HF SINGLE SIDEBAND RADIOTELEPHONE

IC-M700

MAINTENANCE MANUAL

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SECTION 1 SPECIFICATIONS

GENERAL

Frequency Coverage:

Receive	1.6MHz ~ 23.9999MHz
Transmit	2.0MHz ~ 2.9999MHz
	4.0MHz ~ 4.9999MHz
	6.0MHz ~ 6.9999MHz
	8.0MHz ~ 8.9999MHz
	12.0MHz ~ 13.9999MHz
	16.0MHz ~ 17.9999MHz
	22.0MHz ~ 22.9999MHz

Frequency Control:
CPU based 100Hz step Digital PLL synthesizer.
Independent Transmit-Receive Frequency Programmable on any band.

Frequency Readout:
6 digit 100Hz readout.

Frequency Stability:
Less than ±20Hz in the range of −30°C ~ +60°C

Memory Channel Capacity:
48 Simplex or Semi-duplex Channels owner Programmable

Power Supply Requirements:
DC 13.6V ±15% Negative ground
Current drain 25A max.
AC power supply is available for AC operation.

Current Drain:

Receiving;	Stand by	1.2A
	Max. audio output	1.6A
Transmitting;	Average voice	12A
	Two tones	19A

Antenna Impedance:
50 ohms Unbalanced

Weight:
7.2kg (15.8 lb)

Dimensions:
112(124)mm(H) x 287(297)mm(W) x 356(376)mm(D)
( ): Shows the dimensions including projections

TRANSMITTER

Emission Modes:
A3J (J3E; USB and LSB)
A3A (R3E; USB)
A3H (H3E; USB)

RF Output Power:
150 Watts PEP.

Spurious Emissions:
−65dB

Carrier Suppression:
A3J (J3E) 40dB
A3A (R3E) 16dB ±2dB
A3A (H3E) 3 ~ 6dB

Unwanted Sideband:
−55dB

Microphone:
600 ohms with push-to-talk switch

RECEIVER

Receiving System:
Double-conversion Superheterodyne

Receiving Modes:
A3J (J3E; USB and LSB)
A3 (A3E, H3E)

Intermediate Frequencies:

1st	70.4515MHz
2nd	9.0115MHz (A3J)
	9.0100MHz (A3)

Sensitivity:
A3J (J3E) 12dB SINAD at −6dBμ (0.5μV) input
A3 (A3E) 12dB SINAD at 3dBμ (1.4μV) input

Selectivity:
A3J (J3E) 2.3KHz/6dB, 4.2KHz/60dB
A3 (A3E) 6.0KHz/6dB, 20.0KHz/60dB

Spurious and Image Rejection:
70dB

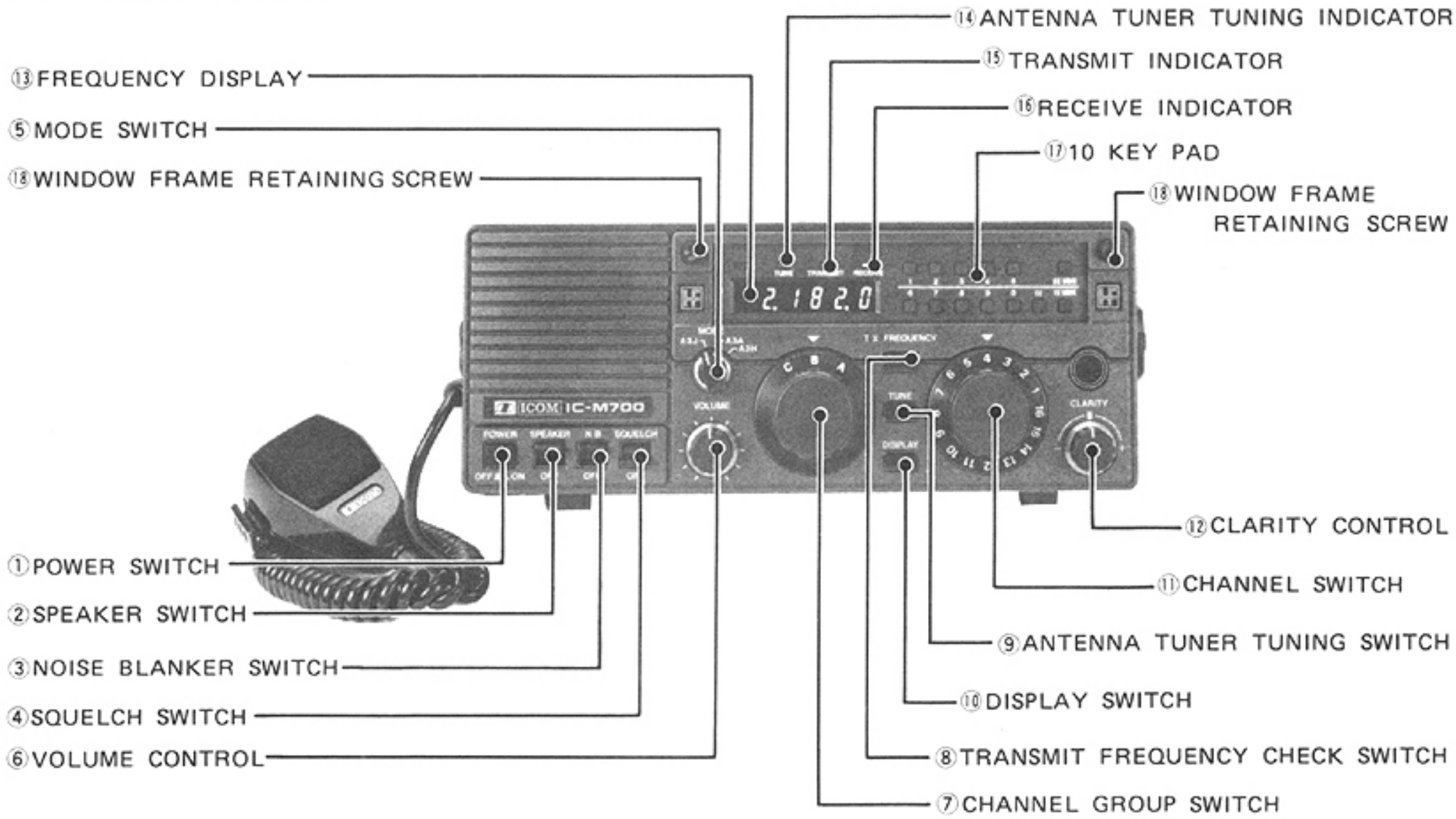
Clarifier Range:
±150Hz

Audio Output:
5 watts (4 ohms, 10% distortion)

AF Output Impedance:
2 - 8 ohms

SECTION 2 OPERATING CONTROLS

2 - 1 FRONT PANEL



1. POWER SWITCH
The POWER SWITCH is a push-lock type switch which controls the input DC power to the IC-M700. When the switch is pushed in and locked, power is supplied to the set. When the switch is pushed again and released, power is cut to all circuits except the PA unit.

2. SPEAKER SWITCH
Switches the internal speaker ON and OFF. When connecting an external speaker to the external speaker jack, the external speaker will be actuated even if this switch is turned OFF.

3. NOISE BLANKER SWITCH
Switches the noise blanker circuit ON and OFF. When the switch is turned ON (up position), pulse-type noises will be reduced to provide acceptable reception.

4. SQUELCH SWITCH
Switches the squelch function ON and OFF. When the squelch is turned ON, the radio maintains silent until a human voice signal is received.

5. MODE SWITCH
Selects the operation mode, one of A3J (J3E), A3A (R3E) and A3H (H3E). Turning this switch counterclockwise further from A3J position, selects A3J LSB mode.

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

7. CHANNEL GROUP SWITCH
Selects a channel group, one of A, B and C. Each group has 16 channels, and a channel can be selected by the CHANNEL SWITCH.

8. TRANSMIT FREQUENCY CHECK SWITCH
While holding this switch, the receive frequency changes to the transmit frequency. Thus the transmit frequency may be checked.

9. ANTENNA TUNER TUNING SWITCH
Starts tuning function of the automatic antenna tuner installed. By holding this switch, the radio is turned in the transmit mode and a low power signal is transmitted (this level can be adjusted by an internal control) to tune the antenna tuner. At this time, the ANTENNA TUNER TUNING INDICATOR is ON. When the tuning has been finished, the TUNING INDICATOR goes off and the radio returns to the receive mode.

10. DISPLAY SWITCH
Turns all the display illuminations ON and OFF.

11. CHANNEL SWITCH
Selects a channel, of 16 channels which has been selected by the CHANNEL GROUP SWITCH.

12. CLARITY CONTROL
Shifts the receive frequency 150Hz (maximum) to either side of the displayed receive frequency. This allows clear reception for an off frequency signal. Rotating this control clockwise (+ side) raises the receive frequency and counterclockwise (– side) lowers the receive frequency.

13. FREQUENCY DISPLAY
Shows the operating frequency (receiving frequency or transmitting frequency) of the selected channel. The frequency indicated is the carrier frequency of each mode.

14. ANTENNA TUNER TUNING INDICATOR
Illuminates when the ANTENNA TUNER TUNING SWITCH is depressed and the antenna tuner is tuning automatically.

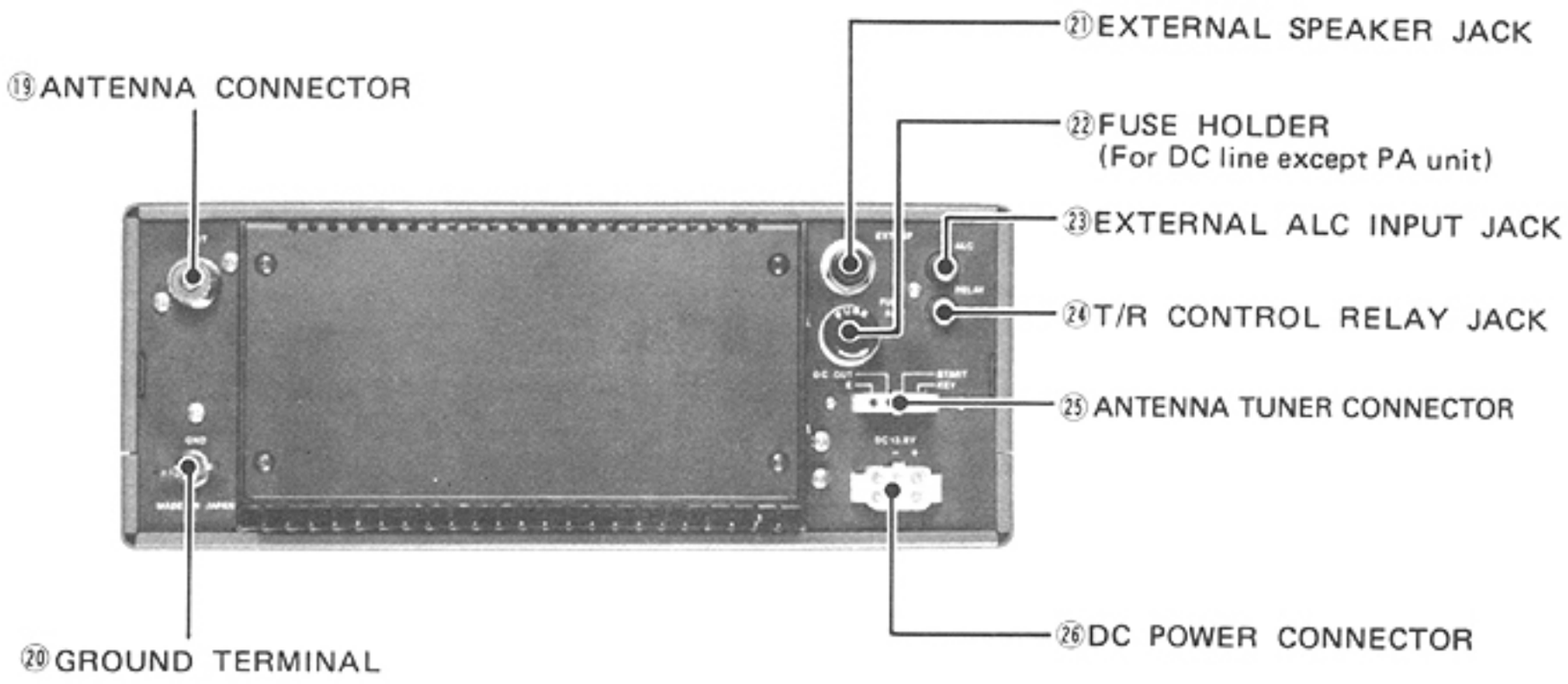
15. TRANSMIT INDICATOR
Illuminates when the radio is in the transmit mode.

16. RECEIVE INDICATOR
Illuminates when the squelch is opened in the receive mode.

17. 10 KEY PAD
By pushing these keys, receive frequency and transmit frequency of each channel can be memorized.

18. WINDOW FRAME RETAINING SCREWS
By removing these screws, the window frame of the frequency display can be removed and this allows to push the keys of the 10 key pad.

2 - 2 REAR PANEL CONNECTIONS



19. ANTENNA CONNECTOR
This is used to connect an antenna to the radio. Its impedance is 50 ohms and connect with a PL-259 connector. When using a whip antenna or single wire antenna, use an antenna coupler (antenna tuner) for matching.

20. GROUND TERMINAL
To prevent electrical shock, interferences for other electronic equipment and other problems, be sure to ground the radio to good ground such as the engine block through the GROUND TERMINAL. For best results use as heavy a gauge wire or strap as possible and make the connection as short as possible.

21. EXTERNAL SPEAKER JACK
When an external speaker is used, connect it to this jack. Use a speaker with an impedance of 4 - 8 ohms. The external speaker is paralleled to the internal speaker and actuated even if the speaker switch is turned off. This jack can also be used as an AF output terminal for a FAX machine or tele-typewriter.

22. FUSE HOLDER
This holds a fuse for the DC circuits except the PA unit. If the fuse is blown, replace it with a new 5 Amp fuse. Open the fuse holder with a Philips head screwdriver.

23. EXTERNAL ALC INPUT JACK
This jack can be used for input terminal of external ALC (Auto Level Control) signal from a linear amplifier. The ALC voltage should be in 0V ~ –4V.

24. T/R CONTROL RELAY JACK
Controls Transmit/Receive for an external linear amplifier or other equipment. This relay can be used to switch 24V 1A DC. Don't exceed this limit.

25. ANTENNA TUNER CONNECTOR
This connector is for an automatic antenna tuner (antenna coupler), and puts out a start signal, inputs tuning signal and supplys 13.6V DC for the antenna tuner.

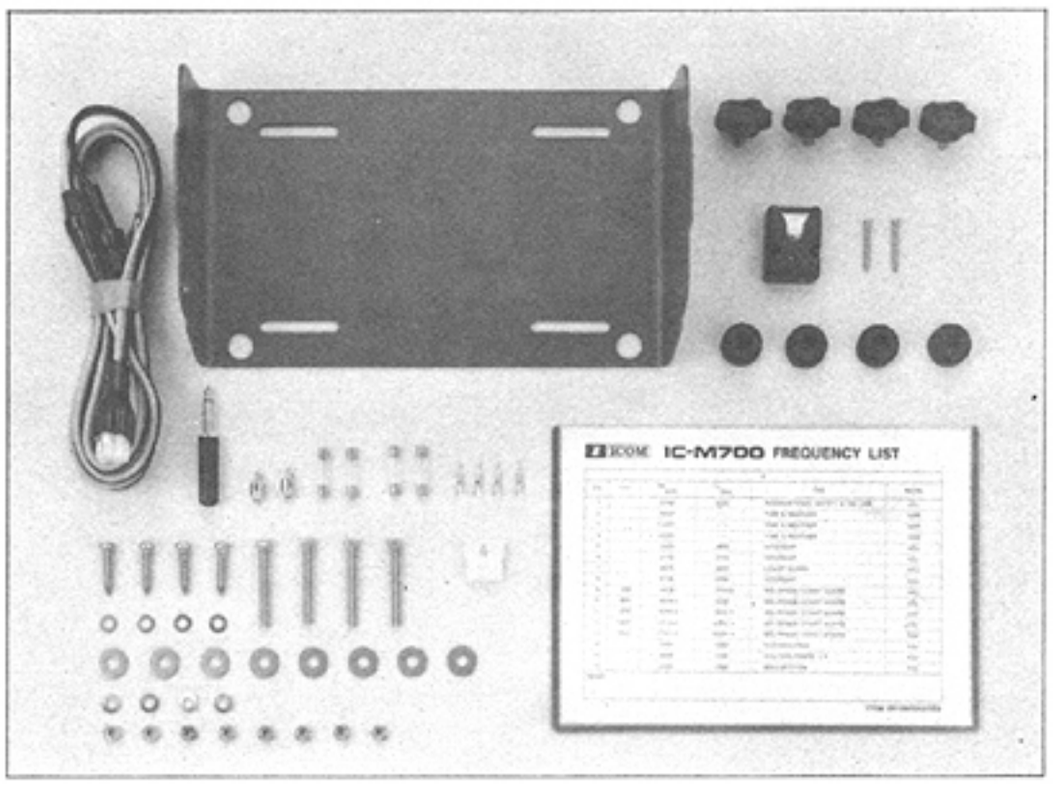
26. DC POWER CONNECTOR
For connection of 13.6V DC power source.

SECTION 3 INSTALLATION

BE SURE TO READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE OPERATION

3 - 1 UNPACKING

Carefully remove your transceiver from the packing carton and examine it for signs of shipping damage. Should any be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. It is recommended you keep the shipping cartons. In the event storage, moving, or reshipment becomes necessary they will be handy. Accessory cables, plugs, etc., are packed with the transceiver. Make sure you have not overlooked anything.



1. Power Cord 1
2. External Speaker Plug 1
3. Pin Plugs 2
4. Fuses (30A) 2
5. Fuses (5A) 2
6. Antenna Tuner Connector (with contact pins) 1
7. Mounting Bracket 1
8. Mounting Screw Knobs 4
9. Flat Washers (M5) 4
10. Bracket Fixing Screws (Tapping Screws) 4
11. Bracket Fixing Screws (Hex Head Screws) 4
12. Flat Washers (M6) 8
13. Spring Washers (M6) 4
14. Bracket Fixing Screw's Nuts (M6). 8
15. Microphone Hanger 1
16. Microphone Hanger Fixing Screws 2
17. Frequency Chart (with Plastic Case) 1
18. Rubber Cushion Feet 4

3 - 2 PLANNING

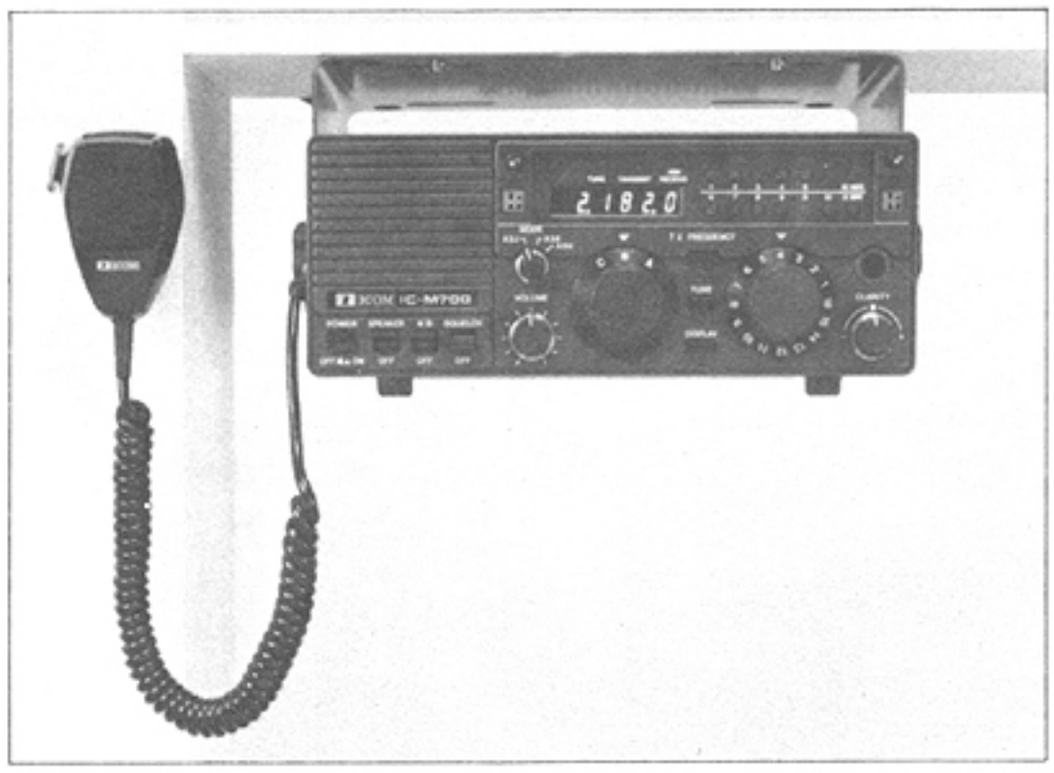
Select a location for your transceiver which will allow free access to the front controls, good air circulation and rear clearance for access to the fuse and cable connectors. Provide the best protection you can from direct rain or heavy seas.

Avoid long cable runs to the antenna and power source. At the same time, keep power and antenna cables as far as possible from electrical sources i.e. generators, alternators, electrical pumps, etc. Stay away from the magnetic compass with the cables, and avoid running the antenna cable near electronic instruments.

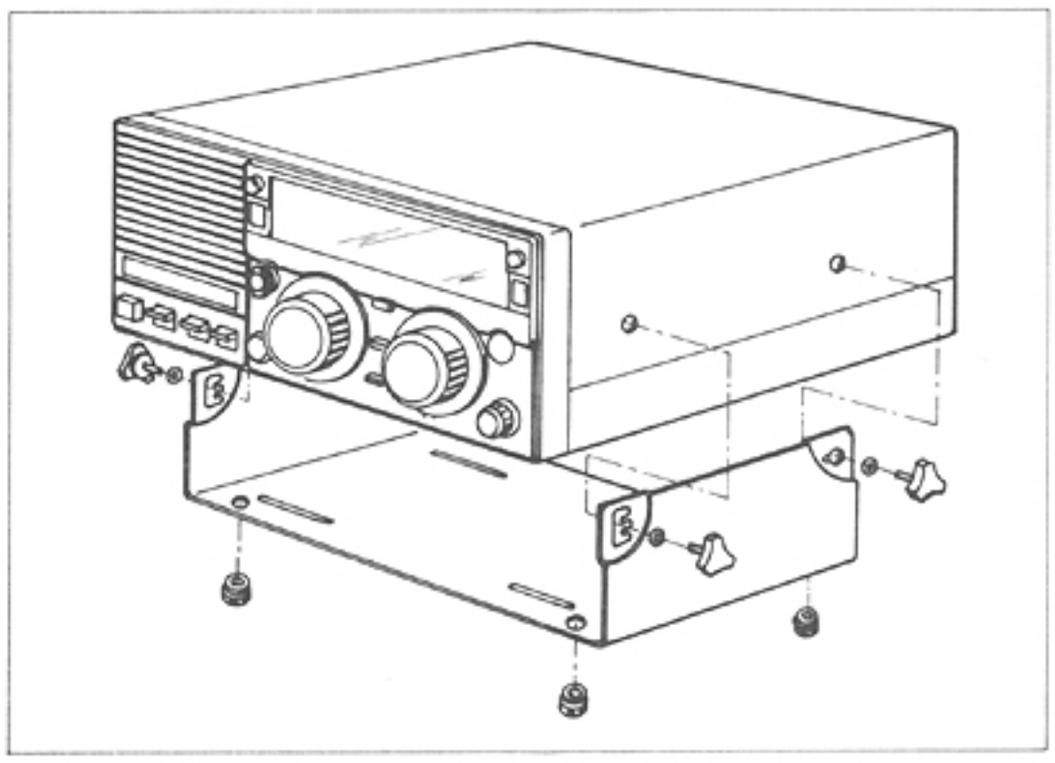
3 - 3 MOUNTING THE TRANSCEIVER

Your ICOM transceiver is supplied with a universal bracket which allows "over" or "under" mounting by placing the bracket where the unit is adequately supported when wave shock and vibration are considered.

The mounting hardware supplied will fit most installations, but should you need special mounting fasteners any good marine supply store will be able to assist you. As in any marine installation it is recommended that high quality marine fasteners be used. Try to avoid drilling new mounting holes in the bracket, as the balance of the set may be affected.





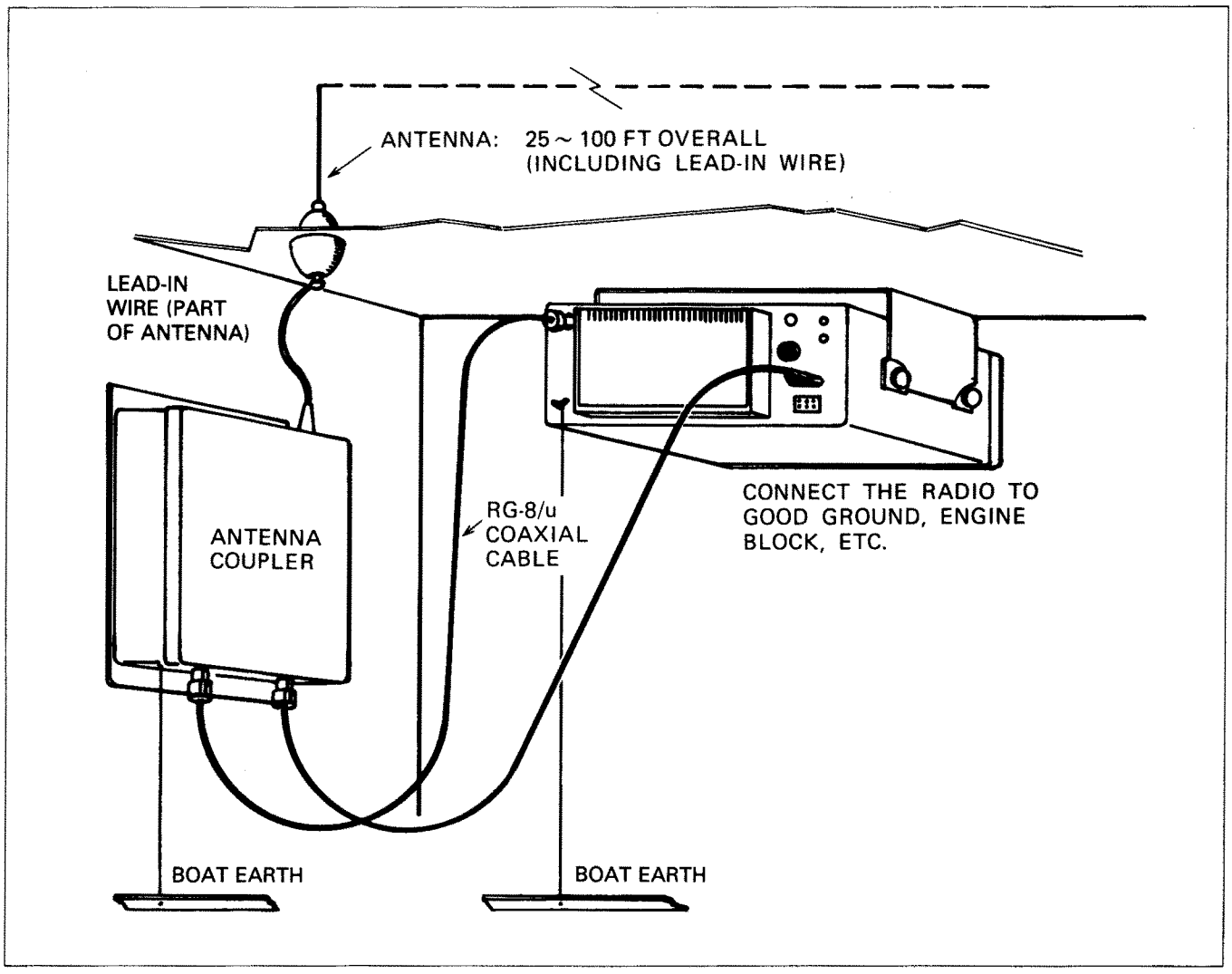


3 - 4 TYPICAL INSTALLATION

The following figure shows a typical installation. Any radio communications system operating with a whip antenna or long wire antenna (insulated back stay) must have an adequate ground connection, otherwise the overall efficiency of the radio installation is degraded especially at lower frequencies.

The 50 ohm output impedance of the transceiver makes it necessary to employ antennas of the trapped or externally matched type. The use of an antenna coupler in conjunction with a whip antenna or long wire antenna (insulated back stay) allows an efficient installation which will cover all HF marine bands. The transceiver was designed to easily interface with most existing antenna couplers for marine applications.

On wooden or fiberglass boats, the use of a copper ground plate as the ground portion of the keel on a sailboat will ofteh perform adequately. The ground system must be joined to the antenna coupler with a heavy copper strap.



3 - 5 PRIMARY POWER

If at all possible, do not exceed the 10 feet length of the power cable supplied, if it is necessary to make a run over 10 feet use #6 cable, and more than 20 feet should not be used. Use a direct run to the power source. Connect the power cable to the DC power source with the RED lead to the positive terminal and the BLACK lead to the negative terminal. When hooking up the cable, solder all connections and insure that all connections are clean, tight and moisture free.

Be sure to leave a service margin in the power cable so that should the transceiver have to be removed from the bracket it can slide out without straining the cable.

3 - 6 EXTERNAL SPEAKER

The IC-M700 contains an internal speaker, and is also designed so that it can drive an external speaker from the external (EXT) speaker jack on the rear panel. Be sure the impedance of the external speaker is 4 - 8 ohms, and connect it with supplied 1/4 inch standard phone plug.

The external speaker is paralleled to the internal speaker and actuated even if the speaker switch on the front panel is turned off. Thus the external speaker jack can also be used as an AF output terminal for a FAX machine or tele-typewriter.

SECTION 4 OPERATING INSTRUCTIONS

4 - 1 HOW TO TUNE

The following instructions are for tuning in any mode. Please read carefully and understand fully before turning ON your unit.

4 - 1 - 1 CHANNEL SELECTION

The frequencies shown in the following charts are memorized in the radio already.

To select a channel which is memorized the desired operation frequency, first, select the group, A, B or C, including the desired channel with the CHANNEL GROUP SWITCH. Then, select the channel with the CHANNEL SWITCH.

Set operation mode to the desired one, A3J, A3A or A3H, if it differs.

BANK		A			
CH	ITU	RX KHz	TX KHz	USE	MODE
1		2182	2182	INTERNATIONAL SAFETY & CALLING	A3J
2		5000	——	TIME & WEATHER	A3H
3		10000	——	TIME & WEATHER	A3H
4		15000	——	TIME & WEATHER	A3H
5		2638	2638	INTERSHIP	A3J
6		2142	2142	INTERSHIP	A3J
7		2670	2670	COAST GUARD	A3J
8		2738	2738	INTERSHIP	A3J
9	424	4428.7	4134.3	MID RANGE/COAST GUARD	A3J
10	601	6506.4	6200	MID RANGE/COAST GUARD	A3J
11	816	8765.4	8241.5	MID RANGE/COAST GUARD	A3J
12	1205	13113.2	12342.4	MID RANGE/COAST GUARD	A3J
13	1625	17307.3	16534.4	MID RANGE/COAST GUARD	A3J
14		2450	2003	KLH/SAN FRAN.	A3J
15		2466	2382	KOU/SAN PEDRO CA	A3J
16		2450	2366	WOU/BOSTON	A3J

BANK		B				BANK		C			
CH	ITU	RX KHz	TX KHz	USE	MODE	CH	ITU	RX KHz	TX KHz	USE	MODE
1	401	4357.4	4063.0	KMI TELEPHONE	A3J	1	1609	17257.7	16484.8	WOM TELEPHONE	A3J
2	804	8728.2	8204.3	KMI TELEPHONE	A3J	2	2215	22639.4	22043.4	WOM TELEPHONE	A3J
3	809	8743.7	8219.8	KMI TELEPHONE	A3J	3	2216	22642.5	22046.5	WOM TELEPHONE	A3J
4	1201	13100.8	12330.0	KMI TELEPHONE	A3J	4	410	4385.3	4090.9	WOO TELEPHONE	A3J
5	1202	13103.9	12333.1	KMI TELEPHONE	A3J	5	411	4388.4	4094.0	WOO TELEPHONE	A3J
6	1602	17236.0	16463.1	KMI TELEPHONE	A3J	6	808	8740.6	8216.7	WOO TELEPHONE	A3J
7	1603	17239.1	16466.2	KMI TELEPHONE	A3J	7	811	8749.9	8226.0	WOO TELEPHONE	A3J
8	2214	22636.3	22040.3	KMI TELEPHONE	A3J	8	1203	13107.0	12336.2	WOO TELEPHONE	A3J
9	2223	22664.2	22068.2	KMI TELEPHONE	A3J	9	1210	13128.7	12357.9	WOO TELEPHONE	A3J
10	403	4363.6	4069.2	WOM TELEPHONE	A3J	10	1605	17245.3	16472.4	WOO TELEPHONE	A3J
11	412	4391.5	4097.1	WOM TELEPHONE	A3J	11	1620	17291.8	16518.9	WOO TELEPHONE	A3J
12	802	8722.0	8198.1	WOM TELEPHONE	A3J	12	2201	22596.0	22000.0	WOO TELEPHONE	A3J
13	805	8731.3	8207.4	WOM TELEPHONE	A3J	13	2205	22608.4	22012.4	WOO TELEPHONE	A3J
14	1206	13116.3	12345.5	WOM TELEPHONE	A3J	14		2482	2382	WOX/NEW YORK	A3J
15	1208	13122.5	12351.7	WOM TELEPHONE	A3J	15		2450	2366	WGB/NORFOLK	A3J
16	1601	17232.9	16460.0	WOM TELEPHONE	A3J	16		2442	2400	WDR/MIAMI	A3J

When a channel is selected, the memorized frequency is displayed on the FREQUENCY DISPLAY with 5 or 6 digits down to 100Hz digit. Since the 1MHz and 1KHz decimal points are displayed, the frequency can be easily read. The frequency indicated is the carrier frequency of each mode.

4 - 1 - 2 MEMORY WRITING (PROGRAMMING THE CHANNELS)

When you wish to rewrite the frequency memorized in a channel or to write a new frequency into a channel, the following steps are taken.

1. Select the channel you wish to rewrite or to write a frequency with the CHANNEL GROUP SWITCH and CHANNEL SWITCH. The frequency memorized in the channel is displayed on the FREQUENCY DISPLAY (if no frequency has been memorized in the channel, only the MHz and KHz decimals are displayed).

2. Remove the WINDOW FRAME RETAINING SCREWs and WINDOW FRAME.

3. Set the desired frequency by pushing digit keys of the 10 KEY PAD representing the frequency desired, beginning with the 10MHz digit (or 1MHz digit depending on the desired frequency) and ending with the 100Hz digit.

4. If illegal digits or out of band frequency have been entered, the entered digits are canceled and the FREQUENCY DISPLAY will be blanked (only MHz and KHz decimals are displayed).

5. When wrong key has been pushed, push the "CE" key, the entered digits are canceled and the previous memorized frequency will be recalled.

6. When the entered digits are correct, push the "RX WRITE" key for receive frequency, or the "TX WRITE" key for transmit frequency. The entered frequency will be memorized into the selected memory channel.

7. When a transmit frequency has been memorized, the memorized transmit frequency is not shown on the FREQUENCY DISPLAY. To check the transmit frequency, push the TRANSMIT FREQUENCY CHECK SWITCH. While depressing the CHECK SWITCH, the memorized transmit frequency will be shown on the FREQUENCY DISPLAY.

8. Memorize not only the receive frequency, but also the transmit frequency, even if the both frequencies are the same.

9. If you wish to memorize only a receive frequency into a channel, enter "0" as the transmit frequency (push "0" key, then "TX WRITE" key).

10. Memorize frequencies into other channels with the same manner.

FOR EXAMPLE:

When memorizing the receive frequency at 12345.6KHz;

Push key	Display	
	12.357.0	(Previous Frequency)
[1]	00.000.1	
[2]	00.001.2	
[3]	00.012.3	
[4]	00.123.4	
[5]	01.234.5	
[6]	12.345.6	
[ ] RX WRITE	12.345.6	(Memorized into the selected channel.)

When memorizing the transmit frequency at 13210.5KHz;

Push key	Display	
	12.357.0	(Previous Frequency)
[1]	00.000.1	
[3]	00.001.3	
[2]	00.013.2	
[1]	00.132.1	
[0]	01.321.0	
[5]	13.210.5	
[ ] TX WRITE	12.345.6	(This shows the receive frequency.)

NOTE: 13210.5KHz has been memorized into the selected channel, but the FREQUENCY DISPLAY will show the receive frequency.
To check the memorized transmit frequency, push the TRANSMIT FREQUENCY CHECK SWITCH.

TX FREQUENCY

[ ] 13.210.5

4 - 2 RECEIVING

After connecting the power cable, an antenna, etc., set knobs and switches as follows:

POWER SWITCH	OFF (OUT)
SPEAKER SWITCH	ON (UP)
NOISE BLANKER SWITCH	OFF (DOWN)
SQUELCH SWITCH	OFF (DOWN)
VOLUME CONTROL	Fully Counterclockwise
MODE SWITCH	Desired Mode
CHANNEL GROUP SWITCH	Desired Group including channel desired
CHANNEL SWITCH	Desired Channel memorized frequency desired
DISPLAY SWITCH	ON (OUT)
CLARITY CONTROL	Center (12 o'clock) position

Now push the POWER SWITCH in. The FREQUENCY DISPLAY will show a receiving frequency and the RECEIVE INDICATOR will be illuminated.

The IC-M700 provides USB (upper sideband) signals in all modes. If you wish to operate on LSB (A3J), turn the MODE SWITCH further counterclockwise from the A3J position.

Slowly turn the VOLUME CONTROL clockwise to a comfortable level.

If squelch function is required to cut out noise when no signal is received, turn the SQUELCH SWITCH on (UP position), and the noise from the speaker stops and the RECEIVE INDICATOR goes off. The radio will now remain silent until an incoming signal (modulated with human voices) is received which opens the squelch and lights the RECEIVE INDICATOR. If the squelch is unstable due to the reception of weak signals or mobile stations, turn off the SQUELCH SWITCH.

When a receiving signal's frequency is slightly off the receiving frequency, adjust the CLARITY CONTROL so that the signal can be heard clearly.

When pulse type noise such as ignition noise is audible, set the NOISE BLANKER SWITCH to the ON (UP) position. The noise will be reduced to provide comfortable reception.

If you wish to cut off the internal speaker when using an external speaker or receiving a FAX or tele-typewriter signal, set the SPEAKER SWITCH to the OFF (DOWN) position.

4 - 3 TRANSMITTING

Before transmitting, listen in the receive mode to make sure your transmissin will not interfere with other communications. If the transmit frequency differs with the receive frequency, push the TRANSMIT FREQUENCY CHECK SWITCH, and the radio receives on the transmit frequency while the switch is depressed.

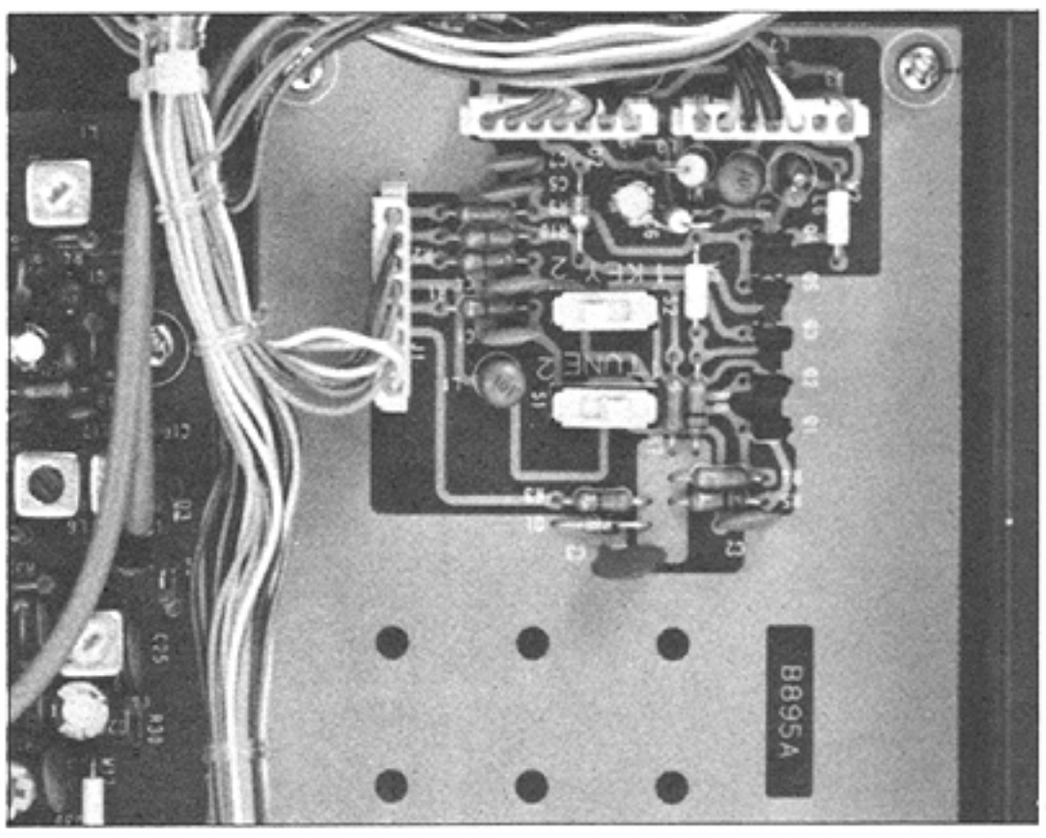
By depressing the PTT (push-to-talk) switch on the microphone, the radio is turned to the transmit mode and the TRANSMIT INDICATOR is illuminated. By speaking into the microphone, transmit signals will be transmitted.

To return to the receive mode, just release the microphone PTT switch.

4 - 4 ANTENNA TUNER (ANTENNA COUPLER)

The IC-M700 provides the antenna tuner connector which outputs and/or inputs control signals to control an automatic antenna tuner. The control signal levels can be selected by internal switches, thus most existing antenna tuners can be used.

When S1 (TUNE switch) on the MIC-C unit is set in the "1" position (indicated on the PC board), the "START" terminal of the ANTENNA TUNER CONNECTOR is usually grounded (0V), and by pushing the ANTENNA TUNER TUNING SWITCH, the START terminal supplys 8V DC through a 1K ohm resistor.



When S1 is set in the "2" position, the "START" terminal usually supplys about 8V DC through a 22K ohm resistor, and by pushing the TUNING SWITCH, the START terminal is grounded (0V) and sinks a current put out from the ANTENNA TUNER.

When S2 (KEY switch) on the MIC-C unit is set in the "1" position (indicated on the PC board), the "KEY" terminal of the ANTENNA TUNER CONNECTOR accepts a DC voltage (2V ~ 15V) which is put out from the ANTENNA TUNER, and the radio keeps the tuning function until the antenna tuner has finished the tuning and stops to put out the DC voltage.

When S2 is set in the "2" position, the "KEY" terminal usually supplys about 8V DC through a 22K ohm resistor, and by starting the TUNING function of the ANTENNA TUNER, the KEY terminal is grounded (0V) by the ANTENNA TUNER, and the radio keeps the tuning function until the antenna tuner has finished the tuning and stops to ground the KEY terminal.

When no antenna tuner is connected, the "TUNE" switch does not function.

4 - 5 ALARM FUNCTION (OPTION)

The ALARM UNIT will be supplied as an option. When the optional unit is installed, the international alarm signal can be automatically transmitted on 2182KHz by pushing the ALARM SWITCH (included with the ALARM UNIT and installed on the front panel).

TO TEST THE ALARM FUNCTION

When the radio is set in the receive mode, by just pushing the ALARM SWITCH, the operation frequency is set on 2182.0KHz and the mode is A3H (H3E), even if a different frequency and mode have been set previously, and international alarm signal tones can be heard from the speaker and the ALARM INDICATOR (located next to the ANTENNA TUNER TUNING INDICATOR on the front panel) is lit. The tones will be made for a period of 50 seconds.

To stop the tones, push the ALARM switch again.

To clear the alarm function and to return to the previous operation frequency and mode, push the TRANSMIT FREQUENCY CHECK switch.

TO TRANSMIT THE ALARM SIGNALS

CAUTION: Never transmit the alarm signals except when your ship is in distress.

Push the ALARM SWITCH while depressing the PTT (Push-To-Talk) switch on the microphone, and the operation frequency is set on 2182.0KHz and the mode is A3H (H3E), even if a different frequency and mode have been set previously, and international alarm signals are transmitted. At the same time, the signal tones can be heard from the speaker and the ALARM INDICATOR on the front panel is lit. The radio will be kept in the transmit mode, even if the PTT switch is released, during a period of 50 seconds.

When an antenna tuner is connected, first, the radio is set in the ANTENNA TUNING mode. After the tuner has been tuned on 2182KHz, the radio is turned in the transmit mode automatically and transmits the alarm signals.

After the period of 50 seconds, the radio returns to the receive mode, but the operation frequency and mode will be maintained 2182KHz and A3H (H3E) respectively.

To transmit distress messages, depress the PTT switch and talk into the microphone with normal and clear voices in the usual way.

To clear the alarm function and to return to the previous operation frequency and mode, push the TRANSMIT FREQUENCY CHECK switch.

SECTION 5 CIRCUIT DESCRIPTION

5 - 1 RECEIVER CIRCUITS

5 - 1 - 1 RF CIRCUITS

The received signal is passed from J606 through the 1.6MMHz high-pass filter consisting of L666 through L668 and C736 through C741. After the strong broadcast signals are removed, the signal passes the filter which is designed for the desired frequency. This filter is switched by D606 through D619 from among 6 band-pass filters and 1 low-pass filter.

These 7 filters are designed for the following bands:

1.6MHz ~ 3.0MHz	B1
3 MHz ~ 5 MHz	B2
5 MHz ~ 7 MHz	B3
7 MHz ~ 10 MHz	B4
10 MHz ~ 14 MHz	B5
14 MHz ~ 18 MHz	B6
18 MHz ~ 24 MHz	B7

Then the image interference is removed and the 1st and 2nd local oscillator frequencies leaking to the ANT terminal are suppressed by the low-pass filter consisting of L620, L621, C638 through C641, and C743. The signal is then fed to the 1st mixer.

The 1st mixer, featuring low noise and high dynamic range, consists of JFETs Q607 and Q608, and converts the receiving signal into the 1st IF frequency of 70.4515MHz. The 1st local oscillator frequency (70.4515MHz higher than the receiving frequency) from the PLL unit passes the high-pass filter, is amplified by Q609, has its harmonics removed by the low-pass filter, and is applied to the gates of Q607 and Q608.

The signal, converted to 70.4515MHz, passes monolithic crystal filter FI601-B, is amplified by Q606, passes a receive/transmit switching diode D604 and a monolithic crystal filter FI601-A, and is fed to the 2nd mixer.

The total passband of both FI601-A and FI601-B is 70.4515MHz ± 7.5KHz (−3dB). The AGC voltage is applied to the 2nd gate of Q606.

The 2nd mixer is a diode DBM (double balanced mixer), IC604 and is injected with the 2nd local oscillator frequency of 61.44MHz from the PLL unit. The 70.4515MHz IF frequency is converted to the 2nd IF frequency (9.0115 MHz) and is fed to the MAIN unit.

5 - 1 - 2 9.0115MHz IF CIRCUIT

The signal, converted to 9.0115MHz by the 2nd mixer in the RF unit, is amplified by Q307 after the mixer's spurious components are removed by the double tuned circuit of L305 and L306.

FI301 (FL-30) and FI302 (FL-33) are crystal filters and their passbands are 2.3KHz/−6dB and 6KHz/−6dB, respectively. Q311 switches between these two filters so that FI301 is selected when the mode switch is set to J3E (A3J) or R3E (A3A) and FI302 is selected when the mode is H3E (A3H).

The 2nd IF signal, amplified by approx. 50dB by Q312 and Q313, is fed to the SSB detector IC302, the AM detector D327, and the AGC detector D323.

5 - 1 - 3 DETECTION CIRCUIT

The J3E (A3J) and R3E (A3A) signals are mixed with the 9.013MHz carrier signal at IC302, converted to AF signals, and fed to the emitter follower Q316.

The H3E (A3H) signals are converted to an AF signal at the diode detector D327 and amplified at the buffer amplifier Q317 to match the output level in the SSB mode.

These outputs are fed to the volume control (on the front panel) and the audio controlled squelch circuit.

5 - 1 - 4 NOISE BLANKER CIRCUIT

A portion of the 2nd IF signal from L305 is fed to the noise amplifier, Q301. This signal is amplified by approx. 80dB at Q301, Q302 and Q303, and then rectified by D301 and D302. Q304 is the AGC amplifier for the noise amplifiers and adjusts the gain of the noise amplifiers approx. 50dB. Q305 and Q306 switch on and off the balanced noise gate consisting of D304, D305, D306, and D307.

5 - 1 - 5 AGC CIRCUIT

The voltage rectified by D323 is amplified by Q314 and controls the AGC voltage. The AGC time constant is set to the fast attack/slow release by R372, R373, C376, and C377. The AGC voltage is applied to the 2nd gate of the RF unit Q606, MAIN unit Q307, Q312, and Q313, and is capable of a gain control of 80dB or more.

5 - 1 - 6 BFO CIRCUIT

The 9.013MHz carrier signal is generated by mixing a 10.24 MHz signal, the output of the highly stable PLL reference oscillator divided into 1/3, with a 1.227MHz signal. The 1.227MHz signal is obtained by dividing the oscillation frequency of X301 into 1/4 by CMOS IC312 to get an accurate frequency. For A3H reception, the dividing operation of IC312 is stopped to prevent beat reception.

The clarifier operates during receive by varying the bias voltage of D346 connected in series with X301. To remove the spurious signals of the carrier, the double balanced mixer IC304 is used to mix 10.24MHz and 1.227MHz, and a filter circuit is provided at the input of each frequency. A LPF and double tuned circuit is also provided for the 9.013 MHz output to prevent the generation of spurious signals.

5 - 1 - 7 AUDIO CONTROL LED SQUELCH CIRCUIT

A portion of the detector output signal enters the squelch circuit. The input signal is amplified by IC305 to the saturation level and a 3 through 5Hz component is detected by the F-V converter of IC306. IC307 is a full-wave rectifier circuit and rectifies the 3 through 5Hz signal into a DC voltage. IC308 is a switch circuit with hysteresis and becomes L (low) level during audio detection. The output of IC308 is connected to the base of Q329. The collector of Q329 switches the analog switch device IC309 and turns ON/OFF the AF signal. At the same time Q329 lights up the receive LED to indicate the squelch is opened.

5 - 1 - 8 AF POWER AMPLIFIER

IC310 is an audio power amplifier from which an output of 5W or more can be obtained. This IC has a low impedance output and has sufficient drive even if a 4 ohm speaker is externally connected in parallel with the built-in 4 ohm speaker.

5 - 2 TRANSMITTER CIRCUIT

5 - 2 - 1 BALANCED MODULATOR

Audio signals from the microphone are fed to the base of Q315 through the mic gain control R391 and amplified by Q315.

The amplified signals are fed to the double balanced modulator IC301 with the carrier signal the same as for the receiver detector.

5 - 2- 2 9.0115MHz IF CIRCUIT

The DSB signal generated in the balanced modulator IC301 is fed into FI301 (in the reverse direction of the receive mode) and results in the SSB signal. During transmit, FI301 is selected regardless of the operating mode and an SSB signal is obtained. The carrier signal necessary for modes other than J3E (A3J) is combined in the linear amplifiers of Q308 and Q309, following FI301.

The transmitting IF signal is amplified to the rated output of −10dBm and then fed to the RF unit.

5 - 2 - 3 RF CIRCUITS

The 9MHz transmitting output from the MAIN unit is mixed with the 61.44MHz local oscillator signal at L611 through L612 and IC604, and converted to the 70.4515MHz IF signal. The spurious components are removed at the crystal filter FI601-A. The signal passes the transmit/receive switching diode D605 and attenuator R645 through R647, then enters the transmitting mixer.

The attenuator acts as a matching network between FI601-A and the mixer and improves the mixer's frequency characteristics.

The transmitting mixer of Q610 and Q611 is fed the local oscillator signal which goes into the 2nd gate. To improve the frequency characteristics, the output has a resistive load of approximately 500 ohms so that the frequency characteristics are not affected at the output, and the signal is sent through the 25MHz low-pass filter of L629, L630 and C664 through C668, then fed to Q612.

The FET amplifier Q612 has an input impedance of 470 ohms to match the low-pass filter. The drain also has a resistive load. The 2nd gate of Q612 is applied with a control voltage for protection against overcurrents and high SWR, and to control output power.

The output of Q612 is amplified by Q613. To improve the frequency characteristics at Q613, the impedance between Q612 and Q613 is low impedance so input capacitance can be ignored. Further, to compensate the frequency characteristics at the output, C673 is added to the emitter.

The output of Q613, after passing the 1.6MHz high-pass filter, passes through the attenuator of R670 through R672 and is output to the PA unit. The attenuator acts as a buffer to the PA unit. This output is approximately +6dBm when the output is 150W.

To get stable operation, the transmitting circuits are supplied with T8V regulated power supply from the MAIN unit. The local oscillator frequency amplifier circuit also is supplied with an 8V regulated power supply from IC601.

5 - 2 - 4 PA PROTECTION CIRCUIT

The voltage of the 2nd gate of Q612 is lowered and the gain is reduced for lower power to protect the final transistors from a temperature rise caused by increased collector loss of the final transistors and overcurrent due to high SWR. This is accomplished by the circuit of IC603, Q605, and Q614.

IC603B is a differential amplifier and amplifies the potential difference generated at R871 (located in the PA unit) due to the current flowing through the PA. Q614 buffers the reflected wave voltage from the SWR detector circuit in the FILTER unit. If either or both voltages exceed the voltage determined by R614 and R681, the inverted amplifier IC603A begins amplification. Normally, the output voltage of IC603B is determined by R614 and R681 through R684. The voltage is lowered due to overcurrent or high SWR and the transmitting power is also lowered.

When the temperature rises, the voltage from J602 pin 4 (POL) turns Q605 on. The output voltage from IC603B is divided by R620 and R621 to lower the voltage and the power is lowered.

Further, when the antenna tuner is connected, the key signal turns Q603 off and Q604 on. The tuning power is set by the voltage divided by R620 and R619.

5 - 2 - 5 PA UNIT

This unit consists of 3 boards (PA, ANT SW, and connector) and the rear panel chassis to which they are attached.

The PA board is a linear amplifier with an output of 150W and amplifies the transmitting signal from the RF unit. The ANT SW board performs antenna switching for transmit/receive and has a protection circuit to prevent damage to the receiving unit caused by a strong input during receive when the output of an adjacent transmitter is induced by the antenna. The connector board and rear panel chassis holds the various boards and the wiring for the connectors mounted on the rear panel chassis.

5 - 2 - 6 PA CIRCUIT

The power amplifier is a 3-stage wide band linear amplifier and consists of a class A single amplifier for the input stage and class AB push-pull amplifiers for the driver and final stages. This unit produces an output of 150W PEP with an input of approximately 6dBm PEP. Further, each stage uses negative feedback and RC frequency compensation for a total gain variation of ±1.5dB or less (at an output of 55W).

5 - 2 - 7 BIAS CIRCUIT

Although the input stage has a fixed bias due to the class A operation, the driver and final stages have adjustable biases due to their class AB operation.

The bias of the driver stage is adjusted by varying the current flowing through D801 with R827. Further, D801 and Q803 are thermally coupled to minimize the variations of the idling current due to temperature changes.

The final stage is provided with emitter follower Q806 since the current flow is greater than in the driver stage. The bias of the final stage is adjusted by varying with R823 the current flowing through D802 and D804. D804 compensates for the voltage drop between the base and emitter of Q806. D802 and Q804 are thermally coupled with Q806 for stability.

5 - 2 - 8 THERMAL PROTECTION CIRCUIT

To prevent the final transistors (Q804, Q805) from excessive temperature rises and damage due to continuous transmitting, thermal switches S801 and S802 are thermally coupled to Q804 and Q805, respectively. When the temperature rises, the fan motor provided for the heat sink is turned on for forced air cooling. The fan motor has 4 speeds, transmit high speed, receive high speed, transmit low speed, and receive low speed.

S802 is a 50°C thermal switch and turns on the fan for low speed when Q805 reaches approximately 50°C. At this time, resistors R832 and R834 are connected in series within the motor. S801 is a 90°C thermal switch and turns on when Q804 reaches approximately 90°C. Then R831 is added in parallel to R832 and the motor voltage is raised. Simultaneously, the POL voltage is supplied to the RF unit to lower the transmitting output by approximately half. Further, during transmit, Q807 shorts R834 to raise the motor voltage higher than during receive, thus increasing the fan speed.

5 - 2 - 9 ANTENNA SWITCHING CIRCUIT

Separate relays are used for antenna switching for transmit and receive. The receiving unit is connected to the antenna connector by RL852 and the transmitting unit by RL851. The antenna connector is provided with a surge absorber to prevent damage to the transmitting and receiving units due to high voltages such as induced lightning.

Further, if there is an input at the antenna connector of 1W or more during receive, its voltage is detected and the control voltage of RL852 is switched off by Q854 and Q853. The antenna is then disconnected from the RF unit to protect the receiving circuits.

A low-pass filter with a cutoff frequency of approximately 30MHz consisting of L851, L852, C852, and C854 is provided between the receive switching relay and the receiving input of the RF unit to reduce the incidental radiation from the antenna during receive.

5 - 2 - 10 FILTER UNIT

This unit is located between the PA unit and the antenna connector and suppresses the harmonics found in the transmitting output from the PA unit to −65dB or below. Chebyshev low-pass filters are used and 7 filters having different cutoff frequencies are switched depending on the transmitting frequency.

Filter switching is performed by driving the relay with the signal from the LOGIC unit.

At the output is an SWR detection circuit which uses a toroidal core. The detected traveling wave voltage is sent to the MAIN unit to control the ALC and the reflected wave voltage is sent to the RF unit as a control voltage for the protection circuit used to prevent an overload on the PA stage caused by a mismatched antenna.

5 - 2 - 11 ALC CIRCUIT

A peak ALC circuit is provided so that the transmit peak level does not exceed the rated output. The traveling-wave voltage detected from the FILTER unit is amplified at operational amplifier IC303 and compared with the reference voltage set by R463 to generate the ALC voltage. This ALC voltage is applied to the 1st gate of Q309 to control the output level of the SSB signal. The ALC voltage is also inverted and amplified by the same IC303 to light up the transmit LED.

Since the circuit for IC303 requires a negative power supply, the oscillator output from IC311 is rectified to produce a −4V.

5 - 2 - 12 POWER SUPPLY CIRCUIT

The power supply circuit consists of 11 transistors. Q318 eliminates the chattering of the PTT switch.

Transistors Q319, Q320, Q321, Q323, and Q325 switches REGs T8V and R8V on/off and controls the switching timing. Q319 also controls the linear standby relay. Q322 and Q324 clamps the line to 8V with REGs R8V and T8V, respectively. The 8V of REG Q328 is the reference for all voltages and is made especially stable. A constant current bias is applied to D334 and is obtained after being buffered by Q327. To prevent transmissions on frequencies other than the marine band, a control signal from the LOGIC unit is applied to Q318 and a circuit is provided so that the equipment does not transmit even if the PTT switch is pressed.

5 - 3 PLL CIRCUITS

This unit generates 2 oscillating outputs (first and second local oscillator signals) required by the RF unit and another oscillating output (third local oscillator signal) used to produce the BFO frequency within the MAIN unit. Among these, the first local oscillator is a frequency variable output in the 72 ~ 95MHz band and is generated by the PLL circuit having 2 locked loops. The second and third local oscillator outputs are fixed and are produced by multiplying or dividing the reference frequency signals.

The oscillating outputs produced within this unit are all determined by a single reference frequency. Adjusting this frequency corrects all the oscillating outputs.

5 - 3 - 1 REFERENCE OSCILLATOR CIRCUIT

The third overtone oscillator circuit of Q10 and X1 oscillates at 30.72MHz. Since this oscillation frequency determines the frequency within the PLL unit, high stability is required. A thermostatic oven is used for X1 and a stability of ±0.5ppm at $-30^{\circ}C \sim +60^{\circ}C$ is obtained.

5 - 3 - 2 SECOND LOCAL OSCILLATOR OUTPUT

The output of the reference oscillator circuit is doubled at Q14, has its spurious components removed by the band pass filter of L3 ~ L5, and fed to the RF unit. The output is +3dBm/50 ohms at 61.44MHz.

5 - 3 - 3 THIRD LOCAL OSCILLATOR OUTPUT

The output of the reference oscillator circuit is divided by 3 at IC5 to obtain 10.24MHz. It is fed to the MAIN unit through emitter follower Q203.

5 - 3 - 4 FIRST LOCAL OSCILLATOR OUTPUT

The PLL circuit composed of 2 locked loops, a main loop and sub-loop are used. The sub-loop is used for the heterodyne signal within the main loop and the VCO output from the main loop is used for the first local oscillator output. The sub-loop causes VCO Q201 to oscillate at approximately 115 ~ 120MHz. This signal passes buffer amplifier Q202 and is locked by PLL ICs IC201 and IC202. The phase comparator frequency of this loop is 5KHz and varies the dividing ratio of the programmable divider within IC201. A frequency variation of 5MHz in 50KHz steps is obtained. The locked VCO output passes through IC204 and IC203, is divided into 1/500 to a frequency of 230 ~ 240KHz. This is mixed by IC4 with the frequency of the reference oscillator circuit and is applied to IC3 within the main loop as a signal having a 10KHz variation in 100Hz steps within 30.95 ~ 30.96MHz.

The main loop switches 4 VCOs to oscillate at a frequency within 72.053MHz ~ 94.4529MHz, required by the first local oscillator. The lock is accomplished by the loop consisting of IC1, IC2, IC3, etc. The phase comparator frequency is 10KHz and varies the dividing ratio of the programmable divider within IC1 to vary the frequency in 10KHz steps. Further, mixer IC3 is provided within the loop. The signal obtained from the sub-loop having a frequency variable in 100Hz steps is used as a heterodyne signal. This covers the frequency variation in 100Hz steps required by the first local oscillator.

The comparator frequency for both the main and sub loops is produced by dividing the frequency of the reference oscillator circuit.

5 - 3 - 5 MUTE CIRCUIT

When the lock of the main or sub loop becomes "unlocked" or when the frequency is varied, the outputs of the first and second local oscillator are blocked to prevent transmitting or receiving on a frequency other than the desired one. The unlock signal output from IC1 and IC201 is given a suitable time constant by Q8 and Q9 and applied to Q24 and Q13 to stop the operation of the amplifiers in the first and second local oscillators, respectively, so that there are no outputs.

5 - 4 LOGIC CIRCUITS

All control of the receive and transmit frequencies of this equipment is performed by IC1005.

When the power is turned on, the signal from IC1008 (B) resets IC1005. The receiving and transmitting signal is fetched from the S input terminal and the frequency data stored in the RAM from the port F. (port H is for the control signal for the RAM) Next, IC1005 outputs, from port G, frequency data, PLL's N data (PLL control data), and switching data for the band pass filter and low-pass filter.

As a result of the data from port G and control signals D7 ~ D9, IC1006 outputs band switching data to P60 ~ P73 (Table 1), PLL control signals to P50 ~ P52, and mute signals for outside the marine bands to P40 ~ P41.

IC1007 buffers the outputs for the data from port G of IC1005 and the control signal from P52 of IC1006. IC1009 is the buffer for the low-pass filter switching relay. IC1008 (A) generates the mute signal output for frequencies outside 1600KHz to 23.99MHz.

TABLE 1

Port P	Band	B.P.F.	L.P.F.	VCO	Transmit Enable Band
P60	1.6000 ~ 2.9999MHz	B1	L1	V1	2.0000 ~ 2.9999MHz
P61	3.0000 ~ 4.9999MHz	B2	L2	V1	4.0000 ~ 4.9999MHz
P62	5.0000 ~ 6.9999MHz	B3	L3	V1	6.0000 ~ 6.9999MHz
P63	7.0000 ~ 9.9999MHz	B4	L4	V2	8.0000 ~ 8.9999MHz
P70	10.0000 ~ 11.9999MHz	B5	L5	V2	————
P71	12.0000 ~ 13.9999MHz	B5	L5	V3	12.0000 ~ 13.9999MHz
P72	14.0000 ~ 17.9999MHz	B6	L6	V3	16.0000 ~ 17.9999MHz
P73	18.0000 ~ 23.9999MHz	B7	L7	V4	22.0000 ~ 22.9999MHz

The RAM can memorize 48 channels each for receive and transmit frequencies and can store them for 5 years by means of a lithium battery.

5 - 5 CIRCUITS ON THE FRONT PANEL

IC1203 is a latched driver used to drive the 7-segment LEDs (DS1201-DS1206) for frequency display with data from the RAM unit.

Because the LEDs are dynamically lit, the BCD-coded signal from IC1005 in the LOGIC unit is converted to 7-segment data and passes through buffer IC1201 to light up an LED digit.

The output of IC1204 is used as a key scan signal when writing frequency data.

The output from IC1202, Q1202, and Q1203 is used as a control signal to light the MHz and KHz decimal points for zero blanking of the 10MHz LED.

IC1205, Q1205, and Q1206 comprise the key input gate for the frequency data and is used to output key scan data from IC1204 to port F of IC1005 in the LOGIC. (IC1205 uses a 3-state gate since port F is used while switching the input and output.)

S1228 is used to disable the key input and a key cannot be input in the open state.

Q1219 and Q1213 checks for receive and transmit based on the signal from the MAIN unit and outputs to IC1005 in the LOGIC unit.

Q1208 to Q1212 buffer the signal for mode switch S1224 and outputs to the MAIN unit.

5 - 6 CIRCUITS ON THE MIC UNIT

This board receives the signal from the MIC connector. This board is selectable according to the type of MIC and antenna tuner.

J1303 is a connector for the MIC. The use of each pin is as follows.

1. AF AF output from the main board.
2. PTT PTT pin. Transmits when shorted with pin 3.
3. PTTE Ground pin for the PTT.
4. MIC MIC ground pin.
5. MIC MIC pin. When shipped from the factory, a DC voltage is applied but becomes input through a capacitor when W1301 is cut.
6. NC
7. AF Connected to the built-in speaker. When the speaker switch is turned on while shorting pins 1 and 7, the built-in speaker is used.

USE OF THE SWITCHES

The 2 switches are for the antenna tuner which uses the output voltages from KEY (pin 1) and START (pin 2) of the tuner connector on the rear panel.

S1 TUNE SWITCH

1. Right side (as seen from the front): Normally, approximately 8V appears at the START pin. It is grounded when the tune switch on the front panel is depressed. (0V, sink)
2. Left side: Normally 0V. Approximately 8V appears at the START pin (internal resistance approximately 1K ohm) when the switch on the front panel is depressed.

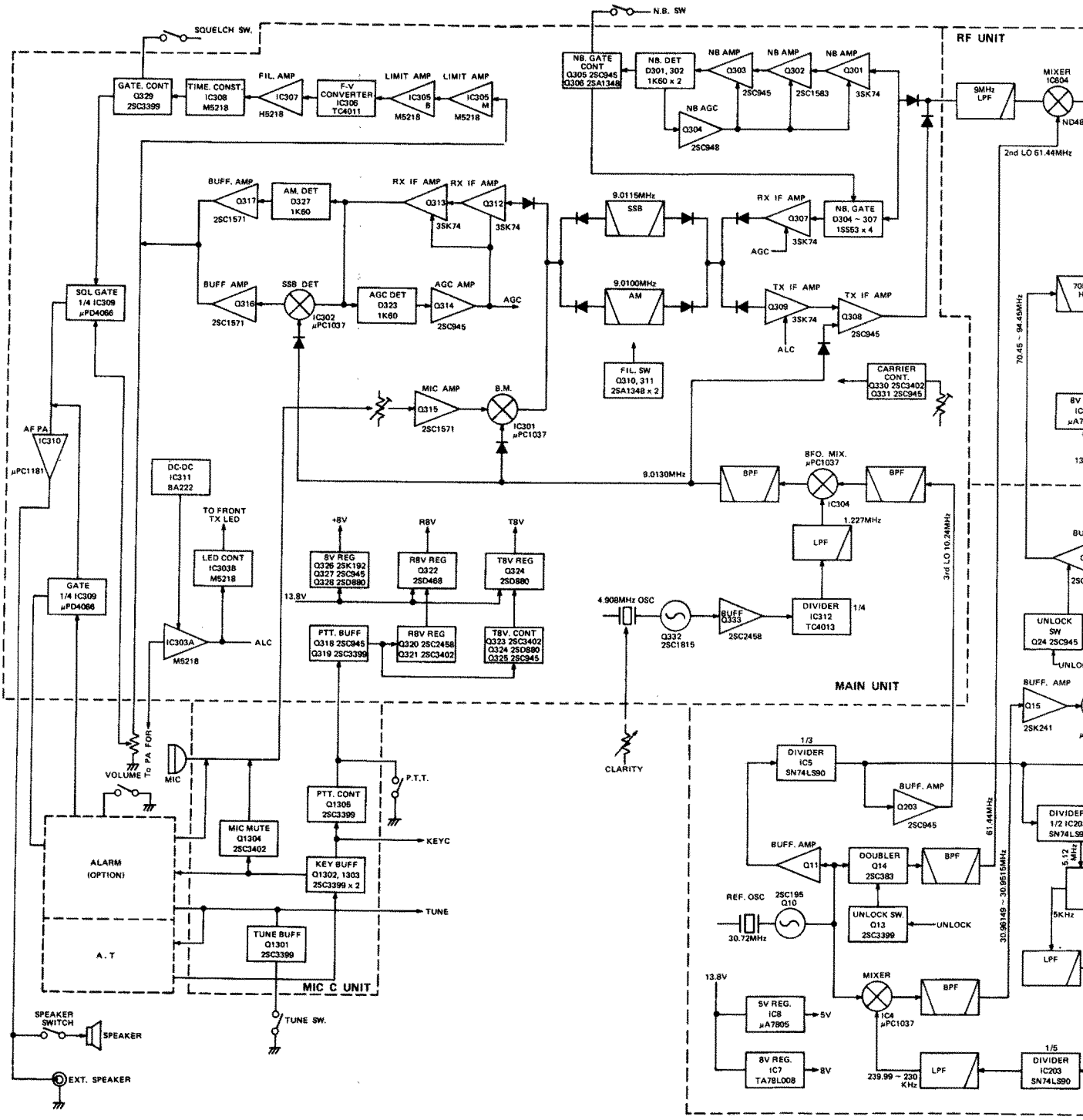
S2 KEY PIN SWITCH

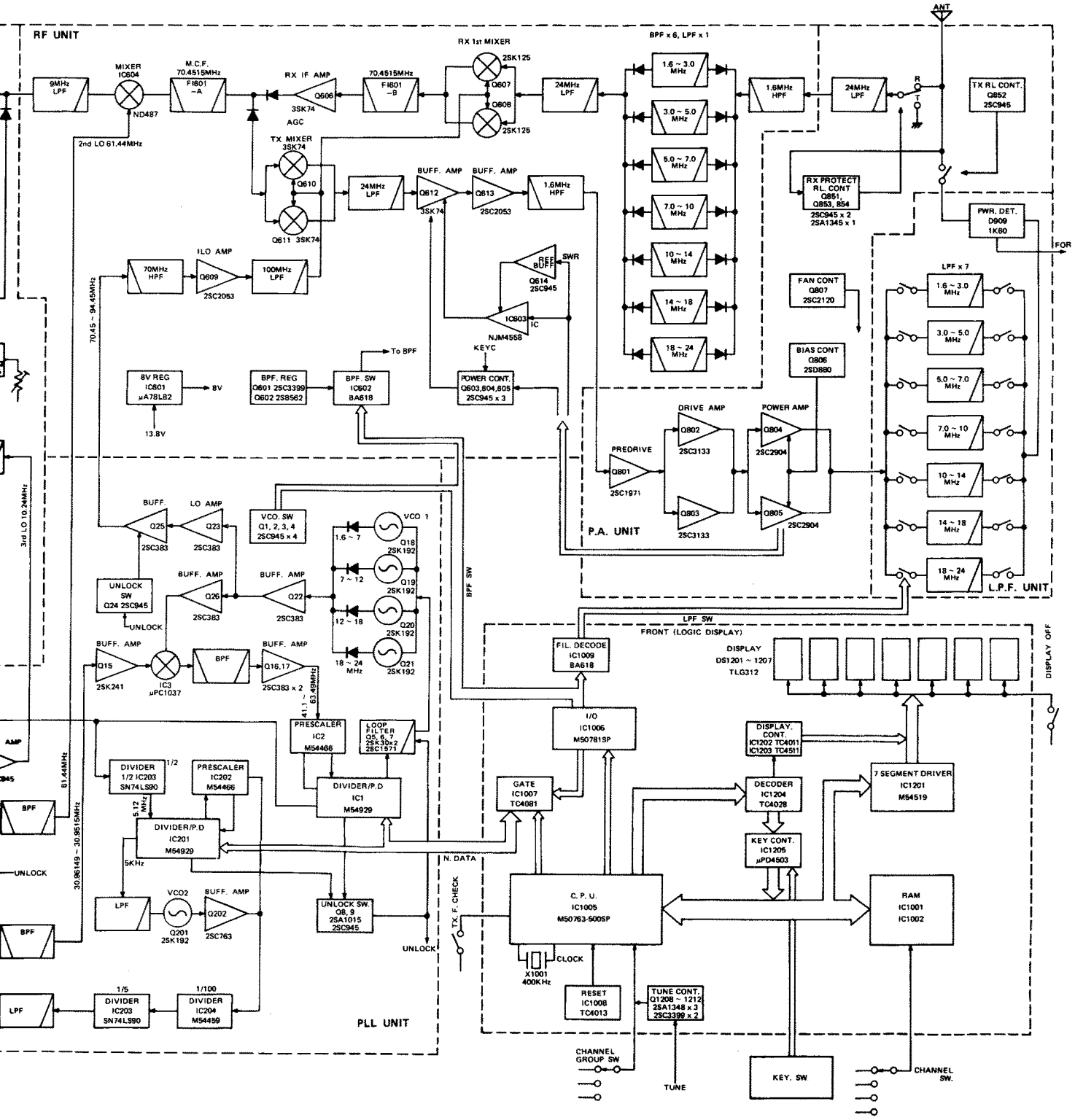
1. Right side: Tuning operation. The tuner sinks current. (approximately 0.4mA flows out) Normally open. (8V, 22K ohm)
2. Left side: Tuning operation. Voltage appears from the tuner side. (2 - 15V) Current: 50 - 400μA.

5 - 7 OTHER CIRCUIT

The rear panel chassis is mounted with the power input connector and other accessory connectors and serves to handle their wiring as well as those to each unit. Directly after the power connector is a reverse connection protection circuit of D872 and D873 which prevents damage to the equipment when the (+) and (–) terminals of the power cord have been inadvertently connected in reverse.

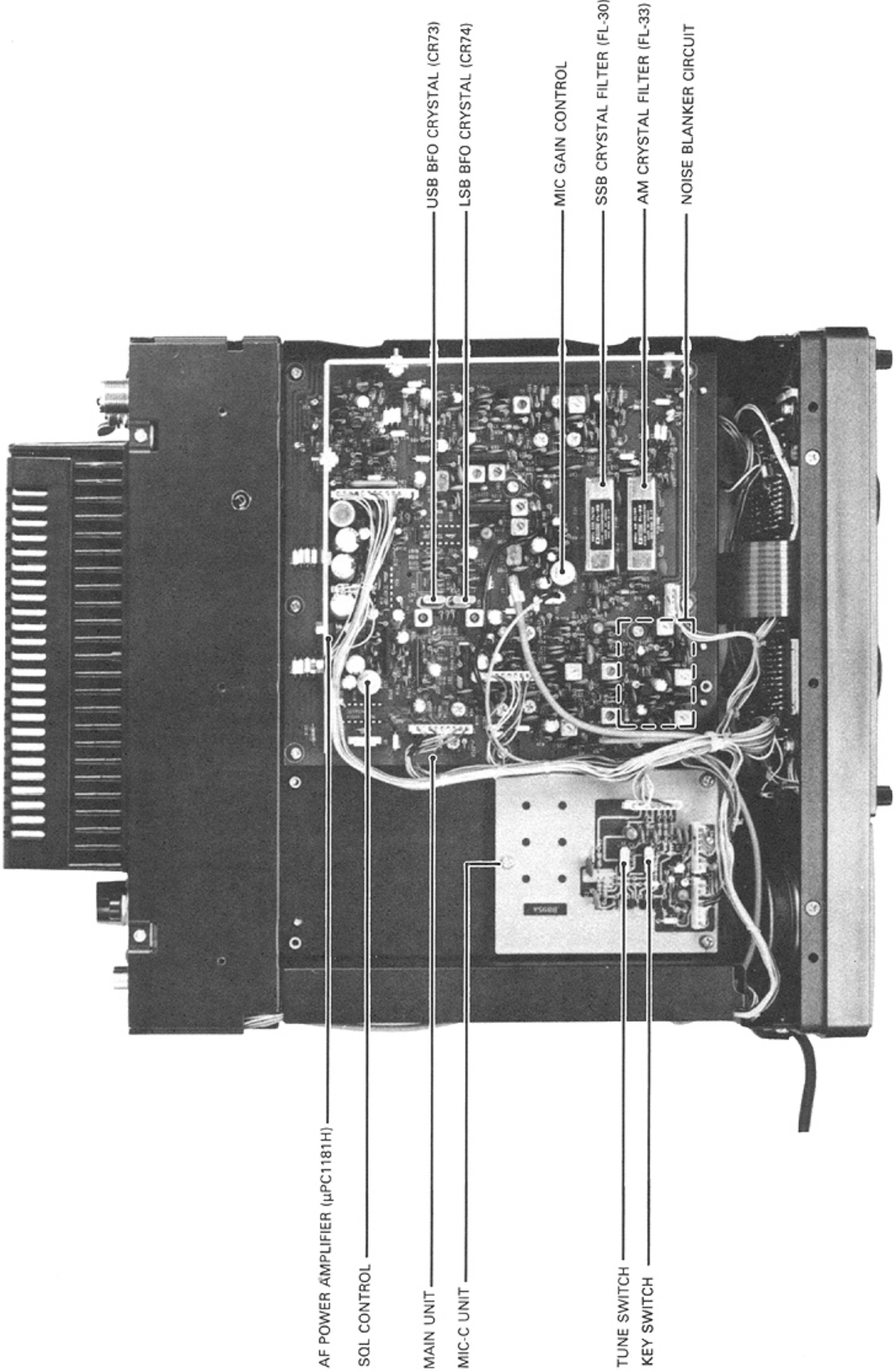
SECTION 6 BLOCK DIAGRAM



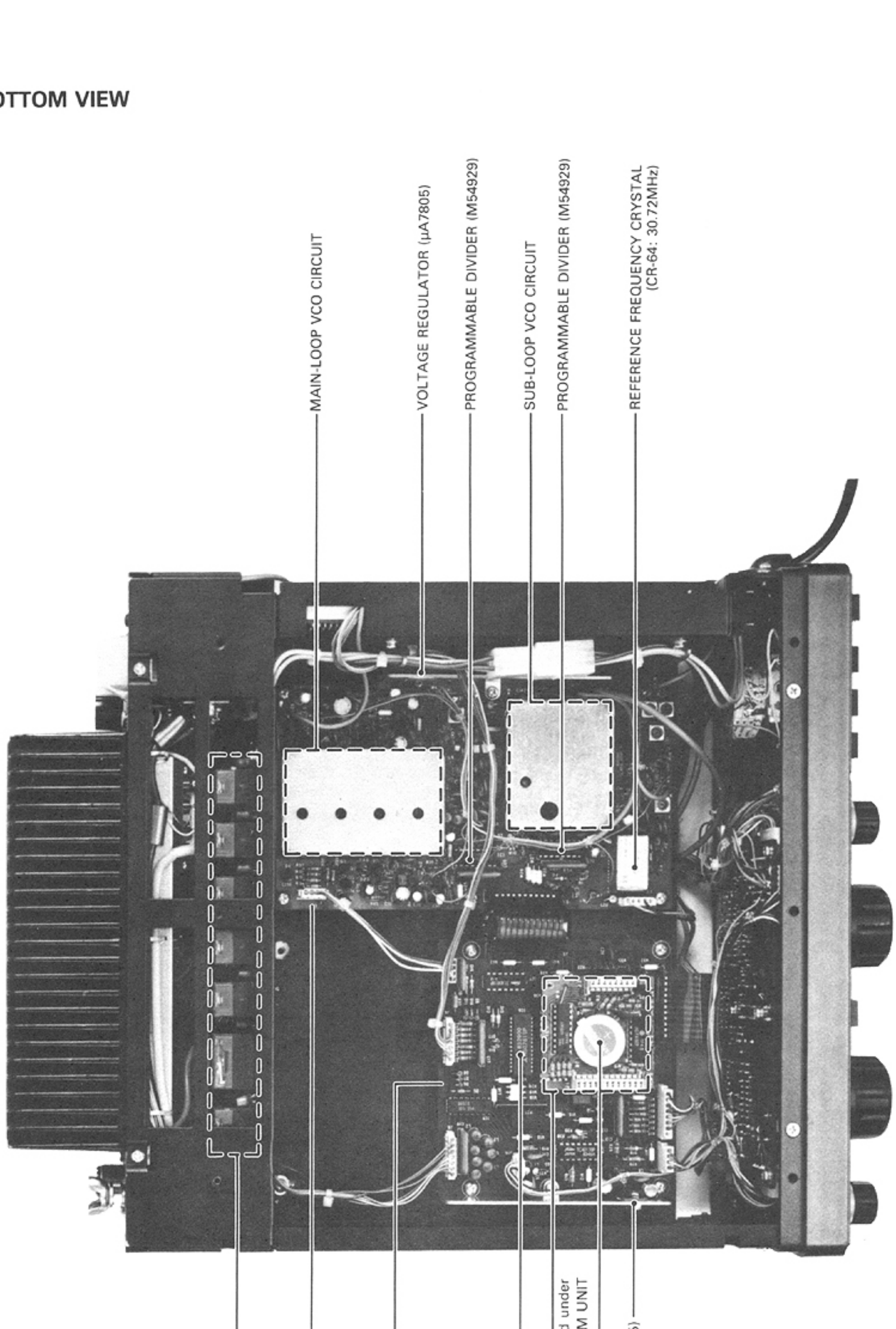

RF UNIT
ANT
RX 1st MIXER
BPF x 6, LPF x 1
MIXER IC604
M.C.F. 70.4515MHz FI601 -A
RX IF AMP Q606 3SK74
AGC
70.4515MHz FI601 -B
2SK125 Q607
Q608 2SK125
9MHz LPF
24MHz LPF
1.6MHz HPF
1.6 ~ 3.0 MHz
3.0 ~ 5.0 MHz
5.0 ~ 7.0 MHz
7.0 ~ 10 MHz
10 ~ 14 MHz
14 ~ 18 MHz
18 ~ 24 MHz
ND487
2nd LO 61.44MHz
TX MIXER 3SK74 Q610
Q611 3SK74
BUFF. AMP Q612 3SK74
BUFF. AMP Q613 2SC2053
TX RL CONT. Q852 2SC945
RX PROTECT RL. CONT Q851, Q853, 854
2SC945 x 2
2SA1345 x 1
PWR. DET. D909 1K60
FOR
LPF x 7
FAN CONT Q807 2SC2120
BIAS CONT Q806 2SD880
ILO AMP Q609 2SC2053
70MHz HPF
100MHz LPF
70.45 ~ 94.45MHz
REF BUFF Q614 2SC945
SWR
IC803 NJM4558
IC
KEYC
To BPF
8V REG IC601 μA78LB2
8V
13.8V
BPF. REG Q601 2SC3399 Q602 2SB562
BPF. SW IC602 BA618
POWER CONT. Q803,604,805 2SC945 x 3
DRIVE AMP Q802 2SC3133
POWER AMP Q804 2SC2904
PREDRIVE Q801 2SC1971
Q803 2SC3133
Q805 2SC2904
P.A. UNIT
L.P.F. UNIT
3rd LO 10.24MHz
BUFF. Q25 2SC383
LO AMP Q23 2SC383
VCO. SW Q1, 2, 3, 4 2SC945 x 4
VCO 1
1.6 ~ 7
7 ~ 12
12 ~ 18
18 ~ 24 MHz
Q18 2SK192
Q19 2SK192
Q20 2SK192
Q21 2SK192
UNLOCK SW Q24 2SC945
UNLOCK
BUFF. AMP Q26 2SC383
BUFF. AMP Q22 2SC383
BPF SW
LPF SW
FRONT (LOGIC DISPLAY)
FIL. DECODE IC1009 BA618
DISPLAY DS1201 ~ 1207 TLG312
DISPLAY OFF
BUFF. AMP Q15 2SK241
IC3 μPC1037
BPF
BUFF. AMP Q16,17 2SC383 x 2
41.1 ~ 63.49MHz
PRESCALER IC2 M54466
LOOP FILTER Q5, 6, 7 2SK30x2 2SC1571
I/O IC1006 M50781SP
DISPLAY. CONT. IC1202 TC4011 IC1203 TC4511
DIVIDER 1/2 IC203 SN74LS90
1/2
PRESCALER IC202 M54466
DIVIDER/P.D IC1 M54929
GATE IC1007 TC4081
DECODER IC1204 TC4028
7 SEGMENT DRIVER IC1201 M54519
5.12 MHz
DIVIDER/P.D IC201 M54929
KEY CONT. IC1205 μPD4503
5KHz
N. DATA
C. P. U. IC1005 M50763-500SP
RAM IC1001 IC1002
TX. F. CHECK
CLOCK
X1001 400KHz
RESET IC1008 TC4013
TUNE CONT. Q1208 ~ 1212 2SA1348 x 3 2SC3399 x 2
61.44MHz
30.96149 ~ 30.95156MHz
UNLOCK
LPF
VCO2 Q201 2SK192
BUFF. AMP Q202 2SC763
UNLOCK SW. Q8, 9 2SA1015 2SC945
1/5
DIVIDER IC203 SN74LS90
1/100
DIVIDER IC204 M54459
PLL UNIT
CHANNEL GROUP SW
TUNE
KEY. SW.
CHANNEL SW.

SECTION 7 INSIDE VIEWS

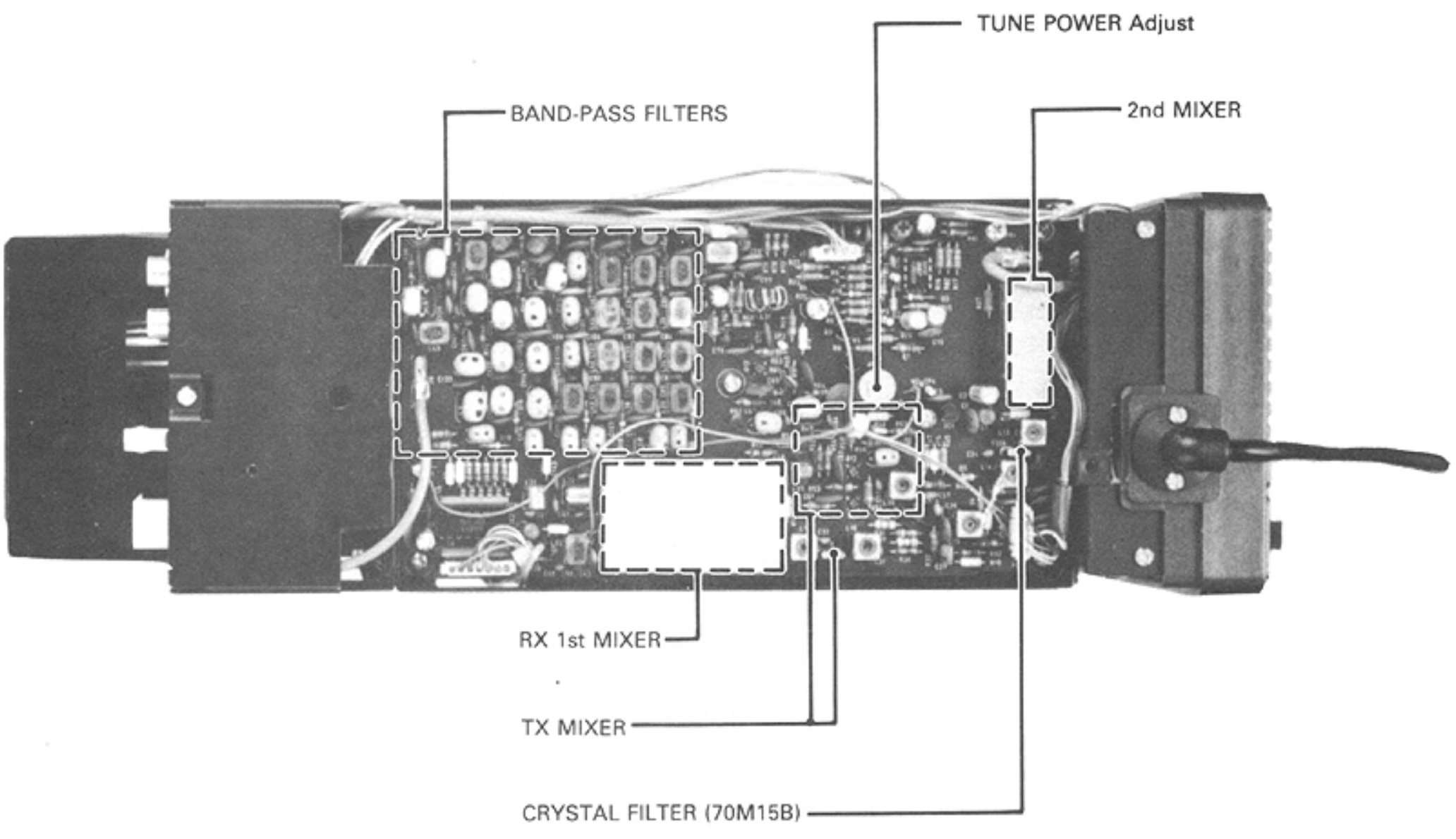
TOP VIEW



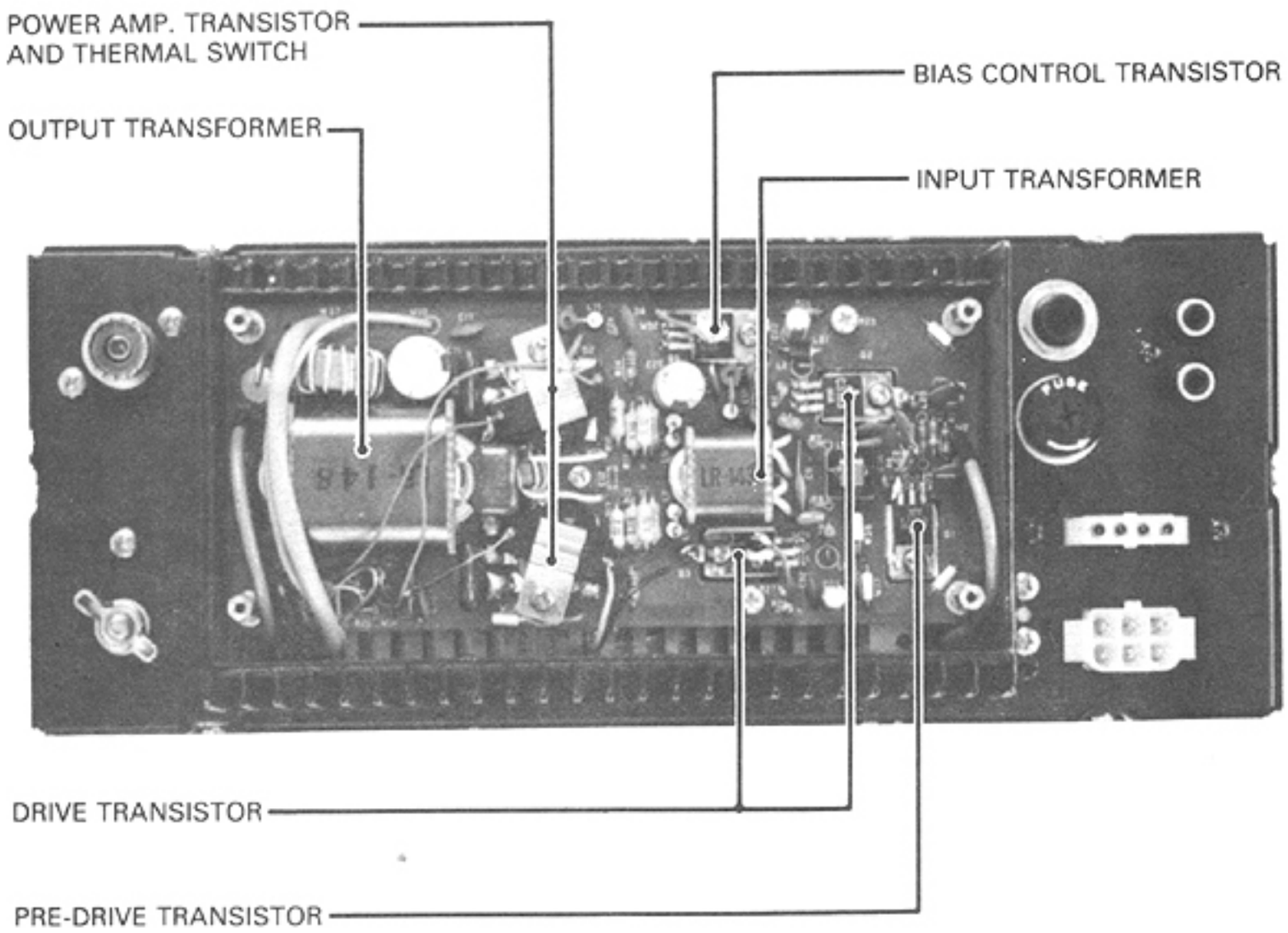
BOTTOM VIEW


FILTER UNIT
PLL UNIT
LOGIC UNIT
I/O EXPANDER IC (M50781SP)
RAM UNIT
*CPU (M50763-500SP) is located under RAM UNIT
LITHIUM BACK-UP BATTERY
VOLTAGE REGULATOR (µA7805)
MAIN-LOOP VCO CIRCUIT
VOLTAGE REGULATOR (µA7805)
PROGRAMMABLE DIVIDER (M54929)
SUB-LOOP VCO CIRCUIT
PROGRAMMABLE DIVIDER (M54929)
REFERENCE FREQUENCY CRYSTAL (CR-64: 30.72MHz)

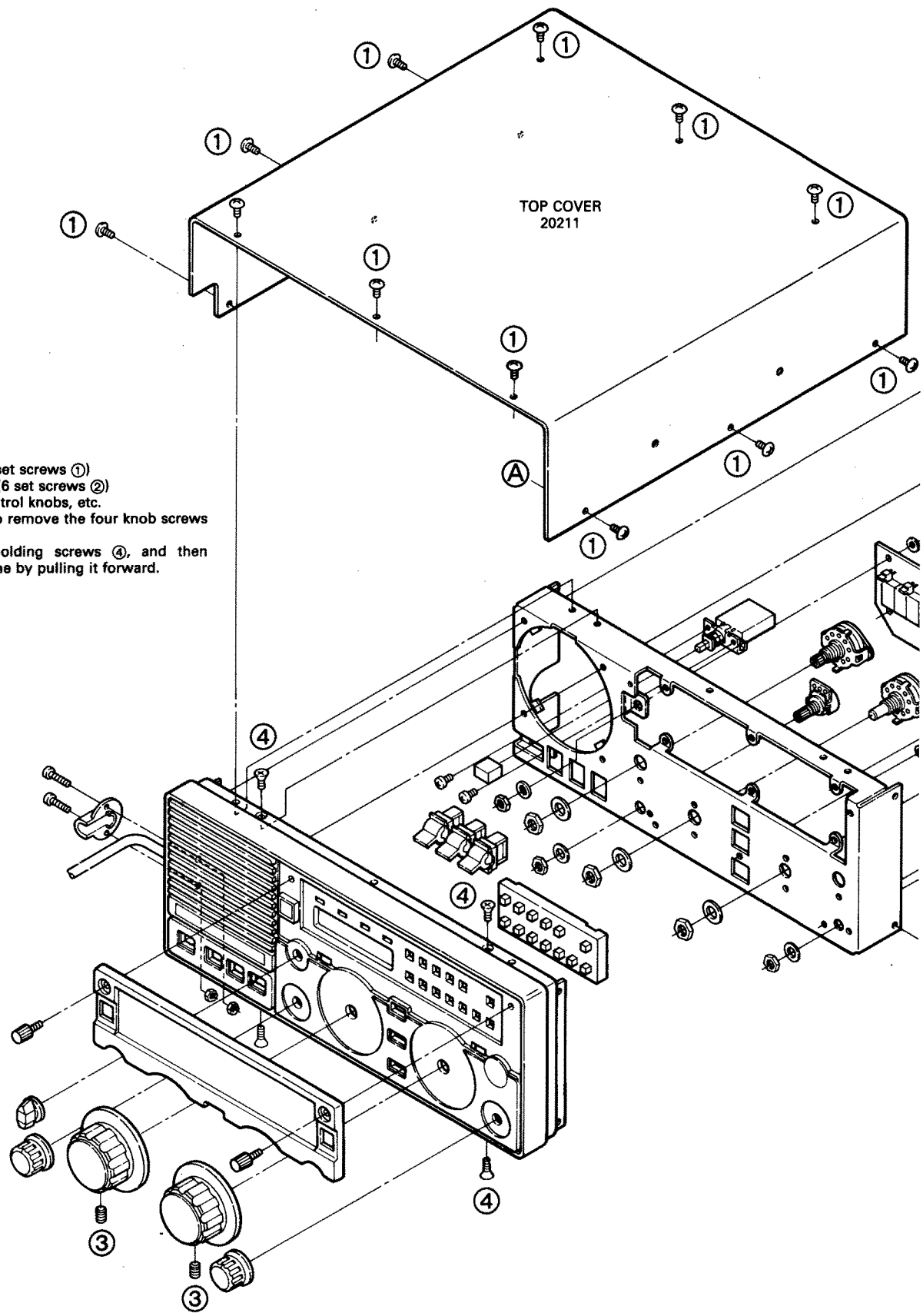
RF UNIT SIDE



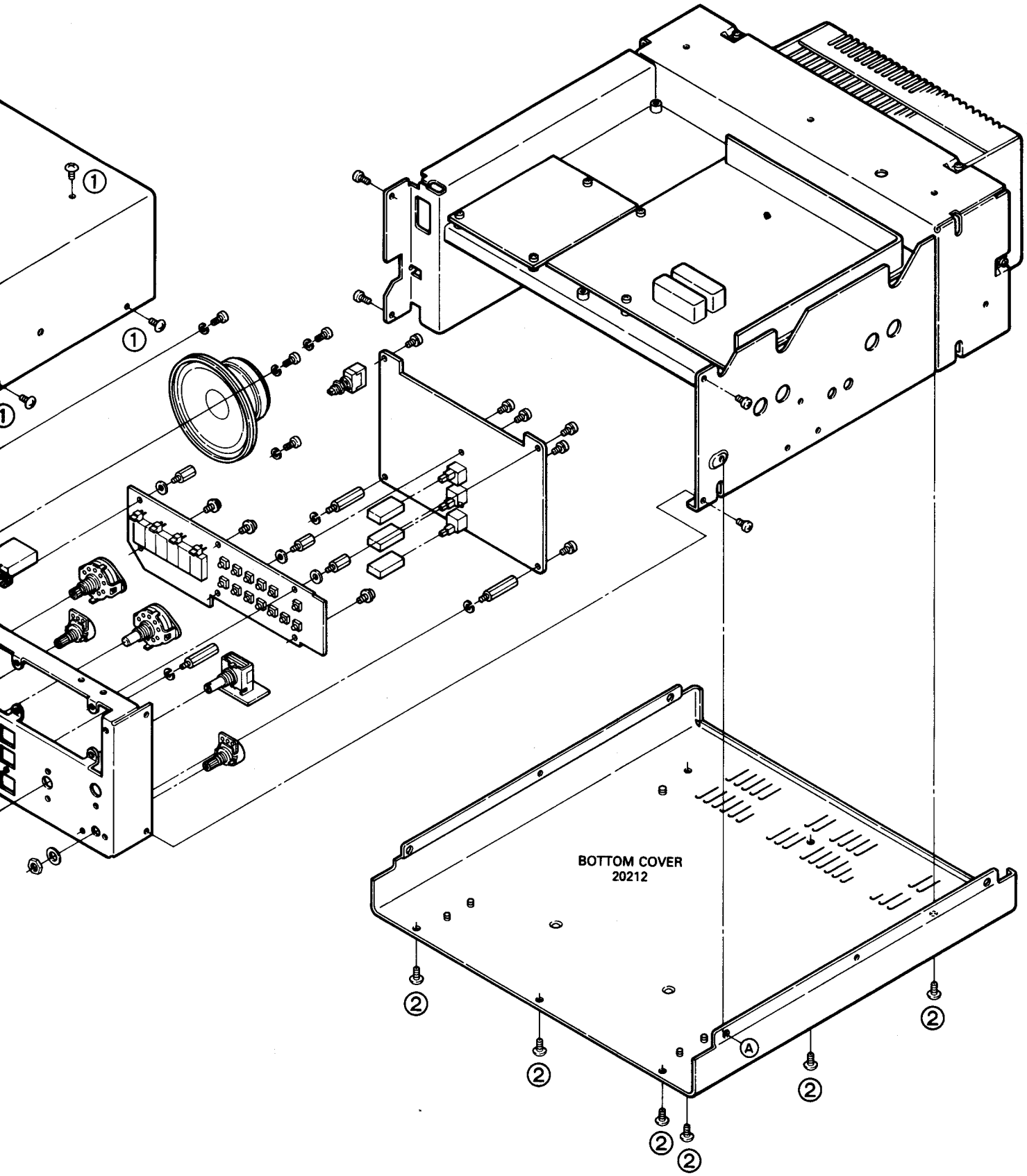
PA UNIT SIDE



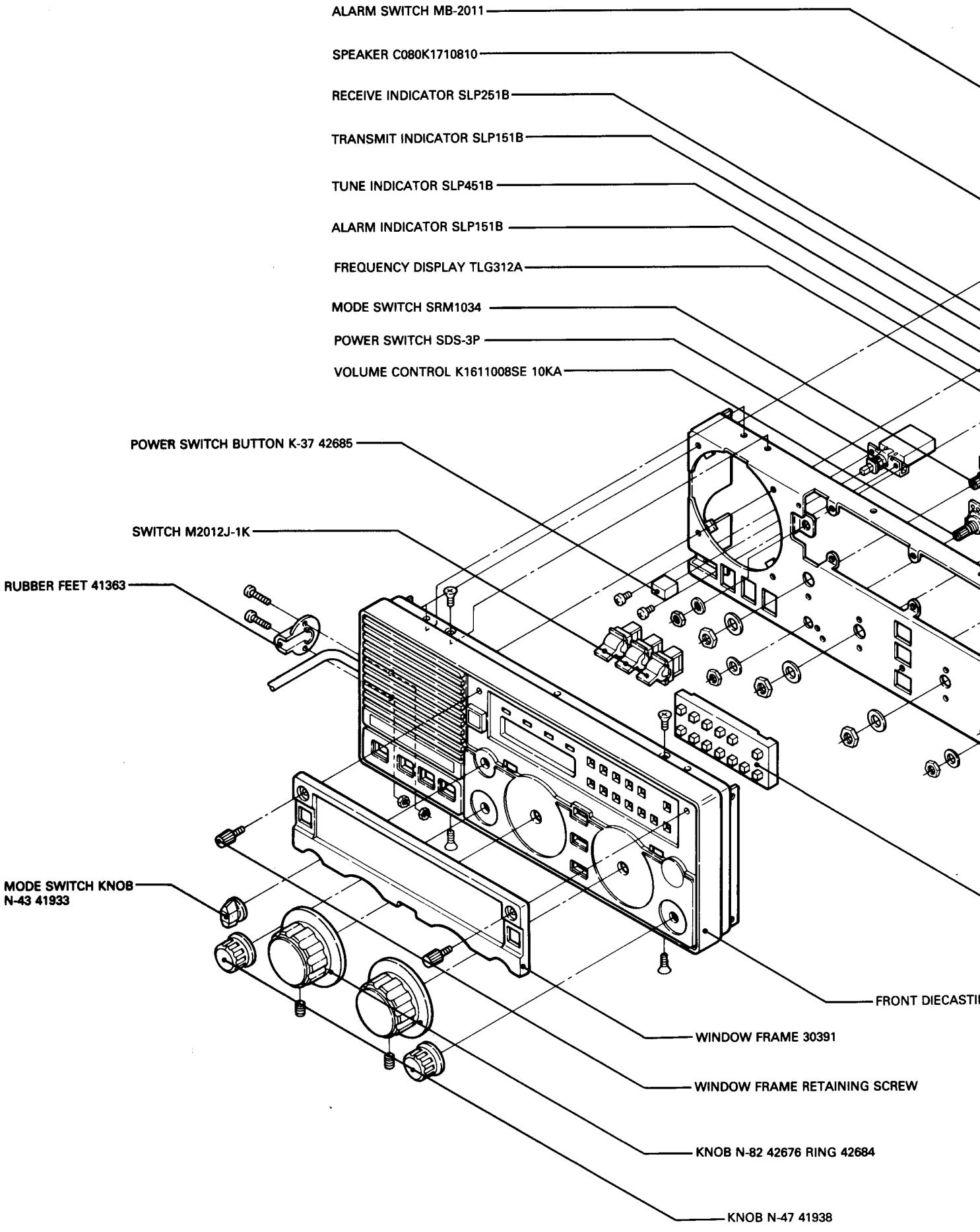
SECTION 8 MECHANICAL PARTS AND DISASSEMBLY

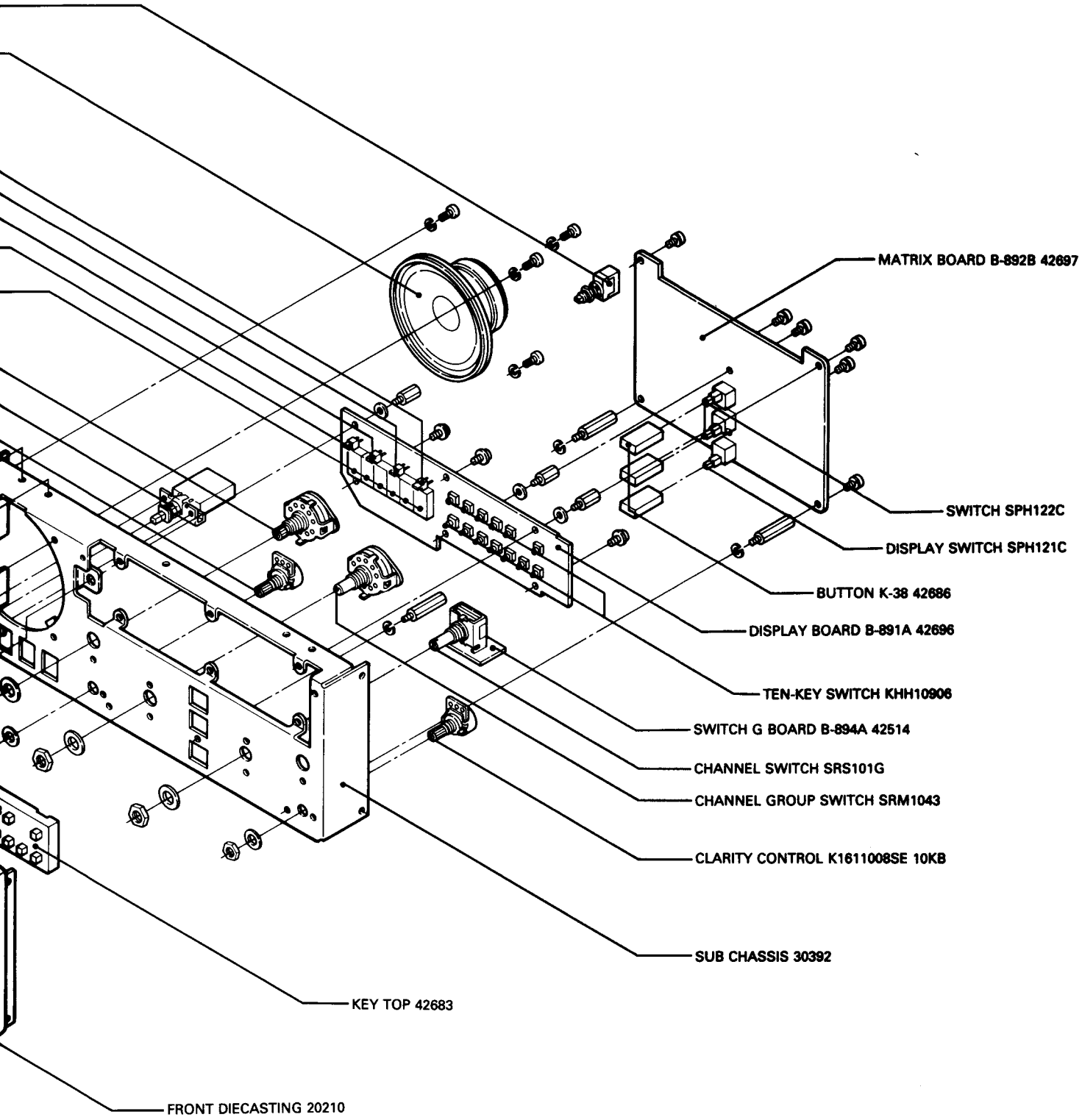


1. Remove the top cover. (12 set screws ①)
2. Remove the bottom cover. (6 set screws ②)
3. Remove the front panel control knobs, etc.
   (Use a hexagonal wrench to remove the four knob screws ③.)
4. Remove the four frame-holding screws ④, and then remove the front panel frame by pulling it forward.


①
①
①
BOTTOM COVER
20212
②
②
②
②
②
②
Ⓐ

FRONT PANEL


ALARM SWITCH MB-2011
SPEAKER C080K1710810
RECEIVE INDICATOR SLP251B
TRANSMIT INDICATOR SLP151B
TUNE INDICATOR SLP451B
ALARM INDICATOR SLP151B
FREQUENCY DISPLAY TLG312A
MODE SWITCH SRM1034
POWER SWITCH SDS-3P
VOLUME CONTROL K1611008SE 10KA
POWER SWITCH BUTTON K-37 42685
SWITCH M2012J-1K
RUBBER FEET 41363
MODE SWITCH KNOB N-43 41933
FRONT DIECASTI
WINDOW FRAME 30391
WINDOW FRAME RETAINING SCREW
KNOB N-82 42676 RING 42684
KNOB N-47 41938



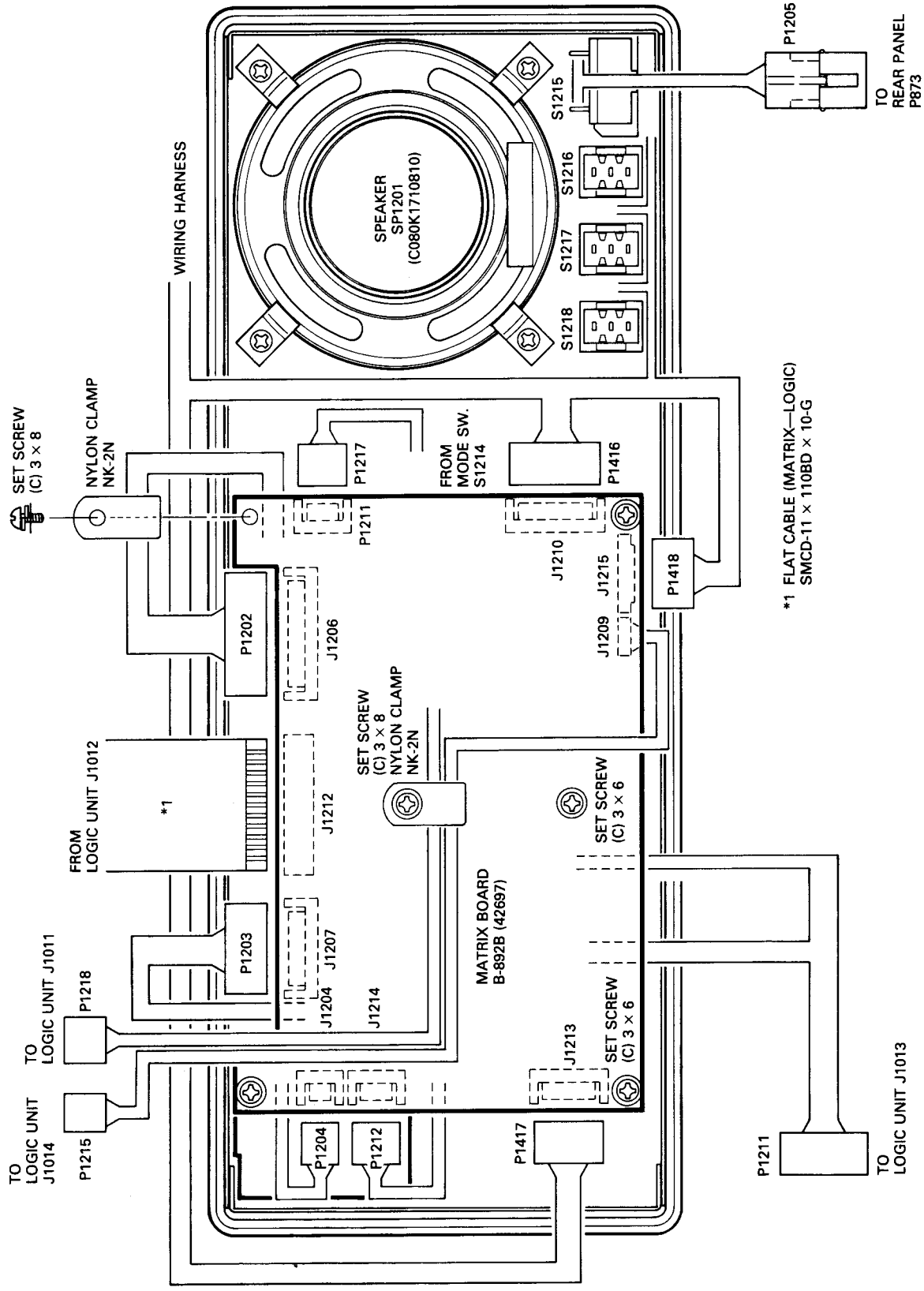
OW FRAME 30391

OW FRAME RETAINING SCREW

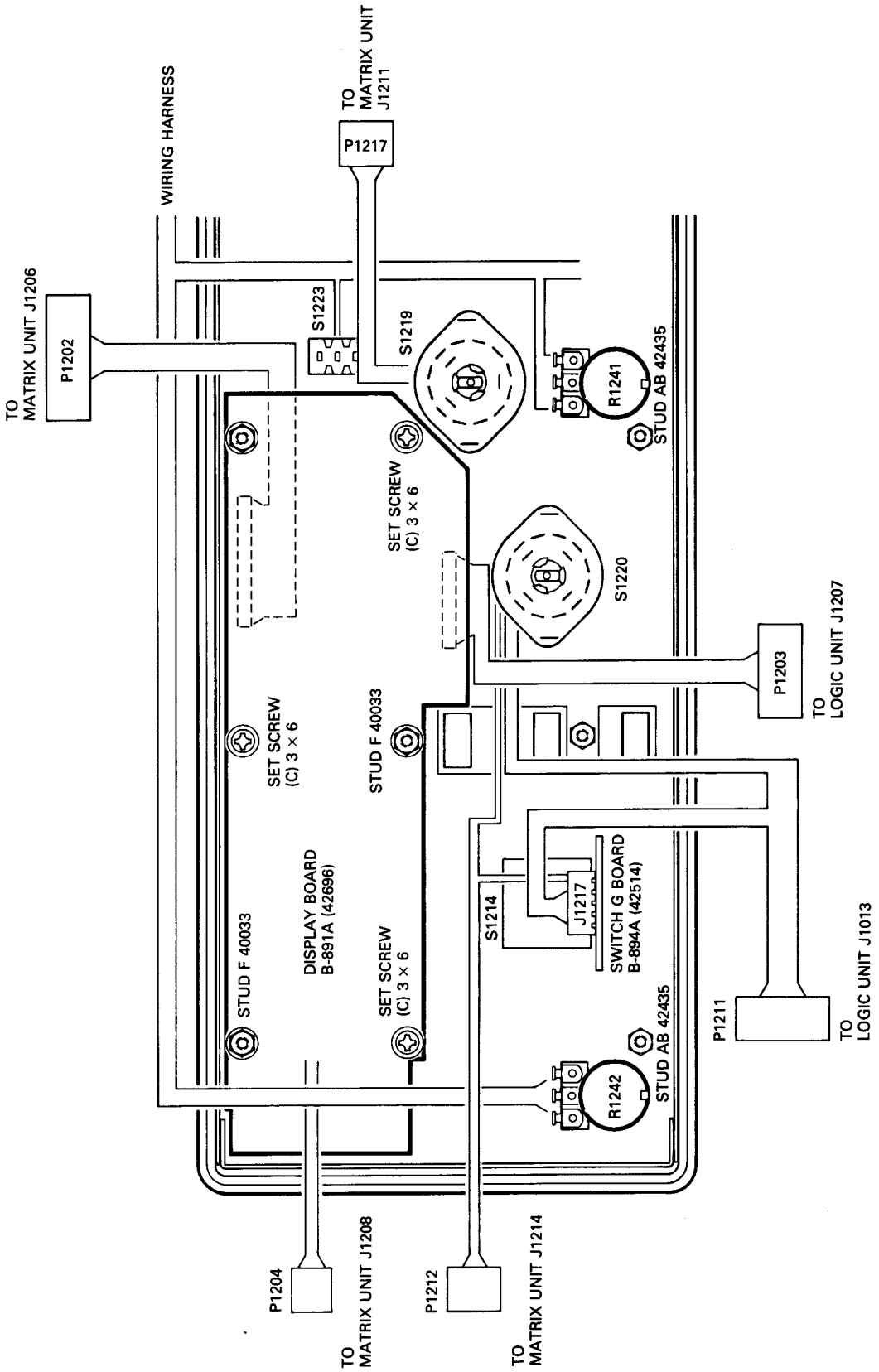
B N-82 42676 RING 42684

KNOB N-47 41938

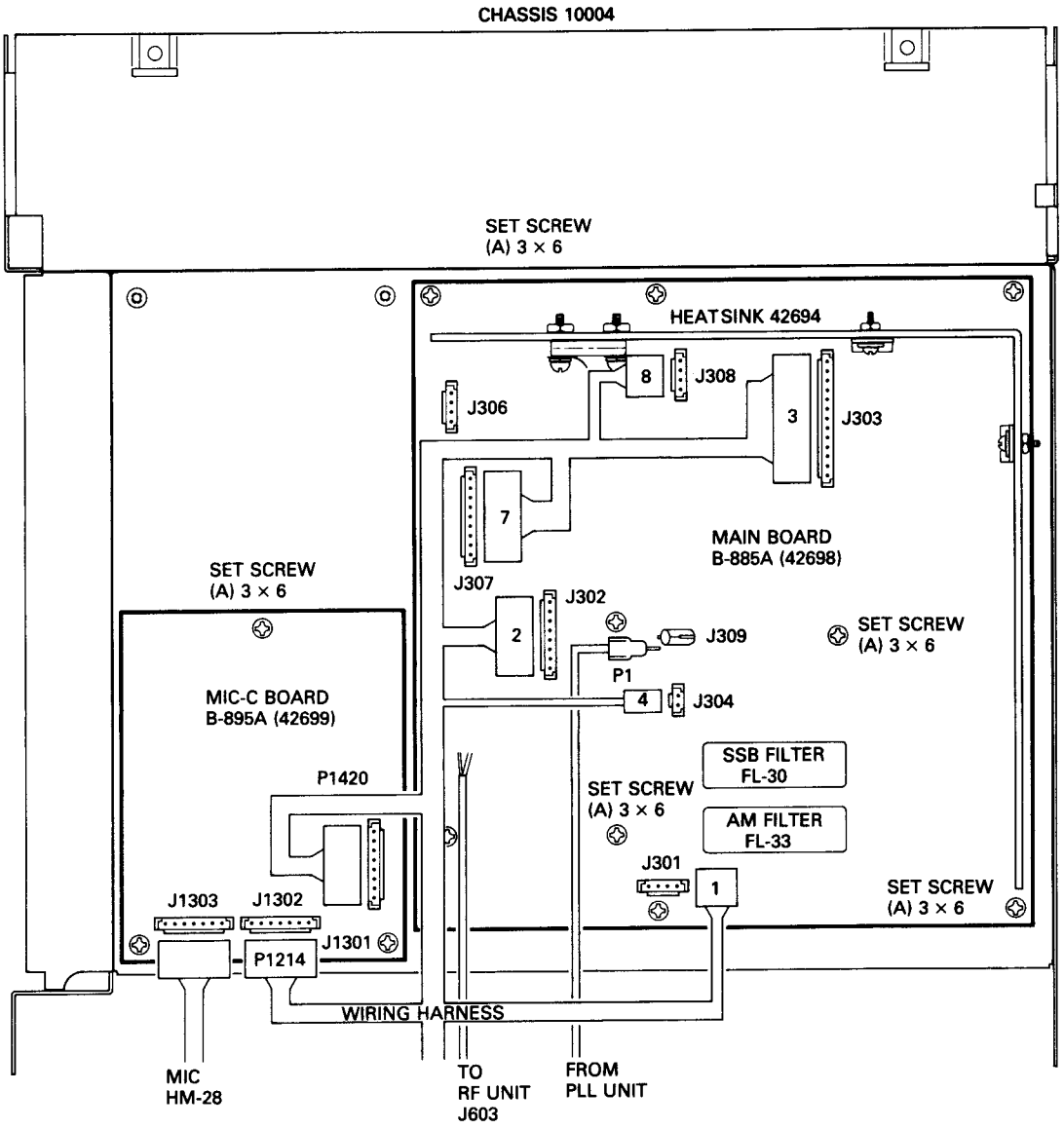
FRONT PANEL CONNECTOR CONNECTIONS (1)



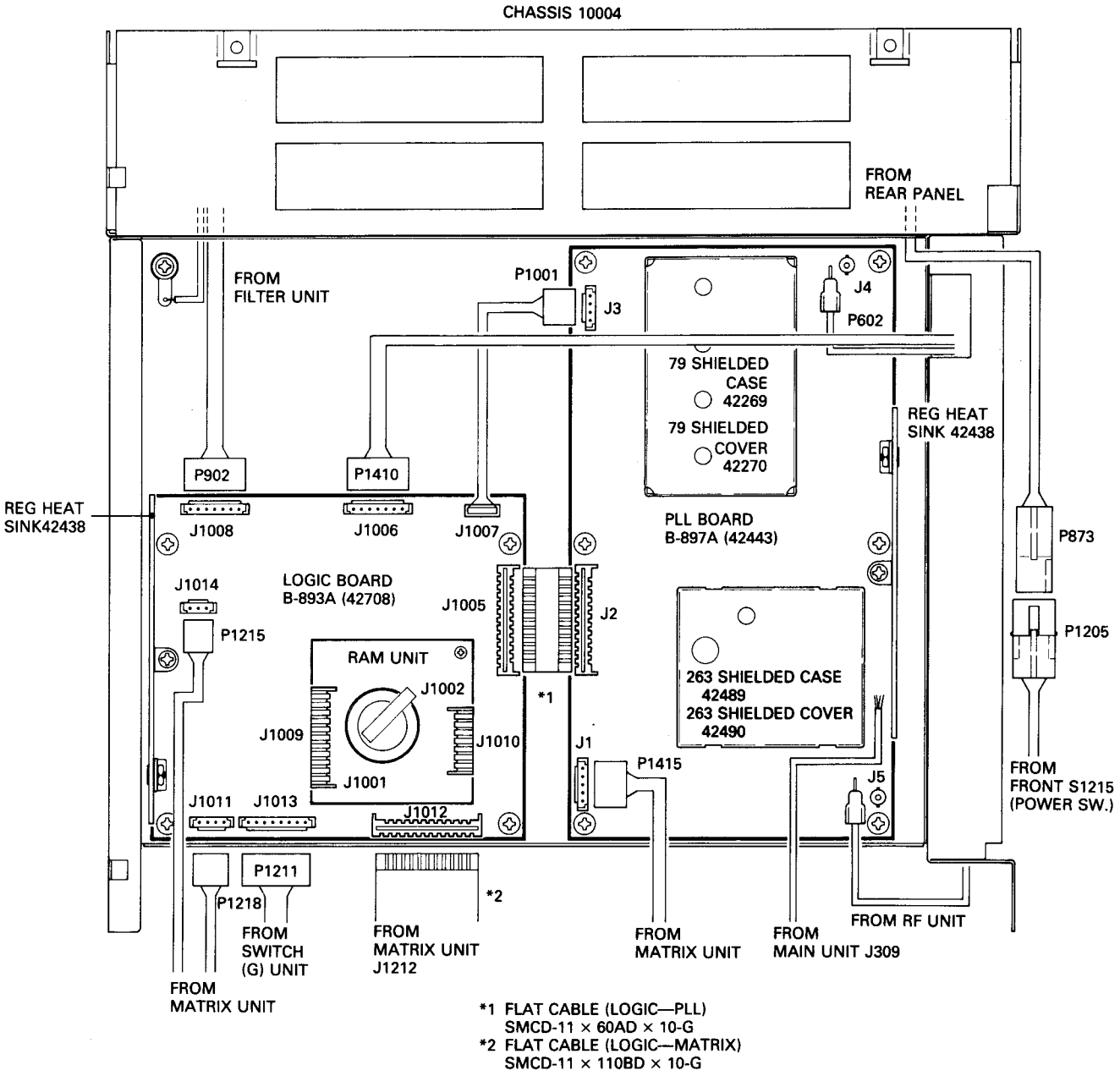
FRONT PANEL CONNECTOR CONNECTIONS (2)



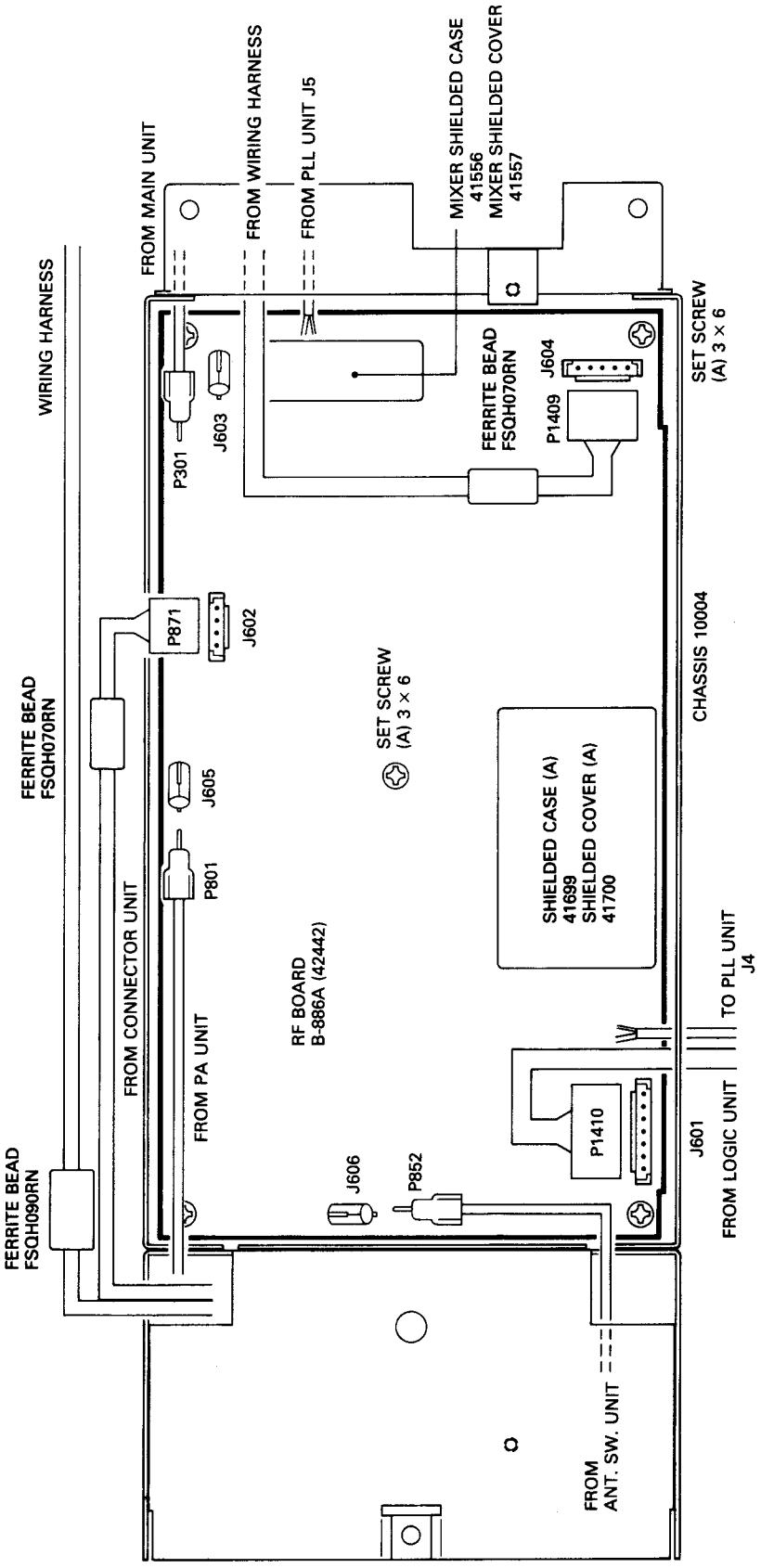
MAIN UNIT SIDE CONNECTOR CONNECTIONS



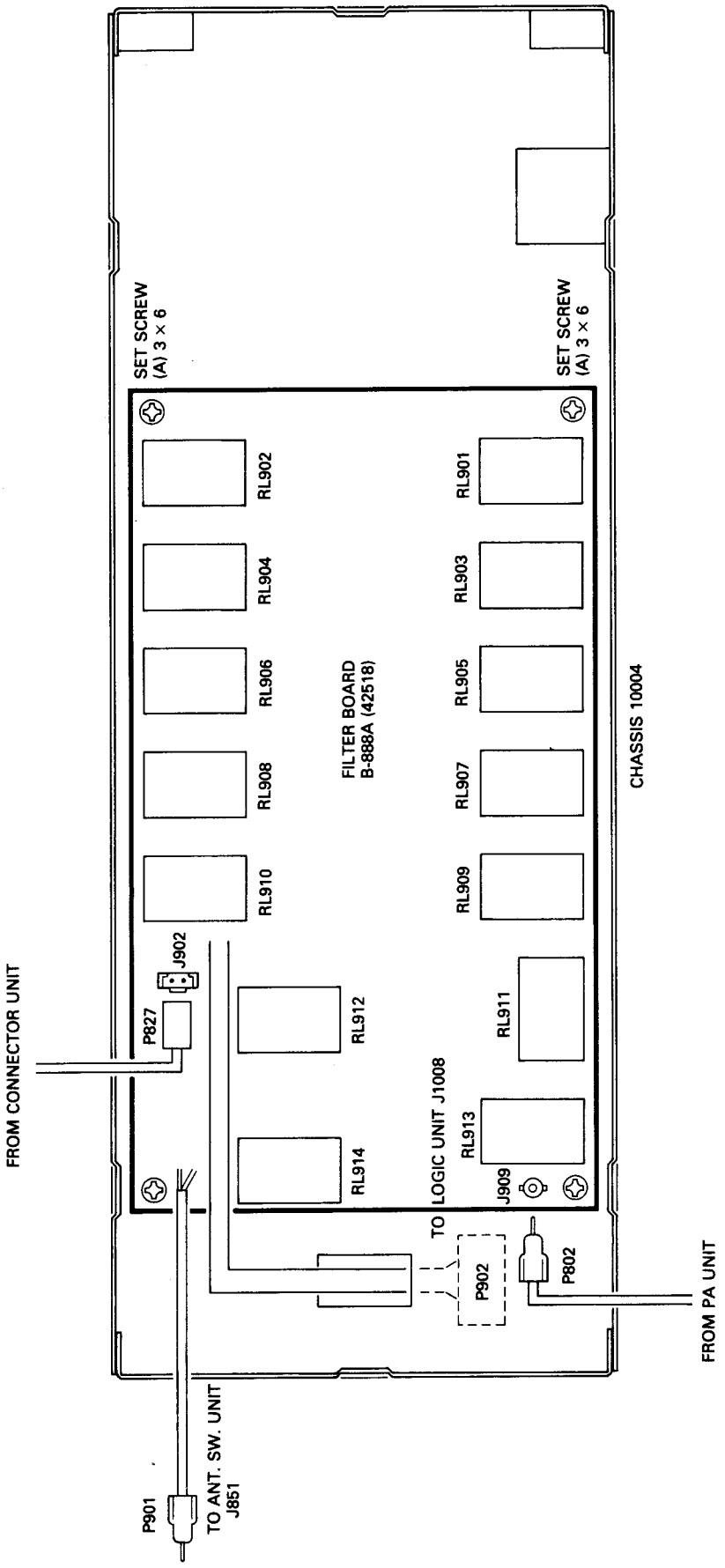
LOGIC·PLL UNIT SIDE CONNECTOR CONNECTIONS



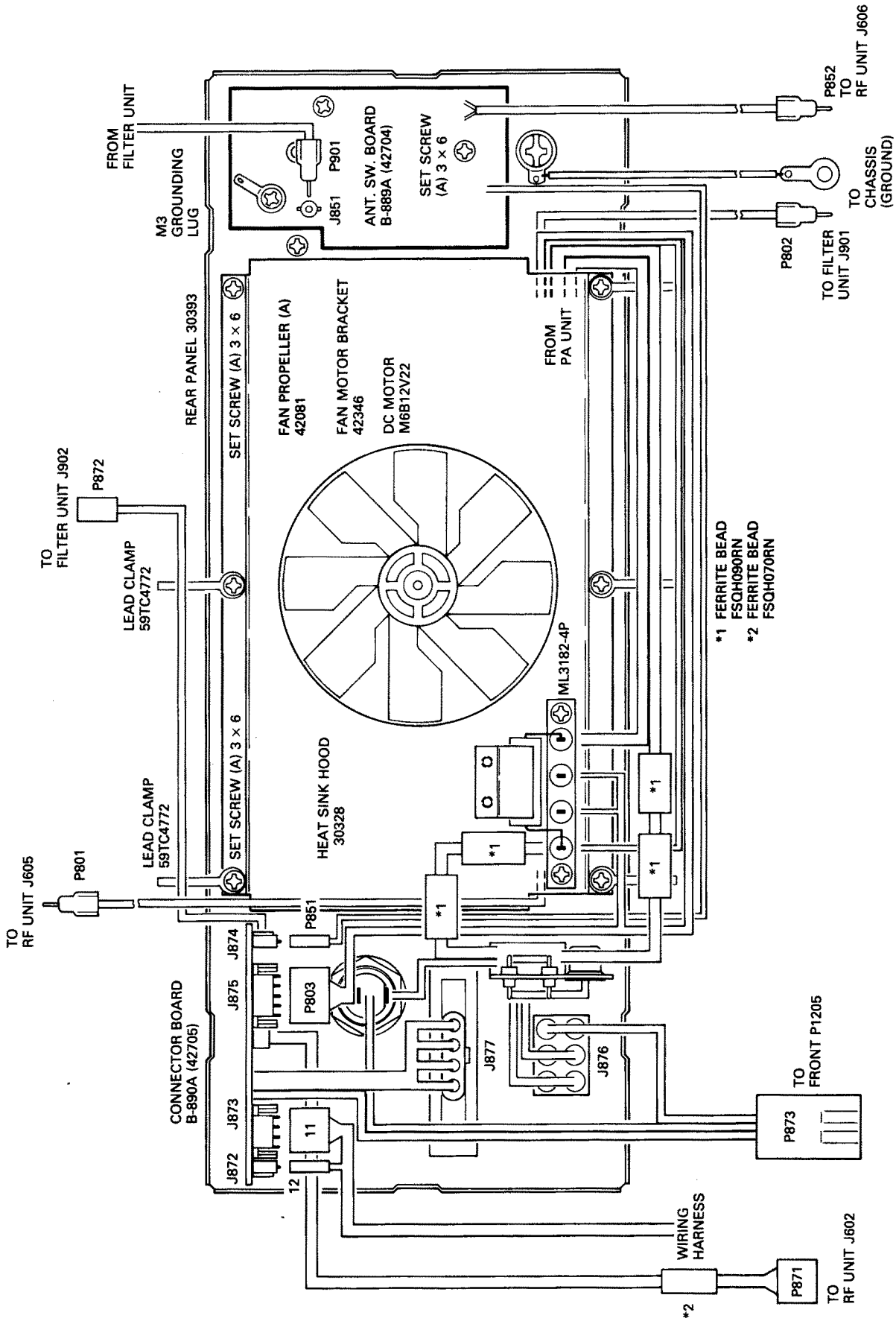
RF UNIT SIDE CONNECTOR CONNECTIONS



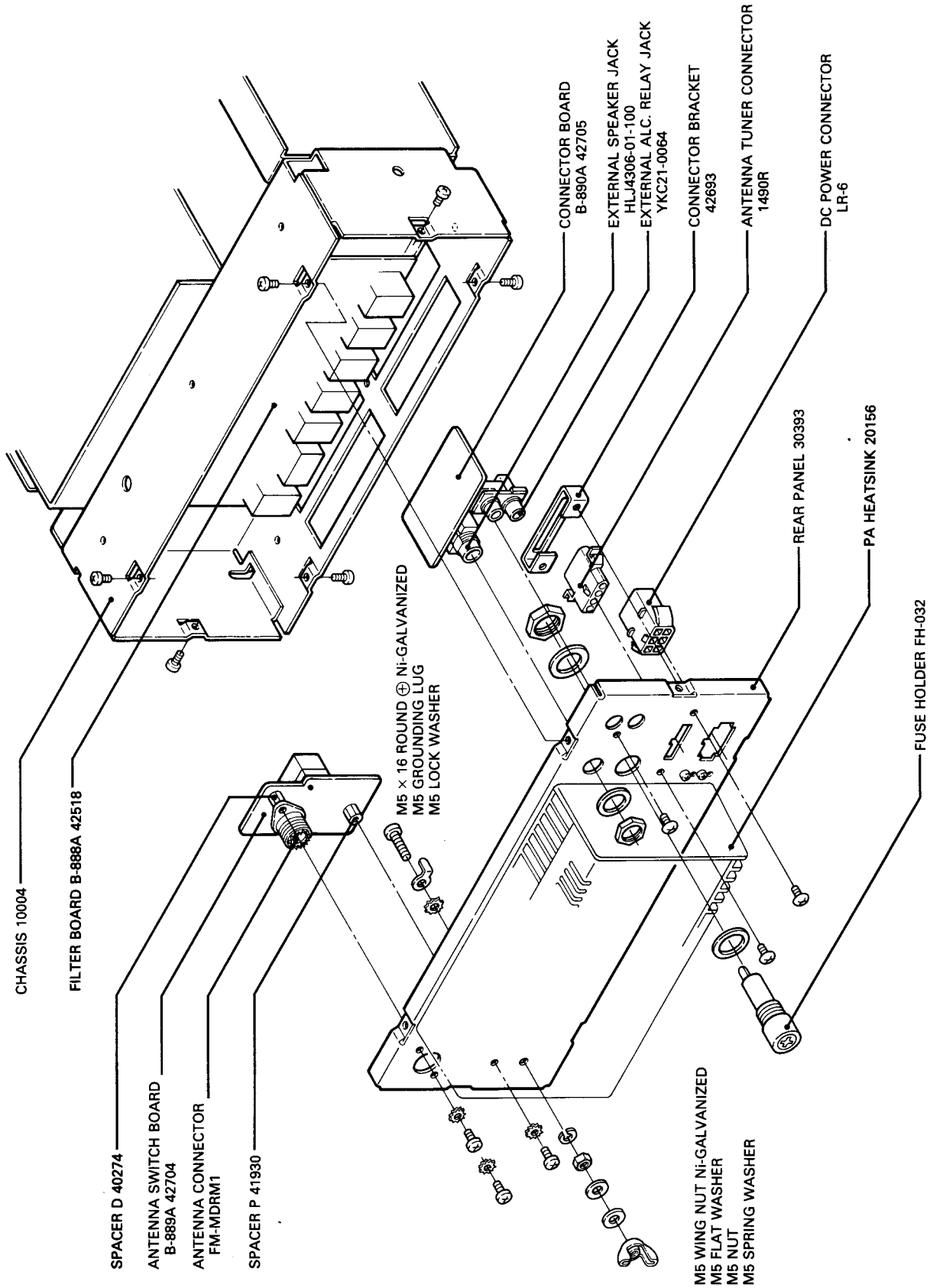
FILTER UNIT SIDE CONNECTOR CONNECTIONS



REAR PANEL CONNECTOR CONNECTIONS

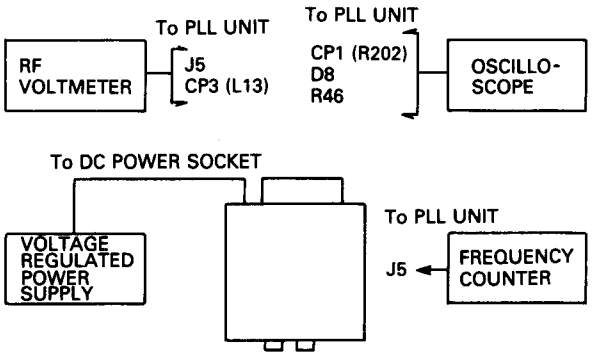


REAR PANEL PARTS



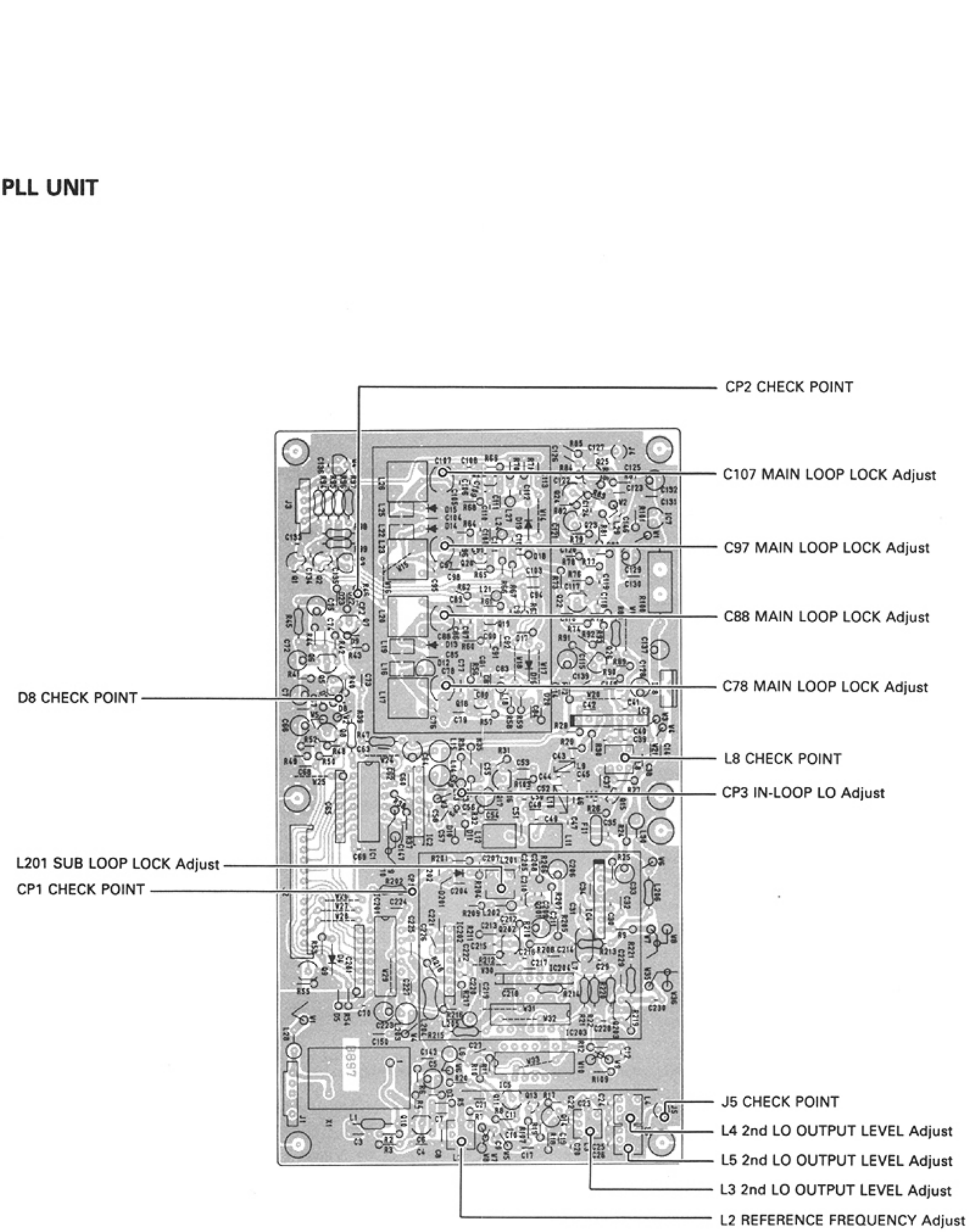
SECTION 9 MAINTENANCE AND ADJUSTMENT

9 - 1 PLL ADJUSTMENT

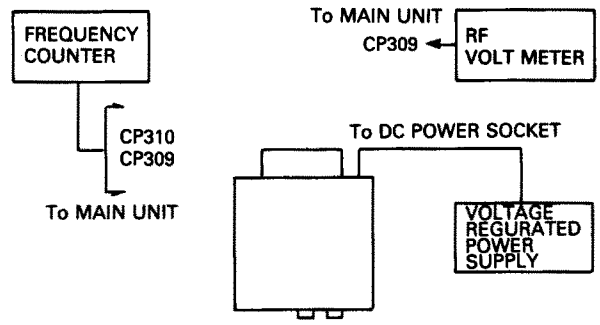
INSTRUMENTS REQUIRED		CONNECTIONS
(1) VOLTAGE REGULATED POWER SUPPLY : OUTPUT VOLTAGE : CURRENT CAPACITY (2) FREQUENCY COUNTER : FREQUENCY RANGE : ACCURACY : SENSITIVITY (3) RF VOLTMETER : FREQUENCY RANGE : MEASURING RANGE (4) OSCILLOSCOPE : FREQUENCY RANGE : MEASURING RANGE	 DC 13.6V ± 15% 30A or more 0.1 ~ 90MHz ± 1ppm or better 100mV or better 0.1 ~ 80MHz 0.01 ~ 10V DC ~ 20MHz 0.01 ~ 10V	

Adjustment		Adjustment conditions	Unit	Measurement location	Adjustment value	Unit	Adjustment point
IN-LOOP LO	1.	• Display frequency: 6.9999MHz • MODE: Any	PLL	Connect the RF voltmeter to CP3 (L13).	Adjust to maximum output: 200 ~ 400mVrms	PLL	L8
SUB LOOP LOCK VOLTAGE	1.	• Display frequency: 7.0000MHz • MODE: Any	PLL	Connect the oscilloscope to CP1 (R202).	3V	PLL	L201
	2.	• Display frequency: 6.9999MHz			Approx. 1.5V		Confirming
	3.			Connect the oscilloscope to D8	2.5 ~ 2.8V		
MAIN LOOP LOCK VOLTAGE	1.	• Display frequency: 6.9999MHz • MODE: Any	PLL	Connect the oscilloscope to CP2 (R46).	6.5V	PLL	C78
	2.	• Display frequency: 11.9999MHz					C88
	3.	• Display frequency: 17.9999MHz					C97
	4.	• Display frequency: 23.9999MHz					C107
REFERENCE FREQUENCY	1.	• Display frequency: Any • MODE: Any	PLL	Connect the frequency counter to J5.	61.440043MHz	PLL	L2
		Note: Adjust to the figure of 1Hz completely.					
2nd LO OUT-PUT LEVEL	1.	• Display frequency: Any • MODE: Any	PLL	Terminate J5 with a 50Ω resistor and connect the RF voltmeter there.	Adjust to maximum output: + 1 ~ 5dBm/50Ω	PLL	L3 ~ L5

PLL UNIT

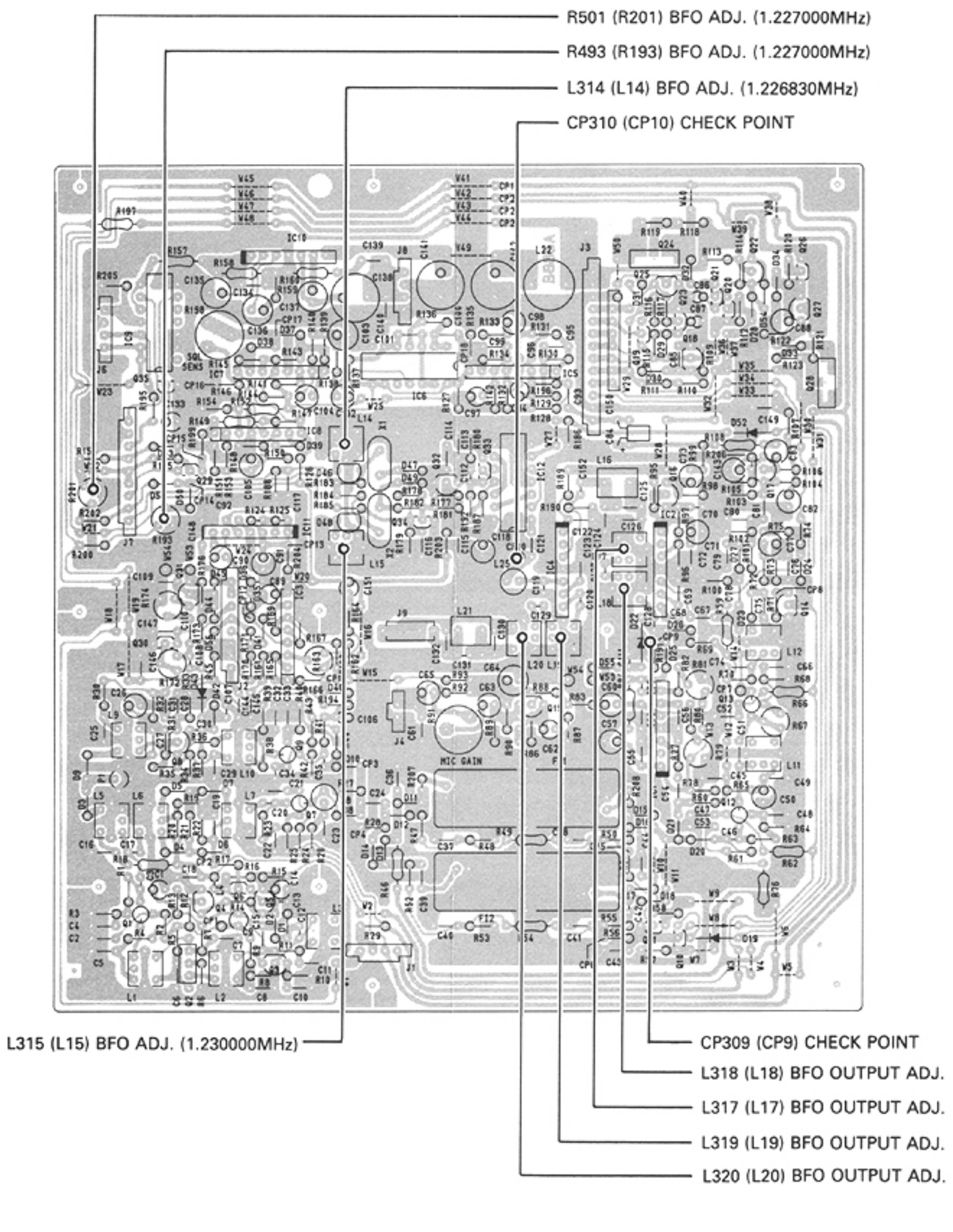

CP2 CHECK POINT
C107 MAIN LOOP LOCK Adjust
C97 MAIN LOOP LOCK Adjust
C88 MAIN LOOP LOCK Adjust
C78 MAIN LOOP LOCK Adjust
D8 CHECK POINT
L8 CHECK POINT
CP3 IN-LOOP LO Adjust
L201 SUB LOOP LOCK Adjust
CP1 CHECK POINT
J5 CHECK POINT
L4 2nd LO OUTPUT LEVEL Adjust
L5 2nd LO OUTPUT LEVEL Adjust
L3 2nd LO OUTPUT LEVEL Adjust
L2 REFERENCE FREQUENCY Adjust

9 - 2 MAIN UNIT ADJUSTMENT

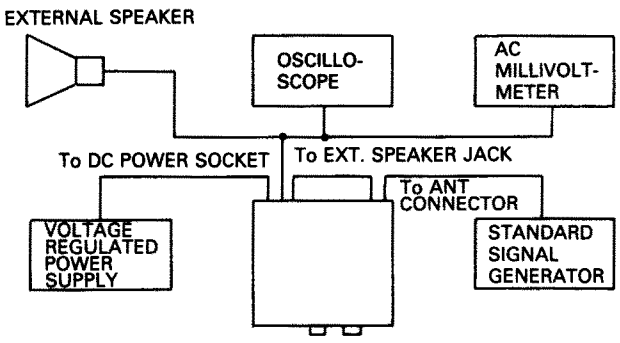
INSTRUMENTS REQUIRED	CONNECTIONS
(1) VOLTAGE REGULATED POWER SUPPLY : OUTPUT VOLTAGE — DC 13.6V ± 15% : CURRENT CAPACITY — 30A or more (2) FREQUENCY COUNTER : FREQUENCY RANGE — 0.1 ~ 90MHz : ACCURACY — ± 1ppm or better : SENSITIVITY — 100mV or better (3) RF VOLTMETER : FREQUENCY RANGE — 0.1 ~ 80MHz : MEASURING RANGE — 0.01 ~ 10V	

Adjustment		Adjustment conditions	Unit	Measurement location	Adjustment value	Unit	Adjustment point
BFO FREQUENCY	1.	• Display frequency: Any • MODE: A3J • CLARITY: Fully counterclockwise	MAIN	Connect the frequency counter to CP310	1.226830MHz	MAIN	L314
	2.	• CLARITY: Center			1.227000MHz		R501
	3.	• CLARITY: Fully clockwise			1.227160MHz ~ 1.227240MHz		Confirming
	4.	Set in TRANSMIT mode.			1.227000MHz		R493
	5.	• MODE: LSB (Left side of A3J)		Connect the frequency counter to CP309 (R491)	1.230000MHz		L315
	6.	• CLARITY: Center Repeat transmitting/receiving			9.01000MHz in transmitting/ receiving		Confirming
	7.	• MODE: A3J Repeat transmitting/receiving			9.01300MHz in transmitting/ receiving		
	8.	• MODE: A3A Repeat transmitting/receiving			9.01300MHz in transmitting/ receiving		
	9.	• MODE: A3H Repeat transmitting/receiving			9.01300MHz No output in receiving		
	10.	• MODE: A3J Set in RECEIVE mode.		Connect the RF voltmeter to CP309 (R491)	Maximum output		L320, L319 L317, L318

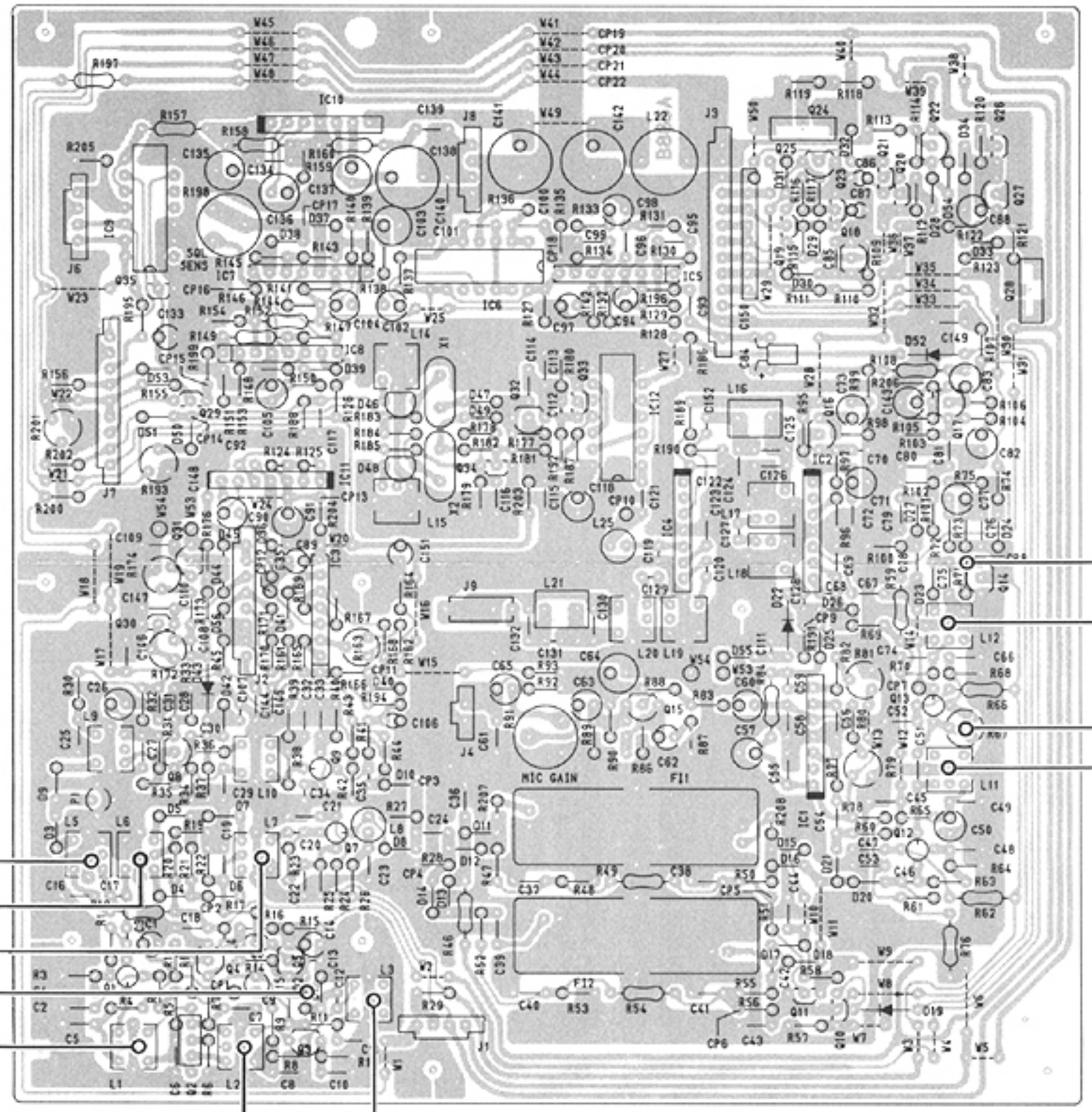
MAIN UNIT


R501 (R201) BFO ADJ. (1.227000MHz)
R493 (R193) BFO ADJ. (1.227000MHz)
L314 (L14) BFO ADJ. (1.226830MHz)
CP310 (CP10) CHECK POINT
L315 (L15) BFO ADJ. (1.230000MHz)
CP309 (CP9) CHECK POINT
L318 (L18) BFO OUTPUT ADJ.
L317 (L17) BFO OUTPUT ADJ.
L319 (L19) BFO OUTPUT ADJ.
L320 (L20) BFO OUTPUT ADJ.

9 - 3 RECEIVER ADJUSTMENT

INSTRUMENTS REQUIRED		CONNECTIONS
(1) VOLTAGE REGULATED POWER SUPPLY : OUTPUT VOLTAGE : CURRENT CAPACITY (2) STANDARD SIGNAL GENERATOR (SSG) : FREQUENCY RANGE : OUTPUT LEVEL (3) AC MILLIVOLTMETER : MEASURING RANGE (4) EXTERNAL SPEAKER : IMPEDANCE (5) OSCILLOSCOPE : FREQUENCY RANGE : MEASURING RANGE	 DC 13.6V ± 15% 30A or more 0.1 ~ 40MHz −20 ~ +90dB (0dB = 1μV) 10mV ~ 3V 8Ω DC ~ 20MHz 0.01 ~ 10V	

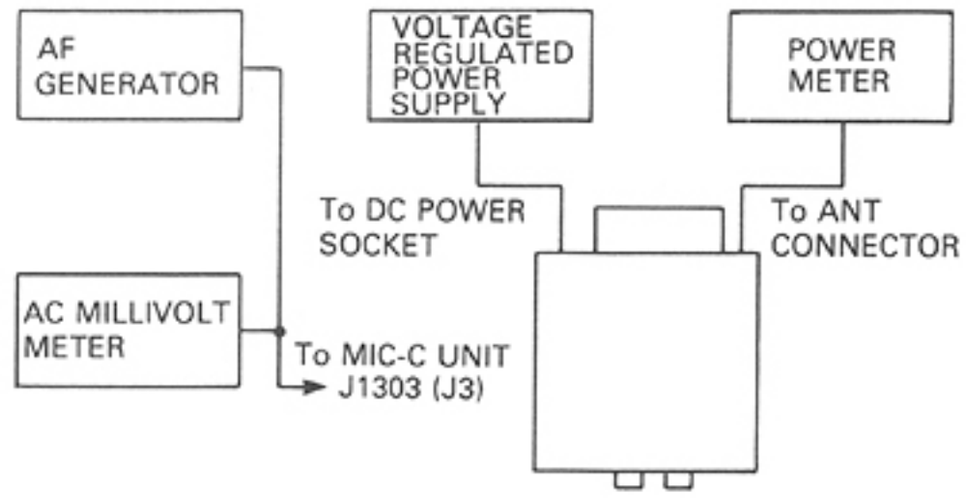
Adjustment		Adjustment conditions	Unit	Measurement location	Adjustment value	Unit	Adjustment point
TOTAL GAIN	1.	• Display frequency: 12MHz • MODE: A3J • SPEAKER: OFF • NB: ON Connect CP308 (R371) to GND with a jumper wire to turn AGC OFF. Set the output level of the SSG to 0dBμ.	Rear panel	Connect the AC MILLIVOLT-METER to EXT. SPEAKER JACK	Adjust to maximum output.	MAIN	L305, L306 L307, L311 L312
	2.	Disconnect the jumper wire between CP308 (R371) and GND. Set the output level of the SSG to approximate +50dBμ.			Adjust the audio level to 3V.	FRONT PANEL	VOLUME CONTROL
	3.	Turn off the output of the SSG.			Adjust the noise level to 100mV.	MAIN	R367
NOISE BLANKER	1.	• Display frequency: 12MHz • MODE: A3J • NB: ON Apply pulse noise (S1 or more on S meter) to the ANT connector.	MAIN	Connect the oscilloscope to D302.	Adjust to maximum noise waveform on the scope.	MAIN	L301 ~ L303


CP308 (CP8)
L312 (L12) TOTAL GAIN Adjust
R367 (R67) TOTAL GAIN Adjust
L311 (L11) TOTAL GAIN Adjust
L305 (L5) TOTAL GAIN Adjust
L306 (L6) TOTAL GAIN Adjust
L307 (L7) TOTAL GAIN Adjust
D302 (D2) CHECK POINT
L301 (L1) NOISE BLANKER Adjsut
L302 (L2) NOISE BLANKER Adjust
L303 (L3) NOISE BLANKER Adjust

9 - 4 TRANSMITTER ADJUSTMENT

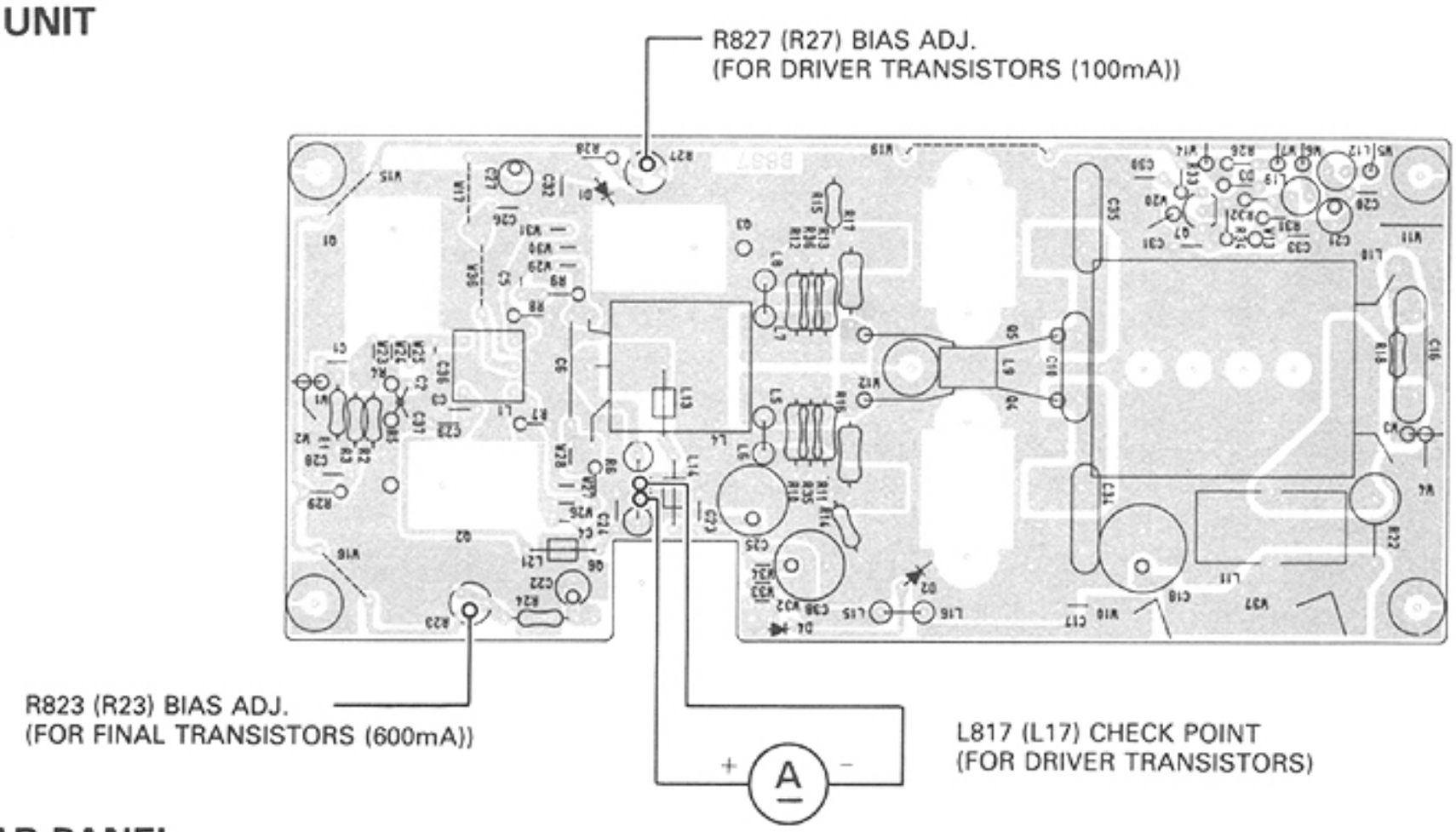
INSTRUMENTS REQUIRED	
(1) VOLTAGE REGULATED POWER SUPPLY	
: OUTPUT VOLTAGE	DC 13.6V ± 15%
: CURRENT CAPACITY	30A
(2) POWER METER (TERMINATED TYPE)	
: MEASURING RANGE	20 ~ 200W
: FREQUENCY RANGE	1.6 ~ 25MHz
: IMPEDANCE	50Ω
: SWR	1.1 or better
(3) AF GENERATOR (AG)	
: FREQUENCY RANGE	200 ~ 3000Hz
: OUTPUT LEVEL	0 ~ 300mV
(4) AC MILLIVOLTMETER	
: MEASURING RANGE	10mV ~ 3V

CONNECTIONS

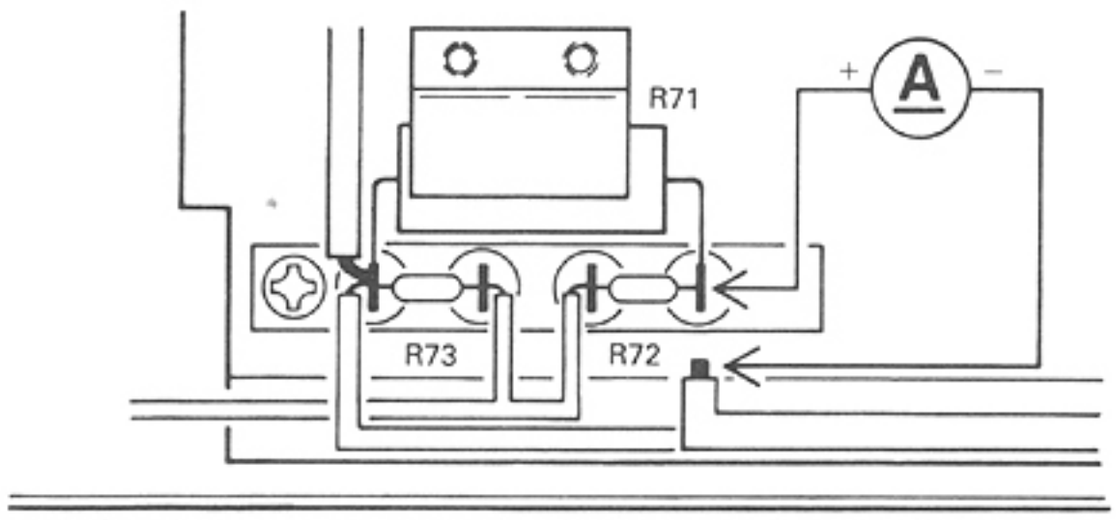


Adjustment		Adjustment conditions	Unit	Measurement location	Adjustment value	Unit	Adjustment point
BIAS VOLTAGE (a) For driver transistors	1.	• Display frequency: 22MHz • MODE: A3J • R391 (MAIN unit): Fully counterclockwise Set in TRANSMIT mode.	PA	Desolder at the center at L817 (CP801) with 6 bead cores, and connect a DC ammeter there in series.	100mA	PA	R827
(b) For final transistors	2.		Rear chassis	Desolder at CP871 (an intersection of R871 and R872) at W837, and connect a DC ammeter there in series.	600mA		R823
		Note: After adjustments of 1. and 2. set R391 of MAIN unit and measurment locations in original conditions.					

PA UNIT



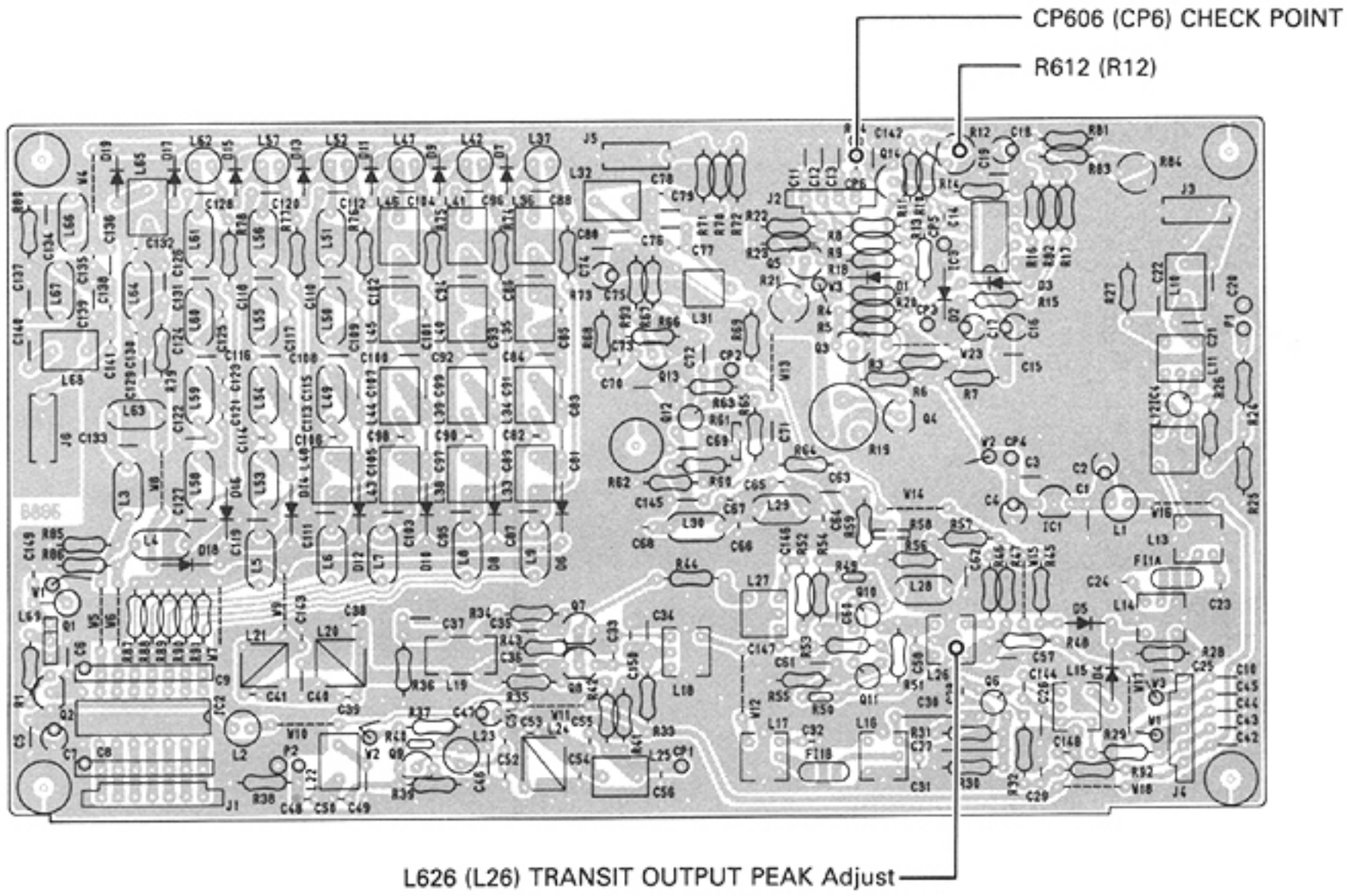
REAR PANEL



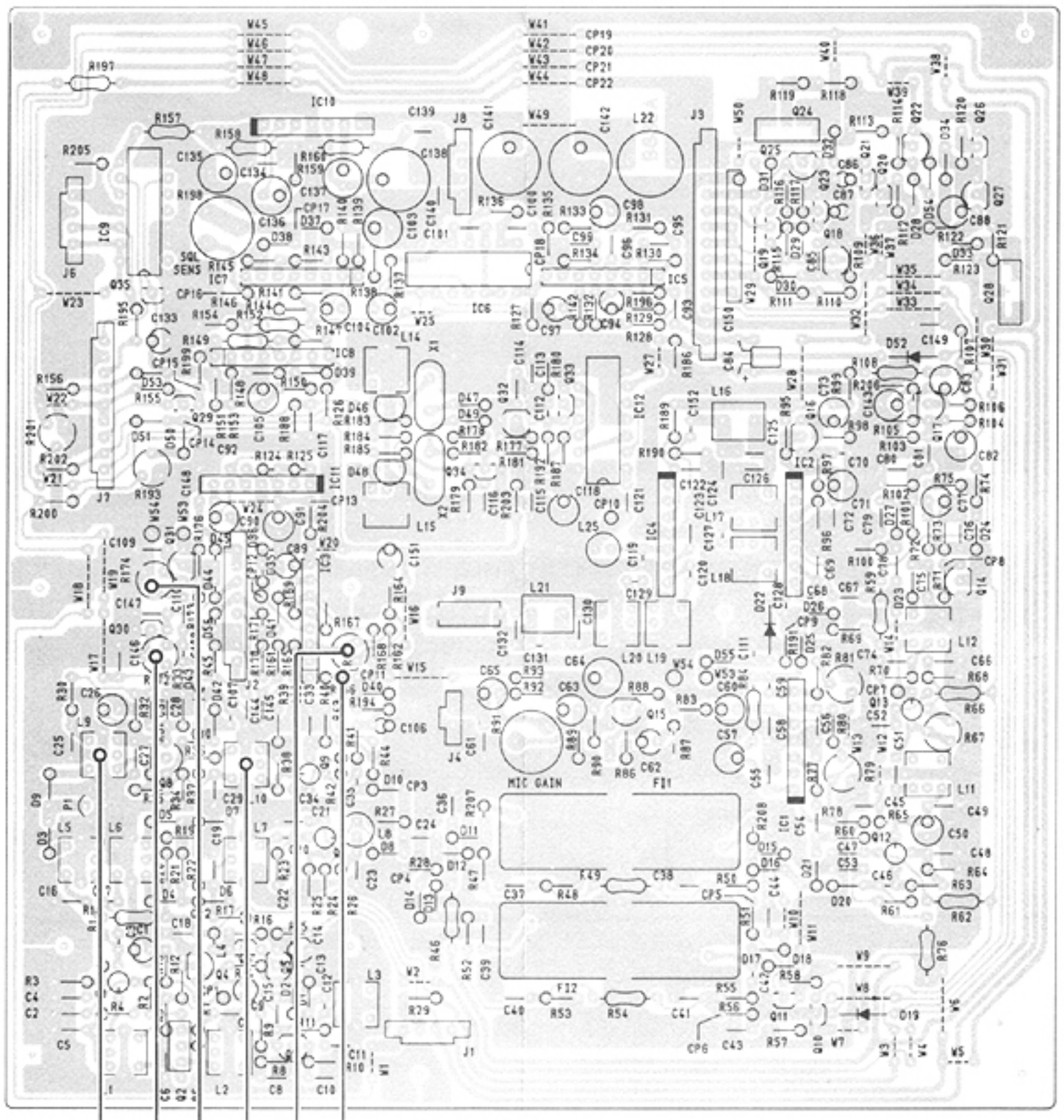
9 - 4 TRANSMITTER ADJUSTMENT (Continued)

Adjustment		Adjustment conditions	Unit	Measurement location	Adjustment value	Unit	Adjustment point
TRANSMIT OUTPUT	1.	• Display frequency: 22MHz • MODE: A3J Set the frequency of the AG to 1.5KHz and the output level to get the TRANSMIT output of 20 ~ 30W.		Connect the RF POWER METER to the ANT connector.	Adjust to maximum output.	MAIN	L309, L310
	2.	• MODE: A3H • R612 (RF unit): Fully clockwise Shunt CP606 (R694) of RF unit and CP311 (R466) of MAIN unit to the ground with a jumper wire respectively.				RF	L626
	3.	Remove the jumper between CP606 (R694) of RF unit and ground.	RF	Connect DC voltmeter to CP606 (R694).	Adjust to minimum voltage.	FILTER	C936
		Note: After adjustment, set R612 and CP311 (R466) in the original conditions.					
ALC	1.	• Display frequency: all bands • MODE: A3H Set in TRANSMIT mode.		Connect the RF POWER METER to the ANT connector.	Adjust R474 to get 40 ~50W (carrier power).	MAIN	R474
	2.	• MODE: A3A			4 ~ 5W (carrier power)		R472
	3.	• Display frequency: 12MHz • MODE: A3J Set the output of the AG to 1.5KHz/100mV.			135W		R463

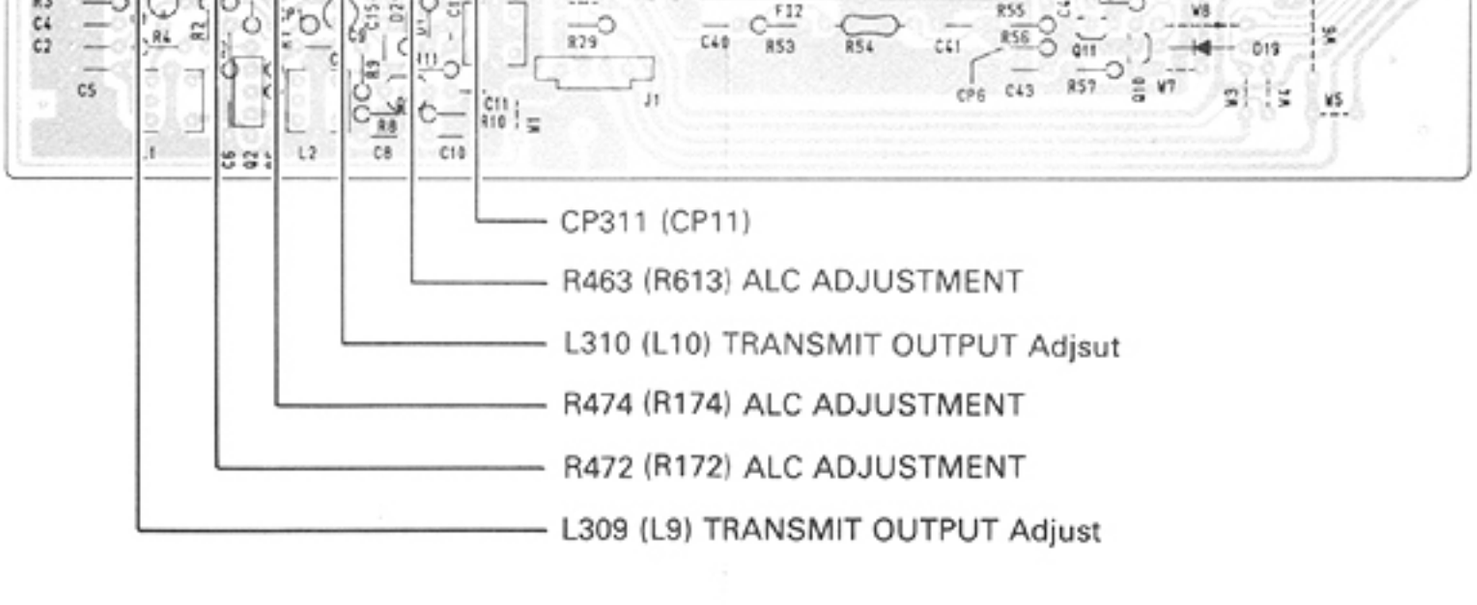
RF UNIT



MAIN UNIT



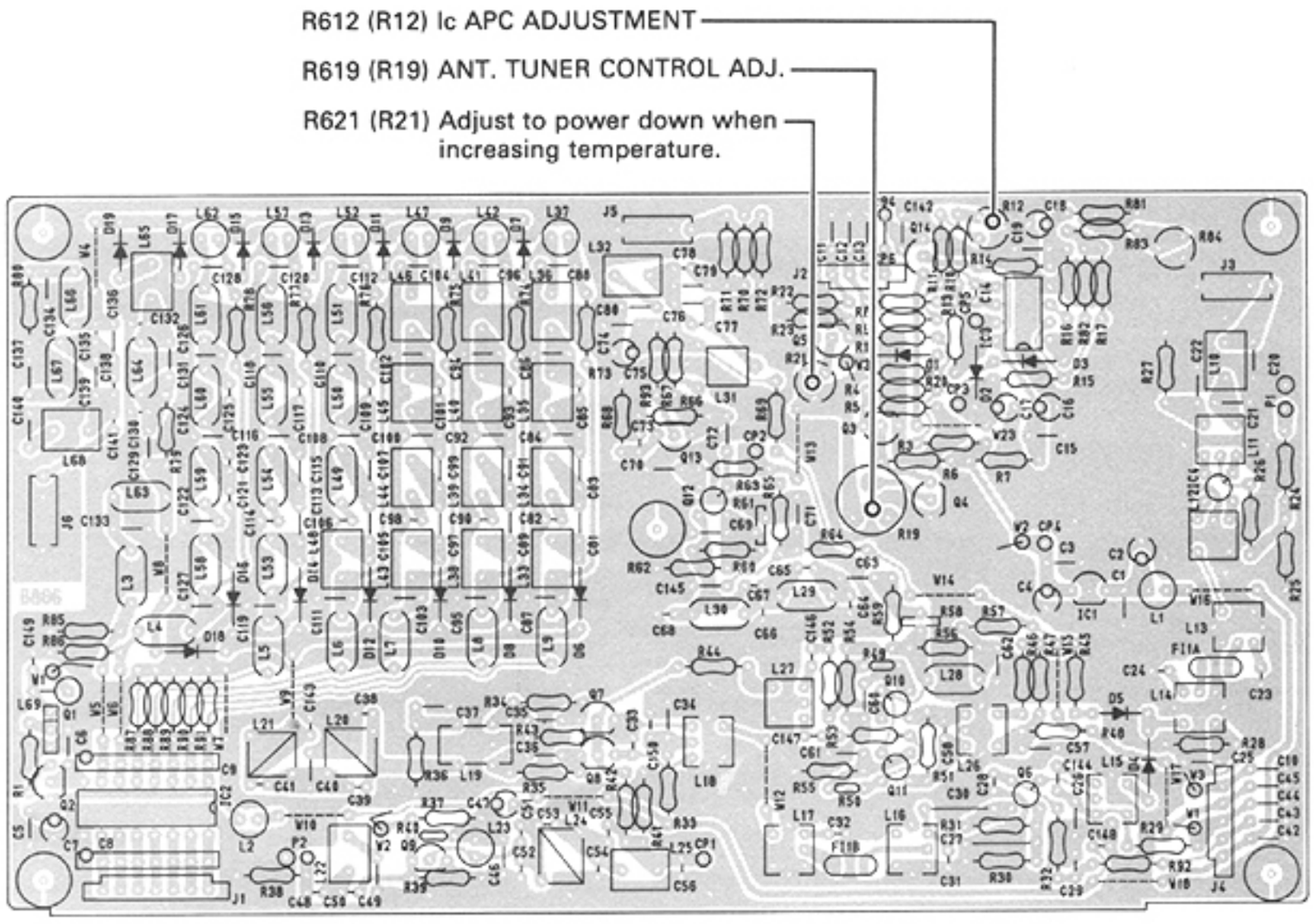
FILTER UNIT



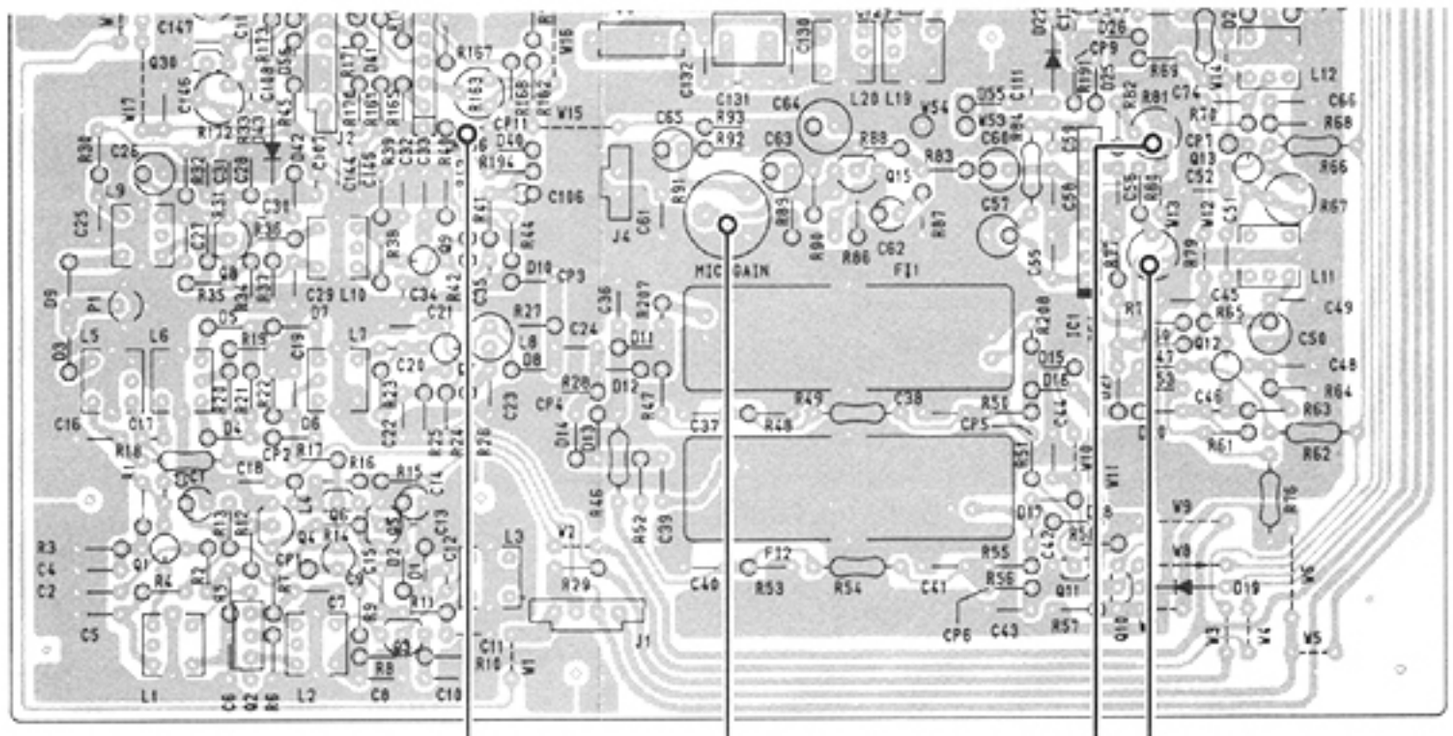
9 - 4 TRANSMITTER ADJUSTMENT (Continued)

Adjustment		Adjustment conditions	Unit	Measurement location	Adjustment value	Unit	Adjustment point
Ic APC	1.	• Display frequency: 22MHz • MODE: A3J R612 (RF unit): Fully counterclockwise Shunt CP311 of MAIN unit to ground with a jumper wire. Set the output of AG to 1.5KHz/100mV.		Read the ammeter provided in the power supply, or connect an ammeter to the power cable in series.	29A	RF	R612
		Note: Adjust R612 turning gradually. After adjustment, remove the jumper wire between CP311 of MAIN unit and GND.					
Power down when increasing temperature.	1.	• Display frequency: 22MHz • MODE: A3H Connect the both terminals of S801 of PA unit with a jumper wire and set in TRANSMIT mode.		Connect the RF POWER METER to the ANT connecter.	3W	RF	L621
		Note: After adjustment, remove the jumper wire of S801.					
ANTENNA TUNER CONTROL	1.	• Display frequency: 12MHz • MODE: A3H After confirming no MIC Input, connect D1302 cathode of MIC-C unit to GND with a jumper wire. And set in TRANSMIT mode.		Connect the RF POWER METER to the ANT commecter.	8 ~ 10W	RF	R619
		Note: Set the adjusting value to required input power of the ANTENNA TUNER being used.					
CARRIER SUPPRESSION	1.	• Display frequency: 22MHz • MODE: A3J R391 (MAIN Unit): Fully counterclockwise Set in TRANSMIT mode.		Connect RF voltmeter or spectrum analyzer to the ANT connector	Adjust to minimum carrier output (−65dB or less)	MAIN	R379 R381
		Note: After completed the adjustment, make R391 in the original condition.					

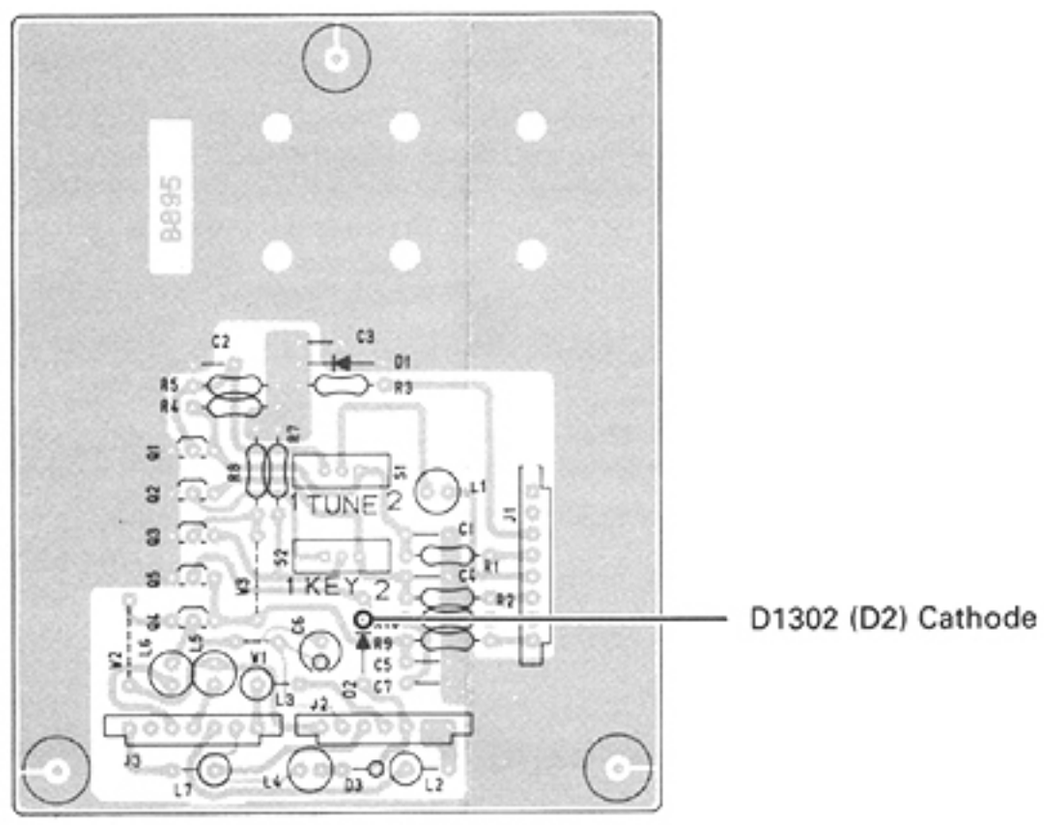
RF UNIT



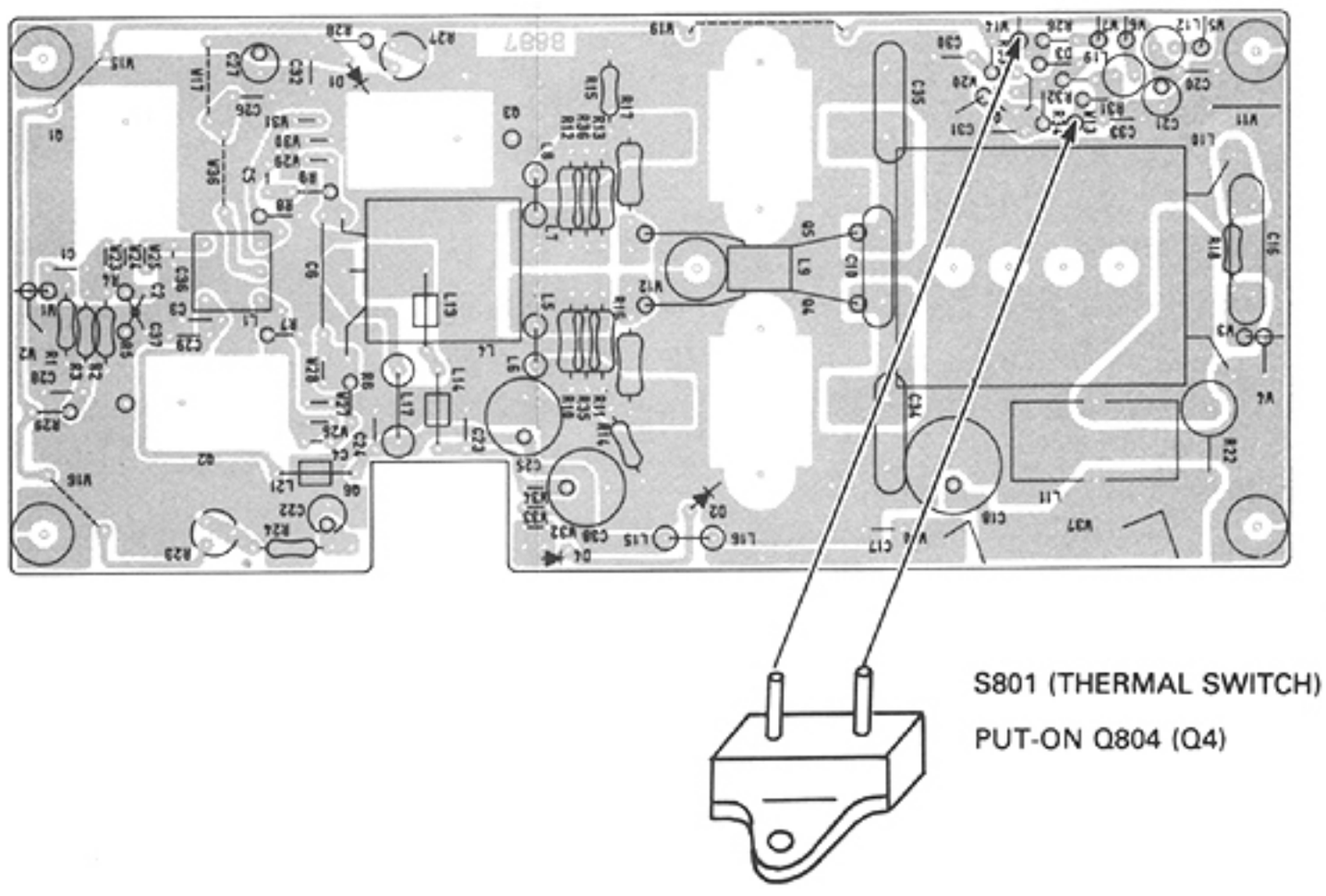
MAIN UNIT



MIC-C UNIT

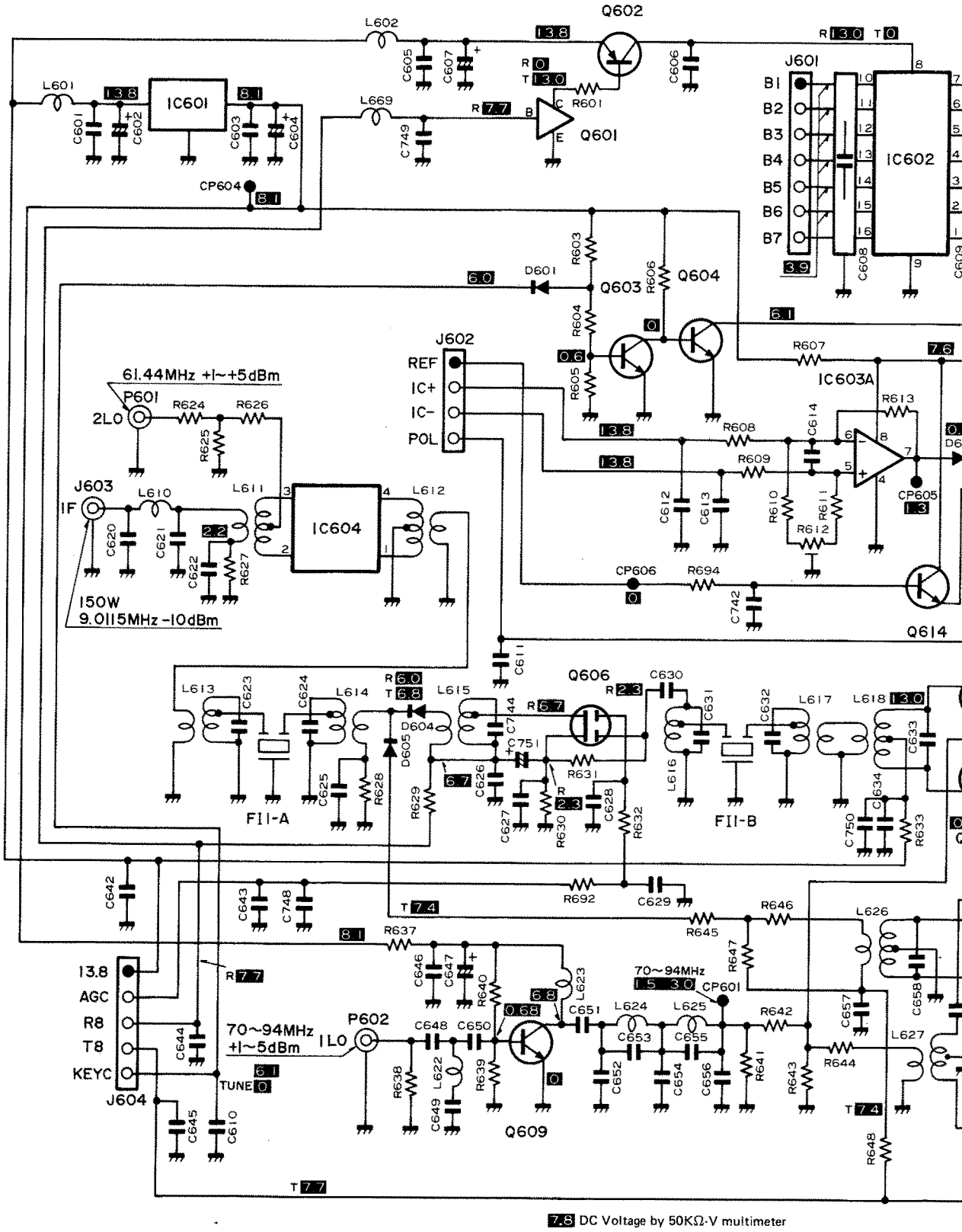


PA UNIT

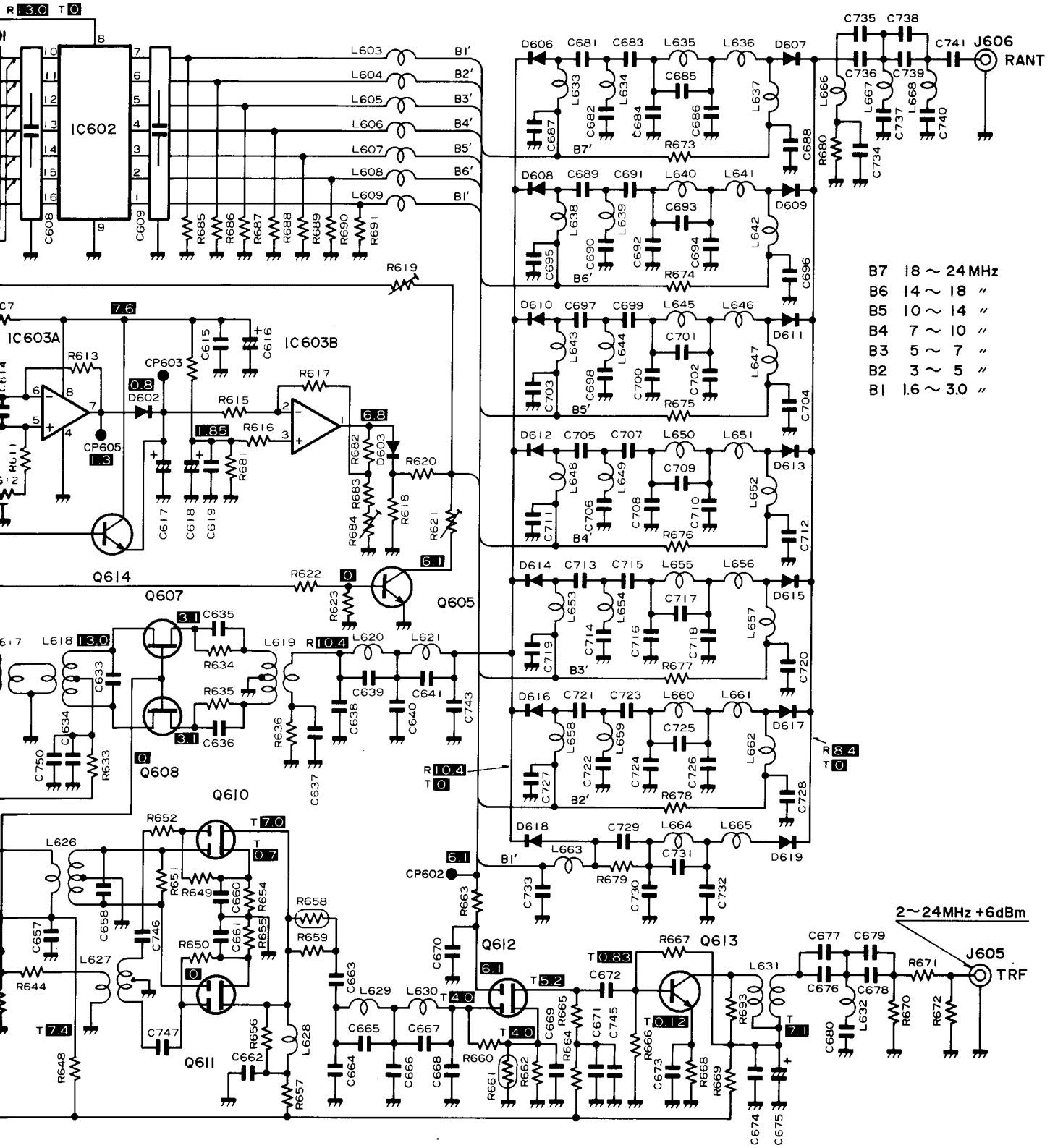


SECTION 10 VOLTAGE (CIRCUIT) DIAGRAMS

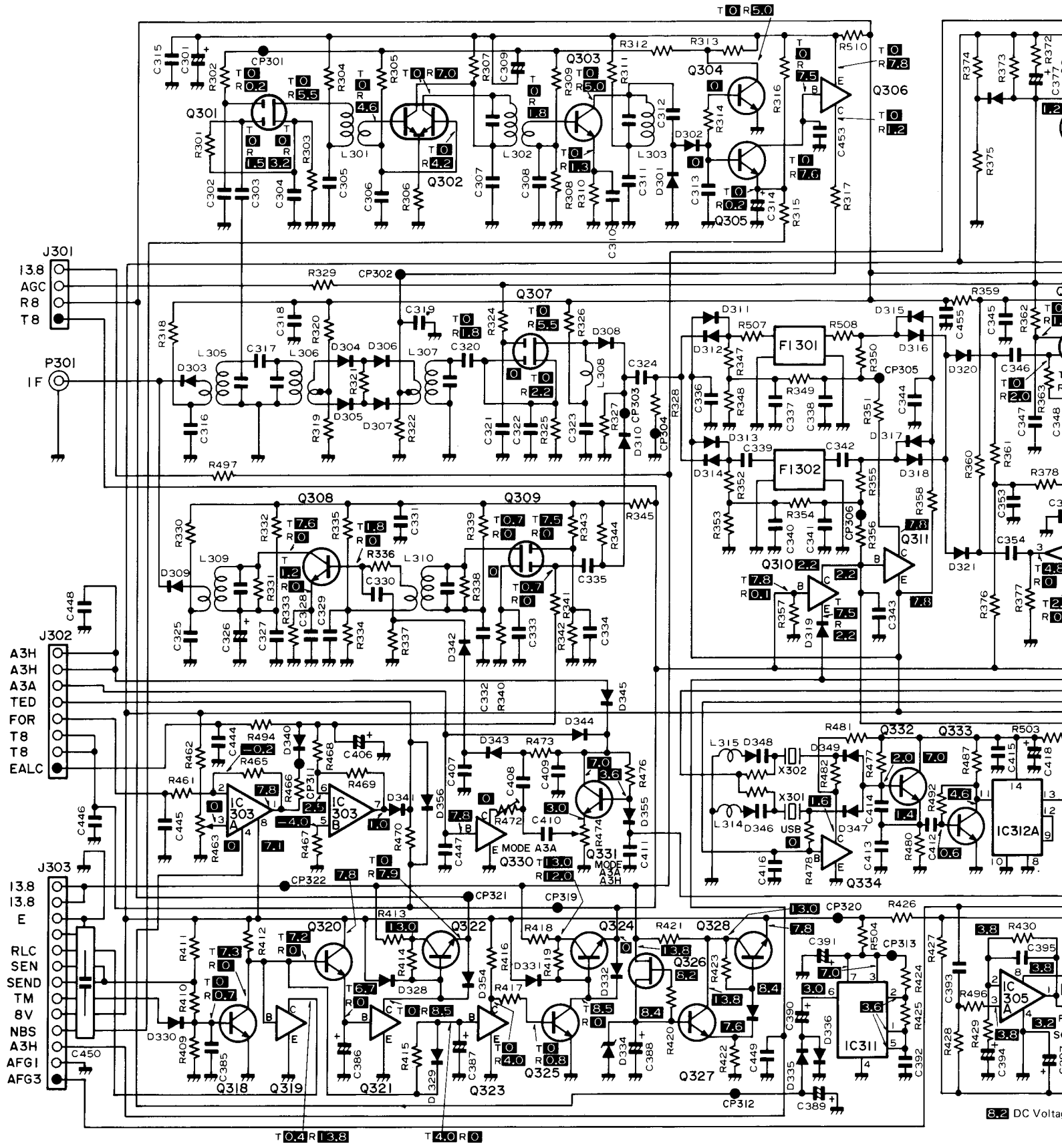
RF UNIT CIRCUIT AND VOLTAGE DIAGRAM

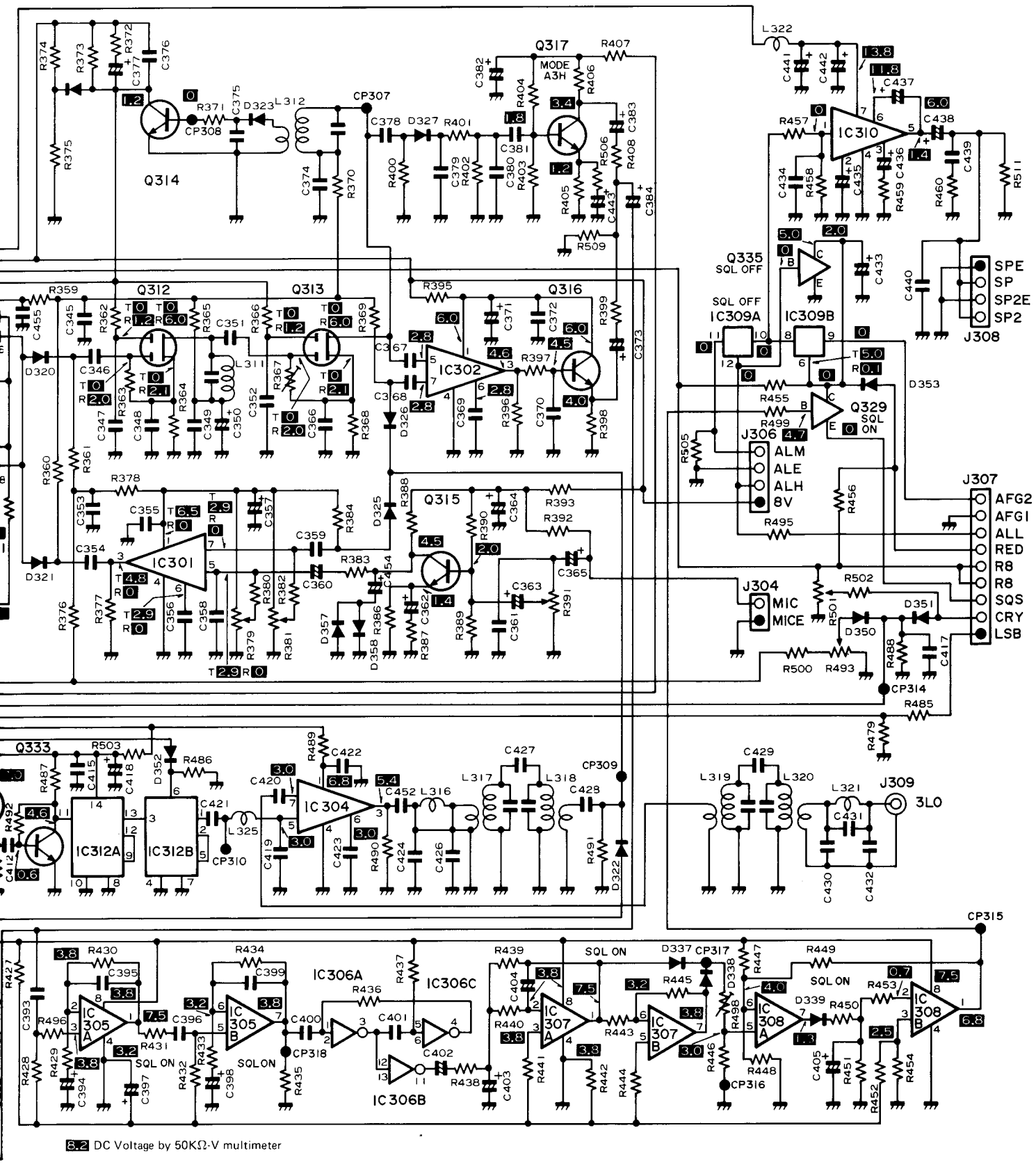


7.8 DC Voltage by 50KΩ-V multimeter


IC602
IC603A
IC603B
Q605
Q607
Q608
Q610
Q611
Q612
Q613
Q614
J606 RANT
J605 TRF
2~24MHz +6dBm
B7 18 ~ 24MHz
B6 14 ~ 18 〃
B5 10 ~ 14 〃
B4 7 ~ 10 〃
B3 5 ~ 7 〃
B2 3 ~ 5 〃
B1 1.6 ~ 3.0 〃

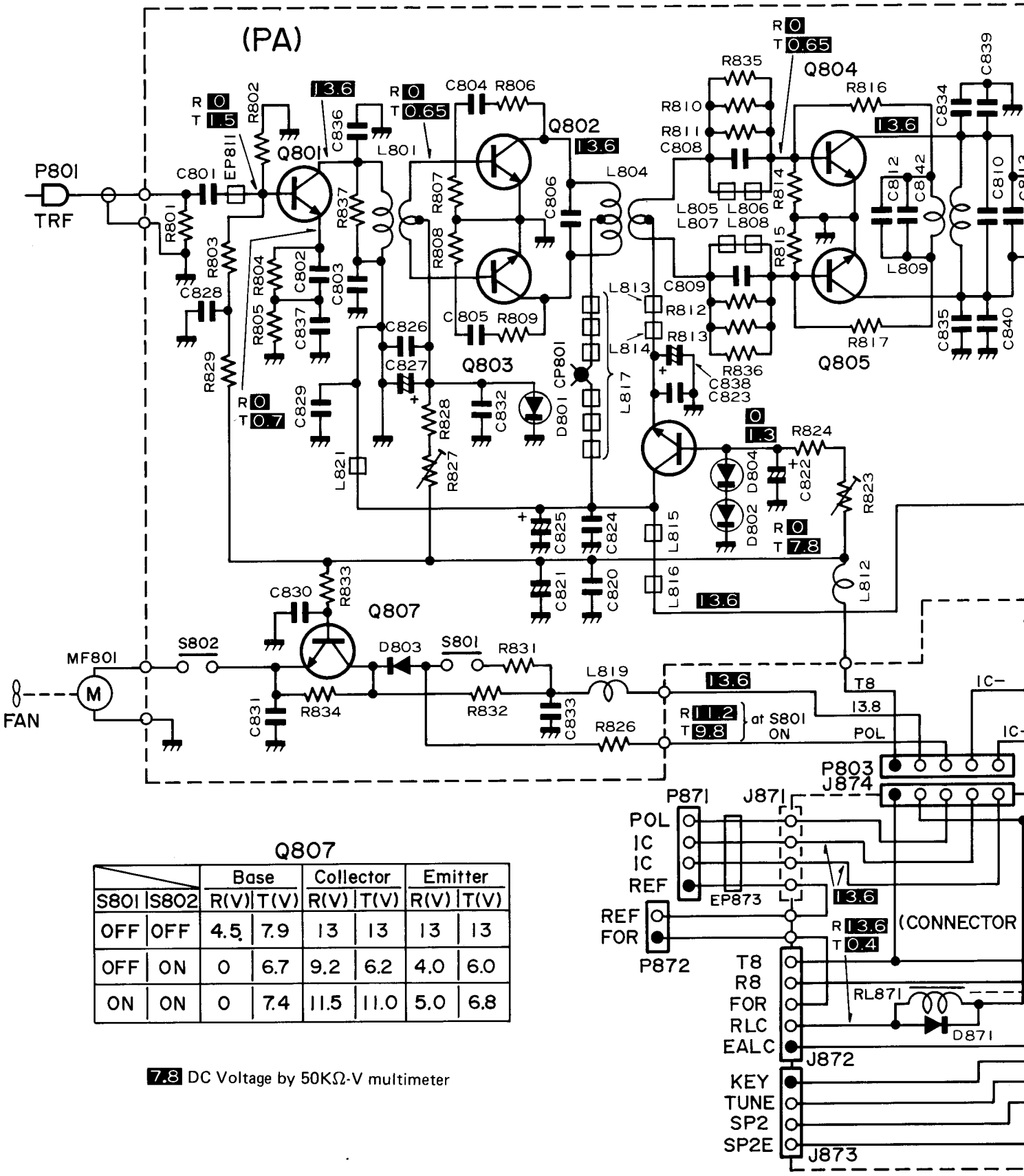
MAIN UNIT CIRCUIT AND VOLTAGE DIAGRAM





8.2 DC Voltage by 50KΩ-V multimeter

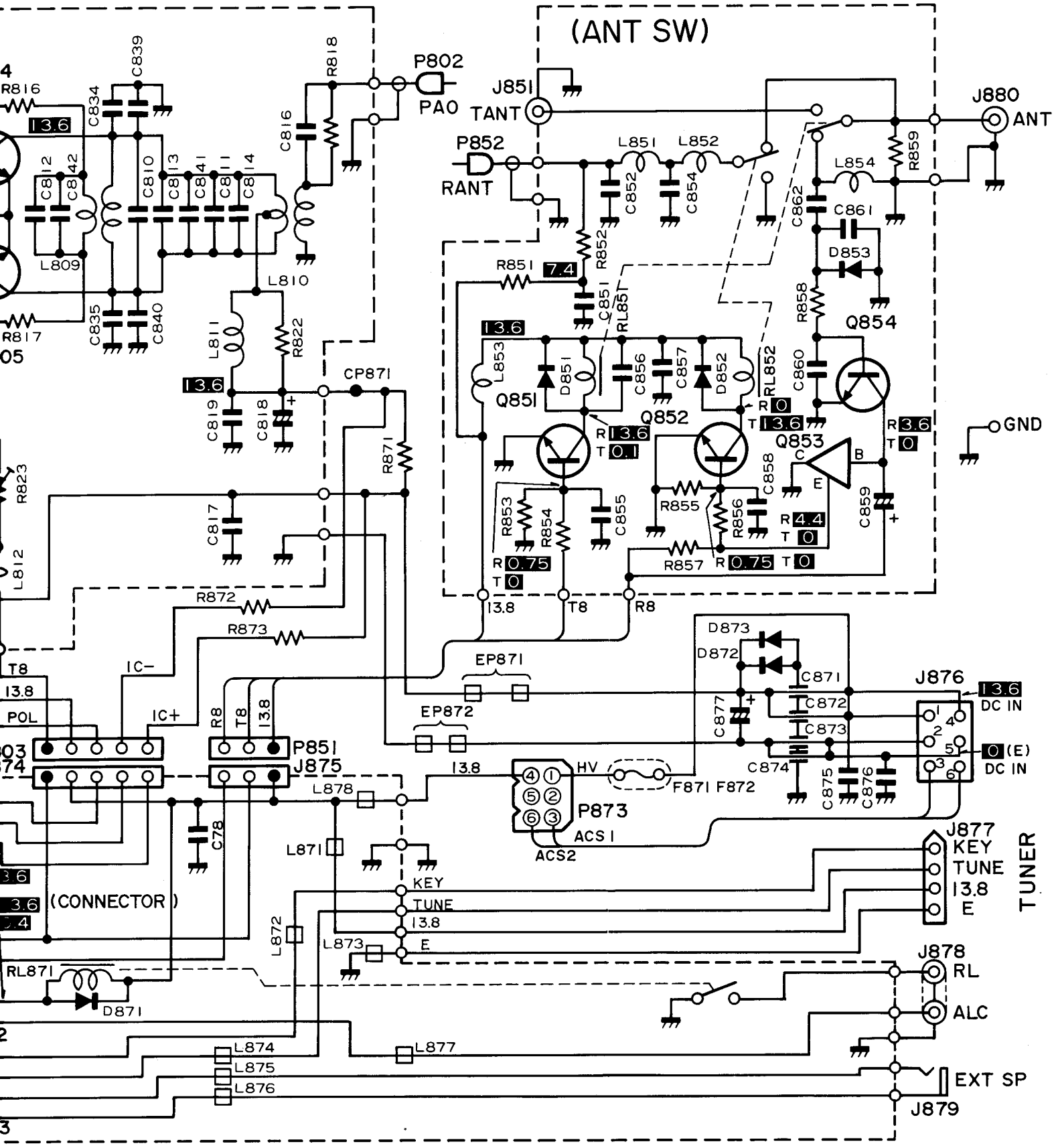
PA UNIT CIRCUIT AND VOLTAGE DIAGRAM



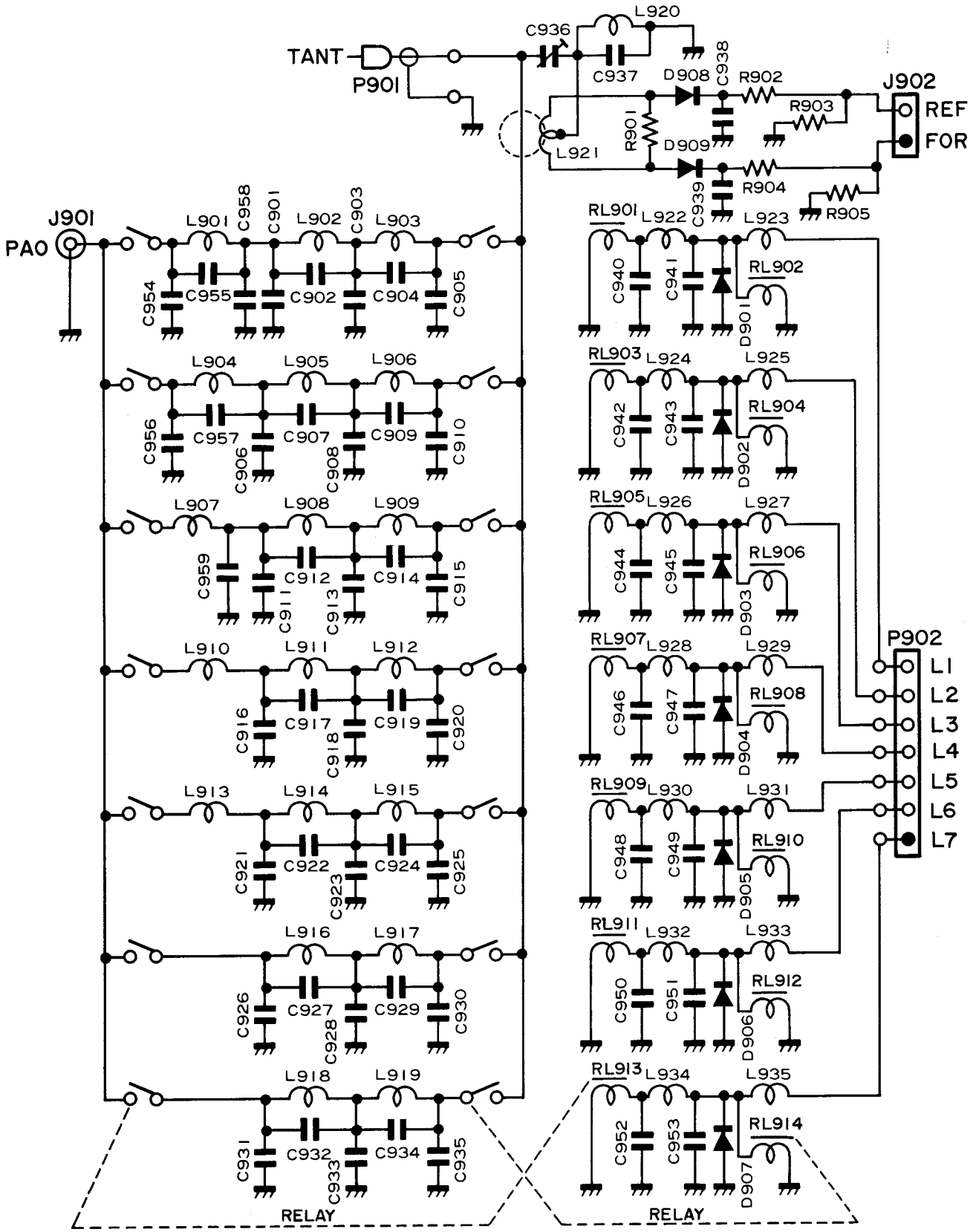
Q807

S801	S802	Base R(V)	Base T(V)	Collector R(V)	Collector T(V)	Emitter R(V)	Emitter T(V)
OFF	OFF	4.5	7.9	13	13	13	13
OFF	ON	0	6.7	9.2	6.2	4.0	6.0
ON	ON	0	7.4	11.5	11.0	5.0	6.8

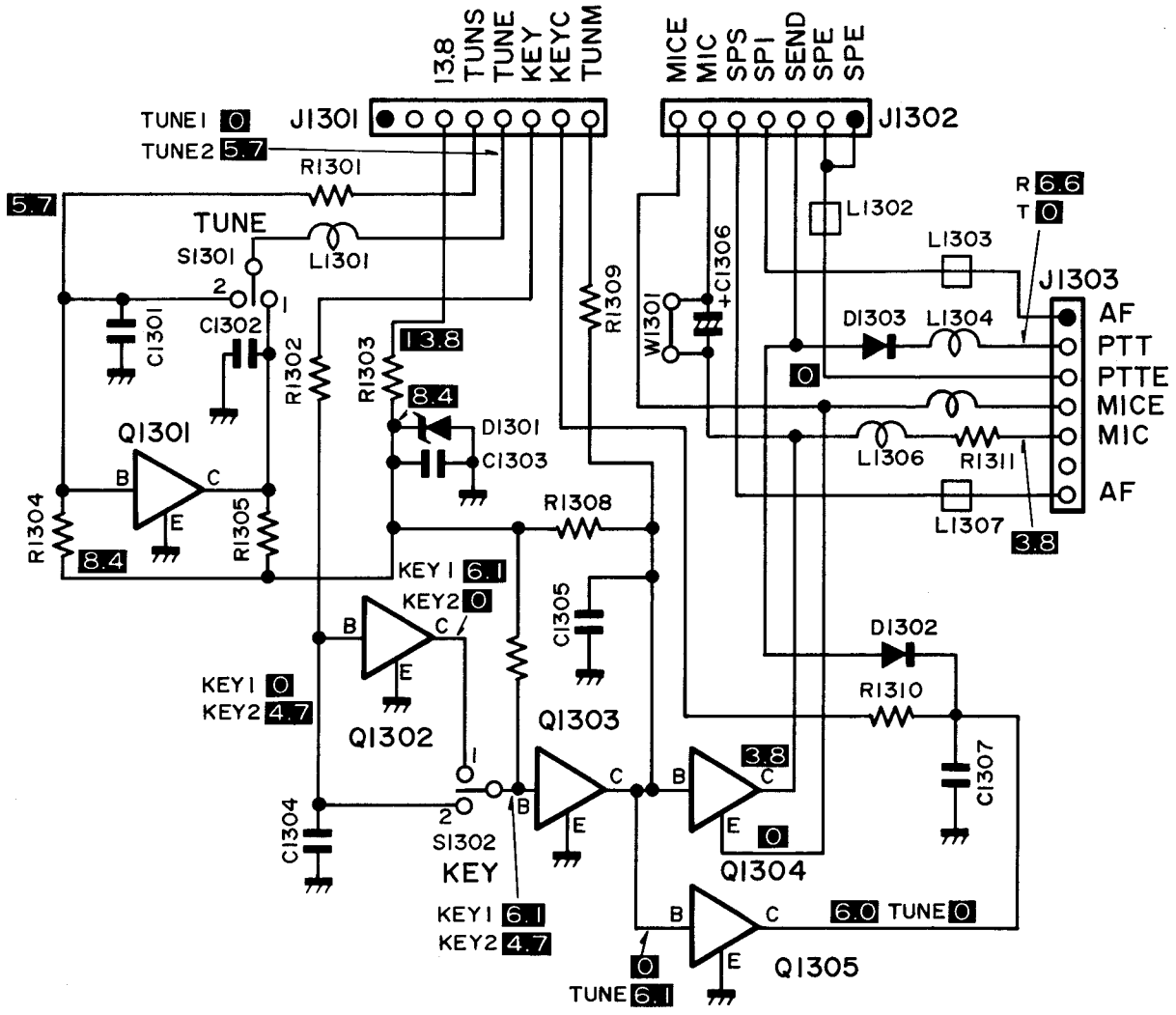
7.8 DC Voltage by 50KΩ-V multimeter


(ANT SW)
P802
PA0
J851
TANT
J880
ANT
P852
RANT
L851
L852
L854
R859
C852
C854
C862
C861
D853
R858
Q854
R851
7.4
R852
C851
RL851
L853
D851
C856
C857
D852
RL852
Q851
Q852
Q853
C860
R 0
T 13.6
R 13.6
T 0.1
R 3.6
T 0
GND
C858
C859
R855
R856
R853
R854
C855
R 4.4
T 0
R857
R 0.75
T 0
13.6
T8
R8
13.8
CP871
R871
R872
R873
EP871
EP872
IC−
IC+
POL
P851
J875
L878
L871
C78
P873
HV
F871 F872
ACS1
ACS2
D873
D872
C871
C872
C873
C874
C875
C876
C877
J876
13.6
DC IN
0 (E)
DC IN
J877
KEY
TUNE
13.8
E
TUNER
(CONNECTOR)
KEY
TUNE
13.8
E
L872
L873
RL871
D871
J878
RL
ALC
EXT SP
J879
L874
L875
L876
L877
L809
L810
L811
L812
C816
C817
C818
C819
C834
C835
C839
C840
C841
C842
R816
R817
R818
R822
R823
C810
C811
C812
C813
C814

FILTER UNIT CIRCUIT DIAGRAM

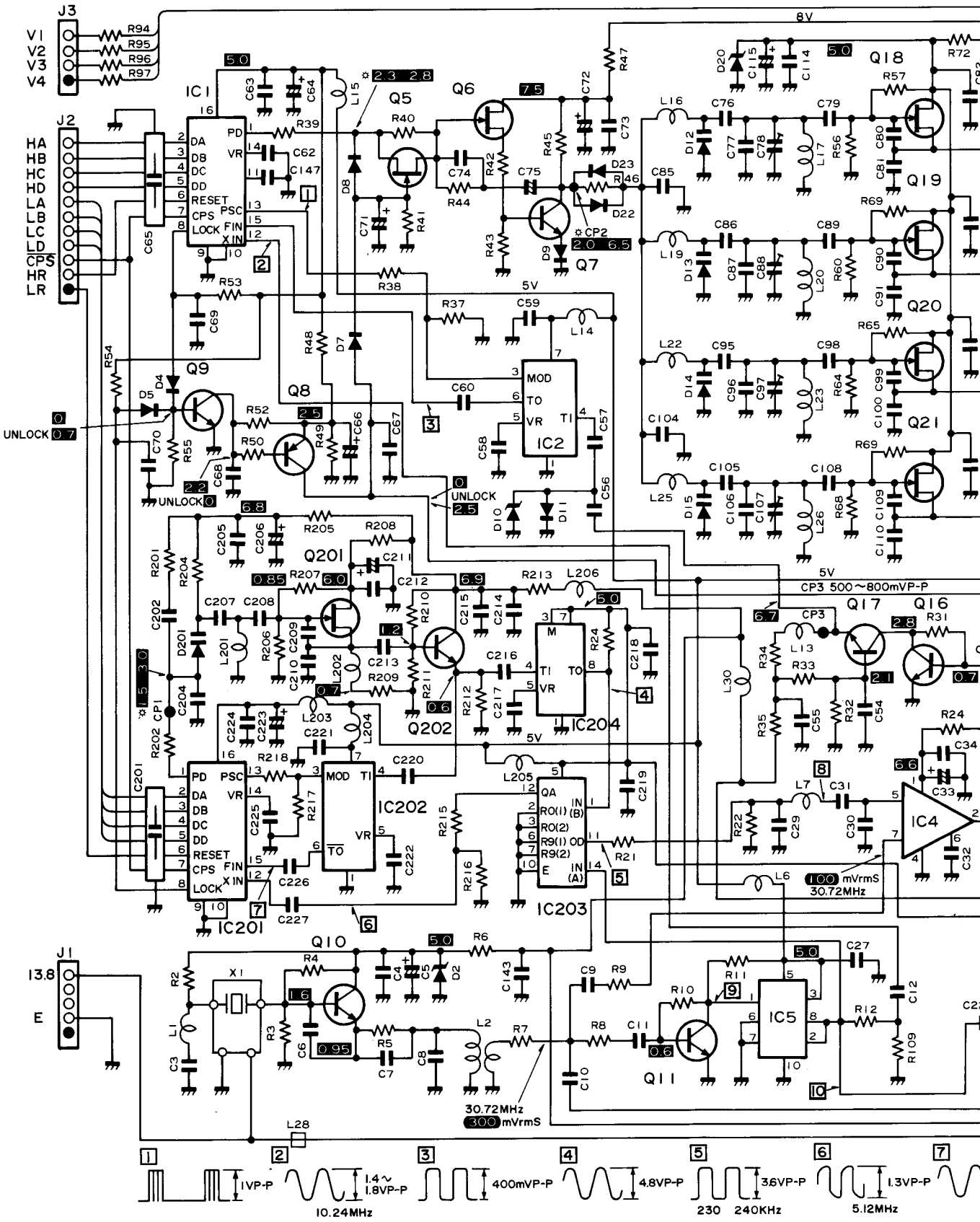


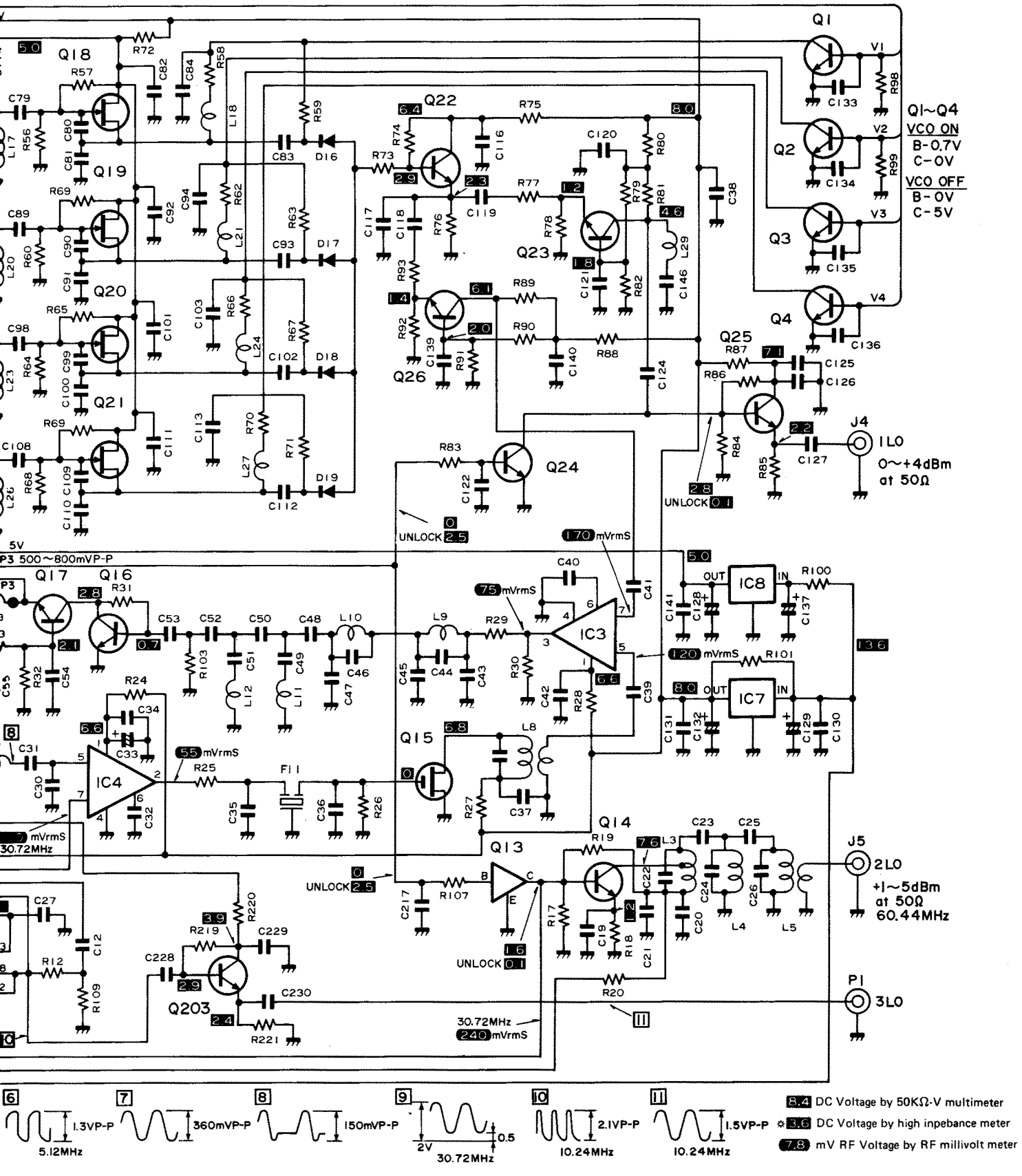
MIC-C UNIT CIRCUIT AND VOLTAGE DIAGRAM



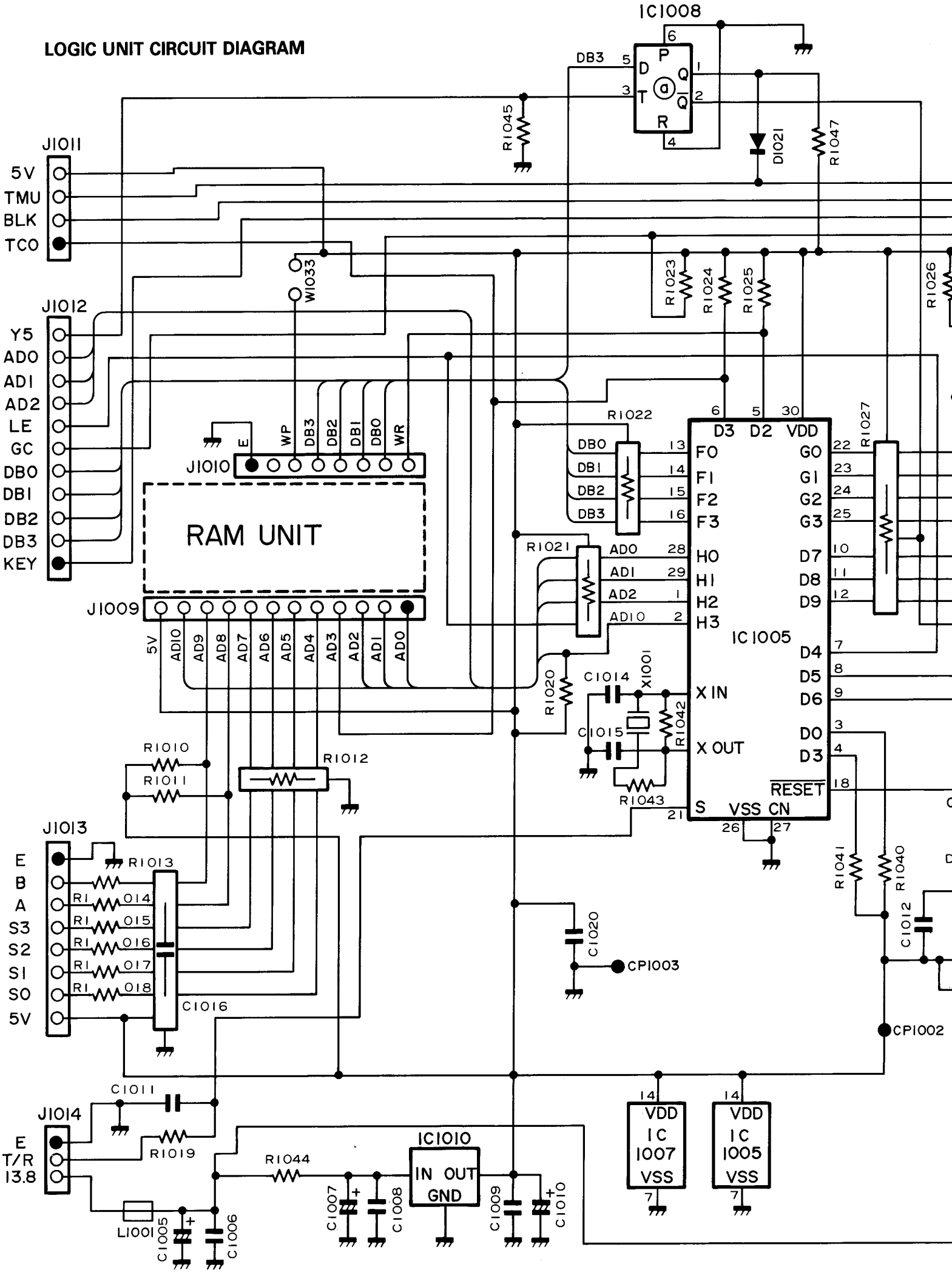
4.0 DC Voltage by 50KΩ-V multimeter

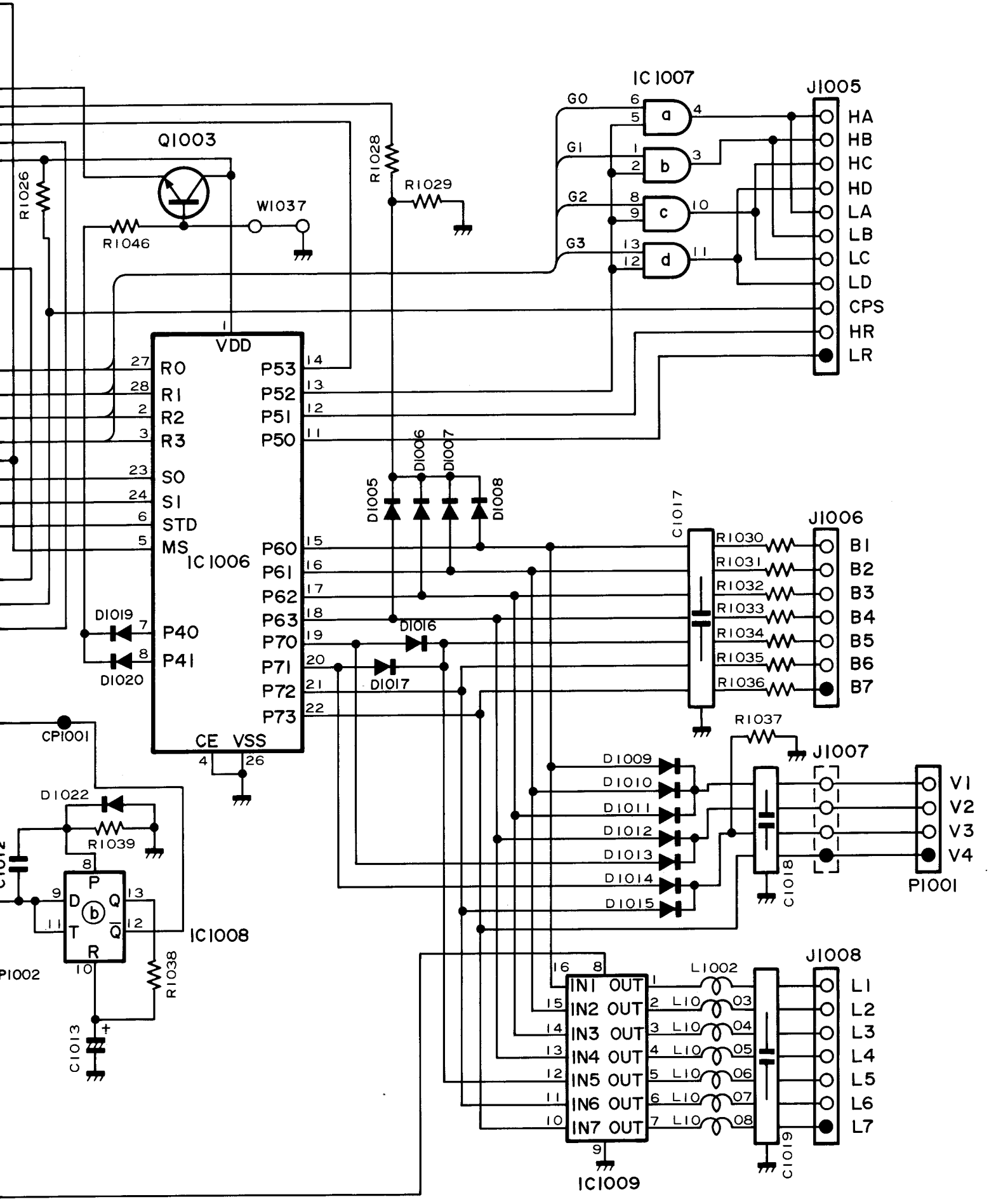
PLL UNIT CIRCUIT AND VOLTAGE DIAGRAM



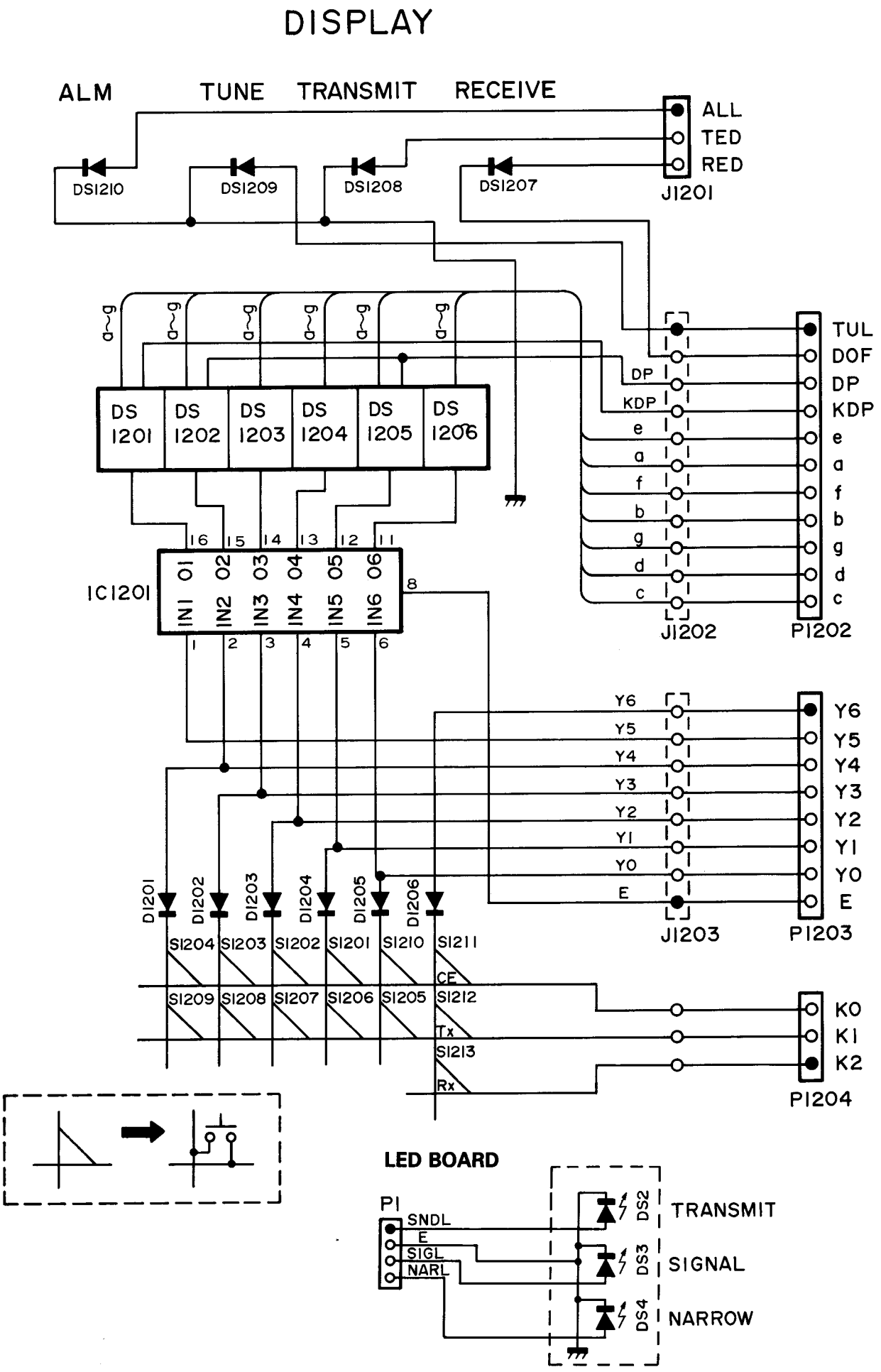

Q1~Q4
VCO ON
B-0.7V
C-0V
VCO OFF
B-0V
C-5V
J4
1LO
0~+4dBm
at 50Ω
J5
2LO
+1~-5dBm
at 50Ω
60.44MHz
P1
3LO
UNLOCK
5V
500~800mVP-P
170 mVrmS
75 mVrmS
120 mVrmS
55 mVrmS
240 mVrmS
30.72MHz
IC3
IC4
IC7
IC8
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q203
F11
6 1.3VP-P 5.12MHz
7 360mVP-P
8 150mVP-P
9 0.5 2V 30.72MHz
10 2.1VP-P 10.24MHz
11 1.5VP-P 10.24MHz
8.4 DC Voltage by 50KΩ-V multimeter
*3.6 DC Voltage by high inpebance meter
7.8 mV RF Voltage by RF millivolt meter

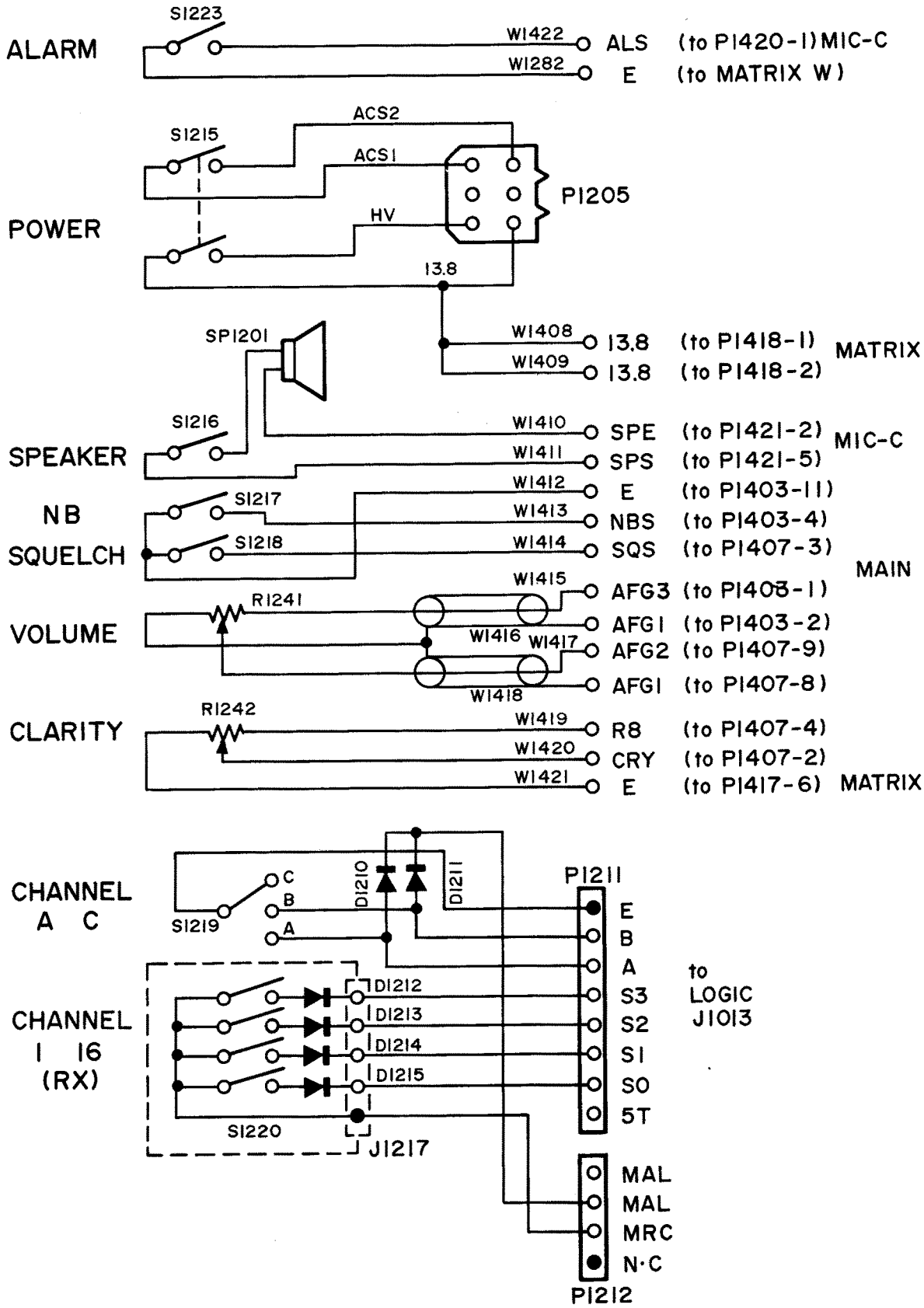
LOGIC UNIT CIRCUIT DIAGRAM



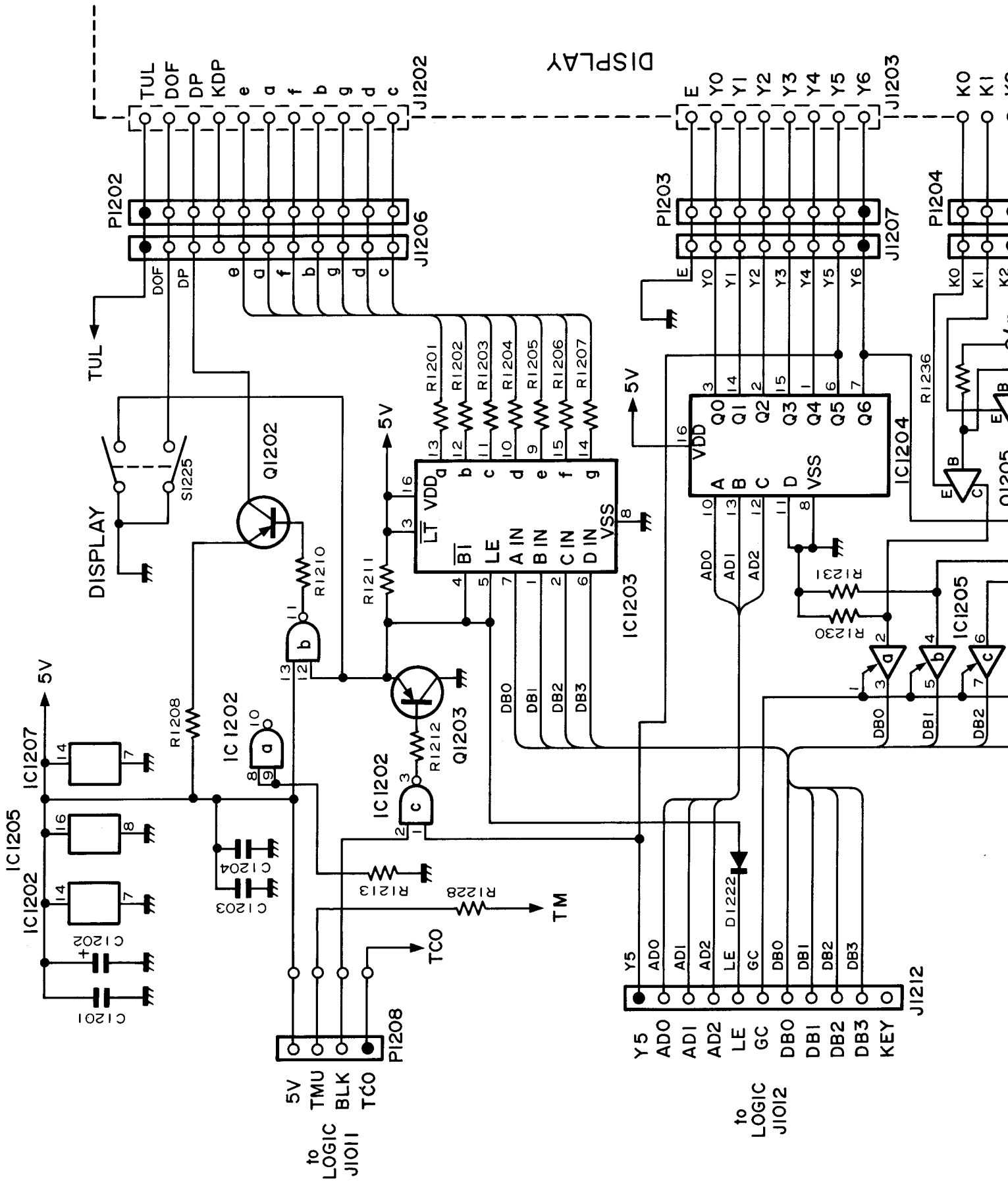

IC1007
J1005
G0
G1
G2
G3
HA
HB
HC
HD
LA
LB
LC
LD
CPS
HR
LR
Q1003
R1026
R1028
R1029
R1046
W1037
VDD
R0
R1
R2
R3
S0
S1
STD
MS
IC1006
P53
P52
P51
P50
P60
P61
P62
P63
P70
P71
P72
P73
P40
P41
CE
VSS
D1005
D1006
D1007
D1008
D1016
D1017
D1019
D1020
C1017
J1006
R1030
R1031
R1032
R1033
R1034
R1035
R1036
B1
B2
B3
B4
B5
B6
B7
CP1001
D1022
R1039
R1037
J1007
D1009
D1010
D1011
D1012
D1013
D1014
D1015
C1018
V1
V2
V3
V4
P1001
IC1008
P1002
R1038
C1013
IC1009
L1002
J1008
IN1 OUT
IN2 OUT
IN3 OUT
IN4 OUT
IN5 OUT
IN6 OUT
IN7 OUT
L10 03
L10 04
L10 05
L10 06
L10 07
L10 08
C1019
L1
L2
L3
L4
L5
L6
L7

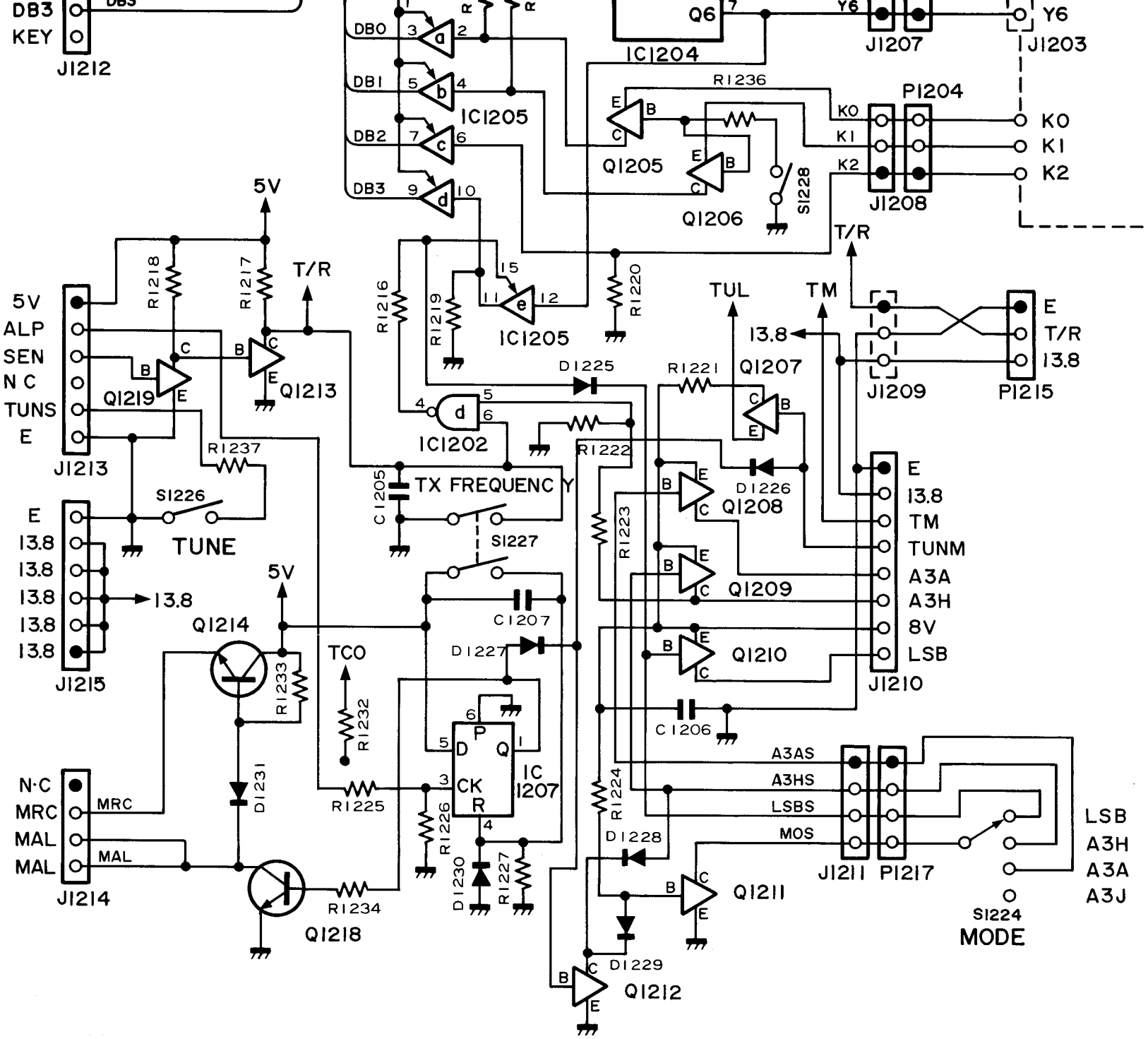
DISPLAY UNIT AND FRONT PANEL CIRCUIT DIAGARM




ALARM
S1223
W1422
ALS
(to P1420-1) MIC-C
W1282
E
(to MATRIX W)
POWER
S1215
ACS2
ACS1
HV
P1205
13.8
W1408
13.8
(to P1418-1)
MATRIX
W1409
13.8
(to P1418-2)
SP1201
SPEAKER
S1216
W1410
SPE
(to P1421-2)
MIC-C
W1411
SPS
(to P1421-5)
NB
S1217
W1412
E
(to P1403-11)
SQUELCH
S1218
W1413
NBS
(to P1403-4)
W1414
SQS
(to P1407-3)
MAIN
VOLUME
R1241
W1415
AFG3
(to P1403-1)
W1416
W1417
AFG1
(to P1403-2)
AFG2
(to P1407-9)
W1418
AFG1
(to P1407-8)
CLARITY
R1242
W1419
R8
(to P1407-4)
W1420
CRY
(to P1407-2)
W1421
E
(to P1417-6)
MATRIX
CHANNEL A C
S1219
C
B
A
D1210
D1211
P1211
E
B
A
to LOGIC J1013
CHANNEL 1 16 (RX)
D1212
D1213
D1214
D1215
S3
S2
S1
S0
5T
S1220
J1217
MAL
MAL
MRC
N·C
P1212

FRONT PANEL MATRIX CIRCUIT DIAGRAM

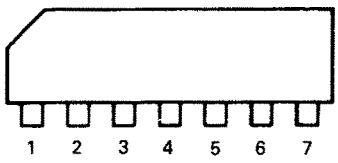



DB3
KEY
J1212
DB0
DB1
DB2
DB3
IC1205
IC1204
Q6
J1207
J1203
Y6
R1236
P1204
K0
K1
K2
Q1205
Q1206
S1228
J1208
5V
T/R
R1218
R1217
R1216
R1219
R1220
J1213
5V
ALP
SEN
N C
TUNS
E
Q1219
Q1213
IC1205
IC1202
D1225
R1221
Q1207
TUL
TM
13.8
J1209
P1215
E
T/R
13.8
R1237
S1226
TUNE
J1215
E
13.8
13.8
13.8
13.8
13.8
C1205
TX FREQUENCY
S1227
R1222
D1226
Q1208
Q1209
Q1210
J1210
E
13.8
TM
TUNM
A3A
A3H
8V
LSB
C1207
D1227
TCO
R1232
R1233
Q1214
C1206
R1223
R1224
R1225
R1226
D1231
D1230
R1227
D1228
Q1211
J1211
P1217
A3AS
A3HS
LSBS
MOS
LSB
A3H
A3A
A3J
S1224
MODE
N·C
MRC
MAL
MAL
J1214
MRC
MAL
R1234
Q1218
D1229
Q1212

SECTION 11 IC RATINGS

μPC1037H (DOUBLE BALANCED MODULATOR)

PIN CONNECTION



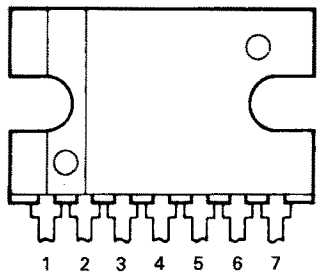
Terminal No.	Connection
1	Vcc
2	Output 1
3	Output 2
4	GND
5	Signal Input
6	Bypass
7	Carrier Input

Maximum Ratings

Item	Symbol	Rating	Unit
Power supply voltage	V_{CC}	9	V
Power dissipation	P_D	270	mW
Operation temperature	T_{OPT}	−30 ~ +65	°C
Storage temperature	T_{STG}	−40 ~ +125	°C

μPC1181H (AUDIO POWER AMPLIFIER)

PIN CONNECTION



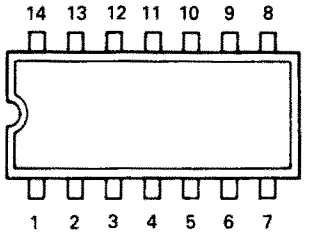
Maximum Ratings

Item	Symbol	Rating	Unit
Peak power supply voltage (200 ms)	$V_{CC\ (SURGE)}$	40	V
Power supply voltage (when no signal)	V_{CC1}	25	V
Power supply voltage (during operation) *1	V_{CC2}	18	V
Circuit current	$I_{CC(PEAK)}$	4.5	A
Power dissipation	P_D	12	W
Operation ambient temperature *2	T_{OPR}	−30 ~ +75	°C
Storage temperature	T_{STG}	−55 ~ +150	°C

*1 *2 Aluminum heat sink (100 × 100 × 1 mm)

TC4011BP (QUAD 2-INPUT POSITIVE NOR GATE)
TC4013BP (DUAL D-TYPE FLIP FLOP)
TC4028 (BCD TO DECIMAL DECODER)
TC4081 (QUAD 2-INPUT POSITIVE AND GATE)
μPD4066B (QUAD BILATERAL SWITCH)
M4019BP (QUADRUPLE AND-OR SELECT GATE)

PIN CONNECTION

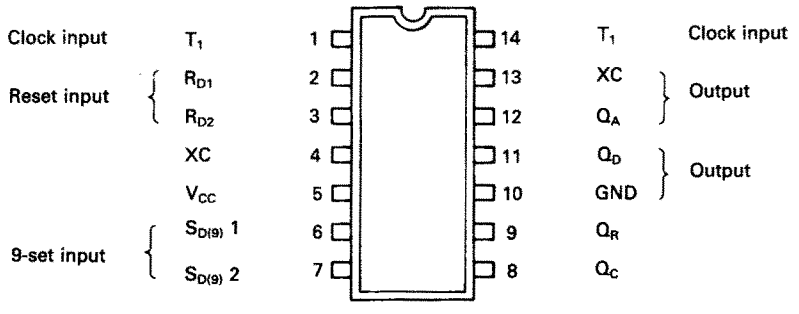


Maximum Ratings

Item	Symbol	Rating	Unit
Power supply voltage	V_{DD}	$V_{SS}-0.5 \sim V_{SS}+20$	V
Input voltage	V_{IN}	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Output voltage	V_{OUT}	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Input current	I_{IN}	± 10	mA
Power dissipation	P_D	300	mW
Storage temperature	T_{STG}	−65 ~ 150	°C
Read temperature and time	T_{SOL}	260°C · 10 sec.	

SN74LS90N (DECODE COUNTER)

PIN CONNECTION



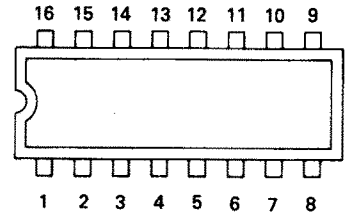
Maximum Ratings

Item	Symbol	Rating	Unit
Power supply voltage	V_{CC}	−0.5 ~ +7	V
Input voltage *1	V_I	−0.5 ~ +5.5	V
Input voltage *2	V_I	−0.5 ~ +15	V
Output voltage *1	V_O	−0.5 ~ V_{CC}	V
Operation ambient temperature	T_{OPR}	−20 ~ +75	°C
Storage temperature	T_{STG}	−65 ~ +150	°C

*1 Inputs T_1 and T_2
*2 Inputs R_{D1}, R_{D2} $S_{D(9)1}$ and $S_{D(9)2}$

μPD4503 (HEX NON-INVERTING 3-STATE BUFFER)

PIN CONNECTION

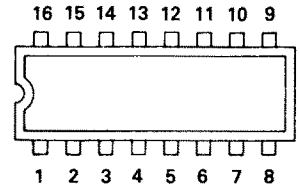


Maximum Ratings

Item	Symbol	Rating	Unit
Power supply voltage	V_{DD}	−0.5 ~ +18	V
Input voltage	V_{IN}	V_{SS} −0.5 ~ V_{DD} +0.5	V
Input current	I_{IN}	10	mA
Output voltage	V_{OUT}	V_{SS} −0.5 ~ V_{DD} +0.5	V
Output current	I_O	25	mA
Power dissipation	P_D	200	mW
Storage temperature	T_{STG}	−65 ~ 150	°C

TC4511BP (BCD TO 7-SEGMENT LATCH/DECODER/DRIVER)

PIN CONNECTION



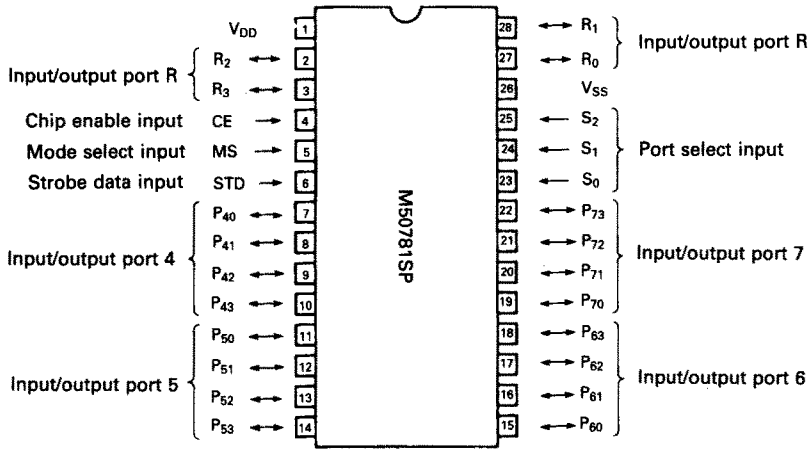
Maximum Ratings

Item	Symbol	Rating	Unit
Power supply voltage	V_{DD}	V_{SS}−0.5 ~ V_{SS} +20	V
Input voltage	V_{IN}	V_{SS}−0.5 ~ V_{DD} +0.5	V
Output voltage	V_{OUT}	V_{SS}−0.5 ~ V_{DD} +0.5	V
Input current	I_{IN}	± 10	mA
Power dissipation	P_D	300	mW
Storage temperature	T_{STG}	−65 ~ 150	°C
Read temperature and time	T_{SOL}	260°C · 10 sec.	

*1 When output is H

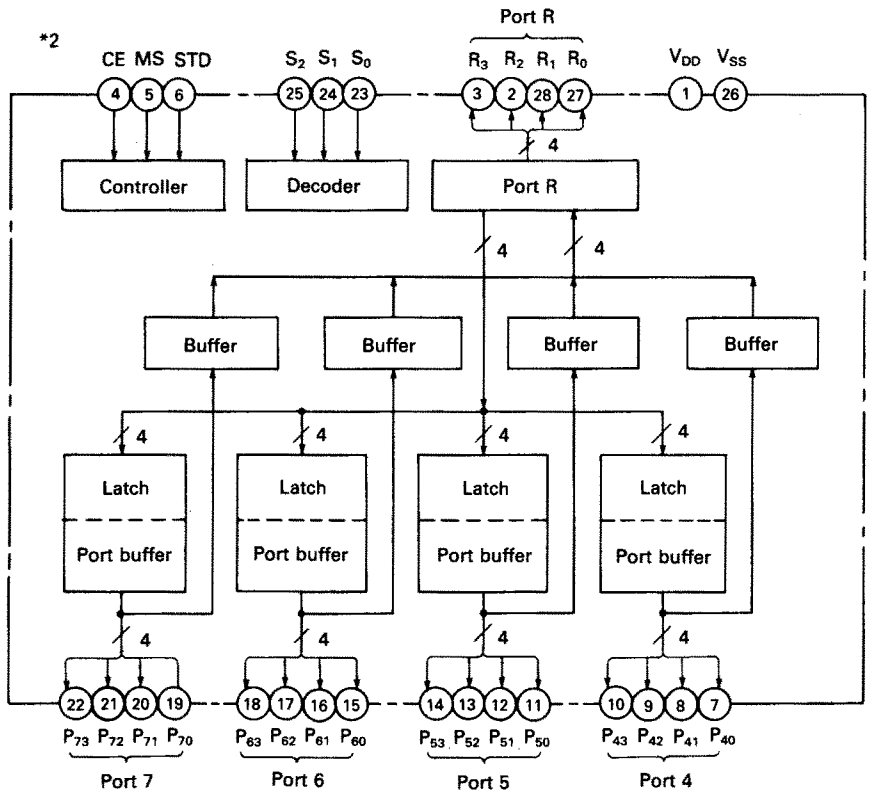
M50781SP (INPUT/OUTPUT EXPANDER)

PIN CONNECTION



BLOCK DIAGRAM

M50781SP



Maximum Ratings

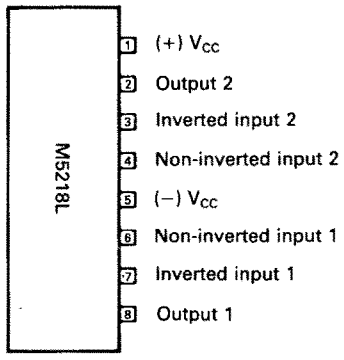
Item	Symbol	Rating	Unit
Power supply voltage	V_{DD}	−0.3 ~ 18	V
Input voltage	V_I	V_{SS} −0.3 ~ V_{DD} +0.3	V
Output voltage *1	V_O	V_{SS}−0.3 ~ V_{DD} +0.3	V
Maximum power dissipation *2	P_D	600	mW
Operation ambient temperature	T_{OPR}	−10 ~ +70	°C
Storage temperature	T_{STG}	−40 ~ +125	°C

*1 If V_{SS} terminal is standard

*2 Ta-25°C

M5218L (DUAL LOW-NOISE OPERATIONAL AMPLIFIER)

PIN CONNECTION

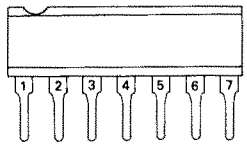


Maximum Ratings (Ta = 25°C)

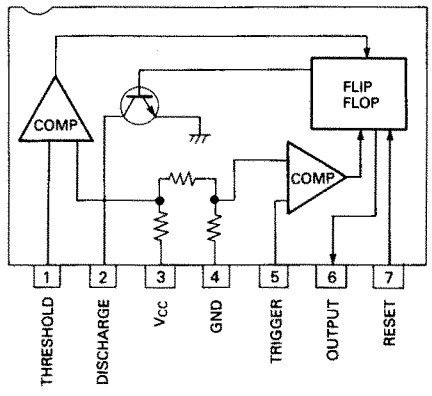
Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	± 18	V
Load current	I_{LP}	± 50	mA
Differential input voltage	V_{id}	± 30	V
In-phase input voltage	V_{io}	± 15	V
Power dissipation	P_d	800	mW
Operating temperature	T_{opr}	−20 ~ +75	°C
Storage temperature	T_{stg}	−55 ~ +125	°C

BA222 (MONOLITHIC TIMER)

PIN CONNECTION



BLOCK DIAGRAM

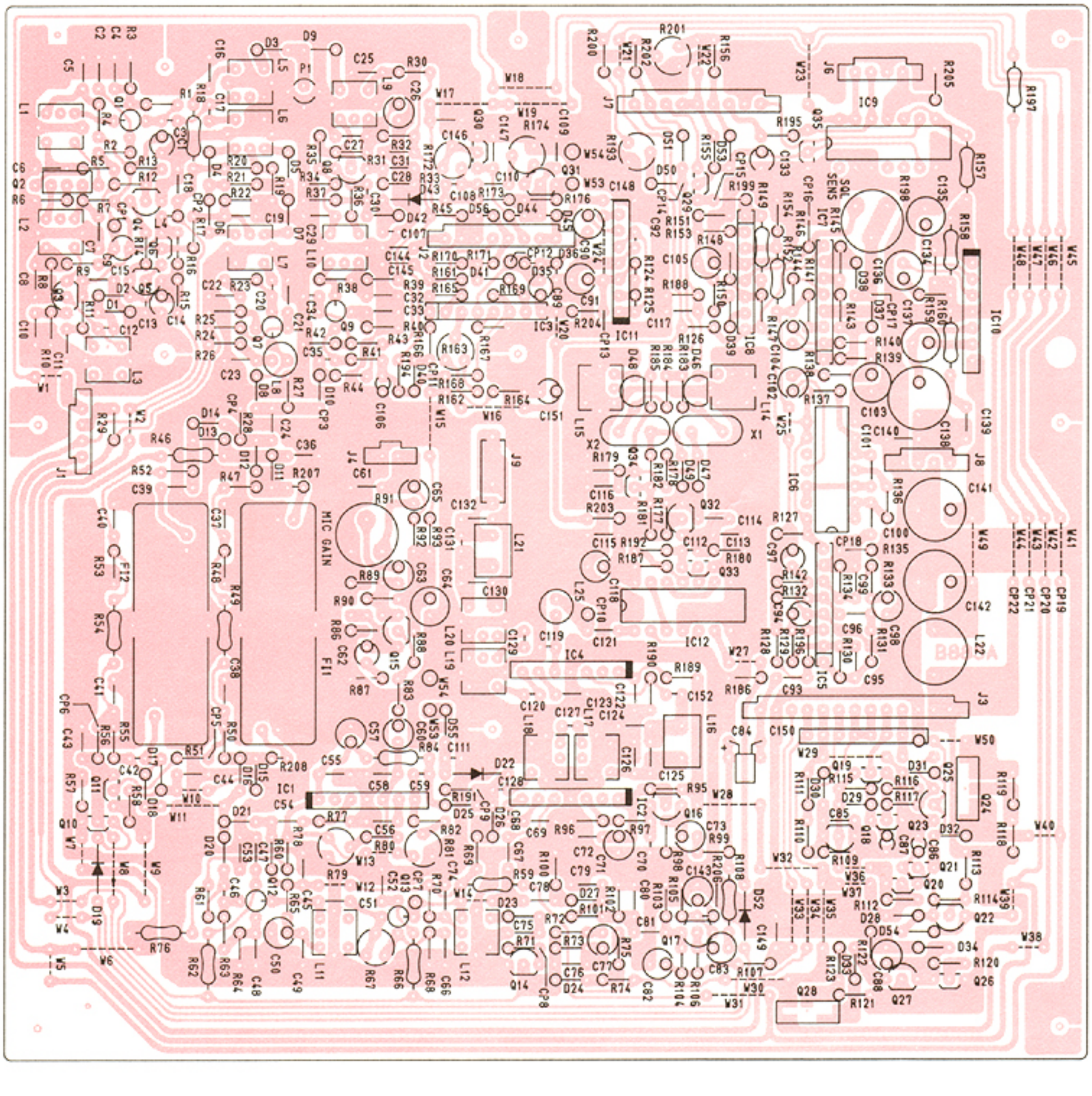


Maximum Ratings

Item	Symbol	Rating	Unit
Power supply voltage	V_{CC}	18	V
Power dissipation	P_D	500	mW
Operation temperature	T_{OPT}	−10 ~ +75	°C
Storage temperature	T_{STG}	−55 ~ +125	°C

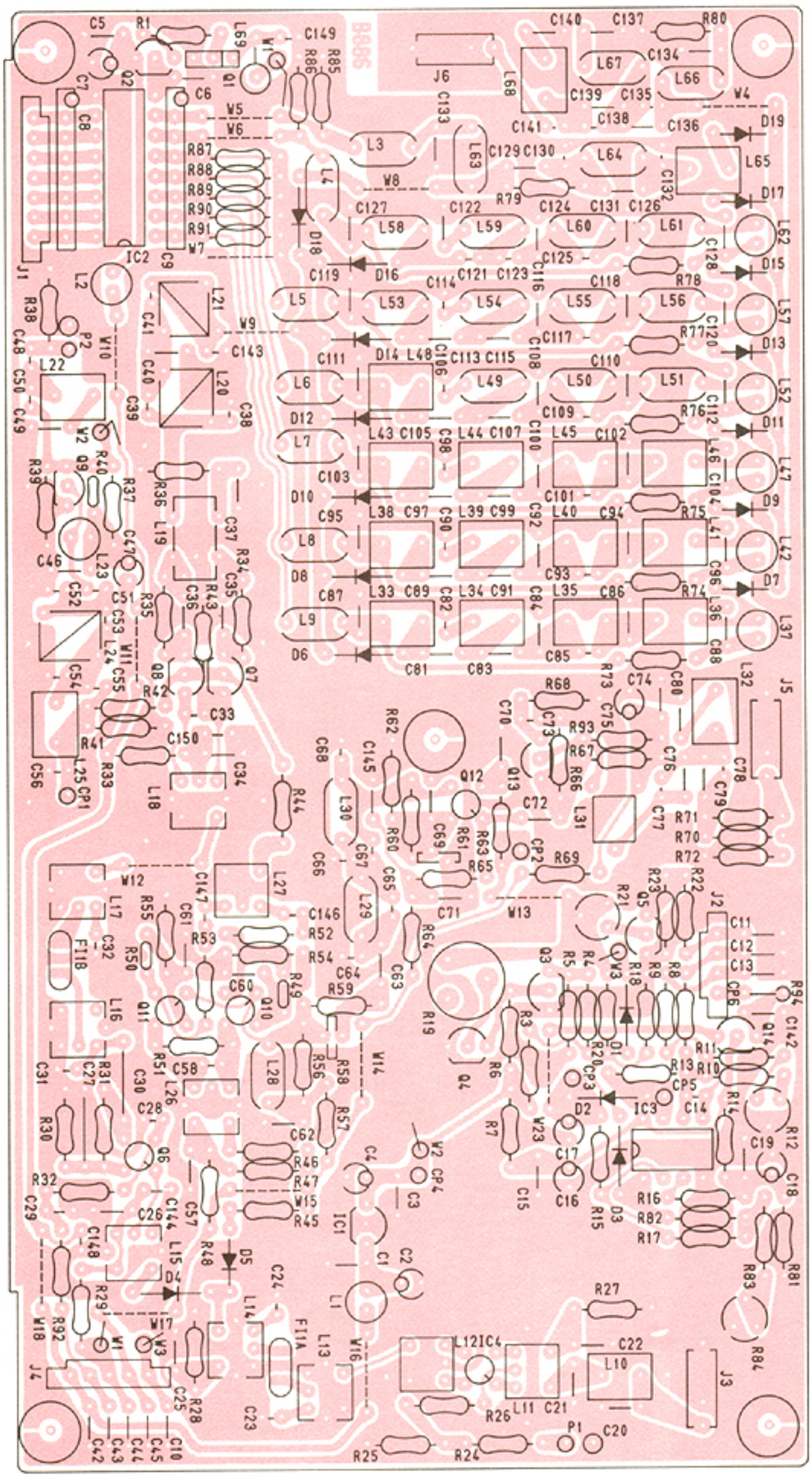
SECTION 12 BOARD LAYOUT

MAIN UNIT BOARD



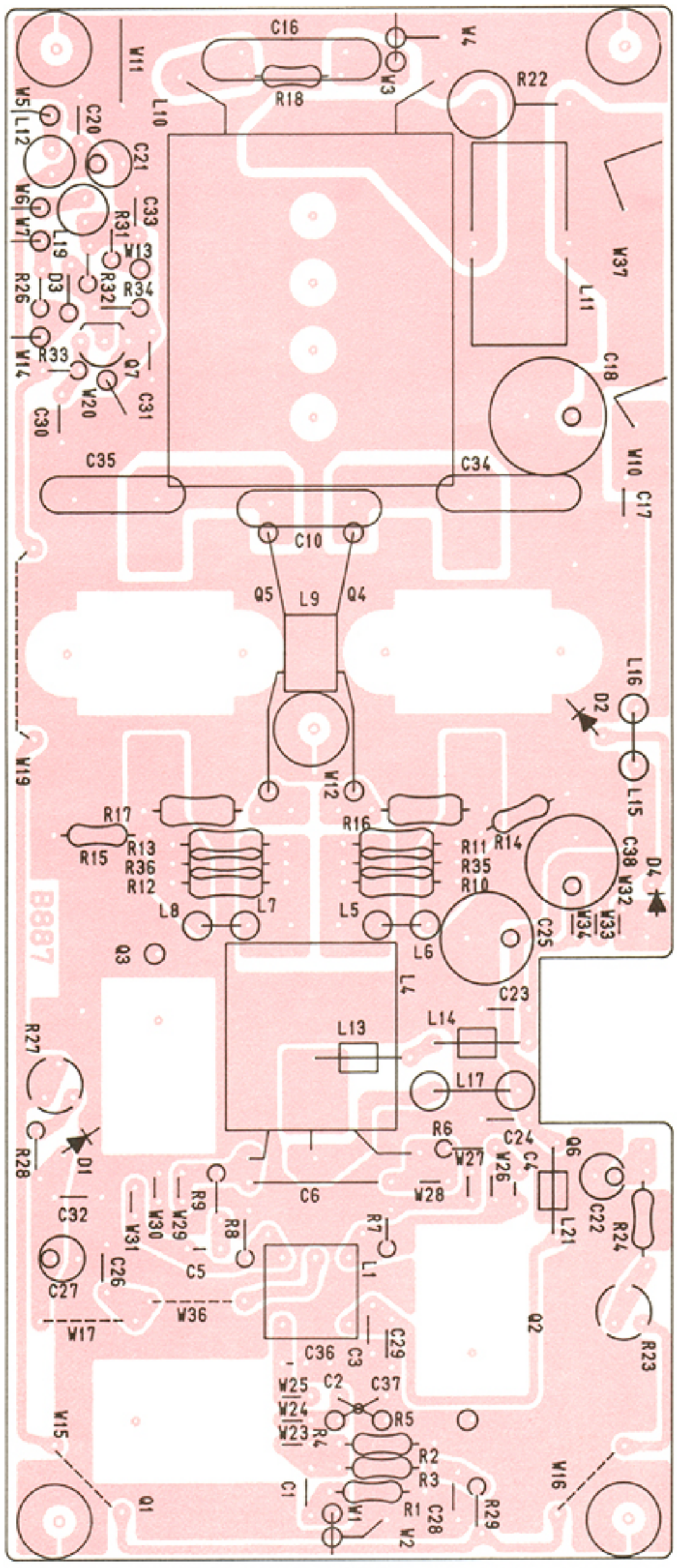
NOTE: Please add "300" to the indicated number on the board for actual part number respectively.

RF UNIT BOARD



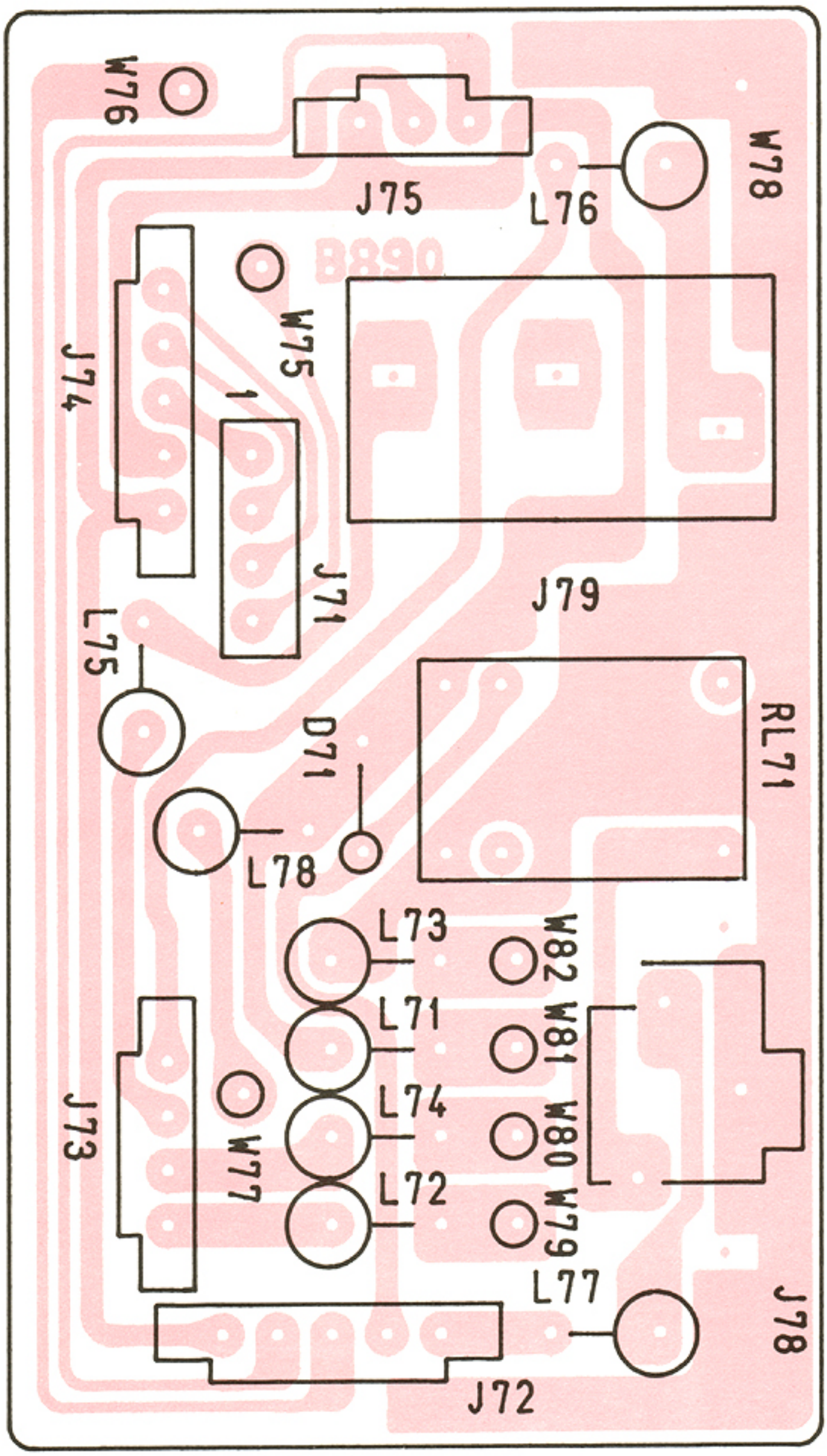
NOTE: Please add "600" to the indicated number on the board for actual part number respectively.

PA UNIT BOARD



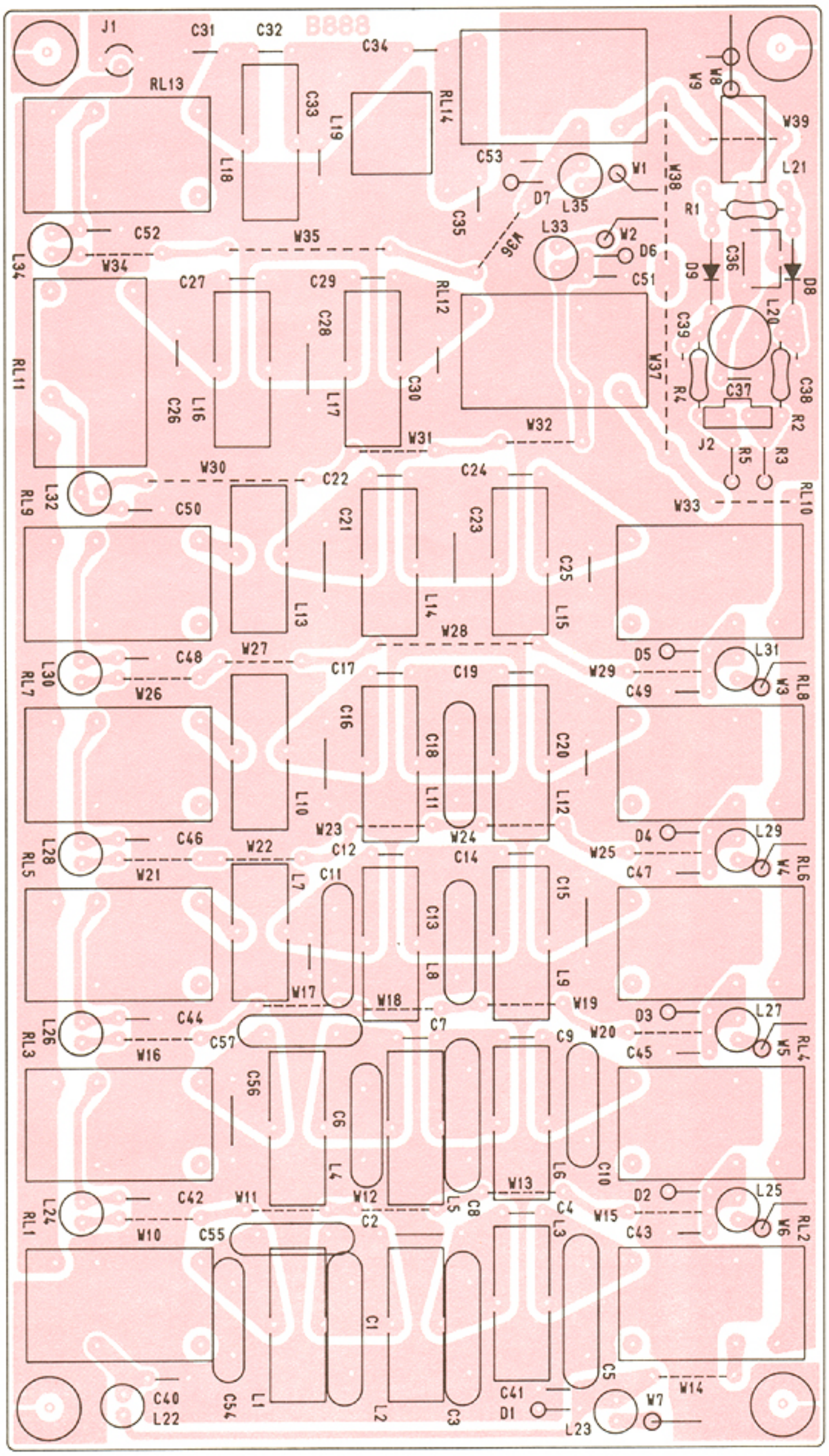
NOTE: Please add "800" to the indicated number on the board for actual part number respectively.

PA CONNECTOR BOARD



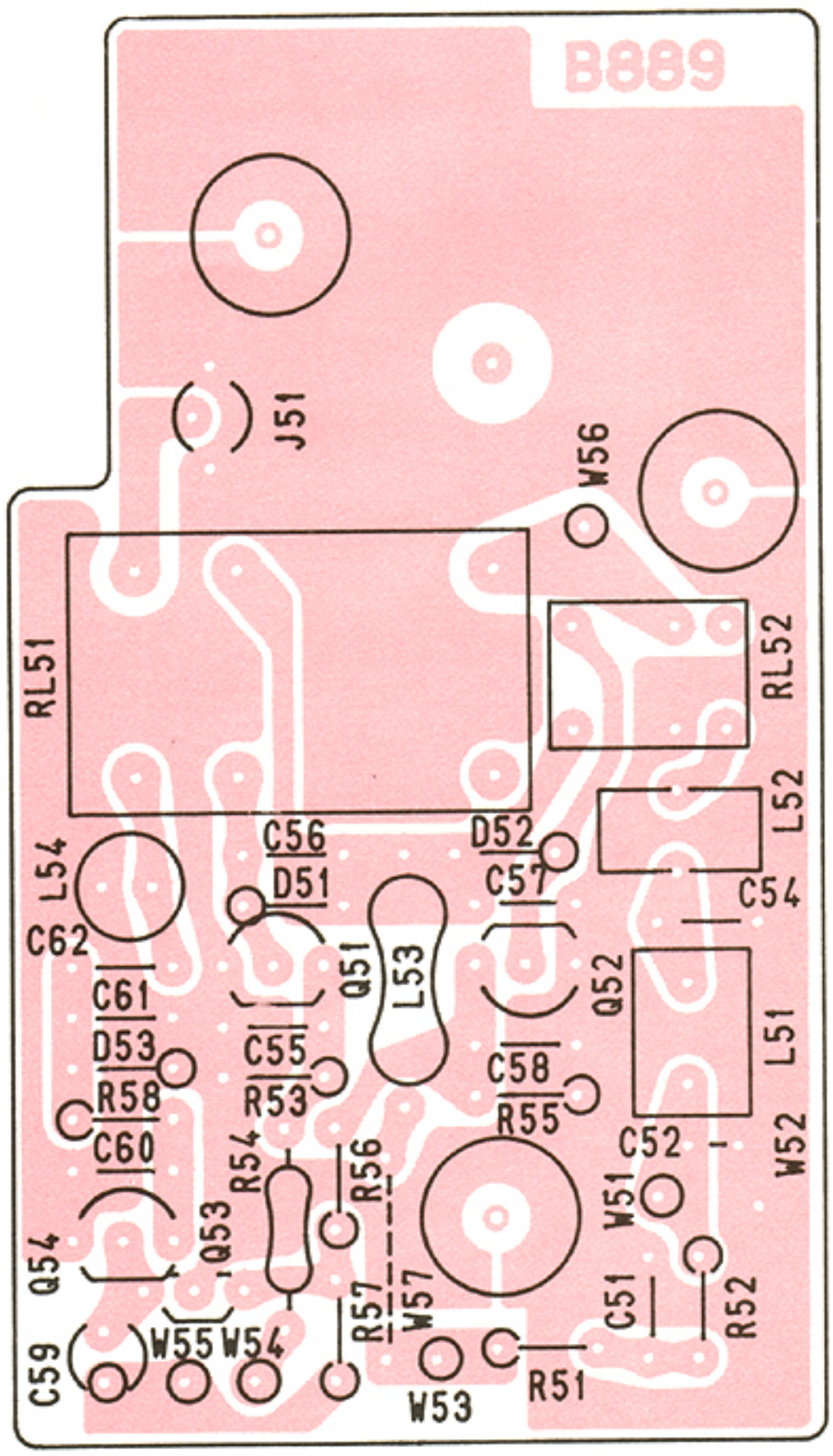
NOTE: Please add "800" to the indicated number on the board for actual part number respectively.

FILTER UNIT BOARD



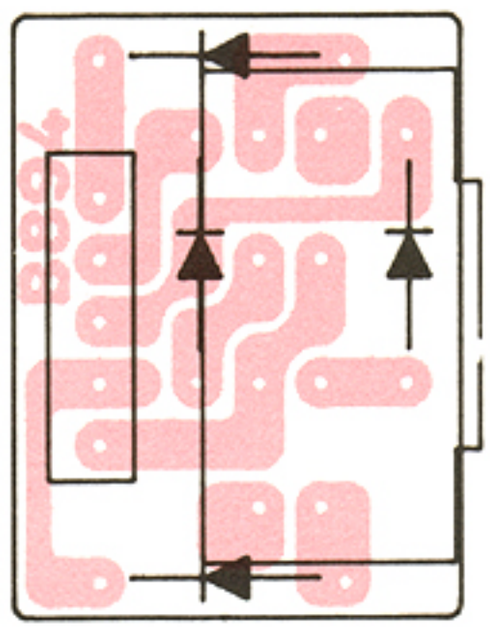
NOTE: Please add "900" to the indicated number on the board for actual part number respectively.

ANTENNA SWITCH BOARD



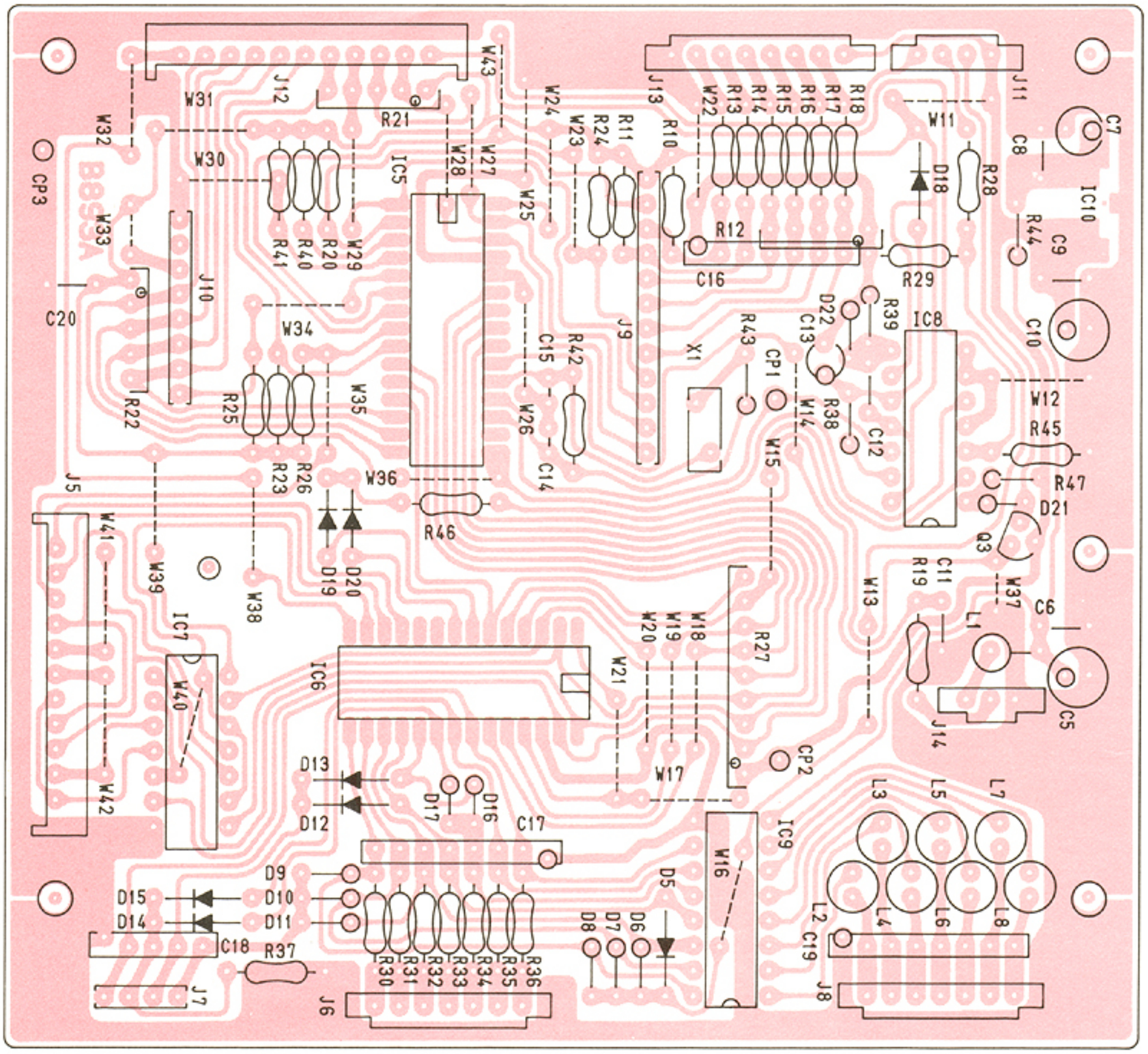
NOTE: Please add "800" to the indicated number on the board for actual part number respectively.

CHANNELLING BOARD



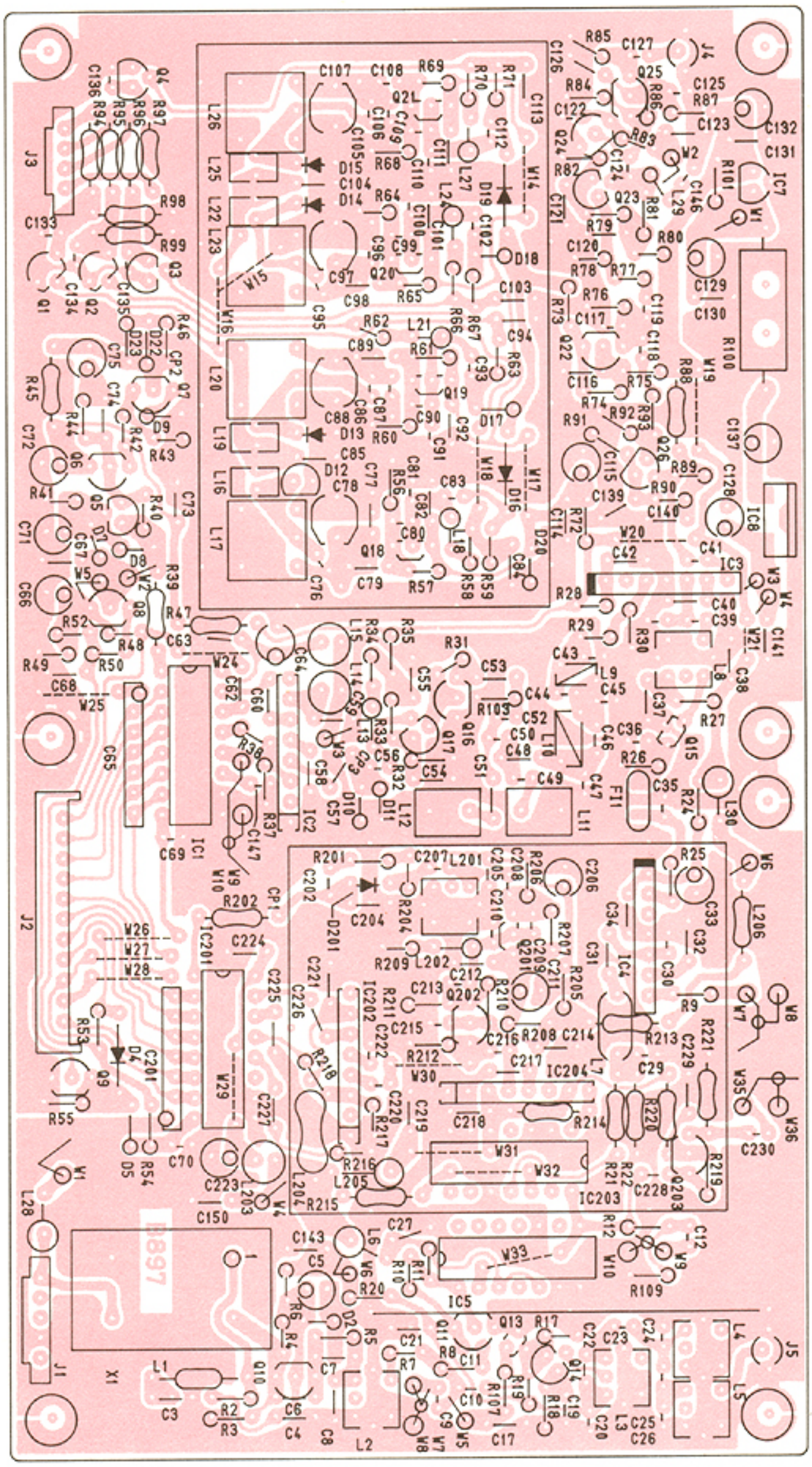
NOTE: Please add "1200" to the indicated number on the board for actual part number respectively.

LOGIC UNIT BOARD

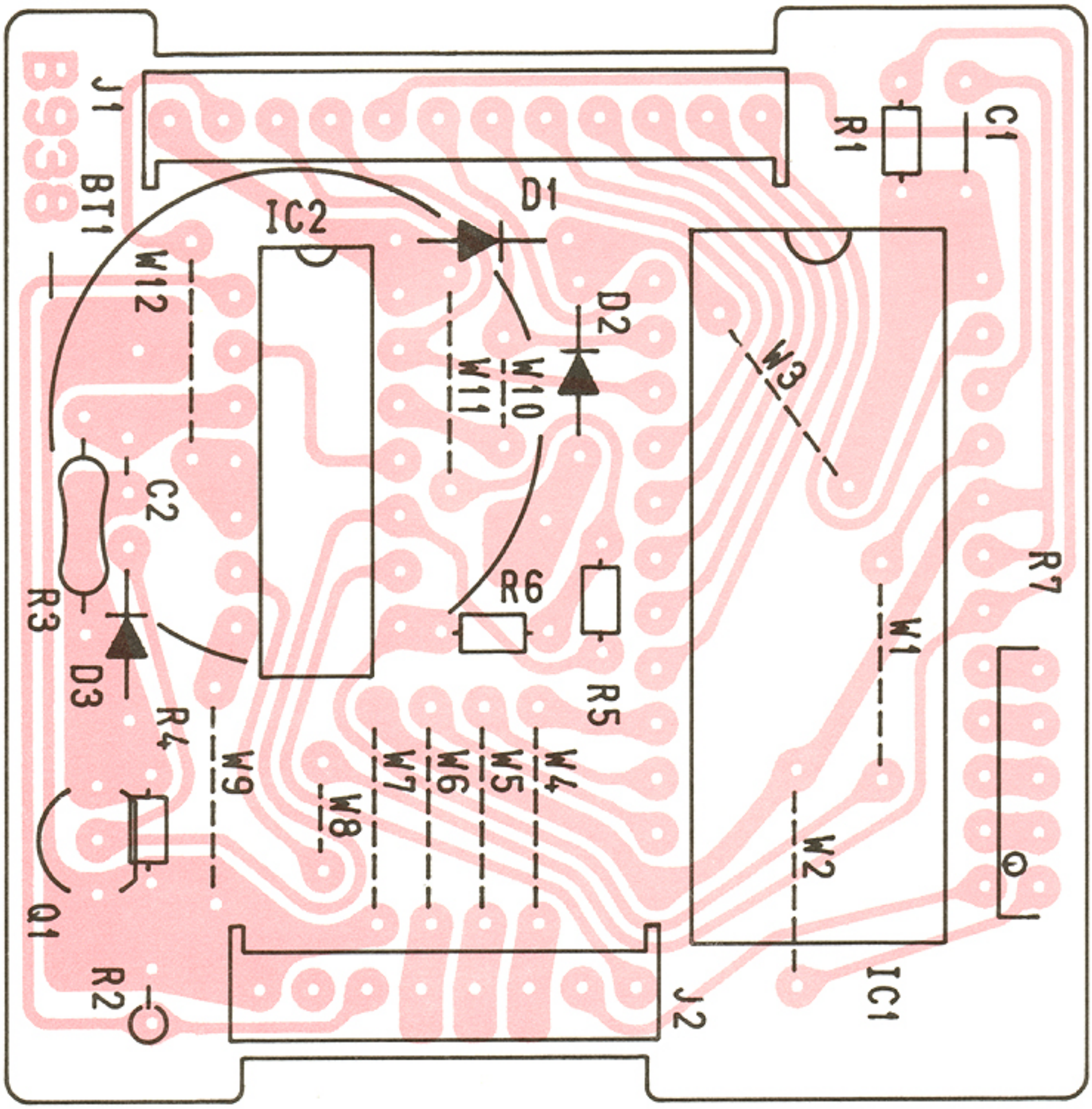


NOTE: Please add "1000" to the indicated number on the board for actual part number respectively.

PLL UNIT BOARD

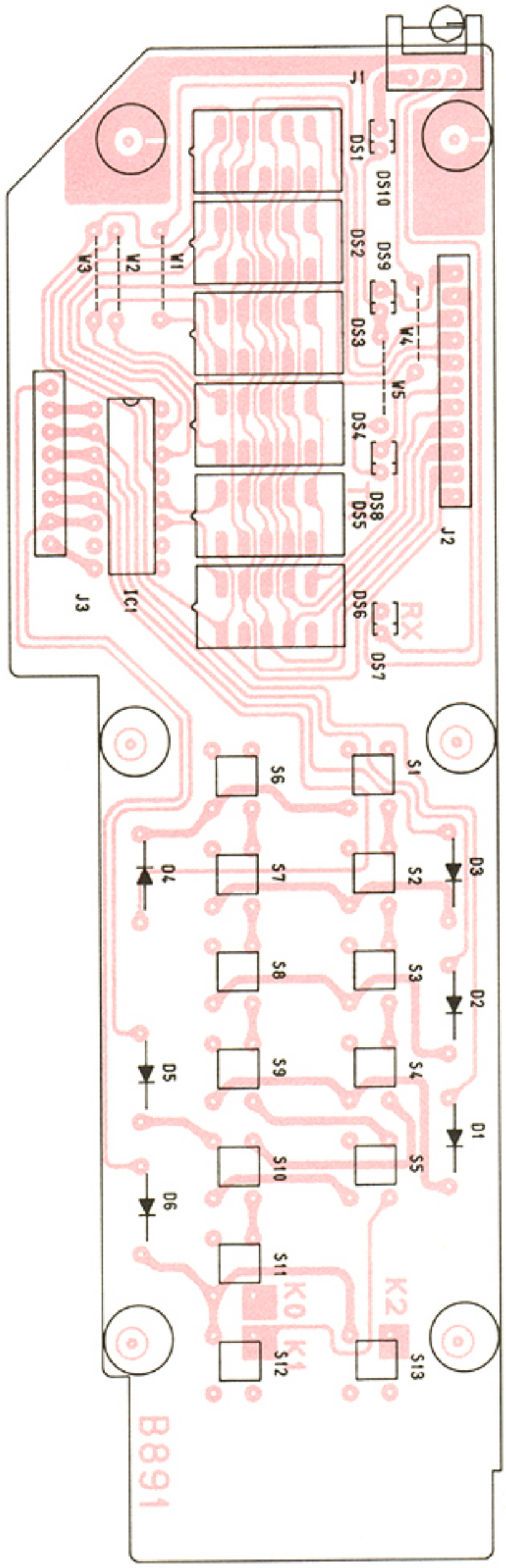


RAM UNIT BOARD



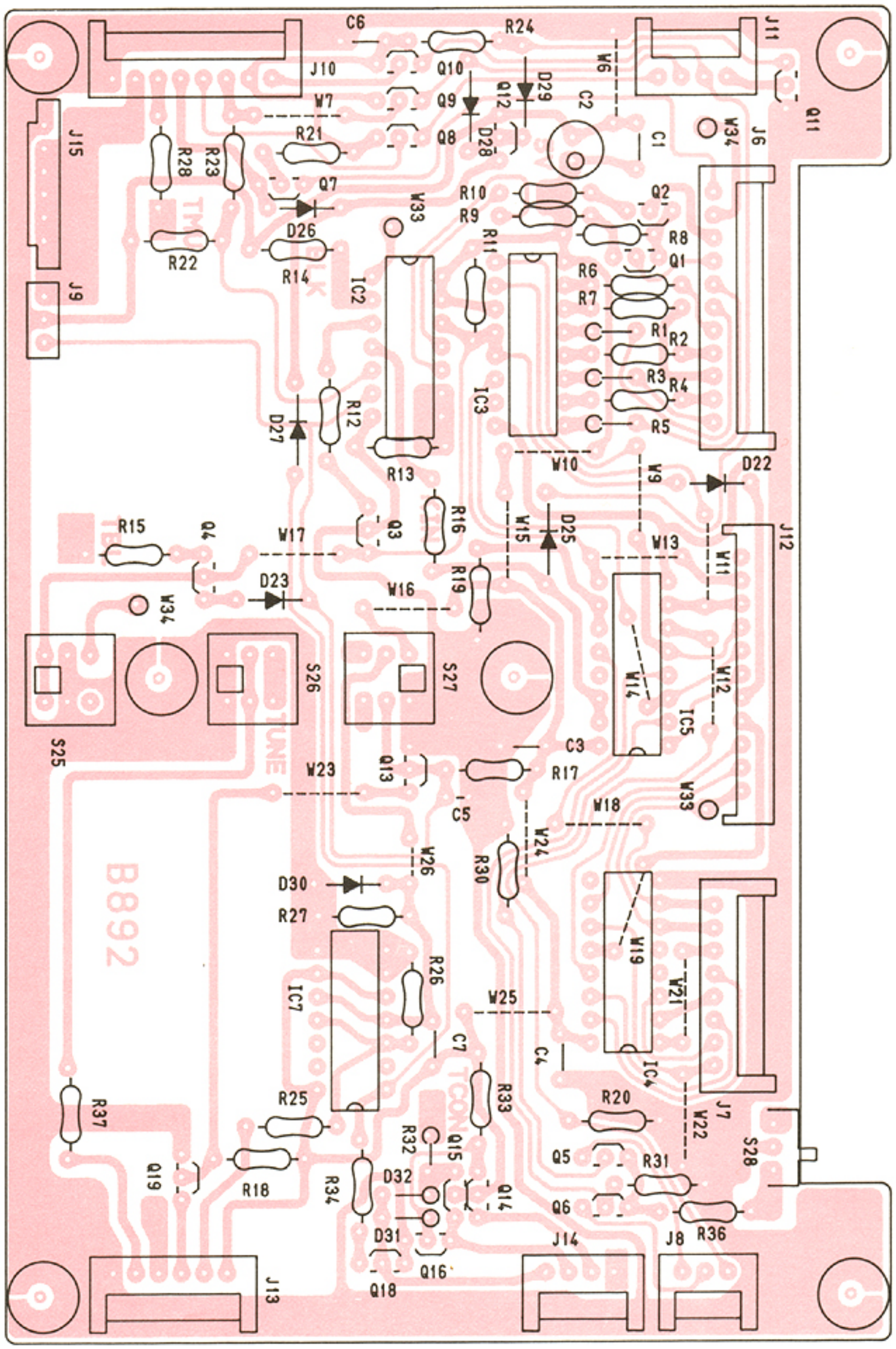
NOTE: Please add "1000" to the indicated number on the board for actual part number respectively.

DISPLAY BOARD



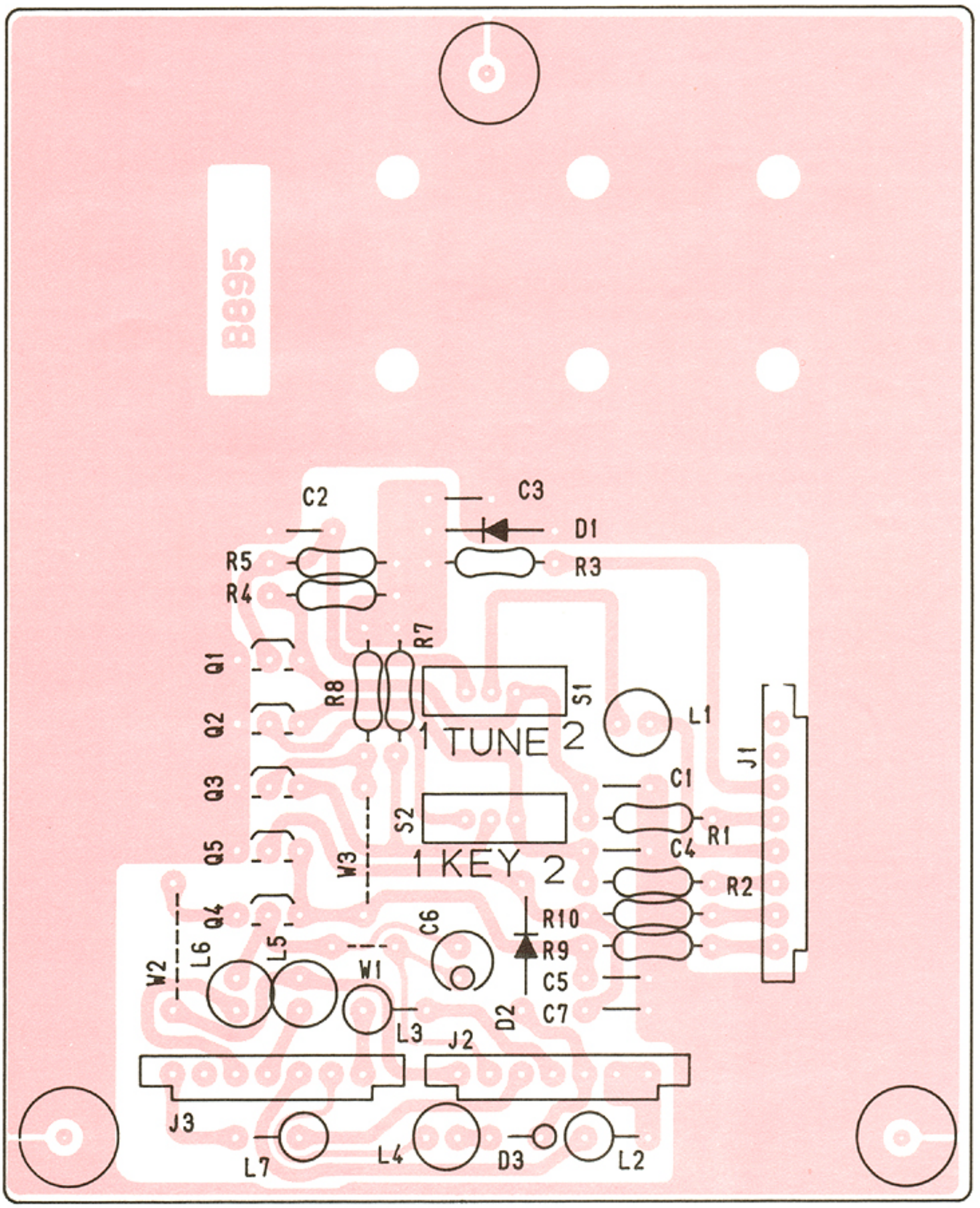
NOTE: Please add "1200" to the indicated number for actual part number respectively.

MATRIX BOARD



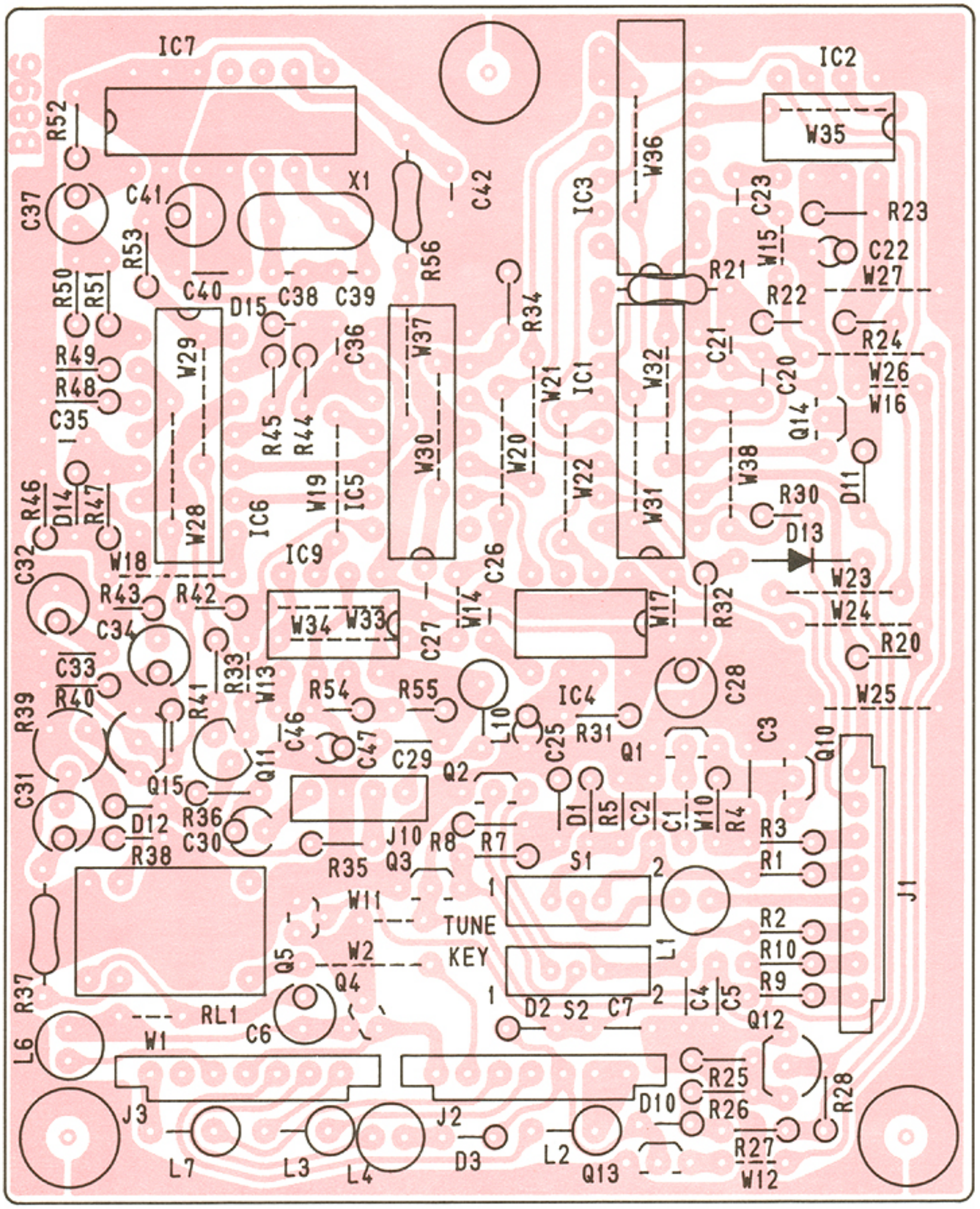
NOTE: Please add "1200" to the indicated number on the board for actual part number respectively.

MIC-C UNIT BOARD



NOTE: Please add "1300" to the indicated number on the board for actual part number respectively.

UT-20 ALARM UNIT (OPTION)



SECTION 13 OPTION INSTALLATION

13-1 UT-20 ALARM UNIT

This gives installation instructions for the optional alarm unit, UT-20. Please read all instructions carefully before installation to get maximum performance and full value from the radio.

PREPARATION

Before performing any work on the radio, make sure that the power cord is unplugged from the radio.

Remove the top cover by unscrewing the six screws on the top, and the three screws on each side.

ASSEMBLY PROCEDURE

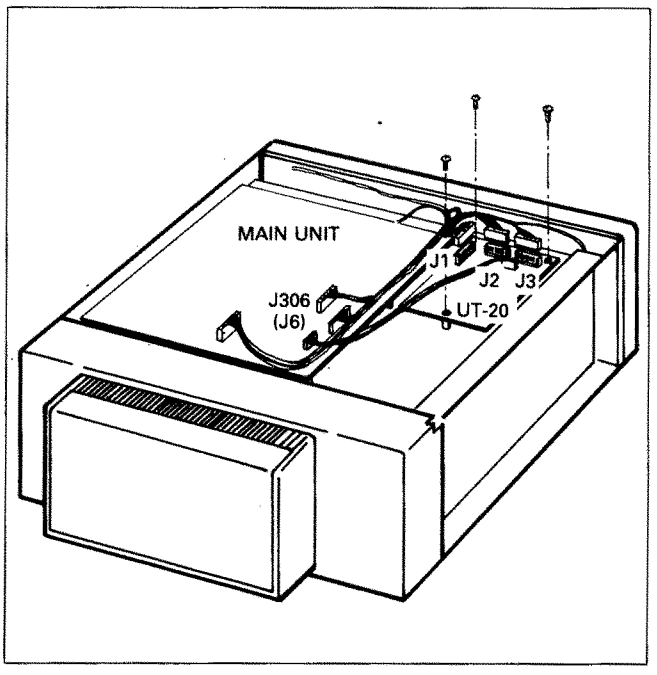
1. Unplug the connectors inserted to J1, J2 and J3 on the MIC-C unit.

2. Remove the MIC-C unit by unscrewing the three screws retaining the unit.

3. Install the optional unit UT-20 at the position where the MIC-C unit was installed previously.

4. Insert the connectors, which were connected to J1, J2 and J3 of the MIC-C unit previously, to J1, J2 and J3 of the UT-20 respectively.

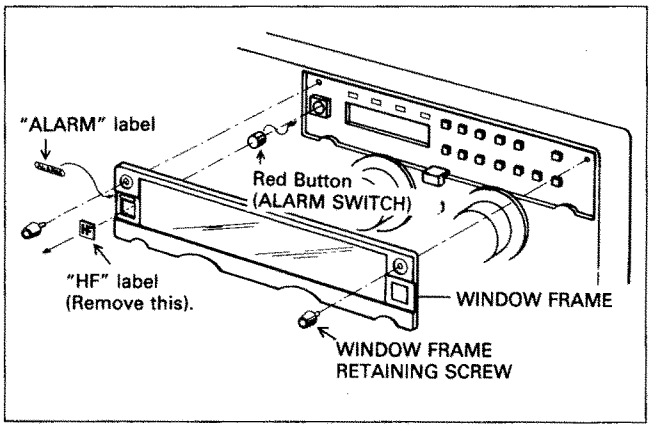
5. Insert the 4-pin plug from the UT-20 to J306 (indicated as J6 on the board) of the MAIN unit.



6. Remove the WINDOW FRAME by unscrewing the WINDOW FRAME RETAINING SCREWs and the "HF" label located between the frequency display and speaker on the front panel.

7. You will find the shaft of the alarm switch there. Screw the supplied red button into this shaft.

8. Replace the WINDOW FRAME as before and attach the supplied "ALARM" label to the position just above the switch.



9. Turn R1339 (indicated as R39 on the board) of the UT-20 fully counterclockwise, and set the switches "TUNE" and "KEY" as before (the same positions as the MIC-C unit; refer to the instruction manual of the IC-M700). Please refer to the instruction manual of the IC-M700 for further detail.

10. Connect a dummy load or terminated power meter to the antenna connector on the rear panel. Push the alarm switch newly installed and adjust R1339 so that proper modulation is obtained.

CAUTION: Never transmit the alarm signals into an antenna when adjusting.

OPERATION

The international alarm signal can be automatically transmitted on 2182 KHz by pushing the ALARM SWITCH newly installed.

TO TEST THE ALARM FUNCTION

When the radio is set in the receive mode, by just pushing the ALARM SWITCH, the operation frequency is set on 2182.0 KHz and the mode is A3H (H3E), even if a different frequency and mode have been set previously, and international alarm signal tones can be heard from the speaker and the ALARM INDICATOR (located next to the ANTENNA TUNER TUNING INDICATOR on the front panel) is lit. The tones will be made for a period of 50 seconds.

To stop the tones, push the ALARM switch again.

To clear the alarm function and to return to the previous operation frequency and mode, push the TRANSMIT FREQUENCY CHECK switch.

TO TRANSMIT THE ALARM SIGNALS

CAUTION: Never transmit the alarm signals except when your ship is in distress.

Push the ALARM SWITCH while depressing the PTT (Push-To-Talk) switch on the microphone, and the operation frequency is set on 2182.0 KHz and the mode is A3H (H3E), even if a different frequency and mode have been set previously, and international alarm signals are transmitted. At the same time, the signal tones can be heard from the speaker and the ALARM INDICATOR on the front panel is lit. The radio will be kept in the transmit mode, even if the PTT switch is released, during a period of 50 seconds.

When an antenna tuner is connected, first, the radio is set in the ANTENNA TUNING mode. After the tuner has been tuned on 2182 KHz, the radio is turned in the transmit mode automatically and transmits the alarm signals.

After a period of 50 seconds, the radio returns to the receive mode, but the operation frequency and mode will be maintained 2182 KHz and A3H (H3E) respectively.

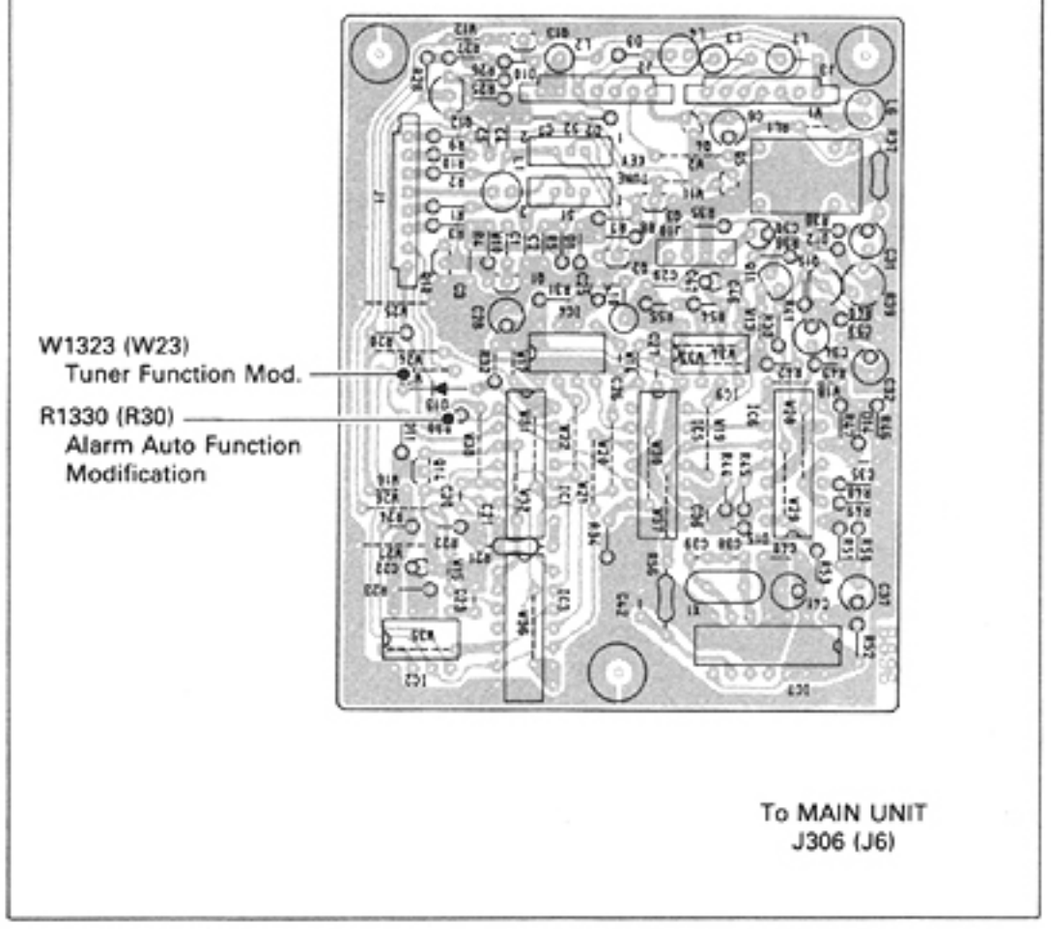
To transmit distress messages, depress the PTT switch and talk into the microphone with a normal and clear voice in a usual way.

To clear the alarm function and to return to the previous operation frequency and mode, push the TRANSMIT FREQUENCY CHECK switch.

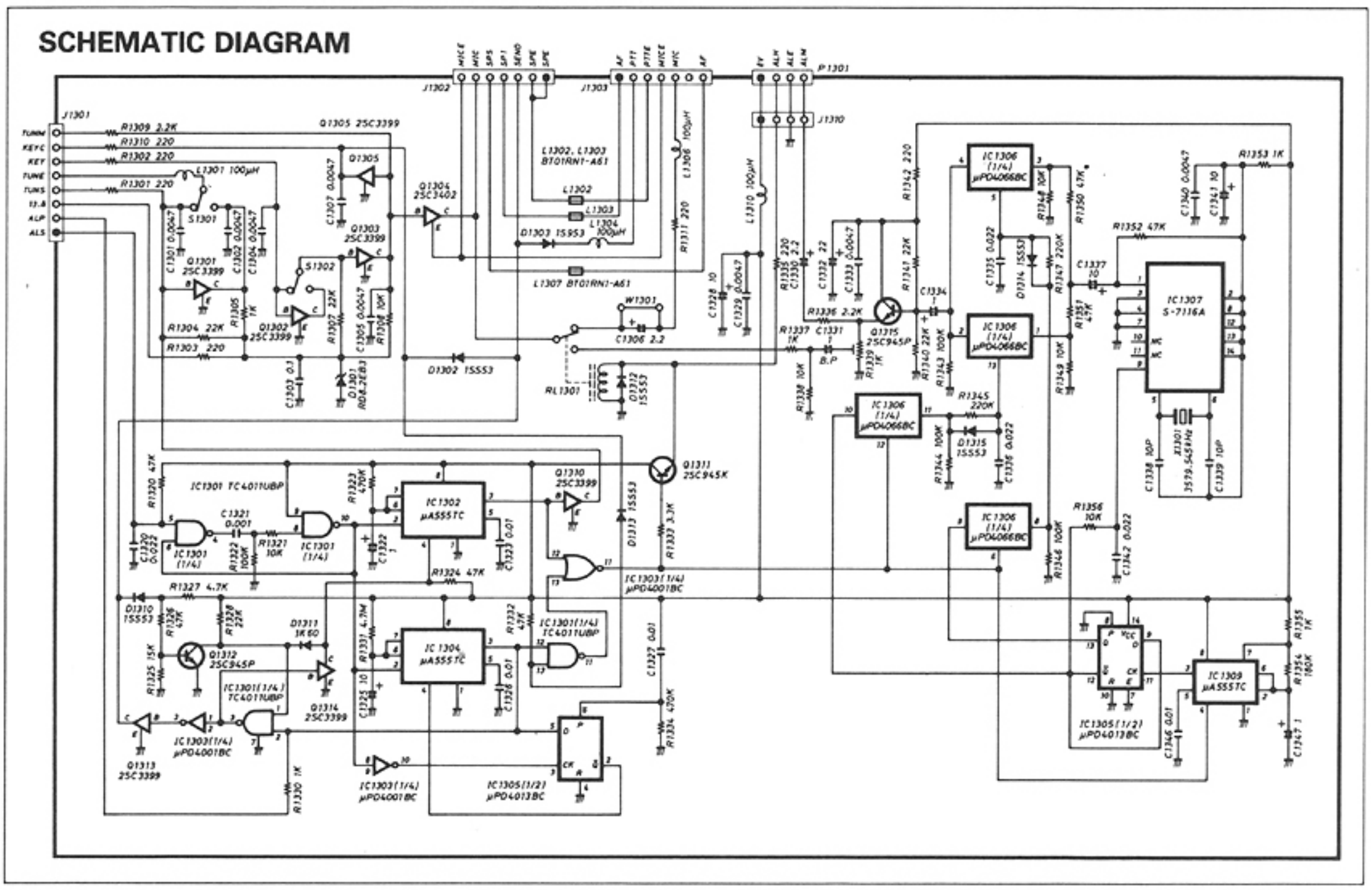
MODIFICATIONS

By pushing the ALARM SWITCH, frequency and mode are set on 2182 KHz and A3H (H3E) automatically. If you would like to change the frequency and/or mode for the other ones, cut the lead of R1330 (indicated as R30 on the board) on the UT-20. The alarm signal will be transmitted on selected frequency and mode.

When an antenna tuner is connected, by pushing the ALARM SWITCH, first the tuner is tuned up then the alarm signal is transmitted. If you do not prefer this function, cut the lead of W1323 (indicated as W23 on the board) on the UT-20.



SCHEMATIC DIAGRAM



SECTION 14 PARTS LIST

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
IC1	IC	M54929P
IC2	IC	M54466L
IC3	IC	μPC1037H
IC4	IC	μPC1037H
IC5	IC	SN74LS90N
IC7	IC	TA78L008AP
IC8	IC	μA7805
IC201	IC	M54929P
IC202	IC	M54466L
IC203	IC	SN74LS90N
IC204	IC	M54459L
Q1	Transistor	2SC945P
Q2	Transistor	2SC945P
Q3	Transistor	2SC945P
Q4	Transistor	2SC945P
Q5	FET	2SK30AY
Q6	FET	2SK30AY
Q7	Transistor	2SC1571G
Q8	Transistor	2SA1015Y
Q9	Transistor	2SC945P
Q10	Transistor	2SC945R
Q11	Transistor	2SC383TM
Q13	Transistor	2SC3399
Q14	Transistor	2SC383TM
Q15	FET	2SK241Y
Q16	Transistor	2SC383TM
Q17	Transistor	2SC383TM
Q18	FET	2SK192AGR
Q19	FET	2SK192AGR
Q20	FET	2SK192AGR
Q21	FET	2SK192AGR
Q22	Transistor	2SC383TM
Q23	Transistor	2SC383TM
Q24	Transistor	2SC945P
Q25	Transistor	2SC383TM
Q26	Transistor	2SC383TM
Q201	FET	2SK192AGR
Q202	Transistor	2SC763C
Q203	Transistor	2SC945P
D2	Zener Diode	RD5.1EB2
D4	Diode	1SS53
D5	Diode	1SS53
D7	Diode	1SS53
D8	Diode	1SS53
D9	Diode	1SS53
D10	Diode	1SS53
D11	Diode	1SS53
D12	Varactor Diode	FC52M
D13	Varactor Diode	1SV50E
D14	Varactor Diode	1SV50E
D15	Varactor Diode	1SV50E
D16	Diode	1SS53
D17	Diode	1SS53
D18	Diode	1SS53
D19	Diode	1SS53
D20	Zener Diode	RD5.1EB2
D22	Diode	1SS53
D23	Diode	1SS53
D201	Varactor Diode	1SV50E

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
FI1	Crystal Filter	FL-69 (30M15A)
X1	Crystal	CR-64 (30.72MHz)
L1	Coil	LW-19
L2	Coil	LS-94
L3	Coil	LS-114
L4	Coil	LS-114
L5	Coil	LS-114
L6	Coil	LAL04NA102K
L7	Coil	EL0810SKI-101
L8	Coil	LS-162
L9	Coil	LA-244
L10	Coil	LA-254
L11	Coil	LB4 R36
L12	Coil	LB4 R23
L13	Coil	LW-17
L14	Coil	FL5H101K
L15	Coil	FL5H101K
L16	Coil	LR-79
L17	Coil	LB-135
L18	Coil	LW-19
L19	Coil	LR-79
L20	Coil	LB-135
L21	Coil	LW-19
L22	Coil	LR-79
L23	Coil	LB-135
L24	Coil	LW-19
L25	Coil	LR-79
L26	Coil	LB-135
L27	Coil	LW-19
L28	Coil	BT01RN1-A61
L29	Coil	LAL03NAR56M
L30	Coil	LAL04NA101K
L201	Coil	LB-113
L202	Coil	LW-19
L203	Coil	FL5H 101K
L204	Coil	LAL04NA101K
L205	Coil	LAL04NA101K
L206	Coil	LAL04NA101K

R2	Resistor	2.2K	ELR25
R3	Resistor	4.7K	ELR25
R4	Resistor	10K	ELR25
R5	Resistor	470	ELR25
R6	Resistor	220	ELR25
R7	Resistor	47	R25
R8	Resistor	47	ELR25
R9	Resistor	100	ELR25
R10	Resistor	15K	ELR25
R11	Resistor	1K	R25
R12	Resistor	470	ELR25
R17	Resistor	10K	ELR25
R18	Resistor	220	ELR25
R19	Resistor	22K	ELR25
R20	Resistor	100	ELR25
R21	Resistor	8.2K	R25
R22	Resistor	1K	R25
R24	Resistor	100	ELR25
R25	Resistor	100	ELR25
R26	Resistor	470	ELR25

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.	
R27	Resistor	220	ELR25
R28	Resistor	100	ELR25
R29	Resistor	47	ELR25
R30	Resistor	3.3K	ELR25
R31	Resistor	47K	ELR25
R32	Resistor	10K	ELR25
R33	Resistor	10K	ELR25
R34	Resistor	220	ELR25
R35	Resistor	220	ELR25
R37	Resistor	2.7K	ELR25
R38	Resistor	390	ELR25
R39	Resistor	1K	R25
R40	Resistor	4.7K	ELR25
R41	Resistor	1.8M	ELR25
R42	Resistor	1K	ELR25
R43	Resistor	1K	ELR25
R44	Resistor	4.7K	ELR25
R45	Resistor	1K	R25
R46	Resistor	10K	R25
R47	Resistor	100	R25
R48	Resistor	2.2K	ELR25
R49	Resistor	2.2K	ELR25
R50	Resistor	10K	ELR25
R52	Resistor	27K	ELR25
R53	Resistor	22K	ELR25
R54	Resistor	22K	ELR25
R55	Resistor	47K	ELR25
R56	Resistor	100K	ELR25
R57	Resistor	100K	ELR25
R58	Resistor	150	ELR25
R59	Resistor	3.3K	ELR25
R60	Resistor	100K	ELR25
R61	Resistor	100K	ELR25
R62	Resistor	150	ELR25
R63	Resistor	3.3K	ELR25
R64	Resistor	100K	ELR25
R65	Resistor	100K	ELR25
R66	Resistor	150	ELR25
R67	Resistor	3.3K	ELR25
R68	Resistor	100K	ELR25
R69	Resistor	100K	ELR25
R70	Resistor	150	ELR25
R71	Resistor	3.3K	ELR25
R72	Resistor	180	ELR25
R73	Resistor	33	ELR25
R74	Resistor	4.7K	ELR25
R75	Resistor	220	ELR25
R76	Resistor	330	ELR25
R77	Resistor	22	ELR25
R78	Resistor	220	ELR25
R79	Resistor	22K	ELR25
R80	Resistor	100	ELR25
R81	Resistor	560	ELR25
R82	Resistor	10K	ELR25
R83	Resistor	47K	ELR25
R84	Resistor	10K	ELR25
R85	Resistor	220	ELR25
R86	Resistor	10K	ELR25
R87	Resistor	100	ELR25
R88	Resistor	100	R25
R89	Resistor	220	ELR25
R90	Resistor	22K	ELR25
R91	Resistor	10K	ELR25
R92	Resistor	470	ELR25

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.		
R93	Resistor	47	ELR25	
R94	Resistor	10K	R25	
R95	Resistor	10K	R25	
R96	Resistor	10K	R25	
R97	Resistor	10K	R25	
R98	Resistor	47K	R25	
R99	Resistor	47K	R25	
R100	Resistor	SRW1P10-J		
R101	Resistor	120	R50X	
R103	Resistor	47	ELR25	
R107	Resistor	47K	ELR25	
R109	Resistor	3.3K	ELR25	
R201	Resistor	33K	ELR25	
R202	Resistor	1K	R25	
R204	Resistor	33K	ELR25	
R205	Resistor	10K	ELR25	
R206	Resistor	470K	ELR25	
R207	Resistor	470K	ELR25	
R208	Resistor	180	ELR25	
R209	Resistor	150	ELR25	
R210	Resistor	5.6K	ELR25	
R211	Resistor	1.2K	ELR25	
R212	Resistor	330	ELR25	
R213	Resistor	150	R25	
R214	Resistor	4.7K	R25	
R215	Resistor	2.2K	R25	
R216	Resistor	2.7K	ELR25	
R217	Resistor	2.7K	ELR25	
R218	Resistor	390	ELR25	
R219	Resistor	22K	ELR25	
R220	Resistor	220	R25	
R221	Resistor	470	R25	
C3	Ceramic	47P	50V	CH
C4	Ceramic	0.0047	50V	
C5	Electrolytic	10	16V	
C6	Ceramic	82P	50V	TH
C7	Ceramic	0.0047	50V	
C8	Ceramic	82P	50V	TH
C9	Ceramic	10P	50V	
C10	Ceramic	68P	50V	
C11	Ceramic	47P	50V	
C12	Ceramic	100P	50V	
C17	Ceramic	0.0047	50V	
C19	Ceramic	0.001	50V	
C20	Ceramic	0.001	50V	
C21	Ceramic	0.0047	50V	
C22	Ceramic	8P	50V	
C23	Ceramic	1P	50V	
C24	Ceramic	8P	50V	
C25	Ceramic	1P	50V	
C26	Ceramic	8P	50V	
C27	Barrier Lay	0.047	25V	
C29	Ceramic	470P	50V	
C30	Ceramic	470P	50V	
C31	Barrier Lay	0.1	16V	
C32	Ceramic	0.0047	50V	
C33	Electrolytic	47	10V	
C34	Ceramic	0.0047	50V	
C35	Ceramic	6P	50V	
C36	Ceramic	6P	50V	
C37	Ceramic	0.0047	50V	
C38	Ceramic	0.0047	50V	
C39	Ceramic	47P	50V	

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.		
C40	Ceramic	0.0047	50V	
C41	Ceramic	0.001	50V	
C42	Ceramic	0.0047	50V	
C43	Ceramic	43P	50V	
C44	Ceramic	51P	50V	
C45	Ceramic	82P	50V	
C46	Ceramic	15P	50V	
C47	Ceramic	62P	50V	
C48	Ceramic	150P	50V	
C49	Ceramic	120P	50V	
C50	Ceramic	56P	50V	
C51	Ceramic	330P	50V	
C52	Ceramic	68P	50V	
C53	Ceramic	150P	50V	
C54	Ceramic	0.0047	50V	
C55	Ceramic	0.0047	50V	
C56	Ceramic	0.001	50V	
C57	Ceramic	0.0047	50V	
C58	Ceramic	0.0022	50V	
C59	Ceramic	0.0047	50V	
C60	Ceramic	0.0047	50V	
C62	Ceramic	0.0047	50V	
C63	Ceramic	0.0047	50V	
C64	Electrolytic	47	10V	
C65	Array	B7ZC0717-32N		
C66	Electrolytic	47	10V	
C67	Barrier Lay	0.047	25V	
C68	Barrier Lay	0.1	16V	
C69	Ceramic	0.001	50V	
C70	Ceramic	0.001	50V	
C71	Electrolytic	1	50V	
C72	Electrolytic	100	10V	
C73	Ceramic	0.0047	50V	
C74	Barrier Lay	0.047	25V	
C75	Electrolytic	1	50V	BP
C76	Ceramic	30P	50V	CH
C77	Ceramic	30P	50V	CH
C78	Trimmer	CTZ51C		
C79	Ceramic	47P	50V	CH
C80	Ceramic	12P	50V	CH
C81	Ceramic	12P	50V	CH
C82	Ceramic	0.0047	50V	
C83	Ceramic	1P	50V	
C84	Ceramic	0.0047	50V	
C85	Barrier Lay	0.047	25V	
C86	Ceramic	51P	50V	CH
C87	Ceramic	18P	50V	CH
C88	Trimmer	CTZ51C		
C89	Ceramic	51P	50V	CH
C90	Ceramic	12P	50V	CH
C91	Ceramic	12P	50V	CH
C92	Ceramic	0.0047	50V	
C93	Ceramic	1P	50V	
C94	Ceramic	0.0047	50V	
C95	Ceramic	47P	50V	CH
C96	Ceramic	15P	50V	CH
C97	Trimmer	CTZ51A		
C98	Ceramic	47P	50V	CH
C99	Ceramic	12P	50V	CH
C100	Ceramic	8P	50V	CH
C101	Ceramic	0.0047	50V	
C102	Ceramic	1P	50V	
C103	Ceramic	0.0047	50V	
C104	Barrier Lay	0.047	25V	
C105	Ceramic	39P	50V	CH

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.		
C106	Ceramic	10P	50V	CH
C107	Trimmer	CTZ51A		
C108	Ceramic	47P	50V	CH
C109	Ceramic	12P	50V	CH
C110	Ceramic	6P	50V	CH
C111	Ceramic	0.0047	50V	
C112	Ceramic	1P	50V	
C113	Ceramic	0.0047	50V	
C114	Barrier Lay	0.047	25V	
C115	Electrolytic	100	10V	
C116	Ceramic	0.0047	50V	
C117	Ceramic	22P	50V	
C118	Ceramic	22P	50V	
C119	Ceramic	47P	50V	
C120	Ceramic	0.0047	50V	
C121	Ceramic	0.0047	50V	
C122	Ceramic	0.001	50V	
C124	Ceramic	47P	50V	
C125	Ceramic	0.001	50V	
C126	Ceramic	0.0047	50V	
C127	Ceramic	47P	50V	
C128	Electrolytic	47	10V	
C129	Electrolytic	100	16V	
C130	Ceramic	0.0047	50V	
C131	Ceramic	0.0047	50V	
C132	Electrolytic	47	10V	
C133	Ceramic	0.001	50V	
C134	Ceramic	0.001	50V	
C135	Ceramic	0.001	50V	
C136	Ceramic	0.001	50V	
C137	Electrolytic	10	16V	
C139	Ceramic	0.0047	50V	
C140	Ceramic	0.0047	50V	
C141	Ceramic	0.0047	50V	
C143	Ceramic	0.0047	50V	
C146	Ceramic	100P	50V	
C147	Ceramic	5P	50V	
C201	Array	B7ZC0717-32N		
C202	Mylar	0.01	50V	
C204	Ceramic	0.0022	50V	
C205	Ceramic	0.001	50V	
C206	Electrolytic	47	10V	
C207	Ceramic	39P	50V	UJ
C208	Ceramic	22P	50V	
C209	Ceramic	4P	50V	
C210	Ceramic	4P	50V	
C211	Electrolytic	47	10V	
C212	Ceramic	0.0022	50V	
C213	Ceramic	1P	50V	
C214	Ceramic	0.0047	50V	
C215	Ceramic	0.001	50V	
C216	Ceramic	47P	50V	
C217	Ceramic	0.0022	50V	
C218	Ceramic	0.0047	50V	
C219	Barrier Lay	0.047	25V	
C220	Ceramic	470P	50V	
C221	Ceramic	0.0047	50V	
C222	Ceramic	0.001	50V	
C223	Electrolytic	47	10V	
C224	Ceramic	0.0047	50V	
C225	Ceramic	0.0047	50V	
C226	Ceramic	0.0047	50V	
C227	Ceramic	0.0047	50V	
C228	Ceramic	330P	50V	

PLL UNIT

REF. NO.	DESCRIPTION	PART NO.
C229	Barrier Lay	0.047 25V
C230	Ceramic	470P 50V
J1	Connector	TL25P-05-V1
J2	Connector	5138-11CPB
J3	Connector	TL25P-04-V1
J4	Connector	TMP-J01X-V2
J5	Connector	TMP-J01X-V2
P1	Connector	(TMP-P01X-A1) W35
B1	PC. Board	B-897 (42443)
W14	Jumper	JPW-02A
W16	Jumper	JPW-02A
W17	Jumper	JPW-02A
W18	Jumper	JPW-02A
W19	Jumper	JPW-02A
W20	Jumper	JPW-02A
W21	Jumper	JPW-02H
W24	Jumper	JPW-02A
W25	Jumper	JPW-02A
W26	Jumper	JPW-02A
W27	Jumper	JPW-02A
W28	Jumper	JPW-02A
W30	Jumper	JPW-02A
W37	Jumper	JPW-02A

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.
IC301	IC	μPC1037H
IC302	IC	μPC1037H
IC303	IC	M5218L
IC304	IC	μPC1037H
IC305	IC	M5218L
IC306	IC	TC4011UBP
IC307	IC	M5218L
IC308	IC	M5218L
IC309	IC	μPD4066B
IC310	IC	μPC1181H
IC311	IC	BA222
IC312	IC	TC4013BP
Q301	FET	3SK74M
Q302	Transistor	2SC1583G
Q303	Transistor	2SC945P
Q304	Transistor	2SC945P
Q305	Transistor	2SC945P
Q306	Transistor	2SA1348
Q307	FET	3SK74M
Q308	Transistor	2SC945P
Q309	FET	3SK74M
Q310	Transistor	2SA1348
Q311	Transistor	2SA1348
Q312	FET	3SK74M
Q313	FET	3SK74M
Q314	Transistor	2SC945P
Q315	Transistor	2SC1571G
Q316	Transistor	2SC1571G
Q317	Transistor	2SC1571G
Q318	Transistor	2SC945P
Q319	Transistor	2SC3399

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.
Q320	Transistor	2SC2458GR
Q321	Transistor	2SC3402
Q322	Transistor	2SD468C
Q323	Transistor	2SC3402
Q324	Transistor	2SD880Y
Q325	Transistor	2SC945P
Q326	FET	2SK192AGR
Q327	Transistor	2SC945P
Q328	Transistor	2SD880Y
Q329	Transistor	2SC3402
Q330	Transistor	2SC3402
Q331	Transistor	2SC945P
Q332	Transistor	2SC1815Y
Q333	Transistor	2SC2458GR
Q334	Transistor	2SC3402
Q335	Transistor	2SC3399
D301	Diode	1K60
D302	Diode	1K60
D303	Diode	1SS53
D304	Diode	1SS53
D305	Diode	1SS53
D306	Diode	1SS53
D307	Diode	1SS53
D308	Diode	1SS53
D309	Diode	1SS53
D310	Diode	1SS53
D311	Diode	1SS53
D312	Diode	1SS53
D313	Diode	1SS53
D314	Diode	1SS53
D315	Diode	1SS53
D316	Diode	1SS53
D317	Diode	1SS53
D318	Diode	1SS53
D319	Diode	1S953
D320	Diode	1SS53
D321	Diode	1SS53
D322	Diode	1SS53
D323	Diode	1K60
D324	Diode	1SS53
D325	Diode	1SS53
D326	Diode	1SS53
D327	Diode	1K60
D328	Diode	1SS53
D329	Diode	1SS53
D330	Diode	1SS53
D331	Diode	1SS53
D332	Diode	1SS53
D333	Diode	1SS53
D334	Zener Diode	RD8.2EB3
D335	Diode	1SS53
D336	Diode	1SS53
D337	Diode	1SS53
D338	Diode	1SS53
D339	Diode	1SS53
D340	Diode	1SS53
D341	Diode	1SS53
D342	Diode	1SS53
D343	Diode	1SS53
D344	Diode	1SS53
D345	Diode	1SS53
D346	Varactor Diode	FC51M
D347	Diode	1SS53
D348	Varactor Diode	FC51M

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.	
D349	Diode	1SS53	
D350	Diode	1SS53	
D351	Diode	1SS53	
D352	Diode	1SS53	
D353	Diode	1SS53	
D354	Diode	1SS53	
D355	Diode	1SS53	
D356	Diode	1SS53	
D357	Diode	1SS99	
D358	Diode	1SS99	
FI301	Crystal Filter	FL-30	
FI302	Crystal Filter	FL-33	
X301	Crystal	CR-73 (4.920MHz)	
X302	Crystal	CR-74 (4.908MHz)	
L301	Coil	LS-175	
L302	Coil	LS-175	
L303	Coil	LS-175	
L305	Coil	LS-163	
L306	Coil	LS-90A	
L307	Coil	LS-90A	
L308	Coil	FL5H 101K	
L309	Coil	LS-175	
L310	Coil	LS-175	
L311	Coil	LS-175	
L312	Coil	LS-137	
L314	Coil	LS-267	
L315	Coil	LS-267	
L316	Coil	LB4 R50K	
L317	Coil	LS-163	
L318	Coil	LS-163	
L319	Coil	LS-66A	
L320	Coil	LS-66A	
L321	Coil	LB4 R50K	
L322	Coil	LW-15	
L325	Coil	FL5H 101K	
R301	Resistor	100K	ELR25
R302	Resistor	1M	ELR25
R303	Resistor	220	ELR25
R304	Resistor	100	ELR25
R305	Resistor	22K	ELR25
R306	Resistor	1K	ELR25
R307	Resistor	100	ELR25
R308	Resistor	100K	ELR25
R309	Resistor	150K	ELR25
R310	Resistor	1K	R25
R311	Resistor	100	ELR25
R312	Resistor	6.8K	ELR25
R313	Resistor	68K	ELR25
R314	Resistor	47K	ELR25
R315	Resistor	330	ELR25
R316	Resistor	10K	ELR25
R317	Resistor	100	R25
R318	Resistor	4.7K	R25
R319	Resistor	2.2K	ELR25
R320	Resistor	2.2K	ELR25
R321	Resistor	220	ELR25
R322	Resistor	1K	ELR25
R323	Resistor	47K	ELR25
R324	Resistor	2.2K	ELR25
R325	Resistor	220	ELR25
R326	Resistor	220	ELR25

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.	
R327	Resistor	10K	ELR25
R328	Resistor	10K	R25
R329	Resistor	1K	ELR25
R330	Resistor	4.7K	ELR25
R331	Resistor	47K	ELR25
R332	Resistor	100	ELR25
R333	Resistor	1K	ELR25
R334	Resistor	10K	ELR25
R335	Resistor	33K	ELR25
R336	Resistor	100	ELR25
R337	Resistor	2.2K	ELR25
R338	Resistor	10K	ELR25
R339	Resistor	100	ELR25
R340	Resistor	330	ELR25
R341	Resistor	47K	ELR25
R342	Resistor	100K	ELR25
R343	Resistor	100K	ELR25
R344	Resistor	2.2K	ELR25
R345	Resistor	10	ELR25
R346	Resistor	10K	R25
R347	Resistor	1K	ELR25
R348	Resistor	2.2K	ELR25
R349	Resistor	100	R25
R350	Resistor	1K	ELR25
R351	Resistor	100	R25
R352	Resistor	1K	ELR25
R353	Resistor	2.2K	ELR25
R354	Resistor	100	R25
R355	Resistor	1K	ELR25
R356	Resistor	100	R25
R357	Resistor	4.7K	ELR25
R358	Resistor	10K	ELR25
R359	Resistor	22	R25
R360	Resistor	2.2K	ELR25
R361	Resistor	2.2K	ELR25
R362	Resistor	1K	R25
R363	Resistor	10K	ELR25
R364	Resistor	220	ELR25
R365	Resistor	100	ELR25
R366	Resistor	1K	R25
R367	Trimmer	10K	H0651A
R368	Resistor	100	ELR25
R369	Resistor	4.7K	ELR25
R370	Resistor	47	ELR25
R371	Resistor	10K	R25
R372	Resistor	2.2K	ELR25
R373	Resistor	3.3M	ELR25
R374	Resistor	10K	ELR25
R375	Resistor	10K	ELR25
R376	Resistor	47	R25
R377	Resistor	3.3K	ELR25
R378	Resistor	47	ELR25
R379	Trimmer	10K	H0651A
R380	Resistor	470K	ELR25
R381	Trimmer	10K	H0651A
R382	Resistor	470K	ELR25
R383	Resistor	2.2K	ELR25
R384	Resistor	4.7K	R25
R386	Resistor	1.5K	ELR25
R387	Resistor	10	ELR25
R388	Resistor	3.3K	ELR25
R389	Resistor	47K	ELR25
R390	Resistor	100K	ELR25
R391	Trimmer	10K	H1051C
R392	Resistor	3.3K	ELR25

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.	
R393	Resistor	100	ELR25
R395	Resistor	100	ELR25
R396	Resistor	3.3K	ELR25
R397	Resistor	4.7K	ELR25
R398	Resistor	1K	ELR25
R399	Resistor	2.2K	ELR25
R400	Resistor	4.7K	ELR25
R401	Resistor	10K	ELR25
R402	Resistor	10K	ELR25
R403	Resistor	47K	ELR25
R404	Resistor	100K	ELR25
R405	Resistor	330	ELR25
R406	Resistor	1K	ELR25
R407	Resistor	220	ELR25
R408	Resistor	3.3K	R25
R409	Resistor	15K	ELR25
R410	Resistor	47K	ELR25
R411	Resistor	4.7K	ELR25
R412	Resistor	1K	ELR25
R413	Resistor	4.7	ELR25
R414	Resistor	1K	ELR25
R415	Resistor	10K	ELR25
R416	Resistor	2.2K	ELR25
R417	Resistor	2.2K	ELR25
R418	Resistor	4.7	ELR25
R419	Resistor	1K	ELR25
R420	Resistor	220	ELR25
R421	Resistor	4.7	ELR25
R422	Resistor	470	ELR25
R423	Resistor	470	ELR25
R424	Resistor	10K	R25
R425	Resistor	47K	R25
R426	Resistor	10	ELR25
R427	Resistor	470	ELR25
R428	Resistor	100K	ELR25
R429	Resistor	2.2K	ELR25
R430	Resistor	1M	ELR25
R431	Resistor	4.7K	ELR25
R432	Resistor	100K	ELR25
R433	Resistor	2.2K	ELR25
R434	Resistor	1M	ELR25
R435	Resistor	10K	R25
R436	Resistor	15K	ELR25
R437	Resistor	15K	ELR25
R438	Resistor	8.2K	ELR25
R439	Resistor	180K	ELR25
R440	Resistor	8.2K	ELR25
R441	Resistor	100K	ELR25
R442	Resistor	470	ELR25
R443	Resistor	10K	ELR25
R444	Resistor	10K	ELR25
R445	Resistor	10K	ELR25
R446	Resistor	22K	ELR25
R447	Resistor	10K	ELR25
R448	Resistor	10K	ELR25
R449	Resistor	33K	R25
R450	Resistor	1K	ELR25
R451	Resistor	470K	ELR25
R452	Resistor	47K	R25
R453	Resistor	100K	R25
R454	Resistor	100K	ELR25
R455	Resistor	47K	ELR25
R456	Resistor	470	ELR25
R457	Resistor	100	R25
R458	Resistor	4.7K	R25

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.		
R459	Resistor	68	R25	
R460	Resistor	1	R25	
R461	Resistor	3.3M	ELR25	
R462	Resistor	100K	R10	
R463	Trimmer	100K	H0651A	
R465	Resistor	1M	ELR25	
R466	Resistor	220	R25	
R467	Resistor	470K	ELR25	
R468	Resistor	220K	ELR25	
R469	Resistor	3.3M	ELR25	
R470	Resistor	10K	ELR25	
R471	Resistor	1K	R25	
R472	Trimmer	100	H0651A	
R473	Resistor	10K	ELR25	
R474	Trimmer	2.2K	H0621A	
R476	Resistor	47K	ELR25	
R477	Resistor	22K	ELR25	
R478	Resistor	5.6K	ELR25	
R479	Resistor	1K	ELR25	
R480	Resistor	470	ELR25	
R481	Resistor	47K	ELR25	
R482	Resistor	6.8K	ELR25	
R483	Resistor	10K	ELR25	
R484	Resistor	10K	ELR25	
R485	Resistor	100	ELR25	
R486	Resistor	10K	ELR25	
R487	Resistor	1K	ELR25	
R488	Resistor	1M	ELR25	
R489	Resistor	47	ELR25	
R490	Resistor	1.5K	ELR25	
R491	Resistor	2.2K	R25	
R492	Resistor	470K	ELR25	
R493	Trimmer	10K	H0621A	
R494	Resistor	470	ELR25	
R495	Resistor	1.5K	ELR25	
R496	Resistor	4.7K	ELR25	
R497	Resistor	2.2	R25	
R498	Trimmer	10K	H1051C	
R499	Resistor	22K	ELR25	
R500	Resistor	4.7K	ELR25	
R501	Trimmer	10K	H0651A	
R502	Resistor	4.7K	ELR25	
R503	Resistor	100	ELR25	
R504	Resistor	150	R25	
R505	Resistor	2.2K	ELR25	
R506	Resistor	47	R10	
R507	Resistor	100	ELR10	
R508	Resistor	100	ELR10	
R509	Resistor	1K	R25	
R510	Resistor	100	ELR25	
R511	Resistor	1K	R25	
C301	Electrolytic	47	10V	
C302	Barrier Lay	0.1	16V	
C303	Ceramic	1P	50V	
C304	Ceramic	0.0047	50V	
C305	Ceramic	0.0047	50V	
C306	Ceramic	0.0047	50V	
C307	Ceramic	0.0047	50V	
C308	Ceramic	0.0047	50V	
C309	Electrolytic	4.7	25V	BP
C310	Ceramic	0.0047	50V	
C311	Ceramic	0.0047	50V	
C312	Ceramic	0.001	50V	
C313	Ceramic	470P	50V	

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.		
C314	Electrolytic	10	16V	MS7
C315	Barrier Lay	0.047	25V	
C316	Ceramic	0.0047	50V	
C317	Ceramic	2P	50V	
C318	Ceramic	0.0047	50V	
C319	Ceramic	0.0047	50V	
C320	Ceramic	0.001	50V	
C321	Mylar	0.033	50V	
C322	Ceramic	0.0047	50V	
C323	Ceramic	0.0047	50V	
C324	Ceramic	0.0047	50V	
C325	Ceramic	0.0047	50V	
C326	Electrolytic	100	10V	
C327	Ceramic	0.0047	50V	
C328	Ceramic	0.0047	50V	
C329	Ceramic	0.0047	50V	
C330	Ceramic	100P	50V	
C331	Ceramic	0.0047	50V	
C332	Ceramic	0.0047	50V	
C333	Ceramic	0.0047	50V	
C334	Ceramic	0.001	50V	
C335	Ceramic	5P	50V	
C336	Ceramic	0.0047	50V	
C337	Ceramic	0.0047	50V	
C338	Ceramic	0.0047	50V	
C339	Ceramic	0.0047	50V	
C340	Ceramic	0.0047	50V	
C341	Ceramic	0.0047	50V	
C342	Ceramic	470P	50V	
C343	Ceramic	0.0047	50V	
C344	Ceramic	0.0047	50V	
C345	Ceramic	0.0047	50V	
C346	Ceramic	470P	50V	
C347	Mylar	0.01	50V	
C348	Ceramic	0.0047	50V	
C349	Ceramic	0.0047	50V	
C350	Electrolytic	47	10V	
C351	Ceramic	0.0047	50V	
C352	Mylar	0.01	50V	
C353	Ceramic	0.0047	50V	
C354	Ceramic	220P	50V	
C355	Ceramic	0.0047	50V	
C356	Barrier Lay	0.1	16V	
C357	Electrolytic	22	10V	
C358	Ceramic	0.0047	50V	
C359	Ceramic	100P	50V	
C360	Electrolytic	0.47	50V	BP
C361	Barrier Lay	0.047	25V	
C362	Electrolytic	10	16V	
C363	Electrolytic	0.47	50V	
C364	Electrolytic	100	10V	
C365	Electrolytic	2.2	50V	
C366	Ceramic	0.0047	50V	
C367	Ceramic	22P	50V	
C368	Ceramic	0.001	50V	
C369	Ceramic	0.0047	50V	
C370	Ceramic	0.001	50V	
C371	Electrolytic	4.7	50V	
C372	Ceramic	0.0047	50V	
C373	Electrolytic	2.2	50V	
C374	Ceramic	0.0047	50V	
C375	Ceramic	330P	50V	
C376	Barrier Lay	0.1	16V	
C377	Tantalum	1	16V	
C378	Ceramic	150P	50V	

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.		
C379	Ceramic	0.0047	50V	
C380	Ceramic	0.0047	50V	
C381	Barrier Lay	0.1	16V	
C382	Electrolytic	47	10V	
C383	Electrolytic	2.2	50V	
C384	Electrolytic	0.47	50V	
C385	Barrier Lay	0.047	25V	
C386	Tantalum	0.47	35V	
C387	Tantalum	2.2	16V	
C388	Electrolytic	1	50V	
C389	Electrolytic	47	10V	
C390	Electrolytic	10	16V	
C391	Electrolytic	100	10V	
C392	Mylar	0.001	50V	
C393	Mylar	0.0047	50V	
C394	Electrolytic	1	50V	MS7
C395	Ceramic	220P	50V	
C396	Mylar	0.0047	50V	
C397	Electrolytic	10	16V	
C398	Electrolytic	1	50V	
C399	Ceramic	220P	50V	
C400	Mylar	0.01	50V	
C401	Mylar	0.01	50V	
C402	Electrolytic	4.7	25V	BP
C403	Electrolytic	4.7	50V	
C404	Electrolytic	0.47	50V	BP
C405	Electrolytic	4.7	50V	
C406	Tantalum	0.68	25V	
C407	Ceramic	100P	50V	
C408	Ceramic	470P	50V	
C409	Ceramic	0.0047	50V	
C410	Ceramic	150P	50V	
C411	Ceramic	47P	50V	
C412	Ceramic	47P	50V	
C413	Ceramic	200P	50V	XL
C414	Ceramic	200P	50V	XL
C415	Ceramic	0.0047	50V	
C416	Ceramic	0.0047	50V	
C417	Ceramic	0.0047	50V	
C418	Electrolytic	22	10V	
C419	Ceramic	0.001	50V	
C420	Ceramic	470P	50V	
C421	Ceramic	0.0047	50V	
C422	Ceramic	0.0047	50V	
C423	Ceramic	0.0047	50V	
C424	Ceramic	DD109SL471J50V2		
C425	Ceramic	51P	50V	
C426	Ceramic	DD109SL471J50V2		
C427	Ceramic	3P	50V	
C428	Ceramic	470P	50V	
C429	Ceramic	10P	50V	
C430	Ceramic	DD108SL391J50V2		
C431	Ceramic	22P	50V	
C432	Ceramic	DD108SL391J50V2		
C433	Barrier Lay	0.047	25V	
C434	Barrier Lay	0.1	16V	
C435	Electrolytic	47	16V	
C436	Electrolytic	220	10V	
C437	Electrolytic	47	16V	
C438	Electrolytic	470	16V	
C439	Mylar	0.1	50V	
C440	Ceramic	0.0047	50V	
C441	Electrolytic	470	16V	
C442	Electrolytic	470	16V	
C443	Electrolytic	10	16V	MS7

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.		
C444	Ceramic	0.0047	50V	
C445	Ceramic	220P	50V	
C446	Ceramic	0.0047	50V	
C447	Ceramic	0.0047	50V	
C448	Ceramic	0.0047	50V	
C449	Ceramic	0.0047	50V	
C450	Array	B8ZC0111-32N		
C451	Electrolytic	100	10V	
C452	Ceramic	0.001	50V	
C453	Mylar	0.01	50V	
C454	Electrolytic	10	16V	RC2
C455	Barrier Lay	0.047	25V	
J301	Connector	TL25P-04-V1		
J302	Connector	TL25P-08-V1		
J303	Connector	TL25P-13-V1		
J304	Connector	TL25P-02-V1		
J306	Connector	TL25P-04-V1		
J307	Connector	TL25P-09-V1		
J308	Connector	TL25P-04-V1		
J309	Connector	TMP-J01X-A2		
P301	Connector	(TMP-P01X-A1) W355		
B301	PC. Board	B-885A		
W301	Jumper	JPW-02H		
W302	Jumper	JPW-02H		
W305	Jumper	JPW-02H		
W306	Jumper	JPW-02A		
W307	Jumper	JPW-02H		
W308	Jumper	JPW-02A		
W309	Jumper	JPW-02A		
W310	Jumper	JPW-02H		
W311	Jumper	JPW-02A		
W312	Jumper	JPW-02H		
W313	Jumper	JPW-02H		
W315	Jumper	JPW-02A		
W316	Jumper	JPW-02A		
W317	Jumper	JPW-02A		
W318	Jumper	JPW-02A		
W319	Jumper	JPW-02A		
W320	Jumper	JPW-02H		
W321	Jumper	JPW-02H		
W322	Jumper	JPW-02H		
W323	Jumper	JPW-02A		
W325	Jumper	JPW-02H		
W327	Jumper	JPW-02H		
W328	Jumper	JPW-02A		
W329	Jumper	JPW-02A		
W330	Jumper	JPW-02A		
W331	Jumper	JPW-02A		
W332	Jumper	JPW-02A		
W333	Jumper	JPW-02A		
W334	Jumper	JPW-02A		
W335	Jumper	JPW-02A		
W338	Jumper	JPW-02H		
W340	Jumper	JPW-02H		
W341	Jumper	JPW-02A		
W342	Jumper	JPW-02A		
W343	Jumper	JPW-02A		
W344	Jumper	JPW-02A		
W345	Jumper	JPW-02A		
W346	Jumper	JPW-02A		

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.
W347	Jumper	JPW-02A
W348	Jumper	JPW-02A
W349	Jumper	JPW-02A
W350	Jumper	JPW-02H

RF UNIT

REF. NO.	DESCRIPTION	PART NO.
IC601	IC	μA78L82AWC
IC602	IC	BA618
IC603	IC	NJM4558D
IC604	IC	ND487C1-3R
Q601	Transistor	2SC3399
Q602	Transistor	2SB562
Q603	Transistor	2SC945Q
Q604	Transistor	2SC945Q
Q605	Transistor	2SC945Q
Q606	FET	3SK74M
Q607	FET	2SK125
Q608	FET	2SK125
Q609	Transistor	2SC2053
Q610	FET	3SK74K
Q611	FET	3SK74K
Q612	FET	3SK74M
Q613	Transistor	2SC2053
Q614	Transistor	2SC945P
D601	Diode	1SS53
D602	Diode	1SS53
D603	Diode	1SS53
D604	Diode	1SS53
D605	Diode	1SS53
D606	Diode	1SS53
D607	Diode	1SS53
D608	Diode	1SS53
D609	Diode	1SS53
D610	Diode	1SS53
D611	Diode	1SS53
D612	Diode	1SS53
D613	Diode	1SS53
D614	Diode	1SS53
D615	Diode	1SS53
D616	Diode	1SS53
D617	Diode	1SS53
D618	Diode	1SS53
D619	Diode	1SS53
FI601	Crystal Filter	FL-64 (70M15B)
L601	Coil	FL5H 102K
L602	Coil	FL5H 102K
L603	Coil	EL0810SKI-102K
L604	Coil	EL0810SKI-101K
L605	Coil	EL0810SKI-101K
L606	Coil	EL0810SKI-101K
L607	Coil	EL0810SKI-101K
L608	Coil	EL0810SKI-101K
L609	Coil	EL0810SKI-101K
L610	Coil	LB4 R83K
L611	Coil	LR-116
L612	Coil	LR-116

RF UNIT

REF. NO.	DESCRIPTION	PART NO.
L613	Coil	LS-254
L614	Coil	LS-254
L615	Coil	LS-114
L616	Coil	LS-254
L617	Coil	LS-254
L618	Coil	LS-198
L619	Coil	LR-129
L620	Coil	LA-258
L621	Coil	LA-257
L622	Coil	LB4 R15K
L623	Coil	FL4H 100K
L624	Coil	LA-267
L625	Coil	LB4 R30K
L626	Coil	LS-198
L627	Coil	LR-145
L628	Coil	EL0810SKI-101K
L629	Coil	EL0810SKI-3R3K
L630	Coil	EL0810SKI-2R7K
L631	Coil	LR-20
L632	Coil	LB4 6R2J
L633	Coil	LB4 R41K
L634	Coil	LB4 R41K
L635	Coil	LB4 R45K
L636	Coil	LB4 R50K
L637	Coil	FL5H 101K
L638	Coil	LB4 R45K
L639	Coil	LB4 R50K
L640	Coil	LB4 R54K
L641	Coil	LB4 R65K
L642	Coil	FL5H 101K
L643	Coil	LB4 R65K
L644	Coil	LB4 R70K
L645	Coil	LB4 R70K
L646	Coil	LB4 R83K
L647	Coil	FL5H 101K
L648	Coil	LB4 R83K
L649	Coil	EL0810SKI-1R0K
L650	Coil	EL0810SKI-1R0K
L651	Coil	EL0810SKI-1R0K
L652	Coil	FL5H 101K
L653	Coil	EL0810SKI-1R2K
L654	Coil	EL0810SKI-1R5K
L655	Coil	EL0810SKI-1R5K
L656	Coil	EL0810SKI-1R5K
L657	Coil	FL5H 101K
L658	Coil	EL0810SKI-1R8K
L659	Coil	EL0810SKI-2R2K
L660	Coil	EL0810SKI-2R2K
L661	Coil	EL0810SKI-2R2K
L662	Coil	FL5H 101K
L663	Coil	EL0810SKI-102K
L664	Coil	EL0810SKI-3R3K
L665	Coil	LB4 4R3J
L666	Coil	EL0810SKI-3R9K
L667	Coil	EL0810SKI-3R9K
L668	Coil	LB4 4R3J
L669	Coil	BTO1RN1-A61
R601	Resistor	1K R25
R603	Resistor	15K R25
R604	Resistor	47K R25
R605	Resistor	15K R25
R606	Resistor	22K R25
R607	Resistor	100 R25
R608	Resistor	68K R25

RF UNIT

REF. NO.	DESCRIPTION	PART NO.
R609	Resistor	68K R25
R610	Resistor	39K R25
R611	Resistor	39K R25
R612	Trimmer	3.3K H0621A
R613	Resistor	1M R25
R614	Resistor	6.8K R25
R615	Resistor	220K R25
R616	Resistor	220K R25
R617	Resistor	330K R25
R618	Resistor	10K R25
R619	Trimmer	10K H1051A
R620	Resistor	2.2K R25
R621	Trimmer	10K H0651A
R622	Resistor	47K R25
R623	Resistor	15K R25
R624	Resistor	8.2 R25
R625	Resistor	150 R25
R626	Resistor	8.2 R25
R627	Resistor	2.2K R25
R628	Resistor	4.7K R25
R629	Resistor	100 R25
R630	Resistor	270 R25
R631	Resistor	3.9K R25
R632	Resistor	10K R25
R633	Resistor	47 R25
R634	Resistor	470 R25
R635	Resistor	470 R25
R636	Resistor	560 R25
R637	Resistor	47 R25
R638	Resistor	100 R25
R639	Resistor	680 R25
R640	Resistor	4.7K R10
R641	Resistor	680 R25
R642	Resistor	33 R25
R643	Resistor	220 R25
R644	Resistor	33 R25
R645	Resistor	5.6 R25
R646	Resistor	5.6 R25
R647	Resistor	220 R25
R648	Resistor	100 R25
R649	Resistor	100K R10
R650	Resistor	100K R10
R651	Resistor	10K R25
R652	Resistor	68 R25
R653	Resistor	68 R25
R654	Resistor	220 R25
R655	Resistor	220 R25
R656	Resistor	390 R25
R657	Resistor	100 R25
R658	Thermistor	23D29
R659	Resistor	390 R25
R660	Resistor	470 R25
R661	Thermistor	33D28
R662	Resistor	560 R25
R663	Resistor	1K R25
R664	Resistor	100 R25
R665	Resistor	39 R25
R666	Resistor	820 R25
R667	Resistor	4.7K R25
R668	Resistor	4.7 R25
R669	Resistor	22 R25
R670	Resistor	470 R25
R671	Resistor	12 R25
R672	Resistor	470 R25
R673	Resistor	100 R25

RF UNIT

REF. NO.	DESCRIPTION	PART NO.	
R674	Resistor	100	R25
R675	Resistor	100	R25
R676	Resistor	100	R25
R677	Resistor	100	R25
R678	Resistor	100	R25
R679	Resistor	100	R25
R680	Resistor	470	R25
R681	Resistor	2.2K	R25
R682	Resistor	33K	R25
R683	Resistor	12K	R25
R684	Trimmer	10K	H0651A
R685	Resistor	10K	R25
R686	Resistor	10K	R25
R687	Resistor	10K	R25
R688	Resistor	10K	R25
R689	Resistor	10K	R25
R690	Resistor	10K	R25
R691	Resistor	10K	R25
R692	Resistor	1M	R25
R693	Resistor	220	R25
R694	Resistor	100K	R25
C601	Ceramic	0.0047	50V
C602	Electrolytic	4.7	50V
C603	Ceramic	0.0047	50V
C604	Electrolytic	10	16V
C605	Ceramic	0.0047	50V
C606	Barrier Lay	0.047	25V
C607	Electrolytic	4.7	50V
C608	Array	B8ZC0111N-32N	
C609	Array	B8ZC0111N-32N	
C610	Barrier Lay	0.047	25V
C611	Barrier Lay	0.047	25V
C612	Ceramic	0.0047	50V
C613	Ceramic	0.0047	50V
C614	Ceramic	100P	50V
C615	Ceramic	0.0047	50V
C616	Electrolytic	10	16V
C617	Electrolytic	4.7	50V
C618	Electrolytic	10	16V
C619	Ceramic	0.0047	50V
C620	Barrier Lay	RAU06SA	681K
C621	Barrier Lay	RAU06SA	681K
C622	Ceramic	0.0047	50V
C623	Ceramic	8P	50V
C624	Ceramic	8P	50V
C625	Ceramic	0.0047	50V
C626	Ceramic	0.0047	50V
C627	Cylinder	UP125X472M	
C628	Ceramic	0.001	50V
C629	Mylar	0.01	50V
C630	Cylinder	UP125B102K	
C631	Ceramic	3P	50V
C632	Ceramic	8P	50V
C633	Ceramic	8P	50V
C634	Barrier Lay	0.1	16V
C635	Barrier Lay	0.1	16V
C636	Barrier Lay	0.1	16V
C637	Barrier Lay	0.1	16V
C638	Ceramic	100P	50V
C639	Ceramic	10P	50V
C640	Ceramic	150P	50V
C641	Ceramic	30P	50V
C642	Barrier Lay	0.047	25V
C643	Ceramic	0.0047	50V

RF UNIT

REF. NO.	DESCRIPTION	PART NO.	
C644	Barrier Lay	0.047	25V
C645	Barrier Lay	0.047	25V
C646	Ceramic	0.0047	50V
C647	Electrolytic	2.2	50V
C648	Ceramic	39P	50V
C649	Ceramic	220P	50V
C650	Ceramic	39P	50V
C651	Ceramic	0.001	50V
C652	Ceramic	3P	50V
C653	Ceramic	5P	50V
C654	Ceramic	15P	50V
C655	Ceramic	1.5P	50V
C656	Ceramic	3P	50V
C657	Ceramic	0.0047	50V
C658	Ceramic	3P	50V
C660	Barrier Lay	0.1	16V
C661	Barrier Lay	0.1	16V
C662	Barrier Lay	0.1	16V
C663	Barrier Lay	0.047	25V
C664	Ceramic	5P	50V
C665	Ceramic	1.5P	50V
C666	Ceramic	22P	50V
C667	Ceramic	4P	50V
C668	Ceramic	5P	50V
C669	Barrier Lay	0.1	16V
C670	Ceramic	0.0047	50V
C671	Barrier Lay	0.1	16V
C672	Barrier Lay	0.1	16V
C673	Barrier Lay	UAT04V	122K
C674	Ceramic	0.0047	50V
C675	Electrolytic	2.2	50V
C676	Ceramic	330P	50V
C677	Barrier Lay	UAT04V	222K
C678	Barrier Lay	UAT04V	222K
C679	Ceramic	330P	50V
C680	Barrier Lay	UAT06V	822K
C681	Ceramic	150P	50V
C682	Barrier Lay	UAT04V	122K
C683	Ceramic	200P	50V
C684	Ceramic	180P	50V
C685	Ceramic	24P	50V
C686	Ceramic	200P	50V
C687	Barrier Lay	0.047	25V
C688	Barrier Lay	0.047	25V
C689	Ceramic	180P	50V
C690	Barrier Lay	UAT04	V152K
C691	Ceramic	270P	50V
C692	Ceramic	220P	50V
C693	Ceramic	39P	50V
C694	Ceramic	300P	50V
C695	Barrier Lay	0.047	25V
C696	Barrier Lay	0.047	25V
C697	Ceramic	270P	50V
C698	Barrier Lay	UAT04V	222K
C699	Ceramic	330P	50V
C700	Ceramic	300P	50V
C701	Ceramic	47P	50V
C702	Ceramic	390P	50V
C703	Barrier Lay	0.047	25V
C704	Barrier Lay	0.047	25V
C705	Ceramic	330P	50V
C706	Barrier Lay	UAT05V	272K
C707	Ceramic	DD109SL471J50V2	
C708	Ceramic	330P	50V
C709	Ceramic	56P	50V

RF UNIT

REF. NO.	DESCRIPTION	PART NO.
C710	Ceramic	DD109SL471J50V2
C711	Barrier Lay	0.047 25V
C712	Barrier Lay	0.047 25V
C713	Ceramic	DD109SL471J50V2
C714	Barrier Lay	UAT05V 392K
C715	Barrier Lay	RAU06SA 681K
C716	Ceramic	DD109SL471J50V2
C717	Ceramic	100P 50V
C718	Barrier Lay	RAU06SA 561K
C719	Barrier Lay	0.047 25V
C720	Barrier Lay	0.047 25V
C721	Barrier Lay	UAT04V 102K
C722	Barrier Lay	UAT06V 682K
C723	Barrier Lay	UAT04V 152K
C724	Barrier Lay	RAU06SA 561K
C725	Ceramic	120P 50V
C726	Barrier Lay	RAU08SA 821K
C727	Barrier Lay	0.047 25V
C728	Barrier Lay	0.047 25V
C729	Barrier Lay	0.1 16V
C730	Barrier Lay	UAT04V 152K
C731	Ceramic	220P 50V
C732	Barrier Lay	UAT04V 152K
C733	Barrier Lay	0.1 16V
C734	Barrier Lay	0.1 16V
C735	Barrier Lay	UAT04V 152K
C736	Ceramic	180P 50V
C737	Barrier Lay	UAT05V 472K
C738	Barrier Lay	UAT04V 122K
C739	Ceramic	220P 50V
C740	Barrier Lay	UAT06V 103K
C741	Barrier Lay	UAT04V 182K
C742	Ceramic	220P 50V
C743	Ceramic	120P 50V
C744	Ceramic	6P 50V
C745	Ceramic	0.0022 50V
C746	Ceramic	0.001 50V
C747	Ceramic	0.001 50V
C748	Ceramic	0.001 50V
C749	Ceramic	0.001 50V
C750	Ceramic	0.001 50V
C751	Electrolytic	22 10V
J601	Connector	TL25P-07-V1
J602	Connector	TL25P-04-V1
J603	Connector	TMP-J01X-A2
J604	Connector	TL25P-05-V1
J605	Connector	TMP-J01X-A2
J606	Connector	TMP-J01X-A2
P601	Connector	(TMP-P01X-A1) W619
P602	Connector	(TMP-P01X-A1) W621
B601	PC. Board	B-886A (42442)
W604	Jumper	JPW-02A
W605	Jumper	JPW-02A
W606	Jumper	JPW-02A
W607	Jumper	JPW-02A
W608	Jumper	JPW-02A
W609	Jumper	JPW-02A
W610	Jumper	JPW-02A
W611	Jumper	JPW-02A
W612	Jumper	JPW-02A

RF UNIT

REF. NO.	DESCRIPTION	PART NO.
W613	Jumper	JPW-02A
W614	Jumper	JPW-02A
W615	Jumper	JPW-02A
W616	Jumper	JPW-02A
W617	Jumper	JPW-02A
W618	Jumper	JPW-02A
W623	Jumper	JPW-02A

PA UNIT

REF. NO.	DESCRIPTION	PART NO.
Q801	Transistor	2SC1971
Q802	Transistor	2SC3133
Q803	Transistor	2SC3133
Q804	Transistor	2SC2904
Q805	Transistor	2SC2904
Q806	Transistor	2SD880Y
Q807	Transistor	2SC2120
Q851	Transistor	2SC945P
Q852	Transistor	2SC945P
Q853	Transistor	2SA1345
Q854	Transistor	2SC945P
D801	Varistor	MV5
D802	Varistor	MV5
D803	Diode	1N4002
D804	Varistor	MV5
D851	Diode	1N4002
D852	Diode	1N4002
D853	Diode	1K60
D871	Diode	1N4002
D872	Diode	15CD11
D873	Diode	15CD11
L801	Coil	LR-142
L804	Coil	LR-143
L805	Coil	BT01RN1-A61
L806	Coil	BT01RN1-A61
L807	Coil	BT01RN1-A61
L808	Coil	BT01RN1-A61
L809	Coil	LR-83
L810	Coil	LR-148
L811	Coil	LR-146
L812	Coil	FL5H 100K
L813	Coil	BT01RN1-A61
L814	Coil	BT01RN1-A61
L815	Coil	BT01RN1-A61
L816	Coil	FSQH050RN
L817	Coil	FSQH050RN
L819	Coil	FL5H 101K
L821	Coil	BT01RN1-A61
L851	Coil	LB4 R36K
L852	Coil	LR-151
L853	Coil	LAL04NA 101K
L854	Coil	FL5H 102K
L871	Coil	BT01RN1-A61
L872	Coil	BT01RN1-A61
L873	Coil	BT01RN1-A61
L874	Coil	BT01RN1-A61
L875	Coil	BT01RN1-A61

PA UNIT

REF. NO.	DESCRIPTION	PART NO.		
L876	Coil	BT01RN1-A61		
L877	Coil	BT01RN1-A61		
L878	Coil	BT01RN1-A61		
R801	Resistor	8.2	R25	
R802	Resistor	180	R25	
R803	Resistor	470	R25	
R804	Resistor	3.3	R25	
R805	Resistor	2.7	R25	
R806	Resistor	100	R50X	
R807	Resistor	47	ELR25	
R808	Resistor	47	ELR25	
R809	Resistor	100	R50X	
R810	Resistor	RSS1B3.3-J		
R811	Resistor	RSS1B3.3-J		
R812	Resistor	RSS1B3.3-J		
R813	Resistor	RSS1B3.3-J		
R814	Resistor	10	R50X	
R815	Resistor	10	R50X	
R816	Resistor	RSS1B2.2-J		
R817	Resistor	RSS1B2.2-J		
R818	Resistor	33K	R25	
R822	Resistor	4.7	R2J	
R823	Trimmer	470	H0651A	
R824	Resistor	150	R25	
R826	Resistor	10K	ELR25	
R827	Trimmer	100	H0651A	
R828	Resistor	68	R50X	
R829	Resistor	10	ELR25	
R831	Resistor	22	ELR25	
R832	Resistor	100	R50X	
R833	Resistor	2.2K	ELR25	
R834	Resistor	120	R50X	
R835	Resistor	RSS1B3.3-J		
R836	Resistor	RSS1B3.3-J		
R837	Resistor	180	R25	
R851	Resistor	4.7K	ELR25	
R852	Resistor	5.6K	ELR25	
R853	Resistor	4.7K	ELR25	
R854	Resistor	4.7K	R25	
R855	Resistor	22K	ELR25	
R856	Resistor	22K	ELR25	
R857	Resistor	33K	ELR25	
R858	Resistor	22K	ELR25	
R859	Surge Absorber	DSA301		
R871	Resistor	SQ5L	0.012-J	
R872	Resistor	1K	R25	
R873	Resistor	1K	R25	
C801	Ceramic	0.0047	50V	
C802	Ceramic	470P	50V	
C803	Barrier Lay	0.1	16V	
C804	Mylar	0.01	50V	
C805	Mylar	0.01	50V	
C806	Ceramic	510P	50V	SL
C808	Monolithic	GR44CH682K	50V	
C809	Monolithic	GR44CH682K	50V	
C810	Dip Mica	DM20C102J51CR		
C811	Monolithic	GR43CH471K	50V	
C812	Monolithic	GR43CH471K	50V	
C813	Monolithic	GR44CH102K	50V	
C814	Dip Mica	DM20C152J51CR		
C816	Dip Mica	DM20C472J51CR		
C817	Barrier Lay	0.047	25V	
C818	Electrolytic	1000	16V	MS16

PA UNIT

REF. NO.	DESCRIPTION	PART NO.		
C819	Monolithic	GR44Y5V684Z	25V	
C820	Barrier Lay	0.047	25V	
C821	Electrolytic	47	10V	
C822	Electrolytic	10	16V	
C823	Barrier Lay	0.047	25V	
C824	Barrier Lay	0.047	25V	
C825	Electrolytic	470	16V	
C826	Barrier Lay	0.047	25V	
C827	Electrolytic	10	16V	
C828	Barrier Lay	0.047	25V	
C829	Ceramic	0.0047	50V	
C830	Barrier Lay	0.047	25V	
C831	Barrier Lay	0.1	16V	
C832	Barrier Lay	0.047	25V	
C833	Barrier Lay	0.047	25V	
C834		330P	500V	SL
C835		330P	500V	SL
C836	Ceramic	33P	50V	CH
C837	Ceramic	0.0047	50V	
C838	Electrolytic	1000	6.3V	
C839	Electrolytic	GR43CH471K	50V	
C840	Electrolytic	GR43CH471K	50V	
C841	Electrolytic	GR44CH102K	50V	
C842	Electrolytic	470P	50V	SL
C851	Ceramic	0.0047	50V	
C852	Ceramic	100P	50V	
C854	Ceramic	150P	50V	
C855	Ceramic	0.0047	50V	
C856	Ceramic	0.0047	50V	
C857	Barrier Lay	0.1	16V	
C858	Ceramic	0.0047	50V	
C859	Electrolytic	2.2	50V	MS7
C860	Barrier Lay	0.047	25V	
C861	Ceramic	33P	500V	
C862	Ceramic	10P	500V	
C871	Feed Through	TF318-452E102GMV		
C872	Feed Through	TF318-452E102GMV		
C873	Feed Through	TF318-452E102GMV		
C874	Feed Through	TF318-452E102GMV		
C875	Barrier Lay	0.047	25V	
C876	Barrier Lay	0.047	25V	
C877	Electrolytic	2200	16V	
C878	Ceramic	0.0047	50V	
RL851	Relay	FBR311D012		
RL852	Relay	FBR22D12-P		
RL871	Relay	FBR211BD012-M		
J851	Connector	TMP-J01X-V2		
J871	Connector	TLB-P04H-B1		
J872	Connector	TL25P-05-V1		
J873	Connector	TL25P-04-V1		
J874	Connector	TL25P-05-V1		
J875	Connector	TL25P-03-V1		
J876	Connector	LR-6		
J877	Connector	1490R		
J878	Connector	YKC21-0046		
J879	Connector	HLJ4306-01-100		
J880	Connector	FM-MDR MI		
P801	Connector	(TMP-P01X-A1)		W801
P802	Connector	(TMP-P01X-A1)		W803
P803	Connector	TL25H-05H-B1		
P851	Connector	TL25H-03H-B1		
P852	Connector	(TMP-P01X-A1)		W851

PA UNIT

REF. NO.	DESCRIPTION	PART NO.
P871	Connector	TL25H-04H-B1
P872	Connector	TL25H-02H-B1
P873	Connector	1261R3
F871	Fuse Holder	FH-032
F872	Fuse	5A
S801	Thermal Switch	OHD-90M
S802	Thermal Switch	OHD-50M
MF801	DC Motor	M6B 12U22
B801	PC. Board	B-887A (42447) (PA)
B802	PC. Board	B-889A (42704) (ANT. SW)
B803	PC. Board	B-890A (42705) (CONNECT.)
EP811	Bead Core	DL20P2.6-3-1.2
EP871	Bead Core	FSQH090RN
EP872	Bead Core	FSQH090RN
EP873	Bead Core	FSQH070RN
W815	Jumper	JPW-02A
W816	Jumper	JPW-02A
W817	Jumper	JPW-02A
W819	Jumper	JPW-02A
W820	Jumper	JPW-02A
W836	Jumper	JPW-02A
W838	Jumper	JPW-02A
W856	Jumper	JPW-02A
W857	Jumper	JPW-02A
W878	Jumper	JPW-02A

FILTER UNIT

REF. NO.	DESCRIPTION	PART NO.
D901	Diode	1N4002
D902	Diode	1N4002
D903	Diode	1N4002
D904	Diode	1N4002
D905	Diode	1N4002
D906	Diode	1N4002
D907	Diode	1N4002
D908	Diode	1K60
D909	Diode	1K60
L901	Coil	LR-138
L902	Coil	LR-150
L903	Coil	LR-150
L904	Coil	LR-141
L905	Coil	LR-138
L906	Coil	LR-138
L907	Coil	LR-140
L908	Coil	LR-149
L909	Coil	LR-149
L910	Coil	LR-53
L911	Coil	LR-140
L912	Coil	LR-140
L913	Coil	LR-54
L914	Coil	LR-91
L915	Coil	LR-91
L916	Coil	LR-54
L917	Coil	LR-55

FILTER UNIT

REF. NO.	DESCRIPTION	PART NO.		
L918	Coil	LR-56		
L919	Coil	LA-168		
L920	Coil	L6 222		
L921	Coil	LR-22A		
L922	Coil	FL5H 101K		
L923	Coil	FL5H 101K		
L924	Coil	FL5H 101K		
L925	Coil	FL5H 101K		
L926	Coil	FL5H 101K		
L927	Coil	FL5H 101K		
L928	Coil	FL5H 101K		
L929	Coil	FL5H 101K		
L930	Coil	FL5H 100K		
L931	Coil	FL5H 100K		
L932	Coil	FL5H 100K		
L933	Coil	FL5H 100K		
L934	Coil	FL5H 100K		
L935	Coil	FL5H 100K		
R901	Resistor	68	R50X	
R902	Resistor	22K	R25	
R903	Resistor	100K	ELR25	
R904	Resistor	22K	R25	
R905	Resistor	47K	ELR25	
C901	Dip Mica	DM20C122J51CR		
C902	Ceramic	300P	500V	SL
C903	Dip Mica	DM20C152J51CR		
C904	Ceramic	180P	500V	SL
C905	Dip Mica	DM20C102J51CR		
C906	Dip Mica	DM19C821J51CR		
C907	Ceramic	200P	500V	SL
C908	Dip Mica	DM20C102J51CR		
C909	Ceramic	68P	500V	SL
C910	Dip Mica	DM19C561J51CR		
C911	Dip Mica	DM19C561J51CR		
C912	Ceramic	120P	500V	SL
C913	Dip Mica	DM19C681J51CR		
C914	Ceramic	68P	500V	SL
C915	Ceramic	330P	500V	SL
C916	Ceramic	330P	500V	SL
C917	Ceramic	100P	500V	SL
C918	Dip Mica	DM19C391J51CR		
C919	Ceramic	56P	500V	SL
C920	Ceramic	220P	500V	SL
C921	Ceramic	300P	500V	SL
C922	Ceramic	68P	500V	SL
C923	Dip Mica	DM19C391J51CR		
C924	Ceramic	39P	500V	SL
C925	Ceramic	180P	500V	SL
C926	Ceramic	150P	500V	SL
C927	Ceramic	27P	500V	SL
C928	Ceramic	270P	500V	SL
C929	Ceramic	39P	500V	SL
C930	Ceramic	100P	500V	SL
C931	Ceramic	100P	500V	SL
C932	Ceramic	10P	500V	SL
C933	Ceramic	220P	500V	SL
C934	Ceramic	47P	500V	SL
C935	Ceramic	100P	500V	SL
C936	Trimmer	ECV-1ZW20X40		
C937	Ceramic	220P	50V	
C938	Ceramic	100P	50V	
C939	Ceramic	100P	50V	
C940	Barrier Lay	0.047	25V	

FILTER UNIT

REF. NO.	DESCRIPTION	PART NO.		
C941	Barrier Lay	0.047	25V	
C942	Barrier Lay	0.047	25V	
C943	Barrier Lay	0.047	25V	
C944	Barrier Lay	0.047	25V	
C945	Barrier Lay	0.047	25V	
C946	Barrier Lay	0.047	25V	
C947	Barrier Lay	0.047	25V	
C948	Ceramic	0.0047	50V	
C949	Ceramic	0.0047	50V	
C950	Ceramic	0.0047	50V	
C951	Ceramic	0.0047	50V	
C952	Ceramic	0.0047	50V	
C953	Ceramic	0.0047	50V	
C954	Dip Mica	DM19C561J51CR		
C955	Dip Mica	DM19C821J51CR		
C956	Ceramic	330P	500V	SL
C957	Dip Mica	DM19C391J51CR		
C958	Ceramic	150P	500V	SL
C959	Ceramic	39P	500V	SL
RL901	Relay	FBR313D012-22		
RL902	Relay	FBR313D012-22		
RL903	Relay	FBR313D012-22		
RL904	Relay	FBR313D012-22		
RL905	Relay	FBR313D012-22		
RL906	Relay	FBR313D012-22		
RL907	Relay	FBR313D012-22		
RL908	Relay	FBR313D012-22		
RL909	Relay	FBR313D012-22		
RL910	Relay	FBR313D012-22		
RL911	Relay	FBR313D012-22		
RL912	Relay	FBR313D012-22		
RL913	Relay	FBR313D012-22		
RL914	Relay	FBR313D012-22		
J901	Connector	TMP-J01X-V2		
J902	Connector	TL25P-02-V1		
P901	Connector	(TMP-P01X-A1) W908		
P902	Connector	TL25H-07-B1		
B901	PC. Board	B-888A		
W910	Jumper	JPW-02A		
W911	Jumper	JPW-02A		
W912	Jumper	JPW-02A		
W913	Jumper	JPW-02A		
W914	Jumper	JPW-02A		
W915	Jumper	JPW-02A		
W916	Jumper	JPW-02A		
W917	Jumper	JPW-02A		
W918	Jumper	JPW-02A		
W919	Jumper	JPW-02A		
W920	Jumper	JPW-02A		
W921	Jumper	JPW-02A		
W922	Jumper	JPW-02A		
W923	Jumper	JPW-02A		
W924	Jumper	JPW-02A		
W925	Jumper	JPW-02A		
W926	Jumper	JPW-02A		
W927	Jumper	JPW-02A		
W928	Jumper	JPW-02A		
W929	Jumper	JPW-02A		
W930	Jumper	JPW-02A		
W931	Jumper	JPW-02A		

FILTER UNIT

REF. NO.	DESCRIPTION	PART NO.
W932	Jumper	JPW-02A
W934	Jumper	JPW-02A
W935	Jumper	JPW-02A
W936	Jumper	JPW-02H
W939	Jumper	JPW-02A

LOGIC UNIT

REF. NO.	DESCRIPTION	PART NO.
IC1005	IC	M50763-500SP
IC1006	IC	M50781SP
IC1007	IC	TC4081
IC1008	IC	TC4013
IC1009	IC	BA618
IC1010	IC	μA7805
Q1003	Transistor	2SC945P
D1005	Diode	1S953
D1006	Diode	1S953
D1007	Diode	1S953
D1008	Diode	1S953
D1009	Diode	1SS53
D1010	Diode	1SS53
D1011	Diode	1SS53
D1012	Diode	1SS53
D1013	Diode	1SS53
D1014	Diode	1SS53
D1015	Diode	1SS53
D1016	Diode	1SS53
D1017	Diode	1SS53
D1019	Diode	1SS53
D1020	Diode	1SS53
D1021	Diode	1SS53
D1022	Diode	1S953
X1001	Ceralock	CSB400A
L1001	Coil	BT01RN1-A61
L1002	Coil	FL5H 101K
L1003	Coil	FL5H 101K
L1004	Coil	FL5H 101K
L1005	Coil	FL5H 101K
L1006	Coil	FL5H 101K
L1007	Coil	FL5H 101K
L1008	Coil	FL5H 101K
R1010	Resistor	47K R25
R1011	Resistor	47K R25
R1012	Array	473 RM-4
R1013	Resistor	1.5 R25
R1014	Resistor	1.5 R25
R1015	Resistor	1K R25
R1016	Resistor	1K R25
R1017	Resistor	1K R25
R1018	Resistor	1K R25
R1019	Resistor	1K R25
R1020	Resistor	10K R25
R1021	Array	103 RM-4
R1022	Array	103 RM-4
R1023	Resistor	10K R25

LOGIC UNIT

REF. NO.	DESCRIPTION	PART NO.	
R1024	Resistor	10K	R25
R1025	Resistor	10K	R25
R1026	Resistor	10K	R25
R1027	Array	473	RM-8
R1028	Resistor	47K	R25
R1029	Resistor	560K	R25
R1030	Resistor	1K	R25
R1031	Resistor	1K	R25
R1032	Resistor	1K	R25
R1033	Resistor	1K	R25
R1034	Resistor	1K	R25
R1035	Resistor	1K	R25
R1036	Resistor	1K	R25
R1037	Resistor	47K	R25
R1038	Resistor	100K	ELR25
R1039	Resistor	680K	ELR25
R1040	Resistor	1K	R25
R1041	Resistor	1K	R25
R1042	Resistor	1M	R25
R1043	Resistor	2.7K	R25
R1044	Resistor	10	R50X
R1045	Resistor	560K	R25
R1046	Resistor	47K	R25
R1047	Resistor	15K	ELR25
C1005	Electrolytic	47	16V
C1006	Ceramic	0.0047	50V
C1007	Electrolytic	47	16V
C1008	Ceramic	0.0047	50V
C1009	Barrier Lay	0.1	16V
C1010	Electrolytic	100	10V
C1011	Ceramic	0.0047	50V
C1012	Barrier Lay	0.047	50V
C1013	Tantalum	1	16V
C1014	Ceramic	120P	50V
C1015	Ceramic	120P	50V
C1016	Array	B7ZC0717-32N	
C1017	Array	B8ZC0111-32N	
C1018	Array	B5RC0124-32N	
C1019	Array	B8ZC0111-32N	
C1020	Barrier Lay	0.1	16V
J1005	Connector	5138-11CPB	
J1006	Connector	TL25P-07-V1	
J1007	Connector	TLB-P04H-B1	
J1008	Connector	TL25P-07-V1	
J1009	Connector	3022-12B	
J1010	Connector	3022-08B	
J1011	Connector	TL25P-04-V1	
J1012	Connector	5138-11CPB	
J1013	Connector	TL25P-08-V1	
J1014	Connector	TL25P-03-V1	
P1001	Connector	TL25H-04-B1	
B1001	PC. Board	B-893A (42708)	
B1003	Ram Unit	EX-314-12	
W1011	Jumper	JPW-02A	
W1012	Jumper	JPW-02A	
W1013	Jumper	JPW-02A	
W1014	Jumper	JPW-02A	
W1015	Jumper	JPW-02A	
W1017	Jumper	JPW-02A	
W1018	Jumper	JPW-02A	

LOGIC UNIT

REF. NO.	DESCRIPTION	PART NO.
W1019	Jumper	JPW-02A
W1020	Jumper	JPW-02A
W1021	Jumper	JPW-02A
W1022	Jumper	JPW-02A
W1023	Jumper	JPW-02A
W1024	Jumper	JPW-02A
W1025	Jumper	JPW-02A
W1026	Jumper	JPW-02A
W1029	Jumper	JPW-02A
W1031	Jumper	JPW-02A
W1032	Jumper	JPW-02A
W1034	Jumper	JPW-02A
W1035	Jumper	JPW-02A
W1036	Jumper	JPW-02A
W1037	Jumper	JPW-02H
W1038	Jumper	JPW-02A
W1039	Jumper	JPW-02A
W1041	Jumper	JPW-02A
W1042	Jumper	JPW-02A
W1043	Jumper	JPW-02A

FRONT UNIT

REF. NO.	DESCRIPTION	PART NO.
IC1201	IC	M54519P
IC1202	IC	TC4011
IC1203	IC	TC4511BP
IC1204	IC	TC4028
IC1205	IC	μPD4503
IC1207	IC	TC4013
Q1202	Transistor	2SA1048Y
Q1203	Transistor	2SA1048Y
Q1205	Transistor	2SA1345
Q1206	Transistor	2SA1345
Q1207	Transistor	2SC3399
Q1208	Transistor	2SA1348
Q1209	Transistor	2SA1348
Q1210	Transistor	2SA1348
Q1211	Transistor	2SC3399
Q1212	Transistor	2SC3399
Q1213	Transistor	2SC3399
Q1214	Transistor	2SC2458Y
Q1218	Transistor	2SC2458Y
Q1219	Transistor	2SC3399
D1201	Diode	1S953
D1202	Diode	1S953
D1203	Diode	1S953
D1204	Diode	1S953
D1205	Diode	1S953
D1206	Diode	1S953
D1210	Diode	1S953
D1211	Diode	1S953
D1212	Diode	1SS53
D1213	Diode	1SS53
D1214	Diode	1SS53
D1215	Diode	1SS53
D1222	Diode	1S953
D1225	Diode	1SS53

FRONT UNIT

REF. NO.	DESCRIPTION	PART NO.		
D1226	Diode	1SS53		
D1227	Diode	1SS53		
D1228	Diode	1SS53		
D1229	Diode	1SS53		
D1230	Diode	1SS53		
D1231	Diode	1S953		
R1201	Resistor	27	ELR25	
R1202	Resistor	27	R25	
R1203	Resistor	27	ELR25	
R1204	Resistor	27	R25	
R1205	Resistor	27	ELR25	
R1206	Resistor	27	R25	
R1207	Resistor	27	R25	
R1208	Resistor	27	R25	
R1210	Resistor	33K	R25	
R1211	Resistor	47K	R25	
R1212	Resistor	47K	R25	
R1213	Resistor	470K	R25	
R1216	Resistor	33K	R25	
R1217	Resistor	4.7K	R25	
R1218	Resistor	10K	R25	
R1219	Resistor	150K	R25	
R1220	Resistor	150K	R25	
R1221	Resistor	1.2K	R25	
R1222	Resistor	47K	R25	
R1223	Resistor	33K	R25	
R1224	Resistor	10K	R25	
R1225	Resistor	33K	R25	
R1226	Resistor	47K	R25	
R1227	Resistor	470K	R25	
R1228	Resistor	4.7K	R25	
R1230	Resistor	470K	R25	
R1231	Resistor	470K	R25	
R1232	Resistor	47K	R25	
R1233	Resistor	33K	R25	
R1234	Resistor	47K	R25	
R1236	Resistor	10	R25	
R1237	Resistor	10	R25	
R1241	Variable Resistor	10KA	K1611008SE	
R1242	Variable Resistor	10KB	K1611008SE	
C1201	Ceramic	0.0047	50V	
C1202	Electrolytic	100	10V	MS7
C1203	Barrier Lay	0.1	16V	
C1204	Barrier Lay	0.1	16V	
C1205	Ceramic	0.001	50V	
C1206	Ceramic	0.0047	50V	
C1207	Barrier Lay	0.047	25V	
J1201	Connector	TL25P-03-L1		
J1202	Connector	TLB-P11H-B1		
J1203	Connector	TLB-P08H-B1		
J1206	Connector	TL25P-11-L1		
J1207	Connector	TL25P-08-L1		
J1208	Connector	TL25P-03-L1		
J1209	Connector	TLB-P03H-B1		
J1210	Connector	TL25P-08-L1		
J1211	Connector	TL25P-04-L1		
J1212	Connector	5138-11APB		
J1213	Connector	TL25P-06-L1		
J1214	Connector	TL25P-04-L1		
J1215	Connector	TL25P-06-V1		
J1217	Connector	TLB-P05H-B1		

FRONT UNIT

REF. NO.	DESCRIPTION	PART NO.
P1202	Connector	TL25H-11-B1
P1203	Connector	TL25H-08-B1
P1204	Connector	TL25H-03-B1
P1205	Connector	1261P1
P1211	Connector	TL25H-08-B1
P1212	Connector	TL25H-04-B1
P1215	Connector	TL25H-03-B1
P1217	Connector	TL25H-04-B1
P1218	Connector	TL25H-04-B1
DS1201	LED	TLG312A (10M)
DS1202	LED	TLG312A (1M)
DS1203	LED	TLG312A (100K)
DS1204	LED	TLG312A (10K)
DS1205	LED	TLG312A (1K)
DS1206	LED	TLG312A (100Hz)
DS1207	LED	SLP251B (RECEIVE)
DS1208	LED	SLP151B (TRANSMIT)
DS1209	LED	SLP451B (TUNE)
DS1210	LED	SLP151B (ALARM)
S1201	Switch	KHH10906 (TEN KEY 1)
S1202	Switch	KHH10906 (TEN KEY 2)
S1203	Switch	KHH10906 (TEN KEY 3)
S1204	Switch	KHH10906 (TEN KEY 4)
S1205	Switch	KHH10906 (TEN KEY 5)
S1206	Switch	KHH10906 (TEN KEY 6)
S1207	Switch	KHH10906 (TEN KEY 7)
S1208	Switch	KHH10906 (TEN KEY 8)
S1209	Switch	KHH10906 (TEN KEY 9)
S1210	Switch	KHH10906 (TEN KEY 0)
S1211	Switch	KHH10906 (TEN KEY CE)
S1212	Switch	KHH10906 (TEN KEY TX)
S1213	Switch	KHH10906 (TEN KEY RX)
S1215	Switch	SDS-3P (POWER)
S1216	Switch	M2012J-1K (SPEAKER)
S1217	Switch	M2012J-1K (N·B)
S1218	Switch	M2012J-1K (SQUELCH)
S1219	Switch	SRM1043 (L=20mm) (CH A·B·C)
S1220	Switch	SRS101G (CH)
S1223	Switch	MB-2011 (ALARM)
S1224	Switch	SRM1034 (L=15mm) (MODE)
S1225	Switch	SPH121C (DISPLAY)
S1226	Switch	SPH122C (TUNE)
S1227	Switch	SPH122C (TX FREQ.)
S1228	Switch	SSS212 TYPEB
SP1201	Speaker	C080K1710810
B1201	PC. Board	B-892B (42697)
B1202	PC. Board	B-891A (42696)
B1203	PC. Board	B-894A (42514)
W1201	Jumper	JPW-02A
W1202	Jumper	JPW-02A
W1203	Jumper	JPW-02A
W1204	Jumper	JPW-02A
W1205	Jumper	JPW-02A
W1206	Jumper	JPW-02A
W1207	Jumper	JPW-02A
W1209	Jumper	JPW-02A
W1210	Jumper	JPW-02A
W1211	Jumper	JPW-02A
W1212	Jumper	JPW-02A

FRONT UNIT

REF. NO.	DESCRIPTION	PART NO.
W1213	Jumper	JPW-02A
W1215	Jumper	JPW-02A
W1216	Jumper	JPW-02A
W1217	Jumper	JPW-02A
W1218	Jumper	JPW-02A
W1221	Jumper	JPW-02A
W1222	Jumper	JPW-02A
W1223	Jumper	JPW-02A
W1224	Jumper	JPW-02A
W1225	Jumper	JPW-02A
W1226	Jumper	JPW-02H
W1281	Jumper	JPW-02A
W1282	Jumper	JPW-02A

MIC-C UNIT

REF. NO.	DESCRIPTION	PART NO.	
Q1301	Transistor	2SC3399	
Q1302	Transistor	2SC3399	
Q1303	Transistor	2SC3399	
Q1304	Transistor	2SC3402	
Q1305	Transistor	2SC3399	
D1301	Zener	RD8.2EB3	
D1302	Diode	1SS53	
D1303	Diode	1S953	
L1301	Coil	FL5H 101K	
L1302	Coil	BT01RN1-A61	
L1303	Coil	BT01RN1-A61	
L1304	Coil	FL5H 101K	
L1306	Coil	LAL03NA101K	
L1307	Coil	BT01RN1-A61	
R1301	Resistor	220	R25
R1302	Resistor	220	R25
R1303	Resistor	220	R25
R1304	Resistor	22K	R25
R1305	Resistor	1K	R25
R1306	***		
R1307	Resistor	22K	R25
R1308	Resistor	3.3K	R25
R1309	Resistor	2.2K	R25
R1310	Resistor	220	R25
R1311	Resistor	220	R25
C1301	Ceramic	0.0047	50V
C1302	Ceramic	0.0047	50V
C1303	Barrier Lay	0.1	16V
C1304	Ceramic	0.0047	50V
C1305	Ceramic	0.0047	50V
C1306	Electrolytic	2.2	50V
C1307	Ceramic	0.0047	50V
J1301	Connector	TL25P-08-V1	
J1302	Connector	TL25P-07-V1	
J1303	Connector	TL25P-07-V1	
S1301	Switch	SSS312 (L=4)	
S1302	Switch	SSS312 (L=4)	

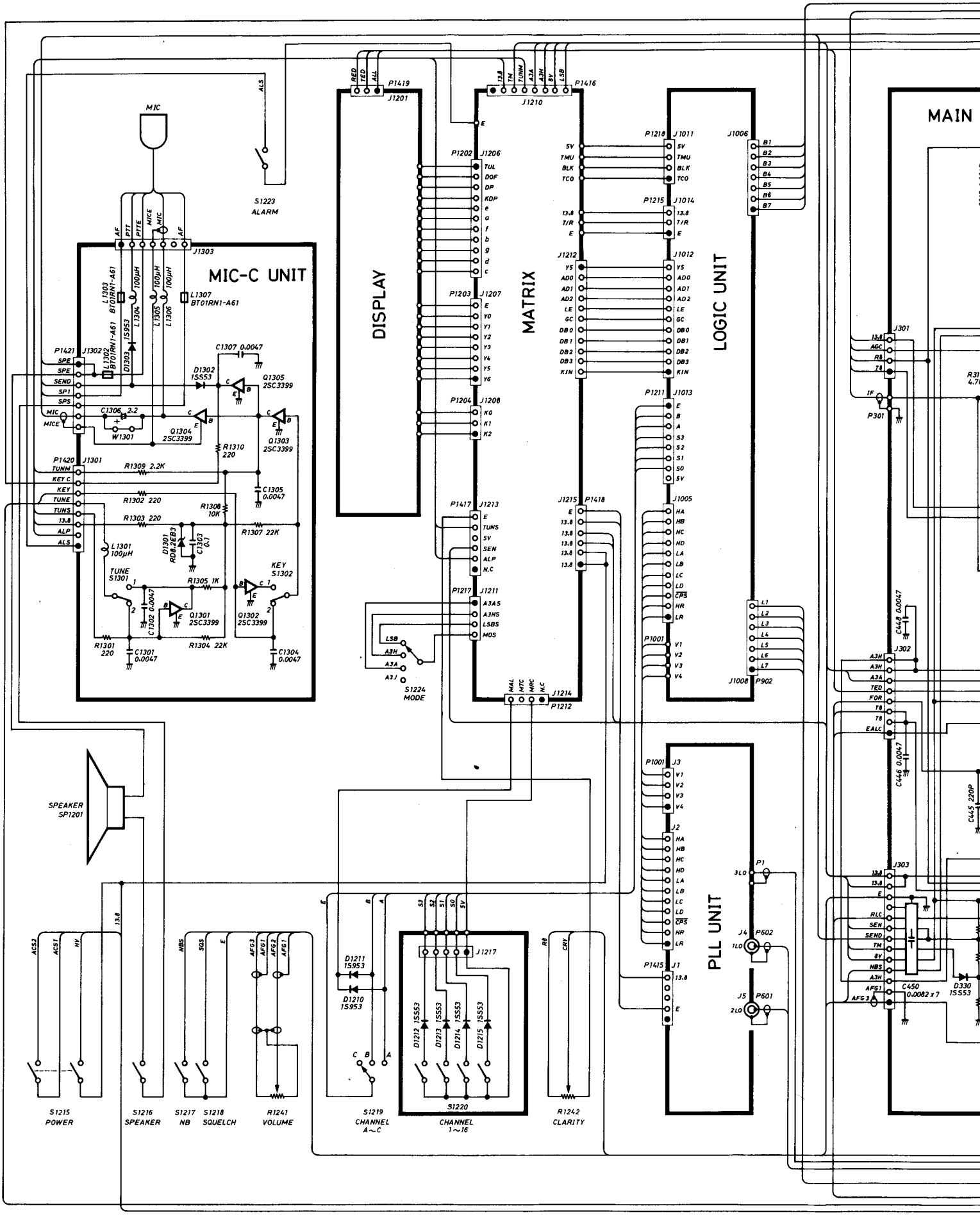
MIC-C UNIT

REF. NO.	DESCRIPTION	PART NO.
B1301	PC. Board	B-895A
W1301	Jumper	JPW-02H
W1302	Jumper	JPW-02A
W1303	Jumper	JPW-02A

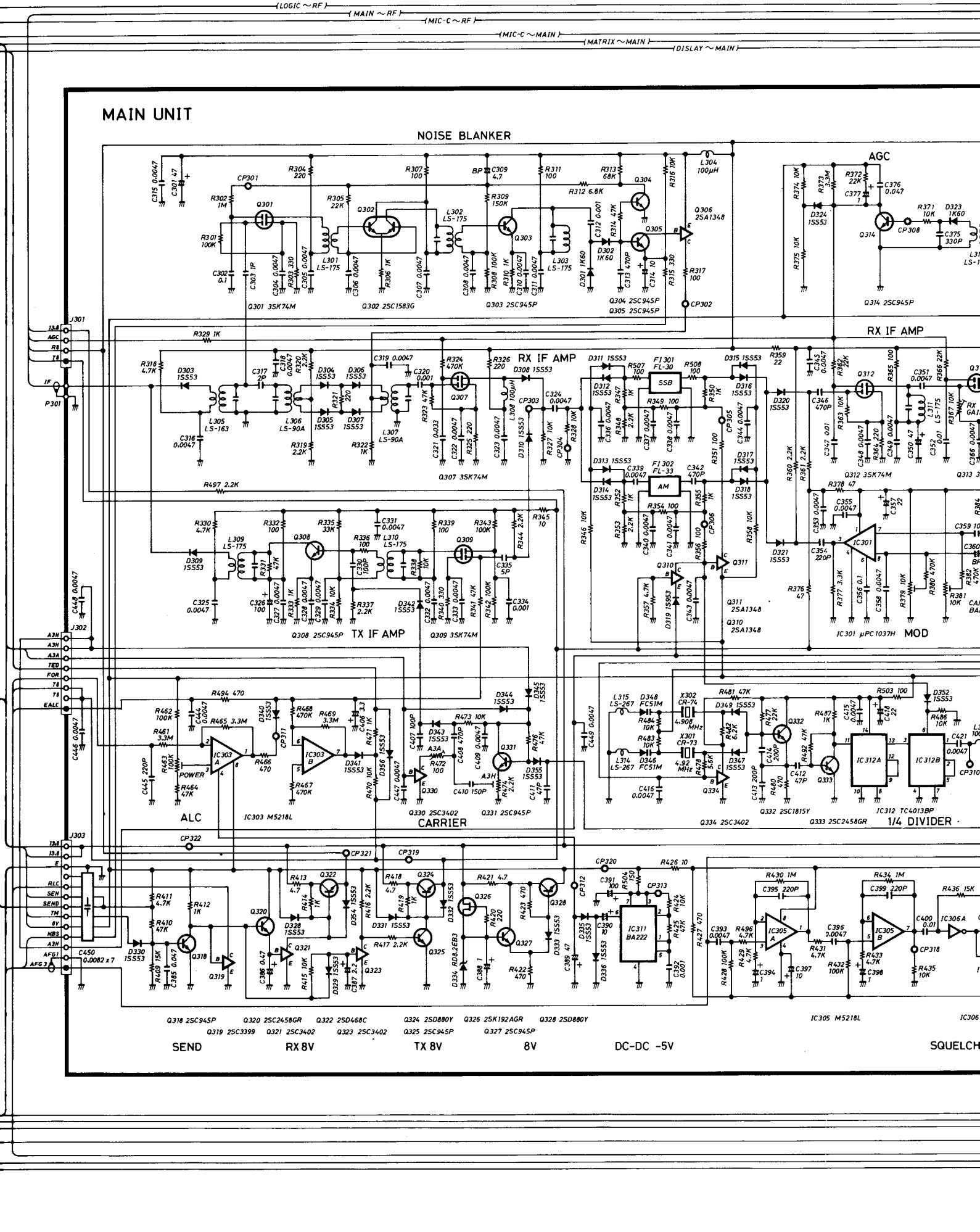
EF UNIT

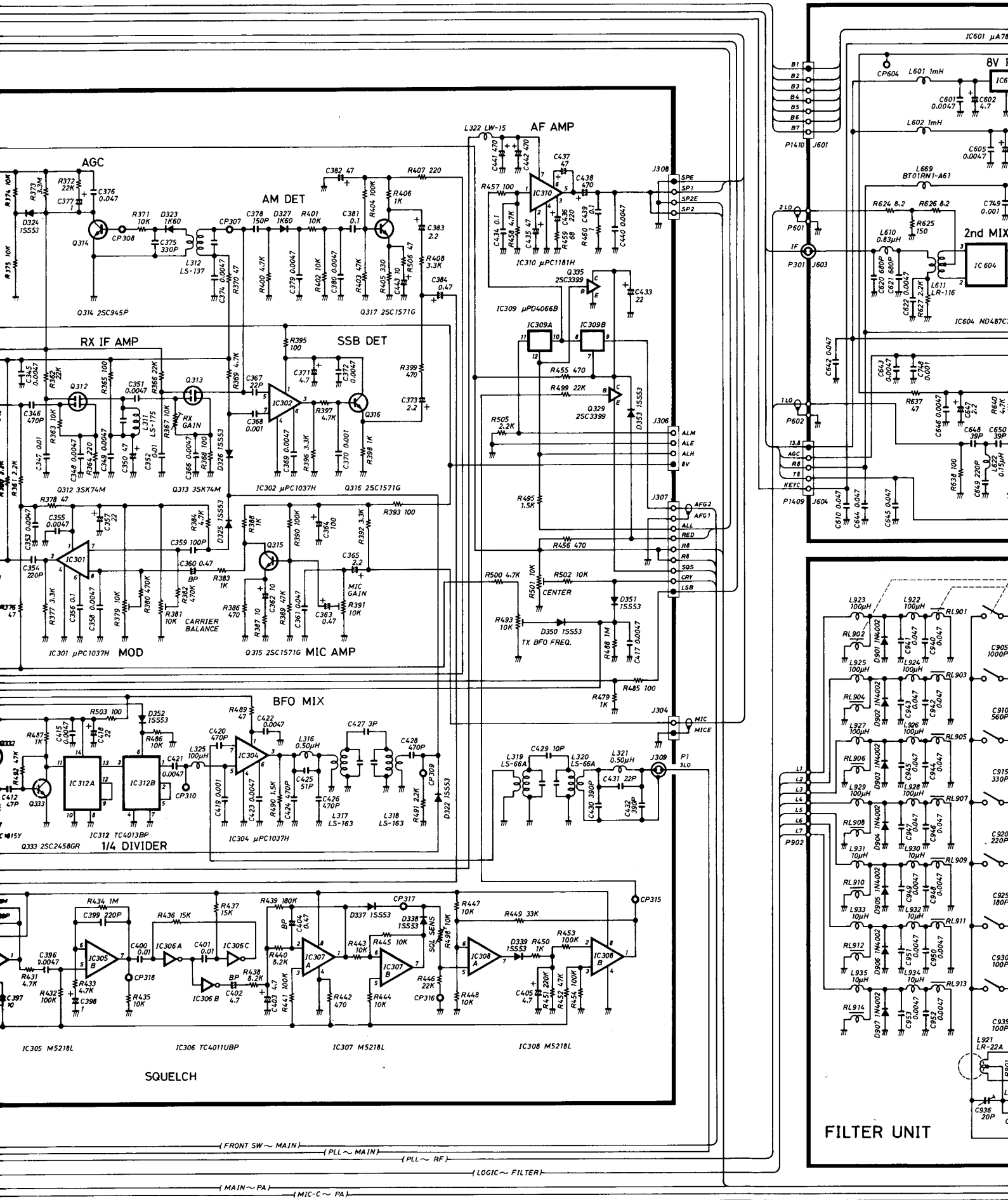
REF. NO.	DESCRIPTION	PART NO.
MC1	Microphone	HM-28
EP1401	Bead Core	FSQH070RN
EP1402	Bead Core	FSQH090RN
P1401	Connector	TL25H-04-B1
P1402	Connector	TL25H-08-B1
P1403	Connector	TL25H-13-B1
P1404	Connector	TL25H-02-B1
P1407	Connector	TL25H-09-B1
P1408	Connector	TL25H-04-B1
P1409	Connector	TL25H-05-B1
P1410	Connector	TL25H-07-B1
P1411	Connector	TL25H-04-B1
P1412	Connector	TL25H-05-B1
P1414	Connector	TL25H-07-B1
P1415	Connector	TL25H-05-B1
P1416	Connector	TL25H-08-B1
P1417	Connector	TL25H-06-B1
P1418	Connector	TL25H-06-B1
P1419	Connector	TL25H-03-B1
P1420	Connector	TL25H-08-B1
P1421	Connector	TL25H-07-B1

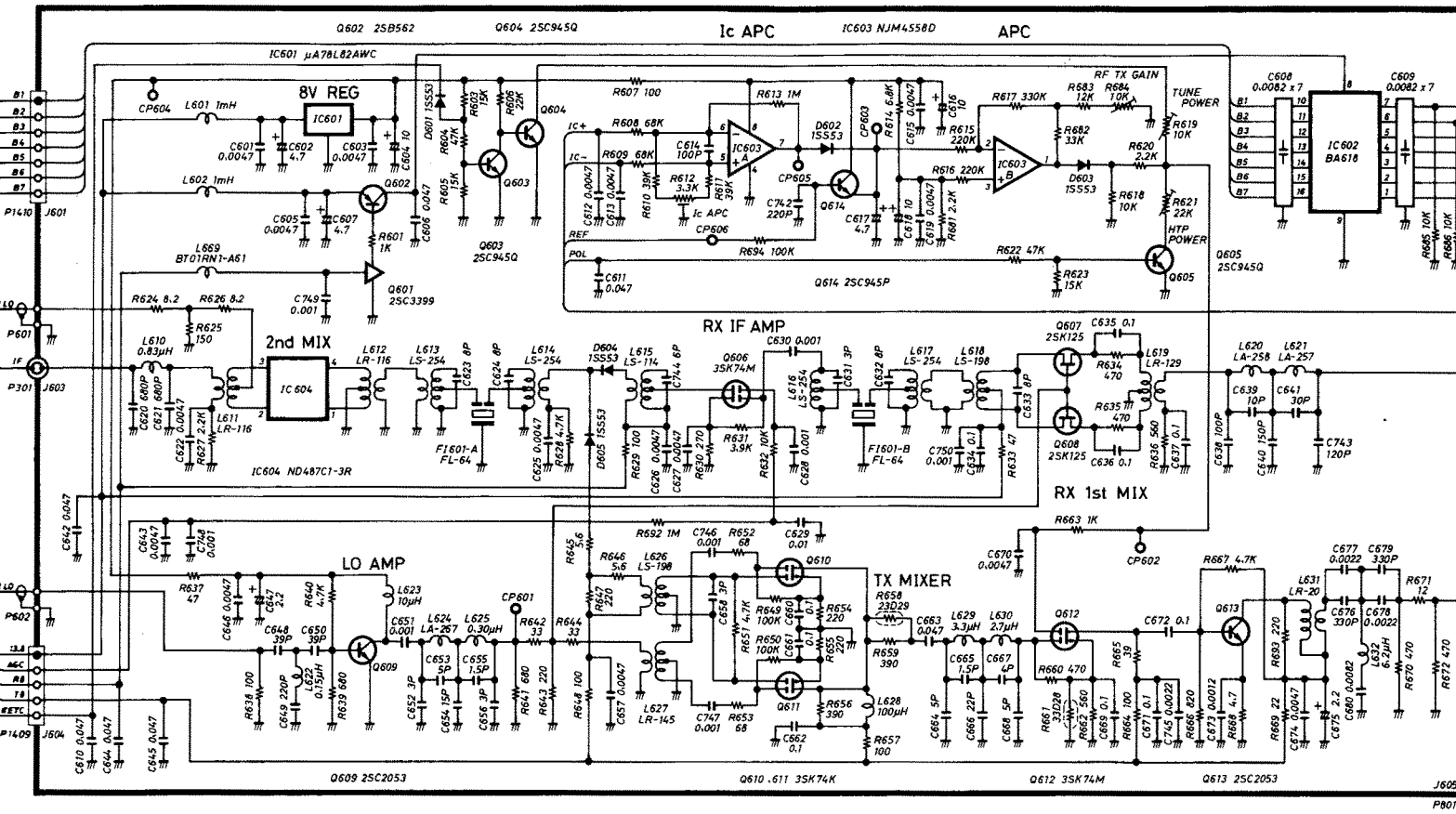
IC-M700 SCHEMATIC DIAGRA

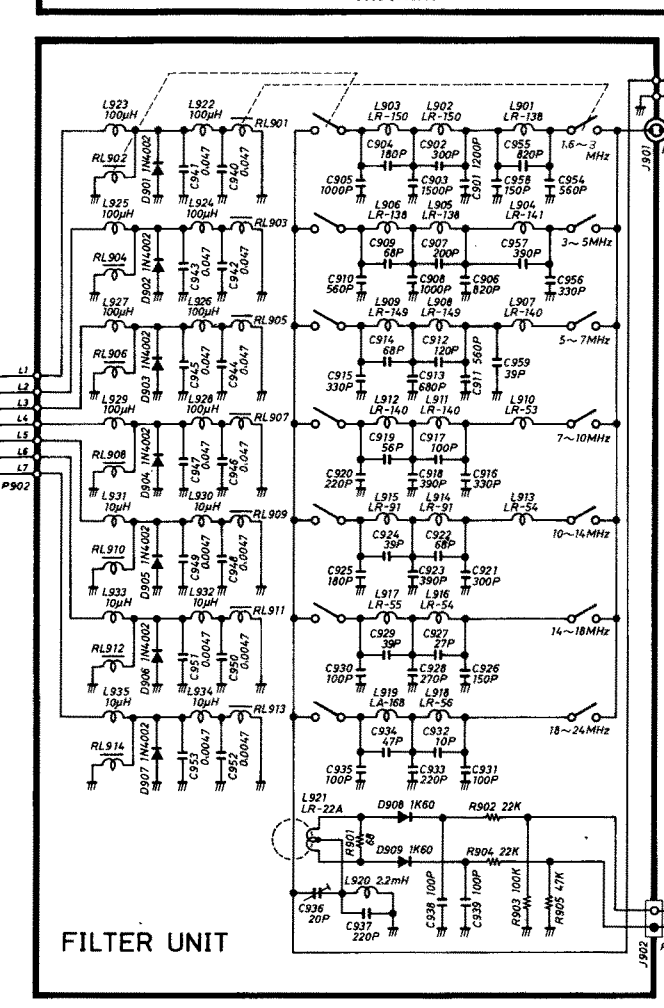


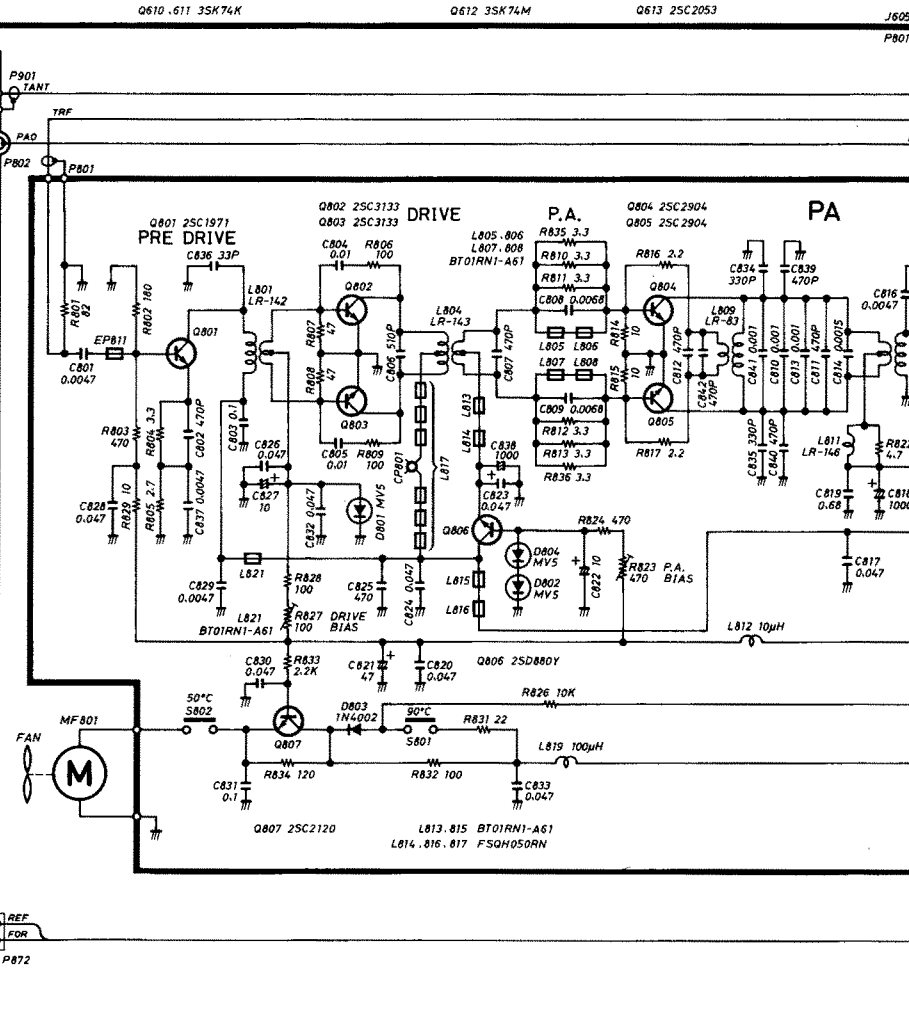
DIAGRAM

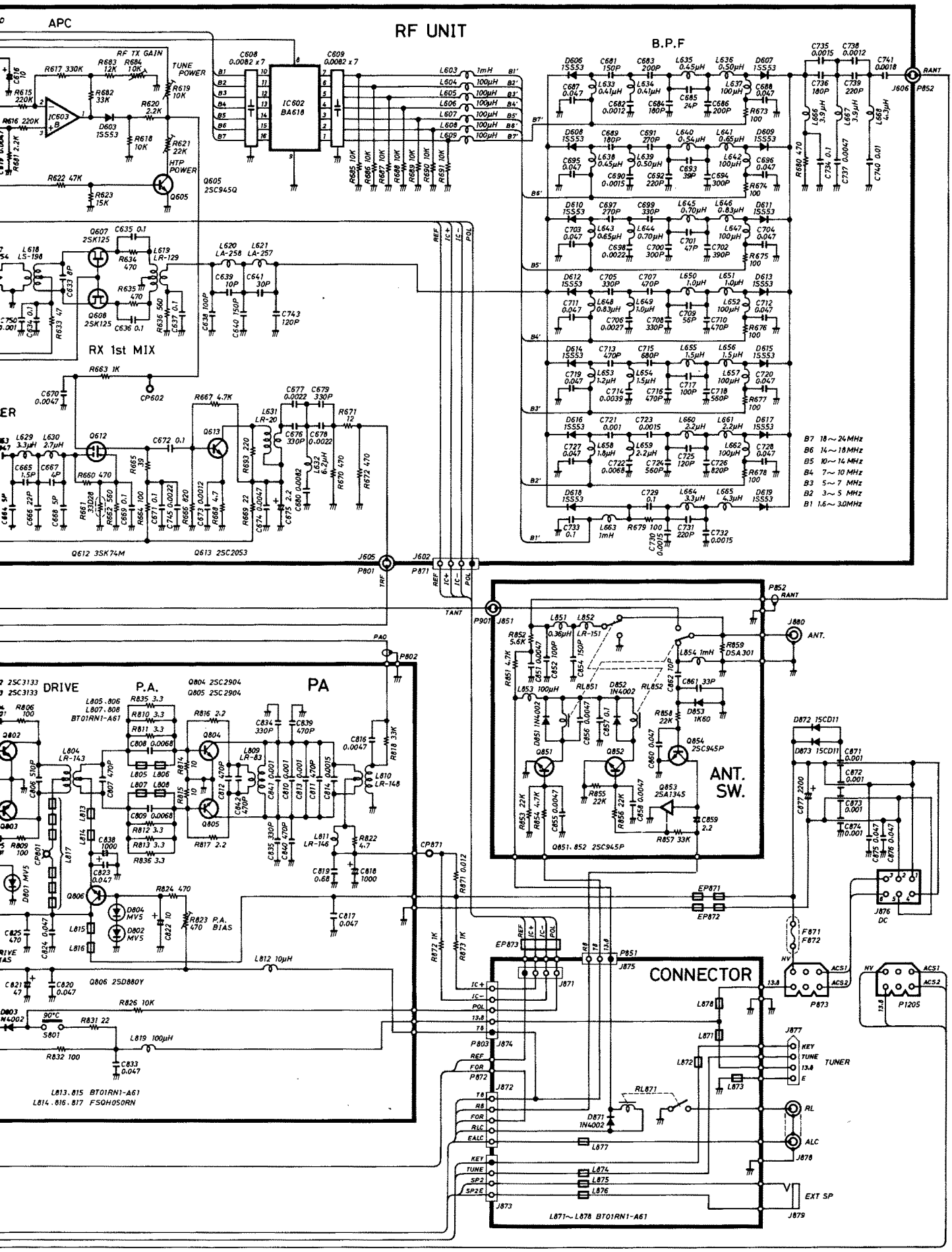

(LOGIC ~ RF)
(MAIN ~ RF)
(MIC-C ~ RF)
(MIC-C ~ MAIN)
(MATRIX ~ MAIN)
(DISLAY ~ MAIN)
MAIN UNIT
NOISE BLANKER
AGC
RX IF AMP
TX IF AMP
MOD
ALC
CARRIER
1/4 DIVIDER
SEND
RX 8V
TX 8V
8V
DC-DC -5V
SQUELCH
Q301 3SK74M
Q302 2SC1583G
Q303 2SC945P
Q304 2SC945P
Q305 2SC945P
Q307 3SK74M
Q308 2SC945P
Q309 3SK74M
Q310 2SA1348
Q311 2SA1348
Q312 3SK74M
Q314 2SC945P
Q318 2SC945P
Q319 2SC3399
Q320 2SC2458GR
Q321 2SC3402
Q322 2SD468C
Q323 2SC3402
Q324 2SD880Y
Q325 2SC945P
Q326 2SK192AGR
Q327 2SC945P
Q328 2SD880Y
Q330 2SC3402
Q331 2SC945P
Q332 2SC1815Y
Q333 2SC2458GR
Q334 2SC3402
IC301 μPC1037H
IC303 M5218L
IC305 M5218L
IC312 TC4013BP
IC311 BA222
J301
J302
J303
P301

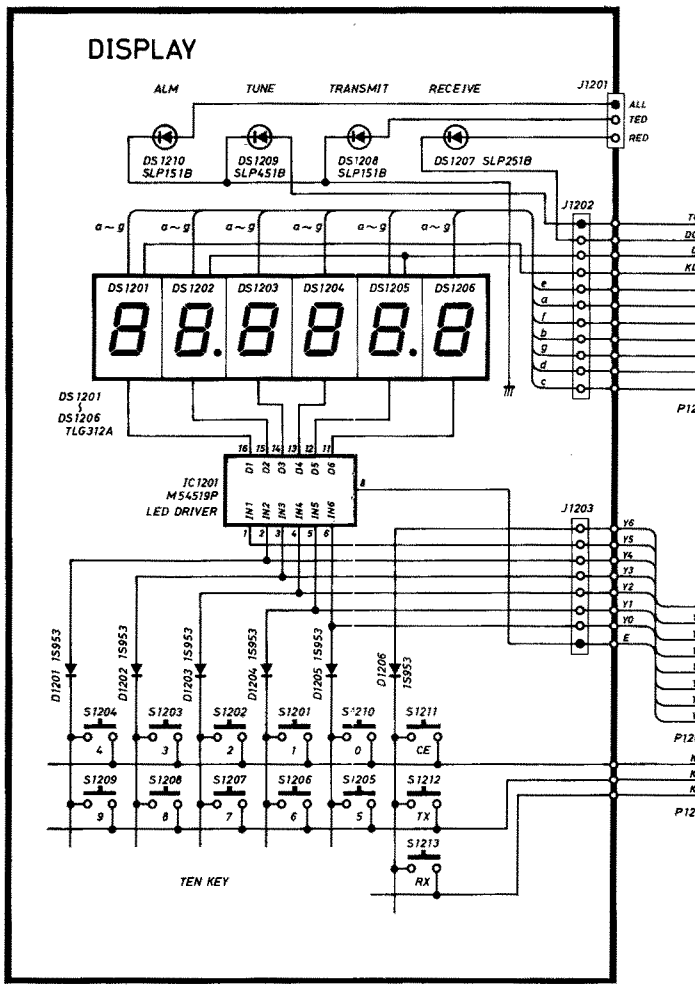

AGC
AM DET
AF AMP
RX IF AMP
SSB DET
BFO MIX
MOD
MIC AMP
1/4 DIVIDER
SQUELCH
FILTER UNIT
IC601 μA78
8V
2nd MIX
IC604 ND487C
IC310 μPC1181H
IC309 μPD4066B
IC302 μPC1037H
IC301 μPC1037H
IC304 μPC1037H
IC312 TC4013BP
IC305 M5218L
IC306 TC4011UBP
IC307 M5218L
IC308 M5218L
Q314 2SC945P
Q317 2SC1571G
Q312 3SK74M
Q313 3SK74M
Q316 2SC1571G
Q315 2SC1571G
Q333 2SC2458GR
Q335 2SC3399
Q329 2SC3399
TX BFO FREQ.
CENTER
CARRIER BALANCE
MIC GAIN
RX GAIN
P1410 J601
P601 J603
P301 J604
P602 J606
P1409 J607
J308
J306
J307
J304
J309
P902
(FRONT SW ~ MAIN)
(PLL ~ MAIN)
(PLL ~ RF)
(LOGIC ~ FILTER)
(MAIN ~ PA)
(MIC-C ~ PA)

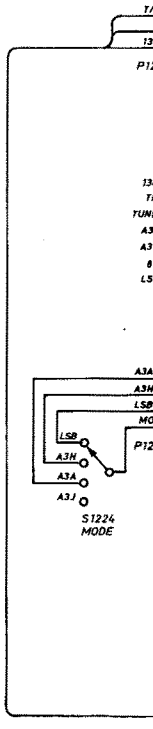

Q602 2SB562
Q604 2SC945Q
Ic APC
IC603 NJM4558D
APC
IC601 μA78L82AWC
8V REG
IC601
RF TX GAIN
TUNE POWER
HTP POWER
IC602 BA618
Q603 2SC945Q
Q605 2SC945Q
Q614 2SC945P
Q601 2SC3399
RX IF AMP
2nd MIX
IC604
IC604 ND487C1-3R
F1601-A FL-64
F1601-B FL-64
Q606 3SK74M
Q607 2SK125
Q608 2SK125
RX 1st MIX
LO AMP
Q609
TX MIXER
Q610
Q611
Q612 3SK74M
Q613 2SC2053
Q609 2SC2053
Q610 .611 3SK74K
P601
P602
P603
P604
P605
P1409
P1410

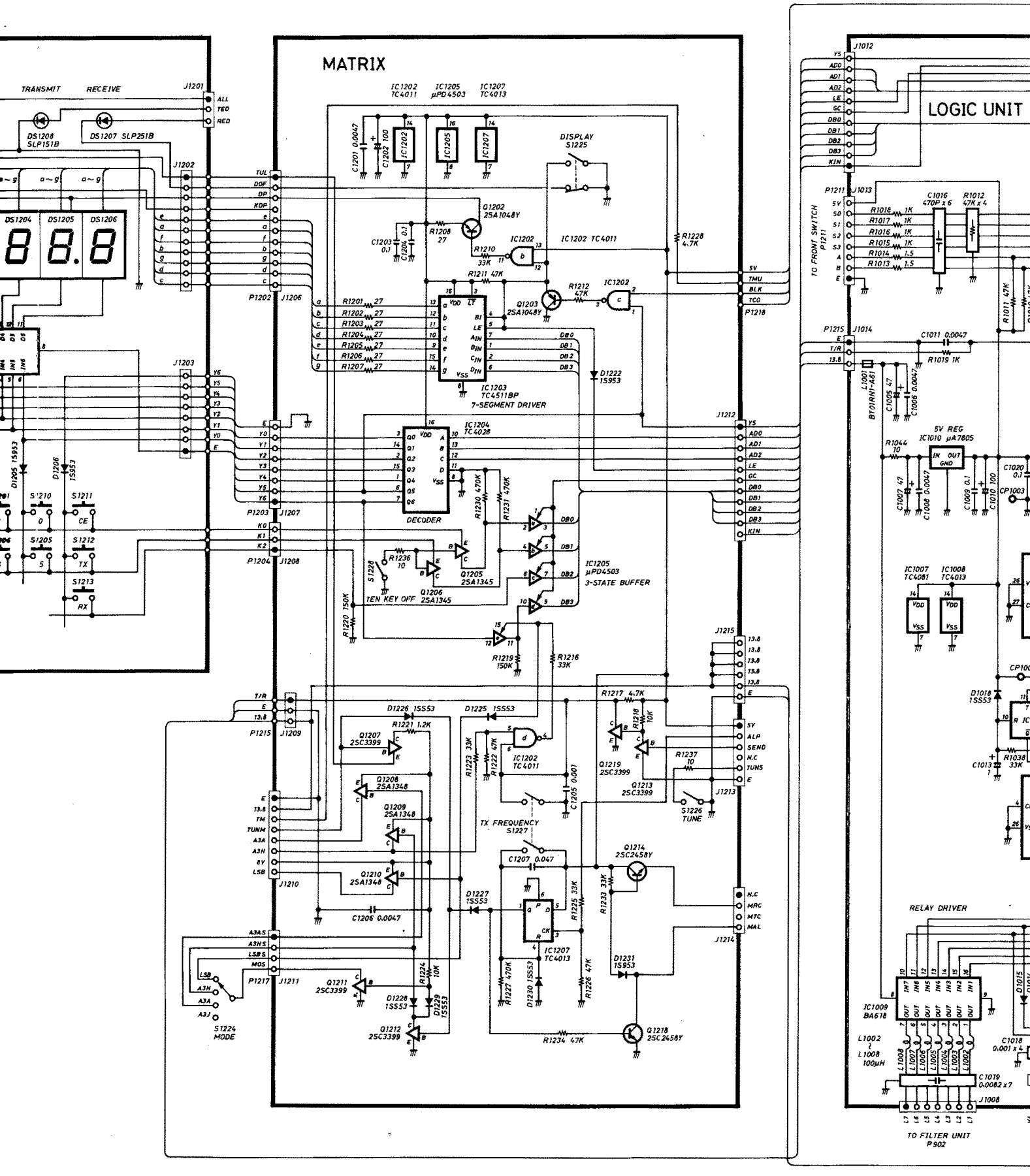

FILTER UNIT
RL901
RL902
RL903
RL904
RL905
RL906
RL907
RL908
RL909
RL910
RL911
RL912
RL913
RL914
1.6~3 MHz
3~5MHz
5~7MHz
7~10MHz
10~14MHz
14~18MHz
18~24MHz
P901 TANT
TRF
PAO
P801
P802
P902
REF
FOR
P872

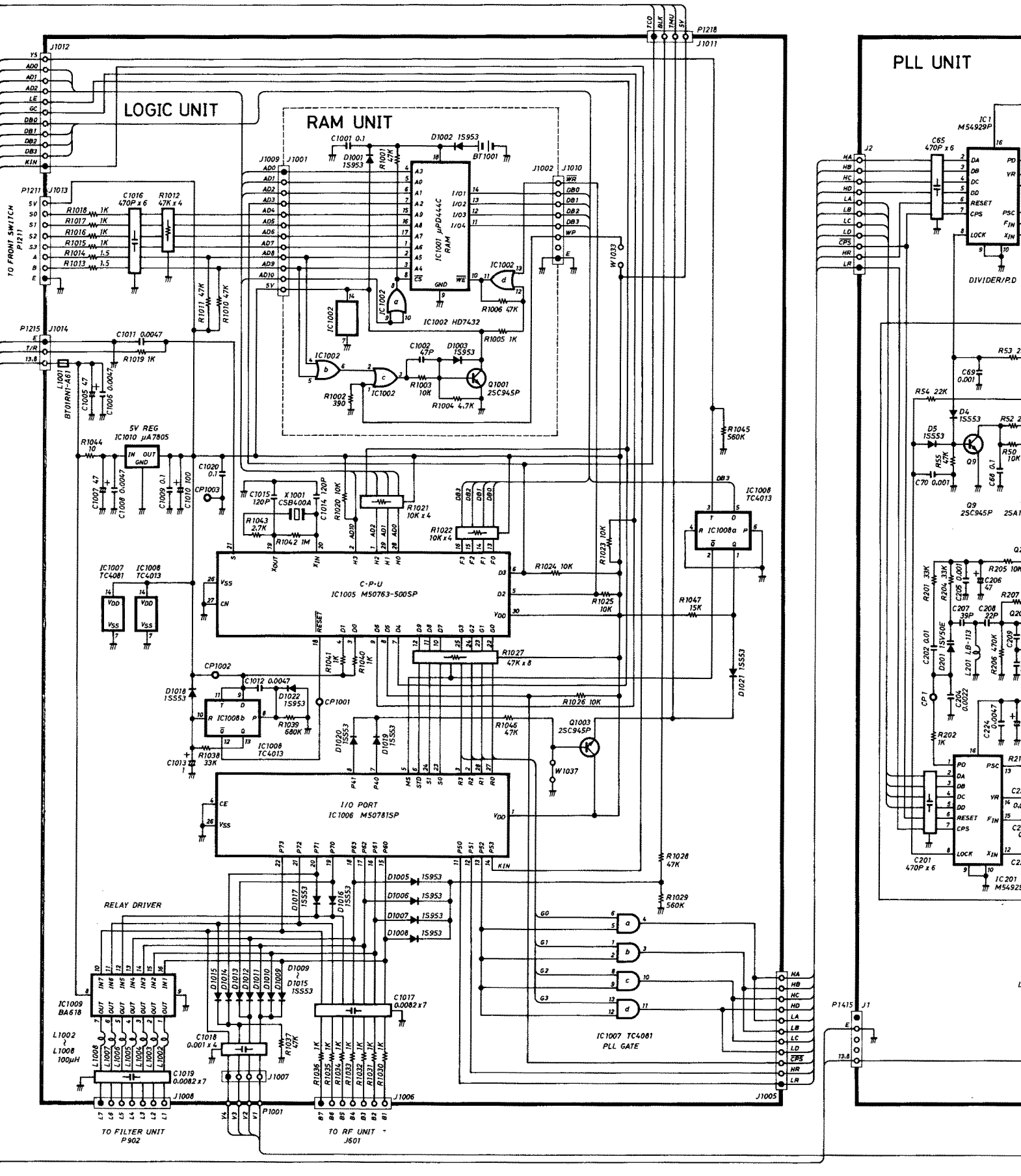

Q801 2SC1971
PRE DRIVE
Q802 2SC3133
Q803 2SC3133
DRIVE
P.A.
Q804 2SC2904
Q805 2SC2904
PA
Q806 2SD880Y
Q807 2SC2120
MF801
FAN
L813. 815 BT01RN1-A61
L814. 816. 817 FSQH050RN

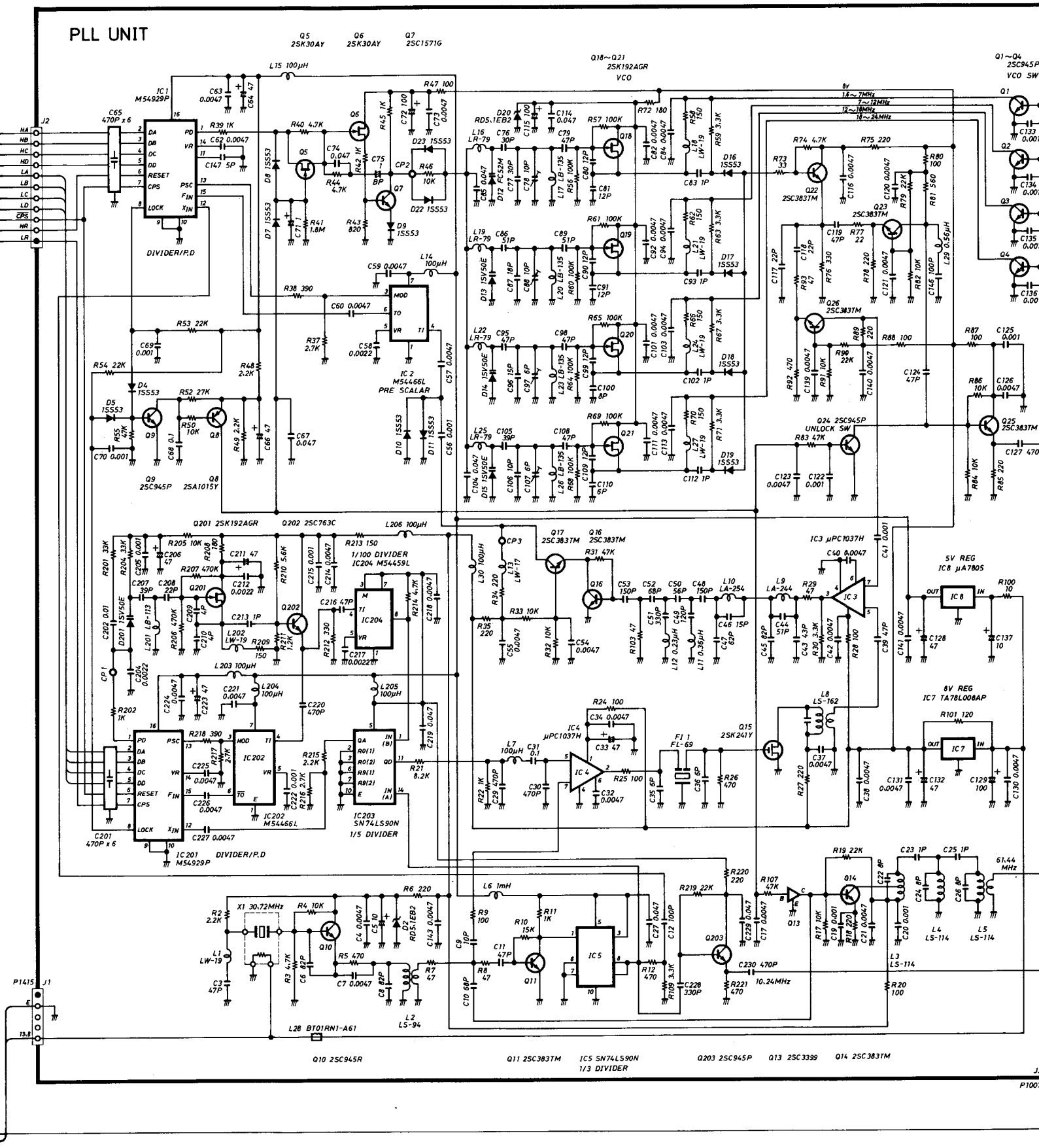

RF UNIT
B.P.F
APC
RF TX GAIN
TUNE POWER
HTP POWER
IC602 BA618
IC603
Q605 2SC945Q
RX 1st MIX
Q607 2SK125
Q608 2SK125
Q612 3SK74M
Q613 2SC2053
DRIVE
P.A.
PA
Q804 2SC2904
Q805 2SC2904
Q806 2SD880Y
BT01RN1-A61
FSQH05RN
B7 18～24MHz
B6 14～18MHz
B5 10～14MHz
B4 7～10MHz
B3 5～7 MHz
B2 3～5 MHz
B1 1.6～3.0MHz
ANT. SW.
Q851. 852 2SC945P
CONNECTOR
L871～L878 BT01RN1-A61
TUNER
EXT SP


DISPLAY
ALM
TUNE
TRANSMIT
RECEIVE
J1201
ALL
TED
RED
DS1210 SLP151B
DS1209 SLP451B
DS1208 SLP151B
DS1207 SLP251B
J1202
a~g
DS1201
DS1202
DS1203
DS1204
DS1205
DS1206
DS1201 ~ DS1206 TLG312A
IC1201 M54519P LED DRIVER
J1203
Y6
Y5
Y4
Y3
Y2
Y1
Y0
E
D1201 1S953
D1202 1S953
D1203 1S953
D1204 1S953
D1205 1S953
D1206 1S953
S1204
S1203
S1202
S1201
S1210
S1211
S1209
S1208
S1207
S1206
S1205
S1212
S1213
CE
TX
RX
TEN KEY

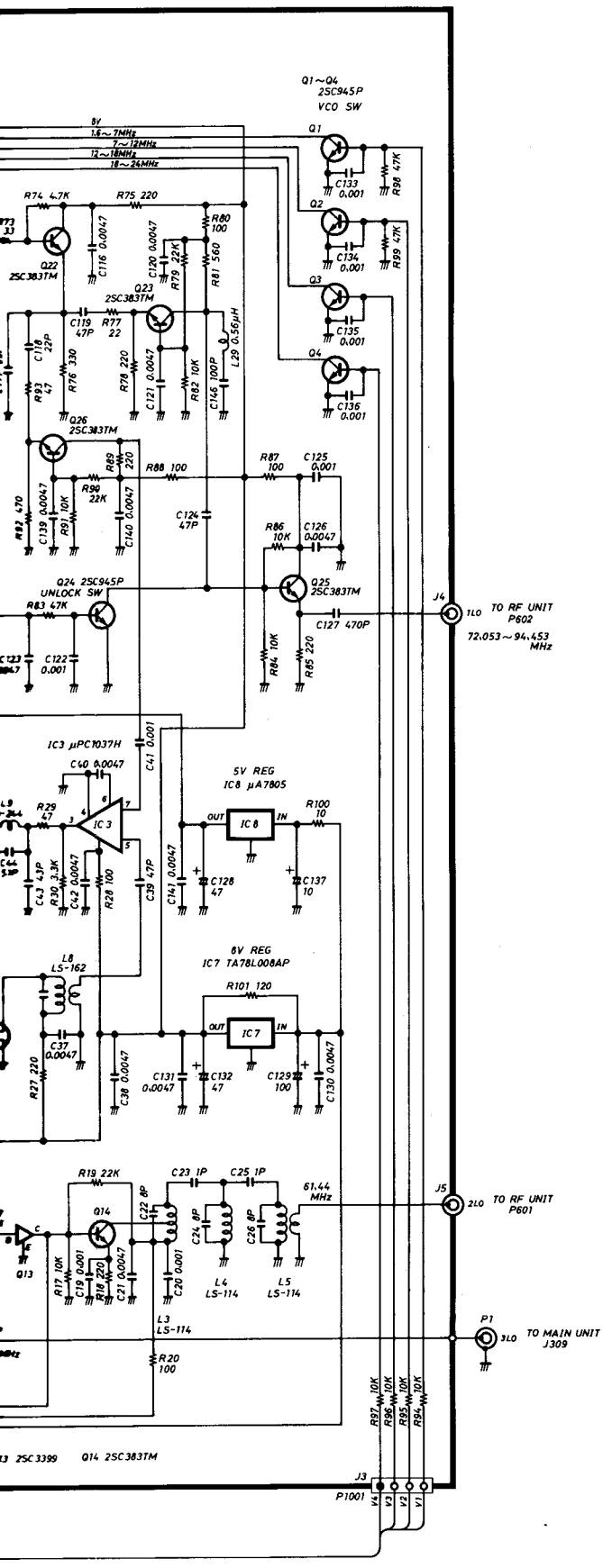

LSB
A3H
A3A
A3J
S1224
MODE


MATRIX
LOGIC UNIT
TRANSMIT
RECEIVE
J1201
DS1208 SLP151B
DS1207 SLP251B
DS1204
DS1205
DS1206
J1202
P1202
J1206
J1203
P1203
J1207
P1204
J1208
P1215
J1209
J1210
P1217
J1211
S1224 MODE
S1210
S1211
S1205
S1212
S1213
IC1202 TC4011
IC1205 µPD4503
IC1207 TC4013
DISPLAY S1225
Q1202 2SA1048Y
IC1202 TC4011
IC1203 TC4511BP 7-SEGMENT DRIVER
IC1204 TC4028
DECODER
IC1205 µPD4503 3-STATE BUFFER
TEN KEY OFF
Q1205 2SA1345
Q1206 2SA1345
Q1203 2SA1048Y
D1222 1S953
D1225 1SS53
D1226 1SS53
Q1207 2SC3399
Q1208 2SA1348
Q1209 2SA1348
Q1210 2SA1348
Q1211 2SC3399
Q1212 2SC3399
Q1213 2SC3399
Q1214 2SC2458Y
Q1218 2SC2458Y
Q1219 2SC3399
TX FREQUENCY S1227
S1226 TUNE
D1227 1SS53
D1228 1SS53
D1229 1SS53
D1230 1SS53
D1231 1S953
IC1207 TC4013
J1212
J1213
J1214
J1215
P1218
TO FRONT SWITCH P1211
J1012
J1013
P1211
P1215
J1014
5V REG IC1010 µA7805
IC1007 TC4081
IC1008 TC4013
IC1009 BA618
RELAY DRIVER
L1001 BT01RN1-A61
L1002 ~ L1008 100µH
J1008
TO FILTER UNIT P902


LOGIC UNIT
RAM UNIT
PLL UNIT
TO FRONT SWITCH P1211
5V REG IC1010 μA7805
IC1001 μPD444C RAM
IC1002 HD7432
Q1001 2SC945P
C-P-U IC1005 M50763-500SP
I/O PORT IC1006 M50781SP
IC1007 TC4081
IC1008 TC4013
IC1009 BA618
RELAY DRIVER
IC1007 TC4081 PLL GATE
DIVIDER/P.D
TO FILTER UNIT P902
TO RF UNIT J601



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