

CDP-EX100

SERVICE MANUAL

AEP Model
UK Model
E Model



This set is the CD player section in
MHC-EX50/EX70AV/EX100AV.

Model Name Using Similar Mechanism	CDP-EX10
CD Mechanism Type	CDM28-5BD19
Base Unit Name	BU-5BD19

SPECIFICATIONS

CD player

System	Compact disc and digital audio system
Laser	Semiconductor laser ($\lambda=780$ nm) Emission duration: continuous
Laser output	Max 44.6 μ W* * This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture.
Wavelength	780 - 790 nm
Frequency response	2 Hz - 20 kHz (± 0.5 dB)
Signal-to-noise ratio	More than 105 dB
Dynamic range	More than 95 dB
Outputs	CD OUT (phono jacks): Output level 2 V (at 50 kilohms) Load impedance over 10 kilohms CD DIGITAL OPTICAL OUT (Square optical connector jack, rear panel): wave length 660 nm output level -18 dBm

Dimensions

Approx. 280 x 82.5 x 280 mm (11 1/8 x 3 1/4 x 11 1/8 in) (w/h/d) incl. projecting parts and controls	
Mass	Approx. 2.1 kg (4 lb 10 oz)

Design and specifications are subject to change without notice.



COMPACT DISC PLAYER
SONY®

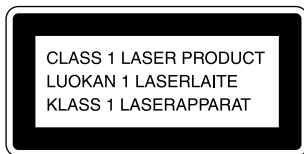
The laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

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The following caution label is located inside of the unit.

CAUTION	; INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL	; USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSÅBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	; AVATTAESSA JA SUOJALUKITUS OHITETTAESSA DLET ALTTIINA LASERSÄTEILYLLE.
WARNING	; LASERSTRÅLING NÅR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URÖPPPLAD.
ADVARSEL	; USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN.



This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Notes on Chip Component Replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.

During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.

The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30 cm away from the objective lens.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK \triangle OR DOTTED LINE WITH MARK \triangle ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1 SERVICE NOTE


• How to operate with a single unit

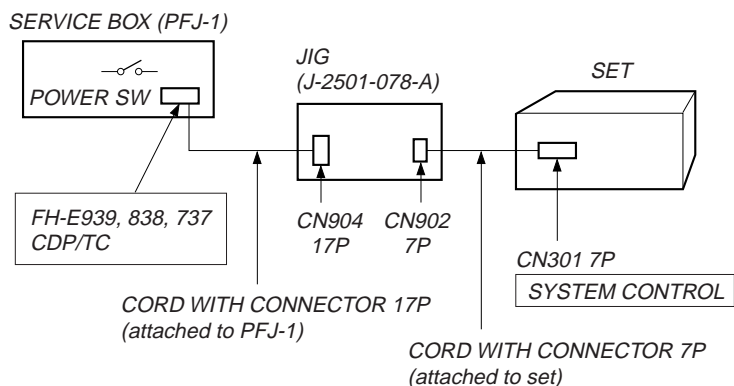
Normally this set does not operate with a single unit.

When you must be mending, connect to other unit.



If the SYSTEM POWER switch of the amplifire is set to ON, the power supply of the set is turned on.

In case of other unit is nothing, the service box (PFJ-1) and exclusive jig (J-2501-078-A) are necessary to operate the set with a single unit.


In case of above mentioned, press the  button and **TIME** button at the same time, to enter the power on.



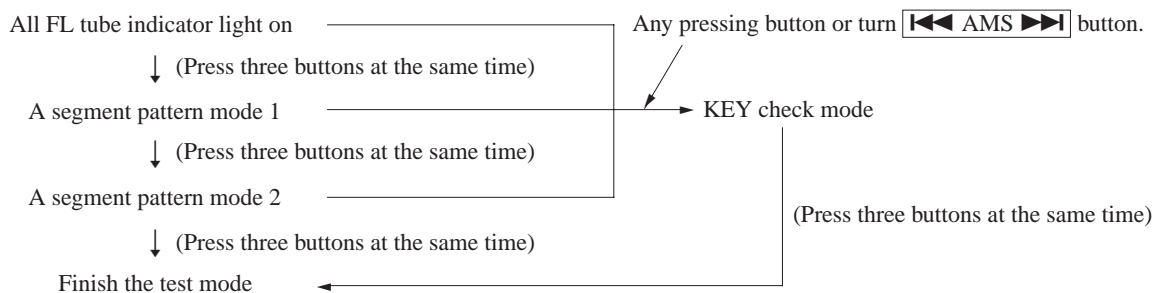
• FL tube/ KEY check mode

After to enter the power on, when  button, **TIME** button and  button are pressed at the same time, you will be check FL tube.

Whenever press the above mentioned three buttons at the same time, change to check mode of FL tube.

Under check mode of FL tube when any pressing button or turn  button, change to KEY check mode.


To finish KEY check mode, press the above mentioned three buttons at the same time.



Note 1)

All FL tube light on mode is kept when three buttons which is pressed to enter all FL tube light on mode, release at the same time. If you will be release failure them, it is moved to KEY check mode after all FL tube light on mode.

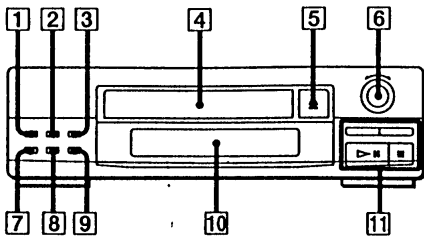
Note 2)

Under KEY check mode, every time and button pressed or  button turned on, figure on "KEY=" of FL tube is increased.

SECTION 2 GENERAL

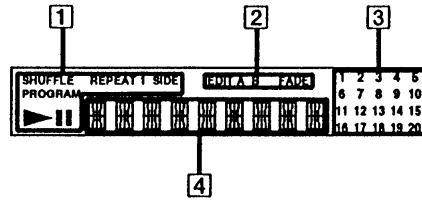
This section is extracted from instruction manual.

Front Panel



- 1 PLAY MODE button (8, 15)
- 2 REPEAT button (9)
- 3 TIME button (7)
- 4 Disc tray (7)
- 5 OPEN/CLOSE button (open/close of the disc tray) (7, 13)
- 6 AMS control (8, 15)
- 7 EDIT button (14, 15)
- 8 CHECK button (9, 15)
- 9 CLEAR button (9)
- 10 Display window (7, 14, 15)
- 11 CD player operating buttons
 - ◀▶ (manual search) (8)
 - ▶|| (play/pause) (7, 14)
 - (stop) (7, 13)

Display Window

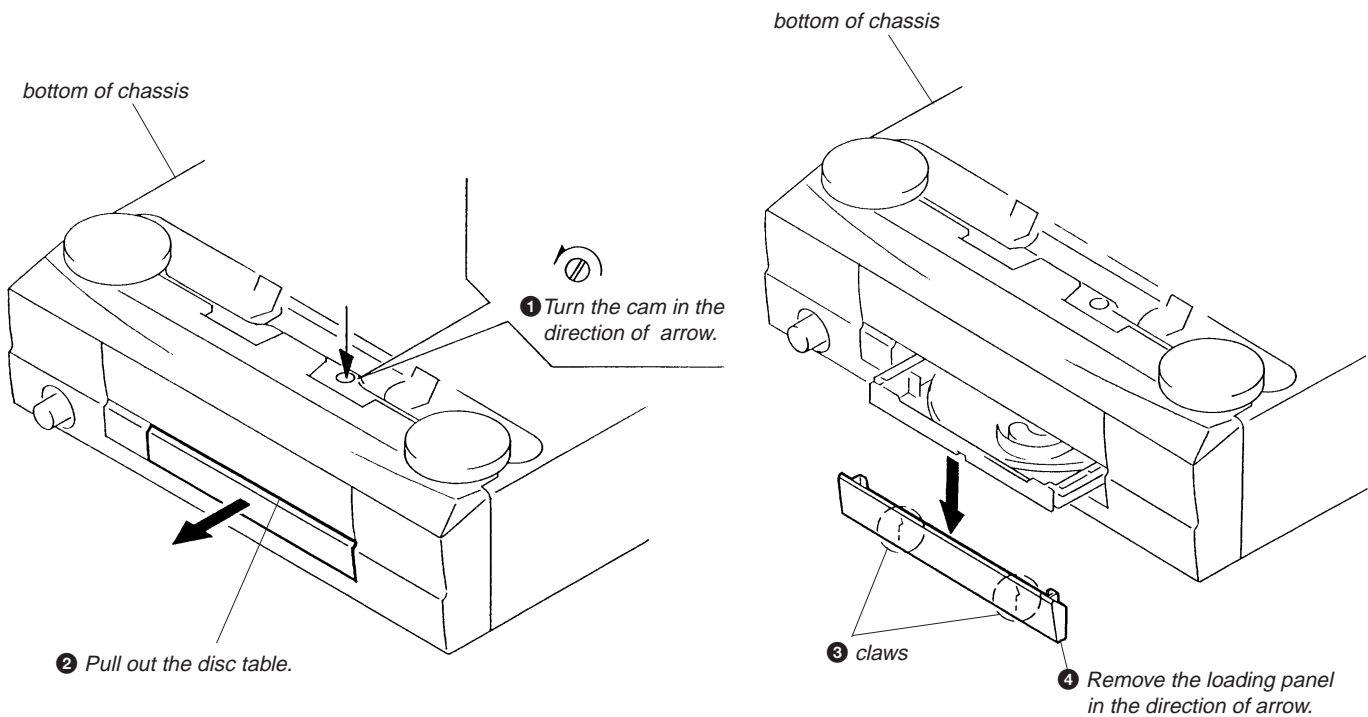


- 1 CD play mode indication (7)
- 2 CD edit mode indication (14)
- 3 Music calendar (7, 14)
- 4 Step/track number/playing time indication (7, 9, 14)

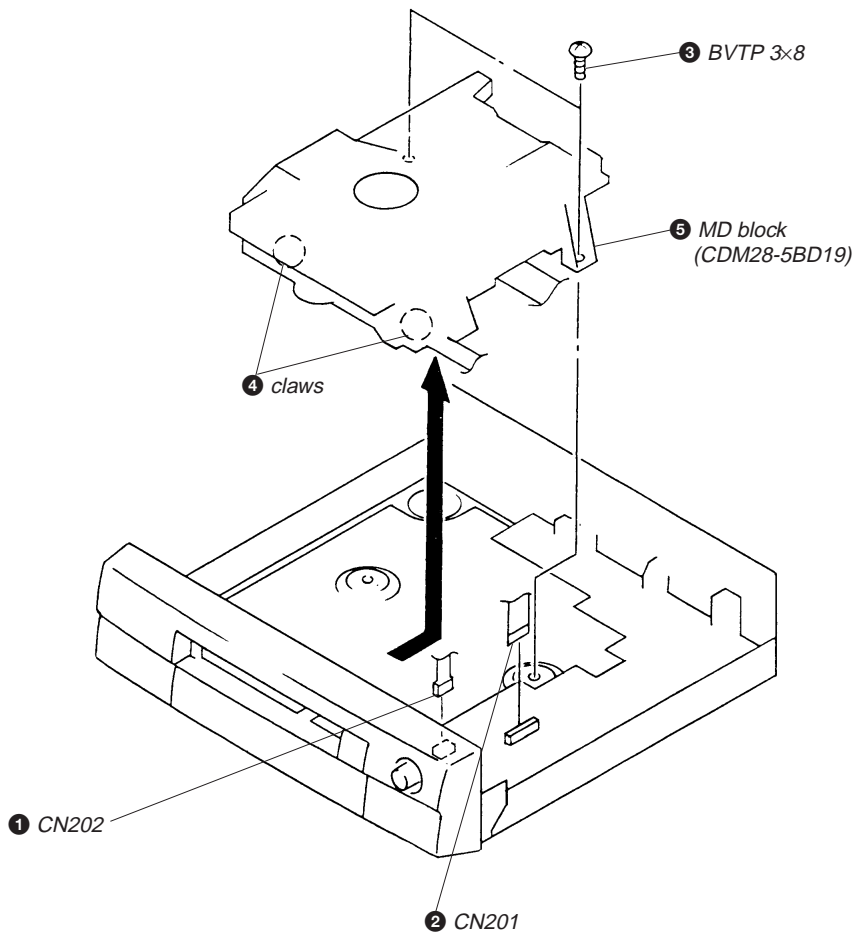
SECTION 3 DISASSEMBLY

Note : Follow the disassembly procedure in the numerical order given.

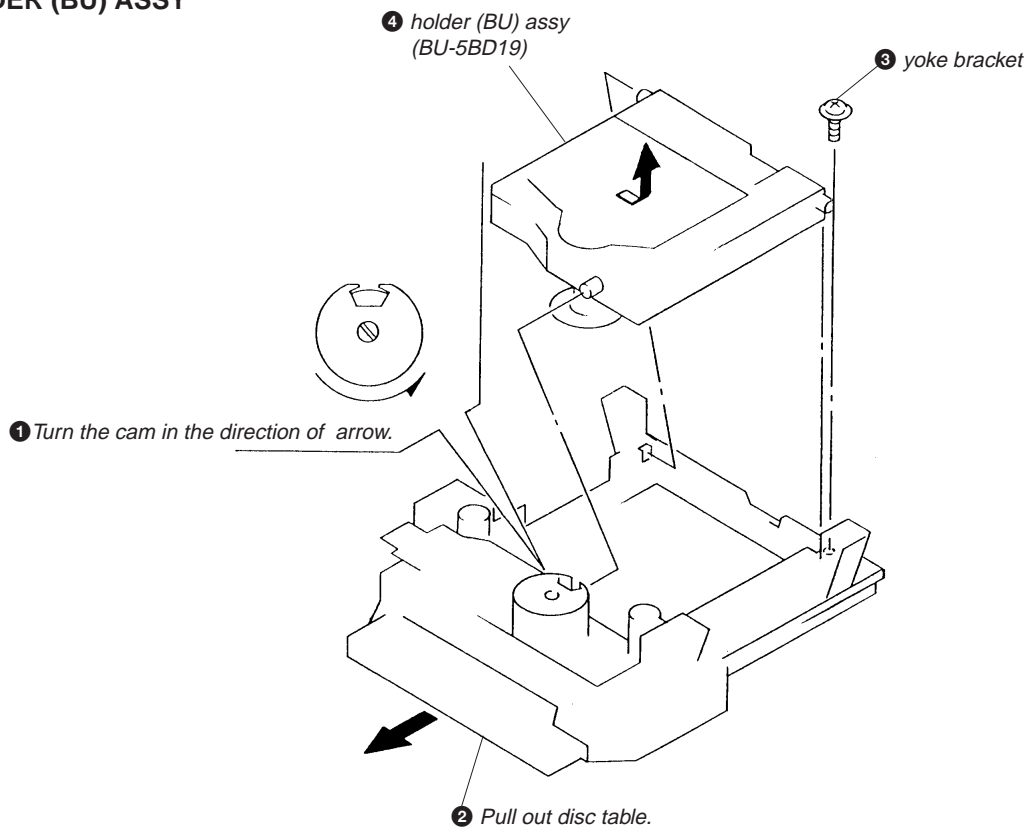
3-1. LOADING PANEL



3-2. MD BLOCK



3-3. HOLDER (BU) ASSY

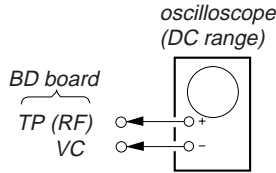


SECTION 4 ELECTRICAL ADJUSTMENTS

Note :

1. Basically designed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (3-702-101-01) unless otherwise indicated.
3. Use an oscilloscope with more than 10MΩ impedance.
4. Clean the objective lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.
5. Adjust the focus bias adjustment when optical block is replaced.

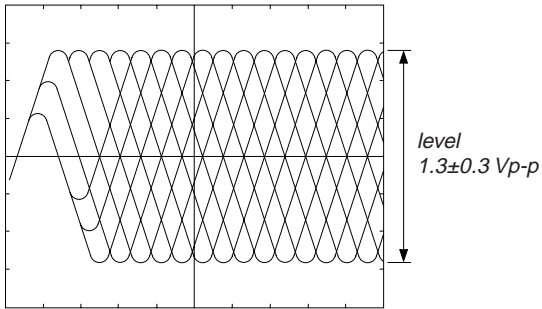
Focus Bias Adjustment



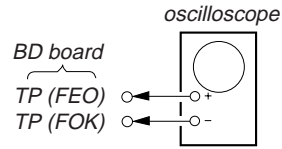
Procedure:

1. Connect oscilloscope to test point TP (RF). (GND terminal : VC)
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Adjust RV101 so that the waveform is clear.
(Clear RF signal waveform means that the shape “◇” can be clearly distinguished at the center of the waveform.)
5. After adjustment, check the RF signal level.

- RF signal
VOLT/DIV : 200 mV
TIME/DIV : 500 nS



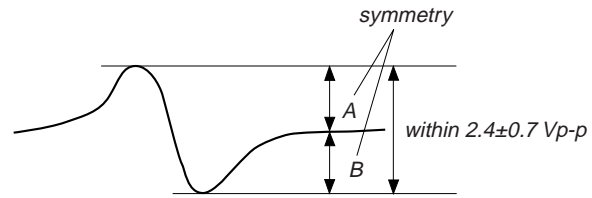
S Curve Check



Procedure:

1. Connect oscilloscope to test point TP(FEO).
2. Connect between test point TP(FOK)and GND by lead wire.
3. Turn Power switch on.
4. Put disc (YEDS-18) in and turn Power switch on again and actuate the focus search. (In case of using SERVICE BOX actuate the focus search when disc table is moving in and out.)
5. Check the oscilloscope waveform (S-curve) is symmetrical between A and B. And confirm peak to peak level within 2.4±0.7 Vp-p.

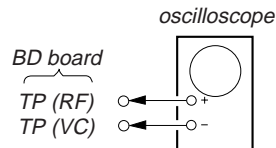
S-curve waveform



6. After check, remove the lead wire connected in step 2.

- Note :**
- Try to measure several times to make sure that the ratio of A:B or B:A is more than 10:7.
 - Take sweep time as long as possible and light up the brightness to obtain best waveform.

RF Level Check



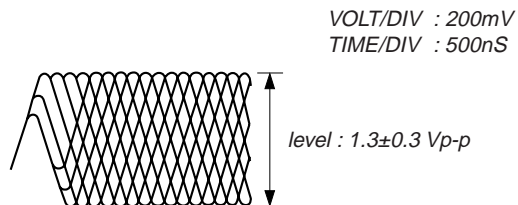
Procedure:

1. Connect oscilloscope to test point TP (RF) on BD board.
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

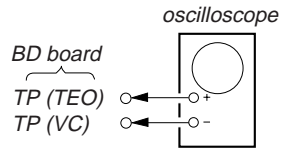
Note :

Clear RF signal waveform means that the shape “◇” can be clearly distinguished at the center of the waveform.

RF signal waveform



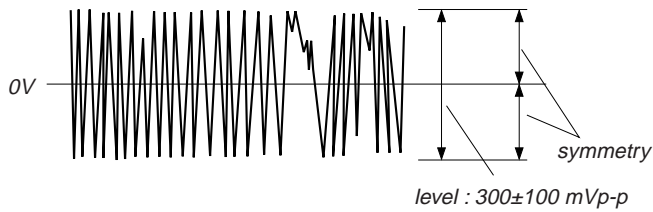
E-F Balance Check



Procedure:

1. Connect oscilloscope to test point TP (TEO).
2. Turn Power switch on.
3. Connect pin ② of IC60I on the PANEL board to GND with a lead wire.
4. Put disc (YEDS-18) in and playback.
5. Push TIME button.
6. Confirm that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0Vdc, and check this level.

Traverse waveform



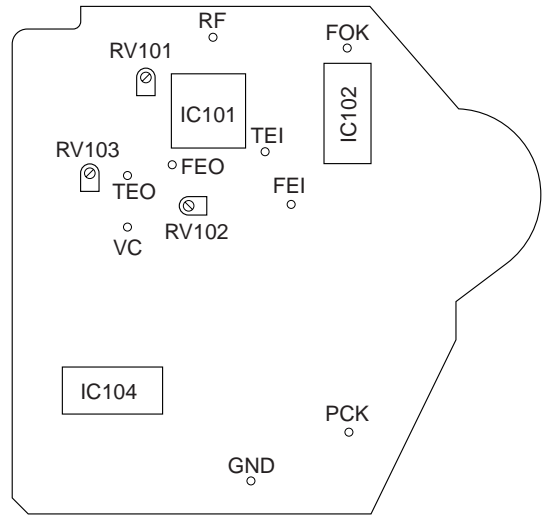
7. Remove the lead wire connected in step 3.

Focus/Tracking Gain Adjustment (RV102, 103)

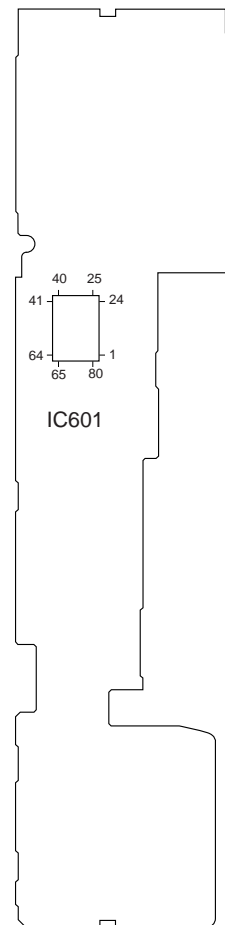
This gain has a margin, so even if it is slightly off. There is no problem. Therefore, do not perform this adjustment. Please note that it should be fixed to mechanical center position when you moved and do not know original position.

Adjustment Location :

[BD BOARD] (Conductor Side)



[PANEL BOARD] (Conductor Side)



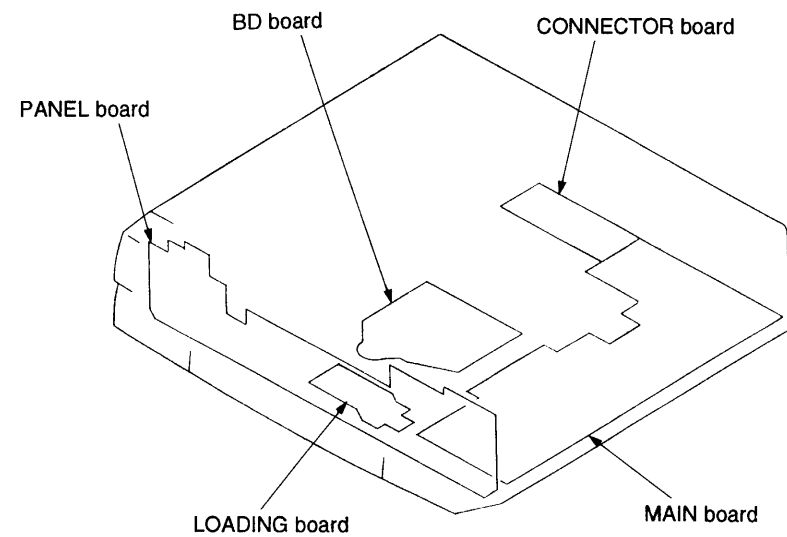
SECTION 5 DIAGRAMS

5-1. IC PIN FUNCTION

• IC601 μ PD78044AGF (SYSTEM CONTROL, FL DRIVER)

Pin No.	Pin Name	I/O	Function
1-7	T6-T0	O	FL display grid output
8	VDD	—	+5V power supply
9	CLK	O	Serial clock output to DSP (CXD2507AQ).
10	DATA	O	Serial data output to DSP (CXD2507AQ).
11	—	—	Fixed at Ground.
12	XLAT	O	Serial data latch pulse output to DSP (CXD2507AQ).
13	PRGL	O	Serial data latch pulse output to D/F DAC (PCM1710U).
14	SQCLK	O	Sub code Q data read clock output to DSP (CXD2507AQ).
15	—	—	Not used. (Open)
16	SUBQ	I	Sub code Q data input from DSP (CXD2507AQ).
17	RESET	I	System reset input (“L”= Active)
18	INSW	I	S292 (load in switch) input
19	OUTSW	I	S291 (load out switch) input
20	AVSS	—	Ground
21	LDOUT	O	Output for rotating M903 (loading motor) in the loading out direction.
22	LDIN	O	Output for rotating M903 (loading motor) in the loading in direction.
23	ADJ	I	Test mode input. (“L”= Stops GFS check)
24	AFADJ	I	Test mode input. Fixed at “H”. (“L”= Test mode)
25	MODE	I	Not used. (Fixed at “H”.)
26-28	KEY2-KEY0	I	Key AD input
29	AVDD	—	+5V power supply
30	AVREF	—	+5V power supply
31	—	—	Fixed at Ground.
32	—	—	Not used. (Open)
33	VSS	—	Ground
34	X1	I	Clock input (5MHz)
35	X2	O	Clock output (5MHz)
36	BDRST	O	BD reset output
37	BDPOWER	O	BD power ON/OFF output
38	—	—	Not used. (Open)
39	SENS	I	SENS input from DSP (CXD2507AQ).
40	AMUTE	O	Not used. (Open)
41	FSW	O	Focus switch output
42	BSOUT	O	Audio bus output
43	—	—	Not used. (Open)
44	SCOR	I	Sub code sync S0+S1 detection input
45	JOG1	I	JOG input
46	—	—	Not used. (Open)
47	BSIN	I	Audio bus input
48	IC (VPP)	—	Connected to Ground.
49	JOG0	I	JOG input
50, 51	—	—	Not used. (Open)
52	VDD	—	+5V power supply
53-70	S22-S5	O	FL display segment output
71	VLOAD	—	-28V power supply for driving FL display.
72-76	S4-S0	O	FL display segment output
77-80	T10-T7	O	FL display grid output

5-2. CIRCUIT BOARDS LOCATION

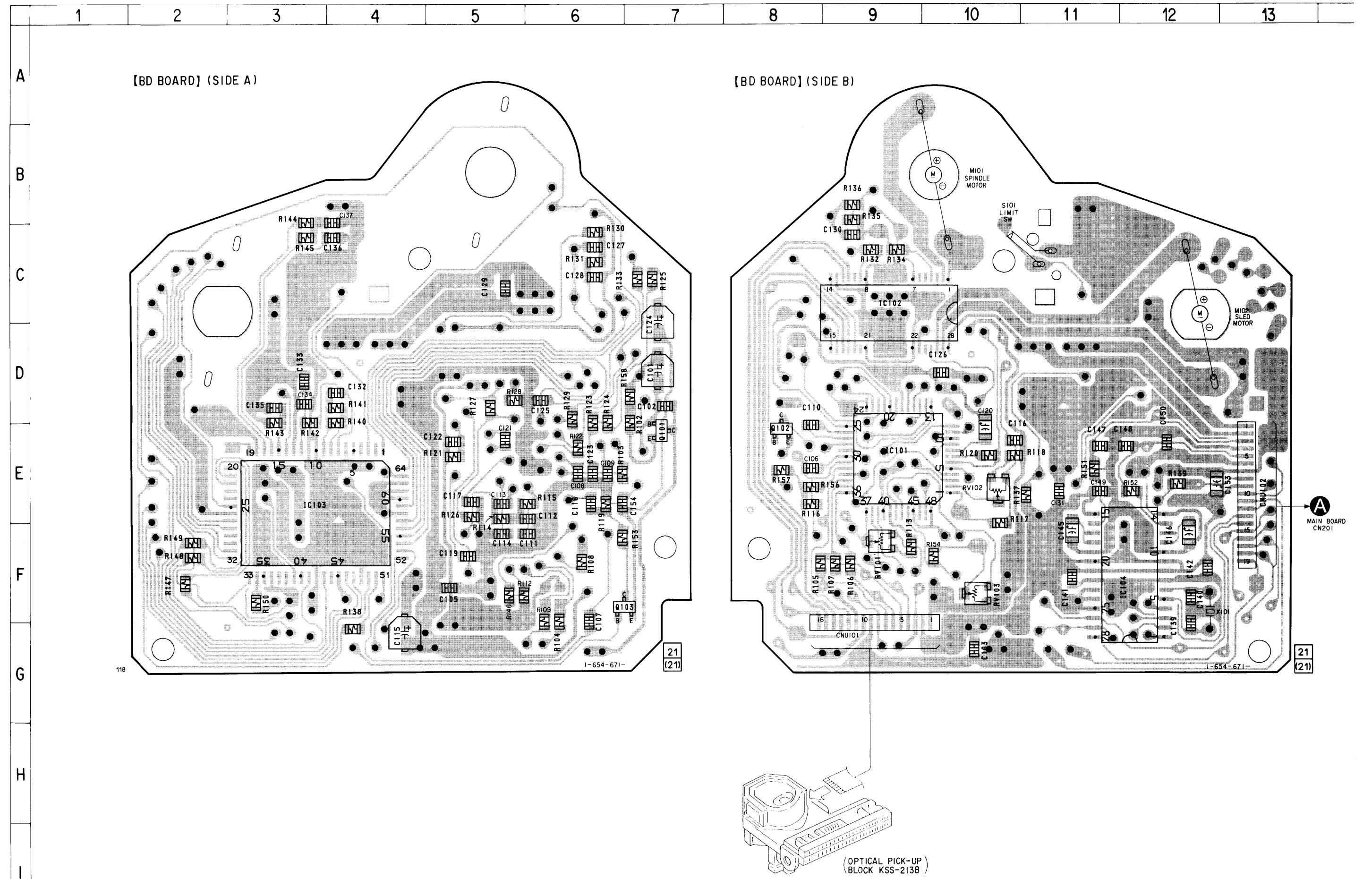


• Semiconductor Location

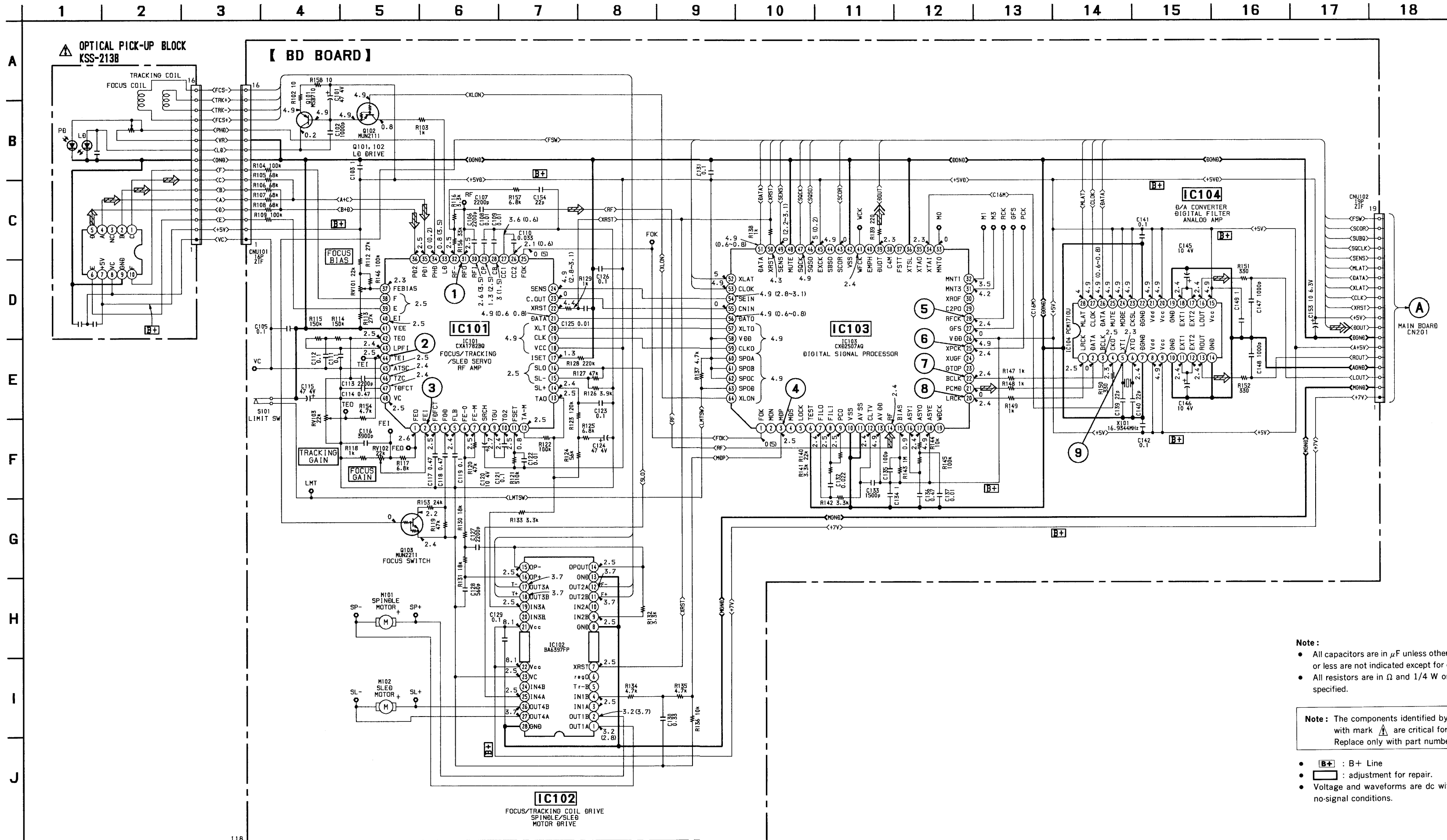
Ref. No.	Location
IC101	E-9
IC102	C-9
IC103	E-3
IC104	F-12
Q101	E-7
Q102	E-8
Q103	F-6

Note :
 • : Through hole.
 • : Pattern on the side which is seen.
 (The other layer's patterns are not indicated.)

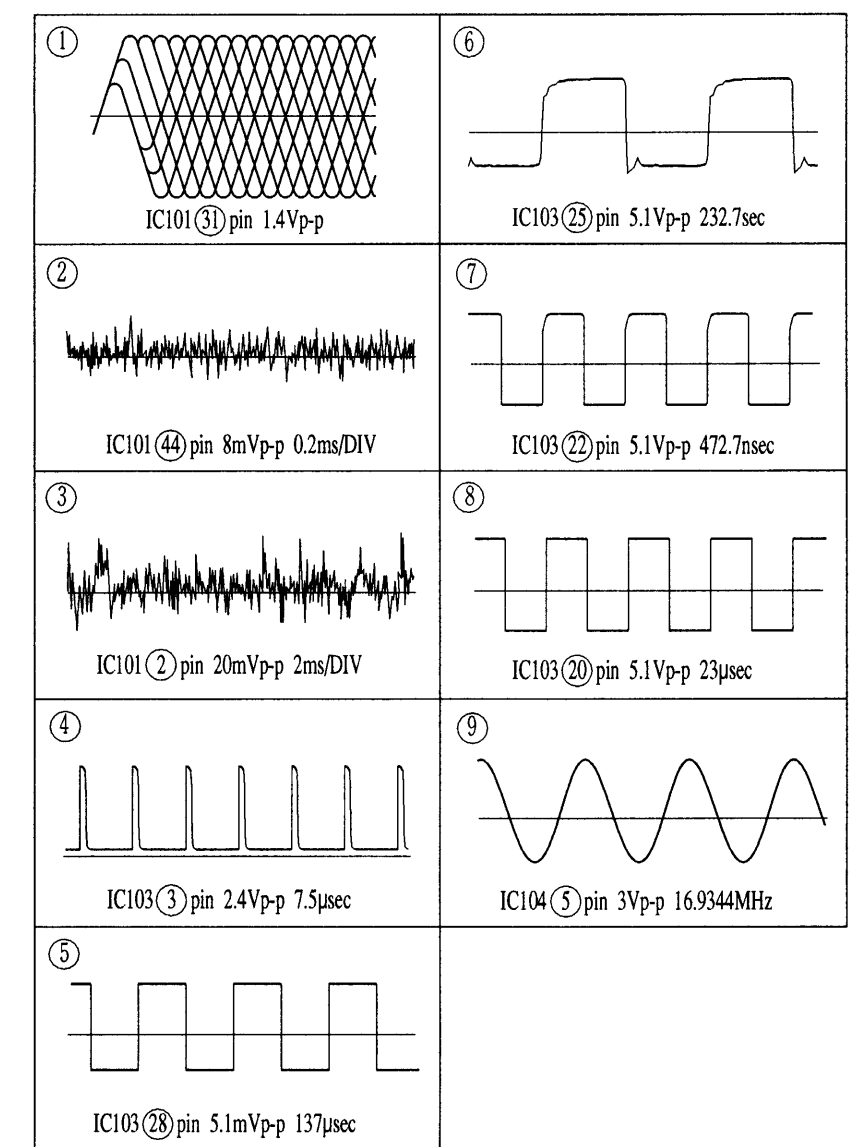
5-3. PRINTED WIRING BOARD — BD SECTION —



5-4. SCHEMATIC DIAGRAM — BD SECTION — • Refer to page 23 for IC Block Diagrams.



• Waveforms



Note:

- All capacitors are in μF unless otherwise noted. pF : μF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.

Note: The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

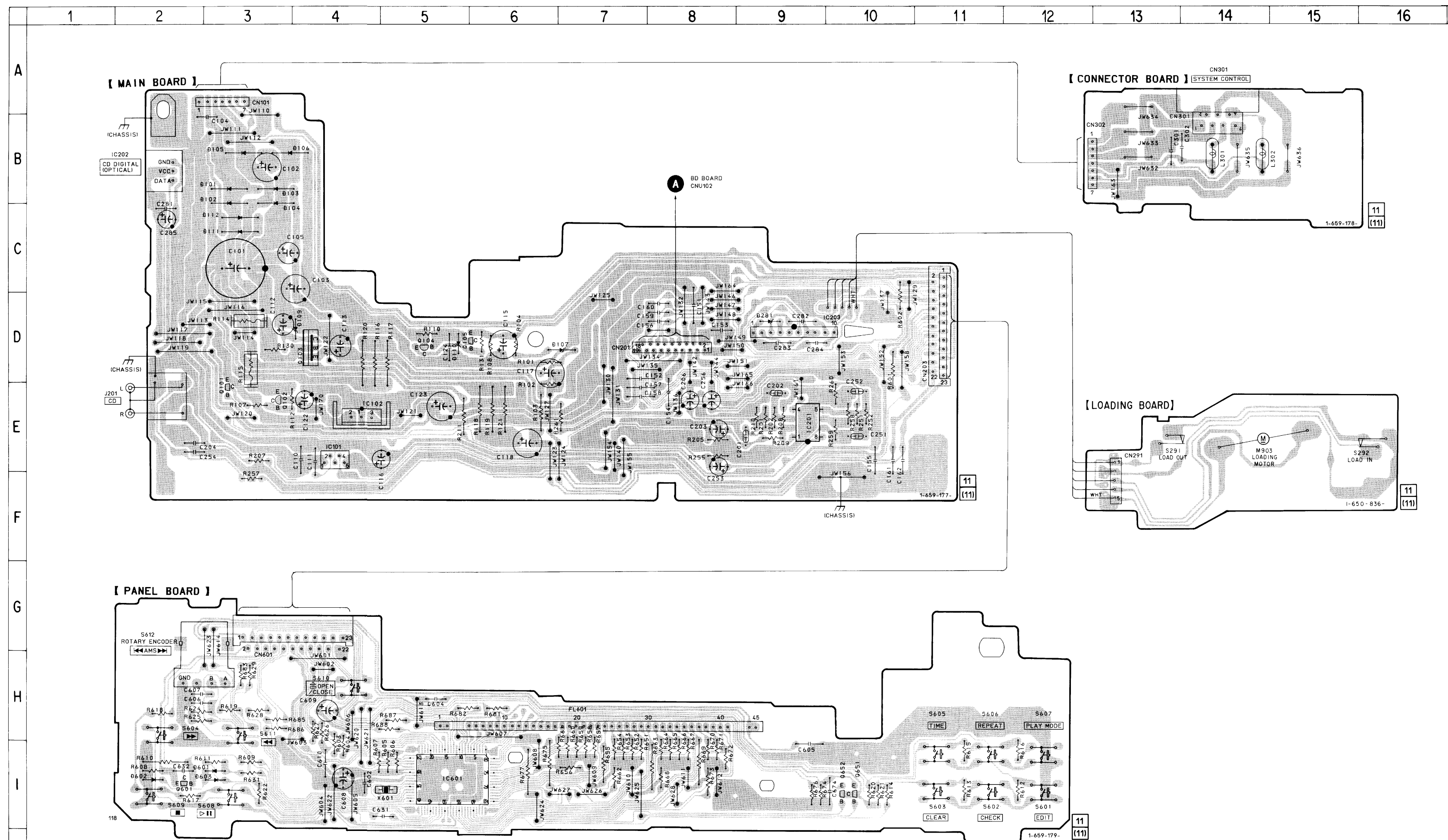
- B+ : B+ Line
- \square : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.

- no mark: STOP () : PLAY
- Voltages are taken with a VOM (Input Impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with an oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
- \rightarrow : CD
- \rightarrow : digital out

• Semiconductor Location

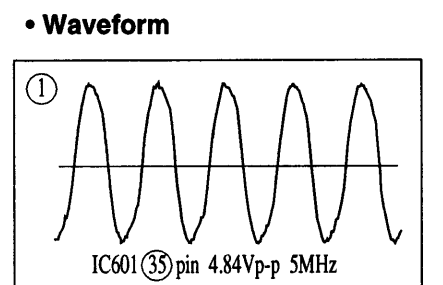
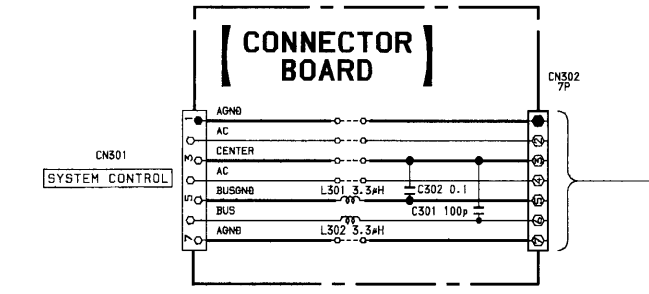
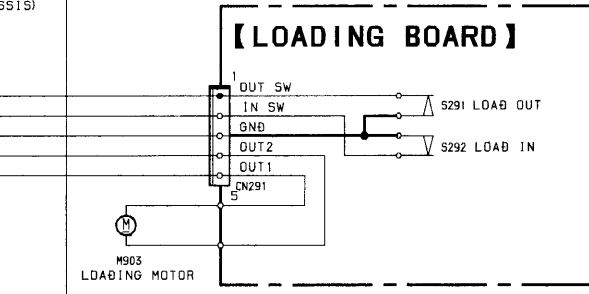
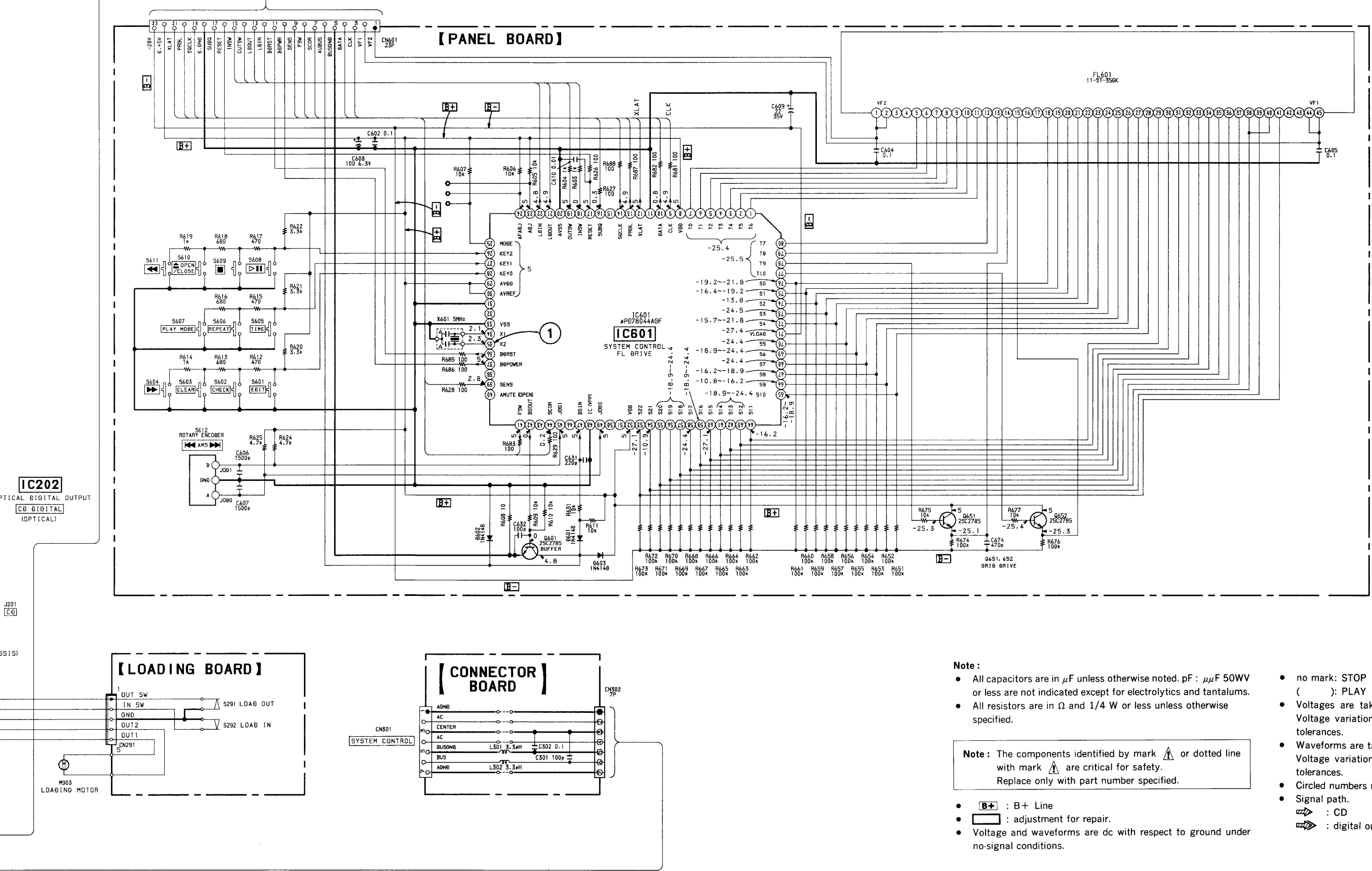
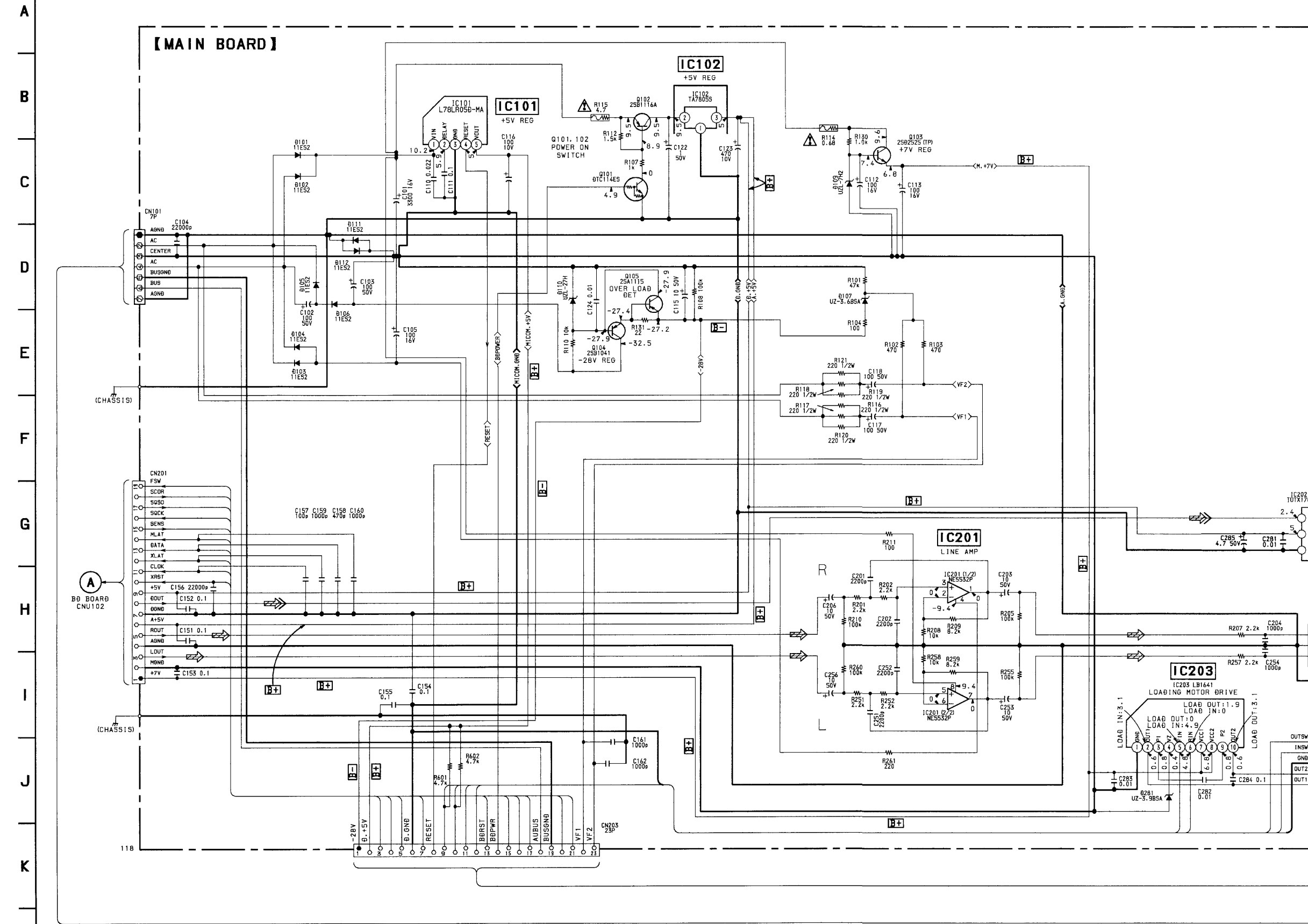
Ref. No.	Location
D101	B-3
D102	B-3
D103	B-3
D104	B-3
D105	B-3
D106	B-3
D107	D-7
D109	D-4
D110	D-5
D111	C-3
D112	C-3
D281	D-9
D601	I-3
D602	I-2
D603	I-3
IC101	E-4
IC102	E-4
IC201	E-9
IC202	B-2
IC203	D-9
IC601	I-5
Q101	E-3
Q102	E-3
Q103	D-4
Q104	D-5
Q105	D-5
Q601	I-2
Q651	I-10
Q652	I-10

Note:
 • : Through hole.
 • : Pattern on the side which is seen.
 (The other layer's patterns are not indicated.)



5-6. SCHEMATIC DIAGRAM — MAIN SECTION — • Refer to page 23 for IC Block Diagrams.

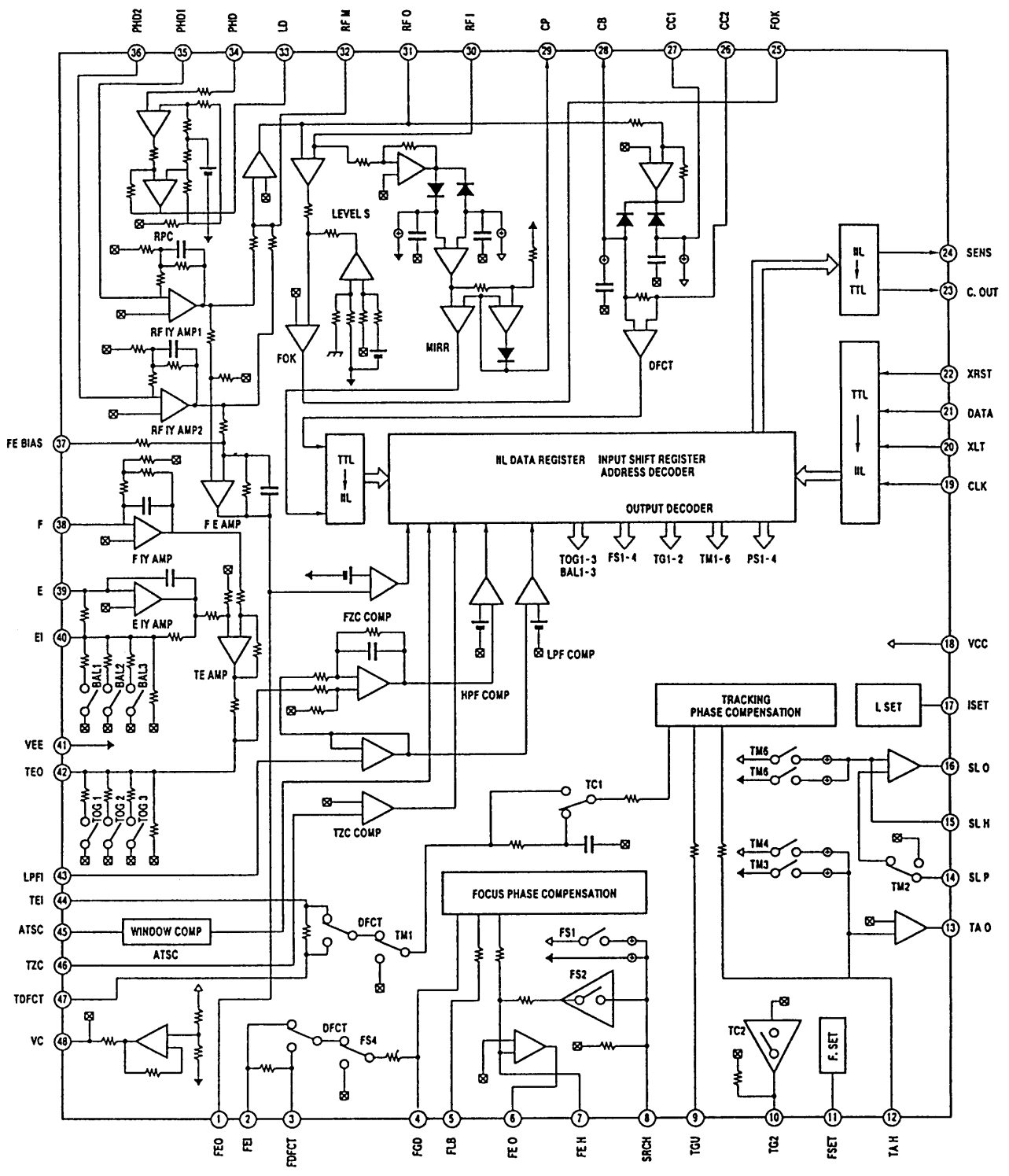
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33



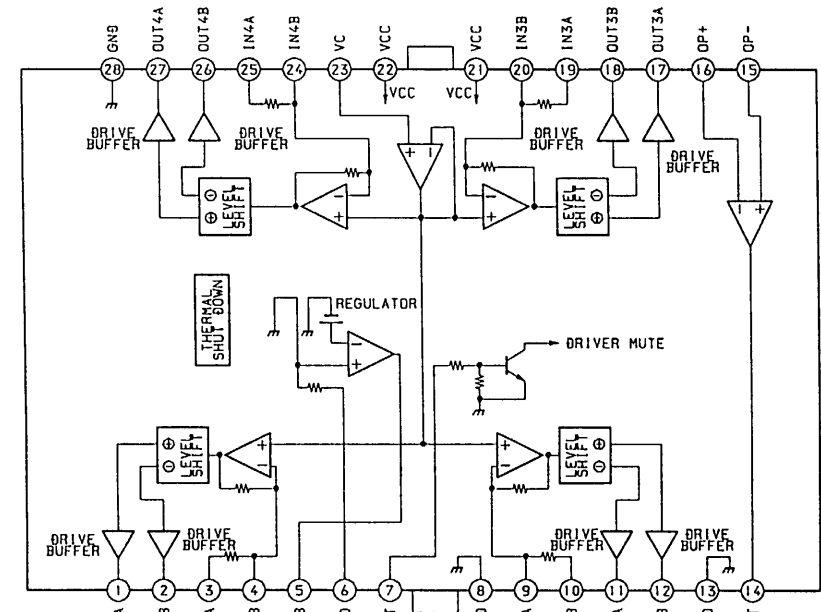
- Note:**
- All capacitors are in μF unless otherwise noted. $\text{pF} = \mu\mu\text{F}$ 50WV or less are not indicated except for electrolytics and tantalums.
 - All resistors are in Ω and 1/4 W or less unless otherwise specified.
 - no mark: STOP () : PLAY
 - Voltages are taken with a VOM (Input Impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.
 - Waveforms are taken with an oscilloscope. Voltage variations may be noted due to normal production tolerances.
 - Circled numbers refer to waveforms.
 - Signal path.
 - CD : digital out
- Note:** The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.
- B+ : B+ Line
 - Δ : adjustment for repair.
 - Voltage and waveforms are dc with respect to ground under no-signal conditions.

• IC Block Diagrams

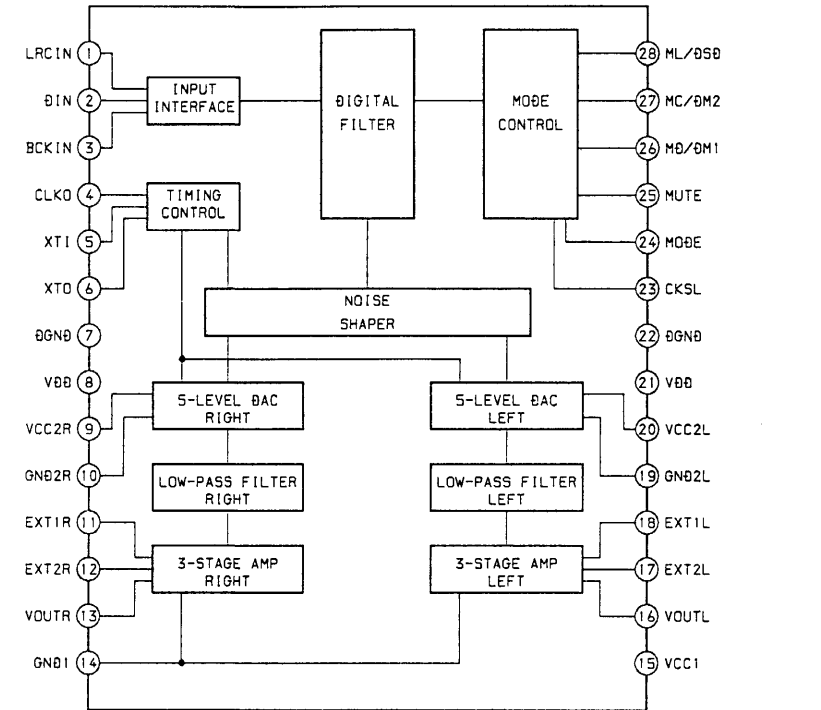
IC101 CXA1782BQ (BD Board)



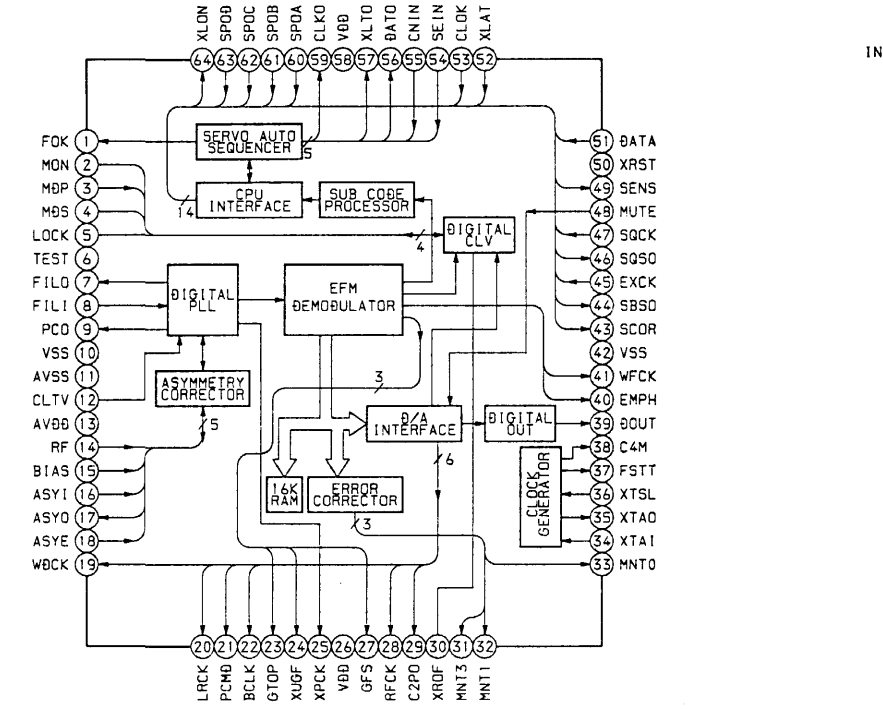
IC102 BA6397FP



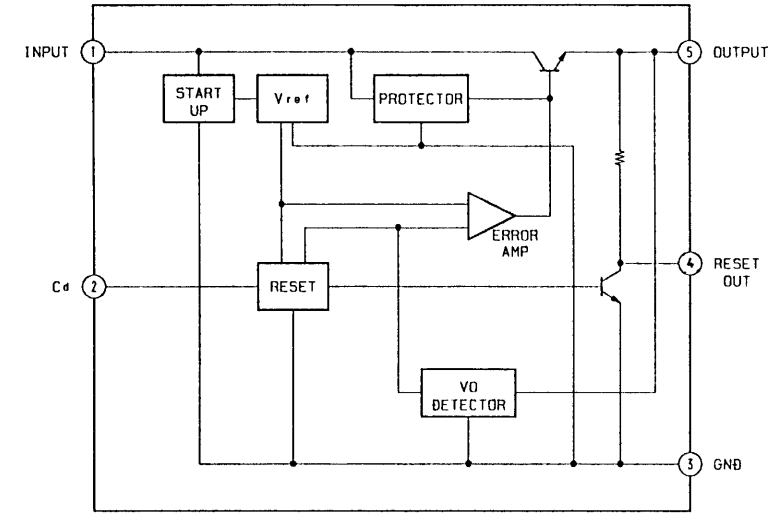
IC104 PCM1710U



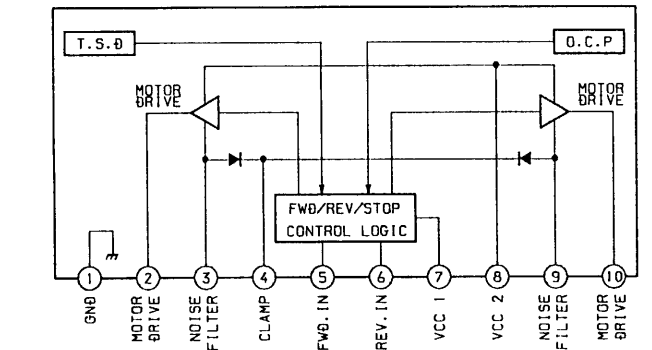
IC103 CXD2507AR



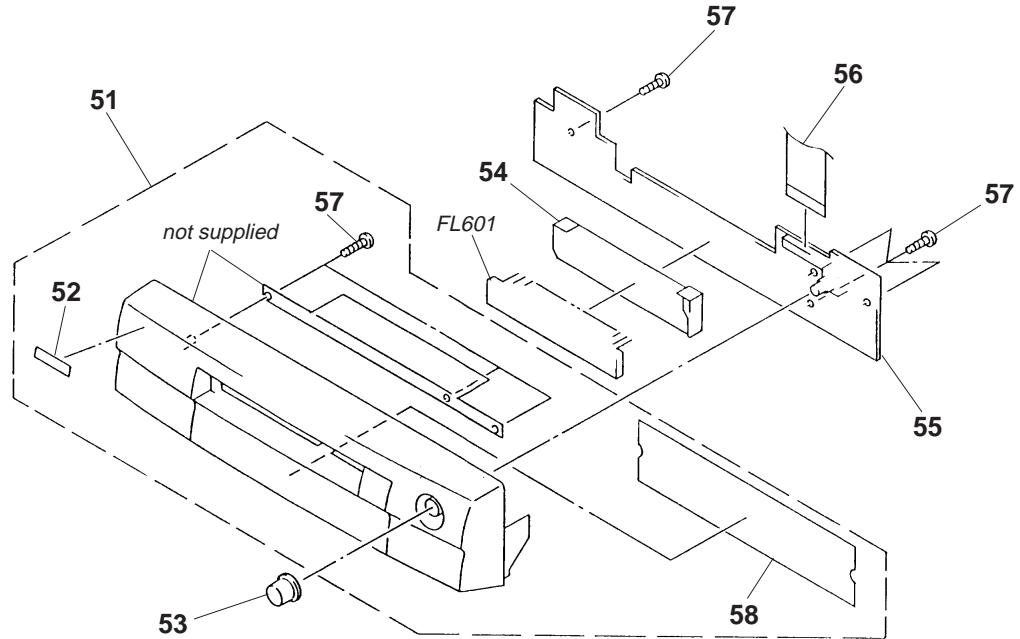
IC101 L78LR05D (Main Board)



IC203 LB1641

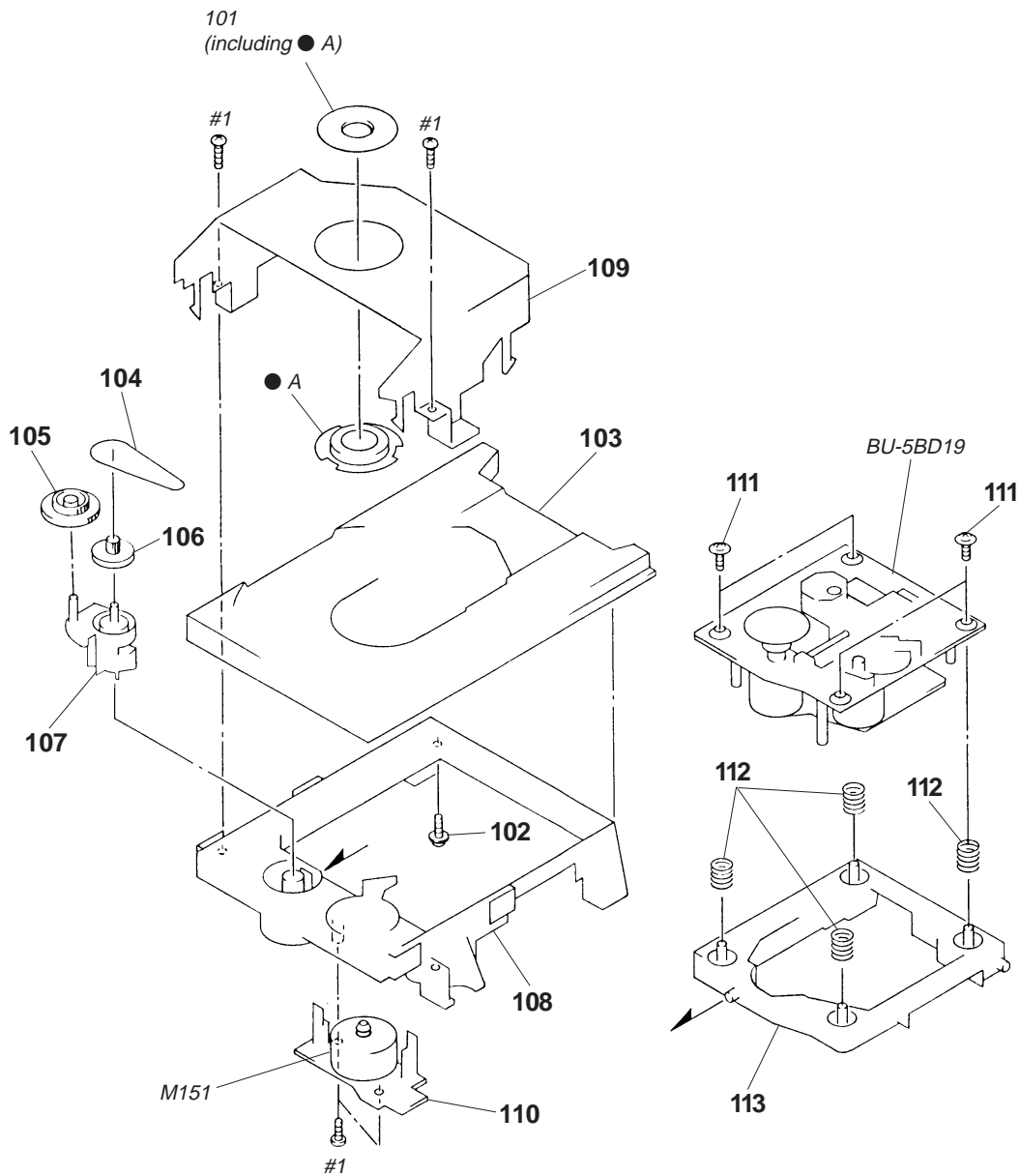


6-2. FRONT PANEL SECTION



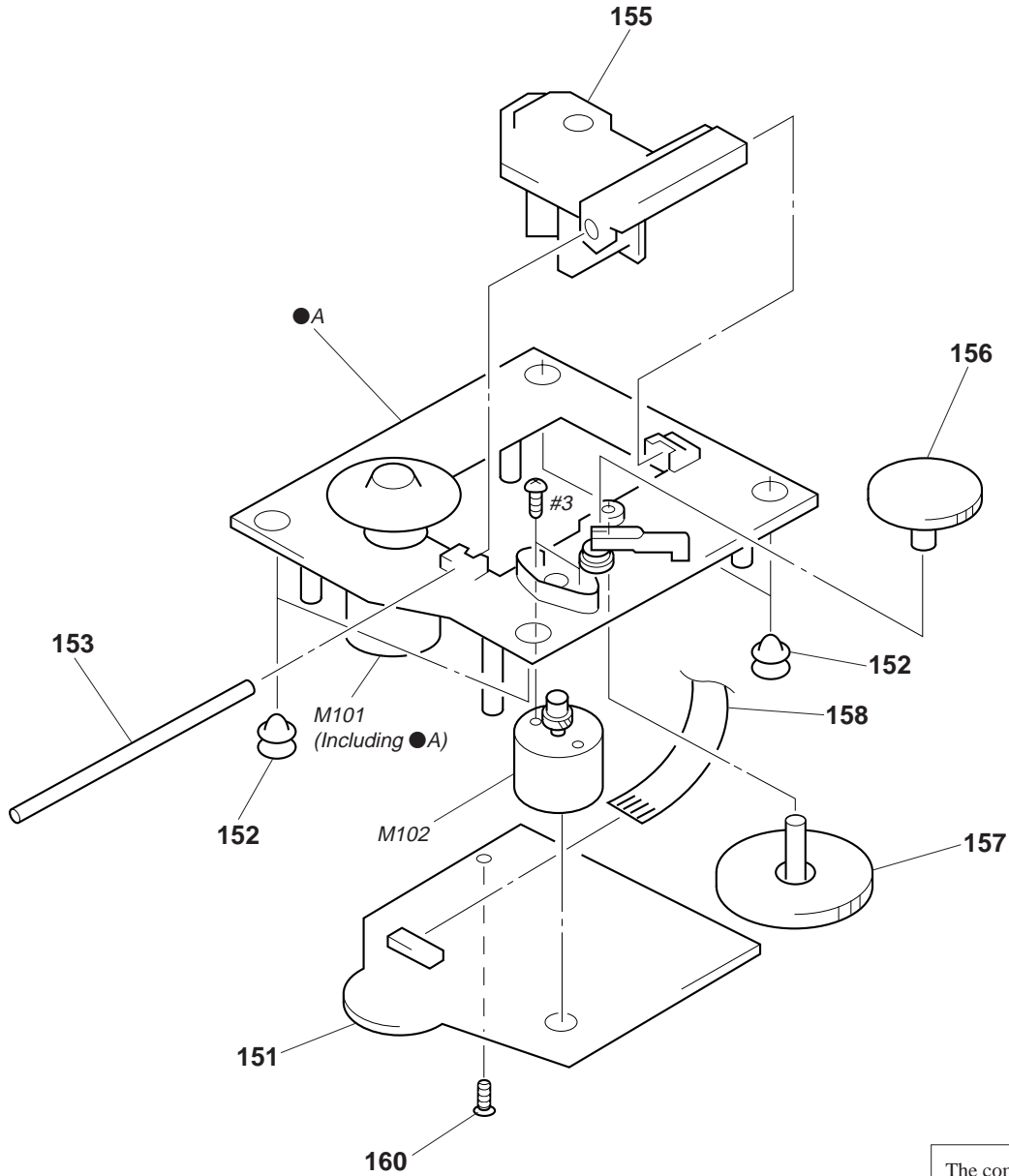
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	X-4946-590-1	PANEL ASSY, FRONT (E,EA,AEP:SILVER) (Made in Malaysia)		* 55	A-4673-913-A	PANEL BOARD, COMPLETE (TH)	
51	X-4946-832-1	PANEL ASSY (B), FRONT (AEP,UK:BLACK)		* 55	A-4673-916-A	PANEL BOARD, COMPLETE (E,EA)	
51	X-4946-852-1	PANEL ASSY (S), FRONT (TH,AEP:SILVER) (Made in France)		* 55	A-4673-919-A	PANEL BOARD, COMPLETE (AEP,UK)	
52	4-962-708-11	EMBLEM (4-A), SONY		56	1-776-237-11	WIRE (FLAT TYPE) (23 CORE)	
53	4-977-987-01	KNOB (JOG) (SILVER)		57	4-951-620-01	SCREW (2.6X8), +BVTP	
53	4-977-987-11	KNOB (JOG) (BLACK)		* 58	4-977-985-01	SHEET (FL)	
54	4-979-797-01	HOLDER (FL)		FL601	1-517-369-11	INDICATOR TUBE, FLUORESCENT	

**6-3. CD MECHANISM SECTION
(CDM28-5BD19)**



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
101	1-452-719-11	MAGNET ASSY		108	4-960-838-03	BASE (MD)	
102	4-917-583-21	BRACKET, YOKE		109	4-960-835-01	HOLDER (M)	
103	4-960-836-01	TABLE, DISC		* 110	1-650-836-11	LOADING BOARD	
104	4-927-649-01	BELT		111	4-933-134-01	SCREW (+PTPWH M2.6X6)	
105	4-960-842-01	GEAR (P)		112	4-959-996-01	SPRING (932), COMPRESSION	
106	4-960-841-01	PULLEY (S)		113	4-960-834-01	HOLDER (BU)	
* 107	4-960-839-01	CAM		M151	A-4604-363-A	MOTOR (L) ASSY (LOADING)	

**6-4. BASE UNIT SECTION
(BU-5BD19)**



The components identified by mark \triangle or dotted line with mark. \triangle are critical for safety. Replace only with part number specified.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>
* 151	A-4673-402-A	BD BOARD, COMPLETE		157	4-917-564-01	GEAR (P), FLATNESS	
152	4-951-940-01	INSULATOR (BU)		158	1-769-069-11	WIRE (FLAT TYPE) (16 CORE)	
153	4-917-565-01	SHAFT, SLED		160	4-951-620-01	SCREW (2.6X8), +BVTP	
\triangle 155	8-848-367-11	PICK-UP, OPTICAL KSS-213B/K-RP		M101	X-4917-523-3	BASE (OUTSERT) ASSY (SPINDLE)	
156	4-917-567-01	GEAR (M)		M102	X-4917-504-1	MOTOR ASSY (SLED)	

SECTION 7 ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- **RESISTORS**
All resistors are in ohms.
METAL: Metal-film resistor.
METAL OXIDE: Metal oxide-film resistor.
F: nonflammable

- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- **SEMICONDUCTORS**
In each case, u : μ , for example:
uA.. : μ A.. uPA.. : μ PA..
uPB.. : μ PB.. uPC.. : μ PC.. uPD.. : μ PD..
- **CAPACITORS**
uF : μ F
- **COILS**
uH : μ H

The components identified by mark Δ or dotted line with mark. Δ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

- **Abbreviation**
EA : Saudi Arabia model
TH : Thai model

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
*	A-4673-402-A	BD BOARD, COMPLETE *****		C145	1-135-201-11	TANTALUM CHIP 10uF	20% 4V
		< CAPACITOR >		C146	1-135-201-11	TANTALUM CHIP 10uF	20% 4V
C101	1-126-607-11	ELECT CHIP 47uF	20% 4V	C147	1-163-275-11	CERAMIC CHIP 0.001uF	5% 50V
C102	1-163-275-11	CERAMIC CHIP 0.001uF	5% 50V	C148	1-163-275-11	CERAMIC CHIP 0.001uF	5% 50V
C103	1-164-346-11	CERAMIC CHIP 1uF	16V	C149	1-164-346-11	CERAMIC CHIP 1uF	16V
C105	1-163-038-00	CERAMIC CHIP 0.1uF	25V	C153	1-135-259-11	TANTAL. CHIP 10uF	20% 6.3V
C106	1-164-695-11	CERAMIC CHIP 0.0022uF	5% 50V	C154	1-163-235-11	CERAMIC CHIP 22PF	5% 50V
C107	1-164-695-11	CERAMIC CHIP 0.0022uF	5% 50V			< CONNECTOR >	
C108	1-164-232-11	CERAMIC CHIP 0.01uF	50V	CNU101	1-770-014-11	CONNECTOR, FFC/FPC 16P	
C109	1-164-232-11	CERAMIC CHIP 0.01uF	50V	CNU102	1-770-013-11	CONNECTOR, FFC/FPC 19P	
C110	1-163-989-11	CERAMIC CHIP 0.033uF	10% 25V			< IC >	
C111	1-163-038-00	CERAMIC CHIP 0.1uF	25V	IC101	8-752-069-56	IC CXA1782BQ	
C112	1-163-038-00	CERAMIC CHIP 0.1uF	25V	IC102	8-759-291-06	IC BA6397FP	
C113	1-164-695-11	CERAMIC CHIP 0.0022uF	5% 50V	IC103	8-752-372-94	IC CXD2507AQ	
C114	1-164-005-11	CERAMIC CHIP 0.47uF	25V	IC104	8-759-185-29	IC PCM1710U-B	
C115	1-126-607-11	ELECT CHIP 47uF	20% 4V			< TRANSISTOR >	
C116	1-163-016-00	CERAMIC CHIP 0.0039uF	10% 50V	Q101	8-729-010-08	TRANSISTOR MSB710-R	
C117	1-164-005-11	CERAMIC CHIP 0.47uF	25V	Q102	8-729-424-08	TRANSISTOR UN2111	
C118	1-107-823-11	CERAMIC CHIP 0.47uF	10% 16V	Q103	8-729-421-22	TRANSISTOR UN2211	
C119	1-163-038-00	CERAMIC CHIP 0.1uF	25V			< RESISTOR >	
C120	1-135-201-11	TANTALUM CHIP 10uF	20% 4V	R102	1-216-001-00	METAL CHIP 10 5%	1/10W
C121	1-163-038-00	CERAMIC CHIP 0.1uF	25V	R103	1-216-049-11	METAL GLAZE 1K 5%	1/10W
C122	1-164-232-11	CERAMIC CHIP 0.01uF	50V	R104	1-216-097-00	METAL GLAZE 100K 5%	1/10W
C123	1-163-038-00	CERAMIC CHIP 0.1uF	25V	R105-108			
C124	1-126-607-11	ELECT CHIP 47uF	20% 4V		1-216-093-00	METAL CHIP 68K 5%	1/10W
C125	1-164-232-11	CERAMIC CHIP 0.01uF	50V	R109	1-216-097-00	METAL GLAZE 100K 5%	1/10W
C126	1-163-038-00	CERAMIC CHIP 0.1uF	25V	R112	1-216-083-00	METAL CHIP 27K 5%	1/10W
C127	1-164-695-11	CERAMIC CHIP 0.0022uF	5% 50V	R113	1-216-083-00	METAL CHIP 27K 5%	1/10W
C128	1-163-135-00	CERAMIC CHIP 560PF	5% 50V	R114	1-216-101-00	METAL CHIP 150K 5%	1/10W
C129	1-163-038-00	CERAMIC CHIP 0.1uF	25V	R115	1-216-101-00	METAL CHIP 150K 5%	1/10W
C130	1-164-336-11	CERAMIC CHIP 0.33uF	25V	R116	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
C131	1-163-038-00	CERAMIC CHIP 0.1uF	25V	R117	1-216-069-00	METAL CHIP 6.8K 5%	1/10W
C132	1-163-037-11	CERAMIC CHIP 0.022uF	10% 25V	R118	1-216-049-11	METAL GLAZE 1K 5%	1/10W
C133	1-163-145-00	CERAMIC CHIP 0.0015uF	5% 50V	R119	1-216-089-00	METAL GLAZE 47K 5%	1/10W
C134	1-164-346-11	CERAMIC CHIP 1uF	16V	R120	1-216-089-00	METAL GLAZE 47K 5%	1/10W
C135	1-163-251-11	CERAMIC CHIP 100PF	5% 50V	R121	1-216-114-00	METAL GLAZE 510K 5%	1/10W
C136	1-164-005-11	CERAMIC CHIP 0.47uF	25V	R122	1-216-097-00	METAL GLAZE 100K 5%	1/10W
C137	1-164-232-11	CERAMIC CHIP 0.01uF	50V	R123	1-216-099-00	METAL CHIP 120K 5%	1/10W
C139	1-163-235-11	CERAMIC CHIP 22PF	5% 50V	R124	1-216-091-00	METAL CHIP 56K 5%	1/10W
C140	1-163-235-11	CERAMIC CHIP 22PF	5% 50V	R125	1-216-069-00	METAL CHIP 6.8K 5%	1/10W
C141	1-163-038-00	CERAMIC CHIP 0.1uF	25V				
C142	1-163-038-00	CERAMIC CHIP 0.1uF	25V				

BD	CONNECTOR	LOADING	MAIN
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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R126	1-216-063-00	METAL GLAZE	3.9K 5% 1/10W	CN302	1-770-031-11	CONNECTOR, BOARD TO BOARD 7P	
R127	1-216-089-00	METAL GLAZE	47K 5% 1/10W			< COIL >	
R128	1-216-105-00	METAL GLAZE	220K 5% 1/10W	L301	1-410-464-11	INDUCTOR 3.3uH	
R129	1-216-049-11	METAL GLAZE	1K 5% 1/10W	L302	1-410-464-11	INDUCTOR 3.3uH	
R130	1-216-079-00	METAL CHIP	18K 5% 1/10W	*****			
R131	1-216-079-00	METAL CHIP	18K 5% 1/10W	*	1-650-836-11	LOADING BOARD	
R132	1-216-061-00	METAL CHIP	3.3K 5% 1/10W			*****	
R133	1-216-061-00	METAL CHIP	3.3K 5% 1/10W			< CONNECTOR >	
R134	1-216-065-00	METAL CHIP	4.7K 5% 1/10W	* CN291	1-568-943-11	PIN, CONNECTOR 5P	
R135	1-216-065-00	METAL CHIP	4.7K 5% 1/10W			< SWITCH >	
R136	1-216-073-00	METAL CHIP	10K 5% 1/10W	S291	1-572-086-11	SWITCH, LEAF (LOAD OUT)	
R137	1-216-065-00	METAL CHIP	4.7K 5% 1/10W	S292	1-572-086-11	SWITCH, LEAF (LOAD IN)	
R138	1-216-049-11	METAL GLAZE	1K 5% 1/10W	*****			
R139	1-216-033-00	METAL CHIP	220 5% 1/10W	*	A-4673-912-A	MAIN BOARD, COMPLETE (TH)	
R140	1-216-081-00	METAL CHIP	22K 5% 1/10W	*	A-4673-915-A	MAIN BOARD, COMPLETE (E,EA)	
R141	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	*	A-4673-918-A	MAIN BOARD, COMPLETE (AEP,UK)	
R142	1-216-061-00	METAL CHIP	3.3K 5% 1/10W			*****	
R143	1-216-121-00	METAL GLAZE	1M 5% 1/10W			1-537-770-21	TERMINAL BOARD, GROUND
R144	1-216-073-00	METAL CHIP	10K 5% 1/10W			7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S
R145	1-216-097-00	METAL GLAZE	100K 5% 1/10W			< CAPACITOR >	
R146	1-216-097-00	METAL GLAZE	100K 5% 1/10W	C101	1-126-936-11	ELECT	3300uF 20% 16V
R147-149				C102	1-126-968-11	ELECT	100uF 20% 50V
	1-216-049-11	METAL GLAZE	1K 5% 1/10W	C103	1-126-968-11	ELECT	100uF 20% 50V
R150-152				C104	1-161-494-00	CERAMIC	0.022uF 25V
	1-216-037-00	METAL CHIP	330 5% 1/10W	C105	1-126-933-11	ELECT	100uF 20% 16V
R153	1-216-082-00	METAL GLAZE	24K 5% 1/10W	C110	1-161-494-00	CERAMIC	0.022uF 25V
R154	1-216-065-00	METAL CHIP	4.7K 5% 1/10W	C111	1-164-159-21	CERAMIC	0.1uF 50V
R156	1-216-085-00	METAL CHIP	33K 5% 1/10W	C112	1-126-933-11	ELECT	100uF 20% 16V
R157	1-216-069-00	METAL CHIP	6.8K 5% 1/10W	C113	1-126-933-11	ELECT	100uF 20% 16V
R158	1-216-001-00	METAL CHIP	10 5% 1/10W	C115	1-126-964-11	ELECT	10uF 20% 50V
		< VARIABLE RESISTOR >		C116	1-126-933-11	ELECT	100uF 20% 10V
RV101	1-241-396-11	RES, ADJ, METAL GLAZE 22K		C117	1-126-968-11	ELECT	100uF 20% 50V
RV102	1-241-396-11	RES, ADJ, METAL GLAZE 22K		C118	1-126-968-11	ELECT	100uF 20% 50V
RV103	1-241-396-11	RES, ADJ, METAL GLAZE 22K		C122	1-124-903-11	ELECT	1uF 20% 50V
		< SWITCH >		C123	1-126-925-11	ELECT	470uF 20% 10V
S101	1-572-085-11	SWITCH, LEAF (LIMIT SW)		C124	1-162-306-11	CERAMIC	0.01uF 30% 16V
		< VIBRATOR >		C151-155			
X101	1-579-280-11	VIBRATOR, CRYSTAL (16.9344MHz)			1-164-159-21	CERAMIC	0.1uF 50V
*****				C156	1-161-494-00	CERAMIC	0.022uF 25V
*	1-659-178-11	CONNECTOR BOARD		C157	1-162-282-31	CERAMIC	100PF 10% 50V
		*****		C158	1-162-290-31	CERAMIC	470PF 10% 50V
		< CAPACITOR >		C159-162			
C301	1-162-282-31	CERAMIC	100PF 10% 50V		1-162-294-31	CERAMIC	0.001uF 10% 50V
C302	1-164-159-21	CERAMIC	0.1uF 50V	C201	1-130-475-00	MYLAR	0.0022uF 5% 50V
		< CONNECTOR >		C202	1-130-475-00	MYLAR	0.0022uF 5% 50V
CN301	1-770-158-21	HOUSING, CONNECTOR 7P (SYSTEM CONTROL)		C203	1-126-964-11	ELECT	10uF 20% 50V
				C204	1-162-294-31	CERAMIC	0.001uF 10% 50V

MAIN

PANEL

Ref. No.	Part No.	Description	Remark
C206	1-126-964-11	ELECT	10uF 20% 50V
C251	1-130-475-00	MYLAR	0.0022uF 5% 50V
C252	1-130-475-00	MYLAR	0.0022uF 5% 50V
C253	1-126-964-11	ELECT	10uF 20% 50V
C254	1-162-294-31	CERAMIC	0.001uF 10% 50V
C256	1-126-964-11	ELECT	10uF 20% 50V
C281-283			
	1-162-306-11	CERAMIC	0.01uF 30% 16V
C284	1-164-159-21	CERAMIC	0.1uF 50V
C285	1-126-963-11	ELECT	4.7uF 20% 50V
< CONNECTOR >			
* CN101	1-691-406-11	CONNECTOR, BOARD TO BOARD 7P	
CN201	1-770-167-11	CONNECTOR, FFC/FPC 19P	
* CN203	1-568-839-11	SOCKET, CONNECTOR 23P	
< DIODE >			
D101	8-719-200-82	DIODE 11ES2	
D102	8-719-200-82	DIODE 11ES2	
D103	8-719-200-82	DIODE 11ES2	
D104	8-719-200-82	DIODE 11ES2	
D105	8-719-200-82	DIODE 11ES2	
D106	8-719-200-82	DIODE 11ES2	
D107	8-719-982-03	DIODE MTZJ-3.6A	
D109	8-719-933-50	DIODE HZS7C2L	
D110	8-719-982-19	DIODE MTZJ-30A	
D111	8-719-200-82	DIODE 11ES2	
D112	8-719-200-82	DIODE 11ES2	
D281	8-719-109-71	DIODE RD3.9ES-B1	
< IC >			
IC101	8-759-805-37	IC L78LR05D	
IC102	8-759-231-53	IC TA7805S	
IC201	8-759-900-72	IC NE5532P	
IC202	8-749-923-04	IC TOTX178 (CD DIGITAL,OPTICAL)	
IC203	8-759-822-09	IC LB1641	
< JACK >			
J201	1-770-272-11	JACK, PIN 2P (CD)	
< TRANSISTOR >			
Q101	8-729-900-80	TRANSISTOR DTC114ES	
Q102	8-729-118-00	TRANSISTOR 2SB1116-L	
Q103	8-729-030-18	TRANSISTOR 2SD2525	
Q104	8-729-019-64	TRANSISTOR 2SB1041	
Q105	8-729-119-76	TRANSISTOR 2SA1175-HFE	
< RESISTOR >			
R101	1-249-437-11	CARBON	47K 5% 1/4W
R102	1-249-413-11	CARBON	470 5% 1/4W
R103	1-249-413-11	CARBON	470 5% 1/4W
R104	1-247-807-11	CARBON	100 5% 1/4W
R107	1-249-417-11	CARBON	1K 5% 1/4W

Ref. No.	Part No.	Description	Remark
R108	1-249-441-11	CARBON	100K 5% 1/4W
R110	1-249-429-11	CARBON	10K 5% 1/4W
R112	1-249-419-11	CARBON	1.5K 5% 1/4W
△ R114	1-219-139-11	FUSIBLE	0.68 10% 1/4W F
△ R115	1-217-641-00	FUSIBLE	4.7 5% 1/4W F
R116-121			
	1-260-091-11	CARBON	220 5% 1/2W
R130	1-249-417-11	CARBON	1K 5% 1/4W
R131	1-247-791-00	CARBON	22 5% 1/4W
R201	1-249-421-11	CARBON	2.2K 5% 1/4W
R202	1-249-421-11	CARBON	2.2K 5% 1/4W
R205	1-249-441-11	CARBON	100K 5% 1/4W
R207	1-249-421-11	CARBON	2.2K 5% 1/4W
R208	1-249-429-11	CARBON	10K 5% 1/4W
R209	1-249-428-11	CARBON	8.2K 5% 1/4W
R210	1-249-441-11	CARBON	100K 5% 1/4W
R211	1-247-807-11	CARBON	100 5% 1/4W
R251	1-249-421-11	CARBON	2.2K 5% 1/4W
R252	1-249-421-11	CARBON	2.2K 5% 1/4W
R255	1-249-441-11	CARBON	100K 5% 1/4W
R257	1-249-421-11	CARBON	2.2K 5% 1/4W
R258	1-249-429-11	CARBON	10K 5% 1/4W
R259	1-249-428-11	CARBON	8.2K 5% 1/4W
R260	1-249-441-11	CARBON	100K 5% 1/4W
R261	1-247-815-00	CARBON	220 5% 1/4W
R601	1-249-425-11	CARBON	4.7K 5% 1/4W
R602	1-249-425-11	CARBON	4.7K 5% 1/4W

*	A-4673-913-A	PANEL BOARD, COMPLETE (TH)	
*	A-4673-916-A	PANEL BOARD, COMPLETE (E,EA)	
*	A-4673-919-A	PANEL BOARD, COMPLETE (AEP,UK)	

*	4-979-797-01	HOLDER (FL)	
< CAPACITOR >			
C602	1-164-159-21	CERAMIC	0.1uF 50V
C604	1-164-159-21	CERAMIC	0.1uF 50V
C605	1-164-159-21	CERAMIC	0.1uF 50V
C606	1-162-301-11	CERAMIC	0.0015uF 30% 16V
C607	1-162-301-11	CERAMIC	0.0015uF 30% 16V
C608	1-126-177-11	ELECT	100uF 20% 10V
C609	1-124-916-11	ELECT	22uF 20% 63V
C610	1-162-306-11	CERAMIC	0.01uF 30% 16V
C631	1-162-286-21	CERAMIC	220PF 10% 50V
C632	1-162-282-31	CERAMIC	100PF 10% 50V
C674	1-162-290-31	CERAMIC	470PF 10% 50V
< CONNECTOR >			
* CN601	1-568-865-11	SOCKET, CONNECTOR 23P	

The components identified by mark △ or dotted line with mark. △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< DIODE >				< SWITCH >			
D601	8-719-815-85	DIODE 1S1585		S601	1-554-303-21	SWITCH, TACTILE (EDIT)	
D602	8-719-815-85	DIODE 1S1585		S602	1-554-303-21	SWITCH, TACTILE (CHECK)	
D603	8-719-815-85	DIODE 1S1585		S603	1-554-303-21	SWITCH, TACTILE (CLEAR)	
< FLUORESCENT INDICATOR TUBE >				S604	1-554-303-21	SWITCH, TACTILE (▶▶)	
FL601	1-517-369-11	INDICATOR TUBE, FLUORESCENT		S605	1-554-303-21	SWITCH, TACTILE (TIME)	
< IC >				S606	1-554-303-21	SWITCH, TACTILE (REPEAT)	
IC601	8-759-340-60	IC uPD78044AGF-091-3B9		S607	1-554-303-21	SWITCH, TACTILE (PLAY MODE)	
< TRANSISTOR >				S608	1-554-303-21	SWITCH, TACTILE (▷ ▮)	
Q601	8-729-119-78	TRANSISTOR 2SC2785-HFE		S609	1-554-303-21	SWITCH, TACTILE (■)	
Q651	8-729-119-78	TRANSISTOR 2SC2785-HFE		S610	1-554-303-21	SWITCH, TACTILE (▲ OPEN/CLOSE)	
Q652	8-729-119-78	TRANSISTOR 2SC2785-HFE		S611	1-554-303-21	SWITCH, TACTILE (◀◀)	
< RESISTOR >				S612	1-467-938-11	ENCODER, ROTARY (◀◀ AMS ▶▶)	
R603	1-249-417-11	CARBON 1K 5% 1/4W		< VIBRATOR >			
R604	1-249-417-11	CARBON 1K 5% 1/4W		X601	1-579-233-11	VIBRATOR, CERAMIC (5MHz)	
R605-607	1-249-429-11	CARBON 10K 5% 1/4W		*****			
R608	1-249-393-11	CARBON 10 5% 1/4W		MISCELLANEOUS			
R609-611	1-249-429-11	CARBON 10K 5% 1/4W		*****			
R612	1-249-413-11	CARBON 470 5% 1/4W		4	1-769-621-11	WIRE (FLAT TYPE) (19 CORE)	
R613	1-249-415-11	CARBON 680 5% 1/4W		56	1-776-237-11	WIRE (FLAT TYPE) (23 CORE)	
R614	1-249-417-11	CARBON 1K 5% 1/4W		101	1-452-719-11	MAGNET ASSY	
R615	1-249-413-11	CARBON 470 5% 1/4W		△ 155	8-848-367-11	PICK-UP, OPTICAL KSS-213B/K-RP	
R616	1-249-415-11	CARBON 680 5% 1/4W		158	1-769-069-11	WIRE (FLAT TYPE) (16 CORE)	
R617	1-249-413-11	CARBON 470 5% 1/4W		M101	X-4917-523-3	BASE (OUTSERT) ASSY (SPINDLE)	
R618	1-249-415-11	CARBON 680 5% 1/4W		M102	X-4917-504-1	MOTOR ASSY (SLED)	
R619	1-249-417-11	CARBON 1K 5% 1/4W		M151	A-4604-363-A	MOTOR (L) ASSY (LOADING)	
R620-622	1-249-423-11	CARBON 3.3K 5% 1/4W		*****			
R624	1-249-425-11	CARBON 4.7K 5% 1/4W		HARDWARE LIST			
R625	1-249-425-11	CARBON 4.7K 5% 1/4W		*****			
R626-629	1-247-807-11	CARBON 100 5% 1/4W		#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
R631	1-249-429-11	CARBON 10K 5% 1/4W		#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
R651-674	1-249-441-11	CARBON 100K 5% 1/4W		#3	7-621-255-15	SCREW +P 2X3	
R675	1-249-429-11	CARBON 10K 5% 1/4W		*****			
R676	1-249-441-11	CARBON 100K 5% 1/4W		*****			
R677	1-249-429-11	CARBON 10K 5% 1/4W		*****			
R681-683	1-247-807-11	CARBON 100 5% 1/4W		*****			
R685-688	1-247-807-11	CARBON 100 5% 1/4W		*****			

The components identified by mark △ or dotted line with mark. △ are critical for safety. Replace only with part number specified.

