PRINTED BOARD REFERENCE:

CODE NUMBER:	BOARD NAME:	QTY:	BOARD NUMBER:
321	TX-POWER UNIT	1	500138
417	TX-RX UNIT	1	500139
926	M.O.DUNIT	1	500124
520	P.L.L. UNIT w/SUB-UNIT	1/1	500140 (Main) 500144 (Sub)
717	CH - SW UNIT	1	500125
211	DISPLAY UNIT	1	500126 (Main)500202 (Sub)
913	TONE-BURST UNIT	1	500149
927	SIDE TONE UNIT	1	500173
942	SCAN UNIT	1	500203 or 500174

NOTE: Reference number are should be shown on the parts list.

ATTENTION: A brand new unit MUST BE work properly,except loose or remove a connector during transportation. So,please DO NOT touch or adjustment before above CONNECTOR/CONNECTIONS.

PROVIDES MEASUREMENT:

NOTE
The trouble isolation of problems to the defective components is most easily accomplished by the use of a VTVM or a VOM/OSCILLOSCOPE and normal transistor servicing techniques. Refer that signal trace must be made to the applicable schematic diagram to determine the circuit figure or values. Except,logical circuit. The logical circuit must apply SYNCROSCOPE or LOGIC - TESTER,may otherwise damage permanent particularly a CPU I.C.
Should need servicing measurement unit as under the following.

1)	V.O.M	More than 1M ohm,input resistance, voltage range 1 - 50Volts D.C.
2)	Audio Voltmeter	More than 1M ohm input resistance, Meter range 10mV - 30V, Frequency range 100Hz - 10KHz.
3)	R.F - VTVM	More than 1M ohm/2pF capacitance input impedance, Meter range 10mV - 50V, Frequency range more than 150MHz.
4)	A.F Generator (Audio Oscillator)	More than 1 volt output level, 600 ohm output impedance,Frequency range 300Hz to 3,000Hz available.
5)	R.F Wattmeter or Dummy Load	Impedance 50 -52 ohm,Power capacity More than 20 - 30watts continuous duty.
6)	Frequency Counter	Frequency range 10MHz to 150MHz,Less than 50mV input sensitivity.
7)	S.Signal Generator	Output frequency range 140-150MHz, (10.7MHz fixed frequency,if available) Output level -10dB to +80dB(0 dBu - 120dBu)and Modulation 0 - +/-5KHz at 1,000Hz.
8)	Oscilloscope	Input impedance, More than 1M ohm and Frequency range more than 5MHz.
9)	Trigerd Osilloscope (if available)	Input impedance,More than 1M ohm/2pF and Frequency more than 50MHz.

PROVIDES MEASUREMENT:

10)	Sweep Generator (if available).	Center frequency 145 or 146MHz, frequency deviation +/-3KHz at Max. Output voltage more than 0.1Vrms.
11)	Linear Detector (if available).	Frequency range 140 - 150MHz, Input sensitivity 100 - 120dBu, Frequency deviation 0 - +/-5KHz, 0 - +/-10KHz.
12)	A.F Dummy Resistor	1 - 2 Watts Carbon Resistor, approx. 8 ohm.
13)	Spectrum Analyzer (if available.)	Input impedance, more than 1M ohm at 2pF. Frequency range 0 - 1,000MHz or more.
14)	Directional coupler	Attenuation level "Thru/-40dB" or "T-pad type". Frequency linearlity upto 300-500MHz.

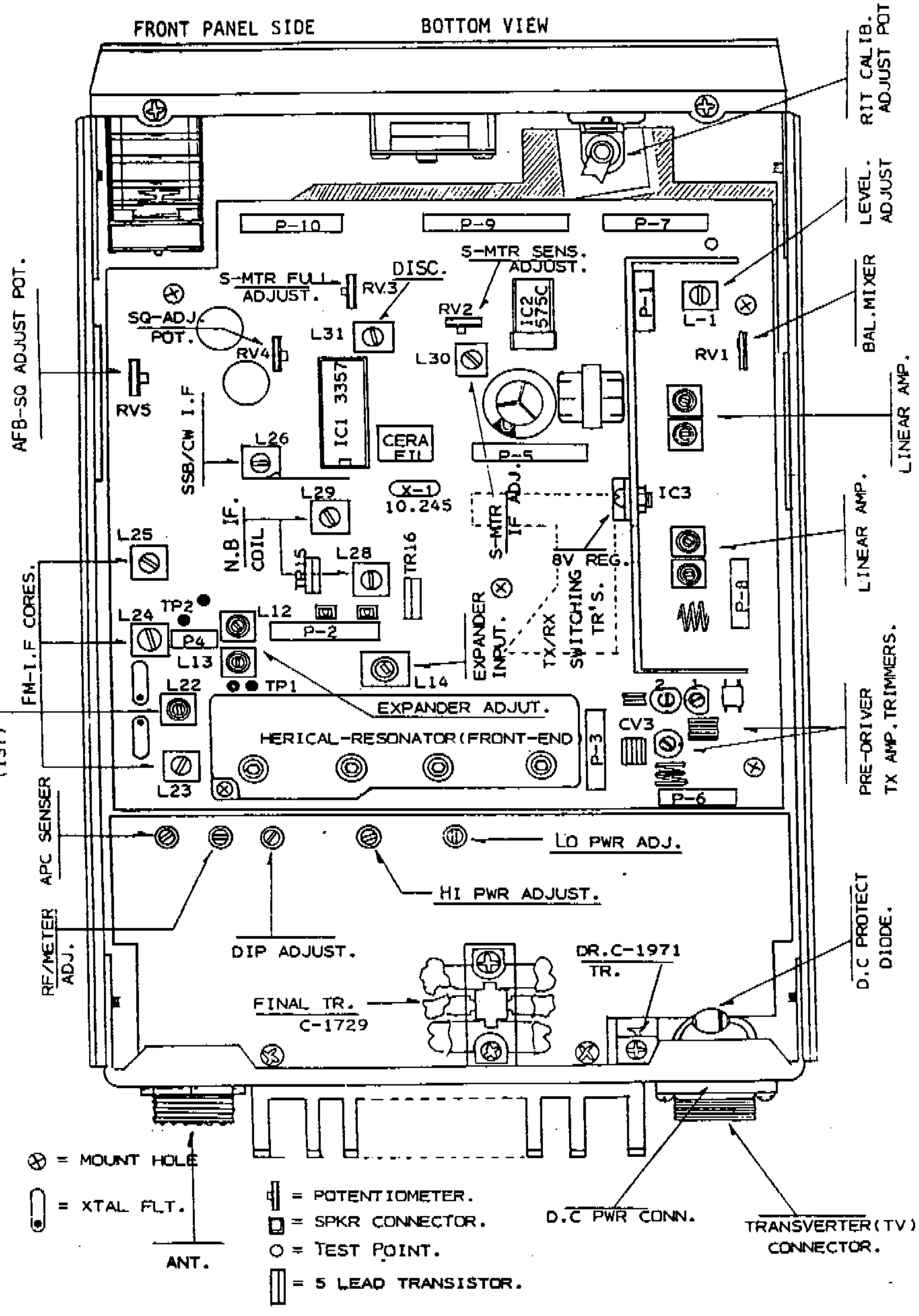
EXPRESS INFORMATION:

The F.D.K Quality Control Department most recommendable inspection/failure part under above shown. However may possible each case a part/unit of difference under the conditions,please remind or recognize with this most general cases before applying service or maintenance.

POINT:	CAUSES:
1) TR-27 TX/RX D.C Switching Transistor. (Receiver board).	Not display F.I.D(frequency), S/RF meter full scale, Seems like "Transmiting" or not transmit.
2) Connector connections. (Receiver board)	Loose the connection between the plug pins. May loosing during transportation, vibration and shocks.
3) Potentiometer. (Receiver board)	May sometimes not proper contact of potentiometer. (all kind)
4) Antenna Switching Diode. (TX-Power unit). D4,MI-301.	Breakable or weakee,Receiver weak sensitivity or way down. If shorted, should also be change D3 diode.
5) Antenna Switching Diode. (TX-Power unit). D3,MI-402	Breakage or short. No RF-output power.

GENERAL ADJUSTMENT POINT:

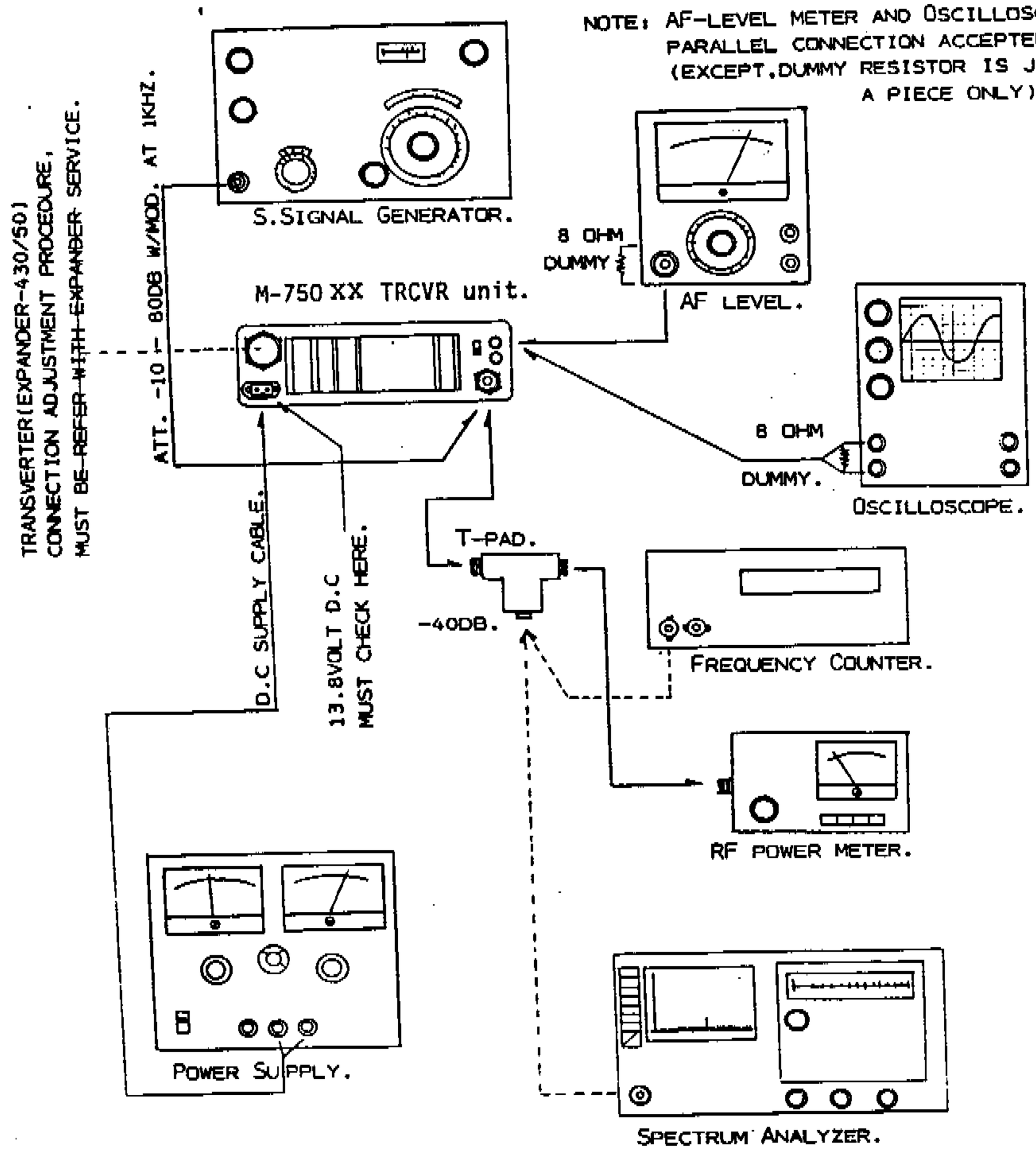
TX-LINEAR/RECEIVER/PWR UNIT



MEASUREMENT CONNECTION PROCEDURE:

TRANSMIT/RECEIVE TEST

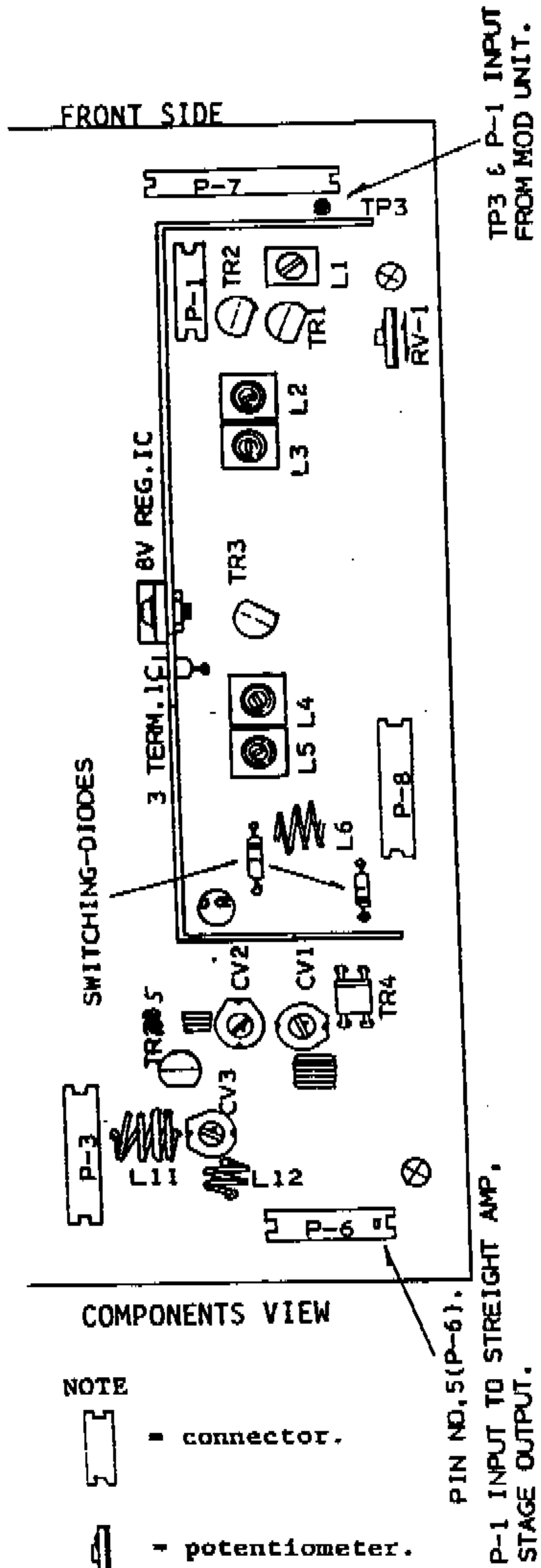
NOTE: AF-LEVEL METER AND OSCILLOSCOPE PARALLEL CONNECTION ACCEPTED. (EXCEPT.DUMMY RESISTOR IS JUST A PIECE ONLY).



NOTE: USING CABLE MUST BE COAXIAL(50-52 OHM)
CONNECTION CABLES LENGTH AS PROPER'S.

RECEIVER/TRANSMITTER UNIT:

ADJUSTMENT PROCEDURE



Set the transceiver SSB mode.
Microphone input level -50dBm at 1,000Hz.

NOTE: TP-3 and P-1 is connected with foil side pattern.

Set the Transceiver frequency at the 146.050MHz(center of the frequency) in the band.

Adjust the L2, L3 maximum level,and L4, L5 also. Used have see above an RF output power level,if not appear with it. RF-VTVM level meter put in to the "P-6" No,5 pin output terminal.

NOTE: The RV-1 BALANCED pot adjusting is,an RF output power connect with a SPECTRUM ANALYZER,which if appeared near-by sprurious adjusted minimum point.(Adjust with max.power position only).

The Transceiver MODE switch change to the "FM" position.

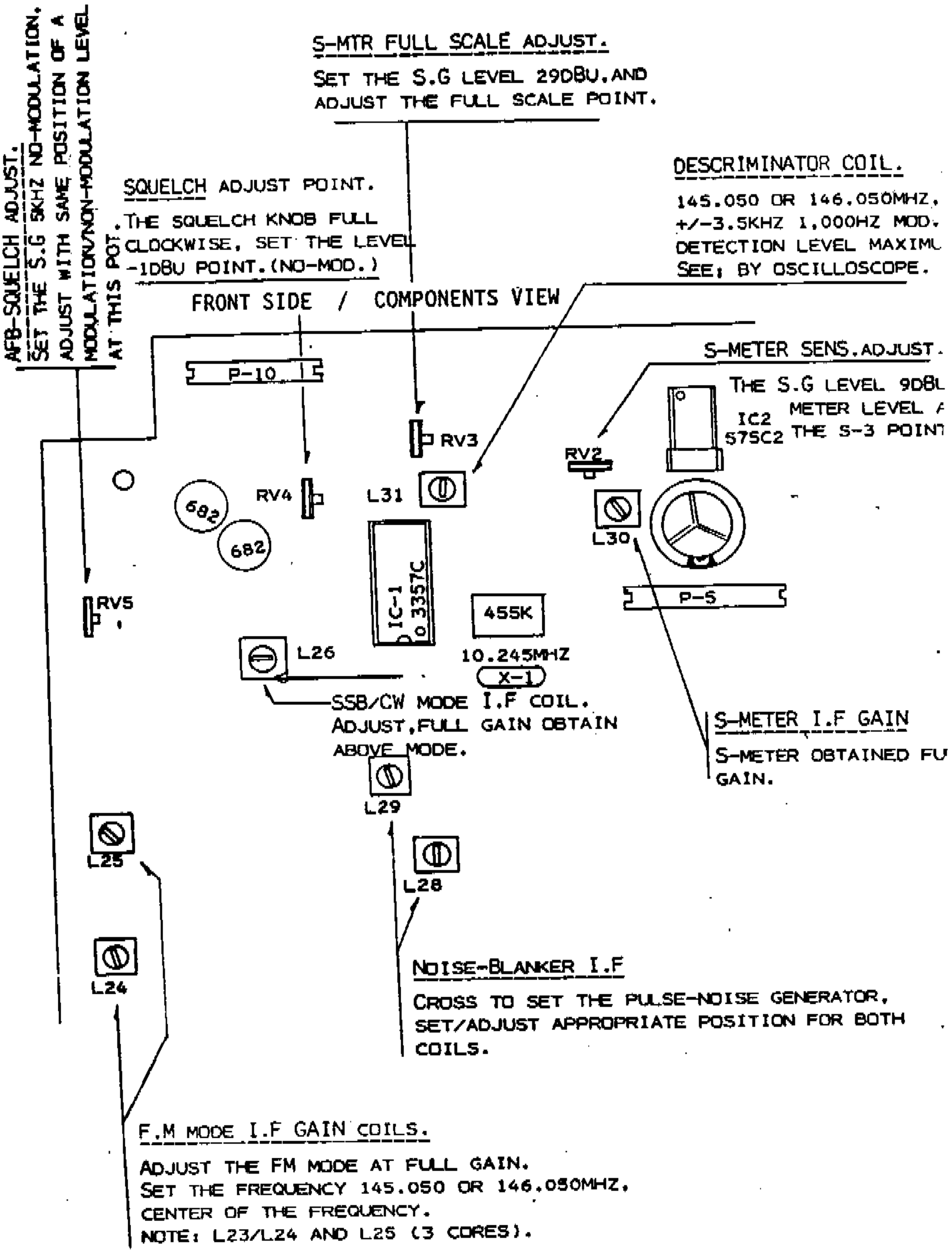
NOTE: Frequency should be stay with center of the band(146.050 or 145.050MHz).

Now,adjust the CV-1, CV-2 and CV-3 trimmers full output power.

NOTE: L-11 & L-12 coils spread,which makes 4MHz range type.

RECEIVER/TRANSMITTER UNIT:

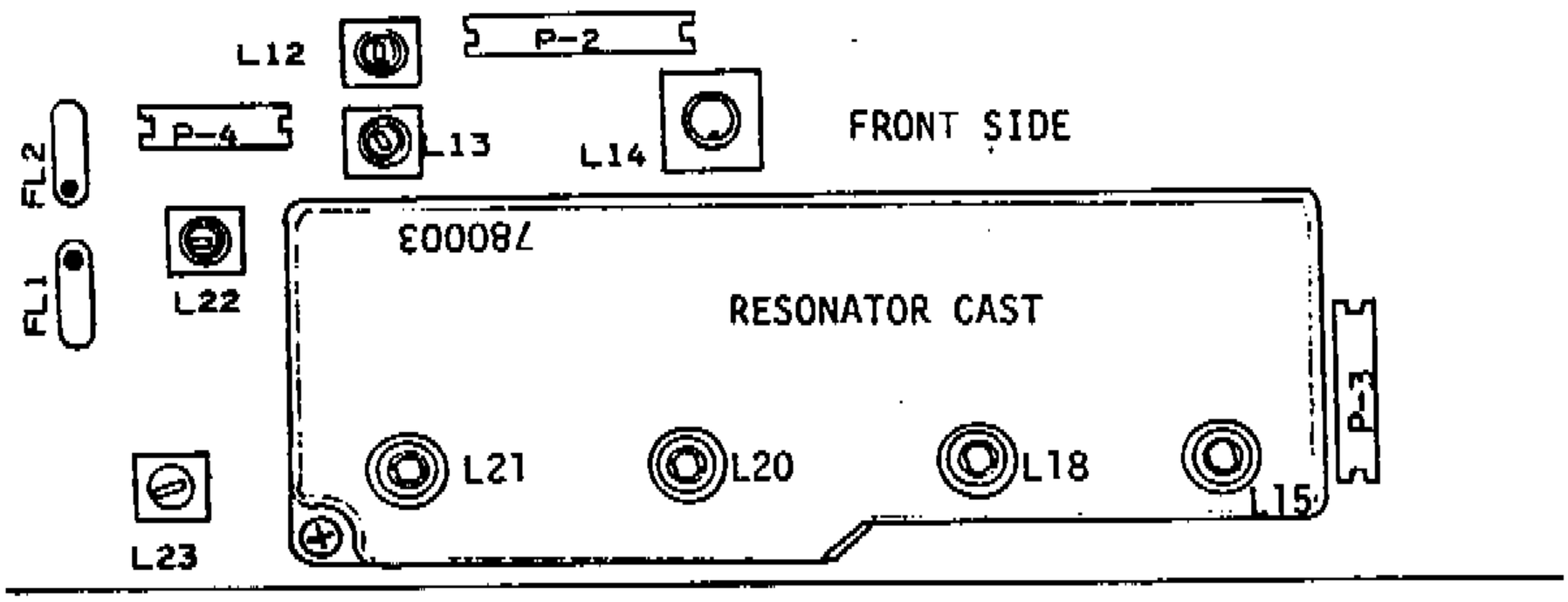
ADJUSTMENT PROCEDURE



RECEIVER/TRANSMITTER UNIT:

ADJUSTMENT PROCEDURE

RESONATOR TUNING:



COMPONENTS VIEW (BOTTOM SIDE)

NOTE: This RESONATOR frequency realignement "Band-Spread" or "Narrow Range" requirement only.

1) Set the measurement condition(Receiver adjustment)for RECEIVER SENSITIVITY adjustment procedure.

2) The L-21 way-pull out the core. (temporaly removed).

3) The receiver dial frequency set to the 147.950MHz or 145.950MHz. Others core obtained full gain until reduceable minimum Signal-Generator attenuator level.

4) Set the Signal-Generator at 144.050MHz(lower range), and put into the L-20 core.

   A L-20 core into slowly,until lower frequency range gain maximum obtained.

NOTE: Upper and Lower frequency range adjustment very critical,the Signal-Generator as reduceable as possible attenuator level. Appropriated reading by S-meter level from 0 - 3.

#10

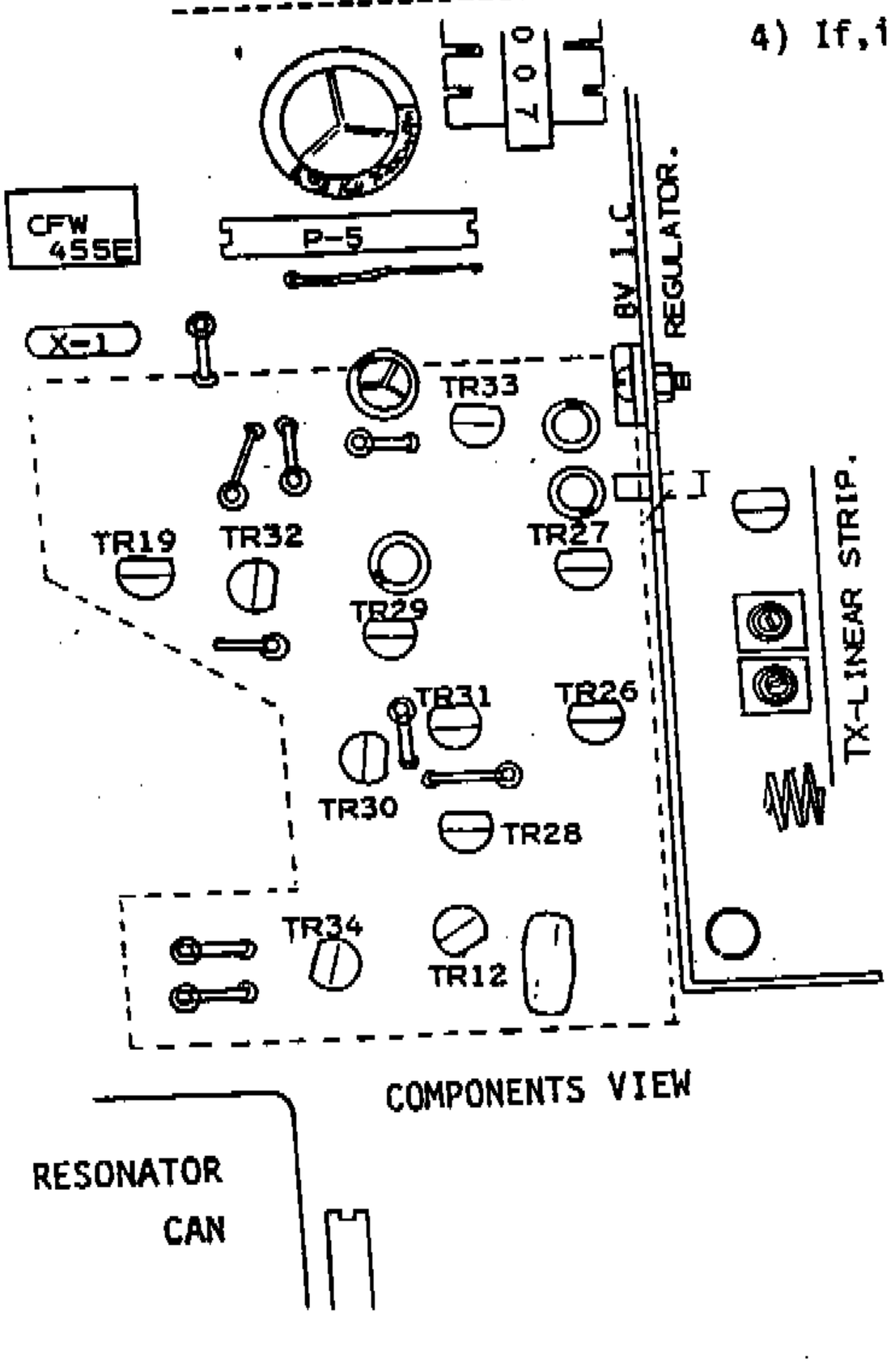
RECEIVER/TRANSMITTER UNIT:

TX/RX-DC SWITCHING

*The MULTI-750A/E transceiver,if in case under above conditions?

1) S-Meter "Full way over indication.
2) No-Transmission/No Reception.
3) Under seems like "Transmitting".
4) If,in case DC 8V line shorted.

FRONT SIDE / BOTTOM VIEW



This transistor is 8V D.C TX/RX Switching control. If it electrical short/shock's may break.

The D.C 8V line controls for TX and RX switching from the 3 terminal 8 Volts REGULATOR I.C line. If it upper above conditions,may check this transistor.

When replace it,as same of A-950 or 2SA-509.
Please refer with "EXPRESS-INFORMATION PAGE.

MARKING NOTE:

= Transistor.

= Diode.

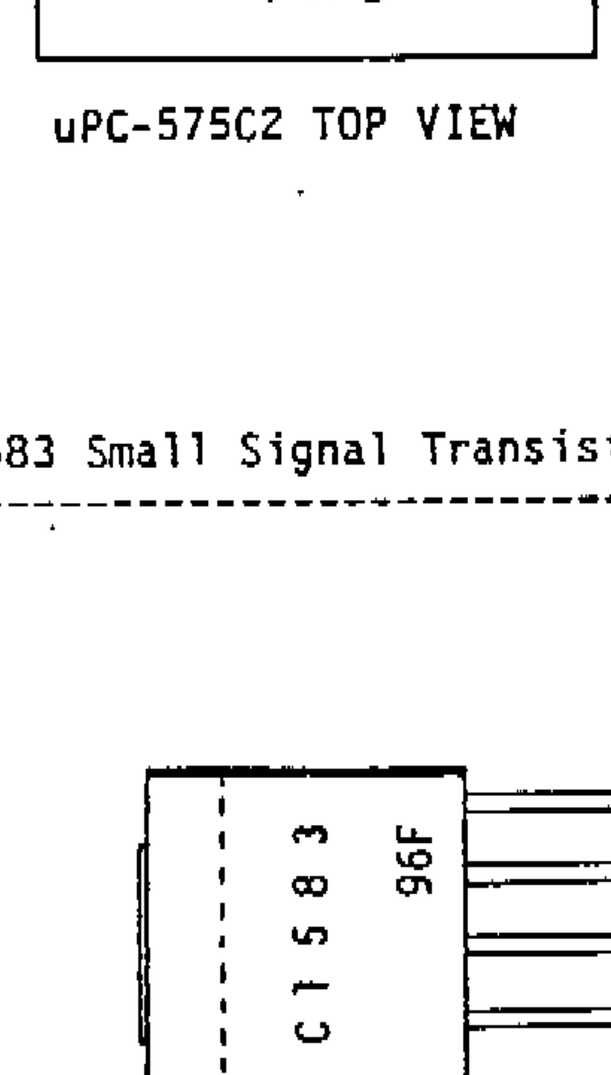
= Capacitor.

TX/RX UNIT:

DEVICE FUNCTION

uPC-575C2 AUDIO AMPLIFIER:

2 watts type audio amp I.C.



uPC-575C2 TOP VIEW

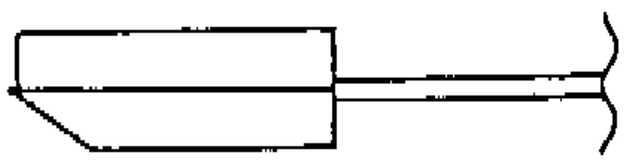
1) Audio input.
2) Differencial/Bias
3) Freq.comp
4)
5) Output
6) Vcc (13.5volts)
7) Freq. comp
8) Freq. comp
TAB) GND.radiator

2SC-1583 Small Signal Transistor:

REAR VIEW

1) Base (No,1)
2) Collector (No,1)
3) Emitter (common)
4) Collector (No,2)
5) Base (No,2)

Low Noise type differencial amp.



SIDE VIEW

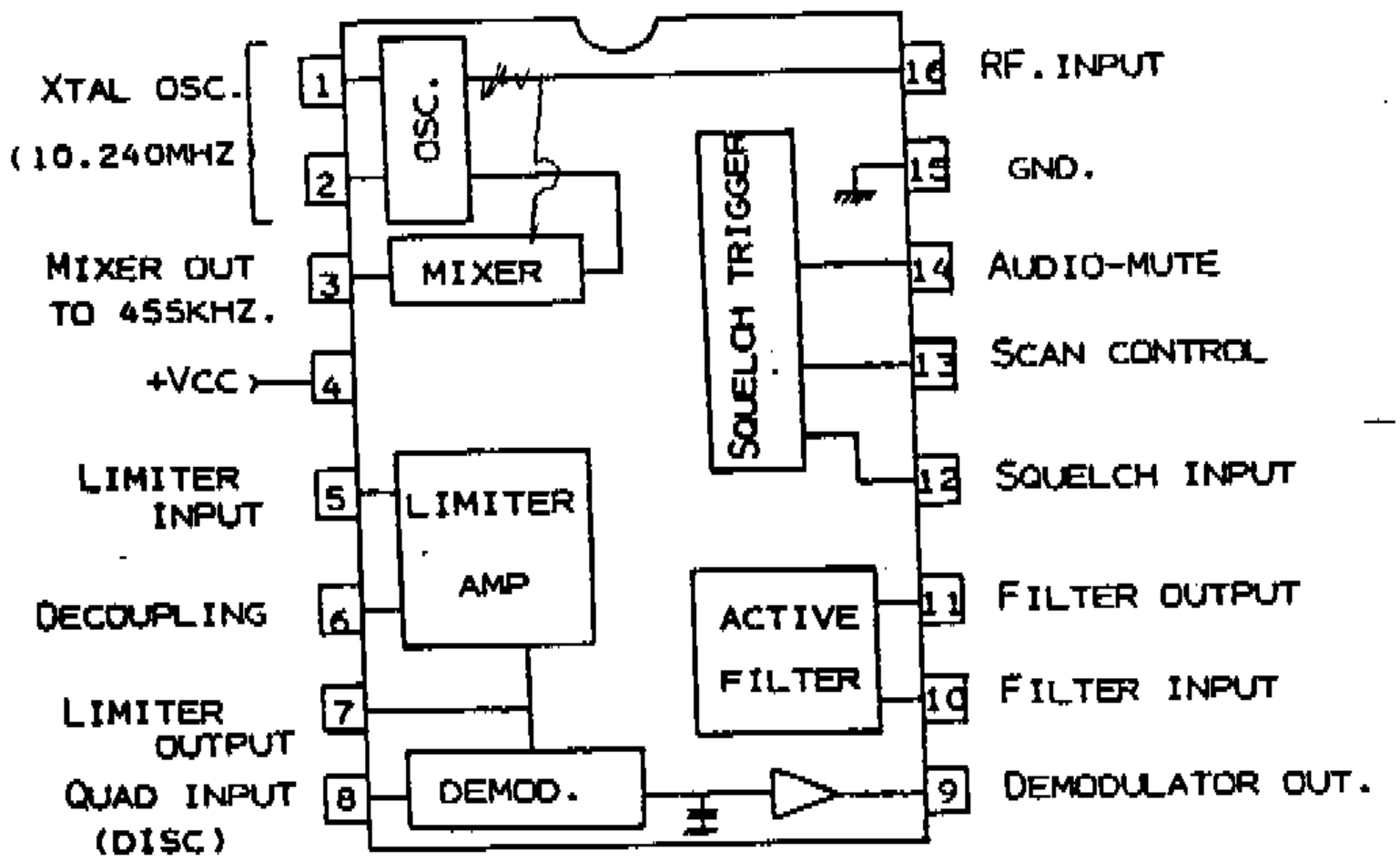
TX/RX UNIT:

DEVICE FUNCTION

MC-3357
OR TK-14020

Under show that the device contained a Mixer, Local Oscillator,Limiter Amplifier,Quadrature-detector with amplifier,Active Filter amplifier and Squelch switching.

The unit supply voltage is 6 volts and current is approximately 3 mA typical.



MC-3357P TOP VIEW

TRANSMITTER POWER UNIT:

GENERAL ADJUSTMENT:

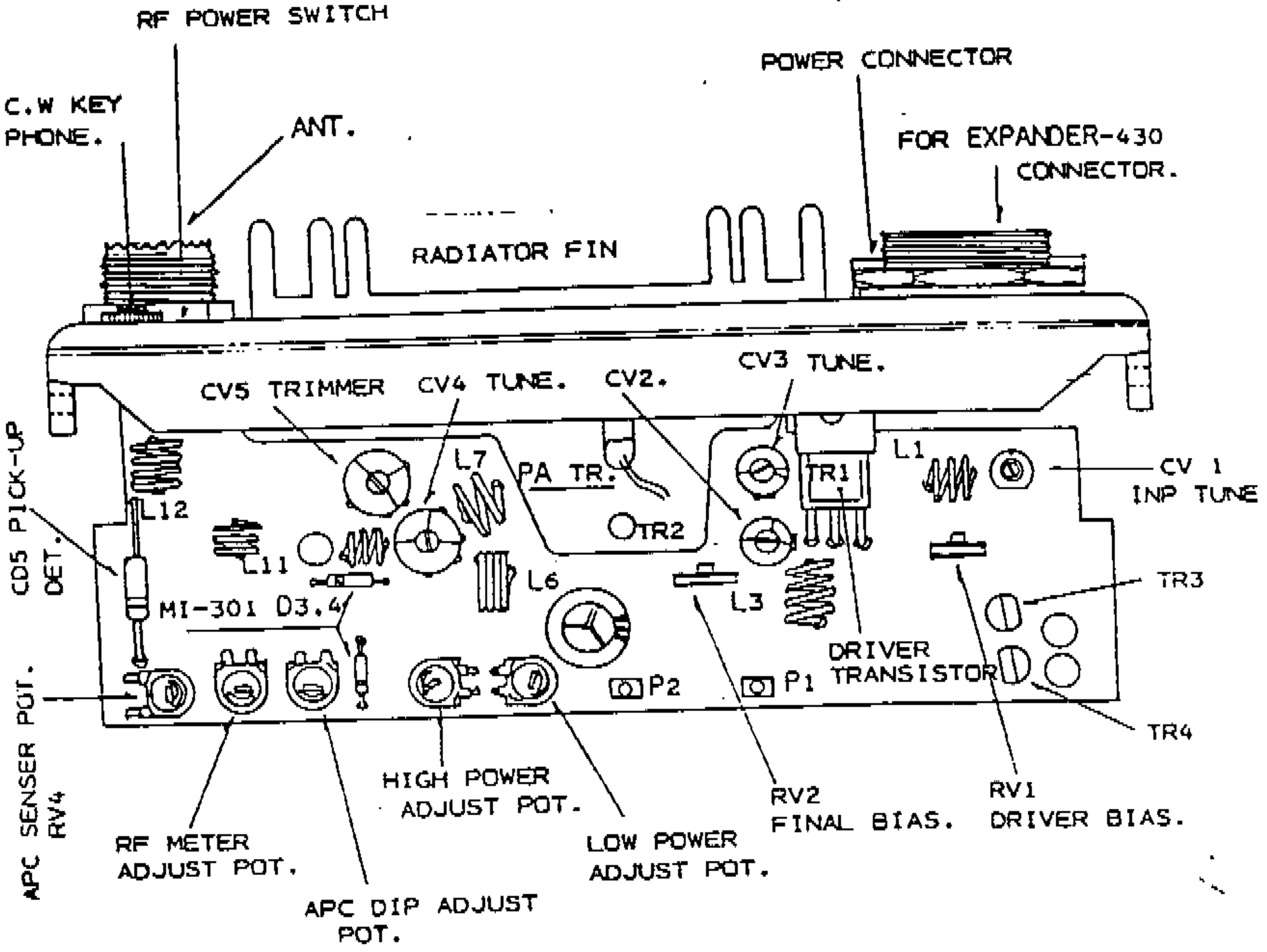
1) REMOVAL TX-POWER UNIT:

Remove four beside flat screws. May not necessary if only tunning trimmers.See above(CH-SW/PLL/SSB)unit side.

2) CONFIRMATION IDLING CURRENT:

Remove the P-1 connector(removal method as same as speaker)then plug between V.O.M. Check the current

(See below)



50mA(+/-5%) at SSB mode without audio. If its right, next of P-2(Final transistor side). Same as remove a wire from the white connector. Put into between the V.O.M check the current 75mA(+/-5%) at same mode.For both proper adjustment by RV1 and RV2 pot's.

3) CONFIRMATION RF OUTPUT POWER:

More than 20 watts obtained at 24dBm input and 13.8V D.C input.
To control less than 25W by RV6, and keep not over than 25W.

TRANSMITTER POWER UNIT:

ADJUSTMENT DIRECTION:

4) Adjustment procedure; (Marking arrow for increase direction).

N.B. 0750E
Max o/p 10W
RA. T/R C1729
(L2670 FM W9S)

N.B. VARIATIONS
750E C20 IN PLACE OF 1PF TO ALC LINE

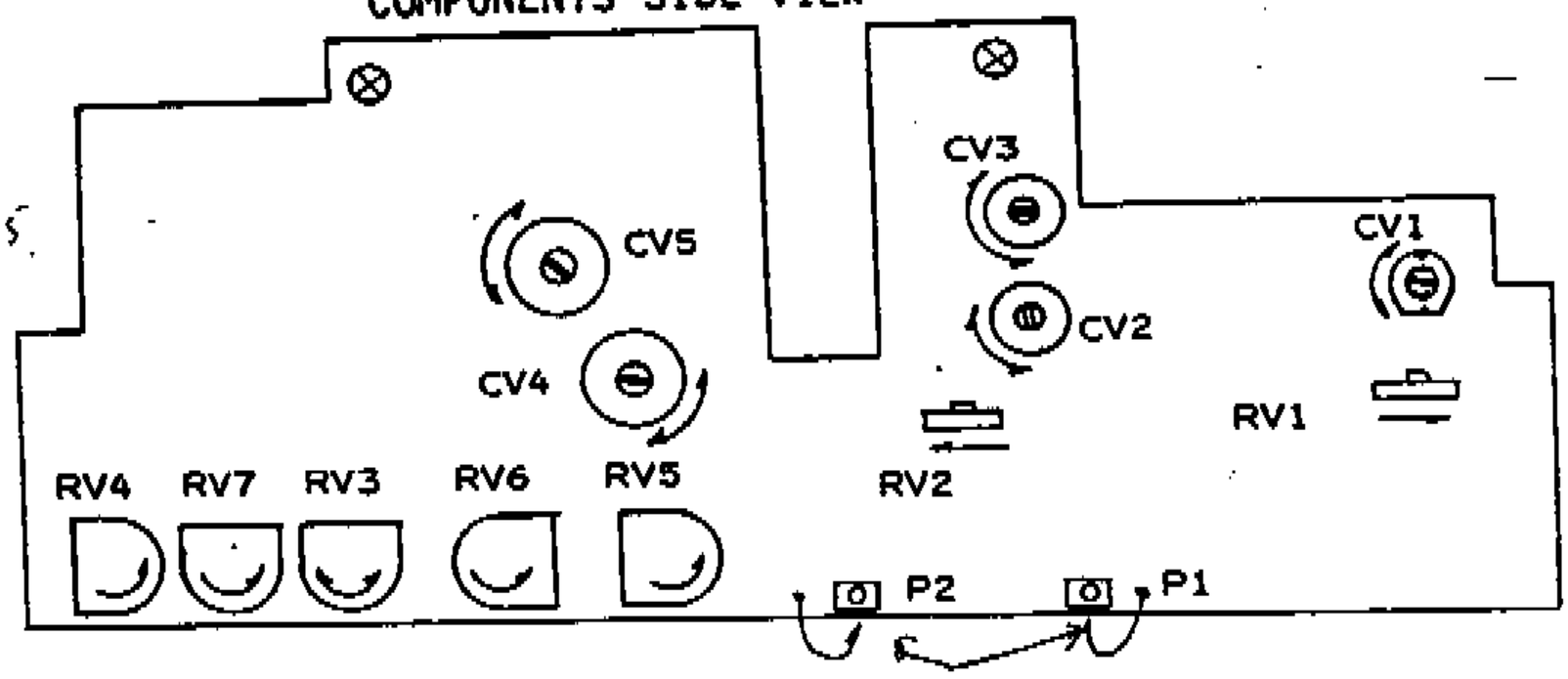
RV-1: TR-1 idling adjustment.
RV-2: TR-2 idling adjustment.
RV-3: Dip adjustment.
RV-4: A.P.C senser level adjustment.
RV-5: Low Power adjustment.
RV-6: High Power adjustment.
RV-7: RF Meter adjustment.

750XX
C20 OMITTED

② 750XX
Max o/p *26W
Nominal ENV. SET 20W.
P.A. T/R C1946A.
(L11.24 FM W9S)

SHOWN ABOVE ARROW'S FOR INCREASE DIRECTION.

COMPONENTS SIDE VIEW



RFC - L8 IS DIFFERENT FROM OTHER RFC's L2, L5.
APPROX 50T ON ¼W 'R' BODY.

THESE ARE SOURCE OF "Hi - R." 13.8V RAILS - GOOD ROUND

DRIVER T/R
2SC 1971.

ALC T/RS
2 x 2SC 1815Y

5) A.P.C adjustment;

Set the frequency at 145.050 or 146.050MHz,V.O.M probe at the CD-8(Cathde side)voltage by RV4.Set the DIP point by RV4 pot. (Proper set voltage approx. 0.4V or less).

6) ALC adjustment;

Set the ALC voltage(approx.4V)by RV4 before dropping point. (Refer with 5) APC adj.if not properly may adjust the L-10 to L-12 coils).

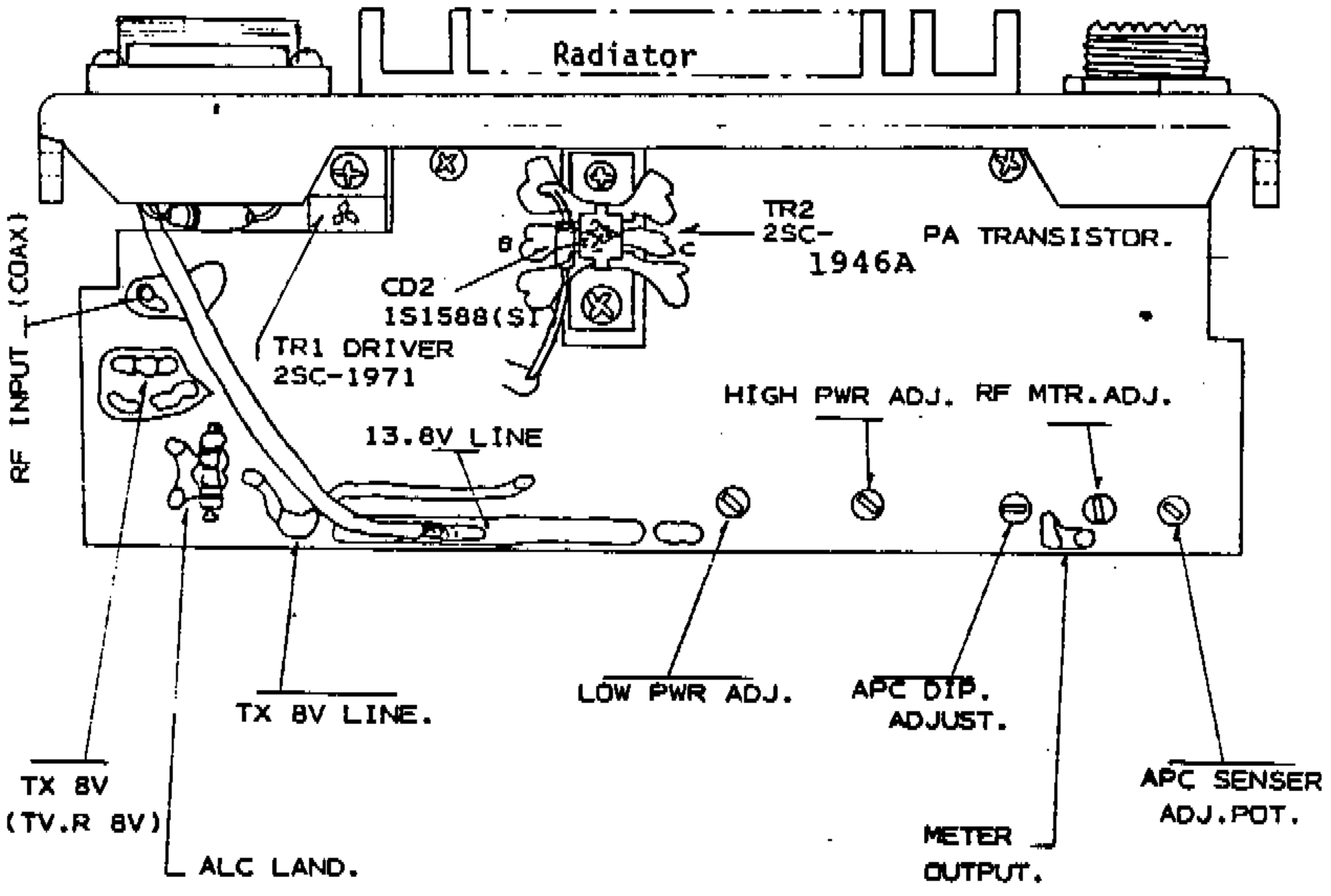
7) Spurious confirmation;

Check the spurious by Spectrum Analyzer,should be less than 65dB below carrier from entire the range.(RF output at less than 12W typical).

TRANSMITTER POWER UNIT:

FOIL SIDE CONNECTION:

Ref: Above front(components side)page adjustment procedure.

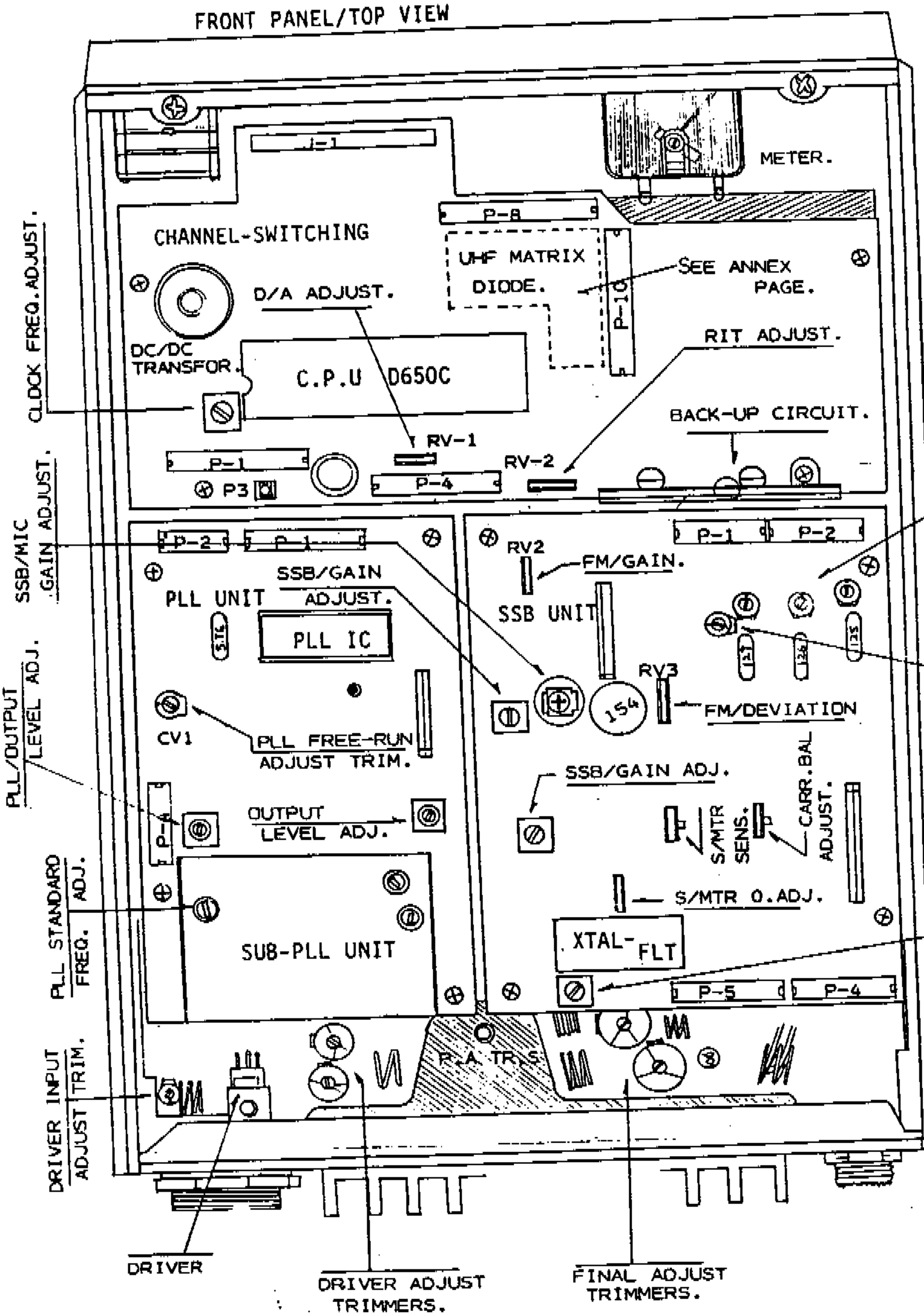


NOTE: Tuning correction must be center of the frequency (145.050/146.050MHz).

GENERAL ADJUSTMENT POINT:

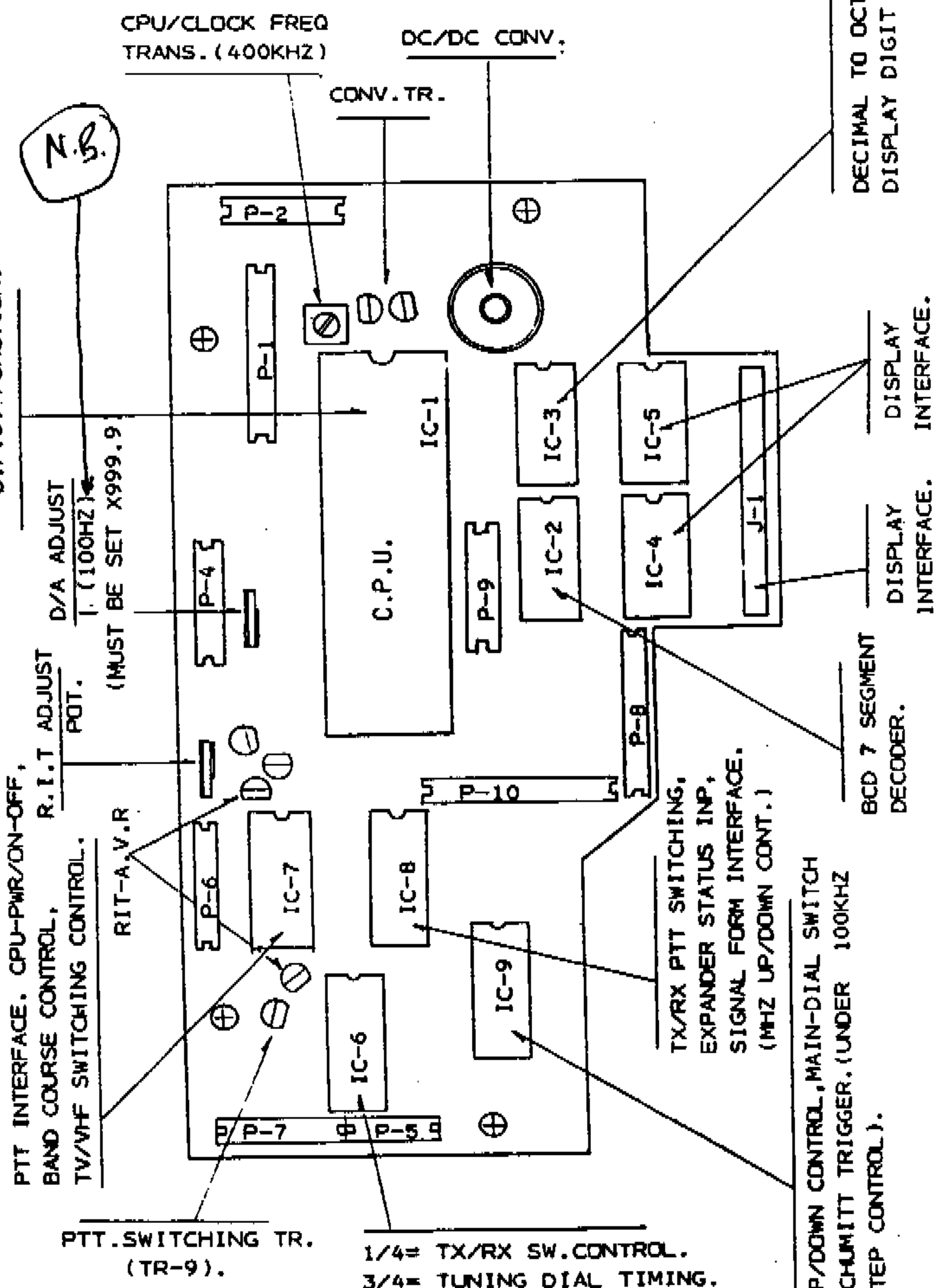
PLL/SSB/CH-SW UNIT

FRONT PANEL/TOP VIEW



CHANNEL-SWITCHING UNIT:

DEVICE FUNCTION



COMPONENTS SIDE VIEW

CHANNEL-SWITCHING UNIT:

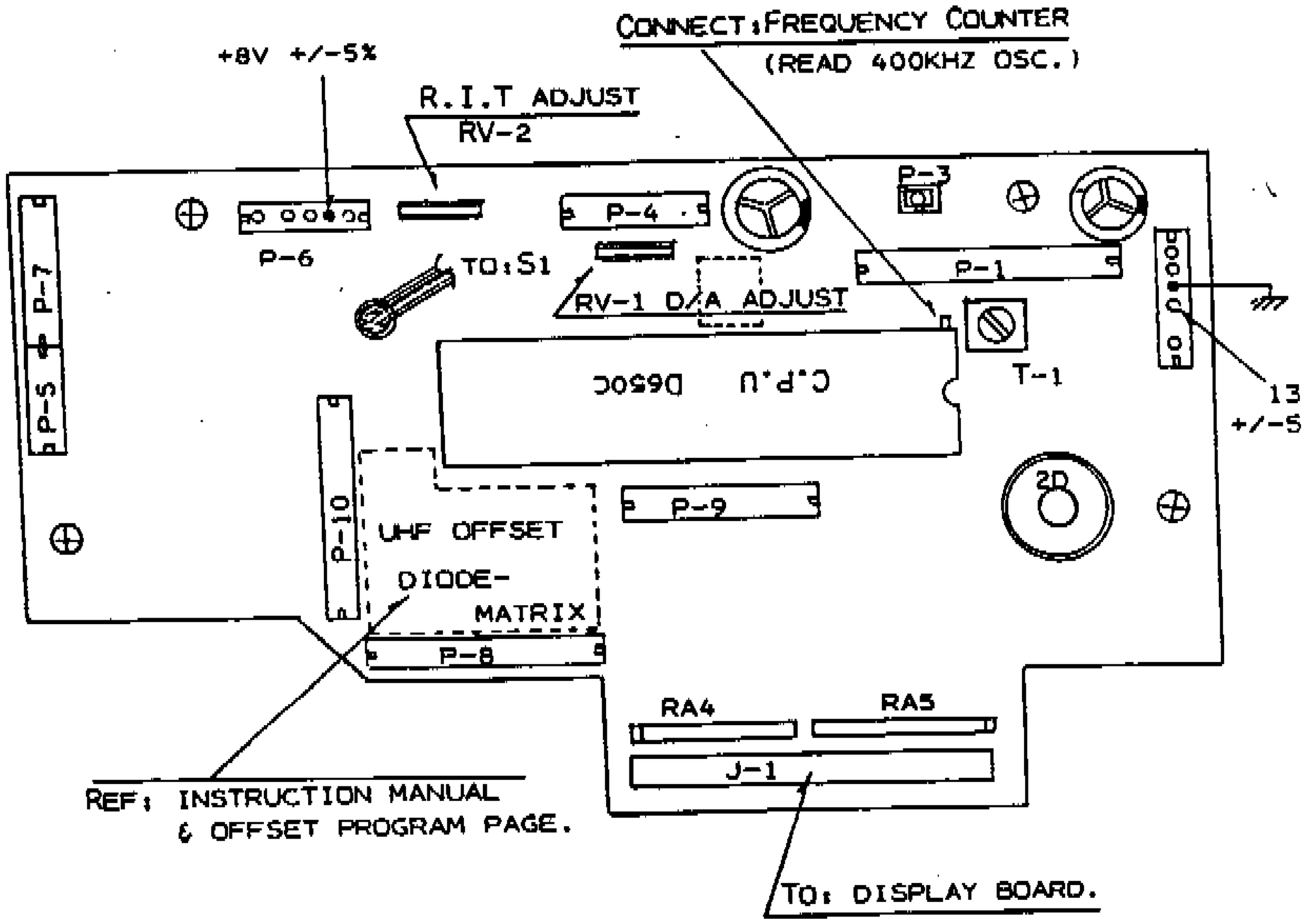
CONFIRMATION

1) CLOCK FREQUENCY ADJUSTMENT;

The Frequency Counter connect at the shown figure point. Adjust the frequency 400KHz by T-1 core.

2) R.I.T ADJUSTMENT;

R.I.T switch ON,during reception.The Frequency counter probe at the CD-10 Diode(anode side,upper view from component).The R.I.T control knob should be center position at the "0" adjust the RV-2 potentiometer.



3) D/A OUTPUT

The Frequency Counter probe connect to the "CD-10" diode. Set the "Main Dial" frequency at 144.999.9MHz,and adjust this RV-1 as same frequency on the Frequency Counter.

To be continue next page.

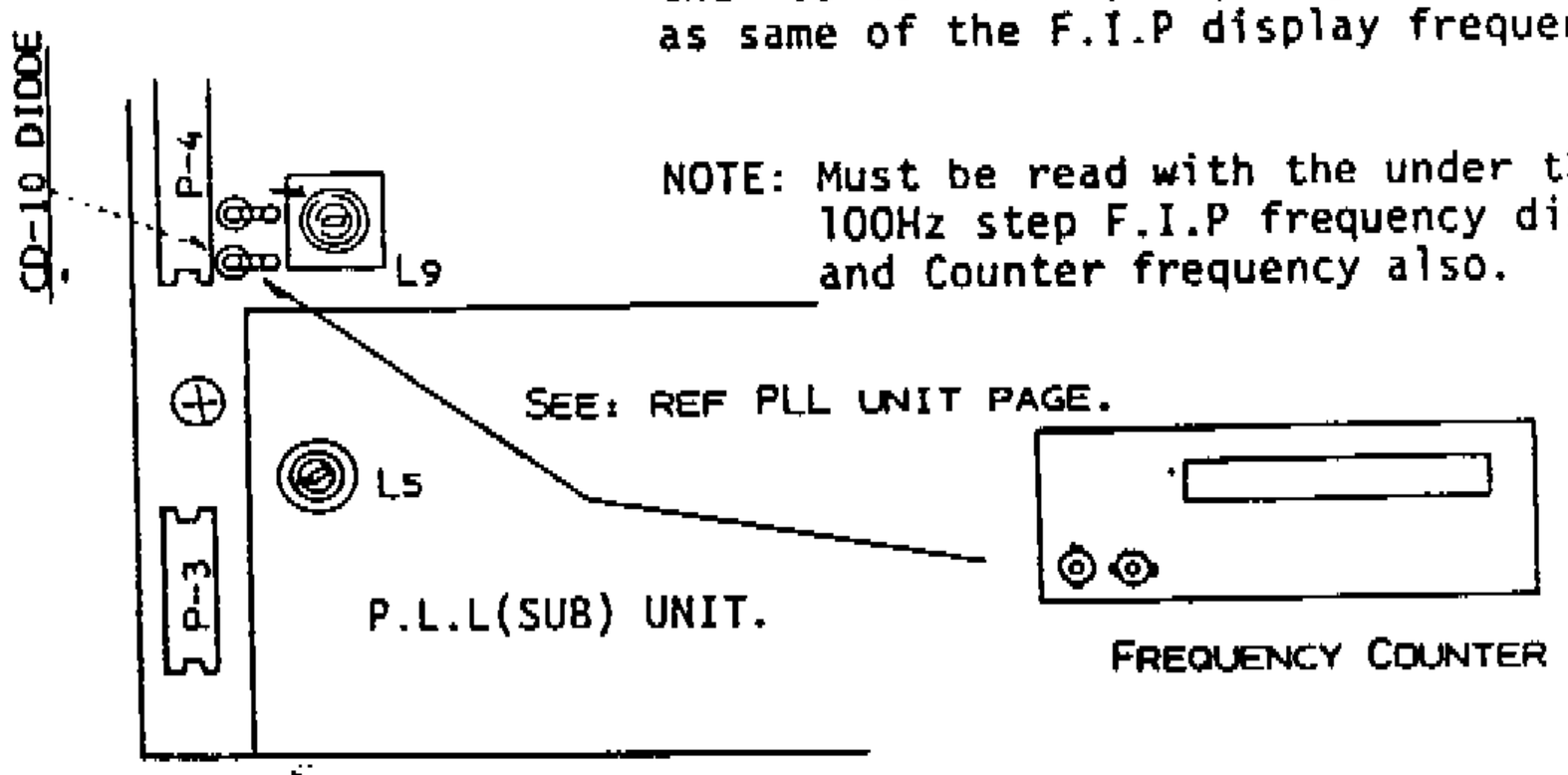
CHANNEL-SWITCHING UNIT:

CONFIRMATION

3) D/A OUTPUT :

Connect the Frequency Counter probe to the "CD-10" diode,frequency read with as same of the F.I.P display frequency.

NOTE: Must be read with the under the 100Hz step F.I.P frequency display and Counter frequency also.



COMPONENTS SIDE VIEW.

4) D/A OUTPUT FREQUENCY CONFIRMATION:

Used Frequency Counter PLL frequency confirmation MUST BE accuracy.

145.000.0MHz = 145.000.0 on the Frequency Counter.

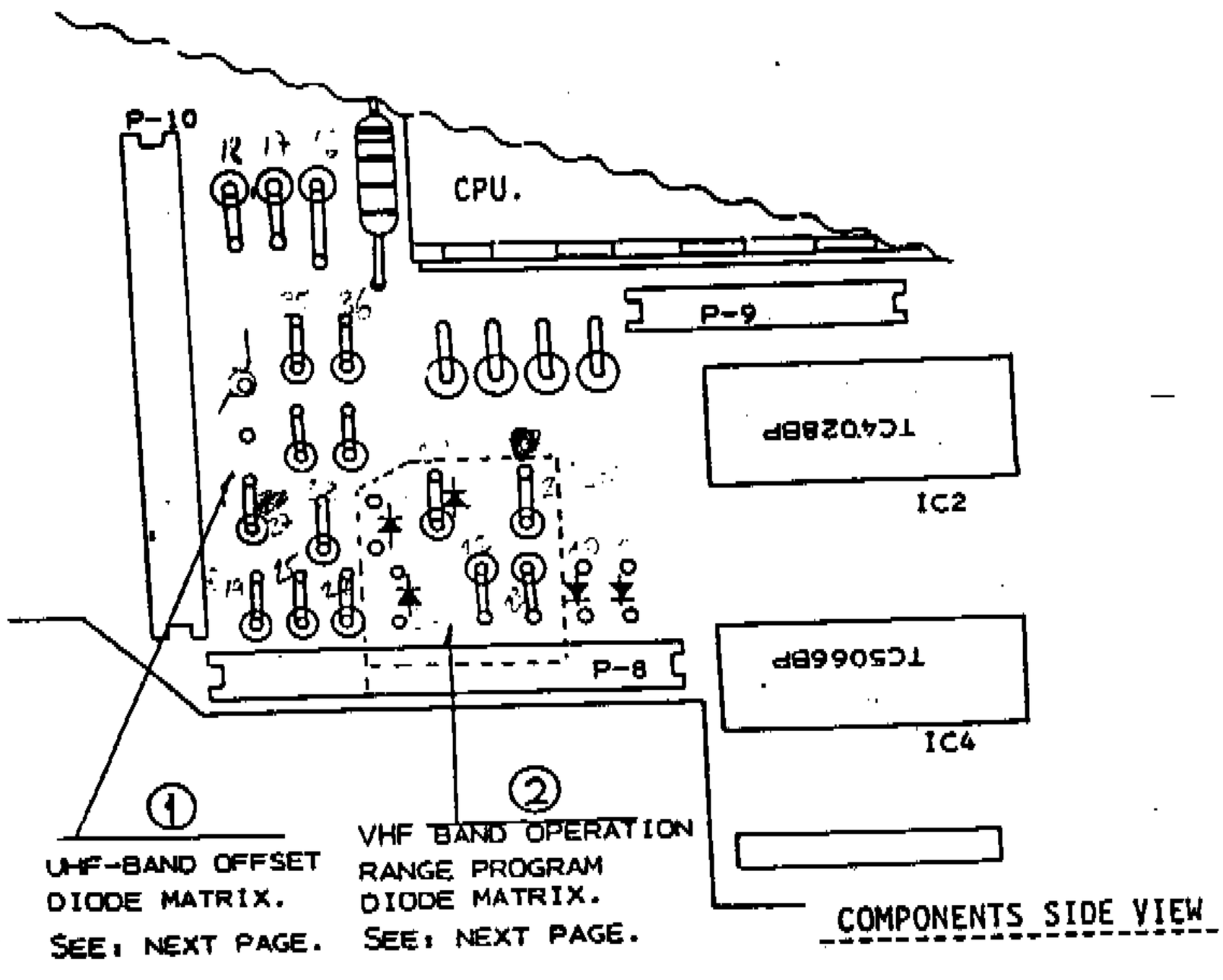
However,D/A adjustment procedure must be F.I.P display;
144.999.9MHz or 145.999.9MHz only.

CAUTION:

The C.P.U(D-650C),DO NOT REMOVE from the printed board, should be handling under comprehension of the C.P.U up to handled only,may should be ask to dealer or distributor.

CHANNEL-SWITCHING UNIT:

DIODE-MATRIX PROGRAM



CHANNEL-SWITCHING UNIT:

DIODE-MATRIX PROGRAM

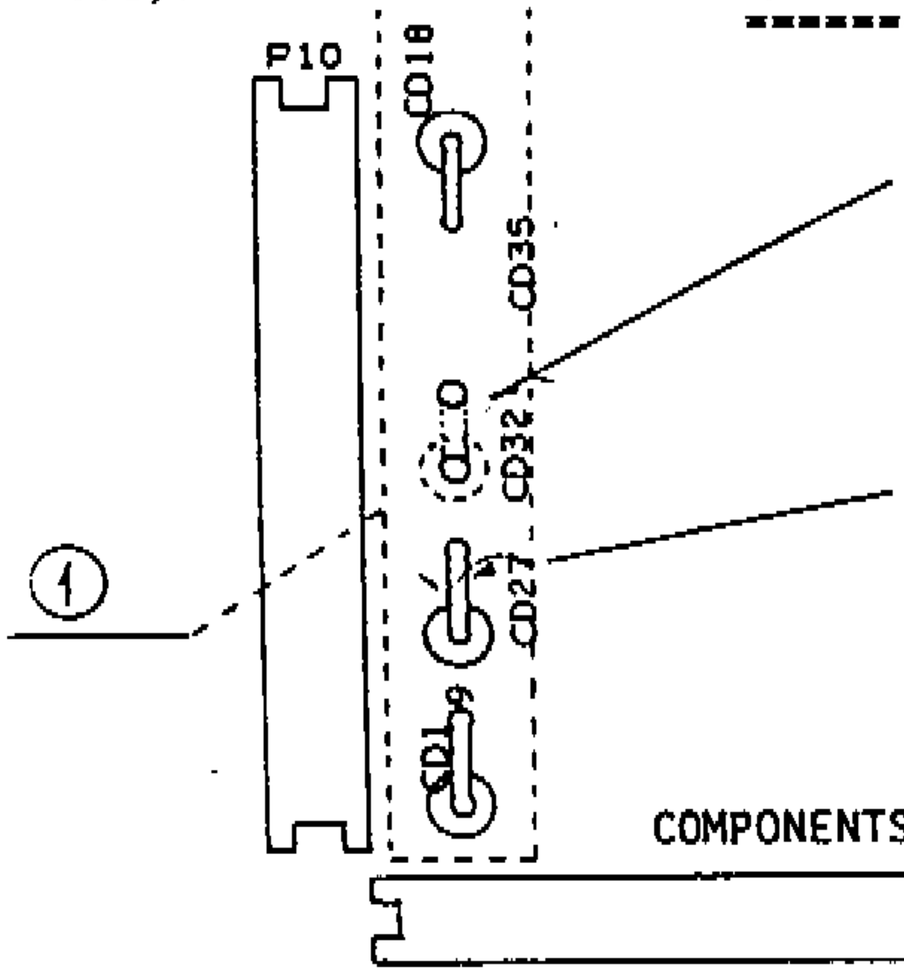
2) UHF BAND OFFSET PROGRAM;

This MULTI-750A/E can program three(3)way UHF offset frequencies.

Available frequency as follows;

-/+1.6MHz,	-/+5.0MHz,	-/+7.6MHz

SAMPLE SHOWN OFFSET FREQ, -/+1.6MHz(except dot diode).

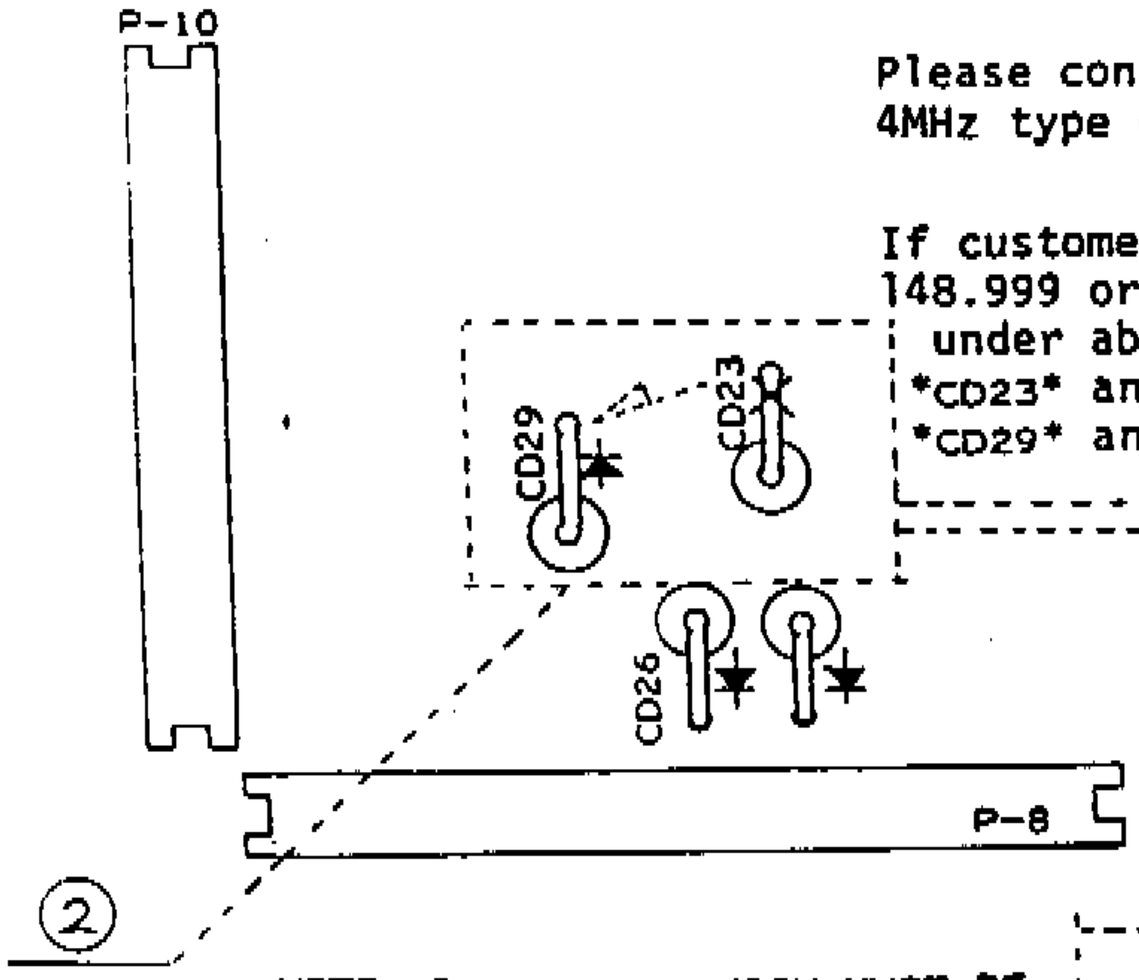


	CD27	32	
1.6	0	X	
5.7	X	X	
7.6	X	0	

3) 144-148.999.9MHz OPERATION PROGRAM:

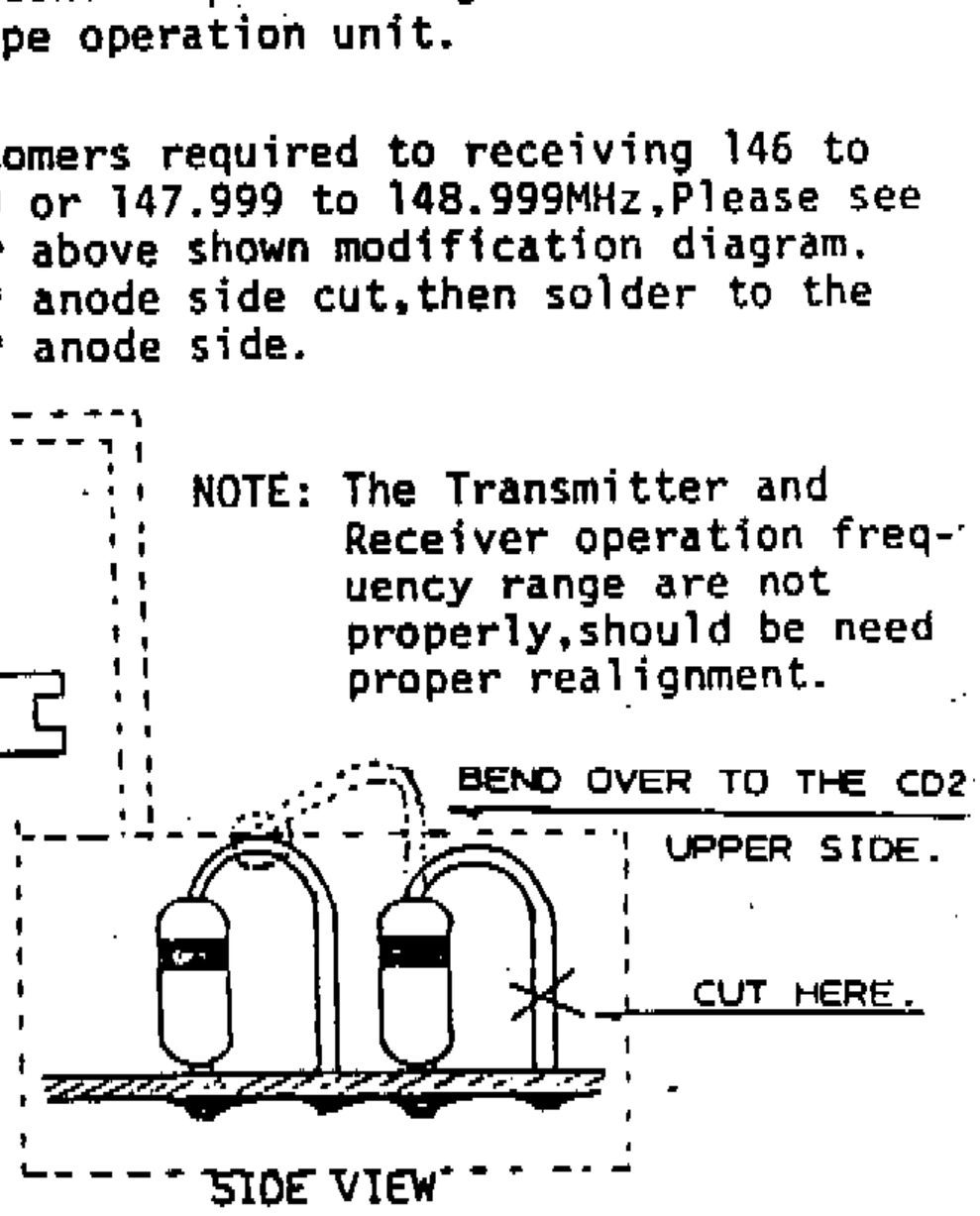
Please confirm"present" your set 2MHz or 4MHz type operation unit.

If customers required to receiving 146 to 148.999 or 147.999 to 148.999MHz,Please see under above shown modification diagram.
CD23 anode side cut,then solder to the *CD29* anode side.



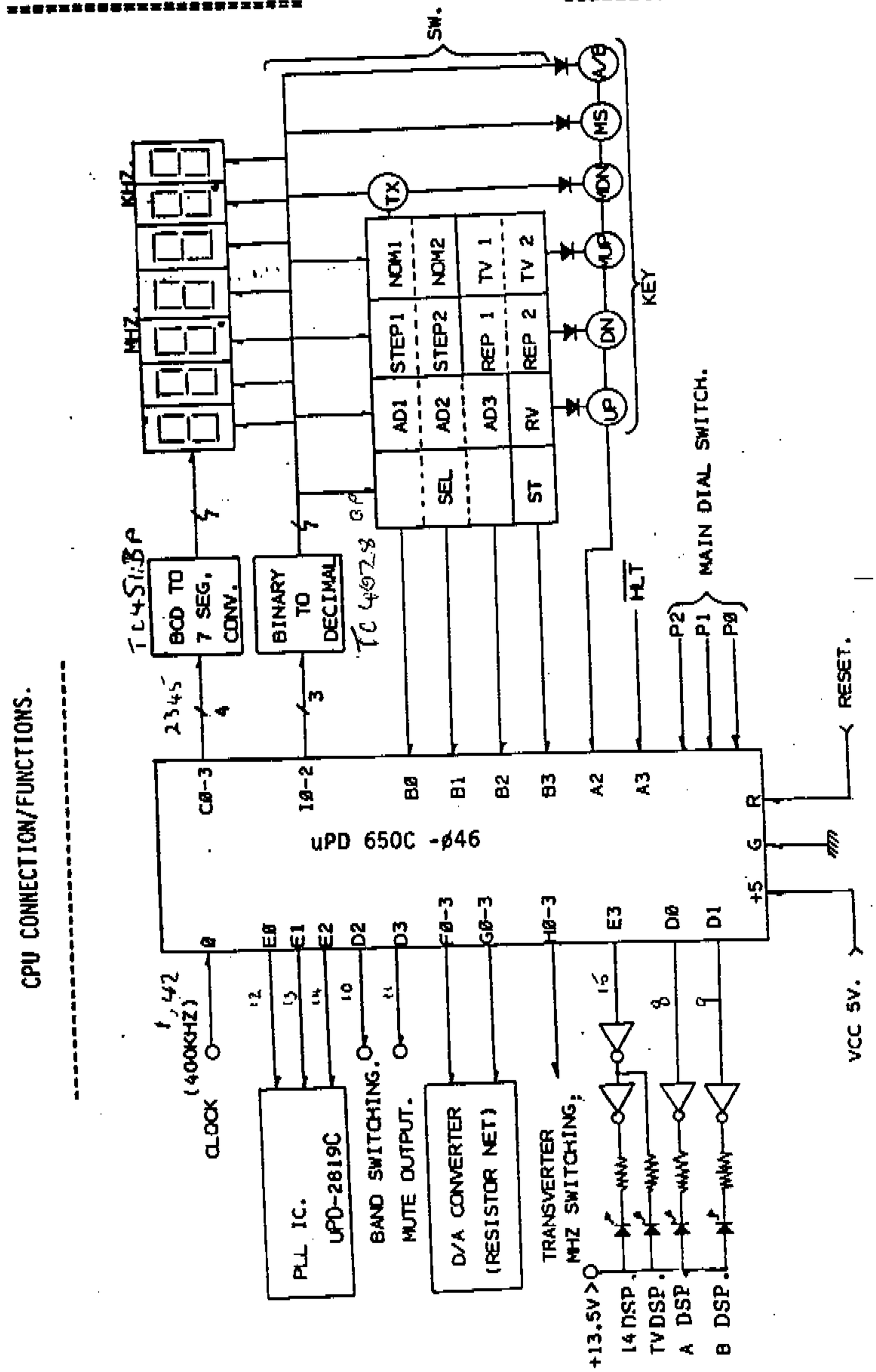
NOTE: DIODE DIRECTION MUST BE ANODE SIDE UPRIGHT.

NOTE: The Transmitter and Receiver operation frequency range are not properly,should be need proper realignment.



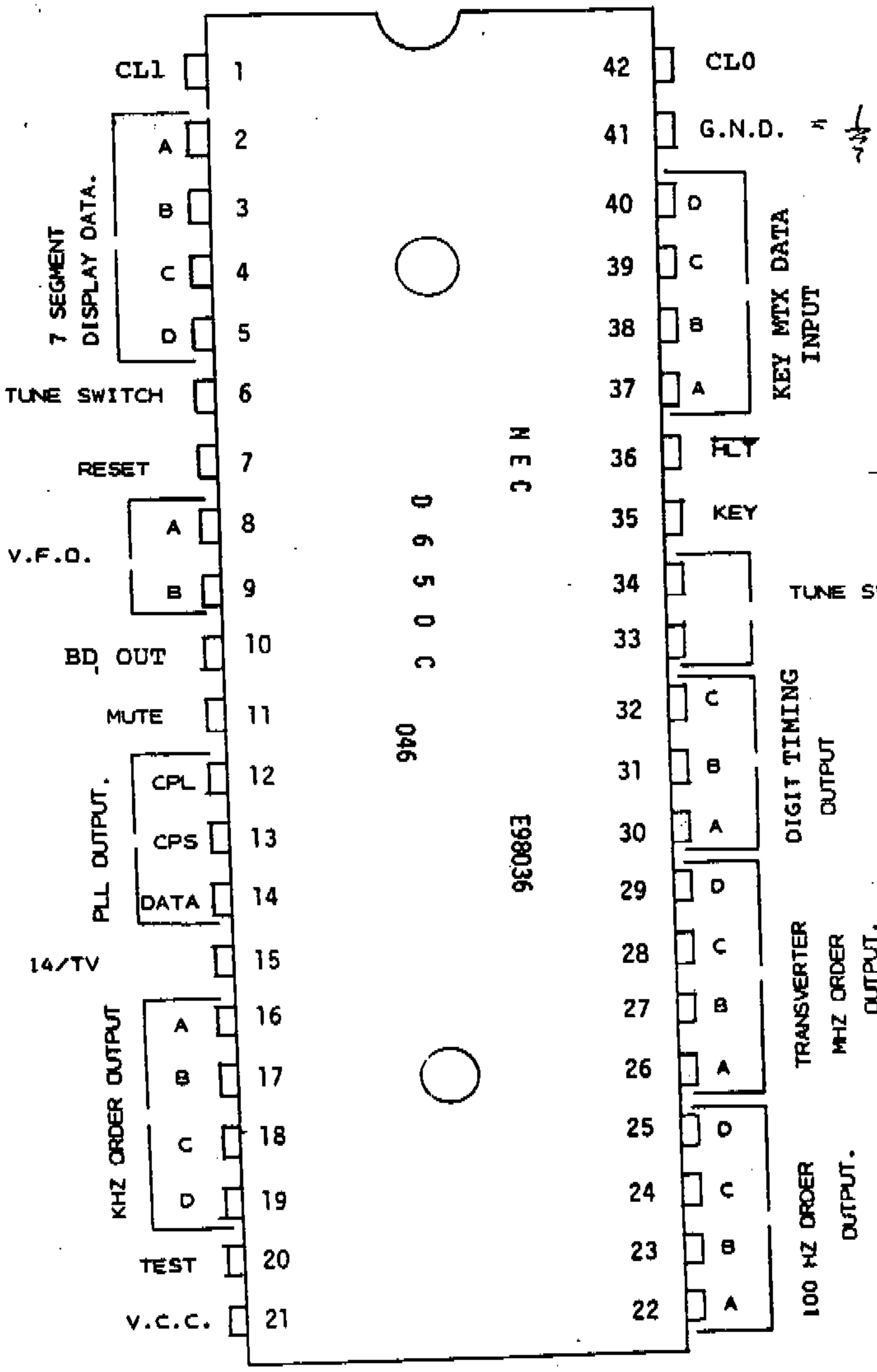
CHANNEL-SWITCHING UNIT:

DEVICE FACILITY



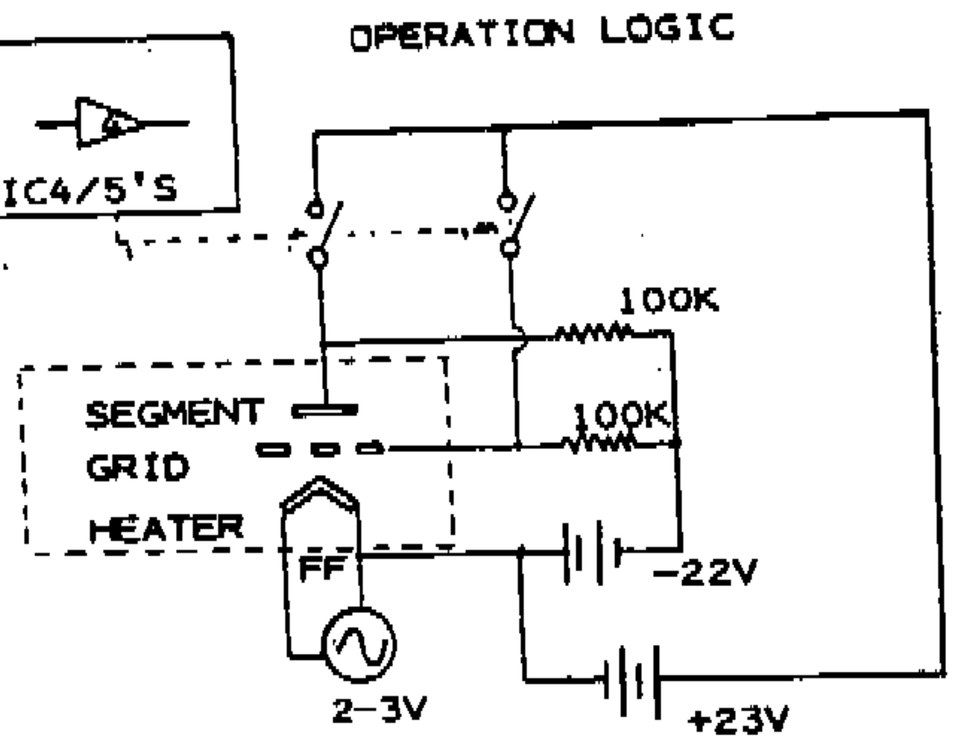
CHANNEL-SWITCHING UNIT:

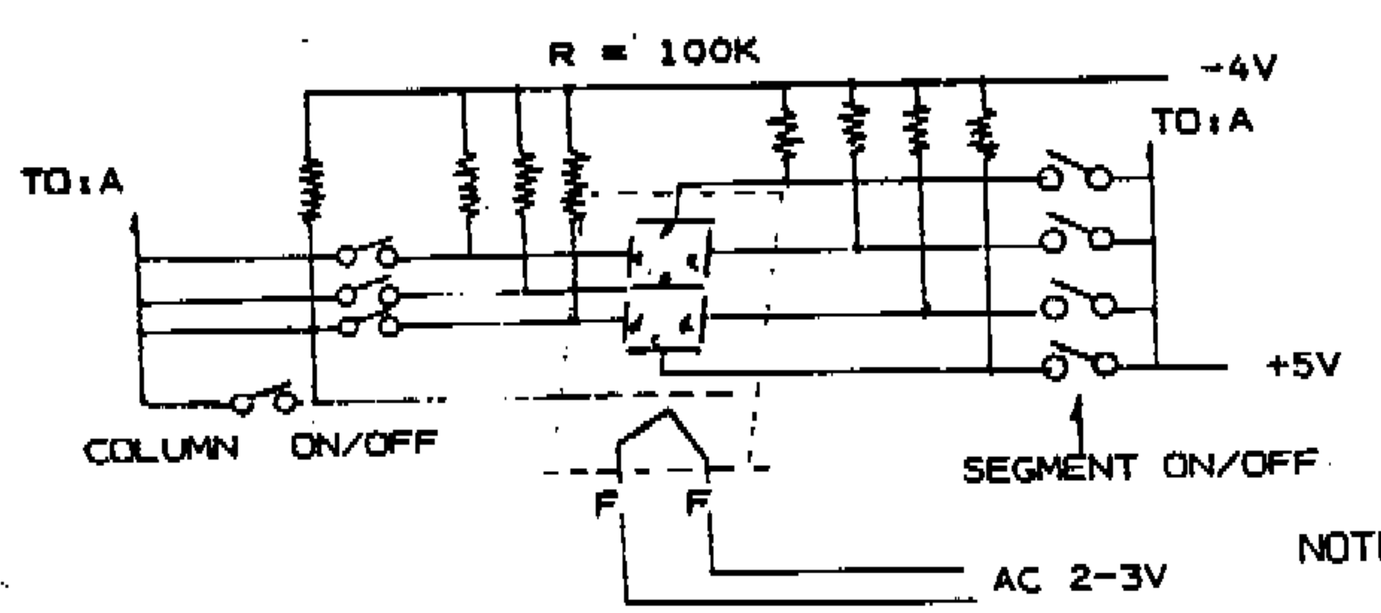
DEVICE FUNCTION



NOTE: CPU FROM TOP VIEW.

CHANNEL SWITCHING UNIT:





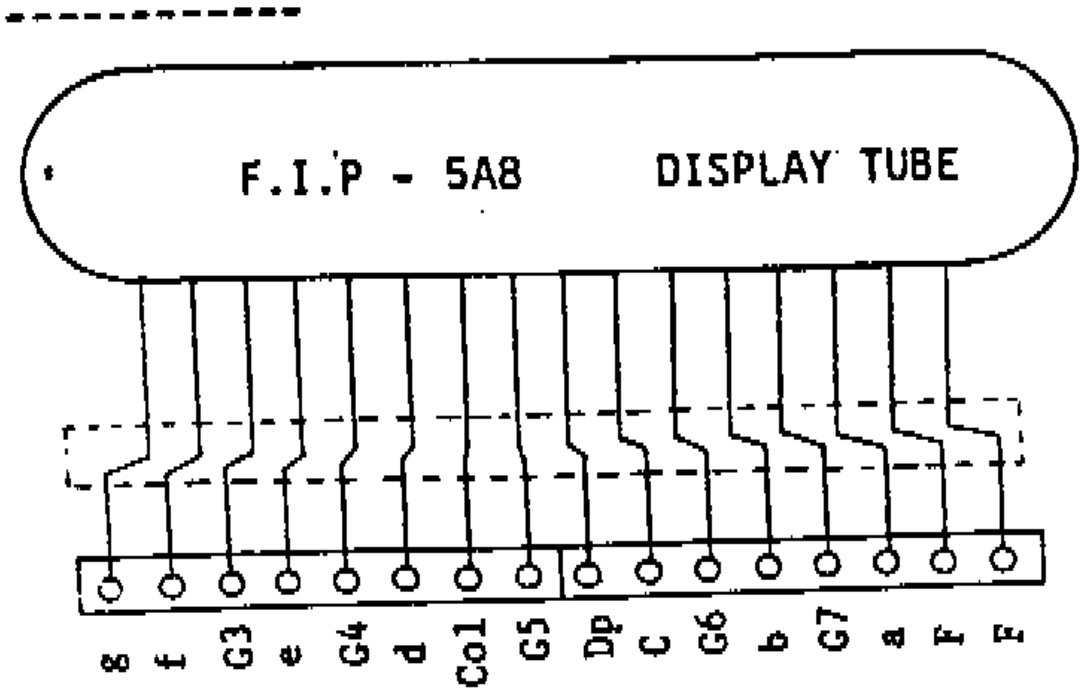
NOTE: VOLTAGE FROM CHASSIS AND MEASURED BY VOM.

F.I.P LOGIC

FIP SYMBOL FUNCTION:

G3 : First(MHz)GRID.
G4 : Second(100KHz)GRID.
G5 : Third(10KHz) GRID.
G6 : Fourth(1KHz) GRID.
G7 : Fifth(100Hz)GRID.
a-g : each segments.
Dp : Dot segment.
F : Filament(heater).

ACTUAL CONNECTION:



NOTE: NUMBER AND LETTER REFER WITH SCHEMATIC DIAGRAM.

See above explanation & Schematic(CH-SW)J1 conn.

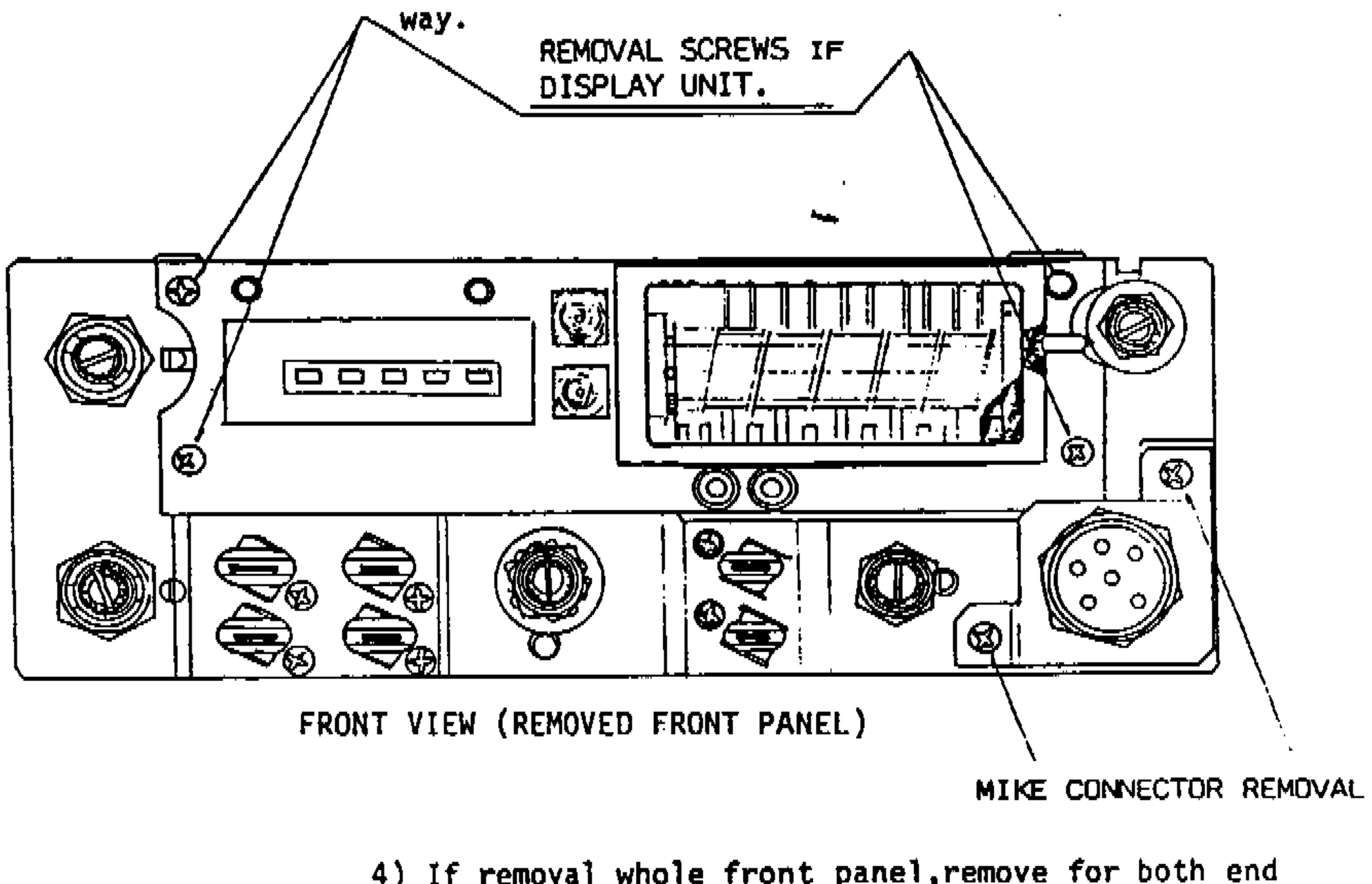
CH-SW/DISPLAY UNIT:

REMOVAL METHOD

1) Remove TOP and BOTTOM cover from the transceiver. Remove also both side alminum hanger rail for both philips type screws.

2) Pull out all knobs from the front panel,except push bottom switches.

3) If removal only DISPLAY UNIT,under above shown screws remove. Move only vertical to holizontal way.



FRONT VIEW (REMOVED FRONT PANEL)

4) If removal whole front panel,remove for both end middle philips screws from the chassis. Remove also all connectors from the main chassis body.

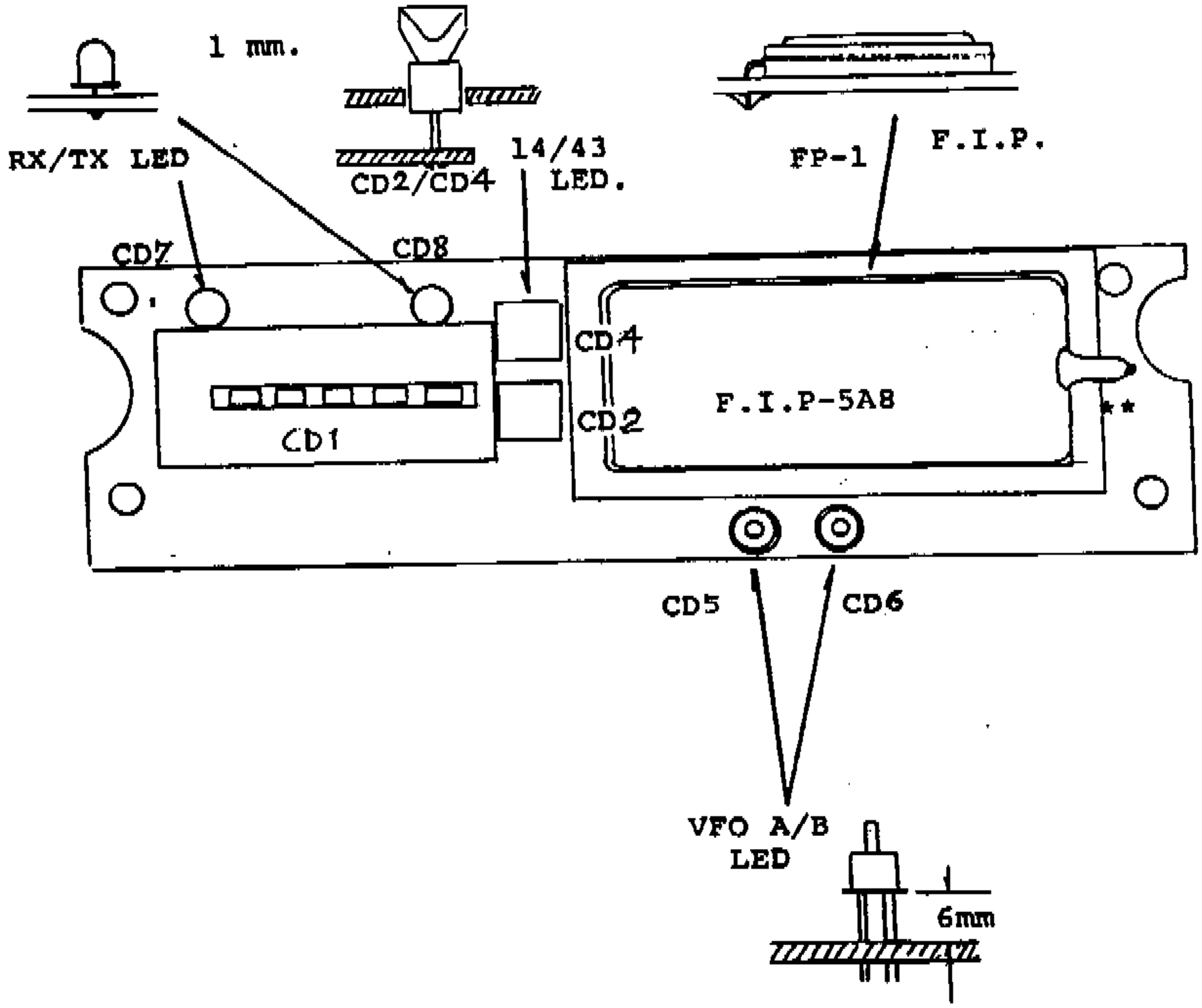
5) If replace into are knobs,knob position counter-clockwise(except Main Dial)then fit into above marking start positions.

6) F.I.P Display output leads removal,pull out slowly do not bend or nick above ribbon wires.

CH-SW DISPLAY UNIT

COMPONENTS REPLACEMENT

DISPLAY BOARD FRONT VIEW
(Removes front panel)



CD1=SLP2528B (GRN)
CD2=RLD-9-332ACS (AMB)
CD3=
CD4=RLD-9-532PCS (GRN)
CD5=SLP246B
CD6= "
CD7=SLP135B
CD8=SLP235B
R2-6=560ohm

NOTE ** HANDLING CARE

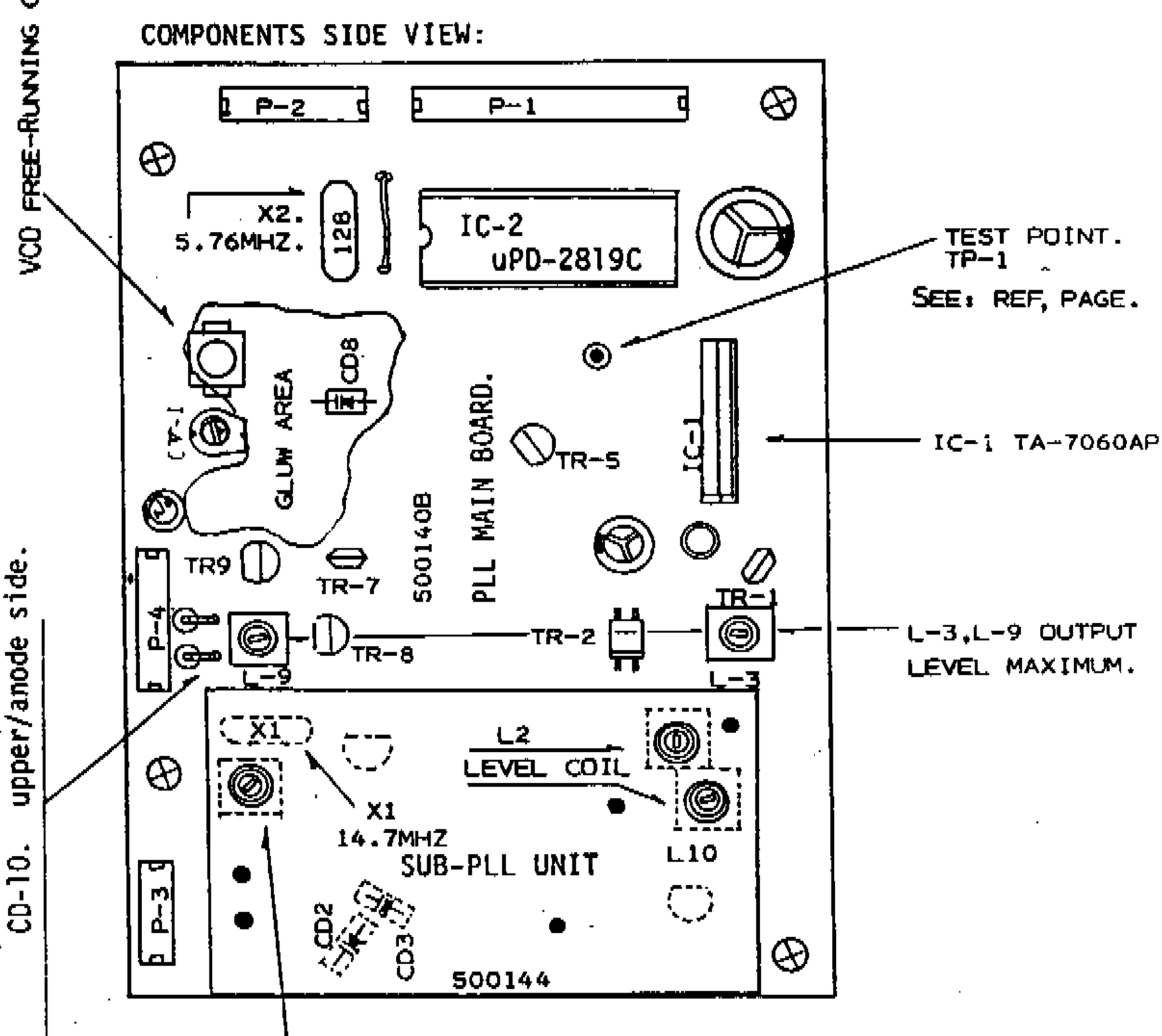
P.L.L (SUB-PLL) UNIT:

1) FREQUENCY CONFIRMATION:

Front F.I.P display frequency set the 146.000MHz.
Connect VTVM to TP1 and adjust CV1 to be 4.0V.

The Counter probe connect to the R-36, Frequency can be read at 5.76MHz.

COMPONENTS SIDE VIEW:



Fourty 145.000
133.800

2) P.L.L STANDARD FREQUENCY ADJUSTMENT:

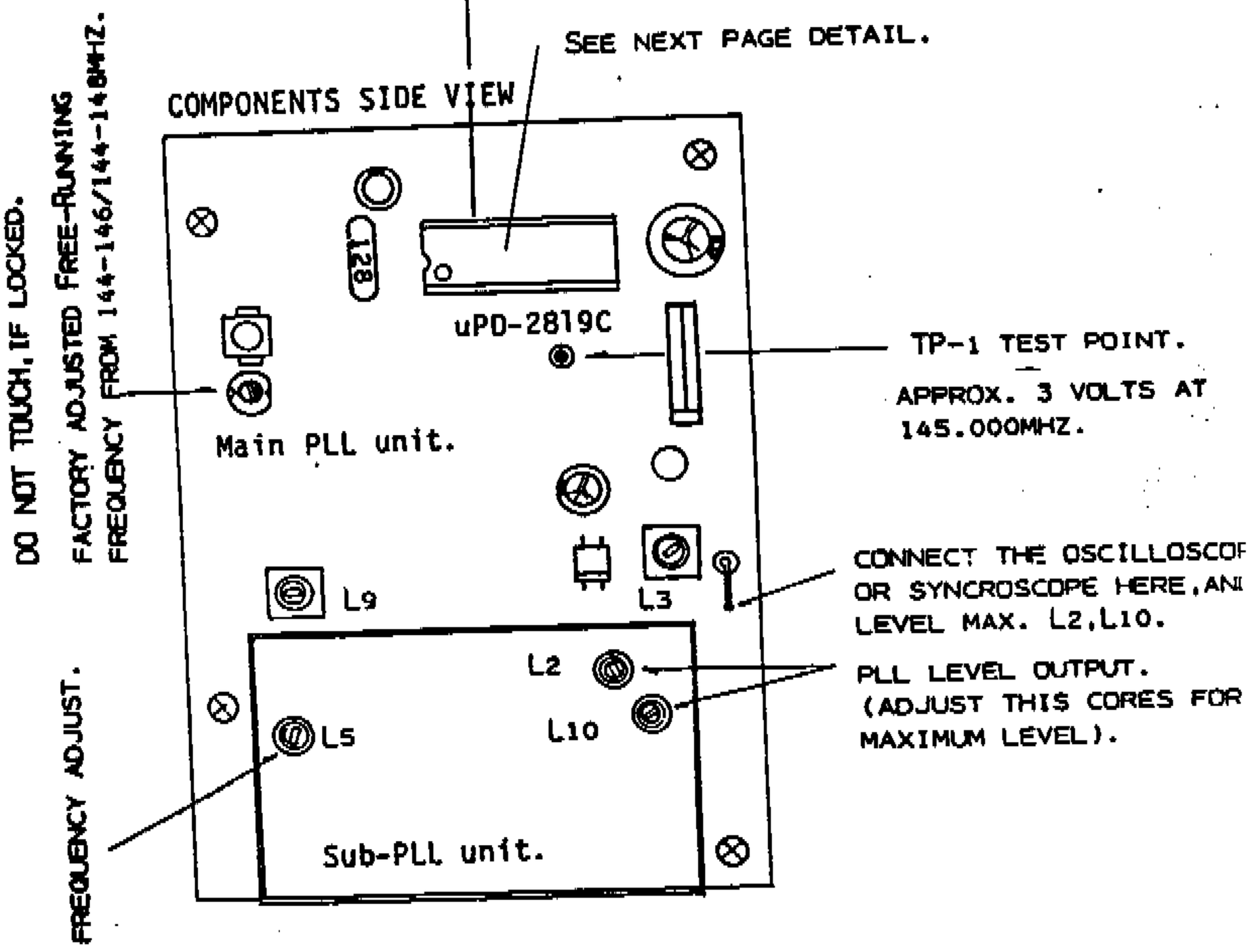
Set the dial frequency at 145.000.0MHz.
The Frequency Counter probe connect to the CD-10 diode(upper/anode).
An output frequency MUST BE 134.300MHz +/-100Hz,adjust the L-5 core.

This is STANDARD PLL frequency,so MUST be tune precise.

#28

CONFIRMATION PROCEDURE:

P.L.L (SUB-PLL) UNIT:



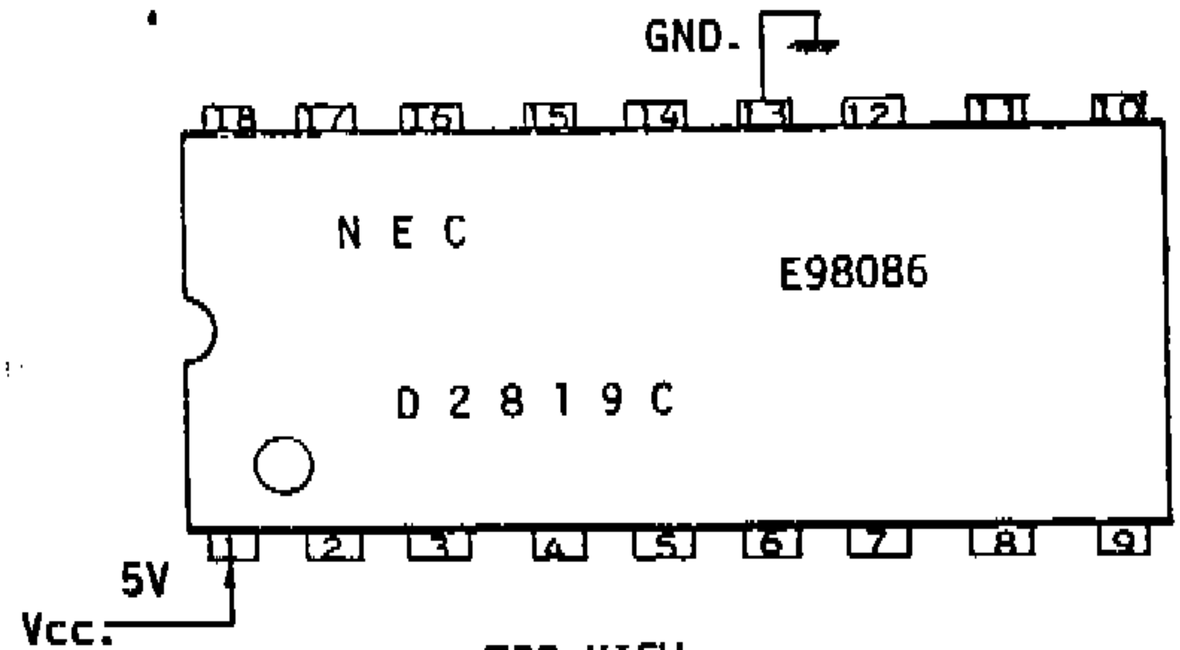
* PLL SUB UNIT LEVEL ADJUST:
  Connect The Scilloscope to 14 pin of MPD2819C and adjust L10,2,3 to be max. level.

* PLL STANDARD FREQ. ADJUST.
  Connect the Freq. Counter to the CD-10
  Adjust the freq. by L5.

P.L.L (SUB-PLL) UNIT:

DEVICE FUNCTION/VOLTAGE:

uPD-2819C PLL I.C:



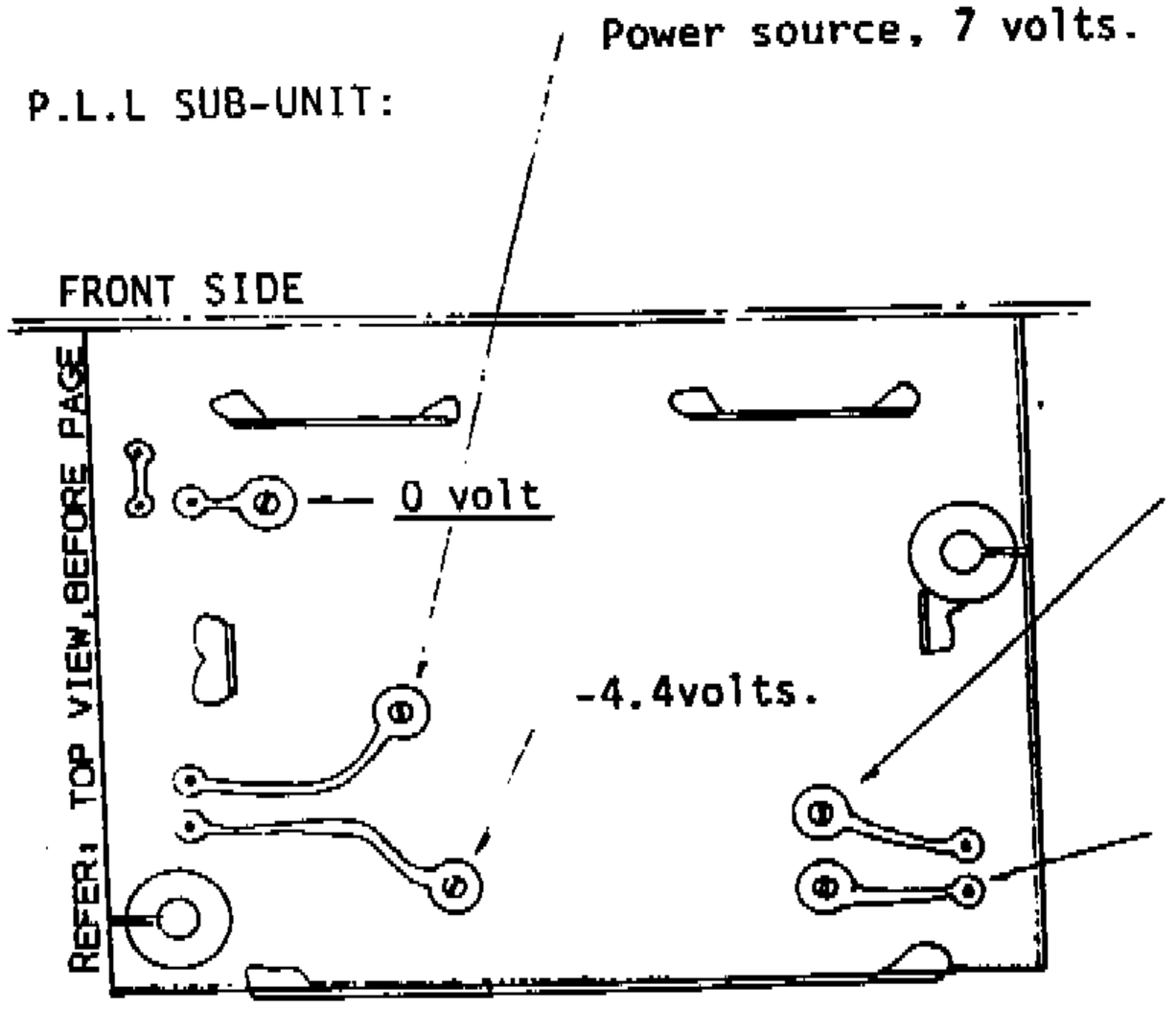
TOP VIEW

No,1 Vdd (5Volts)
No,2 Crystal input(OSC.)
No,3 Crystal input(OSC.)
No,4 Clock out 1.(360KHz)
No,5 Check term.
No,6 Clock out 2.(25Hz)
No,7 Unlock check term.
No,8 Phase-Detector output.
⎍⎍⎍⎍ if unlock.

NOTE: if locked,no output.

No,9 Freq.comparator(Check-term.)
No,10 " " (" ")
No,11 ---
No,12 ---
No,13 Vss (GND)
No,14 Program Counter input
No,15 " " " (No-used
No,16 } PLL CONTROL DATA INPUT
No,17 }
No,18 }

P.L.L SUB-UNIT:

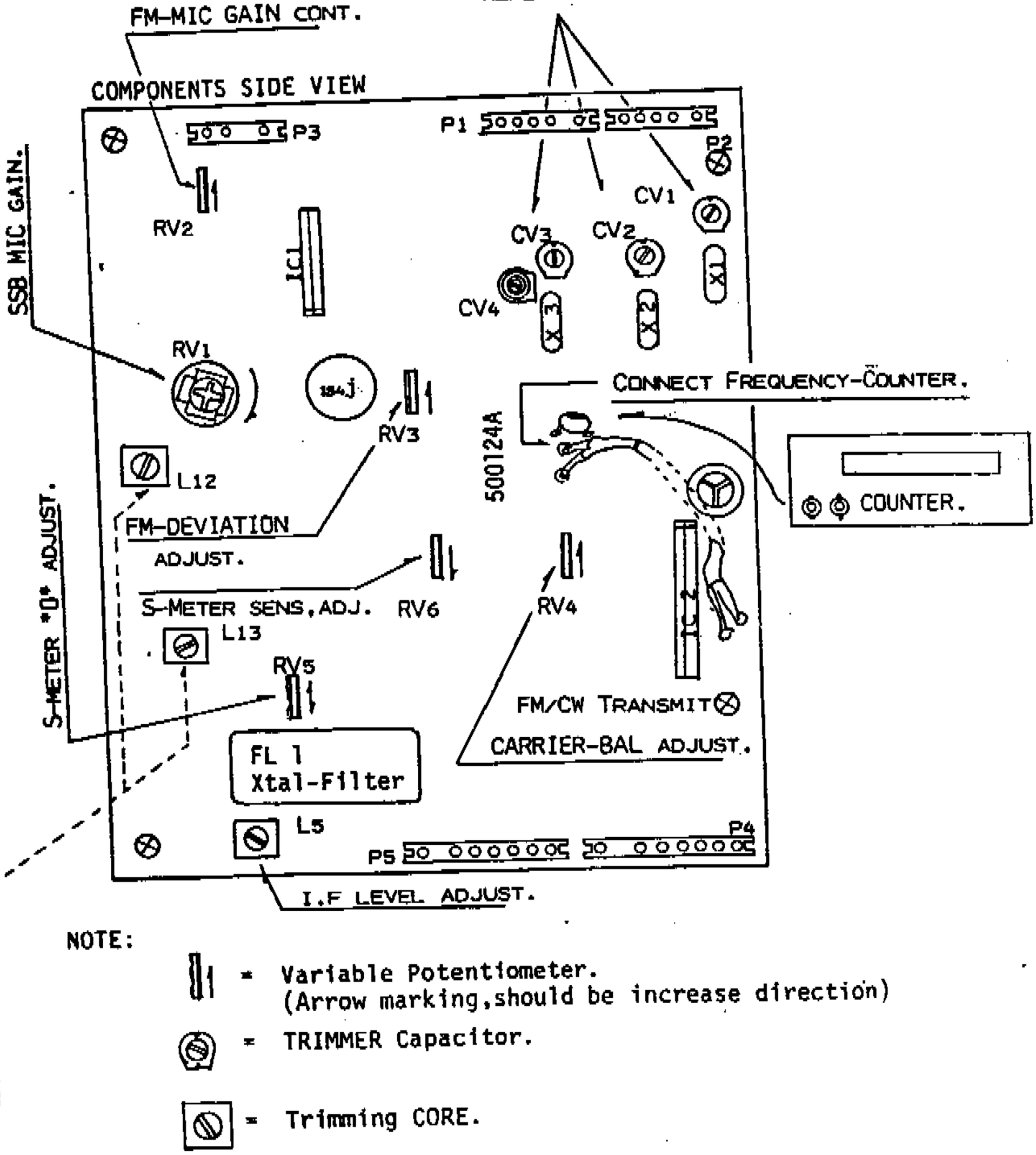


FOIL SIDE VIEW

ADJUSTMENT PROCEDURE

SSB UNIT:

REFER NEXT PAGE.



NOTE:

- = Variable Potentiometer. (Arrow marking,should be increase direction)
- = TRIMMER Capacitor.
- = Trimming CORE.

SSB UNIT:

ADJUSTMENT PROCEDURE

Reference:
X 1 = 10.7000 MHz (125) FM local Carrier.
X 2 = 10.7015 MHz (126) SSB/LSB mode.
X 3 = 10.6993 MHz (127) CW-TX mode Carrier.
10.6985 MHz (127) SSB/USB mode.

Adjustmer :

1) X 1 — The Frequency Counter probe connect to the C 41 or hot side coaxial-cable. Set the MODE switch to the FM position,then TRANSMIT. Adjust the frequency 10.700MHz +/-100Hz.

2) X 2 — Set the MODE switch at LSB position, Trimming the CV 2 for 10.7015MHz +/-50Hz.

3) X 3 — 10.6993 MHz = Set the MODE position at the CW,and TRANSMIT. Frequency adjust the 10.6993MHz by the CV 3 trimmer.

X 3 — 10.6985 MHz = Set the MODE switch at USB/SSB position. Trimming with the CV 3 for 10.6985MHz +/-50Hz.

NOTE: X 3 crystal using for both SSB/USB position and CW mode,however,may necessary for both trimming CV 3 & CV 4.

4) SSB-IF stage adjustment.

Set the all about A.F level meter or Oscilloscope at the Audio output. Tune the Audio output level maximam by L 12 and L 13.

5) CARRIER OUTPUT adjustment.

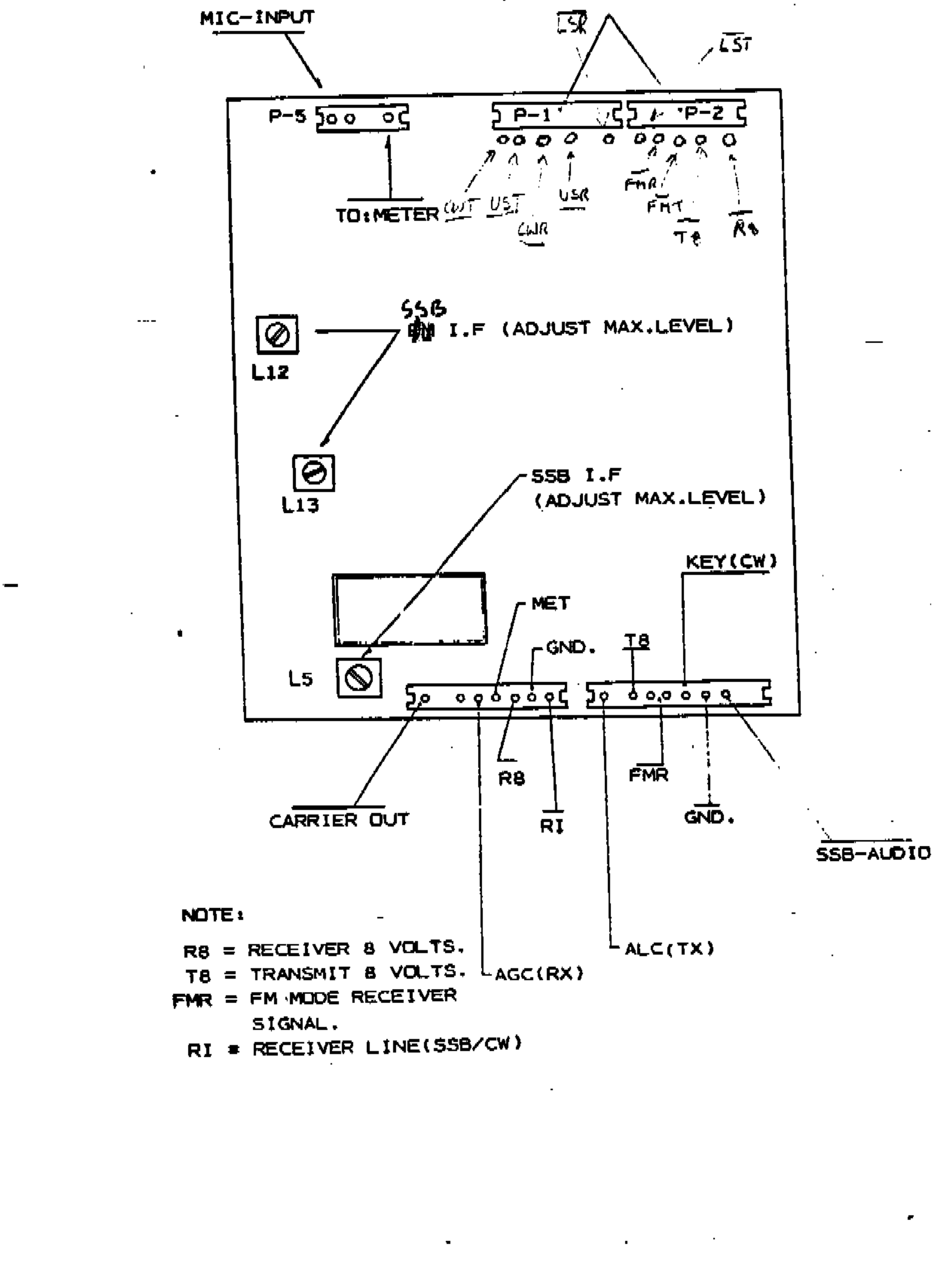
Set the L 5 core maximum level.

6) CARRIER-BALANCE adjustment.

FM position or CW position for TRANSMIT. Output level 250mW(Carrier)level(TP 3 RX-TX) at the SSB TO according with same level with this(RV 4) pot.

SSB UNIT:

CONNECTION WIRES:



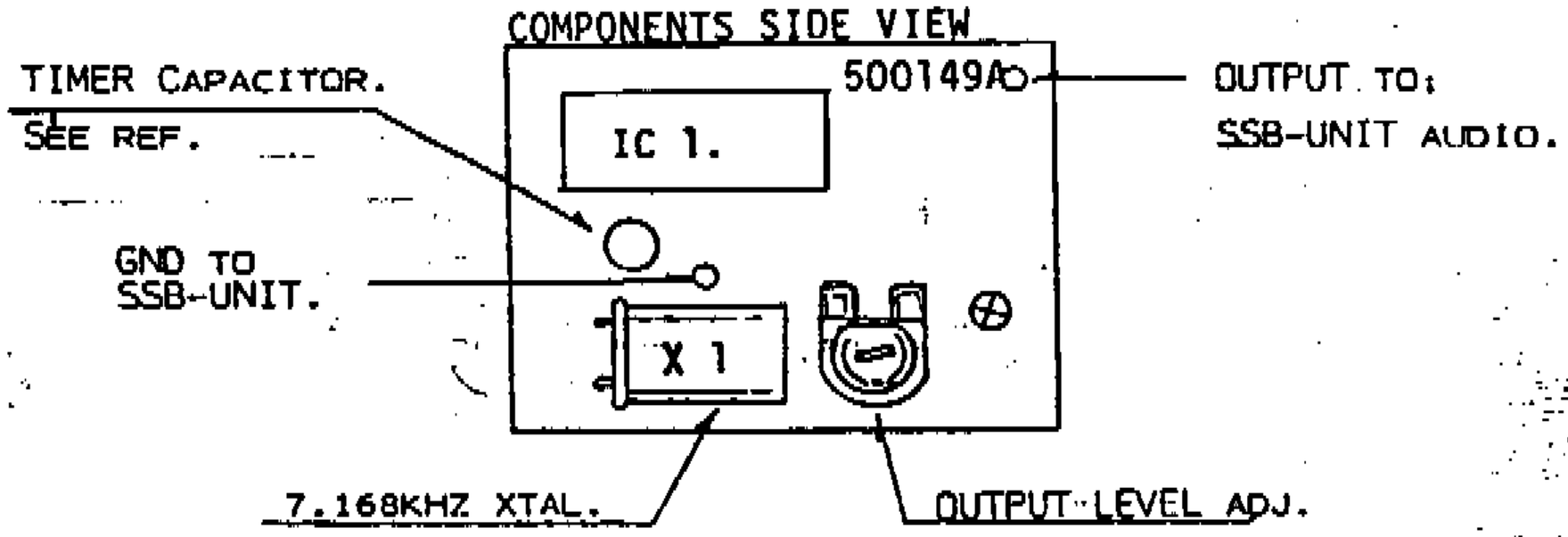
NOTE:

R8 = RECEIVER 8 VOLTS.
T8 = TRANSMIT 8 VOLTS.
FMR = FM MODE RECEIVER SIGNAL.
RI = RECEIVER LINE(SSB/CW)

TONE-BURST UNIT:

ADJUSTMENT/ACCESSORY

NOTE: THIS UNIT HAS WITH EUROPEAN PURPOSE UNIT M-750A/E TRANSCEIVER ONLY. IF NOT ATTACHED WITH THIS UNIT, SHOULD BE U.S TYPE OF UNIT.



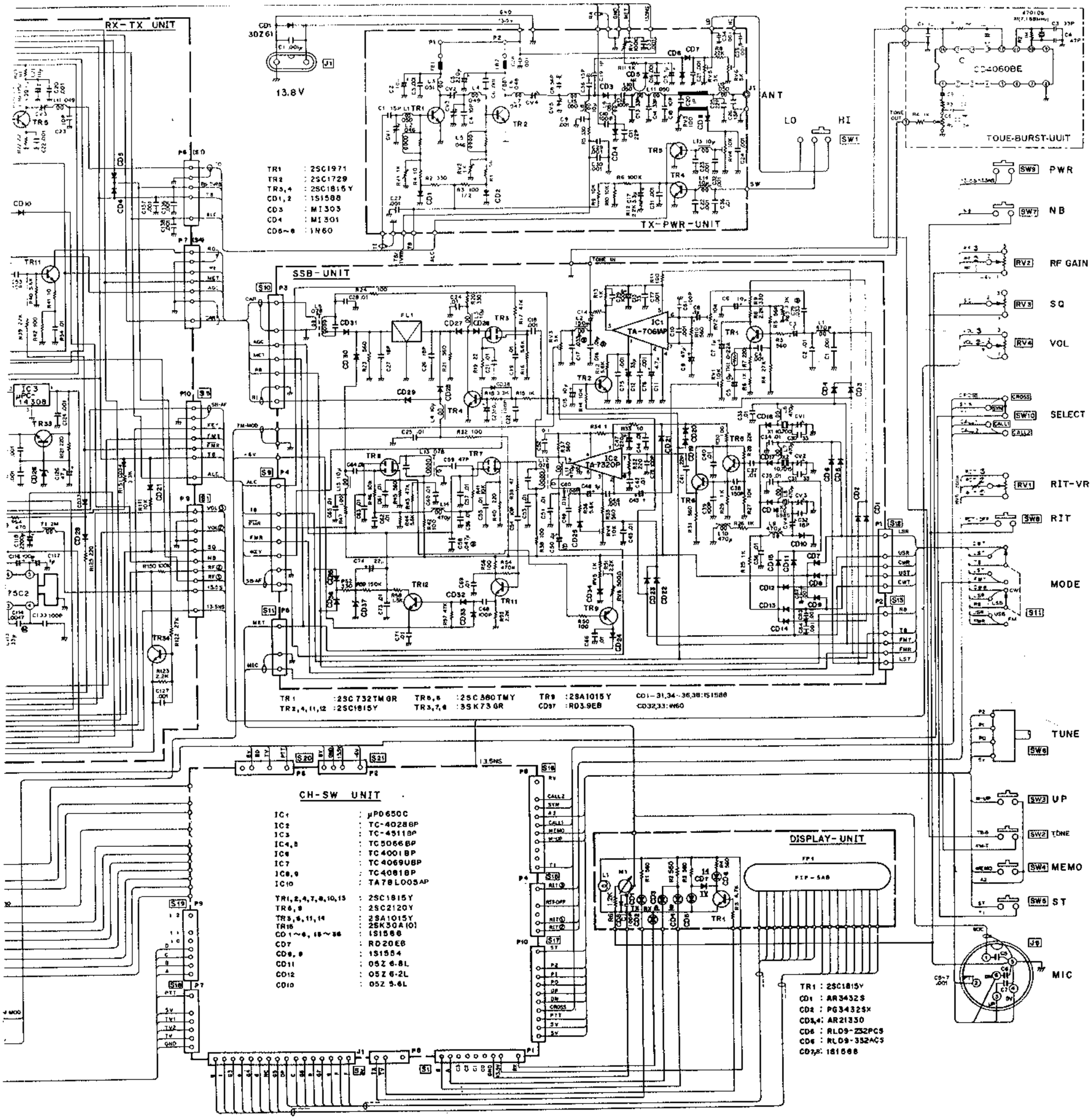
TIMER CAPACITOR REFERENCE:

1.0uF = approx. 1 sec (present time duration).
1.5uF = approx. 1.5 sec
2.0uF = approx. 2.0 sec
3.0uF = approx. 3.0 sec

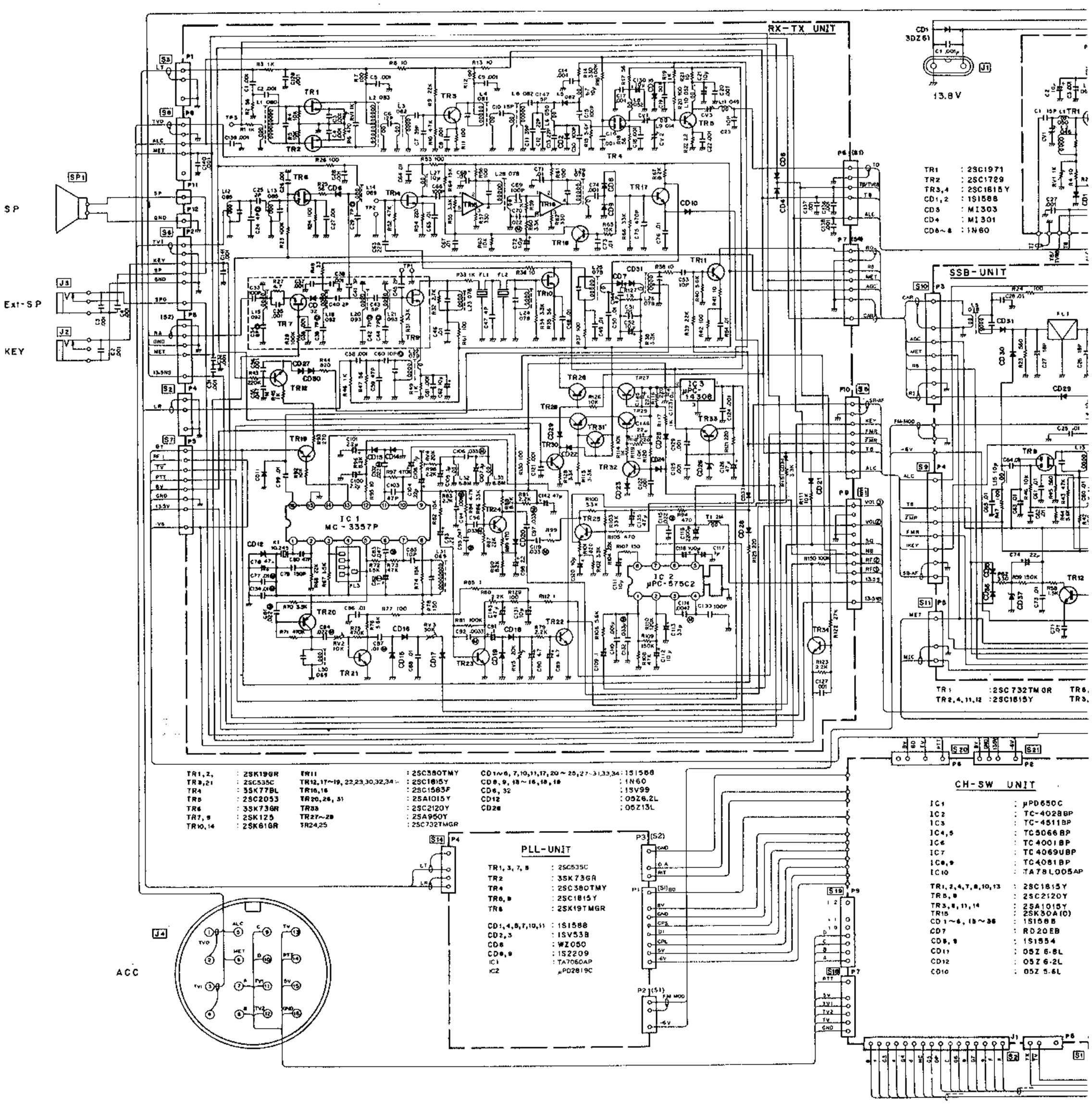
NOTE: Capacitor, should be used "Dipped-tantalum type capacitor only.

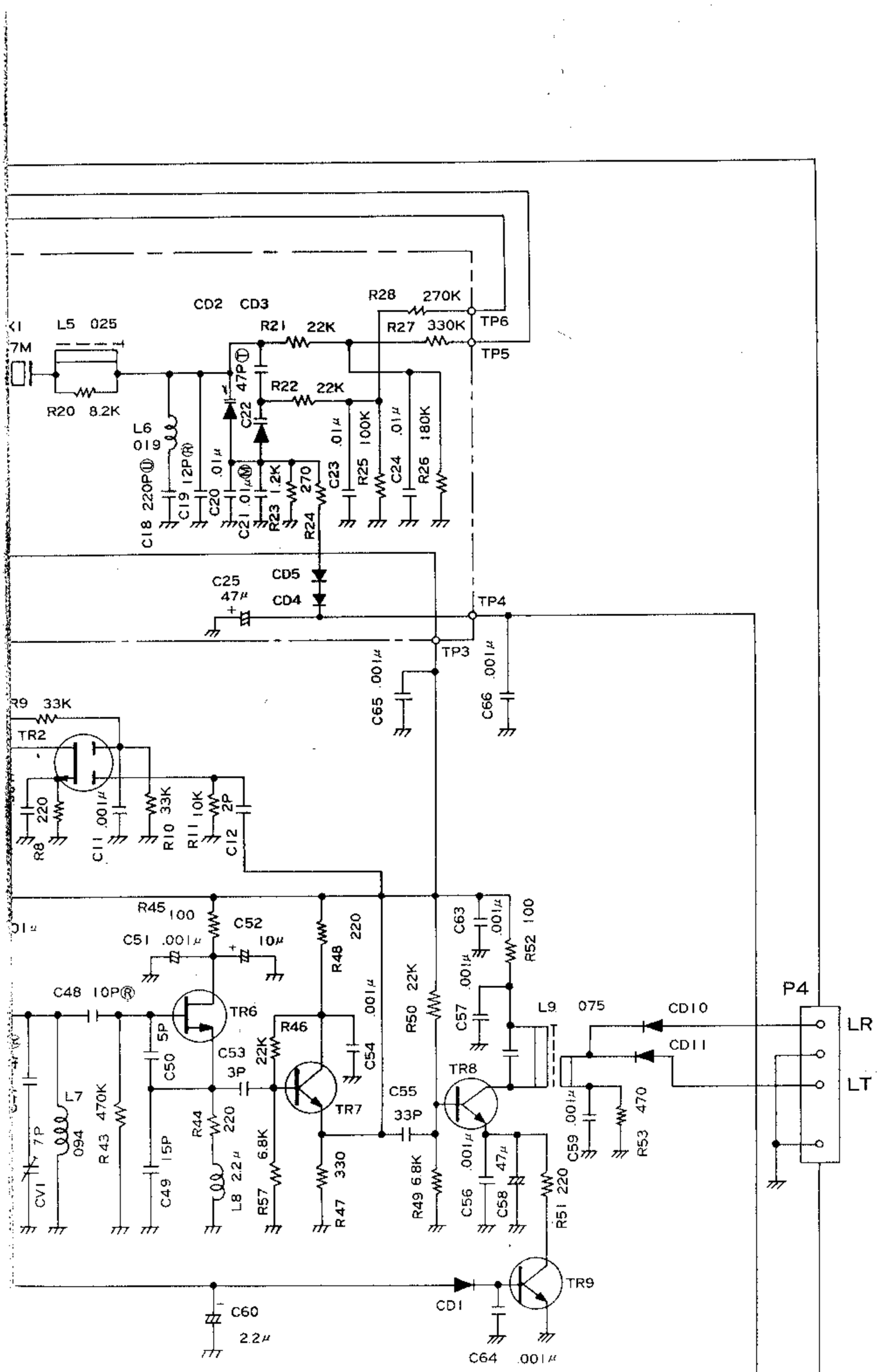
Adjustment deviation:

Audio deviation level +/-5KHz(factory-pre-adjusted), however may not exceed +/-3.5KHz 70% modulation at this OUTPUT LEVEL pot.


RX-TX UNIT
TX-PWR-UNIT
SSB-UNIT
CH-SW UNIT
DISPLAY-UNIT
TOUE-BURST-UUIT
13.8V
ANT
LO
HI
SW1
PWR
NB
RF GAIN
SQ
VOL
SELECT
RIT-VR
RIT
MODE
TUNE
UP
TONE
MEMO
ST
MIC
TR1 : 2SC1971
TR2 : 2SC1729
TR3,4 : 2SC1815Y
CD1,2 : 1S1588
CD3 : MI303
CD4 : MI301
CD6~8 : 1N60
IC1 : μPD650C
IC2 : TC-40286P
IC3 : TC-45118P
IC4,5 : TC5056BP
IC6 : TC4001BP
IC7 : TC4069UBP
IC8,9 : TC4081BP
IC10 : TA78L005AP
TR1,2,4,7,8,10,13 : 2SC1815Y
TR6,9 : 2SC2120Y
TR3,5,11,14 : 2SA1015Y
TR15 : 2SK30A(O)
CD1~6, 15~36 : 1S1588
CD7 : RD20EB
CD8,9 : 1S1554
CD11 : 05Z 6.8L
CD12 : 05Z 6.2L
CD10 : 05Z 5.6L
TR1 : 2SC1815Y
CD1 : AR3432S
CD2 : PG3432SX
CD3,4 : AR21330
CD5 : RLD9-Z52PCS
CD6 : RLD9-352ACS
CD7,8 : 1S1588
TR1 : 2SC732TM GR
TR2,4,11,12 : 2SC1815Y
TR6,8 : 2SC380TMY
TR3,7,9 : 3SK73GR
TR9 : 2SA1015Y
CD37 : RD3.9EB
CD1~31,34~36,38:1S1588
CD32,33:MV60

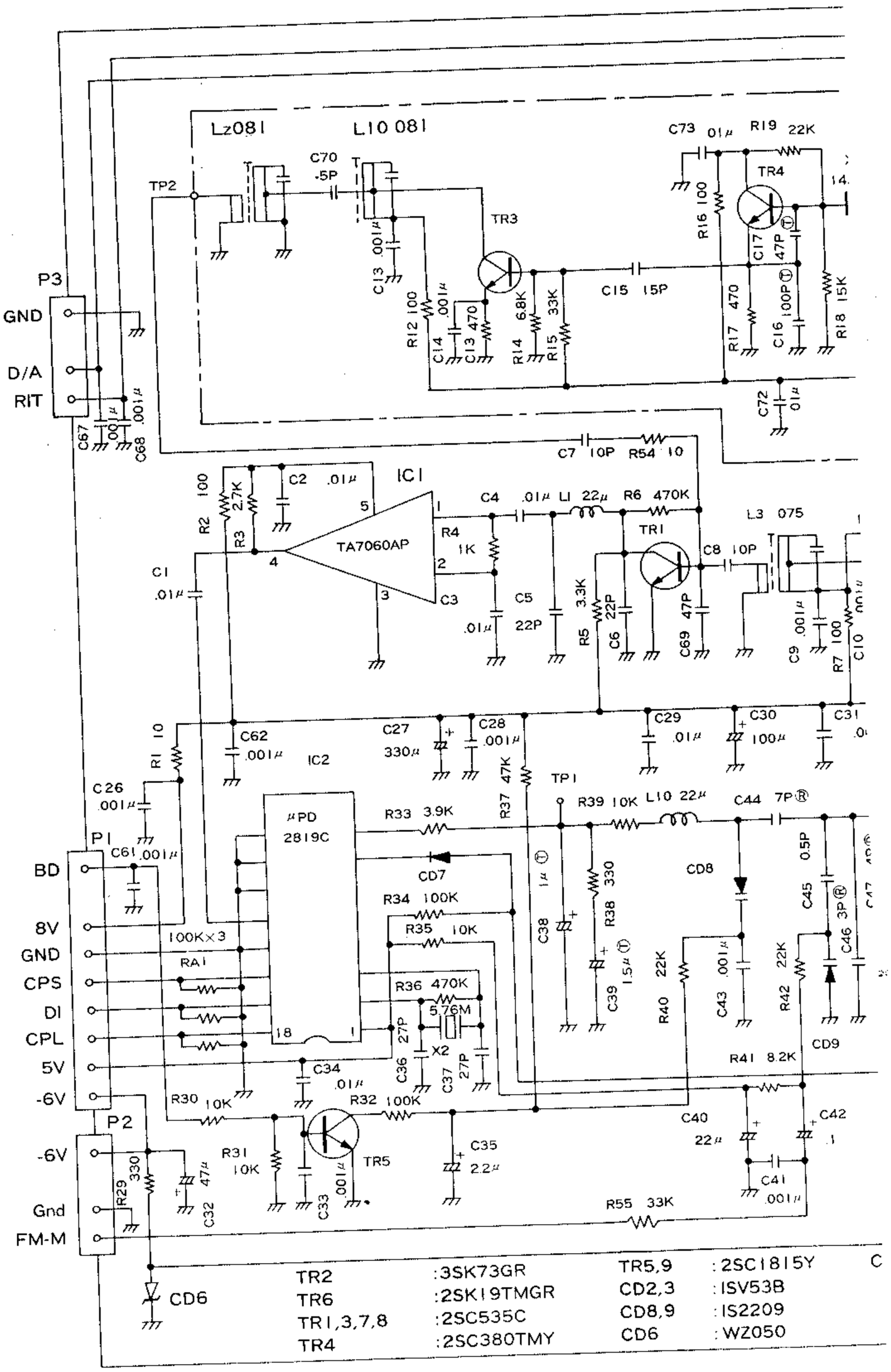
MULTI-750A/E SCHMATIC DIAGRAM / ASSEMBLY UNIT





D1,4,5,7,10,11: 1S1588

MULTI-750A/E P.L.L CIRCUIT DIAGRAM



TR2	:3SK73GR	TR5,9	:2SC1815Y
TR6	:2SK19TMGR	CD2,3	:ISV53B
TR1,3,7,8	:2SC535C	CD8,9	:IS2209
TR4	:2SC380TMY	CD6	:WZ050