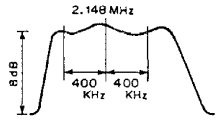
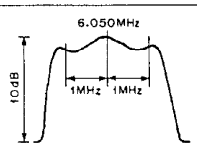
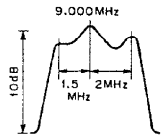
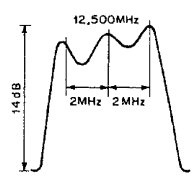
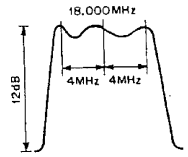
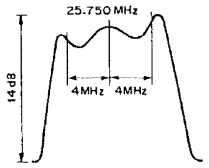
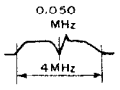
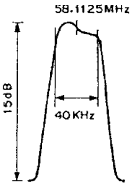
ADJUSTMENT

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)	⑧ -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 **W2** MODE : AM	DC V.M	RF	⑦ -2	RF	L62	6.0V 4.6V **W2**	5.9~6.1V 4.5~4.7V **W2**
	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 **W2** 2MHz **X**						Check	2.7~3.3V 2.8~3.4V **W2** 3.6~4.0V **X**
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	

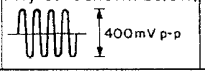
ADJUSTMENT

Item	Condition	Measurement				Adjustment		Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
	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 : 60dBμ	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 alternatelly 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 • φ 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.	
			Front panel	S-meter		VR4	S-meter "2"	
			IF	TP3		VR2	3.0V	2.98~3.02V
	2) S9 SSG output : 32dBμ AF output : 1kHz		Front panel	S-meter		VR3	S-meter "9"	
	3) The edge-rising SSG output : 10dBμ					VR1	S-meter "2"	
	4) Repeat 2) and 3) two times.							
20. D-AGC	1) Same as item 19. SSG output : 92dBμ	SSG	Front panel	S-meter	IF	VR5	S-meter "60dB"	
	2) SSG output : 32dBμ						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 : 12dBμ						Check the squelch open.	
	5) After check SQL VR : MIN							
22. FM SQL	1) FREQ. : 28.675.00 FREQ. : 26.100.00 **W2** 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 : –4dBμ						Check	Squelch open.
	3) Tight SQL-1 SQL VR : MAX SSG output : 12dBμ							
	4) Tight SQL-2 SSG output : 120dBμ							
	5) After check SQL VR : MIN							
23. NOTCH	1) SSG output : 60dBμ AF output : 1kHz, 0.63V/8Ω 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.)

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) **W2** : 29.9MHz, −6dBμ : 26.1MHz, −6dBμ **W2**	SSG						S/N more than 10dB (AF GAIN VR : MAX) 0.63V/8Ω
25. ANT2	1) ANT2 SW : ON							ANT2 LED lit on.
	2) Apply a signal to ANT2 50Ω terminal and 500Ω terminal.						Check	Adjust 500Ω terminal AF output is less than 50Ω terminal.
26. Filter selelct check	1) SELECTIVITY : N	DC V.M SP	IF	D38			Voltage check	8.5~9.5V
	2) SELECTIVITY : M1			D39				
	3) SELECTIVITY : M2			D40				
	4) SELECTIVITY : W			D41				
	5) After check SELECTIVITY : AUTO							
27. Marker check	1) Connect the cable between MKR terminal on the PLL and the RF unit. FREQ. : 15.000.00	SP						Check of possible receive.
	2)							
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

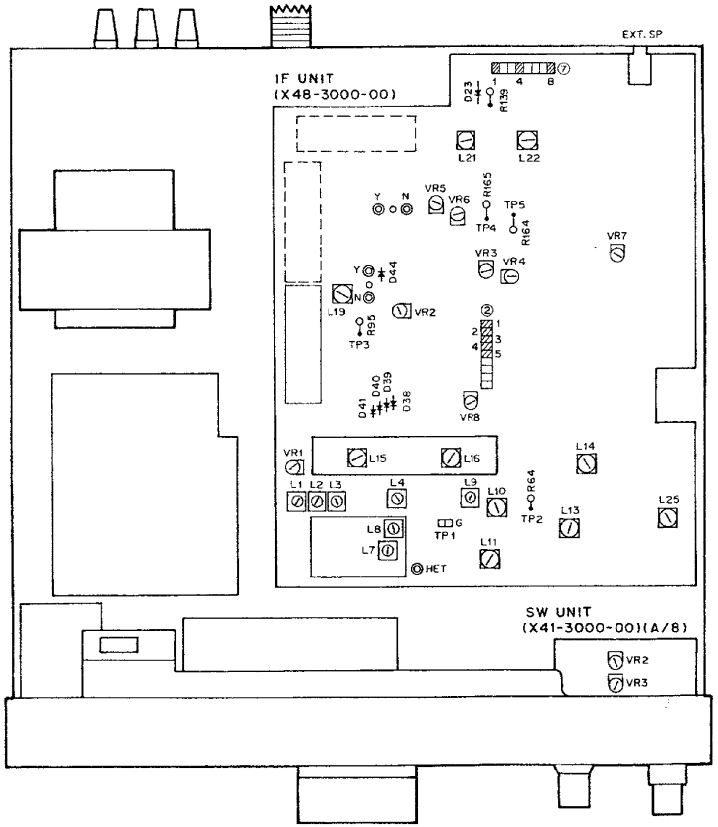
Microprocessor operation check

Item	Condition	Operation check
1. Reset	1) Power SW : ON While depressing the [A=B] key.	A VFO 15.000.00 AM LED : Lights ANT1 : Lights
2. Function	1) Depress the BAND [UP] key once.	A VFO 16.000.00
	2) Depress the BAND [DOWN], key once.	A VFO 15.000.00
	3) Turn the ENCODER clockwise.	FREQ. : UP
	4) Turn the ENCODER counterclockwise.	FREQ. : DOWN
	5) Depress the [LSB] key once.	LSB LED : Lights Beep sound : ·—··
	6) Depress the [USB] key once.	USB LED : Lights Beep sound : ··—
	7) Depress the [CW] key once.	CW LED : Lights 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 : ·—·

Item	Condition	Operation check
2. Function	11) Depress the [A/B] key once.	VFO B 15.000.00 AM LED : Lights ANT1 LED : Lights
	12) Depress the [STEP] key once.	VFO B STEP 15.000.00 STEP display : Lights
	13) Depress the [STEP] key once.	VFO B 15.005.00 STEP display : Lights
	14) Depress the [ANT2] key once.	VFO B 15.000.00 ANT2 LED : Lights
	15) Depress the [ANT1] key once.	VFO B 15.000.00 ANT1 LED : Lights
	16) [F.LOCK] : ON	F. LOCK LED : Lights
	17) [F.LOCK] : OFF	F. LOCK LED : Goes off
	18) Depress the "HF/VHF" key once.	A VFO 145.0000 FM LED : Lights Holds above display momentarilly, then goes HF again. Beep sound

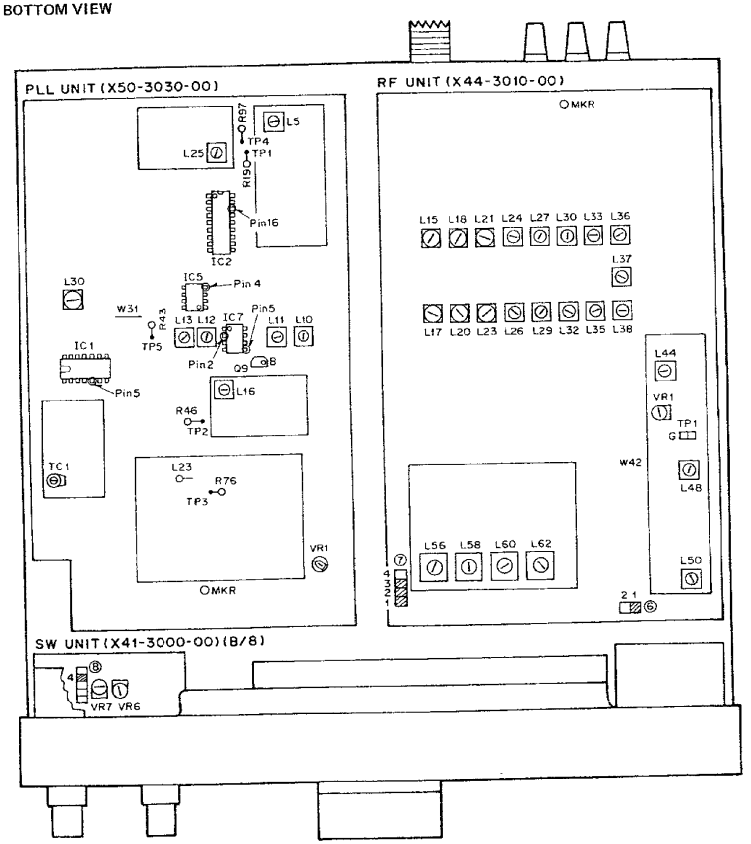
ADJUSTMENT

TOP VIEW



ADJUSTMET

BOTTOM VIEW



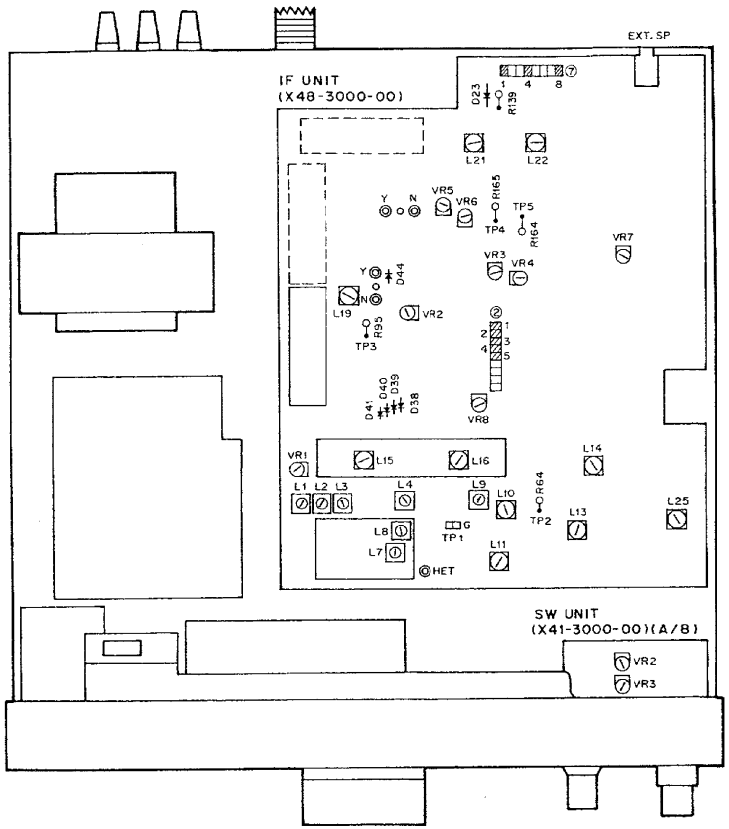
ADJUSTMENT

Item	Condition	Operation check
2. Function	19) CLOCK SW : CLOCK1 20) CLOCK SW : CLOCK2 21) CLOCK SW : OFF	Displays the clock function Displays the clock function. The clock function display disappear.
3. Enter check	1) Depress each key in the following order : [ENT] → [1] → [6] → [7] → [8] → [9] → [ENT]	VFO B 00 16:78:00
4. Memory write	1) Depress the [M.IN] key once.	M.CH B 00 . . M.SCR LED : Lights
	2) Depress the [0] [8] key once.	M.CH B 08 . .
	3) Depress the [M.IN] key once.	VFO B 08 16:78:00
	4) Depress the BAND [UP] key once.	VFO B 09 17:78:00
	5) Depress the [M.IN] key once.	M.CH B 09 16:78:00
	6) Depress the BAND [UP] key once.	M.CH B 09 . .
	7) Depress the [M.IN] key once.	VFO B 09 17:78:00
	8) Depress the [VFO/M] key once.	M.CH B 09. 17:78:00
	9) Depress the BAND [DOWN] key once.	M.CH B 08 16:78:00
	10) Depress the [SCAN] key once.	Scanning Memory CH 08 and 09. SCAN display : Lights
	11) Depress the [CLEAR] key once.	Scan stop
	12) Depress the [M▶V] key once.	VFO B 16:78:00 or : VFO B 17:78:00

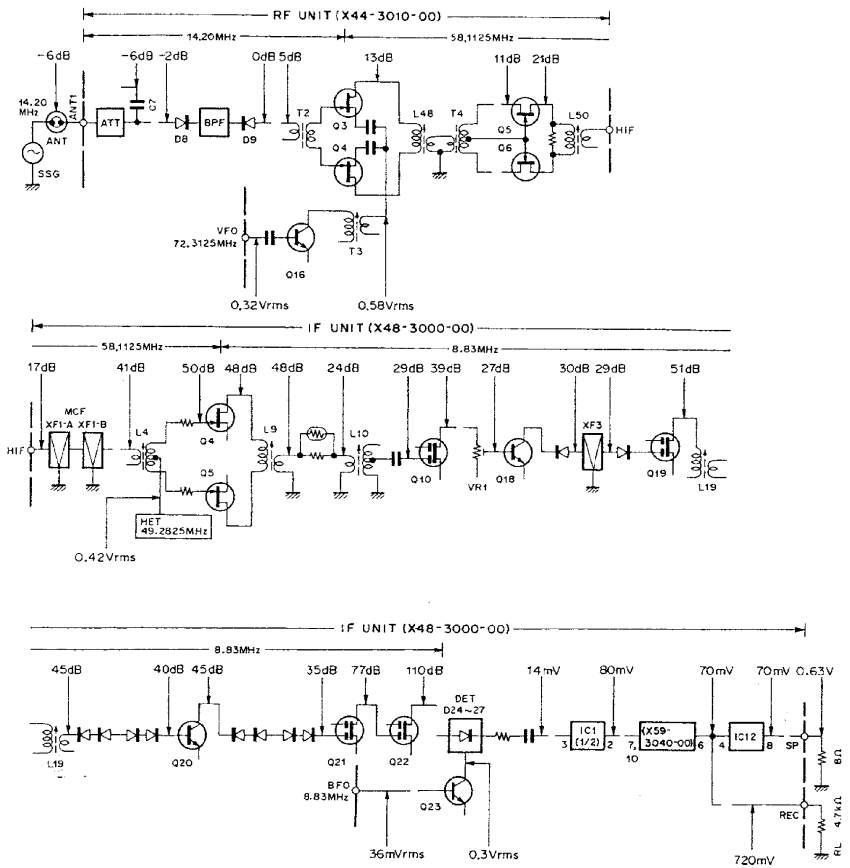
Item	Condition	Operation check
4. Memory write	13) Depress the [SCAN] key once.	SCAN VFO B P0 . . The display steps up 1kHz at each key-press.
	14) Depress the [CLEAR] key once.	SCAN display disappear P0 display disappear the display Memory channel
5. Timer check (ON TIME SET)	1) CLOCK SW : CLOCK1 TIME SET SW : ON Depress the [HOUR] [MINUTE] keys at the same time.	Colon (:) blinking stops
	2) TIMER SW : ON Depress the "ON TIME" SW once.	on . 000
	3) Set the timer with the [HOUR] [MINUTE] keys while depressing the "ON TIME" SW.	on 0000 000
(OFF TIME SET)	4) TIMER SW : ON TIME SET SW : ON Depressing the "OFF TIME" SW once.	oFF . 000
	5) Set the timer with the [HOUR] [MINUTE] keys while depressing the "OFF TIME" SW.	oFF0000 000
	6) TIMER SW : OFF	Colon (:) blinking
	7) TIMER SW : OFF	Display * : Lights
	8) POWER SW : OFF	Power stays ON if the set time is in ON TIME. If ON TIME set is before the displayed time, it shows * 0:00
	9) When reached timer period	ON/OFF check
	10) POWER SW : ON TIMER SW : OFF	* display disappear Normal operation
	Note : Timer function is stops while time setting, therefore, displayed time is different from actual time After adjust the timer follow the TIME SET item 6. The time setting of ON TIME and OFF TIME works at same time setting on both CLOCK1 and CLOCK2.	
6. TIME (CLOCK 1)	1) CLOCK SW : CLOCK1 TIME SET SW : ON Depress the [HOUR] [MINUTE] keys at the same time.	Colon (:) blinking stops.
	2) Set the timer with [HOUR] [MINUTE] keys.	Time set is possible.
	3) TIME SET SW : OFF	Colon (:) blinking and the clock function starts. From this moment, "secod" starts from zero second.
(CLOCK 2)	4) CLOCK SW : CLOCK2 Perform other operations same as CLOCK1, and check the action is all the same.	

ADJUSTMENT

TOP VIEW



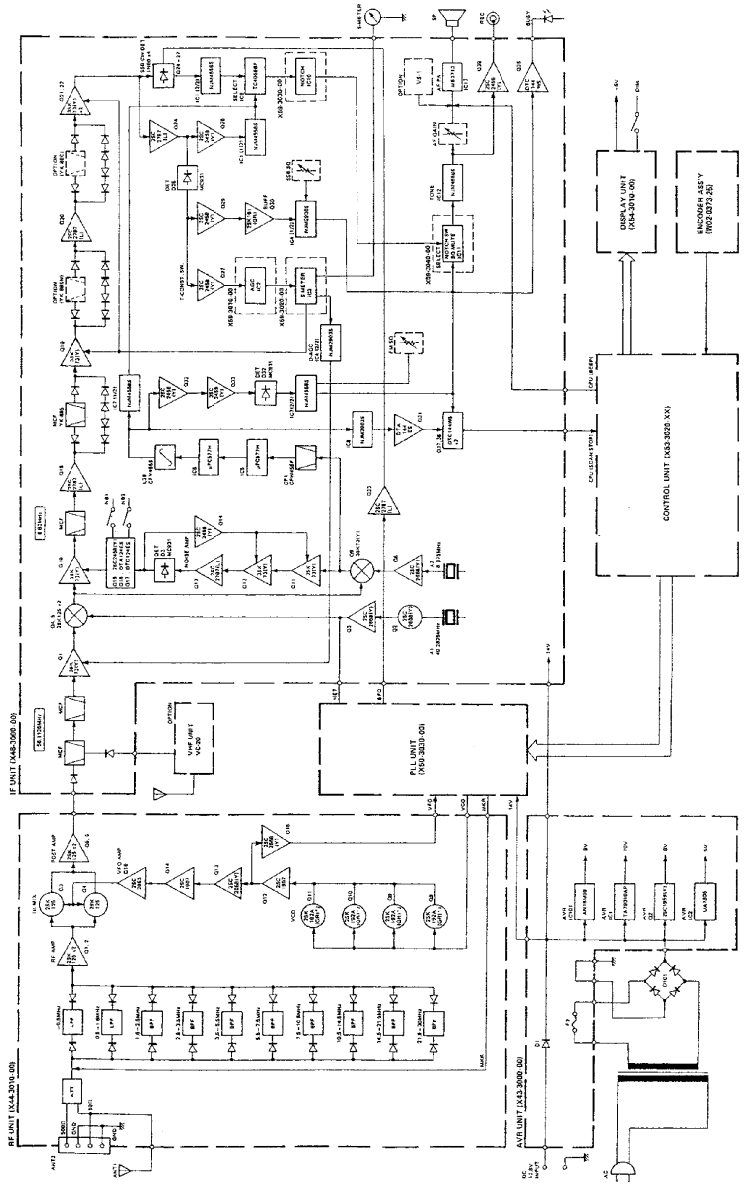
LEVEL DIAGRAM



Frequency : 14.200MHz
Input : –6dBμ
AF output : 0.63V/8Ω
Mode : USB

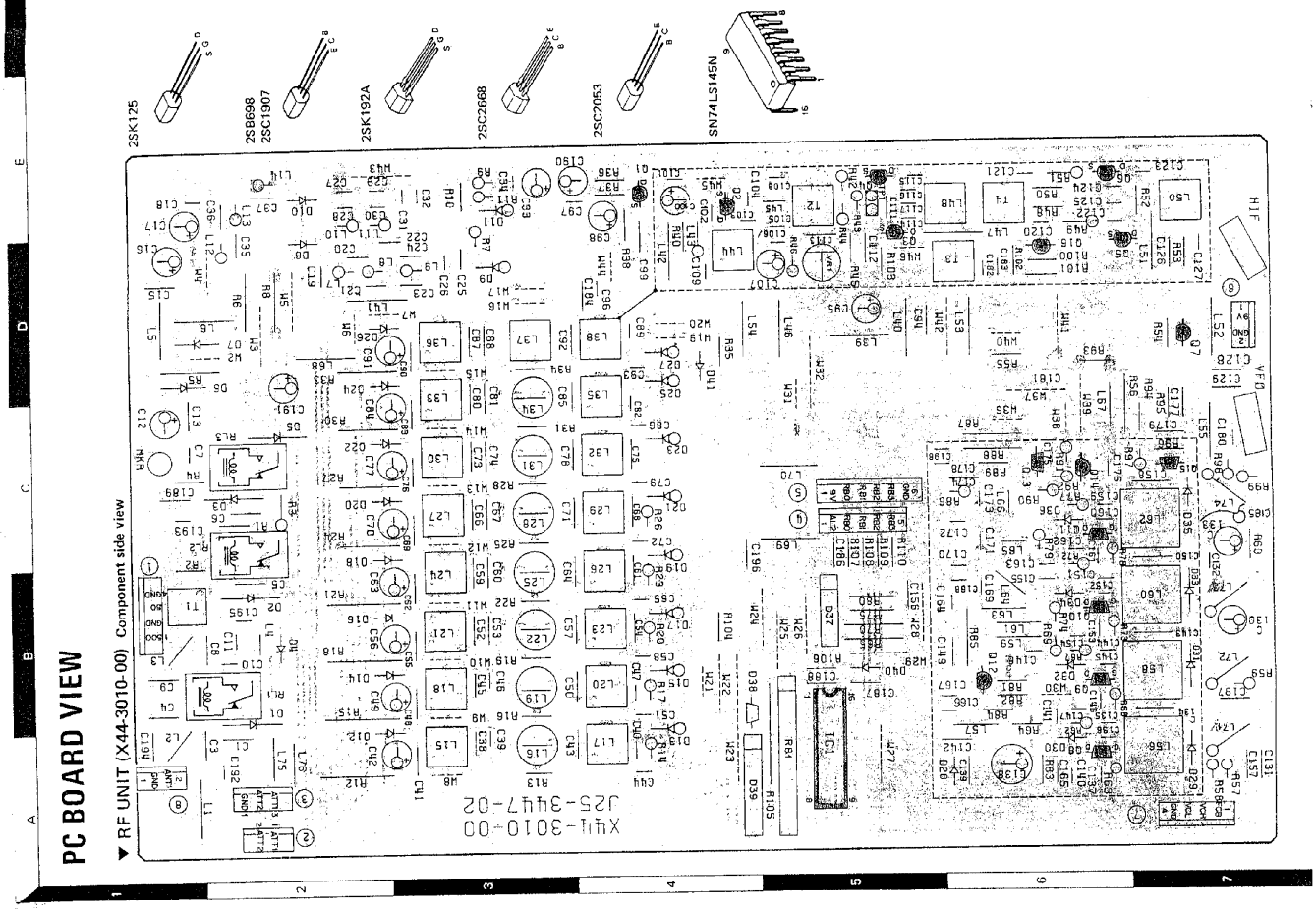
1. A –6dBμ 14.200MHz SSG signal is applied at the ANT terminal, the AF GAIN VR is adjusted to produce an audio output of 0.63V/8Ω, and then the SSG signal levels at various points that are required to the same audio output with the AF GAIN VR left unchanged are plotted.
2. The SSG output signal should always be connected through a titanium oxide porcelain capacitor of 0.01μF, 50WV.

BLOCK DIAGRAM

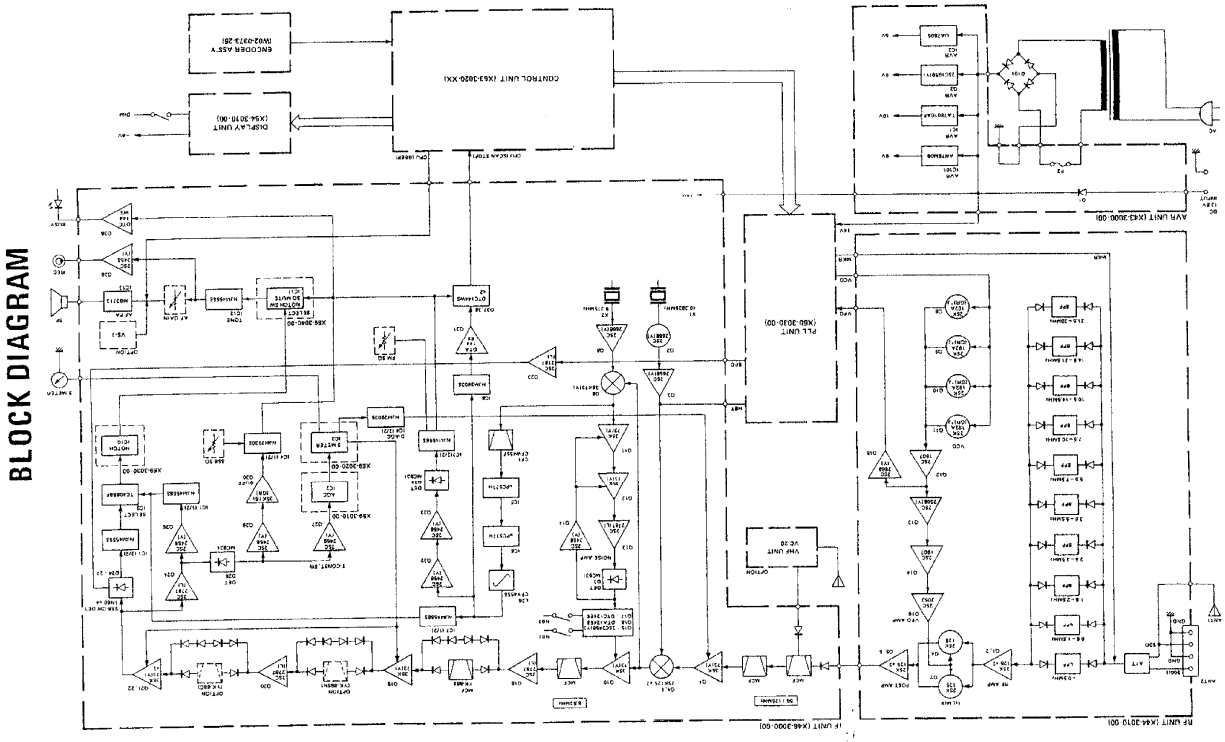


PC BOARD VIEW

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

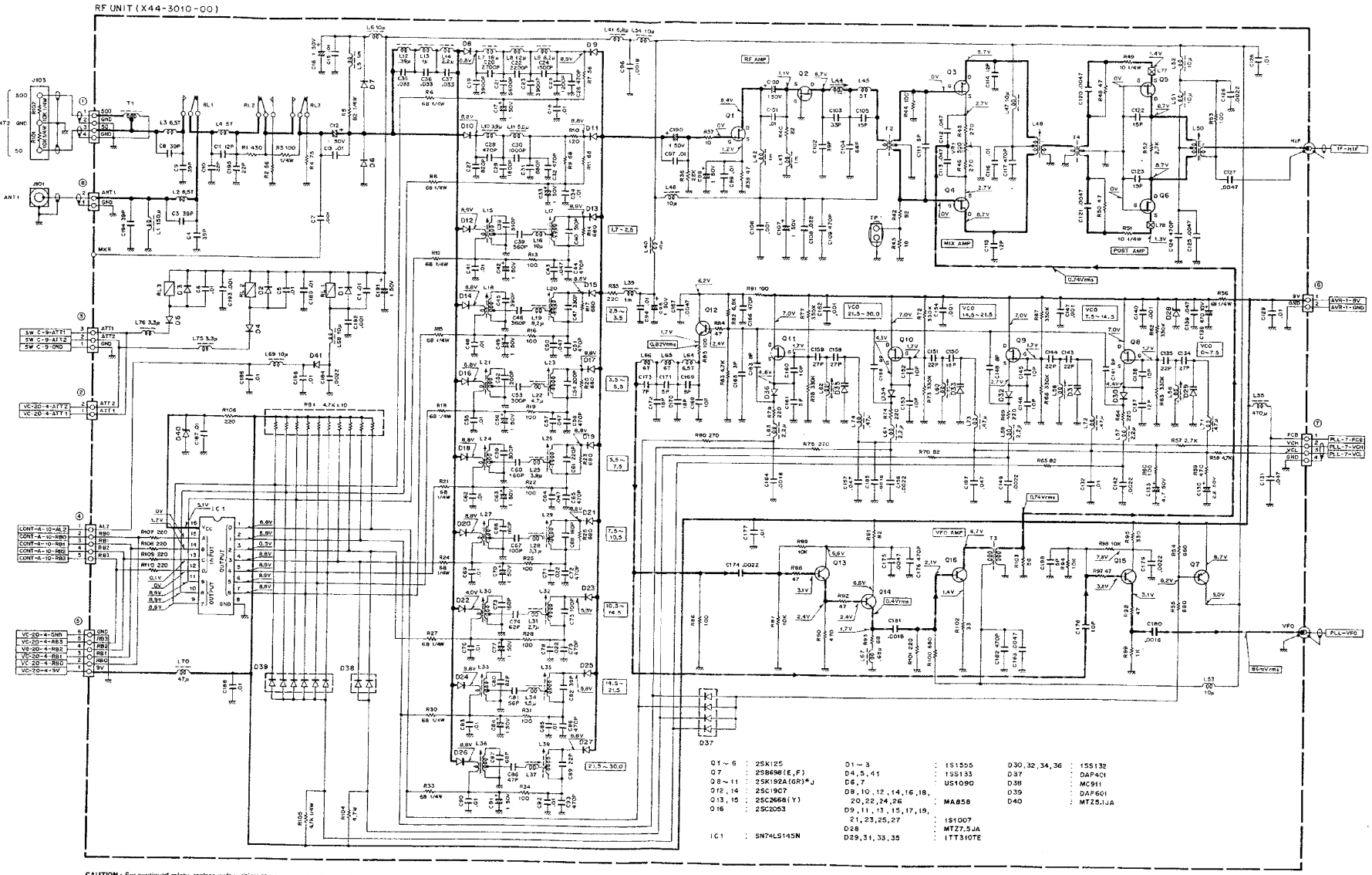


BLOCK DIAGRAM



▼ RF UNIT (X44-3010-00)

CIRCUIT DIAGRAM R-5000

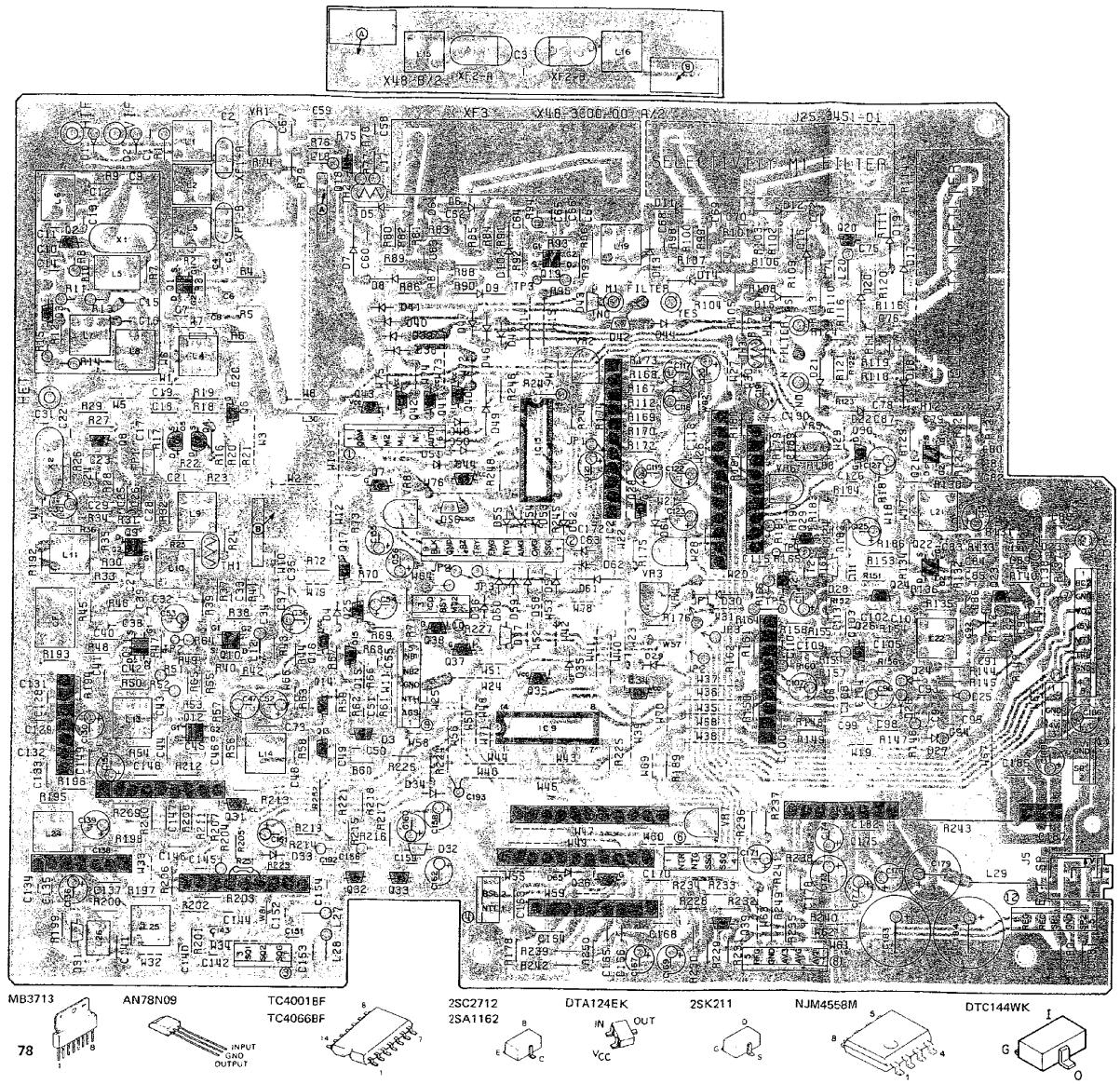


Q1 ~ 6	: 2SK125	D1 ~ 3	: 1S1555	D30,32,34,36	: 1SS132
Q7	: 2SB698(E,F)	D4,5,41	: 1SS133	D37	: DAP401
Q8 ~ 11	: 2SK192A(GR)*J	D6,7	: US1090	D38	: MC911
Q12,14	: 2SC1907	D8,10,12,14,16,18,		D39	: DAP601
Q13,15	: 2SC2668(Y)	20,22,24,26	: MA858	D40	: MTZ5.1JA
Q16	: 2SC2053	D9,11,13,15,17,19,			
		21,23,25,27	: 1S1007		
IC1	: SN74LS145N	D28	: MTZ7.5JA		
		D29,31,33,35	: 1TT310TE		

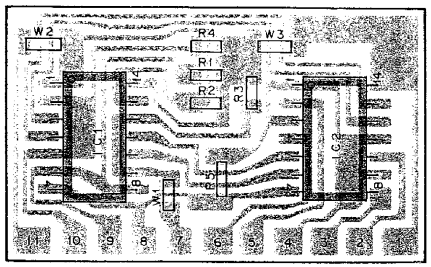
CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list)
⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably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

R-5000 PC BOARD VIEWS

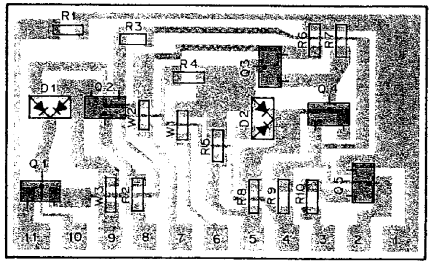
▼ IF UNIT (X48-3000-00) Component side view



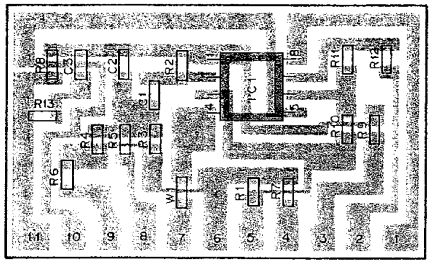
▼ AGC (X59-3010-00) Component side view



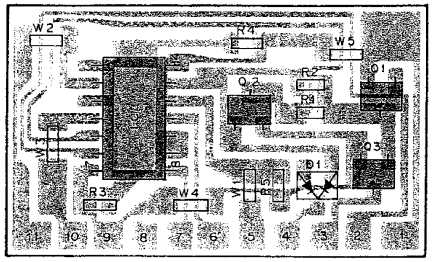
▼ S meter (X59-3020-00) Component side view



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



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

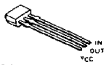


3SK73

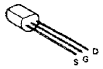
2SC2668 2SC3113
2SC2458 2SC2459

DTC114ES DTC144ES
DTC144WS DTC124ES

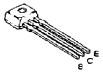
DTA124ES DTA114ES
DTA144ES



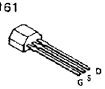
2SK125



2SC2787



2SK161

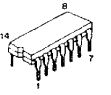


NJM4558S

NJM2903S

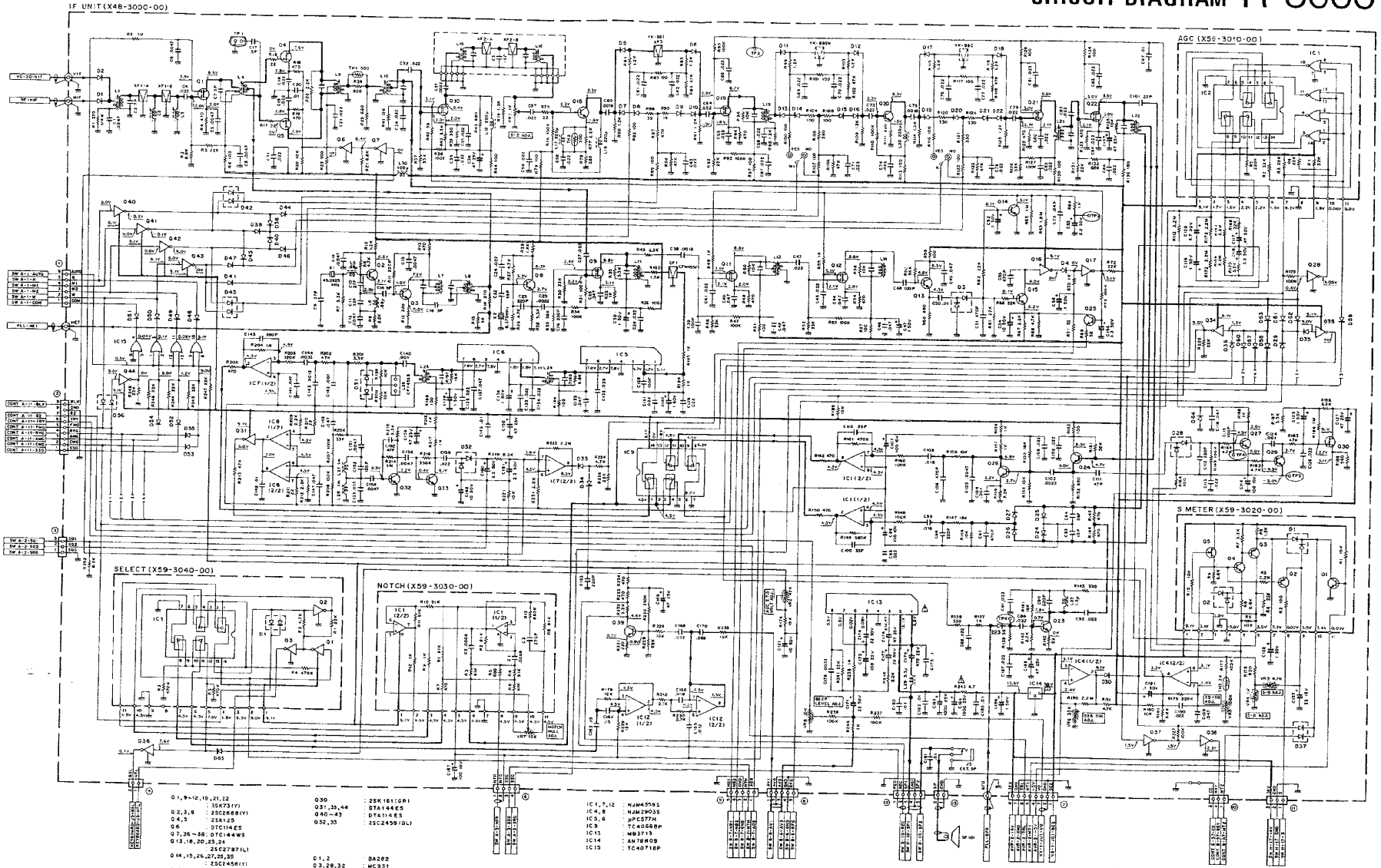
μPC577H

TC4066BP TC4071BP



CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).
△ 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.

▼IF UNIT (X48-3000-00)



Q1,9~12,19,21,22 : 3SK73(Y)
Q2,3,8 : 2SC2668(Y)
Q4,5 : 2SK125
Q6 : DTC114ES
Q7,26~36 : DTC144WS
Q13,18,20,23,24 : 2SC2787(L)
Q14,15,25,27,28,38 : 2SC2458(Y)
Q16,34 : DTA124ES
Q17 : DTC124ES
Q25 : 2SC3113(B)
Q28 : DTC144ES

Q30 : 2SK161(GR)
Q31,35,44 : DTA144ES
Q40~43 : DTA114ES
Q32,33 : 2SC2459(BL)

D1,2 : DA202
D3,28,32 : MC931
D4,29,33~36,38~41,44~49,50~55,57~60,62,63,65 : 1SS133
D5~20,30,49,61 : 1S1587

D24~27 : 1N60
D31 : MC911
D37,42,43,56 : MC921
D64 : 1S1414VE

IC1,7,12 : NJM4558S
IC4,8 : NJM2903S
IC5,6 : μPC577H
IC9 : TC4066BP
IC10 : MB3713
IC14 : AN7809
IC15 : TC4071BP

(X59-3010-00)
IC1 : TC4001BP
IC2 : TC4066BP

(X59-3020-00)
Q1,4 : 2SC2712(Y)
Q2,3 : 2SA1162(Y)
Q5 : 2SK211(GR)
D1,2 : DAN202K

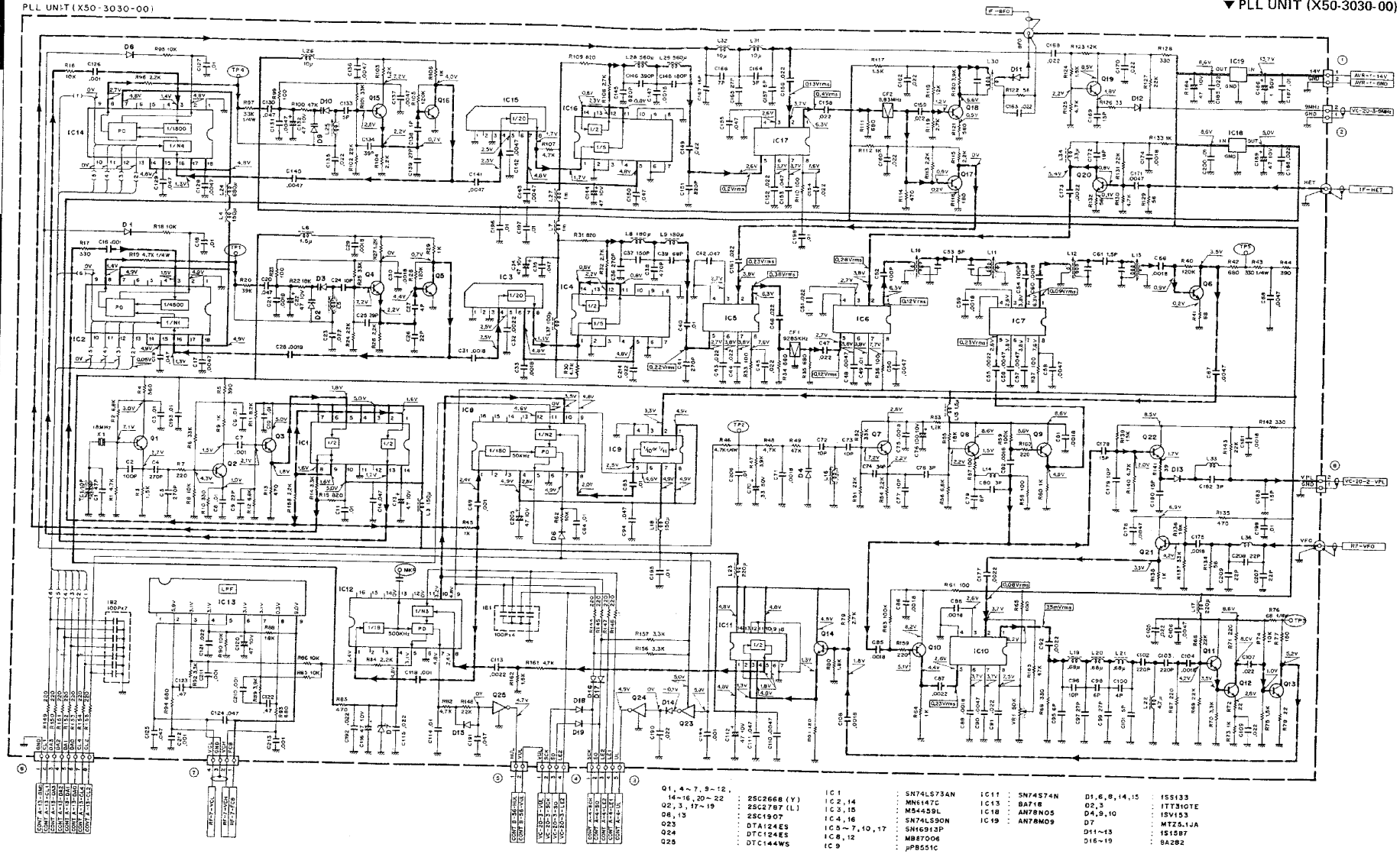
(X59-3030-00)
IC1 : NJM4558M

(X59-3040-00)
Q1 : DTA124EK
Q2,3 : DTC144WK
IC1 : TC4066BF
D1 : DAN202K

R-5000 CIRCUIT DIAGRAM

PLL UNIT (X50-3030-00)

▼ PLL UNIT (X50-3030-00)

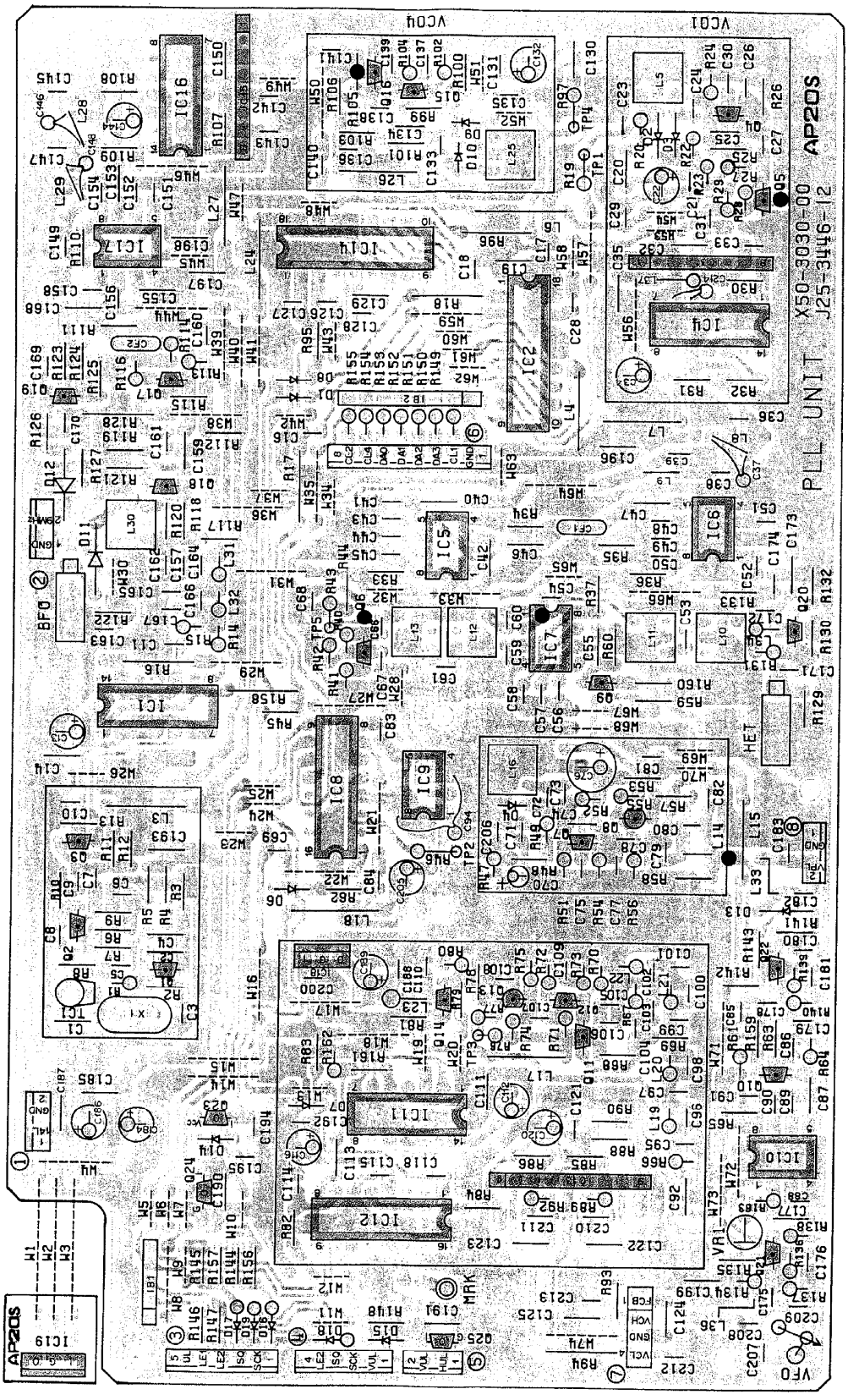


Q1, 4~7, 9~12, 14~16, 20~22	: 2SC2668 (Y)	IC1	: SN74LS73AN	IC11	: SN74S74N	D1,6,8,14,15	: 1SS133
Q2, 3, 17~19	: 2SC2787 (L)	IC2,14	: MN6147C	IC13	: BA718	D2,3	: ITT31GTE
Q8, 13	: 2SC1907	IC3,15	: M54459L	IC18	: AN78N05	D4,9,10	: 1SV153
Q23	: DTA124ES	IC4,16	: SN74LS90N	IC19	: AN78M09	D7	: MTZ5.1JA
Q24	: DTC124ES	IC5~7,10,17	: SN16913P			D11~13	: 1S1587
Q25	: DTC144WS	IC8,12	: MB87006			D16~19	: BA282
		IC9	: μPB551C				

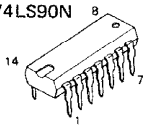
CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably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

PC BOARD VIEW R-5000

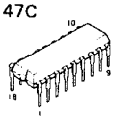
▼ PLL UNIT (X50-3030-00) Component side view



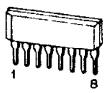
SN74LS73AN SN74S74N
SN74LS90N



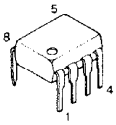
MN6147C



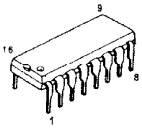
M54459L



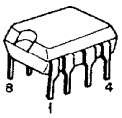
SN16913P



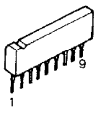
MB87006



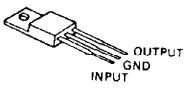
μPB551C



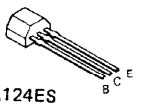
BA718



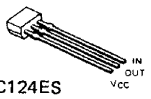
AN78N05 AN78M09



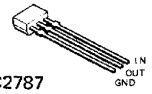
2SC2668(Y)



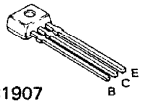
DTA124ES



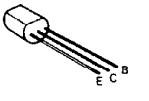
DTC124ES
DTC144WS



2SC2787

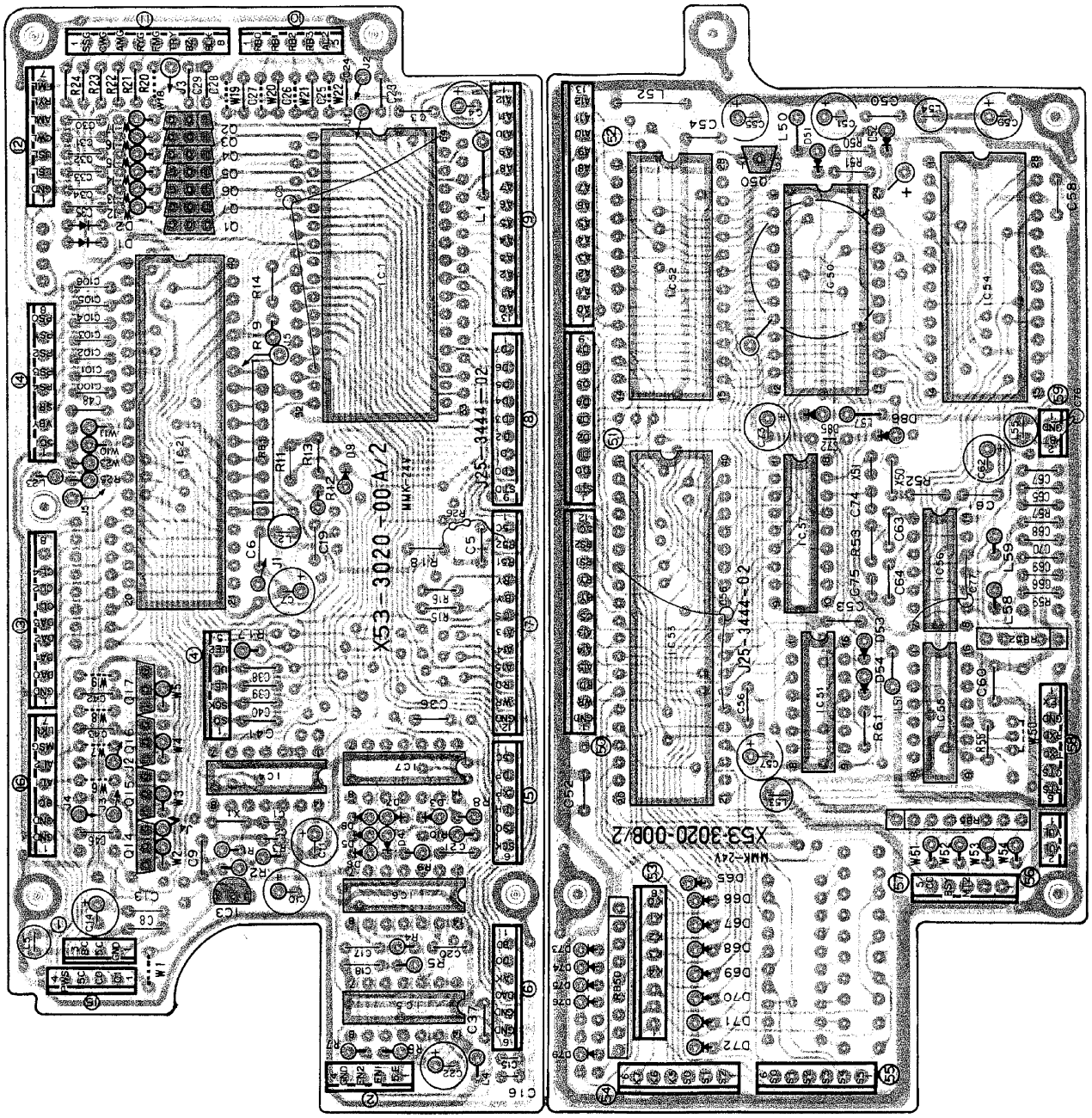


2SC1907

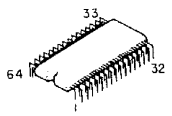


R-5000 PC BOARD VIEW

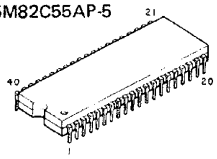
▼ CONTROL UNIT (X53-3020-00) **Component side view** -11 : K,M,T,W1 -61 : W2 -71 : X



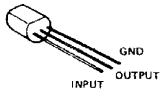
μPD7800G



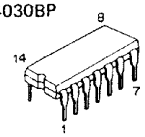
M5M82C55AP-5



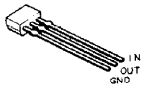
PST520D



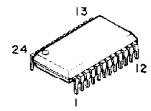
TC4011BP TC4069UBP
TC4030BP



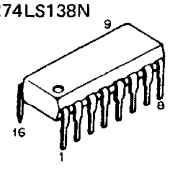
DTC143ES
DTC144WS



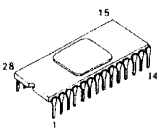
MB8418-20LP-GRA



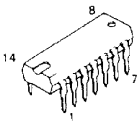
SN74LS138N



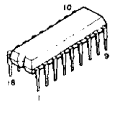
MBM27128-25JBI



SN7404N

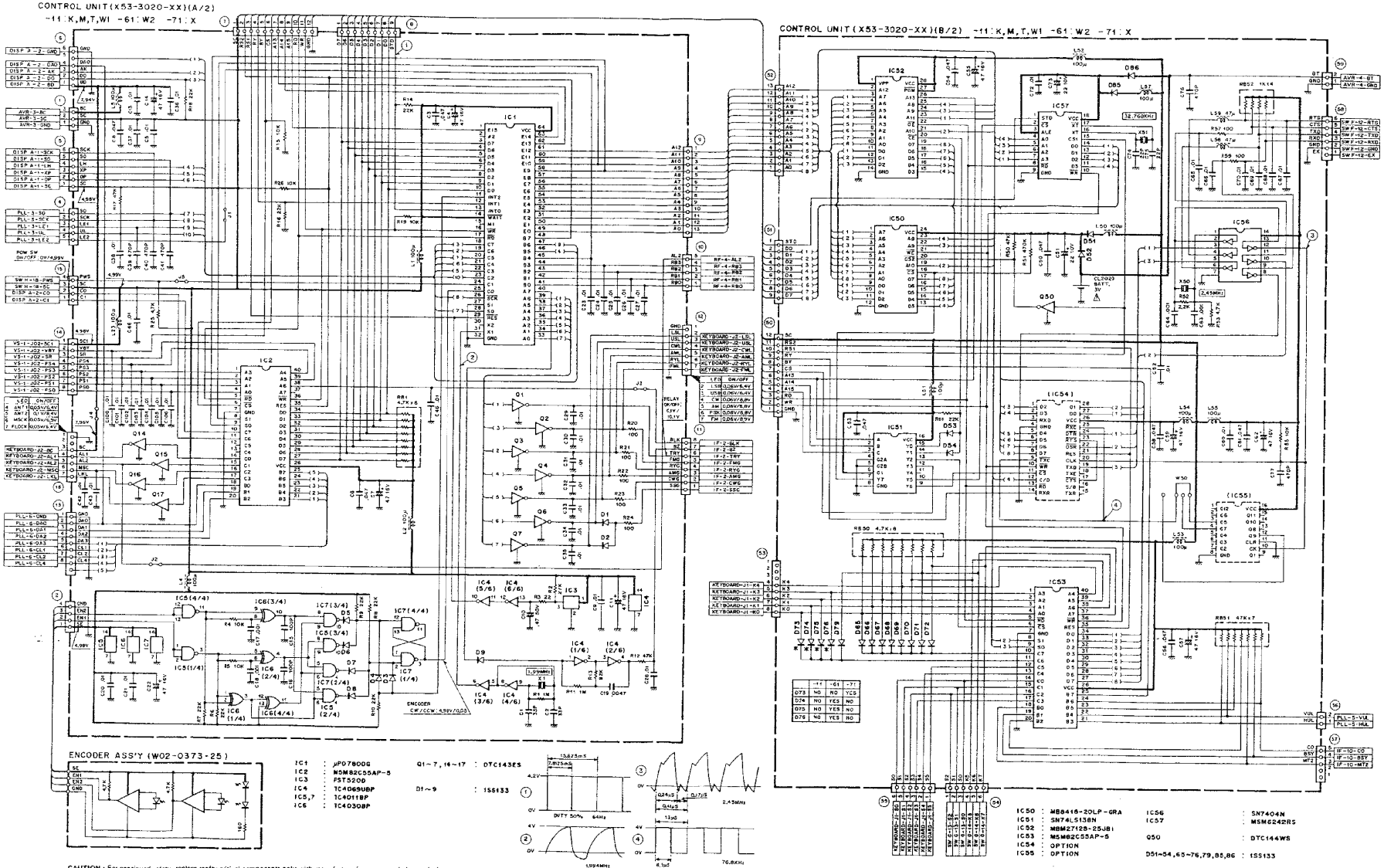


MSM6242RS



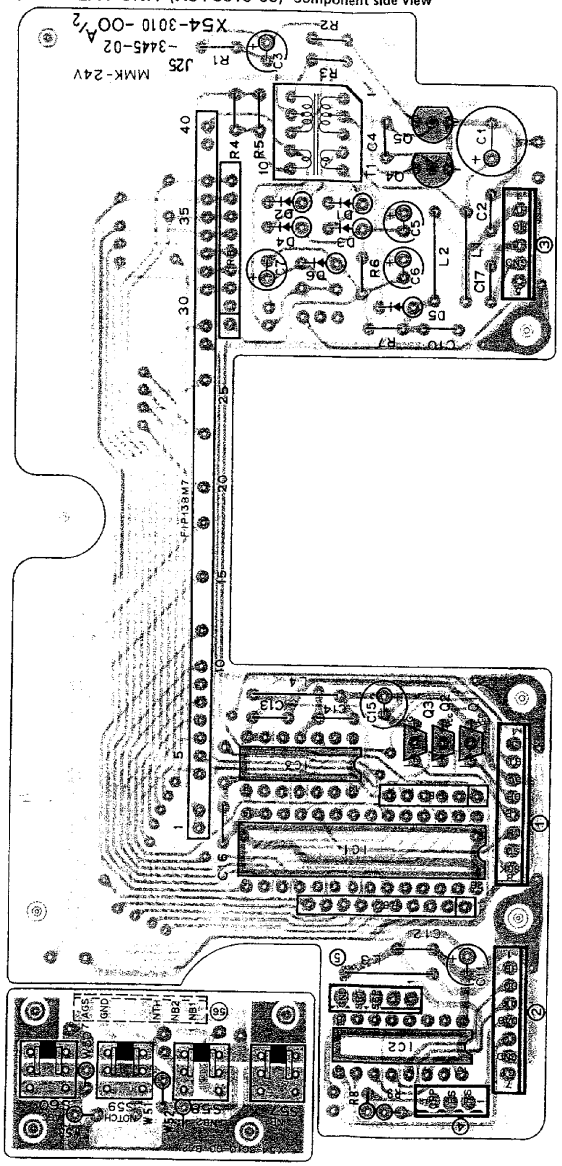
CIRCUIT DIAGRAM R-5000

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

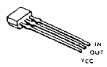


R-5000 PC BOARD VIEWS

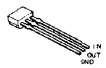
▶ DISPLAY UNIT (X54-3010-00) Component side view



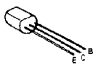
DTA114ES



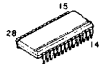
DTC124ES
DTC144WS



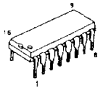
2SC1959



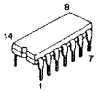
μPD6300C



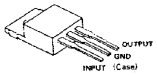
MB4052



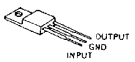
TC4013BP



TA78010AP

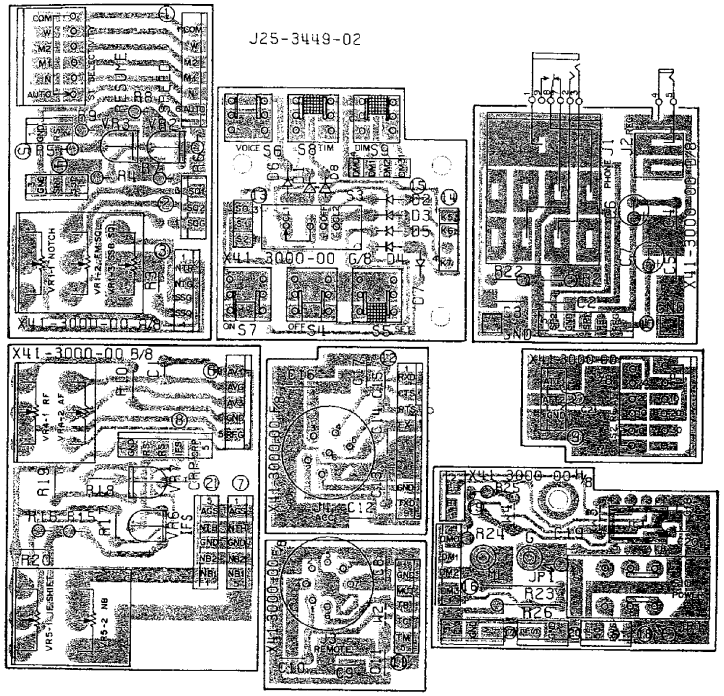


UA7805

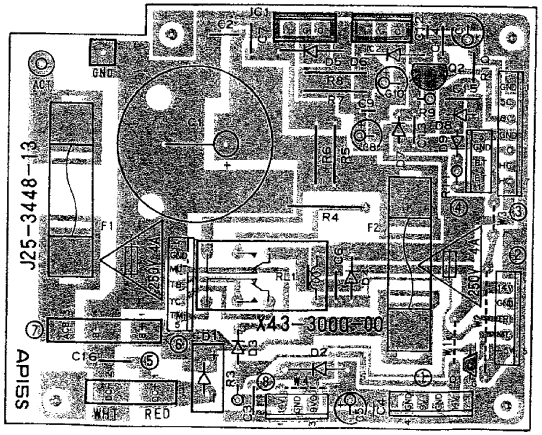


NE555P

▼ SWITCH UNIT (X41-3000-00) Component side view

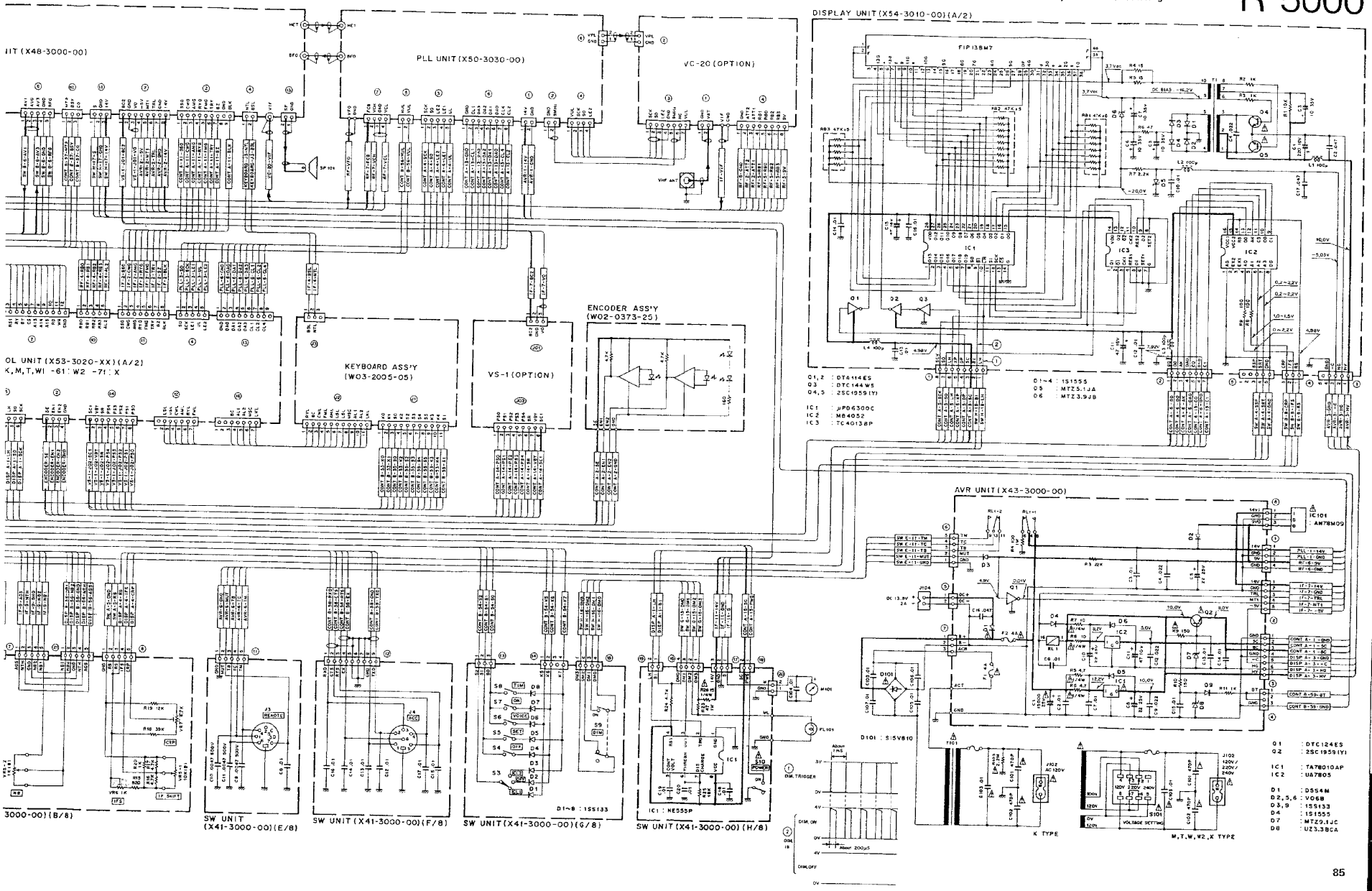


▼ AVR UNIT (X43-3000-00) Component side view



SCHEMATIC DIAGRAM

● Voltage measurement conditions f = 14.17500MHz, USB mode receiving



TERMINAL FUNCTION

Terminal No.	Name	I/O	Terminal Function
SWITCH UNIT (X41-3000-00) (A/8)			
① 1	COM	O	Filter select SW Common
2	W	I	Filter select SW W
3	M2	I	Filter select SW M2
4	M1	I	Filter select SW M1
5	N	I	Filter select SW N
6	AUTO	I	Filter select SW AUTO
② 1	SQG	I	GND
2	SQ2	O	SQL VR (FM)
3	SQ1	O	SQL VR (FM)
③ 1	NTR	O	NOTCH VR
2	NTG	–	GND
3	SSG	–	GND
4	SSQ	O	SQL VR (SSB)
④ 1	SSP	O	Voltage terminal for scan speed setting.
2	SRT	O	Voltage terminal for resume time setting.
3	G	–	GND
⑤ 1	G	–	GND
2	RS	I	Power supply (+ 5V) for scan speed, resume time setting.
SWITCH UNIT (X41-3000-00) (B/8)			
⑥ 1	AV1	I	AF GAIN VR
2	AVG	–	AF Line GND
3	AV3	O	AF GAIN VR
4	GND	–	GND
5	RFG	O	RF GAIN VR
⑦ 1	AGS	O	AGC SLOW/FAST select SW, AGC FAST : GND
2	NTH	O	NOTCH SW, NOTCH ON : GND
3	GND	–	GND
4	NB2	O	Noise Blanker 2 SW, NB OFF : GND
5	NB1	O	Noise Blanker 1 SW, A voltage changes at VR5 when NB1 or NB2 SW ON.
⑧ 1	G	–	GND
2	RS	I	Power supply (+ 5V) for carrier point,
3	RS	I	IF shift setting.
4	IFS	O	Voltage terminal for IF shift setting (approx. 1.1V at center).
5	CRP	O	Voltage terminal for carrier point setting.
SWITCH UNIT (X41-3000-00) (C/8)			
⑨ 1	G	–	GND
2	ATT2	O	RF ATT SW
3	ATT1	O	RF ATT SW
SWITCH UNIT (X41-3000-00) (D/8)			
⑩ 1	REG	I	Audio input for REC terminal
2	REC	I	Audio input for REC terminal
3	SP1	O	Audio output for PHONE terminal
4	G	–	GND
5	SP2	I	Audio input from PHONE terminal
SWITCH UNIT (X41-3000-00) (E/8)			
⑪ 1	GND	–	GND
2	MUT	I	Muting terminal (ON : GND)
3	TB	I	POW ON : TC with TM connect
4	TC	I	STBY, POW OFF : TB with TC connect
5	TM	I	(for REMOTE)
SWITCH UNIT (X41-3000-00) (F/8)			
⑫ 1	RXD	I	RX data
2	CTS	I	Clear to SEND
3	RTS	O	Request to SEND
4	EX	–	Not used
5	GND	–	GND
6	GND	–	GND
7	GND	–	GND
8	G	–	Control unit GND
9	TXD	I	TX data

Terminal No.	Name	I/O	Terminal Function
SWITCH UNIT (X41-3000-00) (G/8)			
⑬ 1	S2	O	CL1/CL2 select CL1 ON : K5 with S2 connect
			CL1 OFF : K6 with S2 connect
			CL2 ON : K7 with S2 connect
2	S1	O	OFF TIME : S1 with K6 connect,
			TIME SET : S1 with K7 connect,
			VOICE : S0 with K5 connect,
3	S0	O	TIMER : S0 with K7 connect,
			ON TIME : S0 with K6 connect
⑭ 1	K5	I	VOICE and CL1 terminal
			VOICE : K5 with S0 connect,
			CL1 : K5 with S2 connect
2	K6	I	ON TIME, OFF TIME, CL terminal
			ON TIME : K6 with S0 connect,
			OFF TIME : K6 with S1 connect,
			CL OFF : K6 with S2 connect
3	NC	–	Not connected
4	K7	I	TIME SET, TIMER, CL2 terminal
			TIME SET : K7 with S1 connect,
			TIMER : K7 with S0 connect,
			CL2 : K7 with S2 connect
⑮ 1	DM3	I	DIM SW terminals
2	DM2	O	DIM OFF : DM3 with DM2 connect
3	DM1	O	DIM SW terminals
4	O	I	DIM ON : DM0 with DM1 connect
SWITCH UNIT (X41-3000-00) (H/8)			
⑯ 1	DM3	O	DIM SW terminals
2	DM2	I	DIM OFF : DM3 with DM2 connect
3	DM1	I	DIM SW terminals
4	DM0	O	DIM ON : DM1 with DM0 connect
⑰ 1	M	I	S meter signal input
2	G	–	GND
3	14V	I	Power supply (+ 14V) for meter lamp
⑱ 1	PWS	O	POW SW (POW ON : GND)
2	5C	I	Power supply (+ 5V) for IC1
⑲ 1	BI	O	DIM output terminal
2	LH	I	DIM trigger pulse terminal
⑳ 1	G	–	GND
2	M	O	S meter signal output terminal
㉑ 1	NB1	I	Noise blanker 1 SW NB1 or NB2 ON : GND
2	NB2	I	Noise blanker 2 SW NB2 OFF : GND
3	GND	–	GND
4	NTH	I	NOTCH SW NOTCH ON : GND
5	AGS	I	AGC SLOW/FAST select SW AGC FAST : GND
	ML	O	Power supply output for Meter lamp
	G	–	GND
AVR UNIT (X43-3000-00)			
① 1	14V	O	Power supply (+ 14V) for PLL unit
2	GND	–	GND
3	9V	O	Power supply (+ 9V) for RF unit
4	GND	–	GND
② 1	14V	O	+ 14V for IF unit
2	GND	–	GND
3	TRL	I	RL1 control terminal (POW ON : GND)
4	MT1	O	MUTE signal (MUTE ON : "H")
5	–5V	O	–5V for IF unit
③ 1	GND	–	GND
2	5C	O	+ 5V for Control unit
3	8C	O	+ 8V for Control unit
4	GND	–	GND
5	–C	I	–5V from Display unit
6	HG	–	GND
7	HC	O	+ 10V for Display unit

R-5000 R-

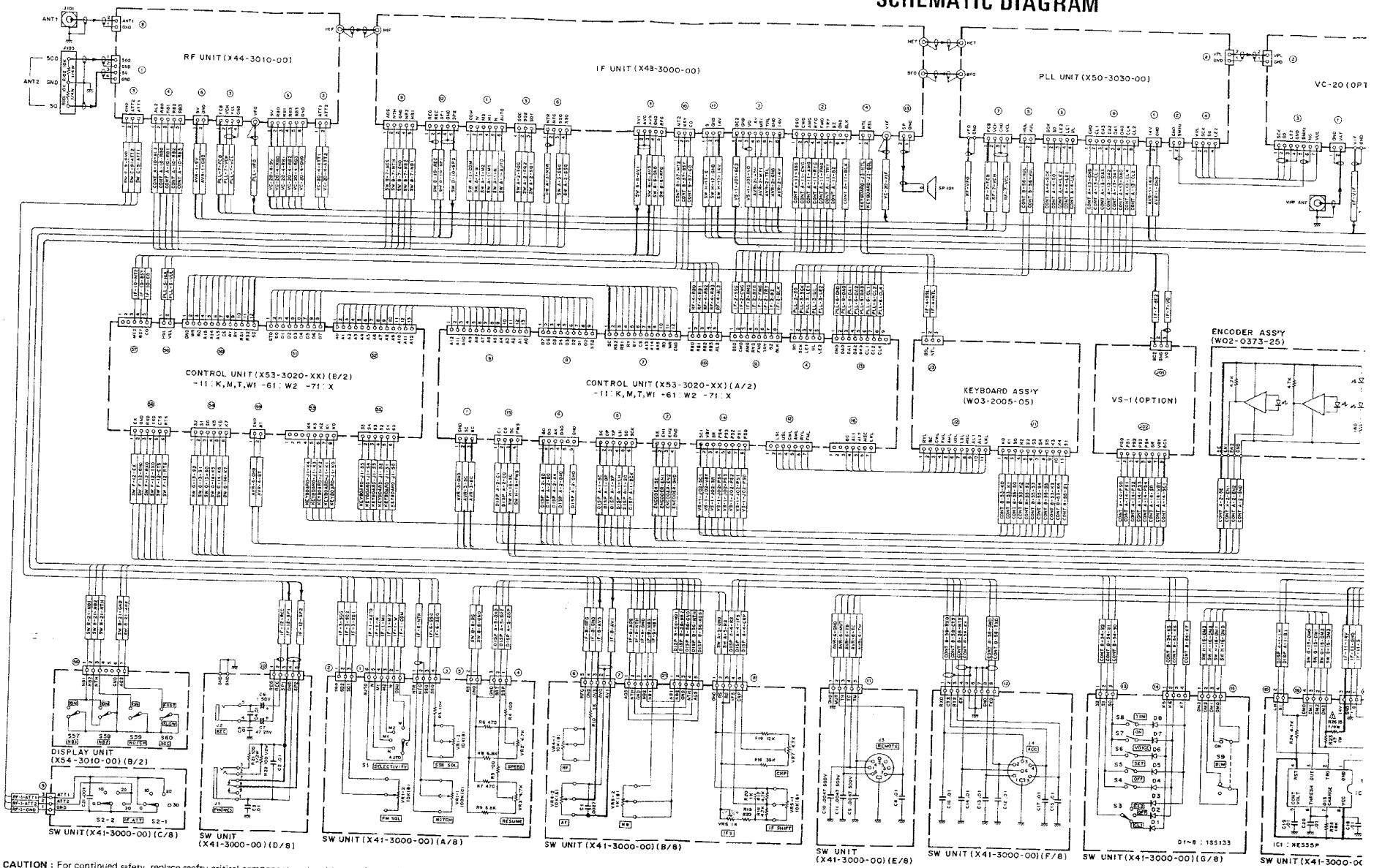
TERMINAL FUNCTION

Terminal No.	Name	I/O	Terminal Function
④ 1	RT	O	Lithium battery charge terminal to Control unit
2	BT	O	Lithium battery charge terminal to Control unit
3	GND	–	GND
⑤ 1	+	I	DC power supply input
2	–	–	GND
⑥ 1	GND	–	GND
2	MUT	I	MUTE signal (MUTE ON : "L")
3	TB	O	POW OFF : TB with TC connect
4	TC	O	POW ON : TC with TM connect
5	TM	O	For REMOTE
⑦ 1	ACB	O	AC power supply, 2nd voltage terminal
2	B–	–	GND
3	B+	I	D101 output voltage terminal
⑧ 1	14VI	O	+ 14V for IC101
2	GND	–	GND
3	9VO	I	IC101 output voltage (+ 9V)
	ATC	I	AC power supply, 2nd voltage terminal
RF UNIT (X44-3010-00)			
① 1	500	I	From ANT2 terminal
2	GND	–	GND
3	50	I	From ANT2 terminal
4	GND	–	GND
② 1	ATT1	I	ATT SW data 0, 20dB : "H"
2	ATT2	I	ATT SW data 20, 30dB : "H"
③ 1	GND	–	GND
2	ATT2	I	ATT SW data 20, 30dB : "H"
3	ATT1	I	ATT SW data 0, 20dB : "H"
④ 1	AL2	I	ANT 1/2 select
2	RB0	I	B.P.F. band data
3	RB1	I	B.P.F. band data
4	RB2	I	B.P.F. band data
5	RB3	I	B.P.F. band data
⑤ 1	9V	O	+ 9V for converter unit
2	RB0	O	B.P.F. band data
3	RB1	O	B.P.F. band data
4	RB2	O	B.P.F. band data
5	RB3	O	B.P.F. band data
6	GND	–	GND
⑥ 1	9V	I	+ 9V
2	GND	–	GND
⑦ 1	FCB	O	+ 9V for PLL unit
2	VCH	I	Main VCO select signal
3	VCL	I	Main VCO select signal
4	GND	–	GND
⑧ 1	GND	–	GND
2	ATT1	I	From ANT1 connector
	HIF	O	Reception 1st IF (58.1125MHz)
	VFO	O	VCO output to PLL unti
	MKR	I	Marker signal input
IF UNIT (X48-3000-00)			
① 1	COM	O	SELECTIVITY SW Common
2	W	I	SELECTIVITY SW W
3	M2	I	SELECTIVITY SW M2
4	M1	I	SELECTIVITY SW M1
5	N	I	SELECTIVITY SW N
6	AUTO	I	SELECTIVITY SW AUTO

Terminal No.	Name	I/O	Terminal Function
② 1	SSG	I	USB, LSB mode : "L", other modes : OPEN
2	CWG	I	CW mode : "L", other modes : OPEN
3	AMG	I	AM mode : "L", other modes : OPEN
4	RYG	I	FSK mode : "L", other modes : OPEN
5	FMG	I	FM mode : "L", other modes : OPEN
6	TRY	I	TIMER relay control, set at "L" mode : Active To AVR unit via IF unit.
7	BZ	I	Beep sound input
8	GND	–	GND
9	BLK	I	Stop 2nd MIXER operations in UL mode, Normally : 0V, UL : 4~5V
③ 1	SQG		FM Squelch VR
2	SQ2		FM Squelch VR
3	SQ1		FM Squelch VR
④ 1	NTL	O	NOTCH LED lit on current absorption
2	BSL	O	BUSY LED lit on current absorption
⑥ 1	NTR		NOTCH VR
2	NTG		NOTCH VR
3	SSG		SSB Squelch VR
4	SSQ		SSB Squelch VR
⑦ 1	8C2	O	Power supply (+ 9V) for VS-1
2	G	–	GND
3	VO	I	VS-1 voice synthesizer input
4	–5V	I	–5V for block bias
5	MT1	I	External mute signal, normally, : "L", Muting : "H"
6	TRL	O	TIMER relay control, set at "L" = Active
7	G	–	
8	14V	I	From power supply rectifier output (not from AVR unit)
⑧ 1	AV1	O	AF GAIN VR
2	AVG	–	AF GAIN VR
3	AV3	I	AF GAIN VR
4	G	–	RF GAIN VR
5	RFG	–	RF GAIN VR
⑨ 1	AGS	I	AGC SW, SLOW : OPEN, FAST : GND
2	NTH	I	NOTCH SW OFF : OPEN, ON : GND
3	G	–	
4	NB2	I	NB2 SW OFF : GND, ON : OPEN
5	NB1	I	NB1 SW via NB LEVEL VR
⑩ 1	MT2	O	Send external muting signal to microprocessor Muting : "L"
2	BSY	O	Send BUSY signal to microprocessor BUSY : "L" (Center decision is added in AM, FM mode.)
3	CO	O	SCAN TO/CO select, normally (GND) : TO, when W64 cut : OPEN, CO
⑪ 1	S	O	S meter output
2	G	–	
3	14V	O	+ 14V for pilot lamp
⑫ 1	REG	–	
2	REC	O	REC OUT output
3	SP1	O	AF power amp. output
4	GND	–	GND
5	SP2	I	AF power amp. output, switched by PHONES
⑬ 1	G		
2	SP	O	Internal speaker output
J5	EXT.SP	O	External speaker output
	VIF	I	Reception IF signal from VC-20 (58.1125MHz)
	HIF	I	Reception IF signal from HF band (58.1125MHz)
	HET	O	2nd LOCAL OSC signal (49.2825MHz)
	BFO	I	SSB demodulation carrie (8.83MHz)

SCHEMATIC DIAGRAM

Signal line — Control line — Common DC line



CAUTION : For continued safety, replace saefty critical components only with manufacturer's recommended parts (refer to parts list).
⚠ 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.

TERMINAL FUNCTION

Terminal No.		Name	I/O	Terminal Function
⑬	1	GND	–	GND
	2	DA0	O	Data output for MN6147
	3	DA1	O	
	4	DA2	O	
	5	DA3	O	
	6	CL1	O	PLL data
	7	CL2	O	PLL1 clock output / PLL2 enable output
	8	CL4	O	PLL4 clock output
	9	–	–	Not used
⑭	1	5C1	O	+ 5V for VS-1
	2	VBY	I	VS-1 Voice-synthesizer BUSY signal
	3	SR	O	VS-1 Voice-synthesizer START signal
	4	PS4	O	VS-1 Voice data output
	5	PS3	O	
	6	PS2	O	
	7	PS1	O	
	8	PS0	O	
⑮	1	C1	O	A/D converter channel select signal
	2	C0	O	
	3	5C	O	+ 5V for Dimmer
	4	PWS	I	Power SW input (POW SW ON : "L", OFF : "H")
⑯	1	–	–	Not used
	2	–	–	Not used
	3	8C	O	Keyboard ass'y, LED drive 8V
	4	AL1	O	ANT1 LED (Lit ON : "L")
	5	AL2	O	ANT2 LED (Lit ON : "L")
	6	MSC	O	MSR LED (Lit ON : "L")
	7	LKL	O	LOCK LED (Lit ON : "L")

CONTROL UNIT (X53-3020-00) (B/2)

⑩	1	GND	–	GND
	2	WR	I	Microprocessor control signal
	3	RD	I	
	4	A15	I	Microprocessor address signal
	5	A14	I	
	6	A13	I	
	7	CS	O	IC2 I/O port select signal (Active : "L")
	8	BY	I	VS-1 Voice-synthesizer BUSY signal (BUSY : "H") (Option)
	9	RY	O	External control character acknowledge signal (Option)
	10	RS1	I	System reset signal (Active : "L")
	11	RS2	I	I/O port reset signal (Active : "H")
	12	5C	I	Control unit (B/2), + 5V
⑪	1	STD	O	Clock, clock-count, interrupting signal (64kHz, duty 50%, open drain output)
	2	D0	I/O	Microprocessor data bus
	3	D1	I/O	
	4	D2	I/O	
	5	D3	I/O	
	6	D4	I/O	
	7	D5	I/O	
	8	D6	I/O	
	9	D7	I/O	

Terminal No.		Name	I/O	Terminal Function
⑫	1	A0	I	Microprocessor address bus
	2	A1	I	
	3	A2	I	
	4	A3	I	
	5	A4	I	
	6	A5	I	
	7	A6	I	
	8	A7	I	
	9	A8	I	
	10	A9	I	
	11	A10	I	
	12	A11	I	
	13	A12	I	
⑬	1			Not used
	2			Not used
	3			Not used
	4	K4	I	Key scan, column input
	5	K3	I	
	6	K2	I	
	7	K1	I	
	8	K0	I	
⑭	1	S2	O	Key scan
	2	S1	O	
	3	S0	O	
	4	K5	I	Key scan, column input
	5	K6	I	
	6	K7	I	
⑮	1	S5	O	Key scan
	2	S4	O	
	3	S3	O	
	4	S2	O	
	5	S1	O	
	6	S0	O	
⑯	1	HUL	I	HF PLL UL signal (LOCK : "L", UNLOCK : "H")
	2	VUL	I	VHF PLL UL signal (LOCK : "L", UNLOCK : "H") (Option)
⑰	1			Not used
	2			Not used
	3	MT2	I	External MUTE signal (MUTE : "L", NONE : "H")
	4	BSY	I	Center STOP BUSY signal (signal BUSY : "L", NONE : "H")
	5	CO	I	BUSY stop TO/CO select (TO : "L", CO : "H")
⑱	1	EX	–	Not used
	2	G	–	Control unit, ground level signal
	3	RXD	I	RX data input for external control
	4	TXD	O	TX data output for external control
	5	CTS	I	External control BUSY control, clear to SEND
	6	RTS	O	External control BUSY control, request to SEND
⑲	1	GND	–	Ground for lithium battery charge
	2	BT	I	Lithium battery charge voltage input

DISPLAY UNIT (X54-3010-00) (A/2)

①	1	LH	O	Dimmer control trigger signal
	2	BI	I	Dimmer control input
	3	5C	I	+ 5V for Display unit
	4	DP	I	Display "decimal point" signal (Lit ON : "H")
	5	XP	I	Display "red letters" signal (Lit ON : "L")
	6	LH	I	Display latch enable input (Active "L")
	7	SO	I	Serial data input for display
	8	SCK	I	Serial clock input for display

TERMINAL FUNCTION/CRYSTAL FILTER

Terminal No.		Name	I/O	Terminal Function
②	1	8D	I	+ 8V for Display unit
	2	D0	O	A/D converter data output
	3	AK	I	A/D converter clock input
	4	DA0	I	A/D converter reset signal
	5	C0	I	A/D converter channel select signal
	6	GND	–	GND
	7	C1	I	A/D converter channel select signal
③	1	HV	I	DC-DC converter input for display tube + 10V
	2	HG	I	DC-DC converter input for display tube GND
	3	–C	O	–5V output
	4	GND	–	GND
	5			Not used

Terminal No.		Name	I/O	Terminal Function
④	1	RS	O	Standard voltage for analog input
	2	IFS	I	Analog input, IF shift
	3	CRP	I	Analog input, carrier point correction
⑤	1			Not used
	2			Not used
	3	SSP	I	Analog input, scan speed
	4	SRT	I	Analog input, scan resume time
	5	GND	–	GND

DISPLAY UNIT (X54-3010-00) (B/2)

①	1	NB1	O	NB1 SW ON : "L"
	2	NB2	O	NB2 SW ON : OPEN
	3	NTH	O	NOTCH SW ON : "L"
	4			Not used
	5			Not used
	6	GND	–	GND
	7	AGS	O	FAST : "L"

Option filters

Item	Rating
Nominal center freq' (fo)	8830kHz
Center freq' deviation	Within ±250Hz at 6dB
Pass bandwidth	±3.0kHz or more at 6dB
Attenuation bandwidth	±6.0kHz or less at 60dB ±1.0kHz or less at 80dB
Ripple	2dB or less
Insertion loss	3dB±2dB
Guaranteed attenuation	80dB or more at fo±10kHz~±1MHz
Input/output impedance	600Ω/15pF

MCF (L71-0237-05) YK-88A-1

Item	Rating
Center freq' (fo)	8830.7kHz
Center freq' deviation	Within ±150Hz at 6dB
Pass bandwidth	±250Hz or more at 6dB
Attenuation bandwidth	±900Hz or less at 60dB
Ripple	2dB or less
Minimum loss	6dB±2dB
Guaranteed attenuation	80dB or more at fo±2kHz~±1MHz
Impedance	600Ω/15pF

CW crystal filter (L71-0211-05) YK-88C

Item	Rating
Center freq' (fo)	8830kHz
Center freq' deviation	Within ±150Hz at 6dB
Pass bandwidth	±900Hz or more at 6dB
Attenuation bandwidth	±1800Hz or less at 60dB
Guaranteed attenuation	80dB or more at fo ±2.5kHz~±1MHz
Ripple	2dB or less
Insertion loss	3dB±2dB
Impedance	600Ω/15pF

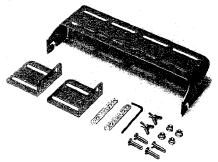
SSB crystal filter (L71-0220-05) YK-88SN

Item	Rating
Nominal center freq' (fo)	8830.7kHz
Center freq' deviation	Within ±150Hz at 6dB/25°C
Pass bandwidth	±125Hz or more at 6dB
Attenuation bandwidth	±600Hz or less at 60dB
Guaranteed attenuation	80dB or more at fo ±2kHz~±1MHz
Ripple	2dB or less
Insertion loss	8dB±2dB
Impedance	600Ω/15pF

CW cystal filter (L71-0221-05) YK-88N

MB-430 (MOBILE MOUNT)/SP-430 (SPEAKER)

MB-430 OUTSIDE VIEW



MB-430 PARTS LIST

N : New parts

Part No.	No marks	Description	Ref. No.
A13-0635-03	N	Angle	
B50-4016-00	N	Instruction manual	
H01-4453-13	N	Packing control (inside) **M**	
H01-4454-13	N	Packing control (inside) **T**	
H25-0077-04		Protective bag	
H25-0098-01		Protective bag 150 x 480	
J30-0521-04	N	Spacer x 2	
N09-0907-05		Wing bolt x 5	
N09-0908-04		Hex. screw x 6	
N14-0009-04		Nut x 6	
N15-1060-46		Flat washer x 6	
N16-0060-46		Spring washer x 6	
N32-3006-46		Flat screw x 4	
N99-0309-04	N	Hex. head screw x 6	
W01-0401-04		Hex. wrench	

SP-430 SPECIFICATIONS

SPEAKER SIZE	3"
RATED INPUT	1.0 watts
IMPEDANCE	8 ohms
FREQUENCY RESPONSE	300 Hz to 5 kHz
DIMENSIONS	4-7/8" wide x 3-3/4" high x 9-1/3" deep (excluding feet)
WEIGHT	3.1 lbs.

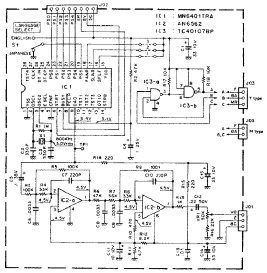
SP-430 PARTS LIST

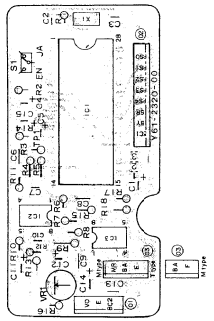
N : New parts

Part No.	No marks	Description	Ref. No.
A01-0942-03	N	Case (B)	
A01-0944-13	N	Case (A)	
A20-2468-03	N	Panel	K,M
A20-2469-03	N	Panel	T
A23-1431-04		Rear panel	
B04-0406-04	N	SP grill	
B07-0613-14		SP ring	
B38-0407-04		Spacer x 2	
B46-0404-00		Warranty card	K
B50-4026-10	N	Instruction manual	K,M
B50-4027-00	N	Instruction manual	T
E20-0208-04		Terminal plate	
E30-1629-15		SP cord	
G53-0507-04		Packing x 4	
H01-4468-14	N	Packing carton	K,M
H01-4469-04	N	Packing carton	T
H10-2513-02		Packing fixture (F)	
H10-2514-12		Packing fixture (R)	
H12-0445-04		Cushion	
H20-1407-03		Protective cover	
H25-0077-03		Protective bag Accessory	
J02-0323-05		Foot x 4	
J02-0409-04		Assistant foot	
J21-1144-14		SP mounting hardware x 2	
J21-2573-04		Foot mounting hardware x 2	
J61-0019-05		Vinyle tie	
N15-1030-46		Washer x 8	
N30-3008-46		Round screw x 4	
N35-3006-41		Bind screw x 12 Case	
N87-3006-46		Self tapping screw x 6	
N87-3008-46		Self tapping screw x 4	
T07-0224-05	N	Speaker	

VS-1 (VOICE SYNTHESIZER)

VS-1 SCHEMATIC DIAGRAM





VS-1 PARTS LIST

Part No.	No marks	
B50-4035-00	N	Instruc
CK45B1H331-K		C 3
CE04CW1A330M		E 3
CE04CW1A100M		E 1
CE04CW1HR22M		E 0
CK45B1H221-K		C 2
CQ92M1H332-K		ML 0
CS15E1E010M		T 1
CS15E1VG61M		T 6
C91-0131-05		C 0
E40-0273-05		Mini d
E40-0373-05		Mini d
E40-0373-05		Mini d
E40-0873-05		Mini d
H01-4481-03	N	Packi
H01-4501-03	N	Packi
H25-0029-04		Protec
L78-0006-05	N	Ceram
N89-3006-46		Tappi
R12-4408-05		Trim
S31-1411-05	N	Slide
AN6662	N	IC
MN6401TRA	N	IC
TC40107BP	N	IC

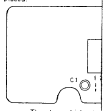
TALK SPEED SELECTION

Speed is factory set at "
different speeds can be selecte

Note : When placing the jumpe

Jumper place	Speed	Std. speed
1		X
2		X
3		X

Symbol O : denotes the pla
placed



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TERMINAL FUNCTION

Terminal No.		Name	I/O	Terminal Function
④	1	RT	O	Lithium battery charge terminal to Control unit
	2	BT	O	Lithium battery charge terminal to Control unit
	3	GND	–	GND
⑤	1	+	I	DC power supply input
	2	–	–	GND
⑥	1	GND	–	GND
	2	MUT	I	MUTE signal (MUTE ON : "L")
	3	TB	O	POW OFF : TB with TC connect
	4	TC	O	POW ON : TC with TM connect
	5	TM	O	For REMOTE
⑦	1	ACB	O	AC power supply, 2nd voltage terminal
	2	B–	–	GND
	3	B+	I	D101 output voltage terminal
⑧	1	14VI	O	+ 14V for IC101
	2	GND	–	GND
	3	9VO	I	IC101 output voltage (+ 9V)
		ATC	I	AC power supply, 2nd voltage terminal

RF UNIT (X44-3010-00)

①	1	500	I	From ANT2 terminal
	2	GND	–	GND
	3	50	I	From ANT2 terminal
	4	GND	–	GND
②	1	ATT1	I	ATT SW data 0, 20dB : "H"
	2	ATT2	I	ATT SW data 20, 30dB : "H"
③	1	GND	–	GND
	2	ATT2	I	ATT SW data 20, 30dB : "H"
	3	ATT1	I	ATT SW data 0, 20dB : "H"
④	1	AL2	I	ANT 1/2 select
	2	RB0	I	B.P.F. band data
	3	RB1	I	
	4	RB2	I	
	5	RB3	I	
⑤	1	9V	O	+9V for converter unit
	2	RB0	O	B.P.F. band data
	3	RB1	O	
	4	RB2	O	
	5	RB3	O	
	6	GND	–	GND
⑥	1	9V	I	+9V
	2	GND	–	GND
⑦	1	FCB	O	+9V for PLL unit
	2	VCH	I	Main VCO select signal
	3	VCL	I	
	4	GND	–	GND
⑧	1	GND	–	GND
	2	ATT1	I	From ANT1 connector
		HIF	O	Reception 1st IF (58.1125MHz)
		VFO	O	VCO output to PLL unit
		MKR	I	Marker signal input

IF UNIT (X48-3000-00)

①	1	COM	O	SELECTIVITY SW Common
	2	W	I	SELECTIVITY SW W
	3	M2	I	SELECTIVITY SW M2
	4	M1	I	SELECTIVITY SW M1
	5	N	I	SELECTIVITY SW N
	6	AUTO	I	SELECTIVITY SW AUTO

Terminal No.		Name	I/O	Terminal Function
②	1	SSQ	I	USB, LSB mode : "L", other modes : OPEN
	2	CWG	I	CW mode : "L", other modes : OPEN
	3	AMG	I	AM mode : "L", other modes : OPEN
	4	RYG	I	FSK mode : "L", other modes : OPEN
	5	FMG	I	FM mode : "L", other modes : OPEN
	6	TRY	I	TIMER relay control, set at "L" mode : Active To AVR unit via IF unit.
	7	BZ	I	Beep sound input
	8	GND	–	GND
	9	BLK	I	Stop 2nd MIXER operations in UL mode, Normally : 0V, UL : 4~5V
③	1	SQG		FM Squelch VR
	2	SQ2		
	3	SQ1		
④	1	NTL	O	NOTCH LED lit on current absorption
	2	BSL	O	BUSY LED lit on current absorption
⑥	1	NTR		NOTCH VR
	2	NTG		
	3	SSG		SSB Squelch VR
	4	SSQ		
⑦	1	BC2	O	Power supply (+ 9V) for VS-1
	2	G	–	GND
	3	VO	I	VS-1 voice synthesizer input
	4	–5V	I	–5V for block bias
	5	MT1	I	External mute signal, normally : "L", Muting : "H"
	6	TRL	O	TIMER relay control, set at "L" = Active
	7	G	–	
	8	14V	I	From power supply rectifier output (not from AVR unit)
⑧	1	AV1	O	AF GAIN VR
	2	AVG	–	
	3	AV3	I	
	4	G	–	RF GAIN VR
	5	RFG	–	
⑨	1	AGS	I	AGC SW, SLOW : OPEN, FAST : GND
	2	NTH	I	NOTCH SW OFF : OPEN, ON : GND
	3	G	–	
	4	NB2	I	NB2 SW OFF : GND, ON : OPEN
	5	NB1	I	NB1 SW via NB LEVE1 VR
⑩	1	MT2	O	Send external muting signal to microprocessor Muting : "L"
	2	BSY	O	Send BUSY signal to microprocessor BUSY : "L" (Center decision is added in AM, FM mode.)
	3	CO	O	SCAN TO/CO select, normally (GND) : TO, when W64 cut : OPEN, CO
⑪	1	S	O	S meter output
	2	G	–	
	3	14V	O	+ 14V for pilot lamp
⑫	1	REG	–	
	2	REC	O	REC OUT output
	3	SP1	O	AF power amp. output
	4	GND	–	GND
	5	SP2	I	AF power amp. output, switched by PHONES
⑬	1	G	–	
	2	SP	O	Internal speaker output
J5		EXT.SP	O	External speaker output
		VIF	I	Reception IF signal from VC-20 (58.1125MHz)
		HIF	I	Reception IF signal from HF band (58.1125MHz)
		HET	O	2nd LOCAL OSC signal (49.2825MHz)
		BFO	I	SSB damodulation carrie (8.83MHz)

TERMINAL FUNCTION

Terminal No.		Name	I/O	Terminal Function
				PLL UNIT (X50-3030-00)
①	1	14V	I	+ 14V
	2	GND	–	GND
②	1	GND	–	
	2	9MHz	O	9MHz for VC-20
③	1	SCK	I	Clock signal for serial PLL data
	2	SO	I	Serial PLL data signal
	3	LE2	I	VC-20, IC101 (PLL5) latch signal
	4	LE1	I	IC12 (PLL3) latch signal
	5	UL	O	Unlock signal
④	1	VUL	I	VC-20 Unlock signal
	2	SCK	O	VC-20 Clock signal from PLL data
	3	SO	O	VC-20 PLL data signal
	4	LE2	O	VC-20 PLL data latch signal for IC101
⑤	1	VUL	O	VC-20 Unlock signal
	2	HUL	O	HF band last PLL unlock signal
⑥	1	GND	–	GND
	2	CL1	I	IC2 (PLL1) clock signal
	3	DA3	I	MN6147/CPLL data signal
	4	DA2	I	
	5	DA1	I	
	6	DA0	I	
	7	CL4	I	IC14 (PLL4) clock signal
	8	CL2	I	IC8 (PLL2) latch enable signal
⑦	1	FCB	I	Power supply line for IC13
	2	VCH	O	RF unit VCO4 control voltage
	3	VCL	O	RF unit VCO1~3 control voltage
	4	G	–	GND
⑧	1	G	–	GND
	2	VPL	O	PLL low-figures signal for VC-20 (86.1125~97.1124MHz or 95.1125~96.1124MHz)
		HET	I	HET signal (46.2825MHz)
		BFO	O	BFO signal (8.83MHz)
		VFO	I	RF unit VCO1~4 output signal
		MKR	O	500kHz marker output signal
				CONTORL UNIT (X53-3020-00) (A/2)
①	1	GND	–	Power supply GND
	2	5C	I	Power supply + 5V
	3	8C	I	Power supply + 8V
②	1	5E	O	Encoder + 5V
	2	EN1	I	Encoder count pulse 1
	3	EN2	I	Encoder count pulse 2
	4	GND	–	GND
③				Not used
④	1	SO	O	Serial data output (PLL data)
	2	SCK	O	Serial clock output (PLL data)
	3	LE1	O	PLL3 latch enable (Active : "H")
	4	UL	I	Low-figures unlock signal (Lock : "H")
	5	LE2	O	PLL5 latch enable (Active : "H") ; Option VHF Converter)
⑤	1	5C	O	Display + 5V
	2	DP	O	Display "decimal point" signal (Lit ON : "H")
	3	XP	O	Display "Red letters" signal (Lit ON : "L")
	4	LH	O	Display latch enable output (Active : "L")
	5	SO	O	Serial data output for display
	6	SCK	O	Serial clock output for display
⑥	1	8D	O	Display + 8V
	2	D0	I	A/D converter, data converter input
	3	AK	O	A/D converter, clock converter output
	4	DA0	O	A/D converter, reset signal
	5	–	–	Not used
	6	GND	–	GND

TERMINAL FUNCTION

Terminal No.		Name	I/O	Terminal Function
⑦	1	5C	O	Control unit (B/2) + 5V
	2	RS2	O	I/O port reset signal (Active : "H")
	3	RS1	O	System reset signal (Active : "L")
	4	RY	I	External control character acknowledge signal (Option)
	5	BY	O	VS-1 Voice synthesizer BUSY signal (BUSY : "H") (Option)
	6	CS	I	IC2 I/O port select signal (Active : "L")
	7	A13	O	Microprocessor address signal
	8	A14	O	Microprocessor address signal
	9	A15	O	Microprocessor address signal
	10	RD	O	Microprocessor control signal
	11	WR	O	Microprocessor control signal
	12	GND	–	GND
⑧	1	D7	I/O	Microprocessor data bus
	2	D6	I/O	
	3	D5	I/O	
	4	D4	I/O	
	5	D3	I/O	
	6	D2	I/O	
	7	D1	I/O	
	8	D0	I/O	
	9	STD	I	Clock, clock-count interrupting signal (64Hz, duty 50%)
⑨	1	A12	O	Microprocessor address signal
	2	A11	O	
	3	A10	O	
	4	A9	O	
	5	A8	O	
	6	A7	O	
	7	A6	O	
	8	A5	O	
	9	A4	O	
	10	A3	O	
	11	A2	O	
	12	A1	O	
	13	A0	O	
⑩	1	RB0	O	Band information signal
	2	RB1	O	
	3	RB2	O	
	4	RB3	O	
	5	AL2	O	ANT 1/2 select signal (ANT2 : "L")
⑪	1	SSG	O	(LSB or USB : "L")
	2	CWG	O	(CW : "L")
	3	AMG	O	Mode select signal (AM : "L")
	4	RYG	O	(FSK : "L")
	5	FMG	O	(FM : "L")
	6	TRY	O	TIMER relay signal (POW ON : "L")
	7	BZ	O	Buzzer signal
	8	BLK	O	Blanking signal (Blanking : "H")
⑫	1	–	–	Not used
	2	LSL	O	(LSB : "L")
	3	USL	O	(USB : "L")
	4	CWL	O	Mode LED output (CW : "L")
	5	AML	O	(AM : "L")
	6	RYL	O	(FSK : "L")
	7	FML	O	(FM : "L")

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 ±10 x 10^{-6} (−10°C~+ 50°C)

Frequency accuracy
Within ±10 x 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.

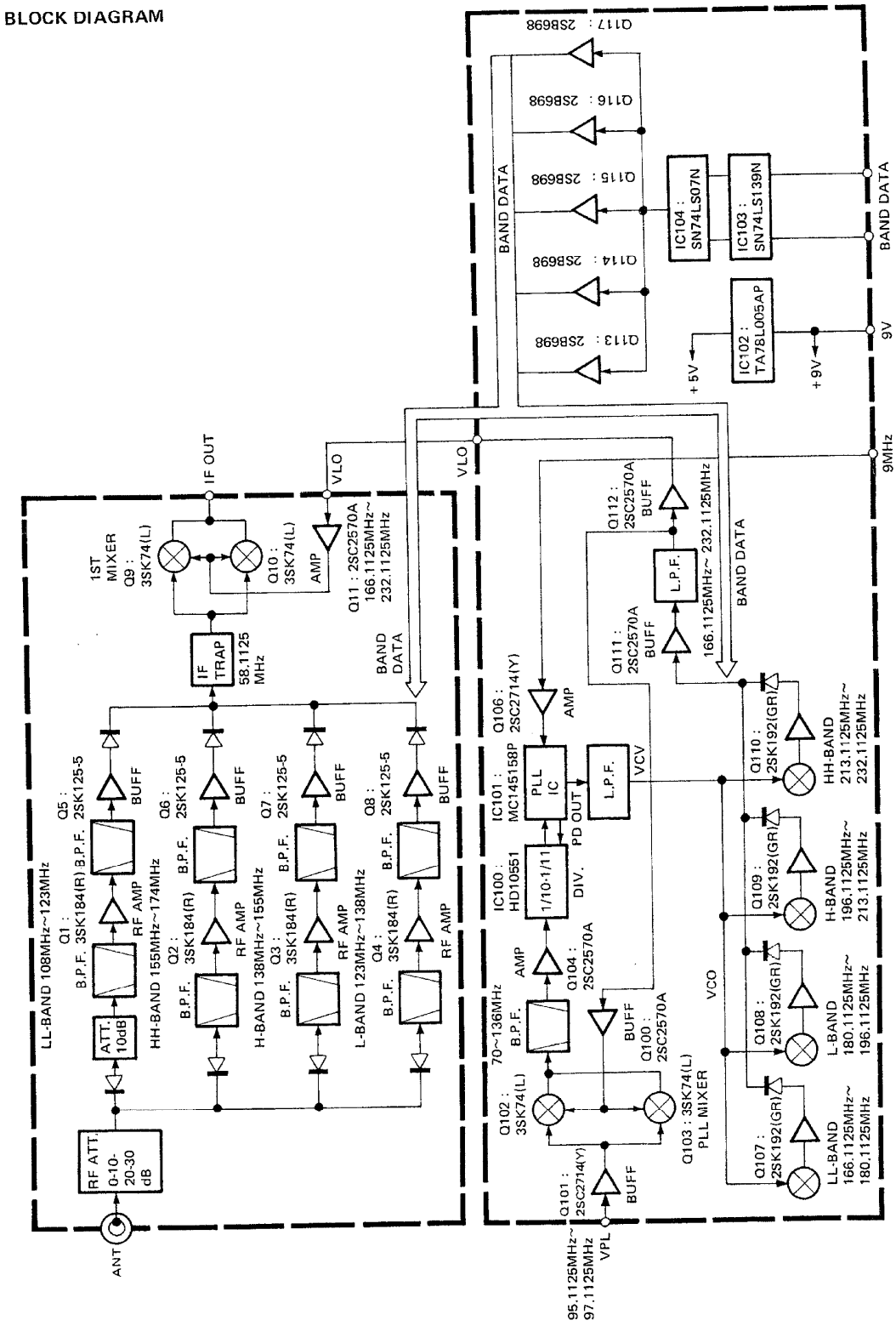
• PLL SECTION (X44-3020-00) (B/2)

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 96.1125 MHz to 97.1125MHz. Either of these ranges is selected according to the actual receiver dial frequency.

VC-20 (VHF CONVERTER)

BLOCK DIAGRAM



VC-20 (VHF CONVERTER)

TERMINAL FUNCTIONS

Terminal No.		Name	I/O	Terminal Function
①	1	GND	–	GND
	2	VAT	I	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

N : New parts

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

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

VC-20 (VHF CONVERTER)

PARTS LIST

* New Parts
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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	Destination 仕向	Remarks 備考
				VC-20		
--		*	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 (ACCESORY)		
-			H25-0162-04	PROTECTION BAG (REALITY)		
--			J21-4210-04	MOUNTING HARDWARE		
-			J21-4211-04	MOUNTING HARDWARE		
--			N35-3004-41	BINDING HEAD MACHINE SCREW		
--			N87-3006-41	BRAZIER HEAD TAPTITE SCREW		
-		*	X44-3020-00	CONVERTER UNIT		
				CONVERTER UNIT (X44-3020-00)		
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)

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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	Destination 仕向	Remarks 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			CC45CH1H560J	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			CQ92M1H104K	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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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名/規格	Destination 仕向	Remarks 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(VCO)LOWER		
-		*	F11-1049-03	SHIELDING COVER(FRAME)		
-		*	F11-1050-03	SHIELDING COVER(FRAME)		
-		*	F11-1051-04	SHIELDING COVER(VCO CASE)		
-			G02-0518-04	FLAT SPRING		
L1			L33-0025-05	CHOKE 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			L34-1164-05	COIL		
L115-121			L40-1001-14	SMALL FIXED INDUCTOR(10UH)		
L122			L40-1001-13	SMALL FIXED INDUCTOR(10UH)		
L123			L34-1163-05	COIL		
L124-126			L92-0110-05	FERRITE CORE		
L127			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
T1		*	L34-4030-05	COIL		
T2			L34-2175-05	COIL		
T3			L34-2174-05	COIL		
T4 ,5			L34-2175-05	COIL		
T6		*	L34-4028-05	COIL		
T7			L34-2169-05	COIL		
T8			L34-2168-05	COIL		
T9 ,10			L34-2169-05	COIL		
T11		*	L34-4028-05	COIL		
T12			L34-2172-05	COIL		
T13			L34-2171-05	COIL		
T14 ,15			L34-2172-05	COIL		
T16		*	L34-4028-05	COIL		
T17			L34-2172-05	COIL		
T18			L34-2171-05	COIL		
T19 ,20			L34-2172-05	COIL		
T21			L34-2161-15	COIL		
T22			L19-0350-05	BALUN TRANSFORMER		
T23		*	L34-4029-05	COIL		
T24			L19-0346-05	BALUN TRANSFORMER		
T100		*	L34-4031-05	COIL		
T101		*	L34-4032-05	COIL		
T102			L19-0350-05	BALUN TRANSFORMER		
T104			L19-0348-05	BALUN TRANSFORMER		
T105		*	L34-4033-05	COIL		
T106		*	L34-4034-05	COIL		
T107		*	L34-4035-05	COIL		
T108		*	L34-4036-05	COIL		
-			N35-2604-41	BIND HEAD MACHINE SCREW(CASE)		
-			N87-2606-46	BRAZIER HEAD TAPTITE SCREW		
-			N87-3010-41	BRAZIER HEAD TAPTITE SCREW(ANT		
R1			RK73FB2A101J	CHIP R 100 J 1/10W		
R2			RK73FB2A750J	CHIP R 75 J 1/10W		
R3			RK73FB2A471J	CHIP R 470 J 1/10W		
R4			RK73FB2A560J	CHIP R 56 J 1/10W		
R7			RK73FB2A473J	CHIP R 47K J 1/10W		
R8			RK73FB2A104J	CHIP R 100K J 1/10W		
R9			RK73FB2A330J	CHIP R 33 J 1/10W		
R10 ,11			RK73FB2A101J	CHIP R 100 J 1/10W		
R12 ,13			RK73FB2A561J	CHIP R 560 J 1/10W		
R14			RK73FB2A101J	CHIP R 100 J 1/10W		
R16			RK73FB2A473J	CHIP R 47K J 1/10W		
R17			RK73FB2A104J	CHIP R 100K J 1/10W		
R18			RK73FB2A330J	CHIP R 33 J 1/10W		
R19 ,20			RK73FB2A101J	CHIP R 100 J 1/10W		
R21			RK73FB2A821J	CHIP R 820 J 1/10W		
R22			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R23			RK73FB2A101J	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			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R185,186			RK73FD2A681J	CHIP R 680 J 1/10W		
R187-190			RK73FB2A221J	CHIP R 220 J 1/10W		
R191			RK73FB2A821J	CHIP R 820 J 1/10W		
VR100			R12-1066-05	TRIMMING POT. (1K)		
VR101-104			R12-1069-05	TRIMMING POT.		
W20 -24			R92-0670-05	CHIP R 0 OHM		
W123-145			R92-0670-05	CHIP R 0 OHM		
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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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 DEMUTIPLEXERS)		
IC104		*	SN74LS07N	IC(BAFFER/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			2SB698(E,F)	TRANSISTOR		
Q118			2SC2714(Y)	CHIP TRANSISTOR		

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VC-20 (VHF CONVERTER)

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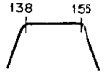
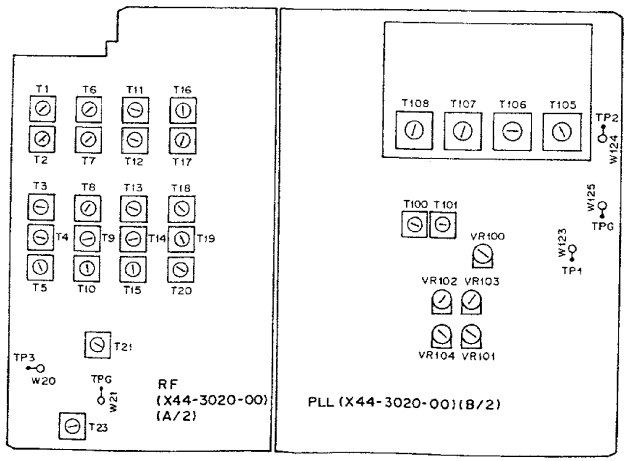
ADJUSTMENT

Item	Condition	Measurement: Test equipment	Measurement: Unit	Measurement: Terminal	Adjustment: Unit	Adjustment: Parts	Adjustment: Method	Specification/Remarks
1. VCO	MODE : FM 1) LL BAND FREQ. : 108.000MHz	DC V.M	PLL	TP2	PLL	T105	2.0V	±0.05V
	: 129.990MHz						Check	3.8±0.5V
	2) L BAND FREQ. : 123.000MHz					T106	2.0V	±0.05V
	: 137.990MHz						Check	3.7±0.5V
	3) H BAND FREQ. : 138.000MHz					T107	2.0V	±0.05V
	: 154.990MHz						Check	3.9±0.5V
	4) HH BAND FREQ. : 155.000MHz					T108	2.0V	±0.05V
	: 174.000MHz						Check	3.9±0.5V
2. PLL MIX	1) FREQ. : 174.000MHz	RF V.M	PLL	TP1 TPG	PLL	T100, T101 VR100 VR101	MAX. MIN. MAX.	
3. RF BPF	1) Connect the Tracking generator and High impedance probe and Spectrum analyzer to ANT terminal. MODE : FM ATT : 0dB 1) LL BAND FREQ. : 108.000MHz Marker spot : 110MHz, 123MHz	Tracking generator (20dB ATT) Spectrum analyzer OSCILLO	RF	ANT TP3 TPG	RF	T1~5	Waveform perform as shown on right.	Tracking generator : Less than −30dBm  About 10dB less than other BAND.
	2) L BAND FREQ. : 123.000MHz Marker spot : 123MHz, 138MHz					T16~ T20		
	3) H BAND FREQ. : 138.000MHz Marker spot : 138MHz, 155MHz					T11~ T15		
	4) HH BAND FREQ. : 155.000MHz Marker spot : 155MHz, 174MHz					T6~ T10		
4. Sensitivity	1) FREQ. : 145.02MHz MODE : FM SSG MOD : 1kHz DEV : 5kHz output : 145.02MHz, 20dBμ	SSG AF V.M	RF R-5000	ANT EXT.SP S-meter	RF R-5000	T23	S-meter MAX. flat.	S/N more than 10dB
	2) SSG output : 145.021MHz, −6dBμ MOD : OFF						Check	S/N More than 10dB.

VC-20 (VHF CONVERTER)

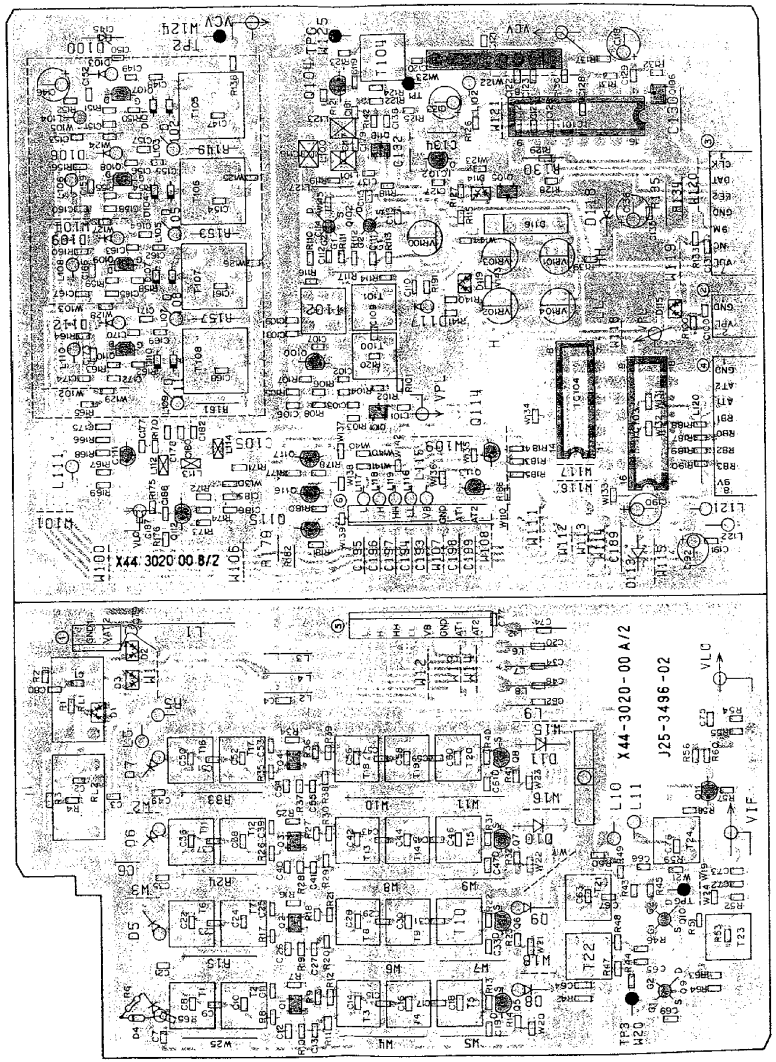
Item	Condition	Measurement: Test equipment	Measurement: Unit	Measurement: Terminal	Adjustment: Unit	Adjustment: Parts	Adjustment: Method	Specification/Remarks
5. Spurious	1) FREQ. : 155.388.5MHz MODE : FM SSG output : 155.388.5MHz, MOD : ON	8Ω dummy load	R-5000	EXT.SP	R-5000	AF VOL	0.63V	
	2) SSG MOD : OFF				VC-20 PLL	VR101 VR100	AF output MIN.	AF output less than 20dB
	3) FREQ. : 147.388.5MHz MODE : FM SSG output : 147.388.5MHz, 60dBμ MOD : ON				R-5000	AF VOL	0.63V	
	4) SSG MOD : OFF				VC-20 PLL	VR102	AF output MIN.	AF output Less than 20dB.
	5) FREQ. : 135.388.5MHz MODE : FM SSG output : 135.388.5MHz, 60dBμ MOD : ON				R-5000	AF VOL	0.63V	
	6) SSG MOD : OFF				VC-20 PLL	VR103	AF output MIN.	AF output less than 15dB.
	7) FREQ. : 118.388.5MHz MODE : FM SSG output : 118.388.5MHz, 60dBμ MOD : ON				R-5000	AF VOL	0.63V	
	8) SSG MOD : OFF				VC-20 PLL	VR104	AF output MIN.	AF output less than 20dB.
6. IF trap	1) FREQ. : 123.020MHz MODE : USB SSG output : 58.112.5MHz, 80dBμ	SSG AF V.M	R-5000	ANT connector EXT.SP	RF	T21	AF output MIN.	Divider ratio is more than 80dB.

ADJUSTING POINT

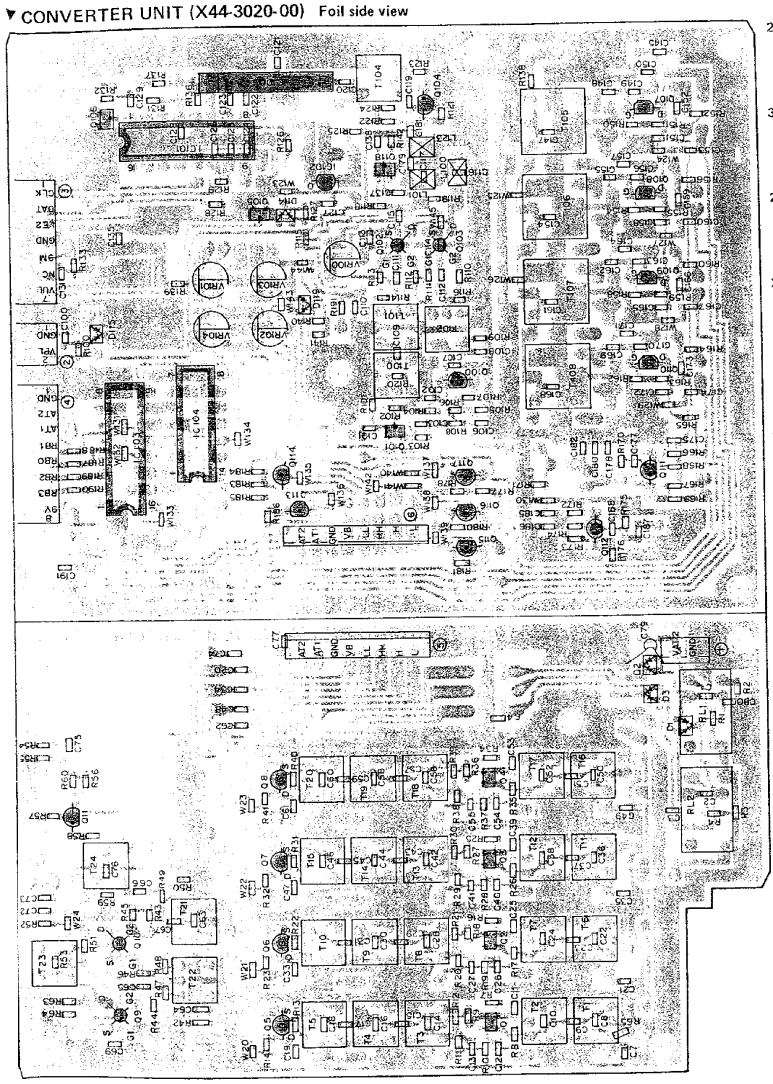


R-5000 VC-20 (VHF CONVERTER) PC BOARD VIEWS

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



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



3SK184

25K125-5

3SK74

2SC2570A

2SC2714(Y)

DTC124EK

2SK194

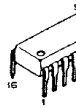
25B698

HD10551

MC145138P

TA78L005AP

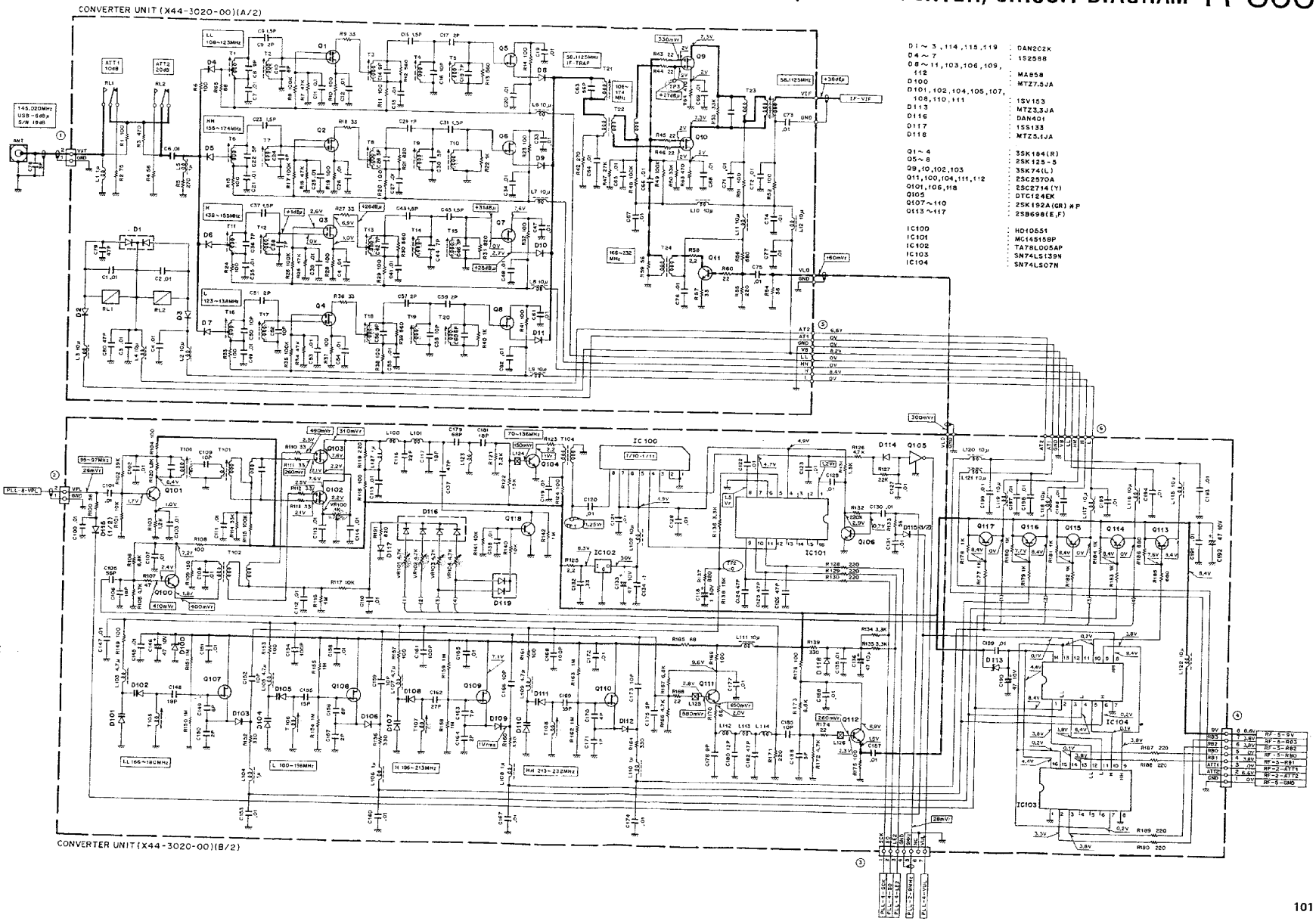
SN74LS139N



SN74LS07N

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

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



INSTALLATION OF OPTIONS

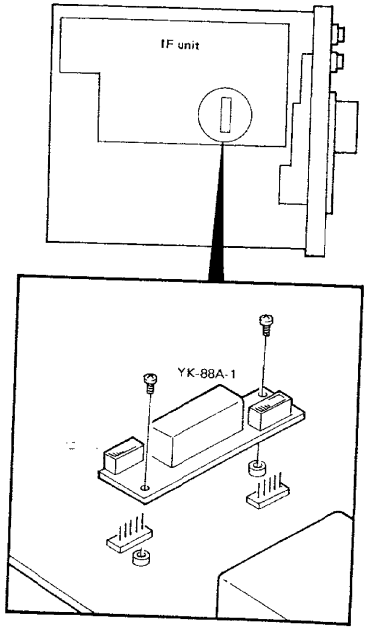
Crystal Filter

A selection of optional filters is available for the R-5000 series : the YK-88SN, 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.

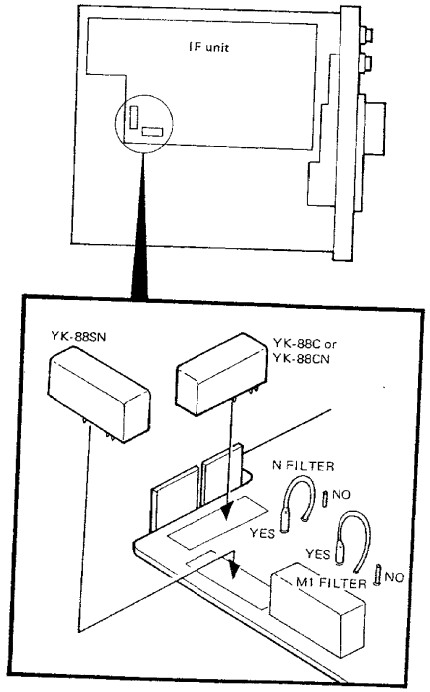
2–1. YK-88A-1

(1) Remove the two screws holding the filter board (X48-3000-00) (B/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-88SN, 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-88SN 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.



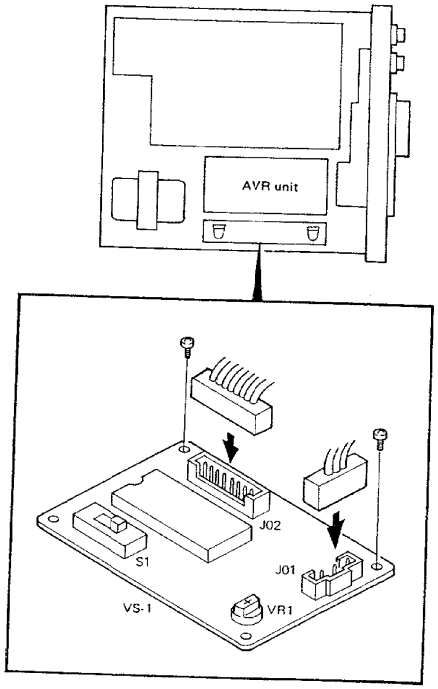
INSTALLATION OF OPTIONS

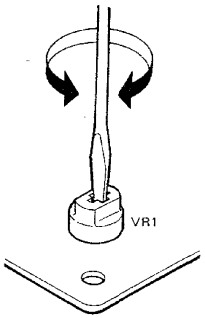
Voice Synthesis Unit VS-1

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.



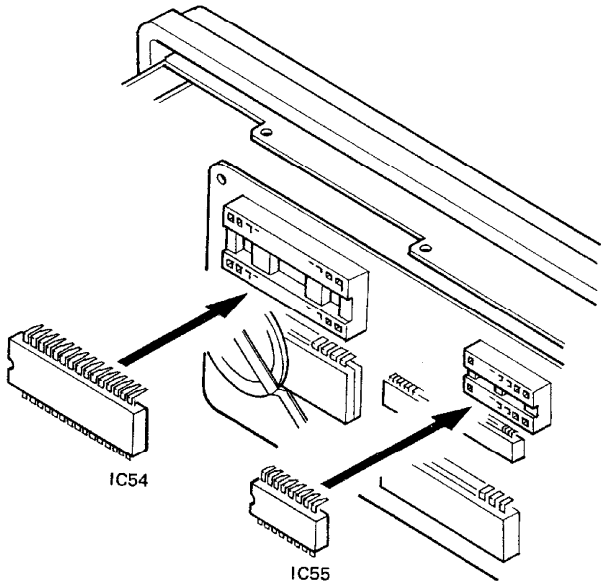


INSTALLATION OF OPTIONS

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.

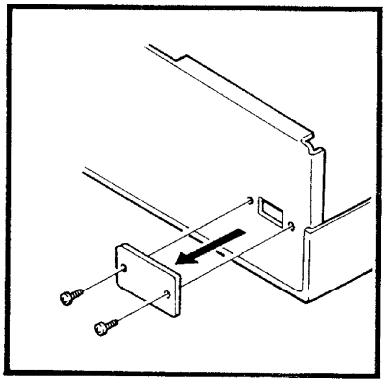


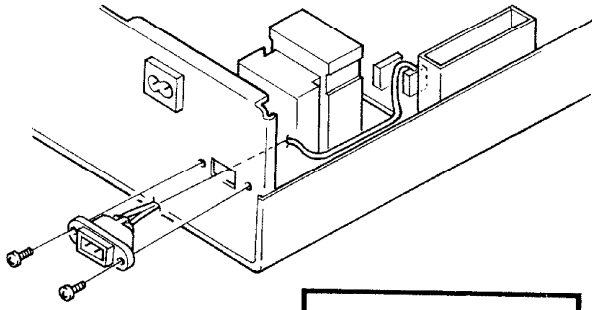
INSTALLATION OF OPTIONS

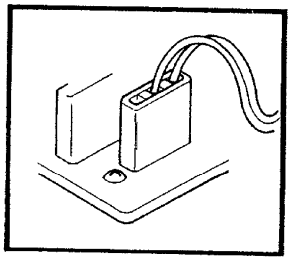
DC Power Cable Kit DCK-2

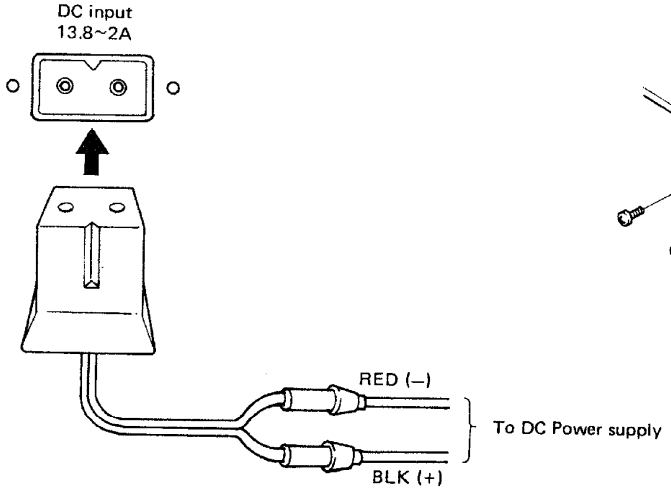
The DCK-2 cable kit is provided for running the R-5000 set from a DC power supply. The installation procedure is as follows :

(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

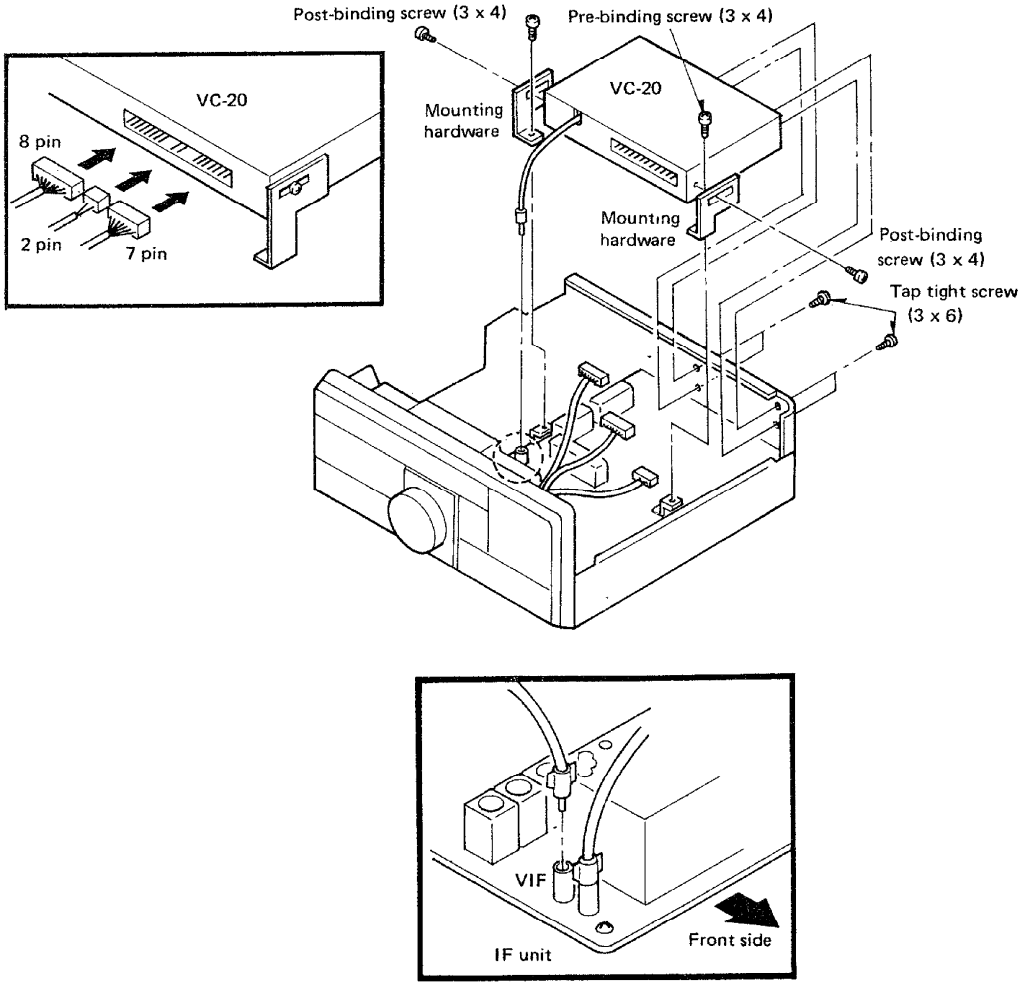
VHF Converter VC-20

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
$-10^{\circ}C \sim +50^{\circ}C$

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

Weight
5.5kg (12.10lbs)

<FREQUENCY STABILITY>

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

Frequency stability (RIT/XIT OFF)
Within $\pm 10 \times 10^{-6}$ $(-10^{\circ}C \sim +50^{\circ}C)$

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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