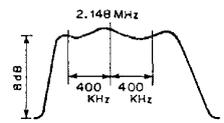
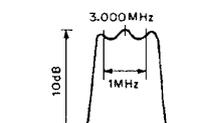
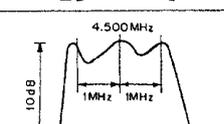
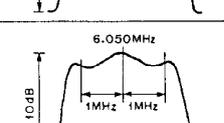
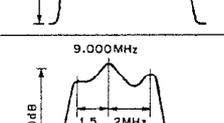
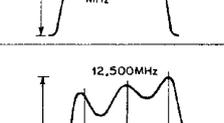
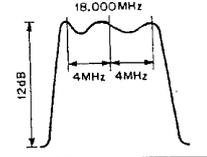
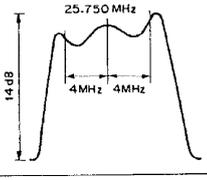
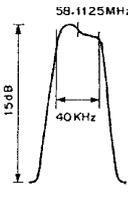


# ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks			
		Test equipment	Unit	Terminal	Unit	Part	Method				
5. IF Shift	1) IF SHIFT VR : Center	DC V.M	SW(B/8)	④ -4	SW(B/8)	VR6	1.1V	1.05~1.15V			
6. LOCAL	1) Disconnect the HET connector in the IF unit and connect the FREQ. counter.	f.counter	IF	L34			Check 49.2825MHz	±1.5kHz			
	2) Connect the HET connector after check.										
7. BFO	1) MODE : USB IF SHIFT VR : Center	f.counter	IF	R139 lead wire	SW(B/8)	VR7	8831.5kHz ±200Hz	8831.5kHz ±200Hz			
	: MAX							More than 8832.5kHz			
	: MIN							Less than 8830.5kHz			
	2) Turns IF shift VR to the center after check.										
8. VCO voltage	1) FREQ. : 30.000.00 FREQ. : 26.200.00 <b>W2</b> MODE : AM	DC V.M	RF	⑦ -2	RF	L62	6.0V 4.6V <b>W2</b>	5.9~6.1V 4.5~4.7V <b>W2</b>			
	2) FREQ. : 21.500.00						Check	2.6~3.3V			
	3) FREQ. : 21.499.99						⑦ -3	RF	L60	6.0V	5.9~6.1V
	4) FREQ. : 14.500.00						Check	2.2~2.9V			
	5) FREQ. : 14.499.99						L58	6.0V	5.9~6.1V		
	6) FREQ. : 7.500.00						Check	2.7~3.3V			
	7) FREQ. : 7.499.99						L56	6.0V	5.9~6.1V		
	8) FREQ. : 30.00 (30kHz) 150kHz <b>W2</b> 2MHz <b>X</b>						Check	2.7~3.3V 2.8~3.4V <b>W2</b> 3.6~4.0V <b>X</b>			
9. RF BPF	1) Tracking Generator output : -20dBm Connect the Tracking generator to ANT terminal.	Tracking generator	RF	TP1	RF	L15, L17	1.8~2.5MHz				
	2) FREQ. : 3.000.00	Spectrum analyzer				L18, L20	2.5~3.5MHz				
	3) FREQ. : 5.000.00		L21, L23	3.5~5.5MHz							
	4) FREQ. : 7.000.00		L24, L26	5.5~7.5MHz							
	5) FREQ. : 10.000.00		L27, L29	7.5~10.5MHz							
	6) FREQ. : 14.000.00		L30, L32	10.5~14.5MHz							

# R-5000

## ADJUSTMENT

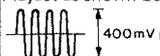
Item	Condition	Measurement			Adjustment		Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	
	7) FREQ. : 21.000.00					L33, L35	14.5~21.5MHz 
	8) FREQ. : 30.000.00					L36~ 38	21.5~30.0MHz 
	9) FREQ. : 1.500.00						
	10) FREQ. : 500.00* * Except X type.						
10. MCF	1) Tracking generator output : -20dBm Connect the tracking generator to TP1 in the RF unit.	Tracking generator	IF	TP1	RF	L50	Larger waveform perform shown on right. 
	2) Short TP4 and TP5 in the IF unit.	Spectrum analyzer			IF	L4 L1~3	Larger waveform perform shown on right.
11. IF	1) FREQ. : 14.100 MODE : USB SSG output : 14.100.0dBμ Short TP4 and TP5 in the IF unit. Beat FREQ. : 1kHz	SSG AF V.M OSCILLO	Rear panel	EXT.SP	IF	L4,7,8 L9,10 L15,16 L19 L21,22	Repeat 2 times. MAX. AF output.
12. RF	1) Condition is the same as item 11.	SSG AF V.M OSCILLO	Rear panel	EXT.SP	RF	L48, L50	MAX. AF output.
13. MIX BM	1) FREQ. : 150.00 (150kHz)	SSG AF V.M OSCILLO	Rear panel	EXT.SP	RF	VR1	MIN. AF noise level VR : center (mechanically) X
14. PLL MIX BM	1) FREQ. : 888.50 (kHz) FREQ. : 2.888.5 (MHz) X MODE : AM SSG output : 890.0kHz, 60dBμ 2.89MHz, 60dBμ X	SSG AF V.M OSCILLO	Rear panel	EXT.SP	PLL	VR1	MIN AF output Less than 85dB.
15. IF TRAP	1) FREQ. : 2~2.499 SSG output : 58.1125MHz, 80dBμ	SSG AF V.M	Rear panel	EXT.SP	RF	L44	MIN. AF beat output. Less than 85dB.
16. NB	1) FREQ. : 14.100.00 MODE : USB SSG output : 14.100MHz, 10dBμ	SSG DC V.M	IF	TP2	IF	L11,13 14	MIN. voltage Less then 2.9V.

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
17. FM IF	1) MODE : FM SSG MOD : 1kHz DEV : 5kHz output : 60dB $\mu$	SSG AF V.M OSCILLO	Rear panel	EXT.SP	IF	L25	MAX. AF output.	
18. Carrier point	1) IF unit VR8 : MIN SSG : OFF	SP	Rear panel	EXT.SP	SW (B/8)	VR7	Turn LSB, USB mode alternately to get the same noise sounds occur.	
	2) After adjustment VR8 : Center							
19. S-meter	1) FREQ. : 14.100.00(14.1MHz) MODE : USB AGC : FAST • $\phi$ point SSG output : OFF Short TP4 and TP5 in the IF unit  Remove the short wire after adjustment.	SSG AF V.M  DC V.M OSCILLO	IF	TP3	IF	VR2	2.9V	2.88~2.92V
						VR3	MAX.	
						VR4	S-meter "2"	
						VR2	3.0V	2.98~3.02V
	2) S9 SSG output : 32dB $\mu$ AF output : 1kHz		Front panel	S-meter		VR3	S-meter "9"	
	3) The edge-rising SSG output : 10dB $\mu$		IF	TP3		VR1	S-meter "2"	
4) Repeat 2) and 3) two times.		Front panel			S-meter			
20. D-AGC	1) Same as item 19. SSG output : 92dB $\mu$	SSG	Front panel	S-meter	IF	VR5	S-meter "60dB"	
	2) SSG output : 32dB $\mu$						Check S-meter "9".	
21. SSB SQL	1) SSG output : OFF SQL VR : 11:00	SSG			IF	VR6	Adjust VR slowly and stop at threshold.	
	2) SQL VR : 10:00						Check the noise sound	
	3) SQL VR : 12:00						Check the noise goes off.	
	4) SQL VR : Threshold SSG output : 12dB $\mu$						Check the squeich open.	
	5) After check SQL VR : MIN							
22. FM SQL	1) FREQ. : 28.675.00 FREQ. : 26.100.00 <b>W2</b> MODE : FM SSG output : OFF (28.675MHz)	SSG					Adjust VR slowly and stop at threshold.	SQ. VR 8:30~10:30
	2) SSG MOD : 1kHz DEV : 3kHz output : -4dB $\mu$						Check	Squelch open.
	3) Tight SQL-1 SQL VR : MAX SSG output : 12dB $\mu$							
	4) Tight SQL-2 SSG output : 120dB $\mu$							
	5) After check SQL VR : MIN							
23. NOTCH	1) SSG output : 60dB $\mu$ AF output : 1kHz, 0.63V/8 $\Omega$ NOTCH : ON	SSG				NO-TCH VR7	MIN. output	The remainder between NOTCH ON and OFF is more than 35dB.
	2) Beat FREQ. : 2.6kHz : 500Hz						Check	More than 30dB (same as above.)

# R-5000

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
24. Sensitivity check	1) FREQ. : 29,900.00 (29.9MHz) FREQ. : 26,100.00 (26.1MHz) <b>W2</b> : 29.9MHz, -6dBμ : 26.1MHz, -6dBμ <b>W2</b>	SSG						S/N more than 10dB (AF GAIN VR : MAX) 0.63V/8Ω
25. ANT2	1) ANT2 SW : ON 2) Apply a signal to ANT2 50Ω terminal and 500Ω terminal.						Check	ANT2 LED lit on. Adjust 500Ω terminal AF output is less than 50Ω terminal.
26. Filter select check	1) SELECTIVITY : N 2) SELECTIVITY : M1 3) SELECTIVITY : M2 4) SELECTIVITY : W 5) After check SELECTIVITY : AUTO	DC V.M SP	IF	D38 D39 D40 D41			Voltage check	8.5~9.5V
27. Marker check	1) Connect the cable between MKR terminal on the PLL and the RF unit. FREQ. : 15,000.00 2)	SP						Check of possible receive.
28. BEEP sound	1) AF GAIN VR : Center RF GAIN VR : MIN Depress [MODE] key	OSCILLO	Rear panel	EXT.SP	IF	VR8	Adjust as shown below. 	300~500mV

### Microprocessor operation check

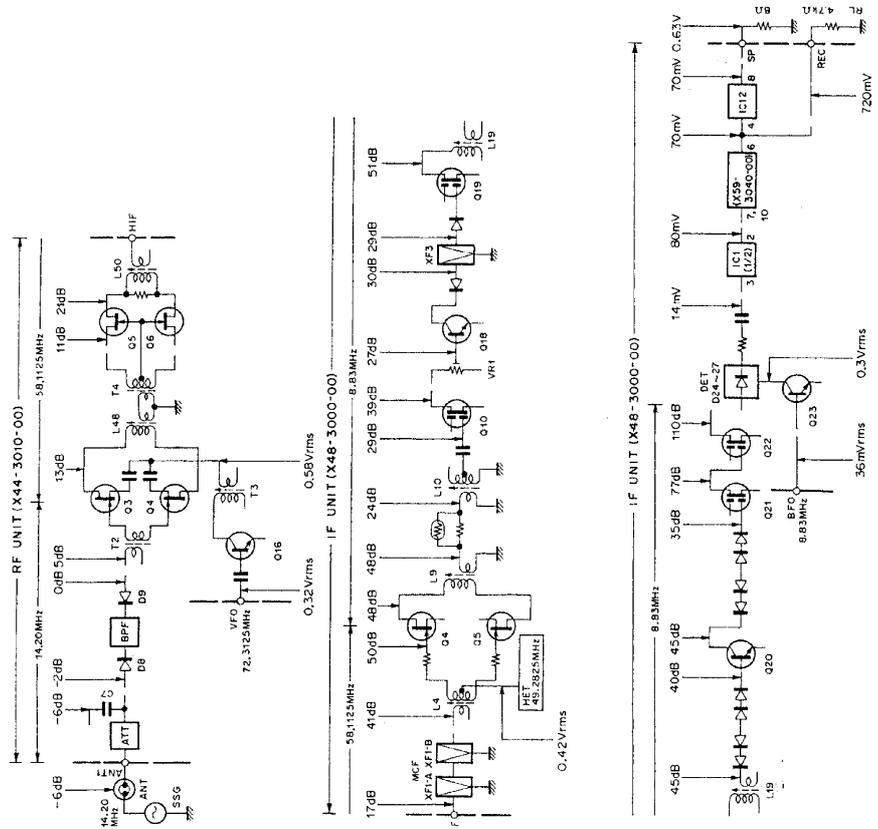
Item	Condition	Operation check	Item	Condition	Operation check
1. Reset	1) Power SW : ON While depressing the [A=B] key.	A VFO 00 15.0000.00 AM LED : Lights ANT1 : Lights	2. Function	11) Depress the [A/B] key once.	VFO B 00 15.0000.00 AM LED : Lights ANT1 LED : Lights
2. Function	1) Depress the BAND [UP] key once.	A VFO 00 16.0000.00	12) Depress the [STEP] key once.	VFO B 00 15.0000.00 STEP display : Lights	
	2) Depress the BAND [DOWN] key once.	A VFO 00 15.0000.00	13) Depress the [STEP] key once.	VFO B 00 15.0000.00 STEP display : Lights	
	3) Turn the ENCODER clockwise.	FREQ. : UP	14) Depress the [ANT2] key once.	VFO B 00 15.0000.00 ANT2 LED : Lights	
	4) Turn the ENCODER counterclockwise.	FREQ. : DOWN	15) Depress the [ANT1] key once.	VFO B 00 15.0000.00 ANT1 LED : Lights	
	5) Depress the [LSB] key once.	LSB LED : Lights Beep sound : ---	16) [F.LOCK] : ON	F. LOCK LED : Lights	
	6) Depress the [USB] key once.	USB LED : Lights Beep sound : ---	17) [F.LOCK] : OFF	F. LOCK LED : Goes off	
	7) Depress the [CW] key once.	CW LED : Lights Beep sound : ---	18) Depress the "HF/VHF" key once.	A VFO 145.0000 FM LED : Lights Holds above display momentarily, then goes HF again. Beep sound	
	8) Depress the [AM] key once.	AM LED : Lights Beep sound : ---			
	9) Depress the [FM] key once.	FM LED : Lights Beep sound : ---			
	10) Depress the [FSK] key once.	FSK LED : Lights Beep sound : ---			





**R-5000**

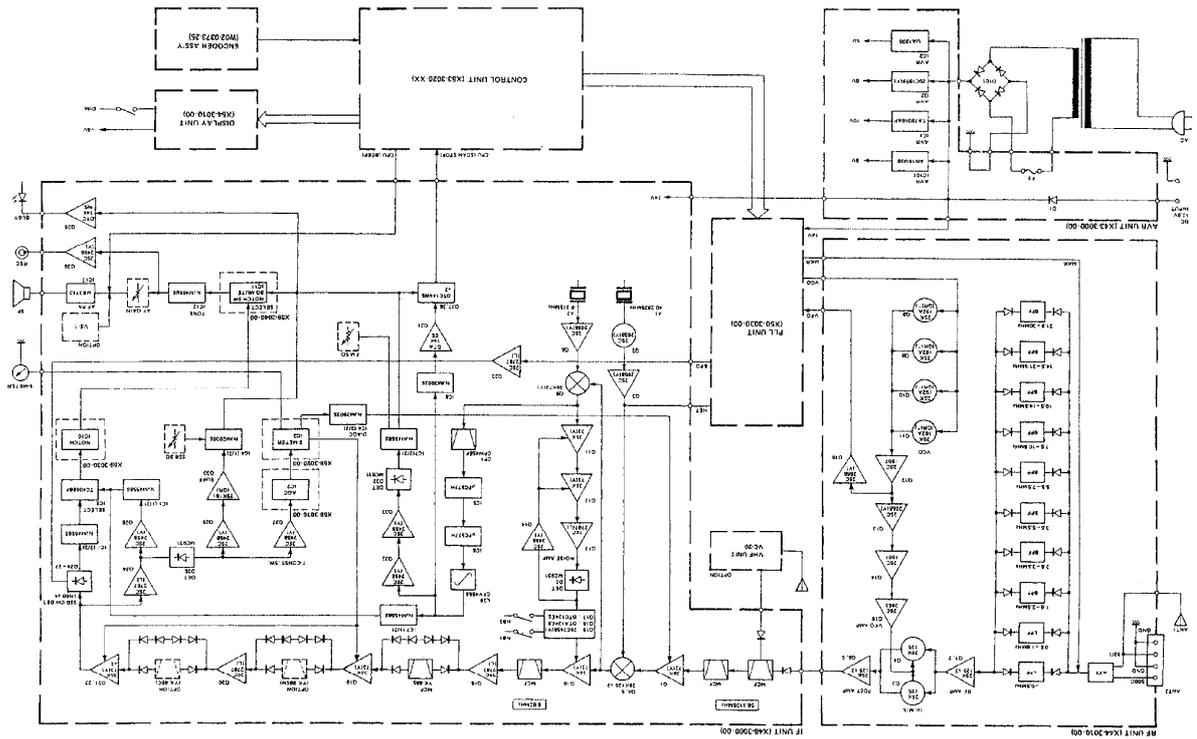
**LEVEL DIAGRAM**



Frequency : 14.200MHz  
 Input : -6dB  
 AF output : 0.83V/8Ω  
 Mode : USB

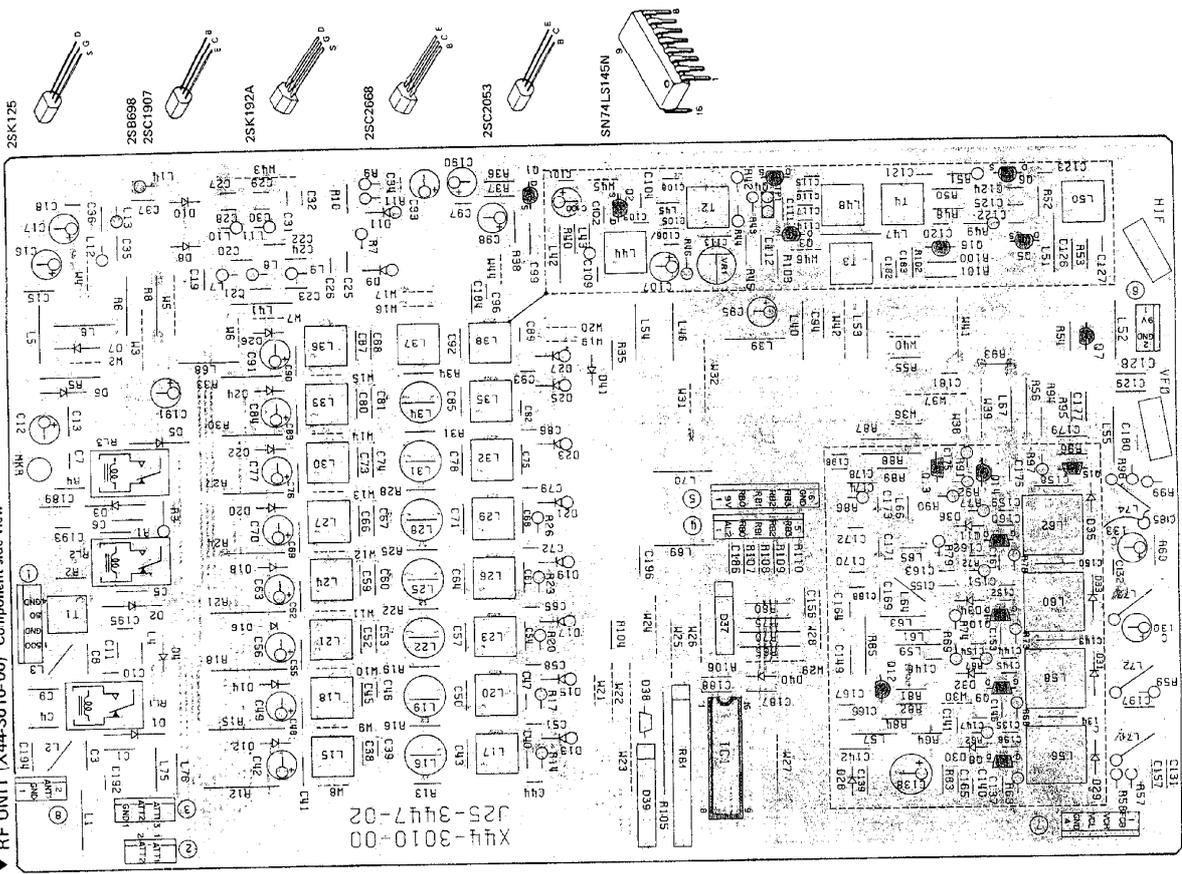
1. A  $-6\mu\text{F}$  14.200MHz SSG signal is applied at the ANT terminal, the AF GAIN VR is adjusted to produce an audio output of 0.83V/8Ω, and then the SSG signal levels at various points that are required to the same audio output with the AF-GAIN VR left unchanged are plotted.
2. The SSG output signal should always be connected through a titanium oxide porcelain capacitor of  $0.01\mu\text{F}$ , 50WV.

**BLOCK DIAGRAM**

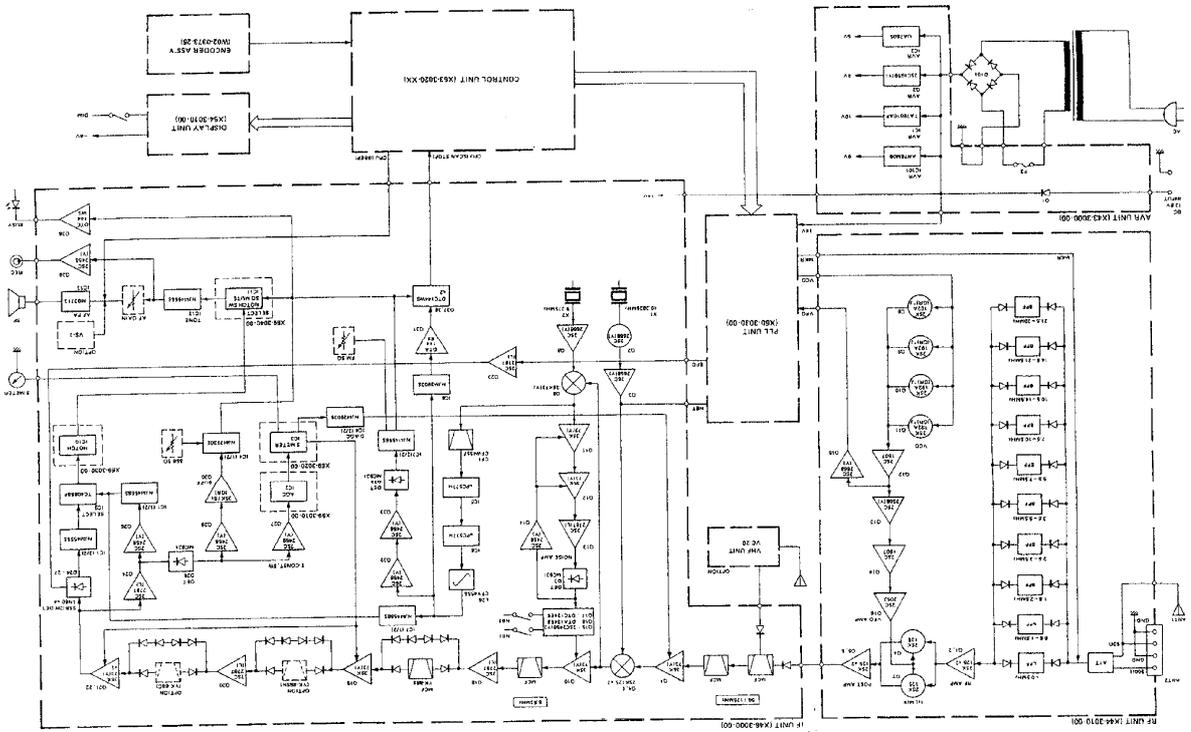


PC BOARD VIEW

RF UNIT (X44-3010-00) Component side view



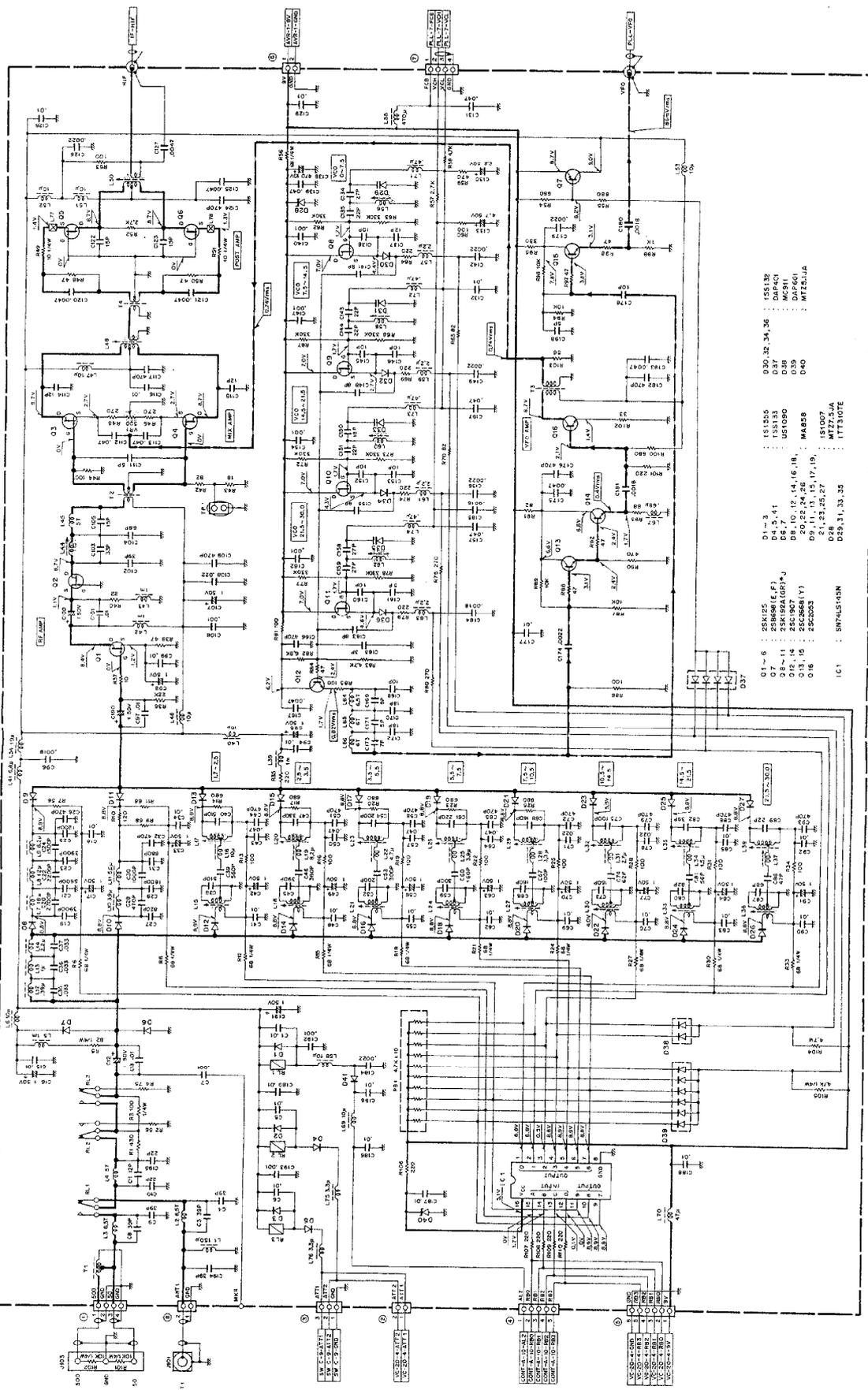
BLOCK DIAGRAM



# CIRCUIT DIAGRAM R-5000

RF UNIT (X44-3010-00)

RF UNIT (X44-3010-00)

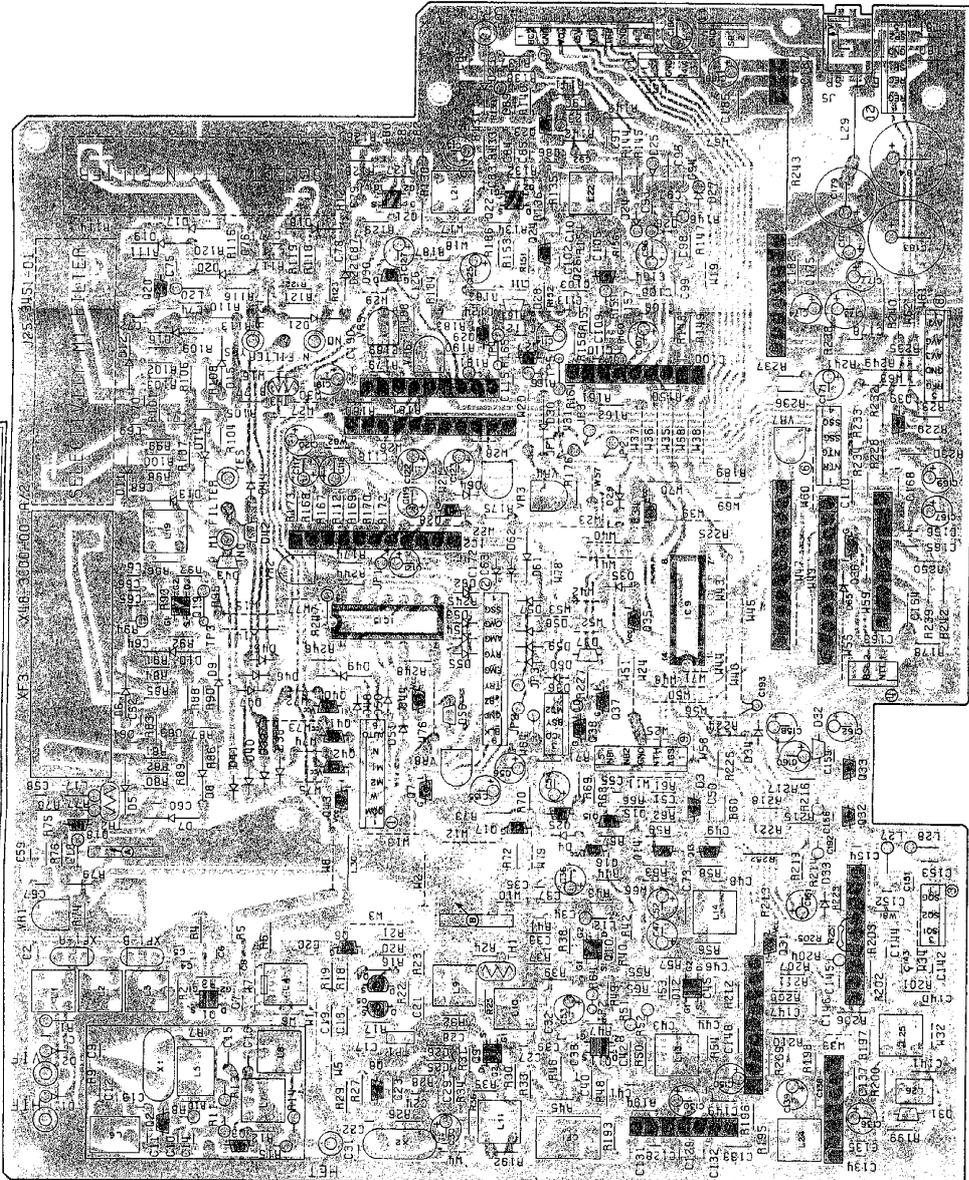
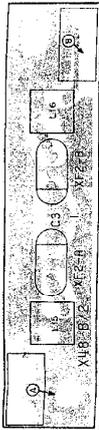


- 01-5 : 6X4
- 01-6 : 6AR5
- 01-7 : 6BE6
- 01-8 : 6BE7
- 01-9 : 6BE8
- 01-10 : 6BE9
- 01-11 : 6BE9A
- 01-12 : 6BE9B
- 01-13 : 6BE9C
- 01-14 : 6BE9D
- 01-15 : 6BE9E
- 01-16 : 6BE9F
- 01-17 : 6BE9G
- 01-18 : 6BE9H
- 01-19 : 6BE9I
- 01-20 : 6BE9J
- 01-21 : 6BE9K
- 01-22 : 6BE9L
- 01-23 : 6BE9M
- 01-24 : 6BE9N
- 01-25 : 6BE9O
- 01-26 : 6BE9P
- 01-27 : 6BE9Q
- 01-28 : 6BE9R
- 01-29 : 6BE9S
- 01-30 : 6BE9T
- 01-31 : 6BE9U
- 01-32 : 6BE9V
- 01-33 : 6BE9W
- 01-34 : 6BE9X
- 01-35 : 6BE9Y
- 01-36 : 6BE9Z
- 01-37 : 6BE9A
- 01-38 : 6BE9B
- 01-39 : 6BE9C
- 01-40 : 6BE9D
- 01-41 : 6BE9E
- 01-42 : 6BE9F
- 01-43 : 6BE9G
- 01-44 : 6BE9H
- 01-45 : 6BE9I
- 01-46 : 6BE9J
- 01-47 : 6BE9K
- 01-48 : 6BE9L
- 01-49 : 6BE9M
- 01-50 : 6BE9N
- 01-51 : 6BE9O
- 01-52 : 6BE9P
- 01-53 : 6BE9Q
- 01-54 : 6BE9R
- 01-55 : 6BE9S
- 01-56 : 6BE9T
- 01-57 : 6BE9U
- 01-58 : 6BE9V
- 01-59 : 6BE9W
- 01-60 : 6BE9X
- 01-61 : 6BE9Y
- 01-62 : 6BE9Z
- 01-63 : 6BE9A
- 01-64 : 6BE9B
- 01-65 : 6BE9C
- 01-66 : 6BE9D
- 01-67 : 6BE9E
- 01-68 : 6BE9F
- 01-69 : 6BE9G
- 01-70 : 6BE9H
- 01-71 : 6BE9I
- 01-72 : 6BE9J
- 01-73 : 6BE9K
- 01-74 : 6BE9L
- 01-75 : 6BE9M
- 01-76 : 6BE9N
- 01-77 : 6BE9O
- 01-78 : 6BE9P
- 01-79 : 6BE9Q
- 01-80 : 6BE9R
- 01-81 : 6BE9S
- 01-82 : 6BE9T
- 01-83 : 6BE9U
- 01-84 : 6BE9V
- 01-85 : 6BE9W
- 01-86 : 6BE9X
- 01-87 : 6BE9Y
- 01-88 : 6BE9Z
- 01-89 : 6BE9A
- 01-90 : 6BE9B
- 01-91 : 6BE9C
- 01-92 : 6BE9D
- 01-93 : 6BE9E
- 01-94 : 6BE9F
- 01-95 : 6BE9G
- 01-96 : 6BE9H
- 01-97 : 6BE9I
- 01-98 : 6BE9J
- 01-99 : 6BE9K
- 01-100 : 6BE9L

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  
 Increased safety is accomplished by the use of safety critical components. Safety critical components are those components or assemblies which, if they fail, could result in a hazardous condition or injury to personnel.

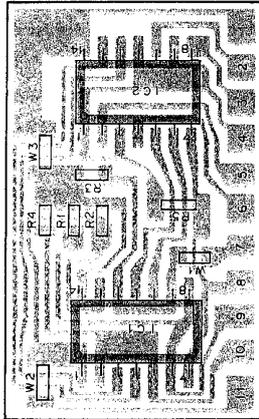
# R-5000 PC BOARD VIEWS

▼ IF UNIT (X48-3000-00) Component side view

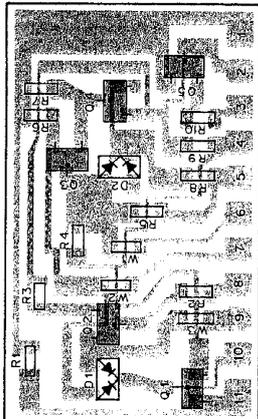


- MB3713
- AN78V09
- TC-0011BF
- TC-4066BF
- 25C2712
- 25A1162
- DTA124EK
- 25K211
- NJM4558M
- DTC144WK
- 78

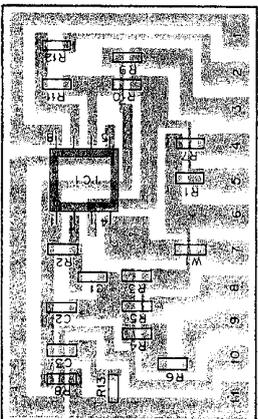
▼ AGC (X59-3010-00) Component side view



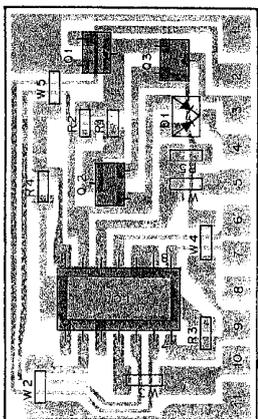
▼ S meter (X59-3020-00) Component side view



▼ NOTCH (X59-3030-00) Component side view



▼ SELECT (X59-3040-00) Component side view



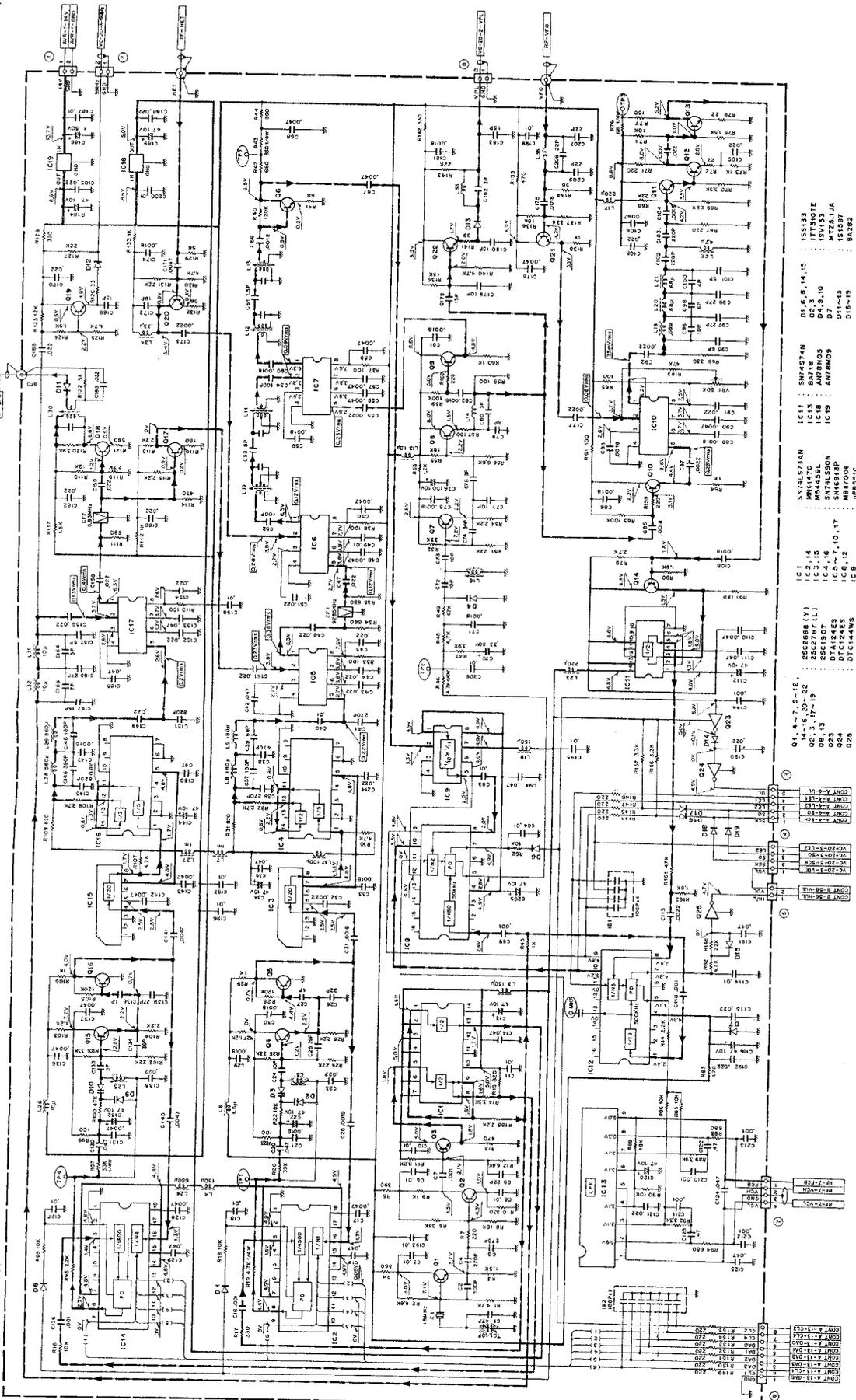
- 3SK73
- 25C2668
- 25C3113
- 25C2456
- 25C2459
- DTC114ES
- DTC144ES
- DTC144WS
- DTC124ES
- DTA124ES
- DTA144ES
- 25K125
- 25C2787
- 25K161
- NJM4558S
- NJM2903S
- #PC577H
- TC4066BP
- TC4071BP



# R-5000 CIRCUIT DIAGRAM

PLL UNIT (X50-3030-00)

▶ PLL UNIT (X50-3030-00)

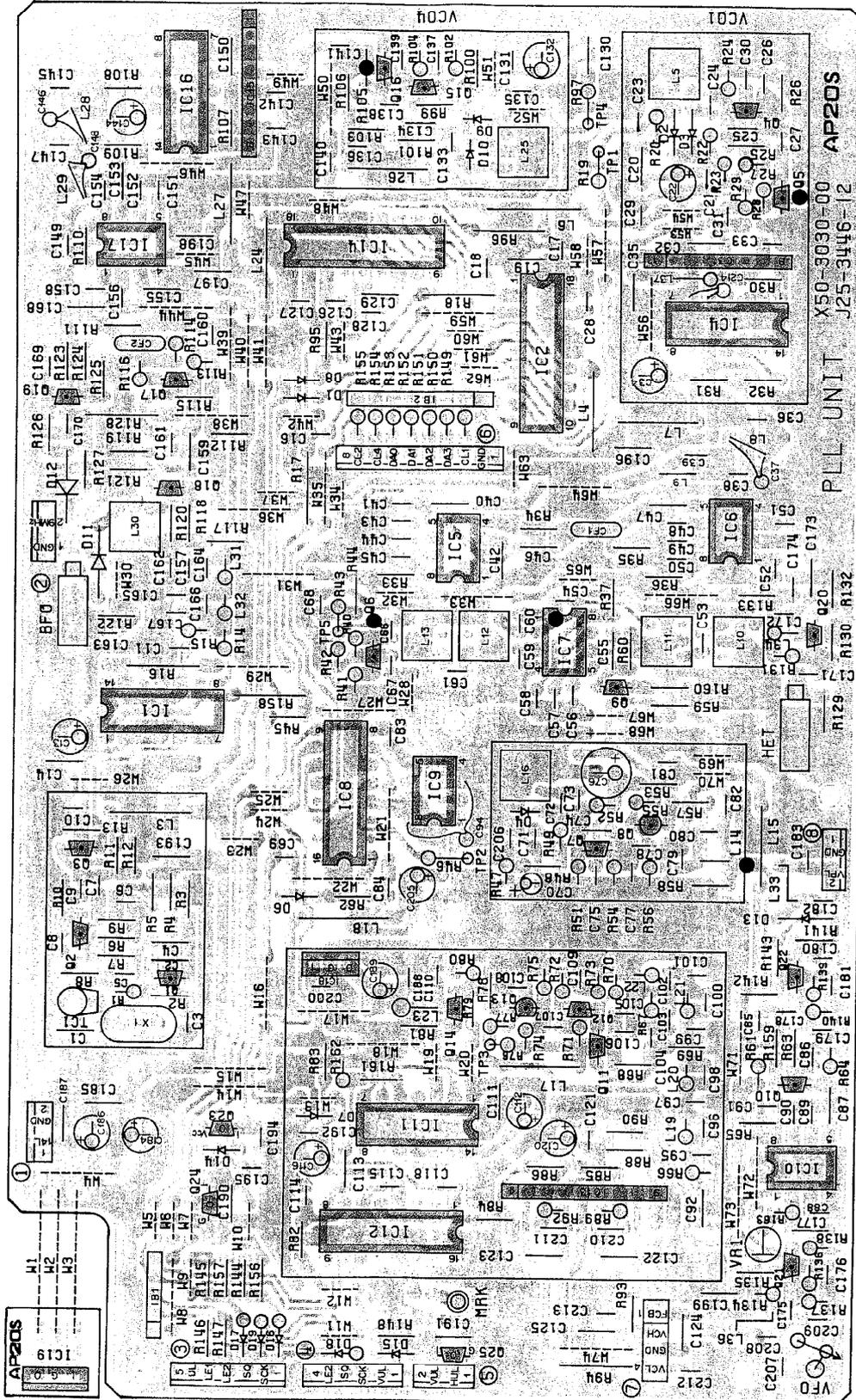


- IC 1, 4, 7, 9-12, 20-22
- 2C2266 (V)
- 02-416-20-22
- 06-13
- Q23
- Q24
- Q25
- Q26
- Q27
- Q28
- Q29
- Q30
- Q31
- Q32
- Q33
- Q34
- Q35
- Q36
- Q37
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- Q97
- Q98
- Q99
- Q100

CAUTION: For optimum safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  
 3. Indicates safety critical components. To reduce the risk of electric shock, safety critical components shall be carried out  
 (checked) parts are acceptable, installed from the supply circuit before the appliance is returned to the user.

# PC BOARD VIEW R-5000

▼ PLL UNIT (X50-3030-00) Component side view



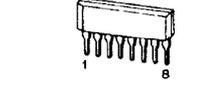
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SN74LS90N



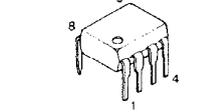
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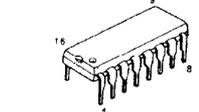
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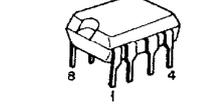
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MB87006



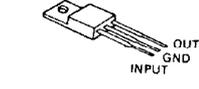
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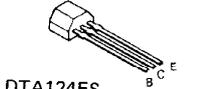
BA718



AN78N05 AN78M09



2SC2668(Y)

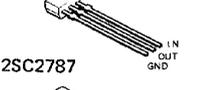


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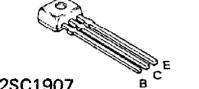


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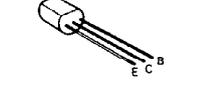
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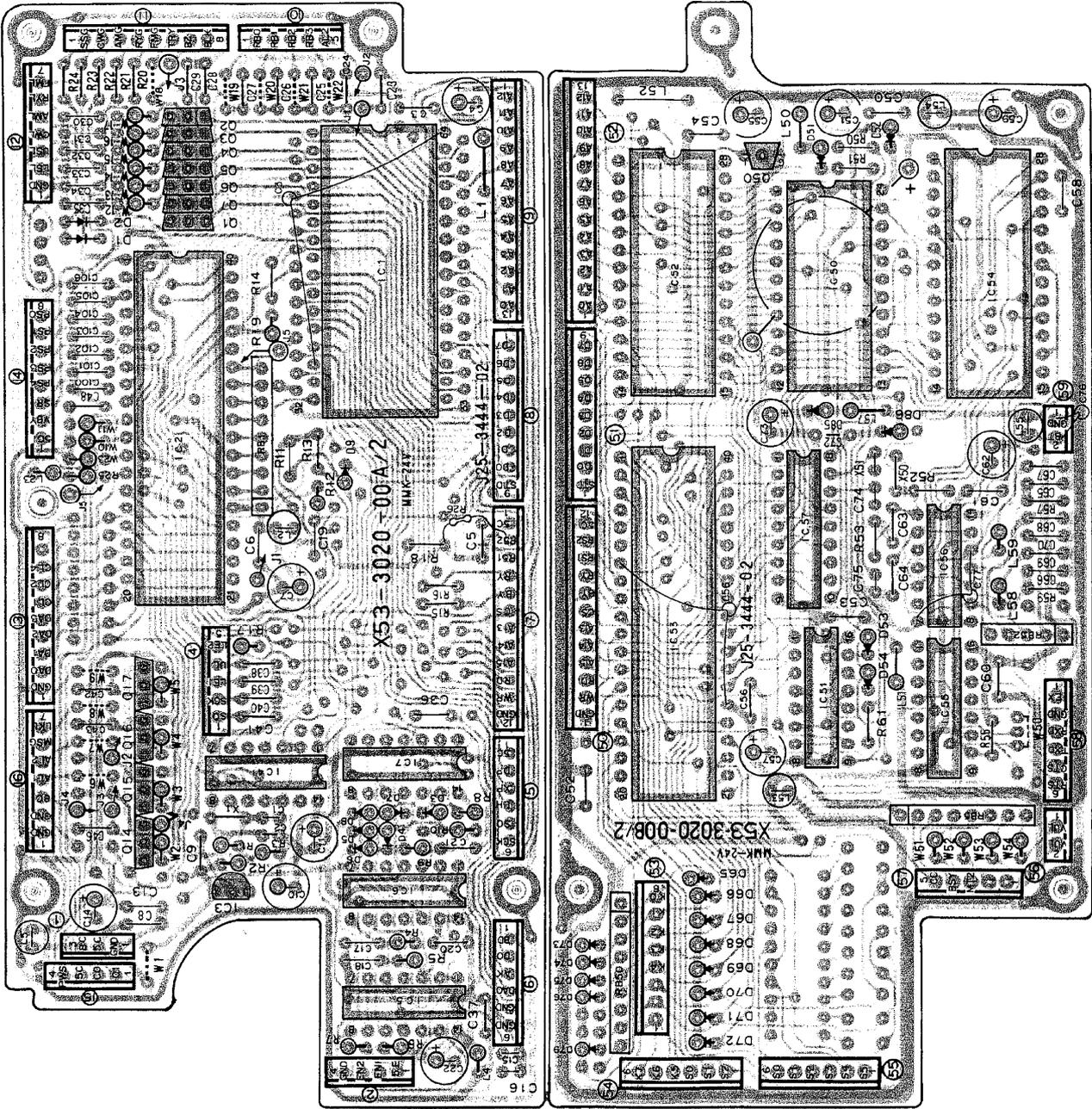


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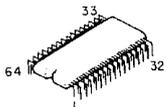


# R-5000 PC BOARD VIEW

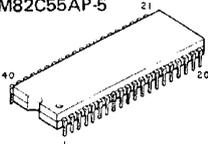
▼ CONTROL UNIT (X53-3020-00) Component side view -11: K,M,T,W1 -61: W2 -71: X



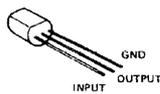
μPD7800G



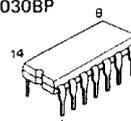
M5M82C55AP-5



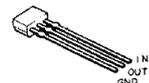
PST520D



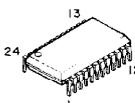
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TC4030BP



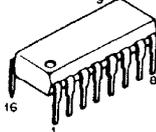
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DTC144WS



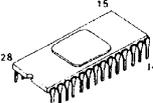
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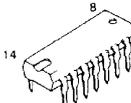
SN74LS138N



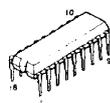
MBM27128-25JBI



SN7404N



MSM6242RS

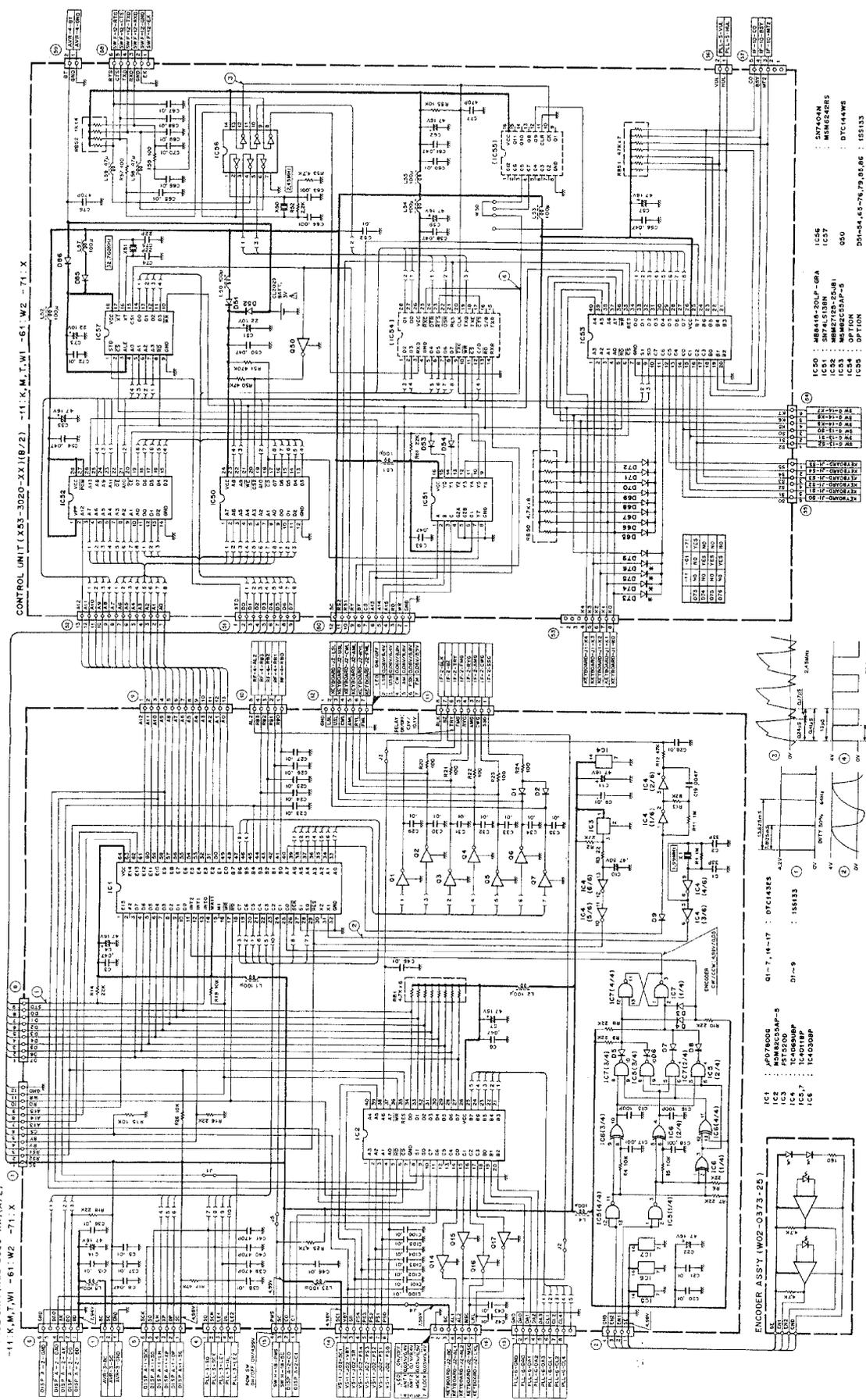


# CIRCUIT DIAGRAM R-5000

▼ CONTROL UNIT (X53-3020-XX) -11: K.M.T.W1 -61: W2 -71: X

CONTROL UNIT (X53-3020-XX)(A/2)

CONTROL UNIT (X53-3020-XX)(B/2) -11: K.M.T.W1 -61: W2 -71: X

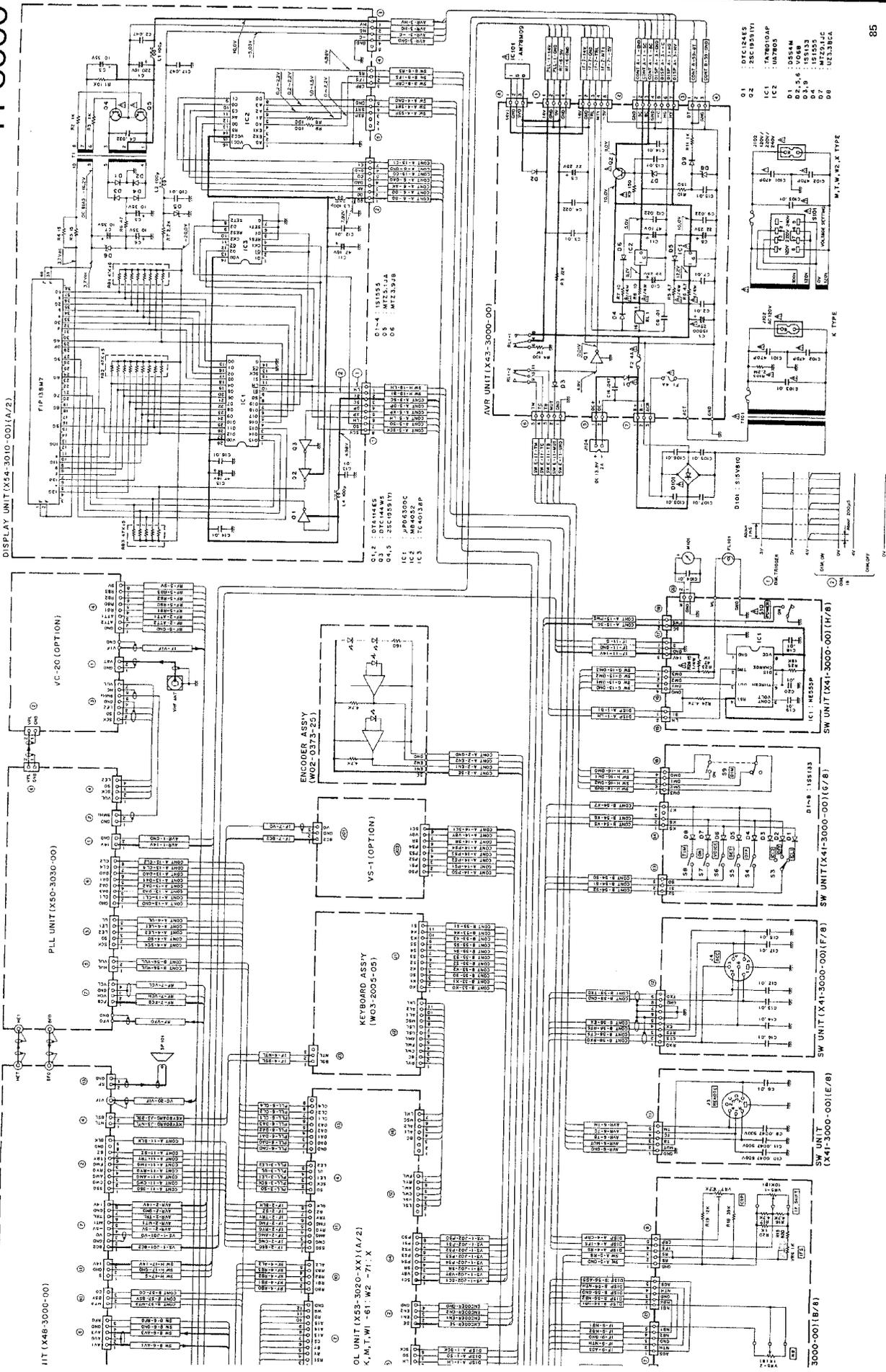




# R-5000

● Voltage measurement conditions f = 14.17500MHz, USB mode receiving  
DISPLAY UNIT (X24-3010-00)(A/Z)

## SCHEMATIC DIAGRAM



TERMINAL FUNCTION

Terminal No.	Name	I/O	Terminal Function
<b>SWITCH UNIT (X41-3000-00) (A/B)</b>			
1	COM	0	Filter select SW Common
2	W	0	Filter select SW W
3	M2	0	Filter select SW M2
4	M1	0	Filter select SW M1
5	N	1	Filter select SW N
6	AUTO	1	Filter select SW AUTO
<b>SWITCH UNIT (X41-3000-00) (B/B)</b>			
1	SOQ	0	SOL VR (FM)
2	SOZ	0	NOTCH VR
3	SO1	0	GND
4	NTG	0	GND
5	SSG	0	GND
6	SSQ	0	SOL VR (SSB)
7	SPT	0	Voltage terminal for scan speed setting.
8	G	0	Voltage terminal for resume time setting.
9	RS	1	Power supply (+5V) for scan speed, resume time setting.
<b>SWITCH UNIT (X41-3000-00) (B/B)</b>			
1	AV1	0	AF GAIN VR
2	AVG	0	AF Line GND
3	AV3	0	AF GAIN VR
4	AV4	0	GND
5	REG	0	RF GAIN VR
<b>SWITCH UNIT (X41-3000-00) (D/B)</b>			
1	REG	1	Audio input for REC terminal
2	REC	1	Audio input for REC terminal
3	SPT	1	Audio output for PHONE terminal
4	G	0	GND
5	SP2	1	Audio input from PHONE terminal
<b>SWITCH UNIT (X41-3000-00) (E/B)</b>			
1	GND	0	GND
2	MUT	0	Muting terminal (ON: GND)
3	TB	1	POW ON: TC with TM connect
4	TC	1	STBY, POW OFF: TB with TC connect (for REMOTE)
5	TM	1	1
<b>SWITCH UNIT (X41-3000-00) (F/B)</b>			
1	RXD	1	RX data
2	CTS	0	Clear to SEND
3	RTS	0	Request to SEND
4	EX	0	Not used
5	GND	0	GND
6	GND	0	GND
7	GND	0	GND
8	G	0	Control unit GND
9	TXD	1	TX data

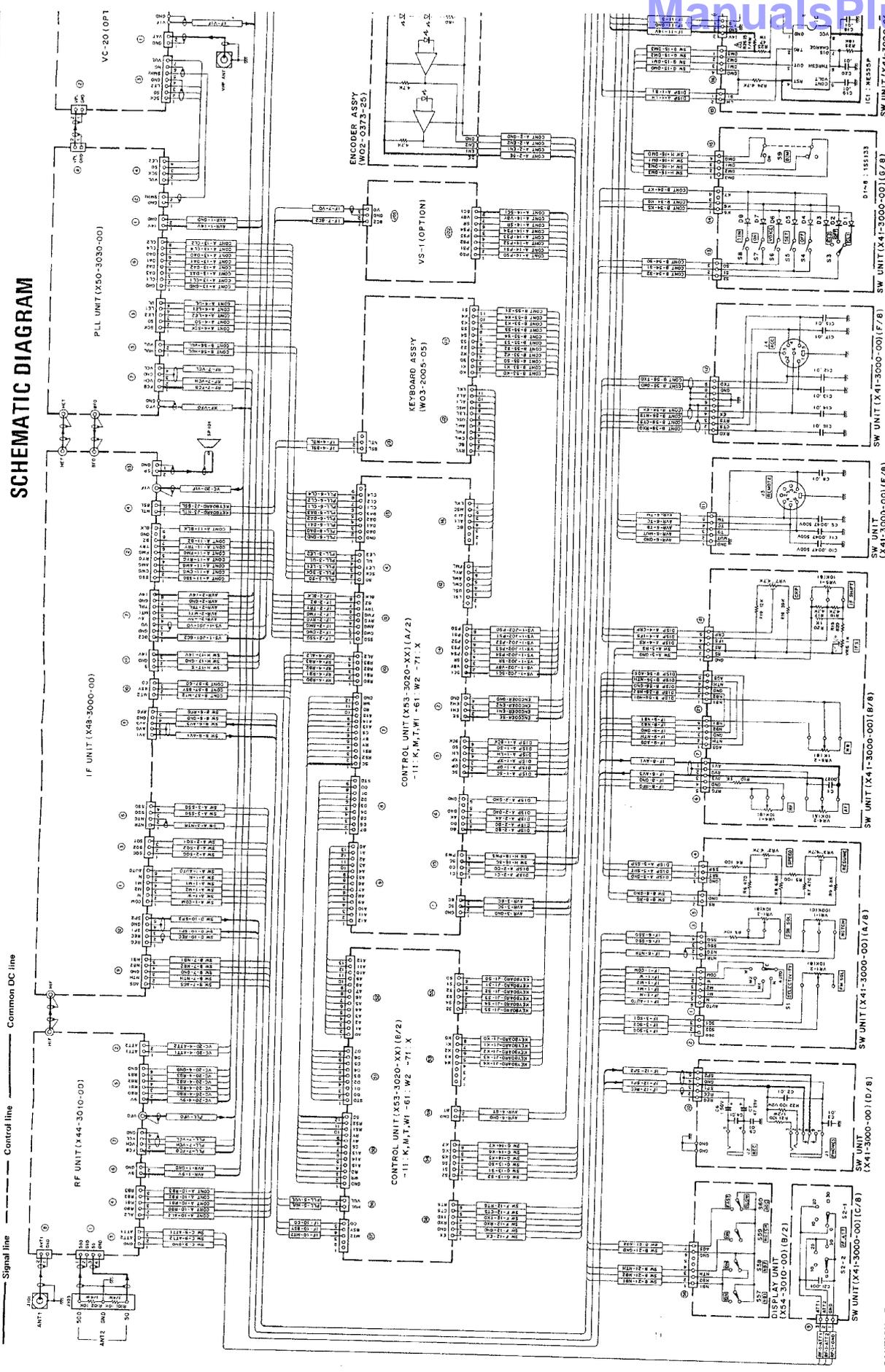
TERMINAL FUNCTION

Terminal No.	Name	I/O	Terminal Function
<b>SWITCH UNIT (X41-3000-00) (G/B)</b>			
1	S2	0	CL1/CL2 select CL1 ON: K5 with S2 connect CL1 OFF: K6 with S2 connect CL2 ON: K7 with S2 connect CL2 OFF: S1 with K6 connect, OFF TIME: S1 with K6 connect, VOICE: S0 with K5 connect, TIMER: S0 with K7 connect, ON TIME: S0 with K8 connect
2	S1	0	
3	S0	0	
<b>SWITCH UNIT (X41-3000-00) (H/B)</b>			
1	K5	1	VOICE and CL1 terminal
2	K6	1	VOICE: K5 with S0 connect, CL1: K5 with S2 connect, ON TIME: OFF TIME, CL terminal ON TIME: K6 with S0 connect, OFF TIME: K6 with S1 connect, CL OFF: K6 with S2 connect, Not connected
3	NC	0	Not connected
4	K7	1	TIME SET, TIMER, CL2 terminal TIME SET: K7 with S1 connect, TIMER: K7 with S0 connect, CL2: K7 with S2 connect
<b>SWITCH UNIT (X41-3000-00) (H/B)</b>			
1	DM3	1	DIM SW terminals
2	DM2	0	DIM OFF: DM3 with DM2 connect
3	DM1	1	DIM SW terminals
4	DM0	0	DIM ON: DM1 with DM2 connect
<b>SWITCH UNIT (X41-3000-00) (H/B)</b>			
1	M	1	S meter signal input
2	G	0	GND
3	14V	1	Power supply (+14V) for meter lamp
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	PWS	0	POW SW (POW ON: GND)
2	5C	1	Power supply (+5V) for IC1
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	BH	1	DIM trigger pulse terminal
2	LH	1	DIM trigger pulse terminal
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	M	0	S meter signal output terminal
2	NB1	1	Noise blanker 1 SW, NB1 or NB2 ON: GND
3	NB2	1	Noise blanker 2 SW, NB2 OFF: GND
4	NTH	0	NOTCH SW, NOTCH ON: GND
5	AGS	1	ACC SLOW/FAST select SW, ACC FAST: GND
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	14V	0	Power supply (+14V) for PLL unit
2	GND	0	GND
3	9V	0	Power supply (+9V) for RF unit
4	GND	0	GND
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	14V	0	+14V for IF unit
2	GND	0	GND
3	TR1	0	RL1 control terminal (POW ON: GND)
4	MT1	0	MUTE signal (MUTE ON: "H")
5	-5V	0	-5V for IF unit
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	GND	0	GND
2	5C	0	+5V for Control unit
3	8C	0	+8V for Control unit
4	GND	0	GND
5	-C	1	-5V from Display unit
6	HG	0	GND
7	HC	0	+10V for Display unit

R-5000 R

Terminal No.	Name	I/O	Terminal Function
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	SSG	1	USB, USB mode: "L", other modes: OPEN
2	CMG	1	CW mode: "L", other modes: OPEN
3	AMG	1	AM mode: "L", other modes: OPEN
4	RYG	1	FM mode: "L", other modes: OPEN
5	FRY	1	FM mode: "L", other modes: OPEN
6	TRG	1	FM mode: "L", other modes: OPEN
7	BZ	1	TIMER relay control, set at "L" mode, Active To AVR unit via IF unit.
8	GND	0	Base sound input
9	BLK	1	Stop 2nd MIXER operations in UL mode, Normally: 0V, UL: 4-5V
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	SOQ	0	FM Squelch VR
2	SOZ	0	FM Squelch VR
3	SO1	0	GND
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	NTL	0	NOTCH LED lit on current absorption
2	BSL	0	BUSY LED lit on current absorption
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	NTR	0	NOTCH VR
2	NTG	0	GND
3	SSG	0	GND
4	SSQ	0	SSB Squelch VR
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	8C2	0	Power supply (+9V) for VS-1
2	G	0	GND
3	VO	1	VS-1 voice synthesizer input
4	-5V	1	-5V for block bias
5	MT1	1	External mute signal, normally: "L", Muting: "H", TIMER relay control, set at "L" = Active (Inct from AVR unit)
6	TRL	0	GND
7	G	0	GND
8	14V	1	From power supply rectifier output
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	AV1	0	AF GAIN VR
2	AV2	0	AF GAIN VR
3	AV3	0	AF GAIN VR
4	G	0	GND
5	REG	0	RF GAIN VR
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	AGS	1	ACC SW, SLOW: OPEN, FAST: GND
2	NTH	0	NOTCH SW OFF: OPEN, ON: GND
3	G	0	GND
4	NB2	1	NB2 SW OFF: GND, ON: OPEN
5	NB1	1	NB1 SW via NB LEVEL VR
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	MT2	0	Send external muting signal to microprocessor
2	BSY	0	Muting: "L", Send BUSY signal to microprocessor
3	CO	0	BUSY: "L", (Center decision is added in AM, FM mode) SCAN TO/CO select, normally (GND): TO, when W64 cut: OPEN, CO
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	S	0	S meter output
2	G	0	GND
3	14V	1	+14V for pilot lamp
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	REG	0	REC OUT output
2	REC	0	REC OUT output
3	SP1	0	AF power amp. output
4	GND	0	GND
5	SP2	1	AF power amp. output, switched by PHONES
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	G	0	GND
2	SP	0	Internal speaker output
<b>SWITCH UNIT (X41-3000-00) (I/B)</b>			
1	EXT.SPI	0	External speaker output
2	VIF	0	Reception IF signal from VC-20 (68.1125MHz)
3	HIF	0	Reception IF signal from HF band (58.1125MHz)
4	HET	0	2nd LOCAL OSC signal (49.2825MHz)
5	BFO	0	SSB demodulation carrier (8.83MHz)

# SCHEMATIC DIAGRAM



**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  
 A. Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the user.





## VC-20 (VHF CONVERTER)

## SPECIFICATIONS

## Frequency range

108~174MHz

## Antenna impedance

50Ω

## Power requirement/power consumption

DC 9V, 300mA (supplies from R-5000.)

## Dimensions ( ) includes projection

W 170(174) x H 25(27) x D 123(136)mm

## Weight

550g

## Receive sensitivity

Mode	Condition	Sensitivity
SSB, CW, FSK	S + N/N = 10dB	0.25μV or less
AM	30% Mod. S + N/N = 10dB	2μV or less
FM	12dB SINAD	0.5μV or less

## Squelch sensitivity

Mode	Sensitivity
SSB, CW, FSK	2μV or less
AM	2μV or less
FM	0.32μV or less

## Spurious response

1st IF : 80dB or more

Others : 50dB or more

## Frequency stability

Within  $\pm 10 \times 10^{-6}$  ( $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$ )

## Frequency accuracy

Within  $\pm 10 \times 10^{-6}$ 

**Note :** Circuit and ratings subject to change without notice due to developments in technology.

## ● GENERAL

The VC-20 is the VHF converter designed to be used exclusively with the R-5000 Shortwave Receiver.

The VC-20 allows expansion of the receiver frequency range to 108MHz thru 174MHz without altering the operation of the R-5000.

## ● RF SECTION (X44-2030-00) (A/2)

The signal applied from the antenna terminal is passed through the attenuator circuit and amplified by RF amplifiers consisting of Q1 thru Q4 : 3SK148R and Q5 thru Q8 : 2SK125-5. These RF amplifier circuits divide the frequencies from 108MHz to 174MHz in four distinct bands. Each band has its own amplifier. The bands are : 108MHz thru 123MHz (LL band); 123MHz to 138MHz (L band); 138MHz to 155MHz (H band); and 155MHz to 174MHz (HH band).

The signal then passes through the first IF trap. T22, and is applied to the first mixer Q9 and Q10 : 3SK74L. In the IF trap the signal is converted into the first IF frequency of 58.1125MHz by mixing the RF signal with the signal from the VCO (Voltage Controlled Oscillator) in the PLL unit. Q11 : 2SC2570A performs the task of mixing these two signals.

## ● PLL SECTION (X44-3020-00) (B/2)

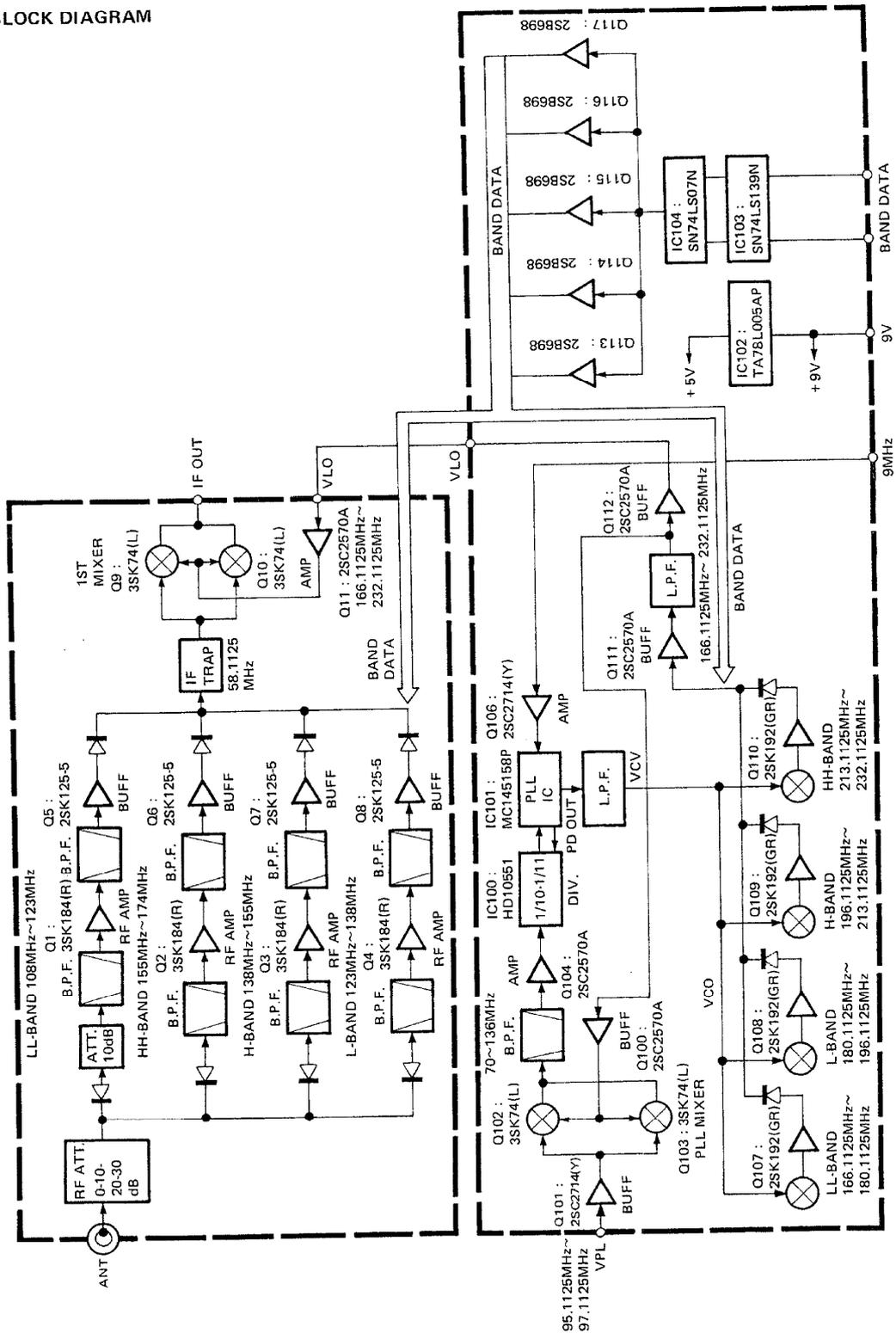
The PLL section includes the PLL circuit and the Band data decoder circuit. The PLL circuit utilizes a single reference loop design, which uses the VPL signal of 95.1125MHz to 97.1125MHz from the R-5000 to enable the VCO to cover 166.1125MHz to 232.1125MHz in 10Hz step.

Actually the VPL signal varies in a series of 1MHz wide bands, between 95.1125MHz to 96.1125MHz and 96.1125MHz to 97.1125MHz. Either of these ranges is selected according to the actual receiver dial frequency.

# R-5000

## VC-20 (VHF CONVERTER)

BLOCK DIAGRAM



## VC-20 (VHF CONVERTER)

### TERMINAL FUNCTIONS

Terminal			Terminal Function
No.	Name	I/O	
①	1	GND	GND
	2	VAT	Antenna input
②	1	GND	GND
	2	VPL	OSC signal from PLL unit. 95.1125~97.1125MHz
③	1	CLK	Clock signal
	2	DAT	Data line
	3	LE2	Latch enable signal
	4	GND	GND for CLK, DAT
	5	9M	Standard 9MHz signal from PLL unit
	6	NC	GND for 9M
	7	VUL	VHF unlock signal UL : "H" (OPEN)
④	1	GND	GND
	2	AT2	20dB attenuator control
	3	AT1	10dB attenuator control
	4	RB1	} Band information from IF unit
	5	RB0	
	6	RB2	
	7	RB3	
	8	9V	+ 9V line from IF unit

### SEMICONDUCTOR

Item	Re- marks	Part No.
<b>Diode</b>		1S2588
		1SS133
		DAN401
		MA858
<b>Varicap Diode</b>		1SV153
<b>Chip Diode</b>		DAN202(K)
<b>Zener Diode</b>		MTZ3.3JA
		MTZ5.1JA
		MTZ7.5JA
<b>TR</b>		2SB698(E,F)
		2SC2570A
<b>Chip TR</b>		2SC2714(Y)

N : New parts

Item	Re- marks	Part No.
<b>Digital TR</b>		DTC124EK
<b>Chip FET</b>		3SK184(R)
<b>FET</b>		2SK125-5
		2SK192A(GR)*P
		3SK74(L)
<b>IC</b>		HD10551
		MC145158P
		SN74LS07N
		SN74LS139N
		TA78L005AP

# R-5000

## VC-20 (VHF CONVERTER)

### PARTS LIST

\* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
<b>VC-20</b>						
-		*	B40-3694-04	MODEL NAME PLATE	K1M1	
-		*	B40-3695-04	MODEL NAME PLATE	T1	
-			B42-2437-04	LABEL		
-			B46-0411-00	WARRANTY CARD	K1	
-		*	B50-8126-00	INSTRUCTION MANUAL	K1M1	
-		*	B50-8128-00	INSTRUNTION MANUAL	T1	
-		*	H01-8056-03	CARTON BOX	K1M1	
-		*	H01-8057-03	CARTON BOX	T1	
-		*	H03-2639-04	OUTER PACKING CASE	K1M1	
-		*	H03-2640-04	OUTER PACKING CASE	T1	
-			H12-1397-04	PACKING FIXTURE(UPPER)		
-			H12-1398-03	PACKING FIXTURE(LOWER)		
-			H25-0029-04	PROTECTION BAG (ACCESSORY)		
-			H25-0162-04	PROTECTION BAG (REALITY)		
-			J21-4210-04	MSUNTING HARDWARE		
-			J21-4211-04	MSUNTING HARDWARE		
-			N35-3004-41	BINDING HEAD MACHINE SCREW		
-			N87-3006-41	BRAZIER HEAD TAPTITE SCREW		
-		*	X44-3020-00	CONVERTER UNIT		
<b>CONVERTER UNIT (X44-3020-00)</b>						
C1 -4			CK73FB1H103K	CHIP C 0.010UF K		
C6			CK45F1H103Z	CERAMIC 0.010UF Z		
C7			CK73FB1H103K	CHIP C 0.010UF K		
C8			CC73FCH1H090D	CHIP C 9.0PF D		
C9			CC73FCH1H020C	CHIP C 2.0PF C		
C10			CC73FCH1H080D	CHIP C 8.0PF D		
C11 -13			CK73FB1H103K	CHIP C 0.010UF K		
C14			CC73FCH1H090D	CHIP C 9.0PF D		
C15			CC73FCH1H1R5C	CHIP C 1.5PF C		
C16			CC73FCH1H100D	CHIP C 10PF D		
C17			CC73FCH1H020C	CHIP C 2.0PF C		
C18			CC73FCH1H070D	CHIP C 7.0PF D		
C19 -21			CK73FB1H103K	CHIP C 0.010UF K		
C22			CC73FCH1H050C	CHIP C 5.0PF C		
C23			CC73FCH1H1R5C	CHIP C 1.5PF C		
C24			CC73FCH1H040C	CHIP C 4.0PF C		
C25 -27			CK73FB1H103K	CHIP C 0.010UF K		
C28			CC73FCH1H050C	CHIP C 5.0PF C		
C29			CC73FCH1H010C	CHIP C 1.0PF C		
C30			CC73FCH1H050C	CHIP C 5.0PF C		
C31			CC73FCH1H1R5C	CHIP C 1.5PF C		
C33 -35			CK73FB1H103K	CHIP C 0.010UF K		
C36			CC73FCH1H070D	CHIP C 7.0PF D		
C37			CC73FCH1H1R5C	CHIP C 1.5PF C		
C38			CC73FCH1H070D	CHIP C 7.0PF D		
C39 -41			CK73FB1H103K	CHIP C 0.010UF K		
C42			CC73FCH1H070D	CHIP C 7.0PF D		
C43			CC73FCH1H1R5C	CHIP C 1.5PF C		
C44			CC73FCH1H070D	CHIP C 7.0PF D		
C45			CC73FCH1H1R5C	CHIP C 1.5PF C		

E: Scandinavia & Europe H: Audio Club K: USA P: Canada W: Europe

A: Saudi Arabia T: England U: PX(Far East, Hawaii)

UE: AAFES(Europe) X: Australia M: Other Areas

 indicates safety critical components.

## VC-20 (VHF CONVERTER)

\* New Parts

Parts without Parts No. are not supplied.

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C46			CC73FCH1H030C	CHIP C 3.0PF C		
C47 -49			CK73FB1H103K	CHIP C 0.010UF K		
C50			CC73FCH1H100D	CHIP C 10PF D		
C51			CC73FCH1H020C	CHIP C 2.0PF C		
C52			CC73FCH1H100D	CHIP C 10PF D		
C53 -55			CK73FB1H103K	CHIP C 0.010UF K		
C56			CC73FCH1H090D	CHIP C 9.0PF D		
C57			CC73FCH1H020C	CHIP C 2.0PF C		
C58			CC73FCH1H100D	CHIP C 10PF D		
C59			CC73FCH1H020C	CHIP C 2.0PF C		
C60			CC73FCH1H060D	CHIP C 6.0PF D		
C61 ,62			CK73FB1H103K	CHIP C 0.010UF K		
C63			CC73FCH1H560J	CHIP C 56PF J		
C64 -69			CK73FB1H103K	CHIP C 0.010UF K		
C71 -77			CK73FB1H103K	CHIP C 0.010UF K		
C78			CC45SL2H030C	CERAMIC 3.0PF C		
C79			CC45SL1H470J	CERAMIC 47PF J		
C80			CC73FCH1H470J	CHIP C 47PF J		
C100-103			CK73FB1H103K	CHIP C 0.010UF K		
C105			CC45SCH1H560J	CERAMIC 56PF J		
C106			CC73FCH1H180J	CHIP C 18PF J		
C107, 108			CK73FB1H103K	CHIP C 0.010UF K		
C109			CC73FCH1H100D	CHIP C 10PF D		
C110-115			CK73FB1H103K	CHIP C 0.010UF K		
C116			CC73FCH1H220J	CHIP C 22PF J		
C117			CC73FCH1H180J	CHIP C 18PF J		
C118			CS15E1E010M	TANTAL 1.0UF 25WV		
C119-123			CK73FB1H103K	CHIP C 0.010UF K		
C124-126			CC73FCH1H470J	CHIP C 47PF J		
C127-129			CK73FB1H103K	CHIP C 0.010UF K		
C131			CK73FB1H103K	CHIP C 0.010UF K		
C132			C91-1074-05	FILM 0.33UF J		
C133			CE04EW1A470M	ELECTRO 47UF 10WV		
C134			C092M1H104K	MYLAR 0.10UF K		
C135			CK73FB1H103K	CHIP C 0.010UF K		
C136			CE04EW1A470M	ELECTRO 47UF 10WV		
C137			CC73FCH1H470J	CHIP C 47PF J		
C138			CK73FB1H103K	CHIP C 0.010UF K		
C145			CK73FB1H103K	CHIP C 0.010UF K		
C146			CE04EW1A470M	ELECTRO 47UF 10WV		
C147			CK73FB1H103K	CHIP C 0.010UF K		
C148			CC73FRH1H180J	CHIP C 18PF J		
C149			CC73FRH1H060D	CHIP C 6.0PF D		
C150			CC73FCH1H020C	CHIP C 2.0PF C		
C151			CK73FB1H103K	CHIP C 0.010UF K		
C152			CC73FRH1H100D	CHIP C 10PF D		
C153			CK73FB1H103K	CHIP C 0.010UF K		
C154			CC73FSL1H101J	CHIP C 100PF J		
C155			CC73FRH1H150J	CHIP C 15PF J		
C156			CC73FRH1H080D	CHIP C 8.0PF D		
C157			CC73FCH1H020C	CHIP C 2.0PF C		
C158			CK73FB1H103K	CHIP C 0.010UF K		
C159			CC73FRH1H100D	CHIP C 10PF D		
C160			CK73FB1H103K	CHIP C 0.010UF K		
C161			CC73FSL1H101J	CHIP C 100PF J		

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R-5000

## VC-20 (VHF CONVERTER)

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Ref. No.	Address	New Parts	Parts No.	Description	Destination	Remarks
参照番号	位置	新	部品番号	部品名 / 規格	仕向	備考
C162			CC73FRH1H270J	CHIP C 27PF J		
C163			CC73FRH1H070D	CHIP C 7.0PF D		
C164			CC73FCH1H020C	CHIP C 2.0PF C		
C165			CK73FB1H103K	CHIP C 0.010UF K		
C166			CC73FRH1H100D	CHIP C 10PF D		
C167			CK73FB1H103K	CHIP C 0.010UF K		
C168			CC73FSL1H101J	CHIP C 100PF J		
C169			CC73FRH1H390J	CHIP C 39PF J		
C170			CC73FRH1H040C	CHIP C 4.0PF C		
C171			CC73FCH1H010C	CHIP C 1.0PF C		
C172			CK73FB1H103K	CHIP C 0.010UF K		
C173			CC73FRH1H100D	CHIP C 10PF D		
C174			CK73FB1H103K	CHIP C 0.010UF K		
C175			CC73FCH1H050C	CHIP C 5.0PF C		
C177			CK73FB1H103K	CHIP C 0.010UF K		
C178			CC73FCH1H090D	CHIP C 9.0PF D		
C179			CC73FCH1H680J	CHIP C 68PF J		
C180			CC73FCH1H120J	CHIP C 12PF J		
C181			CC73FCH1H180J	CHIP C 18PF J		
C182			CC73FCH1H470J	CHIP C 47PF J		
C185			CC73FCH1H100D	CHIP C 10PF D		
C186			CC73FCH1H050C	CHIP C 5.0PF C		
C187, 188			CK73FB1H103K	CHIP C 0.010UF K		
C190			CE04EW1A470M	ELECTRO 47UF 10WV		
C191			CK73FB1H103K	CHIP C 0.010UF K		
C192			CE04EW1A470M	ELECTRO 47UF 10WV		
-			E04-0164-05	RF COAXIAL CABLE RECEPTACLE		
-			E29-0440-14	TERMINAL (GND)		
-		*	E33-1780-00	FINISHED WIRE SET(8P)		
CN1			E40-0273-05	PIN CONNECTOR (2P)		
CN2			E40-0274-05	PIN CONNECTOR (2P)		
CN3			E40-0774-05	PIN CONNECTOR (7P)L		
CN4			E40-0874-05	PIN CONNECTOR (8P)L		
-		*	F10-1348-04	SHIELDING PLATE(VC0)LOWER		
-		*	F11-1049-03	SHIELDING COVER(FRAME)		
-		*	F11-1050-03	SHIELDING COVER(FRAME)		
-		*	F11-1051-04	SHIELDING COVER(VC0 CASE)		
-			G02-0518-04	FLAT SPRING		
L1			L33-0025-05	CHUKE COIL		
L2 -4			L40-1001-14	SMALL FIXED INDUCTOR(10UH)		
L5			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L6 -12			L40-1001-14	SMALL FIXED INDUCTOR(10UH)		
L100-101			L34-1163-05	COIL		
L102			L40-1001-14	SMALL FIXED INDUCTOR(10UH)		
L103			L40-4791-14	SMALL FIXED INDUCTOR(4.7UH)		
L104			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L105			L40-4791-14	SMALL FIXED INDUCTOR(4.7UH)		
L106			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L107			L40-4791-14	SMALL FIXED INDUCTOR(4.7UH)		
L108			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L109			L40-4791-14	SMALL FIXED INDUCTOR(4.7UH)		
L110			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L111			L40-1001-14	SMALL FIXED INDUCTOR(10UH)		

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L112-114 L115-121 L122 L123 L124-126			L34-1164-05 L40-1001-14 L40-1001-13 L34-1163-05 L92-0110-05	COIL SMALL FIXED INDUCTOR(10UH) SMALL FIXED INDUCTOR(10UH) COIL FERRITE CORE		
L127 T1 T2 T3 T4 ,5		*	L40-1092-14 L34-4030-05 L34-2175-05 L34-2174-05 L34-2175-05	SMALL FIXED INDUCTOR(1UH) COIL COIL COIL COIL		
T6 T7 T8 T9 ,10 T11		*	L34-4028-05 L34-2169-05 L34-2168-05 L34-2169-05 L34-4028-05	COIL COIL COIL COIL COIL		
T12 T13 T14 ,15 T16 T17		*	L34-2172-05 L34-2171-05 L34-2172-05 L34-4028-05 L34-2172-05	COIL COIL COIL COIL COIL		
T18 T19 ,20 T21 T22 T23		*	L34-2171-05 L34-2172-05 L34-2161-15 L19-0350-05 L34-4029-05	COIL COIL COIL BALUN TRANSFORMER COIL		
T24 T100 T101 T102 T104		*	L19-0346-05 L34-4031-05 L34-4032-05 L19-0350-05 L19-0348-05	BALUN TRANSFORMER COIL COIL BALUN TRANSFORMER BALUN TRANSFORMER		
T105 T106 T107 T108		*	L34-4033-05 L34-4034-05 L34-4035-05 L34-4036-05	COIL COIL COIL COIL		
- - -			N35-2604-41 N87-2606-46 N87-3010-41	BIND HEAD MACHINE SCREW(CASE) BRAZIER HEAD TAPTITE SCREW BRAZIER HEAD TAPTITE SCREW(ANT)		
R1 R2 R3 R4 R7			RK73FB2A101J RK73FB2A750J RK73FB2A471J RK73FB2A560J RK73FB2A473J	CHIP R 100 J 1/10W CHIP R 75 J 1/10W CHIP R 470 J 1/10W CHIP R 56 J 1/10W CHIP R 47K J 1/10W		
R8 R9 R10 ,11 R12 ,13 R14			RK73FB2A104J RK73FB2A330J RK73FB2A101J RK73FB2A561J RK73FB2A101J	CHIP R 100K J 1/10W CHIP R 33 J 1/10W CHIP R 100 J 1/10W CHIP R 560 J 1/10W CHIP R 100 J 1/10W		
R16 R17 R18 R19 ,20 R21			RK73FB2A473J RK73FB2A104J RK73FB2A330J RK73FB2A101J RK73FB2A821J	CHIP R 47K J 1/10W CHIP R 100K J 1/10W CHIP R 33 J 1/10W CHIP R 100 J 1/10W CHIP R 820 J 1/10W		
R22 R23			RK73FB2A102J RK73FB2A101J	CHIP R 1.0K J 1/10W CHIP R 100 J 1/10W		

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R25			RK73FB2A473J	CHIP R 47K	J	1/10W
R26			RK73FB2A104J	CHIP R 100K	J	1/10W
R27			RK73FB2A330J	CHIP R 33	J	1/10W
R28 ,29			RK73FB2A101J	CHIP R 100	J	1/10W
R30			RK73FB2A561J	CHIP R 560	J	1/10W
R31			RK73FB2A821J	CHIP R 820	J	1/10W
R32			RK73FB2A101J	CHIP R 100	J	1/10W
R34			RK73FB2A473J	CHIP R 47K	J	1/10W
R35			RK73FB2A104J	CHIP R 100K	J	1/10W
R36			RK73FB2A330J	CHIP R 33	J	1/10W
R37 ,38			RK73FB2A101J	CHIP R 100	J	1/10W
R39			RK73FB2A561J	CHIP R 560	J	1/10W
R40			RK73FB2A102J	CHIP R 1.0K	J	1/10W
R41			RK73FB2A101J	CHIP R 100	J	1/10W
R42			RK73FB2A271J	CHIP R 270	J	1/10W
R43 -46			RK73FB2A220J	CHIP R 22	J	1/10W
R47			RK73FB2A273J	CHIP R 27K	J	1/10W
R48 ,49			RK73FB2A104J	CHIP R 100K	J	1/10W
R50			RK73FB2A333J	CHIP R 33K	J	1/10W
R51 ,52			RK73FB2A101J	CHIP R 100	J	1/10W
R53			RK73FB2A333J	CHIP R 33K	J	1/10W
R54			RK73FB2A560J	CHIP R 56	J	1/10W
R55			RK73FB2A221J	CHIP R 220	J	1/10W
R56			RK73FB2A681J	CHIP R 680	J	1/10W
R57			RK73FB2A330J	CHIP R 33	J	1/10W
R58			RK73FB2A2R2J	CHIP R 2.2	J	1/10W
R59			RK73FB2A560J	CHIP R 56	J	1/10W
R60			RK73FB2A220J	CHIP R 22	J	1/10W
R63 ,64			RK73FB2A471J	CHIP R 470	J	1/10W
R65			RK73FB2A680J	CHIP R 68	J	1/10W
R100			RK73FB2A560J	CHIP R 56	J	1/10W
R101			RK73FB2A103J	CHIP R 10K	J	1/10W
R102			RK73FB2A393J	CHIP R 39K	J	1/10W
R103			RK73FB2A122J	CHIP R 1.2K	J	1/10W
R104			RK73FB2A101J	CHIP R 100	J	1/10W
R105			RK73FB2A472J	CHIP R 4.7K	J	1/10W
R106			RK73FB2A682J	CHIP R 6.8K	J	1/10W
R107			RK73FB2A470J	CHIP R 47	J	1/10W
R108			RK73FB2A101J	CHIP R 100	J	1/10W
R109			RK73FB2A151J	CHIP R 150	J	1/10W
R110-113			RK73FB2A330J	CHIP R 33	J	1/10W
R114			RK73FB2A333J	CHIP R 33K	J	1/10W
R115			RK73FB2A104J	CHIP R 100K	J	1/10W
R116			RK73FB2A105J	CHIP R 1.0M	J	1/10W
R118			RK73FB2A101J	CHIP R 100	J	1/10W
R119			RK73FB2A221J	CHIP R 220	J	1/10W
R120			RK73FB2A182J	CHIP R 1.8K	J	1/10W
R121			RK73FB2A222J	CHIP R 2.2K	J	1/10W
R122			RK73FB2A153J	CHIP R 15K	J	1/10W
R123			RK73FB2A2R2J	CHIP R 2.2	J	1/10W
R124			RK73FB2A101J	CHIP R 100	J	1/10W
R125			RK73FB2A2R2J	CHIP R 2.2	J	1/10W
R126			RK73FB2A472J	CHIP R 4.7K	J	1/10W
R127			RK73FB2A223J	CHIP R 22K	J	1/10W
R128,129			RK73FB2A221J	CHIP R 220	J	1/10W

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R131			RK73FB2A152J	CHIP R 1.5K J 1/10W		
R132			RK73FB2A224J	CHIP R 220K J 1/10W		
R133			RK73FB2A560J	CHIP R 56 J 1/10W		
R136			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R137			RK73FB2A821J	CHIP R 820 J 1/10W		
R138			RK73FB2A153J	CHIP R 15K J 1/10W		
R139			RK73FB2A331J	CHIP R 330 J 1/10W		
R140,141			RK73FB2A103J	CHIP R 10K J 1/10W		
R142			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R150,151			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R152			RK73FB2A331J	CHIP R 330 J 1/10W		
R154,155			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R156			RK73FB2A331J	CHIP R 330 J 1/10W		
R158,159			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R160			RK73FB2A331J	CHIP R 330 J 1/10W		
R162,163			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R164			RK73FB2A331J	CHIP R 330 J 1/10W		
R165			RK73FB2A680J	CHIP R 68 J 1/10W		
R166			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R167			RK73FB2A682J	CHIP R 6.8K J 1/10W		
R168			RK73FB2A220J	CHIP R 22 J 1/10W		
R169			RK73FB2A101J	CHIP R 100 J 1/10W		
R170			RK73FB2A560J	CHIP R 56 J 1/10W		
R171			RK73FB2A221J	CHIP R 220 J 1/10W		
R172			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R173			RK73FB2A682J	CHIP R 6.8K J 1/10W		
R174			RK73FB2A220J	CHIP R 22 J 1/10W		
R175,176			RK73FB2A101J	CHIP R 100 J 1/10W		
R177,178			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R180,181			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R183,184			RK73FB2A681J	CHIP R 680 J 1/10W		
R185,186			RK73FB2A221J	CHIP R 220 J 1/10W		
R187-190			RK73FB2A821J	CHIP R 820 J 1/10W		
R191			R12-1066-05	TRIMMING PRT. (1K)		
VR100						
VR101-104			R12-1069-05	TRIMMING PRT.		
W20 -24			R92-0670-05	CHIP R 0 6HM		
W123-145			R92-0670-05	CHIP R 0 6HM		
RL1 ,2			S51-1428-05	RELAY (DC9V)		
D1 -3			DAN202(K)	CHIP DIODE		
D4 -7			1S2588	DIODE		
D8 -11			MA858	DIODE		
D100			MTZ7.5JA	ZENER DIODE		
D101,102			1SV153	VARI-CAP DIODE		
D103			MA858	DIODE		
D104,105			1SV153	VARI-CAP DIODE		
D106			MA858	DIODE		
D107,108			1SV153	VARI-CAP DIODE		
D109			MA858	DIODE		
D110			1SV153	VARI-CAP DIODE		
D112			MA858	DIODE		
D113			MTZ3.3JA	ZENER DIODE (3.3V)		
D114,115			DAN202(K)	CHIP DIODE		
D116			DAN401	DIODE		

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**R-5000****VC-20 (VHF CONVERTER)**

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D117			1SS133	DIODE		
D118			MTZ5.1JA	ZENER DIODE		
D119			DAN202(K)	CHIP DIODE		
IC100			HD10551	IC(PRE SCALER)		
IC101			MC145158P	IC(PLL)		
IC102			TA78L005AP	IC(VOLTAGE REGULATOR/ +5V)		
IC103			SN74LS139N	IC(DUAL 2-4 DEMULTIPLEXERS)		
IC104		*	SN74LS07N	IC(BUFFER/DRIVER GATE)		
Q1 -4			3SK184(R)	CHIP FET		
Q5 -8			2SK125-5	FET		
Q9 ,10			3SK74(L)	FET		
Q11			2SC2570A	TRANSISTOR		
Q100			2SC2570A	TRANSISTOR		
Q101			2SC2714(Y)	CHIP TRANSISTOR		
Q102,103			3SK74(L)	FET		
Q104			2SC2570A	TRANSISTOR		
Q105			DTC124EK	DIGITAL TRANSISTOR		
Q106			2SC2714(Y)	CHIP TRANSISTOR		
Q107-110			2SK192A(GR)*P	FET		
Q111,112			2SC2570A	TRANSISTOR		
Q113-117			2SB678(E,F)	TRANSISTOR		
Q118			2SC2714(Y)	CHIP TRANSISTOR		

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**R-5000 R-5000**

**VC-20 (VHF CONVERTER)**

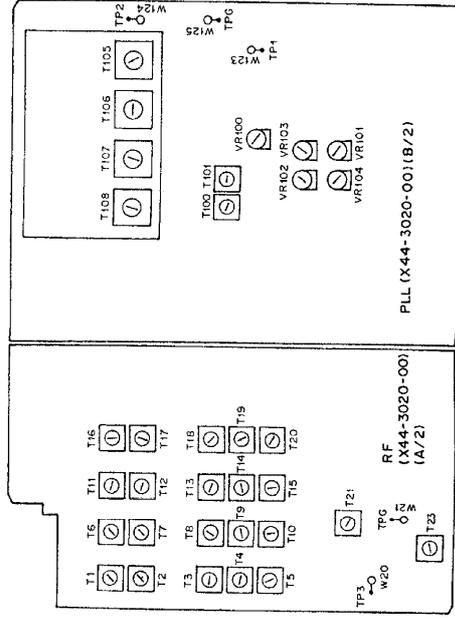
**ADJUSTMENT**

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Parts	Method		
1. VCO	MODE : FM	DC V.M	PLL	TP2	T105	2.0V	±0.05V	
	FREQ. : 106.000MHz						3.8±0.5V	
	FREQ. : 129.980MHz						±0.05V	
	FREQ. : 123.000MHz						3.7±0.5V	
2. PLL MIX	MODE : FM	RF V.M	PLL	TP1 TPG	T100	Check	±0.05V	
	FREQ. : 154.980MHz				T108	2.0V	±0.05V	
3. RF BPF	MODE : FM	Tracking generator (20dB ATT) Spectrum analyzer OSCILLO	RF	ANT TP3 TPG	T101	MAX.	3.9±0.5V	
	MODE : FM				T1-5	Waveform perform as shown on right.		
	MODE : FM							
	MODE : FM							
4. Sensitivity	MODE : FM	SSG AF V.M	RF	ANT EXT.SP S-meter	T16~ T20	S-meter MAX. flat.	S/N more than 10dB	
	FREQ. : 145.02MHz				T11~ T15	Check	S/N More than 10dB.	
	SSG MOD : 1kHz							
	DEV : 5kHz							

**VC-20 (VHF CONVERTER)**

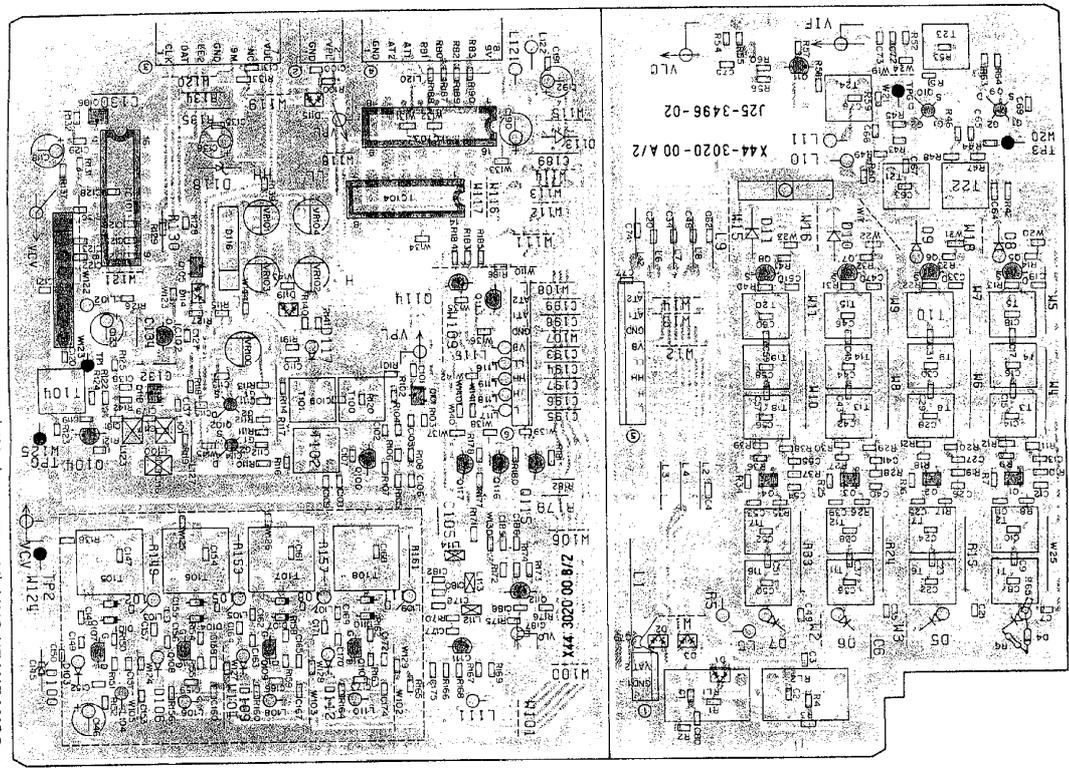
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Parts	Method		
5. Spurious	1) FREQ. : 185.388.5MHz	8Ω dummy load	R- 5000	EXT.SP	AF	0.63V		
	MODE : FM							
	SSG output : 155.388.5MHz,							
	MOD : ON							
	2) SSG MOD : OFF							
	3) FREQ. : 147.388.5MHz				VC-20	AF output MIN.	AF output less than 20dB.	
	MODE : FM				PLL	VR100		
	SSG output : 147.388.5MHz,				R- 5000	0.63V		
60dBμ								
4) SSG MOD : OFF								
5) FREQ. : 135.388.5MHz	VC-20	AF output MIN.	AF output less than 20dB.					
MODE : FM	PLL	VR102						
SSG output : 135.388.5MHz,	R- 5000	0.63V						
60dBμ								
6) SSG MOD : OFF								
7) FREQ. : 118.388.5MHz	VC-20	AF output MIN.	AF output less than 15dB.					
MODE : FM	PLL	VR105						
SSG output : 118.388.5MHz,	R- 5000	0.63V						
60dBμ								
8) SSG MOD : OFF								
1) FREQ. : 123.02MHz	VC-20	AF output MIN.	AF output less than 20dB.					
MODE : USB	PLL	VR104						
SSG output : 68.112.5MHz,	R- 5000	80dBμ						
80dBμ								
6. IF trap		SSG AF V.M	ANT connector EXT.SP	RF T21	AF output MIN. 80dB.	Divider ratio is more than		

**ADJUSTING POINT**

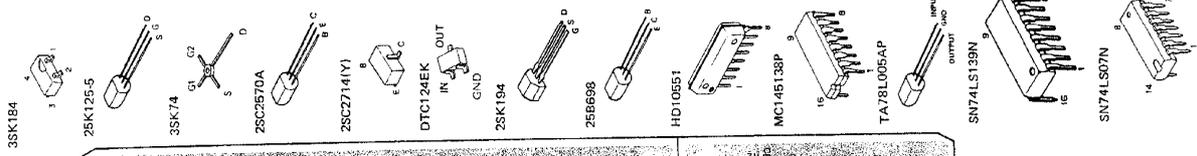
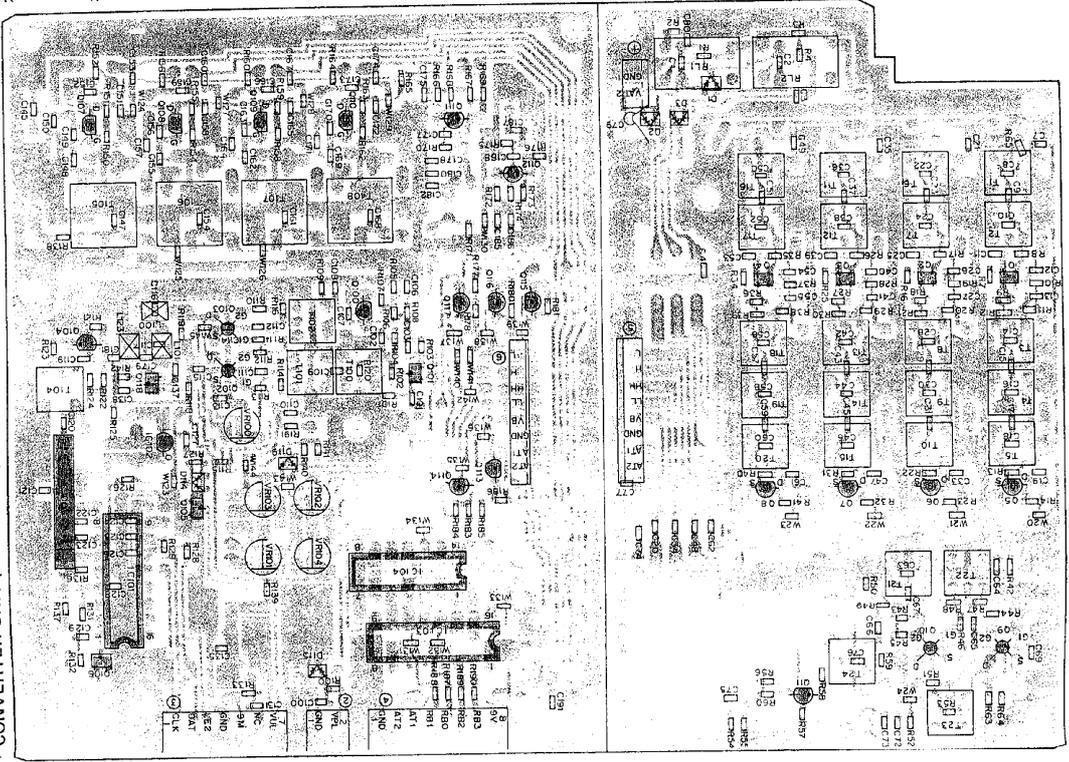


# R-5000 VC-20 (VHF CONVERTER) PC BOARD VIEWS

▼ CONVERTER UNIT (X44-3020-00) Component side view



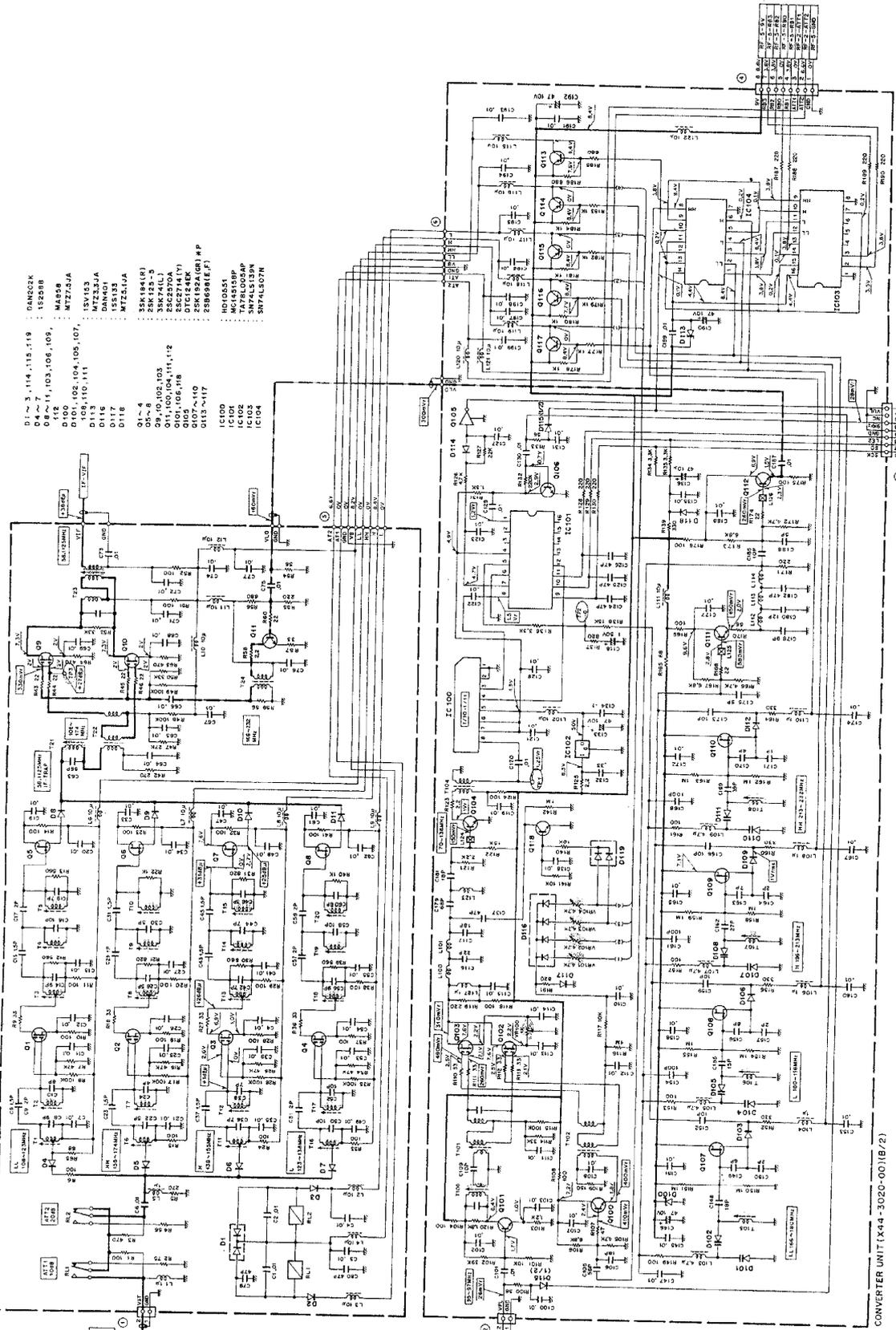
▼ CONVERTER UNIT (X44-3020-00) Foil side view



# VC-20 (VHF CONVERTER) CIRCUIT DIAGRAM R-5000

● Voltage measurement conditions f = 145.02MHz, FM mode receiving

CONVERTER UNIT (X44-3020-00)(A/2)



CONVERTER UNIT (X44-3020-00)(B/2)

- D1 ~ 3, 114, 115, 119
- D4 ~ 7
- D10
- D100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111
- D110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120
- D120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130
- D130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140
- D140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150
- D150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160
- D160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170
- D170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180
- D180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190
- D190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200
- D200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210
- D210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220
- D220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230
- D230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240
- D240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250
- D250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260
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- D780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790
- D790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800
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- D810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820
- D820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830
- D830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840
- D840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850
- D850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860
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- D890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900
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- D920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930
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- D940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950
- D950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960
- D960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970
- D970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980
- D980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990
- D990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

## INSTALLATION OF OPTIONS

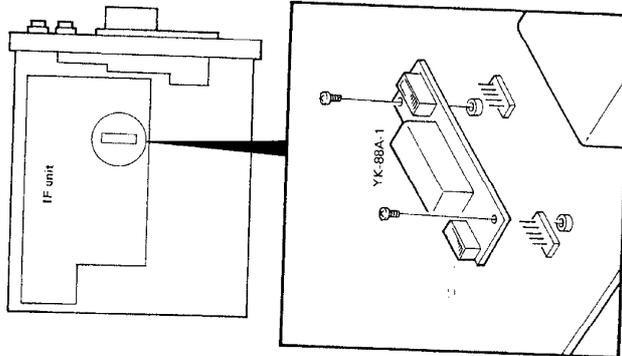
### Crystal Filter

A selection of optional filters is available for the R-5000 series: the YK-885N, YK-88C, YK-88CN, and YK-88A-1. To install them, remove the top cover of the receiver and follow the procedure below. Detach the speaker lead wires so that they will not be broken.

**Note:** Solder as quickly as possible, using a low-power soldering iron (15W to 30W). Be careful not to break the speaker wires when removing the IF unit.

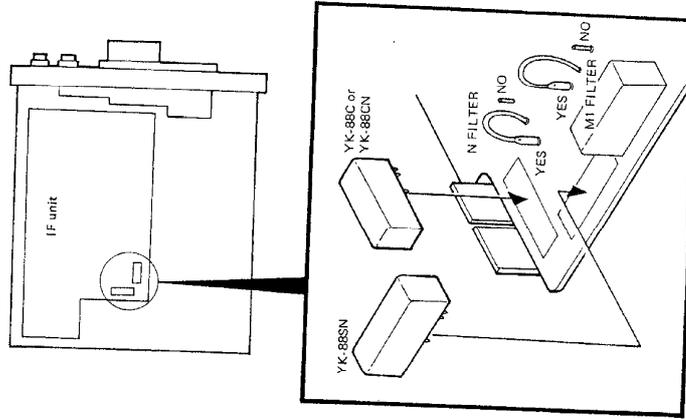
#### 2-1. YK-88A-1

- (1) Remove the two screws holding the filter board (X48-3000-00) (6/2) to the IF unit board, and remove the filter board.
- (2) Install YK-88A-1 and secure it with the two screws.



#### 2-2. YK-885N, YK-88C, and YK-88CN

- (1) Remove the seven screws holding down the IF unit board, and lift it from the chassis.
- (2) Insert the filter into the space provided, and solder it to the foil side of the board at six points. Cut off the excess filter leads extending from the board.
- (3) Install the YK-885N filter in the position marked SELECTIVITY M1 FILTER, Change the white filter selection jumper wire marked M1 FILTER from the NO position to the YES position.
- (4) Install the YK-88C or YK-88CN filters in the position marked SELECTIVITY N FILTER. Change the white filter selection jumper wire marked N FILTER from the NO position to the YES position.
- (5) Reattach the IF unit to the chassis in its former position with the seven screws.
- (6) Reattach the speaker wires and replace the top cover.



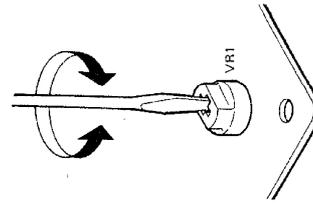
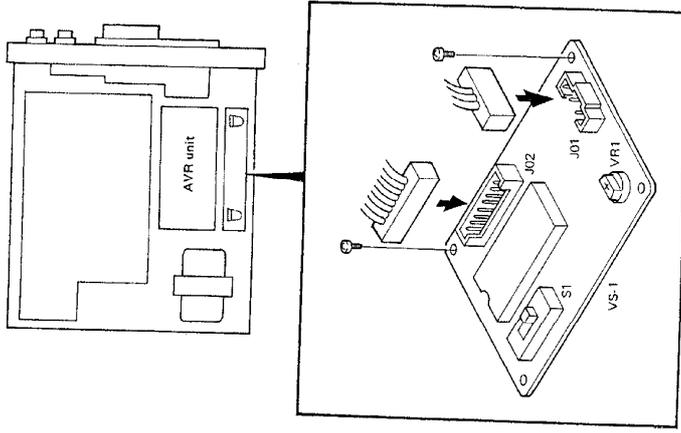
## INSTALLATION OF OPTIONS

### Voice Synthesis Unit VS-1

When the voice synthesis unit is installed, the user does not have to look at the display to read the frequency, but can hear it spoken by a synthesized voice. A switch on the unit selects English or Japanese.

- (1) Remove the top and bottom cover of the receiver cabinet.
- (2) Space for installing the VS-1 unit is provided beside the Power unit. Insert the VS-1 unit in the shield case, making sure it is oriented correctly, and secure it with the two supplied screws.
- (3) Near the VS-1 unit are an unconnected 3-pin connector and 8-pin connector. Plug the 3-pin connector onto J01 on the VS-1 unit (the green connector), the 8-pin connector into J02.
- (4) Set switch S1 on the VS-1 unit to select English or Japanese.
- (5) When power is on, the frequency is spoken when the VOICE switch is pressed. The voice volume can be adjusted by turning VR1 on the VS-1 unit with a screwdriver.

**Warning:** Be careful not to break the wires leading to the speaker mounted on the top cover. Remove these lead wires from the speaker terminals before installing the VS-1 unit.

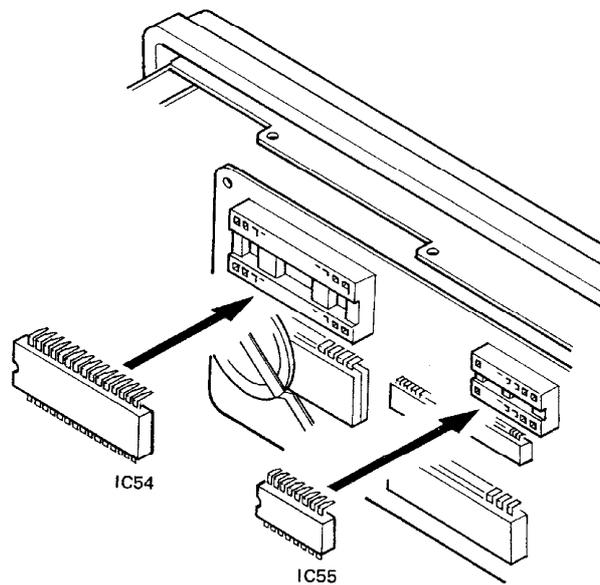


## INSTALLATION OF OPTIONS

### RS-232C Interface Chip IC-10

- (1) Remove the top and bottom covers of the receiver.
- (2) Remove the four screws at the sides of the front panel and pull the front panel forward.
- (3) Remove the five screws (two at the top and three at the bottom) holding the shield plate behind the front panel, and remove the shield plate.
- (4) Insert the IC package from the interface kit (IC54, IC55) in the socket on the board.

Make sure the IC package is inserted securely and in the right direction, and be careful not to damage any of the pins.



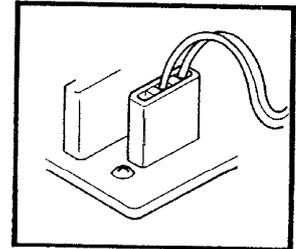
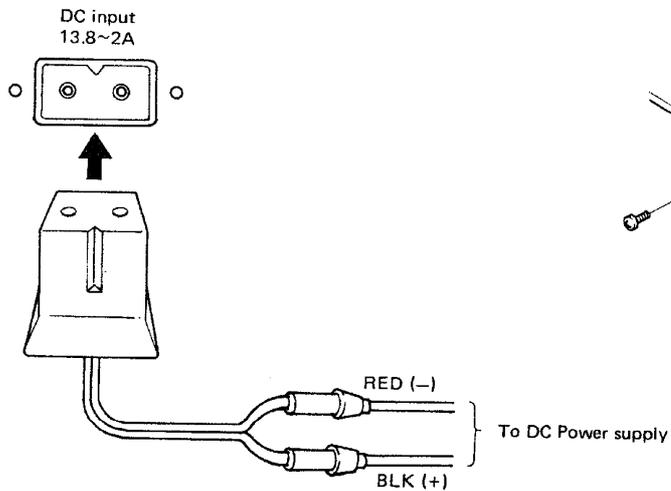
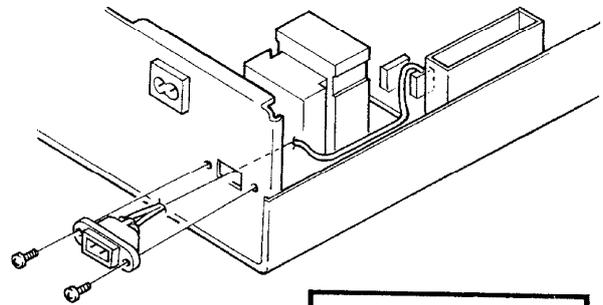
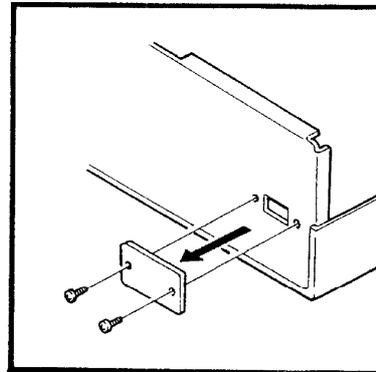
# R-5000

## INSTALLATION OF OPTIONS

### DC Power Cable Kit DCK-2

The DCK-2 cable kit is provided for running the R-5000 set from a DC power supply. The installation procedure is as follows :

- (1) Remove the top cover of the case.
- (2) Remove the blind plate from the rear panel.
- (3) Mount the DC connector in the hole provided for it on the rear panel, using two screws.
- (4) Pass the cable with the 3-pin connector through the two lead holders and plug the connector onto location ⑤ on the AVR unit. The unused pin must be closer to the transformer.
- (5) Use the DC cables to connect the R-5000 to the DC power supply.



## INSTALLATION OF OPTIONS

### VHF Converter VC-20

The VC-20 VHF converter enables the R-5000 to receive the VHF band from 108MHz to 174MHz. The installation procedure is as follows.

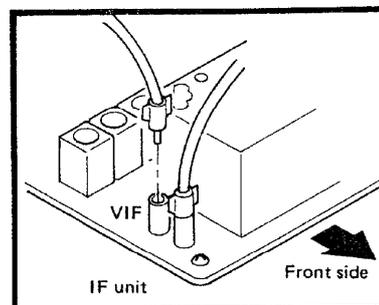
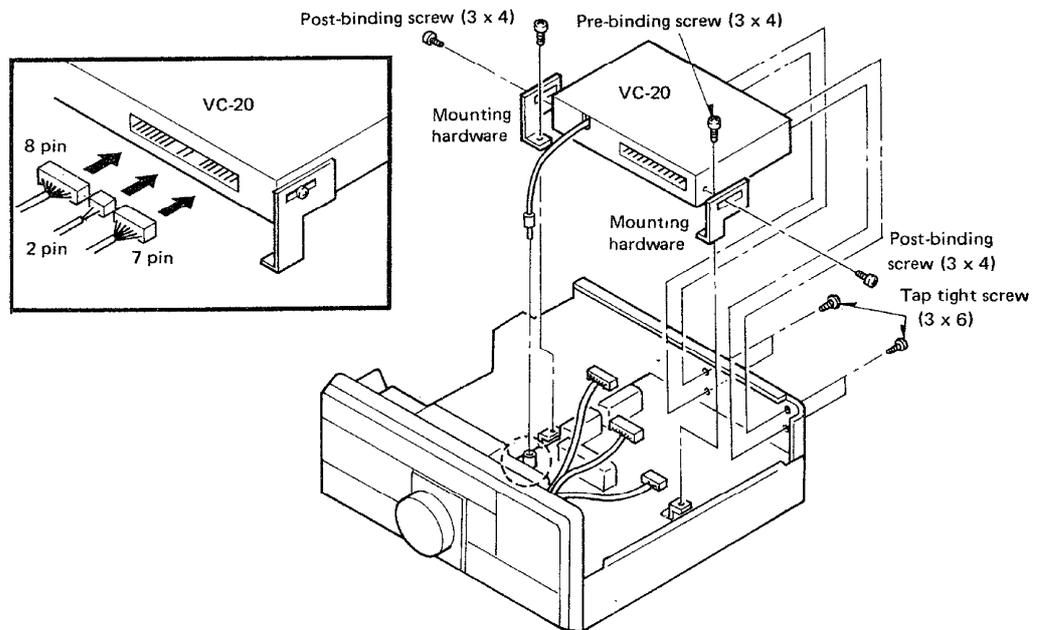
- (1) Remove the top cover of the receiver.
- (2) Attach the two mounting brackets to the chassis with one screw (Bind screw M3 x 4) each.
- (3) Insert the VC-20 from the rear with the antenna connector facing the rear, and attach the VC-20 to the rear panel with four screws (Tapping screw M3 x 6).
- (4) Attach the VC-20 to the two brackets with two screws (Bind screw M3 x 4).

- (5) Near the VC-20 is an unconnected 2-pin connector, a 7-pin connector, and an 8-pin connector. Plug the 2-pin connector onto location ② on the VC-20, the 7-pin connector onto location ③, and the 8-pin connector onto location ④.

- (6) Plug the coaxial cable from the VC-20 into the coaxial connector marked VIF on the IF unit.

**Warning :** Be careful not to break the speaker wires attached to the top cover. Remove these wires from the speaker terminals (speaker side) before installing the VC-20 unit. When installing the converter, be careful the wires not to be caught in the units.

The wires to the VC-20 are bound together with other wires in the IF unit. Remove the beed bands before connection.



# R-5000

## SPECIFICATIONS

### <GENERAL>

**Receive frequency range**  
100kHz~30MHz

**Mode**  
A1 (CW), A3J (SSB), A3 (AM), F1 (FSK), F3 (FM)

**Antenna impedance**  
50/500Ω

**Power requirement**  
AC 100V±10%, DC 13.8V±15%

**Power consumption**  
AC : 35W, DC : 2A

**Frequency configuration**  
1st IF : 58.1125MHz  
2nd IF : 8.83MHz  
3rd IF (FM mode only) : 455kHz  
CW, SSB, AM, FSK; Double conversion superheterodyne  
FM; Triple conversion superheterodyne

**Image ratio**  
60dB or more (100kHz~1.8MHz)  
80dB or more (1.8MHz~30MHz)

**IF rejection ratio**  
60dB or more (100kHz~1.8MHz)  
70dB or more (1.8MHz~30MHz)

**IF SHIFT variable range**  
±0.9kHz or more

**RIT/XIT variable range**  
±1kHz or more

**Audio output power**  
1.5W or more (with 8Ω load, 10% distortion)

**Audio output impedance**  
4~16Ω (including speakers and headphones)

**Operating temperature**  
-10°C~+50°C

**Dimensions ( ) includes projection**  
W 270(279) x H 96(107) x D 270(307)mm

**Weight**  
5.5kg (1210lbs)

### <FREQUENCY STABILITY>

**Frequency accuracy**  
Within ±10 x 10<sup>-6</sup>

**Frequency stability (RIT/XIT OFF)**  
Within ±10 x 10<sup>-6</sup> (-10°C~+50°C)

**Reference oscillats frequency**  
18MHz

#### Sensitivity

Mode \ Range	100~150kHz	150~500kHz	500kHz~1.6MHz	1.6~30MHz
SSB, CW, FSK (S + N/N = 10dB)	2.5μV or less	1μV or less	4μV or less	0.25μV or less
AM (30% Mod. S + N/N = 10dB)	25μV or less	10μV or less	16μV or less	2μV or less
FM (12dB SINAD)	—	—	—	0.5μV or less

#### Squelch sensitivity (Threshold)

Mode \ Range	100~150kHz	150~500kHz	500kHz~1.6MHz	1.6~30MHz
SSB, CW, AM, FSK	20μV or less	10μV or less	20μV or less	2μV or less
FM	—	—	—	0.32μV or less

#### Selectivity

Mode \ Range	-6dB	-50dB	-60dB
SSB, CW, FSK	2.5kHz or more	—	5.8kHz or less
AM	4kHz or more	20kHz or more	—
FM	12kHz or more	25kHz or more	—

Note : Circuit and ratings subject to change without notice due to developments in technology.

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