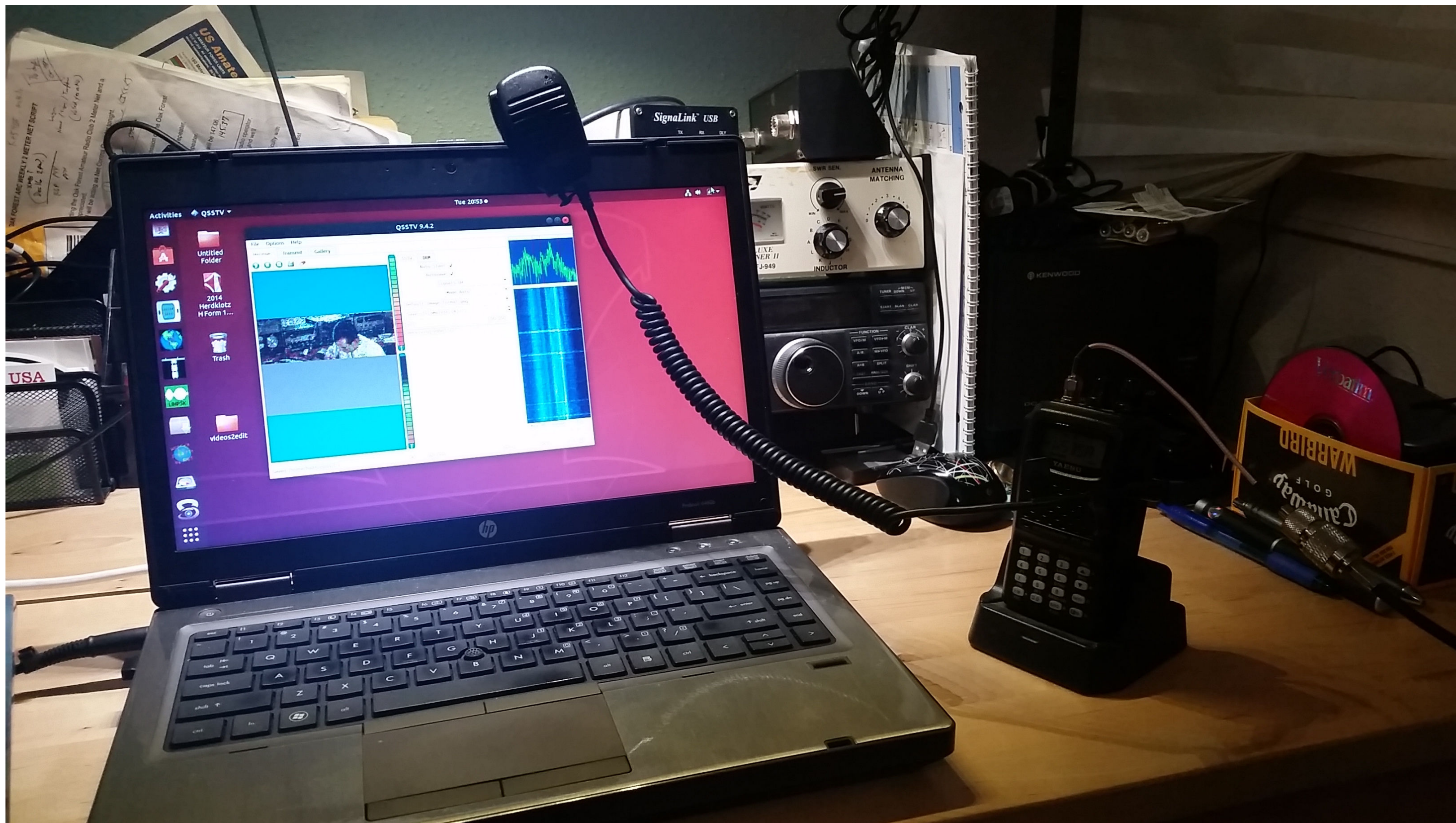


DIGITAL BASICS

KE5HDF
Ralph Phillips
Jan 2020

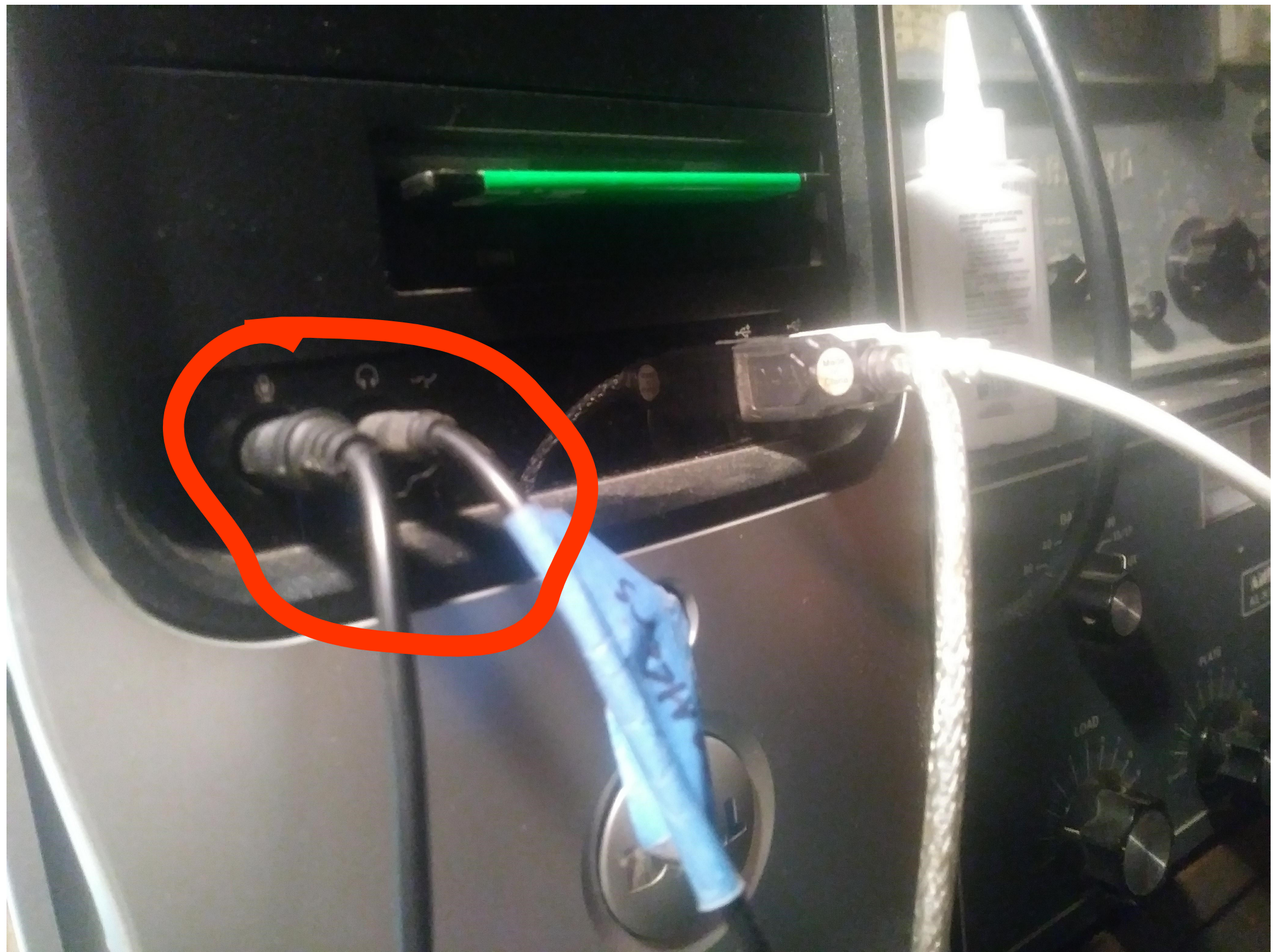
- Digital means computer generated signal is used
- There are A BUNCH of digital modes available to amateur radio operators
- All digital modes are set up in a similar way
- This presentation focuses on FT8 with a dash of PSK31 for flavor





**HEADPHONE
JACK**





Band Activity

UTC	dB	DT	Freq	Message
----- 40m				
012000	0	0.1	294 ~	9G2HO AD0FL EM48
012000	-2	0.0	674 ~	KE0VMT K8QWY EN81
012000	-8	-1.4	721 ~	VE3NOO KE8R R-14
012000	9	0.4	838 ~	W9RF W5JE EM25
012000	-5	0.1	884 ~	CQ N9OY EN43
012000	-6	0.1	964 ~	5T5PA NI5L 73
012000	-9	0.1	1128 ~	CQ WA6GXQ FM06
012000	2	0.1	1222 ~	PV8AJ KD9LLY EN50
012000	6	0.2	1426 ~	KP4PI K6JDC FM07
012000	-4	0.1	1601 ~	LW2DAF KI4RFM EM86
012000	-2	0.2	1625 ~	9G2HO W9KW EN53
012000	5	0.1	1705 ~	KG5LRP AE5TG RR73
012000	-7	0.1	1767 ~	AD4DN KE8KMX FM09
012000	8	0.3	1887 ~	CQ CM2AML EL83
012000	-11	0.5	2123 ~	CQ K3ZK FN21
012000	-4	0.2	2249 ~	5T5PA W3XOX FN00
012000	1	0.1	2381 ~	OK5CW W9RN -20
012000	-21	0.1	2500 ~	AD4DN K6QGV DM13
012000	-4	0.4	2573 ~	K2MFH WB4FWF RR73
012000	0	0.1	2652 ~	9G2HO KC8ETW EN72
012000	-13	0.1	652 ~	9G2HO KC3DRZ EN91
012000	-2	-0.0	838 ~	W9RF KR4FT 73
012000	-2	-0.5	1463 ~	CQ N9TNT EN71
012000	-12	0.1	1583 ~	W3SOX K4GDR EM74
012000	-9	0.3	1710 ~	CX1BBN NE1B FN42
012000	4	-1.5	1881 ~	CQ KY4FLY EM77
012000	-5	-0.7	2381 ~	9G2HO N3EJ EN90

☐ CQ only

40m ☐ ☒

80

60

40

20

0

53 dB

DX Call

N4MF

Lookup

2019 Aug 28
01:20:29

Rx Frequency

UTC	dB	DT	Freq	Message
-----	----	----	------	---------

.S.A.

☒ Menus

Generate Std Msgs		Next	Now	Pwr
F EL29	<input checked="" type="radio"/>		Tx 1	
F +02	<input type="radio"/>		Tx 2	
F R+02	<input type="radio"/>		Tx 3	
F RR73	<input type="radio"/>		Tx 4	
N4MF KE5HDF 73	<input type="radio"/>		Tx 5	
CQ KE5HDF EL29	<input type="radio"/>		Tx 6	

Settings

General

Radio

Audio

Tx Macros

Reporting

Frequencies

Colors

Advanced

Rig: Icom IC-7300 Poll Interval: 1 s

CAT Control

Serial Port: /dev/ttyUSB1

Serial Port Parameters

Baud Rate: 19200

Data Bits

☐ Default ☐ Seven ☒ Eight

Stop Bits

☐ Default ☒ One ☐ Two

Handshake

☐ Default ☒ None ☐ XON/XOFF ☐ Hardware

Force Control Lines

DTR: RTS:

PTT Method

☐ VOX ☒ DTR ☐ CAT ☐ RTS

Port: /dev/ttyUSB1

Transmit Audio Source

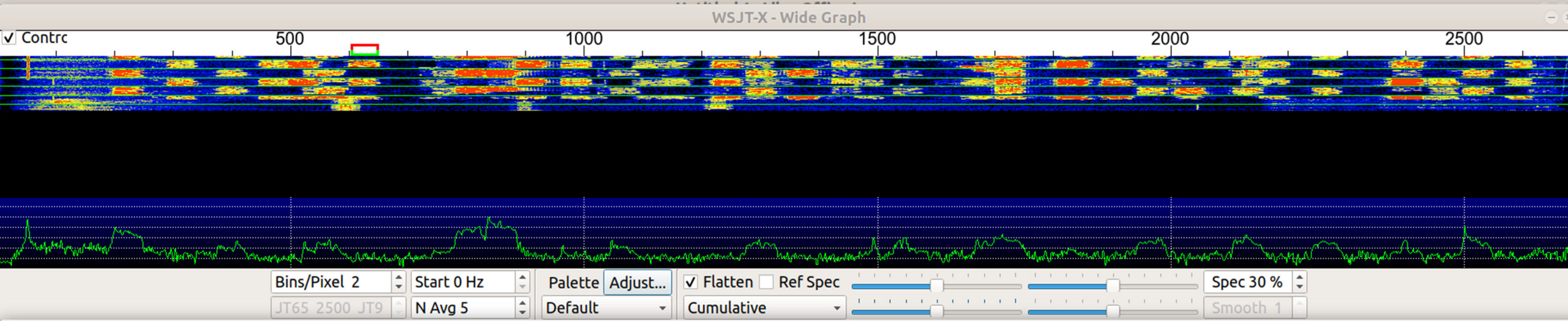
☐ Rear/Data ☒ Front/Mic

Mode

☐ None ☐ USB ☒ Data/Pkt

Split Operation

☒ None ☐ Rig ☐ Fake It



WSJT-X v2.1.0 by K1JT

File Configurations View Mode Decode Save Tools Help

Band Activity						Rx Frequency					
UTC	dB	DT	Freq	Message		UTC	dB	DT	Freq	Message	
011800	10	0.1	1810	~	CQ K3OO FN20 U.S.A.	011730	-15	0.2	1310	~	JY5IB YV5KAJ FK60
011800	-17	0.4	1995	~	CQ KD2FTA FN21 U.S.A.	011730	2	-0.2	603	~	CQ N4MF FM03 U.S.A.
011800	-9	0.3	2059	~	CQ N2BRJ FM29 U.S.A.	011800	0	-0.2	603	~	WA6LIE N4MF -24
011800	-7	0.1	2154	~	9G2HO N4BIX FN01						
011800	-1	0.1	2381	~	OK5CW W9RN -20						
011800	-4	0.3	2573	~	K2MFH WB4FWF -24						
011800	-10	0.1	1218	~	9G2HO KA8LAD EM73						
011800	-15	-2.0	1947	~	W0WB N9XJN R+00						
011800	-11	0.5	2123	~	CQ K3ZK FN21 U.S.A.						

☐ CQ only Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune ☒ Menus

40m

7.074 000

DX Call

N4MF

DX Grid

FM03

Az: 70 1013 mi

Lookup

Add

2019 Aug 28

01:18:21

☐ Tx even/1st

Tx 603 Hz

☐ Hold Tx Freq

Rx 603 Hz

Report 2

☒ Auto Seq ☐ Call 1st

Generate Std Msgs

N4MF KE5HDF EL29

N4MF KE5HDF +02

N4MF KE5HDF R+02

N4MF KE5HDF RR73

N4MF KE5HDF 73

CQ KE5HDF EL29

Next

Now

Tx 1

Tx 2

Tx 3

Tx 4

Tx 5

Tx 6

ICOM

HF/50MHz TRANSCEIVER IC-7300

TX

USB-D



FIL1

VFO A

RFG

7.074.00

S/Po 1:5:9

7.000

7.05

7.10

7.15

7.20

ALC

COMP

0

5

10

15

20

dB

SWR

1

1.5

2

2.5

3

∞

Id

0

5

10

15

20

25A

RF POWER

30%

MIC GAIN

38%

MONITOR

OFF

20%



File Configurations View Mode Decode Save Tools Help


Band Activity

UTC	dB	DT	Freq	Message
011830	-9	0.3	2060 ~	EB3JT N2BRJ -24
011830	-9	0.5	2123 ~	CQ K3ZK FN21 U.S.A.
011830	10	0.1	2381 ~	9G2HO W4ER EM50
011830	-22	0.4	749 ~	CQ HJ3SUA FJ24 Colombia
011830	-11	0.1	1669 ~	W1GLV KN4THR +00
011830	-24	0.0	2606 ~	5T5PA W8UV FM28
----- 40m				
011845	2	0.1	201 ~	WM5L KM4UJI EL88
011845	-3	0.6	377 ~	CQ AC9HP EM69 U.S.A.
011845	0	0.2	546 ~	CQ W3SOX FN10 U.S.A.
011845	-19	0.8	749 ~	KB9UT KP4PI -10
011845	-17	-0.0	801 ~	CQ PV8AJ FJ92 Brazil
011845	8	0.6	889 ~	W5JE WD4LHT EL89
011845	-17	0.2	964 ~	CQ 5T5PA IL10 CQ Zone 35
011845	-12	0.1	1047 ~	CQ WZ4K FM17 U.S.A.
011845	-19	0.1	1207 ~	CM2AML WA6LIE CM96
011845	-4	0.1	1280 ~	N0IZE NA4NA -10
011845	13	0.1	1333 ~	KR4FT W9RF +03
011845	-5	-0.2	1529 ~	CQ YV5DRN FK60 Venezuela
011845	3	1.9	1670 ~	KN4THR W1GLV R-12
011845	-24	0.1	1812 ~	K3OO N3HND FM29
011845	-6	0.1	1946 ~	N9XJN W0WB 73
011845	-6	-0.2	2244 ~	N3TTT WB8SIG EN91
011845	-14	-0.0	2380 ~	W4ER 9G2HO -06
011845	-2	0.1	2501 ~	CQ AD4DN FM04 U.S.A.
011845	-14	-0.3	2611 ~	CQ CO6CG EL92 Cuba
011845	-8	0.0	524 ~	CQ WZ7I FN20 U.S.A.
011845	-5	0.1	889 ~	W5JE K8TBW 73

Rx Frequency

UTC	dB	DT	Freq	Message
011730	-15	0.2	1310 ~	JY5IB YV5KAJ FK60
011730	2	-0.2	603 ~	CQ N4MF FM03 U.S.A.
011800	0	-0.2	603 ~	WA6LIE N4MF -24
011830	2	-0.2	603 ~	WA6LIE N4MF -24

☐ CQ only ☒ Menus

40m 

7.074 000

DX Call

N4MF

Lookup

DX Grid

FM03

Add

Az: 70 1013 mi

2019 Aug 28 01:19:04


54 dB

☐ Tx even/1st
Tx 603 Hz
Rx 603 Hz
Report 2
☒ Auto Seq ☐ Call 1st

☐ Hold Tx Freq

Generate Std Msgs

Next	Now
<input checked="" type="radio"/>	<input type="button" value="Tx 1"/>
<input type="radio"/>	<input type="button" value="Tx 2"/>
<input type="radio"/>	<input type="button" value="Tx 3"/>
<input type="radio"/>	<input type="button" value="Tx 4"/>
<input type="radio"/>	<input type="button" value="Tx 5"/>
<input type="radio"/>	<input type="button" value="Tx 6"/>

Pwr 

Activities

Firefox Web Browser

Tue 21:40

Display Reception Reports - Mozilla Firefox

Display Reception Report

Getting Started

Bookmarks

Search bookmarks

Say 'Hi' to Juno! - NASA J...
SpaceWeather.com - Ne...
entertainment
ham radio
10-10 web site
3905 Century Club - Net S...
Alaska Morning Net | Hig...
Amateur Products - Icom...
Amateur Radio Repeater...
ARRL Home page
ARRL's Logbook of the ...
Arrow Antenna Instructi...
Band Hoppers
Band Hoppers facebook
bcarchams : BCARC Bast...
BCARCHams.org
Brazos Valley Amateur R...
Community Emergency R...
Contact | Greater Housto...
Contest Calendar
DIGITAL Reception Report
Display Reception Report:
DX cluster - dxwatch.com
DXSummit.fi
EB - Amateur Radio Servi...
eQSL.cc - The Electronic ...
GigaParts.com
Ham Nation | TwiT.TV
Ham TV - Amateur Televi...
HamRadioAndVision - In..
Houston amateur radio r...
http://www.cwfun.org/f...
Hurricane Watch Net
Icom IC-T90A Triband HT...
K5EHX Amateur Radio R...

On 40m, show signals, sent by, the callsign KE5HDF, using FT8, over the last 15 minutes, Go!

Display options Permalink

Monitoring KE5HDF (last heard 0 mins ago). Automatic refresh in 5 minutes. 186 reception reports for KE5HDF are shown as times (show logbook).
There are 631 active FT8 monitors on 40m. Show all FT8 on all bands. Show all on all bands. Legend

+

-

BP

CP

DP

EP

FP

GP

HP

IP

JP

KP

LP

MP

NP

OP

PP

QP

RP

AP

BO

CO

DO

EO

FO

GO

HO

IO

JO

KO

LO

MO

NO

OO

PO

QO

RO

AO

BN

CN

DN

EN

FN

GN

HN

IN

JN

KN

LN

MN

NN

ON

PN

QN

RN

AN

BM

CM

DM

EM

FM

GM

HM

IM

JM

KM

LM

MM

NM

OM

PM

QM

RM

AM

BL

CL

DL

EL

FL

GL

HL

IL

JL

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AJ

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EI

FI

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FH

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QH

RH

AH

BG

CG

DG

EG

FG

GG

HG

IG

JG

KG

LG

MG

NG

OG

PG

QG

RG

AG

BF

CF

DF

EF

FF

GF

HF

IF

JF

KF

LF

MF

NF

OF

PF

QF

RF

AF

EE

FE

GE

HE

IE

JE

KE

LE

ME

NE

OE

PE

QE

RE

AE

ED

FD

GD

HD

ID

JD

KD

LD

MD

ND

OD

PD

QD

RD

AD

Rx at Wed, 28 Aug 2019 02:39:14 GMT
From KE5HDF by 5T5PA Loc IL10LW
Frequency: 7.074.977 MHz (40m), FT8, -17dB
Distance: 4852 miles bearing 76°
Using: MSHV v2.15
Antenna: Dipole

Rx at Wed, 28 Aug 2019 02:39:14 GMT
From KE5HDF by 5T5PA Loc IL10LW
Frequency: 7.074.977 MHz (40m), FT8, -17dB
Distance: 4852 miles bearing 76°
Using: MSHV v2.15
Antenna: Dipole

Statistics — Comments to Philip Gladstone — Online discussions — Reception records: 8,306,823,177 (87/sec) — Hosting by Fast Serv Networks, LLC

PSKREPORTER.INFO

Activitieswsjtx

WSJT-X v2.1.0 by K1JT - Log QSO

Click OK to confirm the following QSO:

Call

Start

End

W7OK

28/08/2019 02:42:00

28/08/2019 02:43:00

Mode

Band

Rpt Sent

Rpt Rcvd

Grid

Name

FT8

40m

-13

-15

CN86

Tx power

50

Retain

Comments

FT8 Sent: -13 Rcvd: -15

Retain

Operator

Exch sent

Rcvd

Cancel

OK

024215 -22 -0.0 2505 ~ OA5DSD 9G2HO -15

----- 40m

024245 -13 0.3 337 ~ KE5HDF W7OK RR73

024245 -8 0.1 201 ~ WM5L KM4UJI EL88

024245 9 0.5 425 ~ N7LFX AG5ND -19

024245 -11 0.1 613 ~ CQ KX4TE FM06 U.S.A.

024245 -24 0.1 716 ~ OA6AMN K6KEC -14

024245 -24 0.2 835 ~ CQ LZ4TL KN22 Bulgaria

024245 0 0.1 1024 ~ KG7FZE KX4TW -22

024245 -4 0.3 1136 ~ IU7GTP WD8ANZ 73

024245 1 0.4 1296 ~ CQ CM2XN EL83 Cuba

024245 -10 0.1 1354 ~ KO5T K8RDH -03

024245 2 0.2 1459 ~ N5BKG W1DOH -02

024245 2 0.1 1704 ~ VE2TDT KC4IG RR73

024245 -19 0.0 1999 ~ DL9AKA LW6HAR RR73

024245 -3 0.1 2051 ~ I6IQX K3VN RRR

024245 -21 0.1 2199 ~ KG5ZZB EA1QR R-13

024245 -20 -0.1 2418 ~ CQ N8MRB EM88 U.S.A.

024245 -4 0.3 2552 ~ CQ KD8TUT EN62 U.S.A.

024245 -24 0.4 2600 ~ RT6DO LU1WFU 73

024245 -20 0.1 1406 ~ N1CLG KC7PBH R-10

024245 -22 -0.0 2505 ~ OA5DSD 9G2HO -15

FT8_learnings.odp - LibreOffice Impress

WSJT-X v2.1.0 by K1JT

Rx Frequency

UTC	dB	DT	Freq	Message
023745	-12	-0.0	964	~ CQ 5T5PA IL10 CQ Zone 35
023810				Tx 964 ~ 5T5PA KE5HDF EL29
023815	-5	0.3	963	~ VE2CED WD8ANZ 73
023830				Tx 964 ~ 5T5PA KE5HDF EL29
023815	-17	-0.0	964	~ CQ 5T5PA IL10 CQ Zone 35
023845	-16	0.2	964	~ CQ 5T5PA IL10 CQ Zone 35
023900				Tx 964 ~ 5T5PA KE5HDF EL29
023915	-21	0.2	964	~ SP5EAF 5T5PA -19
023915	-20	0.2	1024	~ KE5HDF 5T5PA -17
023945	-21	0.4	964	~ SP5EAF 5T5PA -19
023945	-20	0.4	1024	~ KE5HDF 5T5PA -17
023945	-24	0.1	963	~ R1CAP EA1QR R+02
024015	-23	0.2	965	~ SP5EAF 5T5PA -19
024015	-24	0.2	1024	~ KE5HDF 5T5PA -17
024045	-22	0.2	964	~ SP5EAF 5T5PA RR73
024115	-15	0.2	964	~ CQ 5T5PA IL10 CQ Zone 35
024145	-16	0.2	964	~ CQ 5T5PA IL10 CQ Zone 35
024145	-9	0.2	337	~ CQ W7OK CN86 U.S.A.
024205				Tx 337 ~ W7OK KE5HDF EL29
024215	-13	0.2	337	~ KE5HDF W7OK -15
024230				Tx 337 ~ W7OK KE5HDF R-13
024245	-13	0.3	337	~ KE5HDF W7OK RR73
024300				Tx 337 ~ W7OK KE5HDF 73

CQ only

Log QSO

Stop

Monitor

Erase

Decode

Enable Tx

Halt Tx

Tune

Menus

40m

7.074 000

DX Call

W7OK

Lookup

DX Grid

CN86

Add

Az: 316 1878 mi

2019 Aug 28

02:43:08

Tx: W7OK KE5HDF 73

7300

FT8

Last Tx: W7OK KE5HDF R-13

8/15

WD:6m

The screenshot shows the Fldigi software interface. The top bar indicates the time is Tue 20:15 and the version is fldigi ver4.0.1 - KESHDF. The main window is split into two panes. The left pane shows a frequency display of 7.070 and a list of messages. The right pane shows a text-based conversation. The bottom status bar contains various controls and indicators. A red circle highlights the 'Spot', 'RxID', 'TxID', and 'TUNE' buttons in the top right corner.

Top bar: Tue 20:15 • fldigi ver4.0.1 - KESHDF

Buttons: File Op Mode Configure View Logbook Help

Frequency: 7.070

Call: 8.961 On Off 0115 In Out

USB

Qth

St Pr Loc

1747 SCDW CQ CQ CQ de KI5

591

12 h lt1
 lS i sn n3 el
 ;s ro ato r e-- t
 otee sodMeeme o dh t f n
 r
 cr
 e o c goslcX eoe e e e e-#et=2 fe ne+on|emiewelt oa Y è ae o e li-stahorta
 =foe
 eph3 It e "
 ter r C n
 tR oue-oe ittb=leo eei 5a g ,³ eteeo i egno tgc4o e e)fIeh
 <<2019-08-28T01:12Z BPSK-31 @ 7070+1898>>
 ood lpck Dame TNX FOR NICE m SO
 BEST it3 73 ND)OD BLESS YOU AND FAMJsY. !
 KY0L Du KC8I?K
 E i
 teKC8G0I de KY0L

Thanks for the QSO Dan. Have a good evening there end 73's.

KC8G0I de KY0L
 T m f otd0eAi alo) ee ocSo oe:iE e e e eea A
 KY0L KY0L de KC4RNF KC4RNF

CQ

2.0

Clear

CQ ANS QSO KN SK Me/Qth Brag T/R Tx Rx TX

500 1000 1500 2000 2500 3000

WF -23 33 x2 SLOW 1891 QSY Store Lk Rv T/R

BPSK31 s/n 6 dB imd -7 dB -3.0 AFC SQL

KESHDF - DigiPan

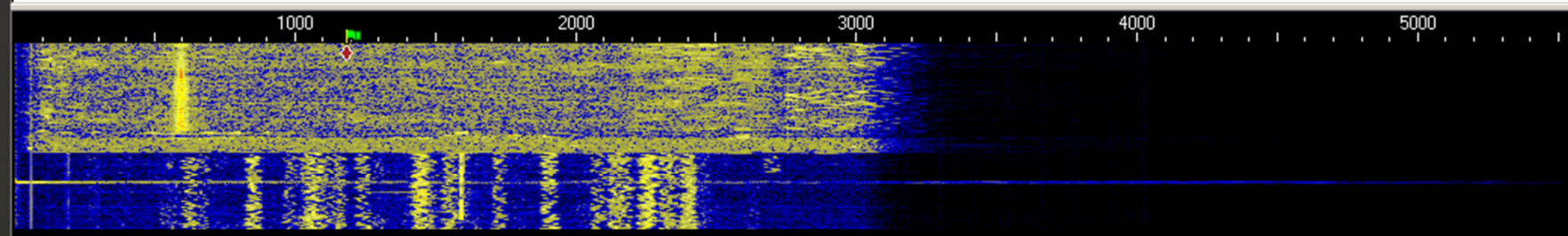
File Edit Clear Mode Options View Lock Configure Help

80m 20m 15m 10m Time Date CW ID

Call: Name: QTH: Rec'd: Sent: Band: Notes: * 20m

t neit et t
^! t tto n
it oa: trp t ocEm e
ftot eoeter fee e to je o i ott
fi

A: IpZa n s i tm rr é ZoO oA t- a eeo etted ee e e ao
B: fp pp t a w ote t aoni#ei. xee t,eeeeeee ooooo ee =n
C: r a ee ls titait e d itie#et r neeeA ette a
D: JI te e l oat oma t eRr + tt ds na =b E f e tti ot o ae l
E: 3e nt! on l ei t a eelen ô e e t aodeee e etonfeioie se tn-ee tP
F: teeai t neo = t oeo et emo ot2ar l n eed et l e tw st t
G: etleZtpo -n de otta tteu , timito e en e a to e m } et e s en a ea
H: ^e! m e ewc i e. a ee t neo .ee a,esseu aeteto een
I: tnrt p c=- en eeavol e eet2oe o ai le t t ei t toil>ts i d
J: ' tG eH te o a t ir qQin t er Wltn i p 7lt t-e e e
K: n T wrt e lea oeaom tt o et yfteeat ee oae ft t e et d
L: l e eat eo p T= enT -o riP t e isme eoc [te sli -Oe r
M: r b o e aaelt TP i ttot = t w eet ie pl tft:trztT
N: XE3VDK de N0TTT K XE3VDK
O:
P:
Q:
R:
S:
T:
U:
V:
W:
X:
Y:
Z:



K N H G D L C M E U F

USEFUL LINKS

List of digital modes with audio samples

<http://wb8nut.com/digital/>

list with links to frequencies

<https://sumterdigitalgroup.com/digital-modes/>

list of common digital modes with preferred frequencies

<https://www.qsl.net/sv1grb/psk31.htm>

digital mode reception reports map

<https://www.pskreporter.info/pskmap.html>

WSJT-x home page

<https://www.physics.princeton.edu/pulsar/k1jt/wshtx.html>

FINAL THOUGHTS

Each radio is a little different to set up, so ask questions and watch videos

YouTube has lots of videos that may be useful. Search for your radio and the mode you want to use

David Casler on YouTube is an excellent resource. LOTS of videos on various topics

Experiment with your settings to find what works for you

Try different digital modes to see what you like best