/fldigi.files/macros/macros.mdf		- • •
Macro Text	Select Tag	
<tx> CQ CQ CQ DE <mycall> <mycall> <mycall> CQ CQ CQ DE <mycall> <mycall> <mycall> CQ CQ CQ DE <mycall> <mycall> <mycall> PSE K <rx></rx></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></tx>	<freq> my frequency <mode> mode <mycall> my call <myloc> my locator <myname> my name <myqth> my QTH <myrst> my RST <antenna> my antenna <band> operating band</band></antenna></myrst></myqth></myname></myloc></mycall></mode></freq>	
Macro Button Label CQ @>	Apply Close	

• right click on ANS button

Macro editor - C:/Users/bern/fldigi.files/macros/macros.mdf			- • ×
Macro Text <tx> <call> <call> CALL> DE <mycall> <mycall< td=""><td><pre> </pre> <pre> </pre> </td><td>Select Tag my frequency mode my call my locator my name my QTH</td><td>•</td></mycall<></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></mycall></call></call></tx>	<pre> </pre>	Select Tag my frequency mode my call my locator my name my QTH	•
Macro Button Label ANS @>)	Apply Close	

• right click on QSO button

Macro editor - C:/Users/bern/fldigi.files/macros/macros.mdf			- • •
Macro Text	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	Select Tag my frequency	
<call> DE <mycall></mycall></call>	<modě> <mycall> <myloc></myloc></mycall></modě>	mode my call my locator	8
	<myname></myname>	my name	<u> </u>
Macro Button Label QSO @>>		Apply Close	

• right click on KN button

Macro editor - C:/Users/bern/fldigi.files/macros/macros.mdf			- • •
BTU <name> <call> DE <mycall> KN <rx></rx></mycall></call></name>	<pre><freq> <mode> <mycall> <myloc> <myname></myname></myloc></mycall></mode></freq></pre>	Select Tag my frequency mode my call my locator my name	•
Macro Button Label KN @		Apply Close	

• right click on SK button

Macro editor - C:/Users/bern/fldigi.files/macros/macros.mdf		x
Macro Text THANK YOU FOR AN ENJOYABLE QSO <name> 73 <zdt> <call> DE <mycall> SK <rx></rx></mycall></call></zdt></name>	Select Tag <freq> my frequency <mode> mode <mycall> my call <myloc> my locator <myname> my name</myname></myloc></mycall></mode></freq>	•
Macro Button Label SK @	Apply Close	

• macros correspond to keyboard function keys

Windows: setting rig control

open Control Panel – open Device Manager – look for
 USB Serial Port – note COM port



• rig control – a convenience but not necessary

• right click Properties — note Manufacturer: FTDI



• Configure menu – select Rig control – for FT-857

Fldigi configuration							
Operator UI Waterfall Modems Rig Audio ID Misc We	b Autostart IO						
Hardware PTT RigCAT Hamlib XML-RPC							
✓Use Hamlib							
Rig: Yaesu FT-857 (Beta)							
Retries Retry Interval (ms) 0 200 Baud rate: 9600							
Write delay (ms) Post write delay (ms) 0 0	Stopbits 2						
OPTT via Hamlib command	Sideband: Rig mode						
ODTR +12	□RTS +12						
ORTS/CTS flow control OXON/XOFF flow control							
Advanced configuration:	Initialize						
Restore defaults	Save Close /-						

 click Initialize – red and green LEDs on CT-62 cable should be rapidly blinking • Configure menu — select Rig control — for IC-706MKIIG

Fldigi configuration	
Operator UI Waterfall Modems Rig Audio ID Misc We	b Autostart IO
Hardware PTT RigCAT Hamlib XML-RPC	
✓Use Hamlib	
Rig: Icom IC-706MkIIG (Stable)	Device: COM27
Retries Retry Interval (ms) 3 1000	Baud rate: 19200
Write delay (ms) Post write delay (ms) 0 0	Stopbits 2
OPTT via Hamlib command	Sideband: Rig mode
ODTR +12	ORTS +12
□RTS/CTS flow control	OXON/XOFF flow control
Advanced configuration:	Initialize
Restore defaults	Save Close <-

 click Initialize – red and green LEDs on CT-17 cable should be rapidly blinking turning tuning knob on radio should change displayed frequency



 changing frequency with mouse should change frequency display on radio • can change bands and transceiver operating modes



• FT-857D quirk - reset transceiver MODE: DIG

• in Configure menu – select Operator – fill in details

Fldigi	configuration								X
Operator	UI Waterfall	Modems	Rig Audio	ID Misc	Web	Autostar	t IO		
	Station								
	Call	sign: W2LI	VX		Name:	DAVE			
			DMAC, MARYI	LAND					
	Loc	ator: FM19	Эjb						
	Ante	nna: ME1		INNA					
			Domini Anti					 	
	1.5.1				[cl	
Re	estore defaults					S	ave	Close	

 in Configure menu – select Waterfall – Display tab – click Monitor transmitted signal

Fldigi configuration						
Operator UI Waterfall	Modems Rig Audio ID I	Misc Web Autostart IO				
Display FFT Processing M	louse					
Colors and cursors	1					
default.pal						
action of particular		Load				
		Save				
Bandwidth	Center line	Signal tracks Notch				
⊘ON	⊘ON	✓ON				
Color	Color	Color Color				
○Wide	○Wide	○Wide				
Frequency scale						
□ Always show a	audio frequencies	Font				
Transmit signal		Signal level				
Monitor transmitted signal						
Restore defaults	Restore defaults Save Close Close					

 in Configure menu – select Waterfall – FFT Processing tab – set waterfall height in pixel

Fldigi configuration	
Operator UI Waterfall Modems Rig Audio ID Misc Web Autostart IO	
Display FFT Processing Mouse	
Image: Slow drop rate	
Changes take effect on next program startup	
Restore defaults Save	Close <-

• in Op Mode menu – select PSK31



• demonstration - PSK31 QSO



- this presentation should help get you started with digital modes on HF
 - configuration for two popular transceivers
 - SignaLink USB makes it easy to get on digital modes
- PSK31 is a popular low RF power digital mode
 - combines the spectrum efficiency of CW with the convenience of using a computer
- fldigi is a well supported digital modes program
- digital modes on HF are fun!

• Chris Sylvain, KB3CS for helping me get started with fldigi and sound interfaces

Questions



education@marcclub.org

fldigi:

http://www.wlhkj.com
http://sourceforge.net/projects/fldigi/files/fldigi
https://launchpad.net/~kamalmostafa/+archive/ubuntu/fldigi

SignaLink:

http://www.tigertronics.com/slusbmain.htm
http://shop.tigertronics.com/Extra-Radio-Cable-p-n-SLCAB6PM-SLCAB6PM.htm
http://shop.tigertronics.com/Plug-Play-Jumper-Module-p-n-SLM0D6PM.htm

rig control cables:

http://www.valley-ent.com/catalog/valley-enterprises/rpc-y857/yaesu-usb-ftdi-ct-62cat-cable-ft-100-ft-817-ft-857-ft-897-p-225.html#.VhQT25egwg4 http://www.valley-ent.com/catalog/valley-enterprises/rpc-i17/icom-ct-17-usb-ftdichipset-ci-cat-control-programming-cable-feet-p-177.html#.VhL6kZegwg4 http://www.ftdichip.com/Drivers/VCP.htm

antenna tuners:

http://www.ldgelectronics.com/c/252/products/17/49/1

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SWR/wattmeter:

http://www.mfjenterprises.com/Product.php?productid=MFJ-860

line isolator:

http://www.radioworks.com/ct-4.html

dummy load antenna:

http://www.mfjenterprises.com/Product.php?productid=MFJ-260C