

## OPERATION GUIDE (Ver. 2.2)

**TJ5A** is a high sensibility, high-performance portable 4-band SSB/CW transceiver, used with DDS as LO, offering wide frequency coverage and fine tuning rate. A signal of 0.1uV is discernible with this transceiver. The Doubly Balanced Diode Ring Mixer makes strong signal handling capability possible.

### Features:

- Low RX current Drain
- High-Performance AGC
- Large built-in speaker
- 40 Memories
- Dual VFO's
- Memory-VFO Transfer
- Low power tuning up mode
- USB socket for DigiPan



### Operating Frequency:

Rx:

2.0 – 30 MHz

Tx

3.750000 – 4.000000

7.000000 – 7.300000

14.000000 – 14.350000

21.000000 – 21.450000

### Mode:

LSB, USB, CW, TUN

### Tuning Rate:

10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz

### IF:

9 MHz (Single conversion super-heterodyne)

### Sensitivity:

0.3uV

### Operating Power:

12 – 12.6 V

### Physical Parameters (WHD):

180 x 58 x 200 mm

Weight: 1.5 kg (1.85 kg with 12 V 4.4 Ah Li-ion battery pack)

### Current Drain:

MODE	CURRENT
Rx (Internal battery power)	200 mA
Rx (External power supply)	320 mA
Tx (SSB)	3.5 A
Tx (CW)	2.7 A

**Output Power ( Amateur Radio Bands):**

MODE	OUTPUT
SSB	Adjustable from 0.5 - 20 W
CW	Adjustable from 0.3 - 10 W (Can be adjusted to 20W)
TUN	10 - 15 mW (Can be set from 1 mW – 10 W)

Transmission stops working automatically outside amateur radio bands.

Output spurious: -50dB

TJ5A's transmit signal complies with the FCC spectral purity requirement.

## 1. Front Panel



### Controls and Indicator

**VOL** – Volume control / Power switch. Turn clockwise to turn on the power and to increase volume. When a click is heard, the power is turned on. The LCD panel LED should become illuminated. Turn counter-clockwise to decrease volume and to turn off the power. When a click is heard, the power is off.

**PWR** – Tx power control. Turn clockwise to increase the drive. Tx power can be adjusted from 0.3 – 10 W (CW), 0.5 – 20W (SSB).

**RIT** – Rx increment tuning. Variable range: +150 Hz / -50Hz

**TUNE** – The big knob on the right side is the Frequency Tuning / Tuning Rate knob. Rotate clockwise is frequency up, counter-clockwise frequency down. Press the knob to select the tuning rate. The sequence is 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, and 1 MHz.

**Power Indicator** – The LED above the TUNE knob is green when TJ5A is turned on. The LED turns red in transmission.

**MOD** – Press to select LSB, USB, CW, and TUN. In CW mode MIC is disabled. The MIC socket is used as the Key socket.



**A / B** – VFO selecting / Memory clearing. Press to select VFO A or VFO B. In MEM state, hold the button until all the memories are cleared.



**V / M** – VFO / MEM switching. Press to switch between VFO and MEM. Turn TUNE to select the memory number.

**MEM** – Frequency saving / MEM to VFO transfer. Press to save the frequency to the memory. Press MEM, the memory number appears. The dashes indicate the blank state of the memory. Turn TUNE to select the MEM position you want to save the frequency to. MEM00 – MEM39 can be used to store the frequency. Frequency saving can be canceled by pressing MOD or STEP.



In the following case, MEM01 is not vacant. A frequency 14.200.000 is stored in this position. You can rotate TUNE knob to find a vacant position.

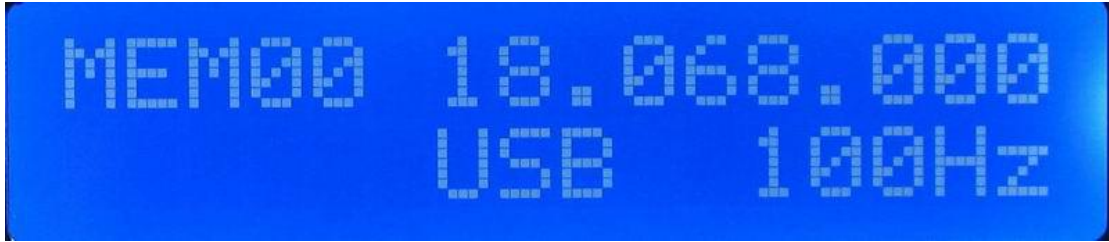


**How to transfer the frequency in MEM to VFO A or B?** First, press V/M to enter MEM state. Second, press MEM to find the VFO's. Now VFO A or B appears on the left corner on LCD. (A or B depends on which VFO is in use before pressing V/M. Third, press A/B button or rotate TUNE knob to select the VFO you want to transfer the memory to (either A or B). Fourth, press MEM to transfer the frequency in the memory to the VFO you have selected. Finally, press V/M button to enter the VFO to which you have transferred the frequency.

Let us practice the transfer.

How to transfer MEM00 (18.068.000) to the VFO B?

First, press V/M to enter the memory. Rotate TUNE knob to find MEM00.



Second, press MEM to find VFO, and the following is displayed. VFO is displayed below the MEM number, either VFO A or VFO B. If VFO A is displayed, press A/B button, or rotating TUNE knob to select. In this example, VFO B is displayed.



Third, press MEM to transfer MEM00 to VFO B, and the following is displayed.



Fourth, press V/M to enter VFO B. Now MEM00 is transferred to VFO B.



**S-Meter/Power Meter:**

In receive the bargraph shows relative signal strength. Each bar represents one level. The second bar indicates a signal of 12uV is injected.

In transmit the output power is also displayed. Each bar represents one level. The first bar indicates 3 Watts. The third bar indicates 5W; the sixth bar indicating 10W.

Note 1: The S-Meter levels are approximate, and accurate calibration is not supported.

Note 2: The output power levels are approximate, and accurate calibration is not supported.

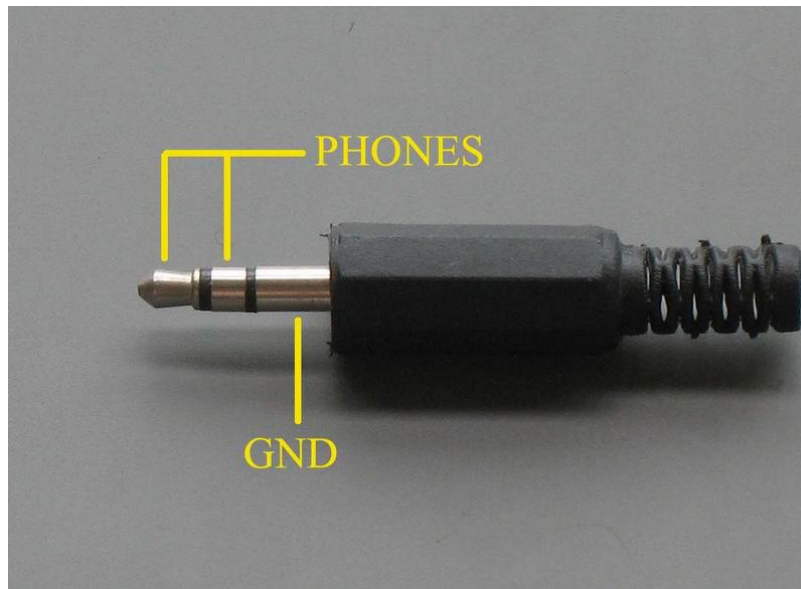




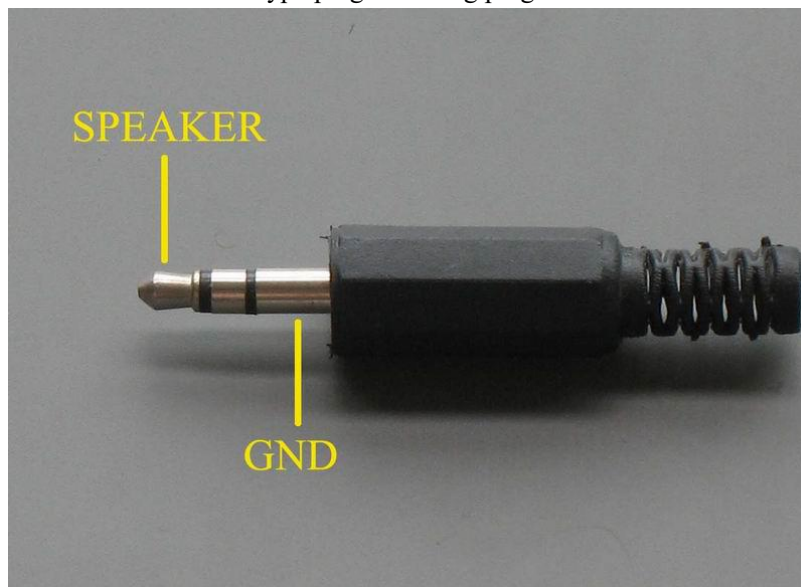
## Connectors

**MIC** – MIC / CW key jack. Use 3.5mm stereo plug. The tip is PTT / KEY, the ring next to the tip is MIC; the sleeve close to the base GND.

**PH** – Earphone / speaker 3.5-mm jack. Either earphones or speaker can be used. When the earphone or speaker is plugged in, the built-in speaker is disconnected. The tip and ring are in parallel. The sleeve is GND. The stereo earphones can be used. Never use the 3.5mm mono type plug. The long plug sleeve short-circuits the ring connection.

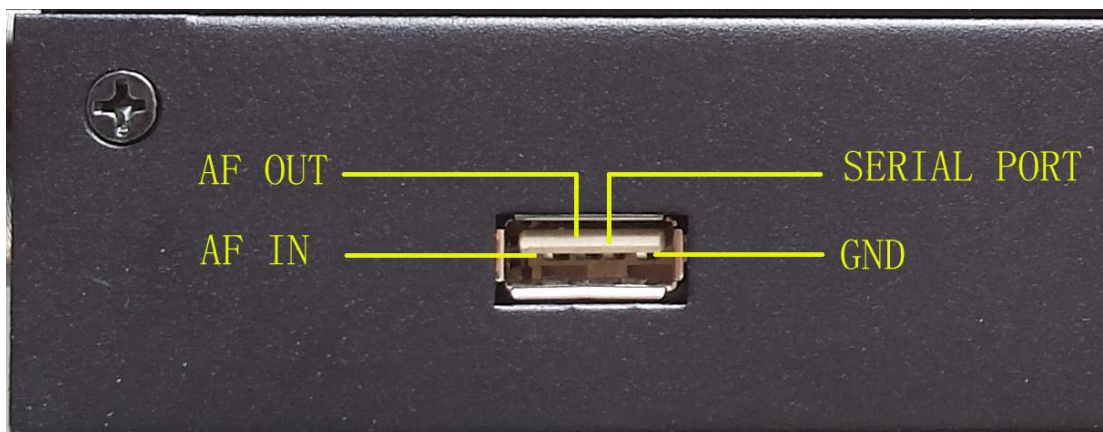


The speaker can be connected to either the tip or the ring, since tip and ring are in parallel. Never use the 3.5-mm mono type plug. The long plug sleeve short-circuits the ring connection.



Do not connect the speaker with the amplifier to PH socket with an ordinary cable. In this case a cable with attenuating network is required.

## 2. Connectors on Right Side



**USB** – This connector can be connected to the computer sound card for DigiPan.



**DC 12V** – DC power connection. The power connector uses two contacts. The left contact (facing the right side of the radio) provides the negative connection to the power supply. The right contact is the positive connection. The unit requires 12 to 12.6 VDC.

**CHG** – 2.1 mm coaxial plug to charge the battery (center positive). The battery is charged no matter what position the switch is set.

**ANT** – The M16 connector on the right side is the antenna socket. Connect 50 ohm antenna to this connector.

## 3. Operation

If you do not have the battery pack, use a DC 12V or 12.6 V regulated power supply with the supplied plug.

### **Warming-up time**

It takes about 5 -10 minutes for the TJ5A to stabilize. A drift of 10 – 20 Hz might be noticed during the warming-up period.

### **Receiving signal**



Connect the antenna and turn on the power. Signals or noise can be heard. A signal of 0.1uV is discernible with this transceiver. Rotate the TUNE knob to the desired frequency. For compactness, TJ5A has no band switch. Therefore, use fast tuning rate (For example, 10 kHz or 1 MHz) as the band switch to get to the meter band so as to save time, and then use the fine tuning rate (100 Hz or 1 kHz) to search signals or tune accurately. Rotating RIT facilitates +150 Hz/-50Hz frequency shift. RIT does not affect transmit frequency. In transmission the shift is canceled automatically. RIT is usually set in the middle position.

### **Receiving CW signal**

Set MODE to CW. Rotate the TUNE knob slowly until an approximately 700 Hz note is heard. The received signal is approximately 700Hz lower than the LCD displayed frequency. The zero-beat frequency is the frequency of the received signal. Rotate clockwise to zero beat the signal, and the displayed frequency at which zero beat occurs is the actual transmit frequency of the station you are working.

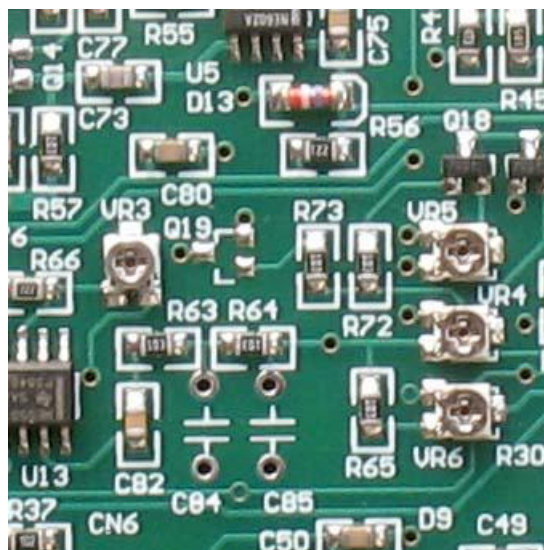
### **SSB transmission**

In LSB or USB mode, press PTT to enter transmit mode. Speak to the handmic and your voice is transmitted. The output power can be adjusted through **PWR** knob.

High-performance MOS RF transistors are used for the driver (RD06HHF1) and output transistors (A pair of RD16HHF1's), offering super-quality transmitting signals.

### **CW transmission**

In CW mode MIC is disabled. MIC socket is used as KEY socket. Press the CW key or PTT on the handmic, and CW signal is transmitted. A 700 Hz side tone can be heard from the speaker. The side tone level is not controlled by **VOL**. It is pre-set to a certain level which can be adjusted to meet the personal desire. If the side tone level does not suit you, adjust VR6 on the main board to obtain your desired level. Open the upper cover the TJ5A. Find VR6. Turn counter-clockwise to reduce the side tone level; turn clockwise to increase the side tone level. When carrying out the side tone level adjusting, please set the power level to the lowest, or set the mode to TUN. Press KEY and adjust VR6 until the desired side tone level is obtained.



Rotate the TUNE knob until the received CW tone is the same with the TJ5A's side tone (The LCD displays the frequency 700 Hz lower than the received frequency). Now the TJ5A's transmit frequency is the same with that of the station you are working. Press your key and send your CQ to the station. The 700 Hz automatic offset in the transmit frequency makes it possible to work a station which is transmitting on your transmit frequency.

## TUN Mode

In this mode, PWR control is disabled. A pre-set low level carrier (10 - 20 mW) is transmitted when KEY or PTT is pressed for the purpose of tuning up the antenna. However, you may set a carrier level you prefer. Adjust VR5 to reduce or increase the carrier level. Turn counter-clockwise to reduce the carrier level; turn clockwise to increase the carrier level. The level can be adjusted from 1mW – 10 W. In TUN mode the transmit frequency is 700 Hz higher than the displayed frequency.

## IMPORTANT!

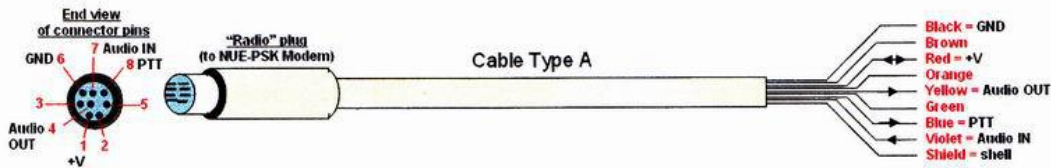
Never try the long key at the full power output. This would overheat the power transistors.

Always use half or lower power or TUN mode to tune the tuner.

Use the matched high efficient antenna such as the dipole, V-dipole, Yagi, long wire with a tuner. Low efficient antenna, such the small diameter loop, short whip, the shortened wire of a few meters, etc. are not recommended, which would degrade the sensitivity of the TJ5A, and lower audio output.

## PSK31 with NUE-PSK Digital Modem

For this PSK31 operation, the MIC jack on the front panel is used as the PTT and DATA IN connector; the PH jack as the DATA OUT connector. Four wires are needed to link to the modem: 1) GND; 2) PTT; 3) DATA IN; 4) DATA OUT.



Connect the TJ5A's MIC (the ring) to the DATA OUT of the modem.

Connect the TJ5A's PH (the tip or the ring) to the DATA IN of the modem.

Connect the TJ5A's PTT (the tip) to the PTT of the modem.

First set up the rig. It is essential to have the modem Tx Audio drive level and the TJ5A power level set properly. Use a dummy load on the transceiver to set up the rig for SSB operation at the normal power level (say 20 W). First set the Tx Audio control on the modem to the minimum level (turn counter-clockwise to the end). Press F8 on the modem keyboard to generate a continuous tone. Adjust the Tx Audio control on the modem to set the transmit level between 3-4 watts (One or two bars appear on the rig's power meter). Press F8 again to discontinue the modem's Tune mode, remove the dummy load and connect your antenna. You are now ready to use the rig on the air without overmodulating. For more detailed information, please refer to the "Quick Start Guide" of NUE-PSK Digital Modem.

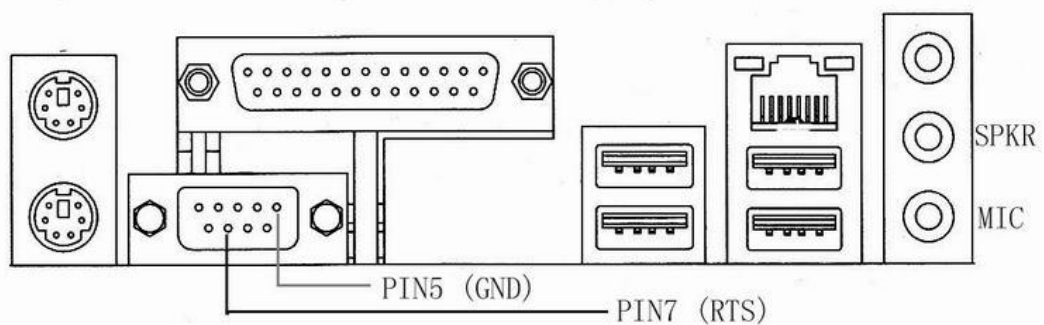
Note: DATA OUT level is affected by the volume control. Set the volume level to suit the modem DATA In level.

### DigiPan

The USB port on the right side of the rig is use for DigiPan. AF IN is connected to LINE or SPEAKR OUT (green) of the computer sound card. AF OUT is connected to MIC (pink) of the computer sound card. SERIAL PORT is connected to the computer 9-pin serial port, with GND connected to Pin 5, SERIAL PORT to Pin 7. The shielded cables are used for AF IN and AF OUT; the cable is equipped with a 3.5-mm stereo plug at the other end. A computer USB data wire can be modified for this cable. Pin 7 of the computer serial port sends the control signal (RTS) to the rig. In Rx mode, RTS from Pin 7 is approximately -10 V; in Tx mode, RTS is approximately 11 V. When 11 V appears at the port, the transceiver is switched to transmit. For more detailed information, please refer to the instruction of DigiPan.

Note: AF OUT level is affected by the volume control. Adjust the volume for proper audio level.

**Important:** Always use 15-14% of the rig's rated level to transmit (3-4watts).



## 5. CW Filter

The optional CW filter is made up of high-pass and low-pass filters, which greatly improves the selectivity during CW reception. The filter is switched out in SSB operation. The filter is either solder to the filter socket (CN2) on the main board. If you have purchased the filter separately, remove the 104 capacitor from CN2, and solder the CW filter in the pads.

