REALISTIC®

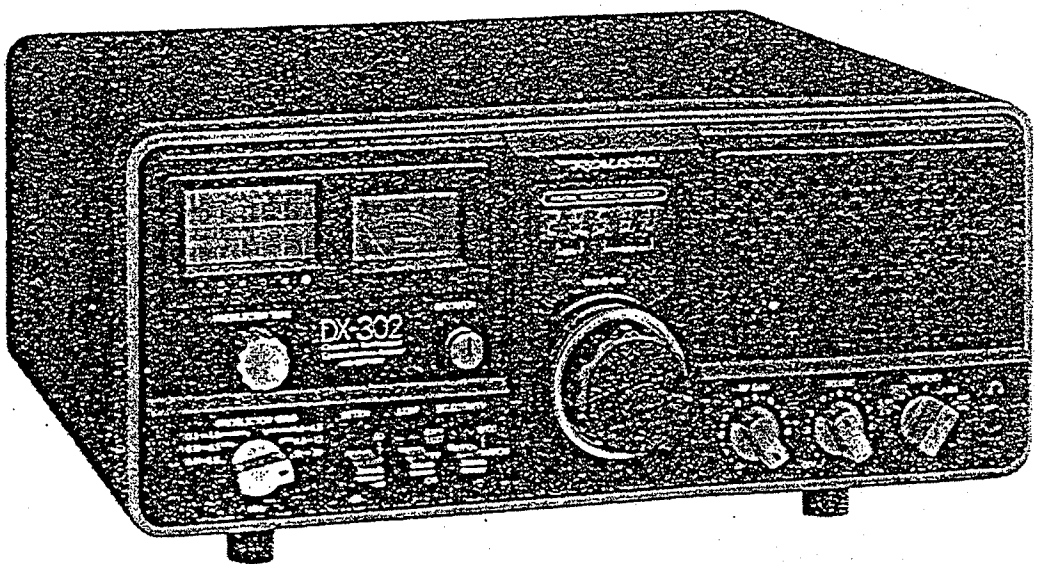
Service Manual

21F270

DX-302

QUARTZ-SYNTHESIZED DIGITAL LED-READOUT COMMUNICATIONS RECEIVER

Catalog Number: 20-220

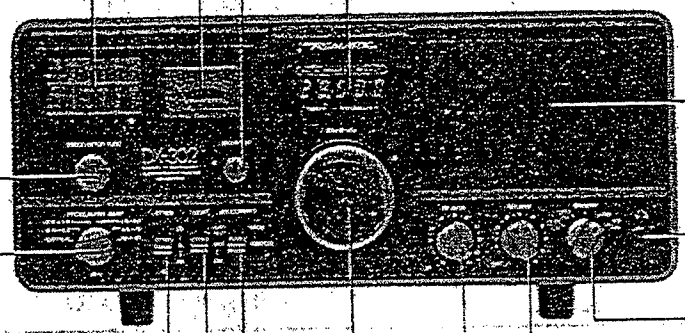


CUSTOM MANUFACTURED FOR RADIO SHACK A DIVISION OF TANDY CORPORATION

CONTENTS

CONTROLS AND THEIR FUNCTIONS

(For complete details on operation, refer to the Owner's Manual.)



SIGNAL STRENGTH & Battery Meter
Shows relative strength of received signal (or Battery condition when BATT TEST is used).

PRESELECTOR TUNE & Dial
Set to approximate frequency you want to tune to.

PRESELECTOR BAND Switch
Set to appropriate band when adjusting PRESELECTOR TUNE.

ATTENuator Switch
Use to attenuate strong local signals.

LIGHT Switch
When using battery power, use to check battery condition (BATT TEST) or turn dial lights on (ON). With AC power, lights are always on.

SELECTIVITY Switch
Set to NARROW to reduce interference.

BFO PITCH
Adjust for best reception of SSB and CW.

Digital Frequency Readout
Shows the precise frequency the Receiver is tuned to (in MHz and kHz).

Speaker
Received sound comes from here (unless headphones are connected).

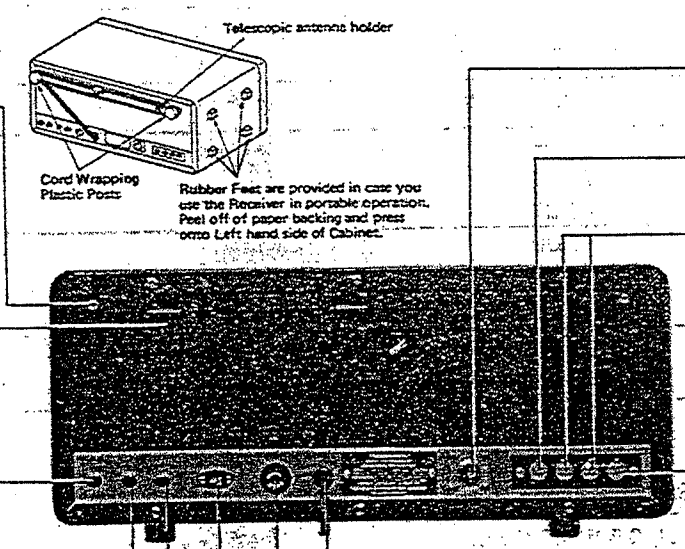
Jack
Connect headphones for private listening or for listening in high background noise locations.

Mode Switch
Determines mode of operation.

VOLUME/OFF Control
Use to turn Receiver "on" and adjust volume of sound.

RF GAIN Control
Use to adjust sensitivity of Receiver.

Main Tuning
Adjust outer knob to desired MHz range.
Adjust inner knob for precise kHz tuning.



Cord Wrapping Posts
Use to wrap the AC Power Cord for storage or when operating from Battery power or external 12 V DC. (Screw posts into back of Cabinet.).

Battery Compartment
To operate from battery power, load 8 heavy-duty "C" Batteries here.

External Speaker Jack
Connect an external speaker to this jack (automatically disconnects built-in speaker).

KEY Jack
To practice Morse Code, plug a code key into this jack, tune Receiver to 1 or 2 MHz and set Mode to USB/CW or LSB/CW.

TAPE OUT Jack
Connect a tape recorder to this jack and record messages off-the-air.

Coax ANTenna Connector
Connect 50 – 75Ω antenna lead in to this.

ANTenna Screw Terminal
Connect long-wire antennas to this screw terminal.

GrouND Screw Terminal
Connect a wire between one of these screws and a good ground point. The other is for MUTE operation.

MUTE Screw Terminal
Can be used for remote muting of the Receiver (without using STANDBY Mode switch position). To Mute, connect to a GND screw.

Power Cord
Connect to a standard AC outlet.

FUSE
Protects the unit from abnormally high current. Use only a 0.5 Amp type.

DC 12V Jack
For operation from an external source of 12 volts DC, connect red wire to + and black wire to –.

SPECIFICATIONS

Description		Condition	Nominal Spec.	Limit Spec.
Frequency Coverage		Band A Band B Band C Band D Band E Band F	10 ~ 150 kHz 150 ~ 500 kHz 500 ~ 1600 kHz 1.6 ~ 4.5 MHz 4.5 ~ 12 MHz 12 ~ 30 MHz	10 ~ 150 kHz 150 ~ 500 kHz 500 ~ 1600 kHz 1.6 ~ 4.5 MHz 4.5 ~ 12 MHz 12 ~ 30 MHz
Sensitivity (S + N)/N = 10 dB AF Output = 50 mW		50 kHz 150 kHz 300 kHz 900 kHz 3.1 MHz 7.1 MHz 15.1 MHz 28.9 MHz	AM 30 μV SSB 30 μV 5 μV 5 μV 1 μV 0.5 μV 0.5 μV 0.3 μV 0.5 μV 0.3 μV 0.5 μV 0.3 μV 0.5 μV 0.3 μV 0.5 μV 0.3 μV	Not specified AM 50 μV SSB 50 μV 10 μV 5 μV 5 μV 5 μV 2 μV 1 μV 2 μV 1 μV 2 μV 1 μV 2 μV 1 μV
Image Ratio		10 ~ 50 kHz 100 kHz 300 kHz 900 kHz 3.1 MHz 7.1 MHz 15.1 MHz 28.1 MHz	Not specified 70 dB 70 dB 70 dB 60 dB 60 dB 60 dB 60 dB	Not specified 50 dB 50 dB 50 dB 50 dB 50 dB 50 dB 50 dB
Intermediate Frequency		1st 2nd 3rd	55.5 ~ 54.5 MHz 3 ~ 2 MHz 455 kHz	
Spurious Rejection at 7.1 MHz		between 5 MHz and 150 MHz	60 dB	30 dB
Birdies at 7.0 MHz		(S + N)/N = 10 dB	5.0 μV	10 μV
Input Attenuator Low Z		0 dB 20 dB 40 dB	 20 dB 40 dB	 14 ~ 26 dB 34 ~ 46 dB
HI Z at 7.1 MHz		0 dB 20 dB 40 dB	 20 dB 40 dB	 Not specified Not specified
Selectivity	WIDE	-6 dB -60 dB	3.5 kHz 6 kHz	6 kHz Max. 8.5 kHz Max.
	NARROW	-6 dB -60 dB	2.5 kHz 4 kHz	4.5 kHz Max. 6.0 kHz Max.
Audio Output		8Ω, 10% T.H.D	1.5 W	1.2 W
Phone Jack Output		8Ω, 0.5 W AF Output	70 mV	35 ~ 140 mV
Tape Output		7.1 MHz 1 mV (1 kHz 30% MOD), 0.5 W AF Output	300 mV	150 ~ 600 mV
Signal-to-Noise Ratio		7.1 MHz 1 mV (1 kHz 30% MOD), 0.5 W AF Output	40 dB	35 dB
Hum & Noise (VOLUME : Minimum)		at 8Ω Speaker Output at 8Ω Phone Jack Output	AM/SSB 1.5 mV AM/SSB 0.15 mV	AM/SSB 5 mV AM/SSB 0.5 mV

Description	Condition	Nominal Spec.	Limit Spec.
Meter Sensitivity	S-9 at 7.1 MHz	30 μV	15 – 100 μV
Audio Response 0 dB 1 kHz	300 Hz 2 kHz	–5 dB –8 dB	–5 ± 6 dB Not specified
Frequency Display Frequency Stability Antenna Impedance Operation Temperature Power source	5-digit LED display (MHz/kHz) Within ± 1 kHz after one hour warm up 50Ω unbalanced type (SO239 type connector) High impedance type (screw type terminal) 0°C to 43.3°C AC 120 V, 60 Hz for USA & CANADIAN models or AC 230 V, 50 Hz for EUROPEAN & AUSTRALIAN models. DC 12 V (negative ground only) or internal 8 PCS "C" cells		

NOTE: *Nominal Specs represent the design specs; all units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit Specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit Spec.*

PRINCIPLES OF OPERATION

This Receiver is a triple-conversion type and employs a "double tuning" system. MHz Tuning tunes to the MHz "unit" of receiving frequency (i.e. selects the desired 1 MHz portion to be tuned) and kHz Tuning tunes to the kHz "unit(s)".

Refer to the Block Diagram as you read through the following description:

An RF signal picked up by the Antenna goes to RF section via ATTenuator and Preselector. The RF signal is amplified by Q201, and up-mixed in 1st Mixer Q203 and Q204 with 1st Local Oscillator Q401 (MHz Tuning). Q401 produces 55.5 MHz to 84.5 MHz signals in 1 MHz spreads as required for the MHz portion of the receiving frequency (i.e. 55.5 MHz for "0" MHz spread... from 10 kHz to 999 kHz, 56.5 MHz for 1 MHz to 1.999 MHz... etc. ...). The resulting frequency will always be from 55.5 MHz to 54.5 MHz. Note the frequency inversion as well as the up-conversion. This signal is amplified by 1st IF Amp Q206 and Q207.

The Reference Oscillator generates a 4 MHz crystal-controlled frequency using Q507. This is divided down to 1 MHz by IC502. D501 and D502 are used for the harmonics generator and produce integer harmonics of 1 MHz, which then are mixed in IC201 with 1st Local Oscillator frequency (55.5 MHz to 84.5 MHz). Of the harmonics mixed with the 1st Local Oscillator signal, only the 52.5 MHz signal is amplified by Q211 – Q213, and fed into Q209. In other words, only those harmonics that will produce 52.5 MHz when mixed with 1st Local Oscillator are applied to the 2nd Mixer. For example, to receive a 4 MHz signal, the 1st Local Oscillator frequency must be 59.5 MHz, so the 7th harmonic from the Harmonics Generator (i.e. 7 MHz) is used to produce required 52.5 MHz.

This 52.5 MHz frequency is down-mixed with 1st IF (55.5 – 54.5 MHz) and produces a 3 – 2 MHz 2nd IF (again note that the signal is "reversed" – i.e. 3 to 2, not 2 to 3 MHz). The 3rd Local Oscillator produces a signal 455 kHz higher than the 2nd IF, and is down-mixed with the 2nd IF at Q302, and a 3rd IF of 455 kHz is produced.

Note that the 55.5 – 84.5 MHz Local Oscillator is used both for 1st and 2nd mixing. This cancels frequency drift. For example, if the 1st heterodyning frequency drifts 1 kHz, the 2nd heterodyning frequency also drifts 1 kHz, thus the drift is cancelled.

For instance:

When tuned to CB Channel 1, 26.965 MHz, and the Local Oscillator is running at 81.6 MHz (but should be 81.5 MHz) this is what happens.

	Actual	Should be
1st Mix.	81.6 – 26.965 = 54.635 MHz	81.5 – 26.965 = 54.535 MHz
2nd Osc.	29 MHz	29 MHz
3rd Mix.	81.6 – 29 = 52.6 MHz	81.5 – 29 = 52.5 MHz
2nd Mix.	54.635 – 52.6 = 2.035 MHz	54.535 – 52.5 = 2.035 MHz

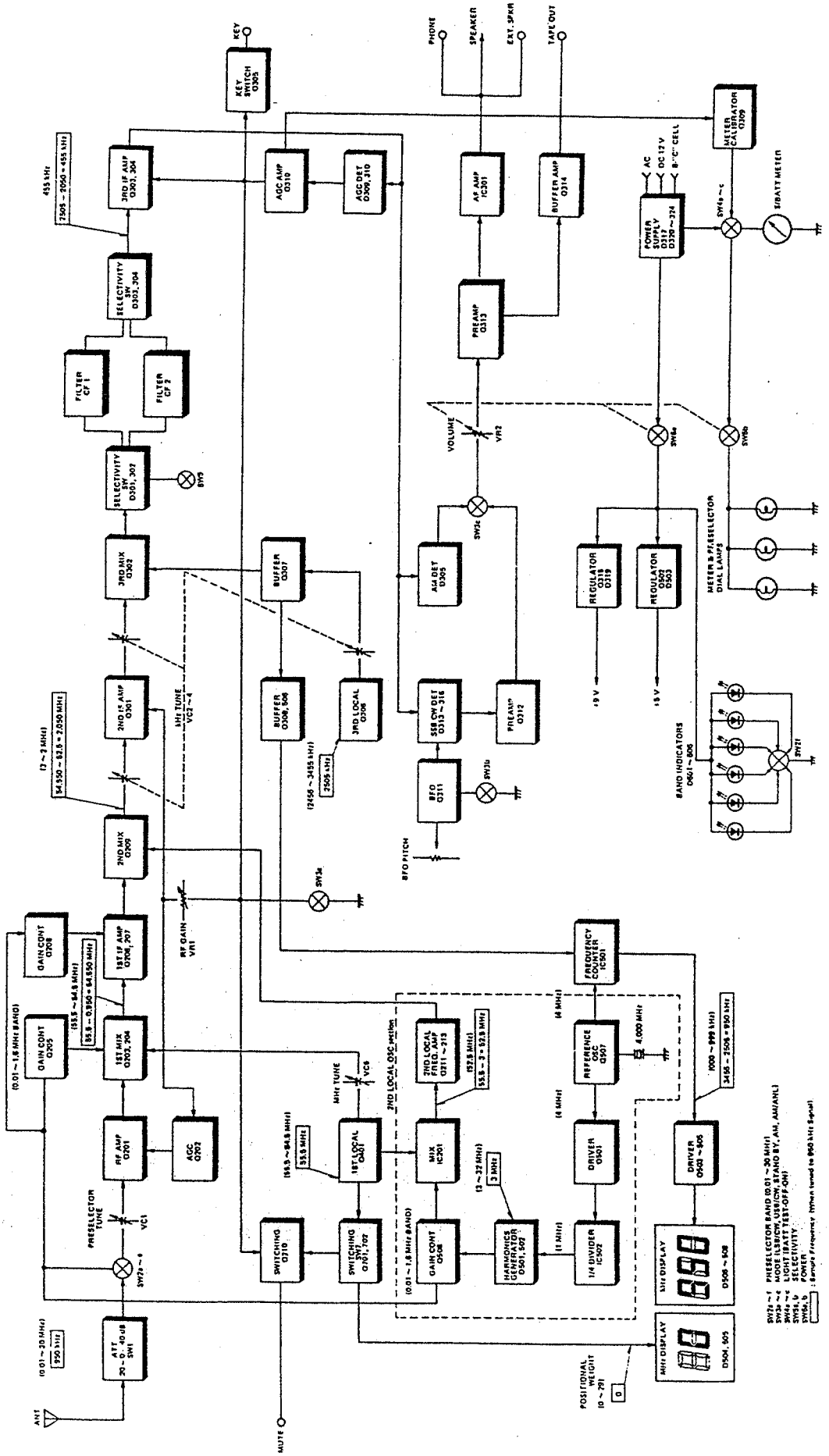
Thus, drift is cancelled.

Frequency Readout:

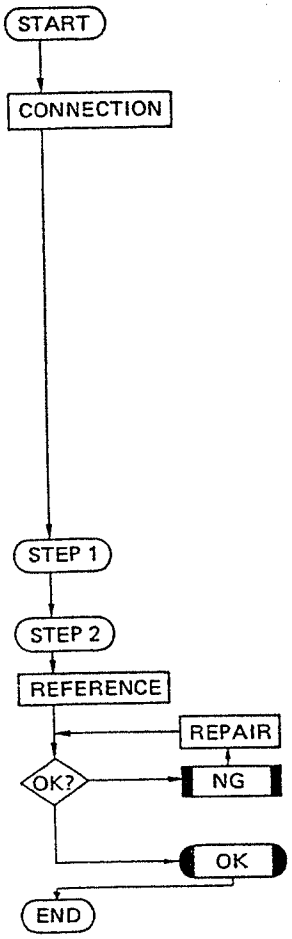
As with Tuning, frequency readout is done in two stages: MHz and kHz.
The MHz indicator is mechanical: MHz tuning capacitor VC5 is mechanically ganged with SW7.
SW7 makes the switch wafer to readout 0 – 29: it will indicate "0" when 1st Osc. is set to 55.5 MHz, "1" for 56.5 MHz, etc. ...

For kHz readout, IC501 counts the 3rd Local Oscillator frequency, which is, (as described above,) the kHz Tuning. The 3rd Osc. signal is buffered and amplified by Q307, Q308 and Q506, and applied to IC501. IC501 then converts this signal and drives the kHz display.

BLOCK DIAGRAM



AF OPERATION CHECK



Connect AF Generator to "hot" end of VOLUME Control.
Connect AC VTVM, Oscilloscope and Distortion Meter to EXT SPKR Jack J3 across 8Ω Dummy Load.
See Figure 1.

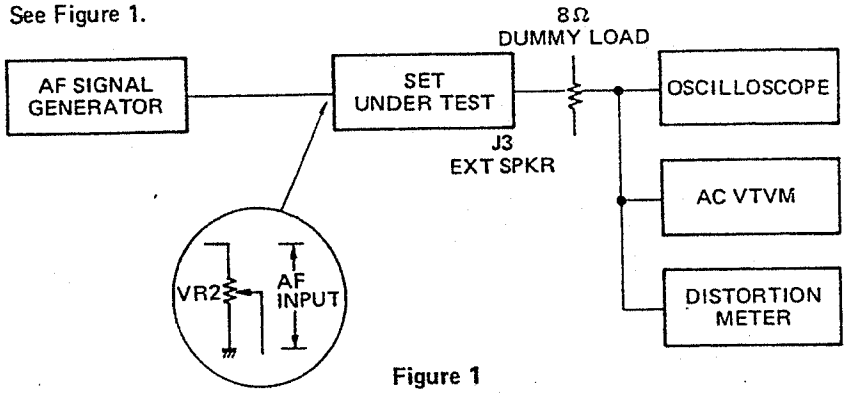


Figure 1

Control setting : VOLUME (max), Mode (AM)
AF Generator setting : 1 kHz

Check AF Output with 10 – 20 mV input.

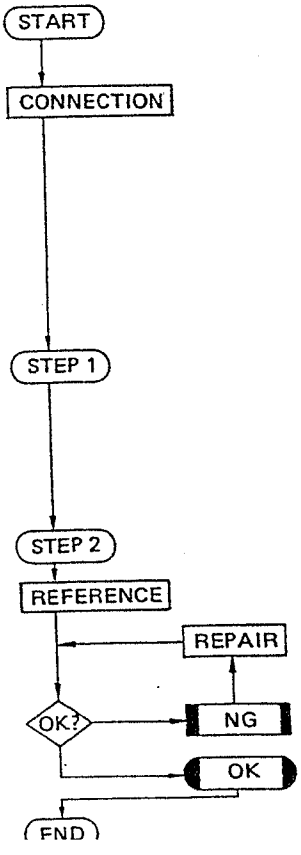
AF Output Power should be 0.5 W with 10 – 20 mV input.

Check AF circuit. See Troubleshooting 3).

AF Output Power is not 0.5 W with 10 – 20 mV input and/or Distortion is over 10%.

AF Output Power is 0.5 W with 10 – 20 mV input and Distortion is less than 10%.

2ND/3RD IF OPERATION CHECK



Connect SG to TP 202 through a 2pF capacitor.
Connect AC VTVM and Oscilloscope to EXT SPKR Jack J3 across 8Ω Dummy Load. See Figure 2.

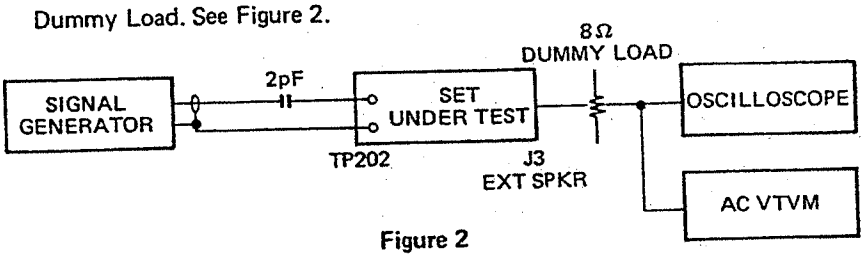


Figure 2

Control setting : Mode (AM), VOLUME (max), RF GAIN (max) SELECTIVITY (WIDE)

Signal Generator : 2.5 MHz (1 kHz, 30% Mod.)

MHz/kHz Tuning : 10.500 MHz

Check AF Output level with 700 – 1400 μV input.

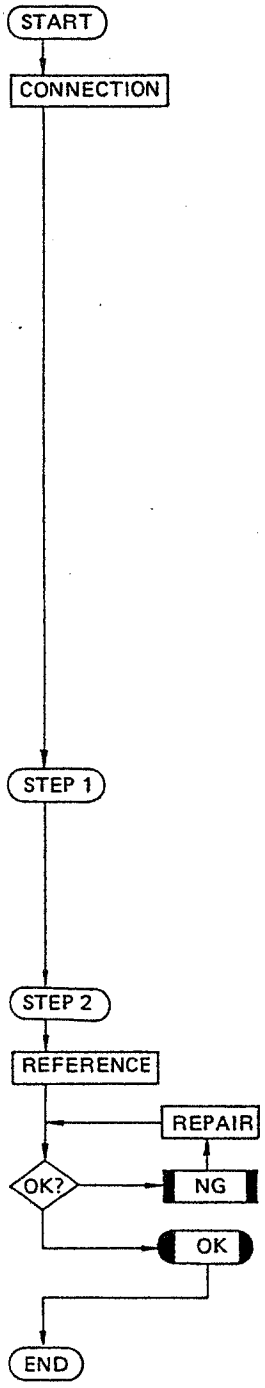
AF Output level should be 3 V with 700 – 1400 μV input.

Check 2nd IF Stage, 3rd IF Stage, DET circuit and/or associated circuit components.

AF Output level is not 3 V with 700 – 1400 μV input.

AF Output level is 3 V with 700 – 1400 μV input.

1ST IF OPERATION CHECK



Connect SG to TP201 and AC VTVM to TP202. See Figure 4.

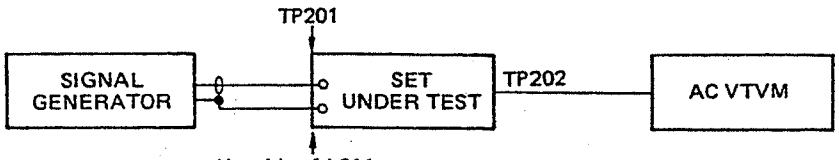


Figure 4

NOTE

1. Connect Pin-2 of TP401 to Pin-3 of TP401 in order to inhibit the 1st Local Oscillator.
2. Supply GND level to the point where C248 and a coaxial cable is jointed in order to inhibit the output of Harmonics Generator (D501, D502).

Control Setting : Mode (AM)
PRESELECTOR BAND (4.5 – 12 MHz)
PRESELECTOR TUNE (10 MHz)
MHz/kHz Tuning (10.5 MHz)

Signal Generator Setting : 55 MHz (No Mod.)

Increase SG output until 50 mV (100 mV) reading is obtained on AC VTVM.

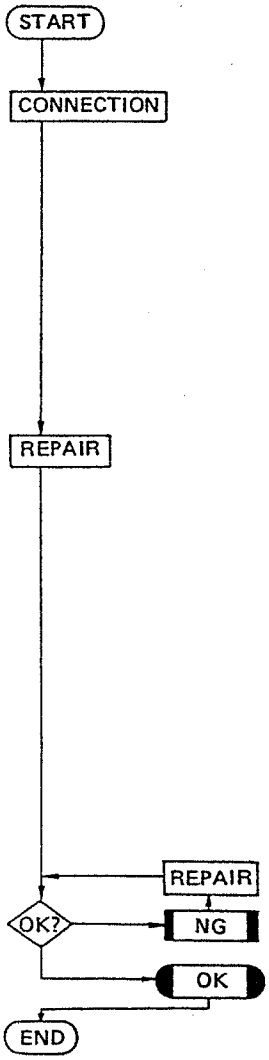
SG output is 2.1 – 8.4 mV (4.2 – 16.8 mV).

Check 1st IF stage and/or associated circuit components.

SG output is not 2.1 – 8.4 mV (4.2 – 16.8 mV).

SG output is 2.1 – 8.4 mV (4.2 – 16.8 mV).

1ST LOCAL OSC OPERATION CHECK



Connect Frequency Counter to TP401 through a Buffer circuit;
See Figure 5.

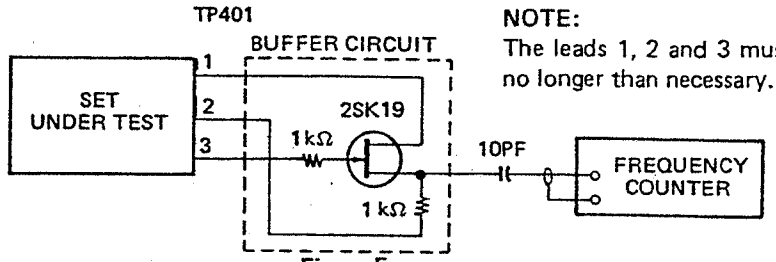


Figure 5

NOTE:
The leads 1, 2 and 3 must be no longer than necessary.

The following readings should be obtained on Frequency Counter in accordance with MHz Tuning.

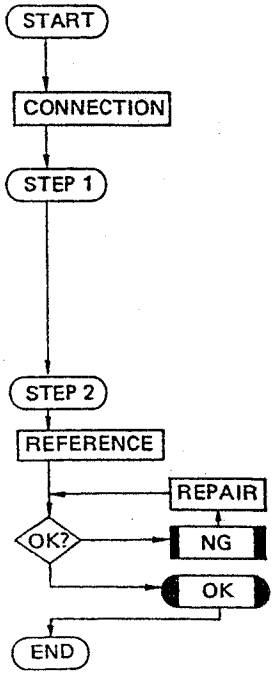
MHz Readout (MHz)	Frequency Counter Readings (MHz)
0	55.5 ± 0.1
1	56.5 ± 0.1
2	57.6 ± 0.1
.	.
.	.
.	.
28	83.5 ± 0.1
29	84.5 ± 0.1

See 1ST LOCAL OSC ALIGNMENT on page 19.

The reading does not meet the chart.

The reading meet the chart.

2ND LOCAL FREQ. AMP OPERATION CHECK



Connect SG to "hot" side of L211 and AC VTVM to TP202.
See Figure 4.

Control Setting : Mode (AM)
PRESELECTOR BAND (4.5 – 12 MHz)
PRESELECTOR TUNE (10 MHz)
MHz/kHz Tuning (10.5 MHz)

Signal Generator Setting : 52.5 MHz (No Mod.)

Increase SG output until 50 mV (100 mV) reading is obtained on AC VTVM.

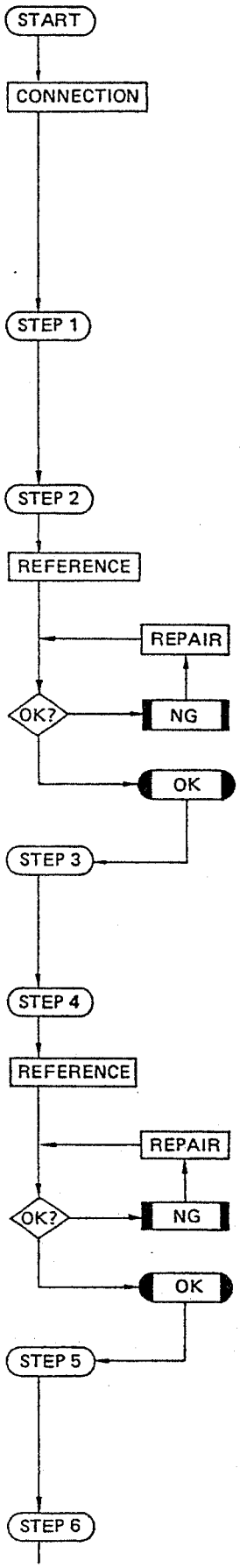
SG output is 2.4 – 8.9 mV (6.3 – 25 mV).

Check Q211 – Q213 and/or associated circuit components.

SG output is not 2.4 – 8.9 mV (6.3 – 25 mV).

SG output is 2.4 – 8.9 mV (6.3 – 25 mV).

TOTAL GAIN CHECK



Connect SG to ANT Jack A-1 and DC VTVM to TP 302. See Figure 3.

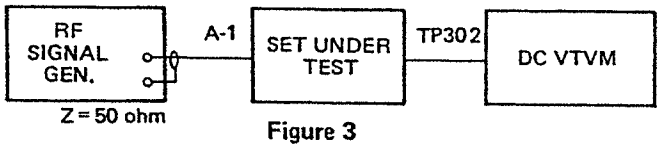


Figure 3

Control Setting : RF GAIN (max.)
PRESELECTOR BAND (0.01 – 0.15) MHz/kHz Tuning (100 kHz)

SG Setting : 100 kHz
SELECTIVITY : WIDE

Increase SG output until 0.2 V reading is obtained on DC VTVM.

SG output is 3.55 – 14μV

Check RF and/or IF Stage and/or associated components.

SG output is more than 14 μV

SG output is 3.55 – 14 μV

Control Setting : PRESELECTOR BAND (0.15 – 0.5) MHz/kHz Tuning (300 kHz)

SG Setting : 300 kHz

Increase SG output until 0.2 V reading is obtained on DC VTVM.

SG output is 0.9 – 3.5 μV

Check RF Stage and/or associated circuit components.

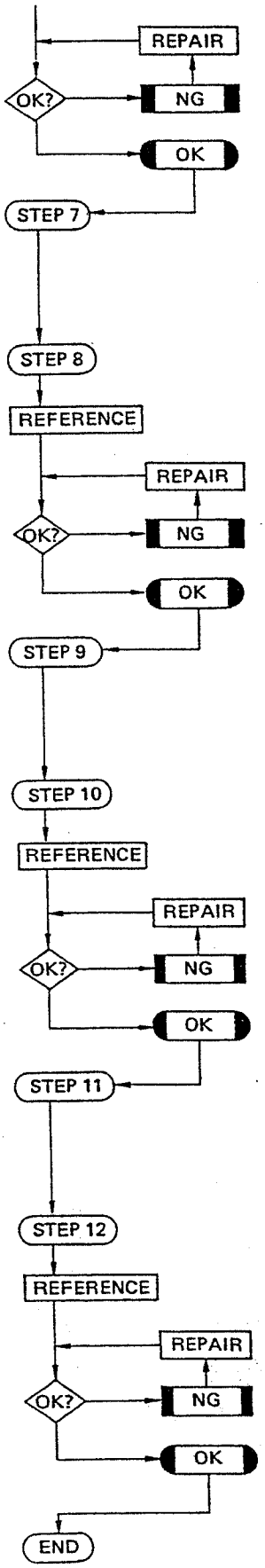
SG output is more than 3.5 μV

SG output is 0.9 – 3.5 μV

Control Setting : PRESELECTOR BAND (0.5 – 1.6) MHz/kHz Tuning (900 kHz)

SG output : 900 kHz

Increase SG output until 0.2 V reading is obtained on DC VTVM.



Check RF Stage and/or associated circuit component.

SG output is more than 1.6 μV

SG output is 0.5 – 1.6 μV

Control Setting : PRESELECTOR BAND (1.6 – 4.5) MHz/kHz Tuning (3.1 MHz)

SG Setting : 3.1 MHz

Increase SG output until 0.24 V reading is obtained on DC VTVM.

SG output is 0.5 – 2 μV

Check RF Stage and/or associated circuit components.

SG output is more than 2 μV

SG output is 0.5 – 2 μV

Control Setting : PRESELECTOR BAND (4.5 – 12) MHz/kHz Tuning (7.1 MHz)

SG Setting : 7.1 MHz

Increase SG output until 0.24 V reading is obtained on DC VTVM.

SG output is 0.5 – 2 μV

Check RF Stage and/or associated circuit component.

SG output is more than 2 μV

SG output is 0.5 – 2 μV

Control Setting : PRESELECTOR BAND (12 – 30) MHz/kHz Tuning (21.1 MHz)

SG Setting : 21.1 MHz

Increase SG output until 0.24 V reading is obtained on DC VTVM.

SG output is 0.7 – 3 μV

Check RF Stage and/or associated circuit component.

SG output is more 3 μV

SG output is 0.7 – 3 μV

PRESELECTOR DIAL CALIBRATION

CONTROL SETTING	Set PRESELECTOR TUNE fully counter-clockwise.
CALIBRATION	Hold PRESELECTOR TUNE knob with your hand, and set the gear (1), shown in Figure 6, so that the Preselector Dial is as shown in Figure 7.

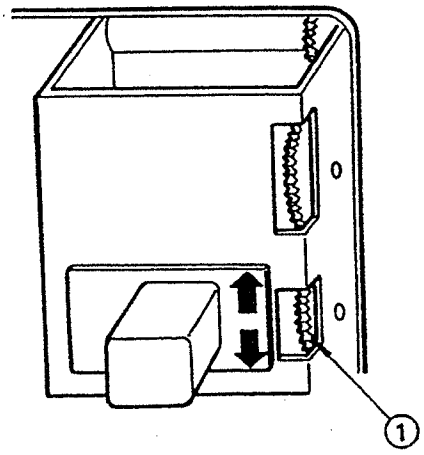


Figure 6

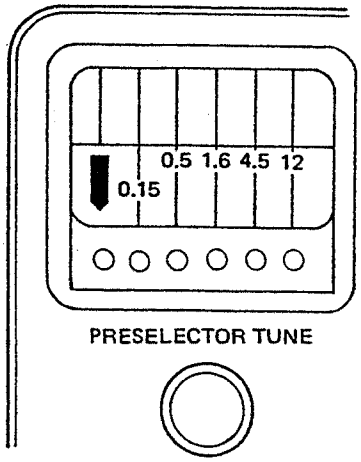


Figure 7

LINKAGE ADJUSTMENT OF MHz SWITCH

PRECAUTION: Do the mechanical adjustment only it is actually necessary after CHECK or you have replaced some parts. Do any necessary adjustment of VR-201 brfore attempting the following adjustment procedure.

CONTROL SETTING	OFF/VOLUME : ON MHz Tune : fully clockwise
CHECK	Check the MHz Tuning indication; rotating the MHz Tuning in the counter-clockwise direction causes the MHz Tuning display to vary in 29, 28, ... 1, 0, sequence and eventually disappear.
ADJUSTMENT	Loosen screw (1) on MHz Switch shaft. Turn the shaft of MHz Switch in the direction that results in a MHz sequence indication of 0, 1, ... 28, 29; tighten screw (1) at the precise point where the 29 MHz indication disappears. To avoid poor tracking, be sure to make this shaft setting very precisely.

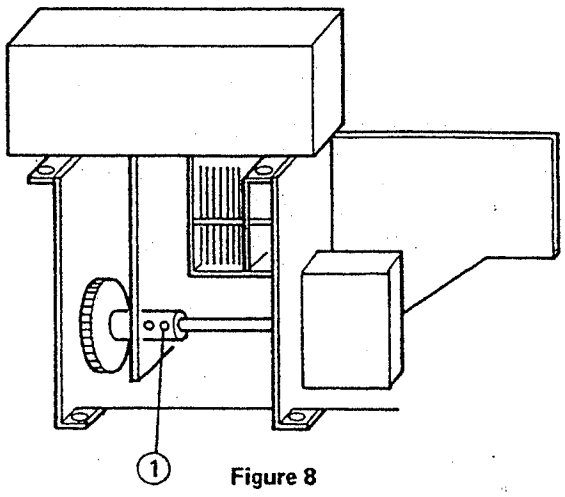


Figure 8

3RD IF ALIGNMENT

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 9	OFF/VOLUME: ON Mode: AM RF GAIN: Max. MHz Tuning: 1 MHz kHz Tuning: 500 kHz	455 kHz 1 mV ± 3 dB (NO MOD.)	T301, T302	Adjust T301 and T302 for max. reading (approx. −0.5V) on DC VTVM.
2	Same as Step 1	Same as Step 1	455 kHz 50 mV ±3 dB (NO MOD.)	Same as Step 1	Adjust T301 and T302 for max. reading (approx. −0.6V) on DC VTVM.

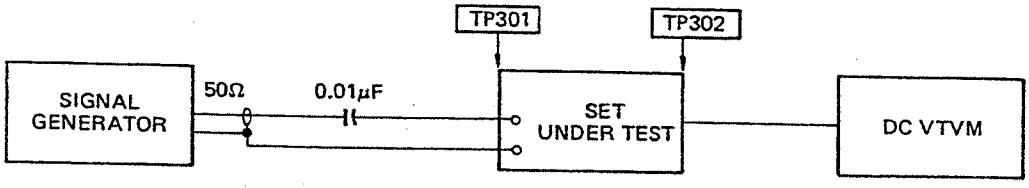


Figure 9

ALIGNMENT OF kHz TRACKING

STEP	CONTROL SETTING	ADJUSTMENT	REMARKS
1	OFF/VOLUME: ON Mode: AM MHz Tuning: 10 MHz Preset kHz Tuning to fully counterclockwise and return it approximately 1-1/4 turns from the point when slipping starts.	TC303	Adjust TC303 for kHz Read-out of "000".
2	OFF/VOLUME: ON Mode: AM MHz Tuning: 10 MHz Set kHz Tuning fully clockwise and return it approximately 1-1/4 turns from the point when slipping starts.	L308	Adjust L308 for kHz Read-out of "999".
3	Repeat Steps 1 and 2 a couple of times.		

2ND IF ALIGNMENT

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 10	OFF/VOLUME: ON Mode: AM RF GAIN: Max. VOLUME: Max. MHz Tuning: 10 MHz kHz Tuning: 900 kHz	2.1 MHz 1 mV (10 mV) ±3 dB 1 kHz 30% Mod.	L301, L303	Adjust L301 and L303 for max. reading [approx. 3 V (3.5 V)] on AC VTVM.
2	Same as Step 1	OFF/VOLUME: ON Mode: AM RF GAIN: Max. VOLUME: Max. MHz Tuning: 10 MHz kHz Tuning: 100 kHz	2.9 MHz 1 mV (10 mV) ±3 dB 1 kHz 30% Mod.	TC301, TC302	Adjust TC301 and TC302 for max. reading [approx. 3 V (3.5 V)] on AC VTVM.
3	Repeat Steps 1 and 2 until no further improvement can be obtained.				

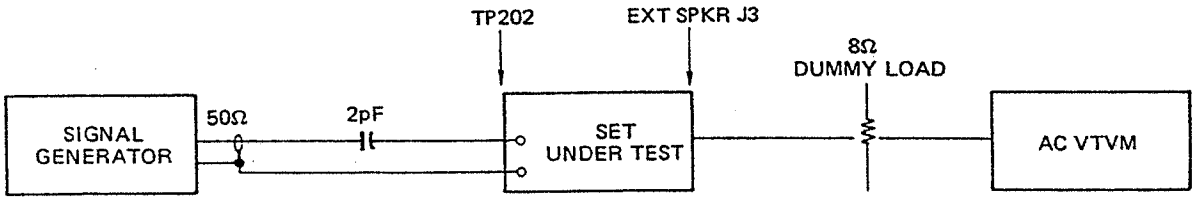


Figure 10

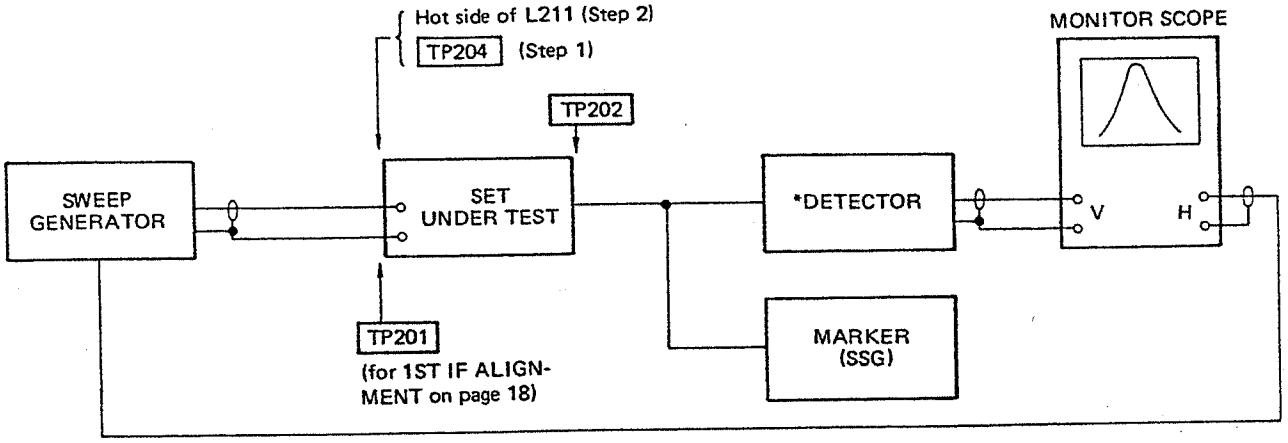
NOTE: Remember, 2nd IF is "reversed"; 3 to 2 MHz, not 2 to 3 MHz. Thus SG frequency should be 2.1 MHz for 2.9 MHz reception and 2.9 MHz for 2.1 MHz reception.

CRYSTAL FREQUENCY ALIGNMENT

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	ADJUSTMENT	REMARKS
	Connect a Frequency counter to TP501 and ground	OFF/VOLUME: ON	TC501	Adjust TC501 for 1000.000 kHz ±10Hz reading on Frequency Counter.

ALIGNMENT OF 2ND LOCAL FREQ. AMP

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 11	OFF/VOLUME : ON Mode : AM PRESELECTOR BAND : 4.5 – 12 MHz PRESELECTOR TUNE : 10 MHz MHz Tuning : 10 MHz kHz Tuning : 500kHz	Center Freq. 52.5 MHz Sweep Width 52.5 ± 2 MHz	L214 ~ L219	Set marker frequency to 52.5 MHz. Adjust L214 ~ L219 to peak on monitor scope.
2	Refer to Figure 11	Same as Step 1	Same as Step 1	L212 ~ 219	Set marker frequency to 52.5 MHz. Adjust L212 ~ L219 to obtain the characteristic curve as shown in Figure 12. The core position of each coil should be approximately as illustrated in Figure 13.



*** DETECTOR CIRCUIT**

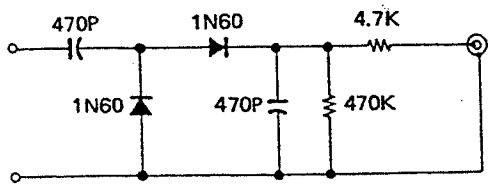


Figure 11

NOTE

1. Connect Pin-2 of TP401 to Pin-3 of TP401.
2. Keep leads between DET. and TP202 as short as possible.

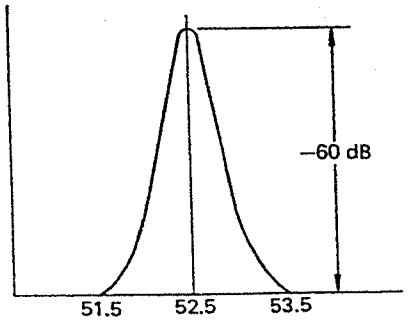


Figure 12

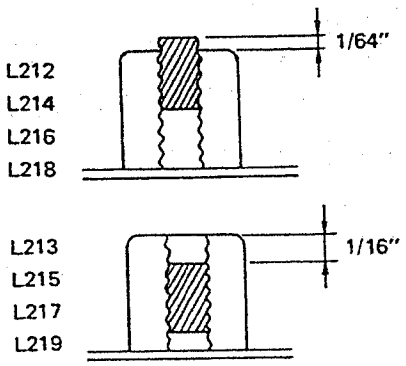


Figure 13

1ST IF ALIGNMENT

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 11	OFF/VOLUME: ON Mode: AM PRESELECTOR BAND : 4.5 ~ 12 MHz PRESELECTOR TUNE : 10 MHz MHz Tuning : 10 MHz kHz Tuning : 500 kHz	Center Freq. 55 MHz Sweep Width 55 ± 2 MHz	L203 ~ L208	Set marker frequency to 54.5 MHz, 55.0 MHz and 55.5 MHz. Adjust L203 ~ 208 to obtain the characteristic curve as shown in Figure 14. The core positions of each coil should be approximately as illustrated in Figure 15.

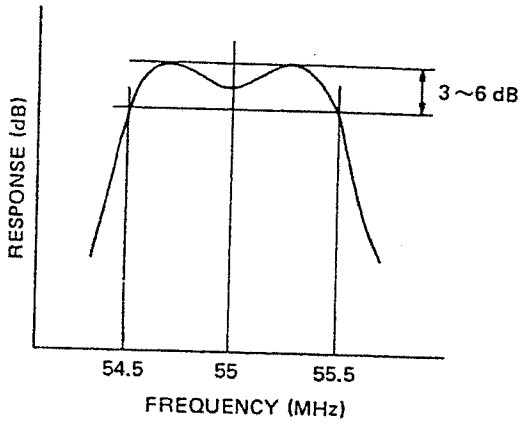


Figure 14

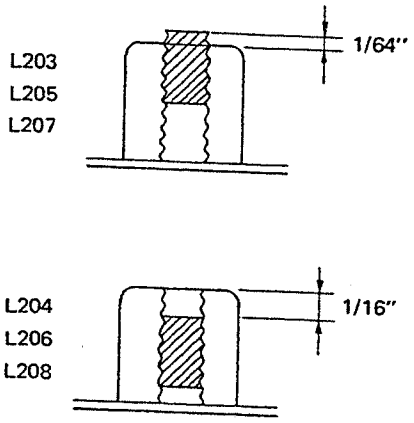


Figure 15

PRECAUTION FOR VR201 AND 1ST LOCAL OSC ALIGNMENT

Any adjustment of VR201, TC401, TC402 and T401 must be made with great precision. Do not attempt any adjustment unless absolutely necessary.

VR201 ALIGNMENT

NOTE: VR201 affects the MHz tracking. Thus, if you find it mandatory to adjust VR201, do so before finalizing MHz tracking. If VR201 adjustment has little effect, return it to the original setting.

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 16	OFF/VOLUME : ON Mode : AM RF GAIN : Max. PRESELECTOR BAND : 0.15 – 0.5 MHz PRESELECTOR TUNE : 0.5 MHz MHz Tuning : 0 MHz kHz Tuning : 500 kHz	500 kHz output : For approx. "3" ~ "5" reading on S-Meter	VR201	Adjust VR201 for max. reading on S-Meter.

1ST LOCAL OSC ALIGNMENT

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 16	OFF/VOLUME : ON VOLUME : For the desired audio output. Mode : AM RF GAIN : Max. ATTEN : 0 dB PRESELECTOR BAND : 1.6 – 4.5 MHz PRESELECTOR TUNE : 3.5 MHz MHz Tuning : 3 MHz kHz Tuning : 500 kHz	3.5 MHz	T401	Set trimmers TC401 and TC402 to mid-capacity point. Adjust T401 to receive SG signal.
2	Same as Step 1	OFF/VOLUME : ON VOLUME : For the desired audio output. Mode : AM RF GAIN : Max. ATTEN : 0 dB PRESELECTOR BAND : 12 – 30 MHz PRESELECTOR TUNE : 28 MHz MHz Tuning : 28 MHz kHz Tuning : 000 kHz	3.5 MHz	TC402	Adjust TC402 to receive the 8th harmonic of SG signal (28 MHz).
3	Repeat Step 1 and Step 2. Check tracking at 10.5 MHz, 17.5 MHz and 24.5 MHz. Adjust TC401 as required for optimum tracking.				
4	As a final check, make sure 1 MHz step tracking is correct all the way from 500 kHz to 29.5 MHz.				

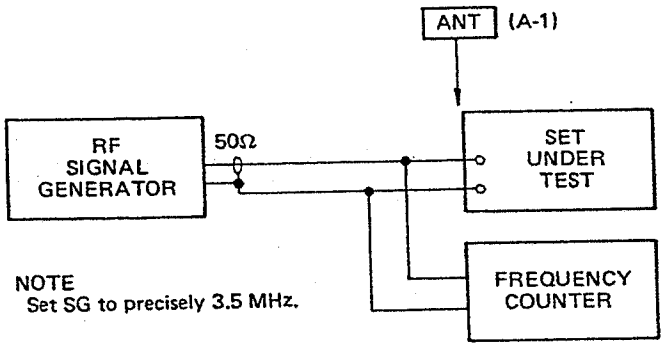


Figure 16

RF STAGE ALIGNMENT

NOTE: Maintain SG output level at minimum necessary to obtain usable output (3-4 readings on S-Meter).

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 16	OFF/VOLUME: ON VOLUME : For the desired audio output. Mode : AM RF GAIN : Max. ATTEN : 0 dB PRESELECTOR BAND : 0.15 ~ 0.5 MHz MHz Tuning : To the point where the max. noise appears with MHz readout at "0". kHz Tuning : 150 kHz PRESELECTOR TUNE : 150 kHz	150 kHz 1kHz 30% Mod.	T202	Adjust T202 for max. reading on S-Meter.
2	Same as Step 1	PRESELECTOR TUNE : 500 kHz kHz Tuning : 500 kHz Other Controls Setting : Same as Step 1	500 kHz 1kHz 30% Mod.	TC201	Adjust TC201 for max. reading on S-meter.
3	Repeat Step 1 and 2 until no further improvement can be obtained.				
4	Same as Step 1	PRESELECTOR BAND : 0.5 ~ 1.6 MHz PRESELECTOR TUNE : 600 kHz kHz Tuning : 900 kHz Other Controls Setting : Same as Step 1	600 kHz 1kHz 30% Mod.	T203	Adjust T203 for max. reading on S-Meter.
5	Same as Step 1	PRESELECTOR TUNE : 1.6 MHz MHz/Tuning : 1.6 MHz Other Controls Setting : Same as Step 1	1.6 MHz 1 kHz 30% Mod.	TC202	Adjust TC202 for max. reading on S-meter.
6.	Repeat Step 4 and 5 until no further improvement can be obtained.				
7	Same as Step 1	PRESELECTOR BAND : 1.6 ~ 4.5 MHz PRESELECTOR TUNE : 1.8 MHz MHz/kHz Tuning : 1.8 MHz Other Controls Setting : Same as Step 1	1.8 MHz 1 kHz 30% Mod.	T204	Adjust T204 for max. reading on S-Meter.
8	Same as Step 1	PRESELECTOR TUNE : 4.5 MHz MHz/kHz Tuning : 4.5 MHz Other Controls Setting : Same as Step 1	4.5 MHz 1 kHz 30% Mod.	TC203	Adjust TC203 for max. reading on S-Meter.
9	Repeat Steps 7 and 8 until no further improvement can be obtained.				
10	Same as Step 1	PRESELECTOR BAND : 4.5 ~ 12 MHz PRESELECTOR TUNE : 5.010 MHz MHz/kHz Tuning : 5.010 MHz Other Controls Setting : Same as Step 1	5.010 MHz 1 kHz 30% Mod.	T205	Adjust T205 for max. reading on S-Meter.
11	Same as Step 1	PRESELECTOR TUNE : 11.010 MHz MHz/kHz Tuning : 11.010 MHz Other Controls Setting : Same as Step 1	11.010 MHz 1 kHz 30% Mod.	TC204	Adjust TC204 for max. reading on S-Meter.
12	Repeat Steps 10 and 11 until no further improvement can obtained.				
13	Same as Step 1	PRESELECTOR BAND : 12 ~ 30 MHz PRESELECTOR GUNE : 13.010 MHz MHz/kHz Tuning : 13.010 MHz Other Controls Setting : Same as Step 1	13.010 MHz 1 kHz 30% Mod.	T206	Adjust T206 for max. reading on S-Meter.
14	Same as Step 1	PRESELECTOR TUNE : 28.010 MHz MHz/kHz Tuning : 28.010 MHz Other Controls Setting : Same as Step 1	28.010 MHz 1 kHz 30% Mod.	TC205	Adjust TC205 for max. reading on S-Meter.
15	Repeat Steps 13 and 14 until no further improvement can be obtained.				

BFO ALIGNMENT

NOTE : Set each control for max. reading on S-Meter.

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 16	OFF/VOLUME : ON VOLUME : For the desired audio Mode : LSB/CW PRESELECTOR BAND : 4.5 ~ 12 MHz PRESELECTOR TUNE : 7.1 MHz RF GAIN : Max. ATTEN : 0 dB SELECTIVITY : WIDE MHz/kHz : 7.1 MHz BFO PITCH : Center position	7.1 MHz 100 μV (No Mod.)	L312	Adjust L312 for zero-beat. Set Mode to USB/CW and adjust kHz Tuning to obtain zero-beat. At this time kHz Readout must be "103" ~ "105"
2	Same as Step 1	Set MHz/kHz Tuning for max. reading on S-Meter. (7.1 MHz) Other Controls Setting : Same as Step 1	Same as Step 1	Same as Step 1	Alternate between LSB and USB and adjust L312 so the zero-beat is obtained at the same level on S-Meter.

S-METER ALIGNMENT

NOTE

1. After checking the specified sensitivities in all bands, adjust S-Meter sensitivity.
2. Set each control for max. reading on S-Meter.

STEP	TEST INSTRUMENT CONNECTION	CONTROL SETTING	SIGNAL GENERATOR SETTING	ADJUSTMENT	REMARKS
1	Refer to Figure 16	OFF/VOLUME : ON Mode : AM PRESELECTOR BAND : 4.5 – 12 MHz PRESELECTOR TUNE : 7.1 MHz RF GAIN : Max. ATTEN : 0 dB MHz/kHz Tuning : 7.1 MHz	7.1 MHz 1 mV 1 kHz 30% Mod.	VR302	Adjust VR302 for full-scale reading on S-Meter.
2	Same as Step 1	Same as Step 1	7.1 MHz 30 μV 1 kHz 30% Mod.	VR301	Adjust VR301 for a reading of 9 on S-Meter.

TROUBLESHOOTING GUIDE

Symptom	Possible Cause
1) Pilot Lamp does not light and/or set fails to operate when power is ON.	A) Faulty power cord. B) Defective Q315 and/or associated circuit components. C) Defective lamp.
2) Fuse blows.	A) Short-circuit in the DC regulator circuit. B) Short-circuit in the power amplifier circuit.
3) Pilot Lamp lights but no sound on any band.	A) Defective Speaker. B) Defective PHONE and/or EXT SPKR Jack. C) Defective IC301 and/or associated circuit components. Proceed to A.F. OPERATION CHECK on page 9. D) Defective Mode switch SW-3.
4) No audio on any band.	A) Faulty Local Oscillator and/or associated circuit components. Proceed to 1ST/2ND LOCAL OSC CHECK on page 13. B) Faulty RF and/or IF Stage and/or associated circuit components. Proceed to TOTAL GAIN CHECK on page 10 – 11.
5) LSB/CW, USB/CW Mode does not function, AM Mode is OK.	A) Defective SSB/CW Detector D313 – D316 and/or associated circuit components. B) Defective BFO Q311 and/or associated circuit components.
6) Noisy	A) Faulty RF Stage amplifier and/or associated circuit components. Proceed to TOTAL GAIN CHECK on page 10 – 11. B) Faulty IF Stage amplifier and/or associated circuit components. Proceed to TOTAL GAIN CHECK on page 10 – 11. C) Defective AF amplifier IC301. Proceed to A.F. OPERATION CHECK on page 9.
7) Incorrect MHz reading.	A) The 1st Local OSC is out of order. See 1ST LOCAL OSC ALIGNMENT on page 18. B) MHz switch and linkage. See LINKAGE ADJUSTMENT OF MHz SWITCH on page 14.
8) Incorrect kHz reading.	A) Mistracking of kHz Tuning. See ALIGNMENT OF kHz TRACKING on page 15. B) IF Stage is out of order. See 1ST/2ND/3RD IF ALIGNMENT.
9) kHz Display is blanked.	A) 3rd Local Osc and/or associated circuit is defective. B) The Reference OSC (4 MHz) is defective. C) Frequency Counter (IC501) is defective.
10) SELECTIVITY WIDE/NARROW does not function.	A) Defective D301 ~ 304 and/or associated circuit components. B) Defective SW5.

SPECIAL NOTE: (1) If a user is annoyed by excessive birdies, which can not be eliminated by proper adjustment of the MHz tuning dial and/or the preselector and band switch, the problem may be caused by 1 MHz harmonics being passed through the 2nd I.F.

The best solution is to be sure that the shield case for the counter PCB is properly grounded (through the two wires from the RF PCB and the 4 screws). Be sure all shielding is secure. Also, try moving wires to see if you can obtain lower level birdies. Birdies with a level of more than 10 μV (S + N/N equals 10 dB) are out of spec; nominal spec is no more than 2 μV at 7.0 MHz.

(2) Typically you can rule out any possibility of image response being responsible for birdies. Consider the following example for the image of 7.1 MHz....

$Fi = Fr + 2IF$

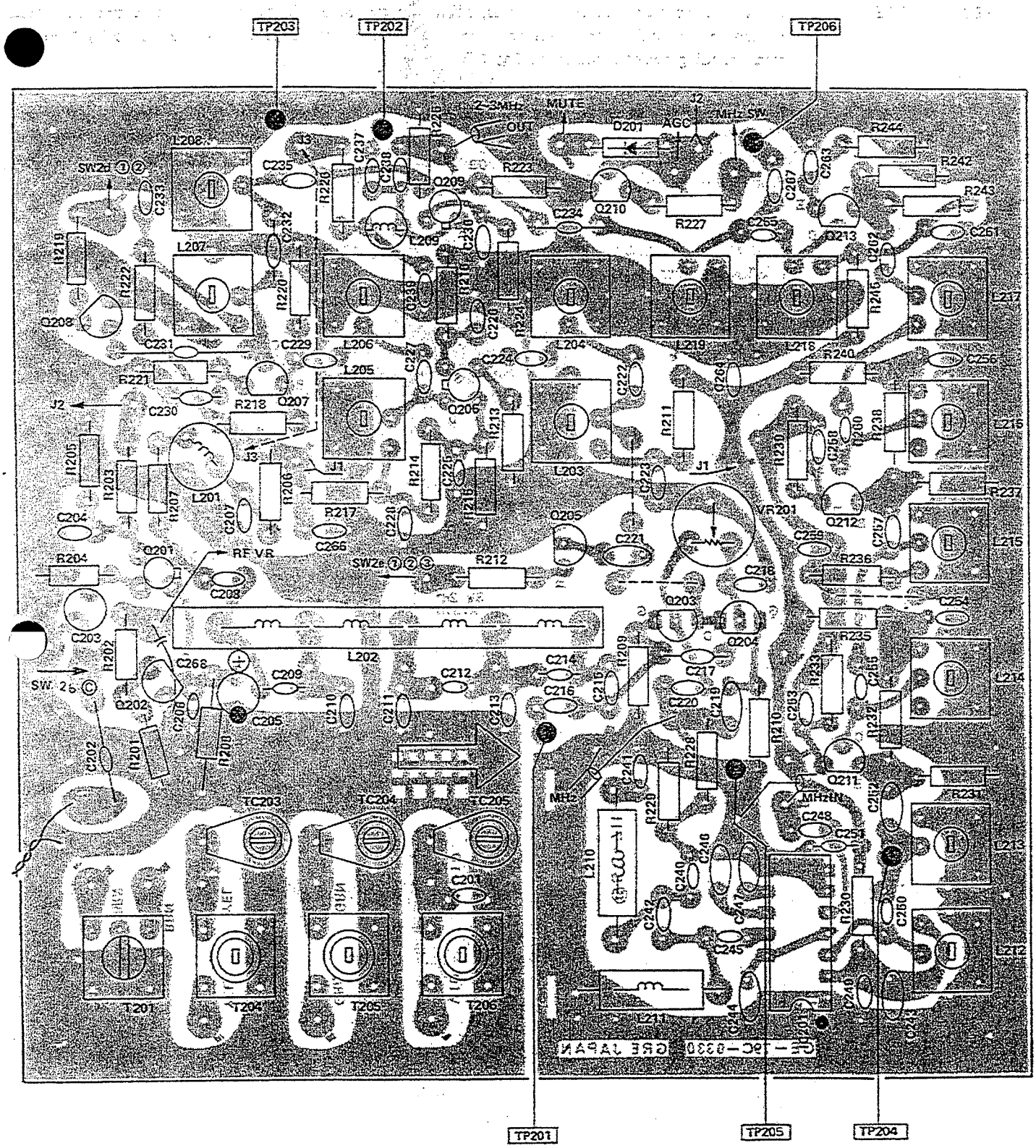
Fi : Image Frequency
Fr : Receiving Frequency
IF = 55.5 MHz – (Fr – integral part)

For instance :

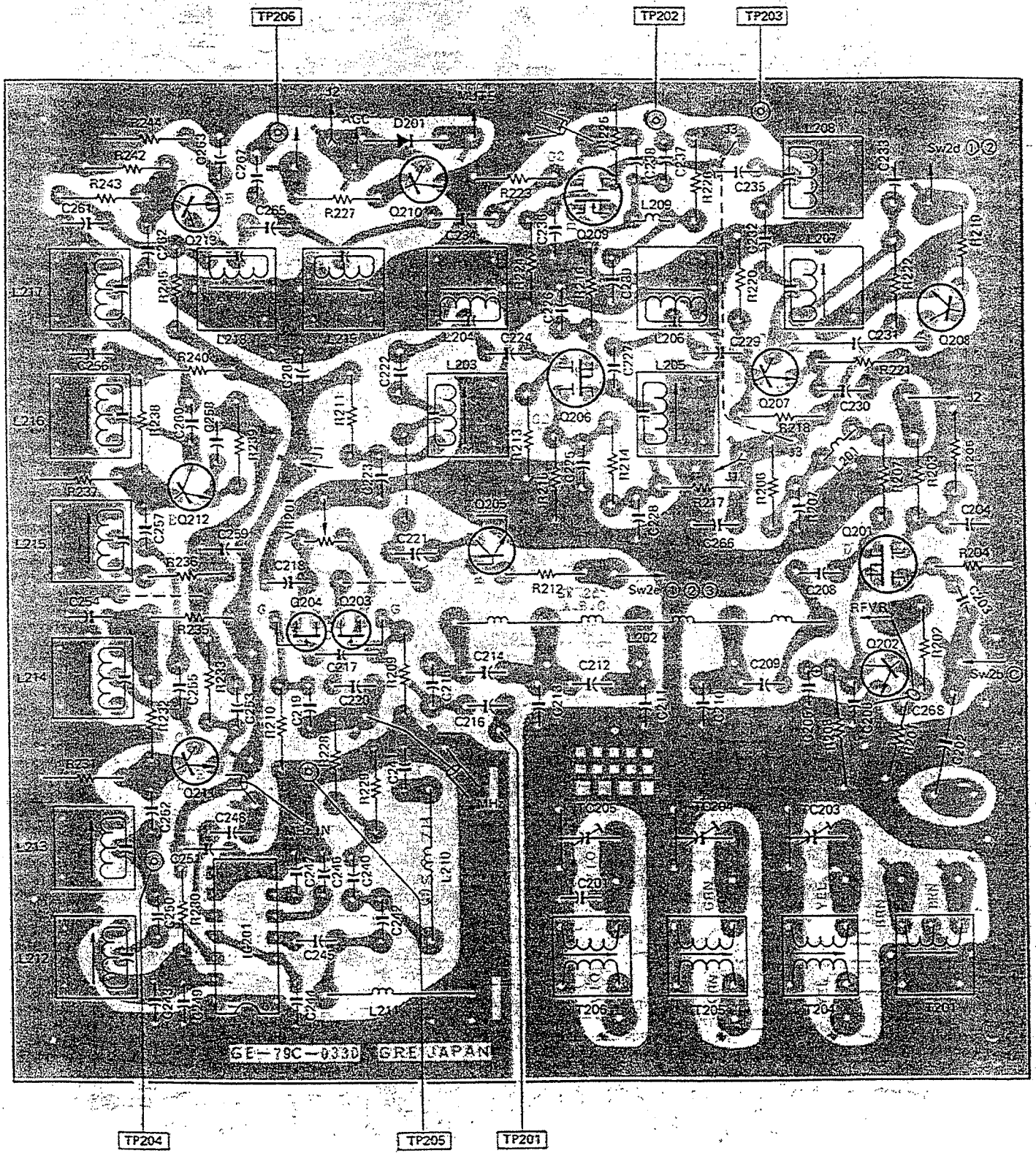
$Fr = 7.1$ MHz

$$Fi = 7.1 + 2\{55.5 - (7.1 - 7)\}$$
$$= 7.1 + 2 \times 55.4$$
$$= 117.9 \text{ MHz}$$

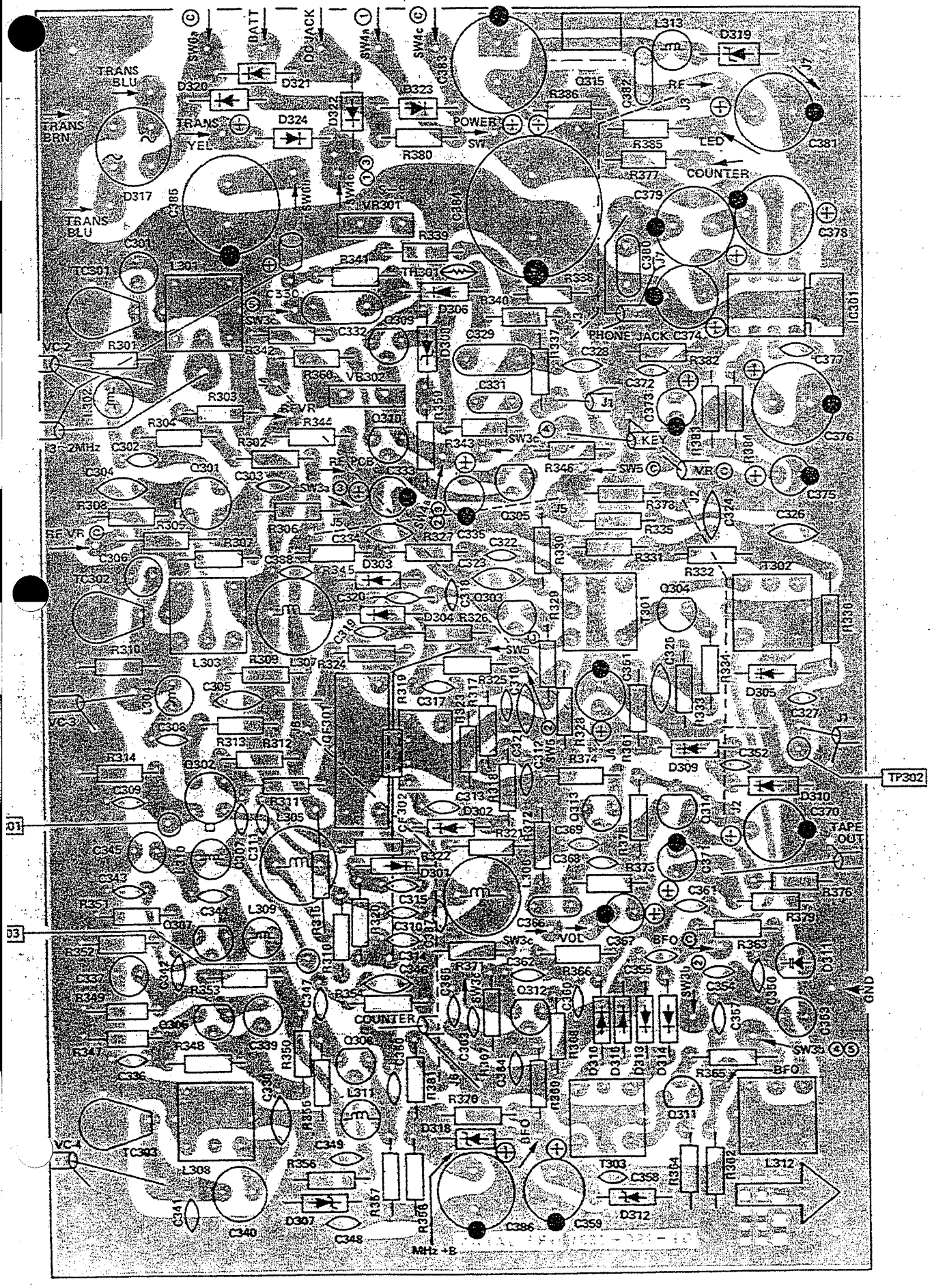
RF P.C. BOARD, TOP VIEW



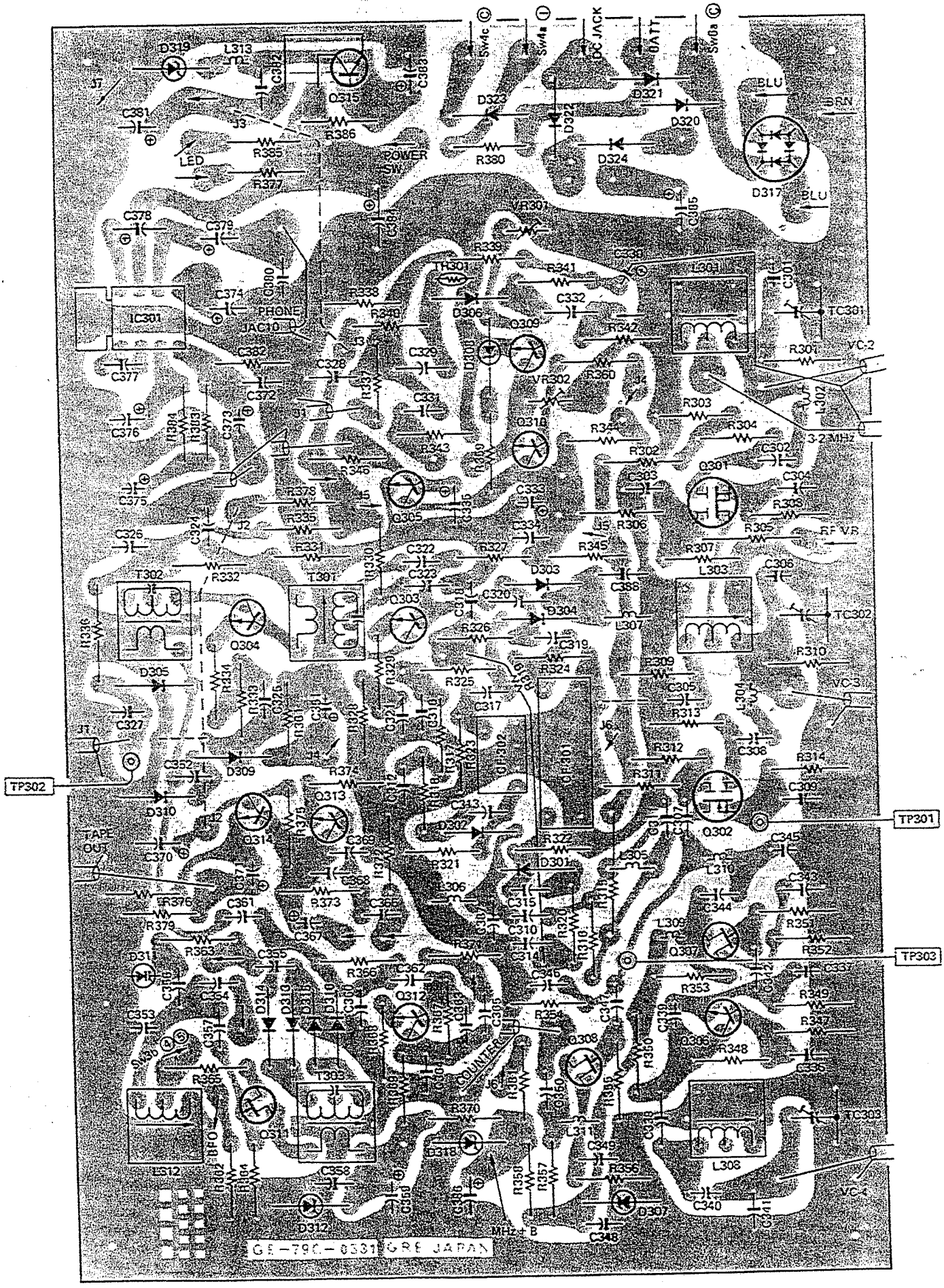
RF P.C. BOARD, BOTTOM VIEW



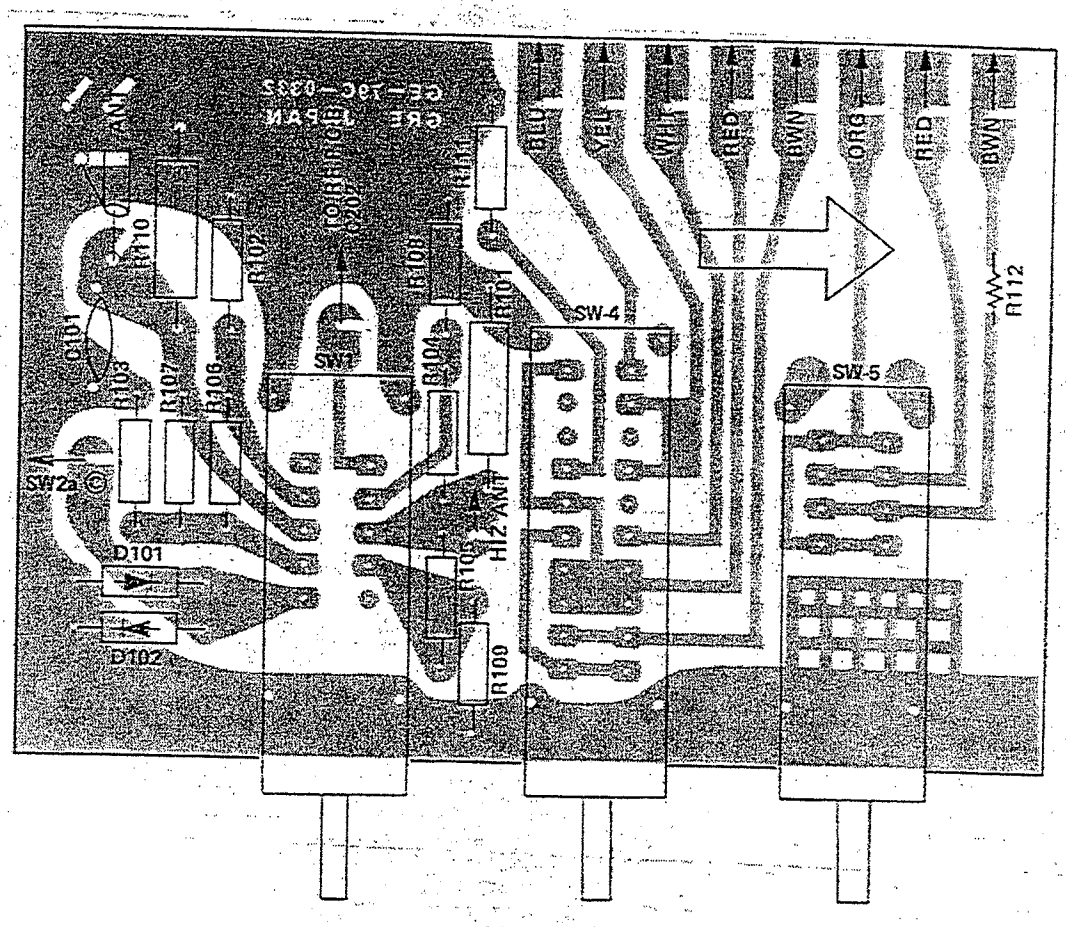
F/AF P.C. BOARD, TOP VIEW



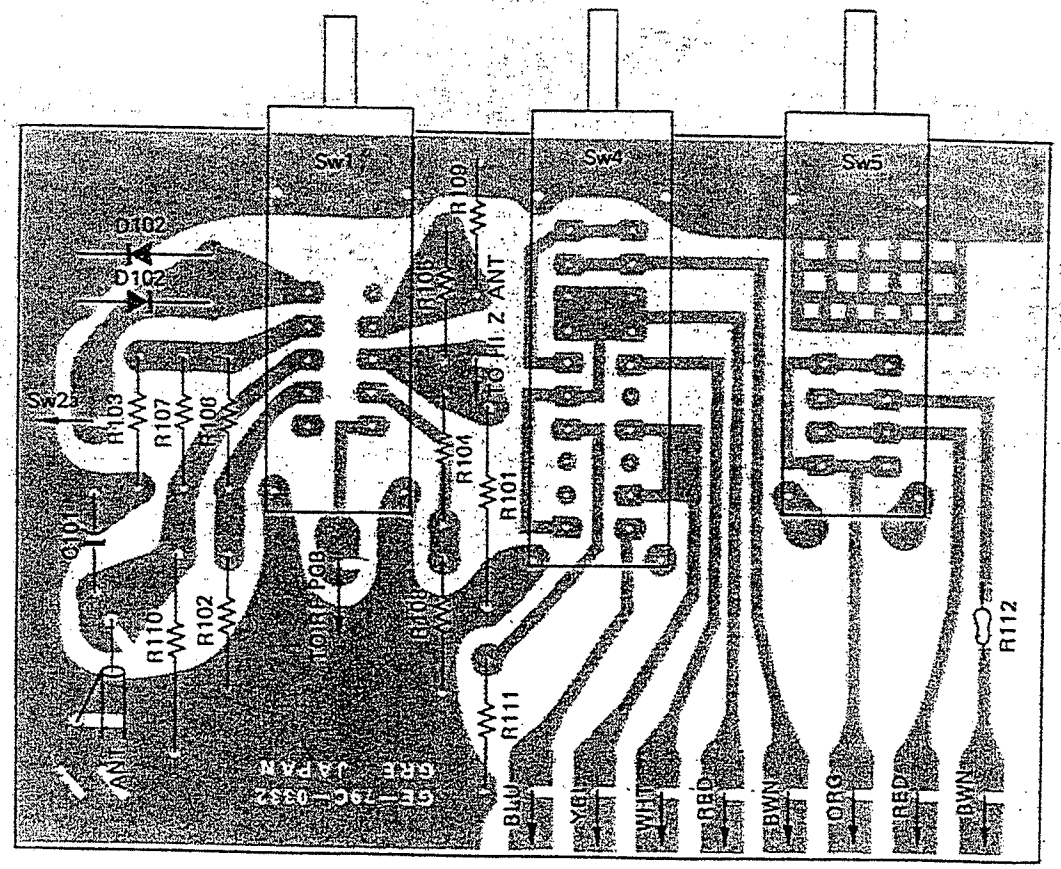
IF/AF P.C. BOARD, BOTTOM VIEW



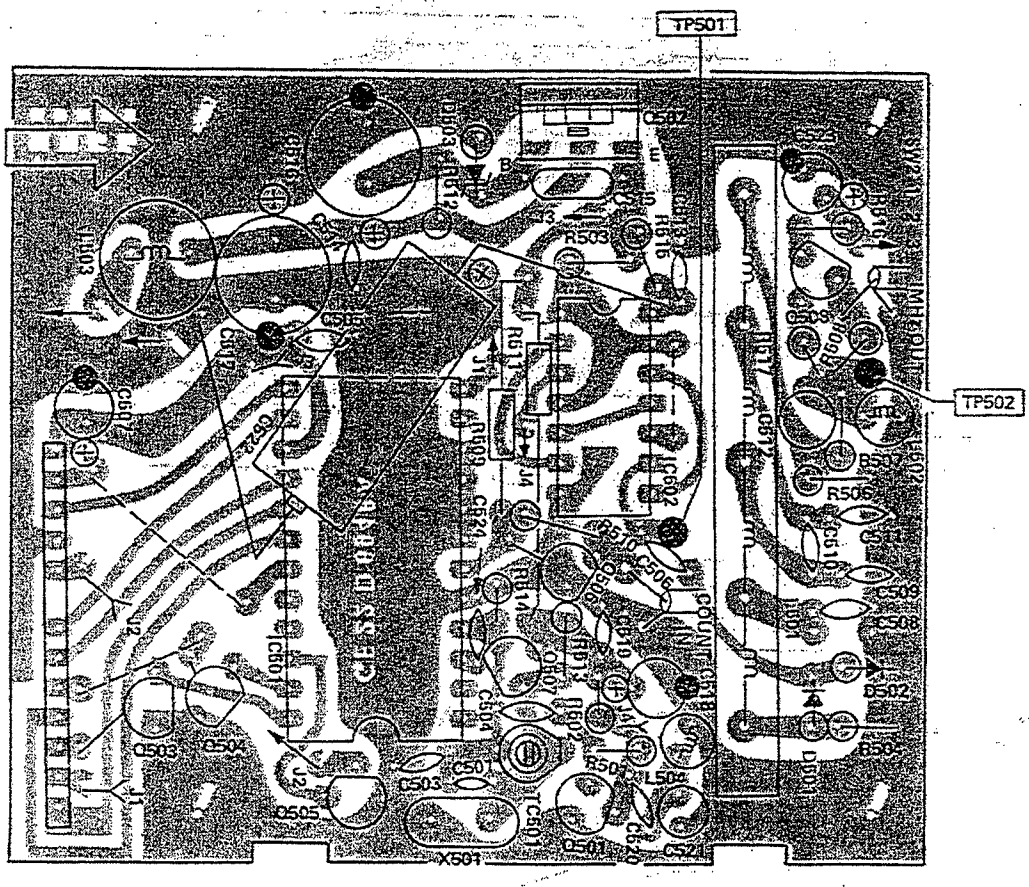
ATT. P.C. BOARD, TOP VIEW



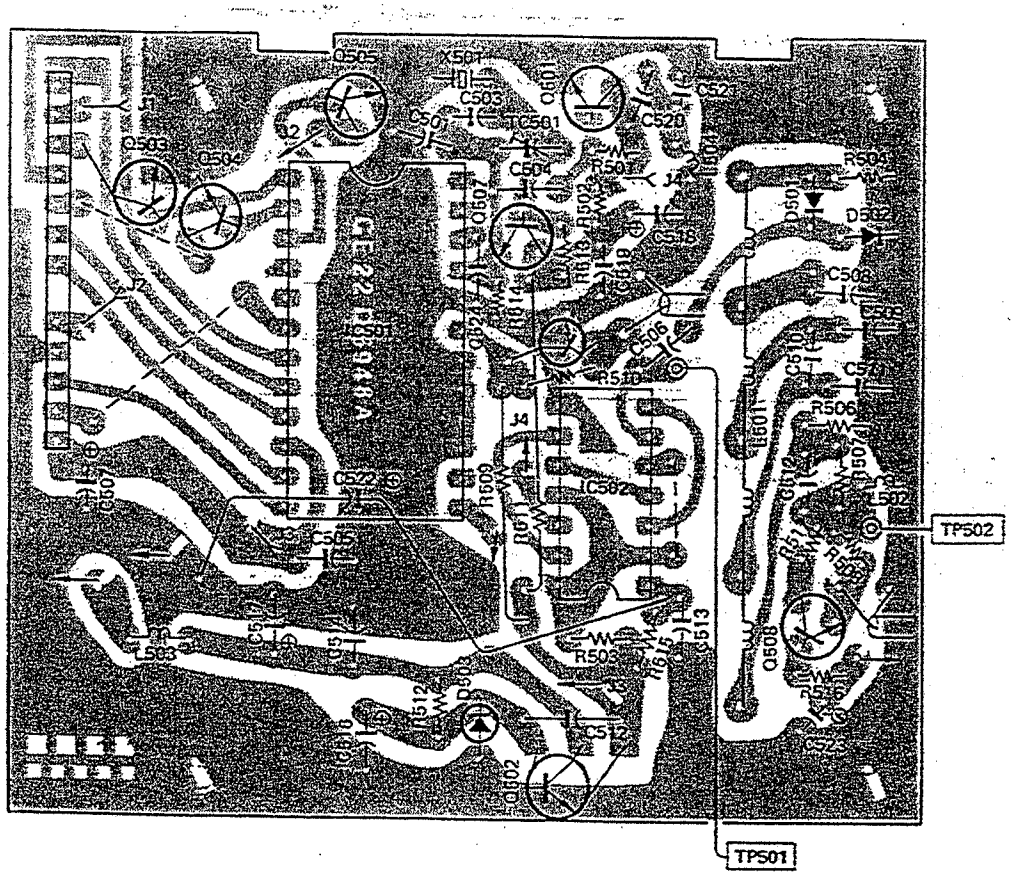
ATT. P.C. BOARD, BOTTOM VIEW



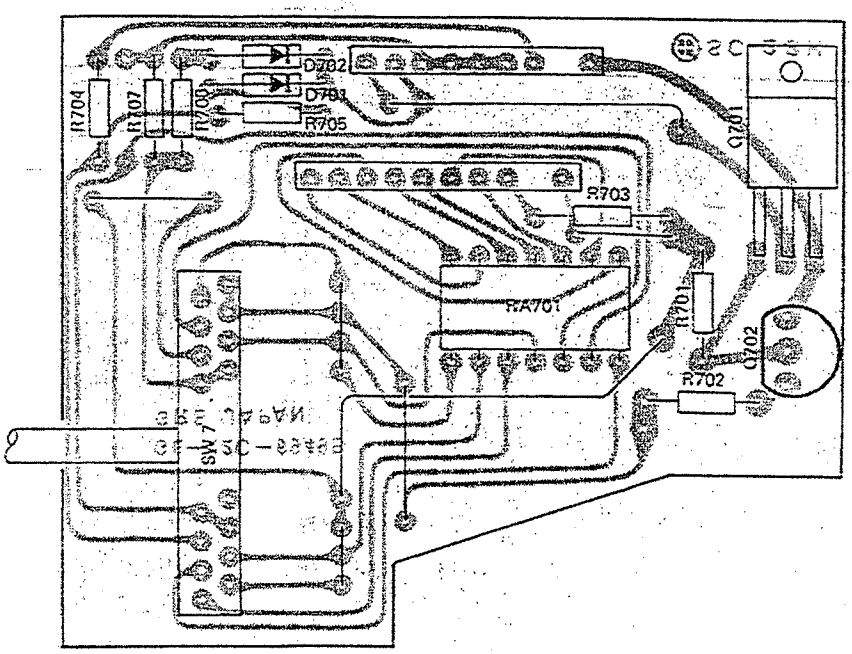
COUNTER P.C. BOARD, TOP VIEW



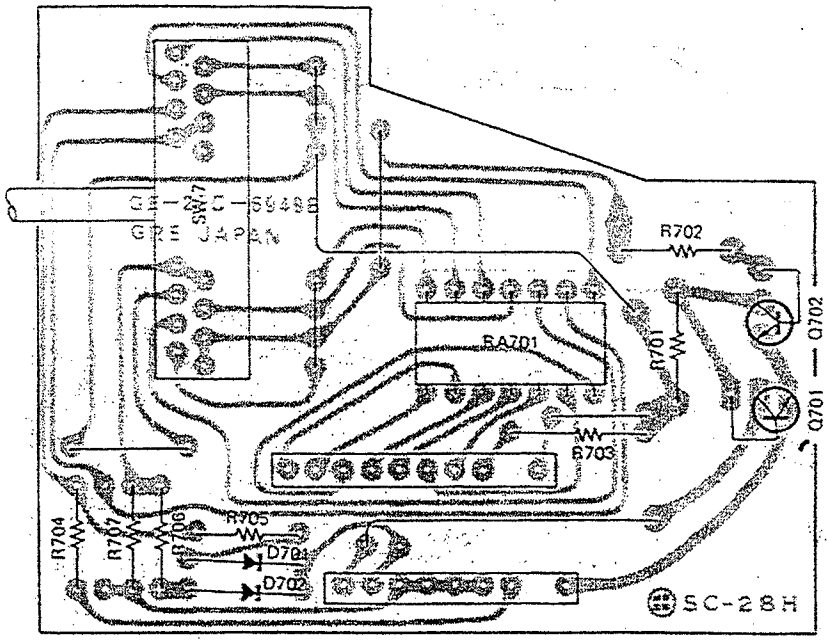
COUNTER P.C. BOARD, BOTTOM VIEW



MHz SWITCH P.C. BOARD, TOP VIEW

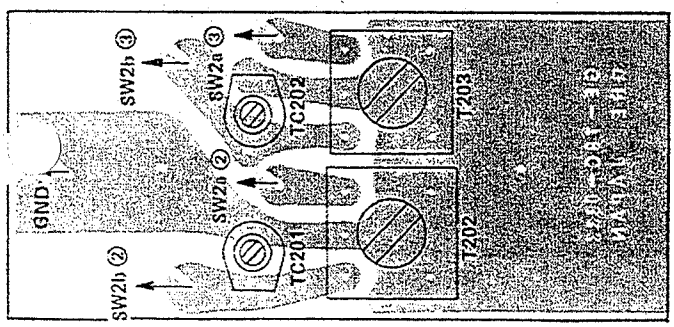


MHz SWITCH P.C. BOARD, BOTTOM VIEW

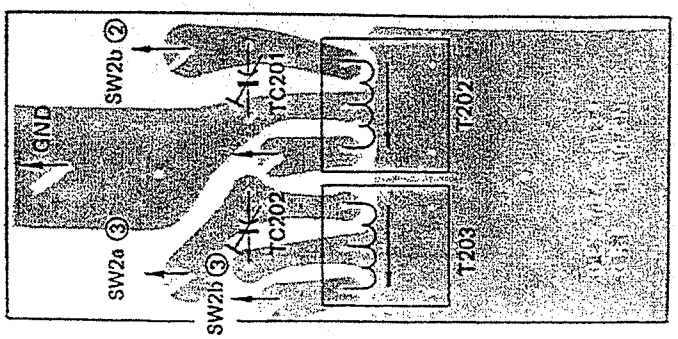


PRESELECTOR COIL P.C. BOARD

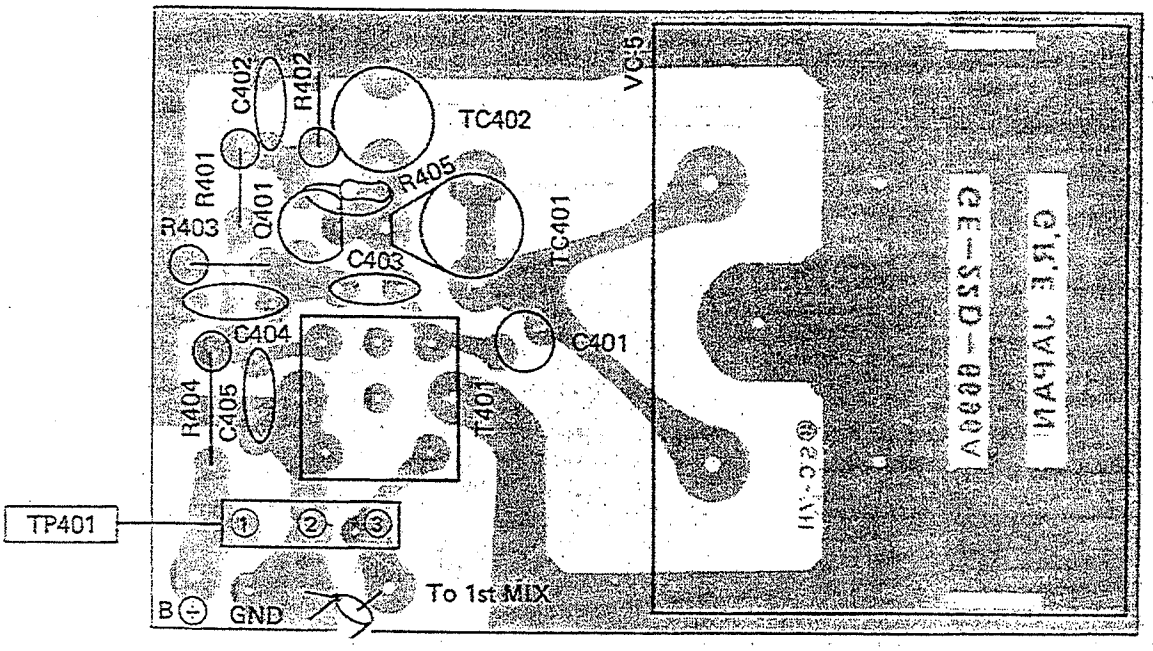
TOP VIEW



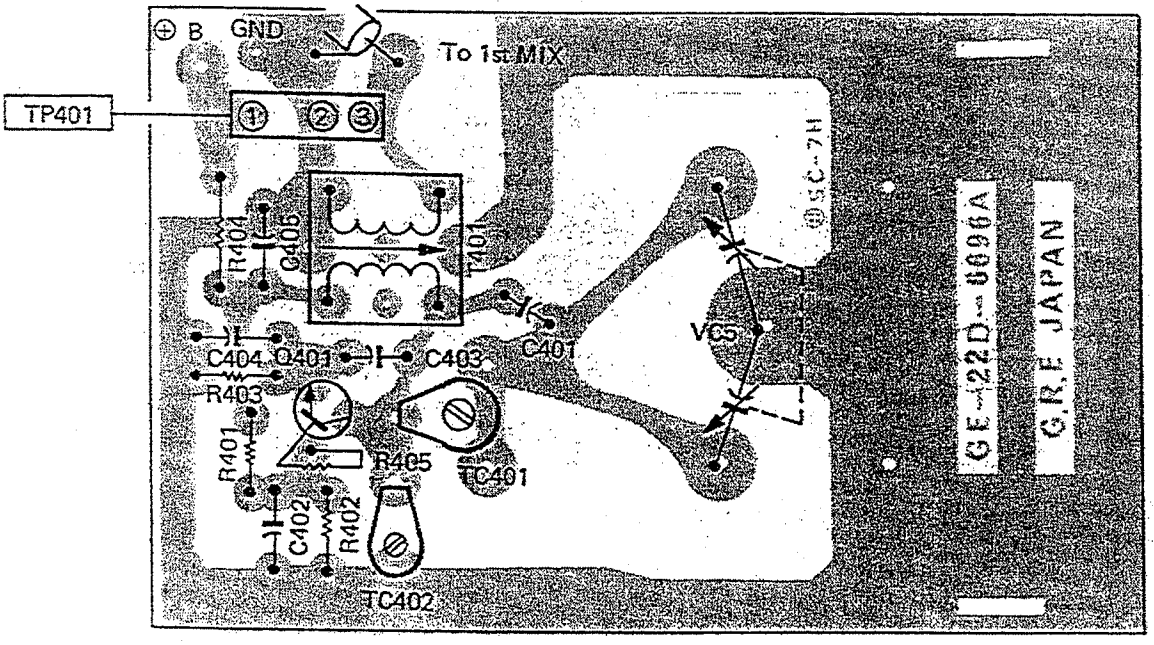
BOTTOM VIEW



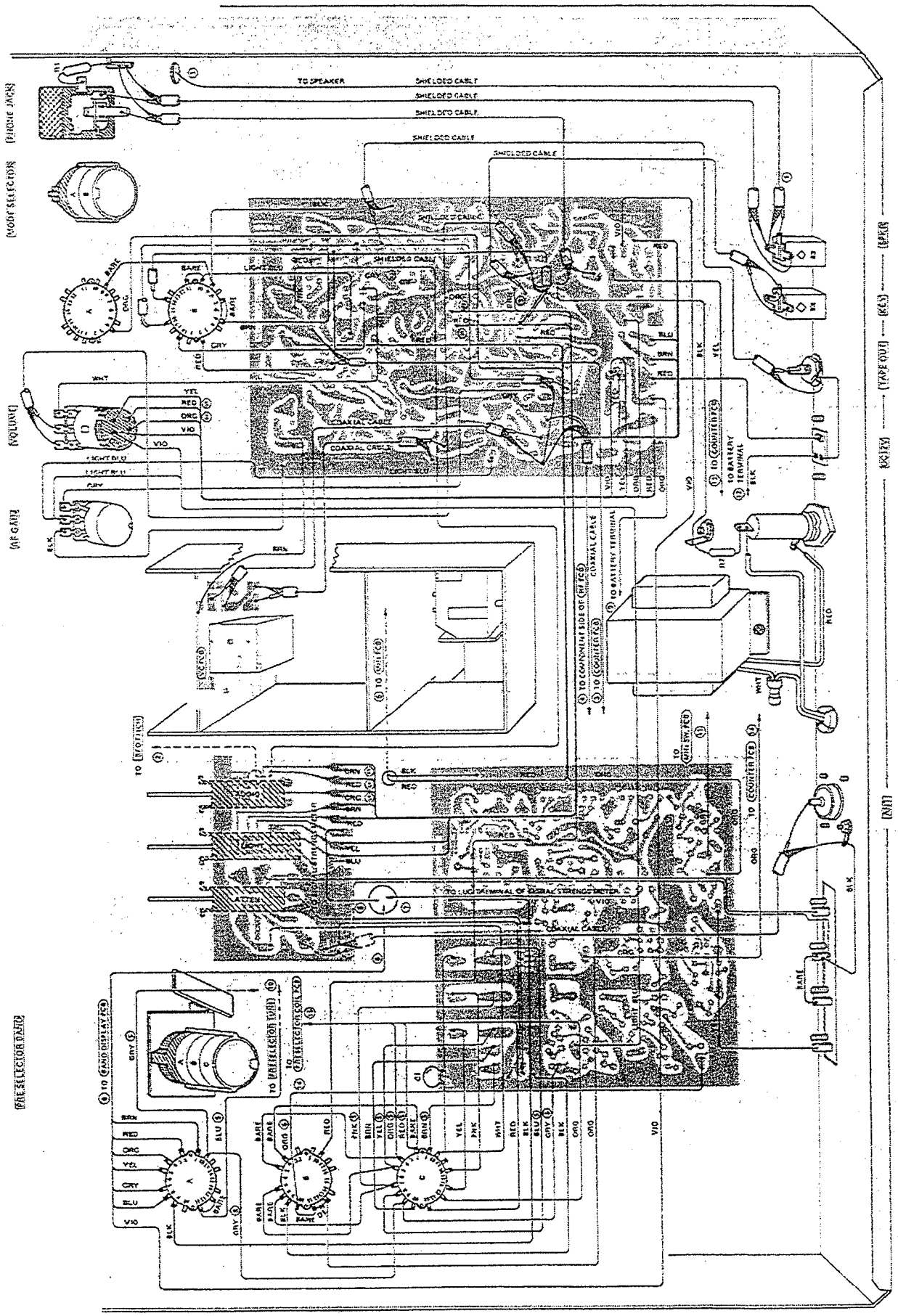
MHz P.C. BOARD, TOP VIEW



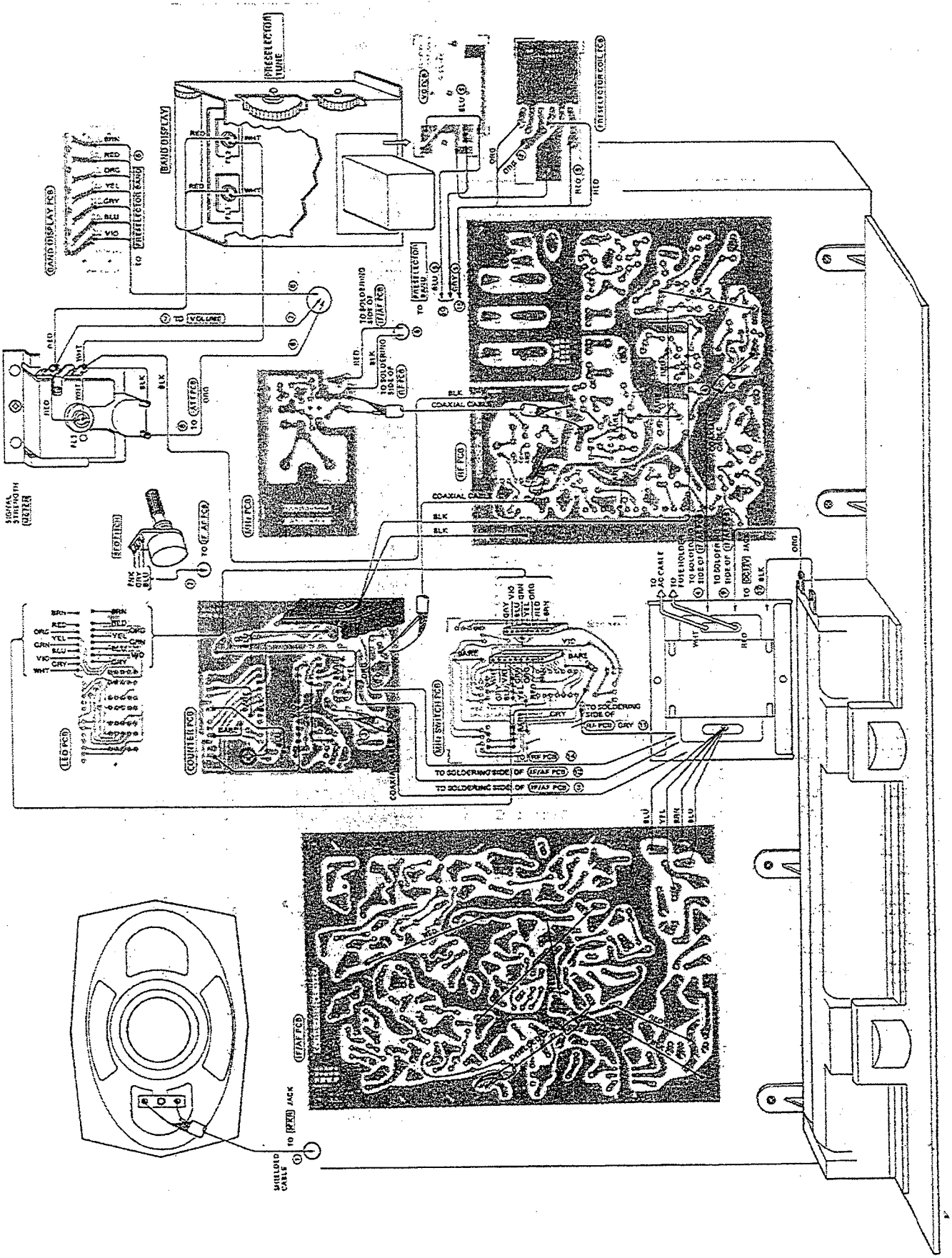
MHz P.C. BOARD, BOTTOM VIEW



WIRING DIAGRAM (TOP)



WIRING DIAGRAM (BOTTOM)



ELECTRICAL PARTS LIST

NOTE: Temperature characteristics
(C).....NP0
(U).....N750
(X).....N2200

CAPACITORS				
Ref. No.	Value	Voltage (V)	Tolerance (%)	Material
C1	220pF	50	±10	Ceramic
C101	100pF	50	±10%	Ceramic
C201	27pF	50	±10	Ceramic (C)
C202	10pF	50	±10	Ceramic (C)
C203	270pF	50	± 5	Polyestrene
C204	0.01μF	50	±20	Ceramic
C205	1μF	50	+75 -10	Electrolytic
C206	0.01μF	50	±20	Ceramic
C207	0.01μF	50	±20	Ceramic
C208	0.01μF	50	±20	Ceramic
C209	3pF	50	±0.25pF	Ceramic (C)
C210	33pF	50	±10	Ceramic (C)
C211	33pF	50	±10	Ceramic (C)
C212	3pF	50	±0.25pF	Ceramic (C)
C213	27pF	50	±10	Ceramic (C)
C214	5pF	50	±0.5pF	Ceramic (C)
C215	0.01μF	50	±20	Ceramic (C)
C216	22pF	50	±10	Ceramic (C)
C217	22pF	50	±10	Ceramic (C)
C218	47pF	50	±10	Ceramic
C219	100pF	50	±10	Ceramic (C)
C220	0.01μF	50	±20	Ceramic
C221	100pF	50	±10	Ceramic (C)
C222	5pF	50	±0.5pF	Ceramic (C)
C223	0.01μF	50	±20	Ceramic
C224	15pF	50	±10	Ceramic (C)
C225	0.01μF	50	±20	Ceramic
C226	0.01μF	50	±20	Ceramic
C227	3pF	50	±0.25pF	Ceramic (C)
C228	0.01μF	50	±20	Ceramic
C229	47pF	50	±10	Ceramic
C230	0.01μF	50	±20	Ceramic
C231	220pF	50	±10	Ceramic
C232	3pF	50	±0.25pF	Ceramic
C233	0.01μF	50	±20	Ceramic
C234	0.01μF	50	±20	Ceramic
C235	82pF	50	±10	Ceramic (C)
C236	0.01μF	50	±20	Ceramic
C237	22pF	50	±10	Ceramic (C)
C238	0.01μF	50	±20	Ceramic
C239	0.047μF	25	+80–20	Ceramic
C240	10pF	50	±10	Ceramic (C)
C241	22pF	50	±10	Ceramic (C)
C242	5pF	50	±0.5pF	Ceramic (C)
C243	0.047μF	25	+80 –20	Ceramic
C244	0.047μF	25	+80 –20	Ceramic
C245	10pF	50	±10	Ceramic (C)
C246	0.047μF	25	+80 –20	Ceramic
C247	0.047μF	25	+80 –20	Ceramic
C248	0.01μF	50	±20	Ceramic
C249	0.001μF	50	±10	Ceramic
C250	2pF	50	±0.25pF	Ceramic (C)
C251	0.01μF	50	±20	Ceramic
C252	47pF	50	±10	Ceramic
C253	0.01μF	50	±20	Ceramic
C254	0.01μF	50	±20	Ceramic
C255	1pF	50	±0.25pF	Ceramic (C)
C256	0.01μF	50	±20	Ceramic
C257	47pF	50	±10	Ceramic
C258	0.01μF	50	±20	Ceramic
C259	0.01μF	50	±20	Ceramic
C260	1pF	50	±0.25pF	Ceramic (C)
C261	0.01μF	50	±20	Ceramic
C262	47pF	50	±10	Ceramic
C263	0.01μF	50	±20	Ceramic
C264	0.01μF	50	±20	Ceramic
C265	2pF	50	±0.25pF	Ceramic (C)
C266	0.01μF	50	±20	Ceramic
C267	3pF	50	±0.25pF	Ceramic (C)
C268	0.01μF	50	+80 –20	Ceramic
C301	150pF	50	± 5	Polystrene
C302	0.01μF	50	+80 –20	Ceramic
C303	0.047μF	25	+80 –20	Ceramic
C304	0.047μF	25	+80 –20	Ceramic
C305	0.047μF	25	+80 –20	Ceramic
C306	150pF	50	± 5	Polystyrene
C307	0.01μF	50	+80 –20	Ceramic
C308	0.01μF	50	+80 –20	Ceramic
C309	0.01μF	50	+80 –20	Ceramic
C310	0.01μF	50	+80 –20	Ceramic
C311	0.047μF	25	+80 –20	Ceramic
C312	0.01μF	50	+80 –20	Ceramic
C313	0.01μF	50	+80 –20	Ceramic
C314	0.01μF	50	+80 –20	Ceramic
C315	0.01μF	50	+80 –20	Ceramic
C316	0.01μF	50	+80 –20	Ceramic
C317	0.01μF	50	+80 –20	Ceramic
C318	0.01μF	50	+80 –20	Ceramic
C319	0.01μF	50	+80 –20	Ceramic
C320	0.01μF	50	+80 –20	Ceramic
C321	0.047μF	25	+80 –20	Ceramic
C322	2pF	50	±0.25pF	Ceramic (C)
C323	0.047μF	25	+80 –20	Ceramic
C324	0.047μF	25	+80 –20	Ceramic
C325	0.047μF	25	+80 –20	Ceramic
C326	0.047μF	25	+80 –20	Ceramic
C327	0.01μF	50	+80 –20	Ceramic
C328	0.01μF	50	+80 –20	Ceramic
C329	0.1μF	50	±10	Mylar
C330	10μF	16	+50 –10	Electrolytic
C331	0.01μF	50	±10	Mylar
C332	0.1μF	50	±10	Mylar
C333	1μF	50	+75 –10	Electrolytic
C334	0.047μF	25	+80 –20	Ceramic
C335	10μF	16	+50 –10	Electrolytic
C336	0.01μF	50	+80 –20	Ceramic
C337	1000pF	50	± 5	Polystyrene
C338	100pF	50	±10	Ceramic (C)
C339	680 pF	50	± 5	Polystyrene
C340	3300pF	50	± 5	Polystyrene
C341	68pF	50	±10	Ceramic (X)
C342	22pF	50	±10	Ceramic (C)
C343	0.047μF	25	+80 –20	Ceramic
C344	0.01μF	50	+80 –20	Ceramic

Ref. No.	Value	Voltage (V)	Tolerance (%)	Material
C345	240pF	50	± 5	Polystyrene
C346	150pF	50	±10	Ceramic
C347	0.01μF	50	+80 –20	Ceramic
C348	0.047μF	25	+80 –20	Ceramic
C349	0.047μF	25	+80 –20	Ceramic
C350	0.01μF	50	+80 –20	Ceramic
C351	22μF	16	+50 –10	Electrolytic
C352	100pF	50	±10	Ceramic (C)
C353	1000pF	50	± 5	Polystyrene
C354	18pF	50	± 5	Ceramic (C)
C355	0.01μF	50	+80 –20	Ceramic
C356	0.01μF	50	+80 –20	Ceramic
C357	22pF	50	±10	Ceramic (C)
C358	0.047μF	25	+80 –20	Ceramic
C359	47μF	16	+50 –10	Electrolytic
C360	0.01μF	50	+80 –20	Ceramic
C361	22pF	50	±10	Ceramic (C)
C362	0.01μF	50	+80 –20	Ceramic
C363	47pF	50	±10	Ceramic
C364	0.01μF	50	+80 –20	Ceramic
C365	0.01μF	50	+80 –20	Ceramic
C366	0.01μF	50	±10	Mylar
C367	1μF	50	+75 –10	Electrolytic
C368	0.01μF	50	+80 –20	Ceramic
C369	4700pF	50	+80 –20	Ceramic
C370	47μF	16	+50 –10	Electrolytic
C371	10μF	16	+50 –10	Electrolytic
C372	150pF	50	±10	Ceramic
C373	1μF	50	+75 –10	Electrolytic
C374	47μF	16	+50 –10	Electrolytic
C375	4.7μF	35	+75 –10	Electrolytic
C376	220μF	16	+50 –10	Electrolytic
C377	100pF	50	±10	Ceramic (C)
C378	100μF	16	+50 –10	Electrolytic
C379	100μF	16	+50 –10	Electrolytic
C380	0.047μF	50	±10	Mylar
C381	100μF	16	±10	Electrolytic
C382	0.033μF	50	±10	Mylar
C383	470μF	16	+50 –10	Electrolytic
C384	2200μF	16	+50 –10	Electrolytic
C385	470μF	16	+50 –10	Electrolytic
C386	100μF	16	+50 –10	Electrolytic
C387	220pF	50	±10	Ceramic
C388	330pF	50	±10	Ceramic
C401	180pF	50	± 5	Polystrene
C402	0.01μF	50	±20	Ceramic
C403	10pF	50	±0.5pF	Ceramic (U)
C404	15pF	50	±10	Ceramic (U)
C405	0.01μF	50	±20	Ceramic
C501	22pF	50	±10	Ceramic (C)
C502	Not used			
C503	10pF	50	±0.5pF	Ceramic (C)
C504	56pF	50	±10	Ceramic (C)
C505	0.01μF	50	+80 –20	Ceramic
C506	56pF	50	±10	Ceramic (C)
C507	10μF	16	+50 –10,	Electrolytic
C508	47pF	50	±10	Ceramic (C)
C509	22pF	50	±10	Ceramic (C)
C510	7pF	50	±0.5pF	Ceramic (C)
C511	22pF	50	±10	Ceramic (C)
C512	330pF	50	± 5	Polystyrene

Ref. No.	Value	Voltage (V)	Tolerance (%)	Material
C513	0.01μF	50	+80 –20	Ceramic
C514	0.01μF	50	+80 –20	Ceramic
C515	0.033μF	50	±10	Mylar
C516	100μF	16	+50 –10	Electrolytic
C517	100μF	16	+50 –10	Electrolytic
C518	10μF	16	+50 –10	Electrolytic
C519	0.01μF	50	+80 –20	Ceramic
C520	0.01μF	50	+80 –20	Ceramic
C521	220pF	50	± 5	Polystyrene
C522	1000μF	10	+50 –10	Electrolytic
C523	1μF	50	+75 –10	Electrolytic
C524	56pF	50	±10	Ceramic (C)

COILS & TRANSFORMERS

Ref. No.	Description	RS Part No.	MFR's Part No.
L201	Choke Coil (1 mH)	CB-2434	LF5-102K
L202	BPF Coil	CA-5014	6NNB-134
L203	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L204	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L205	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L206	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L207	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L208	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L209	Choke Coil (330 μH)	CA-5117	LF1-331K
L210	Choke Coil (1.2 μH)	CB-2437	4LNC-135
L211	Choke Coil (0.84 μH)	CB-2195	4LNC-027
L212	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L213	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L214	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L215	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L216	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L217	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L218	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L219	RF Coil (52.5 – 55 MHz)	CA-5022	10SSB-127
L301	IF Coil (3 – 2 MHz)	CA-7955	10SSA-128
L302	Inductor (4.7 μH)	CA-3891	LF4-4R7K
L303	IF Coil (3 – 2 MHz)	CA-7955	10SSA-128
L304	Inductor (4.7 μH)	CA-3891	LF4-4R7K
L305	Inductor (1 mH)	CA-5307	7106-102K
L306	Inductor (1 mH)	CA-5307	7106-102K
L307	Inductor (1 mH)	CA-5307	7106-102K
L308	OSC Coil (3 – 2 MHz)	CA-5308	10SSO-129
L309	Inductor (100 μH)	CB-2427	LF1-101K
L310	Inductor (270 μH)	CB-2429	LF1-271K
L311	Inductor (270 μH)	CB-2429	LF1-271K
L312	BFO Coil (455 kHz)	CA-5016	10SSO-131
L313	Inductor (470 μH)	C-0835	LF1-471K
L501	BPF Coil	CA-5014	6NNB-134
L502	Inductor (8.2 μH)	CA-5313	LF4-8R2K
L503	Inductor (1 mH)	CB-2434	LF5-102K
L504	Inductor (8.2 μH)	CA-5313	LF4-8R2K
T1	Power Transformer (See APPENDIX for Australian, EC, UK and Canadian Models)	TA-0799	TK-1284B
T201	Antenna Coil (0.01 – 0.15 MHz)	CA-5017	10SSA-123
T202	Antenna Coil (0.15 – 0.5 MHz)	CA-5311	10PSA-152
T203	Antenna Coil (0.5 – 1.6 MHz)	CA-5312	10PSA-153
T204	Antenna Coil (1.6 – 4.5 MHz)	CA-5018	6PNA-124
T205	Antenna Coil (4.5 – 12 MHz)	CA-5019	6PNA-125
T206	Antenna Coil (12 – 30 MHz)	CA-5020	6PNA-126
T301	IF Transformer (455 kHz)	CA-7953	10SSI-132
T302	IF Transformer (455 kHz)	CA-7954	10SSI-133
T303	IF Transformer (455 kHz)	CA-7954	10SSI-133
T401	MHz OSC Coil	CA-5013	10SSO-130

CERAMIC FILTERS & CRYSTALS			
Ref. No.	Description	RS Part No.	MFR's Part No.
CF301	Filter (455 kHz)	C-1057	LF-C2A
CF302	Filter (455 kHz)	C-1058	LF-H2S
X1	X'tal (4,000 MHz)	MX-2378	18 μ

DIODE			
Ref. No.	Description	RS Part No.	MFR's Part No.
D101, 102	Silicon	DX-0270	1S1555
D201	Germanium	DX-0161	1N60
D301~304	Germanium	DY-0270	1S1555
D305, 306	Silicon	DX-0161	1N60
D307	Zener (4.7V)	DX-1366	02BZ4.7V
D308	Zener (4V)	DX-1216	HZ4B3
D309, 310	Germanium	DX-0161	1N60
D311	Varactor		FC52M
D312	Zener (4.7V)	DX-1366	02BZ4.7V
D313~316	Germanium	DX-0161	1N60
D317	Rectifier	DX-1212	1B4B1
D318	Zener (9V)	DX-0110	EQA01-09(R)
D319	Zener (10V)	DX-1213	EQA01-10(S)
D320~324	Silicon	DX-1108	ERB12-01
D501, 502	Germanium	DX-0161	1N60
D503	Zener (6V)	DX-1217	EQA01-06(R)
D504~508	LED	L-0850	TLR312
D601~606	LED	DX-0496	TLR102
D701, 702	Germanium	DX-0161	1N60

INTEGRATED CIRCUITS			
Ref. No.	Description	RS Part No.	MFR's Part No.
IC201	Mixer	MX-3809	SN76514N
IC301	AF Amp	MX-4338	μPC575C2
IC501	Freq. Counter	MX-3807	M54826P
IC502	Divider	MX-3808	SN74LS74N

LAMPS			
Ref. No.	Description	RS Part No.	MFR's Part No.
PL1, 2	Preselector Dial (12V, 50 mA)	L-0990	L50-F12V50
PL3	Meter (12V, 50mA)	L-0990	L50-F12V50

NOTE 1: Unless otherwise specified all resistors are carbon film, wattage 1/4W, tolerance ±5%.

NOTE 2: R2 is not used for Australian/European Models.

RESISTORS					
Ref. No.	Value Value	RS Part No. RS Part No.	Wattage (W)	Tolerance (%)	Material
R1	270Ω				
*R2	1.8MΩ	NEF-0521	1/2	±5	Carbon
R101	1.8MΩ	NEF-0521	1/2	±5	
R102	82Ω	NEE-0122			
R103	150Ω				
R104	27kΩ	NEE-0316			
R105	27kΩ	NEE-0316			
R106	1kΩ	NEE-0196			
R107	1kΩ	NEE-0196			
R108	220Ω	NEE-0149			
R109	10kΩ	NEE-0281			
R110	1.8MΩ	NEF-0521	1/2	±5	
R111	390Ω	NEE-0162			
R112	3.3kΩ	NEE-0230			
R201	6.8kΩ	NEE-0262			
R202	18kΩ				
R203	100kΩ	NEE-0371			
R204	100kΩ	NEE-0371			
R205	47kΩ	NEE-340			
R206	220Ω	NEE-0149			
R207	560Ω	NEE-0176			
R208	100kΩ	NEE-0371			
R209	560Ω	NEE-0176			
R210	100kΩ	NEE-0371			
R211	220Ω	NEE-0149			
R212	22kΩ	NEE-0311			
R213	100kΩ	NEE-0371			
R214	33kΩ	NEE-0324			
R215	33kΩ	NEE-0324			
R216	220Ω	NEE-0149			
R217	220Ω	NEE-0149			
R218	22kΩ	NEE-0311			
R219	22kΩ	NEE-0311			
R220	6.8kΩ	NEE-0262			
R221	1kΩ	NEE-0281			
R222	220Ω	NEE-0149			
R223	100kΩ	NEE-0371			
R224	220Ω	NEE-0149			
R225	100kΩ	NEE-0371			
R226	220Ω	NEE-0149			
R227	33kΩ	NEE-0324			
R228	1kΩ	NEE-0281			
R229	470Ω	NEE-0169			
R230	220Ω	NEE-0149			
R231	6.8kΩ	NEE-0262			
R232	27kΩ	NEE-0316			
R233	1kΩ	NEE-0281			
R234	Not used				
R235	220Ω	NEE-0149			
R236	47kΩ	NEE-0340			
R237	6.8kΩ	NEE-0262			
R238	22kΩ	NEE-0311			
R239	1kΩ	NEE-0281			
R240	220Ω	NEE-0149			

Ref. No.	Value	RS Part No.	Watt-age (W)	Toler-ance (%)	Material
R241	Not used				
R242	4.7kΩ	NEE-0247			
R243	15kΩ	NEE-0297			
R244	1kΩ	NEE-0281			
R245	220Ω	NEE-0149			
R301	33kΩ	NEE-0324			
R302	47kΩ	NEE-0340			
R303	10kΩ	NEE-0281			
R304	100kΩ	NEE-0371			
R305	47kΩ	NEE-0340			
R306	220kΩ	NEE-0396			
R307	47kΩ	NEE-0340			
R308	470Ω	NEE-0169			
R309	220Ω	NEE-0149			
R310	47kΩ	NEE-0340			
R311	100kΩ	NEE-0371			
R312	1MΩ				
R313	100kΩ	NEE-0371			
R314	220Ω	NEE-0149			
R315	220Ω	NEE-0149			
R316	4.7kΩ	NEE-0247			
R317	220Ω	NEE-0149			
R318	4.7kΩ	NEE-0247			
R319	220Ω	NEE-0149			
R320	4.7kΩ	NEE-0247			
R321	2.2kΩ	NEE-0216			
R322	2.2kΩ	NEE-0216			
R323	2.2kΩ	NEE-0216			
R324	2.2kΩ	NEE-0216			
R325	4.7kΩ	NEE-0247			
R326	4.7kΩ	NEE-0247			
R327	220kΩ	NEE-0396			
R328	1kΩ	NEE-0196			
R329	100Ω	NEE-0132			
R330	220Ω	NEE-0149			
R331	3.3kΩ	NEE-0230			
R332	10kΩ	NEE-0281			
R333	470Ω	NEE-0169			
R334	15Ω	NEE-0169			
R335	220Ω	NEE-0149			
R336	120kΩ	NEE-0375			
R337	470Ω	NEE-0423			
R338	10kΩ	NEE-0281			
R339	33kΩ	NEE-0324			
R340	470kΩ	NEE-0423			
R341	10kΩ	NEE-0281			
R342	470kΩ	NEE-0423			
R343	470kΩ	NEE-0423			
R344	10kΩ	NEE-0281			
R345	3.9kΩ	NEE-0237			
R346	22kΩ	NEE-0311			
R347	33kΩ	NEE-0324			
R348	18kΩ	NEE-0303			
R349	1kΩ	NEE-0281			
R350	1kΩ	NEE-0281			
R351	100kΩ	NEE-0371			
R352	100Ω	NEE-0132			
R353	2.2kΩ	NEE-0216			
R354	1kΩ	NEE-281			
R355	100kΩ	NEE-0371			
R356	220Ω	NEE-0149			

Ref. No.	Value	RS Part No.	Watt-age (W)	Toler-ance (%)	Material
R357	2.2kΩ	NEE-0216			
R358	100Ω	NEE-0132			
R359	15kΩ	NEE-0297			
R360	4.7kΩ	NEE-0247			
R361	100kΩ	NEE-0371			
R362	15kΩ	NEE-0297			
R363	100kΩ	NEE-0371			
R364	47kΩ	NEE-0340			
R365	100Ω	NEE-0132			
R366	3.3kΩ	NEE-0230			
R367	1.5MΩ	NEE-0450			
R368	1kΩ	NEE-0281			
R369	4.7kΩ	NEE-0247			
R370	220Ω	NEE-0149			
R371	470kΩ	NEE-0423			
R372	47kΩ	NEE-0340			
R373	1.5MΩ	NEE-0450			
R374	1.5kΩ	NEE-0206			
R375	10kΩ	NEE-0281			
R376	1.8kΩ	NEE-0210			
R377	10Ω	NEE-0063			
R378	470Ω	NEE-0169			
R379	22kΩ	NEE-0311			
R380	33kΩ	NEE-0324			
R381	33Ω	NEE-0087			
R382	43kΩ	NEE-0337			
R383	150kΩ	NEE-0384			
R384	100kΩ	NEE-0371			
R385	2.2kΩ	NEE-0216			
R386	390Ω	NEE-0162			
R387	4.7kΩ	NEE-0247			
R401	22kΩ	NEE-0311			
R402	4.7kΩ	NEE-0247			
R403	680Ω	NEE-0183			
R404	100Ω	NEE-0132			
R405	100Ω	NEE-0132			
R501	100kΩ	NEE-0371			
R502	4.7kΩ	NEE-0247			
R503	4.7kΩ	NEE-0247			
R504	100Ω	NEE-0132			
R505	Not used				
R506	100Ω	NEE-0132			
R507	100Ω	NEE-0132			
R508	3.3kΩ	NEE-0230			
R509	2.2kΩ	NEE-0216			
R510	150kΩ	NEE-0384			
R511	330Ω	NEE-0159			
R512	470Ω	NEE-0169			
R513	270kΩ	NEE-0402			
R514	1kΩ	NEE-0281			
R515	100Ω	NEE-0132			
R516	22kΩ	NEE-0311			
R517	1kΩ	NEE-0281			
R701	15kΩ	NEE-0297			
R702	2.2kΩ	NEE-0216			
R703	1.5kΩ	NEE-0206			
R704	1.5kΩ	NEE-0206			
R705	1.5kΩ	NEE-0206			
R706	1.5kΩ	NEE-0206			
R707	390Ω	NEE-0162			

RESISTOR ARRAYS			
Ref. No.	Description	RS Part No.	MFR's Part No.
RA701	1.5 kΩ x 7	RX-0182	EXB-R7152M

SWITCHES			
Ref. No.	Description	RS Part No.	MFR's Part No.
SW1	Lever Switch (ATTEN)	S-0919	SLR-523
SW2a–f	Rotary Switch (PRESELECTOR BAND)	S-1326	SRN3066N
SW3a–c	Rotary Switch (Mode)	S-1327	SRN2045N
SW4a–c	Lever Switch (LIGHT/BATT)	S-5071	SLR-643-02
SW5a, b	Lever Switch (SELECTIVITY)	S-5070	SLR-522
SW6a, b	Power Switch (included in VOLUME Control VR2)		
SW7	Rotary Switch (included in MHz/kHz Tune Ass'y)	S-1384	CB-118

THERMISTOR			
Ref. No.	Description	RS Part No.	MFR's Part No.
TH301	10 kΩ	T-1012	M-10K

TRANSISTORS			
Ref. No.	Description	RS Part No.	MFR's Part No.
Q201	RF Amp.		3SK45(B)-9
Q202	AGC Amp.		2SC1815(GR)
Q203	1st Mixer		2SK19(Y) or 2SK19(GR)
Q204	1st Mixer		2SK19(Y) or 2SK19(GR)
Q205	Gain Control		2SC1815(GR)
Q206	1st IF Amp.		3SK45(B)-9
Q207	1st IF Amp.		2SC1923(O)
Q208	Gain Control		2SC1815(GR)
Q209	2nd Mixer		2SK45(B)-9
Q210	Switching		2SC1815(GR)
Q211	52.5 MHz Local Freq. Amp		2SC1923(R)
Q212	52.5 MHz Local Freq. Amp		2SC1923(O)
Q213	52.5 MHz Local Freq. Amp		2SC1923(O)
Q301	2nd IF Amp.		3SK45(B)-9
Q302	3rd Mixer		3SK45(B)-9
Q303	3rd IF Amp.		2SC1815(Y)
Q304	3rd IF Amp.		2SC1815(Y)
Q305	AGC Switch		2SC1815(GR)
Q306	3rd Local OSC		2SC1815(Y)
Q307	Buffer Amp.		2SK19(GR)
Q308	Buffer Amp.		2SK19(GR)
Q309	Meter Calibrator		2SC1815(GR)
Q310	AGC Amp.		2SC1815(GR)
Q311	BFO		2SK19(GR)
Q312	AF Preamp.		2SC1815(GR)
Q313	AF Preamp.		2SC1815(GR)
Q314	Buffer Amp.		2SC1815(GR)
Q315	Regulator		2SD526(O)
Q401	1st Local OSC		2SC1923(O)
Q501	Driver Amp.		2SC1815(GR)
Q502	Regulator		2SD526(O)
Q503	kHz Display Driver		2SC1815(GR)
Q504	kHz Display Driver		2SC1815(GR)
Q505	kHz Display Driver		2SC1815(GR)
Q506	Buffer		2SC1815(GR)
Q507	2nd Local OSC		2SC1815(GR)
Q508	Gain Control		2SC1815(GR)
Q701	MHz Display SW		2SD526(O)
Q702	MHz Display SW		2SC1815(GR)

VARIABLE CAPACITORS			
Ref. No.	Description	RS Part No.	MFR's Part No.
TC201, 202	Trimmer (20pF)	C-1047	ECV-1ZW20X53N
TC203 – 205	Trimmer (20pF)	C-1059	ECV-1ZW20X32E
TC301 – 303	Trimmer (50pF)	C-1056	ECV-1ZW50X32E
TC401	Trimmer (50pF)	C-1060	ECV-1ZW50X32E
TC402	Trimmer (10pF)	C-1061	ECV-1ZW10X53
TC501	Trimmer (20pF)	C-1047	ECV-1ZW20X53N
VC1	PRESELECTOR TUNE included in Preselector Dial Ass'y (29)	C-1062	CJ-600-1284
VC2 – 4	kHz Tune included in MHz/kHz Tune Ass'y (30)	C-4673	PVC-20G3J1-10H
VC5	MHz Tune included in MHz/kHz Tune Ass'y (30)	C-4674	C521C133

VARIABLE RESISTORS			
Ref. No.	Description	RS Part No.	MFR's Part No.
VR201	Semi-fixed (4.7 kΩ B)	P-6607	SR19R3 4.7kB
VR301	Semi-fixed (20 kΩ B)	D-6605	EVN-J0AA00B24
VR302	Semi-fixed (500 Ω B)	D-1935	EVN-J0AA00B52
VR1	RF GAIN Control (50 kΩ B)	P-1937	VM10A620C-50kB
VR2/(SW6)	VOLUME Control (50 kΩ A) w/Power Switch	P-7060	VM11AA90C-5M1222-50kA
VR3	BFO PITCH (100 kΩ B)	P-7061	VN20A100kB

MISCELLANEOUS			
Ref. No.	Description	RS Part No.	MFR's Part No.
	RF P.C. Board		GE-79C-0330
	Preselector Coil P.C. Board		GE-79C-0333
	IF/AF P.C. Board		GE-79C-0331
	ATT P.C. Board		GE-79C-0332
	MHz P.C. Board		GE-22D-6696A
	MHz Switch P.C. Board		GE-22C-6949B
	Counter P.C. Board		GE-22D-6948A
	LED P.C. Board		GE-22D-6947
	Band Display P.C. Board		GE-22D-6946
A-1	ANT Jack	J-1009	NC-552-D
J1	KEY Jack	J-0840	S-G8022
J2	Phone Jack	J-1013	S-G7625
J3	External SPKR Jack	J-0840	S-G8022
J4	DC 12V Jack	J-1010	ND-409
J5	TAPE OUT Jack	J-1011	NR-205-2
	8P Wire Connector Ass'y		GE-23D-7082
	9P Wire Connector Ass'y		GE-23D-7083
	Connector (8P: male)		5048-08A
	Connector (9P: male)		5048-09A
TP401	Connector (3P: male) for Test Point		5048-03A
TP201 – 206	Test Point		CHP-01
TP301 – 303	Test Point		CHP-01
TP501, 502	Test Point		CHP-01

MECHANICAL PARTS LIST

NOTE: *Australian, EC, UK and Canadian Models employ different part. Refer to the APPENDIX for these models.

Ref. No.	Description	RS Part No.	MFR's Part No.
(1)	RF GAIN Control	P-1937	VM10A620C-50kB
(2)	VOLUME Control with Power Switch	P-7060	VM11AA90C-5M1222-50kA
(3)	Rotary Switch (Mode)	S-1327	SRN2045N
(4)	Rotary Switch (PRESELECTOR BAND)	S-1326	SRN3066N
(5)	BFO PITCH Control		VN20A100kB
(6)	Knob (PRESELECTOR TUNE)	K-3326	GE-23D-7069
(7)	Knob (BFO PITCH)	K-3327	GE-23D-7036
(8)	Knob (VOLUME/RF GAIN/PRESELECTOR BAND/Mode)	K-3330	GE-23D-7070
(9)	Knob (ATTEN/LIGHT/SELECTIVITY)	K-3331	GE-23D-7071
(10)	Knob (kHz Tune)	K-3328	GE-23B-7068
(11)	Knob (MHz Tune)	K-3329	GE-23B-7067
(12)	IF/AF P.C. Board Ass'y	X-8432	GA-79D-0547
(13)	RF P.C. Board Ass'y	X-8433	GA-79D-0546
(14)	MHz P.C. Board Ass'y	X-8004	GE-23E-7391
(15)	MHz Switch P.C. Board Ass'y		GA-79D-0548
(16)	ATT P.C. Board Ass'y	X-8434	GA-79D-0545
(17)	Counter P.C. Board Ass'y	X-8007	GE-23E-7394
(18)	LED P.C. Board Ass'y	X-8008	GE-23E-7395
(19)	Band Display P.C. Board Ass'y	X-8009	GE-23E-7396
(20)	Preselector coil P.C. Board Ass'y		
(21)	Speaker	S-4793	SR-305-10B
(22)	Meter (S/BATT)	M-0412	49C334
A-2(23)	4P Screw Terminal Strips (ANT/GND/MUTE)	J-4633	UB-1004
(24)	ANT Jack	J-1009	NC-552-D
(25)	FUSE Holder	F-1069	S-N1301
(26)	DC 12V Jack	J-1010	ND-409
(27)	TAPE OUT Jack	J-1011	NR-205-2
(28)	KEY Jack/SPKR Jack	J-0840	S-G8022
(29)	PHONE Jack	J-1013	S-G7625
(30)	Preselector Dial Ass'y	D-5405	GA-79D-0427
	Preselector Gear Ass'y	RA-2664	GE-23-E-7197
	Dial	D-5404	GE-79C-0425
	Variable Capacitor	C-1062	CJ-600-1284
(31)	MHz/kHz Tune Ass'y	C-4708	GE-23E-7399
	MHz/kHz Gear Ass'y	RA-2665	GE-23E-7198
	Rotary Switch	S-1384	CB-118
	Variable Capacitor	C-4673	PVC-20G3J1-10H
	VC P.C. Board	X-8010	GE-22D-6990
	Variable Capacitor	C-4674	C521C133
*(32)	Power Transformer	TA-0799	TK-1284B
(33)	Front Panel Ass'y	Z-5401	GA-79D-0426
	Front Panel		GE-79D-0648
	Preselector Window		
	Frequency Window		
(34)	Chassis		GE-23A-7058A
(35)	Cabinet	Z-5400	GE-23A-7059
(36)	Rear Panel Ass'y	Z-5398	GE-23E-7401A
	Rear Panel	Z-5399	GE-23A-7065A
	Battery Terminal (A), +	HB-8335	GE-23D-7117
	Battery Terminal (B), –	HB-8336	GE-23D-7118
	Battery Terminal (C), ±	HB-8337	GE-23D-7119
	Battery Tube	B-0384	GE-23D-7384
(37)	Battery Cover	DB-0265	GE-23B-7066

Ref. No.	Description	RS Part No.	MFR's Part No.
(38)	Bracket for RF GAIN/VOLUME Controls and Mode SW	HB-8339	GE-23D-7241
(39)	Bracket for PRESELECTOR BAND SW	HB-8340	GE-23D-7062
(40)	Bracket for Meter	HB-8341	GE-23D-7061
(41)	Bracket for Preselector Dial Lamp	HB-8342	GE-23D-7063
(42)	Shaft, PRESELECTOR BAND SW	RT-1953	GE-23D-7120
(43)	Coupler, Shaft and PRESELECTOR BAND SW	HB-8344	GE-23D-7194
(44)	Bracket for Front Panel (A)		GE-23D-7060
(45)	Bracket for Front Panel (B)		GE-23D-7060
(46)	Foot (L)	F-0249	NO. 7112
(47)	Foot (S)	F-0250	NO. 7105
(48)	Hand Strap	H-6250	GE-23D-7121
(49)	Shield Case (Top) for Counter P.C. Board	Z-5402	GE-23C-7115
(50)	Shield Case (Bottom) for Counter P.C. Board	Z-5403	GE-23C-7116
	Pressure Terminal	J-4634	1-SD
(51)	Solder Lug Terminals		3ϕ
	Wrapping Posts		1.2 x 12.5 mm
	Insulator for Band Display P.C. Board	X-8436	GE-23D-7313
	Protection Cloth for Lever SW (ATTEN/LIGHT/AUDIO)		GE-23D-7374
	Protection Cloth for BFO PITCH Control		GE-23D-7375
	Protection Cloth for Rear Panel		GE-23D-7472
	Protection Cloth for Counter Case and Cabinet		GE-20D-5297
	Protector for Hand Strap	H-6251	GE-23D-7404
	Lamp, Meter and Preselector Dial	L-0990	L50-F12V50
	Lamp Grommet for Meter	HB-1182	BU687
	Lamp Grommet for Preselector Dial	HB-8338	GE-23D-7243
	Wire Clip		220-JD485210-01
	Wire Binder		BK-1
	Wire Grommet		OCB-500
	*AC Power Cord (6 Feet, UL, Black)	W-2452	UP-601-002
	*Cord Strain Relief	HB-0705	SR-3P4
	Wrapping Post for AC Power Cord		GE-18D-4215
	Fuse	HF-0025	0.5A, UL
	Fuse Caution Label (0.5 A)		GE-23D-7537
	*Model Label		GE-79D-0411
	Screws		
(52)	Binding-Head Tapping Screws		3 x 6 mm
(53)	Pan-Head Taptite Screws		4 x 8 mm
(54)	Pan-Head Taptile Screws		3 x 10 mm
(55)	Pan-Head Self Tapping Screws	HD-2057	3 x 8 mm
(56)	Binding-Head Screws		2 x 6 mm
(57)	Binding-Head Screws	HD-3030	3 x 12 mm
(58)	Binding-Head Screws	HD-3047	4 x 10 mm
(59)	Binding-Head Screws	HD-3049	4 x 15 mm
(60)	Pan-Head Screws	HD-2044	2.6 x 6 mm
(61)	Pan-Head Screws	HD-2055	3 x 6 mm
(62)	Binding-Head Screws		4 x 8 mm
(63)	Pan-Head Screws	HD-2054	3 x 5 mm
(64)	Pan-Head Screws	HD-2057	3 x 8 mm
(65)	Flat-Nead Screws	HD-4019	3 x 6 mm
(66)	Pan-Head Screws	HD-1181	3 x 6 mm (Nylon)
(67)	Binding-Head Screws		3 x 6 mm (Black)
(68)	Internal Star Lock Washers	HD-8045	2.6ϕ
(69)	Internal Star Lock Washers	HD-8041	3ϕ
(70)	Hex Nuts	HD-7003	3ϕ
(71)	Hex Nuts	HD-7088	9ϕ (Black)
(72)	Speed Nuts	HD-7013	PSN-3

ACCESSORY LIST

Ref. No.	Description	RS Part No.	MFR's Part No.
	DC Power Cord Ass'y	W-2471	DC-1021
	Fuse 1A		
	Fuse Caution Label		
	DC Cord Set		
	Fuse Caution Label		GE-23D-7491
	Antenna Ass'y.	A-4450	GA-79D-0544
	Antenna	A-4451	GR-5311
	Bracket	HB-9728	GE-79D-0458
	Antenna Holder		NO239
	Rubber Feet	F-0184	SJ-5112
	Wire antenna (10 m.)	A-0355	GE-79C-0504

APPENDIX TO PARTS LIST

For Australian, EC, UK and Canadian Models, some parts are changed. Following parts list information applies to these models.

Australian model

Ref. No.	Description	RS Part No.	MFR's Part No.
(33)	Power Transformer		K6218
	AC Power Cord		SAA 3p 2 m
	Strain Relief		SR-5N-4
	Model Label		GE79D-0446
	Terminal Block 12 pins		3012PT-12
	Fiber for Terminal Block		GE-23D-7435
R2	Not used		

EC model

Ref. No.	Description	RS Part No.	MFR's Part No.
(33)	Power Transformer		K6218
	AC Power Cord		KP-419C, LTCE-2F
	Strain Relief		SR-4N-4
	Model Label		GE-79D-0445
	Cord Label		
R2	Not used		

UK model

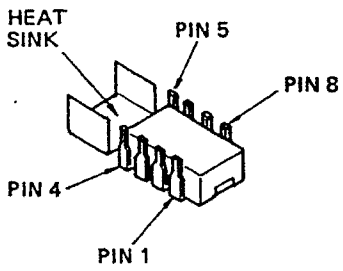
Ref. No.	Description	RS Part No.	MFR's Part No.
(33)	Power Transformer		K6218
	AC Power Cord		BS 2p 2m
	Strain Relief		SR-4N-4
	Model Label		GE-79D-0445
	Cord Label		
R2	Not used		

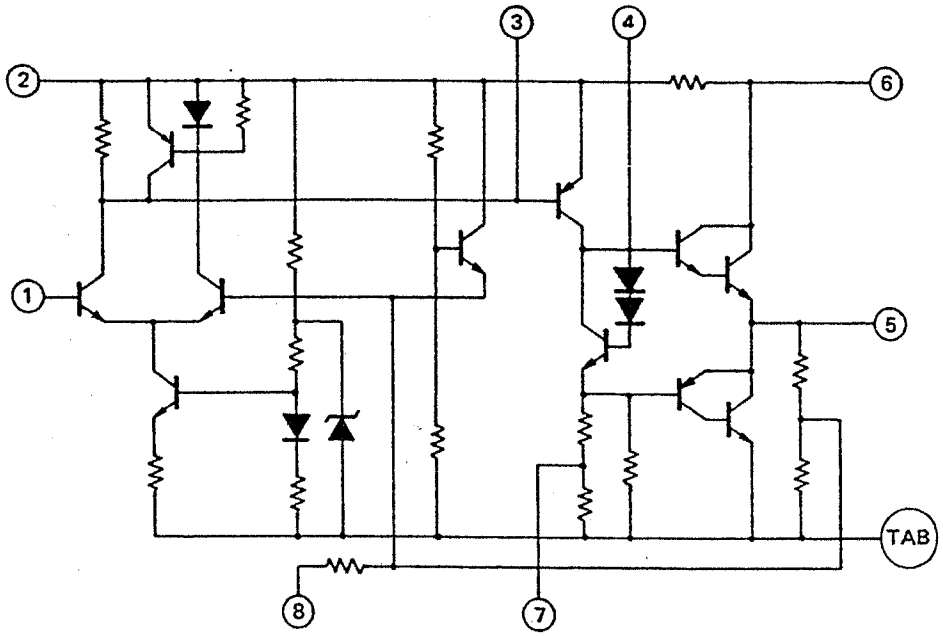
Canadian model

Ref. No.	Description	RS Part No.	MFR's Part No.
(33)	Power Transformer		TK1284B
	AC Power Cord		CSA 6 feet 3p
	Strain Relief		SR-5N-4
	Model Label		GE-79D-0423

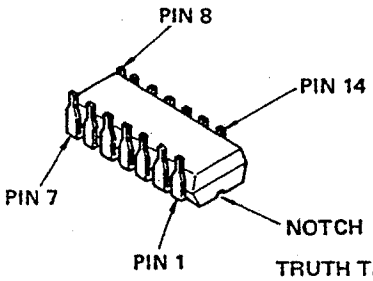
INTEGRATED CIRCUIT IDENTIFICATION

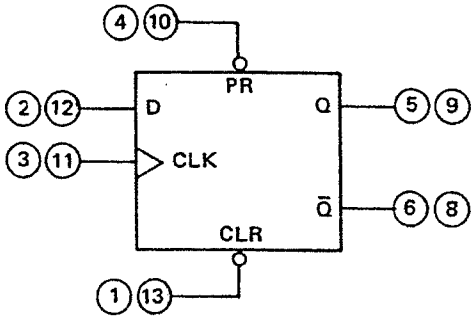
μPC575C2





SN74LS74A





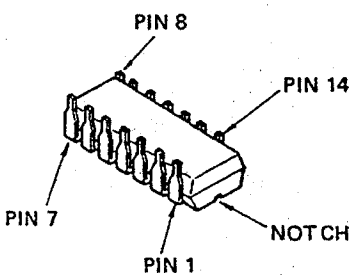
TWO F.F.S IN ONE PACKAGE

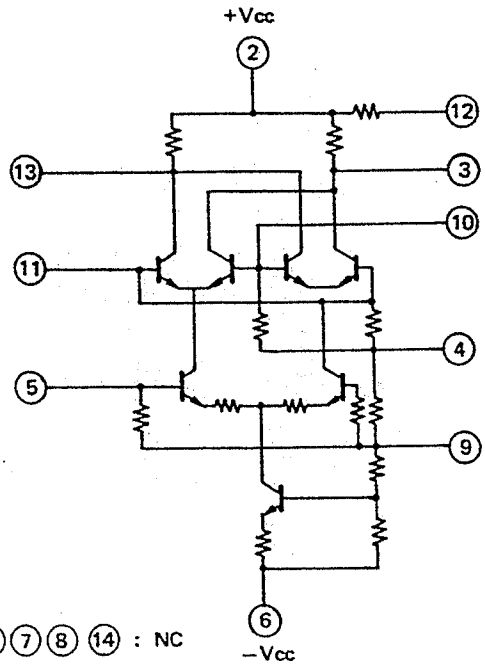
TRUTH TABLE

INPUTS				OUTPUTS	
D	CLOCK	PRESET	CLEAR	Q	$\bar{Q}$
H	↑	H	H	H	L
L	↑	H	H	L	H

↑: POSITIVE TRANSITION

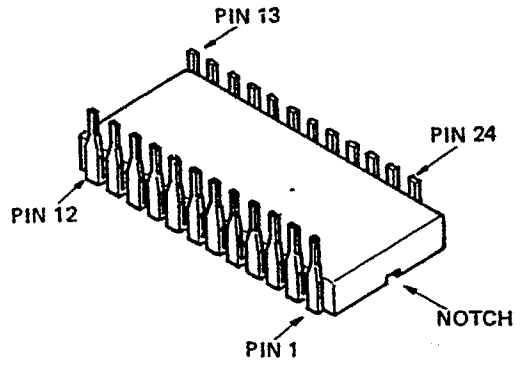
SN76514N





① ⑦ ⑧ ⑭ : NC

M54826P

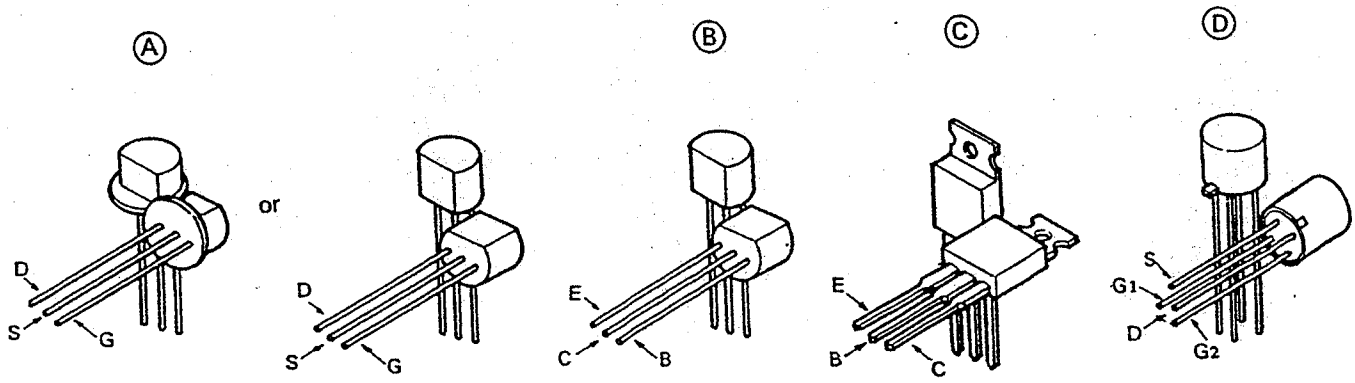


NOTE

1	Not used
2	Not used
3, 4	4 MHz Crystal Oscillator
5	Ground
6	INPUT (2456 ~ 3455 kHz)
7	Count Mode/Preset Selection Input S1; Low
8	Count Mode/Preset Selection Input S2; Low
9	Count Mode/Preset Selection Input S3; Low
10	Count Mode/Preset Selection Input S4; Low
11	Not used
12	Segment Output; g
13	Segment Output; f
14	Segment Output; e
15	Vcc (+5 V)
16	Segment Output; d
17	Segment Output; c
18	Segment Output; b
19	Segment Output; a
20	Not used
21	Not used
22	Digital Output; D506
23	Digital Output; D507
24	Digital Output; D508

TRANSISTOR LEAD IDENTIFICATION

(A); 2SK19(Y)
(B); 2SC1815, 2SC1923
(C); 2SD526
(D); 3SK45(B)-9



SEMICONDUCTOR VOLTAGE READINGS

Ref. No.		Value (V DC)
Q201	G1 G2 D S	0 2.2 3.8 0.10
Q202	B C E	0.69 0.10 0
Q203	G D S	0 9.0 1.5
Q204	G D S	0 9.0 1.5
Q205	B C E	* [0.67 0 0 0 0 0]
Q206	G1 G2 D S	0 4.1 8.2 0.92
Q207	B C E	2.1 9.0 1.4
Q208	B C E	**** [0.67 0 0 0 0 0]
Q209	G1 G2 D S	*** [0 0 8.8 0.33]
Q210	B C E	*** [0.68 0 0.06 6.8 0 0]
Q211	B C E	1.8 9.0 1.1
Q212	B C E	2.0 8.8 1.4
Q213	B C E	2.1 8.8 1.4
IC201	1 2 3 4 5 6 7 8 9 10 11 12 13 14	– 8.4 8.4 4.2 2.8 0 – – 2.8 4.2 4.2 4.2 7.5 –
Q301	G1 G2 D S	1.6 2.4 8.2 2.0
Q302	G1 G2 D S	0 0.86 8.6 0.52

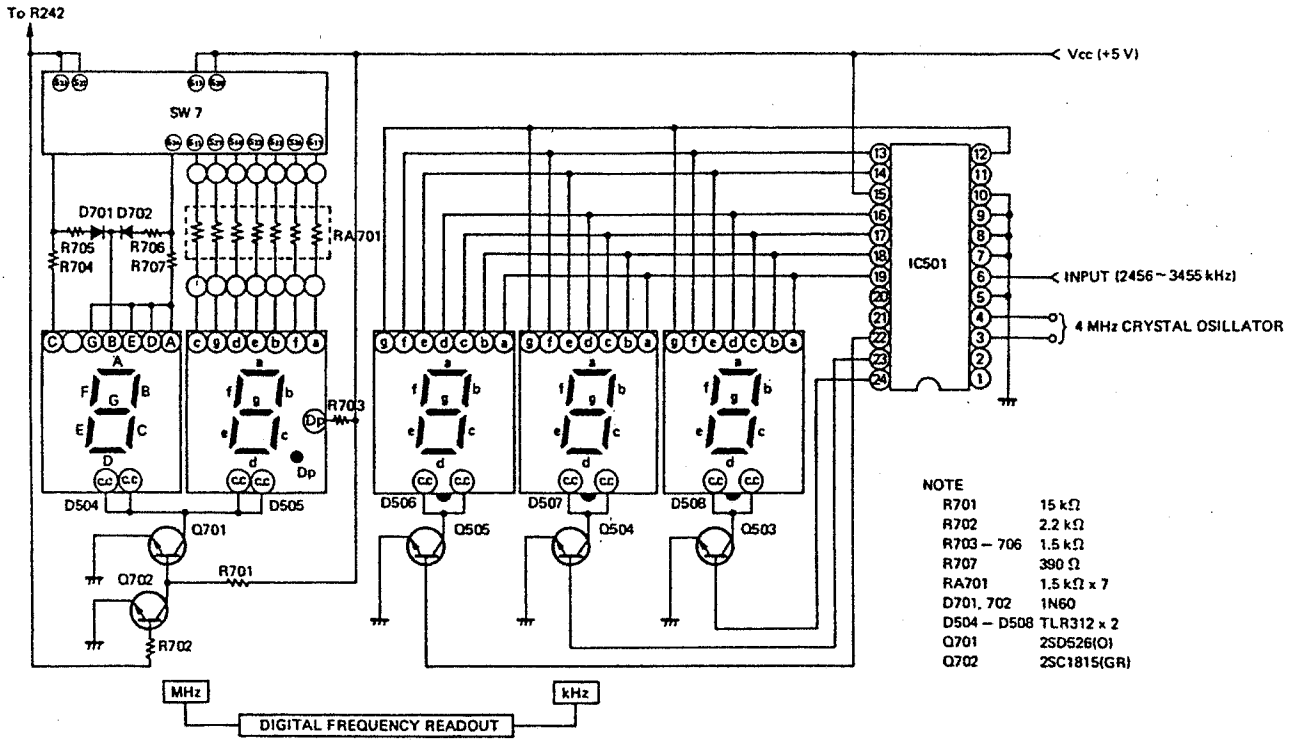
Ref. No.		Value (V DC)
Q303	B C E	3.7 8.6 3.1
Q304	B C E	2.1 8.4 1.4
Q305	B C E	0 6.9 0
Q306	B C E	2.0 3.2 1.5
Q307	G D S	0 4.7 0.46
Q308	G D S	0 4.6 0.72
Q309	B C E	0.64 0 0
Q310	B C E	0 6.8 0
Q311	G D S	0 4.5 0.38
Q312	B C E	0.88 3.2 0.28
Q313	B C E	1.2 4.1 0.58
Q314	B C E	4.1 8.0 3.5
Q315	B C E	9.8 13.8 9.2
IC301	1 2 3 4 5 6 7 8	1.8 13.8 13.0 7.6 6.4 13.8 0.25 1.9
Q401	B C E	1.2 7.5 0.68
Q501	B C E	0.5 0.86 0
Q502	B C E	5.6 12.2 5.0
Q503	B C E	0.12 0.22 0

Ref. No.		Value (V DC)
Q504	B C E	0.12 0.25 0
Q505	B C E	0.11 0.25 0
Q506	B C E	0.52 1.7 0
Q507	B C E	1.2 3.6 0.64
Q508	B C E	* [0.9 0 0.28 C 0.28 0]
IC501	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	** [1.6 1.8 0.19 0.64 0 1.7 0 0 0 0 0.15 0.06 2.0 2.0 5.0 0.9 0.9 0.9 0.9 0.55 0.55 0.11 0.12 0.12]
IC502	1 2 3 4 5 6 7 8 9 10 11 12 13 14	5.0 1.7 0.84 5.0 1.7 1.7 0 1.8 1.8 5.0 1.7 1.8 5.0 4.8
Q701	B C E	*** [0 0.58 3.8 0.11 0 0]
Q702	B C E	*** [0.72 0 0 0.58 0 0]

NOTE

1. DC voltage measured with DC VTVM (input impedance = more than 100 kΩ) under the following conditions ;
   RF GAIN : Maximum
   No input signal
2. (*) The voltage readings are under the condition that PRESELECTOR BAND switch is set to ranges of 0.01 ~ 1.6 MHz.
3. (**) The voltage readings of IC501 are under the condition of kHz readout "000".
4. (***) The voltage readings are under the condition that MHz readout is blanked.
5. (****) The voltage readings are under the condition that PRESELECTOR BAND switch is set to ranges of 0.01 ~ 0.5 MHz.

SCHEMATIC DIAGRAM OF DIGITAL FREQUENCY READOUT SECTION

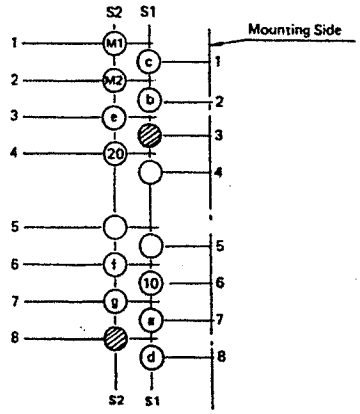


NOTE

R701	15 kΩ
R702	2.2 kΩ
R703 – 706	1.5 kΩ
R707	390 Ω
RA701	1.5 kΩ x 7
D701, 702	1N60
D504 – D508	TLR312 x 2
Q701	2SD526(O)
Q702	2SC1815(GR)

ROTARY SWITCH SW7 (FOR MHz READ OUT)

1. TERMINAL DESIGNATIONS (Soldering Side View)



2. CONTACT FOR LED SEGMENTS

LED Segments		Contact
D504	B, C	S16
	A,B,D,E,G	S24
D505	a	S17
	b	S12
	c	S11
	d	S18
	e	S23
	f	S26
	g	S27

M1, M2 ..... While the rotary switch steps UP/DOWN to next contact, S21 and S22 contacts and it not only disables LEDs (D504, 505) but mute the unit.

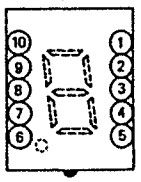
▨ ..... Common (+5V)

○ ..... Not connected

LEDs (D504~508)

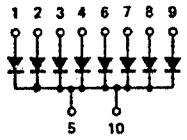
1. LEAD IDENTIFICATION

Soldering Side View



1 Segment A,a
2 Segment F,f
3 Segment E,e
4 Segment D,d
5 Common Cathode
6 Segment C,c
7 Dp Anode
8 Segment G,g
9 Segment B,b
10 Common Cathode

2. EQUIVALENT CIRCUIT



3. FREQUENCY READOUT POSITIONAL WEIGHT

10 MHz---D504
1 MHz---D505
100 kHz ---D506
10 kHz ---D507
1 kHz ---D508

FREQUENCY COUNTER IC501 LEAD IDENTIFICATION

UP/DOWN COUNT MODE ; DOWN COUNT

1 Not used
2 Not used
3, 4 } 4 MHz Crystal Oscillator
5 Ground
6 INPUT (2456 ~ 3455 kHz)
7 Count Mode/Preset Selection Input S1; Low
8 Count Mode/Preset Selection Input S2; Low
9 Count Mode/Preset Selection Input S3; Low
10 Count Mode/Preset Selection Input S4; Low
11 Not used
12 Segment Output; g
13 Segment Output; f
14 Segment Output; e
15 Vcc (+5 V)
16 Segment Output; d
17 Segment Output; c
18 Segment Output; b
19 Segment Output; a
20 Not used
21 Not used
22 Digital Output; D506
23 Digital Output; D507
24 Digital Output; D508

RADIO SHACK A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

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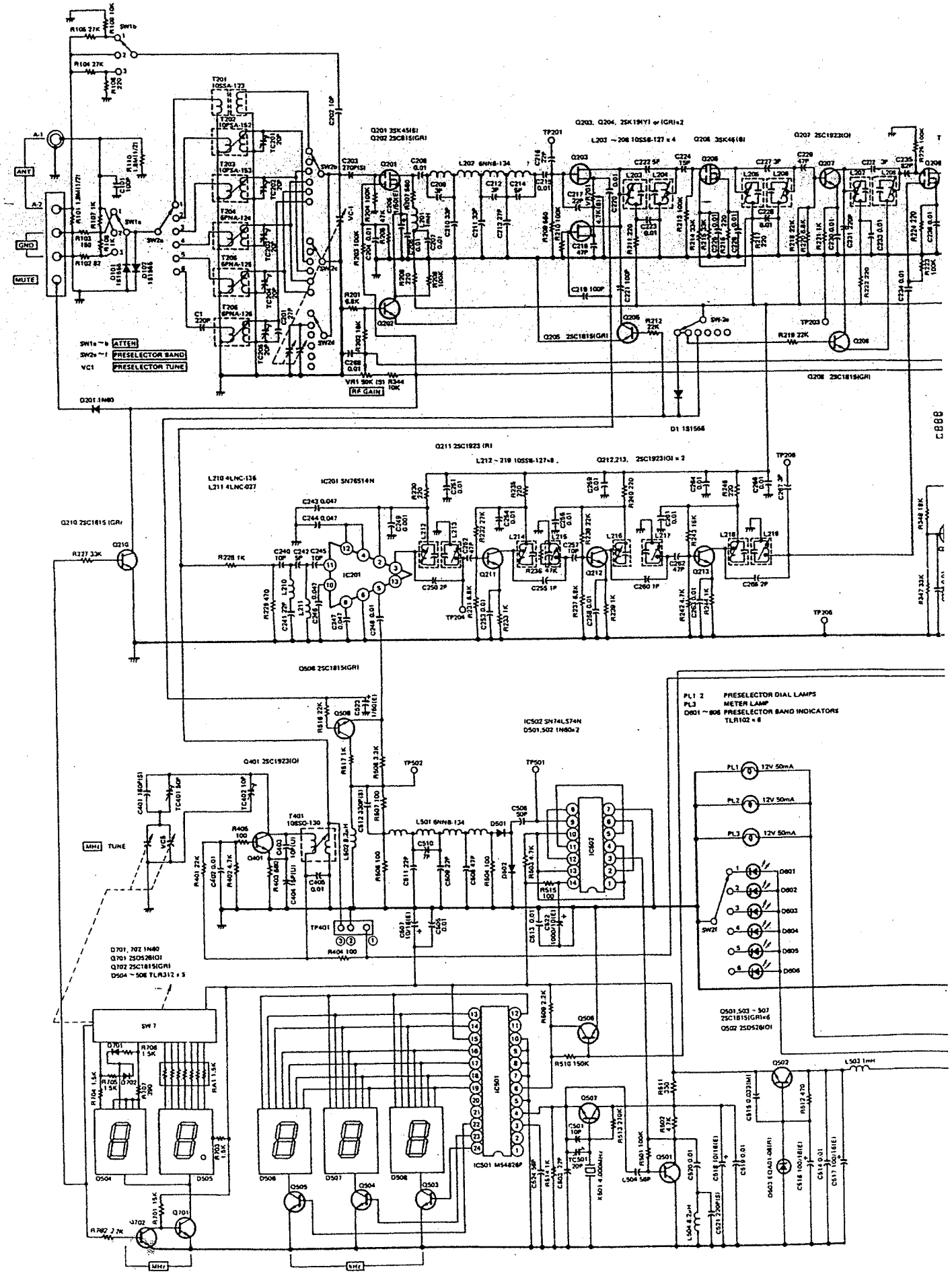
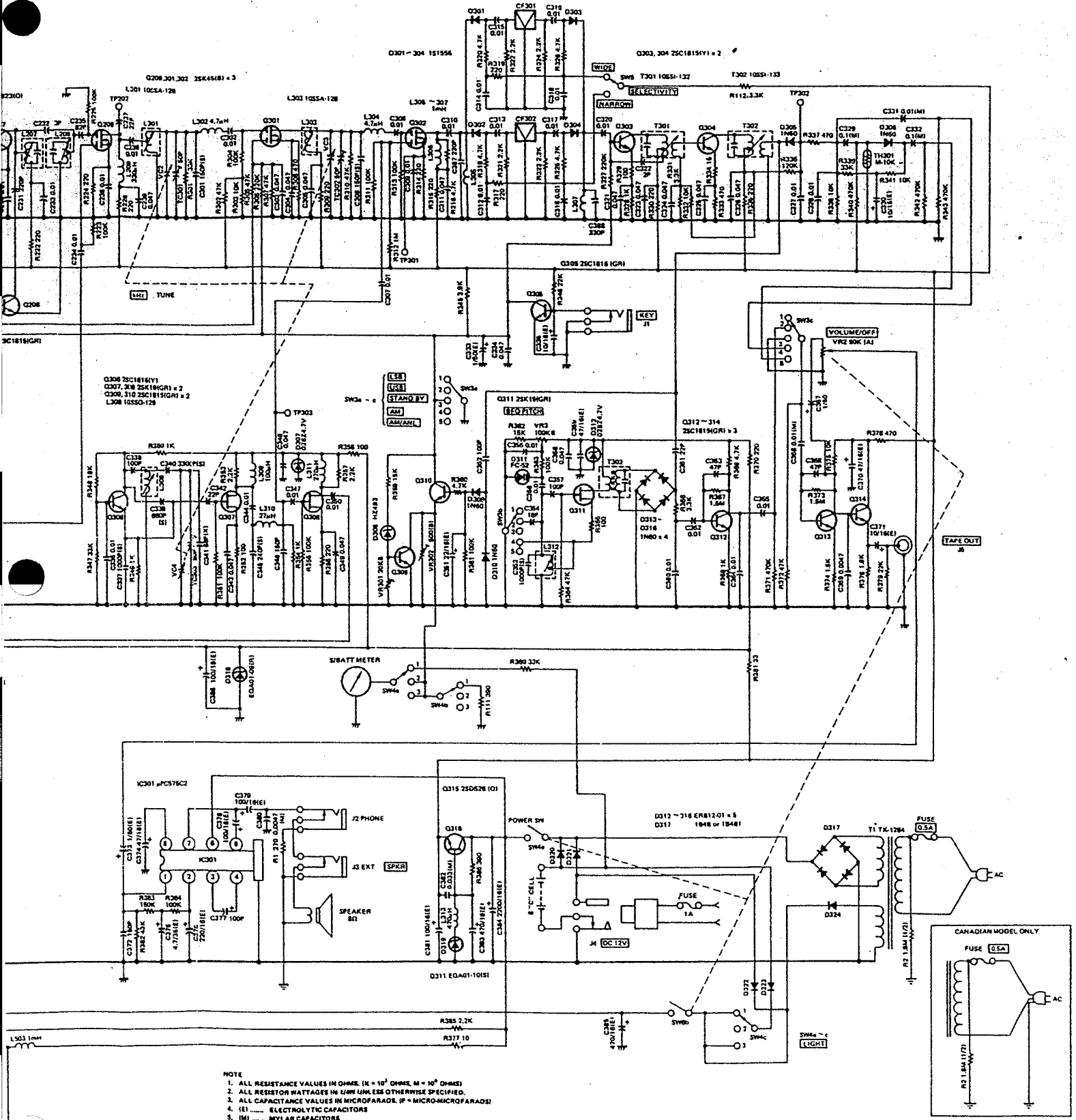
Printed in Japan

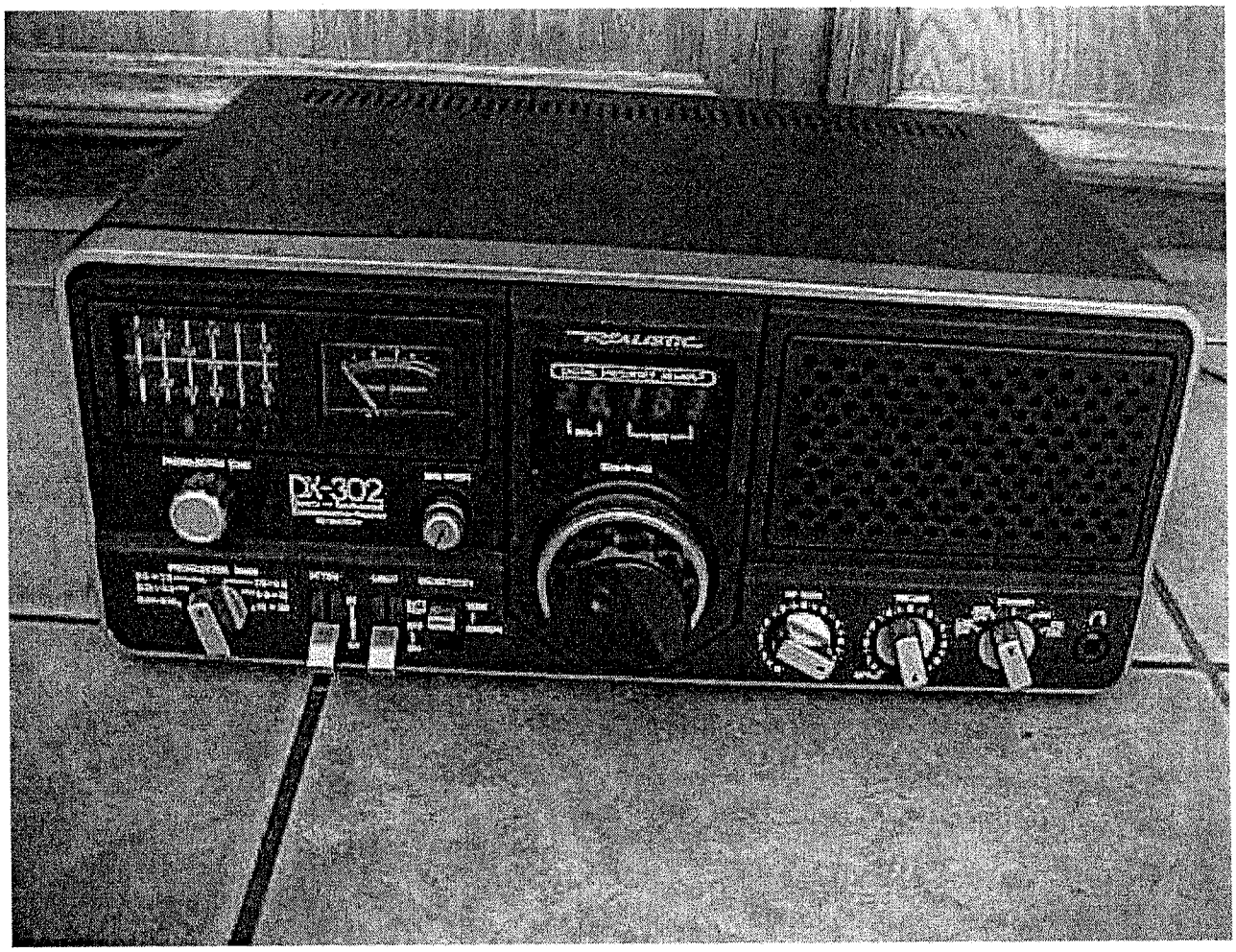
SCHEMATIC DIAGRAM

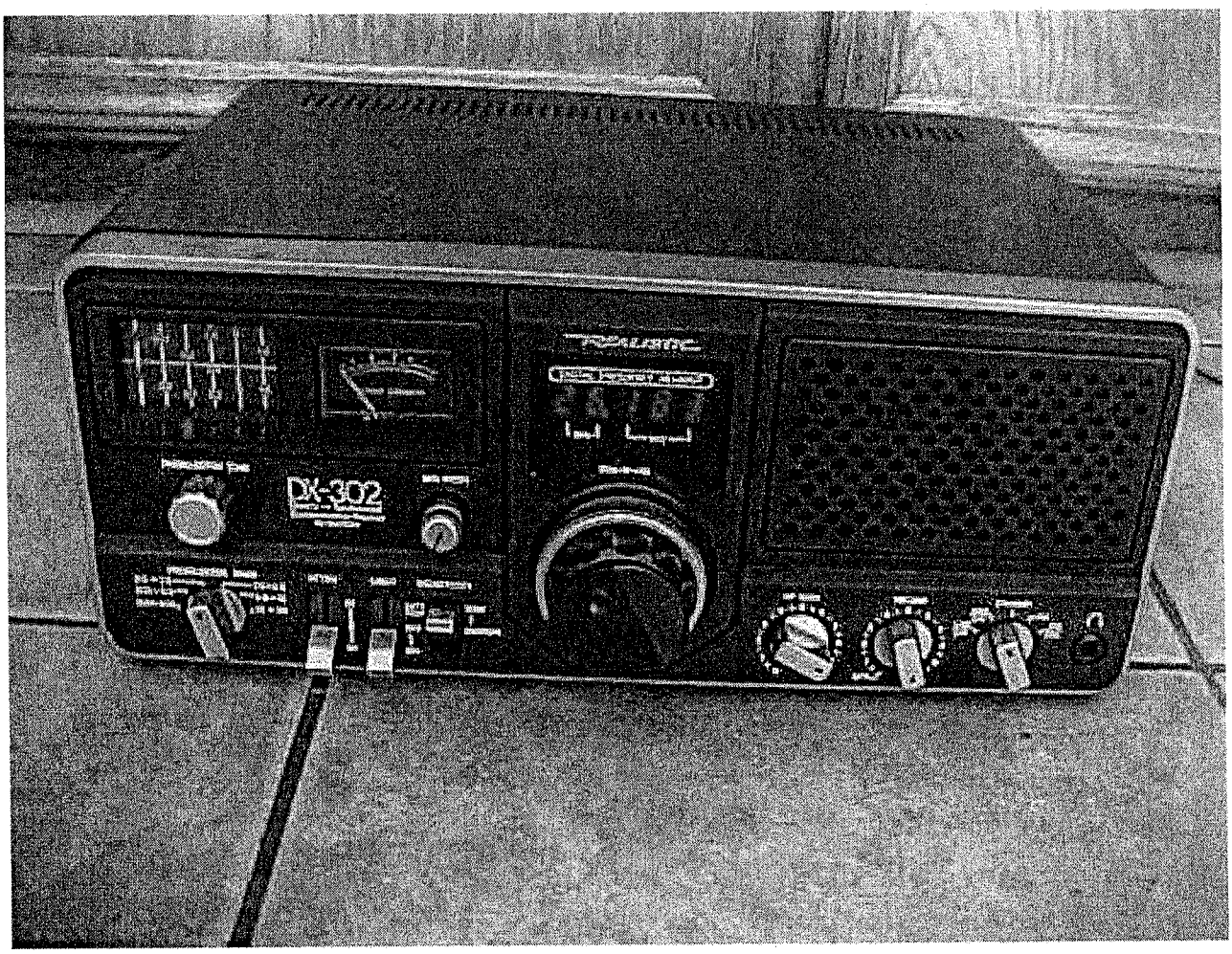




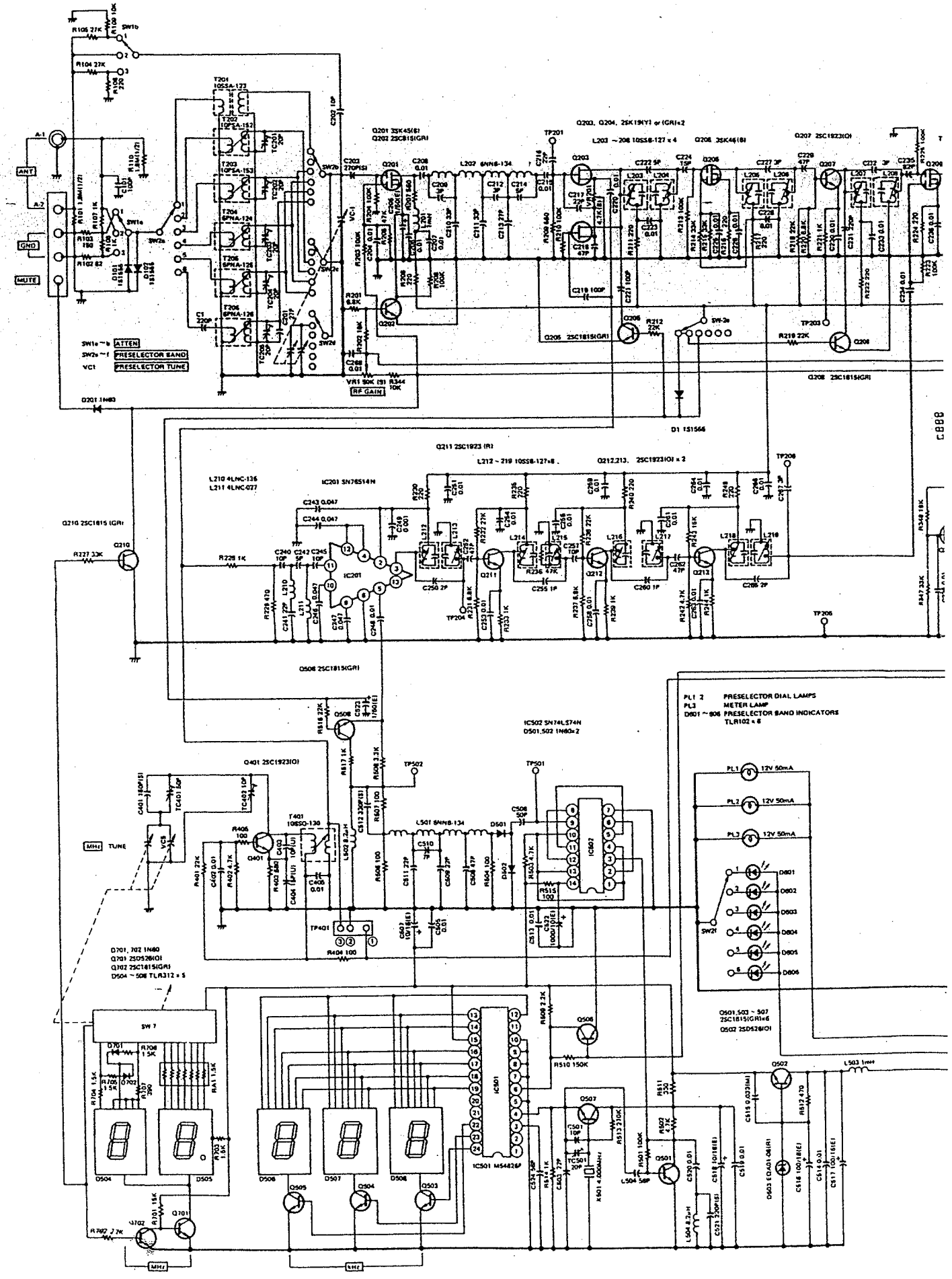
NOTE

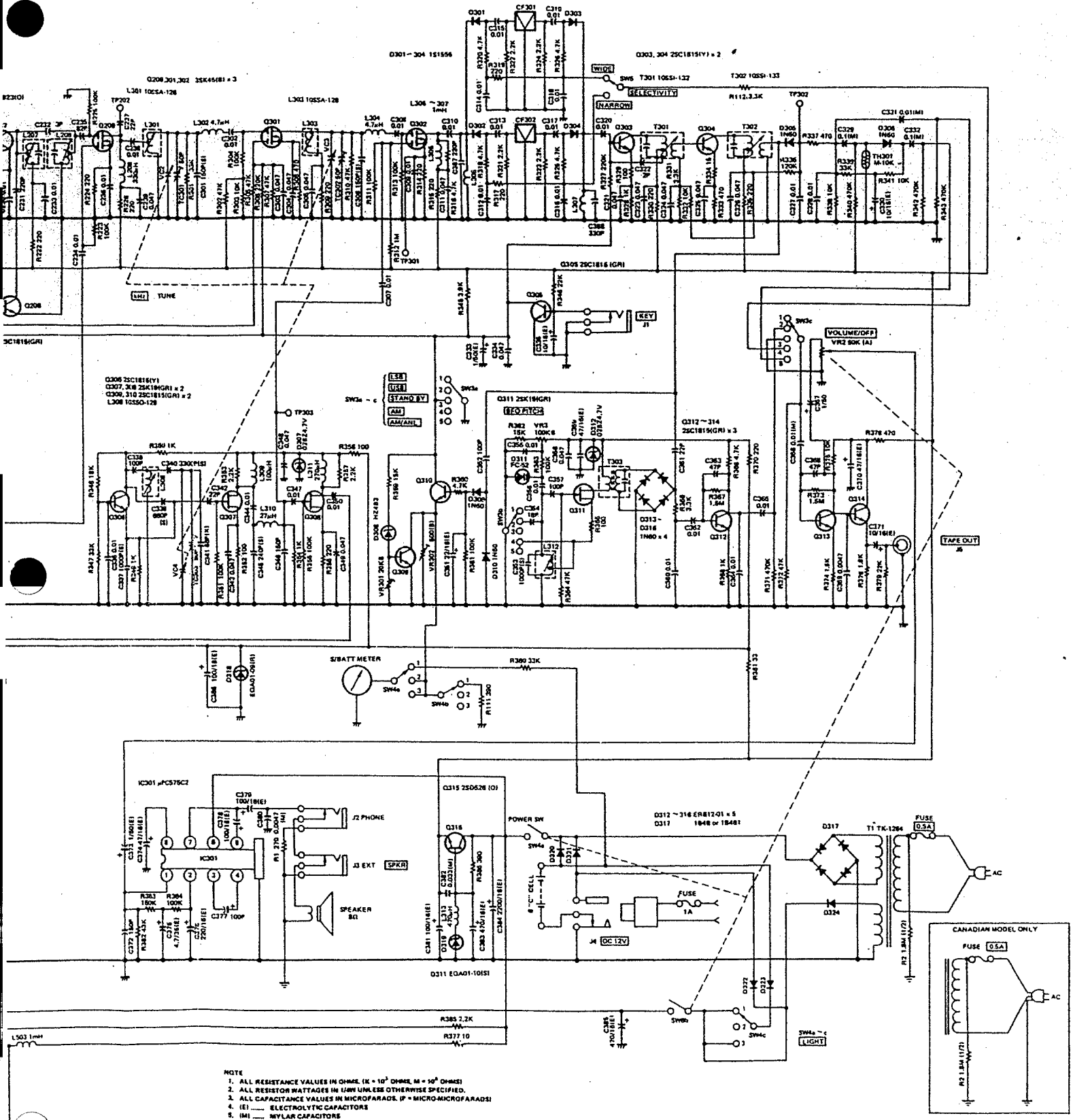
1. ALL RESISTANCE VALUES IN OHMS. (K = 10^3 OHMS, M = 10^6 OHMS)
2. ALL RESISTOR WATTAGES IN 1/4W UNLESS OTHERWISE SPECIFIED.
3. ALL CAPACITANCE VALUES IN MICROFARADS. (P = MICRO-MICROFARADS)
4. (E) ..... ELECTROLYTIC CAPACITORS
5. (M) ..... MYLAR CAPACITORS
6. (S) ..... POLYSTYRENE CAPACITORS
7. (U) ..... CERAMIC CAPACITORS (N750)
8. (X) ..... CERAMIC CAPACITORS (N2200)
9. NO SUFFIXED ..... CERAMIC CAPACITORS
10. RATING OR TYPE NUMBER OF COMPONENT PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT WITHOUT NOTICE.
11. (*) DENOTES THAT FOR EUROPEAN/AUSTRALIAN MODELS PARTS NO. OF T1 IS K4218 AND R2 IS NOT USED.


DX-302


DX-302

SCHEMATIC DIAGRAM





NOTE

1. ALL RESISTANCE VALUES IN OHMS. (K = 10^3 OHMS, M = 10^6 OHMS)
2. ALL RESISTOR WATTAGES IN 1/4W UNLESS OTHERWISE SPECIFIED.
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5. (M) ..... MYLAR CAPACITORS
6. (S) ..... POLYSTYRENE CAPACITORS
7. (U) ..... CERAMIC CAPACITORS (N750)
8. (K) ..... CERAMIC CAPACITORS (N2200)
9. NO SUFFIXED ..... CERAMIC CAPACITORS
10. RATING OR TYPE NUMBER OF COMPONENT PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT WITHOUT NOTICE.
11. (+) DENOTES THAT FOR EUROPEAN/AUSTRALIAN MODELS PARTS NO. OF T1 IS K6218 AND R2 IS NOT USED.