



SERVICE MANUAL

144 MHz FM TRANSCEIVER

IC-2000H

IC-2000

INTRODUCTION

This service manual describes the latest service information for the **IC-2000H/IC-2000** 144 MHz FM TRANSCEIVER at the time of publication.

MODEL	VERSION NO.	VERSION	SYMBOL
IC-2000H	#02	Europe	EUR
	#03	Italy	ITA
	#05	U.S.A.	USA
	#06	Korea	KOR
	#07	Australia	AUS
IC-2000	#04	Thailand	THA

To upgrade quality, any 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>

1140004770 S.IC HD404829C10H IC-2000H LOGIC UNIT 5 pieces
8810008660 Screw PH BT M3×8 NI ZU IC-2000H Rear panel 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 50 dB to 60 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.

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SECTION 1 SPECIFICATIONS

GENERAL

- Frequency coverage :

VERSION	RECEIVE	TRANSMIT
EUR	144.000-146.000 MHz	144.000-146.000 MHz
ITA	136.000-174.000 MHz*	144.000-148.000 MHz
THA	144.000-146.000 MHz	144.000-146.000 MHz
USA	118.000-174.000 MHz*	144.000-148.000 MHz
KOR	144.000-146.000 MHz	144.000-146.000 MHz
AUS	144.000-148.000 MHz	144.000-148.000 MHz
SEA	136.000-174.000 MHz*	144.000-148.000 MHz
- * Guaranteed frequency range is 144-148 MHz
- Mode : FM (F3)
- Memory channels : 50 channels plus 6 scan edge channels
- Antenna impedance : 50 Ω (nominal)
- Usable temperature range : -10°C to $+60^{\circ}\text{C}$ ($+14^{\circ}\text{F}$ to $+140^{\circ}\text{F}$)
- Frequency resolution : 5, 10, 12.5, 15, 20, 25, 30, 50 kHz
- Power supply requirement : 13.8 V DC $\pm 15\%$ (negative ground)
- Current drain :
 - Receive Standby: 0.8 A
 - Max. power: less than 1.0 A
 - Transmit 50 W: 10.5 A
 - 10 W: 5.5 A
 - 5 W: 4.0 A
 - (IC-2000 has no 50 W)
- Dimensions : 150 (W) \times 50 (H) \times 151 (D) mm
5.9 (W) \times 2.0 (H) \times 5.9 (D) in (projections not included)
- Weight : 1.2 kg; 2.6 lb

TRANSMITTER

- Modulation system : Variable reactance frequency modulation
- RF output power :

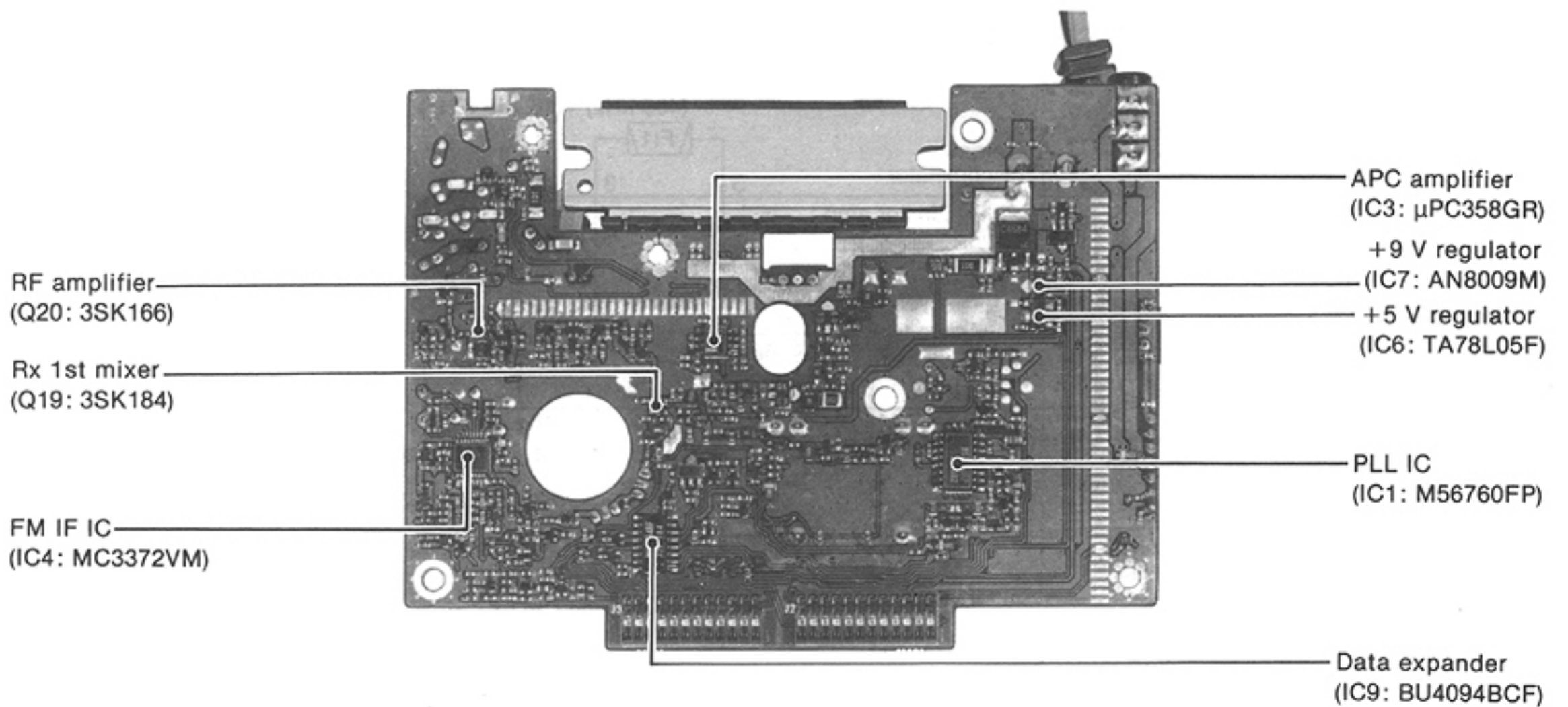
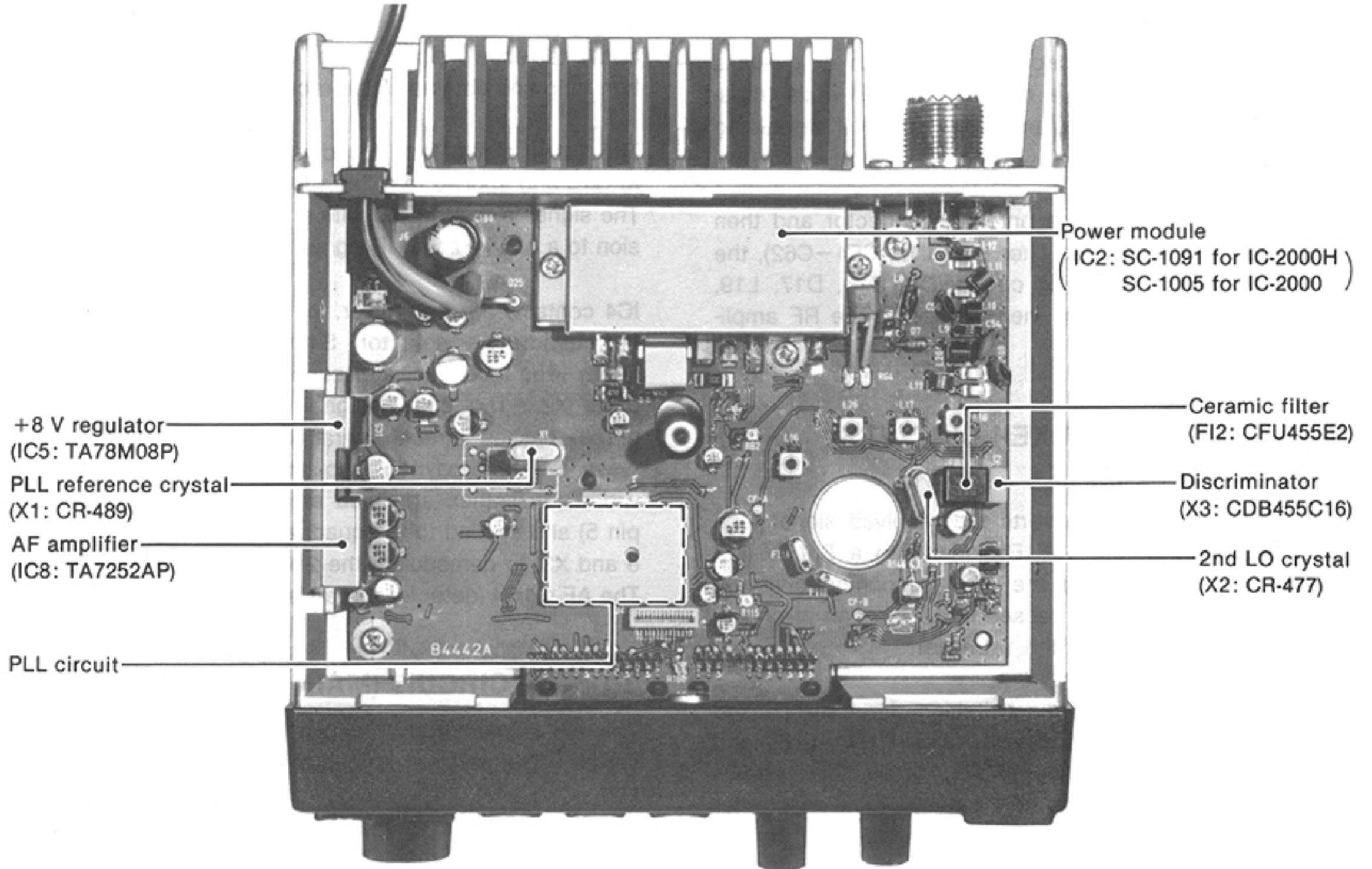
Model	Power Range		
	High	Middle	Low
IC-2000H	50 W	10 W	5 W
IC-2000	10 W	—	5 W
- Max. frequency deviation : ± 5.0 kHz
- Spurious emissions : Less than -60 dB
- Frequency stability : ± 10 ppm (-10°C to $+60^{\circ}\text{C}$)
- Microphone impedance : 600 Ω

RECEIVER

- Receiving system : Double conversion superheterodyne
- Intermediate frequencies :
 - 1st 17.2 MHz
 - 2nd 455 kHz
- Sensitivity : 0.18 μV for 12 dB SINAD
- Squelch threshold sensitivity : Less than 0.13 μV
- Selectivity :
 - More than 15 kHz/ -6 dB
 - Less than 30 kHz/ -60 dB
- Spurious and image rejection ratio : More than 60 dB
- Audio output power : More than 2.4 W at 10% distortion with an 8 Ω load

SECTION 2 INSIDE VIEWS

• MAIN UNIT



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 a resonator circuit while transmitting. The circuit does not allow transmit signals to enter receiver circuits.

Received signals enter the antenna connector and then pass through the low-pass filter (L9–L12, C54–C62), the $\lambda/4$ type antenna switching circuit (D7, D16, D17, L19, L20, C107, C108) and are then applied to the RF amplifier (Q20).

3-1-2 RF AND 1st MIXER CIRCUITS (MAIN UNIT)

The 1st mixer circuit converts the received signal to a fixed frequency of the 1st IF signal with a PLL output frequency. By changing the PLL frequency, only the desired frequency will be passed through a pair of crystal filters at the next stage of the 1st mixer.

The signals from the antenna switching circuit are passed through the tunable band-pass filter (D14, L18) and amplified at the RF amplifier (Q20). The amplified signals are again passed through the tunable band-pass filter (D10, D13, D31, L16, L17, L26) and applied to the 1st mixer (Q19). The signals are then mixed with a 1st LO signal coming from the VCO circuit to produce a 17.2 MHz 1st IF signal. The 1st IF signal is passed through a pair of crystal filters (F11) and is then applied to the IF amplifier (Q18).

3-1-3 2nd IF AND DEMODULATOR CIRCUITS (MAIN UNIT)

The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts receive signal twice) improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the crystal filter (F11) is amplified at Q18 and applied to a 2nd mixer section of IC4 (pin 16). The signal is then mixed with a 2nd LO signal for conversion to a 455 kHz 2nd IF signal.

IC4 contains the 2nd mixer, local oscillator, limiter amplifier, quadrature detector, S-meter detector and active filter. The local oscillator section generates 16.745 MHz using X2. The 2nd IF signal from the 2nd mixer (IC4 pin 3) passes through ceramic filters (F12) to remove unwanted heterodyned frequency and fix a passband width. It is then amplified at the limiter amplifier (IC4, pin 5) and applied to the quadrature detector (IC4, pins 7, 8 and X3) to demodulate the 2nd IF signal into AF signal. The AF signal (detector signal) is output from pin 9.

3-1-4 AF CIRCUIT (MAIN UNIT)

The AF signals from IC4 (pin 9) pass through the AF switch (Q30) and are amplified at the active filters (Q32 HPF; Q33 LPF). Those signals pass through the detector mute switch (Q37), and are level adjusted with the volume control on the LOGIC unit.

The AF amplifier IC8 amplifies the signals to a sufficient level to drive the speaker. The AF mute switch (Q40) turns ON to cut the signal to be input to the AF amplifier (IC8) during transmission.

• FM DETECTOR and SQUELCH CIRCUITS

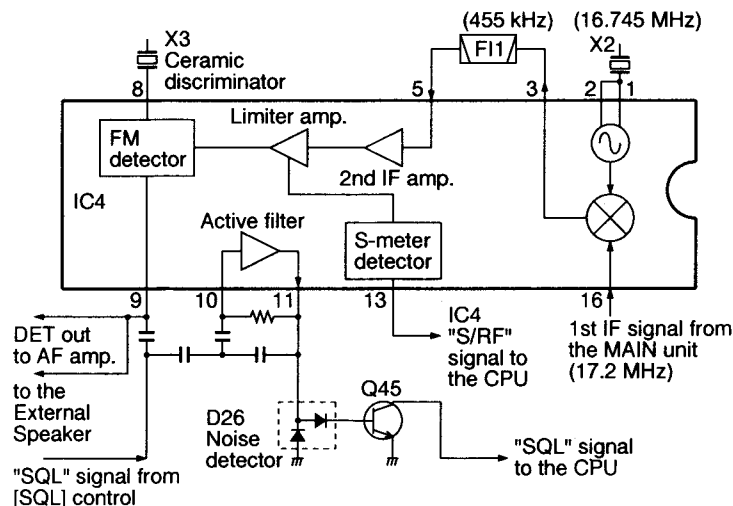


Fig. 1

The AF OUT signals from the VOL1 line are also amplified at the AF amplifier (LOGIC unit Q2) to output AF signal from the microphone connector.

3-1-5 SQUELCH CIRCUIT (MAIN and LOGIC UNITS)

A squelch circuit cuts out AF signals when no RF signals are being received. By detecting noise components in the AF signals, the squelch circuit turns the AF mute switch OFF.

A portion of the AF signals from the FM IF IC (IC4 pin 9) are applied to the active filter (IC4 pin 10) through the noise filter (C145—C147, R128). The active filter section in IC4 amplifies noise components of frequency of 20 kHz and above, and are rectified at the noise detector (D26) and then triggers the noise switch (Q45).

The noise switch (Q45) converts the rectified signals to a "High" or "Low" signal and applied this to the CPU (LOGIC unit IC2 pin 5) as the busy signal. When the CPU receives "High," the CPU outputs the mute signal through the Data expander IC (MAIN unit IC9, pin 11) to cut the AF signals at the detector mute switch (Q37).

Even when the squelch is closed, the AF mute switch (Q40) opens at the moment of emitting been tones.

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER (LOGIC UNIT)

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

The AF signals from the microphone through the mic mute switch (Q4), and are amplified at the microphone amplifier (Q5) and the limiter amplifier (IC1a) which has a negative feedback circuit for +6 dB/octave pre-emphasis.

The amplified signals are applied to the low-pass filter (IC1b) to filter out RF components and then applied to the MAIN unit as the "MOD" signal.

3-2-2 MODULATION CIRCUIT (MAIN UNIT)

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

The audio signals (MOD) change the reactance of D19 on the VCO circuit (Q22, Q23, D19) to modulate the oscillated signal at the VCO (Q22, Q23). The oscillated signal is amplified at the buffer amplifier (Q24) and LO amplifier (Q25, Q26), then applied to the drive amplifiers.

3-2-3 DRIVE/POWER AMPLIFIER CIRCUITS (MAIN UNIT)

The signal from the modulation circuit is passed through the transmit/receive switching circuit (D2) and amplified at the pre-driver (Q11), driver (Q12), and the power module (IC2) in sequence to obtain 50 W* (at 13.8 V DC) of RF power.

* 10 W for the IC-2000 Thailand version.

The amplified signal is passed through the antenna switching circuit (D7), APC detector circuit (L10, D8, D9), and low-pass filter (L11, L12, C61, C62) and is then applied to the antenna connector.

The collector current of the driver (Q12) are controlled by the APC circuit to protect the power module from a mismatched condition as well as to stabilize the output power.

3-2-4 APC CIRCUIT (MAIN UNIT)

The APC circuit protects the power module (IC2) from a mismatched output load and selects High or Low output power.

The APC detector circuit (L10, D8, D9) detects forward signals and rectified signals at D8 and D9 respectively. The combined voltage is at a minimum level when the antenna is matched at 50 Ω and is increased when it is mismatched.

The detected voltage is applied to the inverting amplifier (IC3a) to control the base of Q16 and input current of IC2 (pin 2) and Q12 using Q13.

When the antenna impedance is mismatched, negative input voltage of the inverting amplifier (IC3a) increases, and the base voltage of Q16 and the collector current of Q13 decreases to reduce the output power.

• APC CIRCUIT

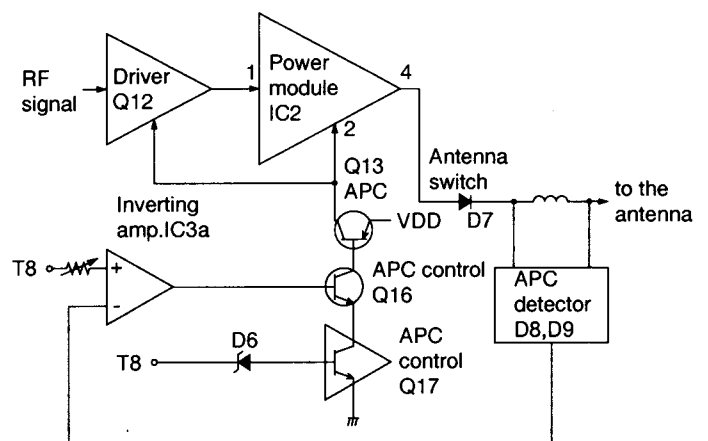


Fig. 2

3-3 PLL CIRCUITS (MAIN 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 the divided ratio (N-data) of a programmable divider.

The VCO (Q22, Q23, D19) generates the desired frequency. The signal is buffer-amplified at Q24, then applied to the PLL IC (IC1). The PLL IC contains a prescaler, programmable divider, and a phase detector, etc.

The entered signal is divided at the prescaler and programmable counter sections by the N-data ratio from the CPU. The divided signals are detected on phase at the phase detector using the reference frequency (5 kHz or 6.25 kHz).

If the oscillated signal drifts, the phase of its frequency changes from the reference frequency, causing a lock voltage change to compensate for the drift in the oscillated frequency.

VCO signals are amplified at the buffer amplifiers and are then applied to the receive 1st mixer (Q19) or transmitter circuit (Q11).

The lock voltage is also used for the receiver tunable band-pass filter of the receiver circuit to match the filter's center frequency to the desired receive frequency. The lock voltage is amplified at the buffer amplifier Q8 and then applied to the tunable band-pass filter (D10, D13, D14, D31).

• PLL CIRCUIT

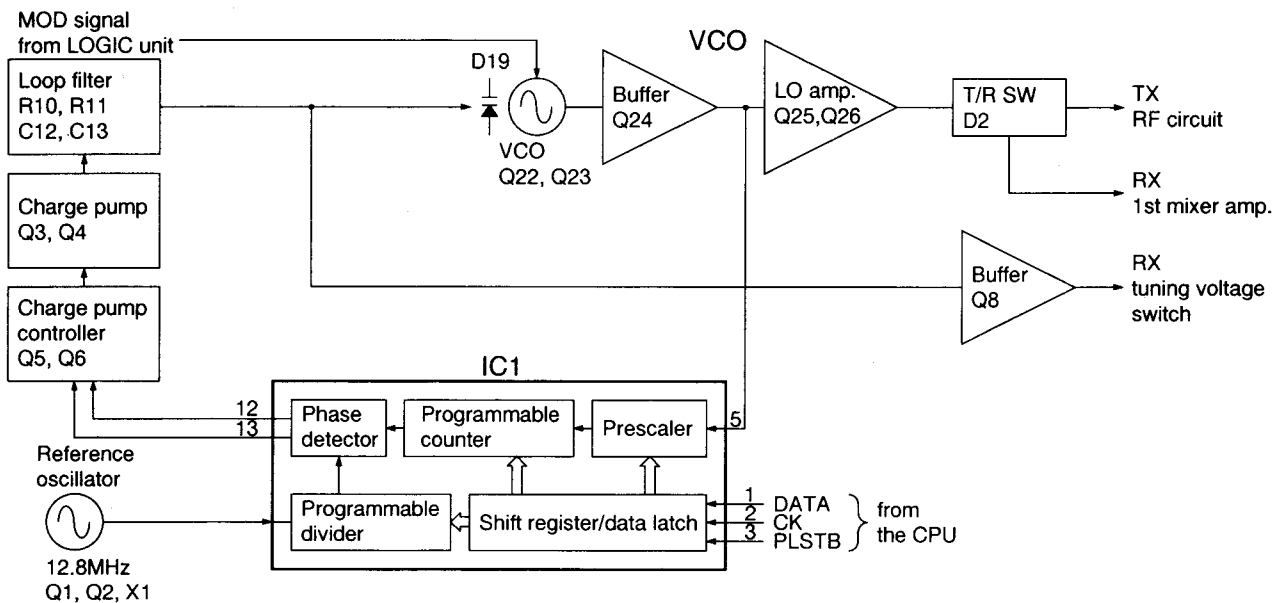


Fig. 3

3-4 POWER SUPPLY CIRCUITS

VOLTAGE LINES (MAIN UNIT)

LINE	DESCRIPTION
13.8 V	13.8 V controlled by the power switching circuit (Q38, Q39). When the [POWER] switch is pushed, the CPU outputs the control signal to the power switching circuit to turn the circuit ON.
+9 V	Common +9 V is converted from 13.8 V line by the +9 V regulator (IC7), and is used for the PLL charge pump.
+8 V	Common +8 V is converted from 13.8 V line by the +8 V regulator (IC5).
T8 V	T8 V is produced from +8 V at Q9 and Q10 on the MAIN unit. Data expander (IC9 pin 7) controls Q9 and Q10.
R8 V	R8 V is produced at Q41 and Q42 on the MAIN unit using a control signal from the Data expander (IC9 pin 12).
C5 V	Common 5 V for the reset IC (IC4) and the [POWER] switch on the LOGIC unit. C5 V is produced at IC10 on the MAIN unit from external DC input directly regardless the power ON/OFF condition.
+5 V	Common +5 V is converted from 13.8 V line by the +5 V regulator (IC6).

3-5 PORT ALLOCATIONS

3-5-1 CPU (LOGIC UNIT IC2)

PIN NUMBER	PORT NAME	SIGNAL NAME	DESCRIPTION
2	AN0	MIC UD	Input port for the [UP]/[DN] switch on the microphone.
3	AN1	PTT	Input port for the [PTT] switch. "High": PTT is pushed.
4	AN2	S/RF	Input port for the S/RF meter signal.
5	AN3	SQL	Input port for the noise squelch signal from the FM IF IC (MAIN unit IC4). "Low": squelch open.
8	OSC	—	Terminals for the CPU clock.
9	OSC2		
10	RESET	RESET	Input port for the CPU reset signal.
14	D0	I3/ DTSTB	Outputs a strobe signal to an optional UT-101 DTMF UNIT.
15	D1	TOSTB	Outputs a strobe signal to an optional UT-85 TONE SQUELCH UNIT.
16	D2	EXSTB	Outputs a strobe signal to the expander IC (MAIN unit IC9).
17	D3	MREMO	Outputs a mic audio mute signal to lead DTMF signals to an optional UT-101 DTMF UNIT for the mic remote function.
18	D4	ECK	Outputs clock signals to the EEPROM (IC5).
19	D5	EDATA	Serial bus line to the EEPROM (IC5).
20	D6	STD	Input port for the decode signal for the DTMF decoder.
22	D8	DET	Input port for the decode signal for the tone squelch.
23	D9	PWRSW	Input port for the power switch.
24	D10/ STOPC	STOPC	Input port for the stop mode cancel signal.
25	D11/ INT0	UNLK	Input port for the PLL unlock signal. "High": PLL unlocked
26	R00/ INT1	BACK UP	Input port for the backup signal to save data before power is turned OFF.
27	R01/ INT2	DLCK	Input ports for the channel selector from the dial selector.
28	R02/ INT3		
29	R03/ INT4		
30	R10/ TOB	BEEP	Outputs a beep tone signal.
31	R11/ TOC	PLSTB	Outputs a strobe signal to the PLL IC. (MAIN unit IC1)

PIN NUMBER	PORT NAME	SIGNAL NAME	DESCRIPTION
32	R12/ TOD	DIM0	Outputs LCD backlight intensity signals.
33	R13/ EVNB	DIM1	
34	R20/ EVND	TOE	Outputs port for an enable signal for the DTMF encoder.
35	R21/ SCK	CK	Outputs a serial clock signal.
36	R22/ SI	PWRON	Outputs a power control signal to the power switching circuit (MAIN unit Q38, Q39).
37	R23/ SO	DATA	Outputs serial data.
38	R30/ SEG1	K1/ TONE	Outputs a strobe signal for the key matrix.
39	R31/ SEG2	K2/ TONE	
40	R32/ SEG3	I1/ TONE	Outputs a strobe signal for the initial matrix.
41	R33/ SEG4	I2/ TONE	
42—45	R40/ SEG5— R43/ SEG8	KR0— KR3	Input ports for the initial matrix and key matrix.
46—57	R50/ SEG9— R73/ SEG20	SEG9— SEG20	Output LCD drive signals.
90—92	COM1— COM3	COM1— COM3	Output LCD drive signals.

3-5-2 DATA EXPANDER (MAIN UNIT IC9)


PIN NUMBER	PORT NAME	DESCRIPTION
4	AMUT	Outputs an AF amplifier mute signal. "High": amplifier mute
5	LP1	Outputs a transmit power control signal.
6	LP2	
7	TX	Outputs a T8V control signal.
11	RMUTE	Outputs a receive mute signal. "High": receiving mute.
12	RX	Outputs an R8V control signal.
14	MMUTE	Outputs a microphone mute signal. "High": mic mute.

SECTION 4 ADJUSTMENT PROCEDURES

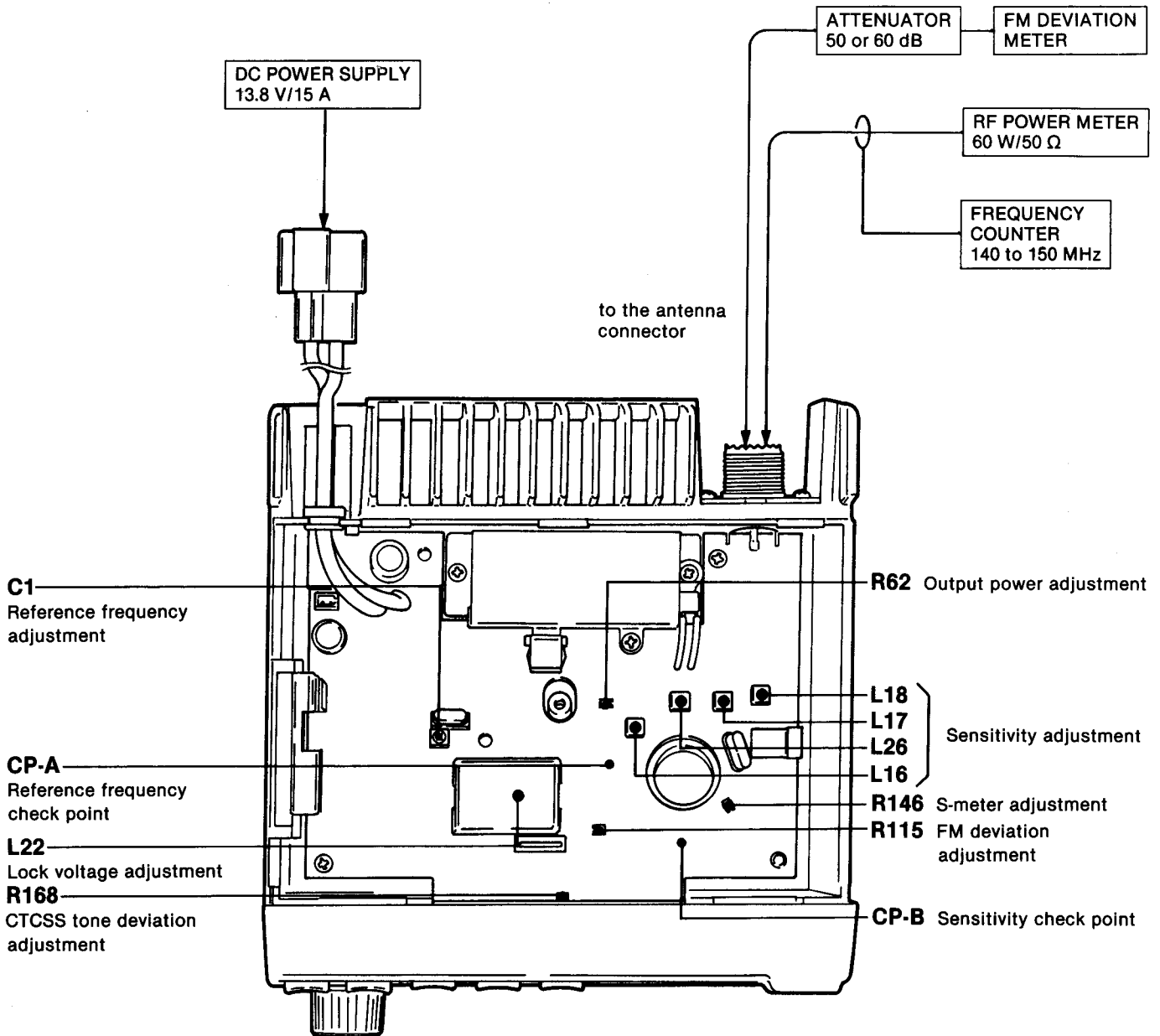
4-1 PLL AND TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	<ul style="list-style-type: none"> Displayed frequency: 145.000 MHz Receiving 	MAIN	Connect the digital multi-meter or oscilloscope to CP-A.	2.0 V	MAIN	L22
REFERENCE FREQUENCY	1	<ul style="list-style-type: none"> Displayed frequency: 145.000 MHz Transmitting 	Rear panel	Loosely couple the frequency counter to the antenna connector.	145.0000 MHz	MAIN	C1
OUTPUT POWER	1	<ul style="list-style-type: none"> Displayed frequency: <ul style="list-style-type: none"> 145.000 MHz (EUR, THA, KOR) 146.000 MHz (ITA, USA, AUS, SEA) Transmitting Power: High 	Rear panel	Connect the RF power meter to the antenna connector.	50 W (IC-2000H) 10 W (IC-2000)	MAIN	R62
FM DEVIATION	1	<ul style="list-style-type: none"> Displayed frequency: <ul style="list-style-type: none"> 145.000 MHz (EUR, THA, KOR) 146.000 MHz (ITA, USA, AUS, SEA) Apply an AF signal to the [MIC] jack. <ul style="list-style-type: none"> 1 kHz/20 mV Set the FM deviation meter as: <ul style="list-style-type: none"> HPF : 50 Hz LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 Transmitting 	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	±4.8 kHz	MAIN	R115
CTCSS TONE DEVIATION	1	<ul style="list-style-type: none"> Displayed frequency: <ul style="list-style-type: none"> 145.000 MHz (EUR, THA, KOR) 146.000 MHz (ITA, USA, AUS, SEA) No signal applied to the [MIC] jack. CTCSS tone frequency: 88.5 Hz Set the FM deviation meter as: <ul style="list-style-type: none"> HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	±0.8 kHz	MAIN	R168

4-2 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	<ul style="list-style-type: none"> Displayed frequency: <ul style="list-style-type: none"> 145.000 MHz (EUR, THA, KOR) 146.000 MHz (ITA, USA, AUS, SEA) Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Level : 1.0 μV* (-107 dBm) Deviation : ±3.5 kHz Modulation: 1 kHz Turn the R146 to maximum level. Receiving 	MAIN	Connect the voltmeter to the CP-B.	Maximum DC voltage	MAIN	Adjust in sequence. L18, L17, L26, L16
S-METER	1	<ul style="list-style-type: none"> Displayed frequency: <ul style="list-style-type: none"> 145.000 MHz (EUR, THA, KOR) 146.000 MHz (ITA, USA, AUS, SEA) Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Level : 1.0 μV* (-107 dBm) Deviation : ±3.5 kHz Modulation: 1 kHz Receiving 	Function display	S/R/F indicator	S3 (4 dots) 	MAIN	R146

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



SECTION 5 PARTS LIST

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110000980	S.IC	NJM4558M(T1)
IC2	1140004770	S.IC	HD404829C10H
IC3	1130003920	S.IC	TC4S89F (TE85R)
IC4	1130007340	S.IC	S-80745SL-A9-T1
IC5	1190000280	S.IC	24LC08BTI/SN
Q1	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q2	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q3	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q4	1590001390	S.FET	2SJ144-Y (TE85R)
Q5	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q6	1590001390	S.FET	2SJ144-Y (TE85R)
Q7	1590000430	S.TRANSISTOR	DTC144EU T107
Q8	1530002840	S.TRANSISTOR	2SC4118-Y (TE85R)
Q9	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q10	1590001390	S.FET	2SJ144-Y (TE85R)
Q11	1590000430	S.TRANSISTOR	DTC144EU T107
Q12	1590001390	S.FET	2SJ144-Y (TE85R)
Q13	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q14	1520000650	S.TRANSISTOR	2SB1201-S-TL
Q15	1530002840	S.TRANSISTOR	2SC4118-Y (TE85R)
Q16	1530003280	S.TRANSISTOR	2SC4211-8-TR
Q17	1510000880	S.TRANSISTOR	2SA1622-8-TR
Q19	1510000880	S.TRANSISTOR	2SA1622-8-TR
Q20	1510000880	S.TRANSISTOR	2SA1622-8-TR
D1	1790001000	S.ZENER	MA8062-L(TX)
D2	1750000390	S.DIODE	1SS353 TE-17
D3	1180000050	S.DIODE	DAP202U T107
D4	1180000050	S.DIODE	DAP202U T107
D5	1180000050	S.DIODE	DAP202U T107
D6	1180000050	S.DIODE	DAP202U T107
D8	1750000390	S.DIODE	1SS353 TE-17 [USA], [EUR], [AUS], [SEA], [THA], [KOR]
D9	1710000600	DIODE	1SS254 [EUR], [AUS]
D10	1750000390	S.DIODE	1SS353 [THA], [KOR]
D11	1750000390	S.DIODE	1SS353 [ITA], [THA], [KOR], [SEA]
D12	1750000390	S.DIODE	1SS353 [EUR], [THA], [AUS]
D13	1750000390	S.DIODE	1SS353 [EUR], [SEA]
D14	1750000390	S.DIODE	1SS353 [ITA], [THA]
D15	1750000390	S.DIODE	1SS353 [KOR]
D16	1750000130	S.DIODE	DA204U T107
X1	6050009300	S.XTAL	CR-505 SMD-49 (4MHz)
R1	7030003800	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R2	7030003580	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R3	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R4	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R5	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R6	7030003380	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R7	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R8	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R9	7030003580	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R10	7030003580	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R11	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R12	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R13	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R14	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R15	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R16	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R17	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R18	7030003530	S.RESISTOR	ERJ3GEYJ 582 V (5.8 kΩ)
R19	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R20	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R21	7030003410	S.RESISTOR	ERJ3GEYJ 581 V (580 Ω)
R22	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R23	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R24	7030003310	S.RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R25	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R26	7030003680	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R27	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R28	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R29	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R30	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R31	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R32	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R33	7030003790	S.RESISTOR	ERJ3GEYJ 824 V (820 kΩ)
R34	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R35	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R36	7030003650	S.RESISTOR	ERJ3GEYJ 583 V (58 kΩ)
R37	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (2.2 MΩ)
R38	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R39	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R40	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R41	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R43	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R44	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R45	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R46	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R47	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R48	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R49	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R50	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R51	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R52	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R53	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R54	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (47 kΩ)
R55	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R56	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R57	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R58	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R59	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R60	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R61	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R62	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R63	7210001870	VARIABLE	EVU-F2AF20 A14 (10KA)
R64	7210001860	VARIABLE	EVU-F2AF20 B14 (10KB)
R65	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R66	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R67	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R68	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R69	7030000020	S.RESISTOR	MCR10EZJH 1 Ω (010)
R70	7030000020	S.RESISTOR	MCR10EZJH 1 Ω (010)
R71	7030001130	S.RESISTOR	MCR50JZHJ 100 Ω (101)
R72	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R73	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R74	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R75	7030003650	S.RESISTOR	ERJ3GEYJ 583 V (58 kΩ)
R76	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R77	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R78	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R79	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R80	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R81	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R82	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R83	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R84	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R85	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)

S.=Surface mount

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R86	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R87	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R88	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R89	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R90	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R91	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R92	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R93	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R95	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R98	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R99	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R100	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R101	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R102	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R103	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R104	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R105	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R106	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R107	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R108	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R109	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R110	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R111	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R112	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
C1	4030008860	S.CERAMIC	C1808 JB 1H 102K-T-A
C2	4030008860	S.CERAMIC	C1808 JB 1H 102K-T-A
C3	4030008860	S.CERAMIC	C1808 JB 1H 102K-T-A
C5	4030008860	S.CERAMIC	C1808 JB 1H 102K-T-A
C6	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C7	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C8	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C9	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C10	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C11	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C12	4510005300	S.ELECTROLYTIC	ECEV1AA330SR
C13	4030008860	S.CERAMIC	C2012 JF 1C 105Z-T-A
C14	4030008660	S.CERAMIC	C2012 JF 1C 105Z-T-A
C15	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C16	4030008860	S.CERAMIC	C1808 JB 1H 102K-T-A
C17	4030008860	S.CERAMIC	C1808 JB 1H 102K-T-A
C18	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C19	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C20	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C21	4030008900	S.CERAMIC	C1808 JB 1C 333K-T-A
C22	4030007020	S.CERAMIC	C1808 CH 1H 120J-T-A
C23	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C24	4510004440	S.ELECTROLYTIC	ECEV1HA010SR
C25	4030009490	S.CERAMIC	C1808 JB 1H 821K-T-A
C26	4030008650	S.CERAMIC	C1808 JB 1H 332K-T-A
C27	4030007120	S.CERAMIC	C1808 CH 1H 820J-T-A
C28	4030007130	S.CERAMIC	C1808 CH 1H 101J-T-A
C31	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C32	4030008670	S.CERAMIC	C1808 JB 1H 222K-T-A
C33	4030008760	S.CERAMIC	C2012 X7R 1C 104K-T-A
C35	4030008880	S.CERAMIC	C1808 JB 1C 223K-T-A
C36	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C37	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C38	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C39	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C40	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C41	4510005870	S.ELECTROLYTIC	ECEV1HA3R3SR
C42	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C43	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C44	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C45	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C46	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C47	4510005590	S.ELECTROLYTIC	ECEV0JA331P
C48	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C49	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C50	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C51	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C52	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C53	4030007030	S.CERAMIC	C1808 CH 1H 150J-T-A

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C54	4030007030	S.CERAMIC	C1808 CH 1H 150J-T-A
C55	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C57	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C58	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C60	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C62	4030007090	S.CERAMIC	C1808 CH 1H 470J-T-A
C63	4030007090	S.CERAMIC	C1808 CH 1H 470J-T-A
C64	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C65	4030007090	S.CERAMIC	C1808 CH 1H 470J-T-A
C66	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C67	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C68	4030007090	S.CERAMIC	C1808 CH 1H 470J-T-A
C69	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
C70	4030007090	S.CERAMIC	C1808 CH 1H 470J-T-A
C71	4030008630	S.CERAMIC	C1808 JF 1C 104Z-T-A
DS1	5030001190	LCD	LD-HU4304E
DS2	5080000330	LAMP	HRS-7219A-RE
DS3	5080000330	LAMP	HRS-7219A-RE
W1	7120000380	JUMPER	JPW 01 R-01 [SEA], [ITA], [THA], [KOR]
W2	7030003860	S.JUMPER	ERJ3GE JPW V
W3	7030003860	S.JUMPER	ERJ3GE JPW V
W4	7030003860	S.JUMPER	ERJ3GE JPW V
W5	7030003860	S.JUMPER	ERJ3GE JPW V
W6	7030003860	S.JUMPER	ERJ3GE JPW V
W7	7030003860	S.JUMPER	ERJ3GE JPW V
J1	6450001470	CONNECTOR	95003-2881
J2	6510016440	S.CONNECTOR	52465-1491
J3	6510018030	S.CONNECTOR	53248-1217
J4	6510018030	S.CONNECTOR	53248-1217
S1	2260001890	S.SWITCH	SKQDPA
S2	2260001890	S.SWITCH	SKQDPA
S3	2250000050	ENCODER	EVQ-WQGF15 24B
S4	2260001890	S.SWITCH	SKQDPA
S5	2260001890	S.SWITCH	SKQDPA
S6	2260001890	S.SWITCH	SKQDPA
S7	2260001890	S.SWITCH	SKQDPA
S8	2260001890	S.SWITCH	SKQDPA
S9	2260001890	S.SWITCH	SKQDPA
EP1	0910044112	PCB	B 4441B
EP2	8930035720	LCD CONTACT	SRCN-1642SSW

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130005700	S.IC	M56760FP
IC2	1150000760	IC	SC1091 [IC-2000H]
	1150001640	IC	SC1005 [IC-2000]
IC3	1110003340	S.IC	μPC358GR-T1
IC4	1110003570	S.IC	MC3372VMEL
IC5	1180001190	IC	TA78M08P
IC6	1180000420	S.IC	TA78L05F (TE12R)
IC7	1110002510	S.IC	AN8009M-(E1)
IC8	1110002550	IC	TA7252AP
IC9	1130007700	S.IC	BU4094BCF-T1
IC10	1180000420	S.IC	TA78L05F (TE12R)
IC11	1130003710	S.IC	TC4S71F (TE85R)
IC12	1130003920	S.IC	TC4S69F (TE85R)
Q1	1530002840	S.TRANSISTOR	2SC4116-Y (TE85R)
Q2	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q3	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q4	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q5	1560000530	S.FET	2SK880-GR (TE85R)
Q6	1560000530	S.FET	2SK880-GR (TE85R)
Q7	1530002840	S.TRANSISTOR	2SC4116-Y (TE85R)
Q8	1560000530	S.FET	2SK880-GR (TE85R)
Q9	1510000690	S.TRANSISTOR	2SA1734 (TE12R)
Q10	1590000430	S.TRANSISTOR	DTC144EU T107
Q11	1530002340	S.TRANSISTOR	2SC2954-T2B
Q12	1530002340	S.TRANSISTOR	2SC2954-T2B
Q13	1510000900	TRANSISTOR	2SA1824 S
Q14	1590000430	S.TRANSISTOR	DTC144EU T107
Q15	1590000430	S.TRANSISTOR	DTC144EU T107
Q16	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q17	1590000430	S.TRANSISTOR	DTC144EU T107
Q18	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q19	1580000480	S.FET	3SK184-S (TX)
Q20	1580000490	S.FET	3SK186-2-T7
Q22	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q23	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q24	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q25	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q26	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q27	1590001050	S.TRANSISTOR	DTC114TU T107
Q28	1560000530	S.FET	2SK880-GR (TE85R)
Q29	1590001390	S.FET	2SJ144-Y (TE85R)
Q30	1590001390	S.FET	2SJ144-Y (TE85R)
Q31	1590000430	S.TRANSISTOR	DTC144EU T107
Q32	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q33	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q35	1590000430	S.TRANSISTOR	DTC144EU T107
Q36	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q37	1590001390	S.FET	2SJ144-Y (TE85R)
Q38	1530002970	S.TRANSISTOR	2SC4684 (TE16R)
Q39	1590000690	S.TRANSISTOR	IMD6 T108
Q40	1530003090	S.TRANSISTOR	2SC4213-B (TE85R)
Q41	1590001040	S.TRANSISTOR	DTA113ZU T107
Q42	1590000430	S.TRANSISTOR	DTC144EU T107
Q43	1590001040	S.TRANSISTOR	DTA113ZU T107
Q44	1590000430	S.TRANSISTOR	DTC144EU T107
Q45	1530002840	S.TRANSISTOR	2SC4116-Y (TE85R)
Q46	1530002840	S.TRANSISTOR	2SC4116-Y (TE85R)
D1	1750000390	S.DIODE	1SS353 TE-17
D2	1790000450	S.DIODE	MA862(TX)
D4	1790000860	S.DIODE	MA133(TX)
D5	1750000390	S.DIODE	1SS353 TE-17
D6	1790001010	S.ZENER	MA8043-L(TX)
D7	1710000310	DIODE	MI407
D8	1790000980	S.DIODE	MA742(TX)
D9	1790000980	S.DIODE	MA742(TX)
D10	1720000370	S.VARICAP	HVU350TRF
D11	1790000620	S.DIODE	MA77(TW)
D12	1790000620	S.DIODE	MA77(TW)
D13	1720000370	S.VARICAP	HVU350TRF
D14	1720000370	S.VARICAP	HVU350TRF

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D15	1790000620	S.DIODE	MA77(TW)
D16	1710000730	S.DIODE	MI809-T11
D17	1710000730	S.DIODE	MI809-T11
D18	1790000980	S.DIODE	MA742(TX)
D19	1720000370	S.VARICAP	HVU350TRF
D20	1790000620	S.DIODE	MA77(TW)
D22	1790001000	S.ZENER	MA8062-L(TX)
D23	1790000980	S.DIODE	MA742(TX)
D25	1790000700	DIODE	DSA3A1
D26	1790000980	S.DIODE	MA742(TX)
D28	1750000390	S.DIODE	1SS353 TE-17
D30	1790000620	S.DIODE	MA77(TW)
D31	1720000370	S.VARICAP	HVU350TRF
D32	1750000390	S.DIODE	1SS353 TE-17
F11	2010001670	XTAL	FL-207 UM-1 (17.200MHz)
F12	2020000080	CERAMIC	CFU455E2
X1	6050009090	XTAL	CR-489 (12.800MHz)
X2	6050008940	XTAL	CR-477 (16.745MHz)
X3	6070000090	DISCRI	CDB455C16
L1	6200001570	S.COIL	LER 015T 1R0M
L2	6200002420	S.COIL	NL 252018T-068J
L3	6200002580	S.COIL	NL 252018T-033J
L4	6200002420	S.COIL	NL 252018T-068J
L5	6200002580	S.COIL	NL 252018T-033J
L6	6200002420	S.COIL	NL 252018T-068J
L7	6200002420	S.COIL	NL 252018T-068J
L8	6170000180	COIL	LW-19
L9	6110001600	COIL	LA-243
L10	6110001550	COIL	LA-235
L11	6110001560	COIL	LA-236
L12	6110001600	COIL	LA-243
L13	6200003510	S.COIL	LER015T R82M
L14	6200004670	S.COIL	NL 252018T-3R9J
L15	6200002640	S.COIL	NL 252018T-R15J
L16	6150004490	S.COIL	LS-502
L17	6150004490	S.COIL	LS-502
L18	6150004490	S.COIL	LS-502
L19	6110001620	COIL	LA-245
L20	6110001570	COIL	LA-237
L21	6200001520	S.COIL	MLF2012D R82K-T
L22	6130002480	S.COIL	LB-277
L23	6200002840	S.COIL	NL 252018T-R22J
L24	6200002840	S.COIL	NL 252018T-R22J
L25	6200002090	S.COIL	ELJFB 681K-F
L26	6150004490	S.COIL	LS-502
L28	6200002650	S.COIL	NL 252018T-R18J
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R4	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R5	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R6	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R7	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R8	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R9	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R10	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R11	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R12	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R13	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R14	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R15	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R16	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R17	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R18	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R19	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4610001260	S.TRIMMER	ECR-JA020 E12W
C2	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C3	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C4	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C5	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C6	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4550006360	S.TANTALUM	ECST1VY104R
C13	4550006360	S.TANTALUM	ECST1VY104R
C14	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C15	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C16	4550006560	S.TANTALUM	ECST1CY225R
C17	4550006560	S.TANTALUM	ECST1CY225R
C18	4550006560	S.TANTALUM	ECST1CY225R
C19	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C21	4510005430	S.ELECTROLYTIC	ECEV0JA220SR
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C24	4510005300	S.ELECTROLYTIC	ECEV1AA330SR
C25	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C26	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C27	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C28	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C29	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C30	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C31	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C32	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C33	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C34	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C35	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C36	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C37	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C38	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C39	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C40	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C41	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C42	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C43	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C44	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C45	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C46	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C47	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C48	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C49	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C50	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C51	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C52	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C53	4030011170	S.CERAMIC	GRM42-6 CH 180J 500PT [USA], [EUR], [AUS], [SEA], [ITA], [KOR]
C54	4010005790	CERAMIC	HM60SJ YB 102K 500V
C55	4030011050	S.CERAMIC	GRM42-6 CJ 030C 500PT
C56	4010007630	CERAMIC	HM60SJ CH 270J 500V
C57	4030011020	S.CERAMIC	GRM42-6 CK 010C 500PT
C58	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C59	4030011020	S.CERAMIC	GRM42-6 CK 010C 500PT
C60	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C61	4030011290	S.CERAMIC	GRM42-6 CH 240J 500PT
C62	4030011290	S.CERAMIC	GRM42-6 CH 240J 500PT
C63	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C64	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C67	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C68	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C69	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C71	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C72	4550006210	S.TANTALUM	ECST1CX106R
C73	4510005870	S.ELECTROLYTIC	ECEV1HA3R3SR
C74	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C75	4550006210	S.TANTALUM	ECST1CX106R

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C76	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C77	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C78	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C79	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C80	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C81	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C82	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C83	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C84	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C85	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C88	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C89	4030007110	S.CERAMIC	C1608 CH 1H 680J-T-A
C90	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C91	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C92	4030009470	S.CERAMIC	C1608 CH 1H R75C-T-A
C93	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C94	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C95	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C98	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C99	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C100	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C101	4030006860	S.CERAMIC	C1608 CH 1H 102K-T-A
C102	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C103	4030006950	S.CERAMIC	C1608 CH 1H 040C-T-A
C104	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C105	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C107	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C108	4010005490	CERAMIC	HM60SJ CH 120J 500V
C109	4510004650	S.ELECTROLYTIC	ECEV1EA4R7SR
C110	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C111	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C112	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C113	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C114	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C115	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C116	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C117	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C118	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C119	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C120	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C121	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C122	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C123	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C124	4030009470	S.CERAMIC	C1608 CH 1H R75C-T-A
C125	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C126	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C127	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C128	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C129	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C130	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C131	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C132	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C133	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C134	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C135	4510004540	S.ELECTROLYTIC	ECEV0JA470SR
C136	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C137	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C138	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C139	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C140	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C141	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C142	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C143	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C144	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C145	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C146	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C147	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C148	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C149	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C150	4030007120	S.CERAMIC	C1608 CH 1H 820J-T-A
C151	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C152	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
C153	4510004440	S.ELECTROLYTIC ECEV1HA010SR
C154	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C155	4030008860	S.CERAMIC C1808 JB 1C 153K-T-A
C156	4030008860	S.CERAMIC C1808 JB 1C 153K-T-A
C157	4030008830	S.CERAMIC C1808 JF 1C 104Z-T-A
C159	4030006880	S.CERAMIC C1808 JB 1H 472K-T-A
C160	4030008870	S.CERAMIC C1808 JB 1H 222K-T-A
C161	4030008680	S.CERAMIC C2012 JF 1C 105Z-T-A
C163	4030008830	S.CERAMIC C1808 JF 1C 104Z-T-A
C164	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C165	4030008880	S.CERAMIC C2012 JF 1C 105Z-T-A
C166	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C167	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C168	4510005300	S.ELECTROLYTIC ECEV1AA330SR
C169	4510006220	S.ELECTROLYTIC ECEV1CA101UP
C170	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C171	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C172	4510004640	S.ELECTROLYTIC ECEV1CA470SP
C173	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C174	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C175	4510005300	S.ELECTROLYTIC ECEV1AA330SR
C176	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C177	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C178	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C179	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C180	4510004600	ELECTROLYTIC 18 MV 1000 HC
C181	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C182	4510005300	S.ELECTROLYTIC ECEV1AA330SR
C183	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C184	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C185	4510006220	S.ELECTROLYTIC ECEV1CA101UP
C186	4510004650	S.ELECTROLYTIC ECEV1EA4R7SR
C187	4510004540	S.ELECTROLYTIC ECEV0JA470SR
C188	4510004640	S.ELECTROLYTIC ECEV1CA470SP
C189	4510004640	S.ELECTROLYTIC ECEV1CA470SP
C190	4510006260	S.ELECTROLYTIC ECEV1AA471UP
C191	4550006130	S.TANTALUM ECST1VY224R
C193	4030006850	S.CERAMIC C1808 JB 1H 471K-T-A
C194	4030008830	S.CERAMIC C1808 JF 1C 104Z-T-A
C195	4030008830	S.CERAMIC C1808 JF 1C 104Z-T-A
C196	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C197	4510004830	S.ELECTROLYTIC ECEV1CA100SR
C198	4510005310	S.ELECTROLYTIC ECEV1CA220SR
C199	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C200	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C201	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C202	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C203	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C205	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C206	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C207	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C208	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C209	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C210	4030007130	S.CERAMIC C1808 CH 1H 101J-T-A
C211	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C212	4510004440	S.ELECTROLYTIC ECEV1HA010SR
C213	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C214	4030009470	S.CERAMIC C1808 CH 1H R75C-T-A
C215	4030007000	S.CERAMIC C1808 CH 1H 090D-T-A
C216	4030007110	S.CERAMIC C1808 CH 1H 680J-T-A
C217	4510004440	S.ELECTROLYTIC ECEV1HA010SR
C218	4030008760	S.CERAMIC C2012 X7R 1C 104K-T-A
C222	4030009990	S.CERAMIC C1808 CH 1H 200J-T-A
C223	4030008990	S.CERAMIC C1808 CH 1H 080D-T-A
C224	4030008630	S.CERAMIC C1808 JF 1C 104Z-T-A
C225	4030008630	S.CERAMIC C1808 JF 1C 104Z-T-A
C226	4030008630	S.CERAMIC C1808 JF 1C 104Z-T-A
C227	4030008630	S.CERAMIC C1808 JF 1C 104Z-T-A
C229	4030008760	S.CERAMIC C2012 X7R 1C 104K-T-A
C230	4030008630	S.CERAMIC C1808 JF 1C 104Z-T-A
C231	4030006900	S.CERAMIC C1808 JB 1E 103K-T-A
C232	4030006860	S.CERAMIC C1808 JB 1H 102K-T-A
C233	4030006990	S.CERAMIC C1808 CH 1H 080D-T-A
C234	4030006920	S.CERAMIC C1808 CH 1H 010C-T-A
C235	4030011190	S.CERAMIC GRM42-6 CH 270J 500PT

[THA] only

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
W1	8900004880	CABLE OPC-485
W2	7120000380	JUMPER JPW 01 R-01
W3	7120000380	JUMPER JPW 01 R-01
W4	7030003860	S.JUMPER ERJ3GE JPW V
W5	7030003860	S.JUMPER ERJ3GE JPW V
J2	6510018040	CONNECTOR 52330-1217
J3	6510018040	CONNECTOR 52330-1217
J4	6510012880	S.CONNECTOR CEW9114-0202
J5	6510014980	S.CONNECTOR B2B-ZR-SM3-TF
J6	6450000140	CONNECTOR HSJ0807-01-010
EP1	0910044122	PCB B 4442B

S.=Surface mount

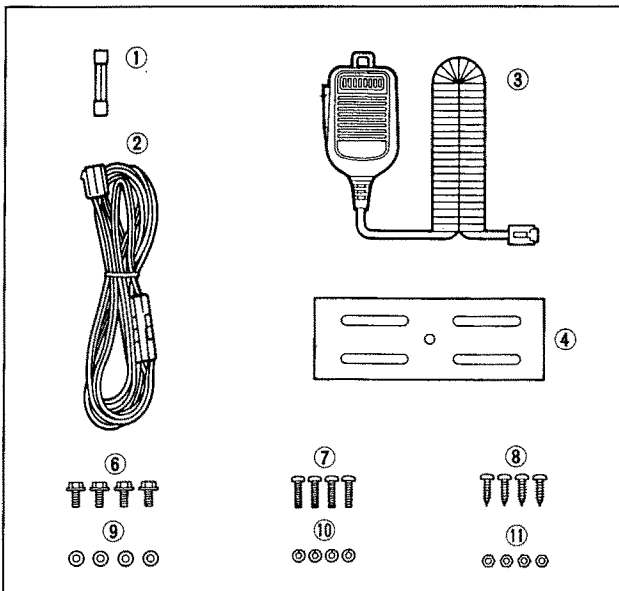
SECTION 6 MECHANICAL PARTS AND DISASSEMBLY

• CHASSIS PARTS

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8810005250	Hex socket bolt M4 × 18 ZK	2
②	8610006480	Knob N152 [SQL], [VOL]	2
③	8610006470	Knob N151 [DIAL]	1
④	8210011920	1642 front panel assembly	1
⑤	8930034820	1642 LCD holder	1
⑥	5030001190	LCD LD-HU4304E	1
⑦	8930034830	1642 LCD filter	1
⑧	8930035720	LCD contact SRCN-1642SSW	1
⑨	8210011930	1642 reflector	1
	8930034810	White seat (attached to the reflector)	1
⑩	7210001860	Variable resistor EVU-F2AF20 B14 [SQL]	1
⑪	7210001870	Variable resistor EVU-F2AF20 A14 [VOL]	1
⑫	2250000050	Encoder EVQ-WQGF15 24B [DIAL]	1
⑬	8010015900	1642 chassis	1
⑭	6510004880	Connector MR-DS-E 01 [ANT]	1
⑮	8810008660	Screw PH BT M3 × 8 NI-ZU	7
⑯	8900004880	Power receptacle cable OPC-465	1
⑰	8930034840	1642 speaker holder	1
⑱	8510009700	1642 module plate	1
⑲	8930035070	1642 clip	1
⑳	2510000470	Speaker EAS-6P100SA	1
㉑	8110005440	1642 cover (include felt, speaker net)	1
㉒	8810008630	Screw PH BT M3 × 6 NI-ZU	1
㉓	8510009550	1642 VCO case	1

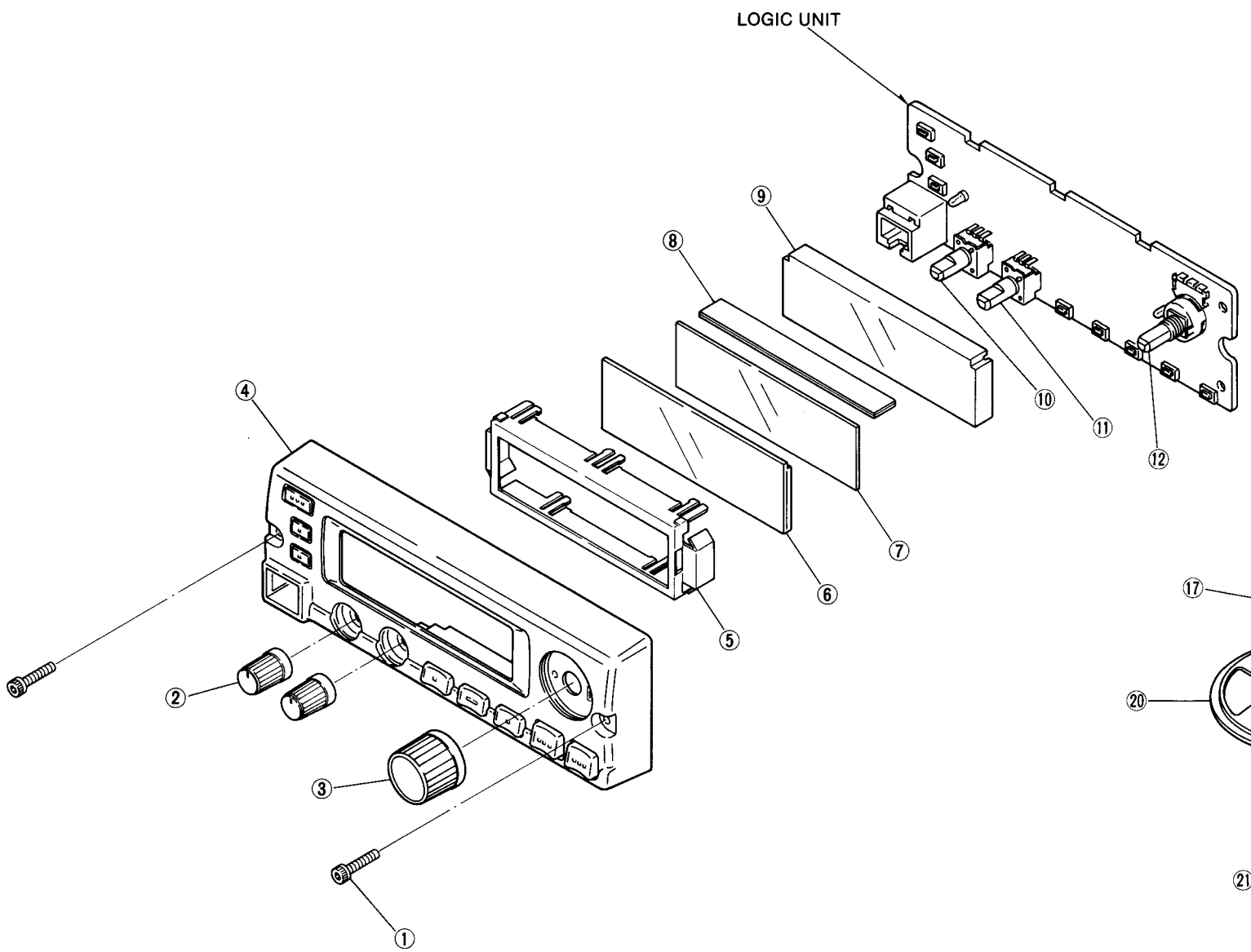
Screw abbreviations PH: Pan head NI: Nickel ZK: Black

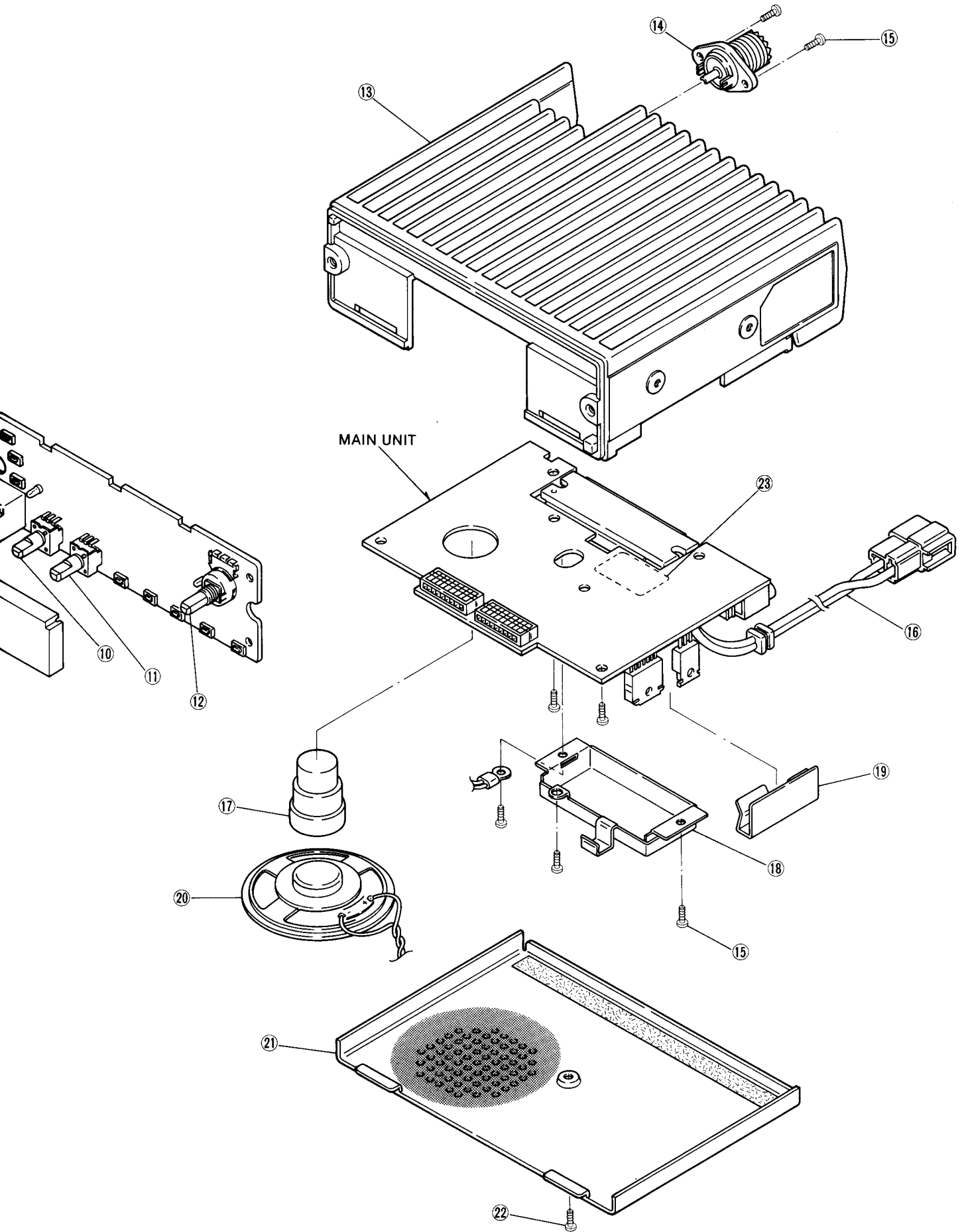
• ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	5210000080	Fuse (20 A)	1
②	8900003760	DC power cable OPC-346	1
③	Optional product	HM-95 DTMF microphone (USA, KOR)	1
	Optional product	HM-96 hand microphone (THA, AUS, SEA)	1
	Optional product	HM-97 hand microphone with 1750 Hz encoder (EUR, ITA)	1
④	8010008710	150 mobile mounting bracket	1
⑤	8930008050	Felt (A) (attached to the bracket)	2
⑥	8820000530	Flange bolt	4
⑦	8810000470	Screw PH M5 × 12 (+/-)	4
⑧	8810000950	Screw PH A M5 × 16	4
⑨	8850000150	Flat washer M5 NI BS	4
⑩	8850000390	Spring washer M5	4
⑪	8830000120	Nut M5	4

Screw abbreviations PH: Pan head NI: Nickel BS: Brass

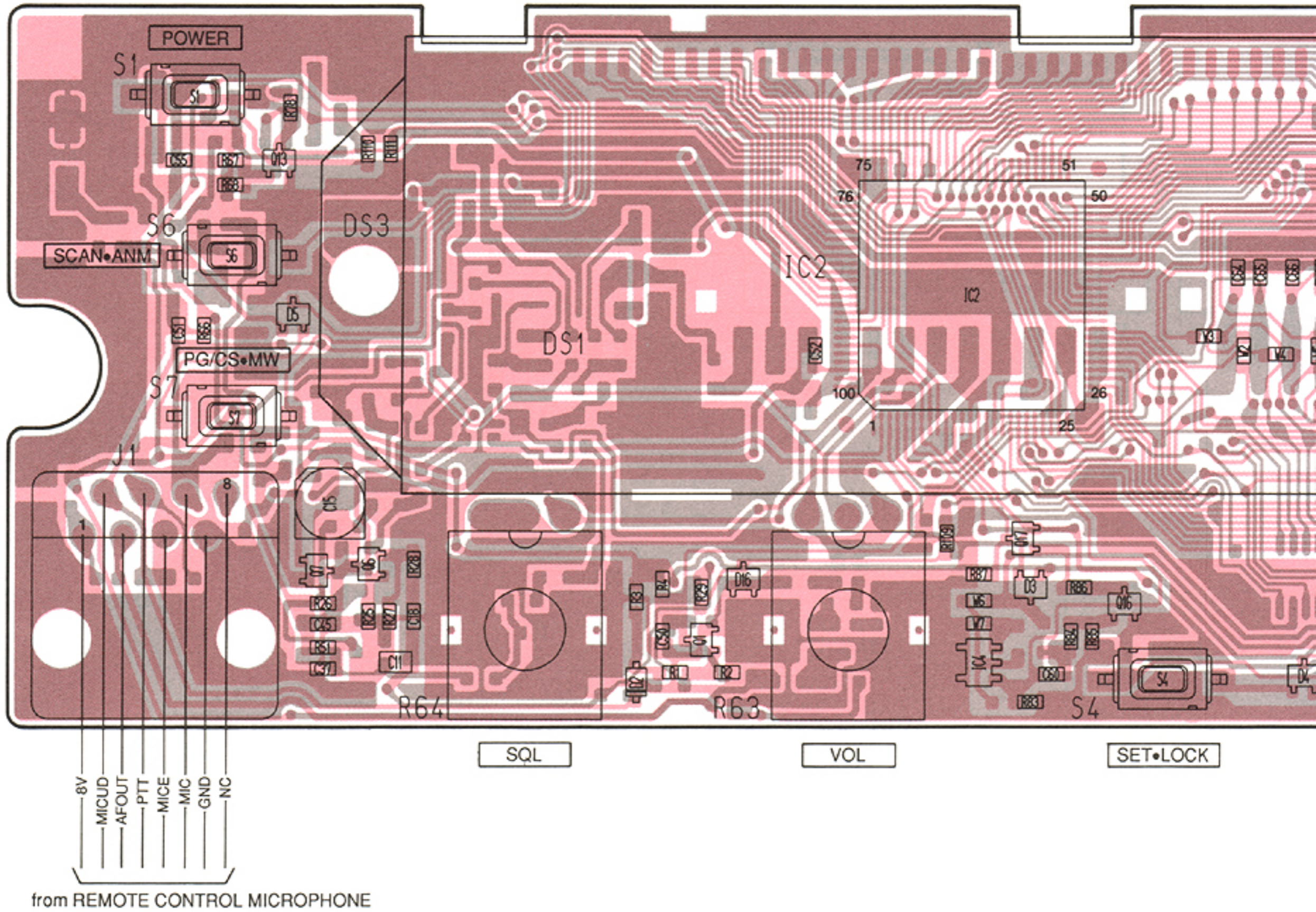




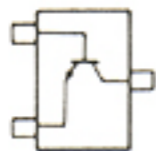
SECTION 7 BOARD LAYOUTS

7-1 LOGIC UNIT

• LOGIC UNIT

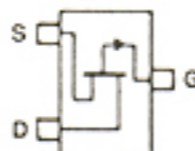


2SC4211 6 TR
(Symbol: L6)



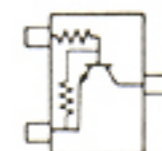
Q1, Q13, Q16

2SJ144 Y
(Symbol: VY)



Q6

DTC144EU
(Symbol: 26)

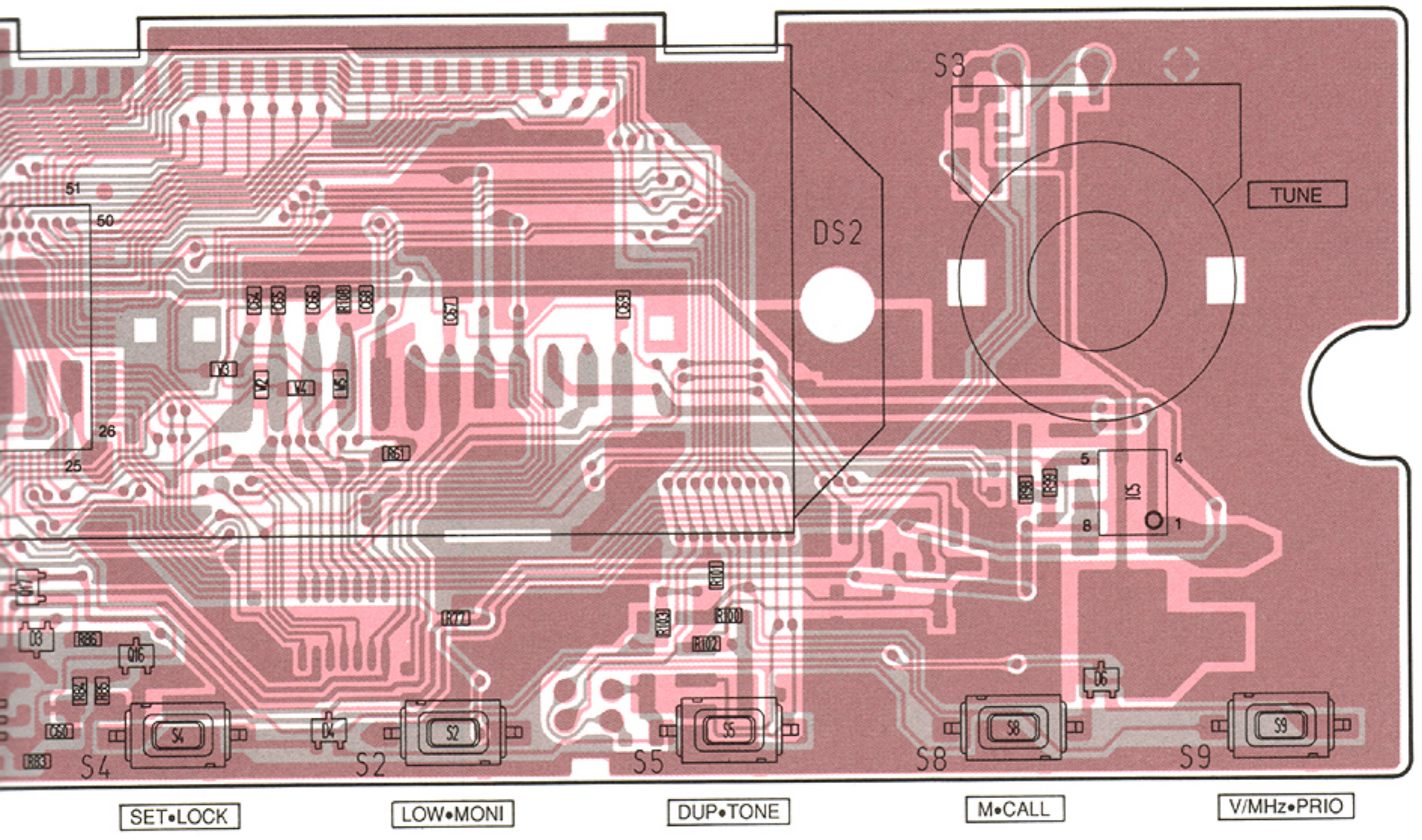


Q7

2SA1622 6 TR
(Symbol: M)



Q17

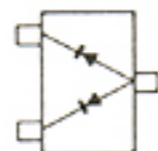


2SA1622 6 TR
(Symbol: M6)



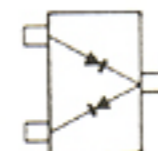
Q17

DAP202U
(Symbol: P)



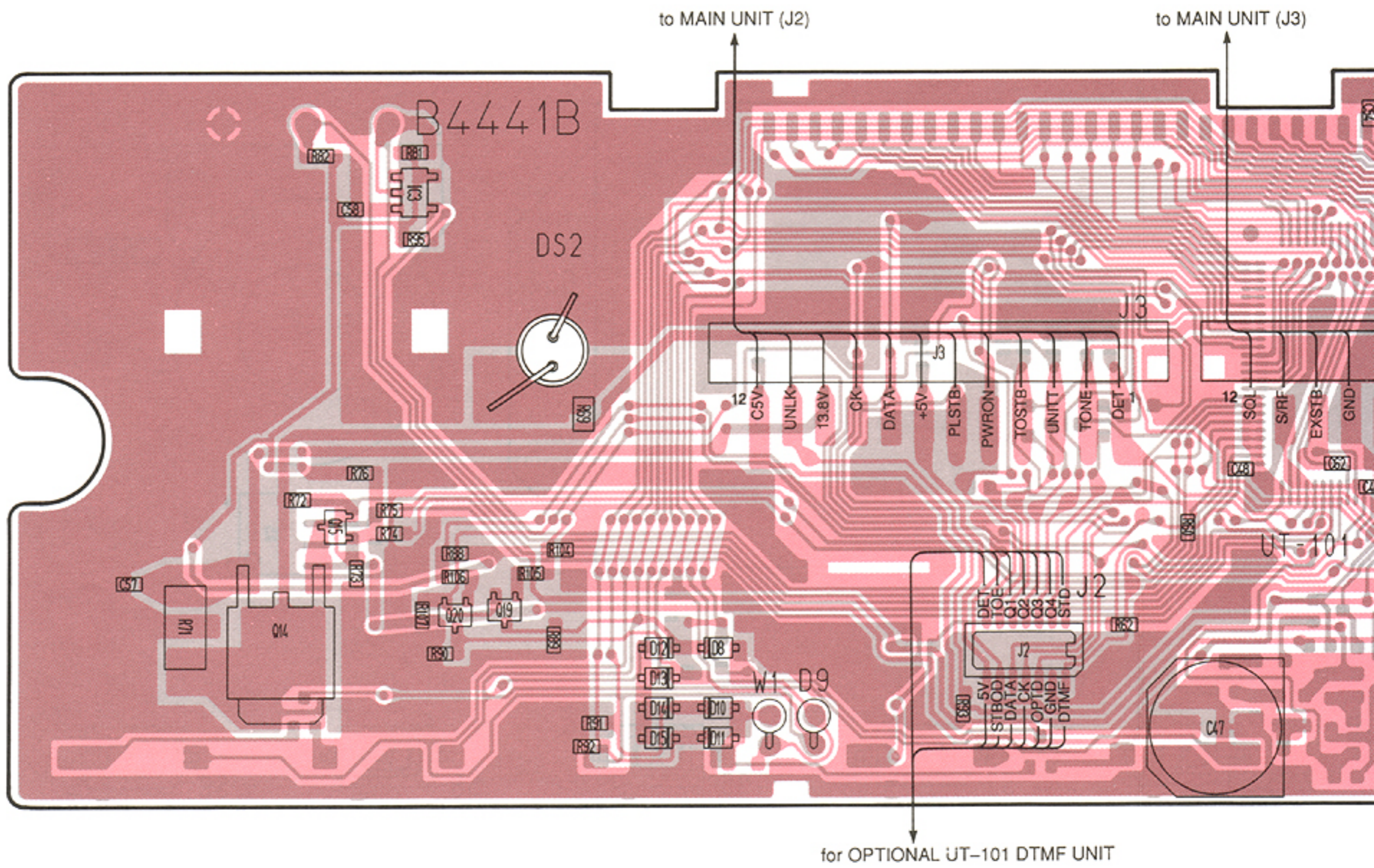
D3, D4, D5, D6

DA204U
(Symbol: K)

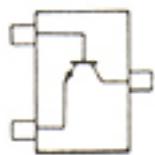


D16

• LOGIC UNIT

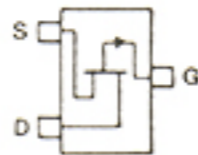


2SC4211 6 TR
(Symbol: L6)



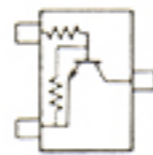
Q2, Q3, Q5, Q9

2SJ144 Y
(Symbol: VY)



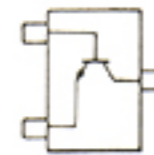
Q4, Q10, Q12

DTC144EU
(Symbol: 26)



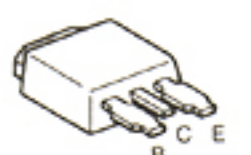
Q11

2SC4116 Y
(Symbol: LY)

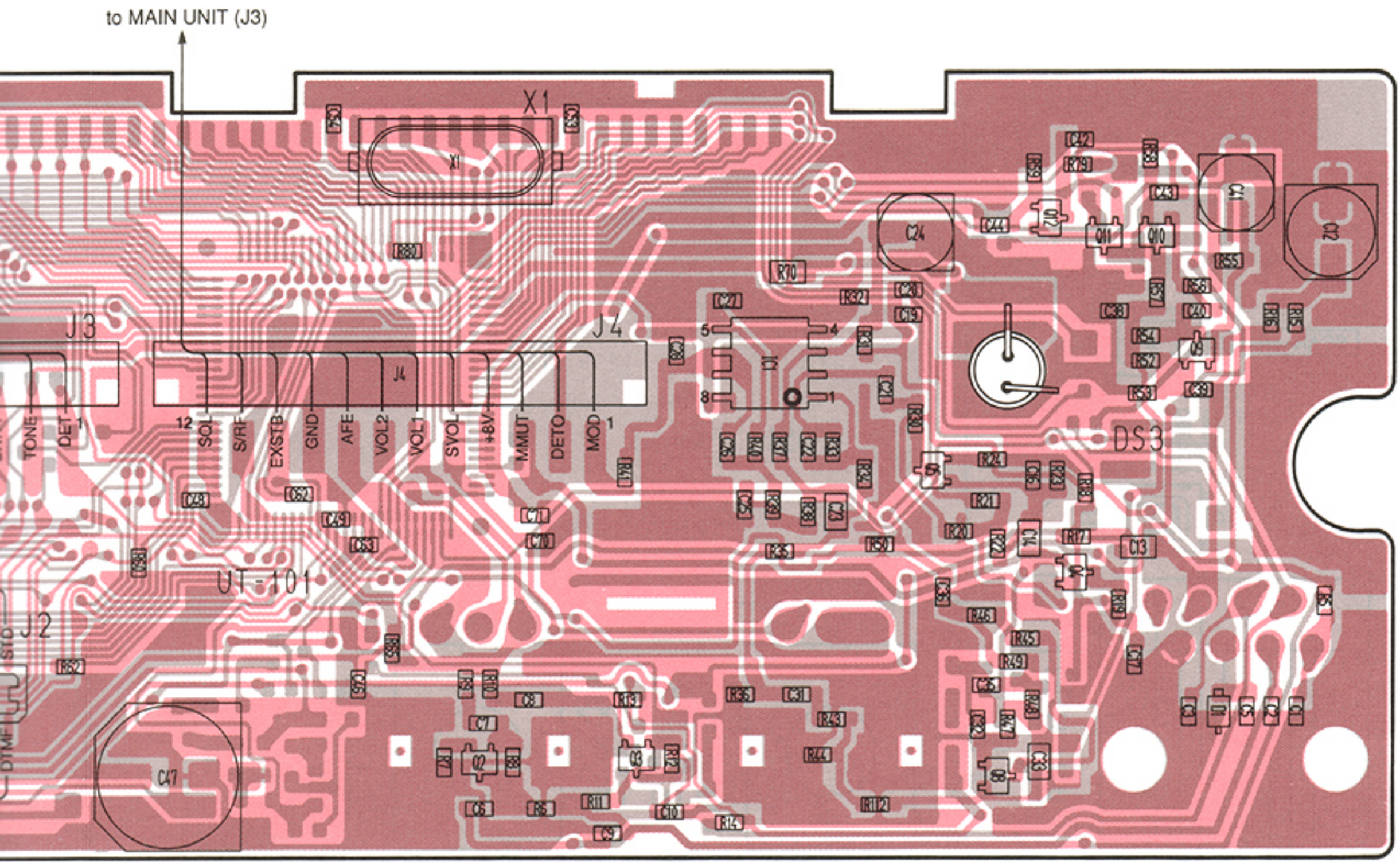


Q8, Q15

2SB1201 S TL
(Symbol: 2M)

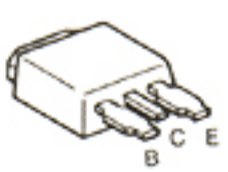


Q14



F UNIT

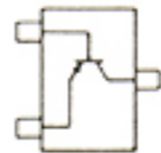
2SB1201 S TL
(Symbol: 2M)



Q14



2SA1622 6 TR
(Symbol: M6)

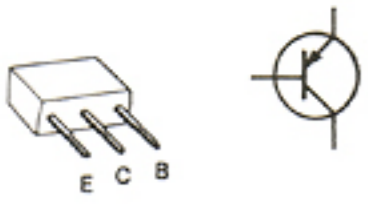


Q19, Q20

7-2 MAIN UNIT

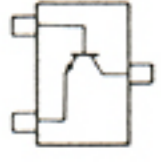
• MAIN UNIT

2SA1824 S
(Symbol: ID)



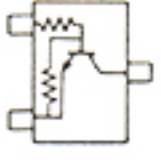
Q13

2SC4211 6 TR
(Symbol: L6)



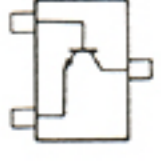
Q16

DTC144EU
(Symbol: 26)

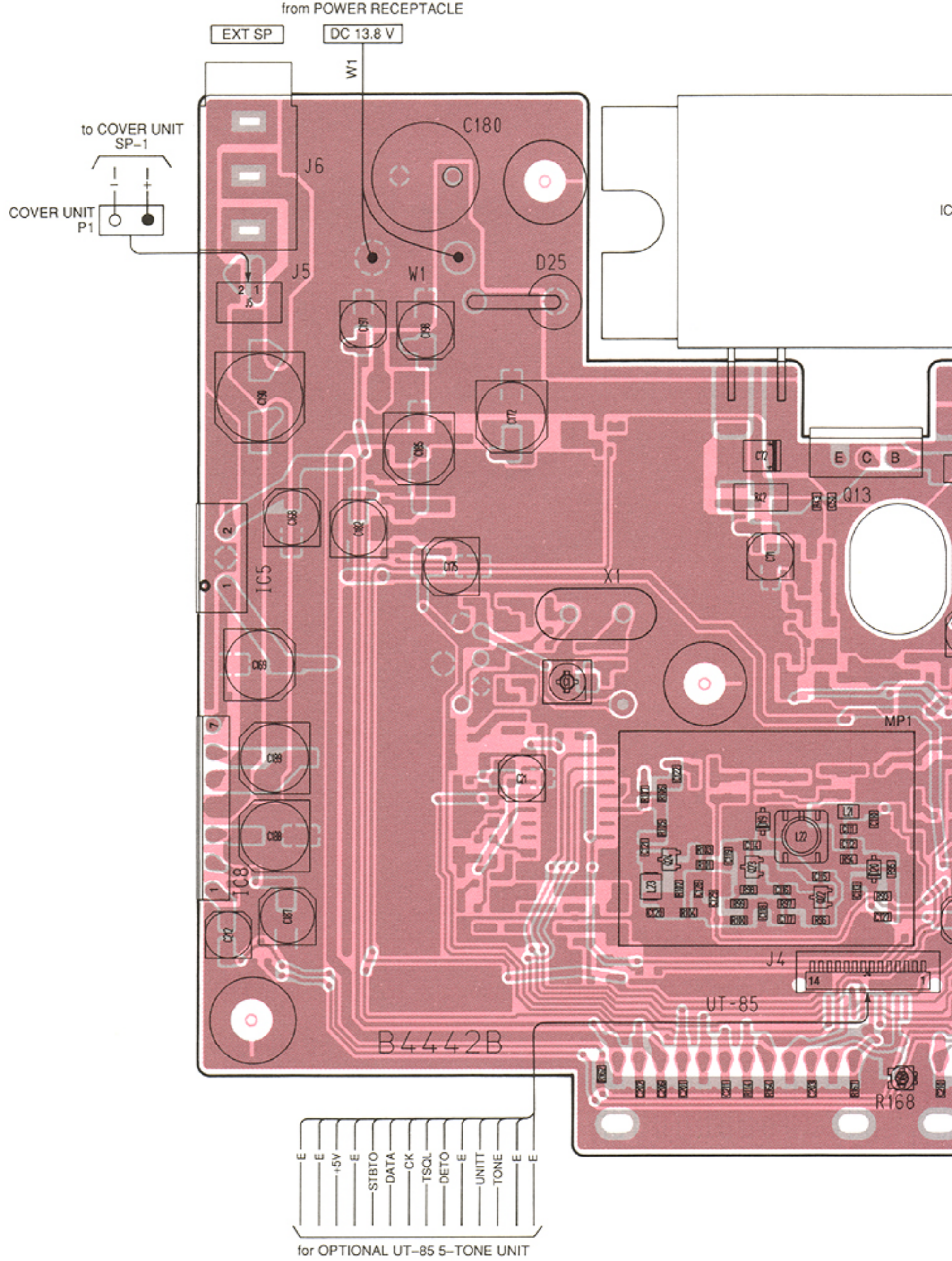


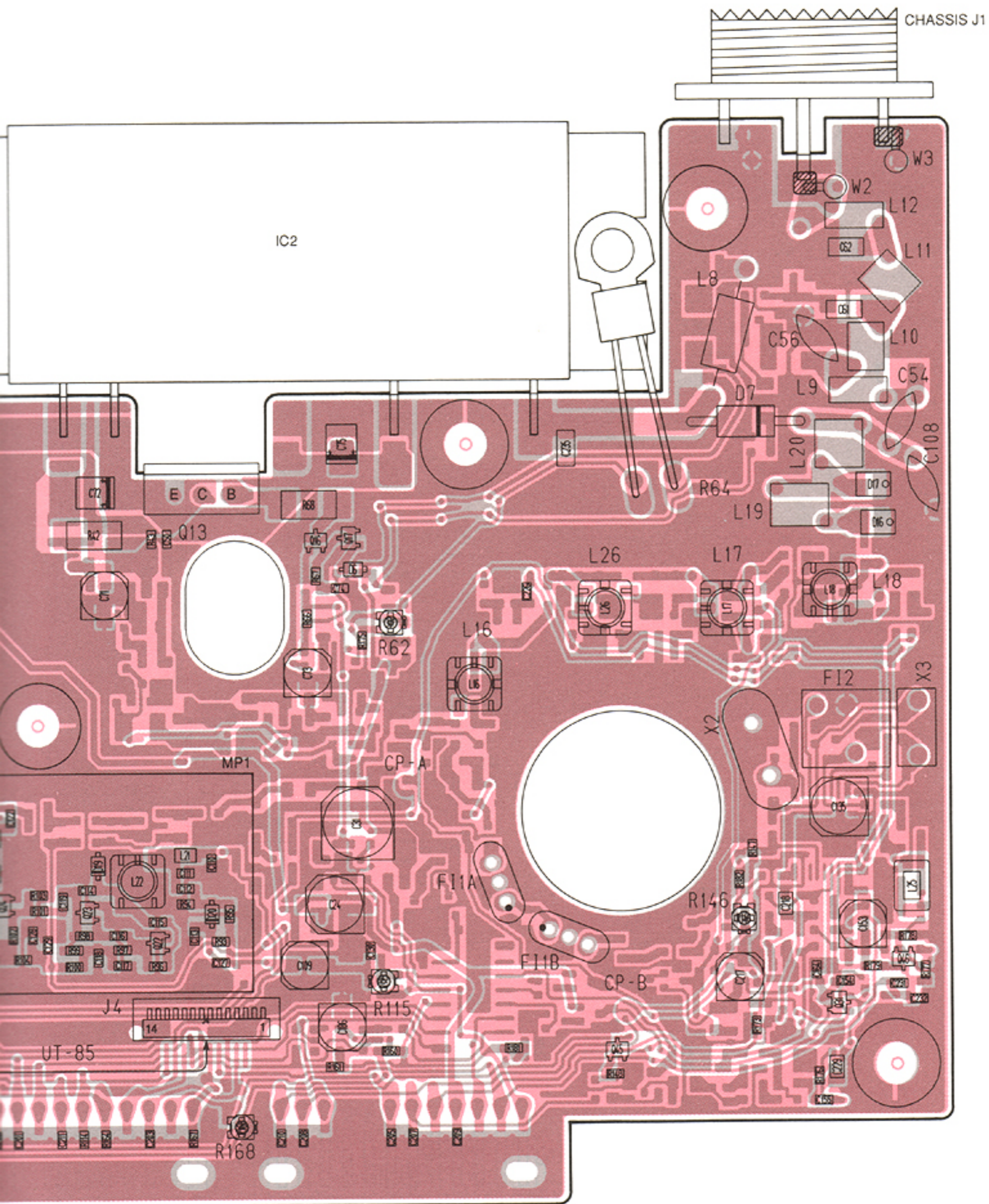
Q17, Q31

2SC4226 R25
(Symbol: R25)

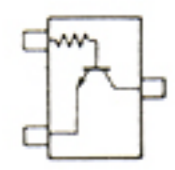


Q22, Q23, Q24



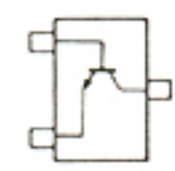


DTC114TU
(Symbol: 04)



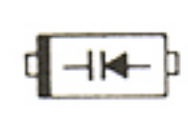
Q27

2SC4116 Y
(Symbol: LY)



Q45, Q46

HVU350TRF
(Symbol: 4)



D19

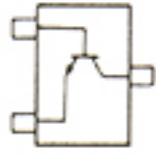
• MAIN UNIT

2SC4116 Y
(Symbol: LY)



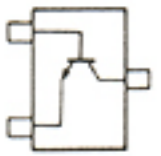
Q1, Q7

2SC4403 3
(Symbol: LY3)



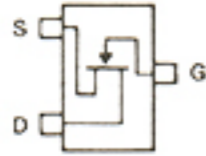
Q2

2SC4117 GR
(Symbol: DG)



Q3, Q4

2SK880 GR
(Symbol: XG)



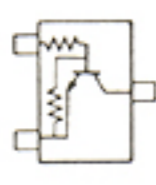
Q5, Q6, Q8, Q28

2SA1734
(Symbol: LB)



Q9

DTC144EU
(Symbol: 26)



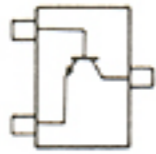
Q10, Q14, Q15,
Q35, Q42, Q44

2SC2954
(Symbol: QK)



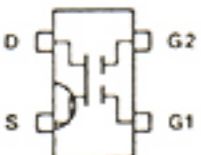
Q11, Q12

2SC4226 R25
(Symbol: R25)



Q18, Q25, Q26

3SK184 S
(Symbol: 3R)

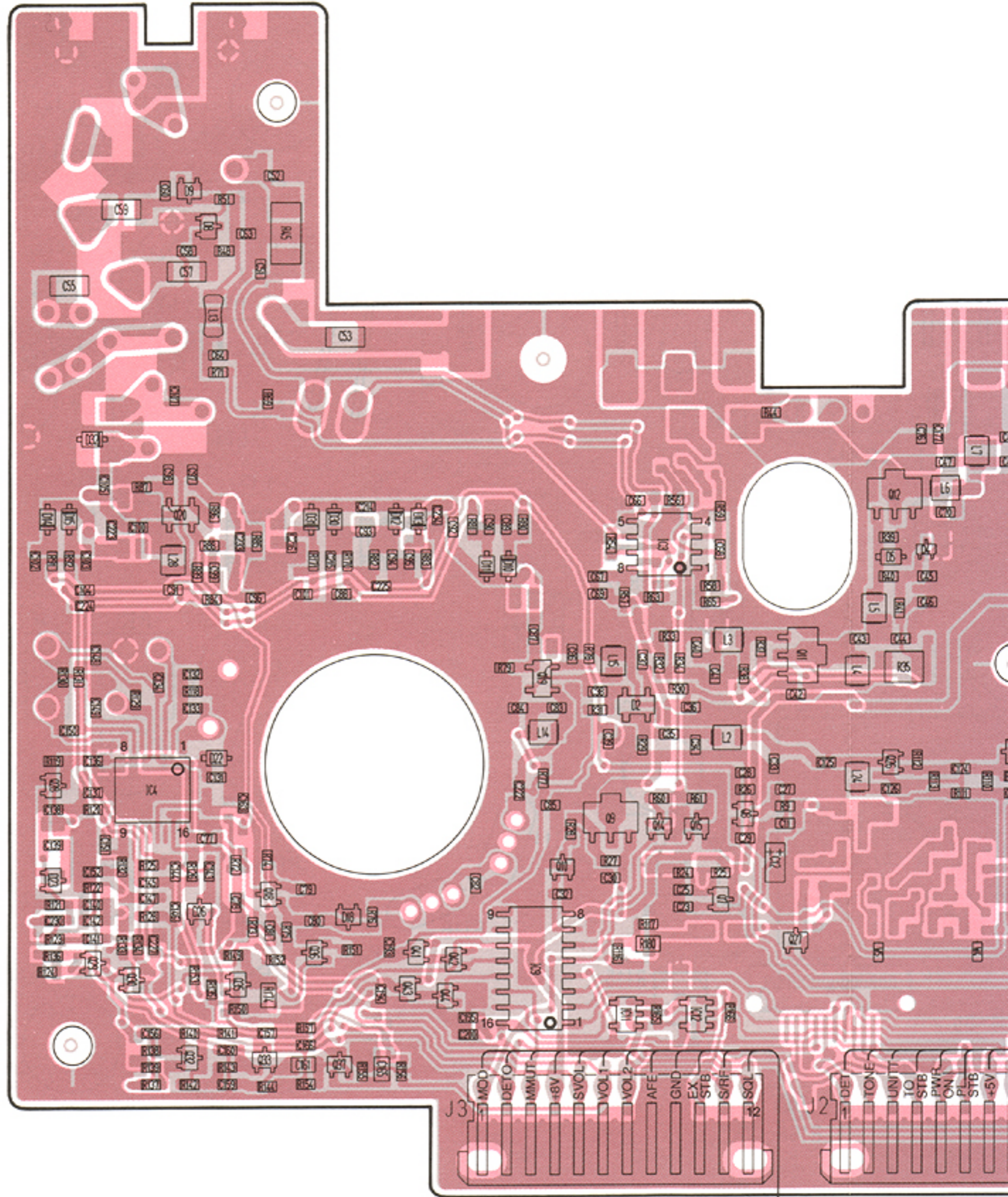


Q19

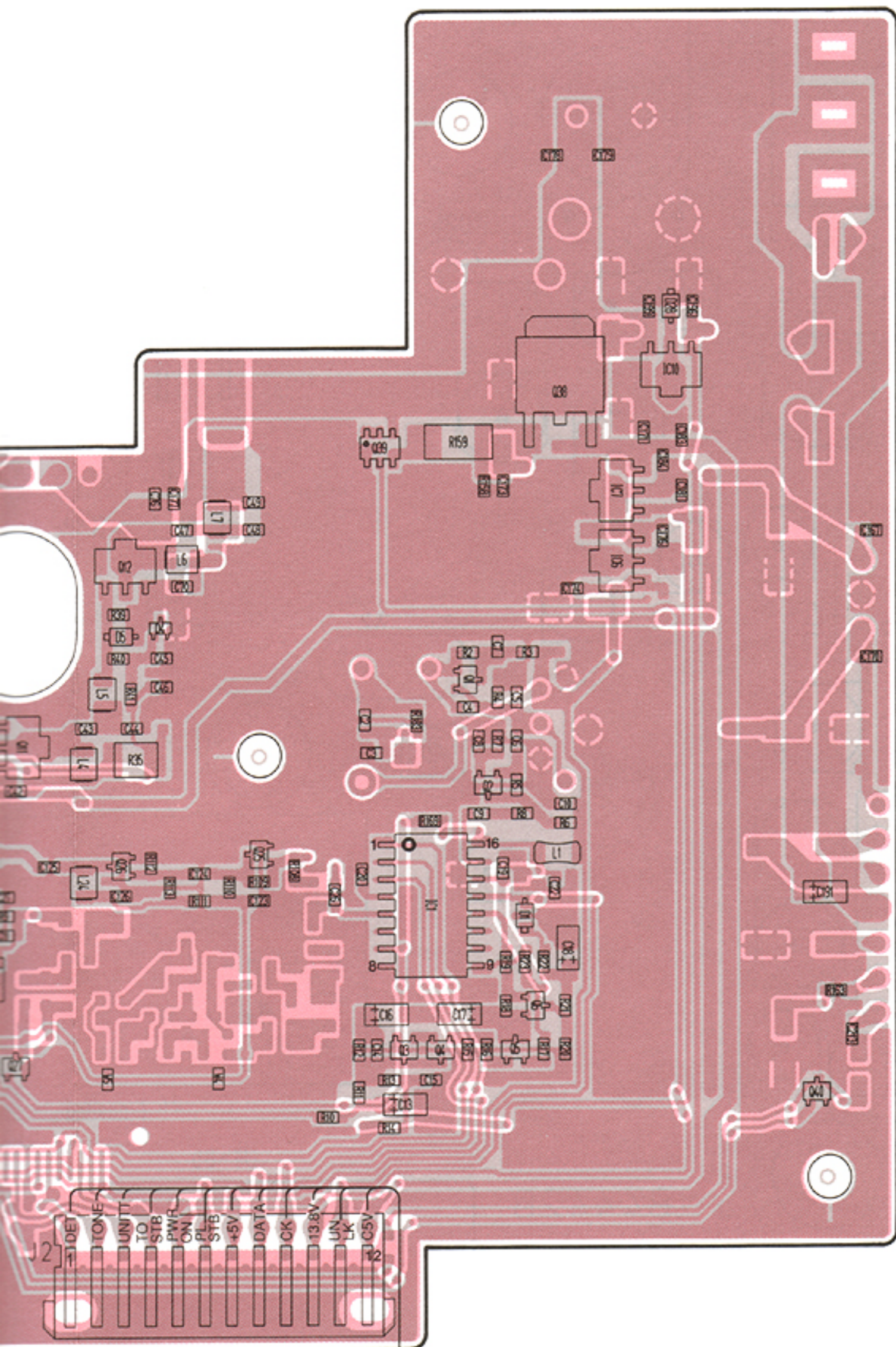
3SK166 2
(Symbol: K)



Q20



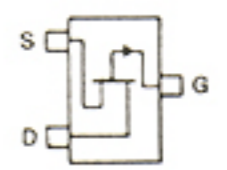
to LOGIC UNIT (J4)



UNIT (J4)

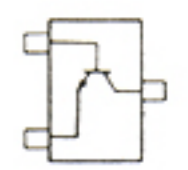
to LOGIC UNIT (J3)

2SJ144 Y
(Symbol: VY)



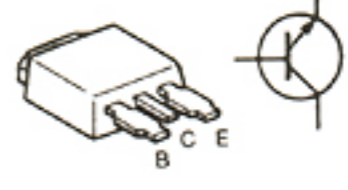
Q29, Q30, Q37

2SC4211 6 TR
(Symbol: L6)



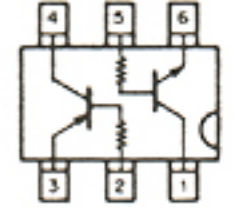
Q32, Q33, Q36

2SC4684
(Symbol: 4G)



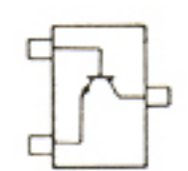
Q38

IMD6
(Symbol: D6)



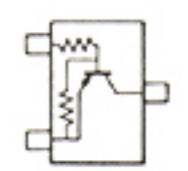
Q39

2SC4213 B
(Symbol: AB)



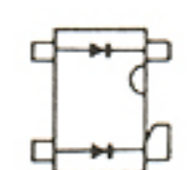
Q40

DTA113ZU
(Symbol: 111)



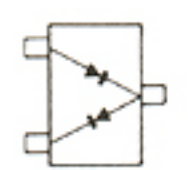
Q41, Q43

MA862
(Symbol: M1I)



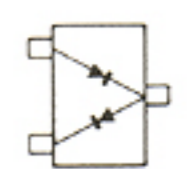
D2

MA133
(Symbol: MP)



D4

MA742
(Symbol: M1U)



D8, D9, D18,
D23, D26

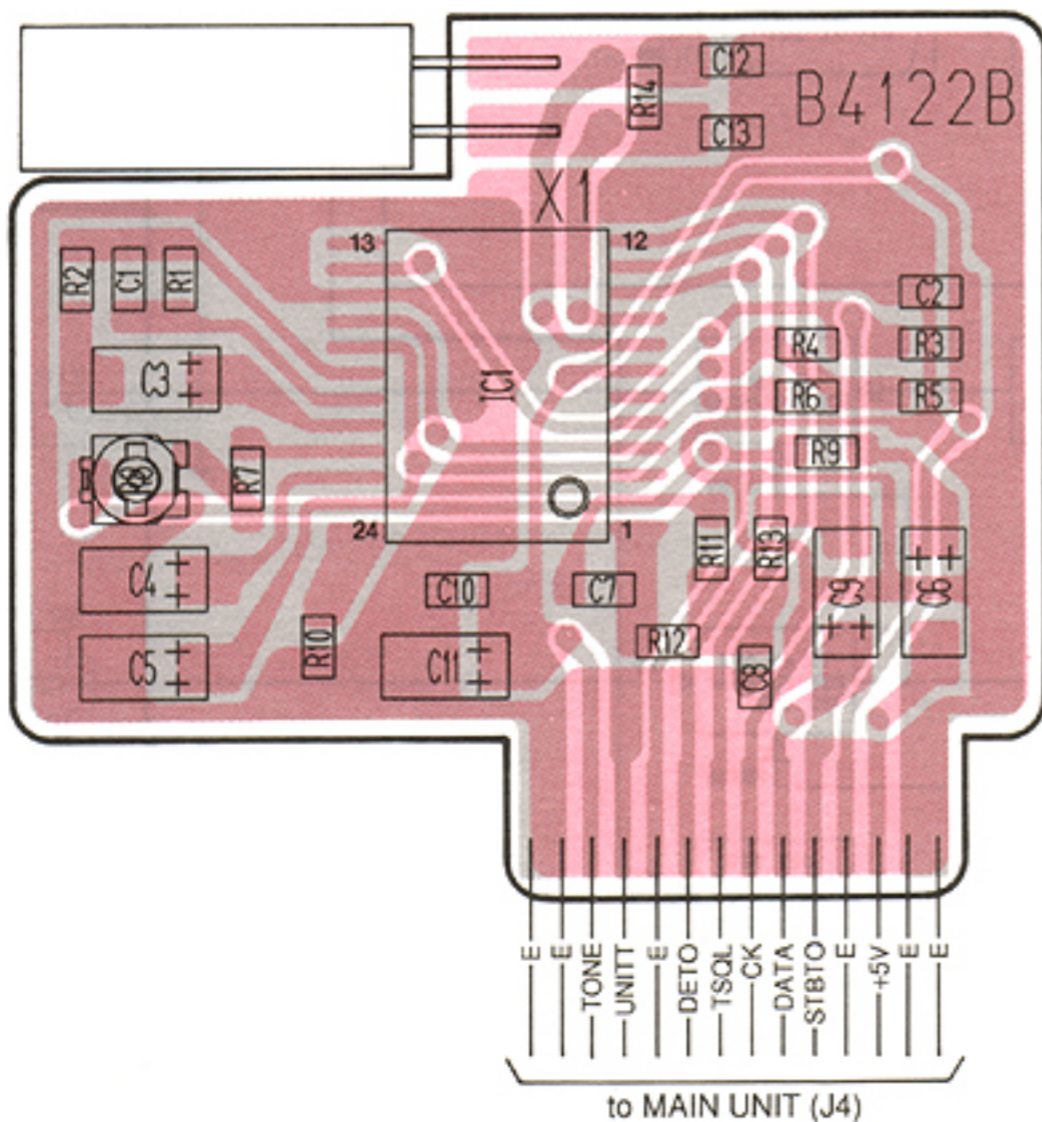
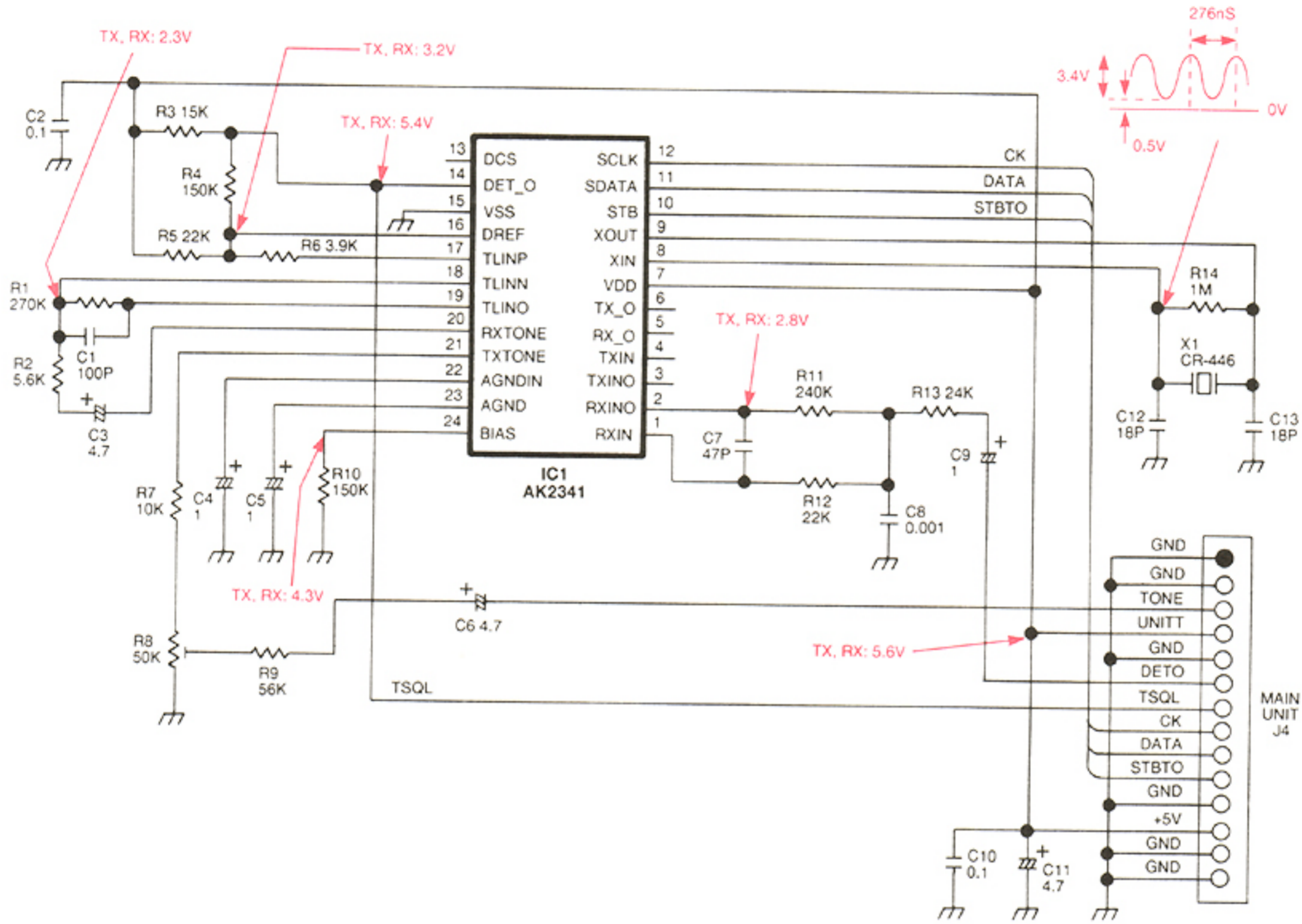
HVU350TRF
(Symbol: 4)



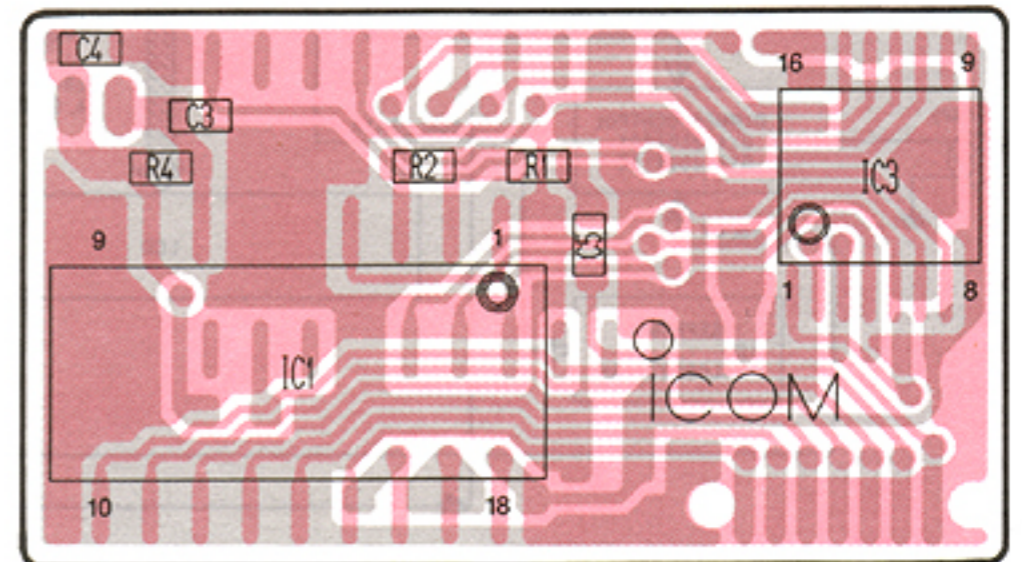
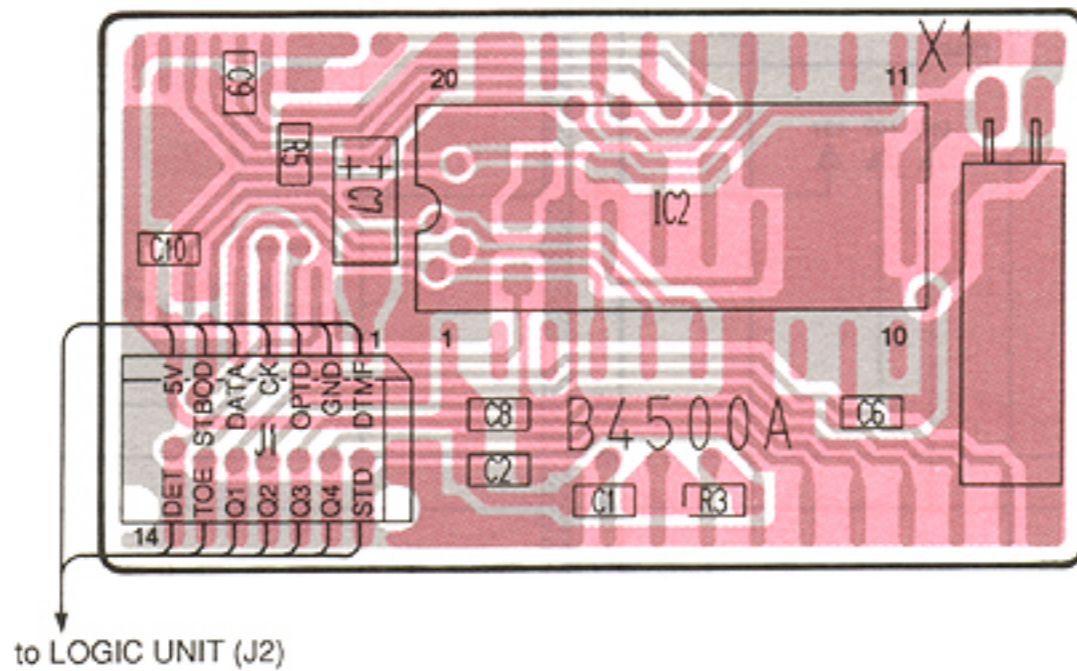
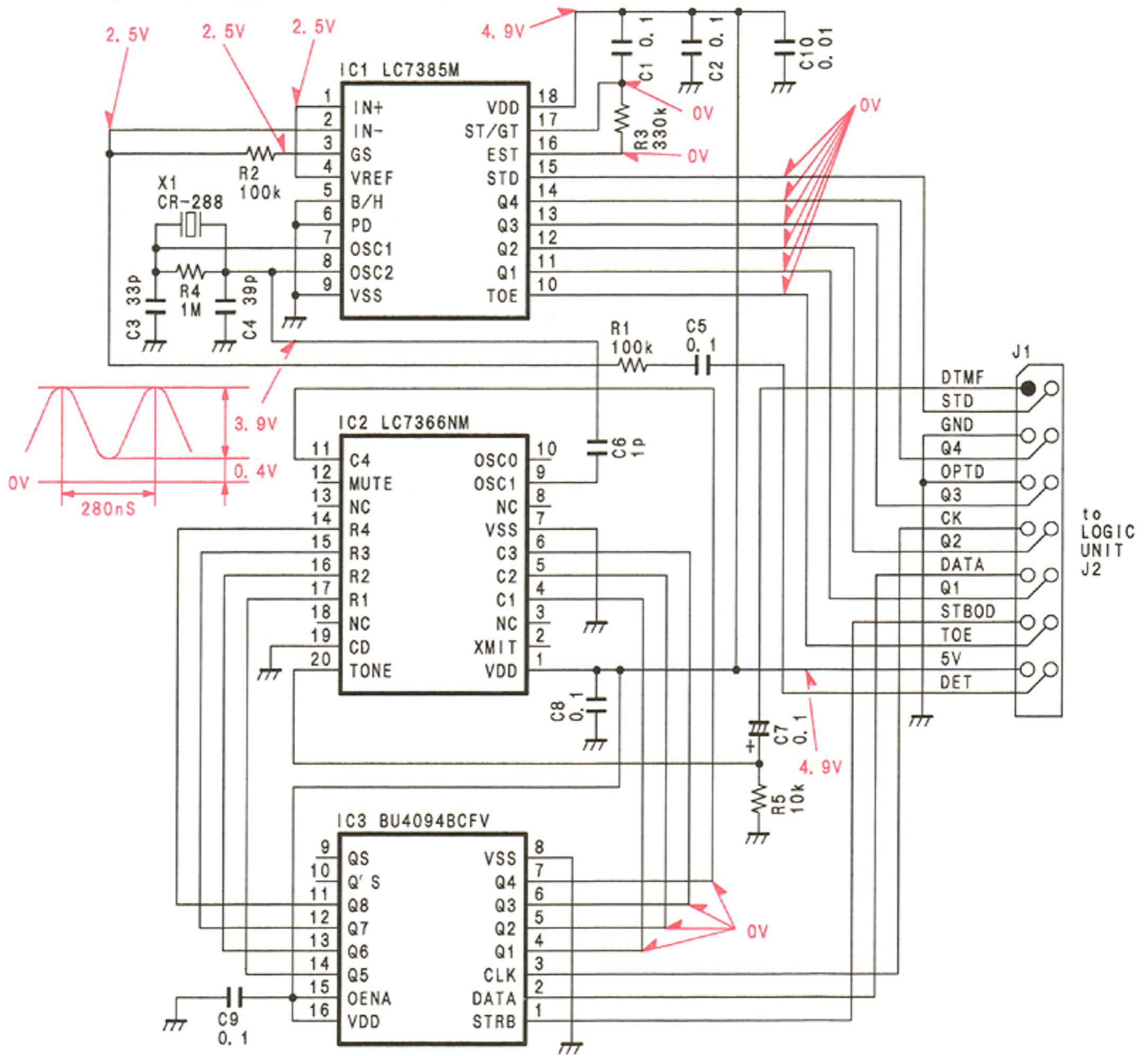
D10, D13, D14, D31

SECTION 8 OPTIONAL UNITS

8-1 UT-85 TONE SQUELCH UNIT

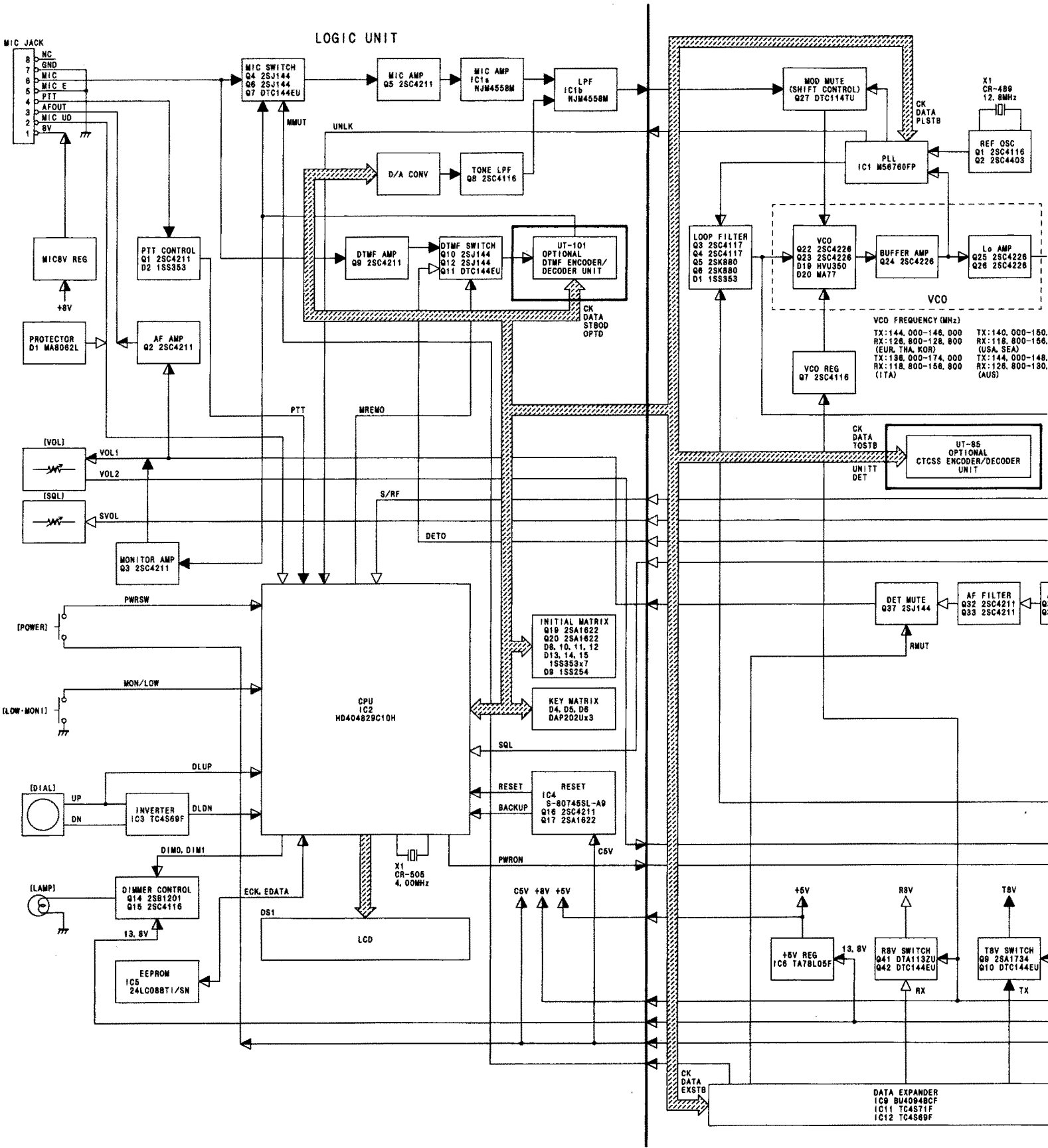


8-2 UT-101 DTMF UNIT



to LOGIC UNIT (J2)

SECTION 9 BLOCK DIAGRAM

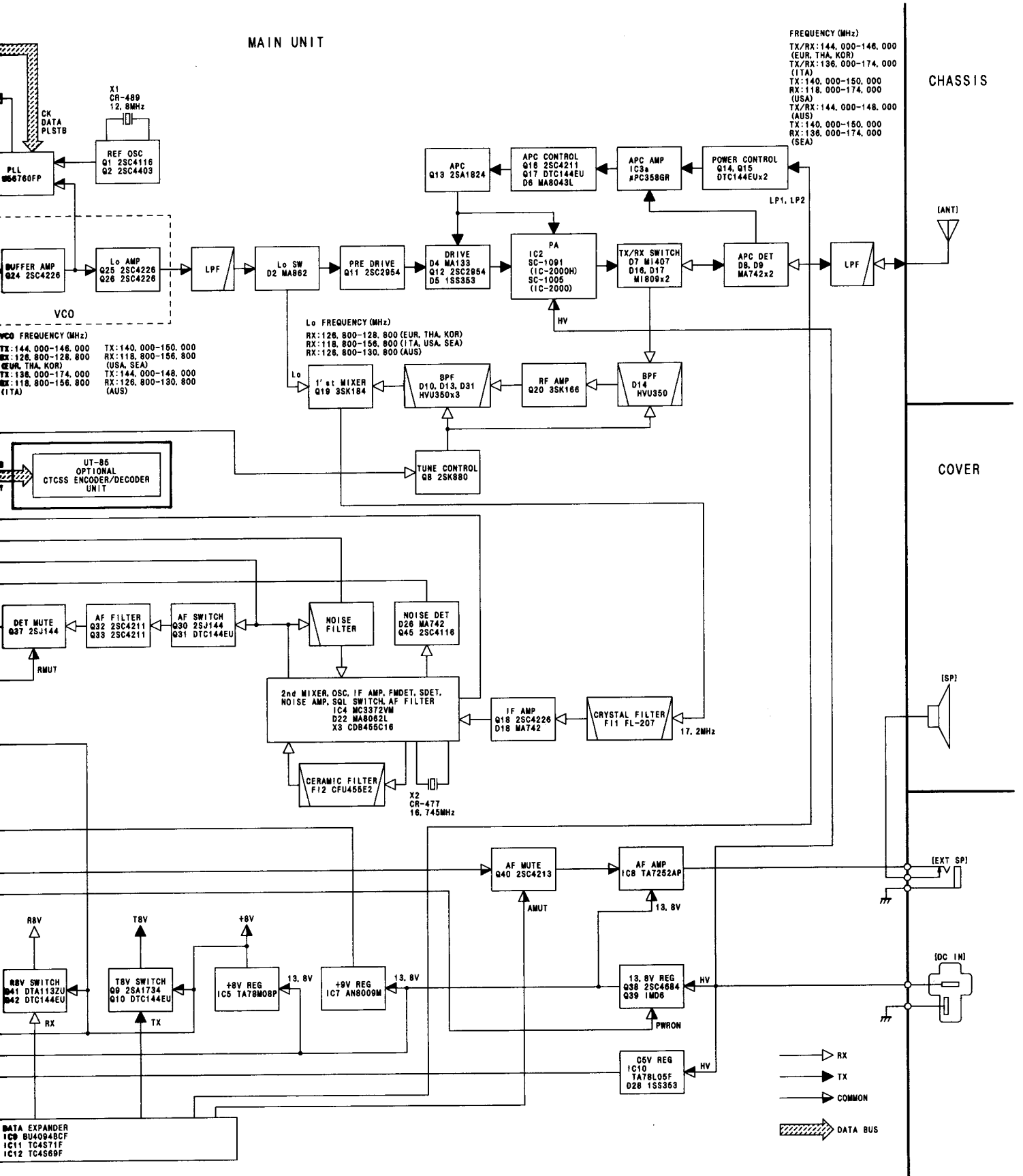


MAIN UNIT

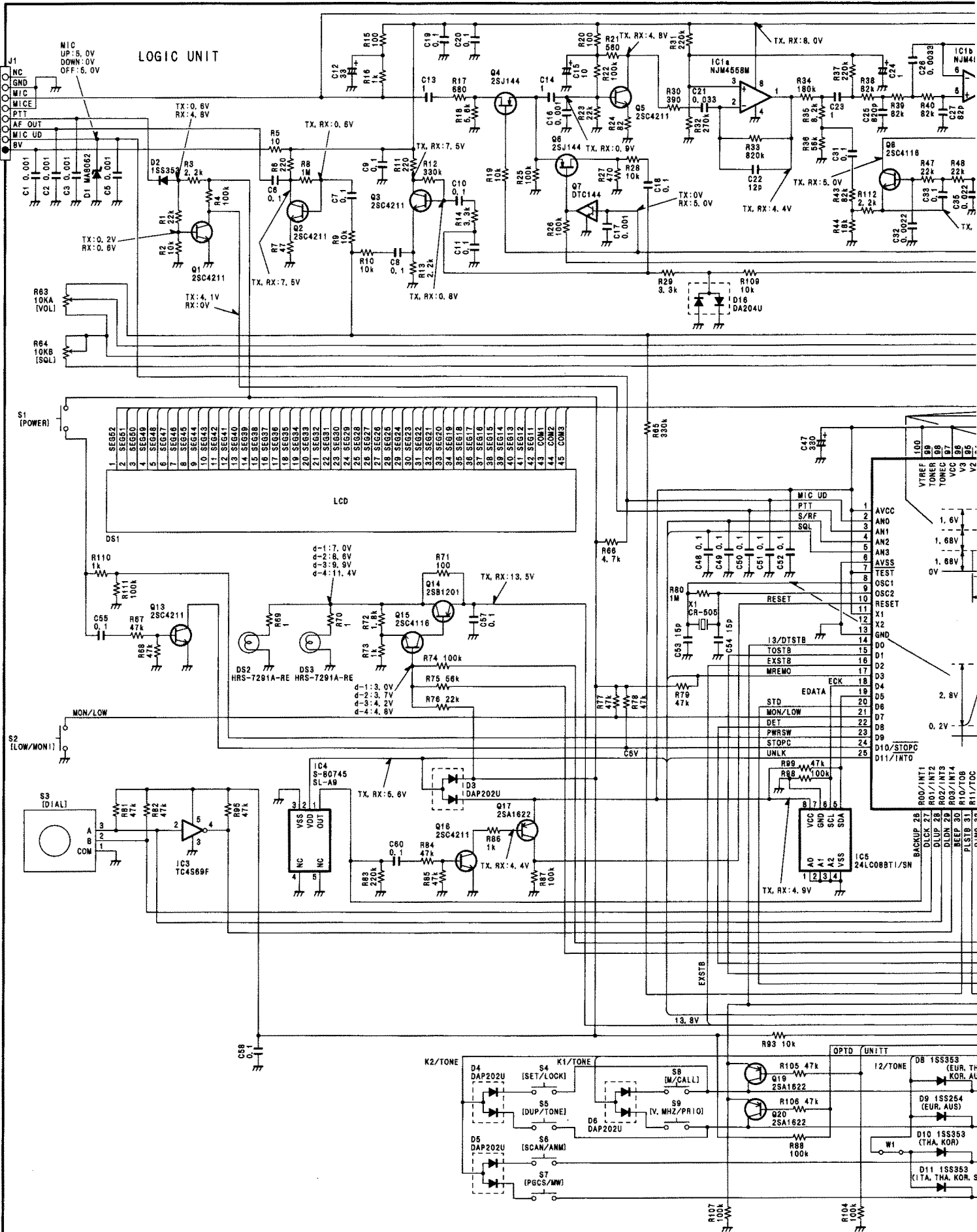
FREQUENCY (MHz)
 TX/RX: 144, 000-148, 000
 (EUR, THA, KOR)
 TX/RX: 136, 000-174, 000
 (ITA)
 TX: 140, 000-150, 000
 RX: 118, 000-174, 000
 (USA)
 TX/RX: 144, 000-148, 000
 (AUS)
 TX: 140, 000-150, 000
 RX: 136, 000-174, 000
 (SEA)

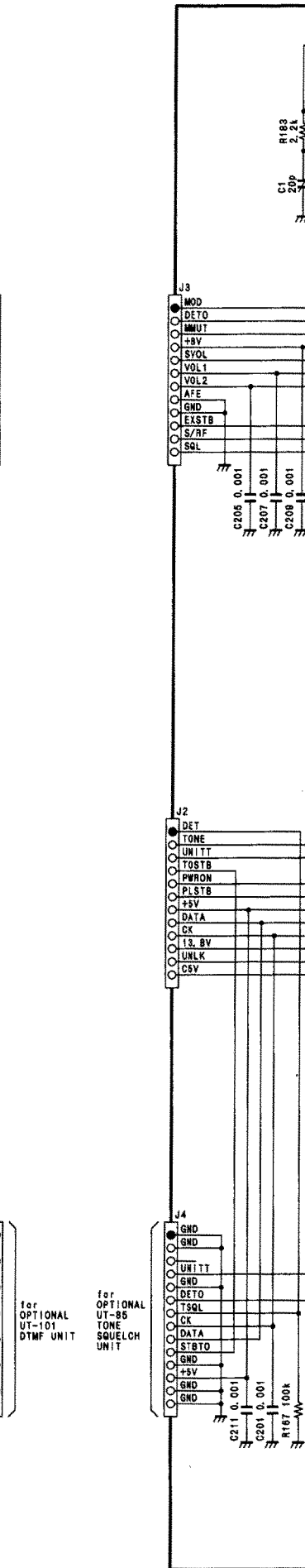
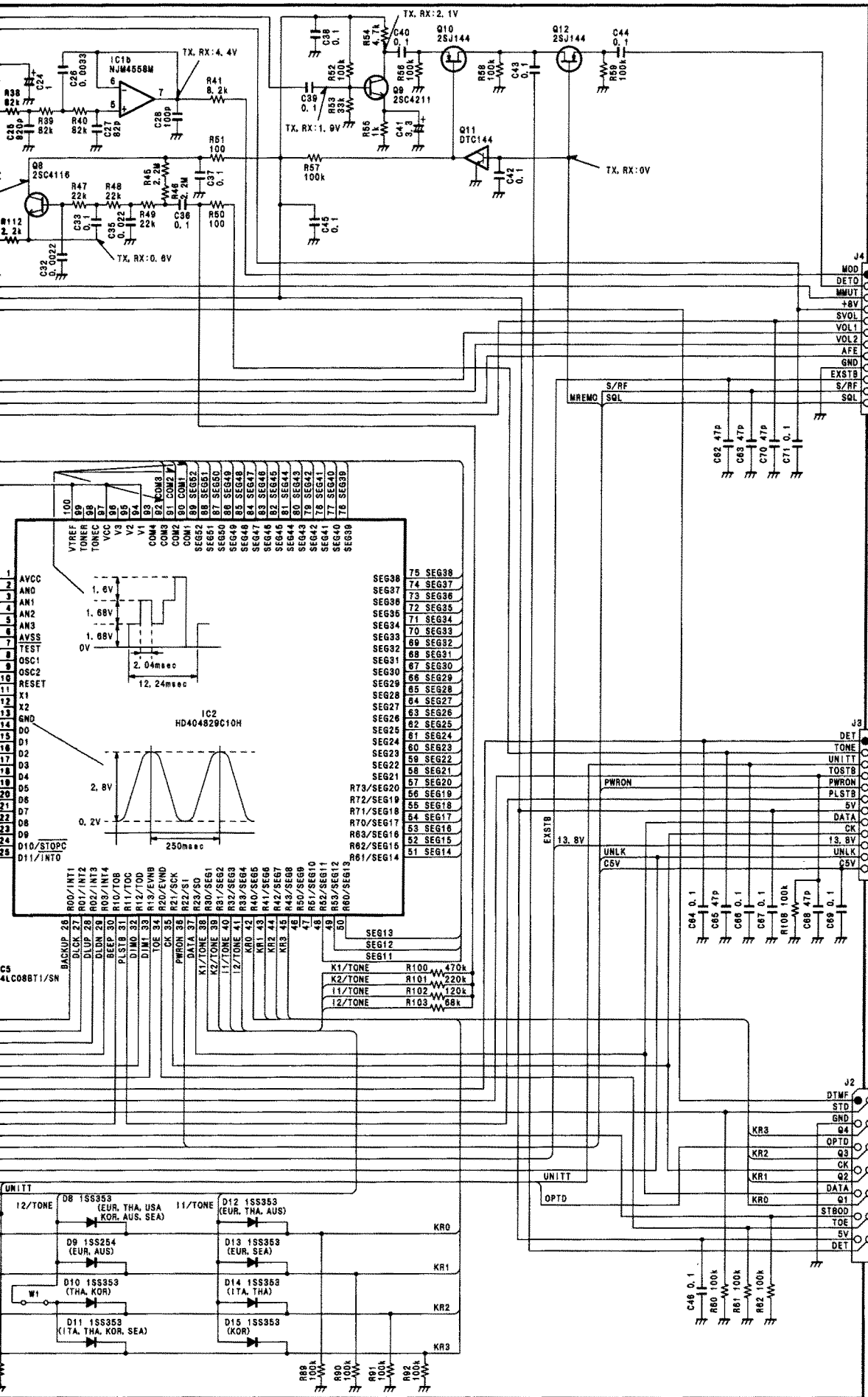
CHASSIS

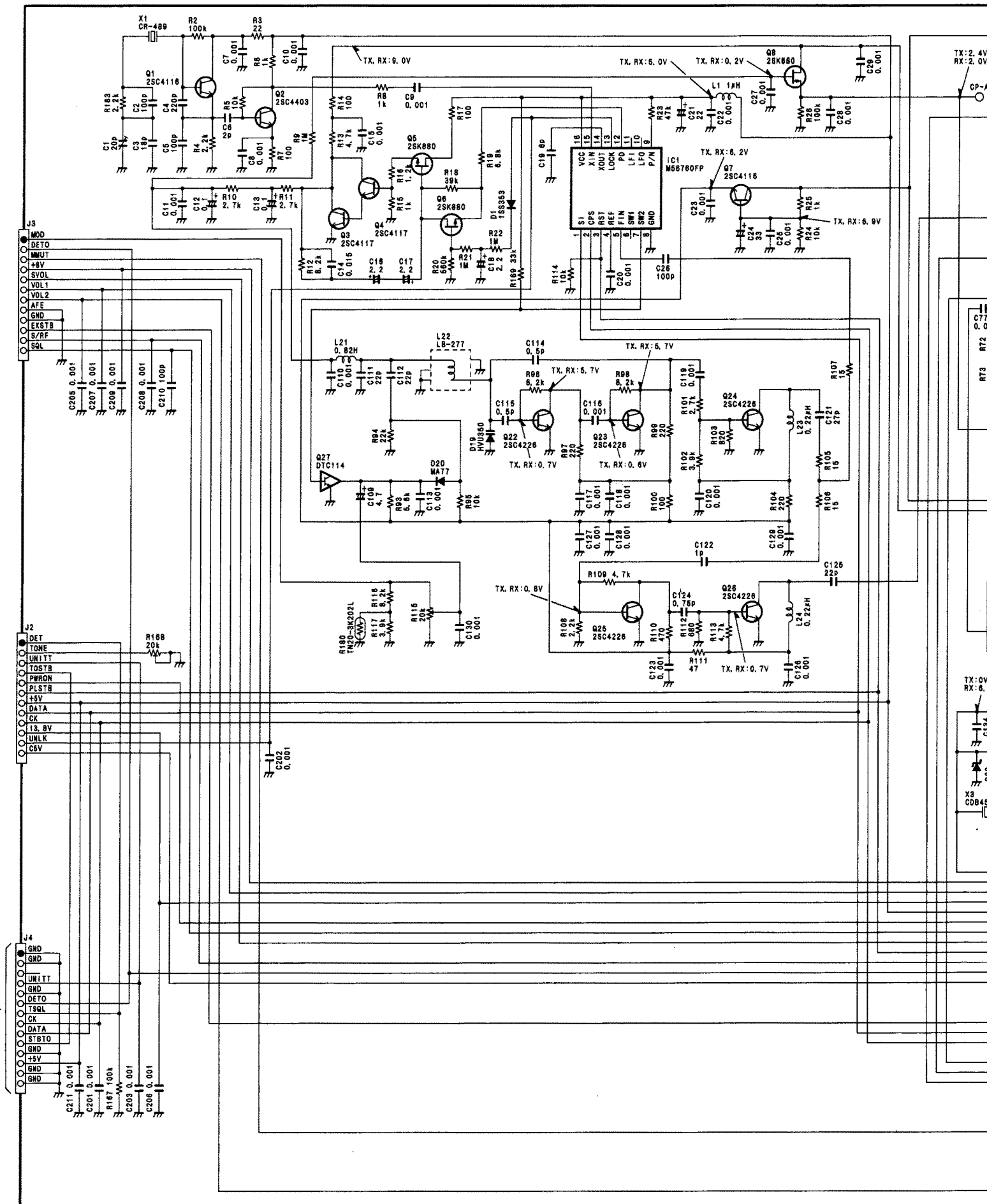
COVER

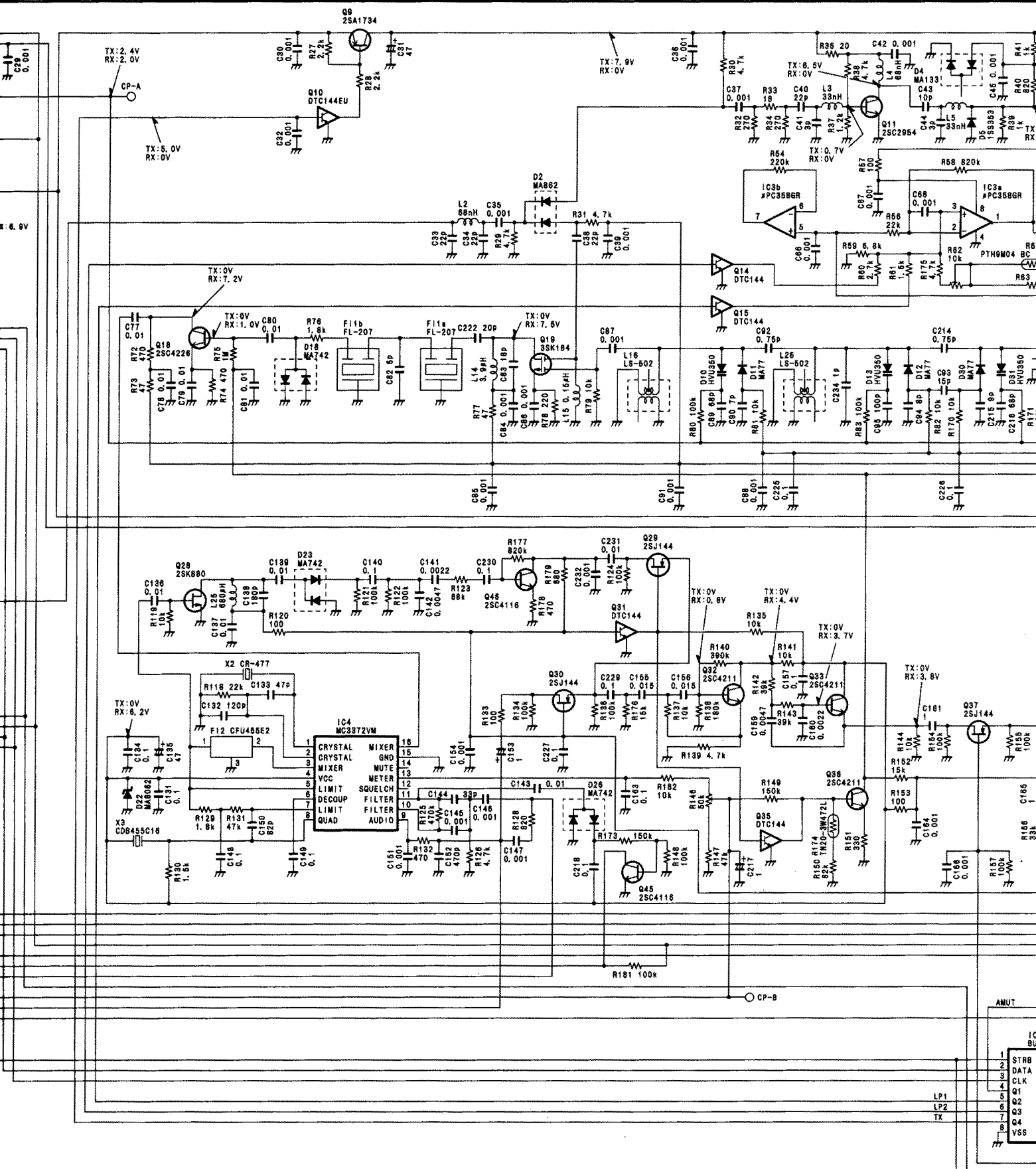


SECTION 10 VOLTAGE DIAGRAM





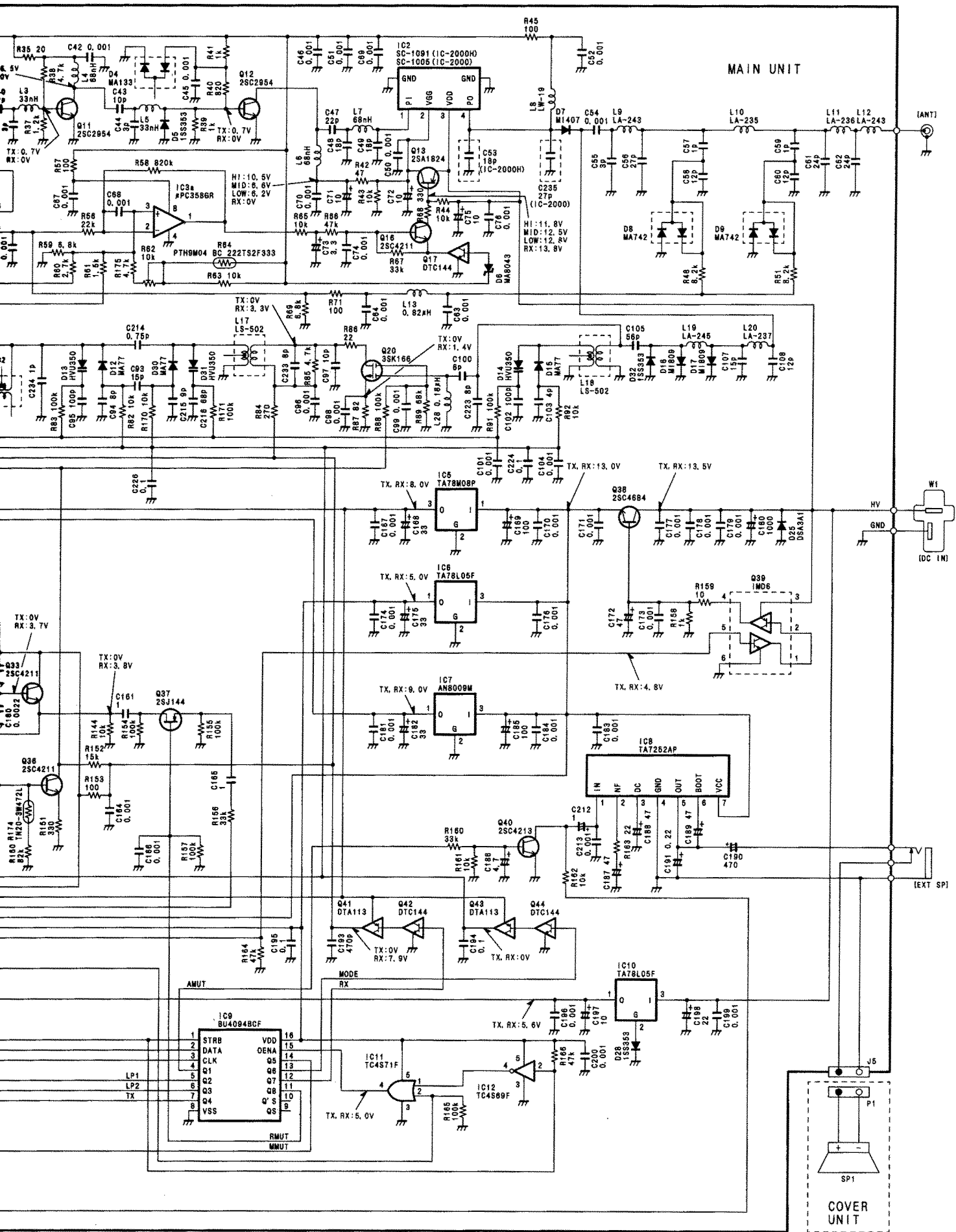




AMUT

1	STRB
2	DATA
3	CLK
4	Q1
5	Q2
6	Q3
7	Q4
8	VSS

LP1
LP2
TX



MAIN UNIT

(ANT)

(DC IN)

(EXT SP)

COVER UNIT

IC9
BU4094BCF

1	STRB	16	VDD
2	DATA	15	
3	CLK	14	OENA
4	Q1	05	Q6
5	Q2	06	Q7
6	Q3	07	Q8
7	Q4	08	Q9
8	VSS	10	QS
		9	

LP1
LP2
TX
RMUT
MMUT

IC11
TC4S71F

TX, RX: 5.0V

IC12
TC4S69F

IC8
TA7262AP

IN 1, 2, 3, 4, 5, 6, 7
NF, DC, GND, OUT, BOOT, VCC

IC7
AN8008M

TX, RX: 9.0V

IC6
TA78L05F

TX, RX: 5.0V

IC5
TA78M08P

TX, RX: 8.0V

Q38
2SC4684

TX, RX: 13.5V

Q39
1MD6

TX, RX: 4.8V

Q20
3SK166

TX: 0V
RX: 3.3V

Q16
2SC4211

TX: 0V
RX: 0V

Q12
2SC2954

TX: 0.7V
RX: 0V

IC2
SC-1091 (IC-2000H)
SC-1006 (IC-2000)

IC3
APC3586R

H1: 10.5V
MID: 6.6V
LOW: 6.2V
RX: 0V

IC4
PTHM04 BC 222TS2F333

Q11
2SC2954

TX: 0.7V
RX: 0V

Q33
2SC4211

TX: 0V
RX: 3.7V

Q38
2SC4211

TX: 0V
RX: 3.8V

Q41
DTA113

TX: 0V
RX: 7.9V

Q42
DTC144

TX, RX: 0V

Q43
DTA113

TX, RX: 0V

Q44
DTC144

Q1
2SC4211

Q2
2SC4211

Q3
2SC4211

Q4
2SC4211

Q5
2SC4211

Q6
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Q7
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Q90
2SC4211

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