

\* I N S T R U C T I O N      M A N U A L \*

HF Band SSB/CW Transceiver

Model HT-180, 140, 120  
115, 110

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Tokyo Hy-Power Labs., Inc.

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## [ 1 ] FEATURES

HT-100 series is the very compact and light weight HF band SSB/CW mono band transceiver. It features all solid-state circuit design along with the use of digital IC's, linear IC's and transistors. Also, it employs the digital VFO using PLL circuit, and produces the maximum output of 20W in spite of the compactness. At CW mode, it is easy to operate through the use of the semi-break in system. You can use it not only at home station, but also on mobile or trip. Combining with the optional DC Power Supply with a loud speaker, Antenna Tuner and Linear Amp., you can enjoy the various kinds of attractive operations.

### 1. Easy to operate Digital VFO

The VFO incorporates the Optical Rotary Encoder in the dial section, which makes the operation very smooth and easy. The frequency changes at the rate of 5KHz per one turn of the dial knob with 100Hz step. When you turn the dial knob quickly, the frequency can be also changed at the rate of 50KHz per turn with the automatic quick frequency change circuitry.

### 2. LOCK switch .

By pushing the LOCK switch button on the front panel, the dial frequency is locked, and does not move if you turn VFO dial. The dial frequency is still memorized even after the power switch is turned off.

### 3. High RX Sensitivity and excellent IF characteristics

As it uses not only the performance MOS FET in the RF amplifier stage, but also the bandpass filter in the frontend, an excellent band width characteristics has been achieved. The single conversion design is employed, and the FET is used in the mixer stage. The high performance SSB crystal filter following the mixer stage results in the superb selectivity. By using the same MOS FET in IF stage as used in the RF amp stage, it achieves the high sensitivity as well as the excellent cross modulation distortion characteristics.

### 4. Balanced Modulator IC

Using the specially designed Balanced Modulator IC, the very good carrier suppression is obtained. Using same IC's and band-pass filter in the transmitting mixer stage, the very low spurious level is achieved. Furthermore, the ALC is applied to the transmitting IF Amp. stage so that the distortion is suppressed, and the clean signal with low spurious output is obtained. The mute circuit is built-in not to emit the signal while the PLL VFO circuit is in the lock-out state. The power amplifier stage uses the pushpull configuration which can produce the stable output power. Also the low pass filter built-in this stage helps reduce the spurious output level and produce the clean output power.

## 5.CW operation

For switching from SSB to CW, only press the mode select button on the front panel. If you connect the key, you can enjoy the semi-break-in CW of the automatic transmitting and receiving.

## 6.Noise Blanker etc.

Also, the noise blanker(option) is effective for the pulse noise such as the ignition noise. The RIT circuit will comfortably help cope with the signal drift of other station.

## [ 2 ] SPECIFICATIONS

### ° General

- 1.Frequency range: Model HT-180(80m band) 3.5000 - 3.9999MHz  
HT-140(40m band) 7.0000 - 7.4999MHz  
HT-120(20m band) 14.0000 -14.4999MHz  
HT-115(15m band) 21.0000 -21.4999MHz  
HT-110(10m band) 28.0000 -29.9999MHz
- 2.Frequency stability : ° from 1 minute after power switch on till 60 minutes, within +/- 150Hz.  
° then, within 100Hz per 30 minutes
- 3.Antenna Impedance, Antenna connector : 50Ω SO-239
- 4.Supply Voltage : DC 13.8V±10%
- 5.Grounding polarity : negative ground
- 6.Power consumption : Transmission = Max. 5.0A  
Reception = Max. 700mA
- 7.VFO, dial indication : PLL synthesized digital VFO.  
4 digit LED display
- 8.Dimensions : 180(W) x 60(H) x 250(D) mm  
7.09"(W) x 2.36"(H) x 9.84"(D) inch
- 9.Weight : 2.60 Kg approx.  
(approx. 5.7 lbs)
- 10.Accessory Circuitry : CW side-tone monitor circuit
- 11.Accessories : Microphone, DC Power Cord,  
Spare Fuse(5A), Instruction manual

° Transmitter Section

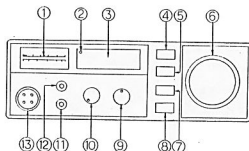
- 1.Mode : SSB(A3j), CW(A1)
- 2.Max. Transmitter  
Output power : SSB = 20W(PEP)  
CW = 20W
- 3.SSB Modulation : Balanced Modulation(IC)
- 4.Spurious Level : -40dB or less
- 5.Carrier Supression : -40dB or less
- 6.Microphone input  
impedamce : 600Ω

° Receiver section

- 1.Receiver Circuitry : Single superheterodyne
- 2.IF : 9MHz
- 3.Receiving Sensitivity : for 0.4μV input, S+N/N=10dB min.
- 4.Selectivity :  $\pm 1.1\text{KHz}$  or over = -6dB  
 $\pm 3.0\text{KHz}$  or less = -60dB  
 CW filter(option) :  $\pm 250\text{Hz}$  or over = -6dB  
 $\pm 800\text{Hz}$  or less = -60dB
- 5.RIT :  $\pm 1\text{KHz}$   
 (Receiver Incremental Tuning)
- 6.Audio Frequency Output : 1W or over(for 8Ω load at 10% distortion)

### [ 3 ] EXPLANATION OF FEATURES

#### \* Front panel



Figure

#### \* Rear panel

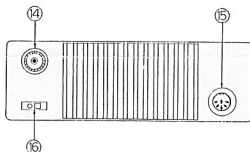


Figure 2

#### ①. S/Rf Level Meter :

On reception, indicates the level of signal(S meter).  
On transmission, it works as an output power level meter.

#### ②. ON AIR pilot lamp :

Lights when you push P.T.T. switch of mic on SSB mode,  
and when the KEY turns ON on CW mode, it indicates "Transmitting"  
state.

#### ③ Frequency Dial Indicator :

Indicates 4 digits of 100KHz through 100Hz of operating  
frequency.

④.Noise Blanker switch(Noise Blanker Circuit is available as options.)

When an artificial noise or ignition noise of automobile exists, push this switch on. Noises will disappear and you can receive a clear signal.  
(However, this circuit can't always work effectively depending on the sort of noise.)

⑤.Mode Switch :

Select operation mode of either SSB or CW. As for SSB polarity, HT-180 and HT-140 transmit and receive LSB signal and TR-120, HT-115 and HT-110 transmit and receive USB signal.  
When you switch to CW, the carrier point moves and the device will be ready for CW reception.  
(CW filter is available for CW reception as option.)

⑥.VFO knob :

Knob to change TX/RX frequency with 100Hz step.  
By turning clockwise, frequency will get higher at the rate of 5KHz per 1 turn. If you turn this knob quickly in a moment, the frequency will be forwarded rapidly.

⑦.Frequency Select Switch : (HT-110 model only)

Select operating frequency of either 28MHz or 29MHz.  
28MHz range with , 29MHz with .

⑧.LOCK switch :

When this switch is ON, the dial frequency is locked, and does not move if you turn VFO dial.  
This switch works effectively when the automobile joggles.

⑨.RIT knob :

When you turn this knob clockwise, the circuit will be made on, and, and RIT circuit starts to work.  
Receiving frequency can be changed within the range of approx.  $\pm 1.0\text{KHz}$ , but the frequency indication does not change.

⑩.AF/ON.OFF knob :

Power switch on/off, and adjust sound level from speaker.  
By turning clockwise, the level increases, and turning fully counter-clockwise, power switch is made off.

⑪.KEY Jack :

At CW operation, connect KEY plug into. Use 3.5  $\phi$ mm plug.

⑫.EXT.SP Jack :

Connects an external speaker.  
Use the speaker of 8ohm impedance.  
When the external speaker is connected, the sound comes from the external speaker not from the built-in speaker.  
Use 3.5 $\phi$ mm plug.

⑬.MIC connector :

Connects the microphone.  
Use a microphone of 600ohm impedance.

⑭.Antenna connector :

Connects an antenna. Output impedance : 50 ohm.  
Use PL-259 coaxial connector for connection.

⑮.ACC connector :

Connector viewed from rear panel

| Pin No. | Designation             |
|---------|-------------------------|
| 1       | +8V on transmission     |
| 2       | GND                     |
| 3       | 13.8V output(0.5A max.) |
| 4       | +8V on reception        |
| 5       | ALC input               |



⑯.DC Power :

Connects DC power cord of accessory.  
Use the power supply of DC13.8V $\pm$  10% with capacity of over 5A.

Figure 3



#### [ 4 ] PREPARATION BEFORE OPERATION

Be careful of the following items which may become the cause of troubles.

1. Set the amp in a well ventilated place.
2. In the same way, DO NOT operate the amp at places where it is exposed to the direct heat of the sun, or near a heater.
3. Keep a space from the rear panel not to prevent the effect of cooling of the heat sink.
4. Be sure to check the "Matching" or VSWR of antenna before operation. If SWR value is too high, adjust your antenna to obtain a lower SWR value. You should obtain an SWR of less than 1.5:1 or hopefully as low as 1.0:1.
5. The DC power voltage is 13.8V. DO NOT connect AC117V. In case that you use it at home station, use the power supply of DC13.8V with capacity of over 5A.
6. For setting the amp under the dash board panel of automobile with an attached mobile mounting bracket(option), please refer to Figure 4 and 5.

1 Set the bracket to the dash board panel.

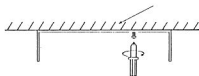


Figure 4

Put together two points with screw  
(screws are not accessories)

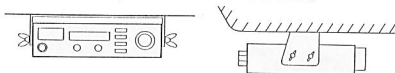


Figure 5

\* CAUTION at mobile operation

1. The DC supply voltage is 13.8V.
2. The DC power is supplied to this model by DC power cord directly not through the power switch in order to protect the frequency memory. When your car is parked for a long time connecting this model to the Power Supply, be sure to take off the DC power cord from this model.

## [ 5 ] OPERATION

### 1) SSB operation

1. Select Mode Switch to SSB, and connect a microphone to MIC connector.
2. Keep RIT switch off.
3. Turn AF knob clockwise to be power on, and frequency is displayed on Frequency Dial Indicator. Displays 80m band as 500.0, 7-28MHz band as 0000, and the device will be made reception state. By turning VFO Knob clockwise, frequency changes by 100Hz step.
4. By pressing P.T.T. switch on the microphone, ON AIR pilot lamp lights and the device is made into transmitting state.
5. Speak to the microphone with the normal voice level. RF meter will deflect by the level of the sound.
6. In SSB mode, depends on low voice or high voice, and output will be change. But, even louder, output will not increase, and spurious will be occur.
7. The relation between frequency and display.(on 10m Band)  
As show on figure 6, if setting on 28MHz, display will show 28.5000MHz, and if setting on 29MHz, will show 29.5000MHz.

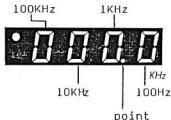


Figure 6

### 2) CW operation

1. Set the mode switch to CW.
2. Please connect the key to the key jack as shown on Figure 7. When you make the key on and ON AIR pilot lamp lights, then RF level meter deflects and CW signal will be emitted.

Then CW Monitor circuit will also work.  
You can hear approx. 800Hz monitor sound.



Figure 7

### 3) Internal adjustment

We always tune-up and inspect the product completely at our factory before shipping. It is recommended that the adjustment or the realignment of the radio is made by the qualified personnel. Following parts are just for information, if the radio is to be adjusted.

1. VR5 is the semi-fixed variable resistor to adjust the mic gain on SSB mode.  
If you turn it clockwise, the mic gain will increase.
2. Side Tone Monitor(VR11)  
While the CW is operated the monitor circuit will work and approx. 800Hz tone can be heard. VR11 is the monitor sound adjustment volume. Sound will increase if turned clockwise.
3. Carrier level adjustment volume(VR12)  
Carrier output level will be changed.
4. ALC adjustment volume(VR9)  
This unit has ALC circuit in order to avoid the output level from exceeding maximum level. Turning the VR9 clockwise, output will be decreased.

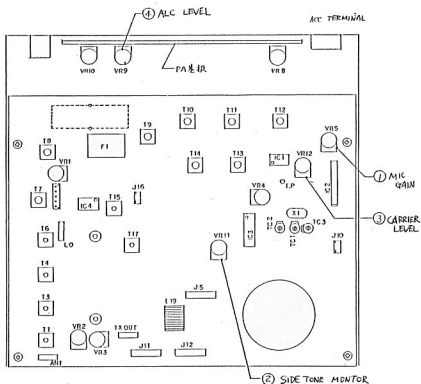


Figure 8

## [ 6 ] ACCESSORIES AND OPTION

### 1. Accessories

- ° Microphone..... 1
- ° DC Power Cord..... 1
- ° Spare Fuse(5A)..... 1
- ° Instruction manual.... 1

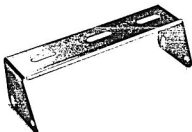
### 2. Optional unit



a. CW Filter



b. N.B.(Noise Blanker) Unit  
HNB-100



c. Mobile Mounting Bracket

- d. DC Power Supply with a loud speaker HP-100S
- e. Antenna Tuner HC-100
- f. 100W Linear Amp. HL-100B

## OPERATION

- \* HNB-100 unit has been fully aligned at the factory. Turn on the noise blanker switch on the front panel of the radio. And you can now receive signals well with noises disappeared.
- \* By turning the semi-fixed volume control \*VR1 installed in TX/RX PC board, you can adjust the effect of noise blanker(Threshold Level). The effect becomes lower when turning the semi-fixed volume clockwise, and it becomes higher when turning the volume counterclockwise.
- \* When such a strong signal as a broadcasting radio etc. exists in your operating band as heard on 3.5MHz or 7MHz band, you can occasionally get better effect if you use the attenuator switch of the transceiver (please refer to Instruction manual page 4) together with the HNB-100.

## CAUTION

- \* HNB-100 is designed to be especially effective to the pulse noise such as an ignition noise of the car, and it's not always quite effective depending on the types of noises.
- \* When installing HNB-100, the sensitivity may be a little reduced in some cases. In such a case, adjust the IF1 \*T7 for the maximum sensitivity.
- \* Receiving signal will become weak when you excessively turn the volume control for Threshold Level \*VR1 counterclockwise. While you receive the stable signals (about S 3-7) of broadcasting station etc., turn \*VR1 counterclockwise, and adjust it to that best position just before S-meter starts to decline.
- \* Please refer to Figure 1 for the location of \*VR1 and \*T7

## INSTRUCTION MANUAL FOR HNB-100

### INSTALLATION

- \* Loosen and remove four screws on the lower cover of the radio (HT-100) with a screwdriver for a while, and remove a cover.
- \* Set the HNB-100 to the space for noise blanker and fix it with by attached screws, referring to Figure 1.
- \* Insert a plug at cable tip into 5P(5 pin) socket attached to the main (TX/RX) circuit board.
- \* Set the removed cover to the radio and tighten four screws.

Figure 1

