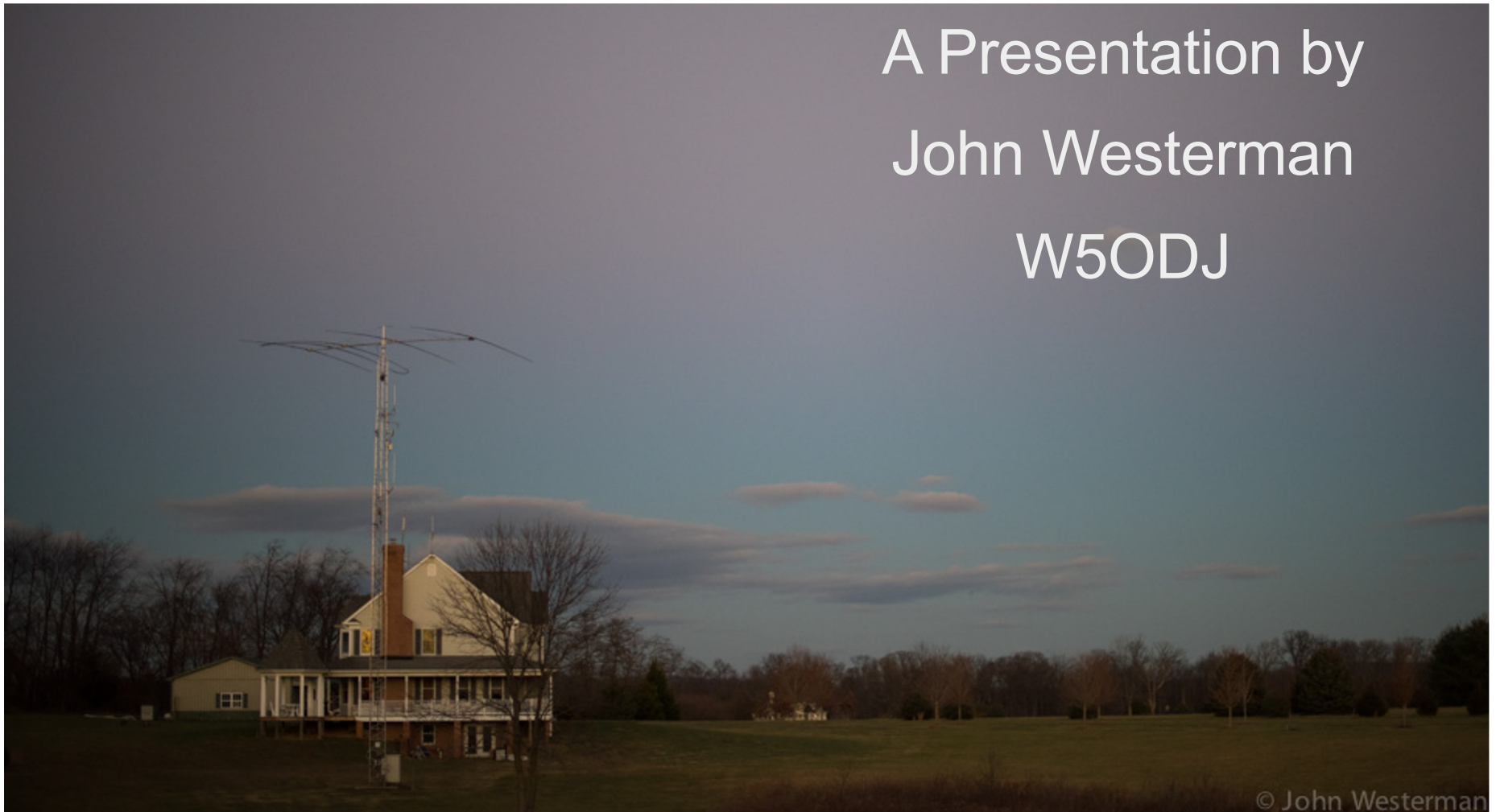


JS8 HF Digital Operation

A Presentation by
John Westerman
W5ODJ



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Digital Operation - Agenda

- Digital Modes and Operations
- JS8 Digital Mode
- Digital Operation Tips
- Individual components of digital kit
- Details of how to sew system together
- Questions
- Live demonstration
- 30 minutes

My first Digital QSO, April 22, 2008:

CQ CQ Skirmish de WA4EEZ WA4EEZ WA4EEZ

WA4EEZ DE WB50DJ WB50DJ

WB50DJ LESLIE WA4 LESLIE WA4 WB50DJ

HI LESLIE HANDLE HERE IS JOHN MY FIRST PSK QSO OVER

WB50DJ de WA4EEZ...John, I am so happy to be ur first PSK QSO....You will enjoy this mode and meet lots of new friends...I am in a PSK contest, and the exchange is the name, and the prefix...so you can send me your prefix--like WB5--...

BTU John, de WA4EEZ kn

LESLIE ... THANKS FOR TAKING MY TRANSMISSION. I AM A COMPUTER GUY BUT THIS IS ALL VER NEW TO ME. I WILL LET YOU GET BACK TO YOUR CONTEST. WA5EEZ DE WB50DJ OVER

WB50DJ de WA4EEZ...ok John, well I am most definitely not a computer gal, but sure enjoy these digital modes....BTW ur sig is 599 599 and clean...very nice.

73 es thanks for this contact, and may you have many, many more!! 73 and good hamming to you

WB50DJ de WA4EEZ..oh my name is Leslie.. bk

wa4eez de wb5odj ... handle is John. QTH is Northern Virginia (lovettsville). Antenna is new SteppIR at 80 feet. driven by a ICOM 756pro3. beam pointed to FL at the moment. UR signal is also 599 599 599 over.

WB50DJ de WA4EEZ...My kinfolk are from Giles County up there in VA....Thanks again John, and will see you again, I am sure...73 de WA4EEZ sk

73 73 73 and good night. thanks a million for the qso. WB50DJ clear

Digital Operation

- All digital communications use USB.
- Most radios want to use “D” (digital) mode; D(igital) mode will mute microphone input.
- Digital in most bands requires very little power (≤ 25 watts), esp. when band is active/open.
- Digital modes consume consistent power as compared to CW or voice SSB.
- Computer will open carrier and transmit, even idle, 100% of the time.

Digital Operation

- Shorthand follows CW
 - K = “Over”
 - KN = “Over to N0GQ”
 - SK = “End of transmission”
 - BK = “Break”
 - CQ = “Calling all stations”
- Anything works!
- Don’t get caught up in semantics; no one cares.
- Observe the flow; get in and fumble around.

Digital Operation - Power

- It is best to use only the power you need at all times. You will be very surprised what you can do with 5 watts using OLIVIA protocol.
- If low power doesn't do the job often aggressive power won't either.
- Unnecessary high power in digital mode wastes bandwidth.
- It is obvious when used ("splatter") and does nothing for readability of your transmission.

Digital Operation - VNC

- VNC (“Virtual Network Computing”) is common remote control software
- Use any computer as a client; Access Raspberry Pi remotely. Works well with VPN Works on any OS including phones and tablets.
- Let Pi computer focus on very few tasks; removing these tasks from your computer.
- RPi uses very little power in idle mode. I leave powered on.
- Use this setup with multiple radios; each with their own control computer. I use two; one on IC7610, the other IC7300. Each have their own antenna

Digital Operation - LARG Nets

➤ LARG DIGITAL NETS

- Digital Watering Hole
 - (<https://k4lrg.org/nets/digital-modes/>)
- Sunday night, 19:30 local time
- In winter 80 meters is used.
- Center frequency 3582.75 kHz
- Olivia 500/8 mode
- USB-D Mode 3581.25 kHz + 1500 Hz for center
- Reference: <https://k4lrg.org/nets/>

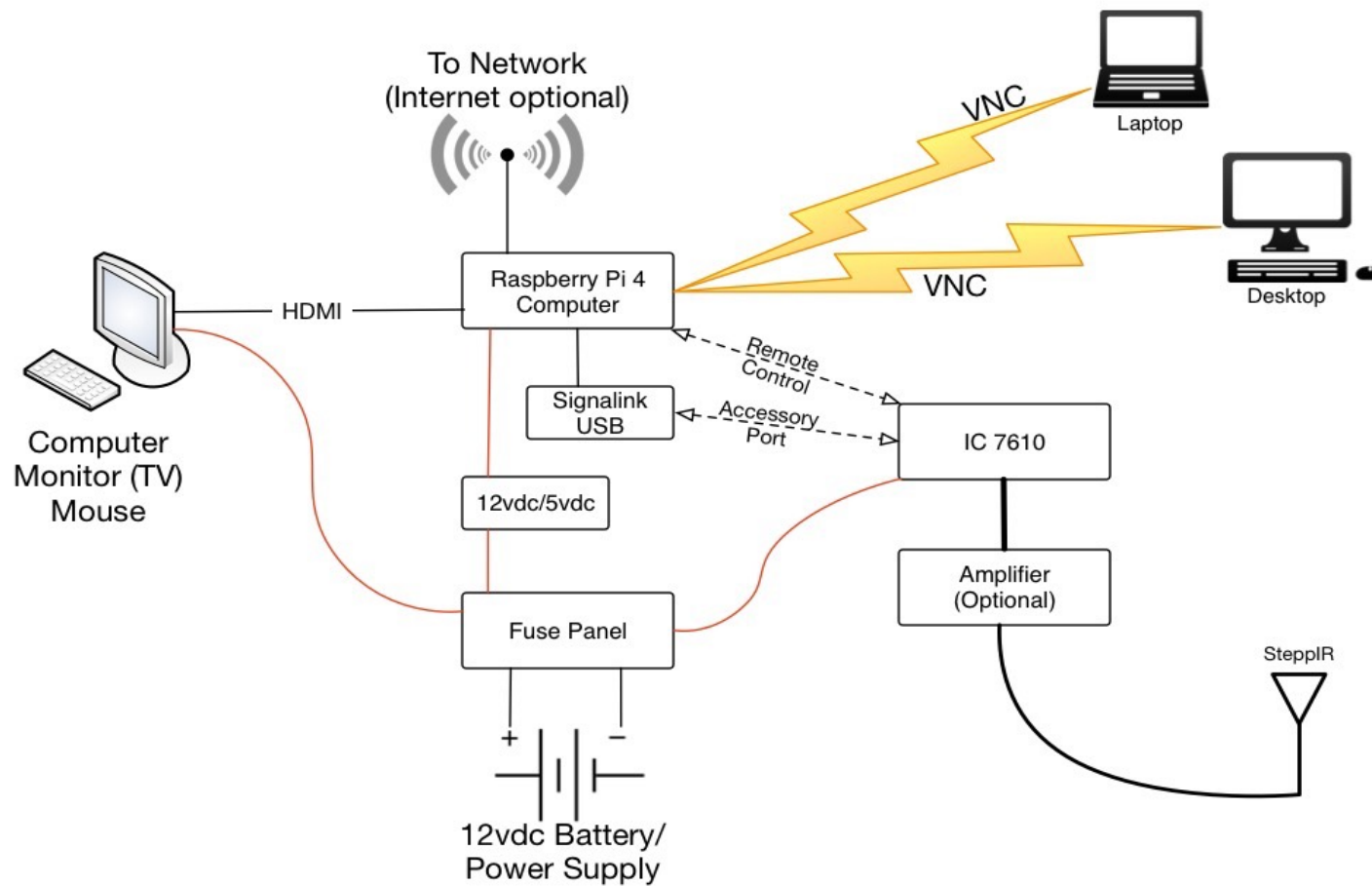
➤ CW

- The original digital mode
- Tuesday nights 20:00 local time

Digital Operation - Frequencies

- Frequencies
 - Many! See ARRL Band plan
 - 40 meters: 7.040 Mhz (\pm)
 - 40 meters: 7.078 Mhz (JS8Call)
 - 20 meters 14.070 Mhz (\pm)
- Reference LARG web site:
<https://k4lrg.org/nets/digital-modes/>
- Get out there and listen around!

Digital Operation - Design





Digital Operation – IC7610 Setup



Digital Operation – IC7300 Setup

JS8 Digital Mode

- JS8Call is software that uses the JS8 Digital Mode providing weak signal keyboard to keyboard messaging to Amateur Radio Operators.
 - JS8Call is an experiment to test the feasibility of a digital mode with the robustness of FT8, combined with a messaging and network protocol layer for weak signal communication on HF, using a keyboard messaging style interface.
 - It is not designed for any specific purpose other than connecting amateur radio operators who are operating under weak signal conditions.
 - JS8Call is heavily inspired by WSJT-X, Fldigi, and FSQCall and would not exist without the hard work and dedication of the many developers in the amateur radio community.
- Decodes in 4 different speeds simultaneously
- Decodes the entire spectrum of waterfall
- Can dedicate tx/rx but generally not necessary/needed

JS8 Digital Mode - API

- Works with compromised antennae and very low power
- Conversational. Not computer driven
- Normal QSO vs. letting your computer do the work
- Can set up for group calls (nets like @LARG or @K4LRG)
- Automated functions (Querying @ALLCALL for HB)
- Message storage (send “email” to each other)
- Relay messages through other stations

JS8 Digital Mode - API

- Allows for API access to most functions.
- Good fun programming the API interface
- Reference:
 - <https://github.com/jfrancis42/js8net>
 - Python code to interface js8net library:
<https://files.k4lrg.org/s/EXg9xbfAK24c96e>

JS8 Operation

Weekly Nets - Loudo... JS8Call de KN4CRD (...)

JS8Call de KN4CRD (v2.2.0)

File Configurations Mode Log View Control Help

7.078 000 :
2002 Hz

W5ODJ
06:45:47
2021 Jan 12

RX TX NORMAL+MULTI+AUTO+HB+ACK
SPOT LOG TUNE

Offset	Age	SNR	Message(s)
690 Hz	1m	+18 dB	WE4SEL: VA3OZO HEARTBEAT SNR -03
749 Hz	1m	+10 dB	W7SUA: VA3OZO HEARTBEAT SNR -17
1000 Hz	1m	+03 dB	NM5XD: VA3OZO HEARTBEAT SNR -16

06:15:58 - (600) - W5ODJ: N0GQ HEARTBEAT SNR +05
06:26:29 - (650) - W5ODJ: KB8HTU HEARTBEAT SNR +00
06:27:12 - (2002) - N0GQ: VE7OES HEARTBEAT SNR -05
06:28:43 - (900) - W5ODJ: K0FBS HEARTBEAT SNR +04
06:31:59 - (650) - W5ODJ: WS3H HEARTBEAT SNR -07
06:41:58 - (850) - W5ODJ: CE4HUS HEARTBEAT SNR +05

\$

★ Callsigns (289)	Age	SNR	Offset	✓	Name	Comment
@ALLCALL						
NM5XD	1m	+03 dB	1000 Hz			
W7SUA	1m	+10 dB	749 Hz			
WE4SEL	1m	+18 dB	690 Hz			
CE4HUS	3m	+05 dB	501 Hz			
KC7OGJ	5m	+16 dB	744 Hz			
WS3H	13m	-07 dB	898 Hz			
K0FBS	17m	+04 dB	694 Hz			
W9DRR	18m	-09 dB	800 Hz			
★ N0GQ	18m	+10 dB	2002 Hz			
KO4DEF	18m	-07 dB	502 Hz			
KB8HTU	19m	+00 dB	794 Hz			

HB + ACK CQ REPLY SNR INFO STATUS Saved Directed Deselect Send (15s) Halt

CAT

80 60 40 20 0 42 dB

06:45:30 40m
06:45:15 40m
06:45:00 40m
06:44:45 40m

Control Display Timing

Offset
Offset: 2002 Hz

QSY
QSY
Center: 1500 Hz

Filter
☐ Enable Filter
Center: 1500 Hz Sync

Decoding JS8 Last Tx: W5ODJ: CE4HUS HEARTBEAT SNR +05 2/15 8.0wpm / 32.0cpm

Live Demo

- Raspberry Pi 4
- Remote VNC control
- JS8Call digital software
- TX/RX tuned for 40 meters centered at 7.078 Mhz
- 25 watts into SteppIR @ 90'
- IC-7610 set for USB-D mode into Signalink
 - Digital modes always use USB
 - D(igital) mode will mute microphone input on TX

The end...

Thank you!

Be sure and get out to:

<https://k4lrg.org/nets/digital-modes/>

and check out all the details there.

You will find this presentation there.

73 de W5ODJ SK