VHF LAND MOBILE RADIOTELEPHONE

IC-125/T/TM

MAINTENANCE MANUAL

TABLE OF CONTENTS

SECTION 1 SPECIFICATIONS

GENERAL:

Number of Semiconductors	:	Transistors 24 FET 9 IC 9 Diode 30 (not including diodes on the matrix board)
Frequency Coverage	:	One of the following segments 150MHz ~ 158MHz 155MHz ~ 163MHz 161MHz ~ 168MHz 166MHz ~ 174MHz
Operation	:	Simplex/Semi-duplex
Antenna Impedance	:	50 Ohms unbalanced
Power Supply Requirements	:	DC 13.8V ±15% Negative Ground 6.0A Max.
Current Drain	:	Transmitting: Approx. 5.5A Receiving: At Max. Audio. Approx. 1.0A Squelched Approx. 0.3A
Operating Temperature	:	−10°C to +50°C
Dimensions	:	50mm(H) x 150mm(W) x 180mm(D)
Net Weight	:	1.5Kg
Five Tone Selective System (IC-125T/TM only)	:	One of the following tone system CCIR ZVEI NATEL

TRANSMITTER:

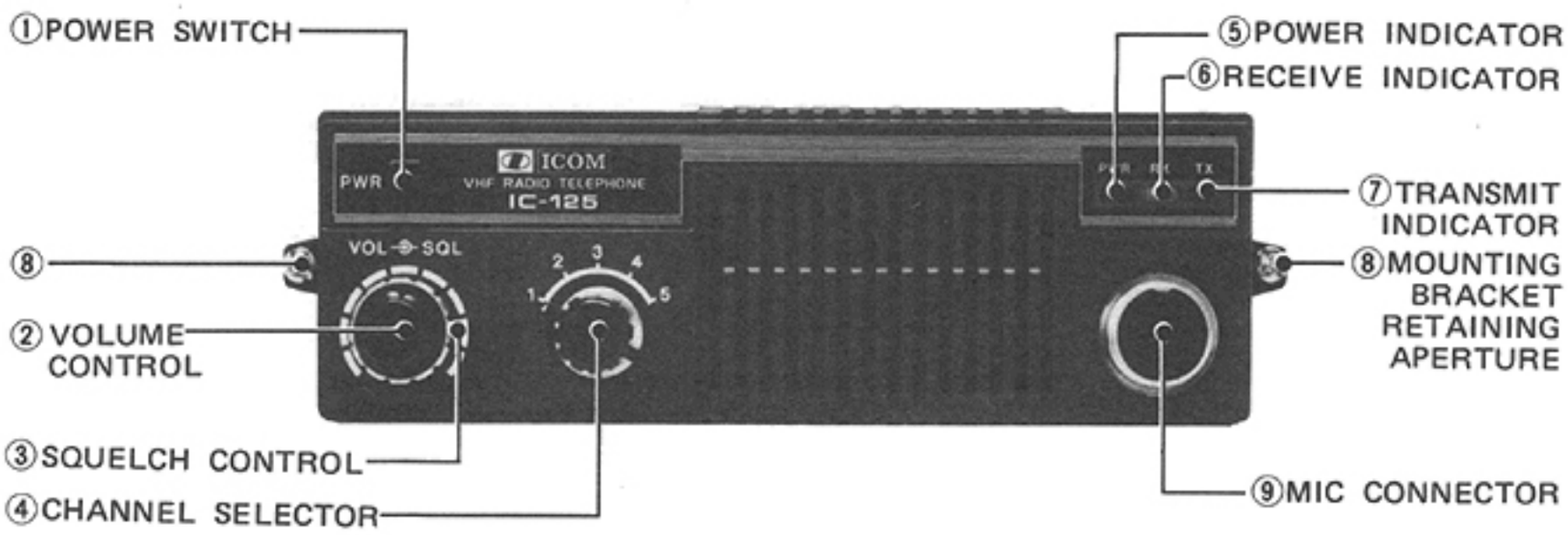
Transmitting Frequency	:	5 Channels
Channel Spread	:	2.5MHz maximum
Channel Spacing	:	25KHz spacing (15KHz or 12.5KHz available)
Frequency Stability	:	±0.0005%
Emission Mode	:	$16F_3$
Output Power	:	25W (IC-125TM: 10W)
Max. Frequency Deviation	:	5KHz
Modulation System	:	Variable reactance frequency modulation
Spurious Emission	:	More than 70dB below carrier
Microphone	:	Impedance: 600 Ohms Input level: 10mV typical Dynamic or optional Electret condenser microphone

RECEIVER:

Receiving Frequency	:	5 Channels
Channel Spread	:	2.5MHz maximum
Modulation Acceptance	:	$16F_3$
Receiving System	:	Double superheterodyne
Intermediate Frequency	:	First IF 21.4MHz Second IF 455KHz
Sensitivity	:	Less than 0.3μV for 12dB SINAD
Squelch Sensitivity	:	Less than 0.3μV
Spurious Response Rejection Ratio	:	More than 80dB
Adjacent Channel Rejection Ratio	:	More than 80dB
Intermodulation Rejection Ratio	:	More than 75dB
Selectivity	:	±6KHz at the −6dB point ±12.5KHz at the −70dB point
Squelch	:	Dual: Noise compensated squelch Continuous Subaudible Tone squelch option (IC-125 only)
Audio Output Power	:	More than 2 Watts with less than 10% distortion
Audio Output Impedance	:	4 ~ 8 Ohms

SECTION 2 OPERATING CONTROLS

2-1 FRONT PANEL (IC-125)



1. POWER SWITCH

A push lock type ON/OFF switch controls the supplied power to the set. Push the switch IN (lock position) to apply power to the set.

2. VOLUME CONTROL

Controls the audio output level in the receive mode. Clockwise rotation increases audio output.

3. SQUELCH CONTROL

Sets the squelch threshold level. To turn OFF the squelch function, rotate this control completely counter-clockwise. To set the threshold level higher, turn the control clockwise.

4. CHANNEL SELECTOR

This switch selects the operating frequency.

5. POWER ON INDICATOR

When the set is turned ON, this indicator is lit.

6. RECEIVE INDICATOR

Illuminates when the squelch is opened in the receive mode.

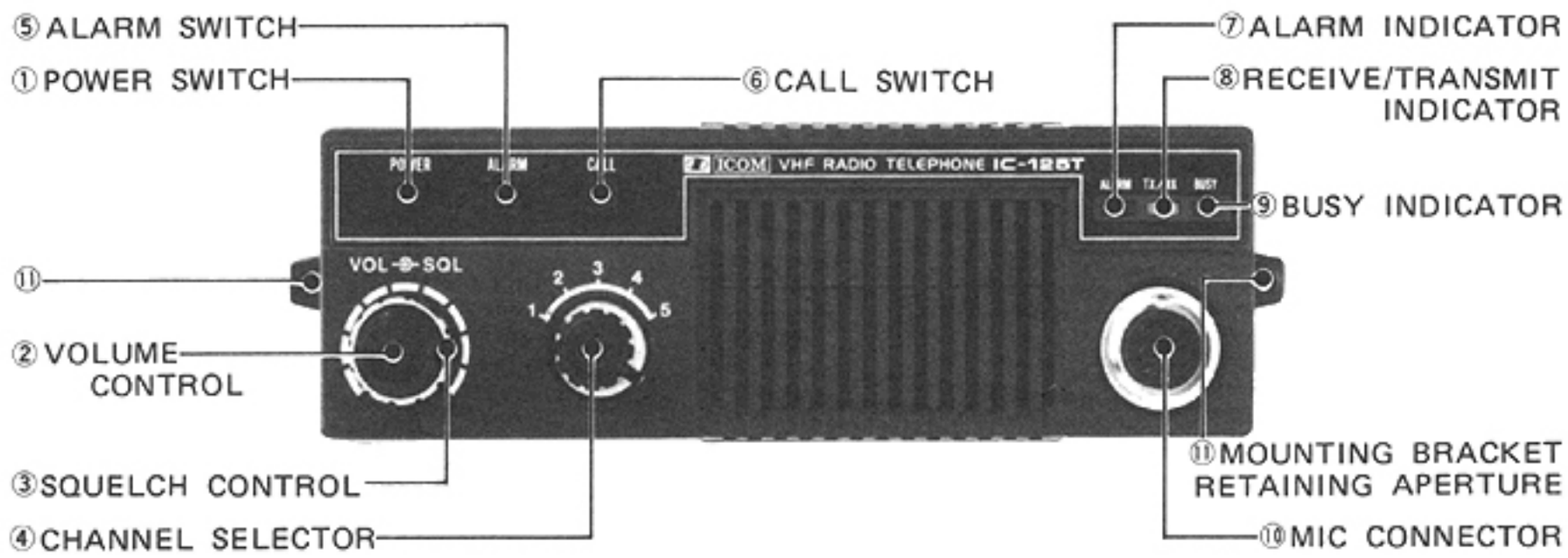
7. TRANSMIT INDICATOR

When your set is in the transmit mode this indicator is lit.

8. MOUNTING BRACKET RETAINING APERTURE

Connect the supplied microphone or optional microphone to this jack. The IC-SM3 stand-type Electret microphone or IC-HS1 handset can also be used. If you wish to use a microphone other than one of these, refer to the drawing on page 4 of the instruction manual.

2 - 2 FRONT PANEL (IC-125T/TM)



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A push lock type ON/OFF switch controls the supplied power to the set. Push the switch IN (lock position) to apply power to the set.

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3. SQUELCH CONTROL

Sets the squelch threshold level. To turn OFF the squelch function, rotate this control completely counter-clockwise. To set the threshold level higher, turn the control clockwise.

4. CHANNEL SELECTOR

This switch selects the operating frequency.

5. ALARM SWITCH

Sets or releases the standby function. In the standby condition, the radio will remain silent until an appropriate call signal is received.

6. CALL SWITCH

By pushing this switch, the radio is turned in the transmit mode, and a five tone call signal will be sent. Then the radio is turned in the receive mode and the standby function is released to receive an answerback signal.

7. ALARM INDICATOR

When an assigned call signal has been received, this indicator is lit until the standby condition is released by pushing the alarm switch.

8. RECEIVE/TRANSMIT INDICATOR

When the radio is turned ON and in the receive mode, this indicator is lit green. In the transmit mode, this indicator is lit red.

9. BUSY INDICATOR

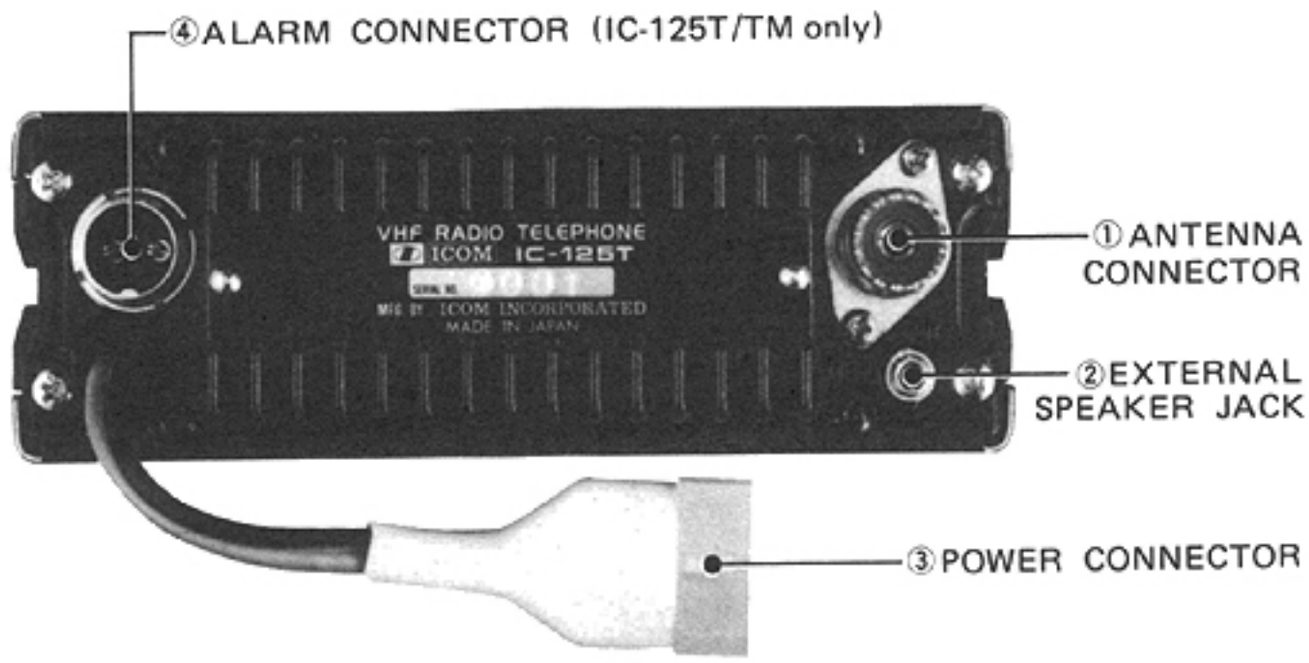
When the selected channel is being used by other party, this indicator is lit. At this time, these signals can be heard by pushing the alarm switch to release the standby function.

10. MIC CONNECTOR

Connect the supplied microphone or optional microphone to this jack. The IC-SM3 stand-type Electret microphone or IC-HS1 handset can also be used. If you wish to use a microphone other than one of these, refer to the drawing on page 4 of the instruction manual.

11. MOUNTING BRACKET RETAINING APERTURE

2-3 REAR PANEL



1. ANTENNA CONNECTOR

This is used to connect the antenna to the set. Its impedance is 50 ohms and connects with a PL-259 connector.

2. EXTERNAL SPEAKER JACK

When an external speaker is used, connect it to this jack. Use a speaker with an impedance of 4 ~ 8 ohms. When the external speaker is connected, the built-in speaker does not function.

3. POWER CONNECTOR

Connect the supplied power cord to this connector.

4. ALARM CONNECTOR (IC-125T/TM only)

This is used to connect an external alarm. When a call signal is received the contacts of the internal relay are made.

SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

1. **Antenna Switching Circuit.**
   Signals from the antenna connector J1 are fed to Antenna Switching Circuit consisting of D1 ~ D3 through the Hormonic Low-Pass Filter, then the incoming signals are fed to the RF Amplifier.

2. **RF Amplifier and First Mixer Circuit.**
   The incoming signals are fed to RF Amplifier Q25 through a Band-Pass Filter consisting of L20 and L21. The signals are again fed to Band-Pass Filter consisting of L17, L18 and L19 which reduces interference and intermodulation from out of the band signals. The filtered signals are fed to the first gate of Q24, the First Mixer, and the PLL signals to the second gate to obtain 21.4MHz first IF signals.

   The PLL frequency can be calculated with the following formula;

   f (PLL Frequency) = (Receiving Frequency – 21.4MHz)

3. **IF Amplifiers Circuits.**
   21.4MHz first IF signals are fed to Monolithic Crystal Filter, FI1, and amplified by Q23. The amplified signals from Q23 are fed to Q22, the Second Mixer with the Second Local Oscillator signals to obtain 455KHz second IF signals. The Second Local Oscillator Q19 oscillates at 20.945MHz with X2 crystal unit. This mixed signals, 455KHz, are fed to Limiter Amplifier IC5 through Ceramic Filters, FI2 and FI3 and amplifiers Q20 and Q21. The signals are detected at discriminator DS1, D10 and D11 to obtain AF signals.

4. **AF Power Amplifier Circuit.**
   The signals from detector are fed to AF Power Amplifier IC3 through AF amplifier Q17 and Low-Pass Filter Q18 and amplified to drive the speaker.

5. **Squelch Circuit.**
   The signals from Discriminator DS1 are filtered about 20KHz noise component by a Resonator consisting of L14 and C74 and amplified at Q15. Then they are rectified by D7 and D8. The rectified DC voltage from D7 and D8 is applied to the base of Q14, turning it on. Since the collector of Q14 is connected to the base bias network of AF Amplifier Q17 and Q17 is turned off. Thus squelch action is applied and no audio is amplified by IC3. When incoming signals are recieved, noise is suppressed, the base voltage of Q14 falls, and Q14 is turned off. Therefore normal voltage is applied to the base of Q17, the squelch is opened, and audio signals are heard from the speaker.

3-2 TRANSMITTER CIRCUIT

1. **AF Amplifier and Limiter Circuit.**
   Audio signals from the microphone are amplified by IC-2(A) and differentiated by R34 and C42, then fed to IC-2(B) which is a Limiter Amplifier and has 6dB/octave response between 300Hz and 3KHz. This output is fed to the Splatter Filter Q1 to cut components above 3KHz, then fed to varactor diode D3 for modulation.

2. **FM Modulation Circuit.**
   The amplified audio signals from the microphone are supplied to varactor diode D3 connected in series with the crystal unit which oscillates at 21.4MHz through level adjust trimmer R25. Voltage of these signals causes the capacetance of D3 to vary and frequency modulation is effected. Since this transceiver is a heterodyne type, any frequency deviation that occurs in this circuit appears unchanged as a frequency deviation on the operation frequency, and a crystal unit with special characteristics is used to ensure suitable frequency deviation and stability. R21 is a thermistor, and makes temperature compensation to prevent the deviation is fluctuated by temperature variation.
   These modulated signals are taken out at the emitter of Q5, And after amplified by IC1 limiter amplifier, the signals are applied to the Transmit Mixer Circuit.

3. **Transmit Mixer and Driver Circuit.**
The local oscillator signal from the PLL Unit is mixed with the 21.4MHz modulated signal to give signal of the local oscillator frequency ±21.4MHz. As a double balanced mixer consisting of wide dynamic range FET's Q3 and Q4, used for this mixing stage, 21.4MHz and the local oscillator frequency signals are cancelled and not appear in the output. The mixed signal is further passed through a Band-Pass Filter consisting of L4 to L6 to produce signal in the operating band only. And amplified by Q2 and Q1, then fed to PA Module IC1.

4. **Power Amplifier Circuit.**
The signal from Q1 in the Main unit are amplified by IC1 in the PA unit to obtain 25W output. The heat from IC1 is transmitted to the diecast heat sink which radiates the heat very efficiently. IC1 is a hybrid IC consisting of a two-stage RF power amplifier. The output signal of IC1 is fed to the antenna terminal through the T/R switching diode D1 and three-stage low-pass filter, which suppress harmonics by more than 60dB.

5. **ALC Circuit.**
This circuit stabilizes the output power, even when the power voltage or the antenna load is fluctuating. The variation of the output of IC1 is detected at D4 in the PA unit and amplified by differential amplifier Q9 and Q10 in the Main unit. The output voltage from Q9 and Q10 is fed to Q8 then Q13. This lowers Q1's collector voltage and PA module's driver stage voltage, and input excitation level to the power amplifier module and reduces input power to the final stage, thus preventing damage to the module due to high current. The output power can be adjusted by R51.

6. **Power Supply Circuit.**
This circuit employs a multipurpose voltage regulator, IC4. It puts out a constantly activated 8V, R8V which is operative during receive, and T8V which is operative during transmit. R8V is put out from Pin 6, and T8V is put out from Pin 8 of IC4. By grounding Pin 5, R8V goes to 0V and T8V is actuated, thus the set will be turned to transmit mode.

3 - 3 PLL (Phase Locked Loop)

1. **Local Oscillator Circuit.**
This circuit oscillales 42.283MHz (when F1 version) signal with Q9, and the signal at 3 times this frequency, i.e., 126.875MHz, is taken from the collector of Q9.

2. **Mixer, Low-Pass Filter, and Amplifier Circuit.**
The output signal from the local oscillator circuit and the VCO signal amplified by Q10 are mixed by the MOS FET mixer Q8. The output signals are fed to low-pass filters to filter out only the signals below 15MHz. The output signal from the filter is amplified to the proper drive level (more than 3Vp-p) of the programmable divider IC1 by Q7. Then the signal is fed to Pin 2 of IC1.

3. **Programmable Divider.**
The programmable divider is called a programmable counter (1/N counter) and BCD input equal N (frequency dividing ratio).
The input signal at Pin 2 of IC1 is divided by BCD input signals from the matrix circuit at Pin 3 ~ Pin 15.

4. **Reference Frequency Generator Circuit.**
Reference frequency generator IC3 consists of a crystal oscillator and a highspeed divider. X1 oscillates at 5.12MHz (6.4MHz when 12.5KHz, channel spacing version), which is divided by 1024.
5KHz (6.25KHz when 12.5KHz version) reference frequency is fed to phase detector IC2.
This 5KHz reference frequency decides the variation step of the PLL output frequency and the divided number N decides the PLL output frequency.

PLL Output Freq. = Local oscillator Freq. (MHz) + 0.005MHz* (the reference freq.) x N (divide number of programmable divider)
* 0.00625MHz when the set is 12.5KHz channel spacing version.

5. **Phase Detector and Loop Filter Circuit.**
Digital phase detector, IC2, detects the phase difference of the pulse signals of the 5KHz reference frequency and the output signal of the programmable divider, and proportionately puts out pulse signals at Pin 3, which becomes high impedance when the PLL is locked.

Pin 4 is for detecting the lock failures and changes to ground level according to the phase difference of the two pulse signals. When the lock fails, the pulse signal from Pin 4 is intergrated by R4 and C20.
When the intergrated voltage exceeds the junction voltage of Q1's base, Q1 is turned ON and then Q6 in the Main unit is turned ON.

The collector of Q6 is connected to the base of Q5 through D2, so the base voltage of Q5 becomes ground level, and Q5 stops oscillation to prevent transmitting unwanted signals.

The loop filter, consisting of Q2, Q3, C25, R5 and R7 converts the pulse signal from Pin 3 into a DC voltage and decides the response time of the whole loop.

The output signal is fed to tuning diode D2 of the VCO circuit as the control voltage for the VCO frequency set.

6. VCO Circuit.

The VCO (Voltage-Controlled Oscillator) is a modified Clapp circuit, using Q4, and oscillates in the 130MHz range. The oscillation frequency is controlled by a DC voltage which is supplied from the loop filter in the PLL unit to varactor diode D2, inserted in series with the oscillation coil.

The oscillator output is taken from the source of Q4, and fed to buffer amplifiers Q5, Q6 and Q10 in the PLL unit to become the local oscillator signal for the transmitter and receiver, and to get a DC voltage to control the frequency of the VCO.

7. Matrix Circuit.

Frequency of the PLL (N set up) is set up transmitting and receiving frequencies separately by diode matrix. (Auto-controlled by T8V and R8V)

Dividing ratio can be calculated with the following formula;

$$N = \frac{\text{Desired operating frequency} - \text{Intermediate freq.} - \text{Local oscillator freq.}}{\text{Reference frequency}} \text{ (MHz)}$$

$$= \frac{(\text{Desired operating frequency} - 21.4) - 126.875}{0.005} \text{ (MHz)}$$

NOTE: This formula is for F1 version. Refer to page 6 - 1 for other versions.

3 - 4 OTHER CIRCUITRY

1. 5-TONE UNIT (IC-125T/TM only)

CODING

The coding can be programmed for each of receiving and transmitting functions. The CALL NUMBER, or ADDRESS CODE is programmed by connecting the Digit Sequence Switch terminals (for OUTPUT) S1 ~ S5 (LSI pins 16 ~ 20), to the required Tone Digit Select terminals (INPUT) 1 ~ G, (LSI pins 4 ~ 15).

Pins 11 and 12 of the IC plug of this unit are as the Tone Digit Select Input terminals, 1 ~ G, while pins 13 ~ 20, and 22 and 23 of the IC plug are as Digit Sequence Switch Terminals (A3 ~ A5 for Transmit, G3 ~ G5 for Answer-back).

DECODER GATE PERIOD

The Decoder Gate Period, for example the maximum time allowed for receipt of the consecutive digits in the Address Code, is set at approximately 100 mS by C21 and R30.
Upon receipt of the address code, the Decoded Address output terminal (LSI pin 23) becomes H-level.

This terminal is automatically turned OFF after a specified period which is set by C24 and R33 connected to the reset terminal, pin 25.

These tones are transmitted continuously until the code is completed and the duration of each tone is approximately 60 mS which is set by C23 and R31.

By linking the Decoded Address output to the Transmit Enable terminal pin 22, the Automatic Transponding function is obtained; the Encoder section transmits an answer-back code each time when the specified address code has been received.

DECODE AND ENCODE TONE FREQUENCIES

Decode and Encode Tone Frequencies are obtained by dividing a high frequency clock (VCO) which is locked to a multiple of a low reference frequency (VCM). The VCO frequency is approximately 156 KHz and is set by C12, R20 and R21.

TONE DIGIT SELECT INPUT

The Tone Digit Select signals are fed to one of the Tone Digit Select Terminals through logic gates. This decides division factor for the selected tone. Therefore absolute accuracy is determined by the VCM frequency.

The desired timing period of the VCM is set by C15, R23, R24 and R25 which obtains 0.788 mS for CCIR and ZVEI tone, and 1.055 mS for the NATEL tone.

Also R28, C16 and C17 as well as R28, C19 and C20 are form sampling integrators.

Increasing C19 and C20 increases filter Q (higher broadband noise rejection), but increases response time. Increased tone amplitude also increases response time. Therefore C7, R26, R28, C16, C17, C19 and C20 are set for values which were stated for 0.1V to 1V RMS and standard tone period.

Q1 and Q2 are controlled by a Decoded Address output through D4 and also by pushing the Call Switch. At this time, Q1 is turned ON and the PTT line is grounded, which makes the IC-125T/TM in the transmit mode.

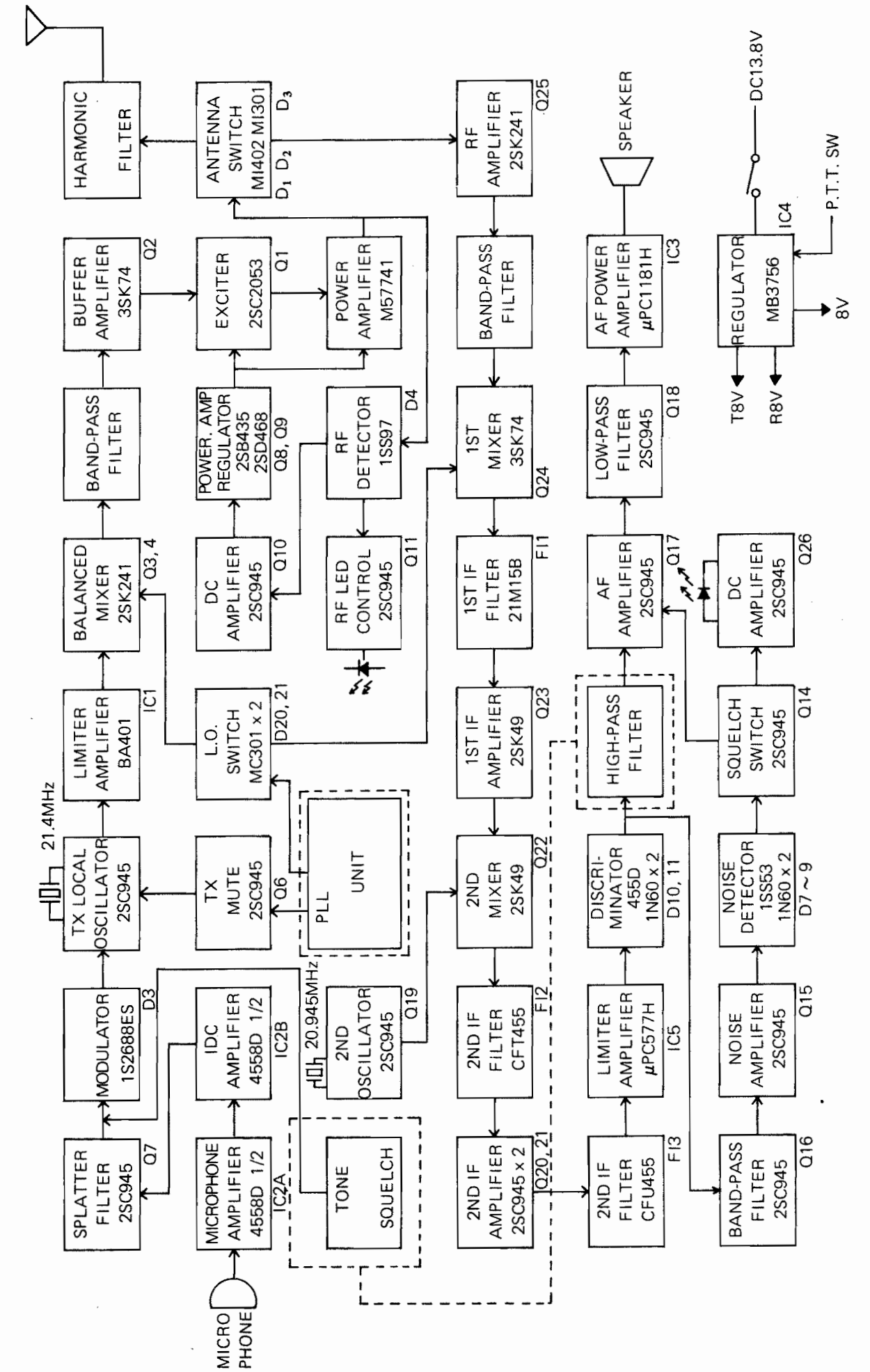
The Flip-Flop, consisting of Q3, Q4 and D1 is set by the Decoded Address output signal through Q6. Thus Q9 for controlling the External Alarm Relay is controlled by Q6, and the relay is turned ON because of the Flip-Flop output Q3 is at ground level as well. Q3 remains at this condition until the Flip-Flop is reset.

However, the External Alarm Relay is turned OFF after the Decoded Address output signal is OFF and a predetermined period is passed, which turns both Q6 and Q9 OFF. Q5 is an AC amplifier which amplifies the signal input to the LSI.

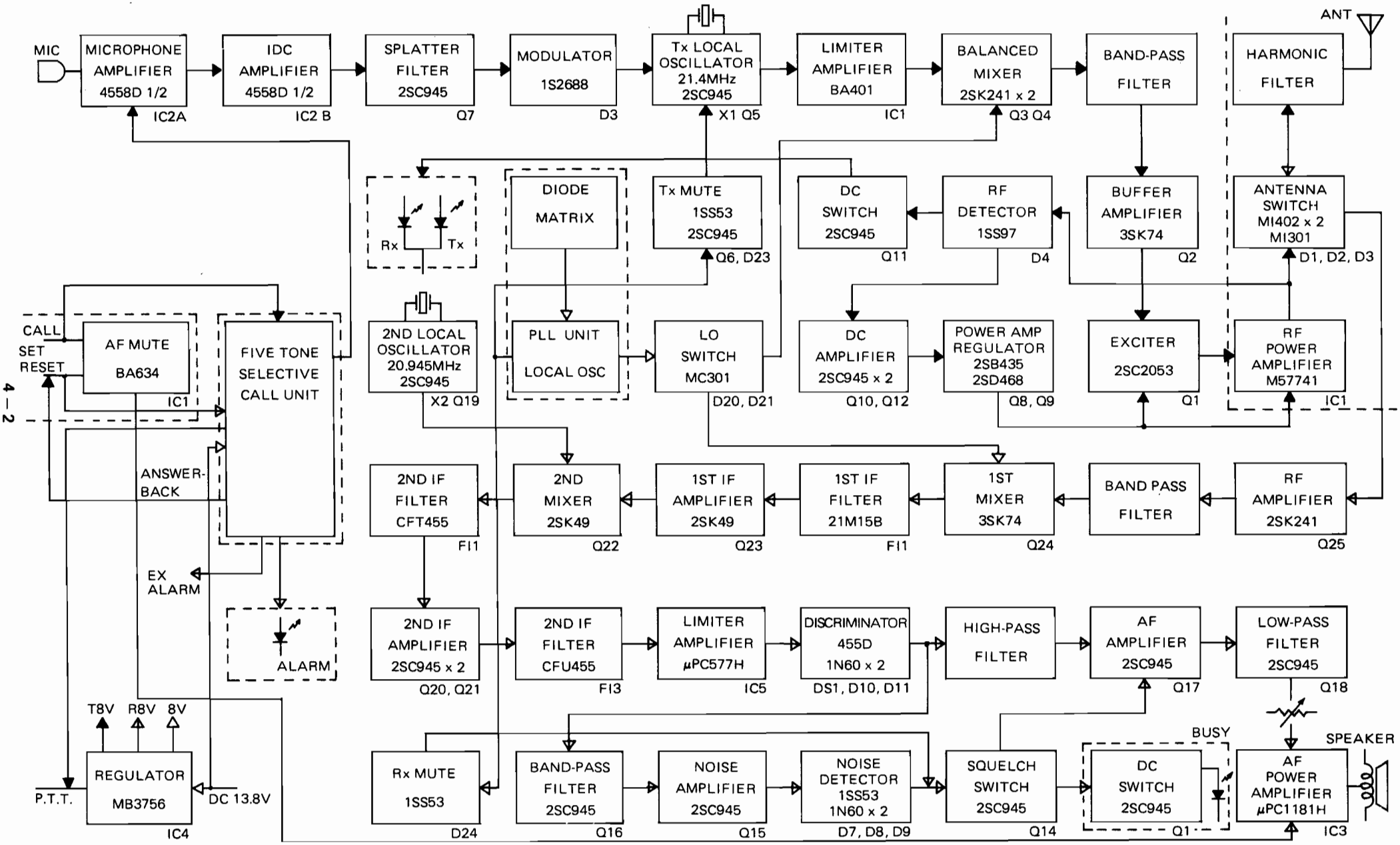
Changing the TX and RX codes is switched by bi-direction analog switches IC3 and IC4 which are controlled by the logic gates composed of Q7, Q8 and IC2.

SECTION 4 BLOCK DIAGRAM

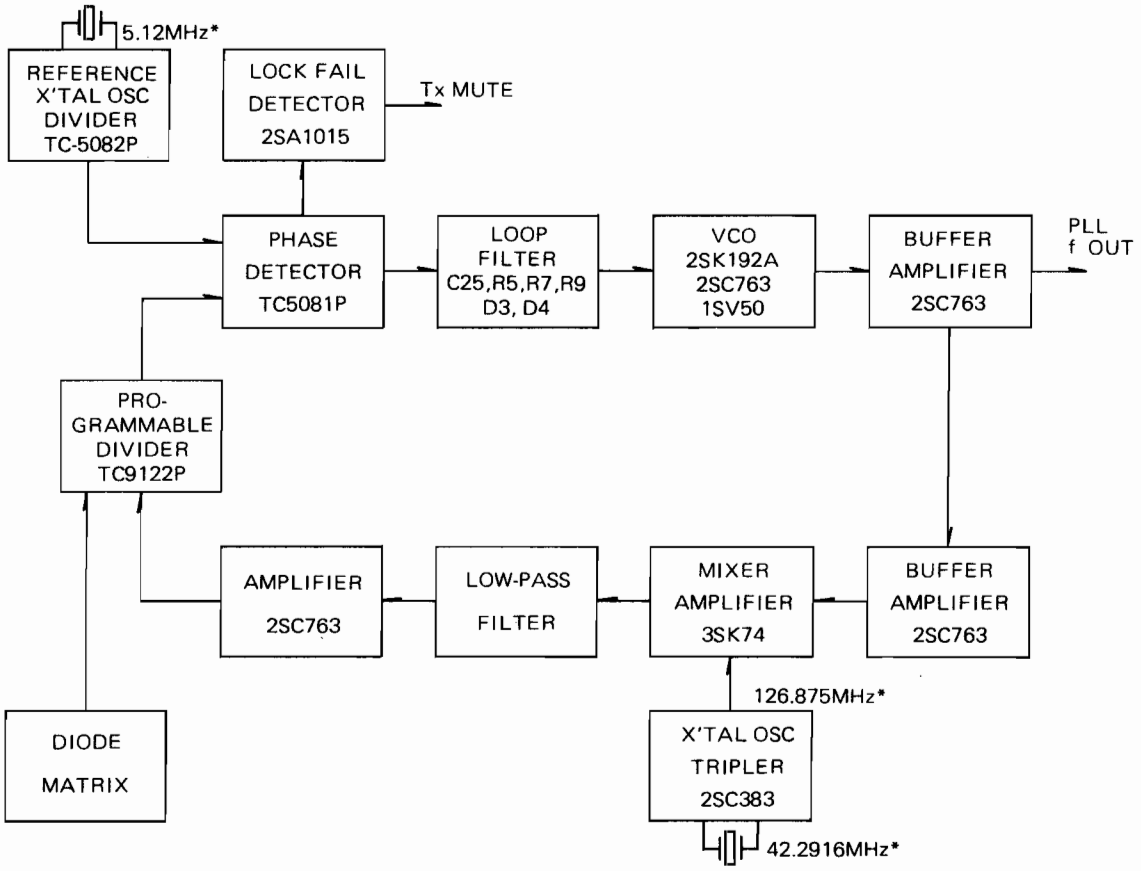
4-1 IC-125 MAIN UNIT



4 - 2 IC-125T/TM MAIN UNIT

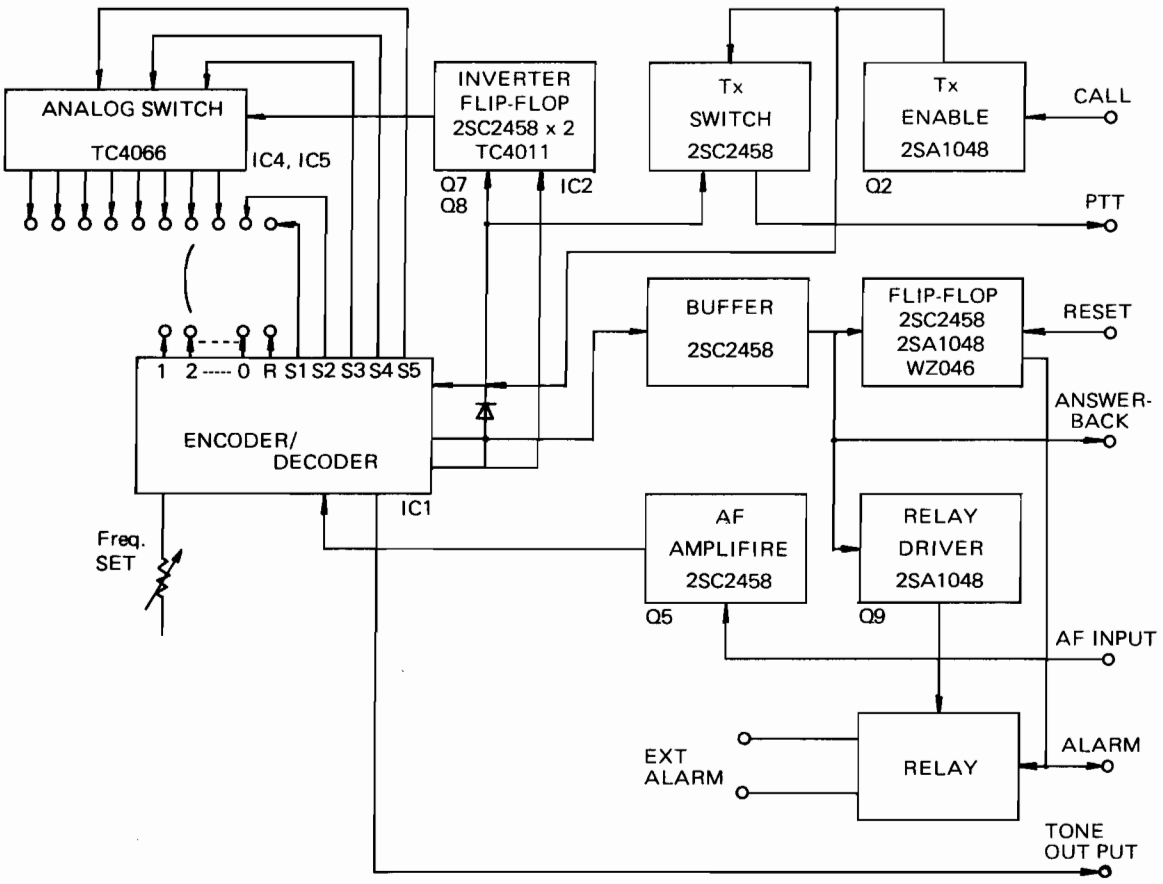


4 - 3 IC-125/T/TM PLL UNIT



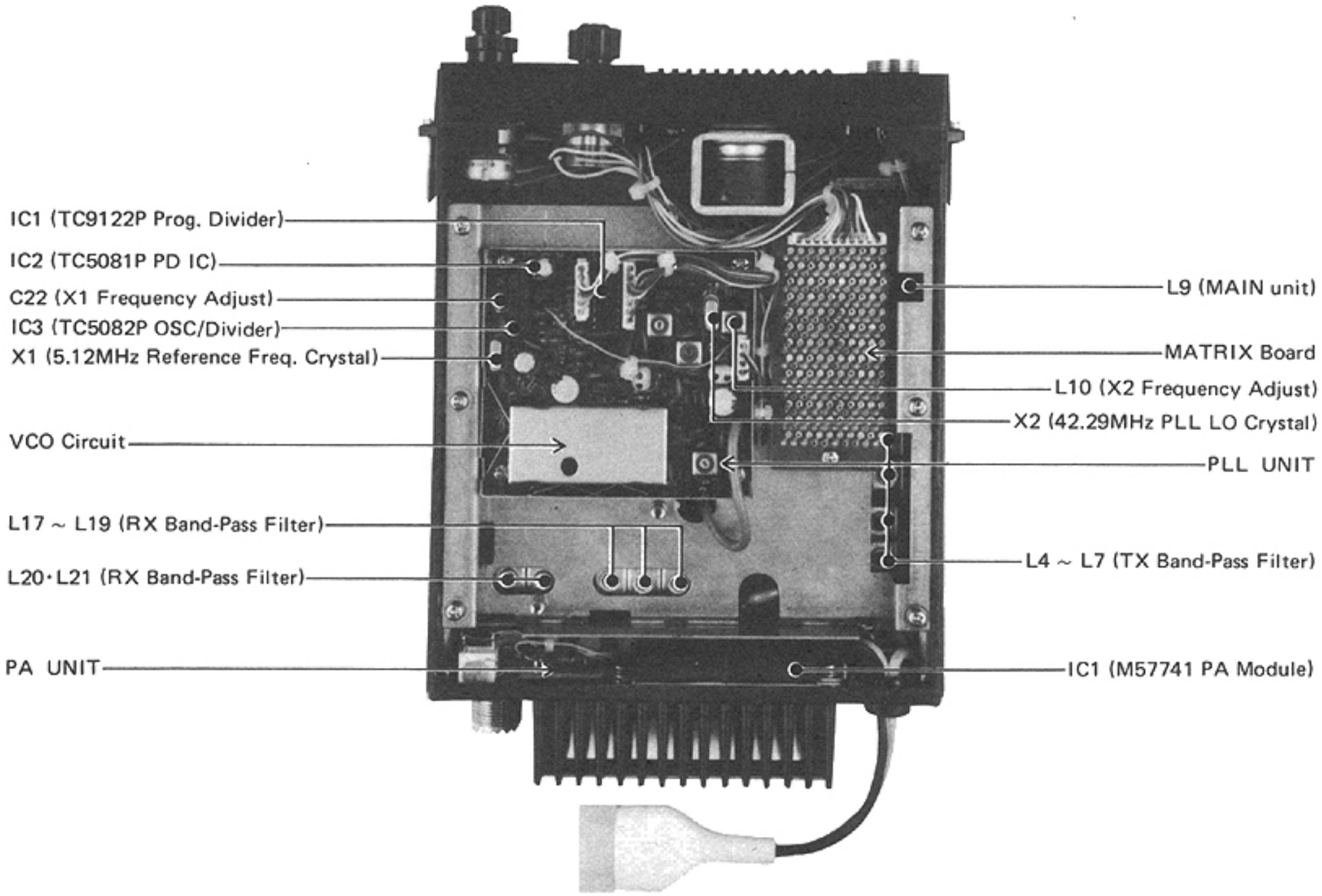
*differ depending on versions.

4 - 4 IC-125T/TM 5-TONE UNIT

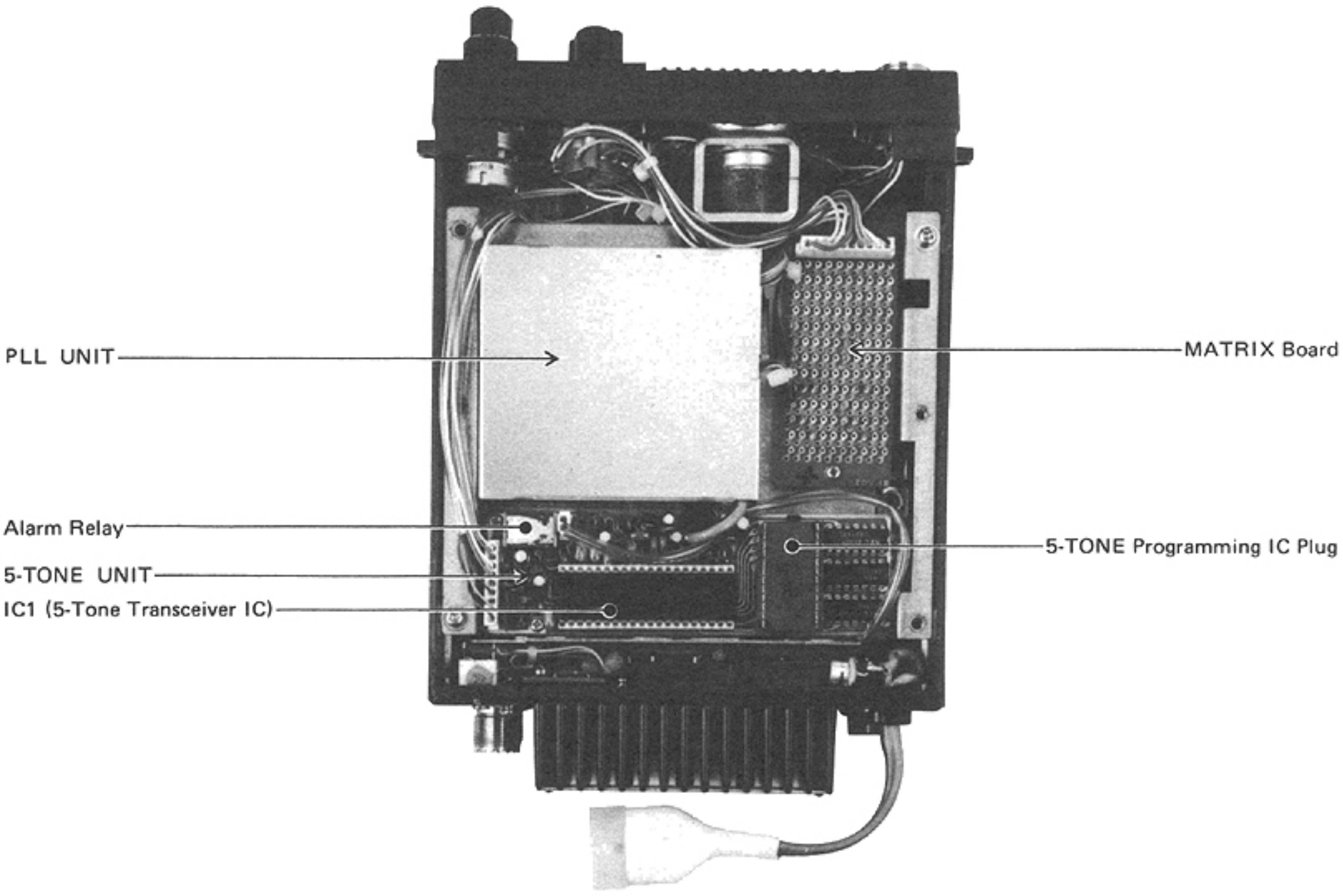


SECTION 5 INSIDE VIEWS

5 - 1 PLL UNIT SIDE (IC-125)



5 - 2 PLL UNIT SIDE (IC-125T/TM)



SECTION 6 FREQUENCY PROGRAMMING

The transceiver has 5 channels, both transmit and receive. The channel selector switch selects one transmit and one receive channel in each of its 5 positions.

The amount of frequency spread between any two receiving or any two transmitting frequencies should not exceed 2.5MHz. Since the receiver and transmitter are independent of each other, you may have any practical amount of frequency separation you wish here. Only two or more widely spaced frequencies for the receiver alone or for the transmitter alone need be considered under the 2.5MHz limitation.

Desired operating frequency can be programmed by mounting certain diode(s) on the MATRIX board.

1. Calculate the "N" number of the desired operating frequency, using the programming fomula for each version shown below. ("N" is divided number of the programmable divider in the Phase Locked Loop, and is determined by the BCD code.)

For F1 (150MHz ~ 158MHz) version: $$N = \frac{\text{Desired Frequency (MHz)} - 21.4 - 126.875}{0.005^*}$$

For F2 (155MHz ~ 163MHz) version: $$N = \frac{\text{Desired Frequency (MHz)} - 21.4 - 132.1}{0.005^*}$$

For F3 (161MHz ~ 168MHz) version: $$N = \frac{\text{Desired Frequency (MHz)} - 21.4 - 137.1}{0.005^*}$$

For F4 (166MHz ~ 174MHz) version: $$N = \frac{\text{Desired Frequency (MHz)} - 21.4 - 142.65}{0.005^*}$$

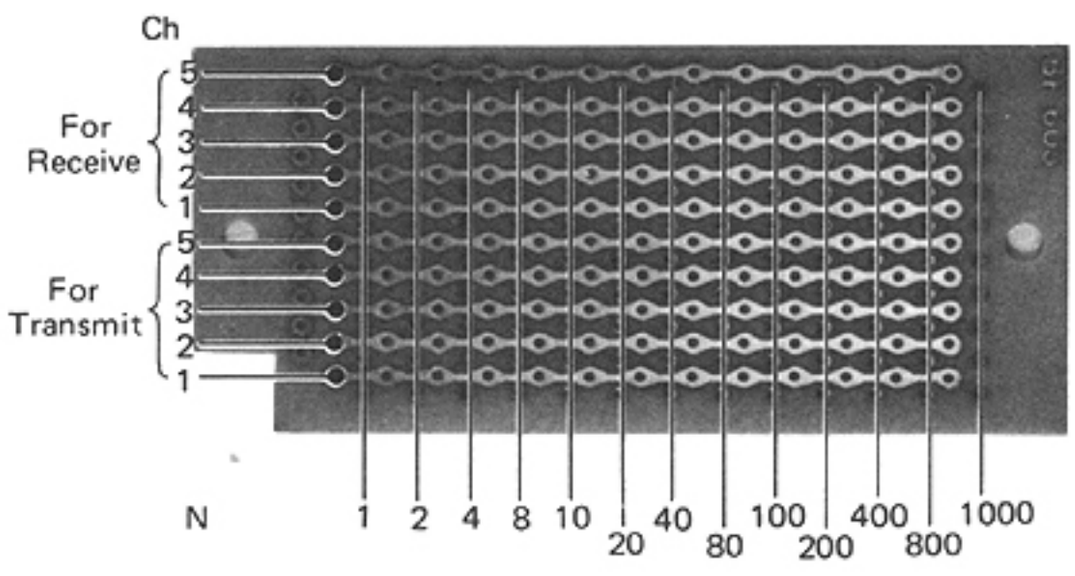
* If your transceiver is a 12.5KHz channel spacing version, use "0.00625" instead of "0.005".

2. Convert each digit of the "N" number to BCD, using the conversion table shown below.

N	BCD	N	BCD
1	0001	6	0110
2	0010	7	0111
3	0011	8	1000
4	0100	9	1001
5	0101	0	0000

Example: If N = 1259, BCD = 1 0010 0101 1001

3. Mount diodes corresponding to the chosen channel, using the BCD number, when "1" = diode mounted, and "0" = diode not mounted. The first digit of the BCD corresponds to the first row (N = 1), where is next to the 10-Pin connector on the MATRIX board, the second digit of the BCD corresponds to the second row (N = 2), the third digit, to the third row (N = 4), and so on.



4. Complete programming for additional desired channels in the same manner. The receive and transmit frequencies must be programmed individually, even if the both frequencies are the same.

FREQUENCY : N-NUMBER REFERENCE CHART (For F1; 150MHz ~ 158MHz 5KHz increment)

FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N
150.000	345	5	3 150.435	432	4	150.870	519	5	151.300	605
.005	346	5	.440	433	5	.875	520	3	.400	625
.010	347	6	.445	434	4	.880	521	4	.500	645
.015	348	4	.450	435	5	.885	522	4	.600	665
.020	349	5	.455	436	5	.890	523	5	.700	685
.025	350	4	.460	437	6	.895	524	4	.800	705
.030	351	5	.465	438	4	.900	525	5	.900	725
.035	352	5	.470	439	5	.905	526	5	152.000	745
.040	353	6	.475	440	2	.910	527	6	.100	765
.045	354	5	.480	441	3	.915	528	4	.200	785
.050	355	6	.485	442	3	.920	529	5	.300	805
.055	356	6	.490	443	4	.925	530	4	.400	825
.060	357	7	.495	444	3	.930	531	5	.500	845
.065	358	5	150.500	445	4	.935	532	5	.600	865
.070	359	6	.505	446	4	.940	533	6	.700	885
.075	360	4	.510	447	5	.945	534	5	.800	905
.080	361	5	.515	448	3	.950	535	6	.900	925
.085	362	5	.520	449	4	.955	536	6	153.000	945
.090	363	6	.525	450	3	.960	537	7	.100	965
.095	364	5	.530	451	4	.965	538	5	.200	985
150.100	365	6	.535	452	4	.970	539	6	.300	1005
.105	366	6	.540	453	5	.975	540	3	.400	1025
.110	367	7	.545	454	4	.980	541	4	.500	1045
.115	368	5	.550	455	5	.985	542	4	.600	1065
.120	369	6	.555	456	5	.990	543	5	.700	1085
.125	370	5	.560	457	6	.995	544	4	.800	1105
.130	371	6	.565	458	4	151.000	545	5	.900	1125
.135	372	6	.570	459	5	.005	546	5	154.000	1145
.140	373	7	.575	460	3	.010	547	6	.100	1165
.145	374	6	.580	461	4	.015	548	4	.200	1185
.150	375	7	.585	462	4	.020	549	5	.300	1205
.155	376	7	.590	463	5	.025	550	4	.400	1225
.160	377	8	.595	464	4	.030	551	5	.500	1245
.165	378	6	150.600	465	5	.035	552	5	.600	1265
.170	379	7	.605	466	5	.040	553	6	.700	1285
.175	380	3	.610	467	6	.045	554	5	.800	1305
.180	381	4	.615	468	4	.050	555	6	.900	1325
.185	382	4	.620	469	5	.055	556	6	155.000	1345
.190	383	5	.625	470	4	.060	557	7	.100	1365
.195	384	4	.630	471	5	.065	558	5	.200	1385
150.200	385	5	.635	472	5	.070	559	6	.300	1405
.205	386	5	.640	473	6	.075	560	4	.400	1425
.210	387	6	.645	474	5	.080	561	5	.500	1445
.215	388	4	.650	475	6	.085	562	5	.600	1465
.220	389	5	.655	476	6	.090	563	6	.700	1485
.225	390	4	.660	477	7	.095	564	5	.800	1505
.230	391	5	.665	478	5	151.100	565	6	.900	1525
.235	392	5	.670	479	6	.105	566	6	156.000	1545
.240	393	6	.675	480	2	.110	567	7	.100	1565
.245	394	5	.680	481	3	.115	568	5	.200	1585
.250	395	6	.685	482	3	.120	569	6	.300	1605
.255	396	6	.690	483	4	.125	570	5	.400	1625
.260	397	7	.695	484	3	.130	571	7	.500	1645
.265	398	5	150.700	485	4	.135	572	6	.600	1665
.270	399	6	.705	486	4	.140	573	6	.700	1685
.275	400	1	.710	487	5	.145	574	7	.800	1705
.280	401	2	.715	488	3	.150	575	6	.900	1725
.285	402	2	.720	489	4	.155	576	7	157.000	1745
.290	403	3	.725	490	3	.160	577	8	.100	1765
.295	404	2	.730	491	4	.165	578	6	.200	1785
150.300	405	3	.735	492	4	.170	579	7	.300	1805
.305	406	3	.740	493	5	.175	580	3	.400	1825
.310	407	4	.745	494	4	.180	581	4	.500	1845
.315	408	2	.750	495	5	.185	582	4	.600	1865
.320	409	3	.755	496	5	.190	583	5	.700	1885
.325	410	2	.760	497	6	.195	584	4	.800	1905
.330	411	3	.765	498	4	151.200	585	5	.900	1925
.335	412	3	.770	499	5	.205	586	5	158.000	1945
.340	413	4	.775	500	2	.210	587	6		
.345	414	3	.780	501	3	.215	588	4		
.350	415	4	.785	502	3	.220	589	5		
.355	416	4	.790	503	4	.225	590	4		
.360	417	5	.795	504	3	.230	591	5		
.365	418	3	150.800	505	4	.235	592	5		
.370	419	4	.805	506	4	.240	593	6		
.375	420	2	.810	507	5	.245	594	5		
.380	421	3	.815	508	4	.250	595	6		
.385	422	3	.820	509	4	.255	596	6		
.390	423	4	.825	510	3	.260	597	7		
.395	424	3	.830	511	4	.265	598	5		
150.400	425	4	.835	512	4	.270	599	6		
.405	426	4	.840	513	5	.275	600	2		
.410	427	5	.845	514	4	.280	601	3		
.415	428	3	.850	515	5	.285	602	3		
.420	429	4	.855	516	5	.290	603	4		
.425	430	3	.860	517	6	.295	604	3		
.430	431	4	.865	518	4	151.300	605	4		

FREQUENCY : N-NUMBER REFERENCE CHART (For F2; 156MHz ~ 163MHz 5KHz increment)

FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N
156.000	500	2	156.435	587	6	156.870	674	6	157.300	760
.005	501	3	.440	588	4	.875	675	7	.400	780
.010	502	3	.445	589	5	.880	676	7	.500	800
.015	503	4	.450	590	4	.885	677	8	.600	820
.020	504	3	.455	591	5	.890	678	6	.700	840
.025	505	4	.460	592	5	.895	679	7	.800	860
.030	506	4	.465	593	6	156.900	680	3	.900	880
.035	507	5	.470	594	5	.905	681	4	158.000	900
.040	508	3	.475	595	6	.910	682	4	.100	920
.045	509	4	.480	596	6	.915	683	5	.200	940
.050	510	3	.485	597	7	.920	684	4	.300	960
.055	511	4	.490	598	5	.925	685	5	.400	980
.060	512	4	.495	599	6	.930	686	5	.500	1000
.065	513	5	156.500	600	2	.935	687	6	.600	1020
.070	514	4	.505	601	3	.940	688	4	.700	1040
.075	515	5	.510	602	3	.945	689	5	.800	1060
.080	516	5	.515	603	4	.950	690	4	.900	1080
.085	517	6	.520	604	3	.955	691	5	159.000	1100
.090	518	4	.525	605	4	.960	692	5	.100	1120
.095	519	5	.530	606	4	.965	693	6	.200	1140
156.100	520	3	.535	607	5	.970	694	5	.300	1160
105	521	4	.540	608	3	.975	695	6	.400	1180
.110	522	4	.545	609	4	.980	696	6	.500	1200
.115	523	5	.550	610	3	.985	697	7	.600	1220
.120	524	4	.555	611	4	.990	698	5	.700	1240
.125	525	5	.560	612	4	.995	699	6	.800	1260
.130	526	5	.565	613	5	157.000	700	3	.900	1280
.135	527	6	.570	614	3	.005	701	4	160.000	1300
.140	528	4	.575	615	4	.010	702	4	.100	1320
.145	529	5	.580	616	4	.015	703	5	.200	1340
.150	530	4	.585	617	5	.020	704	4	.300	1360
.155	531	5	.590	618	4	.025	705	5	.400	1380
.160	532	5	.595	619	5	.030	706	5	.500	1400
.165	533	6	156.600	620	3	.035	707	6	.600	1420
.170	534	5	.605	621	4	.040	708	4	.700	1440
.175	535	6	.610	622	4	.045	709	5	.800	1460
.180	536	6	.615	623	5	.050	710	4	.900	1480
.185	537	7	.620	624	4	.055	711	5	161.000	1500
.190	538	5	.625	625	5	.060	712	5	.100	1520
.195	539	6	.630	626	5	.065	713	6	.200	1540
156.200	540	3	.635	627	6	.070	714	5	.300	1560
.205	541	4	.640	628	4	.075	715	6	.400	1580
.210	542	4	.645	629	5	.080	716	6	.500	1600
.215	543	5	.650	630	4	.085	717	7	.600	1620
.220	544	4	.655	631	5	.090	718	5	.700	1640
.225	545	5	.660	632	5	.095	719	6	.800	1660
.230	546	5	.665	633	6	157.100	720	4	.900	1680
.235	547	6	.670	634	5	.105	721	5	162.000	1700
.240	548	4	.675	635	6	.110	722	5	.100	1720
.245	549	5	.680	636	6	.115	723	6	.200	1740
.250	550	4	.685	637	7	.120	724	5	.300	1760
.255	551	5	.690	638	5	.125	725	6	.400	1780
.260	552	5	.695	639	6	.130	726	6	.500	1800
.265	553	6	156.700	640	3	.135	727	7	.600	1820
.270	554	5	.705	641	4	.140	728	5	.700	1840
.275	555	6	.710	642	4	.145	729	6	.800	1860
.280	556	6	.715	643	5	.150	730	5	.900	1880
.285	557	7	.720	644	4	.155	731	6	163.000	1900
.290	558	5	.725	645	5	.160	732	6	.100	1920
.295	559	6	.730	646	5	.165	733	7	.200	1940
156.300	560	4	.735	647	6	.170	734	6	.300	1960
.305	561	5	.740	648	4	.175	735	7	.400	1980
.310	562	5	.745	649	5	.180	736	7		
.315	563	6	.750	650	4	.185	737	8		
.320	564	5	.755	651	5	.190	738	6		
.325	565	6	.760	652	5	.200	739	7		
.330	566	6	.765	653	6	157.200	740	4		
.335	567	7	.770	654	5	.205	741	4		
.340	568	5	.775	655	6	.210	742	5		
.345	569	6	.780	656	6	.215	743	6		
.350	570	5	.785	657	7	.220	744	5		
.355	571	6	.790	658	5	.225	745	6		
.360	572	6	.795	659	6	.230	746	6		
.365	573	7	156.800	660	4	.235	747	7		
.370	574	6	.805	661	5	.240	748	5		
.375	575	7	.810	662	5	.245	749	6		
.380	576	7	.815	663	6	.250	750	5		
.385	577	8	.820	664	5	.255	751	6		
.390	578	6	.825	665	6	.260	752	6		
.395	579	7	.830	666	6	.265	753	7		
156.400	580	3	.835	667	7	.270	754	6		
.405	581	4	.840	668	5	.275	755	7		
.410	582	4	.845	669	6	.280	756	7		
.415	583	5	.850	670	5	.285	757	8		
.420	584	4	.855	671	6	.290	758	6		
.425	585	5	.860	672	6	.295	759	7		
.430	586	5	.865	673	7	157.300	760	5		

FREQUENCY : N-NUMBER REFERENCE CHART (For F3; 161MHz ~ 168MHz 5KHz increment)

FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N
161.000	500	2	161.435	587	6	161.870	674	6	162.300	760
.005	501	3	.440	588	4	.875	675	7	.400	780
.010	502	3	.445	589	5	.880	676	7	.500	800
.015	503	4	.450	590	4	.885	677	8	.600	820
.020	504	3	.455	591	5	.890	678	6	.700	840
.025	505	4	.460	592	5	.895	679	7	.800	860
.030	506	4	.465	593	6	161.900	680	3	.900	880
.035	507	5	.470	594	5	.905	681	4	163.000	900
.040	508	3	.475	595	6	.910	682	4	.100	920
.045	509	4	.480	596	6	.915	683	5	.200	940
.050	510	3	.485	597	7	.920	684	4	.300	960
.055	511	4	.490	598	5	.925	685	5	.400	980
.060	512	4	.495	599	6	.930	686	5	.500	1000
.065	513	5	161.500	600	2	.935	687	6	.600	1020
.070	514	4	.505	601	3	.940	688	4	.700	1040
.075	515	5	.510	602	3	.945	689	5	.800	1060
.080	516	5	.515	603	4	.950	690	4	.900	1080
.085	517	6	.520	604	3	.955	691	5	164.000	1100
.090	518	4	.525	605	4	.960	692	5	.100	1120
.095	519	5	.530	606	4	.965	693	6	.200	1140
161.100	520	3	.535	607	5	.970	694	5	.300	1160
.105	521	4	.540	608	3	.975	695	6	.400	1180
.110	522	4	.545	609	4	.980	696	6	.500	1200
.115	523	5	.550	610	3	.985	697	7	.600	1220
.120	524	4	.555	611	4	.990	698	5	.700	1240
.125	525	5	.560	612	4	.995	699	6	.800	1260
.130	526	5	.565	613	5	162.000	700	3	.900	1280
.135	527	6	.570	614	4	.005	701	4	165.000	1300
.140	528	4	.575	615	5	.010	702	4	.100	1320
.145	529	5	.580	616	5	.015	703	5	.200	1340
.150	530	4	.585	617	6	.020	704	4	.300	1360
.155	531	5	.590	618	4	.025	705	5	.400	1380
.160	532	5	.595	619	5	.030	706	5	.500	1400
.165	533	6	161.600	620	3	.035	707	6	.600	1420
.170	534	5	.605	621	4	.040	708	4	.700	1440
.175	535	6	.610	622	4	.045	709	5	.800	1460
.180	536	6	.615	623	5	.050	710	4	.900	1480
.185	537	7	.620	624	4	.055	711	5	166.000	1500
.190	538	5	.625	625	5	.060	712	5	.100	1520
.195	539	6	.630	626	5	.065	713	6	.200	1540
161.200	540	3	.635	627	6	.070	714	5	.300	1560
.205	541	4	.640	628	4	.075	715	7	.400	1580
.210	542	4	.645	629	5	.080	716	6	.500	1600
.215	543	5	.650	630	4	.085	717	7	.600	1620
.220	544	4	.655	631	5	.090	718	5	.700	1640
.225	545	5	.660	632	5	.095	719	6	.800	1660
.230	546	5	.665	633	6	162.100	720	4	.900	1680
.235	547	6	.670	634	5	.105	721	5	167.000	1700
.240	548	4	.675	635	6	.110	722	5	.100	1720
.245	549	5	.680	636	6	.115	723	6	.200	1740
.250	550	4	.685	637	7	.120	724	5	.300	1760
.255	551	5	.690	638	5	.125	725	6	.400	1780
.260	552	5	.695	639	6	.130	726	6	.500	1800
.265	553	6	161.700	640	3	.135	727	7	.600	1820
.270	554	5	.705	641	4	.140	728	5	.700	1840
.275	555	6	.710	642	4	.145	729	6	.800	1860
.280	556	6	.715	643	5	.150	730	5	.900	1880
.285	557	7	.720	644	4	.155	731	6	168.000	1900
.290	558	5	.725	645	5	.160	732	6	.100	1920
.295	559	6	.730	646	5	.165	733	7	.200	1940
161.300	560	4	.735	647	6	.170	734	6	.300	1960
.305	561	5	.740	648	4	.175	735	7	.400	1980
.310	562	5	.745	649	5	.180	736	7		
.315	563	6	.750	650	4	.185	737	8		
.320	564	5	.755	651	5	.190	738	6		
.325	565	6	.760	652	5	.195	739	7		
.330	566	6	.765	653	6	162.200	740	4		
.335	567	7	.770	654	5	.205	741	5		
.340	568	5	.775	655	6	.210	742	5		
.345	569	6	.780	656	6	.215	743	6		
.350	570	5	.785	657	7	.220	744	5		
.355	571	7	.790	658	5	.225	745	6		
.360	572	6	.795	659	6	.230	746	6		
.365	573	7	161.800	660	4	.235	747	7		
.370	574	6	.805	661	5	.240	748	5		
.375	575	7	.810	662	5	.245	749	6		
.380	576	7	.815	663	6	.250	750	5		
.385	577	8	.820	664	5	.255	751	6		
.390	578	6	.825	665	6	.260	752	6		
.395	579	7	.830	666	6	.265	753	7		
161.400	580	3	.835	667	7	.270	754	6		
.405	581	4	.840	668	5	.275	755	7		
.410	582	4	.845	669	6	.280	756	7		
.415	583	5	.850	670	5	.285	757	8		
.420	584	4	.855	671	6	.290	758	6		
.425	585	5	.860	672	6	.295	759	7		
.430	586	5	.865	673	7	162.300	760	5		

FREQUENCY : N-NUMBER REFERENCE CHART (For F4; 166MHz ~ 174MHz 5KHz increment)

FREQUENCY	N	D's	FREQUENCY	N	D's	FREQUENCY	N	D's	Frequency	N
166.000	390	4	166.435	477	7	166.870	564	5	167.300	650
.005	391	5	.440	478	5	.875	565	6	.400	670
.010	392	5	.445	479	6	.880	566	6	.500	690
.015	393	6	.450	480	2	.885	567	7	.600	710
.020	394	5	.455	481	3	.890	568	5	.700	730
.025	395	6	.460	482	3	.895	569	6	.800	750
.030	396	6	.465	483	4	166.900	570	5	.900	770
.035	397	7	.470	484	3	.905	571	6	168.000	790
.040	398	5	.475	485	4	.910	572	6	.100	810
.045	399	6	.480	486	4	.915	573	7	.200	830
.050	400	1	.485	487	5	.920	574	6	.300	850
.055	401	2	.490	488	3	.925	575	7	.400	870
.060	402	2	.495	489	4	.930	576	7	.500	890
.065	403	3	166.500	490	3	.935	577	8	.600	910
.070	404	2	.505	491	4	.940	578	6	.700	930
.075	405	3	.510	492	4	.945	579	7	.800	950
.080	406	3	.515	493	5	.950	580	3	.900	970
.085	407	4	.520	494	4	.955	581	4	169.000	990
.090	408	2	.525	495	5	.960	582	4	.100	1010
.095	409	3	.530	496	5	.965	583	5	.200	1030
166.100	410	2	.535	497	6	.970	584	4	.300	1050
.105	411	3	.540	498	4	.975	585	5	.400	1070
.110	412	3	.545	499	5	.980	586	5	.500	1090
.115	413	4	.550	500	2	.985	587	6	.600	1110
.120	414	3	.555	501	3	.990	588	4	.700	1130
.125	415	4	.560	502	3	.995	589	5	.800	1150
.130	416	4	.565	503	4	167.000	590	4	.900	1170
.135	417	5	.570	504	3	.005	591	6	170.000	1190
.140	418	3	.575	505	4	.010	592	5	.100	1210
.145	419	4	.580	506	4	.015	593	6	.200	1230
.150	420	2	.585	507	5	.020	594	5	.300	1250
.155	421	3	.590	508	3	.025	595	6	.400	1270
.160	422	3	.595	509	4	.030	596	6	.500	1290
.165	423	4	166.600	510	3	.035	597	7	.600	1310
.170	424	3	.605	511	4	.040	598	5	.700	1330
.175	425	4	.610	512	4	.045	599	6	.800	1350
.180	426	4	.615	513	5	.050	600	2	.900	1370
.185	427	5	.620	514	3	.055	601	3	171.000	1390
.190	428	3	.625	515	4	.060	602	3	.100	1410
.195	429	4	.630	516	4	.065	603	4	.200	1430
166.200	430	3	.635	517	5	.070	604	3	.300	1450
.205	431	4	.640	518	3	.075	605	4	.400	1470
.210	432	4	.645	519	4	.080	606	4	.500	1490
.215	433	5	.650	520	3	.085	607	5	.600	1510
.220	434	4	.655	521	4	.090	608	3	.700	1530
.225	435	5	.660	522	4	.095	609	4	.800	1550
.230	436	5	.665	523	5	167.100	610	3	.900	1570
.235	437	6	.670	524	4	.105	611	4	172.000	1590
.240	438	4	.675	525	5	.110	612	4	.100	1610
.245	439	5	.680	526	5	.115	613	5	.200	1630
.250	440	2	.685	527	6	.120	614	4	.300	1650
.255	441	3	.690	528	4	.125	615	5	.400	1670
.260	442	3	.695	529	5	.130	616	5	.500	1690
.265	443	4	166.700	530	4	.135	617	6	.600	1710
.270	444	3	.705	531	5	.140	618	4	.700	1730
.275	445	4	.710	532	5	.145	619	5	.800	1750
.280	446	4	.715	533	6	.150	620	3	.900	1770
.285	447	5	.720	534	5	.155	621	4	173.000	1790
.290	448	3	.725	535	6	.160	622	4	.100	1810
.295	449	4	.730	536	6	.165	623	5	.200	1830
166.300	450	3	.735	537	7	.170	624	4	.300	1850
.305	451	4	.740	538	5	.175	625	5	.400	1870
.310	452	4	.745	539	6	.180	626	5	.500	1890
.315	453	5	.750	540	3	.185	627	6	.600	1910
.320	454	4	.755	541	4	.190	628	4	.700	1930
.325	455	5	.760	542	4	.195	629	5	.800	1950
.330	456	5	.765	543	5	167.200	630	4	.900	1970
.335	457	6	.770	544	4	.205	631	5	174.000	1990
.340	458	4	.775	545	5	.210	632	5		
.345	459	5	.780	546	5	.215	633	6		
.350	460	3	.785	547	6	.220	634	5		
.355	461	4	.790	548	4	.225	635	6		
.360	462	4	.795	549	5	.230	636	6		
.365	463	5	166.800	550	4	.235	637	7		
.370	464	4	.805	551	5	.240	638	5		
.375	465	5	.810	552	5	.245	639	6		
.380	466	5	.815	553	6	.250	640	3		
.385	467	6	.820	554	5	.255	641	4		
.390	468	4	.825	555	6	.260	642	4		
.395	469	5	.830	556	6	.265	643	5		
166.400	470	4	.835	557	7	.270	644	4		
.405	471	5	.840	558	5	.275	645	5		
.410	472	5	.845	559	6	.280	646	5		
.415	473	6	.850	560	4	.285	647	6		
.420	474	5	.855	561	5	.290	648	4		
.425	475	6	.860	562	5	.295	649	5		
.430	476	6	.865	563	6	167.300	650	4		

FREQUENCY : N-NUMBER REFERENCE CHART (For F1 ~ F4 : 12.5KHz increment; Part 1)

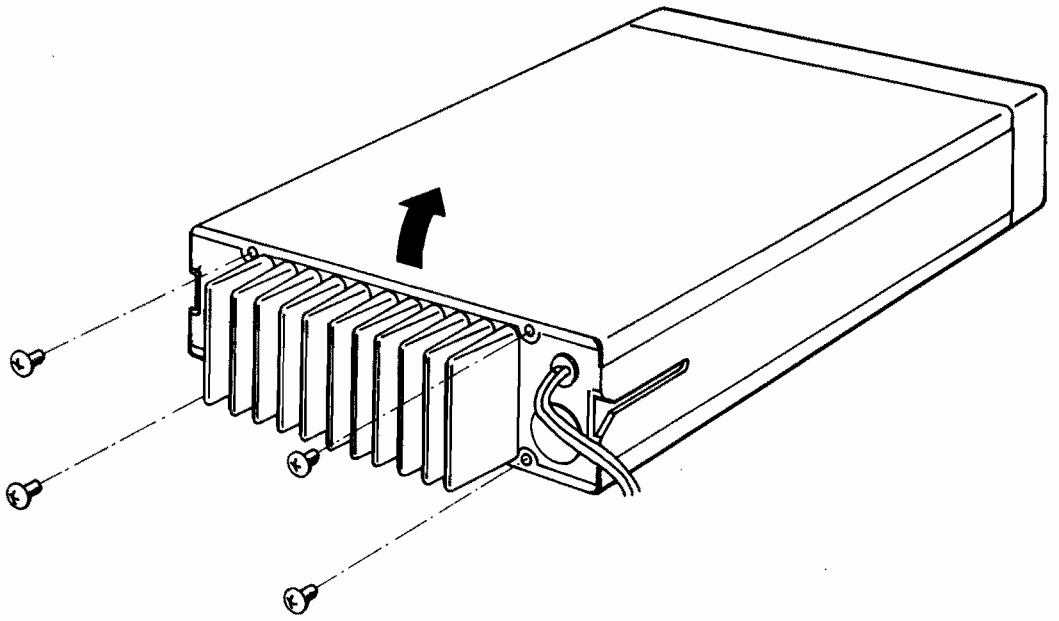
F1 FREQUENCY	N	D's	F2 FREQUENCY	N	D's	F3 FREQUENCY	N	D's	F4 FREQUENCY	N	D's
150.000	276	6	156.000	400	1	161.000	400	1	166.000	312	4
.0125	278	5	.0125	402	2	.0125	402	2	.0125	314	4
.025	280	2	.025	404	2	.025	404	2	.025	316	5
.0375	282	3	.0375	406	3	.0375	406	3	.0375	318	4
.050	284	3	.050	408	2	.050	408	2	.050	320	3
.0625	286	4	.0625	410	2	.0625	410	2	.0625	322	4
.075	288	3	.075	412	3	.075	412	3	.075	324	4
.0875	290	3	.0875	414	3	.0875	414	3	.0875	326	5
.100	292	4	.100	416	4	.100	416	4	.100	328	4
.1125	294	4	.1125	418	3	.1125	418	3	.1125	330	4
.125	296	5	.125	420	2	.125	420	2	.125	332	5
.1375	298	4	.1375	422	3	.1375	422	3	.1375	334	5
.150	300	2	.150	424	3	.150	424	3	.150	336	6
.1625	302	3	.1625	426	4	.1625	426	4	.1625	338	5
.175	304	3	.175	428	3	.175	428	3	.175	340	3
.1875	306	4	.1875	430	3	.1875	430	3	.1875	342	4
.200	308	3	.200	432	4	.200	432	4	.200	344	4
.2125	310	3	.2125	434	4	.2125	434	4	.2125	346	5
.225	312	4	.225	436	5	.225	436	5	.225	348	4
.2375	314	4	.2375	438	4	.2375	438	4	.2375	350	4
.250	316	5	.250	440	2	.250	440	2	.250	352	5
.2625	318	4	.2625	442	3	.2625	442	3	.2625	354	5
.275	320	3	.275	444	3	.275	444	3	.275	356	6
.2875	322	4	.2875	446	4	.2875	446	4	.2875	358	5
.300	324	4	.300	448	3	.300	448	3	.300	360	4
.3125	326	5	.3125	450	3	.3125	450	3	.3125	362	5
.325	328	4	.325	452	4	.325	452	4	.325	364	5
.3375	330	4	.3375	454	4	.3375	454	4	.3375	366	6
.350	332	5	.350	456	5	.350	456	5	.350	368	5
.3625	334	5	.3625	458	4	.3625	458	4	.3625	370	5
.375	336	6	.375	460	3	.375	460	3	.375	372	6
.3875	338	5	.3875	462	4	.3875	462	4	.3875	374	6
.400	340	3	.400	464	4	.400	464	4	.400	376	7
.4125	342	4	.4125	466	5	.4125	466	5	.4125	378	6
.425	344	4	.425	468	4	.425	468	4	.425	380	3
.4375	346	5	.4375	470	4	.4375	470	4	.4375	382	4
.450	348	4	.450	472	5	.450	472	5	.450	384	4
.4625	350	4	.4625	474	5	.4625	474	5	.4625	386	5
.475	352	5	.475	476	6	.475	476	6	.475	388	4
.4875	354	5	.4875	478	5	.4875	478	5	.4875	390	4
.500	356	6	.500	480	2	.500	480	2	.500	392	5
.5125	358	5	.5125	482	3	.5125	482	3	.5125	394	5
.525	360	4	.525	484	3	.525	484	3	.525	396	6
.5375	362	5	.5375	486	4	.5375	486	4	.5375	398	5
.550	364	5	.550	488	3	.550	488	3	.550	400	1
.5625	366	6	.5625	490	3	.5625	490	3	.5625	402	2
.575	368	5	.575	492	4	.575	492	4	.575	404	2
.5875	370	5	.5875	494	4	.5875	494	4	.5875	406	3
.600	372	6	.600	496	5	.600	496	5	.600	408	2
.6125	374	6	.6125	498	4	.6125	498	4	.6125	410	2
.625	376	7	.625	500	2	.625	500	2	.625	412	3
.6375	378	6	.6375	502	3	.6375	502	3	.6375	414	4
.650	380	3	.650	504	3	.650	504	3	.650	416	3
.6625	382	4	.6625	506	4	.6625	506	4	.6625	418	2
.675	384	4	.675	508	3	.675	508	3	.675	420	3
.6875	386	5	.6875	510	3	.6875	510	3	.6875	422	3
.700	388	4	.700	512	4	.700	512	4	.700	424	3
.7125	390	4	.7125	514	4	.7125	514	4	.7125	426	4
.725	392	5	.725	516	5	.725	516	5	.725	428	3
.7375	394	5	.7375	518	4	.7375	518	4	.7375	430	3
.750	396	6	.750	520	3	.750	520	3	.750	432	4
.7625	398	5	.7625	522	4	.7625	522	4	.7625	434	4
.775	400	1	.775	524	4	.775	524	4	.775	436	5
.7875	402	2	.7875	526	5	.7875	526	5	.7875	438	4
.800	404	2	.800	528	4	.800	528	4	.800	440	2
.8125	406	3	.8125	530	4	.8125	530	4	.8125	442	3
.825	408	2	.825	532	5	.825	532	5	.825	444	3
.8375	410	2	.8375	534	5	.8375	534	5	.8375	446	4
.850	412	3	.850	536	6	.850	536	6	.850	448	3
.862587	414	3	.8625	538	5	.8625	538	5	.8625	450	3
.875	416	4	.875	540	3	.875	540	3	.875	452	4
.8875	418	3	.8875	542	4	.8875	542	4	.8875	454	4
.900	420	2	.900	544	4	.900	544	4	.900	456	5
.9125	422	3	.9125	546	5	.9125	546	5	.9125	458	4
.925	424	3	.925	548	4	.925	548	4	.925	460	3
.9375	426	4	.9375	550	4	.9375	550	4	.9375	462	4
.950	428	3	.950	552	5	.950	552	5	.950	464	4
.9625	430	3	.9625	554	5	.9625	554	5	.9625	466	5
.975	432	4	.975	556	6	.975	556	6	.975	468	4
.9875	434	4	.9875	558	5	.9875	558	5	.9875	470	4
151.000	436	5	157.000	560	4	162.000	560	4	167.000	472	5
.0125	438	4	.0125	562	5	.0125	562	5	.0125	474	5
.025	440	2	.025	564	5	.025	564	5	.025	476	6
.0375	442	3	.0375	566	6	.0375	566	6	.0375	478	5
.050	444	3	.050	568	5	.050	568	5	.050	480	2
.0625	446	4	.0625	570	5	.0625	570	5	.0625	482	3
.075	448	3	.075	572	6	.075	572	6	.075	484	3

FREQUENCY : N-NUMBER REFERENCE CHART (For F1 ~ F4 : 12.5KHz increment; Part 2)

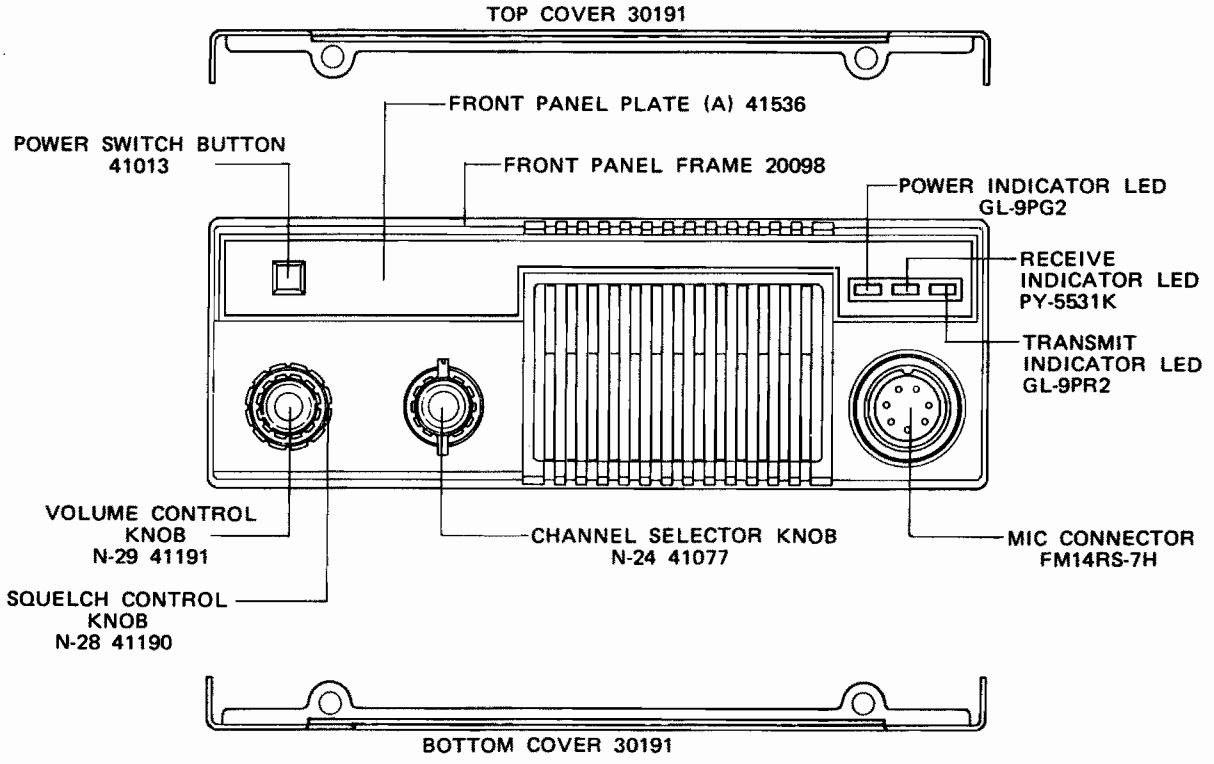
F1 FREQUENCY	N	F2 FREQUENCY	N	F3 FREQUENCY	N	F4 FREQUENCY	N
151.000	436	157.000	560	162.000	560	167.000	472
.100	452	.100	576	.100	576	.100	488
.200	468	.200	592	.200	592	.200	504
.300	484	.300	608	.300	608	.300	520
.400	500	.400	624	.400	624	.400	536
.500	516	.500	640	.500	640	.500	552
.600	532	.600	656	.600	656	.600	568
.700	548	.700	672	.700	672	.700	584
.800	564	.800	688	.800	688	.800	600
.900	580	.900	704	.900	704	.900	616
152.000	596	158.000	720	163.000	720	168.000	632
.100	612	.100	736	.100	736	.100	648
.200	628	.200	752	.200	752	.200	664
.300	644	.300	768	.300	768	.300	680
.400	660	.400	784	.400	784	.400	696
.500	676	.500	800	.500	800	.500	712
.600	692	.600	816	.600	816	.600	728
.700	708	.700	832	.700	832	.700	744
.800	724	.800	848	.800	848	.800	760
.900	740	.900	864	.900	864	.900	776
153.000	756	159.000	880	164.000	880	169.000	792
.100	772	.100	896	.100	896	.100	808
.200	788	.200	912	.200	912	.200	824
.300	804	.300	928	.300	928	.300	840
.400	820	.400	944	.400	944	.400	856
.500	836	.500	960	.500	960	.500	872
.600	852	.600	976	.600	976	.600	888
.700	868	.700	992	.700	992	.700	904
.800	884	.800	1008	.800	1008	.800	920
.900	900	.900	1024	.900	1024	.900	936
154.000	916	160.000	1040	165.000	1040	170.000	952
.100	932	.100	1056	.100	1056	.100	968
.200	948	.200	1072	.200	1072	.200	984
.300	964	.300	1088	.300	1088	.300	1000
.400	980	.400	1104	.400	1104	.400	1016
.500	996	.500	1120	.500	1120	.500	1032
.600	1012	.600	1136	.600	1136	.600	1048
.700	1028	.700	1152	.700	1152	.700	1064
.800	1044	.800	1168	.800	1168	.800	1080
.900	1060	.900	1184	.900	1184	.900	1096
155.000	1076	161.000	1200	166.000	1200	171.000	1112
.100	1092	.100	1216	.100	1216	.100	1128
.200	1108	.200	1232	.200	1232	.200	1144
.300	1124	.300	1248	.300	1248	.300	1160
.400	1140	.400	1264	.400	1264	.400	1176
.500	1156	.500	1280	.500	1280	.500	1192
.600	1172	.600	1296	.600	1296	.600	1208
.700	1188	.700	1312	.700	1312	.700	1224
.800	1204	.800	1328	.800	1328	.800	1240
.900	1220	.900	1344	.900	1344	.900	1256
156.000	1236	162.000	1360	167.000	1360	172.000	1272
.100	1252	.100	1376	.100	1372	.100	1288
.200	1268	.200	1392	.200	1392	.200	1304
.300	1284	.300	1408	.300	1408	.300	1320
.400	1300	.400	1424	.400	1424	.400	1336
.500	1316	.500	1440	.500	1440	.500	1352
.600	1332	.600	1456	.600	1456	.600	1368
.700	1348	.700	1472	.700	1472	.700	1384
.800	1364	.800	1488	.800	1488	.800	1400
.900	1380	.900	1504	.900	1504	.900	1416
157.000	1396	163.000	1520	168.000	1520	173.000	1432
.100	1412	.100	1536	.100	1536	.100	1448
.200	1428	.200	1552	.200	1552	.200	1464
.300	1444	.300	1568	.300	1568	.300	1480
.400	1460	.400	1584	.400	1584	.400	1496
.500	1476	.500	1600	.500	1600	.500	1512
.600	1492	.600	1616	.600	1616	.600	1528
.700	1508	.700	1632	.700	1632	.700	1544
.800	1524	.800	1648	.800	1648	.800	1560
.900	1540	.900	1664	.900	1664	.900	1576
158.000	1556	164.000	1680	169.000	1680	174.000	1592

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

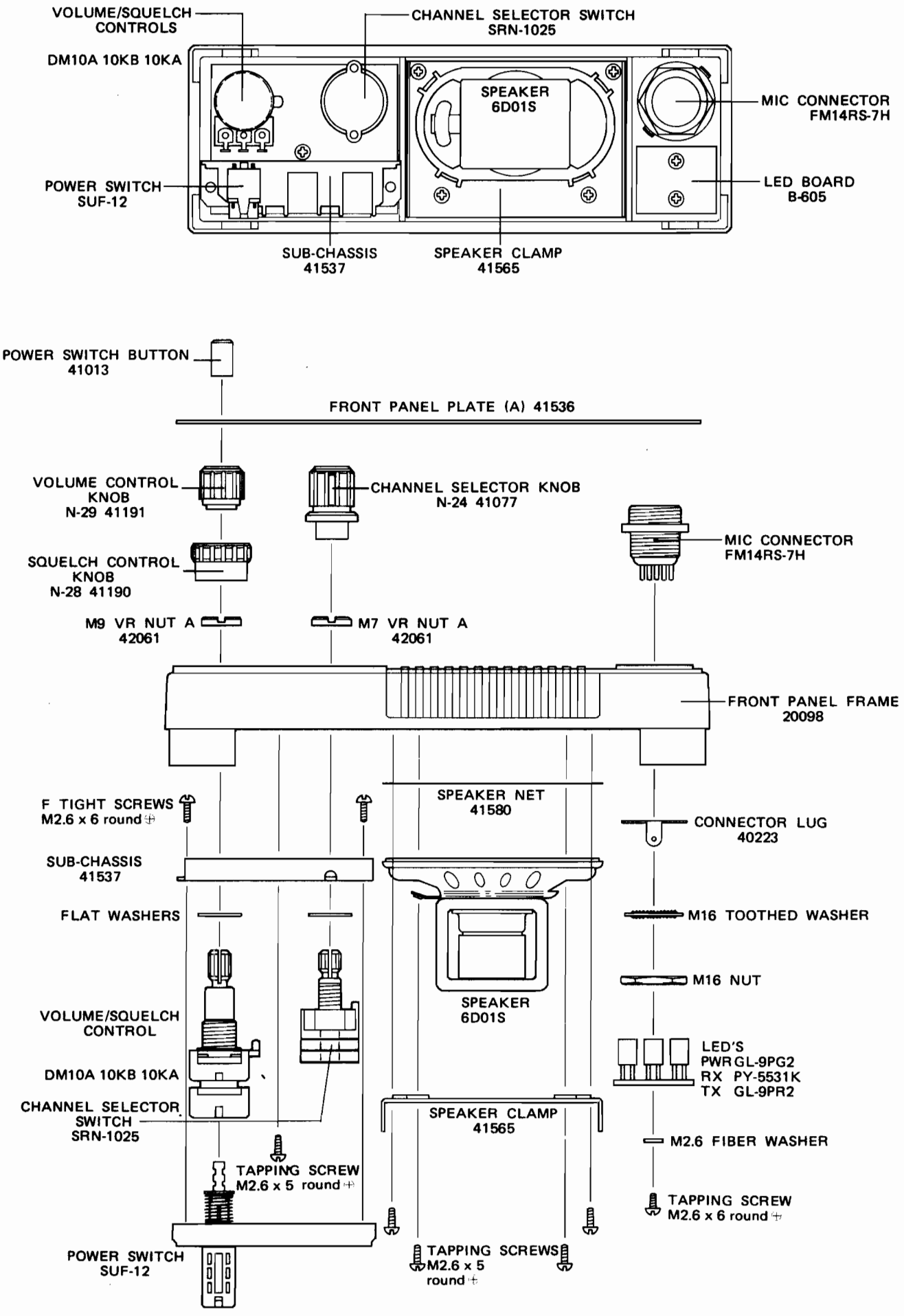
7 - 1 COVERS DISASSEMBLY



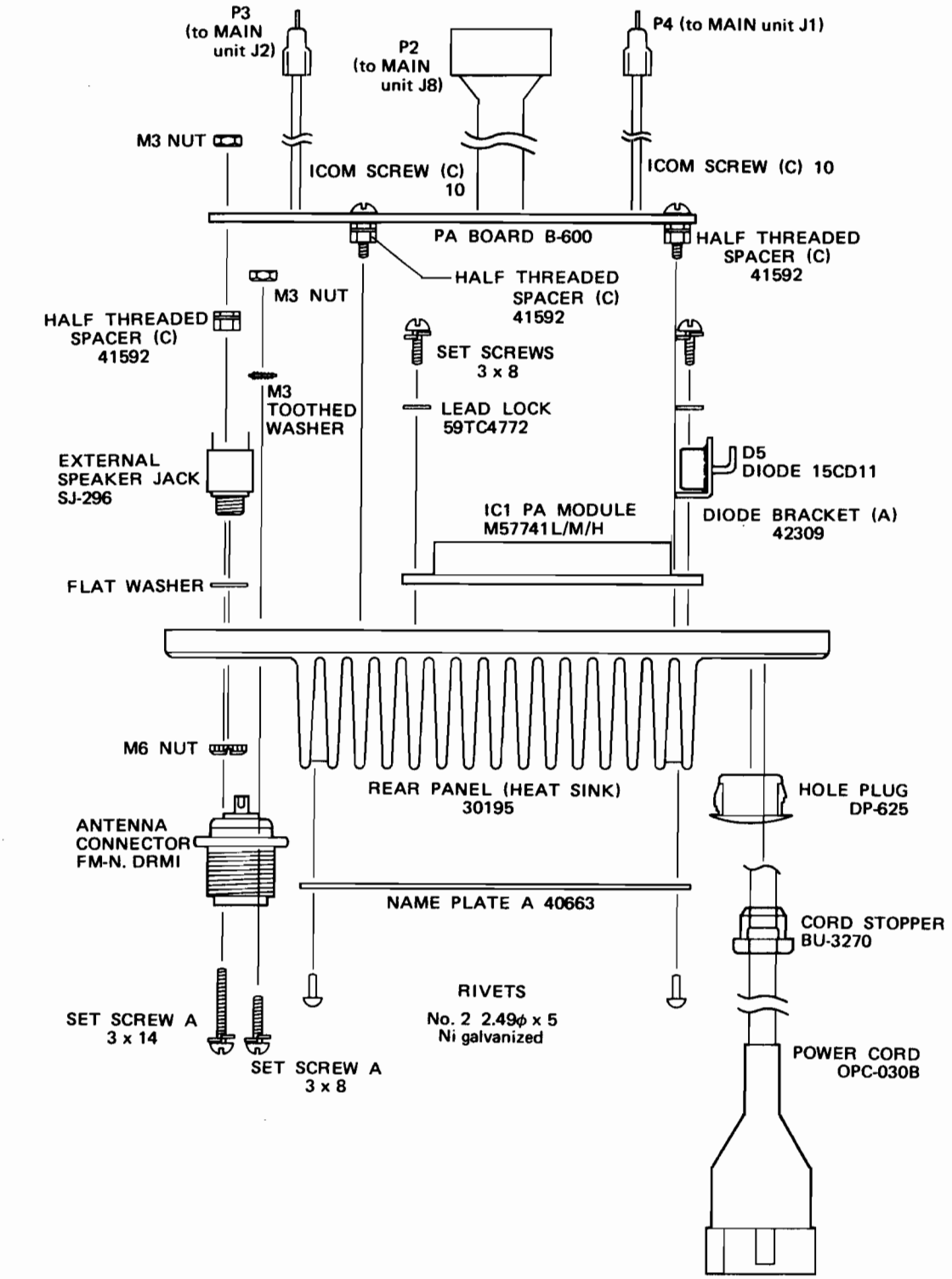
7 - 2 PARTS ON FRONT PANEL (IC-125)

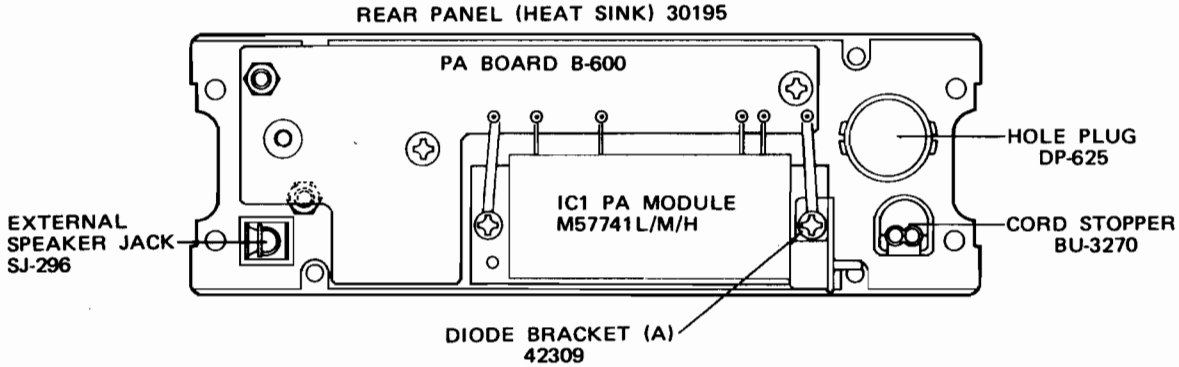


7 - 3 FRONT PANEL DISASSEMBLY (IC-125)

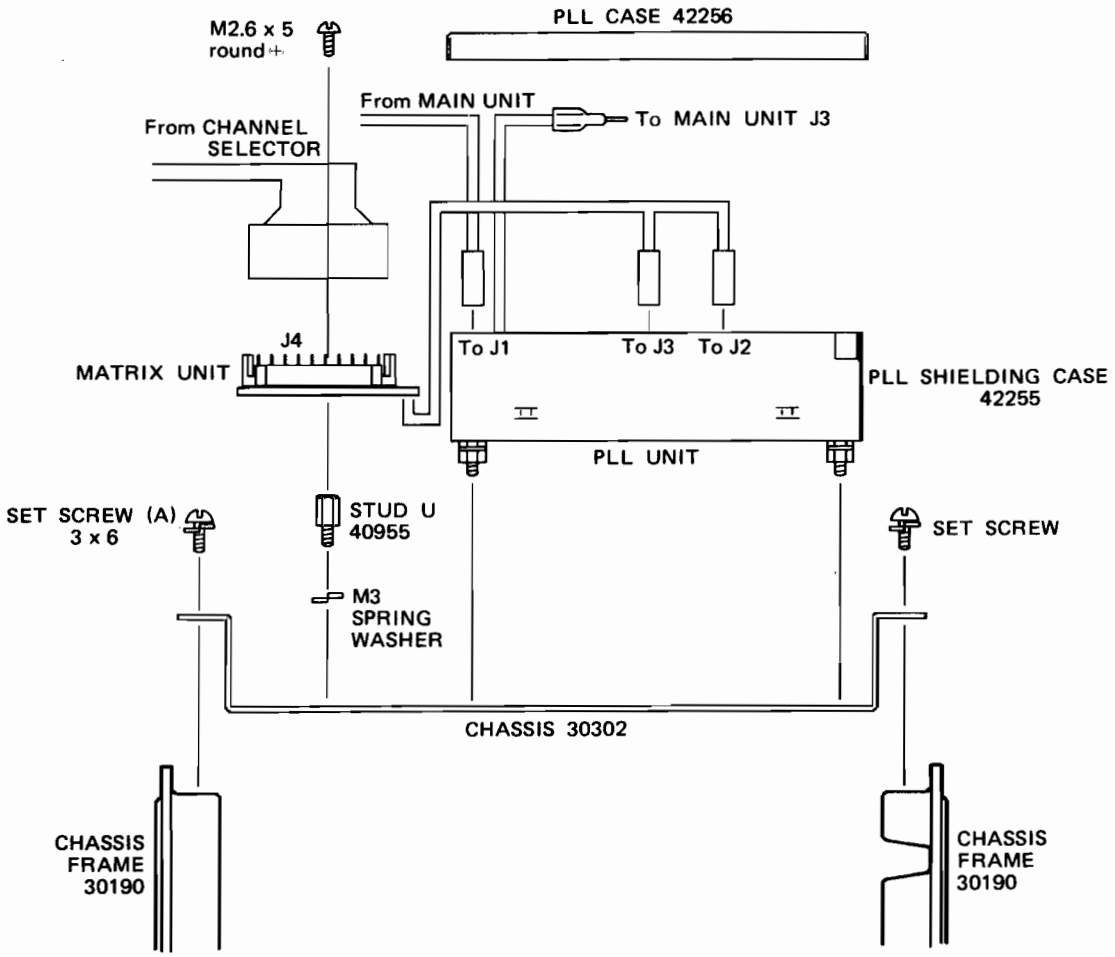


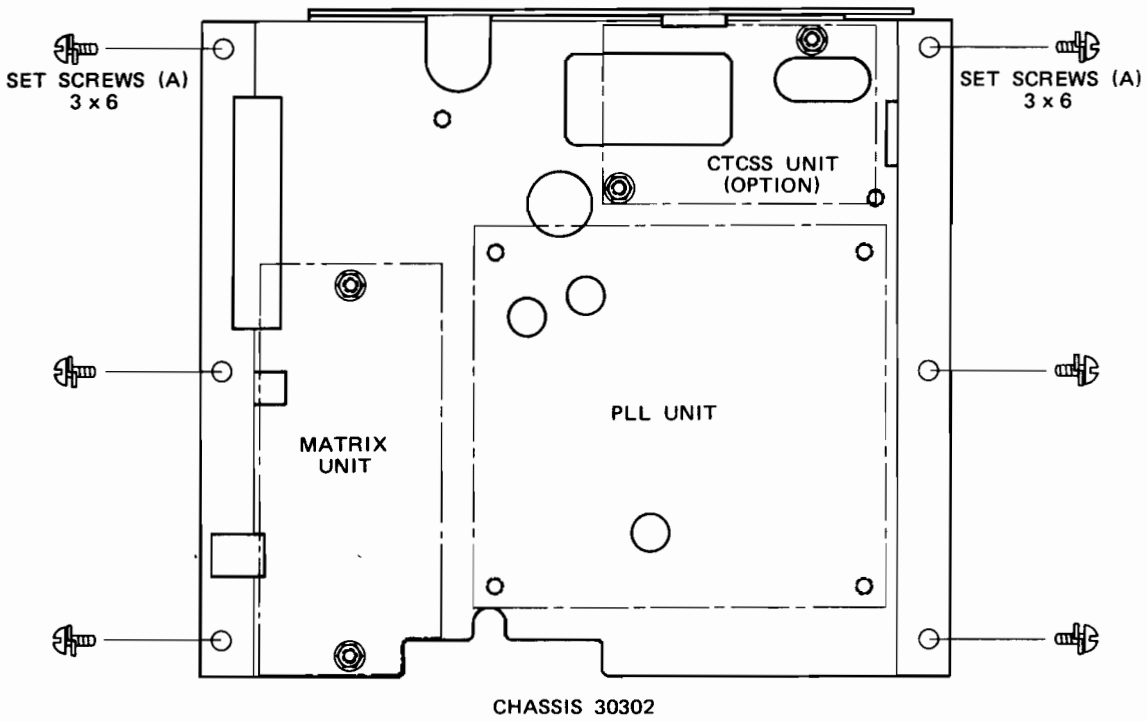
7-4 REAR PANEL DISASSEMBLY (IC-125)



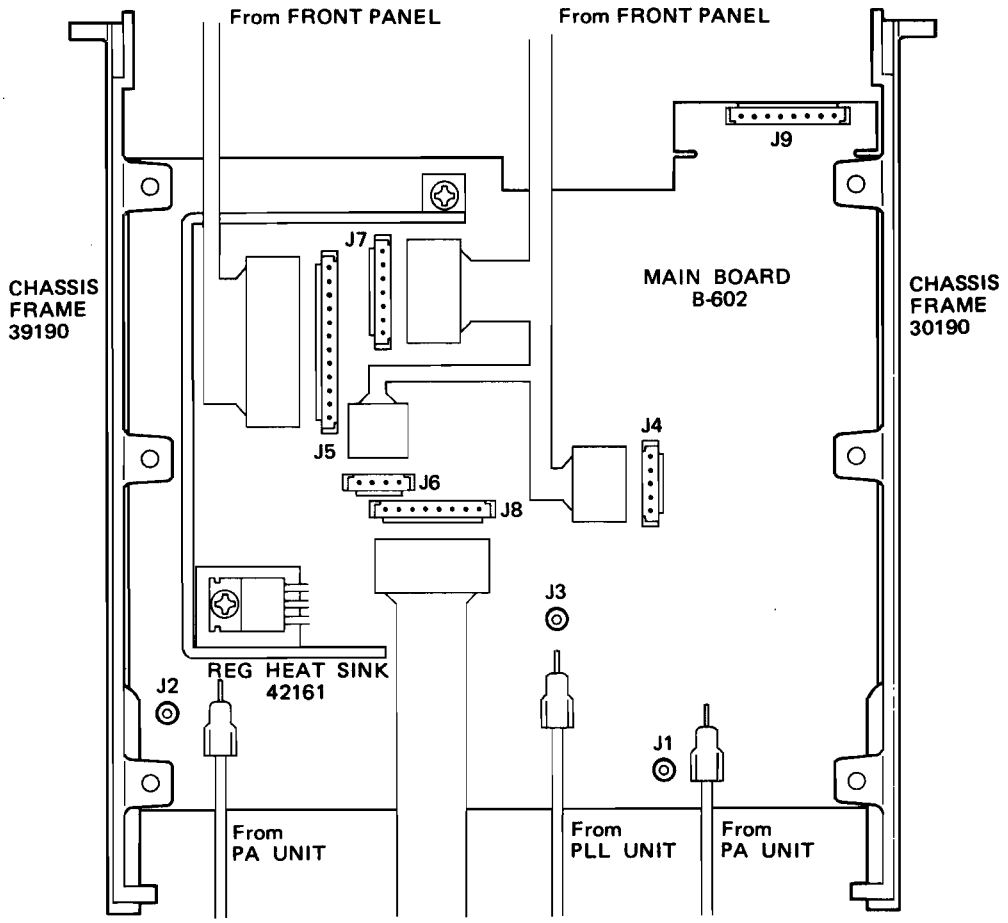


7 - 5 PLL/MATRIX UNITS DISASSEMBLY (IC-125)

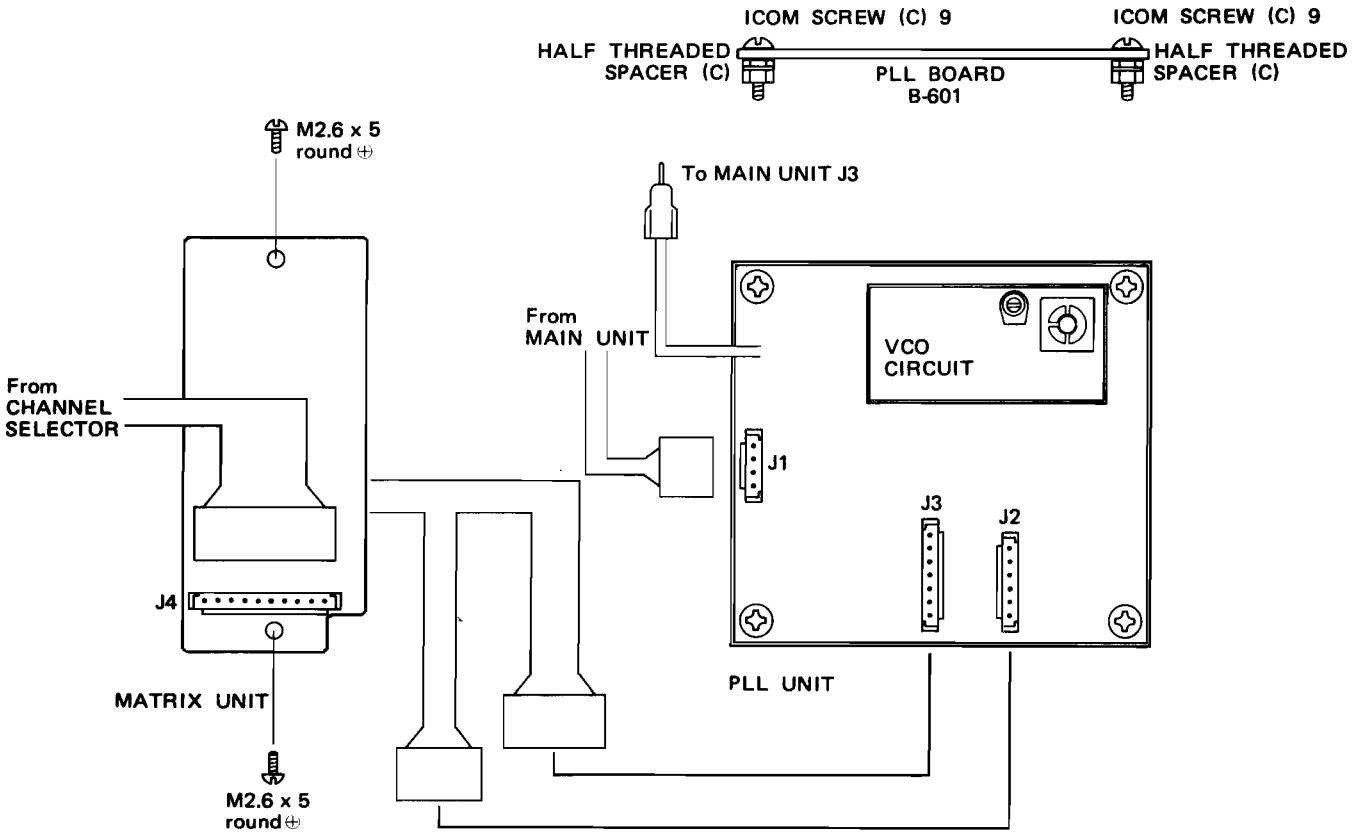




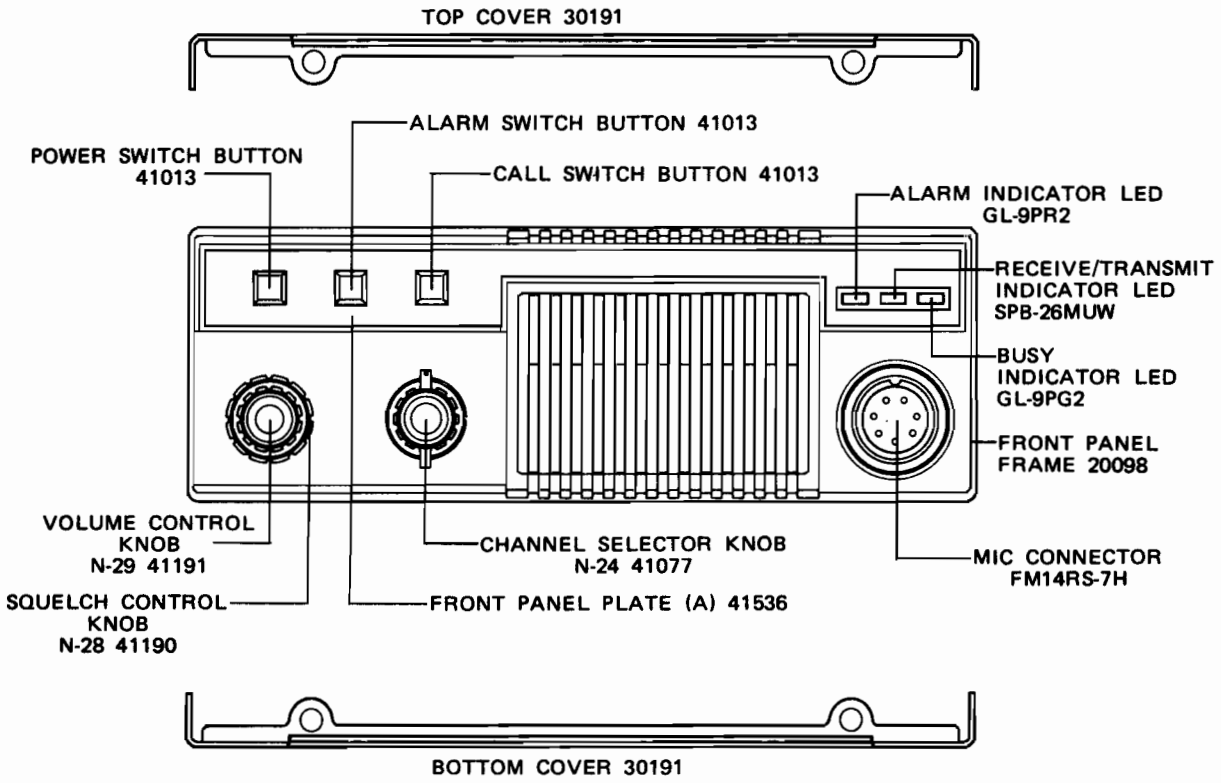
7-6 MAIN UNIT WIRING



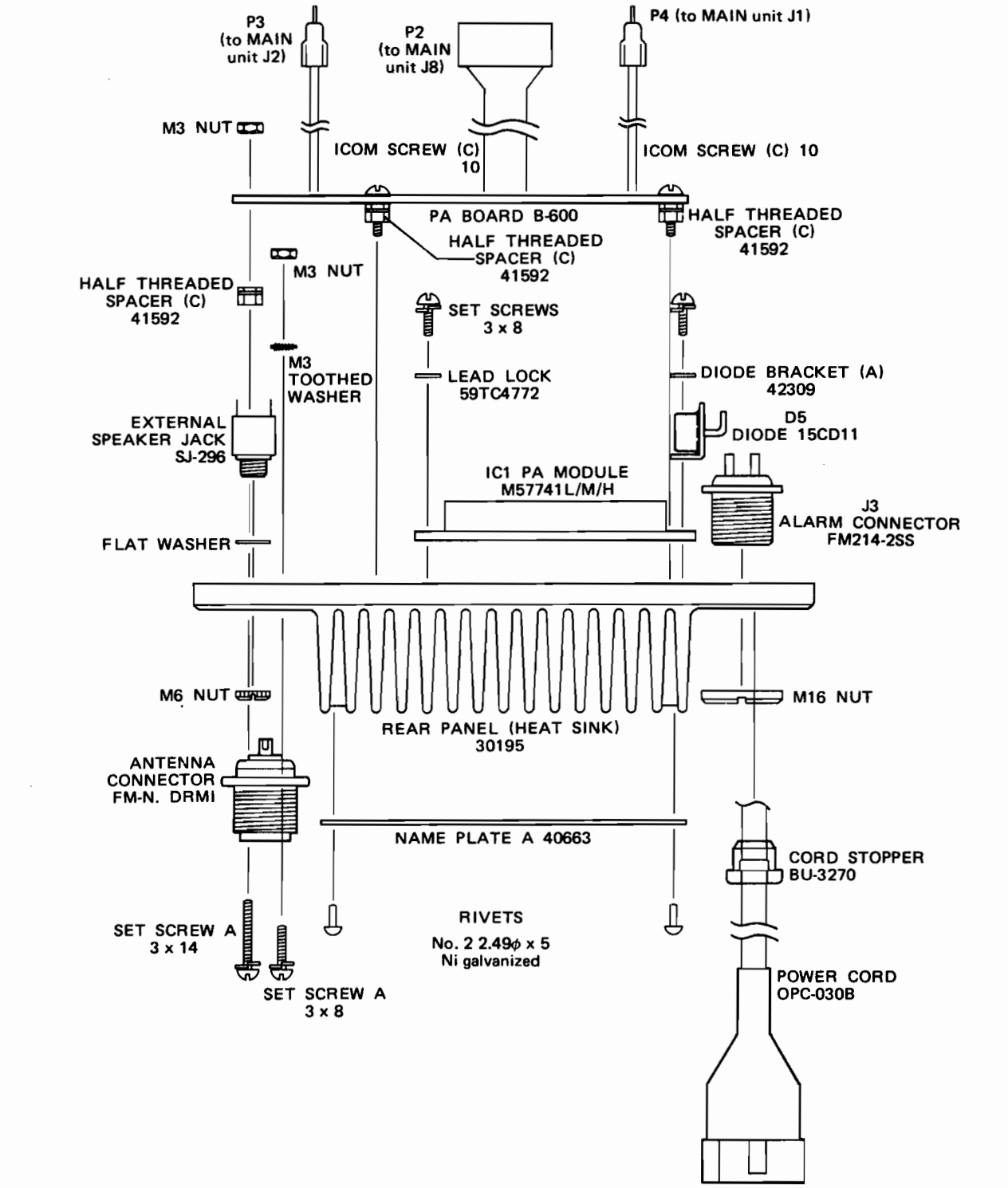
7-7 PLL/MATRIX UNITS WIRING

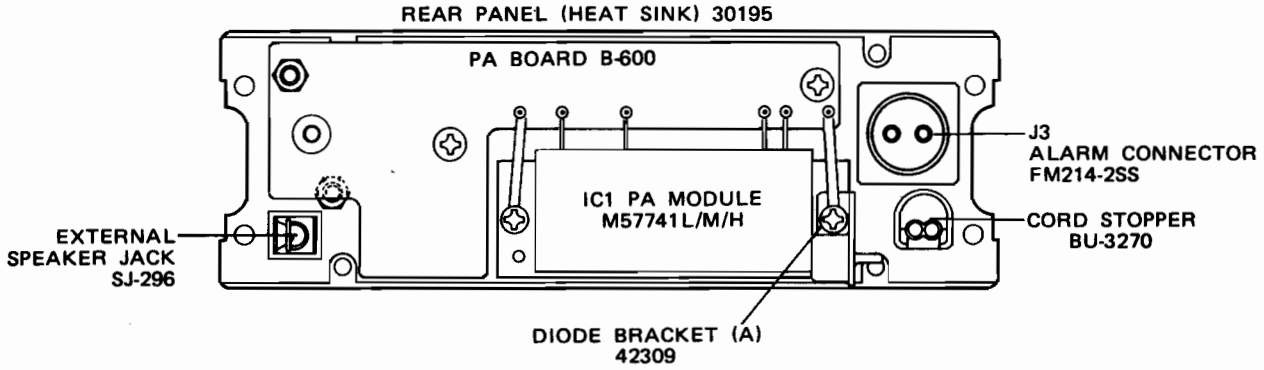


7 - 8 PARTS ON FRONT PANEL (IC-125T/TM)

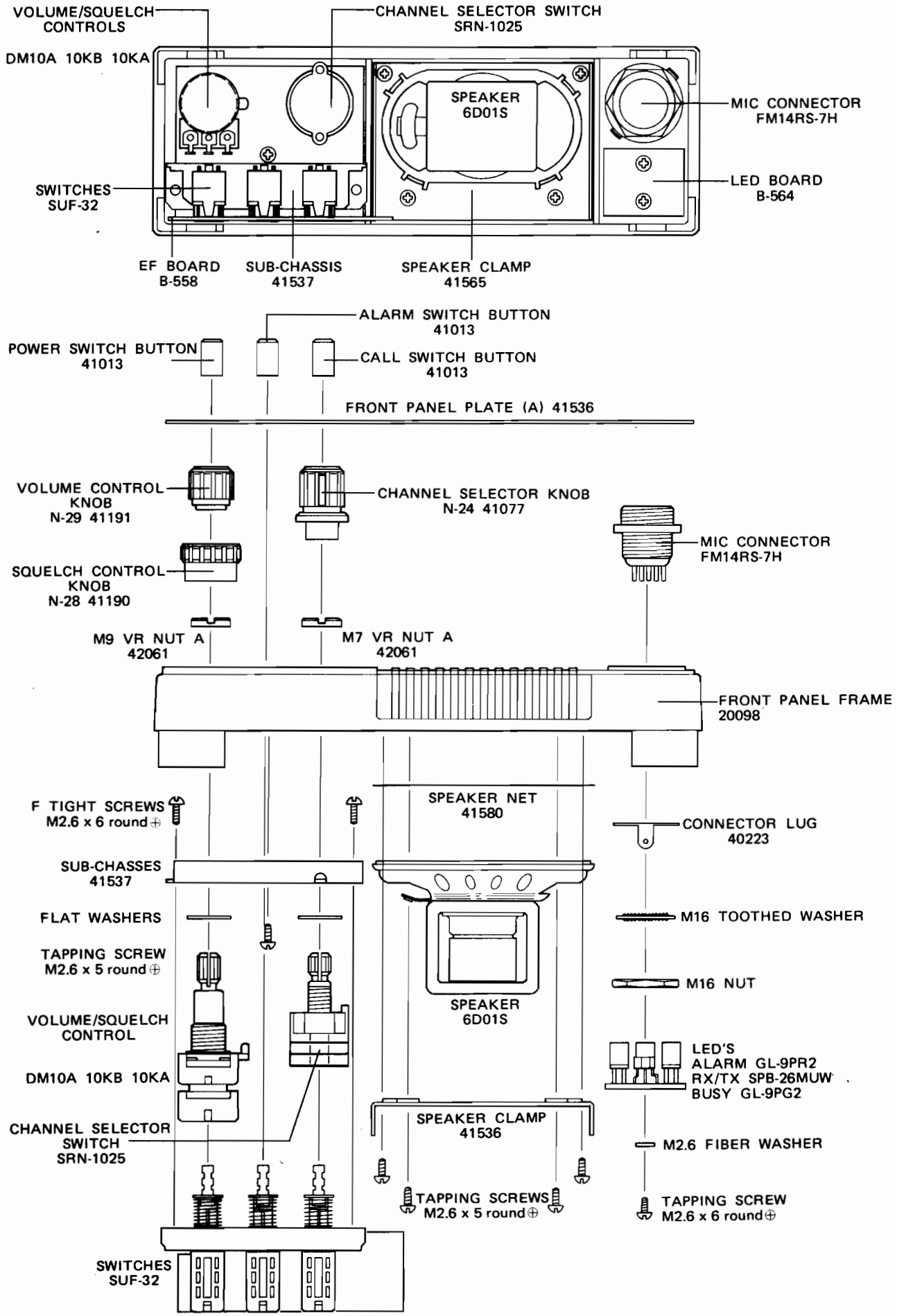


7 - 9 REAR PANEL DISASSEMBLY (IC-125T/TM)

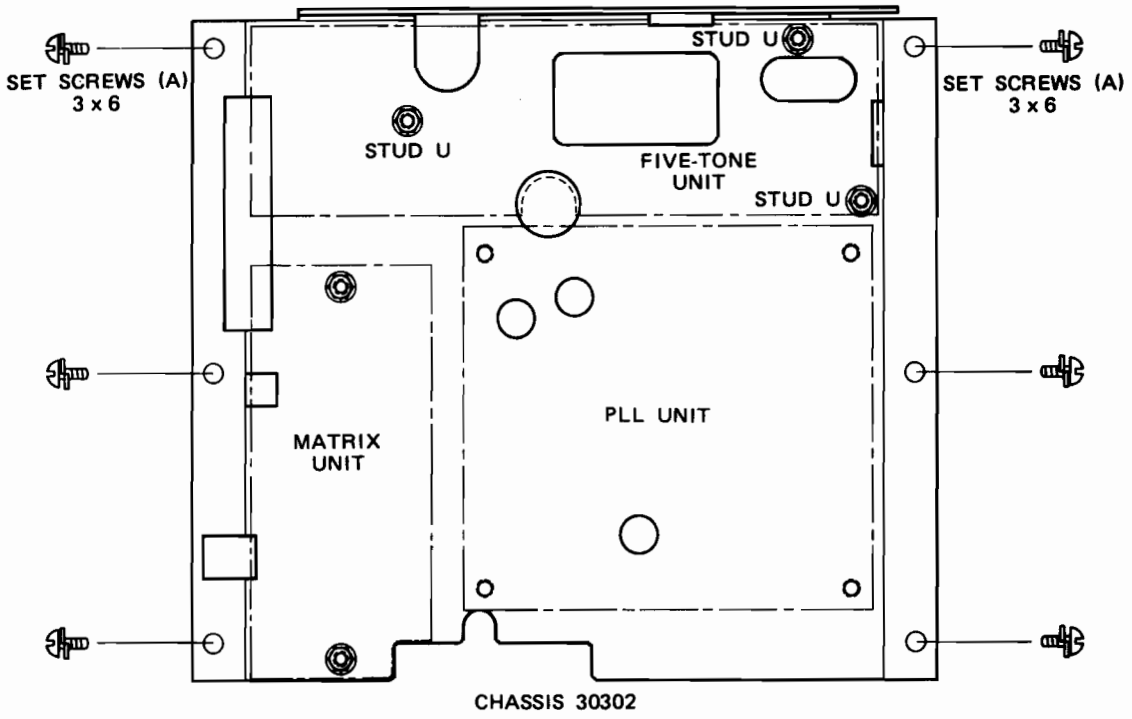


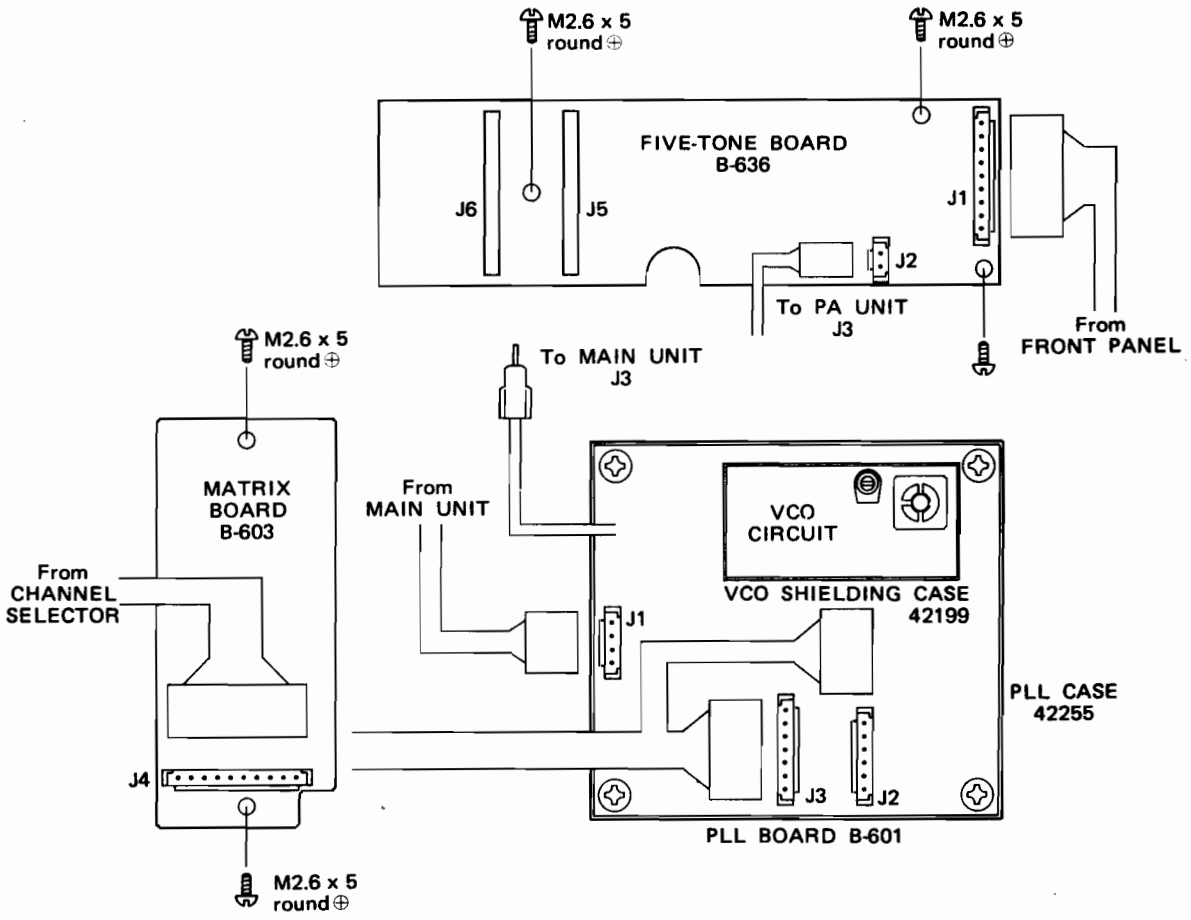


7 - 10 FRONT PANEL DISASSEMBLY (IC-125T/TM)



7 - 11 PLL/MATRIX/5-TONE UNITS DISASSEMBLY/WIRING (IC-125T/TM)





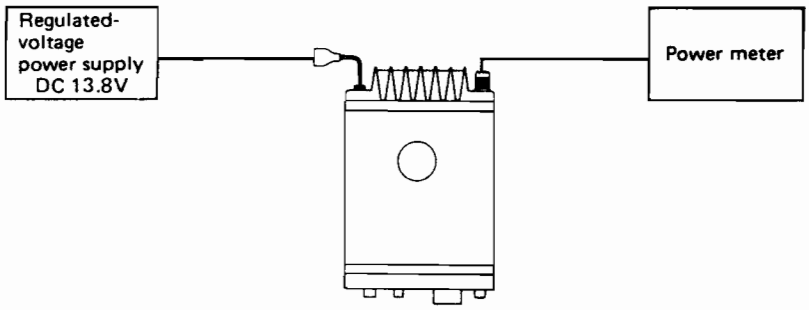
SECTION 8 MAINTENANCE AND ADJUSTMENT

8 - 1 MEASURING INSTRUMENTS REQUIRED FOR ADJUSTMENT

(1) FREQUENCY COUNTER	FREQUENCY RANGE	0.1 - 180MHz
	ACCURACY	BETTERY THAN ±1 ppm
	SENSITIVITY	100mV or BETTER
(2) SIGNAL GENERATOR	FREQUENCY RANGE	0.1MHz - 180MHz
	OUTPUT VOLTAGE	−20 - 90dB (0dB = 1μV)
(3) MULTIMETER	50KΩ/Volt or better	
(4) AC MILLIVOLTMETER	MEASURING RANGE	10mV - 2V
(5) RF VOLTMETER	FREQUENCY RANGE	0.1 - 180MHz
	MEASURING RANGE	0.001 - 10V
(6) RF WATTMETER (Terminated Type)	MEASURING RANGE	30 Watts
	FREQUENCY RANGE	150 ~ 180MHz
	IMPEDANCE	50 OHMS
	SWR	LESS THAN 1.1
(7) AF OSCILLATOR	OUTPUT FREQUENCY	200 - 3000Hz
	OUTPUT VOLTAGE	0 - 200mV
	DISTORTION	LESS THAN 0.1%
(8) OSCILLOSCOPE	FREQUENCY RANGE	DC – 10MHz
	MEASURING RANGE	0.01 – 10V
(9) FM DEVIATION METER	FREQUENCY RANGE	150 ~ 180MHz
	MEASURING RANGE	0 ~ ±10KHz
(10) DIRECTIONAL COUPLER	FREQUENCY RANGE	150 ~ 180MHz
(11) DUMMY LOAD OR EXTERNAL SPEAKER	IMPEDANCE	8 OHMS
(12) VARIABLE VOLTAGE REGULATED POWER SUPPLY	OUTPUT VOLTAGE	11.0V ~ 16.5V DC
	CAPACITY	6A OR MORE

8 - 2 PRELIMINARY CHECKS

8 - 2 - 1 TRANSMITTER OUTPUT CHECKS

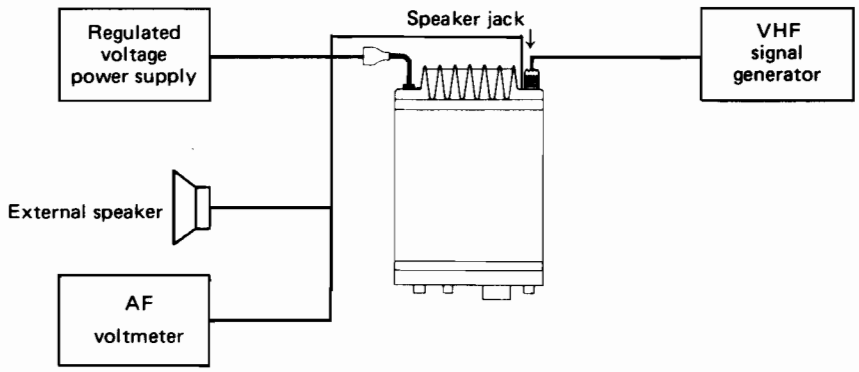


1. Connect a 50 ohm RF wattmeter to the ANT connector.

2. Setting the IC-125/T/TM to any programmed channel and key the transmitter. Observe the RF power OUTPUT.

3. Power output should be 25 watts (IC-125TM: 10 watts) at rated input voltage.

8 - 2 - 2 RECEIVER CHECKS



Make ali checks at 13.8V DC

1. Settings of controls and switches

Power switch	ON
Squelch Control	Minimum position
Frequency	Any programmed channel

2. Connect an AF voltmeter to the SP jack and set the SQL control fully counterclockwise.

3. Connect the RF output of a VHF signal generator to the ANT connector.

4. Adjust the VOL control and the AF voltmeter range.
   Adjust the VOL control for a full scale reading on the AF voltmeter. Don't change the VOL control setting after this adjustment.

5. Set the signal generator to the receiving frequency and adjust the output level of the signal generator until the AF voltmeter shows a 20dB decrease in reading.

6. The signal generator output voltage at this point is the 20dB quieting sensitivity.

8 - 3 PREPARATION AND PROCEDURE BEFORE SERVICING

1. Confirm defective operation and check to make sure setup or external sources are not the cause of the problem.

2. Proper tools and measuring instruments are required for repair and adjustment. Don't try to repair or modify without them.

3. Remove the transceiver case as shown on Page 7 - 1. Use a screw driver that fits the screws.

4. Attach a 13.8V DC external power source to the power connector. Be sure to check the polarity.

5. In the case of a transmission problem, a dummy load should be connected to the antenna connector. In the case of a receiving problem, an antenna or signal generator is connected to the antenna connector. Be careful not to transmit into the signal generator.

6. Recheck for the suspected malfunction with the power switch on.

7. Check the defective circuit and measure the DC voltages of the collector, base and emitter of each transistor.

8. When checking a transmission problem, it is convenient to short circuit an accessory mic connector plug and insert it, turning on the transmitter.

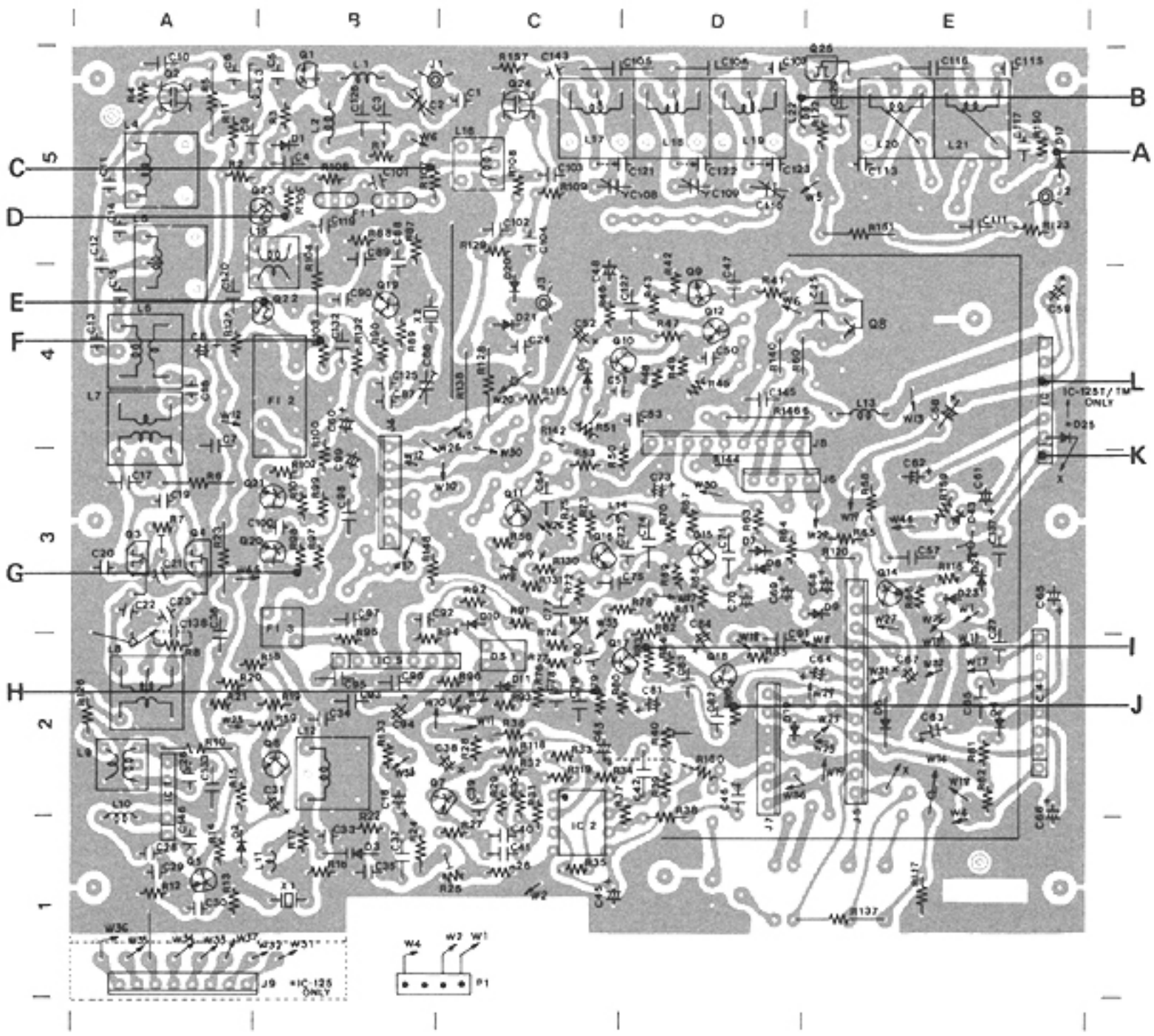
8 - 4 HOW TO CHECK

8 - 4 - 1 RECEIVER

1. Check the frequency of P.L.L. unit when you are unable to receive with a strong signal present and noise present when turning up the AF volume control.

2. When no noise is present at the speaker, check audio frequency amplifier or voltage regulator first.

3. Inject RF through a 0.01μF capacitor from an FM signal generator modulated with 1KHz audio modulation (FM), to points (A) through (G) in order, check for receiver output.



(A): Selected channel frequency
(B): Selected channel frequency
(C): 21.400MHz
(D): 21.400MHz
(E): 21.4MHz/455KHz
(F): 455KHz
(G): 455KHz

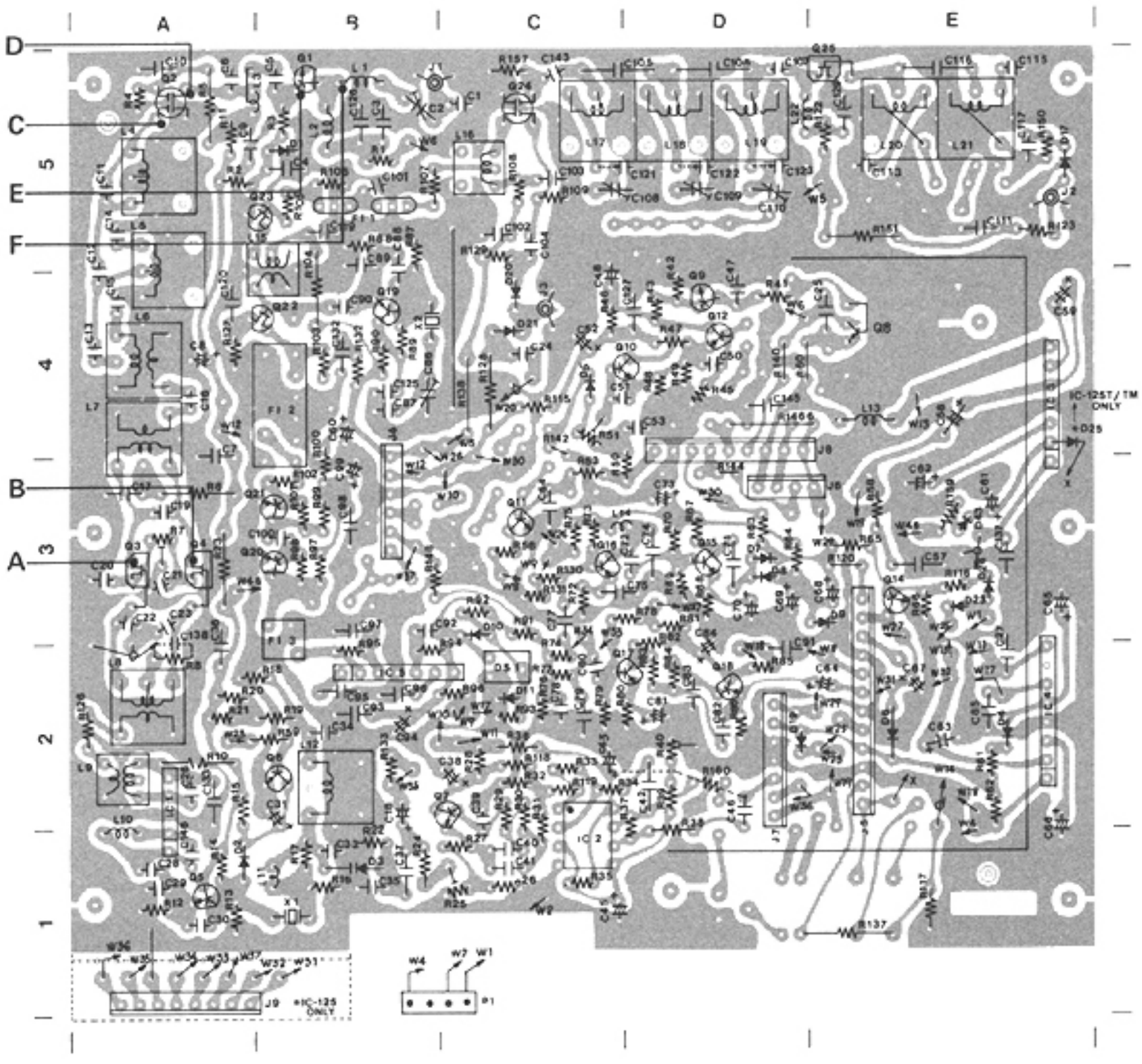
4. Check (H) through (L) with an oscilloscope, for demodulated output in the audio frequency range.

8 - 4 - 2 TRANSMITTER

1. Check (A) through (F) in order with RF voltmeter.

2. When the transmitter output is low, check regulated power supply voltage first, do not turn coil trimmers.

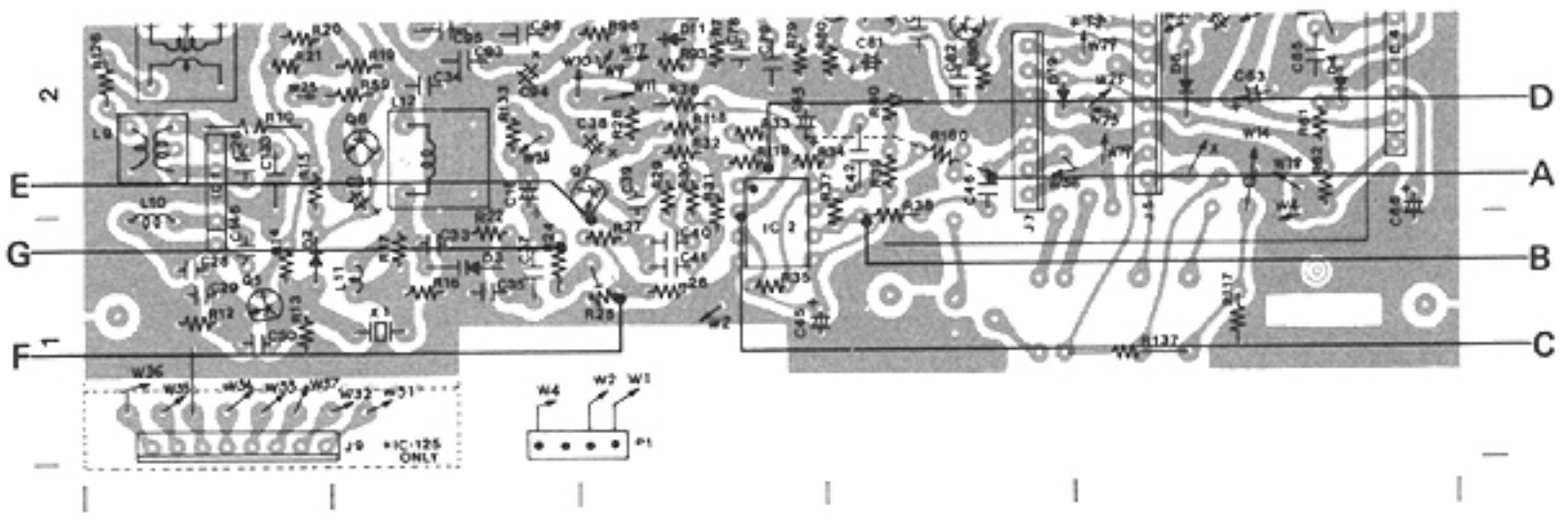
3. When transmission is normal, RF is present and it is not possible to measure the DC voltage accurately with a voltmeter.



8 - 4 - 3 MODULATION

1. Put a signal into the EXT MIC connector (1KHz 40mV) with an AF oscillator or an external mic.

2. Check the AF voltages (A) through (G) in order with an oscilloscope.



8 - 4 - 4 P.L.L.

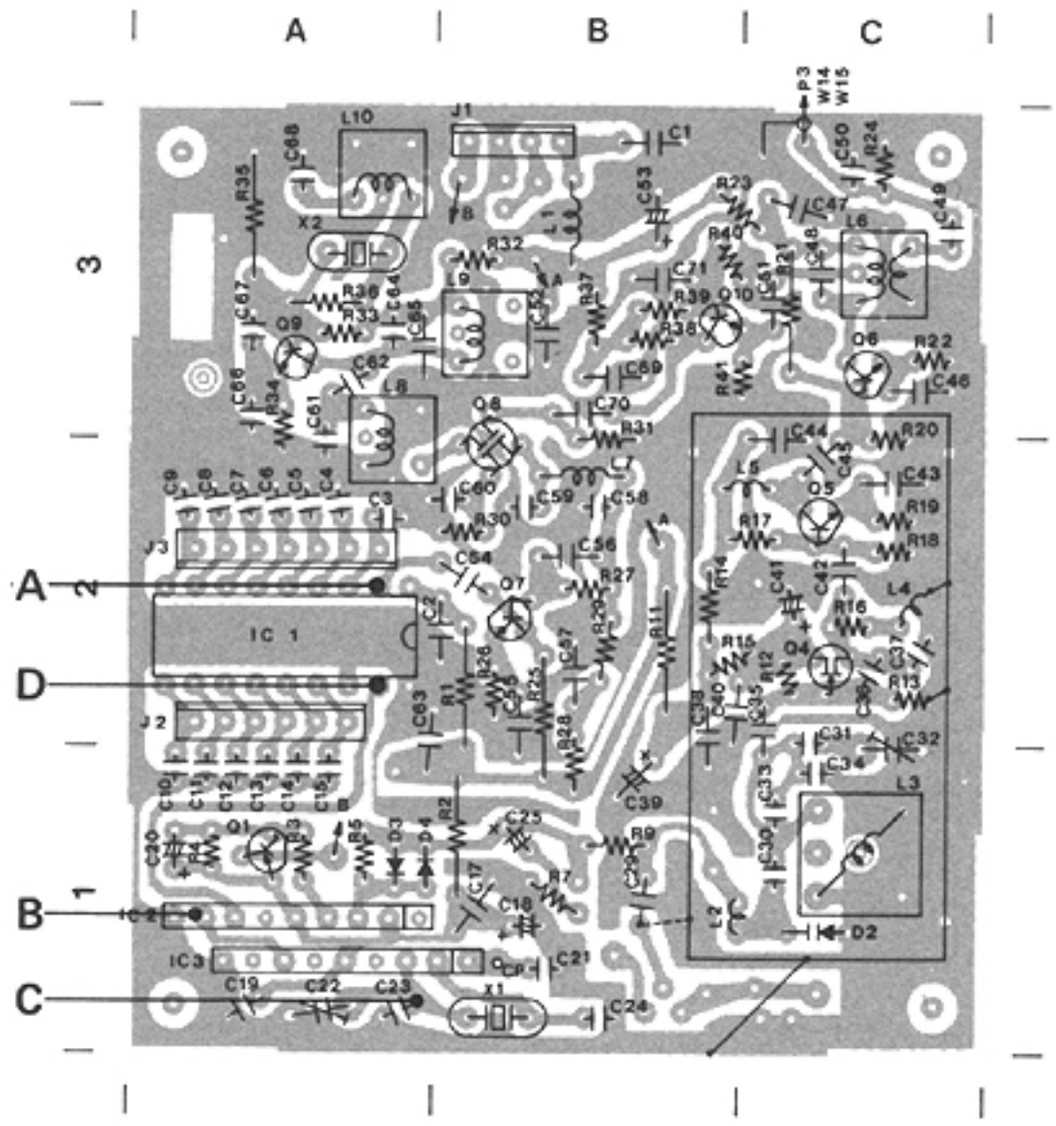
1. Check (A) with an oscilloscope. A lock failure is indicated by an instability or absence of the waveform. Check as follows:

2. Check the frequency of the reference oscillator (5.12MHz or 6.40MHz). If a 5KHz (or 6.25KHz) 5Vp-p squarewave is not observed at (B), measure DC voltage on Pin 5 of IC3 if no oscillation.

3. Wave measure the output of (C) and (D) with an oscilloscope.

4. Measure DC voltage of Q4, Q5, Q6 and Q7.

5. If the transmit or receive frequency differs from the programmed frequency, check the voltage of A1 to A4 on the IC1 (BCD control lines from matrix board). (Refer SECTION 6 FREQUENCY PROGRAMMING.)

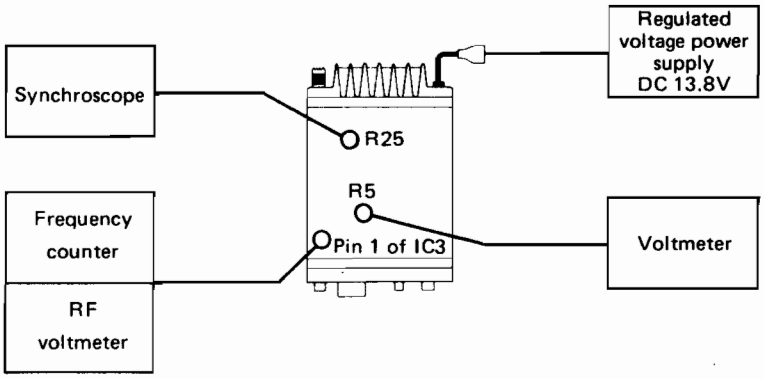


8 - 5 BASIC ALIGNMENT PROCEDURE

8 - 5 - 1 P.L.L. CIRCUIT

A. Lock Adjustment

1. Connect the measuring instrument and set the control knobs as follows:
   Connect an oscilloscope. (10MHz band width) to R25.
   Connect voltmeter between R5 and ground.
   Set the channel selector switch at a channel programmed N500.



2. Procedure
   When the cicuit is operating normally, adjust coil L3. The P.L.L. will lock.
   Adjust the coil of L3, and the voltage of R5 varies between 0 ~ 5V, and P.L.L. should lock.
   Adjust L3 for 1V after lock.

   Next, adjust L8 and L9 for maximum voltage (P-P value) on the oscilloscope.
   Set the channel selector switch at a channel programmed the highest frequency, and repeat adjustment of L8 and L9 several times. After that, confirm the following voltage of R25 (both transmit and receive) is over 0.8Vp-p (over operating range of the radio). If the P.L.L. won't lock, check these voltage: R+8V, T+8V, 8V constant, and the P.L.L. LO and reference frequency oscillator for oscillation.

B. Reference Frequency Oscillator Check

1. Connect a frequency counter through a capacitor to Pin 1 of IC3 (check point).
2. Adjust C22 for 5.120MHz when X1 is 5.12MHz or for 6.400MHz when X1 is 6.4MHz.
3. Confirm frequency is: 5.120MHz (or 6.400MHz) ±250Hz.

C. P.L.L. LO Frequency Adjustment

1. Connection of the measuring instruments and the setting of knobs.
   Connect the frequency counter to the output terminal of the LO (P3).
   Set the channel selector switch to the channel programmed N500.
   Adjust L10 so that one of the shown frequency can be obtained.

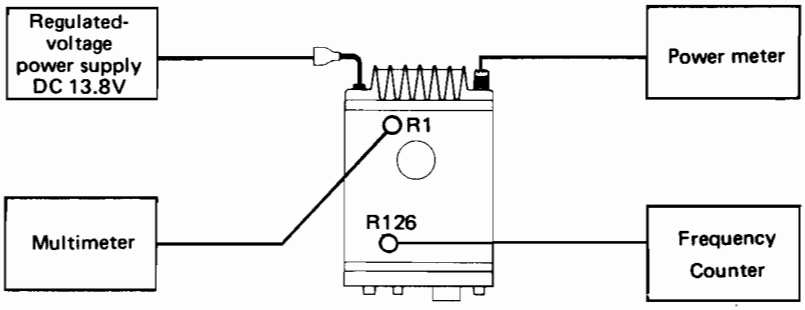
Version	X1: 5.12MHz	X1: 6.4MHz
F 1	129.375MHz	130.000MHz
F 2	134.600MHz	135.225MHz
F 3	139.600MHz	140.225MHz
F 4	145.150MHz	145.775MHz

2. Confirmation
   Check each frequency.
   All frequency should be within ±500Hz.

8 - 5 - 2 TRANSMITTER

A. Mixer and Band-Pass Filter Adjustment

1. Connection of measuring instruments
   Connect a 50 ohm powermeter to the antenna connector.
   Connect a voltmeter and variable power supply to the set.
   Set voltage of the power supply to 13.8V.
   Connect a frequency counter across R126 and ground.



2. Procedure
   Adjust L12 for 21.400MHz.
   Connect a multimeter across R1 (L2 side) and ground.
   Then adjust L4 through L7 to obtain minimum voltage.

B. Power Adjustment

1. Connection of measuring instruments.
   Connect a 50 ohm powermeter to the antenna connector.
   Connect a voltmeter and variable voltage power supply to the set.
   Set voltage of the power supply to 13.8V.

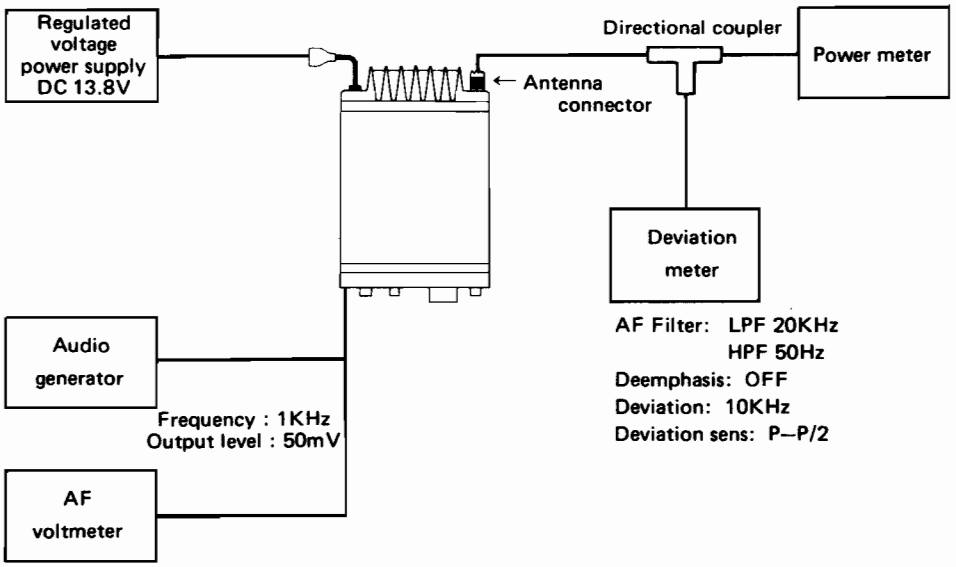
2. Procedure
   Turn R51 fully counterclockwise.
   Adjust C2 and L4 for maximum power output.
   Confirm the output power is 30W or more.
   Then adjust R51 for 25W output power.
   Change the voltage of the power supply from 11.0V to 16.5V, and confirm the output power is between 22W and 28W.

C. Modulation Adjustment

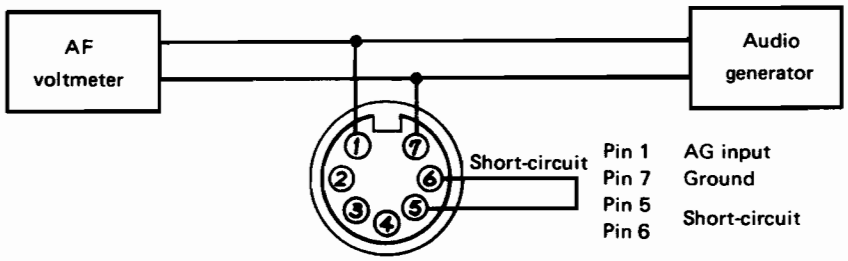
1. Connection of measuring instruments.
   Connect a deviation meter with a direction coupler or attenuator.
   The deviation meter shall be set high-pass filter: 50Hz, low-pass filter: 20KHz, de-emphasis: OFF.
   Connect an oscilloscope to the AF output terminal of the deviation meter.
   Connect an AF generator, with an AF millivoltmeter in parallel, to the MIC connector.

2. Procedure

Set the channel selector switch at a programmed channel.
Set R25 and R40 to the center position.
Set the AF generator output to 1KHz, 50mV.
Tune the deviation meter to the transmitting frequency.
Then adjust R40 for minimum distortion.
Set the AF generator output to 15mV and adjust R25 for maximum deviation (5KHz for 25KHz channel spacing, or 3.5KHz for 12.5KHz channel spacing).



Microphone connector (7 pin) connections

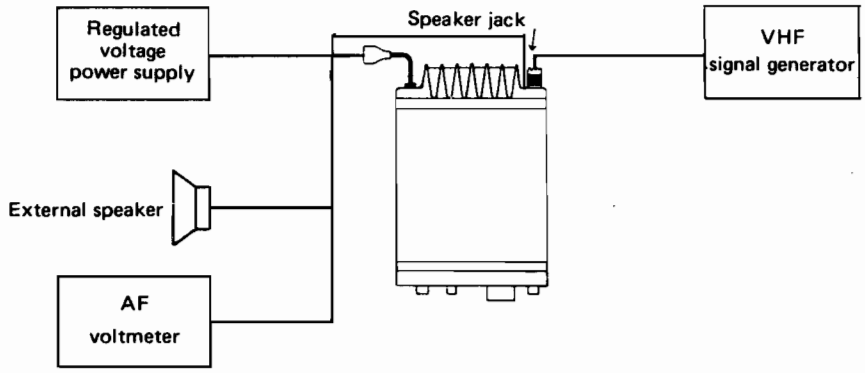


8-5-3 RECEIVER

A. 2nd LO Frequency Adjustment
Connect a frequency counter to the gate of Q22 through a capacitor.
Adjust C86 for 20.945MHz.

B. Receiver Sensitivity Adjustment
1. Connection of measuring instruments.
Connect an RF Signal Generator to the antenna connector.
Connect an AF millivoltmeter and external speaker (in parallel) to the external speaker jack.
Connect a regulated-voltage power supply (13.8V) to the power connector.

(Connection of measuring instruments)



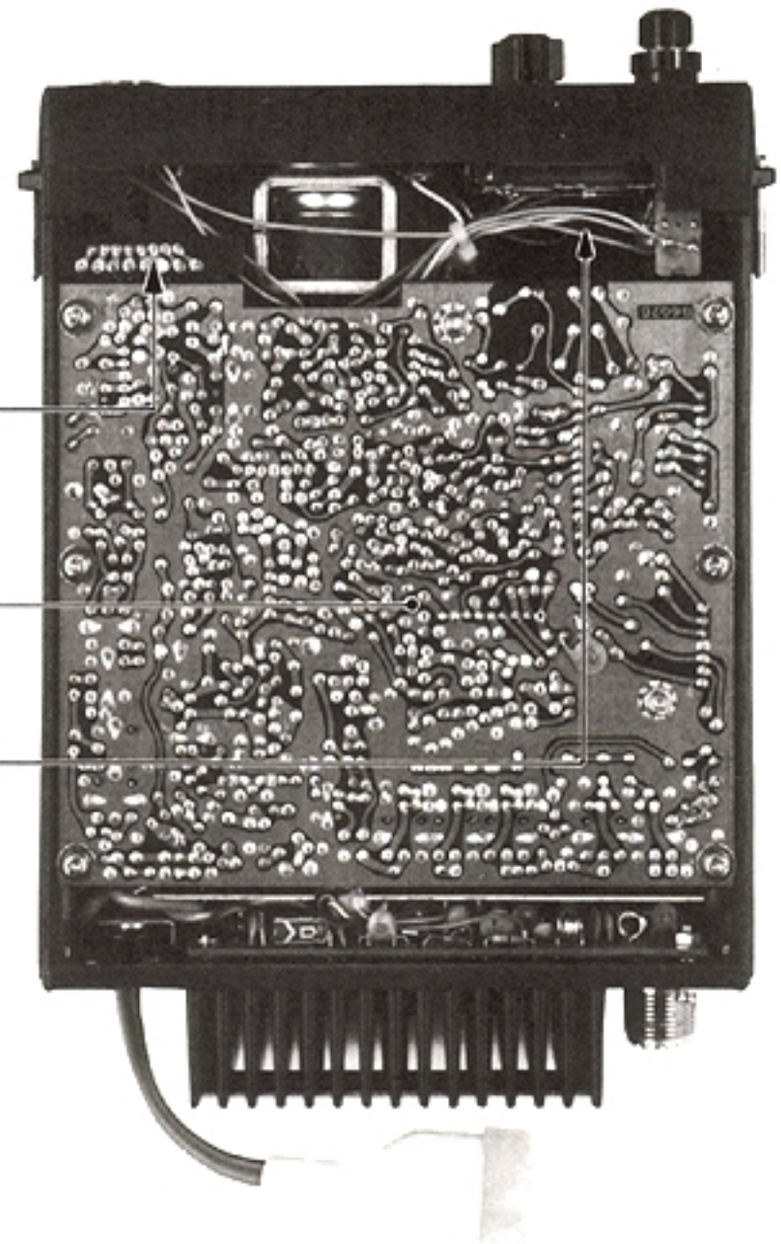
2. Procedure
Set the channel selector switch at a programmed channel. Tune the signal generator to the receiving frequency and set its output level so that signal noise ratio of the receiver output is 10dB.
Adjust L20, L21, C108, C109 and C110 so that noise is decreased. If noise level becomes too small, decrease output level of the signal generator.
Set the signal generator deviation to the maximum deviation (5KHz or 3.5KHz) with 1KHz AF.
Adjust L15 and L16 for maximum AF output.

3. Confirmation
Sensitivity should be less than 0.4 microvolts for 20dB noise quieting.

C. Squelch operation check
With the SG output at 10dB, and with SQL control at maximum, check to be sure that the squelch opens.

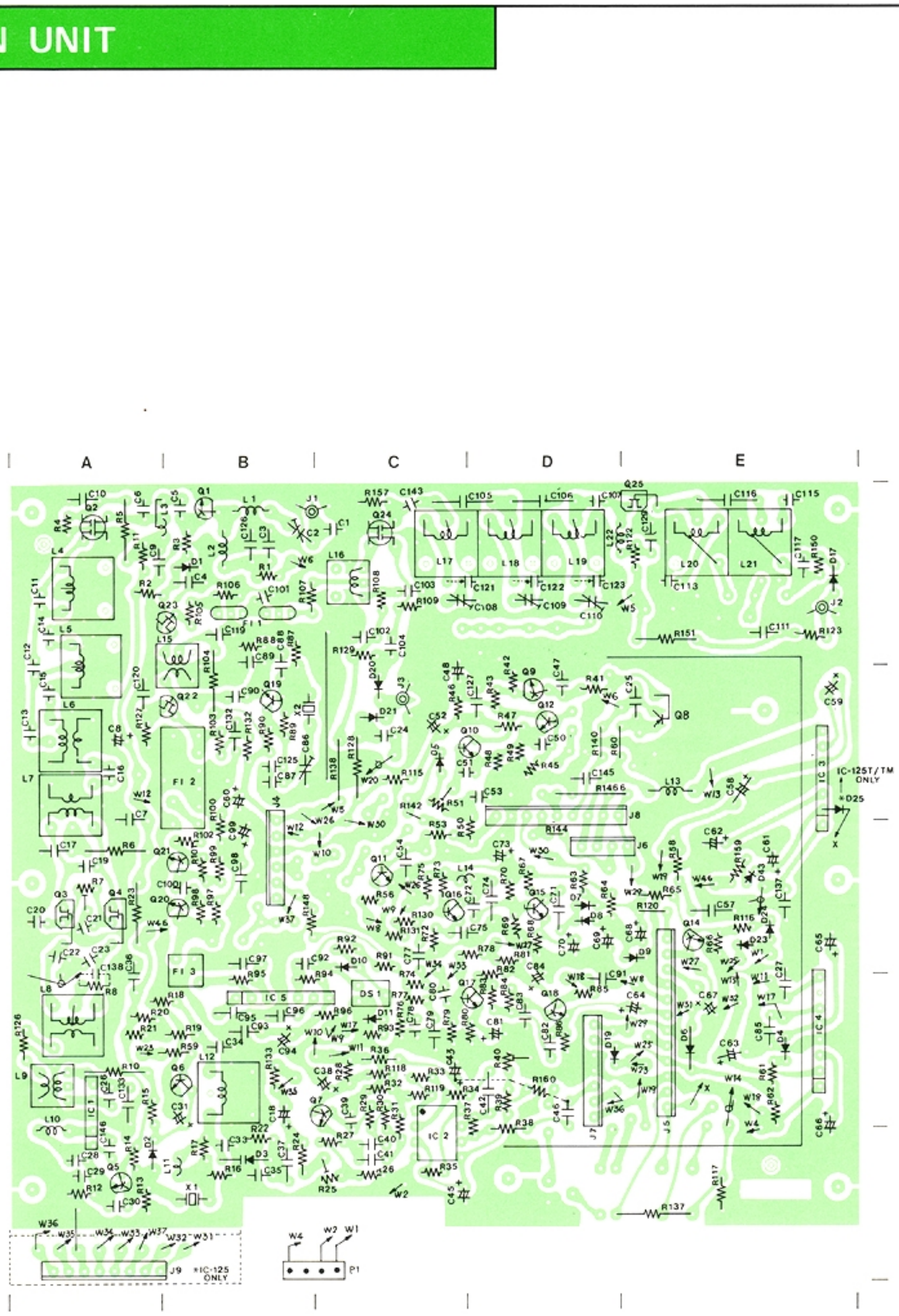
D. AF output check
With the SG output at 10dB, check to be sure that AF output is 5.5V or more.

UNIT LAYOUT


FRONT UNIT
LED BOARD
MAIN UNIT
FRONT UNIT SWITCH BOARD
(IC-125T/TM ONLY)

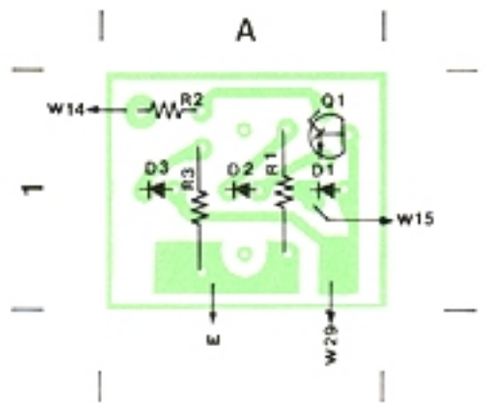
PLL UNIT
DIODE MATRIX UNIT
5 TONE UNIT
(IC-125T/TM ONLY)
PA UNIT

MAIN UNIT

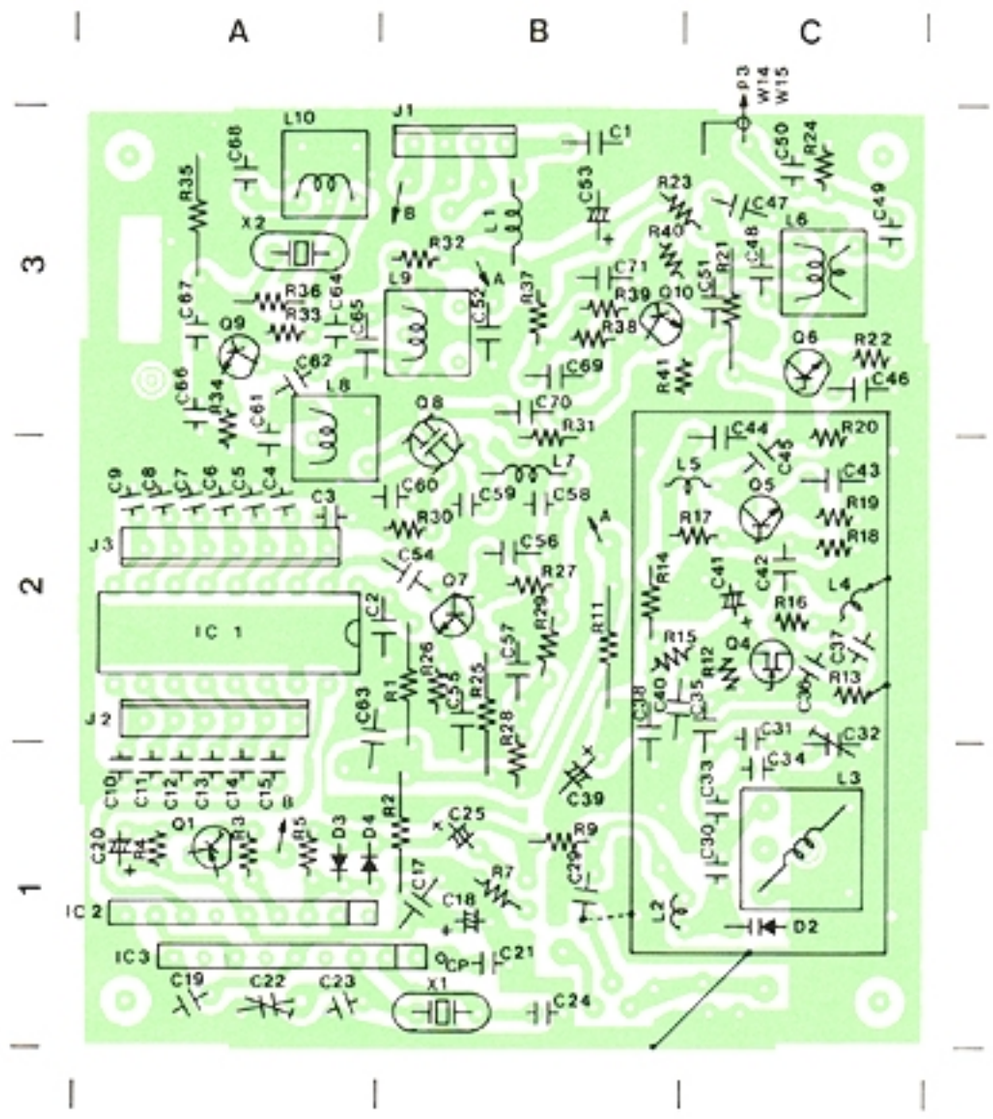


FRONT UNIT

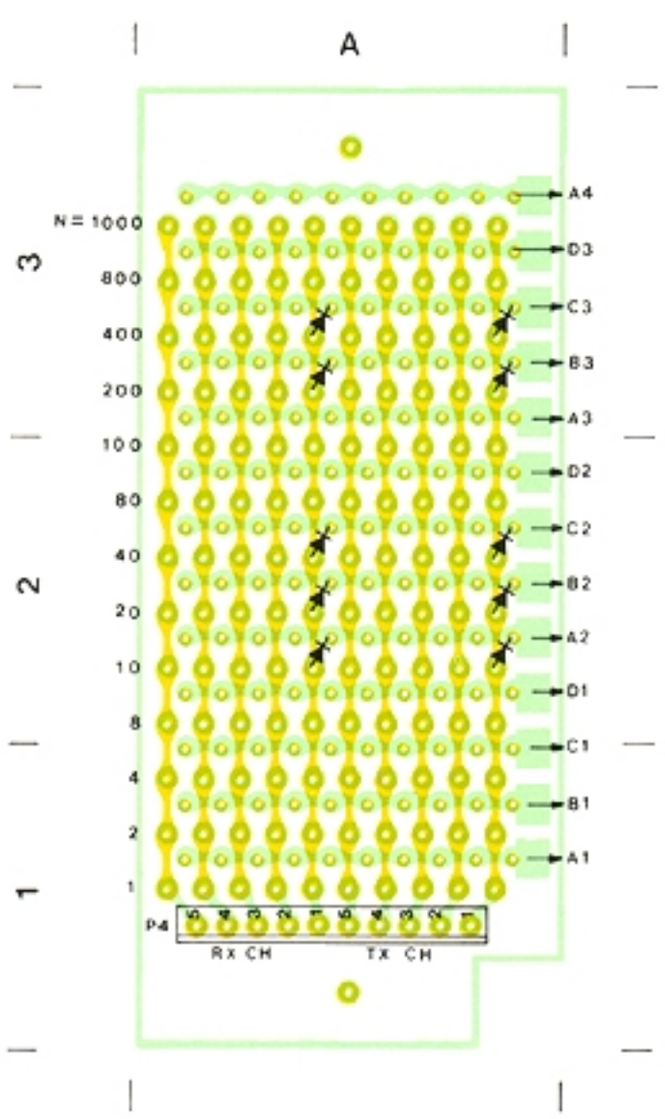
■ LED BOARD



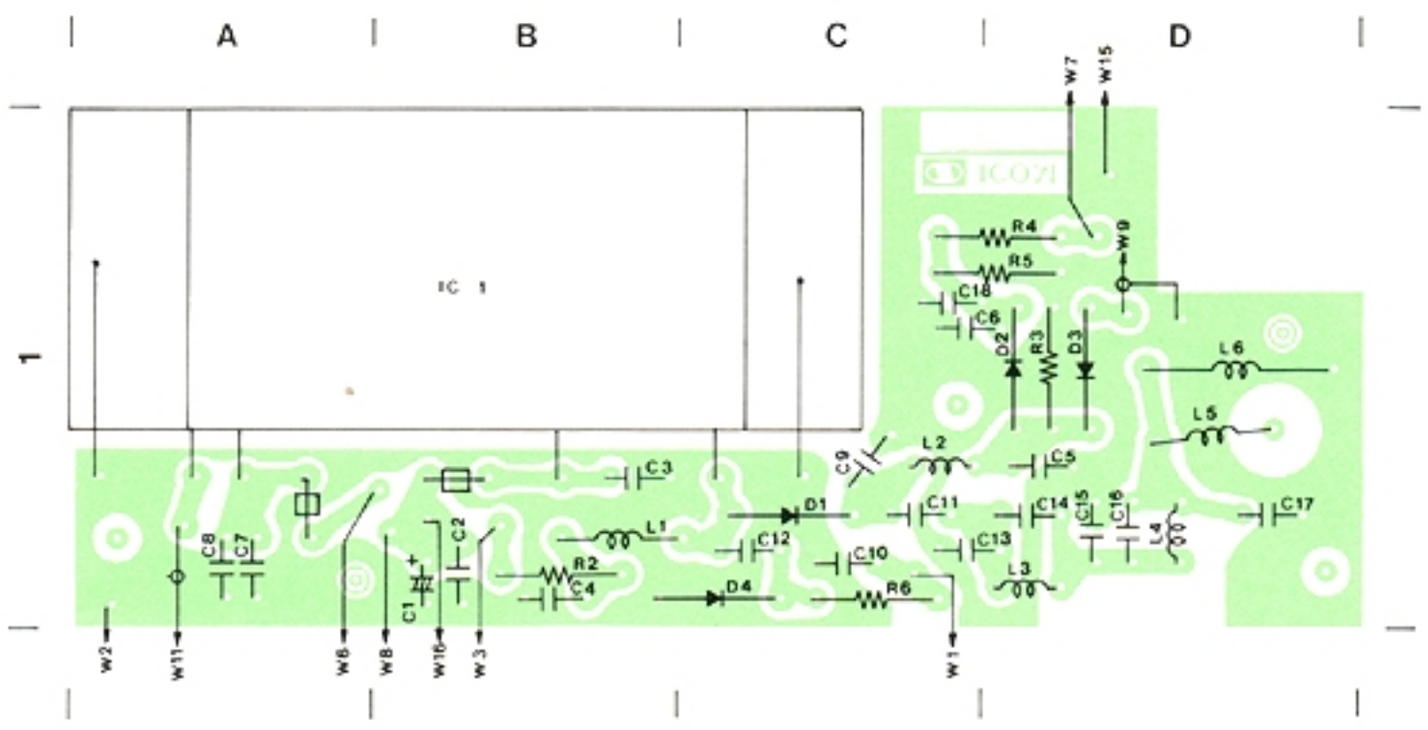
PLL UNIT



DIODE MATRIX UNIT

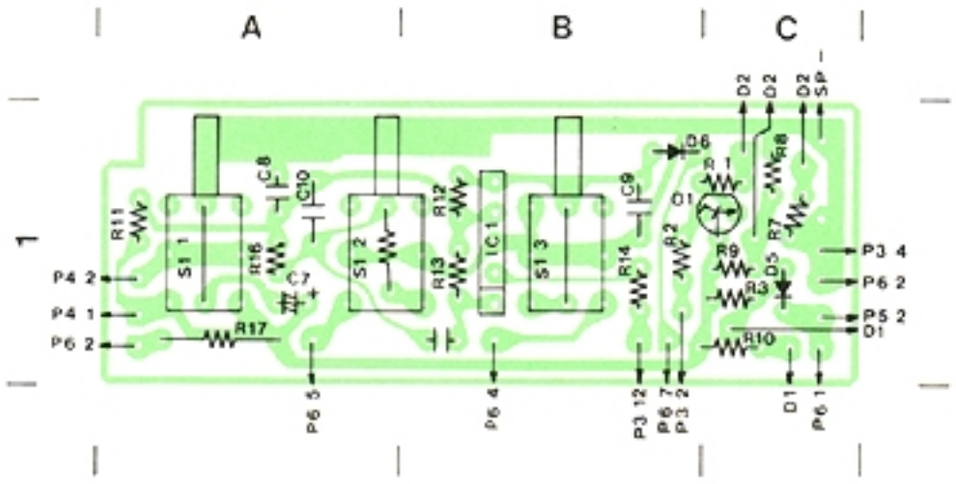


PA UNIT

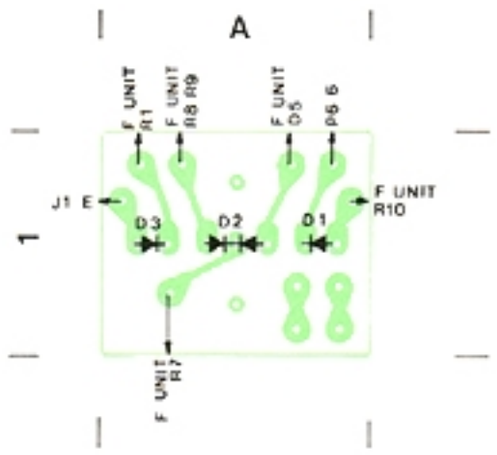


FRONT UNIT

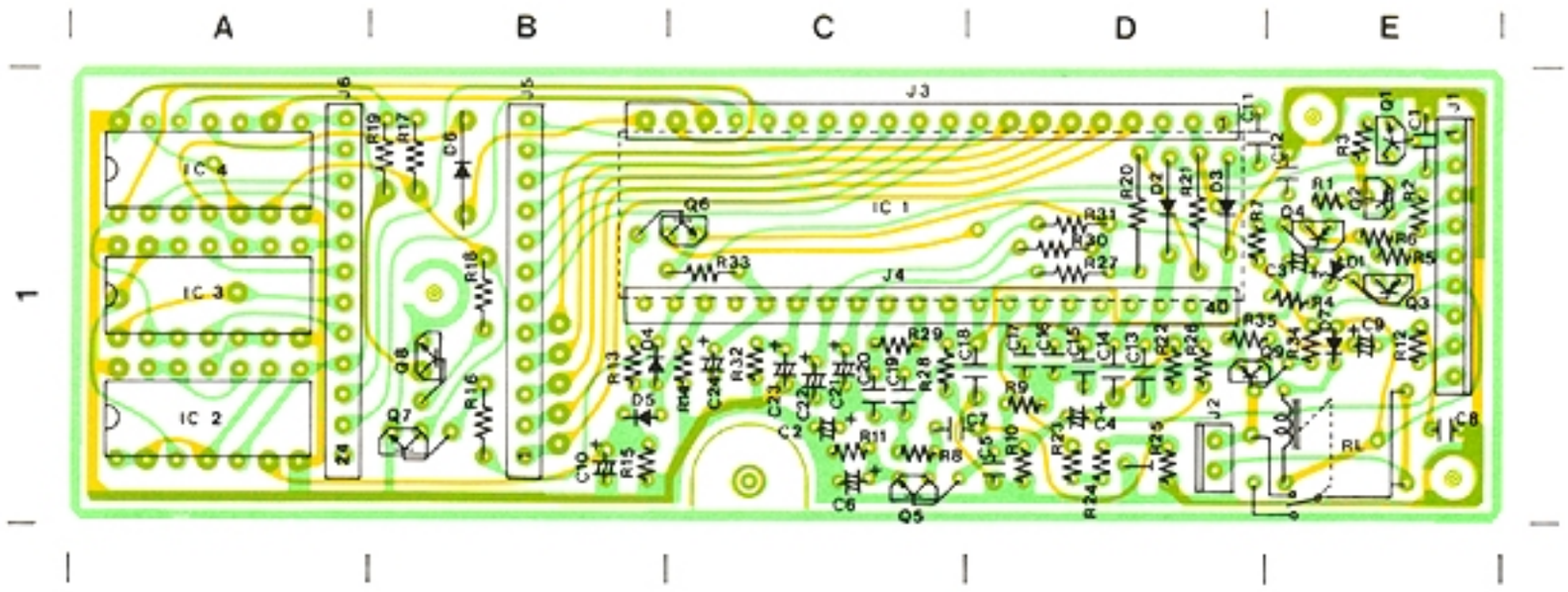
■ SWITCH BOARD



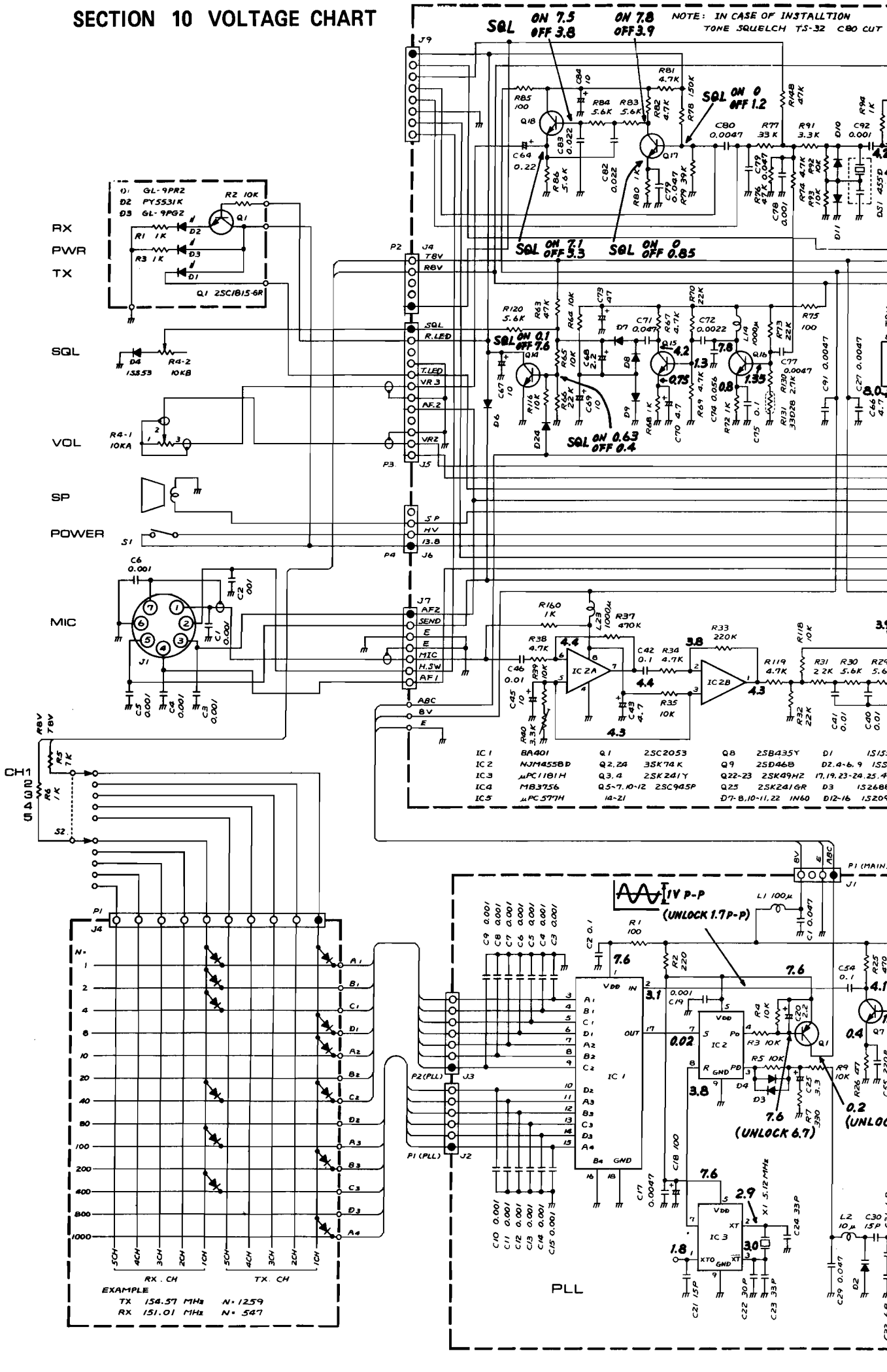
■ LED BOARD

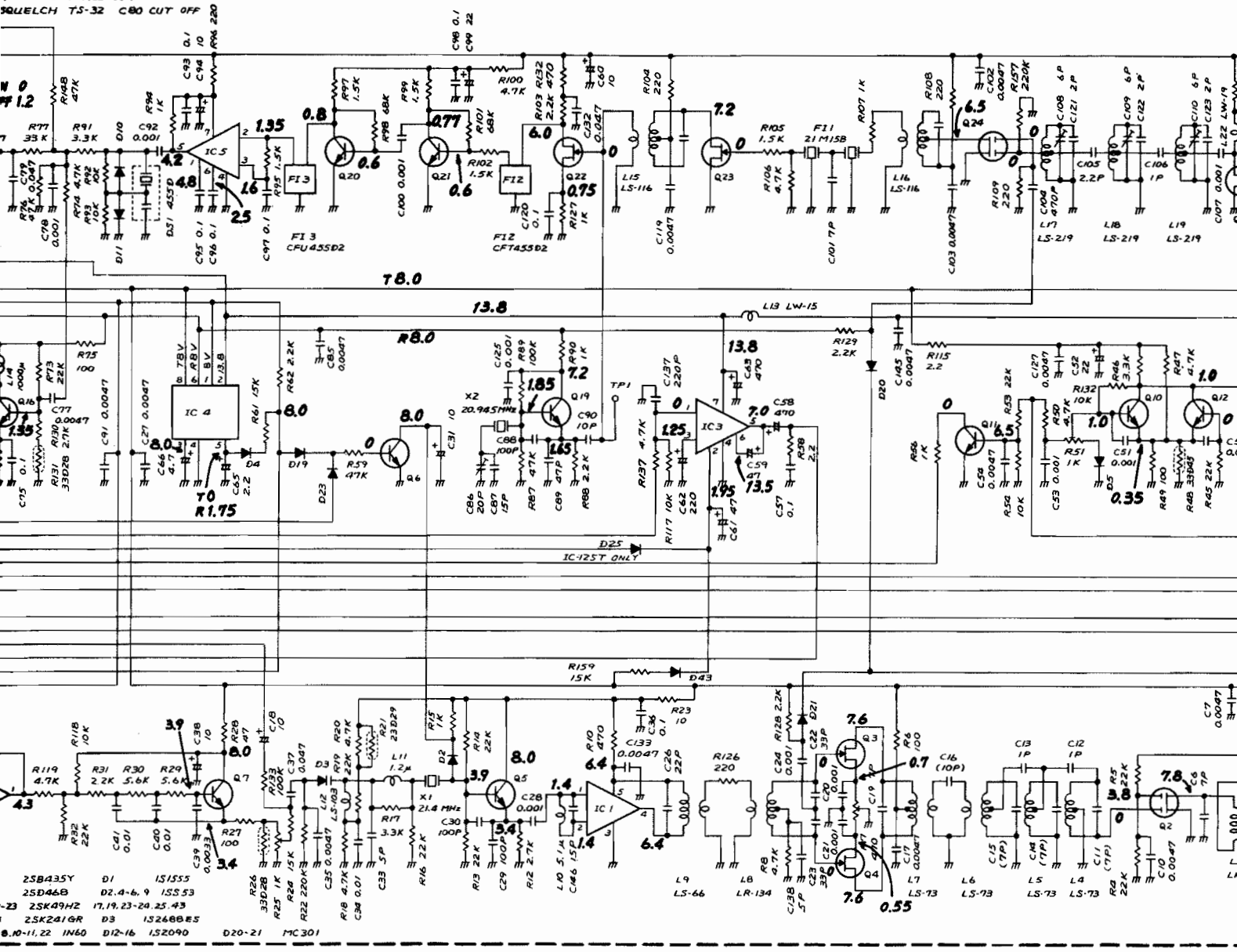


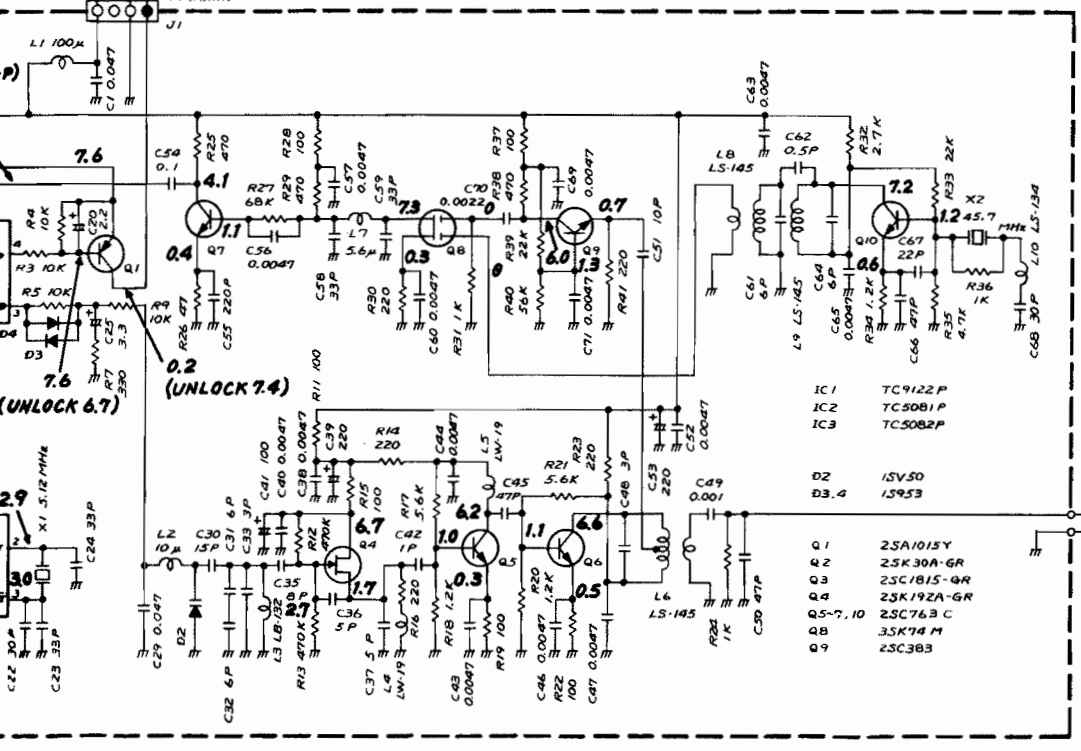
5 TONE UNIT



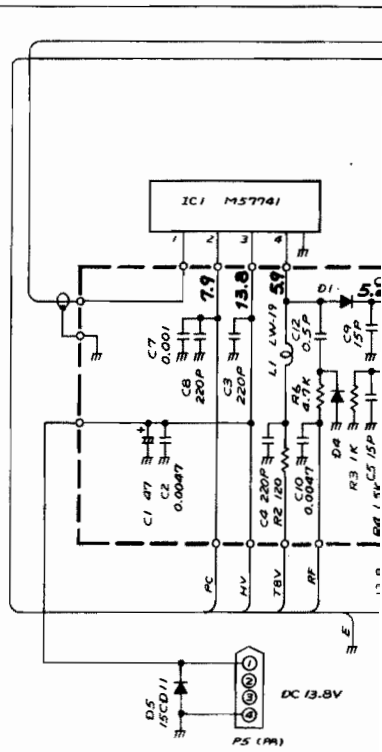
SECTION 10 VOLTAGE CHART

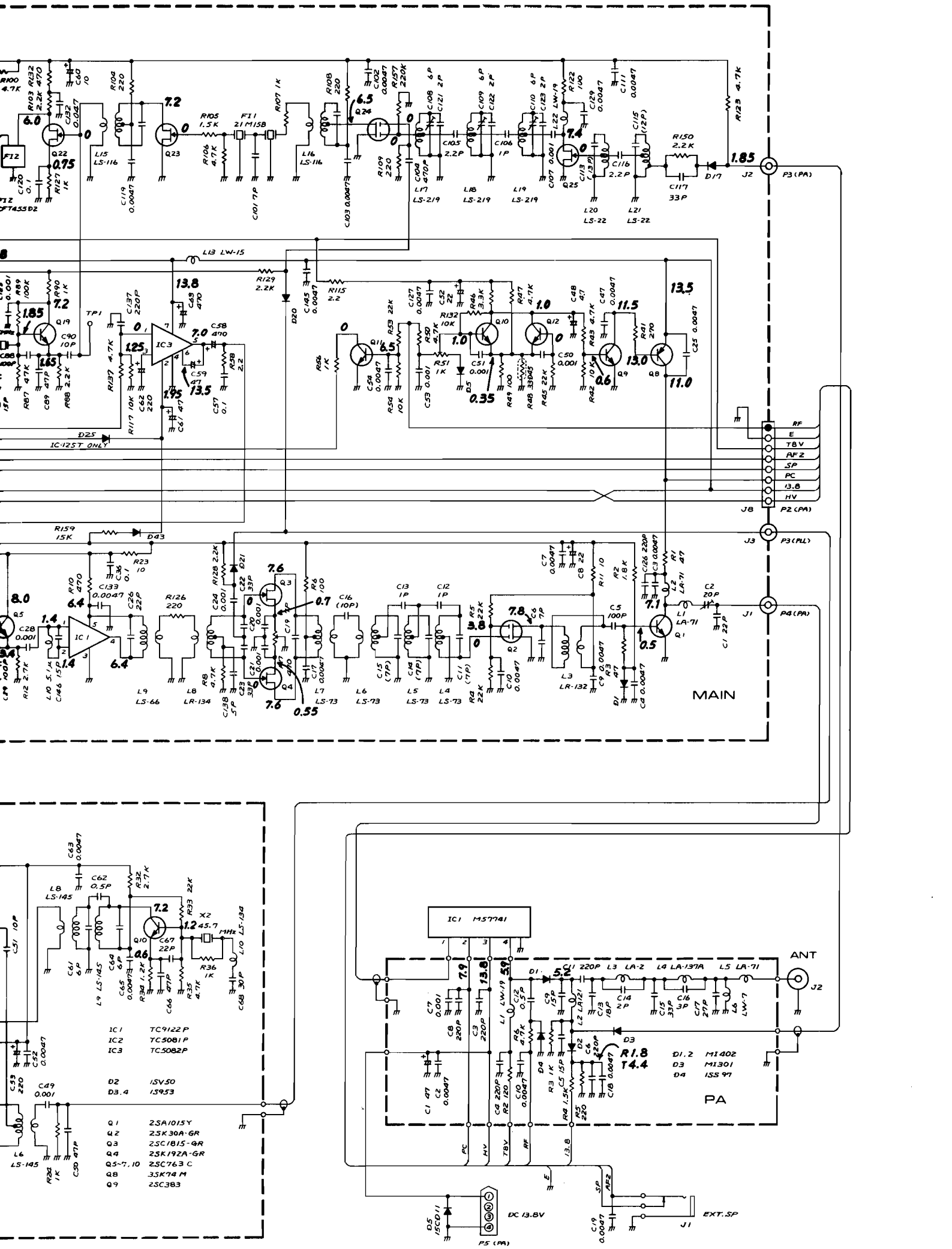



ASE OF INSTALLTION
SQUELCH TS-32 C80 CUT OFF
T8.0
13.8
R8.0
IC 4
IC3
IC 5
X2
20.945MHz
TP1
D25
IC-12ST ONLY
FI 3
CFU455D2
FI2
CFT455D2
T0
R1.75
0.35
13.5


2SB435Y D1 IS1555
2SD468 D2.4-6.9 IS5S53
2SK49H2 17.19.23-24.25.43
2SK241GR D3 IS2688ES
8.10-11.22 IN60 D12-16 IS2090 D20-21 MC301
X1
21.4 MHz
L9 LS-66
L8 LR-134
L7 LS-73
L6 LS-73
L5 LS-73
L4 LS-73

P1 (MAIN)
J1
(UNLOCK 6.7)
0.2
(UNLOCK 7.4)
X1 5.12 MHz
X2 45.7 MHz
L8 LS-145
L9 LS-145
L10 LS-134
L4 LS-145
IC1 TC9122P
IC2 TC5081P
IC3 TC5082P
D2 1SV50
D3,4 1S953
Q1 2SA1015Y
Q2 2SK30A-GR
Q3 2SC1815-GR
Q4 2SK19ZA-GR
Q5~7,10 2SC763 C
Q8 3SK74 M
Q9 2SC383


IC1 M57741
DC 13.8V
PS (PA)
D5 1SCD11


MAIN
PA
IC1 M57741
IC1 TC9122P
IC2 TC5081P
IC3 TC5082P
D2 1SV50
D3,4 1S953
Q1 2SA1015Y
Q2 2SK30A-GR
Q3 2SC1815-GR
Q4 2SK192A-GR
Q5-7,10 2SC763C
Q8 3SK74M
Q9 2SC383
D1,2 M1402
D3 M1301
D4 1SS97
ANT
J2
P3(PA)
P2(PA)
P3(PLL)
P4(PA)
J1
P5(PA)
DC 13.8V
EXT.SP
RF
E
TBV
AFZ
SP
PC
13.8
HV
IC-12ST ONLY

SECTION 11 TROUBLESHOOTING

11 - 1 LOCK FAILURE OR WRONG FREQUENCY

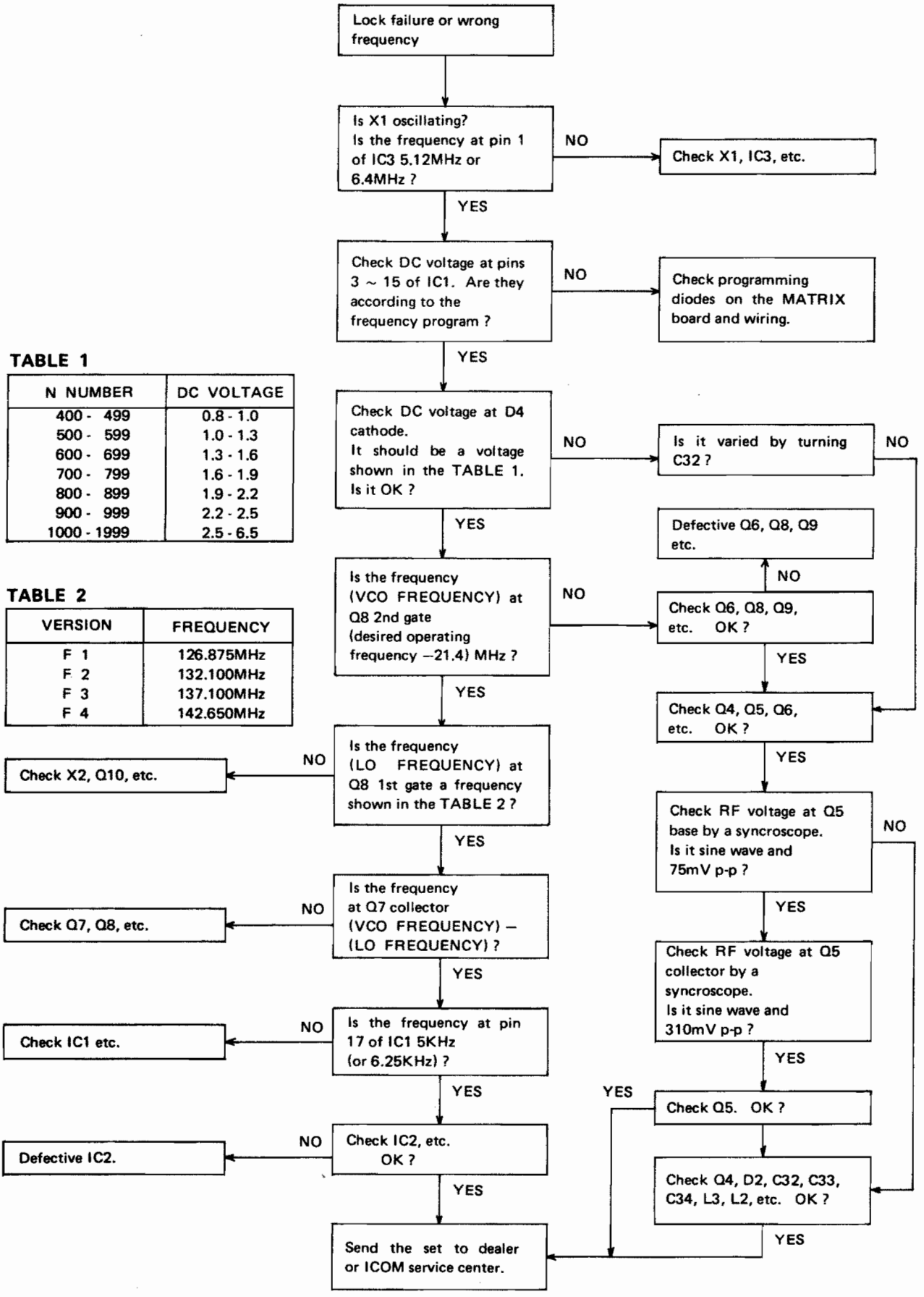


TABLE 1

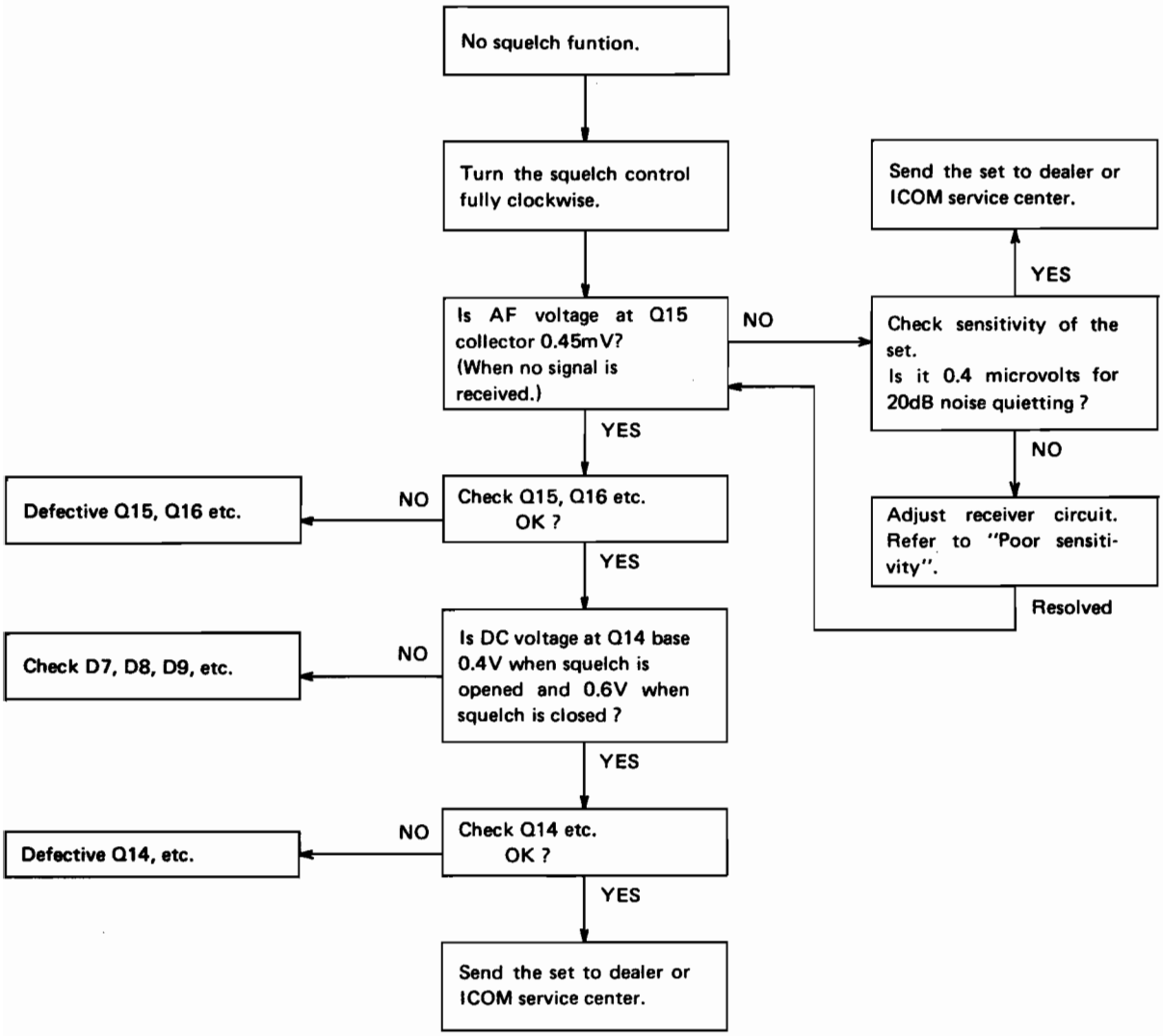
N NUMBER	DC VOLTAGE
400 - 499	0.8 - 1.0
500 - 599	1.0 - 1.3
600 - 699	1.3 - 1.6
700 - 799	1.6 - 1.9
800 - 899	1.9 - 2.2
900 - 999	2.2 - 2.5
1000 - 1999	2.5 - 6.5

TABLE 2

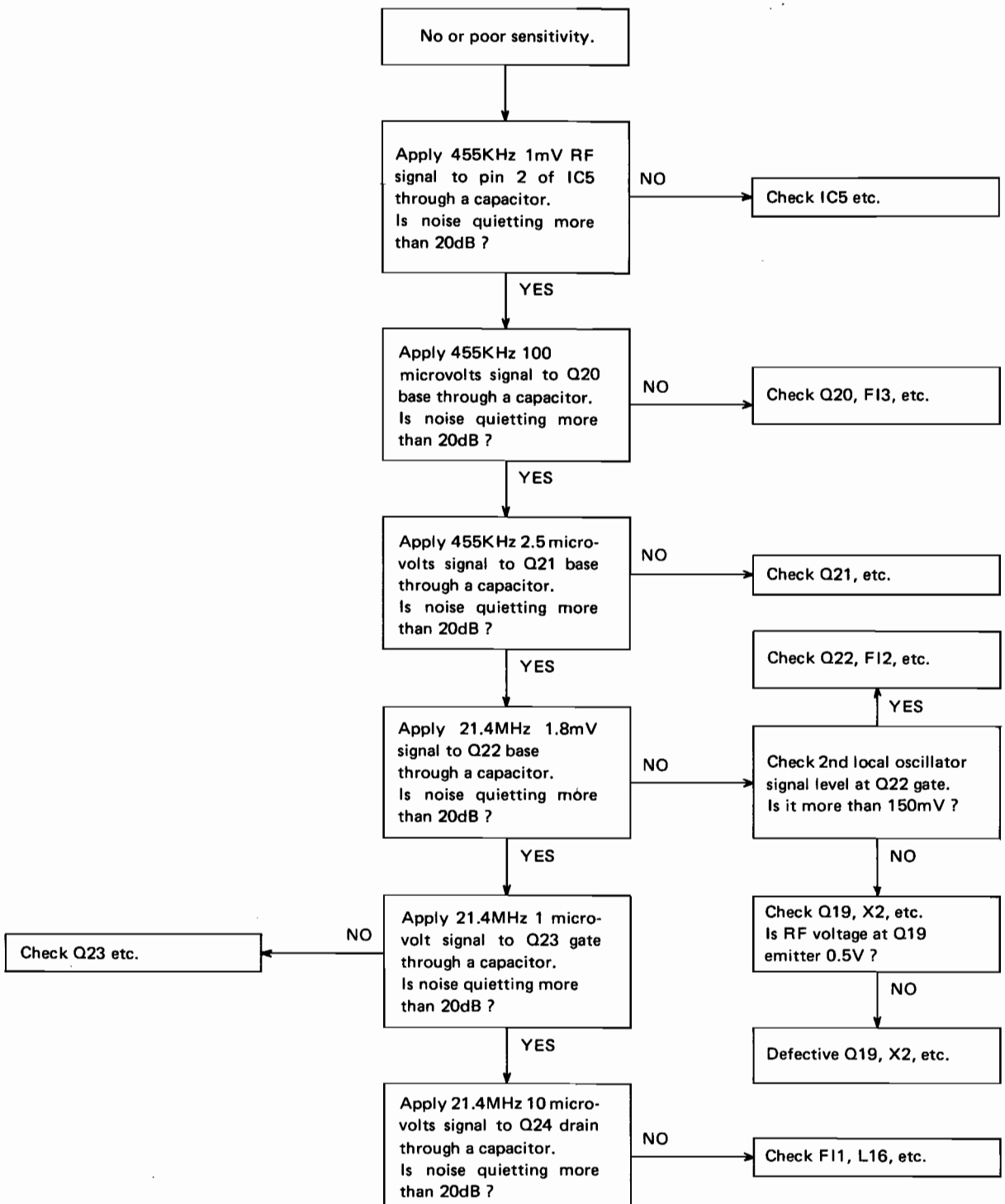
VERSION	FREQUENCY
F 1	126.875MHz
F 2	132.100MHz
F 3	137.100MHz
F 4	142.650MHz

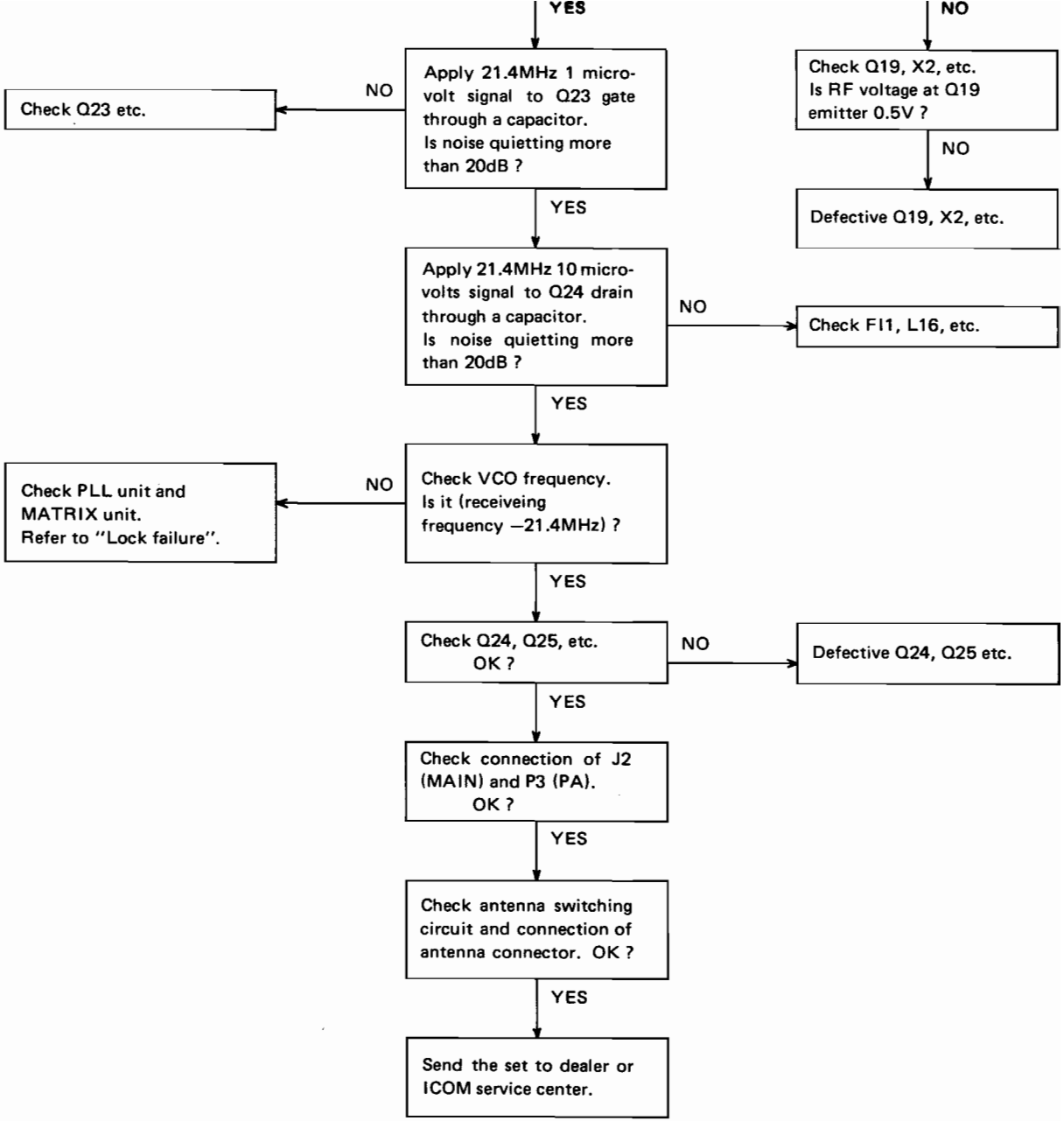
11 - 2 NO AUDIO OUTPUT

11 - 3 NO SQUELCH FUNCTION

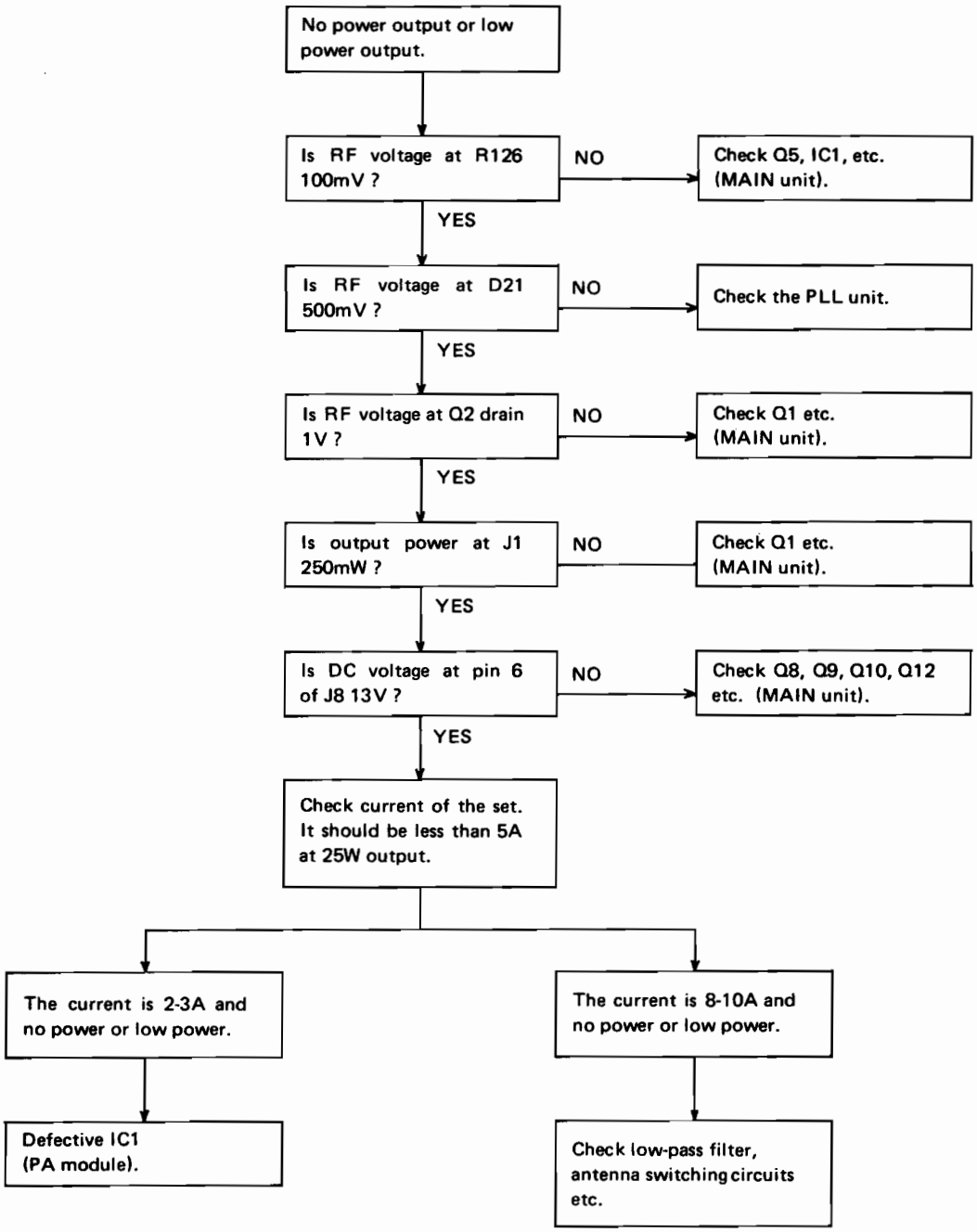


11 - 4 POOR SENSITIVITY

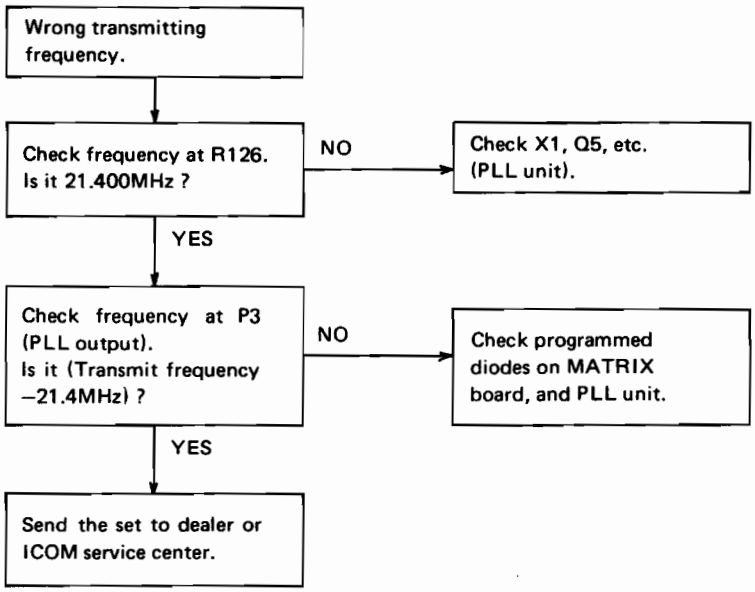



YES
NO
Check Q19, X2, etc.
Is RF voltage at Q19 emitter 0.5V ?
NO
Defective Q19, X2, etc.
Apply 21.4MHz 1 micro-volt signal to Q23 gate through a capacitor.
Is noise quietting more than 20dB ?
NO
Check Q23 etc.
YES
Apply 21.4MHz 10 micro-volts signal to Q24 drain through a capacitor.
Is noise quietting more than 20dB ?
NO
Check FI1, L16, etc.
YES
Check VCO frequency.
Is it (receiveing frequency −21.4MHz) ?
NO
Check PLL unit and MATRIX unit.
Refer to "Lock failure".
YES
Check Q24, Q25, etc.
OK ?
NO
Defective Q24, Q25 etc.
YES
Check connection of J2 (MAIN) and P3 (PA).
OK ?
YES
Check antenna switching circuit and connection of antenna connector. OK ?
YES
Send the set to dealer or ICOM service center.

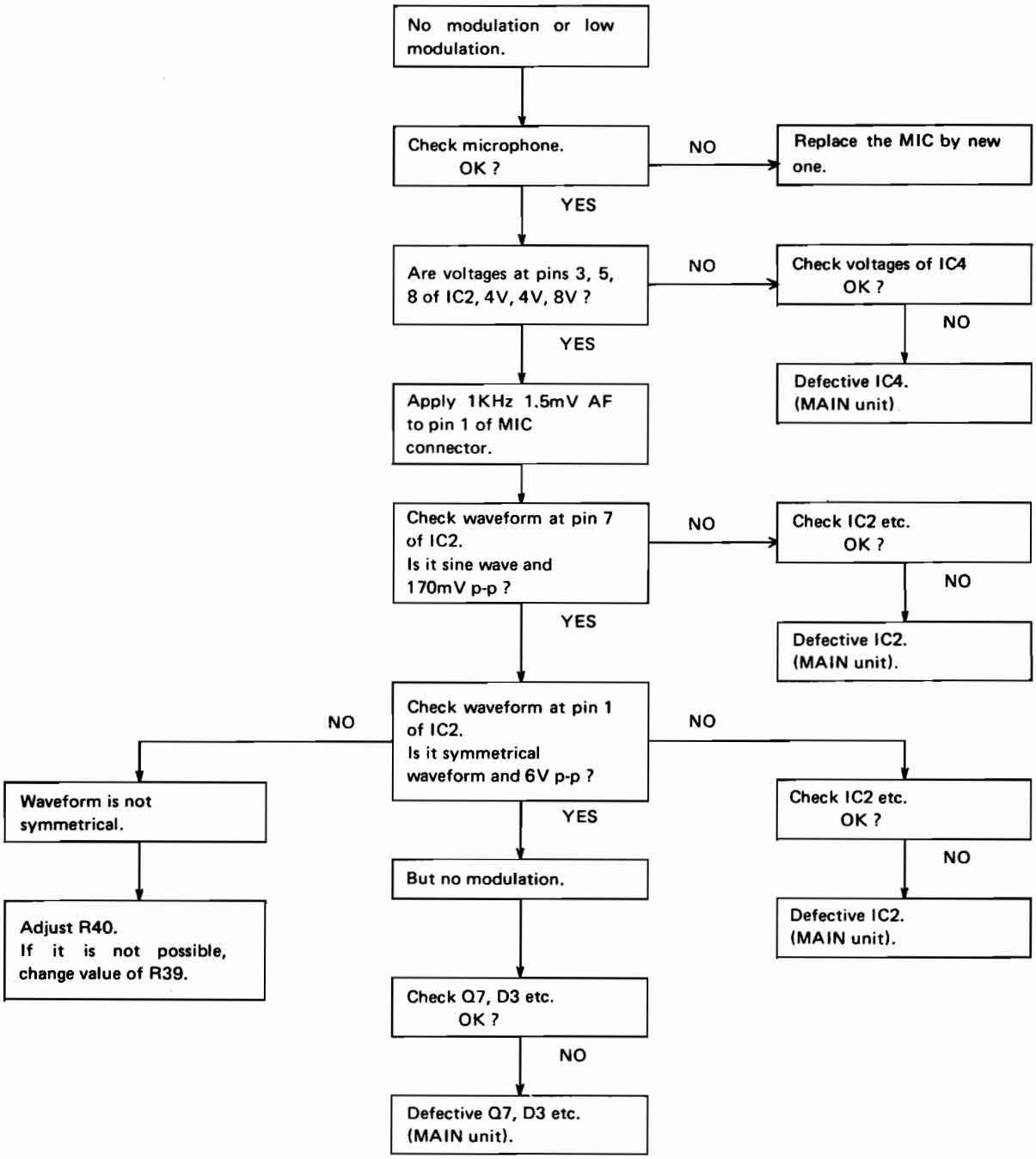
11 - 5 NO POWER OUTPUT



11 - 6 WRONG TX FREQUENCY



11 - 7 NO MODULATION

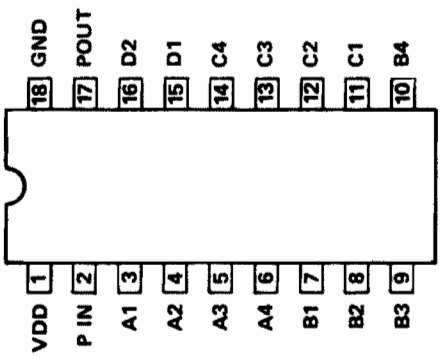


TC-9122P (BCD PROGRAMMABLE COUNTER)

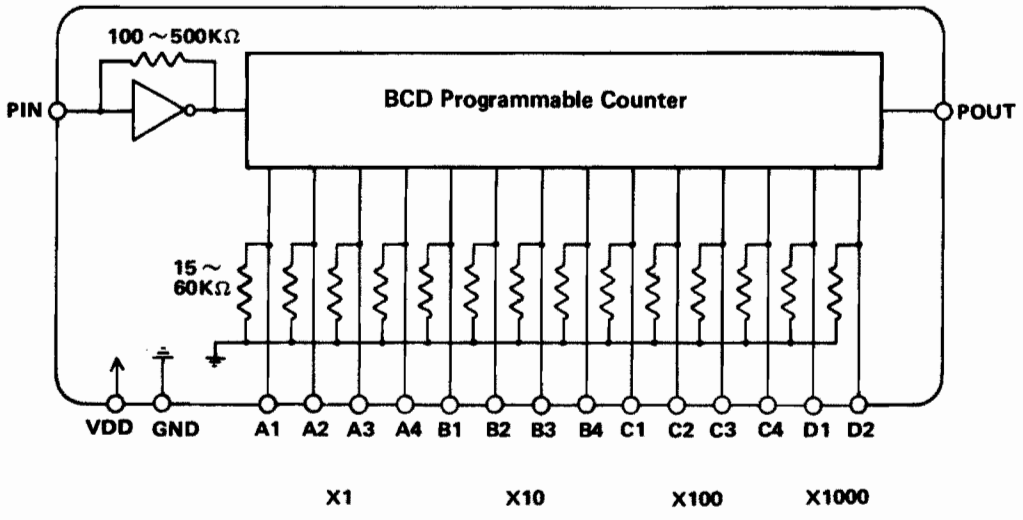
MAXIMUM RATINGS (Ta = 25°C)

SYMBOL	DESCRIPTION	RATINGS	UNIT
V_{DD}	Supply Voltage	10	V
V_{IN}	Input Voltage	$-0.3 \sim V_{DD} +0.3$	V
T_{OPR}	Operating Temperature	$-30 \sim 75$	°C
T_{STR}	Storage Temperature	$-55 \sim 125$	°C

PIN CONNECTION



BLOCK DIAGRAM

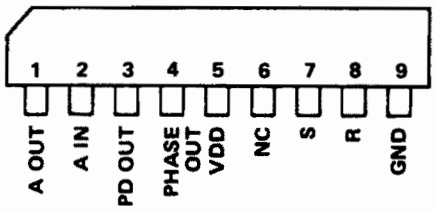


TC-5081 (PHASE COMPARATOR)

MAXIMUM RATINGS (Ta = 25°C)

SYMBOL	DESCRIPTION	RATINGS	UNIT
V_{DD}	Supply Voltage	10	V
V_{IN}	Input Voltage	−0.3 ~ V_{DD} +0.3	V
T_{OPR}	Operating Temperature	−30 ~ 75	°C
T_{STR}	Storage Temperature	−55 ~ 125	°C

PIN CONNECTION

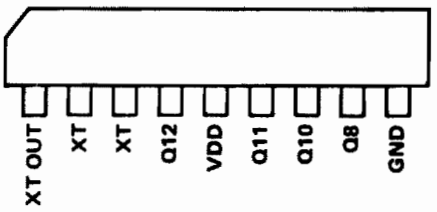


TC-5082 (OSCILLATOR AND 10 STAGE DIVIDER)

MAXIMUM RATINGS (Ta = 25°C)

SYMBOL	DESCRIPTION	RATINGS	UNIT
V_{DD}	Supply Voltage	10	V
V_{IN}	Input Voltage	−0.3 ~ V_{DD} +0.3	V
T_{OPR}	Operating Temperature	−30 ~ 75	°C
T_{STR}	Storage Temperature	−55 ~ 125	°C

PIN CONNECTION

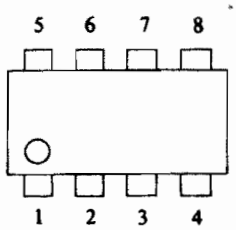


NJM4558D (DUAL LOW NOISE AMP.)

MAXIMUM RATING

ITEM	SYMBOL	RATING	UNIT
Power supply voltage	V_{DD}	18	V
Input voltage	V_{IN}	15	V
Operation temperature range	T_{OPT}	−20 ~ +75	°C
Storage temperature range	T_{STG}	−40 ~ +125	°C

PIN CONNECTION

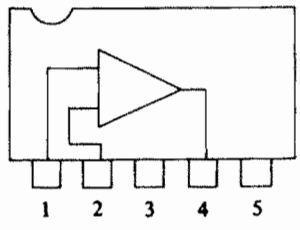


BA401 (FM/IF LIMITER)

MAXIMUM RATING

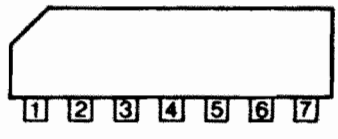
ITEM	SYMBOL	RATING	UNIT
Power supply voltage	V_{CC}	15	V
Output voltage	V_{OUT}	24	V
Input voltage	V_{IN}	±3	V
Operation temperature range	T_{OPR}	−25 ~ +75	°C
Storage temperature range	T_{STG}	−55 ~ +125	°C

BLOCK DIAGRAM



μPC577H (FM-IF AMPLIFIER)

PIN CONNECTION



MAXIMUM RATING

ITEM	SYMBOL	RATING	UNIT
Power supply voltage	V_{CC}	15	V
Terminal-terminal voltage	V_{IN}	±3.0	V
Permissible Dissipation	P_D	300	mW
Operation temperature	T_{OPT}	−20 ~ +75	°C
Storage temperature	T_{STG}	−40 ~ +125	°C

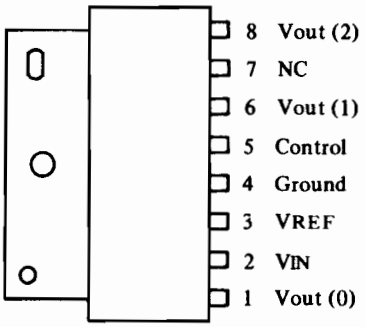
MB3756 (VOLTAGE REGULATOR W/OUTPUT-SELECTOR)

MAXIMUM RATINGS

ITEM	SYMBOL	RATING	UNIT
Power supply voltage	V_{IN}	18	V
Power dissipation	P_D	1*	W
		4**	W
Operation temperature	T_{OP}	−30 ~ + 80	°C
Storage temperature	T_{STG}	−55 ~ +150	°C

*NO Heat Sink TA ≦ 70°C
**Infinite Heat Sink TA ≦ 70°C

PIN CONNECTION



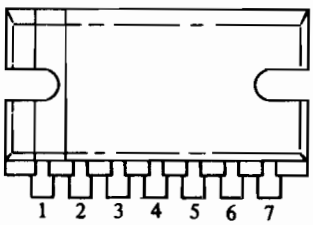
μPC1181H3 (5.8W AF POWER AMPLIFIER)

MAXIMUM RATINGS

ITEM	SYMBOL	RATING	UNIT
Power supply voltage (surge)	V_{CC} 1 (200mS)	40	V
Power supply voltage (no-signal)	V_{CC} 1	25	V
Power supply voltage (operation)	V_{CC} 2	18*	V
Circuitry current	I_{CC} (peak)	45	A
Permissible Dissipation	P_D	12	W
Operation temperature	T_{OPR}	−30 ~ +75*	°C
Storage temperature	T_{STG}	−40 ~ +125	°C

*With 100mm x 100mm x 1mm aluminum heat sink

PIN CONNECTION



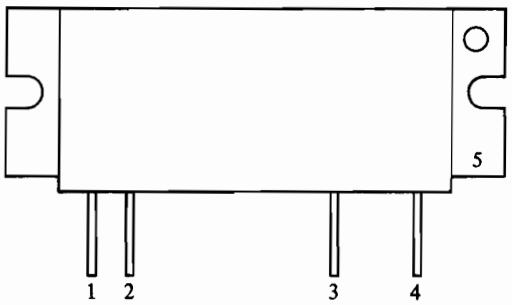
1. Input
2. Ripple filter
3. N. F. B.
4. Ground
5. Output
6. Bootstrap
7. Vcc

M57741 (VHF POWER AMPLIFIER)

MAXIMUM RATING (Ta = 25°C)

ITEM	SYMBOL	RATING	UNIT
Power supply voltage	Vcc	17	V
Consumption current	Icc	7	A
RF Input power	PIN	0.5	W
RF output power	Po	35	W
Operation case temperature	T(COP)	−30 ~ +110	°C
Storage temperature	TSTG	−40 ~ +110	°C

PIN CONNECTION



1. RF Input
2. Driving stage Power supply
3. PA stage Power supply
4. RF Output
5. Fin (Ground)

FX407/507/607 (5-TONE SEQUENTIAL CODE TRANSCEIVERS)

MAXIMUM RATINGS

Max. voltage between any pin and +Ve supply. (Pin 33) . . . . . –20V & +0.3V

Operating temperature range . . . . . –30°C to +85°C

Storage temperature range. . . . . –55°C to +125°C

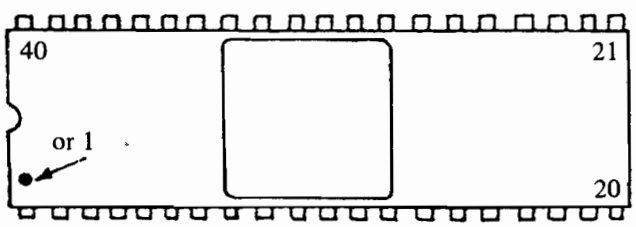
Device dissipation. (at 20°C ambient temperature) 400mW

Characteristics

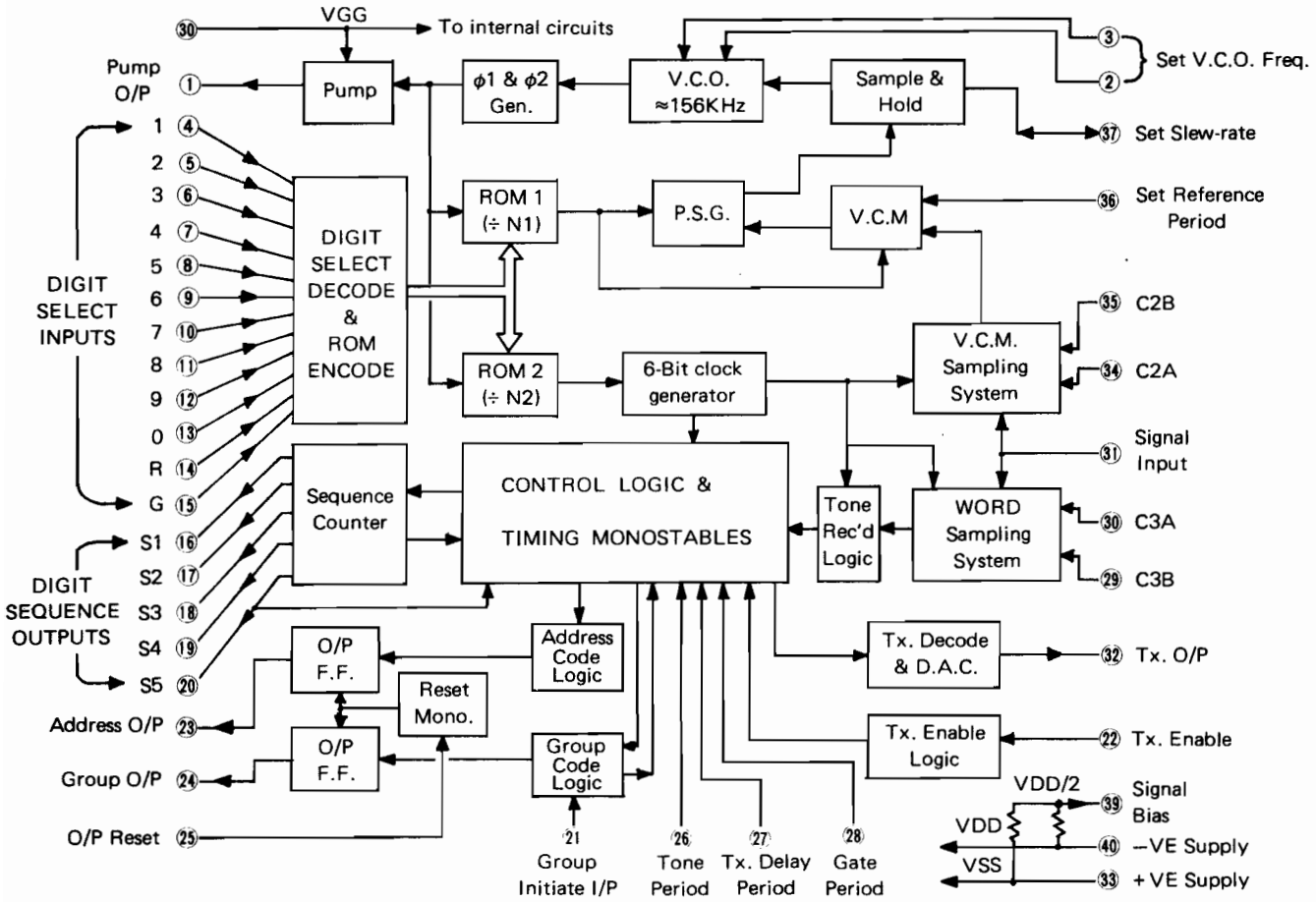
NOTE: Due to AC signal coupling either supply polarity may be "ground".

Symbol	Parameter	Notes		Min	Typ	Max	Units
Vs	Supply voltage	Operating range		10	12	15	V
Is	Supply current	Total, excluding external loads			12		mA
	Signal input	Tone amplitude range		0.05		1.0	V. (r.m.s.)
		Signal + noise amplitude				2.0	V. (r.m.s.)
	Signal to noise ratio Noise BW = 3KHz	Operating S/N for specified code timing (in receive mode).			–6		dB
		Use longer tones and increase R'in. C3			–18		dB
BW (407A/S)	Bandwidth 0dB i/p	100% decode		3			%
	Bandwidth +24dB i/p	0% decode				6	%
BW (507A/S)	Bandwidth 0dB i/p	100% decode		4			%
	Bandwidth +24dB i/p	0% decode				9	%
BW (607N)	Bandwidth 0dB i/p	100% decode		4			%
	Bandwidth +24dB i/p	0% decode				9	%
	Frequency Stability	In transmit & receive	vs supply		0.05		%/%
			vs T'amb.		0.005	0.015	%/°C

PIN CONNECTION



FX407/507/607 BLOCK DIAGRAM



TONE FREQUENCIES

The FX-407, 507 and FX-607 are similar circuits differing in the internal division factors selected by the Digit Select inputs. The tone frequency index of each type is given below.

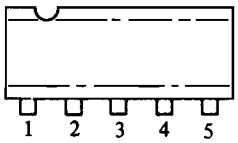
PIN No	4	5	6	7	8	9	10	11	12	13	14	15
DIGIT.	1	2	3	4	5	6	7	8	9	0	R	G
	Type FX-407 based on C.C.I.R. tone frequencies.											
Hz	1121	1200.5	1278	1357	1444	1541	1638	1747	1856.3	1983	2113	2401
	Type FX-507 based on Z.V.E.I. tone frequencies.											
Hz	1057.5	1163	1269	1402	1530	1665.5	1828	2001	2203	2403	2601	2796
	Type FX-607 based on NATEL tone frequencies.											
Hz	631	697	770	852	941	1040	1209	1336	1477	1633	1805	1995

BA634 (T TYPE FLIP-FLOP WITH RESET)

MAXIMUM RATINGS

ITEM	SYMBOL	RATING	UNIT
Power supply voltage	V_{EE}	−16	V
Permissible Dissipation	Pd	150	mW
Operation temperature range	TOPR	−10 ~ +60	°C
Storage temperature range	TSTG	−55 ~ +125	°C

PIN CONNECTION



1. Input
2. Output
3. VEE
4. Ground
5. Reset

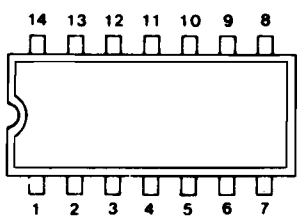
TC4011UBP (QUADRUPLE 2-INPUT NAND GATE)

TC4066B (QUAD BILATERAL SWITCH)

MAXIMUM RATING

ITEM	SYMBOL	RATING	UNIT
Power supply voltage	V_{DD}	Vss −0.5 ~ Vss +20	V
Input voltage	V_{IN}	Vss −0.5 ~ V_{DD} +0.5	V
Output voltage	V_{OUT}	Vss −0.5 ~ V_{DD} +0.5	V
Input current	I_{IN}	±10	mA
Permissible Dissipation	PD	300	mW
Storage temperature range	TSTG	−65 ~ 150	°C
Lead temperature/time	TSOL	260°C · 10Sec.	

PIN CONNECTION



SECTION 13 PARTS LIST

[EF PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
IC1	IC BA634 (IC-125T/TM only)	
Q1	Transistor 2SC1815GR (IC-125) 2SC945 (P.Q.R) (IC-125T/TM)	
D1	LED GL-9PR2	
D2	LED PY5531K (IC-125) SPB-26MUW (IC-125T/TM)	
D3	LED GL-9PG2	
D4	Diode 1SS53	
D5	Diode 1SS53 (IC-125T/TM only)	
D6	Diode 1SS53 (IC-125T/TM only)	
R1	Resistor 1K R25 (IC-125) 1K ELR25 (IC-125T/TM)	
R2	Resistor 10K ELR25 (IC-125T/TM) 10K R10 (IC-125)	
R3	Resistor 470 ELR25 (IC-125T/TM) 1K R25 (IC-125)	
R4	Variable DM10A 10KB-10A (VOLUME/SQUELCH)	
R5	Resistor 1K R10	
R6	Resistor 1K R10	
R7	Resistor 220 ELR25 (IC-125T/TM only)	
R8	Resistor 470 ELR25 (IC-125T/TM only)	
R9	Resistor 1K ELR25 (IC-125T/TM only)	
R10	Resistor 1K ELR25 (IC-125T/TM only)	
R11	Resistor 220 ELR25 (IC-125T/TM only)	
R12	Resistor 100K ELR25 (IC-125T/TM only)	
R13	Resistor 100K ELR25 (IC-125T/TM only)	
R14	Resistor 22K ELR25 (IC-125T/TM only)	
R15	Resistor 10 R10 (IC-125T/TM only)	
R16	Resistor 470K ELR25 (IC-125T/TM only)	
R17	Resistor 100 R25 (IC-125T/TM only)	
C1	Ceramic 0.001 50V B	
C2	Ceramic 0.001 50V B (IC-125 only)	
C3	Ceramic 0.001 50V B	
C4	Ceramic 0.001 50V B	
C5	Ceramic 0.001 50V B	
C6	Ceramic 0.001 50V B	
C7	Electrolytic 33 16V (IC-125T/TM only)	

[EF PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
C8	Barrier Lay 0.01 50V (IC-125T/TM only)	
C9	Mylar 0.022 50V (IC-125T/TM only)	
C10	Barrier Lay 0.1 16V (IC-125T/TM only)	
C11	Ceramic 0.0047 50V B (IC-125T/TM only)	
C12	Ceramic 0.001 50V B (IC-125T/TM only)	
S1	Switch SUF32 (IC-125T/TM) SUF12 (IC-125) (POWER SW)	
S2	Rotary Switch SRN-1025 (CHANNEL SW)	
P1	Connector TL-25H-10-B1	
P2	Connector TL-25H-05-B1	
P3	Connector TL-25H-12-B1	
P4	Connector TL-25H-04-B1	
P5	Connector TL-25H-07-B1	
P6	Connector TL-25H-09-B1 (IC-125T/TM only)	
J1	Connector FM-14RS-7H (MIC)	
	Speaker 6D01S	
	PC Board B-605 (IC-125)	
	PC Board B-564 (IC-125T/TM)	
	PC Board B-558B (IC-125T/TM only)	

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
IC1	IC BA401	2A
IC2	IC NJM4558D	1C
IC3	IC μPC1181H	4E
IC4	IC MB3756	2E
IC5	IC μPC577H	2B
FI1	MC Filter 21M15B	5B
FI2	Ceramic Filter CFT455D2	4B
FI3	Ceramic Filter CFU455D2	3B
DS1	Ceramic Discriminator 455D	2C
X1	Xtal HC-18/u 21.40MHz	1B
X2	Xtal HC-18/u 20.945MHz	4B
Q1	Transistor 2SC2053	5B
Q2	FET 2SC74K	5A
Q3	FET 2SK241Y	3A
Q4	FET 2SK241Y	3A
Q5	Transistor 2SC945P	1A
Q6	Transistor 2SC945P	2B

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
Q7	Transistor 2SC945R	2C
Q8	Transistor 2SB435Y	4E
Q9	Transistor 2SD468	4D
Q10	Transistor 2SC945P	4D
Q11	Transistor 2SC945P (IC-125 only)	3C
Q12	Transistor 2SC945P	4D
Q14	Transistor 2SC945P	3E
Q15	Transistor 2SC945P	3D
Q16	Transistor 2SC945P	3C
Q17	Transistor 2SC945P	2D
Q18	Transistor 2SC945P	2D
Q19	Transistor 2SC945P	4B
Q20	Transistor 2SC945P	3B
Q21	Transistor 2SC945P	3B
Q22	FET 2SK49H2	4B
Q23	FET 2SK49H2	5B
Q24	FET 3SK48	5C
Q25	FET 2SK241GR	5E
D1	Diode 1S1555	5B
D2	Diode 1SS53	1A
D3	Varactor diode 1S2688ES	1B
D4	Diode 1SS53	2E
D5	Diode 1SS53	4C
D6	Diode 1SS53	2E
D7	Diode 1N60	3D
D8	Diode 1N60	3D
D9	Diode 1SS53	3E
D10	Diode 1N60	3C
D11	Diode 1N60	2C
D17	Diode 1SS53	5E
D19	Diode 1SS53	2D
D20	Diode MC301	4C
D21	Diode MC301	4C
D23	Diode 1SS53	3E
D24	Diode 1SS53	3E
D25	Diode 1SS53 (IC-125T/TM only)	4E
D43	Diode 1SS53	3E
L1	Coil LA-71	5B
L2	Coil LA-71	5B
L3	Coil LR-132	5B
L4	Coil LS-73	5A
L5	Coil LS-73	5A
L6	Coil LS-73	4A
L7	Coil LS-73	4A
L8	Coil LR-134	2A
L9	Coil LS-66	2A
L10	Choke coil LB4 5R1J	2A
L11	Choke coil L4-1R2	1B
L12	Coil LS-103	2B
L13	Choke coil LW-15	4E
L14	Choke coil L4-102	3C
L15	Coil LS-116	5B
L16	Coil LS-116	5C
L17	Coil LS-219	5C
L18	Coil LS-219	5D
L19	Coil LS-219	5D
L20	Coil LS-22	5E
L21	Coil LS-22	5E
L22	Choke coil LW-19	5D

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
C1	Ceramic 22P 50V SL	5C
C2	Trimmer CV05D02001	5B
C3	Ceramic 0.0047 50V B	5B
C4	Ceramic 0.0047 50V B	5B
C5	Ceramic 100P 50V SL	5B
C6	Ceramic 7P 50V SL	5A
C7	Ceramic 0.0047 50V B	4A
C8	Electrolytic 22 10V	4A
C9	Ceramic 0.0047 50V B	5A
C10	Ceramic 0.0047 50V B	5A
C11	Ceramic 7P/7P/5P/5P 50V CH	5A
C12	Ceramic 1P 50V CH	5A
C13	Ceramic 1P 50V CH	4A
C14	Ceramic 7P/7P/5P/5P 50V CH	5A
C15	Ceramic 7P/7P/3P/3P 50V CH	4A
C16	Ceramic 10P/10P/3P/3P 50V CH	4A
C17	Ceramic 0.0047 50V B	3A
C18	Electrolytic 10 16V (IC-125 only)	2B
C19	Ceramic 7P 50V CH	3A
C20	Ceramic 0.001 50V B	3A
C21	Ceramic 0.001 50V B	3A
C22	Ceramic 33P 50V SL	3A
C23	Ceramic 33P 50V SL	3A
C24	Ceramic 0.001 50V B	4C
C25	Ceramic 0.0047 50V B	4E
C26	Ceramic 22P 50V SL	2A
C27	Ceramic 0.0047 50V B	2E
C28	Ceramic 0.001 50V B	1A
C29	Ceramic 100P 50V XL	1A
C30	Ceramic 100P 50V XL	1A
C31	Electrolytic 10 16V	2B
C33	Ceramic 5P 50V CH	1B
C34	Mylar 0.01 50V K	2B
C35	Mylar 0.0047 50V K	1B
C36	Barrier Lay 0.1 25V	3A
C37	Barrier Lay 0.047 25V	1B
C38	Electrolytic 10 16V	2C
C39	Mylar 0.0033 50V K	2C
C40	Mylar 0.01 50V K	1C
C41	Mylar 0.01 50V K	1C
C42	Mylar 0.1 50V K	2D
C43	Electrolytic 4.7 25V	2C
C45	Electrolytic 10 16V	1C
C46	Mylar 0.01 50V K	2D
C47	Ceramic 0.0047 50V B	4D
C48	Electrolytic 4.7 25V	4C
C50	Ceramic 0.001 50V B	4D
C51	Ceramic 0.001 50V B	4C
C52	Electrolytic 22 10V	4C
C53	Ceramic 0.001 50V B	4D
C54	Ceramic 0.0047 50V B (IC-125 only)	3C
C57	Mylar 0.1 50V K	3E
C58	Electrolytic 470 10V	4E
C59	Electrolytic 47 10V	4E
C60	Electrolytic 10 16V	4B
C61	Electrolytic 47 10V	3E
C62	Electrolytic 220 16V	3E
C63	Electrolytic 470 16V	2E
C64	Electrolytic 0.22 50V	2E

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
C65	Electrolytic 2.2 50V	3E
C66	Electrolytic 4.7 25V	2E
C67	Electrolytic 10 16V	2E
C68	Electrolytic 2.2 50V	3E
C69	Electrolytic 10 16V	3D
C70	Electrolytic 4.7 25V	3D
C71	Barrier Lay 0.047 35V	3D
C72	Mylar 0.0022 50V K	3D
C73	Electrolytic 47 10V	3D
C74	Mylar 0.056 50V K	3D
C75	Barrier Lay 0.1 25V	3D
C76	Deleted	
C77	Mylar 0.0047 50V K	3C
C78	Mylar 0.001 50V K	2C
C79	Mylar 0.047 50V K	2C
C80	Mylar 0.0047 50V K	2C
C81	Electrolytic 4.7 25V	2D
C82	Mylar 0.022 50V K	2D
C83	Mylar 0.022 50V K	2D
C84	Electrolytic 10 16V	2D
C85	Ceramic 0.0047 50V B	2E
C86	Trimmer CV05D2001	4B
C87	Dip Mica 15P 50V	4B
C88	Dip Mica 100P 50V	5B
C89	Dip Mica 47P 50V	5B
C90	Ceramic 10P 50V SL	4B
C91	Ceramic 0.0047 50V B	2D
C92	Mylar 0.001 50V K	3B
C93	Barrier Lay 0.1 25V	2B
C94	Electrolytic 10 16V	2B
C95	Barrier Lay 0.1 25V	2B
C96	Barrier Lay 0.1 25V	2B
C97	Barrier Lay 0.1 25V	3B
C98	Barrier Lay 0.1 25V	3B
C99	Electrolytic 22 16V	3B
C100	Ceramic 0.001 50V B	3B
C101	Ceramic 7P 50V SL	5B
C102	Ceramic 0.0047 50V B	5C
C103	Ceramic 0.0047 50V B	5C
C104	Ceramic 470P 50V	5C
C105	Cylinder 2.2P 50V	5D
C106	Cylinder 1P 50V	5D
C107	Ceramic 0.001 50V B	5D
C108	Trimmer CV05A0601	5C
C109	Trimmer CV05A0601	5D
C110	Trimmer CV05A0601	5D
C111	Ceramic 0.0047 50V B	5E
C113	Ceramic 12P/10P/8P/8P 50V CH	5E
C115	Ceramic 15P/12P/10P/10P 50V CH	5E
C116	Cylinder 2.2P 50V	5E
C117	Ceramic 33P 50V SL	5E
C119	Ceramic 0.0047 50V B	5B
C120	Barrier Lay 0.1 25V	4A
C121	Ceramic 2P 50V SL	5D
C122	Ceramic 2P 50V SL	5D
C123	Ceramic 2P 50V SL	5D
C125	Ceramic 0.001 50V B	4B
C126	Ceramic 220P 50V SL	5B
C127	Ceramic 0.0047 50V B	
C128	Deleted	
C129	Ceramic 0.0047 50V B	5E
C132	Barrier Lay 0.047 25V	4B

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
C133	Ceramic 0.0047 50V B	2A
C137	Ceramic 220P 50V SL	3E
C138	Ceramic 5P 50V SL	3A
C143	Ceramic 6P 50V SL	5C
C145	Ceramic 0.0047 50V B	4D
C146	Ceramic 15P 50V SL	1A
R1	Resistor 47 ELR25	5B
R2	Resistor 1.8K ELR25	5A
R3	Resistor 47 ELR25	5B
R4	Resistor 22K ELR25	5A
R5	Resistor 22K R25	5A
R6	Resistor 100 R25	3A
R7	Trimmer H0651A 470	3A
R8	Resistor 4.7K R25	2A
R10	Resistor 470 R25	2A
R11	Resistor 10 ELR25	5A
R12	Resistor 2.7K ELR25	1A
R13	Resistor 22K ELR25	1A
R14	Resistor 22K ELR25	1A
R15	Resistor 1K ELR25	2A
R16	Resistor 22K ELR25	1B
R17	Resistor 3.3K ELR25	1B
R18	Resistor 4.7K ELR25	2B
R19	Resistor 22K ELR25	2B
R20	Resistor 4.7K ELR25	2A
R21	Thermistor 23D29	2A
R22	Resistor 220K ELR25	1B
R23	Resistor 10 R25	3A
R24	Resistor 15K ELR25	1B
R25	Trimmer H0651A 1K	1C
R26	Thermistor 33D28	1C
R27	Resistor 100 ELR25	1C
R28	Resistor 47 ELR25	2C
R29	Resistor 5.6K ELR25	2C
R30	Resistor 5.6K ELR25	2C
R31	Resistor 2.2K ELR25	2C
R32	Resistor 22K ELR25	2C
R33	Resistor 220K ELR25	2C
R34	Resistor 4.7K ELR25	2C
R35	Resistor 10K ELR25	1C
R36	Resistor 47 ELR25	2C
R37	Resistor 470K ELR25	2D
R38	Resistor 4.7K ELR25	1D
R39	Resistor 10K ELR25	2D
R40	Trimmer H0651A 3.3K	2D
R41	Resistor 270 R50	4D
R42	Resistor 10K ELR25	4D
R43	Resistor 4.7K ELR25	4D
R45	Resistor 22K ELR25	4D
R46	Resistor 3.3K ELR25	4C
R47	Resistor 4.7K ELR25	4D
R48	Thermistor 35D45	4D
R49	Resistor 100 ELR25	4D
R50	Resistor 4.7K ELR25	3D
R51	Trimmer H0651A 1K	4C
R53	Resistor 22K ELR25 (IC-125 only)	3C
R56	Resistor 1K ELR25 (IC-125 only)	3C
R58	Resistor 2.2 ELR25	3E
R59	Resistor 47K ELR25 (IC-125 only)	2B
R60	Jumper JPW-02H	4D

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)			BOARD LOCATION
R61	Resistor	15K	ELR25	2E
R62	Resistor	2.2K	ELR25	2E
R63	Resistor	47K	ELR25	3D
R64	Resistor	10K	ELR25	3D
R65	Resistor	10K	ELR25	3E
R66	Resistor	22K	ELR25	3E
R67	Resistor	4.7K	ELR25	3D
R68	Resistor	1K	ELR25	3D
R69	Resistor	4.7K	ELR25	3D
R70	Resistor	22K	ELR25	3D
R72	Resistor	1K	ELR25	3C
R73	Resistor	22K	ELR25	3C
R74	Resistor	4.7K	ELR25	2C
R75	Resistor	100	ELR25	3C
R76	Resistor	47K	ELR25	2C
R77	Resistor	33K	ELR25	2C
R78	Resistor	150K	ELR25	3D
R79	Resistor	39K	ELR25	2C
R80	Resistor	1K	ELR25	2D
R81	Resistor	4.7K	ELR25	3D
R82	Resistor	4.7K	ELR25	3D
R83	Resistor	5.6K	ELR25	2D
R84	Resistor	5.6K	ELR25	2D
R85	Resistor	100	ELR25	2D
R86	Resistor	5.6K	ELR25	2D
R87	Resistor	47K	ELR25	5B
R88	Resistor	2.2K	ELR25	5B
R89	Resistor	100K	ELR25	4B
R90	Resistor	1K	ELR25	4B
R91	Resistor	3.3K	ELR25	3C
R92	Resistor	10K	ELR25	3C
R93	Resistor	10K	ELR25	2C
R94	Resistor	1K	ELR25	2B
R95	Resistor	1.5K	ELR25	2B
R96	Resistor	220	ELR25	2C
R97	Resistor	1.5K	ELR25	3B
R98	Resistor	68K	ELR25	3B
R99	Resistor	1.5K	ELR25	3B
R100	Resistor	4.7K	ELR25	3B
R101	Resistor	68K	ELR25	3B
R102	Resistor	1.5K	ELR25	3B
R103	Resistor	2.2K	ELR25	4B
R104	Resistor	220	R25	4B
R105	Resistor	1.5K	ELR25	5B
R106	Resistor	4.7K	ELR25	5B
R107	Resistor	1K	ELR25	5B
R108	Resistor	220	ELR25	5C
R109	Resistor	220	ELR25	5C
R115	Resistor	2.2	ELR25	4C
R116	Resistor	10K	ELR25	3E
R117	Resistor	10K	ELR25	1E
R118	Resistor	10K	ELR25	2C
R119	Resistor	4.7K	ELR25	2C
R120	Jumper	JPW-02H		3E
R122	Resistor	100	ELR25	5E
R123	Resistor	4.7K	ELR25	5E
R126	Resistor	220	R25	2A
R127	Resistor	1K	ELR25	4A
R128	Resistor	2.2K	R25	4C
R129	Resistor	2.2K	ELR25	5C
R130	Resistor	2.7K	ELR25	3C
R131	Thermistor	33D28		3C
R132	Resistor	470	ELR25	4B

[MAIN UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)			BOARD LOCATION
R133	Resistor	100K	ELR25	2B
		(IC-125 only)		
R136	Deleted			
R137	Resistor	4.7K	R25	1E
R138	Jumper	JPW-02A		4C
R139	Deleted			
R140	Jumper	JPW-02H		4D
R141	Jumper	JPW-02A		
		(IC-125 only)		
R142	Jumper	JPW-02H (IC-125/T)		4C
R143	Resistor	470	ELR25	
		(IC-125TM)		
R144	Jumper	JPW-02H		3D
R146	Jumper	JPW-02A		4D
R148	Resistor	4.7K	ELR25	3B
		(IC-125T/TM)		
		47K	ELR25	
		(IC-125)		
R150	Resistor	2.2K	ELR25	5E
R151	Jumper	JPW-02A		5E
R157	Resistor	220K	ELR25	5C
R159	Resistor	15K	ELR25	3E
R160	Resistor	15K	ELR25	2D
J1	Connector	TMP-J01X-V1		5B
J2	Connector	TMP-J01X-V1		5E
J3	Connector	TMP-J01X-V1		4C
J4	Connector	TL-25P-05-V1		3B
J5	Connector	TL-25P-12-V1		2E
J6	Connector	TL-25P-04-V1		3D
J7	Connector	TL-250-07-V1		2D
J8	Connector	TL-25P-08-V1		4D
J9	Connector	TL-25P-08-V1		1A
P1	Connector	TL-25H-04-B1		
CP1	Check Point	RT-01-1.0B		
		(IC-125T/TM only)		
	PC Board	B-602 E	42196	
	Heat Sink	REG. Heat Sink		
			42161	
	Shielding Board	FX-220 (B)		
			42253	
	Insulating Spacers P103 kA			
	Insulating Washer B-17			
	Grounding spring		42042	

[PLL UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)		BOARD LOCATION
IC1	IC	TC9122P	2A
IC2	IC	TC5081P	1A
IC3	IC	TC5082PL	1A
Q1	Transistor	2SA1015Y	1A
Q4	FET	2SK192A GR or 2SK19A GR	2C
Q5	Transistor	2SC763C	2C
Q6	Transistor	2SC763C	3C

[PLL UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
Q7	Transistor 2SC763C	2B
Q8	FET 3SK74M	2B
Q9	Transistor 2SC383TM	3A
Q10	Transistor 2SC763C	3B
D2	Varactor Diode 1SV50 (1) E	1C
D3	Diode 1S953	1A
D4	Diode 1S953	1A
L1	Choke coil EL0810SKI 101K	3B
L2	Choke coil 100J L4	1B
L3	Coil LB-132	1C
L4	Choke coil LW-19	2C
L5	Choke coil LW-19	2C
L6	Coil LS-145	3C
L7	Choke coil EL0810SKI 5R6K	2B
L8	Coil LS-145	3A
L9	Coil LS-145	3B
L10	Coil LS-134	3A
X1	Crystal 5.12MHz HC-43/U (5KHz increment) 6.40MHz HC-18/U (12.5KHz increment)	1B
X2	Crystal 42.2916MHz HC-43/U (150 ~ 158MHz) 44.033MHz HC-43/U (156 ~ 163MHz) 45.700MHz HC-43/U (161 ~ 168MHz) 47.550MHz HC-43/U (166 ~ 174MHz)	3A
C1	Barrier Lay 0.047 25V	3B
C2	Barrier Lay 0.1 25V	2B
C3	Ceramic 0.001 50V B	2A
C4	Ceramic 0.001 50V B	2A
C5	Ceramic 0.001 50V B	2A
C6	Ceramic 0.001 50V B	2A
C7	Ceramic 0.001 50V B	2A
C8	Ceramic 0.001 50V B	2A
C9	Ceramic 0.001 50V B	2A
C10	Ceramic 0.001 50V B	2A
C11	Ceramic 0.001 50V B	2A
C12	Ceramic 0.001 50V B	2A
C13	Ceramic 0.001 50V B	2A
C14	Ceramic 0.001 50V B	1A
C15	Ceramic 0.001 50V B	1A
C17	Ceramic 0.0047 50V B	1B
C18	Electrolytic 100 10V	1B
C19	Ceramic 0.001 50V B	1A
C20	Electrolytic 2.2 50V	1A
C21	Ceramic 15P 50V SL	1B
C22	Trimmer CV05E3001	1A
C23	Dip Mica 33P 50V	1A
C24	Dip Mica 33P 50V	1B
C25	Tantalum 3.3 16V	1B
C29	Barrier Lay 0.047 25V	1B
C30	Ceramic 15P 50V SH	1C
C31	Ceramic 6P/4P/6P/4P 50V UJ	2C
C32	Trimmer CV05A0601	1C
C33	Ceramic –/3P/–/–/ 50V UJ	1C

[PLL UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
C34	Ceramic 4P/3P/–/–/ 50V UJ	1C
C35	Ceramic 10P/10P/8P/8P 50V CH	2C
C36	Ceramic 3P 50V CH	2C
C37	Ceramic 5P 50V CH	2C
C38	Ceramic 0.0047 50V B	2C
C39	Electrolytic 220 10V	1B
C40	Ceramic 0.0047 50V B	2B
C41	Electrolytic 100 10V	2C
C42	Ceramic 1P 50V SL	2C
C43	Ceramic 0.0047 50V B	2C
C44	Ceramic 0.0047 50V B	3C
C45	Ceramic 47P 50V SL	2C
C46	Ceramic 0.0047 50V B	3C
C47	Ceramic 0.0047 50V B	3C
C48	Ceramic 3P/3P/3P/– 50V SL	3C
C49	Ceramic 0.001 50V B	3C
C50	Ceramic 47P/47P/47P/33P 50V SL	3C
C51	Ceramic 10P 50V SL	3C
C52	Ceramic 0.0047 50V B	3B
C53	Electrolytic 220 10V	3B
C54	Barrier Lay 0.1 25V	2B
C55	Ceramic 220P 50V B	2B
C56	Ceramic 0.0047 50V B	2B
C57	Ceramic 0.0047 50V B	2B
C58	Ceramic 33P 50V SL	2B
C59	Ceramic 33P 50V SL	2B
C60	Ceramic 0.0047 50V B	2B
C61	Ceramic 6P 50V SL	3A
C62	Ceramic 0.5P 50V SL	3A
C63	Ceramic 0.0047 50V B	2A
C64	Ceramic 6P 50V SL	3A
C65	Ceramic 0.0047 50V B	3A
C66	Ceramic 47P 50V SL	3A
C67	Ceramic 22P 50V SL	3A
C68	Ceramic 30P 50V CH	3A
C69	Ceramic 0.0047 50V B	3B
C70	Ceramic 0.0022 50V B	3B
C71	Ceramic 0.0047 50V B	3B
C72	Ceramic 1P 50V CH	1C
R1	Resistor 100 R25	2B
R2	Resistor 220 R25	1B
R3	Resistor 10K ELR25	1A
R4	Resistor 10K ELR25	1A
R5	Resistor 10K ELR25	1A
R7	Resistor 330 ELR25	1B
R9	Resistor 10K ELR25	1B
R11	Resistor 100 ELR25	2B
R12	Resistor 470K ELR25	2C
R13	Resistor 470K R25	2C
R14	Resistor 220 ELR25	2B
R15	Resistor 100 ELR25	2B
R16	Resistor 220 ELR25	2C
R17	Resistor 5.6K ELR25	2C
R18	Resistor 1.2K ELR25	2C
R19	Resistor 100 ELR25	2C
R20	Resistor 1.2K ELR25	3C
R21	Resistor 5.6K ELR25	3C
R22	Resistor 100 ELR25	3C
R23	Resistor 220 ELR25	3B

[PLL UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
R24	Resistor 1K ELR25	3C
R25	Resistor 470 R25	2B
R26	Resistor 47 ELR25	2B
R27	Resistor 68K ELR25	2B
R28	Resistor 100 ELR25	1B
R29	Resistor 470 ELR25	2B
R30	Resistor 220 ELR25	2B
R31	Resistor 1K ELR25	2B
R32	Resistor 1K R25	3B
R33	Resistor 22K ELR25	3A
R34	Resistor 1.2K ELR25	3A
R35	Resistor 4.7K R25	3A
R36	Resistor 1K R10	3A
R37	Resistor 100 ELR25	3B
R38	Resistor 470 ELR25	3B
R39	Resistor 22K ELR25	3B
R40	Resistor 5.6K ELR25	3B
R41	Resistor 220 ELR25	3C
J1	Connector TL-25P-04-V1	3B
J2	Connector TL-25P-06-V1	2A
J3	Connector TL-25P-07-V1	2A
P1	Connector TL-25H-06-A1	
P2	Connector TL-25H-07-A1	
P3	Connector TMP-P01X-A1	
	Shielding Case FX-220 42199	
	Shielding Case FX-220 42200	
	PIN RT-01T-1.3B	
	PLL Case FX-220 42255	
	PLL Case FX-220 42256	
	Shielding Board FX-220(A)42252	
	P.C. Board B-601 A 42197	
	B-603 42254	
	Spacer (C) 1=4 41592	
	ICOM Screw (C) 9	
	Grounding spring 41595	
	Spring-Finger 41573	

[PA UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
IC1	IC M57741L (150 ~ 158MHz) M57741M (156 ~ 163MHz) M57741M (161 ~ 168MHz) M57741H (166 ~ 174MHz)	1B
D1	Diode MI402	1C
D2	Diode MI402	1D
D3	Diode MI301	1D
D4	Diode 1SS97	1C
D5	Diode 15CD11	

[PA UNIT PARTS]

REF NO.	DESCRIPTION (PART NO)	BOARD LOCATION
L1	Choke coil LW-19	1B
L2	Coil LA-121	1C
L3	Coil LA-71	1D
L4	Coil LA-71	1D
L5	Coil LA-71	1D
L6	Choke coil LW-7	1D
R2	Resistor 120 R25	1B
R3	Resistor 1K R25	1D
R4	Resistor 1.5K R25	1D
R5	Resistor 220 R25	1D
R6	Resistor 10K R25	1C
C1	Electrolytic 47 16V	1B
C2	Ceramic 0.0047 50V B	1B
C3	Ceramic 220P 50V SL	1B
C4	Ceramic 220P 50V SL	1B
C5	Ceramic 15P 500V SL	1D
C6	Ceramic 220P 50V SL	1C
C7	Ceramic 0.001 50V B	1A
C8	Ceramic 220P 50V SL	1A
C9	Ceramic 15P 500V SL	1C
C10	Ceramic 0.0047 50V B	1C
C11	Ceramic 220P 50V SL	1C
C12	Ceramic 0.5P 500V SL	1C
C13	Ceramic 18P 500V SL	1C
C14	Ceramic 2P 500V SL	1D
C15	Ceramic 33P 500V SL	1D
C16	Ceramic 3P 500V SL	1D
C17	Ceramic 27P 500V SL	1D
C18	Ceramic 0.0047 50V B	1C
	Spacer (C) L=5 41592	
	ICOM Screw (C) L=10	
P2	Connector TL-25H-08-V1	
P3	Connector TMP-P01X-A1	
P4	Connector TMP-P01X-A1	
P5	DC Cable OPC-030B	
P6	Connector TL-25H-02V1	
J1	Connector SJ296	
J2	Connector FM-M. DRMI	
J3	Connector FM214-2SS (IC-125T/TM only)	
	PIN RT-01T-1.3B	
	Lead Lock 59TC4772	
	Rear Panel 30195	
	PC. Board B-600B 42198	
	Code Stopper BU-3270	
	Diode Bracket (A) 42309	
	Hole Plug DP625 (IC-125 only)	

[FIVE TONE UNIT]

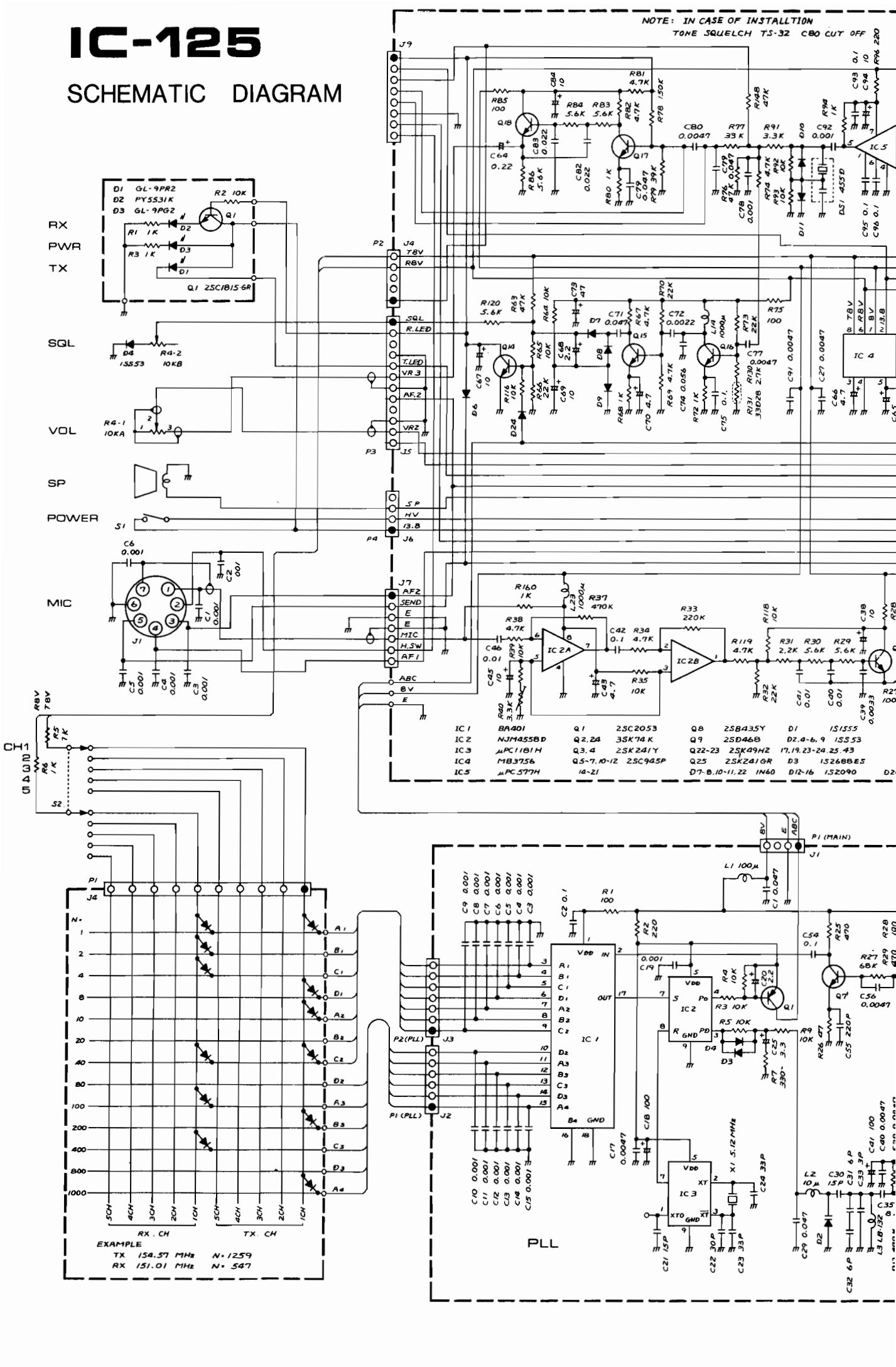
REF NO.	DESCRIPTION (PART NO)			BOARD LOCATION
IC1	IC	FX-407 (CCIR Tones) FX-507 (ZVEI Tones) FX-607 (NATEL Tones)		1C
IC2	IC	TC4011UBP		1A
IC3	IC	TC4066B		1A
IC4	IC	TC4066B		1A
Q1	Transistor	2SC2458 GR		1E
Q2	Transistor	2SA1048 Y		1E
Q3	Transistor	2SC2458 GR		1E
Q4	Transistor	2SA1048 Y		1E
Q5	Transistor	2SC2458 GR		1C
Q6	Transistor	2SC2458 GR		1C
Q7	Transistor	2SC2458 GR		1B
Q8	Transistor	2SC2458 GR		1B
Q9	Transistor	2SA1048 Y		1D
D1	Zener Diode	WZ046		1E
D2	Diode	1SS53		1D
D3	Diode	1SS53		1D
D4	Diode	1SS53		1B
D5	Diode	1SS53		1B
D6	Diode	1SS53		1B
D7	Diode	1SS53		1E
R1	Resistor	10K	ELR25	1E
R2	Resistor	10K	ELR25	1E
R3	Resistor	4.7K	ELR25	1E
R4	Resistor	4.7K	ELR25	1E
R5	Resistor	47K	ELR25	1E
R6	Resistor	1K	ELR25	1E
R7	Resistor	10K	ELR25	1D
R8	Resistor	8.2K	ELR25	1C
R9	Resistor	68K	ELR25	1D
R10	Resistor	10K	ELR25	1D
R11	Resistor	3.3K	ELR25	1C
R12	Resistor	22K	ELR25	1E
R13	Resistor	10K	ELR25	1B
R14	Resistor	1M	ELR25	1C
R15	Resistor	330K	ELR25	1B
R16	Resistor	10K	R10	1B
R17	Resistor	100K	R10	1B
R18	Resistor	100K	R10	1B
R19	Resistor	100K	R10	1B
R20	Resistor	22K	R25	1D
R21	Resistor	100K	R25	1D
R22	Resistor	100K	ELR25	1D
R23	Resistor	100K	ELR25	1D
R24	Resistor	10K	ELR25	1D
R25	Trimmer	H0621A	103	1D
R26	Resistor	330K	ELR25	1D
R27	Resistor	470	R10	1D
R28	Resistor	330K	ELR25	1C
R29	Resistor	220K	ELR25	1C
R30	Resistor	150K	R10	1D
R31	Resistor	680K	R10	1D
R32	Resistor	100K	R25	1C
R33	Resistor	820K	R10	1C
R34	Reistor	4.7K	ELR25	1E
R35	Resistor	4.7K	ELR25	1D

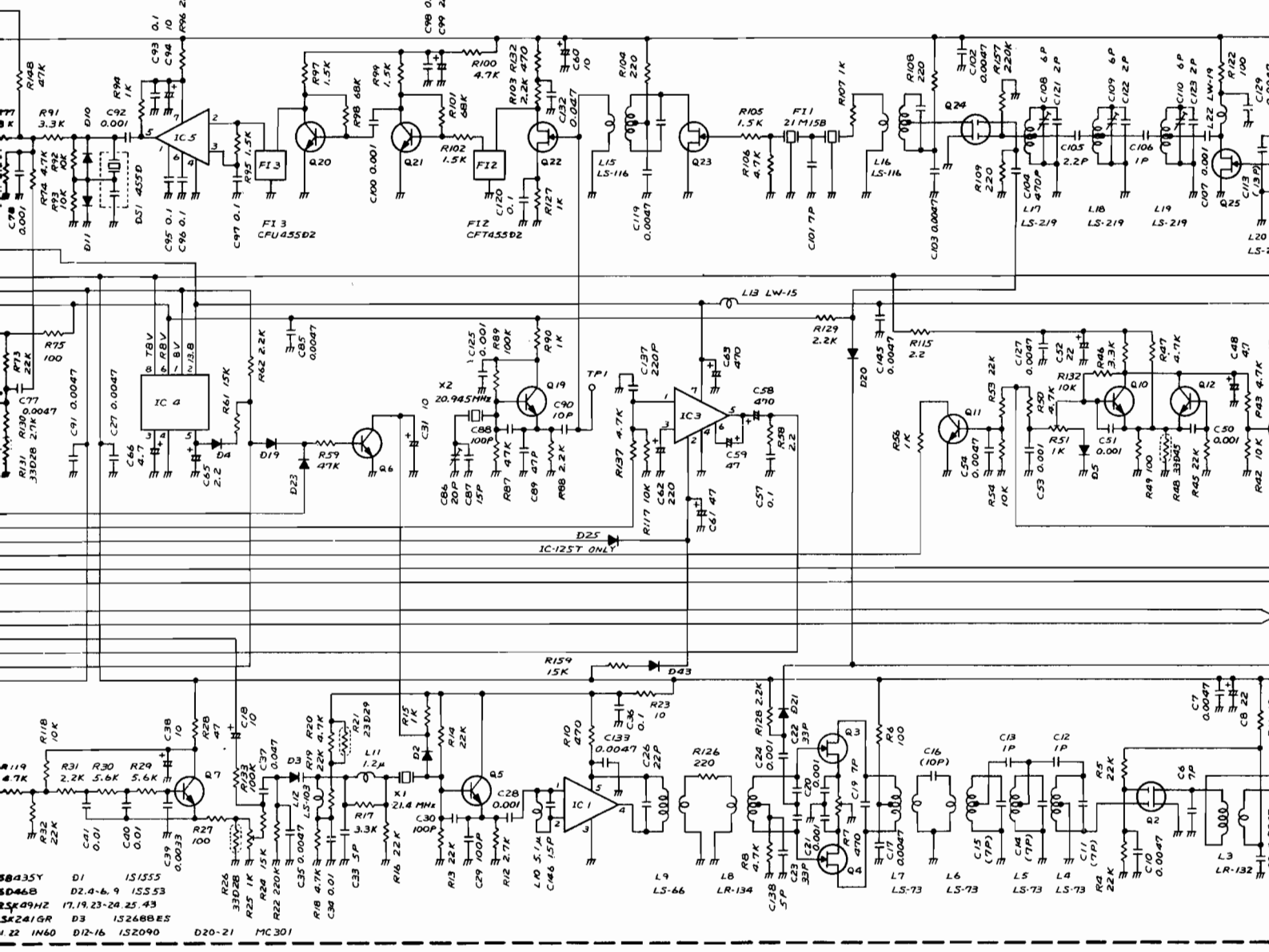
[FIVE TONE UNIT]

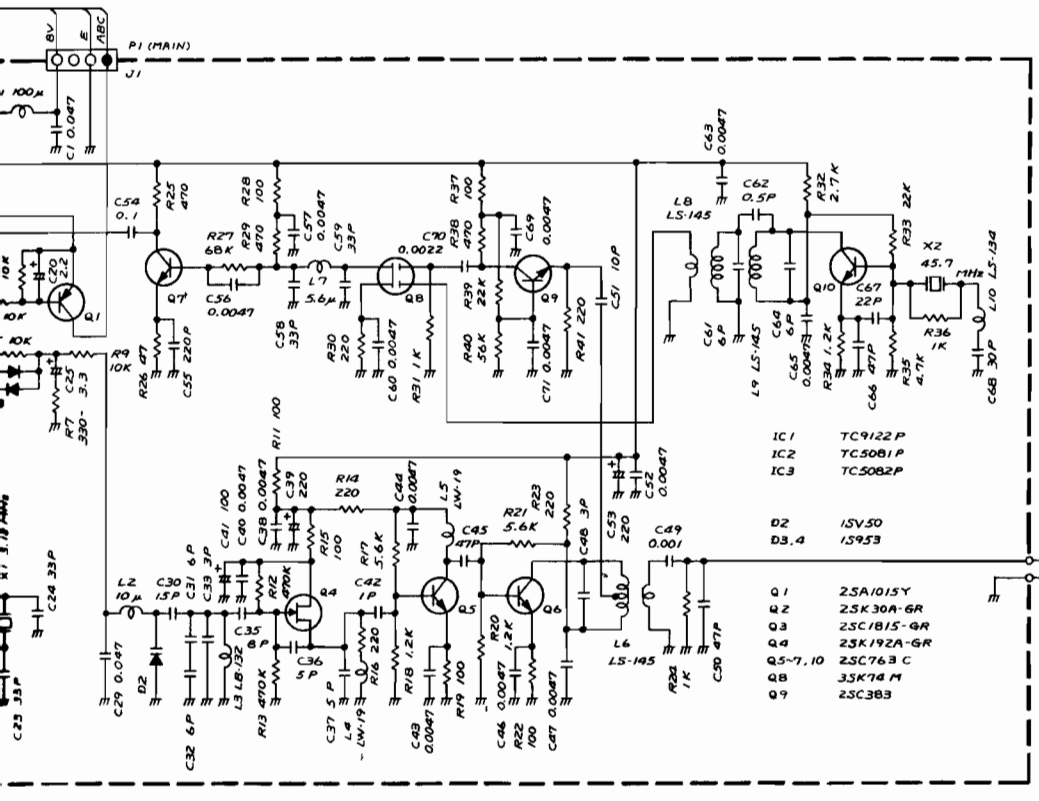
REF NO.	DESCRIPTION (PART NO)			BOARD LOCATION
C1	Barrier Lay	0.047	25V	1E
C2	Electrolytic	10	16V RC2	1C
C3	Electrolytic	10	16V RC2	1E
C4	Electrolytic	10	16V RC2	1D
C5	Ceramic	100P	50V SL	1D
C6	Electrolytic	10	16V RC2	1C
C7	Mylar	0.01	50V	1C
C8	Mylar	0.001	50V	1E
C9	Electrolytic	10	16V RC2	1E
C10	Electrolytic	4.7	25V RC2	1B
C11	Mylar	0.022	50V	1D
C12	Mica	VFM 680K05		1E
C13	Mylar	0.022	50V	1D
C14	Mylar	0.022	50V	1D
C15	Mylar	0.01	50V	1D
C16	Ceramic	470P	50V SL	1D
C17	Ceramic	470P	50V SL	1D
C18	Mylar	0.022	50V	1D
C19	Mylar	0.01	50V	1C
C20	Mylar	0.01	50V	1C
C21	Tantalum	1	25V	1C
C22	Tantalum	1	25V	1C
C23	Tantalum	1	25V	1C
C24	Tantalum	2.2	35V RC2	1C
J1	Connector	TL-25P-09-V1		1E
J2	Connector	TL-25P-02-V1		1D
J3	Connector	ICC04-020-350G		1C
J4	Connector	ICC04-020-350G		1C
J5	Connector	12P		1B
J6	Connector	12P		1A
P1	Connector	IC-49-P4		
	Relay	FBR211AD012-M		1E
	PC Board	B-636B		

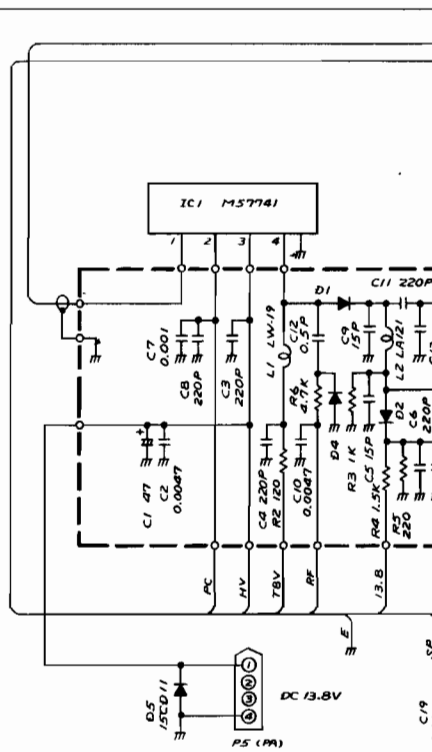
IC-125

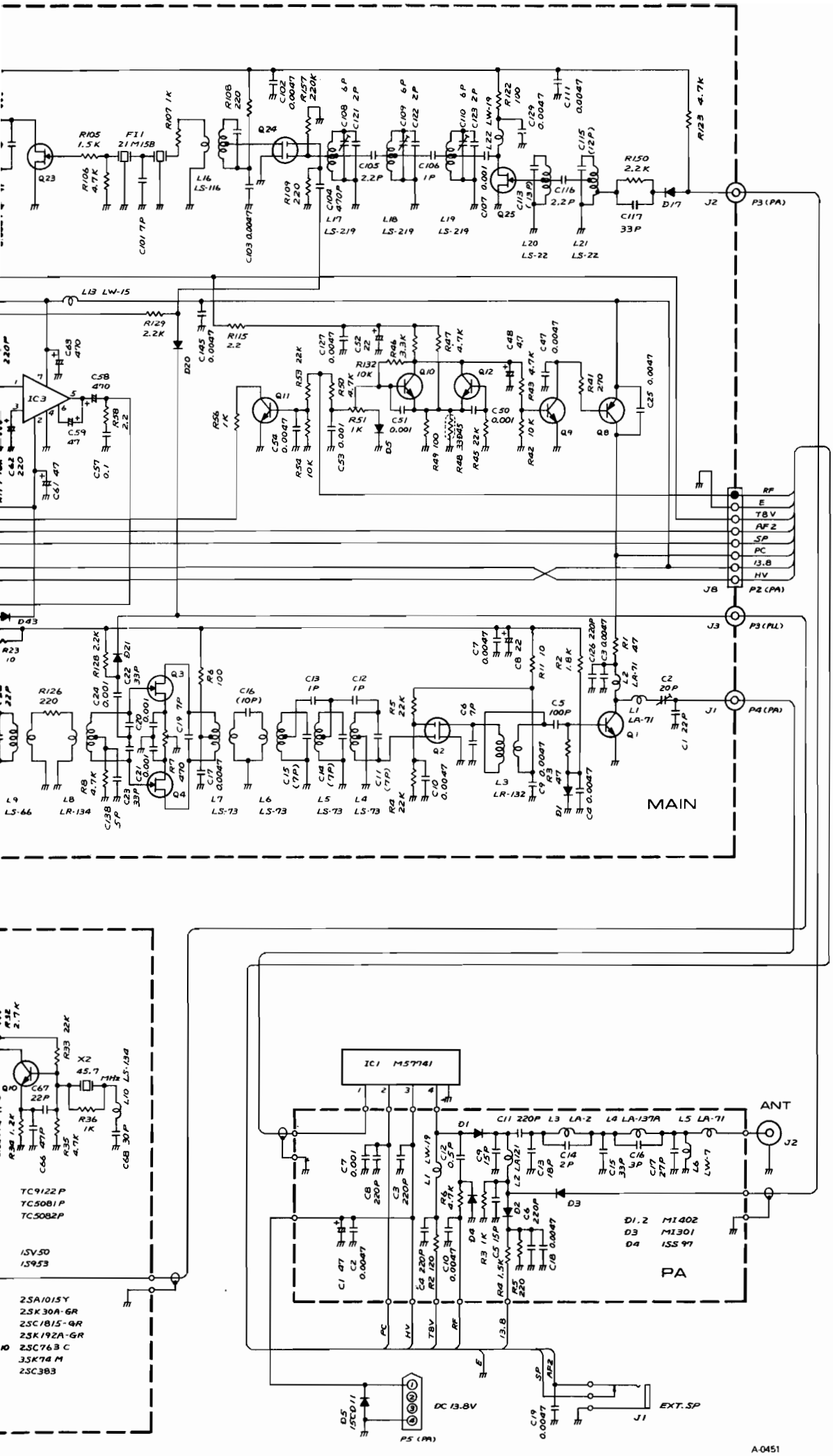
SCHEMATIC DIAGRAM




F INSTALLTION
LCH TS-32 C80 CUT OFF
IC 5
IC 4
IC 3
IC 1
FI 3
CFU455D2
FI 2
CFT455D2
X2
20.945MHz
X1
21.4 MHz
TP1
D25
IC-125T ONLY
L13 LW-15
L15 LS-116
L16 LS-116
L17 LS-219
L18 LS-219
L19 LS-219
L20 LS-
L9 LS-66
L8 LR-134
L7 LS-73
L6 LS-73
L5 LS-73
L4 LS-73
L3 LR-132
DS1 455D
D1 1S1555
D2,4-6,9 1SS53
D3 1S2688ES
D12-16 1S2090
D20-21 MC301


P1 (MAIN)
J1
IC1 TC9122P
IC2 TC5081P
IC3 TC5082P
D2 1SV50
D3,4 1S953
Q1 2SA1015Y
Q2 2SK30A-GR
Q3 2SC1815-GR
Q4 2SK192A-GR
Q5~7,10 2SC763 C
Q8 3SK74 M
Q9 2SC383
L6 LS-145
L8 LS-145
L9 LS-145
L10 LS-134


IC1 M57741
D1
D2
D3
D4
D5 1SC011
DC 13.8V
P5 (PA)
PC
HV
TBV
RF
E



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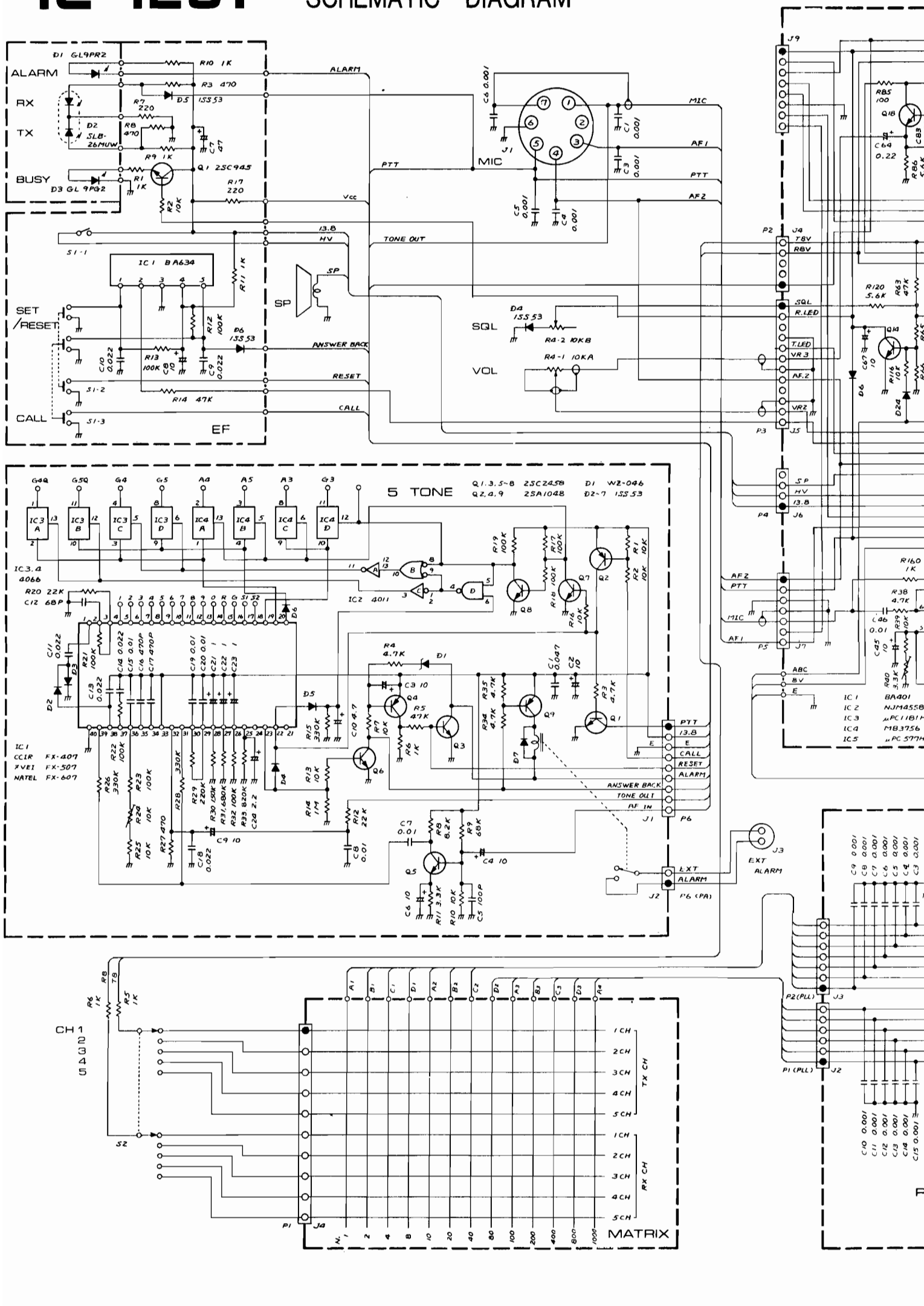
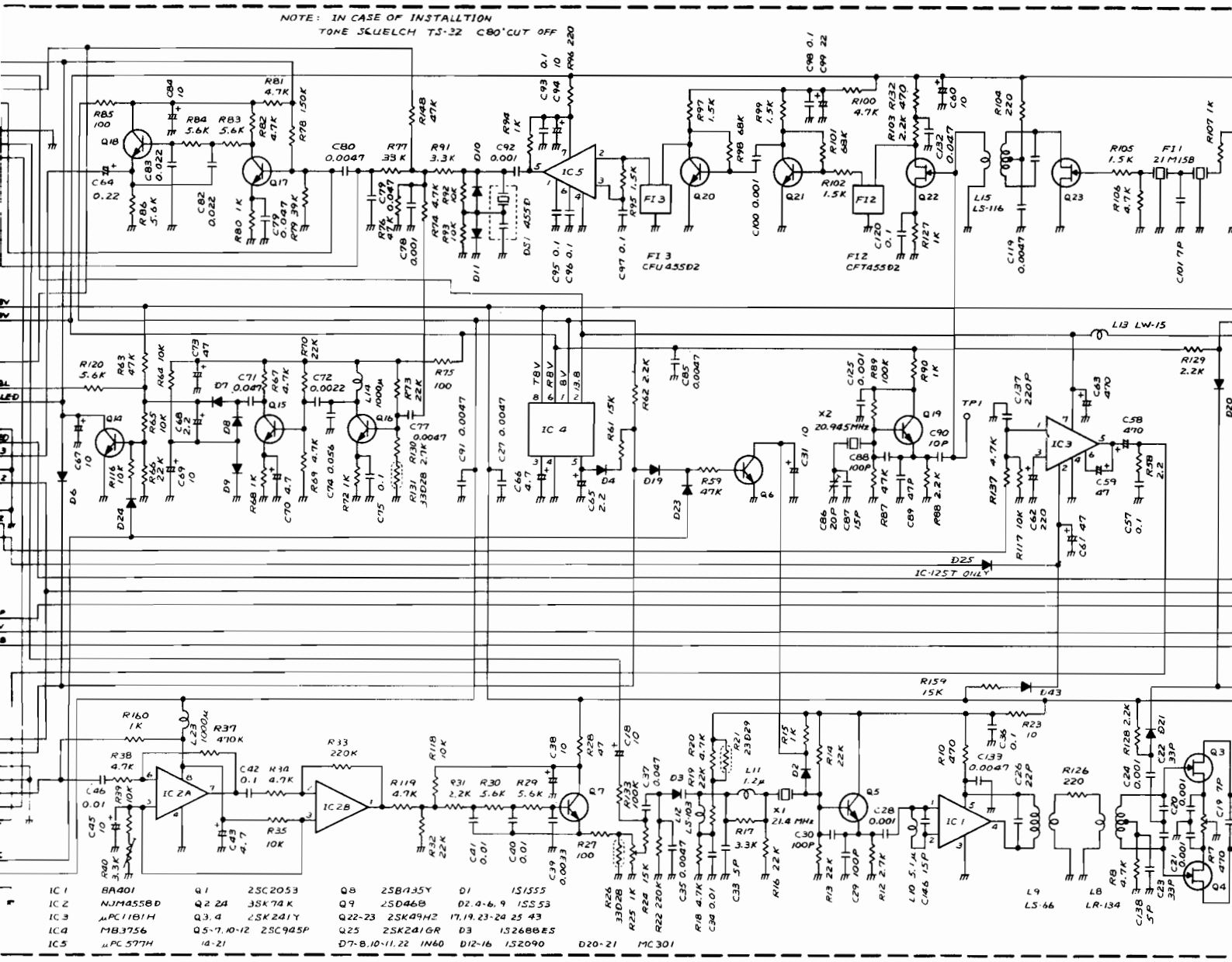
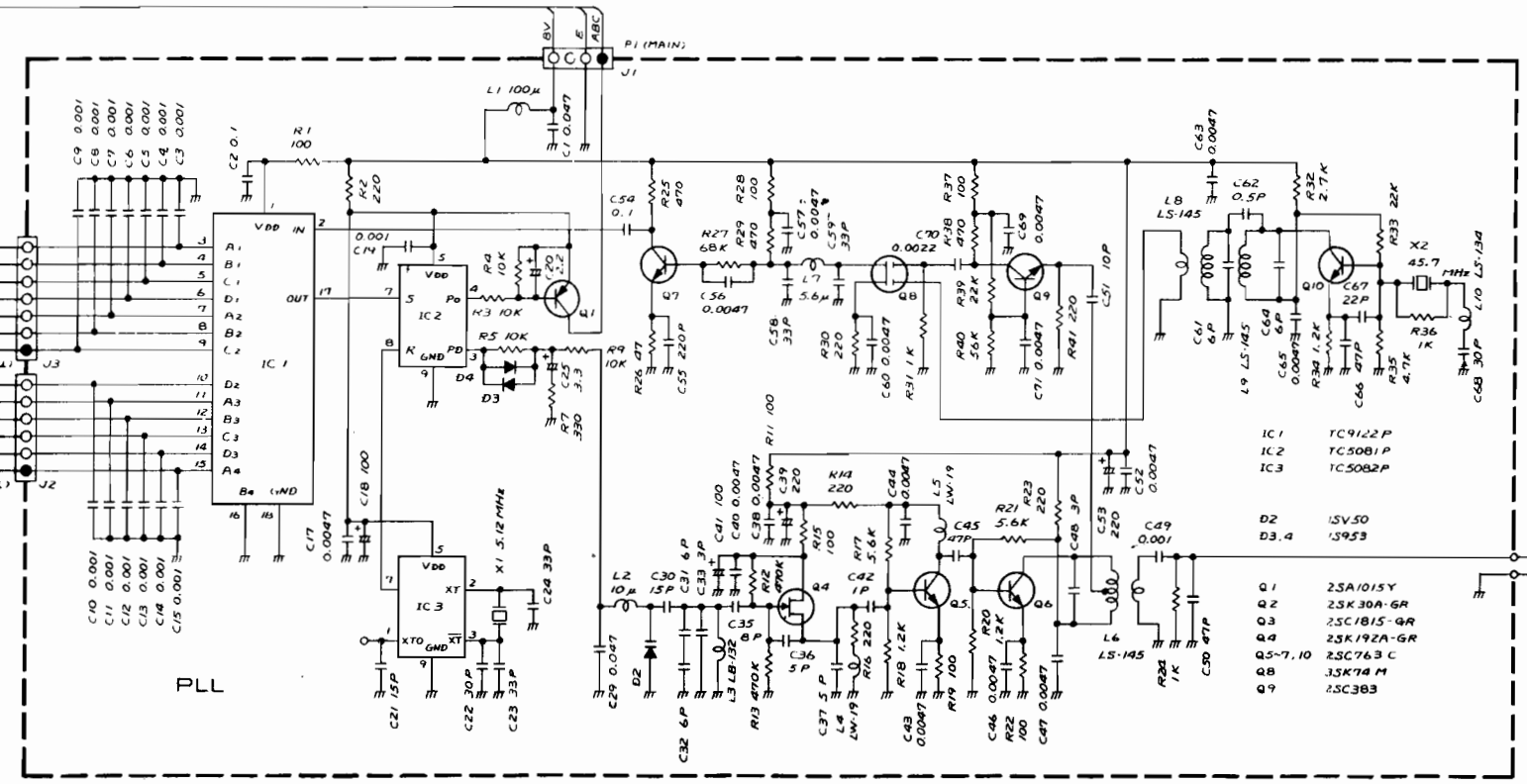
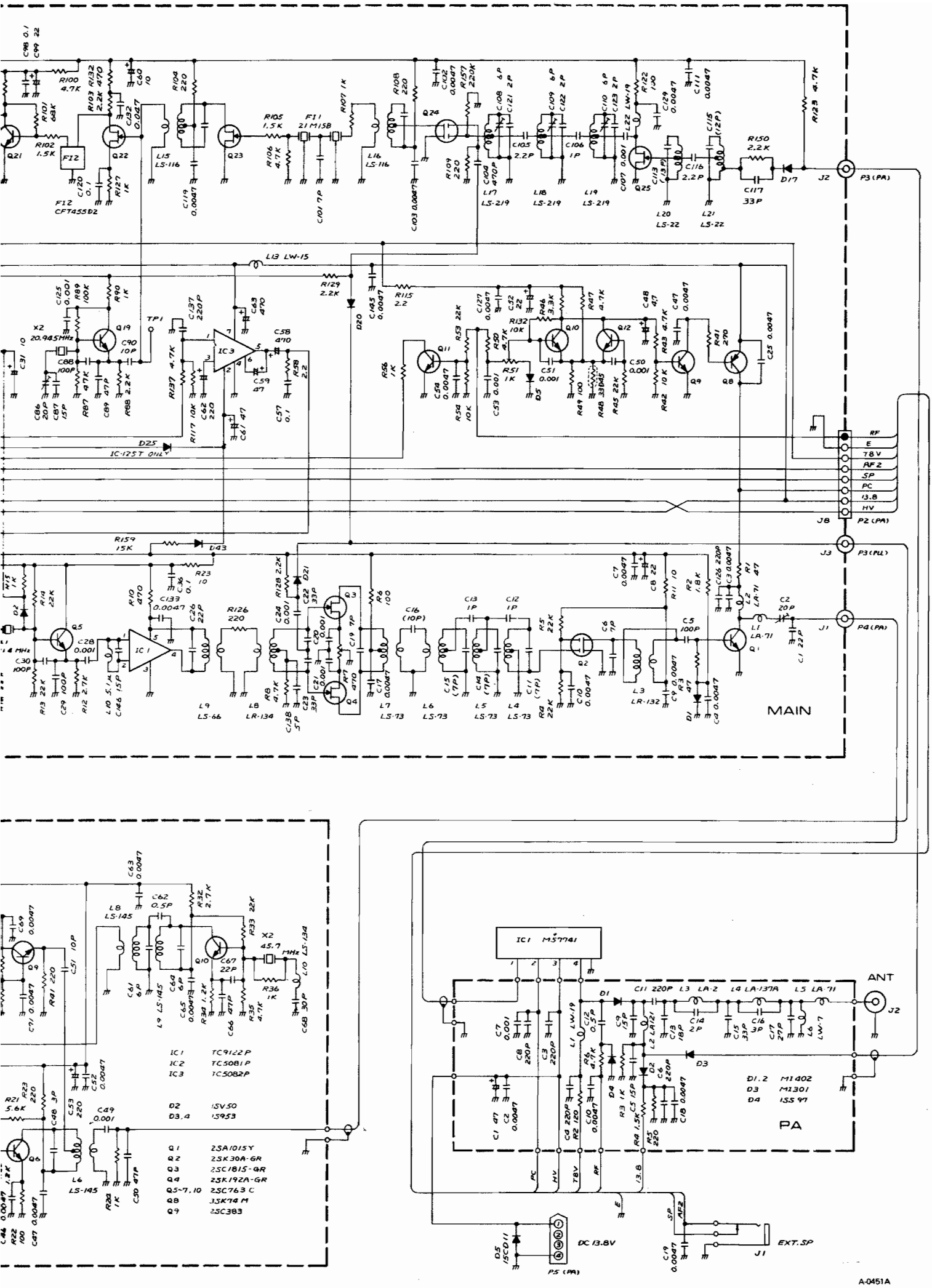
IC-125T SCHEMATIC DIAGRAM




NOTE: IN CASE OF INSTALLTION
TONE SQUELCH TS-32 C80 'CUT OFF
IC 1 BA401
IC 2 NJM455BD
IC 3 μPC1181H
IC 4 MB3756
IC 5 μPC577H
Q1 2SC2053
Q2 2A 3SK74 K
Q3, 4 2SK241Y
Q5-7, 10-12 2SC945P
Q8 2SB435Y
Q9 2SD468
Q22-23 2SK49H2
Q25 2SK241GR
D7-8, 10-11, 22 1N60
D1 1S1555
D2, 4-6, 9 1SS53
17, 19, 23-24 25 43
D3 1S2688ES
D12-16 1S2090
D20-21 MC301
IC-125T ONLY
FI 3 CFU455D2
F12 CFT455D2
L13 LW-15
TP1
X2 20.945MHz
X1 21.4 MHz


P1 (MAIN)
J1
J2
J3
PLL
X1 5.12 MHz
X2 45.7 MHz
IC 1 TC9122P
IC 2 TC5081P
IC 3 TC5082P
D2 1SV50
D3, 4 1S953
Q1 2SA1015Y
Q2 2SK30A-GR
Q3 2SC1815-GR
Q4 2SK192A-GR
Q5-7, 10 2SC763C
Q8 3SK74M
Q9 2SC383



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