



SERVICE MANUAL

VHF TRANSCEIVER

IC-V220

INTRODUCTION

This service manual describes the latest information for the following transceivers at the time of publication.

MODEL	VERSION NO.	FREQUENCY COVERAGE
IC-V220	#01	150.000 ~ 174.000 MHz

To upgrade quality, all electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the transceiver.

DO NOT expose the transceiver to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the transceiver.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.



ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

1110002550 IC TA7252AP IC-V220 MAIN UNIT 5 pieces
8810006230 Screw FH M2.6 x 4 ZK BS IC-V220 Top cover 10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 40 dB ~ 50 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.

TABLE OF CONTENTS

SECTION	1	SPECIFICATIONS	1-1
SECTION	2	INSIDE VIEWS	2-1
SECTION	3	CIRCUIT DESCRIPTION	3-1 ~ 6
	3-1	RECEIVER CIRCUITS	3-1 ~ 2
	3-2	TRANSMITTER CIRCUITS	3-2
	3-3	PLL CIRCUITS	3-3
	3-4	LOGIC CIRCUITS	3-4 ~ 6
	3-5	POWER REGULATOR CIRCUIT	3-6
SECTION	4	MECHANICAL PARTS AND DISASSEMBLY	4-1 ~ 2
	4-1	FRONT PANEL AND CHASSIS PARTS	4-1 ~ 2
	4-2	ACCESSORIES	4-1
SECTION	5	PARTS LIST	5-1 ~ 7
SECTION	6	ADJUSTMENT PROCEDURES	6-1 ~ 5
	6-1	PREPARATION BEFORE SERVICING	6-1
	6-2	PLL ADJUSTMENT	6-2 ~ 3
	6-3	RECEIVER ADJUSTMENT	6-2 ~ 3
	6-4	TRANSMITTER ADJUSTMENT	6-4 ~ 5
SECTION	7	BOARD LAYOUTS	7-1 ~ 6
	7-1	MAIN UNIT	7-1 ~ 2
	7-2	LOGIC UNIT	7-3 ~ 4
	7-3	VCO UNIT	7-3 ~ 4
	7-4	PLL UNIT	7-3 ~ 4
	7-5	IF UNIT	7-5 ~ 6
	7-6	CTCSS UNIT	7-5 ~ 6
	7-7	AF FIL UNIT	7-5 ~ 6
	7-8	MIC AMP UNIT	7-5 ~ 6
	7-9	YGR UNIT	7-5
SECTION	8	OPTION UNIT	8-1
SECTION	9	BLOCK DIAGRAM	9-1
SECTION	10	VOLTAGE DIAGRAM	10-1

SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : 150.000 ~ 174.000 MHz
- Mode : FM (16K0F3E)
- Channel spacing : 30 kHz
- Memory channels : Up to 18
- Antenna impedance : 50 Ω (nominal)
- Power supply requirement : 13.8 V DC \pm 15 % (negative ground)
- Current drain : Receive 450 mA (squelched)
1.1 A (max. audio output)
: Transmit 6.0 A (high)
3.2 A (low)
- Usable temperature range : $-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ($-22^{\circ}\text{F} \sim +140^{\circ}\text{F}$)
- Frequency stability : $\pm 0.0005\%$ ($-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$)
- Dimensions : 140 (W) x 40 (H) x 160 (D) mm; 5.5 (W) x 1.6 (H) x 6.3 (D) in
(Projections not included)
- Weight : 1.0 kg (2.2 lb)

■ TRANSMITTER

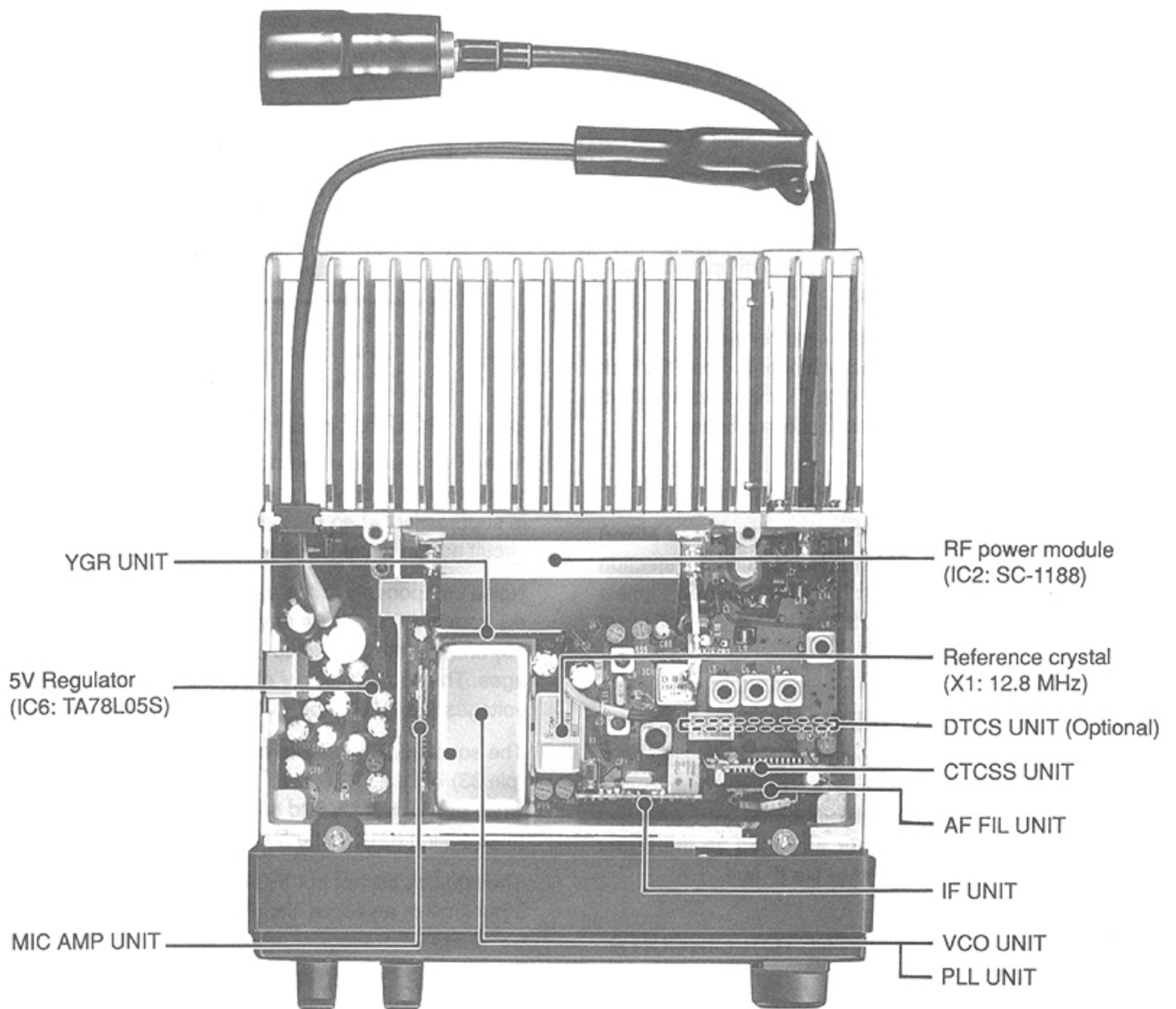
- Output power : 25 W (high), 5 W (low)
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ± 5.0 kHz
- Spurious emissions : -70 dB
- Harmonic emissions : -70 dB
- Noise and hum ratio : -50 dB
- Audio harmonic distortion : 10%
- Audio frequency response : $+1$ dB ~ -3 dB of $+6$ dB/octave with 300 Hz to 3000 Hz input
- Microphone impedance : 600 Ω

■ RECEIVER

- Receive system : Double-conversion superheterodyne
- Intermediate frequencies : 1st 21.8 MHz
2nd 455 kHz
- Sensitivity : 0.2 μV for 12 dB SINAD
- Squelch sensitivity : 0.2 μV (threshold level)
- Adjacent channel selectivity : -75 dB (-80 dB typical)
- Spurious response rejection : -90 dB
- Intermodulation rejection : -70 dB (-75 dB typical)
- Audio frequency response : $+1$ dB ~ -3 dB of -6 dB/octave with 300 Hz to 3000 Hz deviation
- Audio output power : 4 W with a 4 Ω load
- Audio output impedance : 4 Ω

All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

3-1-1 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

The antenna switching circuit functions as a low-pass filter while receiving and as a resonator circuit while transmitting. It switches the flow of the transmitting or receiving signal.

Received signals enter the MAIN unit from the antenna connector and pass through the low-pass filter (C42 ~ C45, L11, L12). They are then applied to the antenna switching circuit (D6, D8, D9, L9, L10).

3-1-2 RF CIRCUIT (MAIN UNIT)

The signals pass through the antenna switching circuit and are applied to the bandpass filter circuit (D5, L8, C31) where the object signals are led to the RF amplifier (Q3).

The signals amplified by Q3 are applied to the 3-stage variable bandpass filter (D2 ~ D4, L5 ~ L7, C14, C16, C17, C20, C21, C24) to eliminate the out-of-band signals and improve the selectivity. The signals are then applied to the 1st mixer (IC1).

The PLL lock voltage is used as a power source for the control voltage of D2 ~ D5 (varactor diodes). The PLL lock voltage output from the PLL unit ("CLV") is current-amplified by Q6 and Q7, and is then applied to these diodes.

3-1-3 MIXER CIRCUIT (MAIN UNIT)

The IC-V220 employs a DBM IC (Double Balanced Mixer) as a 1st mixer to obtain a high intermodulation rejection ratio. The mixer circuit (IC1) mixes the received signals and 1st LO signal from the PLL to produce a 21.8 MHz 1st IF signal.

3-1-4 1ST IF CIRCUIT (MAIN UNIT)

The 1st IF signal is amplified by the 1st IF amplifier (Q2) and is then applied to F11. F11 is a pair of monolithic crystal filters which only pick up an object signal with sufficient selectivity. This signal is further amplified by the buffer amplifier (Q1) and is then applied to the IF unit.

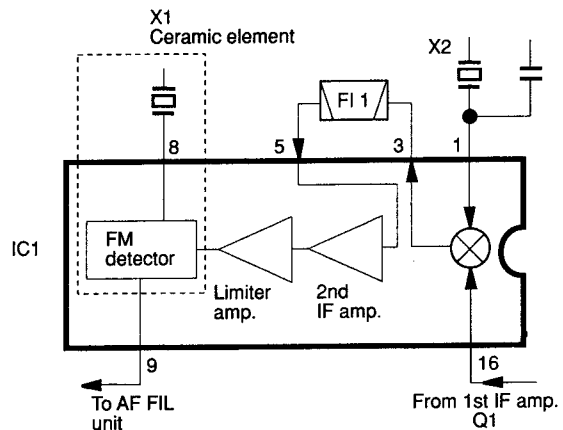
3-1-5 2ND IF AND FM DETECTOR CIRCUITS (IF UNIT)

IC1 contains the 2nd LO circuit, 2nd mixer circuit, limiter amplifier circuit, squelch trigger circuit and quadrature detector circuit.

The 1st IF signal from Q1 is applied to the 2nd mixer section of IC1 (pin 16), and is mixed with a 2nd LO signal generated by X2 to produce a 455 kHz 2nd IF signal.

The 2nd IF signal is output from IC1 (pin 3) and is passed through the ceramic filter (F11), where unwanted signals are suppressed, and is then applied to the 2nd IF and limiter amplifiers in IC1 (pin 5). The signal is detected by AF signals from the FM detector section in IC1.

The FM detector circuits employ a quadrature detection method (linear phase detection), which uses a ceramic element for phase delay to obtain a non-adjusting circuit. The detected signal exits IC1 (pin 9).



3-1-6 SQUELCH CIRCUIT (IF UNIT)

In an FM receiver, audio noise is produced in its IF and AF circuits when receiving no RF signals. However, the noise is suppressed when receiving a signal. The noise squelch circuit acts in accordance with this phenomenon.

Noise components in the detected signal (20 kHz and higher) from IC1 (pin 9) are amplified at the active filter IC1 (pin 10) and are then detected by D2 and converted to DC voltages. The squelch trigger circuit IC1 (pin 12) converts these voltages to a "HIGH" or "LOW" squelch switch signal.

The squelch control switch signal is applied to the CPU IC2 (pin 33) in the LOGIC unit. The CPU pin 54 outputs "HIGH" while pin 33 is "LOW" to cut the audio signals using the AF mute switch (Q12 in the MAIN unit).

The squelch control pot (R34 in the LOGIC unit) adjusts the input level of an active filter IC1 (pin 10).

3-1-7 AF CIRCUIT (AF FIL UNIT)

The AF signals output from IC1 (pin 9) in the IF unit are amplified and filtered in the AF FIL unit.

Output from the AF FIL unit ("FILOUT") passes through the AF mute switch (Q12) and the [VOL] control (in the LOGIC unit) and is amplified by the AF power amplifier (IC7) to drive a speaker.

3-1-8 AF MUTE CIRCUIT (MAIN UNIT)

The AF mute switch (Q12) cuts the AF signal when its gate is "HIGH." This condition appears while noise squelch, CTCSS or DTCS is activated or while transmitting.

A portion of the AF detector signals from the AF FIL unit ("DETO" port) are applied to the CTCSS unit and an optional DTCS unit. "HIGH" or "LOW" detector signals from the CTCSS or DTCS unit are applied to the CPU IC2 (pin 35) to control the CPU MUTE1 port (pin 54).

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER CIRCUIT (MIC AMP UNIT)

The microphone amplifier circuit amplifies audio signals with +6 dB/octave pre-emphasis from the microphone to a level needed at the modulation circuit.

The signals from the microphone pass through the mic mute circuit (Q1) and through the pre-emphasis circuit (C7, R8) that is given the frequency characteristics of +6 dB/oct.

The signals are amplified by IC1a and are then passed through the active high-pass filter (IC1b). IC1b eliminates frequencies lower than 300 Hz. The signals are amplified at the limiter amplifier (IC1c) to be limited in frequency deviation and are then applied to the splatter filter (IC1d), where the signals higher than 3 kHz are eliminated. The signals are amplified by IC4b in the MAIN unit and are then applied to the modulation circuit.

3-2-2 MODULATION CIRCUIT (VCO UNIT)

The modulation circuit modulates the VCO oscillating signal (RF signal) using the microphone audio signals.

Audio signals from IC4b ("MOUT") in the MAIN unit are applied to the VCO unit. The signals change the capacitance between the gate and source of the VCO oscillator (Q1) to modulate the oscillated signal using the microphone audio signals. The oscillated signal is buffer-amplified at Q2 and Q3 and is then applied to the MAIN unit.

3-2-3 DRIVER AMPLIFIER CIRCUIT (YGR UNIT)

The driver amplifier circuit amplifies the VCO oscillating signal to a level needed at the power amplifier.

The VCO output signal passes through the low-pass filter (C51, C58, L15) in the MAIN unit and is applied to the YGR unit. The signal is amplified by the predrive (Q1) and drive (Q2) amplifiers in the YGR unit to obtain an approximate +26 dBm (400 mW) signal level. The signal is applied to the RF power amplifier (IC2 in the MAIN unit).

3-2-4 POWER AMPLIFIER CIRCUIT (MAIN UNIT)

The power amplifier circuit amplifies the driver signal to an output power level.

Though IC2 is a power module which has amplify capabilities of up to about 30 W, the APC circuit sets the power to 25 W or 5 W.

The output from IC2 (pin 4) passes through D9, C39 and the low-pass filter (L11 ~ L12, C42 ~ C45) to reduce the higher harmonic wave of the transmission frequency. The transmit/receive switching circuit (D6, D8, D9) is turned ON by T8 to prevent the transmit output power from going into the receiver circuit. While receiving, D6, D8 and D9 turn OFF for the antenna switching circuit to act as a low-pass filter.

3-2-5 APC CIRCUIT (MAIN UNIT)

The APC circuit stabilises RF output power even when the supplied voltage changes.

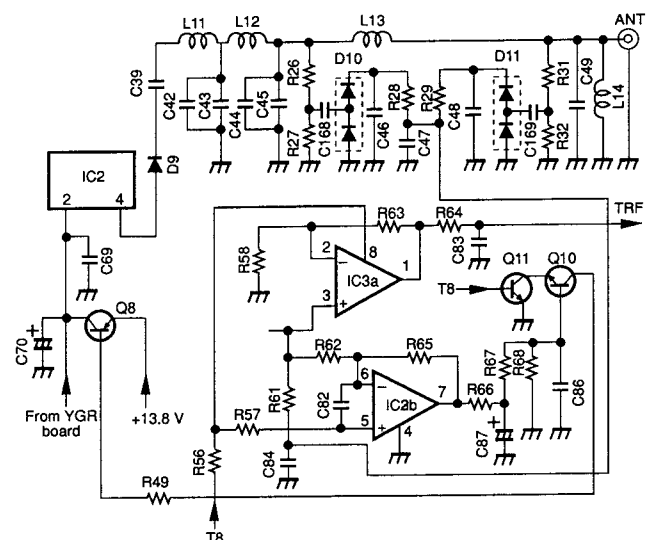
The RF output power from IC2 is detected by the mismatching detection circuit (D10, D11, L13) and its detected voltage is minimum while the output is matched with 50 Ω .

However, when the output is mismatched, the detected voltage rises. This voltage is applied to IC3a (pin 3) and IC3b (pin 5).

IC3b is as an APC amplifier which acts as a differential amplifier. IC3b's \oplus input (pin 5) receives a reference voltage which determines the output power and the \ominus input (pin 6) receives the APC detected voltage. IC3b compares both inputs and controls current amplifiers (Q10, Q8).

When antenna impedance is mismatched, the APC detected voltage increases and becomes higher than the reference voltage. At this time IC3b decreases the corrector current of Q10 and Q8 to decrease the output power.

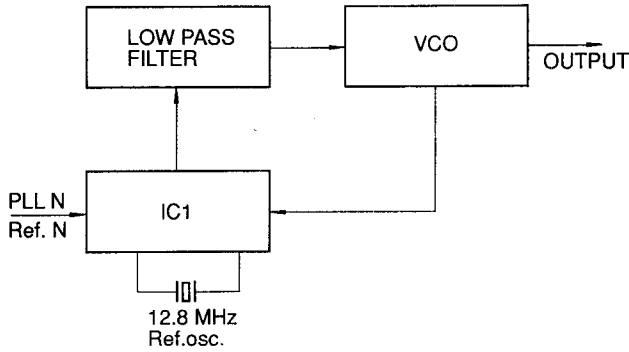
A level of low output power is also set by the reference voltage. High/low power switching is controlled by Q9.



3-3 PLL CIRCUITS

3-3-1 GENERAL DESCRIPTION (PLL UNIT)

A PLL circuit provides stable oscillation of the transmit frequency and the receive local frequency. The PLL circuit compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by a reference oscillator and the divided ratio of a programmable divider.



The one chip PLL IC (IC1 in the PLL unit) contains two programmable dividers, a phase detector and a shift register.

The VCO oscillation output from OUT2 passes through the low-pass filter (L2, C9, C10) to cut the higher harmonic component and to prevent miss-dividing in IC1.

IC1 divides this input with the serial data from the CPU and phase-detects it with the divided reference frequency (12.8 MHz oscillated by X1 and Q15 in the MAIN unit) and then outputs the phase difference as a pulse.

The output signal is converted to a DC voltage by the charge pump (Q1, Q2) and the loop filter (R6, R7, R16, C2, C4, C17, C20) and as well controls the varactor diodes (D1, D2, D3, D4 in the VCO unit).

3-3-2 VCO CIRCUIT (VCO UNIT)

A VCO circuit generates receive and transmit frequencies and produces FM modulation.

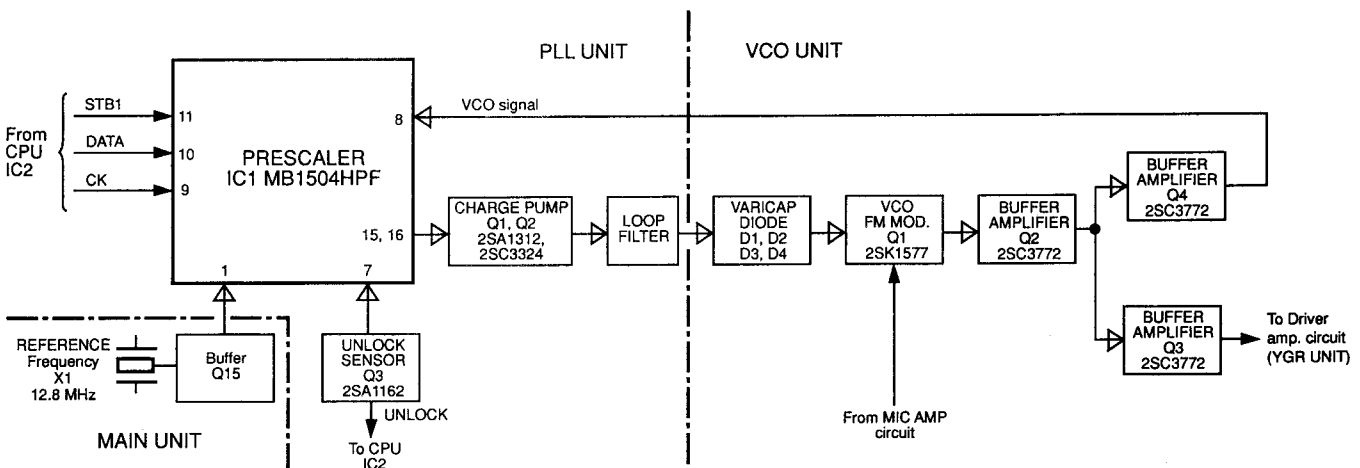
The VCO circuit forms a Colpitts oscillator circuit (Q1). Q1 FET causes oscillation; C14, with a small capacitance, provides coupling; and Q2 provides a buffer effect that is unaffected by VCO oscillation.

The output of Q2 is divided into OUT1 and OUT2 with a pad that has a resistor. OUT1 is sent to the YGR and LO circuits, and OUT2 is led to the PLL circuit.

3-3-3 REFERENCE OSCILLATOR (MAIN UNIT)

The reference oscillator circuit oscillates the PLL reference frequency.

The reference frequency is determined by X1 (12.8 MHz). This signal is supplied to IC1 (PLL unit) through the buffer amplifier (Q15).



3-4 LOGIC CIRCUITS

3-4-1 CPU PORT DESCRIPTION (LOGIC UNIT)

PIN NO.	NAME	DESCRIPTION
1	TXC	Power supply control signal when transmitting. Outputs a "HIGH" signal when transmitting.
2	RXC	Power supply control signal when receiving. Outputs a "HIGH" signal when receiving.
3	OPC	Output port for the optional decoder power supply control signal. Outputs a standby signal "HIGH" when this port receives a "HIGH" from a HANG.
4	STB3	Output port for the DTCS data strobe signal.
5	STB2	Output port for the CTCSS tone data strobe signal.
6	RESET	Input port for RESET of the CPU. When a "LOW" signal is applied here, the CPU is initialised.
29	STBY	When a "LOW" signal is applied here, the CPU changes to back-up mode.
30	DCK	Input port for the clock signal of the channel dial.
31	DUP	Input port for the up signal of the channel dial.
32	DDWN	Input port for the down signal of the channel dial.
33	SQLS	Input port for the squelch open signal; becomes "LOW" when opened.
34	UNLK	Input port for PLL unlock signals. During unlock conditions, this port is "HIGH."
35	DOUT	When the received TONE code is matched to the desired code, this terminal becomes "HIGH."
36	PTT1	Input port for the transmit signal. This port transmits the data when it receives "LOW."
37	CPO	Outputs cloning data.
38	CK	Outputs a synchronised clock signal for PLL, CTCSS, DTCS and LCD data.
39	DATA	Outputs a data signal for PLL, CTCSS, DTCS and LCD data.

PIN NO.	NAME	DESCRIPTION
44	CL	Input port for the clone mode. This port can set the clone mode when a "LOW" signal is applied here.
45	S. P	Input port for the self-program mode. This port changes to self-program mode from the clone mode when a "LOW" signal is applied here.
46	BAND	Input port for changing to VHF or UHF. This port is in VHF mode when it becomes "LOW."
47	DIMMER	Input port for the dimmer control signal. The luminescence changes one by one when it becomes "LOW."
48	HANG	Input port for TSQL and DTCS. When a "HIGH" signal is applied here, the CPU changes to stand-by mode. When a "LOW" signal is applied here, the CPU is opened.
50	LBUSY	Input port for the BUSY signal of the LCD driver.
51	BEEP	Output port for the beep tone signal.
52	TRF	Input port for "TX" INDICATOR. The indicator appears on the LCD when this port is "HIGH."
53	PTT2	Input port for the transmit signal. This port transmits the data when the PTT1 port is "HIGH" and this port is "LOW."
54	MUTE1	Output port for muting an AF amplifier. It becomes "HIGH" when the speaker sound is muted.
55	MMUTE	Output port for muting a mic amplifier.
56	LRST	Outputs a reset signal for the LCD.
57	LC/D	Outputs a "LOW" signal when LCD data is sent out. Outputs a "HIGH" signal when an LCD command is sent out.
58	D1	Output for the dimmer control signal 1.
59	D2	Output for the dimmer control signal 2.
60	STB1	Outputs a strobe signal for a PLL-IC.
63	LCS	The CPU is in standby mode for LCD data when this port outputs a "LOW" signal.
64	LOW	This port becomes low when the [HI/LOW] switch is pushed. Outputs a "HIGH" signal when low power is transmitted.

3-4-2 PORT ALLOCATION (μPC78212GC)

NO	PIN	FUNC-TION	OPERATION	STAND-BY		TERMINAL NAME
			SETTING	SETTING	LOGIC SYMBOL	
00	54	O	O	O	L	MUTE1
01	55	O	O	O	L	MMUTE
02	56	O	O	O	L	LRST
03	57	O	O	O	L	LC/D
04	58	O	O	O	L	D1 (DIM)
05	59	O	O	O	L	D2 (DIM)
06	60	O	O	O	L	STB1
07	61	O	O	O	L	

20	28	I	I	I	--	P20
21	29	I	I	I	--	STBY
22	30	I	I	I	--	DCK
23	31	I	I	I	--	DUP
24	32	I	I	I	--	DDWN
25	33	I	I	I	--	SQLS
26	34	I	I	I	--	UNLK
27	35	I	I	I	--	DOUT

30	36	IO	I	I	--	PTT1
31	37	IO	O	O	L	CPO
32	38	IO	O	O	L	CK
33	39	IO	O	O	L	DATA
34	50	IO	I	I	--	LBUSY
35	51	IO	O	O	L	BEEP
36	52	IO	I	I	--	TRF
37	53	IO	I	I	--	PTT2

40	26	IO	O	O	L	P40
41	25	IO	O	O	L	P41
42	23	IO	O	O	L	P42
43	22	IO	O	O	L	P43
44	21	IO	O	O	L	P44
45	20	IO	O	O	L	P45
46	19	IO	O	O	L	P46
47	18	IO	O	O	L	P40

50	17	IO	O	O	L	P50
51	16	IO	O	O	L	P51
52	15	IO	O	O	L	P52
53	14	IO	O	O	L	P53
54	13	IO	O	O	L	P54
55	12	IO	O	O	L	P55
56	11	IO	O	O	L	P56
57	10	IO	O	O	L	P57

60	5	O	O	O	L	STB2
61	4	O	O	O	L	STB3
62	3	O	O	O	L	OPC
63	2	O	O	O	L	RXC
64	1	IO	O	O	L	TXC
65	64	IO	O	O	L	LOW
66	63	IO	O	O	L	LCS
67	62	IO	O	O	L	

70	49	I	I	I	--	P70
71	48	I	I	I	--	HANG
72	47	I	I	I	--	DIMMER
73	46	I	I	I	--	BAND
74	45	I	I	I	--	S. P
75	44	I	I	I	--	CL

3-4-3 CONTROL AND BUFFER CIRCUIT (LOGIC UNIT)

CPU POWER SUPPLY

Q10 and Q11 function as a power supply switch for IC2 (CPU). When 5 V is supplied from the MAIN unit, Q10 and Q11 turn ON and supply 5 V to IC2.

During backup, Q10 turns OFF to prevent the battery current (BT1) from flowing to anything other than IC2.

CLONE BUFFER

Q7 and Q8 constitute a PTT buffer circuit and function as a clone input. The input/output are arranged to be in-phase.

Q5 and Q6 constitute a CPO buffer circuit and also function as a clone output that is in-phase for input and output.

Q4 is a HANG buffer circuit. Q4 ~ Q8's function is protection against the outside (MIC, etc.).

BEEP TONE

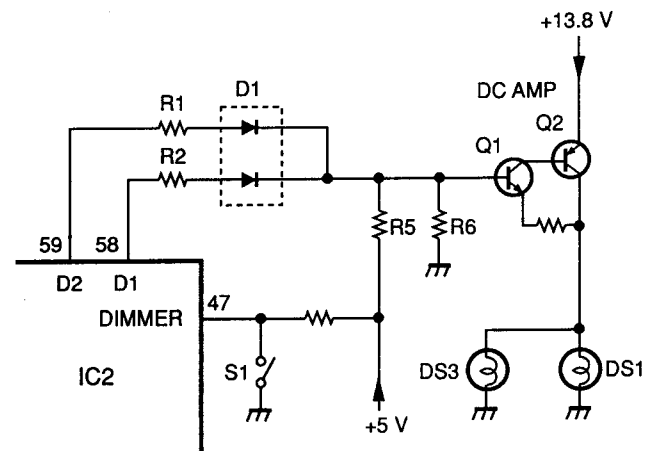
The beep signal from IC2 (pin 51) is applied to the AF power amplifier via the [VOLUME] control. While a beep sounds, the CPU cuts the audio using the "MUTE1" port (pin 54).

3-4-4 DIMMER CIRCUIT (LOGIC UNIT)

Each time S1 is turned ON, IC2's "DIMMER" port (pin 47) becomes "LOW" and the "D1" port (pin 58) and "D2" port (pin 59) are sequentially set "HIGH." The voltage from R1, R2, R5 and R6 is applied to the input (Q1 base) of the DC amplifier (Q1, Q2). The output (Q2 collector) of the DC amplifier supplies the voltage corresponding to the input to DS1 and DS3 to adjust the illumination.

Level 3 is brightest.

Level	0	1	2	3
DM1	L	H	L	H
DM2	L	L	H	H

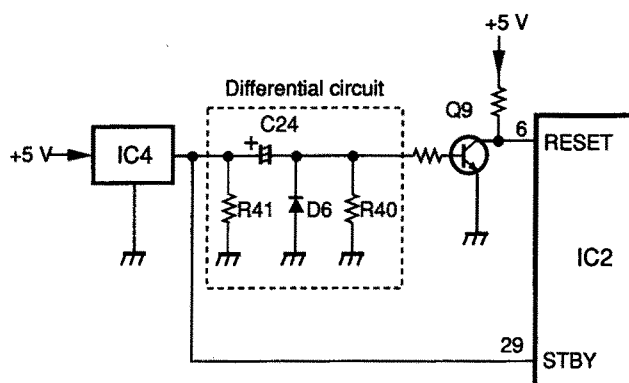


3-4-5 CPU RESET CIRCUIT (LOGIC UNIT)

The resetting IC (IC4) sets the CPU to the operating mode when turning power ON and sets it to the backup mode when turning power OFF.

When turning power ON, voltages in the 5 V line increase. When the voltages exceed the IC4 reference voltage, IC4 outputs "HIGH." The signal switches Q9, for a period determined by the differential (R40, R41, C24, D6), to set the CPU to the operating mode.

When turning power OFF, IC4 applies "LOW" to the "STB5" port of the CPU thus setting the CPU to the backup mode.



3-4-6 AUTO MEMORY CHANNEL TABLE

CH NO	RECEIVING FREQUENCY (MHz)	TRANSMITTING OFF-SET FREQUENCY (MHz)	RECEIVING TONE	TRANSMITTING TONE	TRANSMITTING POWER
1	150.100	-0.100	OFF	OFF	High
2	161.900	+0.100	OFF	OFF	High
3	173.900	+0.100	OFF	OFF	High
4	150.100	-0.100	DTCS 023	DTCS 023	Low
5	161.900	+0.100	DTCS 023	DTCS 023	Low
6	173.900	+0.100	DTCS 023	DTCS 023	Low
7	150.100	-0.100	CTCSS 67 Hz	CTCSS 67 Hz	High
8	150.100	-0.100	CTCSS 250.3 Hz	CTCSS 250.3 Hz	High
9	161.900	+0.100	CTCSS 88.5 Hz	CTCSS 88.5 Hz	High
10	173.900	+0.100	CTCSS 67 Hz	CTCSS 67 Hz	High
11	173.900	+0.100	CTCSS 250.3 Hz	CTCSS 250.3 Hz	High

3-5 POWER REGULATOR CIRCUIT

When the [POWER] switch on the front panel is turned ON, Q20 and Q30 in the MAIN unit activate and supply 13.8 V to each power source circuit.

IC6 is a 3-terminal regulator which produces +5 V. The current amplifier (Q26, Q27) amplifies this reference voltage to supply each circuit.

IC5 is +9 V regulator and its output is used as the reference voltage for the T8 and R8 voltage lines.

HV	External power from the DC power connector.
13.8 V	13.8 V DC from the [VOL] switch.
5 V	Common 5 V converted from the 13.8 V line at Q27. Common 5 V converted from the 13.8 V line at IC6.
8 V	Common 8 V converted from the 13.8 V line at Q22.
T8	Transmit 8 V converted from the 13.8 V line at Q17.
R8	Receive 8 V converted from the 13.8 V line at Q24.

SECTION 4 MECHANICAL PARTS AND DISASSEMBLY

4-1 FRONT PANEL AND CHASSIS PARTS

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8210007330	Front panel (includes window panel)	1
②	8610006500	Knob N-154 [MAIN DIAL]	1
③	8610007390	Button N-178 [POWER]	1
④	8610007380	Button N-179 [DIMMER]	1
⑤	8610006490	Knob N-153 [VOL, SQL]	2
⑥	8810002160	Screw FH M3 x 5	4
⑦	8930017960	Spring	2
⑧	8930017690	LCD rubber	1
⑨	8930020000	LCD holder	1
⑩	5030000710	LCD LD-BU5185E (E-5407)	1
⑪	8930021510	LCD contact strip SRCN-943W	1
⑫	8930017500	LCD filter	1
⑬	8010010780	LCD reflector	1
⑭	8810003150	Screw PH M3 x 5	3
⑮	8510007100	LOGIC shield	1
⑯	8010009830	835 chassis	1
⑰	8930020650	AF-IC slider	1

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
⑱	8930020800	976 TR-slider	1
⑲	8930020970	833 speaker holder	1
⑳	2510000470	Speaker EAS-6P100SA	1
㉑	8110004740	Top cover (incl. ⑲, ⑳)	1
㉒	8810006230	Screw FH M2.6 x 4 ZK	4
㉓	8810002480	Screw FH M3 x 6 BS ZK	8
㉔	6510005150	Pin LLM61T-2.0 (included in ㉑)	2
㉕	6510013250	Connector LR-02-1V (included in ㉑)	1
㉖	6950000180	Connector cover (included in ㉑)	1
㉗	8900002640	Power supply cable OPC-250	1
㉘	8810001900	Screw PH M3 x 5 BS Ni	4
㉙	8510006440	ANT plate	1
㉚	8900002450	ANT cable OPC-223	1
㉛	6950000040	M-type cap (Black)	1
㉜	8810003250	Screw PH M3 x 8 Ni	2
㉝	8810001350	Screw B0 M3 x 6	5
㉞	8110004730	Bottom cover	1

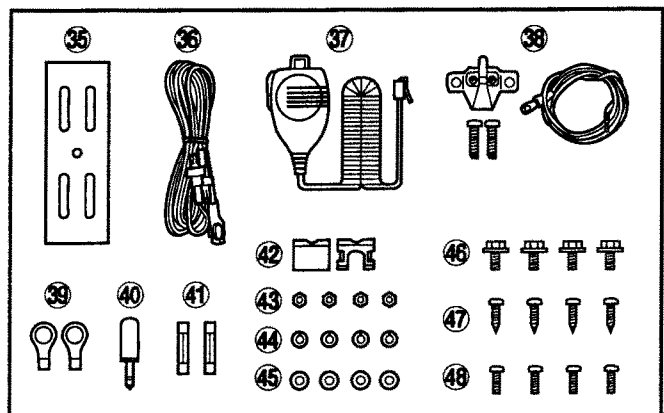
Screw abbreviations PH: Pan head FH: Flat head

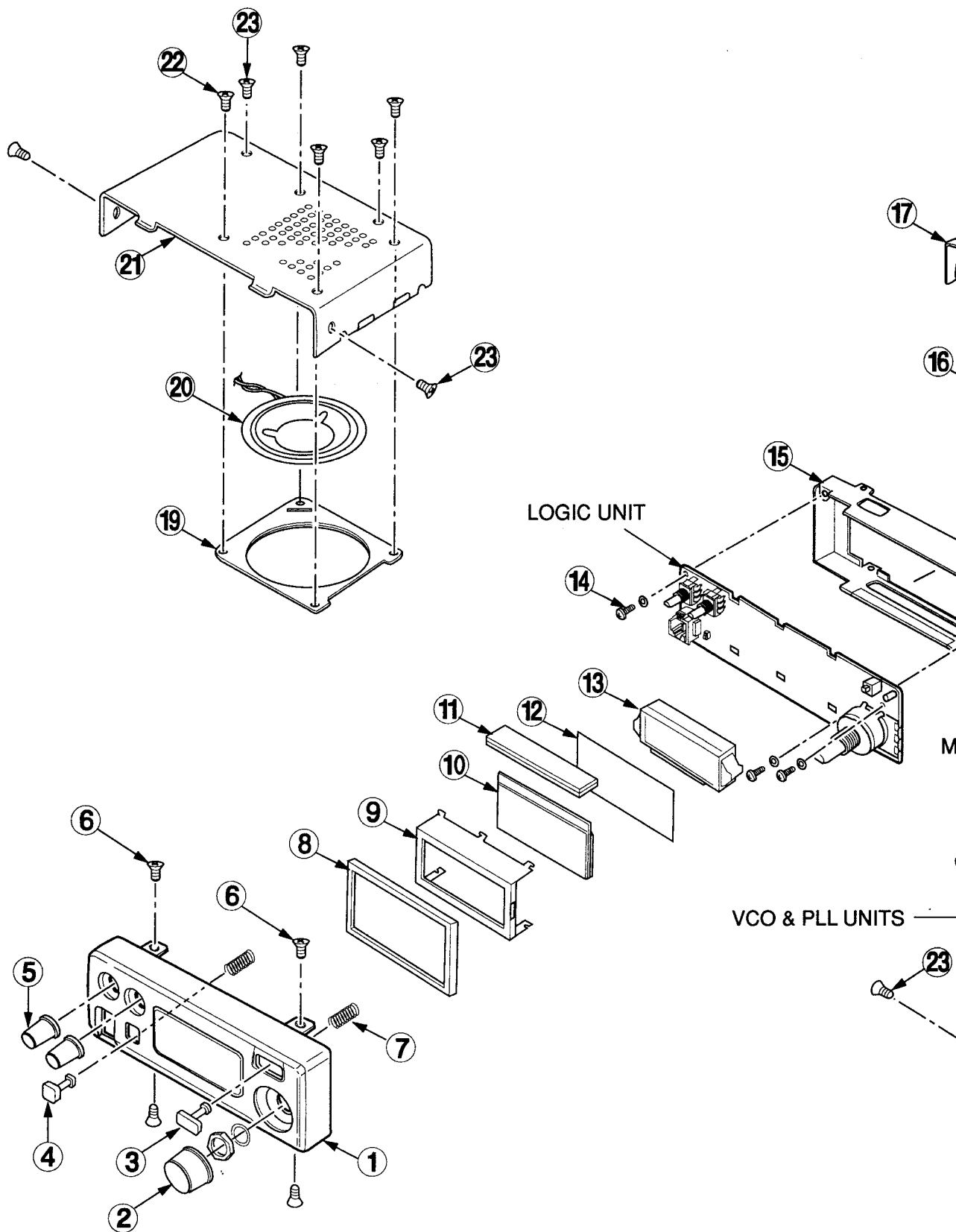
B0: Self-tapping screw ZK: Black Ni: Nickel

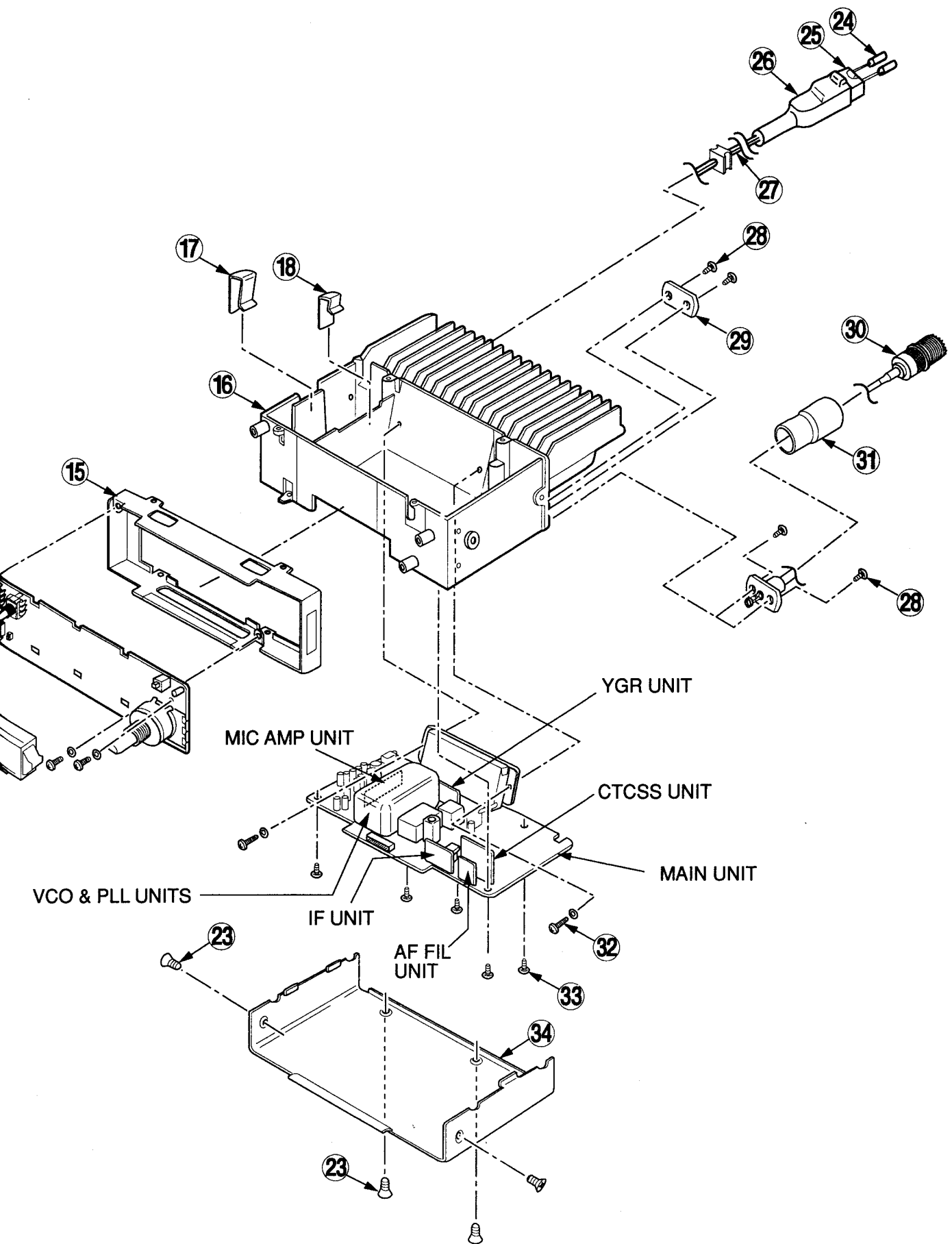
4-2 ACCESSORIES

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
㉟	8010005180	Mounting bracket	1
㊱	Optional	DC power code (OPC-044B)	1
㊲	Optional	EM-65 microphone	1
㊳	8930007610	Microphone hanger set	1
㊴	6510003070	Cable lugs R5.5-8	2
㊵	5610000020	External speaker plug (3.5 ϕ)	1
㊶	5210000120	Fuse FGB 15 A	2
㊷	8930020700	Microphone connector covers set	1
㊸	8830000120	Nut M5	4
㊹	8850000390	Spring washer M5	4
㊺	8850000150	Flat washer M5 Ni BS	4
㊻	8820000530	Mounting bolt	4

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
㊼	8810000950	Screw PH A0 M5 x 16	4
㊽	8810000470	Screw PH M5 x 12 (+ -)	4







SECTION 5 PARTS LIST

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	6910005740	IC	CB424M1R
IC2	1150001040	IC	S-AV21H / SC1188
IC3	1110002210	S.IC	TA75358CF(TP1)
IC4	1110000960	S.IC	NJM4558M(T1)
IC5	1110002510	S.IC	AN8009M-(E1)
IC6	1180000620	IC	TA78L05S
IC7	1110002550	IC	TA7252AP
Q1	1560000430	S.FET	2SK302-GR (TE85R)
Q2	1560000670	S.FET	2SK1771 (TE85R)
Q3	1580000490	S.FET	3SK166-2-T7
Q5	1530002050	S.TRANSISTOR	2SC3661-TA
Q6	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q7	1560000360	S.FET	2SK209-Y (TE85R)
Q8	1520000380	TRANSISTOR	2SB1143 S
Q9	1590000630	S.TRANSISTOR	RN1403 (TE85R)
Q10	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q11	1530001940	S.TRANSISTOR	2SC2712-BL (TE85R)
Q12	1590000520	S.FET	2SJ106-GR (TE85R)
Q13	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q14	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q15	1530002360	S.TRANSISTOR	2SC2714-Y (TE85R)
Q16	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q17	1520000450	S.TRANSISTOR	2SB1132 T100 Q
Q18	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q19	1520000080	TRANSISTOR	2SB909M R
Q20	1540000390	TRANSISTOR	2SD1474 P
Q21	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q22	1520000380	TRANSISTOR	2SB1143 S
Q23	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q24	1520000450	S.TRANSISTOR	2SB1132 T100 Q
Q25	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q26	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q27	1520000080	TRANSISTOR	2SB909M R
Q28	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q29	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q30	1590001000	S.TRANSISTOR	RN2427 (TE85R)
D2	1790000640	S.VARICAP	MA363B(TX)
D3	1790000640	S.VARICAP	MA363B(TX)
D4	1790000640	S.VARICAP	MA363B(TX)
D5	1790000640	S.VARICAP	MA363B(TX)
D6	1710000730	S.DIODE	MI809-T11
D8	1710000730	S.DIODE	MI809-T11
D9	1710000310	DIODE	MI407
D10	1790000490	S.DIODE	HSM88AS-TR
D11	1790000490	S.DIODE	HSM88AS-TR
D12	1750000060	S.DIODE	1SS196 (TE85R)
D13	1790000450	S.DIODE	MA862(TX)
D14	1790000700	DIODE	DSA3A1
D15	1750000040	S.DIODE	1SS190 (TE85R)
D16	1750000040	S.DIODE	1SS190 (TE85R)
D17	1750000020	S.DIODE	1SS184 (TE85R)
D18	1750000060	S.DIODE	1SS196 (TE85R)
X1	6050007730	CRYSTAL	CR-362 NTO-781C 12.8MHz
Fl1	2010000200	FILTER	21M15B3 (FL-42)

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6150002720	COIL	LS-297
L2	6150003160	COIL	LS-332
L3	6150003140	COIL	LS-330
L4	6200000440	S.COIL	MLF3216A 1R5M-T
L5	6150003820	COIL	LS-440
L6	6150003820	COIL	LS-440
L7	6150003820	COIL	LS-440
L8	6150003820	COIL	LS-440
L9	6110001550	COIL	LA-235
L10	6110001610	COIL	LA-244
L11	6110001540	COIL	LA-234
L12	6110001550	COIL	LA-235
L13	6110001550	COIL	LA-235
L14	6170000230	COIL	LW-25
L15	6200000760	S.COIL	LQN 2A 56NM
L16	6110002150	COIL	LA-385
L17	6170000230	COIL	LW-25
L18	6200000780	S.COIL	LQH 3N 100K
L19	6200000720	S.COIL	LQN 2A 10NM
R2	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R3	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R4	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R5	7030000200	S.RESISTOR	MCR10EZHZ 33 Ω (330)
R6	7030000520	S.RESISTOR	MCR10EZHZ 15 kΩ (153)
R7	7030000530	S.RESISTOR	MCR10EZHZ 18 kΩ (183)
R8	7030000330	S.RESISTOR	MCR10EZHZ 390 Ω (391)
R9	7030000170	S.RESISTOR	MCR10EZHZ 18 Ω (180)
R10	7030000330	S.RESISTOR	MCR10EZHZ 390 Ω (391)
R11	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R12	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R13	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R14	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R15	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R16	7030000140	S.RESISTOR	MCR10EZHZ 10 Ω (100)
R17	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R18	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R19	7030000290	S.RESISTOR	MCR10EZHZ 180 Ω (181)
R20	7030000590	S.RESISTOR	MCR10EZHZ 56 kΩ (563)
R21	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R22	7030000560	S.RESISTOR	MCR10EZHZ 33 kΩ (333)
R23	7030000570	S.RESISTOR	MCR10EZHZ 39 kΩ (393)
R24	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R25	7030001630	S.RESISTOR	MCR10EZHZ 3.3 MΩ (335)
R26	7030000520	S.RESISTOR	MCR10EZHZ 15 kΩ (153)
R27	7030000370	S.RESISTOR	MCR10EZHZ 820 Ω (821)
R28	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R29	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R31	7030000520	S.RESISTOR	MCR10EZHZ 15 kΩ (153)
R32	7030000370	S.RESISTOR	MCR10EZHZ 820 Ω (821)
R33	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R34	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R35	7030000280	S.RESISTOR	MCR10EZHZ 150 Ω (151)
R36	7030000280	S.RESISTOR	MCR10EZHZ 150 Ω (151)
R37	7030000490	S.RESISTOR	MCR10EZHZ 8.2 kΩ (822)
R38	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R39	7030000390	S.RESISTOR	MCR10EZHZ 1.2 kΩ (122)
R40	7030000410	S.RESISTOR	MCR10EZHZ 1.8 kΩ (182)
R41	7030000500	S.RESISTOR	MCR10EZHZ 10 kΩ (103)
R42	7030000510	S.RESISTOR	MCR10EZHZ 12 kΩ (123)
R43	7030000660	S.RESISTOR	MCR10EZHZ 220 kΩ (224)
R44	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R45	7010004660	RESISTOR	R50XJ 15 Ω

S. = Surface mount

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION
R46	7030001690	S.RESISTOR MCR18EZHZ 220 Ω (221)
R49	7010004770	RESISTOR R50XJ 330 Ω
R50	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R52	7030000140	S.RESISTOR MCR10EZHZ 10 Ω (100)
R53	7010004730	RESISTOR R50XJ 120 Ω
R54	4610001230	TRIMMER EVM-LGGA00 B14 (103)
R55	4610001020	TRIMMER EVM-LGGA00 B24 (203)
R56	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R57	7030000560	S.RESISTOR MCR10EZHZ 33 kΩ (333)
R58	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R59	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R60	7030000420	S.RESISTOR MCR10EZHZ 2.2 kΩ (222)
R61	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R62	7030000520	S.RESISTOR MCR10EZHZ 15 kΩ (153)
R63	7030000620	S.RESISTOR MCR10EZHZ 100 kΩ (104)
R64	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R65	7030000670	S.RESISTOR MCR10EZHZ 270 kΩ (274)
R66	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R67	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R68	7030000440	S.RESISTOR MCR10EZHZ 3.3 kΩ (332)
R69	7030000420	S.RESISTOR MCR10EZHZ 2.2 kΩ (222)
R70	7030000300	S.RESISTOR MCR10EZHZ 220 Ω (221)
R71	7030000680	S.RESISTOR MCR10EZHZ 330 kΩ (334)
R72	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R73	7030000620	S.RESISTOR MCR10EZHZ 100 kΩ (104)
R74	7030000560	S.RESISTOR MCR10EZHZ 33 kΩ (333)
R75	4610001040	TRIMMER EVM-LGGA00 B54 (503)
R76	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R77	7030000610	S.RESISTOR MCR10EZHZ 82 kΩ (823)
R78	7030000550	S.RESISTOR MCR10EZHZ 27 kΩ (273)
R79	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R80	7030000620	S.RESISTOR MCR10EZHZ 100 kΩ (104)
R81	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R82	4610001040	TRIMMER EVM-LGGA00 B54 (503)
R83	7030000490	S.RESISTOR MCR10EZHZ 8.2 kΩ (822)
R84	7030000220	S.RESISTOR MCR10EZHZ 47 Ω (470)
R85	7030003850	S.RESISTOR MCR10EZHFX 20 kΩ (203)
R86	7030000600	S.RESISTOR MCR10EZHZ 68 kΩ (683)
R87	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R88	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R89	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R90	7030000720	S.RESISTOR MCR10EZHZ 680 kΩ (684)
R91	7030000540	S.RESISTOR MCR10EZHZ 22 kΩ (223)
R92	7030000580	S.RESISTOR MCR10EZHZ 47 kΩ (473)
R93	4610001560	TRIMMER EVM-LGGA00 B35 (304)
R94	7030000620	S.RESISTOR MCR10EZHZ 100 kΩ (104)
R95	7030000580	S.RESISTOR MCR10EZHZ 47 kΩ (473)
R96	7030000580	S.RESISTOR MCR10EZHZ 47 kΩ (473)
R97	7030000530	S.RESISTOR MCR10EZHZ 18 kΩ (183)
R98	7030000550	S.RESISTOR MCR10EZHZ 27 kΩ (273)
R99	4610001230	TRIMMER EVM-LGGA00 B14 (103)
R100	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R101	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R102	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R103	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R104	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R105	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R106	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R107	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R108	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R109	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R110	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R111	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R112	7030000420	S.RESISTOR MCR10EZHZ 2.2 kΩ (222)
R114	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R115	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R116	7030000430	S.RESISTOR MCR10EZHZ 2.7 kΩ (272)
R117	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R118	7030000380	S.RESISTOR MCR10EZHZ 1 kΩ (102)
R119	7030000540	S.RESISTOR MCR10EZHZ 22 kΩ (223)
R120	7030000700	S.RESISTOR MCR10EZHZ 470 kΩ (474)
R121	7030000610	S.RESISTOR MCR10EZHZ 82 kΩ (823)

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION
R122	7030000660	S.RESISTOR MCR10EZHZ 220 kΩ (224)
R123	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R124	7030000740	S.RESISTOR MCR10EZHZ 1 MΩ (105)
R125	4610001110	TRIMMER EVM-LGGA00 B15 (104)
R126	7030000660	S.RESISTOR MCR10EZHZ 220 kΩ (224)
R128	7030000180	S.RESISTOR MCR10EZHZ 22 Ω (220)
R129	7030000260	S.RESISTOR MCR10EZHZ 100 Ω (101)
R130	7030000250	S.RESISTOR MCR10EZHZ 82 Ω (820)
R131	7030000140	S.RESISTOR MCR10EZHZ 10 Ω (100)
R132	7030000210	S.RESISTOR MCR10EZHZ 39 Ω (390)
R134	7030000460	S.RESISTOR MCR10EZHZ 4.7 kΩ (472)
R135	7030000560	S.RESISTOR MCR10EZHZ 33 kΩ (333)
R136	7030000580	S.RESISTOR MCR10EZHZ 47 kΩ (473)
R137	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R138	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R139	7030000500	S.RESISTOR MCR10EZHZ 10 kΩ (103)
R140	7030000340	S.RESISTOR MCR10EZHZ 470 Ω (471)
R141	7030000300	S.RESISTOR MCR10EZHZ 220 Ω (221)
R142	7030000410	S.RESISTOR MCR10EZHZ 1.8 kΩ (182)
R143	7030000620	S.RESISTOR MCR10EZHZ 100 kΩ (104)
R144	7030000590	S.RESISTOR MCR10EZHZ 56 kΩ (563)
R145	7030000540	S.RESISTOR MCR10EZHZ 22 kΩ (223)
C1	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C2	4030005110	S.CERAMIC C2012 JB 1E 473K-T-A
C3	4030004750	S.CERAMIC C2012 JB 1H 103K-T-A
C5	4030004430	S.CERAMIC C2012 SL 1H 060D-T-A
C7	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C8	4030005090	S.CERAMIC C2012 JB 1H 223K-T-A
C9	4030004750	S.CERAMIC C2012 JB 1H 103K-T-A
C10	4030004520	S.CERAMIC C2012 SL 1H 220J-T-A
C11	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C12	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C13	4030004450	S.CERAMIC C2012 SL 1H 080D-T-A
C14	4030004500	S.CERAMIC C2012 SL 1H 180J-T-A
C16	4030004370	S.CERAMIC C2012 SL 1H 0R5C-T-A
C17	4030004370	S.CERAMIC C2012 SL 1H 0R5C-T-A
C18	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C20	4030004500	S.CERAMIC C2012 SL 1H 180J-T-A
C21	4030004400	S.CERAMIC C2012 SL 1H 030C-T-A
C22	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C23	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C24	4030004530	S.CERAMIC C2012 SL 1H 270J-T-A
C25	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C27	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C28	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C29	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C30	4030004400	S.CERAMIC C2012 SL 1H 030C-T-A
C31	4030004520	S.CERAMIC C2012 SL 1H 220J-T-A
C32	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C33	4030004420	S.CERAMIC C2012 SL 1H 050C-T-A
C34	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C35	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C36	4030004380	S.CERAMIC C2012 SL 1H 010C-T-A
C37	4030004480	S.CERAMIC C2012 SL 1H 120J-T-A
C38	4010003930	CERAMIC DD06 SL 270K 500V
C39	4010004120	CERAMIC DD07 B 102K 500V
C42	4030003150	S.MICA UC232H 0220F
C43	4030003150	S.MICA UC232H 0220F
C44	4010003890	CERAMIC DD06 SL 180K 500V
C45	4010003890	CERAMIC DD06 SL 180K 500V
C46	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C47	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C48	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C49	4010003870	CERAMIC DD06 SL 120K 500V
C50	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C51	4030004520	S.CERAMIC C2012 SL 1H 220J-T-A
C52	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C53	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C54	4510002740	ELECTROLYTIC 10 SS 220 μF
C55	4510003040	ELECTROLYTIC 16 SS 100 μF

S. = Surface mount

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION
C56	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C57	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C58	4030004520	S.CERAMIC C2012 SL 1H 220J-T-A
C59	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C60	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C61	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C62	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C63	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C64	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C65	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C66	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C67	4030004400	S.CERAMIC C2012 SL 1H 030C-T-A
C68	4030004500	S.CERAMIC C2012 SL 1H 180J-T-A
C69	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C70	4550000260	TANTALUM DN 1V 100M
C71	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C73	4550001030	S.TANTALUM TESVD 1E 106M-12L
C74	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C75	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C76	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C77	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C78	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C79	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C80	4510001100	ELECTROLYTIC 16 MS7 10 μF
C81	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C82	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C83	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C84	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C85	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C86	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C87	4550000340	TANTALUM DN 1C 100M
C88	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C89	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C90	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C91	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C92	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C93	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C94	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C95	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C96	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C97	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C98	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C99	4550000010	TANTALUM DN 1C 4R7M
C100	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C101	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C102	4030004820	S.CERAMIC C2012 CH 1H 050C-T-A
C103	4030004390	S.CERAMIC C2012 SL 1H 020C-T-A
C104	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C105	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C106	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C107	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C108	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C109	4550003030	S.TANTALUM TEMSVA 0J 475M-8L
C110	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C111	4510001100	ELECTROLYTIC 16 MS7 10 μF
C112	4510002720	ELECTROLYTIC 10 SS 47 μF
C113	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C115	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C116	4550000450	S.TANTALUM TESVC 1C 106M-12L
C117	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C118	4510002780	ELECTROLYTIC 16 SS 10 μF
C119	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C120	4510002780	ELECTROLYTIC 16 SS 10 μF
C121	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C122	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C123	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C124	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C125	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C126	4550002120	TANTALUM DN 1C 220M
C127	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C128	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C129	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION
C130	4030004570	S.CERAMIC C2012 SL 1H 470J-T-A
C131	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C132	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C133	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C134	4510002780	ELECTROLYTIC 16 SS 10 μF
C135	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C136	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C137	4510002780	ELECTROLYTIC 16 SS 10 μF
C138	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C139	4510002780	ELECTROLYTIC 16 SS 10 μF
C140	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C141	4510002780	ELECTROLYTIC 16 SS 10 μF
C142	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C143	4510002720	ELECTROLYTIC 10 SS 47 μF
C144	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C145	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C146	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C147	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C148	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C149	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C150	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C151	4510002950	ELECTROLYTIC 50 SS 2R2 μF
C152	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C153	4510002940	ELECTROLYTIC 50 SS 1 μF
C154	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C155	4510002810	ELECTROLYTIC 16 SS 47 μF
C156	4510002810	ELECTROLYTIC 16 SS 47 μF
C157	4550000390	TANTALUM DN 1V R22M
C158	4510002810	ELECTROLYTIC 16 SS 47 μF
C159	4510004930	ELECTROLYTIC 16 YK 1000 μF
C160	4510002870	ELECTROLYTIC 25 SS 100 μF
C161	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C162	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C163	4030006450	S.CERAMIC C2012 JF 1H 103Z-T-A
C164	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C165	4010003880	CERAMIC DD06 SL 150K 500V
C166	4550003030	S.TANTALUM TEMSVA 0J 475M-8L
C167	4030004710	S.CERAMIC C2012 JB 1H 471K-T-A
C168	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C169	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C170	4550002770	S.TANTALUM TESVD2 1C 226M-12L
C171	4510002820	ELECTROLYTIC 16 SS 1000 μF
C172	4030005090	S.CERAMIC C2012 JB 1H 223K-T-A
C174	4030004720	S.CERAMIC C2012 JB 1H 102K-T-A
C175	4030004480	S.CERAMIC C2012 SL 1H 120J-T-A
W4	7030003970	S.JUMPER MCR18EZHZ JPW (000)
W6	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W7	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W8	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W9	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W10	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W14	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W15	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W17	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W18	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W19	7030000010	S.JUMPER MCR10EZHZ JPW (000)
W24	7120000010	JUMPER JPW 02A
DS1	5040000880	S.LED SLM-13MWS T97B
EP1	910033422	PCB B 2986B FX-975
EP13	6910000650	BEAD FSOH081RL
EP14	6910000650	BEAD FSOH081RL

S. = Surface mount

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130004930	S.IC	UPD7225GB-3B7
IC2	1140002660		UPD78212GC-509-AB8
IC3	1130004500	S.IC	TC4S11F (TE85R)
IC4	1110001500	S.IC	S-8054ALR-LN-T1
Q1	1530001940	S.TRANSISTOR	2SC2712-BL (TE85R)
Q2	1520000450	S.TRANSISTOR	2SB1132 T100 Q
Q4	1590000410	S.TRANSISTOR	RN2404 (TE85R)
Q5	1590000410	S.TRANSISTOR	RN2404 (TE85R)
Q6	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q7	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q8	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q9	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q10	1510000580	S.TRANSISTOR	2SA1362-GR (TE85R)
Q11	1590000420	S.TRANSISTOR	RN1404 (TE85R)
D1	1750000020	S.DIODE	1SS184 (TE85R)
D3	1750000030	S.DIODE	1SS187 (TE85R)
D4	1750000030	S.DIODE	1SS187 (TE85R)
D5	1750000030	S.DIODE	1SS187 (TE85R)
D6	1750000030	S.DIODE	1SS187 (TE85R)
D7	1750000030	S.DIODE	1SS187 (TE85R)
X1	6050006930	CRYSTAL	RF-4A3 FAT NKD (9.8304M)
R1	7030000510	S.RESISTOR	MCR10EZHZ 12 kΩ (123)
R2	7030000550	S.RESISTOR	MCR10EZHZ 27 kΩ (273)
R3	7030000350	S.RESISTOR	MCR10EZHZ 560 Ω (561)
R4	7030000430	S.RESISTOR	MCR10EZHZ 2.7 kΩ (272)
R5	7030000510	S.RESISTOR	MCR10EZHZ 12 kΩ (123)
R6	7030000470	S.RESISTOR	MCR10EZHZ 5.6 kΩ (562)
R7	7030000650	S.RESISTOR	MCR10EZHZ 180 kΩ (184)
R8	7030000500	S.RESISTOR	MCR10EZHZ 10 kΩ (103)
R9	7030000500	S.RESISTOR	MCR10EZHZ 10 kΩ (103)
R10	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R11	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R12	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R13	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R14	7030000520	S.RESISTOR	MCR10EZHZ 15 kΩ (153)
R15	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R17	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R18	7010004450	RESISTOR	R20J 100 kΩ
R19	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R20	7030000500	S.RESISTOR	MCR10EZHZ 10 kΩ (103)
R24	7030000500	S.RESISTOR	MCR10EZHZ 10 kΩ (103)
R25	7030000580	S.RESISTOR	MCR10EZHZ 47 kΩ (473)
R26	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R27	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R29	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R30	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R31	7030000500	S.RESISTOR	MCR10EZHZ 10 kΩ (103)
R32	7030000540	S.RESISTOR	MCR10EZHZ 22 kΩ (223)
R33	7030000430	S.RESISTOR	MCR10EZHZ 2.7 kΩ (272)
R34	7210002130	VARIABLE	RV-247 (RK09L1140) 10KB
R35	7210002120	VARIABLE	RV-246 (RK09L1140) 10KA
R36	7030000580	S.RESISTOR	MCR10EZHZ 47 kΩ (473)
R37	7030000580	S.RESISTOR	MCR10EZHZ 47 kΩ (473)
R38	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R39	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R40	7030000660	S.RESISTOR	MCR10EZHZ 220 kΩ (224)
R41	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R42	7030000540	S.RESISTOR	MCR10EZHZ 22 kΩ (223)
R43	7030000580	S.RESISTOR	MCR10EZHZ 47 kΩ (473)
R44	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R45	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R46	7010004770	RESISTOR	R50XJ 330 Ω

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R47	7030000530	S.RESISTOR	MCR10EZHZ 18 kΩ (183)
R48	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R49	7030000510	S.RESISTOR	MCR10EZHZ 12 kΩ (123)
R50	7030000520	S.RESISTOR	MCR10EZHZ 15 kΩ (153)
R51	7030000140	S.RESISTOR	MCR10EZHZ 10 Ω (100)
C1	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C2	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C3	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C4	4030004550	S.CERAMIC	C2012 SL 1H 330J-T-A
C5	4030004550	S.CERAMIC	C2012 SL 1H 330J-T-A
C6	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C7	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C8	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C9	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C10	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C11	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C12	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C14	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C15	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C16	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C17	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C18	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C19	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C20	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C21	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C22	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C23	4510002730	ELECTROLYTIC	10 SS 100 μF
C24	4550000270	S.TANTALUM	TESVA 1E 474M1-8L
C25	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C26	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C27	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C29	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C30	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C31	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C32	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
DS1	5080000150	LAMP	HRS-7219A
DS2	5030000710	LCD	LD-BU5185E (E-5407)
DS3	5080000150	LAMP	HRS-7219A
S1	2260001220	SWITCH	SW-114 (SKHLAK013A)
S2	2230000800	SWITCH	SW-112 (SPPH24)
S3	2250000080	ENCODER	EVQ-WQGF20 24B
BT1	3020000020	LITHIUM	BR2032-1T2
W1	7120000380	JUMPER	JPW 01 R-01
W2	7120000380	JUMPER	JPW 01 R-01
EP1	910030283	PCB	B 2988C (LOGIC FX976)
EP3	8930021510	LCD CONTACT	SRCN-943W

[PLL UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1140002210	S.IC	MB1504HPF-G-BND
Q1	1510000760	S.TRANSISTOR	2SA1312-BL (TE85L)
Q2	1530002860	S.TRANSISTOR	2SC3324-BL (TE85R)
Q3	1510000500	S.TRANSISTOR	2SA1162-GR (TE85R)

S. = Surface mount

[PLL UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
D1	1750000040	S.DIODE	1SS190 (TE85R)
L1	6180001410	COIL	LAL 02KR 100K
L2	6200000760	S.COIL	LQN 2A 56NM
R1	7030000540	S.RESISTOR	MCR10EZHZ 22 kΩ (223)
R2	7030000540	S.RESISTOR	MCR10EZHZ 22 kΩ (223)
R3	7030000420	S.RESISTOR	MCR10EZHZ 2.2 kΩ (222)
R4	7030000460	S.RESISTOR	MCR10EZHZ 4.7 kΩ (472)
R5	7030000740	S.RESISTOR	MCR10EZHZ 1 MΩ (105)
R6	7030000350	S.RESISTOR	MCR10EZHZ 560 Ω (561)
R7	7030000400	S.RESISTOR	MCR10EZHZ 1.5 kΩ (152)
R9	7030000540	S.RESISTOR	MCR10EZHZ 22 kΩ (223)
R12	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R13	7030000580	S.RESISTOR	MCR10EZHZ 47 kΩ (473)
R15	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R16	7030000420	S.RESISTOR	MCR10EZHZ 2.2 kΩ (222)
C1	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C2	4550002460	TANTALUM	DN 1V 3R3M
C4	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
C5	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C6	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C7	4510001890	ELECTROLYTIC	50 MS5 0R1μF
C9	4030004520	S.CERAMIC	C2012 SL 1H 220J-T-A
C10	4030004520	S.CERAMIC	C2012 SL 1H 220J-T-A
C15	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C17	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C19	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C20	4550002430	TANTALUM	DN 1V R33M
W1	7030000010	S.JUMPER	MCR10EZHZ JPW (000)
W2	7030000010	S.JUMPER	MCR10EZHZ JPW (000)
W3	7030000010	S.JUMPER	MCR10EZHZ JPW (000)
EP1	910028512	PCB	B 2839B PLL (FX976)

[VCO UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R1	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R2	7030000340	S.RESISTOR	MCR10EZHZ 470 Ω (471)
R3	7030000610	S.RESISTOR	MCR10EZHZ 82 kΩ (823)
R4	7030000530	S.RESISTOR	MCR10EZHZ 18 kΩ (183)
R5	7030000220	S.RESISTOR	MCR10EZHZ 47 Ω (470)
R6	7030000150	S.RESISTOR	MCR10EZHZ 12 Ω (120)
R7	7030000180	S.RESISTOR	MCR10EZHZ 22 Ω (220)
R8	7030000200	S.RESISTOR	MCR10EZHZ 33 Ω (330)
R9	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R10	7030000460	S.RESISTOR	MCR10EZHZ 4.7 kΩ (472)
R11	7030000360	S.RESISTOR	MCR10EZHZ 680 Ω (681)
R12	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R13	7030000160	S.RESISTOR	MCR10EZHZ 15 Ω (150)
R14	7030000160	S.RESISTOR	MCR10EZHZ 15 Ω (150)
R15	7030000160	S.RESISTOR	MCR10EZHZ 15 Ω (150)
R16	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R17	7030000460	S.RESISTOR	MCR10EZHZ 4.7 kΩ (472)
R18	7030000360	S.RESISTOR	MCR10EZHZ 680 Ω (681)
R19	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R20	7030000460	S.RESISTOR	MCR10EZHZ 4.7 kΩ (472)
R21	7030000360	S.RESISTOR	MCR10EZHZ 680 Ω (681)
C1	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C2	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C3	4550000340	TANTALUM	DN 1C 100M
C4	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
C5	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C6	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
C7	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C8	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C9	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C10	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C11	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C12	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C13	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C14	4030004370	S.CERAMIC	C2012 SL 1H 0R5C-T-A
C15	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C16	4030004490	S.CERAMIC	C2012 SL 1H 150J-T-A
C17	4030004490	S.CERAMIC	C2012 SL 1H 150J-T-A
C18	4030004490	S.CERAMIC	C2012 SL 1H 150J-T-A
C19	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C20	4030004470	S.CERAMIC	C2012 SL 1H 100D-T-A
C21	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C22	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
EP1	910032822	PCB	B 3278B VCO (FX975)

[VCO UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1560000650	S.FET	2SK1577-2-T7
Q2	1530002030	S.TRANSISTOR	2SC3772-3-TA
Q3	1530002030	S.TRANSISTOR	2SC3772-3-TA
Q4	1530002030	S.TRANSISTOR	2SC3772-3-TA
D1	1720000220	S.VARICAP	1SV166-T2B
D2	1720000220	S.VARICAP	1SV166-T2B
D3	1720000220	S.VARICAP	1SV166-T2B
D4	1720000220	S.VARICAP	1SV166-T2B
L1	6180001940	COIL	LAL 02NA 3R3K
L2	6130001870	COIL	LB-201
L3	6180002540	COIL	LAL 02NA 470K
L4	6180001940	COIL	LAL 02NA 3R3K
L5	6200000260	S.COIL	LQN 2A R10K
L6	6200000260	S.COIL	LQN 2A R10K
L7	6200000260	S.COIL	LQN 2A R10K

[MIC AMP UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002850	S.IC	BA14741F-T1
Q1	1590000520	S.FET	2SJ106-GR (TE85R)
Q2	1590000520	S.FET	2SJ106-GR (TE85R)
R1	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R2	7030000380	S.RESISTOR	MCR10EZHZ 1 kΩ (102)
R3	7030000620	S.RESISTOR	MCR10EZHZ 100 kΩ (104)
R4	7030000560	S.RESISTOR	MCR10EZHZ 33 kΩ (333)
R5	7030000490	S.RESISTOR	MCR10EZHZ 8.2 kΩ (822)
R6	7030001600	S.RESISTOR	MCR10EZHZ 1.2 MΩ (125)
R7	7030001600	S.RESISTOR	MCR10EZHZ 1.2 MΩ (125)
R8	7030000410	S.RESISTOR	MCR10EZHZ 1.8 kΩ (182)

S. = Surface mount

[MIC AMP UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R9	7030000490	S.RESISTOR	MCR10EZHZJ 8.2 kΩ (822)
R10	7030000660	S.RESISTOR	MCR10EZHZJ 220 kΩ (224)
R12	7030000570	S.RESISTOR	MCR10EZHZJ 39 kΩ (393)
R16	7030000570	S.RESISTOR	MCR10EZHZJ 39 kΩ (393)
R17	7030000570	S.RESISTOR	MCR10EZHZJ 39 kΩ (393)
R18	7030000380	S.RESISTOR	MCR10EZHZJ 1 kΩ (102)
R19	7030000260	S.RESISTOR	MCR10EZHZJ 100 Ω (101)
C1	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C2	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C3	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C4	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C5	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C6	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C7	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C8	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C9	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C10	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C11	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C12	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C15	4030004730	S.CERAMIC	C2012 JB 1H 222K-T-A
C17	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C18	4030004620	S.CERAMIC	C2012 SL 1H 121J-T-A
W1	7030000010	S.JUMPER	MCR10EZHZJ JPW (000)
EP1	910035192	PCB	B 2972B (FX975-1)
EP2	6910003330	LEADFRAM	PD2.0-0.9-8

[AF FIL UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C14	4030004640	S.CERAMIC	C2012 SL 1H 181J-T-A
C15	4030005080	S.CERAMIC	C2012 JB 1H 332K-T-A
C16	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C17	4510001100	ELECTROLYTIC	16 MS7 10 μF
C18	4510001160	ELECTROLYTIC	50 MS7 1 μF
W1	7030000010	S.JUMPER	MCR10EZHZJ JPW (000)
EP1	910035201	PCB	B 2977A AF FIL (FX975-1)
EP2	6910003330	LEADFRAM	PD2.0-0.9-8

[YGR UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002240	S.TRANSISTOR	2SC3775-3-TA
Q2	1530002340	S.TRANSISTOR	2SC2954-T2B
D1	1750000070	S.DIODE	1SS226 (TE85R)
D2	1750000060	S.DIODE	1SS196 (TE85R)
L1	6200000120	S.COIL	LQN 2A 39NM
L2	6200000910	S.COIL	LQN 2A 82NM
L3	6200000110	S.COIL	LQN 2A 33NM
L4	6200000770	S.COIL	LQN 2A 68NM
R1	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R2	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R3	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R4	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R6	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
C1	4030006660	S.CERAMIC	C1608 SL 1H 220J-T-A
C2	4030006540	S.CERAMIC	C1608 SL 1H 030C-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006610	S.CERAMIC	C1608 SL 1H 100D-T-A
C6	4030006690	S.CERAMIC	C1608 SL 1H 330J-T-A
C7	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C11	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
W1	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	910032950	PCB	B 3048 (FX-975-1)
EP2	6910003330	LEADFRAM	PD2.0-0.9-8

[AF FIL UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002530	S.IC	TA75902F(TP1)
R1	7030000660	S.RESISTOR	MCR10EZHZJ 220 kΩ (224)
R2	7030000580	S.RESISTOR	MCR10EZHZJ 47 kΩ (473)
R3	7030000580	S.RESISTOR	MCR10EZHZJ 47 kΩ (473)
R4	7030000500	S.RESISTOR	MCR10EZHZJ 10 kΩ (103)
R5	7030000540	S.RESISTOR	MCR10EZHZJ 22 kΩ (223)
R6	7030000550	S.RESISTOR	MCR10EZHZJ 27 kΩ (273)
R7	7030000510	S.RESISTOR	MCR10EZHZJ 12 kΩ (123)
R8	7030000650	S.RESISTOR	MCR10EZHZJ 180 kΩ (184)
R10	7030000490	S.RESISTOR	MCR10EZHZJ 8.2 kΩ (822)
R11	7030000700	S.RESISTOR	MCR10EZHZJ 470 kΩ (474)
R12	7030000500	S.RESISTOR	MCR10EZHZJ 10 kΩ (103)
R13	7030000500	S.RESISTOR	MCR10EZHZJ 10 kΩ (103)
R14	7030000260	S.RESISTOR	MCR10EZHZJ 100 Ω (101)
R15	7030000590	S.RESISTOR	MCR10EZHZJ 56 kΩ (563)
R16	7030000590	S.RESISTOR	MCR10EZHZJ 56 kΩ (563)
R17	7030000590	S.RESISTOR	MCR10EZHZJ 56 kΩ (563)
R18	7030000540	S.RESISTOR	MCR10EZHZJ 22 kΩ (223)
C1	4510001100	ELECTROLYTIC	16 MS7 10 μF
C2	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C3	4030005110	S.CERAMIC	C2012 JB 1E 473K-T-A
C4	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C5	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C6	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C7	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C10	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C11	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C12	4510001100	ELECTROLYTIC	16 MS7 10 μF
C13	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A

S. = Surface mount

[IF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002200	S.IC	MC3372MR
D1	1730000120	ZENER	RD6.2E B2
D2	1790000490	S.DIODE	HSM88AS-TR
X1	6070000090	DISCRIMINATOR	CDB455C16
X2	6050002000	CRYSTAL	CR-70
FI1	2020000830	CERAMIC	CFZM455F
R1	7030000400	S.RESISTOR	MCR10EZHZJ 1.5 kΩ (152)
R2	7030000580	S.RESISTOR	MCR10EZHZJ 47 kΩ (473)
R3	7030000410	S.RESISTOR	MCR10EZHZJ 1.8 kΩ (182)
R4	7030000580	S.RESISTOR	MCR10EZHZJ 47 kΩ (473)
R6	7030000450	S.RESISTOR	MCR10EZHZJ 3.9 kΩ (392)
R7	7030000380	S.RESISTOR	MCR10EZHZJ 1 kΩ (102)
R9	7030000700	S.RESISTOR	MCR10EZHZJ 470 kΩ (474)
R10	7030000280	S.RESISTOR	MCR10EZHZJ 150 Ω (151)
R12	7030000460	S.RESISTOR	MCR10EZHZJ 4.7 kΩ (472)
R13	7030000640	S.RESISTOR	MCR10EZHZJ 150 kΩ (154)
R14	7030001560	S.RESISTOR	MCR10EZHZJ 1.5 MΩ (155)
R15	7030000580	S.RESISTOR	MCR10EZHZJ 47 kΩ (473)
R16	7030000260	S.RESISTOR	MCR10EZHZJ 100 Ω (101)
C1	4510001100	ELECTROLYTIC	16 MS7 10 μF
C2	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C3	4030005000	S.CERAMIC	C2012 CH 1H 121J-T-A
C4	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C5	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C6	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C7	4030004970	S.CERAMIC	C2012 CH 1H 680J-T-A
C10	4030005000	S.CERAMIC	C2012 CH 1H 121J-T-A
C12	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C13	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C14	4030004740	S.CERAMIC	C2012 JB 1H 472K-T-A
C15	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
C16	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C17	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C18	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
C19	4030004520	S.CERAMIC	C2012 SL 1H 220J-T-A
C20	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C21	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C22	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C23	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C24	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C25	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
W1	7030000010	S.JUMPER	MCR10EZHZJ JPW (000)
W2	7030000010	S.JUMPER	MCR10EZHZJ JPW (000)
W3	7030000010	S.JUMPER	MCR10EZHZJ JPW (000)
W4	7030000010	S.JUMPER	MCR10EZHZJ JPW (000)
EP1	910035181	PCB	B 2971A (FX975-1)
EP2	6910003330	LEADFRAM	PD2.0-0.9-8

[CTCSS UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110000960	S.IC	NJM4558M(T1)
IC2	1130001830	S.IC	MN6520
IC3	1130005810	S.IC	BU4094BF-T1
Q1	1590000460	S.TRANSISTOR	RN1402 (TE85R)
X1	6050003110	CRYSTAL	RF-4A3 FAC NKD (4.194304M)
R1	7030000690	S.RESISTOR	MCR10EZHZJ 390 kΩ (394)
R2	7030000650	S.RESISTOR	MCR10EZHZJ 180 kΩ (184)
R3	7030000620	S.RESISTOR	MCR10EZHZJ 100 kΩ (104)
R4	7030000680	S.RESISTOR	MCR10EZHZJ 330 kΩ (334)
R5	7030000670	S.RESISTOR	MCR10EZHZJ 270 kΩ (274)
R6	7030000670	S.RESISTOR	MCR10EZHZJ 270 kΩ (274)
R7	7030000670	S.RESISTOR	MCR10EZHZJ 270 kΩ (274)
R8	7030000500	S.RESISTOR	MCR10EZHZJ 10 kΩ (103)
R9	7030000500	S.RESISTOR	MCR10EZHZJ 10 kΩ (103)
R10	7030000670	S.RESISTOR	MCR10EZHZJ 270 kΩ (274)
R11	7030000500	S.RESISTOR	MCR10EZHZJ 10 kΩ (103)
R12	7030000480	S.RESISTOR	MCR10EZHZJ 6.8 kΩ (682)
R13	7030000640	S.RESISTOR	MCR10EZHZJ 150 kΩ (154)
R14	7030000420	S.RESISTOR	MCR10EZHZJ 2.2 kΩ (222)
R17	7030000380	S.RESISTOR	MCR10EZHZJ 1 kΩ (102)
C1	4030004720	S.CERAMIC	C2012 JB 1H 102K-T-A
C2	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C3	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C4	4030005090	S.CERAMIC	C2012 JB 1H 223K-T-A
C5	4030004640	S.CERAMIC	C2012 SL 1H 181J-T-A
C6	4030004740	S.CERAMIC	C2012 JB 1H 472K-T-A
C7	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C8	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C9	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C10	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C11	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C12	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C13	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C14	4030004900	S.CERAMIC	C2012 CH 1H 180J-T-A
C15	4030004900	S.CERAMIC	C2012 CH 1H 180J-T-A
C16	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C18	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
EP1	910035211	PCB	B 2980A (FX975-1)
EP2	6910003330	LEADFRAM	PD2.0-0.9-8

S. = Surface mount

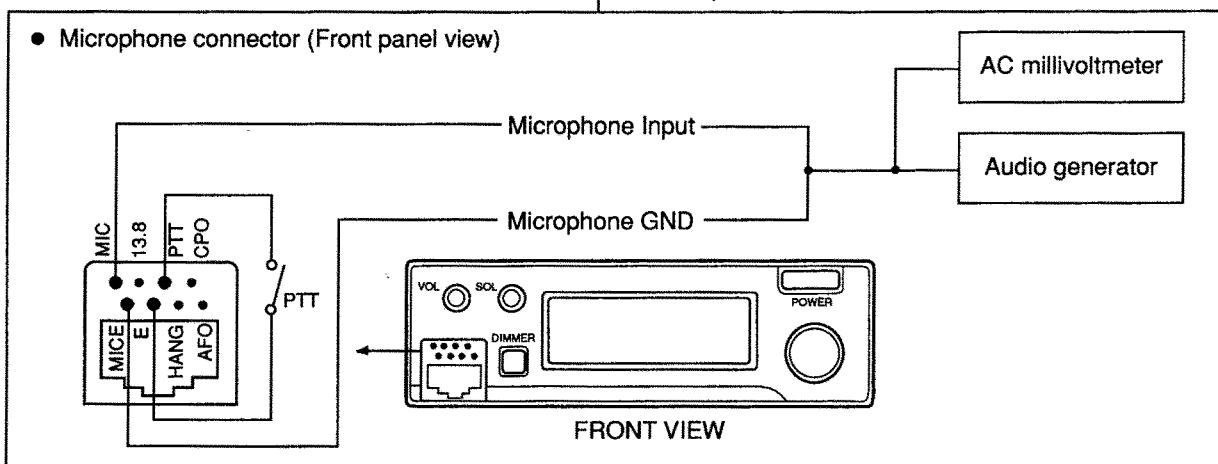
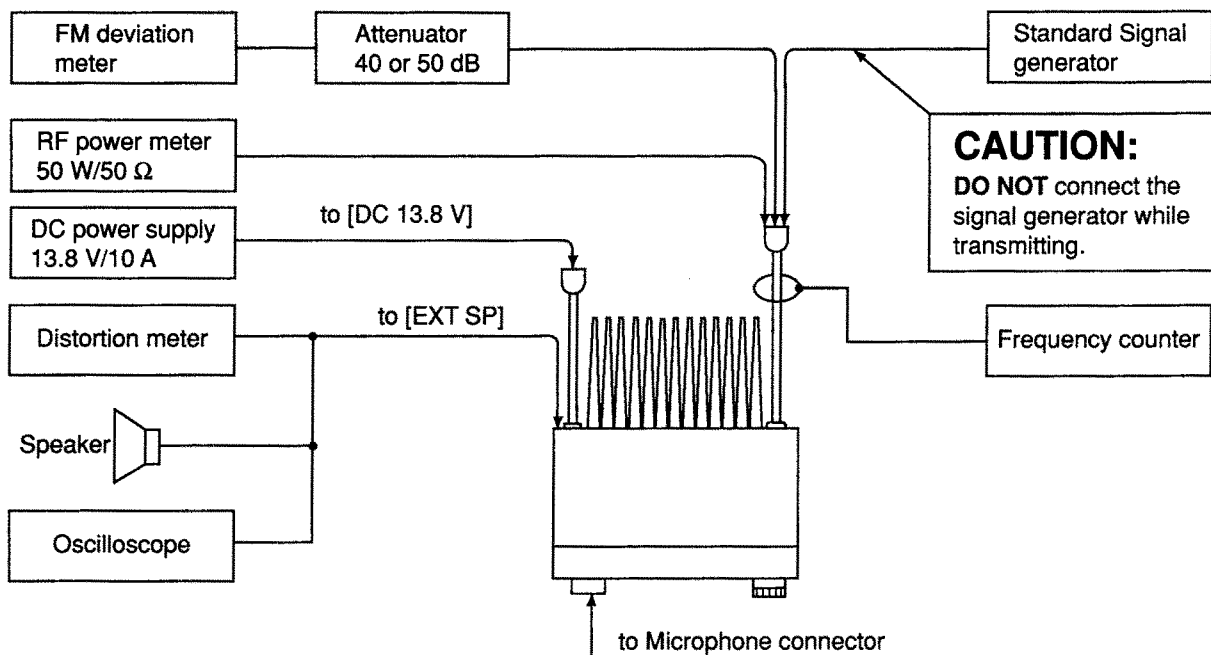
SECTION 6 ADJUSTMENT PROCEDURES

6-1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.8 V DC Current capacity : 10 A or more	Audio generator	Frequency range : 300 ~ 3000 Hz Output level : 1 ~ 200 mV
RF power meter (terminated type)	Measuring range : 1 ~ 50 W Frequency range : 120 ~ 200 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Attenuator	Power attenuation : 40 or 50 dB Capacity : 25 W or more
Frequency counter	Frequency range : 0.1 ~ 200 MHz Frequency accuracy : ± 1 ppm or better Sensitivity : 100 mV or better	AC millivoltmeter	Measuring range : 2 ~ 200 mV
Distortion meter	Frequency range : 1 kHz ± 10 Hz Measuring range : 1 ~ 100%	Oscilloscope	Frequency range : DC ~ 20 MHz Measuring range : 0.01 ~ 10 V
Standard signal generator (SSG)	Frequency range : 120 ~ 200 MHz Output level : -127 ~ -17 dBm (0.1 μV ~ 32 mV)	DC voltmeter	Input impedance : 50 kΩ/DC or better
		FM deviation meter	Frequency minimum : 200 MHz Measuring range : 0 ~ ±5 kHz
		External speaker	Impedance : 4 Ω

■ CONNECTIONS



6-2 PLL ADJUSTMENT

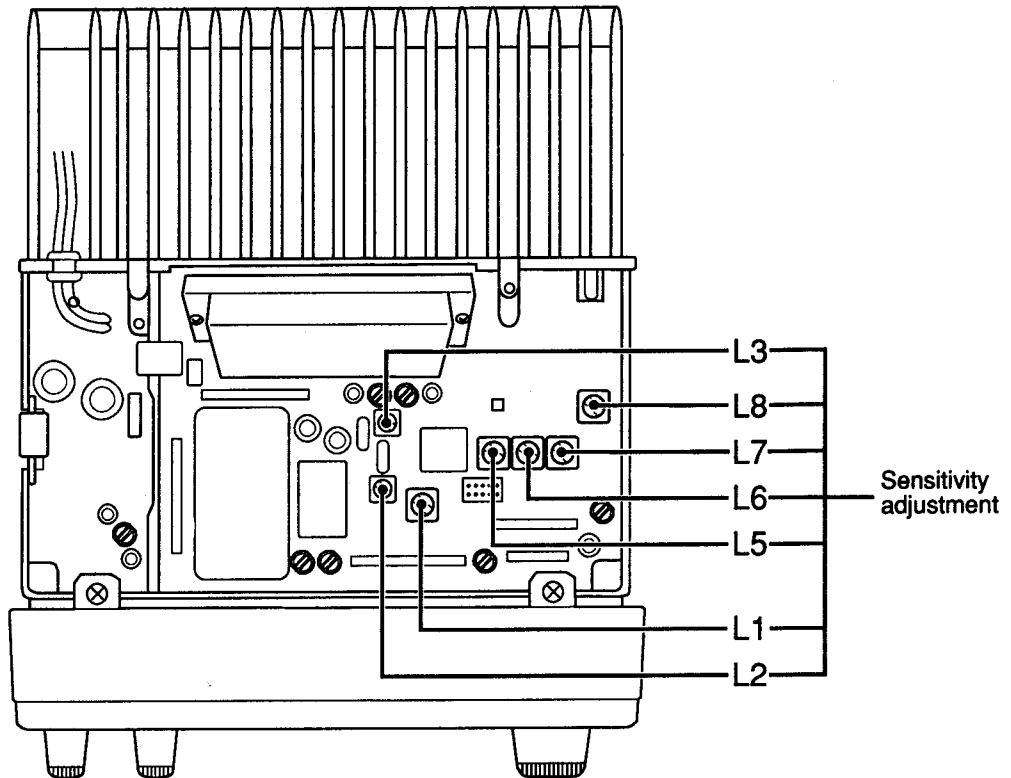
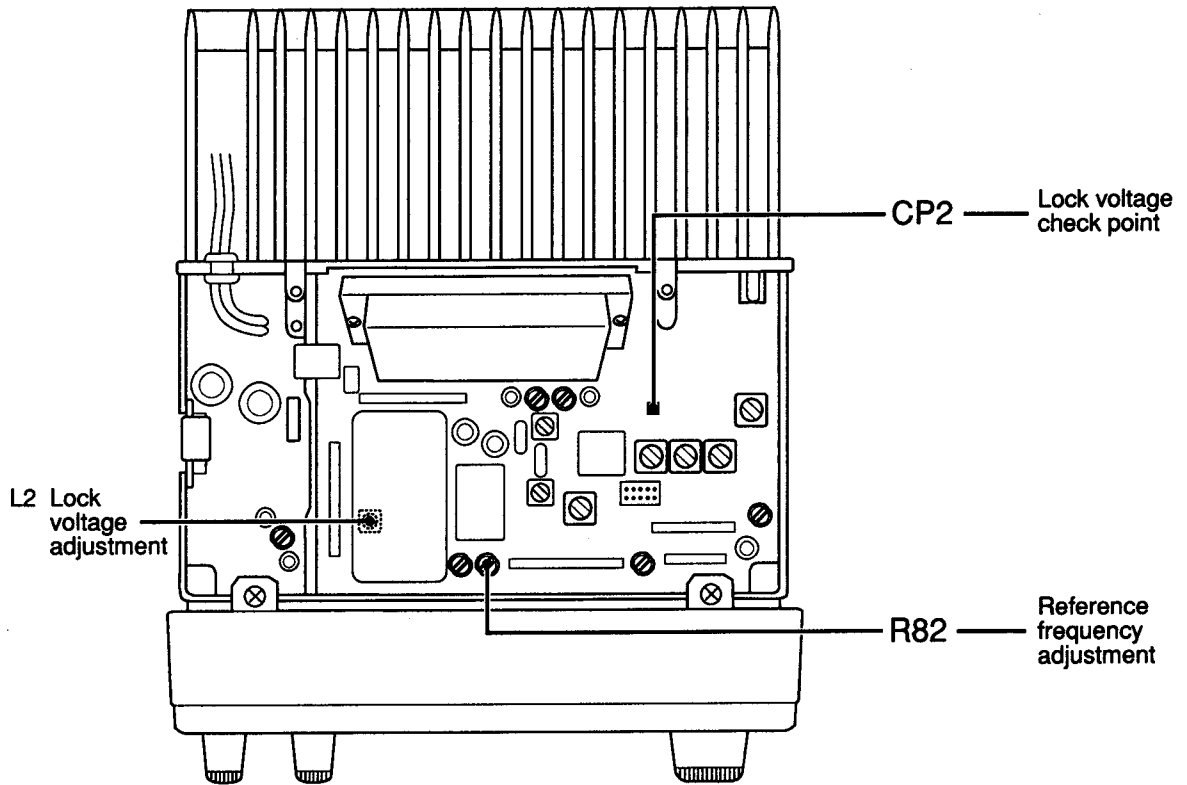
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	<ul style="list-style-type: none"> ● Operating frequency: 150.000 MHz ● Receiving 	MAIN	Connect the DC voltmeter to CP2.	2.1 V	VCO	L2
REFERENCE FREQUENCY	2	<ul style="list-style-type: none"> ● Select any channel. ● Connect the RF power meter or a 50 Ω dummy load to the antenna connector. ● Be sure the CTCSS and DTCS are turned OFF and that there is no audio input to the microphone connector. ● Transmitting 	Rear panel	Loosely couple the frequency counter to the antenna connector.	The same frequency as the programmed one.	MAIN	R82

6-3 RECEIVER ADJUSTMENT

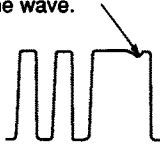
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY		NOTE: When the sensitivity is less than 0.2 μV on every channel, the following sensitivity adjustment is not necessary. Skip to Section 6 - 4 TRANSMITTER ADJUSTMENT.					
	1	<ul style="list-style-type: none"> ● Operating frequency: 150.000 MHz ● Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Level : 0.2 μV* (-121 dBm) Modulation : 1 kHz Deviation : ±3.0 kHz ● [SQL] control : Maximum counterclockwise ● Receiving 	MAIN	Connect the distortion meter to the [EXT SP] jack with a 4 Ω load.	Minimum distortion level	MAIN	Adjust in sequence L8, L7, L6, L5, L3, L2, L1

* This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

• MAIN UNIT



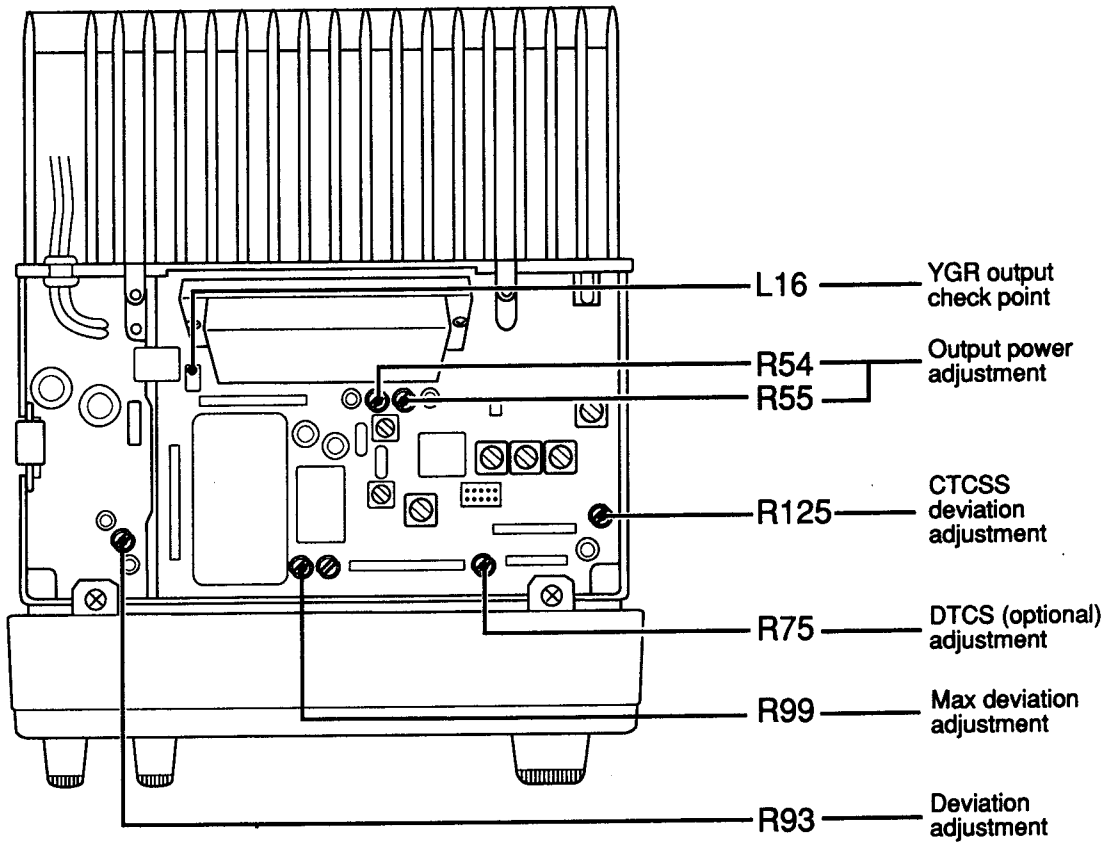
6-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1 <ul style="list-style-type: none"> ● Select a channel which is programmed for high power and which is around the center of the frequency range. ● Connect the RF power meter to the antenna connector. ● Transmitting 	MAIN	RF power meter	25 W	MAIN	R55
	2 <ul style="list-style-type: none"> ● Select a channel which is programmed for low power and which is around the center of the frequency range. 			5 W		R54
YGR OUTPUT (For repair purposes only)	1 <ul style="list-style-type: none"> ● Remove W4. ● Transmitting 	MAIN	Connect the power meter (1 W; +30 dBm) to L16	More than +23 dBm (200 mW)		Verify
NOTE: Return W4 to its previous position after checking.						
DEVIATION	1 <ul style="list-style-type: none"> ● Operating frequency : 174.000 MHz ● Connect the audio generator to the microphone connector* with an AC millivoltmeter and set as: Level : 50 mV Frequency : 1.0 kHz ● Set the FM deviation meter as: HPF : 20 Hz LPF : 20 kHz De-emphasis : OFF ● TONE (CTCSS, DTCS) : OFF ● Transmitting 	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	±4.0 kHz	MAIN	R99
	2 <ul style="list-style-type: none"> ● Set the audio generator as: Level : 5.0 mV Frequency : 1.0 kHz 			±3.0 kHz		R93
NOTE: Repeat steps 1 ~ 2 several times for precision.						
CTCSS DEVIATION	1 <ul style="list-style-type: none"> ● Select a channel which is programmed for CTCSS encoder. (67.0 Hz) ● Set the FM deviation meter as: HPF : 20 Hz LPF : 20 kHz De-emphasis : OFF ● Apply no signal to the microphone connector. ● Transmitting 	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	±0.7 kHz	MAIN	R125
DTCS DEVIATION (Optional)	1 <ul style="list-style-type: none"> ● Select a channel which is programmed for DTCS encoder. (023) ● Set the FM deviation meter as: HPF : 20 Hz LPF : 20 kHz De-emphasis : OFF ● Transmitting 	Rear panel	Connect the oscilloscope to the FM deviation meter.	Minimum drop on the wave. 	MAIN	R75

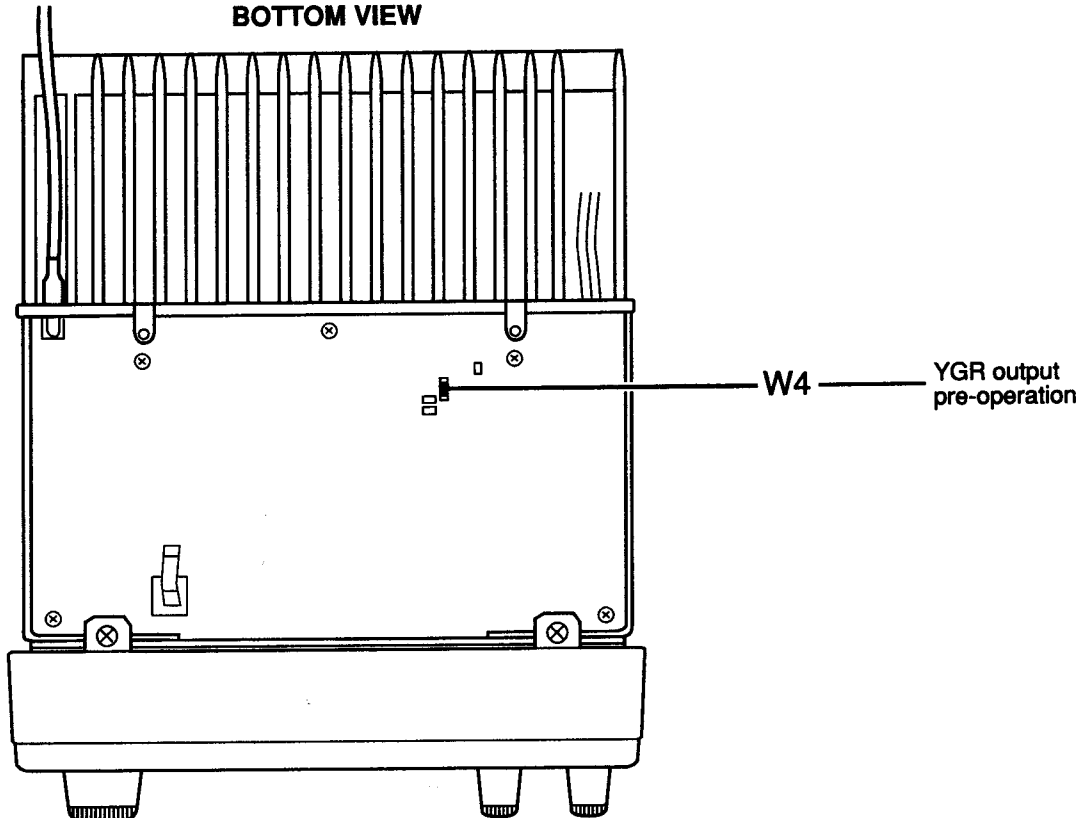
* See p. 6-1 for connection.

• MAIN UNIT

TOP VIEW



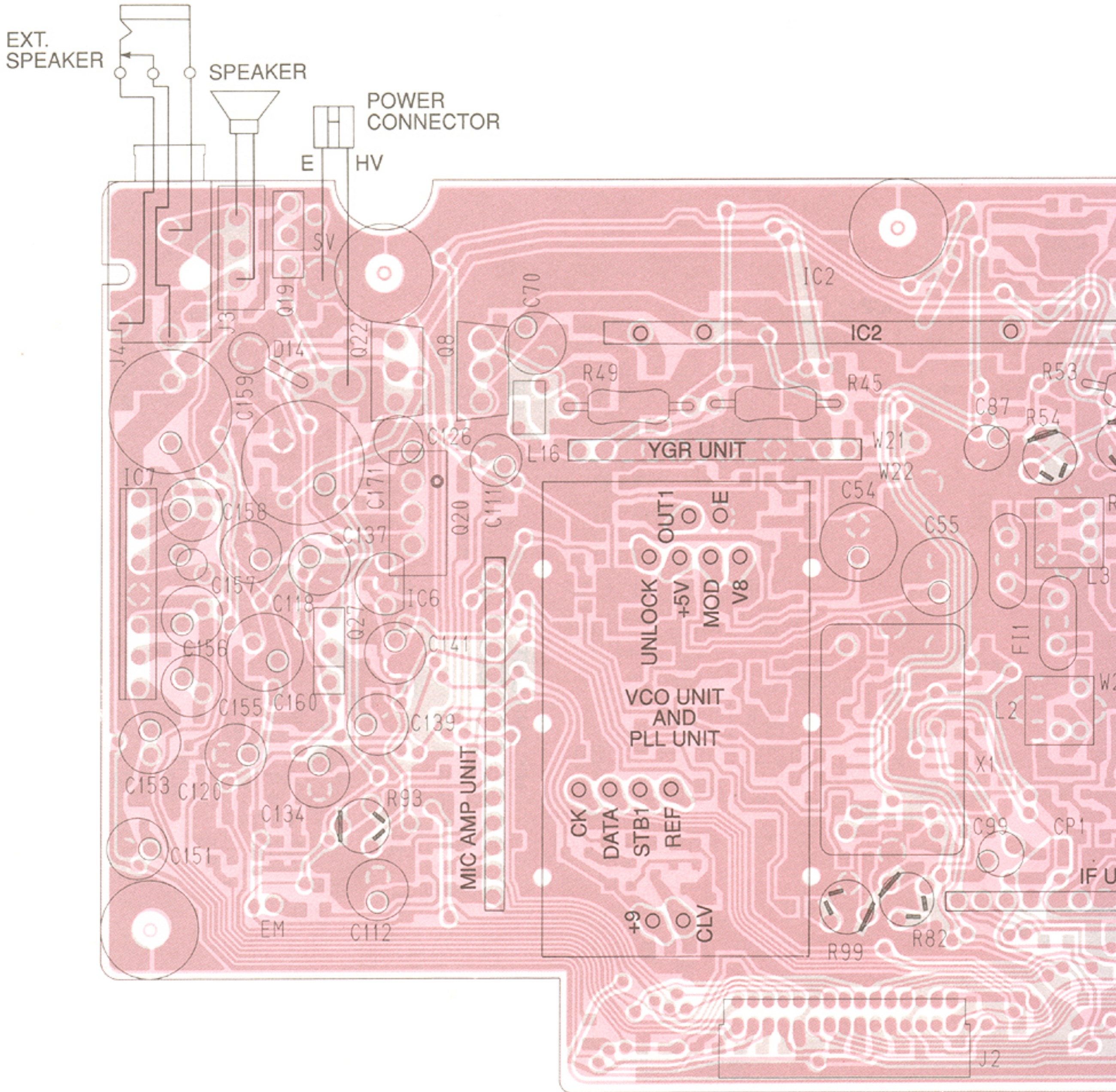
BOTTOM VIEW



SECTION 7 BOARD LAYOUTS

7-1 MAIN UNIT

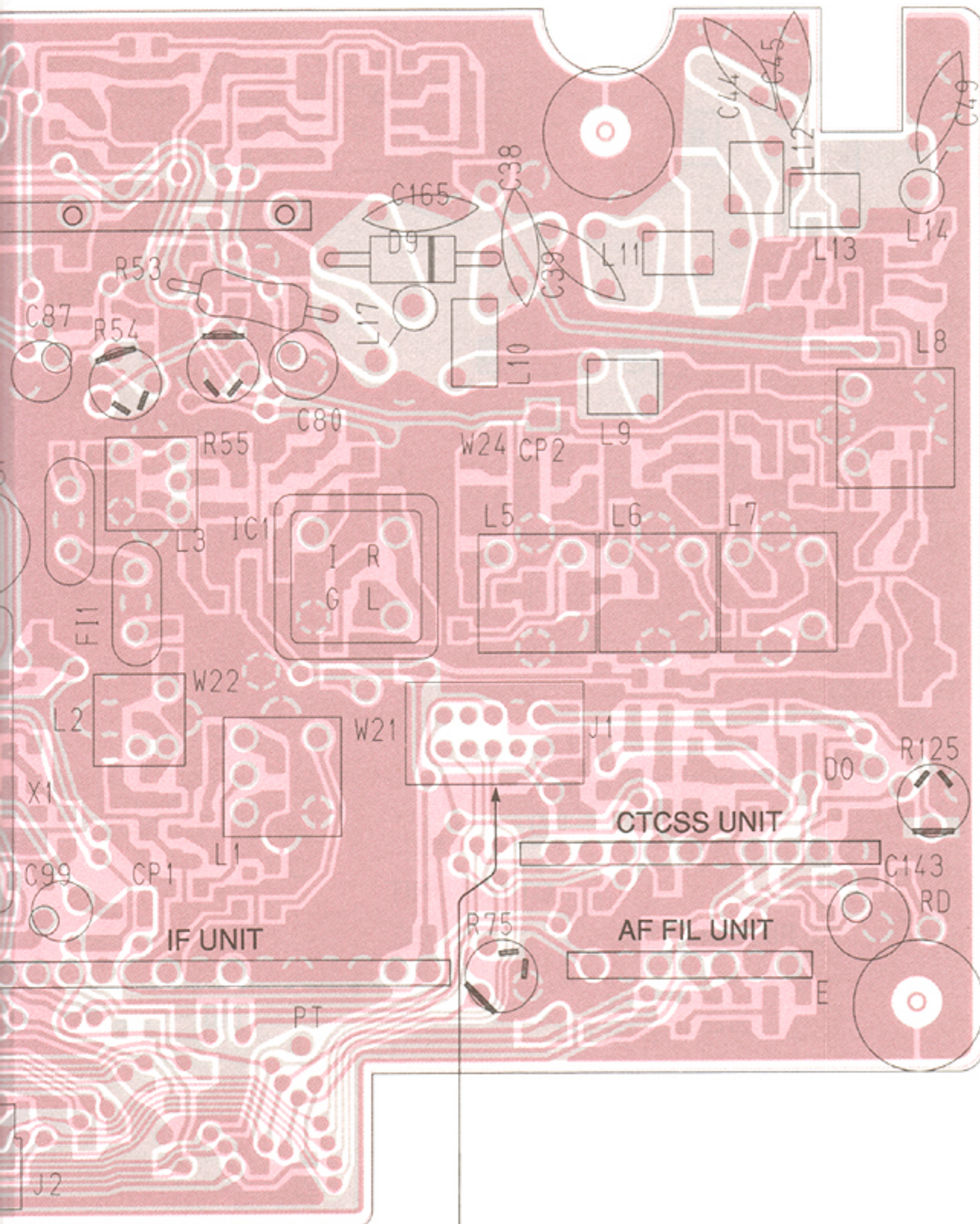
• MAIN UNIT (TOP VIEW)



MICE	AFO	OPC	TXC	RXC	13.8	E	MMUTE	UNLOCK	POSW	SOLS	TRF	LOW	BAND	STB1	DATA
MIC	VR2	VR3	VR1	SQL	+5	PTT2	MUTE1	BEEP	DOUT	E	STB3	STB2	CK		

LOGIC UNIT J1

The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.

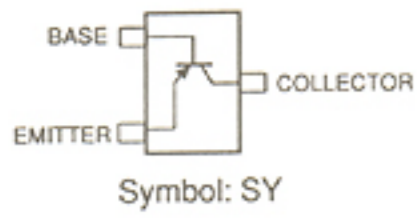


DATA	5V	CK	TXREQ	DTCS	DET.
CK	DATA	STB	DTCS	IN	OUT
BUSY	E	OUT	OUT	OUT	

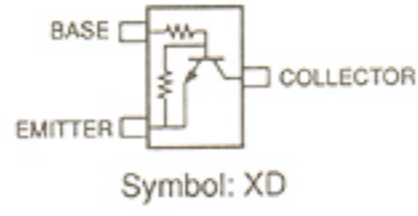
DTCS UNIT J1
(Optional)

• MAIN UNIT (BOTTOM VIEW)

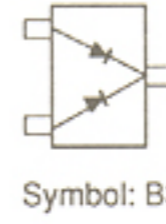
2SA1162
Q6



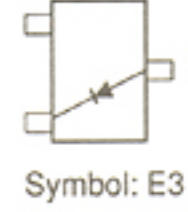
RN1404
Q14, Q18, Q21, Q25, Q29



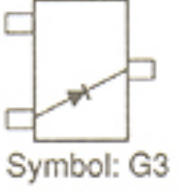
1SS184
D17



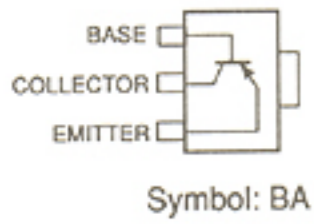
1SS190
D15, D16



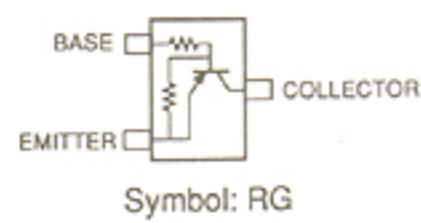
1SS196
D12, D18



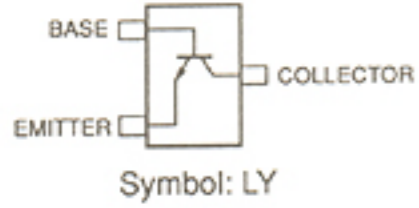
2SB1132
Q17, Q24



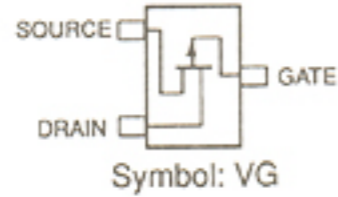
RN2427
Q30



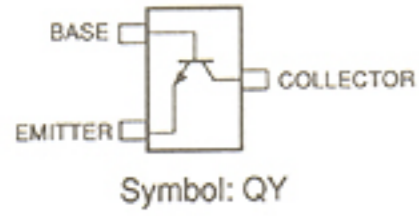
2SC2712
Q10, Q11, Q23, Q26, Q28



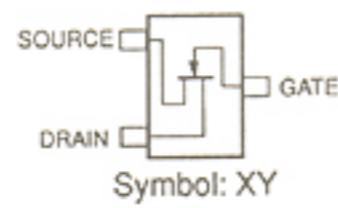
2SJ106
Q12



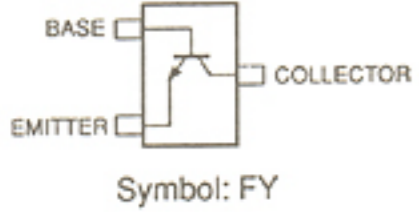
2SC2714
Q15



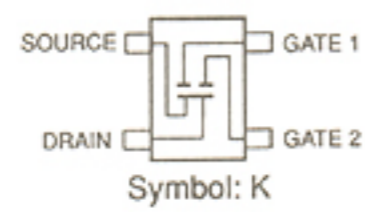
2SK209
Q7



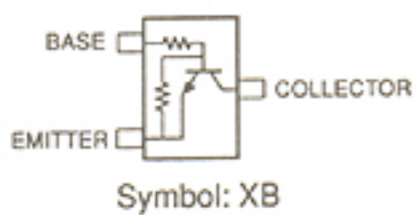
2SC3661
Q7



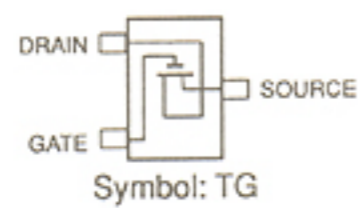
3SK166
Q3



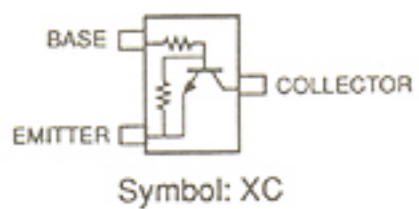
RN1402
Q13, 16



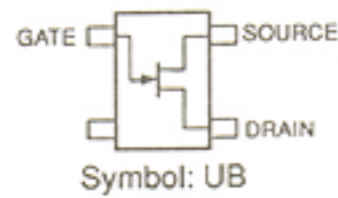
2SK302
Q1



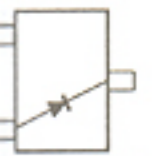
RN1403
Q9



2SK1771
Q2

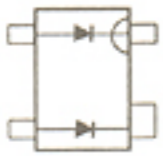


ISS196
D12, D18



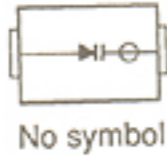
Symbol: G3

MA862
D13



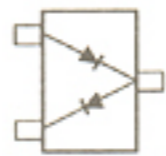
Symbol: MI1

MI809
D6, D8



No symbol

HSM88AS
D10, D11

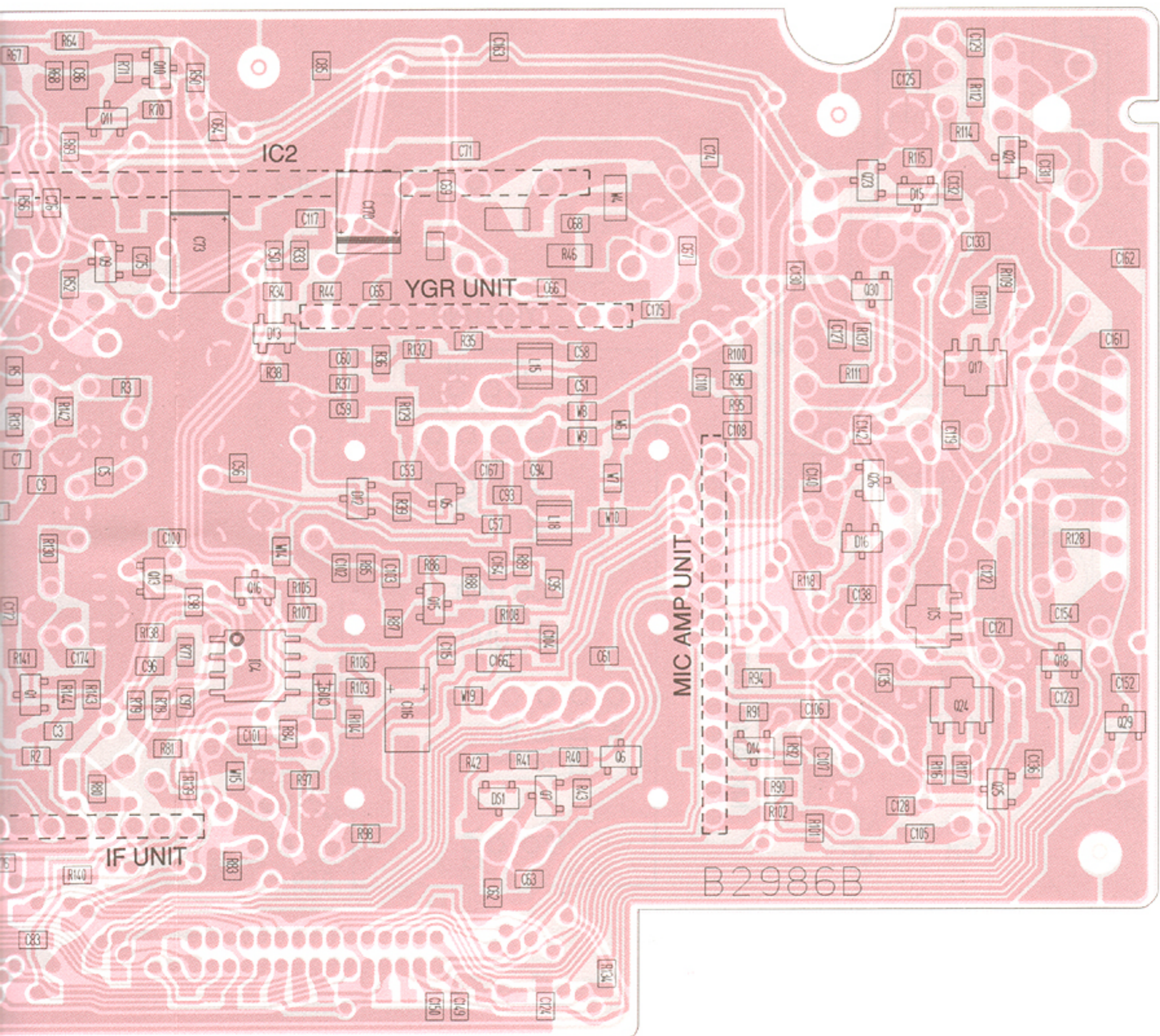


Symbol: C1

MA363B
D2, D3, D4, D5



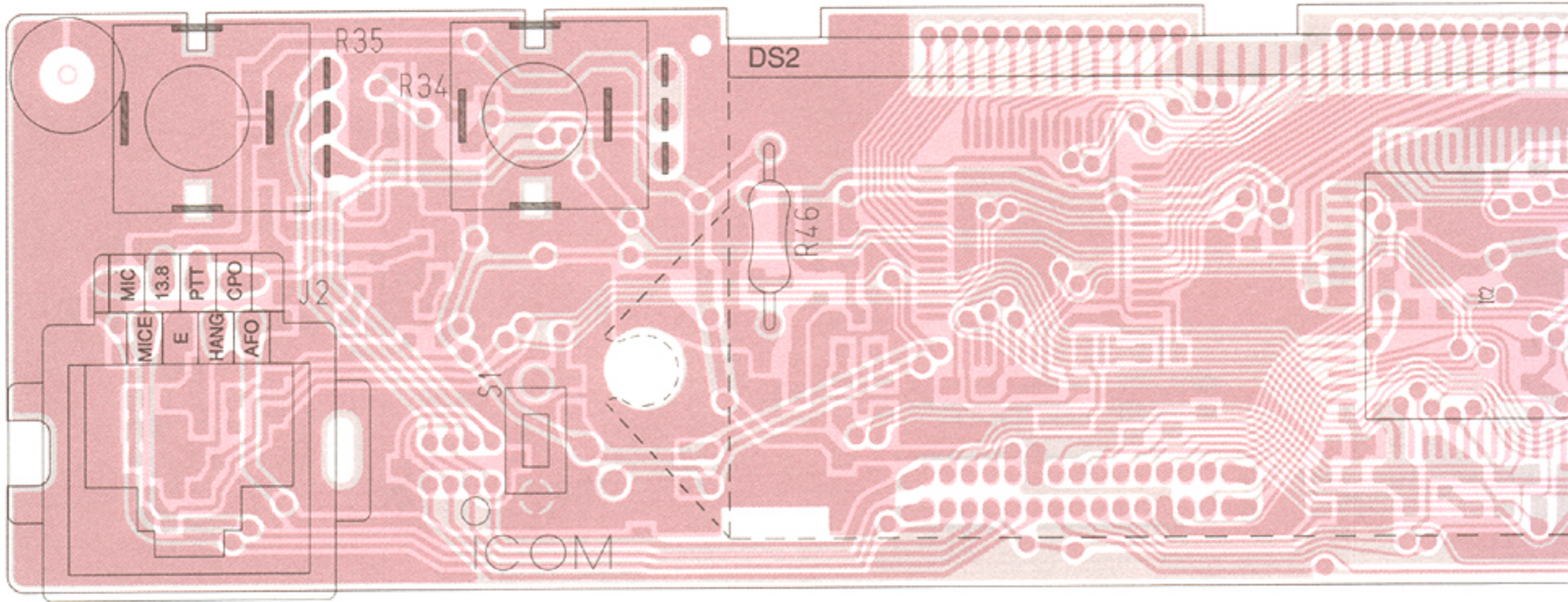
Symbol: hi



B2986B

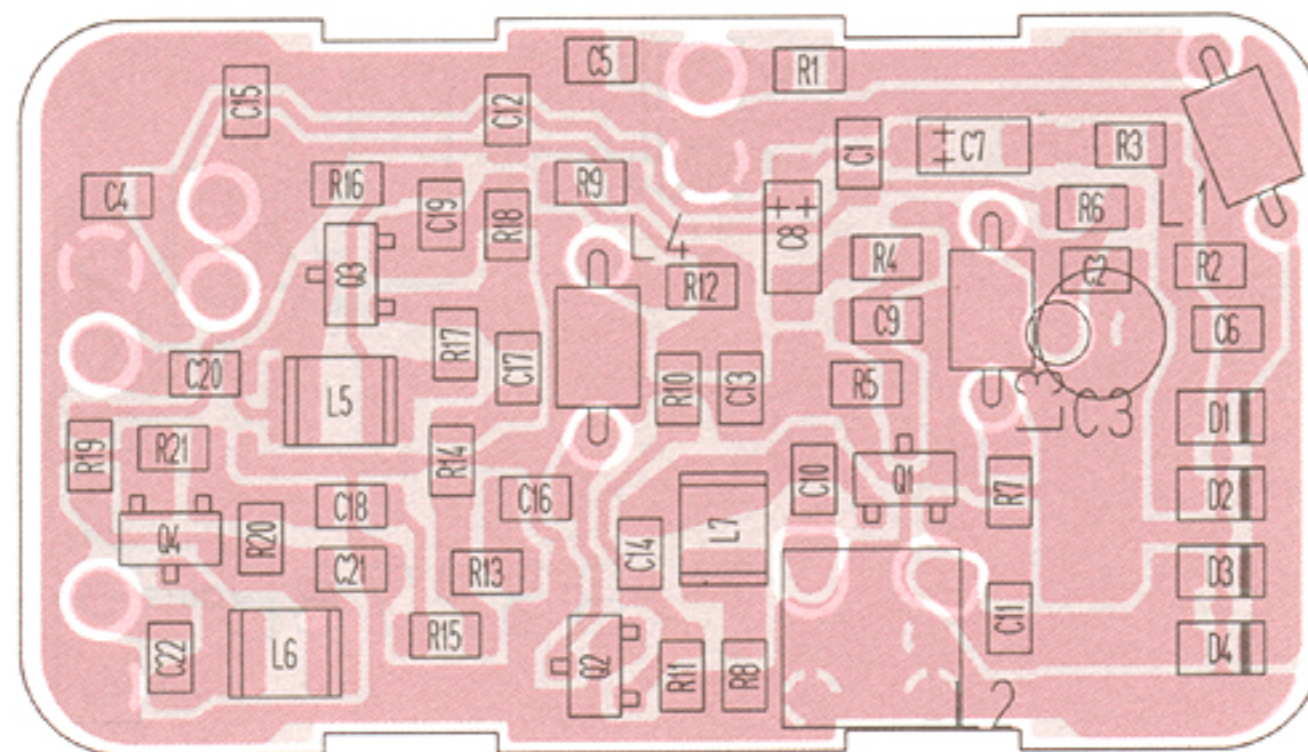
7-2 LOGIC UNIT

• LOGIC UNIT (TOP VIEW)

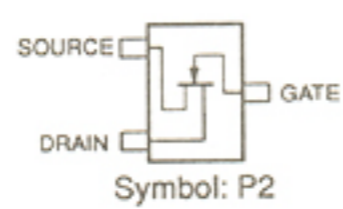


7-3 VCO UNIT

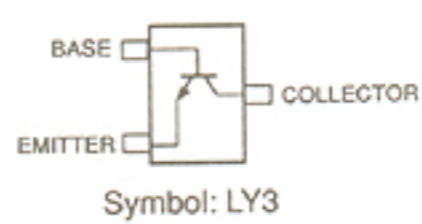
• VCO UNIT (TOP VIEW)



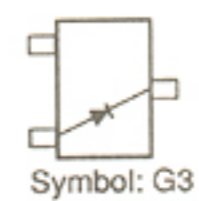
2SK1577-2
Q7



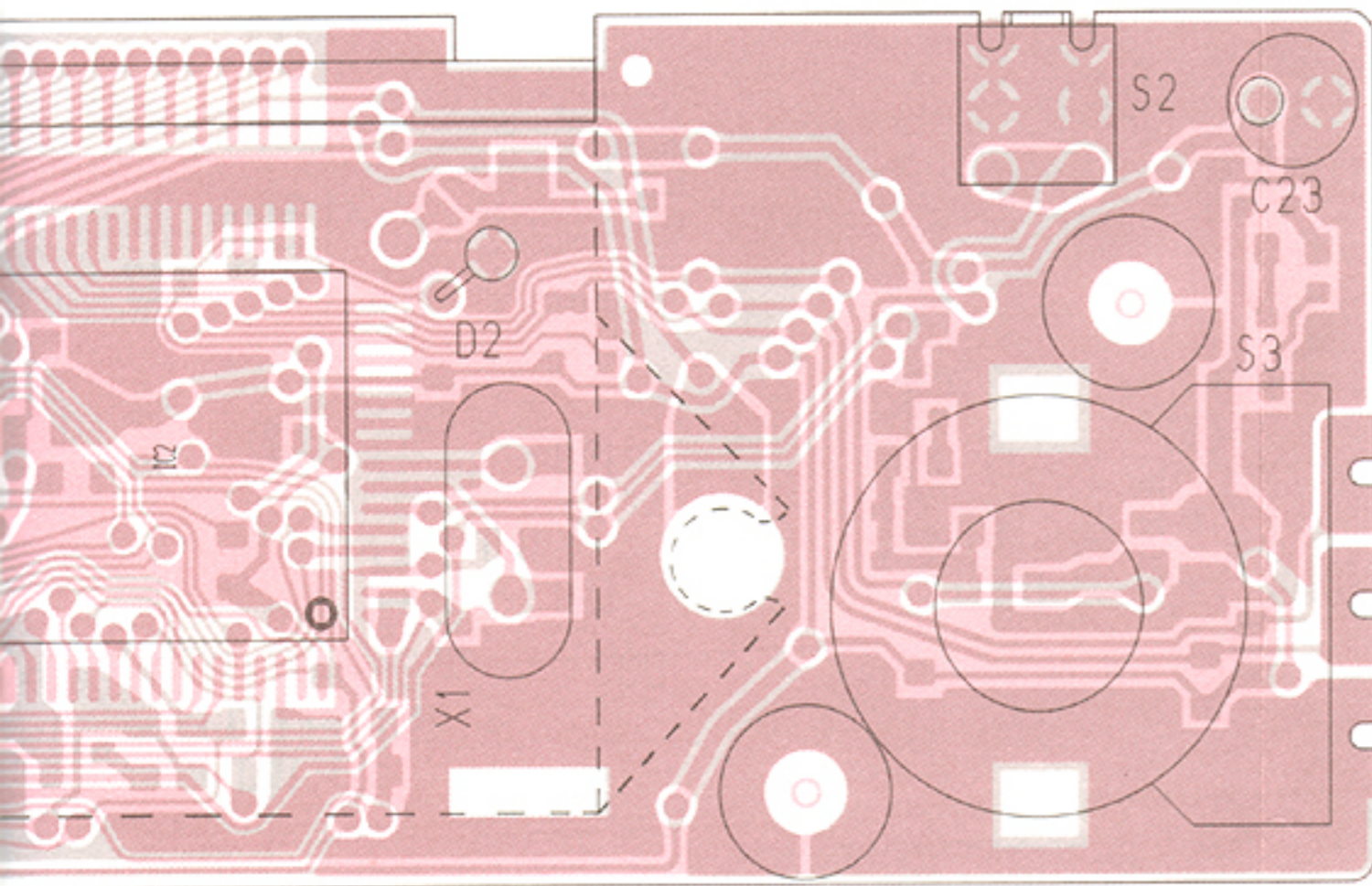
2SC3772
Q2, Q3, Q4



1SS196
D1

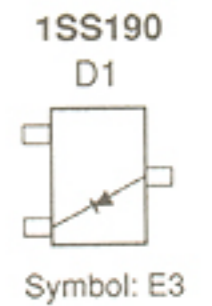
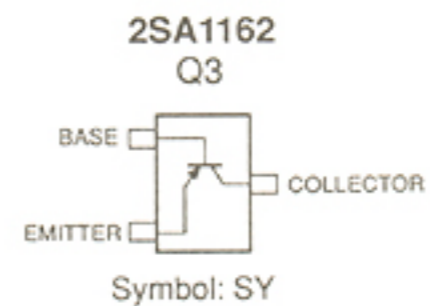
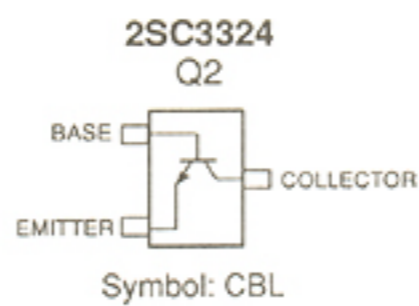
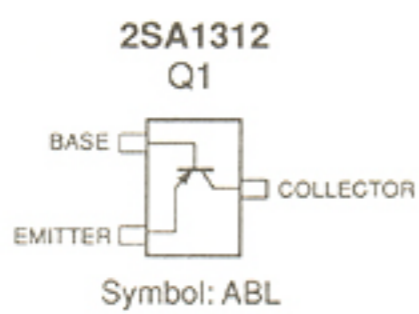
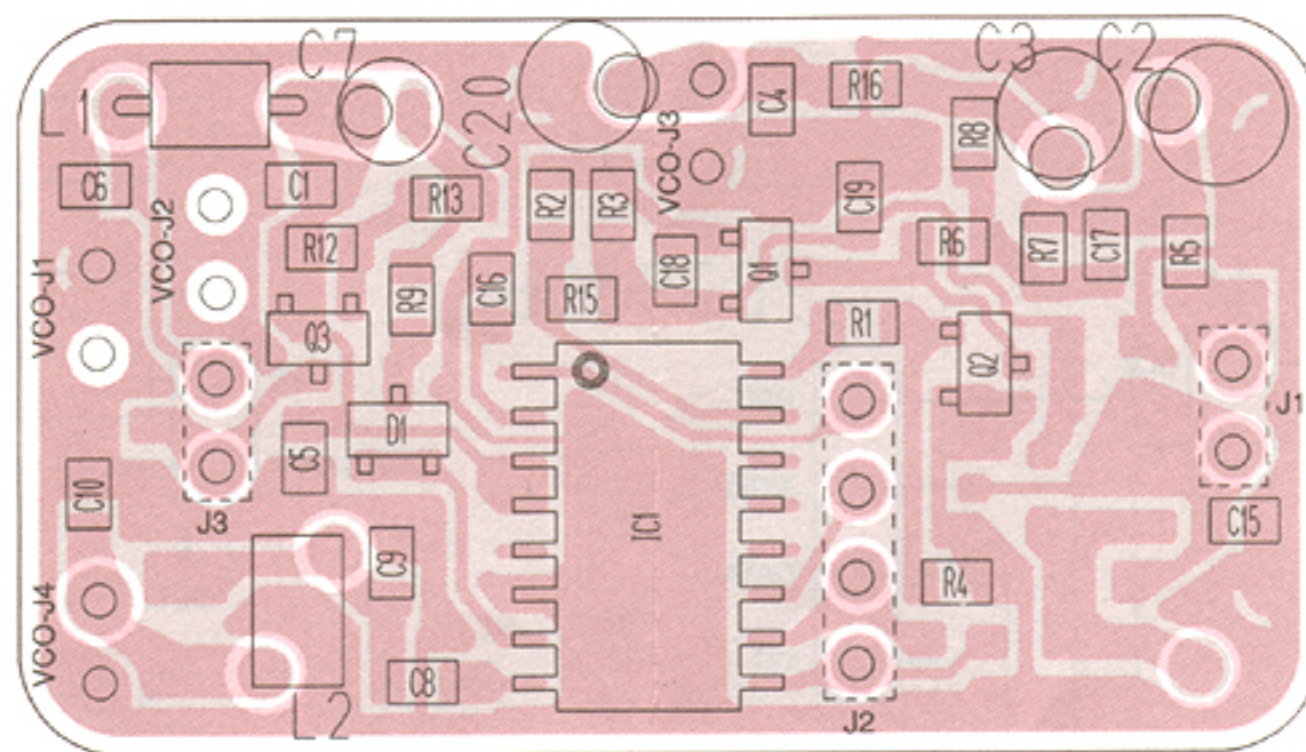


The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.

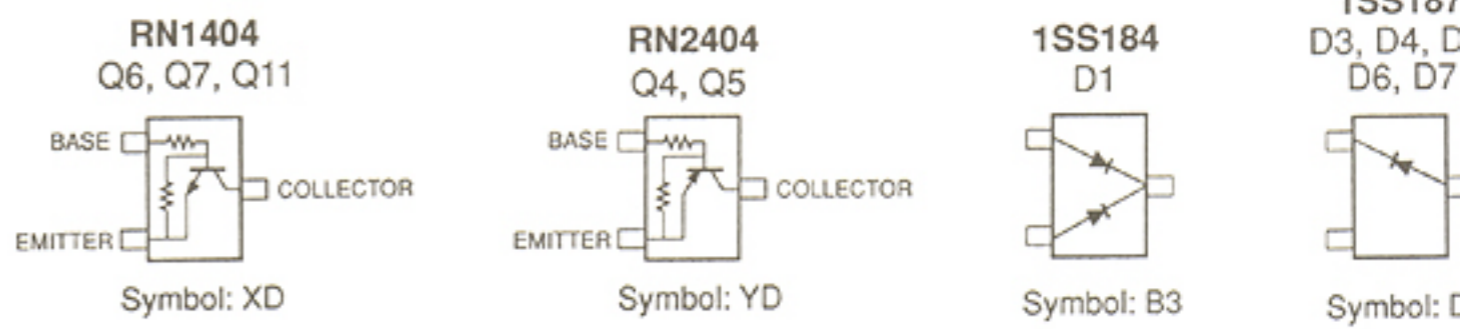
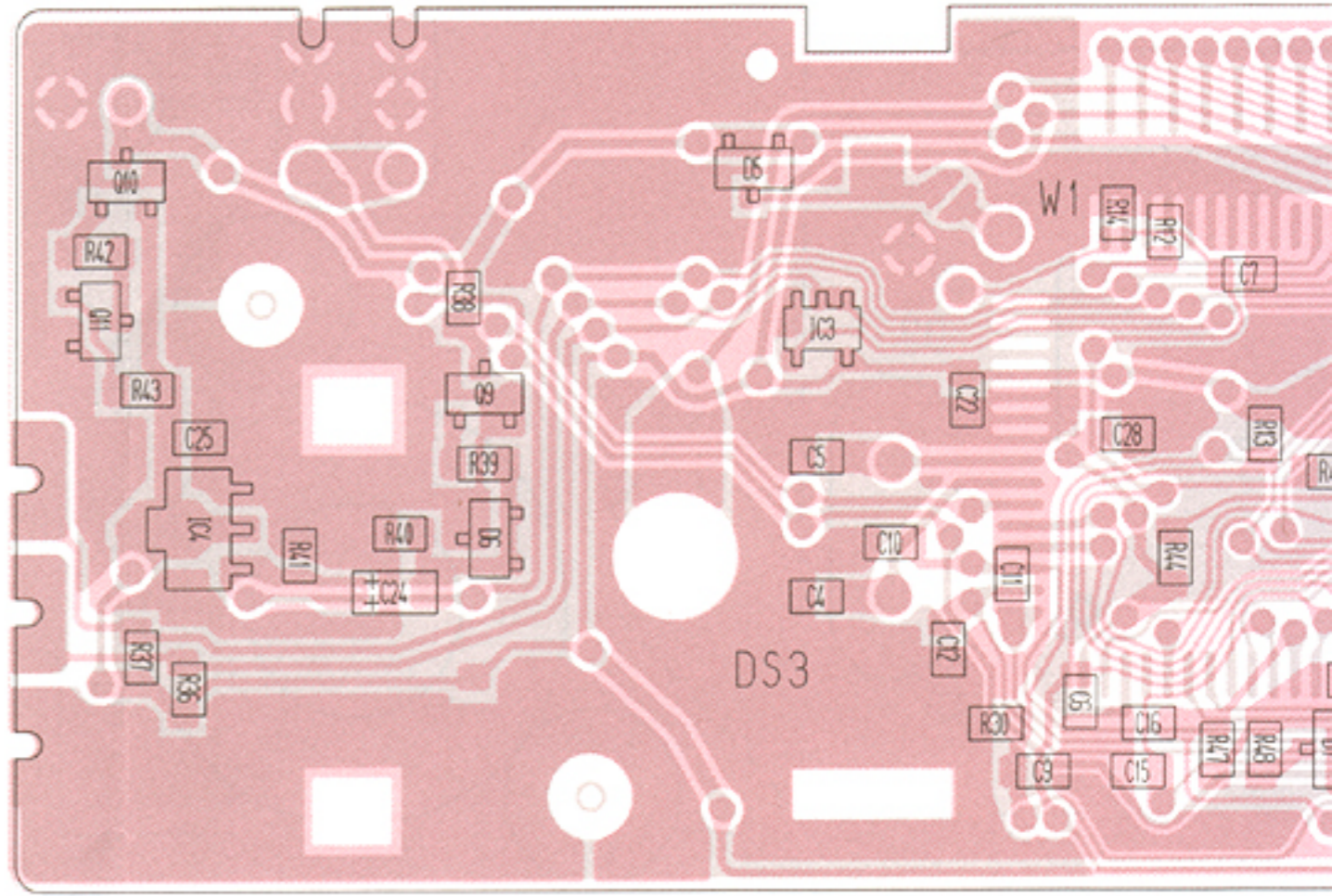
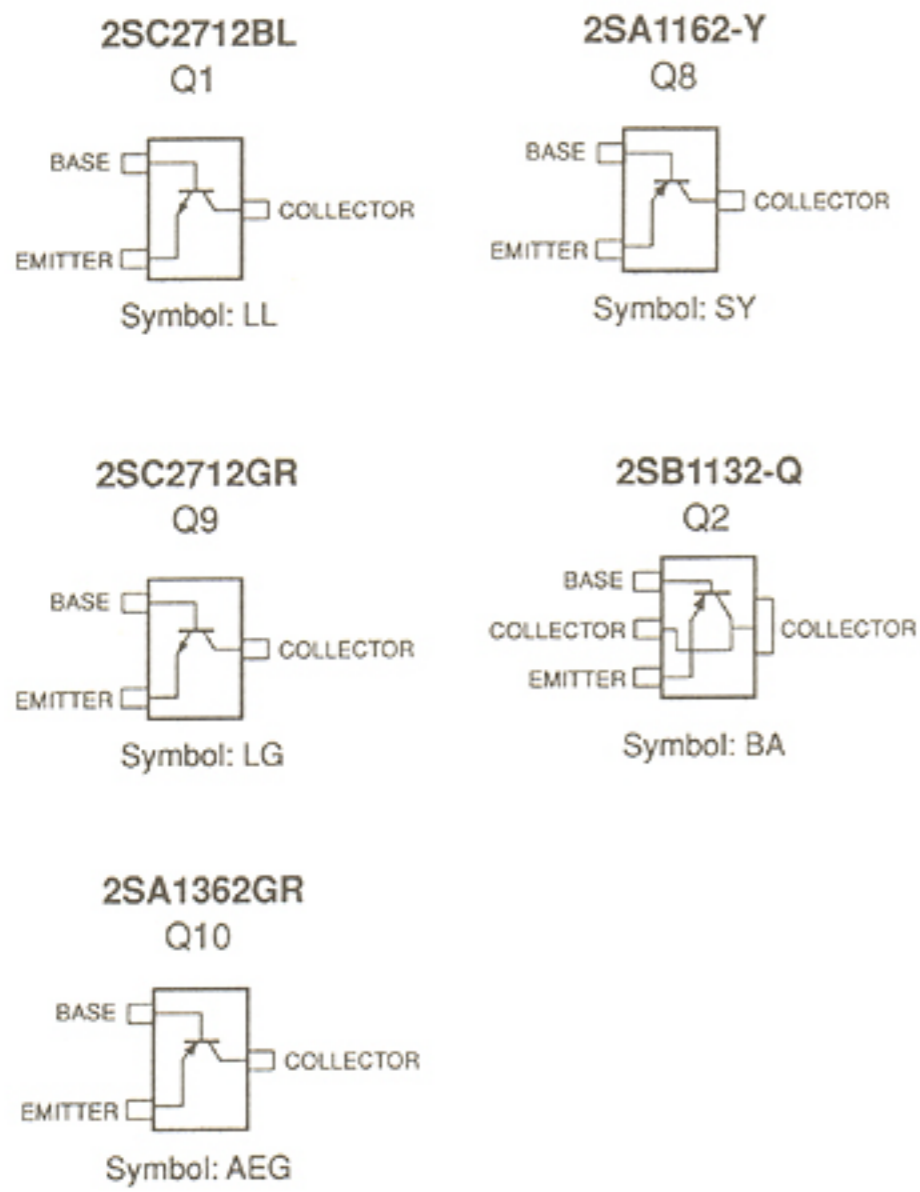


7-4 PLL UNIT

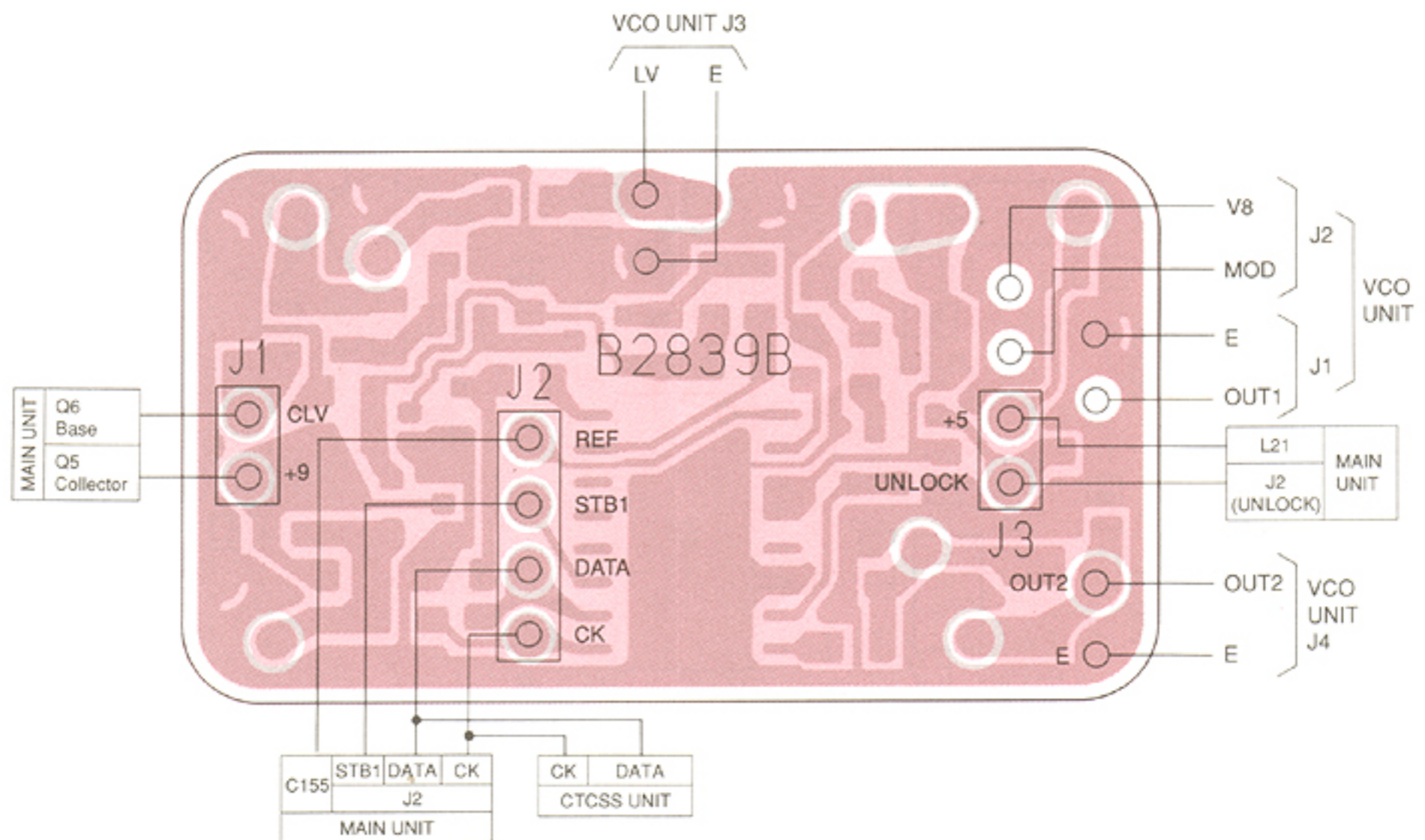
• PLL UNIT (TOP VIEW)

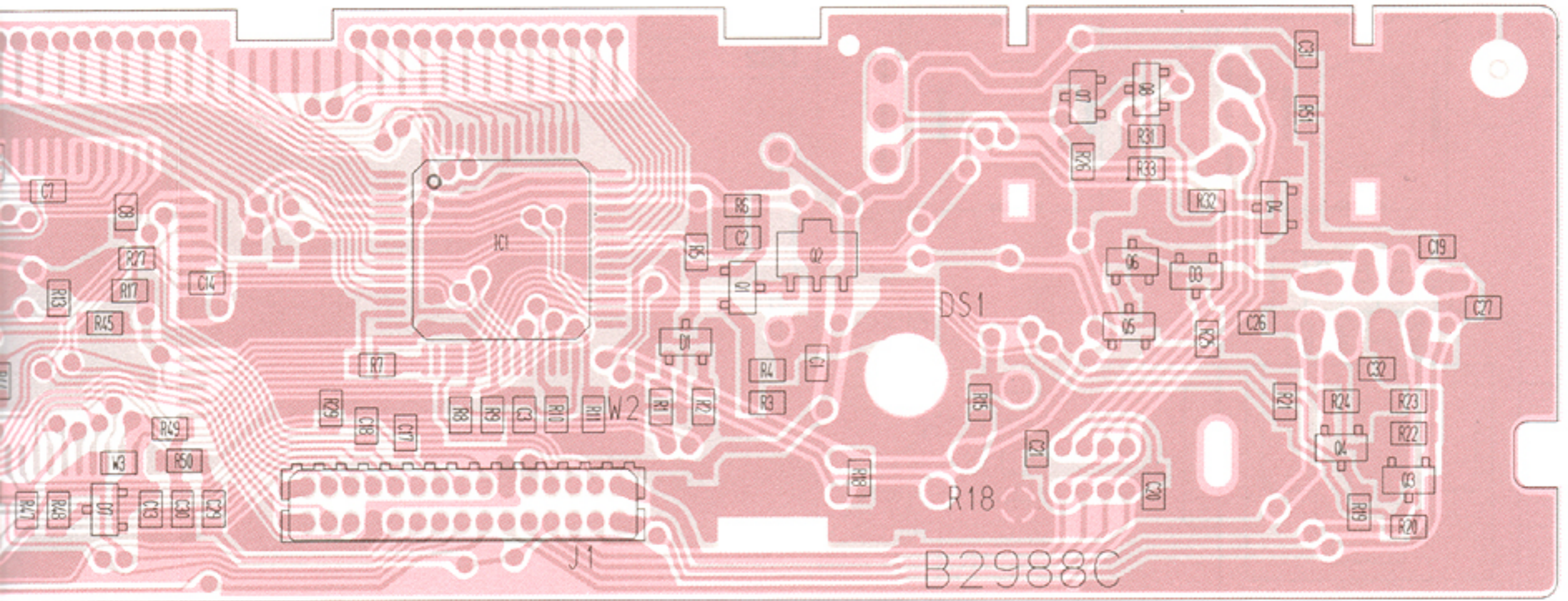


• LOGIC UNIT (BOTTOM VIEW)



• PLL UNIT (BOTTOM VIEW)

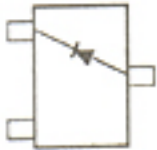




CK	DATA
STB2	STB1
STB3	BAND
E	LOW
DOUT	TRF
BEEP	SQLS
MUTE1	POSW
PTT2	UNLOCK
+5	MMUTE
SQL	E
VR1	13.8
VR3	RXC
VR2	TXC
MIC	OPC
MICE	AFO

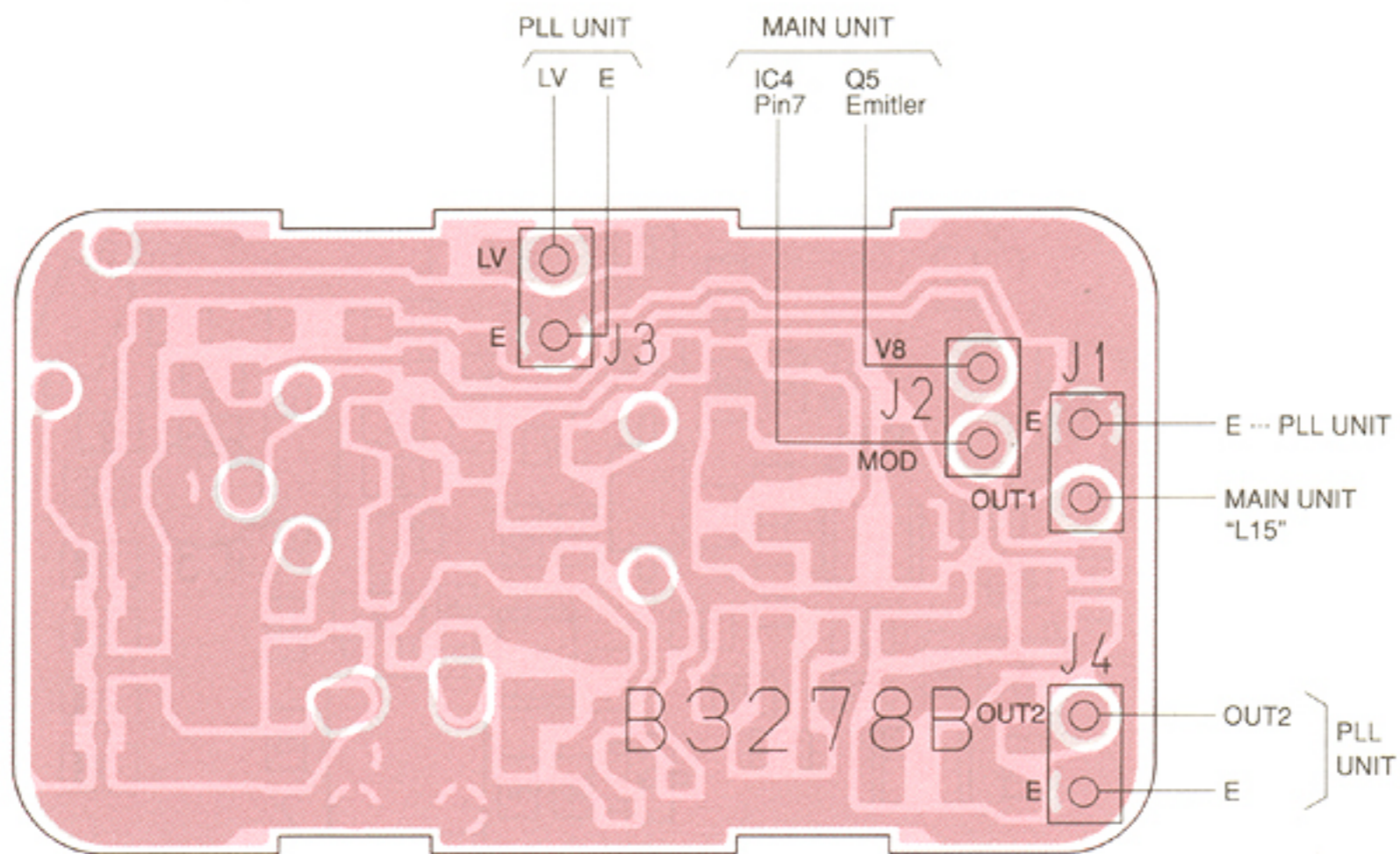
MAIN UNIT J2

1SS187
D3, D4, D5,
D6, D7



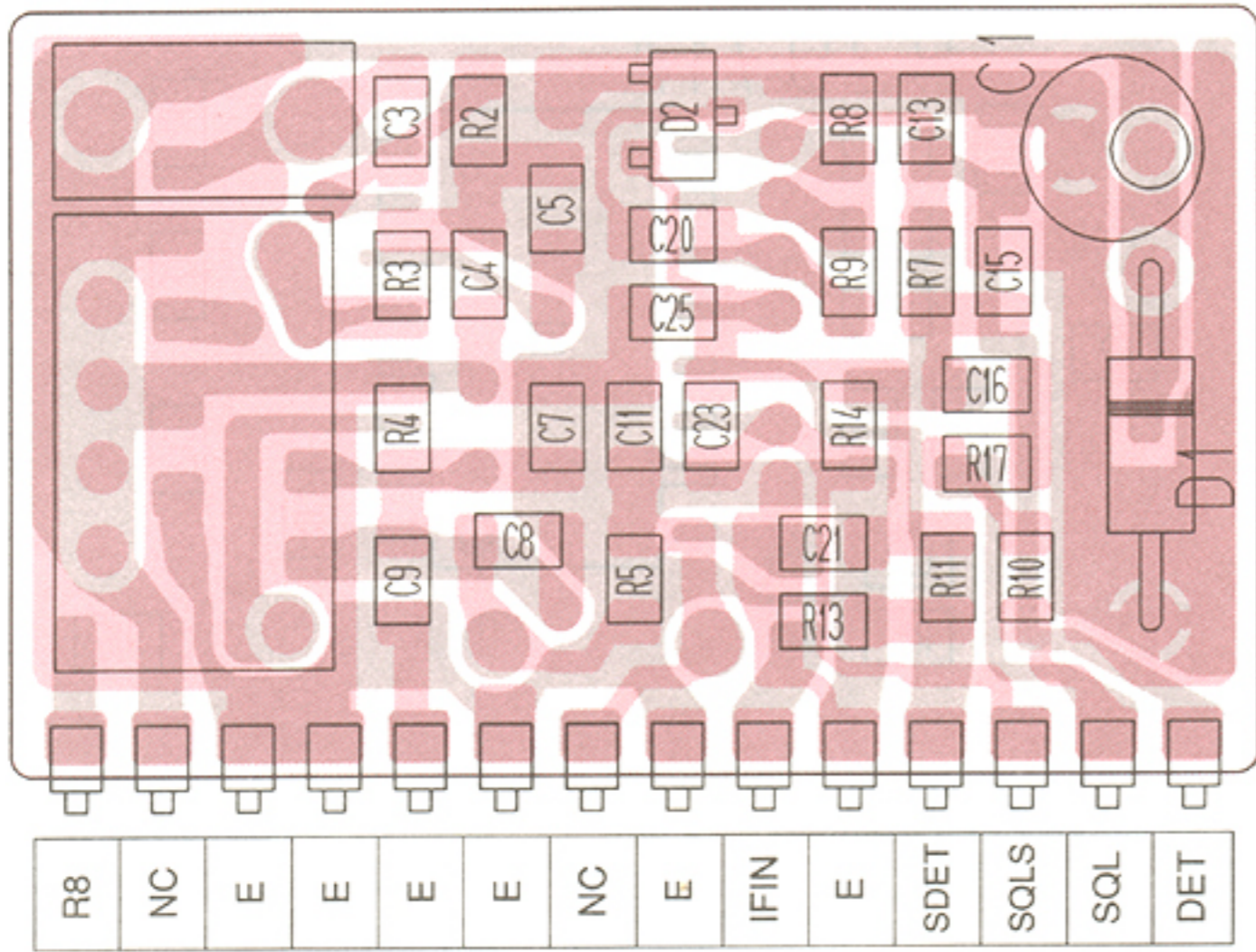
Symbol: D3

• VCO UNIT (BOTTOM VIEW)

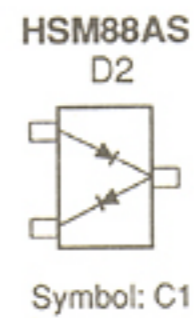


7-5 IF UNIT

• IF UNIT (TOP VIEW)

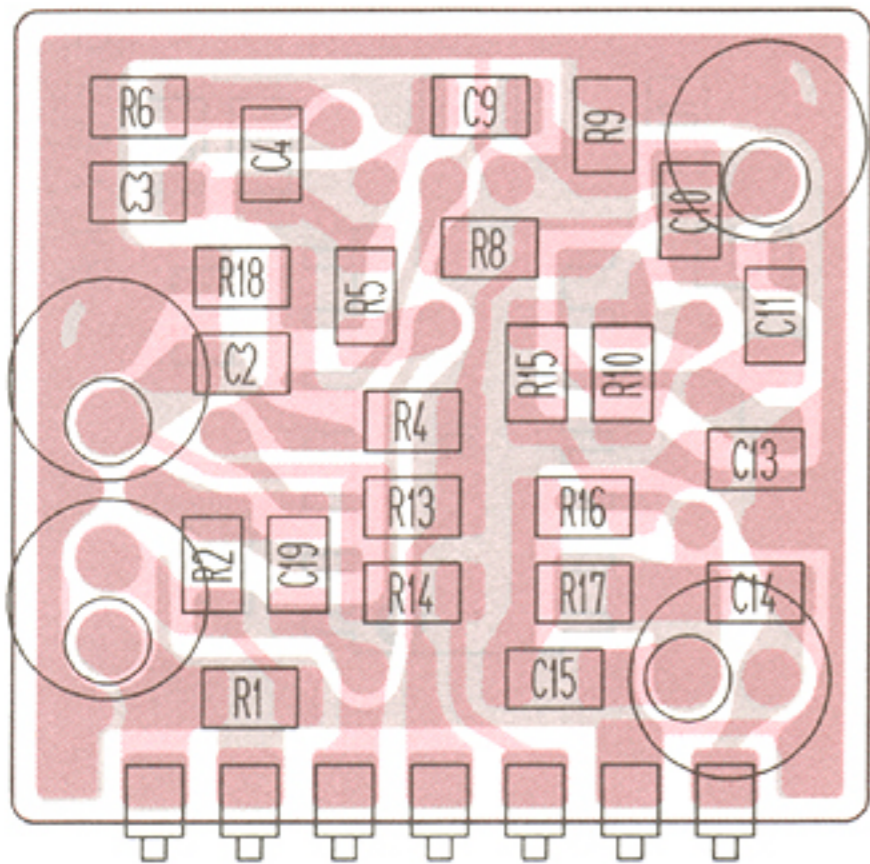


MAIN UNIT



7-7 AF FIL UNIT

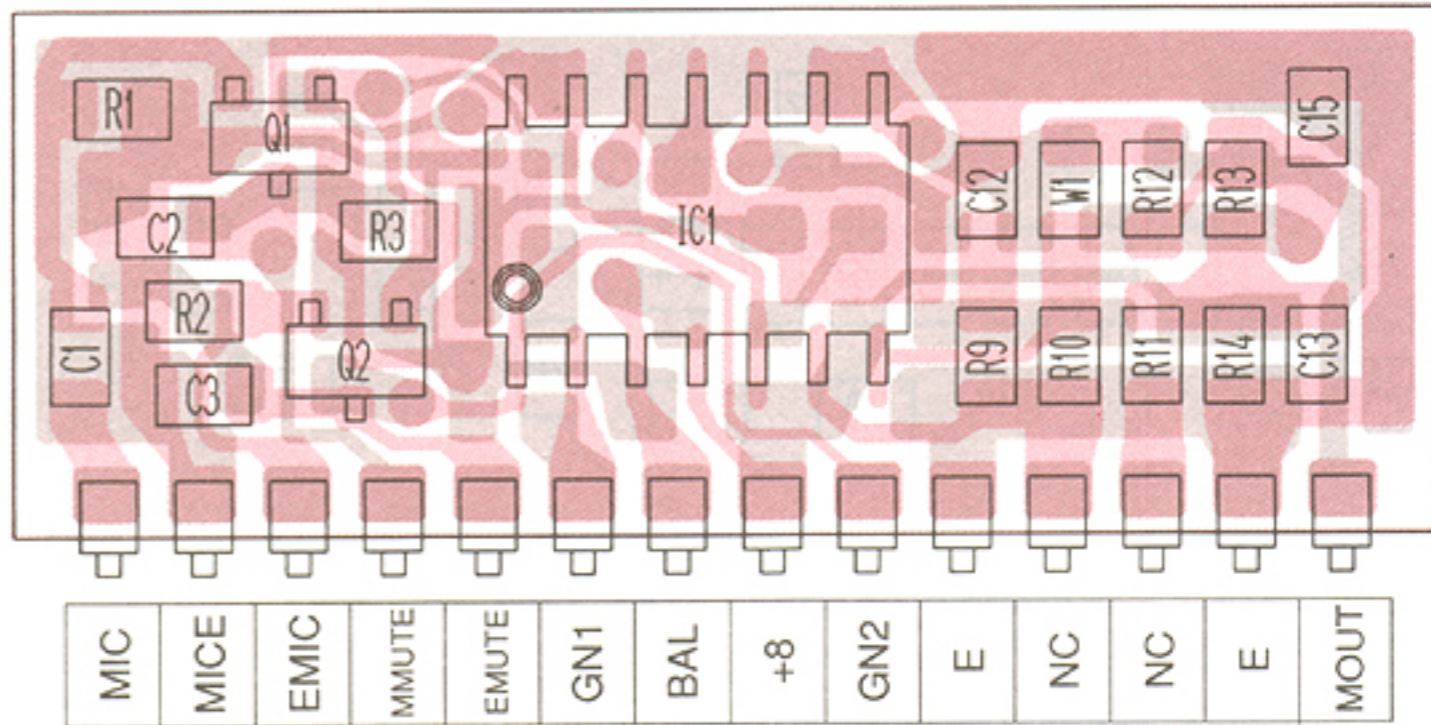
• AF FIL UNIT (TOP VIEW)



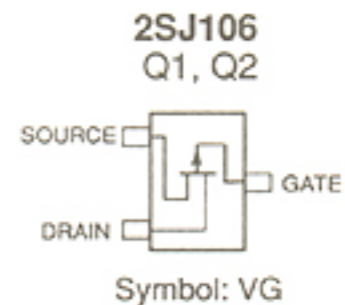
MAIN UNIT

7-8 MIC AMP UNIT

• MIC AMP UNIT (TOP VIEW)



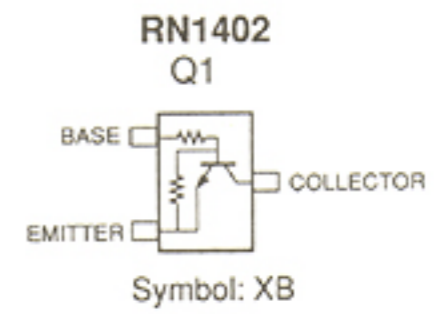
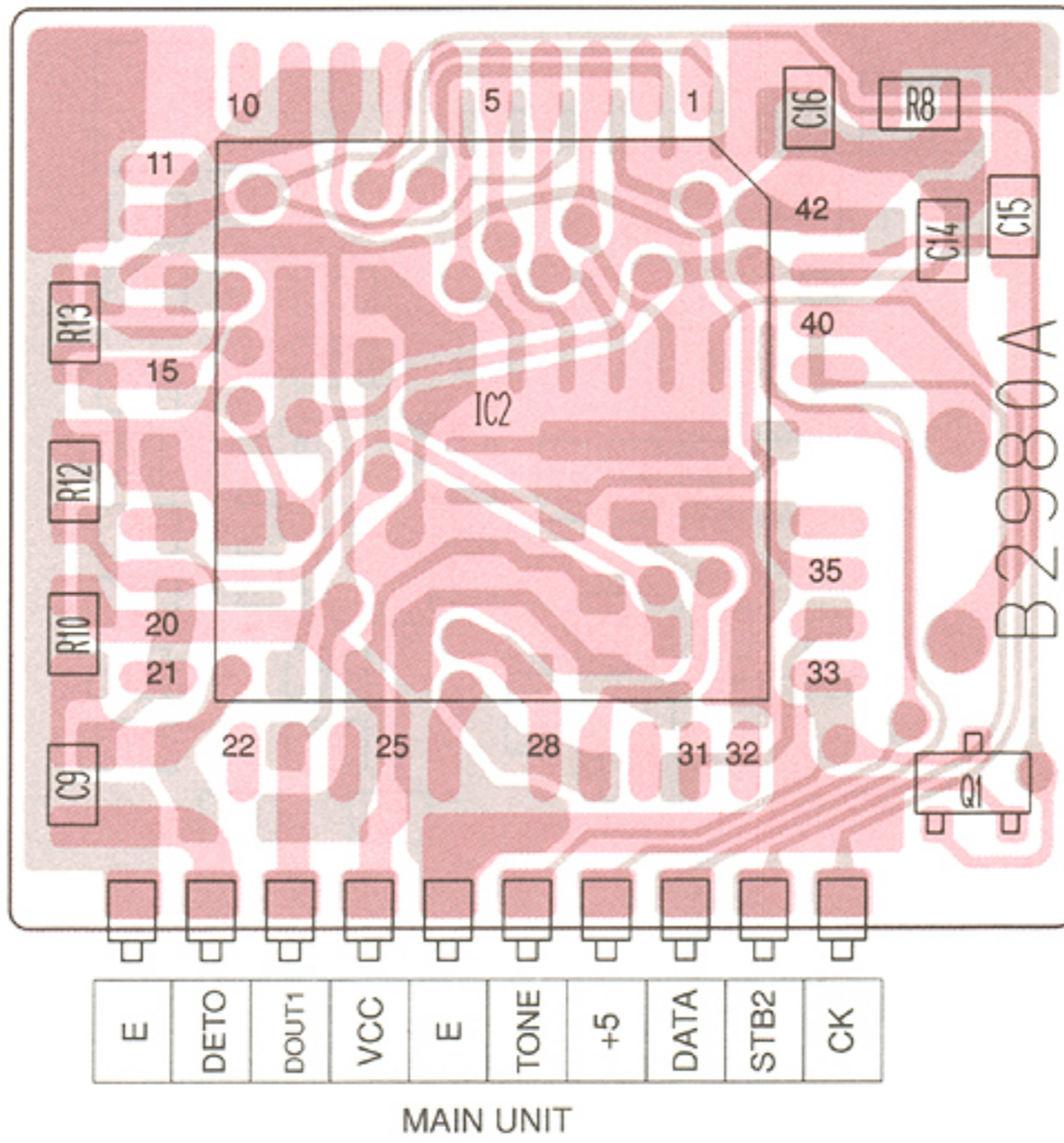
MAIN UNIT



7-6 CTCSS UNIT

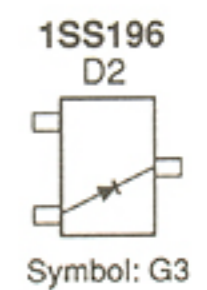
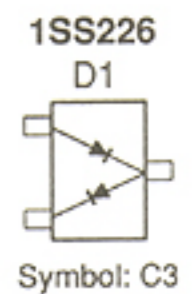
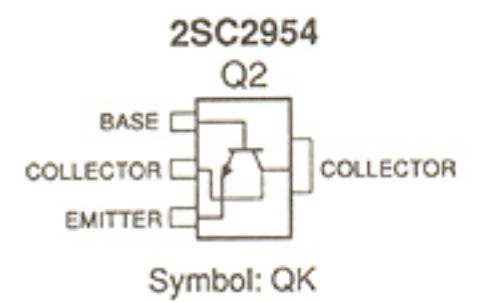
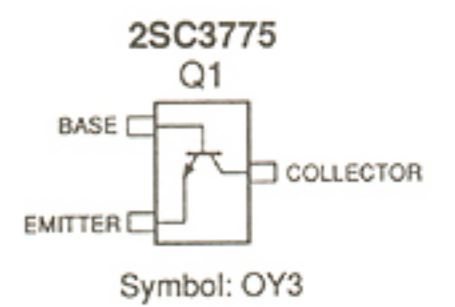
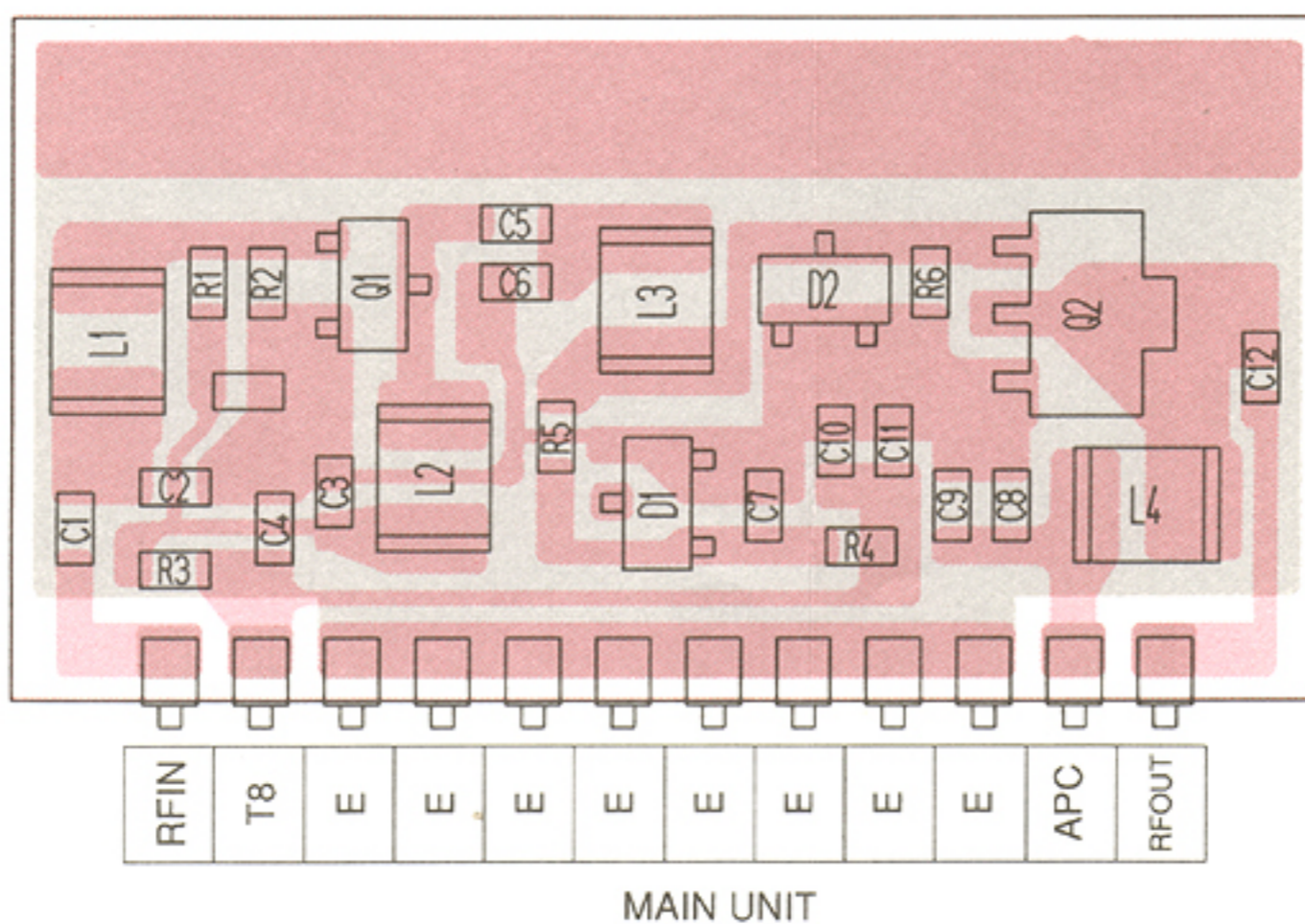
• CTCSS UNIT (TOP VIEW)

The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.

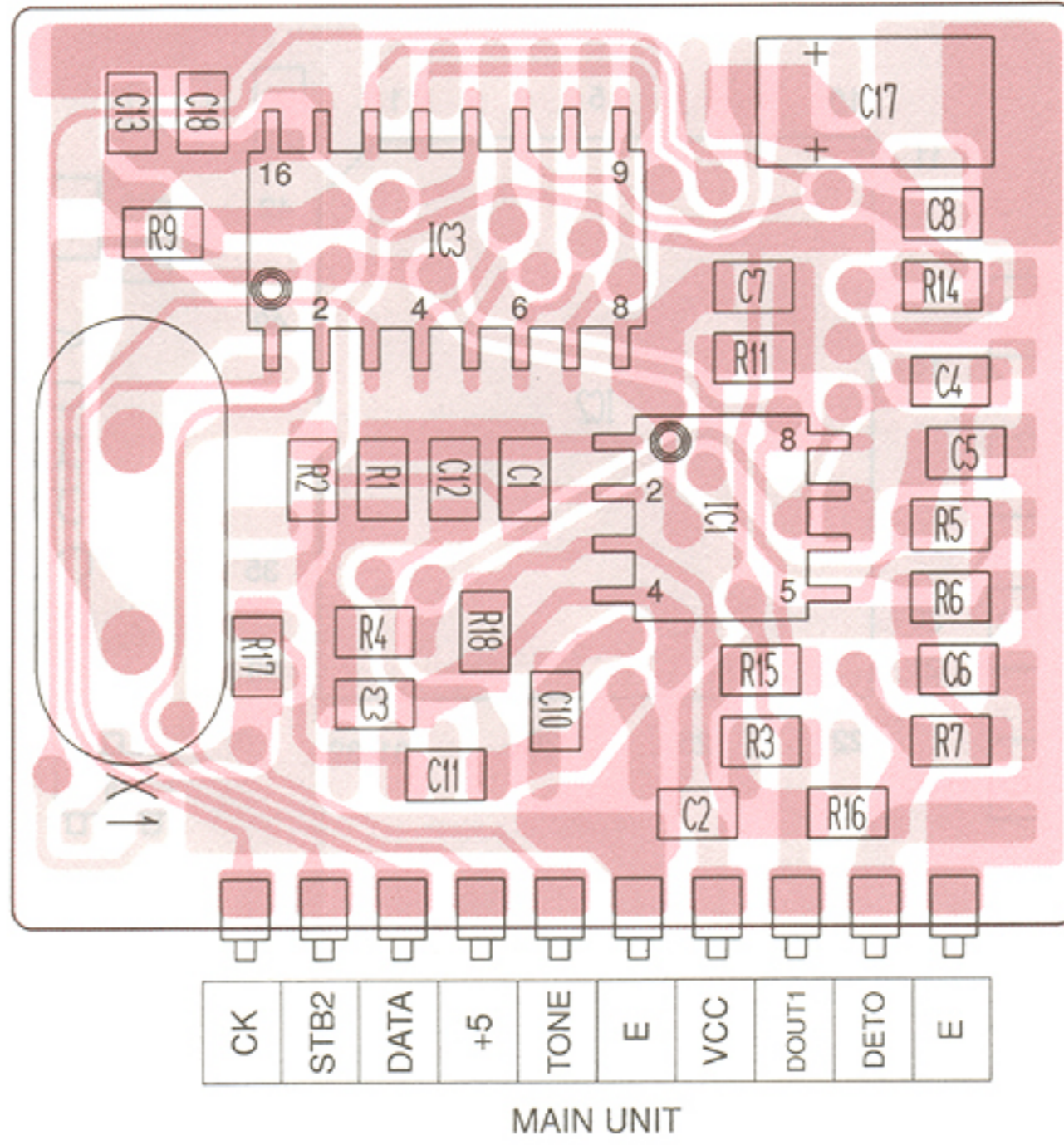


7-9 YGR UNIT

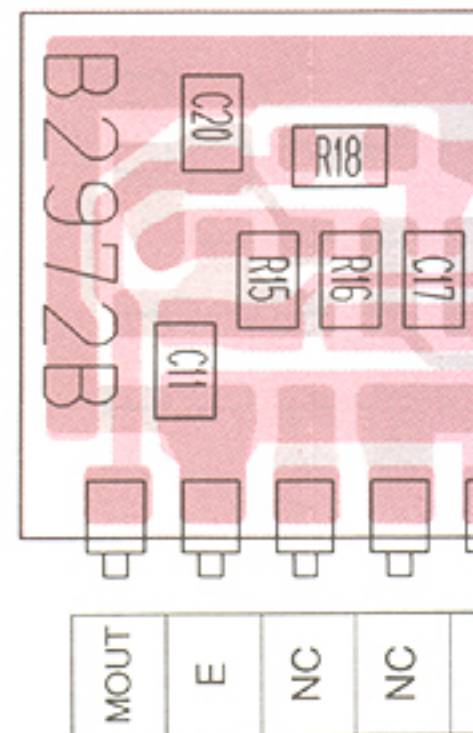
• YGR UNIT (TOP VIEW)



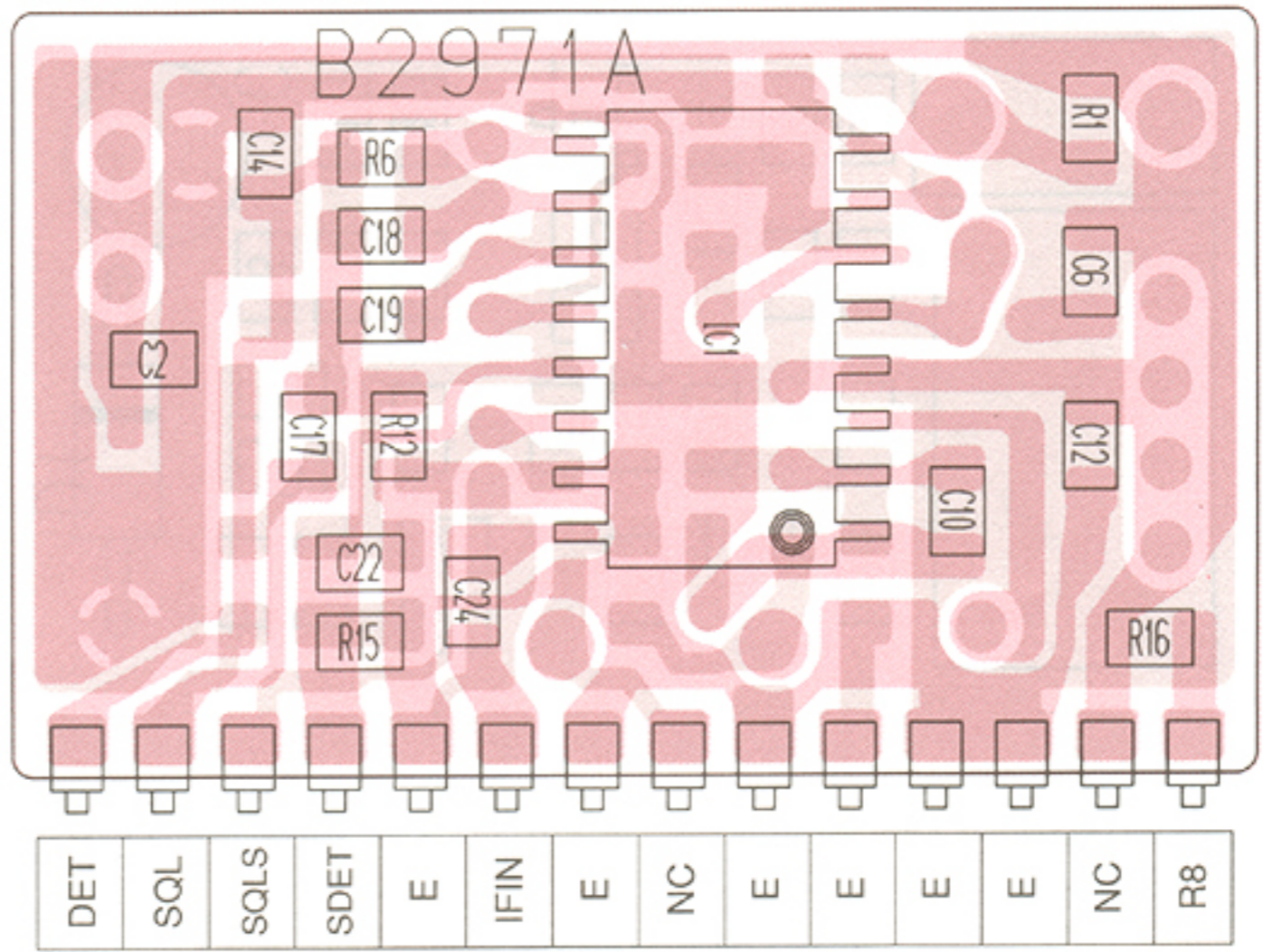
• CTCSS UNIT (BOTTOM VIEW)



• MIC AMP UNIT (BOT

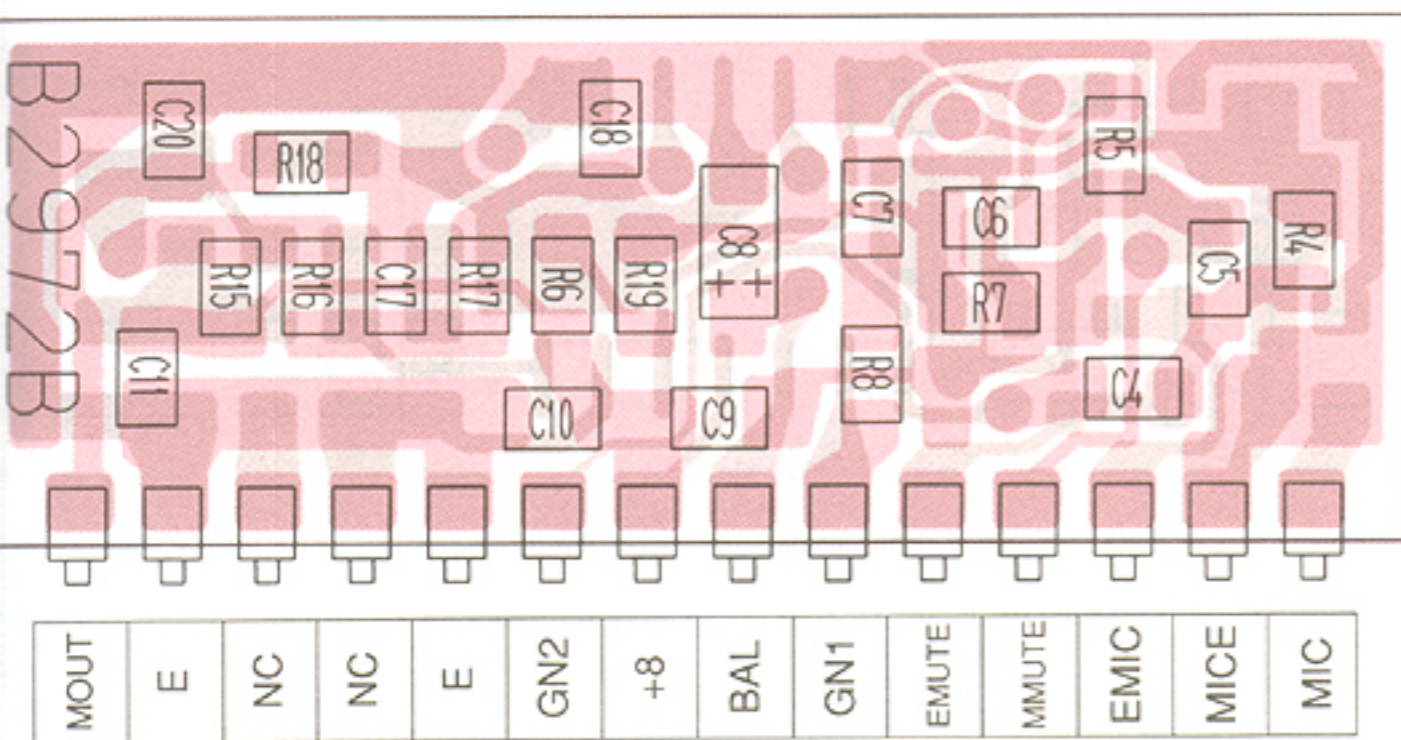


• IF UNIT (BOTTOM VIEW)



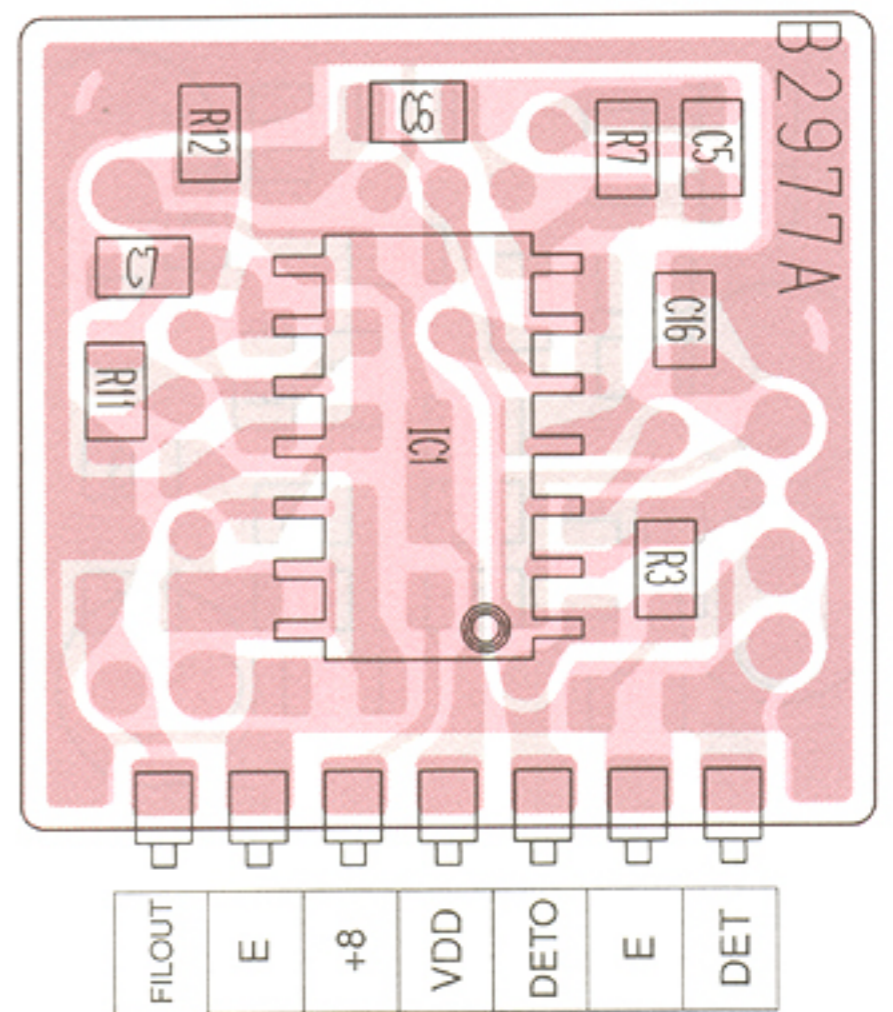
MAIN UNIT

MIC AMP UNIT (BOTTOM VIEW)



MAIN UNIT

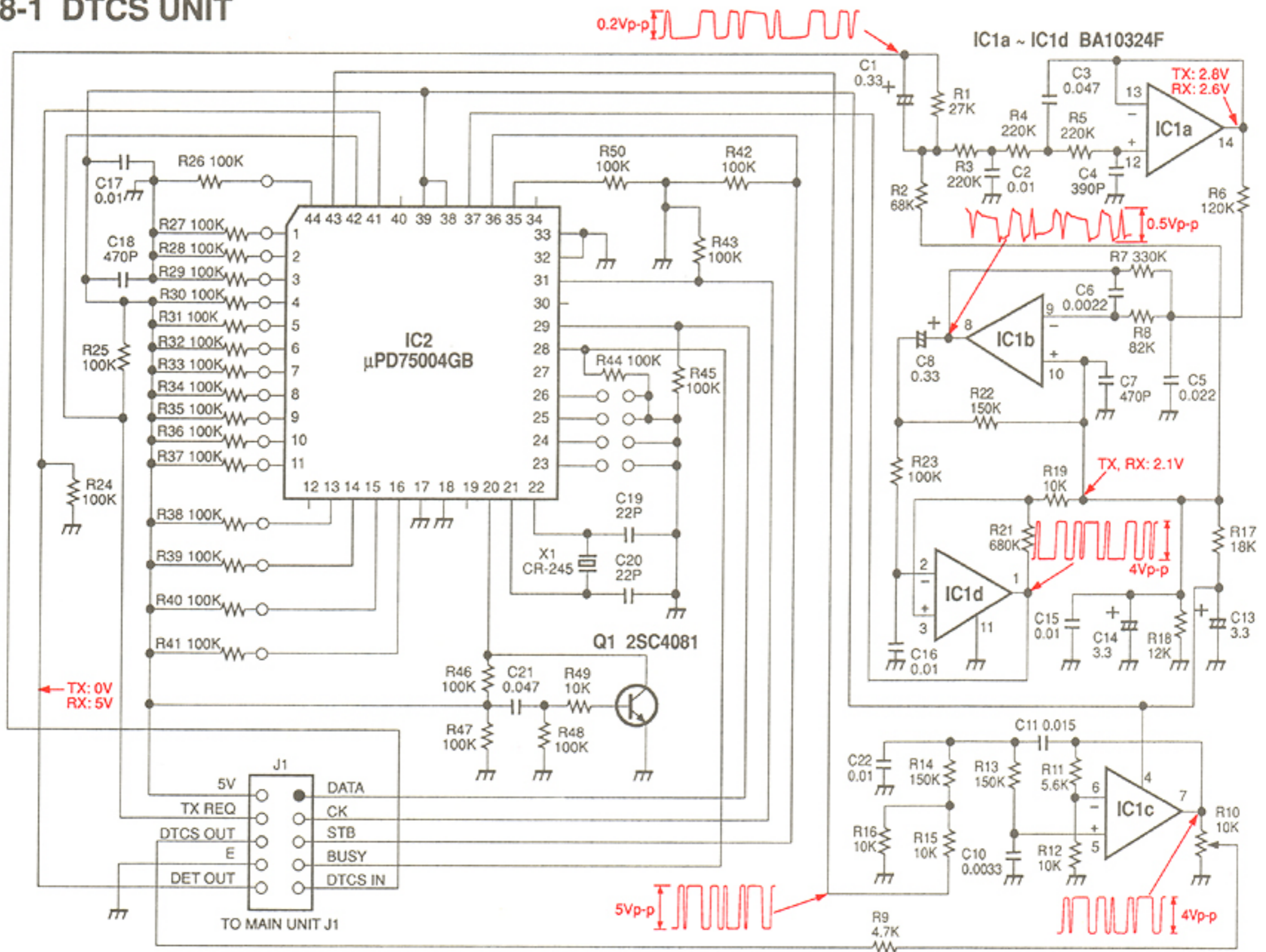
• AF FIL UNIT (BOTTOM VIEW)



MAIN UNIT

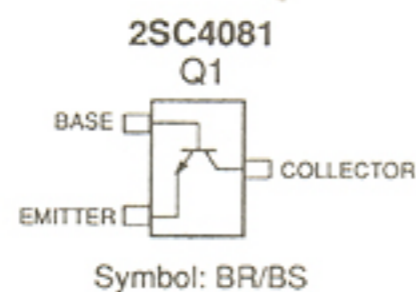
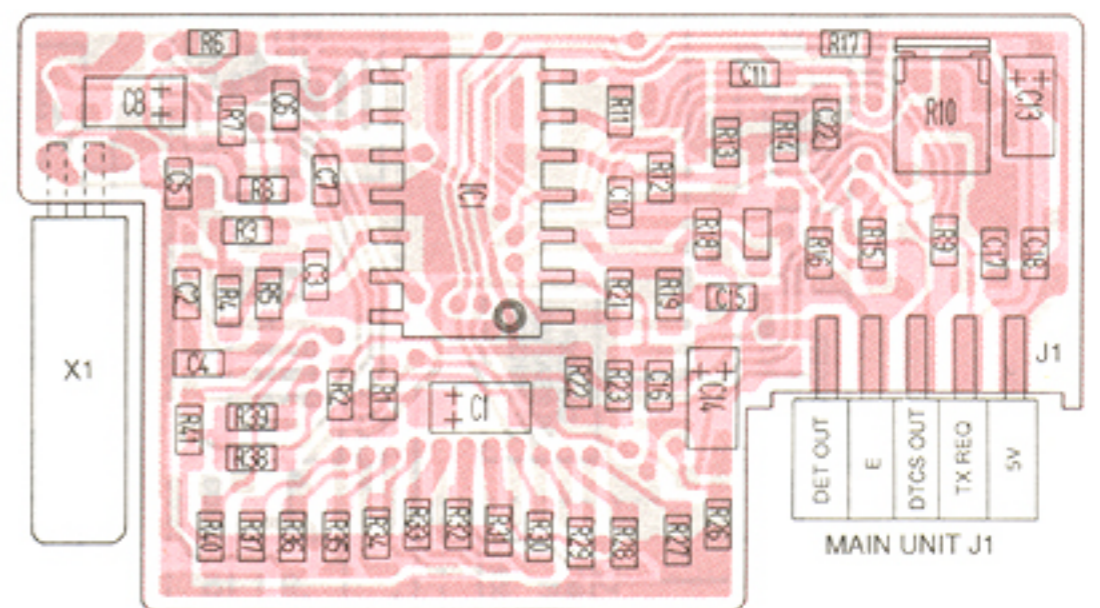
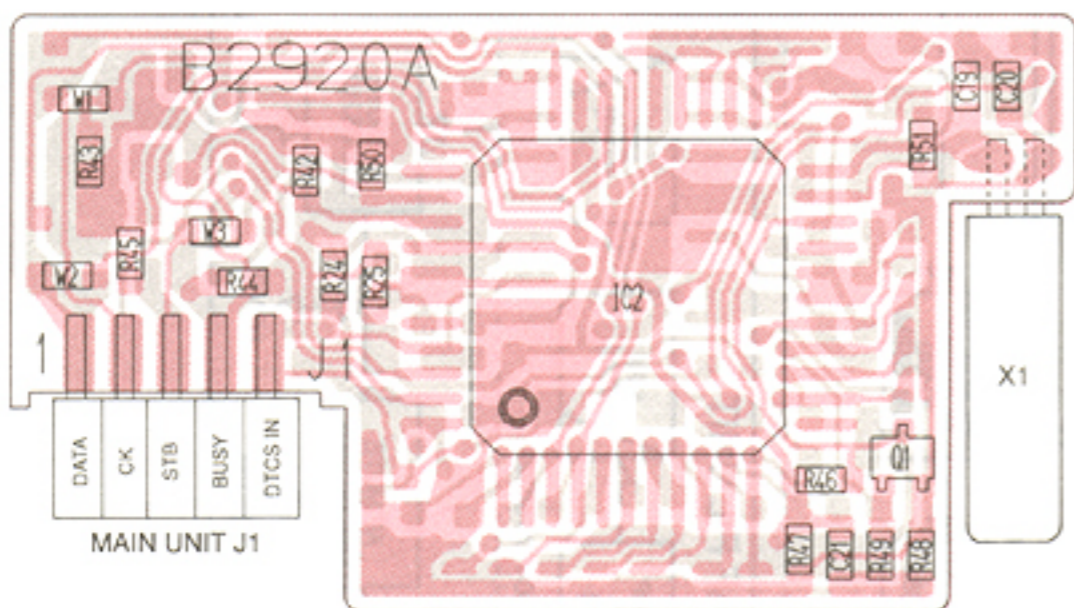
SECTION 8 OPTION UNIT

8-1 DTCS UNIT

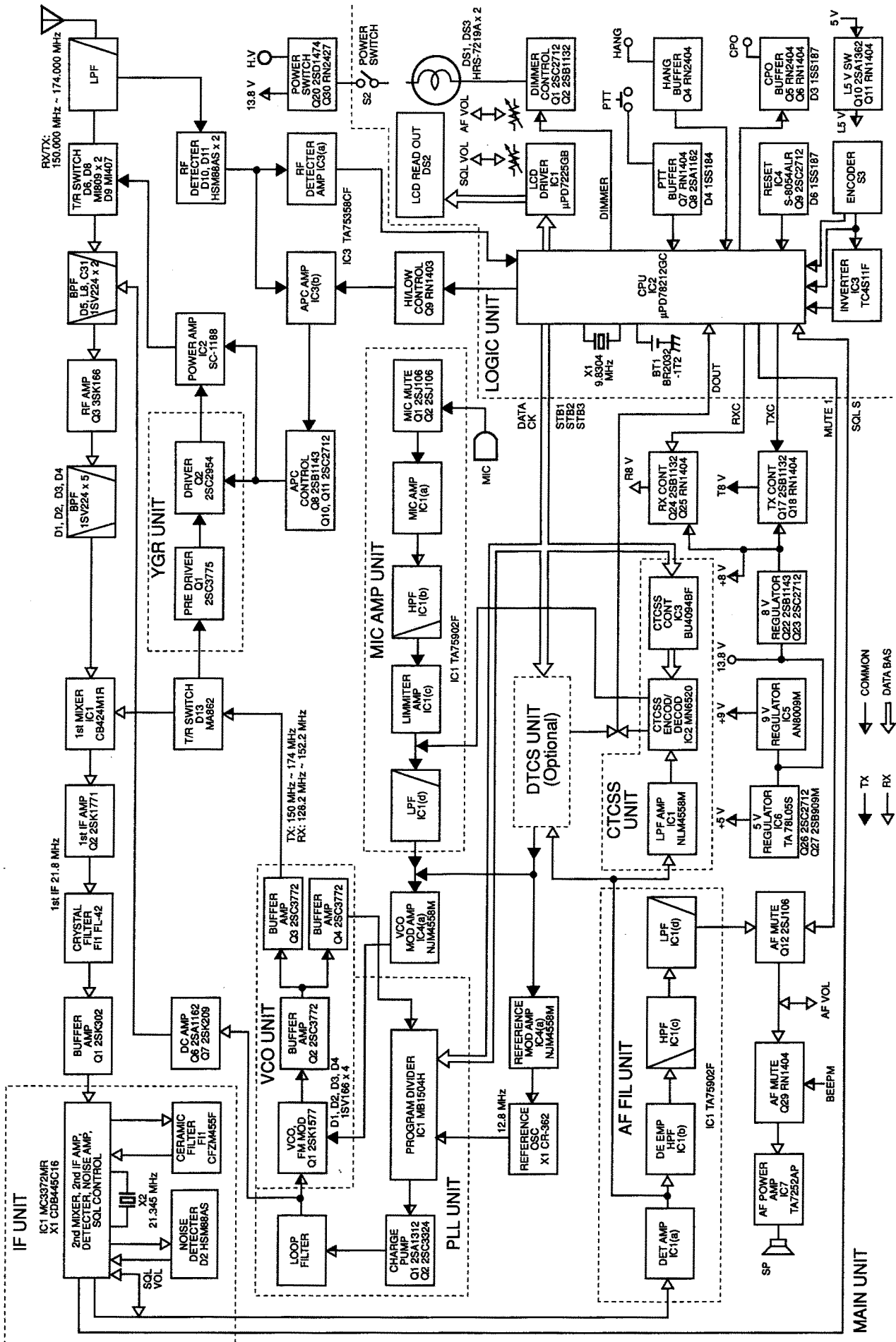


• BOARD LAYOUT (TOP VIEW)

• BOARD LAYOUT (BOTTOM VIEW)

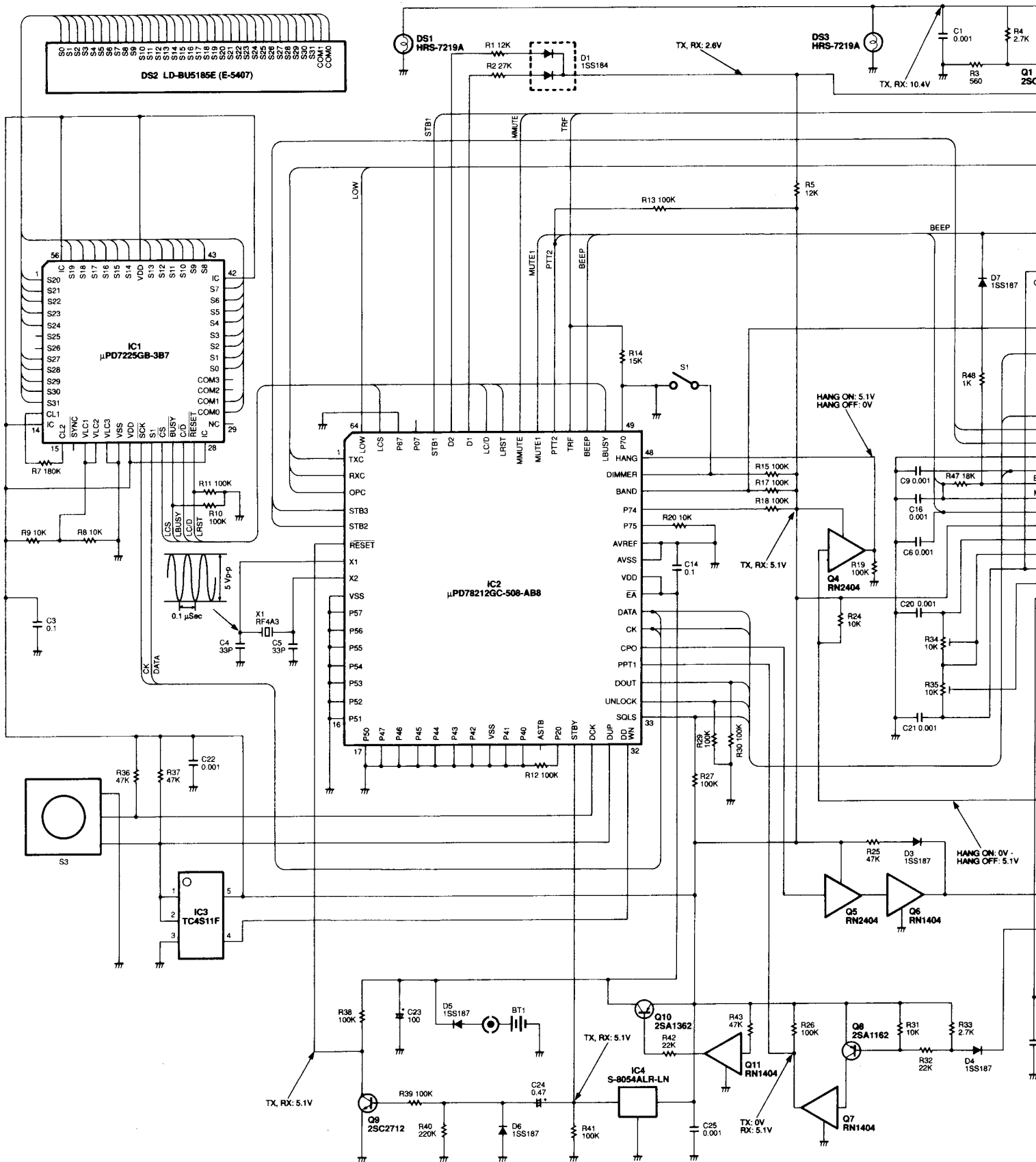


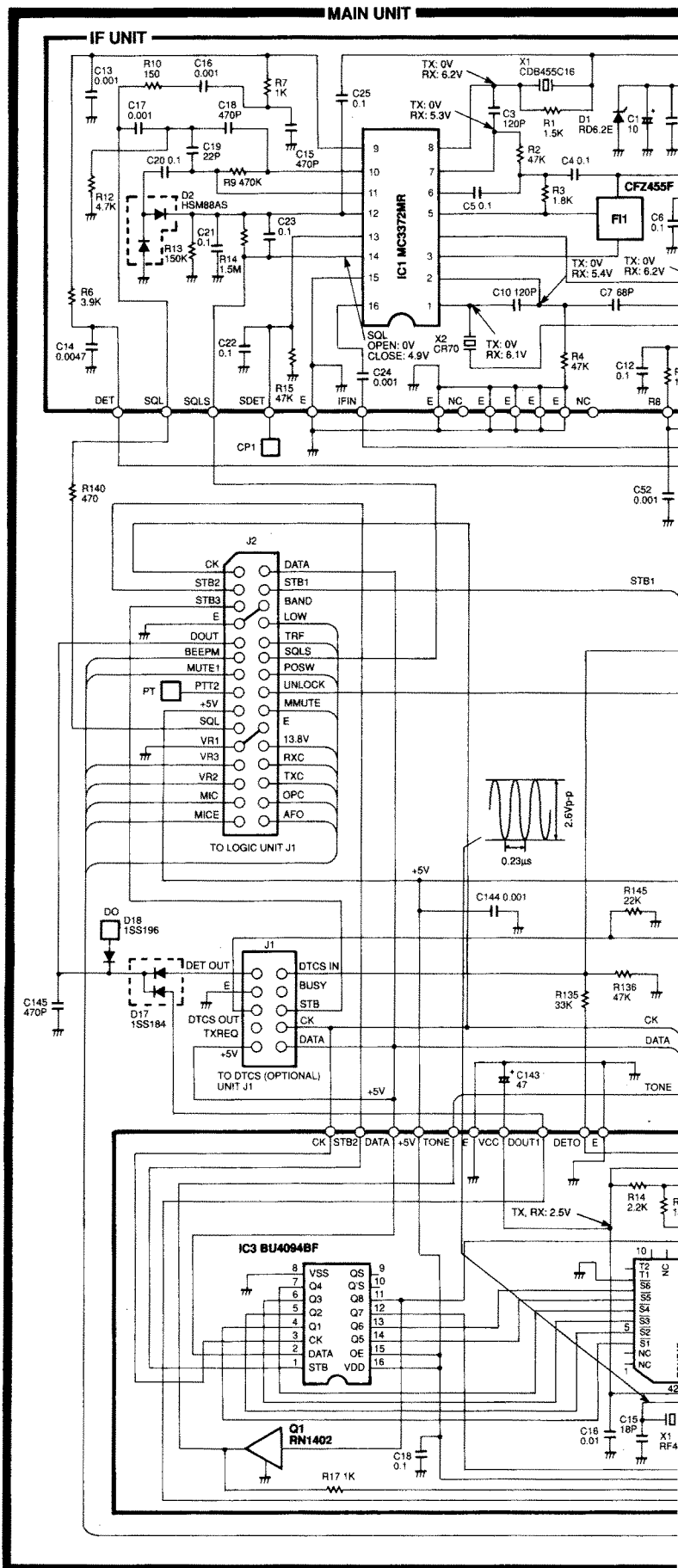
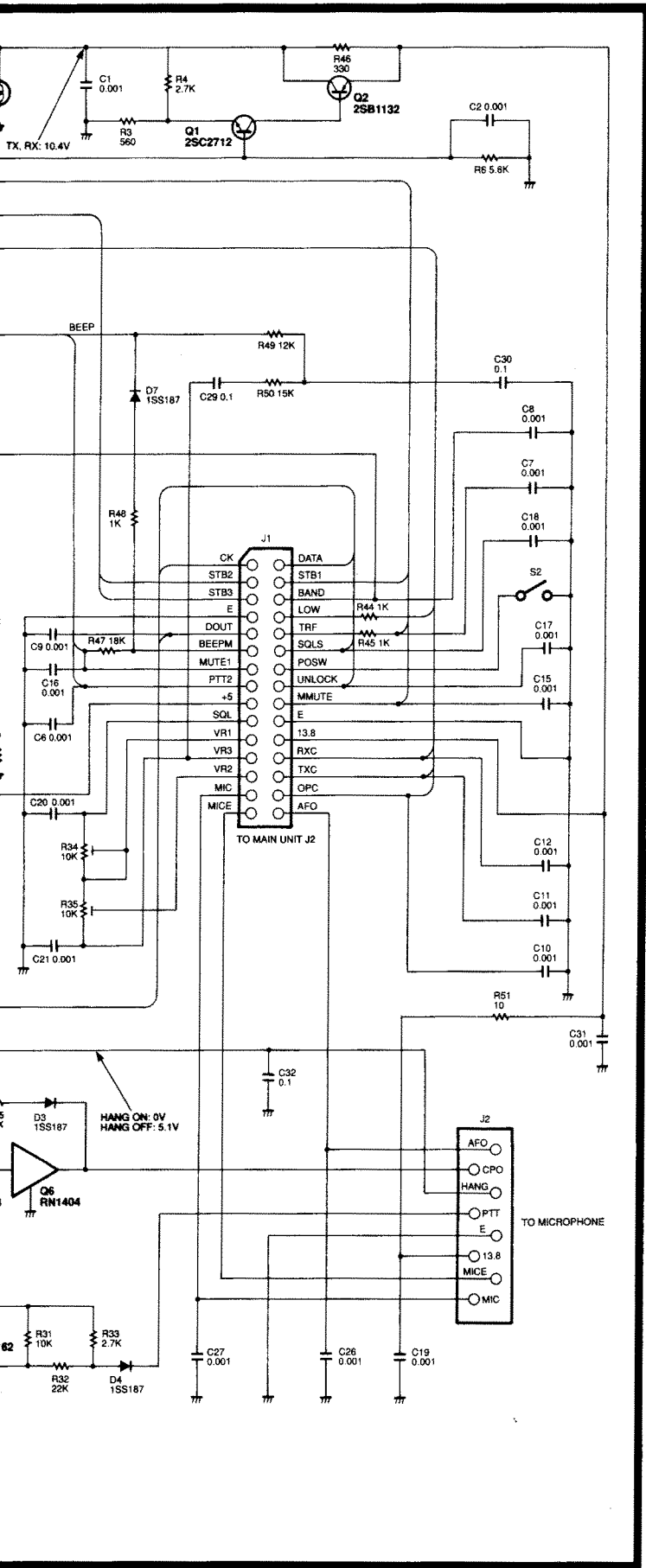
SECTION 9 BLOCK DIAGRAM

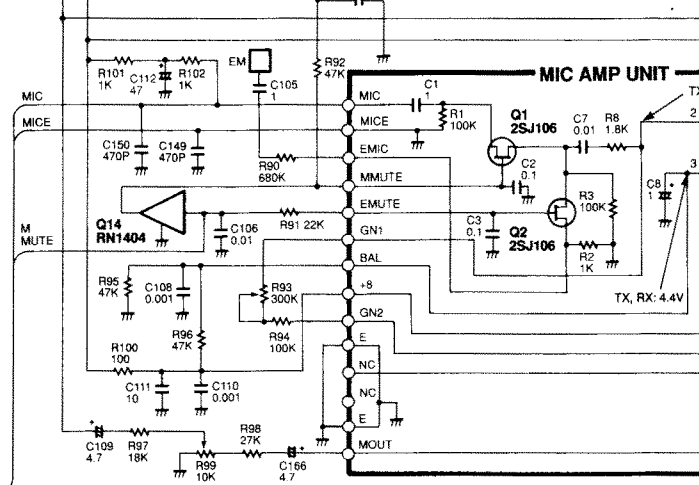
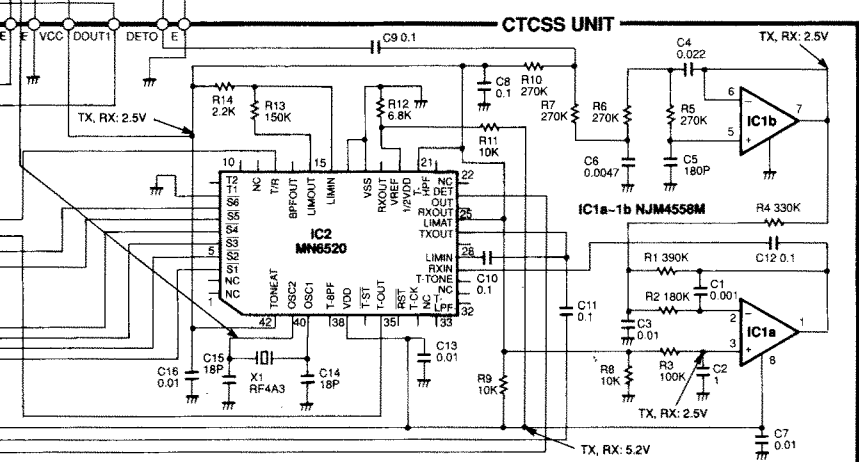
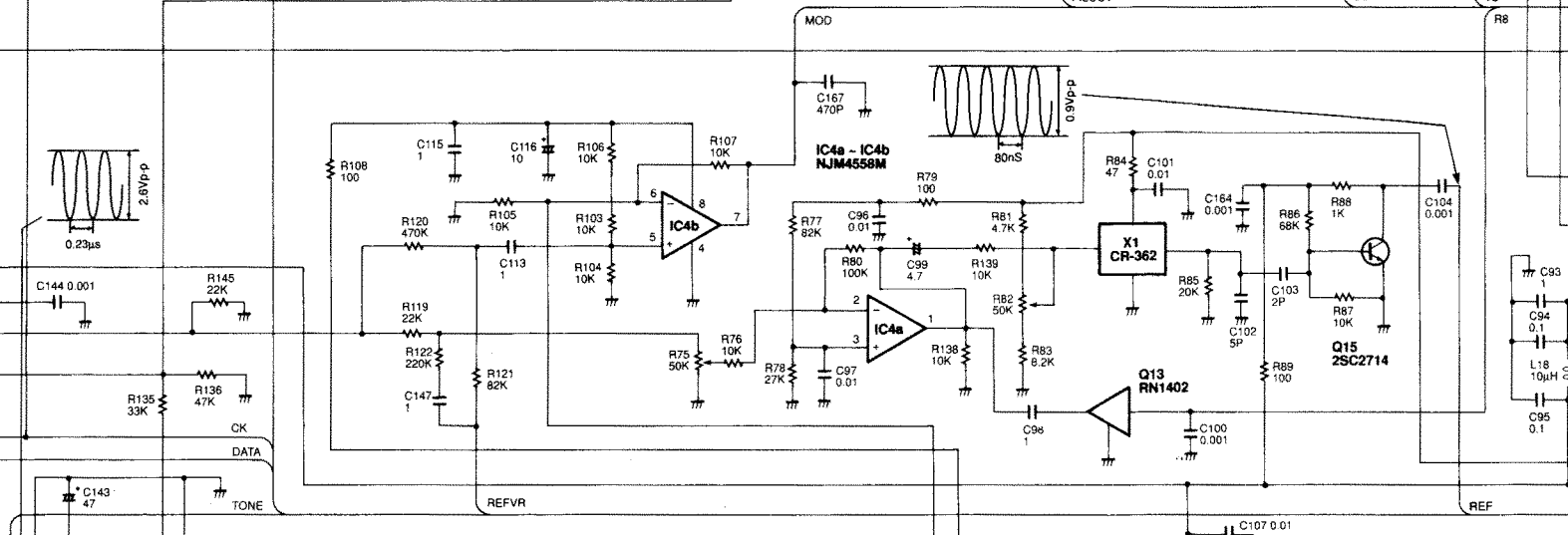
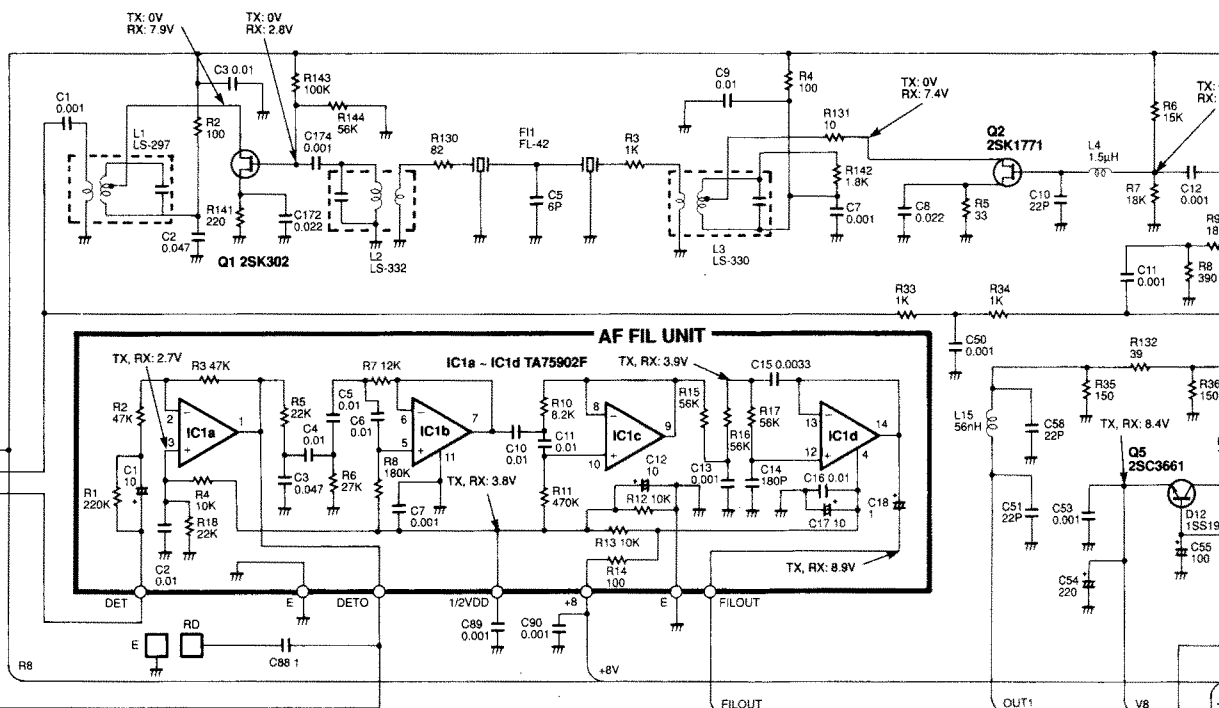
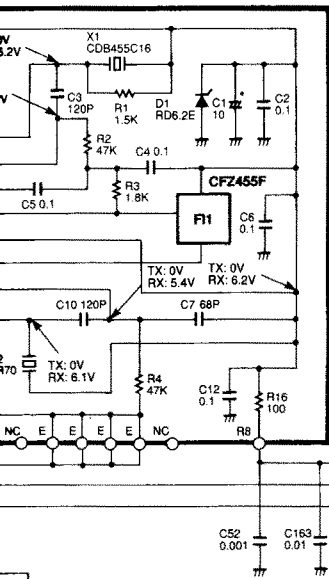


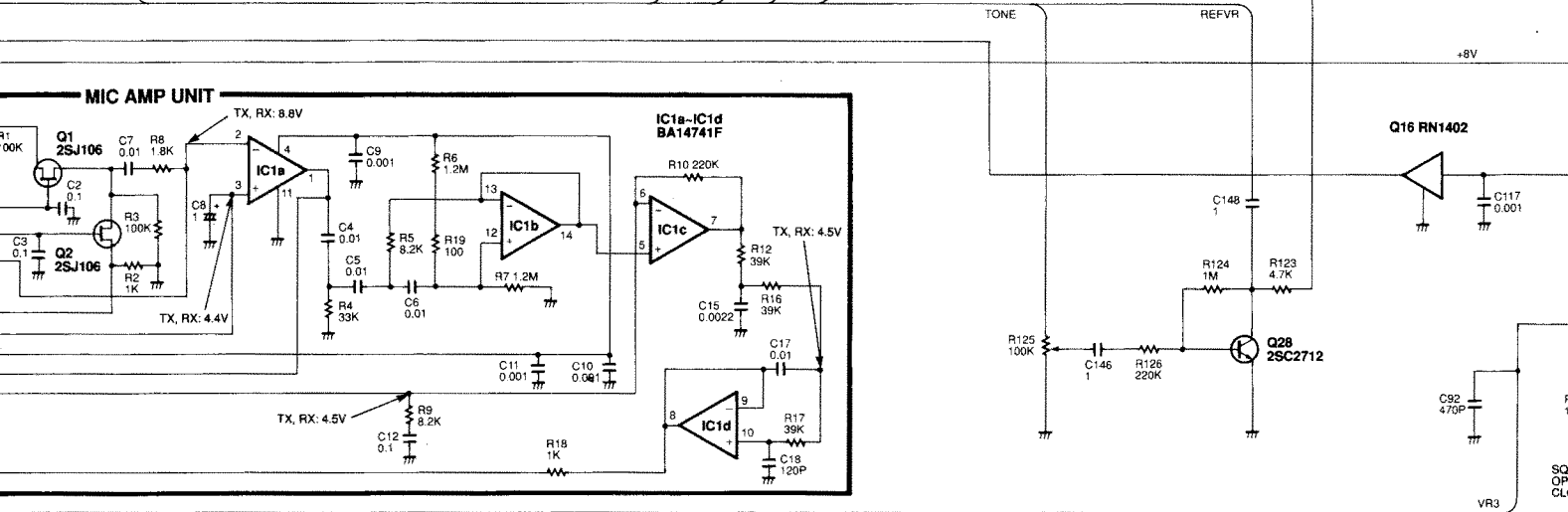
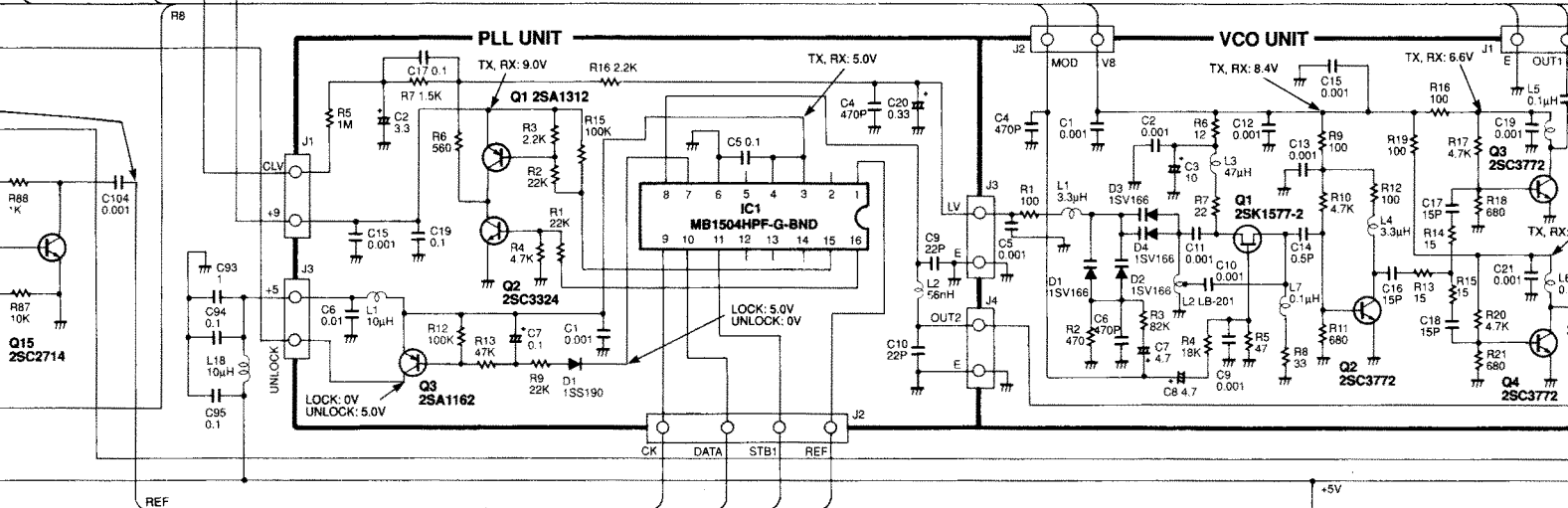
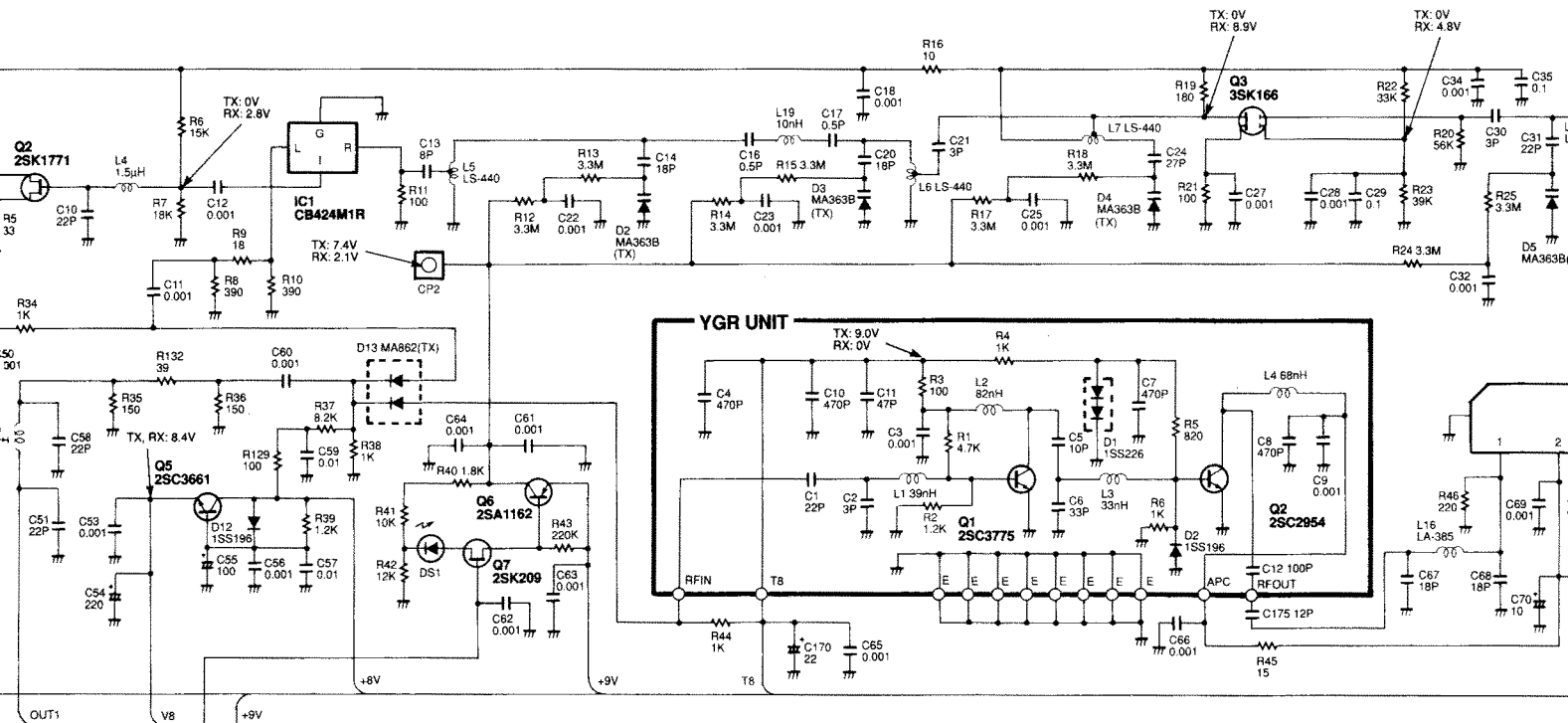
SECTION 10 VOLTAGE DIAGRAM

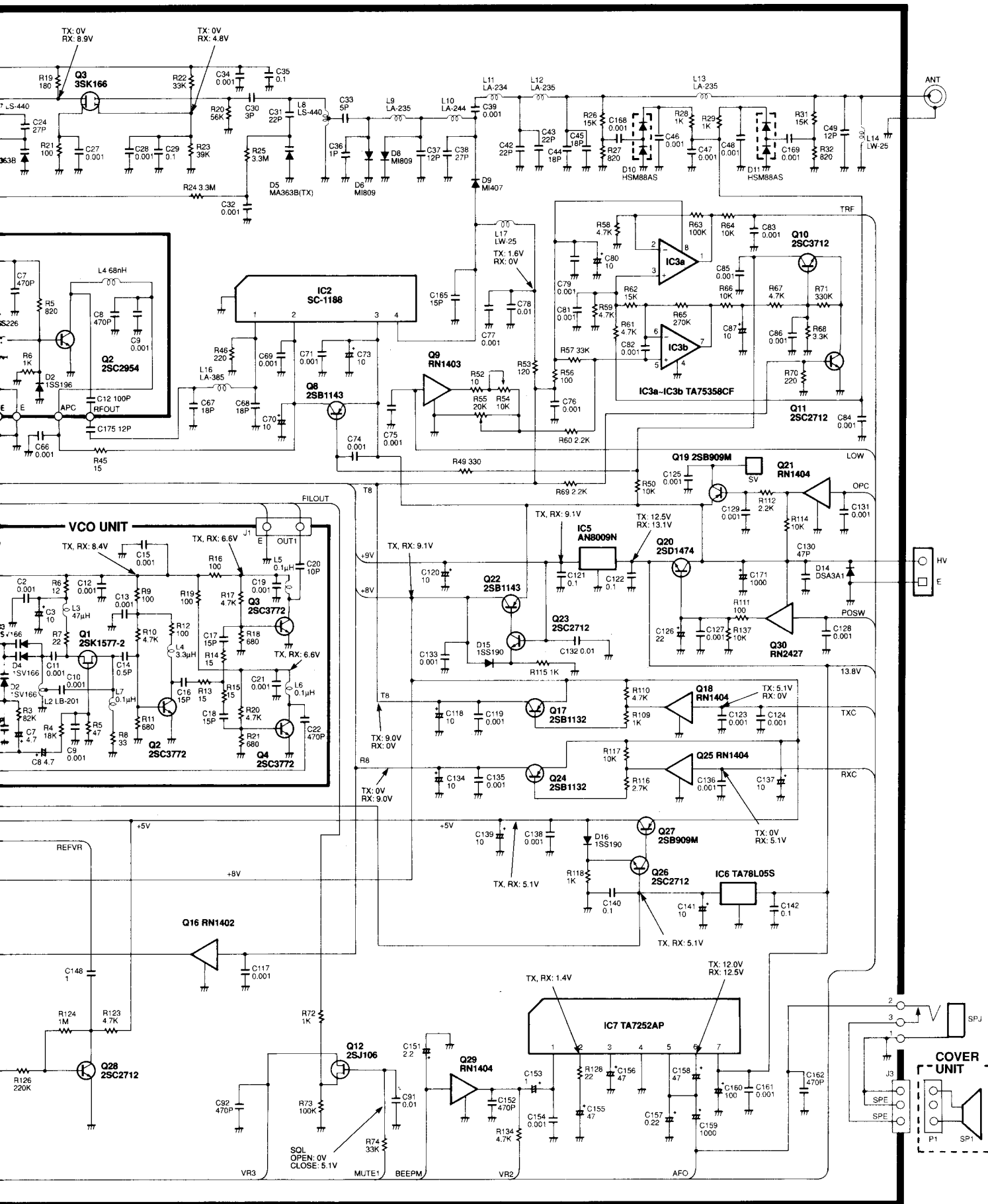
LOGIC UNIT











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