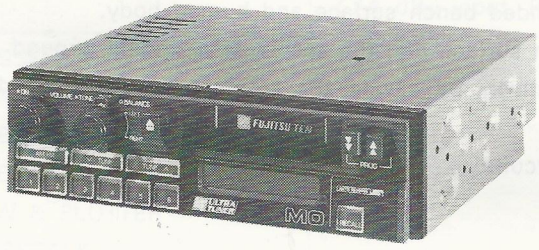
CE-6230 EX1
CE-6231 EX1
CE-6232 EX1
CE-6233 EX1

"TEN" SERVICE MANUAL

AM-FM MPX. RADIO WITH ELECTRONIC TUNER and CASSETTE TAPE PLAYER

M series

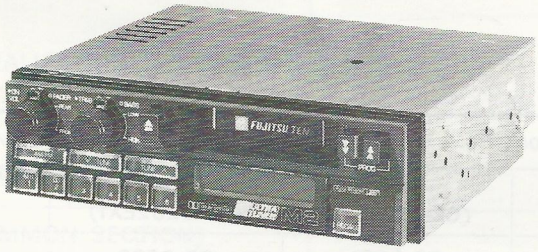


M 0 (CE-6233EX1)

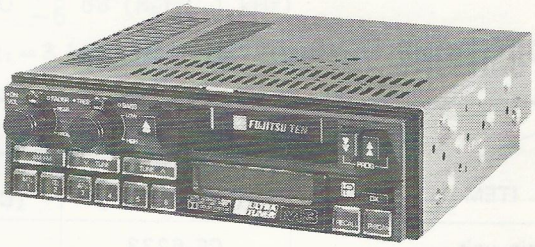
*Dolby NR, LOUD

M 1 (CE-6230EX1)

High power, *Doldy NR, APS, LO/DX, P-SCAN, LOUD



M 2 (CE-6231EX1)



M 3 (CE-6232EX1)

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* Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
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FUJITSU TEN LIMITED

NOTICE : AM FREQUENCY STEPS

The M Series Frequency is changeable at set increments with a switch in the bottom of the unit. The delivered sets from the factory have 10 kHz increments in Models M3/M2/M1 and 9 kHz increments in Model M0. Please set your unit in accordance with the following figure.

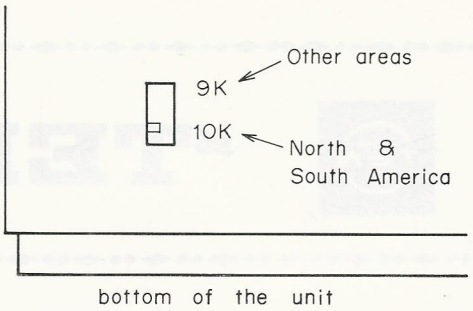


Fig. 1

REPAIRING PRECAUTIONS MOS IC

The following precautions are necessary for repairing PC boards containing MOS IC.
This model contains MOS ICs as follows :

RN-EIM-UPD1708G-011

1. MOS ICs should be stored or transported in conductive material so that all exposed leads are shorted together. MOS ICs must not be inserted into conventional stylo-form or plastic trays of the type used for storage and transportation of other semiconductor devices.
   Sometimes, several kilo-volt static may exist on an ungrounded bench surface and human body.
2. Therefore, MOS ICs should be placed on a grounded bench surface and the technicians should ground themselves prior to handing devices. This is done most effectively by having the technician wear a conductive wrist strap in series with 100k ohm to ground.
3. Nylon clothing should not be worn while handling MOS circuits.
4. Do not insert or remove MOS ICs with power applied.
5. Use a grounded soldering iron when soldering.
6. MOS ICs should be handied by their packages and not by the leads, if at all possible. Prior to touching the unit, the technician should touch an electrical ground to remove any static charge that may have been accumulated.

COMPOSITIONS

MODEL / ITEM	Stock No.				Q'ty
	M 0 (CE-6233EX1)	M1 (CE-6230EX1)	M 2 (CE-6231EX1)	M 3 (CE-6232EX1)	
Main unit	CE-6233	CE-6230	CE-6231	CE-6232	1
Escutcheon	RN-MDP-1590				1
Bracket	RN-MBE-1745				2
Bracket	RN-MBE-1746A				1
Bracket	RN-MBF-11				1
Wiring assembly	RN-EWJ-1744				1
Wiring assembly	RN-EWJ-3382				2
Wiring assembly	RN-EWJ-3408				1
Spring	RN-MSC-1425				2
Screw, 5×8mm	F6-SSA-5×8S				4
Bolt, 5×10mm	RN-MBW-C5×10S				1
Bolt, 5×20mm	RN-MBW-C5×20S				1
Nut, 5mm	RN-MNR-D5S				2
Tapping screw	RN-MTN-A6×16				1
Special screw	RN-MET-1328				1
Owners manual	RN-MXK-164	RN-MXK-160	RN-MXK-162	RN-MXK-163	1

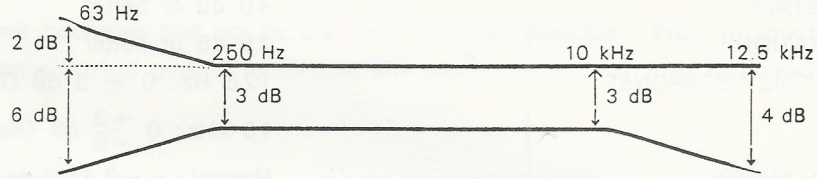
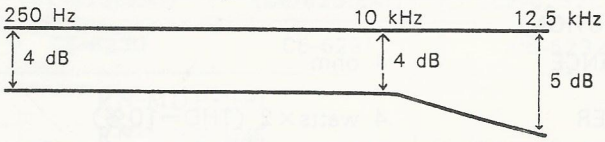
SPECIFICATIONS

M0, M1 (CE-6233EX1, CE-6230EX1)

SM-603
[CE-6233EX1] M0
[CE-6230EX1] M1
[CE-6231EX1] M2
[CE-6232EX1] M3

ITEM	M0 (CE-6233EX1)	M1 (CE-6230EX1)
(RADIO SECTION)	[AM]	[FM]
TUNING RANGE	530 to 1620 kHz (10 kHz step) 531 to 1611 kHz (9 kHz step)	88.1 to 107.9 MHz (200 kHz step) 87.5 to 108 MHz (100 kHz step)
INTERMEDIATE FREQUENCY	450 kHz	10.7 MHz
SENSITIVITY	35 dBμ or better	
SENSITIVITY AT ELECTRONIC TUNING	Distant: 32 ± 6 dBμ	Distant: 20 ± 6 dBμ
LIMITING SENSITIVITY		8 ± 6 dBμ
SEPARATION		20 dB or better (at 1 kHz)
ELECTRICAL FIDELITY	100 Hz: 0 ± 3 dB (74 dBμ input, Refer. 400 Hz) 4 kHz: −14 ± 4 dB (74 dBμ input, Refer. 400 Hz)	100 Hz: 0 ± 3 dB (54 dBμ input, Refer. 400 Hz) 10 kHz: −15 ± 5 dB (54 dBμ input, Refer. 400 Hz)
(CASSETTE DECK SECTION)		
NUMBER OF TRACKS	4-track 2-channels	
TAPE CARTRIDGE	Stereo/Monaural compact cassette	
TAPE SPEED	4.76 cm/sec. (1-7/8", i.p.s.)	
WOW & FLUTTER	0.3% or less (WRMS)	
CROSSTALK	40 dB or better	
SEPARATION	25 dB or better	
FREQUENCY RESPONSE	125 Hz: 0 ± 3 dB (Refer. 1 kHz) 10 kHz: 0 $^{+3}_{-5}$ dB (Refer. 1 kHz)	
EQUALIZATION	Normal: t_1=3,180μsec., t_2=120μsec. Chrome and metal: t_1=3,180μsec., t_2=70μsec.	
SIGNAL TO NOISE RATIO	46 dB or better (with MTT-112B test tape)	
TAKE-UP TORQUE	40 to 75 g-cm	
(COMMON SECTION)		
LOAD IMPEDANCE	4 ohm	
OUTPUT POWER	4 watts×2 (THD=10%)	2.5 watts×4 (THD=10%)
POWER INPUT VOLTAGE	12-volt car battery, negative terminal to ground 13.2 VDC	
CURRENT	Approx. 0.7 ampere (0.5 watt×2) Approx. 1.6 ampere (Max.)	Approx. 1 ampere (0.5 watt×4) Approx. 2.6 ampere (Max.)
SEMICONDUCTOR	9 ICs, 31 Transistors, 26 Diodes	8 ICs, 30 Transistors, 26 Diodes
DIMENSIONS	178(W)×50(H)×150(D)mm (7", 1-31/32", 5-29/32")	
WEIGHT	Unit—1.5 kg (3.3 lbs.)	

SPECIFICATIONS M2, M3 (CE-6231EX1, CE-6232EX1)

ITEM	M 2 (CE-6231EX1)	M 3 (CE-6232EX1)
(RADIO SECTION)	[AM]	[FM]
TUNING RANGE	530 to 1620 kHz (10 kHz step) 531 to 1611 kHz (9 kHz step)	88.1 to 107.9 MHz (200 kHz step) 87.5 to 108 MHz (100 kHz step)
INTERMEDIATE FREQUENCY	450 kHz	10.7 MHz
SENSITIVITY	35 dBμ or better	
SENSITIVITY AT ELECTRONIC TUNING	Distant: 32 ± 6 dBμ Local: Distant sens. +25 ± 6 dBμ	Distant: 20 ± 6 dBμ Local: Distant sens. +25 ± 6 dBμ
LIMITING SENSITIVITY		8 ± 6 dBμ
SEPARATION		20 dB or better (at 1 kHz)
ELECTRICAL FIDELITY	100 Hz: 0 ± 3 dB (74 dBμ input, Refer. 400 Hz) 4 kHz: −14 ± 4 dB (74 dBμ input, Refer. 400 Hz)	100 Hz: 0 ± 3 dB (54 dBμ input, Refer. 400 Hz) 10 kHz: −15 ± 5 dB (54 dBμ input, Refer. 400 Hz)
(CASSETTE DECK SECTION)		
NUMBER OF TRACKS	4-track 2-channels	
TAPE CARTRIDGE	Stereo/Monaural compact cassette	
TAPE SPEED	4.76 cm/sec. (1-7/8", i.p.s.)	
WOW & FLUTTER	0.3% or less (WRMS)	
CROSSTALK	40 dB or better	
SEPARATION	30 dB or better	25 dB or better
FREQUENCY RESPONSE		
EQUALIZATION	Normal: t_1=3,180μsec., t_2=120μsec. Chrome and metal: t_1=3,180μsec., t_2=70μsec.	
SIGNAL TO NOISE RATIO	46 dB or better (With MTT-112B test tape)	
TAKE-UP TORQUE	40 to 75 g-cm 	
(COMMON SECTION)		
LOAD IMPEDANCE	10k ohm (RCA termi.) 4 ohm (Speaker termi.)	
OUTPUT POWER	2.5 watts×4 (THD=10%)	5 watts×4 (THD=10%)
OUTPUT VOLTAGE	315 mV (Test tape: −10 dB, 1 kHz RCA termi.)	
POWER INPUT	12-volt car battery, negative terminal to ground	
VOLTAGE	13.2 VDC	
CURRENT	Approx. 1.1 ampere (0.5 watt×4) Approx. 2.4 ampere (Max.)	Approx. 2.4 ampere (1 watt×2) Approx. 6.2 ampere (Max.)
SEMICONDUCTOR	11 ICs, 37 Transistors, 29 Diodes	13 ICs, 42 Transistors, 31 Diodes
DIMENSIONS	178(W)×50(H)×150(D)mm (7", 1-31/32", 5-29/32")	
WEIGHT	Unit—1.5 kg (3.3 lbs.)	Unit—1.6 kg (3.5 lbs.)

CONNECTIONS

SM-603
[CE-6233EX1] M0
[CE-6230EX1] M1
[CE-6231EX1] M2
[CE-6232EX1] M3

M0 (CE-6233EX1)

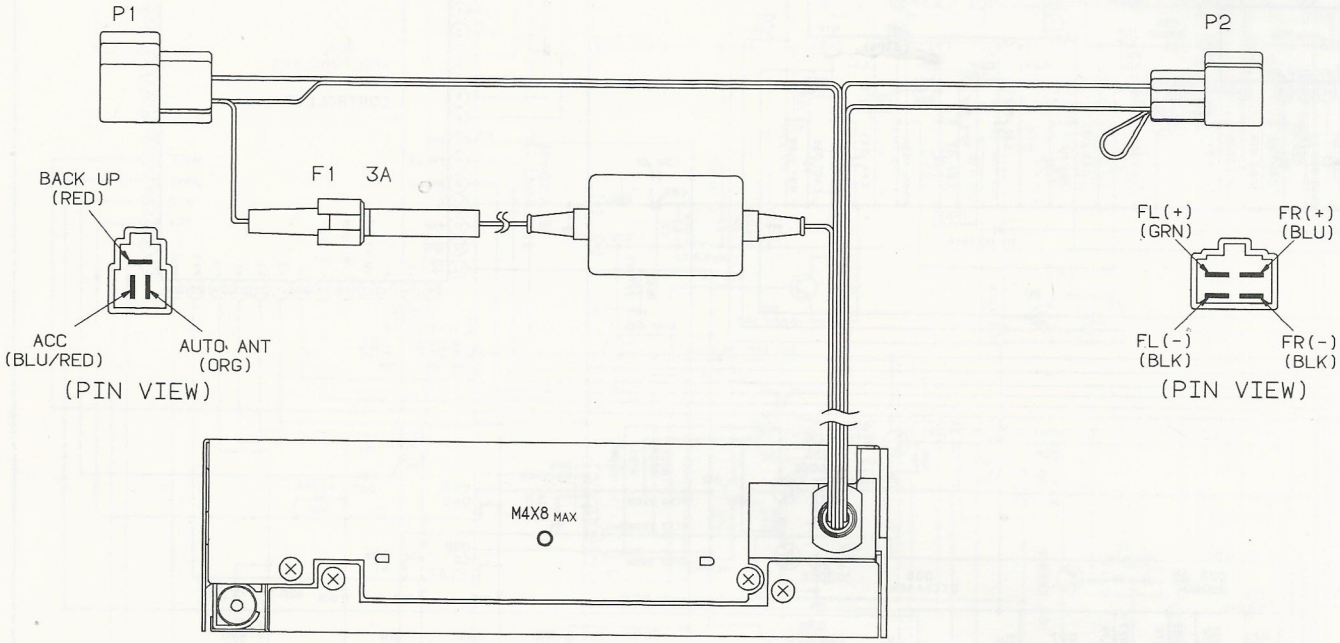


Fig. 2 (C23191233)

M1 (CE-6230EX1)

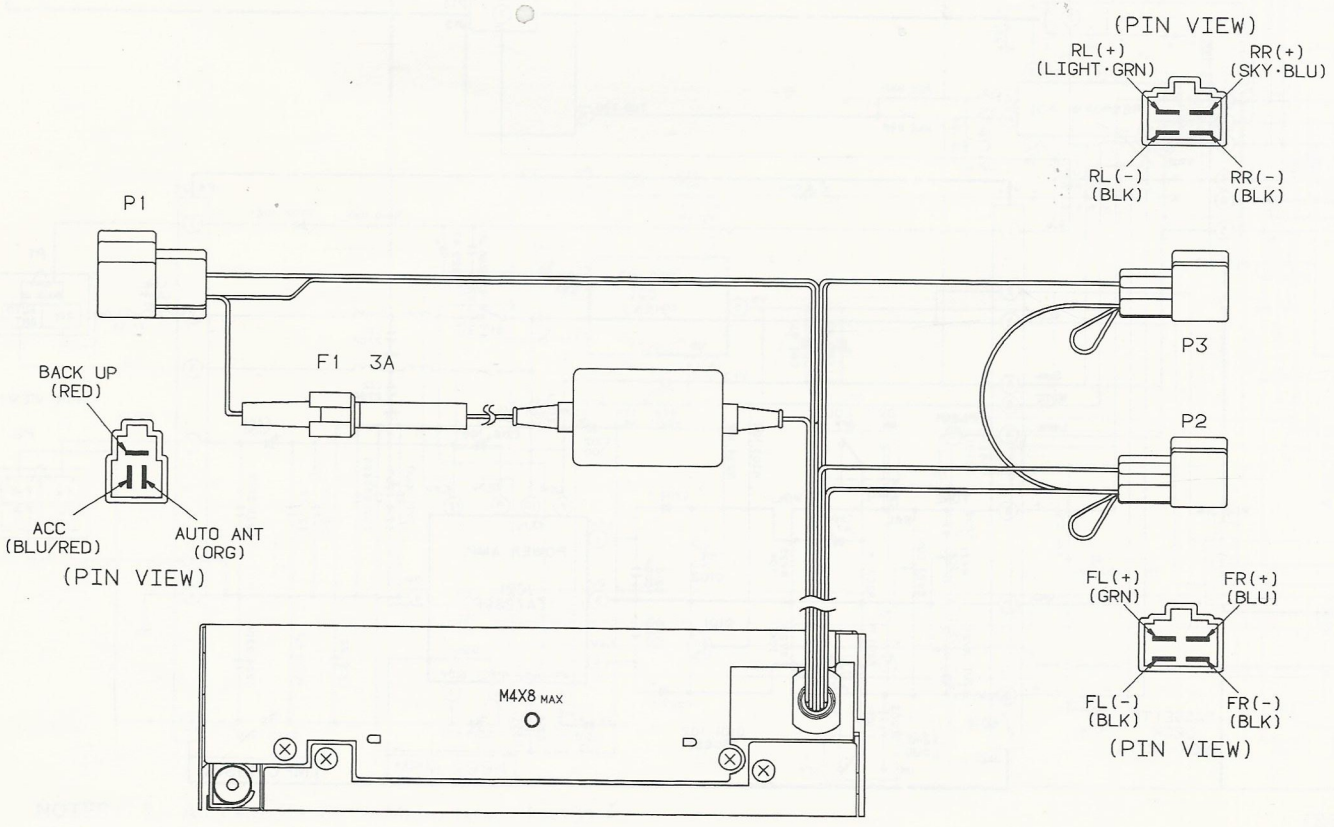


Fig. 3 (C23191230)

M2 (CE-6231EX1)

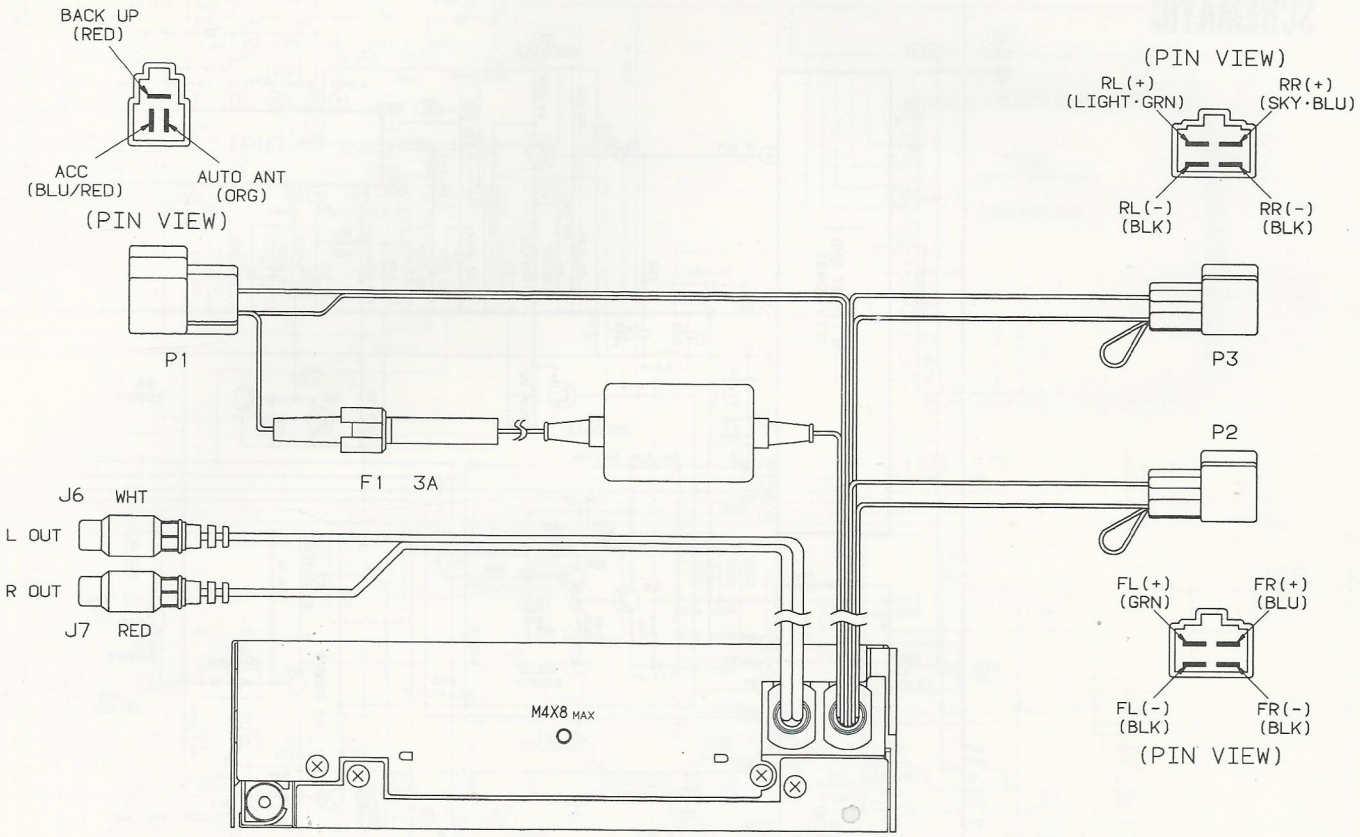


Fig. 4 (C23191231)

M3 (CE-6232EX1)

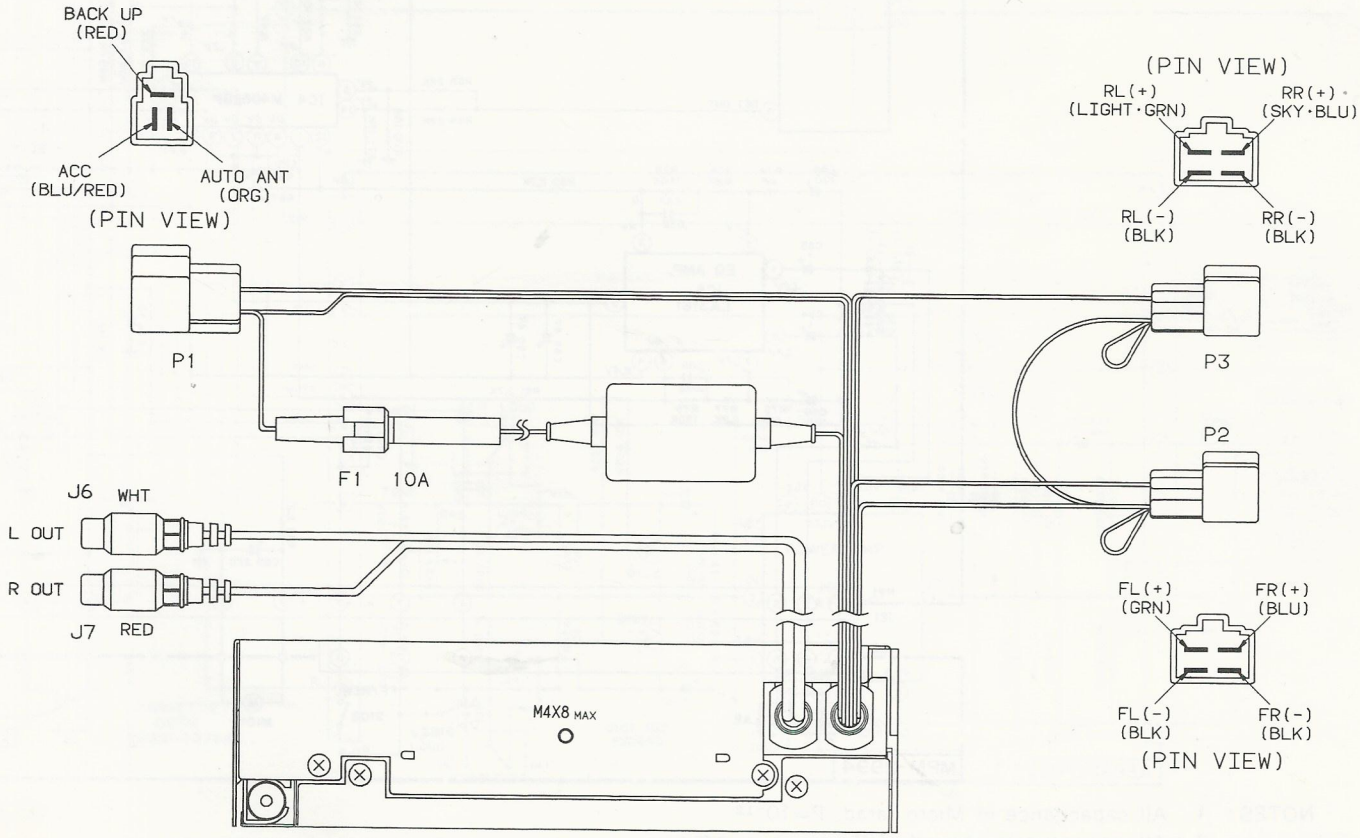


Fig. 5 (C23191232)

M3 (CE-6232EX1) HOOK-UP

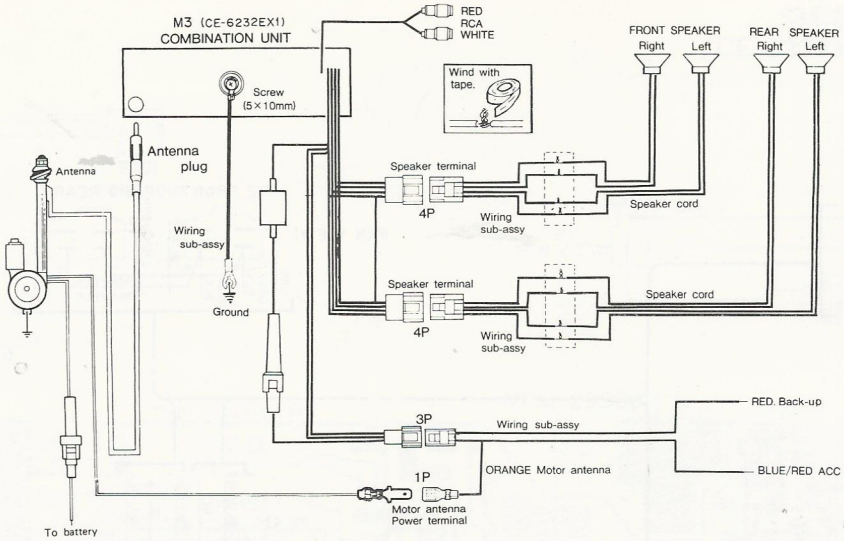


Fig. 14

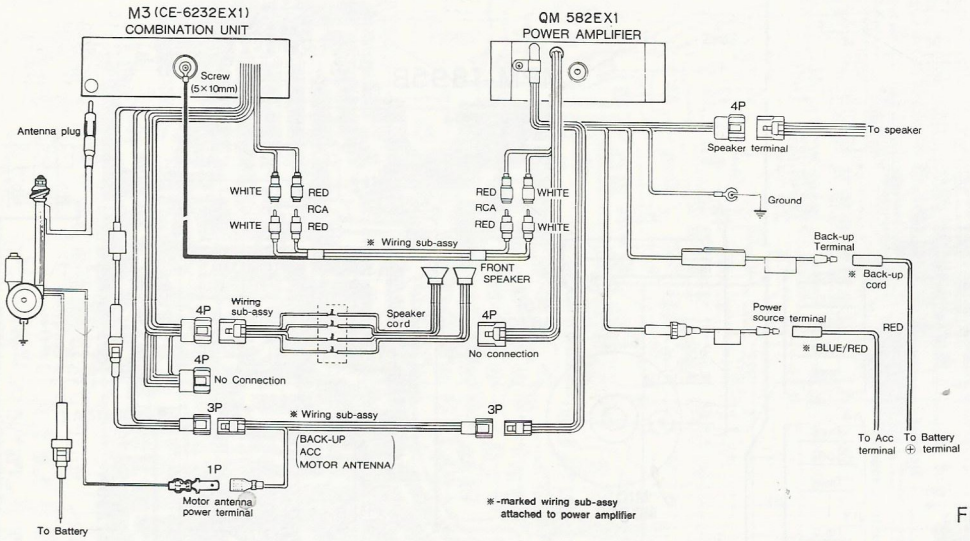


Fig. 15

PLAYBACK HEAD ADJUSTMENT (Azimuth)

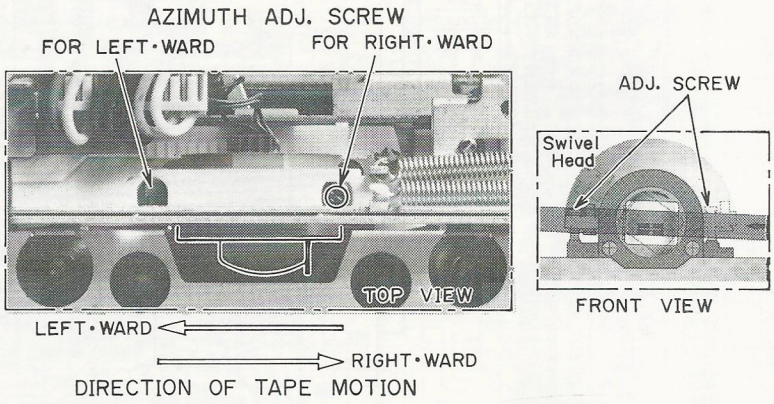


Fig. 16

Normally the playback head is precisely aligned at the factory and further adjustment should not be required unless the playback head or its mounting components are replaced. Beware of excessive adjustment. because improper adjustment results in inferior performance. If the azimuth is unnecessarily varied, the angle gets out of order, which cause lowering of tonal quality. Carefully adjust the azimuth adjust screw as shown in Fig. 16. Always use the test tape for azimuth adjustment because improper adjuustment would cause bad effect on the Dolby level adjustment. Dolby level should be readjusted after azimuth adjustment.

a. Connections : Refer to Fig. 17.

b. Power supply : 13.2 VDC

c. Test tape : MTT-114N (10 kHz, −10 dB Full track recording)

Alignment Prodedure

Insert a test tape for the azimuth adjustment and drive the screw a little once.

Adjust the playback head so as to get equal and maximum output or right and left channel in either track, loosening the screw.

FM ALIGNMENT

Standard adjustment condition

a. Power supply ·····13.2V
b. AM/FM changing switch ·····FM
c. DX switch ·····ON
d. Balance ·····Center
e. Bass/treble ·····Center
f. Volume ····· Adjust to get 1.4V output level.
g. Connections

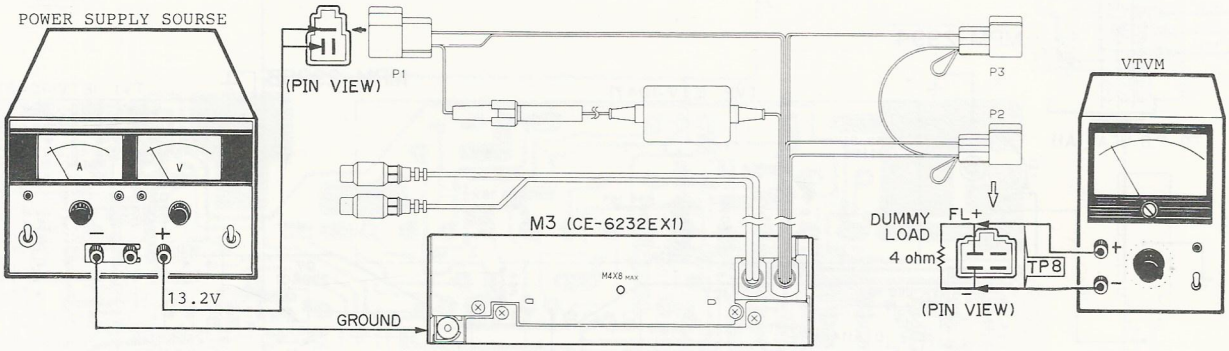


Fig. 17 (C33191232)

〔1〕 IF Alignment

(1) Connections

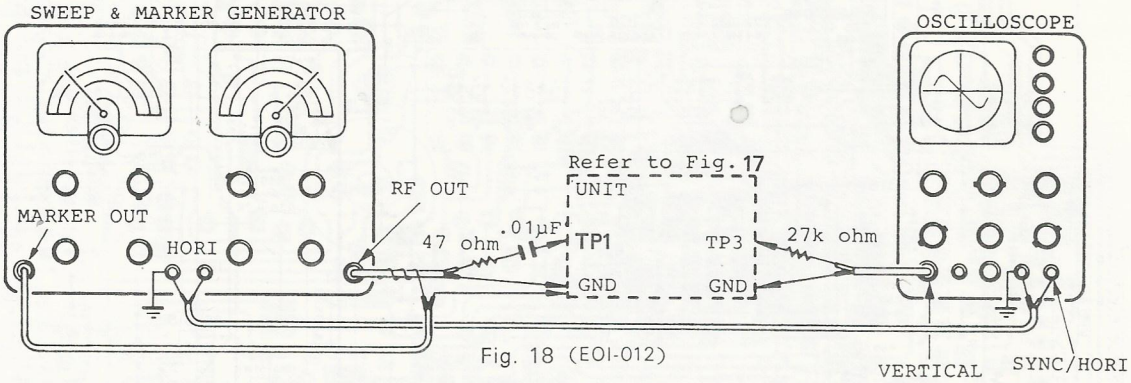


Fig. 18 (EOI-012)

SWEEP GENERATOR OUTPUT	OSCILLOSCOPE VERTICAL INPUT	OSCILLOSCOPE HORIZONTAL INPUT
Antenna receptacle (J1) TP 1	Connect TP 3 in Fig. 21 through 27K-ohm resistor	Connect with HORIZONTAL terminal of sweep generator

(2) Alignment (Refer to Fig. 21)

STEP	PURPOSE	SWEEP GENERATOR FREQUENCY	ADJUSTMENT POINTS	PROCEDURE
1	S curve	10.7 MHz	T 1	Adjust for full gain and length of s-curve at linears. (See Fig. 19)
2	S curve (Center)	SG 10.7 MHz (400 Hz, 30%)		Fine-adjust the potential difference between IC 1 ⑦ and ⑬ pins for 0V.

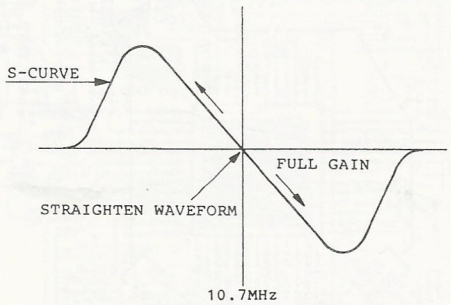


Fig. 19

NOTE: S curve center can be adjusted in the same manner by receiving local FM broadcast near 98.1 MHz.

[2] Limiting sensitivity alignment

(1) Connections

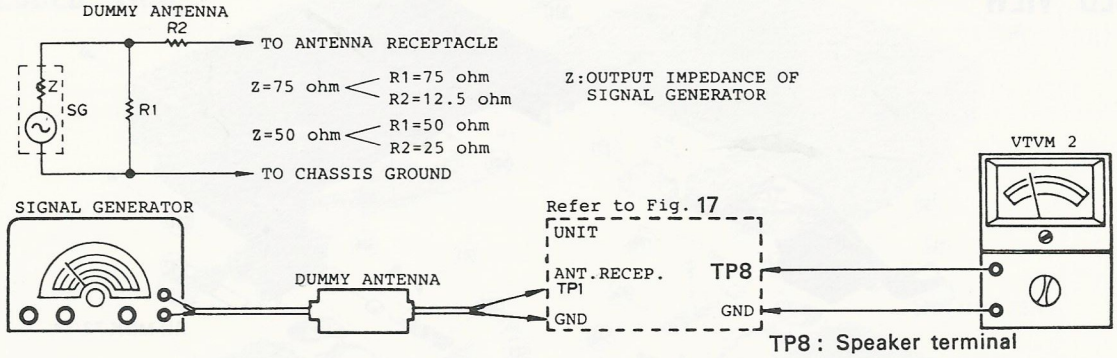


Fig. 20 (EOT-009)

(2) Alignment (Refer to Fig. 21)

STEP	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR OUTPUT LEVEL	ADJUSTMENT POINT	PROCEDURE
1	98.1 MHz (400Hz, 30%)	54 dBμ	———	Adjust volume control (VOL) until TP 8 output voltage is 1.4V.
2		10±5 dBμ	RV 1	Adjust output voltage for −3 dB (1V).

[3] SEEK Alignment

(1) Connections Refer to Fig. 20

(2) Alignment

STEP	PURPOSE	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR OUTPUT LEVEL	ADJUSTMENT POINT	PROCEDURE
1	Set the local/distant selector switch in the local position.				
2	Local sensitivity	98.1 MHz (400 Hz, 30%)	45 dBμ (±6 dBμ)	RV 5	Depress SEEK button to actuate the searching, and then adjust sensitivity so that the searching action may stop nearly at 98.1 MHz.

[4] ASC Working sensitivity alignment

(1) Connections Refer to Fig. 20

(2) Alignment (Refer to Fig. 21)

STEP	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR OUTPUT LEVEL	ADJUSTMENT POINT	PROCEDURE
1	98.1 MHz (1 kHz, 30%)	54 dBμ	———	Adjust volume control (VOL) until TP 8 output voltage is 1.4V.
2		30 dBμ	RV 4	Adjust the separation for 10 dB.

[5] Noise blanker alignment

(1) Connections a. Stereo signal generator·····Connect the TP 1

b. Oscilloscope ·····Connect the TP 5

(2) Alignment (Refer to Fig. 21)

STEP	STEREO SIGNAL GENERATOR FREQUENCY	STEREO SIGNAL GENERATOR OUTPUT LEVEL	ADJUSTMENT POINT	PROCEDURE
1	98.1 MHz (Stereo mode, No modulation)	54 dBμ	RV 3	After making sure of "STEREO" display, adjust the pilot signal wave (19 kHz) for minimum.

[6] Separation alignment

(1) Connections a. Stereo signal generator·····Connect the TP 1

b. Oscilloscope ·····Connect the TP 8 (L-ch)

(2) Alignment (Refer to Fig. 21)

STEP	STEREO SIGNAL GENERATOR FREQUENCY	STEREO SIGNAL GENERATOR OUTPUT LEVEL	ADJUSTMENT POINT	PROCEDURE
1	98.1 MHz (R-ch : 1 kHz, 30% L-ch : no modulation)	54 dBμ	RV 2	Adjust L-ch output level for minimum.

〔7〕 Crystal oscillating frequency adjustment

(1) Connections a. Frequency counter (Resolution : 1 Hz)·····Connect the TP 4

(2) Alignment (Refer to Fig. 21)

STEP	FREQ. DISPLAY OF UNIT	ADJUSTMENT POINT	PROCEDURE
1	1000 kHz	CV 1	Adjust CV1 for 1450 kHz at the frequency counter by using a screwdriver.

DOLBY NR LEVEL ALIGNMENT (M2, M3 only)

NOTES : 1. Always use the test tape (MTT-150) for alignment.

2. In alignment of Dolby N.R. circuit, only gain adjustment is required.

3. Make sure that Dolby level falls with in the Dolby standards, when parts in the head or Dolby N.R. circuit being exchanged.

4. Always use the parts listed in the parts list for Dolby circuit.

(1) Connections

a. VTVM·····Hot side : TP 9 or TP 10 Cold side : chassis

b. Test tape ·····MTT-150 (400 Hz, 0 dB full track recording)

c. Power supply ·····13.2 VDC d. Tape select (MTL) switch·····Normal

e. Dolby N.R. ( ) switch·····OFF

(2) Alignments (Refer to Fig. 21 for ADJUSTMENT POINTS.)

STEP	ADJUSTMENT POINT	PROCEDURE
1	VR 7	Adjust to get 300 mV (±30 mV) output of left channel with a volt meter.
2	VR 6	Adjust to get 300 mV (±30 mV) output of right channel with a volt meter.
3	———	Make sure that the output of left channel is equal to that of right channel, by using a volt meter.

NOTE : Adjust to get equal output of right and left channels in either track.

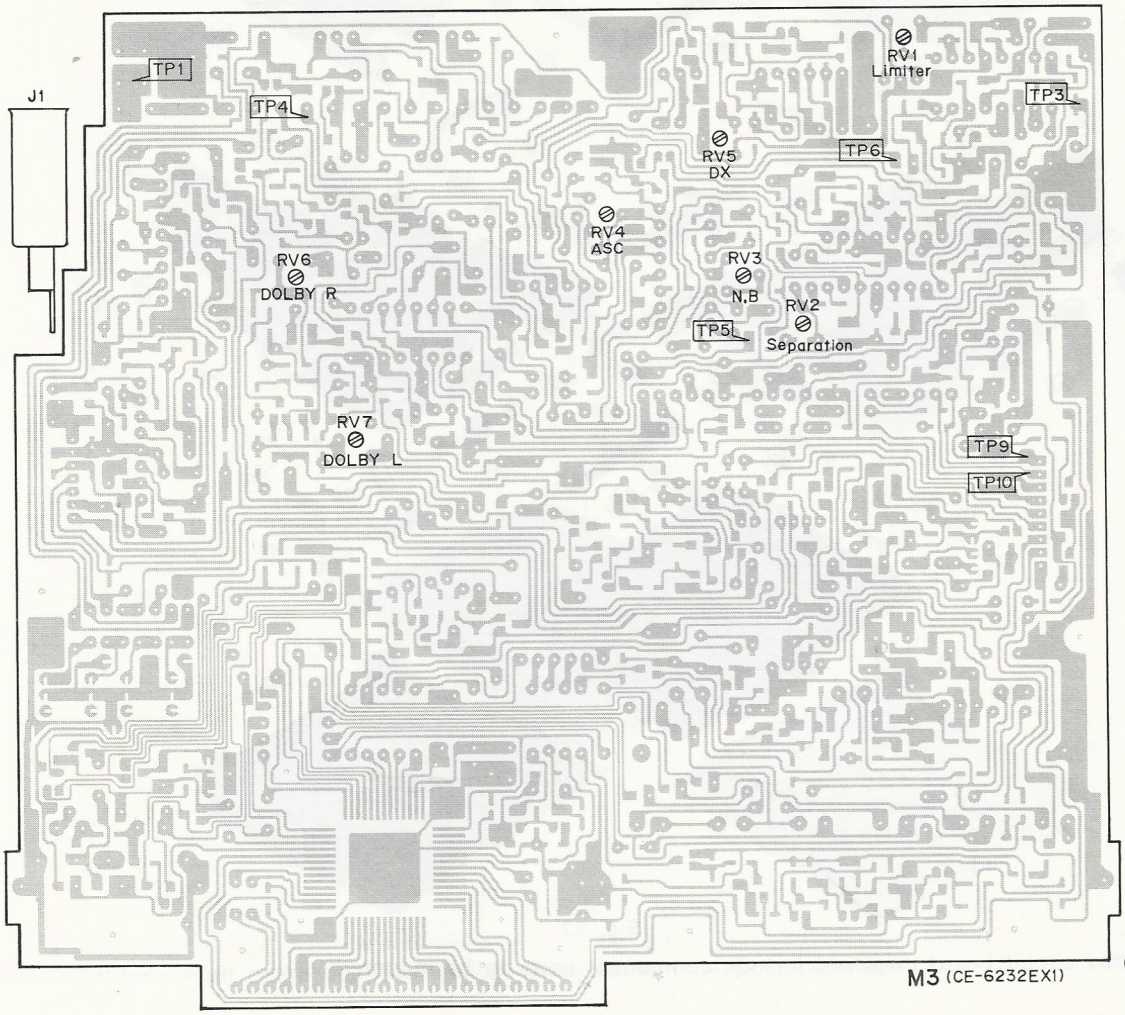


Fig. 21
(C33191232)

M0 (CE-6233EX1)
EXPLODED VIEW

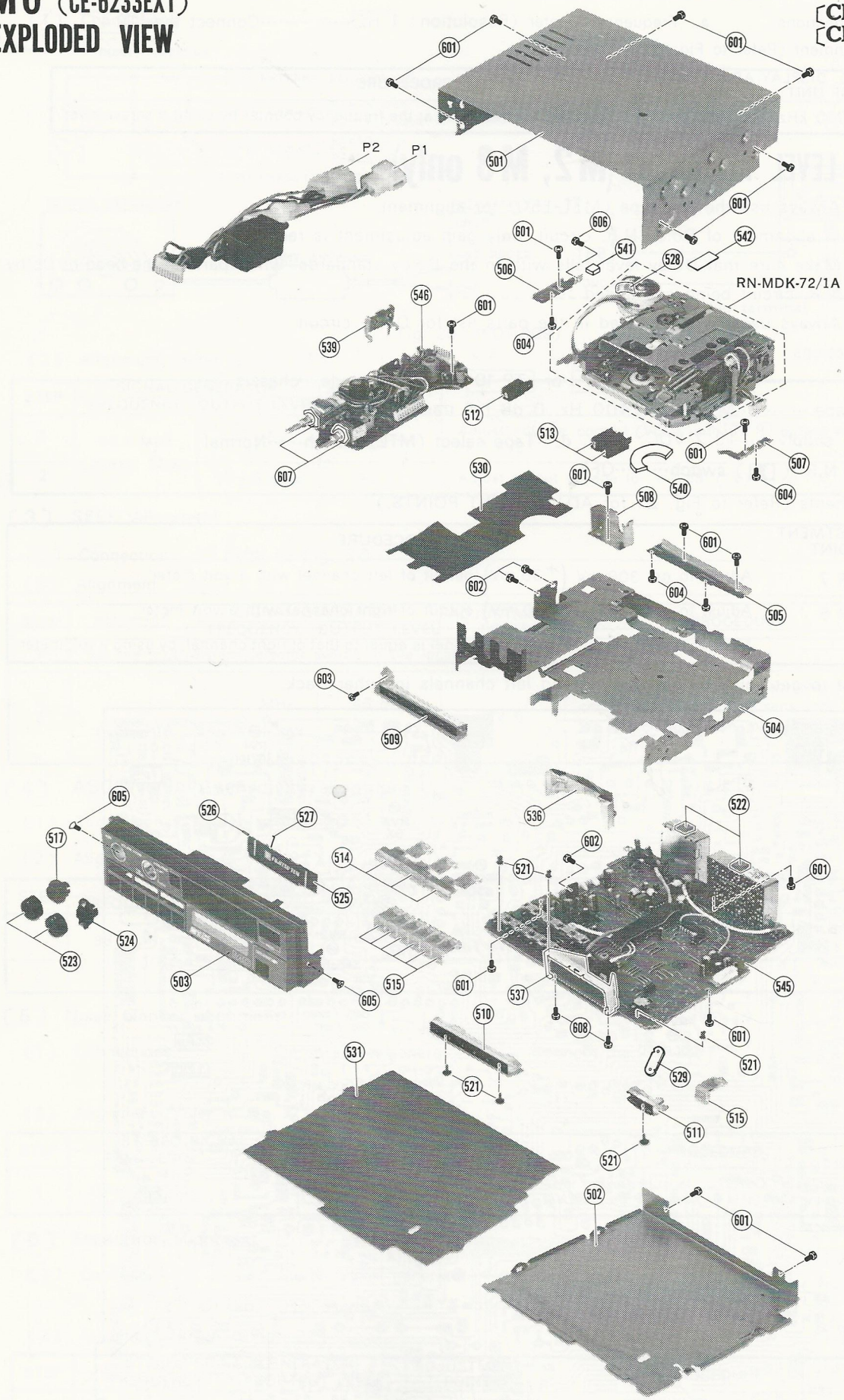


Fig. 22

NOTE : Printed circuit board does not include component parts to be mounted.

M1 (CE-6230EX1)
EXPLODED VIEW

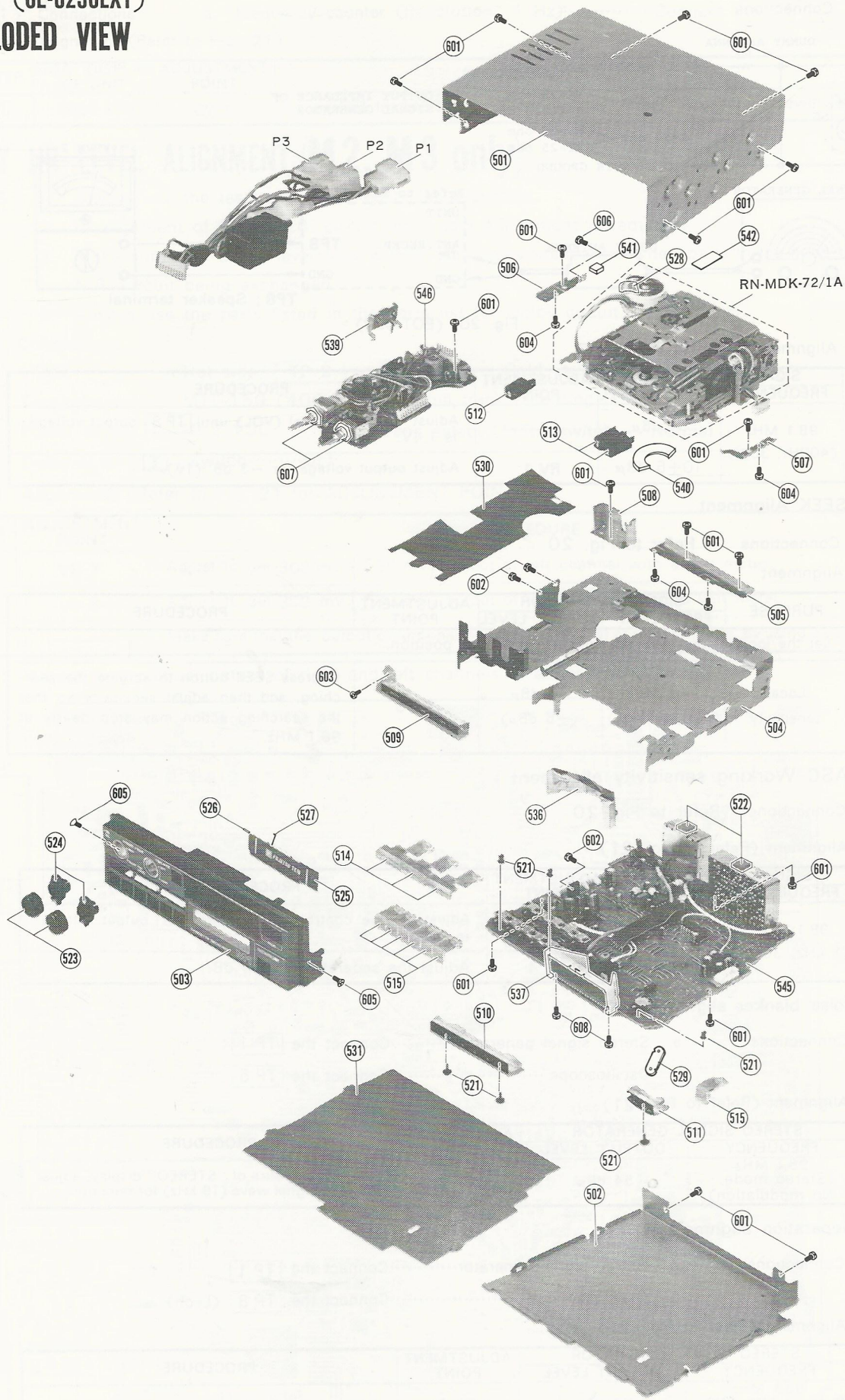


Fig. 23

NOTE : Printed circuit board does not include component parts to be mounted.

M2 (CE-6231EX1) EXPLODED VIEW

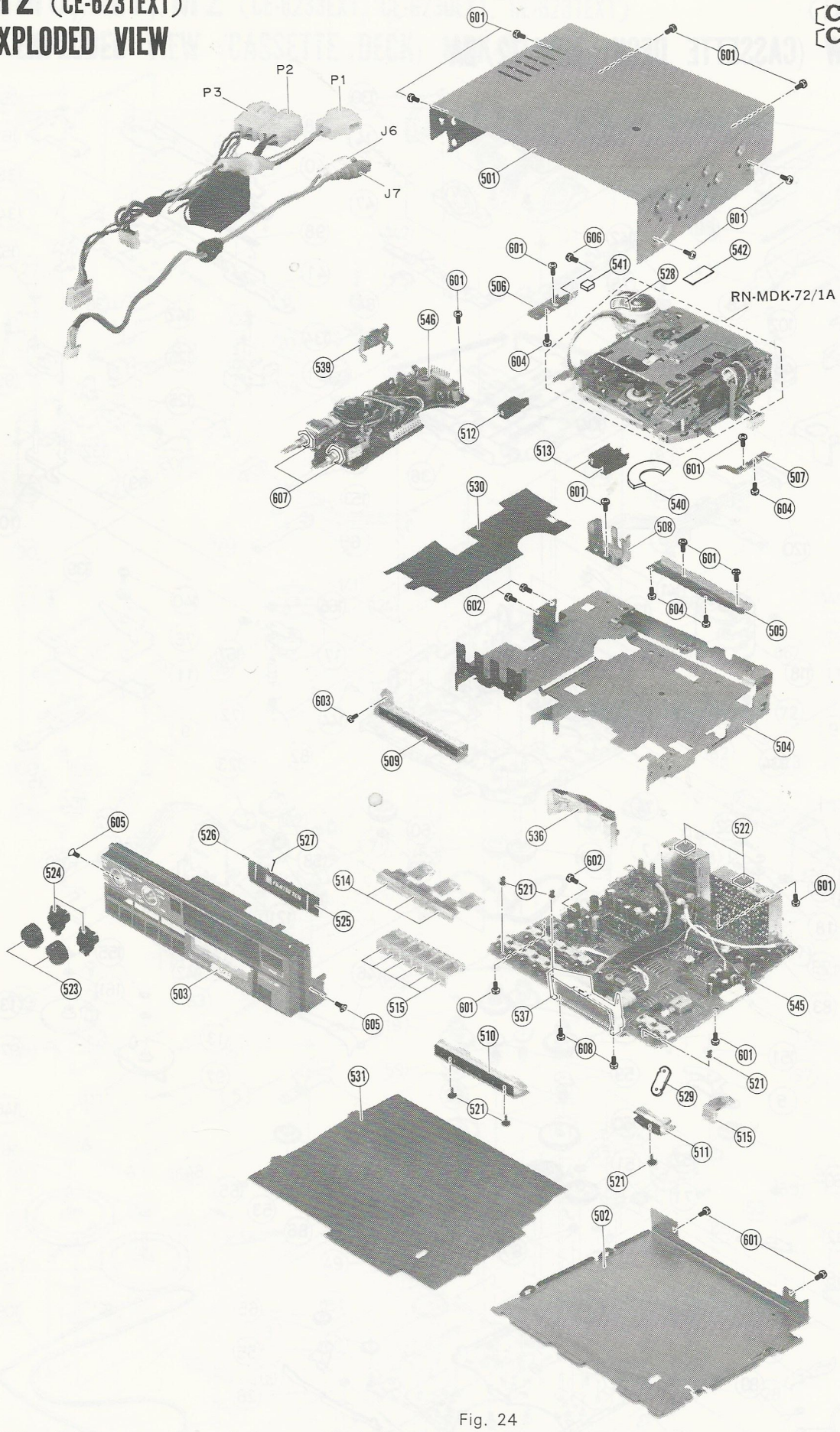


Fig. 24

NOTE : Printed circuit board does not include component parts to be mounted.

M3 (CE-6232EX1)
EXPLODED VIEW

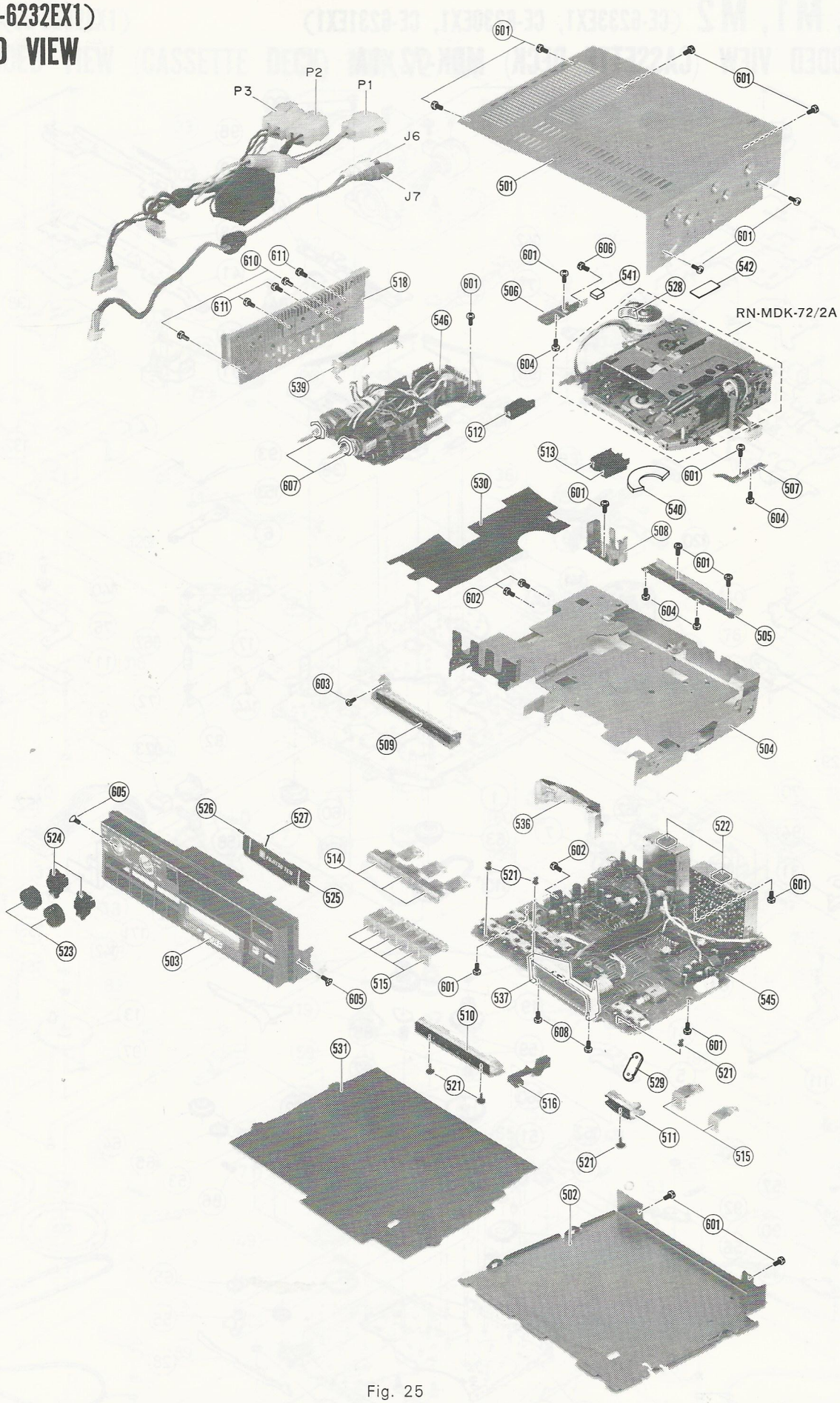


Fig. 25

NOTE : Printed circuit board does not include component parts to be mounted.

M0, M1 (CE-6233EX1, CE-6230EX1)

REPLACEMENT PARTS LIST

Note : Main replacement parts are marked ○ in the remarks column.

Symbol No. (Fig.6,8)	Stock No.	Description	Remark
CAPACITORS			
C1,3,4,10,14 84	RN-ECK-CB1E223M-1/TY	.022μF 25V ceramic (chip)	
C2,7,8,9,11 33,87,101	RN-ECK-CB1E473M-1/TY	.047μF 25V ceramic (chip)	
C5,6,28,29 46,48,49,50 86,90,97	RN-ECK-CB1E103M-1/TY	.01 μF 25V ceramic (chip)	
C12,13,34,81	RN-ECE-M4R7V25-32	4.7 μF 25V electrolytic	
C15,27,85,88	RN-ECE-M100V16-32	10 μF 16V electrolytic	
C16	RN-ECC-CSL1H330J-1/TY	33 pF 50V ceramic (chip)	
C17	RN-ECC-CSL1H151J-1/TY	150 pF 50V ceramic (chip)	
C18	RN-ECC-CSL1H471J-1/TY	470 pF 50V ceramic (chip)	
* C19,20	RN-ECC-CSL1H681J-1/TY	680 pF 50V ceramic (chip)	
* C21	RN-ECK-CB1H122K-1/TY	1200 pF 50V ceramic (chip)	
* C22	RN-ECC-CSL1H680J-1/TY	68 pF 50V ceramic (chip)	
* C23,24,25,26	RN-ECC-CCH1H271J-1/TY	270 pF 50V ceramic (chip)	
* C30	EN-ECE-M220V10-4	22 μF 10V electrolytic	
* C31	RN-ECK-CB1H222K-1/TY	2200 pF 50V ceramic (chip)	
C32,82,83	RN-ECK-CB1H682M-1/TY	6800 pF 50V ceramic (chip)	
C35	RN-ECK-CB1H152K-1/TY	1500 pF 50V ceramic (chip)	
C36	RN-ECK-CB1H332K-1/TY	3300 pF 50V ceramic (chip)	
C37,44,45	RN-ECK-CB1E333K-1/TY	.033μF 25V ceramic (chip)	
C38,40,43,50 54,80,89	RN-ECE-M1R0V50-12	1 μF 50V electrolytic	
C39	RN-ECE-MR22V50-9/TT	.22 μF 50V electrolytic	
C41,57,58	RN-ECK-CB1E223K-1/TY	.022μF 25V ceramic (chip)	
C42	RN-ECE-MR47V50-9	.47 μF 50V electrolytic	
C47	RN-ECE-M2R2V50-12	2.2 μF 50V electrolytic	
C51,52	RN-ECC-CSL1H821J-1/TY	820 pF 50V ceramic (chip)	
C55,56	RN-ECE-M101V6R3-2	100 μF 6.3V electrolytic	
C59,60	RN-ECE-M470V16-16/TT	47 μF 16V electrolytic	
C69	RN-ECE-M221V16-9	220 μF 16V electrolytic	
C70	RN-ECK-CF1E224Z-1/TY	.22 μF 25V ceramic (chip)	
C73	RN-ECE-M470V10-51	47 μF 10V electrolytic	
C76,78,93	RN-ECE-M100V16-15	10 μF 16V electrolytic	
C79	RN-ECE-M221V10-11	220 μF 10V electrolytic	
C91	RN-ECC-CCH1H150J-1/TY	15 pF 50V ceramic (chip)	
C92	RN-ECC-CCH1H220J-1/TY	22 pF 50V ceramic (chip)	
C94,95	RN-ECE-M1R0V50-32	1 μF 50V electrolytic	
C96	RN-ECE-M221V10-41	220 μF 10V electrolytic	
C98	RN-ECE-M470V10-18	47 μF 10V electrolytic	
C100	RN-ECE-M4R7V25-7	4.7 μF 25V electrolytic	
C201,202,213	RN-ECH-R104V50-3	.1 μF 50V MP	
C203,204,228	RN-ECB-D0X103E	.01 μF 25V ceramic	
C205,206	RN-ECE-MR47V50-32	.47 μF 50V electrolytic	

NOTE : *-marked parts are for model M0 only

Symbol No. (Fig.6,8)	Stock No.	Description	Remark
C207,208	RN-ECE-M1R0V50-51	1 μF 50V electrolytic	
C209,210	RN-ECK-DB102KY	1000 pF ceramic	
C211,212,215 216	RN-ECE-M101V10-12	100 μF 10V electrolytic	
C214	RN-ECE-M330V16-13	33 μF 16V electrolytic	
C217	RN-ECE-M102V16-13	1000μF 16V electrolytic	
C218	RN-ECE-M222V16-7	2200μF 16V electrolytic	
C219,220,221	RN-ECH-R224V50-2	.22 μF 50V MP	
C222,223	RN-ECE-M102V10-4	1000μF 10V electrolytic	
C224,225,226 227	RN-ECC-DSL221JY	220 pF 50V ceramic	
C229	RN-ECE-M470V16-32	47 μF 16V electrolytic	
CI1	RB-ECI-A271-1	270 pF	
CI2	RN-ECI-B271-2	270 pF	
CV1	RN-ECV-A20-70	20 pF ceramic trimmer	
RESISTORS			
R1,6	RN-ERG-IC331J-1/TY	330 ohm 5% 1/8W metallic (chip)	
R2,36,37,41	RN-ERG-IC332J-1/TY	3.3kohm 5% 1/8W metallic (chip)	
R3,10,18,19 42,48,62 130,131,150	RN-ERG-IC103J-1/TY	10k ohm 5% 1/8W metallic (chip)	
R4,8,44	RN-ERG-IC101J-1/TY	100 ohm 5% 1/8W metallic (chip)	
R5,124	RN-ERG-IC152J-1/TY	1.5kohm 5% 1/8W metallic (chip)	
R7,12,13,52 55,56,57,58 59,60,63,64 66,67,105 106,125,126 127,128,139 141,142,144	RN-ERG-IC473J-1/TY	47k ohm 5% 1/8W metallic (chip)	
R9,129	RN-ERG-IC562J-1/TY	5.6kohm 5% 1/8W metallic (chip)	
R11,132,133 134,135,136 137	RN-ERG-IC224J-1/TY	220kohm 5% 1/8W metallic (chip)	
R14,16,27,68 69	RN-ERG-IC223J-1/TY	22k ohm 5% 1/8W metallic (chip)	
R15,31,38,39 45,138	RN-ERG-IC392J-1/TY	3.9kohm 5% 1/8W metallic (chip)	
R17,24,25,32 43,102,103 146,147	RN-ERG-IC222J-1/TY	2.2kohm 5% 1/8W metallic (chip)	
R20,21,22,23 34,46	RN-ERG-IC472J-1/TY	4.7kohm 5% 1/8W metallic (chip)	
R26,80,,81 120,123	RN-ERG-IC272J-1/TY	2.7kohm 5% 1/8W metallic (chip)	
R28,145	RN-ERG-IC104J-1/TY	100kohm 5% 1/8W metallic (chip)	
R29,76,77	RN-ERG-IC682J-1/TY	6.8kohm 5% 1/8W metallic (chip)	
R30,35,109	RN-ERG-IC563J-1/TY	56K ohm 5% 1/8W metallic (chip)	
R33,70,71	RN-ERG-IC153J-1/TY	15K ohm 5% 1/8W metallic (chip)	
R40,49,50,51 53,54,61,65	RN-ERG-IC102J-1/TY	1K ohm 5% 1/8W metallic (chip)	

NOTES: 1, Stock No. of ※-marked parts are different from model to model.
2, *-marked parts are for model M3 only.

	Symbol No. (Fig.10,12)	Stock No.	Description	Remark
※	RV25,26,27 28,29,30,31 (S1)	RN-ERV-2P7-2	10K ohm×2, 20K ohm×3, BAL·VOL·FADER (M3 only)	○
	SEMICONDUCTORS			
	IC1	RN-EIC-LA1143	FM IF amp.~ Q.DET. linear-monolithic IC	○
	IC2	RN-EIC-LA2113	Noise blanker linear-monolithic IC	○
	IC3	RN-EIC-LA3433	MPX.decoder	○
	IC4	RN-EID-M4052BP	Digital-monolithic IC	○
	IC5	RN-EIC-LA3161	Equalizer amp. linear-monolithic IC	○
*	IC6	RN-EIC-LA2010	APS (M3 only) linear-monolithic IC	○
	IC7	RN-EIE-UHN011101	Dolby NR hybrid IC	○
	IC8	RN-EIC-AN6540	V.Regulator linear-monolithic IC	○
	IC9	RN-EIC-UPC78L05J	V.Regulator linear-monolithic IC	○
	IC10	RN-EIM-UPD1708G-625	Controller C-MOS IC	○
	IC21	RN-EIE-MH-1993	BASS/TRE. hybrid IC	○
	IC22,23	RN-EIC-TA7280P	Power amp. linear-monolithic IC	○
	Q1,2	RN-EVS-2SC3053-CD/TY	Silicon transistor (chip) mark:FC,FD	○
	Q3,9,17	RN-EVS-DTA114EK/TY	Silicon transistor (chip) mark:14	○
	Q4,5,6,7,8 10,13,14,15 16,24,25,26 27,28,29,33 36	RN-EVS-2SD601-QRS/TY	Silicon transistor (chip) mark:YQ,YR,YS	○
	Q11,12,21,34	RN-EVS-2SB815-67/TY	Silicon transistor (chip) mark:B6,B7	○
	Q18,35	RN-EVS-DTC144EK/TY	Silicon transistor (chip) mark:26	○
	Q19,23	RN-EVS-2SD638-QR	Silicon transistor	○
	Q20	RN-EVS-2SB873-QR	Silicon transistor	○
	Q22,37	EN-EVS-DTC114EK/TY	Silicon transistor (chip) mark:24	○
	Q30,38,39,40	RN-EVS-2SA1235-EF/TY	Silicon transistor (chip) mark:ME,MF	○
	Q31,32	RN-EVS-2SD1048-678/TY	Silicon transistor (chip) mark:X6,X7,X8	
	Q41	RN-EVS-DTA114TK/TZ	Silicon transistor (chip) mark:94	○
	Q101,102	RN-EVS-2SD1328-RST/TZ	Silicon transistor (chip) mark:1DR,1DS	○
	D1,4,6,7,12 15,16,17,18 20,21,22,23 25,26	RN-EDS-MA151K/TY 16,17,18,	Silicon diode (chip) mark:MH	○
	D2,3,5,8,9 11,14,24	RN-EDS-MA151WK/TY	Silicon diode (chip) mark:MT	○
	D10	RN-EDT-RD9R1EB3	Zener diode	○
	D19	RN-EDS-MA151A/TZ	Silicon diode (chip) mark:MA	○
	D27	RN-EDS-1S1555	Silicon diode	○
	D28	RN-EDS-1SS211	Silicon diode	○
	D101,102	RN-EDS-10E1	Silicon diode	○
	D103	RN-EDS-S5566B/TR	Silicon diode	○
	MISCELLANEOUS ELECTRICAL			
	CF1	RN-EFC-F2-114	Cramic filter	

NOTES: Stock No. of ※-marked parts are different from model to model.

	Symbol No. (Fig.10,12)	Stock No.	Description	Remark
	R11,95,132 133,134,135 136,137	RN-ERG-IC224J-1/TY	220kohm 5% 1/8W metallic (chip)	
	R14,16,27	RN-ERG-IC223J-1/TY	22k ohm 5% 1/8W metallic (chip)	
	R15,31,45 138	RN-ERG-IC392J-1/TY	3.9kohm 5% 1/8W metallic (chip)	
	R17,24,25,32 43,63,64,70	RN-ERG-IC222J-1/TY	2.2kohm 5% 1/8W metallic (chip)	
	71,83,89 100,101,102 103,118,119 215,216,225	RN-ERG-IC222J-1/TY	2.2kohm 5% 1/8W metallic (chip)	
	R20,21,22,23 34,38,39,46 96,97,111 112,113	RN-ERG-IC472J-1/TY	4.7kohm 5% 1/8W metallic (chip)	
	R26,80,,81 120,123	RN-ERG-IC272J-1/TY	2.7kohm 5% 1/8W metallic (chip)	
	R28,84,88,93 124,145	RN-ERG-IC104J-1/TY	100kohm 5% 1/8W metallic (chip)	
	R29,76,77 201,202(225)	RN-ERG-IC682J-1/TY	6.8kohm 5% 1/8W metallic (chip)	
	R30,35,109	RN-ERG-IC563J-1/TY	56K ohm 5% 1/8W metallic (chip)	
	R33,66,67	RN-ERG-IC153J-1/TY	15K ohm 5% 1/8W metallic (chip)	
	R40,49,50,51 53,54,61,65 98,104,114 115,117,148 203,204	RN-ERG-IC102J-1/TY	1K ohm 5% 1/8W metallic (chip)	
	R68,69	RN-ERG-IC183J-1/TY	18K ohm 5% 1/8W metallic (chip)	
	R74,75	RN-ERG-IC680J-1/TY	68 ohm 5% 1/8W metallic (chip)	
	R78,79	RN-ERG-IC154J-1/TY	150Kohm 5% 1/8W metallic (chip)	
	R99	RN-ERD-DF2R2J-3	2.2 ohm 5% 1/2W corbon	
	R121,122,219 225	RN-ERG-IC273J-1/TY	27K ohm 5% 1/8W metallic (chip)	
	R140	RN-ERG-IC124J-1/TY	120Kohm 5% 1/8W metallic (chip)	
	R143	RN-ERG-IC821J-1/TY	820 ohm 5% 1/8W metallic (chip)	
※	R209,210	RN-ERG-IC181J-1/TY	180 ohm 5% 1/8W metallic (chip)	
	R213,214	RN-ERG-IC390J-1/TY	39 ohm 5% 1/8W metallic (chip)	
*	R217,218(211)	RN-ERG-IC4R7J-1/TY	4.7 ohm 5% 1/8W metallic (chip)	
	R226	RN-ERD-AE101jA	100 ohm 5% 1/4W corbon	
	VARIABLE RESISTORS			
	RV1	RN-ERV-ON1-307	300 ohm	
	RV2,4,6,7	RN-ERV-ON1-312	20K ohm	
	RV3	RB-ERV-ON1-313	50K ohm	
	RV5	RB-ERV-ON1-309	2K	
	RV21,22,23 24,(S2)	RN-ERV-2P4-30	50K ohm ×4 BASS/TRE·LOUD	○
※	RV25,26,27 28,29,30,31 (S1)	RN-ERV-2P7-1	10K ohm×2, 20K ohm×3,BAL·VOL. FADER,(M2 only)	○

NOTE : *-marked parts are for model M3 only.

M2, M3 (CE-6231EX1, CE-6232EX1)

NOTE: 1, Stock No. of ※-marked parts are different from model to model.
2, *-marked parts are for model M3 only.

	Symbol No. (Fig.10,12)	Stock No.	Description	Remark
	J1	RN-EJA-1001	Antenna receptacle	
	J6,7,8	RN-EWJ-4373	Lead assembly,RCA cord	
※	J9,10,11	RN-EWJ-4374A	Lead assembly,8P-5P-4P(M3 only)	
※	J10,11	RN-EWJ-4371A	Lead assembly,8P-8P (M2 only)	
	J12,13	RN-EWJ-4369A	Lead assembly,10P-9P	
	J14,15	RN-EWJ-4370	Lead assembly 4P-3P	
	J16	RN-EWJ-4452	Lead assembly,5P	
	J22	RN-EWJ-4379	Lead assembly,8P-7P	
	J23	RN-EWJ-4378	Lead assembly	
	J26	RN-EWJ-3845	Lead assembly	
	J27	RN-EWJ-4377	Lead assembly	
	J28	RN-EWJ-3736	Lead assembly	
	L1,2	RN-ELH-C6R8-KAL/TP	Coil,6.8μH	
	L3	RN-ELH-C4R7-KAL/TP	Coil,4.7μH	
	L4	RN-ELH-C102-6	Coil,1 mH	
	M101	RN-EDM-1089	Motor	
	NL1	RN-EPN-1002	Neon lamp	
※	P1,2,3,J4	RN-EWJ-4368	Lead assembly,11P-4P-3P (M2 only)	
※	P1,2,3,J4,5	RN-EWJ-4372B	Lead assembly,7P-5P-4P-3P (M3 only)	
※	P4	RN-EJU-S11V-260	11P connector (M2 only)	
※	P4	RN-EJU-S05V-256	5P connector (M3 only)	
※	P5	RN-EJU-S07V-258	7P connector (M3 only)	
	P8	RN-EJU-S04V-563	4P connector	
*	P13	RN-EJU-S09V-957	9P connector	
	P14	RN-EJU-S03V-574	3P connector	
	P15	RN-EJU-S05V-576	5P connector	
	P21	RN-EJU-S07V-955	7P connector	
	PL1	RN-EPM-1228A	Lamp assembly	○
	PL2	RN-EPM-1227	Lamp assembly	
	PL201	RN-EPM-1226	Lamp assembly	
	S11~16	RN-ESD-6N-166	Push switch	○
	S17,18,19	RN-ESD-3N-165	Push switch	○○○
※	S20	RN-ESB-1N1-175	Push switch (M2 only)	○
※	S20,22	RN-ESD-2N-164	Push switch (M3 only)	○
	S21	RN-ESS-12-173	Slide switch	○
*	S23	RN-ESB-2L2-183	Push switch (M3 only)	○
	S101	RN-ESM-1017	Micro switch	○
	S102	RN-ESS-1070	Slide switch	○
	S103	RN-ESL-1047	Leaf switch	○
	T1	RN-ETF-1004A	Transformer	
	TV1	RN-ETV-1048	FM front end	○
	TV2	RN-ETV-1047A	AM tuner	○
	VB1	RN-EVB-1021-MNC02TN	LCD	○
	X1	RN-EXB-CSB456FG15	Oscillator,19kHz	
	X2	RN-EXC-1036	Crystal,4.5MHz	

Illus.No. (Fig.22-25)	Stock No.	Description	Q'ty	Remark
※ 545	RN-MPM-2998B	PC board,main (M3 only) No parts	1	
※ 546	RN-MPC-1893A	PC board,amp. (M0 only) No parts	1	
	RN-MPC-1892A	PC board,amp. (M1 only) No parts	1	
	RN-MPC-1894A	PC board,amp. (M2 only) No parts	1	
	RN-MPC-1895B	PC board,amp. (M3 only) No parts	1	
608	RN-MTJ-2B2.6×6	Screw,2.6×6mm	2	
601	F6-SBD-3×6S	Screw,3×6mm	17	
602	F6-SBD-3×8S	Screw,3×8mm	3	
603	F6-SBD-2×6S	Screw,2×6mm	1	
604	F6-SBD-2.6×3S	Screw,2.6×3mm	4	
605	F6-SSA-3×6S-M-ZN2A	Screw,3×6mm (black)	2	
606	F6-SNATP2-2×4	Screw,2×4mm	1	
607	RN-MSN-1	Nut 9mm	2	
610	F6-SSA-3×6S	Screw,3×6mm (M3 only)	2	
611	F6-SBD-3×16S	Screw,3×16mm (M3 only)	3	

NOTE: Stok No of ※-marked parts are different from model to model.

Illus.No. (Fig.22-25)	Stock No.	Description	Q'ty	Remark
MECHANICAL				
※ 501	RN-MTD-1239	Chassis,top	1	
	RN-MTD-1241A	Chassis,top (M3 only)	1	
502	RN-MTD-1240A	Chassis,bottom	1	
※ 503	RN-MDP-1601B	Escutcheon (M0 only)	1	○
	RN-MDP-1600B	Escutcheon (M1 only)	1	○
	RN-MDP-1602B	Escutcheon (M2 only)	1	○
	RN-MDP-1603B	Escutcheon (M3 only)	1	○
※ 504	RN-MHE-1715A	Holder	1	
	RN-MHE-1700A	Holder, (M3 only)		
505	RN-MHE-1701A	Holder,deck R	1	
506	RN-MHE-1702A	Holder,deck F·L	1	
507	RN-MHE-1703A	Holder,deck F·R	1	
※ 508	RN-MHE-1716	Holder,cord (M0,M1 only)	1	
	RN-MHE-1714	Holder,cord (M2,M3 only)	1	
509	RN-MLF-1168A	Filter,A/F·TUNE	1	
※ 510	RN-MLF-1169A	Filter,Pre-set	1	
	RN-MLF-1170A	Filter,Pre-set(M2 only)	1	
	RN-MLF-1171A	Filter,Pre-set(M3 only)	1	
511	RN-MLF-1174A	Filter,RECALL	1	
512	RN-MYB-1965A	Button,EJECT	1	○
513	RN-MYB-1966	Button,FF/REW	2	○
514	RN-MYB-1967	Button,A/F·TUNE	3	○
515	RN-MYB-1968	Button,SET·RECALL	7	○
※ 516	RN-MYB-1969A	Button,(M3 only)	1	○
※ 517	RN-MYD-1084	Knob (M0 only)	1	○
※ 518	RN-MRE-1140A	Heat-sink (M3 only)	1	
521	RN-MHT-1004	Rivet	3	
522	RN-MSE-1601	Spacer	2	
523	RN-MYC-1064	Knob,VOL·TRE	2	○
524	RN-MYD-1082	Knob,BASS·BAL·FADER	2	○
525	RN-MCV-1665A	Door	1	
526	RN-MSI-1054	Shaft	1	
527	RN-MSC-1201	Spring	1	
528	RN-MSE-1651	Spacer	1	
529	RN-MIP-1479	Insulator	1	
530	RN-MIP-1466	Insulator	1	
531	RN-MIP-1469A	Insulator,bottom	1	
536	RN-MHE-1704A	Holder	1	
※ 537	RN-MHE-1705	Holder	1	
539	RN-MHE-1707A	Holder	1	
	RN-MHE-1547A	Holder (M3 only)		
540	RN-MSE-1675	Spacer	1	
541	RN-MSE-1676	Spacer	1	
542	RN-MSE-1677	Spacer	1	
※ 545	RN-MPM-2996B	PC board,main (M0 only) No parts	1	
	RN-MPM-2995B	PC board,main (M1 only) No parts	1	
	RN-MPM-2997B	PC board,main (M2 only) No parts	1	

NOTE : *- marked parts are for model M3 only.

Illus.No. (Fig.26,27)	Stock No.	Description	Q'ty	Remark
56	RN-MUC-1037	Cum	1	
57	RN-MUL-1405	Lever	1	
58	RN-MHE-1786	Holder	1	
59	RN-MUC-1038	Cum	2	
60	RN-MRP-1132	Roller	1	
61	RN-MUG-1199	Gear	1	
62	RN-MUG-1200	Gear	1	
63	RN-MRP-1133	Roller	1	
64	RN-MUG-1201	Gear	2	
65	RN-MUG-1202	Gear	4	
* 69	RN-MSi-1109	Shaft	1	
70	RN-MST-1125	Spacer	1	
71	RN-MST-1126	Spacer	1	
72	RN-MST-1127	Spacer	1	
73	RN-MST-1128	Spacer	1	
74	RN-MST-1129	Spacer	1	
75	RN-MST-1130	Spacer	1	
76	RN-MST-1131	Spacer	1	
81	RN-MSC-1439	Spring	1	
82	RN-MSC-1440	Spring	1	
83	RN-MSC-1441	Spring	1	
84	RN-MSC-1442	Spring	1	
85	RN-MSC-1443	Spring	2	
86	RN-MSC-1444	Spring	1	
87	RN-MSC-1445	Spring	1	
88	RN-MSC-1446	Spring	1	
89	RN-MSC-1447	Spring	1	
90	RN-MSC-1448	Spring	1	
91	RN-MSC-1449	Spring	1	
92	RN-MSC-1450	Spring	1	
93	RN-MSC-1451	Spring	1	
94	RN-MSC-1452	Spring	1	
95	RN-MSC-1453	Spring	1	
96	RN-MSC-1454	Spring	1	
97	RN-MSC-1455	Spring	2	
98	RN-MSC-1456	Spring	2	
99	RN-MSC-1457	Spring	1	
100	RN-MSC-1458	Spring	1	
101	RN-MSC-1459	Spring	1	
102	RN-MSC-1460	Spring	1	
103	RN-MSC-1461	Spring	1	
104	RN-MSE-1669	Spacer	1	
* 105	RN-MSC-1462	Spring	1	
109	RN-MUB-1046	Belt	1	○
110	RN-MUB-1047	Belt	1	○
111	RN-MSW-1013	Spring	1	
112	RN-MSW-1014	Spring	1	
113	RN-MSE-1670	Spacer	1	

CASSETTE DECK (RN-MDK-72/1A&2A)

Illus.No. (Fig.26,27)	Stock No.	Description	Q'ty	Remark
MECHANICAL				
1	RN-MAS-1068	Chassis,main	1	
2	RN-MYT-1308	Sub-chassis	1	
3	RN-MUL-1388	Lever	1	
4	RN-MHE-1775	Holder	1	
5	RN-MUL-1389	Lever	1	
6	RN-MUL-1390	Lever	1	
7	RN-MUL-1391	Lever	1	
8	RN-MHE-1776	Holder	1	
9	RN-MUL-1392	Lever	1	
10	RN-MHE-1777	Holder	1	
11	RN-MUL-1393	Lever	1	
13	RN-MHE-1778	Holder	2	
(A1) 14	RN-MHE-1779	Holder,(Includes P.B Head)	1	○
16	RN-MUF-1026	Flywheel	2	
17	RN-MKR-1217	Pinchroller assembly(F)	1	
18	RN-MKR-1218	Pinchroller assembly(R)	1	
19	RN-MKS-1027	Slip mechanism	2	○
20	RN-MKS-1028	Slip mechanism	1	○
25	RN-MKi-1027	Slide plate assembly	1	
26	RN-MHE-1780	Holder	1	
27	RN-MUL-1394	Lever	1	
28	RN-MUL-1395	Lever	1	
29	RN-MUL-1396	Lever	1	
30	RN-MUL-1381	Lever	1	
31	RN-MUL-1397	Lever	1	
32	RN-MUC-1036	Cum	1	
33	RN-MYT-1309	Sub-chassis	1	
34	RN-MUL-1398	Lever	1	
35	RN-MUL-1399	Lever	1	
36	RN-MYT-1310	Sub-chassis	1	
37	RN-MUL-1400	Lever	1	
38	RN-MYT-1311	Sub-chassis	1	
39	RN-MHE-1781	Holder	1	
40	RN-MUL-1401	Lever	1	
41	RN-MUL-1402	Lever	1	
42	RN-MHE-1747	Holder	1	
46	RN-MUL-1403	Lever	1	
47	RN-MUG-1195	Gear	1	
48	RN-MUL-1404	Lever	1	
49	RN-MUG-1196	Gear	1	
50	RN-MUG-1197	Gear	1	
51	RN-MUG-1198	Gear	1	
52	RN-MHE-1782	Holder	1	
53	RN-MHE-1783	Holder	1	
54	RN-MHE-1784	Holder	1	
55	RN-MHE-1785	Holder	1	

NOTE : *- marked parts are for model M3 only.

Illus.No. (Fig.26,27)	Stock No.	Description	Q'ty	Remark
M101(118)	RN-EDM-1089	Motor	1	○
J22(119)	RN-EWj-4379	7P connector and lead assembly	1	○
J16(120)	RN-EWj-4452	5P connector and lead assembly	1	
121	RN-MPM-2994	PC board	1	
S103(122)	RN-ESL-1047	Leaf switch,FF/REW	1	○
S102(123)	RN-ESS-1070	Slide switch	1	○
S101(124)	RN-ESM-1017	Micro switch,AR/CS	1	○
E101(125)	RN-EEM-1048	Plunger solenoid	1	
130	RN-MET-1356	Special screw	2	
132	RN-MET-1357	Special screw	1	
134	RN-MET-1358	Special screw	5	
136	RN-MET-1359	Special screw	1	
137	RN-MET-1360	Special screw	1	
139	RN-MET-1361	Special screw	3	
140	RN-MET-1362	Special screw	1	
141	RN-MET-1363	Special screw	1	
142	RN-MET-1364	Special screw	3	
144	RN-MET-1365	Special screw	1	
146	RN-MET-1366	Special screw	2	
151	F6-ER-1.2	E-type ring,1.2mm	2	
152	F6-ER-1.5	E-type ring,1.5mm	4	
153	F6-ER-2	E-type ring,2mm	1	
154	F6-ER-2.5	E-type ring,2.5mm	1	
155	F6-ER-1.5	E-type ring,1.5mm	2	
159	RN-MWP-1114	Washer	4	
160	RN-MWP-1115	Washer	3	
161	RN-MWP-1116	Washer	5	
162	RN-MWP-1117	Washer	1	
166	RN-MWP-1118	Washer	2	
167	RN-MWP-1119	Washer	2	
171	RN-MWS-1053	Washer	1	

NOTE : Specifications subject to change without prior notice.

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Kobe, Japan

Printed in Japan
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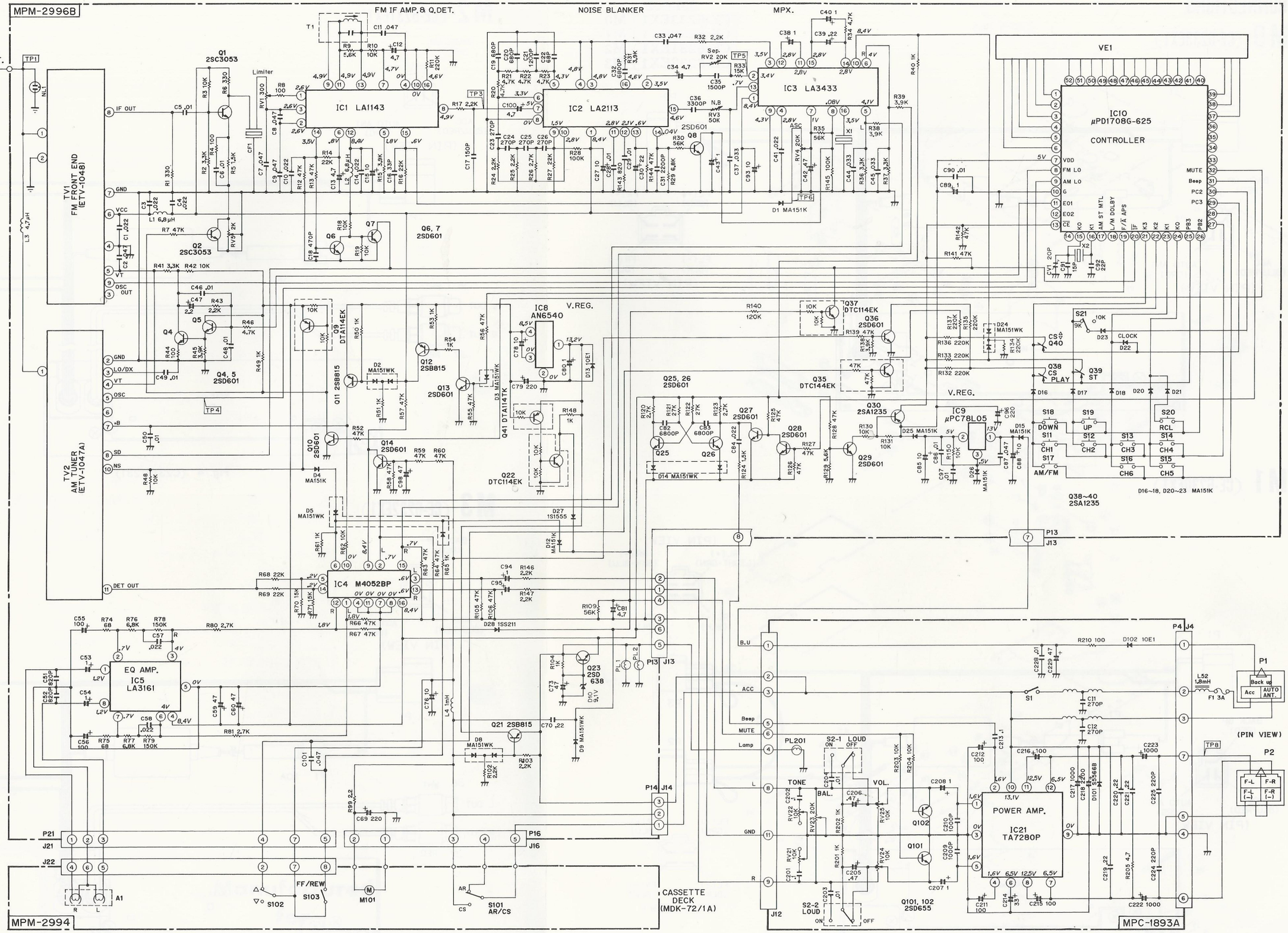
MO (CE-6233EX1) SCHEMATIC



NOTES: 1. All capacitance in Micro farad, $P=10^{-12}$
2. All resistance in ohm, $K=10^{3}$
3. All inductance in henry, $m=10^{-3}$, $\mu=10^{-6}$

Fig. 6 (C24191233)

4. DC voltages against the chassis measured with 10M ohms digital volt meter, power supply set at +13.2 VDC, no signal input.

M1 (CE-6230EX1)
SCHEMATIC

SM-603
[CE-6233EX1] M0
[CE-6230EX1] M1

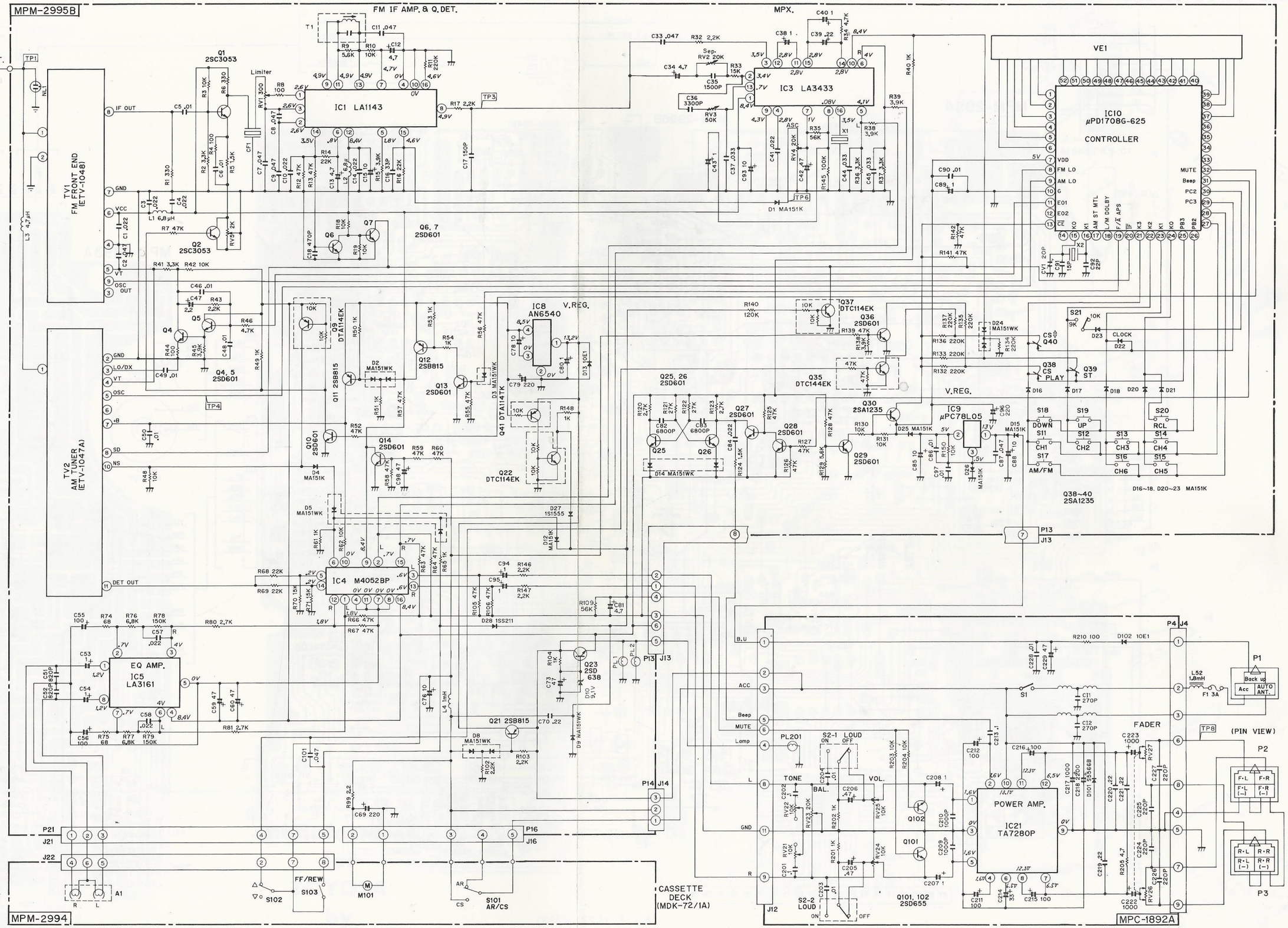


Fig. 8
(C24191230)

NOTES: 1. All capacitance in Micro farad, $P=10^{-12}$ 2. All resistance in ohm, $K=10^{3}$ 3. All inductance in henry, $m=10^{-3}$, $\mu=10^{-6}$ 4. DC voltages against the chassis measured with 10M ohms digital volt meter, power supply set at +13.2 VDC, no signal input.

MO (CE-6233EX1)
WIRING ON PC BOARDS

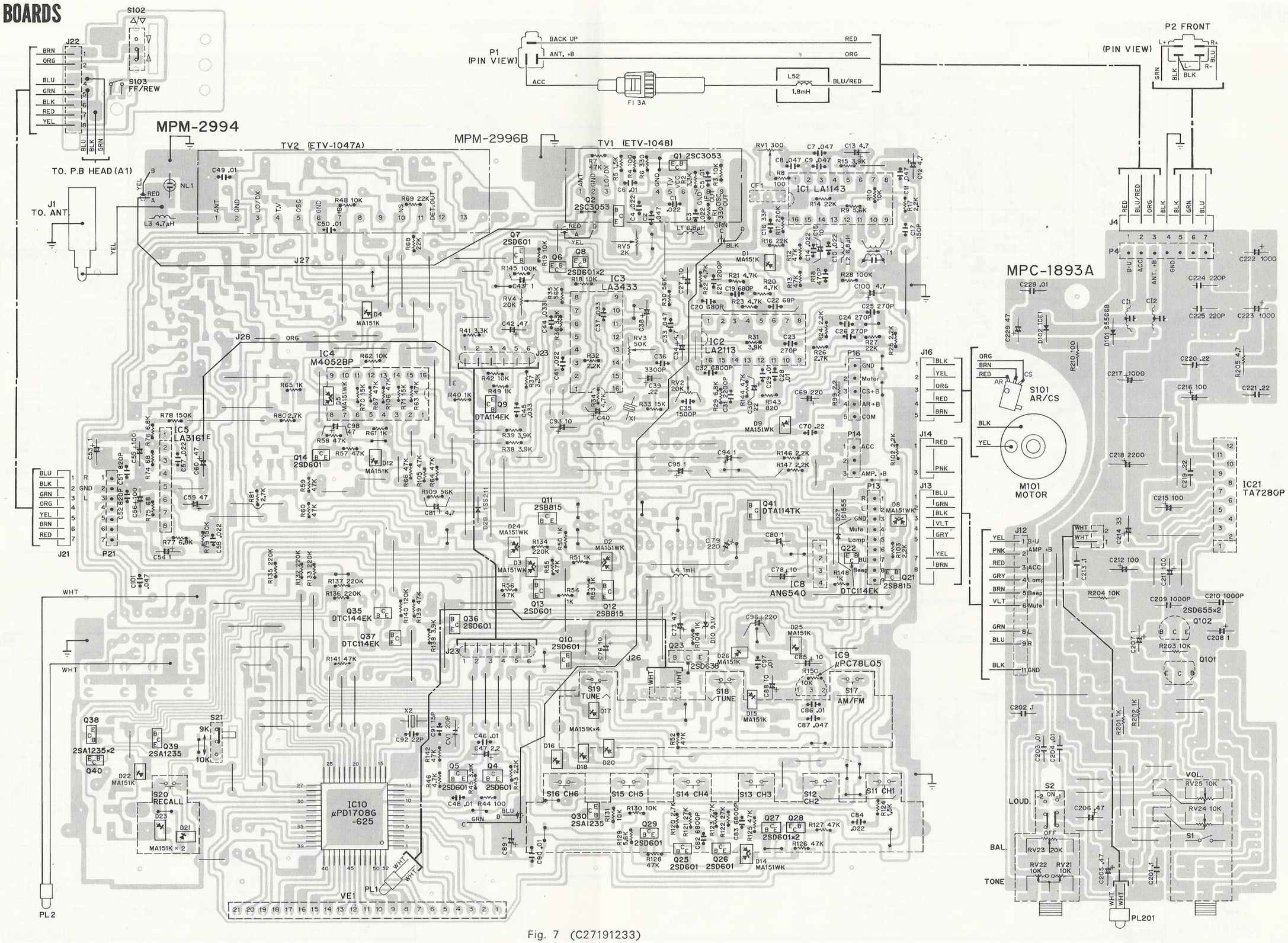


Fig. 7 (C27191233)

M1 (CE-6230EX1)
WIRING ON PC BOARDS

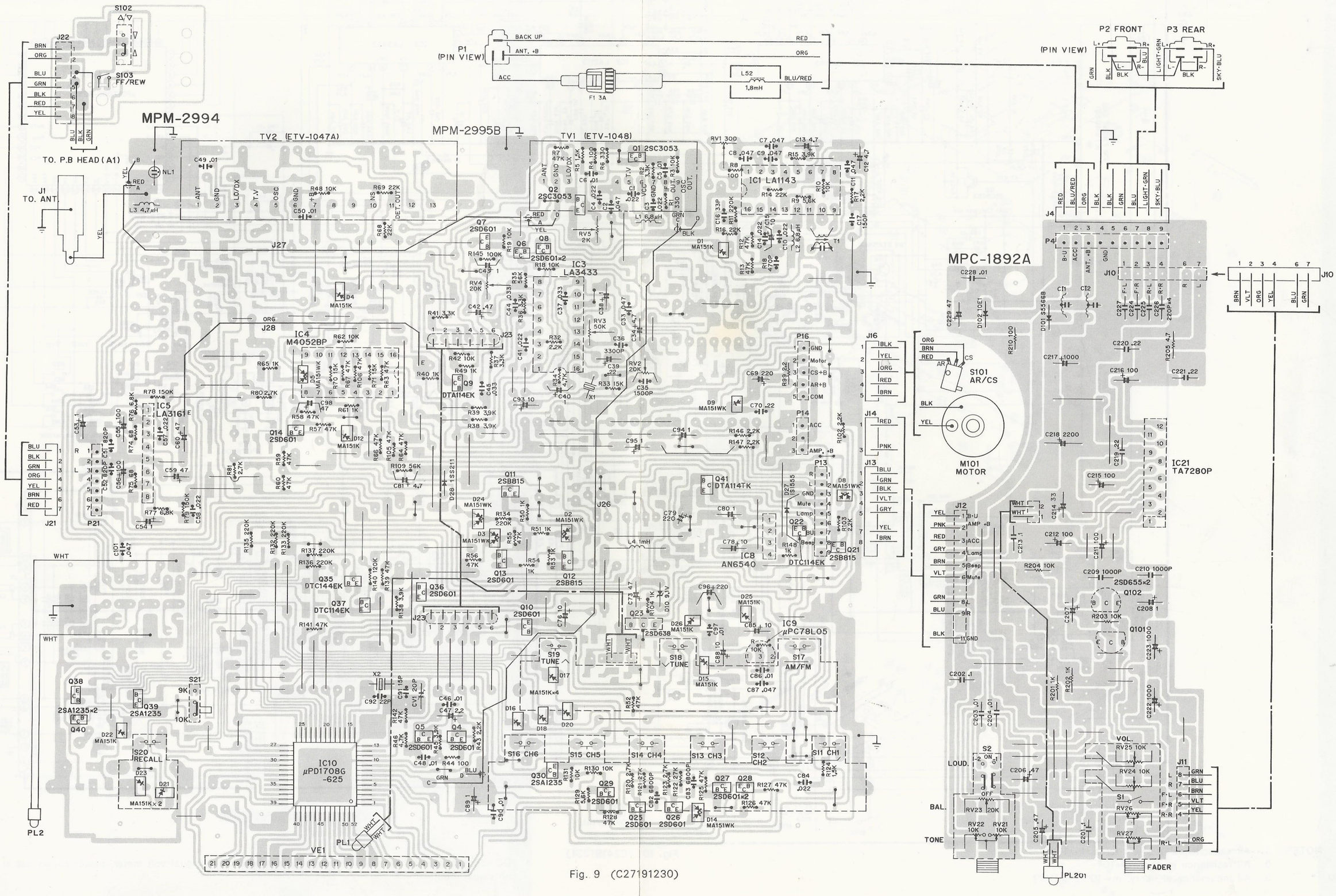
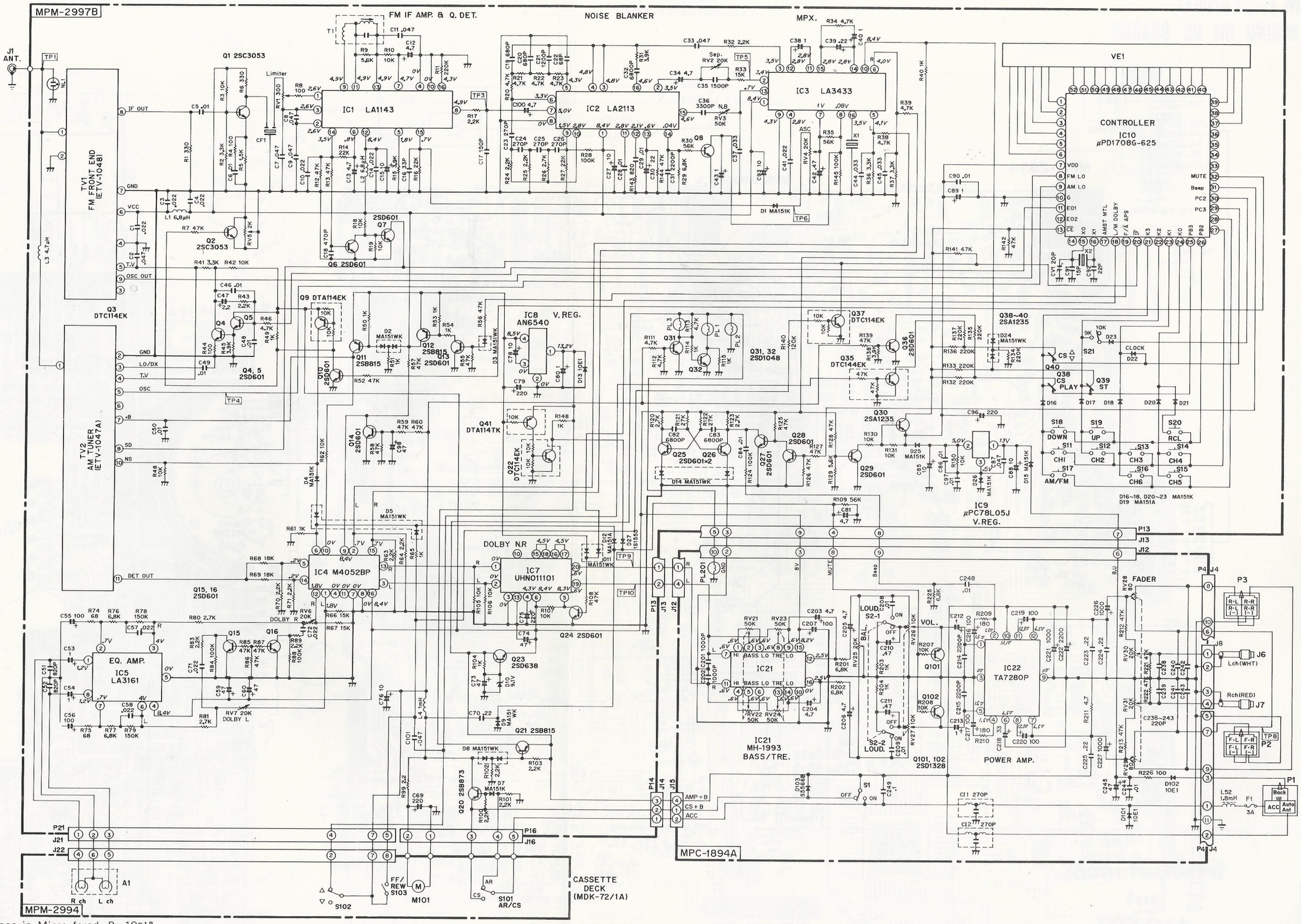


Fig. 9 (C27191230)

M2 (CE-6231EX1)
SCHEMATIC



NOTES:
1. All capacitance in Micro farad, $P=10^{-12}$
2. All resistance in ohm, $K=10^{3}$
3. All inductance in henry, $m=10^{-3}$, $\mu=10^{-6}$

Fig. 10 (C24191231)

4. DC voltages against the chassis measured with 10M ohms digital volt meter, power supply set at +13.2 VDC, no signal input.

M2 (CE-6231EX1)
WIRING ON PC BOARDS

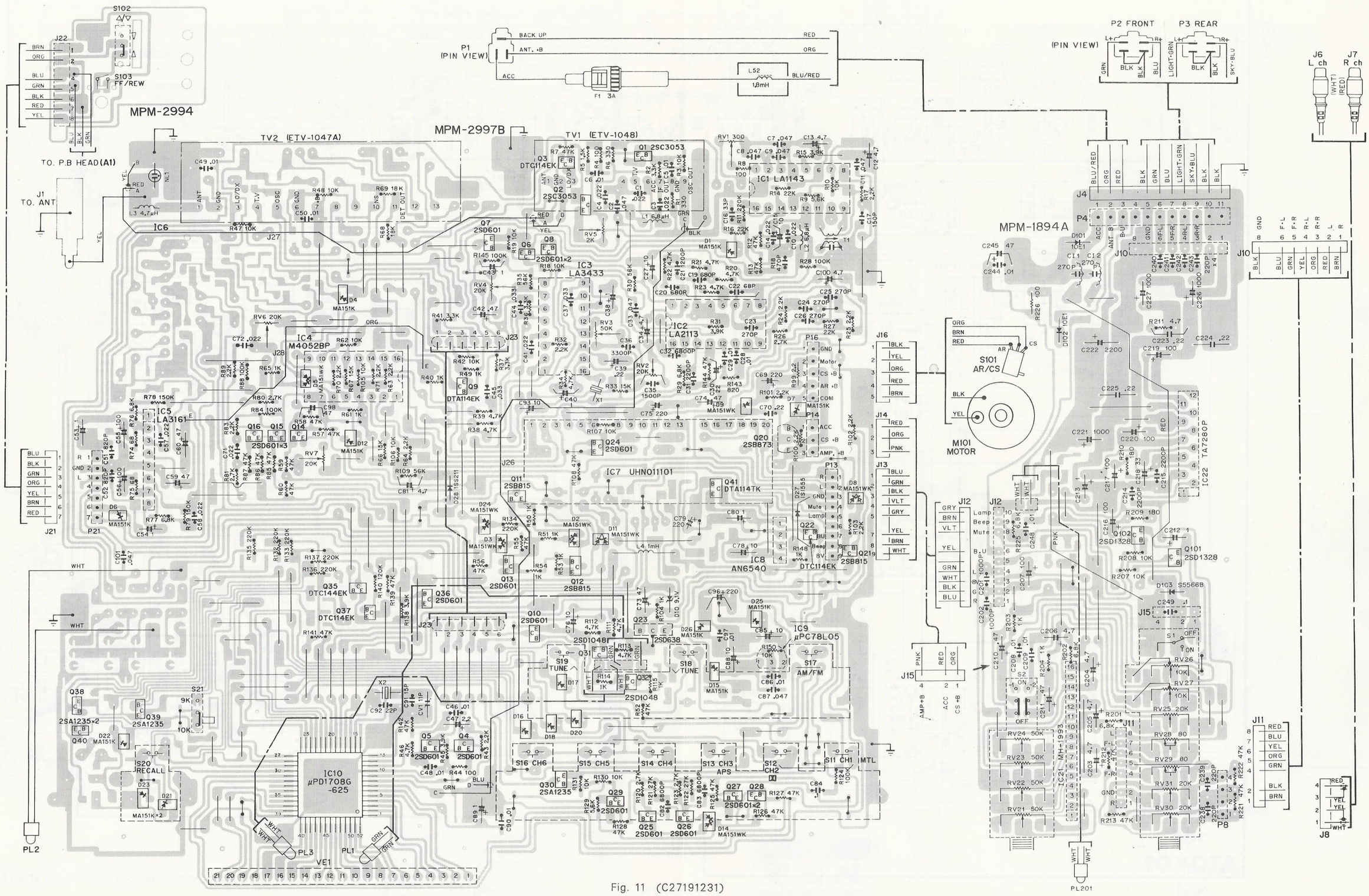


Fig. 11 (C27191231)

M3 (CE-6232EX1)
SCHEMATIC

SM-603
[CE-6231EX1] M2
[CE-6232EX1] M3

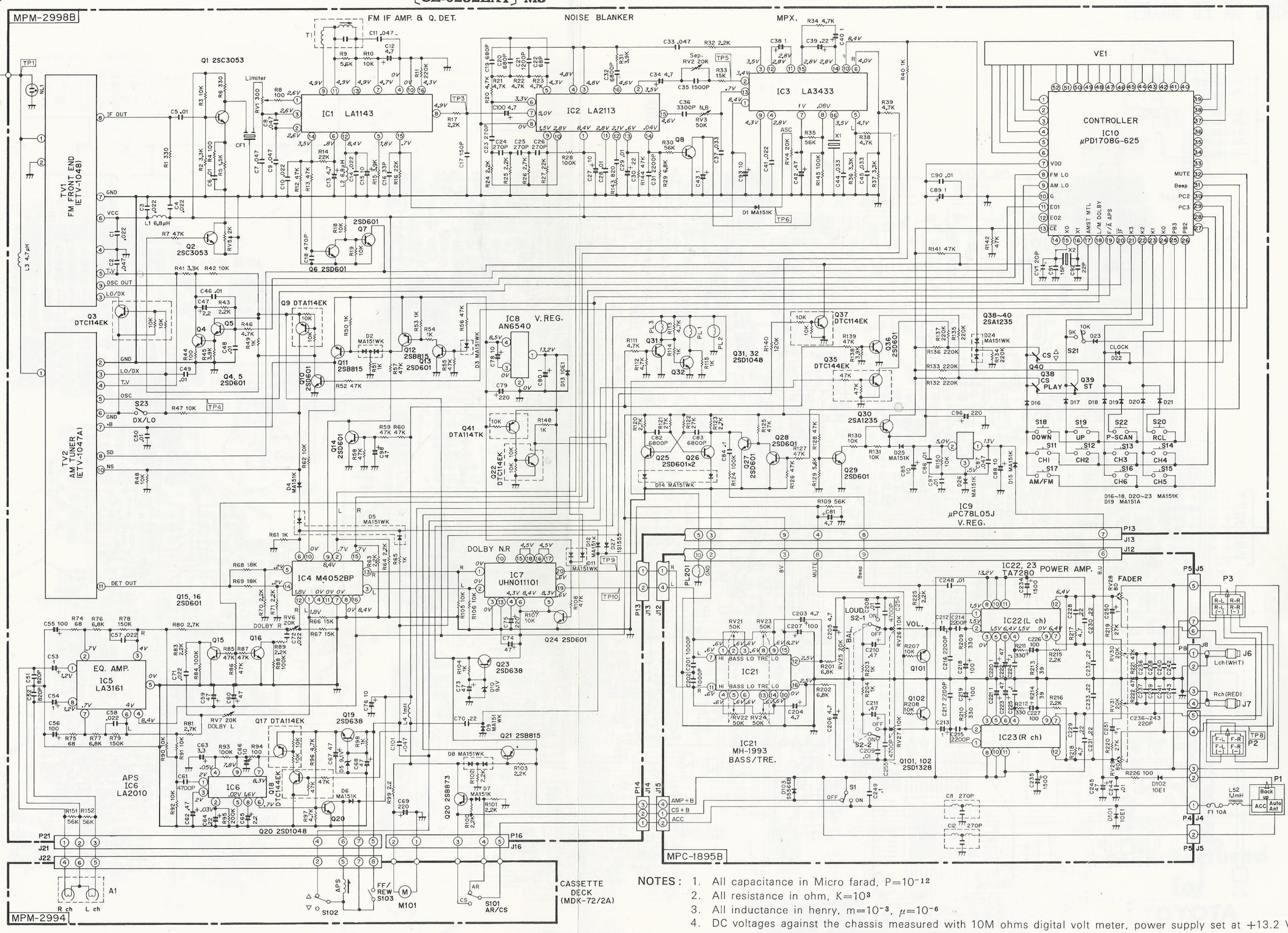


Fig. 12 (C24191232)

NOTES:
1. All capacitance in Micro farad, $P=10^{-12}$
2. All resistance in ohm, $K=10^{3}$
3. All inductance in henry, $m=10^{-3}$, $\mu=10^{-6}$
4. DC voltages against the chassis measured with 10M ohms digital volt meter, power supply set at +13.2 VDC, no signal input.

M3 (CE-6232EX1)
WIRING ON PC BOARDS

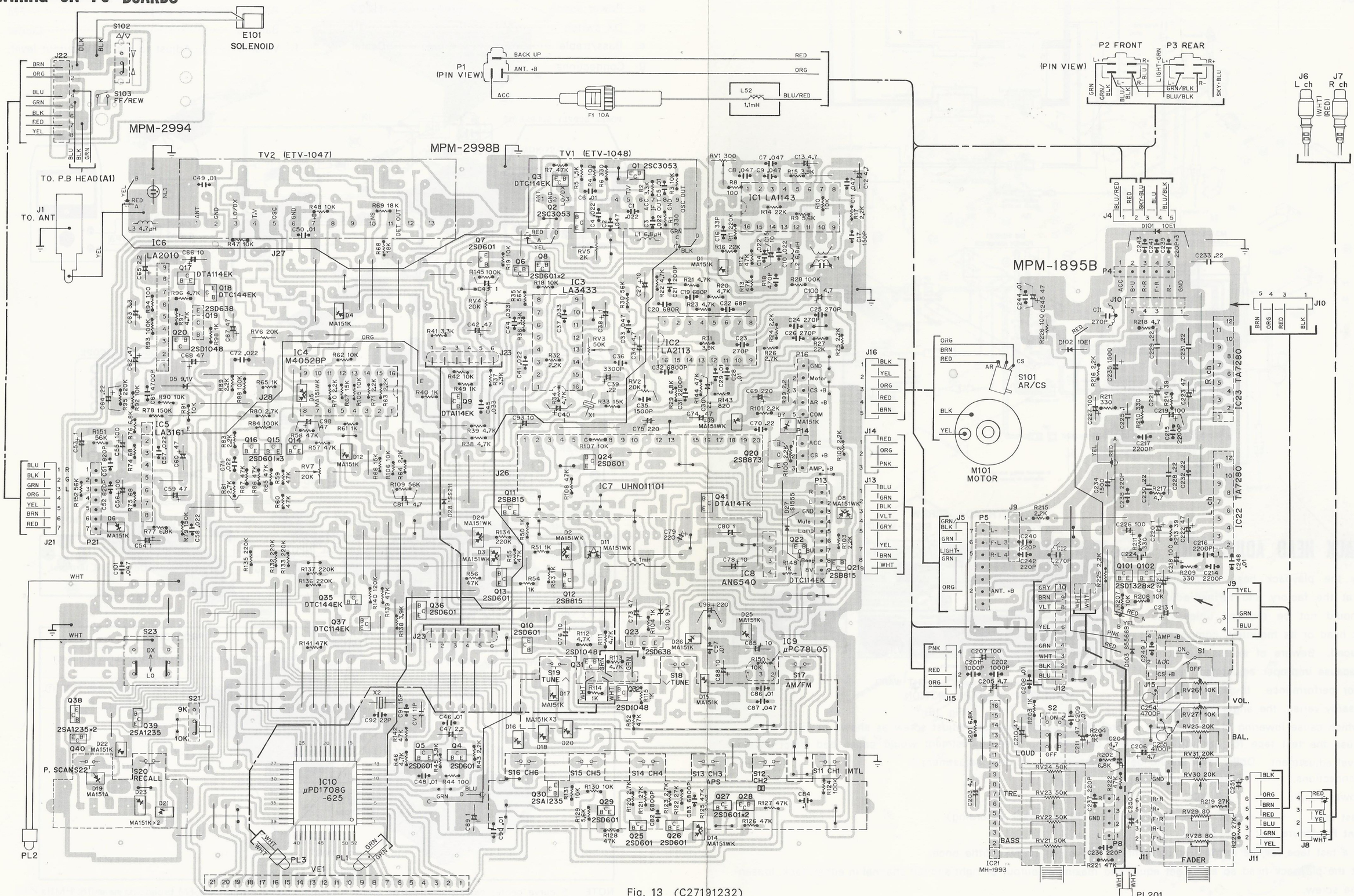


Fig. 13 (C27191232)

M0, M1, M2 (CE-6233EX1, CE-6230EX1, CE-6231EX1)

EXPLODED VIEW (CASSETTE DECK) MDK-72/1A

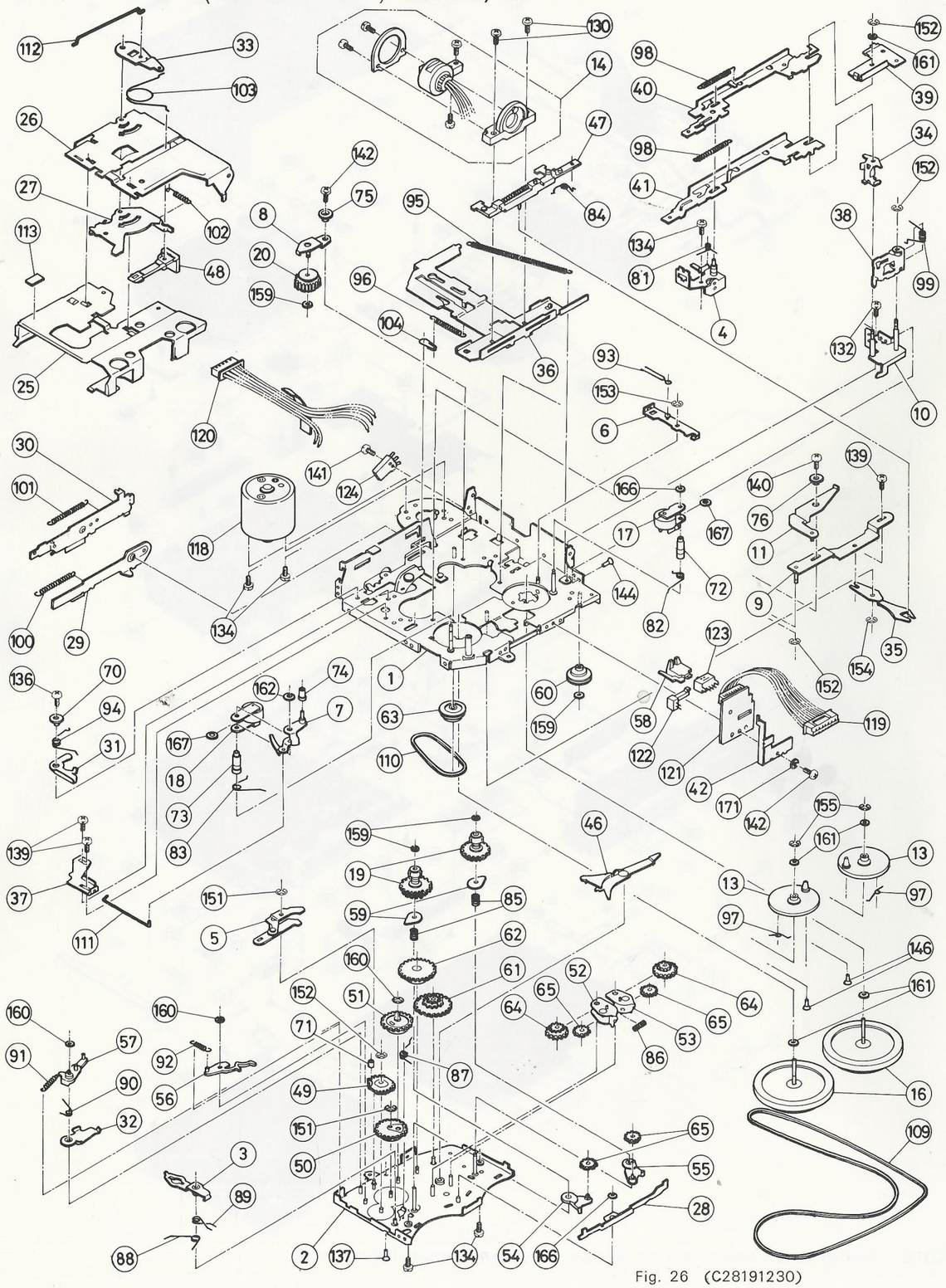


Fig. 26 (C28191230)

M3 (CE-6232EX1)

EXPLODED VIEW (CASSETTE DECK) MDK-72/2A

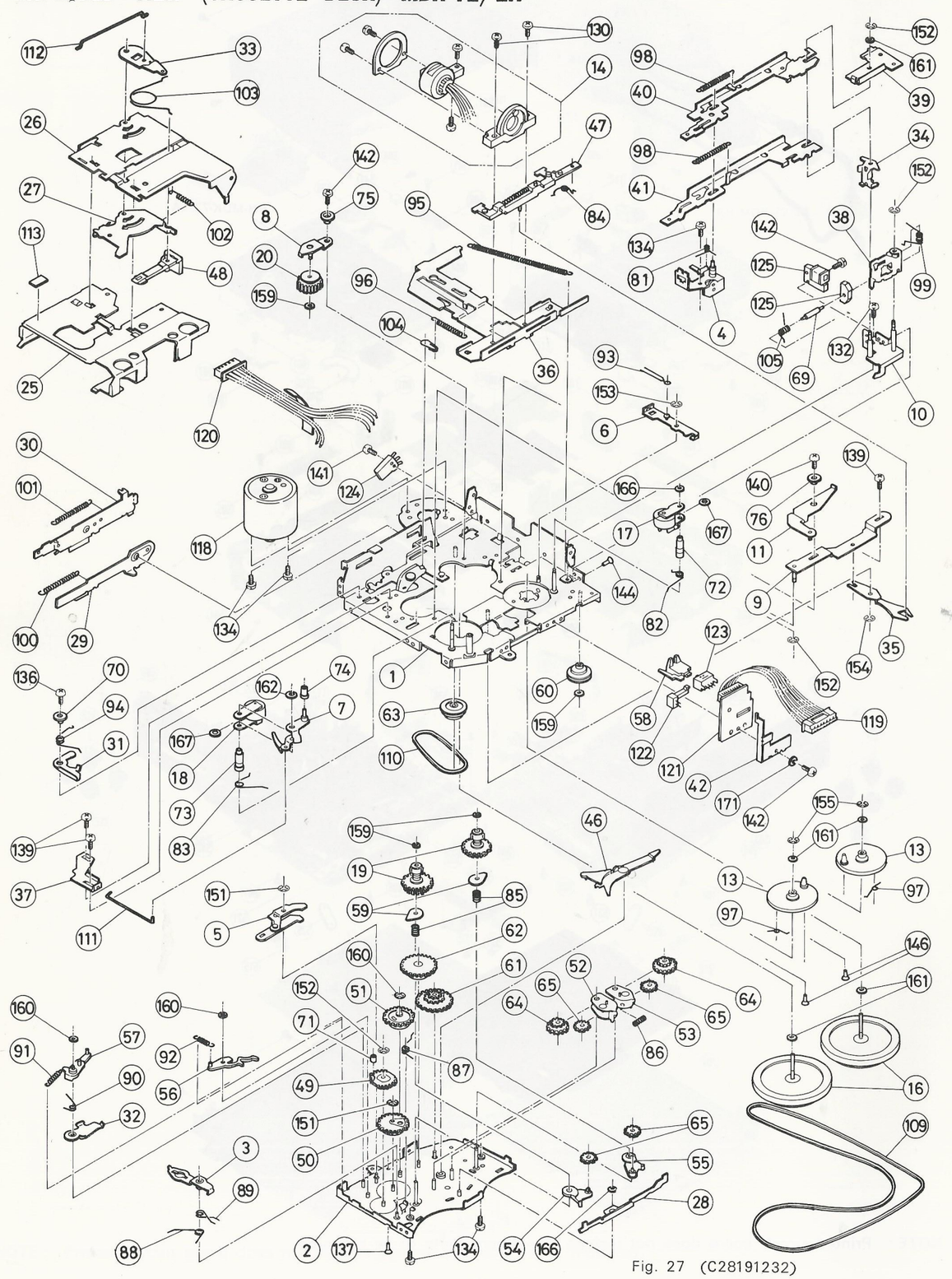


Fig. 27 (C28191232)