

from a differentiator comprised of C10 and R20 is input to Pin 9 to reset Pin 10 of IC7 when Q2 stops oscillation.

4 - 5 OTHER UNITS

4 - 5 - 1 REGULATOR UNIT

IC1 is a voltage regulator with an output switching circuit, with three output terminals at Pins 1, 6 and 8. Pin 1 outputs 8V ($8.2V \pm 0.4V$) constantly, Pin 6 outputs R8V ($8.2 \pm 0.4V$) in the receive mode by applying more than 2V at Pin 5, and Pin 8 outputs T8V ($8.2V \pm 0.4V$) in the transmit mode by grounding Pin 5. The maximum current drain from each output is 100mA.

A protector circuit is provided to protect against overheating and excess current drain.

The constantly supplied 8V is boosted its current capacity by Q1 and it outputs from the 8A terminal.

4 - 5 - 2 DISPLAY UNIT

This unit consists of a DC-DC converter section (L1 and Q9) and a DS1 driver unit (IC1 and Q1 — 6). The DC-DC converter unit supplies $-14V$ and heater voltage for the display tube and $-5V$ for the other circuits.

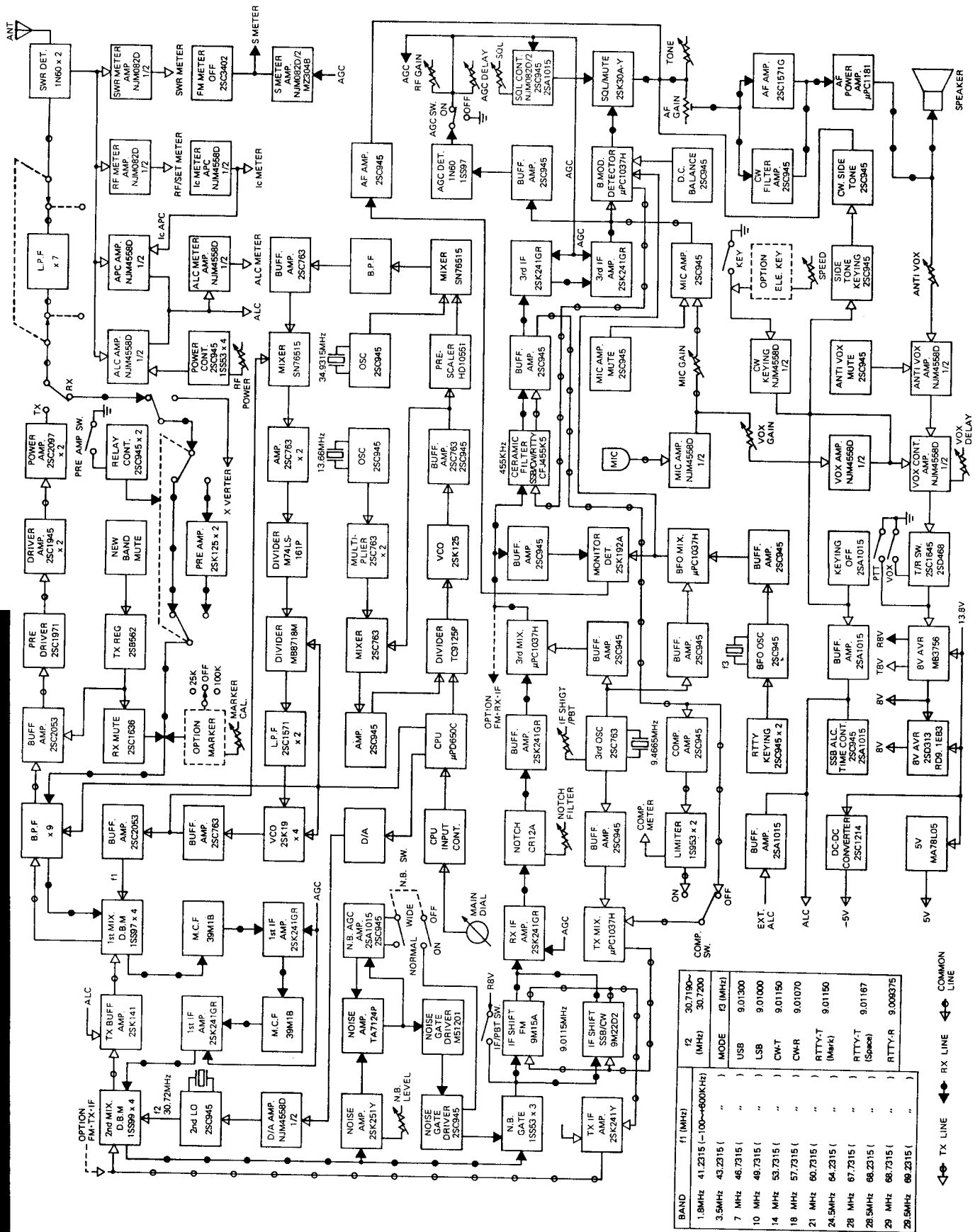
The luminescent display tube (DS1) is driven by the driver IC1, and lights dynamically. IC1 contains such functions as input data latch, clock oscillator, data memory, segment decoders, etc.

D1 and D2 light the decimal points.

Both 1.8MHz and 3.5MHz bands are recognized as the 3.5MHz band by the CPU. Therefore the band data signals for 1.8MHz are input to Q1 and Q2, which control Q3 — 6 to turn off segments a, d, f and g of the 1MHz digit display.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

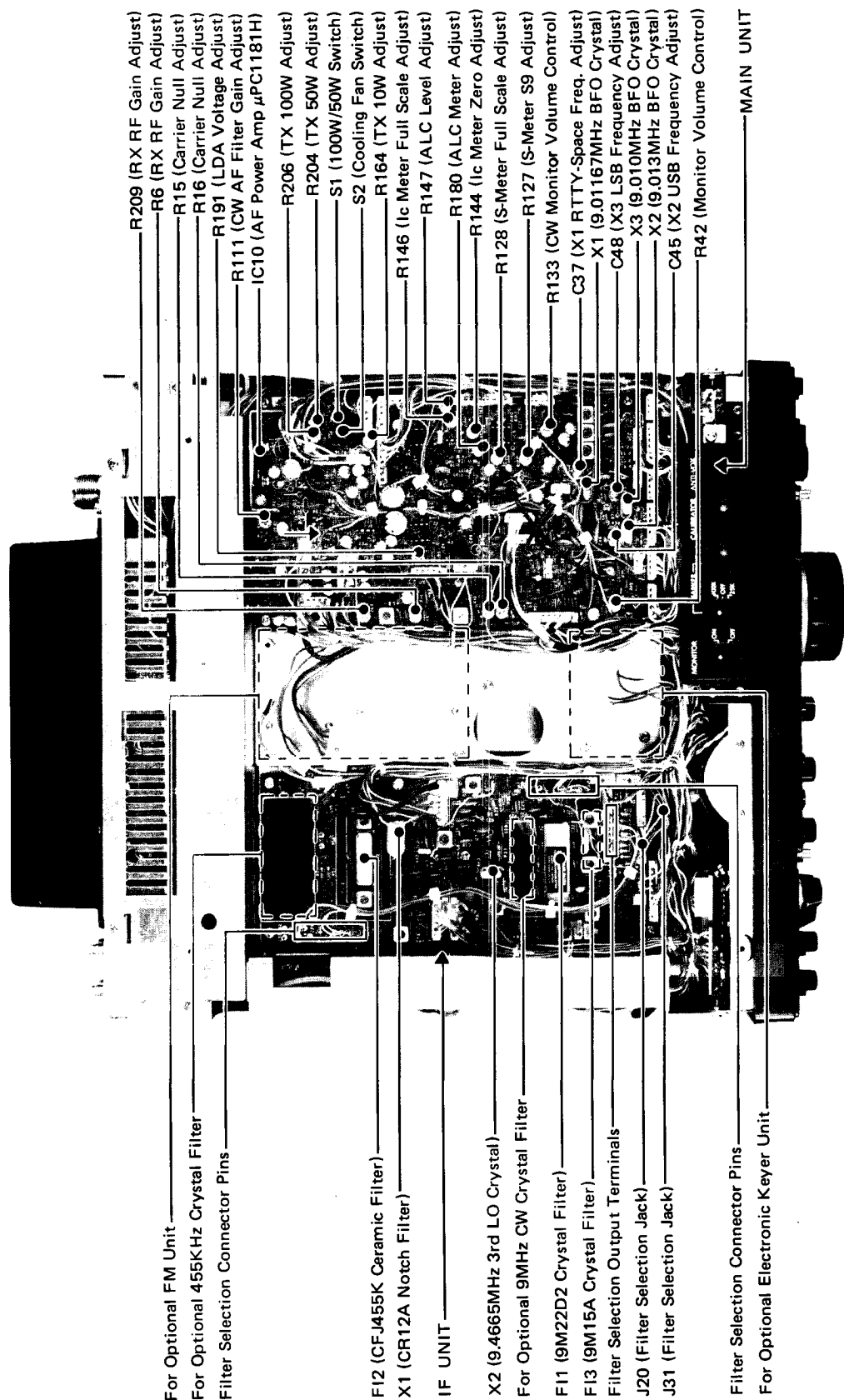
SECTION 5 BLOCK DIAGRAM



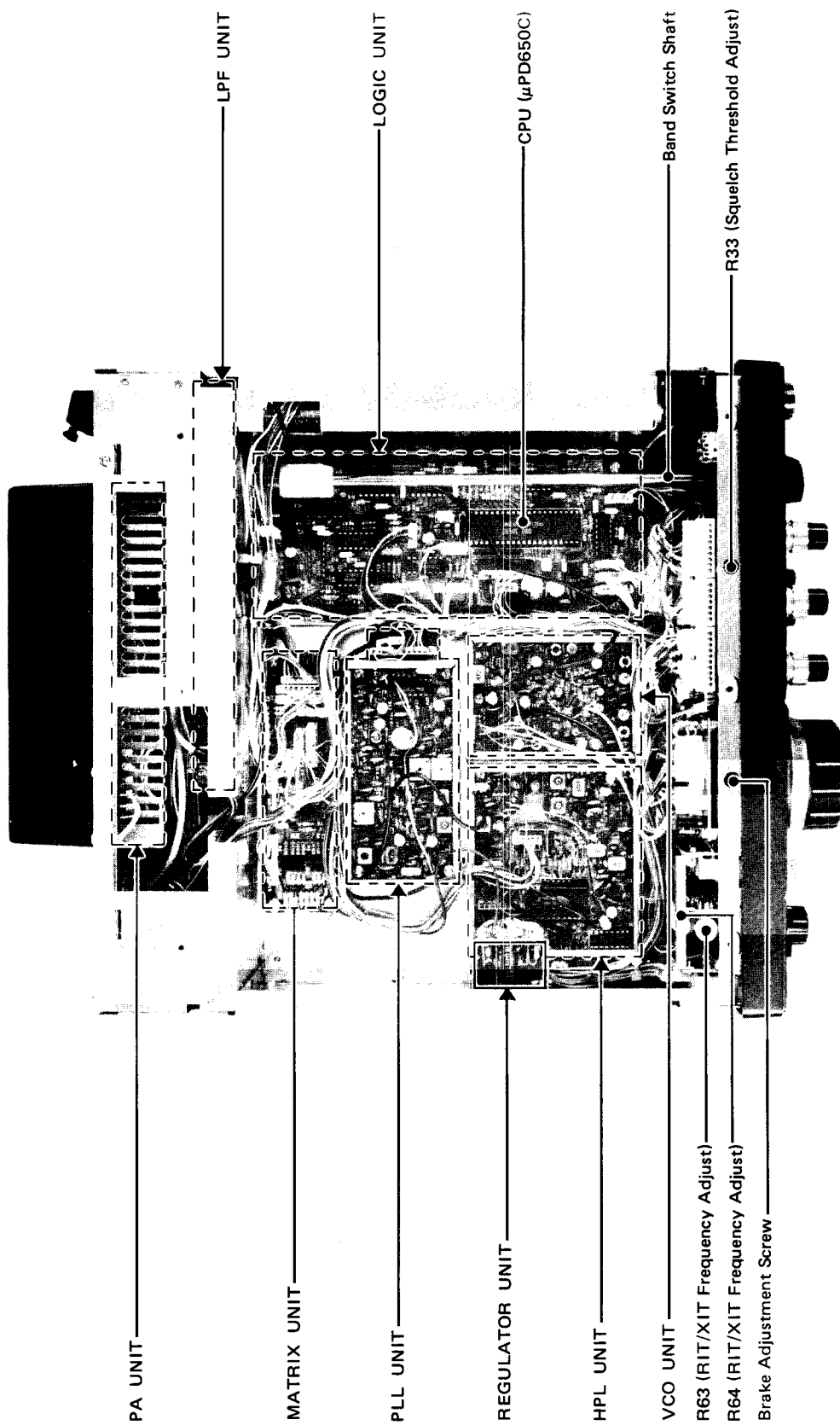
BAND	f1 (MHz)	f2 (MHz)	MODE	f3 (MHz)
1.8MHz	41.2315	41.2315	USB	9.01300
3.5MHz	43.2315	43.2315	LSB	9.01000
7 MHz	46.7315	46.7315	CW-T	9.01150
10 MHz	48.7315	48.7315	CW-R	9.01070
14 MHz	53.7315	53.7315	RTTY-T	9.01150
18 MHz	57.7315	57.7315	RTTY-T	9.01150
21 MHz	60.7315	60.7315	RTTY-T	9.01150
24.5MHz	64.2315	64.2315	RTTY-T	9.01150
28 MHz	67.7315	67.7315	RTTY-T	9.01150
28.5MHz	68.2315	68.2315	RTTY-T	9.01150
29 MHz	68.7315	68.7315	RTTY-T	9.01150
29.5MHz	69.2315	69.2315	RTTY-T	9.01150

SECTION 6 INSIDE VIEWS

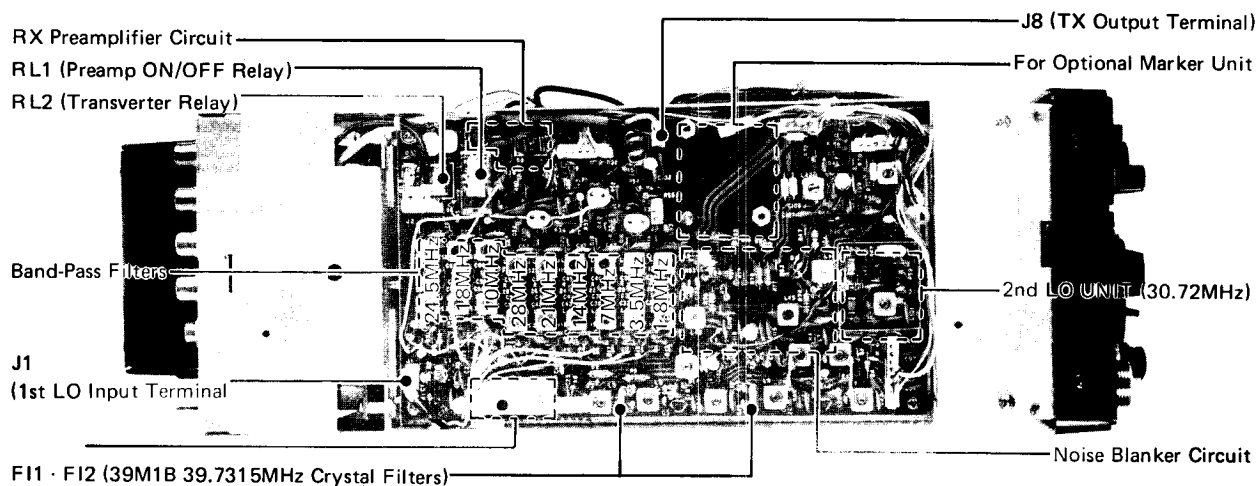
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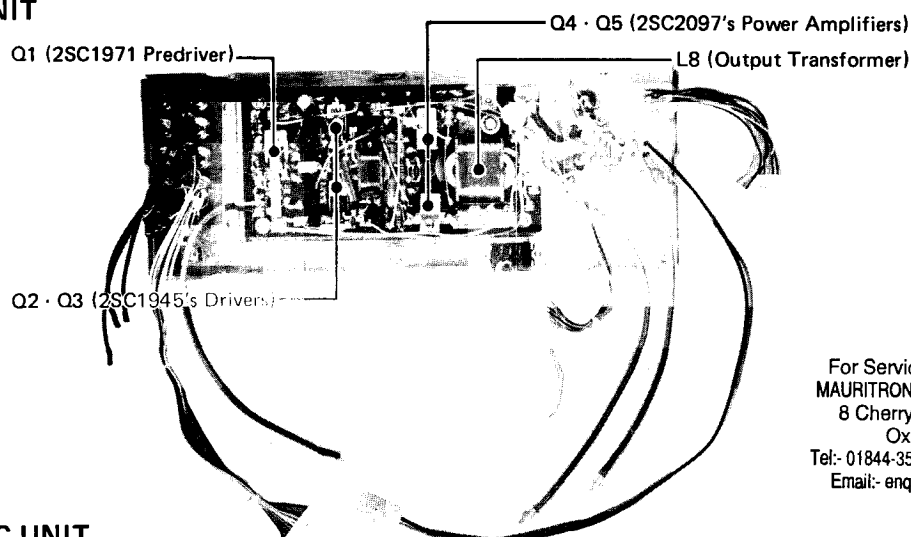
6 - 2 BOTTOM VIEW



6 - 3 RF UNIT

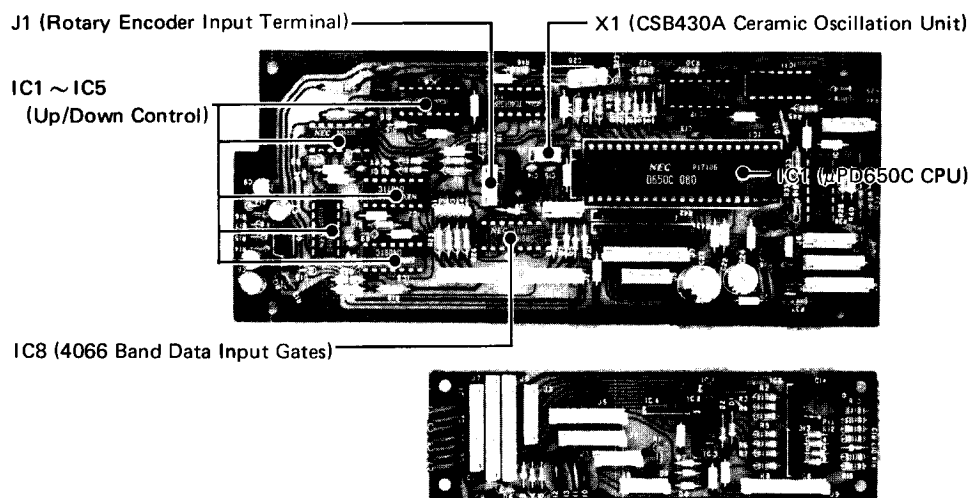


6 - 4 PA UNIT



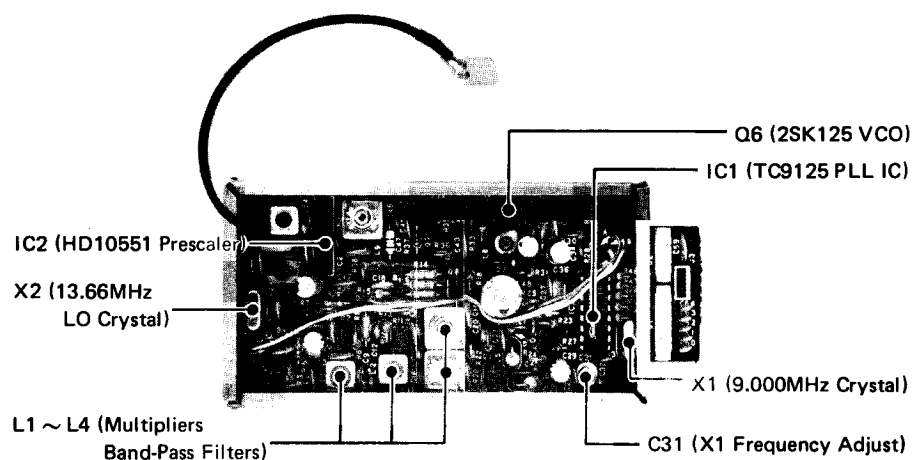
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6 - 5 LOGIC UNIT

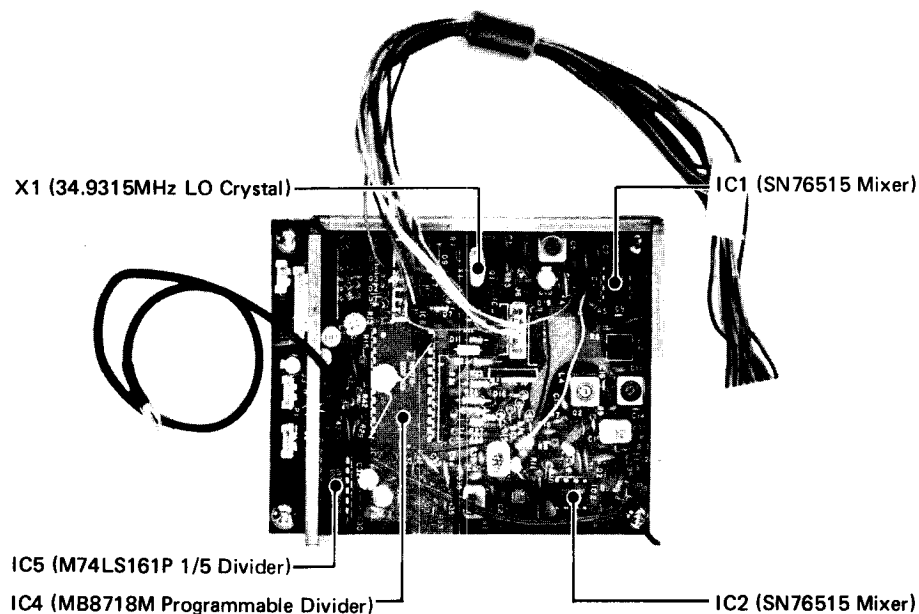


BAND MATRIX UNIT

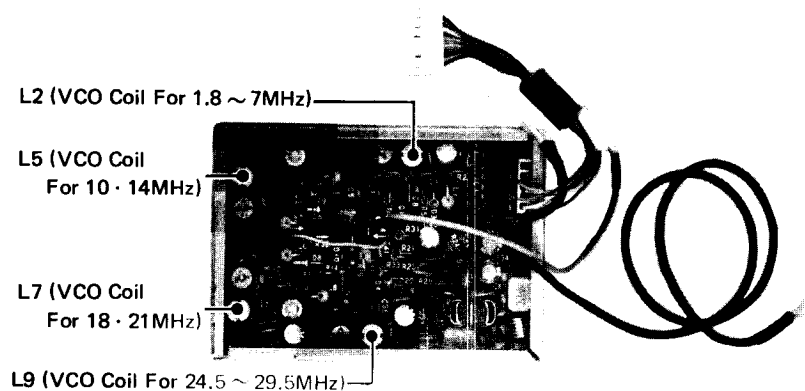
6 - 6 PLL UNIT



6 - 7 HPL UNIT



6 - 8 VCO UNIT



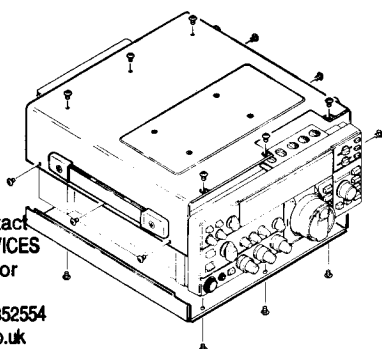
SECTION 7 OPTION INSTALLATION

The following tools are needed for the installation of the options:

Phillips Screwdriver	Diagonal cutters
Screwdriver	Soldering Iron (40W)
Solder	Soldering tool
De-soldering braid	

Before performing any work on the set, make sure that the power cord is detached from the transceiver.

Remove the top and bottom covers by unscrewing the six screws each on the top and bottom, and the three screws on each side, while taking care not to damage the internal speaker, and unplug its connector.



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7 - 1 INSTALLATION OF OPTIONAL FILTER

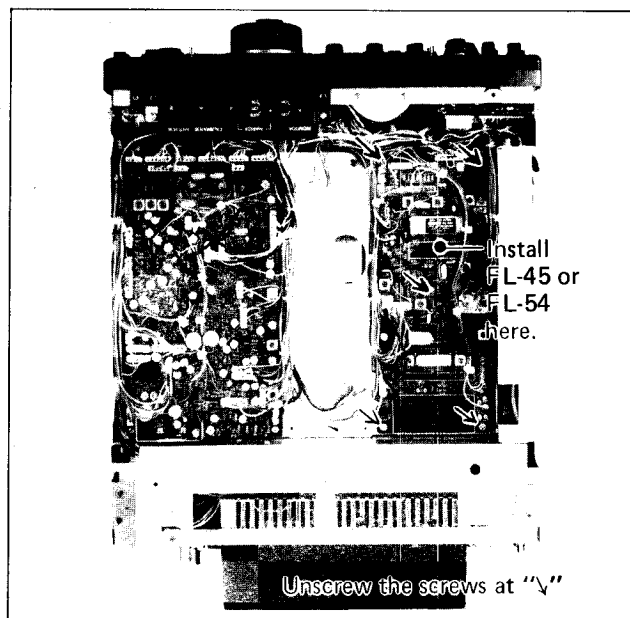
We have prepared various optional filters as follows.

	CENTER FREQUENCY	CHARACTERISTICS	USABLE MODE
FL-45	9.0115MHz	$\pm 250\text{Hz}/-6\text{dB}$, $\pm 800\text{Hz}/-60\text{dB}$	CW-RTTY
FL-54	9.0115MHz	$\pm 135\text{Hz}/-6\text{dB}$, $\pm 550\text{Hz}/-60\text{dB}$	CW
FL-44A	455.0KHz	$\pm 1.2\text{KHz}/-6\text{dB}$, $\pm 2.1\text{KHz}/-60\text{dB}$	SSB
FL-52A	455.0KHz	$\pm 250\text{Hz}/-6\text{dB}$, $\pm 500\text{Hz}/-60\text{dB}$	CW-RTTY
FL-53A	455.0KHz	$\pm 125\text{Hz}/-6\text{dB}$, $\pm 240\text{Hz}/-60\text{dB}$	CW

7 - 1 - 1 INSTALLATION OF FL-45/FL-54

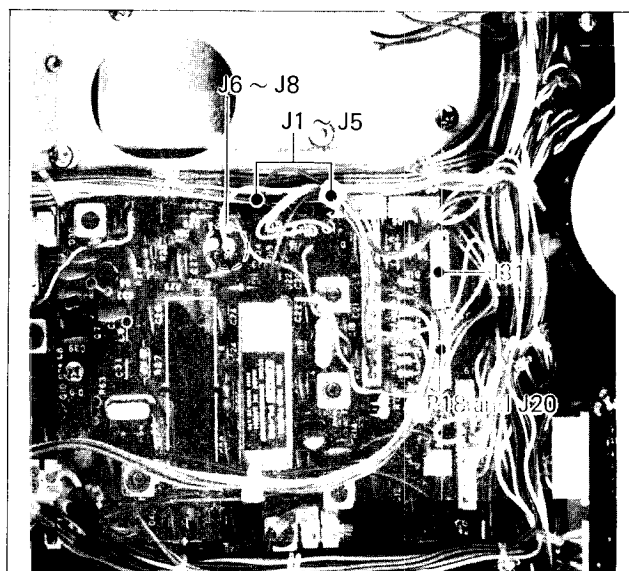
1. Unscrew the five screws retaining the IF unit board shown in the photo. Then turn the board over to the front side so that the foil side of the board can be seen.
2. The location for the filter is shown in the photo. The holes for mounting the legs and the leads of the filter are predrilled. Be sure to orient the filter so that the label on the top of the unit is facing the same direction as the other filter already mounted in the set. Insert the filter flush with the board, bend the leads and legs flush with the opposite side of the board and solder them in. Trim the leads even with the solder points. This completes the installation. Replace the IF Unit, and the screws.
3. When you would like to use the installed filter (FL-45 or FL-54) on the CW mode only, unplug P13 (BLUE wire) from J5, then plug it into J6 or J7.

In the CW mode, the installed filter is selected when the FILTER switch on the front panel is pushed in, and the filter gives 500Hz/-6dB or 250Hz/-6dB pass-band.



4. When you would like to use FL-45 on CW and RTTY modes (FL-45 cannot be used on RTTY mode, because its pass-band is too narrow for RTTY), unplug P18 (5 pins plug) from J20 and plug it into J31, and unplug P13 and plug it into J6 or J7 the same as (3).

In the CW and RTTY modes, the FL-45 is selected when the FILTER switch on the front panel is pushed in, and the filter gives 500Hz/-6dB pass-band for both the CW and RTTY modes.



NOTE: 1. The installed filter will function when the PBT switch on the front panel is pushed in.

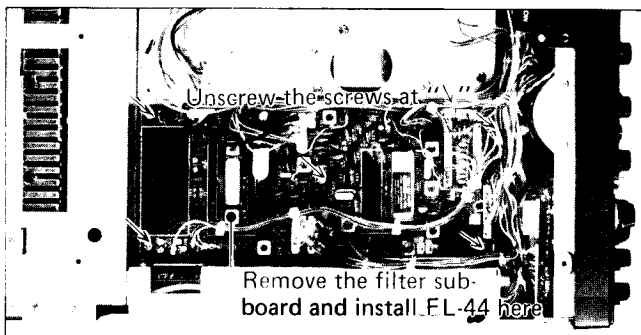
2. When you have installed the FL-52A or FL-53A 455KHz crystal filter and you would like to switch the 455KHz filter and the newly installed 9MHz filter by the FILTER switch, unplug P11 (GREEN wire), instead of P13, from J4 then plug it into J6 or J7.

The 455KHz filter is selected when the FILTER switch is pushed in and the 9MHz filter is selected when the FILTER switch is in the out position.

7 - 1 - 2 INSTALLATION OF FL-44A

A. When replacing the original ceramic filter by FL-44A

1. Unscrew the five screws retaining the IF unit board shown in the photo. Then turn the board over to the front side so that the foil side of the board can be seen.
2. Remove the solder from the ceramic filter sub-board on the IF unit board shown in the photo below, using a de-soldering braid, then remove the sub-board.
3. Insert the FL-44A to the position where the ceramic filter was installed (shown in the photo below) and retain it by using the two supplied nuts, then solder its terminal pins.
4. Replace the IF unit board, and top and bottom covers.
5. No adjustment is required for operation.



B. When installing FL-44A onto the position for an optional filter

1. Follow step 1 of the above instructions.
2. Insert the FL-44A to the position where is shown as "OPTION FILTER" for FL-52A and FL-53A, and retain it by two supplied nuts then solder its terminal pins.
3. Unplug P4 (RED wire) from J23, then plug it into J28 or J29.
Replace the IF unit board, and top and bottom covers.
4. In the SSB mode, the original ceramic filter and FL-44A can be selected by the FILTER switch on the front panel.
When the FILTER switch is pushed in, the FL-44A is selected and gives its higher selectivity.

7 - 1 - 3 INSTALLATION OF FL-52A/FL-53A

1. Unscrew the five screws retaining the IF unit board shown in the photo. Then turn the board over to the front side so that the foil side of the board can be seen.

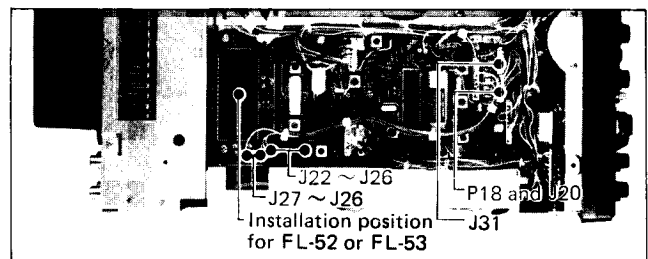
2. Insert the FL-52A or FL-53A to the position where is shown as "OPTION FILTER" for FL-52 and FL-53, and retain it by using the two supplied nuts then solder its terminal pins.

3. When you would like to use the installed filter (FL-52A or FL-53A) in the CW mode only, unplug P12 (BLUE wire) from J26, then plug it into J28 or J29.

In the CW mode, the installed filter is selected when the FILTER switch on the front panel is pushed in, and the filter gives 500Hz/−6dB or 250Hz/−6dB pass-band.

4. When you would like to use FL-52A on CW and RTTY modes (FL-53A cannot be used on RTTY mode, because its pass-band is too narrow for RTTY), unplug P18 (5 pins plug) from J20 and plug it into J31, and unplug P12 from J26 and plug it into J28 or J29 the same as (3).

In the CW and RTTY modes, the FL-52A is selected when the FILTER switch on the front panel is pushed in, and the filter gives 500Hz/−6dB pass-band for both the CW and RTTY modes.

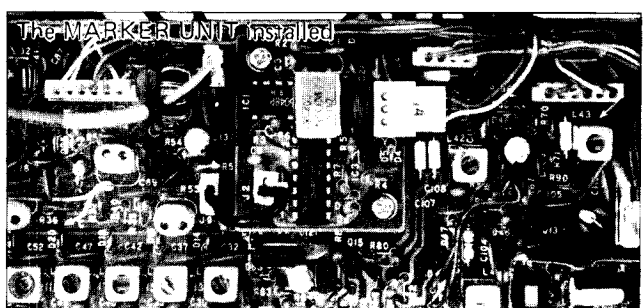


7 - 2 MARKER UNIT IC-EX241

This unit generates marker signals to calibrate IC-740's operation frequency. The marker generator puts out accurate 100KHz or 25KHz signals on the entire band, and gives easy and accurate frequency calibration.

7 - 2 - 1 ASSEMBLY PROCEDURE

1. Install this unit in the position as shown in the photo on page 26, using the attached screws.
2. Plug P14 (3 pins) of the set to J1 of this unit.
3. Plug P1 (2 pins) of this unit to J9 of the RF unit.
4. Replace the speaker cord connector, and top and bottom covers.



7 - 2 - 2 CALIBRATION OF THE MARKER

1. Set the MODE Switch in the CW position and BAND switch in the 10MHz position, then turn ON the POWER switch.
2. The FREQUENCY DISPLAY will show "10.100.0". Turn the TUNING CONTROL knob to tune to WWV (or other standard frequency station) on 10.000MHz, and a 800Hz beat tone will be heard. Set the TUNING RATE switch in 10Hz steps for fine tuning.
3. Set the MARKER Switch on the top cover in the "100K" or "25K" and adjust the MARKER CALIBRATION CONTROL on the top cover, so that the two tones are of the same pitch (in zero beat).

7 - 2 - 3 CALIBRATION OF THE TRANSCEIVER

1. Set the MODE switch in the CW position and the TUNING RATE switch in 100Hz position. Tune to the lower band edge of the band you want to calibrate, as an example, "21.000.0".
2. Ground the KEY jack on the rear panel so that the CW sidetone becomes audible. (Don't transmit.)
3. Set the MARKER switch in the "100K" or "25K", and adjust the FREQUENCY SET CONTROL of the set so that the two tones are of the same pitch (in zero beat).
4. The frequency calibration is sufficient on a frequency on the same band, but it is required for each band.

7 - 3 FM UNIT IC-EX242

This unit has a 9.0115MHz FM generator, 2nd IF amplifier, and FM detector circuits that will upgrade the IC-740 to a complete all-mode transceiver. The unit provides a clear, powerful FM signal, and interference-free steady reception for 29MHz FM and/or a VHF/UHF transverter.

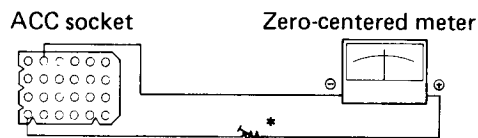
7 - 3 - 1 ASSEMBLY PROCEDURE

1. Install this unit into the position shown in the photo on page 6 - 1, using the attached screws.
2. Unplug P25 (2 pins with a coaxial cable) which is plugged into J16 of the IF unit, and then plug it into J4 to this unit.
3. Plug P26 (3 pins with a shielded wire and red wire) from the IF unit, into J1 of this unit.
4. Plug P28 (7 pins with white, gray, yellow, purple, red, black, and brown wires) from the front panel, into J2 of this unit.
5. Plug P29 (3 pins with brown, blue and yellow wires) from the front panel, into J3 of this unit.
6. Plug P1 (2 pins with a coaxial cable) of this unit, into, J16 of the IF unit.

7. Plug P2 (3 pins with a coaxial cable and green wire) of this unit into J12 of the IF unit.
8. Plug P3 (2 pins with a shielded wire) of this unit, into J25 of the MAIN unit.
9. Replace the speaker cord connector, and top and bottom covers.
10. No adjustment is required, and the unit provides a complete FM operation.

7 - 3 - 2 OPERATION

Refer to page 3 - 8 for the FM operations. When you would like to use a discriminator-meter, connect a zero-centered meter ($\pm 50\mu\text{A}$ - $100\mu\text{A}$) across Pin 1 and Pin 8 (ground) of the ACCESSORY socket on the rear panel of the set.



* Insert a trimmer resistor if the meter swings too much.

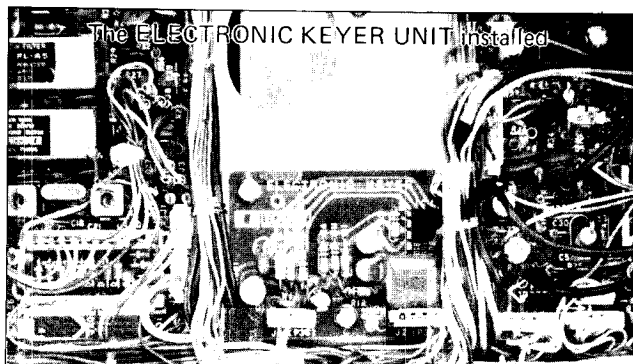
7 - 4 ELECTRONIC KEYER UNIT IC-EX243

This unit provides automatic keying function with an iambic paddle. This unit is built with a single CMOS IC. Features designed into this IC include contact debouncing, RF immunity, self-completing character generation, dot memory and weight control.

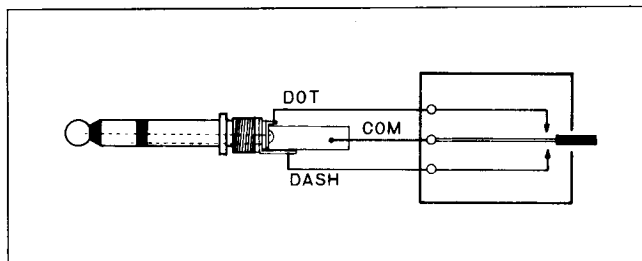
The keying speed can be changed between 5 - 45 wpm by the VOX GAIN/KEYER SPEED CONTROL on the front panel of the set.

7 - 4 - 1 ASSEMBLY PROCEDURE

1. Install this unit into the position shown in the photo on page 6 - 1 using the attached screws.
2. Plug P36 (3 pins) from the front panel, into J1 of this unit.
3. Plug P37 (4 pins) from the front panel, into J2 of this unit.



4. Connect an iambic paddle with a 3-p 1/4 inch key plug as shown in the following illustration.



5. Plug the key plug to the KEY JACK on the rear panel.

6. Check the operation of the keyer. If you would like to increase the weight (to alter the dot-space ratio), turn the weight control on this unit clockwise for your favorite position.

7. Replace the speaker cord connector, and top and bottom covers.

7-4-2 OPERATION

Turn the VOX GAIN/KEYER SPEED CONTROL click on, and adjust keying speed by turning the control further clockwise for the most comfortable speed for you.

When you don't wish to use the keyer, turn the VOX GAIN/KEYER SPEED CONTROL completely counter-clockwise and click off. Then connect a hand key to the KEY JACK on the rear panel.

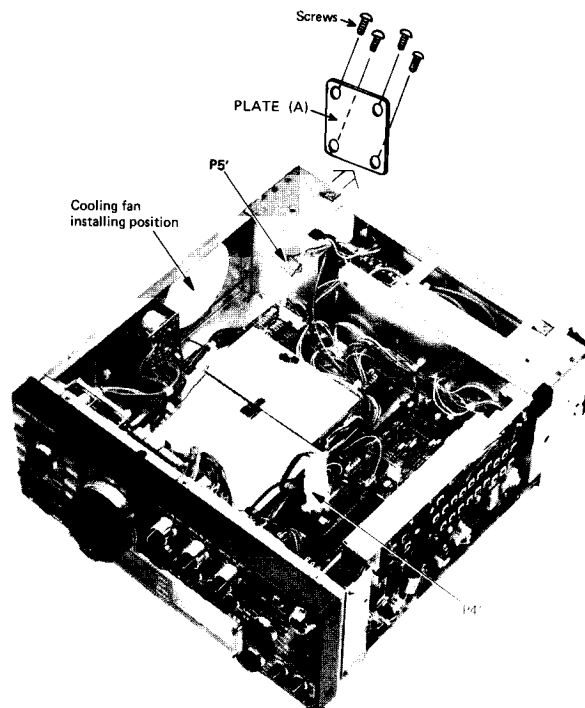
7-5 BUILT-IN POWER SUPPLY UNIT IC-PS740

7-5-1 SPECIFICATIONS

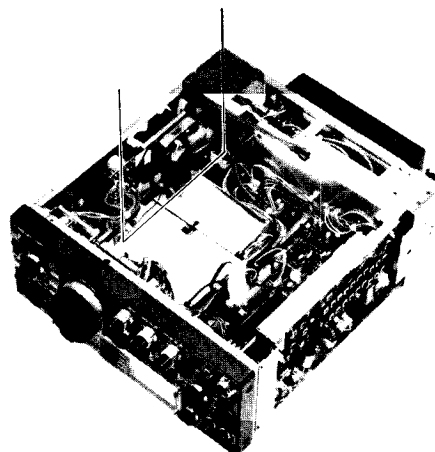
Number of	Transistor	5
Semiconductors	IC	2
	Diode	6
Input Voltage	110/220V AC (50/60Hz)	
Allowable Voltage	±10% of input voltage	
Fluctuation	(suitable line voltage)	
Input Capacity	550VA (at 20A load)	
Output Voltage	13.8V DC Negative ground	
Max. Load Current	20A (10 mins ON/10 mins OFF)	
Dimensions	194(W) x 50(H) x 186(D) mm	
	(excluding cooling fan)	
Weight	Approx. 2.5kg (including cooling fan)	
Kit Included	Main Unit	1
	Cooling Fan	1
	Power Socket Unit	1
	AC Power Cord	1
	Spare Fuse	2
	Installation Screws	10

7-5-2 ASSEMBLY PROCEDURE

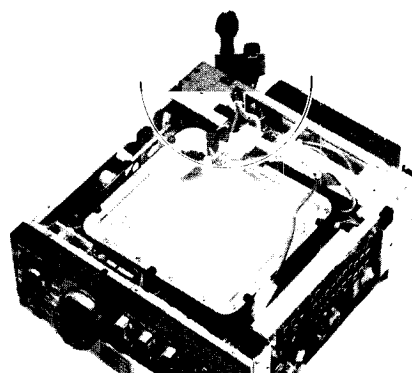
1. Turn the IC-740 upside down. Remove the "PLATE (A)" attached to the rear panel by unscrewing four screws. These screws will be used later.
 Unplug the connector P4' and leave the unplugged connector which is attached with wired from the rear panel to the space between the front panel and chassis.

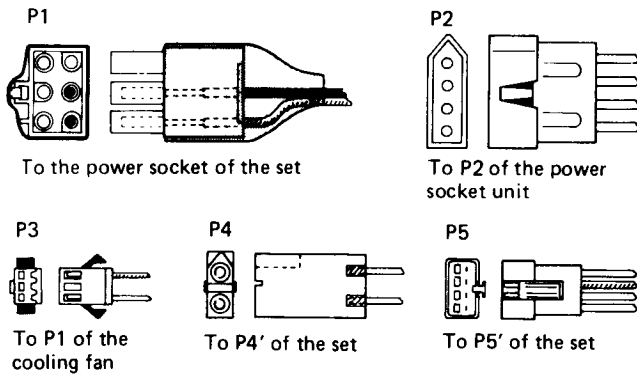


2. Place the cooling fan onto the installing position so that the motor coil is toward the rear as shown in the photo. Fix it with the four screws from the outer side of the chassis.

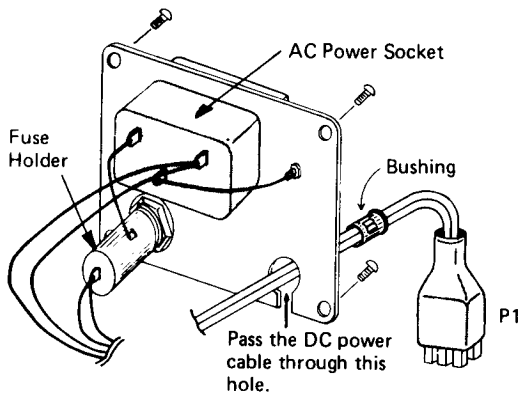


3. Put the power supply unit into the set so that its cables are toward the rear as shown in the photo. Connect the connectors with the appropriate one. Pass the DC power connector, P1, through the hole which was closed by the PLATE (A) before.

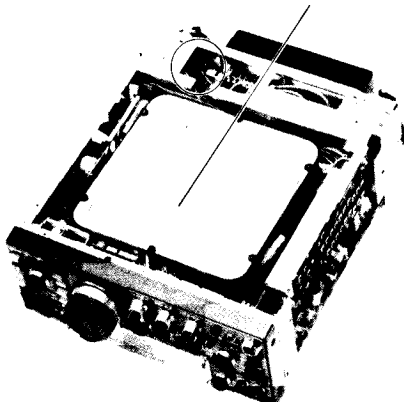




4. Pass the DC power cable attached to P1 through the hole of the AC power socket plate as shown in the illustration, then insert the bushing into the hole. Attach the AC power socket plate to the position where the PLATE (A) was attached before, by using the screws described in 1, so that the AC power socket is toward the bottom of the set.



5. Put P2 and P5 into the space under the chassis (indicated by a circle in the photo), and other connectors into the space between the power supply unit and the chassis of the set. Adjust the position of the power supply unit so that the center screw holes become centered with the center screw holes for the bottom cover.



6. Put the bottom cover of the set onto the power supply unit so that the screw holes of the bottom cover are fitted on the holes of the unit.

Then fix the power supply unit to the bottom cover with the supplied six screws.

7. Connect the internal speaker connector and replace the bottom and top covers of the set. Plug P1 of the power supply unit to the DC Power Socket of the set.

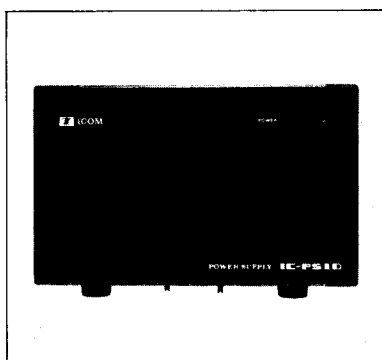
7-5-3 OPERATION

1. Connect the DC output plug, P1, of this unit into the transceiver DC Power Socket securely. At this time, make sure that:
 - A. The power switch on the transceiver is OFF.
 - B. The T/R switch is in the RECEIVE position.
 - C. The PTT switch on the microphone is not depressed.
 - D. The VOX switch is in the OFF (out) position.
2. Connect the supplied AC power cord into the AC power socket (newly installed) on the rear panel of the transceiver. Then connect the AC power plug into an AC power outlet.
3. By turning the transceiver power switch ON, this unit will be turned ON and supply a 13.8V DC to the transceiver.
4. When the AC power plug is connected to an active AC line, the power to the CPU of the set is continuously supplied even when the power switch of the transceiver is turned OFF, to retain all the programmed frequencies in the memory channels, the operating frequencies of the VFO's, operating mode, etc.

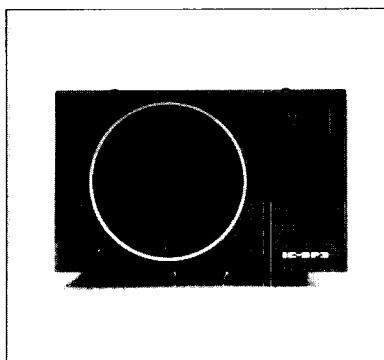
7-5-4 CAUTION

1. Ground the GROUND TERMINAL of the set with as short a wire as possible to prevent electrical shock, TVI, BCI and other problems.
2. This unit stops the output voltage with a protection circuit, when output voltage is shorted or consumed load current exceeds 25A. When the output voltage is stopped, turn the power switch of the transceiver OFF and remove the cause of the problem.
3. If the fuse blows, replace it with a 10A (at 117V) or 5A (at 240V) fuse after checking the cause of the problem. Use a Philips (+) screwdriver to open the holder. The outside ring of the holder cannot be rotated.
4. The optional IC-PS15 power supply however cannot be used with the IC-740 which has already had the IC-PS740 unit installed.

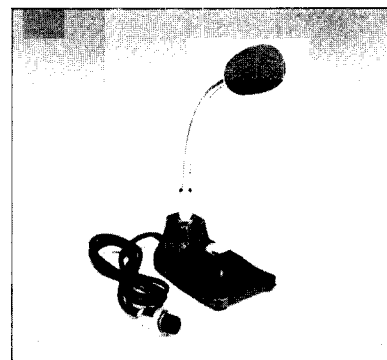
7-6 OTHER OPTIONS



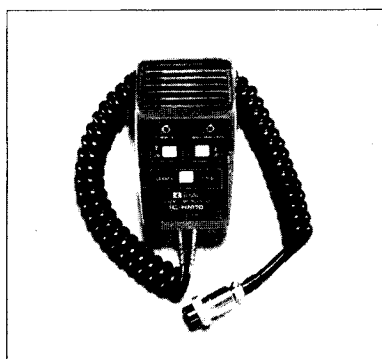
IC-PS15
AC POWER SUPPLY



IC-SP3
EXTERNAL SPEAKER



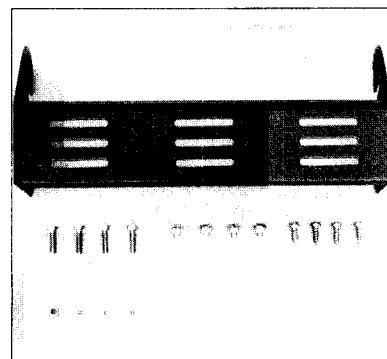
IC-SM5
ELECTRET CONDENSER TYPE
DESK MICROPHONE



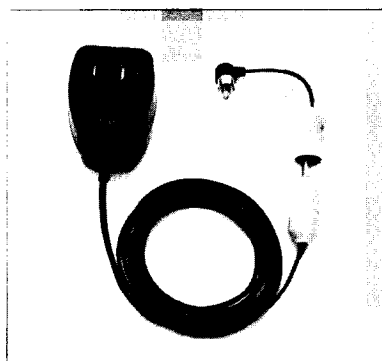
IC-HM10
SCANNING MICROPHONE



IC-HP1
HEADPHONES



IC-MB12
MOBILE MOUNTING
BRACKET

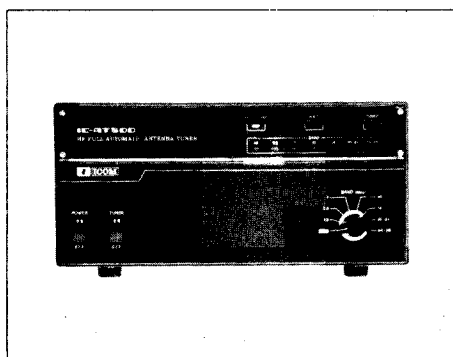


BC-10A
MEMORY BACKUP
AC POWER SUPPLY



IC-2KLPS
ATTENDANT POWER SUPPLY
FOR IC-2KL

IC-2KL
500W SOLID-STATE
LINEAR AMPLIFIER



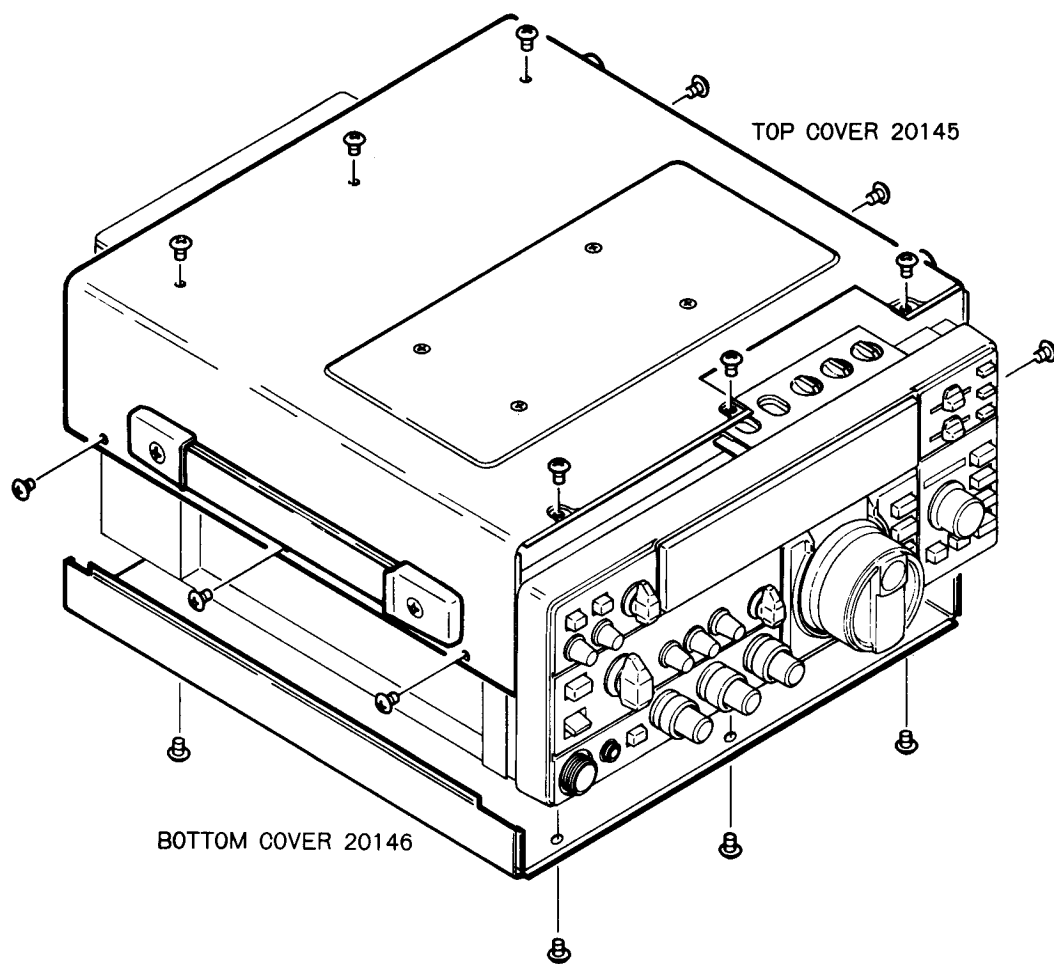
IC-AT100
(100W)
IC-AT500
(500W)

AUTOMATIC
ANTENNA TUNER

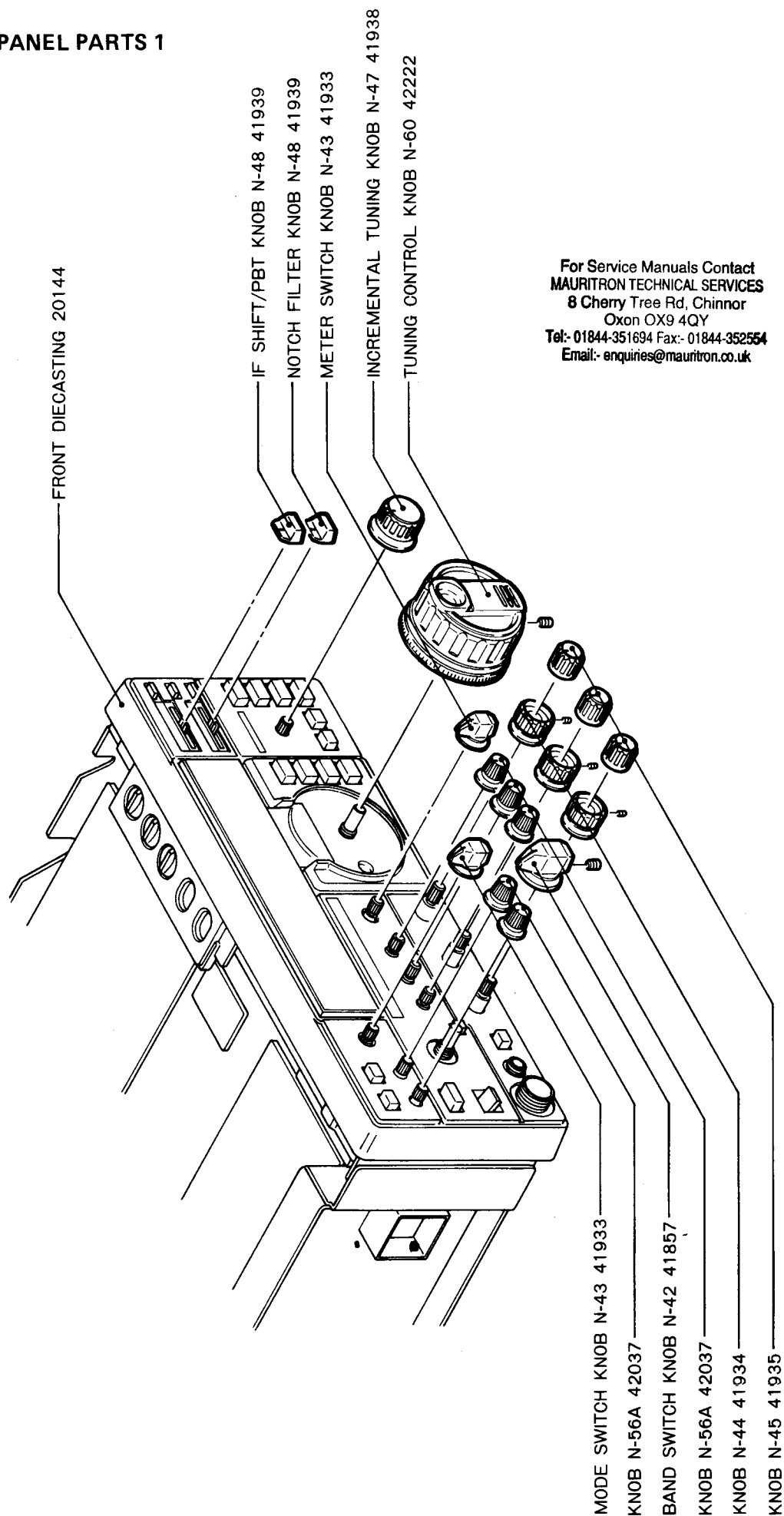
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Email:- enquiries@mauritron.co.uk

SECTION 8 MECHANICAL PARTS AND DISASSEMBLY

COVERS DISASSEMBLY

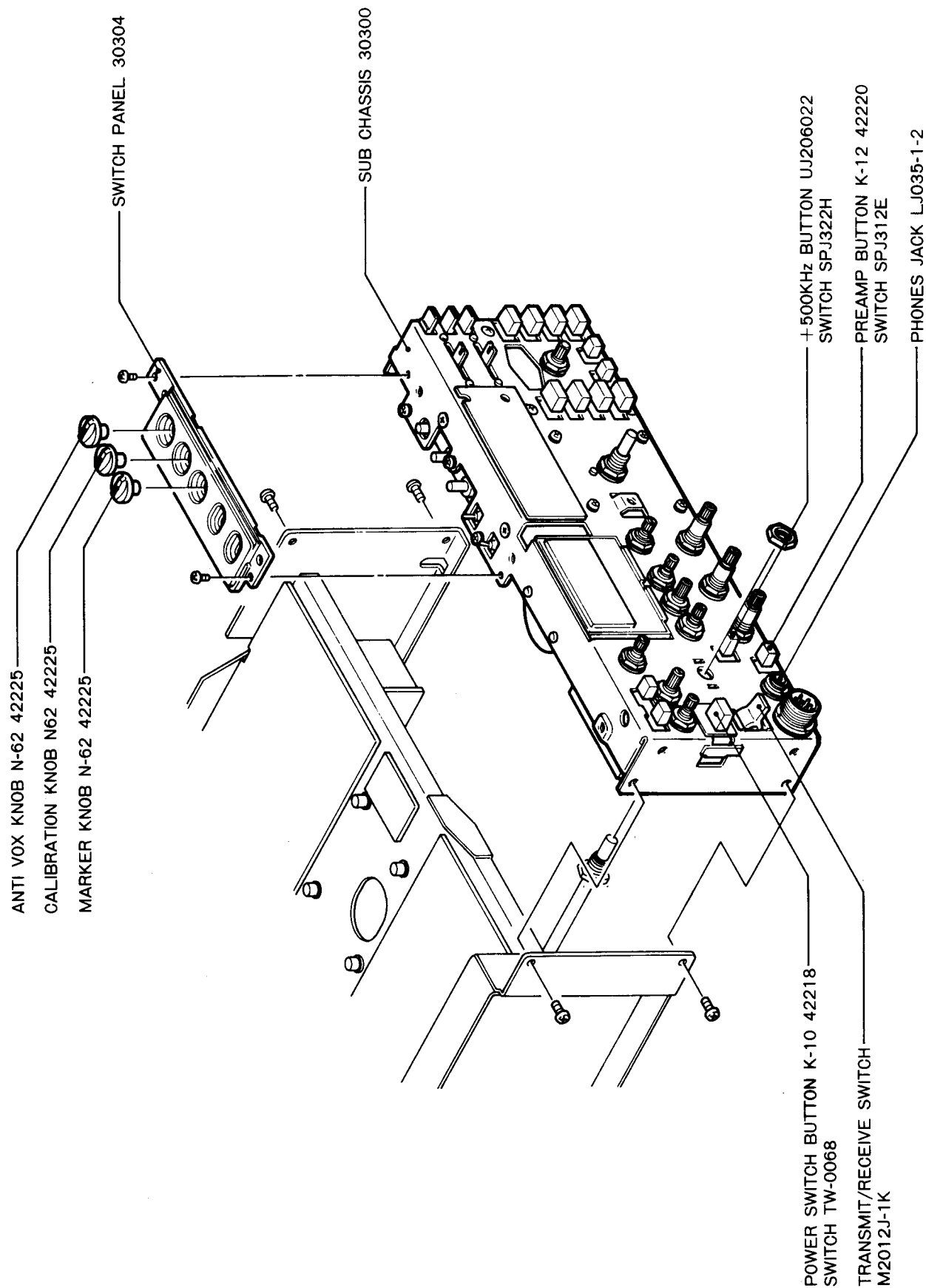


FRONT PANEL PARTS 1

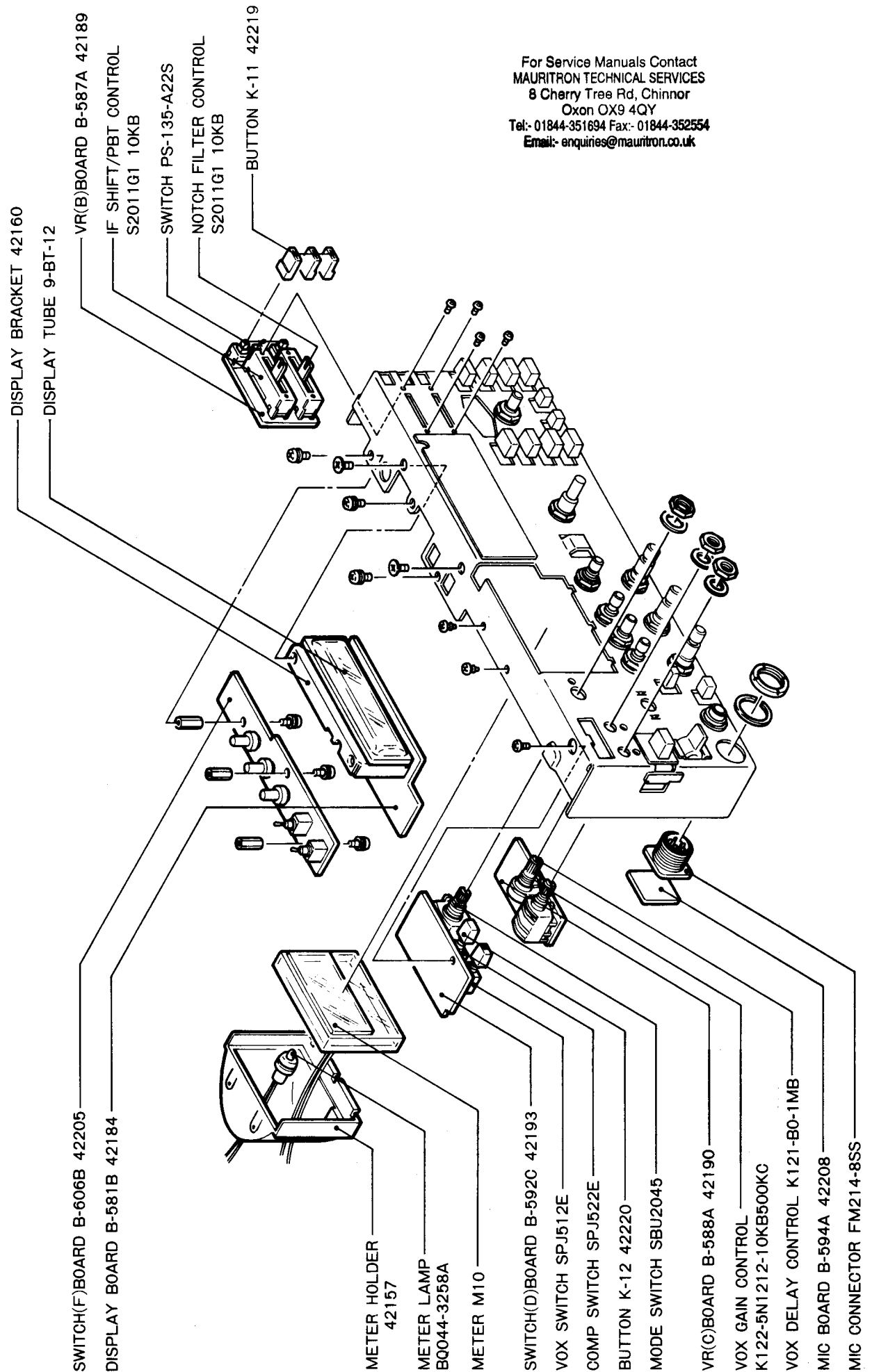


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FRONT PANEL PARTS 2

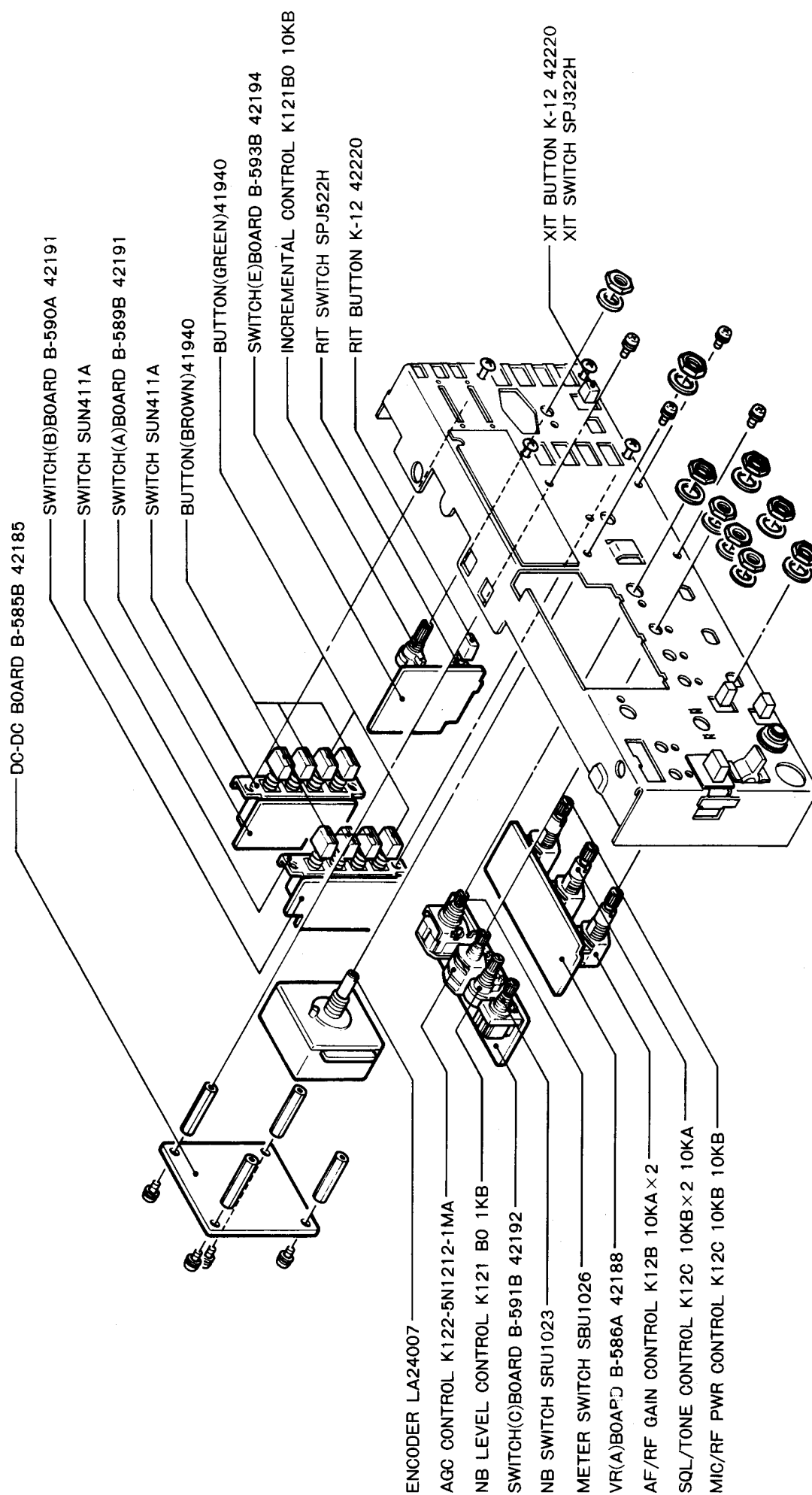


FRONT PANEL PARTS 3

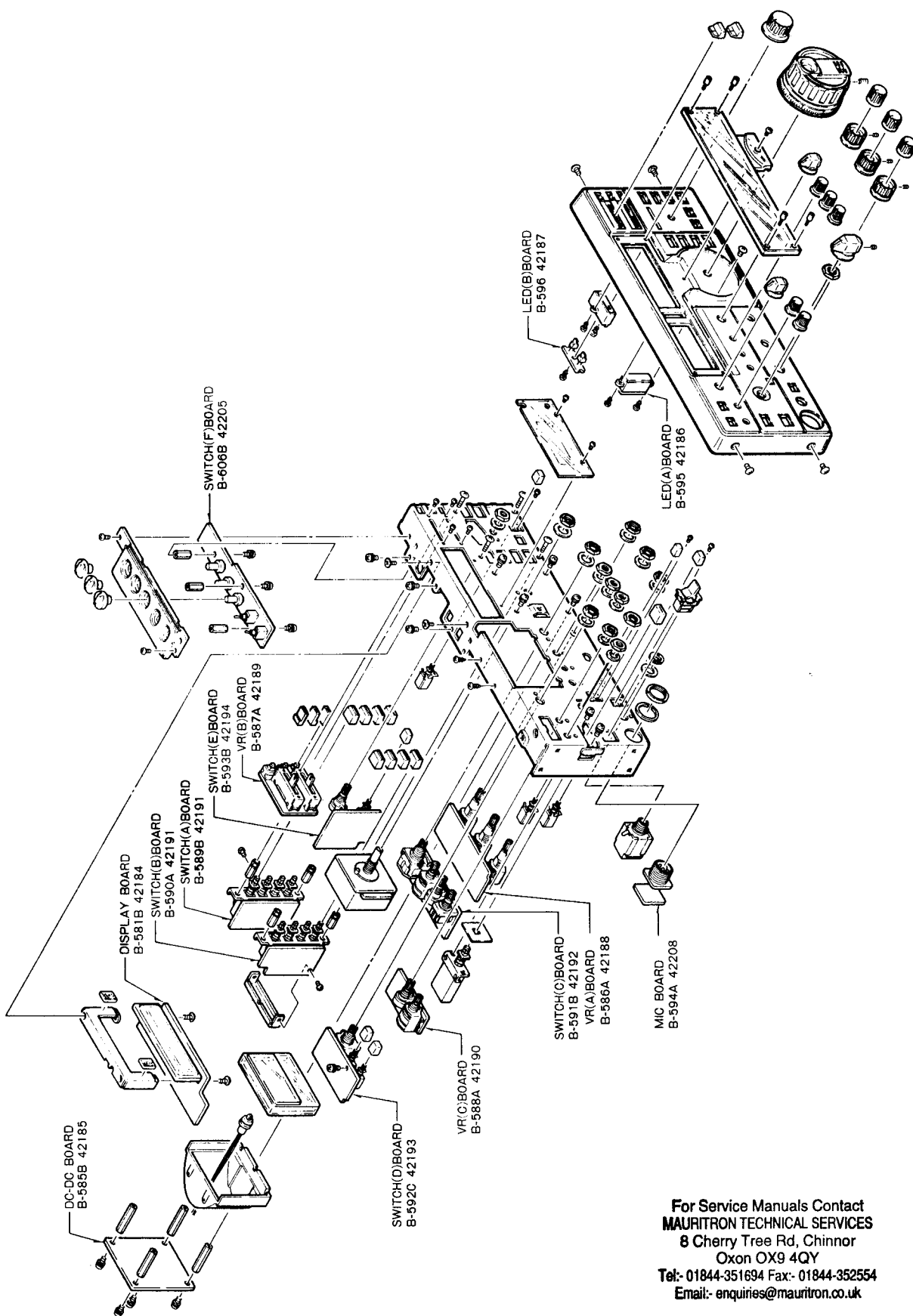


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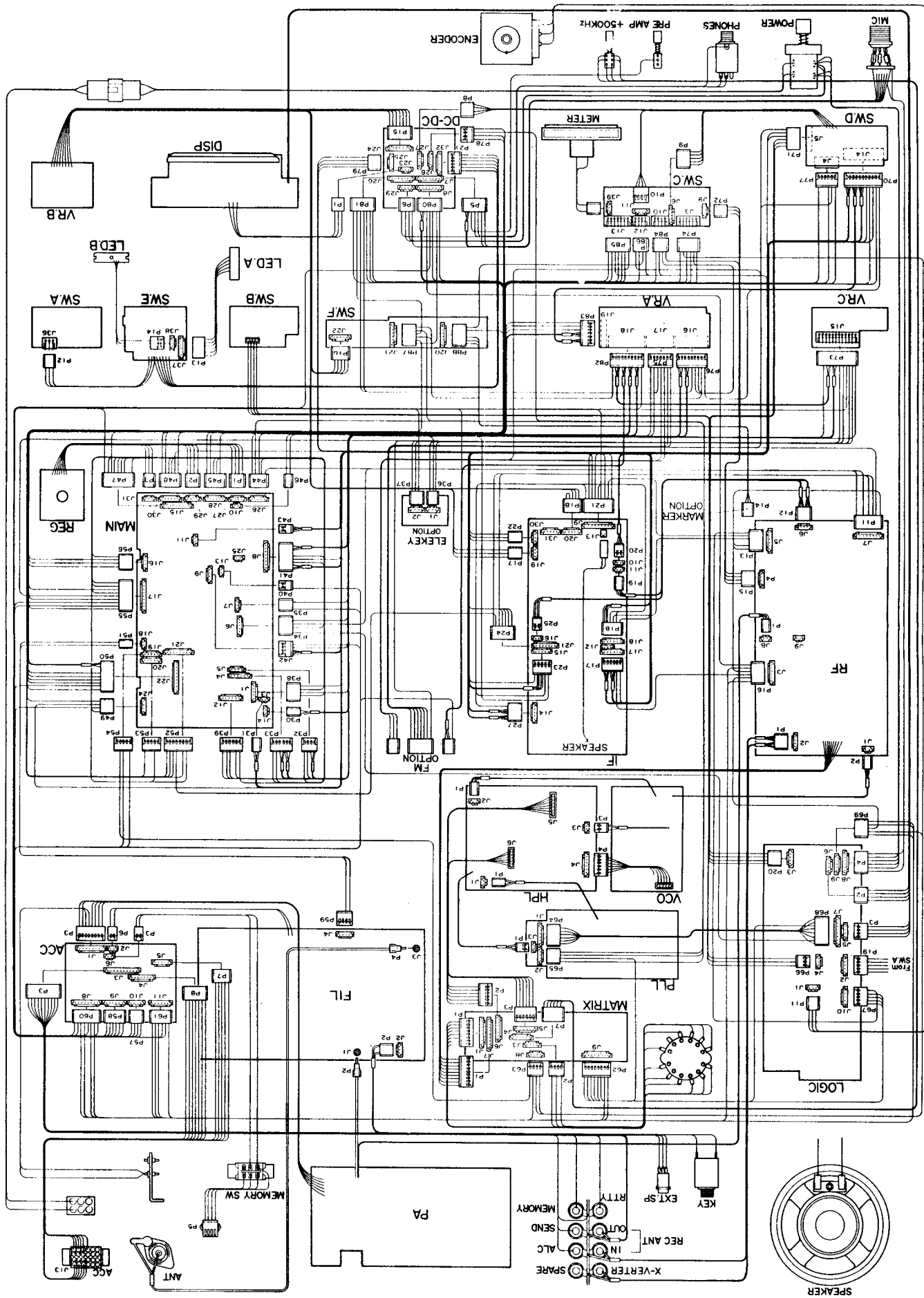
FRONT PANEL PARTS 4

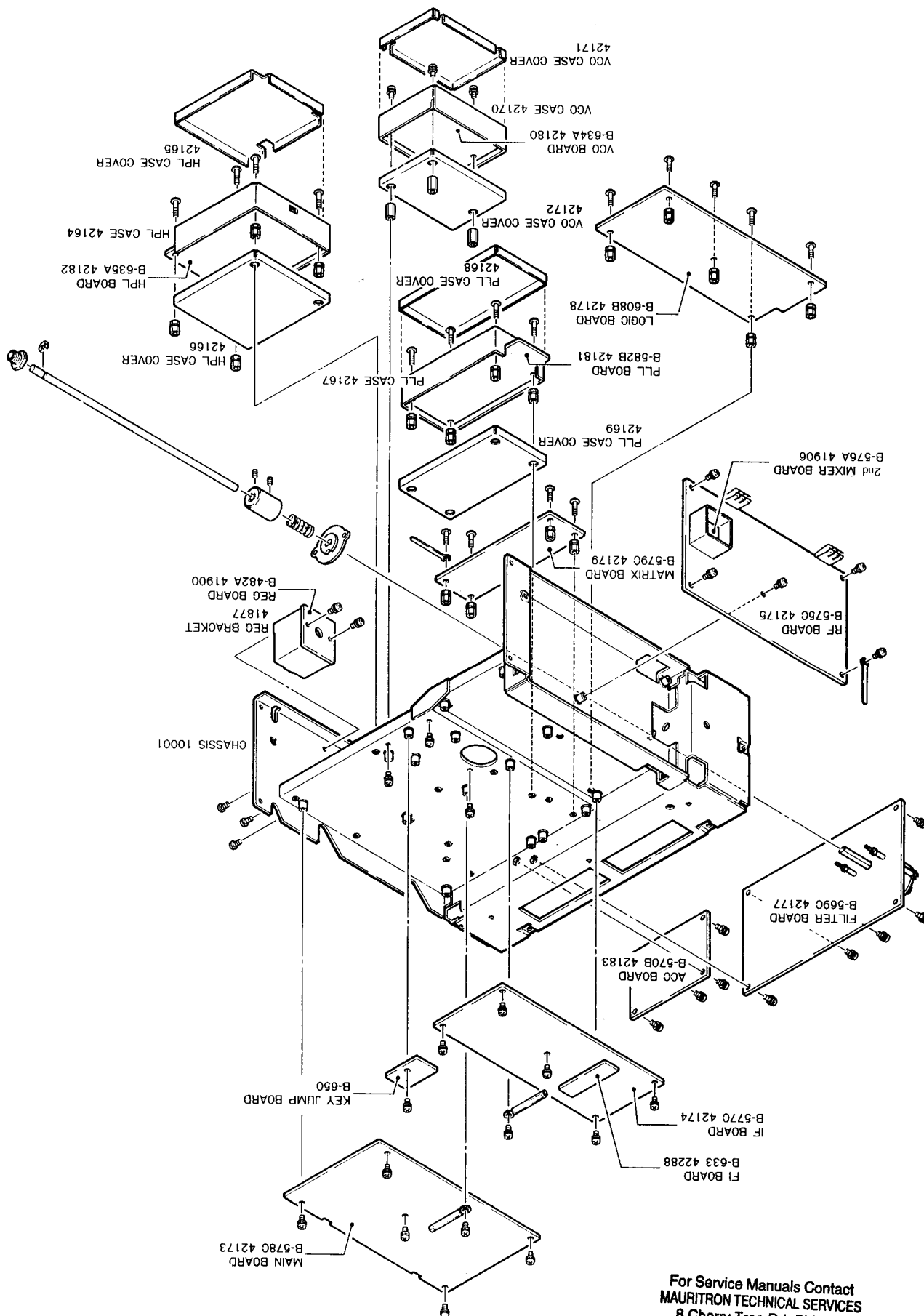


FRONT PANEL PC BOARDS



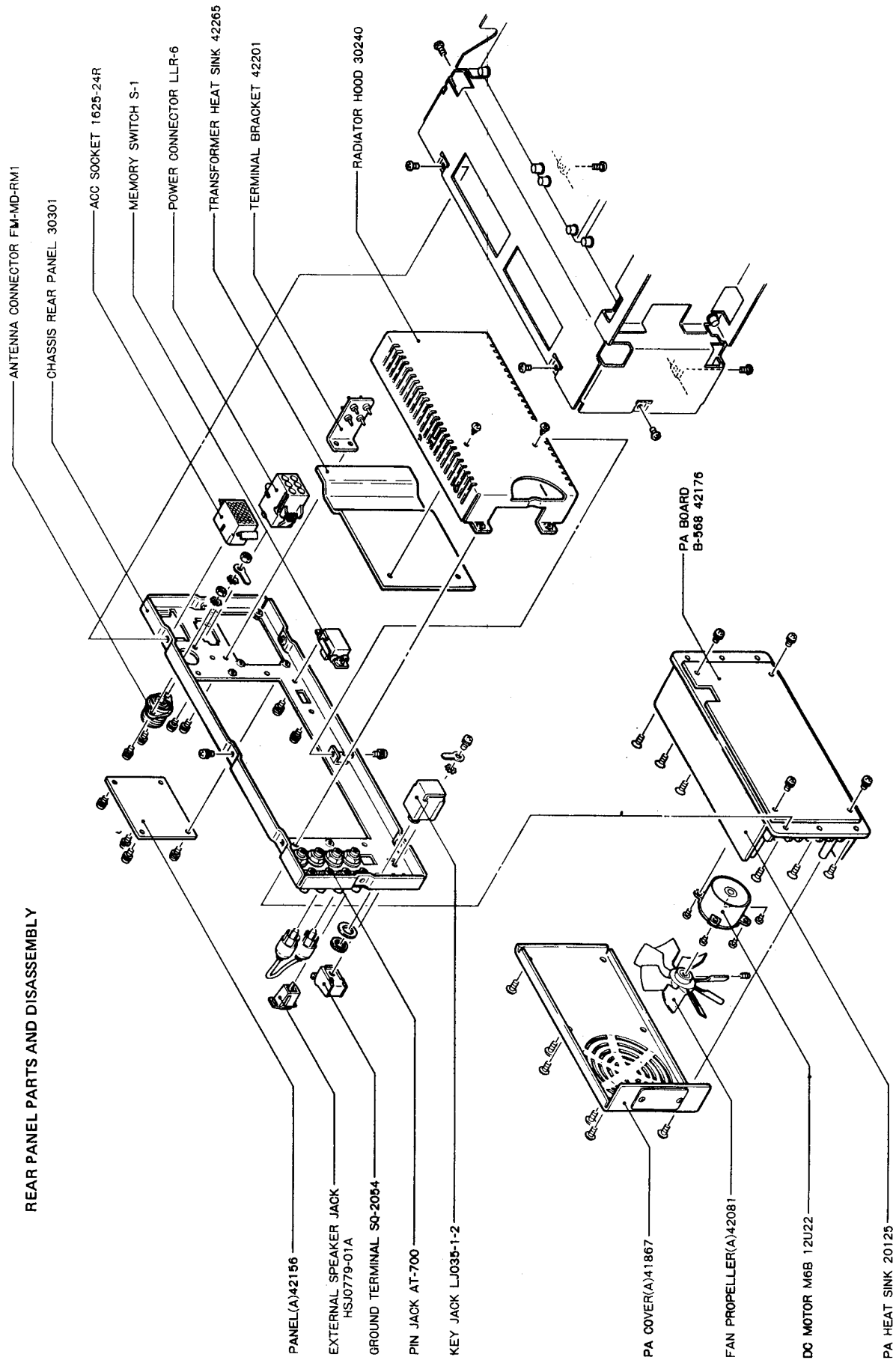
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REAR PANEL PARTS AND DISASSEMBLY

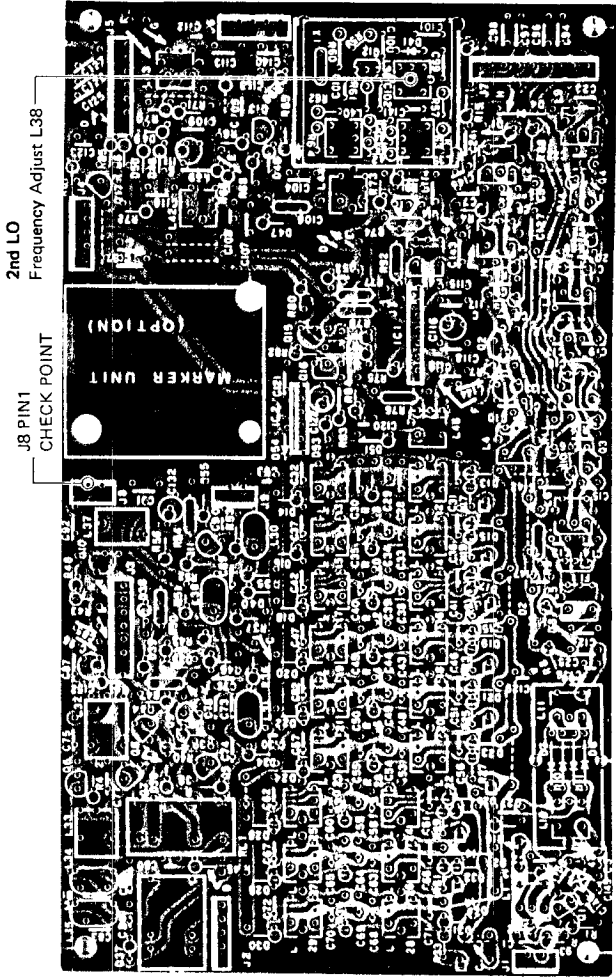


SECTION 9: MAINTENANCE AND ADJUSTMENT

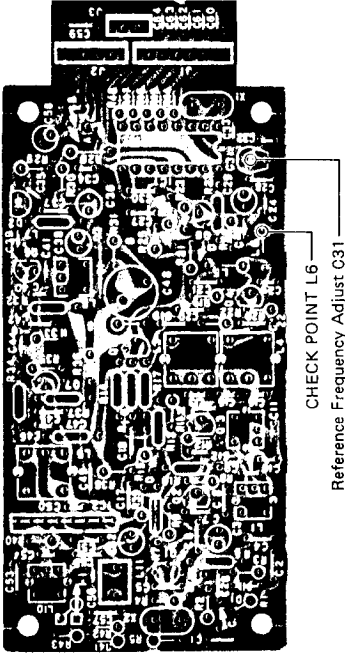
9 - 1 PLL ADJUSTMENT

Adjustment	Conditions	Unit	Measuring Points	Instrument Reading	Unit	Adjust Points
REFERENCE FREQUENCY	1. • MODE : CW • DISPLAY : 14.1000MHz • RIT/XIT : OFF	PLL	Connect a frequency counter to L6.	11.0000MHz	PLL	C31
HPL FREQUENCY	1. • MODE : SSB-NOR • DISPLAY : 14.0985MHz • RIT/XIT : OFF	HPL	Connect the frequency counter to pin 1 of J1.	53.8315MHz	HPL	L1
2nd LO FREQUENCY	1. • MODE : CW or RTTY • DISPLAY : 14.1000MHz • RIT/XIT : OFF	RF	Connect the frequency counter to pin 1 of J8.	14.1000MHz	RF	L38

RF UNIT

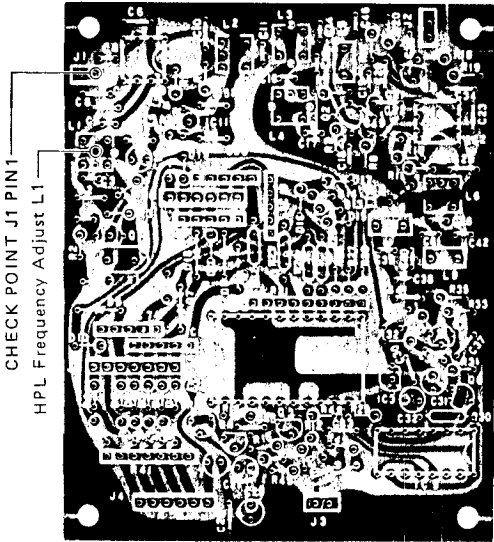


PLL UNIT



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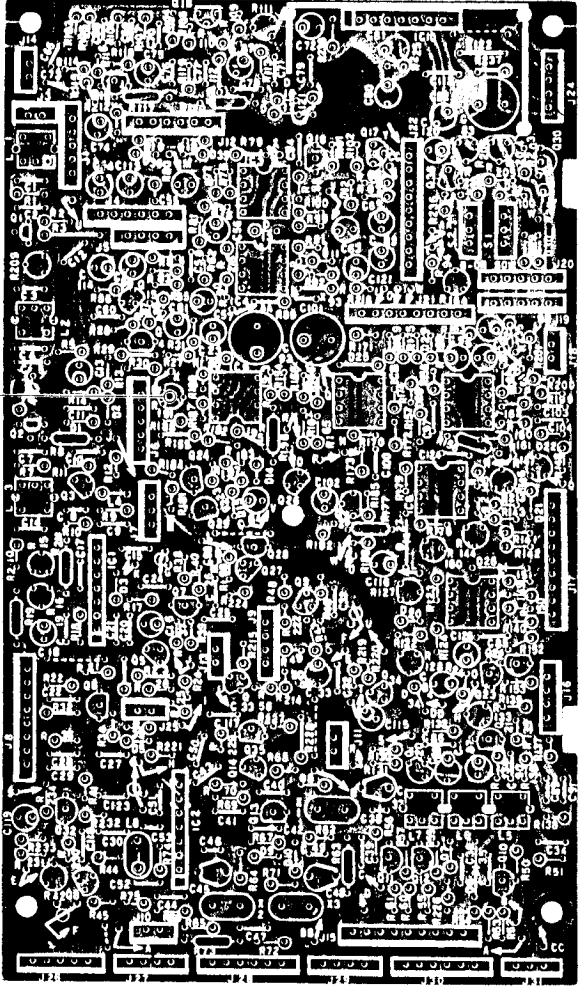
HPL UNIT



9 - 1 PLL ADJUSTMENT (Continued)

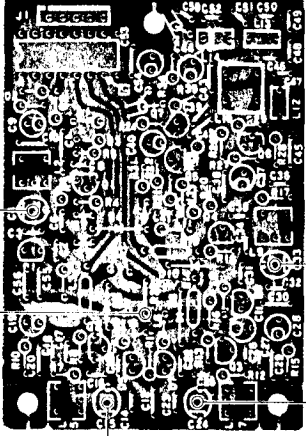
Adjustment	Conditions	Unit	Measuring Points	Instrument Reading	Unit	Adjust Points
PLL LOCK	1. ● MODE : SSB-NOR ● DISPLAY : 1.4000MHz	VCO	Connect a multimeter (10V range) or an oscilloscope to R32	1.8V	VCO	C4
	2. ● DISPLAY : 14.5989MHz					
	3. ● DISPLAY : 21.5989MHz					
	4. ● DISPLAY : 30.0999MHz					
	5. ● DISPLAY : 4.0999MHz					
	6. ● DISPLAY : 9.9000MHz					
	7. ● DISPLAY : 17.9000MHz					
	8. ● DISPLAY : 24.4000MHz					
	9. ● DISPLAY : 7.5999MHz					
	10. ● DISPLAY : 6.9000MHz					
LDO (10Hz steps)	1. ● MODE : CW ● DISPLAY : 14.1000MHz ● T/R SWITCH : TRANSMIT ● Connect an RF power meter to ANT connector.		Couple a frequency counter to the RF power meter connected to the ANT connector.	2V ~ 6V	TOP PANEL	CALIBRATOR OR Control
	2. ● DISPLAY : 14.0999MHz					

MAIN UNIT



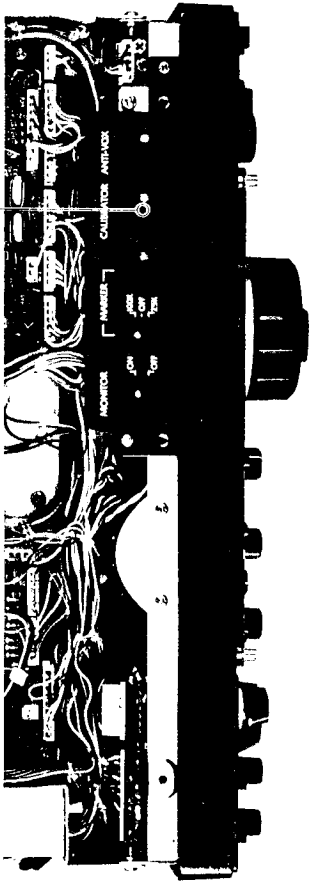
VCO UNIT

R32 CHECK POINT
C4 PLL LOCK VOLTAGE Adjust



TOP PANEL

CALIBRATOR Control

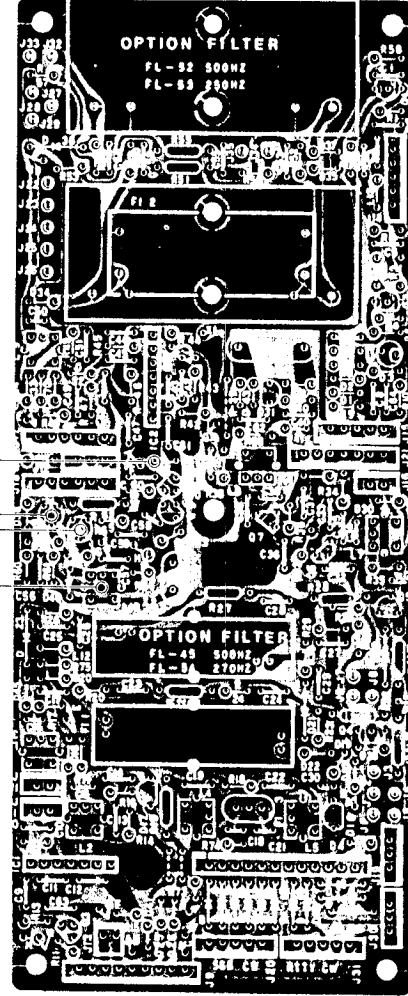


9 - 2 COMMON CIRCUITS ADJUSTMENT

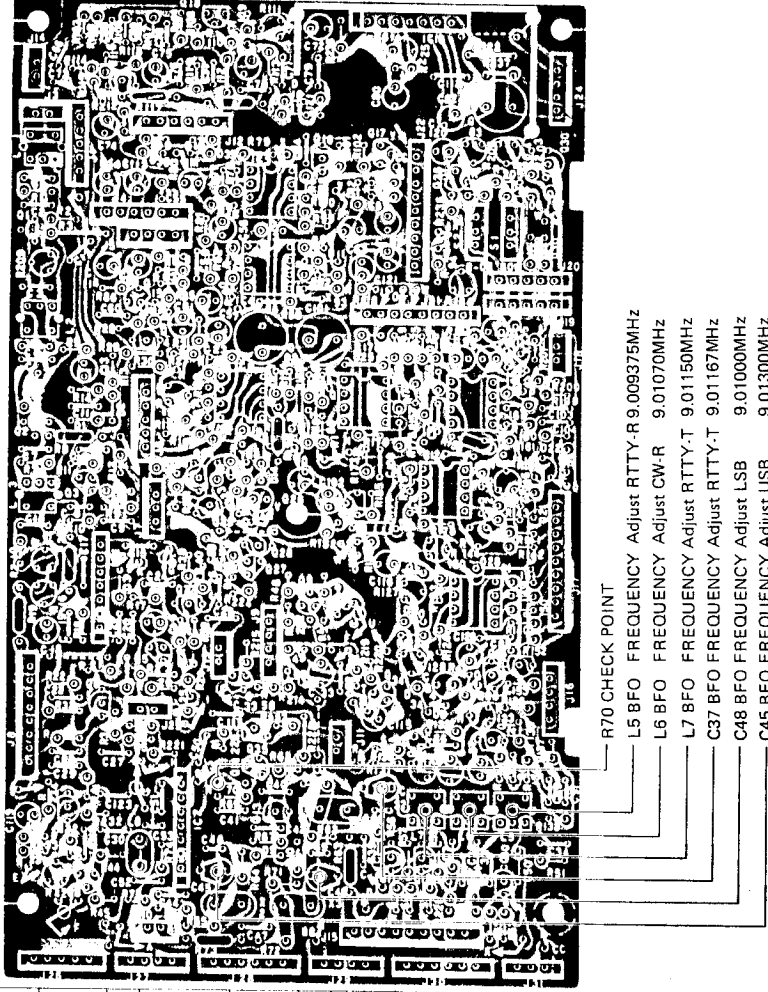
Adjustment	Conditions	Unit	Measuring Points	Instrument Reading	Unit	Adjust Points
BFO FREQUENCY	1. • BAND : 14MHz • MODE : USB (NOR) • T/R SWITCH : RECEIVE	MAIN	Connect a frequency counter to R70 through a 470 ohm resistor.	9.01300MHz	MAIN	C45
	2. • MODE : LSB (REV)			9.01000MHz		C48
	3. • MODE : RTTY • T/R SWITCH : TRANSMIT Jumper between pin 1 of J9 and ground.			9.01167MHz		C37
	4. Remove the jumper wire between pin 1 of J9 and ground.			9.01150MHz		L7
P.B.T./COMP. FREQUENCY	5. • MODE : CW	IF	Connect the frequency counter to R67 through a 470 ohm resistor.	9.01150MHz	IF	Confirming
	6. • T/R SWITCH : RECEIVE			9.01070MHz		L6
	7. • MODE : RTTY			9.008375MHz		L5
	1. • P.B.T. SWITCH : P.B.T. • PASS-BAND SHIFT CONTROL : Fully left • T/R SWITCH : RECEIVE			9.46830MHz		L10
	2. • PASS-BAND SHIFT CONTROL : Center			9.46650MHz		SW-F
	3. • PASS-BAND SHIFT CONTROL : Fully right			9.4647MHz		Confirming
	4. • COMP : OFF • T/R SWITCH : TRANSMIT			9.46650MHz		R72
	5. • COMP : ON			9.46650MHz		R59

IF UNIT

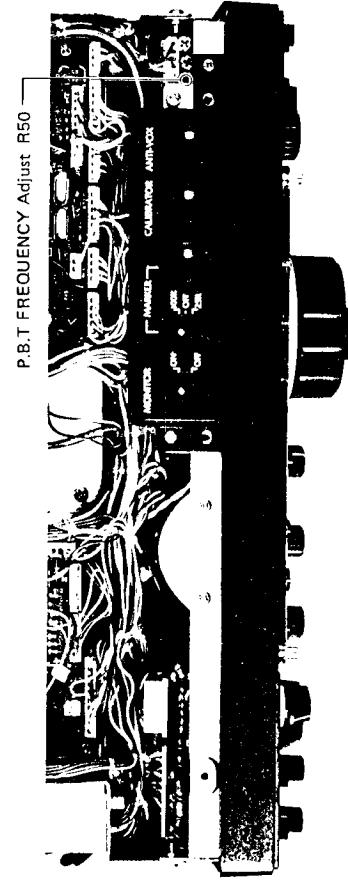
L10 P.B.T. FREQUENCY Adjust
R59 COMP FREQUENCY Adjust
R72 COMP FREQUENCY Adjust
R67 CHECK POINT



MAIN UNIT



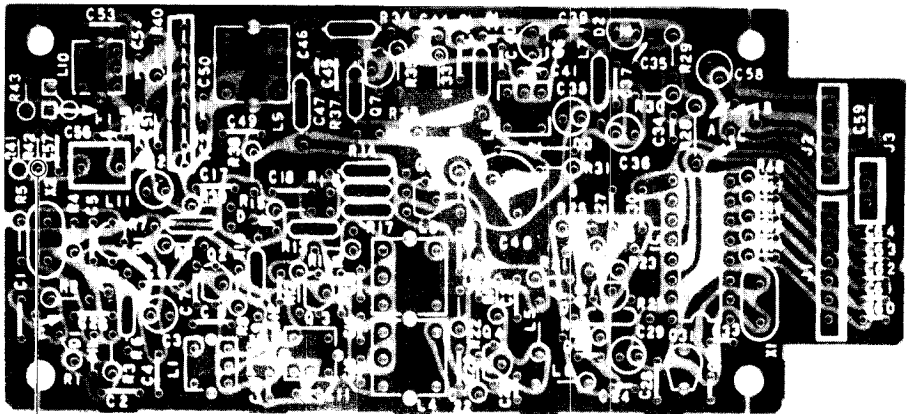
SW-F UNIT



9 - 2 COMMON CIRCUITS ADJUSTMENT (Continued)

Adjustment	Conditions	Unit	Measuring Points	Instrument Reading	Unit	Adjust Points
RIT/XIT FREQUENCY	1. • CALIBRATOR : Center • T/R SWITCH : RECEIVE • DISPLAY : 6.9000MHz • MODE : CW • RIT : OFF	PLL	Connect the frequency counter to R42.	13.2000MHz	SW-E	R63
	2. • RIT : ON • RIT/XIT CONTROL : Center					R64

PLL UNIT



R42 CHECK POINT

SW-E UNIT

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