HF BAND SSB/CW TRANSCEIVER

"100" SERIES

SERVICE MANUAL

Tokyo Hy-Power Labs., Inc.

CONTENTS

1. EXPLANATION OF FEATURES ---1

2. EXPLANATION OF OPERATIONS

RECEIVER SECTION ---2

SSB TRANSMITTER SECTION ---3

RECEIVER/TRANSMITTER SECTION ---3

SEMI BREAK IN CIRCUIT

SIDE TONE MONITOR CIRCUIT ---4

PLL SECTION ---5

3. ADJUSTMENT

3-1 MEASURING APPARATUS REQUIRED FOR ADJUSTMENT ---9

3-2 CONNECTION OF MEASURING APPARATUS FOR ADJUSTMENT ---9

3-3 ADJUSTMENT DIRECTIONS

3-3-1 PLL UNIT ---11

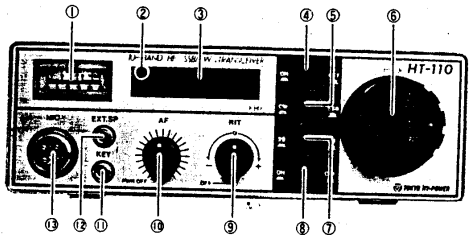
3-3-2 ADJUSTMENT OF TRANSMITTER/RECEIVER UNIT ---18

3-3-3 ADJUSTMENT OF PA UNIT ---22

3-4 FREQUENCY ADJUSTMENT ---24

1. EXPANATION OF FEATURES

Front panel



1 S/RF level meter

2 ON AIR pilot lamp (indicator)

3 Frequency dial indicator

4 Noise blanker switch

5 Mode switch

6 VFO knob

7 Frequency select switch (10m band only)

8 LOCK switch

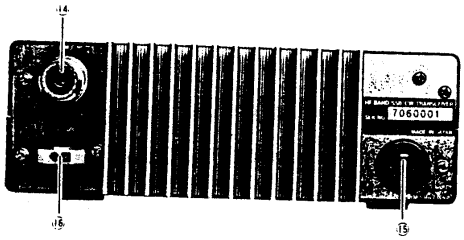
9 RIT knob

10 AF/POWER ON-OFF knob

11 KEY jack

12 EXT.SP jack

13 MIC connector



Rear Panel

14 Antenna connector

15 ACC connector

16 DC power

2. Operations

Receiver section

The receiving circuitry is an IF 9MHZ single conversion super heterodyne.

A signal entering the circuit from the antenna connector passes through the transmitter/receiver change-over relay (PL1), through B.P.F 1 and reaches gate 1 of RF AMP Q1 (3SK73Y).

The signal amplified at Q1 passes through B.P.F 2 and is mixed with a local oscillator signal. The mixed signal then is converted into an IF signal and passes the Q2 drain.

This signal passes through NB gate (D3,D4,1K40), the transmitter /receiver switching diode, and the SSB filter (F1.9M22C), and is sent to the IF AMP.

The IF AMP is a 3 stage straight amplifier 3SK73(Y). The amplified signal is applied to pin No.7 of the transmitting/receiving modulator/demodulator IC (IC1.SN76515). At the same time, the signal is detected by D12, D13 (1K60) and used as AGC voltage.

The IF signal applied to pin No.7 of IC1 (SN76515) is mixed with a signal (8.9985-9.0015MHZ) from BFO (Q21 2SC2668Y). The mixed signal is detected and relayed by pin No.8. L9, C11 filter draws low frequency elements only from the relayed signal, containing a large percentage of high frquency elements from B.F.O. The resulting signal passes through AF gain adjustment volume (VR6), then is applied to pin No.2 of IC3 (LM 380), and is amplified in order to drive the loudspeaker.

SSB transmitter

1. The input signal received by the microphone is amplified by IC2 (TA7137AP) and applied to pin No.7 of modulator IC (IC1 SN7615). A 9MHZ DSB signal produced at pin No.1 is then amplified at Q23 (25K192Y) and interpreted by transmitter/receiver switching diode D10 (IS 2076). It then passes SSB filter (F1), and is converted to an SSB signal.

   The 9MHZ SSB signal is mixed with a local oscillator signal by IC4 (SN 16913), then passes BPF 3, and is amplified through 4 stages of Q27 (2SK192Y), Q28 (2SK1959Y), Q29 (2SC2971) and Q30.31 (2SC-1969).

   Finally, the signal passes LPF1 and the transmitter/receiver switching relay, then exits through the ANT connector.

Transmitter/receiver circuit

Filter switching circuit

The SSB filter (F1) serves both transmitter and receiver purposes. While receiving, a forward direction current flows through D6 and D9 turns both of them on, as a reverse bias applied to D7 and D10 turns them off, thus allowing only receiver signals to pass through the filter. While transmitting, the above function is performed in the opposite direction.

Additionally, by using the optional CW filter, a DC voltage applied only to Q.18 base during CW transmitting turns D5, D8 on and D6, D7, D9, D10 off while CW receiving, allowing the signal to pass through the CW filter. During CW transmitting, D7, D10 are on and the others are turned off, allowing the signal to pass through the SSB filter.

S meter, Level meter circuit

Q35 bias is fixed by the differential amplifier 2SK192Y, and the variation of Q6 bias voltage is reflected on the meter. The level meter circuit operates on AGC voltage while receiving, and a DC signal from transmitting level while transmission.

BFO circuit

During CW transmitting on 3.5MHZ, and 7MHZ bands, a 9.000 MHZ quartz oscillator works at its natural mode. While receiving, it is shifted by -800HZ and during SBB it is shifted to -1.5KHZ.

On 14MHZ~28MHZ bands, 9.0015MHZ is produced for SSB, shifted by -800HZ during CW receiving, and shifted by -1.5KHZ to make 9.0000MHZ during transmitting.

Power and Transmitter/receiver circuit

Power voltage for all circuits with the exception of the final and driver stages is stabilized at 8V. D19, Q10 are circuits for stabilizing receiving conditions; D20, Q12 are for transmitting; D21 and Q13 are stabilizer circuits for the transmitter/receiver circuit. Switching from transmitter to receiver and vice versa is controlled by Q7, Q8, Q11.

Transmitter holding circuit

An "unlock" signal applied to Q33 base, when PLL circuit is unlocked, keeps the transmitter/receiver circuit to receiving state and then no further transmission signals are emitted.

Semi-break in circuit, Side-tone monitor circuit

A key-down in CW mode generates a transmitting condition. Q22 moves the IC1 balance and causes a BFO output signal at pin No.1. Simultaneously, Q25 gate of the side-tone monitor is turned on and

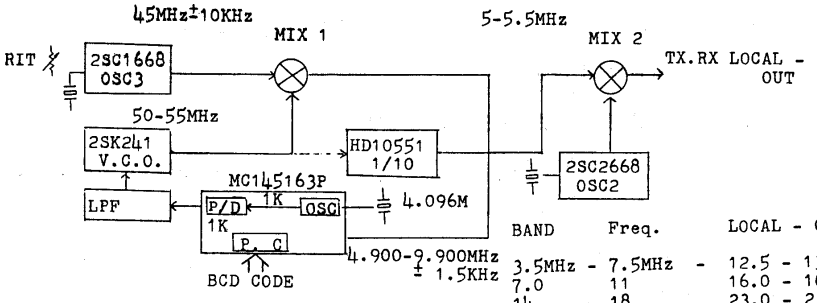
output from side-tone oscillator circuit Q24 is applied to IC3 input.

On/Off of Q16 corresponds to keying-variations, which controls Q27 drain voltage and Q28 base bias.

PLL section

The PLL system used in the HT-100 series controls PLL by the BCD code output from the UP/DOWN counter. A PLL output of 5MHZ band is mixed with a second oscillator frquency of each frequency band, to create the final local output of the PLL section.

BASIC PLL BLOCK DIAGRAM



BAND	Freq.	LOCAL - OUT
3.5MHz - 7.5MHz		12.5 - 13.0MHz
7.0	11	16.0 - 16.5
14	18	23.0 - 23.5
21	25	30.0 - 30.5
28	32.0	37.0 - 37.5
	32.5	37.5 - 38.0
	33.0	38.0 - 38.5
	33.5	38.5 - 39.0

1. PLL IC (MC145163P)

This IC contains a built-in reference oscillator, phase detector, and a programmable frequency divider.

The oscillator frequency is 4,096MHZ. The frequency divider divides this frequency by 1/4096. The resulting 1KHZ is then applied to the phase detector circuit (P/D).

2. Programmable counter

Frequency dividing ratio N is variable within the range of 4900~9900±15 by a BCD output from the UP/DOWN counter. The programmable counter receives an input of 4.900 9.900MHZ?15KHZ from mixer 1,and the result is applied to the phase detector circuit (P/D). The divided frequency is 1KHZ.

3. Phase detector circuit

The phase difference between the 1KHZ signal, which is 1/4096 of oscillator frequency 4.096MHZ, and the 1KHZ signal from the programmabl counter is compared to achieve phase difference inside of MC145163P. This passes an internal charge pump and is then applied to the loop filter.

4. Loop filter

The output signal from the phase detector circuit (P/D) is converted into a DC voltage by an integral circuit. This changes the voltage applied to the V.C.O vari-cap diode and also the V.C.O oscillator frequency.

5. V.C.O circuit

The capacitance of the variable-capacitance diode varies with the DC voltage applied to MV306 thus controlling the oscillator frequency. The variation range is 50,000 55,000MHZ 25KHZ.

6. Prescaler

50MHZ band frequency signal from V.C.O is divided by 1/10 to create a 5MHZ band signal.

7. RIT circuit

A range of±10KHZ is variable corresponding to 45,1MHZ inside th PLL loop.

First, a VXO quartz oscillator frequency of 15,033MHZ is generated, then multiplied 3 times to 45.1MHZ. A 1/10 pre-scaler connected to VCO output limits the actual variable range to ±1KHZ.

8. Mixer 1

The 50MHZ oscillator frequency from VCO is converted into the input frequency of the programmable counter. A 50MHZ band frequency and 45.1MHZ from the RIT circuit are mixed to create a frequency of 4.9~ 9.9MHZ.

9. Mixer 2, Buffer stage

The 5MHZ output from VCO divided by 1/10 and each band frequency from OSC 2 are mixed to produce the intended local OSC signal. This signal passes through the band-pass filter and buffer stage and is sent to the transmitter/receiver mixer.

10. Unlock circuit

Unlock of the PLL circuit generates a low level pulse output from PLL IC (MC145163P) No.28 pin, which is reversed and buffered at Q45, Q46.

The pulse output passes through CR integral circuit and becomes a high level DC voltage. This signal turns on the "no transmitting circuit" which allows no transmission of radio wave. Simultaneously, the signal cancels the dial display to indicate that the circuit is unlocked.

11. Dial circuit

The dial on this transceiver detects phase difference with an optical rotary encoder. The waveform is corrected by the IC32 (NJM 2904D) Schmidt circuit. Signal B from the encoder enters each clock of the up/down counter; encoder signal A directly reaches 1KHZ, 10KHZ, and 100KHZ digits of the up/down counter. The other 100HZ digit is controlled by the gate circuit IC33 (MSM 4011) and IC34 (NJM 2904D). The controller circuit IC33 and IC34 switches off IC21 during dial-lock mode.

Also, a quick frequency change function will operate when the dial is turned quickly. IC35 output pulses will increase when A clock pulses become quicker. When CR integral circuit voltage exceeds the IC34 threshold, IC21 stops its function and only the 3 top digits, IC18~20, are operated.

12. Display section

BCD signal from counters IC18~21 drives the decoder IC22~25. The decoder then lights the 7 segment LED displays, each corresponding to a digit, and displays the operating frequency.

While transmitting, a smaller LED, D78 light to indicate transmitting mode.

13. Power

A power input of 13.8V is converted into 8V by three terminal regulator IC NJM 7808.

This 8V voltage is wupplied to every section of the PLL unit.

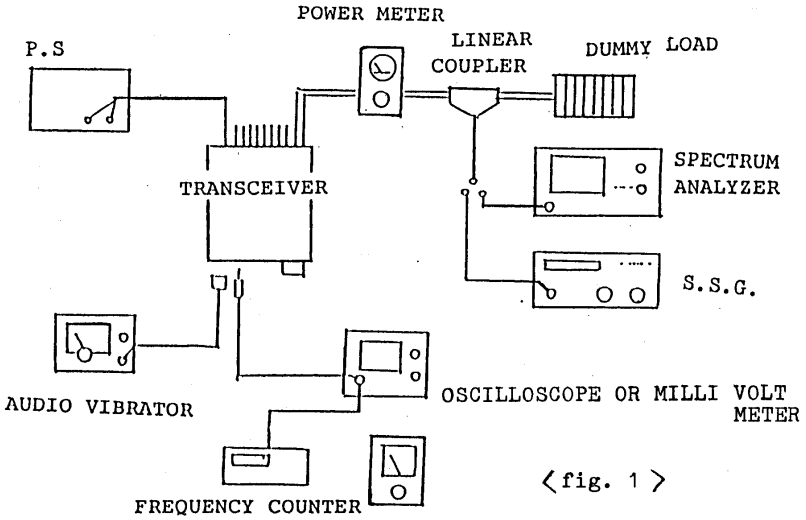
3. ADJUSTMENT

3-1. MEASURING APPARATUS REQUIRED FOR ADJUSTMENT

- Oscilloscope (about DC~50MHZ)
- Frequency counter (about 10~100MHZ; resolution 10HZ or over)
- Standard signal generator (S.S.G) (about 1M~50MHZ and stable)
- Spectrum analyzer (measurable up to 500MHZ)
- Tracking generator and measuring cable * (must synchronize with spectrum analyzer; used only for band pass filter adjustment)
- 50Ω dummy load (30W or over) or attenuator (20dB, 30W or over). Unnecessary if a termination power meter is available.
- Directional power meter or termination power meter
- audio oscillator
- Directional coupler or linear coupler (about -40dB)
- Power supply 13.8V 5.5A or over
- Resistor (8Ω, 1W)
- Circuit Tester

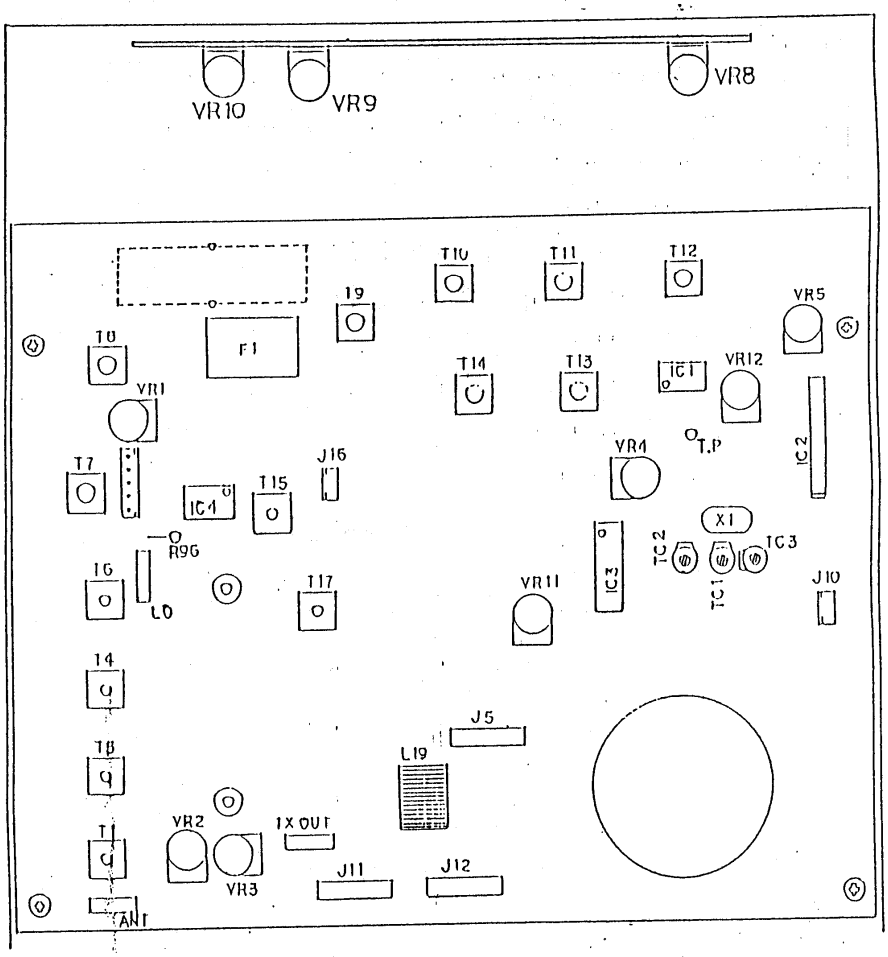
* reference in text

3-2. CONNECTION OF MEASURING APPARATUS FOR ADJUSTMENT



〈fig. 1〉

DIAGRAM OF TRANSMITTER/RECEIVER UNIT



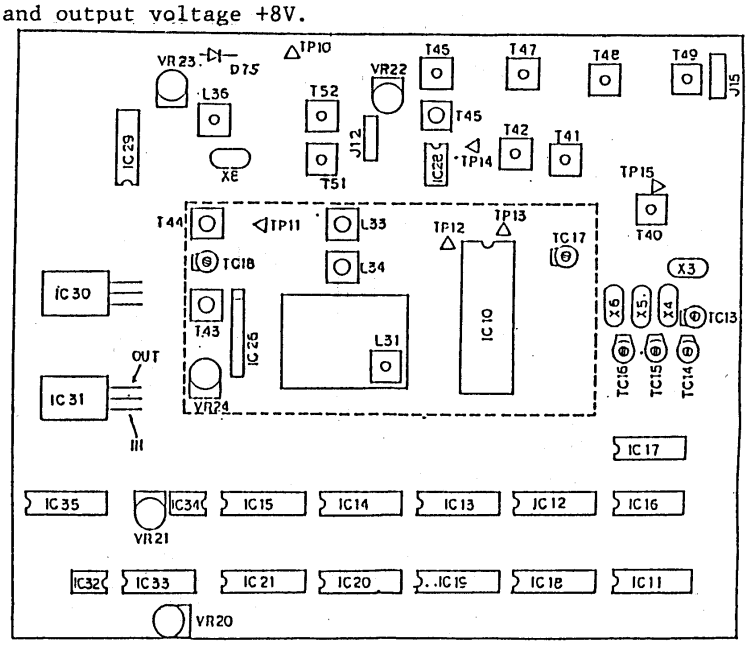
<fig. 2>

3-3. ADJUSTMENT DIRECTIONS

3-3-1. PLL UNIT

1. Confirmation of A.V.R (7808) function.

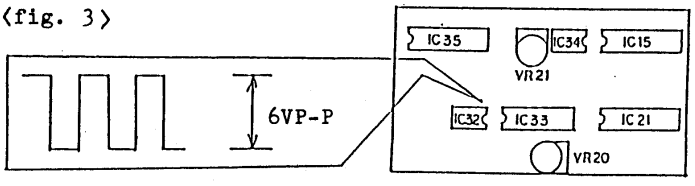
After turning the switch on, examine the input and output pin voltages of both IC30 and IC31. Confirm that the input voltage is +13.8V and output voltage +8V.



2. Adjustment of rotary encoder

Fix the oscilloscope probe on IC32 pin, and watch the waveform on the oscilloscope while turning VFO dial. The output waveform should be a 50% duty square wave as shown in ⟨fig.3⟩ with an output of approx. 6Vp-p. If not 50% duty, adjust VR20.

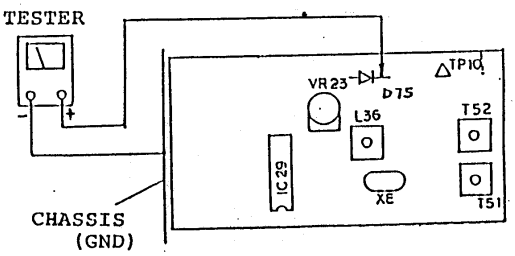
⟨fig. 3⟩



3. Adjustment of RIT circuit

Set the RIT knob on the front panel to 0. Measure and record the cathode voltage of D75. Then, turning RIT knob to off, adjust VR23 so that cathode voltage of D75 is same as that of RIT knob when it is set to 0 (approx. 4V).

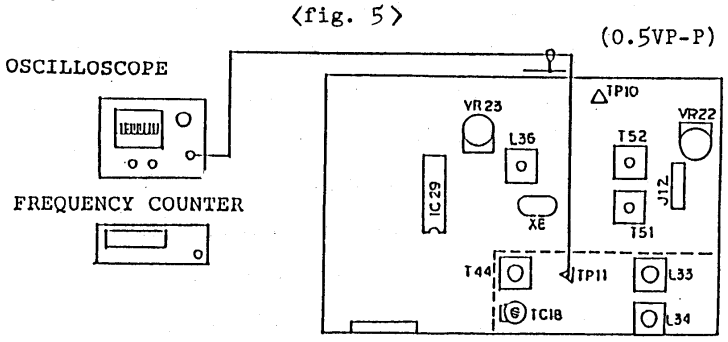
<fig. 4>



4. Adjustment of variable crystal oscillator (VXO)

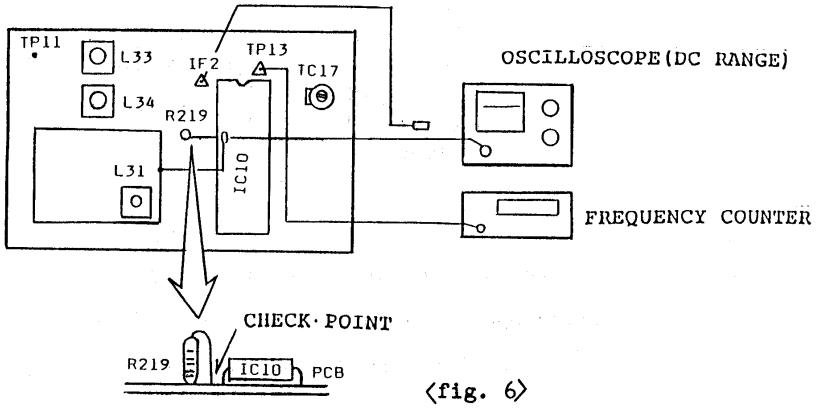
Fix the oscilloscope probe to TP11 and adjust T52, T51 so maximum level is obtained (usually around 0.5Vp-p). Then measure the TP11 signal frequency with a frequency counter. Adjust L36 so the frequency counter indicates 45.100MHZ (The frequency will be adjusted at final adjustment stage. Precise adjustment at this stage is not necessary.)

<fig. 5>



5. VCO adjustment

Set oscilloscope to DC measuring range. Fix probe to lead of R219 as shown in 〈fig.6〉. When PLL circuit is in unlock state, the frequency display on the transceiver will operate only faintly or not at all. The lead end voltage of R219 at this moment is 0V or 8V.



〈fig. 6〉

Then turn the L31 core either clockwise or counter-clock wise and set it at a point where the frequency display is bright. Adjust the VFO knob and set the frequency display to 0.000 or 5.000. Also, adjust L31 so the "check point" voltage is 3V.

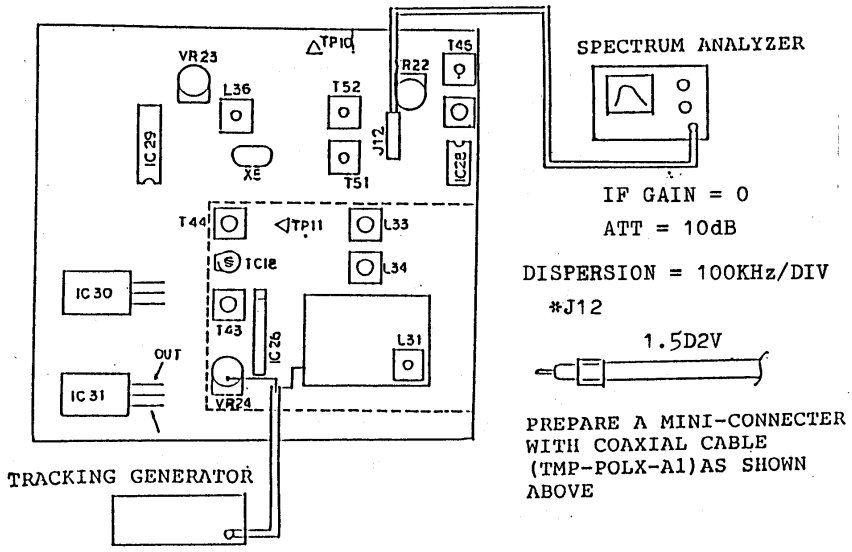
6. PLL loop filter L33 L34 adjustment

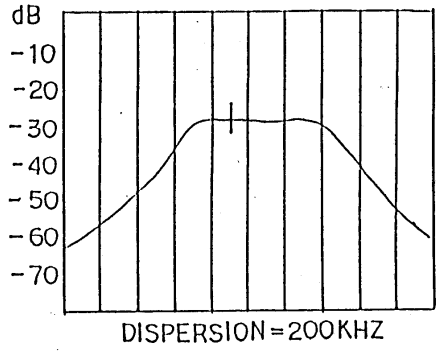
Fix oscilloscope probe to TP12 (see 〈fig.6〉). Adjust the VFO knob and set the frequency display to 4.900 or 9.900(HT-110, TR-110). Then adjust L33, L34 core to maximum level.

7. Standard frequency adjustment (4.096MHZ)

Fix oscilloscope probe to TP 13 (see 〈fig.6〉). Adjust TC17 and set frequency to 4.09600MHZ.

〈fig. 7〉





〈fig. 8〉 EXAMPLE OF BAND -PASS CHARACTERISTICS

8. Confirmation of quick frequency change circuitry function.

Observe frequency display (of transceiver) while turning the VFO knob. Check that the 100HZ digit changes when turned slowly, and 1KHZ or 10KHZ digit displays change when turned quickly.

9. Tracking adjustment of 1/10 frequency divider output band-pass filter.

Connect spectrum analyzer or oscilloscope to J12, and obtain a 5MHZ output. See that the output level difference within band is under 1dB. If not, adjust tracking as instructed below.

Connect spectrum analyzer to J12, and tracking generator output to VR24 main rotor as in 〈fig.7〉. Adjust T43, T44, TC18 so a flat frequency characteristic is obtained. An example of band-pass characteristics is shown in 〈fig.7〉.

10. Local oscillator circuit adjustment

Local oscillator frequencies of each band model are as shown in CHART 1. Adjustment for 3.5MHZ~21MHZ band models is as below.

a. Fix oscilloscope probe to TP15. Set oscillator level to slightly below maximum (T40 core position should be moved clockwise by 1/2~1 turn from maximum output point).

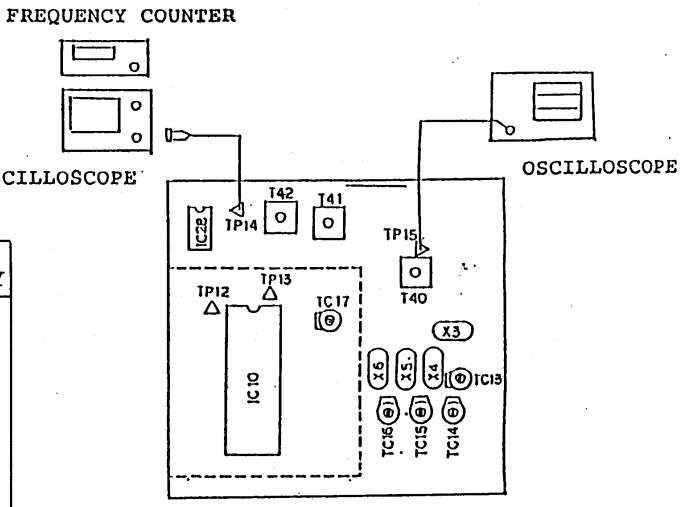


CHART 1

BAND	LO FREQUENCY
3.5MHz	7.5MHz
7MHz	11.0MHz
14MHz	18.0MHz
21MHz	25.0MHz
28MHz	32.0MHz
	32.5MHz
	33.0MHz
	33.5MHz

〈fig. 9〉

b. Connect oscilloscope probe to TP-14 and adjust T41, T42 cores so that voltage becomes 0.4Vp-p.

c. Reconnect probe to frequency counter and adjust TC-16 to obtain the corresponding oscillator frequency (see CHART 1).

11. Adjustment of 28MHZ band local oscillator circuit

4 oscillator xtals for local oscillator are built-in for 28MHZ band model. These xtals are switched automatically as band switch S5 and VFO dial are changed. S5 position, displayed frequency, and local oscillator frequency relations are shown in〈CHART 2.〉

Adjustments are as below.

a. Set band switch S5 to 29MHZ, and turn VFO dial so a frequency within 5.000~9.999 is displayed. Turn T40 core counter clockwise and adjust core head so that it is the same height as T40 video case.

b. Connect frequency counter probe to TP14 and turn T40 core slowly clockwise. Check that 33.5MHZ oscillator oscillates. Turn core clockwise for approx. 1/2 turn from this position.

CHART 2

BAND SWITCH S	FREQUENCY DISPLAY	LOCAL OSCILLATOR FREQUENCY
28····· ▬	0-4.999 5.000-9.999	32.0MHz 32.5MHz
29····· ▬	0-4.999 5.000-9.999	33.0MHz 33.5MHz

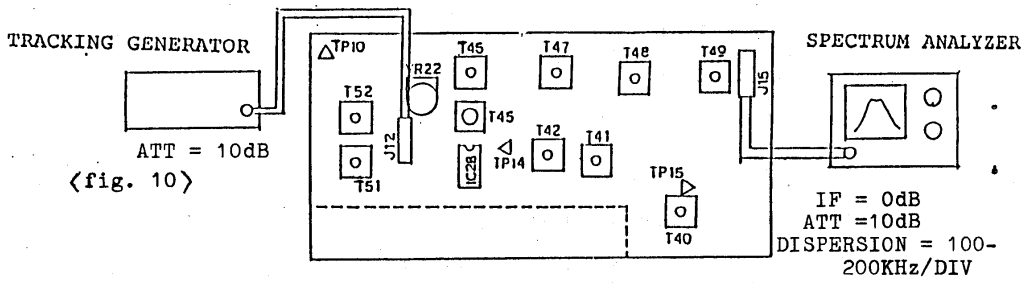
c. Check that other channels operate properly by moving band switch S5 and VFO dial.

d. Re-connect probe to oscilloscope and adjust T41, T42 until the 4 channel output levels are all equal, and 0.4Vp-p is obtained.

e. Adjust frequency of each channel by switching the band switch S5 and moving dials, switching all 4 channels.

12. Adjustment of BPF4, BPF5

Connect tracking generator to J12, and spectrum analyzer to J15.



〈fig. 10〉

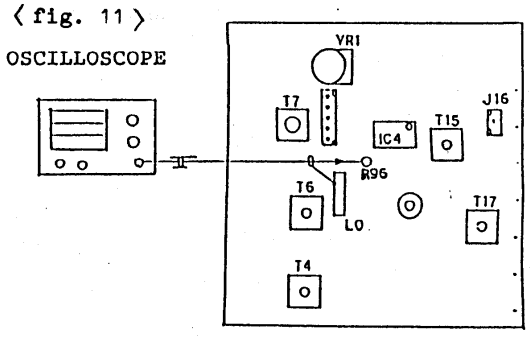
Adjust T46~T49 so band pass characteristic is flat. Band pass frequency of each model is as in〈CHART 3〉

Then, connect J15 and LO terminal of transmitter/receiver board with a coaxial cable. Connect oscilloscope probe to R96 lead and adjust VR24 so voltage is approx. 1Vp-p.

CHART 3

BAND	BPF FREQUENCY
3.5MHz	12.5-13MHz
7MHz	16.0-16.5MHz
14MHz	23.0-23.5MHz
21MHz	30.0-30.5MHz
28MHz	37.0-39MHz

〈fig. 11〉



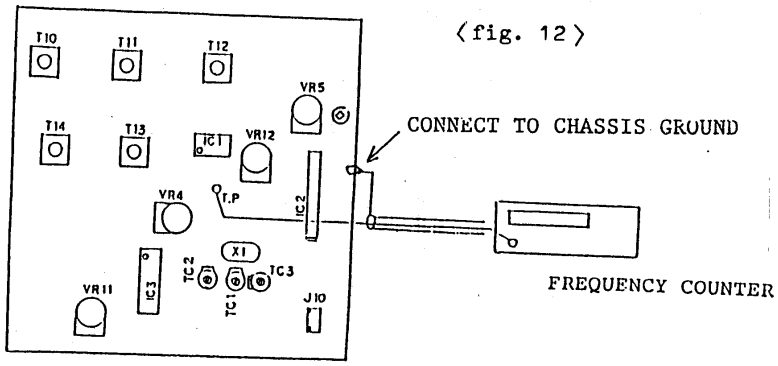
3-3-2 Adjustment of transmitter/receiver unit

1. Adjustment of carrier oscillator circuit

Connect frequency counter to test point (T.P.), and adjust carrier frequencies for SSB transmitting/receiving, CW receiving, and CW transmitting. Xtal oscillator frequencies per mode, transceiver frequency band are shown in〈CHART 4.〉

BAND	SSB/REC	CW RECEIVING	CW TRANSMITTING
3.5MHz	8.9785	8.9992	9.0000
7MHz	8.9985	8.9992	9.0000
14MHz	9.0015	9.0008	9.0000
21MHz	9.0015	9.0008	9.0000
28MHz	9.0015	9.0008	9.0000

CHART 4



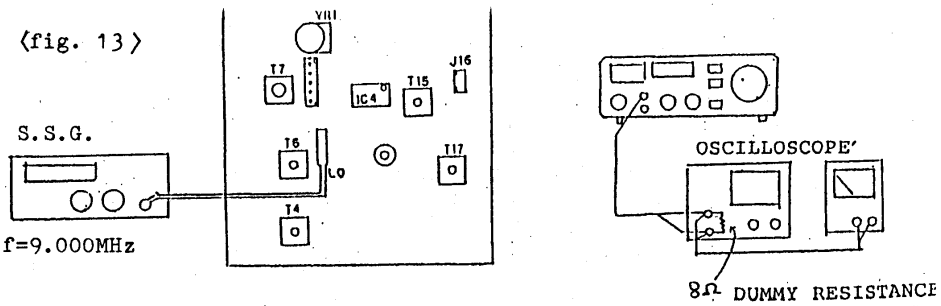
〈fig. 12〉

For example: 3.5,7MHZ bands. In CW transmitting, adjust TC3 to obtain 9.0000MHZ, and in CW receiving mode, adjust TC2 to obtain 8.9992MHZ. Then adjust TC1 for 8.9985MHZ in SSB mode.

2. 9MHZ IF Amp adjustment

As in diagram, connect SSG output to LO input terminal. Set S.S.G. frequency to 9.000MHZ, and connect, in parallel, 8Ω dummy resistor, oscilloscope, and MILLI VOLT METER to EXT SP terminal of transceiver.

〈fig. 13〉

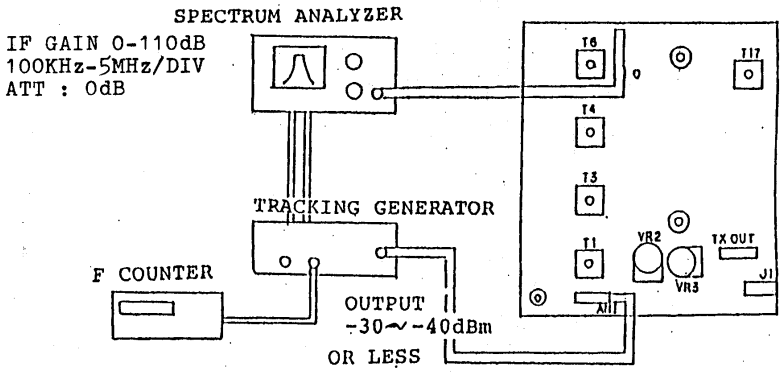


When a waveform is displayed on the oscilloscope, adjust T7~12 so that wave height is maximum.

When a signal becomes stronger, the AGC circuit prevents level from rising over a certain height. Therefore, adjust while lowering the S.S.G. signal. Properly functioning, the result should be+10dBμV or less for S+N/N=10dB.

3. Adjustment of Rx section B.P.F.

Connect tracking generator to ANT terminal, and spectrum analyzer to LO terminal as shown below. Also, a frequency counter is connected



〈fig. 14〉

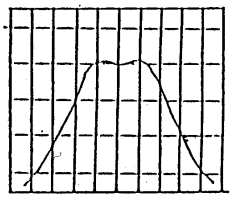
to the tracking gernerator to serve as a monitor. Keep tracking generator output to less than -30~-40dBm. and set the Dispersion of spectrum analyzer to an easy-to-see spot within 100KHZ~5MHZ/DIV range.

Adjust T1, T3, T4, T6 so the level difference within band is less than 2dB. Band-frequency range relation is shown in〈CHART 5.〉

CHART 5

BAND	FREQUENCY RANGE(MHz)
3.5MHz	3.5- 4.0
7MHz	7.0- 7.5
14MHz	14.0-14.5
21MHz	21.0-21.5
28MHz	28.0-30.0

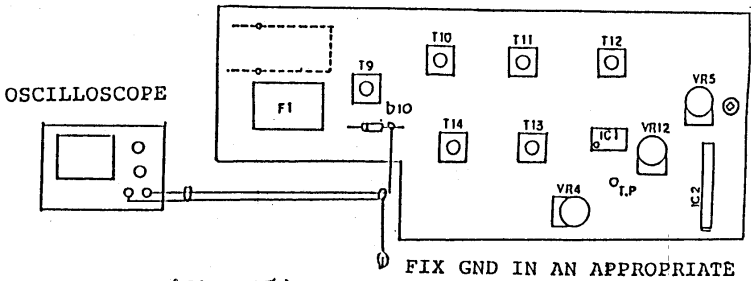
EXAMPLE OF CHARACTERISTIC



200KHz/DIV

4. Adjustment of 9MHZ generator output

Switch to CW mode, and plug electric key etc. to key jack to obtain a transmitting condition. The signal is picked up from D10 cathode. Turn VR12 completely clockwise, then adjust T13, T14 so output level is maximum.

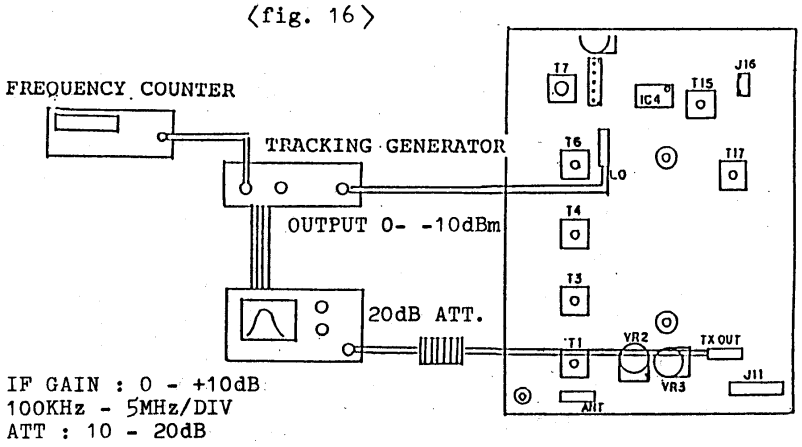


〈fig. 15〉

5. Adjustment of Tx section BPF

As indicated in 〈fig.16〉, connect tracking generator to LO terminal, and spectrum analyzer to Tx out terminal through a 20dB ATT connected in-between. Also, connect a frequency counter to tracking generator to serve as a monitor. Adjust output from tracking generator to 0~-10dBm, and set the dispersion of spectrum analyzer to an easy-to-see point within 100KHZ~5MHZ/DIV range.

〈fig. 16〉

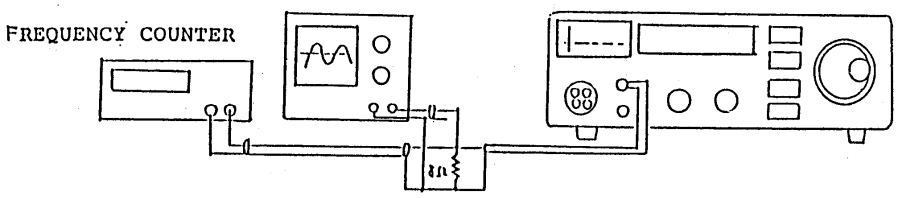


Then, adjust T15, T17 so the level difference within band is less than 1dB. See "3. Adjustment of RX sectionBB.P.F." for adjustment directions.

6. S meter circuit adjustment

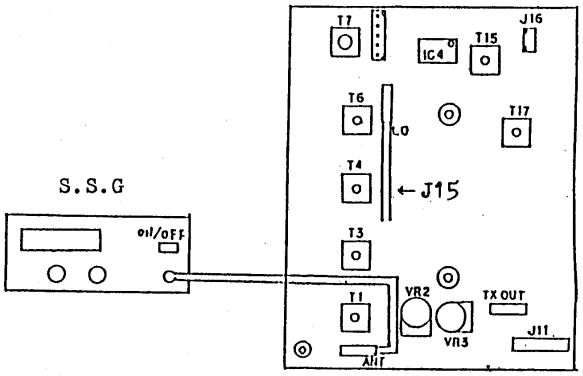
Connect an 8Ω dummy resistor and frequency counter and oscilloscope to EXT. SP jack as indicated in the diagram below.

〈fig. 17〉



Next, connect SSG to ANT terminal, and a LO output cable (J15) from PLL unit to LO terminal. Switch transceiver mode to SSB, and turn RIT off. By adjusting SSG frequency, set the output level at +32dBm. Adjust the transceiver's VFO knob and RIT knob so the received signal is 1KHZ during actual receiving. Then adjust VR3 until the S meter indicates S9. Turning off the SG output, adjust VR2 so the S meter indicator position is at the left end of the scale.

〈fig. 18〉



Repeat this adjustment procedure (+32dBμ→S9. OFF→ left end of scale) several times.

3-3-3 PA Unit adjustment

1. Adjustment of idling current

Connect a 1A ammeter between power source and power cable. Disconnect coaxial cable from "TX out" terminal of transitting/receiving board, and detach plug from PA control terminal J11. Switch transceiver mode to SSB, and plug the key into the Keyjack for transmitting mode. Assume the ammeter reading at this moment is I1. Next, insert plug into control terminal J11 to generate transmitting mode, and assume the ammeter reading at this moment is I2. I2-I1 is the approximate idling current. Adjust VR8 so the resulting current is approx. 400mA to 500mA.

2. PA output adjustment

Connect power meter to the antenna terminal on the rear panel of the transceiver. Switch to CW mode and turn VR12 transmitter/receiver board clockwise completely. Also, turn VR9, VR10 completely counter clockwise.

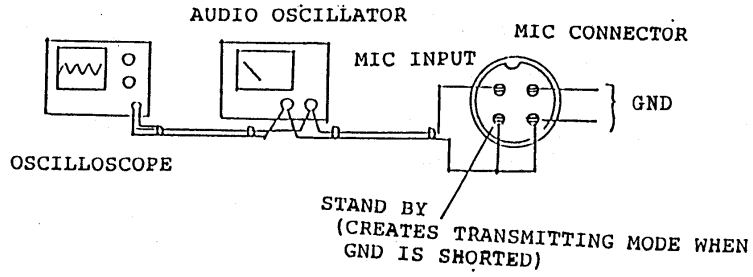
Generate transmitting mode by plugging key into jack, and turn VR12 gradually counter clockwise to produce a 10W output. Then, turn VR9 gradually clockwise to cut down output by 20 30%. Next, turn VR12 counter clockwise. Adjust T13 or T14 core (by turning counter clockwise) so the output, when VR12 is completely turned, is 20W (10W for Japan model).

3. Adjustment of output level meter

Adjust VR10 to obtain a meter reading of 20~25 on the output level scale during maximum output (20W).

4. Confirmation of mic amp circuit and carrier suppression adjustment.

Connect power meter and spectrum analyzer as indicated in〈fig,1〉. Switch to SSB mode and turn VR5 (mic gain adjusting volume) completely clock wise. Set audio oscillator frquency to 1KHZ, and connect output from oscillator to mic input pin of the mic connector.



〈fig. 19〉

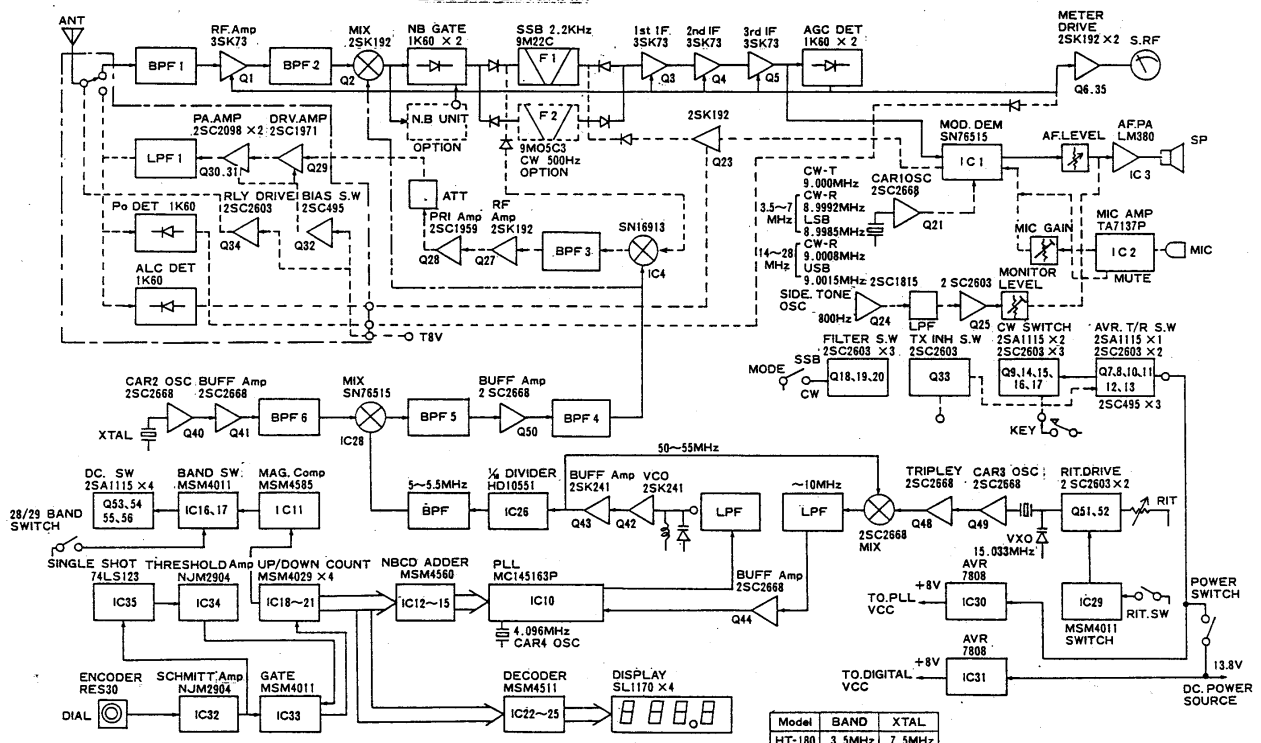
A transmitting mode is created when the stand-by pin is shorted to GND. By increasing the output level of audio oscillator a transmitter output is obtained. If the transmitter output is in a saturated condition when the mic input level is 50mV~70mV, the circuit is functioning normally.

While still in transmitting mode, short the mic input pin to GND. Adjust VR4 so that the signal appearing on spectrum analyzer at this moment (carrier omission) is minimum.

3-4 FREQUENCY ADJUSTMENT

Connect power meter and frequency counter as indicated in <fig.1>. By turning the VFO dial, adjust the displayed frequency of the transceiver to 0.000 (3.5MHZ band: 5.000). Switch to CW mode and transmit with a continuous carrier. Finally, delicately adjust the core of L36 so the frequency counter reading matches the frequency display reading.

BLOCK DIAGRAM



BAND \ PPL	LPF/fc	BPF 1	BPF 2	BPF 3	BPF 4	BPF 5	BPF 6
3.5MHz	4 MHz	3.5~ 4 MHz			12.5~13 MHz		7.5MHz
7 MHz	7.5MHz	7 ~ 7.5MHz			16 ~16.5MHz		11 MHz
14 MHz	14.5MHz	14 ~14.5MHz			23 ~23.5MHz		18 MHz
21 MHz	21.5MHz	21 ~21.5MHz			30 ~30.5MHz		25 MHz
28 MHz	30 MHz	28 ~30 MHz			37 ~39 MHz		32~33.5

Model	BAND	XTAL
HT-180	3.5MHz	7.5MHz
HT-140	7 MHz	11 MHz
HT-120	14 MHz	18 MHz
HT-115	21 MHz	25 MHz
HT-110	28 MHz	32 MHz
HT-110	28.5MHz	32.5MHz
HT-110	29 MHz	33 MHz
HT-110	29.5MHz	33.5MHz

HF BAND SSB/CW TRANSCEIVER

"100" SERIES

PARTS LIST

Tokyo Hy-Power Labs., Inc.

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
IC10	IC	MC145163P
IC11	IC	MSM4585BRS (28M)
IC12	IC	MSM4560RS
IC13	IC	MSM4560RS
IC14	IC	MSM4560RS
IC15	IC	MSM4560RS
IC16	IC	MSM4011BRS
IC17	IC	MSM4011BRS (28M)
IC18	IC	MSM4029BRS
IC19	IC	MSM4029BRS
IC20	IC	MSM4029BRS
IC21	IC	MSM4029BRS
IC26	IC	HD10551
IC27	IC	NJM78L05A
IC28	IC	SN76515
IC29	IC	MSM4011BRS
IC30	IC	AN7808
IC31	IC	AN7808
IC32	IC	NJM2904D
IC33	IC	MSM4011BRS
IC34	IC	NJM2904D
IC35	IC	74LS123
Q40	TRANSISTOR	2SC2668Y
Q41	TRANSISTOR	2SC2668Y
Q42	FET	2SK241~O
Q43	FET	2SK241~O
Q44	TRANSISTOR	2SC2668Y
Q45	TRANSISTOR	2SC2603E
Q46	TRANSISTOR	2SC2603E
Q47	TRANSISTOR	2SC2668Y
Q48	TRANSISTOR	2SC2668Y
Q49	TRANSISTOR	2SC2668Y
Q50	TRANSISTOR	2SC2668Y
Q51	TRANSISTOR	2SC2603E
Q52	TRANSISTOR	2SC2603E
Q53	TRANSISTOR	2SA1115E (28M)
Q54	TRANSISTOR	2SA1115E (28M)
Q55	TRANSISTOR	2SA1115E (28M)
Q56	TRANSISTOR	2SA1115E (28M)
Q57	TRANSISTOR	2SA1115E
D53	DIODE	1S2076 S2
D54	DIODE	1S2076 S2
D55	DIODE	1S2076 S2
D56	DIODE	1S2076 S2
D57	DIODE	MV306
D58	DIODE	MV306
D59	ZENER DIODE	HZ5C1
D62	DIODE	1S2076 S2
D63	DIODE	1S2076 S2

PLL UNIT

REF. NO.	DESCRIPTION	PART. NO.
D64	DIODE	1S2076 S2
D65	DIODE	1S2076 S2
D66	DIODE	1S2076 S2
D67	DIODE	1S2076 S2
D68	ZENER DIODE	HZ5C1
D69	ZENER DIODE	HZ5C1
D74	DIODE	MV306
D75	DIODE	1S2076 FA
D76	DIODE	1S2076 FA
X3	CRYSTAL	HC/18U(32.0) (28M)
X4	CRYSTAL	HC/18U(32.5) (28M)
X5	CRYSTAL	HC/18U(33.0) (28M)
X6	CRYSTAL	HC/18U(33.5) (28M)
	CRYSTAL	HC/18U(7.5) (3.5M)
	CRYSTAL	HC/18U(11.0MHZ) (7M)
	CRYSTAL	HC/18U(18.0) (14M)
	CRYSTAL	HC/18U(25.0) (21M)
X7	CRYSTAL	HC/18U(4.096MHZ)
X8	CRYSTAL	HC/18U(15.033MHZ)
VR20	TRIMMER	RVM083H10KB
VR21	TRIMMER	RVM083H10KB
VR22	TRIMMER	RVM083H10KB
VR23	TRIMMER	RVM083H10KB
VR24	TRIMMER	RVM083H2KB
R203	RESISTOR	8.2KΩF
R204	RESISTOR	27KF
R205	RESISTOR	680ΩF
R206	RESISTOR	100ΩF
R207	RESISTOR	100ΩF
R208	RESISTOR	5.6KΩF
R209	RESISTOR	27KF
R210	RESISTOR	100ΩF
R211	RESISTOR	100ΩF
R212	RESISTOR	10M15
R213	RESISTOR	4.7KF(28M)
R214	RESISTOR	4.7KF(28M)
R215	RESISTOR	4.7KF(28M)
R216	RESISTOR	4.7KF
R217	RESISTOR	100KF
R218	RESISTOR	100KF
R219	RESISTOR	1KF
R220	RESISTOR	4.7KF
R221	RESISTOR	33KF
R222	RESISTOR	47KF
R223	RESISTOR	470ΩF
R224	RESISTOR	50UΩF
R225	RESISTOR	10KF
R226	RESISTOR	470ΩF
R227	RESISTOR	3.3KF
R228	RESISTOR	470KF
R229	RESISTOR	100ΩF

PLL UNIT

REF. NO.	DESCRIPTION	PART. NO
R230	RESISTOR	10KF
R231	RESISTOR	1KF
R232	RESISTOR	10KF
R233	RESISTOR	82ΩF
R234	RESISTOR	47ΩF
R235	RESISTOR	220ΩF
R236	RESISTOR	10ΩM10
R238	RESISTOR	100KF
R239	RESISTOR	3.3KF
R240	RESISTOR	10ΩF
R241	RESISTOR	120KF
R242	RESISTOR	100ΩM12.5
R243	RESISTOR	10ΩF10
R244	RESISTOR	1KF
R245	RESISTOR	1KF
R246	RESISTOR	22KF
R247	RESISTOR	220ΩF
R248	RESISTOR	5.6KF
R249	RESISTOR	100ΩF
R250	RESISTOR	470ΩF
R251	RESISTOR	5.6KF
R252	RESISTOR	27KF
R253	RESISTOR	10ΩF
R254	RESISTOR	100ΩF
R255	RESISTOR	1KF
R256	RESISTOR	27KF
R257	RESISTOR	8.2KF
R259	RESISTOR	100KF
R260	RESISTOR	10KF
R261	RESISTOR	10KF
R262	RESISTOR	10KF
R263	RESISTOR	1KM10
R264	RESISTOR	10KF
R265	RESISTOR	50ΩF
R267	RESISTOR	1KF
R268	RESISTOR	4.7KF(28M)
R269	RESISTOR	10KF(28M)
R270	RESISTOR	4.7KF(28M)
R271	RESISTOR	10KF(28M)
R272	RESISTOR	4.7KF(28M)
R273	RESISTOR	10KF(28M)
R274	RESISTOR	4.7KF(28M)
R275	RESISTOR	10KF(28M)
R276	RESISTOR	10KM12.5
R277	RESISTOR	47KF
R278	RESISTOR	47KM12.5
R279	RESISTOR	47KF
R280	RESISTOR	47KF
R281	RESISTOR	47KF
R282	RESISTOR	47KM12.5
R283	RESISTOR	47KF
R284	RESISTOR	47KF
R285	RESISTOR	47KF
R286	RESISTOR	47KM12.5

PLL UNIT

REF. NO	DESCRIPTION	PART NO.
R287	RESISTOR	47KF
R288	RESISTOR	47KF
R289	RESISTOR	47KF
R294	RESISTOR	10KM12.5
R295	RESISTOR	5.1KF
R296	RESISTOR	100ΩF
R297	RESISTOR	330KF
R298	RESISTOR	3.3KF
R299	RESISTOR	10KF
R300	RESISTOR	5.1KF
R301	RESISTOR	330KF
R302	RESISTOR	3.3KM10
R303	RESISTOR	3.3KF
R304	RESISTOR	1KF
R305	RESISTOR	47KF
R306	RESISTOR	10KF
R307	RESISTOR	10KF
R308	RESISTOR	10KF
R309	RESISTOR	510ΩF
R310	RESISTOR	2.2KM10
R311	RESISTOR	3.9KF
R312	RESISTOR	1KF
R313	RESISTOR	220ΩF
R315	RESISTOR	10ΩM15
R316	RESISTOR	100ΩF
R317	RESISTOR	10ΩM12.5
R318	RESISTOR	3.3KF
R319	RESISTOR	10KF
R320	RESISTOR	3.3KF
R321	RESISTOR	47KF
R322	RESISTOR	10KF
R323	RESISTOR	100KF
R324	RESISTOR	3.3KF
R326	RESISTOR	510ΩF
R328	RESISTOR	3.3KF
C203	CERAMIC	ROU04F102Z
C204	CERAMIC	UAT05X103Z
C205	CERAMIC	RAU05SA151J (3.5M)
		RAU08CH101J (7M)
		RAU08CH101J (14M)
		RAU05CH270J (21M)
		RAU05CH270J (28M)
C206	CERAMIC	RAU06SA331K (3.5M)
		RAU05SA221K (7M)
		RAU05SA221K (14M)
		RAU05CH330J (21M)
		RAU05CH330J (28M)
C207	CERAMIC	RAU05SL101J (3.5M)
		RAU05SL101J (7M)
		RAU05SL510J (14M)
		RAU04SL270J (21M)
		RAU04SL270J (28M)
C208	ELECTROLYTIC	10μ25VSM
C209	CERAMIC	UAT05X103Z

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
C210	CERAMIC	RAU04SL220J
C211	CERAMIC	UAT05X103Z
C212	CERAMIC	RAU05SL101J (3.5M)
		RAU05SL101J (7M)
		RAU05SL510J (14M)
		RAU04SL270J (21M)
		RAU04SL270J (28M)
C213	CERAMIC	UAT05X103Z
C214	CERAMIC	RAU04SL010C
C215	CERAMIC	RAU05SL101J (3.5M)
		RAU05SL101J (7M)
		RAU05SL510J (14M)
		RAU04SL270J (21M)
		RAU04SL270J (28M)
C216	CERAMIC	RAU04SL100J (28M)
C217	CERAMIC	RAU04SL100J (28M)
C218	CERAMIC	RAU04SL100J (28M)
C219	CERAMIC	RAU04SL100J
C220	CERAMIC	UAT05X103Z (28M)
C221	CERAMIC	UAT05X103Z (
C222	CERAMIC	UAT05X103Z (
C223	CERAMIC	UAT05X103Z (
C224	CERAMIC	ROU04F102Z
C225	CERAMIC	RAU05SA151J
C226	CERAMIC	RAU04CH050C
C227	ELECTROLYTIC	22μ16VSM
C228	CERAMIC	ROU04F102Z
C229	CERAMIC	RAU05CH200J
C230	CERAMIC	RAU04CH100J
C231	CERAMIC	UAT05X103Z
C232	CERAMIC	RAU04CH050C
C233	ELECTROLYTIC	100μ10VSM
C234	ELECTROLYTIC	22μ16VSM
C235	CERAMIC	ROU04F102Z
C236	TANTALUM	CS15E1V0R1M
C237	TANTALUM	CS15E1C3R3M
C238	CERAMIC	ROU04F102Z
C239	CERAMIC	ROU04F102Z
C240	CERAMIC	RAU05SA151J
C241	CERAMIC	RAU05SA151J
C242	CERAMIC	RAU05SA151J
C243	CERAMIC	RAU05SA151J
C244		
C245	CERAMIC	UAT05X103Z
C246	CERAMIC	UAT05X103Z
C247	CERAMIC	UAT05X103Z
C248	CERAMIC	UAT05X103Z
C249	CERAMIC	RAU05CH330J
C250	CERAMIC	UAT05X103Z
C251	CERAMIC	UAT05X103Z
C252	CERAMIC	UAT05X103Z
C253	CERAMIC	UAT05X103Z
C254	CERAMIC	UAT05X103Z
C255	CERAMIC	UAT05X103Z
C256	CERAMIC	UAT05X103Z

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
C257	CERAMIC	UAT05X103Z
C258	CERAMIC	UAT05X103Z
C259	CERAMIC	UAT05X103Z
C260	CERAMIC	UAT05X103Z
C261	CERAMIC	UAT05X103Z
c262	CERAMIC	RAU04F102Z
C263	CERAMIC	RAU04F102Z
C264	ELECTROLYTIC	10μ25VSM
C265	ELECTROLYTIC	10μ25VSM
C266	CERAMIC	RAU04F102Z
C267	CERAMIC	RAU08SL181J
C268	CERAMIC	RAU08SL181J
C269	CERAMIC	UAT05X103Z
C270	CERAMIC	UAT05X103Z
C271	CERAMIC	UAT05X103Z
C272	CERAMIC	UAT05X103Z
C273	CERAMIC	UAT05X103Z
C274	CERAMIC	UAT05X103Z
C275	CERAMIC	UAT05X103Z
C276	CERAMIC	UAT05X103Z
C277	CERAMIC	UAT05X103Z
C278	CERAMIC	RAU04SL330J (3.5M)
		RAU04SL100J (7M)
		RAU04SL100J (14M)
		RAU04SL200J (21M)
		RAU04SL100J (28M)
C279	CERAMIC	RAU05SL820J (3.5M)
		RAU05SL510J (7M)
		RAU04SL220J (14M)
		RAU04SL390J (21M)
		RAU04SL220J (28M)
C280	CERAMIC	RAU05SL820J (3.5M)
		RAU05SL510J (7M)
		RAU04SL220J (14M)
		RAU04SL390J (21M)
		RAU04SL220J (28M)
C281	CERAMIC	RAU05SL101J

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
C282	CERAMIC	RAU05SL820J (3. 5M) RAU05SL510J (7M) RAU04SL270J (14M) RAU04SL390J (21M) RAU04SL220J (28M)
C283	CERAMIC	RAU04SL330J (3. 5M) RAU04SL100J (7M) RAU04SL100J (14M) RAU04SL200J (21M) RAU04SL100J (28M)
C284	CERAMIC	UAT05X103Z
C285	CERAMIC	RAU04SL330J (3. 5M) RAU04SL100J (7M) RAU04SL100J (14M) RAU04SL200J (21M) RAU04SL100J (28M)
C286	CERAMIC	UAT05X103Z
C287	CERAMIC	ROU04F102Z
C288	CERAMIC	UAT05X103Z
C289	CERAMIC	UAT05X103Z
C290	CERAMIC	RAU04SL060C
C291	CERAMIC	RAU04SL150J
C292	CERAMIC	UAT05X103Z
C293	CERAMIC	RAU04SL010C
C294	CERAMIC	RAU04SL150J
C295	ELECTROLYTIC	10μ25VSM
C296	CERAMIC	RAU05SL470J
C297	CERAMIC	UAT05X103Z
C299	CERAMIC	UAT05X103Z
C300	CERAMIC	RAU05SA151J
C301	CERAMIC	RAU05SA151J
C302	ELECTROLYTIC	10μ25VSM
C303	CERAMIC	RAU05SA151J
C304	CERAMIC	ROU04F102Z
C305	ELECTROLYTIC	10μ25VSM
C307	ELECTROLYTIC	10μ25VSM
C308	CERAMIC	UAT05X103Z (28M)
C309	ELECTROLYTIC	10μ25VSM
C310	CERAMIC	UAT05X103Z
C311	CERAMIC	UAT05X103Z
C312	CERAMIC	UAT05X103Z
C313	CERAMIC	UAT05X103Z
C314	CERAMIC	ROU04F102Z
C319	CERAMIC	ROU04F102Z
C320	CERAMIC	ROU04F102Z
C321	CERAMIC	ROU04F102Z
C322	CERAMIC	ROU04F102Z
C323	ELECTROLYTIC	10μ25VSM
C324	ELECTROLYTIC	10μ25VSM
C325	ELECTROLYTIC	10μ25VSM
C326	ELECTROLYTIC	10μ25VSM
C327	ELECTROLYTIC	1μ50VSMB

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
C328	ELECTROLYTIC	10μ25VSM
C329	ELECTROLYTIC	10μ25VSM
C330	ELECTROLYTIC	10μ25VSM
C331	ELECTROLYTIC	220μ25VSM
C332	ELECTROLYTIC	470μ16VSM
C333	CERAMIC	UAT10X104Z
C334	CERAMIC	UAT05X103Z
C335	CERAMIC	UAT05X103Z
C336	CERAMIC	UAT05X103Z
C337	CERAMIC	UAT05X103Z
C338	CERAMIC	UAT05X103Z
C339	CERAMIC	UAT05X103Z
C340	CERAMIC	UAT05X103Z
C341	CERAMIC	UAT05X103Z
C342	CERAMIC	UAT05X103Z
C343	CERAMIC	UAT05X103Z
C344	CERAMIC	UAT05X103Z
C345	ELECTROLYTIC	10μ25VSM
C501	CERAMIC	UAT05X103Z
C502	CERAMIC	ROU04F102Z
C506	ELECTROLYTIC	100μ10VSMB
TC13	CERAM. TRIMMER	CV05E3001(28M)
TC14	CERAM. TRIMMER	CV05E3001(28M)
TC15	CERAM. TRIMMER	CV05E3001(28M)
TC16	CERAM. TRIMMER	CV05E3001
TC17	CERAM. TRIMMER	CV05E5001
TC18	CERAM. TRIMMER	CV05E5001
T40	RF TRANS	THP-7R-090(3.5M) THP-7R-020(7M) THP-7I-030(14M) THP-7I-030(21M) THP-7R-040(28M)
T41	RF TRANS	THP-7R-090(3.5M) THP-7R-020(7M) THP-7I-030(14M) THP-7I-030(21M) THP-7R-040(28M)
T42	RF TRANS	THP-7R-090(3.5M) THP-7R-020(7M) THP-7I-030(14M) THP-7I-030(21M) THP-7R-040(28M)
T43	RF TRANS	THP-7R-090
T44	RF TRANS	THP-7R-090
T45	RF TRANS	THP-7R-080

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
T46	RF TRANS	THP-7R-020 (3. 5M)
		THP-7R-020 (7M)
		THP-7I-030 (14M)
		THP-7R-040 (21M)
		THP-7R-040 (28M)
T47	RF TRANS	THP-7R-020 (3. 5M)
		THP-7R-020 (7M)
		THP-7I-030 (14M)
		THP-7R-040 (21M)
		THP-7R-040 (28M)
T48	RF TRANS	THP-7R-020 (3. 5M)
	RF TRANS	THP-7R-020 (7M)
		THP-7I-030 (14M)
		THP-7R-040 (21M)
		THP-7R-040 (28M)
T49	RF TRANS	THP-7R-020 (3. 5M)
		THP-7R-020 (7M)
		THP-7I-030 (14M)
		THP-7R-040 (21M)
		THP-7R-040 (28M)
T50	1:4TRANS	FBH22UEW023TB
T51	RF TRANS	THP-7R-040
T52	RF TRANS	THP-7R-040
L30	INDUCTOR	FL5H221K
L31	RF COIL	THP-7R-111
L32	INDUCTOR	FL5H221K
L33	RF COIL	THP-7R-070
L34	RF COIL	THP-7R-070
L35	RF COIL	VH40UEW0430T
L36	RF COIL	THP-7R-131
L39	SN COIL	SN-3-200
1026M05	VCO SHIELD CASE TYPE B	
1026M09	VCO SHIELD CASE TYPE A	
1026M12	PLL SHIELD CASE TYPE B(28M)	
1026M13	PLL SHIELD CASE TYPE A(28M)	
1026B04	PCB. BOARD	PC1084
J1	PIN BLOCK	PI25C06M
J2	PIN BLOCK	PI25C06M
J3	PIN BLOCK	PI25C06M
J4	PIN BLOCK	PI25C06M
J6	PIN BLOCK	PI25C05M
J7	PIN BLOCK	PI25C04M
J8	PIN BLOCK	PI25C03M
J12	PIN BLOCK	PI25C06M
J15	MINI JACK	TMP-J01X-A2
J17	MINI JACK	TMP-J01X-A2
J18	PIN BLOCK	PI25C02M

DISPLAY UNIT

REF. NO.	DESCRIPTION	PART NO.
IC22	IC	MSM4511BRS
IC23	IC	MSM4511BRS
IC24	IC	MSM4511BRS
IC25	IC	MSM4511BRS
D70	7SEGMENT LED	SL2170(G)
D71	7SEGMENT LED	SL2170(G)
D72	7SEGMENT LED	SL2170(G)
D73	7SEGMENT LED	SL2170(G)
D78	LED	TLG102A
R290	T. F. R. NETWARK	RA7DS1K14P
R291	T. F. R. NETWARK	RA7DS1K14P
R292	T. F. R. NETWARK	RA7DS1K14P
R293	T. F. R. NETWARK	RA7DS1K14P
R314	RESISTOR	1KM10
C315	CERAMIC	UAT05X103Z
C316	CERAMIC	UAT05X103Z
C317	CERAMIC	UAT05X103Z
C318	CERAMIC	UAT05X103Z
1026B05	PC BOAD	PC1085
1026B06	PC BOAD	PC1086

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
IC1	IC	SN76515
IC2	IC	TA7137P
IC3	IC	LM380N
IC4	IC	SN16913
Q1	FET	3SK73Y
Q2	FET	2SK192AY
Q3	FET	3SK73Y
Q4	FET	3SK73Y
Q5	FET	3SK73Y
Q6	FET	2SK192AY
Q7	TRANSISTOR	2SA1115E
Q8	TRANSISTOR	2SC2603E
Q9	TRANSISTOR	2SC2603E
Q10	TRANSISTOR	2SC3419
Q11	TRANSISTOR	2SC2603E
Q12	TRANSISTOR	2SC3419
Q13	TRANSISTOR	2SC3419
Q14	TRANSISTOR	2SA1115E
Q15	TRANSISTOR	2SC2603E
Q16	TRANSISTOR	2SA1115E
Q17	TRANSISTOR	2SC2603E
Q18	TRANSISTOR	2SC2603E
Q19	TRANSISTOR	2SC2603E
Q20	TRANSISTOR	2SC2603E
Q21	TRANSISTOR	2SC2668Y

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
Q22	TRANSISTOR	2SC2603E
Q23	FET	2SK192AY
Q24	TRANSISTOR	2SC1815GR
Q25	TRANSISTOR	2SC2603E
Q27	FET	2SK192AY
Q28	TRANSISTOR	2SC1959Y
Q33	TRANSISTOR	2SC2603E
Q35	FET	2SK192AY
D3	DIODE	1K60UF
D4	DIODE	1K60UF
D5	DIODE	1S2076FJ
D6	DIODE	1S2076FJ
D7	DIODE	1S2076F2
D8	DIODE	1S2076FA
D9	DIODE	1S2076S2
D10	DIODE	1S2076FJ
D11	DIODE	1S2076S2
D12	DIODE	1K60UF
D13	DIODE	1K60UF
D14	DIODE	1S2076S2
D15	DIODE	1K60UF
D16	DIODE	1K60UF
D17	DIODE	1S2076FA
D18	DIODE	1S2076S2
D19	ZENER DIODE	HZ9B2
D20	ZENER DIODE	HZ9B2
D21	ZENER DIODE	HZ9B2
D22	DIODE	1S2076S2
D23	DIODE	1S2076FA
D24	DIODE	1S2076S2
D25	DIODE	1S2076S2
D28	DIODE	1S2076S2
D30	DIODE	1S2076S2
D34	DIODE	1S2076S2
D38	DIODE	1N5402
D39	DIODE	1S2076S2
F1	XTAL FILTER	9M22C
X1	CRYSTAL	HC/18U 9.0000MHZ(3.5M~7M)
		HC/18U 9.0015MHZ(14~28M)
VR1	TRIMMER	RVM083H10KB
VR2	TRIMMER	RVM083H2KB
VR3	TRIMMER	RVM083H2KB
VR4	TRIMMER	RVM083H5KB
VR5	TRIMMER	RVM083H10KB
VR11	TRIMMER	RVM083H10KB
VR12	TRIMMER	RVM083H5KB
R1	RESISTOR	100KF
R2	RESISTOR	10KF
R3	RESISTOR	22KF
R4	RESISTOR	100ΩF
R5	RESISTOR	100ΩF
R6	RESISTOR	470KF

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
R7	RESISTOR	2.2KF
R8	RESISTOR	100ΩM12.5
R9	RESISTOR	2.2KF
R10	RESISTOR	2.2KF
R12	RESISTOR	100ΩF
R13	RESISTOR	100ΩM10
R14	RESISTOR	100ΩP
R15	RESISTOR	100ΩF
R16	RESISTOR	100ΩM10
R17	RESISTOR	1KF
R18	RESISTOR	1KF
R19	RESISTOR	10KF
R20	RESISTOR	10KF
R21	RESISTOR	2.2KF
R22	RESISTOR	100ΩM10
R23	RESISTOR	100KF
R24	RESISTOR	1KF
R25	RESISTOR	22KM12.5
R26	RESISTOR	220ΩF
R27	RESISTOR	1KF
R28	RESISTOR	100KF
R29	RESISTOR	22KF
R30	RESISTOR	22KM12.5
R31	RESISTOR	100ΩF
R32	RESISTOR	100ΩF
R33	RESISTOR	100KF
R34	RESISTOR	22KF
R35	RESISTOR	22KM12.5
R36	RESISTOR	100ΩF
R37	RESISTOR	100ΩF
R38	RESISTOR	100KF
R39	RESISTOR	150KP
R41	RESISTOR	2.2KF
R42	RESISTOR	2.2KF
R43	RESISTOR	10ΩF
R44	RESISTOR	10KF
R45	RESISTOR	1KF
R46	RESISTOR	10KF
R47	RESISTOR	1KM15
R48	RESISTOR	1KF
R49	RESISTOR	10KF
R50	RESISTOR	10KF
R51	RESISTOR	3.3KF
R52	RESISTOR	10KF
R53	RESISTOR	10KF
R54	RESISTOR	3.3KF
R55	RESISTOR	10KF
R56	RESISTOR	4.7KF
R57	RESISTOR	2.7KF
R58	RESISTOR	2.7KF
R59	RESISTOR	10KF
R60	RESISTOR	10KF
R61	RESISTOR	1KF
R62	RESISTOR	3.3KM10

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
R63	RESISTOR	3.3KF
R64	RESISTOR	47KF
R65	RESISTOR	470ΩF
R66	RESISTOR	2.7KP
R67	RESISTOR	33KM10
R68	RESISTOR	12KF
R69	RESISTOR	56KF
R70	RESISTOR	4.7KF
R71	RESISTOR	4.7KF
R72	RESISTOR	100ΩF
R73	RESISTOR	330ΩF
R74	RESISTOR	2.2KF
R75	RESISTOR	3.3KF
R76	RESISTOR	10KF
R77	RESISTOR	100KF
R78	RESISTOR	3.3Ω1/2WF
R79	RESISTOR	18KF
R80	RESISTOR	18KF
R81	RESISTOR	18KF
R82	RESISTOR	150KF
R83	RESISTOR	100ΩF
R84	RESISTOR	3.3KF
R85	RESISTOR	6.8KF
R86	RESISTOR	33KF
R87	RESISTOR	33KF
R88	RESISTOR	6.8KM10
R89	RESISTOR	2.7KF
R90	RESISTOR	33KF
R91	RESISTOR	100ΩF
R92	RESISTOR	2.2KF
R94	RESISTOR	10KF
R96	RESISTOR	470ΩF
R97	RESISTOR	100ΩF
R98	RESISTOR	100KF
R99	RESISTOR	100ΩF
R100	RESISTOR	100ΩF
R101	RESISTOR	510ΩF
R102	RESISTOR	510ΩF
R117	RESISTOR	470ΩF
R118	RESISTOR	10KF
R119	RESISTOR	1KM15
R120	RESISTOR	1KM10
R121	RESISTOR	510ΩF
R122	RESISTOR	510ΩF
R124	RESISTOR	10KM15
R130	RESISTOR	1KF
R131	RESISTOR	1KM10
R132	RESISTOR	10ΩF
R135	RESISTOR	10ΩM10

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
R136	RESISTOR	1KP
R137	RESISTOR	1KM10
R138	RESISTOR	2. 2ΩM15
R139	RESISTOR	1KF
R140	RESISTOR	100ΩF (3. 5M)
		150ΩF (7M, 14M)
		220ΩF (21M, 28M)
R141	RESISTOR	150ΩF (3. 5M)
		100ΩF (7M)
		33ΩF (14M)
		22ΩF (21M, 28M,)
R142	RESISTOR	100ΩF (3. 5M)
		150ΩF (7M, 14M,)
		220ΩF (21M, 28M)
R143	RESISTOR	10ΩF
R144	RESISTOR	10ΩM10
R145	RESISTOR	10ΩM10
R146	RESISTOR	10ΩM10
R147	RESISTOR	10ΩM10
R148	RESISTOR	10ΩM10
R149	RESISTOR	100KF
R150	RESISTOR	5. 6KF (3. 5, 7M)
		4. 7KF (14, 21M)
R151	RESISTOR	1. 5KF (3. 5M)
		3. 3KF (7, 14, 21, 28M)
R152	RESISTOR	1KM10
R153	RESISTOR	100ΩM10
R154	RESISTOR	2. 2ΩF
R155	RESISTOR	4. 7KF
R156	RESISTOR	4. 7KF
R157	RESISTOR	10ΩM10
R158	RESISTOR	1KF
R159	RESISTOR	1KP
TC1	TRIMMER	CV05E5001
TC2	TRIMMER	CV05E5001
TC3	TRIMMER	CV05E3001
C1	CERAMIC	RAU06SL151J (3. 5M)
		RAU05SL820J (7M)
		RAU05SL680J (14M)
		RAU04SL330J (21M)
		RAU04SL150J (28M)
C2	CERAMIC	RAU06SL151J (3. 5M)
		RAU05SL820J (7M)
		RAU05SL680J (14M)
		RAU04SL330J (21M)
		RAU04SL150J (28M)
C3	CERAMIC	RAU06SL151J (3. 5M)
		RAU05SL560J (7M)
		RAU04SL220J (14M)
		RAU04SL150J (21M)
		RAU04SL100J (28M)
C5	CERAMIC	RAU04F102Z

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
C8	CERAMIC	UAT05X103Z
C9	CERAMIC	UAT05X103Z
C10	CERAMIC	RAU06SL151J (3.5M)
		RAU05SL820J (7M)
		RAU05SL680J (14M)
		RAU04SL330J (21M)
		RAU04SL150J (28M)
C11	CERAMIC	RAU06SL151J (3.5M)
		RAU05SL820J (7M)
		RAU05SL680J (14M)
		RAU04SL330J (21M)
		RAU04SL150J (28M)
C12	CERAMIC	RAU06SL151J (3.5M)
		RAU05SL560J (7M)
		RAU04SL220J (14M)
		RAU04SL150J (21M)
		RAU04SL100J (28M)
C15	CERAMIC	UAT05X103Z
C16	CERAMIC	ROU04F102Z
C17	CERAMIC	ROU04F102Z
C18	CERAMIC	RAU04SL100J
C19	CERAMIC	RAU05SL101J
C20	CERAMIC	UAT05X103Z
C21	CERAMIC	ROU04F102Z
C22	CERAMIC	ROU04F102Z
C23	CERAMIC	UAT05X103Z
C24	CERAMIC	ROU04F102Z
C25	CERAMIC	RAU05SL101J
C26	CERAMIC	UAT05X103Z
C28	CERAMIC	UAT05X103Z
C29	CERAMIC	ROU04F102Z
C30	CERAMIC	ROU04F102Z
C31	CERAMIC	ROU04F102Z
C32	CERAMIC	UAT05X103Z
C33	CERAMIC	UAT05X103Z
C34	CERAMIC	UAT05X103Z
C35	CERAMIC	ROU04F102Z
C36	CERAMIC	RAU04SL330J
C37	CERAMIC	UAT05X103Z
C38	CERAMIC	UAT05X103Z
C39	CERAMIC	UAT05X103Z
C40	CERAMIC	RAU05SL101J
C41	CERAMIC	RAU05SL101J
C42	CERAMIC	UAT05X103Z
C43	CERAMIC	UAT05X103Z
C44	CERAMIC	RAU05SL101J
C45	CERAMIC	UAT05X103Z
C46	CERAMIC	ROU04F102Z
C47	CERAMIC	UAT05X103Z
C48	CERAMIC	UAT05X103Z
C49	CERAMIC	RAU05SL101J
C50	CERAMIC	UAT05X103Z
C51	CERAMIC	ROU04F102Z
C52	CERAMIC	UAT05X103Z

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
C53	CERAMIC	UAT05X103Z
C54	CERAMIC	RAU05SL101J
C55	CERAMIC	RAU04SL220J
C56	CERAMIC	UAT05X103Z
C57	CERAMIC	ROU04F102Z
C58	CERAMIC	UAT05X103Z
C59	ELECTROLYTIC	33μ16VSM
C60	CERAMIC	UAT05X103Z
C61	CERAMIC	UAT05X103Z
C62	CERAMIC	UAT05X103Z
C63	CERAMIC	UAT05X103Z
C65	CERAMIC	UAT05X103Z
C66	CERAMIC	UAT05X103Z
C67	ELECTROLYTIC	47μ10VSM
C68	ELECTROLYTIC	10μ25VSM
C69	CERAMIC	UAT05X103Z
C70	ELECTROLYTIC	1μ50VSM
C71	CERAMIC	UAT05X103Z
C72	ELECTROLYTIC	1μ50VSM
C73	ELECTROLYTIC	10μ25VSM
C74	ELECTROLYTIC	10μ25VSM
C75	ELECTROLYTIC	10μ25VSM
C76	ELECTROLYTIC	10μ25VSM
C77	CERAMIC	UAT05X103Z
C78	CERAMIC	RAU04CH100J
C79		
C80	CERAMIC	UAT05X103Z
C81	CERAMIC	UAT05X103Z
C82	CERAMIC	RAU06SA331J
C83	CERAMIC	RAU06SA331J
C84	CERAMIC	UAT05X103Z
C85	ELECTROLYTIC	10μ25VSM
C86	CERAMIC	UAT05X103Z
C87	ELECTROLYTIC	10μ25VSM
C88	CERAMIC	UAT05X103Z
C89	ELECTROLYTIC	10μ25VSM
C90	CERAMIC	UAT05X103Z
C91	CERAMIC	UAT05X103Z
C92	CERAMIC	UAT05X103Z
C93	CERAMIC	UAT05X103Z
C94	ELECTROLYTIC	10μ25VSM
C95	ELECTROLYTIC	100μ10VSM
C96	ELECTROLYTIC	10μ25VSM
C97	MYLAR	QYX2A333KTP
C98	ELECTROLYTIC	100μ10VSM
C99	CERAMIC	ROU04F102Z
C100	MYLAR	QYX2A473KTP
C101	ELECTROLYTIC	33μ16VSM
C102		
C103	CERAMIC	UAT05X103Z
C104	CERAMIC	RAU05SL101J
C105	CERAMIC	UAT05X103Z
C106	CERAMIC	UAT05X103Z
C107	CERAMIC	ROU04F102Z

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
C108	CERAMIC	RAU05SL101J
C109	CERAMIC	UAT05X103Z
C110	CERAMIC	ROU04F102Z
C111	CERAMIC	UAT05X103Z
C112	ELECTROLYTIC	10μ25VSM
C113	ELECTROLYTIC	1μ50VSM
C114	ELECTROLYTIC	10μ25VSM
C115	ELECTROLYTIC	100μ10VSM
C116	ELECTROLYTIC	100μ10VSM
C117	ELECTROLYTIC	0.1μ50VSM
C118	ELECTROLYTIC	10μ25VSM
C119	MYLAR	QYX2A472KTP
C120	MYLAR	QYX2A472KTP
C121	MYLAR	QYX2A472KTP
C122	CERAMIC	UAT05X103Z
C123	CERAMIC	ROU04F102Z
C124	CERAMIC	UAT05X103Z
C125	CERAMIC	UAT05X103Z
C126	CERAMIC	ROU04F102Z
C127	CERAMIC	UAT05X103Z
C130	CERAMIC	ROU04F102Z
C131	CERAMIC	UAT05X103Z
C132	CERAMIC	UAT05X103Z
C133	CERAMIC	UAT05X103Z
C134	CERAMIC	UAT05X103Z
C136	CERAMIC	UAT05X103Z
C137	ELECTROLYTIC	10μ25VSM
C161	ELECTROLYTIC	0.33μ50VSM
C173	CERAMIC	UAT05X103Z
C174	ELECTROLYTIC	100μ16VSM
C175	ELECTROLYTIC	100μ16VSM
C176	CERAMIC	UAT05X103Z
C177	MYLAR	QYX2A103KTP
C178	ELECTROLYTIC	1μ50VSM
C179	ELECTROLYTIC	10μ25VSM
C180	MYLAR	QYX2A333KPT
C181	MYLAR	QYX2A472KTP
C182	ELECTROLYTIC	1μ50VSM
C183	CERAMIC	RAU06SL151J (3.5M) RAU05SL820J (7M) RAU05SL680J (14M) RAU04SL270J (21M) RAU04SL150J (28M)
C184	CERAMIC	RAU06SL121J (3.5M) RAU05SL470J (7M) RAU04SL220J (14M) RAU04SL100J (21M) RAU04SL070C (28M)

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
C185	CERAMIC	RAU06SL151J (3.5M) RAU05SL820J (7M) RAU05SL680J (14M) RAU04SL270J (21M) RAU04SL150J (28M)
C188	CERAMIC	UAT05X103Z
C190	CERAMIC	RAU05SL101J
C191	CERAMIC	RAU05SL101J
C192	CERAMIC	UAT05X103Z
C193	CERAMIC	UAT05X103Z
C194	CERAMIC	UAT05X103Z
C195	ELECTROLYTIC	100μ25VSM
C196	CERAMIC	UAT05X103Z
C197	CERAMIC	UAT05X103Z
C198	ELECTROLYTIC	10μ25VSM
C199		
C400	CERAMIC	UAT05X103Z
C401	CERAMIC	UAT05X103Z
C402	CERAMIC	UAT05X103Z
C403	CERAMIC	UAT05X103Z
C404	ELECTROLYTIC	10μ25VSM
C405	CERAMIC	RAU06CH560J
C406	CERAMIC	RAU05SL101J
C407	CERAMIC	UAT05X103Z
C408	ELECTROLYTIC	10μ25VSM
L1	RF COIL	FL5H471K
L2	RF COIL	FL5H471K
L3	RF COIL	FL5H471K
L4	RF COIL	FL5H471K
L5	RF COIL	FL5H471K
L6	RF COIL	FL5H471K
L7	RF COIL	FBH2001UEW0.2T5
L8	RF COIL	FL5H471K
L9	RF COIL	FL5H471K
L19	SN COIL	SN-8-D500
T1	RF TRANSFORMER	THP-7R-080 (3.5M) THP-7R-090 (7M) THP-7R-020 (14M) THP-7I-030 (21M) THP-7I-030 (28M)
T3	RF TRANSFORMER	THP-7R-080 (3.5M) THP-7R-090 (7M) THP-7R-020 (14M) THP-7I-030 (21M) THP-7I-030 (28M)

TX/RX UNIT

REF. NO.	DESCRIPTION	PART NO.
T4	RF TRANS	THP-7R-080 (3.5M)
		THP-7R-090 (7M)
		THP-7R-020 (14M)
		THP-7I-030 (21M)
		THP-7I-030 (28M)
T6	RF TRANS	THP-7R-080 (3.5M)
		THP-7R-090 (7M)
		THP-7R-020 (14M)
		THP-7I-030 (21M)
		THP-7I-030 (28M)
T7	RF TRANS	THP-7R-070
T8	RF TRANS	THP-7R-070
T9	RF TRANS	THP-7R-070
T10	RF TRANS	THP-7R-070
T11	RF TRANS	THP-7R-070
T12	RF TRANS	THP-7R-070
T13	RF TRANS	THP-7R-070
T14	RF TRANS	THP-7R-070
T15	RF TRANS	THP-7R-080 (3.5M)
		THP-7R-090 (7M)
		THP-7R-020 (14M)
		THP-7I-030 (21M)
		THP-7I-030 (28M)
T17	RF TRANS	THP-7R-080 (3.5M)
		THP-7R-090 (7M)
		THP-7R-020 (14M)
		THP-7I-030 (21M)
		THP-7I-030 (28M)
T18	1:9 RF TRANS	FBH22UEW026T
T19	1:4 RF TRANS	FBH22UEW023TB
1026B01	PCB BOARD	PC1081
J5	PIN BLOCK	PI25C06M(ACC)
J9	PIN BLOCK	PI25C05M(N.B)
J10	PIN BLOCK	PI25C02M(SP)
J11	PIN BLOCK	PI25C06M(PA)
J12	PIN BLOCK	PI25C06M(PLL)
J16	PIN BLOCK	PI25C02M(CW)
J20	MINI JACK	TMP-J01X-A2
J21	MINI JACK	TMP-J01X-A2
J22	MINI JACK	TMP-J01X-A2

PA UNIT

REF. NO.	DESCRIPTION	PART NO.
Q29	TRANSISTOR	2SC1971
Q30	TRANSISTOR	2SC1969
Q31	TRANSISTOR	2SC1969
Q32	TRANSISTOR	2SC3419
Q34	TRANSISTOR	2SC2603E
D31	DIODE	1N4002
D32	DIODE	1N4002
D33	DIODE	1N4002
D35	DIODE	1K60UF
D36	DIODE	1S2076S2
D37	DIODE	1K60UF
VR8	TRIMMER	RVM083V1KB
VR9	TRIMMER	RVM083V100KB
VR10	TRIMMER	RVM083V10KB
R103	RESISTOR	100ΩF
R104	RESISTOR	100Ω1/2WF
R106	RESISTOR	1KF
R107	RESISTOR	33ΩF
R108	RESISTOR	270ΩF
R109	M. O. RESISTOR	100Ω1W
R110	M. O. RESISTOR	100Ω1W
R111	M. O. RESISTOR	20Ω1W
R112	M. O. RESISTOR	20Ω1W
R113	RESISTOR	5. 1ΩF
R114	RESISTOR	10KF
R126	RESISTOR	47KF
R127	RESISTOR	470ΩF
R128	RESISTOR	470ΩF
C138	CERAMIC	UAT10X104Z
C139	CERAMIC	UAT05X103Z
C140	CERAMIC	UAT10X104Z
C142	CERAMIC	UAT05X103Z
C143	ELECTROLYTIC	10μ25VSM
C144	CERAMIC	UAT10X104Z
C145	ELECTROLYTIC	10μ25VSM
C146	CERAMIC	UAT05X103Z
C147	CERAMIC	UAT05X103Z
C148	CERAMIC	UAT10X104Z
C149	ELECTROLYTIC	10μ25VSM
C150	CERAMIC	RAU06SA391K
C151	CERAMIC	UAT10X104Z
C152	CERAMIC	UAT10X104Z
C153	CERAMIC	RAU08CH101J
C154	CERAMIC	UAT05X103Z
C155	CERAMIC	UAT10X104Z
C156	ELECTROLYTIC	220μ25V

PA UNIT

REF. NO.	DESCRIPTION	PART NO.
C157	CERAMIC	RAU08SA681K (3.5M) RAU06SA331K (7M) RAU10CH151J (14M) RAU08CH101J (21M) RAU08CH101J (28M)
C158	CERAMIC	RAU06SA561K (3.5M) RAU06SA331K (7M) RAU10CH151J (14M) RAU08CH101J (21M) RAU08CH820J (28M)
C159	CERAMIC	RAU05SL470J (3.5M) RAU04SL220J (7M) RAU04SL120J (14M) RAU04SL080C (21M) RAU04SL040C (28M)
C160	CERAMIC	RAU05SL470J (3.5M) RAU04SL220J (7M) RAU04SL120J (14M) RAU04SL080C (21M) RAU04SL040C (28M)
C162	CERAMIC	UAT05X103Z
C163	CERAMIC	UAT05X103Z
C166	CERAMIC	UAT05X103Z
C171	CERAMIC	RAU08SA681K (3.5M) RAU06SA331K (7M) RAU10CH151J (14M) RAU08CH101J (21M) RAU08CH820J (28M)
C172	CERAMIC	RAU10CH151J (3.5M) * RAU06SA471K (3.5M) * RAU06SA331K (7M) RAU10CH151J (14M) RAU08CH101J (21M) RAU08CH820J (28M)
C186	CERAMIC	ROU04B391K
C187	CERAMIC	YAT10X104Z
T21	1:4 TRANSFORMER	FBH22UEW023TB
T28	RF TRANSFORMER	RIB-8-14-13-4A
T29	1:4 TRANSFORMER	VH40UEW049TB
T30	RF TRANSFORMER	RIB-8-14-13-4A2
L10	RFC	FL5H330K
L11	RFC	FL5H330K
L12	L.P.F COIL	T37-2*2-0.6UEW18T (3.5M) T37-2-0.6UEW19T (7M) T37-2-0.6UEW15T (14M) T37-2-0.6UEW11T (21M) T37-2-0.6UEW9T (28M)

PA UNIT

REF. NO.	DESCRIPTION	PART NO.
L18	L. P. F. COIL	T37-2*2-0. 6UEW18T (3. 5M) T37-2-0. 6UEW19T (7M) T37-2-0. 6UEW15T (14M) T37-2-0. 6UEW11T (21M) T37-2-0. 6UEW9T (28M)
L20	RFC	LC0039
FB1	FERRITE BEAD	FBh2001
FB2	FERRITE BEAD	FBh2001
FB3	FERRITE BEAD	FBh2001
FB4	FERRITE BEAD	FBh2001
FB5	FERRITE BEAD	FBh2001
RL	RELAY	AG2033
1026B03	PC BOARD	PC1083

SWITCH UNIT

REF. NO.	DESCRIPTION	PART NO.
SW2	PUSH SWITCH	SPUZ 12F
SW3	PUSH SWITCH	SPUZ 12F
S5	PUSH SWITCH	SPUZ 12F
S6	PUSH SWITCH	SPUZ 12F
1026B07	PCB BOARD	PC1087
R163	RESISTOR	62ΩP (3. 5M, 7M)
R164	RESISTOR	62ΩP (3. 5M, 7M)
R162	RESISTOR	220ΩP (3. 5M, 7M)

MECHANICAL PARTS

REF. NO.	DESCRIPTION	QTY	PART NO.
1026M01	CHASSIS	1	
1026M02	CASE COVER (UPPER)	1	
1026M03	CASE COVER (LOWER)	1	
1026M04	SHELD PLATE	1	
1026M05	REAR PANEL	1	
1026M06	SPEAKER BRACKET	2	
1026M07	METER BRACKET	1	
1026M08	HEAT SINK	1	
1026M09	VCO SHELD CASE A	1	
1026M10	VCO SHELD CASE B	1	
1026M14	STAND	1	
1026M15	STAND BAKET	2	
1076P01	FRONT PANEL HT-180 (3. 5M) HT-140 (7M) HT-120 (14M) HT-115 (21M) HT-110 (28M)	1	
1076P02	FREQUENCY DISPLAY PLATE	1	
DIAL	ROTARY ENCODER	1	RES20-50-200
	SWITCH KNOB	4	KEY PITCH12. 5 (BLACK)
VR6 (SW1)	VARIABLE RESISTOR	1	K-121B1003E5N1111-10KA

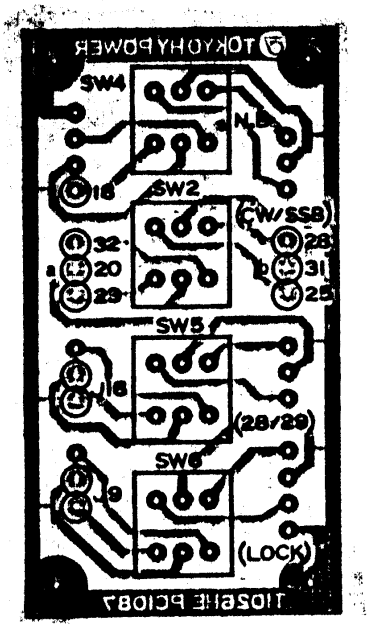
MECHANICAL PARTS

REF. NO.	DESCRIPTION	QTY	PART NO.
VR24	VARIABLE RESISTOR	1	K-121B1003E5N1111-10KB
EXT. SP	EARPHONE JACK	1	3.5Φ
KEY	EARPHONE JACK	1	3.5Φ
A	METER	1	MH15A400μ
MIC	MIC JACK	1	505-0400
ANT	ANTENNA CONNECTOR	1	MRB
S.P	SPEAKER	1	77F27A13
P03	DIAL KNOB	1	
	VOLUME KNOB	2	
	TRANSISTOR ACCESSORY	2	AC316
	TRANSISTOR ACCESSORY	3	AC229
ACC	ACCESSORY TERMINAL	1	D5-732N-00
	RECEPTACLE HOUSING	1	MLR-02

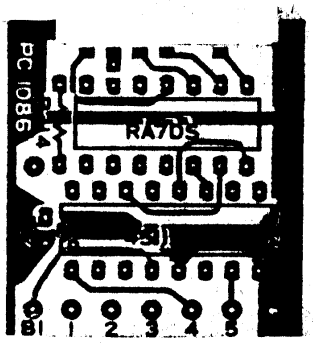
ACCESSORYES

DESCRIPTION	QTY
POWER CABLE	1
FUSE HOLDER	1
FUSE (5A)	2
MICROPHNE 600Ω	1

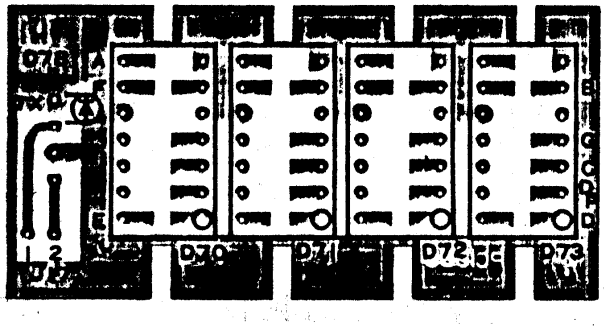
SWITCH UNIT



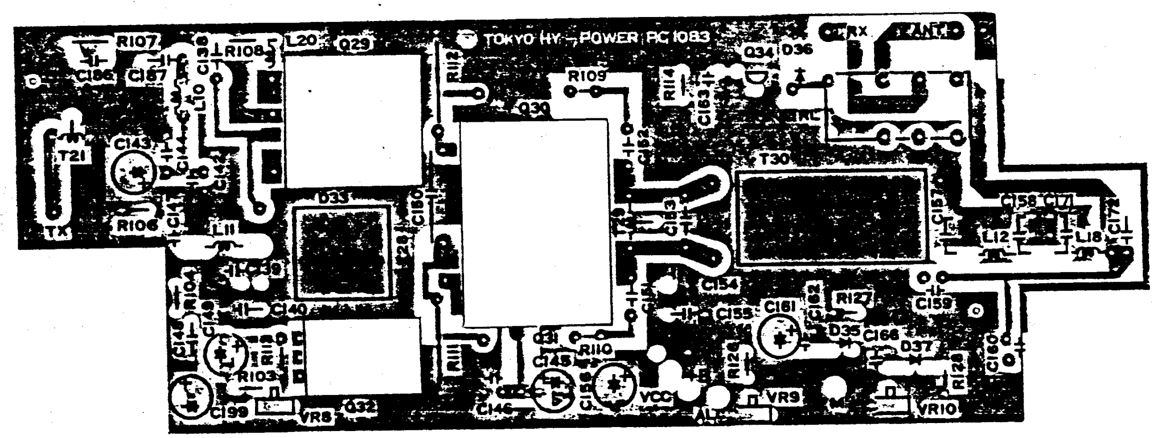
LED DISPLAY SUB UNIT



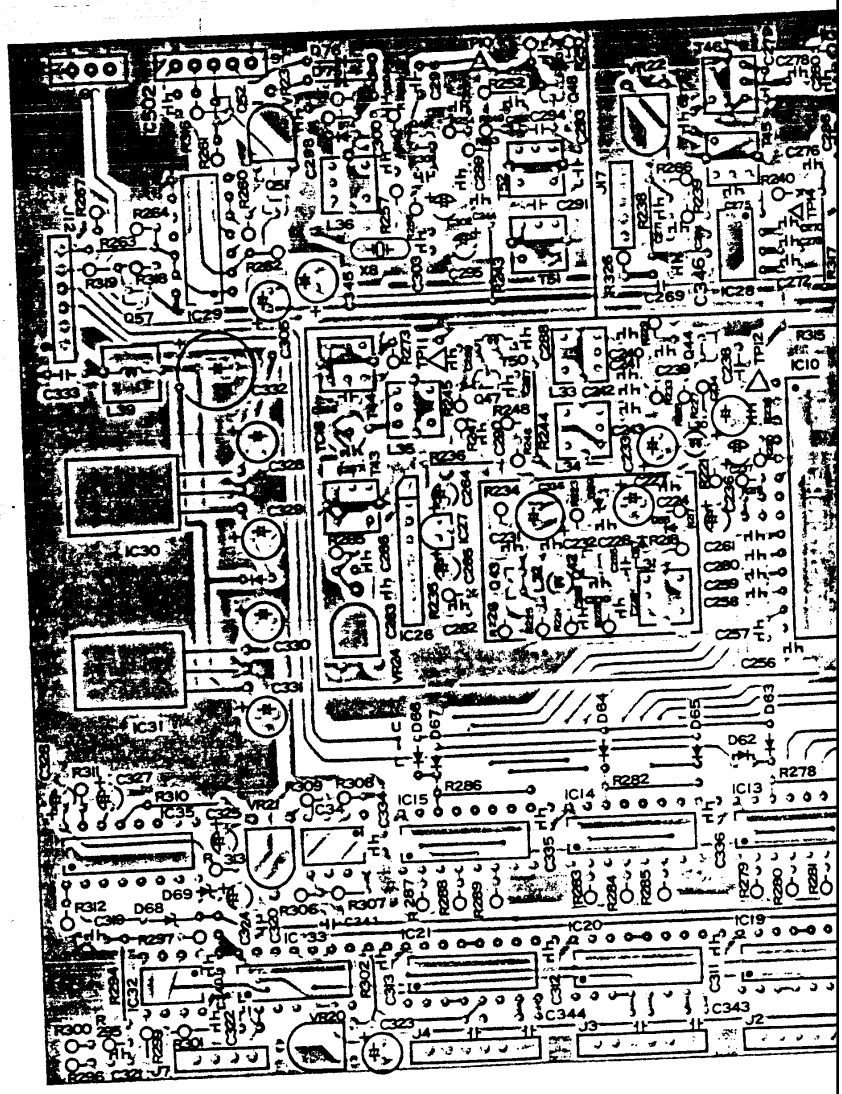
LED DISPLAY UNIT



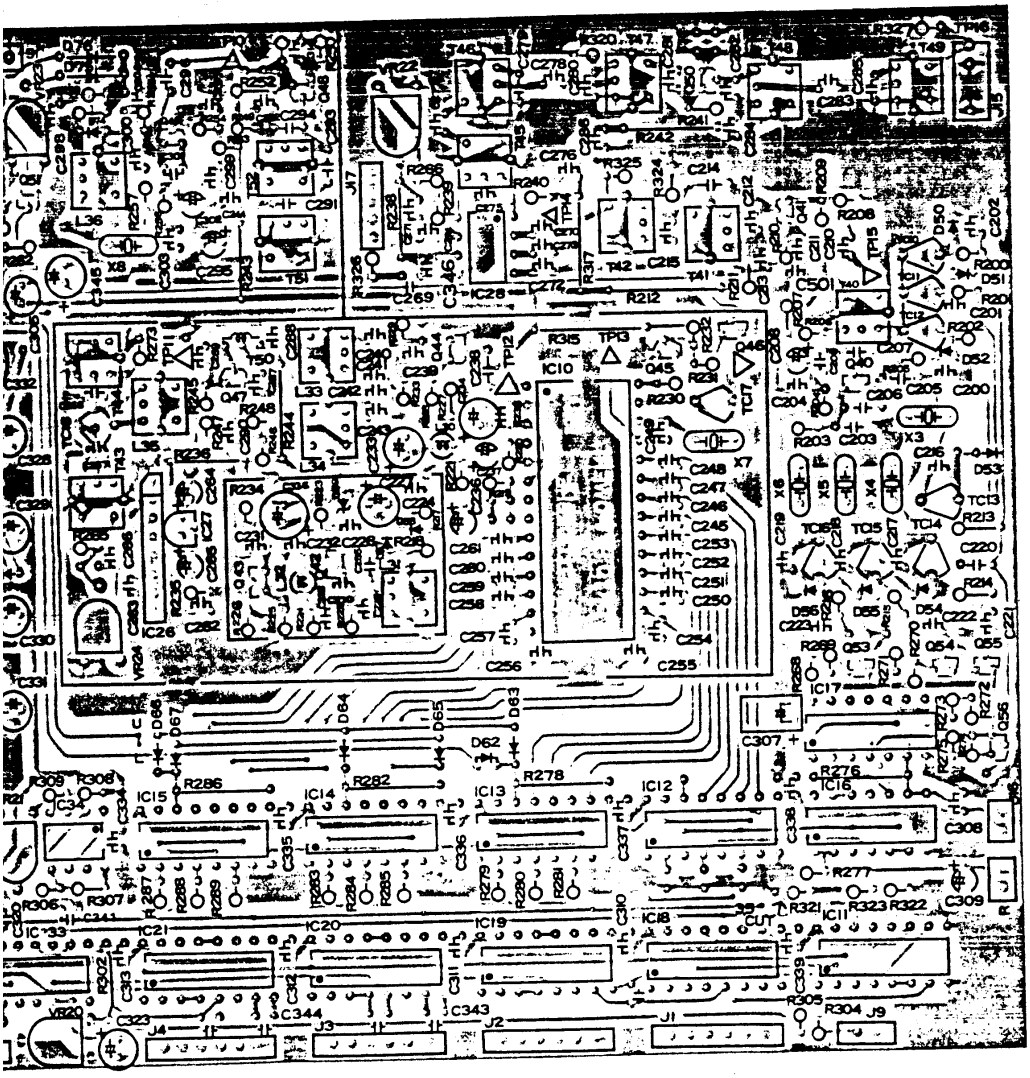
PA UNIT


TOKYO HY-POWER PC1083
RX
ANT
TX
T21
T30
Q29
Q30
Q31
Q32
Q34
D33
D35
D36
D37
L10
L11
L12
L18
L20
R103
R104
R106
R107
R108
R109
R110
R111
R112
R114
R126
R127
R128
VR8
VR9
VR10
VCC
ALC
C138
C140
C141
C142
C143
C144
C145
C146
C149
C150
C152
C153
C154
C155
C156
C157
C158
C159
C160
C161
C162
C163
C166
C171
C172
C186
C187
C199

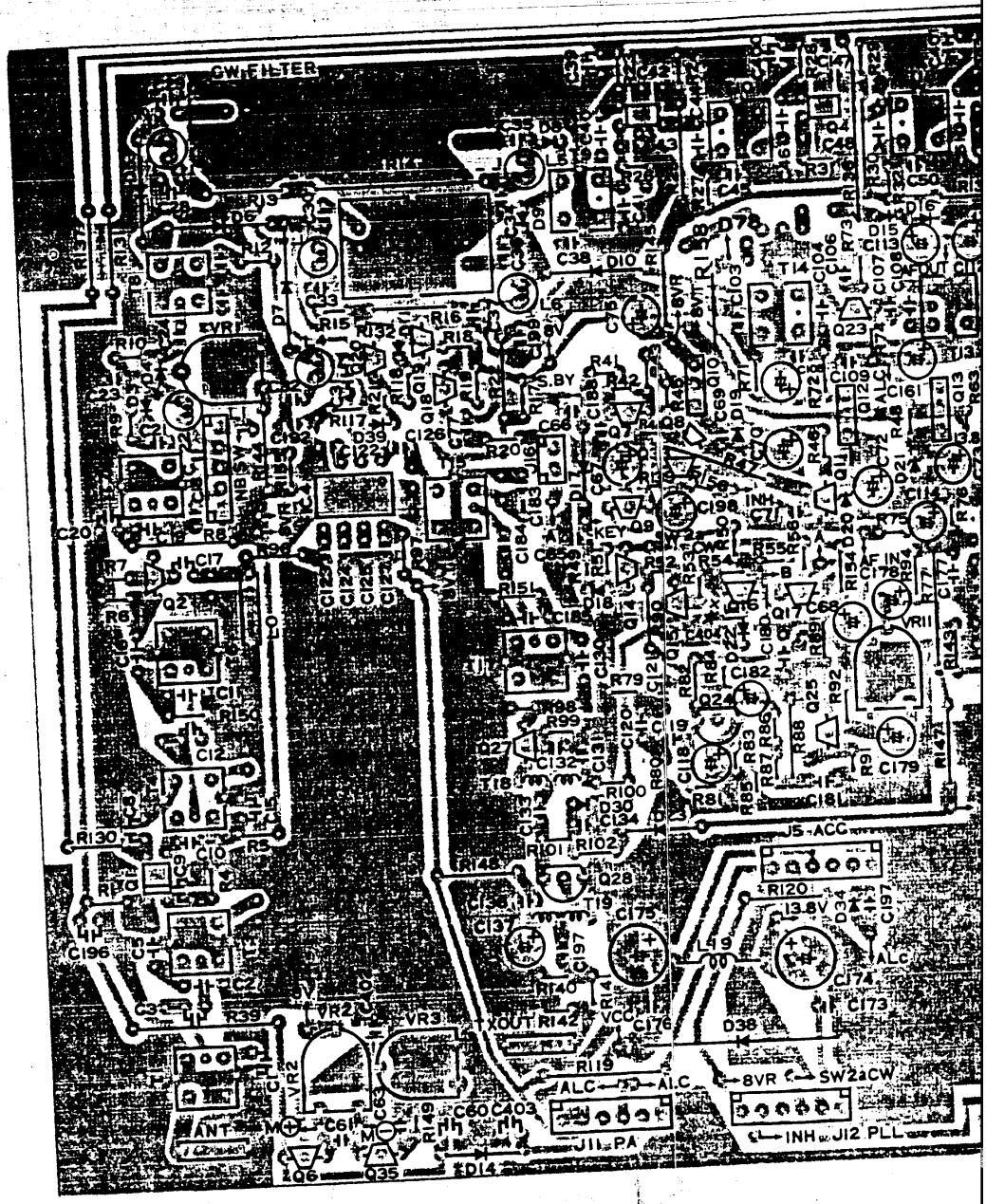
PLL VFO UNIT



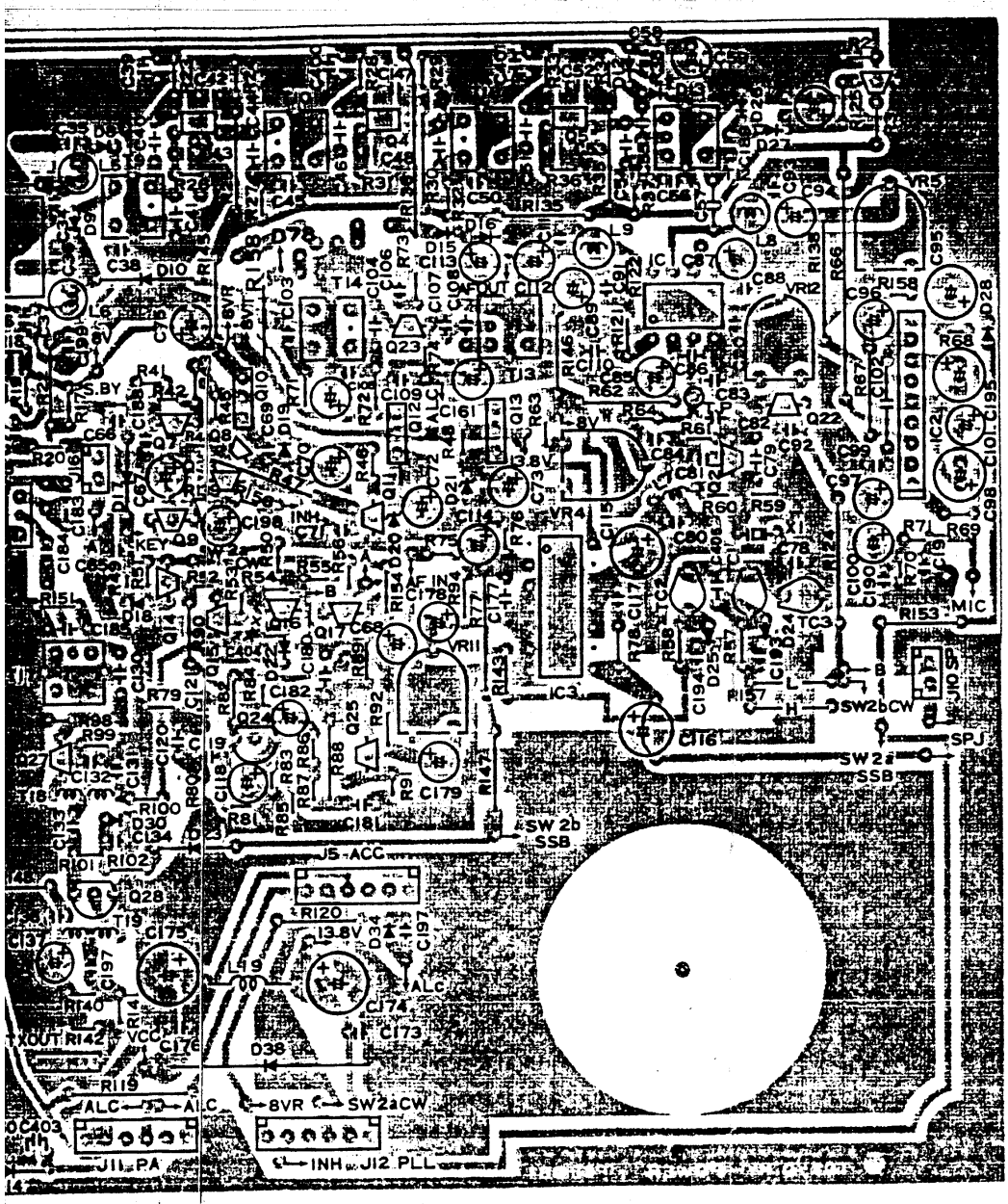
LL VFO UNIT



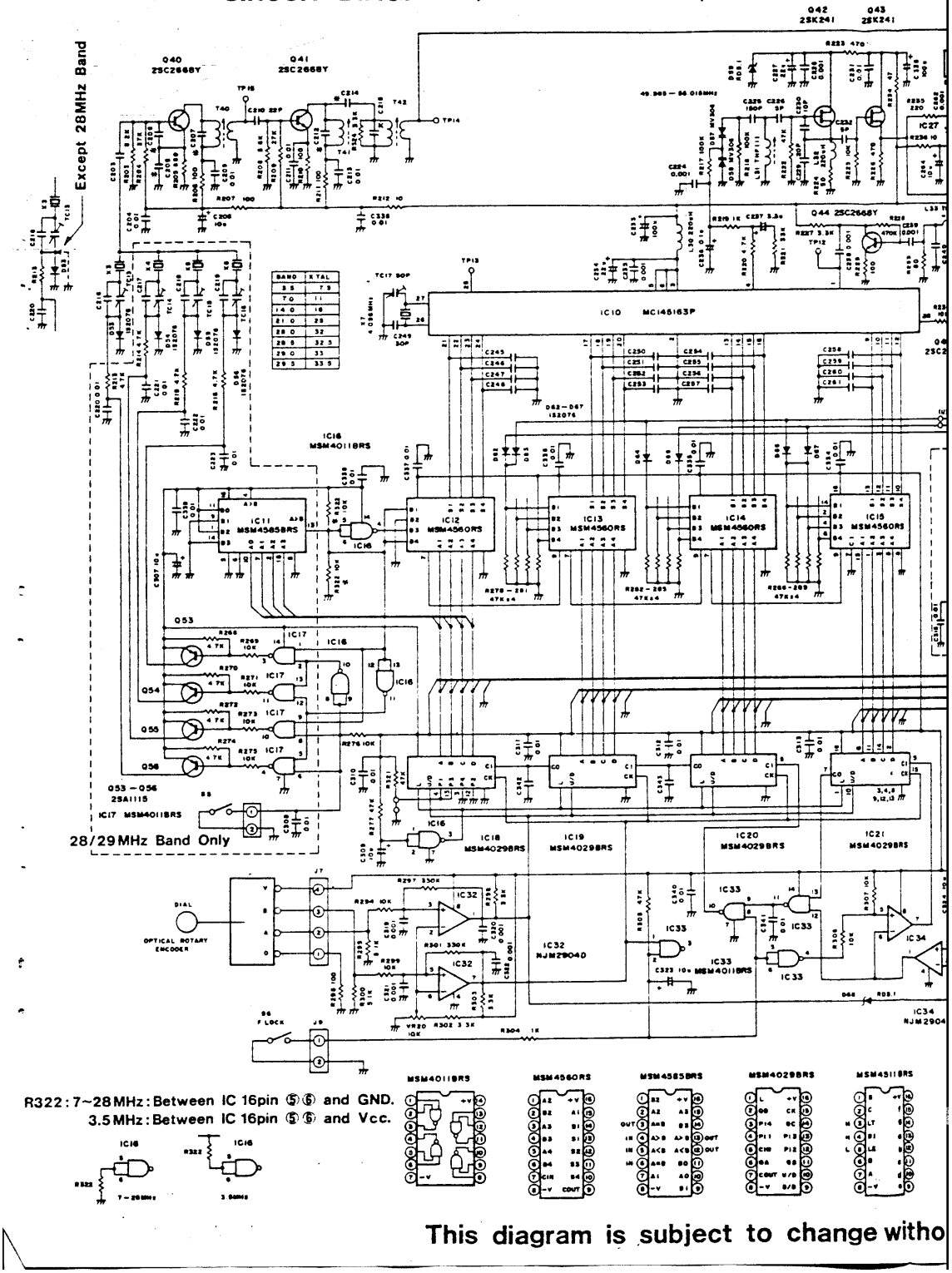
TX/RX UNIT


CW FILTER
J5 ACC
J11 PA
J12 PLL
ANT
ALC
INH
SW2aCW
8VR
13.8V
VCC
XOUT
S.BY
KEY
AF IN
VR1
VR2
VR3

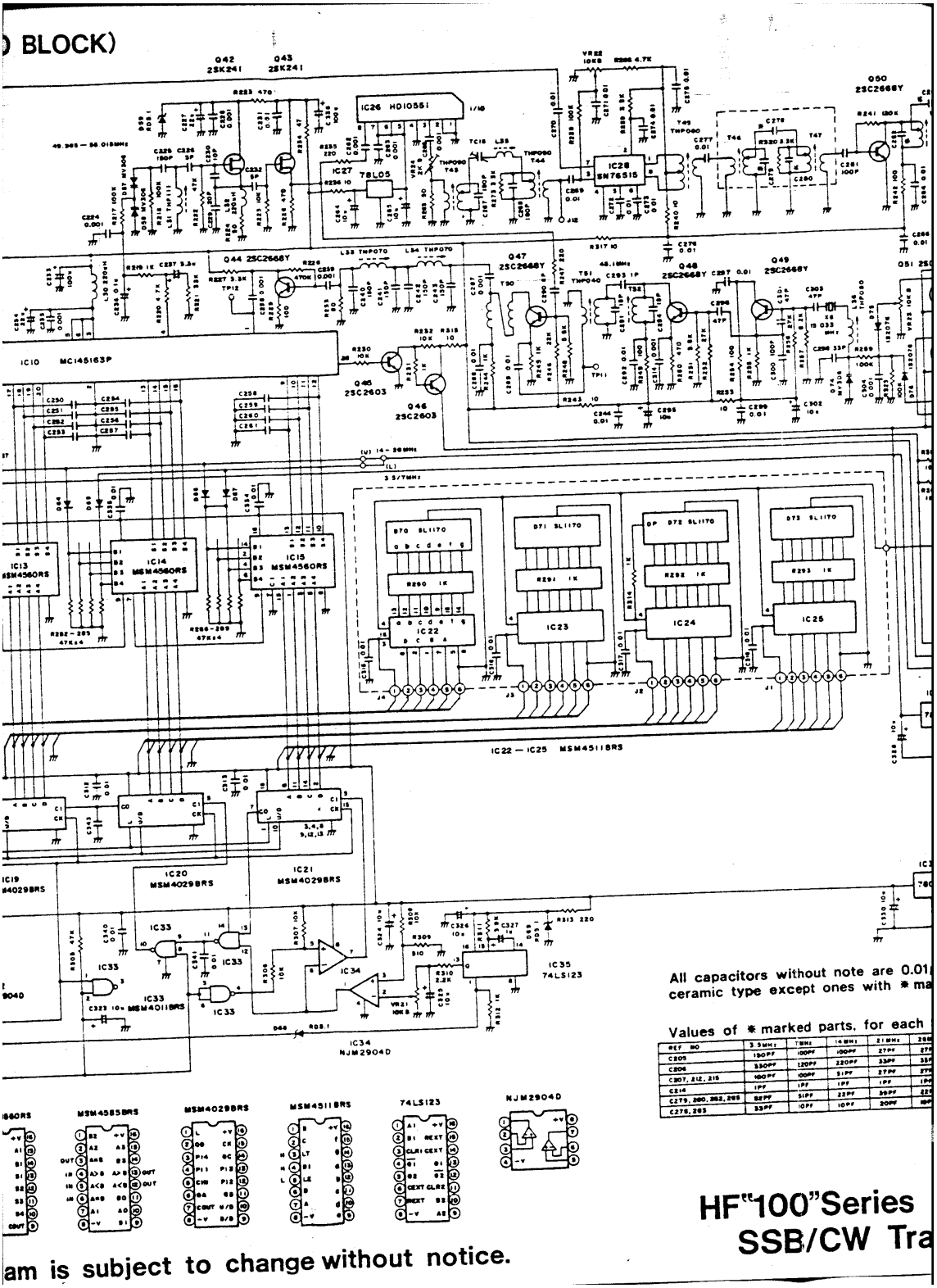
TX/RX UNIT

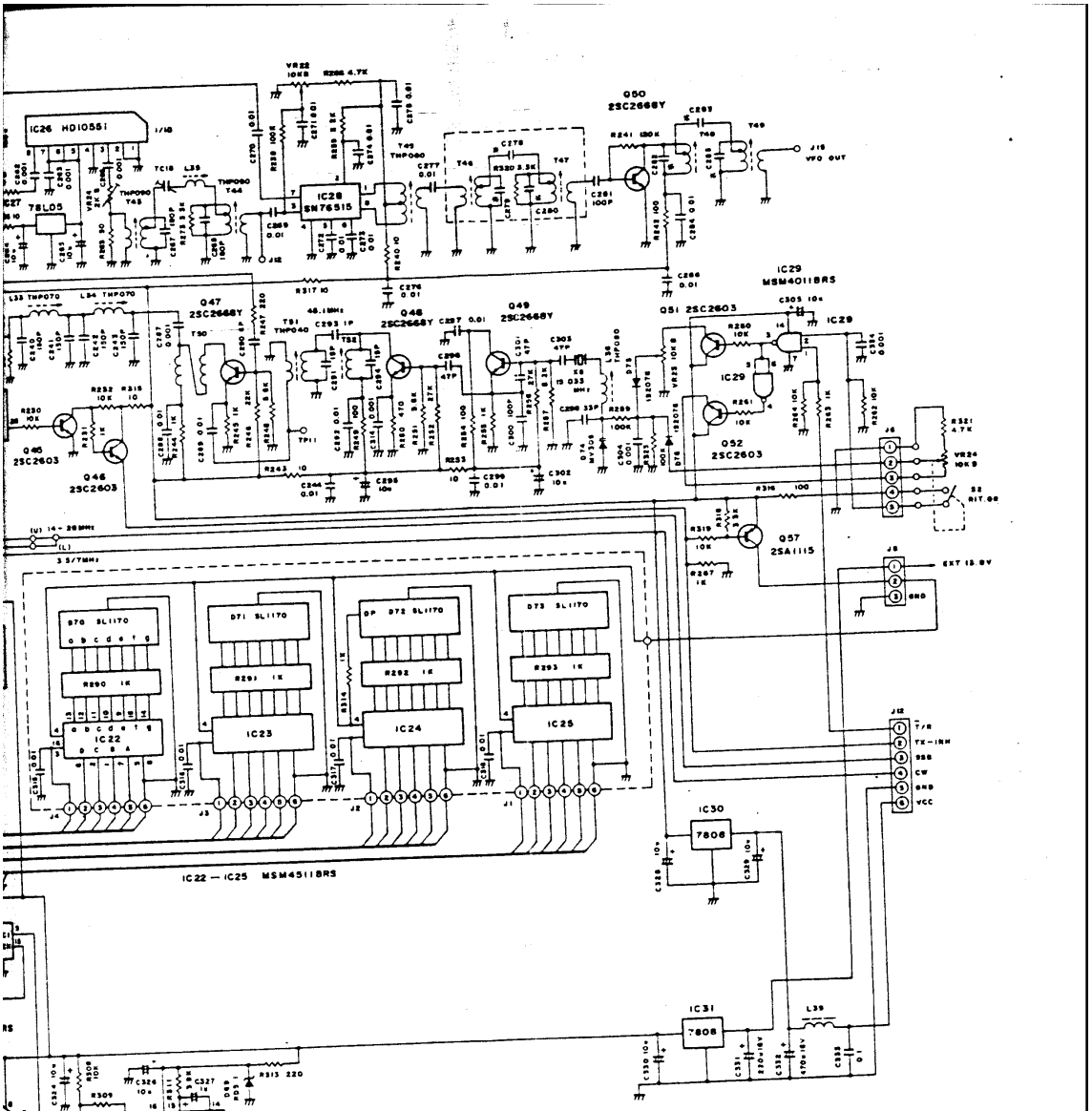

J5-ACG
SW2b SSB
SW2bCW
SW2 SSB
SPJ
MIC
J10 SP
J11 PA
J12 PLL
INH
ALC
8VR
13.8V
8V
S.BY
KEY
AF IN
IF
VCC
XOUT

CIRCUIT DIAGRAM (PLL VFO BLOCK)



This diagram is subject to change witho

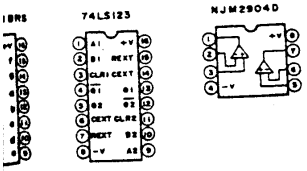

) BLOCK)
IC22 — IC25 MSM5111BRS
All capacitors without note are 0.01
ceramic type except ones with * ma
Values of * marked parts. for each
HF"100"Series
SSB/CW Tra
am is subject to change without notice.



All capacitors without note are 0.01μF/25V ceramic type except ones with * mark.

Values of * marked parts, for each band.

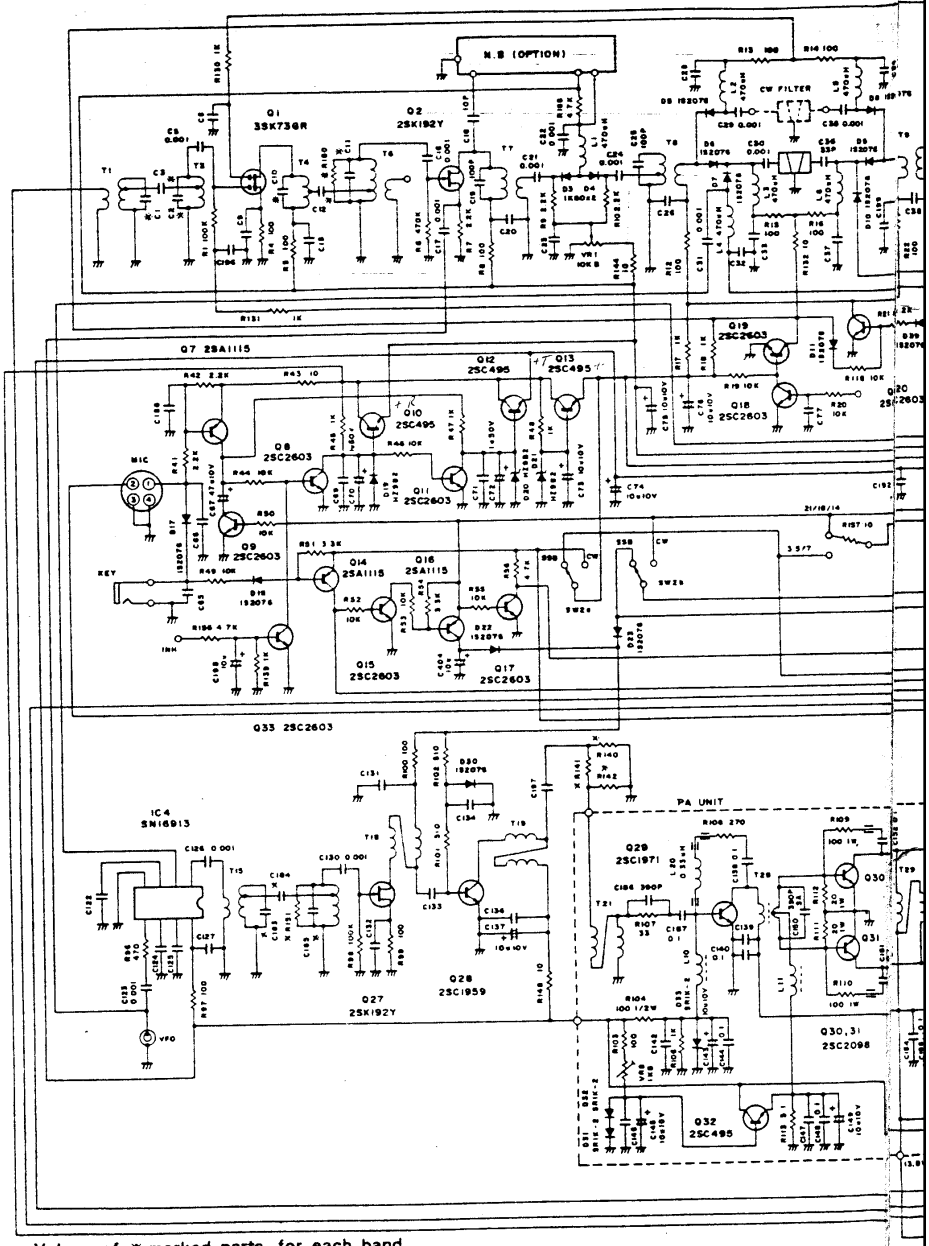
REF. NO	3.5MHz	7MHz	14MHz	21MHz	28MHz	
C205	150PF	100PF	100PF	27PF	27PF	
C206	330PF	120PF	220PF	33PF	33PF	
C207, 212, 215	100PF	100PF	51PF	27PF	27PF	
C214	1PF	1PF	1PF	1PF	1PF	50V
C279, 280, 282, 285	82PF	51PF	22PF	39PF	22PF	
C278, 283	33PF	10PF	10PF	20PF	10PF	



HF"100"Series Mono-Band SSB/CW Transceiver.

without notice.

CIRCUIT DIAGRAM (TX/RX BLOCK)

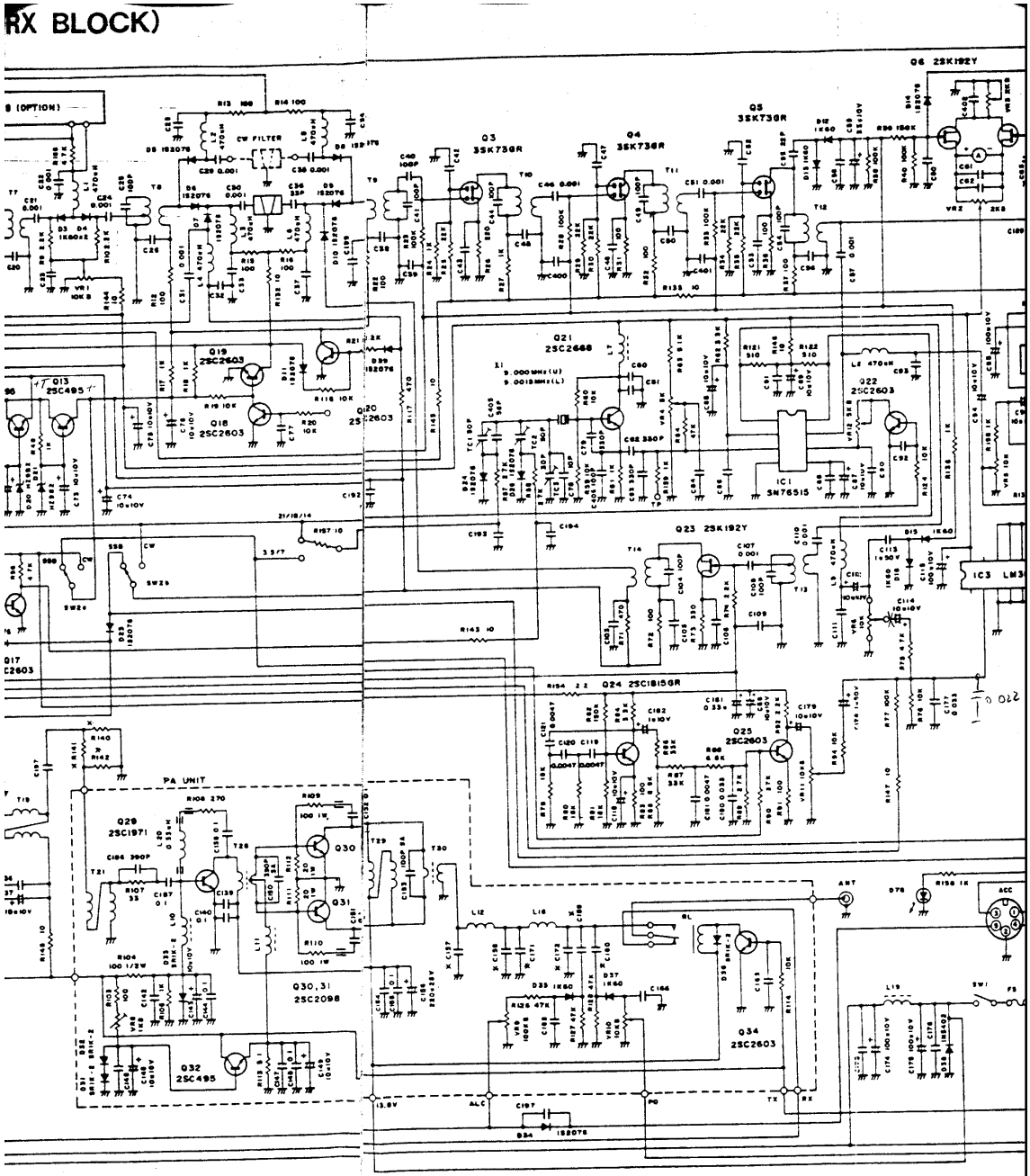


Values of ✱ marked parts, for each band.

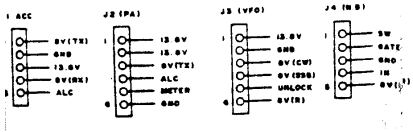
REF NO.	3.5MHz	7MHz	14MHz	21MHz	28MHz	
C1,2,10,11,183,188	150PF	82PF	68PF	33PF	15PF	
C3,12	100PF	56PF	22PF	18PF	10PF	
C184	120PF	47PF	22PF	10PF	7PF	
C197,171	680PF	330PF	150PF	100PF	100PF/82PF	50V
C158	560PF	330PF	180PF	100PF	82PF	
C172	180PF+470P	330PF	150PF	100PF	82PF	
C159,160	47PF	22PF	12PF	8PF	4PF	
R141	68	33	33	22	22	
R140,142	100	180	180	220	220	1/4W F
R150	5.6K	5.6K	4.7K	4.7K	4.7K	
R131	1.8K	3.3K	3.3K	3.3K	3.3K	

This diagram is subject to cha

RX BLOCK)

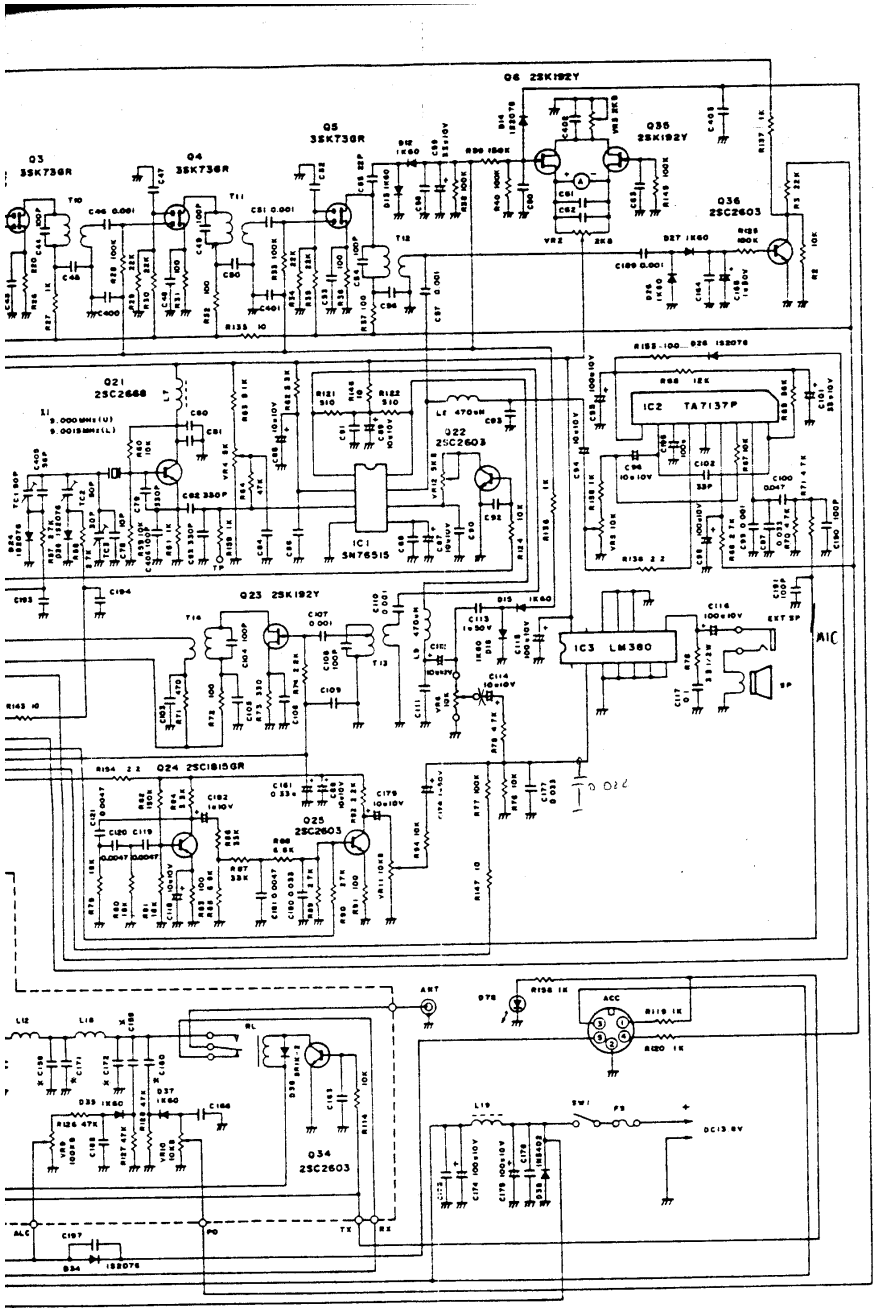


All capacitors without voltage note are 50V type.
All capacitors without any note are 0.01μF 25V type except ones with * mark.



HF "100" Series
SSB/CW T

s diagram is subject to change without notice.



icitors without voltage note are 50V type.
icitors without any note are 0.01μF 25V
cept ones with * mark.

vithout notice.

HF "100" Series Mono-Band SSB/CW Transceiver.