

*The Swiss Army Knife of
Radio's*

*A Complete Shack in a
Box*

*New ICOM IC-705 QRP
Transceiver*

WB6DJI

[HTTPS://WWW.YOUTUBE.COM/WATCH?
V=FETYCLFVZ9I](https://www.youtube.com/watch?v=FETYCLFVZ9I)

What is an ICOM IC-705

Base/Portable QRP Transceiver HF VHF / UHF 50-144- 430MHz -GPS with 10 watts, The IC-705 is a multiband transceiver in all modes, covering 1.8 to 50Mhz 2 m, 70 cm. In addition to the traditional SSB, AM, FM, CW and RTTY modes, the transceiver also features DV and DD D-STAR (Digital Intelligent Amateur Radio Technology) modes. A full-featured satellite mode has been incorporated! The large 4.3 inch touch screen color display is the same size as that used in the IC-7300 and IC-9700. Dramatically improves visibility and operability in the fields

Maximum transmission power of 5W with BP-272 battery and 10W powered at 13.8VDC

SSB, CW, RTTY, AM, FM and DV modes

4.3 color touch screen

Cascade Waterfall and real-time spectrum display

Memory Keyer for Voice and CW

Micro USB connector with Full USB Codec for Computer Control

Micro-SD card slot

WLAN / Bluetooth / 14Bit A/D with DV Digital Voice /Picture Modes

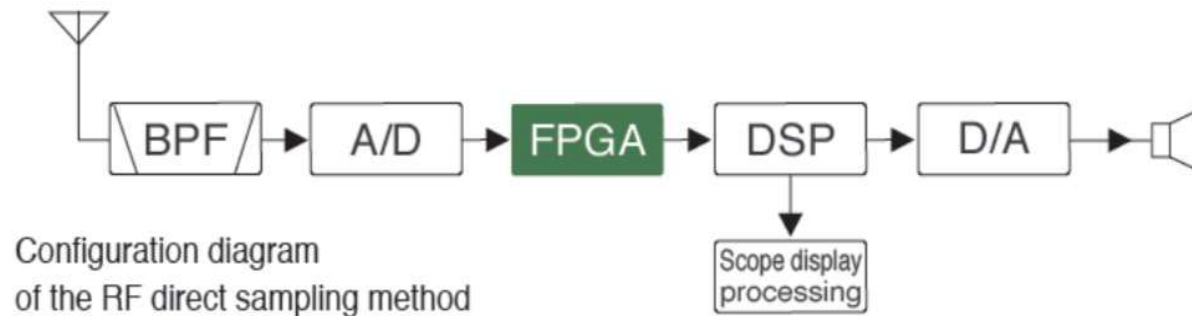
Internal GPS functions Stability & Time Sync for FT8/JT8/WSPR Modes

GPS downloads all Nearby Digital and Analog Repeaters

No more Repeater Books to carry around ! (Similar to RFINDER Unit)

ICOM IC-705 BLOCK DIAGRAM

Figure 2: Simplified block diagram of IC-705 receiver.



The FPGA also delivers a 1 MHz-wide digital video signal to the Scope Display Processing, which manages the screen displays, including the fast FFT spectrum scope, waterfall, audio scope and audio FFT (spectrum analyzer) as used in other Icom transceivers (7300 7610, 9700). The spectrum scope has a maximum span of ± 500 kHz, adjustable reference level (-20 to 20 dB), video bandwidth and averaging, and minimum $\text{RBW} \leq 50$ Hz.

A unique “touch-tune” feature allows quick tuning to a signal displayed on the scope by touching the scope or waterfall field to magnify an area, then touching the desired signal within that area.

In the transmitter, the audio codec converts mic audio to a digital baseband, which the DSP then processes further and the digital up-converter in the FPGA then converts to a digital RF signal at the transmit frequency. This signal is converted to analog by the high-speed 12-bit DAC to the RF excitation for the PA Unit.

Above 25 MHz, a heterodyne converter down-converts the RF signal to an IF in the 38.85 MHz range. This IF is then sampled by the ADC.

*What does an ICOM IC-705 Look Like
Modern Engineering
14bit A/D SDR Radio*



*One Box Solution with Built in Sound Card
Touch-Screen and Display*

The Competitor to ICOM IC-705 Using 3 Boxes & Messy Cables for FT8



How Compact is ICOM IC-705



IC-705 cabling requirements

- ▣ For digital modes with IC-705 you need:
- ▣ Micro USB cable
- ▣ Power cable
- ▣ Even though IC-705 is slightly bigger than KX3, there's more spare room in my bag
- ▣ Don't need external speaker or PX3
- ▣ Both KX3 and IC-705 need cables for K1EL Winkeyer
- ▣ 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 Win-keyer

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 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

CS-705 Programming Software

IC-705 Memories New Waterfall.icf - CS-705

File View COM Port Clone Option Help

IC-705

- Memory CH
 - Group Operation
 - 00: Pittsburgh
 - <Add Group>
- CALL CH
 - Program Scan Edge
 - DTMF Memory
- DR Mode
 - Digital
 - GPS
 - Common

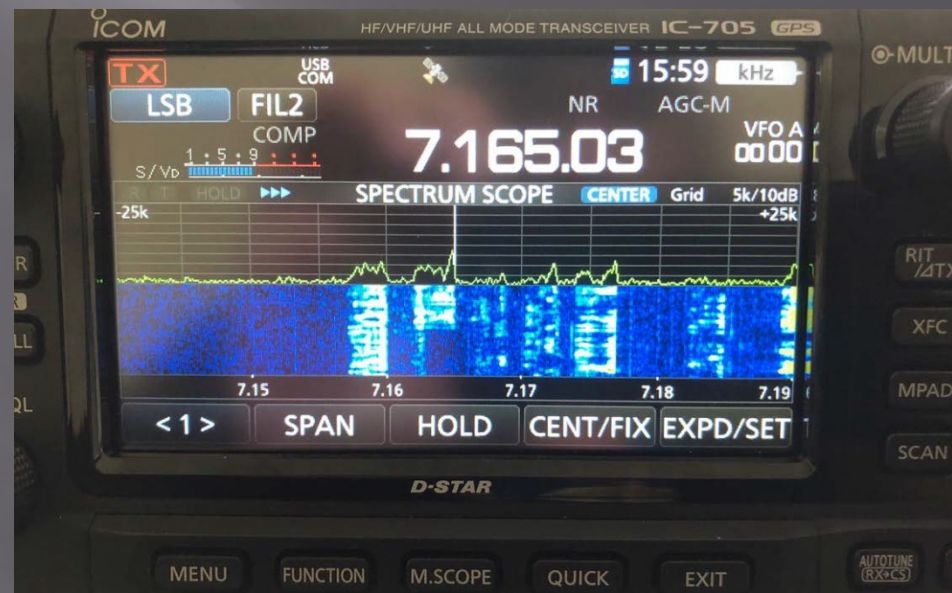
00: Pittsburgh (Remain 493 CH)

CH	Name	SEL	Split	Frequency						Tone
				Operating Freq	DUP	Offset Freq	Mode	DATA	Filter	
0	Univ of Pitt			443.450000	DUP+	5.000000	FM		1	TONE
1	Hermitage			145.350000	DUP-	0.600000	FM		1	TONE
2	Skyview			146.640000	DUP-	0.600000	FM		1	TONE
3	Greenville			146.445000	DUP+	1.000000	FM		1	TONE
4	Pittsburgh			147.090000	DUP+	0.600000	FM		1	TONE
5	Pittsbu Pittsbur			146.820000	DUP-	0.600000	DV	—	1	—
6	Atlanti Atlantic			147.150000	DUP+	0.600000	DV	—	1	—
7										
8										
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17										

- 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

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 DC Low Power Consumption is Outstanding !

- ❑ 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

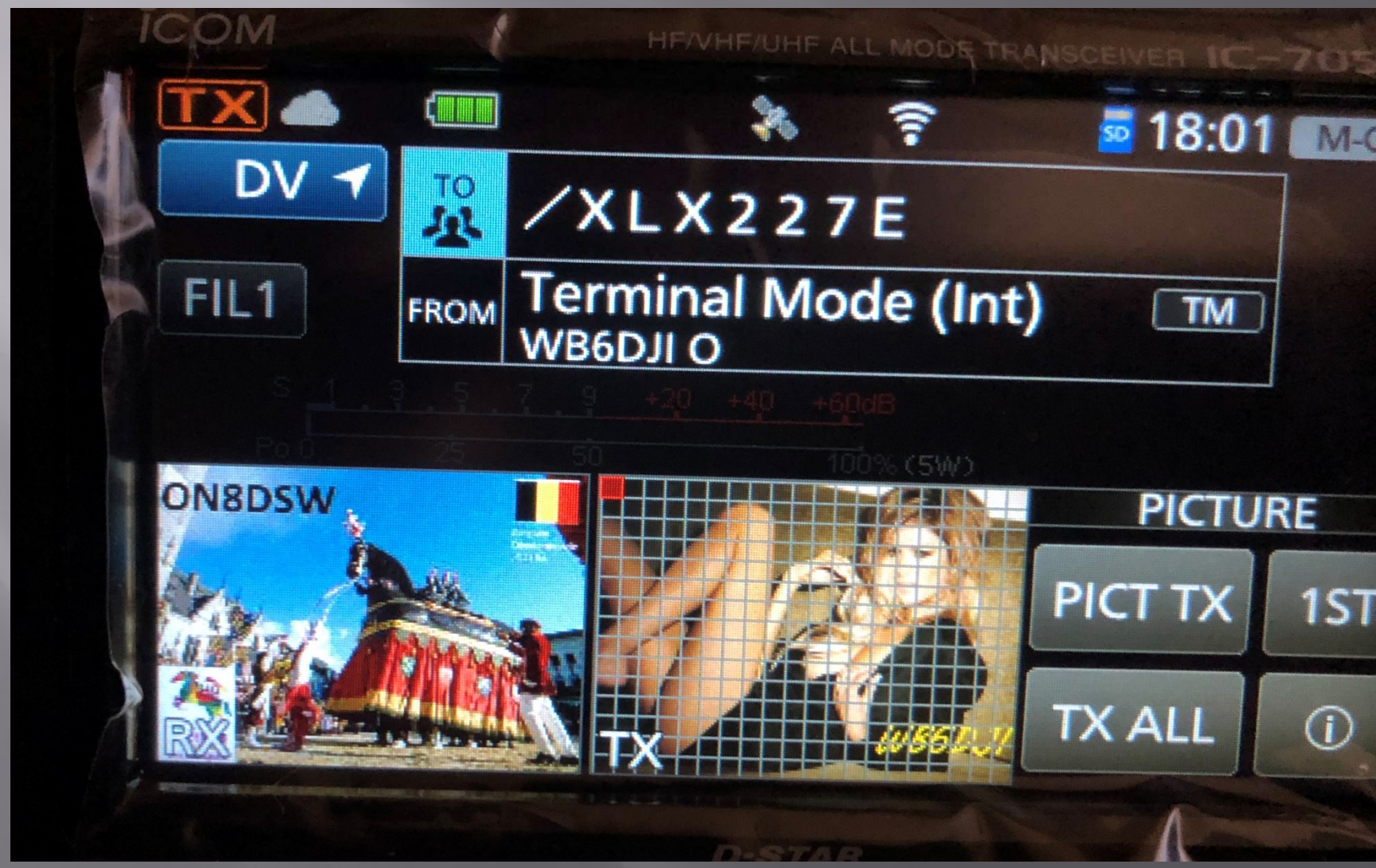


Working Satellites with IC-705 is Fun !



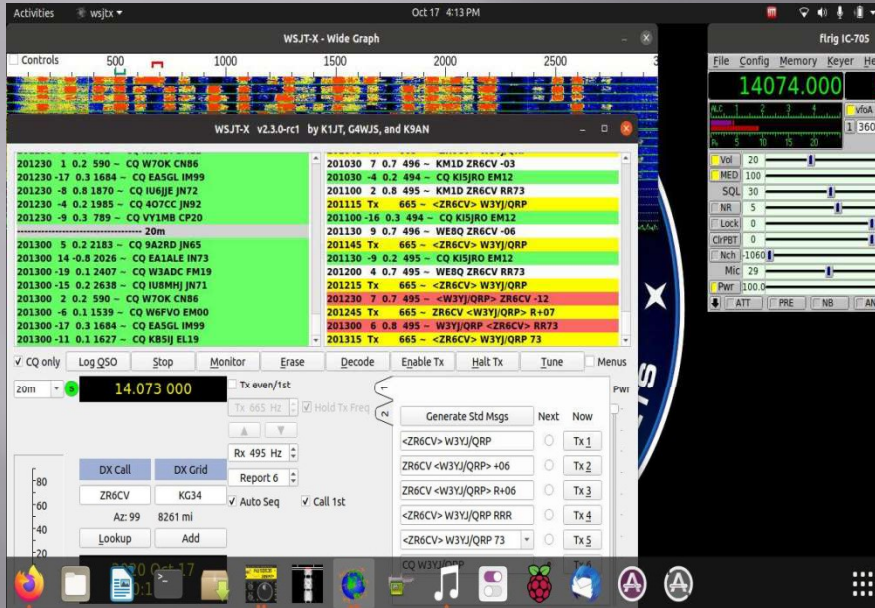
- ▣ Attempts to work a Hamsat
- ▣ IC-705 can operate USB/LSB on 2M/430 in addition to FM
- ▣ Pan-adaptor simplifies tuning for Doppler shift
- ▣ We just started...need more practice

Can Send Pictures with IC-705 over DV with HF/6meters - VHF/UHF and Internet around the World !



Examples from IC-705 Users

QRP DX FT8 is real !



!

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

Final thoughts and Conclusions

Many capabilities...Advanced Manual is 218 pages with 18 chapters.
Has Wi-Fi, GPS, Bluetooth and QSO Recorder with Date, Time,
and recorded QSO for later playback from SD Card

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 easier UI and so many more features

And now...the video from OH8STN....if time permits....
Questions ?

<https://www.youtube.com/watch?v=FEtYClfVz9I> !

Appendix