

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

144MHz Band All Mode Power Amplifier

Model HL-110V

Tokyo Hy-Power Labs., Inc.

HL-110V is a high power linear amplifier designed for the 144MHz all mode operation. It boasts of maximum output power of 120W. Boosting low input even from hand-held(portable) transceivers to full output power due to input level select switch. With a combination of built-in low noise MOS FET receive pre-amp, HL-110V enables you to enjoy a more comfortable VHF DX QSO.

## FEATURES

- °Input power level switch(2W/10W)  
Matching with almost all kinds of hand-held and portable transceivers of 1W to 3W output, and mobile radio of 10W output.
- °Power Level Meter  
You can observe the output power, and check the power level at all times. An accurate output power can be read with a built-in precision directional coupler of micro strip line.
- °All mode compatibility(SSB/FM)  
At SSB mode, setting the time constant of COX(automatic send-receive switch) to approx. one second, a relay rarely chatters during conversation, and a smooth SSB transmission can be achieved.
- °Terminal for Remote Send-Receive Control  
A remote control terminal is accommodated at the rear panel, which enables a smooth and instant changeover especially on SSB mode and CW mode when two leads are wired to the remote control terminal of the transceiver.
- °Spurious  
A low spurious signal emission(60dB min. down) with an effective output low pass filter.
- °Aluminum heat sink with a combined case by our original design is used. An excellent radiation effect as well as a new, smart appearance is achieved.

## SPECIFICATION

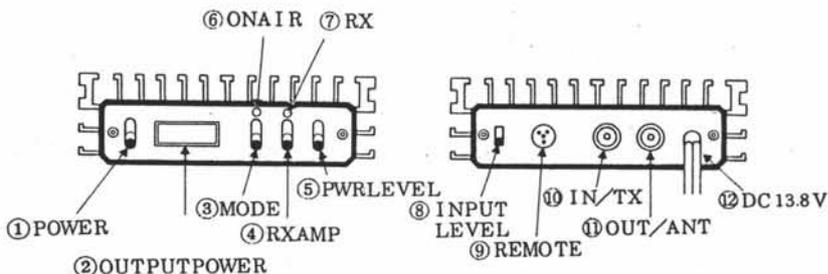
Frequency	: 144MHz band
Mode	: FM.SSB.CW(AM)
DC Power	: DC13.8V(negative ground)
Power Consumption	: 18A (Max.)
Output power	: 110W(Max. 120W)
RF Input power	: 2W/10W selectable
Input/Output Impedance	: 50 $\Omega$
Input/Output connector	: M type

Accessory circuit	: COX(carrier operated T-R switch), Remote control jack, RX pre-amp, Power meter, Reverse DC power polarity protection
Semiconductors	: RF power transistor x 3, Transistor x 5, Diode x 12, LED x 2
Accessories	: Mobile mounting bracket, M-M jumper cable, Remote control terminal plug (attached on rear panel), Fuse(20A), Instruction manual
Dimension	: 172(W) x 60(H) x 263(D) mm
Weight	: approx. 2.5 Kg

EXPLANATION OF FEATURES

\*Front panel

\*Rear panel



(FIG.1)

1. POWER(DC Power switch)  
At off position, the amp is made "THRU" state. The transmitting and receiving signals will bypass the internal part of the HL-110V
2. OUTPUT POWER (Power meter)  
Indicates transmitting output power, even at "THRU" state transmission.
3. MODE(FM/SSB mode select)  
When changing from TX(send) to RX(receive) at "SSB", relay change-over is made with some delay of approx. 1 second. This change is made instantly at "FM".
4. RX AMP(RX receive pre-amp switch)  
At ON position, the receiving signal is amplified.
5. POWER LEVEL switch  
Selects either high or low output level. At "HI", a full power is delivered and at "LO", a half of the full output.

- 6.ON AIR pilot lamp  
Green lamp indicates the amp is transmitting or on air.
- 7.RX pilot lamp  
It is lighted when RX pre-amp is ready, even if DC power switch is off. (It can work independently.)
- 8.INPUT LEVEL switch  
Select either 10W or 2W input level.
- 9.REMOTE(Remote control terminal)  
If the terminal is connected to remote send-receive control terminal of your transceiver, the transmitting and receiving switch can be controlled remotely by the transceiver.
- 10.IN/TX(RF input)  
Connect the coaxial jumper cable from ANT connector of transceiver.
- 11.OUT/ANT(RF output)  
Connect a coaxial jumper cable to antenna.
- 12.DC Power leads(13.8V)  
Red for positive with fuse holder, Black for negative.  
(Fuse holder is mounted on the PC board inside.)

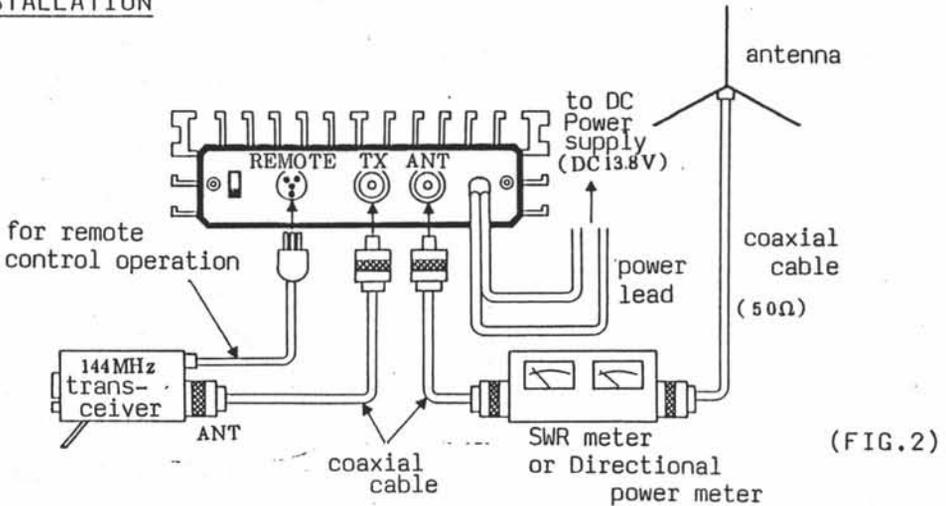
#### CAUTION

Be careful of following subjects which may become the cause of the trouble.

- 1.During transmission, the heat sink may reach a high temperature (approx. 50°C-80°C). Set the amp at a well-ventilated place.  
Don't put objects on top of the amp.
- 2.As the same way, don't operate the amp at places where is exposed to the direct rays of the sun, or nearby a heater etc.
- 3.Be sure to check the "Matching" or VSWR of antenna before operation. Measure "SWR" value by using SWR meter according to FIG.2.  
If SWR value is too high, adjust your antenna and the length of the cable to obtain a lower SWR value.  
You had better obtain SWR less than 1.3 or hopefully as low as 1.
- 4.Choose a good mobile antenna which withstands a high power, or SWR is degraded within a few minutes by heat after starting transmission.  
It is necessary to withstand over 100W.
- 5.Don't try to drive over the rated level(2W or 10W).  
Be sure to check not to select 2W input level for 10W output transceiver.

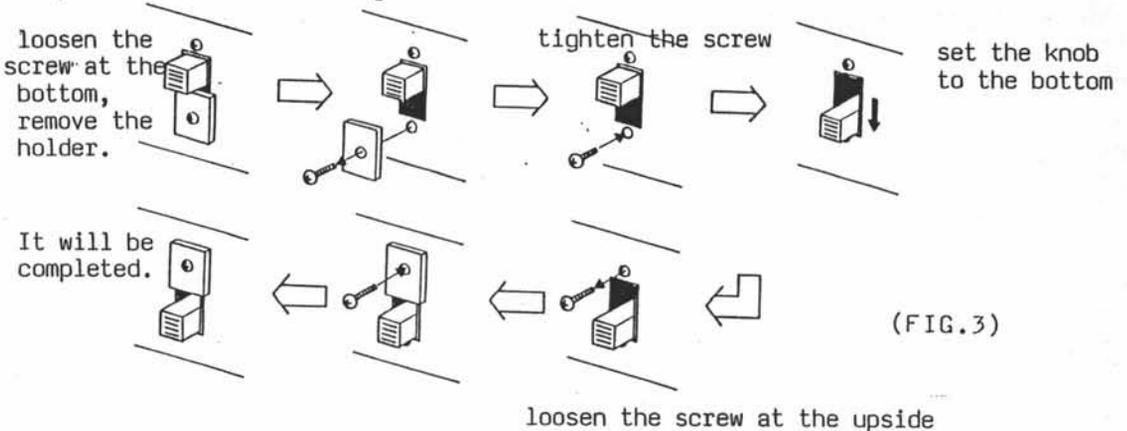
6. Be careful that DC power voltage is kept no higher than 13.8V (12-14V). Some automobiles generate as high as 15V. Although this will not kill the amp immediately, it is most dangerous, if such other bad conditions occur, as antenna mis-match or over drive, simultaneously.
7. In case that AC to DC converter (stabilized power supply) is used at home station, some DC power supplies produce abnormally high output voltage due to high frequency RF intrusion, which will kill the RF power transistor of the amp. Use a DC power supply fully protected against high frequency intrusion, and withstanding high current while transmitting.

INSTALLATION



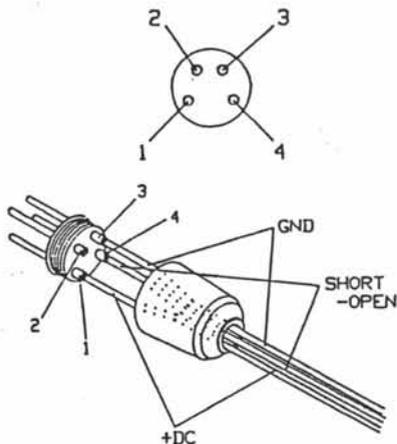
PREPARATIONS BEFORE OPERATION

1. In case that the output power is 1 to 2W type hand-held portable transceiver, set the input level switch to "2W" on the rear panel and lock it again.



2. Connect cables as required according to FIG.2 on page 4.
3. Measure SWR value of antenna. At first, turn the power switch off, and measure with the output level of transceiver only.  
When SWR is high, adjust the antenna height etc. to lower SWR value to 1.3 or less.
4. For a remote control operation from transceiver, remove "REMOTE" relay from rear panel at the base. According to FIG.3, connect vinyl coated wires to "STAND-BY" terminal (remote control) at the transceiver.

°Rear side view, the cover of the plug being removed.

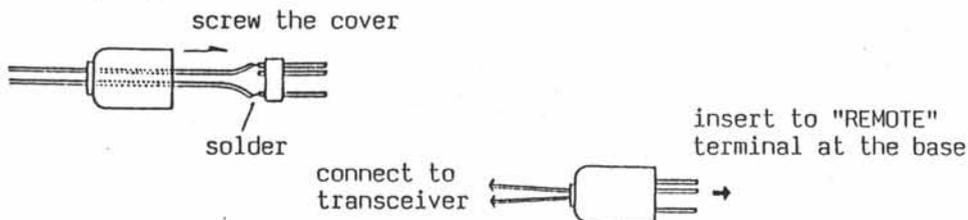


NO	Designation	Connecting point at transceiver
1	+DC	Terminal or circuitry which produce DC+3-9V, on transmission
2	GND	Ground at transceiver (GND)
3	GND	
4	SHORT -OPEN	Terminal or circuitry which is made short on transmission and open on reception at the transceiver

(\* Either of No.1 or 2 available)

°Connection

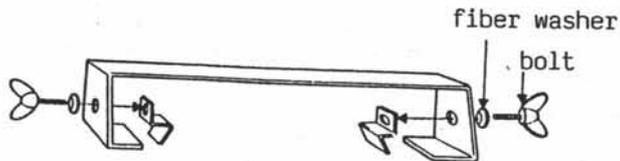
- a) Read the instruction manual of your transceiver, to locate terminal pins which correspond to mentioned table "Connecting Point at transceiver".
- b) In case that a terminal is not applied, search for a circuitry which comes to "+DC" at the transceiver.
- c) After a terminal or circuitry are decided, cut two vinyl cords in suitable length, and solder as FIG.5.
- d) Solder two vinyl cords to either pins 1 and 2 or 3 and 2 of the plug.



(FIG.5)

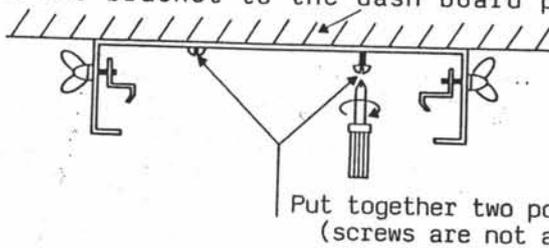
5. For setting the amp under the dash board panel of automobile with an attached mobile mounting bracket, please refer to FIG.6,7 and 8.

a) Construct the bracket.



(FIG.6)

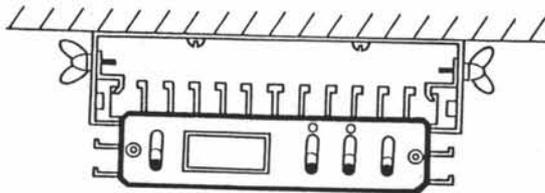
b) Set the bracket to the dash board panel.



(FIG.7)

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

c) Set the device.



(FIG.8)

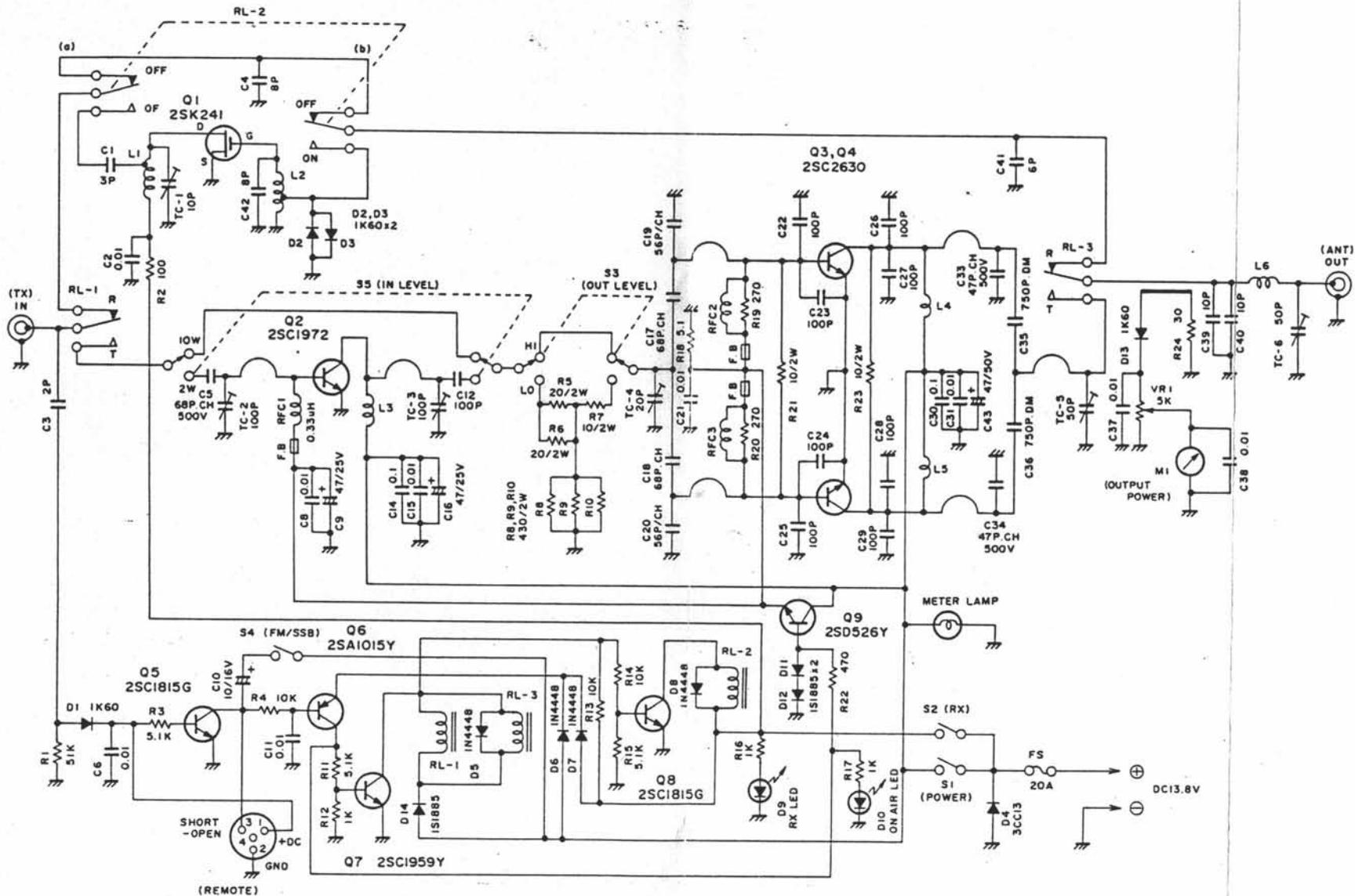
\*Slide upper both corner of the device into the bracket, tighten the device spinning bolts on both sides at the suitable position on front and rear direction. And setting will be finished.

### OPERATION

1. Turn the power switch on, and red lamp on front panel is lighted.
2. At receiving state, signals to and from antenna bypass the internal part of the device. In that case, you can hear received signal from the transceiver.
3. By turning the transceiver to "transmit", the device is made to "transmitting power amplification" state, and high power signal is emitted from antenna. At the same time, green lamp (ON AIR) on front panel is lighted and indicates that the amp is transmitting or on the air.
4. Select "MODE" switch to operate mode.
5. In case the receiving signals are weak, noisy and hard to understand, turn "RX AMP" switch on. You can hear signals clearly with a low noise.

TROUBLE SHOOTING (not trouble)

Symptoms	Cause	Treatment
In spite of turning the power switch off at mobile operation, the black lead of DC power becomes hot.	You are connecting power leads conversely to polarity of battery.	Connect power leads to the battery at right position again.
At transmitting, an internal relay is chattering.	<ol style="list-style-type: none"> <li>1.The Input/Output connectors are connected on reverse side.</li> <li>2.The voltage of the DC power supply drops by RF signal intrusion.</li> </ol>	<ol style="list-style-type: none"> <li>1.Set a connector at the right position again.</li> <li>2.To cure this, solder some of 0.1, 0.01, 100<math>\mu</math>F capacitors in parallel and connect them to + and - terminals of DC power supply. (It is not always efficient to get rid of the trouble with this method.)</li> </ol>
Heat sink becomes hot remarkably.	Mis-matching of antenna.	Lower SWR value of antenna. (Refer to "CAUTION-3" on page 3)
The device doesn't work at transmitting and receiving.	Troubles of each coaxial cables.	Check connection of coaxial cables, or if there is "SHORT" or "OPEN" states.
Nominal output power can not be achieved.	<ol style="list-style-type: none"> <li>1.Input level switch at rear panel of transceiver is set "LOW".</li> <li>2. Power level switch is set "LO" position.</li> <li>3.Power voltage is very low.</li> </ol>	<ol style="list-style-type: none"> <li>1.Set the input level to "2W".(Refer to "PREPARATION-1" on page 4)</li> <li>2.Set the power level switch to "HI".</li> <li>3.a)Set the stabilized power supply to the right voltage. b)At automobile station, check the power leads circuitry.</li> </ol>



All resistors without notes: 1/4W, Carbon  
 All capacitors without notes: 50V, Ceramic  
 C39,40 : Ceramic CH500V, ±10% type

The diagram is subject to change without notice.

TOKYO HY-POWER HL-110V  
 CIRCUIT DIAGRAM