Icom IC-705 First Thoughts

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KX3 issues – why buy a new QRP rig?

- Bought my Elecraft KX3 in 2011
- Receiver highly rated by Rob Sherwood NC0B
- Love it!!! Super radio for CW and SSB
- But…not really designed for modern digital modes
- No internal USB soundcard
- Cannot charge internal batteries while in use
- Requires large number of cables, connectors, and a USB soundcard
- Takes 10-15 min to hook everything up and then tear down
- Not designed for heavy transmit duty cycle…large aftermarket for heatsinks
- Insufficient frequency stability for JT modes without calibration
- Look, I'm a huge Elecraft fan, but the KX3 is showing it's age

KX3 cabling requirements

- Need following for KX3 digital operation
  - USB soundcard
  - Cable from headphone jack to USB soundcard
  - Powered speaker because we have cable plugged into headphone jack
  - USB cable to recharge powered speaker
  - Audio splitter between headphone cable and speaker
  - Cable from mic jack to USB soundcard
  - Twin cables from PX3 panadapter to KX3
  - Power cable for PX3
  - Power cable for KX3
  - USB cable from soundcard to computer
  - Elecraft USB rig control cable

KX3 Frequency Stability

- KX3 came out just before JT modes in WSJT-X like FT8, JT9 and WSPR
- JT modes require excellent frequency stability
- Elecraft announced a calibration procedure in 2012 to improve stability
- Required equipment for 30 min calibration procedure:
  - Precision 50 MHz signal generator
  - Heat gun
  - Refrigerator

IC-705 cabling requirements

- For digital modes with IC-705 you need:
  - Micro USB cable
  - Power cable if you want 10W output
- Even though IC-705 is bigger than KX3, there's more spare room in my bag
- Don't need external speaker or PX3
- Yes, IC-705 has no antenna tuner, but my antennas are resonant
- At some point may buy small ATU, for now have old LDG Z11

Price comparison

- IC-705 is complete at $1299.50
- KX3 starts at $1164.95 (note that package deals and occasional discounts are available)
  - Roofing filter $169.95
  - Internal NiMH charger $89.95
  - PX3 $659.95
  - 2M Module $289.95
  - Hand mic $69.95 (not included with radio)
  - Do the math…I'm an engineer, not an MBA!

Example of KX3 for digital operation

What a mess! Error prone and time consuming to set up

Example of IC-705 for digital operation

Much simpler! Most cables are for K1EL Winkeyer

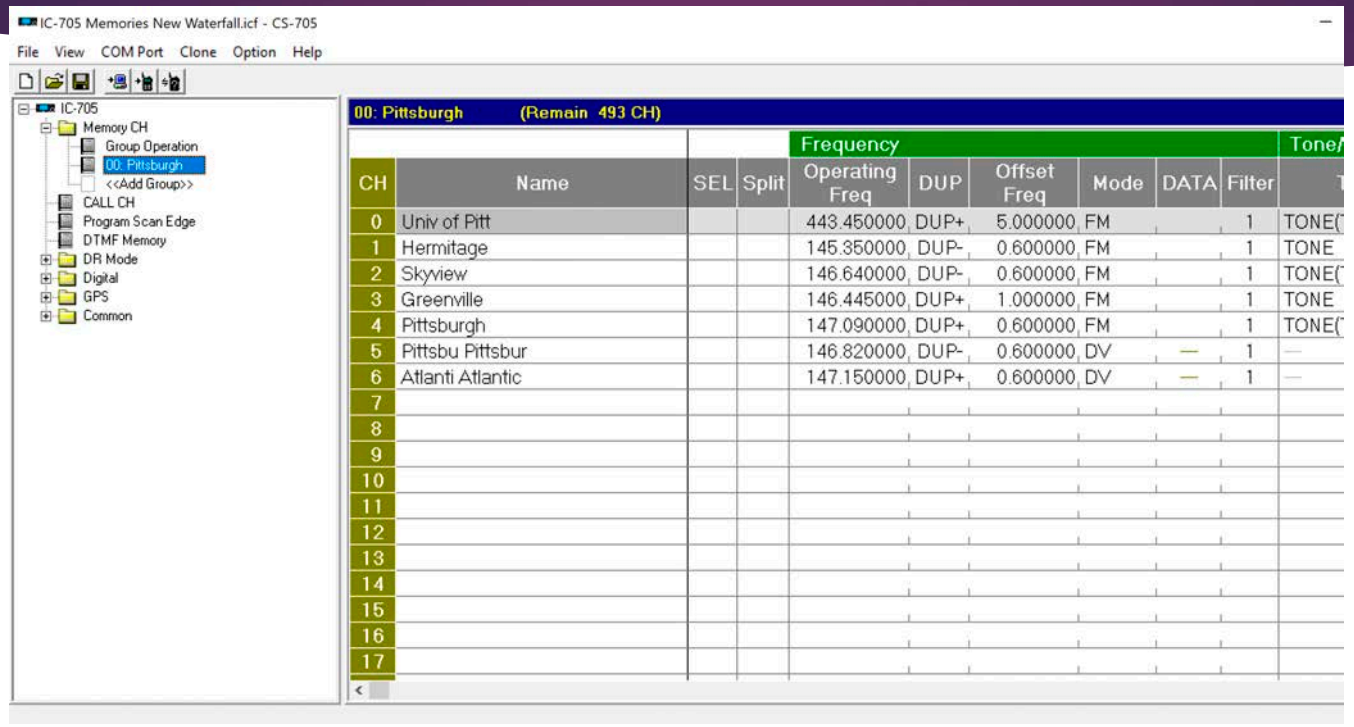
First impressions of IC-705

- It's like a mini IC-7300 but with more features like 2M, 440, and D-STAR
- Great CW radio
- Works well with Fldigi/Flrig and WSJT-X
- Snap-on battery packs are excellent idea, better than internal batteries
- Can charge batteries while in operation
- Batteries can be charged from either external supply or USB cable
- Can access D-STAR through Internet connection
- User interface just like IC-7300
- Not lightweight, but not all that heavy
- Seems reasonably weather sealed
- Front facing speaker sounds very natural

First impressions of IC-705

- No problems with 100% duty-cycle digital modes
- Voltmeter on display huge help for operating with batteries
- CW reception just like IC-7300…filters and NR seem the same
- SSB works surprisingly well with reports of good audio
- Works great through 2M/440 repeaters…reports of good audio quality
- Having an HF radio with 2M/440 FM capability perfect for travelers
- Can use noise-reducing headphones connected through Bluetooth
- Able to operate all afternoon on 3AH LiFePO4 battery including heavy digital use at 10W
- BP-307 battery allows operation for very long time, quick setup for 5W output

CS-705 Programming Software



CS-705 programming software is free
Windows only, but runs under Parallels on my MacBook Pro
Much easier than entering directly into the IC-705

IC-705 annoyances and nit-picking

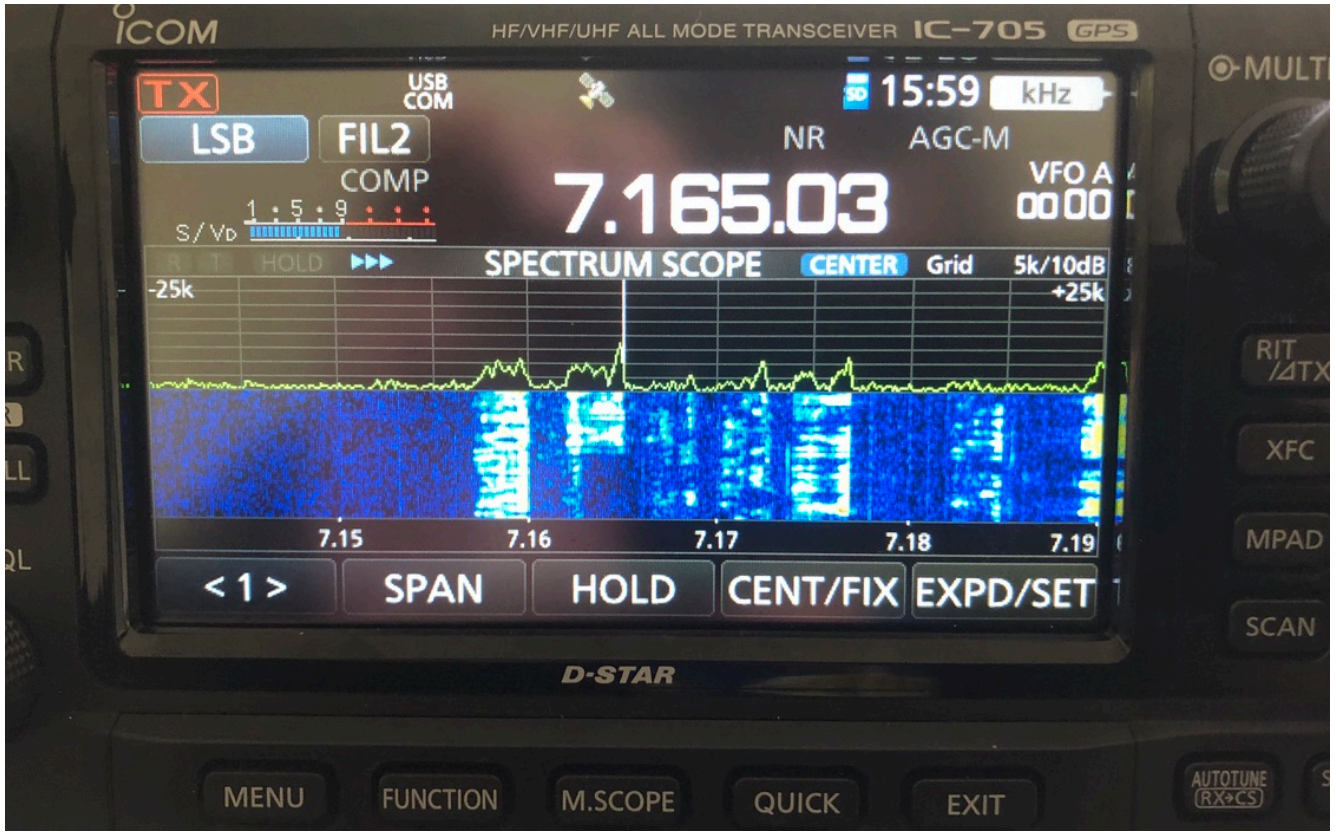
- No USB cable included
- Appears rig transmits when connecting to D-STAR gateway through network
- Must update list of D-STAR systems by downloading from Icom and copying to micro SD card. Why not just download directly to radio?
- Keeps tipping over…needs flip-out feet on front
- Remote software costs around $150 and runs only on Windows
- Noisy T/R relays just like IC-7300 but not as loud. Must run in the family
- 2.5mm DC power connector instead of more popular 2.1mm
- Remote control and picture apps only for Android, none for iOS

Cheap mount for IC-705

- IC-705 sits flat…less than ideal ergonomics
- $10 Ulanzi MT-03 photo tripod solves this problem
- Light and easy to carry
- Available from B&H and Amazon
- Any “tabletop” photo tripod will work
- Thread on IC-705 is standard for ball heads

Customizing IC-705 Signal Display

- Excellent video on customizing waterfall display by Ham Radio DX YouTube Channel
- Also works for IC-7300 and IC-7610
- https://youtu.be/PTDSF4eYm2I



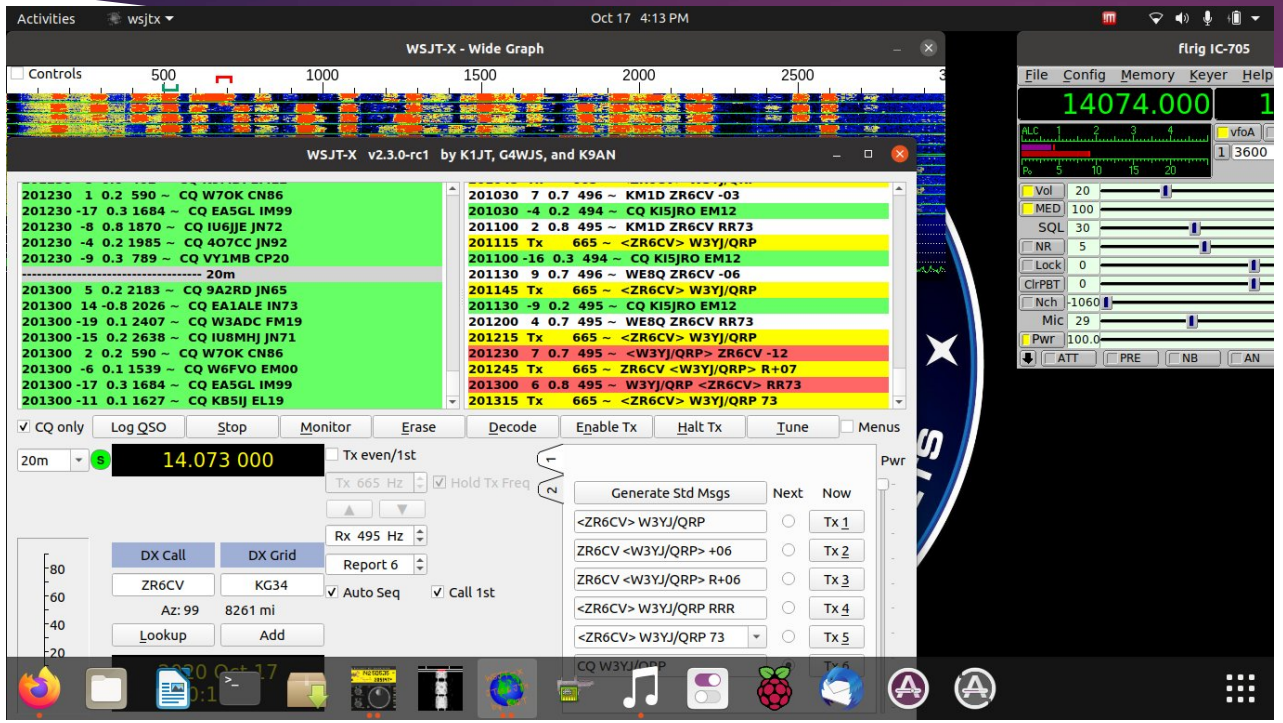
IC-705 power consumption

- Much concern in QRP community about power consumption
- About 240 mA current receive
- About 2230 mA at 10W continuous transmit
- Not significantly more than KX3, less than KX3+PX3
- With modern LiFePO4 batteries power consumption is less of an issue

Working Satellites with IC-705

Panther Amateur Radio Club attempts to work a hamsat
IC-705 can operate USB/LSB on 2M/430 in addition to FM
Panadaptor simplifies tuning for Doppler shift
We just started…need more practice

Yeah, it works!



Working ZS6CV on 20M FT8 10W
Antenna PAR 20M end-fed
Ubuntu Linux

IC-705 with Fldigi and Flrig

- Wiki for setting up with Fldigi and Flrig at https://sourceforge.net/p/fldigi/wiki/IC-705%20Setup/
- New feature: CW via CAT over USB
- No external keyer required
- Don't need extra USB or CW keying cable
- Just configure CW modem in Fldigi and set Fldigi mode to CW
- Raspberry Pi 3B+ tablet at right draws only 250 mA at 13.8 VDC

IC-705 and GPS

- GPS receiver in IC-705 can be used to set precise time in Raspberry Pi
- Important for operating FT8 outside range of Internet
- See help sheet at http://www.w1hkj.com/W3YJ/Pi_IC-705_GPS.pdf

```
Time:          2020-11-17T22:45:25.000Z
Latitude:       40.49008166 N
Longitude:      79.89746499 W
Altitude:      788.386 ft
Speed:         0.81 mph
Heading:       269.8 deg (true)
Climb:         0.00 ft/min
Status:        3D FIX (80 secs)
Longitude Err:    +/- 36 ft
Latitude Err:     +/- 37 ft
Altitude Err:     +/- 113 ft
Course Err:       n/a
Speed Err:        +/- 51 mph
Time offset:      0.034
Grid Square:      FN00bl
```

PRN:	Elev:	Azim:	SNR:	Used:
3	37	250	22	Y
4	47	310	32	Y
16	64	200	37	Y
22	27	226	23	Y
26	72	062	17	Y
27	11	165	16	Y
29	15	045	18	Y
31	37	070	20	Y
9	10	313	24	N
32	07	135	00	N

Eliminate USB cable with kappanhang

- USB cables for rig control can be a huge source of noise
- No amount of rf suppression attached to cable seems to eliminate all noise
- Solution: Turn on IC-705's BA1 wireless server and…
- Run a program named kappanhang on your Linux system that will connect wirelessly to your IC-705.
- kappanhang provides wireless USB rig control and audio interface
- Have tested with Ubuntu and Rasp Pi in many hours of operation
- Unlike Icom's remote software, you don't need a Windows computer and…it's FREE and Open Source
- Developed by Norbert HA2NON
- Full instructions and at https://github.com/nonoo/kappanhang
- It really works great! Liberating to not be tethered to a computer

OM0ET UltraLight Mag Loop antenna

- Paul OM0ET in Slovakia makes a great mag loop antenna
- Weighs about 1kg
- Constructed from quality parts
- Assembles easily
- Tunes with minimal hand capacitance
- Really works well!
- Cost is 260€ plus shipping
- Excellent email support
- https://www.om0et.com/

Final thoughts

- IC-705 in Rob Sherwood NC0B list of receiver reports http://www.sherweng.com/table.html
- Short version of Sherwood report: IC-705 performance similar to IC-7300
- Would love to see comparison with Xeigu G90…see many reviews online and hear many on the air
- Just scratched the surface of capabilities…Advanced Manual is 218 pages with18 chapters.
- If you don't do digital modes and want a good rig for SOTA or POTA, a KX3 or KX2 are still worth considering…smaller and lighter…KX2 starts at $804.95
- IC-705 draws more current than KX3, but with LiFePO4 batteries this is less of an issue, both from an operating time and size/weight standpoint
- My opinion…who does SOTA or POTA every day? IC-705 better rig for daily use with UI just like popular IC-7300, many more features, and more modern design