

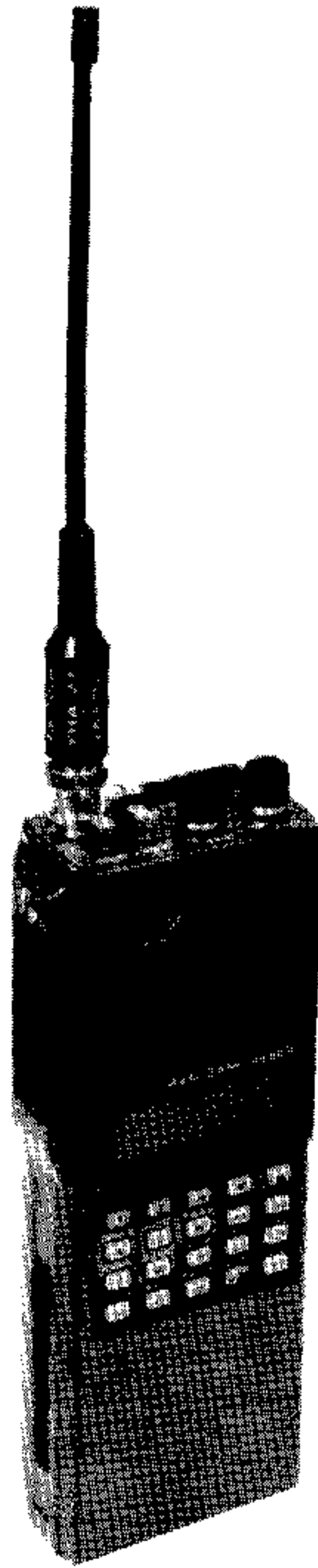
FT-727R

TECHNICAL SUPPLEMENT

This booklet contains supplemental technical information related to the FT-727R for use with the FT-727R Operating Manual. Service or repairs to the FT-727R transceiver should be performed by qualified technicians only.

YAESU MUSEN CO., LTD.
C.P.O. BOX 1500
TOKYO, JAPAN

FT-727R
TECHNICAL SUPPLEMENT



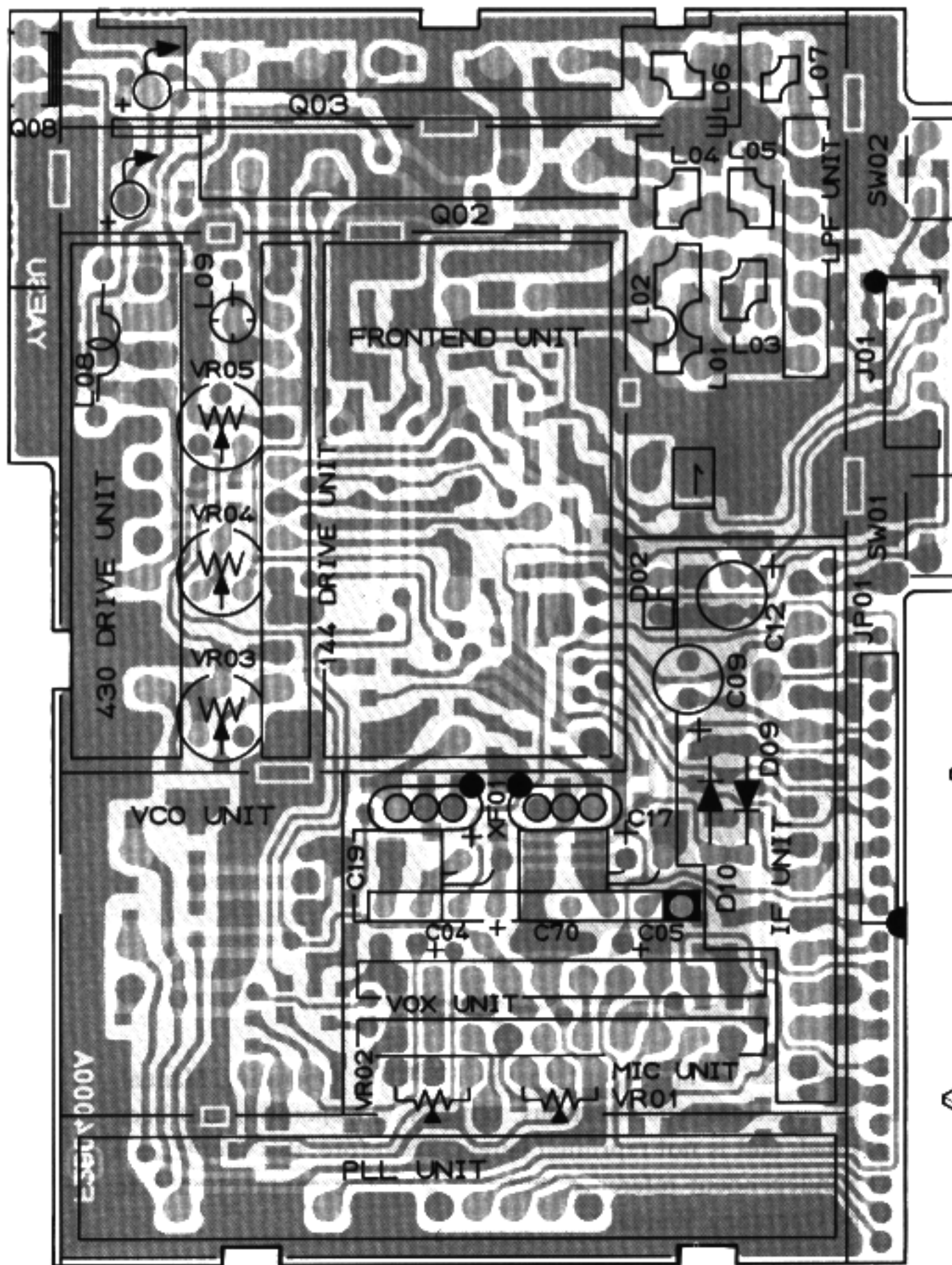
This manual is intended to serve as a supplement to the FT-727R Operating Manual. Detailed information regarding functions, specifications, options and operation has been provided in the Operating Manual, and is not reprinted herein. Therefore, this supplement is not intended to serve as an independent 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-727R, 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 and tracks on the near side.

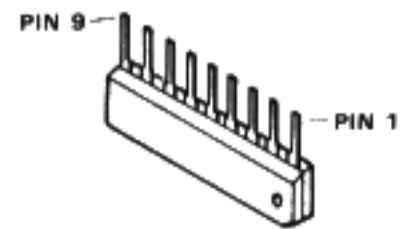
While we believe the technical information in this manual is correct, Yaesu assumes no liability for damage that may occur as a result of typographical or other errors that may be present. Your cooperation in pointing out any inconsistencies in the technical information would be appreciated.

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.

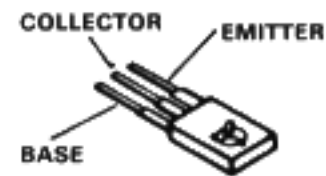
MAIN UNIT



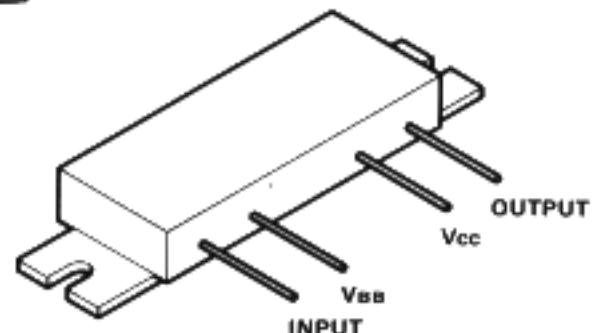
(Obverse view of "component" side)



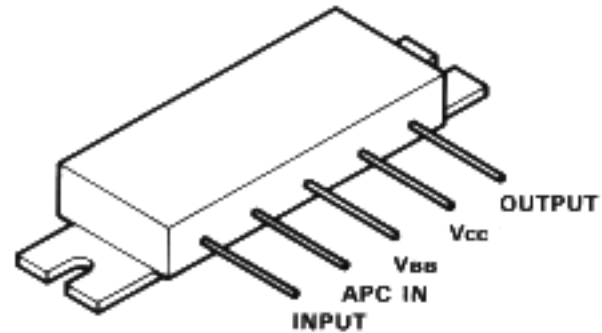
LA4145 (Q1001)



COLLECTOR
BOTTOM SURFACE
2SB772Q (Q1008)

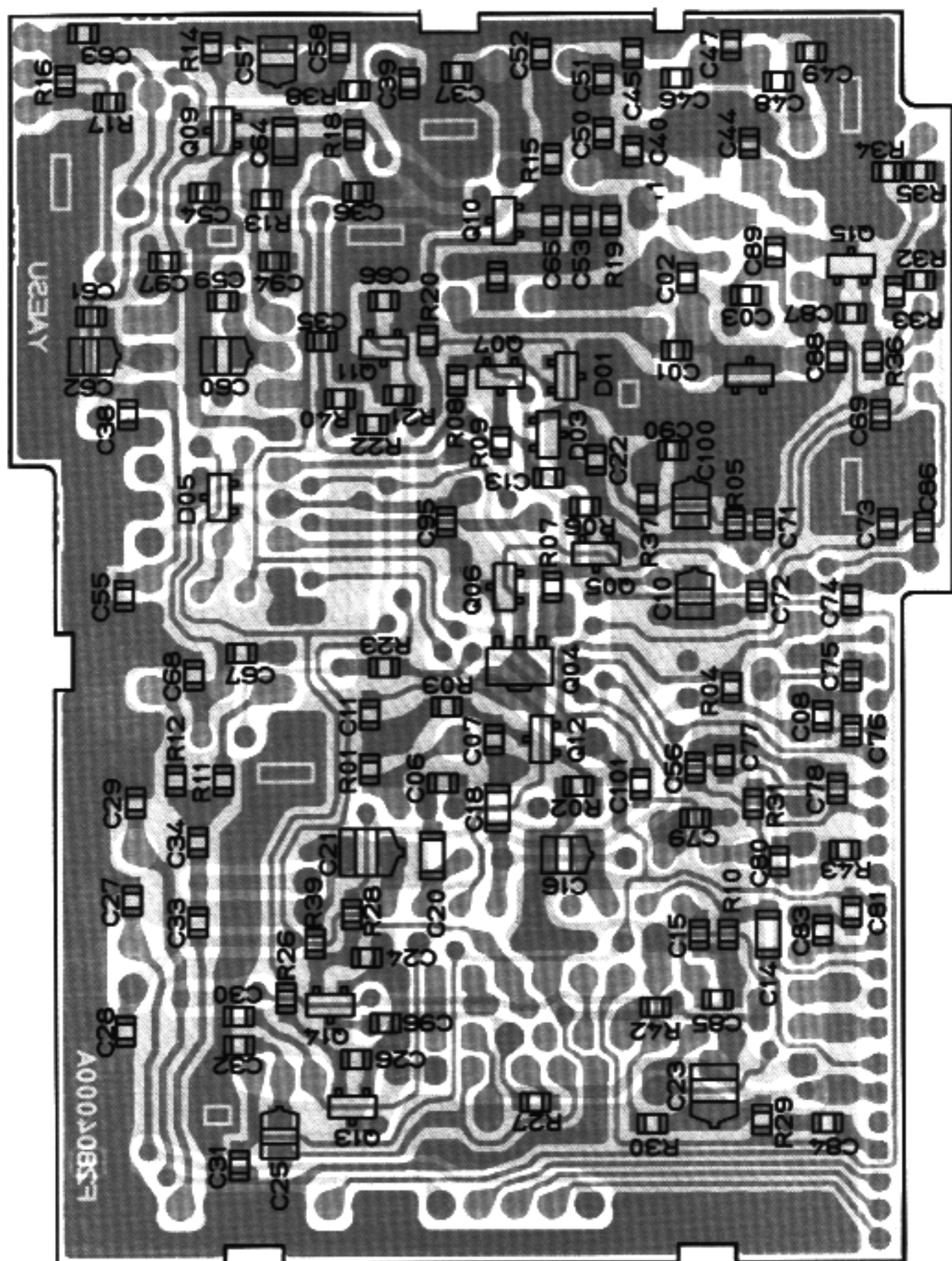


M57796MA (Q1002)



M57797MA (Q1003)

MAIN UNIT



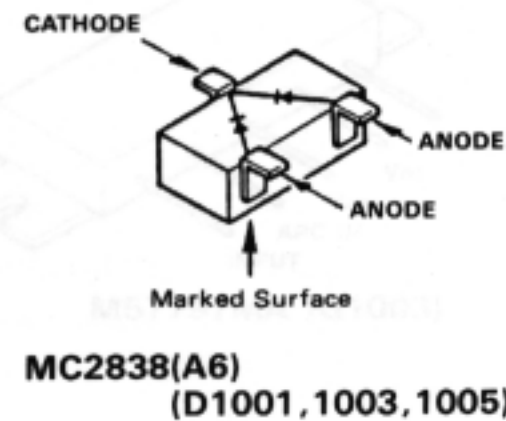
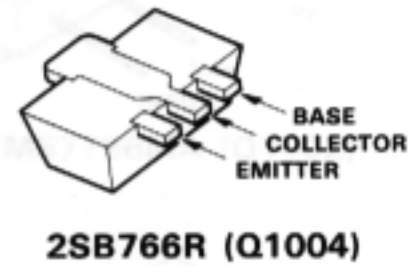
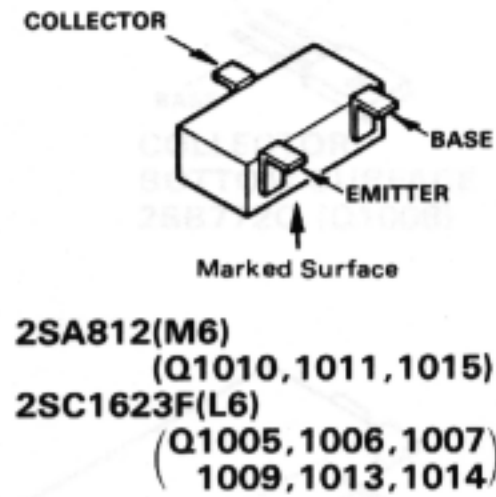
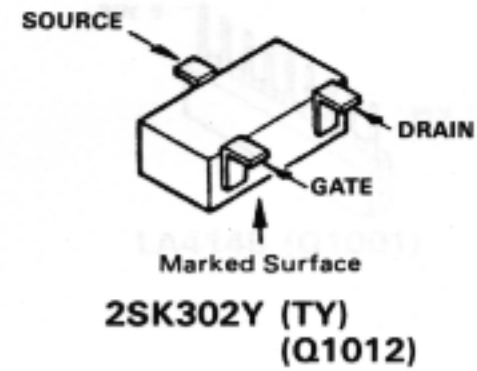
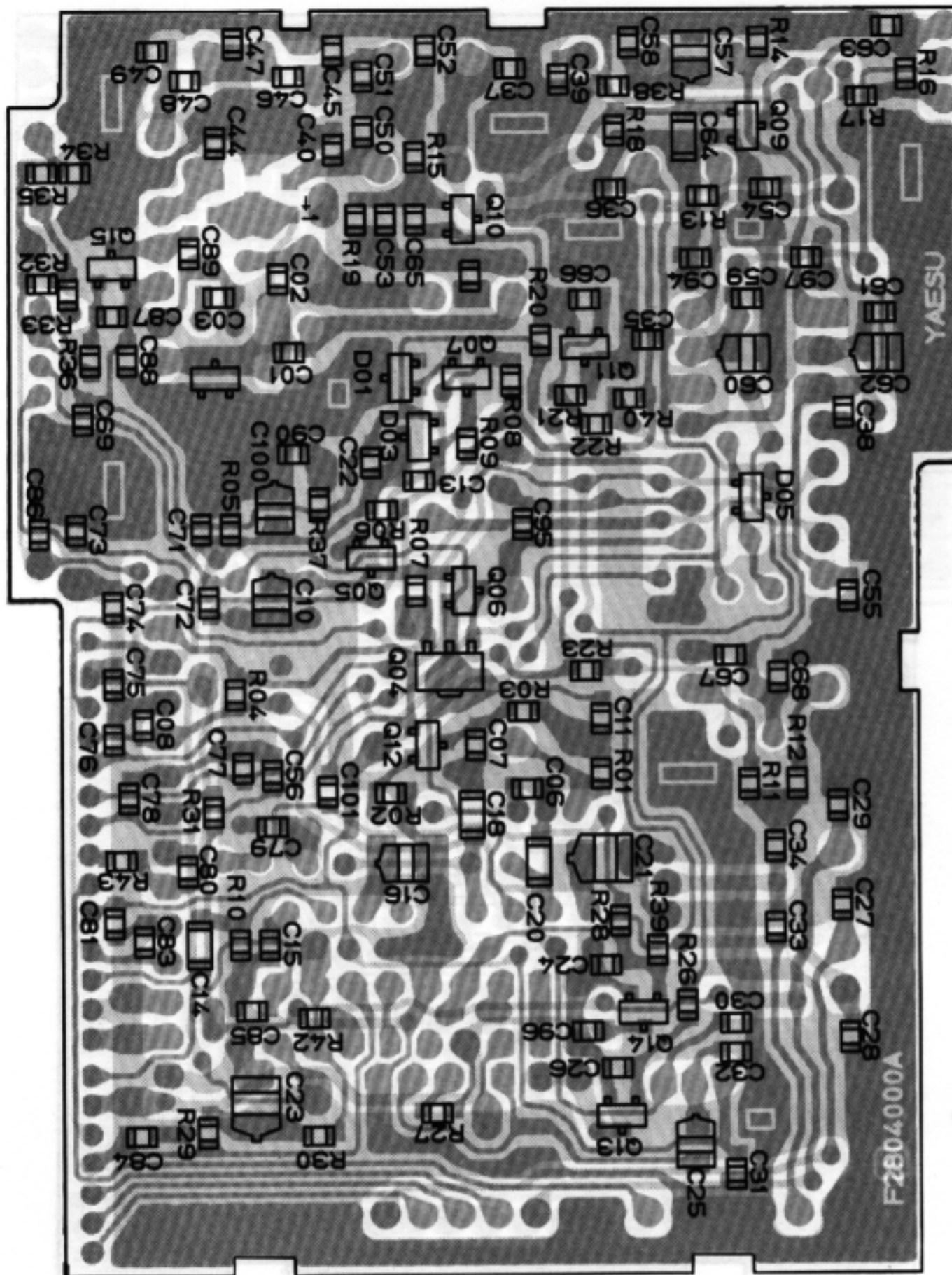
(Reverse view of "chip" side)

SEMICONDUCTOR CROSS-REFERENCE

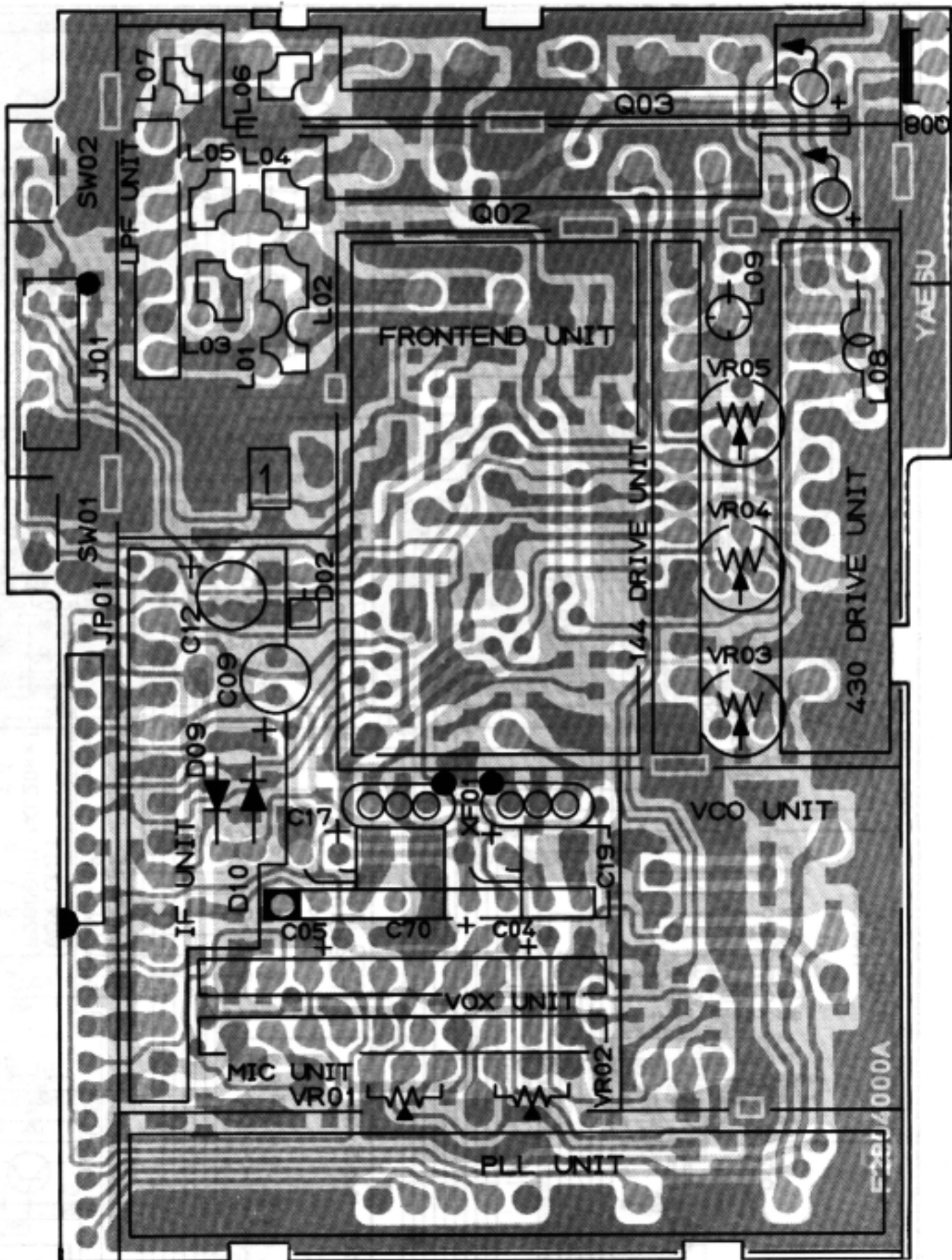
PART LOCATION No.	ORIGINAL	REPLACEMENT	
	NOMENCLATURE (MARKING) AND PART NUMBER	NOMENCLATURE (MARKING) AND PART NUMBER	
Q 1010, 1011, 1015, 503, 2001, 2003, 3008, 3018, 3028, 3030	2SA812F/G (M6/M7) G3108120F/G	2SA1162GR (SG) G3111620G	2SA1179F/G (M6/M7) G3111790F/G
Q 1005, 1006, 1007, 1009, 1013, 1014, 902, 2002, 3010, 3011, 3019, 3020, 3021, 3022, 3023, 3025, 3026, 3027, 3029, 3031	2SC1623F/G (L6/L7) G3316230F/G	2SC2712GR/Y (LG/LY) G3327120G/Y	2SC2812F (L6) G3328120F
Q 901	M5224FP G1090726	LA6324M G1090559	μ PC324G G1090603
Q 3002	M5233FP G1090728	LA6393M —	
D 501	1SS123(A7) G2070020	1SS181(C3) G2090003	DCA015TA (A4) G2070014
D 502, 602, 2201, 2202, 2203, 2204, 2205, 2206, 2203, 3009	MC2836 (A4) G2070024	1SS181(A3) G2070001	DCA015TA (A4) G2070014
D 1001, 1003, 1005, 301, 302, 303, 2001, 2002, 3001, 3002, 3004, 3005, 3007, 3008, 3010, 3011, 3015, 3016, 3019	MC2838 (A6) G2070018	1SS184(B3) G2070009	DCB015TA (A6) G2070012
D 3012	SLM-13VW G2070030	SLM-23VMW G2070028	
Q 3003, 3004	μ PD4011BG G1090600	LC4011BM G1090773	

*Semiconductors not listed above may be replaced only with original types.

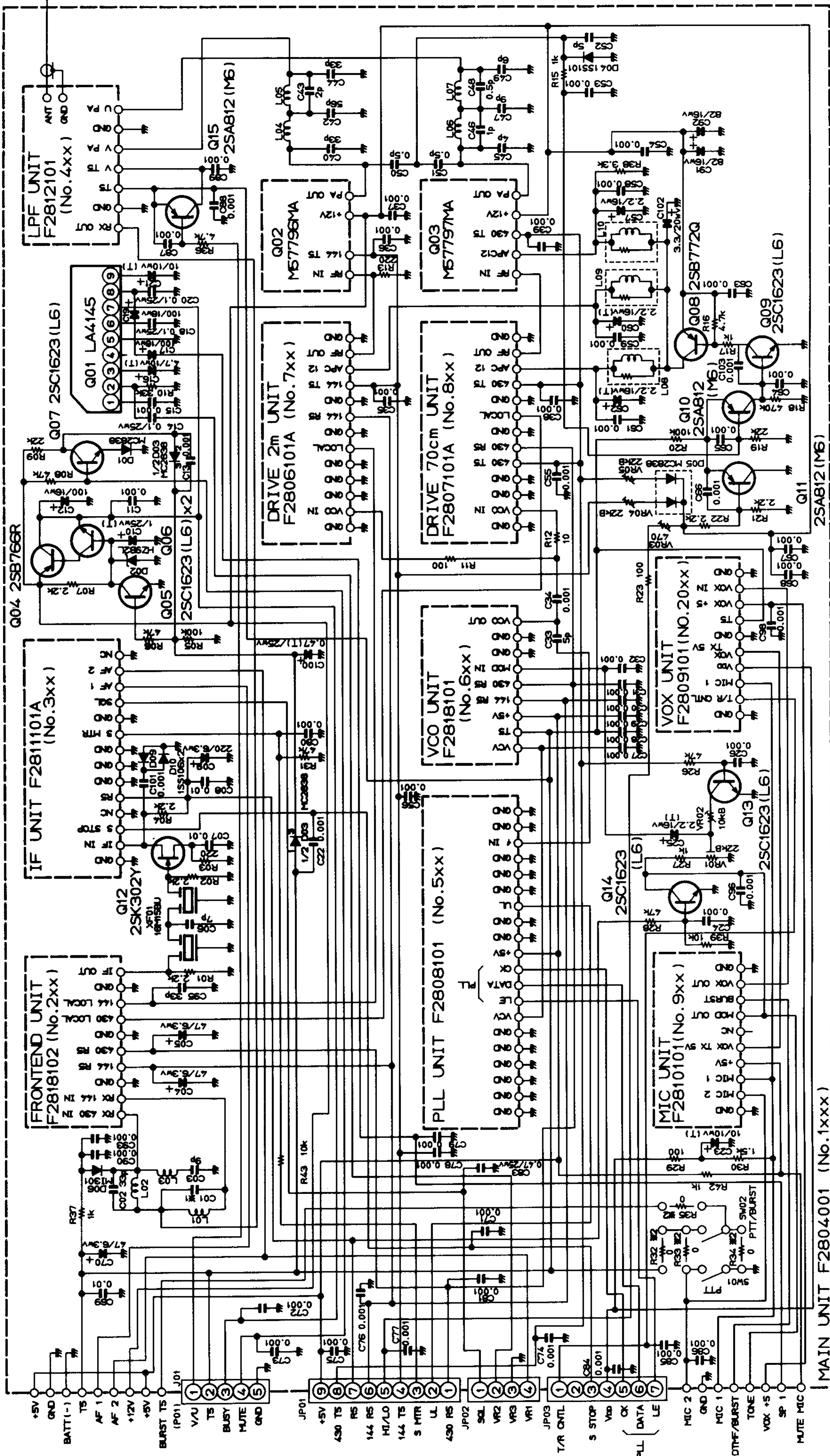
MAIN UNIT



MAIN UNIT



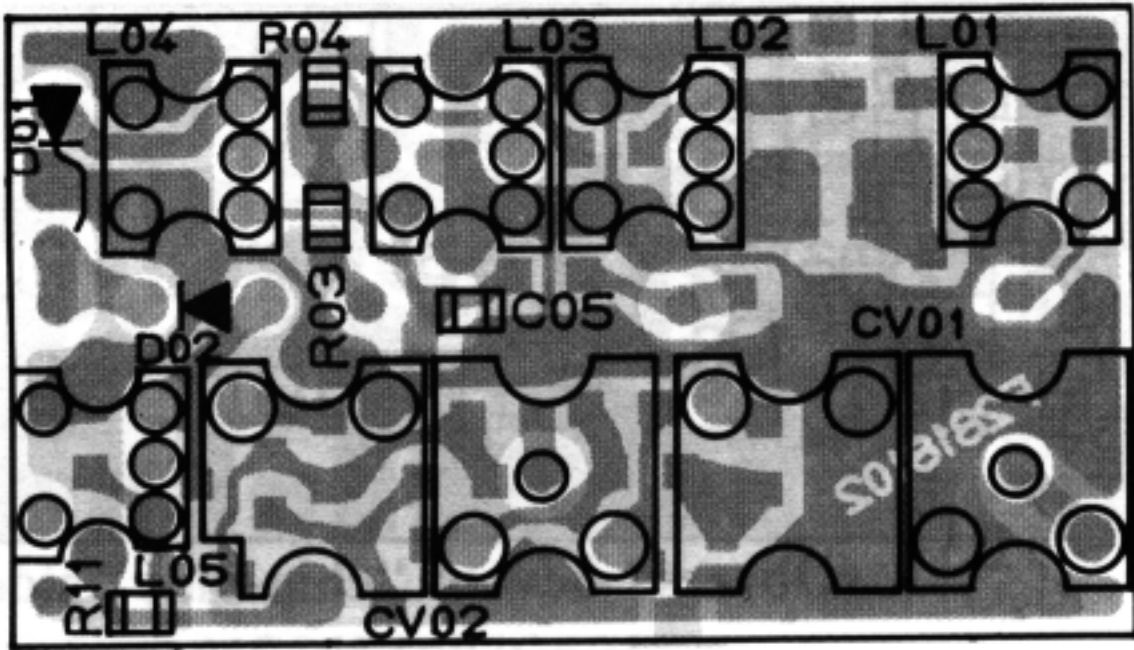
MAIN UNIT



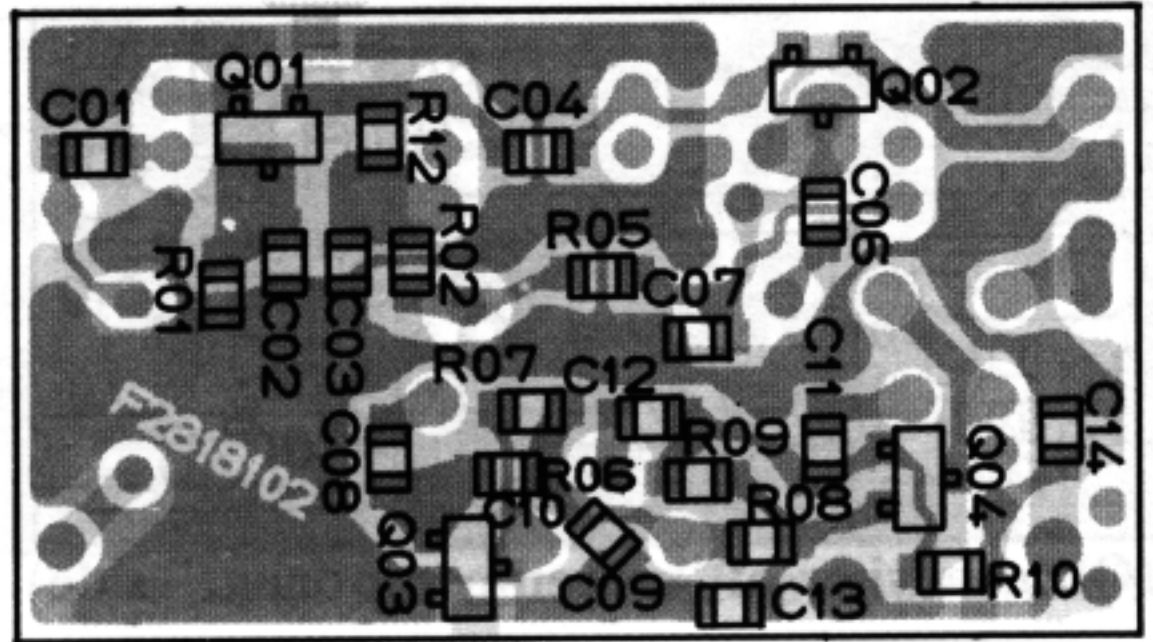
R1		R32		R33		R34		R35	
A	7pF	-	0	0	0	0	0	-	0
B,C,F	5pF	0	0	0	0	0	0	0	0

RESISTOR VALUES ARE IN Ω , 1/10W; CAPACITOR VALUES ARE IN μ F, 50V;
AND INDUCTOR VALUES ARE IN H; UNLESS OTHERWISE NOTED.
(T) CAPACITORS ARE TANTALUM.

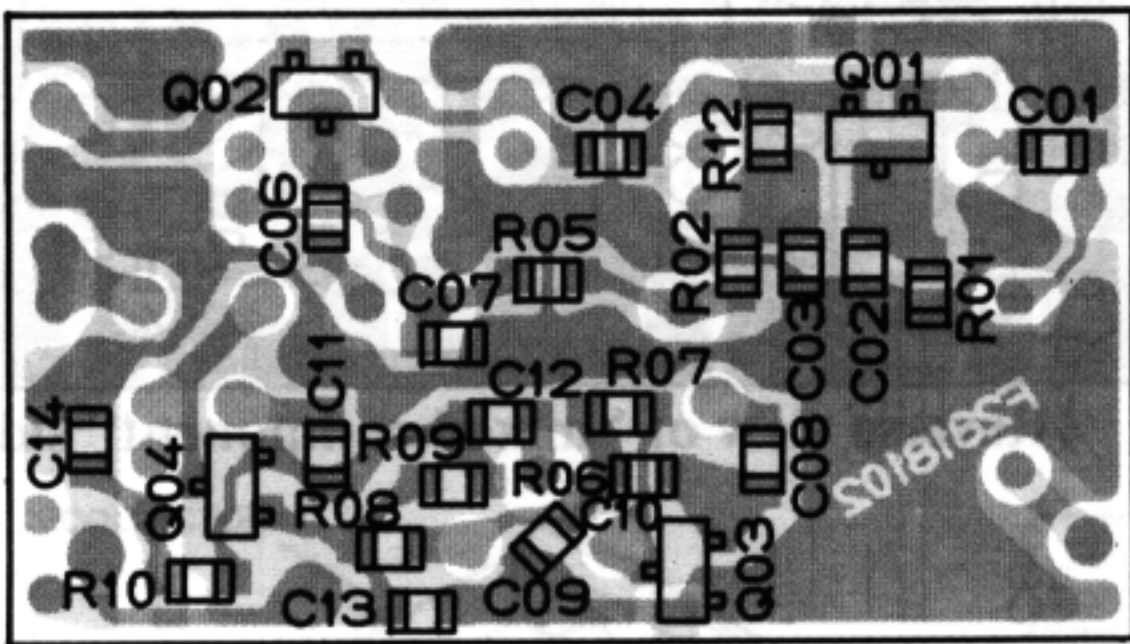
FRONTEND UNIT



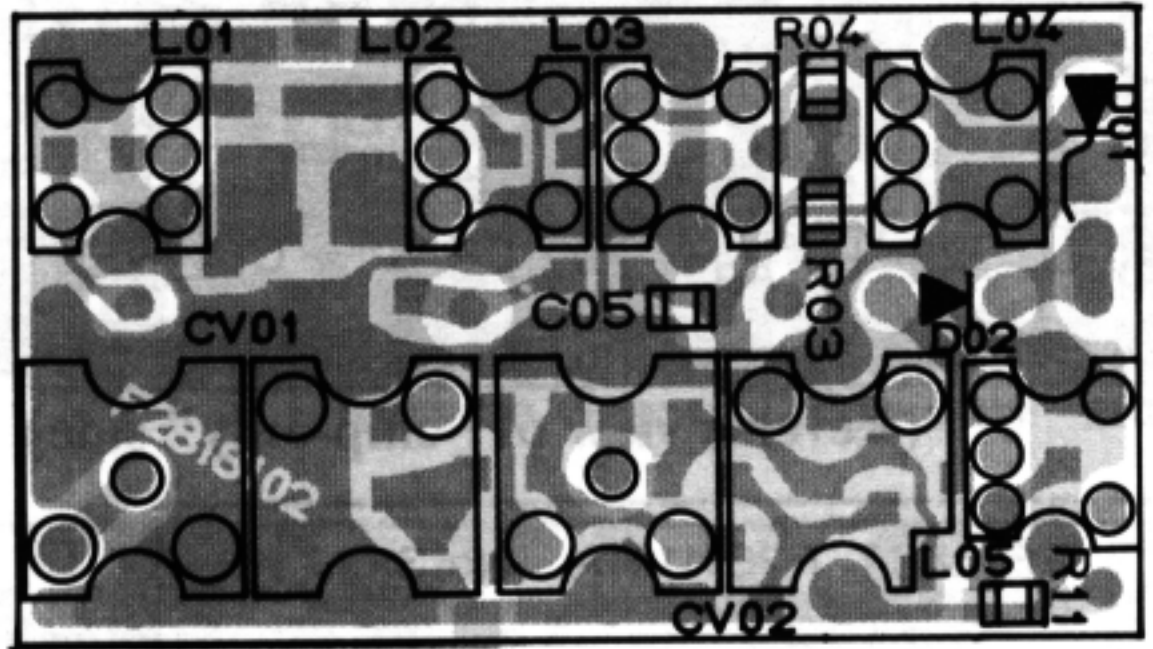
(Obverse view of "mixed-component" side)



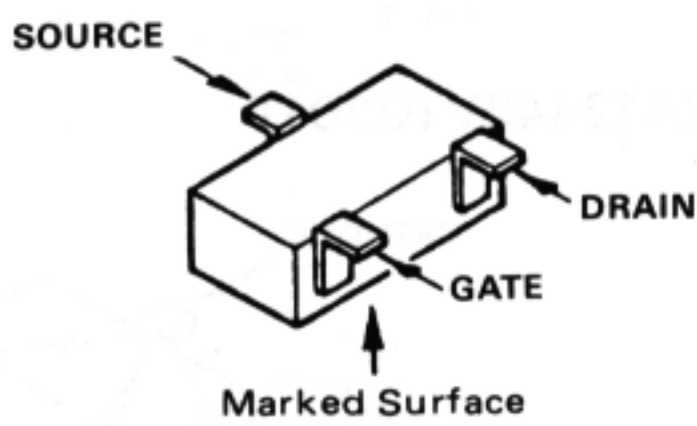
(Obverse view of "chip-only" side)



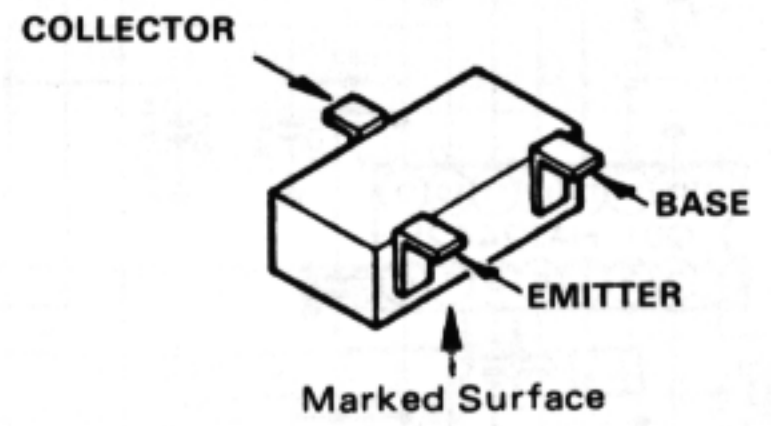
(Reverse view of "chip-only" side)



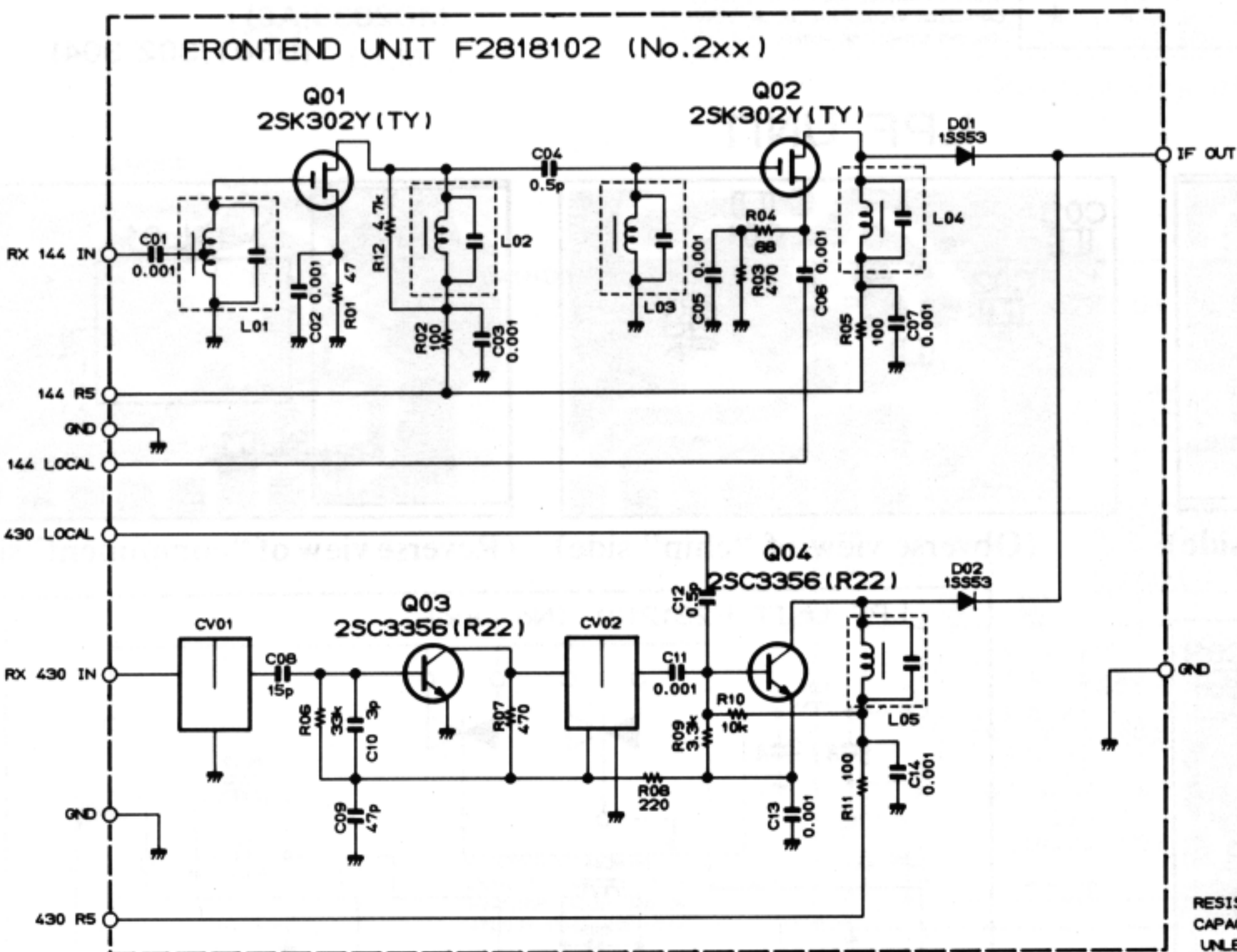
(Reverse view of "mixed-component" side)



2SK302Y(TY)
(Q201, 202)

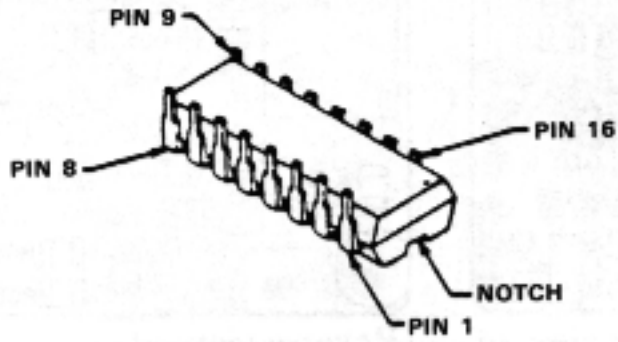


2SC3356(R22)
(Q203, 204)

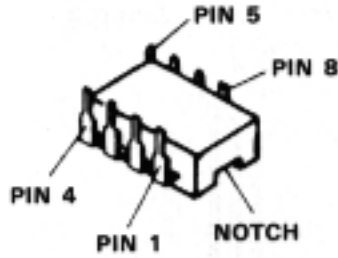


RESISTOR VALUES ARE IN Ω , 1/10W;
CAPACITOR VALUES ARE IN μ F, 50v;
UNLESS OTHERWISE NOTED.

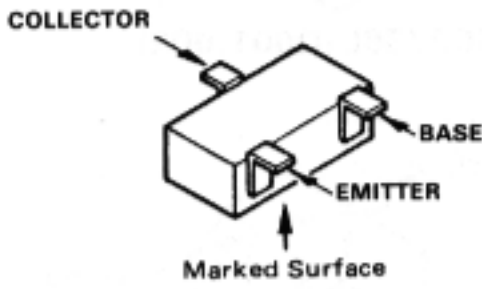
PLL UNIT



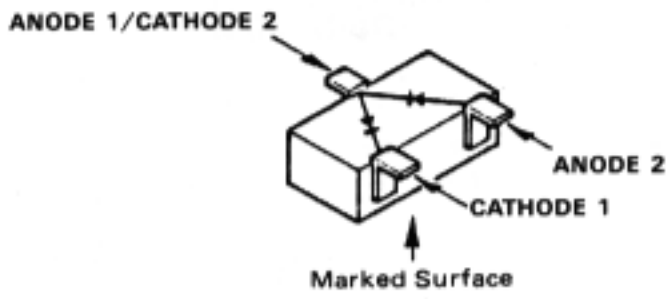
MC145158 (Q501)



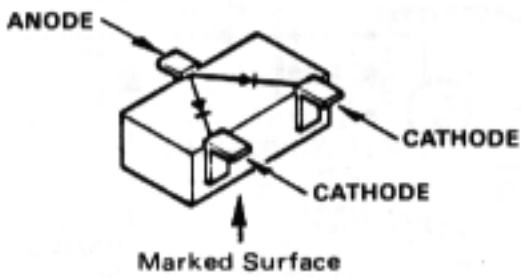
MC12017 (Q502)



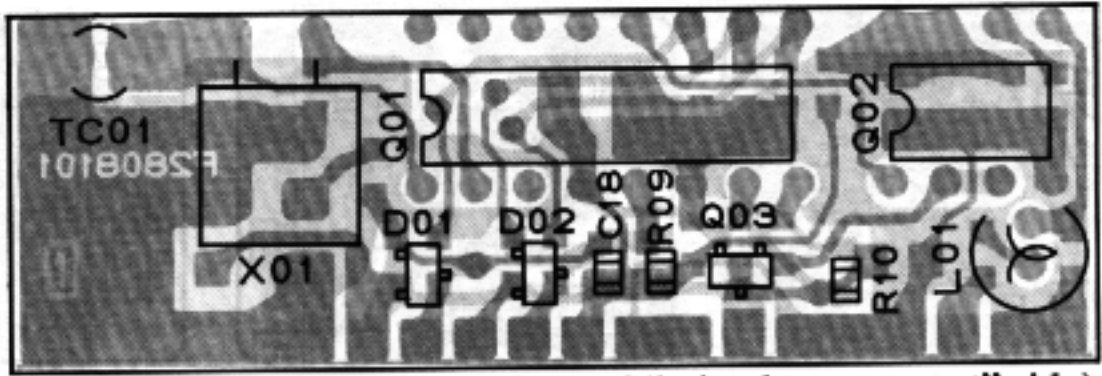
2SA812(M6)
(Q503)



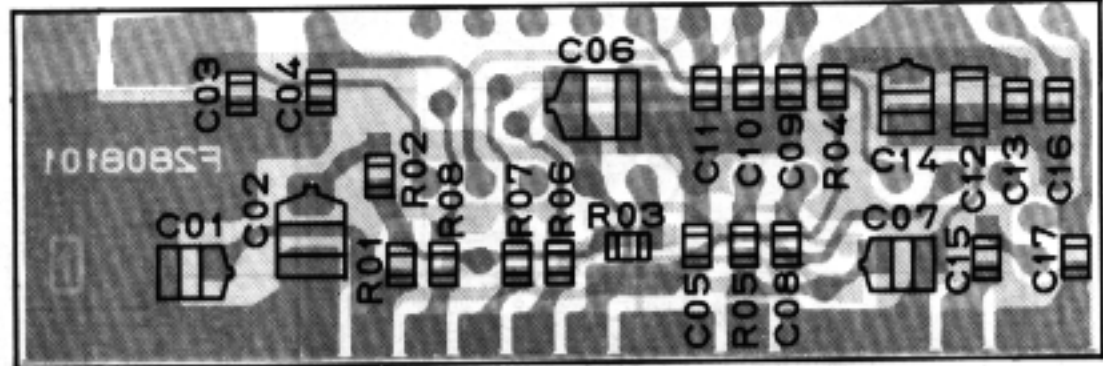
1SS123(A7)
(D501)



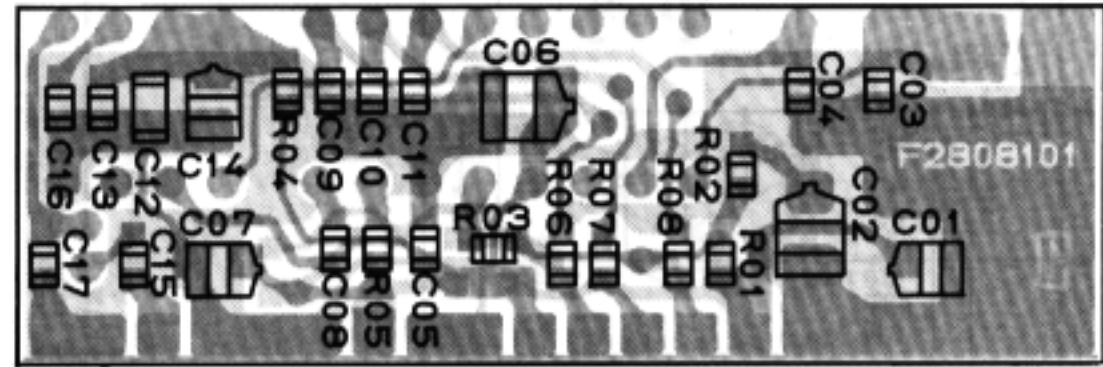
MC2836(A4)
(D502)



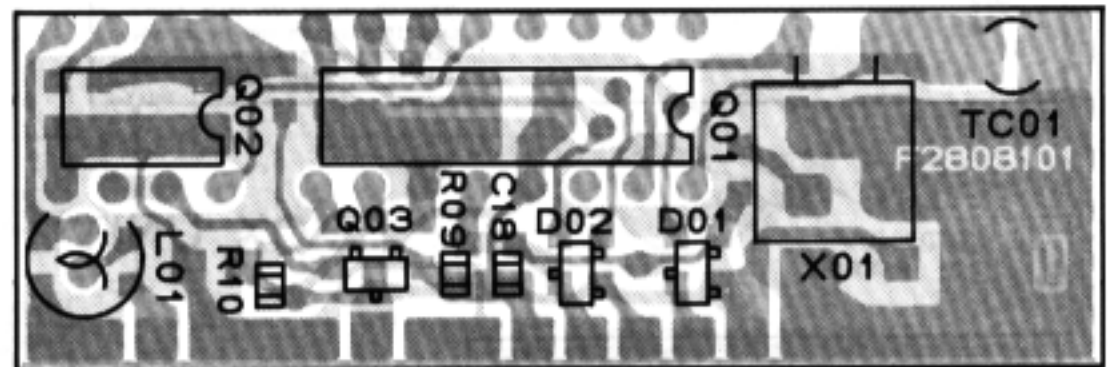
(Obverse view of "mixed-component" side)



(Reverse view of "chip-only" side)

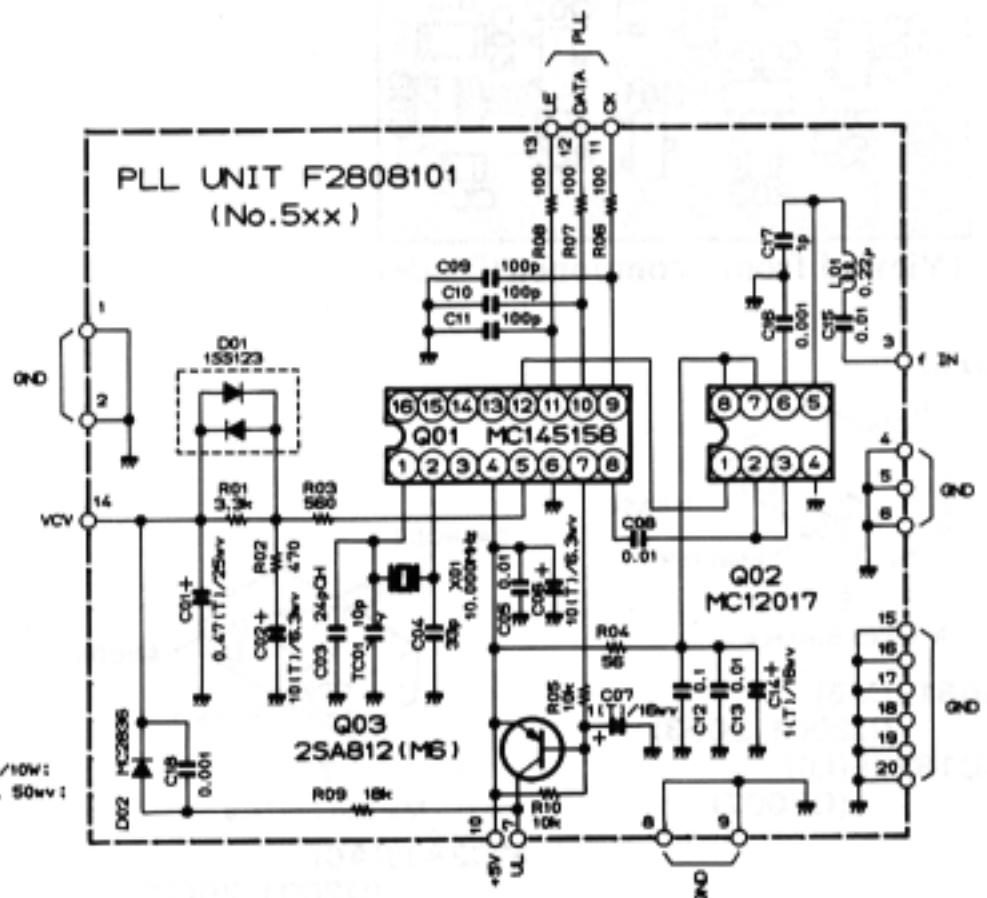


(Obverse view of "chip-only" side)

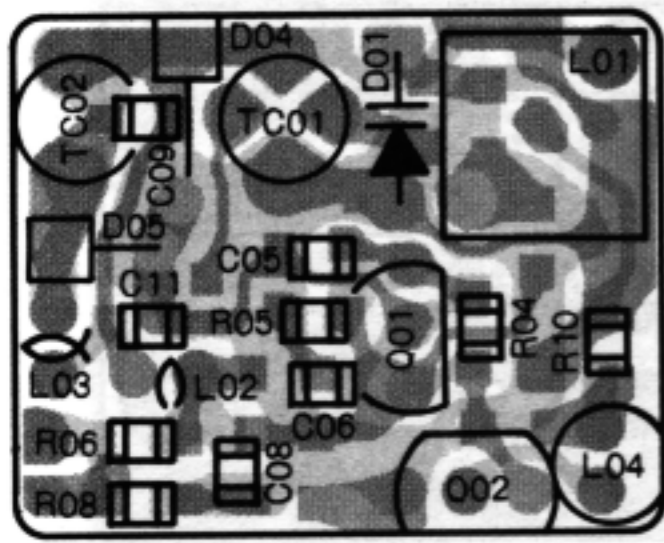


(Reverse view of "mixed-component" side)

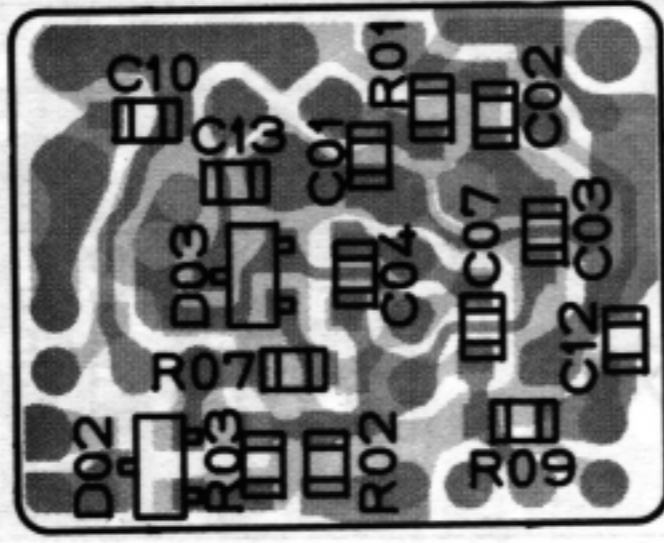
RESISTOR VALUES ARE IN Ω , 1/10W;
CAPACITOR VALUES ARE IN μ F, 50V;
INDUCTOR VALUES ARE IN H;
UNLESS OTHERWISE NOTED.



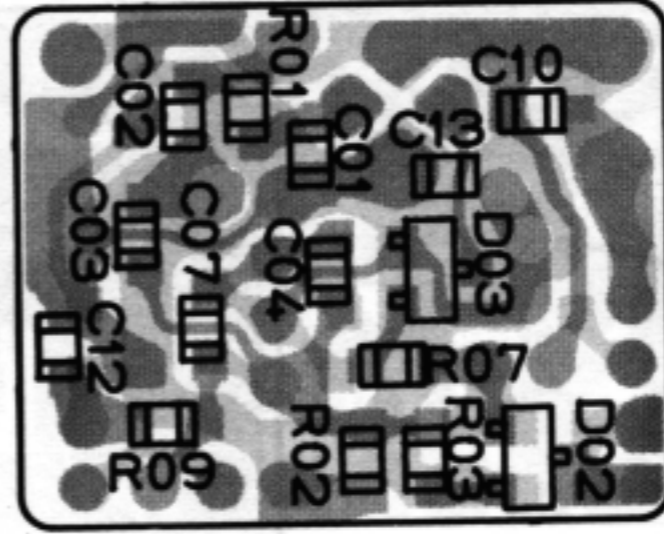
VCO UNIT



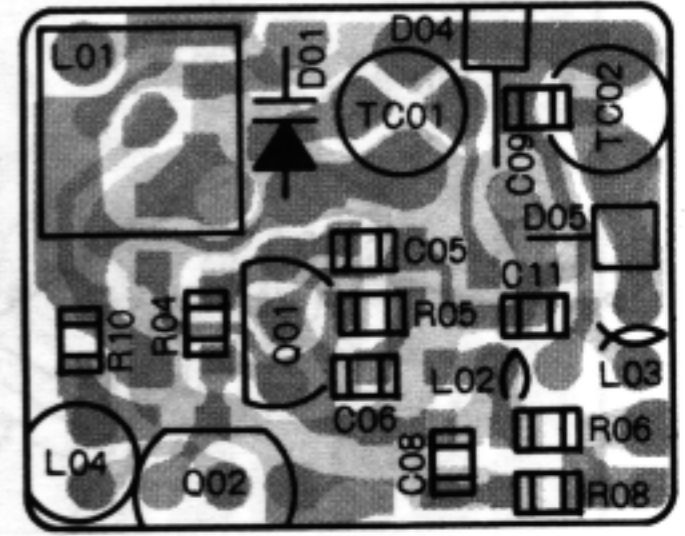
(Obverse view of "mixed-component" side)



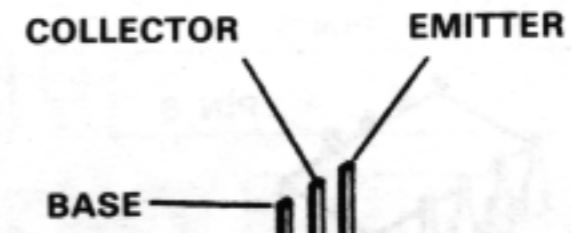
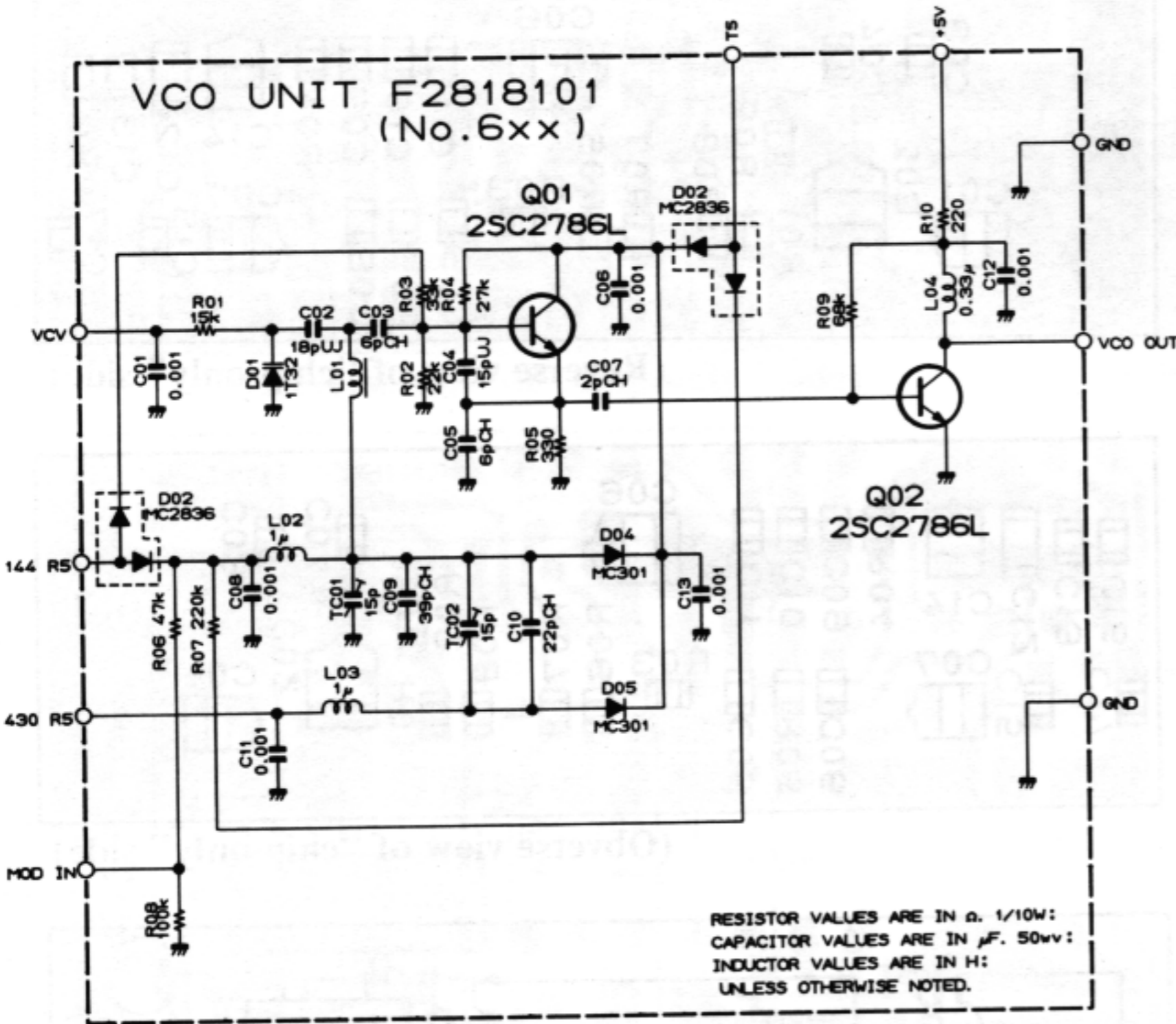
(Reverse view of "chip-only" side)



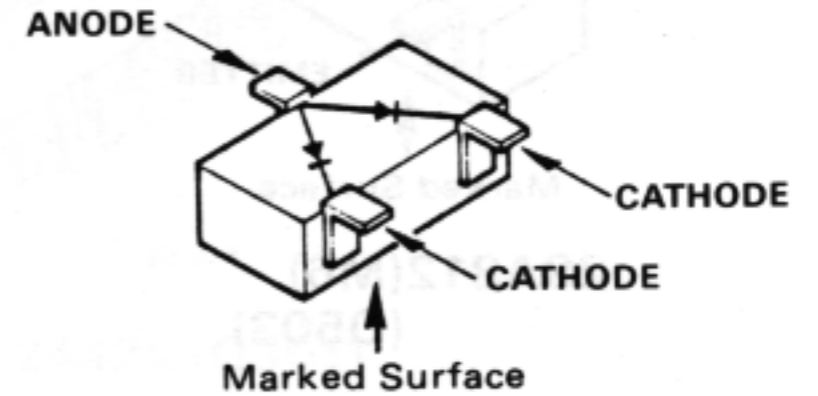
(Obverse view of "chip-only" side)



(Reverse view of "mixed-component" side)

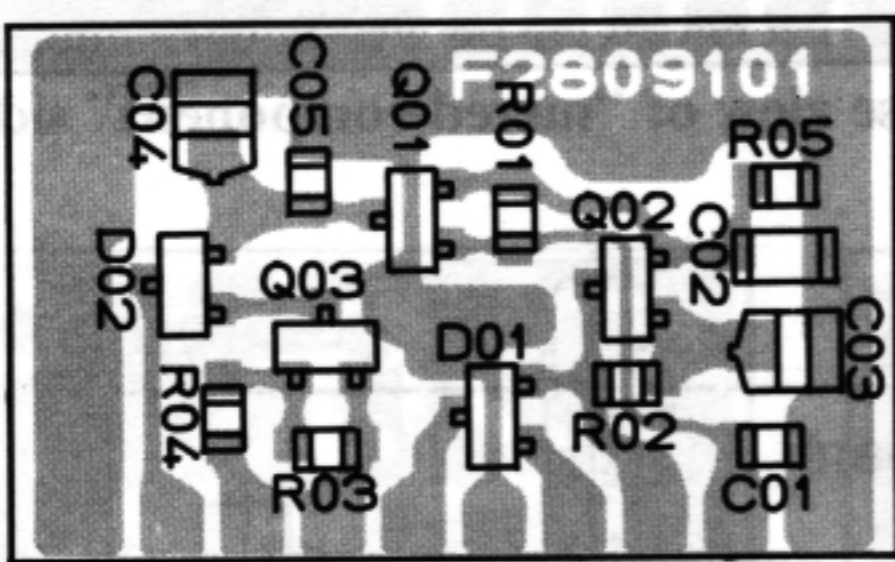


2SC2786L (Q601, 602)

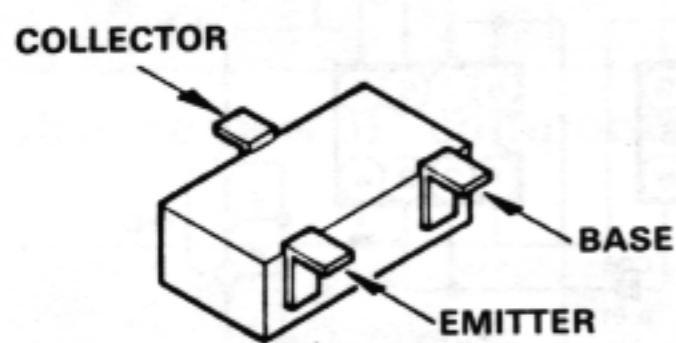


MC2836(A4)
(D602, 603)

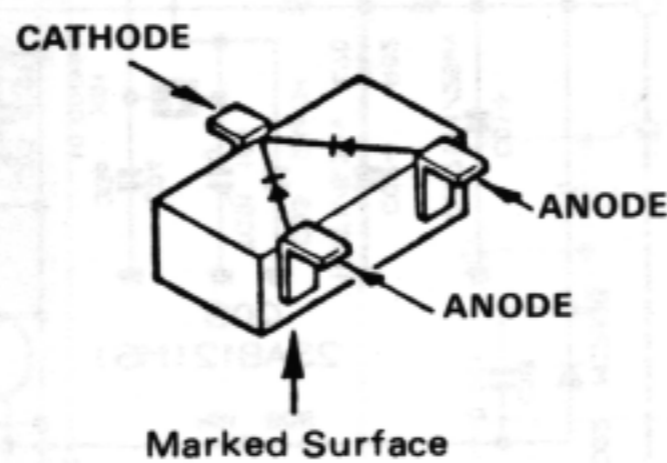
VOX UNIT



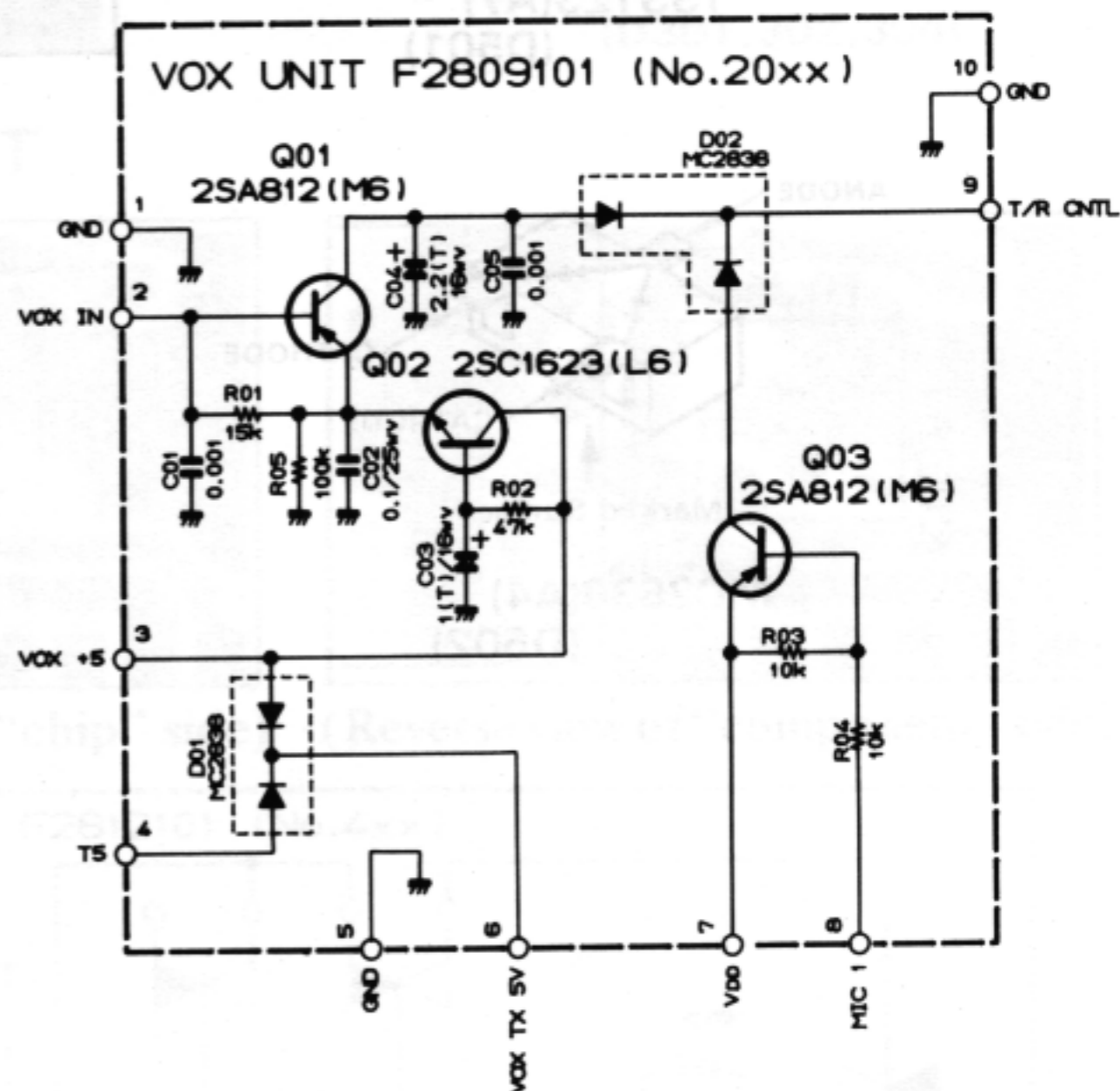
(Viewed from "component" side)



2SA812(M6)
(Q2001, 2003)
2SC1623F(L6)
(Q2002)

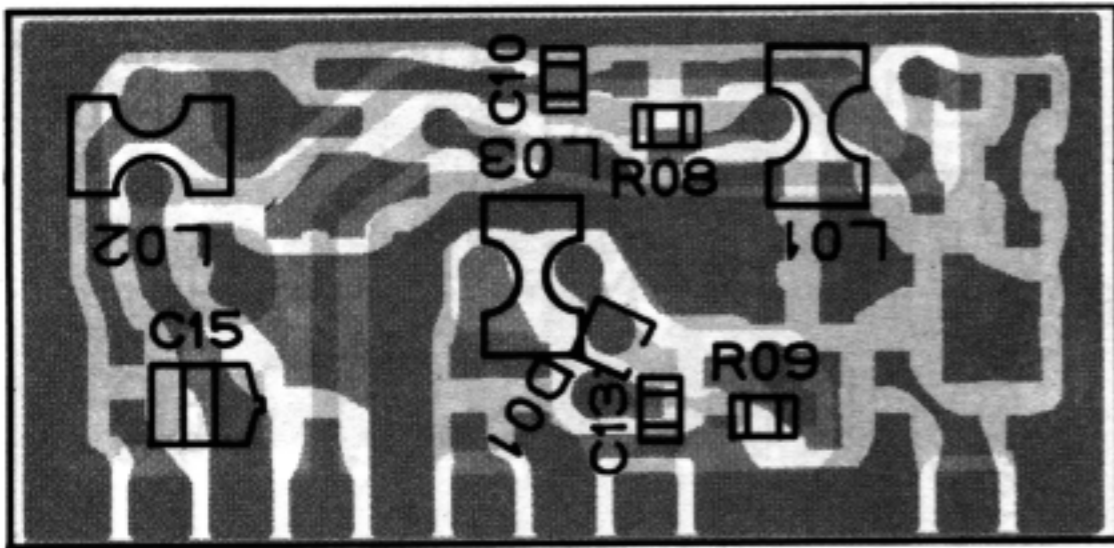


MC2838(A6)
(D2001, 2002)

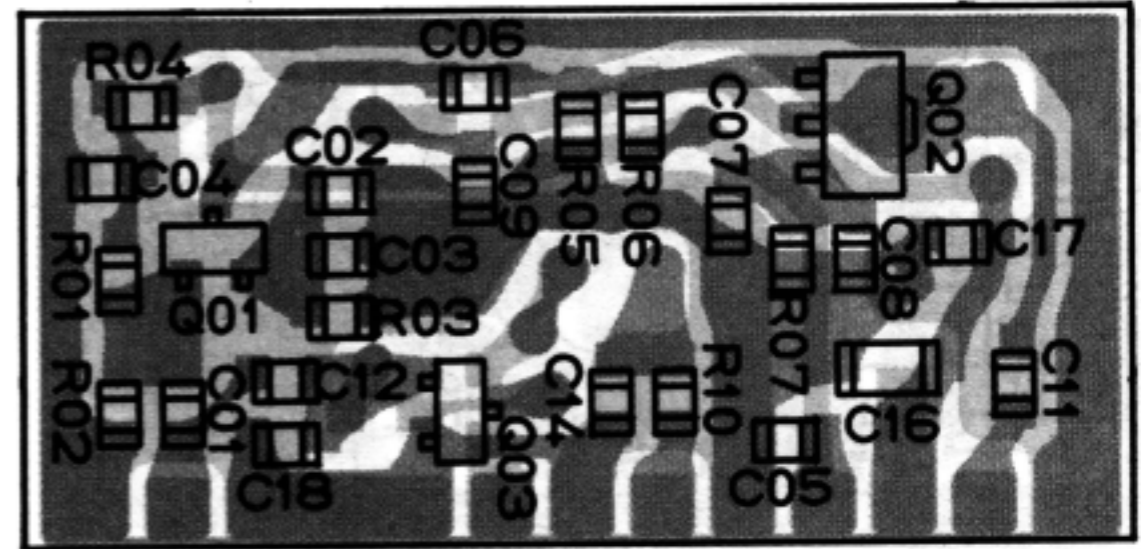


RESISTOR VALUES ARE IN Ω , 1/10W;
CAPACITOR VALUES ARE IN μ F, 50vV;
UNLESS OTHERWISE NOTED.

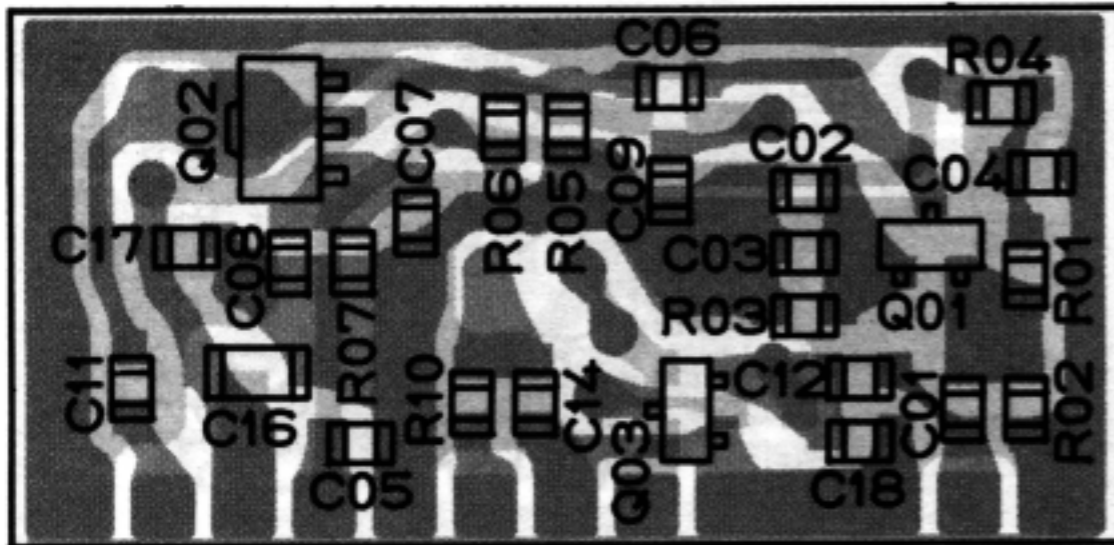
2m DRIVE UNIT



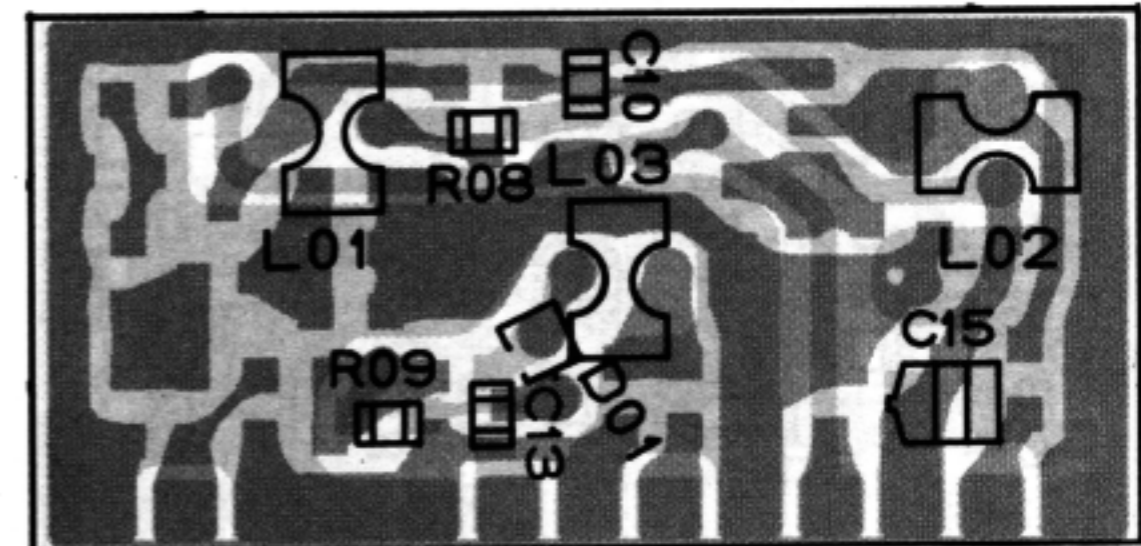
(Obverse view of "mixed-component" side)



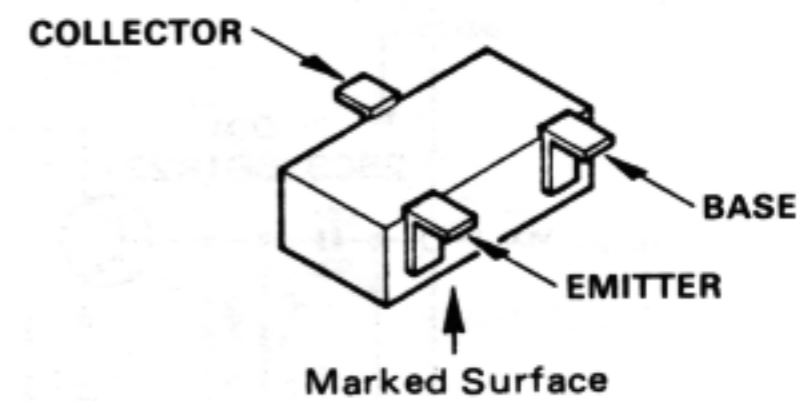
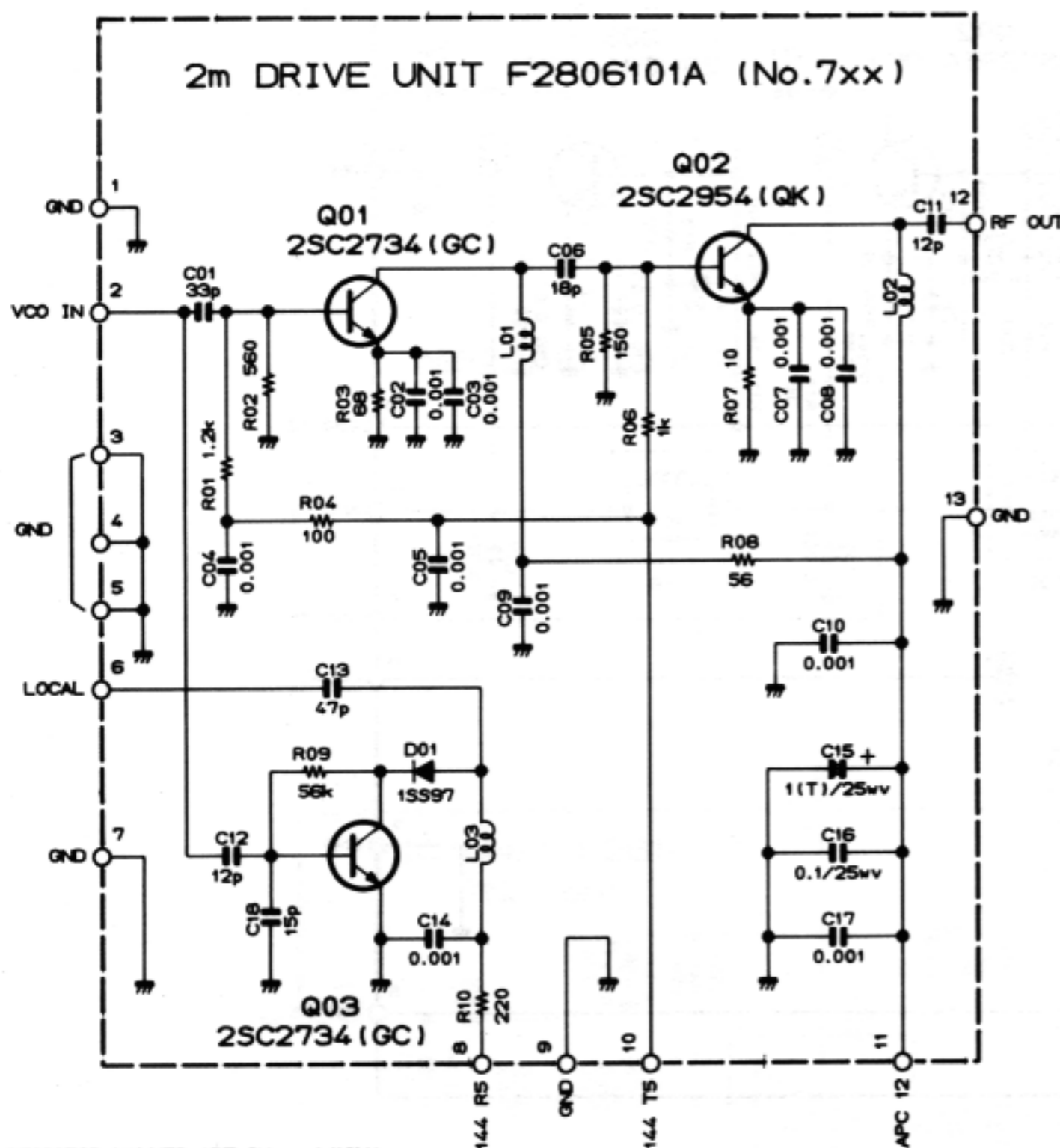
(Obverse view of "chip-only" side)



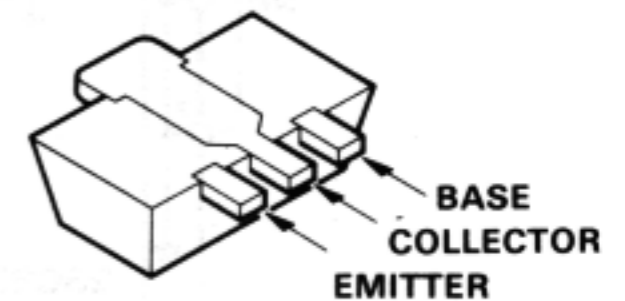
(Reverse view of "chip-only" side)



(Reverse view of "mixed-component" side)



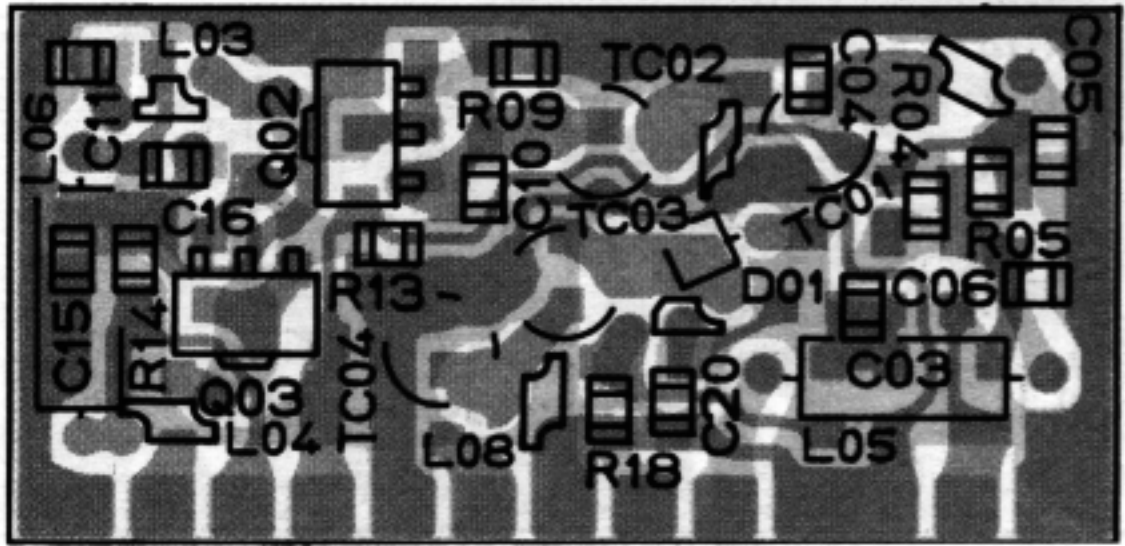
2SC2734(GC)
(Q701, 703)



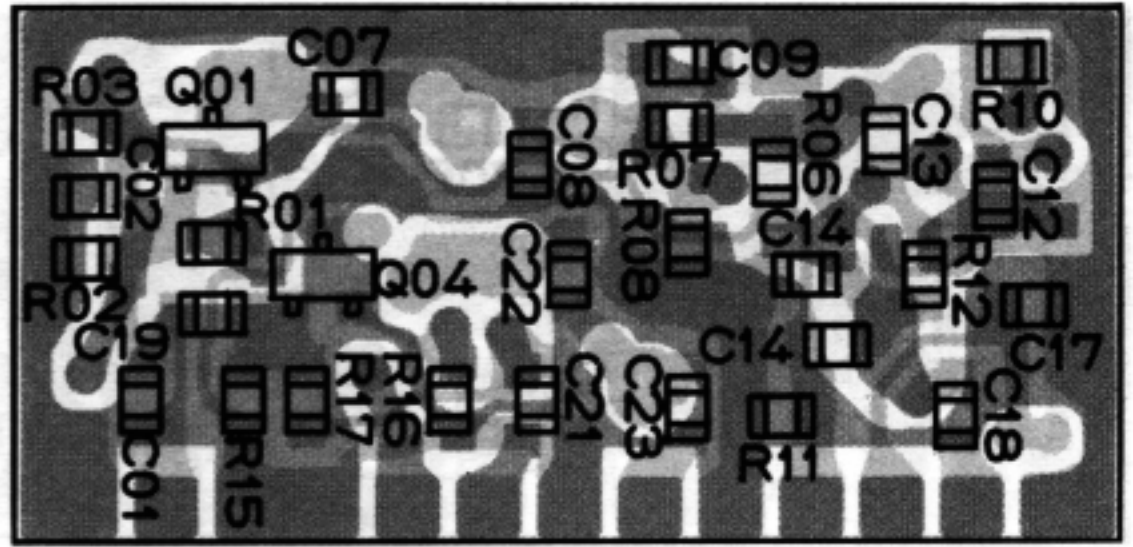
2SC2954 (Q702)

RESISTOR VALUES ARE IN Ω , 1/10W:
CAPACITOR VALUES ARE IN μ F, 50V:
UNLESS OTHERWISE NOTED.

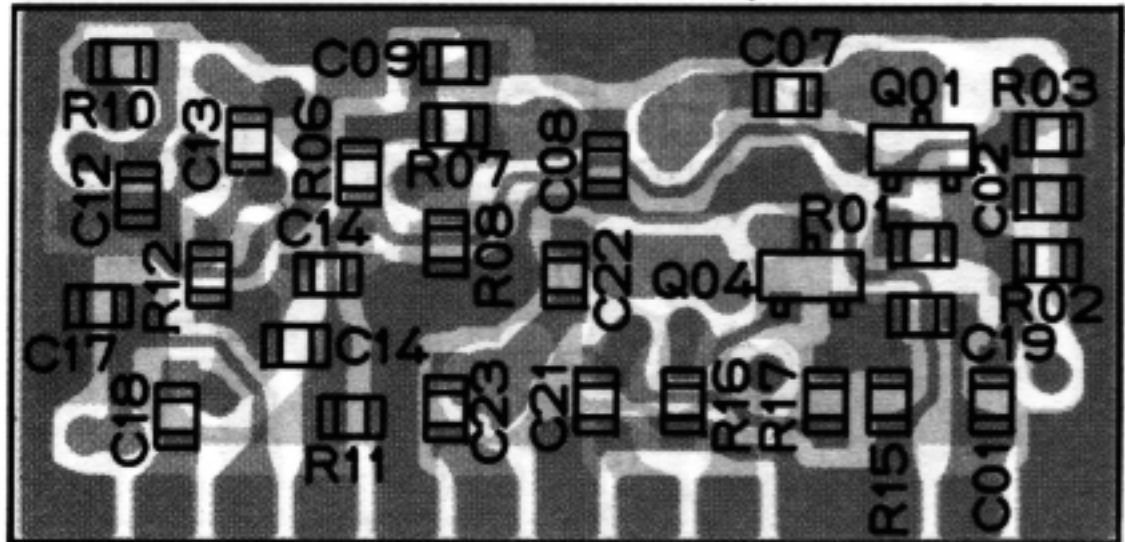
70cm DRIVE UNIT



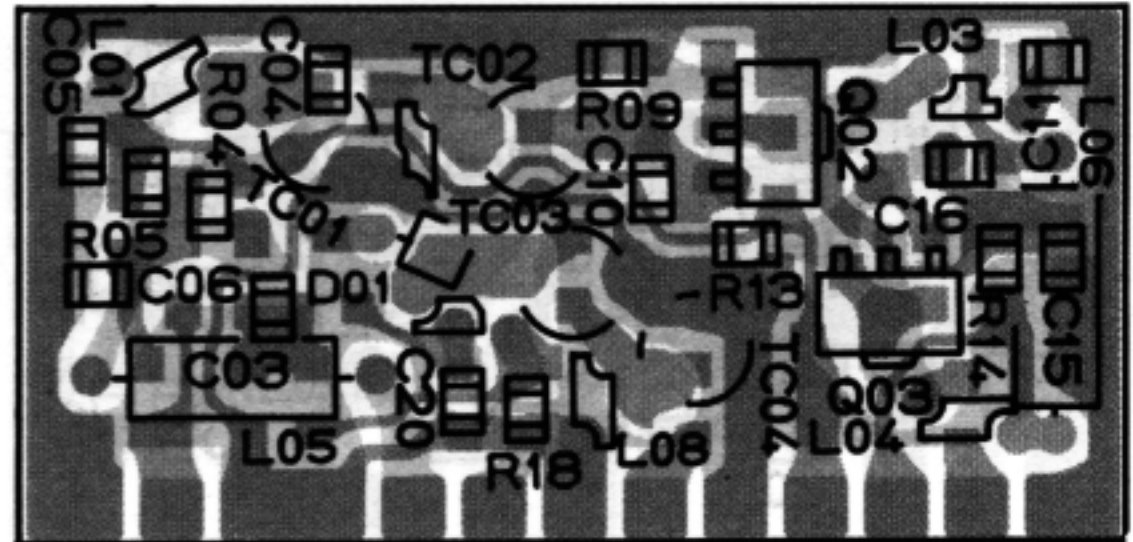
(Obverse view of "mixed-component" side)



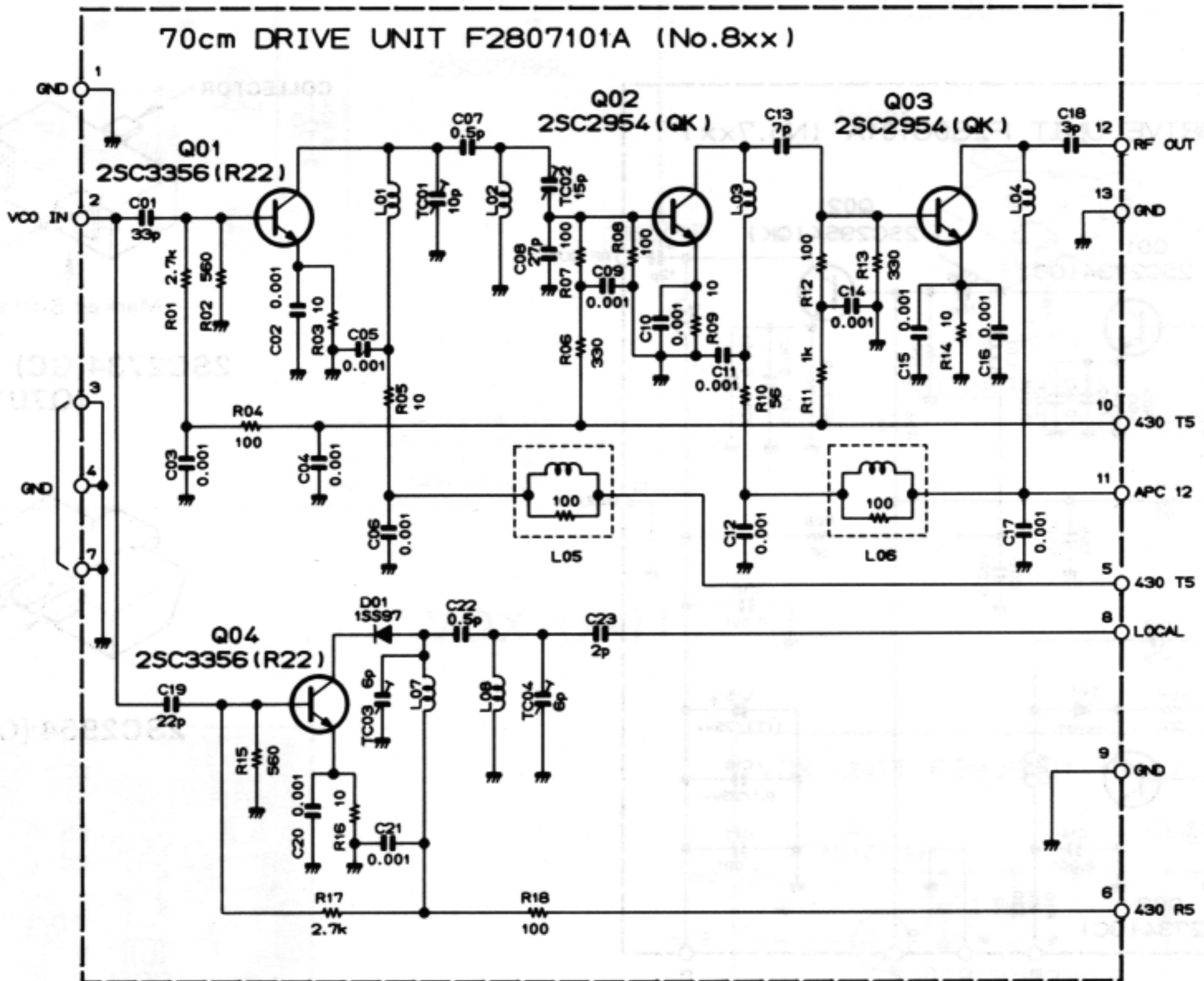
(Obverse view of "chip-only" side)



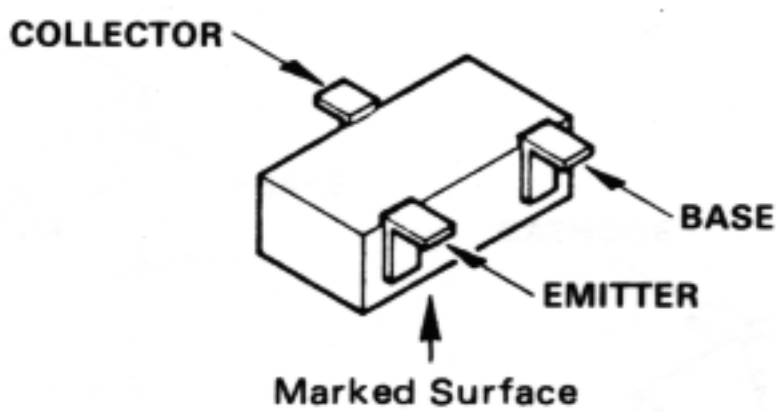
(Reverse view of "chip-only" side)



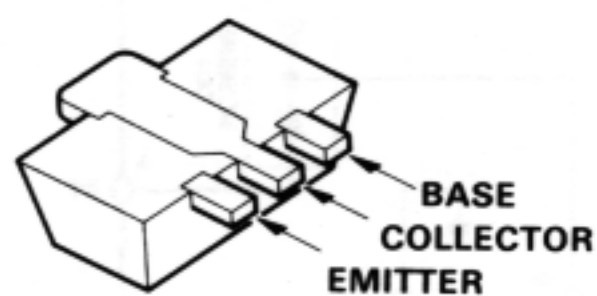
(Reverse view of "mixed-component" side)



RESISTOR VALUES ARE IN Ω , 1/10W;
CAPACITOR VALUES ARE IN μ F, 50V;
UNLESS OTHERWISE NOTED.

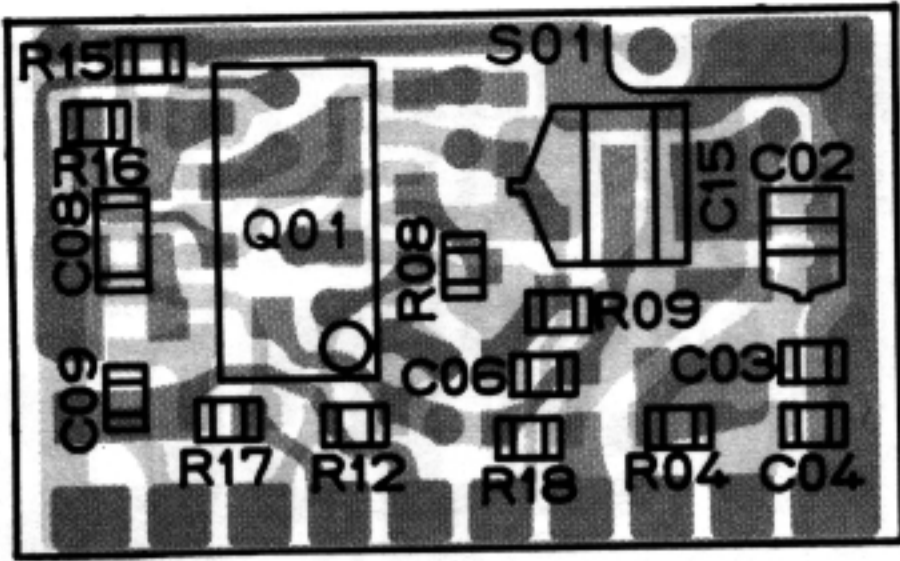


2SC3356(R22)
(Q801, 804)

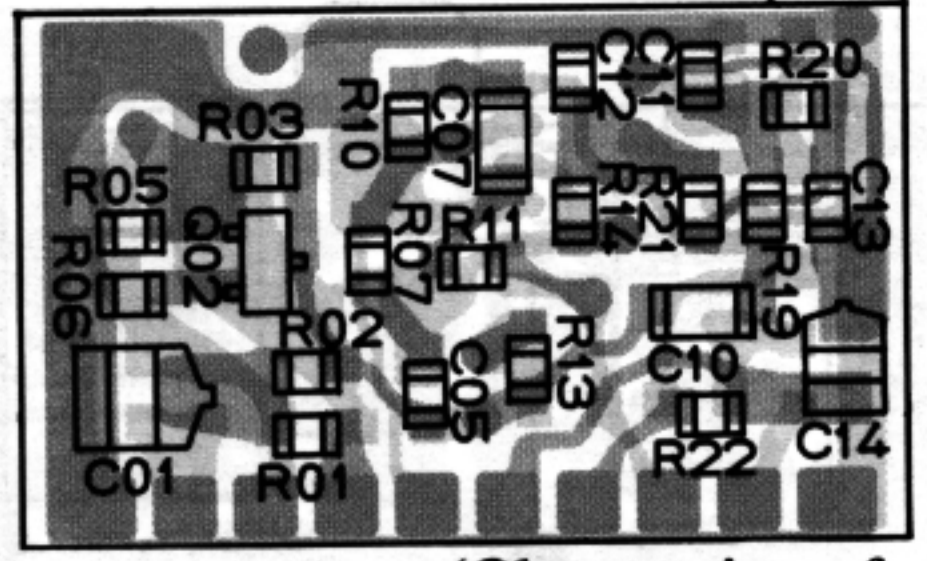


2SC2954 (Q802, 803)

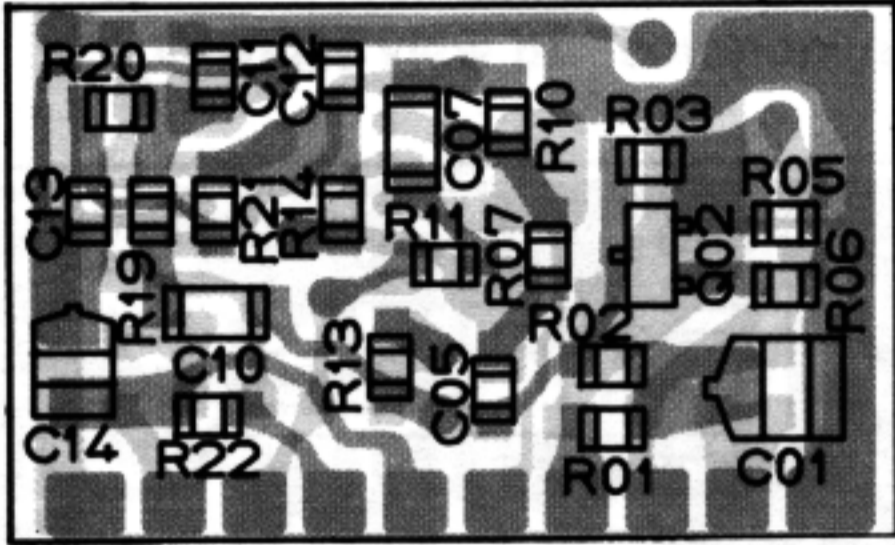
MIC UNIT



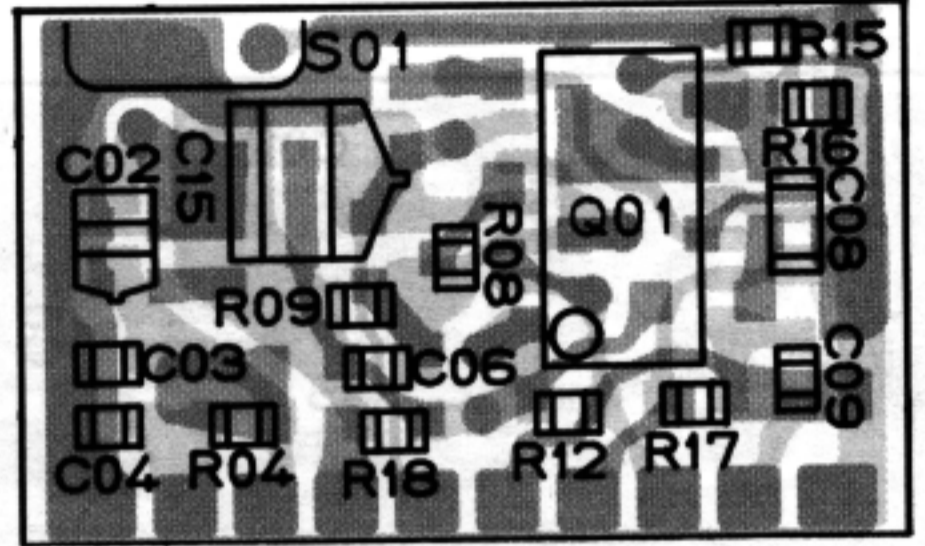
(Obverse view of "mixed-component" side)



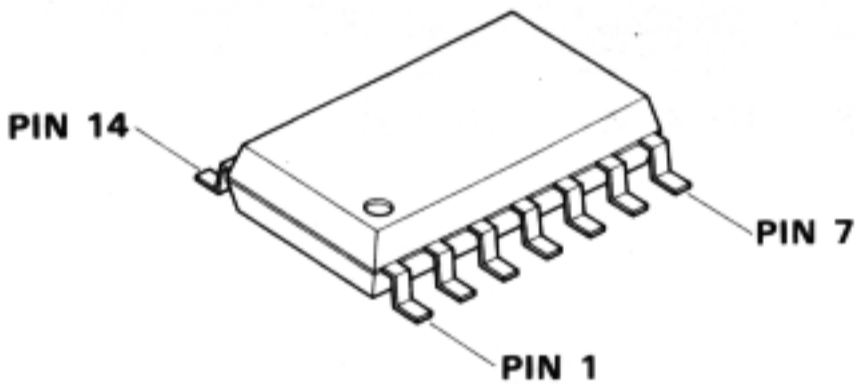
(Obverse view of "chip-only" side)



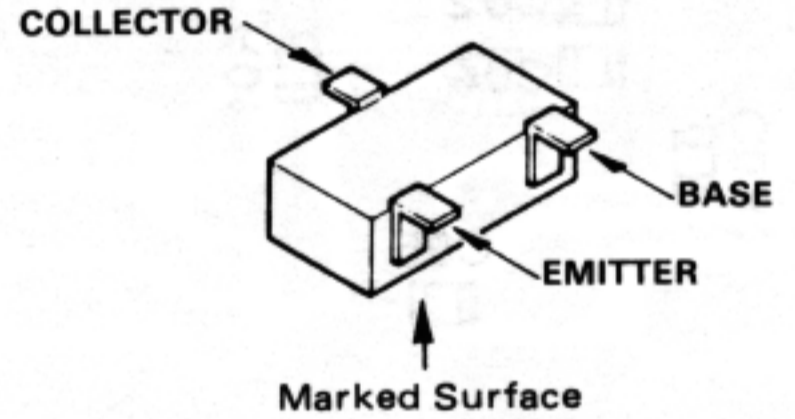
(Reverse view of "chip-only" side)



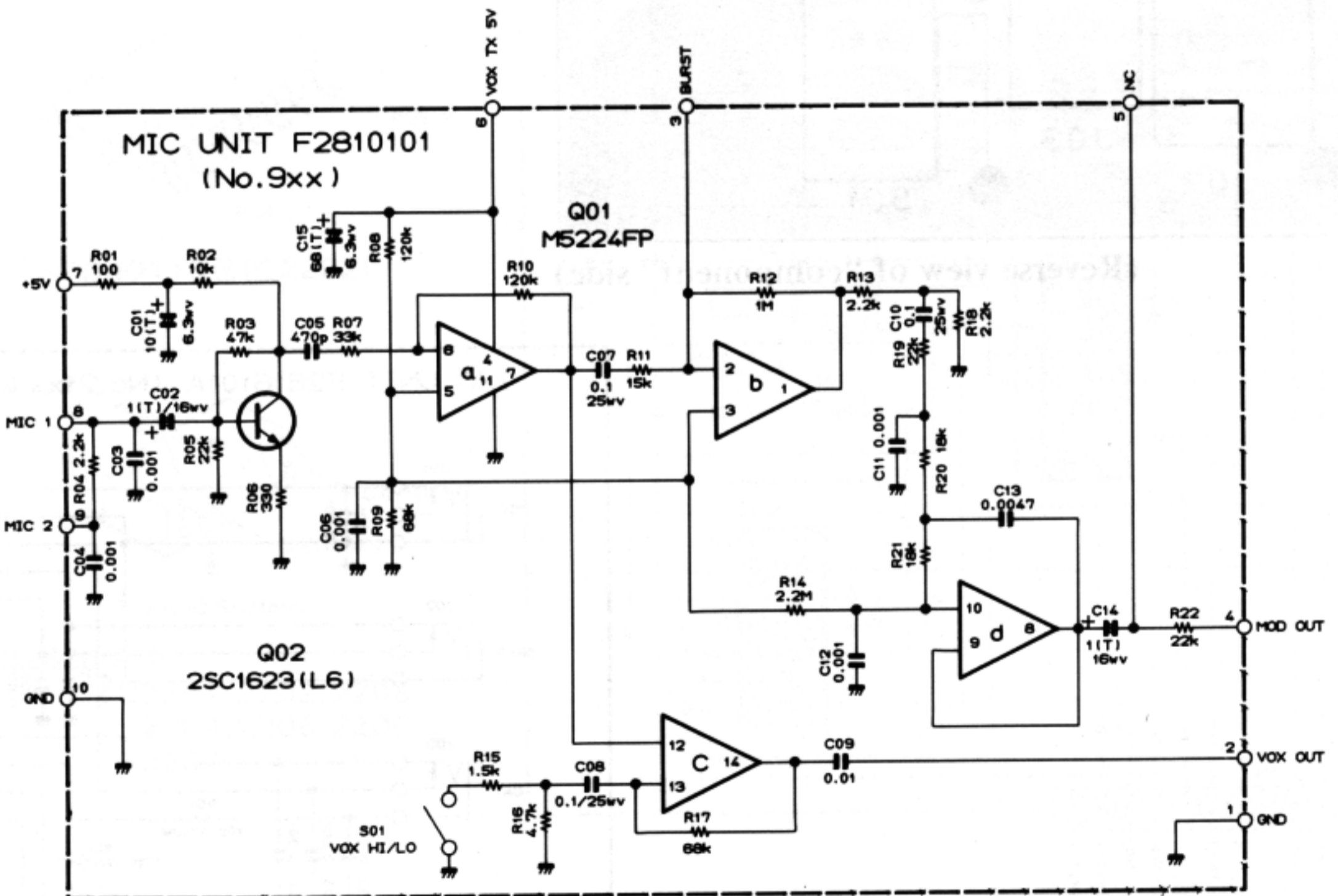
(Reverse view of "mixed-component" side)



M5224FP (Q901)

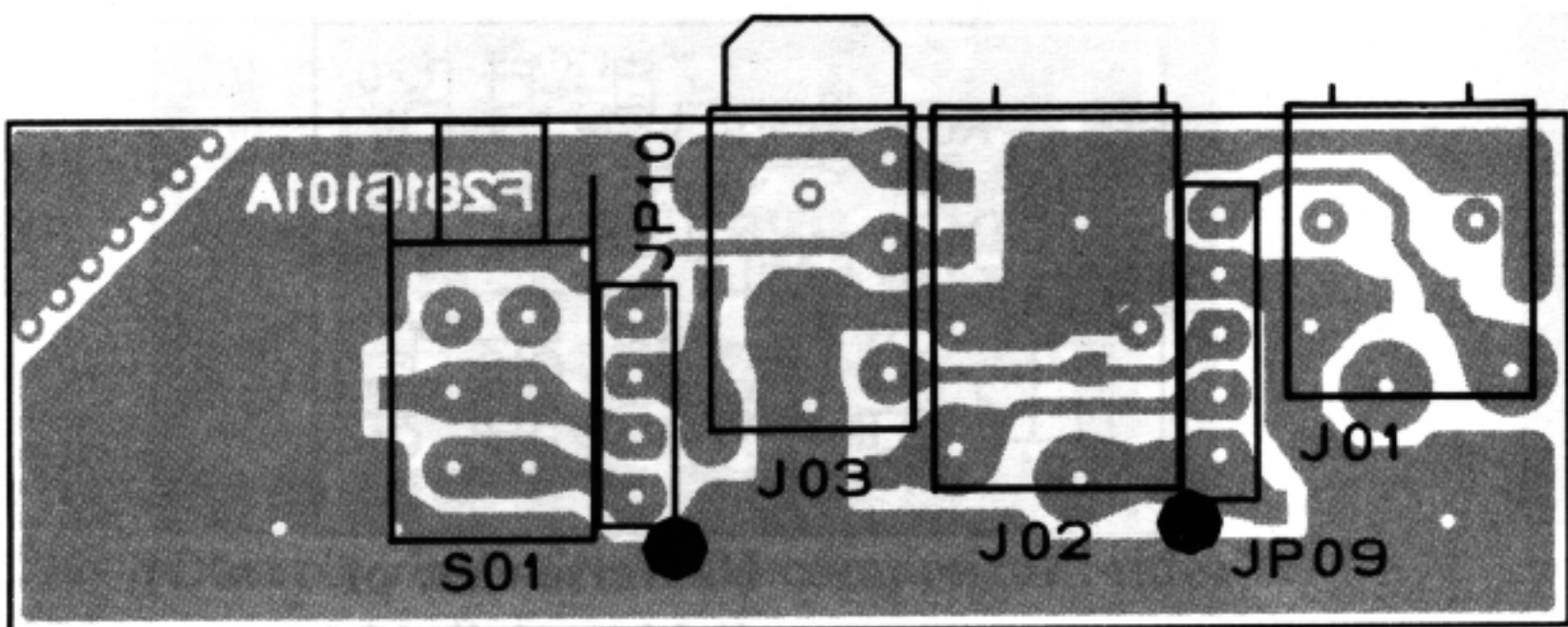


2SC1623F(L6)
(Q902)

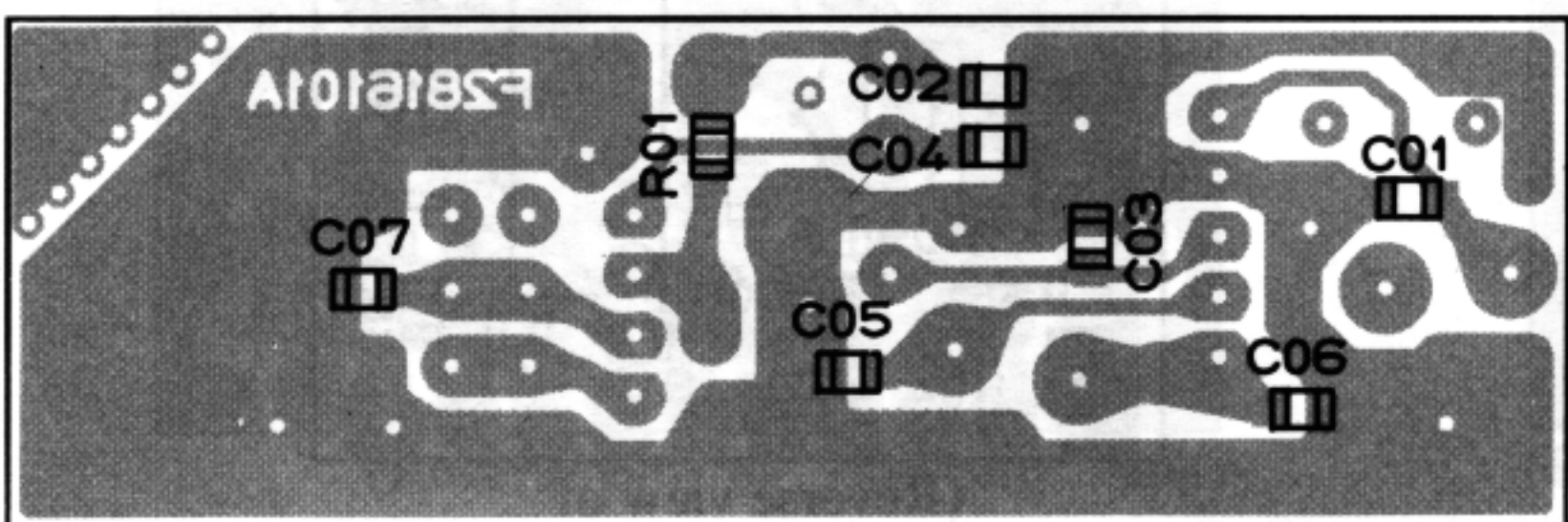


RESISTOR VALUES ARE IN Ω , 1/10W;
CAPACITOR VALUES ARE IN μ F, 50V;
UNLESS OTHERWISE NOTED.

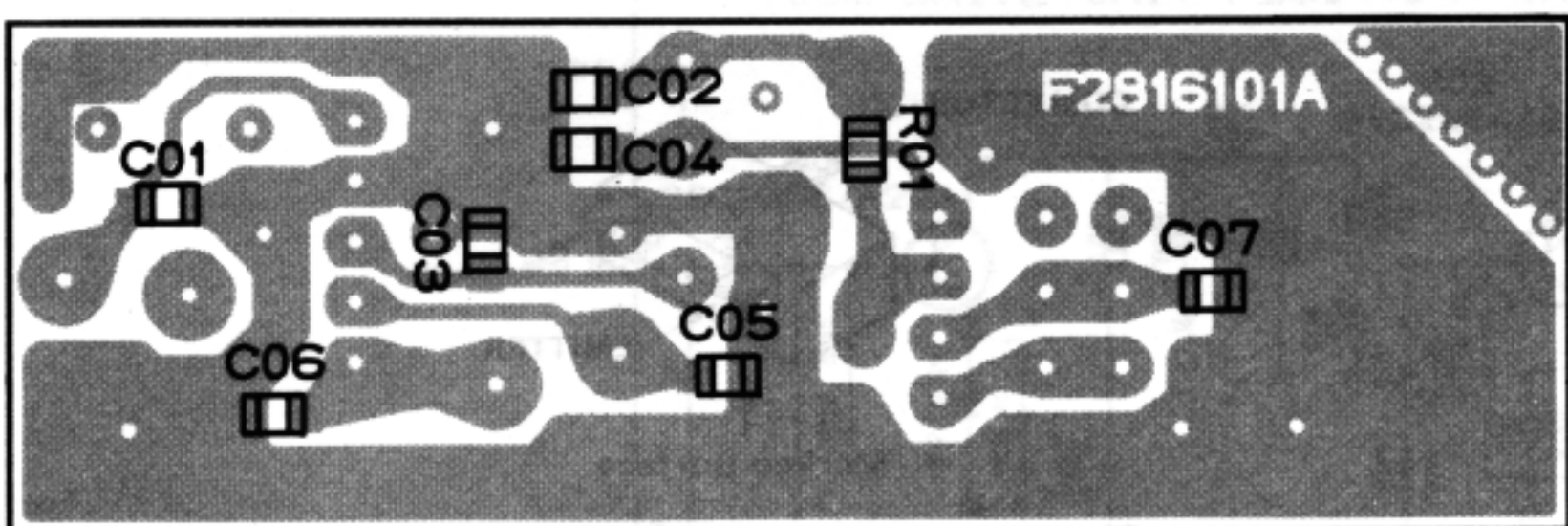
INTERFACE UNIT



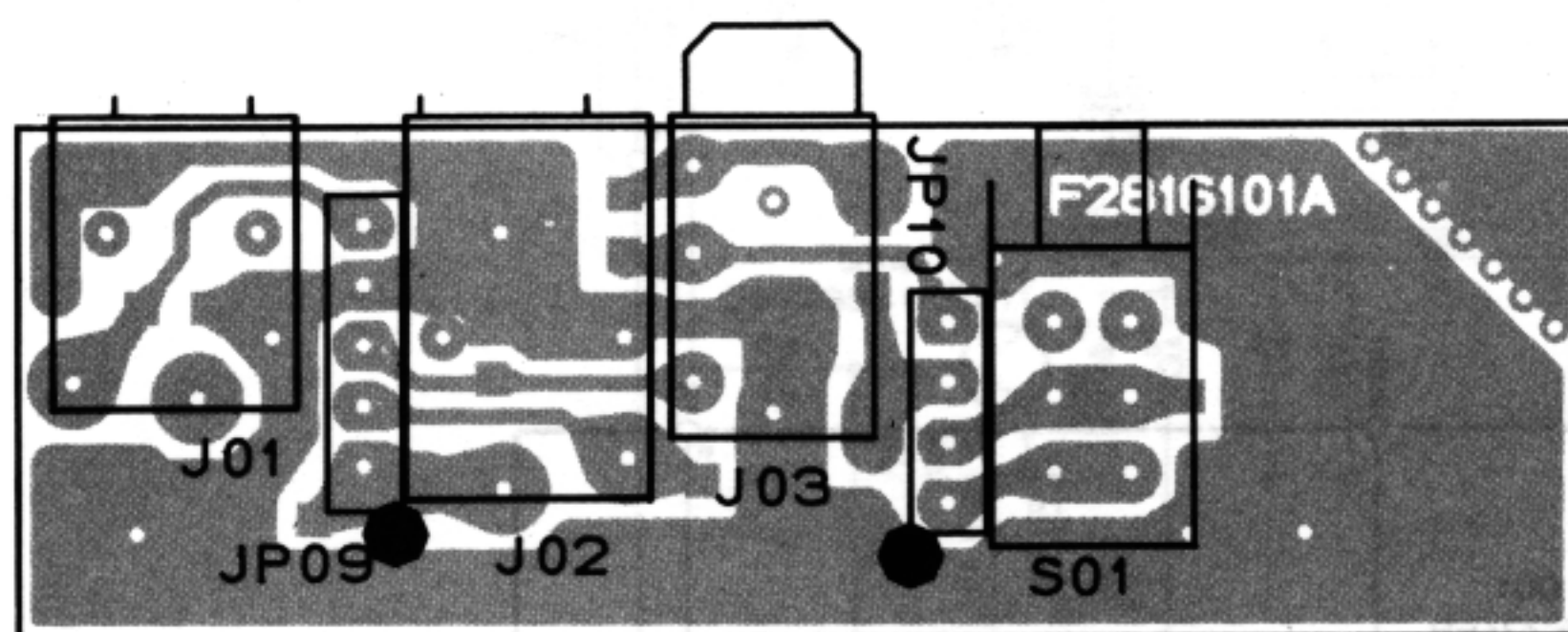
(Obverse view of "component" side)



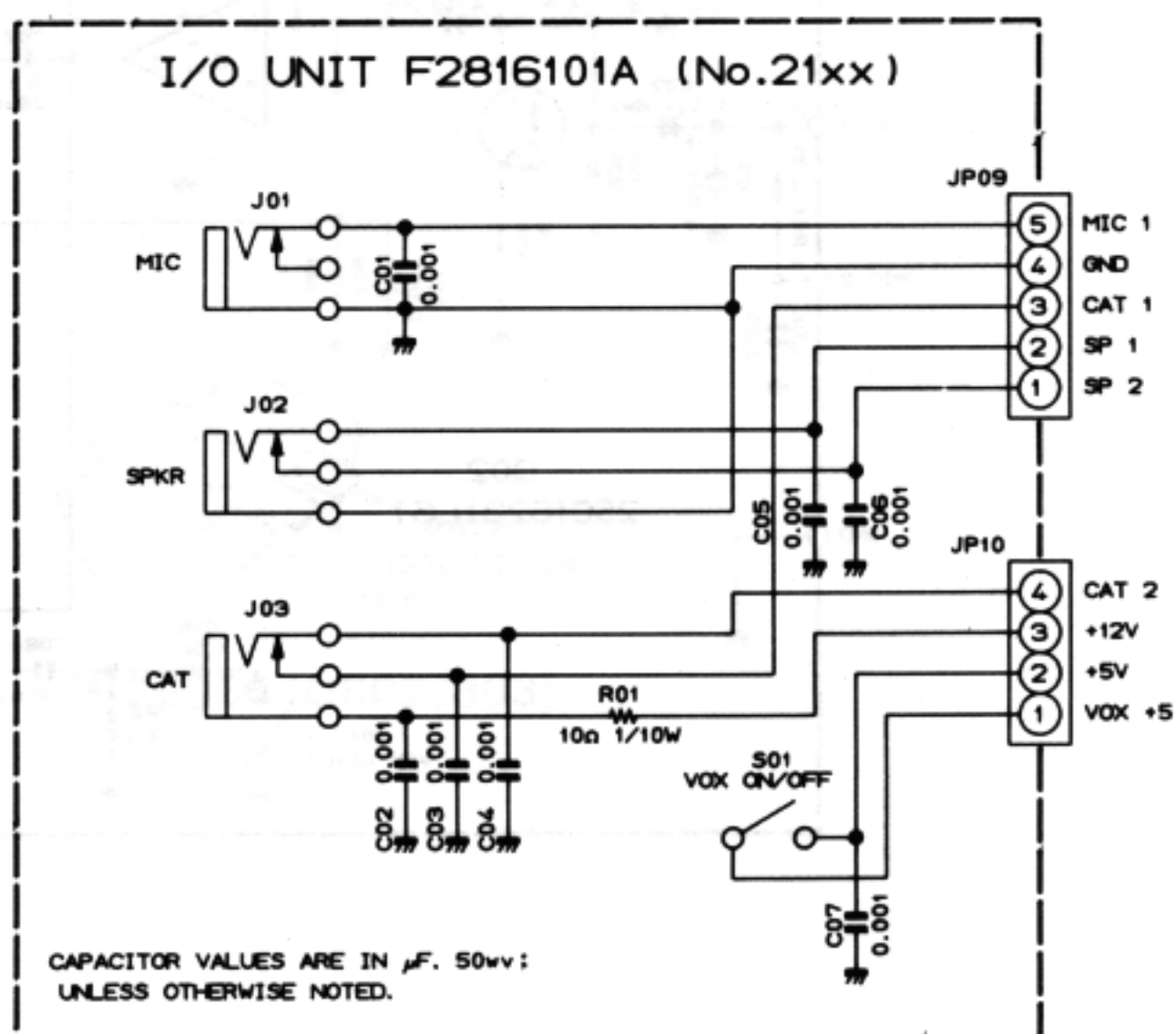
(Reverse view of "chip" side)



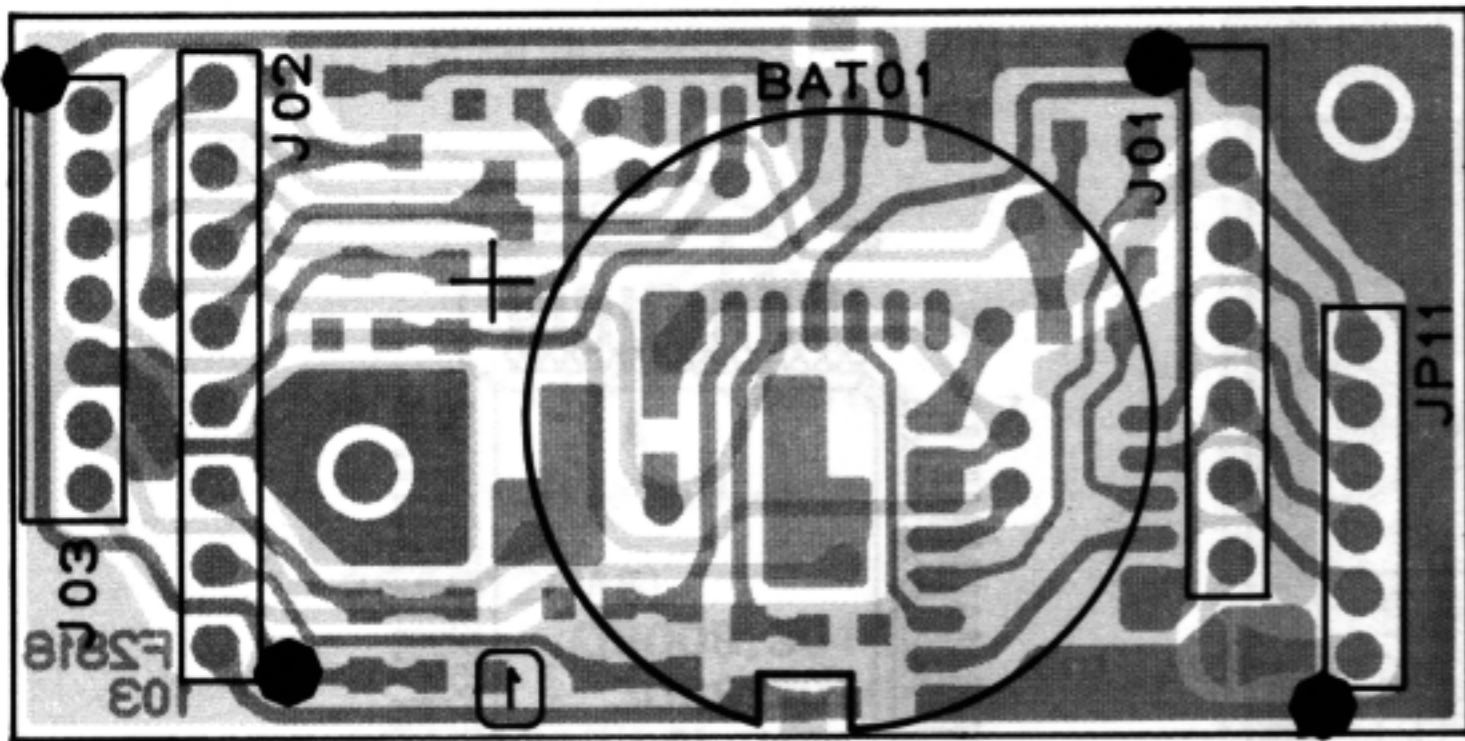
(Obverse view of "chip" side)



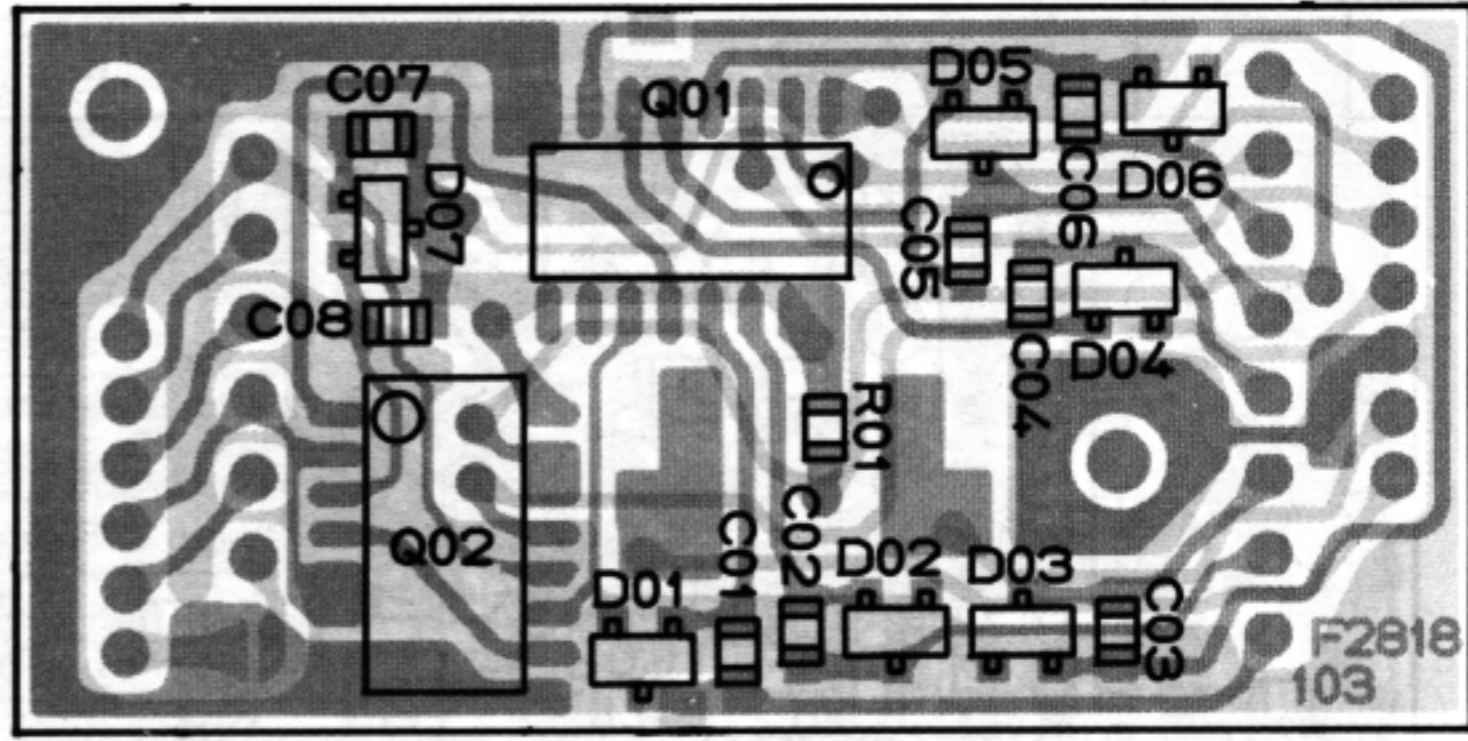
(Reverse view of "component" side)



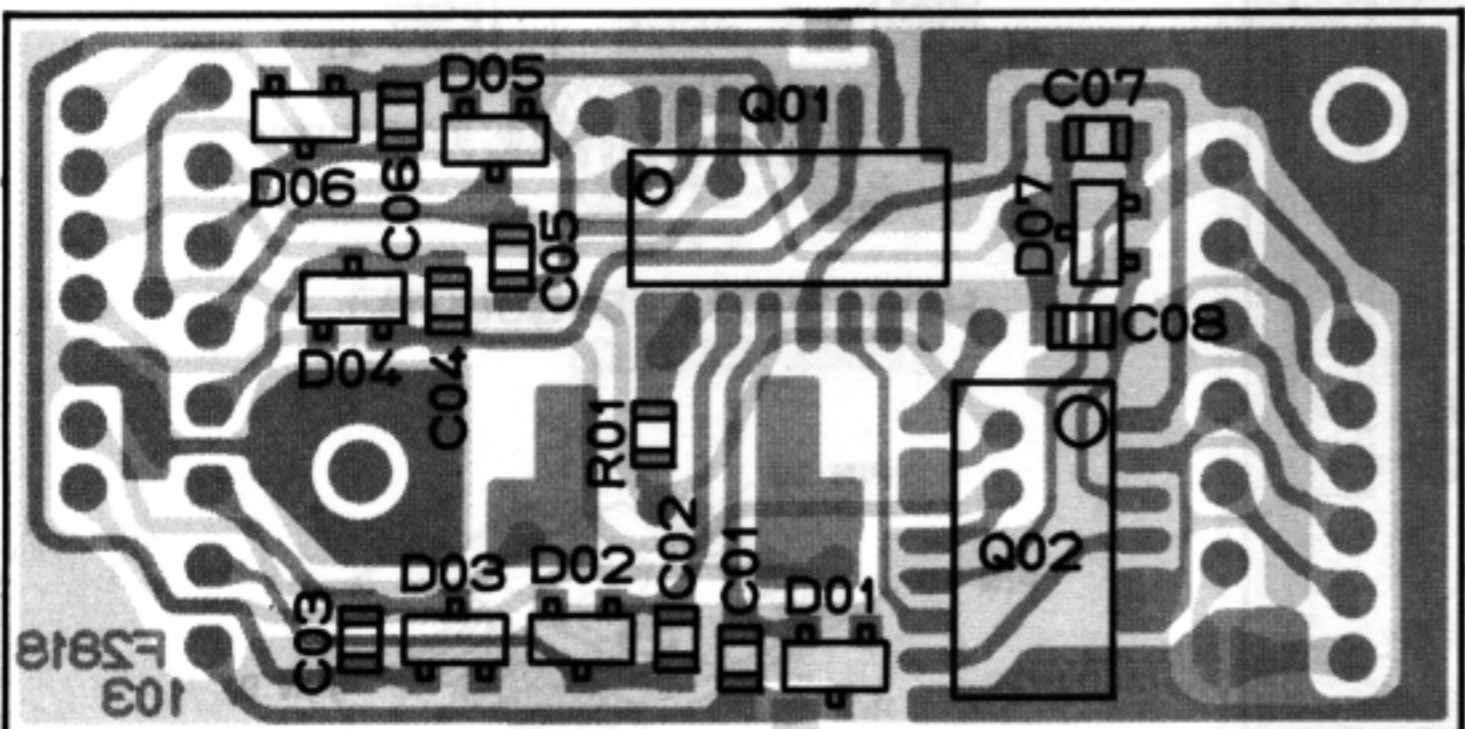
CONNECTOR UNIT



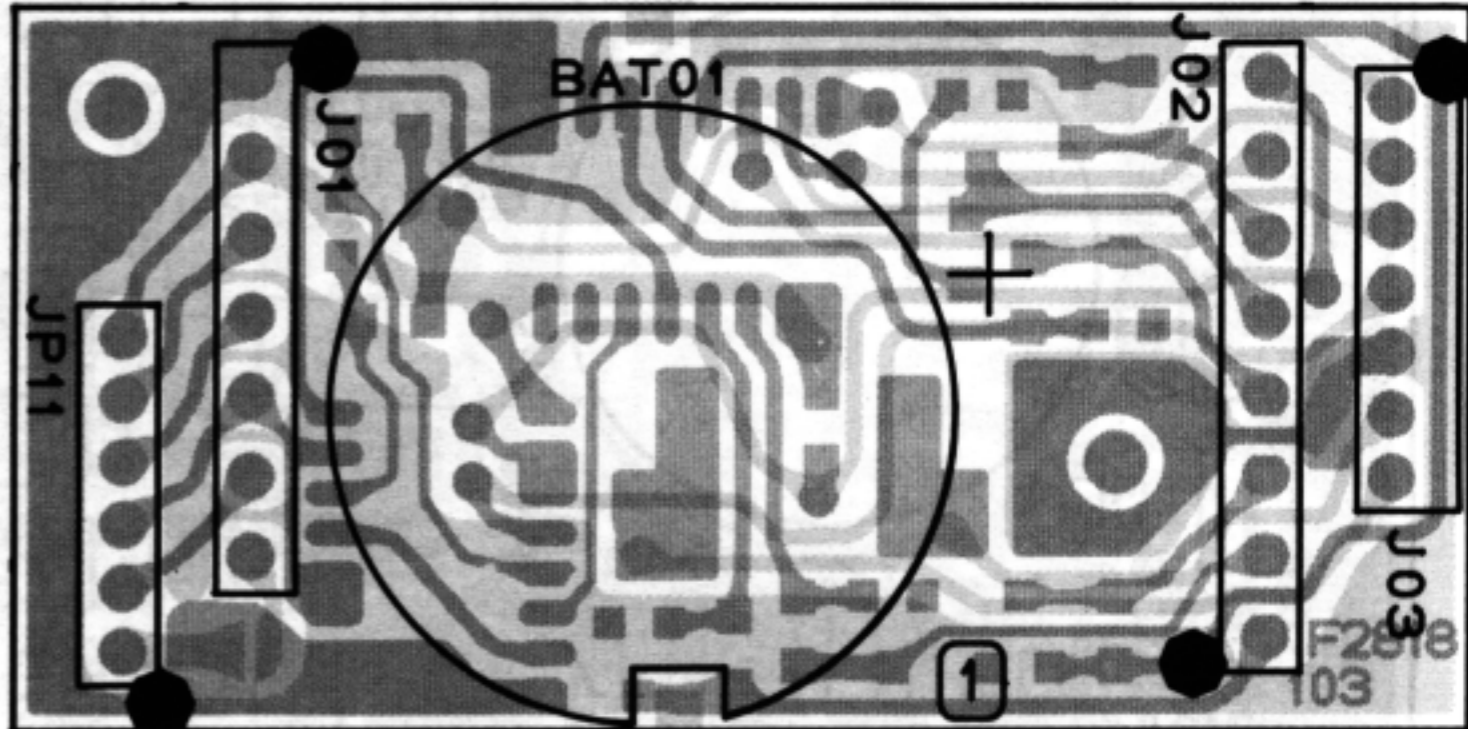
(Obverse view of "component" side)



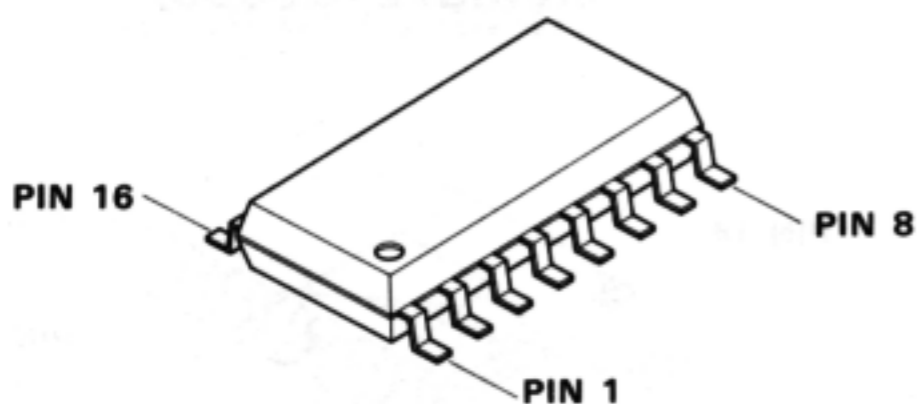
(Obverse view of "chip" side)



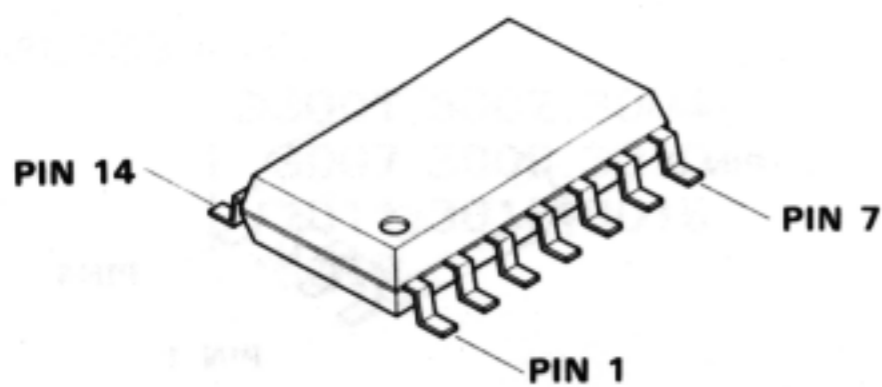
(Reverse view of "chip" side)



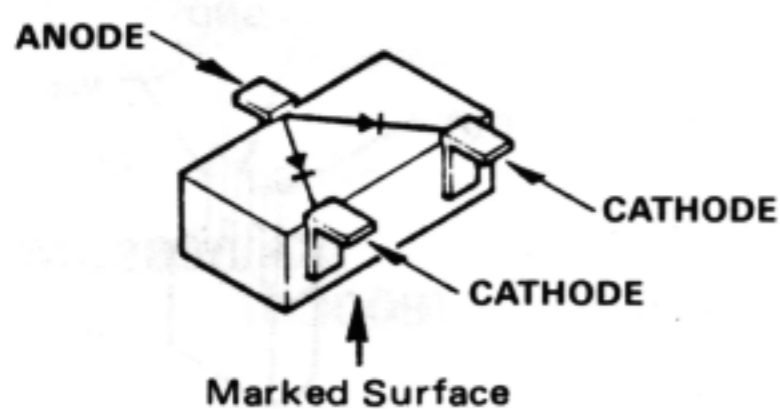
(Reverse view of "component" side)



μ PD4094BG (Q2201)

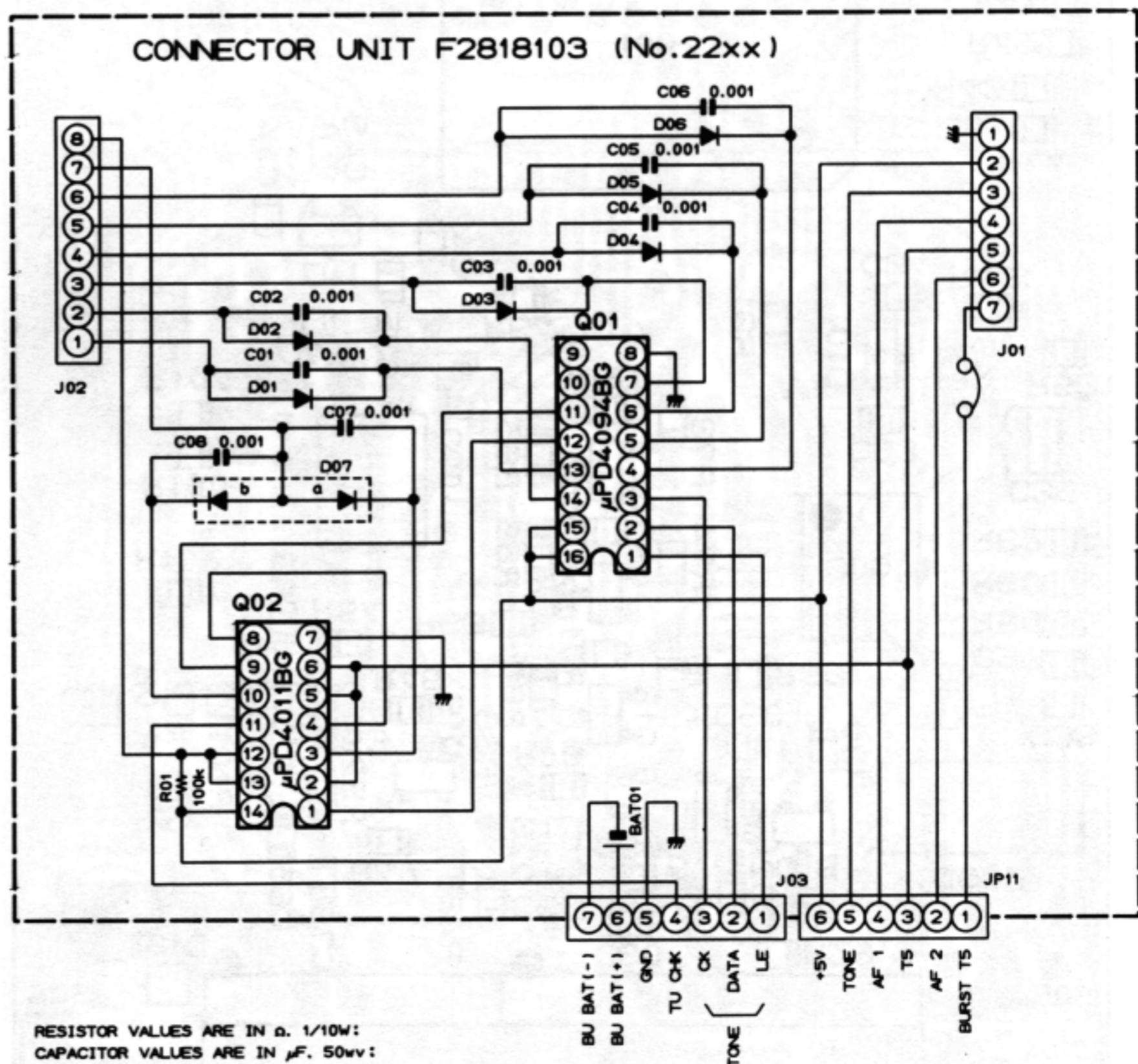


μ PD4011BG (Q2202)



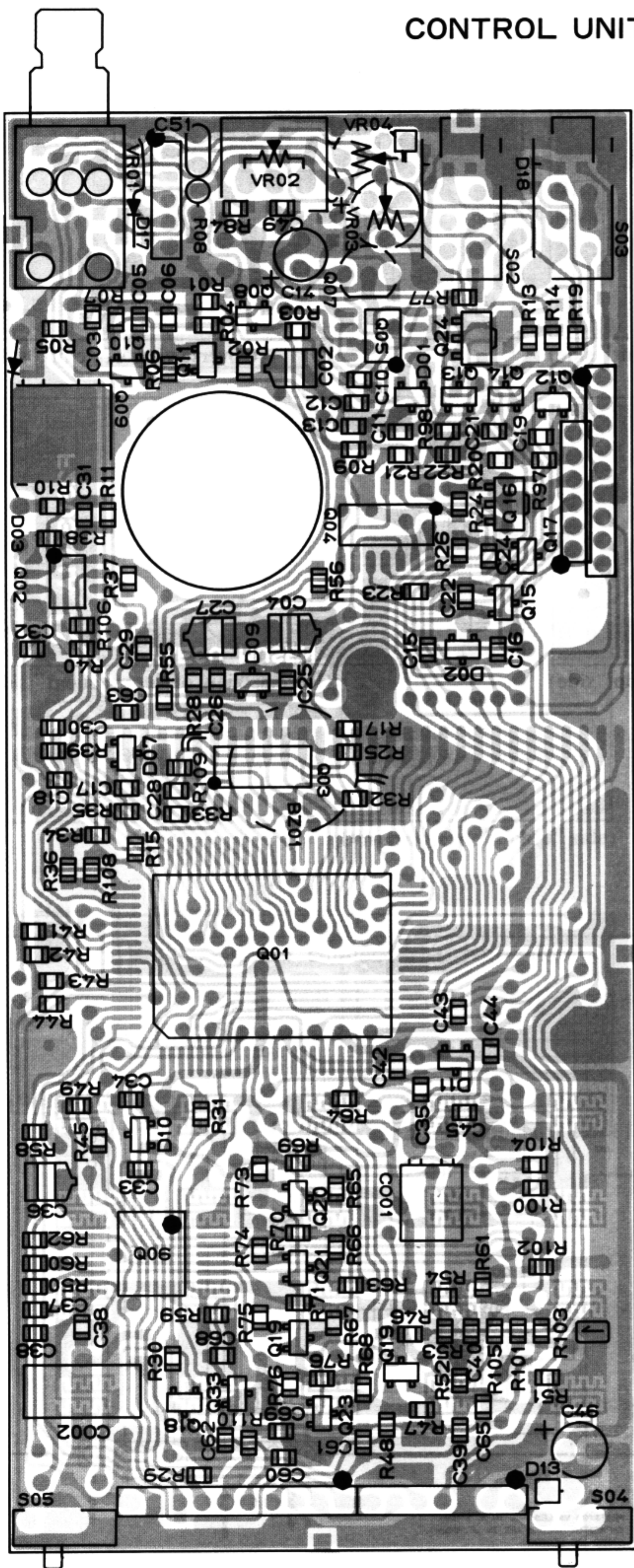
MC2836(A4)

(D2201, 2202, 2203,
2204, 2205, 2206,
2207)

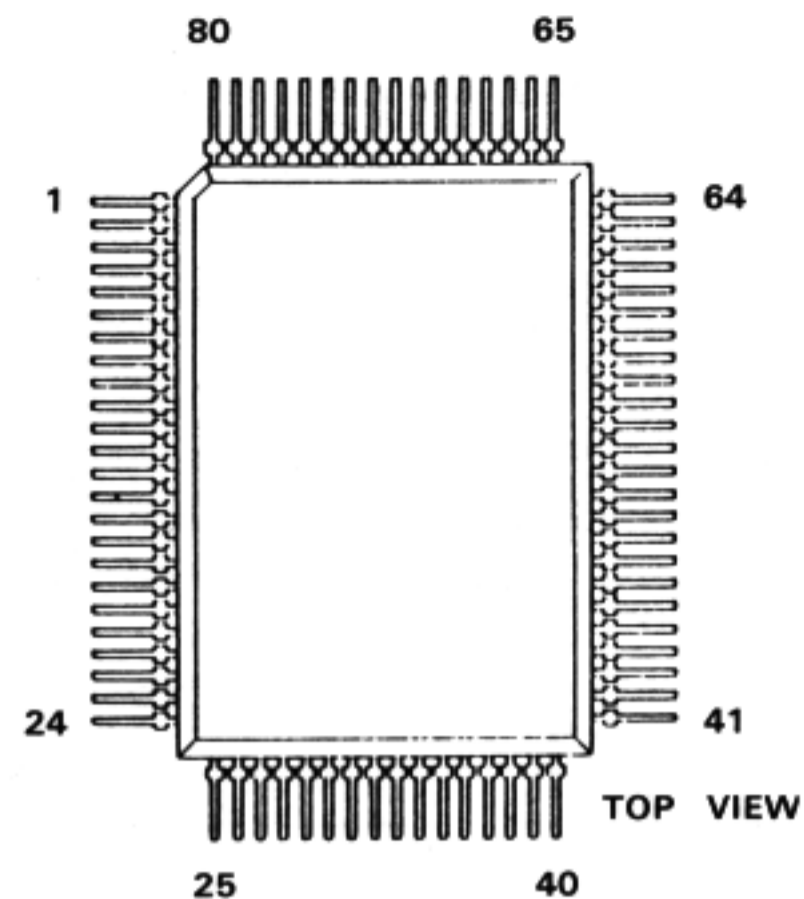


RESISTOR VALUES ARE IN Ω , 1/10W:
CAPACITOR VALUES ARE IN μ F, 50Vv:
DIODE ARE MC2836:
UNLESS OTHERWISE NOTED.

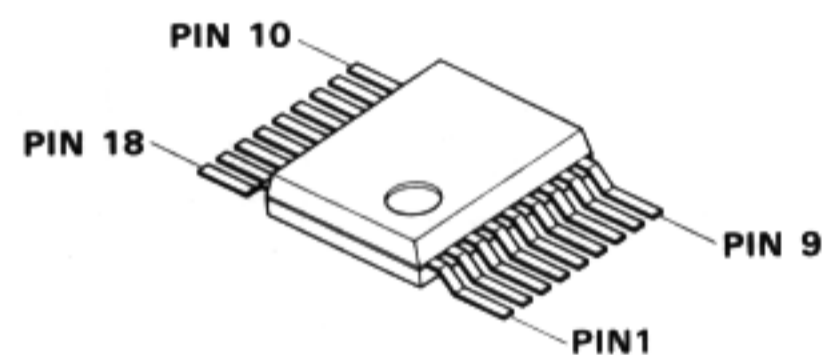
CONTROL UNIT



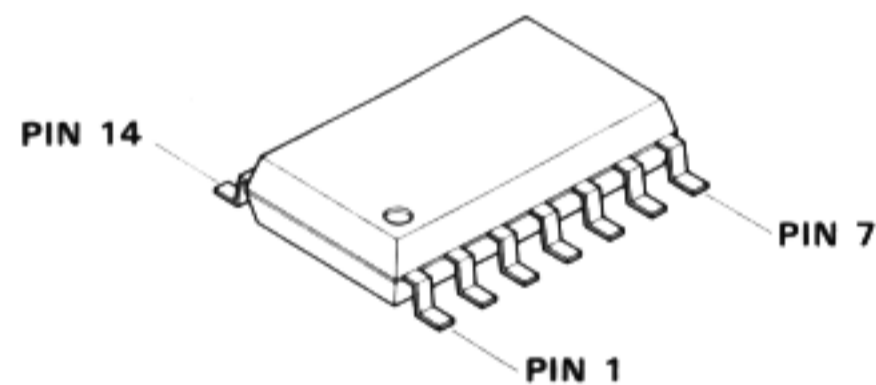
(Obverse view of "microprocessor" side)



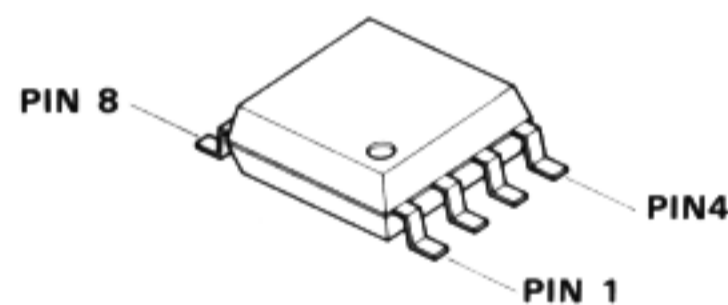
HD613901A55 (Q3001)



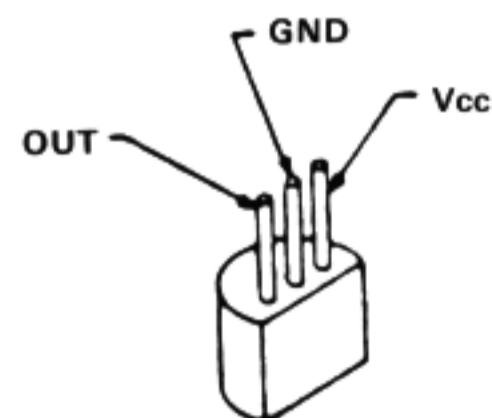
LR40872 (Q3006)



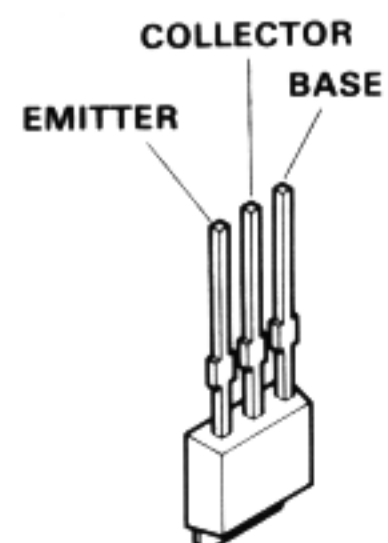
PD4011BG (Q3003, 3004)



LA5005MH (Q3005)
M5233FP (Q3002)

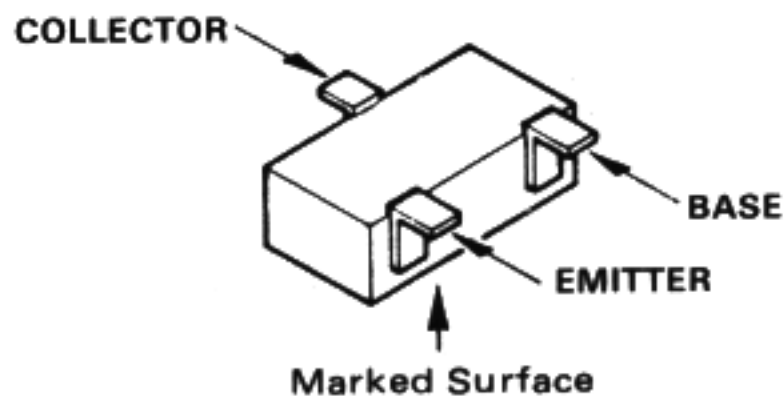


PST524C (Q3007)

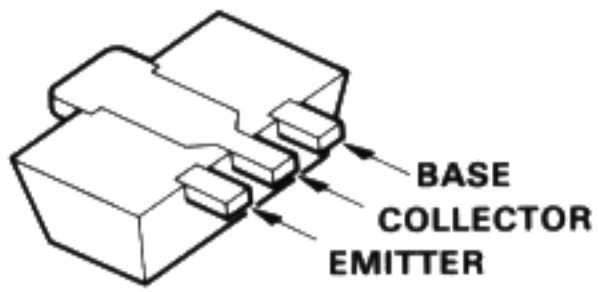


2SC1243 (Q3009)

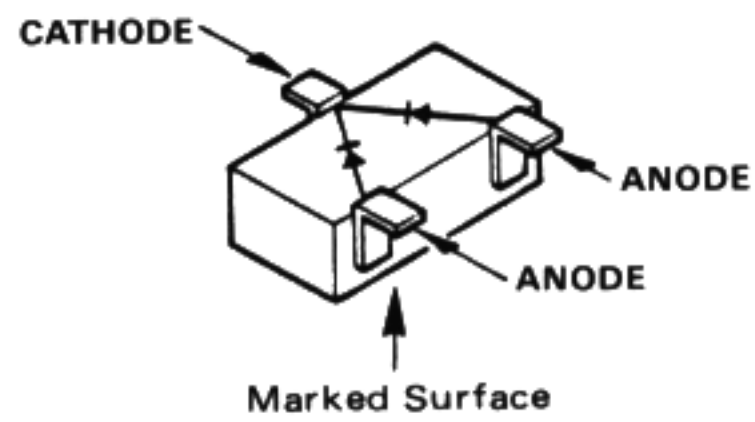
CONTROL UNIT



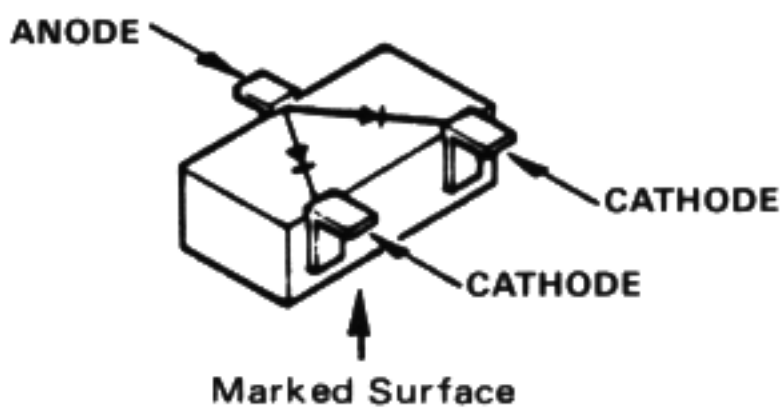
- 2SA812(M6)**
(Q3008, 3018)
(3028, 3030)
- 2SA1623F(L6)**
(Q3010, 3011)
(3019, 3023)
(3025, 3027)
(3029, 3031)
- 2SA1365AG(AF)**
(Q3012-3015)
(3017)
- FA1A4M(L33)**
(Q3032, 3033)



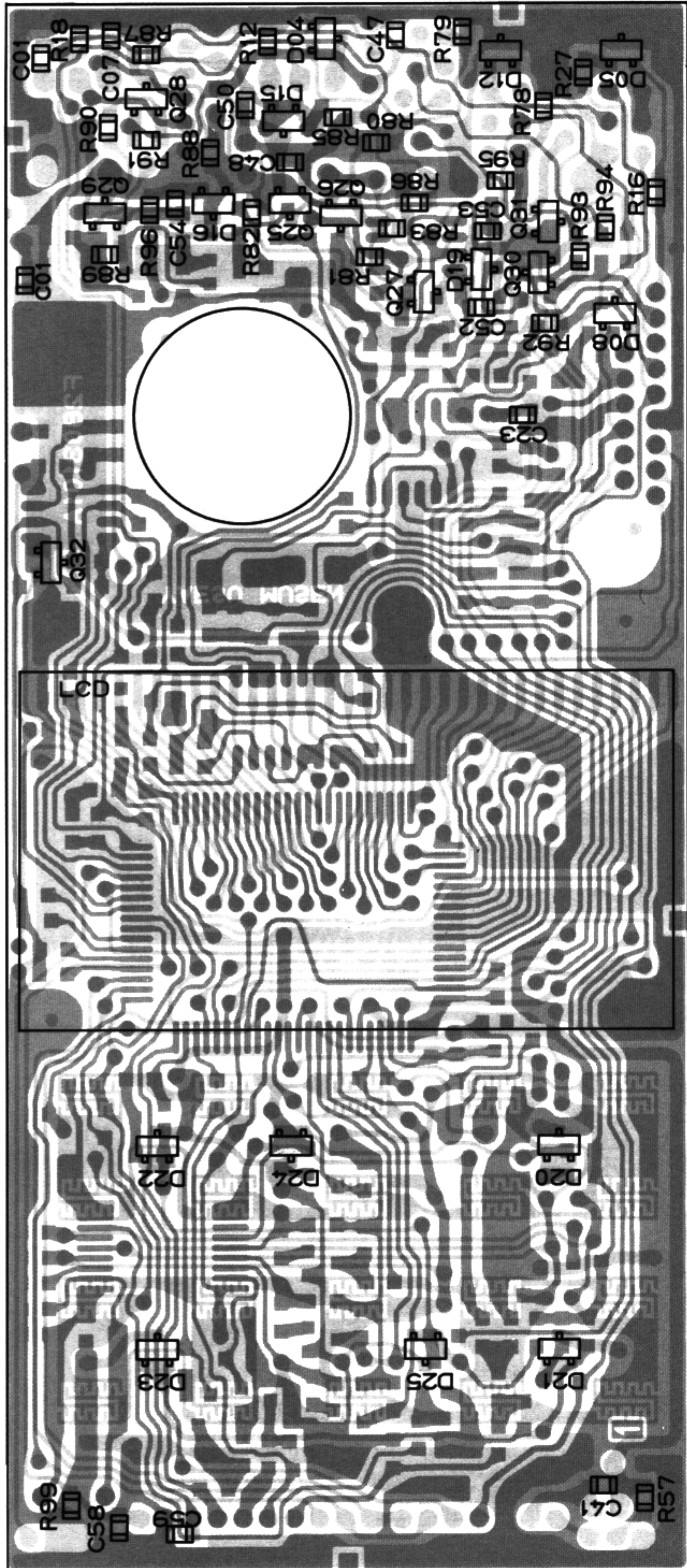
- 2SB766R (Q3016)**
2SD1366A (Q3024)



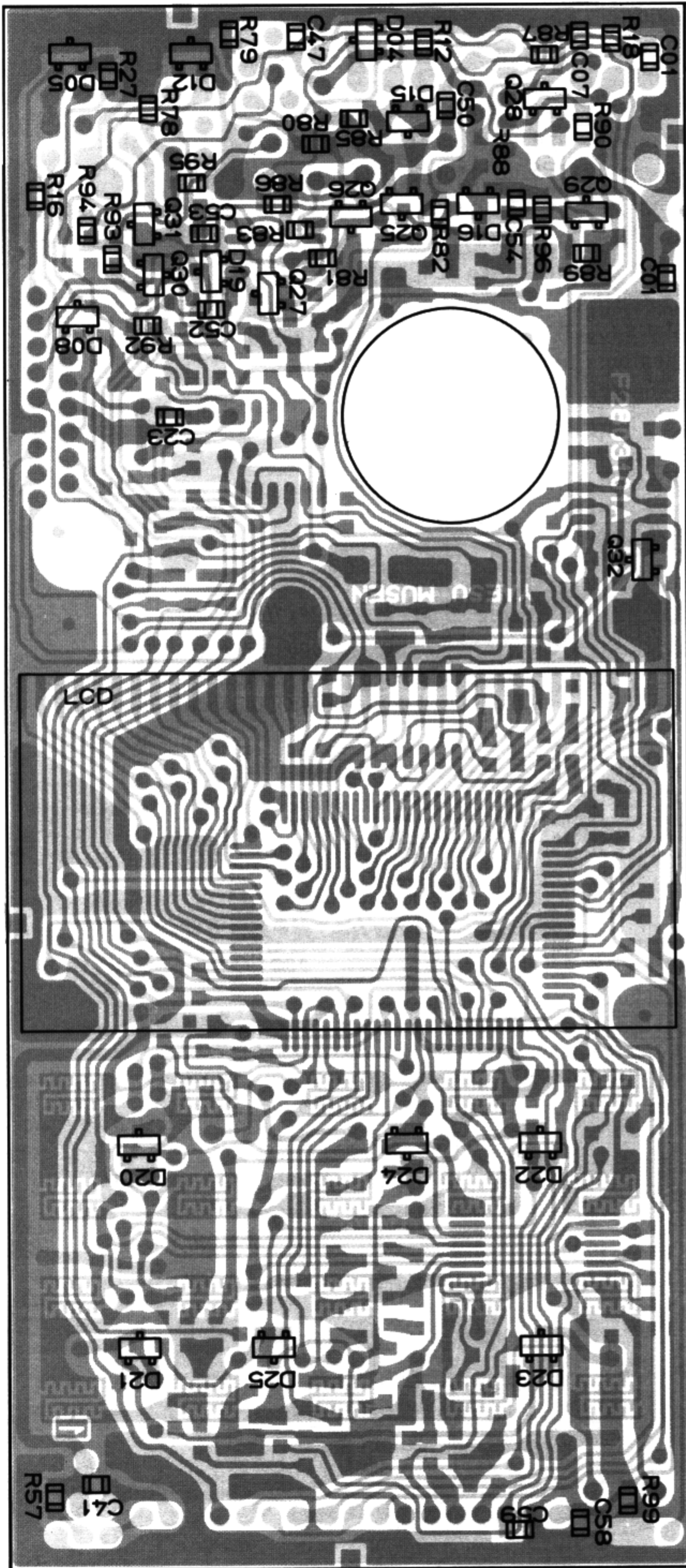
- MC2838(A6)**
(D3001, 3002, 3004)
(3007, 3008, 3010)
(3011, 3015, 3016)
(3019)



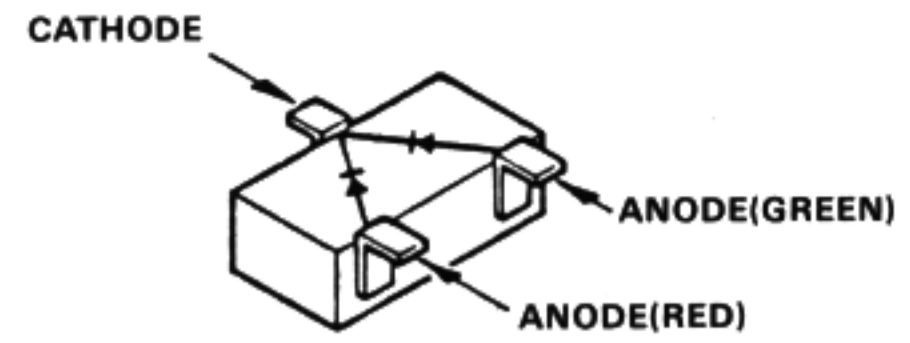
- MC2836(A4)**
(D3009)



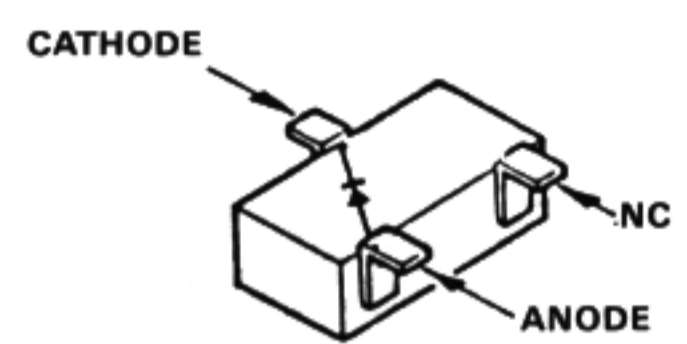
CONTROL UNIT



(Obverse view of "display" side)

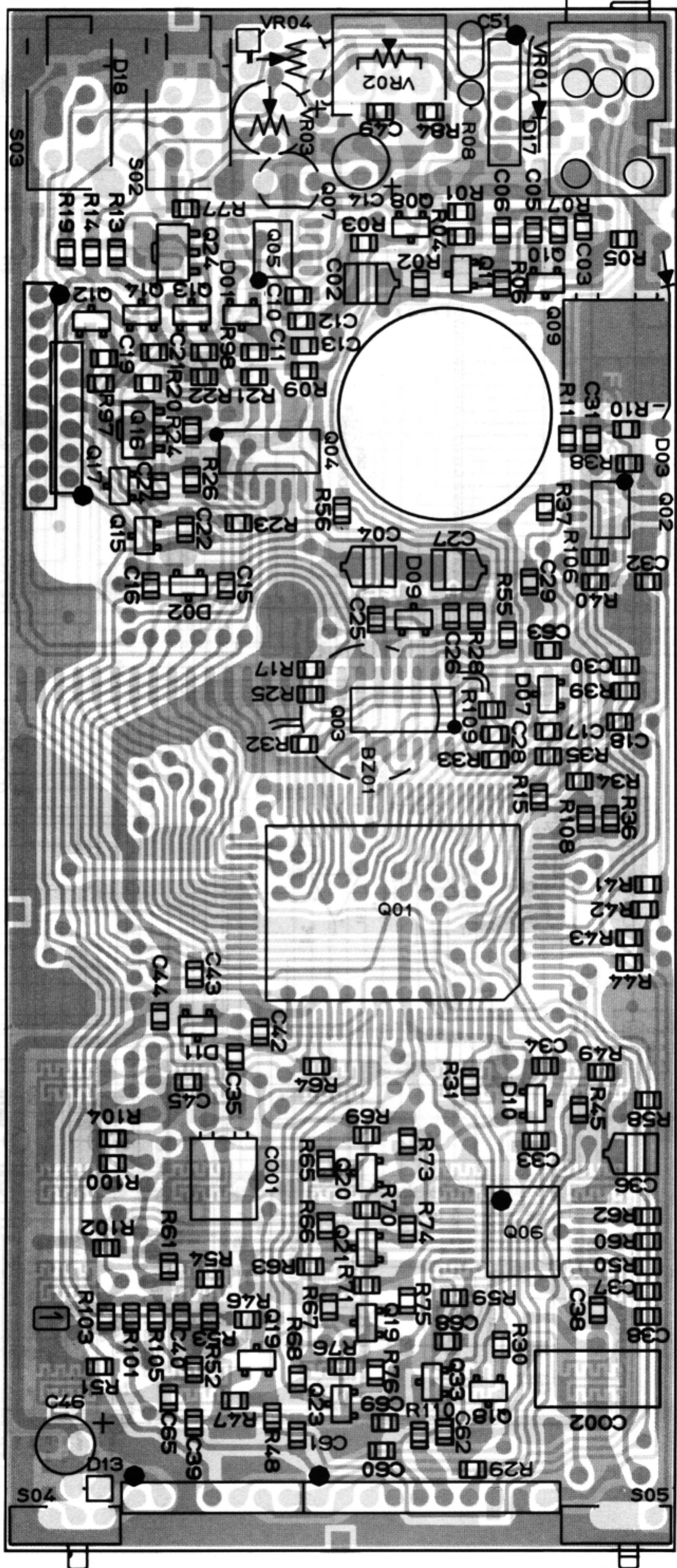


SLM-23VMW (D3005)



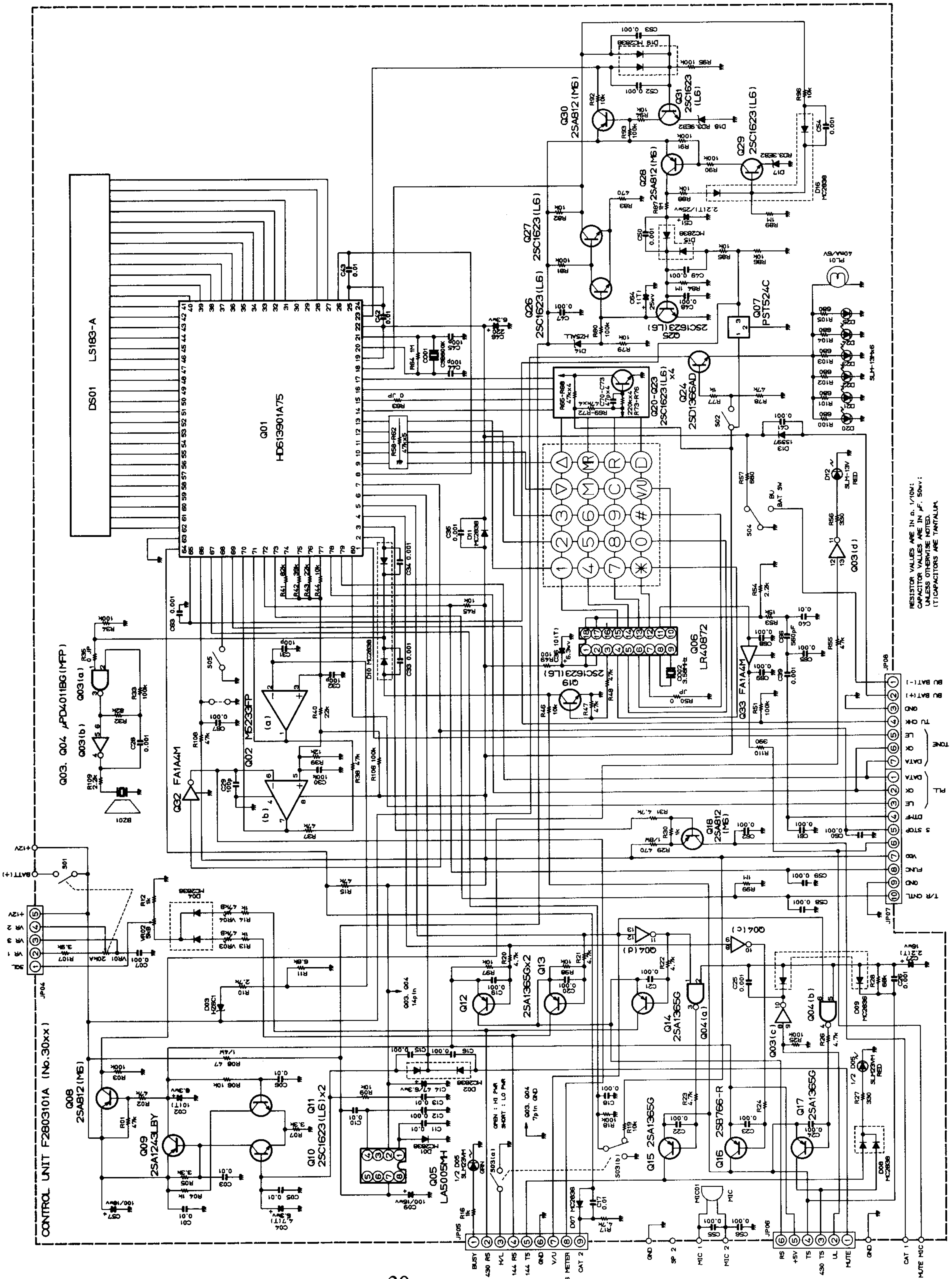
SLM-13VM (D3012)
SLM-13MW (D3020-3025)

CONTROL UNIT

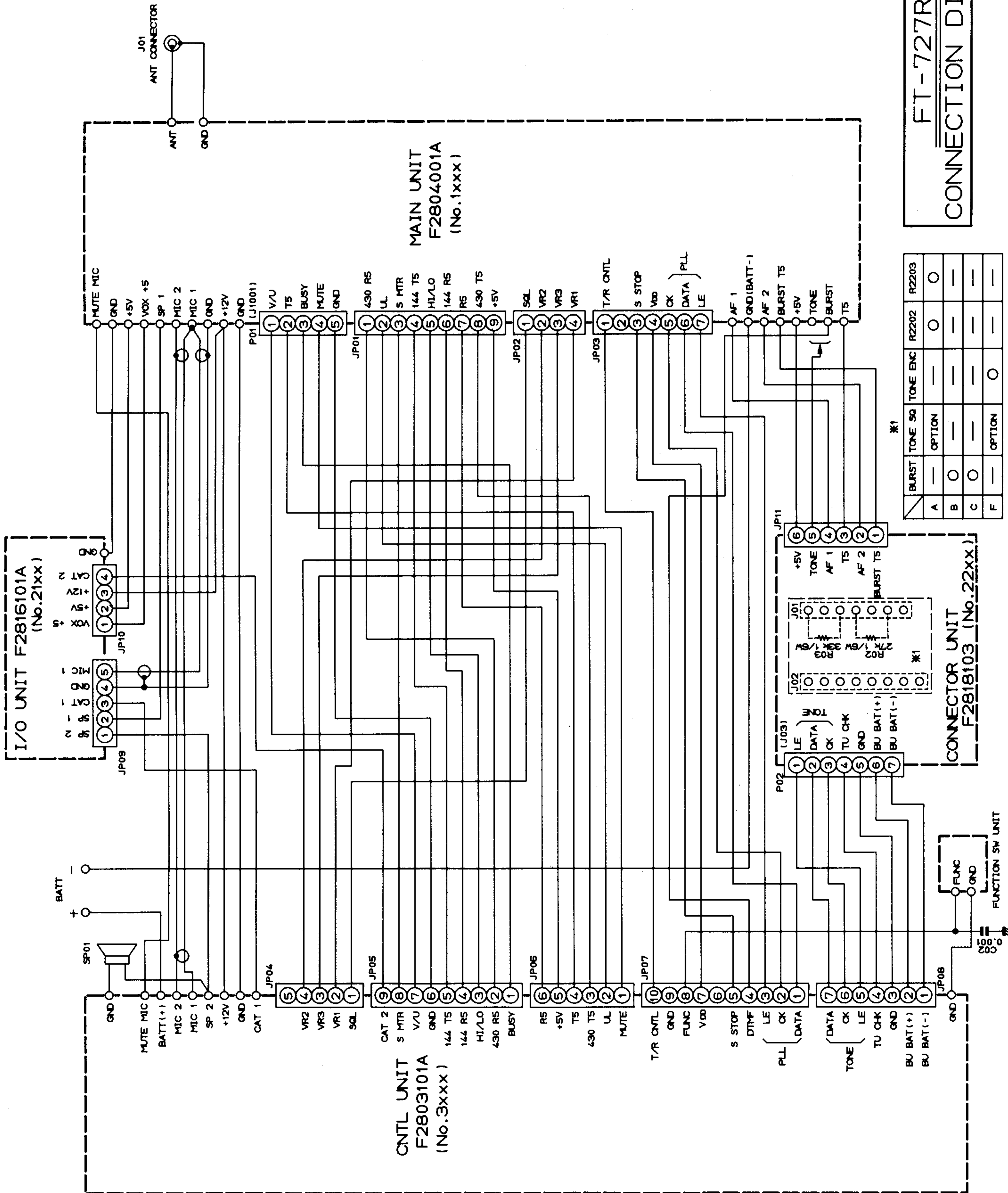


(Reverse view of "microprocessor" side)

CONTROL UNIT



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



The FT-727R has been aligned at the factory for best performance across the specified frequency range. Realignment should therefore not be necessary except in the event of component failure, or alteration of version. All component replacement and service should be performed only by an authorized Yaesu representative, or the warranty policy may be voided.

The following test equipment is required for alignment:

- RF Signal Generator: calibrated output level at 450 MHz
- Deviation Meter (linear detector)
- Oscilloscope
- AF Millivoltmeter
- SINAD Meter
- Inline Wattmeter: 10W at 450 MHz
- Regulated DC Power Supply: adjustable from 4 to 17V, 2A
- 50-ohm Non-reactive Dummy Load: 10W at 450 MHz
- Frequency Counter: 0.2ppm accuracy at 450 MHz
- AF Signal Generator
- DC Voltmeter: high impedance

ALIGNMENT FREQUENCY (MHz)

Version	Low edge		Center		High edge	
	VHF	UHF	VHF	UHF	VHF	UHF
A	144	440	146	445	148	450
B, B1	144	430	145	435	146	400
C	144	430	146	435	148	440

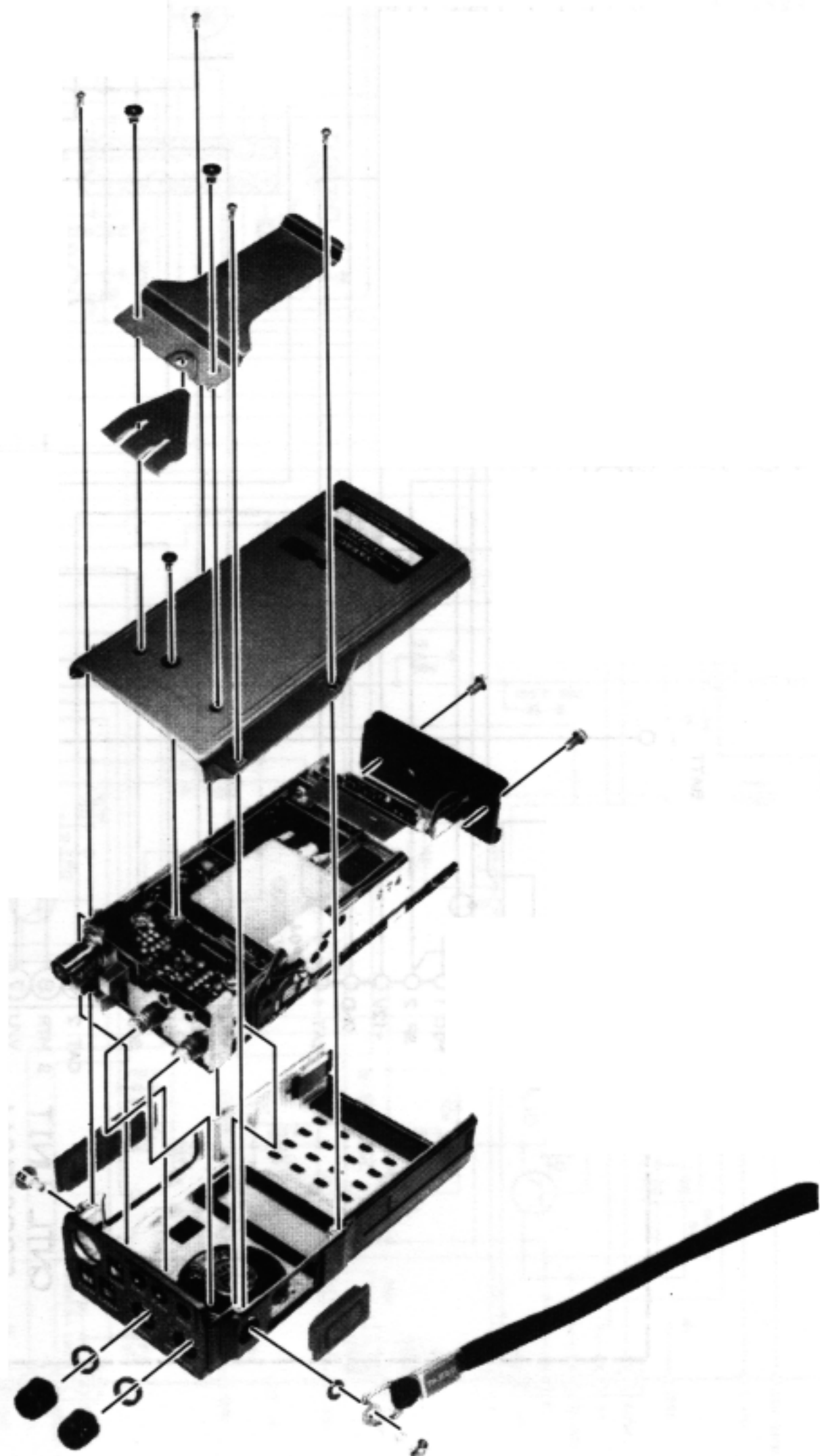
Preparation & Precautions

Before beginning alignment, allow the temperature of the transceiver to stabilize in the alignment environment. Temperature must be stable between 20 and 30°C (68 to 86°F) during alignment.

Set the regulated power supply voltage to 10.8V for all steps unless specifically indicated otherwise (for transmitter output power alignment). Do not depend on the battery as a stable voltage source during alignment.

Do not use an antenna during alignment, as RF loopback will cause false readings.

CASE DISASSEMBLY



I. PLL

Set up the test equipment as shown below for PLL and transmitter alignment.

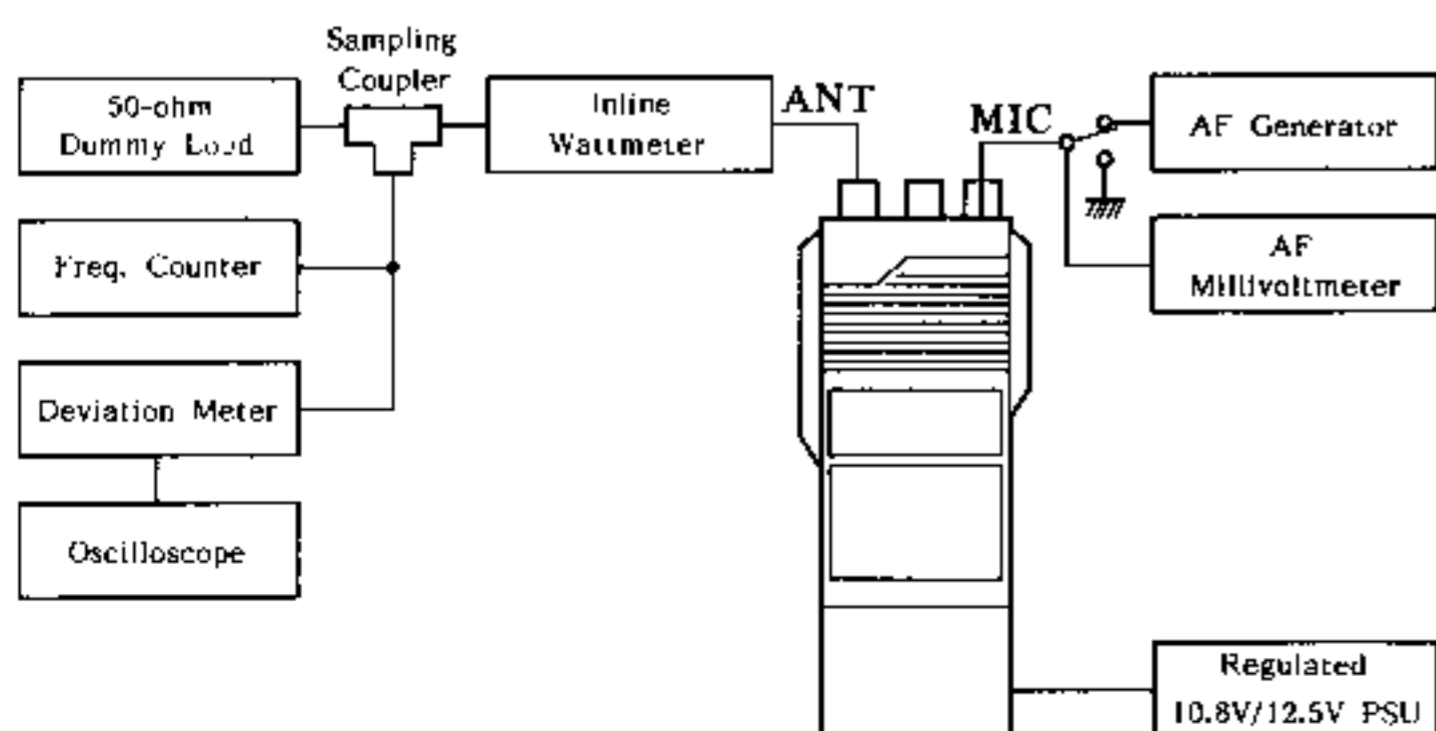
A. 2m PLL VCV (Varactor Control Voltage)

- (1) Connect the DC voltmeter (10V scale) to pin 14 at the edge of the PLL Unit.
- (2) Set the transceiver to the low edge of the 2m band, and adjust L601 on the VCO Unit for 1.5V DC on the meter.
- (3) Retune to the high edge of the 2m band and check for not more than 2.5V DC (3V in versions A & C) on the meter.

B. 70cm PLL VCV

- (1) Connect the DC voltmeter (set to the 10V scale) to pin 14 at the edge of the PLL Unit.
- (2) Set the transceiver to the low edge of the 70cm band, close the PTT switch, and adjust TC601 on the VCO Unit for 1.5V DC (2.5V for version A) on the meter.
- (3) Tune to the high band edge, close the PTT, and check for not more than 3V DC (4V in version A) on the meter.
- (4) Retune to the low band edge, and adjust TC602 on the VCO Unit for 1.5V DC (2.3V for version A) while receiving.
- (5) Retune to the high band edge, and check for less than 3V DC (4V for version A) on the meter while receiving.

PLL & TRANSMITTER ALIGNMENT POINTS



II. TRANSMITTER

With the test equipment connected as indicated in the diagram below, close the PTT switch for all readings and adjustments during these steps.

A. 2m Power Output

- (1) Tune the transceiver to the center of the 2m band, set the supply voltage to 12.5V, and set the LOW switch on the top panel to the undepressed position.
- (2) Adjust VR1004 on the Main Unit for 5 watts output on the wattmeter. Confirm 5 ± 0.5 watts output at the high and low edges of the 2m band.

B. 70cm Power Output

- (1) Tune the transceiver to the center of the 70cm band, and with the supply voltage set to 12.5V and the LOW switch set to the undepressed position, preset VR1005 on the Main Unit fully clockwise.
- (2) Adjust TC801, TC802, L803 and L804 on the 70cm Drive Unit for maximum power output (close the shield cover on the Drive Unit when adjusting the trimmers).
- (3) Now adjust VR1005 for 5 watts output, and confirm 5 ± 0.5 watts at each band edge.

C. Low Power Setting

Tune to the center of the 70cm band, and with 12.5V supply, press the LOW switch and adjust VR1003 on the Main Unit for 0.5 watts on the wattmeter. Confirm 0.5 watts output on the 2m band.

D. Frequency Calibration

Set the supply voltage to 10.8V, and tune to the center of the 70cm band. Close the PTT and adjust TC501 on the PLL Unit, if necessary, so that the displayed frequency matches the frequency counter ± 200 Hz.

E. Modulator Deviation

- (1) Tune to the center of the 2m band, and set the audio generator to 1 kHz at a level of 25 mV at the MIC jack. Adjust VR1001 on the Main Unit, if necessary, for ± 4.5 kHz deviation.
- (2) Now set the transceiver to the center of the 70cm band, and adjust VR1002, if necessary, for ± 4.5 kHz deviation.
- (3) Reduce the AF generator output level until the deviation meter shows ± 3.5 kHz deviation, and check that the AF generator level is between 2 and 4 mV (both bands).

F. DTMF Deviation Check

Tune to the center of the 70cm band, close the PTT and press '1' and 'C' on the keypad while transmitting, and observe the deviation meter, which should show ± 2 to ± 3.5 kHz deviation.

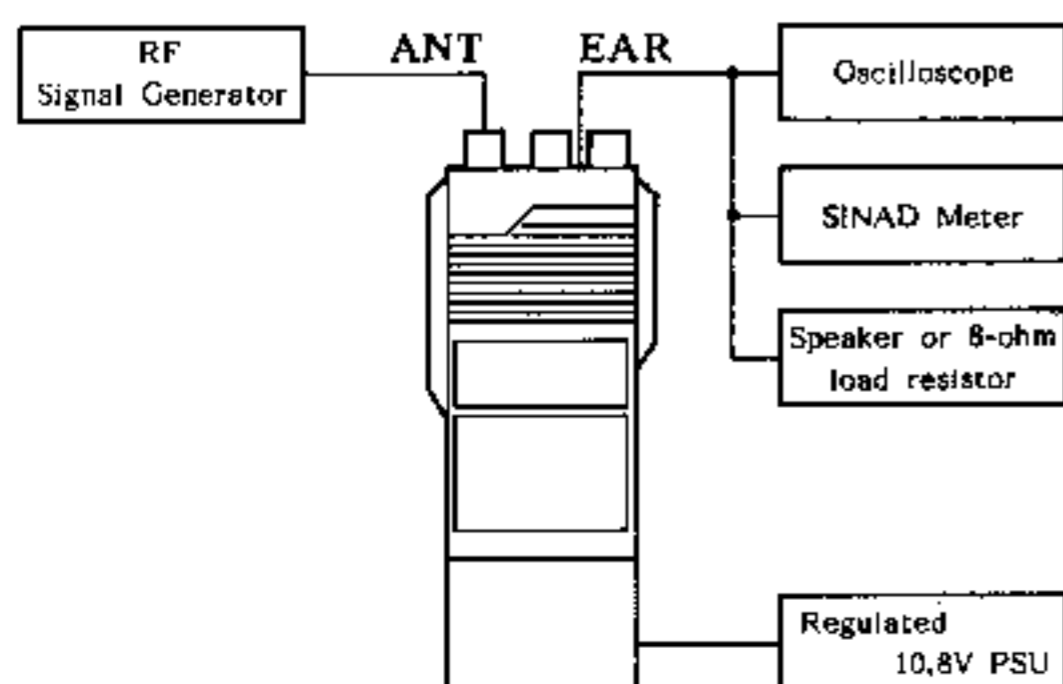
F. Burst Deviation Check (Eu vers. only)

Tune to the center of the 70cm band, close the PTT and Burst buttons, and observe the deviation meter, which should show ± 2.5 to ± 4.5 kHz deviation.

G. VOX Sensitivity Check

With the transceiver tuned to the center of the 70cm band, set the AF Generator (at the MIC jack) to 1 kHz. Vary the input level from the AF Generator and note the levels at which VOX trips, which should be 6 to 10 mV when the VOX button is depressed, and 3 to 6 mV when undepressed.

RECEIVER ALIGNMENT SETUP



II. RECEIVER

Set up the test equipment as shown below for receiver alignment.

A. 2m Resonant Circuits

- (1) With the transceiver and RF signal generator (at the ANT jack) both tuned to the center of the 2m band, set the generator for ± 3.5 kHz deviation of 1 kHz tone modulation, and set the output level so that the S-meter on the transceiver reads '4'.
- (2) Adjust L201 through L204 on the Front End Unit for peak S-meter indication, and adjust L301 on the IF Unit for maximum amplitude and minimum distortion on the oscilloscope.
- (3) Set the RF generator level to -6 dBu (0.12 uV) and adjust L201 - L203 again, for optimum SINAD indication.
- (4) At both edges of the 2m band, confirm at least 12 dB SINAD with 0.25 uV input from the RF generator.

B. 70cm Resonant Circuits

- (1) With the transceiver and RF signal generator (at the ANT jack) both tuned to the center of the 70cm band, set the generator for ± 3.5 kHz deviation of 1 kHz tone modulation, and set the output level so that the S-meter on the transceiver reads '4'.
- (2) Adjust CV201, CV202 and L205 on the Front End Unit, and TC803 and TC804 on the 70cm Drive Unit, for peak S-meter indication.
- (3) Set the RF generator level to -6 dBu (0.12 uV) and adjust CV201, CV202, TC803 and TC804 again, for optimum SINAD indication.
- (4) At both edges of the 70cm band, confirm at least 12 dB SINAD with 0.25 uV input from the RF generator.

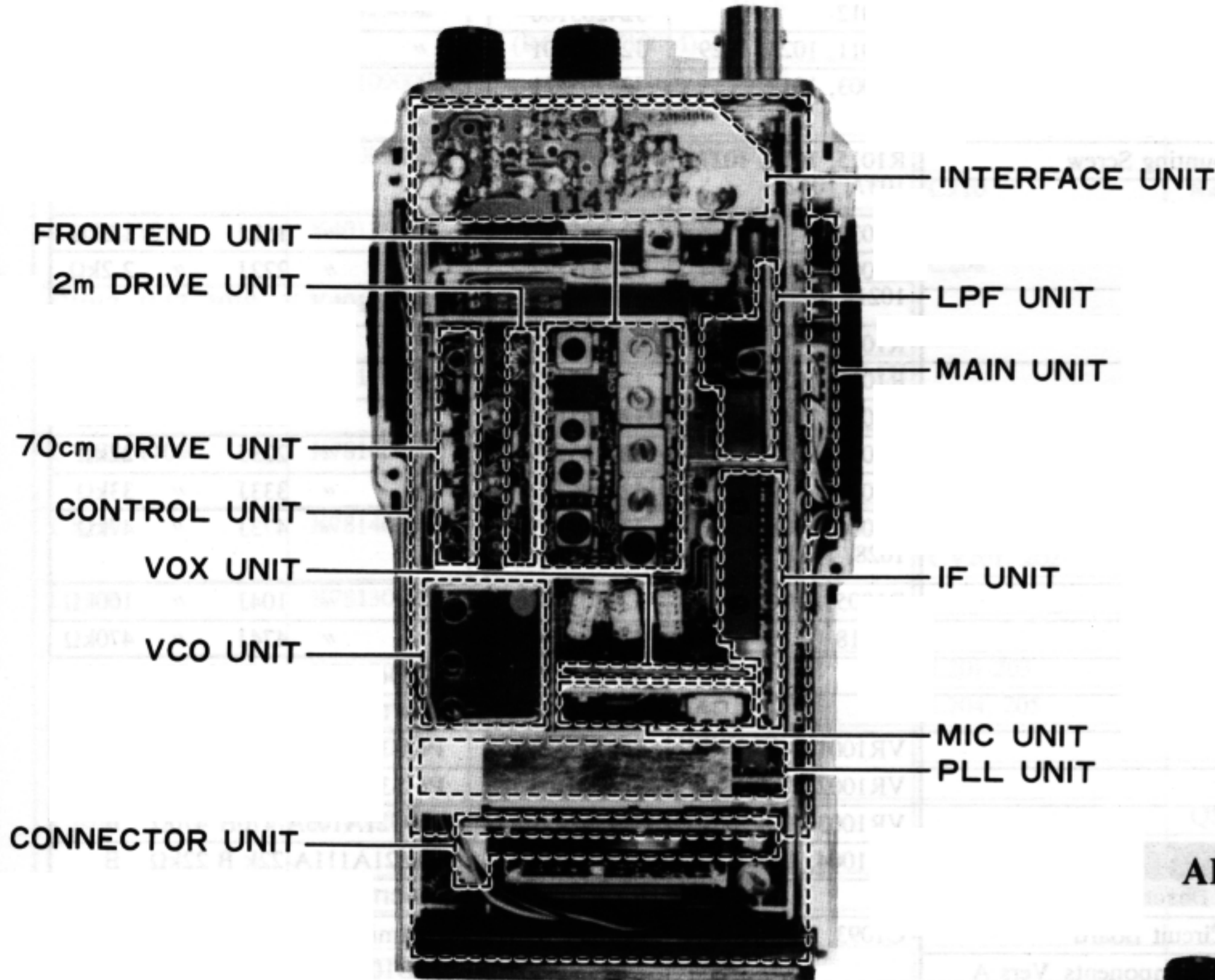
C. Squelch Preset

(1) Set the transceiver to the center of the 2m band, and set the SQL control on the top panel to the center of its range. Reduce the RF generator level at the ANT jack to nil (but do not disconnect it, to maintain a 50-ohm termination).

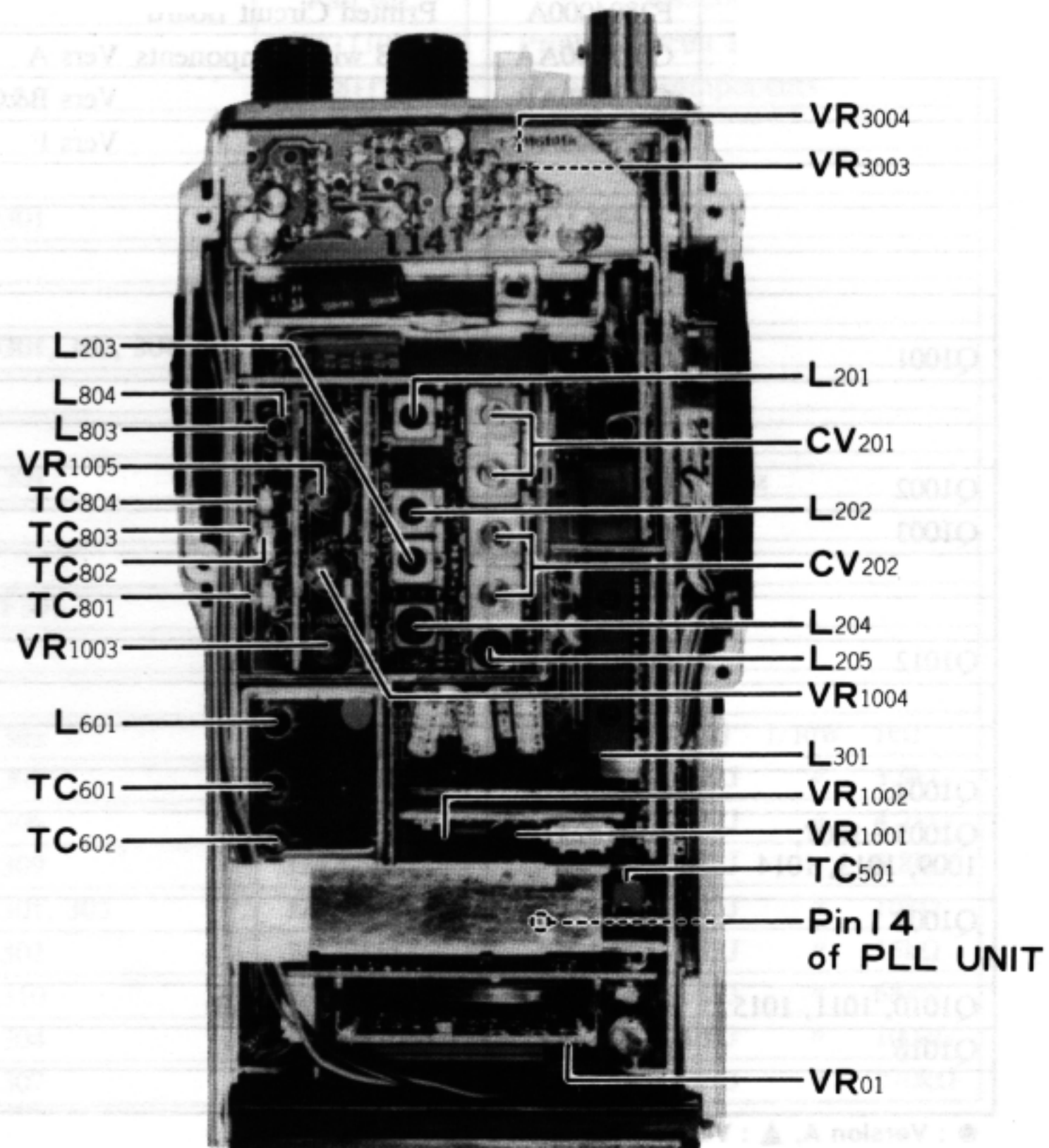
(2) Adjust VR3003 on the Control Unit so that the squelch just closes.

(3) Retune to the center of the 70cm band, and adjust VR3004 so that the squelch again just closes.

BOARD LAYOUT



ALIGNMENT POINTS



PARTS LIST

MAIN CHASSIS			D1001, 1003, 1005	G2070018	MC2838-T14-2 Si
Symbol No.	Part No.	Description	D1002	G2090227	HZ9B2L Zener
	F2803102	Printed Circuit Board	D1004	G2090223	1SS101 Schottky
			D1006	G2090033	M1301 PIN
			D1008	G2090168	RD5. 6EB1 Zener
		CONNECTOR	D1009, 1010	G2090244	1SS106 Schottky
J1	P1090541	BNC-RM			CRYSTAL FILTER
			XF1001	H1102108	16M15BU
				R7066320	Insulator
	R3507630C	Front Cover			
	R4803350B	Rear Cover w/o label, belt clip			
	R3507440A	FUNC Button			RESISTORS
	R3507620	PTT Button Vers A	R1033 [•] ×, 1034 [•] ×	J24205000	RMC 1/10T 000J 1/10W 0Ω
	R3507430A	PTT, BURST Button Vers B&C	R1032, 1035 [▲]	J24205000	" " " " "
	R3115560	Knob VOL & SQL	R1012	J24205100	" " 100J " 10Ω
	R3507400C	Battery Mounting Track	R1011, 1023, 1029	J24205101	" " 101J " 100Ω
	R3102080	Push Button	R1003, 1013	J24205221	" " 221J " 220Ω
	R6111460	Strap Mounting Dummy Screw		J24205561	" " 561J " 560Ω
	R6105240	Strap Mounting Screw	R1015, 1017, 1027, 1037, 1042	J24205102	" " 102J " 1kΩ
	R0116710C	Belt Clip			
	S6000061	Hand Strap	R1030	J24205152	" " 152J " 1.5kΩ
	R3116730A	Rubber Cap	R1001, 1002, 1004, 1021, 1022	J24205222	" " 222J " 2.2kΩ
	R3507570B	Rubber Key top			
			R1038	J24205332	" " 332J " 3.3kΩ
			R1016, 1036	J24205472	" " 472J " 4.7kΩ
		CAPACITOR	R1039, 1043	J24205103	" " 103J " 10kΩ
	K12171102	Ceramic disc 50WV 0.001 μ F E	R1007, 1009, 1019	J24205223	" " 223J " 22kΩ
			R1010	J24205333	" " 333J " 33kΩ
		MINI CONNECTORS	R1006, 1008, 1026, 1028, 1031	J24205473	" " 473J " 47kΩ
P1	T9205369C				
P2	T9205370		R1005, 1020	J24205104	" " 104J " 100kΩ
P3	T9205371B		R1018	J24205474	" " 474J " 470kΩ
P4	T9205372			J01215153	Carbon film 1/8w 15kΩ TJ
P5	T9205373B				POTENTIOMETERS
P6	T9205374		VR1001	J50773223	P6-S3Z 22K 22kΩ B
			VR1002	J50773103	P6-S3Z 10k 10kΩ B
			VR1003	J51762471	H0521A105A-470B 470Ω B
			VR1004, 1005	J51762223	H0521A111A-22k B 22kΩ B
MAIN UNIT					CAPACITORS
Symbol No.	Part No.	Description			
	F2804000A	Printed Circuit Board	C1093, 1098, 1103	K12171102	ceramic disc 50WV 0.001 μ F E (DD104E102P50)
	C028040AA	PCB with components Vers A			
	C028040AB	" Vers B&C	C1048, 1050, 1051	K22170201	Chip Ceramic 50WV 0.5pF CH (C2012CH1H0R5CFA)
	C028040AC	" Vers F			
			C1046	K22170202	" " " 1pF " (C2012CH1H010CFA)
			C1043	K22170203	" " " 2pF " (C2012CH1H020CFA)
		IC			
Q1001	G1090558	LA4145	C1045, 1052	K22170205	" " " 4pF " (C2012CH1H040CFA)
		POWER MODULES			
Q1002	G1090732	M57796MA	C1033	K22170206	" " " 5pF " (C2012CH1H050CFA)
Q1003	G1090733	M57797MA			
			C1049	K22170207	" " " 6pF " (C2012CH1H060DFA)
		FET			
Q1012	G3803027Y	2SK302YTE85R	C1001 [•] , 1006	K22170208	" " " 7pF " (C2012CH1H070DFA)
		TRANSISTORS			
Q1004	G3207667R	2SB766-R	C1001 [▲] ×, 1003, 1047	K22170210	" " " 9pF " (C2012CH1H090DFA)
Q1005-1007, 1009, 1013, 1014	G3316237F	2SC1623-T2BL6		K22170217	" " " 18pF " (C2012CH1H180JFA)
Q1008	G3207720Q	2SB772Q	C1002, 1040, 1044, 1095	K22170223	" " " 33pF " (C2012CH1H330JFA)
Q1010, 1011, 1015	G3108127F	2SA812T2BM6B			
Q1016	G3090074	BA1A4M		K22170219	" " " 22pF " (C2012CH1H220JFA)
		DIODES			

● : Version A, ▲ : Version B & C, × : Version F

C603, 605	K22170207	" " " 6pF " (C2012CH1H060DFA)	C715	K78140002	Chip tantalum 25WV 1μF (F951E105SAAFIQ2)
C610	K22170219	" " " 22pF " (C2012CH1H220JFA)			INDUCTORS
C609	K22170225	" " " 39pF " (C2012CH1H390JFA)	L701, 703 L702	L0021638 L0020743	
C604	K22170315	" " " 15pF UJ (C2012UJ1H150JFA)			
C602	K22170317	" " " 18pF " (C2012UJ1H180JFA)			
C601, 606, 608 C611-613	K22170805	" " " 0.001μF B (C2012B1H102MFA)			
					70cm DRIVE UNIT
			Symbol No.	Part No.	Description
				F2807101A	Printed Circuit Board
				C028071AA	PCB with components
					TRANSISTORS
			Q801, 804	G3333567	2SC3356-T2B
			Q802, 803	G3329547	2SC2954-T2
		TRIMMER CAPACITORS			
TC601, 602	K91000107	ECR-GA015E30 15PF			
					DIODE
		INDUCTORS	D801	G2090118	ISS97 Schottky
L601	L0190127	MC122			
L602, 603	L1190283	LAL02NAIR0M			RESISTORS
L604	L1190277	LAL02NAR33M	R803, 805, 809, 814, 816	J24205100	RMC 1/10T 100J 1/10W 10Ω
		TERMINAL POSTS	R810	J24205560	" " 560J " 56Ω
	Q5000052	TP-M	R804, 807, 808, 812, 818	J24205101	" " 101J " 100Ω
			R806, 813	J24205331	" " 331J " 330Ω
			R802, 815	J24205561	" " 561J " 560Ω
			R811	J24205102	" " 102J " 1kΩ
			R801, 817	J24205272	" " 272J " 2.7kΩ
					TRANSISTORS
Q701, 703	G3327347	2SC2734G TR			
Q702	G3329547	2SC2954-T2			
					CAPACITORS
			C807, 822	K22170201	chip ceramic 50WV 0.5pF CH (CZ012CH1H0R5CFA)
		DIODE			
D701	G2090118	ISS97 Schottky	C823	K22170203	" " " 2pF " (C2012CH1H020CFA)
		RESISTORS	C818	K22170204	" " " 3pF " (C2012CH1H030CEA)
R707	J24205100	RMC 1/10T 100J 1/10W 10Ω	C813	K22170207	" " " 6pF " (C2012CH1H060JFA)
R708	J24205560	" " 560J " 56Ω	C808	K22170221	" " " 27pF " (C2012CH1H270JFA)
R703	J24205680	" " 680J " 68Ω	C801	K22170223	" " " 33pF " (C2012CH1H330JFA)
R704	J24205101	" " 101J " 100Ω			
R705	J24205151	" " 151J " 150Ω	C802-806, C809-812, C814-817, C820, 821	K22170805	" " " 0.001μF B (C2012B1H102MFA)
R710	J24205221	" " 221J " 220Ω			
R702	J24205561	" " 561J " 560Ω			
R706	J24205102	" " 102J " 1kΩ			
R701	J24205122	" " 122J " 1.2kΩ			
R709	J24205563	" " 563J " 56kΩ			
					CAPACITORS
C712	K00175120	Ceramic disc 50WV 12pF CH (DD104SL120J50)	C819	K00175220	Ceramic disc " 22pF SL (DD104SL220J50)
					TRIMMER CAPACITORS
C716	K22141904	chip ceramic 25WV 0.1μF D (C3216D1E104MFA)	TC801	K91000101	ECR-GA010D30 10pF
			TC803, 804	K91000105	ECR-GA006A30 6pF
C711	K22170213	" " " 12pF " (C2012CH1H120JFA)	TC802	K91000107	ECR-GA015E30 15pF
C718	K22170315	" " " 15pF UF (C2012UJ1H150JFA)			INDUCTORS
C706	K22170317	" " " 18pF UJ (C2012UJ1H180JFA)	L801-803	L0021637	
C701	K22170223	" " " 33pF " (C2012CH1H330JFA)	L805, 806	L0020720	
			L804, 807, 808	L0021636	
					MIC AF UNIT
			Symbol No.	Part No.	Description
				F2810101	Printed Circuit Board
				C028101AA	PCB with components
					IC
C702-705, C707-710, C714, 717	K22170805	" " " 0.001μF B (C2012B1H102MFA)	Q901	G1090726	M5224FP

					(F951C105MRAAF1Q2)
		TRANSISTOR	C2004	K78120002	" " " 2.2 μ F
Q902	G3316237F	2SC1623-T2BL6			(F951C225MSAAF1Q2)
		RESISTORS	INTERFACE UNIT		
R901	J24205101	RMC 1/10T 101J 1/10W 100 Ω	Symbol No.	Part No.	Description
R906	J24205331	" " 331J " 330 Ω		F2816101A	Printed Circuit Board
R915	J24205152	" " 152J " 1.5k Ω		C028161AA	PCB with components
R904, 913, 918	J24205222	" " 222J " 2.2k Ω			
R916	J24205472	" " 472J " 4.7k Ω			RESISTOR
R902	J24205103	" " 103J " 10k Ω	R2101	J24205100	RMC1/10T 100J 1/10W 10 Ω
R911	J24205153	" " 153J " 15k Ω			
R920, 921	J24205183	" " 183J " 18k Ω			CAPACITORS
R905, 919, 922	J24205223	" " 223J " 22k Ω	C2101-2107	K22170805	chip ceramic 50WV 0.001 μ F B (C2012B1H102MFA)
R907	J24205333	" " 333J " 33k Ω			
R903	J24205473	" " 473J " 47k Ω			
R909, 917	J24205683	" " 683J " 68k Ω			SWITCH
	J24205104	" " 104J " 100k Ω	S2101	N4090091	SPJ422N26
R908, 910	J24205124	" " 124J " 120k Ω			
R912	J24205105	" " 105J " 1M Ω			CONNECTORS
R914	J24205225	" " 225J " 2.2M Ω	J2101	P1090369	HSJ0838-01-010
			J2102	P1090370	HSJ0836-01-010
		CAPACITORS	J2103	P1090538	S-G8058
C907, 908, 910	K22141904	chip ceramic 25WV 0.1 μ F D (C3216D1E104MFA)			
			CONNECTOR UNIT		
C905	K22170801	" " 50WV 470pF B (C2012B1H471MFA)	Symbol No.	Part No.	Description
				F2818103	Printed Circuit Board
C903, 904, 906, 911, 912	K22170805	" " " 0.001 μ F " (C2012B1H102MFA)		C028183AA	PCB with components w/o BAT2201
C913	K22170813	" " " 0.0047 μ F " (C2012B1H472MFA)			
					ICs
C909	K22170817	" " " 0.01 μ F " (C2012B1H103MFA)	Q2201	G1090696	μ PD4094BG
			Q2202	G1090600	μ PD4011BG
C901	K78080003	Chip tantalum 6.3WV 10 μ F (F950J106MTAAF1Q2)			
					DIODES
C915	K78080014	" " " 68 μ F (F950J686MGCAF1)	D2201-2207	G2070024	MC2836-T14-2
C902, 914	K78120013	" " 16WV 1 μ F (F951C105MRAAF1Q2)			RESISTORS
		SWITCH	R2201	J24205104	RMC1/10T 104J 1/10W 100k Ω
			R2202(Vers A)	J01225273	Carbon film 1/6W 27k Ω
S901	N6090051	SSS212299	R2203(")	J01225333	" " " 33k Ω
					CAPACITORS
VOX UNIT			C2201-2208	K22170805	chip ceramic 50WV 0.001 μ F B (C2012B1H102MFA)
Symbol No.	Part No.	Description			
	F2809101	Printed Circuit Board			
	C028091AA	PCB with components			
					CONNECTORS
		TRANSISTORS	J2201	Q5000080	310-92-164-07
Q2001, 2003	G3108127F	2SA812-T2BM6B	J2202	Q5000081	310-92-164-08
Q2002	G3316237F	2SC1623-TZBL6	J2203	P0090490	PI22A07M
		DIODES			BATTERY
D2001, 2002	G2070018	MC2838-T14-2	BAT2201	Q9000268	CR2032-WT6
		RESISTORS	TONE BURST UNIT		
R2003, 2004	J24205103	RMC 1/10T 103J 1/10W 10k Ω	Symbol No.	Part No.	Description
R2001	J24205153	" " 153J " 15k Ω		F2815101	Printed Circuit Board
R2002	J24205473	" " 473J " 47k Ω		C028151AA	PCB with components
R2005	J24205104	" " 104J " 100k Ω			
					IC
		CAPACITORS	Q2301	G1090239	TC5082P-G
C2002	K22141904	chip ceramic 25WV 0.1 μ F D (C3216D1E104MFA)			
					CRYSTAL
C2001, 2005	K22170805	" " 50WV 0.001 μ F B (C2012B1H102MFA)	X2301*	H0101982	HC-18/T 7.168MHz 1750Hz
			X2301*	H0101983	" 7.3728MHz 1800Hz
C2003	K78120013	Chip tantalum 16WV 1 μ F			

		RESISTORS	BZ3001	M4290001	FEBRE-25D02
R2304	J24205273	RMC 1/10T 273J 1/10W 27kΩ			
R2302	J24205683	" " 683J " 68kΩ			RESISTORS
R2303	J24205154	" " 154J " 150kΩ	R3008	J02245470	Carbon film 1/4W 47Ω SJ
R2301	J24205474	" " 474J " 470kΩ	3035, 3050, 3063	J24205000	RMC 1/10T 000J 1/10W 0Ω
			R3049	J24205101	" " 101J " 100Ω
		CAPACITORS	R3027, 3056	J24205331	" " 331J " 330Ω
C2302, C2303	K22170223	chip ceramic 50WV 33pF CH (C2012CH1H330JFA)	R3110	J24205391	" " 391J " 390Ω
C2301	K22170315	" " " 15pF UJ (C2012UJ1H150JFA)	R3083	J24205471	" " 471J " 470Ω
C2305	K22170805	" " " 0.001μF B (C2012B1H102MFA)	R3057, 3100-3105	J24205681	" " 681J " 680Ω
C2304	K22170817	" " " 0.01μF " (C2012B1H103MFA)	R3004, 3012-3014 3016, 3024, 3030, 3077	J24205102	" " 102J " 1kΩ
CONTROL UNIT			R3054, 3109	J24205222	" " 222J " 2.2kΩ
Symbol No.	Part No.	Description	R3010	J24205272	" " 272J " 2.7kΩ
	F2803101A	Printed Circuit Board	R3005, 3007	J24205332	" " 332J " 3.3kΩ
	C028031AA	PCB with components	R3107	J24205392	" " 392J " 3.9kΩ
		ICs	R3017, 3020-3023, 3026, 3031	J24205472	" " 472J " 4.7kΩ
Q3001	G1090740	HD613901A55	R3011	J24205682	" " 682J " 6.8kΩ
Q3002	G1090728	M5233FP	R3006, 3009, 3019, 3044-3046, 3079, 3082, 3085, 3086, 3088, 3092, 3094, 3096-3098	J24205103	" " 103J " 10kΩ
Q3003, 3004	G1090600	μPD4011BG			
Q3005	G1090729	LA5005MH			
Q3006	G1090731	LR40872			
Q3007	G1090730	PST524C			
		TRANSISTORS	R3039	J24205123	" " 123J " 12kΩ
Q3008, 3018, 3028, 3030	G3108127F	2SA812-T2BM6B	R3053	J24205153	" " 153J " 15kΩ
Q3009	G3112430Y	2SA1243LB-Y	R3040, 3043	J24205223	" " 223J " 22kΩ
Q3010, 3011 3019-3023 3025-3027 3029, 3031	G3316237F	2SA1623-T2BL6	R3042	J24205393	" " 393J " 39kΩ
Q3012-3015, 3017	G3113657G	2SA1365AG	R3001, 3002, 3015, 3037, 3038, 3047, 3048, 3055, 3058-3062, 3065-3072, 3078, 3108	J24205473	" " 473J " 47kΩ
Q3016	G3207667R	2SB766-R TW	R3028	J24205683	" " 683J " 68kΩ
Q3024	G3413667D	2SD1366A-AD-TR	R3032, 3041	J24205823	" " 823J " 82kΩ
Q3032, 3033	G3070001	FA1A4M	R3003, 3018, 3025, 3033, 3034, 3051, 3080, 3081, 3090, 3091, 3093, 3095, 3106	J24205104	" " 104J " 100kΩ
		DIODES	R3073-3076	J24205224	" " 224J " 220kΩ
D3001, 3002, 3004 3007, 3008 3010, 3011, 3015 3016, 3019	G2070018	MC2838-T14-2 Si	R3064, 3084, 3087 3089, 3099	J24205105	" " 105J " 1MΩ
D3009	G2070024	MC2836-T14-2 "	R3029	J01215471	Carbon film 1/8W 470kΩ TJ
D3013	G2090118	1SS97 Schottky	R3106	J01215104	Carbon film 1/8W 100kΩ "
D3003	G2090111	HZ6C1 Zener			POTENTIOMETERS
D3014	G2090365	HZ5ALL "	VR3001	J60800105	K0911100B-5R1111-20KA 20kΩA (VOL)
D3017	G2090201	RD3.3EB2 "	VR3002	J60800111	K0911005K-5KB 5kΩB3 (SQL)
D3018	G2090266	RD3.9EB2 "	VR3003, 3004	J51762473	H0521A117A-47KB 47kΩB
D3005	G2070028	SLM-23VMW T-97 LED			CAPACITORS
D3012	G2070030	SLM-13VM T-97 "	C3056	K12171101	Ceramic disc 50WV 0.001μF E (DD104E102P50)
D3020-3025	G2070036	SLM-13MW T-97 "	C3029-3032, 3044, 3045	K22170235	Chip Ceramic " 100pF CH (C2012CH1H101JFA)
D3026	G2015550	1S1555 Si	C3070-3073	K22170227	" " " 47pF " (C2012CH1H470JFA)
		LIQUID CRYSTAL DISPLAY	C3007, 3012, 3015-3026, 3028, 3033-3035, 3039, 3041, 3047-3050 3052-3055 3058-3060, 3062, 3063, 3065-3069	K22170805	" " " 0.001μF B (C2012B1H102MFA)
DS3001	G6090054	LS183-A			
		CERAMIC RESONATORS			
CO3001	H7900270	CSB800k			
CO3002	H7900337	FAR-C4CA-03580000-MOO-S			
		BEEPER			

C3001, 3003, 3005, 3006, 3010, 3011, 3013, 3040, 3042, 3043	K22170817	" " " 0.01 μ F " (C2012B1H103MFA)
C3039	K22141904	" " 25WV 0.1 μ F D (C3216D1E104MFA)
C3046	K40089010	Electrolytic 6.3WV 220 μ F (RC2-6V221M)
C3014	K40089003	" " 47 μ F (RC2-6V101M)
C3009, 3057	K40089003	" 16WV 100 μ F (RC2-16V101M)
C3051	K70147225	Tantalum 25WV 2.2 μ F (DN1E2R2MIS)
C3064	K78140002	Chip tantalum 25WV 1 μ F (F951E105MSAAF1Q2)
C3004	K78080002	" " 6.3WV 4.7 μ F (F950J475MSAAF1Q2)
C3002, 3036	K78080003	" " " 10 μ F (F950J106MTAAF1Q2)
C3027	K78120002	" " 16WV 2.2 μ F (F951C225MSAAF1Q2)
		MICROPHONE
MIC3001	M3290007	EM-78
		SPEAKER
SP3001	M4090063	TO36S13Y2611
		SWITCHES
S3001		with VR3001
S3002, 3003	N4090091	SPJ422N26
S3004, 3005	N6090060	SSS712
		LAMP
PL3001	Q1000060	KD-0001-01 6V 40AM
	R0507460	LCD MOUNT
ACCESSORIES		
Symbol No.	Part No.	Description
		ANTENNA
	Q3000046	YHA-27
		Ni-Cd BATTERY PACK* FNB-3A FNB-4A
		DRY BATTERY CASE*
		FBA-5A
		CHARGER FOR FNB-3A*
	Q9000070	NC-9A 100V AC
	Q9000071	NC-9B 117V AC
	Q9000072	NC-9C 220-234V AC
		CHARGER FOR FNB-4A*
	Q9000279	NC-18A 100V AC
	Q9000280	NC-18B 117V AC
	Q9000281	NC-18C 220-234V AC
		CARRYING CASE*
		CSC-17 use W/FNB-3A
		CSC-18 use W/FNB-4A