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

430MHz Band All Mode Power Amplifier

Model HL-63U

Tokyo Hy-Power Labs., Inc.

Read this instruction manual completely before starting operation in order to keep HL-63U in the best condition for a long time.

GENERAL INFORMATION

HL-63U is a high power linear amplifier with maximum output power of 50W, designed for 430MHz band all mode operation with our long accumulated UHF RF technology.
Incorporating numerous new functions such as automatic RF input level select (10W/25W) and ultra low-noise GaAs FET RX pre-amp, HL-63U is a remarkable and useful UHF band power amplifier.

FEATURES

- RF input select (10W/25W) circuit. You can operate with not only 10W but also 25W output radios, as the amp automatically selects the incoming RF drive level.

- With a high performance GaAs FET MGF1202 in the RX pre-amp stages, high gain and very low noise operation has been achieved. The RX gain can be varied with the slide volume control on the front panel. (+15dB - -15dB)

- With WARNG (WARNING) circuit, the over-voltage and antenna mismatch conditions can be monitored. And, LED on the front panel indicates these troubles.

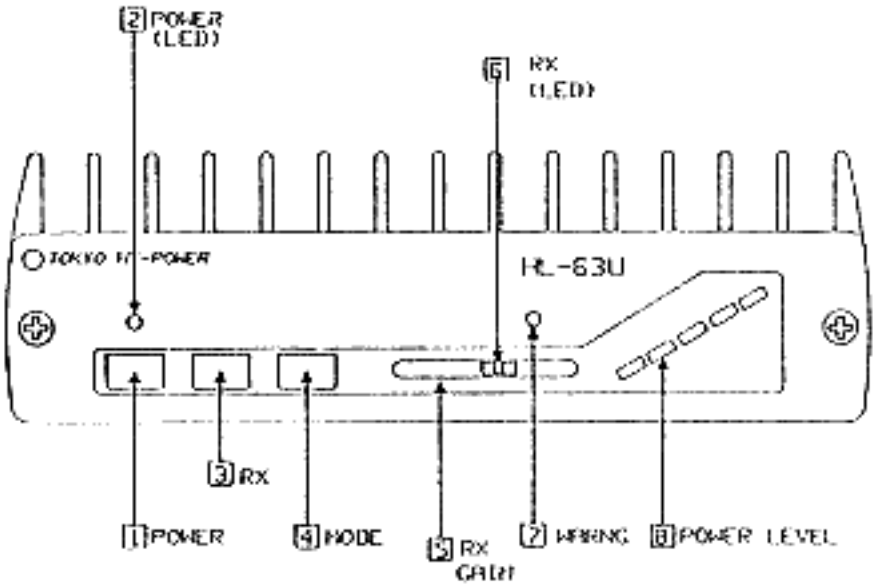
- On the rear panel, the connecting jack for remote controller (option, HRC-60) is accommodated.
This enables remote control operations for main power switch and RX pre-amp.

SPECIFICATIONS

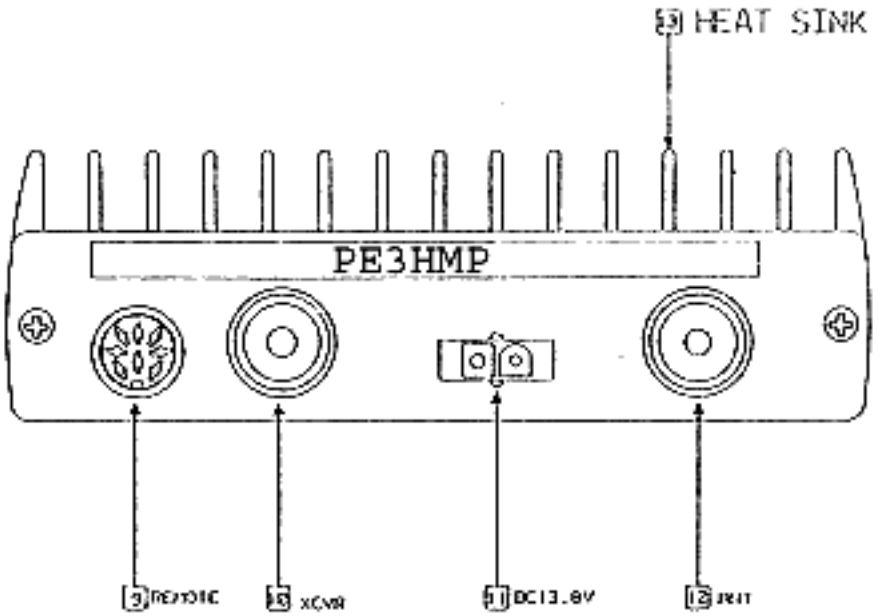
Frequency Band	: 430MHz Band (430-440MHz)
Mode	: FM/SSB/CW
Output Power	: 50W (3 - 50W)
RF Input Power	: 10W/25W Automatic Level Select(0.5-25W)
Spurious Level	: -60dB or less
Input/Output Impedance	: 50Ω
Input/Output Connector	: SO-239 (M type)
RX Pre-amp Gain	: -15dB - +15dB (Variable)
DC Power Supply	: DC 13.8V (Negative ground)
Power Consumption	: 10A max.
Accessory Circuitry	: 1.RF input automatic level select(10/25W) 2.Variable gain GaAs FET low noise RX pre-amp 3.DC power over-voltage, ANT mis-match protection and WARNG circuit 4.LED power level indicator 5.Reverse DC power polarity protection
Semiconductors	: RF power transistor x 1, IC x 2 Transistor x 8, Diode x 32 GaAs FET x 1, LED x 8
Fuse	: 10A
Accessories	: 1.Mobile mounting bracket x 1 2.M4x12 bolt for bracket installation x 4 3.Coaxial jumper cable (M-M) x 1 4.DC power lead with connector 5.Fuse (10A)
Dimension	: 150(W) x 47(H) x 182(D) mm
Weight	: approx. 1.3 Kg

EXPLANATION OF FEATURES

* Front panel



* Rear panel



[Fig. 1]

1 POWER (Power switch)
The power switch of the TX amp section. It is a self-lock push switch. The switch will be locked by the first push for ON status, and the next push will release the lock, returning knob to forefront position for OFF status.

2 POWER (LED)
LED indicates the power is applied to TX amp.

3 RX AMP (RX pre-amp switch)
It can be operated independently by turning RX AMP switch on even if POWER switch is off.

4 MODE (FM/SSB mode select)
The select switch of the change-over time from TX (send) to RX (receive) by carrier operated T/R switch. When pushed for "SSB", relay change-over is made with a delay of approx. one second. If released for "FM", this change is made instantly.
For CW operation, push to the SSB position.
For packet communication, set to the FM position.

5 RX GAIN (RX pre-amp gain control level)
Gain can be varied from +15dB max. to -15dB. It works as an attenuator between 0dB and -15dB. This is effective when the receiving signal is weaker than the nearby interfering signal.

6 RX (LED)
Lights when RX pre-amp is on.
It is recognized only when it lights.

7 WARNG (LED)
LED indicates the DC power of power amp section is turned off when troubles such as DC power over-voltage and antenna mismatch occur. After solving these troubles, turn on the power switch [1].

8 PWR LEVEL (Output power level indicator)
Indicates output power level with 5 LED's.
With all of them lighting, it indicates 40W or more output.

9 REMOTE (Remote controller connector jack)
The connector jack for remote control operation of some switches and functions of the amp with the optional remote controller (HRC-60). See page 7.

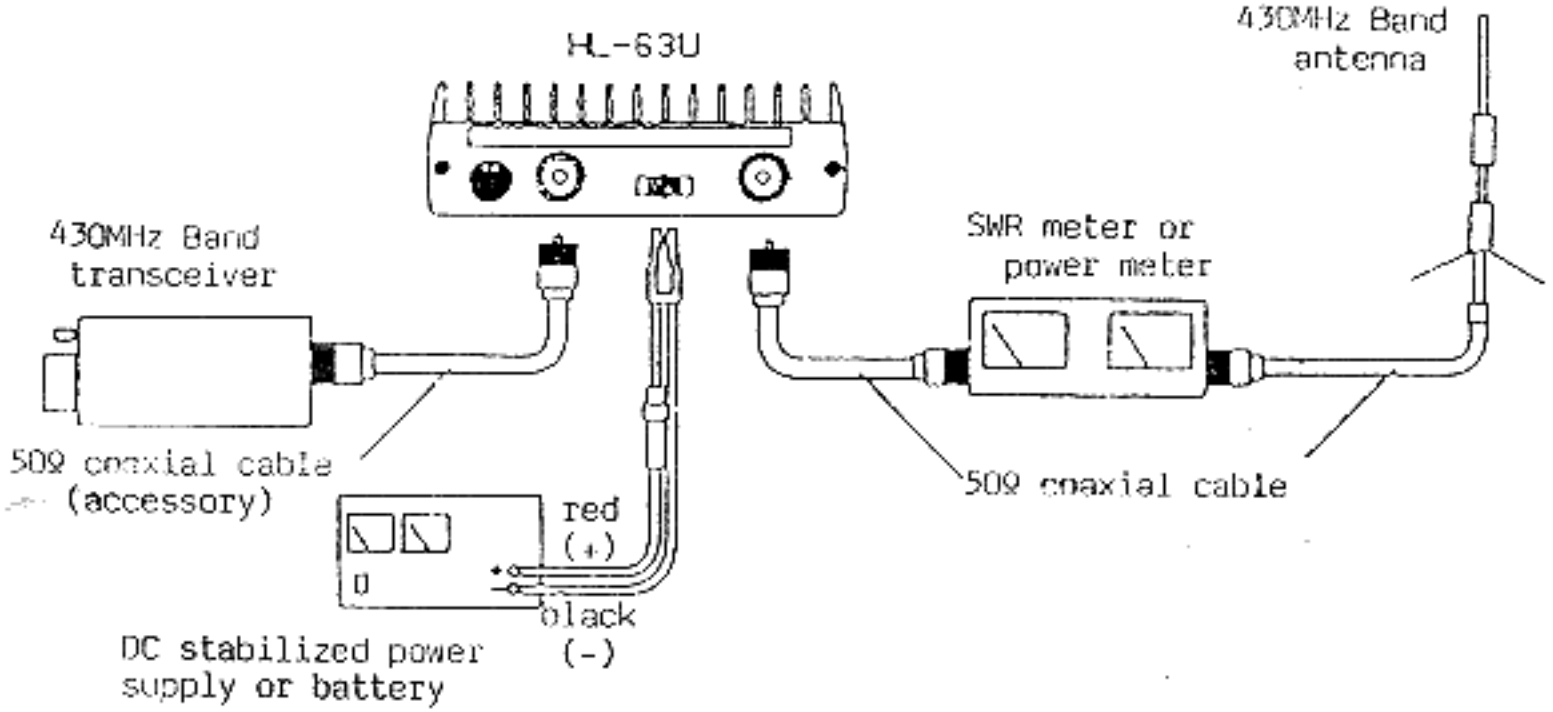
10 XCVR (Input connector)
The connector should be connected to the antenna connector of the transceiver. Both 10W and 25W radio can be connected directly.

11 DC 13.8V IN (Power cord)
The tip of the cord should be connected to battery (12V) or DC stabilized power supply. The red is positive and the black, negative. Use a power supply with a current capacity of 10A or more.

12 ANT (Output connector)
Connect coaxial cable to antenna.

13 HEAT SINK
DON'T put objects on top of the amp. During transmission, the heat sink may reach a high temperature. Place the amp in a well-ventilated place. Be careful not to block the heat shink surface to ensure ventilation.

INSTALLATION



[Fig. 2]

OPERATION

1. Be sure to check the installation according to Fig. 2 again.

2. Turn the power switch of transceiver on. At receiving state, signals to and from antenna bypass the internal part of the amp. Then, you can hear received signal from the transceiver.

3. Keep [1] POWER switch off.

4. Next, tune the transceiver at unoccupied frequency channel and turn on to "transmit". Then, check SWR value with an SWR meter etc. In case the SWR value is high (1.3 or more), adjust the antenna to obtain a good "matching" by varying the installation point of an antenna or the element length.
It is recommended to obtain SWR of as low as 1, hopefully.

5. Turn [1] POWER switch of the amp on after you confirm that the antenna obtains "matching".

6. By turning the transceiver to "transmit", HL-63U is made into "transmitting power amplification" state, and high power signal is emitted from antenna. At the same time, [8] PWR LEVEL lamp lights, the number of lamps lighted are related to output power level. Be sure to check SWR value at "transmitting" state. Sometimes SWR value is varied by increasing power level.
In case SWR becomes too high, adjust again to obtain "matching" according to above 4.

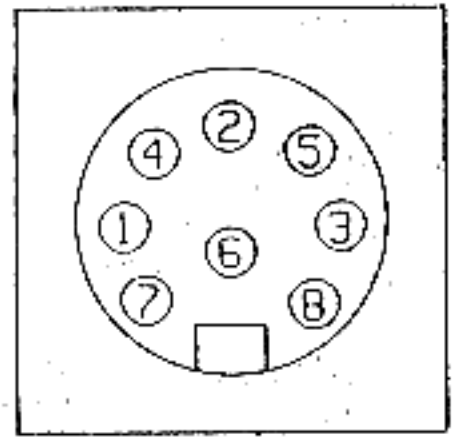
7. The amp can amplify with even the input power of 0.5W because of its linear characteristics. As the output power level of the amp is in proportion to the driving level, the output power of a transceiver needs to be 10W or 25W to obtain the maximum output power of 50W from the amp.

8. Set [4] MODE select switch to the operating mode, "FM" or "SSB". Please note that the amp turns to "receive" state temporarily at the interval between conversation at SSB mode due to the change-over of TX/RX carrier controlled circuitry.

9. In case the receiving signals are weak, noisy and hard to understand, or too strong to make troubles, turn [3] RX pre-amp switch on and adjust [5] RX GAIN the slide control knob to set at suitable point. You can control the RX gain as you like by sliding [5] RX GAIN control level.
Max. on the right, Min. on the left (it becomes to work as an attenuator as slided towards the left).

10. In case you operate with transceiver only, just turn [1] POWER. The signal to and from the transceiver bypasses the internal part of the amp. And if you need to operate RX pre-amp only, just turn [2] RX pre-amp switch on.

ABOUT REMOTE CONTROLLER JACK



Rear view on the panel

Pin No.	Designation	
①	RX SW	Connected to RX AMP switch. RX AMP(V/UHF) is made to "ON", when +DC13.8V is applied.
②	Vcc	Connected to POWER LEAD ⊕. +DC13.8V appears here at all times.
③	NC	Non-connection.
④	WARNG LED	The voltage to light LED appears when WARNG lamp lights.
⑤	ON AIR	+DC13.8V (50mA max.) appears at transmitting.
⑥	GND	Ground
⑦	POWER SW	Connected to DC power switch. POWER is made to "ON" when +DC13.8V is applied.
⑧	NC	Non-connection.

CAUTIONS

To avoid malfunctions and damages, and to achieve the full performance, please pay attention to the following matters.

1. The heat sink temperature will rise high during the transmission. Be careful not to block the heat sink surface to ensure ventilation. Also, avoid operation near heat sources such as locations exposed to sunlight or locations near heaters.

2. If the antenna matching condition is poor (or the SWR is high), please try to lower SWR. This is also important to ensure the efficient transmitting of output power from antenna. Also, check thoroughly before operation if antenna is properly connected and if there are no short and open.

3. Keep the rating of 25W or less for RF drive.

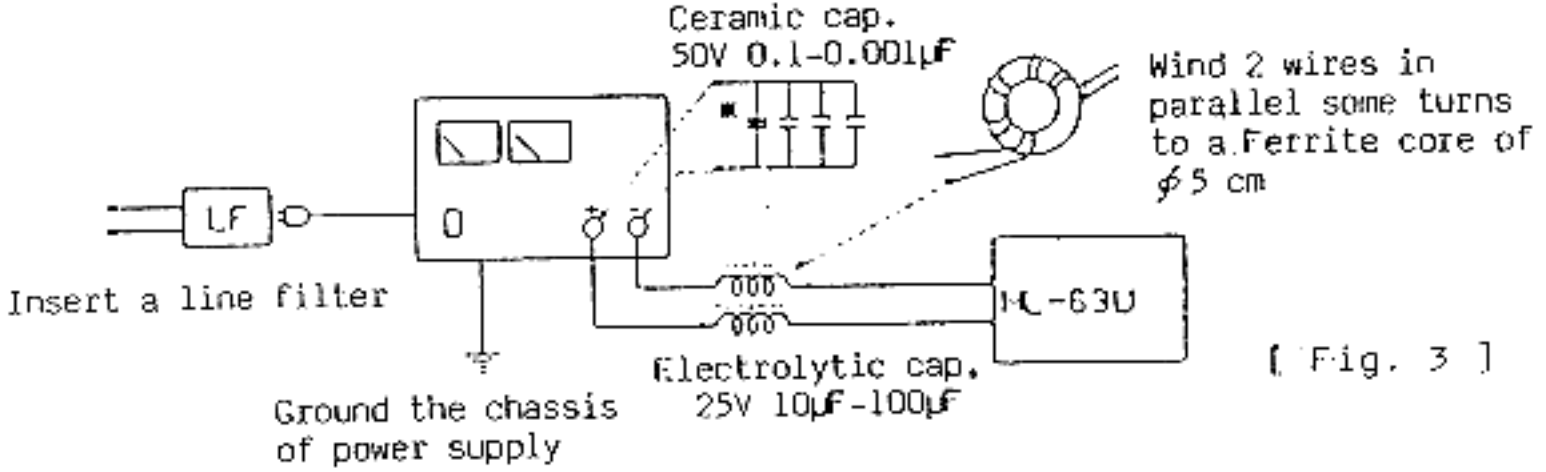
4. Be sure that the power voltage does not exceed DC 13.8V (12V - 14V). The unit will easily be damaged if connected to DC 24V (battery for truck use) or AC 100V power sources.

5. Never connect the whip antenna of handy-transceiver directly to the antenna connector of the amp unit using M-BNC converting connector etc. It may otherwise cause the damage of antenna due to insufficient power capacity, as well as the trouble and damage of the transceiver or this amp unit with a strong RF signal intrusions.

6. When utilizing a mono band antenna, check before operation that the antenna is identical with transceiver operating frequency. At the same time, when inserting coaxial switch to either or both of input and output sides of this amp unit in order to operate two sets of transceivers and antennas of which the frequencies differ, it is necessary to check carefully the setting position of the coaxial switch.

7. Be sure to use 50Ω cable for the coaxial cable used for various connections. When the impedance differs as with 75Ω cable much reflected wave occurs as a result of the mis-match, becoming hard to obtain a full power from the amp unit and it may cause to kill RF power transistor.

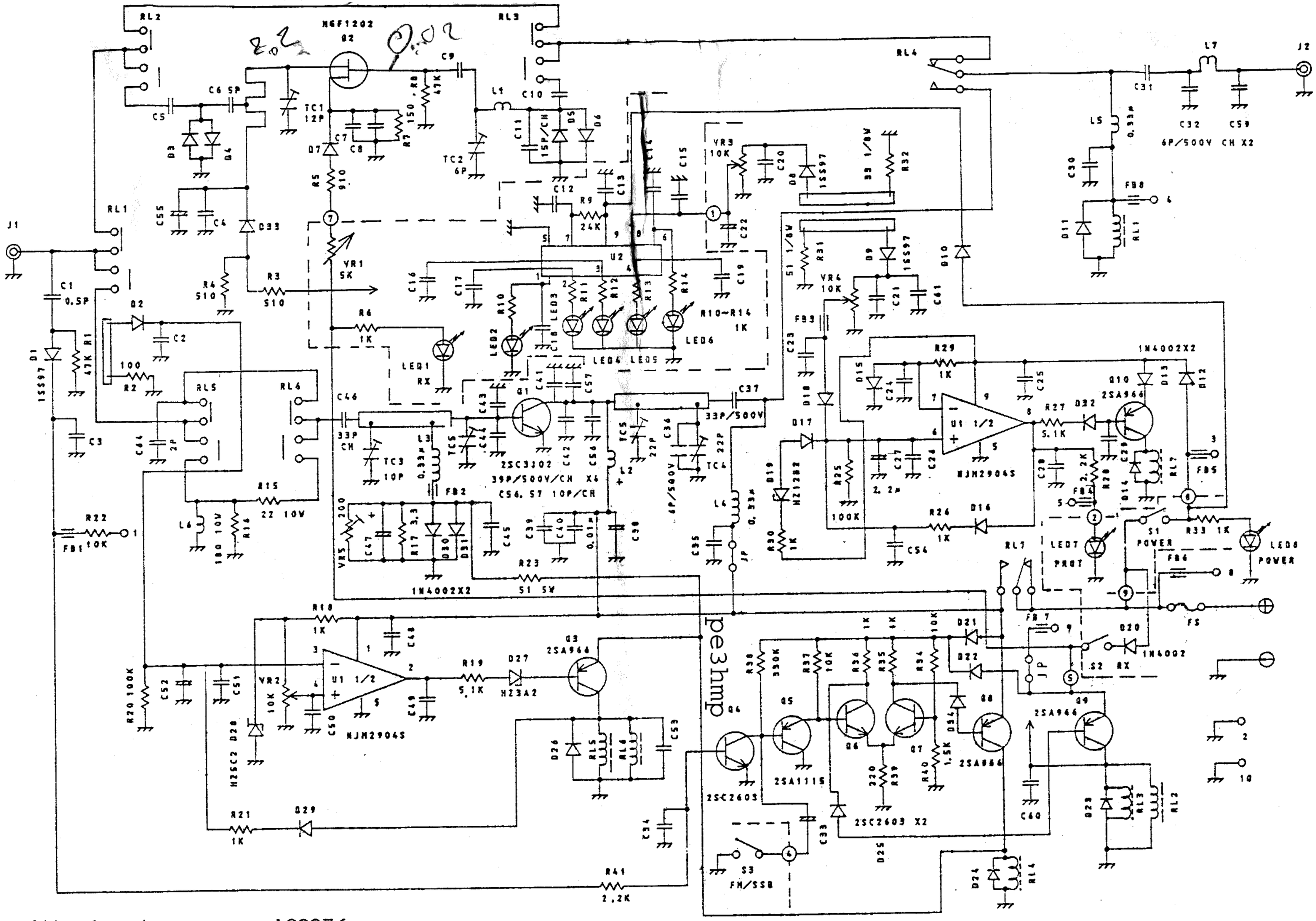
8. When using stabilized DC power supply, the output voltage may rise to an abnormal level, resulting from malfunction due to RF signal intrusion. Therefore, use a power supply with sufficient current capacity (10A or more) as well as with a good protection for RF intrusion. If power supply malfunctions, discontinue operation by turning off the power switch and take the necessary measure for a power supply as illustrated below.



[Fig. 3]

* If trouble does not cease with this procedure, consult manufacturer of power supply.

9. The cord may be burned if power cord is connected in the reverse polarity, especially when power source is a battery. Check polarity well before connection. However, the interior of this amp unit is protected from reverse connection by the protection circuit.



All diode without notes : 1S2076
All resistors without notes : 1/4W, Carbon
All capacitors without notes : 1000 pF/50V, Ceramic
All electrolytic capacitors without notes : 10μF/50V

HL-63U CIRCUIT DIAGRAM

TOKYO HY-POWER

* The diagram is subject to change without notice.