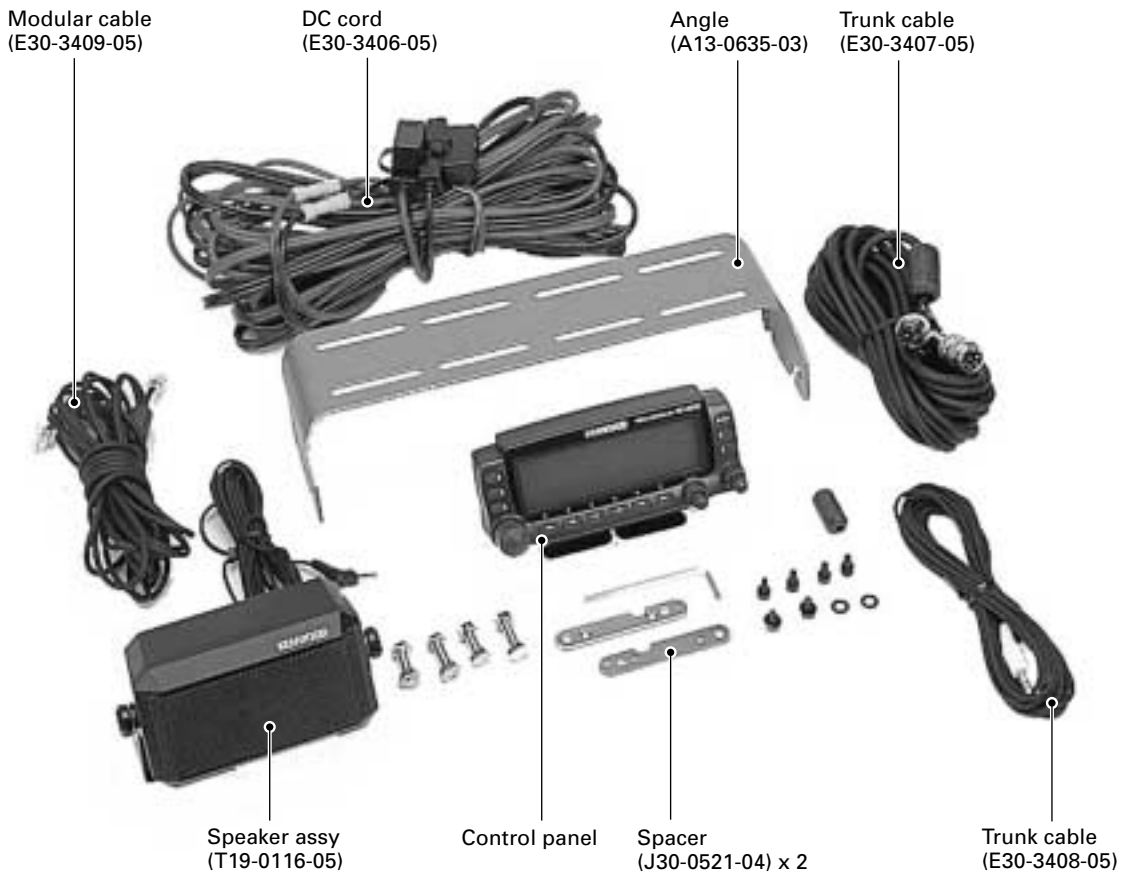
MOBILE CONTROLLER

RC-2000

SERVICE MANUAL

KENWOOD

B51-8571-00 (N) 697



CONTENTS

CIRCUIT DESCRIPTION

Panel Section (LCD ASSY : B38-0829-05)

The panel section controls serial communications with the main unit control section, the key input circuit, the display circuit, and the dimmer circuit through the microprocessor (IC4).

■ Serial communications circuit

A buffer amp is inserted in order to protect the microprocessor ports.

■ Key, Volume input circuit

Circuits to operate the panel section keys are connected to each microprocessor port. The PSW key is pulled up and the other keys are pulled up with software within the microprocessor. Rotary encoder operating circuits are connected directly to the microprocessor. The control divides the power supply voltage, reads the A/D port of the microprocessor, and transfers that data to the main unit.

■ Display circuit

Display section is a 188 x 54-dot full-dot matrix LCD controlled by two LCD. As shown is Figure 1, the master IC (IC2) side is connected to 22 common dots and 88 segment dots and the slave IC (IC1) side is connected to 33 common dots and 100 segment dots. The LCD drive voltage is obtained by raising the power supply voltage (5V) within the IC.

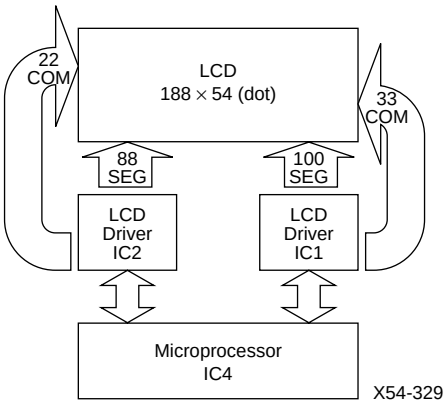


Fig. 1 Display circuit

■ Dimmer circuit

The dimmer circuit switches the lamp brightness to one of four levels or OFF (See table1). The current flowing to the LEDs is varied by selecting resistors from R8 to R14.

Dimmer level	DIM 0	DIM 1	DIM 2	DIM 3
1	H	L	L	L
2	L	H	L	L
3	L	L	H	L
4	L	L	L	H
OFF	L	L	L	L

Table 1 Port logic

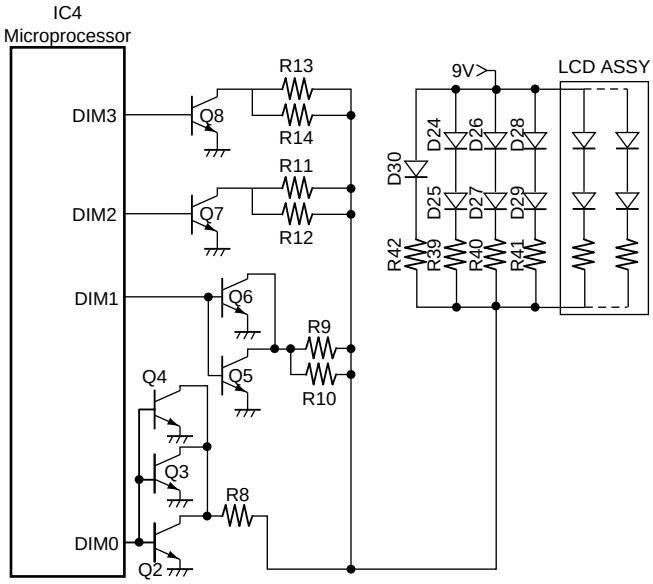


Fig. 2 Dimmer circuit

SEMICONDUCTOR DATA

CPU : 30622M8759GP (Display Unit IC4)

Pin No.	Port name	I/O	Function	Active level
1	KYCALL	I	[AT] key input	L
2	KYVFO	I	[Q. IN] key input	L
3	KYMR	I	[EASY] key input	L
4	KYPM	I	[PM] key input	L
5	KYMNU	I	[RIT] key input	L
6	BYTE	I	Select 8-bit data bus (5C)	
7	CNVSS	I	Select memory expansion mode	
8	FUNC	I	[F1] key input	L
9	KYF1	I	[F2] key input	L
10	RESET	I	Reset	
11	XOUT	O	Clock output	
12	VSS	-	GND	
13	XIN	I	Clock input	
14	VCC	-	Power input	
15	NMI	(I)	Not used	
16	INT2	I	Interrupt from serial input port	
17	INT1	I	Encoder pulse 1 input	
18	INT0	I	Encoder pulse 2 input	
19	KYF2	I	[F3] key input	L
20	KYF3	I	[F4] key input	L
21	NC	I	Not used (VCC)	
22	NC	I	Not used (VCC)	
23~26	DIM3~0	O	Dimmer output	
27	PSW	O	Power SW control output	
28	BS	O	Beat shift output	
29	NC	I	Not used (VCC)	
30	NC	I	Not used (VCC)	
31	KYF4	I	[F5] key input	L
32	KYF5	I	[F6] key input	L
33	TXD0	O	Serial port for connecting to TX-RX uint	
34	RXD0	I	Serial port for connecting to TX-RX uint	

Pin No.	Port name	I/O	Function	Active level
35	NC	I	Not used (VCC)	
36	NC	I	Not used (VCC)	
37~41	NC	I	Not used	
42	RD	-	Read signal	
43	NC	-	Not used	
44	WR	-	Write signal	
45	LCDA0	O	LCD address 0	
46	LCDCD2	O	LCD chip select 2	
47	LCDCD1	O	LCD chip select 1	
48	CS0	-	Flash ROM chip select signal	
49	A19	-	Not used (Open)	
50~59	A18~9	-	Address bus 18~9	
60	VCC	-	Power input	
61	A8	-	Address bus 8	
62	VSS	-	GND	
63~70	A7~0	-	Address bus 7~0	
71~78	LCDD7~0	I/O	LCD data bus 7~0	
79~86	D7~0	-	Data bus 7~0	
87	LCDRD	O	LCD read terminal	
88	LCDWR	O	LCD write terminal	
89	LCDRES	O	LCD reset	
90	POWER	I	[⏻] key input (key interrupt)	L
91	B-AFVR	I	Sub band R AF VOL (A/D)	
92	B-SQVR	I	Sub band R SQ VOL (A/D)	
93	A-AFVR	I	Main band L AF VOL (A/D)	
94	AVSS	-	Analog power input (GND)	
95	A-SQVR	I	Main band L SQ VOL (A/D)	
96	VREF	-	A/D reference voltage input	
97	AVCC	-	Analog power input (5C)	
98	MHz	I	[TUNING CONTROL] key input	L
99	B_KEY	I	[SUB AF CONTROL] key input	L
100	A_KEY	I	[MAIN AF CONTROL] key input	L

DESCRIPTION OF COMPONENTS / TERMINAL FUNCTION

Display Unit (X54-3290-00)

Ref. No.	Application/Function	Operation/Condition/Compatibility
IC1	Serial transmission buffer	
IC2	Serial transmission buffer	
IC3	AVR with reset function	
IC4	Control microcomputer	
IC5	ROM	
Q1	Power switch	
Q2~4,6, 7,9,10	Dimmer	
D1	Reverse flow prevention	
D2	Reset circuit	
D3-23	Over-voltage prevention (Surge elimination)	
D24~30	Key illumination	

Display Unit (X54-3290-00)

CN No.	Pin No.	Name	Function
CN1	1	D7	LCD driver data
	2	D6	LCD driver data
	3	D5	LCD driver data
	4	D4	LCD driver data
	5	D3	LCD driver data
	6	D2	LCD driver data
	7	D1	LCD driver data
	8	D0	LCD driver data
	9	RD	LCD driver RD
	10	WR	LCD driver WR
	11	A0	LCD driver A0
	12	GND	GND
	13	CS2	LCD driver chip select
	14	CS1	LCD driver chip select
	15	RES	LCD driver reset
	16	VDD	LCD driver VDD
	17	VL	Illumination LED control
	18	VL	Illumination LED control
	19	PB	Illumination LED power
	20	PB	Illumination LED power
CN2	1		GND
CN3	2		VR power
	3		switch
	4		VR voltage
	5		SQL voltage

PARTS LIST

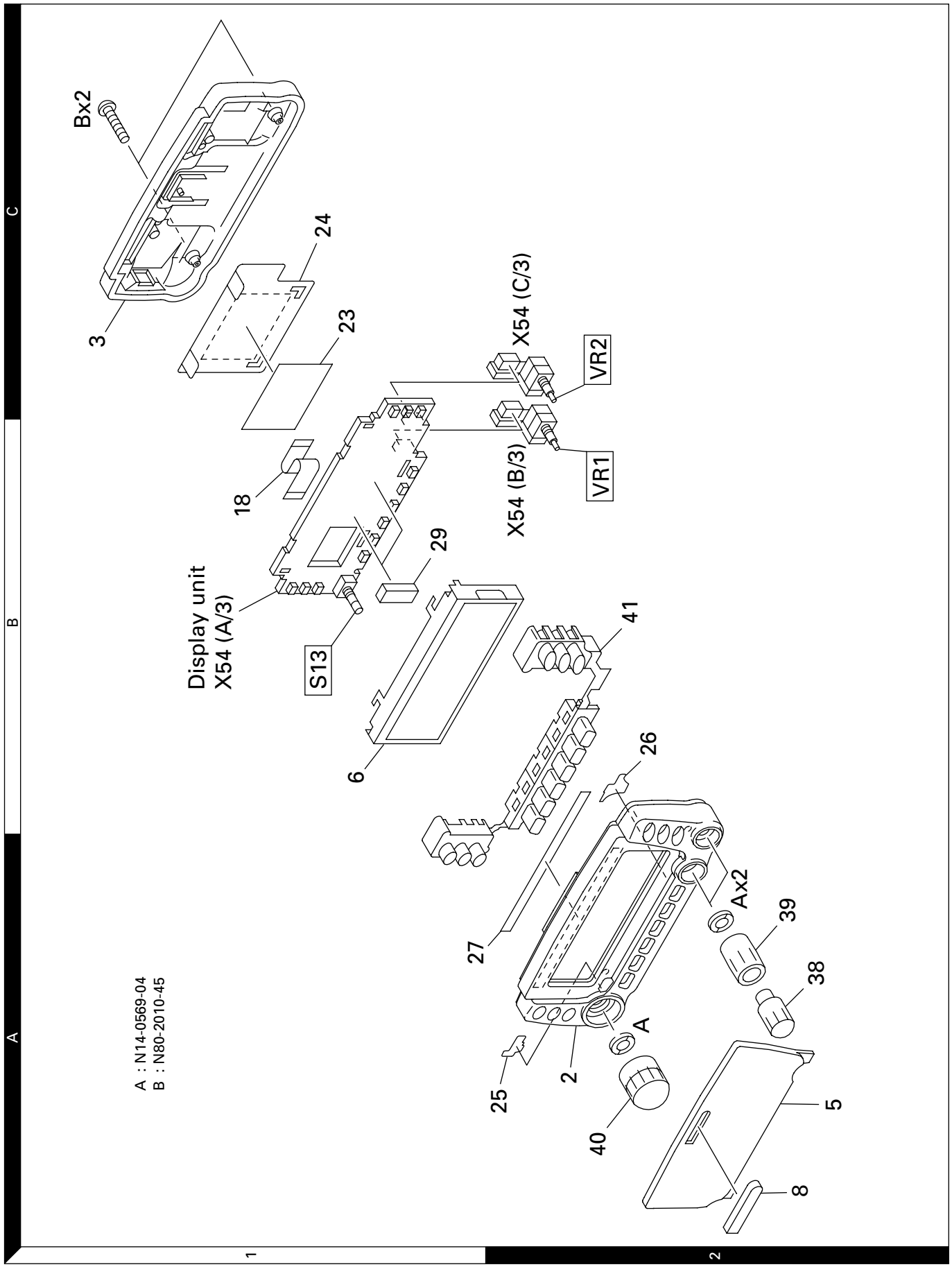
✻ New Parts. ⚠ indicates safety critical components.
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia **K** : USA **P** : Canada
Y : PX (Far East, Hawaii) **T** : England **E** : Europe
Y : AAFES (Europe) **X** : Australia **M**: Other Areas

RC-2000
DISPLAY UNIT (X54-3290-00)

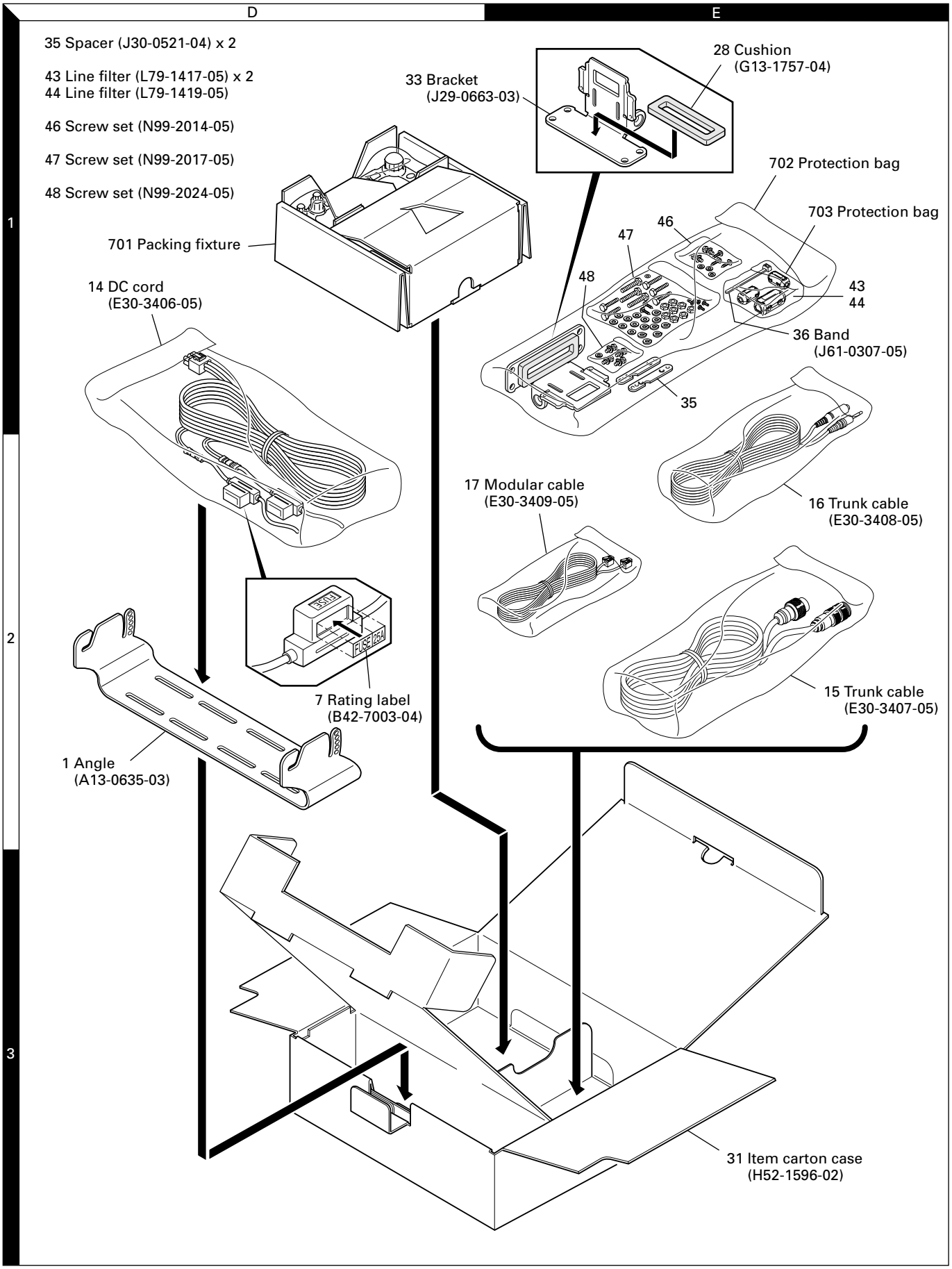
Ref. No.	Address	New parts	Parts No.	Description	Destination
RC-2000					
1	2D		A13-0635-03	ANGLE (TS-2000 (X)/TS-B2000)	
2	2A		A62-0775-03	PANEL (PANEL)	
3	1C		A82-0040-01	REAR PANEL (PANEL)	
5	2A	✻	B10-2628-02	FRONT GLASS (PANEL)	
6	1B		B38-0829-05	LCD ASSY (PANEL)	
7	2D		B42-7003-04	RATING LABEL (DC CORD)	
8	2A		B43-1222-04	BADGE (PANEL)	
9	2G		B46-0310-03	WARRANTY CARD (EUROPEAN COUNTRIES)	
10	2G		B46-0469-10	WARRANTY CARD (U.S.A. AND CANADA)	
11	2G	✻	B62-1292-00	INSTRUCTION MANUAL	
12	1F	✻	B72-1754-04	MODEL NAME PLATE	
14	1D	✻	E30-3406-05	DC CORD	
15	2E	✻	E30-3407-05	TRUNK CABLE (MIC)	
16	2E	✻	E30-3408-05	TRUNK CABLE (SP)	
17	2E	✻	E30-3409-05	MODULAR CABLE	
18	1B		E37-0835-05	FLAT CABLE (PANEL)	
21	3F		F05-2531-05	FUSE (BLADE) 25A/32V	
23	1C		G10-1257-04	FIBROUS SHEET (PANEL)	
24	1C		G11-2600-14	SHEET (PANEL)	
25	2A		G11-2611-04	SHEET (PANEL)	
26	2B		G11-2612-14	SHEET (PANEL)	
27	2A		G13-1753-04	CUSHION (PANEL)	
28	1E		G13-1757-04	CUSHION (BRACKET)	
29	1B		G13-1784-04	CUSHION (PANEL)	
31	3E	✻	H52-1596-02	ITEM CARTON CASE	
33	1E		J29-0663-03	BRACKET	
34	3F		J29-0664-13	BRACKET	
35	1E		J30-0521-04	SPACER (ANGLE)	
36	1E		J61-0307-05	BAND (MIC)	
38	2A		K29-5222-03	KNOB (PANEL)	
39	2A		K29-5223-03	KNOB (PANEL)	
40	2A		K29-5381-03	KNOB (PANEL)	
41	2B	✻	K29-9129-01	BUTTON KNOB (PANEL)	
43	1E		L79-1417-05	LINE FILTER (PANEL,SP)	
44	1E		L79-1419-05	LINE FILTER (MIC)	
A	2A		N14-0569-04	CIRCULAR NUT (PANEL)	
B	1C		N80-2010-45	PAN HEAD TAPTITE SCREW (PANEL)	
46	1E		N99-2014-05	SCREW SET (BRACKET)	
47	1E	✻	N99-2017-05	SCREW SET (SPEAKER ASSY,ANGLE)	
48	1E		N99-2024-05	SCREW SET (ANGLE)	
50	1F	✻	T19-0116-05	SPEAKER ASSY	
DISPLAY UNIT (X54-3290-00)					
D24-30			B30-2215-05	LED	
C1			CK73GB1C104K	CHIP C 0.10UF K	
C2,3			CC73GCH1H101J	CHIP C 100PF J	
C4			C92-0512-05	CHIP-TAN 1.0UF 16WV	
C5			CK73GB1C104K	CHIP C 0.10UF K	
C6			C92-0698-05	ELECTRO 47UF 16WV	
C7,8			CK73GB1H102K	CHIP C 1000PF K	
C9,10			CC73GCH1H220J	CHIP C 22PF J	
C11			CK73GB1H103K	CHIP C 0.010UF K	
C12			CK73GB1H102K	CHIP C 1000PF K	
C13,14			CK73GB1H472K	CHIP C 4700PF K	
C15			CK73GB1H103K	CHIP C 0.010UF K	
C16			CK73GB1H102K	CHIP C 1000PF K	
C17-23			CK73GB1H103K	CHIP C 0.010UF K	
C24			CK73FB1C105K	CHIP C 1.0UF K	
C25			CK73GB1H472K	CHIP C 4700PF K	
CN1			E40-5852-05	FLAT CABLE CONNECTOR (20P)	
CN2,3			E40-5392-05	PIN ASSY (5P)	
CN4,5			E40-5409-05	PIN ASSY (5P)	
J1			E58-0457-05	MODULAR JACK	
L1-7			L92-0140-05	FERRITE CHIP	
L9			L92-0140-05	FERRITE CHIP	
X1			L77-1814-05	CRYSTAL RESONATOR (11.0592MHZ)	
CP1-15			R90-0741-05	MULTIPLE RESISTOR 1K X2	
R2			RK73GB1J473J	CHIP R 47K J 1/16W	
R3			RK73GB1J103J	CHIP R 10K J 1/16W	
R4			RK73GB1J331J	CHIP R 330 J 1/16W	
R5,6			RK73GB1J473J	CHIP R 47K J 1/16W	
R8			R92-0670-05	CHIP R 0 OHM	
R9,10			RK73FB2A560J	CHIP R 56 J 1/10W	
R11,12			RK73FB2A181J	CHIP R 180 J 1/10W	
R13,14			RK73FB2A271J	CHIP R 270 J 1/10W	
R15			R92-1252-05	CHIP R 0 OHM	
R17-22			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R25			RK73GB1J103J	CHIP R 10K J 1/16W	
R27-29			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R30-32			RK73GB1J473J	CHIP R 47K J 1/16W	
R33			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R34-38			RK73GB1J473J	CHIP R 47K J 1/16W	
R39-41			RK73FB2A391J	CHIP R 390 J 1/10W	
R42			RK73FB2A471J	CHIP R 470 J 1/10W	
R43			R92-1252-05	CHIP R 0 OHM	
R44			R92-0679-05	CHIP R 0 OHM	
VR1,2	2B,2C		R31-0629-05	VARIABLE RESISTOR 50K	
S1-12			S70-0439-05	TACT SWITCH	
D1			LFB01	DIODE	
D2			MA2S111	DIODE	
D3-23			DA221	DIODE	
IC1,2			TC4S81F	IC (SERIAL TRANSMISSION BUFFER)	
IC3			L78LR05B-FA	IC (AVR WITH RESET FUNCTION)	
IC4			30622M8759GP	IC (CONTROL MICROCOMPUTER)	
IC5			AT29C020-90TI	IC (ROM)	
Q1			2SA1162(Y)	TRANSISTOR	
Q2-4			DTC143EKA	DIGITAL TRANSISTOR	
Q6,7			DTC143EKA	DIGITAL TRANSISTOR	
Q9,10			DTC143EKA	DIGITAL TRANSISTOR	
S13	1B		W02-1978-05	ENCODER	

EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

PACKING



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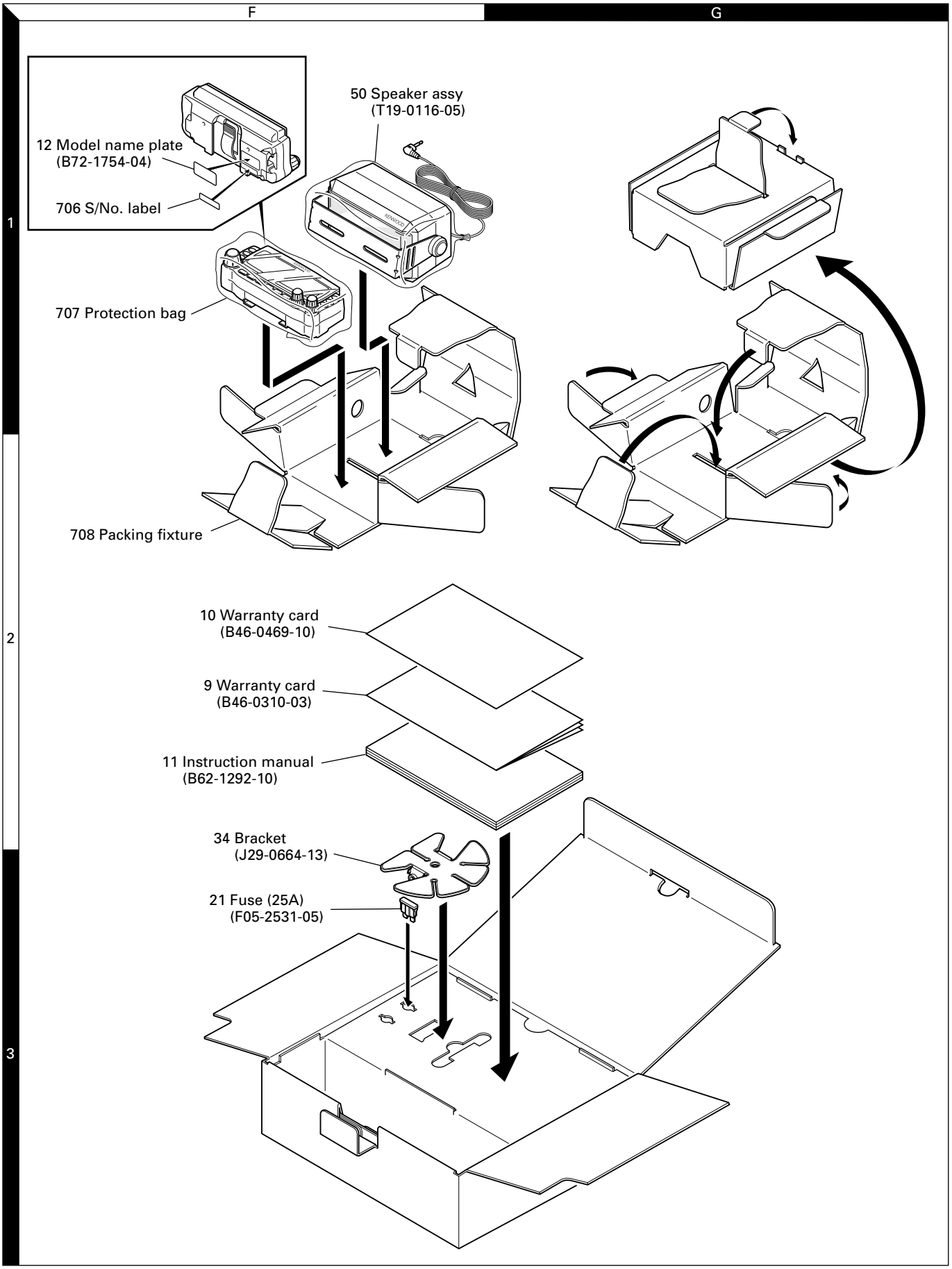
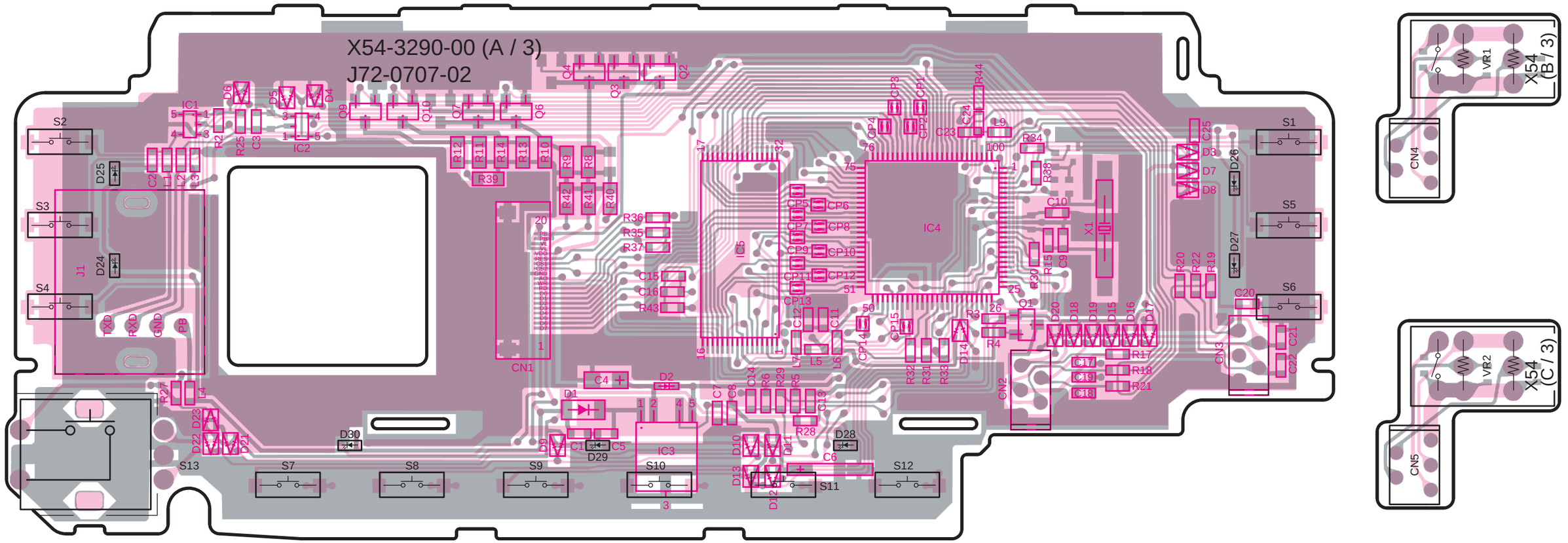


Parts with the exploded numbers larger than 700 are not supplied.

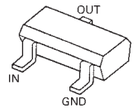
DISPLAY UNIT (X54-3290-00) Component side view



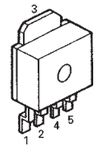
Component side
Foil side

2SA1162

DTC143EKA

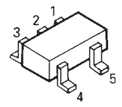


L78LR05B-FA

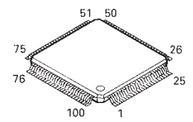


DA221

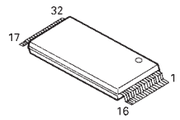
TC4S81F



30622M8759GP

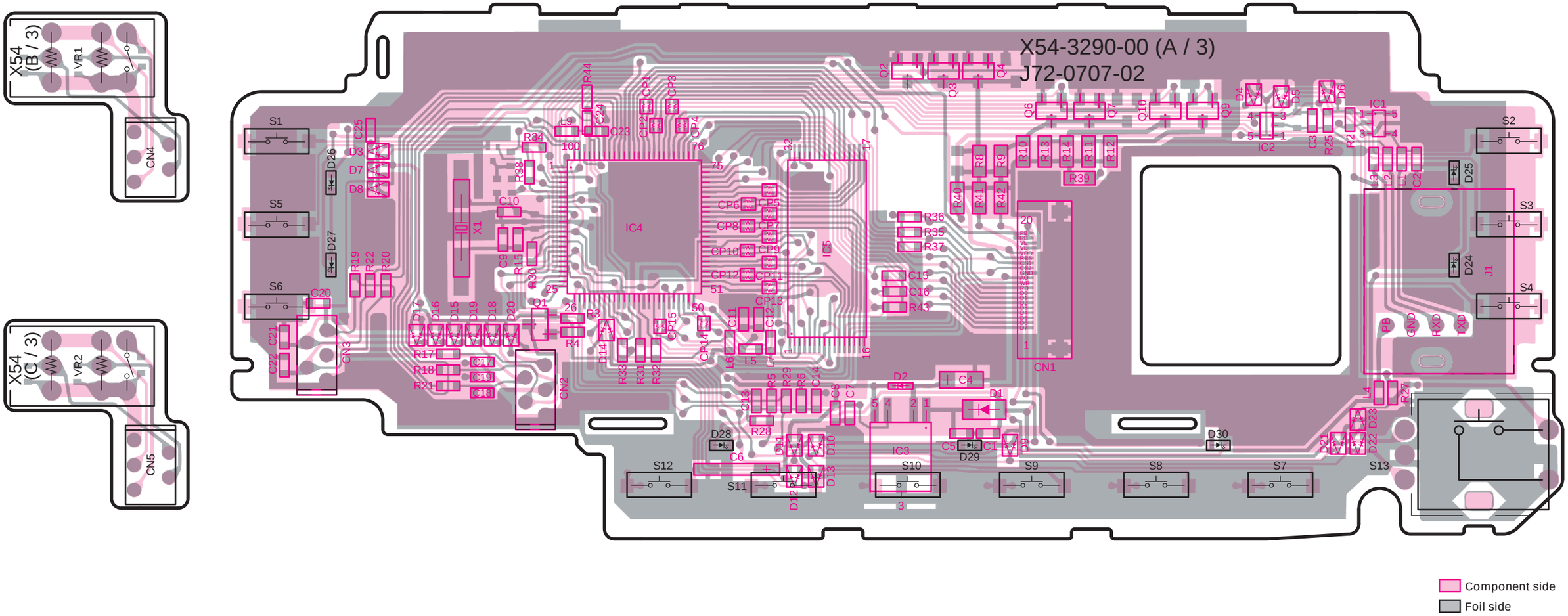


AT29C020-90TI



RC-2000 PC BOARD VIEWS

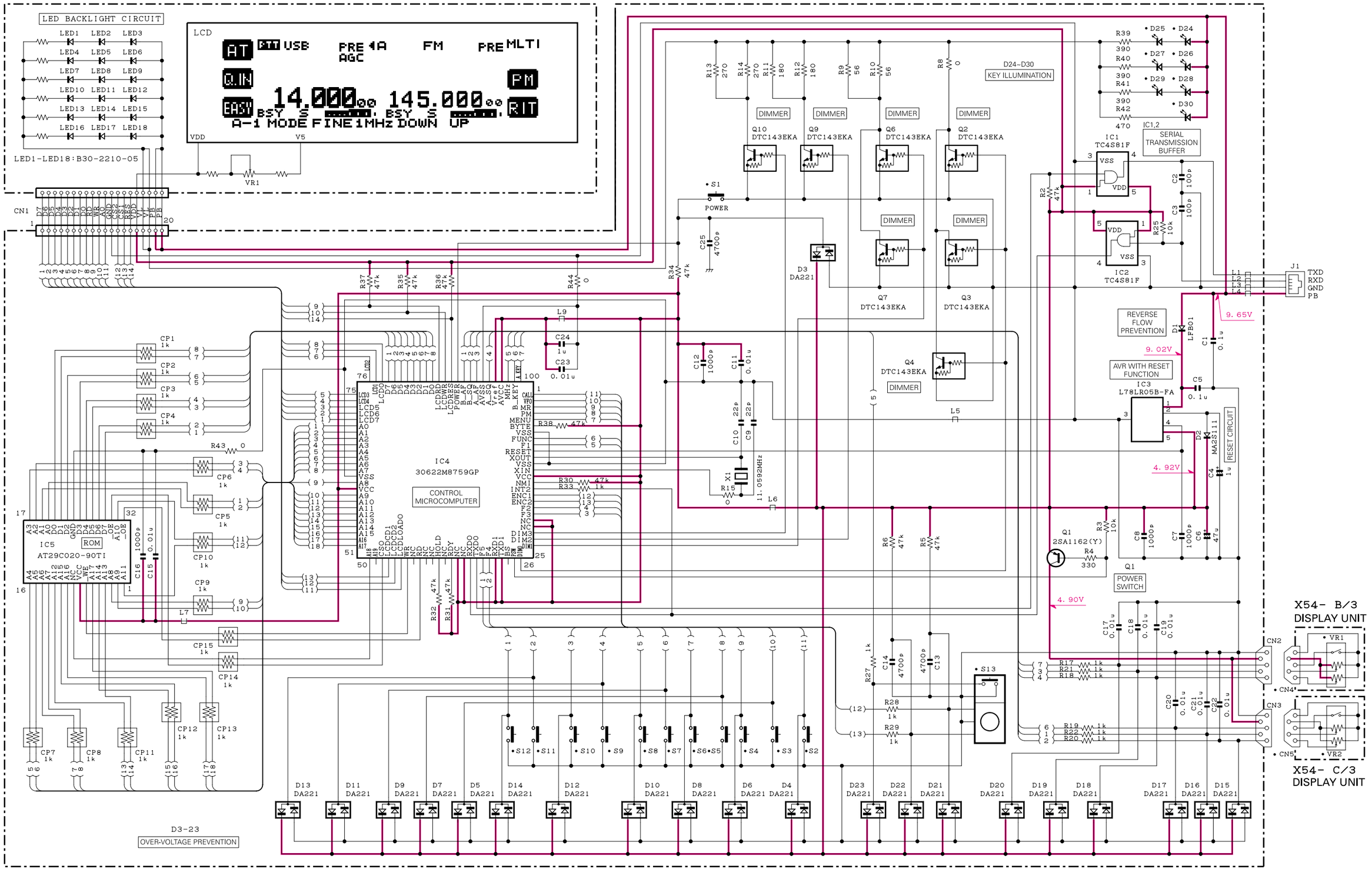
DISPLAY UNIT (X54-3290-00) Foil side view



SCHEMATIC DIAGRAM RC-2000

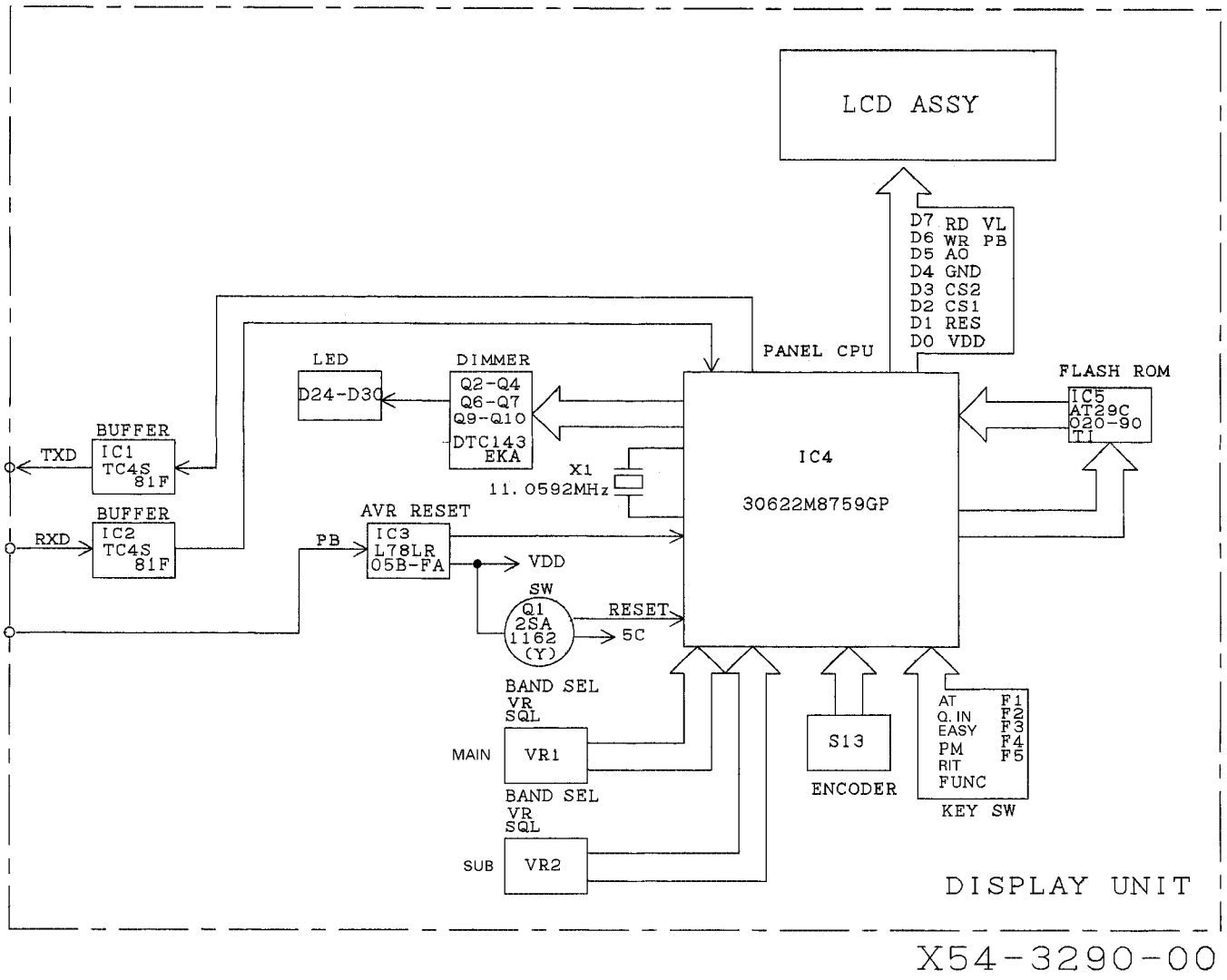
LCD ASSY

X54-3290-00 A/3 DISPLAY UNIT



D1	:LFB01	IC1,2	:TC4S81F	Q1	:2SA1162(Y)
D2	:MA2S111	IC3	:L78LR05B-FA	Q2-4.6.7.9.10	:DTC143EKA
D3-23	:DA221	IC4	:30622M8759GP		
D24-30	:B30-2215-05	IC5	:AT29C020-90TI		

BLOCK DIAGRAM



X54-3290-00

SPECIFICATIONS

Control Panel

Usable temperature range	–20°C to +60°C (–4°F to +140°F)	
Supply voltage	9.5V DC ±0.5V	
Current	Less than 200mA	
Dimensions (W x H x D, Projections included)	140 (5.5) x 60 (2.4) x 49.3 (2.0)	mm (inch)
Weight	Approx. 180g (0.4 lbs)	

External Speaker

Speaker impedance	4Ω±15%	
Output audio level	85±2dB/W	
Frequency response	300 to 9000Hz	
Input power	3W (Nominal), 5W (Maximum)	
Dimensions (W x H x D)	113 (4.5) x 66 (2.6) x 58.5 (2.3)	mm (inch)
Weight	Approx. 360g (0.79 lbs)	

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