



SERVICE MANUAL

MARINE RADAR

MR-610

INTRODUCTION

This service manual describes the latest information for the **MR-610 MARINE RADAR** at the time of publication.

DANGER

HIGH VOLTAGE WARNING

High voltages of up to hundreds of thousands of volts are used in this unit. **BEWARE** of high voltage when removing the outer cover of the unit. When working on the interior, avoid direct contact with the high voltage circuitry especially on the CRT unit and the transmit circuit.

Electric shock of 1000 volts or more causes instant electrocution and death; and, even an electric shock of only 100 volts can kill you.

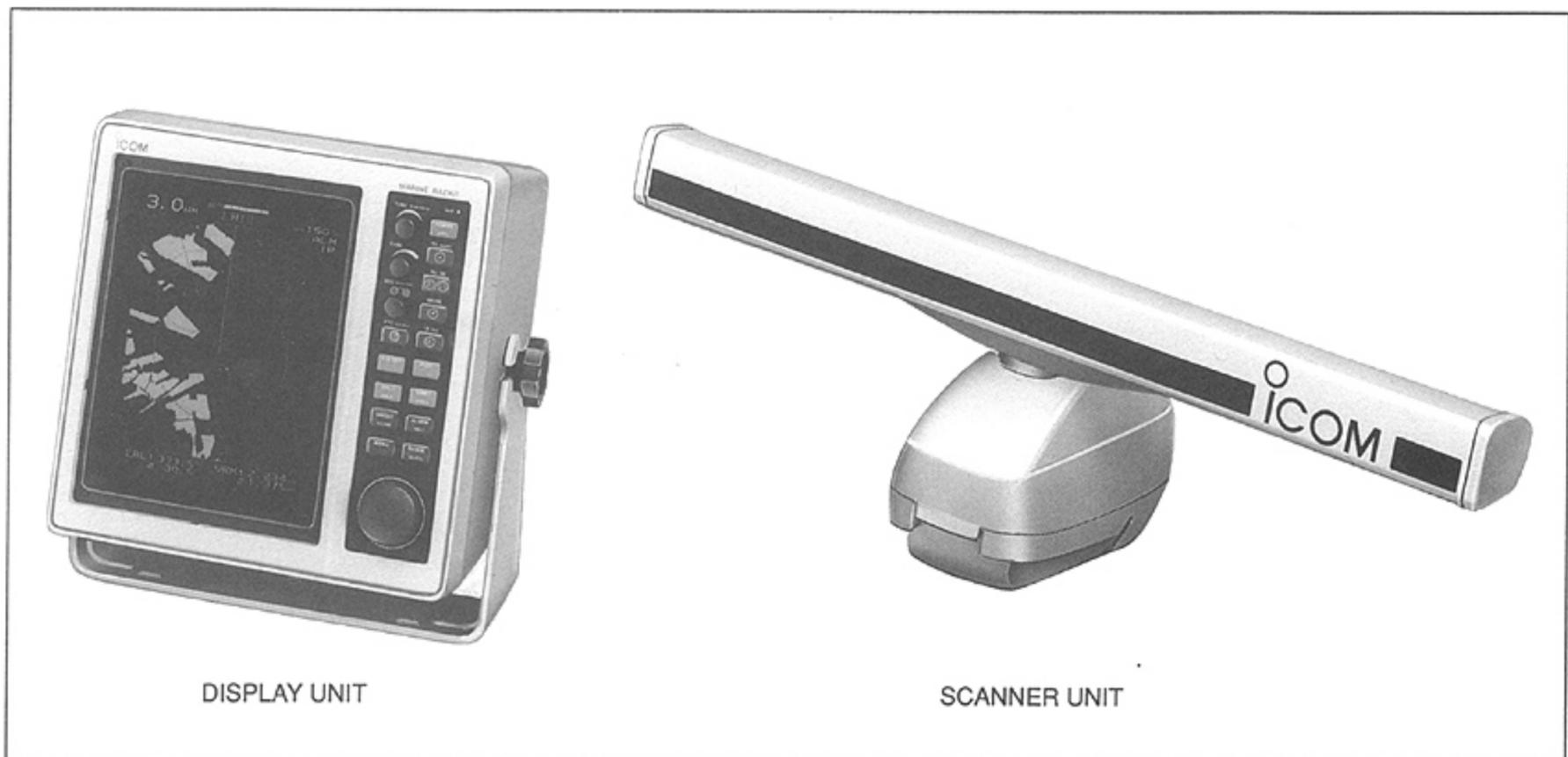
ELECTRIC SHOCK

PREVENTING ELECTRIC SHOCK

Before opening the display unit cover, wait more than 1 min. from disconnecting the DC power cable in order to discharge the capacitor inside the unit.

FIRST AID IN CASE OF ELECTRIC SHOCK

A stable foothold is essential to prevent more extensive or additional injuries. When injured by electric shock, disinfect the burn completely and begin first aid as soon as possible. To avoid electric shock, all adjustments should be made using an insulated turning tool.



DISPLAY UNIT

SCANNER UNIT

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>

1140004220	IC	HD64180R1P6	MR-610	MAIN UNIT	5 pieces
8810001280	Screw	PH M5 x 20 SUS	MR-610	FRONT UNIT	8 pieces

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

REPAIR NOTES

1. Make sure a problem is internal before disassembling the unit.
2. **DO NOT** open the unit until the unit is disconnected from the power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits of electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the unit is defective.
8. **READ** the instructions of the test equipment thoroughly before connecting equipment to the unit.

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To upgrade quality, all electrical or mechanical parts and internal circuits are subject to change without notice or obligation.
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SECTION 1 SPECIFICATIONS

General

- Minimum range : 25 m; 82 ft (when measurement range is 1/8 nm)
- Maximum range : 48 nm (when measurement range is 48 nm)
- Measurement range :

RANGE (nm)	1/8	1/4	1/2	3/4	1.5	3.0	6.0	12	24	32	48
FIXED RING (nm)	1/16	1/8	1/4	1/4	1/4	1/2	1.0	2.0	4.0	8.0	8.0
NUMBER	2	2	2	3	6	6	6	6	6	4	6

- Preheat time : 2 min.
- Connection length between display and antenna : 15 m; 49.2 ft. (standard), 30m; 98.4 ft (optional)

Scanner unit

- Type : 1200 mm open-type slot array
- Revolution speed : Approx. 24 r.p.m
- Beam width : Horizontal beam 2° at -3 dB point
Vertical beam 25° at -3 dB point
- Side lobe : -24 dB
- Polarization : Horizontal
- Transmission frequency : 9410 MHz ±30 MHz (X band)
- Peak output power : 4 kW
- Pulse width :

RANGE (nm)	NORMAL PULSE	LONG PULSE
1/8, 1/4, 1/2, 3/4, 1.5	0.08 μsec./1800 Hz	0.2 μsec./900 Hz
3	0.2 μsec./900 Hz	0.4 μsec./900 Hz
6	0.4 μsec./900 Hz	0.75 μsec./600 Hz
12, 24, 32, 48	0.75 μsec./600 Hz	

- Modulation system : FET switching
- Transmit/receive switching : Circulator
- Intermediate frequency : 60 MHz
- IF circuit characteristics : Linear
- Dimensions : 1200 (L) x 400 (W) x 360 (H); 47.2 (L) x 15.7 (W) x 14.2 (H) in
- Usable temperature range : -10°C to +60°C (+14°F to +140°F)
- Weight : 17 kg; 37.5 lb (Not including the cable's weight)

Display unit

- System : Raster scan method
- CRT display : 9-inch green display
- Pixels : 640 x 512 dots (327680 pixels)
- CRT mounting : Vertical
- Input : NMEA0182 or NMEA0183 format (for navigation receiver)
N+1 Data format (flux gate compass sensor)
- Output : Alarm zone output (relay)
- Power supply requirement : 11 to 40 V DC
- Power consumption : Approx. 60 W at wind velocity zero
- External alarm current : Less than 1 A (24 V DC)
- Usable temperature range : 0°C to +55°C (+32°F to +131°F)
- Relative humidity : Less than 95% at +35°C (+95°F)
- Dimensions : 250 (W) x 157 (H) x 288 (D) mm; 9.8 (W) x 6.2 (H) x 11.3 (D) in
- Weight : 6.7 kg; 14.8 lb

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

SECTION 2 INSIDE VIEWS

2-1 DISPLAY UNIT

• MAIN UNIT

Sampling memory • Video memory data transfer circuit

Sweep generator (IC29, IC30: μ PC358G2-T1)

A-D converter circuit

Bearing pulse • Heading marker composite signal separating circuit

Alarm detector (IC26: TMP82C54M-2)

Front unit interface (IC9: TMP82C255AN-2-Z)

Main CPU (IC10: HD64180R1P6)

LCA (IC54: XC3020-70PC84C)

MAIN unit

Sub CPU (IC45: HD647180XRFS6)

Address counter circuit

Brightness adjustment circuit

VIDEO RAM (IC52, IC53: M5M482128AJ-8)

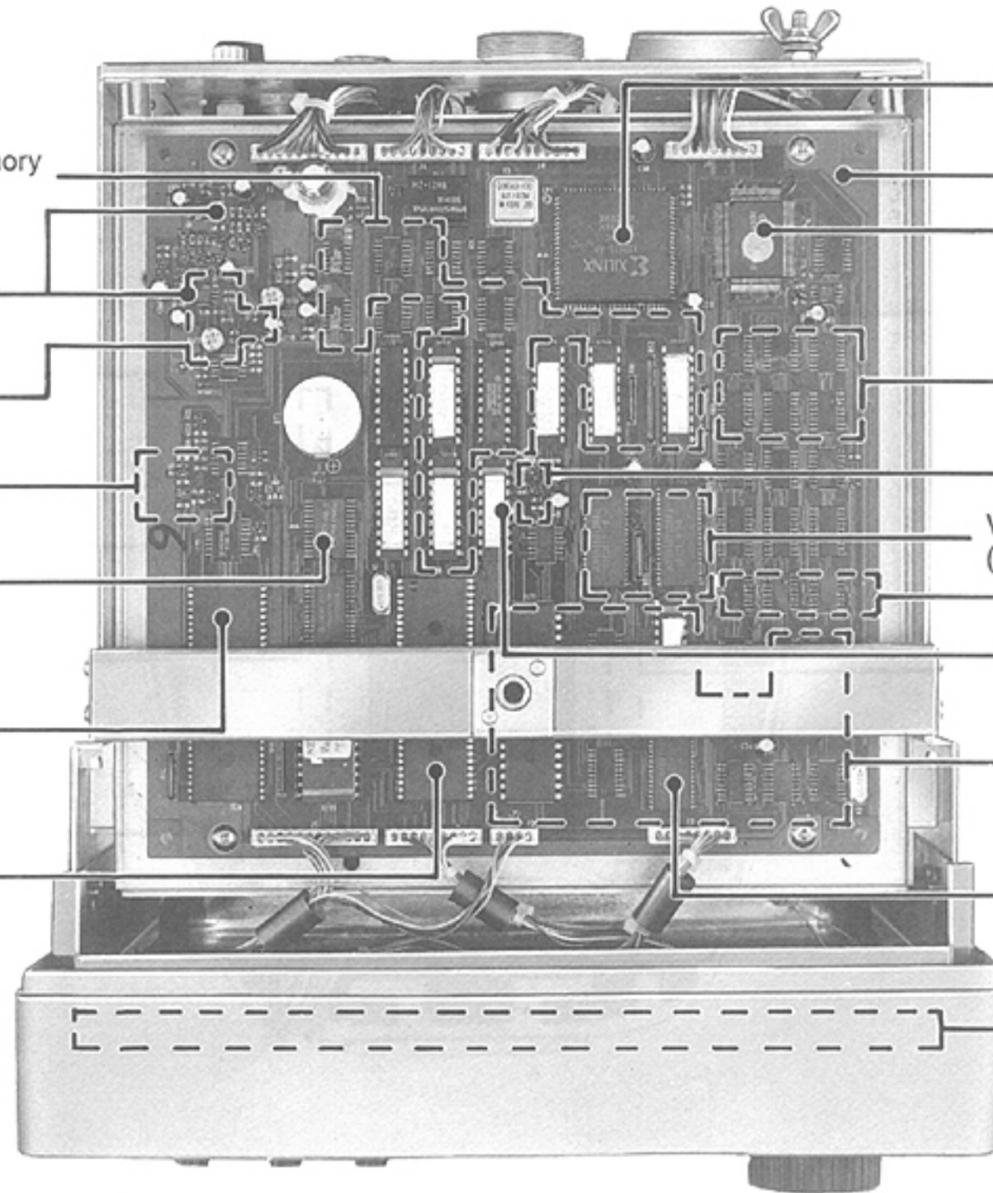
Shift register

Composite video signal circuit

Text screen display circuit

Text screen VRAM (IC27: M5M482128AJ-8)

FRONT unit



• DISPLAY-A UNIT

REG board

HORIZ. output trans.

REAR unit

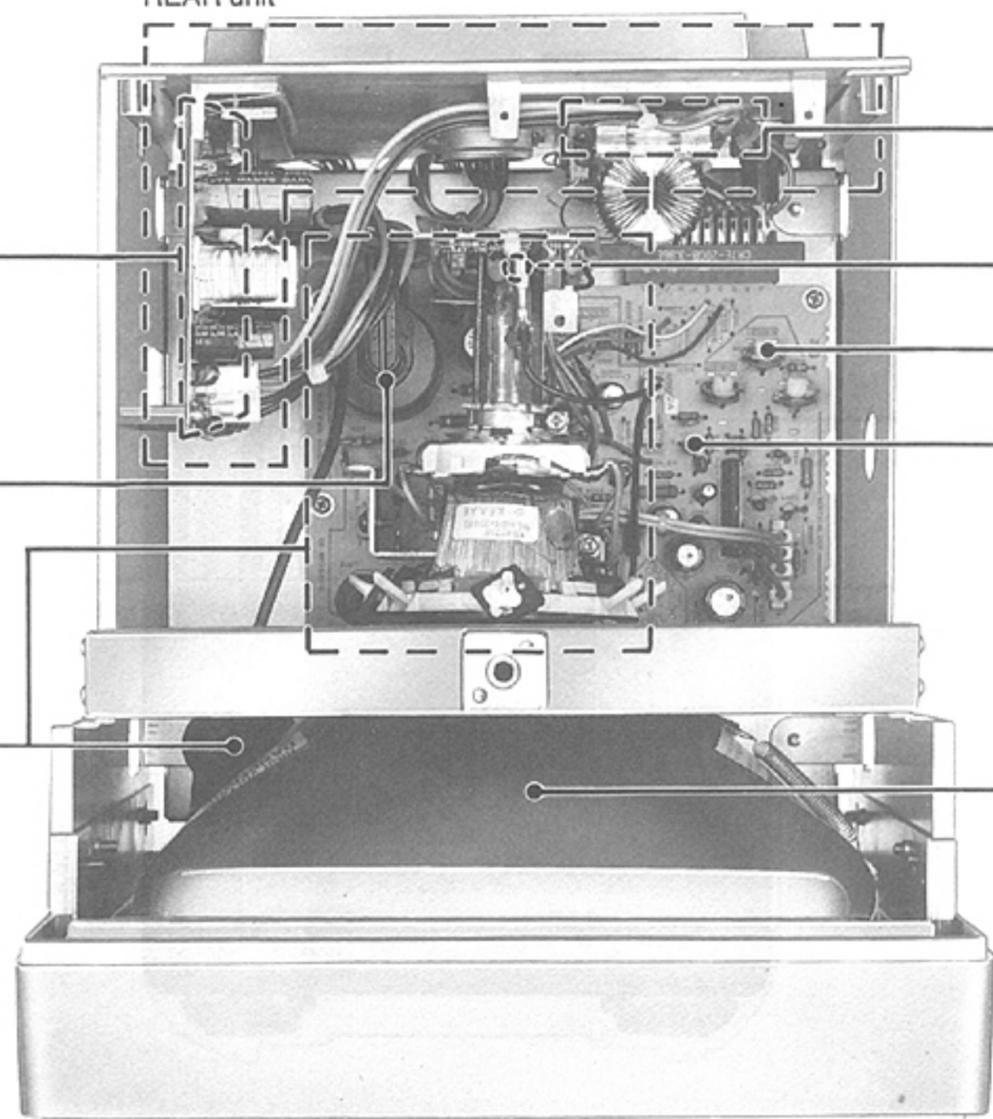
FIL board

Vert. Hold

Sub brightness

DISPLAY-A unit

CRT tube

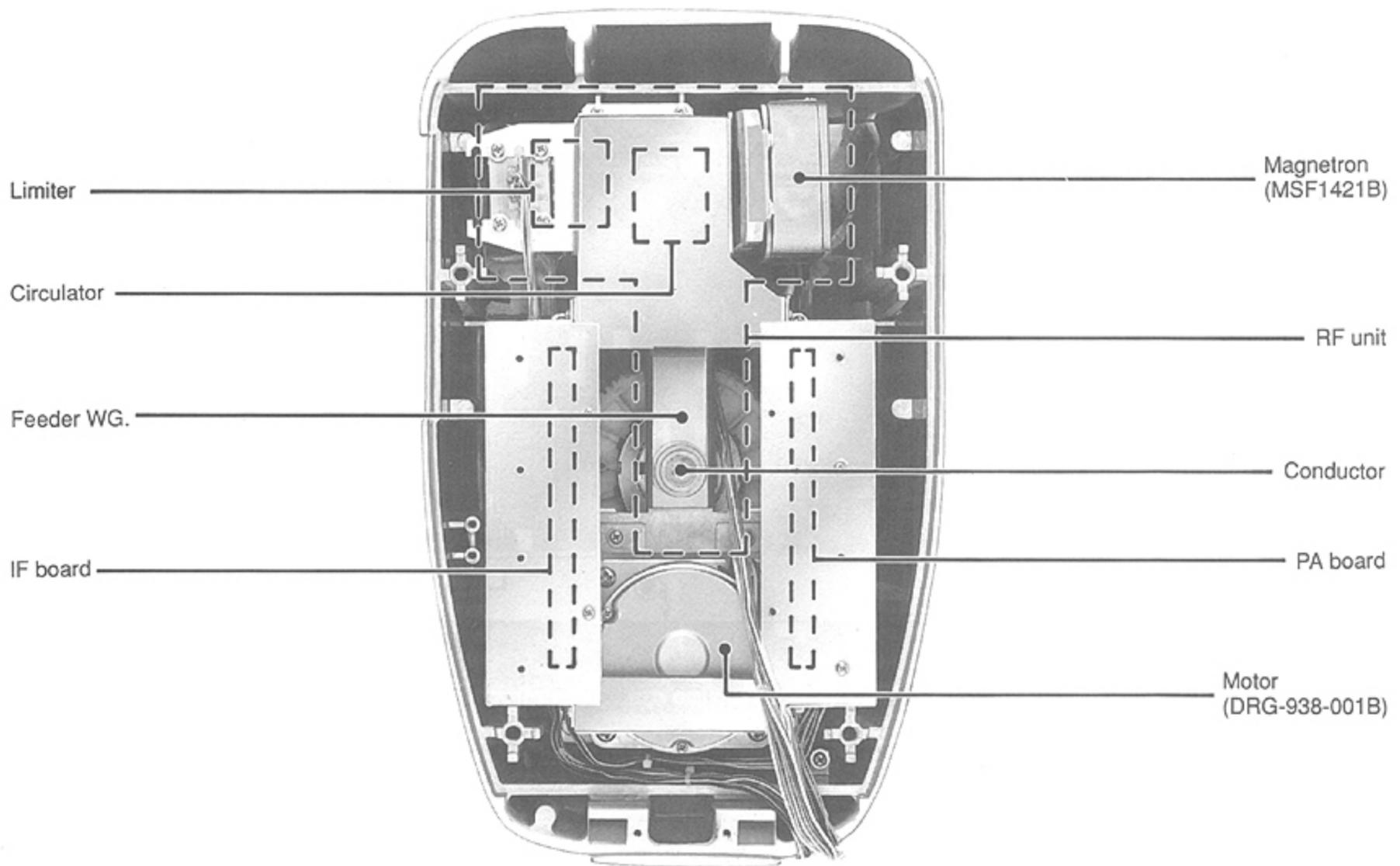


⚠ DANGER HIGH VOLTAGE

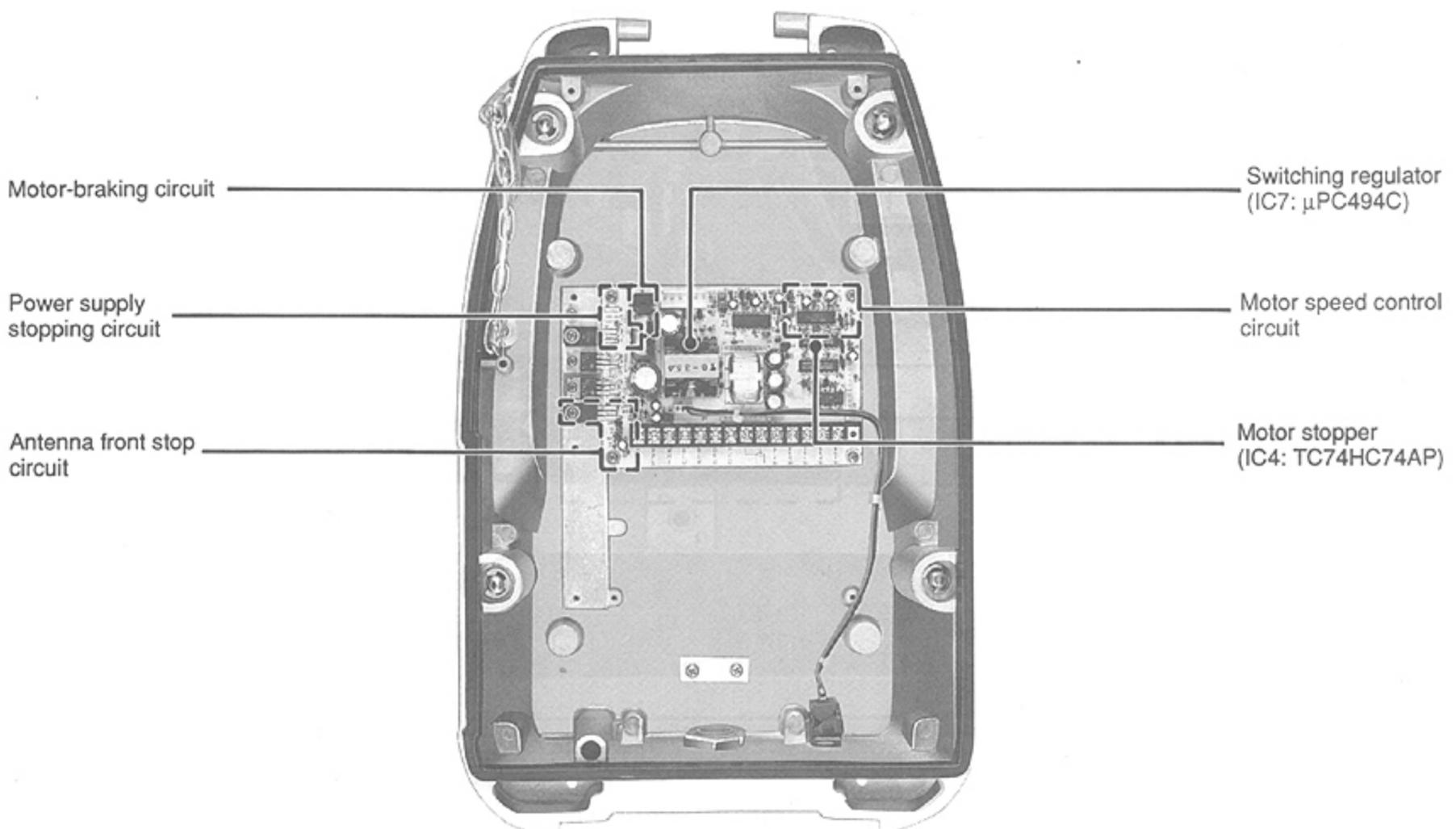
NEVER touch these parts while DC power cable is connected.

2-2 SCANNER UNIT

• CTRL UNIT



• HARNESS UNIT



SECTION 3 CIRCUIT DESCRIPTION

3-1 ANTENNA UNIT (SCANNER)

The antenna unit consists of a waveguide slot array, a horn-type reflector, a cross polarization suppression element and a power-feeding waveguide.

The waveguide slot array has 45 slots to realize a low side lobe (for a small false image) and a small beam width (for high resolution). The waveguide adopts a travelling-wave driving system to achieve sufficient antenna performance, compensating for shifts in the magnetron oscillating frequency.

The horn-type reflector focuses the beam in a vertical plane to obtain 25° to 30° of vertical beam.

3-2 PA UNIT (SCANNER)

The trigger signal from the IF amplifier enters the pulse width determining circuit (IC1, IC9, Q17 ~ Q19, R45 ~ R52) where the width is determined by R49 ~ R52. The signal is then amplified by a pulse amplifier (IC7, Q12 ~ Q16) and input to a power MOSFET (Q5, Q6).

A DC-DC converter (IC6, Q1 ~ Q4) converts the ship's supply voltage into +16 V, +7 V. Another DC-DC converter (IC2, Q9, Q10) produces +270 V using R24. D7, R3, C41 and R62 prevent possible damage to the power MOSFET from abnormal oscillation, etc.

3-3 IF UNIT (SCANNER)

The IF unit consists of an IF frequency amplifier, a detector circuit, an STC/GAIN control circuit, an MBS circuit, a tuning level amplification circuit, an automatic tuning circuit, a serial-parallel conversion circuit and a beaming pulse generation circuit.

3-3-1 IF AMPLIFIER AND DETECTOR

The IF amplifier circuit consists of 3 stages. The first stage is a low-noise FET amplifier (Q9) and the 2nd and 3rd stages are monolithic amplifiers (IC3, IC4). All of these are controlled by the STC/GAIN control signal.

An amplified IF frequency is detected at IC5, is amplified at Q17, Q18 and Q20, and is then applied to the display unit.

3-3-2 STC/GAIN CONTROL CIRCUIT

The STC/GAIN circuit controls the sensitivity of the receiver in response to the [STC GAIN] control setting on the front panel.

When a trigger signal from the display unit is applied to a mono-multivibrator (IC14), this circuit generates an STC gate signal which is determined by C83 and R148. The STC gate signal is buffer amplified and then applied to an STC curve generator circuit (R142 ~ R144, C29 ~ C31). The STC curve signal is mixed with the GAIN control signal

and STC control signal from the display unit at D24, D27 and D33 and is then buffer amplified and applied to the 2nd and 3rd stages of the IF amplifier.

3-3-3 MBS CIRCUIT

The MBS circuit controls the 1st stage gain to prevent saturation from leaked signals. The trigger signal from IC13 is applied to the 1st stages' FET gate via Q8 and Q9.

3-3-4 TUNING LEVEL AMPLIFIER CIRCUIT

This circuit deflects the tuning level meter. It performs peak hold (Q2, D7, IC7c) by picking up the 60 MHz signal from Q1 and Q7.

3-3-5 AUTOMATIC TUNING CIRCUIT

This circuit is similar to the tuning level amplifier circuit and performs peak hold by picking up the 56 MHz and 64 MHz signals.

Automatic tuning output is added to the tuning control voltage and supplied to the front end. Q10 and Q11 reset peak hold. Q13 and Q21 turn automatic tuning OFF and ON.

3-3-6 SERIAL-PARALLEL CONVERSION CIRCUIT

Some of the control signals from the display unit are sent to the antenna after being turned into serial signals. The serial-parallel conversion circuit returns these serial signals to their original state.

STR, CLK and DAT signals from the display unit are input to IC1 and IC2 via a buffer amplifier (Q14 ~ Q16). IC1 performs serial-parallel conversion to output 7 signals: tuning preset, tuning, gain, STC, tuning level center control, automatic tuning center control and gain preset.

IC2 uses a shift register for serial-parallel conversion of 8 signals: motor control, automatic tuning ON/OFF, transmission pulse width switches 1 and 2 and the IF amplification circuits pass band switches 1, 2 and 3.

Furthermore, preset voltages (IC10a, IC11a, IC11b) are added, respectively, to the tuning, gain control and STC control signals before these signals are output.

3-3-7 BEARING PULSE GENERATION CIRCUIT

The FG signal from the HARNESS unit is multiplied by 6 at the PLL circuit (IC6, IC8, Q22) and then output as a bearing signal of 1800 pulses.

This signal is combined with the ship's heading signal at Q24 and Q25 and then sent to the display unit via Q29.

3-3-8 DC-DC CONVERTER

-12 V and +20 V are produced by the DC-DC converter circuit (IC9, D17 ~ D22).

3-4 RF UNIT (SCANNER)

The RF unit consists of a magnetron, a circulator, a diode limiter and a front end.

The magnetron generates high energy oscillation for the input pulse. The circulator is used as a transmit/receive switch. The diode limiter is used to protect the receiving section at the front end.

The front end consists of an amplifier, local oscillator and a diode mixer. The microwave signal input from the circulator is amplified by the low-noise amplifier and then enters the diode mixer. A microwave signal is then mixed with the local oscillator signal to be converted to a 60 MHz IF frequency. The frequency of the local oscillator circuit is adjusted with the tuning voltage.

3-5 HARNESS UNIT (SCANNER)

The motor control circuit makes a loop to stabilize the motor rotation. The motor rotation is fed back to the motor control circuit as pulse signals. The pulse signals are converted to voltage with the f/v converter. The voltage is compared with the reference voltage to control the switching pulse width.

A pulse signal (FG) synchronized with the motor rotation is input via J6 (pin 4). The number of pulse are doubled by detecting the leading and trailing edge at the differential circuit (Q18, C23, C24, R34, R35, D13 D14).

These pulses enter the 1-shot multiplier (IC5) to be converted to DC voltages. The output voltages are amplified and temperature compensated at the buffer amplifier (Q24) to obtain voltages proportional to the antenna's rotational speed.

These voltages are compared with a reference voltage (Q9 emitter) which is determined by R22 ~ R24. Thus, the pulse width of the switching regulator IC output is controlled. The output from IC7 is applied to the switching circuit (Q12 ~ Q15) and is then boosted at T1. The boosted voltage is rectified at D7 to obtain DC voltage.

Q4, Q5 and Q8 is a power supply delay circuit which produces power until the antenna rotates to a forward direction. At stop, Q6 and Q7 further ground the motor power line to make a breaking circuit. R1 is an over-current detection resistor and D12 prevents excessive voltage.

At standby, SLOW voltage is emitted from IC4 and the reference voltage (Q9 emitter) is lowered by Q11 for slow rotation. Then, the heading pulse is input via J5 (pin 2) and STOP voltage is emitted from IC4 to lower the reference voltage completely. At the same time, the supply voltage is cut and the power is shorted to stop the motor completely (in a forward direction).

At power ON, a power circuit (Q19, Q20, Q23, D15) starts operating via Q21. During rotation, Q22 turns ON by MOVE (/STOP) voltage to continue the power supply. At the same time, supply voltage rises to the motor and is controlled by IC7 and IC6a (R7, R49, C14).

Doubled pulses pass through IC5 and are output via the isolator as FG output.

3-6 PPI IMAGE PROCESSING CIRCUITS (MAIN UNIT in DISPLAY)

3-6-1 ANALOG-DIGITAL CONVERSION CIRCUITS

The FTC circuit is a differential circuit with a variable time constant for removing low frequency component echoes as a result of rain and snow.

The video signal (J8, pin 2) is input from the IF unit, passes through the FTC circuit (IC30b, IC60a, D11) and is then converted into a negative-logic 4 value (0 ~ 3) quantization signal in IC57 and IC58.

The time constant of the FTC circuit is controlled at a variable diode (D11) using bias control voltage from the D/A converter (IC25). IC57 and IC58 are high speed comparators.

3-6-2 SAMPLING CIRCUITS

After having its voltage base quantized by IC57 and IC58, the video signal's time base is quantized by IC55 and IC64 and is then converted into a 2-bit + 2-bit (time division) digital signal by IC59. It is then sampled in the sampling memory IC (IC37) per trigger pulse.

The sampling frequency changes according to the setting range and the maximum sampling frequency is 31.08 MHz.

3-6-3 COORDINATES CONVERSION CIRCUIT

The video data memorized in sampling memory (IC37) is arrayed in coordinates of distance-bearing. A gate array IC (IC54) converts the distance-bearing to X-Y coordinates in order to indicate the sampled signal on the CRT display. The converted signal is then applied to the X and Y axis counters (IC32 ~ IC36).

3-6-4 INTERFERENCE REDUCTION AND ECHO STRETCH FUNCTIONS

The interference reduction circuit (IC46) correlates the sampling data and trigger pulse to reduce interference. The echo stretch circuit (IC38) expands the sampling signals.

3-6-5 VIDEO MEMORY

The MAIN unit has 3 video RAM ICs for the PPI screen (IC53), PLOT function (IC52) and TEXT screen (IC27). The read-modify-write IC modifies necessary data only in the video RAM, since the video RAM adopts an 8-bit parallel device.

The read-modify-write procedure for the plot function perform 1 only even though the procedure for the PPI screen performs 1 and 0. The plot function retains the data when targets change their position.

3-6-6 PPI VIDEO SIGNAL GENERATOR

Coordinate-converted video data is output from VRAM per address via GSC clock timing.

The parallel video signal output from VRAM is loaded to the shift register (IC39 ~ IC41) by SLCK clock timing and is serial converted by the dot clock DCK timing.

These 3 video signals are combined with the text video signal in IC17 to make a composite video signal which is output to the CRT.

3-6-7 TIMING CONTROL CIRCUIT

IC45 (SUB CPU) and IC54 (gate array IC) generate the timing signal required for the PPI image processing circuit.

IC54 generates the following clock or switching signals:

- ① A sampling clock.
- ② A sampling memory address counting clock.
- ③ A timing signal for data transfer.
- ④ A coordinate conversion address counting clock.
- ⑤ A PPI video memory read-modify-write timing signal.
- ⑥ A switching signal for data sampling, data transfer and hold (pause).

IC54's basic operation clock is 62.160 MHz.

3-7 TRIGGER PULSE GENERATION CIRCUITS (MAIN UNIT in DISPLAY)

3-7-1 SEPARATION CIRCUIT OF BEARING PULSE AND HEADING MARKER

The signal separation circuit (IC3e, IC3f, Q8, D12) separates the bearing pulse/heading marker composite signal (BP/SHM) input from the scanner (IF unit).

The heading marker signal (SHM) is detected using D12 and Q8, smoothed by R72 and C132, shaped by IC3e and is then applied to IC45 and IC54.

At the same time, the bearing pulse signal (BP) is input to IC3f via the high voltage protection circuit (R57, D13), shaped and then input to the sub CPU via the status-holding flip-flop IC (IC65) as an interrupt signal.

3-7-2 TRIGGER PULSE GENERATION CIRCUIT

The sub CPU (IC45) processes the following when receiving a BP signal:

- ① Counts the internal bearing counter (resets the counter when receiving an SHM signal).
- ② Outputs trigonometric data to LCA (IC54).
- ③ Outputs a trigger signal via pin 35 when a condition is matched (in TX and when IC54 is not in the sampling data transfer condition).
- ④ Outputs an alarm trigger signal (AGT) when a blip is in the alarm zone.

Trigger signal output from IC45 (pin 35) is pulse-width-adjusted in IC50 and is then applied to the scanner as a TRIG signal via the buffer IC (IC28e).

At the same time, the sampling trigger (PTRG) is output to IC54 with a delay time. This delay time compensates for transmit/receive signals exceeding the delay time and the scanner/display connection cable propagation delay time. The delay time is produced in the integral circuit of IC50 using IC25 and IC61.

3-8 REG BOARD (DISPLAY)

3-8-1 ON/OFF CIRCUIT

The power \oplus voltage is applied to the Q9 collector. When the [POWER] switch is pushed while power off, the \oplus voltage is applied to Q9 base; Q9 applies the power voltage to IC4. IC4 sets RL1 to turn ON via Q11. When the [POWER] switch is pushed for 1 sec. while power on, IC4 resets RL1 to turn OFF.

RL1 is a latching relay which retains its condition until receiving a set or reset signal.

3-8-2 CONTROL CIRCUIT

IC2 is a pulse width control type switching regulator which controls output voltage using a dead time control input (pin 4). The dead time control is provided by IC2. Q5 ~ Q7 is a power source circuit for IC2. IC2 output (pins 9, 10) controls the switching transistors (Q1 ~ Q4).

3-8-3 RECTIFIER CIRCUIT

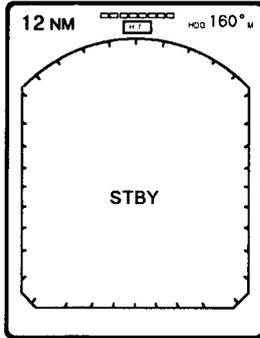
AC voltage, produced at the switching transistors (Q1 ~ Q4), is converted at the transformer (T1). These voltages are rectified by D4, D6 and D5/D9 for +12V, CRT12V and -5V respectively. +12V is regulated at the differential amplifier circuit (Q12, Q17, Q18). CRT12V, regulated at Q13, Q15 and Q16, is used to drive the CRT. Q14 uses this voltage for the power save function.

SECTION 4 ADJUSTMENTS via FRONT PANEL

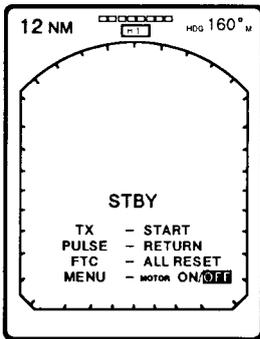
4-1 SELECTING SERVICE MODE

The radar has a pre-set mode called "service mode." Slight adjustment of the automatic tuning function can be performed without removing and opening the scanner unit. Select the service mode as follows.

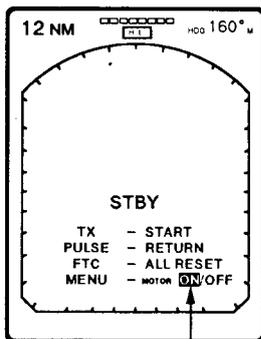
- ① Push [POWER] to turn power ON and wait 2 min.
 - Standby mode is selected.
 - Push [TX] when the PPI screen has been selected.



- ② While pushing [EBL1] and [VRM1], push [H.M OFF] to select the service mode.



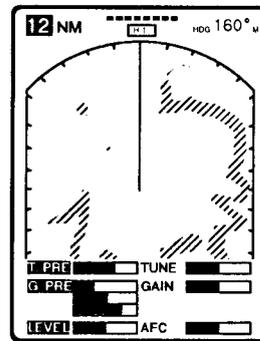
- ③ If the backup battery on the MAIN unit is replaced, push and hold [FTC] for 2 sec. to reset memory contents.
 - A beep tone sounds for verification.
- ④ Push [MENU] to select the scanner motor ON.
 - If you perform any maintenance without scanner motor rotation, skip this step.



"ON" becomes highlighted.

- ⑤ Push [TX] to enter the service mode setting condition and start adjustment.
 - If you have skipped step ④, targets are shown as circles in the display.
 - Controls act as follows:

CONTROL	Alternates by pushing [STC]		
	Alternates by pushing [TUNE]		
[TUNE]	T.PRE	TUNE	Deactivate
[GAIN]	G.PRE	GAIN	GAIN
[STC]	LEVEL		AFC
[DIAL]	Range selection		

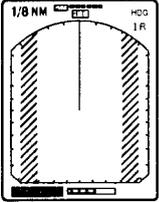


- ⑥ Perform the adjustments on the next page.
- ⑦ Push [TX] to exit the setting condition.
- ⑧ Push [PULSE] to exit the service mode and return to Standby mode.

4-2 SERVICE MODE SETTINGS

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
TUNING LEVEL INDICATOR PRE-SETTING	1 <ul style="list-style-type: none"> • Service mode • Select 12 nm range using [DIAL]. 	Display unit	Screen	Maximum resolution of blips	Front panel	[TUNE] control (T.PRE)	
GAIN PRE-SETTING	2 <ul style="list-style-type: none"> • "GAIN" indicator : Maximum (Push [TUNE], rotate [GAIN] clockwise and then push [TUNE].) 			2 clicks counter-clockwise from maximum noise level		[GAIN] control (G.PRE)	
	3 <ul style="list-style-type: none"> • "GAIN" indicator : Center (Push [TUNE], rotate [GAIN] and then push [TUNE].) 			Verify the noise level.		Verify	
	4 <ul style="list-style-type: none"> • Select 6.0 nm range using [DIAL]. 			Same noise level as step 3		[GAIN] control (G.PRE)	
	5 <ul style="list-style-type: none"> • Select 1.5 nm range using [DIAL]. 			Same noise level as step 3		[GAIN] control (G.PRE)	
TUNING LEVEL INDICATOR (AUTOMATIC TUNING CORRECTION)	6 <ul style="list-style-type: none"> • Select 12 nm range using [DIAL]. 			Tuning level indicator 		Maximum resolution of blips	[TUNE] control (TUNE)
	7					Maximum (Center position of the full scale range)	[STC] control (LEVEL)
AFC (AUTOMATIC TUNING CORRECTION)	8 <ul style="list-style-type: none"> • Auto tuning : ON (Push [STC]. "AUTO" appears.) 			Screen		Maximum resolution of blips	[STC] control (AFC)

4-3 CABLE LENGTH CORRECTION

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
CABLE LENGTH CORRECTION	1 <ul style="list-style-type: none"> • Navigation mode • Display a straight target. • Range : 1/8 nm • Push and hold [MENU] until "H.M. ADJ." appears; then, push [MENU] again. ("LINE ADJ." appears.) 	Display unit	Screen	Adjust the target blip so it is straight. 	Front panel	[DIAL]

SECTION 5 INTERNAL ADJUSTMENT

5-1 PREPERATION BEFORE SERVICING

■ CTRL UNIT REMOVAL

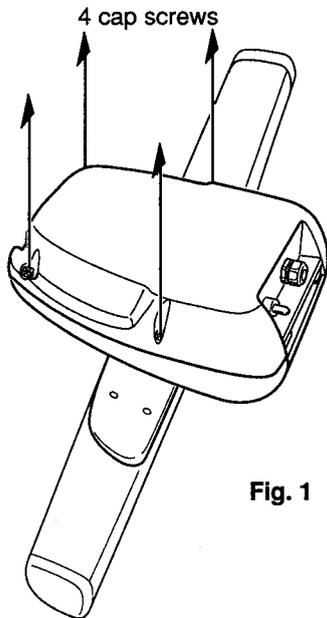


Fig. 1

- ① Remove 4 cap screws, to open the bottom case.

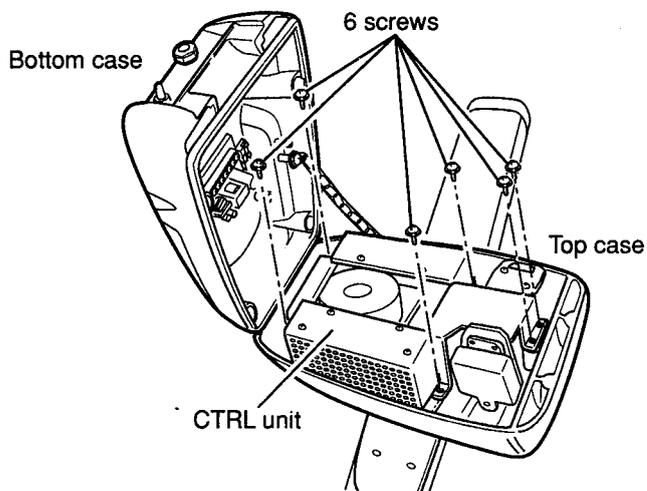


Fig. 2

- ② Remove 6 screws, (silver, 10 mm), to remove the CTRL unit.
③ Pull out the CTRL unit from the top case.

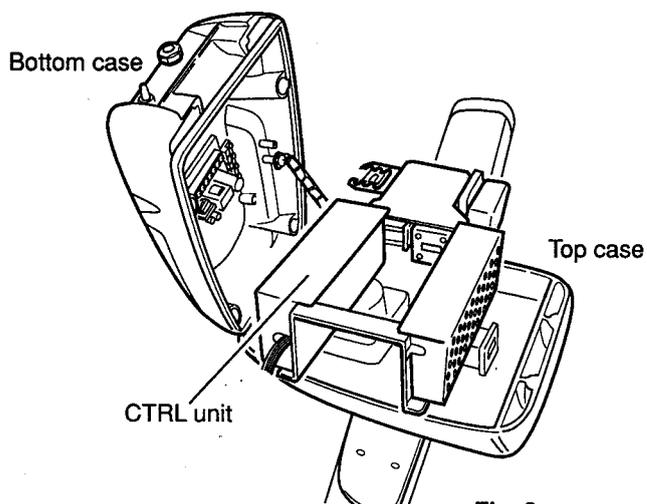


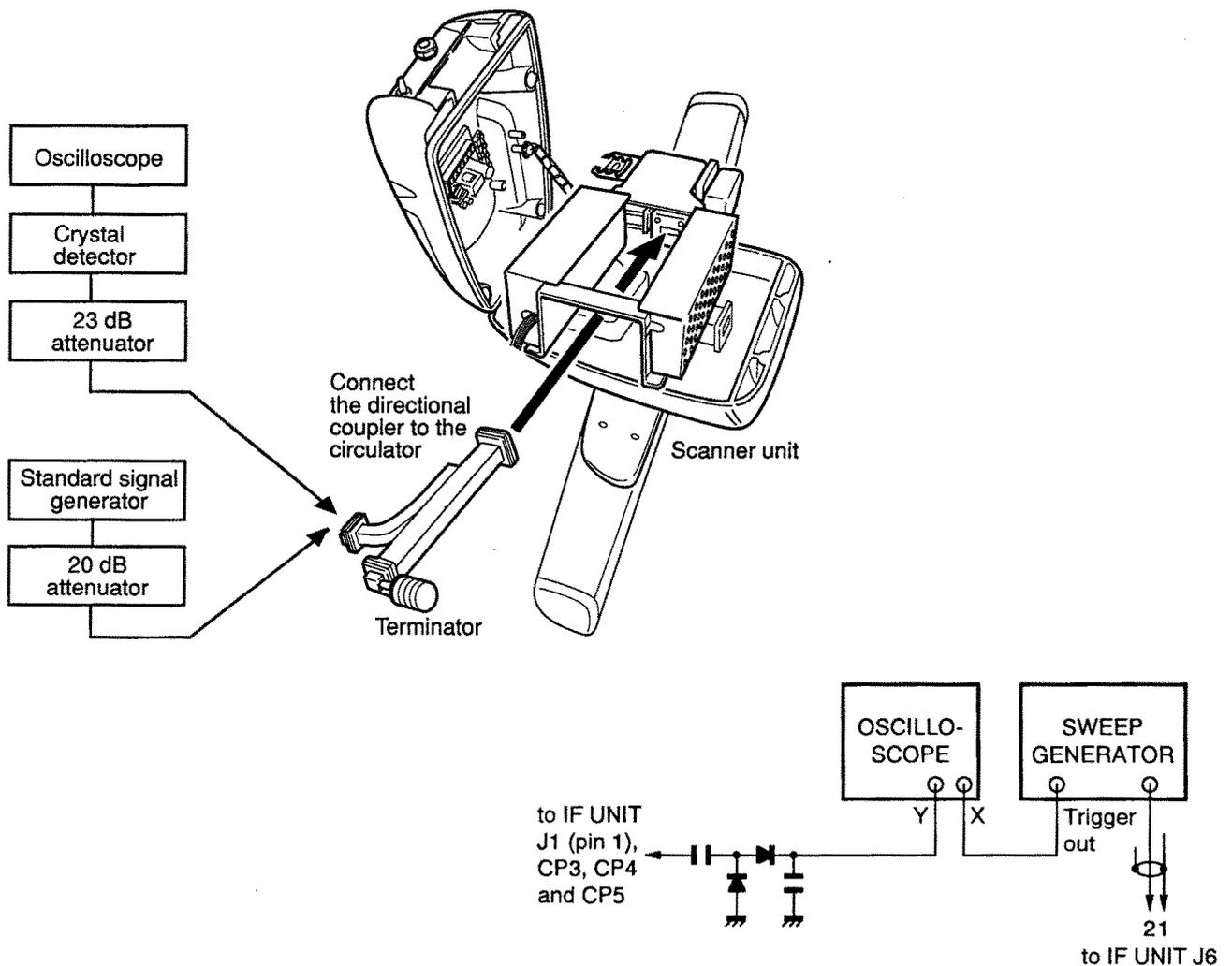
Fig. 3

- ④ Put the CTRL unit on the top case. See Fig. 3.

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 11 – 40 V DC Current capacity : 6 A or more	Standard signal generator (SSG) (Antenna unit adjustment and sensitivity check only)	Frequency range : 1.0 – 10 GHz Output level : 1.0 μ V – 3.2 V (– 107 to 3 dBm)
Directional coupler	Power attenuation : 20 dB Capacity : 10 W or more		
Sweep generator	Frequency range : 20 – 100 MHz Sweep bandwidth : At least 30 MHz Output impedance : 50 Ω	Spectrum analyzer (Antenna unit adjustment only)	Frequency range : At least 10 GHz Spectrum bandwidth: \pm 100 MHz or more
AC milli-voltmeter	Measuring range : 10 mV – 10 V	Terminator	Resistance : 50 Ω Peak power level : At least 6 kW Average power level: At least 5 W
Oscilloscope	Frequency range : DC – 100 MHz Measuring range : 0.01 – 10 V	Attenuator	Power attenuation : 20 and 23 dB Peak power level : At least 6 kW Average power level: At least 5 W
Frequency counter	Frequency range : 0.1 – 200 kHz Frequency accuracy: \pm 1 ppm or better Sensitivity : 100 mV or better	Digital multi-meter	Input impedance : 1 M Ω /DC or better
Crystal detector	Input frequency : At least 10 GHz Peak input level : At least 1 W Average input level : At least 100 mW		

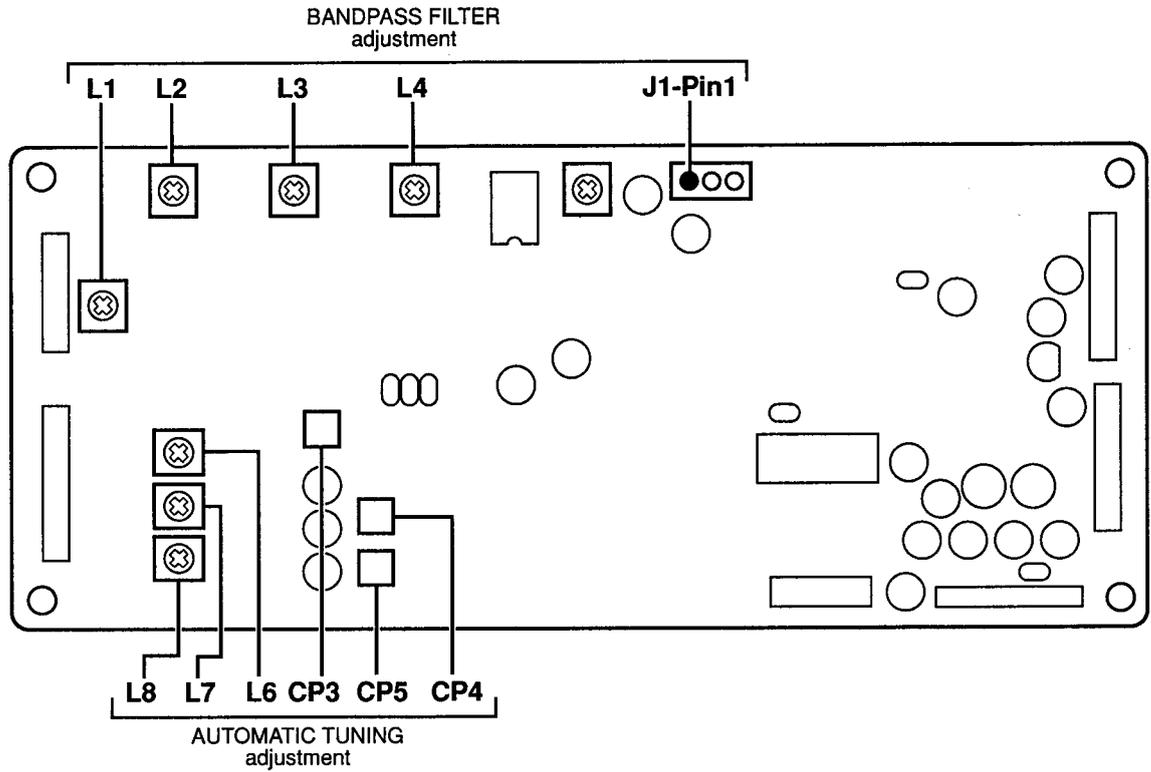
■ CONNECTION



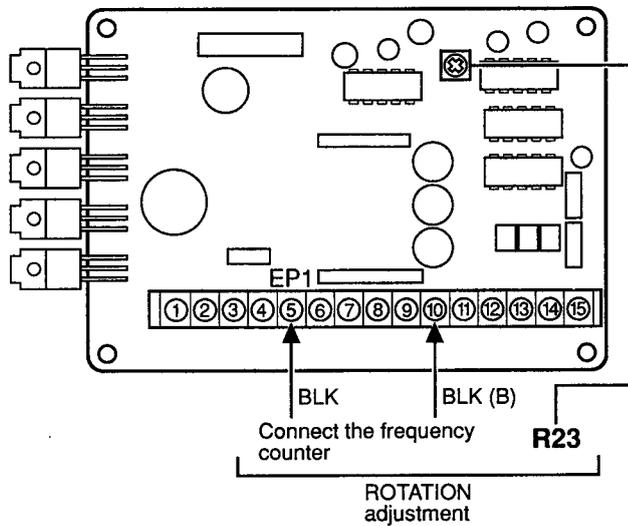
5-2 MAJOR RECEIVER ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
BANDPASS FILTER	1 <ul style="list-style-type: none"> • Connect the sweep generator to J6, pins 1 and 2 (IF unit); and set as: Center frequency : 60 MHz Level : 71 μV (- 70 dBm) • Range : 12 nm • Navigation mode • Adjust [GAIN], if required. 	IF	Connect the oscilloscope to J1 pin 1.	Maximum waveform	IF	L1 – L4	
	2 <ul style="list-style-type: none"> • Range : 1.5 and 3 nm 					Verify that the waveform has changed from the above adjustment on both ranges.	Verify
AUTOMATIC TUNING	NOTE: Using service mode, slight adjustment can also be performed without removing and opening the scanner unit.						
	1	Preset the following settings to center using "Service mode." (p. 5-1) <ul style="list-style-type: none"> • "LEVEL" indicator : Center (Rotate [STC] control.) • "AFC" indicator : Center (Push [STC] then rotate [STC] control.) 					
	2	<ul style="list-style-type: none"> • Connect the sweep generator to J6, pins 1 and 2 (IF unit); and set as: Center frequency : 60 MHz Level : 71 mV (- 10 dBm) • Navigation mode 	IF	Connect the oscilloscope to CP3.	Maximum waveform	IF	L6
	3	<ul style="list-style-type: none"> • Set the sweep generator: Center frequency : 62 MHz 		Connect the oscilloscope to CP4.			L7
	4	<ul style="list-style-type: none"> • Set the sweep generator: Center frequency : 58 MHz 		Connect the oscilloscope to CP5.			L8
NOTE: Verify this adjustment from step 2.							
ANTENNA ROTATION	1 <ul style="list-style-type: none"> • Set the frequency counter: Gate time : 1 sec. • Navigation mode 	HARNESS	Connect the frequency counter to EP1, BLK and BLK (B).	1800 Hz	HARNESS	R23	
SUB BRIGHTNESS	1 <ul style="list-style-type: none"> • Navigation mode 	Display unit	Screen	Adjust the retrace line until it disappears.	MAIN	R2	
NOTE: After these adjustments, perform "Adjustment via front panel" on p. 5-1 or proceed to the receiver adjustment on p. 5-4.							

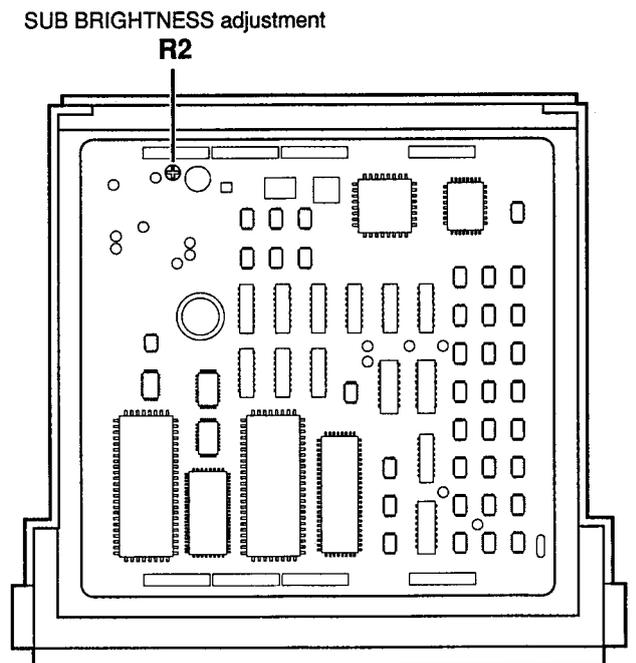
• IF UNIT



• HARNESS UNIT



• MAIN UNIT



5-3 RECEIVER ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
ANTENNA UNIT TUNING	1	<ul style="list-style-type: none"> Connect the signal generator as shown in Fig 5-1 and 5-2; and set as: Frequency : 9.41G Hz Set the spectrum analyzer as: Center frequency : 9.41 GHz Span : 200 MHz Do not place any objects within 5 meters. (Place a wave absorber on the front of the scanner radiator.) 	ANTENNA	Connect the signal generator and spectrum analyzer to the directional coupler as shown in Fig 5-1.	Preset the waveform to 0 dBm.	SSG	SSG output level
	2			Connect the spectrum analyzer to the antenna unit as shown in Fig 5-2.	Minimum level	CHASSIS	MP11
SENSITIVITY CHECK	1	<ul style="list-style-type: none"> Range : 12 nm [GAIN] control : Maximum STC function : OFF Connect the signal generator to the circulator via the 20 dB attenuator; and set as: Frequency : 9.41 GHz Level : 0.22 mV (-60 dBm) Navigation mode 	HARNESS	Connect the AC milli-voltmeter to EP1.	Minimum level	Front panel	[TUNE] control
	2						Set the signal generator: OFF
	3				Set the signal generator: ON	10 dB lower than the level displayed on the AC milli-voltmeter in step 2 above.	SSG
	NOTE: Verify that the signal generator output level, in step 3 above, plus the insertion loss is less than -65 dBm.						
NOTE: After these adjustments, perform "Adjustment via front panel" on p. 4-1 or proceed to the transmitter adjustment on the next page.							

• CHASSIS UNIT

• HARNESS UNIT

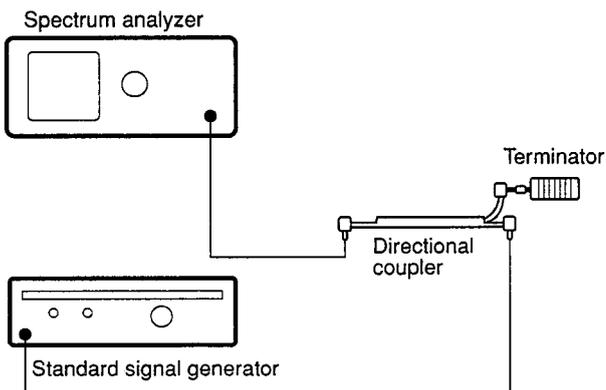
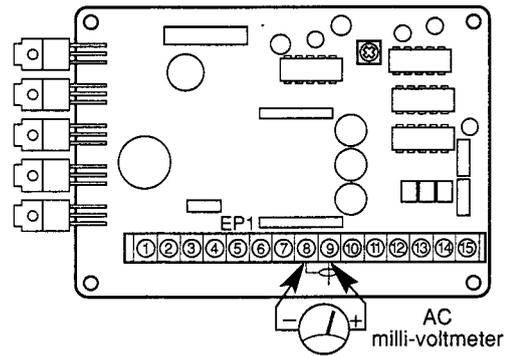
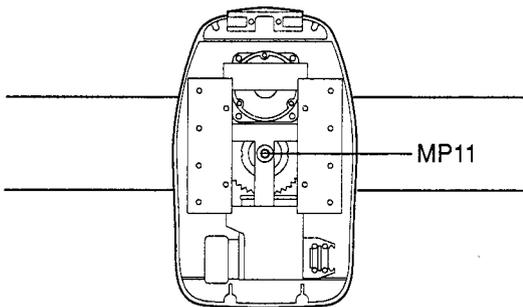


Fig. 5-1

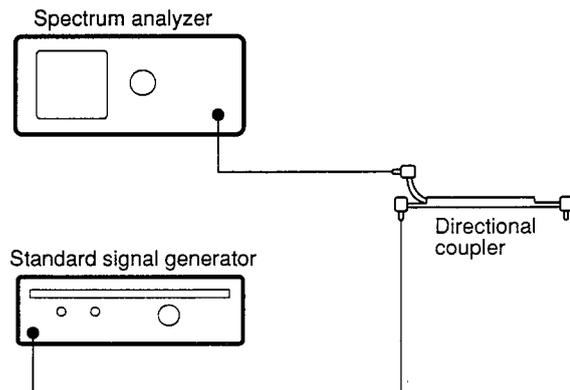
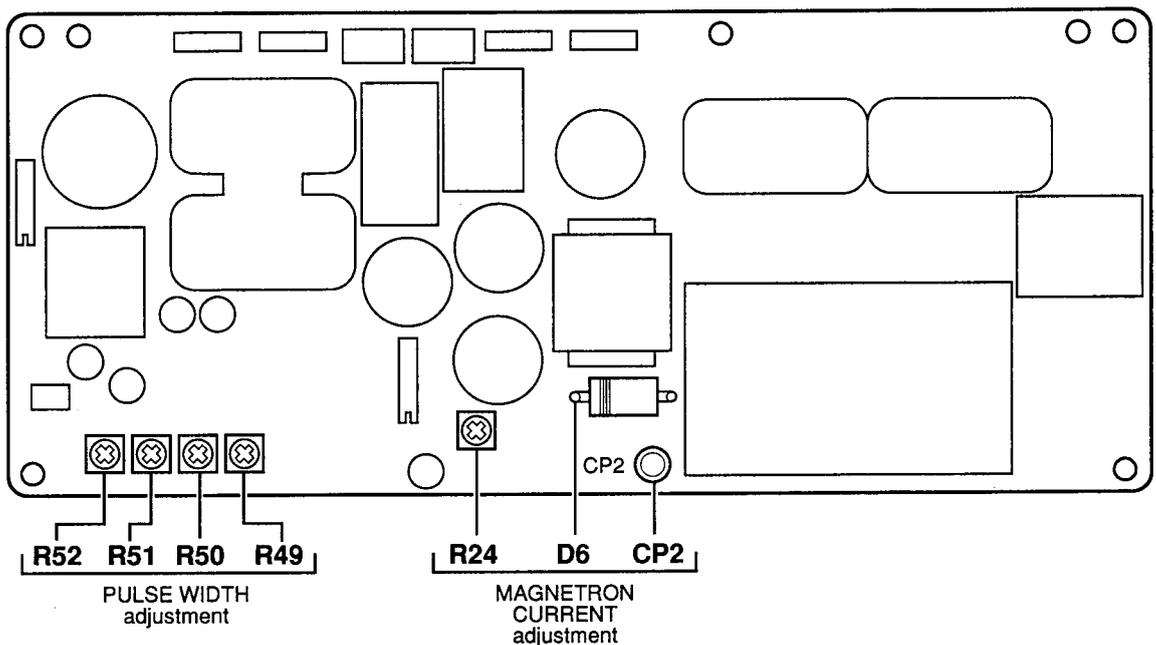


Fig. 5-2

5-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
MAGNETRON CURRENT	1	<ul style="list-style-type: none"> • R49 (PA) : Center • R50 (PA) : Center • R51 (PA) : Center • R52 (PA) : Max. CCW 	PA	Connect the Digital multi-meter to CP2.	7.6 V DC (± 0.6 V)	PA	Verify
	2			Connect the Digital multi-meter to the cathode of D6.	260 V DC		R24
	3	<ul style="list-style-type: none"> • Range : 12 nm • Navigation mode 		Connect the oscilloscope to the magnetron lead through a current probe.	3.2 A at 400 nsec. after the current rises.		
PULSE WIDTH	NOTE: In this adjustment, pulse width is measured when the detector output voltage is more than 70% of the maximum.						
	1	<ul style="list-style-type: none"> • Range : 12 nm • Pulse width : Normal • Navigation mode 	PA	Connect the oscilloscope to the circulator through the detector.	Adjust for 750 nsec. pulse width.	PA	R52
	2	<ul style="list-style-type: none"> • Range : 6 nm 			Adjust for 400 nsec. pulse width.		R51
	3	<ul style="list-style-type: none"> • Range : 3 nm 			Adjust for 200 nsec. pulse width.		R50
	4	<ul style="list-style-type: none"> • Range : 1.5 nm 			Adjust for 80 nsec. pulse width.		R49
	NOTE: Verify this adjustment from step 1.						
NOTE: After these adjustments, perform "Adjustment via front panel" on p. 4-1.							

• PA UNIT



SECTION 6 PARTS LIST

[MAIN UNIT]

REF. NO.	PARTS NO.		DESCRIPTION
IC1	1120002390	S.IC	TC74AC166F
IC2	1120002390	S.IC	TC74AC166F
IC3	1130005290	S.IC	TC74HC14AF
IC4	1130005250	S.IC	TC74HC08AF
IC5	1120002300	S.IC	TC74AC04F
IC6	1170000180	IC	PC817D
IC7	1110001500	S.IC	S-8054ALR-LN-T1
IC8	1130005770	S.IC	MB4052PF-G-BND
IC9	1140000940	IC	TMP82C255AN-2-Z
IC10	1140001220	IC	HD64180R1P6
IC11	1130005510	IC	μPD72020C-8
IC12	1130006010	S.IC	HM6264ALFP15LD
IC13	1140003120	IC	SC-1234
IC14	1140003020	IC	SC-1226
IC15	1120002330	S.IC	TC74AC573F
IC16	1120002330	S.IC	TC74AC573F
IC17	1140003030	IC	SC-1227
IC18	1130005120	S.IC	TC74HC74AF (TP1)
IC19	1120002310	S.IC	TC74AC161F
IC20	1120002380	S.IC	TC74AC175F
IC21	1130005740	S.IC	TC74AC74F
IC22	1130005740	S.IC	TC74AC74F
IC23	1130005420	S.IC	TC74HC175AF
IC24	1140003070	IC	SC-1231
IC25	1140002320	S.IC	μPD6325G
IC26	1140002240	S.IC	TMP82C54M-2
IC27	1130006790	S.IC	M5M482128AJ-8
IC28	1120002370	S.IC	HD74LS06FP
IC29	1110001240	S.IC	μPC358G2-T1
IC30	1110001240	S.IC	μPC358G2-T1
IC31	1130005430	S.IC	TC74HC191AF
IC32	1130005430	S.IC	TC74HC191AF
IC33	1130005430	S.IC	TC74HC191AF
IC34	1130005430	S.IC	TC74HC191AF
IC35	1130005430	S.IC	TC74HC191AF
IC36	1130005430	S.IC	TC74HC191AF
IC37	1110003050	IC	HM6268P25D
IC38	1130005550	S.IC	μPD74HC123AGS
IC39	1120002390	S.IC	TC74AC166F
IC40	1120002390	S.IC	TC74AC166F
IC41	1120002390	S.IC	TC74AC166F
IC42	1130005380	S.IC	TC74HC161AF
IC43	1130005380	S.IC	TC74HC161AF
IC44	1140003040	IC	SC-1228
IC45	1140003140	S.IC	HD647180X0FS6
IC46	1140003080	IC	SC-1229
IC47	1140003100	IC	SC-1232
IC48	1140003130	IC	SC-1235
IC49	1140003050	IC	SC-1230
IC50	1130005550	S.IC	μPD74HC123AGS
IC51	1120002320	S.IC	TC74AC245F
IC52	1130006790	S.IC	M5M482128AJ-8
IC53	1130006790	S.IC	M5M482128AJ-8
IC54	1110003040	S.IC	XC3020-70PC84C
IC55	1130005740	S.IC	TC74AC74F
IC56	1130005380	S.IC	TC74HC161AF
IC57	1110003120	S.IC	NE521D
IC58	1110003120	S.IC	NE521D
IC59	1140003110	IC	SC-1233
IC60	1110003130	S.IC	MC14577 BF
IC61	1110001240	S.IC	μPC358G2-T1
IC62	1120002330	S.IC	TC74AC573F
IC63	1120002330	S.IC	TC74AC573F
IC64	1130005740	S.IC	TC74AC74F

[MAIN UNIT]

REF. NO.	PARTS NO.		DESCRIPTION
IC65	1130005740	S.IC	TC74AC74F
IC66	1130003830	S.IC	TC7S04F (TE85R)
IC67	1130005120	S.IC	TC74HC74AF (TP1)
IC68	1130006440	S.IC	TC7S08F (TE85R)
IC69	1110002070	IC	TA78L08S
Q1	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q2	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q3	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q4	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q5	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q6	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q7	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q8	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q9	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q10	1590000480	S.TRANSISTOR	RN2402 (TE85R)
D1	1750000060	S.DIODE	1SS196 (TE85R)
D2	1750000060	S.DIODE	1SS196 (TE85R)
D3	1750000060	S.DIODE	1SS196 (TE85R)
D4	1750000060	S.DIODE	1SS196 (TE85R)
D5	1750000060	S.DIODE	1SS196 (TE85R)
D6	1750000060	S.DIODE	1SS196 (TE85R)
D7	1750000060	S.DIODE	1SS196 (TE85R)
D8	1750000020	S.DIODE	1SS184 (TE85R)
D9	1750000060	S.DIODE	1SS196 (TE85R)
D10	1750000060	S.DIODE	1SS196 (TE85R)
D11	1720000030	VARICAP	1SV149C
D12	1730000730	S.ZENER	RD6.2M-T2B2
D13	1750000060	S.DIODE	1SS196 (TE85R)
D14	1750000060	S.DIODE	1SS196 (TE85R)
D15	1750000060	S.DIODE	1SS196 (TE85R)
D16	1750000060	S.DIODE	1SS196 (TE85R)
D17	1750000060	S.DIODE	1SS196 (TE85R)
X1	6050008310	XTAL	DOC-492 12.288MHz
X2	6050008320	XTAL	DOC-49S2 40.000MHz
X3	6050008330	XTAL	DOC-431CC 62.160MHz
R1	7030000580	S.RESISTOR	MCR10EZHZJ 47KΩ (473)
R2	7310000800	TRIMMER	RH0651CJ5J01A (224)
R3	7030000460	S.RESISTOR	MCR10EZHZJ 4.7KΩ (472)
R4	7030000440	S.RESISTOR	MCR10EZHZJ 3.3KΩ (332)
R5	7030000500	S.RESISTOR	MCR10EZHZJ 10KΩ (103)
R6	7030000340	S.RESISTOR	MCR10EZHZJ 470Ω (471)
R7	7030000460	S.RESISTOR	MCR10EZHZJ 4.7KΩ (472)
R8	7030000400	S.RESISTOR	MCR10EZHZJ 1.5KΩ (152)
R9	7030000500	S.RESISTOR	MCR10EZHZJ 10KΩ (103)
R10	7030000340	S.RESISTOR	MCR10EZHZJ 470Ω (471)
R11	7030000400	S.RESISTOR	MCR10EZHZJ 1.5KΩ (152)
R12	7030000380	S.RESISTOR	MCR10EZHZJ 1KΩ (102)
R13	7410000070	ARRAY	RMX- 4 472K
R14	7410000050	ARRAY	RMX- 4 103K
R15	7410000210	ARRAY	RMX- 8 472K
R16	7030000620	S.RESISTOR	MCR10EZHZJ 100KΩ (104)
R17	7030000620	S.RESISTOR	MCR10EZHZJ 100KΩ (104)
R18	7030000620	S.RESISTOR	MCR10EZHZJ 100KΩ (104)
R19	7030000460	S.RESISTOR	MCR10EZHZJ 4.7KΩ (472)
R20	7030000500	S.RESISTOR	MCR10EZHZJ 10KΩ (103)
R21	7030000510	S.RESISTOR	MCR10EZHZJ 12KΩ (123)

S. = Surface mount

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION
R22	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R23	7030000420	S.RESISTOR MCR10EZHZ 2.2KΩ (222)
R24	7030000460	S.RESISTOR MCR10EZHZ 4.7KΩ (472)
R25	7030000140	S.RESISTOR MCR10EZHZ 10Ω (100)
R26	7030000690	S.RESISTOR MCR10EZHZ 390KΩ (394)
R27	7030000540	S.RESISTOR MCR10EZHZ 22KΩ (223)
R28	7030000580	S.RESISTOR MCR10EZHZ 47KΩ (473)
R29	7030000640	S.RESISTOR MCR10EZHZ 150KΩ (154)
R30	7030000600	S.RESISTOR MCR10EZHZ 68KΩ (683)
R31	7030000620	S.RESISTOR MCR10EZHZ 100KΩ (104)
R32	7030000620	S.RESISTOR MCR10EZHZ 100KΩ (104)
R33	7030000590	S.RESISTOR MCR10EZHZ 56KΩ (563)
R34	7030000510	S.RESISTOR MCR10EZHZ 12KΩ (123)
R35	7030000580	S.RESISTOR MCR10EZHZ 47KΩ (473)
R36	7030000590	S.RESISTOR MCR10EZHZ 56KΩ (563)
R37	7030000500	S.RESISTOR MCR10EZHZ 10KΩ (103)
R38	7030000580	S.RESISTOR MCR10EZHZ 47KΩ (473)
R39	7030000520	S.RESISTOR MCR10EZHZ 15KΩ (153)
R40	7030000700	S.RESISTOR MCR10EZHZ 470KΩ (474)
R41	7030000500	S.RESISTOR MCR10EZHZ 10KΩ (103)
R42	7030000620	S.RESISTOR MCR10EZHZ 100KΩ (104)
R43	7030000420	S.RESISTOR MCR10EZHZ 2.2KΩ (222)
R44	7030000460	S.RESISTOR MCR10EZHZ 4.7KΩ (472)
R45	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R46	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R47	7030000460	S.RESISTOR MCR10EZHZ 4.7KΩ (472)
R49	7030000400	S.RESISTOR MCR10EZHZ 1.5KΩ (152)
R50	7030000400	S.RESISTOR MCR10EZHZ 1.5KΩ (152)
R51	7030000260	S.RESISTOR MCR10EZHZ 100Ω (101)
R52	7410000210	ARRAY RMX- 8 472K
R53	7410000070	ARRAY RMX- 4 472K
R54	7030000540	S.RESISTOR MCR10EZHZ 22KΩ (223)
R55	7030000420	S.RESISTOR MCR10EZHZ 2.2KΩ (222)
R56	7030000500	S.RESISTOR MCR10EZHZ 10KΩ (103)
R57	7030000500	S.RESISTOR MCR10EZHZ 10KΩ (103)
R58	7030000260	S.RESISTOR MCR10EZHZ 100Ω (101)
R59	7030000260	S.RESISTOR MCR10EZHZ 100Ω (101)
R60	7030000620	S.RESISTOR MCR10EZHZ 100KΩ (104)
R61	7030000340	S.RESISTOR MCR10EZHZ 470Ω (471)
R62	7030000370	S.RESISTOR MCR10EZHZ 820Ω (821)
R67	7030000420	S.RESISTOR MCR10EZHZ 2.2KΩ (222)
R68	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R69	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R72	7030000460	S.RESISTOR MCR10EZHZ 4.7KΩ (472)
R73	7030000640	S.RESISTOR MCR10EZHZ 150KΩ (154)
R74	7030000640	S.RESISTOR MCR10EZHZ 150KΩ (154)
R75	7030000400	S.RESISTOR MCR10EZHZ 1.5KΩ (152)
R76	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R77	7030000430	S.RESISTOR MCR10EZHZ 2.7KΩ (272)
R78	7030000380	S.RESISTOR MCR10EZHZ 1KΩ (102)
R79	7030000620	S.RESISTOR MCR10EZHZ 100KΩ (104)
R80	7410000070	ARRAY RMX- 4 472K
R81	7410000070	ARRAY RMX- 4 472K
R82	7030000500	S.RESISTOR MCR10EZHZ 10KΩ (103)
R84	7030000330	S.RESISTOR MCR10EZHZ 390Ω (391)
R85	7030000420	S.RESISTOR MCR10EZHZ 2.2KΩ (222)
R86	7030000590	S.RESISTOR MCR10EZHZ 56KΩ (563)
R88	7030000260	S.RESISTOR MCR10EZHZ 100Ω (101)
R89	7030000620	S.RESISTOR MCR10EZHZ 100KΩ (104)
R91	7030000490	S.RESISTOR MCR10EZHZ 8.2KΩ (822)
R92	7030000600	S.RESISTOR MCR10EZHZ 68KΩ (683)
R93	7030000580	S.RESISTOR MCR10EZHZ 47KΩ (473)
R94	7030000460	S.RESISTOR MCR10EZHZ 4.7KΩ (472)
R95	7030000470	S.RESISTOR MCR10EZHZ 5.6KΩ (562)
R96	7030000470	S.RESISTOR MCR10EZHZ 5.6KΩ (562)
R97	7030000020	S.RESISTOR MCR10EZHZ 1Ω (010)
R98	7030000370	S.RESISTOR MCR10EZHZ 820Ω (821)
R100	7030000430	S.RESISTOR MCR10EZHZ 2.7KΩ (272)
R101	7030000400	S.RESISTOR MCR10EZHZ 1.5KΩ (152)
R102	7030000500	S.RESISTOR MCR10EZHZ 10KΩ (103)
R104	7030000480	S.RESISTOR MCR10EZHZ 6.8KΩ (682)

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION
R105	7030000440	S.RESISTOR MCR10EZHZ 3.3KΩ (332)
R106	7030000740	S.RESISTOR MCR10EZHZ 1MΩ (105)
R107	7030000420	S.RESISTOR MCR10EZHZ 2.2KΩ (222)
R108	7030000160	S.RESISTOR MCR10EZHZ 15Ω (150) (#02)
C1	4030008960	S.CERAMIC C2012 JB 1C 104K-T-A
C2	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C3	4030004760	S.CERAMIC C2012 JF 1E 104Z-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	4030004760	S.CERAMIC C2012 JF 1E 104Z-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	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C12	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C13	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C14	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C15	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C16	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C17	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C18	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C19	4030004760	S.CERAMIC C2012 JF 1E 104Z-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	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C25	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C26	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C27	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C28	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C29	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C30	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C31	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C32	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C33	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C34	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C35	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C36	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C37	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C38	4510004990	ELECTROLYTIC 16 MV 100 HC
C39	4510003910	ELECTROLYTIC 16 MV 47 HW
C40	4510003890	ELECTROLYTIC 16 MV 10 HW
C41	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C42	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C43	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C44	4030008550	S.CERAMIC C2012 JF 1H 473Z-T-A
C45	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C46	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C47	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C48	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C49	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C50	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C51	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C52	4030006460	S.CERAMIC C2012 SL 1H 102J-T-A
C53	4510003910	ELECTROLYTIC 16 MV 47 HW
C54	4510004490	ELECTROLYTIC 25 MV 22 HW
C55	4510004610	ELECTROLYTIC 16 MV 1000 AG
C56	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C57	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C58	4510003910	ELECTROLYTIC 16 MV 47 HW
C59	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C60	4510004830	ELECTROLYTIC 50 MV 1 NPDPW
C61	4030004730	S.CERAMIC C2012 JB 1H 222K-T-A
C63	4030004730	S.CERAMIC C2012 JB 1H 222K-T-A
C64	4510003960	ELECTROLYTIC 50 MV 1 HW
C65	4030004760	S.CERAMIC C2012 JF 1E 104Z-T-A
C66	4510003910	ELECTROLYTIC 16 MV 47 HW

S. = Surface mount

[MAIN UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C67	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C68	4510003890	ELECTROLYTIC	16 MV 10 HW
C69	4030004710	S.CERAMIC	C2012 JB 1H 471K-T-A
C70	4030005030	S.CERAMIC	C2012 CH 1H 221J-T-A
C71	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C72	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C73	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C74	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C75	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C76	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C77	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C78	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C79	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C80	4030009340	S.CERAMIC	C2012 JF 1H 472Z-T-A
C81	4030009340	S.CERAMIC	C2012 JF 1H 472Z-T-A
C82	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C83	4510003900	ELECTROLYTIC	16 MV 22 HW
C85	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C96	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C97	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C98	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C99	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C100	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C101	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C102	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C103	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C104	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C105	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C106	4030009340	S.CERAMIC	C2012 JF 1H 472Z-T-A
C107	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C108	4510003910	ELECTROLYTIC	16 MV 47 HW
C109	4510003910	ELECTROLYTIC	16 MV 47 HW
C110	4510003960	ELECTROLYTIC	50 MV 1 HW
C111	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C112	4030002280	S.CERAMIC	GRM40 SH 151J 50PT
C113	4030009340	S.CERAMIC	C2012 JF 1H 472Z-T-A
C114	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C115	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C116	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C118	4510003890	ELECTROLYTIC	16 MV 10 HW
C119	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C120	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C121	4510003910	ELECTROLYTIC	16 MV 47 HW
C122	4510003910	ELECTROLYTIC	16 MV 47 HW
C123	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C124	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C125	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C127	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C128	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C129	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C130	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C131	4030004950	S.CERAMIC	C2012 CH 1H 470J-T-A
C132	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C133	4030005030	S.CERAMIC	C2012 CH 1H 221J-T-A
C134	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C135	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
RL1	6330000180	RELAY	MZ-12HG
BT1	3020000070	LITHIUM BATTERY	BR2032-1HF
EP1	910036054	PCB	B 3514D

[FRONT UNIT] (VR BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
S1	7600000140	ENCODER	SW-144 (RK09710HL)
S2	7600000150	ENCODER	SW-145 (RK09710HH)
S3	7600000140	ENCODER	SW-144 (RK09710HL)
EP1	910035432	PCB	B 3517B 3 pieces

[FRONT UNIT] (SENSOR BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
S1	2250000020	ENCODER	SRB18100 25KC
EP1	910035441	PCB	B 3518A

[FRONT UNIT] (SW BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1590000340	TRANSISTOR	RN1202
Q2	1530000100	TRANSISTOR	2SC2458-Y
D1	1710000160	DIODE	1SS133
D2	1710000160	DIODE	1SS133
D3	1710000160	DIODE	1SS133
D4	1710000160	DIODE	1SS133
D5	1710000160	DIODE	1SS133
D6	1710000160	DIODE	1SS133
D7	1710000160	DIODE	1SS133
D8	1710000160	DIODE	1SS133
D9	1710000160	DIODE	1SS133
D10	1710000160	DIODE	1SS133
D11	1710000160	DIODE	1SS133
D12	1710000160	DIODE	1SS133
D13	1710000160	DIODE	1SS133
R1	7010004190	RESISTOR	R20J 1KΩ
R3	7010004140	RESISTOR	R20J 390Ω
R4	7010004090	RESISTOR	R20J 150Ω
R5	7010004090	RESISTOR	R20J 150Ω
R6	7010003350	RESISTOR	ELR20J 390Ω
DS1	5040001750	LED	TLRC160
DS2	5040000820	LED	SLN-210MC
DS3	5040000820	LED	SLN-210MC
DS4	5040000820	LED	SLN-210MC
S1	2260000851	SWITCH	SKHQFA018B
S2	2260000861	SWITCH	SKHQFB015B
S3	2260000861	SWITCH	SKHQFB015B
S4	2260000861	SWITCH	SKHQFB015B
S5	2260000861	SWITCH	SKHQFB015B
S6	2260000861	SWITCH	SKHQFB015B
S7	2260000861	SWITCH	SKHQFB015B
S8	2260000861	SWITCH	SKHQFB015B
S9	2260000861	SWITCH	SKHQFB015B
S10	2260000861	SWITCH	SKHQFB015B
S11	2260000861	SWITCH	SKHQFB015B
S12	2260000861	SWITCH	SKHQFB015B

S. = Surface mount

[FRONT UNIT] (SW BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
S13	2260000861	SWITCH	SKHQFB015B
S14	2260000861	SWITCH	SKHQFB015B
SP1	2520000070	PIEZO BUZZER	EFBRQ38C01
EP1	910035462	PCB	B 3516B

[REAR UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
F2	5210000070	FUSE	FGB 10A

[REAR UNIT] (REG BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110001950	IC	μPC494C
IC2	1110002260	IC	μPC1093J
IC3	1170000180	IC	PC817D
IC4	1130000050	IC	TC4013BP (NEW)
Q1	1510000070	TRANSISTOR	2SA1048-Y
Q2	1560000600	FET	2SK740
Q3	1560000600	FET	2SK740
Q4	1510000070	TRANSISTOR	2SA1048-Y
Q5	1510000720	TRANSISTOR	2SA1428-Y
Q6	1510000070	TRANSISTOR	2SA1048-Y
Q7	1530000100	TRANSISTOR	2SC2458-Y
Q9	1540000150	TRANSISTOR	2SD1225M R
Q10	1590000350	TRANSISTOR	RN1204
Q11	1590000350	TRANSISTOR	RN1204
Q12	1520000230	TRANSISTOR	2SB909M Q
Q13	1520000290	TRANSISTOR	2SB1015-Y
Q14	1510000070	TRANSISTOR	2SA1048-Y
Q15	1530000100	TRANSISTOR	2SC2458-Y
Q16	1530000100	TRANSISTOR	2SC2458-Y
Q17	1530000100	TRANSISTOR	2SC2458-Y
Q18	1530000100	TRANSISTOR	2SC2458-Y
D1	1710000040	DIODE	1S953
D2	1710000040	DIODE	1S953
D4	1790000740	DIODE	MA693
D5	1790000760	DIODE	RG-2A
D6	1790000740	DIODE	MA693
D8	1730000250	ZENER	RD12E B2
D9	1790000760	DIODE	RG-2A
D10	1710000160	DIODE	1SS133
D11	1710000160	DIODE	1SS133
D12	1710000160	DIODE	1SS133
D13	1710000160	DIODE	1SS133
D14	1710000160	DIODE	1SS133
D15	1710000160	DIODE	1SS133
D16	1730001830	ZENER	RD10E B1
D17	1710000160	DIODE	1SS133
D18	1710000160	DIODE	1SS133
D19	1790000700	DIODE	DSA3A1
D20	1790000700	DIODE	DSA3A1

[REAR UNIT] (REG BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6190000640	COIL	TF2528S-102Y5R0-01
L2	6190000810	COIL	HP-012Z
L3	6190000800	COIL	HP-011Z
L4	6170000140	COIL	LW-15
R2	7010003980	RESISTOR	R20J 18Ω
R3	7010003400	RESISTOR	ELR20J 1KΩ
R4	7010003400	RESISTOR	ELR20J 1KΩ
R5	7010003980	RESISTOR	R20J 18Ω
R6	7010004840	RESISTOR	R50XJ 39Ω
R7	7010004840	RESISTOR	R50XJ 39Ω
R8	7010003490	RESISTOR	ELR20J 5.6KΩ
R9	7010003350	RESISTOR	ELR20J 390Ω
R10	7010003530	RESISTOR	ELR20J 10KΩ
R11	7010003420	RESISTOR	ELR20J 1.5KΩ
R12	7010003540	RESISTOR	ELR20J 12KΩ
R13	7010003440	RESISTOR	ELR20J 2.2KΩ
R15	7010003400	RESISTOR	ELR20J 1KΩ
R16	7010003400	RESISTOR	ELR20J 1KΩ
R17	7080000260	RESISTOR	CRB25FX 4.7KΩ
R19	7080000260	RESISTOR	CRB25FX 4.7KΩ
R21	7010003530	RESISTOR	ELR20J 10KΩ
R22	7010003580	RESISTOR	ELR20J 22KΩ
R23	7010003580	RESISTOR	ELR20J 22KΩ
R24	7010003400	RESISTOR	ELR20J 1KΩ
R25	7010003700	RESISTOR	ELR20J 220KΩ
R26	7010003400	RESISTOR	ELR20J 1KΩ
R27	7010003530	RESISTOR	ELR20J 10KΩ
R28	7010003660	RESISTOR	ELR20J 100KΩ
R29	7010003680	RESISTOR	ELR20J 150KΩ
R30	7010003480	RESISTOR	ELR20J 4.7KΩ
R31	7010003620	RESISTOR	ELR20J 47KΩ
R32	7010003280	RESISTOR	ELR20J 100Ω
R33	7010003490	RESISTOR	ELR20J 5.6KΩ
R34	7540000060	ABSORBER	ERZ-C05DK 560
R35	7540000060	ABSORBER	ERZ-C05DK 560
R36	7010003400	RESISTOR	ELR20J 1KΩ
R37	7010003400	RESISTOR	ELR20J 1KΩ
R38	7010003360	RESISTOR	ELR20J 470Ω
R39	7010003490	RESISTOR	ELR20J 5.6KΩ
R40	7010003510	RESISTOR	ELR20J 6.8KΩ
R41	7070000220	RESISTOR	CRH100X R-02J 470Ω (471)
R42	7010004090	RESISTOR	R20J 150Ω
R43	7010004210	RESISTOR	R20J 1.5KΩ
R44	7010003410	RESISTOR	ELR20J 1.2KΩ
R45	7010003530	RESISTOR	ELR20J 10KΩ
R46	7010003380	RESISTOR	ELR20J 680Ω
R47	7010003530	RESISTOR	ELR20J 10KΩ
C1	4510004770	ELECTROLYTIC	50 MV 1000 EZ
C2	4010004130	CERAMIC	DD09 B 222K 500V
C3	4010004130	CERAMIC	DD09 B 222K 500V
C4	4510003970	ELECTROLYTIC	50 MV 2R2 HW
C5	4510003910	ELECTROLYTIC	16 MV 47 HW
C6	4510003960	ELECTROLYTIC	50 MV 1 HW
C7	4510003960	ELECTROLYTIC	50 MV 1 HW
C8	4310000330	MYLAR	50 F2D 102J
C9	4310000330	MYLAR	50 F2D 102J
C10	4510004490	ELECTROLYTIC	25 MV 22 HW
C11	4510003910	ELECTROLYTIC	16 MV 47 HW
C12	4510003960	ELECTROLYTIC	50 MV 1 HW
C13	4510004750	ELECTROLYTIC	25 MV 470 AG
C14	4510005030	ELECTROLYTIC	10 MV 1000 AG
C15	4510005060	ELECTROLYTIC	25 MV 220 HW
C16	4510003940	ELECTROLYTIC	25 MV 4R7 HW
C17	4510005260	ELECTROLYTIC	25 MV 10 HW
C18	4510004490	ELECTROLYTIC	25 MV 22 HW
C19	4510003960	ELECTROLYTIC	50 MV 1 HW
C20	4510005260	ELECTROLYTIC	25 MV 10 HW

[REAR UNIT] (REG BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
C21	4510005260	ELECTROLYTIC	25 MV 10 HW
C22	4510004490	ELECTROLYTIC	25 MV 22 HW
C23	4010000560	CERAMIC	DD106 F 103Z 50V
C24	4010000560	CERAMIC	DD106 F 103Z 50V
C25	4010000560	CERAMIC	DD106 F 103Z 50V
C26	4510005570	ELECTROLYTIC	50 MV 330 HW
C27	4510004940	ELECTROLYTIC	50 MV 33 NPDPW
C28	4510004940	ELECTROLYTIC	50 MV 33 NPDPW
C29	4010000560	CERAMIC	DD106 F 103Z 50V
C30	4010000560	CERAMIC	DD106 F 103Z 50V
C31	4010000560	CERAMIC	DD106 F 103Z 50V
C32	4510004610	ELECTROLYTIC	16 MV 1000 AG
C33	4510003910	ELECTROLYTIC	16 MV 47 HW
C34	4010004840	CERAMIC	DD305 F 104Z 12V
C35	4510004490	ELECTROLYTIC	25 MV 22 HW
C36	4010000330	CERAMIC	DD105 SL 101J 50V
T1	5920000530	TRANSFORMER	TO-33
RL1	6330000940	RELAY	G6EK-134P-1-US DC9V
EP1	910035403	PCB	B 3507C

[CTRL UNIT] (IF BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130006950	IC	μPD6326C
IC2	1130006350	S.IC	TC4094BF (TP1)
IC3	1110002590	S.IC	MC1350 D
IC4	1110002590	S.IC	MC1350 D
IC5	1110002300	IC	MC1330 AP
IC6	1130005010	IC	HD14046BP
IC7	1110001200	S.IC	μPC324G2
IC8	1130005380	S.IC	TC74HC161AF
IC9	1110000240	IC	BA222-V
IC10	1110001240	S.IC	μPC358G2-T1
IC11	1110001240	S.IC	μPC358G2-T1
IC12	1180000010	IC	TA78L005AP
IC13	1130002760	S.IC	μPD4584BG-T1
IC14	1130003710	S.IC	TC4S71F (TE85R)
IC15	1130003710	S.IC	TC4S71F (TE85R)
Q1	1530002030	S.TRANSISTOR	2SC3772-3-TA
Q2	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q3	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q4	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q5	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q6	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q7	1530002030	S.TRANSISTOR	2SC3772-3-TA
Q8	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q9	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q10	1590000520	S.FET	2SJ106-GR (TE85R)
Q11	1590000520	S.FET	2SJ106-GR (TE85R)
Q12	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q13	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q14	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q15	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q16	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q17	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q18	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q19	1580000390	S.FET	3SK131K-T1
Q20	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q21	1590000480	S.TRANSISTOR	RN2402 (TE85R)
Q22	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q23	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q24	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q25	1590000480	S.TRANSISTOR	RN2402 (TE85R)
Q26	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q27	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q28	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q29	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q30	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q31	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q32	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q33	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q34	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q35	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
D1	1720000220	S.VARICAP	1SV166-T2B
D2	1720000220	S.VARICAP	1SV166-T2B
D3	1720000220	S.VARICAP	1SV166-T2B
D4	1750000060	S.DIODE	1SS196 (TE85R)
D5	1750000060	S.DIODE	1SS196 (TE85R)
D6	1750000060	S.DIODE	1SS196 (TE85R)
D7	1750000060	S.DIODE	1SS196 (TE85R)
D8	1750000060	S.DIODE	1SS196 (TE85R)
D9	1750000060	S.DIODE	1SS196 (TE85R)
D10	1750000060	S.DIODE	1SS196 (TE85R)
D11	1750000060	S.DIODE	1SS196 (TE85R)
D12	1750000060	S.DIODE	1SS196 (TE85R)
D13	1750000060	S.DIODE	1SS196 (TE85R)
D14	1790000960	S.DIODE	1SS317-T
D15	1750000060	S.DIODE	1SS196 (TE85R)
D16	1750000060	S.DIODE	1SS196 (TE85R)
D17	1750000060	S.DIODE	1SS196 (TE85R)

[REAR UNIT] (FIL BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6180002940	COIL	TF3233S-102Y10R0-01
L2	6910000670	COIL	BT01RN1-A61-001
L3	6910000670	COIL	BT01RN1-A61-001
C1	4510004940	ELECTROLYTIC	50 MV 33 NPDPW
C2	4510005570	ELECTROLYTIC	50 MV 330 HW
C3	4510004940	ELECTROLYTIC	50 MV 33 NPDPW
C4	4010000590	CERAMIC	DD110 F 473Z 50V
C5	4010000590	CERAMIC	DD110 F 473Z 50V
C6	4010000590	CERAMIC	DD110 F 473Z 50V
C7	4010000590	CERAMIC	DD110 F 473Z 50V
C8	4010000590	CERAMIC	DD110 F 473Z 50V
C9	4010000560	CERAMIC	DD106 F 103Z 50V
C10	4010000560	CERAMIC	DD106 F 103Z 50V
F1	5210000060	FUSE	FGB 5A
EP1	910036541	PCB	B 3630A

[CTRL UNIT] (RF)

REF. NO.	PARTS NO.	DESCRIPTION	
EP1	6910004880	MAGNETRON	MSF1421B
EP2	6910004870	FRONTEND	NJT1946
EP3	6910004860	CIRCULATOR	NJC3901D
EP4	6910004850	LIMITER	NJS6930

S. = Surface mount

[CTRL UNIT] (IF BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
D18	1750000060	S.DIODE	1SS196 (TE85R)
D19	1750000060	S.DIODE	1SS196 (TE85R)
D20	1750000060	S.DIODE	1SS196 (TE85R)
D21	1750000040	S.DIODE	1SS190 (TE85R)
D22	1750000060	S.DIODE	1SS196 (TE85R)
D23	1750000060	S.DIODE	1SS196 (TE85R)
D24	1750000060	S.DIODE	1SS196 (TE85R)
D25	1750000060	S.DIODE	1SS196 (TE85R)
D26	1730000730	S.ZENER	RD6.2M-T2B2
D27	1750000060	S.DIODE	1SS196 (TE85R)
D28	1790000960	S.DIODE	1SS317-T
D29	1790000960	S.DIODE	1SS317-T
D30	1790000960	S.DIODE	1SS317-T
D31	1750000060	S.DIODE	1SS196 (TE85R)
D32	1750000060	S.DIODE	1SS196 (TE85R)
D33	1750000060	S.DIODE	1SS196 (TE85R)
D34	1750000070	S.DIODE	1SS226 (TE85R)
D35	1750000070	S.DIODE	1SS226 (TE85R)
D36	1750000060	S.DIODE	1SS196 (TE85R)
D37	1750000070	S.DIODE	1SS226 (TE85R)
L1	6150002430	COIL	LS-254
L2	6150002430	COIL	LS-254
L3	6150002430	COIL	LS-254
L4	6150002430	COIL	LS-254
L5	6150002430	COIL	LS-254
L6	6150002430	COIL	LS-254
L7	6150002430	COIL	LS-254
L8	6150002430	COIL	LS-254
L9	6180000690	COIL	LAL 03NA R22M
R1	7030000740	S.RESISTOR	MCR10EZHZ 1M Ω (105)
R2	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R3	7030000300	S.RESISTOR	MCR10EZHZ 220 Ω (221)
R4	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R5	7030000470	S.RESISTOR	MCR10EZHZ 5.6K Ω (562)
R6	7030000660	S.RESISTOR	MCR10EZHZ 220K Ω (224)
R7	7030000340	S.RESISTOR	MCR10EZHZ 470 Ω (471)
R8	7030000530	S.RESISTOR	MCR10EZHZ 18K Ω (183)
R9	7030000530	S.RESISTOR	MCR10EZHZ 18K Ω (183)
R10	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R11	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R12	7030000340	S.RESISTOR	MCR10EZHZ 470 Ω (471)
R13	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R14	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R15	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R16	7030000320	S.RESISTOR	MCR10EZHZ 330 Ω (331)
R17	7030000440	S.RESISTOR	MCR10EZHZ 3.3K Ω (332)
R18	7030000450	S.RESISTOR	MCR10EZHZ 3.9K Ω (392)
R19	7030000450	S.RESISTOR	MCR10EZHZ 3.9K Ω (392)
R20	7030000140	S.RESISTOR	MCR10EZHZ 10 Ω (100)
R21	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R22	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R23	7030000180	S.RESISTOR	MCR10EZHZ 22 Ω (220)
R24	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R25	7030000300	S.RESISTOR	MCR10EZHZ 220 Ω (221)
R26	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R27	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R28	7030000440	S.RESISTOR	MCR10EZHZ 3.3K Ω (332)
R29	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R30	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R31	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R32	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R33	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R34	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R35	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R36	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R37	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R38	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)

[CTRL UNIT] (IF BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
R39	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R40	7030000640	S.RESISTOR	MCR10EZHZ 150K Ω (154)
R41	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R42	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R43	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R44	7030000480	S.RESISTOR	MCR10EZHZ 6.8K Ω (682)
R45	7030000460	S.RESISTOR	MCR10EZHZ 4.7K Ω (472)
R46	7030000480	S.RESISTOR	MCR10EZHZ 6.8K Ω (682)
R47	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R48	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R49	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R50	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R51	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R52	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R53	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R54	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R55	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R56	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R57	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R58	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R59	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R60	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R62	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R64	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R65	7030000440	S.RESISTOR	MCR10EZHZ 3.3K Ω (332)
R66	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R67	7030000740	S.RESISTOR	MCR10EZHZ 1M Ω (105)
R68	7030000630	S.RESISTOR	MCR10EZHZ 120K Ω (124)
R69	7030000630	S.RESISTOR	MCR10EZHZ 120K Ω (124)
R70	7030000460	S.RESISTOR	MCR10EZHZ 4.7K Ω (472)
R71	7030000560	S.RESISTOR	MCR10EZHZ 33K Ω (333)
R72	7030000220	S.RESISTOR	MCR10EZHZ 47 Ω (470)
R73	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R74	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R75	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R76	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R77	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R79	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R80	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R81	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R82	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R83	7030000450	S.RESISTOR	MCR10EZHZ 3.9K Ω (392)
R84	7030000490	S.RESISTOR	MCR10EZHZ 8.2K Ω (822)
R85	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R86	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R87	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R88	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R89	7030000460	S.RESISTOR	MCR10EZHZ 4.7K Ω (472)
R90	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R91	7030000500	S.RESISTOR	MCR10EZHZ 10K Ω (103)
R92	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R93	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R94	7030000490	S.RESISTOR	MCR10EZHZ 8.2K Ω (822)
R96	7030000540	S.RESISTOR	MCR10EZHZ 22K Ω (223)
R97	7030000380	S.RESISTOR	MCR10EZHZ 1K Ω (102)
R98	7030000260	S.RESISTOR	MCR10EZHZ 100 Ω (101)
R99	7030000440	S.RESISTOR	MCR10EZHZ 3.3K Ω (332)
R100	7030000340	S.RESISTOR	MCR10EZHZ 470 Ω (471)
R101	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R102	7030000340	S.RESISTOR	MCR10EZHZ 470 Ω (471)
R103	7030000420	S.RESISTOR	MCR10EZHZ 2.2K Ω (222)
R104	7030000490	S.RESISTOR	MCR10EZHZ 8.2K Ω (822)
R105	7030000430	S.RESISTOR	MCR10EZHZ 2.7K Ω (272)
R106	7030000480	S.RESISTOR	MCR10EZHZ 6.8K Ω (682)
R107	7030000430	S.RESISTOR	MCR10EZHZ 2.7K Ω (272)
R108	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R109	7030000490	S.RESISTOR	MCR10EZHZ 8.2K Ω (822)
R110	7030000580	S.RESISTOR	MCR10EZHZ 47K Ω (473)
R111	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)
R112	7030000580	S.RESISTOR	MCR10EZHZ 47K Ω (473)
R113	7030000620	S.RESISTOR	MCR10EZHZ 100K Ω (104)

S. = Surface mount

[CTRL UNIT] (IF BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
R114	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R115	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R116	7030000470	S.RESISTOR	MCR10EZHZ 5.6KΩ (562)
R117	7030000460	S.RESISTOR	MCR10EZHZ 4.7KΩ (472)
R118	7030000480	S.RESISTOR	MCR10EZHZ 6.8KΩ (682)
R119	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R120	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R121	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R122	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R124	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R125	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R126	7030000450	S.RESISTOR	MCR10EZHZ 3.9KΩ (392)
R127	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R130	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R131	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R132	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R133	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R134	7030000460	S.RESISTOR	MCR10EZHZ 4.7KΩ (472)
R135	7030000440	S.RESISTOR	MCR10EZHZ 3.3KΩ (332)
R136	7030000420	S.RESISTOR	MCR10EZHZ 2.2KΩ (222)
R137	7030000420	S.RESISTOR	MCR10EZHZ 2.2KΩ (222)
R138	7030000420	S.RESISTOR	MCR10EZHZ 2.2KΩ (222)
R139	7030000300	S.RESISTOR	MCR10EZHZ 220Ω (221)
R140	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R142	7030000140	S.RESISTOR	MCR10EZHZ 10Ω (100)
R143	7030000430	S.RESISTOR	MCR10EZHZ 2.7KΩ (272)
R144	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R145	7030000490	S.RESISTOR	MCR10EZHZ 8.2KΩ (822)
R146	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R147	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R148	7030000650	S.RESISTOR	MCR10EZHZ 180KΩ (184)
R149	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R150	7030000580	S.RESISTOR	MCR10EZHZ 47KΩ (473)
R152	7030000580	S.RESISTOR	MCR10EZHZ 47KΩ (473)
R153	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R154	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R155	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R156	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R157	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R158	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R159	7030000440	S.RESISTOR	MCR10EZHZ 3.3KΩ (332)
R160	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R161	7030000580	S.RESISTOR	MCR10EZHZ 47KΩ (473)
R162	7030000540	S.RESISTOR	MCR10EZHZ 22KΩ (223)
R163	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R164	7030000640	S.RESISTOR	MCR10EZHZ 150KΩ (154)
R165	7030000440	S.RESISTOR	MCR10EZHZ 3.3KΩ (332)
R166	7030000440	S.RESISTOR	MCR10EZHZ 3.3KΩ (332)
R167	7030000440	S.RESISTOR	MCR10EZHZ 3.3KΩ (332)
R168	7030000460	S.RESISTOR	MCR10EZHZ 4.7KΩ (472)
R169	7030000360	S.RESISTOR	MCR10EZHZ 680Ω (681)
R170	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R171	7030000460	S.RESISTOR	MCR10EZHZ 4.7KΩ (472)
R172	7030000460	S.RESISTOR	MCR10EZHZ 4.7KΩ (472)
R173	7030000430	S.RESISTOR	MCR10EZHZ 2.7KΩ (272)
R174	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R175	7030000490	S.RESISTOR	MCR10EZHZ 8.2KΩ (822)
R176	7030000400	S.RESISTOR	MCR10EZHZ 1.5KΩ (152)
C1	4030004840	S.CERAMIC	C2012 CH 1H 070D-T-A
C2	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C3	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C4	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C5	4030004470	S.CERAMIC	C2012 SL 1H 100D-T-A
C6	4030004470	S.CERAMIC	C2012 SL 1H 100D-T-A
C7	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C8	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C9	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C10	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C11	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A

[CTRL UNIT] (IF BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
C12	4030004580	S.CERAMIC	C2012 SL 1H 560J-T-A
C13	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C14	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C15	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C16	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C17	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C18	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C19	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C20	4030009640	S.CERAMIC	C2012 CH 1H 300J-T-A
C21	4030009640	S.CERAMIC	C2012 CH 1H 300J-T-A
C22	4030009640	S.CERAMIC	C2012 CH 1H 300J-T-A
C23	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C24	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C25	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C26	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C27	4310000360	MYLAR	50 F2D 103J
C28	4510003890	ELECTROLYTIC	16 MV 10 HW
C29	4310000610	MYLAR	50 F2D 472J
C30	4310000610	MYLAR	50 F2D 472J
C31	4310000590	MYLAR	50 F2D 332J
C33	4030004630	S.CERAMIC	C2012 SL 1H 151J-T-A
C34	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C35	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C36	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C37	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C38	4030006450	S.CERAMIC	C2012 JF 1H 103Z-T-A
C39	4510003890	ELECTROLYTIC	16 MV 10 HW
C40	4310000360	MYLAR	50 F2D 103J
C41	4510005530	ELECTROLYTIC	50 MV 10 EZ
C42	4510005200	ELECTROLYTIC	25 MV 47 HW (6.3X11)
C43	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C44	4510004990	ELECTROLYTIC	16 MV 100 HC
C45	4510003910	ELECTROLYTIC	16 MV 47 HW
C46	4510005200	ELECTROLYTIC	25 MV 47 HW (6.3X11)
C47	4510005200	ELECTROLYTIC	25 MV 47 HW (6.3X11)
C48	4510005530	ELECTROLYTIC	50 MV 10 EZ
C49	4510005530	ELECTROLYTIC	50 MV 10 EZ
C50	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C51	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C52	4030004610	S.CERAMIC	C2012 SL 1H 101J-T-A
C54	4030004570	S.CERAMIC	C2012 SL 1H 470J-T-A
C55	4030004810	S.CERAMIC	C2012 CH 1H 040C-T-A
C56	4030004810	S.CERAMIC	C2012 CH 1H 040C-T-A
C57	4030004810	S.CERAMIC	C2012 CH 1H 040C-T-A
C58	4030004810	S.CERAMIC	C2012 CH 1H 040C-T-A
C59	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C60	4510003890	ELECTROLYTIC	16 MV 10 HW
C61	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C62	4510003890	ELECTROLYTIC	16 MV 10 HW
C63	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C64	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C65	4510003910	ELECTROLYTIC	16 MV 47 HW
C66	4510003910	ELECTROLYTIC	16 MV 47 HW
C67	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C68	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C69	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C70	4030004420	S.CERAMIC	C2012 SL 1H 050C-T-A
C71	4030004420	S.CERAMIC	C2012 SL 1H 050C-T-A
C72	4030004420	S.CERAMIC	C2012 SL 1H 050C-T-A
C73	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C74	4510003940	ELECTROLYTIC	25 MV 4R7 HW
C76	4030004580	S.CERAMIC	C2012 SL 1H 560J-T-A
C77	4030004580	S.CERAMIC	C2012 SL 1H 560J-T-A
C78	4030004470	S.CERAMIC	C2012 SL 1H 100D-T-A
C80	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C81	4510003890	ELECTROLYTIC	16 MV 10 HW
C82	4510003890	ELECTROLYTIC	16 MV 10 HW
C83	4010000880	CERAMIC	DD106 CH 560J 50V
C84	4510004990	ELECTROLYTIC	16 MV 100 HC
C85	4510003890	ELECTROLYTIC	16 MV 10 HW
C86	4510003890	ELECTROLYTIC	16 MV 10 HW

S. = Surface mount

[CTRL UNIT] (IF BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
C87	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C88	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C89	4030006460	S.CERAMIC	C2012 SL 1H 102J-T-A
C90	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C91	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C92	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C93	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C94	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C95	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
EP1	910035413	PCB	B 3504C

[CTRL UNIT] (PA BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130003710	S.IC	TC4S71F (TE85R)
IC2	1110003070	S.IC	μPC494GS
IC3	1110001820	S.IC	μPC1093T
IC4	1170000180	IC	PC817D
IC5	1180000450	IC	NJM7812A
IC6	1110003070	S.IC	μPC494GS
IC7	1130000580	S.IC	μPD4050BG
IC8	1170000190	IC	TLP521-1 (BL)
IC9	1130003710	S.IC	TC4S71F (TE85R)
Q1	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q2	1560000600	FET	2SK740
Q3	1560000600	FET	2SK740
Q4	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q5	1560000700	FET	2SK1449
Q6	1560000700	FET	2SK1449
Q7	1510000720	TRANSISTOR	2SA1428-Y
Q8	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q9	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q10	1560000600	FET	2SK740
Q11	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q12	15300002790	S.TRANSISTOR	2SC2859-Y (TE85R)
Q13	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q14	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q15	1540000250	S.TRANSISTOR	2SD999-T2 CK
Q16	1510000610	S.TRANSISTOR	2SA1182-Y (TE85R)
Q17	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q18	1590000460	S.TRANSISTOR	RN1402 (TE85R)
Q19	1590000460	S.TRANSISTOR	RN1402 (TE85R)
D1	1750000060	S.DIODE	1SS196 (TE85R)
D2	1750000060	S.DIODE	1SS196 (TE85R)
D3	1790000740	DIODE	MA693
D4	17300001000	S.ZENER	RD16M-T2B2
D6	1790000760	DIODE	RG-2A
D7	1790000760	DIODE	RG-2A
D8	1750000070	S.DIODE	1SS226 (TE85R)
D9	1790000740	DIODE	MA693
D10	1750000060	S.DIODE	1SS196 (TE85R)
D11	1750000070	S.DIODE	1SS226 (TE85R)
D12	1750000060	S.DIODE	1SS196 (TE85R)
D13	17300001000	S.ZENER	RD16M-T2B2
L1	6190000800	COIL	HP-011Z
L2	6190000810	COIL	HP-012Z
L3	6140000700	COIL	LR-92
L4	6140000700	COIL	LR-92

[CTRL UNIT] (PA BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
R1	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R2	7030001110	S.RESISTOR	MCR50JZHZ 68Ω (680)
R3	7070000530	RESISTOR	CRH200 R-02J 33Ω (330)
R4	7030000140	S.RESISTOR	MCR10EZHZ 10Ω (100)
R5	7030000140	S.RESISTOR	MCR10EZHZ 10Ω (100)
R6	70100005140	RESISTOR	R50XJ 1Ω
R7	7030000180	S.RESISTOR	MCR10EZHZ 22Ω (220)
R8	7030000180	S.RESISTOR	MCR10EZHZ 22Ω (220)
R9	7030001080	S.RESISTOR	MCR50JZHZ 39Ω (390)
R10	7030001080	S.RESISTOR	MCR50JZHZ 39Ω (390)
R11	7030000470	S.RESISTOR	MCR10EZHZ 5.6KΩ (562)
R12	7030000470	S.RESISTOR	MCR10EZHZ 5.6KΩ (562)
R13	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R14	7030000510	S.RESISTOR	MCR10EZHZ 12KΩ (123)
R15	7030000420	S.RESISTOR	MCR10EZHZ 2.2KΩ (222)
R16	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R17	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R18	7030002800	S.RESISTOR	MCR10EZHF 2.7KΩ (272)
R19	7030000470	S.RESISTOR	MCR10EZHZ 5.6KΩ (562)
R20	7030000470	S.RESISTOR	MCR10EZHZ 5.6KΩ (562)
R21	7030000580	S.RESISTOR	MCR10EZHZ 47KΩ (473)
R22	7030000550	S.RESISTOR	MCR10EZHZ 27KΩ (273)
R23	7030000420	S.RESISTOR	MCR10EZHZ 2.2KΩ (222)
R24	4610001620	TRIMMER	EVM-MSGA01 B13
R25	7030001540	S.RESISTOR	MCR50JZHZ 180KΩ (184)
R26	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R27	7030000620	S.RESISTOR	MCR10EZHZ 100KΩ (104)
R28	7070000270	RESISTOR	CRH100X R-02J 100Ω (101)
R29	7030000170	S.RESISTOR	MCR10EZHZ 18Ω (180)
R30	7030000340	S.RESISTOR	MCR10EZHZ 470Ω (471)
R31	7030000440	S.RESISTOR	MCR10EZHZ 3.3KΩ (332)
R33	7030000580	S.RESISTOR	MCR10EZHZ 47KΩ (473)
R34	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R35	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R36	7030000580	S.RESISTOR	MCR10EZHZ 47KΩ (473)
R37	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R38	7030000380	S.RESISTOR	MCR10EZHZ 1KΩ (102)
R39	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R40	7030000330	S.RESISTOR	MCR10EZHZ 39Ω (391)
R41	7030002830	S.RESISTOR	MCR10EZHF 4.7KΩ (472)
R42	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R44	7100000010	RESISTOR	SRW1P 0R1Ω (0R1)
R45	7030000400	S.RESISTOR	MCR10EZHZ 1.5KΩ (152)
R46	7030000470	S.RESISTOR	MCR10EZHZ 5.6KΩ (562)
R47	7030000510	S.RESISTOR	MCR10EZHZ 12KΩ (123)
R48	7030000540	S.RESISTOR	MCR10EZHZ 22KΩ (223)
R49	4610001630	TRIMMER	EVM-MSGA01 B23
R50	4610001640	TRIMMER	EVM-MSGA01 B53
R51	4610001660	TRIMMER	EVM-MSGA01 B24
R52	4610001650	TRIMMER	EVM-MSGA01 B14
R53	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R55	7030002890	S.RESISTOR	MCR10EZHF 15KΩ (153)
R56	7030001540	S.RESISTOR	MCR50JZHZ 180KΩ (184)
R57	7030000420	S.RESISTOR	MCR10EZHZ 2.2KΩ (222)
R58	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R59	7030000260	S.RESISTOR	MCR10EZHZ 100Ω (101)
R60	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R61	7030000500	S.RESISTOR	MCR10EZHZ 10KΩ (103)
R62	7030001010	S.RESISTOR	MCR50JZHZ 10Ω (100)
R65	7030000140	S.RESISTOR	MCR10EZHZ 10Ω (100)
R66	7030000140	S.RESISTOR	MCR10EZHZ 10Ω (100)
C1	4310000440	MYLAR	50 F2D 473J
C2	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C3	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C4	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C5	4310000910	MYLAR	ECW F4105KZ
C6	4310000910	MYLAR	ECW F4105KZ
C7	4560000010	CERAMIC	D55X5T 1H 104M51
C8	4510004770	ELECTROLYTIC	50 MV 1000 EZ

S. = Surface mount

[CTRL UNIT] (PA BOARD)

REF. NO.	PARTS NO.	DESCRIPTION	
C9	4010004130	CERAMIC	DD09 B 222K 500V
C10	4010004130	CERAMIC	DD09 B 222K 500V
C11	4510003970	ELECTROLYTIC	50 MV 2R2 HW
C12	4510005200	ELECTROLYTIC	25 MV 47 HW (6.3X11)
C13	4510003900	ELECTROLYTIC	16 MV 22 HW
C14	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C15	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C16	4310000330	MYLAR	50 F2D 102J
C17	4510005470	ELECTROLYTIC	25 MV 1000 AG
C18	4510004310	ELECTROLYTIC	450 TWS 10µF (12.5X25)
C19	4510005470	ELECTROLYTIC	25 MV 1000 AG
C20	4510005470	ELECTROLYTIC	25 MV 1000 AG
C21	4010004100	CERAMIC	DD14 SL 331K 500V
C23	4030009240	S.CERAMIC	GRM40 CH 102J 50PT
C24	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C25	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C26	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C27	4310000440	MYLAR	50 F2D 473J
C28	4510003910	ELECTROLYTIC	16 MV 47 HW
C29	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C30	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C31	4560000010	CERAMIC	D55X5T 1H 104M51
C32	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C33	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C34	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C35	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C37	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C38	4030004970	S.CERAMIC	C2012 CH 1H 680J-T-A
C39	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C40	4030004750	S.CERAMIC	C2012 JB 1H 103K-T-A
C41	4010004130	CERAMIC	DD09 B 222K 500V
C43	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C44	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C45	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C46	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C47	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C48	4030008550	S.CERAMIC	C2012 JF 1H 473Z-T-A
C49	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C50	4030004760	S.CERAMIC	C2012 JF 1E 104Z-T-A
C51	4510004140	ELECTROLYTIC	50 MV 10 HW
F1	5210000230	FUSE	MC 2 1/2
T1	5920000560	TRANSFORMER	TO-37
T2	5920000510	TRANSFORMER	TO-26
T3	5920000540	TRANSFORMER	TO-34
EP1	910035333	PCB	B 3505C

[HARNESS UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q2	1590000340	TRANSISTOR	RN1202
Q3	1590000340	TRANSISTOR	RN1202
Q4	1540000200	TRANSISTOR	2SD1406 Y
Q5	1510000070	TRANSISTOR	2SA1048-Y
Q6	1540000200	TRANSISTOR	2SD1406 Y
Q7	1530000100	TRANSISTOR	2SC2458-Y
Q8	1590000340	TRANSISTOR	RN1202
Q9	1530000100	TRANSISTOR	2SC2458-Y
Q10	1590000340	TRANSISTOR	RN1202
Q11	1590000340	TRANSISTOR	RN1202
Q12	1560000600	FET	2SK740
Q13	1510000070	TRANSISTOR	2SA1048-Y
Q14	1560000600	FET	2SK740
Q15	1510000070	TRANSISTOR	2SA1048-Y
Q16	1510000070	TRANSISTOR	2SA1048-Y
Q17	1590000340	TRANSISTOR	RN1202
Q18	1590000350	TRANSISTOR	RN1204
Q19	1520000290	TRANSISTOR	2SB1015-Y
Q20	1510000070	TRANSISTOR	2SA1048-Y
Q21	1590000350	TRANSISTOR	RN1204
Q22	1590000340	TRANSISTOR	RN1202
Q23	1530000100	TRANSISTOR	2SC2458-Y
Q24	1530000100	TRANSISTOR	2SC2458-Y
D1	1710000160	DIODE	1SS133
D2	1710000160	DIODE	1SS133
D3	1710000160	DIODE	1SS133
D4	1710000160	DIODE	1SS133
D5	1710000160	DIODE	1SS133
D6	1710000160	DIODE	1SS133
D7	1790000740	DIODE	MA693
D9	1710000160	DIODE	1SS133
D10	1710000040	DIODE	1S953
D11	1710000040	DIODE	1S953
D12	1730000280	ZENER	RD24E B2
D13	1710000160	DIODE	1SS133
D14	1710000160	DIODE	1SS133
D15	1730000250	ZENER	RD12E B2
D16	1710000160	DIODE	1SS133
L1	6190000640	COIL	TF2528S-102Y5R0-01
L2	6190000790	COIL	HP-023Z
R1	7010003740	RESISTOR	ELR20J 470KΩ
R2	7010003660	RESISTOR	ELR20J 100KΩ
R3	7010003620	RESISTOR	ELR20J 47KΩ
R4	7010003620	RESISTOR	ELR20J 47KΩ
R5	7010003620	RESISTOR	ELR20J 47KΩ
R6	7010003480	RESISTOR	ELR20J 4.7KΩ
R7	7010003620	RESISTOR	ELR20J 47KΩ
R8	7010003360	RESISTOR	ELR20J 470Ω
R9	7010003360	RESISTOR	ELR20J 470Ω
R10	7010003620	RESISTOR	ELR20J 47KΩ
R11	7100000010	RESISTOR	SRW1P 0R1Ω (0R1)
R12	7010003530	RESISTOR	ELR20J 10KΩ
R13	7010003490	RESISTOR	ELR20J 5.6KΩ
R14	7010003530	RESISTOR	ELR20J 10KΩ
R15	7010003540	RESISTOR	ELR20J 12KΩ
R16	7010003660	RESISTOR	ELR20J 100KΩ
R17	7010003400	RESISTOR	ELR20J 1KΩ
R18	7010003400	RESISTOR	ELR20J 1KΩ
R19	7010003400	RESISTOR	ELR20J 1KΩ
R20	7010003580	RESISTOR	ELR20J 22KΩ
R21	7010003580	RESISTOR	ELR20J 22KΩ
R22	7010003430	RESISTOR	ELR20J 1.8KΩ
R23	4610001640	TRIMMER	EVM-MSGA01 B53
R24	7010003470	RESISTOR	ELR20J 3.9KΩ
R25	7010003360	RESISTOR	ELR20J 470Ω

[HARNESS UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1170000180	IC	PC817D
IC2	1170000180	IC	PC817D
IC3	1170000180	IC	PC817D
IC4	1130004480	IC	TC74HC74AP
IC5	1130005540	IC	µPD74HC123AC
IC6	1130005150	IC	TC74HC14AP
IC7	1110001950	IC	µPC494C
IC8	1180000010	IC	TA78L005AP
Q1	1590000340	TRANSISTOR	RN1202

S. = Surface mount

[HARNESS UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R26	7010003580	RESISTOR	ELR20J 22KΩ
R27	7010003400	RESISTOR	ELR20J 1KΩ
R28	7010003190	RESISTOR	ELR20J 18Ω
R29	7010003400	RESISTOR	ELR20J 1KΩ
R30	7010003190	RESISTOR	ELR20J 18Ω
R31	7010003490	RESISTOR	ELR20J 5.6KΩ
R32	7010003580	RESISTOR	ELR20J 22KΩ
R33	7010003530	RESISTOR	ELR20J 10KΩ
R34	7010003660	RESISTOR	ELR20J 100KΩ
R35	7010003660	RESISTOR	ELR20J 100KΩ
R36	7010003620	RESISTOR	ELR20J 47KΩ
R37	7010003400	RESISTOR	ELR20J 1KΩ
R38	7010003400	RESISTOR	ELR20J 1KΩ
R39	7010003400	RESISTOR	ELR20J 1KΩ
R41	7010003360	RESISTOR	ELR20J 470Ω
R43	7010003530	RESISTOR	ELR20J 10KΩ
R44	7010003490	RESISTOR	ELR20J 5.6KΩ
R45	7010003490	RESISTOR	ELR20J 5.6KΩ
R46	7010003530	RESISTOR	ELR20J 10KΩ
R47	7010003530	RESISTOR	ELR20J 10KΩ
R48	7010003480	RESISTOR	ELR20J 4.7KΩ
R49	7010003620	RESISTOR	ELR20J 47KΩ
R50	7010003580	RESISTOR	ELR20J 22KΩ
R53	7010003400	RESISTOR	ELR20J 1KΩ
R54	7010003660	RESISTOR	ELR20J 100KΩ
R55	7010003400	RESISTOR	ELR20J 1KΩ
R56	7010003400	RESISTOR	ELR20J 1KΩ
C1	4560000060	CERAMIC	D33Y5V 1H 104Z21
C2	4560000060	CERAMIC	D33Y5V 1H 104Z21
C3	4560000060	CERAMIC	D33Y5V 1H 104Z21
C4	4510004940	ELECTROLYTIC	50 MV 33 NPDW
C5	4510004940	ELECTROLYTIC	50 MV 33 NPDW
C6	4510005570	ELECTROLYTIC	50 MV 330 HW
C7	4310000360	MYLAR	50 F2D 103J
C8	4310000380	MYLAR	50 F2D 153J
C9	4040000260	BARRIER	UZE 08X 104M
C10	4010000500	CERAMIC	DD104 B 102K 50V
C11	4510003910	ELECTROLYTIC	16 MV 47 HW
C12	4310000360	MYLAR	50 F2D 103J
C13	4310000330	MYLAR	50 F2D 102J
C14	4510003910	ELECTROLYTIC	16 MV 47 HW
C15	4040000260	BARRIER	UZE 08X 104M
C16	4510005470	ELECTROLYTIC	25 MV 1000 AG
C17	4310000330	MYLAR	50 F2D 102J
C18	4510003910	ELECTROLYTIC	16 MV 47 HW
C19	4510001770	ELECTROLYTIC	16 RBP 10μF
C20	4510004990	ELECTROLYTIC	16 MV 100 HC
C21	4510004770	ELECTROLYTIC	50 MV 1000 EZ
C23	4310000360	MYLAR	50 F2D 103J
C24	4310000360	MYLAR	50 F2D 103J
C25	4510003970	ELECTROLYTIC	50 MV 2R2 HW
C26	4510003910	ELECTROLYTIC	16 MV 47 HW
C27	4560000020	CERAMIC	D33Y5V 1E 104Z21
C28	4560000020	CERAMIC	D33Y5V 1E 104Z21
C29	4510003970	ELECTROLYTIC	50 MV 2R2 HW
C30	4510003890	ELECTROLYTIC	16 MV 10 HW
C31	4310000360	MYLAR	50 F2D 103J
C34	4510004140	ELECTROLYTIC	50 MV 10 HW
C35	4560000060	CERAMIC	D33Y5V 1H 104Z21
C36	4040000260	BARRIER	UZE 08X 104M
T1	5920000550	TRANSFORMER	TO-35
EP2	910035353	PCB	B 3506C

[MARKER UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1170000230	PHOTO IN	GP1S50
R1	7010003330	RESISTOR	ELR20J 270Ω
R2	7010003530	RESISTOR	ELR20J 10KΩ
C1	4560000020	CERAMIC	D33Y5V 1E 104Z21
EP1	910035450	PCB	B 3519

[DISP-A UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
DS1	5070000080	CRT	MG981F-IC

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

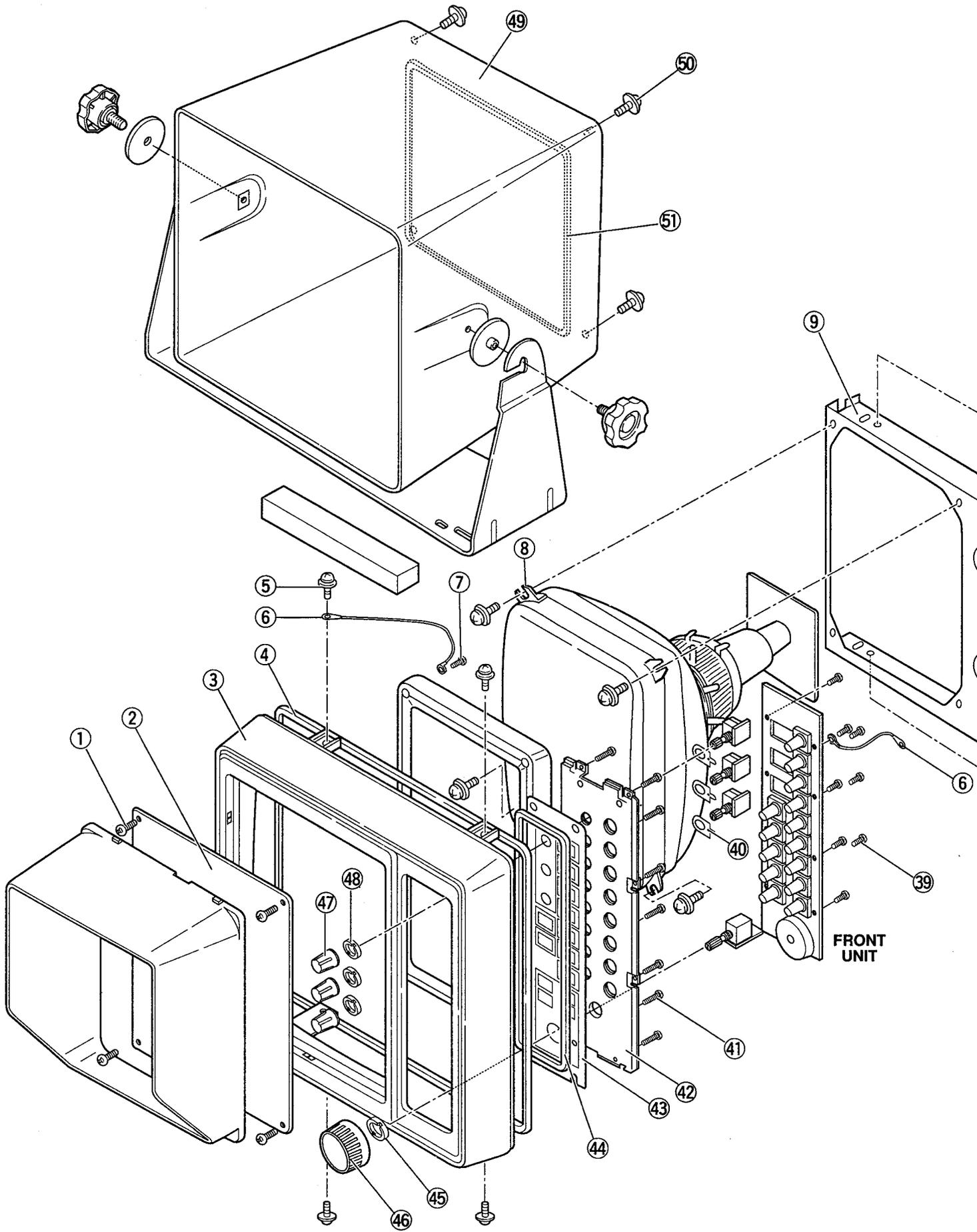
7-1 FRONT PANEL AND CHASSIS PARTS

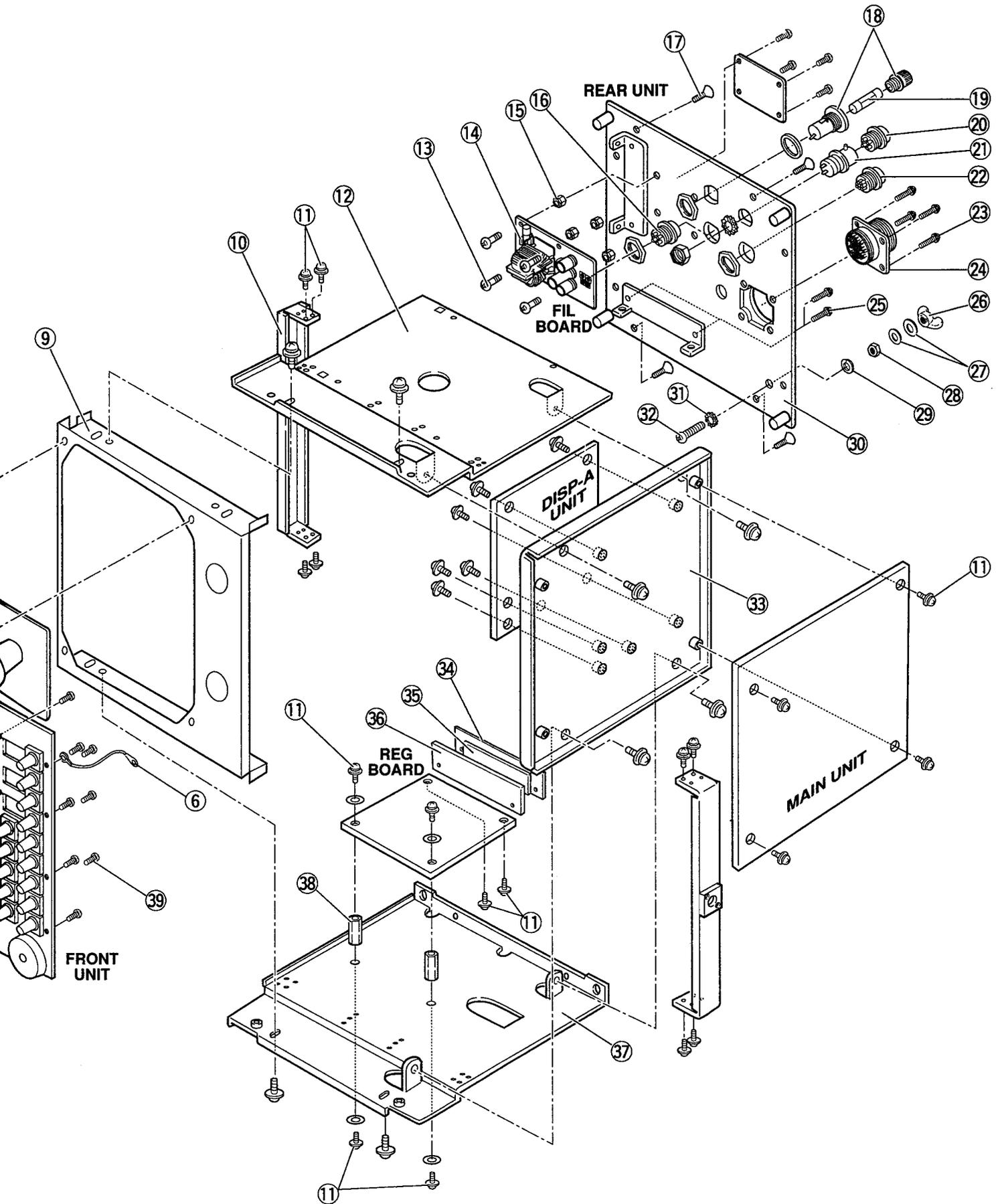
LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8820000740	Spacer screw	4
②	8010010631	749 Screen-1	1
③	8210008050	749 Front panel-1	1
④	8930019211	Front seal rubber-1	1
⑤	8810003390	Set screw (C) 4 x 8	4
⑥	8900003970	OPC-379	5
⑦	8810003960	Set screw (A) 2.6 x 5	4
⑧	8900002890	CRT harness	1
⑨	8010010420	749 Sub chassis	1
⑩	8010010340	749 Bracket holder	2
⑪	8810003360	Set screw (C) 3 x 6	18
⑫	8010010400	Top side chassis	1
⑬	8810003760	Icom screw (C) 10	4
⑭	5210000060	Fuse FGB 5A	1
⑮	8930006070	Half thread spacer (B)	4
⑯	6510003390	Connector B03B-EH-S	1
⑰	8810002510	Screw FH M3 x 6 SUS	4
⑱	5220000140	Fuse holder FH-042	1
⑲	5210000070	Fuse FGB 10A	1
⑳	6510007560	Connector FM14-4S	1
㉑	6510011420	Connector 31 - 10	1
㉒	6510012160	Connector FM14-8S	1
㉓	8810006360	Set screw (A) 348 SUS	4
㉔	8900003880	Connector OPC-378	1
㉕	8010006350	Set screw (A) 3 x 20 SUS	2
㉖	8830000370	Wing nut M5 SUS	1

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
㉗	8850000180	Flat washer M5 SUS	2
㉘	8830000250	Nut M5 SUS	1
㉙	8850000500	Spring washer M5 SUS	1
㉚	8010010181	749 Rear panel-1	1
㉛	8850000600	Star washer M5 SUS	1
㉜	8810000700	Screw (PH) M5 x 20 SUS	1
㉝	8010010440	Right side chassis	1
㉞	8930019310	Radiator sheet	1
㉟	8930001410	TR sponge (L)	1
㊱	8930019390	FET-holder	1
㊲	8010010381	Bottom side chassis-1	1
㊳	8930000520	Thread spacer (B)	2
㊴	8810001280	Tapping screw (PH) B1 2.6 x 6	8
㊵	8860000820	1188 Grounding lug	3
㊶	8810001290	Tapping screw (PH) B1 2.6 x 8	8
㊷	8010014150	1188 Switch board panel	1
㊸	8310026930	1188 Switch sheet	1
㊹	8930019240	Key board seal rubber	1
㊺	8830000050	VR nut (B)	1
㊻	8610006810	Knob-63 (B)	1
㊼	8610008320	Knob-163 (A)	3
㊽	8830000550	VR nut (E)	3
㊾	8010010610	749 case	1
㊿	8810006320	Set screw (C) 4 x 10 SUS	4
①	8930019200	Rear panel seal	1

Screw abbreviations

 PH : Pan head FH : Flat head
 SUS : Stainless



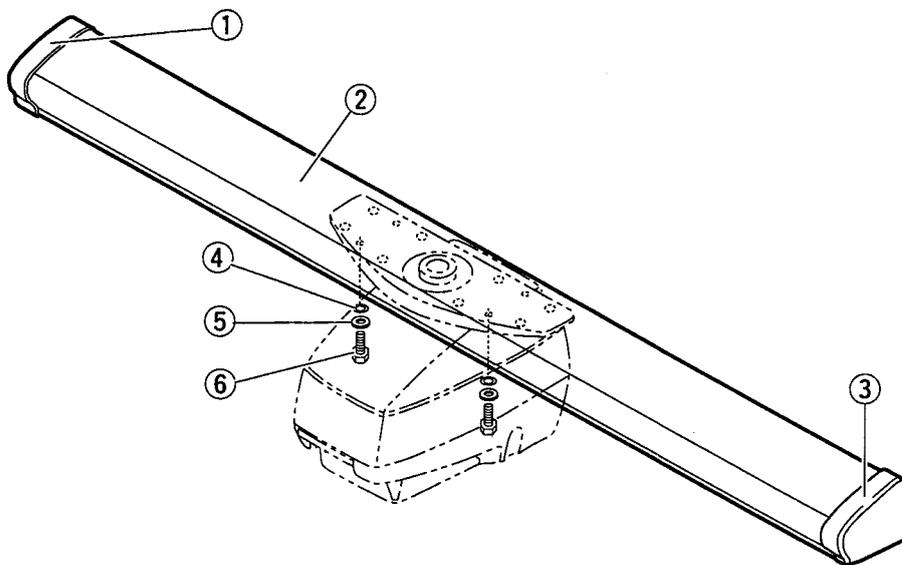


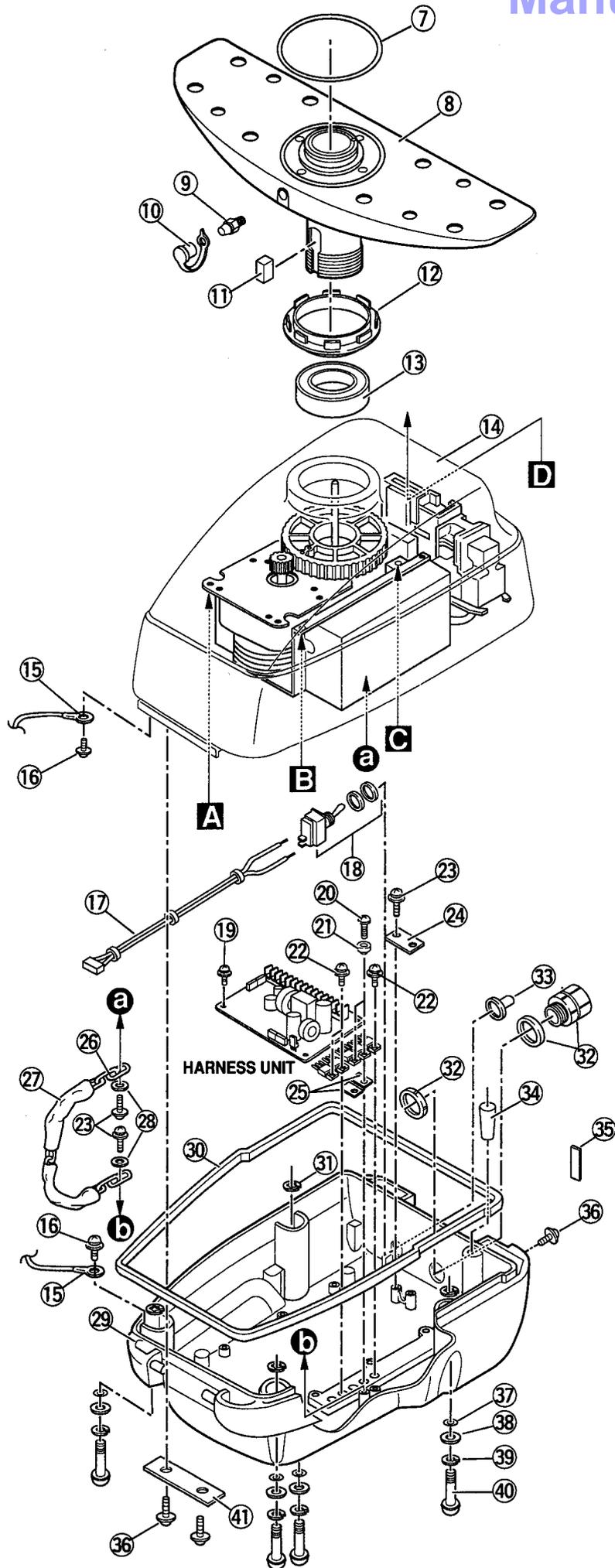
7-2 SCANNER PARTS

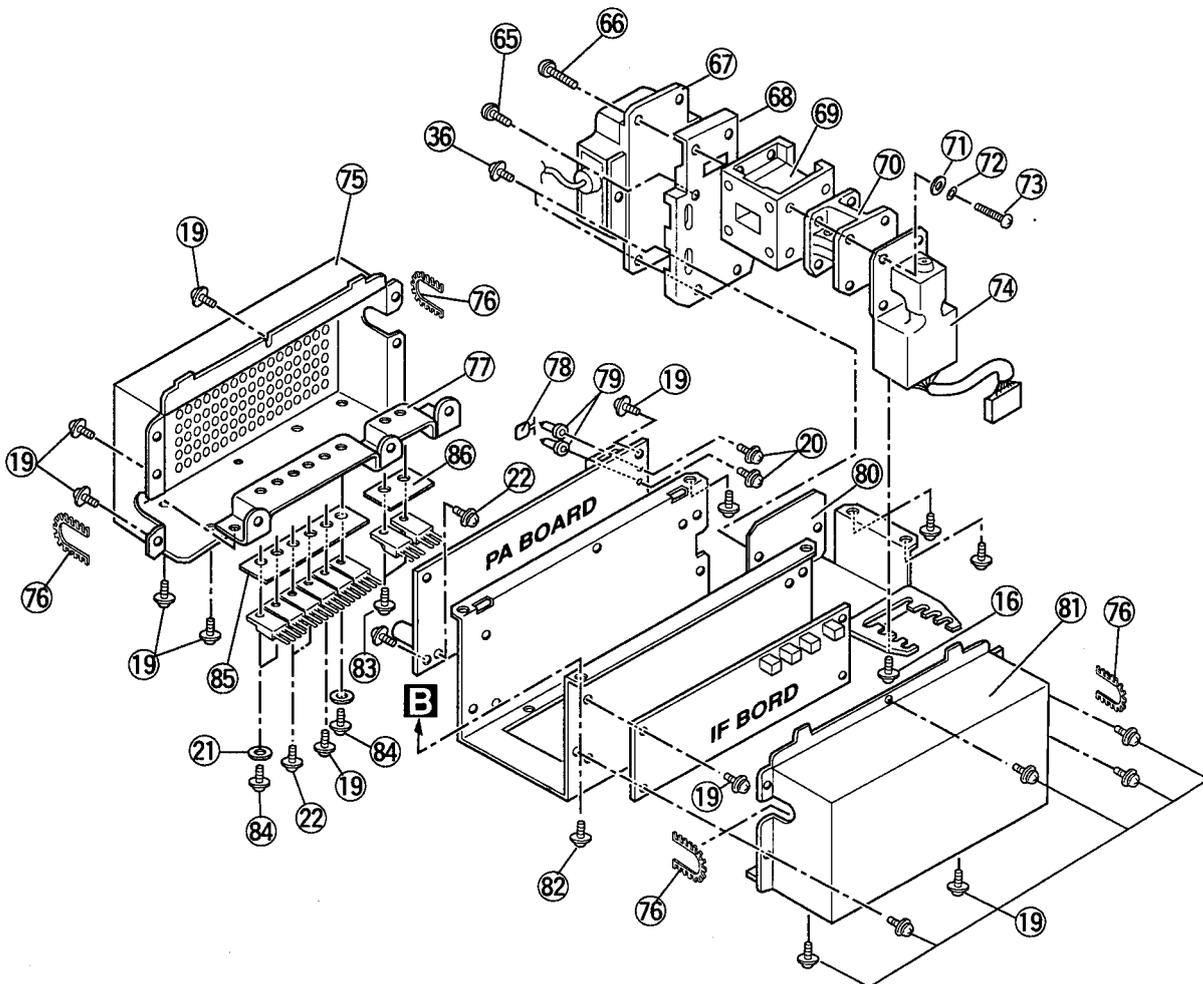
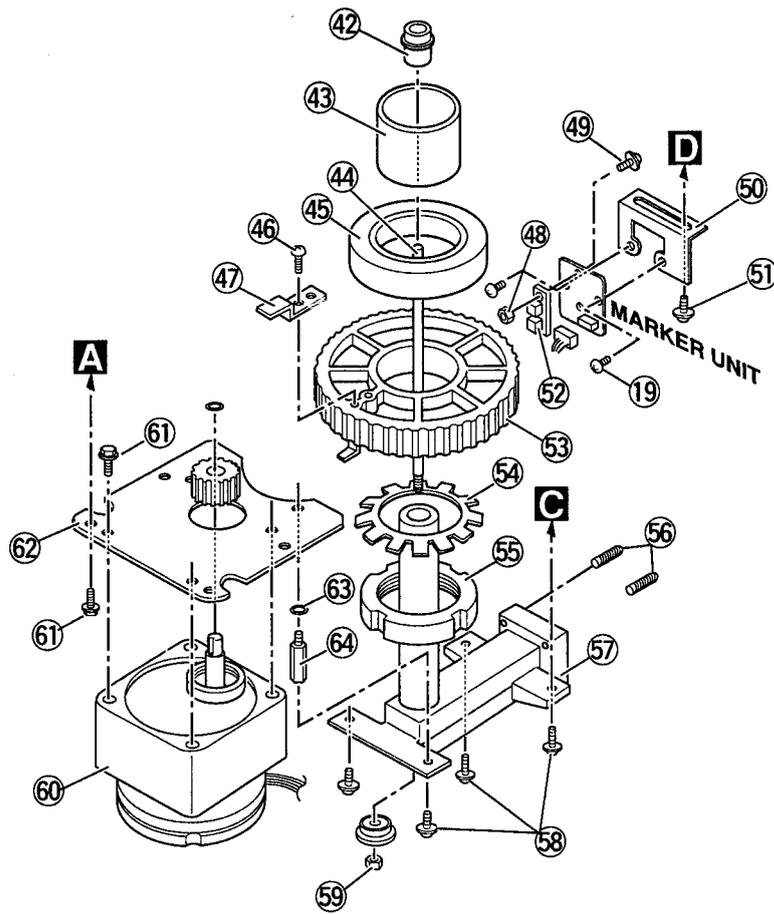
LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8010013040	1188 Radome cap (R)	1
②	8010013050	1188 Radome	1
③	8010013030	1188 Radome cap (L)	1
④	8930026770	O ring JIS P8	4
⑤	8850000210	Flat washer M8 SUS	4
⑥	8810007460	Hexagon Bolt M8 x 18 SUS	4
⑦	8930026760	O ring IN80 NBR-40	1
⑧	8930024650	1188 Antenna holder	1
⑨	8950002660	Grease nipples A-6 x 0.75 NI	1
⑩	8950002810	Grease nipples cap M6	1
⑪	8930025770	1188 key	1
⑫	8310026920	1188 Holder seal	1
⑬	8950002770	Bearing 6009ZZ-C3BN	1
⑭	8010013070	1188 U-scanner body	1
⑮	8900000960	Grounding lead OPC-094	1
⑯	8810003390	Set screw (C) M4 x 8	6
⑰	8600029540	Connector P01CH	1
⑱	2260001280	Switch AJ41100	1
⑲	8810003360	Set screw (C) 3 x 6	28
⑳	8810003160	Set screw (A) 3 x 6	4
㉑	6910000281	B24 Isolating bush	5

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
㉒	8810003370	Set screw (C) 3 x 8	5
㉓	8810006310	Set screw (C) 4 x 16 SUS	4
㉔	8930026060	1188 Cord plate	1
㉕	8950000230	Isolating sheet T045A T=0.4	2
㉖	8950002840	1188 chain	1
㉗	8950002850	1188 tube	2
㉘	8850000040	Binding washer	2
㉙	8010013060	1188 L-Scanner body	1
㉚	8930025290	1188 Scanner rubber seal	1
㉛	8860000790	E ring M7	4
㉜	6910005010	SCL-14B	1
㉝	6910004900	Switch cover cap WD1911	1
㉞	8930026890	Bio-silico N-12-BL	1
㉟	8310028850	1188 ON-OFF seal (AC)	1
㊱	8810006320	Set screw (C) 4 x 10 SUS	7
㊲	8930026770	O ring JIS P8	4
㊳	8850000210	Flat washer M8 SUS	4
㊴	8850000520	Spring washer M8 SUS	4
㊵	8820000730	1188 Cap screw	4
㊶	8930024710	1188 Hinge plate	1

Screw abbreviations SUS: Stainless NI: Nickel







7-3 SCANNER INSIDE PARTS

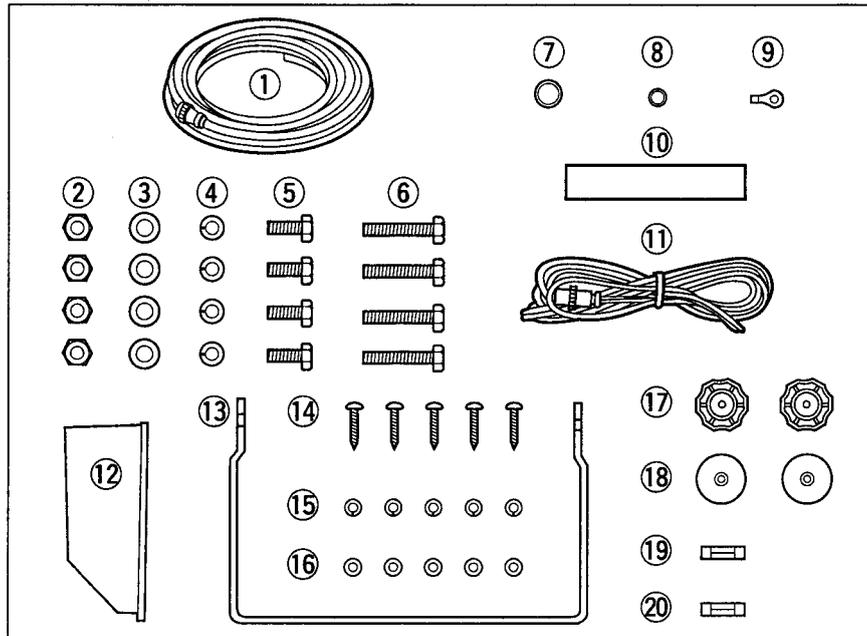
LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
④②	8930024620	1188 Insulator	1
④③	8930024690	Bearing spacer (A)	1
④④	8930025280	1188 Center conductor	1
④⑤	8950002770	Bearing 6009ZZC3B3N	1
④⑥	8810001350	Tapping screw (PH) B1 3 x 6	1
④⑦	8930024660	1188 Sensor plate	1
④⑧	8830000100	Nut M3	2
④⑨	8810003710	Set screw (A) 3 x 8	2
⑤⑩	8010012470	1188 Sensor angle	1
⑤①	8810003860	Set screw (A) 4 x 8	2
⑤②	1170000230	GP1S50	1
⑤③	8930025310	1188 B-Gear	1
⑤④	8850001290	Washer AW09X	1
⑤⑤	8830000800	Nut AN09	1
⑤⑥	8860000810	Spring pin (wave-type) 4 x 14 SUS	2
⑤⑦	8930024750	1188 Feeder WG.	1
⑤⑧	8810005980	Set screw (C) 4 x 15	4
⑤⑨	8830000100	Nut M3	1
⑥⑩	8930026430	Motor DRG-938-001B	1
⑥①	8810007680	Set screw (I) 6 x 12 SUS	8
⑥②	8930024670	1188 Mounting plate	1
⑥③	8850000430	Spring washer M4 NI	2
⑥④	8930025780	Standoff (J)	2

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
⑥⑤	8810006580	Set screw (A) 4 x 10 SUS	2
⑥⑥	8810007620	Set screw (C) 4 x 20 SUS	2
⑥⑦	6910001880	Magnetron MSF1421B	1
⑥⑧	8010013080	1188 Corner WG.	1
⑥⑨	6910001860	Circulator NJC3901D	1
⑦⑩	6910004850	Limiter NJS6930	1
⑦①	8850000170	Flat washer M4 SUS	4
⑦②	8850000490	Spring washer M4 SUS	4
⑦③	8810007660	Screw (PH) M4 x 40 SUS	1
⑦④	6910004870	Frontend NST 1946	1
⑦⑤	8010013820	1188 L-shield cover	1
⑦⑥	6910002320	Edge cover KG-012 L49	4
⑦⑦	8410001850	Heatsink	1
⑦⑧	4560000010	Capacitor C31 0.1 50V	1
⑦⑨	2610000340	ST-A2	2
⑧⑩	8930024680	1188 Main plate	1
⑧①	8010013570	1188 R-Shield	1
⑧②	8810003400	Set screw (C) 4 x 10	6
⑧③	8810003380	Set screw (C) 3 x 10	2
⑧④	8810003170	Set screw (A) 3 x 8	3
⑧⑤	8930026000	A-sheet	1
⑧⑥	8930026010	B-sheet	1

Screw abbreviations

PH: Pan head SUS: Stainless
NI : Nickel

7-4 SUPPLIED ACCESSORIES



LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8900003870	OPC-377 system cable	1
②	8830000270	Nut M 10 SUS	4
③	8850001150	Flat washer M 10 SUS	4
④	8850001140	Spring washer M 10 SUS	4
⑤	8810006420	Hexagon bolt M 10 x 25 SUS	4
⑥	8810006380	Hexagon bolt M 10 x 50 SUS	4
⑦	8930010000	Connector cover	1
⑧	8930019500	BNC-R connector cap	1
⑨	6510012870	Cable lug R5.5-6	1
⑩	8930019690	Sponge (CK)	1
⑪	8900002810	OPC-275 DC power cable	1
⑫	8010010601	749 hood-1	1
⑬	8010010390	Bracket	1
⑭	8810001500	Screw PH M 6 x 30 SUS	5
⑮	8850000510	Spring washer M 6 SUS	5
⑯	8850000190	Flat washer M 6 (6 x 13 x 1.0) SUS	5
⑰	8820000610	Mounting screw knob G2-6-20	2
⑱	8930015280	Bracket rubber	1
⑲	5210000070	Fuse FGB 10A	1
⑳	5210000060	Fuse FGB 5A	1

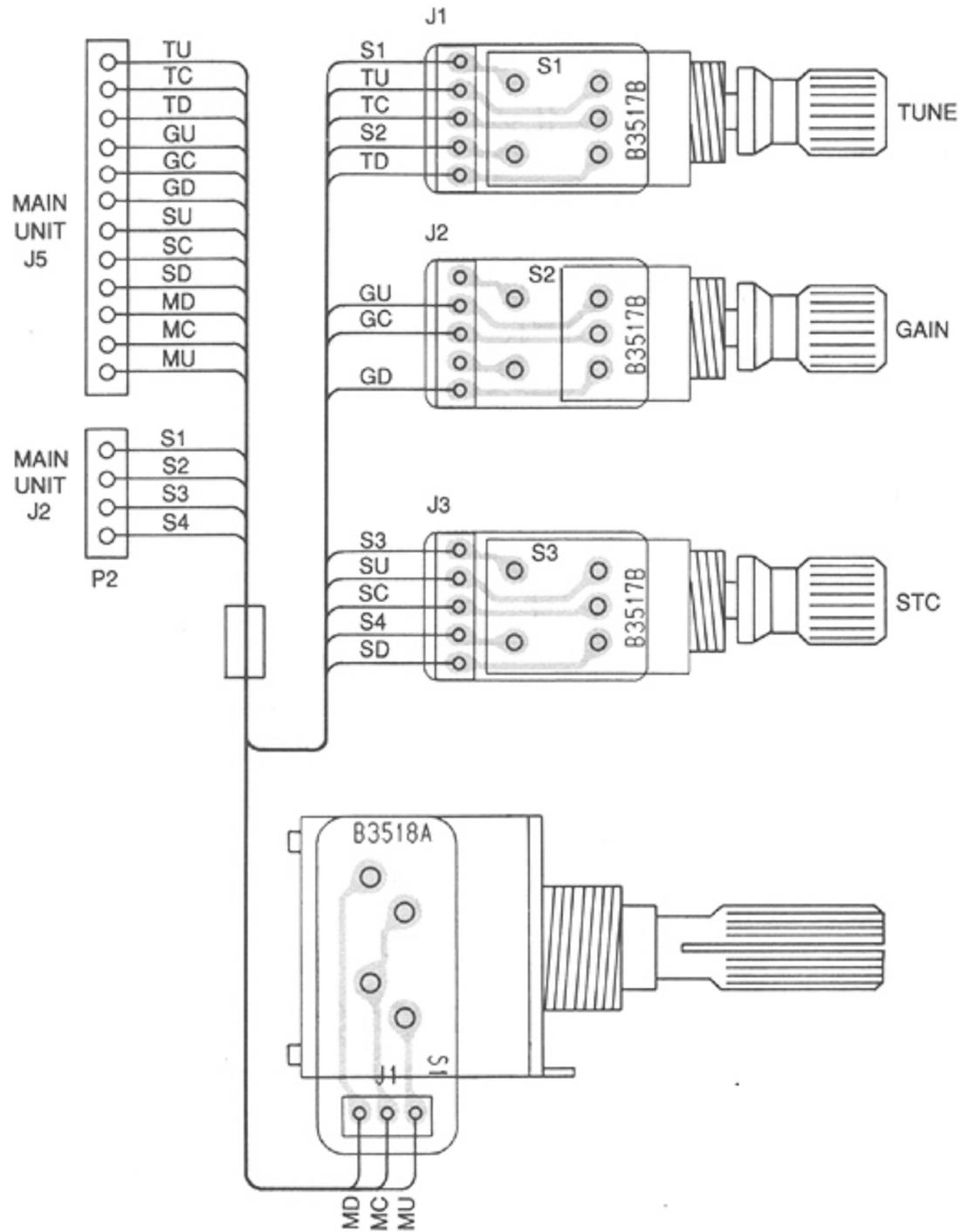
SCREW ABBREVIATIONS

PH: Pan head SUS: Stainless

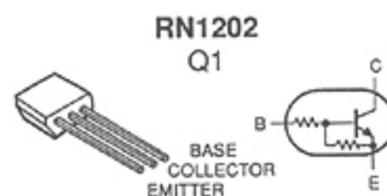
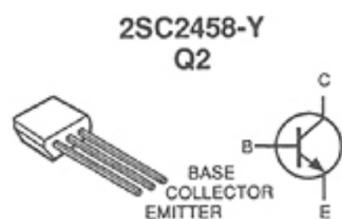
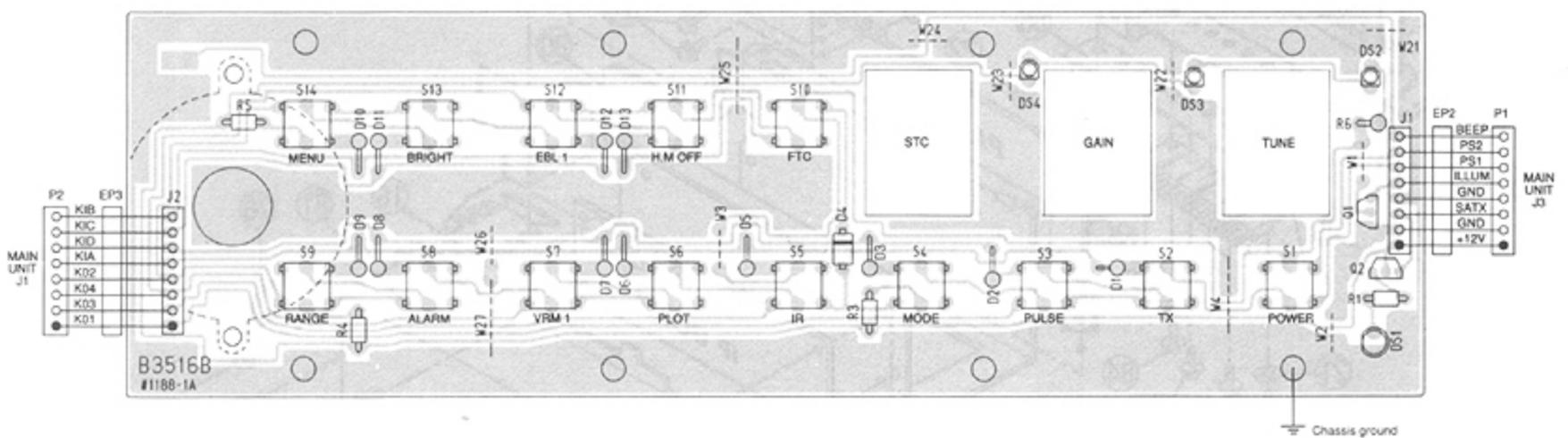
SECTION 8 BOARD LAYOUTS

8-1 FRONT UNIT (VR BOARD, SENSOR BOARD AND SW BOARD)

• VR BOARD (TOP VIEW)

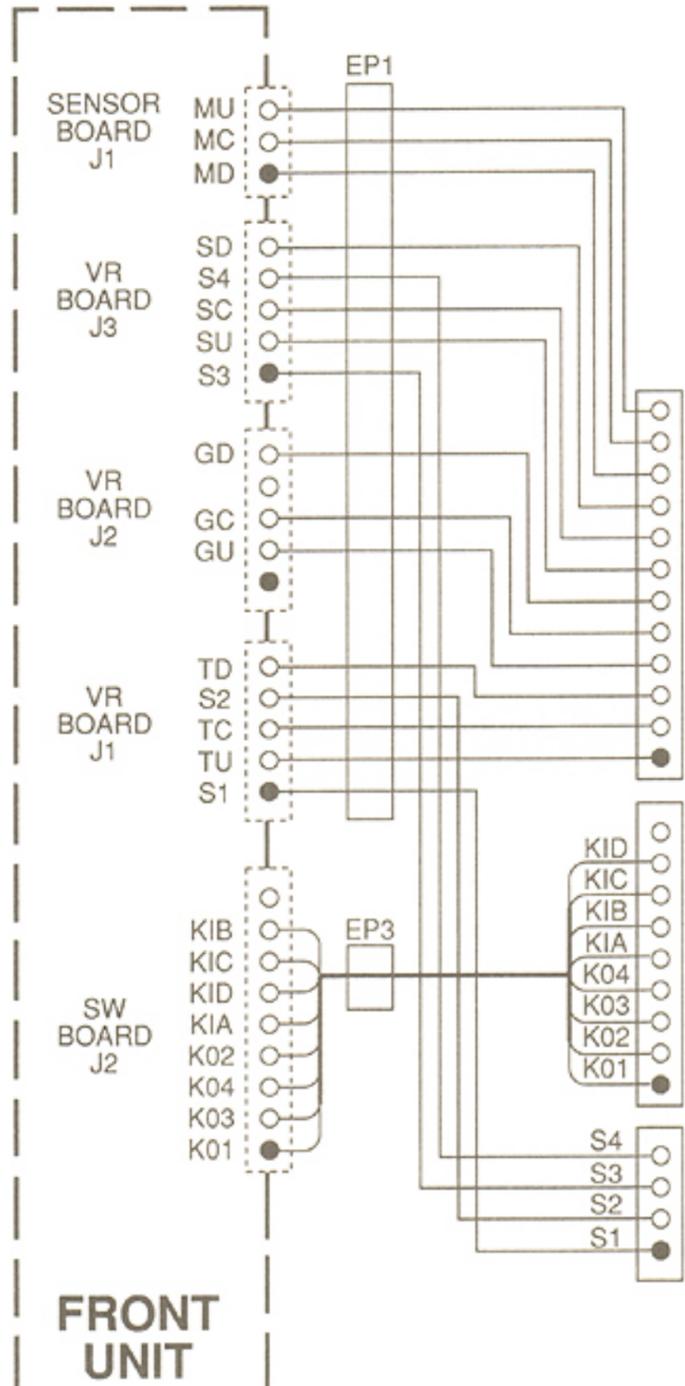


• SW BOARD (TOP VIEW)

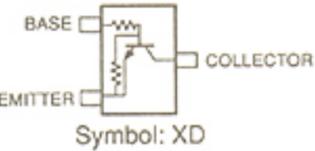


8-2 MAIN UNIT

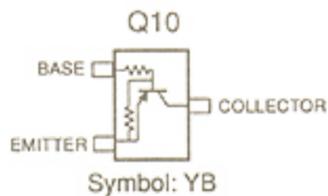
• MAIN UNIT (TOP VIEW)



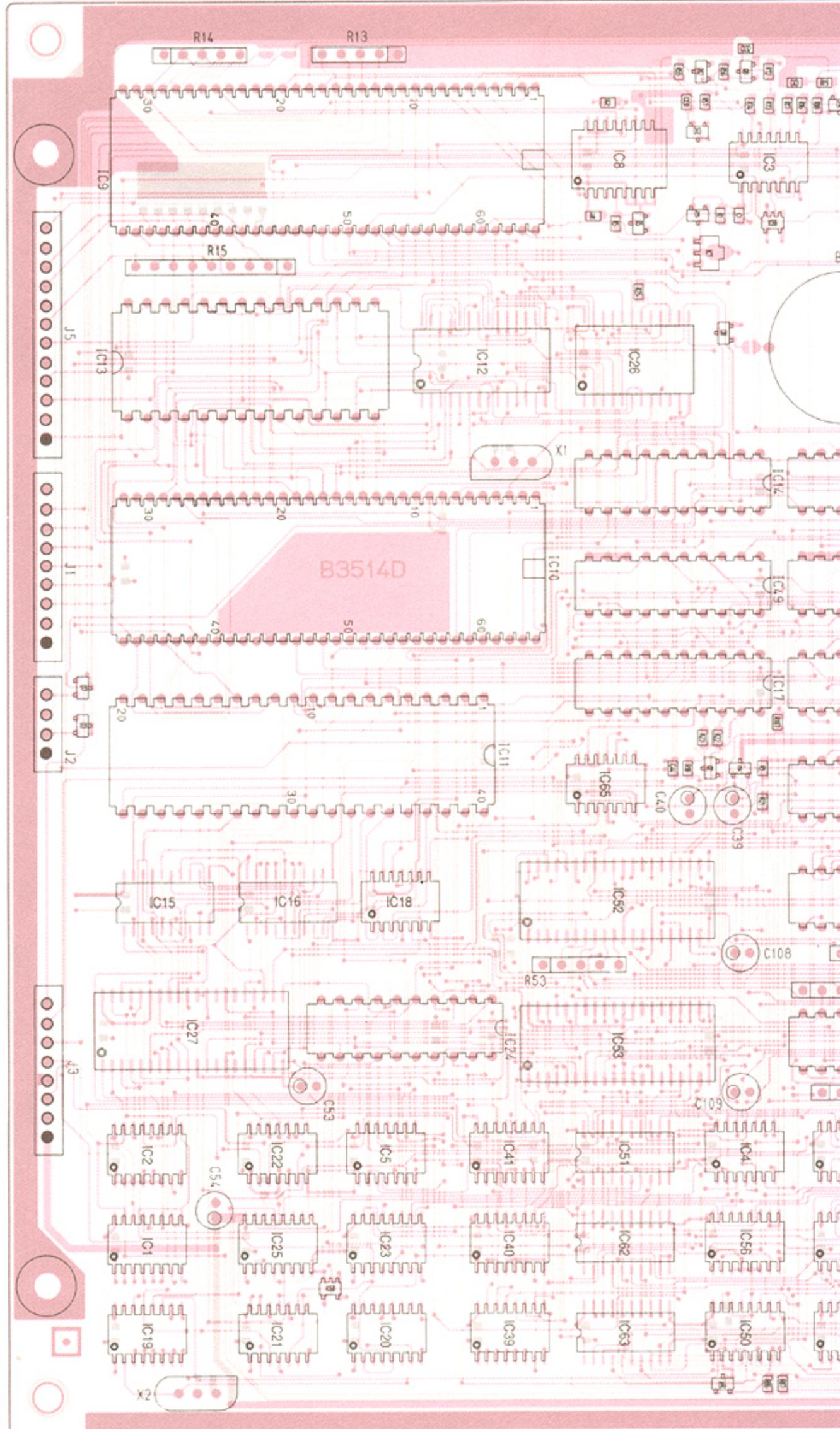
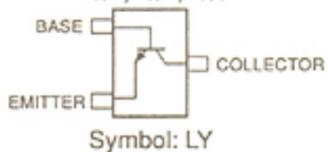
RN1404
 Q3 ~ Q5, Q7 ~ Q9



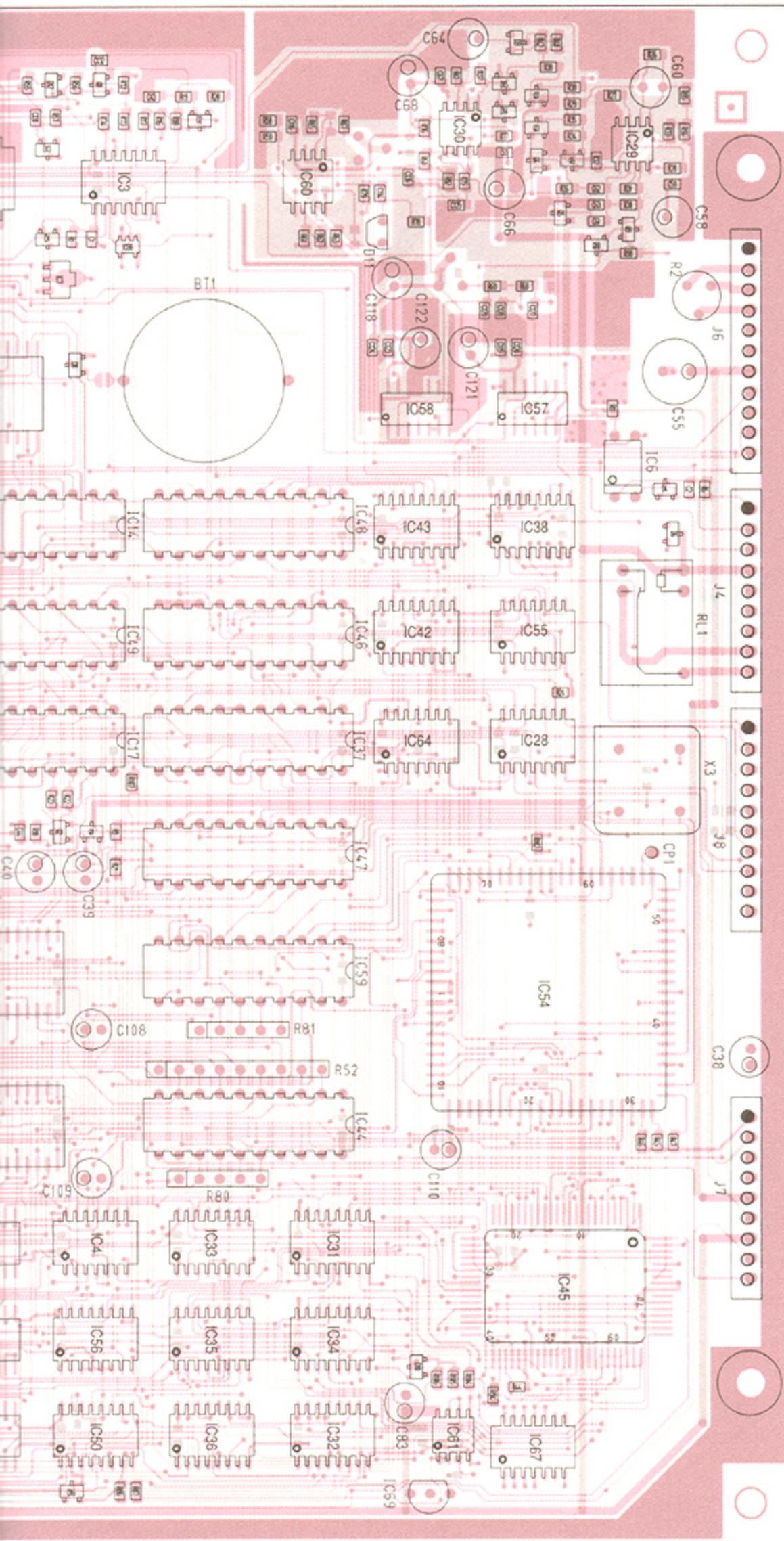
RN2402
 Q10



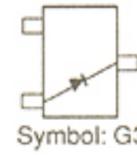
2SC2712-Y
 Q1, Q2, Q6



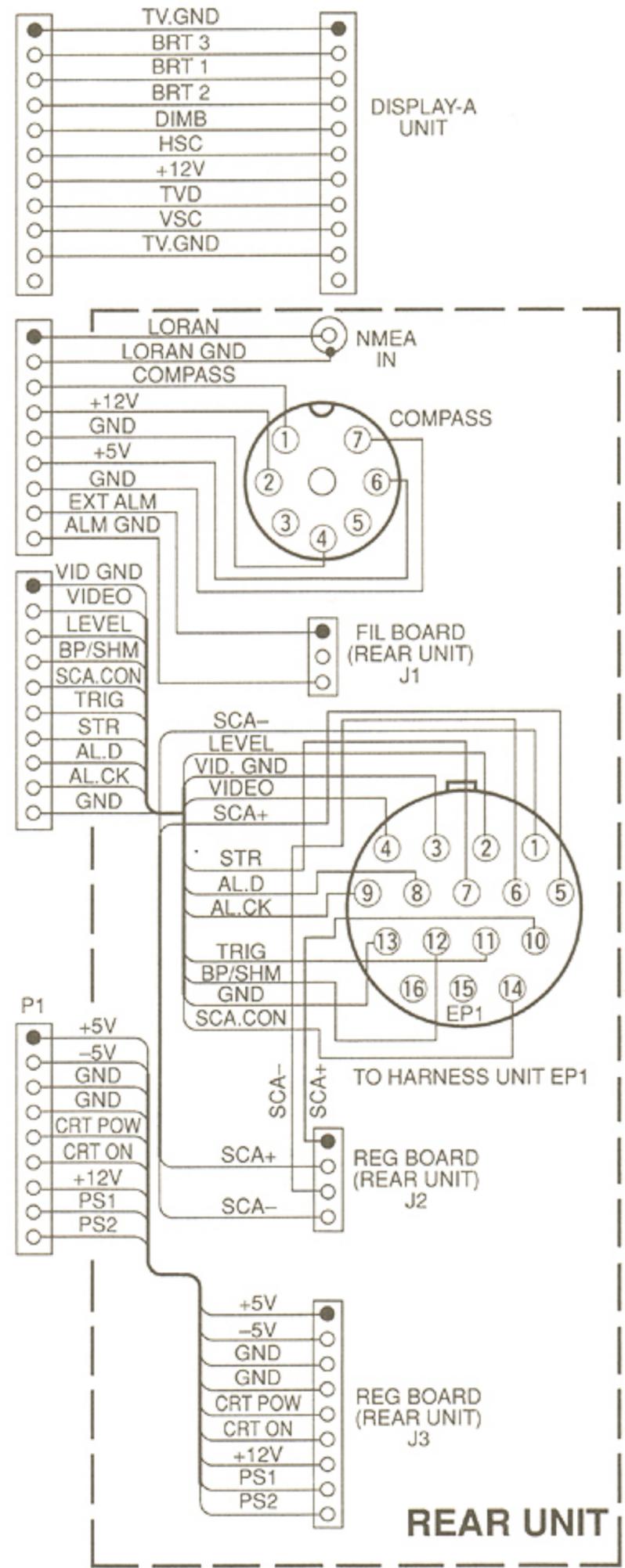
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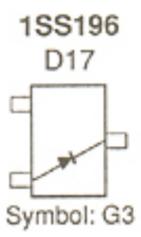
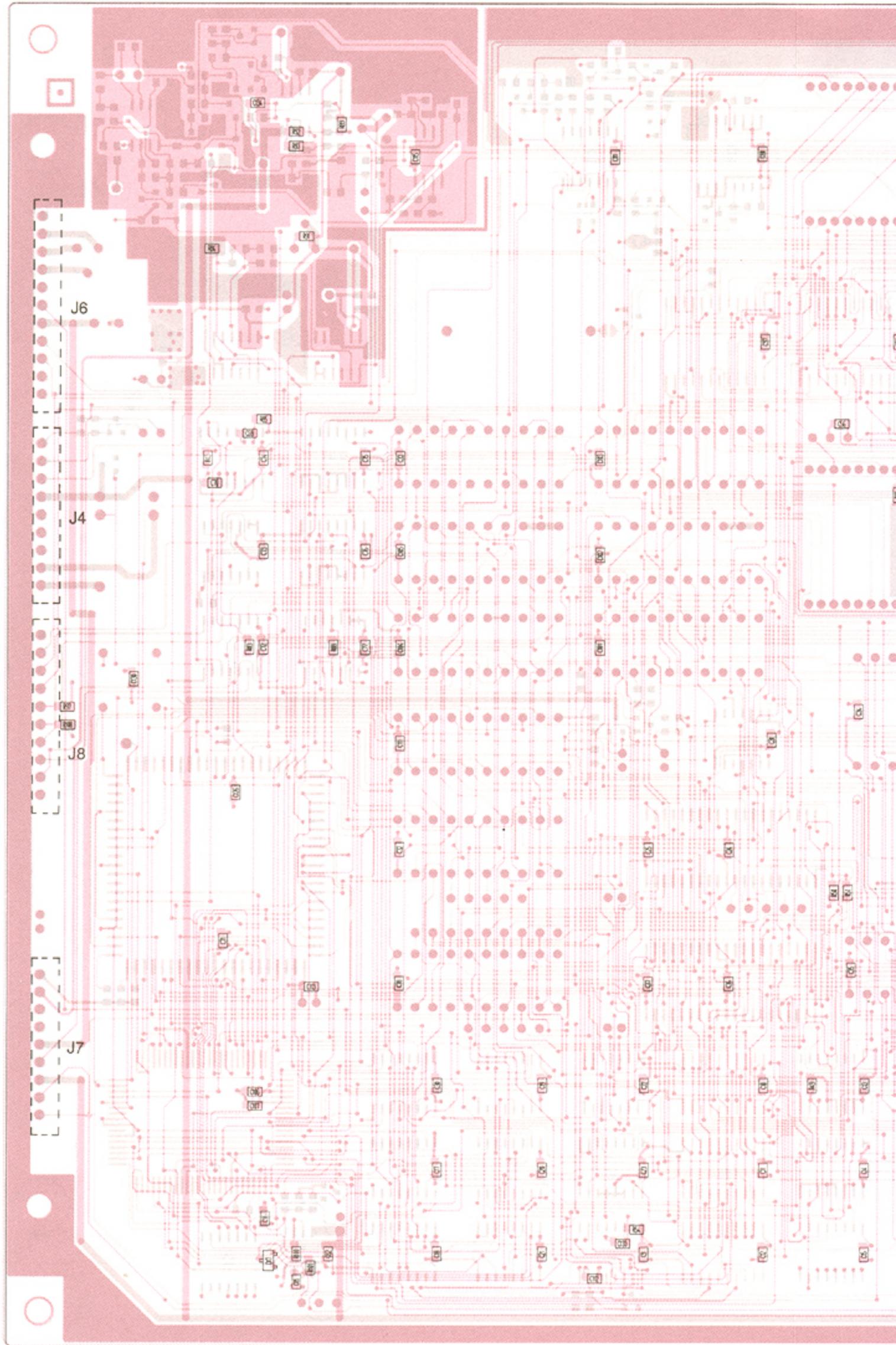
1SS196
D1~D10, D13 ~ D16

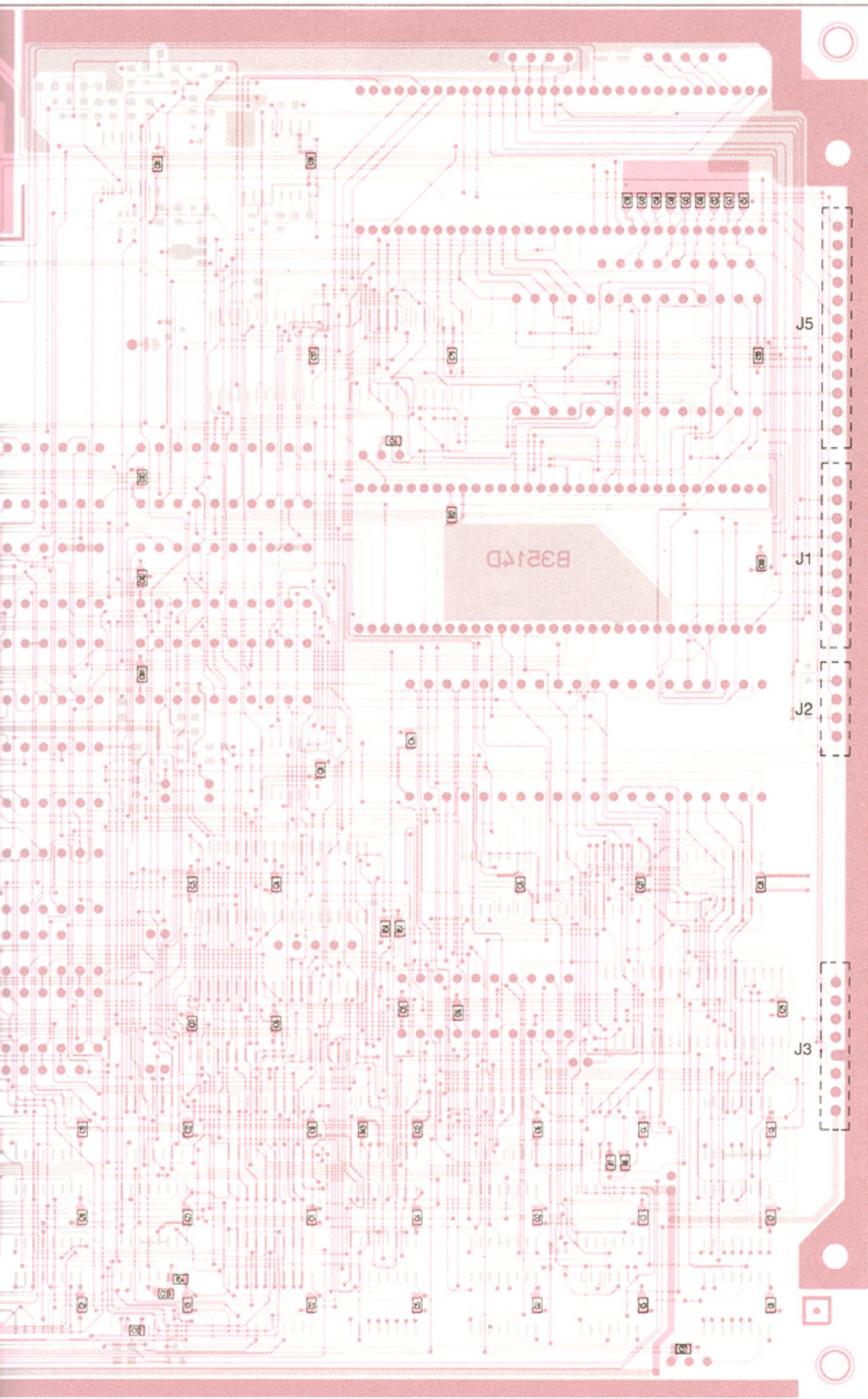


RD6.2M-T2B2
D12



• MAIN UNIT (BOTTOM VIEW)

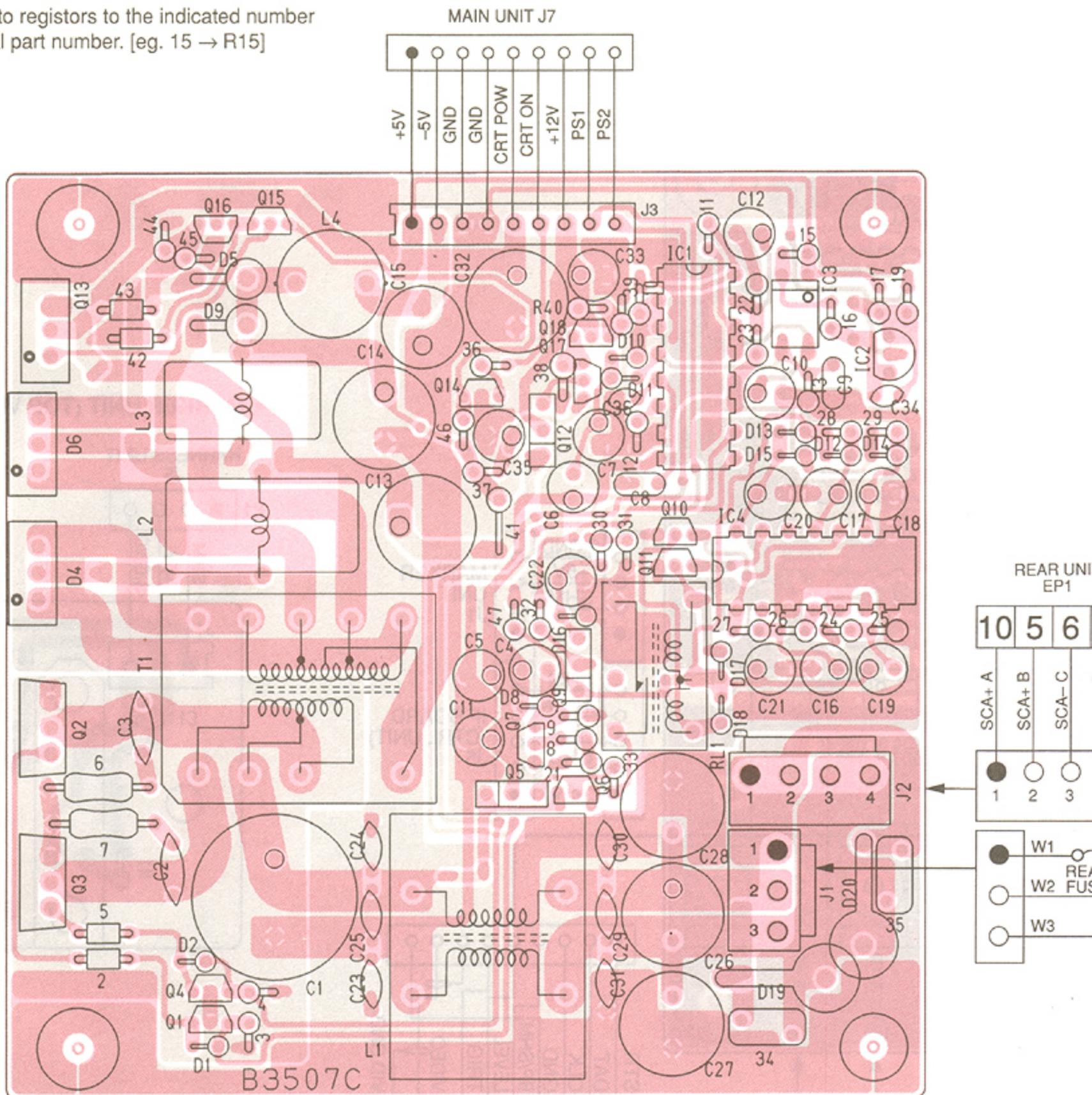




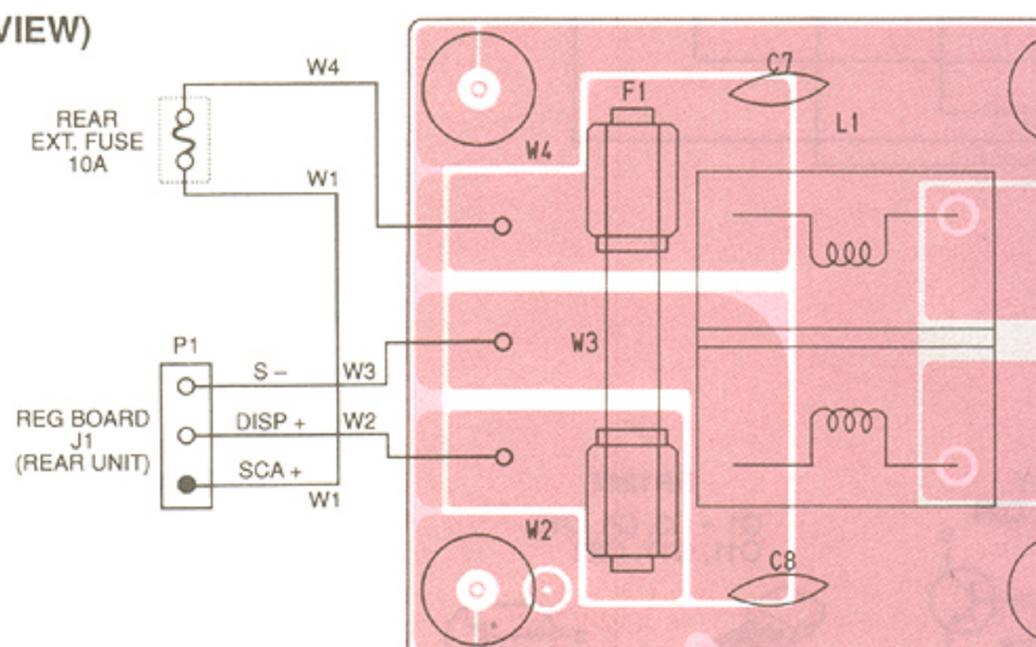
8-3 REAR UNIT (REG BOARD AND FIL BOARD)

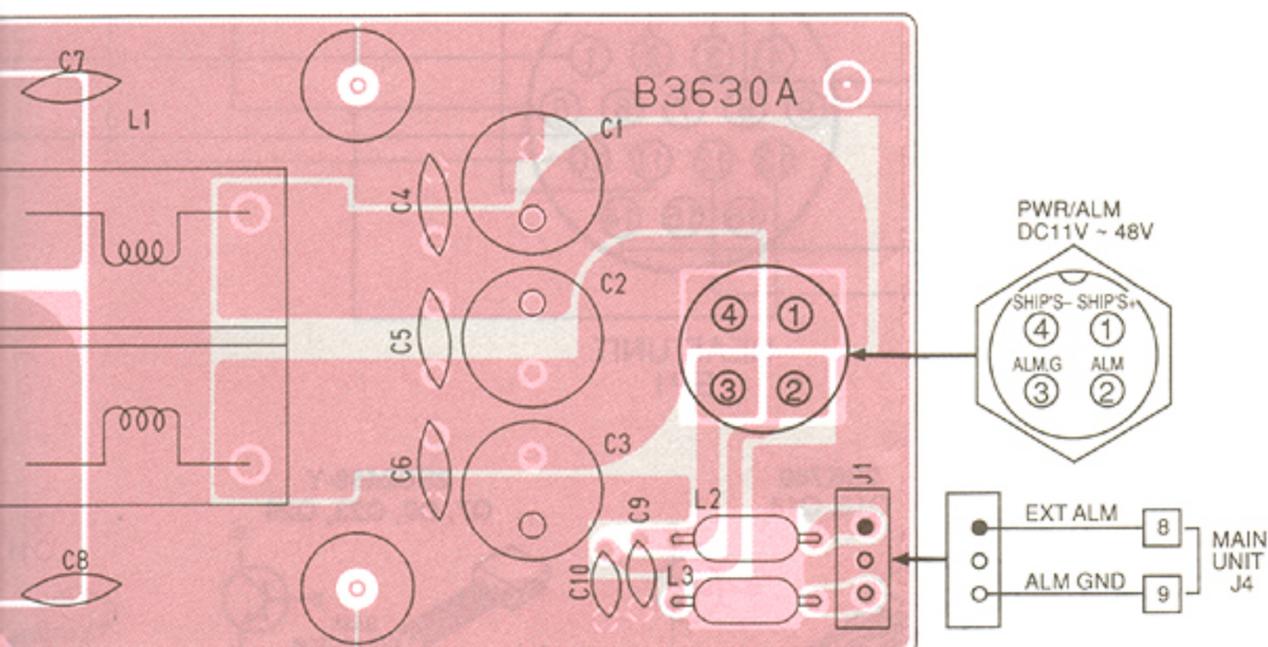
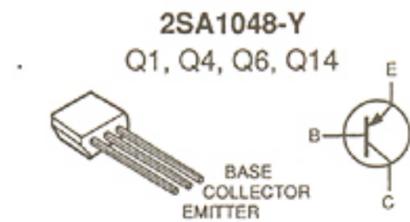
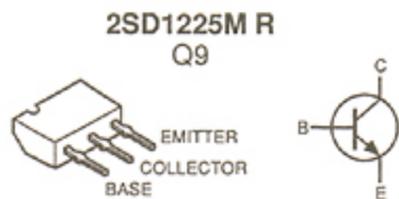
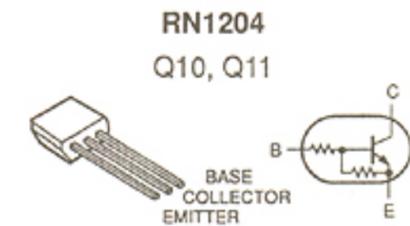
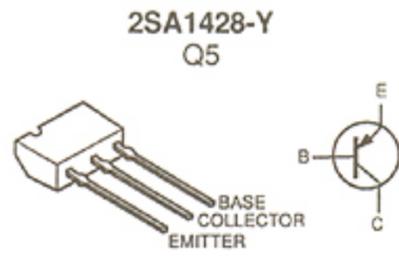
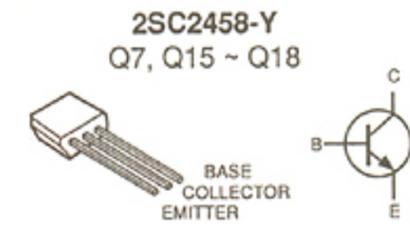
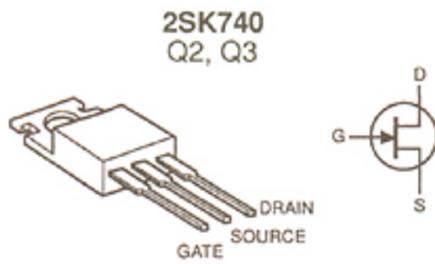
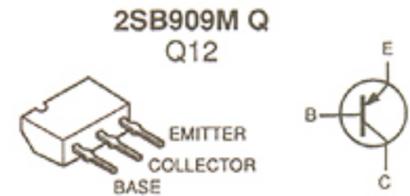
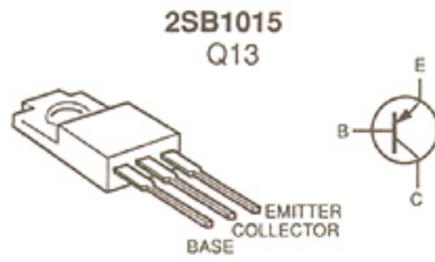
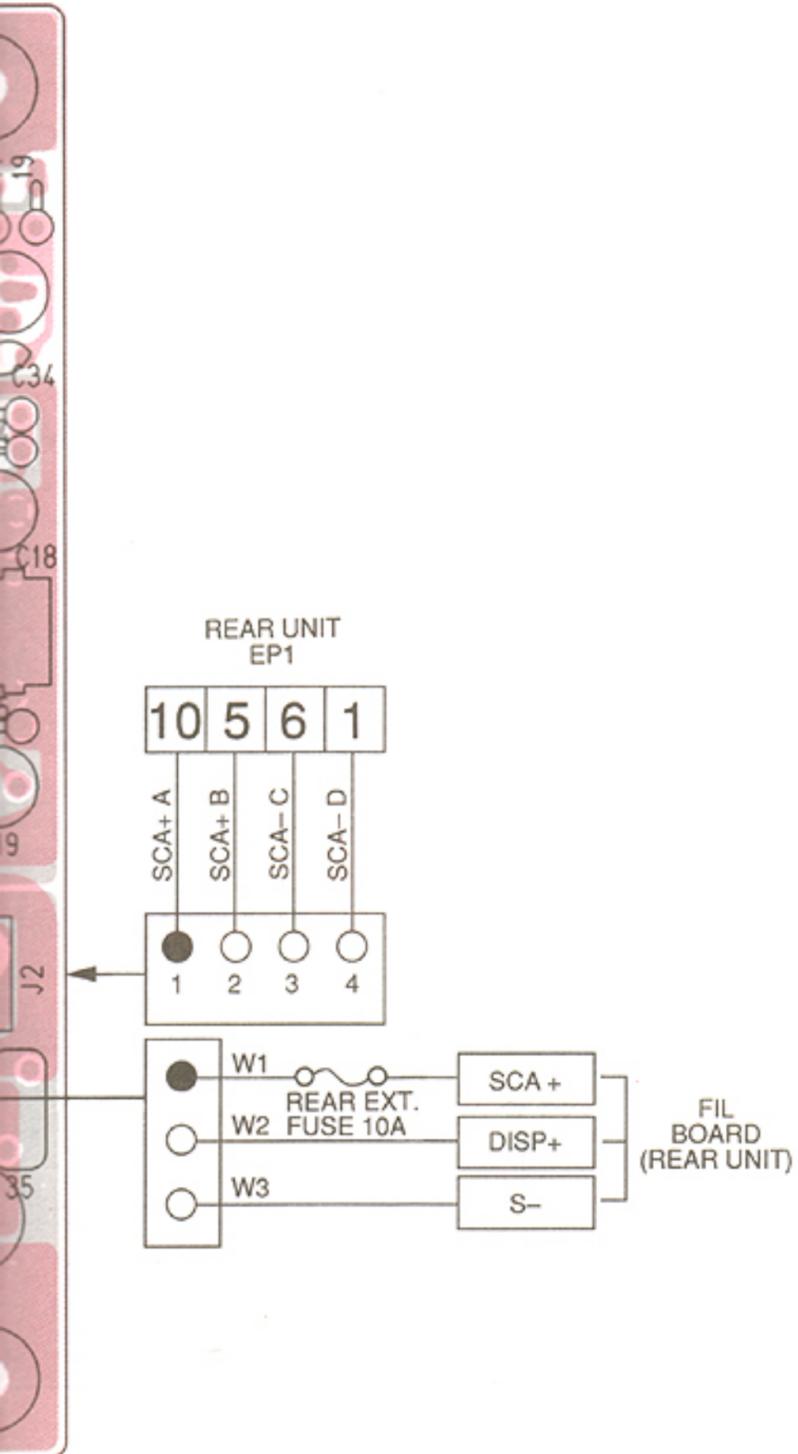
• REG BOARD (TOP VIEW)

NOTE: Add "R" to registers to the indicated number for actual part number. [eg. 15 → R15]



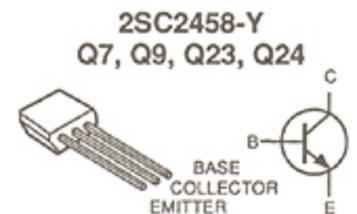
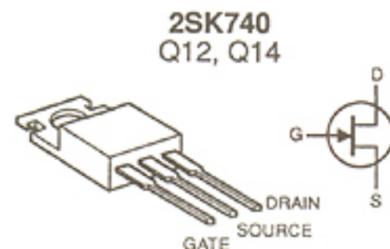
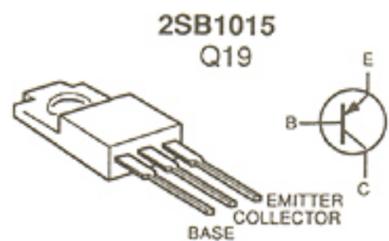
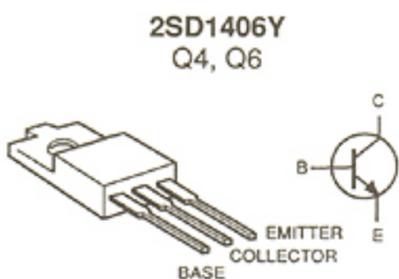
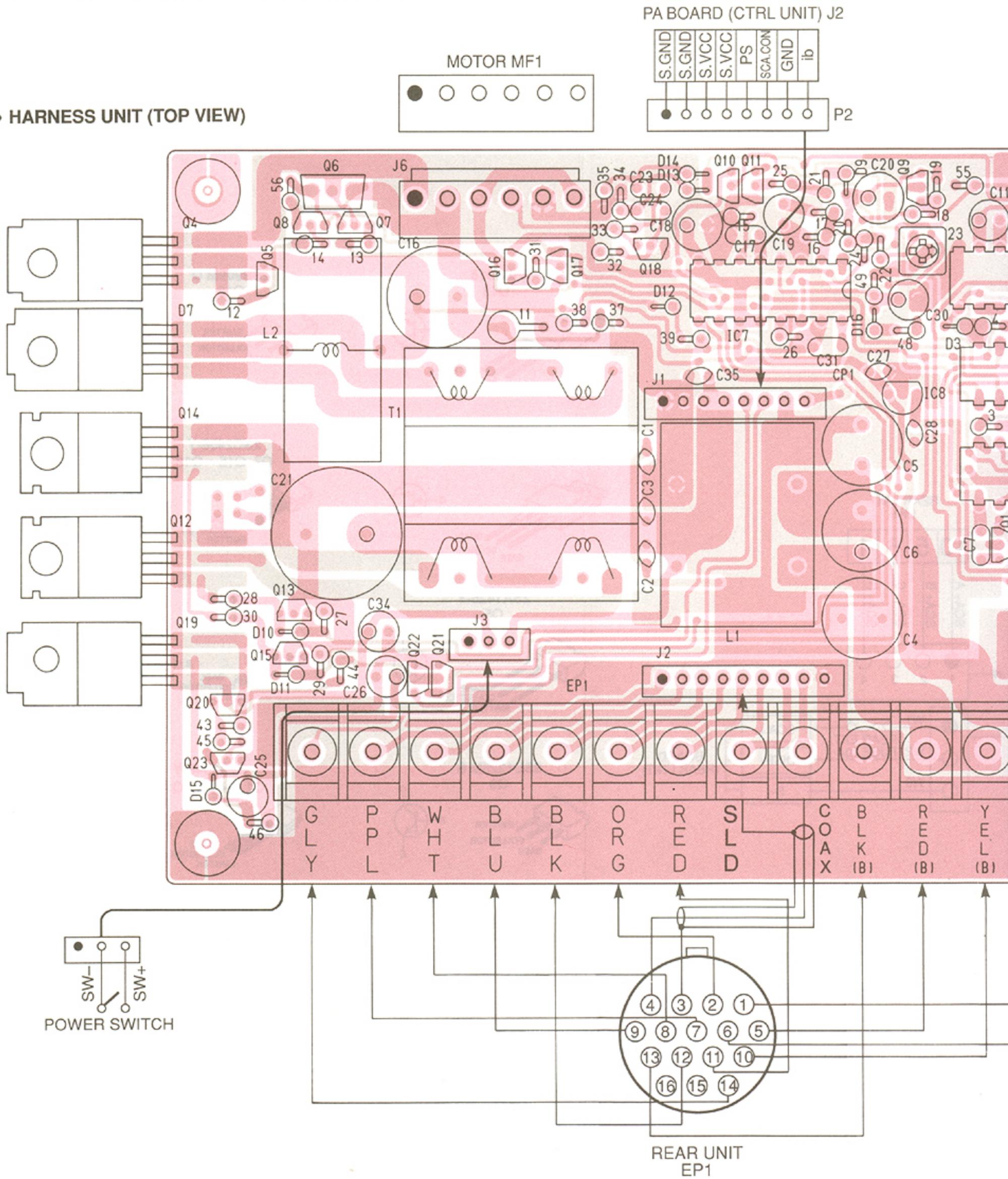
• FIL BOARD (TOP VIEW)

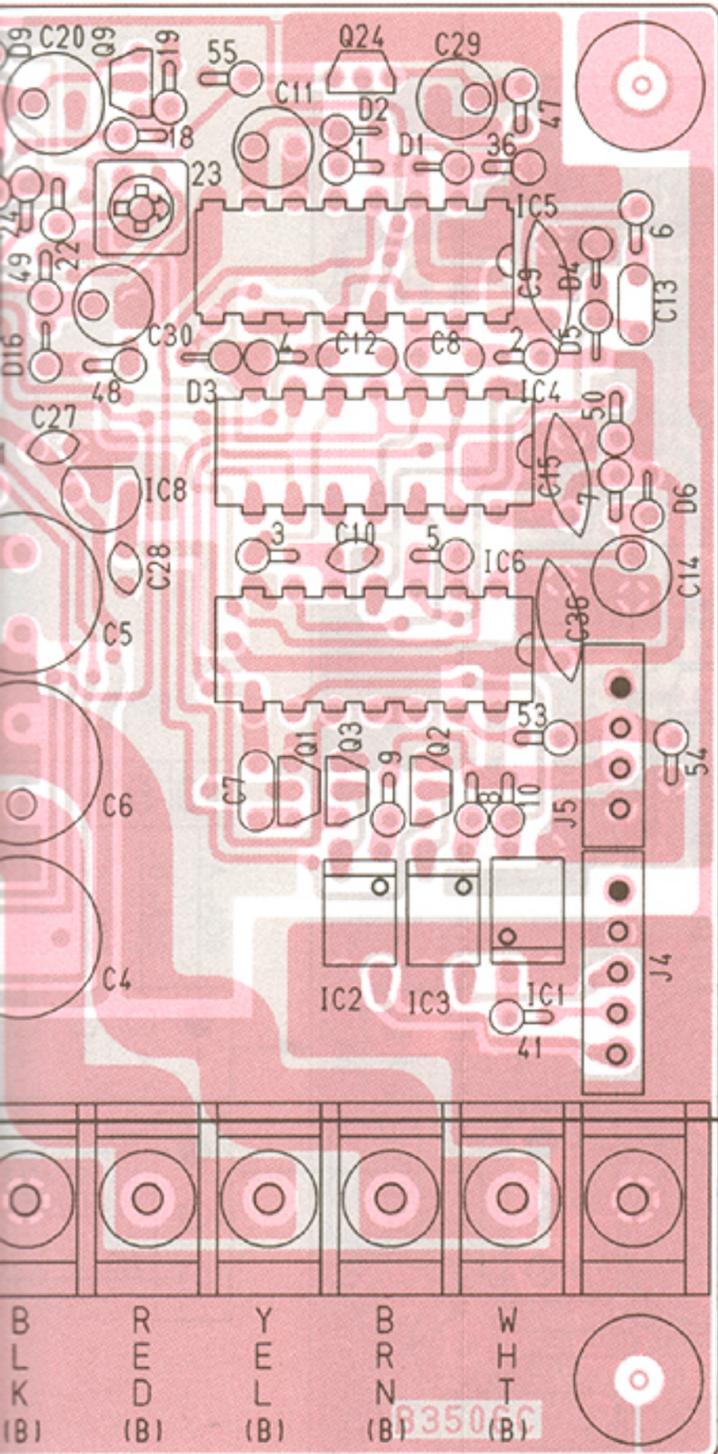




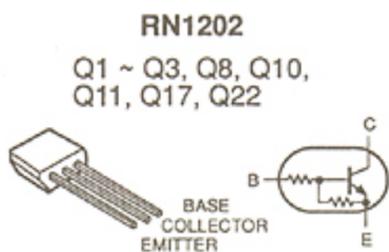
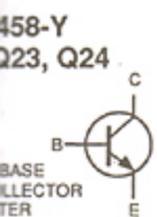
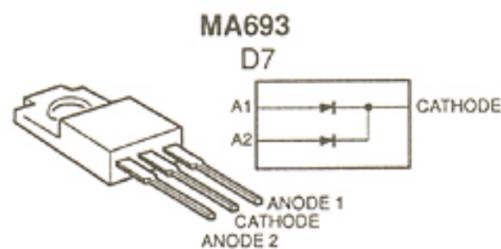
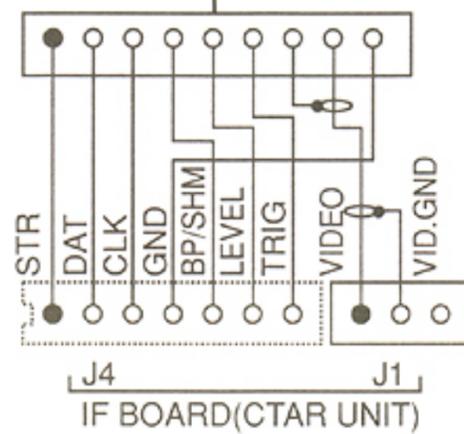
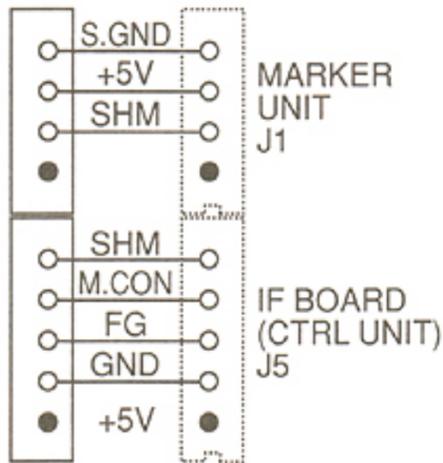
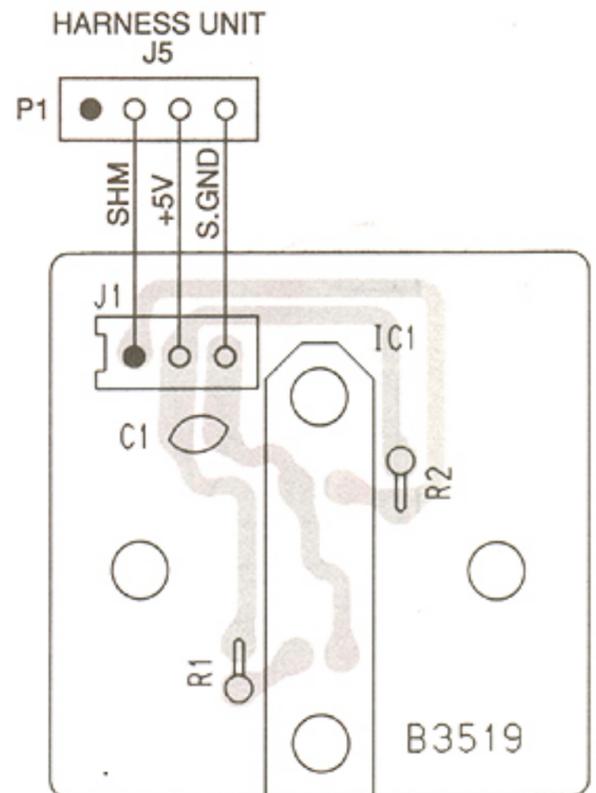
8-4 HARNESS UNIT AND MARKER UNIT

• HARNESS UNIT (TOP VIEW)



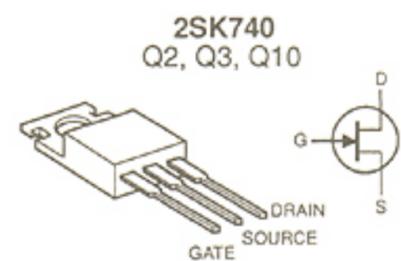
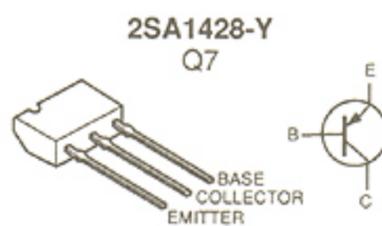
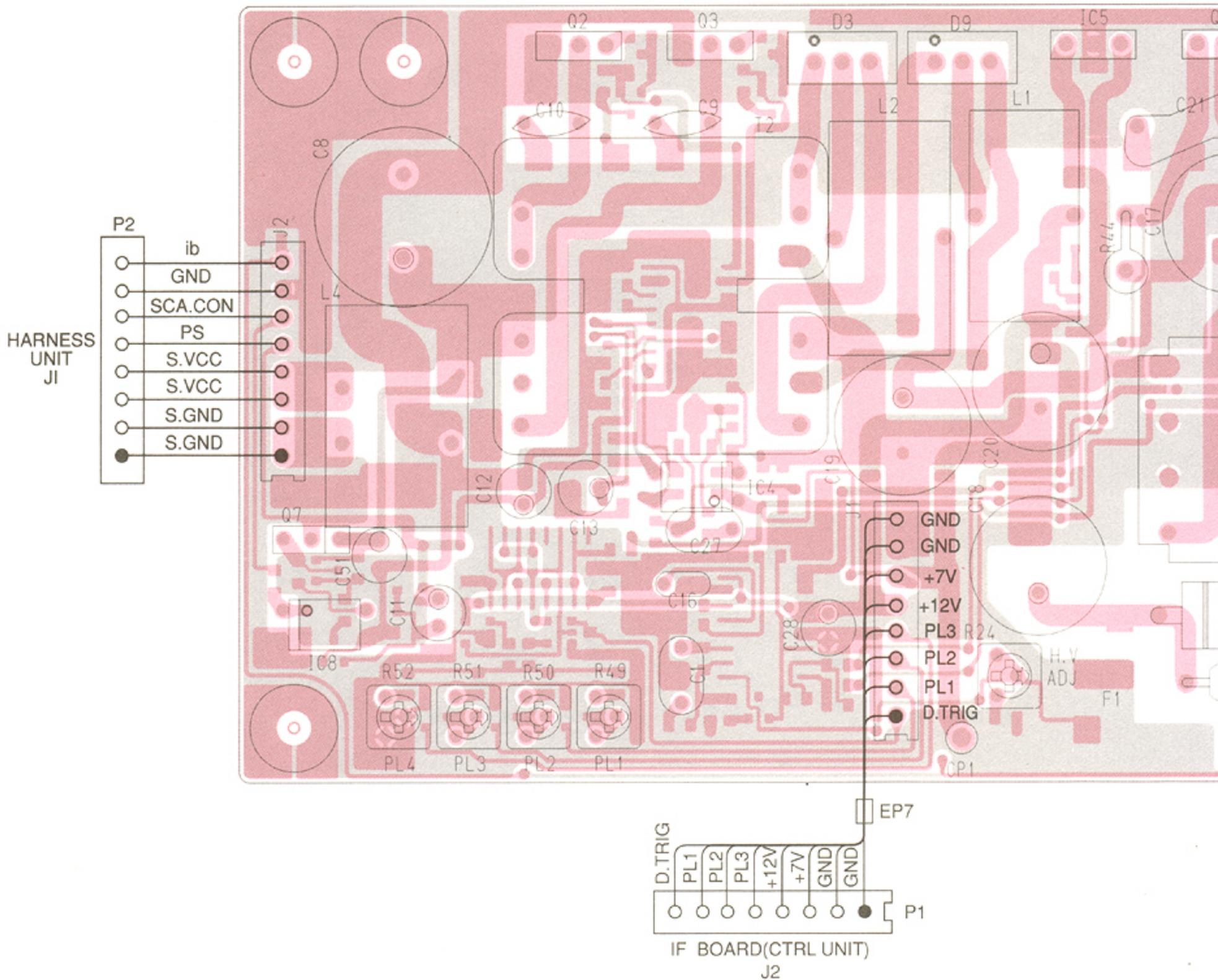


• MARKER UNIT (TOP VIEW)

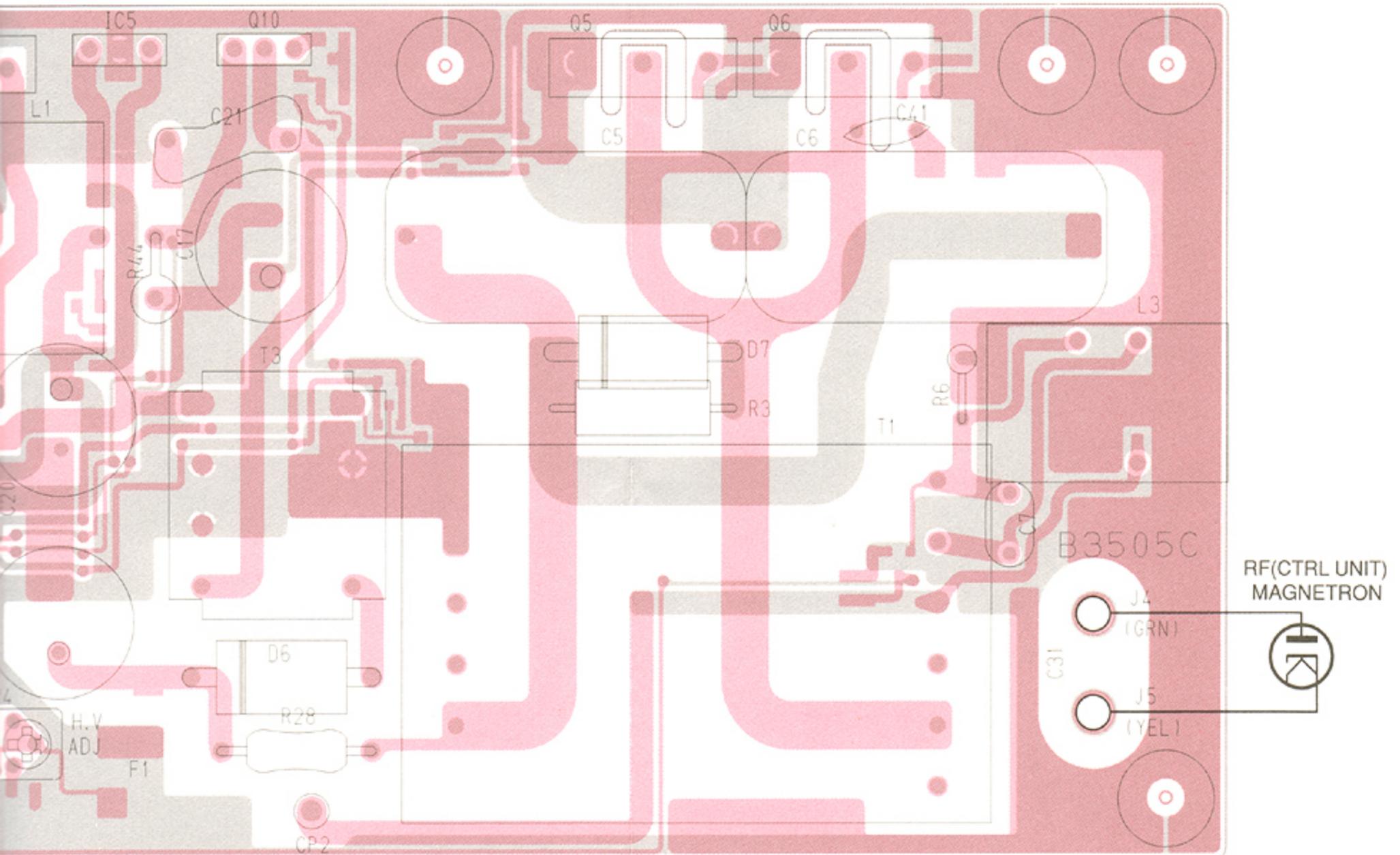


8-5 CTRL UNIT (PA BOARD AND IF BOARD)

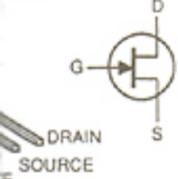
• PA BOARD (TOP VIEW)



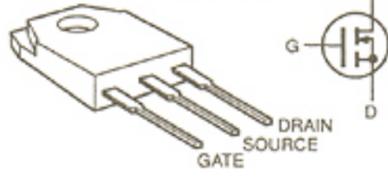
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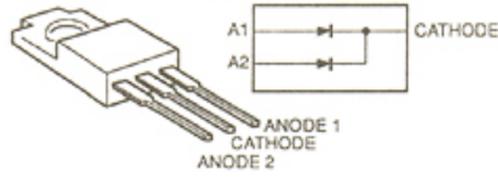
740
3, Q10



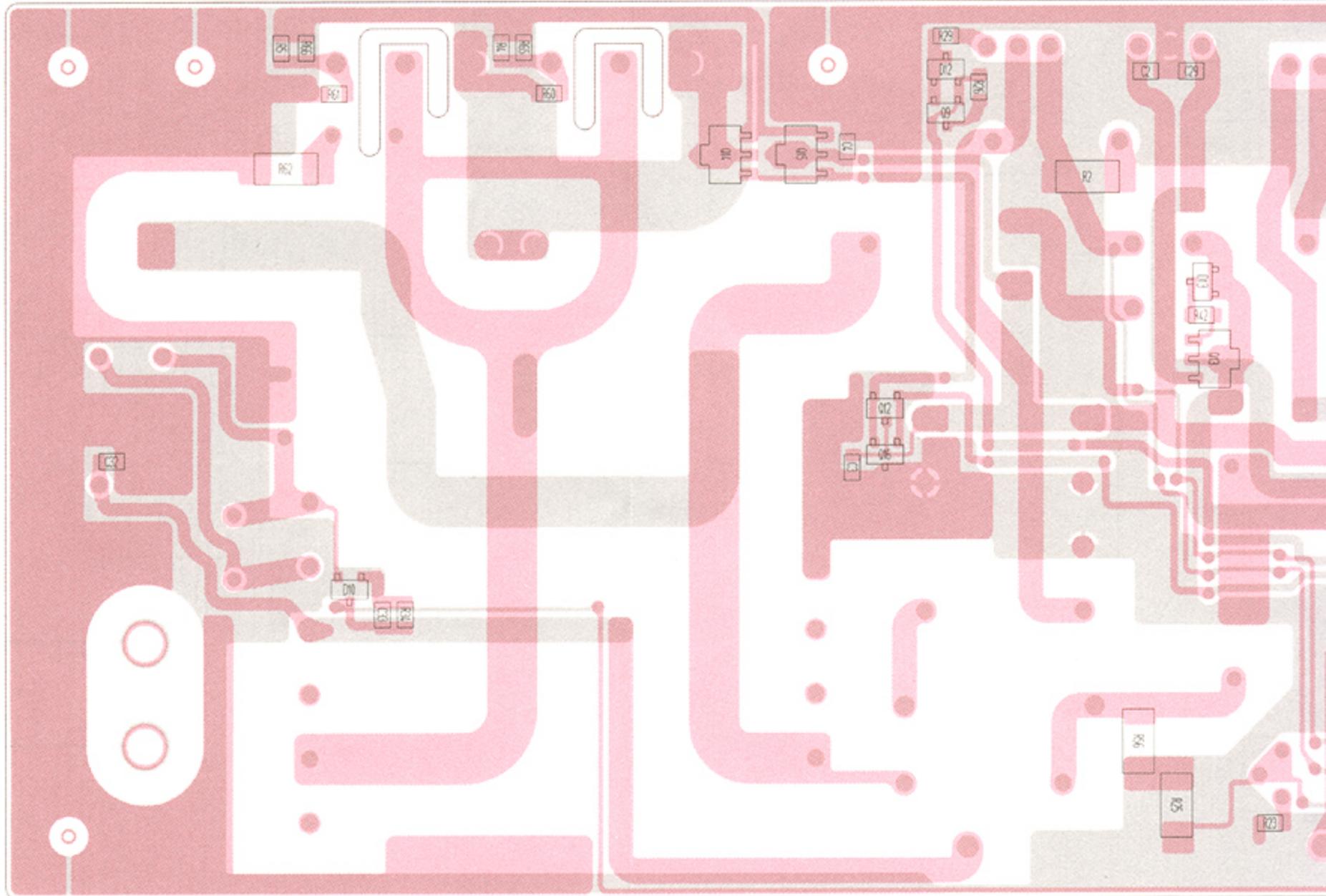
2SK1449
Q5, Q6



MA693
D3, D9



• PA BOARD (BOTTOM VIEW)



2SC2712-Y

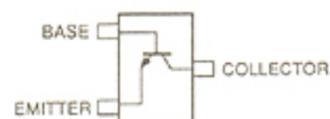
Q8



Symbol: LY

2SC2859-Y

Q12



Symbol: WY

2SA1162-Y

Q1, Q4, Q9, Q11



Symbol: SY

2SB798-T2

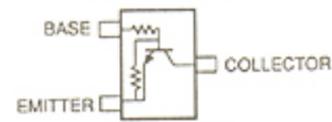
Q13, Q14



Symbol: DK

RN1402

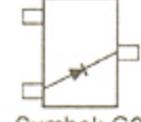
Q17 ~ Q19



Symbol: XB

1SS196

D1, D2, D10, D12



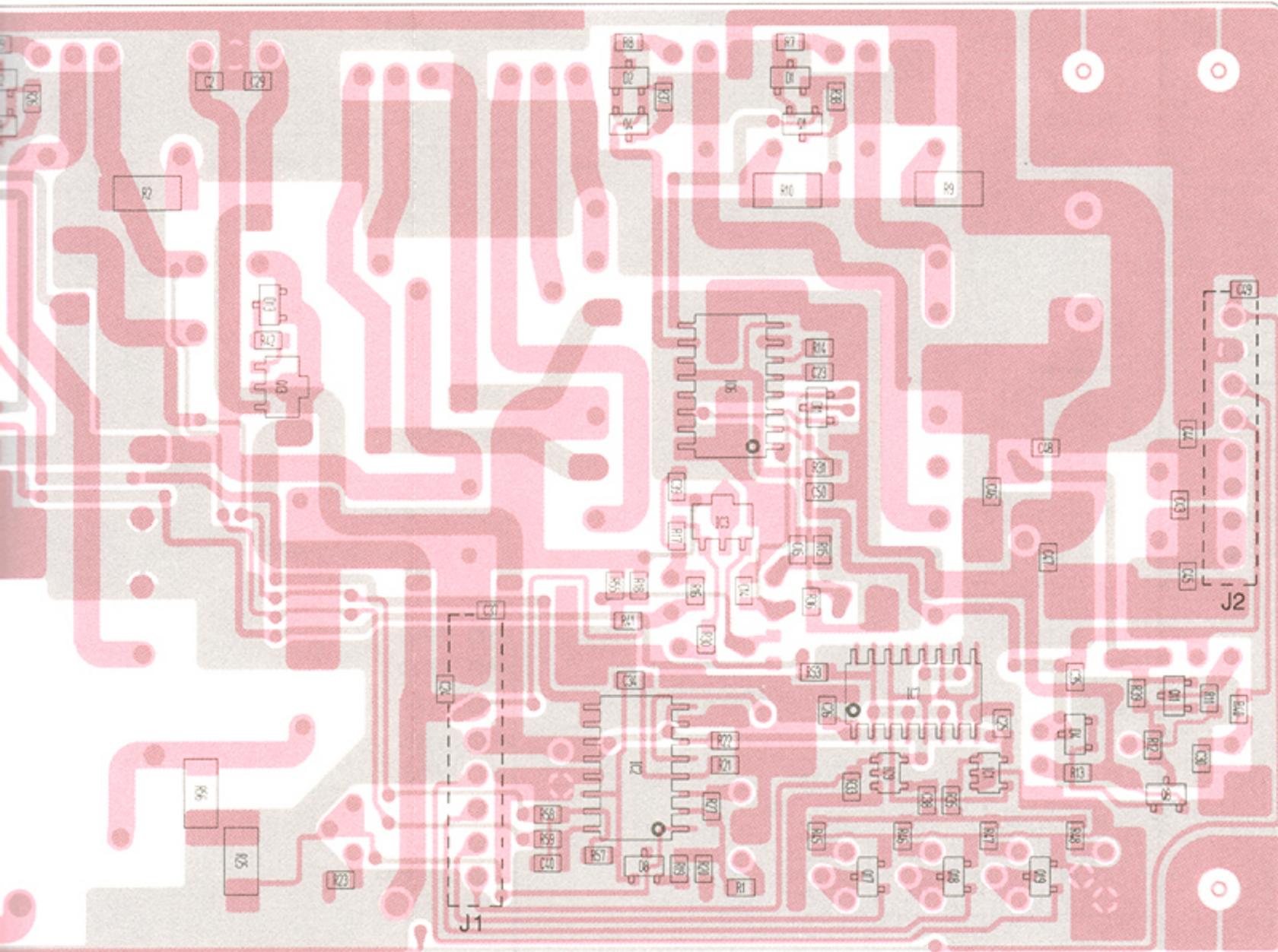
Symbol: G3

1SS2

D8, D

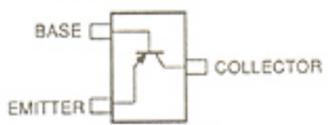


Symbol:



2SA1162-Y

Q1, Q4, Q9, Q11



Symbol: SY

2SD999-T2

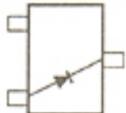
Q15



Symbol: CK

1SS196

D1, D2, D10, D12



Symbol: G3

1SS226

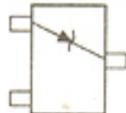
D8, D11



Symbol: C3

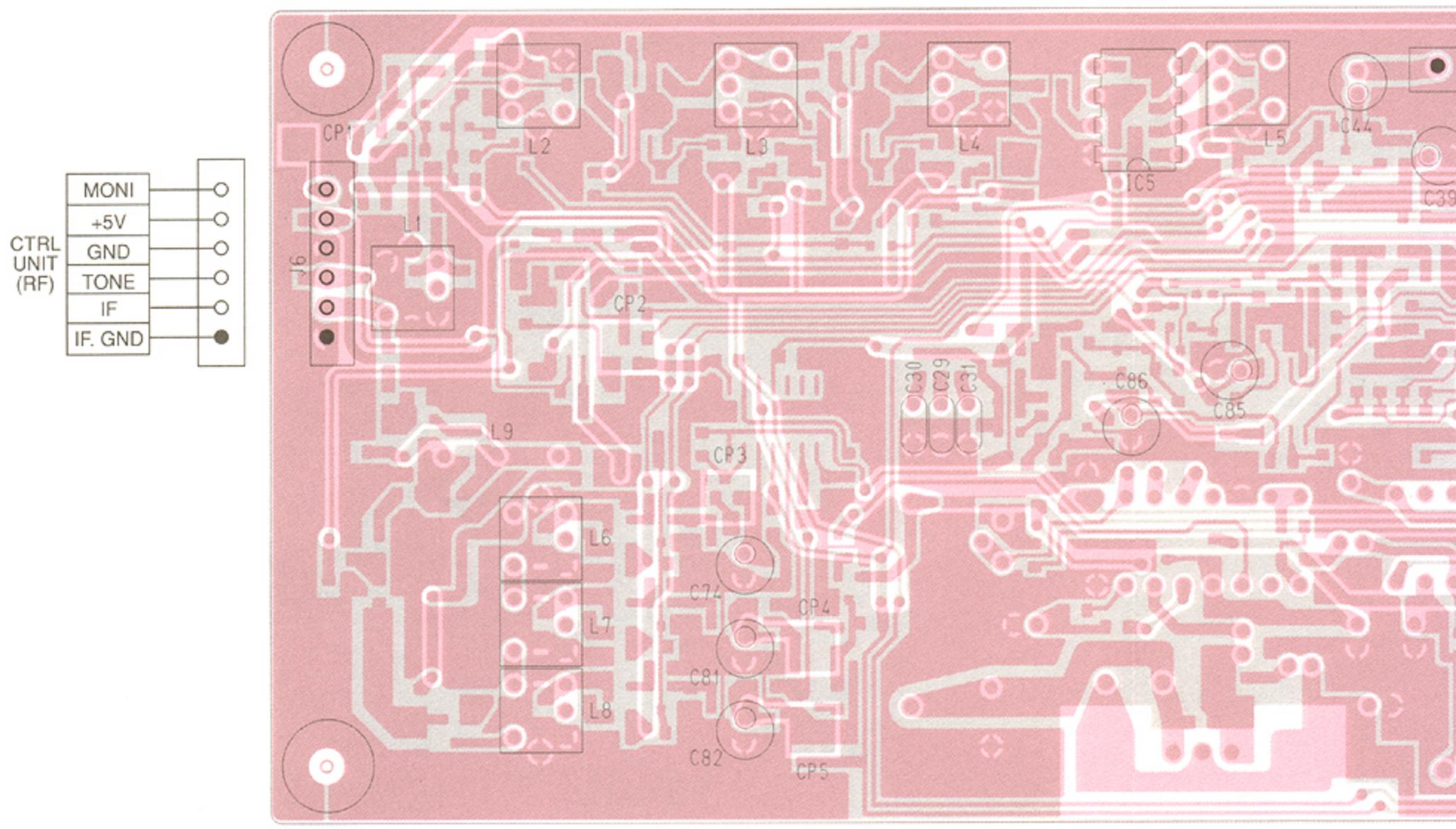
RD16M

D4, D13

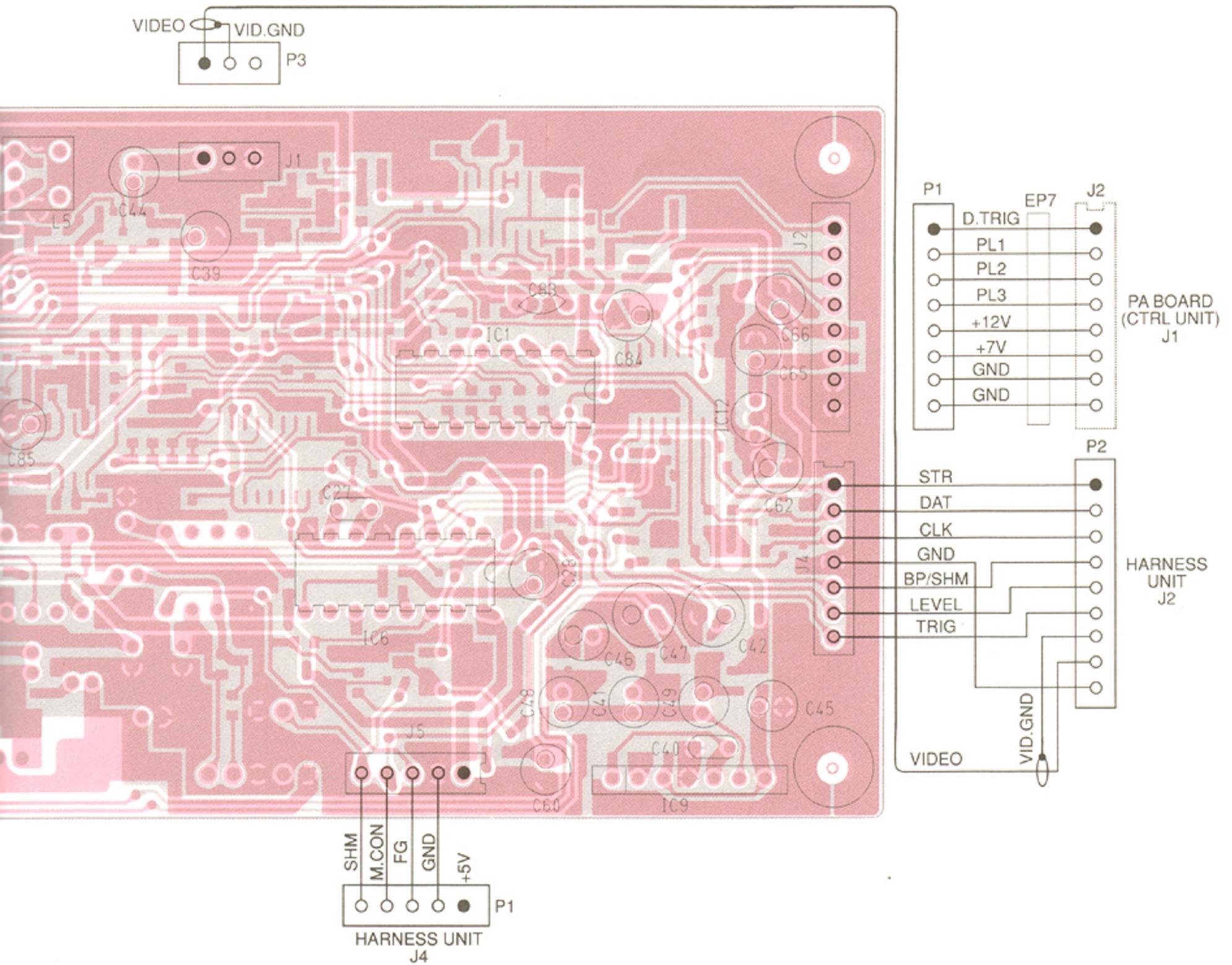


Symbol: 162

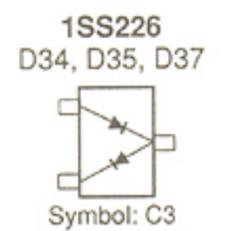
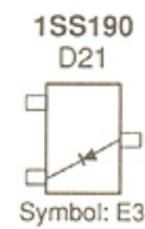
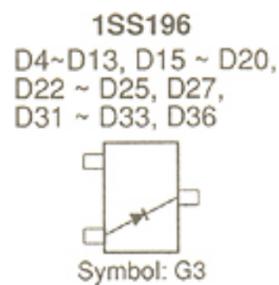
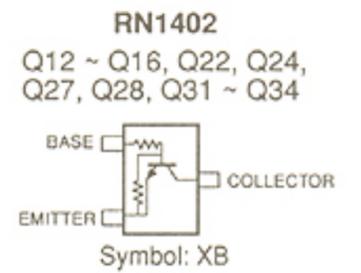
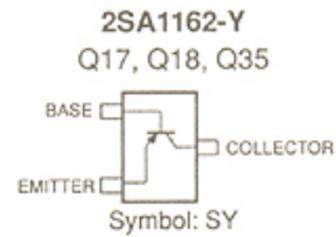
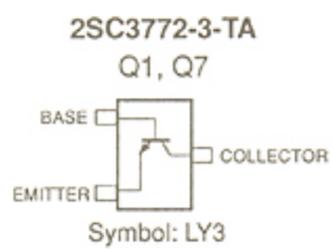
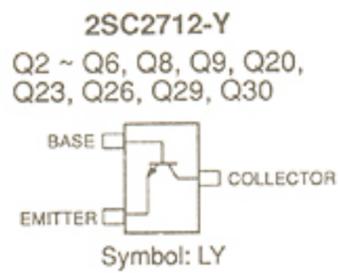
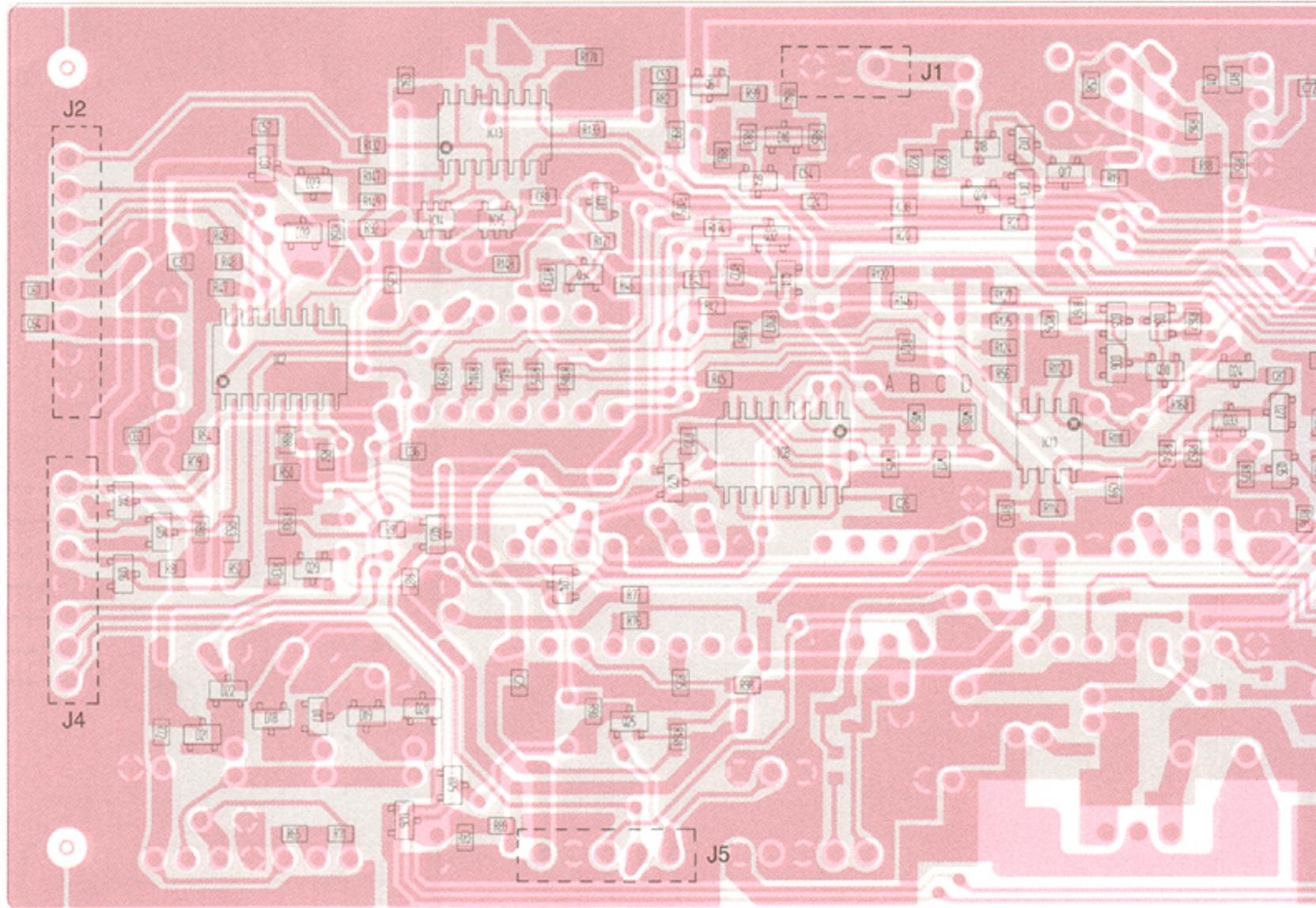
• IF BOARD (TOP VIEW)

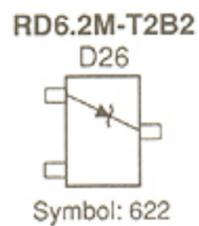
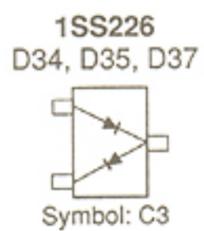
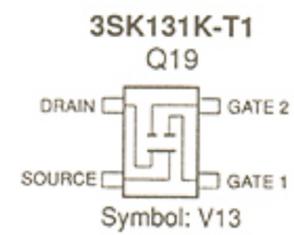
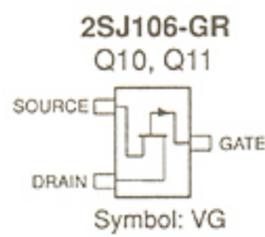
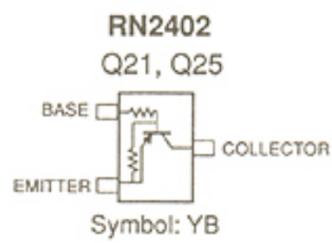
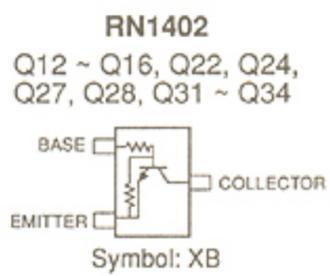
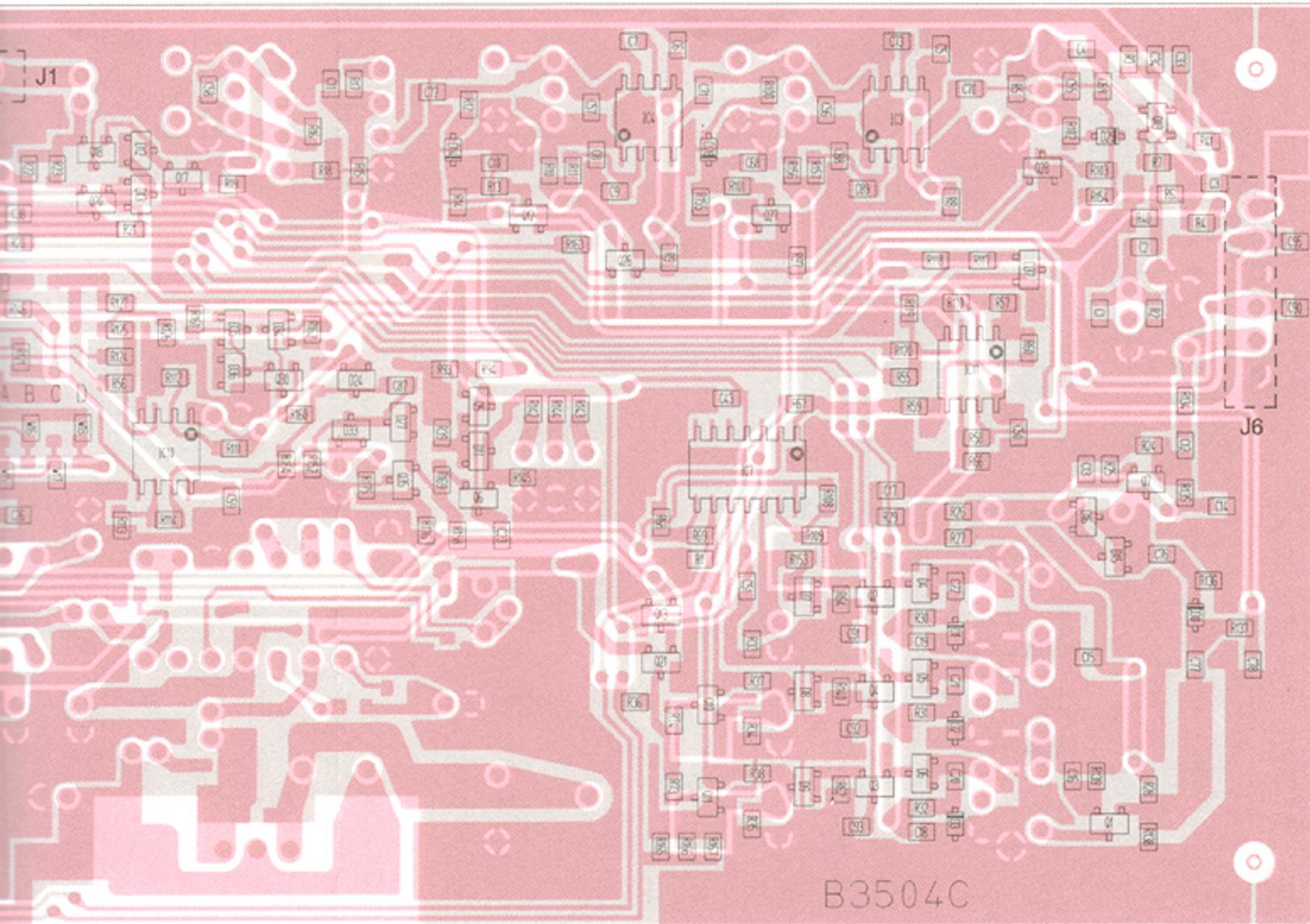


The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.



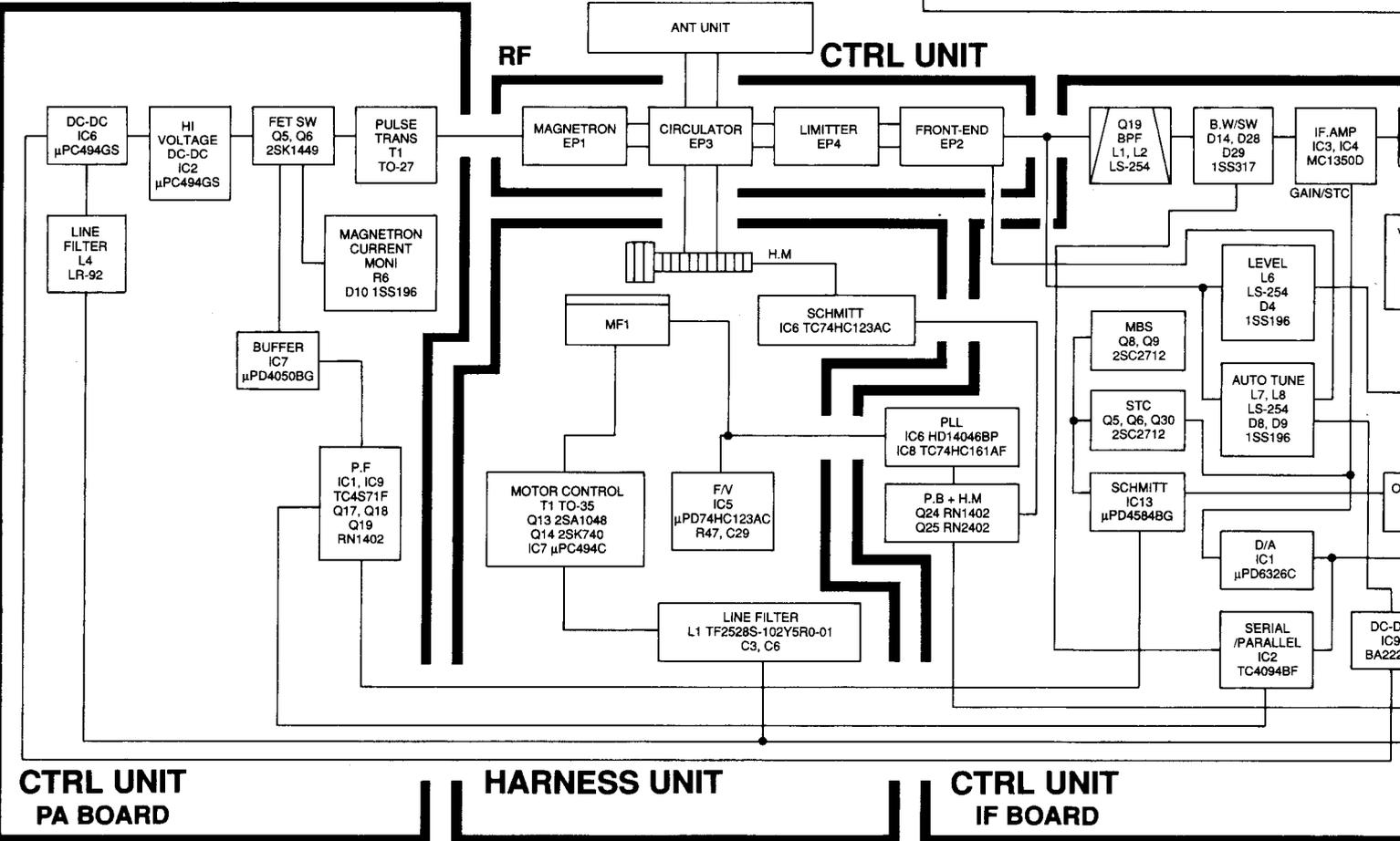
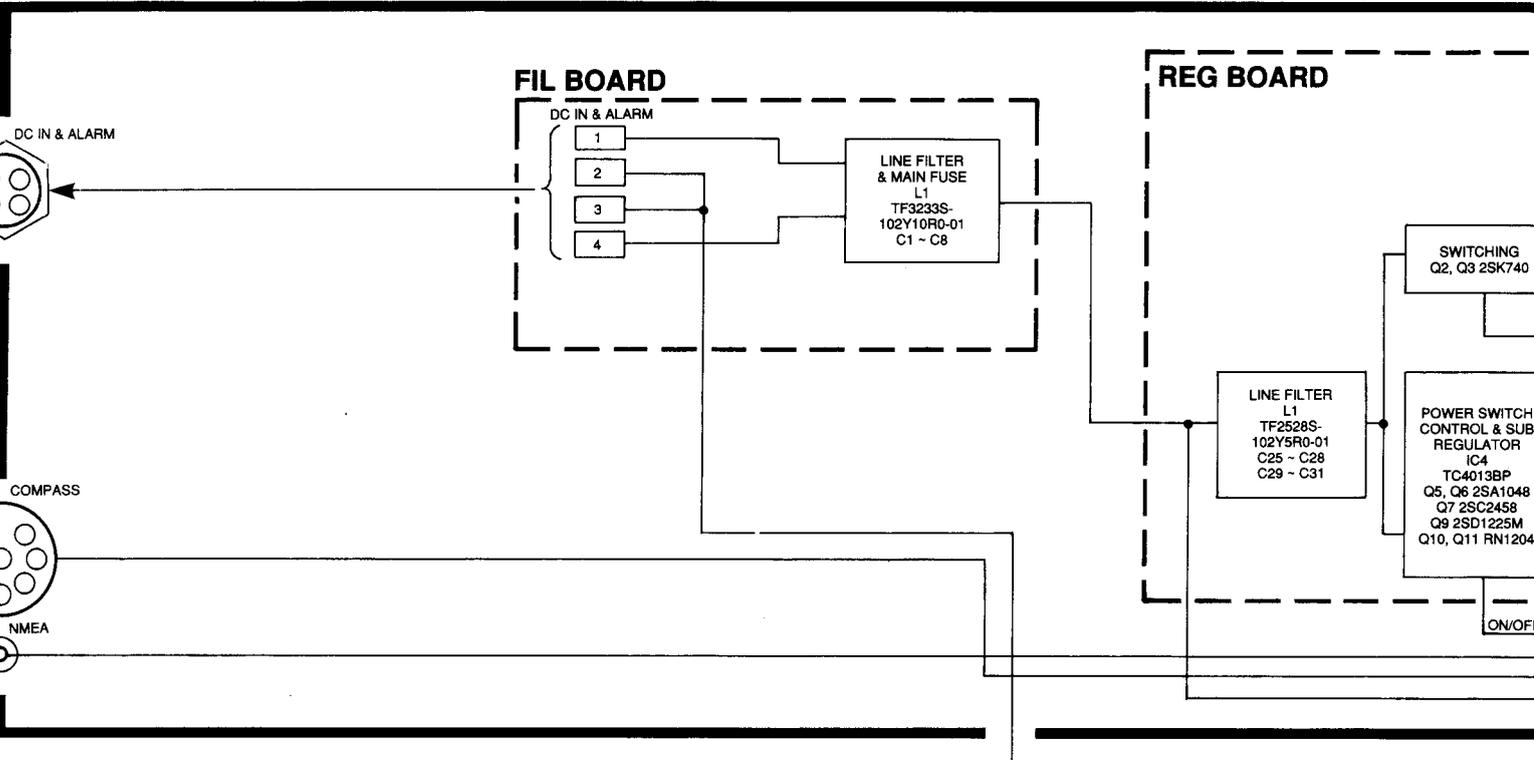
• IF BOARD (BOTTOM VIEW)





SECTION 9 BLOCK DIAGRAM

REAR UNIT

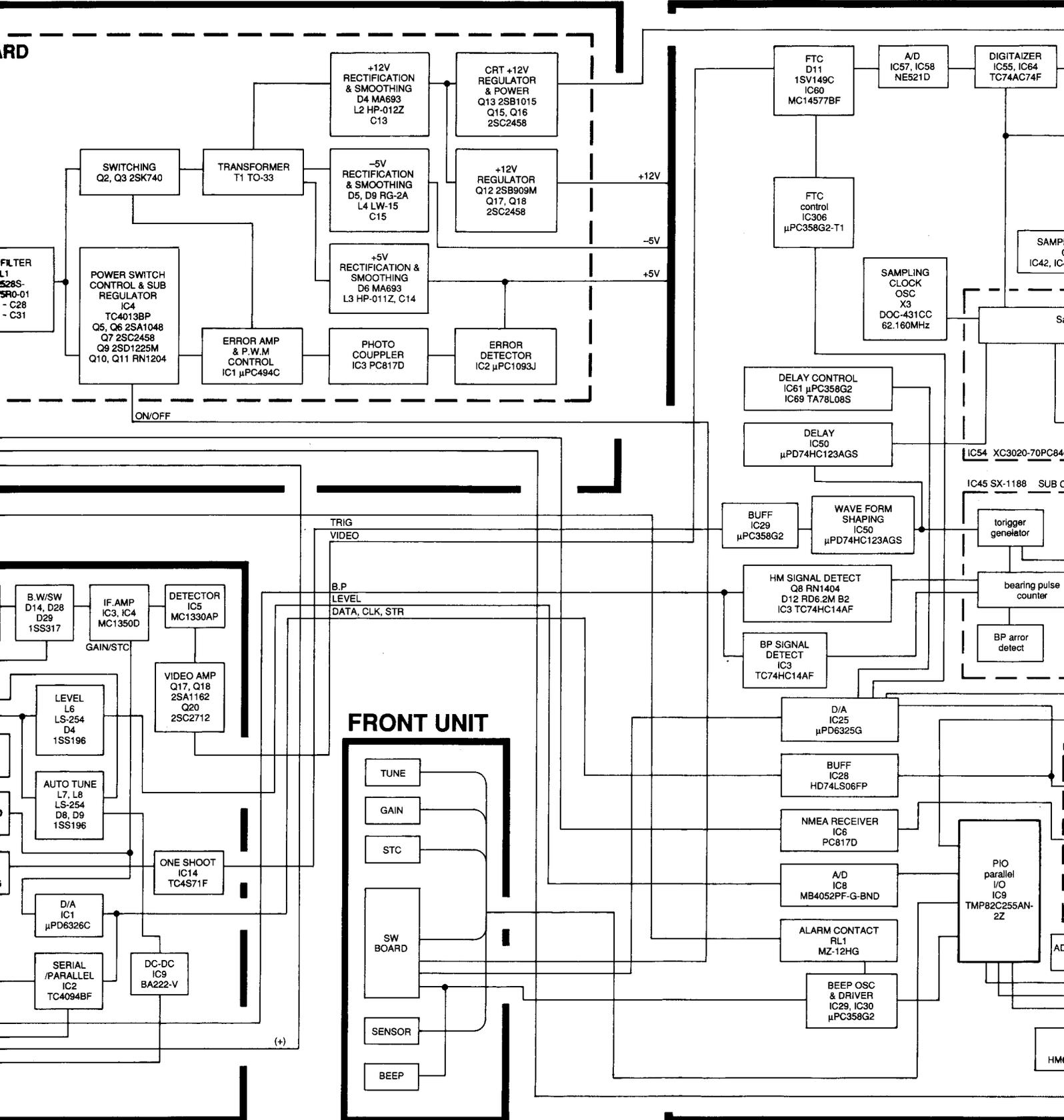


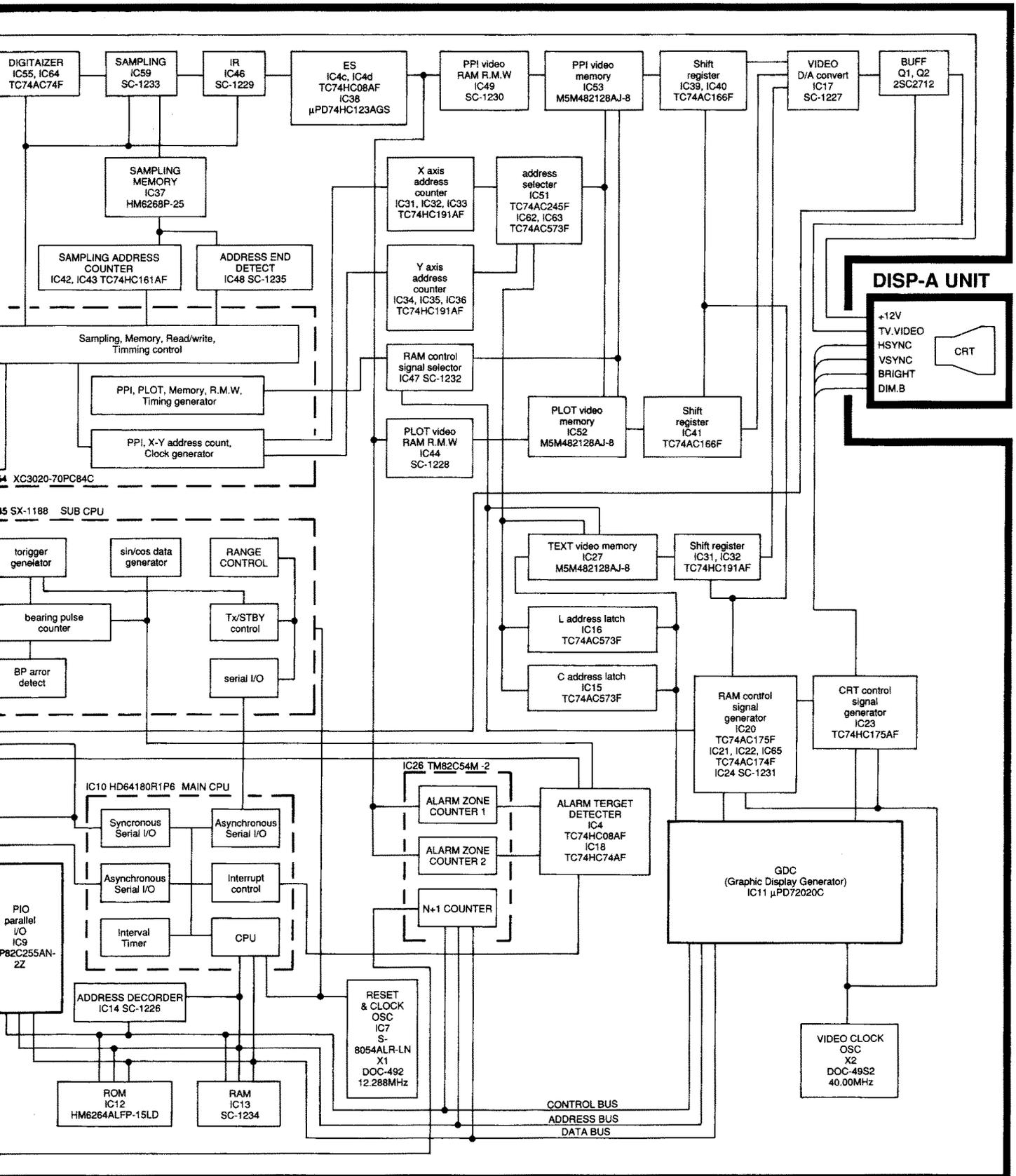
CTRL UNIT
PA BOARD

HARNESS UNIT

CTRL UNIT
IF BOARD

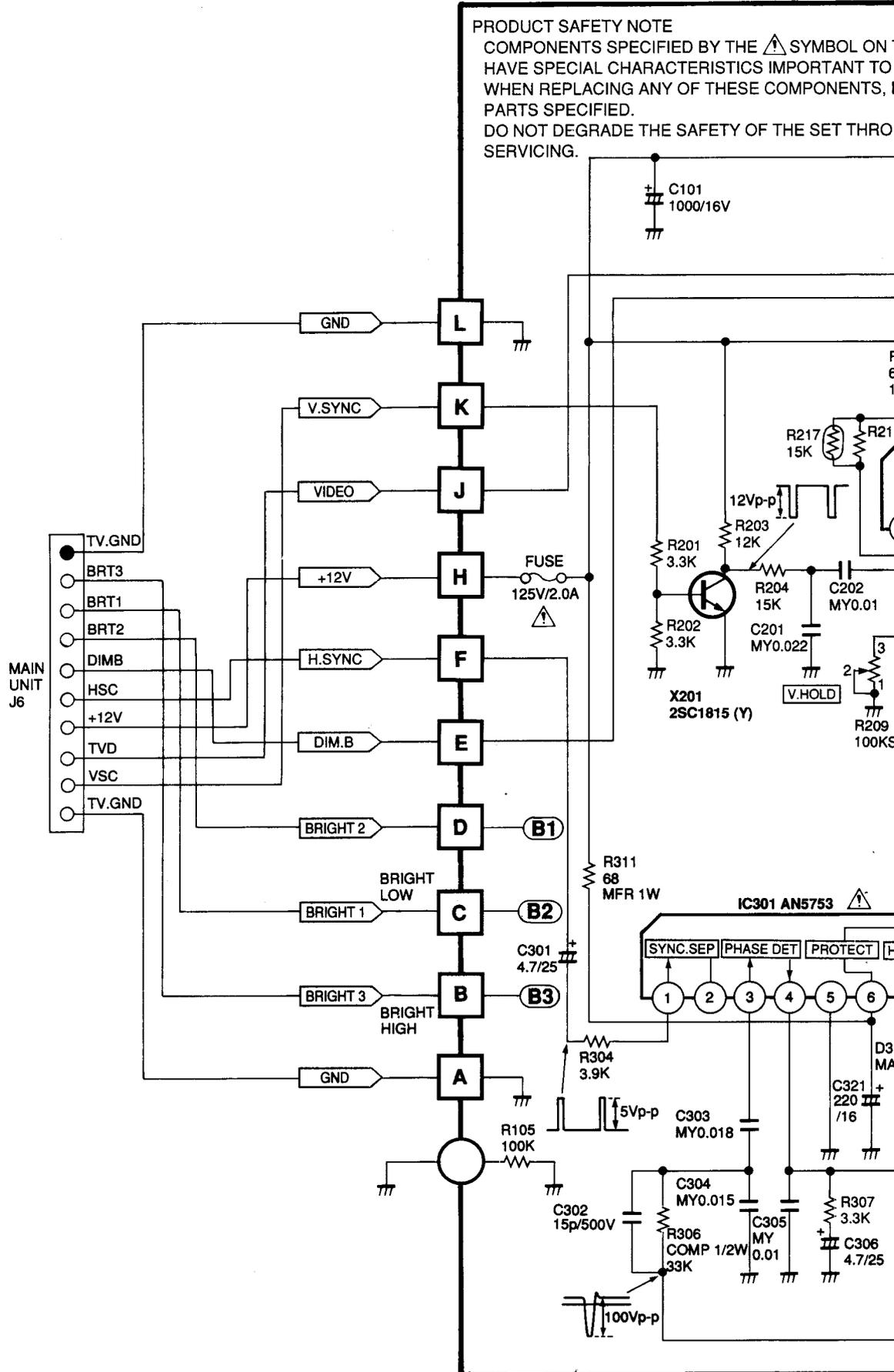
MAIN UNIT





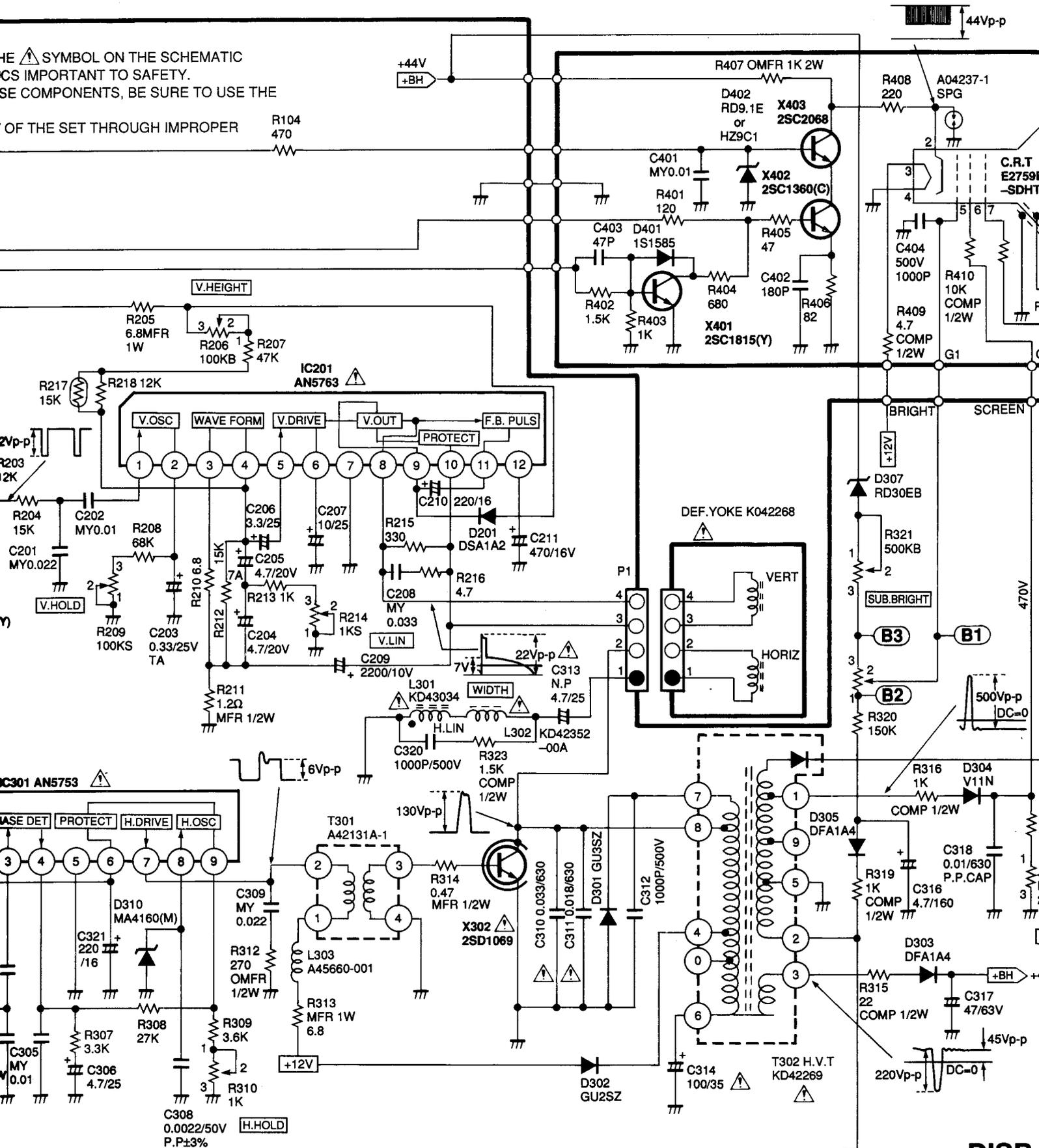
SECTION 10 VOLTAGE DIAGRAMS

10-1 DISPLAY-A UNIT

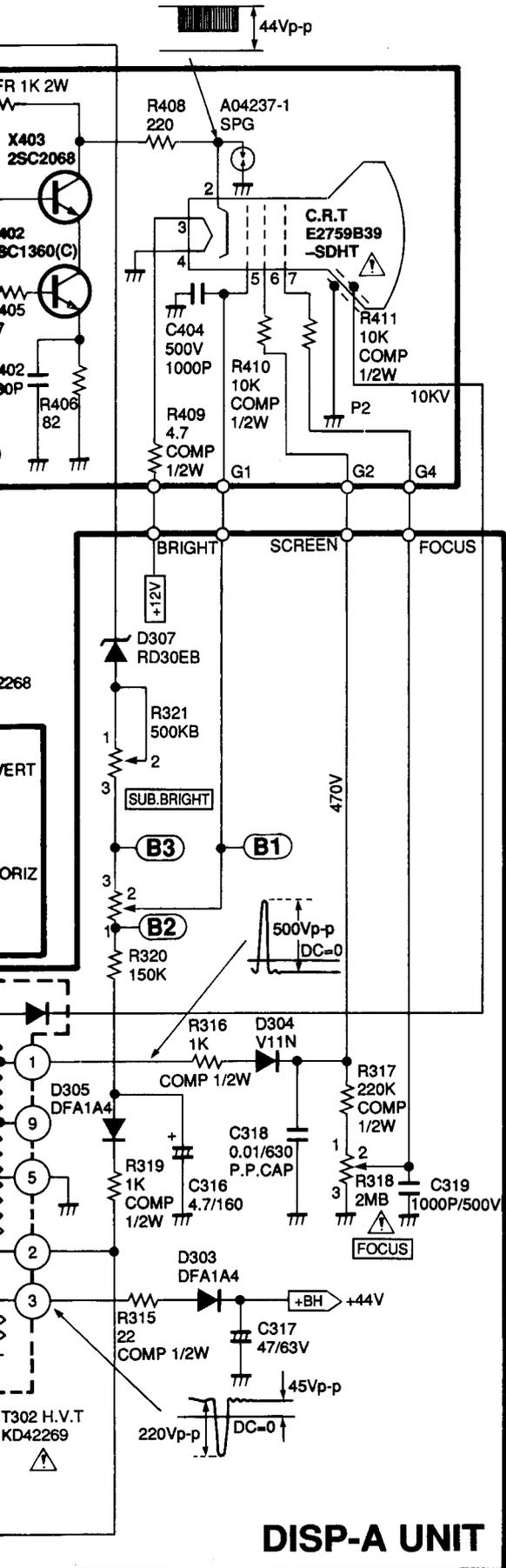


THE  SYMBOL ON THE SCHEMATIC IS IMPORTANT TO SAFETY. PLEASE USE THE CORRECT COMPONENTS, BE SURE TO USE THE CORRECT PARTS OF THE SET THROUGH IMPROPER

OF THE SET THROUGH IMPROPER

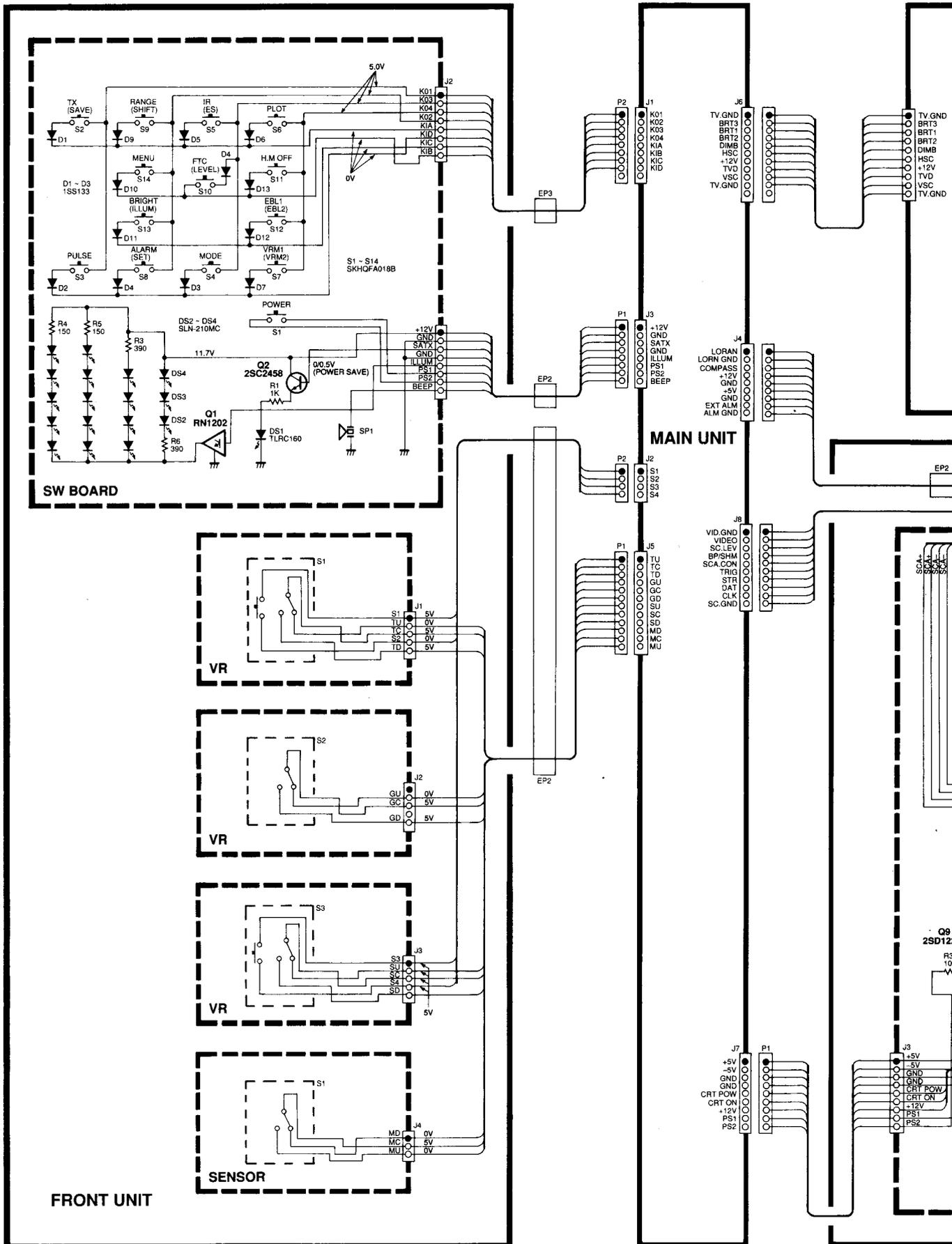


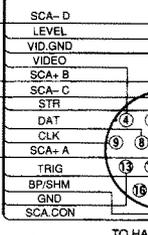
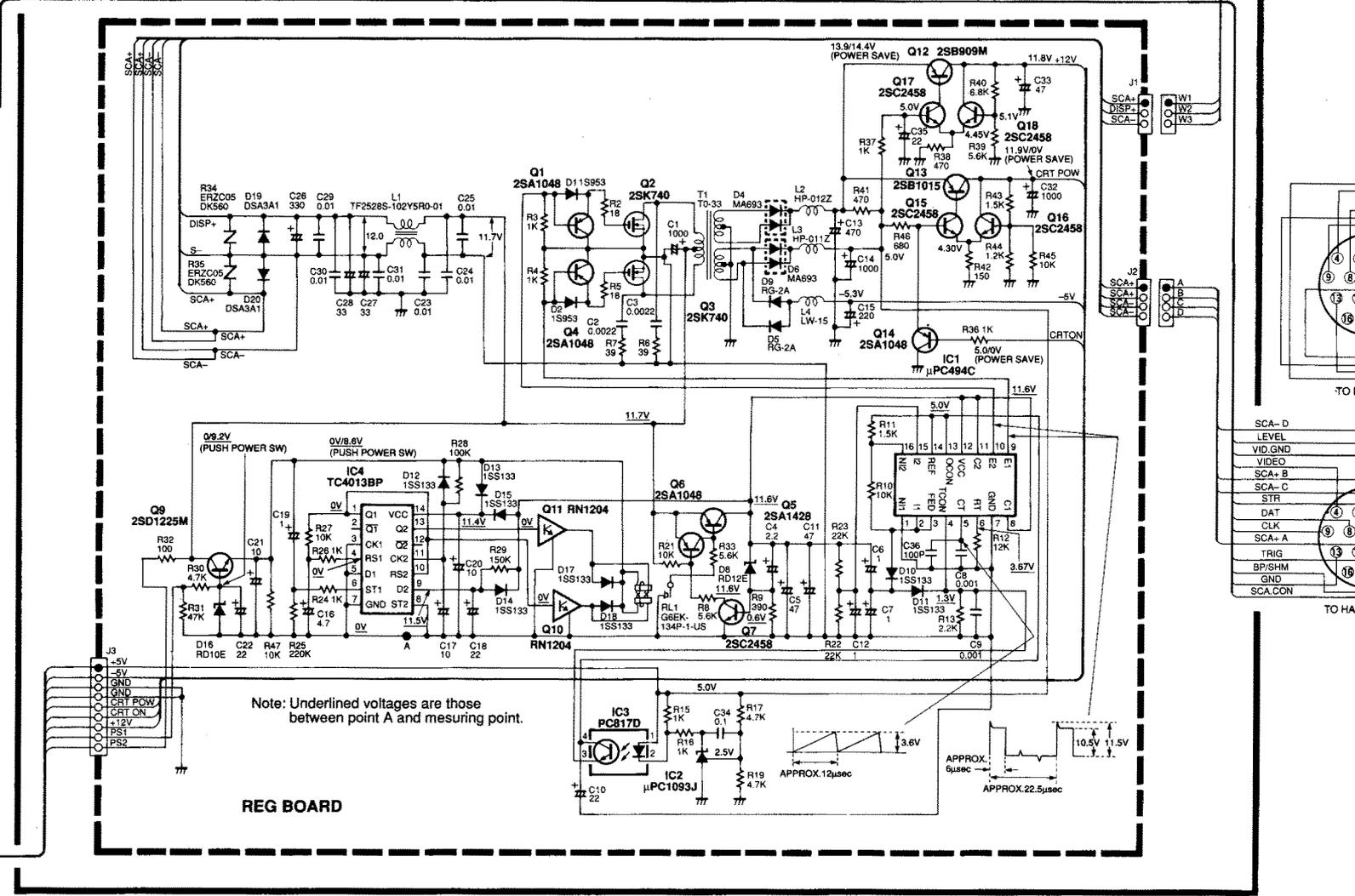
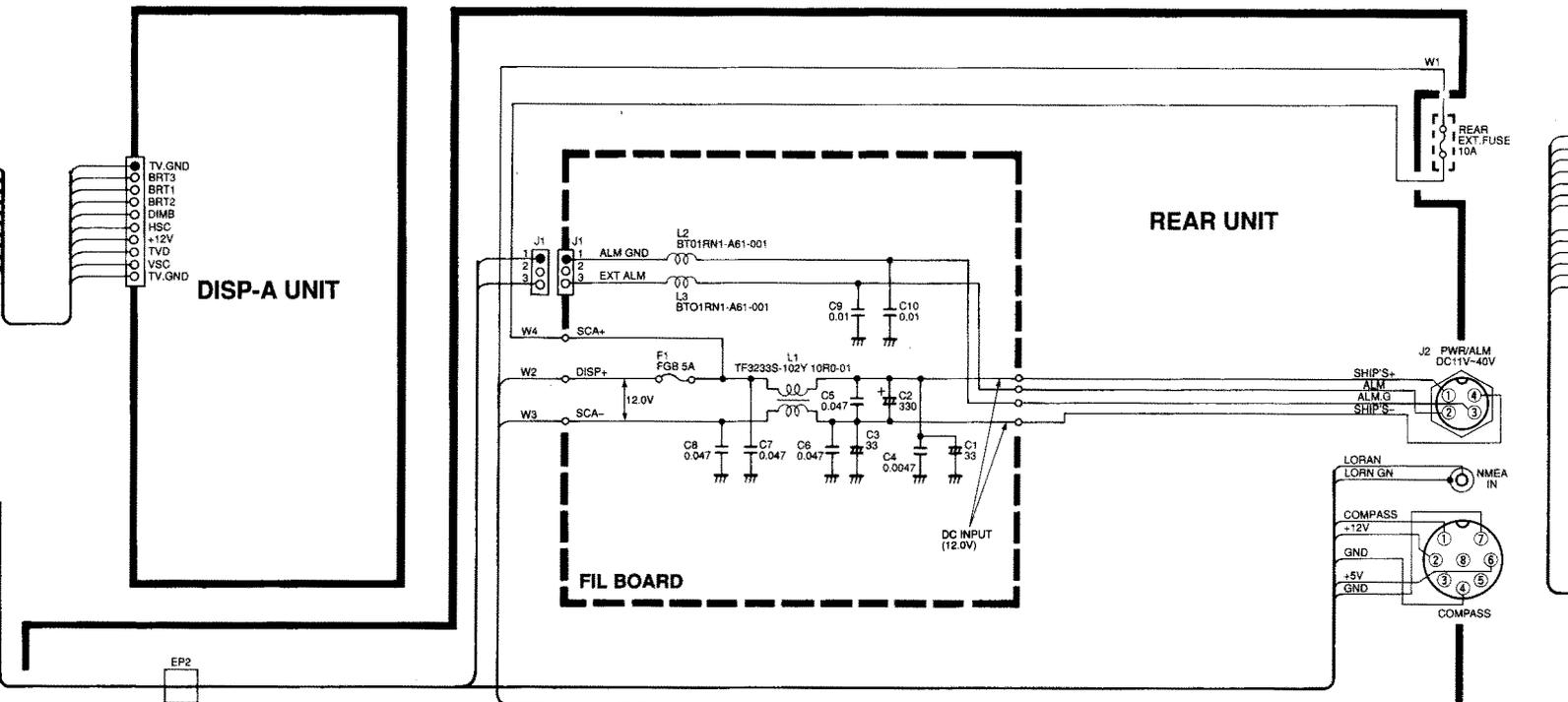
DISP-

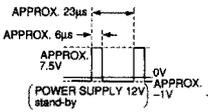


DISP-A UNIT

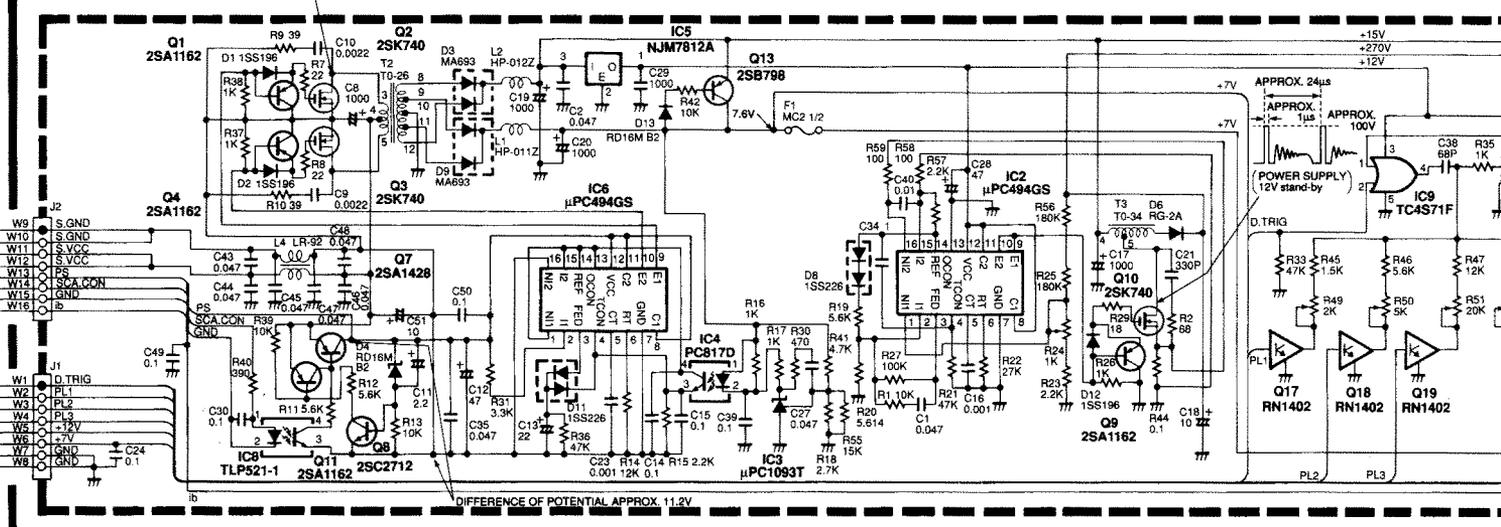
10-2 WHOLE CIRCUIT DIAGRAM







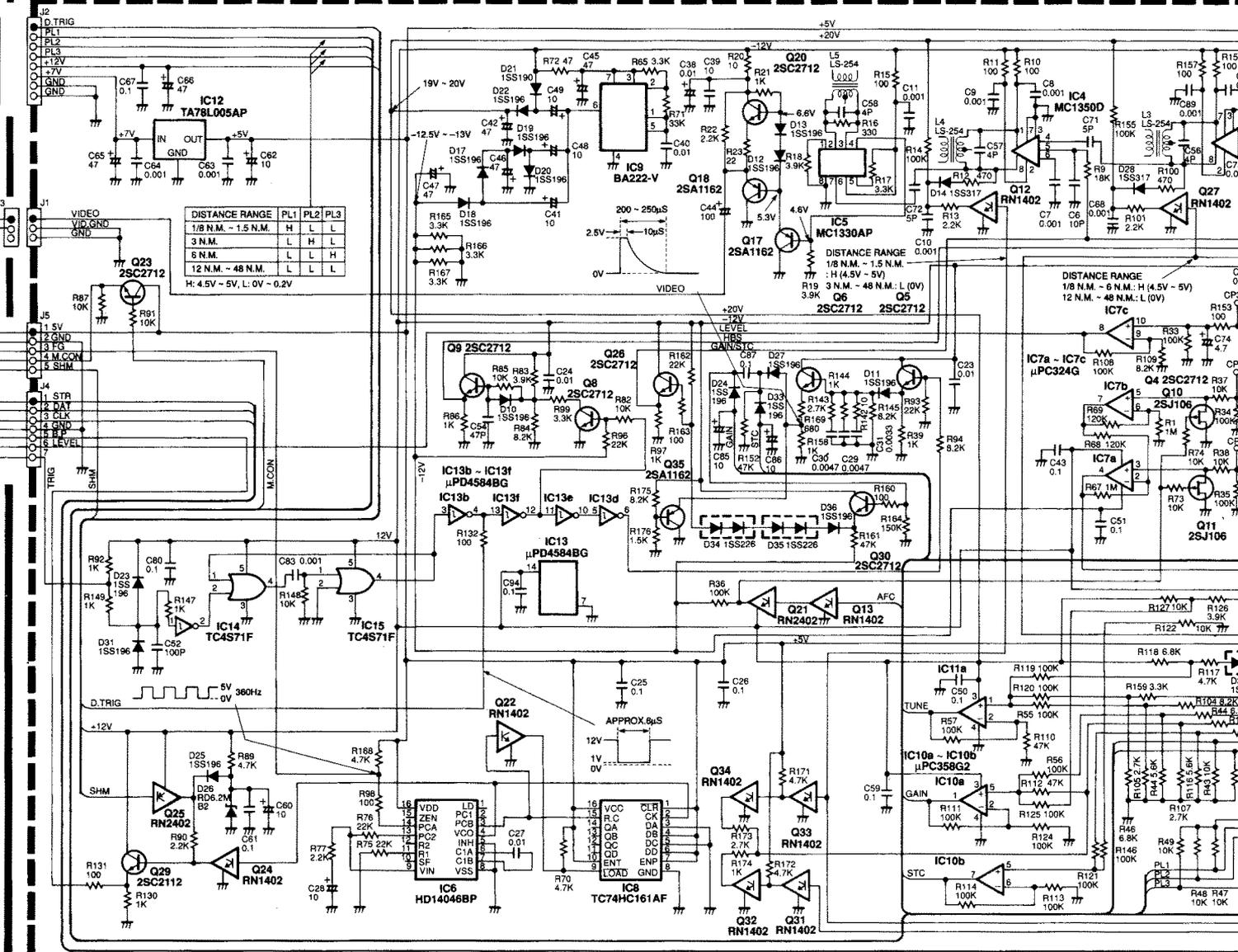
CTRL UNIT



DIFFERENCE OF POTENTIAL APPROX. 11.2V

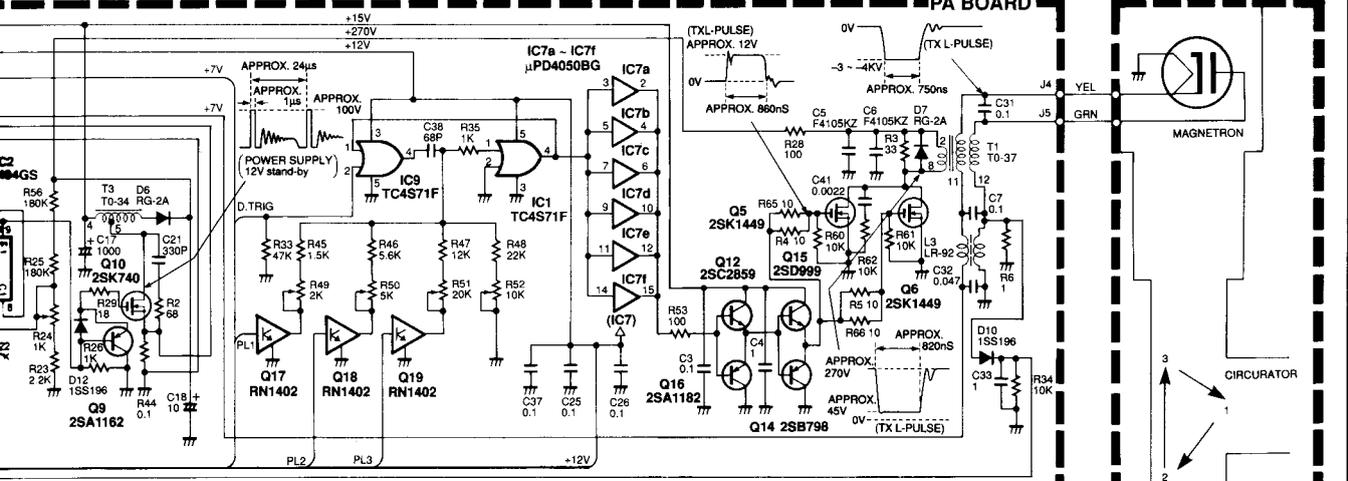
DISTANCE RANGE	PL1	PL2	PL3
1/8 N.M. - 1.5 N.M.	H	L	L
3 N.M.	L	H	L
6 N.M.	L	L	H
12 N.M. - 48 N.M.	L	L	L

H: 4.5V - 5V, L: 0V - 0.2V

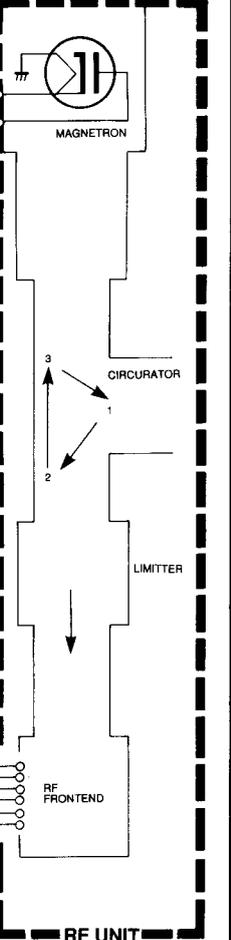
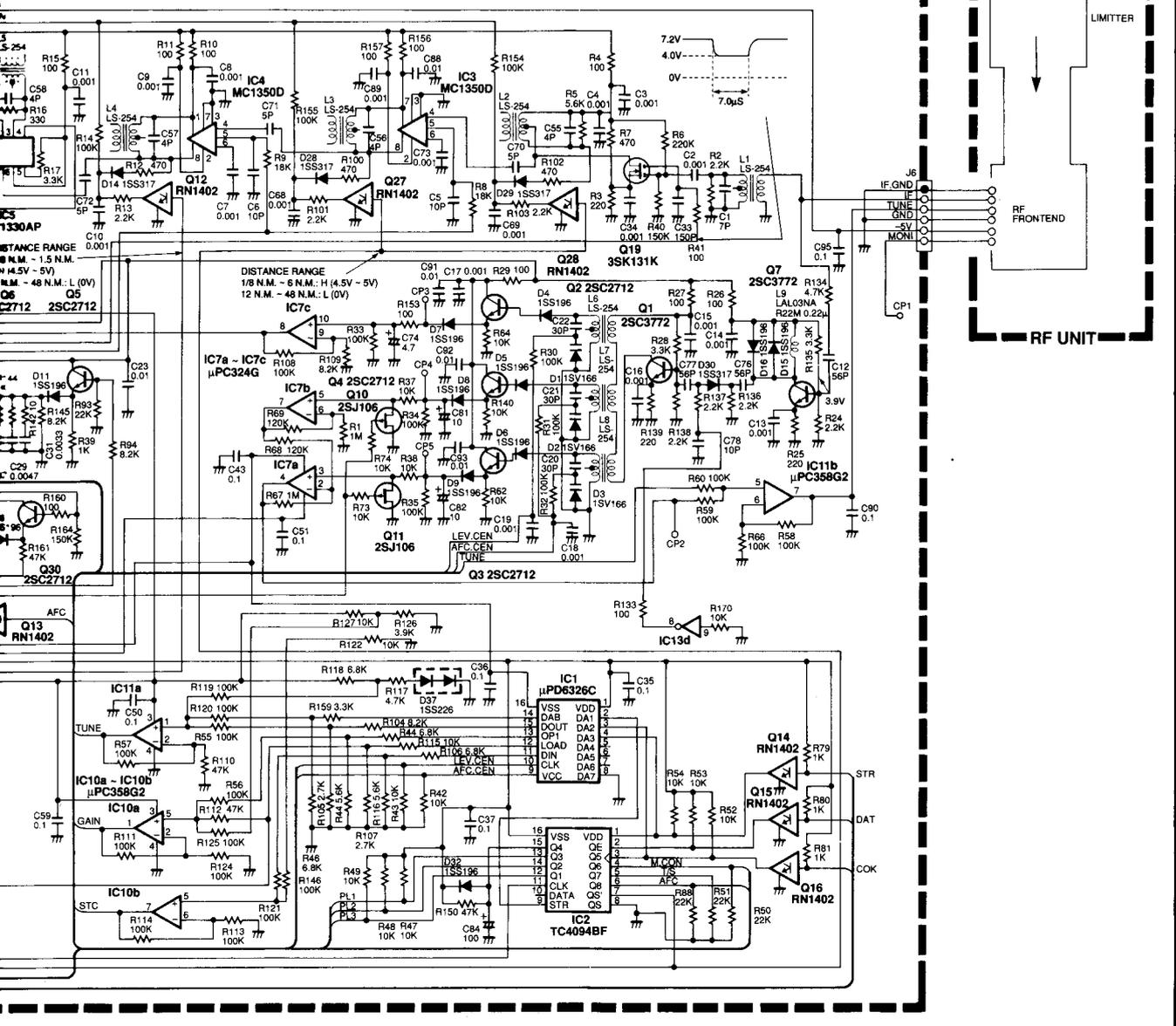


CTRL UNIT

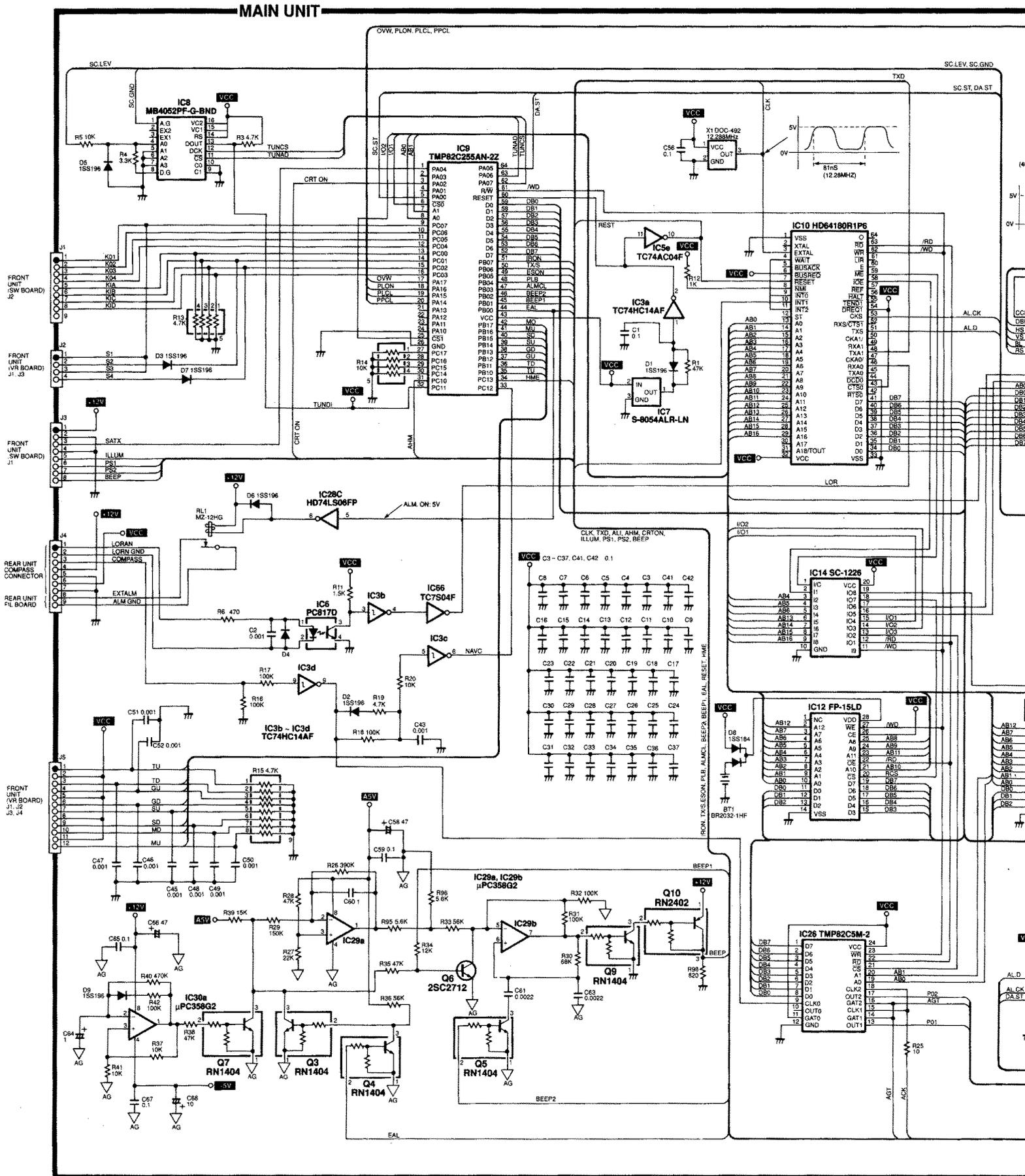
PA BOARD

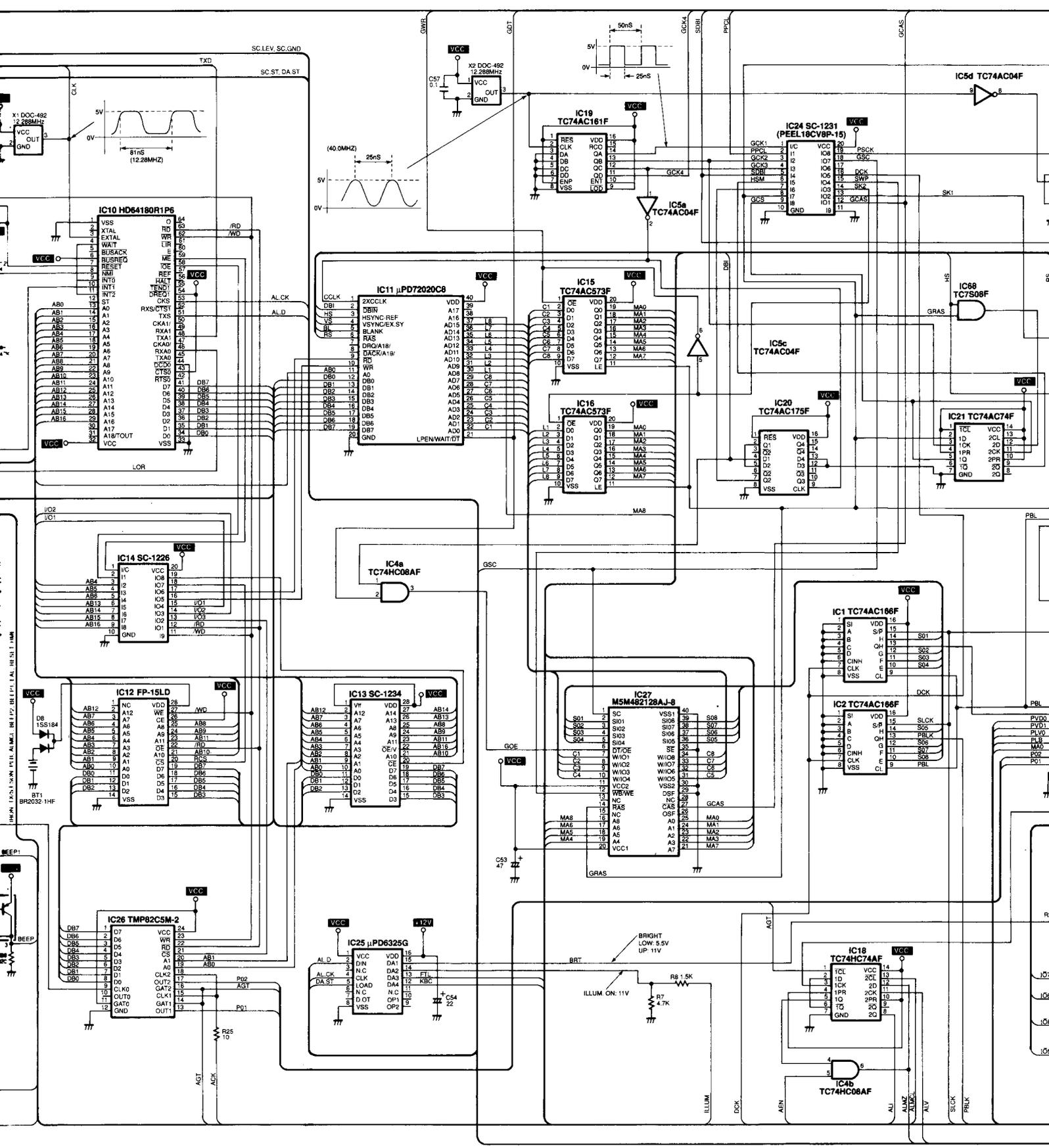


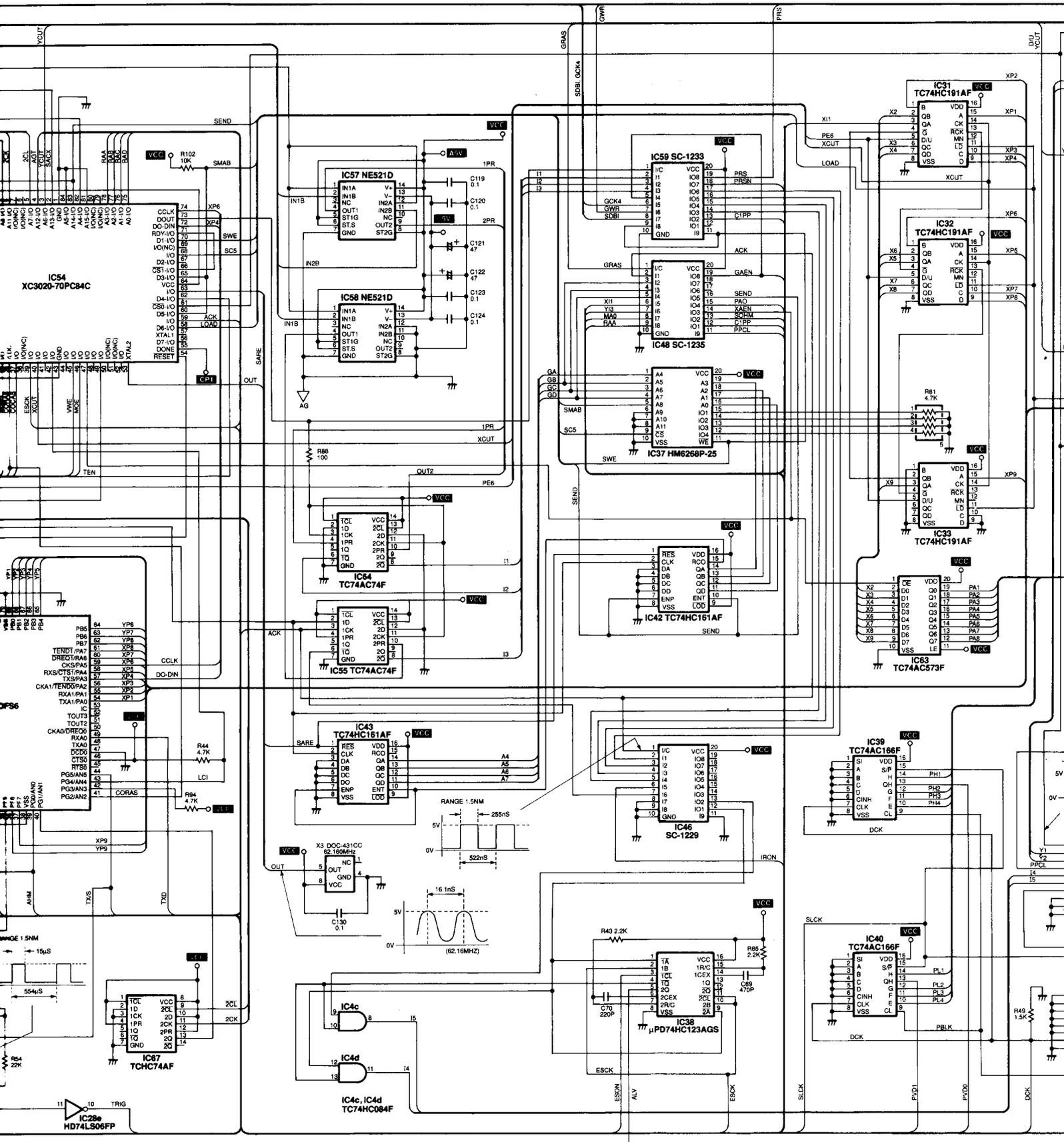
IF BOARD



10-3 MAIN UNIT







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Fax : 06 793 0013
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