

Notes on the use of the Chinese Radio TYT TH-9000D for VARA VHF/UHF

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Useful reference: https://www.hamvoip.org/howto/TYT_mod.pdf

(Shows pictures, pinouts, parts list for needed mods to build a repeater)

Modifying and using the TH-9000D for 2 Meter VARA FM

(should be similar for 220 and 440 MHz models)

- 1) Radio ordered and delivered by Amazon. Ordered Nov 13, 2021 Price: \$127.99 + Florida tax.
- 2) Radio received complete with:
 - a. Programming cord (USB to 3 conductor 1/8" phone jack. Programming software Mini CD Can also be downloaded from <https://www.radioddity.com/pages/tyt-download>
 - b. Model iordered was 2 Meter originally shipped as 150-160 MHz only (required by FCC rules) and easily modified to 136 to 174 MHz using the above software for ham use. Power range: 10W, 25W, 60W. (45 W max for 220 MHz and 440 MHz versions)
 - c. Microphone with keypad
 - d. Power cord, connector, Fuses
 - e. Also available in 45 Watt 222-225 MHz and 420-450 MHz versions
 - f. Book supplied includes specs and radio keyboard instructions but initial "unlocking" must be done with the supplied or downloaded programming software.
- 3) Radio received without the DB9 female connector on rear but casting has cutout for attaching the connector. Screws for the DB9 are tapped for the same as the bottom cover (TORX metric 2.5 x 5 mm)
- 4) Requires a close spacing (approx .05 ") 6 conductor flex cable to connect to the DB9 for Packet work. A 10 pack of the Cable assembly with male connector was ordered from Digi-Key (PN A100196-ND) (about \$2.25 ea). I had to shave off two small alignment plastic bumps on the male connector plug (razor blade or sharp knife) to get the connector to insert fully. Once in, it appears tight and made all connections. On the Digi-key this was the wire color coding and signal pairing. These DB9 pinouts were wired to match the similar signals on the Alinco DR135 which should allow the same sound card setup (DRA-36) but may require some DRA-36 level adjustments.
 - a. Pin 1 Gnd white wire (connect to 9 pin DB9 pin #1)
 - b. Pin 2 Tx Audio In, yellow wire (Connect to DB9 # 3)
 - c. Pin 3 COS Orange wire (not used)
 - d. Pin 4 Rcv Audio out blue wire (Connect to DB9 #4)
 - e. Pin 5 PTT black wire (Connect to DB9 #8)
 - f. Pin 6 +5V dc red wire (not used)

Rear panel view of connector (looking at connector from the rear of the radio)

Pin 1

Pin 5



Pin 6

Pin 9

5) Channel setup using the downloaded software:

TH9000D

- Channel
- Function Setup
- DTMF
- 2Tone
- 5Tone
- Scan Information
- Emergency Information
- Key Setting
- Communication Note

| CH | RX Frequency | TX Frequency | CH Name | Step(KHz) | Channel Spacing | TX Power | CTCSS/DCS Decode | CTCSS/DCS Encode | Optional Signaling |
|----|--------------|--------------|---------|-----------|-----------------|----------|------------------|------------------|--------------------|
| 0 | 144.99000 | 144.99000 | | 10 | 20 | Middle | Off | Off | Off |
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |

This setup uses middle power (25 W) and should be fine for most applications without a fan on the heat sink. 65W and 10W were tested and work fine (max output measured at about 65 W with SWR=1.1) but extended use at 65W should probably have a fan on the heat sink and/or Power supply. Power can easily be changed with push of manual buttons on radio as described in the supplied handbook. Bandwidth on radio set for 20KHz (can be set for 5 to 25 KHz).

6) Operation and testing.

Test were run over the same Winlink VARA FM network (Florida East Coast) that was also used by the Alinco DR-135 radio. Some level adjustment was required to reduce the received audio gain in the DRA-36 sound card modem (simple screwdriver adjustment in the DRA-36 using the TUNE function of the VARA menu. Results were about equal to the DR-135 (50 Watt) running the TH-9000D at 25 watt. The path below was a two-hop ping KN6KB-10 to KG4ORQ-10 (~60 mi) via VARA Digi K4DCS-10 (~12 mi). Screen captures below show levels and symbol clustering.

Connect with: KG4ORQ-10 Via1: K4DCS-10 Via2: []

S/N: +23.4 VU: -24 dB

KN6KB KG4ORQ-10

S/N: +21.4 VU: -6 dB

VARA FM v4.1.8 KN6KB-10

Settings View Log* Help

Grid: 1.0 to 0.0 (dB)

VU: Audio Input: 53 dBFS CPU Usage: 11.1%

ACK IDLE NACK BREAK REQ QRT TX Delay S/N

● RX: Disconnected WIDE TCP ● BUSY