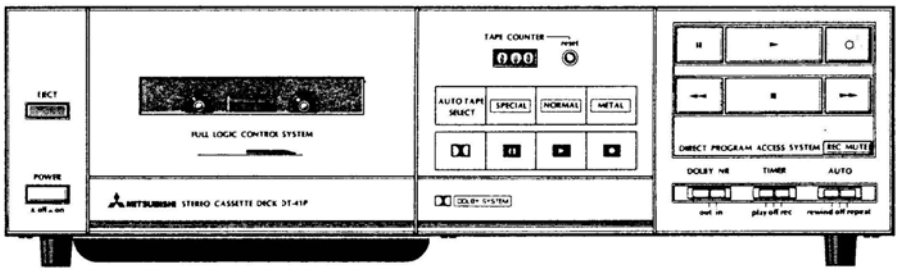
MITSUBISHI
AUDIO SYSTEMS

SERVICE MANUAL

STEREO CASSETTE DECK

MODEL DT-41P



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MITSUBISHI ELECTRIC (U.K) LTD.,

SPECIFICATIONS

Tape	4 track, 2 channel Stereo Cassette Deck
Motor type	
Capstan motor	DC servo motor
Reel motor	DC motor
Mechanism drive motor	DC motor
Head material	
REC/PB head	Hard permalloy
Erase head	Ferrite
Tape speed	4.75cm/s (1-7/8 ips)
Tape speed accuracy	±1%
Wow and flutter	0.05% Wrms
Fast forward/rewind times	115sec. (C-60 type)
SN ratio (400Hz, 3% THD, Weighted, Metal tape)	
Dolby NR out	58dB (at 5 KHz)
Dolby NR in	68dB (at 5 KHz)
Frequency response (Record level 160 pwb/mm –30dB)	
Normal tape	20–15,000Hz
Special tape	20–17,000Hz
Metal tape	20–18,000Hz
Erasure ratio (1kHz)	60dB (at 1 KHz)
Input sensitivity/impedance	
Line input	150mV (120k ohms)
Bias frequency	85 KHz
Output level	
Line output	440mV (22k ohms load)
Power consumption	16W
Dimensions (W x H x D)	355 x 103 x 230 mm (14 x 4-1/16 x 9-1/16")
Weight	3.9kg (8.6 lbs)

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Specifications of this unit are subject to change without notice for improvement.

DISMANTLING INSTRUCTIONS

1. REMOVAL CASE

1) Remove six screws (SCREW-METAL 3 x 8) fixing the case and slide the case backward for removal. (See Fig. 1)

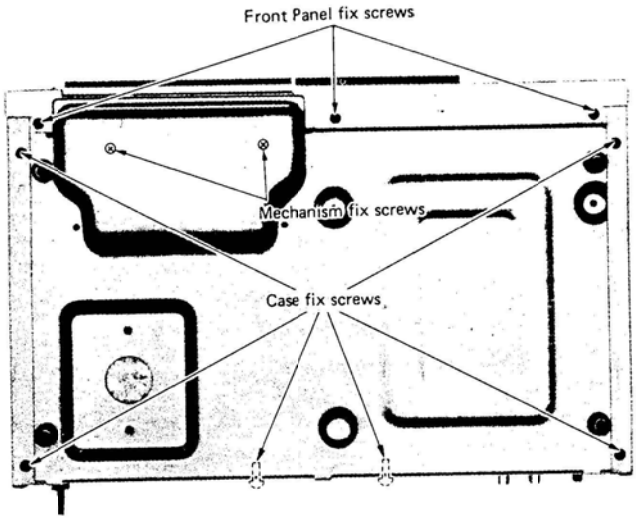


Fig. 1

2. FRONT PANEL REMOVAL

1) Remove the case according to the procedure of 1.
2) Remove the cassette case.
3) Remove front panel fixing screws (two 2-3 x 8 on the top, one 2-3 x 6 on the top and three 2-3 x 6 on the bottom). Front panel can be removed together with the SWITCH PC board. (See Figs. 1 and 2)
4) Remove one screw 1-2.6 x 6 fixing the SWITCH PC board. PC board can now be disassembled from the panel.

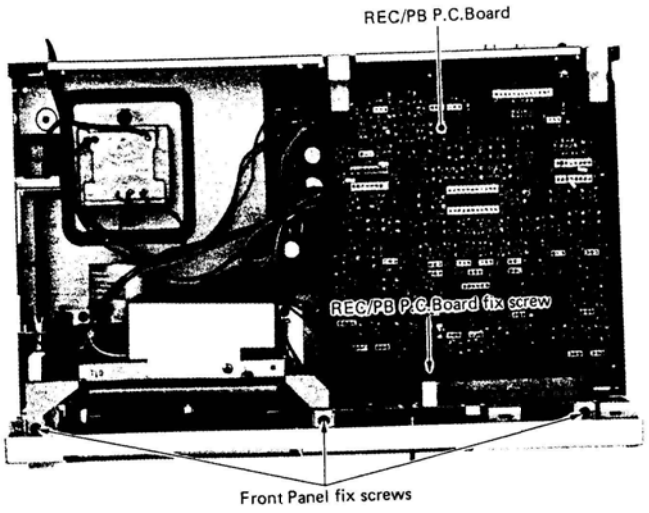


Fig. 2

3. MECHANISM REMOVAL

1) Remove the case and front panel according to the procedure of 1 and 2.
2) Take off the counter belt from the counter side.
3) Remove five screws (2-3 x 6) fixing the mechanism assembly. (See Figs. 3 and 4) (Fig. 1)
4) Remove one screw 2-3 x 8 fixing the RECORD PC board. Raise the PC board and disconnect jacks J110, J140, and 510 and jacks J920 and 921 of MECHANISM CONTROL PC board. The mechanism assembly can be removed.

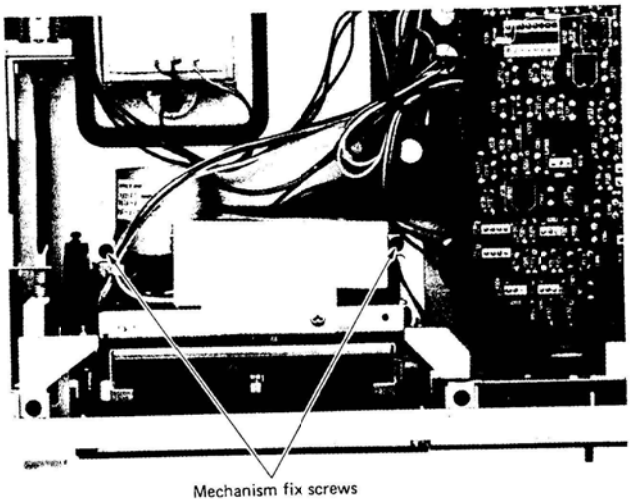


Fig. 3

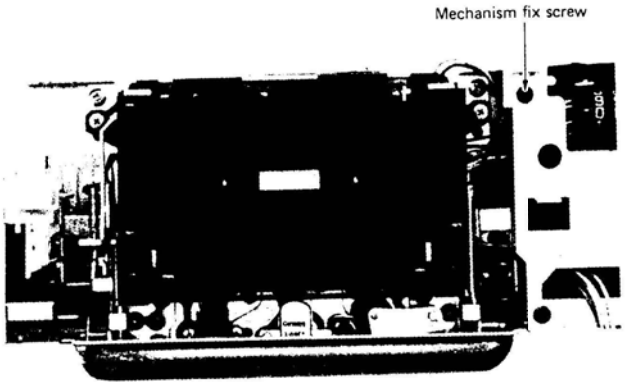


Fig. 4

ADJUSTMENT OF MECHANICAL SECTION

1. ADJUSTING THE TAPE SPEED

1) Setting – Connect a frequency counter to the output terminal.
2) Test tape – MTT-111 (3 kHz)
3) Adjustment procedure – Play back the test tape, and insert a standard screwdriver into the motor adjusting hole and adjust till the frequency counter indicates 3000 Hz.

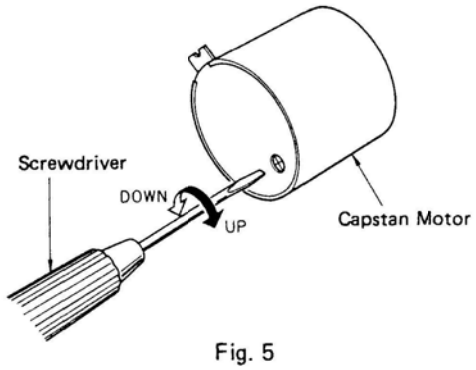


Fig. 5

2. ADJUSTING THE HEAD ANGLE

1) Setting . . . . . Set the PLAY-BACK OUTPUT LEVEL ADJUSTMENT preset control VR102 (L), VR202 (R) to the max. level.
2) Test tape . . . . . MTT-215C (10k/315Hz, –10 dB, NORMAL)
3) Location of adjustment . . . . . Head angle adjusting screw
4) Adjustment procedure . . . . . Play back the test tape and adjust for maximum output on both channels.

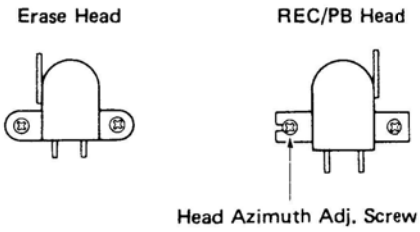
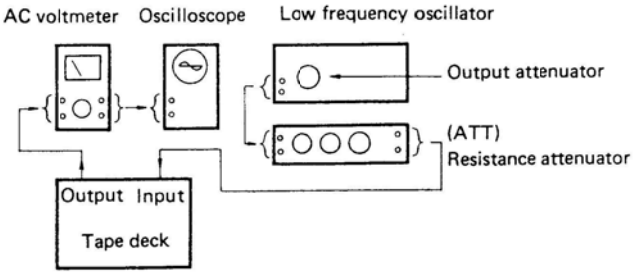


Fig. 6

ADJUSTMENT OF ELECTRICAL SECTION

MEASURING INSTRUMENTS AND TEST TAPES

1. Low-frequency oscillator . . . . . 20 Hz – 20 kHz
2. Variable resistance attenuator . . . . . 0 – 90 dB, 0.1 or 0.5 dB step
3. AC voltmeter . . . . . Measuring range of 20 Hz – 200 kHz or more, input impedance more than 100 kΩ, and –60 dB or more
4. Frequency counter
5. Oscilloscope
6. Test tape
   - MTT-111 (3 kHz)
   - MTT-215C (10K/315 Hz, –10dB, NORMAL)
   - MTT-150 (400Hz dolby level)
   - AC-512 (blank)
7. How to connect the instrument
   1) Connect a load resistance 22 kΩ, then the AC voltmeter and oscilloscope to the output terminal of deck.
   2) To adjust the recording system, connect the low-frequency oscillator and resistance attenuator to the input terminal of deck.



ADJUSTMENT OF PLAY-BACK SYSTEM

1. ADJUSTING THE PLAY-BACK OUTPUT LEVEL

1) Test tape . . . . . MTT-150 (Dolby level)
2) Location fo adjustment . . . . . Preset control VR102 (L), VR202 (R)
3) Location of detection . . . . . (+) side of electrolytic capacitor C129 (L), C229 (R)
4) Adjustment procedure . . . . . Playback the test tape and adjust untill the output level on the (+) side of C129 and C229 becomes 580 mV ± 0.25 dB.

2. ADJUSTING THE MPX FILTER

1) Setting . . . . . With the deck kept in the specified recording condition, stop the bias oscillator.

2) Location of adjustment . . . . . FL101 (L), FL201 (R)
3) Adjustment procedure . . . . . Apply a 19kHz signal to the input terminal and adjust FL101 and FL201 for minimum output level.

ADJUSTMENT OF RECORDING SYSTEM

1. ADJUSTING THE BIAS FREQUENCY

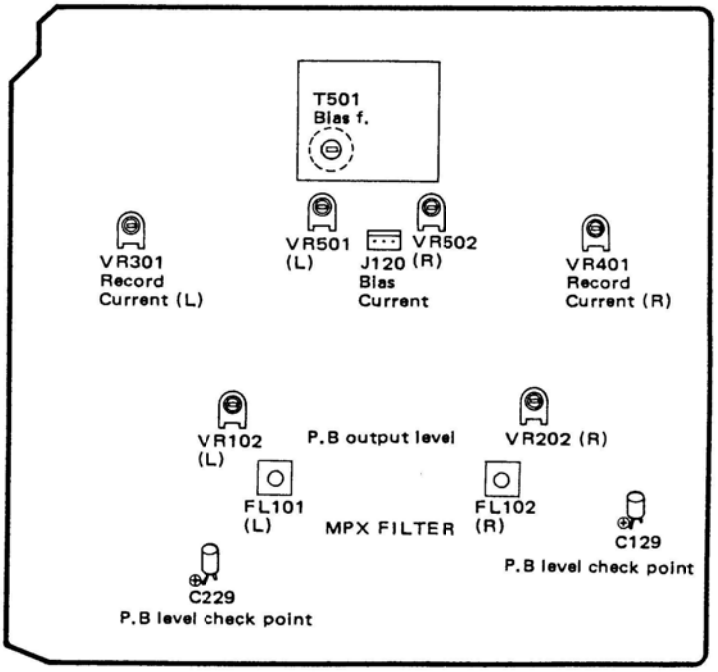
1) Setting . . . . . Connect the frequency counter to pin 1 (L) and pin 3 (R), J120.
2) Location of adjustment T501
3) Adjustment procedure . . . . . Adjust untill the frequency count-indicates 85 kHz.

2. ADJUSTING THE RECORDING CURRENT

1) Setting . . . . . With the deck in a recording state, apply a 400 Hz, −10dB signal. Adjust the RECORDING LEVEL CONTROL control untill a −7 dB output is obtained at the output terminal. Then lower the input level by 30 dB.
2) Test tape AC-512
3) Location of adjustment . . . . . Preset control VR301 (L), VR401 (R)
4) Adjustment procedure . . . . . Adjust so that the output level for recording and play-back of 400 Hz signal is equal to the level for monitoring.

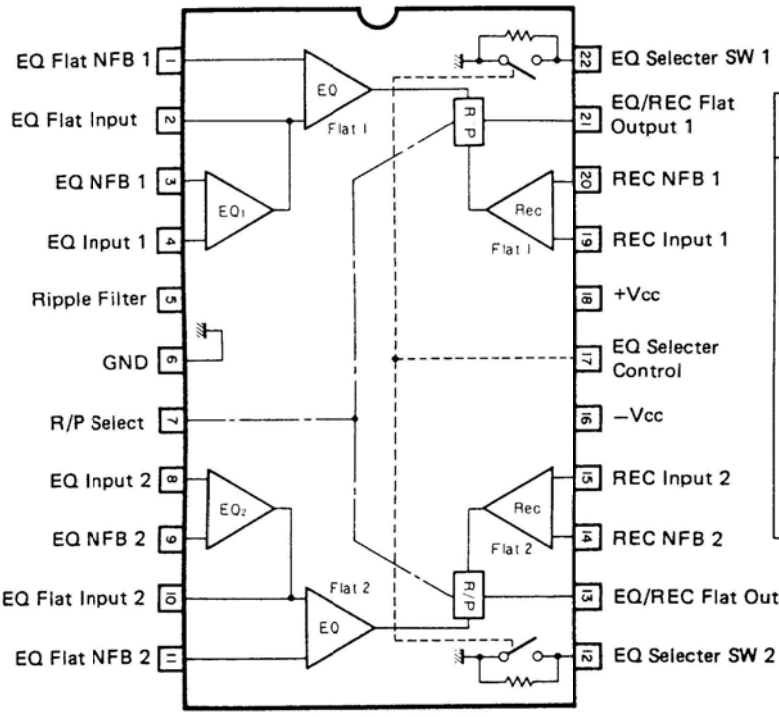
3. ADJUSTING THE BIAS CURRENT

1) Setting . . . . . Same as for the adjustment of recording current described in 2.
2) Test tape AC512
3) Location of adjustment . . . . . Preset control VR-501 (L), VR502 (R)
4) Adjustment procedure . . . . . Adjust so that the level difference of 8 kHz to 400 Hz is +0.5dB, −0dB when recording and play-back 400 Hz and 8 kHz signals.



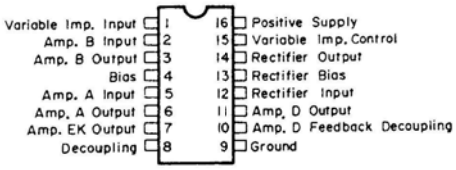
INTERNAL DIAGRAMS AND PINOUT OF INTEGRATED CIRCUITS

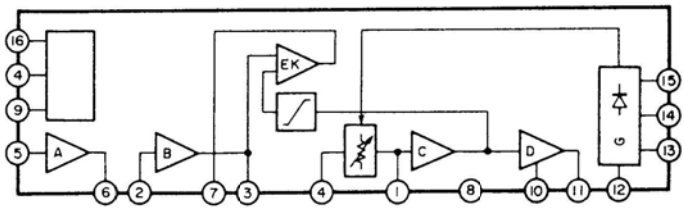
IC101:M51125P



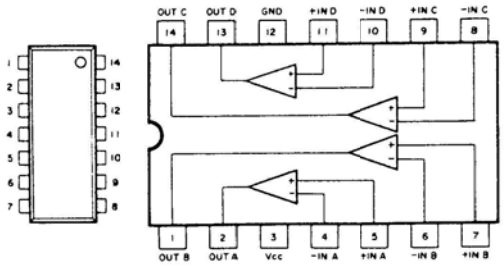
Pin No	REC	PLAY	Pin No	REC	PLAY
1	0V	0V	12	0V	0V
2	0V	0V	13	0V	0V
3	0V	0V	14	0V	0V
4	0V	0V	15	0V	0V
5	0V	0V	16	−5.9V	−5.9V
6	0V	0V	17	4.6V	4.6V
7	2.8V	0.3V	18	5.8V	5.8V
8	0V	0V	19	0V	0V
9	0V	0V	20	0V	0V
10	0V	0V	21	0V	0V
11	0V	0V	22	0V	0V

IC102, 202: TA7629P
Dolby B-NR





IC902: MB4204
Comparator



● COMPARATOR

Pin No. / Mode	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PLAY	4.1V	4.1V	Vcc	✱ 3.0V	4.9V	3.0V	4.9V	✱ 3.0V	4.9V	0.6V	0.6V	GND	5.3V	4.2V
REC	4.1V	4.1V	Vcc	✱ 3.0V	4.9V	✱ 3.0V	4.9V	✱ 3.0V	4.9V	0.6V	0.6V	−	5.3V	4.2V
FF	4.1V	4.1V	Vcc	✱ 3.0V	4.9V	✱ 3.0V	4.9V	✱ 3.0V	4.9V	0.5V	0.5V	−	4.5V	4.2V
REW	4.1V	4.1V	9.4V Vcc	✱ 3.0V	4.9V	✱ 3.0V	4.9V	✱ 3.0V	4.9V	0.5V	0.5V	−	4.3V	4.2V
STOP	4.1V	4.1V	10.4V Vcc	3.0V	4.9V	3.0V	4.9V	3.0V	4.9V	0 V	0 V	−	5.5V	4.2V
PAUSE	4.1V	4.1V	10.2V Vcc	✱ 3.0V	4.9V	✱ 3.0V	4.9V	✱ 3.0V	4.9V	0 V	0 V	−	5.5V	4.2V
FWD	3.4V	4.1V	9.3V Vcc	✱ 3.0V	4.9V	✱ 3.0V	4.0V	✱ 3.0V	4.9V	0.5V	0.5V	−	4.5V	4.2V
REV	4.1V	4.1V	9.3V Vcc	✱ 3.0V	4.9V	✱ 3.0V	4.9V	✱ 3.0V	4.9V	0.5V	0.5V	−	4.4V	4.2V

● Vcc··· 8.6V

IC901:MB884-584K MICROPROCESSOR (MECHANISM CONTROL)

TERMINAL DESCRIPTION OF MECHANISM CONTROL IC

Pin No.	Pin nomenclature	Function		
1	Extal	–	IN	• Clock (3MHz) • 1/2 branched inside to be used as a basic clock (instruction execution time 4MS/STEP)
2	Xtal	–	OUT	
3	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	IN	• Internal initialized with "L" to allow program execution start from an address "0".
4	IRO	TAPE END S. IN.	IN	• Interruption handling with "L" to count the number of pulses. • With the interruption handling unexecuted for the second, the end stop function is actuated (in the TAPE RUN mode).
5	SO	BLANK	OUT	Blank
6	SI	BLANK	IN	Blank
7	$\overline{\text{SC/TO}}$	BLANK	IN, OUT	Blank
8	TC	BLANK	IN	Blank
9	P_0	DA_0	OUT	• D/A control output to produce comparison voltage for key interruption • Output in BCD code. One cycle completed in "F" → "D" → "B" → "9" → "7" → "5" → "3" → "1"
10	P_1	DA_1	OUT	
11	P_2	DA_2	OUT	
12	P_3	DA_3	OUT	
13	O_0	MPSS Z_0	OUT	
14	O_1	MPSS Z_1	OUT	• MPSS set number of skip selection programs/operation display. • Output in BCD code: codes "0" – "8" and "F" used.
15	O_2	MPSS Z_2	OUT	
16	O_3	MPSS Z_3	OUT	
17	O_4	$\overline{\text{HEAO}}$ CONT.	OUT	• Output signal for REC OUT (R_5 Zrpin) and R/P change-over . • "L" in REC.
18	O_5	$\overline{\text{BIAS OSC}}$ CONT.	OUT	• Output signal for ON/OFF of bias oscillation circuit. • "L" in REC PLAN, REC/PLAY/ASPS.
19	O_6	REC MUTE.	OUT	• Output signal for REC MUTE • "H" in MUTE;
20	O_7	PLAY BACK MUTE	OUT	• Output signal for PLAY BACK MUTE (LINE MUTE) • "H" in MUTE.
21	Vss	GND	–	• Ground of power supply.

22	R_0	$\overline{\text{CAM M.}}$ OUT I	OUT	• Cam motor control output signal. • R_0 = "L" and R_1 = "H" output at early stage of power supply application for positioning of stop.
23	R_1	$\overline{\text{CAM M.}}$ OUT I	OUT	
24	R_2	$\overline{\text{REEL M.}}$ OUT_0	OUT	• Reel motor control output signal. • R_2 = "L", R_3 = "H" output during play.
25	R_3	$\overline{\text{REEL M.}}$ OUT_2	OUT	
26	R_4	$\overline{\text{PLAY}}$ OUT	OUT	• Output signal (for display) turning into "L" at PLAY.
27	R_5	$\overline{\text{REC}}$ OUT	OUT	• Output signal (for display) turning into "L" at REC. • Used, together with HEAD CONT (O_4 17p/n), for R/P change-over.
28	R_6	$\overline{\text{PAUSE}}$ OUT	OUT	• Output signal (for display) turning into "L" at PAUSE.
29	R_7	$\overline{\text{ASPS}}$ OUT	OUT	• Output signal (for display) turning into "L" at ASPS.
30	R_8	$\overline{\text{SHORT R.}}$ OUT	OUT	• Control output signal turning into "L" during SHORT REPEAT function. • AMP gain change-over signal for MPSS (MSS).
31	R_9	$\overline{\text{VOLT}}$ OUT.	OUT	• Reel motor voltage control output signal. • "L" at FF/REC, FWD/REV for change-over to high voltage.
32	R_{10}	$\overline{\text{CAPS M.}}$ OUT	OUT	• Capstan motor control output signal. • "L" at PLAY or PAUSE for motor running.
33	R_{11}	$\overline{\text{MPSS}}$ OUT	OUT	• Output signal turning into "L" at program selection of MPSS (MSS).
34	R_{12}	MPSS IN	IN	• "H" (between programs) and "L" (within program) are input for control of heading.
35	R_{13}	$\overline{\text{MEMORY}}$ IN	IN	• Memory function goes ON with ⌐‾. • ON with _⌐ only for MEMORY SHORT REPEAT.
36	R_{14}	ANTI REC IN	IN	• Recording preventive input signal. • "L" input to prevent recording.
37	R_{15}	PLAY POS.	IN	• Head base PLAY position input signal. • "L" input only at PLAY position.
38	K_0	K_0 IN	IN	• Signal input terminal of switches, STOP, PLAY, FWD, and TIMER REC/PLAY. • ON/OFF judged with code value of DA_0 – DA_3
39	K_1	K_1 IN	IN	• Signal input terminal of switches, REC, FF, REW, MPSS RESET, MPSS SET, and SPEED TEST. • ON/OFF judgement with code value of DA_0 – DA_3
40	K_2	K_2 IN	IN	• Signal input terminal of switches, PAUSE, REW, ASPS, and AUTO REPEAT/REW/PLAY. • ON/OFF judgement with code value DA_0 – DA_3
41	K_3	$\overline{\text{O. POS.}}$	IN	• Position input signal, which is "L" at each position (STOP, FF/REW, PASE, PLAY) of head base.
42	Vcc	= 5V		• ± 5V power supply

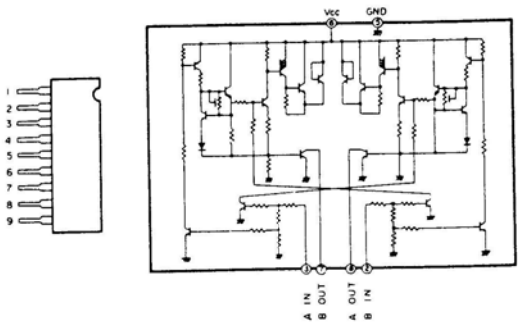
Next Mode	1 Input STOP	1 Input FF	1 Input REW	1 Input PLAY	1 Input PAUSE	2 Input REC/ PAUSE	2 Input REC/ PLAY	3 Input REC/ PLAY/ ASPS	1 Input REC/	1 Input ASRS	1 Input (MPSS) (MSS) REV	1 Input (MPSS) (MSS) FWD	Note 2) (MPSS) (MSS) PLAY
STOP	→	FF (1)	REW (2)	PLAY (3)	PAUSE (4)	REC/ PAUSE/ (5)	REC/ PLAY/ (6)	REC/ PLAY ASPS/ (7)	→	→	REV (8)	FWD (9)	
FF	STOP (10)	→	REW (11)	* PLAY (12)	→	→	* REC/ PLAY (13)	* REC/ PLAY/ ASPS/ (14)	→	→	REV (15)	FWD (16)	
REW	STOP (17)	FF (18)	→	* PLAY (19)	→	→	* REC/ PLAY/ (20)	* REC/ PLAY/ ASPS/ (21)	→	→	REV (22)	FWD (23)	
PLAY (MPSS) (MSS)	▲ STOP (24)	FF (25)	REW (26)	→	▲ PAUSE (27)	▲ REC/ PAUSE/ (28)	REC/ PLAY (29)	REC/ PLAY/ ASPS (30)	→	→	REV (31)	FWD (32)	
PAUSE	STOP (33)	FF (34)	REW (35)	PLAY (36)	→	REC/ PAUSE/ (37)	REC/ PLAY/ (38)	REC/ PLAY/ ASPS/ (39)	→	→	Note 1) REV (40)	Note 1) FWD (41)	
REC/ PAUSE	STOP (42)	FF (43)	REW (44)	REC/ PLAY (45)	→	→	REC/ PLAY/ (45)	REC/ PLAY/ ASPS/ (46)	→	→	* REV (47)	* FWD (48)	
REC/ PLAY	▲ STOP (49)	FF (50)	REW (51)	→	▲ REC/ PAUSE/ (52)	▲ REC/ PAUSE (52)	→	REC/ PLAY/ ASPS/ (53)	→	REC/ PLAY/ ASPS/ (93)	* REC (54)	* FWD (55)	
REC/ PLAY/ ASPS	▲ STOP (56)	FF (57)	REW (58)	REC/ PLAY/ (59)	▲ REC/ PAUSE/ (60)	▲ REC/ PAUSE (60)	REC/ PLAY/ (59)	→	→	→	* REV (61)	* FWD (62)	
(MPSS) (MSS) REV	STOP (63)	FF (64)	REW (65)	* PLAY (66)	* PAUSE (67)	→	* REC/ PLAY/ (68)	* REC/ PLAY ASPS/ (69)	→	→	→	(70)	* (MPSS) (MSS) PLAY (66)
(MPSS) (MSS)	STOP (72)	FF (73)	REW (74)	* PLAY (76)	* PAUSE (76)	→	* REC/ PLAY/ (77)	* REC/ PLAY/ ASPS/ (78)	→	→	REC (78)	→	* (MPSS) (MSS) PLAY (75)

- ▲ — Rewinding
- * — Function via stop
- → — Indicates continuation of current mode
- X — No combination

Note 1) When PAUSE → REV : FWD is effectuated, PAUSE state is obtained in the order of a selected program and a next program.

Note 2) This state is a short repeat (repetition of one program) function set only within the mechanical control.

IC903, 904: BA6208
Reel Motor
Cam Motor Drive



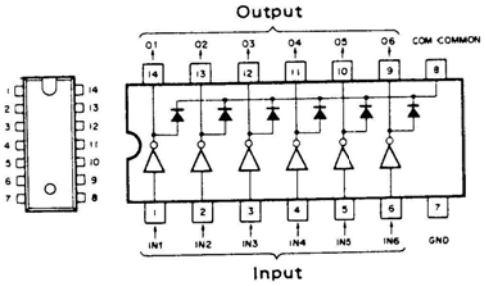
● DRIVE VOLTAGE (REEL MOTOR)

Pin No. / Mode	1	2	3	4	5	6	7	8	9
STOP	10.5V	2.8V	2.8V	0 V	0 V	5.7V	0 V	0 V	0 V
PLAY	8.8V	3.1V	0 V	0 V	0.7V	5.6V	4.6V	0.9V	0 V
FF	9.3V	3.1V	0 V	0 V	0.5V	8.4V	7.5V	0.6V	0 V
REW	9.4V	0 V	3.0V	0 V	0.5V	8.4V	0.6V	7.5V	0 V

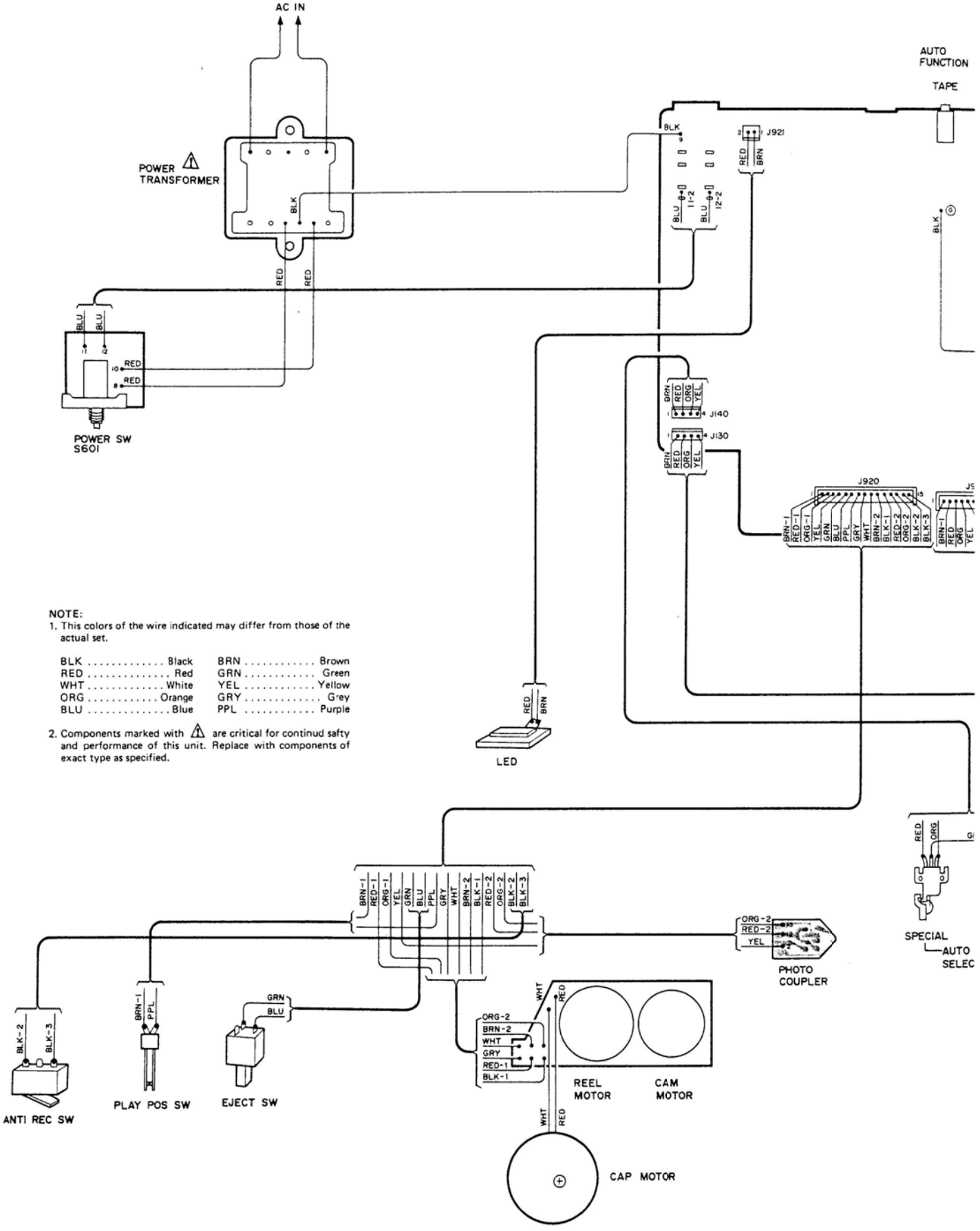
● TRUTH TABLE

AIN	BIN	B OUT	A OUT	Motor
1	1	L	L	Short
1	0	H	L	+
0	2	L	H	–
0	0	–	–	Open

IC905: M54527P
Interface



WIRING DIAGRAM

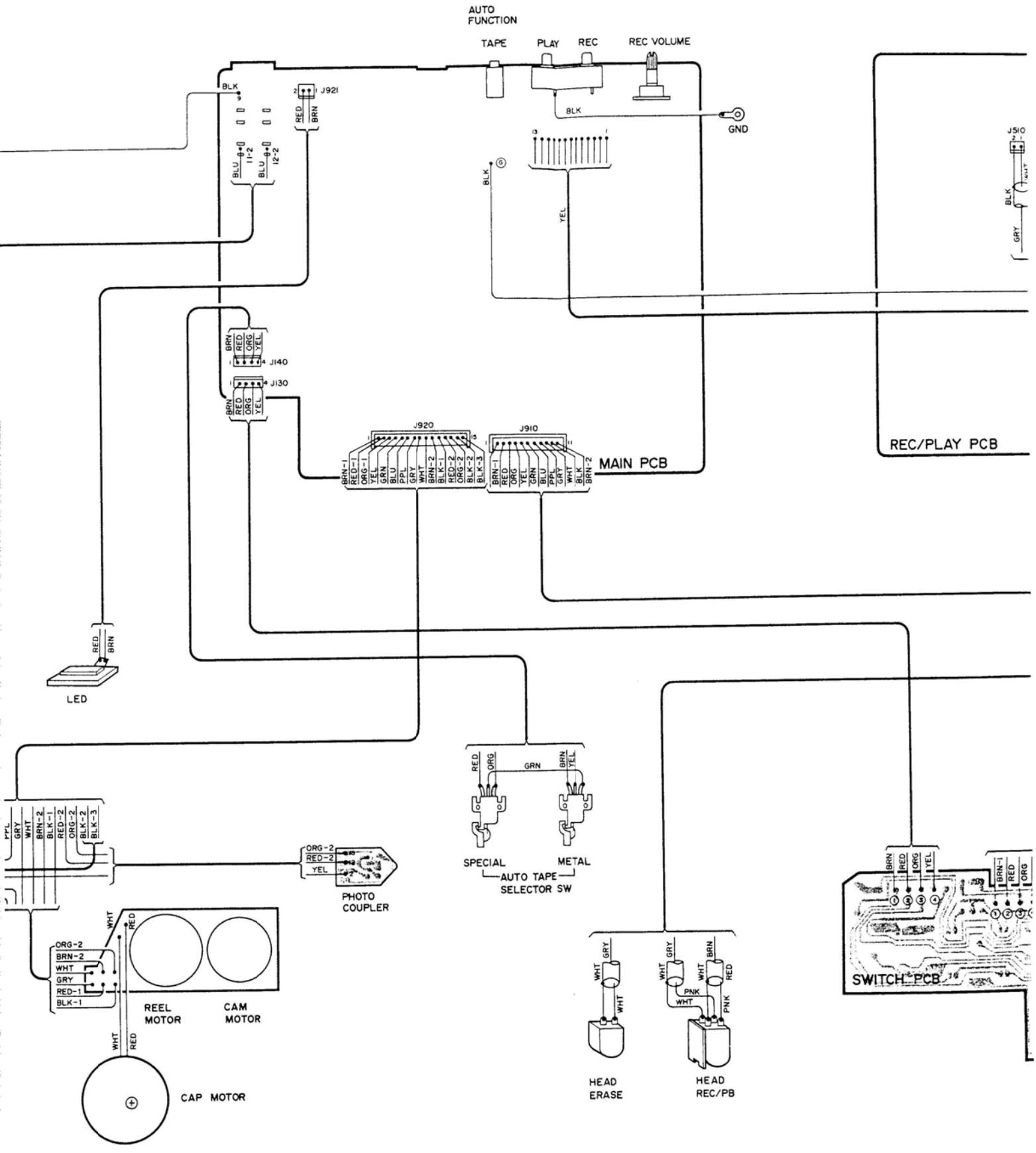


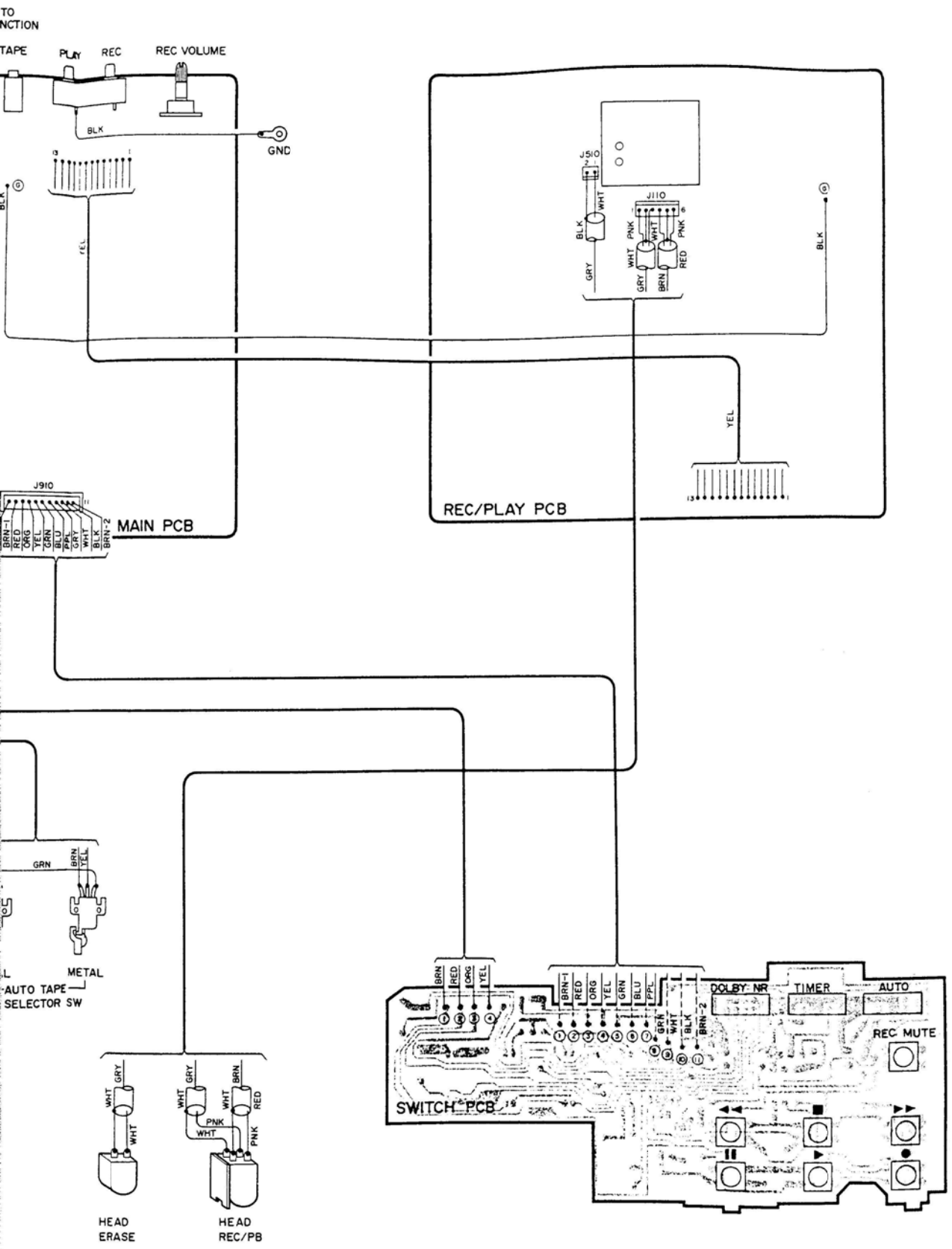
NOTE:

1. This colors of the wire indicated may differ from those of the actual set.

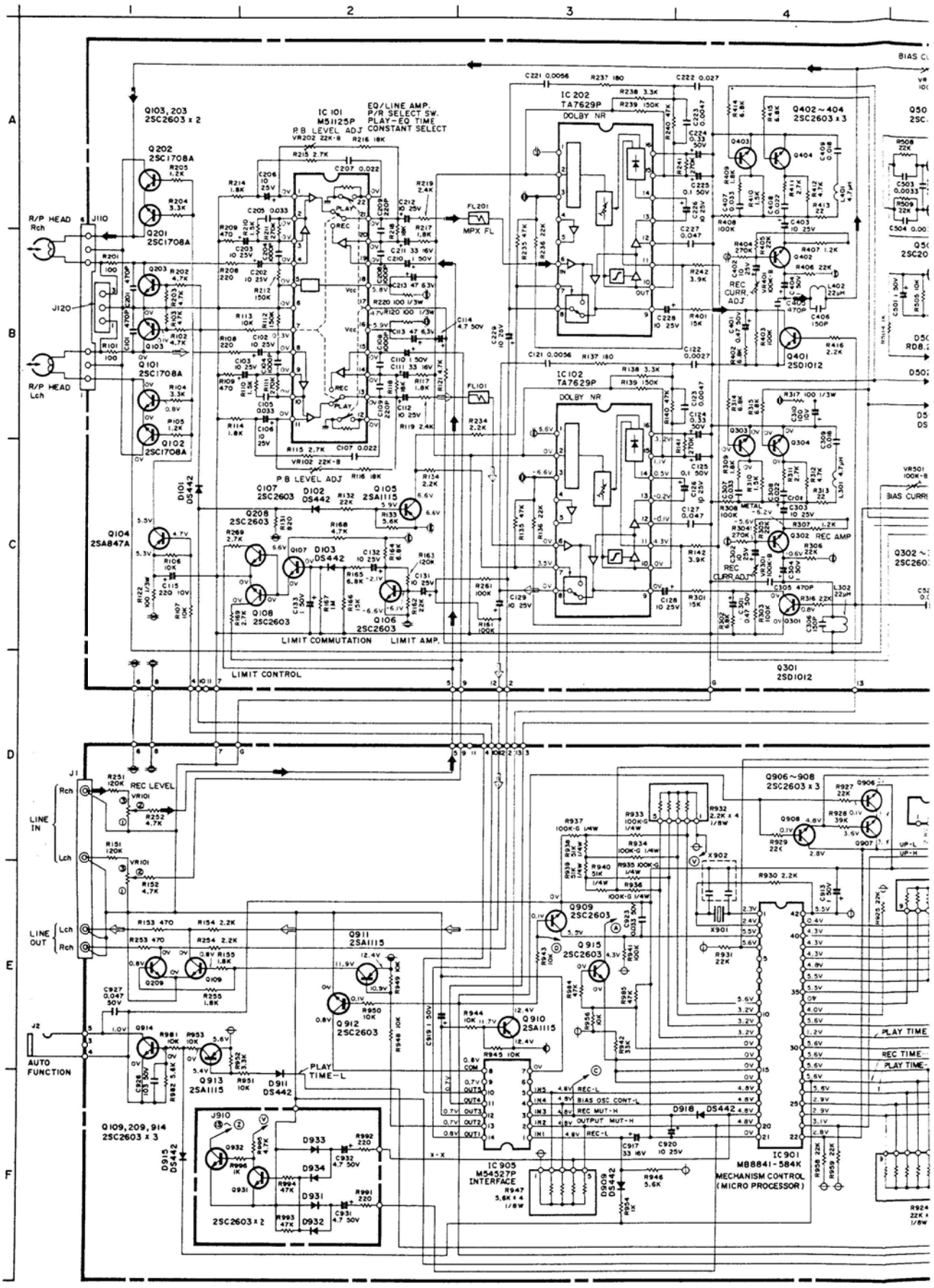
BLK	Black	BRN	Brown
RED	Red	GRN	Green
WHT	White	YEL	Yellow
ORG	Orange	GRY	Grey
BLU	Blue	PPL	Purple

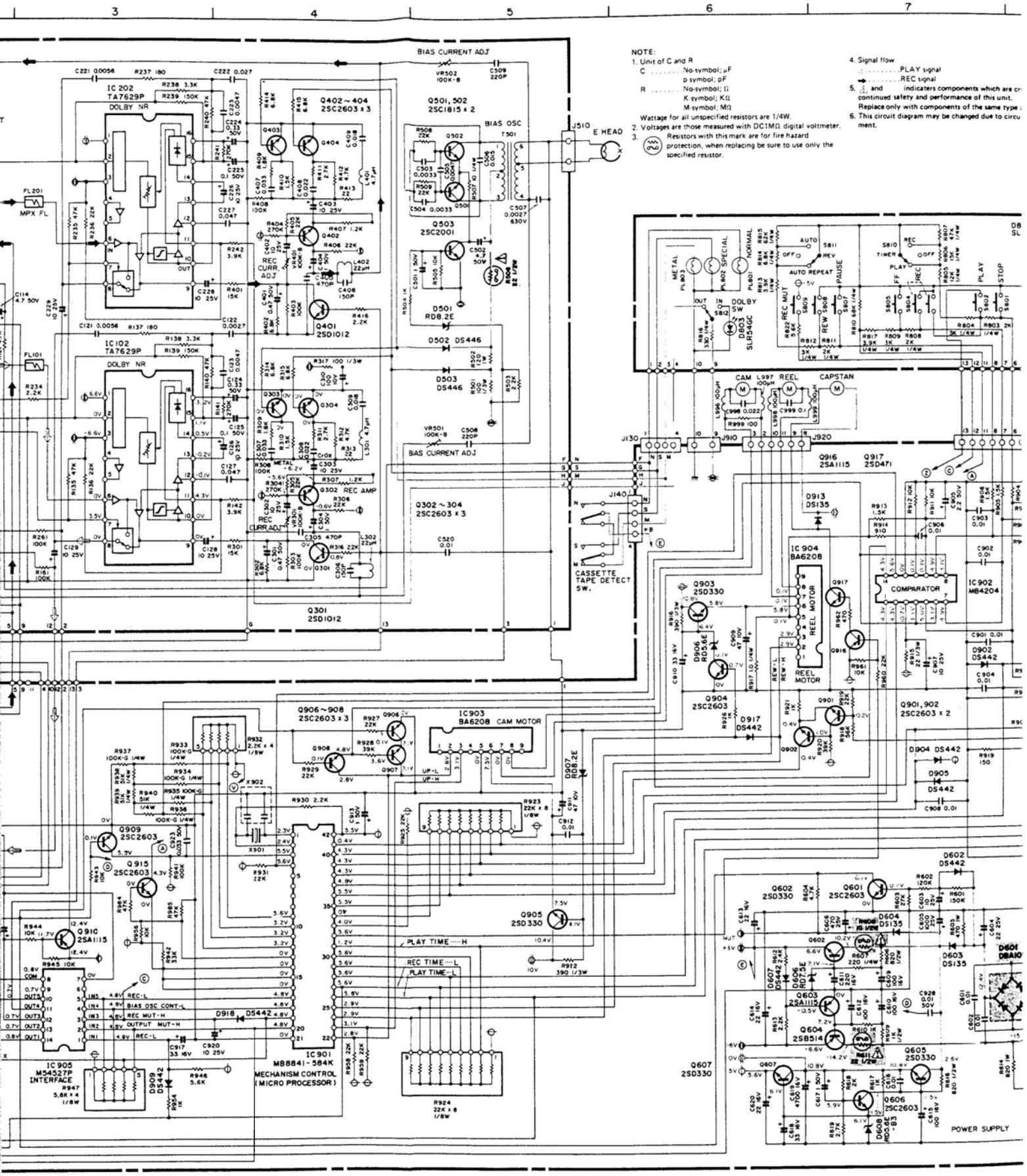
2. Components marked with ⚠ are critical for continud safty and performance of this unit. Replace with components of exact type as specified.


AUTO FUNCTION
TAPE
PLAY
REC
REC VOLUME
GND
J921
J140
J130
J920
J910
MAIN PCB
REC/PLAY PCB
J510
LED
SPECIAL
METAL
AUTO TAPE SELECTOR SW
PHOTO COUPLER
REEL MOTOR
CAM MOTOR
CAP MOTOR
HEAD ERASE
HEAD REC/PB
SWITCH PCB


TO
NCTION
TAPE
PLAY
REC
REC VOLUME
BLK
GND
YEL
J910
BRN-1
RED
ORG
YEL
GRN
BLU
PPL
GRY
WHT
BLK
BRN-2
MAIN PCB
REC/PLAY PCB
J510
J110
WHT
BLK
PNK
GRY
BRN
RED
GRN
METAL
AUTO TAPE
SELECTOR SW
HEAD
ERASE
HEAD
REC/PB
SWITCH PCB
DOLBY NR
TIMER
AUTO
REC MUTE

SCHEMATIC DIAGRAM




3
4
5
6
7
BIAS CURRENT ADJ
IC 202
TA7629P
DOLBY NR
Q402~404
2SC2603 x 3
BIAS OSC
E HEAD
Q501, 502
2SC1815 x 2
Q503
2SC2001
D501
RD8.2E
D502 DS446
D503
DS446
Q401
2SD1012
IC 102
TA7629P
Q302 REC AMP
Q302~304
2SC2603 x 3
Q301
2SD1012
CASSETTE
TAPE DETECT
SW.
Q916
2SA1115
Q917
2SD471
IC 904
BA6208
REEL MOTOR
COMPARATOR
IC 902
M84204
Q903
2SD330
Q904
2SC2603
Q901, 902
2SC2603 x 2
Q906~908
2SC2603 x 3
IC 903
BA6208 CAM MOTOR
Q909
2SC2603
Q915
2SC2603
Q910
2SA1115
Q905
2SD330
Q907
2SD330
IC 905
M54527P
INTERFACE
IC 901
M88841-584K
MECHANISM CONTROL
(MICRO PROCESSOR)
PLAY TIME ····H
REC TIME ····L
PLAY TIME ····L
Q602
2SD330
Q601
2SC2603
Q603
2SA1115
Q604
2SB514
Q605
2SD330
Q606
2SC2603
POWER SUPPLY
NOTE:
1. Unit of C and R
C ..... No-symbol; μF
p-symbol; pF
R ..... No-symbol; Ω
K-symbol; KΩ
M-symbol; MΩ
Wattage for all unspecified resistors are 1/4W.
2. Voltages are those measured with DC1MΩ digital voltmeter.
3. Resistors with this mark are for fire hazard protection, when replacing be sure to use only the specified resistor.
4. Signal flow
..... PLAY signal
..... REC signal
5. and indicaters components which are cr
continued safety and performance of this unit.
Replace only with components of the same type
6. This circuit diagram may be changed due to circu
ment.