Clarion

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Service Manual

Closer Relations through
"Clarion Service Manual"

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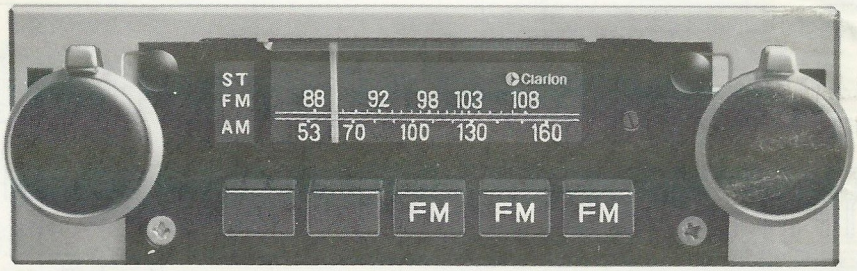
MAZDA AUTOMOBILE GENUINE RADIO

Model RT-456



■SPECIFICATIONS:

Circuit system: Superheterodyne
Tuning system: Manual μ-tuning
5-push button system
Receive range: AM 530kHz to 1,605kHz
FM 88MHz to 108MHz
Intermediate frequency:
AM 450kHz
FM 10.7MHz
Maximum sensitivity:
AM Less than 20dB (at VOL MAX.)
FM Less than 15dB (at VOL MAX.)
Quieting sensitivity: AM Less than 30dB (at 20dB S/N)
FM Less than 18dB (at 30dB S/N)
A.F.C: FM 500±200kHz
Separation: FM More than 20dB
Fidelity: AM 100Hz H +4±3dB
L +6±5dB
400Hz M 0dB
4,000Hz H −16±5dB
L −29±5dB
FM 100Hz H +2±5dB
L +4±5dB
400Hz M 0dB
7,000Hz H −15±5dB
L −35±5dB
Load impedance: 4Ω×2
Power output: More than 3W×2 (at 10% distortion)
More than 5W×2 (at max. volume)
Power supply voltage:
DC 13.2V (10.8V to 15.6V)
Negative ground
Current consumption: 2A
Semiconductors: 6 ICs, 2 transistors, 1 FET and 7 diodes.
Dimensions: Width 160mm
Height 50mm
Depth 80mm
Weight: 0.79kg

Printed in Japan 298-2714-00 RT-456

■COMPONENTS:

RT-456C,D,F-51

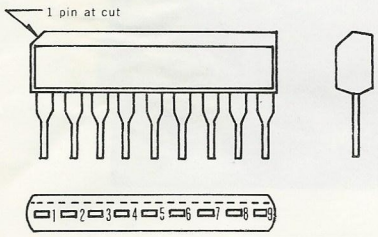
	Main unit	1
SPA-601-102	Speaker ass'y	2
(090-0050-30)		
SPA-643-100	Speaker ass'y	2
(090-0170-11)		
745-0430-01	Flat washer	2
722-0231-00	Hexagon nut	2
380-4047-00(C,D-51)	Knob (Small)	2
380-4048-01(C,D-51)	Knob (Large)	2
380-3693-01(F-51)	Knob (Small)	2
380-3770-01(F-51)	Knob (Large)	2

RT-456F-52

	Main unit	1
PAS-109-103	Antenna ass'y	1
SPA-557-101	Speaker ass'y	2
(090-0050-20)		
745-0430-01	Flat washer	2
722-0231-00	Hexagon nut	2
380-3503-02	Knob (Large)	2
380-3279-01	Knob (Small)	2

■EXPLANATION OF IC's:

■051-0122-00 TA7303P



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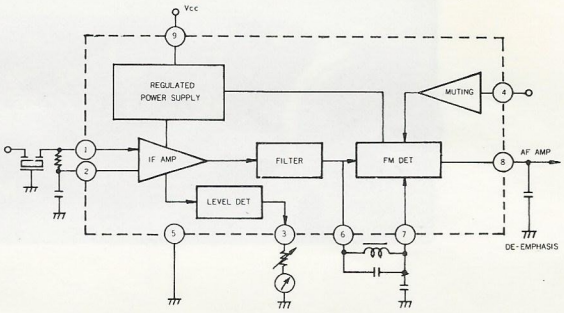
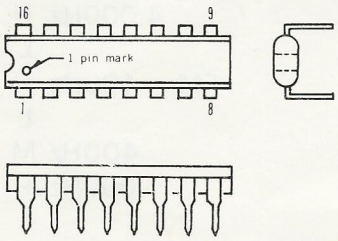


BLOCK DIAGRAM

■051-0307-00 LA2101



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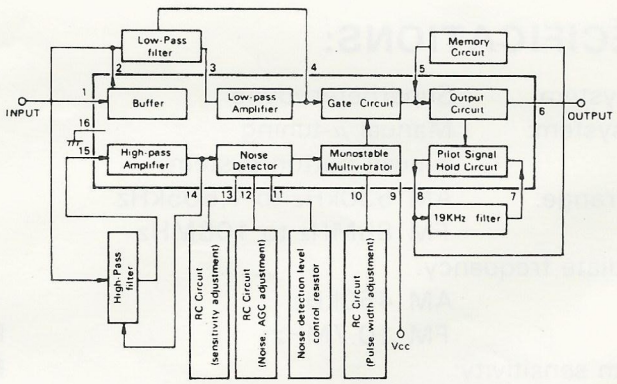

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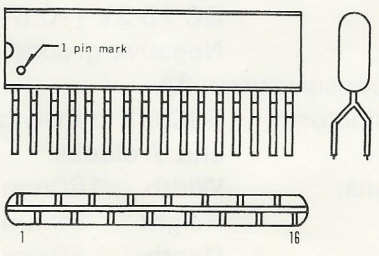
■051-0308-00 LA3370



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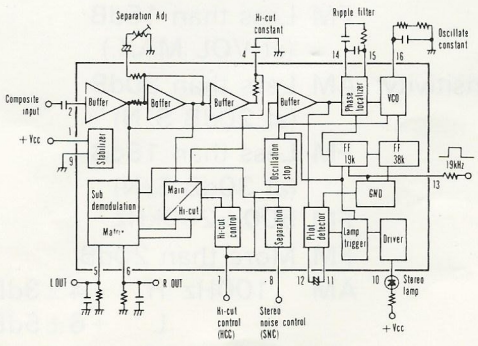

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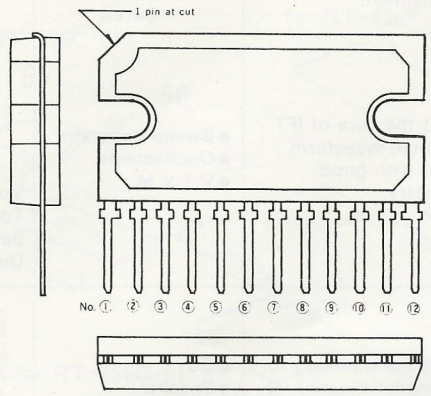
■051-0334-00 AN7158N



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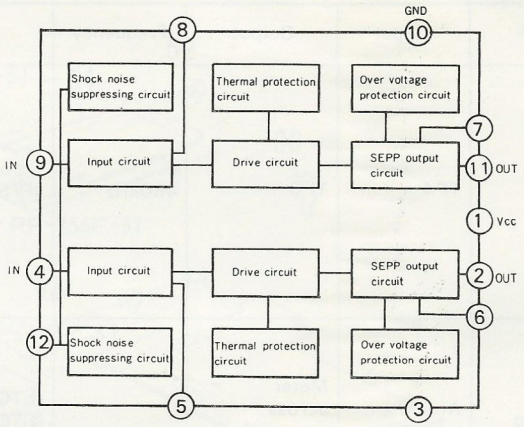

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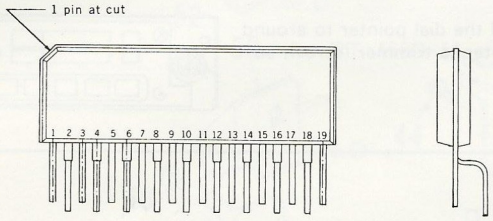
■051-0335-03 μPC1216V2



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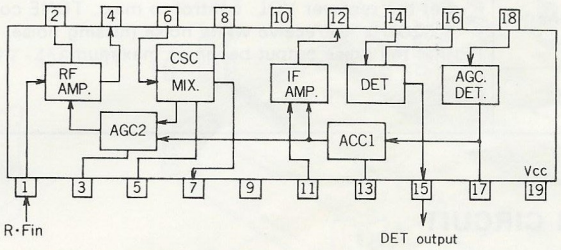
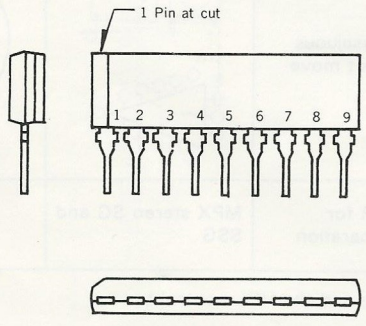


BLOCK DIAGRAM

Pin No.	Pin Names	Pin No.	Pin Names
1	RF INPUT	2	BYPASS
3	BYPASS	4	RF OUTPUT
5	BYPASS	6	MIX INPUT
7	MIX OUTPUT	8	LOCAL OSC
9	GND	10	GND
11	IF INPUT	12	IF OUTPUT
13	BYPASS	14	DETECTOR INPUT
15	DETECTOR OUTPUT	16	BYPASS
17	BYPASS	18	AGC DET. INPUT
19	Vcc		

Pin Assignments

■051-0356-00 AN7254



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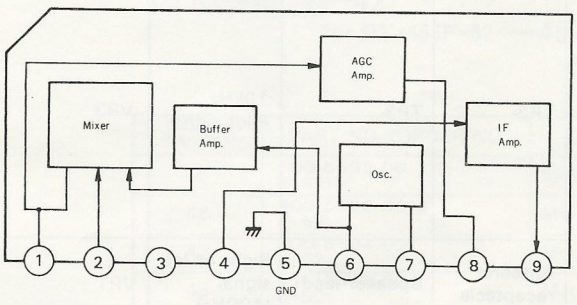


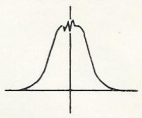
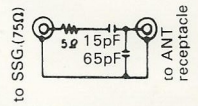
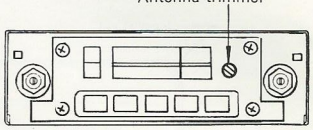
BLOCK DIAGRAM

Pin No.	Pin Names
1	Mixer Output
2	Mixer Input
3	Vcc
4	IF Amp. Input
5	GND
6	Osc. Base
7	Osc. Emitter
8	AGC Output
9	IF Amp. Output

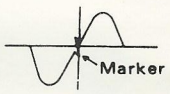
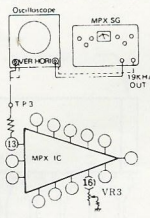
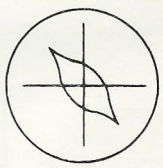
Pin Assignments

■ADJUSTMENTS:

■AM CIRCUIT

Item	Input	Output	Frequency	Method of adjustment		Instruments required	Remark
IF	TP4	TP5	450kHz	IFT5	Adjust the core of IFT maximum waveform height with good symmetry.	● Sweep generator ● Oscilloscope ● V.T.V.M.	IF curve  Vol: minimum Tone: maximum Balance: center Dial pointer: right end
Tracking	Antenna receptacle	Meter across the speaker voice coil	1,620KHz	①TC4 (ANT) ②TC5 (RF) ③TC6 (OSC)	Adjust the trimmers for maximum indication of V.T.V.M.	● SG ● Speaker ● V.T.V.M.	 Use dummy antenna between SSG and ANT receptacle.
Antenna trimmer	Set the receiver VOL. control to max., TONE control to high, and the dial pointer to around 1,620kHz to receive white noise (hissing noise) and adjust the antenna trimmer (screw) so that the noise output becomes maximum.						Antenna trimmer 

■FM CIRCUIT

Item	Input	Output	Frequency	Method of adjustment		Instruments required	Remark
S-curve	TP1	TP2	10.7MHz	IFT1, 4	Adjust the core for waveform having good symmetry and good linearity.	● Sweep generator ● Oscilloscope ● V.T.V.M.	 (10.7MHz)
Tracking	Antenna receptacle	Speaker lead	87.5MHz	TC3 (OSC trimmer)	Adjust the trimmers for maximum indication of V.T.V.M.	● Speaker ● V.T.V.M. ● SG	
			98MHz	TC1 (ANT trimmer) TC2 (RF trimmer)			
<MPX> 19kHz Pilot signal (VCO)	TP3	TP3	19kHz Pilot signal	VR3	Adjust the Lissajuous figure does not move	● MPX stereo SG 	 after adjusted
Separation	Antenna receptacle	Speaker lead	Right or left signal (400Hz)	VR1	Adjust the VR for maximum separation	MPX stereo SG and SSG	
SASC	Receive a 98MHz FM signal. Set the ANT input to 55dB, MOD to 7kHz and the VOL control to a suitable position. Consider this point as 0dB. Next adjust VR2 so that the output becomes 3dB down when the ANT input is dropped to 35dB.						

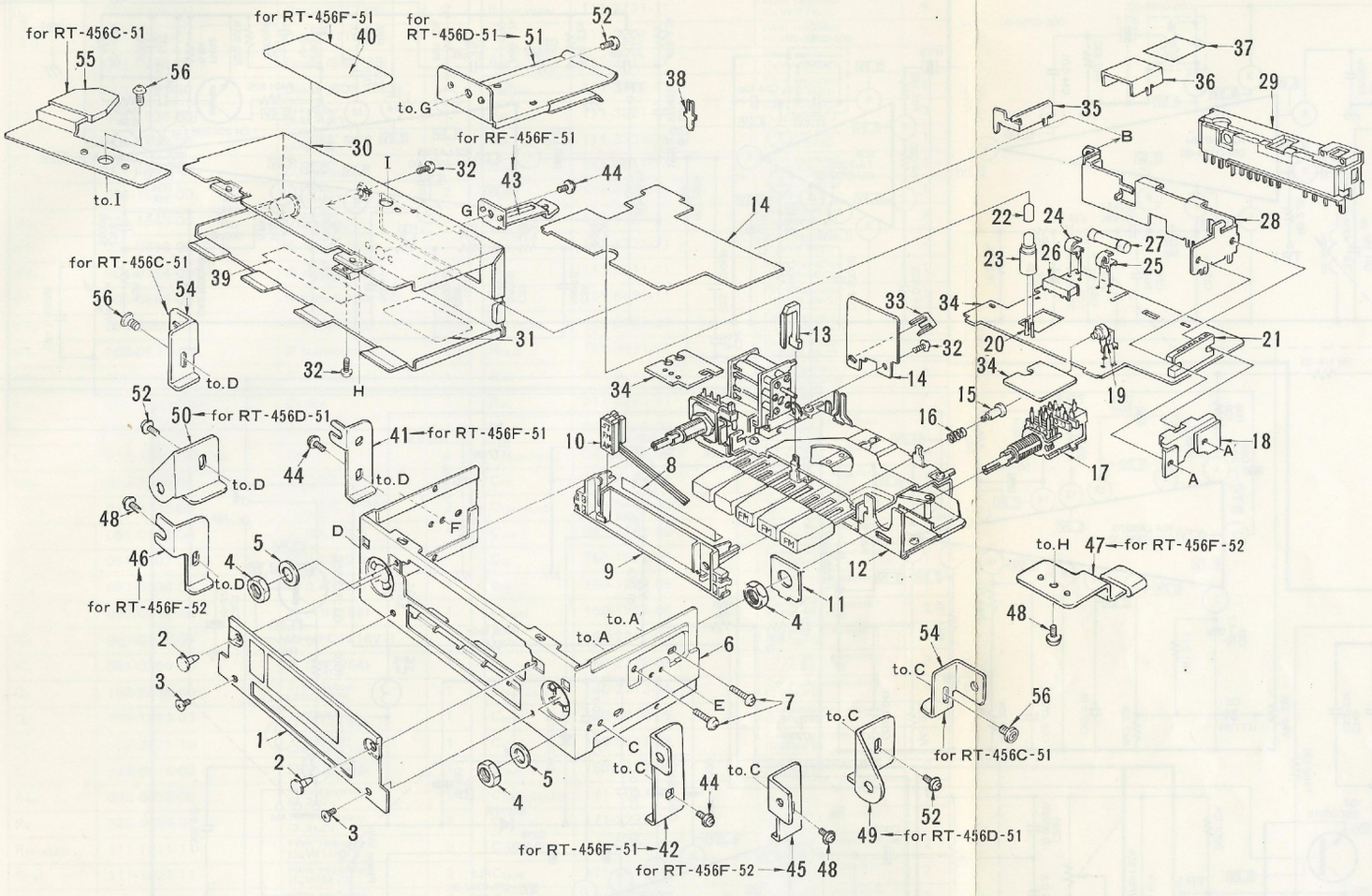
〔**Note**〕 At this time, adjust the center frequency to the resonance frequency of the ceramic filter.

Center Frequency of Ceramic Filter

Color	Center frequency
Black	10.64MHz±30KHz
Blue	10.67MHz±30KHz
Red	10.70MHz±30KHz
Orange	10.73MHz±30KHz
White	10.76MHz±30KHz

■EXPLODED VIEW:

◎Main section



REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
45	300-5592-00 (F-52)	Mounting bracket	1
46	300-5593-00 (F-52)	Mounting bracket	1
47	300-6384-00 (F-52)	Mounting bracket	1
48	716-0417-00 (F-52)	Machine screw	3
49	300-6171-00 (D-51)	Mounting bracket	1
50	300-6172-00 (D-51)	Mounting bracket	1
51	300-6201-00 (D-51)	Mounting bracket	1
52	716-0417-00 (D-51)	Machine screw	3
53	300-6208-00 (C-51)	Mounting bracket	1
54	300-6209-00 (C-51)	Mounting bracket	1
55	300-6402-00 (C-51)	Mounting bracket	1
56	716-0417-00 (C-51)	Machine screw	3

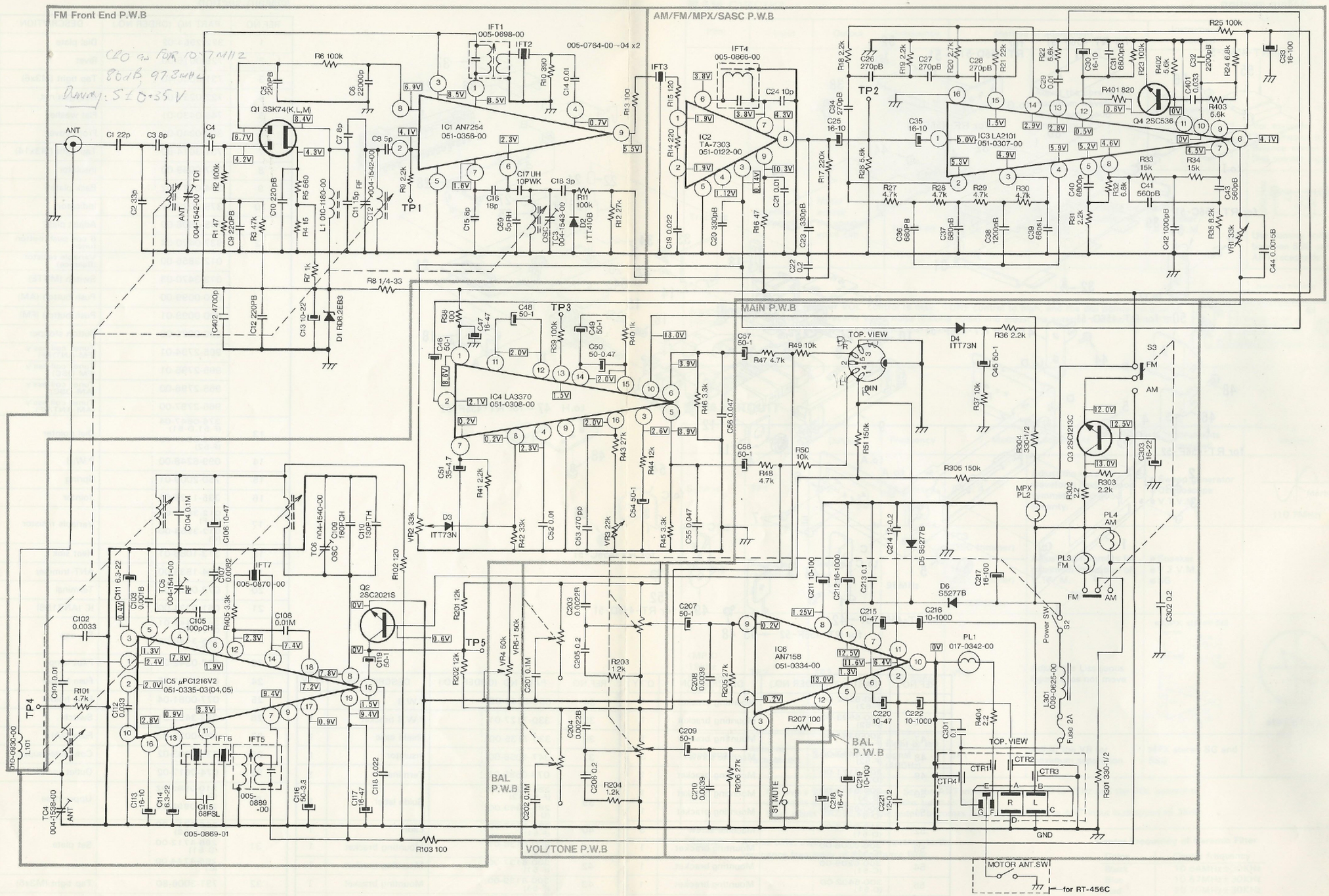
REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
34	099-6249-02	P.W.B	1
35	330-7127-01	P.W.B bracket	1
36	330-7135-00	Shield case	1
37	347-1056-00	Insulator	1
38	073-0585-01	Terminal	1
39	285-0958-00 (F-51,52) 285-0959-00 (D-51)	Guide label	1
40	290-3177-00 (F-51)	Label	1
41	300-6136-01 (F-51)	Mounting bracket	1
42	300-6137-00 (F-51)	Mounting bracket	1
43	300-6139-00 (F-51)	Mounting bracket	1
44	716-0417-00 (F-51)	Machine screw	3

■PARTS LIST:

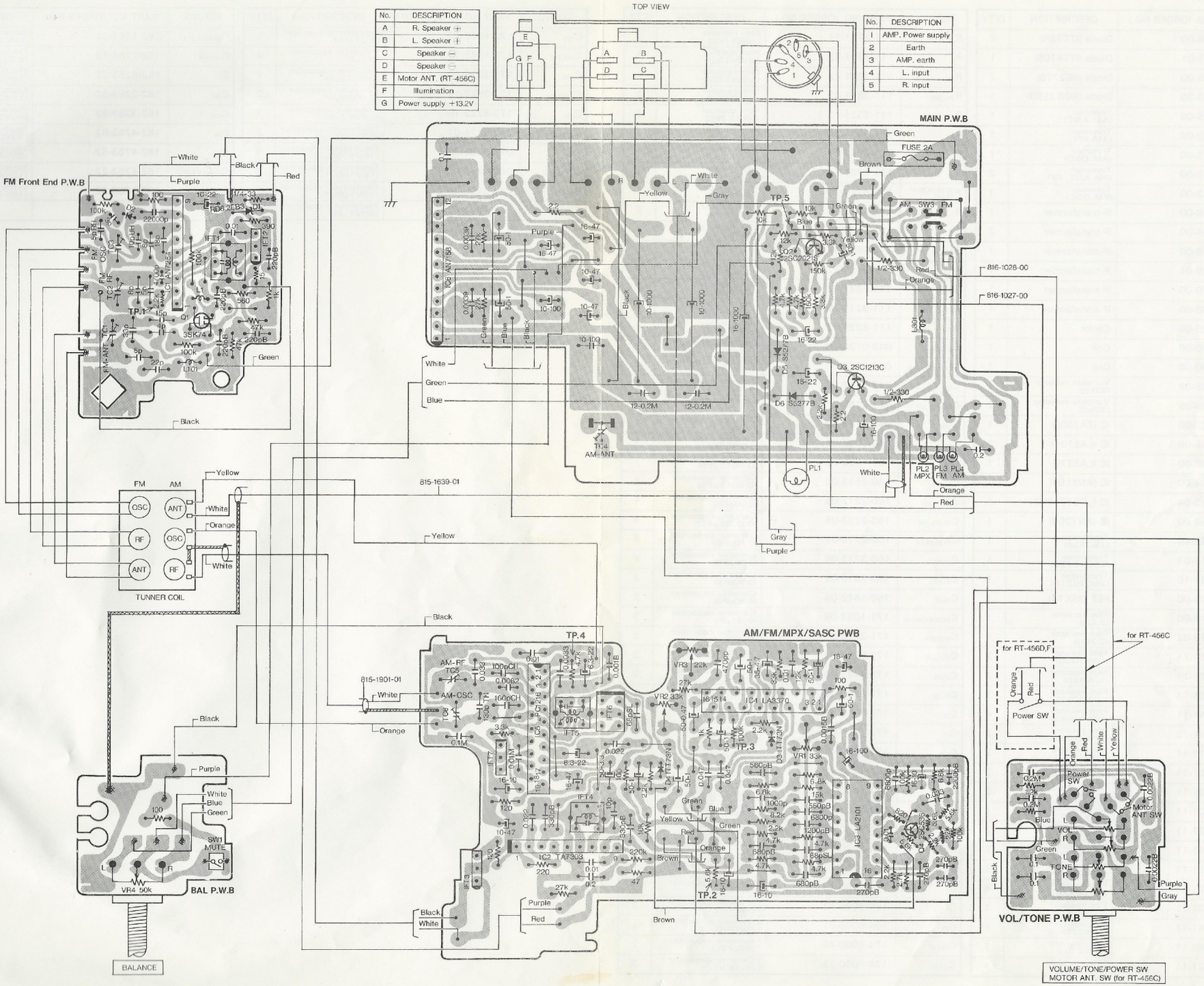
◎Main section

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
1	372-2964-02	Dial plate	1
2	729-0015-00	Rivet	2
3	731-3006-40	Tap tight (M3x6)	2
4	722-0231-00	Hexagon nut	3
5	745-0430-01	Flat washer	2
6	308-0940-03	Front cover	1
7	731-3014-80	Tap tight (M3x14)	2
8	347-0989-00	Insulator	1
9	374-0777-02	Back plate	1
10	379-0028-01	Indicator	1
11	745-0606-00	Adjust plate	1
12	937-0420-04	6 coil push button tuner	1
	012-3856-00	Variable resistor (Balance)	1
	013-3470-03	Switch (MUTE)	1
	680-0099-00	Push button (AM)	2
	680-0099-01	Push button (FM)	3
	690-0326-00	Button stopper	5
	965-2794-01	Tuner coil ass'y (FM-ANT/RF)	2
	965-2795-01	Tuner coil ass'y (FM-OSC)	1
	965-2796-00	Tuner coil ass'y (AM-OSC)	1
	965-2797-00	Tuner coil ass'y (AM-ANT/RF)	2
13	376-0847-04 (F-51,D-51) 376-0847-05 (F-52)	Dial pointer	1
14	099-6248-00	P.W.B	1
15	750-2009-01	Spring	1
16	335-1126-01	Jointer	1
17	012-3828-00 (D,F) 012-3954-00 (C)	Variable resistor	1
18	313-1086-01	Heat sink	1
19	004-1538-00	ANT-trimmer	1
20	073-0575-02	Terminal	2
21	051-0334-00	IC (AN7158)	1
22	345-3446-01 (F-51,52) 345-3446-02 (D-51)	P.L cap	1
23	017-0342-00	Pilot lamp	1
24	077-0081-05	Fuse holder	1
25	077-0081-04	Fuse holder	1
26	013-3422-01	Switch	1
27	120-0020-02	Fuse (2A)	1
28	330-6903-02	Connecter support	1
29	074-0617-02	Outlet socket	1
30	310-0993-02 (D,F) 310-0993-05 (C)	Upper case	1
31	286-4711-00 (F-51,52) 286-4712-00 (D-51) 286-4744-00 (C)	Set plate	1
32	731-3006-80	Tap tight (M3x6)	3
33	073-0573-01	Terminal	1

■CIRCUIT DIAGRAM:



■PRINTED WIRING BOARD:



■PARTS LIST:

◎Electrical section

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
$D_{3,4}$	001-0208-00	Diode (ITT73N)	2
D_2	001-0231-01	Diode (ITT410B)	1
$D_{5,6}$	001-0276-00	Diode (S5277B)	2
D_1	001-0323-30	Diode (RD8.2EB3)	1
TC_4	004-1538-00	Trimmer (AM-ANT)	1
TC_5	004-1540-00	Trimmer (AM-RF)	1
TC_6	004-1541-00	Trimmer (AM-OSC)	1
$TC_{1,2}$	004-1542-00	Trimmer (FM-ANT, RF)	2
TC_3	004-1543-00	Trimmer (FM-OSC)	1
IFT_1	005-0698-00	IF-transformer	1
$IFT_{2,3}$	005-0764-00	IF-transformer	2
IFT_4	005-0866-00	IF-transformer	1
IFT_6	005-0869-01	IF-transformer	1
IFT_7	005-0870-00	IF-transformer	1
IFT_5	005-0889-00	IF-transformer	1
L_{301}	009-0625-00	Choke	1
L_{101}	010-0930-00	Coil	1
L_1	010-1180-00	Coil	1
VR_3	012-3735-08	Variable resistor (22kΩ)	1
$VR_{1,2}$	012-3735-09	Variable resistor (33kΩ)	2
IC_2	051-0122-00	IC (TA7303)	1
IC_3	051-0307-00	IC (LA2101)	1
IC_4	051-0308-00	IC (LA3370)	1
IC_6	051-0334-00	IC (AN7158)	1
IC_5	051-0335-04	IC (μPC1216V2)	1
IC_1	051-0356-00	IC (AN7254)	1
Q_4	102-0536-40	Transistor (2SC536)	1
Q_3	102-1213-03	Transistor (2SC1213C)	1
Q_2	102-2021-10	Transistor (2SC2021S)	1
Q_1	124-0074-00	FET (3SK74)	1
R_{404}	032-0018-00	Film resistor (2.2Ω)	1
R_9	032-0059-02	Film resistor (2.2kΩ)	1
$R_{38,103,207}$	111-1011-11	Film resistor (1/8W100Ω)	3
$R_{7,40}$	111-1021-11	Film resistor (1/8W1kΩ)	2
$R_{37,49,50}$	111-1031-11	Film resistor (1/8W10kΩ)	3
$R_{11,23,25,39}$	111-1041-11	Film resistor (1/8W100kΩ)	4
$R_{2,6}$	111-1041-22	Film resistor (1/4Ws100kΩ)	2
$R_{15,102}$	111-1211-11	Film resistor (1/8W120Ω)	2
$R_{203,204}$	111-1221-11	Film resistor (1/8W1.2kΩ)	2
$R_{44,201,202}$	111-1231-11	Film resistor (1/8W12kΩ)	3
R_4	111-1501-11	Film resistor (1/8W15Ω)	1
$R_{33,34}$	111-1531-11	Film resistor (1/8W15kΩ)	2
$R_{51,305}$	111-1541-11	Film resistor (1/8W150kΩ)	2
R_{14}	111-2211-11	Film resistor (1/8W220Ω)	1
$R_{303}^{18,19,31,36,41}$	111-2221-11	Film resistor (1/8W2.2kΩ)	6
R_{21}	111-2231-11	Film resistor (1/8W22kΩ)	1
R_{17}	111-2241-11	Film resistor (1/8W220kΩ)	1
R_{302}	111-2291-11	Film resistor (1/8W2.2Ω)	1
R_{20}	111-2721-11	Film resistor (1/8W2.7kΩ)	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
$R_{12,43,205,206}$	111-2731-11	Film resistor (1/8W27kΩ)	4
R_8	111-3301-22	Film resistor (1/4Ws33Ω)	1
R_{13}	111-3311-22	Film resistor (1/4Ws330Ω)	1
$R_{301,304}$	111-3311-41	Film resistor (1/2W330Ω)	2
$R_{45,46,405}$	111-3321-11	Film resistor (1/8W3.3kΩ)	3
R_{42}	111-3331-11	Film resistor (1/8W33kΩ)	1
R_{10}	111-3911-11	Film resistor (1/8W390Ω)	1
R_{16}	111-4701-11	Film resistor (1/8W47Ω)	1
$R_{48,101}^{27,28,29,30,47}$	111-4721-11	Film resistor (1/8W4.7kΩ)	7
$R_{1,3}$	111-4731-11	Film resistor (1/8W47kΩ)	2
R_5	111-5611-11	Film resistor (1/8W560Ω)	1
R_{26}	111-5621-11	Film resistor (1/8W5.6kΩ)	1
$R_{22,402,403}$	111-5621-22	Film resistor (1/4Ws5.6kΩ)	3
$R_{24,32}$	111-6821-11	Film resistor (1/8W6.8kΩ)	2
R_{401}	111-8211-22	Film resistor (1/4Ws820Ω)	1
R_{35}	111-8221-11	Film resistor (1/8W8.2kΩ)	1
$C_{214,221}$	043-0126-00	Ceramic capacitor (0.2μFM)	2
$C_{22,205,206,302}$	043-0126-01	Ceramic capacitor (0.2μFM)	4
C_{53}	043-0147-00	Ceramic capacitor (470pFPP)	1
$C_{104,201,202}$	043-0165-01	Ceramic capacitor (0.1μFM)	3
C_{109}	043-0169-00	Ceramic capacitor (160pFCH)	1
C_{42}	160-1022-05	Ceramic capacitor (1000pFB)	1
C_{38}	160-1222-05	Ceramic capacitor (0.0012μFB)	1
$C_{44,103}$	160-1522-05	Ceramic capacitor (0.0015μFB)	2
$C_{5,9,10,12}$	160-2212-05	Ceramic capacitor (220pFB)	4
$C_{32,203,204}$	160-2222-05	Ceramic capacitor (0.0022μFB)	3
$C_{26,27,28,34}$	160-2712-05	Ceramic capacitor (270pFB)	4
$C_{20,23}$	160-3312-05	Ceramic capacitor (330pFB)	2
$C_{41,43}$	160-5612-05	Ceramic capacitor (560pFB)	2
$C_{36,37}$	160-6812-05	Ceramic capacitor (680pFB)	2
$C_{14,21,29,52,101}$	171-1033-06	Ceramic capacitor (0.01μF)	5
$C_{6,19,118}$	171-2233-06	Ceramic capacitor (0.022μF)	3
$C_{112,401}$	171-3333-06	Ceramic capacitor (0.033μF)	2
$C_{55,56}$	171-4733-06	Ceramic capacitor (0.047μF)	2
$C_{31,40}$	171-6823-06	Ceramic capacitor (6800pF)	2
C_{24}	174-1000-13	Ceramic capacitor (10pFCH)	1
C_{17}	174-1000-56	Ceramic capacitor (10pFUH)	1
C_{105}	174-1010-13	Ceramic capacitor (100pFCH)	1
C_{110}	174-1310-51	Ceramic capacitor (130pFTH)	1
C_{11}	174-1500-13	Ceramic capacitor (15pFCH)	1
C_{16}	174-1800-13	Ceramic capacitor (18pFCH)	1
C_1	174-2200-13	Ceramic capacitor (22pFCH)	1
C_{18}	174-3090-13	Ceramic capacitor (3pFCH)	1
C_2	174-3300-13	Ceramic capacitor (33pFCH)	1
C_4	174-4090-13	Ceramic capacitor (4pFCH)	1
C_8	174-5090-13	Ceramic capacitor (5pFCH)	1
C_{59}	174-5090-37	Ceramic capacitor (5pFRH)	1
$C_{39,115}$	174-6800-46	Ceramic capacitor (68pFSL)	2
$C_{3,7,15}$	174-8090-13	Ceramic capacitor (8pFCH)	3

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
C_{108}	173-1032-10	Polyester capacitor (0.01μFM)	1
$C_{213,301}$	173-1042-10	Polyester capacitor (0.1μF)	2
C_{102}	173-3322-10	Polyester capacitor (0.0033μF)	1
$C_{208,210}$	173-3922-10	Polyester capacitor (0.0039μF)	2
C_{107}	173-8222-10	Polyester capacitor (0.0082μF)	1
$C_{216,222}$	042-0274-01	Electrolytic capacitor (10V1000μF)	2
C_{212}	042-0288-00	Electrolytic capacitor (16V1000μF)	1
$C_{33,217}$	042-0289-00	Electrolytic capacitor (16V100μF)	2
$C_{210,219}$	042-0290-00	Electrolytic capacitor (10V100μF)	2
$C_{209}^{45,46,48,49,54,57,58,119,207}$	182-1053-62	Electrolytic capacitor (50V1μF)	10

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
$C_{25,30,35,113}$	182-1063-32	Electrolytic capacitor (16V10μF)	4
$C_{111,114}$	182-2263-12	Electrolytic capacitor (6.3V22μF)	2
C_{13}	182-2263-22	Electrolytic capacitor (10V22μF)	1
C_{303}	182-2263-32	Electrolytic capacitor (16V22μF)	1
C_{116}	182-3353-62	Electrolytic capacitor (50V3.3μF)	1
C_{50}	182-4743-62	Electrolytic capacitor (50V0.47μF)	1
C_{51}	182-4753-52	Electrolytic capacitor (35V4.7μF)	1
$C_{106,215,220}$	182-4763-22	Electrolytic capacitor (10V47μF)	3
$C_{47,117,218}$	182-4763-32	Electrolytic capacitor (16V47μF)	3