

# FT-4700RH



YAESU MUSEN CO., LTD.

This manual is intended to serve as a supplement to the FT-4700RH Operating Manual. Detailed information regarding functions, specifications, options and operation has been provided in the Operating Manual, and is not reprinted herein. Therefore, this supplement is not intended to serve as an independent reference, but to be used in conjunction with the information provided in the Operating Manual.

Because of the compactness and complexity of the double-sided glass-epoxy circuit boards used in the FT-4700RH, four layout diagrams are provided for each board. Each side of the board is identified by the type of the majority of components installed on that side. In most cases one side has only chip components, and the other has either a mixture of both chip and lead components (trimmers, coils, electrolytic capacitors, packaged ICs, etc.), or lead components only. The two "obverse" views depict the board as it is seen when viewed directly with the eye, while the two "reverse" views depict the unseen side of the board as it would appear if one were to peer through the board from the other side without seeing the components on the near side.

While we believe the technical information in this manual is correct, Yaesu assumes no liability for damage that may occur as a result of typographical or other errors that may be present. Your cooperation in pointing out any inconsistencies in the technical information would be appreciated.

Yaesu Musen reserves the right to make changes in the circuitry of this transceiver, in the interest of technological improvement, without notification of the owners.

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# CIRCUIT BOARD ACCESS

## Top Cover

Removing the top cover gives access to the VHF boards and one half of the Control Unit. To remove the top cover, remove the six screws denoted by stars in Figure 1.

## Bottom Cover

Removing the bottom cover gives access to the UHF boards and the other half of the Control Unit. To remove the bottom cover, remove the six screws denoted by double rings in Figure 1, and then separate the cover slowly to avoid straining the loudspeaker wires. These can be unplugged from the UHF Main Unit before pulling the cover away.

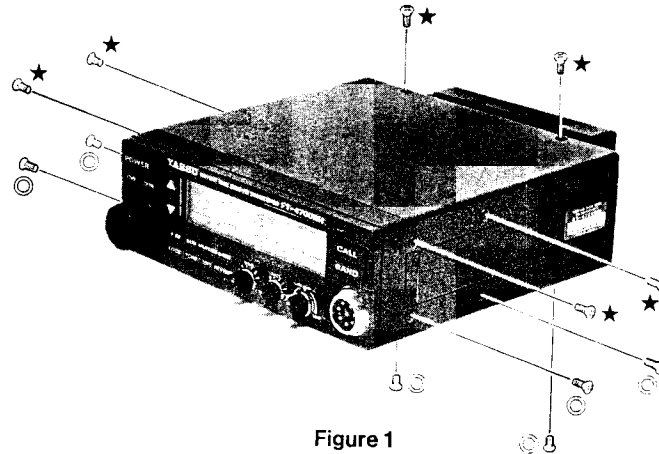


Figure 1

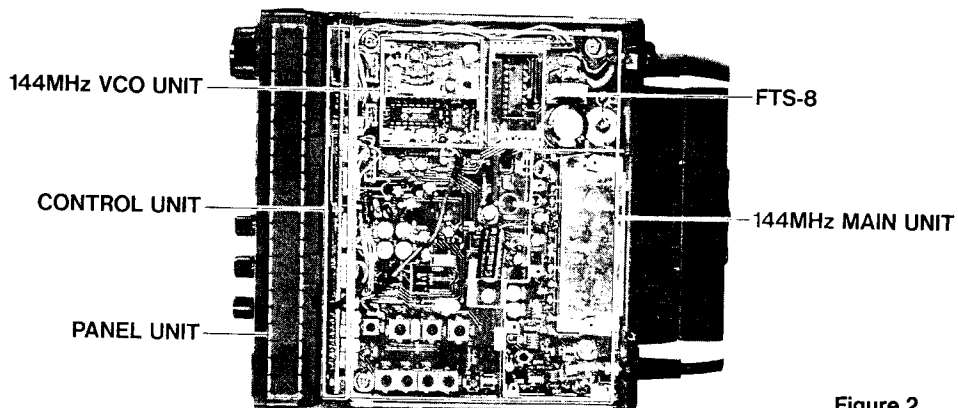


Figure 2

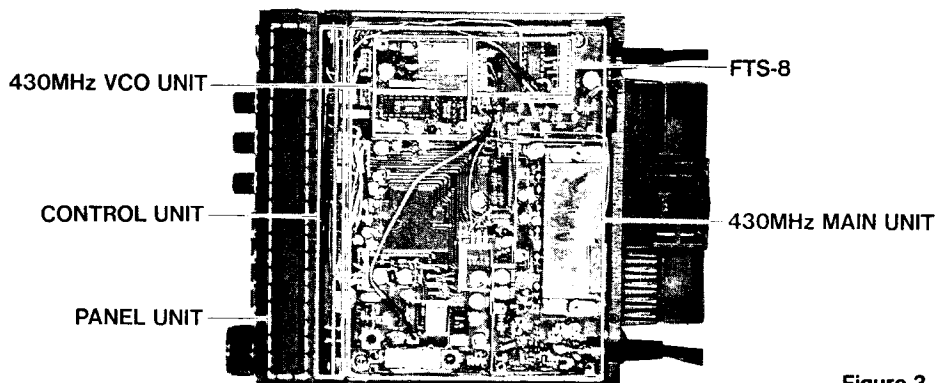


Figure 3

# CIRCUIT BOARD ACCESS

## Front Panel

The front panel is removed by removing the top and bottom covers, as described above, and then unplugging the control cable from the rear of the front panel (Figure 4).

To open the Front Panel/Controller, refer to Figure 5. Remove the screw in the rear of the unit, and then carefully pry the rear cover off using a wide-blade screwdriver. Four catches hold the cover in place: two each top and bottom. Do not squeeze the edges of the unit while prying the cover off.

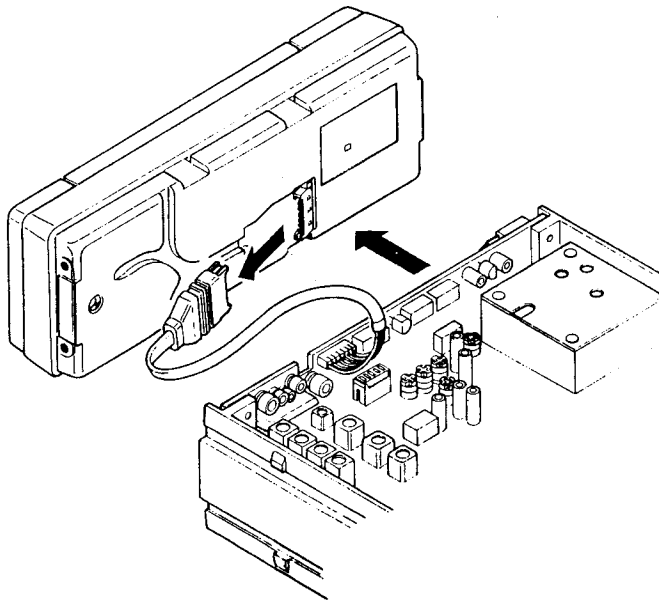


Figure 4

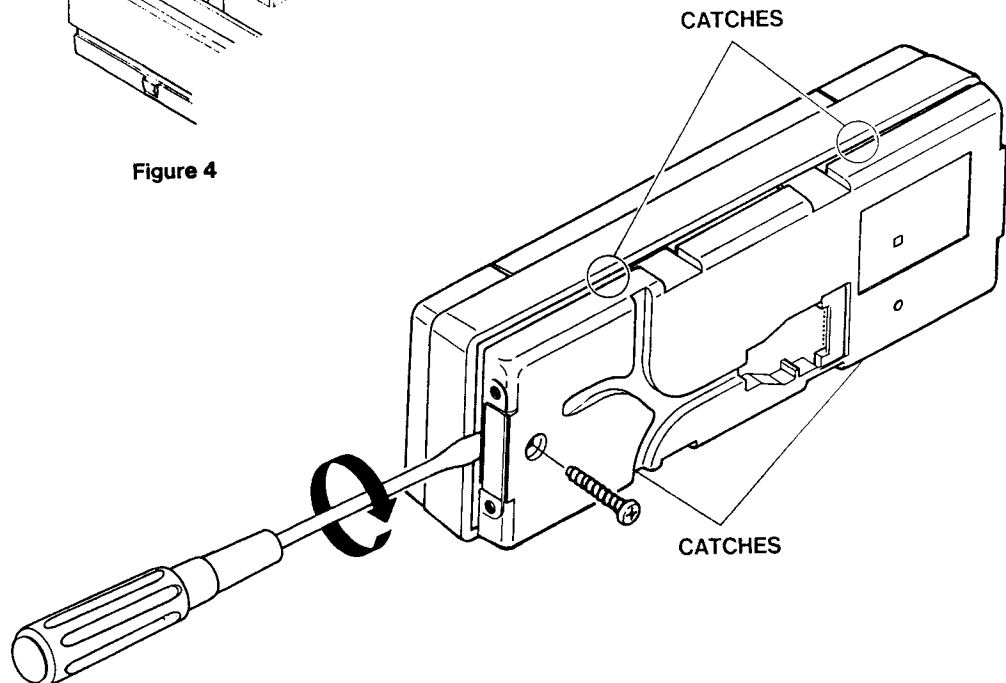


Figure 5



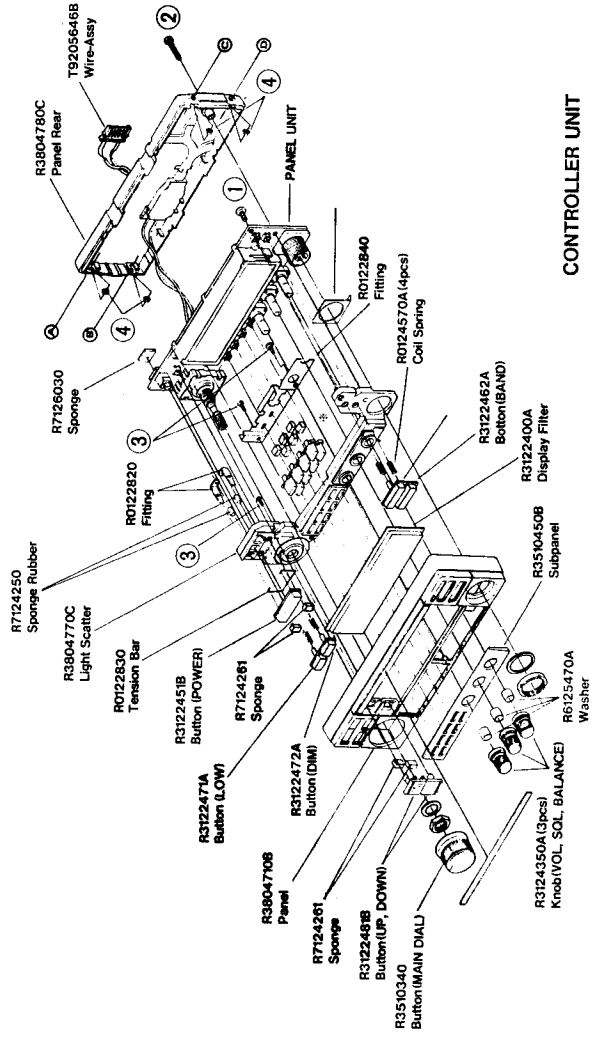
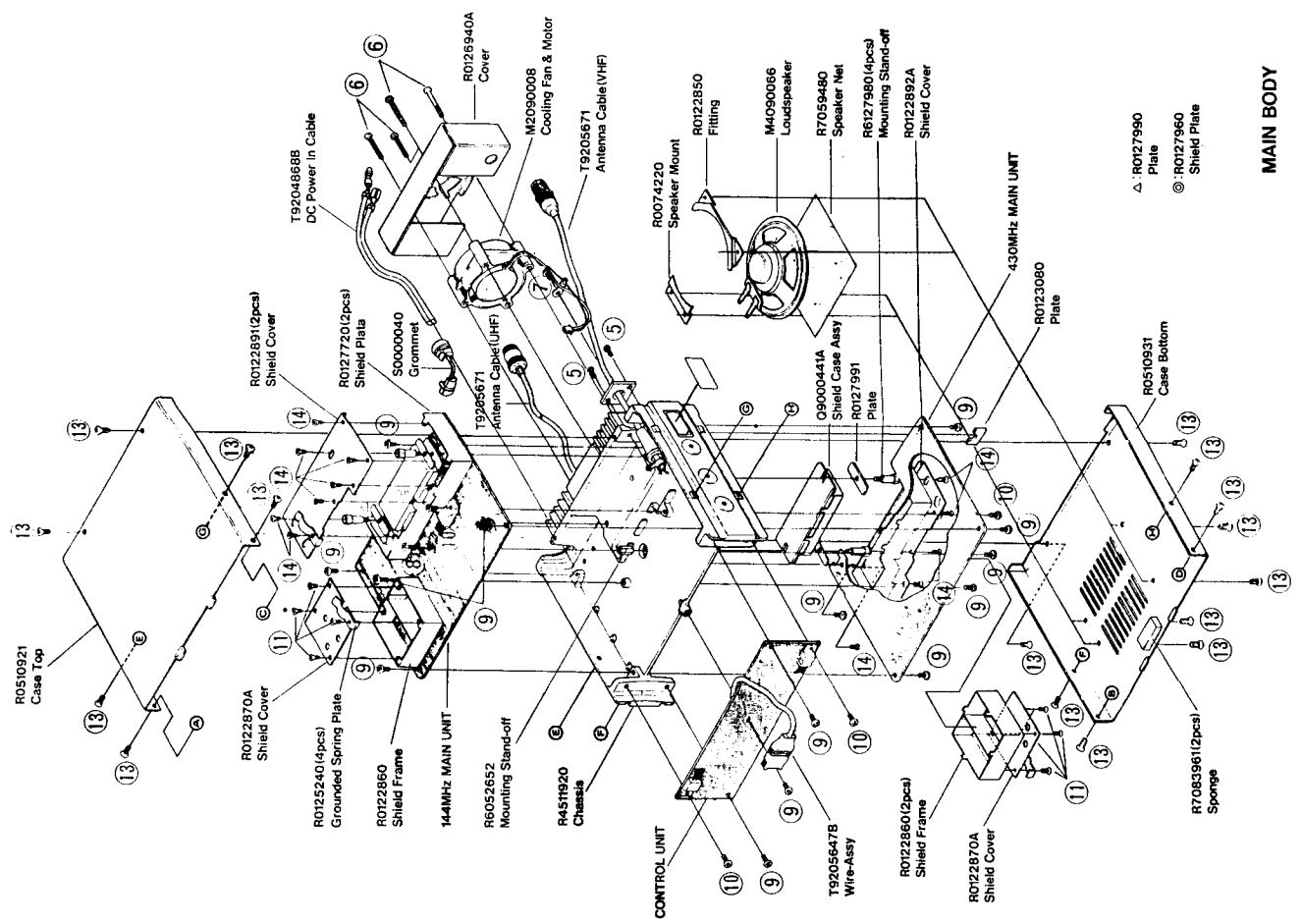
### MAIN UNIT SCREW LIST

Ref No.	Part No.	Description	Qty
5	U00308007	PAN HEAD SCREW M3X8B	2
6	U00325007	PAN HEAD SCREW M3X25B	4
7	U02306001	SEMS SCREW SMDX6	1
8	U03306001	SEMS SCREW ASM3X6	2
9	U24306001	TAPTITE SCREW M3X6	13
10	U24310001	TAPTITE SCREW M3X10	4
11	U30103001	FLAT HEAD SCREW M2X3	8
12	U30104001	FLAT HEAD SCREW M2X4	14
13	U31206007	OVAL HEAD SCREW M2.6X8B	16

### CONTROLLER UNIT SCREW LIST

Ref No.	Part No.	Description	Qty
1	U23112001	TAPTITE SCREW M2X12	1
2	U23314007	TAPTITE SCREW M3X14B	1
3	U43106001	TAPTITE SCREW M2X6	3
4	U60200101	HEX NUT N2.6	4

Button	Sponge
F <b>M</b>	R7124260
SUB	R7124260
MUTE <b>PR</b>	R7124260
D/MR	R7124260
LOCK	R7124260
tone	R7124260
RPT	R7124260
REV <b>STEP</b>	R7124260

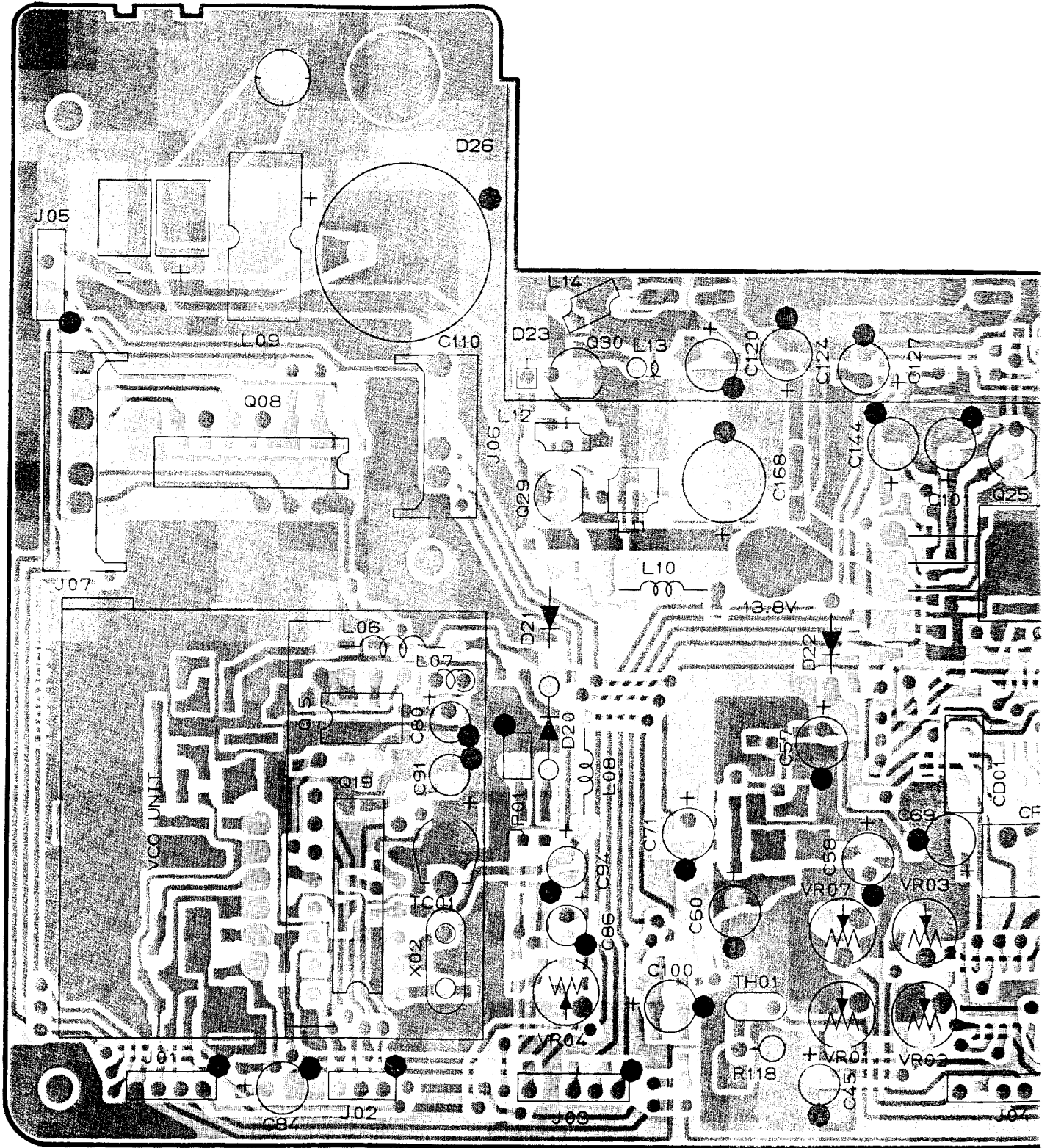


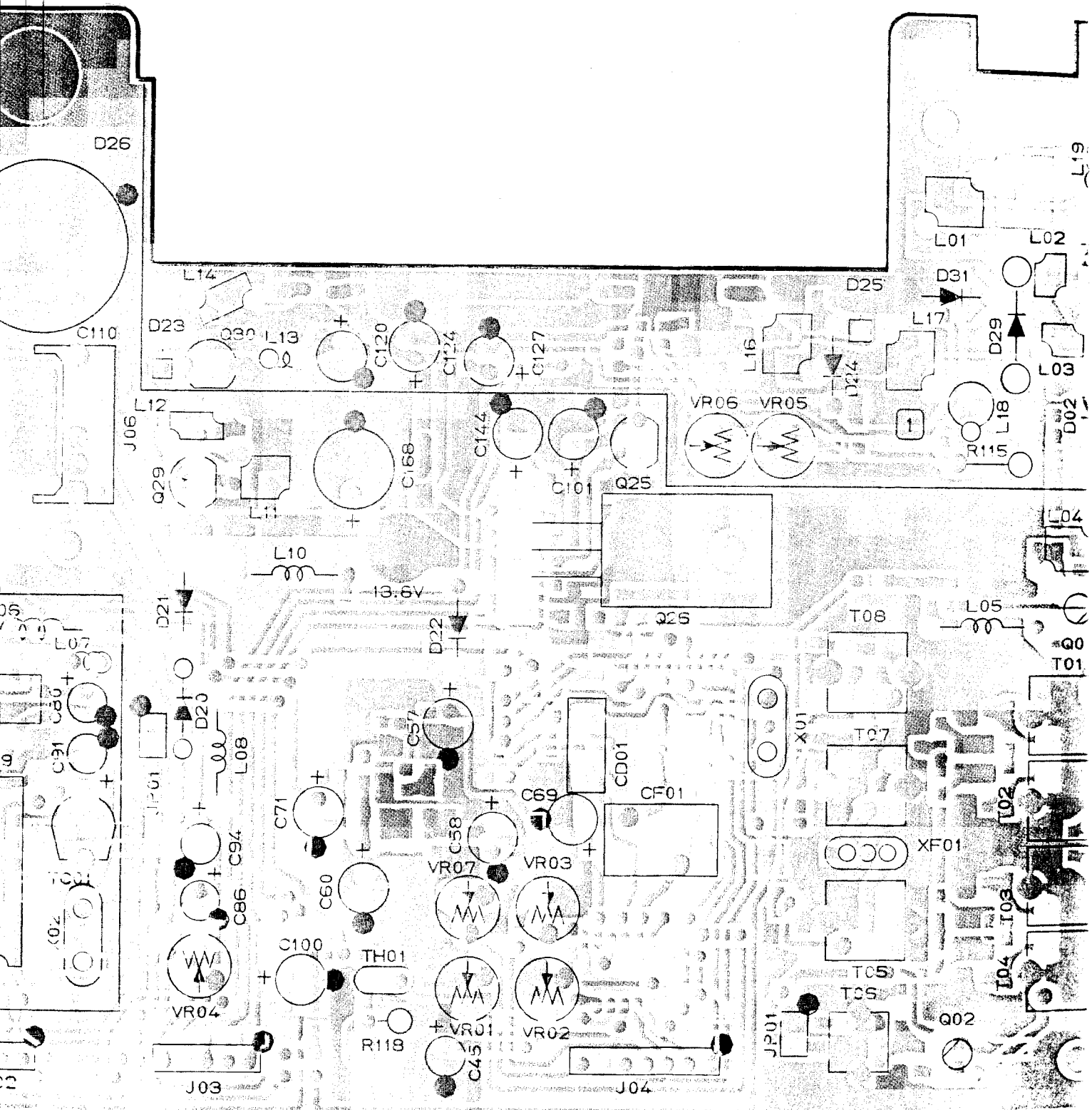
# MAIN CHASSIS PARTS LIST

## \*\*\* MAIN CHASSIS \*\*\*

Q1	G1090915	IC (VHF PA)	S-AV17	
Q2	G1090910	IC (UHF PA)	M57788M-23	
SP1	M4090066	Loudspeaker	VS-66Y	2W 8-Ohm
FN1	M2090008	Cooling Fan & Motor		
	T9204868B	DC Power In Cable		
	T9205671	Antenna Cable (VHF)		
	T9205710	Antenna Cable (UHF)		
	T9205654	Speaker Cable		
	R4511920	Chassis		
	R6127980	Mounting Stand-off		
	R0122891	Shield Cover		
	R0122892A	Shield Cover		
	R0122960	Shield Plate		
	S0000040	Grommet		
	R0125240	Grounded Spring Plate		
	Q9000441A	Shield Case Assy		
	R0510921	Case Top		
	R0510931	Case Bottom		
	R3804710B	Panel		
	R3122400A	Display Filter		
	R3122451A	Button (POWER)		
	R3122461	Button (CALL)		
	R3122462	Button (BAND)		
	R3122471	Button (LOW)		
	R3122472	Button (DIM)		
	R0124570A	Coil Spring		
	R3122490	Button (F, SUB, MUTE, D)		
	R3122500	Button (LOCK, TONE, RPT, REV)		
	R3510340	Knob (MAIN DIAL)		
	R3122481A	Button (UP, DOWN)		
	R3124350A	Knob (VOL, SQL, BALANCE)		
	R3510450B	Subpanel		
	R3804780C	Panel Rear		
	Q7000156	Panel Unit		

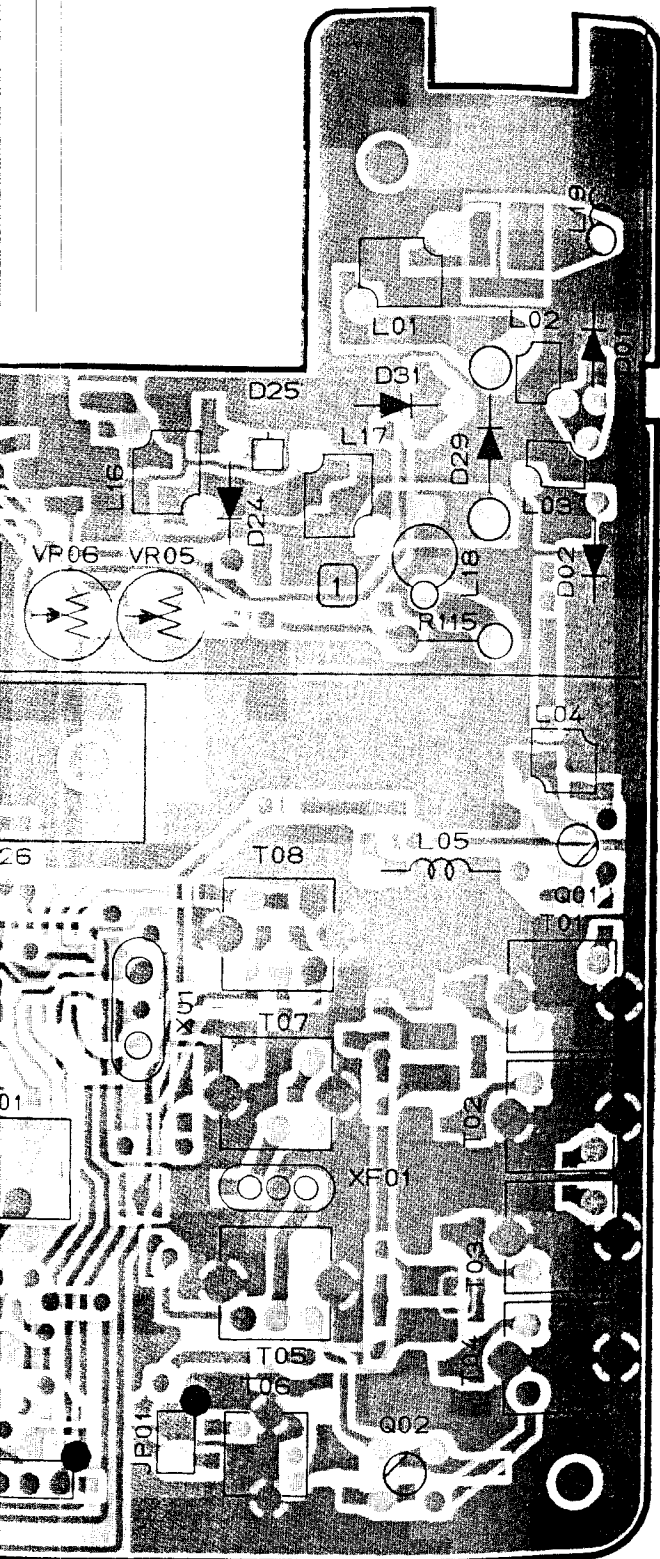
144MHz MAIN UNIT (No.1 XXX)



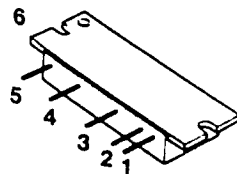


obverse view of "component"

# VHF MAIN UNIT PARTS LAYOUT

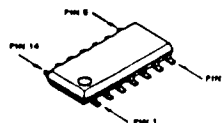


obverse view of "component" side

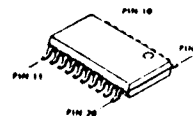


- 1. INPUT
- 2. Vcc1
- 3. Vcc2
- 4. Vcc3
- 5. OUTPUT
- 6. FLA

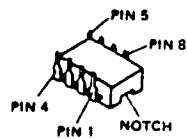
S-AV17(Q1)



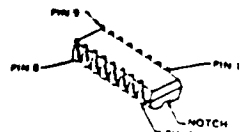
LA6324M(Q1006)



TK10487M(Q1005)



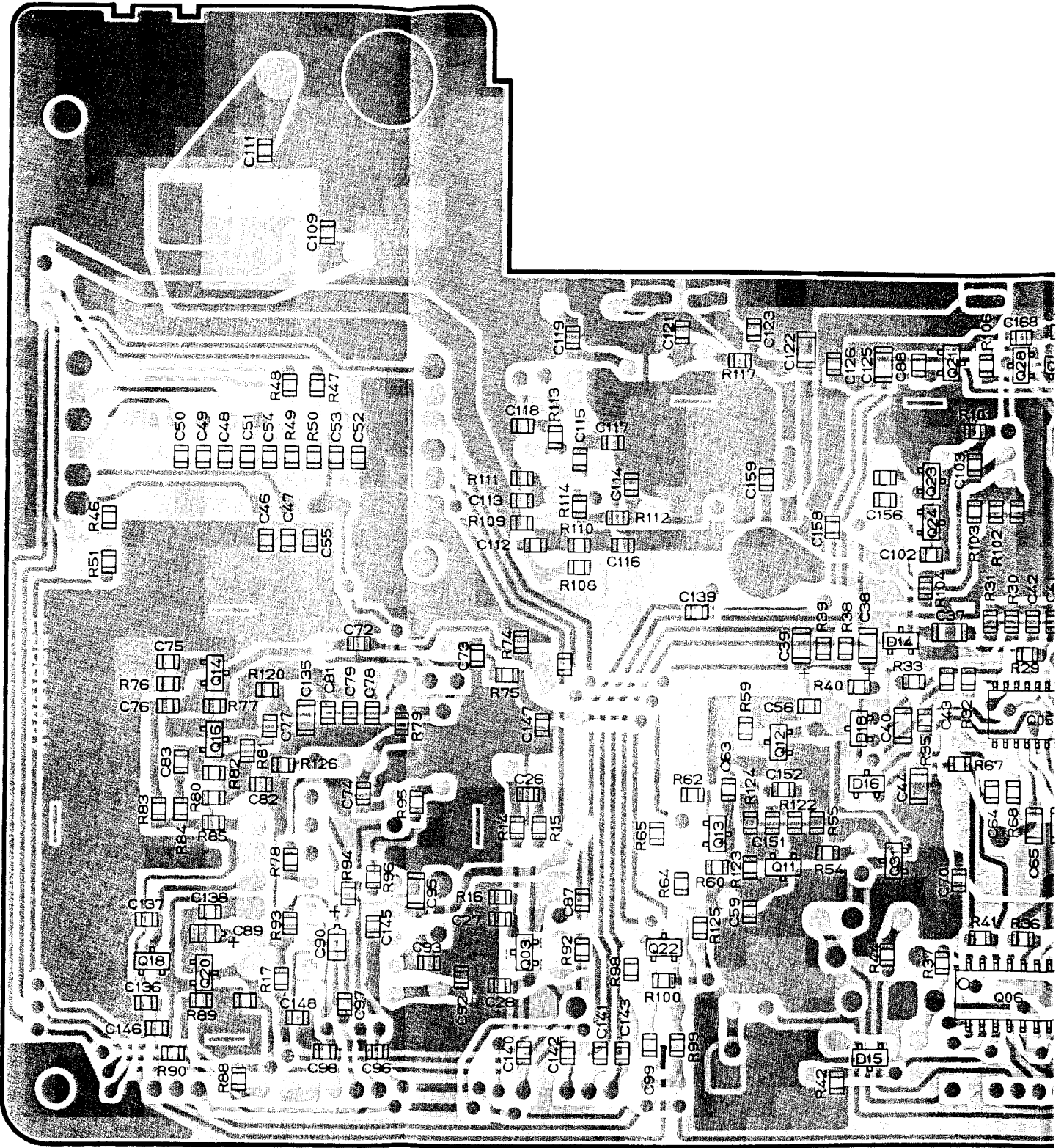
MC12017P(Q1015)



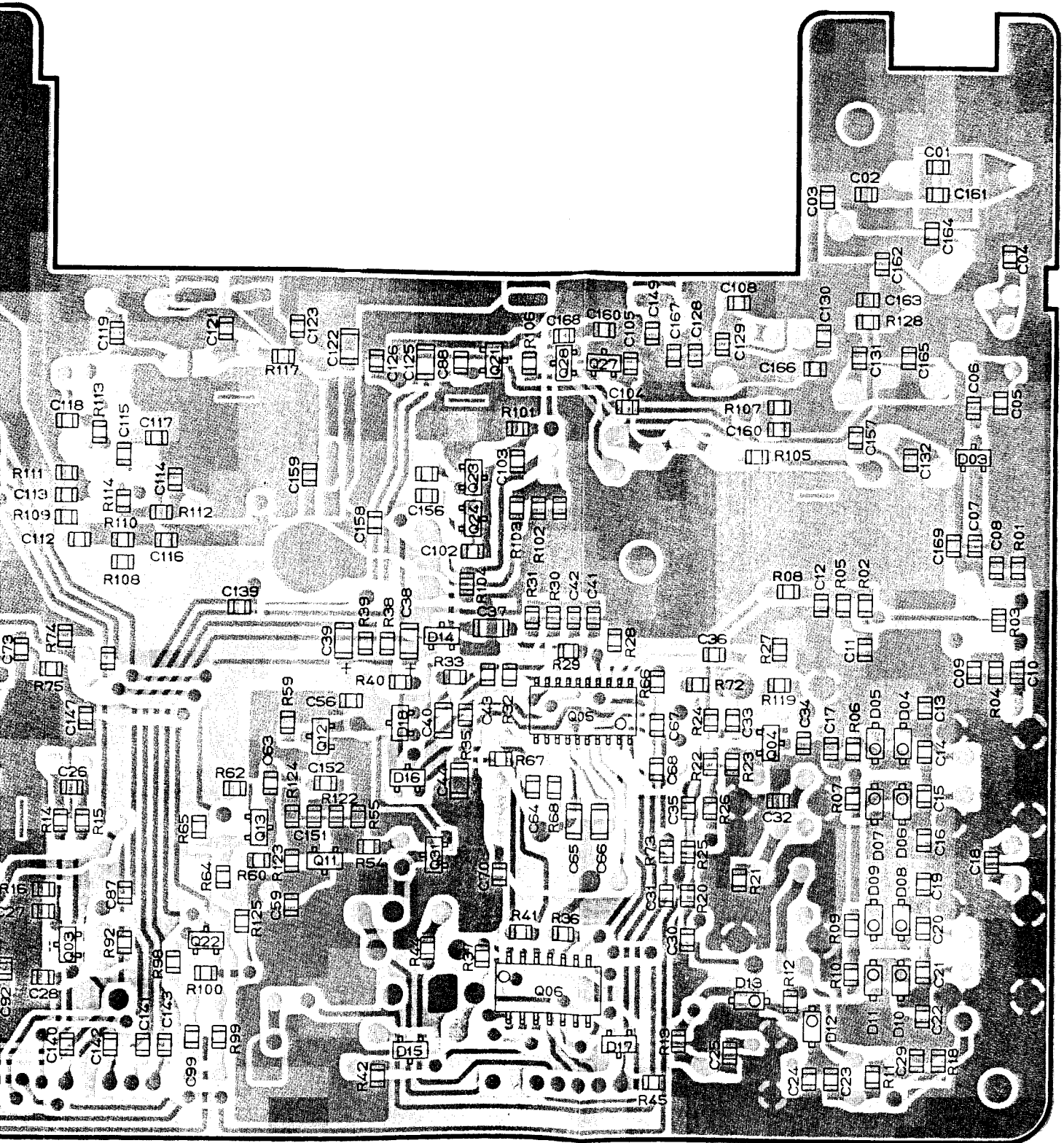
PD4094BC(Q1008)  
MC145158P(Q1019)



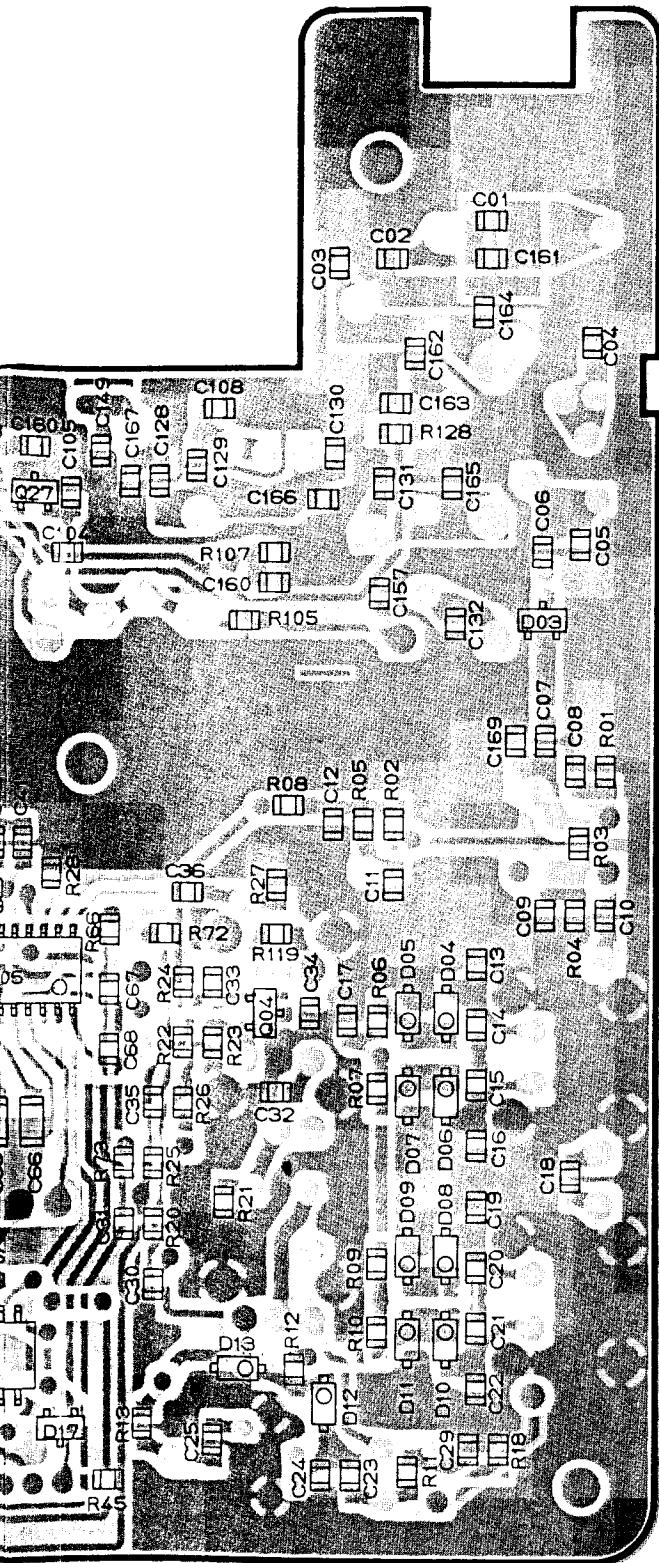
# VHF MAIN UNIT PARTS LAYOUT



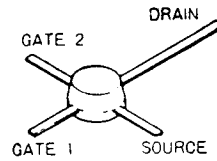
# TS LAYOUT



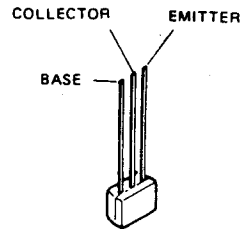
reverse view of "chip-only" side



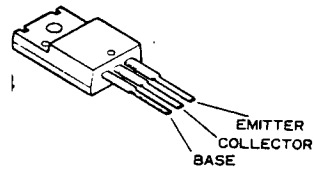
reverse view of "chip-only" side



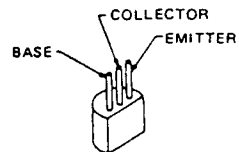
3SK81 (Q1002)  
3SK122L(Q1001)



BA1A4M(Q1031)

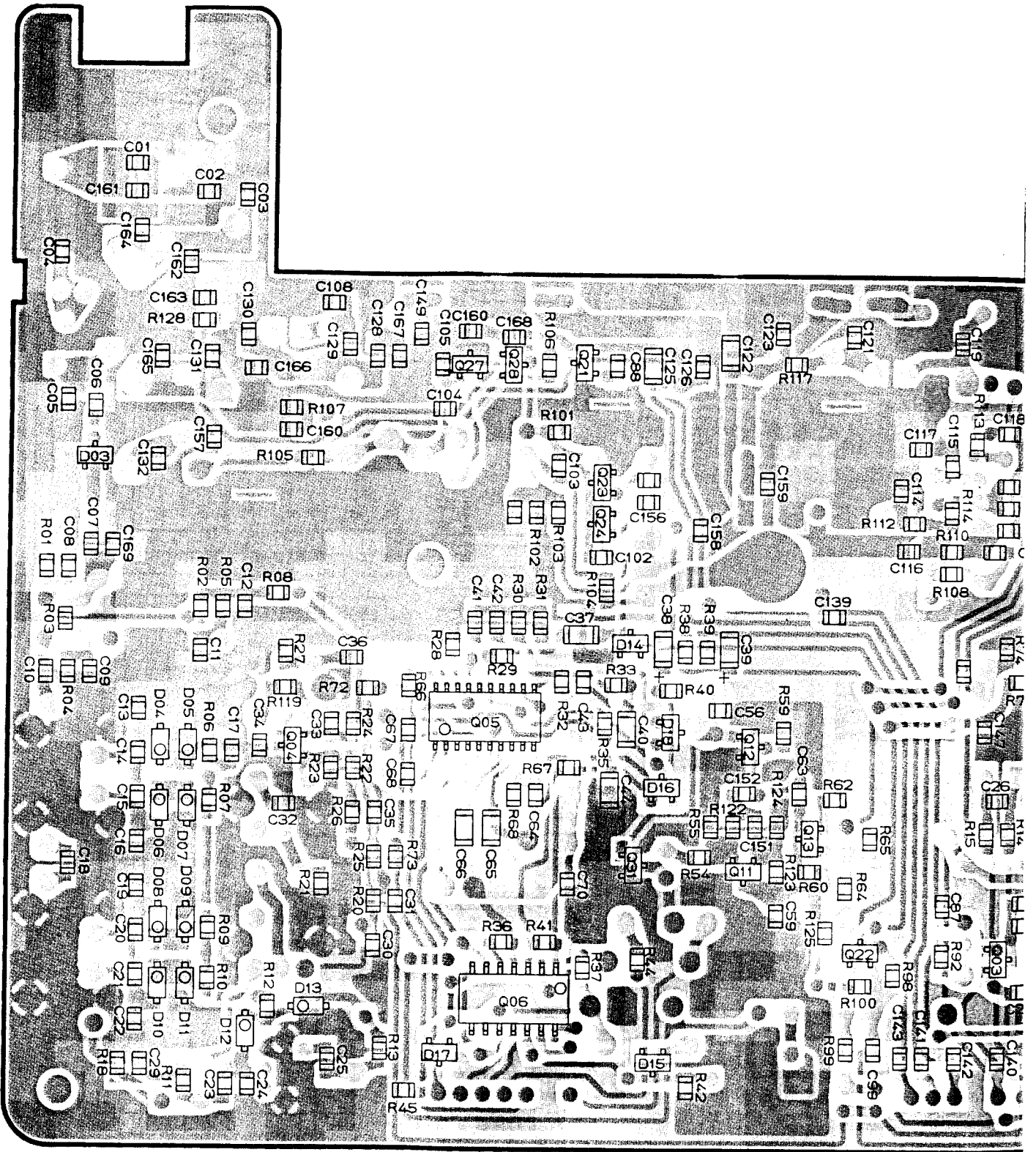


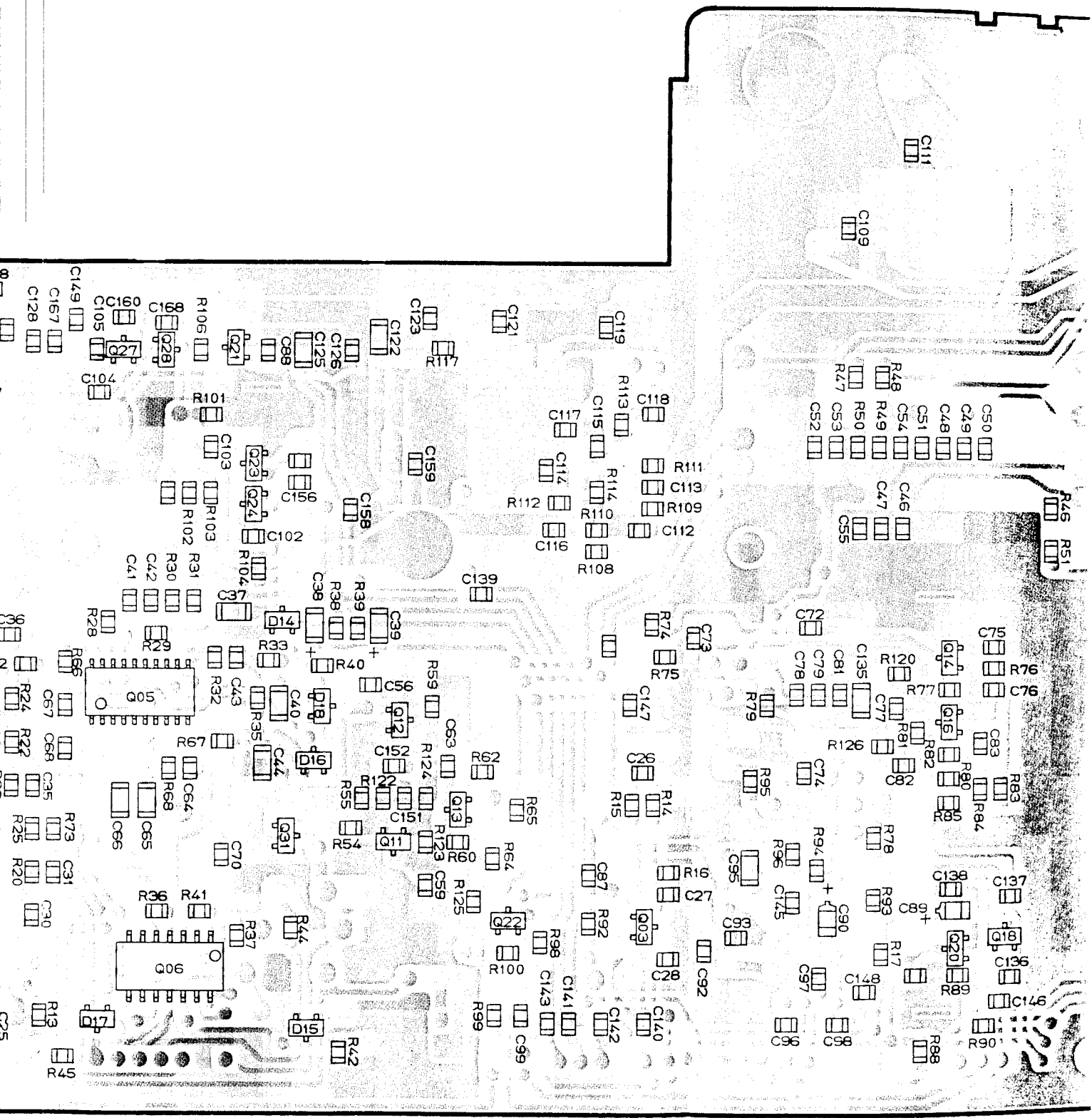
2SB1134R(Q1026)



2SC945AP(Q1025)

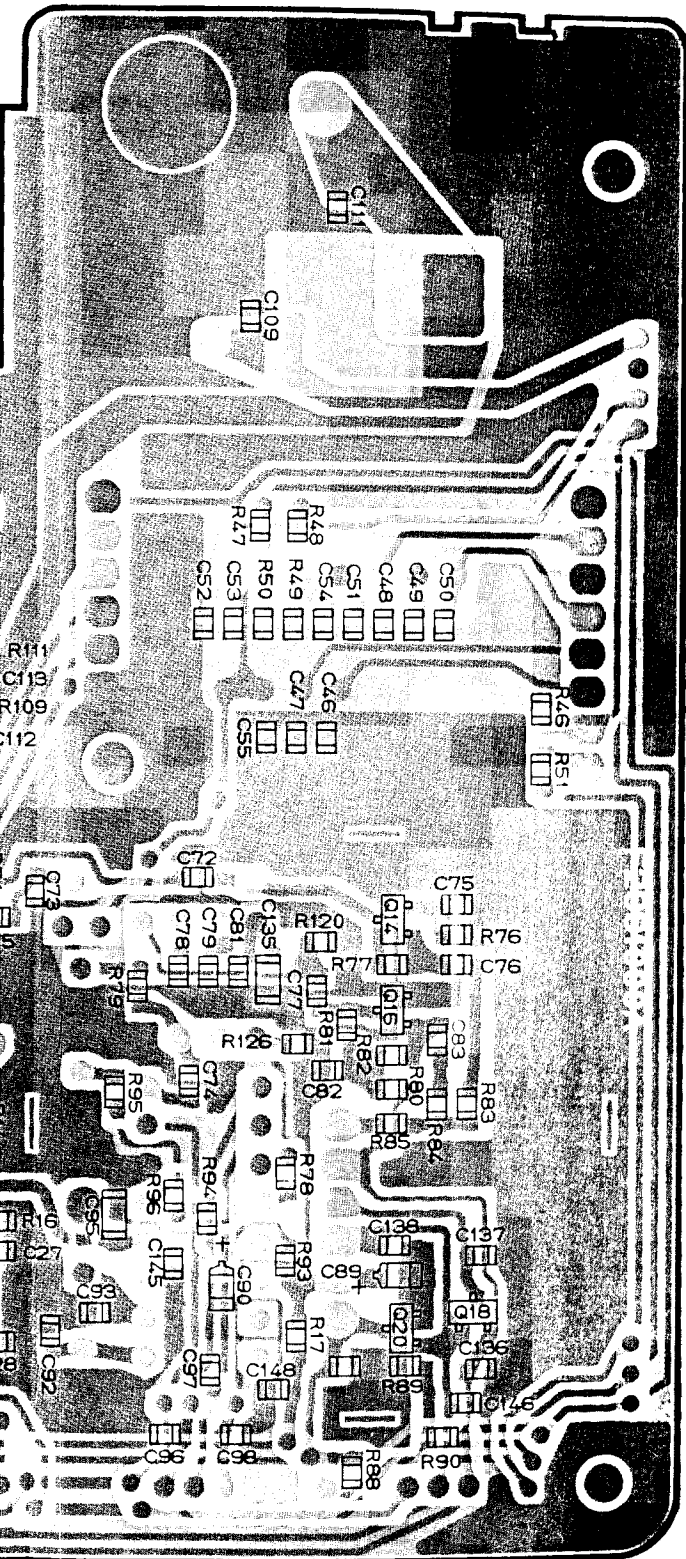




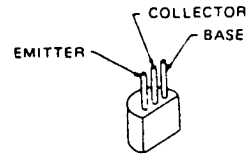


reverse view of "chip-only"

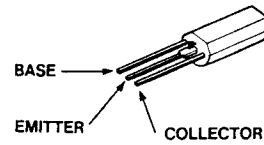
# VHF MAIN UNIT PARTS LAYOUT



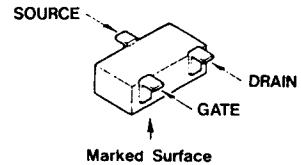
reverse view of "chip-only" side



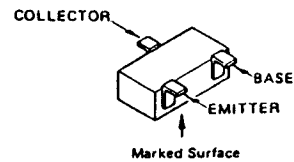
2SC2538(Q1030)



2SC3355(Q1029)

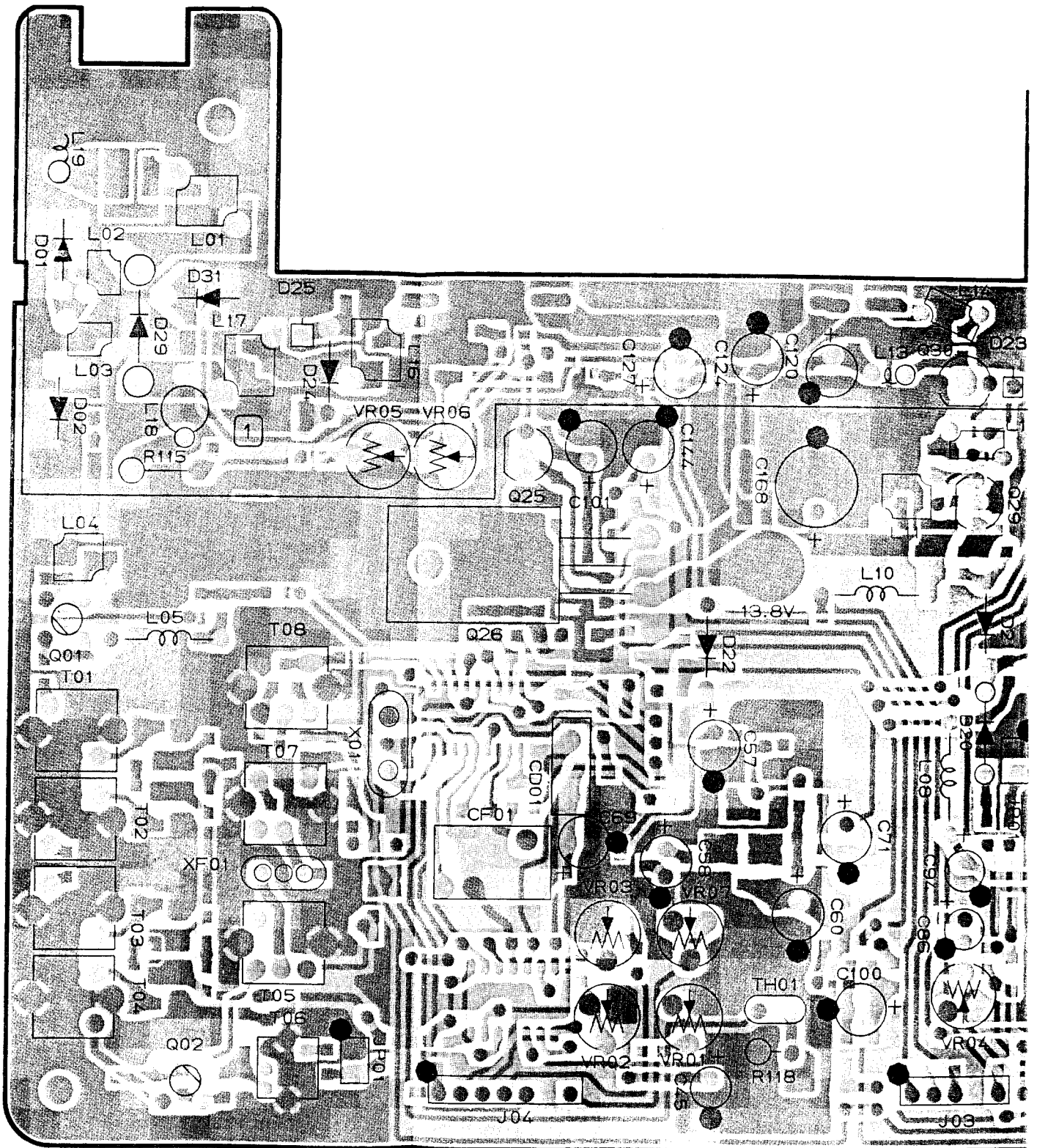


2SK302GR(TG) (Q1003)



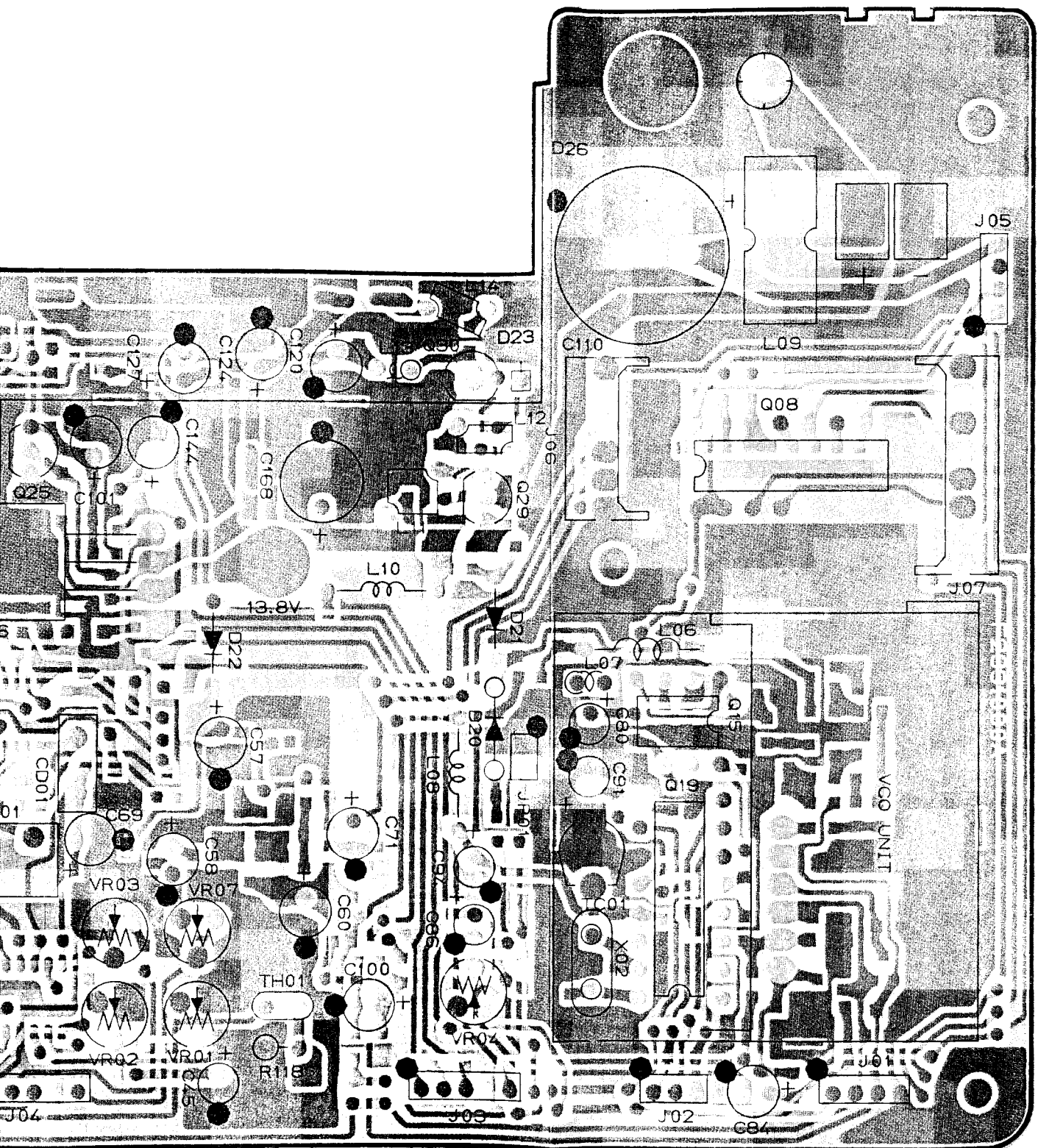
FA1A4M(L33)  
 (Q1012, 1020, 1021)  
 1023, 1024  
 2SA1162GR(SG)  
 (Q1022, 1027, 1028)  
 2SC2620(QB) (Q1004)  
 2SC2712(LG)  
 (Q1011, 1013)  
 2SC3356(R24)  
 (Q1014, 1016)

# VHF MAIN UNIT PARTS LAYOUT

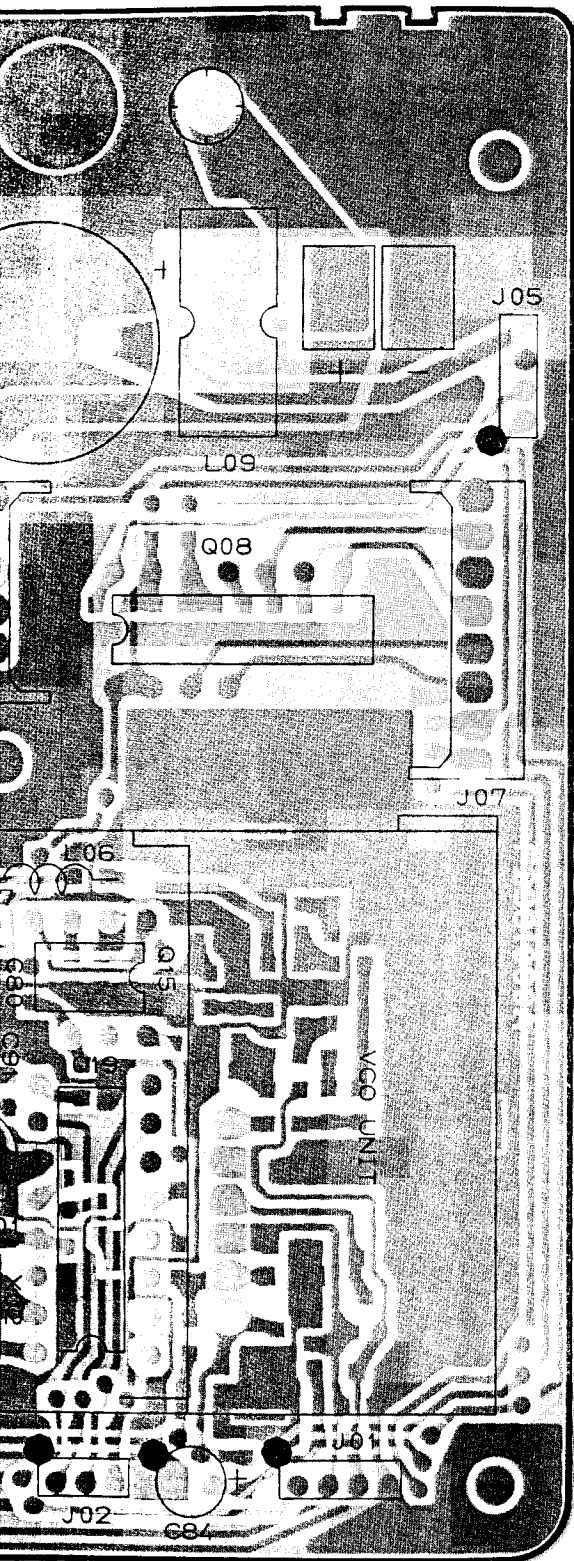




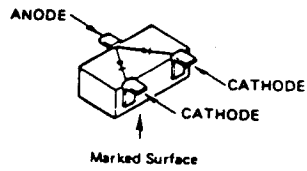
# S LAYOUT



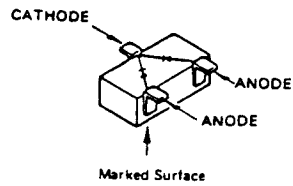
obverse view of "component" side



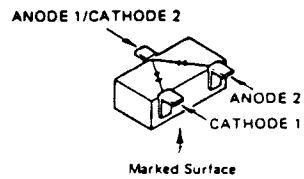
obverse view of "component" side



1SS181(A3) (D1017)



1SS184(B3)  
(D1015, 1016, 1018)

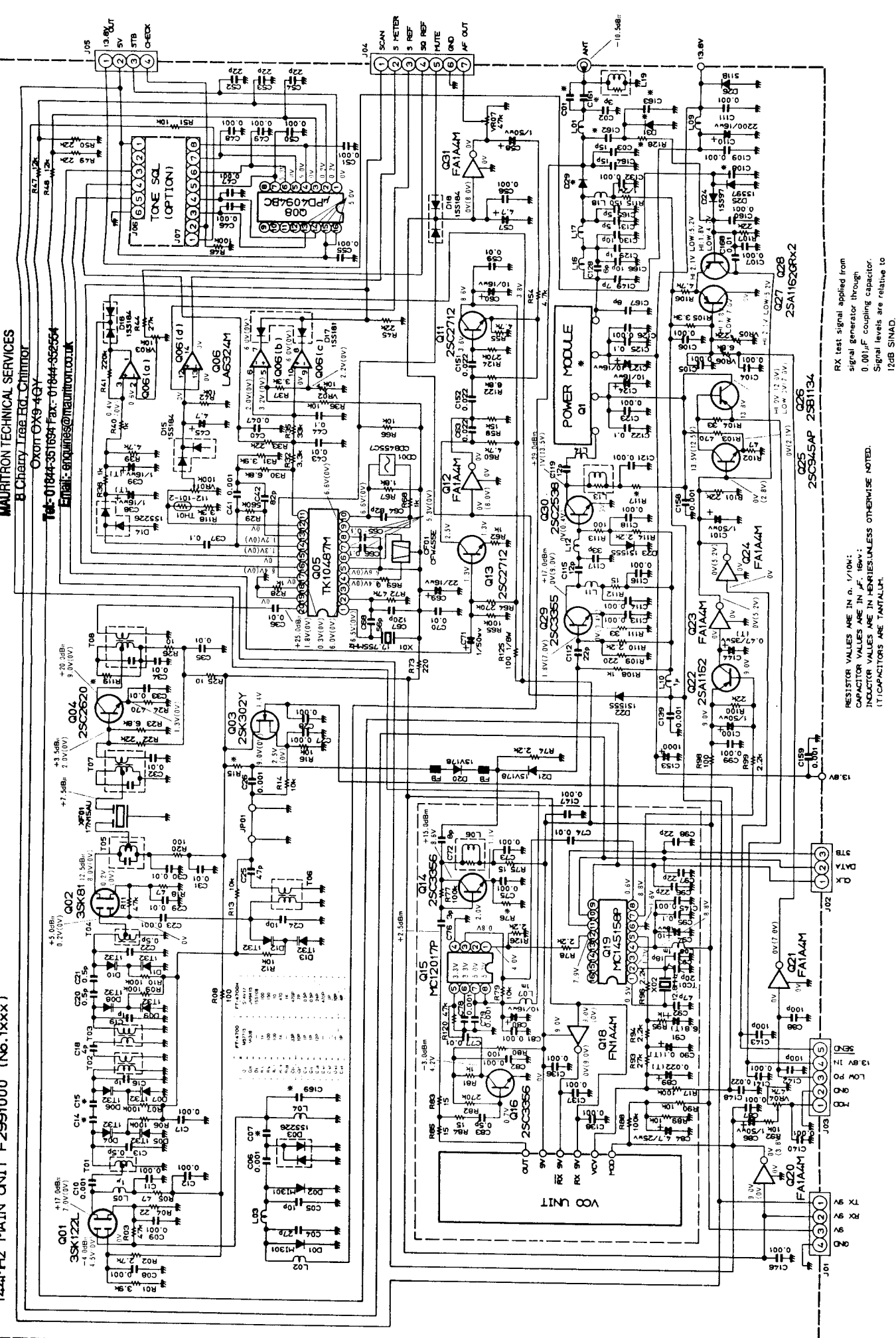


1SS226(C3)  
(D1003, 1014)

# VHF MAIN UNIT CIRCUIT DIAGRAM

For Service Manuals Contact  
**MAURITRON TECHNICAL SERVICES**  
 8 Cherry Lane Rd. Chittinor  
 Oxnard CA 91320  
**Tel: 01844-351634 Fax: 01844-352564**  
**Email: enquiries@mairitron.co.uk**

144MHz MAIN UNIT F2991000 (No.1xxx)



RX test signal applied from  
 signal generator through  
 0.001µF coupling capacitor.  
 Signal levels are relative to  
 12dB SINAD.

RESISTOR VALUES ARE IN Ω, 1/10Ω,  
 CAPACITOR VALUES ARE IN pF, 100pF,  
 INDUCTOR VALUES ARE IN HENRIES, UNLESS OTHERWISE NOTED.  
 (1) CAPACITORS ARE TANTALUM.

# VHF MAIN UNIT PARTS LIST

\*\*\* 144 MAIN UNIT \*\*\*

C029910AE PCB with Components, with VCO, without Q1,  
for Vers. A, B, C, D & H

F2991000B Printed Circuit Board

Q1001	G4801220L	FET	3SK122L
Q1002	G4800810	FET	3SK81
Q1003	G3802410Y	FET	2SK241Y TE85R
Q1004	G3326207B	Transistor	2SC2620QB-TR
Q1005	G1090859	IC	TK10487M
Q1006	G1090559	IC	LA6324M
Q1008	G1090297	IC	uPD4094BC
Q1011	G3327127G	Transistor	2SC2712GR TE85R
Q1012	G3070001	Transistor	FA1A4M-T2B
Q1013	G3327127G	Transistor	2SC2712GR TE85R
Q1014	G3333567	Transistor	2SC3356
Q1015	G1090725	IC	MC12017P
Q1016	G3333567	Transistor	2SC3356
Q1018	G3070005	Transistor	FN1A4M-T2B
Q1019	G1090648	IC	MC145158P
Q1020	G3070001	Transistor	FA1A4M-T2B
Q1021	G3327127G	Transistor	2SC2712GR TE85R
Q1022	G3111627G	Transistor	2SA1162GR TE85R
Q1023	G3070001	Transistor	FA1A4M-T2B
Q1024	G3070001	Transistor	FA1A4M-T2B
Q1025	G3309451P	Transistor	2SC945AP
Q1026	G3211340R	Transistor	2SB1134R
Q1027	G3111627G	Transistor	2SA1162GR TE85R
Q1028	G3111627G	Transistor	2SA1162GR TE85R
Q1029	G3333550	Transistor	2SC3355
Q1030	G3325380	Transistor	2SC2538
Q1031	G3070001	Transistor	BA1A4M-T2B
D1001	G2090033	Diode	MI301
D1002	G2090033	Diode	MI301
	S6000138	Diode Insulators	
D1003	G2070003	Diode	1SS226 TE85R
D1004	G2070035	Diode	1T32-T8
D1005	G2070035	Diode	1T32-T8
D1006	G2070035	Diode	1T32-T8
D1007	G2070035	Diode	1T32-T8
D1008	G2070035	Diode	1T32-T8
D1009	G2070035	Diode	1T32-T8
D1010	G2070035	Diode	1T32-T8
D1011	G2070035	Diode	1T32-T8
D1012	G2070035	Diode	1T32-T8
D1013	G2070035	Diode	1T32-T8
D1014	G2070003	Diode	1SS226 TE85R
D1015	G2070009	Diode	1SS184 TE85R
D1016	G2070009	Diode	1SS184 TE85R
D1017	G2070001	Diode	1SS181 TE85R
D1018	G2070009	Diode	1SS184 TE85R
D1020	G2090344	Diode	1SV178
D1021	G2090344	Diode	1SV178
D1022	G2015550	Diode	1S1555
D1023	G2015550	Diode	1S1555
D1024	G2090118	Diode	1SS97
D1025	G2090118	Diode	1SS97
D1029	G2090425	Diode	UM9415



# VHF MAIN UNIT PARTS LIST

X1001	H0102909	Crystal	HC/49T	17.755MHz
X1002	H0102804	Crystal	HC/49T	12.8MHz
XF1001	H1102143	Crystal Filter	17N15AU	
GF1001	H3900394	Ceramic Filter	KBF-455R-15R	
CD1001	H7900180	Ceramic Discriminator	CDB455C7	
TH1001	G9090020	Thermistor	112-101-2	100 Ohm
R1001	J24205392	Chip Res.	3.9k Ohm	1/10W
R1002	J24205272	Chip Res.	2.7k Ohm	1/10W
R1003	J24205473	Chip Res.	47k Ohm	1/10W
R1004	J24205220	Chip Res.	22 Ohm	1/10W
R1005	J24205470	Chip Res.	47 Ohm	1/10W
R1006	J24205104	Chip Res.	100k Ohm	1/10W
R1007	J24205104	Chip Res.	100k Ohm	1/10W
R1008	J24205101	Chip Res.	100 Ohm	1/10W
R1009	J24205104	Chip Res.	100k Ohm	1/10W
R1010	J24205104	Chip Res.	100k Ohm	1/10W
R1011	J24205473	Chip Res.	47k Ohm	1/10W
R1012	J24205103	Chip Res.	10k Ohm	1/10W
R1013	J24205103	Chip Res.	10k Ohm	1/10W
R1014	J24205103	Chip Res.	10k Ohm	1/10W
R1015	J24204102	Chip Res.	1k Ohm	1/10W
R1016	J24205103	Chip Res.	10k Ohm	1/10W
R1017	J24205104	Chip Res.	100k Ohm	1/10W
R1018	J24205470	Chip Res.	47 Ohm	1/10W
R1020	J24205101	Chip Res.	100 Ohm	1/10W
R1022	J24205223	Chip Res.	22k Ohm	1/10W
R1023	J24205682	Chip Res.	6.8k Ohm	1/10W
R1024	J24205471	Chip Res.	470 Ohm	1/10W
R1025	J24205100	Chip Res.	10 Ohm	1/10W
R1026	J24205100	Chip Res.	10 Ohm	1/10W
R1028	J24205102	Chip Res.	1k Ohm	1/10W
R1029	J24205564	Chip Res.	560k Ohm	1/10W
R1030	J24205682	Chip Res.	5.6k Ohm	1/10W
R1031	J24205392	Chip Res.	3.9k Ohm	1/10W
R1032	J24205332	Chip Res.	3.3k Ohm	1/10W
R1033	J24205223	Chip Res.	22k Ohm	1/10W
R1035	J24205333	Chip Res.	33k Ohm	1/10W
R1036	J24205103	Chip Res.	10k Ohm	1/10W
R1037	J24205332	Chip Res.	3.3k Ohm	1/10W
R1038	J24205102	Chip Res.	1k Ohm	1/10W
R1039	J24205472	Chip Res.	4.7k Ohm	1/10W
R1040	J24205102	Chip Res.	1k Ohm	1/10W
R1041	J24205224	Chip Res.	220k Ohm	1/10W
R1042	J24205103	Chip Res.	10k Ohm	1/10W
R1044	J24205273	Chip Res.	27k Ohm	1/10W
R1045	J24205223	Chip Res.	22k Ohm	1/10W
R1046	J24205104	Chip Res.	100k Ohm	1/10W
R1047	J24205123	Chip Res.	12k Ohm	1/10W
R1048	J24205123	Chip Res.	12k Ohm	1/10W
R1049	J24205223	Chip Res.	22k Ohm	1/10W
R1050	J24205223	Chip Res.	22k Ohm	1/10W
R1051	J24205103	Chip Res.	10k Ohm	1/10W
R1054	J24205472	Chip Res.	4.7k Ohm	1/10W
R1055	J24205472	Chip Res.	15k Ohm	1/10W
R1059	J24205153	Chip Res.	15k Ohm	1/10W
R1060	J24205332	Chip Res.	3.3k Ohm	1/10W
R1062	J24205331	Chip Res.	330 Ohm	1/10W

# VHF MAIN UNIT PARTS LIST

R1066	J24205103	Chip Res.	10k Ohm	1/10W
R1067	J24205182	Chip Res.	1.8k Ohm	1/10W
R1068	J24205102	Chip Res.	1k Ohm	1/10W
R1072	J24205473	Chip Res.	47k Ohm	1/10W
R1073	J24205221	Chip Res.	220 Ohm	1/10W
R1074	J24205222	Chip Res.	2.2k Ohm	1/10W
R1075	J24205150	Chip Res.	15 Ohm	1/10W
R1076	J24205101	Chip Res.	100 Ohm	1/10W
R1077	J24205104	Chip Res.	100k Ohm	1/10W
R1078	J24205222	Chip Res.	2.2k Ohm	1/10W
R1079	J24205103	Chip Res.	10k Ohm	1/10W
R1080	J24205101	Chip Res.	100 Ohm	1/10W
R1081	J24205102	Chip Res.	1k Ohm	1/10W
R1083	J24205150	Chip Res.	15 Ohm	1/10W
R1084	J24205150	Chip Res.	15 Ohm	1/10W
R1085	J24205150	Chip Res.	15 Ohm	1/10W
R1088	J24205104	Chip Res.	100k Ohm	1/10W
R1089	J24205103	Chip Res.	10k Ohm	1/10W
R1090	J24205103	Chip Res.	10k Ohm	1/10W
R1092	J24205103	Chip Res.	10k Ohm	1/10W
R1093	J24205273	Chip Res.	27k Ohm	1/10W
R1094	J24205222	Chip Res.	2.2k Ohm	1/10W
R1095	J24205102	Chip Res.	1k Ohm	1/10W
R1096	J24205222	Chip Res.	2.2k Ohm	1/10W
R1098	J24205101	Chip Res.	100 Ohm	1/10W
R1099	J24205222	Chip Res.	2.2k Ohm	1/10W
R1100	J24205223	Chip Res.	22k Ohm	1/10W
R1102	J24205101	Chip Res.	100 Ohm	1/10W
R1103	J24205471	Chip Res.	470 Ohm	1/10W
R1104	J24205472	Chip Res.	4.7k Ohm	1/10W
R1105	J24205332	Chip Res.	3.3k Ohm	1/10W
R1106	J24205102	Chip Res.	1k Ohm	1/10W
R1107	J24205103	Chip Res.	10k Ohm	1/10W
R1108	J24205102	Chip Res.	1k Ohm	1/10W
R1109	J24205221	Chip Res.	220 Ohm	1/10W
R1110	J24205332	Chip Res.	3.3k Ohm	1/10W
R1111	J24205330	Chip Res.	33 Ohm	1/10W
R1112	J24205150	Chip Res.	15 Ohm	1/10W
R1113	J24205101	Chip Res.	100 Ohm	1/10W
R1114	J24205222	Chip Res.	2.2k Ohm	1/10W
R1115	J01275151	Carbon Film Res.	150 Ohm	1/2W
R1116	J01245563	Carbon Film Res.	56k Ohm	1/4W
R1117	J24205100	Chip Res.	10 Ohm	1/10W
R1118	J01215332	Carbon Film Res.	3.3k Ohm	1/8W
R1119	J24205561	Chip Res.	560 Ohm	1/10W
R1120	J24205473	Chip Res.	47k Ohm	1/10W
R1122	J24205682	Chip Res.	6.8k Ohm	1/10W
R1123	J24205224	Chip Res.	220k Ohm	1/10W
R1124	J24205274	Chip Res.	270k Ohm	1/10W
R1125	J24205101	Chip Res.	100 Ohm	1/10W
R1126	J24205222	Chip Res.	2.2k Ohm	1/10W
R1127	J01225334	Carbon Film Res.	330k Ohm	1/6W
R1128	J24205102	Chip Res.	1k Ohm	1/10W
R1130	J24205101	Chip Res.	100 Ohm	1/10W
R1131	J24205222	Chip Res.	2.2k Ohm	1/10W
R1132	J01245681	Carbon Film Res.	680 Ohm	1/4W
R1133	J01215102	Carbon Film Res.	1k Ohm	1/8W
VR1001	J51745104	Potentiometer	100k Ohm	
VR1002	J51745103	Potentiometer	10k Ohm	
VR1003	J51745103	Potentiometer	10k Ohm	
VR1004	J51745473	Potentiometer	47k Ohm	

# VHF MAIN UNIT PARTS LIST

VR1005	J51745223	Potentiometer	22k Ohm		
VR1006	J51745682	Potentiometer	6.8k Ohm		
VR1007	J51745473	Potentiometer	47k Ohm		
C1001	K22170251	Chip Cap.	470pF	50V	CH
C1002	K22170204	Chip Cap.	3pF	50V	CH
C1003	K22170217	Chip Cap.	18pF	50V	CH
C1004	K22170221	Chip Cap.	27pF	50V	CH
C1005	K22170211	Chip Cap.	10pF	50V	CH
C1006	K22170805	Chip Cap.	0.001uF	50V	B
C1007	K22170211	Chip Cap.	10pF	50V	CH
C1008	K22170805	Chip Cap.	0.001uF	50V	B
C1009	K22170805	Chip Cap.	0.001uF	50V	B
C1010	K22170805	Chip Cap.	0.001uF	50V	B
C1011	K22170805	Chip Cap.	0.001uF	50V	B
C1012	K22170805	Chip Cap.	0.001uF	50V	B
C1013	K22170201	Chip Cap.	0.5pF	50V	CH
C1014	K22170202	Chip Cap.	1pF	50V	CH
C1015	K22170202	Chip Cap.	1pF	50V	CH
C1016	K22170202	Chip Cap.	1pF	50V	CH
C1017	K22170805	Chip Cap.	0.001uF	50V	B
C1018	K22170205	Chip Cap.	4pF	50V	CH
C1019	K22170202	Chip Cap.	1pF	50V	CH
C1020	K22170201	Chip Cap.	0.5pF	50V	CH
C1021	K22170201	Chip Cap.	0.5pF	50V	CH
C1022	K22170201	Chip Cap.	0.5pF	50V	CH
C1023	K22170805	Chip Cap.	0.001uF	50V	B
C1025	K22170227	Chip Cap.	47pF	50V	CH
C1026	K22170805	Chip Cap.	0.001uF	50V	B
C1027	K22170805	Chip Cap.	0.001uF	50V	B
C1028	K22170805	Chip Cap.	0.001uF	50V	B
C1029	K22170817	Chip Cap.	0.01uF	50V	B
C1030	K22170817	Chip Cap.	0.01uF	50V	B
C1031	K22170817	Chip Cap.	0.01uF	50V	B
C1032	K22170817	Chip Cap.	0.01uF	50V	B
C1033	K22170817	Chip Cap.	0.01uF	50V	B
C1034	K22170817	Chip Cap.	0.01uF	50V	B
C1035	K22170817	Chip Cap.	0.01uF	50V	B
C1036	K22170817	Chip Cap.	0.01uF	50V	B
C1037	K22141809	Chip Cap.	0.1uF	25V	B
C1038	K78120009	Tantalum Chip Cap.	1uF	16V	
C1039	K78120009	Tantalum Chip Cap.	1uF	16V	
C1040	K22141808	Chip Cap.	0.047uF	25V	B
C1041	K22170805	Chip Cap.	0.001uF	50V	B
C1042	K22170233	Chip Cap.	82pF	50V	CH
C1043	K22170817	Chip Cap.	0.01uF	50V	B
C1044	K22141809	Chip Cap.	0.1uF	25V	B
C1045	K40149001	Al Electro Cap.	4.7uF	25V	
C1046	K22170805	Chip Cap.	0.001uF	50V	B
C1047	K22170805	Chip Cap.	0.001uF	50V	B
C1048	K22170805	Chip Cap.	0.001uF	50V	B
C1049	K22170805	Chip Cap.	0.001uF	50V	B
C1050	K22170805	Chip Cap.	0.001uF	50V	B
C1051	K22170805	Chip Cap.	0.001uF	50V	B
C1052	K22170219	Chip Cap.	22pF	50V	CH
C1053	K22170219	Chip Cap.	22pF	50V	CH
C1054	K22170219	Chip Cap.	22pF	50V	CH
C1055	K22170805	Chip Cap.	0.001uF	50V	B
C1056	K22170805	Chip Cap.	0.001uF	50V	B
C1057	K40149001	Al Electro Cap.	4.7uF	25V	
C1058	K40149013	Al Electro Cap.	1uF	25V	
C1059	K22170817	Chip Cap.	0.01uF	50V	B

# VHF MAIN UNIT PARTS LIST

C1060	K40129004	Al Electro Cap.	10uF	16V	
C1063	K22140807	Chip Cap.	0.022uF	25V	B
C1064	K22170233	Chip Cap.	82pF	50V	CH
C1065	K22141809	Chip Cap.	0.1uF	25V	B
C1066	K22141809	Chip Cap.	0.1uF	25V	B
C1067	K22170237	Chip Cap.	120pF	50V	CH
C1068	K22170229	Chip Cap.	56pF	50V	CH
C1069	K40129016	Al Electro Cap.	22uF	16V	
C1070	K22170817	Chip Cap.	0.01uF	50V	B
C1071	K40179013	Al Electro Cap.	1uF	50V	
C1072	K22170209	Chip Cap.	8pF	50V	CH
C1073	K22170805	Chip Cap.	0.001uF	50V	B
C1074	K22170817	Chip Cap.	0.01uF	50V	B
C1075	K22170805	Chip Cap.	0.001uF	50V	B
C1076	K22170204	Chip Cap.	3pF	50V	CH
C1077	K22170817	Chip Cap.	0.01uF	50V	B
C1078	K22170805	Chip Cap.	0.001uF	50V	B
C1079	K22170805	Chip Cap.	0.001uF	50V	B
C1080	K40129012	Al Electro Cap.	10uF	16V	
C1081	K22170817	Chip Cap.	0.01uF	50V	B
C1082	K22170805	Chip Cap.	0.001uF	50V	B
C1083	K22170201	Chip Cap.	0.5pF	50V	CH
C1084	K40149001	Al Electro Cap.	4.7uF	25V	
C1086	K40179013	Al Electro Cap.	1uF	50V	
C1087	K22170805	Chip Cap.	0.001uF	50V	B
C1088	K22170235	Chip Cap.	100pF	50V	CH
C1089	K78160021	Tantalum Chip Cap.	0.022uF	35V	
C1090	K78160025	Tantalum Chip Cap.	0.1uF	35V	
C1091	K70127685	Tantalum Cap.	6.8uF	16V	
C1092	K22170227	Chip Cap.	47pF	50V	CH
C1093	K22170217	Chip Cap.	18pF	50V	CH
C1094	K40129004	Al Electro Cap.	10uF	16V	
C1095	K22141809	Chip Cap.	0.1uF	25V	B
C1096	K22170219	Chip Cap.	22pF	50V	CH
C1097	K22170219	Chip Cap.	22pF	50V	CH
C1098	K22170219	Chip Cap.	22pF	50V	CH
C1099	K22170805	Chip Cap.	0.001uF	50V	B
C1100	K40179013	Al Electro Cap.	1uF	50V	
C1101	K40179013	Al Electro Cap.	1uF	50V	
C1104	K22170805	Chip Cap.	0.001uF	50V	B
C1105	K22170805	Chip Cap.	0.001uF	50V	B
C1107	K22170805	Chip Cap.	0.001uF	50V	B
C1108	K22170220	Chip Cap.	24pF	50V	CH
C1109	K22170805	Chip Cap.	0.001uF	50V	B
C1110	K40129050	Al Electro Cap.	2200uF	16V	
C1111	K22170805	Chip Cap.	0.001uF	50V	B
C1112	K22170219	Chip Cap.	22pF	50V	CH
C1113	K22170805	Chip Cap.	0.001uF	50V	B
C1114	K22170805	Chip Cap.	0.001uF	50V	B
C1115	K22170213	Chip Cap.	12pF	50V	CH
C1116	K22170805	Chip Cap.	0.001uF	50V	B
C1117	K22170223	Chip Cap.	33pF	50V	CH
C1118	K22170805	Chip Cap.	0.001uF	50V	B
C1119	K22170213	Chip Cap.	12pF	50V	CH
C1121	K22170805	Chip Cap.	0.001uF	50V	B
C1122	K22141809	Chip Cap.	0.1uF	25V	B
C1123	K22170805	Chip Cap.	0.001uF	50V	B
C1124	K40129004	Al Electro Cap.	10uF	16V	
C1125	K22141809	Chip Cap.	0.1uF	25V	B
C1126	K22170805	Chip Cap.	0.001uF	50V	B
C1127	K40129004	Al Electro Cap.	10uF	16V	
C1128	K22170207	Chip Cap.	6pF	50V	CH

# VHF MAIN UNIT PARTS LIST

C1129	K22170202	Chip Cap.	1pF	50V	CH
C1130	K22170211	Chip Cap.	10pF	50V	CH
C1131	K22170206	Chip Cap.	7pF	50V	CH
C1132	K22170805	Chip Cap.	0.001uF	50V	B
C1135	K22141809	Chip Cap.	0.01uF	25V	B
C1136	K22170805	Chip Cap.	0.001uF	50V	B
C1137	K22170805	Chip Cap.	0.001uF	50V	B
C1138	K22170805	Chip Cap.	0.001uF	50V	B
C1139	K22170805	Chip Cap.	0.001uF	50V	B
C1140	K22170805	Chip Cap.	0.001uF	50V	B
C1141	K22170805	Chip Cap.	0.001uF	50V	B
C1142	K22170235	Chip Cap.	100pF	50V	CH
C1143	K22170235	Chip Cap.	100pF	50V	CH
C1144	K70167474	Tantalum Cap.	0.47uF	35V	
C1145	K22170805	Chip Cap.	0.001uF	50V	B
C1146	K22170805	Chip Cap.	0.001uF	50V	B
C1147	K22170805	Chip Cap.	0.001uF	50V	B
C1148	K22140807	Chip Cap.	0.022uF	25V	B
C1149	J22170208	Chip Cap.	7pF	50V	CH
C1151	K22140807	Chip Cap.	0.022uF	25V	B
C1152	K22140807	Chip Cap.	0.022uF	25V	B
C1153	K40129050	Al. Electro Cap.	1000uF	16V	
C1156	K22170805	Chip Cap.	0.001uF	50V	B
C1157	K22170805	Chip Cap.	0.001uF	50V	B
C1158	K22170805	Chip Cap.	0.001uF	50V	B
C1159	K22170805	Chip Cap.	0.001uF	50V	B
C1160	K22170805	Chip Cap.	0.001uF	50V	B
C1161	K22170251	Chip Cap.	470pF	50V	CH
C1162	K22170202	Chip Cap.	1pF	50V	CH
C1163	K22170211	Chip Cap.	10pF	50V	CH
C1164	K22170215	Chip Cap.	15pF	50V	CH
C1165	K22170206	Chip Cap.	5pF	50V	CH
C1166	K22170211	Chip Cap.	10pF	50V	CH
C1167	K22170209	Chip Cap.	8pF	50V	CH
C1168	K22170817	Chip Cap.	0.01uF	50V	B
C1169	K22170203	Chip Cap.	2pF	50V	CH
TC1001	K91000029	Trimmer Cap.	20pF		
L1001	L0021647	Coil			
L1002	L0020679	Coil			
L1003	L0020679	Coil			
L1004	L0021705	Coil			
L1005	L1190149	RFC	1uH		
L1006	L0020672	Coil			
L1007	L1190189	RFC	1mH		
L1008	L1190189	RFC	1mH		
L1009	L2190001	Toroidal			
L1010	L1190149	RFC	1uH		
L1011	L0021705	Coil			
L1012	L0021359	Coil			
L1013	L1020469	Coil			
L1014	L0021359	Coil			
L1016	L0021910	Coil			
L1017	L0021907	Coil			
L1018	L0021522	Coil			
L1019	L0020745B	Coil			
L1019	L0020889	Coil			
T1001	L0021702	Coil			
T1002	L0021703	Coil			
T1003	L0021703	Coil			

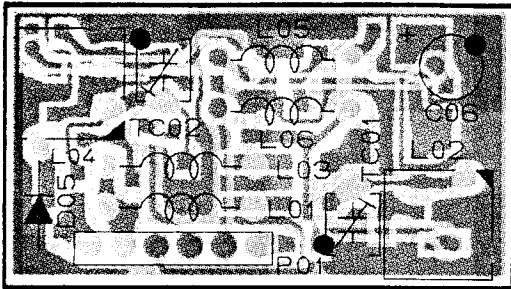
# VHF MAIN UNIT PARTS LIST

T1004	L0021702	Coil	
T1005	L0021533	Coil	
T1006	L0021418	Coil	
T1007	L0021533	Coil	
T1008	L0021533	Coil	
J1001	P0090611	Connector	SB20-04WS
J1002	P0090610	Connector	SB20-03WS
J1003	P0090612	Connector	SB20-05WS
J1004	P0090614	Connector	SB20-07WS
J1005	P0090611	Connector	SB20-04WS
J1006	P1090419	Connector	3024-06CHPB
J1007	P1090250	Connector	3024-08CHPB
	L9190001	Ferrite Beads	4A2 Ri 3x3-1
	R0122860	Shield Frame	
	R0122870A	Shield Cover	
	R0127720A	Shield Plate	
	R0111320	Ground Plate	
	R0125860	Ring	
	R0122230	Heatsink	

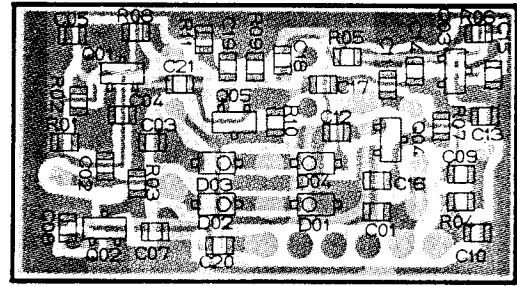
# NOTES

# VHF VCO UNIT PARTS LAYOUT/CIRCUIT DIAGRAM

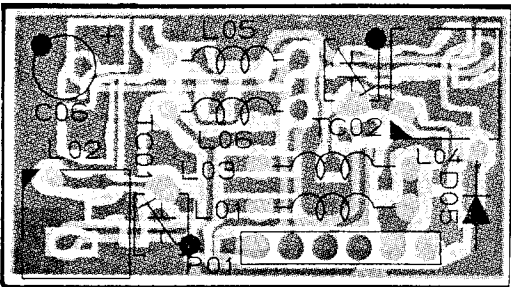
144MHz VCO UNIT(No.2 XXX)



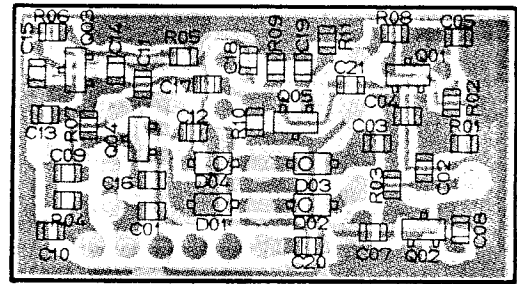
obverse view of "component" side



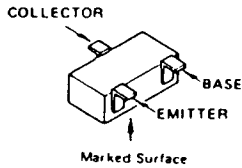
obverse view of "chip-only" side



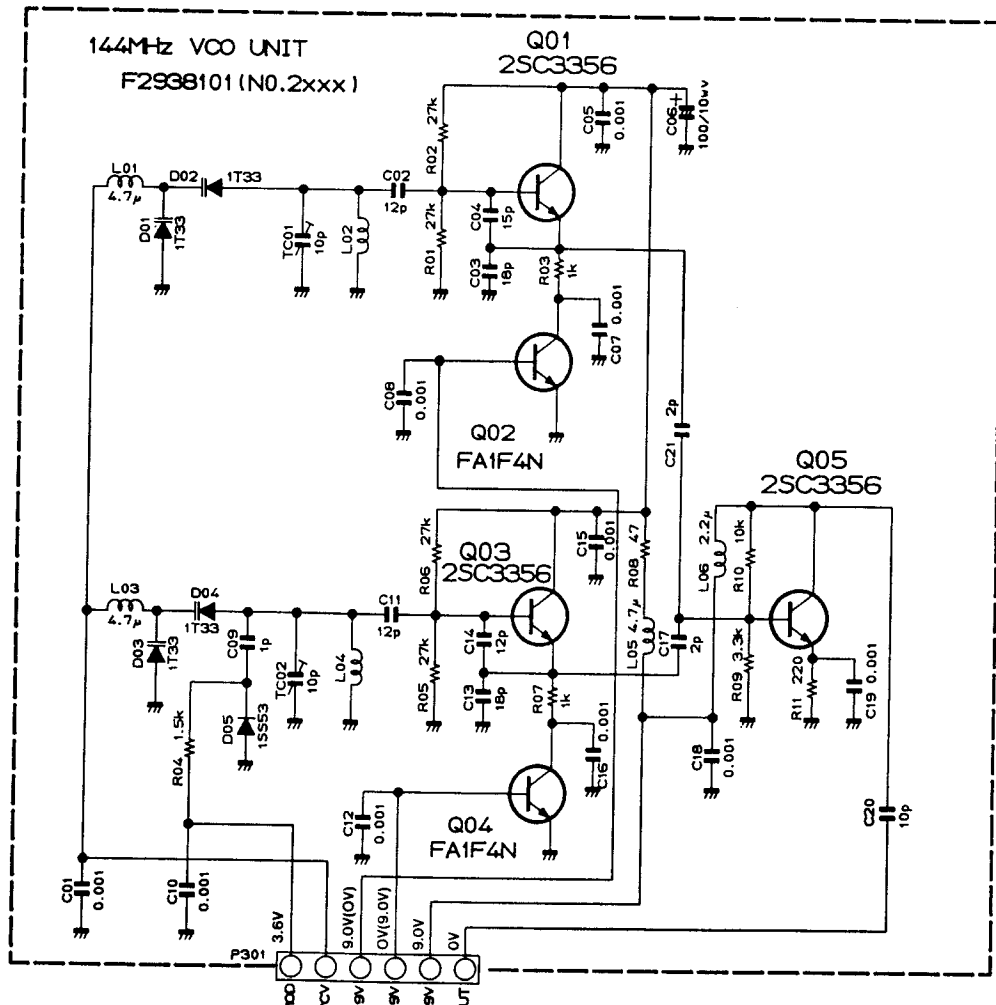
reverse view of "component" side



reverse view of "chip-only" side



- 2SC3356(R22)
- (Q2001, 2003, 2005)
- FA1F4N-T2B(R24)
- (Q2002, 2004)



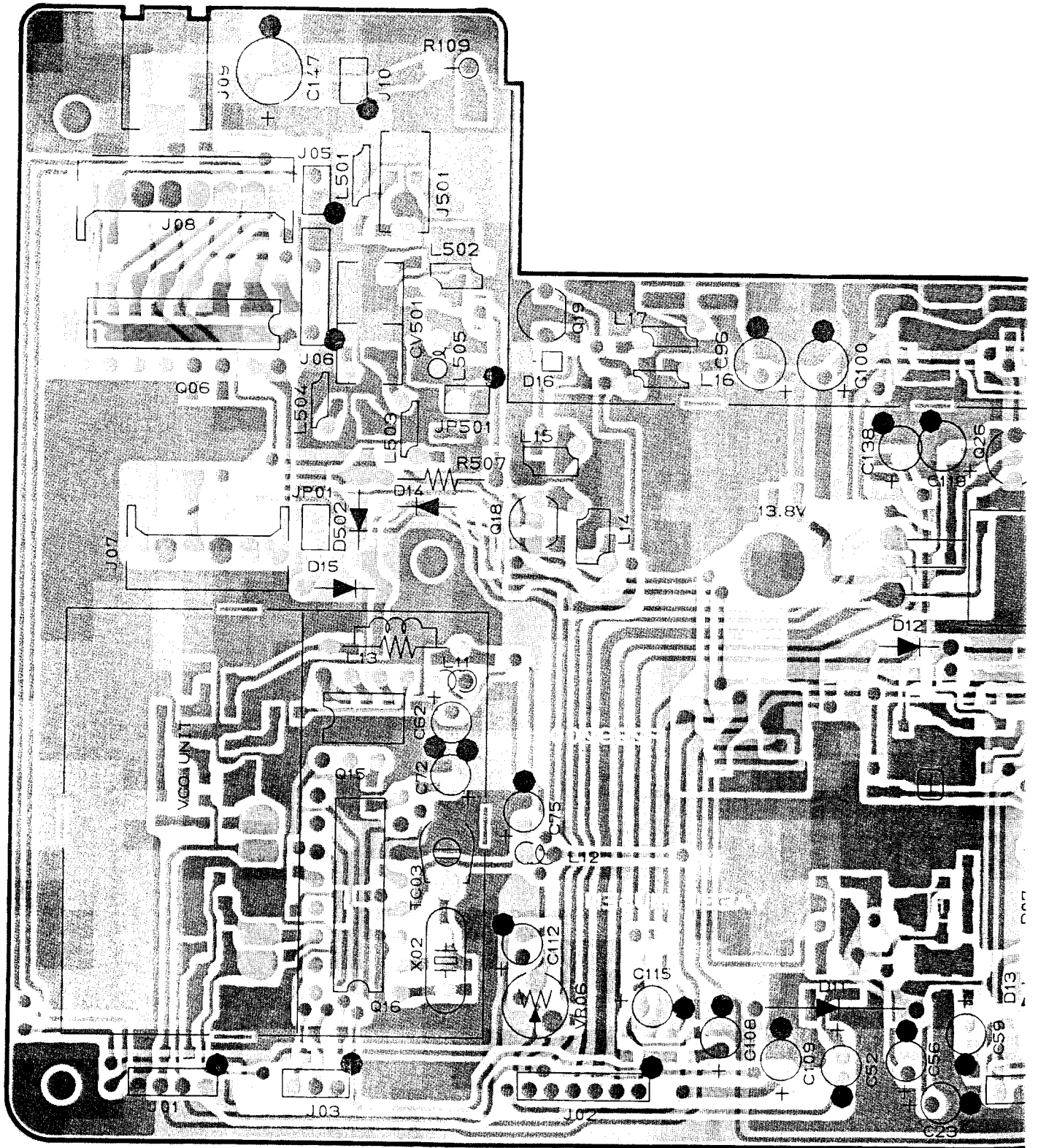
RESISTOR VALUES ARE IN  $\Omega$ , 1/10W  
CAPACITOR VALUES ARE IN  $\mu$ F, 50V:  
INDUCTOR VALUES ARE IN H; UNLESS OTHERWISE NOTED.

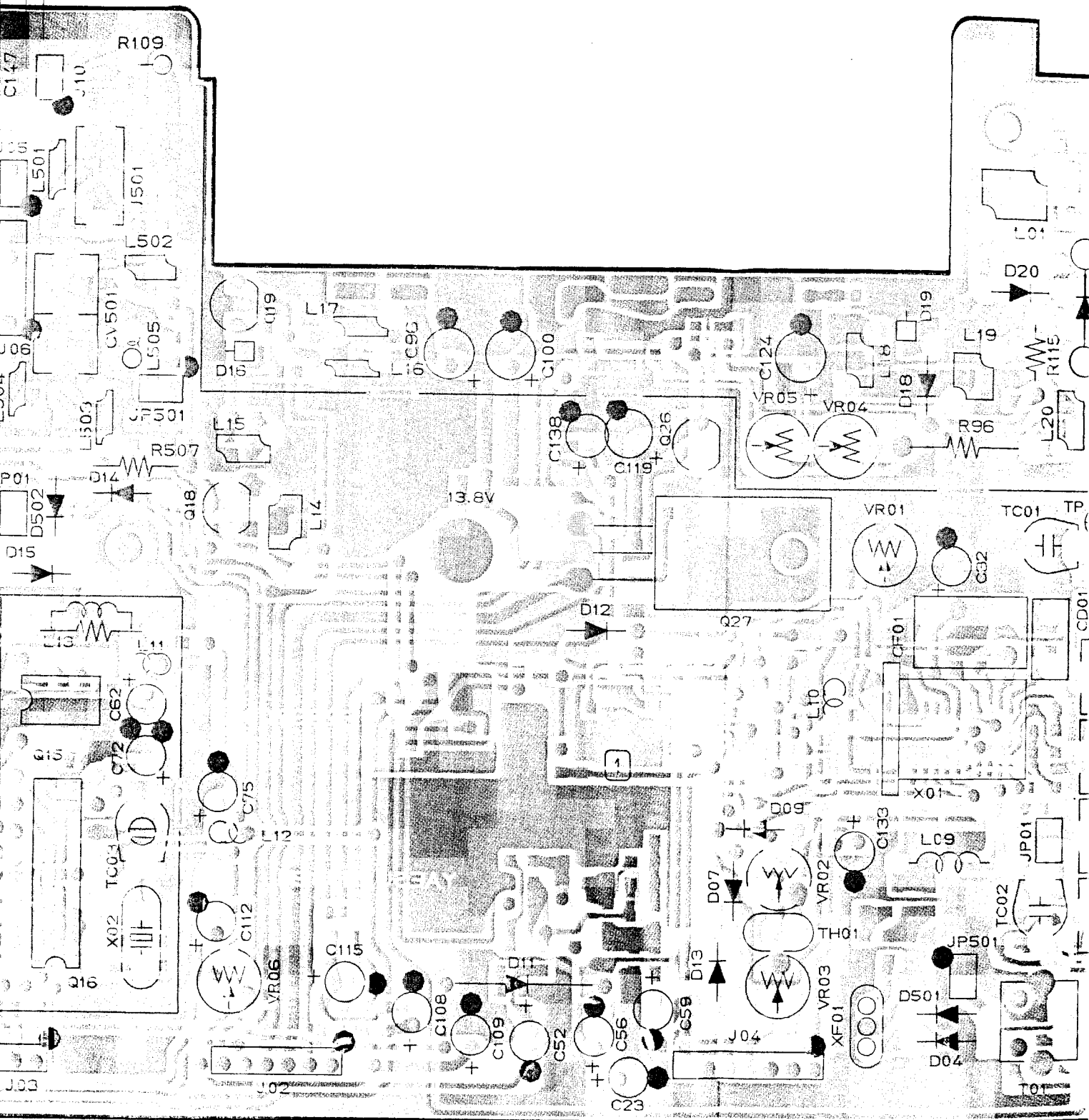


# VHF VCO UNIT PARTS LIST

\*\*\* 144 VCO UNIT \*\*\*

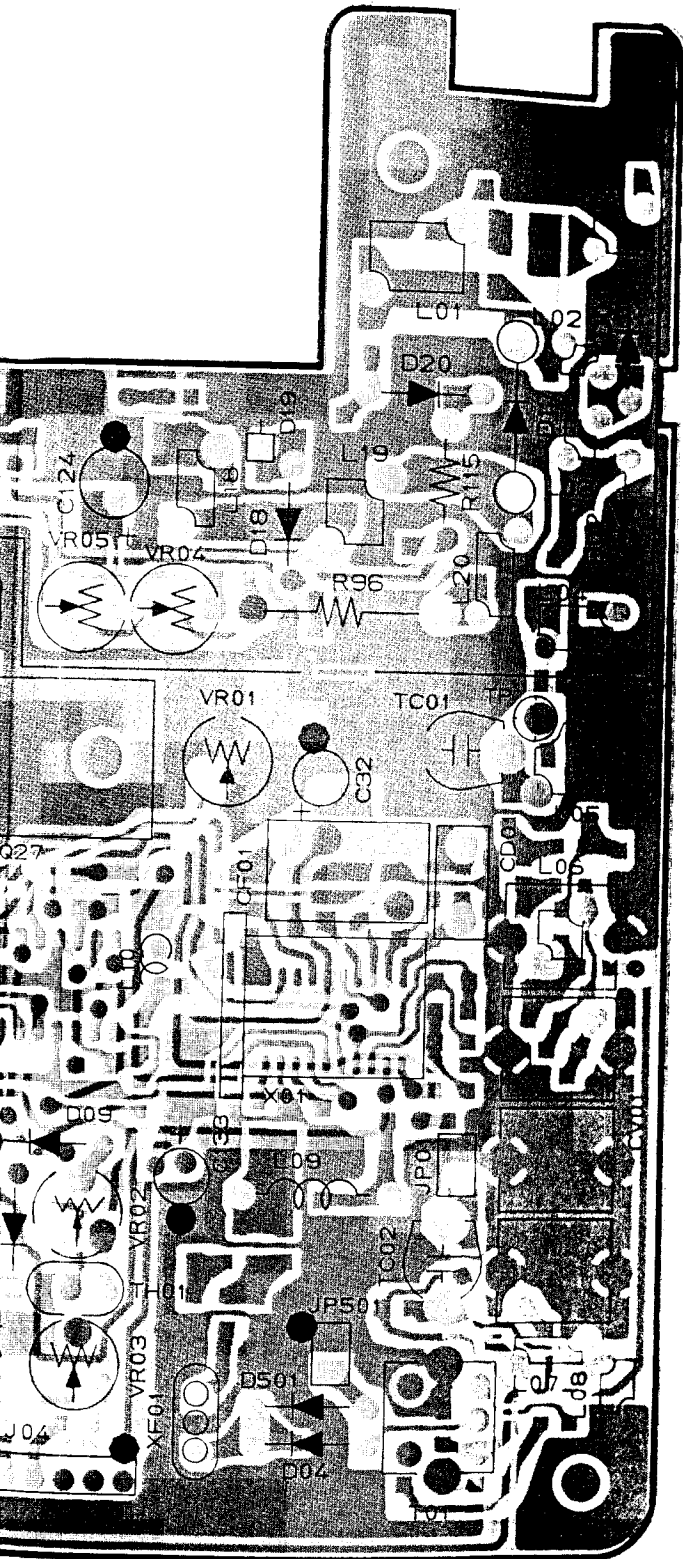
	C029381AC	PCB with Components	50W		
	F2938101	Printed Circuit Board			
Q2001	G3333567D	Transistor	2SC3356-T2B	R24	
Q2002	G3070007	Transistor	FA1F4N-T2B		
Q2003	G3333567D	Transistor	2SC3356-T2B	R24	
Q2004	G3070007	Transistor	FA1F4N-T2B		
Q2005	G3333567D	Transistor	2SC3356-T2B	R24	
D2001	G2070040	Diode	1T33-T7		
D2002	G2070040	Diode	1T33-T7		
D2003	G2070040	Diode	1T33-T7		
D2004	G2070040	Diode	1T33-T7		
D2005	G2070040	Diode	1T33-T7		
R2001	J24205273	Chip Res.	27k Ohm	1/10W	
R2002	J24205273	Chip Res.	27k Ohm	1/10W	
R2003	J24205102	Chip Res.	1k Ohm	1/10W	
R2004	J24205152	Chip Res.	1.5k Ohm	1/10W	
R2005	J24205273	Chip Res.	27k Ohm	1/10W	
R2006	J24205273	Chip Res.	27k Ohm	1/10W	
R2007	J24205102	Chip Res.	1k Ohm	1/10W	
R2008	J24205470	Chip Res.	47 Ohm	1/10W	
R2009	J24205332	Chip Res.	3.3k Ohm	1/10W	
R2010	J24205103	Chip Res.	10k Ohm	1/10W	
R2011	J24205221	Chip Res.	220 Ohm	1/10W	
C2001	K22170805	Chip Cap.	0.001uF	50V	B
C2002	K22170213	Chip Cap.	12pF	50V	CH
C2003	K22170217	Chip Cap.	18pF	50V	CH
C2004	K22170215	Chip Cap.	15pF	50V	CH
C2005	K22170805	Chip Cap.	0.001uF	50V	B
C2006	K40129038	Al Electro Cap.	100uF	16V	
C2007	K22170805	Chip Cap.	0.001uF	50V	B
C2008	K22170805	Chip Cap.	0.001uF	50V	B
C2009	K22170202	Chip Cap.	1pF	50V	CH
C2010	K22170805	Chip Cap.	0.001uF	50V	B
C2011	K22170213	Chip Cap.	12pF	50V	CH
C2012	K22170805	Chip Cap.	0.001uF	50V	B
C2013	K22170217	Chip Cap.	18pF	50V	CH
C2014	K22170213	Chip Cap.	12pF	50V	CH
C2015	K22170805	Chip Cap.	0.001uF	50V	B
C2016	K22170805	Chip Cap.	0.001uF	50V	B
C2017	K22170203	Chip Cap.	2pF	50V	CH
C2018	K22170805	Chip Cap.	0.001uF	50V	B
C2019	K22170805	Chip Cap.	0.001uF	50V	B
C2020	K22170211	Chip Cap.	10pF	50V	CH
C2021	K22170203	Chip Cap.	2pF	50V	CH
C2022	K22170208	Chip Cap.	7pF	50V	CH
C2023	K02172050	Ceramic Cap.	5pF	50V	CH
TC2001	K91000157	Trimmer Cap.	10pF		
TC2002	K91000157	Trimmer Cap.	10pF		
L2001	L1190203	RFC	4.7uH		
L2002	L0190151	Coil			
L2003	L1190203	RFC	4.7uH		
L2004	L0190136	Coil			
L2005	L1190203	RFC	4.7uH		
L2006	L1190199	RFC	2.2uH		
P2001	P0090473	Connector	3022-06B		



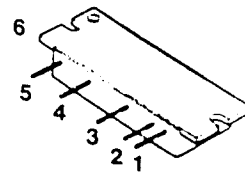


obverse view of "comp

# UHF MAIN UNIT PARTS LAYOUT

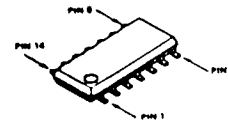


obverse view of "component" side

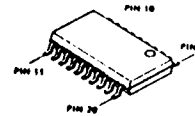


1. INPUT
2. Vcc1
3. Vcc2
4. Vcc3
5. OUTPUT
6. FLA

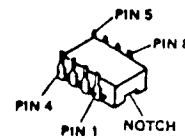
M57788M-23(Q2)



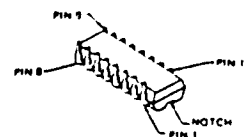
LA6324M(Q3005)



TK10487M(Q3004)



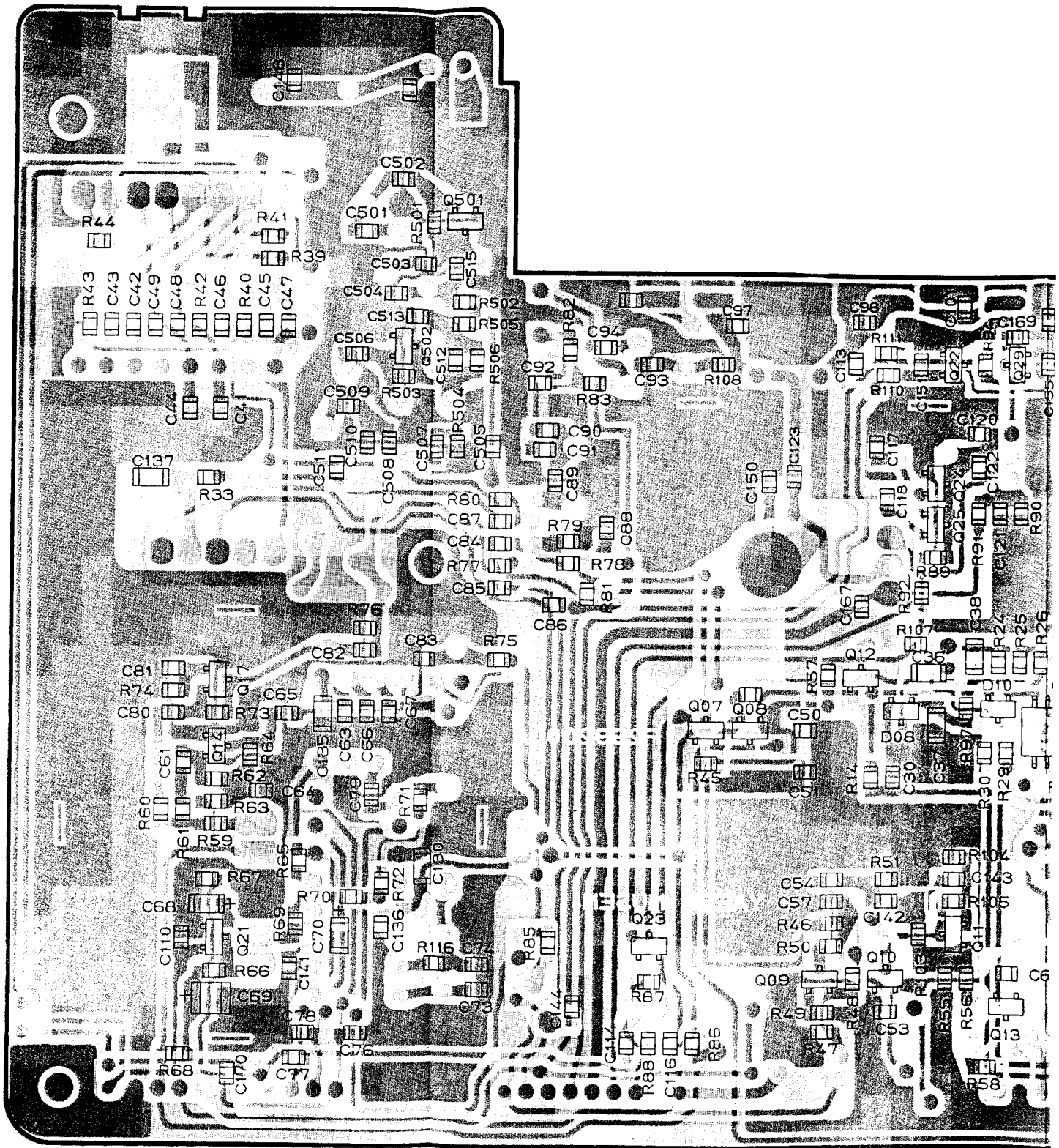
MC12018P(Q3015)



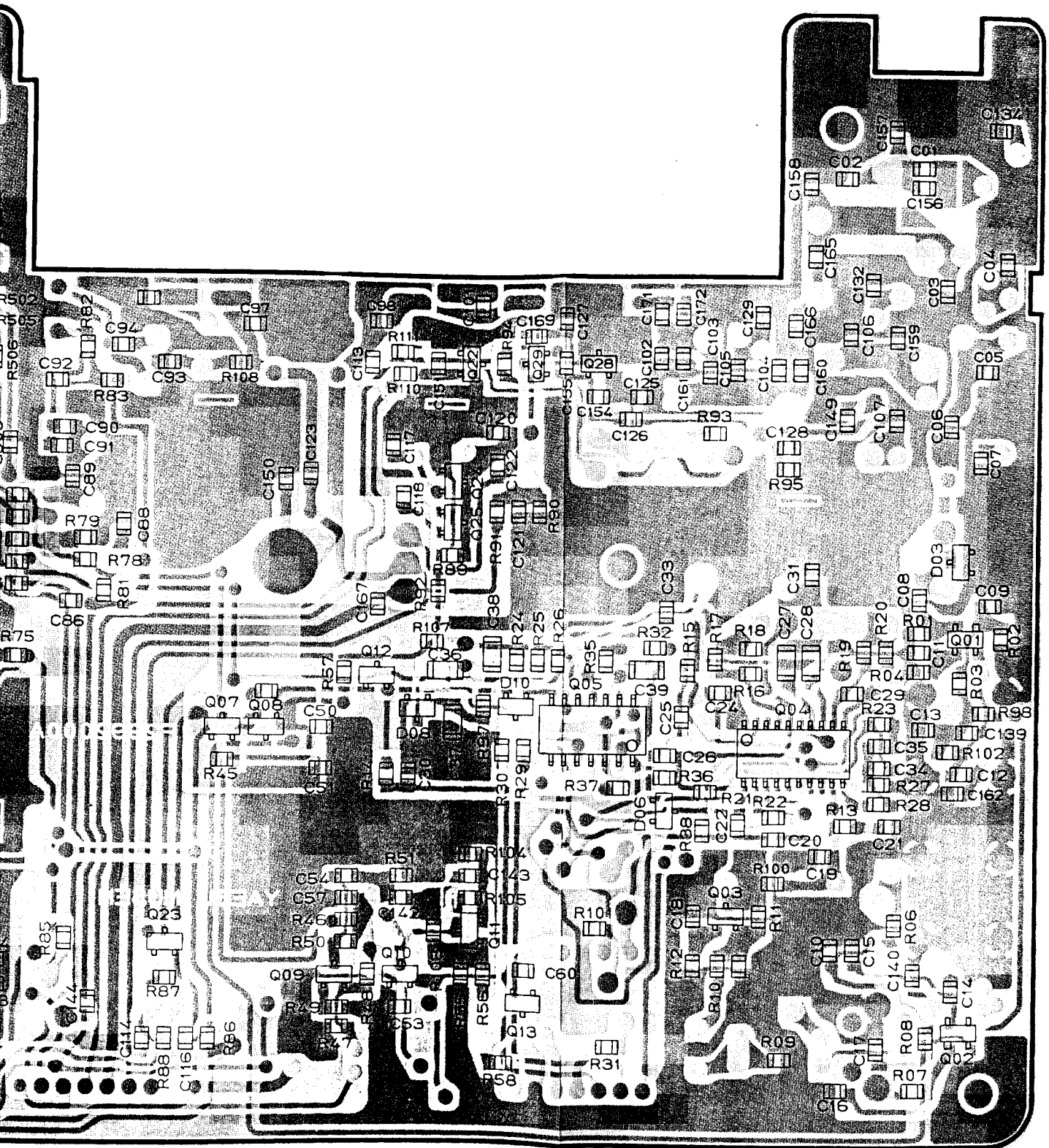
μPD4094BC(Q3006)  
MC145158P(Q3016)



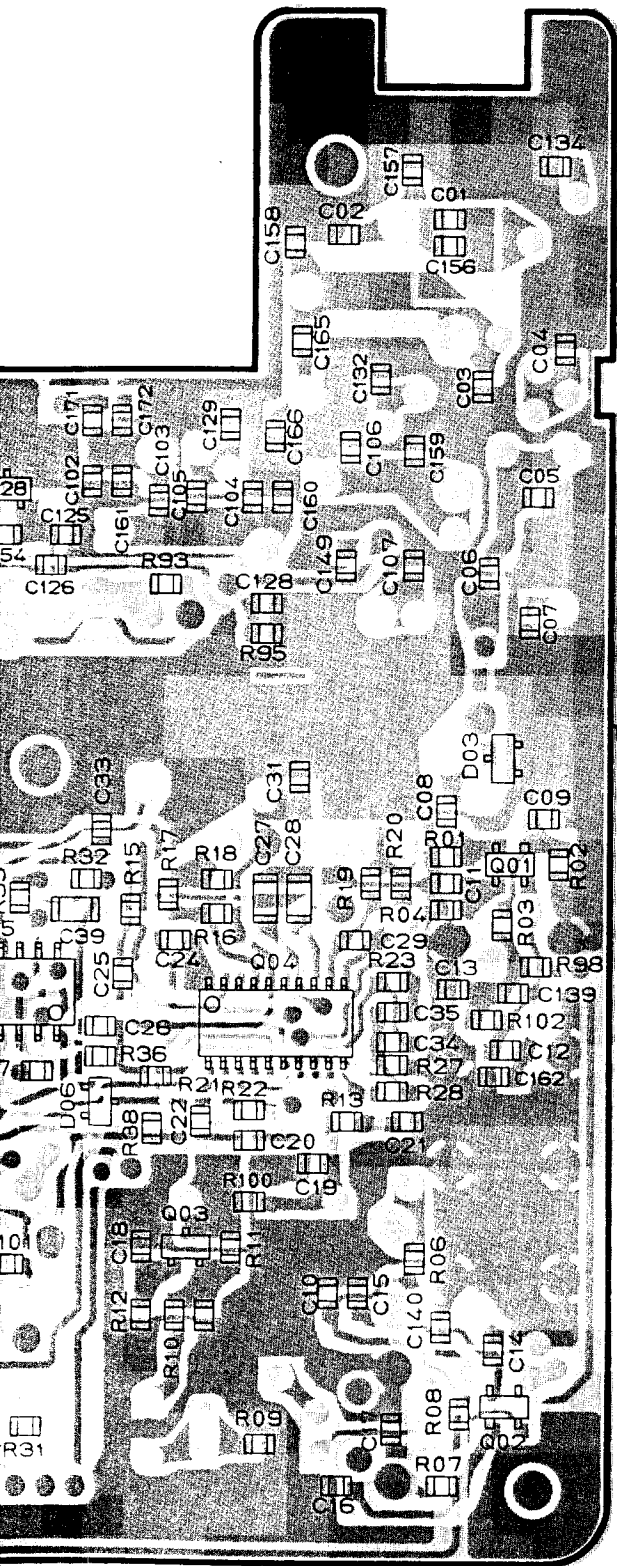
# UHF MAIN UNIT PARTS LAYOUT



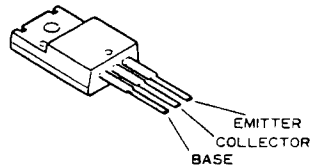
# S LAYOUT



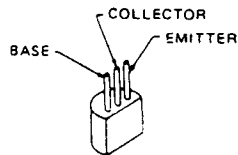
reverse view of "chip-only" side



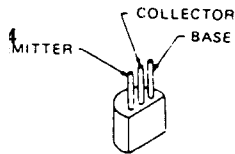
reverse view of "chip-only" side



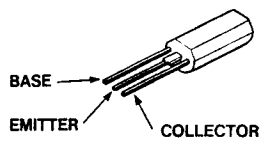
2SB1134R(Q3027)



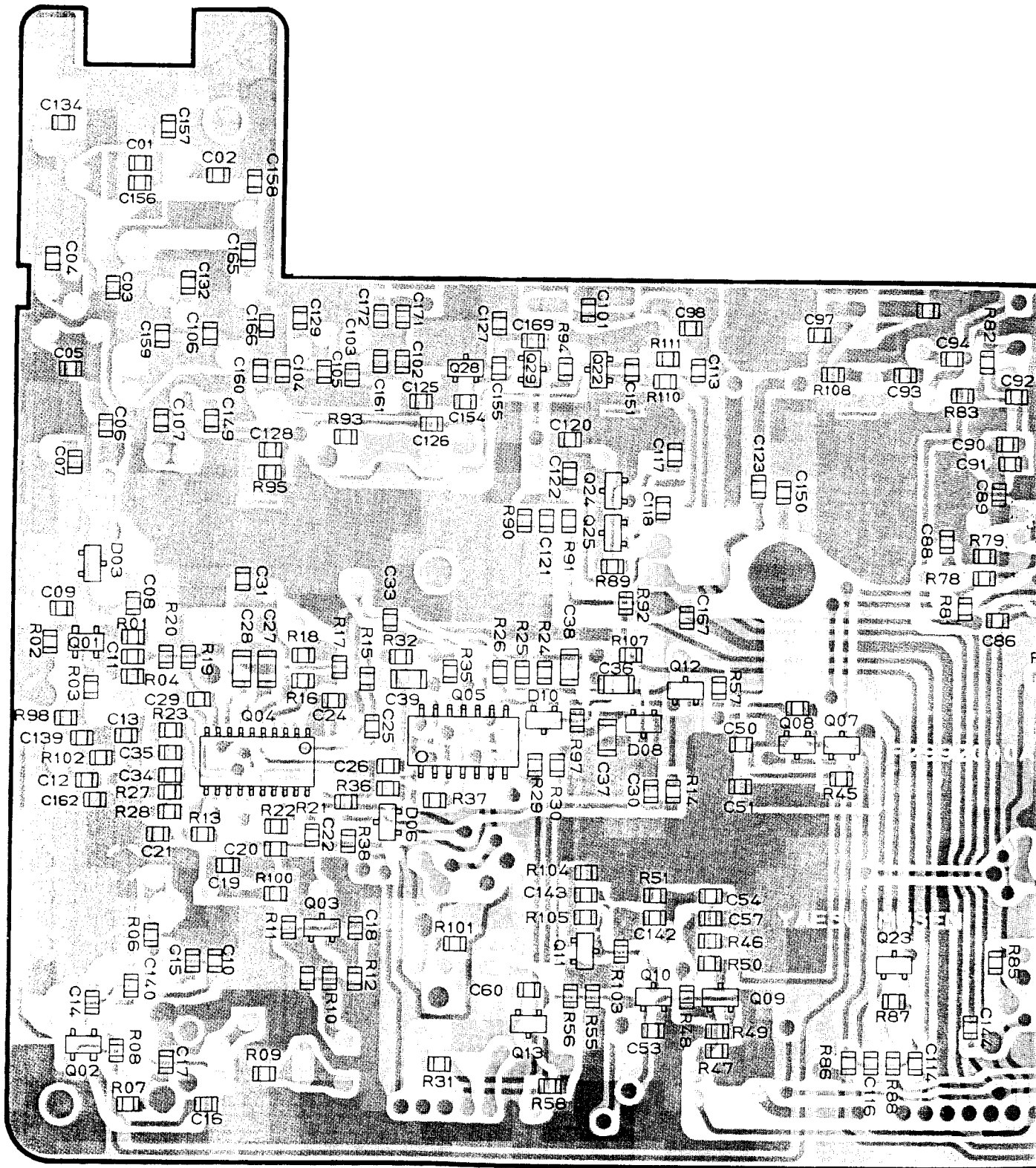
2SC945AP(Q3026)



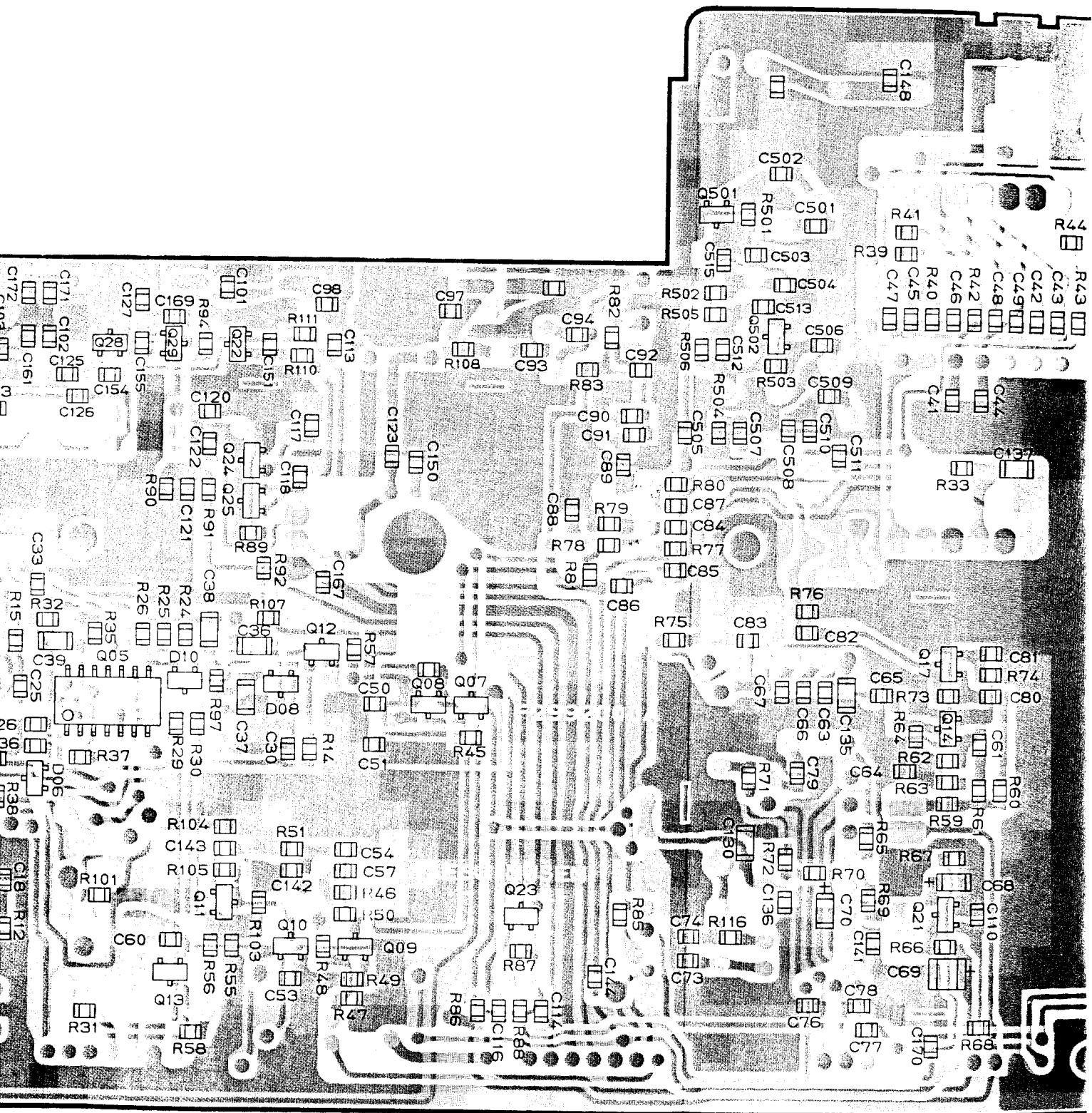
2SC2407(Q3019)



2SC3355(Q3018)

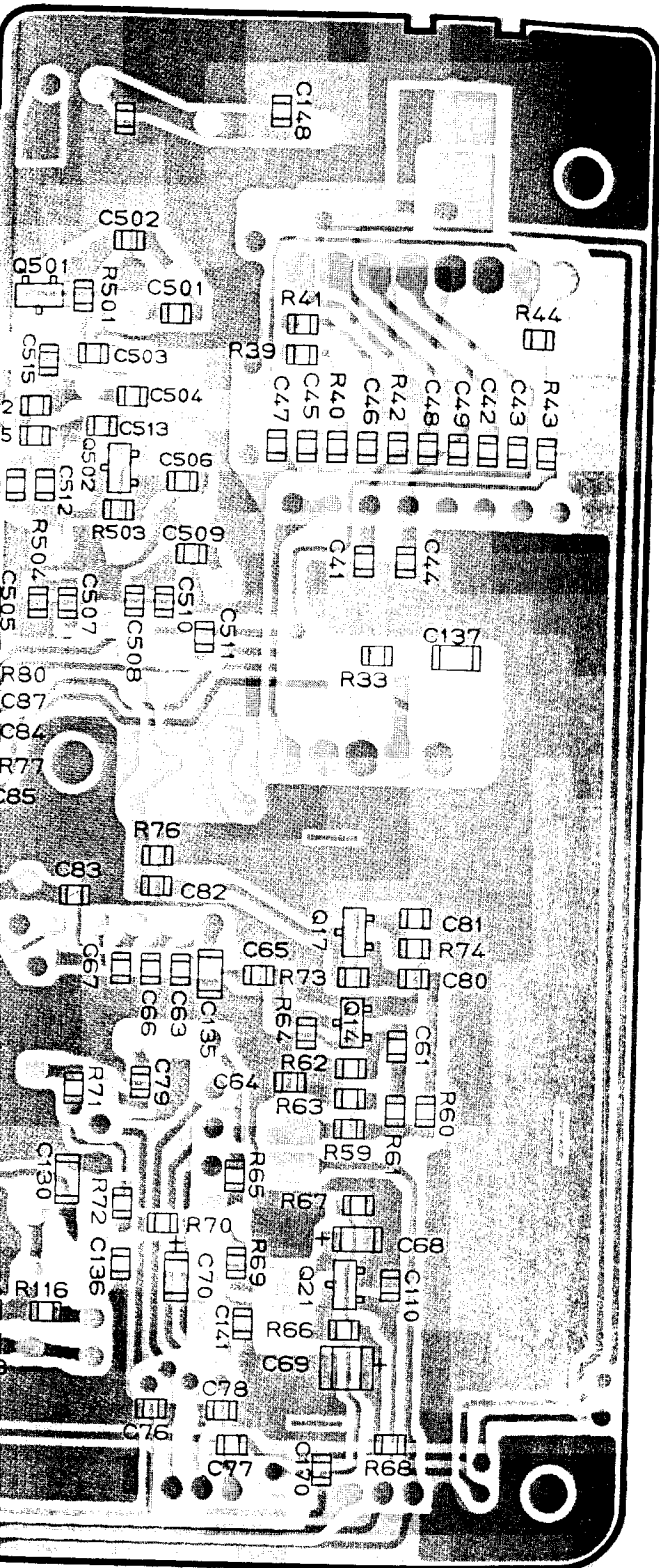




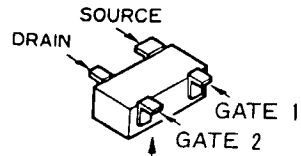


obverse view of "chip-on-board"

# UHF MAIN UNIT PARTS LAYOUT

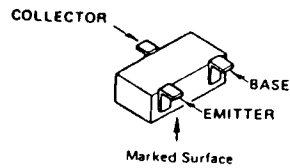


obverse view of "chip-only" side



Marked surface

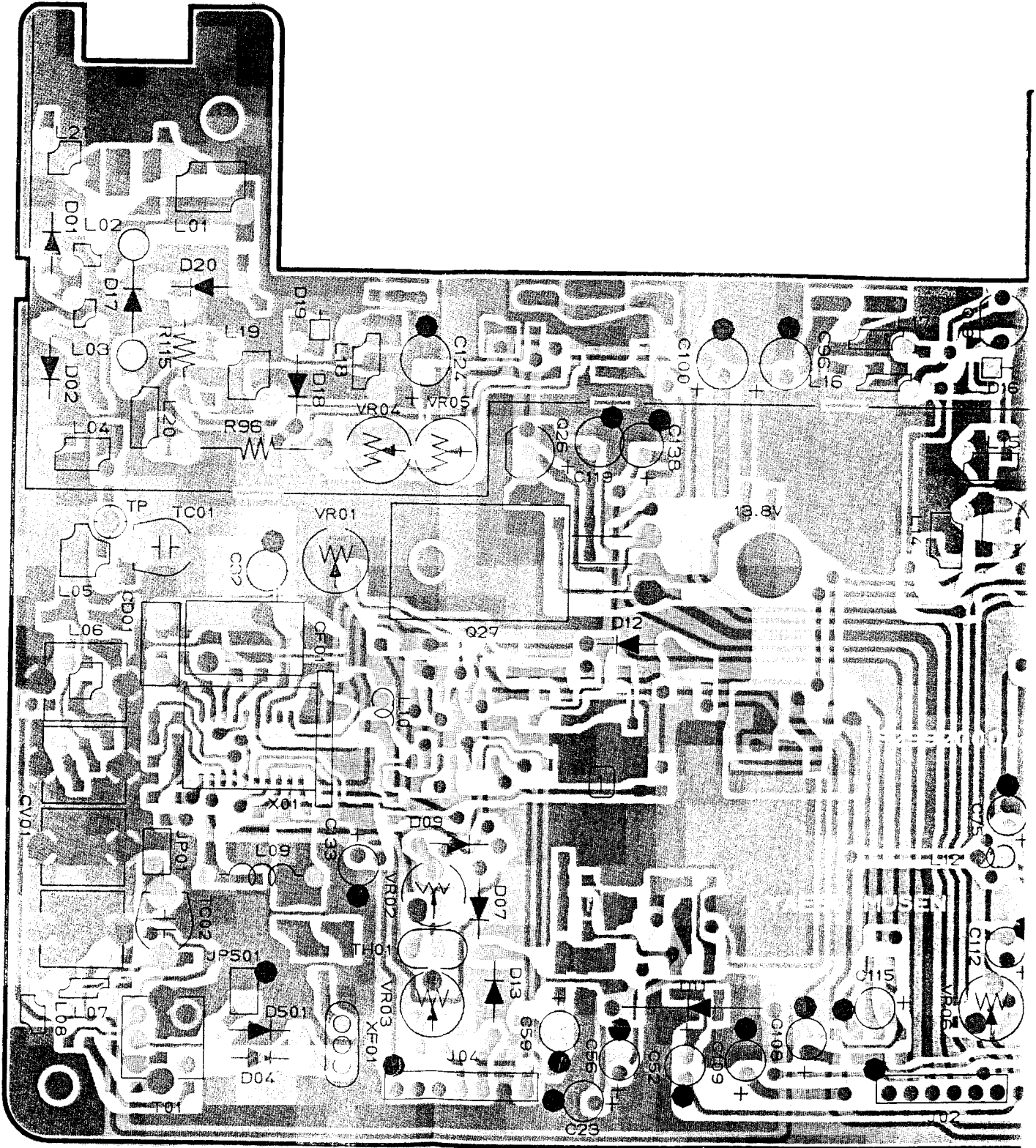
3SK164(F)  
(Q3001, 3002)



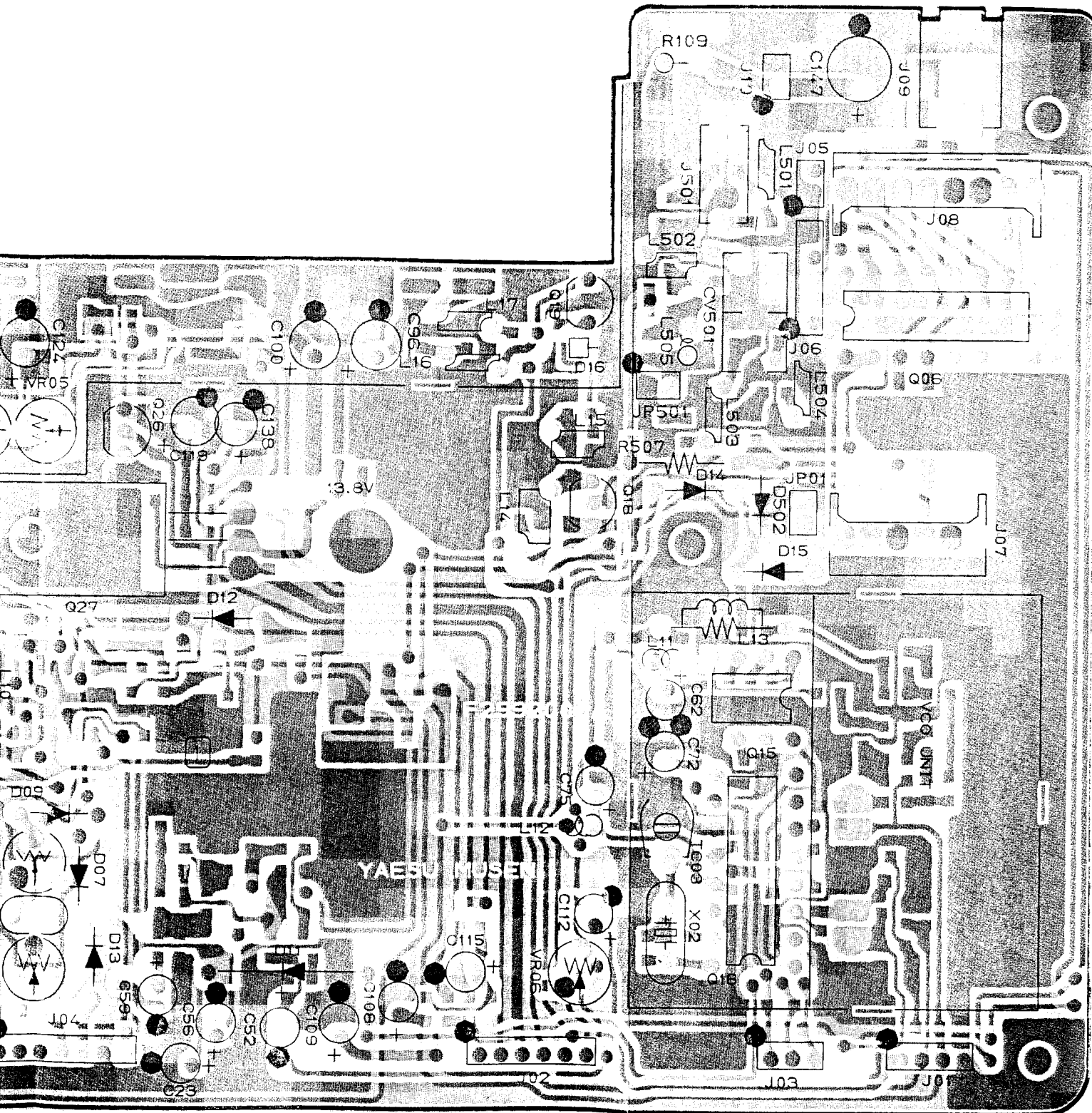
Marked Surface

FA1A4M(L33)  
(Q3010, 3013, 3021)  
3022, 3024, 3025)  
FN1A4M(M33) (Q3007)  
2SA1162GR(SG)  
(Q3023, 3028, 3029)  
2SC2620(QB) (Q3003)  
2SC2712(LG)  
(Q3008, 3009, 3011)  
2SC3356(R24)  
(Q3014, 3017)

# UHF MAIN UNIT PARTS LAYOUT

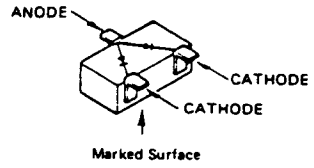
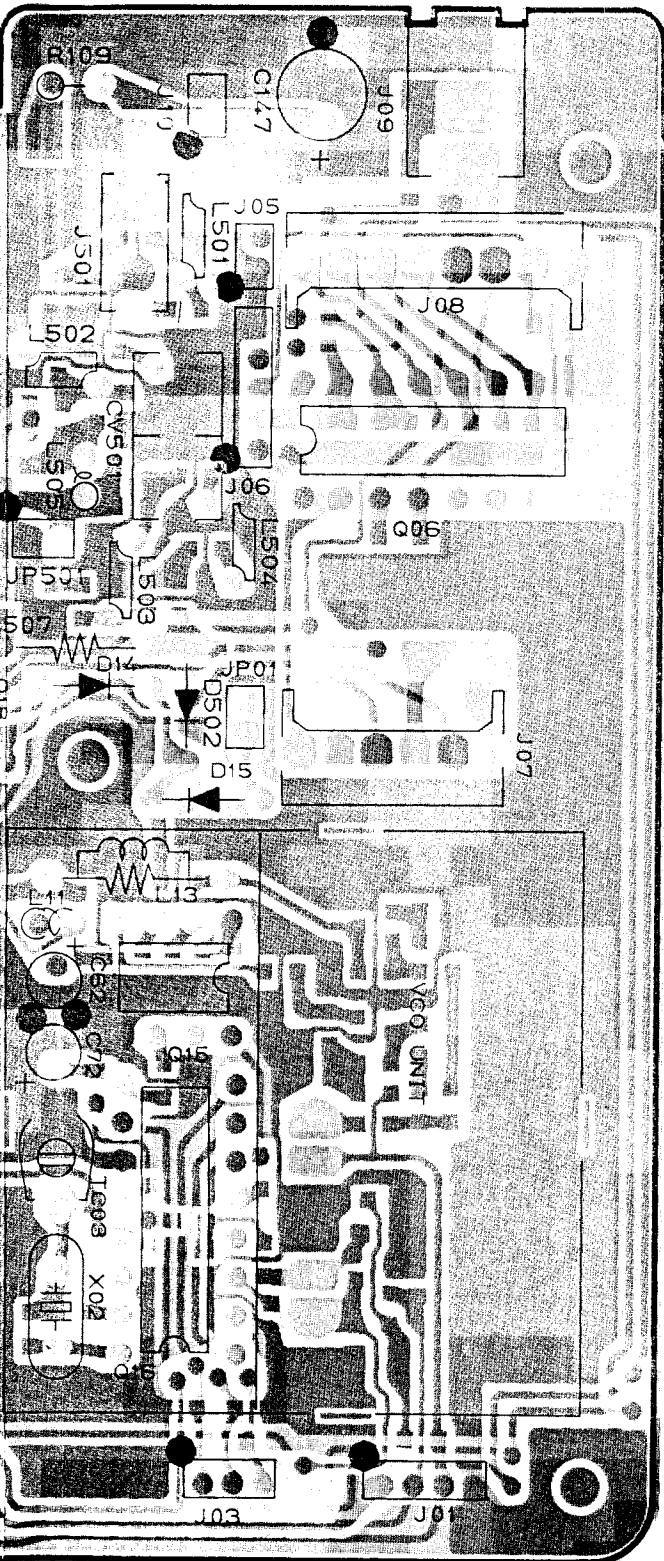


# ARTS LAYOUT

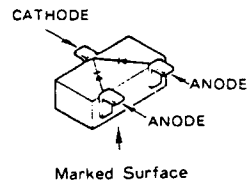


reverse view of "component" side

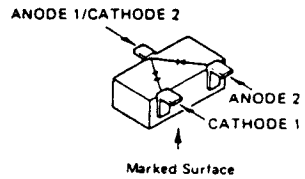




1S181(A3) (D3006)



1S184(B3) (D3010)



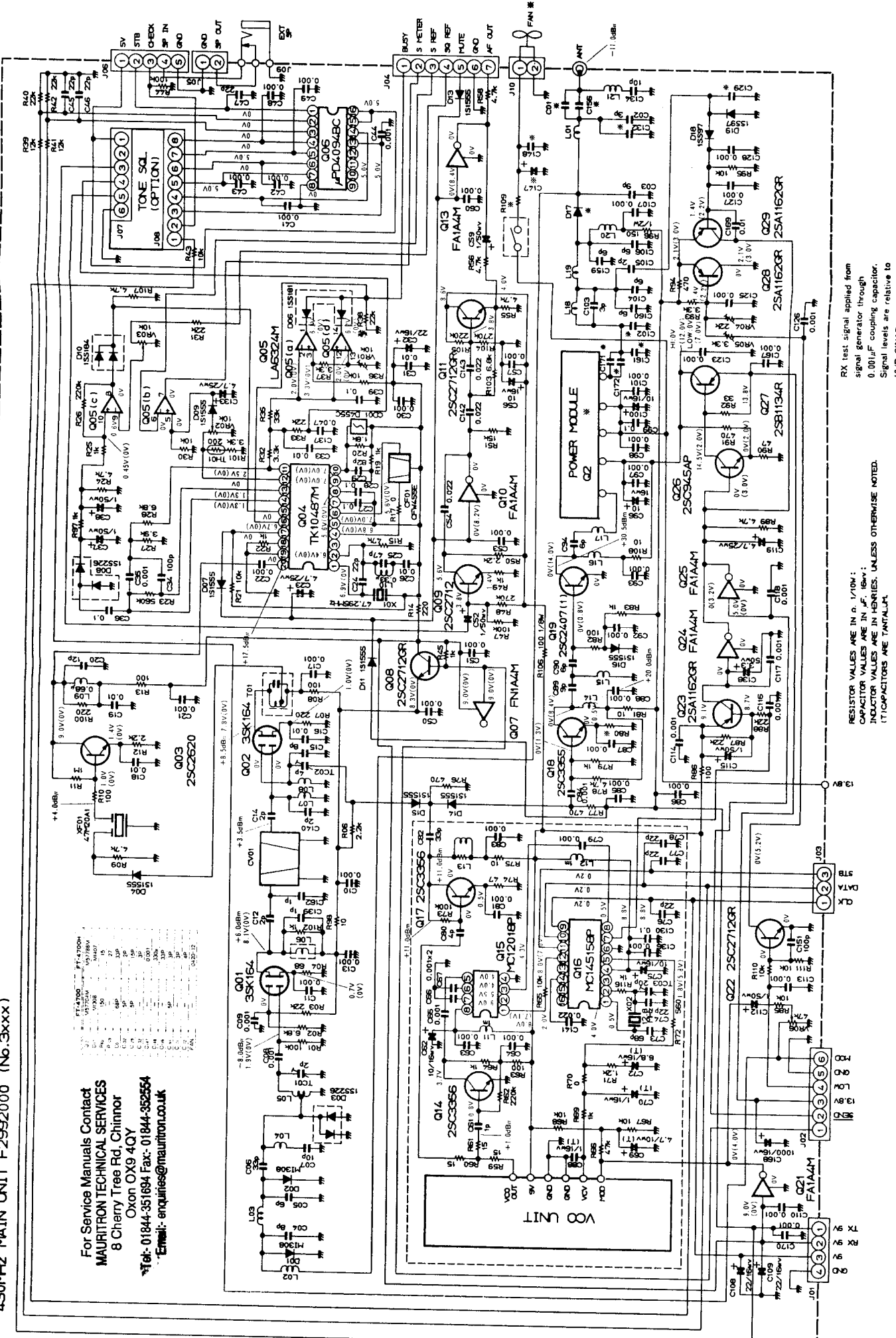
1S226(C3)  
(D3003, 3008)

# UHF MAIN UNIT CIRCUIT DIAGRAM

430MHz MAIN UNIT F2992000 (No.3xxx)

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

REF	DESCRIPTION	VALUE
FT-4700	FT-4700H	15
U1	U1000	15
R1	R100	15
R2	R200	15
R3	R300	15
R4	R400	15
R5	R500	15
R6	R600	15
R7	R700	15
R8	R800	15
R9	R900	15
R10	R1000	15
R11	R1100	15
R12	R1200	15
R13	R1300	15
R14	R1400	15
R15	R1500	15
R16	R1600	15
R17	R1700	15
R18	R1800	15
R19	R1900	15
R20	R2000	15
R21	R2100	15
R22	R2200	15
R23	R2300	15
R24	R2400	15
R25	R2500	15
R26	R2600	15
R27	R2700	15
R28	R2800	15
R29	R2900	15
R30	R3000	15
R31	R3100	15
R32	R3200	15
R33	R3300	15
R34	R3400	15
R35	R3500	15
R36	R3600	15
R37	R3700	15
R38	R3800	15
R39	R3900	15
R40	R4000	15
R41	R4100	15
R42	R4200	15
R43	R4300	15
R44	R4400	15
R45	R4500	15
R46	R4600	15
R47	R4700	15
R48	R4800	15
R49	R4900	15
R50	R5000	15
R51	R5100	15
R52	R5200	15
R53	R5300	15
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R56	R5600	15
R57	R5700	15
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R59	R5900	15
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R61	R6100	15
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R82	R8200	15
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R85	R8500	15
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R87	R8700	15
R88	R8800	15
R89	R8900	15
R90	R9000	15
R91	R9100	15
R92	R9200	15
R93	R9300	15
R94	R9400	15
R95	R9500	15
R96	R9600	15
R97	R9700	15
R98	R9800	15
R99	R9900	15
R100	R10000	15



RESISTOR VALUES ARE IN  $\Omega$ , 1/10V;  
 CAPACITOR VALUES ARE IN  $\mu$ F, 10nV;  
 INDUCTOR VALUES ARE IN HARRIES, UNLESS OTHERWISE NOTED.  
 ITT CAPACITORS ARE TANTALUM.  
 RX test signal applied from  
 signal generator through  
 0.001 $\mu$ F coupling capacitor.  
 Signal levels are relative to  
 12dB SINAD



# NOTES

# UHF MAIN UNIT PARTS LIST

## \*\*\* 430 MAIN UNIT \*\*\*

C029920AC	PCB with Components, with VCO, without Q2, for Ver.A		
C029920AD	PCB with Components, with VCO, without Q2, for Vers. B, C, D & H		
F2992000B	Printed Circuit Board		
Q3001	G48016470	FET	3SK164-O-T7
Q3002	G48016470	FET	3SK164-O-T7
Q3003	G3326207B	Transistor	2SC2620QB-TR
Q3004	G1090859	IC	TK10487M
Q3005	G1090559	IC	LA6324M
Q3006	G1090297	IC	uPD4094BC
Q3007	G3070005	Transistor	FN1A4M-T2B
Q3008	G3327127G	Transistor	2SC2712 TE85R
Q3009	G3327127G	Transistor	2SC2712 TE85R
Q3010	G3070001	Transistor	FA1A4M-T2B
Q3011	G3327127G	Transistor	2SC2712 TE85R
Q3013	G3070001	Transistor	FA1A4M-T2B
Q3014	G3333567	Transistor	2SC3356-T2B
Q3015	G1090708	IC	MC12018P
Q3016	G1090648	IC	MC145158P
Q3017	G3333567	Transistor	2SC3356-T2B
Q3018	G3333550	Transistor	2SC3355
Q3019	G3090050	Transistor	2SC2407(1)
Q3021	G3070001	Transistor	FA1A4M-T2B
Q3022	G3327127G	Transistor	2SC2712 TE85R
Q3023	G3111627G	Transistor	2SA1162GR TE85R
Q3024	G3070001	Transistor	FA1A4M-T2B
Q3025	G3070001	Transistor	FA1A4M-T2B
Q3026	G3309451P	Transistor	2SC945AP
Q3027	G3211340R	Transistor	2SB1134R
Q3028	G3111627G	Transistor	2SA1162GR TE85R
Q3029	G3111627G	Transistor	2SA1162GR TE85R
D3001	G2090337	Diode	MI308
D3002	G2090337	Diode	MI308
D3003	G2070003	Diode	1SS226 TE85R
D3004	G2015550	Diode	1S1555
D3006	G2070001	Diode	1SS181 TE85R
D3007	G2015550	Diode	1S1555
D3008	G2070003	Diode	1SS226 TE85R
D3009	G2015550	Diode	1S1555
D3010	G2070009	Diode	1SS184 TE85R
D3011	G2015550	Diode	1S1555
D3013	G2015550	Diode	1S1555
D3014	G2015550	Diode	1S1555
D3015	G2015550	Diode	1S1555
D3016	G2015550	Diode	1S1555
D3017	G2090345	Diode	MI407
	S6000138	Diode Insulator	
D3018	G2090118	Diode	1SS97
D3019	G2090118	Diode	1SS97
D3020	G2090377	Diode	1SS108
D3021	G2090377	Diode	1SS108
X3001	H0102861	Crystal	HC/49T 47.295MHz
X3002	H0102914	Crystal	HC/49T 12.8MHz

# UHF MAIN UNIT PARTS LIST

XF3001	H1102122	Crystal Filter	47M20A1	
CF3001	H3900394	Ceramic Filter	KBF-455R-15A	
CD3001	H7900180	Ceramic Discriminator	CDB455C7	
TH3001	G9090026	Thermistor	112-201-2	200 Ohm
R3001	J24205104	Chip Res.	100k Ohm	1/10W
R3002	J24205682	Chip Res.	6.8k Ohm	1/10W
R3003	J24205223	Chip Res.	22k Ohm	1/10W
R3004	J24205680	Chip Res.	68 Ohm	1/10W
R3006	J24205222	Chip Res.	2.2k Ohm	1/10W
R3007	J24205221	Chip Res.	220 Ohm	1/10W
R3008	J24205101	Chip Res.	100 Ohm	1/10W
R3009	J24205472	Chip Res.	4.7k Ohm	1/10W
R3010	J24205101	Chip Res.	100 Ohm	1/10W
R3011	J24205105	Chip Res.	1M Ohm	1/10W
R3012	J24205222	Chip Res.	2.2k Ohm	1/10W
R3013	J24205101	Chip Res.	100 Ohm	1/10W
R3014	J24205221	Chip Res.	220 Ohm	1/10W
R3015	J24205473	Chip Res.	47k Ohm	1/10W
R3017	J24205000	Chip Res.	0 Ohm	1/10W
R3019	J24205102	Chip Res.	1k Ohm	1/10W
R3020	J24205182	Chip Res.	1.8k Ohm	1/10W
R3021	J24205103	Chip Res.	10k Ohm	1/10W
R3022	J24205102	Chip Res.	1k Ohm	1/10W
R3023	J24205564	Chip Res.	560k Ohm	1/10W
R3024	J24205472	Chip Res.	4.7k Ohm	1/10W
R3025	J24205102	Chip Res.	1k Ohm	1/10W
R3026	J24205224	Chip Res.	220k Ohm	1/10W
R3027	J24205392	Chip Res.	3.9k Ohm	1/10W
R3028	J24205682	Chip Res.	6.8k Ohm	1/10W
R3030	J24205103	Chip Res.	10k Ohm	1/10W
R3031	J24205223	Chip Res.	22k Ohm	1/10W
R3032	J24205332	Chip Res.	3.3k Ohm	1/10W
R3033	J24205223	Chip Res.	22k Ohm	1/10W
R3035	J24205333	Chip Res.	33k Ohm	1/10W
R3036	J24205103	Chip Res.	10k Ohm	1/10W
R3037	J24205332	Chip Res.	3.3k Ohm	1/10W
R3038	J24205223	Chip Res.	22k Ohm	1/10W
R3039	J24205123	Chip Res.	12k Ohm	1/10W
R3040	J24205223	Chip Res.	22k Ohm	1/10W
R3041	J24205123	Chip Res.	12k Ohm	1/10W
R3042	J24205223	Chip Res.	22k Ohm	1/10W
R3043	J24205103	Chip Res.	10k Ohm	1/10W
R3044	J24205104	Chip Res.	100k Ohm	1/10W
R3045	J24205102	Chip Res.	1k Ohm	1/10W
R3049	J24205471	Chip Res.	470 Ohm	1/10W
R3050	J24205332	Chip Res.	3.3k Ohm	1/10W
R3051	J24205153	Chip Res.	15k Ohm	1/10W
R3055	J24205472	Chip Res.	4.7k Ohm	1/10W
R3056	J24205472	Chip Res.	4.7k Ohm	1/10W
R3058	J24205223	Chip Res.	22k Ohm	1/10W
R3059	J24205150	Chip Res.	15 Ohm	1/10W
R3060	J24205150	Chip Res.	15 Ohm	1/10W
R3061	J24205150	Chip Res.	15 Ohm	1/10W
R3062	J24205224	Chip Res.	220k Ohm	1/10W
R3063	J24205101	Chip Res.	100 Ohm	1/10W
R3064	J24205102	Chip Res.	1k Ohm	1/10W
R3065	J24205103	Chip Res.	10k Ohm	1/10W
R3066	J24205473	Chip Res.	47k Ohm	1/10W

# UHF MAIN UNIT PARTS LIST

R3067	J24205103	Chip Res.	10k Ohm	1/10W	
R3068	J24205103	Chip Res.	10k Ohm	1/10W	
R3069	J24205102	Chip Res.	1k Ohm	1/10W	
R3070	J24205000	Chip Res.	0 Ohm	1/10W	
R3071	J24205122	Chip Res.	1.2k Ohm	1/10W	
R3072	J24205561	Chip Res.	560 Ohm	1/10W	
R3073	J24205104	Chip Res.	100k Ohm	1/10W	
R3074	J24205470	Chip Res.	47 Ohm	1/10W	
R3075	J24205100	Chip Res.	10 Ohm	1/10W	
R3076	J24205471	Chip Res.	470 Ohm	1/10W	
R3077	J24205471	Chip Res.	470 Ohm	1/10W	
R3078	J24205472	Chip Res.	4.7k Ohm	1/10W	
R3079	J24205102	Chip Res.	1 k Ohm	1/10W	
R3080	J24205150	Chip Res.	15 Ohm	1/10W	
R3081	J24205100	Chip Res.	10 Ohm	1/10W	
R3082	J24205101	Chip Res.	100 Ohm	1/10W	
R3083	J24205102	Chip Res.	1k Ohm	1/10W	
R3085	J24205103	Chip Res.	10k Ohm	1/10W	
R3086	J24205101	Chip Res.	100 Ohm	1/10W	
R3087	J24205223	Chip Res.	22k Ohm	1/10W	
R3088	J24205223	Chip Res.	22k Ohm	1/10W	
R3089	J24205472	Chip Res.	4.7k Ohm	1/10W	
R3090	J24205101	Chip Res.	100 Ohm	1/10W	
R3091	J24205471	Chip Res.	2.2k Ohm	1/10W	
R3092	J24205101	Chip Res.	100 Ohm	1/10W	
R3093	J24205332	Chip Res.	3.3k Ohm	1/10W	
R3094	J24205471	Chip Res.	470 Ohm	1/10W	
R3095	J24205103	Chip Res.	10k Ohm	1/10W	
R3096	J01275151	Carbon Film Res.	150 Ohm	1/2W	
R3097	J24205102	Chip Res.	1k Ohm	1/10W	
R3098	J24205100	Chip Res.	10 Ohm	1/10W	
R3099	J01245563	Carbon Film Res.	56k Ohm	1/4W	
R3100	J24205221	Chip Res.	220 Ohm	1/10W	
R3101	J24205332	Chip Res.	3.3k Ohm	1/10W	
R3102	J24205102	Chip Res.	1k Ohm	1/10W	
R3103	J24205682	Chip Res.	6.8k Ohm	1/10W	
R3104	J24205274	Chip Res.	270k Ohm	1/10W	
R3105	J24205224	Chip Res.	220k Ohm	1/10W	
R3106	J24205101	Chip Res.	100 Ohm	1/10W	
R3107	J24205472	Chip Res.	4.7k Ohm	1/10W	
R3108	J24205100	Chip Res.	10 Ohm	1/6W	
R3109	J00275270	Carbon Film Res.	27 Ohm	1/2W	
R3110	J24205103	Chip Res.	10k Ohm	1/10W	
R3111	J24205103	Chip Res.	10k Ohm	1/10W	
R3114	J24205000	Chip Res.	0 Ohm	1/10W	
R3116	J24205102	Chip Res.	1k Ohm	1/10W	
R3117	J01225334	Carbon Film Res.	330k Ohm	1/6W	
R3119	J24205101	Chip Res.	100 Ohm	1/10W	
R3120	J24205222	Chip Res.	2.2k Ohm	1/10W	
R3121	J01245681	Carbon Film Res.	680 Ohm	1/4W	
R3122	J24205473	Chip Res.	47k Ohm	1/10W	
VR3001	J51745103	Potentiometer	100k Ohm		
VR3002	J51745103	Potentiometer	10k Ohm		
VR3003	J51745103	Potentiometer	10k Ohm		
VR3004	J51745223	Potentiometer	22k Ohm		
VR3005	J51745332	Potentiometer	3.3k Ohm		
VR3006	J51745473	Potentiometer	47k Ohm		
C3001	K22170223	Chip Cap.	33pF	50V	CH
C3002	K22170204	Chip Cap.	3pF	50V	CH
C3003	K22170210	Chip Cap.	9pF	50V	CH
C3004	K22170209	Chip Cap.	8pF	50V	CH
C3005	K22170207	Chip Cap.	6pF	50V	CH
C3006	K22170223	Chip Cap.	33pF		

# UHF MAIN UNIT PARTS LIST

C3007	K22170211	Chip Cap.	10pF	50V	CH
C3008	K22170805	Chip Cap.	0.001uF	50V	B
C3009	K22170805	Chip Cap.	0.001uF	50V	B
C3010	K22170805	Chip Cap.	0.001uF	50V	B
C3011	K22170805	Chip Cap.	0.001uF	50V	B
C3012	K22170203	Chip Cap.	2pF	50V	CH
C3013	K22170805	Chip Cap.	0.001uF	50V	B
C3014	K22170203	Chip Cap.	2pF	50V	CH
C3015	K22170209	Chip Cap.	8pF	50V	CH
C3016	K22170817	Chip Cap.	0.01uF	50V	B
C3017	K22170805	Chip Cap.	0.001uF	50V	B
C3018	K22170817	Chip Cap.	0.01uF	50V	B
C3019	K22170817	Chip Cap.	0.01uF	50V	B
C3020	K22170213	Chip Cap.	12pF	50V	CH
C3021	K22170805	Chip Cap.	0.001uF	50V	B
C3022	K22170805	Chip Cap.	0.001uF	50V	B
C3023	K40149011	Al Electro Cap.	4.7uF	25V	
C3024	K22170219	Chip Cap.	22pF	50V	CH
C3025	K22170227	Chip Cap.	47pF	50V	CH
C3026	K22170817	Chip Cap.	0.01uF	50V	B
C3027	K22141809	Chip Cap.	0.1uF	25V	B
C3028	K22141809	Chip Cap.	0.1uF	25V	B
C3029	K22170233	Chip Cap.	82pF	50V	CH
C3030	K22170805	Chip Cap.	0.001uF	50V	B
C3031	K22170817	Chip Cap.	0.01uF	50V	B
C3032	K40129013	Al Electro Cap.	22uF	16V	
C3033	K22170817	Chip Cap.	0.01uF	50V	B
C3034	K22170235	Chip Cap.	100pF	50V	CH
C3035	K22170805	Chip Cap.	0.001uF	50V	B
C3036	K22141809	Chip Cap.	0.1uF	25V	B
C3037	K78120009	Tantalum Chip Cap.	1uF	16V	
C3038	K78120009	Tantalum Chip Cap.	1uF	16V	
C3039	K22141809	Chip Cap.	0.1uF	25V	B
C3041	K22170805	Chip Cap.	0.001uF	50V	B
C3042	K22170805	Chip Cap.	0.001uF	50V	B
C3043	K22170805	Chip Cap.	0.001uF	50V	B
C3044	K22170805	Chip Cap.	0.001uF	50V	B
C3045	K22170219	Chip Cap.	22pF	50V	CH
C3046	K22170219	Chip Cap.	22pF	50V	CH
C3047	K22170219	Chip Cap.	22pF	50V	CH
C3048	K22170805	Chip Cap.	0.001uF	50V	B
C3049	K22170805	Chip Cap.	0.001uF	50V	B
C3050	K22170805	Chip Cap.	0.001uF	50V	B
C3051	K22170805	Chip Cap.	0.001uF	50V	B
C3052	K40179001	Al Electro Cap.	1uF	50V	
C3053	K22170805	Chip Cap.	0.001uF	50V	B
C3054	K22140807	Chip Cap.	0.022uF	25V	B
C3056	K40129012	Al Electro Cap.	10uF	16V	
C3057	K22170805	Chip Cap.	0.001uF	50V	B
C3059	K40179001	Al Electro Cap.	1uF	50V	
C3060	K22170805	Chip Cap.	0.001uF	50V	B
C3061	K22170202	Chip Cap.	1pF	50V	CH
C3062	K40129012	Al Electro Cap.	10uF	16V	
C3063	K22170805	Chip Cap.	0.001uF	50V	B
C3064	K22170805	Chip Cap.	0.001uF	50V	B
C3065	K22170805	Chip Cap.	0.001uF	50V	B
C3066	K22170805	Chip Cap.	0.001uF	50V	B
C3067	K22170805	Chip Cap.	0.001uF	50V	B
C3068	K78120009	Tantalum Chip Cap.	1uF	16V	
C3069	K78100010	Tantalum Chip Cap.	4.7uF	10V	
C3070	K78120009	Tantalum Chip Cap.	1uF	16V	
C3072	K70147685	Tantalum Cap.	6.8uF	25V	
C3073	K22170231	Chip Cap.	68pF	50V	CH
C3074	K22170221	Chip Cap.	27pF	50V	CH
C3075	K40129012	Al Electro Cap.	10uF	16V	

# UHF MAIN UNIT PARTS LIST

C3076	K22170219	Chip Cap.	22pF	50V	CH
C3077	K22170219	Chip Cap.	22pF	50V	CH
C3078	K22170219	Chip Cap.	22pF	50V	CH
C3079	K22170805	Chip Cap.	0.001uF	50V	B
C3080	K22170205	Chip Cap.	4pF	50V	CH
C3081	K22170805	Chip Cap.	0.001uF	16V	B
C3082	K22170223	Chip Cap.	33pF	50V	CH
C3083	K22170805	Chip Cap.	0.001uF	50V	B
C3084	K22170805	Chip Cap.	0.001uF	50V	B
C3085	K22170805	Chip Cap.	0.001uF	50V	B
C3086	K22170805	Chip Cap.	0.001uF	50V	B
C3087	K22170805	Chip Cap.	0.001uF	50V	B
C3089	K22170202	Chip Cap.	1pF	50V	CH
C3090	K22170205	Chip Cap.	4pF	50V	CH
C3090	K22170207	Chip Cap.	6pF	50V	CH
C3092	K22170805	Chip Cap.	0.001uF	50V	B
C3093	K22170805	Chip Cap.	0.001uF	50V	B
C3094	K22170207	Chip Cap.	6pF	50V	CH
C3096	K40129004	Al Electro Cap.	10uF	16V	
C3097	K22170805	Chip Cap.	0.001uF	50V	B
C3098	K22170805	Chip Cap.	0.001uF	50V	B
C3100	K40129004	Al Electro Cap.	10uF	16V	
C3101	K22170805	Chip Cap.	0.001uF	50V	B
C3102	K22170203	Chip Cap.	2pF	50V	CH
C3103	K22170204	Chip Cap.	3pF	50V	CH
C3104	K22170207	Chip Cap.	6pF	50V	CH
C3105	K22170203	Chip Cap.	2pF	50V	CH
C3106	K22170207	Chip Cap.	6pF	50V	CH
C3107	K22170805	Chip Cap.	0.001uF	50V	B
C3108	K40129013	Al Electro Cap.	22uF	16V	
C3109	K40129013	Al Electro Cap.	22uF	16V	
C3110	K22170805	Chip Cap.	0.001uF	50V	B
C3112	K40179001	Al Electro Cap.	1uF	50V	
C3113	K22170805	Chip Cap.	0.001uF	50V	B
C3114	K22170805	Chip Cap.	0.001uF	50V	B
C3115	K40179001	Al Electro Cap.	1uF	50V	
C3116	K22170805	Chip Cap.	0.001uF	50V	B
C3117	K22170805	Chip Cap.	0.001uF	50V	B
C3118	K22170805	Chip Cap.	0.001uF	50V	B
C3119	K40149011	Al Electro Cap.	4.7uF	25V	
C3123	K22170805	Chip Cap.	0.001uF	50V	B
C3125	K22170805	Chip Cap.	0.001uF	50V	B
C3126	K22170805	Chip Cap.	0.001uF	50V	B
C3127	K22170805	Chip Cap.	0.001uF	50V	B
C3128	K22170805	Chip Cap.	0.001uF	50V	B
C3129	K22170215	Chip Cap.	15pF	50V	CH
C3130	K22141809	Chip Cap.	0.1uF	25V	B
C3133	K40149011	Al Electro Cap.	4.7uF	25V	
C3134	K22170211	Chip Cap.	10pF	50V	CH
C3135	K22141809	Chip Cap.	0.1uF	25V	B
C3136	K22170805	Chip Cap.	0.001uF	50V	B
C3137	K22141808	Chip Cap.	0.047uF	25V	B
C3138	K70167335	Tantalum Cap.	3.3uF	35V	
C3139	K22170202	Chip Cap.	1pF	50V	CH
C3140	K22170203	Chip Cap.	2pF	50V	CH
C3141	K22140807	Chip Cap.	0.022uF	25V	B
C3142	K22140807	Chip Cap.	0.022uF	25V	B
C3143	K22140807	Chip Cap.	0.022uF	25V	B
C3144	K22170235	Chip Cap.	100pF	50V	CH
C3147	K40129043	Al Electro Cap.	330uF	16V	
C3148	K22170805	Chip Cap.	0.001uF	50V	B
C3150	K22170805	Chip Cap.	0.001uF	50V	B
C3151	K22170235	Chip Cap.	100pF	50V	CH
C3156	K22170223	Chip Cap.	33pF	50V	CH
C3157	K22170204	Chip Cap.	3pF	50V	CH

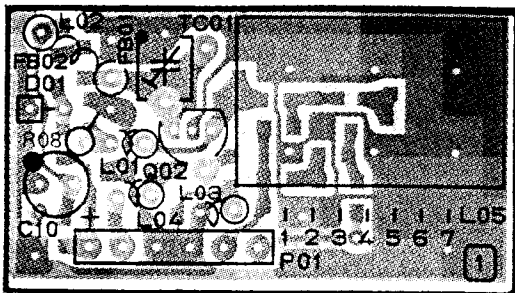


# UHF MAIN UNIT PARTS LIST

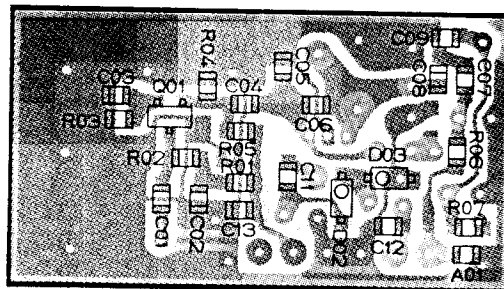
C3159	K22170207	Chip Cap.	6pF	50V	CH
C3160	K22170207	Chip Cap.	6pF	50V	CH
C3161	K22170204	Chip Cap.	3pF	50V	CH
C3162	K22170202	Chip Cap.	1pF	50V	CH
C3167	K22170805	Chip Cap.	0.001uF	50V	B
C3168	K40129046	Al Electro Cap.	1000uF	16V	
C3169	K22170817	Chip Cap.	0.01uF	50V	B
C3170	K22170805	Chip Cap.	0.001uF	50V	B
C3171	K22170207	Chip Cap. Ver.A	6pF	50V	CH
C3171	K22170204	Vers. B, C, D & H	3pF	50V	CH
C3172	K22170205	Chip Cap.	4pF	50V	CH
TC3001	K91000060	Trimmer Cap.	2pF		
TC3002	K91000059	Trimmer Cap.	4pF		
TC3003	K91000029	Trimmer Cap.	20pF		
CV3001	L4020081	Cavity	HF-63H21	440MHz	
T3001	L0021740	Coil		47.7MHz	
L3001	L0020840	Coil			
L3002	L0021532	Coil			
L3003	L0021532	Coil			
L3004	L0020678	Coil			
L3005	L0020900	Coil			
L3006	L0020852	Coil			
L3007	L0020852	Coil			
L3008	L0020852	Coil			
L3009	L1190194	RFC	0.68uH		
L3010	L1190150	RFC	0.33uH		
L3011	L1190189	RFC	1mH		
L3012	L1190189	RFC	1mH		
L3013	L1020672	RFC			
L3014	L0020852	Coil			
L3015	L0021359	Coil			
L3016	L0021359	Coil			
L3017	L0021359	Coil			
L3018	L0020841	Coil			
L3019	L0020841	Coil			
L3020	L0021520	Coil			
L3021	L0020428	Coil			
J3001	P0090611	Connector	SB20-04WS		
J3002	P0090613	Connector	SB20-06WS		
J3003	P0090610	Connector	SB20-03WS		
J3004	P0090614	Connector	SB20-07WS		
J3005	P0090609	Connector	SB20-02WS		
J3006	P0090612	Connector	SB20-05WS		
J3007	P1090419	Connector	SB20-06WS		
J3008	P1090250	Connector	SB20-08WS		
J3009	P1090350	Connector	S-G8035#01		
J3010	P0090609	Connector	SB20-02WS		
	L9190036	Coil Case	M7D 12-1286B		
	Q5000016	Terminal Post	TP-E		
	R0122230	Heatsink			
	R0122860	Shield Frame			
	R0122870A	Shield Cover			
	R0127720A	Shield Plate			
	R0111320	Ground Plate			
	R0125250	Ground Spring Plate			

# UHF VCO UNIT PARTS LAYOUT/CIRCUIT DIAGRAM

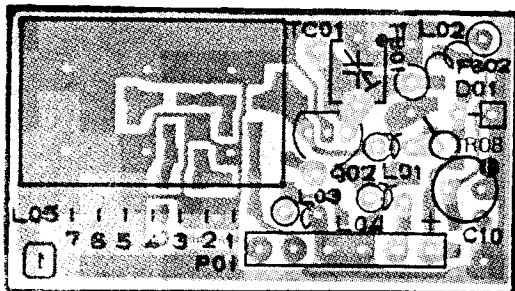
## 430MHz VCO UNIT(No.4 XXX)



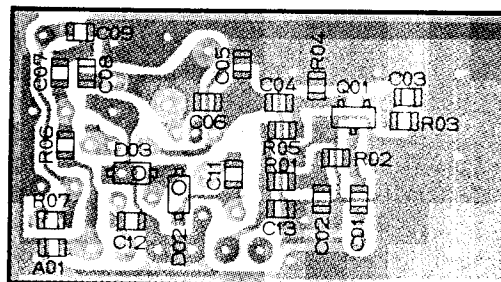
obverse view of "component" side



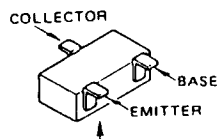
obverse view of "chip-only" side



reverse view of "component" side

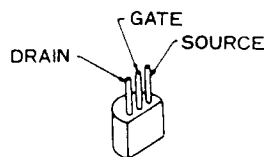


reverse view of "chip-only" side

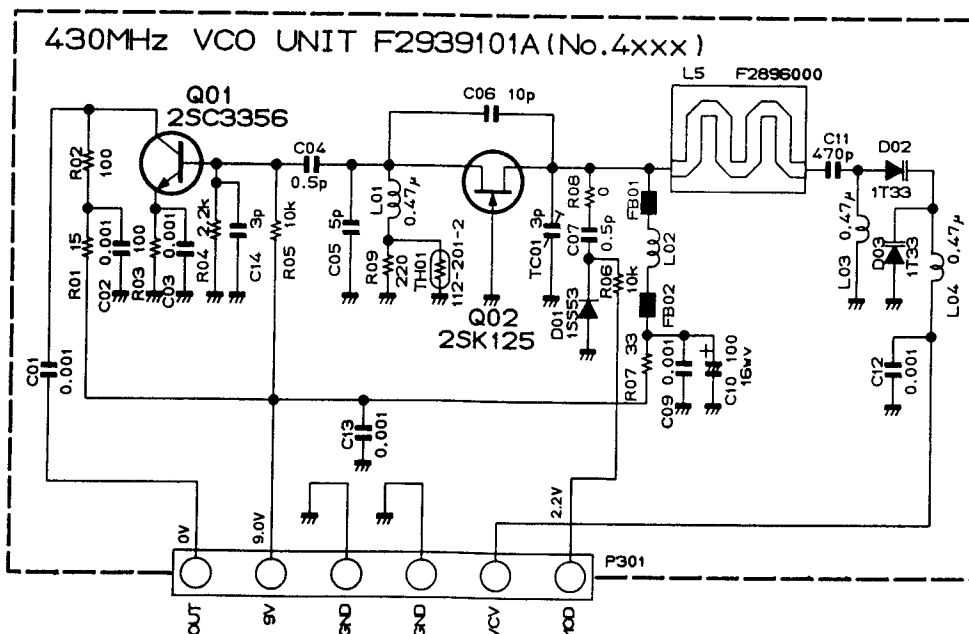


Marked Surface

2SC3356(R22) (Q4001)



2SK125(Q4002)

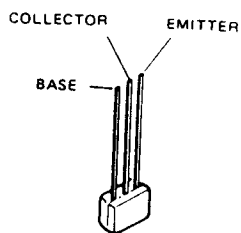
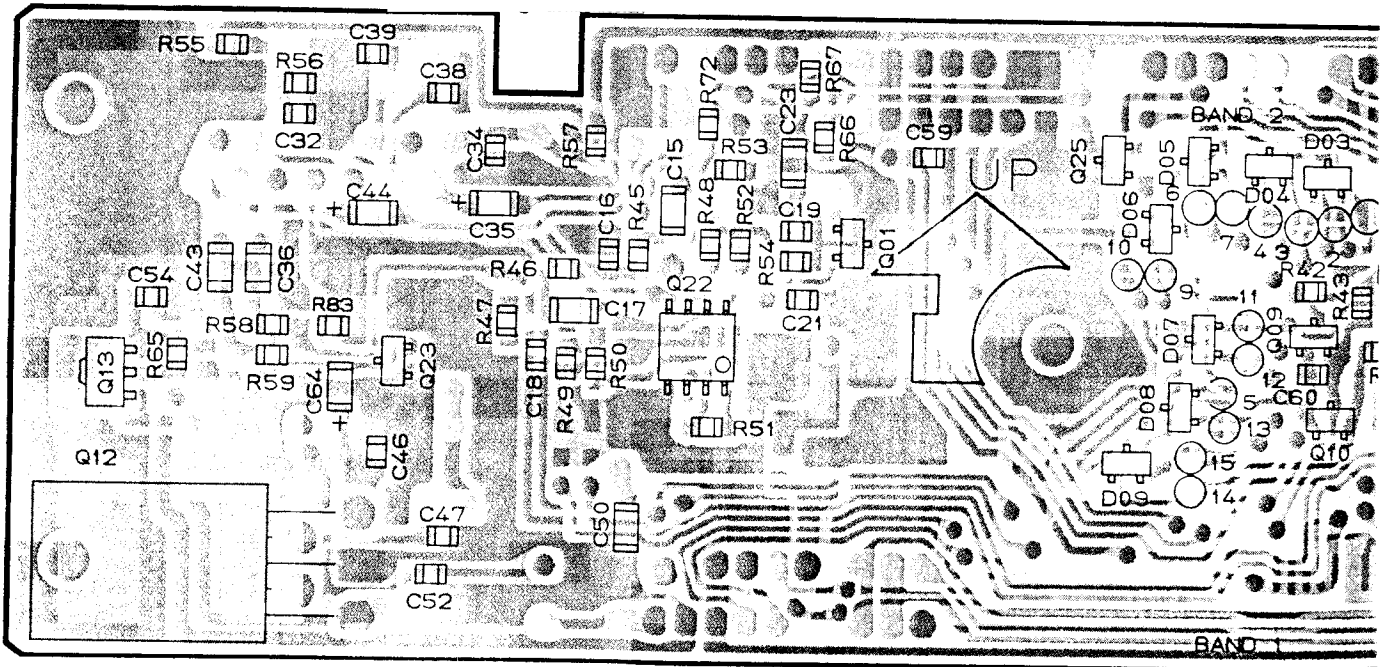
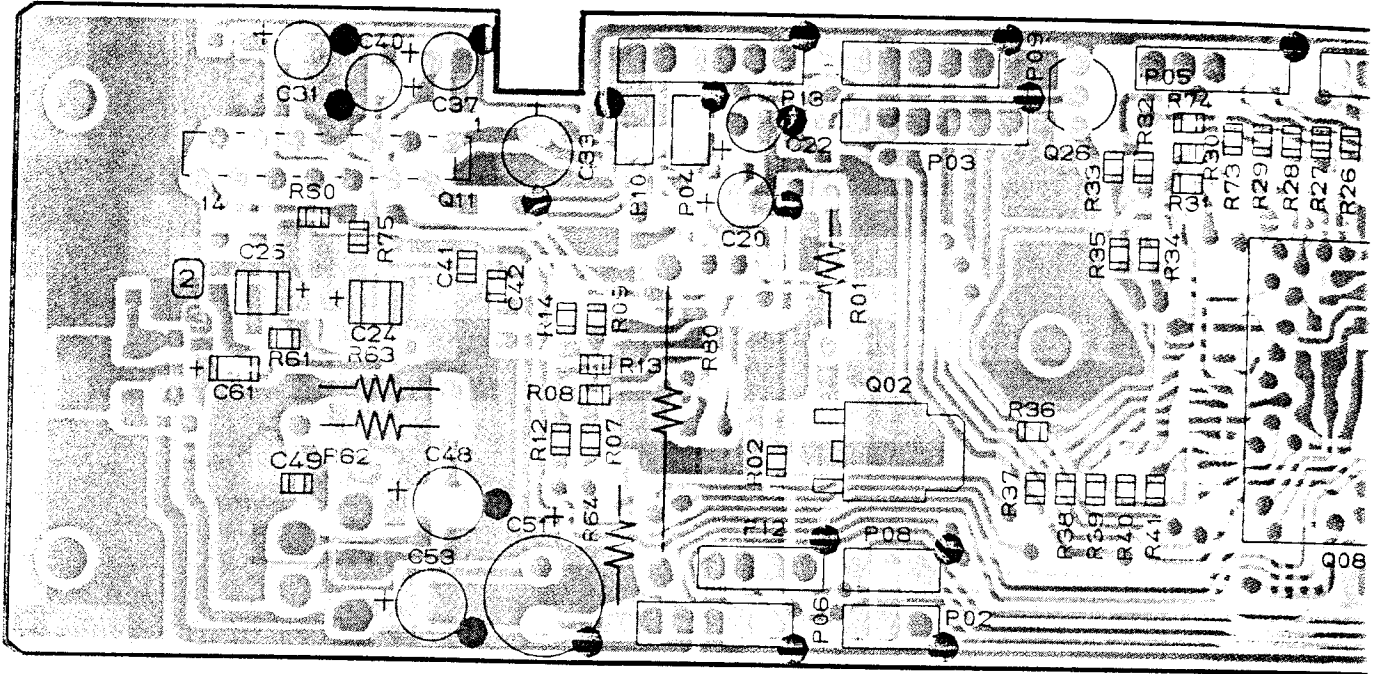


RESISTOR VALUES ARE IN  $\Omega$ , 1/10W:  
CAPACITOR VALUES ARE IN  $\mu$ F, 50V:  
INDUCTOR VALUES ARE IN H:  
UNLESS OTHERWISE NOTED.

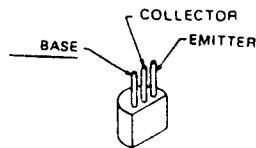
# UHF VCO UNIT PARTS LIST

\*\*\* 430 VCO UNIT \*\*\*

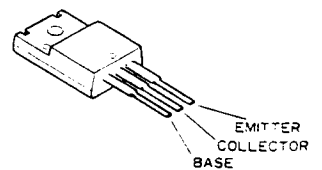
	C029391AA	PCB with Components			
	F2939101A	Printed Circuit Board			
Q4001	G3333567D	Transistor	2SC3356-T2B	R24	
Q4002	G3801250	FET	2SK125		
D4001	G2090027	Diode	1SS53		
D4002	G2070040	Diode	1T33-T7		
D4003	G2070040	Diode	1T33-T7		
TH4001	G9090026	Thermistor	112-201-2		
R4001	J24205150	Chip Res.	15 Ohm	1/10W	
R4002	J24205101	Chip Res.	100 Ohm	1/10W	
R4003	J24205101	Chip Res.	100 Ohm	1/10W	
R4004	J24205222	Chip Res.	2.2k Ohm	1/10W	
R4005	J24205103	Chip Res.	10k Ohm	1/10W	
R4006	J24205103	Chip Res.	10k Ohm	1/10W	
R4007	J24205330	Chip Res.	33 Ohm	1/10W	
R4008	J24205000	Chip Res.	0 Ohm	1/10W	
R4009	J24205151	Chip Res.	150 Ohm	1/10W	
C4001	K22170805	Chip Cap.	0.001uF	50V	B
C4002	K22170805	Chip Cap.	0.001uF	50V	B
C4003	K22170805	Chip Cap.	0.001uF	50V	B
C4004	K22170201	Chip Cap.	0.5pF	50V	CH
C4005	K22170205	Chip Cap.	4pF	50V	CH
C4006	K22170208	Chip Cap.	7pF	50V	CH
C4007	K22170201	Chip Cap.	0.5pF	50V	CH
C4009	K22170805	Chip Cap.	0.001uF	50V	B
C4010	K40129038	Al Electro Cap.	100uF	16V	
C4011	K22170251	Chip Cap.	470pF	50V	CH
C4012	K22170805	Chip Cap.	0.001uF	50V	B
C4013	K22170805	Chip Cap.	0.001uF	50V	B
C4014	K22170204	Chip Cap.	3pF	50V	CH
TC4001	K91000167	Trimmer Cap.	3pF		
L4001	L1190192	RFC	0.47uH		
L4002	L0021520	Coil			
L4003	L1190192	RFC	0.47uH		
L4004	L1190192	RFC	0.47uH		
L4005	F2896000	Strip Line			
P4001	P0090473	Connector	3022-06B		
FB4001	L9190001	Ferrite Bead	4A2 RI3x3x-1		
FB4002	L9190001	Ferrite Bead	4A2 RI3x3x-1		



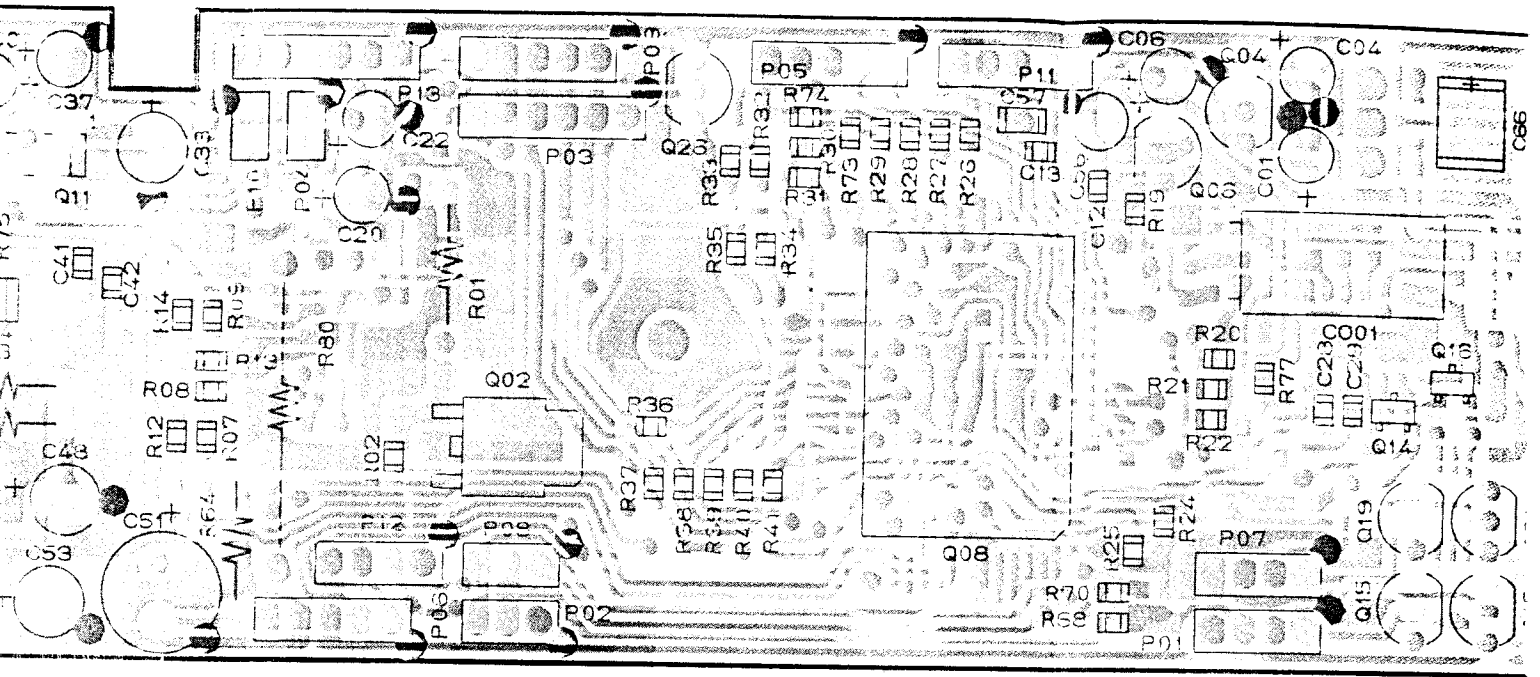
BN1A4M(Q5029)



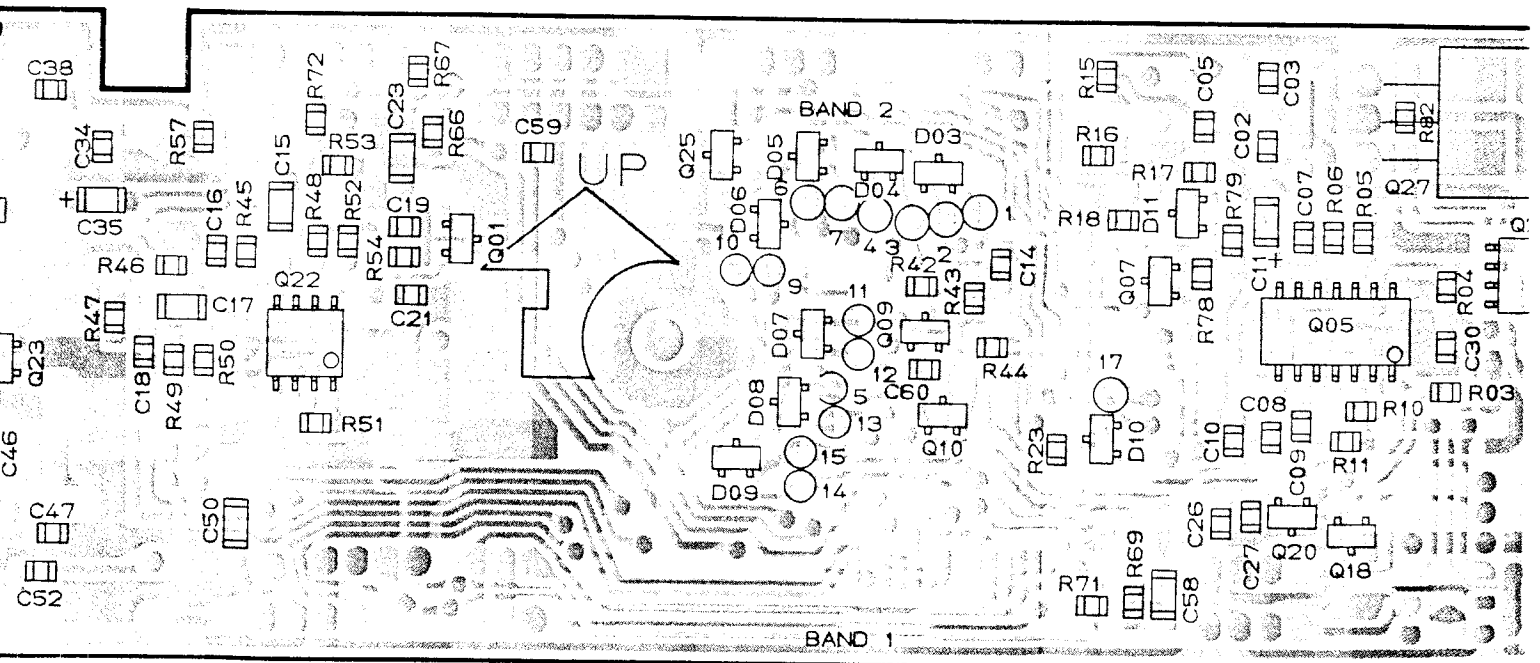
AQ1L2Q(Q5026)  
2SA1528  
(Q5015, 5017, 5019, 5021)



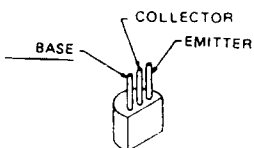
2SB1134R(Q5027)



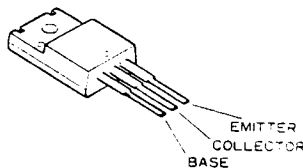
obverse view of "cor"



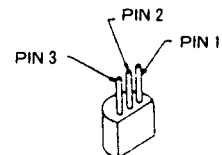
reverse view of "ct"



AQ1L2Q(Q5026)  
 2SA1528  
 (Q5015, 5017, 5019, 5021)

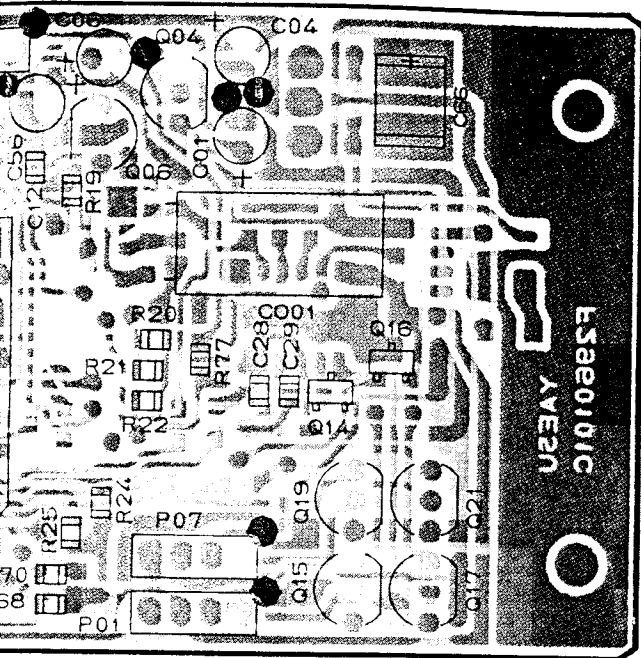


2SB1134R(Q5027)

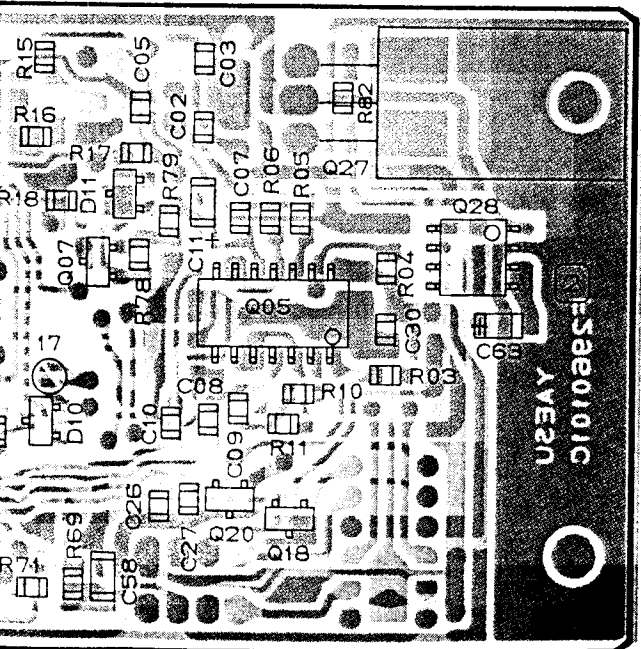


PST523C-2(Q5006)

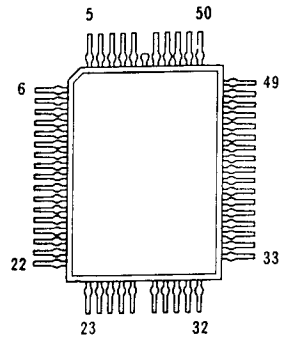
# CONTROL UNIT PARTS LAYOUT



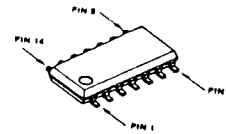
obverse view of "component" side



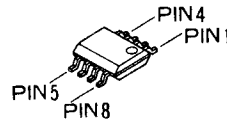
reverse view of "chip-only" side



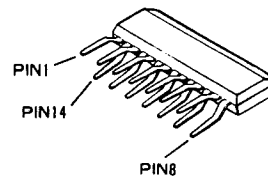
HD44820B75(Q5008)



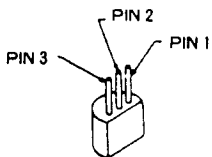
$\mu$ PD4001BG(Q5005)



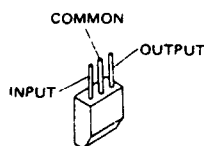
M5223FP(Q5022)  
TK11701M(Q5028)



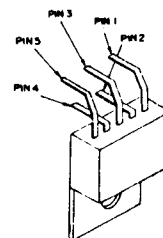
M51523AL(Q5011)



PST523C-2(Q5006)



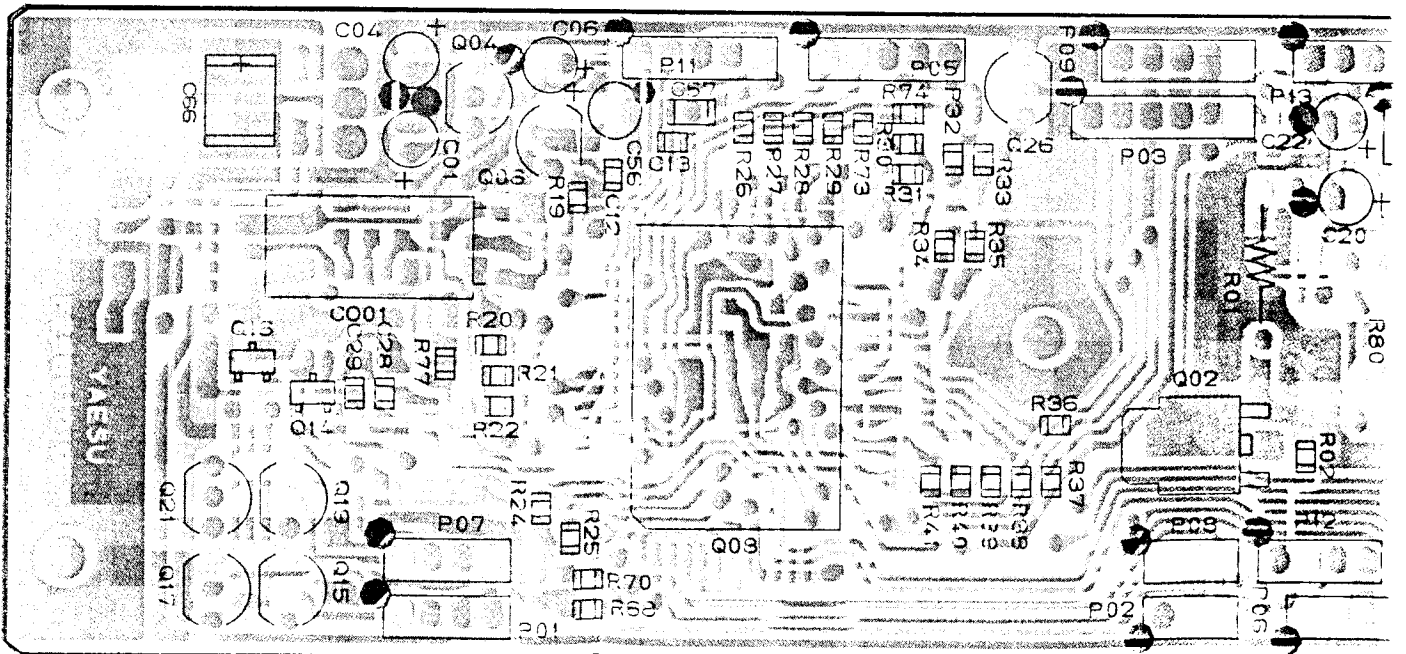
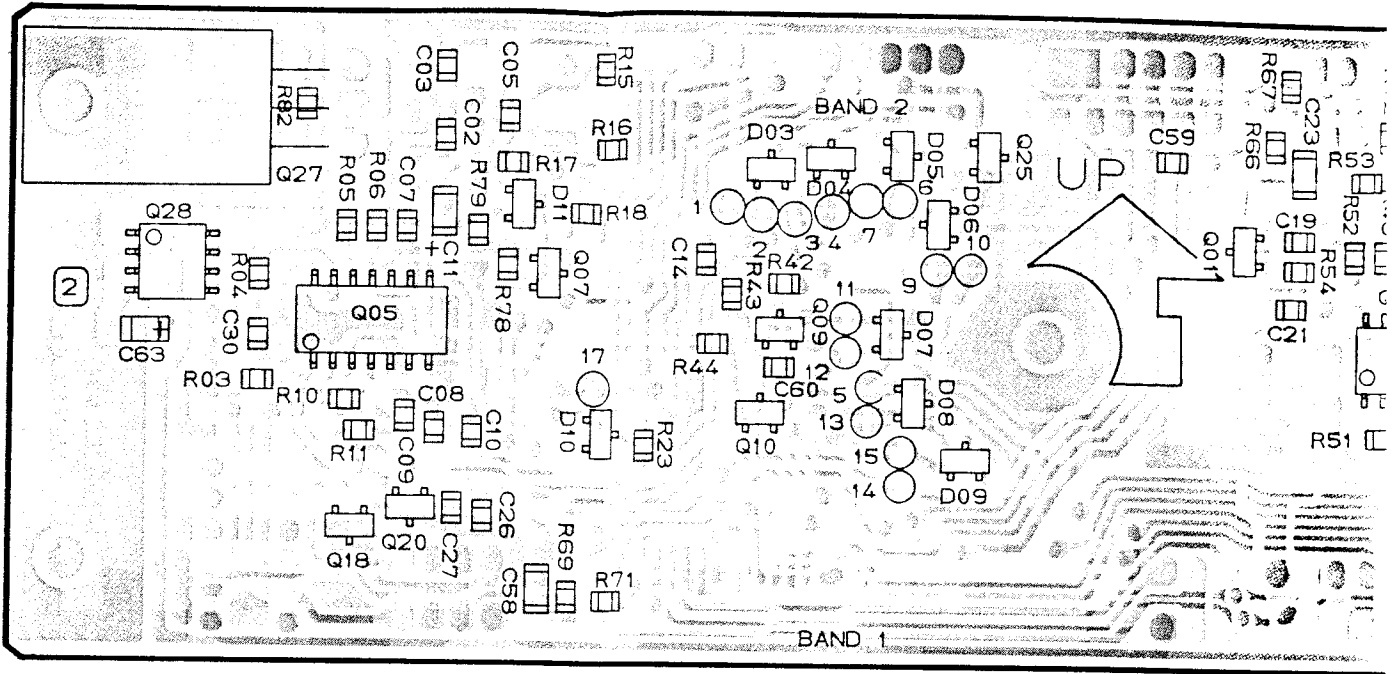
$\mu$ PC78L05(Q5004)



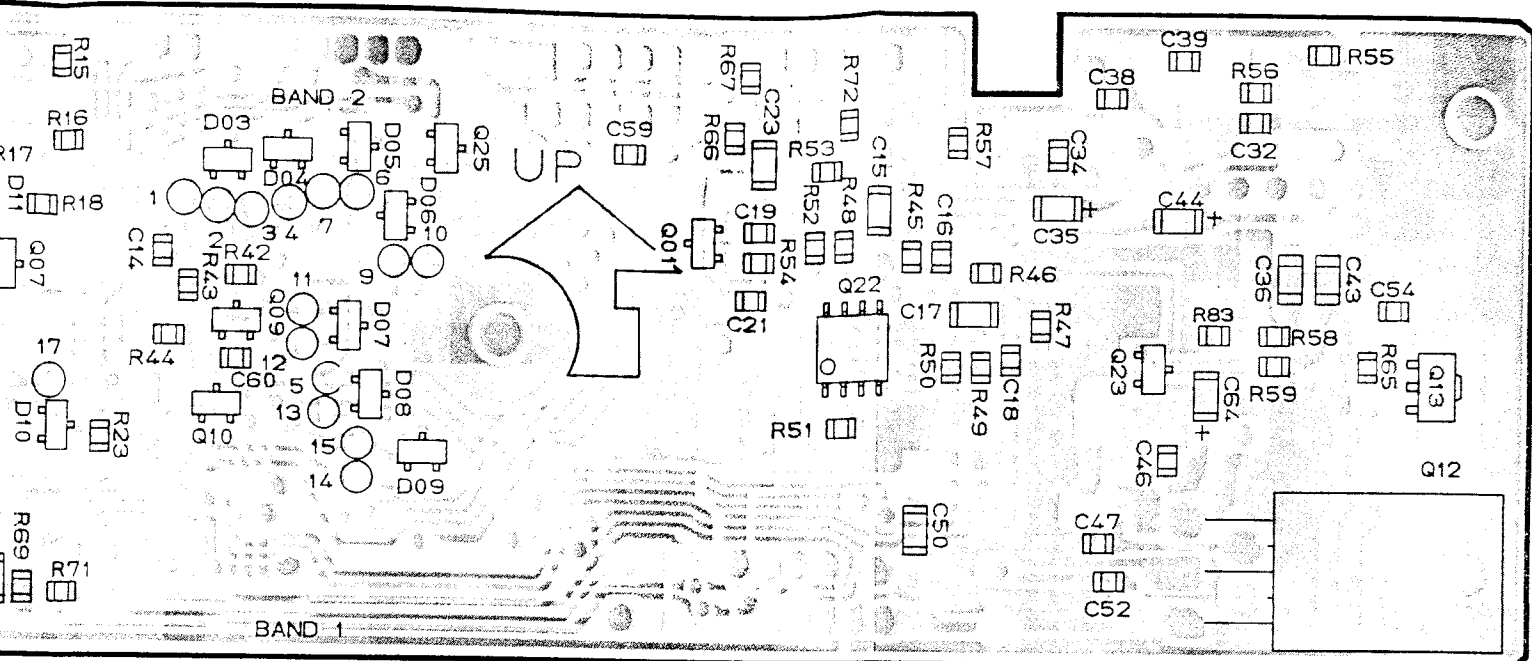
TDA2003(Q5012)



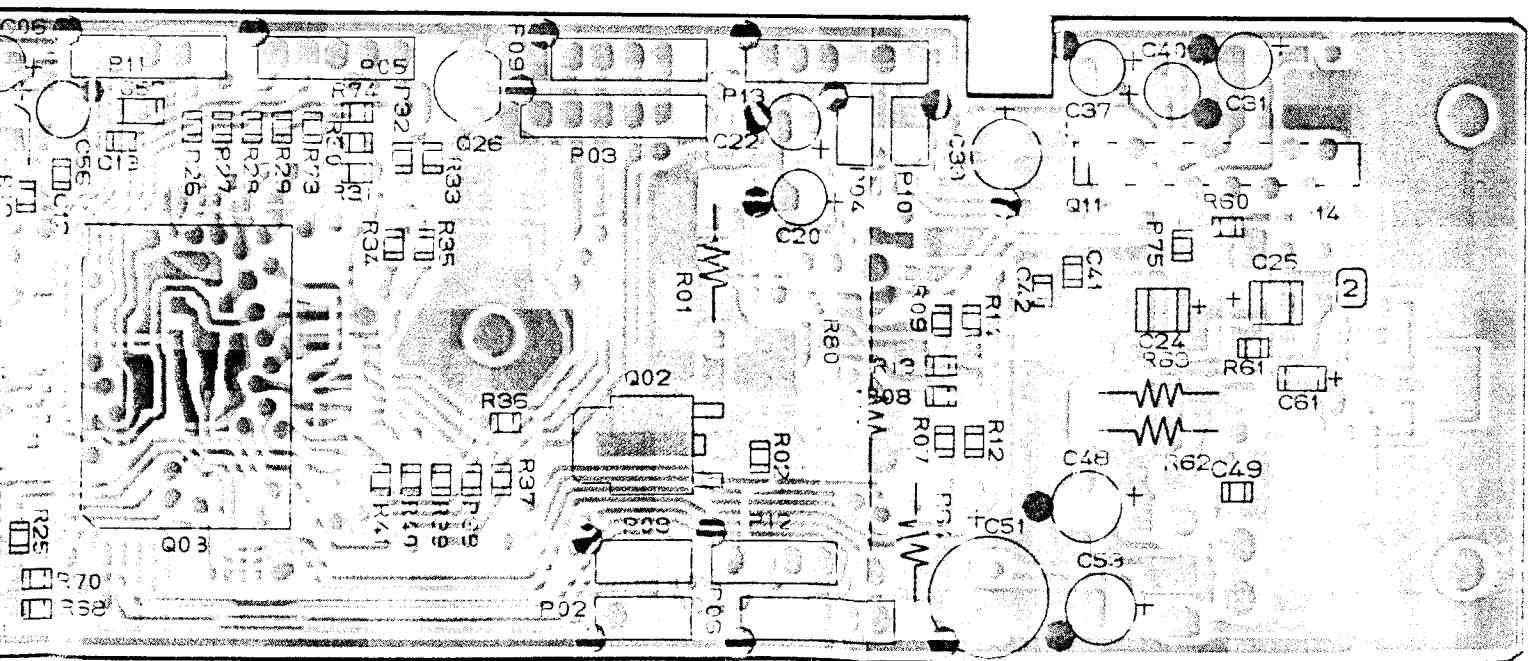
# CONTROL UNIT PARTS LAYOUT



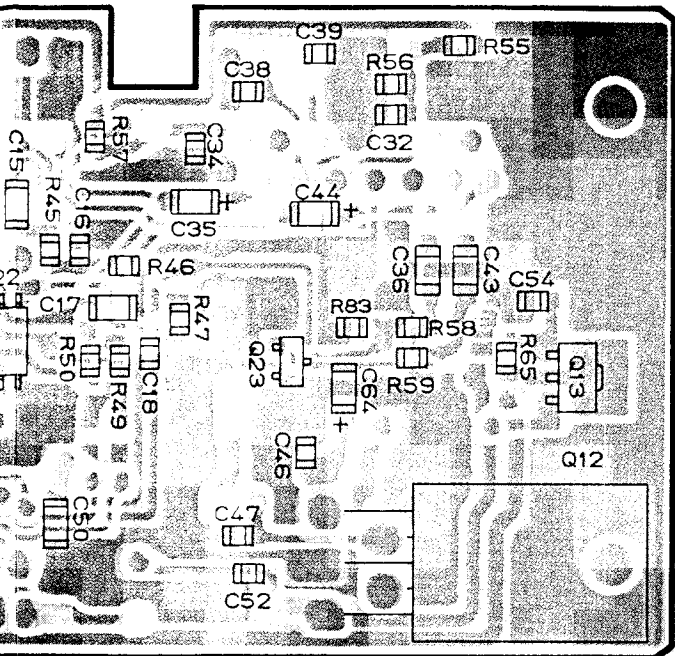
# PARTS LAYOUT



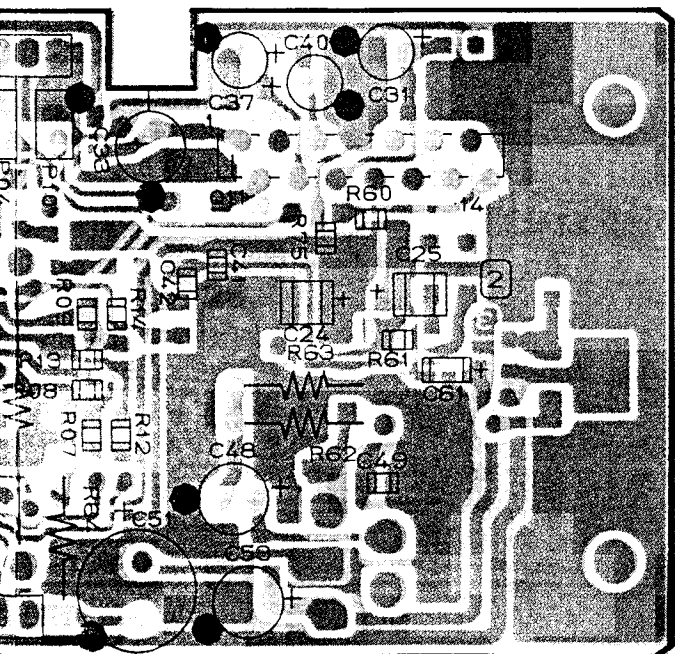
obverse view of "chip-only" side



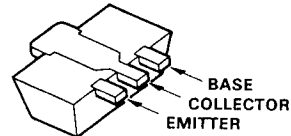
reverse view of "component" side



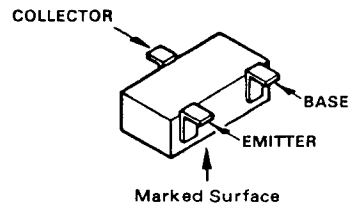
obverse view of "chip-only" side



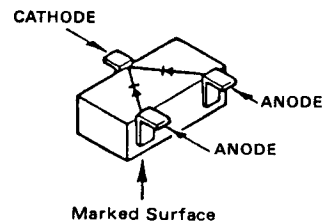
reverse view of "component" side



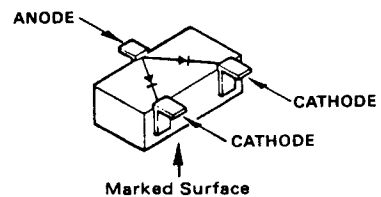
2SD1000(LL) (Q5013)



- 2SA1162(SG) (Q5007)
- FA1A4M(L33) (Q5009, 5010)
- FA1F4N(R24) (Q5023)
- FA1L4L(L30) (Q5025)
- FN1A4M(M33)
- (Q5014, 5016, 5018, 5020)
- FN1A4P(M34) (Q5001)

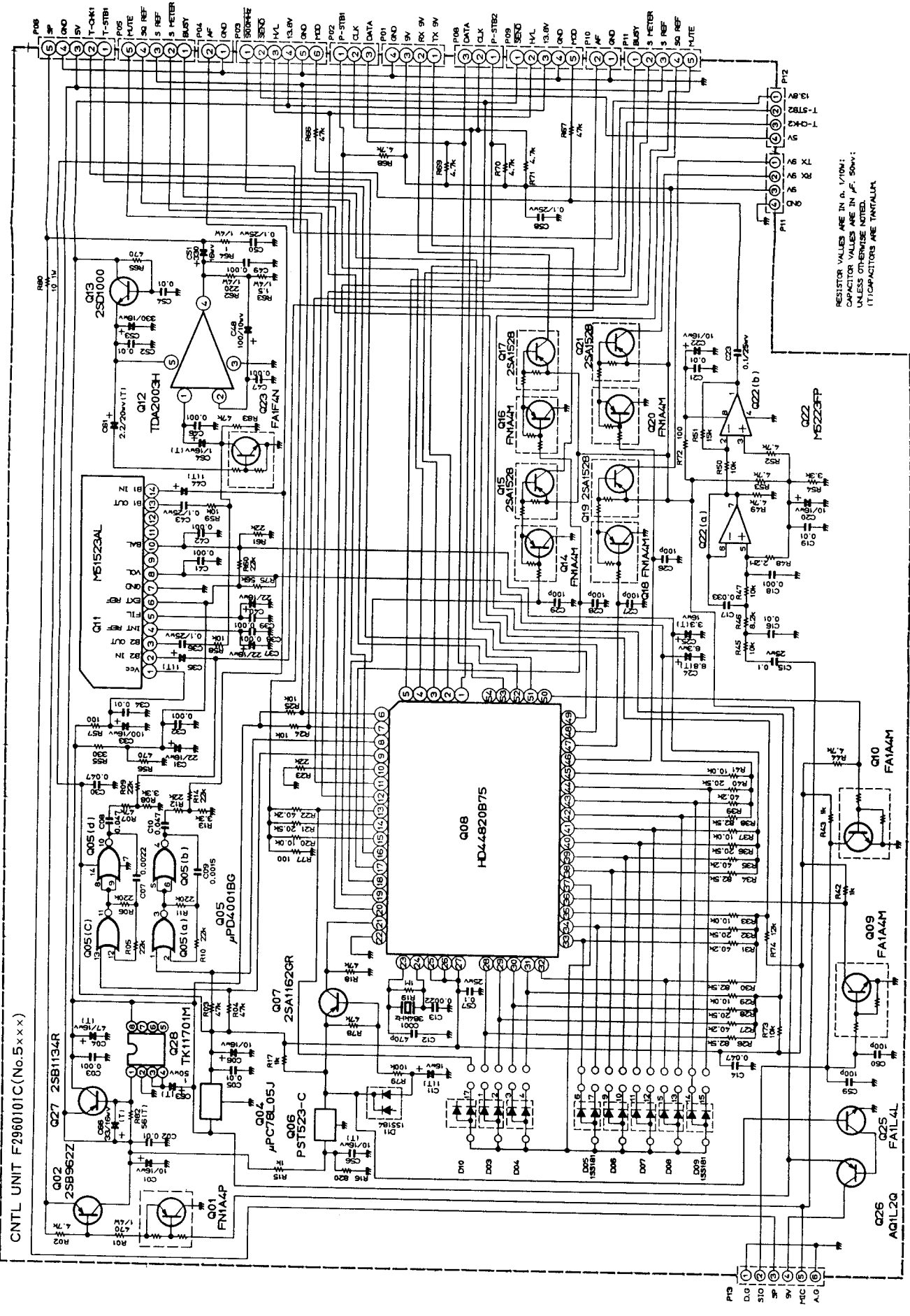


1SS184(B3) (D5011)



1SS181(A3)  
(D5002, 5007, 5009)

# CONTROL UNIT CIRCUIT DIAGRAM



RESISTOR VALUES ARE IN Ω, 1/10W;  
 CAPACITOR VALUES ARE IN µF, 50V;  
 UNLESS OTHERWISE NOTED.  
 (†) CAPACITORS ARE TANTALUM.

CNTL UNIT F2960101C (No. 5x x x x)

# NOTES

# CONTROL UNIT PARTS LIST

## \*\*\* CONTROL UNIT \*\*\*

	C029601AC	PCB with Components	A1	
	C029601AD	PCB with Components	A2	
	C029601AE	PCB with Components	A3	
	C029601AF	PCB with Components	B1	
	C029601AG	PCB with Components	B2	
	C029601AH	PCB with Components	B3	
	C029601AJ	PCB with Components	C1	
	C029601AK	PCB with Components	C2	
	C029601AL	PCB with Components	C3	
	C029601AM	PCB with Components	H1	
	C029601AN	PCB with Components	H2	
	C029601AP	PCB with Components	H3	
	C029601AQ	PCB with Components	D	
	F2960101C	Printed Circuit Board		
Q5001	G3070011	Transistor	FN1A4P-T2B	
Q5002	G3090085	Transistor	2SB962P-Z	
Q5004	G1090848	IC	uPC78L05J	
Q5005	G1090601	IC	uPD4001BG	
Q5006	G1090812	IC	PST523C-2	
Q5007	G3111627G	Transistor	2SA1162GR TE85R	
Q5008	G1090833	IC	HD44820B75	
Q5009	G3070001	Transistor	FA1A4M-T2B	
Q5010	G3070001	Transistor	FA1A4M-T2B	
Q5011	G1090854	IC	M51523AL	
Q5012	G1090815	IC	TDA2003H	
Q5013	G3410007L	Transistor	2SD1000-T2B	
Q5014	G3070005	Transistor	FN1A4M-T2B	
Q5015	G3115280	Transistor	2SA1528	
Q5016	G3070005	Transistor	FN1A4M-T2B	
Q5017	G3115280	Transistor	2SA1528	
Q5018	G3070005	Transistor	FN1A4M-T2B	
Q5019	G3115280	Transistor	2SA1528	
Q5020	G3070005	Transistor	FN1A4M-T2B	
Q5021	G3115280	Transistor	2SA1528	
Q5022	G1090846	IC	M5223FP	
Q5023	G3070007	Transistor	FA1F4N-T2B	
Q5025	G3070014	Transistor	FA1L4L-T2B	
Q5026	G3090088	Transistor	AQ1L2Q	
Q5027	G3211340R	Transistor	2SB1134R	
Q5028	G1090916	IC	TK11701M	
D5005	G2070001	Diode	1SS181 TE85R	
D5007	G2070001	Diode	1SS181 TE85R	
D5009	G2070001	Diode	1SS181 TE85R	
D5011	G2070009	Diode	1SS184 TE85R	
C05001	H7900450	Ceramic Resonator	CSB384P	
R5001	J01245471	Carbon Film Res.	470 Ohm	1/4W
R5002	J24205472	Chip Res.	4.7k Ohm	1/10W
R5003	J24205473	Chip Res.	47k Ohm	1/10W
R5004	J24205473	Chip Res.	47k Ohm	1/10W
R5005	J24205223	Chip Res.	22k Ohm	1/10W
R5006	J24205224	Chip Res.	220k Ohm	1/10W
R5007	J24205473	Chip Res.	47k Ohm	1/10W
R5008	J24205682	Chip Res.	6.8k Ohm	1/10W
R5009	J24205223	Chip Res.	22k Ohm	1/10W
R5010	J24205223	Chip Res.	22k Ohm	1/10W



# CONTROL UNIT PARTS LIST

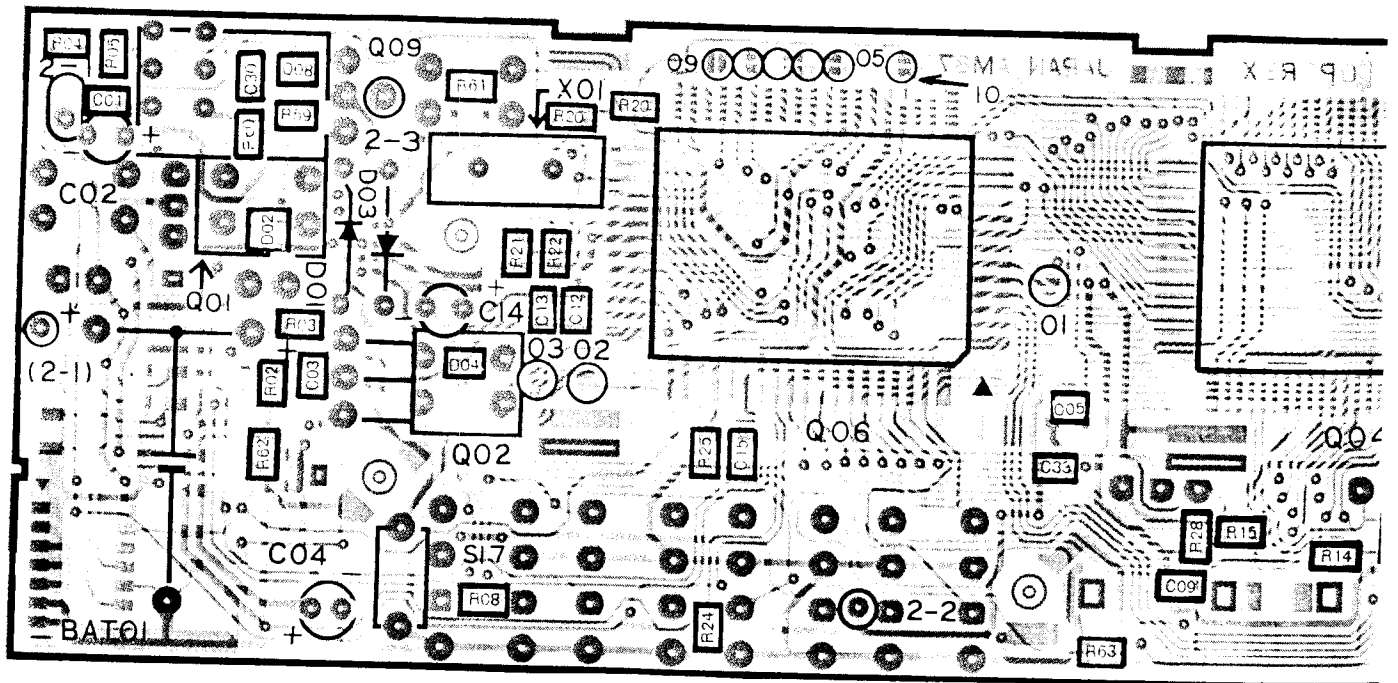
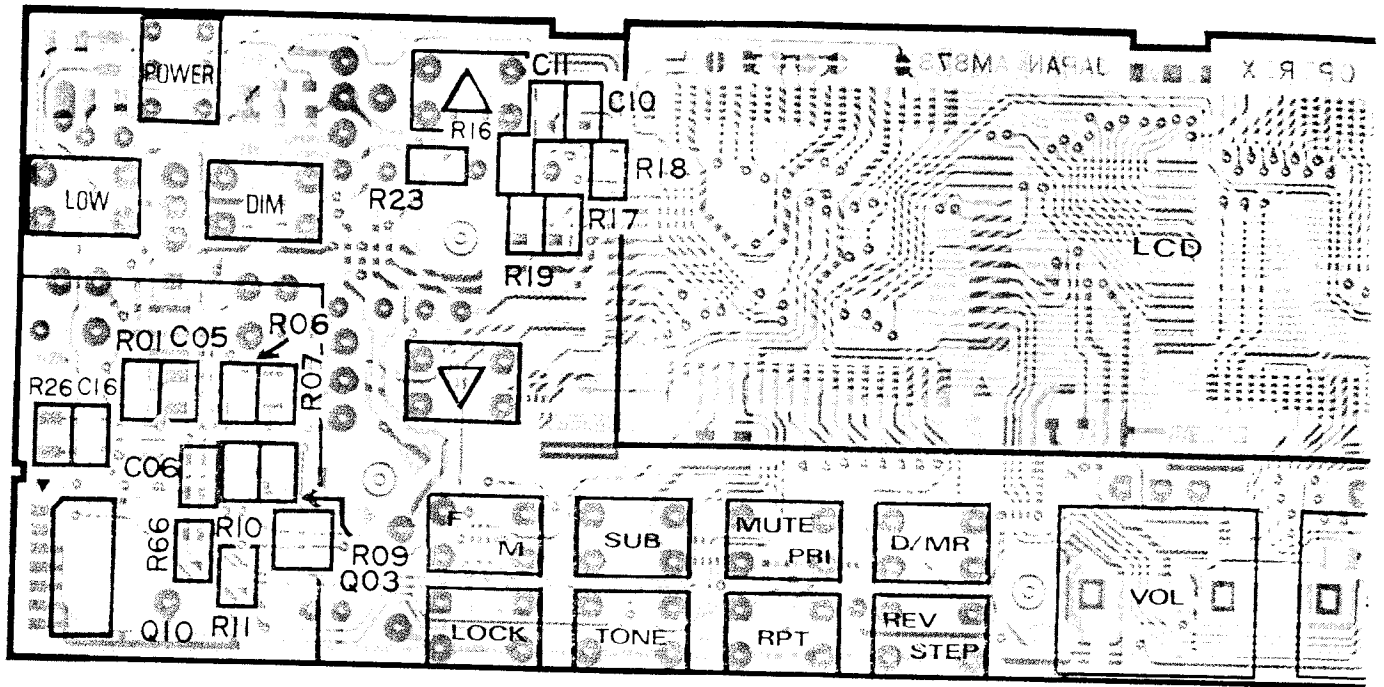
R5011	J24205224	Chip Res.	220k Ohm	1/10W
R5012	J24205223	Chip Res.	22k Ohm	1/10W
R5013	J24205682	Chip Res.	6.8k Ohm	1/10W
R5014	J24205223	Chip Res.	22k Ohm	1/10W
R5015	J24205102	Chip Res.	1k Ohm	1/10W
R5016	J24205821	Chip Res.	820 Ohm	1/10W
R5017	J24205102	Chip Res.	1k Ohm	1/10W
R5018	J24205473	Chip Res.	47k Ohm	1/10W
R5019	J24205105	Chip Res.	1M Ohm	1/10W
R5020	J24209001	Chip Res.	10.0k Ohm	1/10W
R5021	J24209002	Chip Res.	20.5k Ohm	1/10W
R5022	J24209003	Chip Res.	40.2k Ohm	1/10W
R5023	J24205223	Chip Res.	22k Ohm	1/10W
R5024	J24205103	Chip Res.	10k Ohm	1/10W
R5025	J24205103	Chip Res.	10k Ohm	1/10W
R5026	J24209004	Chip Res.	82.5K Ohm	1/10W
R5027	J24209003	Chip Res.	40.2k Ohm	1/10W
R5028	J24209002	Chip Res.	20.5k Ohm	1/10W
R5029	J24209001	Chip Res.	10.0k Ohm	1/10W
R5030	J24209004	Chip Res.	82.5K Ohm	1/10W
R5031	J24209003	Chip Res.	40.2k Ohm	1/10W
R5032	J24209002	Chip Res.	20.5k Ohm	1/10W
R5033	J24209001	Chip Res.	10.0k Ohm	1/10W
R5034	J24209004	Chip Res.	82.5K Ohm	1/10W
R5035	J24209003	Chip Res.	40.2k Ohm	1/10W
R5036	J24209002	Chip Res.	20.5k Ohm	1/10W
R5037	J24209001	Chip Res.	10.0k Ohm	1/10W
R5038	J24209004	Chip Res.	82.5K Ohm	1/10W
R5039	J24209003	Chip Res.	40.2k Ohm	1/10W
R5040	J24209002	Chip Res.	20.5k Ohm	1/10W
R5041	J24209001	Chip Res.	10.0k Ohm	1/10W
R5042	J24205102	Chip Res.	1k Ohm	1/10W
R5043	J24205102	Chip Res.	1k Ohm	1/10W
R5044	J24205472	Chip Res.	4.7k Ohm	1/10W
R5045	J24205103	Chip Res.	10k Ohm	1/10W
R5046	J24205822	Chip Res.	8.2k Ohm	1/10W
R5047	J24205103	Chip Res.	10k Ohm	1/10W
R5048	J24205225	Chip Res.	2.2M Ohm	1/10W
R5049	J24205472	Chip Res.	4.7k Ohm	1/10W
R5050	J24205103	Chip Res.	10k Ohm	1/10W
R5051	J24205153	Chip Res.	15k Ohm	1/10W
R5052	J24205472	Chip Res.	4.7k Ohm	1/10W
R5053	J24205472	Chip Res.	4.7k Ohm	1/10W
R5054	J24205332	Chip Res.	3.3k Ohm	1/10W
R5055	J24205331	Chip Res.	330 Ohm	1/10W
R5056	J24205471	Chip Res.	470 Ohm	1/10W
R5057	J24205101	Chip Res.	100 Ohm	1/10W
R5058	J24205103	Chip Res.	10k Ohm	1/10W
R5059	J24205103	Chip Res.	10k Ohm	1/10W
R5060	J24205223	Chip Res.	22k Ohm	1/10W
R5061	J24205223	Chip Res.	22k Ohm	1/10W
R5062	J01245221	Carbon Film Res.	220 Ohm	1/4W
R5063	J01245339	Carbon Film Res.	3.3 Ohm	1/4W
R5064	J01245010	Carbon Film Res.	1 Ohm	1/4W
R5065	J24205471	Chip Res.	470 Ohm	1/10W
R5066	J24205473	Chip Res.	47k Ohm	1/10W
R5067	J24205473	Chip Res.	47k Ohm	1/10W
R5068	J24205472	Chip Res.	4.7k Ohm	1/10W
R5069	J24205472	Chip Res.	4.7k Ohm	1/10W
R5070	J24205472	Chip Res.	4.7k Ohm	1/10W
R5071	J24205472	Chip Res.	4.7k Ohm	1/10W
R5072	J24205101	Chip Res.	100 Ohm	1/10W

# CONTROL UNIT PARTS LIST

R5073	J24205103	Chip Res.	10k Ohm	1/10W	
R5074	J24205123	Chip Res.	12k Ohm	1/10W	
R5075	J24205563	Chip Res.	56k Ohm	1/10W	
R5077	J24205101	Chip Res.	100 Ohm	1/10W	
R5078	J24205104	Chip Res.	100k Ohm	1/10W	
R5079	J24205104	Chip Res.	100k Ohm	1/10W	
R5080	J20306100	Metallic Film Res.	10 Ohm	1W	
R5082	J24205560	Chip Res.	56 Ohm	1/10W	
R5083	J24205473	Chip Res.	47k Ohm	1/10W	
C5001	K40129012	Al Electro Cap.	10uF	16V	
C5002	K22170817	Chip Cap.	0.01uF	50V	B
C5003	K22170817	Chip Cap.	0.01uF	50V	B
C5004	K70127476	Tantalum Cap.	47uF	16V	
C5005	K22170817	Chip Cap.	0.01uF	50V	B
C5006	K40129012	Al Electro Cap.	10uF	16V	
C5007	K22170809	Chip Cap.	0.0022uF	50V	B
C5008	K22171008	Chip Cap.	0.047uF	50V	F
C5009	K22170807	Chip Cap.	0.0015uF	50V	B
C5010	K22171008	Chip Cap.	0.047uF	50V	B
C5011	K78120009	Tantalum Chip Cap.	1uF	16V	
C5012	K22170801	Chip Cap.	470pF	50V	B
C5013	K22170809	Chip Cap.	0.0022uF	50V	B
C5014	K22171008	Chip Cap.	0.047uF	50V	F
C5015	K22141809	Chip Cap.	0.1uF	25V	B
C5016	K22170817	Chip Cap.	0.01uF	50V	B
C5017	K22141806	Chip Cap.	0.033uF	25V	B
C5018	K22170805	Chip Cap.	0.001uF	50V	B
C5019	K22170817	Chip Cap.	0.01uF	50V	B
C5020	K40129012	Al Electro Cap.	10uF	16V	
C5021	K22170817	Chip Cap.	0.01uF	50V	B
C5022	K40129012	Al Electro Cap.	10uF	16V	
C5023	K22141809	Chip Cap.	0.1uF	25V	B
C5024	K78080011	Tantalum Chip Cap.	6.8uF	6.3V	
C5025	K78120010	Tantalum Chip Cap.	3.3uF	16V	
C5026	K22170235	Chip Cap.	100pF	50V	CH
C5027	K22170235	Chip Cap.	100pF	50V	CH
C5028	K22170235	Chip Cap.	100pF	50V	CH
C5029	K22170235	Chip Cap.	100pF	50V	CH
C5030	K22171008	Chip Cap.	0.047uF	50V	
C5031	K40129013	Al Electro Cap.	22uF	16V	
C5032	K22170805	Chip Cap.	0.001uF	50V	B
C5033	K40129038	Al Electro Cap.	100uF	16V	
C5034	K22170817	Chip Cap.	0.01uF	50V	B
C5035	K78120009	Tantalum Chip Cap.	1uF	16V	
C5036	K22141809	Chip Cap.	0.1uF	25V	B
C5037	K40129013	Al Electro Cap.	22uF	16V	
C5038	K22170805	Chip Cap.	0.001uF	50V	B
C5039	K22170805	Chip Cap.	0.001uF	50V	B
C5040	K40129013	Al Electro Cap.	22uF	16V	
C5041	K22170805	Chip Cap.	0.001uF	50V	B
C5042	K22170805	Chip Cap.	0.001uF	50V	B
C5043	K22141809	Chip Cap.	0.1uF	25V	B
C5044	K78120009	Tantalum Chip Cap.	1uF	16V	
C5046	K22170805	Chip Cap.	0.001uF	50V	B
C5047	K22170805	Chip Cap.	0.001uF	50V	B
C5048	K40109015	Al Electro Cap.	100uF	10V	
C5049	K22170805	Chip Cap.	0.001uF	50V	B
C5050	K22141809	Chip Cap.	0.1uF	25V	B
C5051	K40129043	Al Electro Cap.	330uF	16V	
C5052	K22170817	Chip Cap.	0.01uF	50V	B
C5053	K40129043	Al Electro Cap.	330uF	16V	

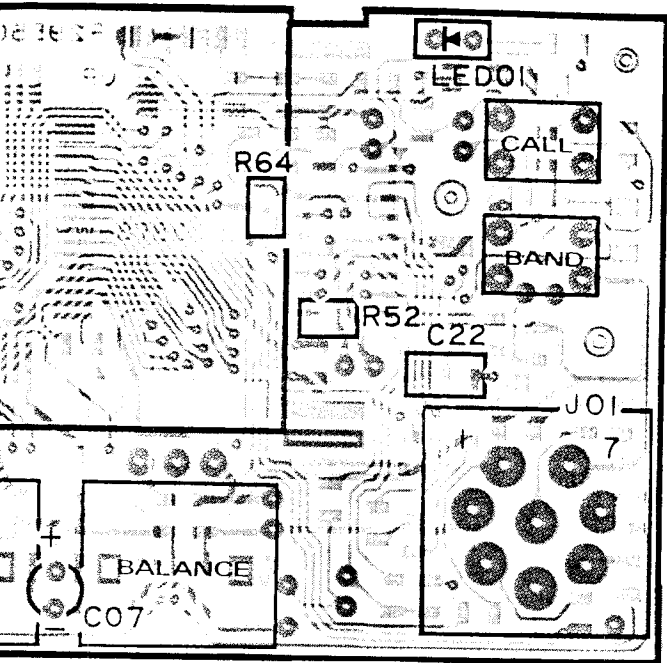
# CONTROL UNIT PARTS LIST

C5054	K22170817	Chip Cap.	0.01uF	50V	B
C5056	K40129012	Al Electro Cap.	10uF	16V	
C5057	K22141809	Chip Cap.	0.1uF	25V	B
C5058	K22141809	Chip Cap.	0.1uF	25V	B
C5059	K22170235	Chip Cap.	100pF	50V	CH
C5060	K22170235	Chip Cap.	100pF	50V	CH
C5061	K78130010	Tantalum Chip Cap.	2.2uF	20V	
C5063	K78120009	Tantalum Chip Cap.	1uF	16V	
C5064	K78120009	Tantalum Chip Cap.	1uF	16V	
C5066	K70127336	Tantalum Cap.	33uF	16V	
P5001	T9205650	Wire Assy			
P5002	T9205651A	Wire Assy			
P5003	T9205652A	Wire Assy			
P5004	T9205653	Wire Assy w/ P5005			
P5006	T9205655B	Wire Assy			
P5007	T9205656	Wire Assy			
P5008	T9205657A	Wire Assy			
P5009	T9205658A	Wire Assy			
P5010	T9205659	Wire Assy w/ P5011			
P5012	T9205660B	Wire Assy			
P5013	T9205647B	Wire Assy			
	Q9000192	Thermal Gasket	30F-TO-220		

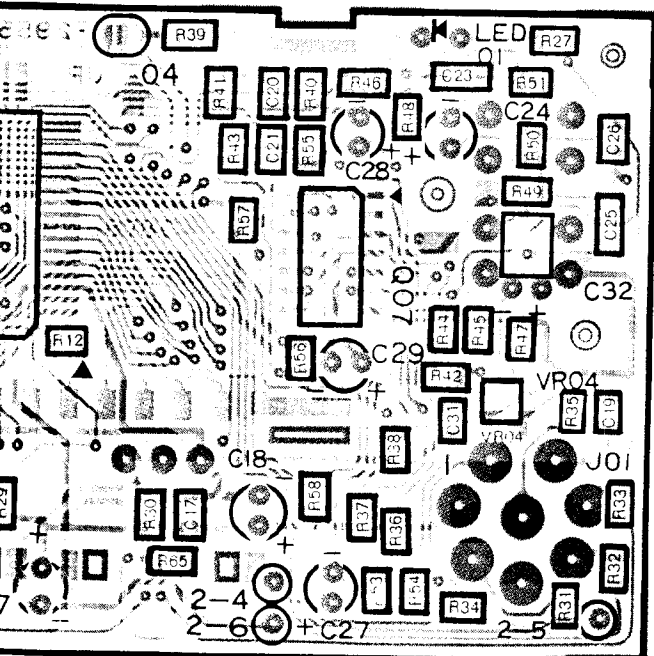




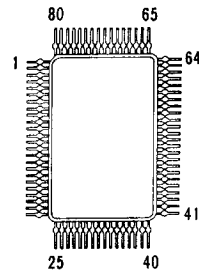
# PANEL UNIT PARTS LAYOUT



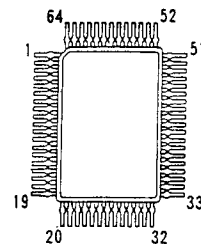
obverse view of "component" side



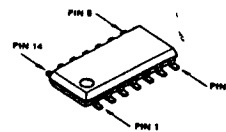
reverse view of "chip-only" side



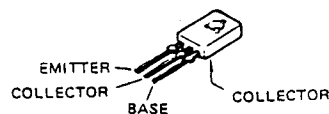
HD61602R(Q6004)



HD404418A09F(Q6006)



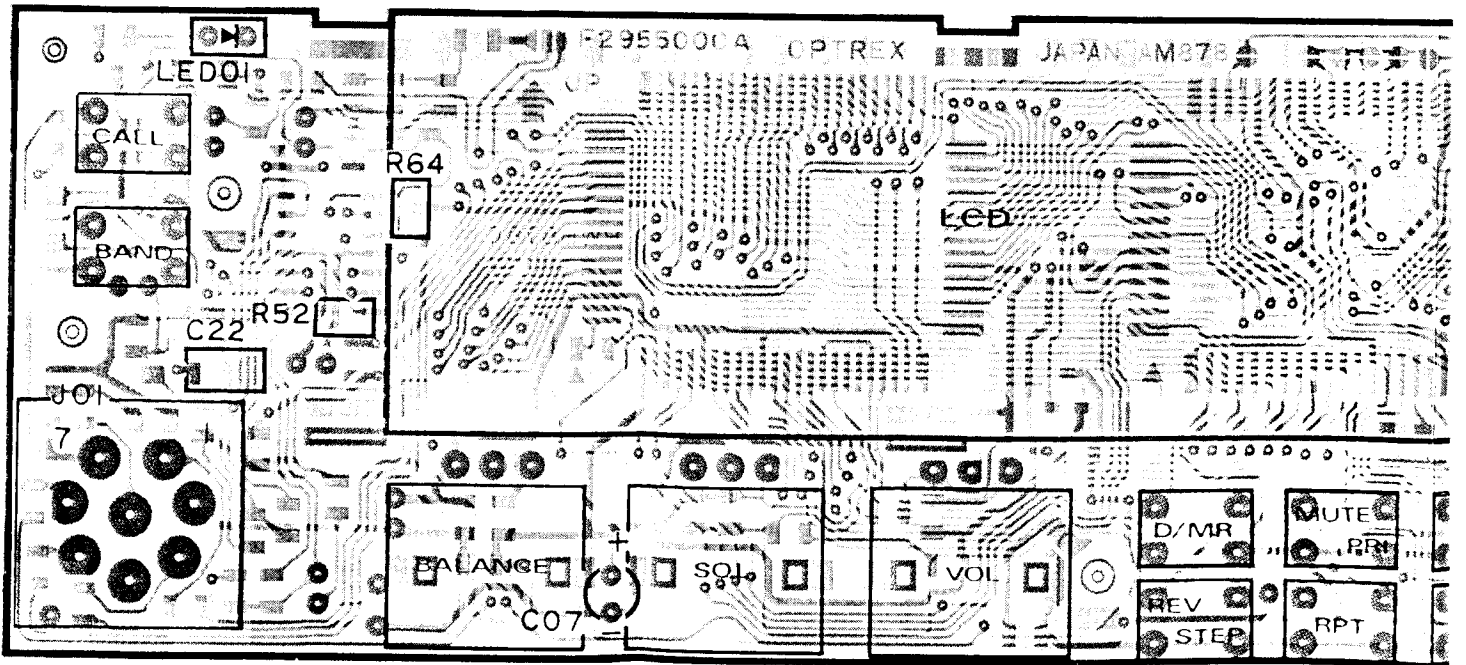
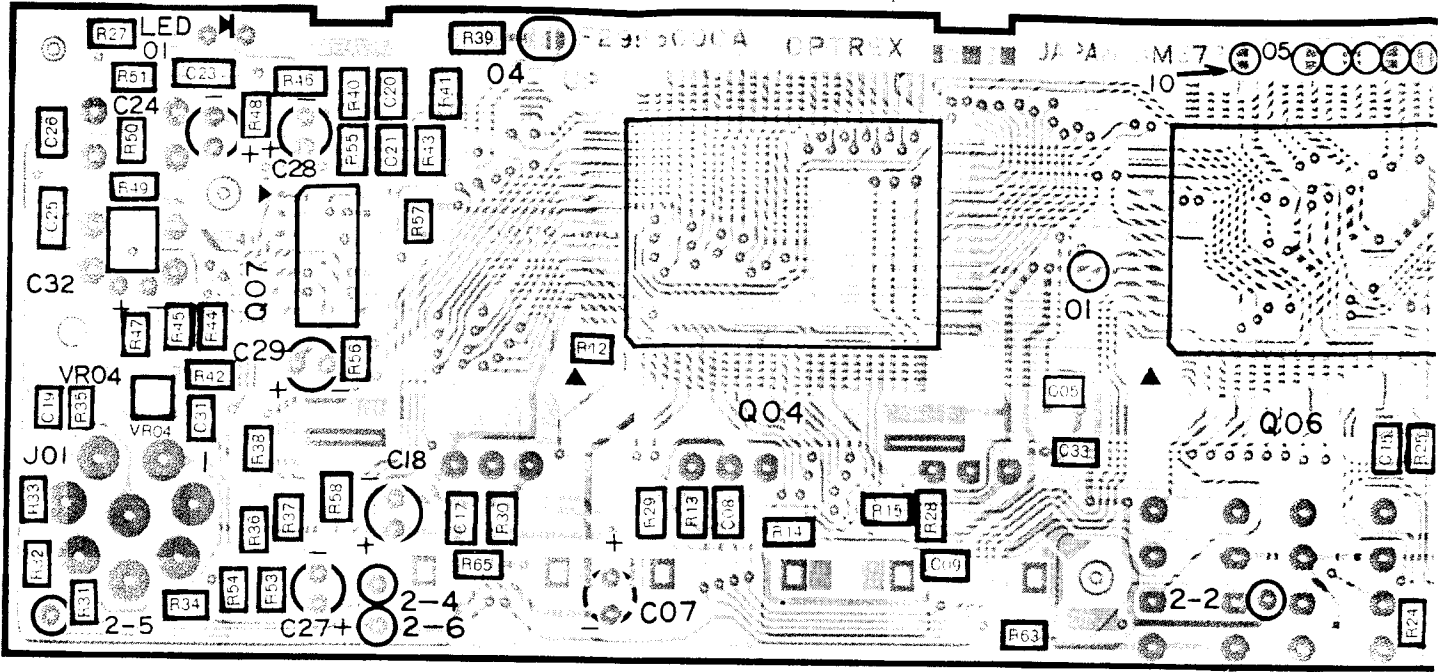
M5224FP(Q6007)  
μPD4013BG(Q6010)



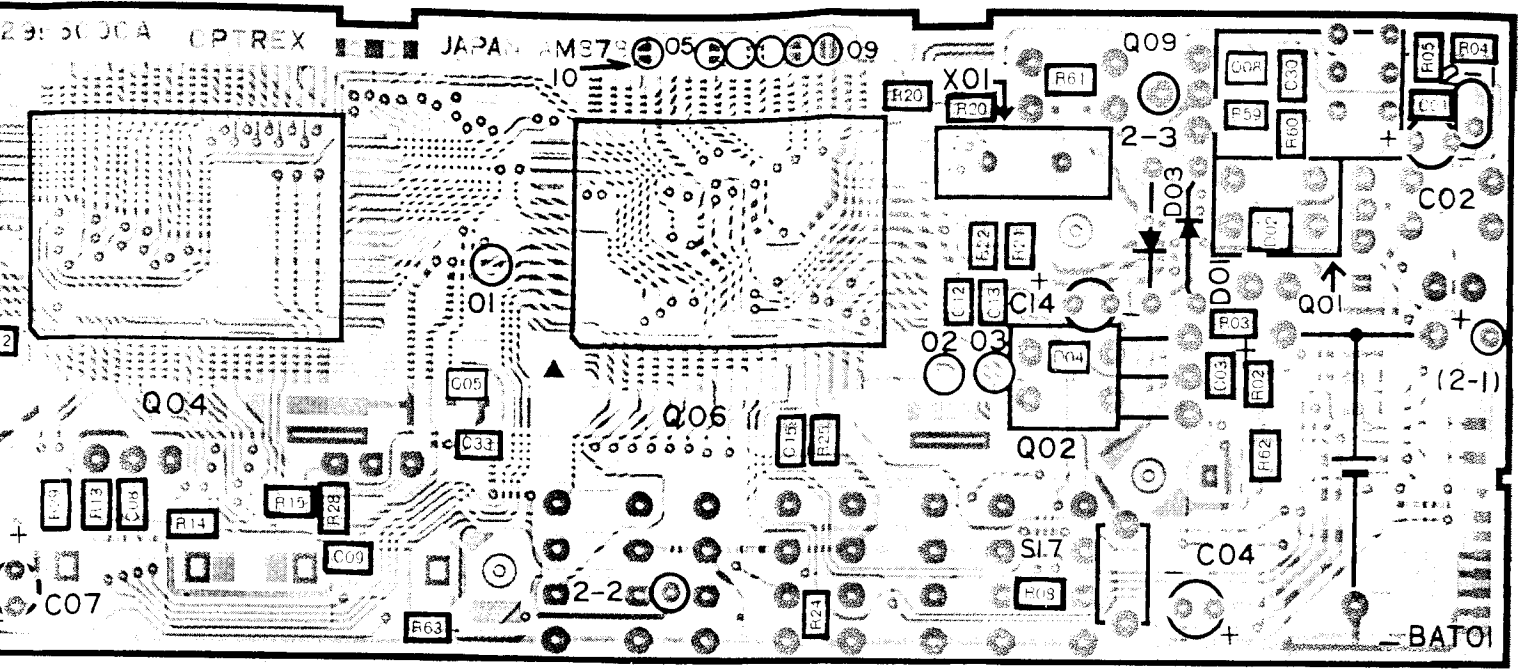
2SB772Q(Q6009)



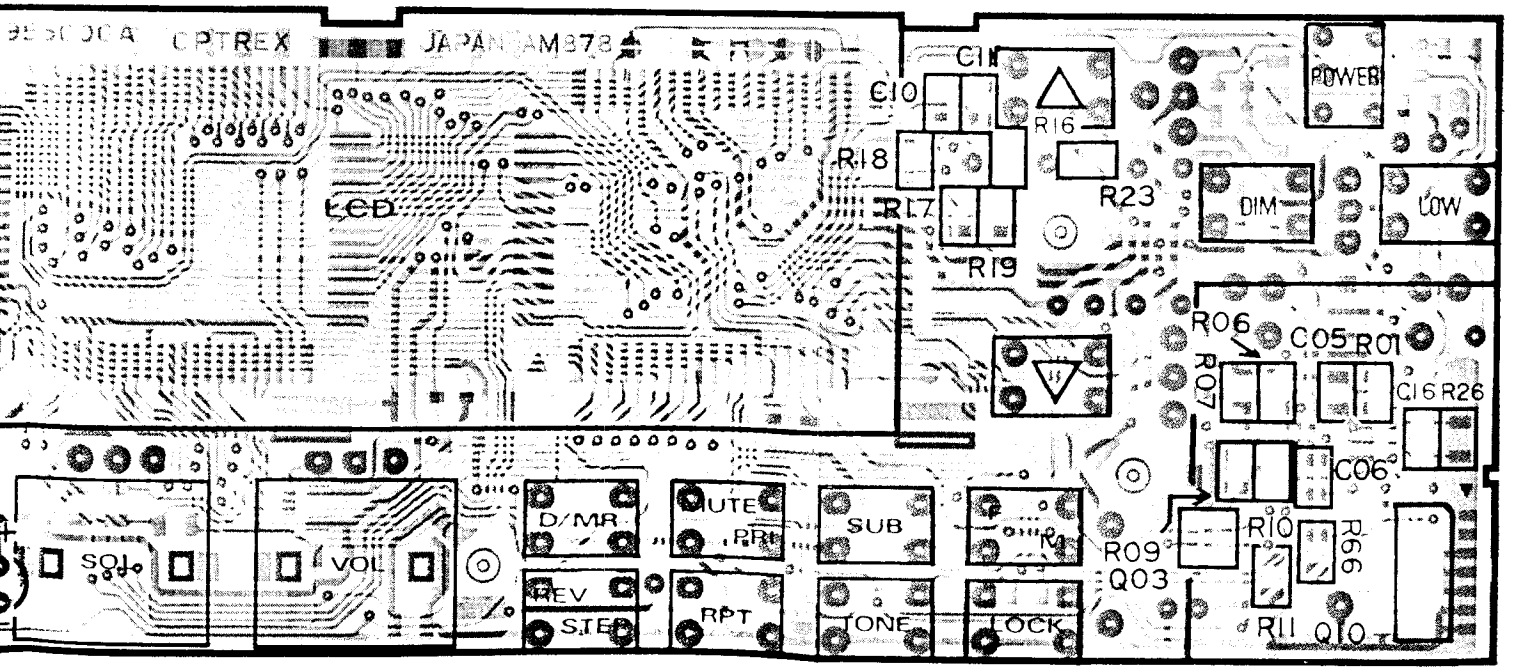
# PANEL UNIT PARTS LAYOUT



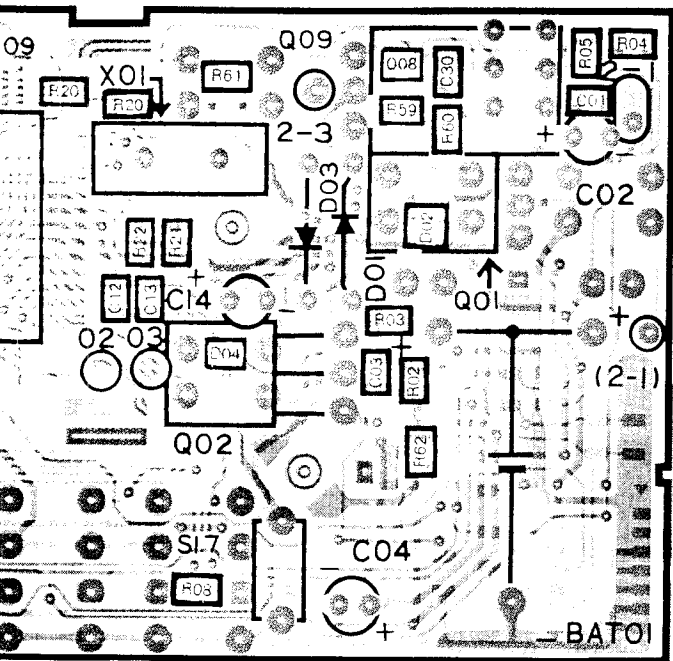
# LAYOUT



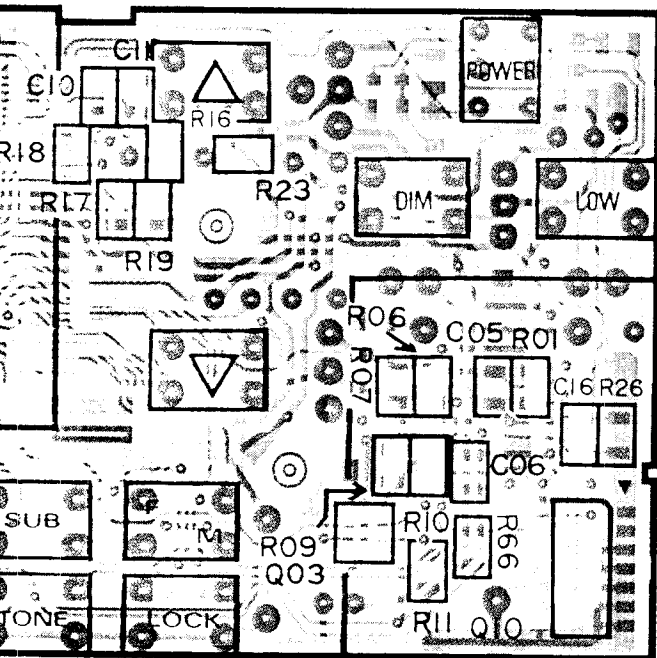
obverse view of "chip-only" side



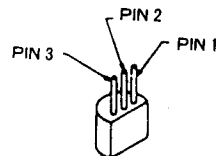
reverse view of "component" side



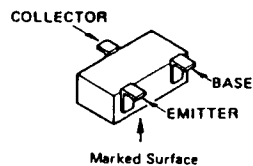
obverse view of "chip-only" side



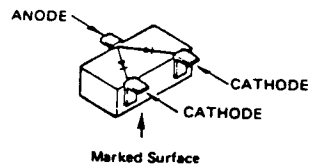
reverse view of "component" side



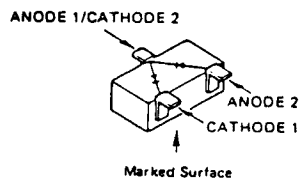
PST523C-2(Q6002)



2SC1623(L6) (Q6008)  
2SA1162(SG) (Q6003)  
FA1L3M(L81) (Q6005)

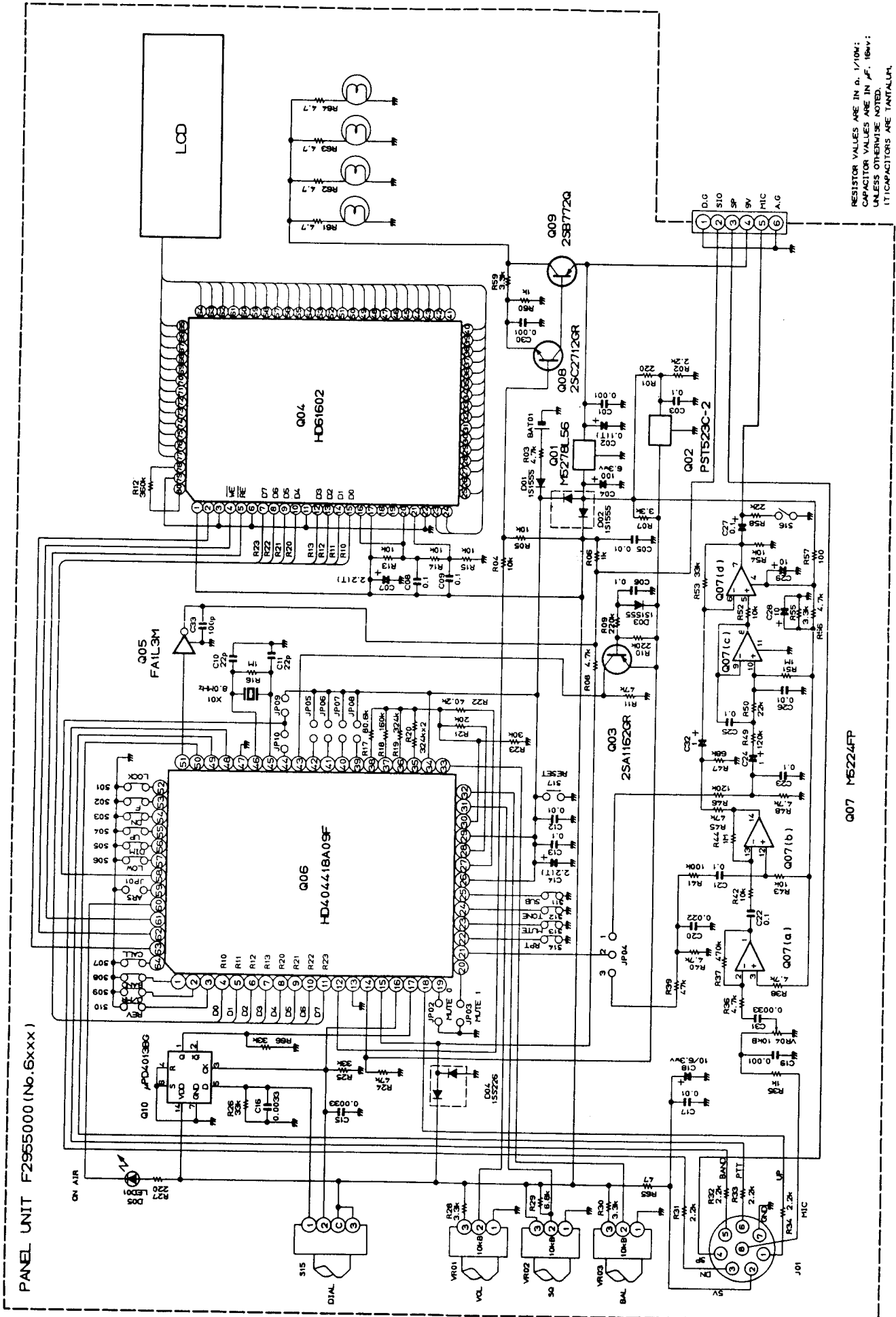


1SS181(A3) (D6002)



1SS226(C3) (D6004)

# PANEL UNIT CIRCUIT DIAGRAM



RESISTOR VALUES ARE IN  $\Omega$ , 1/10M;  
CAPACITOR VALUES ARE IN  $\mu$ F, 16mV;  
ITICAPACITORS ARE TANTALUM.

# PANEL UNIT PARTS LIST

## \*\*\* PANEL UNIT \*\*\*

	Q7000156	LCD Unit Assy		
D6005	G2090243	LED	TLR210	
J6001	P0090384	Connector	FM214-8SSPY	
BT6001	Q9000398	Lithium Battery	CR2032-HE4	
C6034	K40089023	Al Electro Cap.	47uF	6.3V

## \*\*\* FT-4700RH LCD Unit Parts List \*\*\*

	F2955000	Printed Circuit Board (PWB878C)		
Q6001	G1090694	IC	M5278L56	
Q6002	G1090812	IC	PST523C	
Q6003	G3111627G	Transistor	2SA1162GR TE85R	
Q6004	G1090856	IC	HD61602R	
Q6005	G3070035	Transistor	FA1L3M-T2B	
Q6006	G1090914	IC	HD404418A09F	
Q6007	G1090726	IC	M5224FP	
Q6008	G3316237F	Transistor	2SC1623-T2BL6	
Q6009	G3207720Q	Transistor	2SB772Q	
Q6010	G1090668	IC	uPD4013BG	
D6001	G2015550	Diode	1S1555	
D6002	G2070001	Diode	1SS181 TE85R	
D6003	G2015550	Diode	1S1555	
D6004	G2070003	Diode	1SS226 TE85R	
X6001	H0102916	Crystal	AT49-8.000MHz	
R6001	J24205221	Chip Res.	220 Ohm	1/10W
R6002	J24205222	Chip Res.	2.2k Ohm	1/10W
R6003	J24205472	Chip Res.	4.7k Ohm	1/10W
R6004	J24205103	Chip Res.	10k Ohm	1/10W
R6005	J24205103	Chip Res.	10k Ohm	1/10W
R6006	J24205102	Chip Res.	1k Ohm	1/10W
R6007	J24205332	Chip Res.	3.3k Ohm	1/10W
R6008	J24205472	Chip Res.	4.7k Ohm	1/10W
R6009	J24205224	Chip Res.	220k Ohm	1/10W
R6010	J24205224	Chip Res.	220k Ohm	1/10W
R6011	J24205473	Chip Res.	47k Ohm	1/10W
R6012	J24205364	Chip Res.	360k Ohm	1/10W
R6013	J24205103	Chip Res.	10k Ohm	1/10W
R6014	J24205103	Chip Res.	10k Ohm	1/10W
R6015	J24205103	Chip Res.	10k Ohm	1/10W
R6016	J24205105	Chip Res.	1M Ohm	1/10W
R6017	J24209011	Chip Res.	80.6k Ohm	1/10W
R6018	J24205164	Chip Res.	160k Ohm	1/10W
R6019	J24205324	Chip Res.	320k Ohm	1/10W
R6020a	J24205324	Chip Res.	320k Ohm	1/10W
R6020b	J24205324	Chip Res.	320k Ohm	1/10W
R6021	J24205203	Chip Res.	20k Ohm	1/10W
R6022	J24209003	Chip Res.	40.2k Ohm	1/10W
R6023	J24205303	Chip Res.	30k Ohm	1/10W
R6024	J24205473	Chip Res.	47k Ohm	1/10W
R6025	J24205333	Chip Res.	33k Ohm	1/10W

# PANEL UNIT PARTS LIST

R6026	J24205333	Chip Res.	33k Ohm	1/10W	
R6027	J24205221	Chip Res.	220 Ohm	1/10W	
R6028	J24205332	Chip Res.	3.3k Ohm	1/10W	
R6029	J24205682	Chip Res.	6.8k Ohm	1/10W	
R6030	J24205332	Chip Res.	3.3k Ohm	1/10W	
R6031	J24205222	Chip Res.	2.2k Ohm	1/10W	
R6032	J24205222	Chip Res.	2.2k Ohm	1/10W	
R6033	J24205222	Chip Res.	2.2k Ohm	1/10W	
R6034	J24205222	Chip Res.	2.2k Ohm	1/10W	
R6035	J24205102	Chip Res.	1k Ohm	1/10W	
R6036	J24205472	Chip Res.	4.7k Ohm	1/10W	
R6037	J24205474	Chip Res.	470k Ohm	1/10W	
R6038	J24205472	Chip Res.	4.7k Ohm	1/10W	
R6039	J24205473	Chip Res.	47k Ohm	1/10W	
R6040	J24205472	Chip Res.	4.7k Ohm	1/10W	
R6041	J24205104	Chip Res.	100k Ohm	1/10W	
R6042	J24205103	Chip Res.	10k Ohm	1/10W	
R6043	J24205103	Chip Res.	10k Ohm	1/10W	
R6044	J24205105	Chip Res.	1M Ohm	1/10W	
R6045	J24205473	Chip Res.	47k Ohm	1/10W	
R6046	J24205124	Chip Res.	120k Ohm	1/10W	
R6047	J24205683	Chip Res.	68k Ohm	1/10W	
R6048	J24205472	Chip Res.	4.7k Ohm	1/10W	
R6049	J24205124	Chip Res.	120k Ohm	1/10W	
R6050	J24205223	Chip Res.	22k Ohm	1/10W	
R6051	J24205105	Chip Res.	1M Ohm	1/10W	
R6052	J24205103	Chip Res.	10k Ohm	1/10W	
R6053	J24205333	Chip Res.	33k Ohm	1/10W	
R6054	J24205103	Chip Res.	10k Ohm	1/10W	
R6055	J24205332	Chip Res.	3.3k Ohm	1/10W	
R6056	J24205472	Chip Res.	4.7k Ohm	1/10W	
R6057	J24205101	Chip Res.	100 Ohm	1/10W	
R6058	J24205223	Chip Res.	22k Ohm	1/10W	
R6059	J24205332	Chip Res.	3.3k Ohm	1/10W	
R6060	J24205102	Chip Res.	1k Ohm	1/10W	
R6061	J24205479	Chip Res.	4.7 Ohm	1/10W	
R6062	J24205479	Chip Res.	4.7 Ohm	1/10W	
R6063	J24205479	Chip Res.	4.7 Ohm	1/10W	
R6064	J24205479	Chip Res.	4.7 Ohm	1/10W	
R6065	J24205470	Chip Res.	47 Ohm	1/10W	
R6066	J24205333	Chip Res.	33k Ohm	1/10W	
VR6001	J60800151	Pot. (RK09K113-103B20F)	10k Ohm		
VR6002	J60800151	Pot. (RK09K113-103B20F)	10k Ohm		
VR6003	J60800152	Pot (RK09K113-103B20FC)	10k Ohm		
VR6004	Q9000443	Pot. Chip	10k Ohm		
C6001	K22170805	Chip Cap.	0.001uF	50V	B
C6002	K70167104	Tantalum Cap.	0.1uF	35V	
C6003	K22141809	Chip Cap.	0.1uF	25V	B
C6004	K40179014	Al Electro Cap.	10uF	50V	
C6005	K22170817	Chip Cap.	0.01uF	50V	B
C6006	K22141809	Chip Cap.	0.1uF	25V	B
C6007	K70167225	Tantalum Cap.	2.2uF	35V	
C6008	K22141809	Chip Cap.	0.1uF	25V	B
C6009	K22141809	Chip Cap.	0.1uF	25V	B
C6010	K22170219	Chip Cap.	22pF	50V	CH
C6011	K22170219	Chip Cap.	22pF	50V	CH
C6012	K22170817	Chip Cap.	0.01uF	50V	B
C6013	K22141809	Chip Cap.	0.1uF	25V	B
C6014	K70167225	Tantalum Cap.	2.2uF	35V	
C6015	K22170811	Chip Cap.	0.0033uF	50V	B

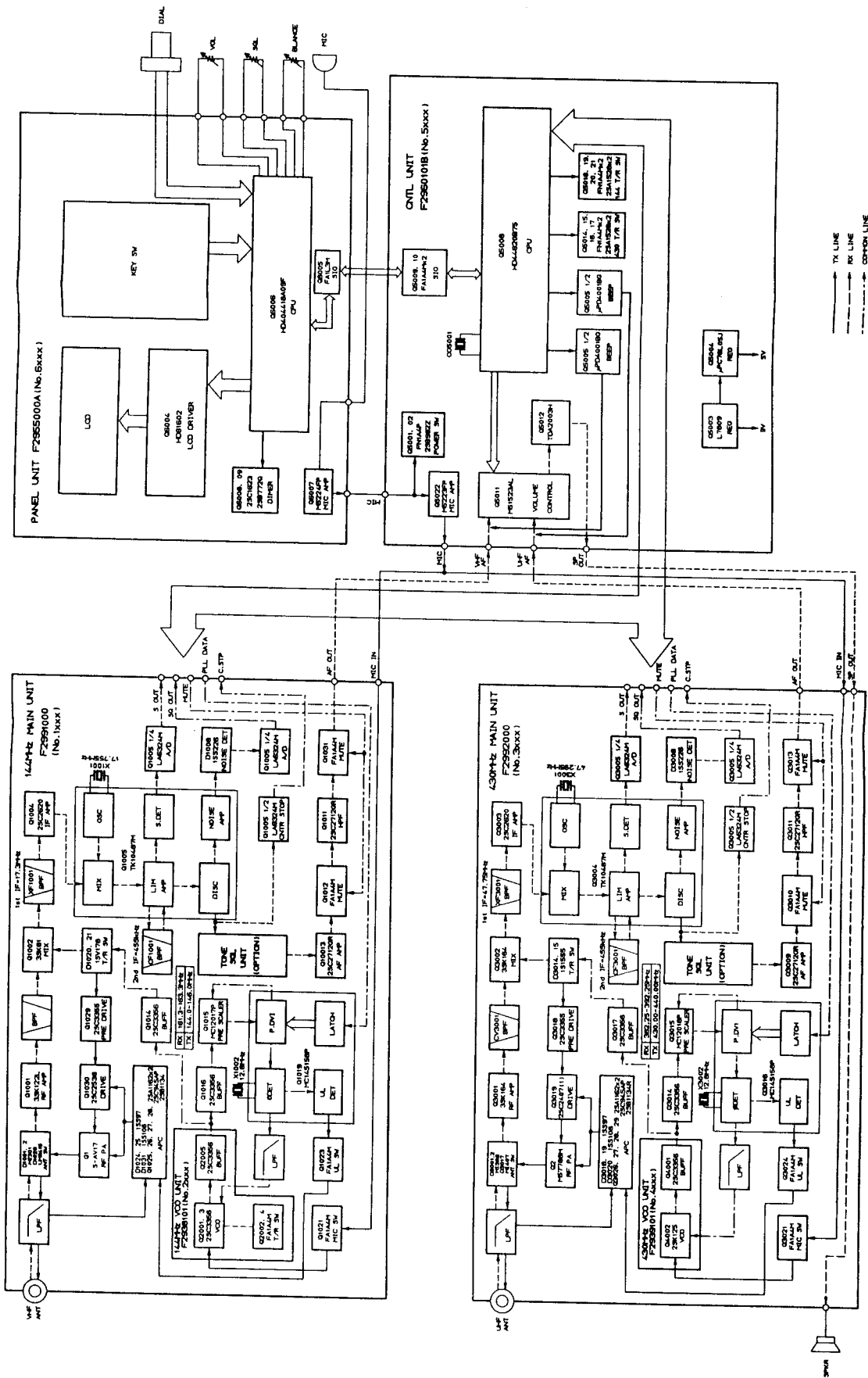


# PANEL UNIT PARTS LIST

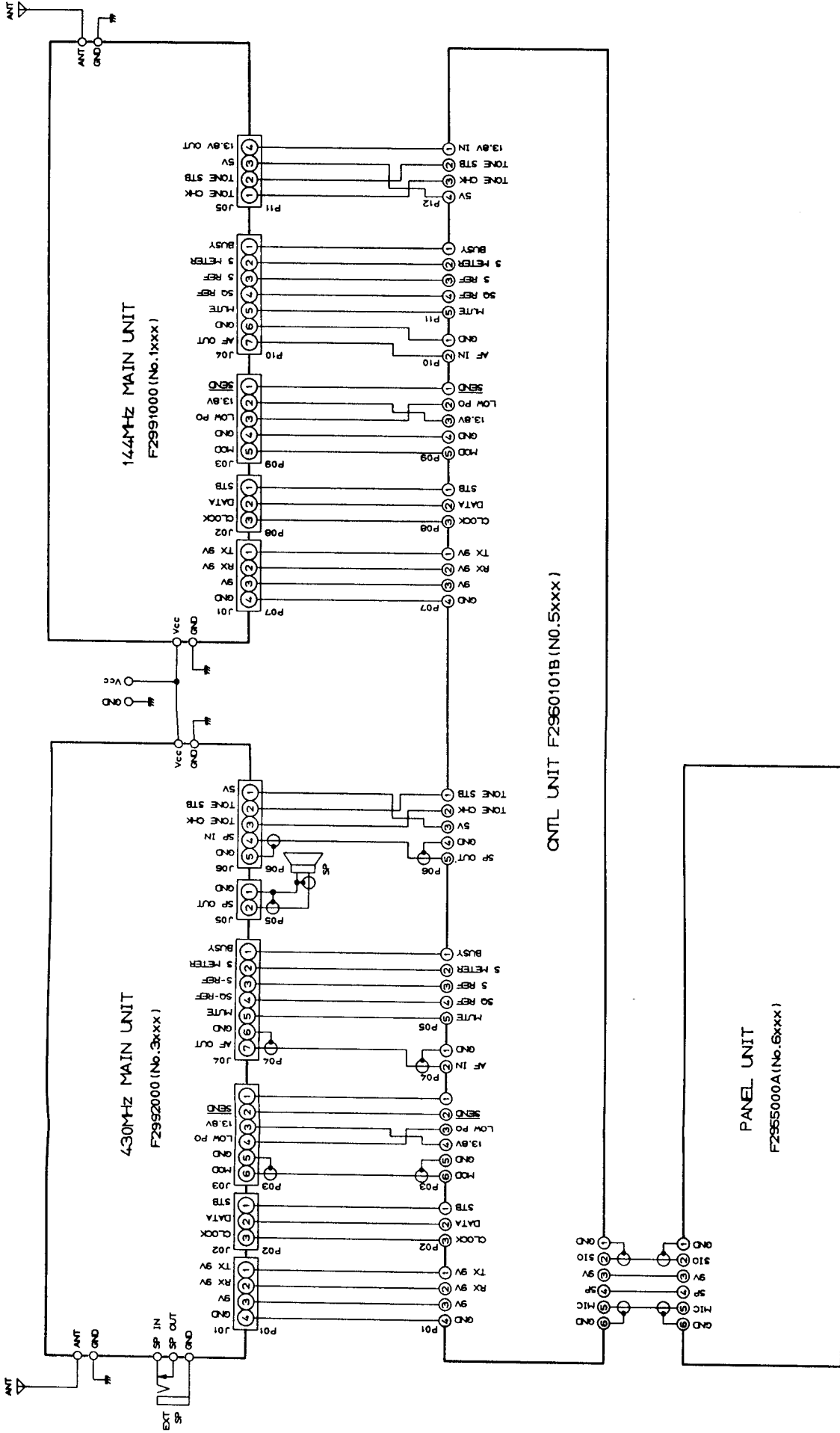
C6016	K22170811	Chip Cap.	0.0033uF	50V	B
C6017	K22170817	Chip Cap.	0.01uF	50V	B
C6018	K40179014	Al Electro Cap.	10uF	50V	
C6019	K22170805	Chip Cap.	0.001uF	50V	B
C6020	K22140807	Chip Cap.	0.022uF	25V	B
C6021	K22141809	Chip Cap.	0.1uF	25V	B
C6022	K22140807	Chip Cap.	0.022uF	25V	B
C6023	K22141809	Chip Cap.	0.1uF	25V	B
C6024	K40179013	Al Electro Cap.	1uF	50V	
C6025	K22141809	Chip Cap.	0.1uF	25V	B
C6026	K22170817	Chip Cap.	0.01uF	50V	B
C6027	K40179016	Al Electro Cap.	0.1uF	50V	
C6028	K40179014	Al Electro Cap.	10uF	50V	
C6029	K40179014	Al Electro Cap.	10uF	50V	
C6030	K22170805	Chip Cap.	0.001uF	50V	B
C6031	K22170811	Chip Cap.	0.0033uF	50V	B
C6032	K40179013	Al Electro Cap.	1uF	50V	
C6033	K22170235	Chip Cap.	100pF	50V	CH
PL6001	Q1000074	Lamp	T1-9V60R-0R06		
PL6002	Q1000074	Lamp	T1-9V60R-0R06		
PL6003	Q1000074	Lamp	T1-9V60R-0R06		
PL6004	Q1000074	Lamp	T1-9V60R-0R06		
S6001	N5090029	TACT Switch	JPM1990-0101		
S6002	N5090029	TACT Switch	JPM1990-0101		
S6003	N5090029	TACT Switch	JPM1990-0101		
S6004	N5090029	TACT Switch	JPM1990-0101		
S6005	N5090029	TACT Switch	JPM1990-0101		
S6006	N5090029	TACT Switch	JPM1990-0101		
S6007	N5090029	TACT Switch	JPM1990-0101		
S6008	N5090029	TACT Switch	JPM1990-0101		
S6009	N5090029	TACT Switch	JPM1990-0101		
S6010	N5090029	TACT Switch	JPM1990-0101		
S6011	N5090029	TACT Switch	JPM1990-0101		
S6012	N5090029	TACT Switch	JPM1990-0101		
S6013	N5090029	TACT Switch	JPM1990-0101		
S6014	N5090029	TACT Switch	JPM1990-0101		
S6015	Q9000444	Rotary Switch	SRGFVV020B		
S6016	N4090085	Push Switch	SPPH221B		
S6017	N5090024	TACT Switch	SKHLAC		
LCD6001	G6090073	Liquid Crystal Display	FTD8624HZ-CU		
	S6000148	Interconnector	FCW878SG		
	S6000149	Diffusor	LGP878-503-0R09		
	S6000150	Light Guide	LGP878ACR		
	S5000121	LCD Holder	HLD878SPTT		
	S6000151	Spacer	SR878T		
	S6000152	Insulator	SPC878PEF		
	S6000153	Sheet	SPC878IP		



# BLOCK DIAGRAM



# CONNECTION DIAGRAM



The high reliability of the chip components in the FT-4700RH minimize the possibility that repair or realignment should be needed after leaving the factory. However, if damage occurs and some parts subsequently be replaced, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

Because of the compact circuitry of this model, we recommend servicing only by authorized Yaesu service technicians who are experienced with the circuitry and fully equipped for repair and alignment. Therefore, if a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized Yaesu service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components.

Those who do undertake any of the following alignments are cautioned to do so at their own risk. Yaesu reserves the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners.

No alignment should be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and the need for realignment determined to be absolutely necessary.

The following test equipment (and thorough familiarity with its correct use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy.

A 50-ohm dummy load that is non-reactive up to 450 MHz must be used. Correct alignment is not possible with an antenna.

## Alignment Equipment

- DC voltmeter (at least 20-kilohms/volt)
- 450 MHz standard signal generator (SSG) with calibrated output level and modulation (see note below)
- AF signal generator
- SINAD meter (SINADDER)
- FM linear detector (deviation meter)
- CM coupler (directional coupler)
- RF wattmeter (50W,  $\pm 5\%$  @ 450MHz)
- 50-ohm non-reactive (@450 MHz) dummy load
- Frequency counter (100Hz res. @450MHz)
- Oscilloscope (recommended, not required)

Note: SSG levels referred to in the alignment procedure are based on  $0\text{dBu}=0.5\text{uV}$ .

## Alignment Precautions

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 20 and 30°C (68 to 86°F). When the transceiver is brought into the shop it should be allowed at least 2 hours for thermal equalization before alignment.

Alignments must not be made unless the oscillator shields and circuit boards are firmly affixed in place. Also, the frequency counter must be thoroughly warmed up before beginning.

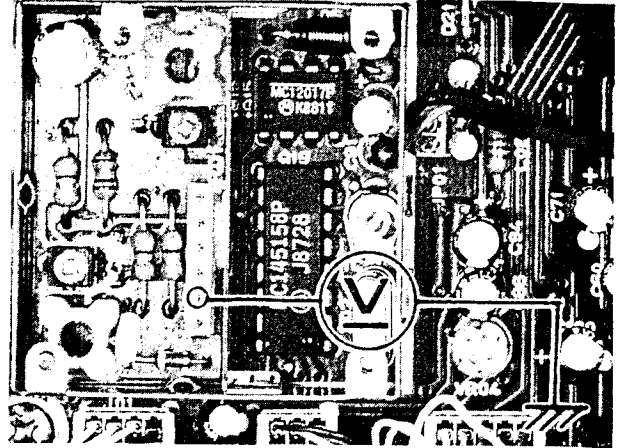
Supply voltage during alignment must be held constant at 13.8V DC. Use a well regulated, adjustable power supply capable of at least 10A continuous load.

# ALIGNMENT (VHF PLL)

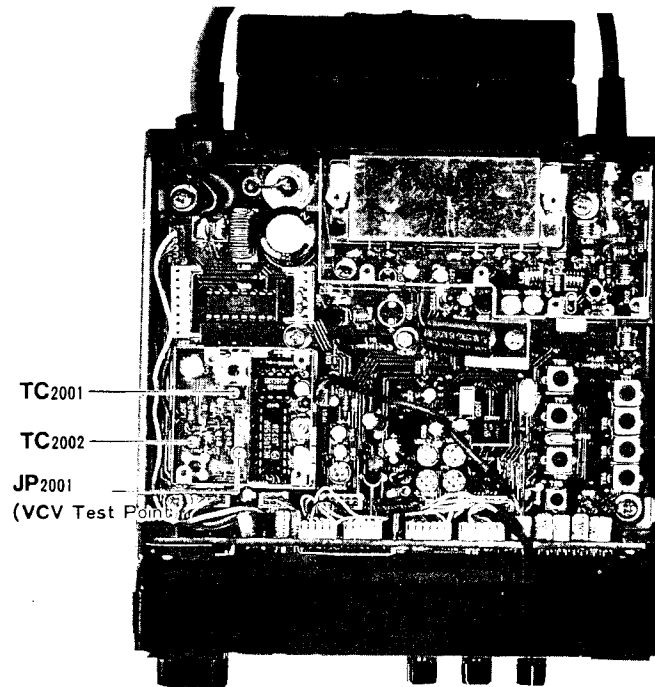
## A. VHF PLL

### 1) VCV (Varactor Control Voltage)

- a) With the dummy load connected to the VHF ANT jack, connect the DC voltmeter (2V scale) to test point TP2001 on the 144 MHz VCO Unit.
- b) Tune to 144 MHz, and while receiving, adjust TC2001 on the 144 MHz VCO Unit for at least 1.0V.
- c) Close the PTT line and adjust TC2002 also for at least  $1\pm 0V$  while transmitting.



DC VOLTMETER TEST POINT



VHF PLL ALIGNMENT POINTS

# ALIGNMENT (VHF Transmitter)

## B. VHF Transmitter (on 144 MHz Main Unit)

Set up the test equipment as shown in Figure 1. Close the PTT line when making adjustments.

### 1) Power Output

- a) Tune the transceiver to the center of the band, and set the LOW button to the high power position.
- b) Adjust VR1005 for maximum power output (at least 50 watts).
- c) With the transceiver tuned to the center of the band, set the LOW button to the low power position, and adjust VR1006 for 5W output.

### 2) Frequency Calibration

- a) Adjust TC1001 to match the counter with the transceiver display.

### 3) Deviation

- a) Set the AF generator for 50mV output at 1 kHz. Adjust VR1004 for  $\pm 4.5$  kHz on the Deviation Meter.
- b) Reduce the AF generator level to 5mV and confirm  $\pm 3.5$  kHz deviation.

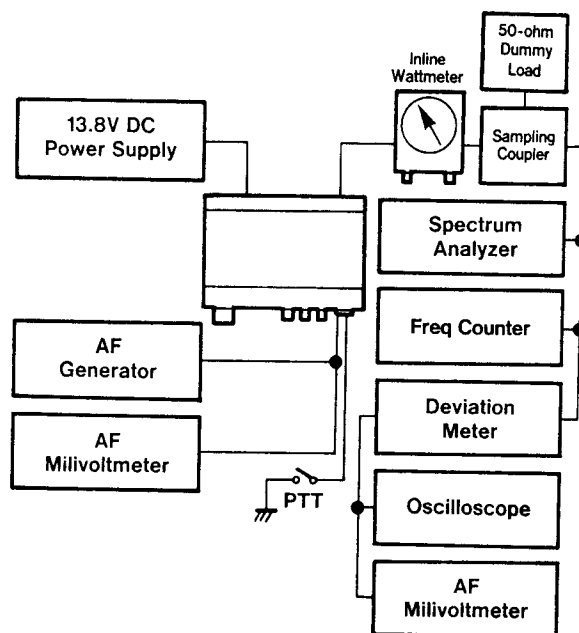
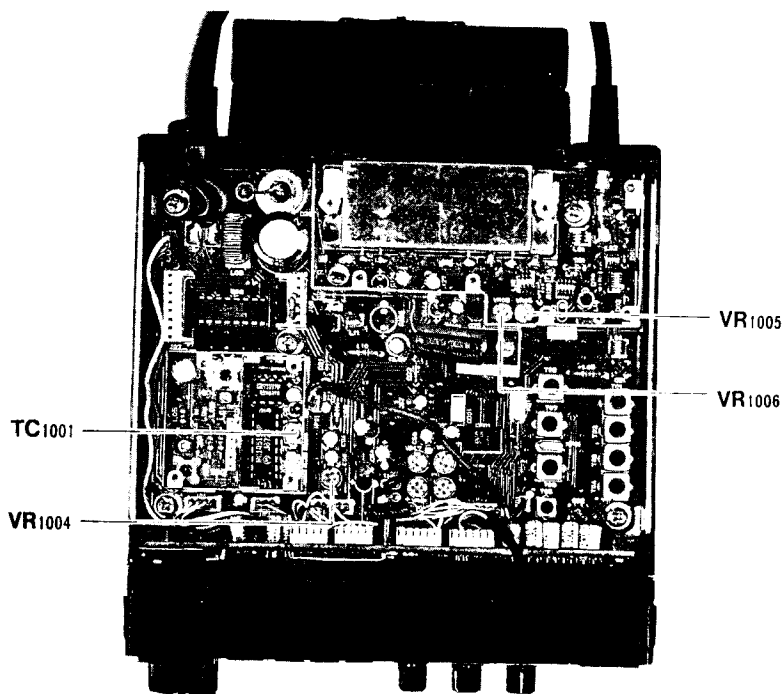


Figure 1  
VHF TRANSMITTER ALIGNMENT SETUP



VHF TRANSMITTER ALIGNMENT POINTS



# ALIGNMENT (VHF Receiver)

## C. VHF Receiver (on 144 MHz Main Unit)

Set up the test equipment as shown in Figure 2.

### 1) Interstage Transformers

- a) Connect the DC voltmeter between the exposed end of R1118 and chassis ground.
- b) Modulate the RF signal generator for  $\pm 3.5$  kHz deviation of a 1 kHz tone.
- c) Tune the transceiver and signal generator to the same frequency at the center of the band, and set the injection level to produce midrange S-meter indication.
- d) Adjust T1001 through T1008 for maximum S-meter indication. Reduce the injection level, if necessary, to keep the S-meter near midrange.
- e) Confirm 12dB SINAD sensitivity of -10dBu (0.16uV) or better on the SINADDER.

### 2) S-Meter Calibration

- a) At the center of the band, set the signal generator for 20dBu (5uV) injection with  $\pm 3.5$  kHz deviation of a 1 kHz tone.
- b) Adjust VR1001 so that all S-meter segments are just on.

### 3) Scanner Center-Stop

- a) Tune the receiver to the center of the band, and set the SQL fully ccw (the BUSY lamp should be lit).
- b) Tune the RF generator 4.0 kHz above the receiver, and inject 20dBu (5uV) with  $\pm 3.5$  kHz deviation of a 1 kHz tone.
- c) Adjust VR1002 so that the BUSY lamp is just turned on, and confirm that it turns off when the generator is tuned 3-5 kHz above and 2 to 5 kHz below the receiver frequency.

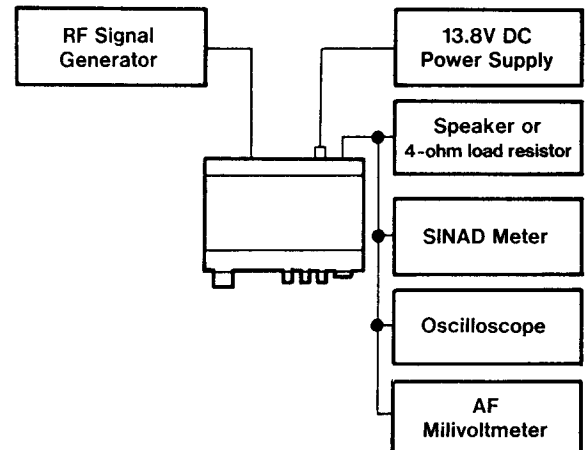
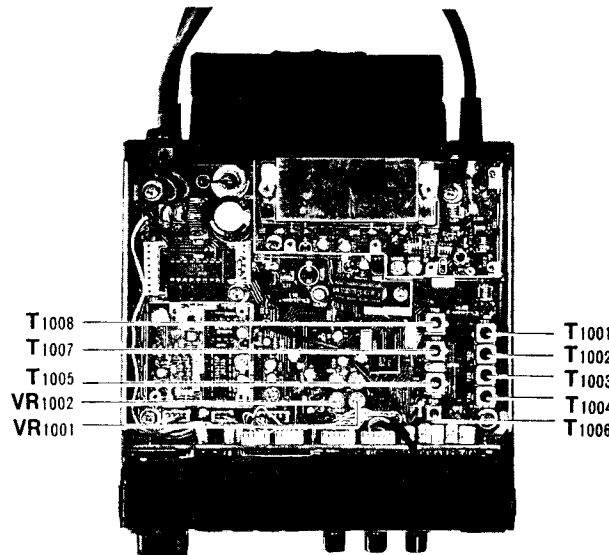


Figure 2  
VHF RECEIVER ALIGNMENT SETUP



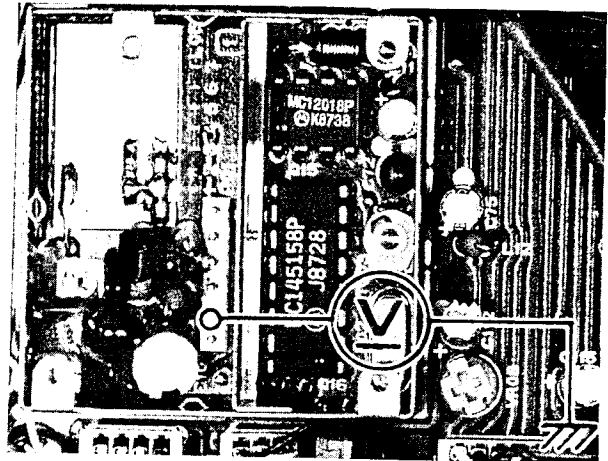
VHF RECEIVER ALIGNMENT POINTS

# ALIGNMENT (UHF PLL)

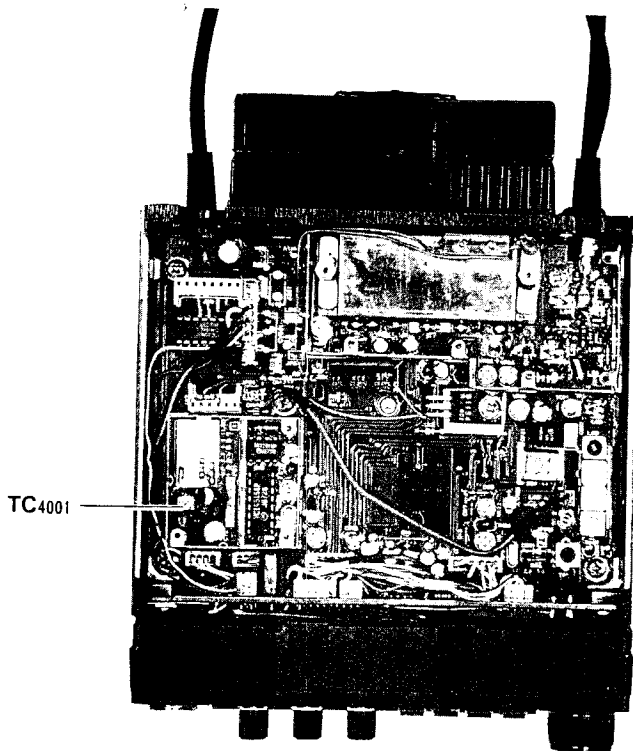
## D. UHF PLL

### 1) VCV (Varactor Control Voltage)

- a) With the dummy load connected to the UHF ANT jack, connect the DC voltmeter (3V scale) to test point TP4001 on the 430 MHz VCO Unit.
- b) Tune to 430 MHz, and while receiving, adjust TC4001 on the 430 MHz VCO Unit for at least 1.6V.
- c) Retune the transceiver to the top edge of the band, close the PTT switch, and adjust TC4002 for 7.5 - 8.0V (vers. A), or 5.5 - 7.0V (all other versions).
- d) Repeat steps b and c several times, and then remove the voltmeter.



DC VOLTMETER TEST POINT



UHF PLL ALIGNMENT POINTS

# ALIGNMENT (UHF Transmitter)

## E. UHF Transmitter (430 MHz Main Unit)

Set up the test equipment as shown in Figure 3. Close the PTT line when making adjustments.

### 1) Power Output

- a) Tune the transceiver to the center of the band, and set the LOW button to the high power position.
- b) Adjust VR3004 for maximum power output (at least 40 watts).
- c) With the transceiver tuned to the center of the band, set the LOW button to the low power position, and adjust VR3003 for 5W output.

### 2) Frequency Calibration

- a) Adjust TC3003 to match the counter with the transceiver display.

### 3) Deviation

- a) Set the AF generator for 50mV output at 1 kHz. Adjust VR3006 for  $\pm 4.5$  kHz on the Deviation Meter.
- b) Reduce the AF generator level to 5mV and confirm  $\pm 3.5$  kHz deviation.

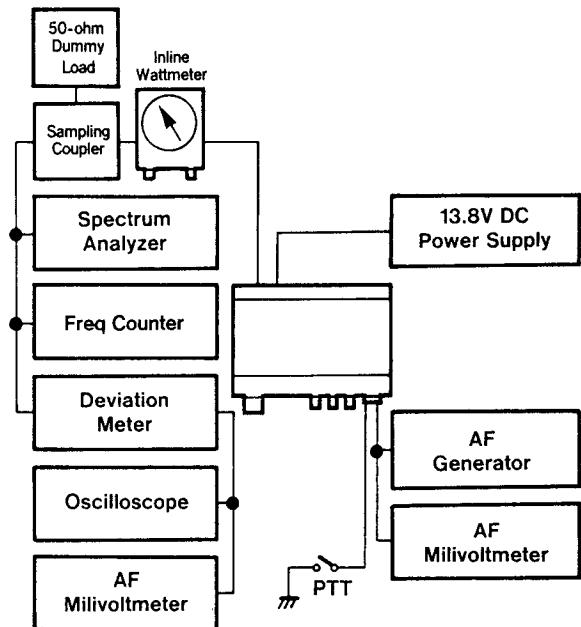
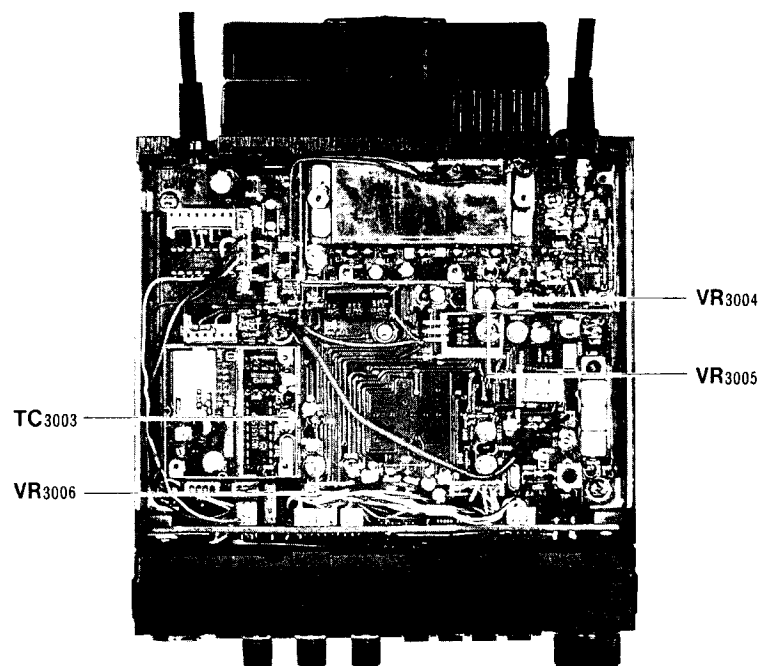


Figure 3  
UHF TRANSMITTER ALIGNMENT SETUP



UHF TRANSMITTER ALIGNMENT POINTS

# ALIGNMENT (UHF Receiver)

## F. UHF Receiver (on 430 MHz Main Unit)

Set up the test equipment as shown in Figure 4.

### 1) Interstage Transformers

- Modulate the RF signal generator for  $\pm 3.5$  kHz deviation of a 1 kHz tone.
- Tune the transceiver and signal generator to the same frequency at the center of the band, and set the injection level to produce midrange S-meter indication.
- Adjust TC3001, TC3002 and T3001 for maximum S-meter indication. Reduce the injection level, if necessary, to keep the S-meter near midrange.
- Confirm 12dB SINAD sensitivity of -10dBu (0.16uV) or better on the SINADDER.

### 2) S-Meter Calibration

- At the center of the band, set the signal generator for 15dBu (2.8uV) injection with  $\pm 3.5$  kHz deviation of a 1 kHz tone.
- Adjust VR3002 so that all S-meter segments are just on.

### 3) Scanner Center-Stop

- Tune the transceiver to 435.000 or 445.000 MHz, and set the SQL fully counterclockwise (the BUSY lamp should be lit).
- Tune the RF generator 4.0 kHz above the receiver, and inject 20dBu (5uV) with  $\pm 3.5$  kHz deviation of a 1kHz tone.
- Adjust VR1002 so that the BUSY lamp is just turned on, and confirm that it turns off when the generator is tuned 3-5 kHz above and 2 to 5 kHz below the receiver frequency.

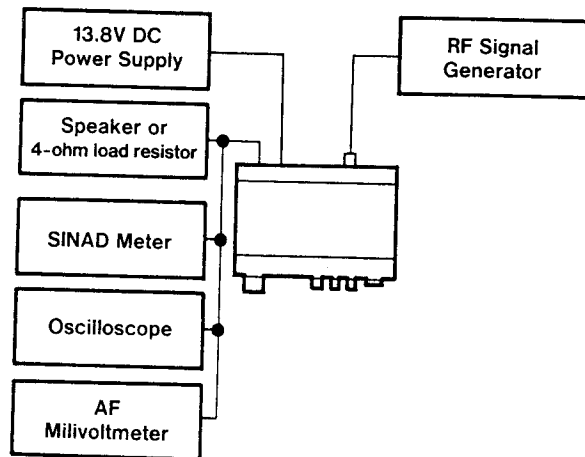
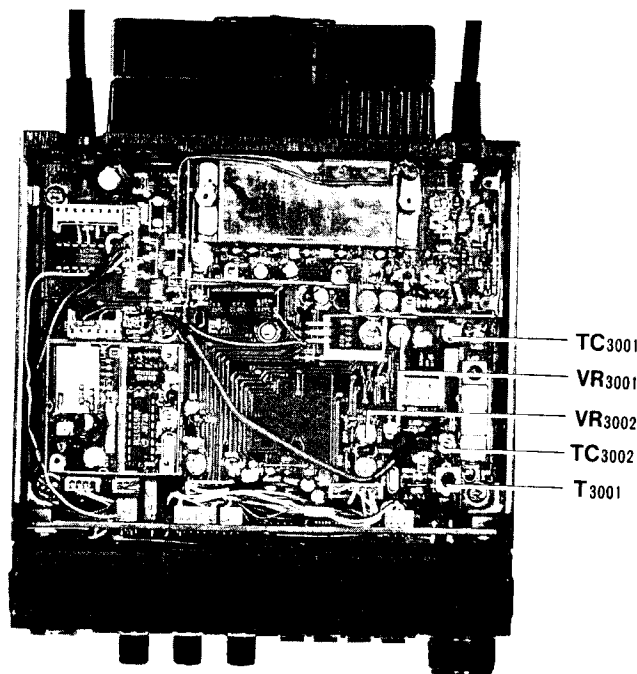


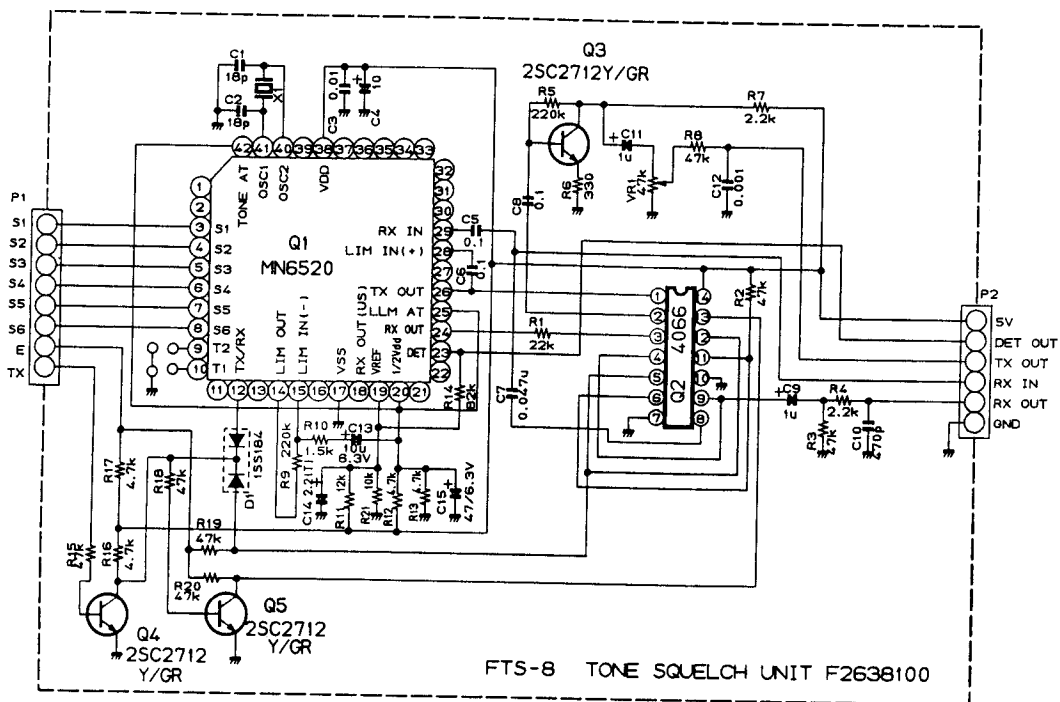
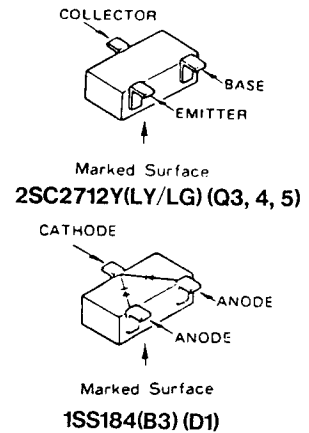
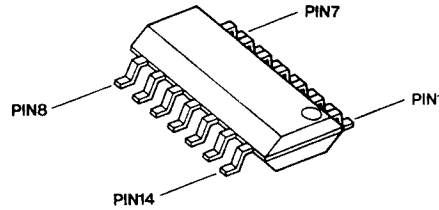
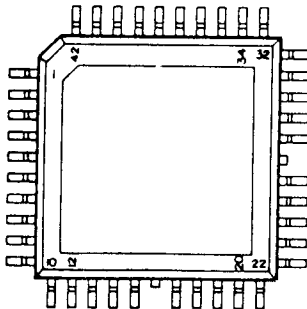
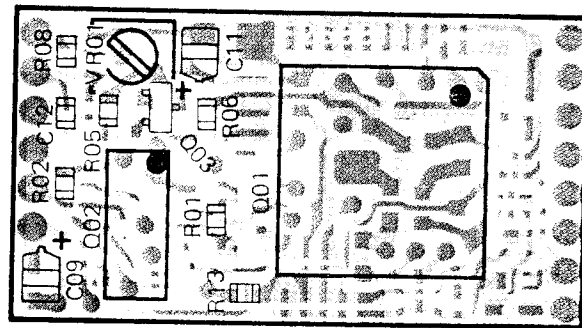
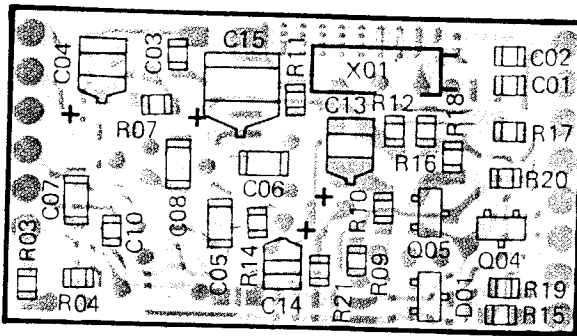
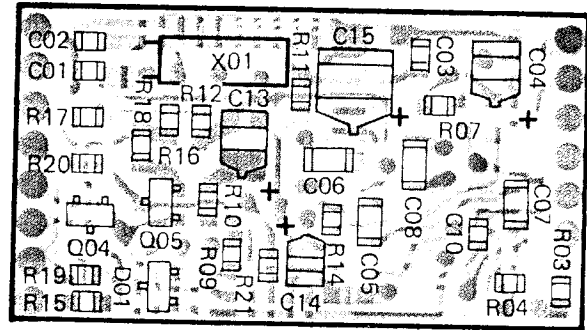
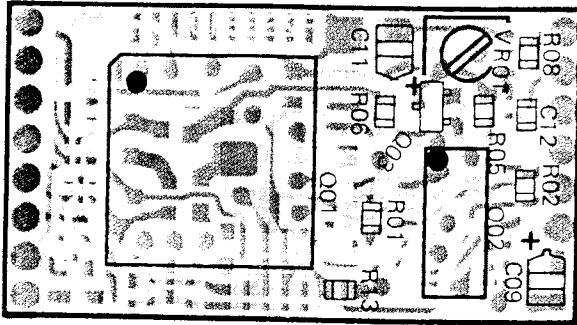
Figure 4  
UHF RECEIVER ALIGNMENT SETUP



UHF TRANSMITTER ALIGNMENT POINTS

# NOTES

# (OPTION) FTS-8 PARTS LAYOUT/CIRCUIT DIAGRAM





# FTS-8 PARTS LIST

\*\*\*\*\* FTS-8 PARTS LIST \*\*\*\*\*

	F2638101	Printed Circuit Board			
Q1	G1090577	IC	MN6520		
Q2	G1090602	IC	uPD4066BG		
Q3	G3327127G	Transistor	2SC2712GR	TE85R	
Q4	G3327127G	Transistor	2SC2712GR	TE85R	
Q5	G3327127G	Transistor	2SC2712GR	TE85R	
D1	G2070009	Diode	1SS184	TE85R	
X1	H0102571	Crystal	MS41F	4.1943	MHz
R1	J24205223	Chip Res.	22k Ohm	1/10W	
R2	J24205473	Chip Res.	47k Ohm	1/10W	
R3	J24205473	Chip Res.	47k Ohm	1/10W	
R4	J24205222	Chip Res.	2.2k Ohm	1/10W	
R5	J24205224	Chip Res.	220k Ohm	1/10W	
R6	J24205331	Chip Res.	330 Ohm	1/10W	
R7	J24205222	Chip Res.	2.2k Ohm	1/10W	
R8	J24205473	Chip Res.	47k Ohm	1/10W	
R9	J24205224	Chip Res.	220k Ohm	1/10W	
R10	J24205332	Chip Res.	3.3k Ohm	1/10W	
R11	J24205153	Chip Res.	15k Ohm	1/10W	
R12	J24205472	Chip Res.	4.7k Ohm	1/10W	
R13	J24205472	Chip Res.	4.7k Ohm	1/10W	
R14	J24205683	Chip Res.	68k Ohm	1/10W	
R15	J24205473	Chip Res.	47k Ohm	1/10W	
R16	J24205472	Chip Res.	4.7k Ohm	1/10W	
R17	J24205472	Chip Res.	4.7k Ohm	1/10W	
R18	J24205473	Chip Res.	47k Ohm	1/10W	
R19	J24205473	Chip Res.	47k Ohm	1/10W	
R20	J24205473	Chip Res.	47k Ohm	1/10W	
R21	J24205123	Chip Res.	12k Ohm	1/10W	
VR1	J51771503	Potentiometer	50k Ohm		
C1	K22170217	Chip Cap.	18pF	50V	CH
C2	K22170217	Chip Cap.	18pF	50V	CH
C3	K22171004	Chip Cap.	0.01uF	50V	F
C4	K78080003	Tantalum Chip Cap.	10uF	6.3V	
C5	K22141904	Chip Cap.	0.1uF	25V	B
C6	K22141904	Chip Cap.	0.1uF	25V	B
C7	K22141902	Chip Cap.	0.047uF	25V	B
C8	K22141904	Chip Cap.	0.1uF	25V	B
C9	K78120013	Tantalum Chip Cap.	1uF	16V	
C10	K22170807	Chip Cap.	0.0015uF	50V	B
C11	K78120013	Tantalum Chip Cap.	1uF	16V	
C12	K22170805	Chip Cap.	0.001uF	50V	B
C13	K78080003	Tantalum Chip Cap.	10uF	6.3V	
C14	K78120002	Tantalum Chip Cap.	2.2uF	16V	
C15	K78080013	Tantalum Chip Cap.	47uF	6.3V	
J01	P0090092	Connector	3022-08A		
	P0090069	Connector	3022-06A		