

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

430MHz band All mode RF power amplifier

Model HL-60U

Tokyo Hy-Power Labs., Inc.

The HL-60U is a 430MHz band all mode high power linear amplifier with a maximum output power of 60W, designed through our long accumulated RF power technology. It is a most reliable amplifier with state of the art semiconductors and circuit technology. With a combination of built-in low noise GaAs FET receive pre-amp, HL-60U enables you to enjoy a more comfortable UHF DX QSO.

#### FEATURES

°FM/SSB mode switch and remote Send-Receive control for SSB has now become unnecessary since the switching time from TX to RX is instantaneous by using newly developed full diode switching system.

°With the built-in receive pre-amp using GaAs dualgate MES FET 3SK121, even a very weak receiving signal is amplified with relatively low noise level.

°A rugged RF power transistor with a latest technology, 2SC3102 is used, which can stand some antenna mismatch(under normal operating condition).  
It is designed to be easy to use without having a protection circuitry built in.

°With an excellent linearity, it is especially effective on SSB.

°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.

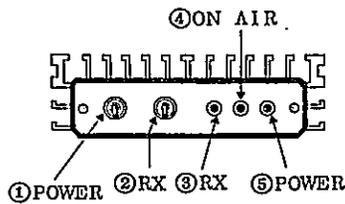
#### SPECIFICATIONS

Frequency	: 430 MHz band(430-440 MHz) HL-60Uc (Australian) model: 475-479 MHz
Mode	: FM, SSB, CW, TV(with reduced output)
DC power	: DC 13.8V(12-14V)/Negative ground
Power consumption	: 9A max.
Output power	: 50W (5W-60W)
Input power	: 12W (1W-15W)
Input/output impedance	: 50 ohm
Input/output connector	: M type (SO-239)
Insertion loss	: 1 dB Max
Accessory circuit	: Diode antenna switching, carrier control unit, GaAs FET low noise RX pre-amp, reverse polarity protection, Remote control terminal
Gain for RX pre-amp	: 15 dB
Noise figure	: NF = 1dB max (nominal)

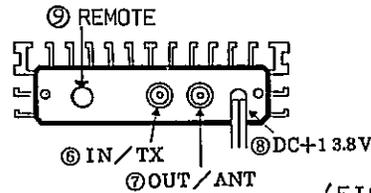
Semiconductors	: RF power transistor x 1, GaAs FET x 1, Transistor x 6, Pin type diode x 3, Diode x 22, LED x 3
Fuse	: 10A
Accessories	: Mobile mounting bracket, M-M jumper cable for UHF, Instruction manual, Fuse(10A)
Dimension	: 150(W) x 45(H) x 164(D) mm
Weight	: 1.2 Kg. (Approx.)

EXPLANATION OF FEATURES

Front panel



Rear panel



(FIG.1)

1. POWER(DC power switch) :At off position, the device is made "THRU" state. The transmitting and receiving signals will bypass the internal parts.
2. RX(Switch for RX pre-amp):The pre-amp works even if the main "POWER" switch is off.
3. RX("ON AIR"pilot lamp for RX pre-amp)  
:Red lamp indicates RX pre-amp functions.
4. ON AIR(pilot lamp) :Green lamp indicates linear amp functions.
5. POWER(pilot lamp) :Red lamp indicates DC power is on.
6. IN/TX(RF input connector):Connect the coaxial jumper cable from ANT connector of transceiver.
7. OUT/ANT(RF output connector):Connect the coaxial jumper cable to antenna.
8. DC+13.8V(DC power leads) :Red for positive with fuse holder, Black for negative.
9. REMOTE terminal :Terminal for remote cotrol operation.

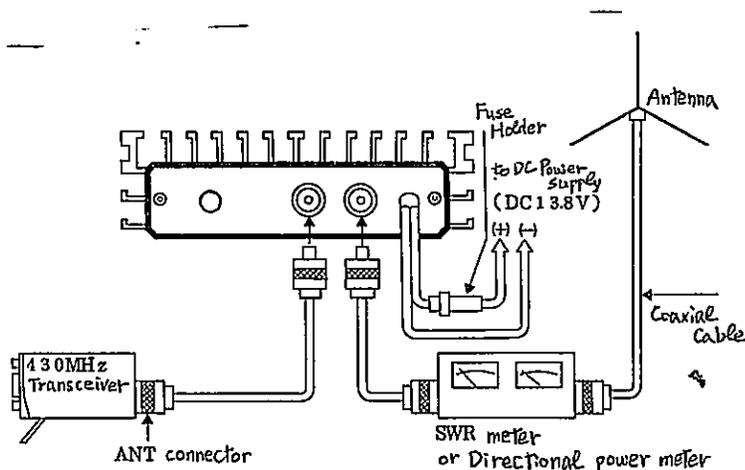
CAUTION

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

1. During transmitting, the heat sink may reach a high temperature (approx 60°-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 the 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 to obtain "Matching". You had better obtain SWR of less than 1.3 or hopefully as low as 1. Please note that SWR value is changed by power level.
4. Choose a good mobile antenna which withstands a high power, or SWR is degraded within several minutes by heat after starting transmission.
5. Don't try to drive over 10W.
6. Be careful that DC power voltage is kept no higher than rated voltage of 13.8V(12V-14V). Some automobiles generate as high as DC 15V. Although this will not kill the amp immediately, it is most dangerous, if such other bad conditions coincide, with antenna mis-match or over drive.
7. In case that AC to DC converter(power supply) is used at home, some DC power supplies produce abnormally high output voltage due to high frequency RF intrusion, which will kill the expensive RF power transistor of the amp. Use a DC power supply fully protected against high frequency intrusion.
8. Be sure to check the INPUT/OUTPUT connector not to connect reversely. In case you connect reversely and transmit without caution, output power of transceiver will be open state and it may kill the final transistor of the transceiver. Also it may easily damage the internal parts such as switching diode etc.. Furthermore, expensive GaAs FET may be damaged as the second trouble.

### INSTALLATION

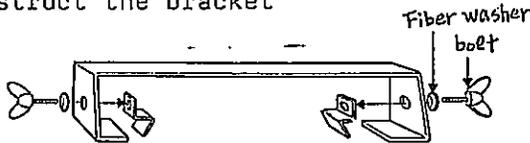


(FIG. 2)

PREPARATIONS BEFORE OPERATION

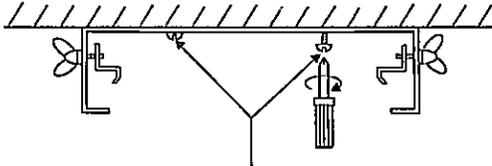
1. Connect cables as FIG.2.
2. Measure SWR value of antenna. At first, turn the power switch off, and measure SWR with output level of transceiver only.
3. For setting the amp under the dash board of automobile with an attached mobile mounting bracket, please refer to FIG.3,4 and 5.

. Construct the bracket



(FIG.3)

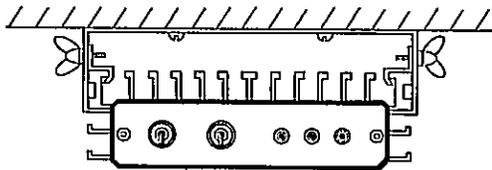
. Set the bracket to the dash board panel



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

(FIG.4)

. Set the device

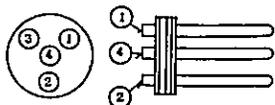


(FIG.5)

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

4. For remote control operation from transceiver, remove "REMOTE" plug from the rear panel of the device, and connect vinyl coated wires to "STAND-BY" (remote control) terminal of the transceiver, according to FIG.6.

\*Rear and side view, the cover of the plug being removed.

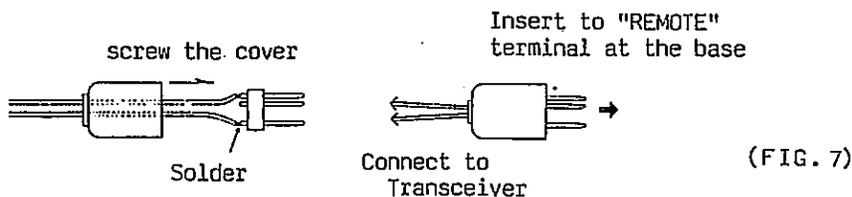


(FIG.6)

No.	Designation	Connecting point at transceiver
1.	+DC	Terminal or circuitry which produce DC +13 - 9V, on "transmit".
2.	GND	Ground at transceiver (GND)
3.	SHORT -OPEN	Terminal or circuitry which is made "SHORT" state at transmit, and "OPEN" state at receiving.
4.	(empty)	

\*Connection

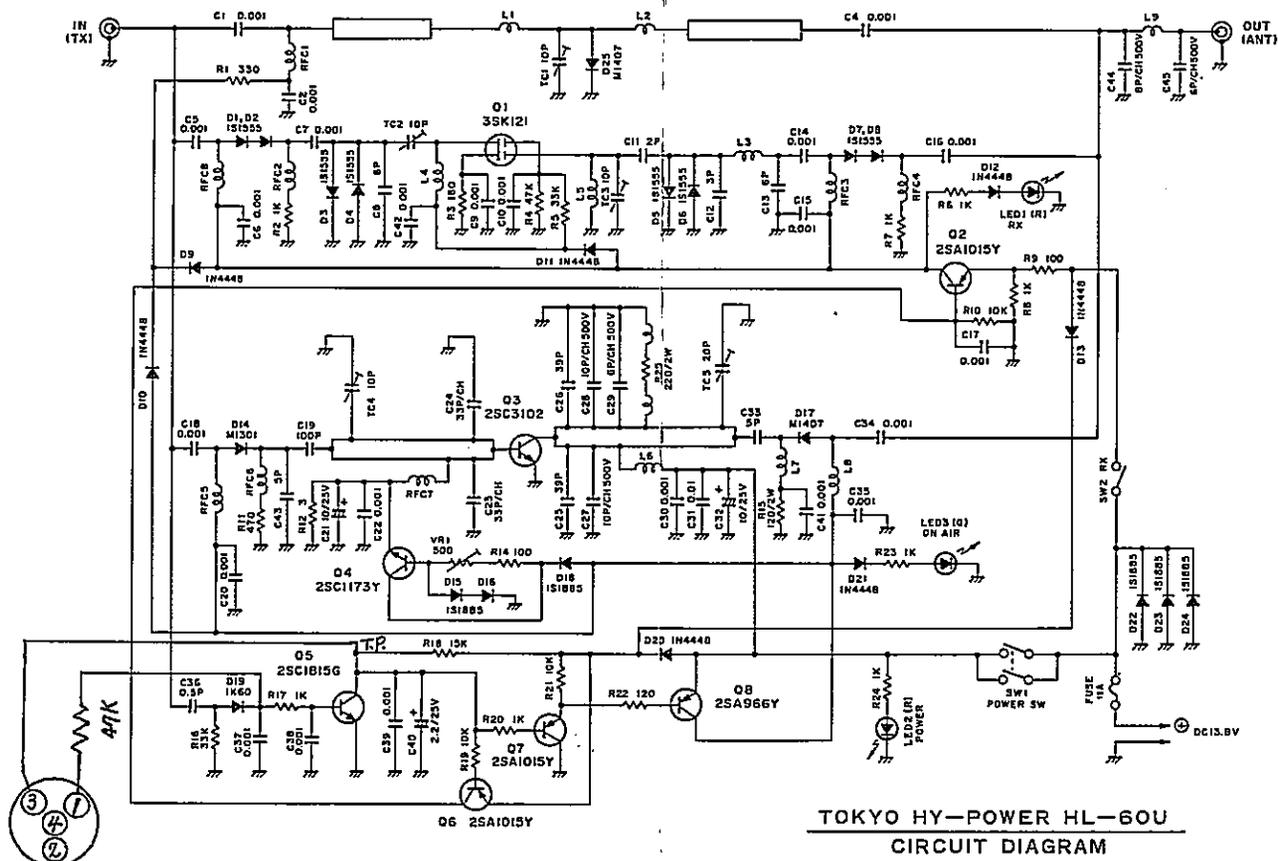
- a) Read the instruction manual of your transceiver to locate terminal pins which correspond to mentioned table "Connecting point at transceiver".
- b) In case that a terminal is not applied, search for a circuitry which comes to "+DC13.8V" at the transceiver.
- c) After a terminal or circuitry are decided, cut two vinyl cords in suitable length, and solder as FIG.7.
- d) Solder two vinyl cords to either pins 1 and 2 or pins 3 and 2 of the plug.



(FIG.7)

## OPERATION

1. Turn the power switch of transceiver on. At receiving state, signals to and from antenna bypass the internal parts of the device.  
In that case, you can hear received signal from transceiver.
2. Turn the power switch of the device on, and red lamp on front panel is lighted.
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. In case the signals are weak, noisy and hard to understand, turn the switch of receiving pre-amp on. You can hear signals clearly.  
It works even with the power switch off, and a red lamp lights.



All capacitors without notes: 50V, Ceramic  
 L4, L5 : on P.C.B. Pattern  
 C25,26 : 39pF/500V Ceramic chipped Capacitor

The diagram is subject to change without notice.