INSTRUCTION MANUAL

144MHz Band All Mode Power Amplifier

Model HL-200V/50

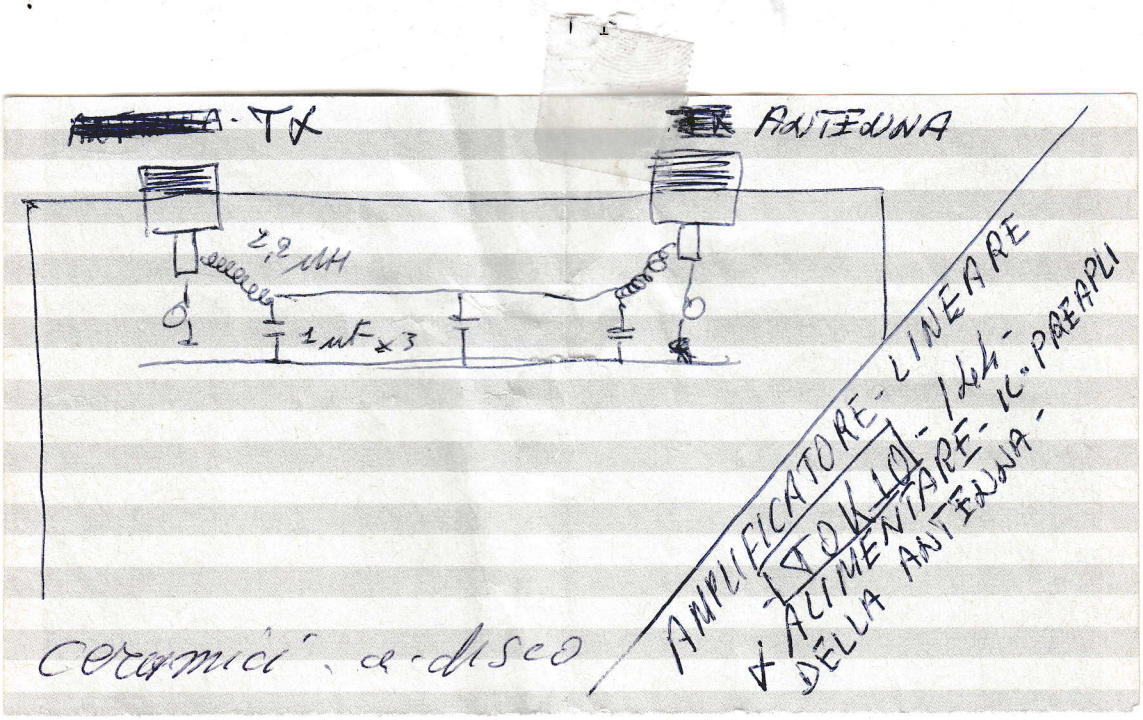
TOKYO HY-POWER LABS., INC.

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

144MHz Band All Mode Power Amplifier

Model HL-200V/50



Tokyo Hy-Power Labs., Inc.

HL-200V/50 is a high power linear amplifier designed for 144MHz band all mode operation. It provides a maximum output power of 200W when driven by 50W radio.
Using the built-in low noise GaAs FET receive pre-amp, the HL-200V/50 enables you to enjoy a more comfortable VHF DX QSO.

FEATURES

° LED Power Level Indicator
You can monitor the output power level at all times. The output power is detected with the built-in precision microstrip line type directional coupler, and then fed to monolithic IC LED driver.

° Protection Circuit
When the connector at the RF output side is open or shorted, or when the supply voltage gets over the rating, protection circuits will operate to prevent the expensive RF power transistors from being damaged.

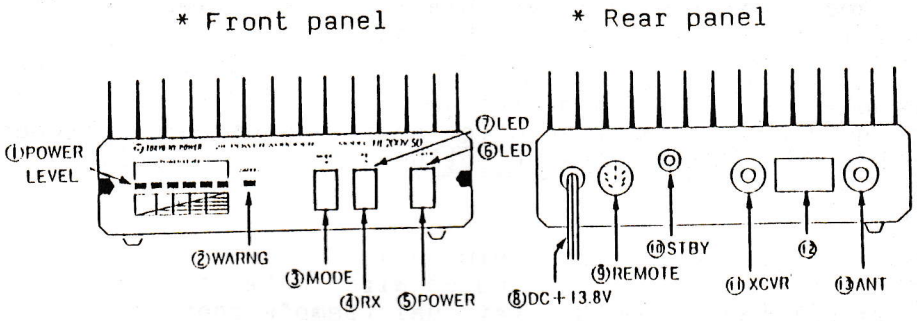
° All Mode Compatibility (SSB/FM/CW)
In the SSB mode, the time constant of the COX (automatic send receive switch) is set to be approximately one second. Consequently, the relay rarely chatters during conversation, and smooth SSB operation is the result.

° Remote Send-Recieve Control
"+DC or SHORT" remote control lead wires are incorporated. Connecting cables between remote send-receive control terminal of the device and transceiver, a relay will not chatter at SSB/CW mode, and a smooth transmission can be achieved.

SPECIFICATIONS

Frequency	: 144MHz Band
Mode	: FM/SSB/CW
DC Power Supply	: DC 13.8V (negative ground)
Power Consumption	: 24A (max.)
Output Power	: 200W max.
RF Input Power	: 50W max.
Input/Output Impedance	: 50Ω
Input/Output Connector	: SO-239 (M type)
Accessory Circuit	: ① COX (Carrier operated T/R switch) ② Remote control terminal ③ Mode select switch ④ LED power level indicator ⑤ Load open/short protection ⑥ DC power overvoltage protection ⑦ Reverse DC power polarity protection ⑧ GaAs FET low noise RX pre-amp ⑨ External remote controller terminal
Semiconductors	: RF power transistor x 2 IC x 2, GaAs FET x 1, LED x 9 Transistor x 10, Diode x 23
Accessories	: Coaxial jumper cable (M-M) x 1 RCA plug x 1, Spare fuse x 2 Mobile mounting bracket x 1
Dimensions	: 183(W) x 78(H) 303(D) mm
Weight	: 2.80 Kg (approx,) or 6.17 lbs.

EXPLANATION OF FEATURES



(Figure 1)

① Power Level (Output power level indicator)
Indicates output power level with 6 LEDs.
With all of them lighting, it indicates 200W output.

② WARNG (Protection pilot lamp)
When output of the amplifier is open, shorted or SWR of the antenna is extremely high, DC power is disconnected automatically to protect the power transistors.
At this time, the WARNG lamp lights to indicate the amplifier is off.

③ MODE (FM/SSB mode select)
When changing from TX (send) to RX (receive) in the "SSB" mode, relay change-over is made with a delay of approximately one second. This change is made instantly at "FM".

④ RX AMP (RX receive pre-amp switch)
In the "ON" position, the received signal is amplified by a low noise GaAs FET device.

⑤ POWER (DC power switch)
In the off position, the amp is in the "THRU" state.
The transmitted and received signals will bypass the active internal part of the HL-200V/50.

⑥ (LED)
Lights when DC power is supplied to TX amp and power switch is "ON".

⑦ (LED)
Lights when ④ RX switch is turned on, even if DC power switch is off. The pre-amp may be used even when the power amplifier is off.

⑧ DC +13.8V
DC power leads. Red for positive, black for negative.
Fuse holder is built-in inside of the case.

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 9.

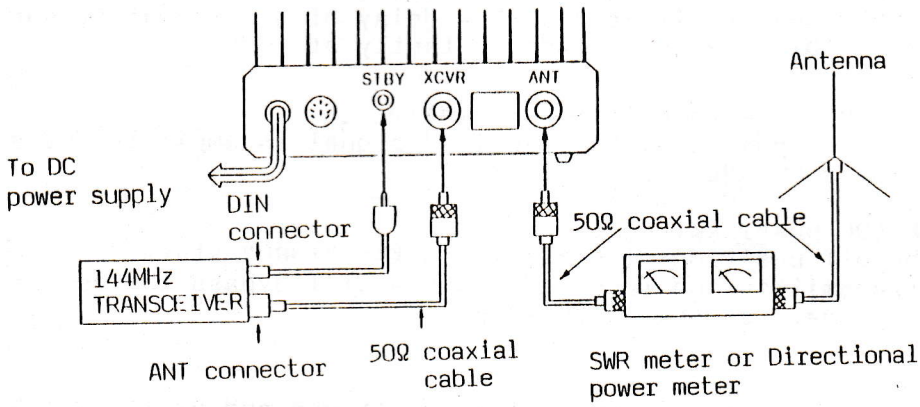
⑩ REMOTE (External remote control terminal)
Connect the RCA plug with vinyl coated wires between remote control terminal and "STAND BY" terminal (remote control) at the transceiver, and then HL-200V/50 can be controlled remotely by the transceiver. (See item 2 of preperation before operation.)

⑪ TX (RX input connector)
Connects a coaxial jumper cable from ANT connector of transceiver.

⑫ Name Plate
Layout of coaxial connectors etc. is illustrated.

⑬ ANT (output connector)
Connect a coaxial cable to antenna.

INSTALLATION

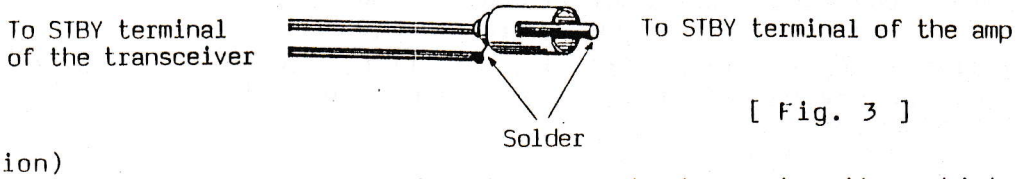


[Fig. 2]

PREPARATION BEFORE OPERATION

1. Connect cables as required according to the installation on page 4.

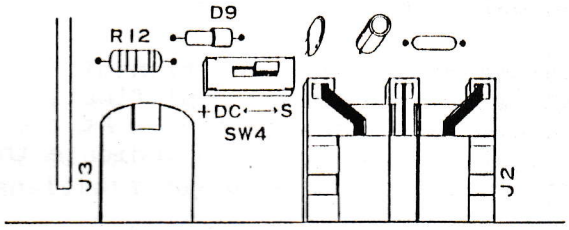
2. Connect the RCA plug to "STBY" (10) and vinyl coated wires of plug for remote operation to "STAND BY" terminal on transceiver.



[Fig. 3]

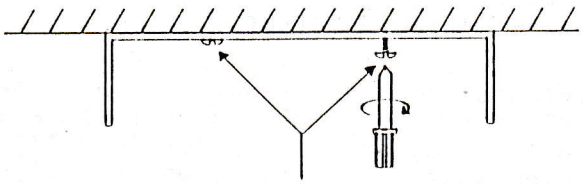
(Caution)
Please check that the transceiver has terminal or circuitry which comes to +DC on transmission or which is made short on transmission and open on reception. In case of "+DC", set the switch SW4 on the PC board to "+DC" position. And, in case of SHORT/OPEN, set to "S" position.

[Fig. 4]



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

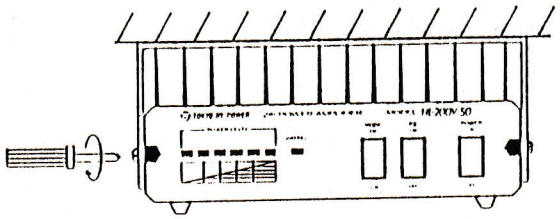
(1) Set the bracket to the dash board panel.



[Fig. 5]

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

(2) Set the device.



Tighten the amp with spinning bolts on both sides at the suitable position on front and rear position.
And setting will be finished.

[Fig. 6]

OPERATION

1. Before operation, keep ⑤ POWER switch and ④ RX AMP switch off.

2. Turn the power switch of transceiver on and receive.

3. Signals to and from the antenna will bypass the internal part of the device. In that case, you can hear signals on the transceiver.

4. Turn ⑤ POWER switch on, and ⑥ POWER ON pilot lamp lights.

5. Select ③ MODE switch to the operating mode. When you operate by remote control, this switch must be always set to "FM", not to the actual mode.

6. By making the transceiver to "transmit", the HL-200V/50 will provide "transmitting power amplification" and a high power signal is emitted from amplifier. At the same time, ① POWER LEVEL indicator lamp lights to indicate that the amp is transmitting or on air.

7. Protection circuit for SHORT or OPEN state at output side and overvoltage of DC power is included. When the connector at output side is open or shorted, and DC power voltage is more than 15V, signals from the antenna are not amplified and bypass the internal part of the device. Then, ② WARNG lamp lights when the OPEN/SHORT state is made. With overvoltage of DC power, DC power is disconnected automatically.
   To release the protection, turn ⑤ POWER switch off.
   Please start from the beginning after the trouble is cleared.

8. In case the receiving signals are weak, noisy and hard to copy, turn ④ RX AMP switch on. You can hear signals clearly with the low noise pre-amp, and ⑦ RX pilot lamp lights.
   If you use RX pre-amp where the very strong signal exists nearby, the pre-amp GaAs FET can be destroyed.

9. In case of a local QSO when the amp is not needed, just set ⑤ POWER and ④ RX AMP switches off.

10. In case of operating RX pre-amp only, set ④ RX AMP switch on with ⑤ POWER switch off.

CAUTION

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

(1) The heat sink temparature will rise high during the transmission. Be careful not to block the heat sink surface to ensure ventilation.

(2) Also, avoid operation near heat sources such as locations exposed to sunlight or locations near heaters.

(3) Be sure to check the "Matching" or VSWR of antenna before operation. Measure the SWR value by using an SWR meter according to the installation on Page 4.
If SWR value is too high, adjust your antenna to obtain a lower SWR value. You should obtain an SWR of less than 1.3:1 or hopefully as low as 1.0:1.

(4) Choose a good antenna which withstands high power, or the SWR will be degraded within a few minutes after starting transmission, due to the heating of the antenna. In some cases, the antenna may be damaged or destroyed.
Also, the RF power transistors may be killed.

(5) Be careful that the DC power voltage is kept no higher than 13.8V(12-14V). Although supplying about 15V will not kill the amp immediately, it is dangerous to the transistors if such other undersirable conditions occur, as antenna mismatch or over drive, simultaneously.

(6) In case that AC to DC converter (voltage stabilized DC 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 OVP (Over Voltage Protected) SUPPLY ONLY! Use a DC power supply fully protected against high frequency intrusion, and capable of supplying high current.

(7) DO NOT open and touch the internal part of the amp.
The device is fully adjusted at the factory.

2.Please pay attention to the following subjects in order to keep this amp in a good condition.

① Please use the coaxial cable as thick as possible.

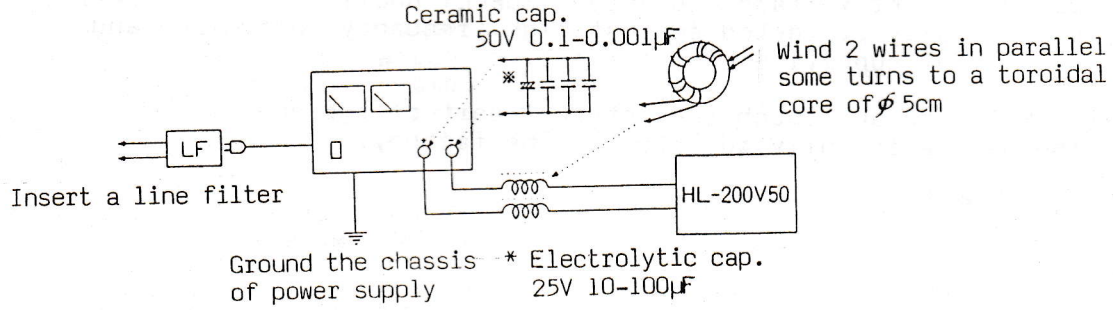
② Be sure to use the 50Ω coaxial cable. If you use the different impedance (such as 75Ω) cable, it causes the mismatching of antenna, and you can not get the rated output power due to increase of the reflected power. It also becomes the cause of the trouble by "mis-matching". Choose the thicker cable to reduce the insertion loss of the output level.

③ In case of extending the power cable with other ones, be sure to use the thicker cable than the attached one as short as possible. If the cable is too slim and long, the amp may not obtain the rated output power by the voltage drop through the power cable.

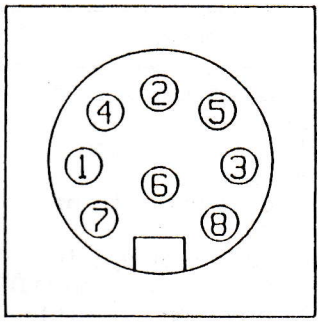
④ Even when parking, keep the engine running not to cause the voltage drop.

3.Please pay fully attention to the dangerous subject, as follows. If you touch the antenna directly during the transmission, you will receive an electrick shock and be burnt due to high frequency output power energy.

HOW TO MAKE A PROTECTION AGAINST THE RF INTRUSION TO A STABILIZED DC POWER SUPPLY



ABOUT REMOTE CONTROLLER JACK



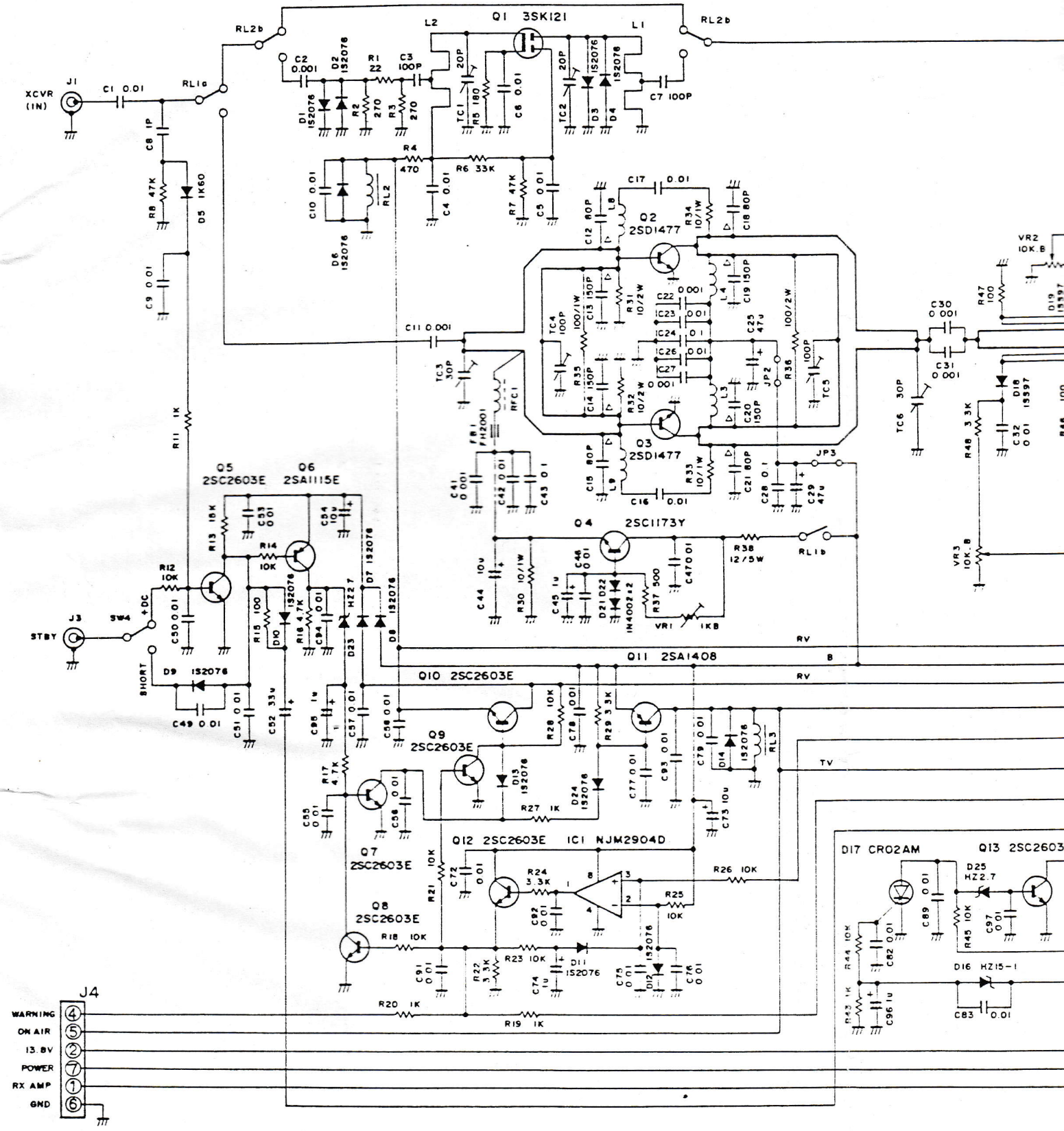
Rear view on the panel

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.

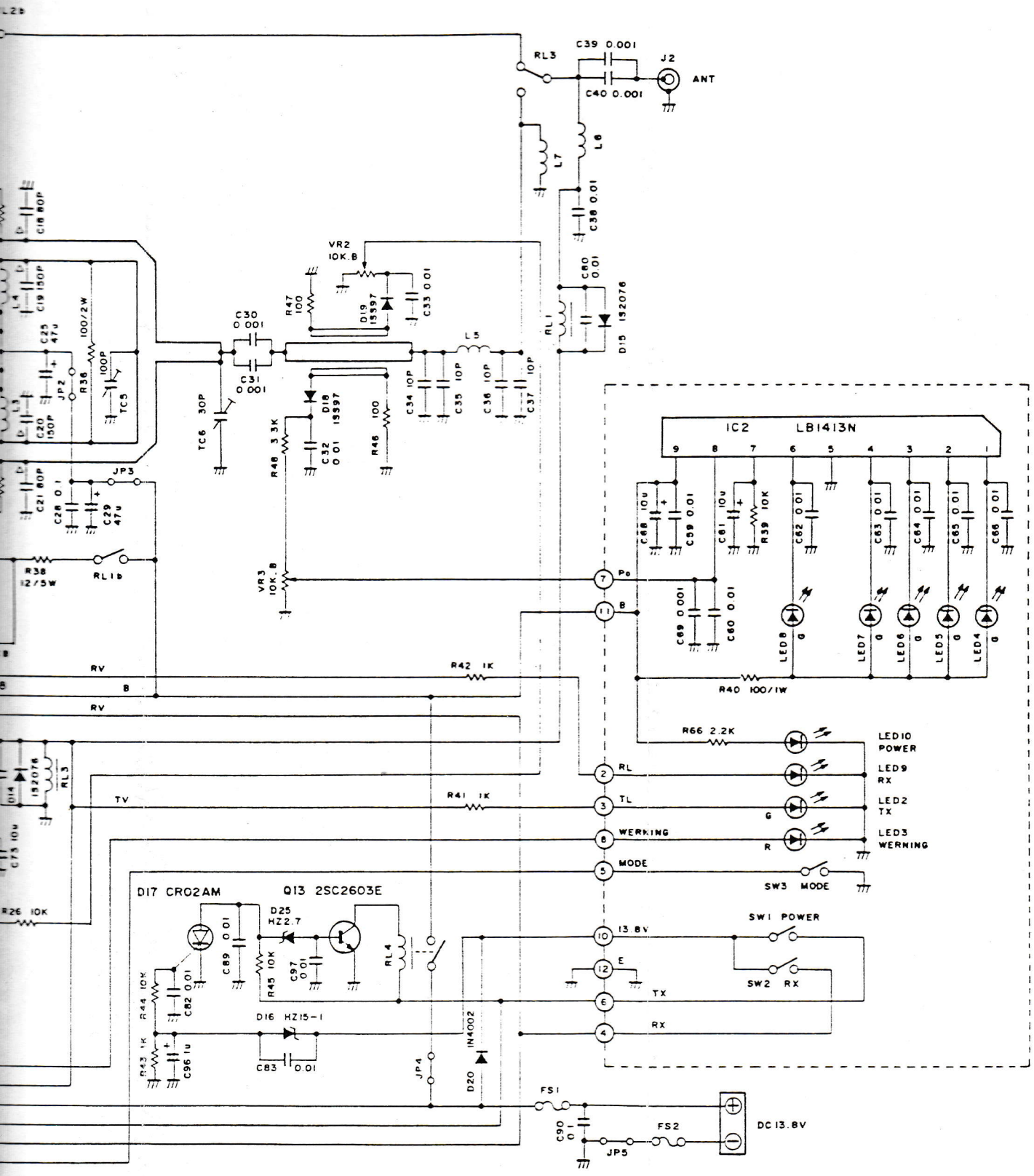
TROUBLE-SHOOTING

The following symptoms are minor troubles, which can be solved rather easily.
Please check each cause of trouble carefully.

Symptoms	Cause	Treatment
DC power can not be turned on.	1.DC power cord is not connected. 2.Mis-wiring of the polarity (+/-). 3.Fuse is not set, or blown. 4.DC power voltage is more than 15V, and PROT (protection circuit) works.	1.Connect DC power cord surely. 2.Wire correctly. 3.Set two fuses correctly. 4.Please refer to "operation-7".
Fuse blown repeatedly.	1.One fuse is not proper (less than 30A).	1.Set a 30A fuses.
Can not transmit and receive.	1.Trouble of each coaxial jumper cable.	1.Check each cable which is not connected or which has a trouble of short/open.
Output power is not amplified.	1.Connectors of input and output is connected reversely. (Relay chatters.) 2.WARNG(protection circuit) works and the amp is made into the locked state. (DC power is made into off.)	1.Connect cables correctly. 2.Remove the cause of WARNG, and then release the protection. (Please refer to "OPERATION-7".)
Output power is less than the rated level.	1.DC power voltage is less than the rated level. 2.Driving power from the transceiver is less than 50W.	1.Make the DC power voltage to the correct level. 2.Readjust the transceiver or use it under that condition.
Output voltage of the stabilized DC power supply decreases while transmitting.	1.Insufficient of current capacity and DC power protection is operated.	1.Replace the DC power supply to a larger capacity (Ampere).
Output voltage of the stabilized DC power supply is increased while transmitting.	1.Mis-operation of DC power control circuit due to the RF intrusion.	1.Make a protection for DC power line referring to the following "HOW TO MAKE A PROTECTION AGAINST THE RF INTRUSION TO A STABILIZED DC POWER SUPPLY".



* THE DIAGRAM IS SUBJECT TO CHANGE WITHOUT NOTICE.



HOUT NOTICE.

HL-200V/50 CIRCUIT DIAGRAM

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