

CDL1100

SONY[®]

SERVICE MANUAL

For Technical Service

SUPPLEMENT-2

File this supplement with the service manual.

SUBJECT : 1. ADDITION CDL1100-40 SERIES

(ENG-99001)

The 40 series has been added to the CDL1100. Use this manual together with the service manual already distributed (SUPPLEMENT-1).

MODEL IDENTIFICATION — SPECIFICATION LABEL —



-2□ : 20 series
-4□ : 40 series

OUTLINE AND SPECIFICATIONS OF THE CDL1100-40 SERIES

The CDL1100-40 series is a CD-ROM library system with two 24X (MAX) speed drives. It incorporates the compact feature of the CDL1100-20 series.

The main specifications are as follows.

SPECIFICATIONS

CDL1100-40 series (* indicates the differences from the CDL1100-20 series.)

Capacity

Number of drives	2
Number of slots	100
Total capacity	65GB

Library Performance

Disc Exchange Time	Typ.12.2sec. (average)
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Drive Performance

*Sustained Transfer Rate	1800-3600KB (P-CAV)
*Access Time	Typ.90ms (average)

Interface

Robotics	SCSI-2 single ended
Drives	SCSI-2 single ended
Analog Audio	Output Stereo mini jack
Async	RS-232C

Readable Format

CD-DA
CD-ROM (Mode 1 and Mode 2)
CD-ROM XA (Mode 2 Form 1 and Mode 2 Form 2)
CD-I Ready
CD-Bridge
CD-EXTRA
Video CD
Photo CD (Single and multiple session)

Physical Size

Dimensions (WxHxD)	215x430x435 (mm)
*Weight	14.0Kg

Power Requirements

Line Voltage	120V/230V
Line Frequency	50Hz/60Hz

Power Consumption

*0.33A	120V
*0.17A	230V

Temperature

Operating	5 to 35degC
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Relative Humidity

Operating	30 to 80%
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Page No: Added, Refer to on page
—: Not applicable)

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List of Technical Service Tools

Name	Parts No.	CDL1100-20 Series	CDL1100-40 Series
Test software-ATP415 system disc (OR-D019)	8-980-308-19	○	✕
Test software-ATP625 disc (CDM-001)	J-2501-173-A	✕	○
Test disc YEDS-18	3-702-101-01	○	○
Test disc TGRS-21	J-2501-110-A	○	○
Test disc YEHS-4	3-702-548-01	○	✕
DC power supply (Can be substituted with CDL1100)	1-413-362-12	○	○
SCSI 50P Flat Cable	J-902-900-0A	○	○
AU-CNBoard	A-8080-815-A	○	○
CDL1100 (CDM-47) CONTROLLER	J-2501-141-A	○	○

6-2. TOOLS AND MEASURING INSTRUMENTS

6-2-1. GENERAL AND SPECIAL TOOLS LIST

The tools and measuring instruments for performing maintenance on the CDM-47 are listed below.

6-2-1-1. General Tools

	<u>SONY Parts No.</u>
⊕Driver 2mm	(7-700-749-01)
⊕Driver 2.6mm	(7-700-749-03)
Tweezers	(7-700-753-02)
Round Nose Plier	(7-700-757-01)
Cutter	(7-700-758-02)
Soldering Iron (20W)	
Desoldering Metal Braid (Solder Wick)	
Multi Meter (DRM)	

6-2-1-2. Special Tools

IBM PS/VP System	
PS/VP and the monitor (640kbyte RAM, 3.5" FDD, HDD, Video RAM-CGA or Higher, DOS Ver. 6.2 or later)	
Adaptec SCSI board AHA-1520B or AHA-2940	
DC Power Supply	(1-413-362-12)
(If no power supply unit is available:Supply power from the CDL1100 unit.)	
Power cord	(1-559-370-11)
SCSI 50P Flat Cable	(J-902-900-0A)
AU-CN Board	(A-8080-815-A)
BLER Counter For TC940X	(J-907-564-0A)
CDL1100 (CDM-47) CONTROLLER	(J-2501-141-A)
Active Speaker	

6-2-1-3. Test Disc

SONY Test Disc (YEDS-18)	(3-702-101-01)
SONY Test Disc (TGRS-21)	(J-2501-110-A)

6-2-1-4. Measuring Equipments

Oscilloscope Dual Trace 20MHz (probe x10)
DC Volt Meter (min. 10mA)

6-2-1-5. Software

ATP625 Disc (CDM-001)	(J-2501-173-A)
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6-2-1-6. Expendable and Chemical Supplies

Cotton Swab (200 pieces)	(7-740-900-65)
Lens Cleaning Liquid	(J-250-100-0A)
Molykote Grease (EM-30L)	(4-918-645-01)
Hanarl (SFL-9)	(7-400-000-00)

6-2-2. Setting Single-Operation of CDM-47 Mechanism Block

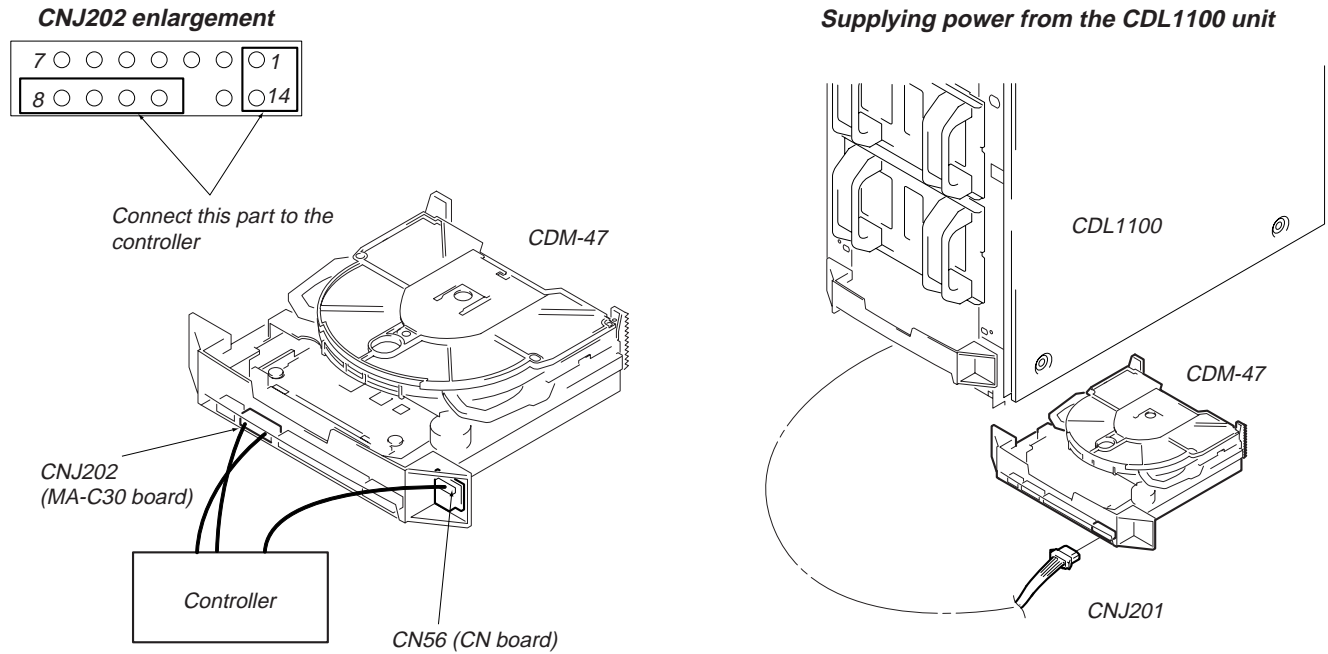
Jig :

CDL-1100 (CDM-47) controller : J-2501-141-A
 Power supply unit : 1-413-362-12 (If no power supply units available : Supply power from the CDL1100 unit)
 CD test disc (YEDS-18) : 3-702-101-01

Connection Method :

If no power supply unit is available : Supply power from the CDL1100 unit.

Connect the unit (CNJ202, CN56:MA-C30 board) and controller.



Pin No.	Signal Name	Jig Wire Color	Pin No.	Signal Name	Jig Wire Color
1	Ground	White	8	Parity	Brown
2	Ground	—	9	ID0	Black
3	Ground	—	10	ID1	Yellow
4	Ground	—	11	ID2	Blue
5	Ground	—	12	NC	—
6	Ground	—	13	P/A	—
7	Ground	—	14	TEST	Red

[Disc Chucking/Unchucking Method]

1. Connect the controller.
2. Load a disc directly into the drive with your hand.
3. Press the **[EJECT]** button of the controller. The LEDs will go off in the order of red and green.
When both LEDs go off, it means that both discs have been chucked.
4. To eject the disc, press the **[EJECT]** button again.
5. The LEDs light up in the order of green and red. When both LEDs light up, it means that the discs have been unchucked.

NOTE :

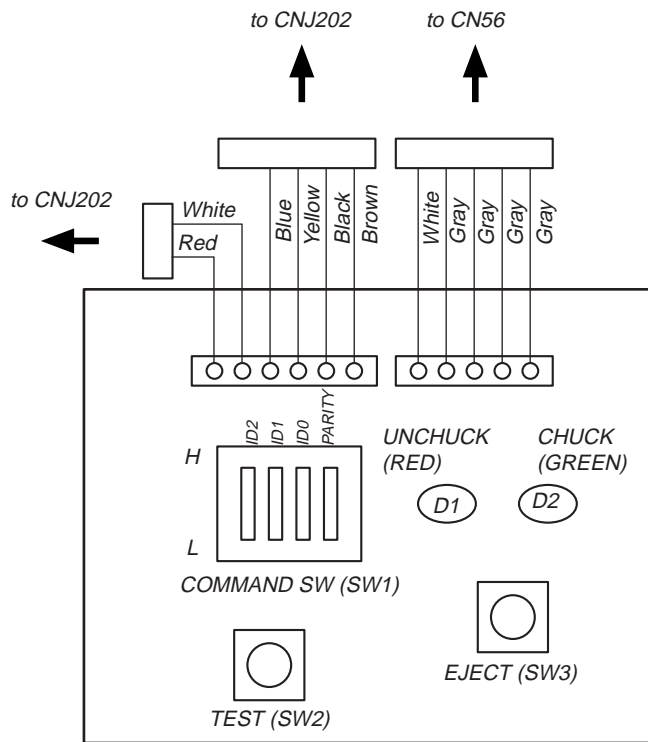
If the LEDs remain lit or off even when chucking/unchucking is performed, S51 (red:UNCHUCK), S52 (green:CHUCK) of the CDM-47 LDSW board may be improperly connected.

[Single-Operation of CDM-47]

1. Chuck the disc beforehand.
2. Set the COMMAND SW of the controller to the test mode.

ID2	ID1	ID0	PARITY
L	H	L	L

3. While pressing the **[TEST]** button of the controller, turn on the power of the CDL1100 or power supply unit.
4. After about 1 second later, release the **[TEST]** button.
5. This sets the test mode. To enter the other mode, refer to the following table, set the dip switch, and press the **[TEST]** button.



Setting of Single-Operation Mode

Mode	ID2	ID1	ID0	PARITY
Test Mode	L	H	L	L

Command list of Single-Operation Mode

Mode	ID2	ID1	ID0	PARITY
Initialize	L	L	L	L
x1 speed	L	L	H	L
x4 speed	L	H	L	L
x8 speed	L	H	H	L
x12 ~x24(Partial CAV) speed	H	L	L	L
Tracking servo OFF	L	L	H	H
Tracking servo ON	L	L	L	H
PlayAudio (23'47")	H	H	L	L
PlayAudio (5'00")	H	L	H	L
PlayAudio (55'00")	H	H	H	L

6-2-3. SYSTEM CONFIGURATION

Setting of SW and Configuration file.

6-2-3-1. Set up PS/VP System

- a. Install the ANSI.SYS (Device = ANSI.SYS) and ASPI 2 DOS.SYS in Config. SYS.
(Refer to Instruction Manual for more detail)
- b. Set the jumpers on the Adaptec SCSI Interface board as follows.
(Refer to Instruction Manual for Adaptec SCSI board AHA-1520B or 2940 in detail)

AHA-1520B (for ISA BUS)...
All of DIP SW (1 to 4) are OFF...

AHA-2940 (for PCI BUS)...

No Jumper and SW setting on the board.

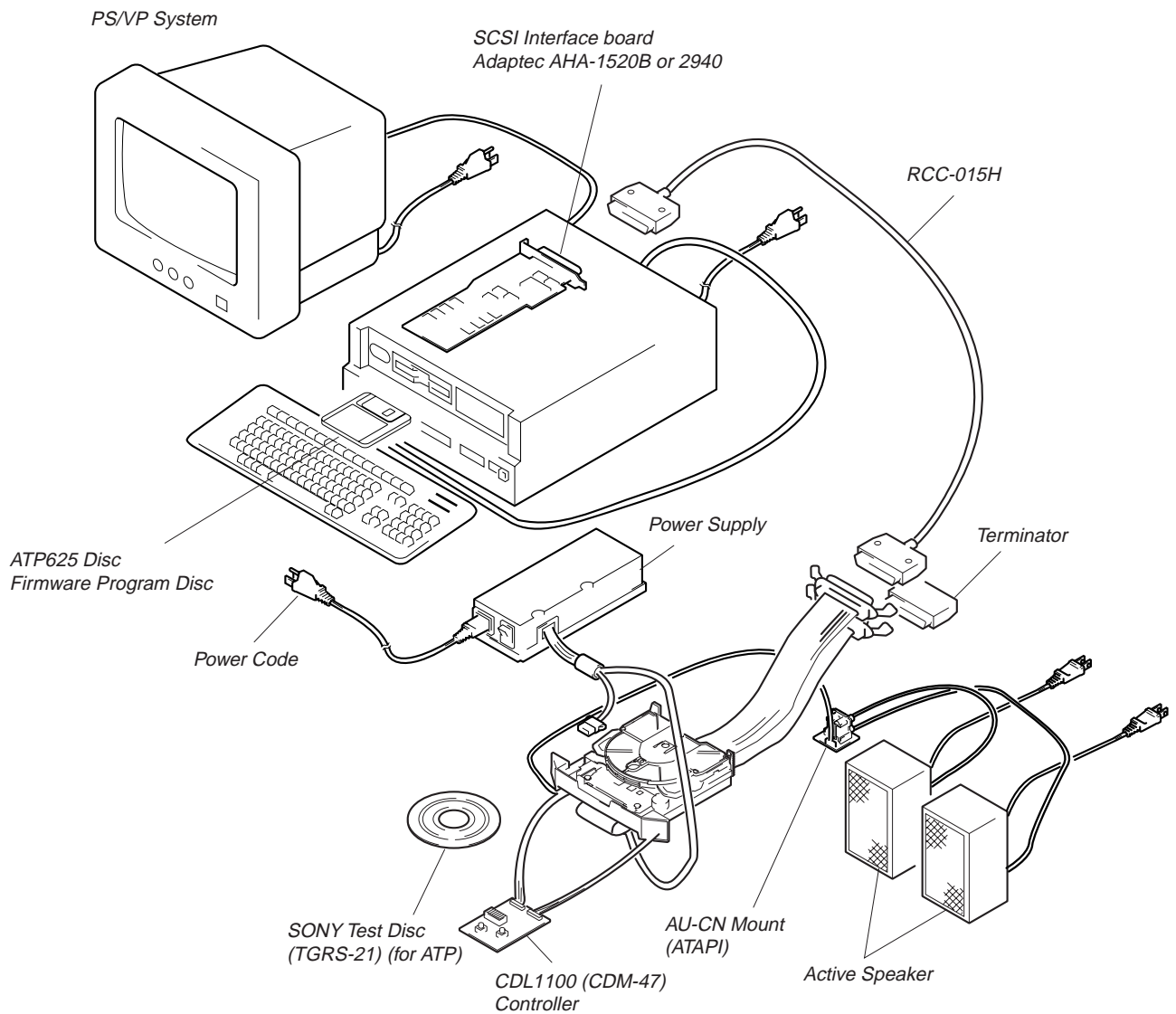
Use default parameter for SSI Select configuration utility.

It is not necessary to install the device driver when using on the windows '95.

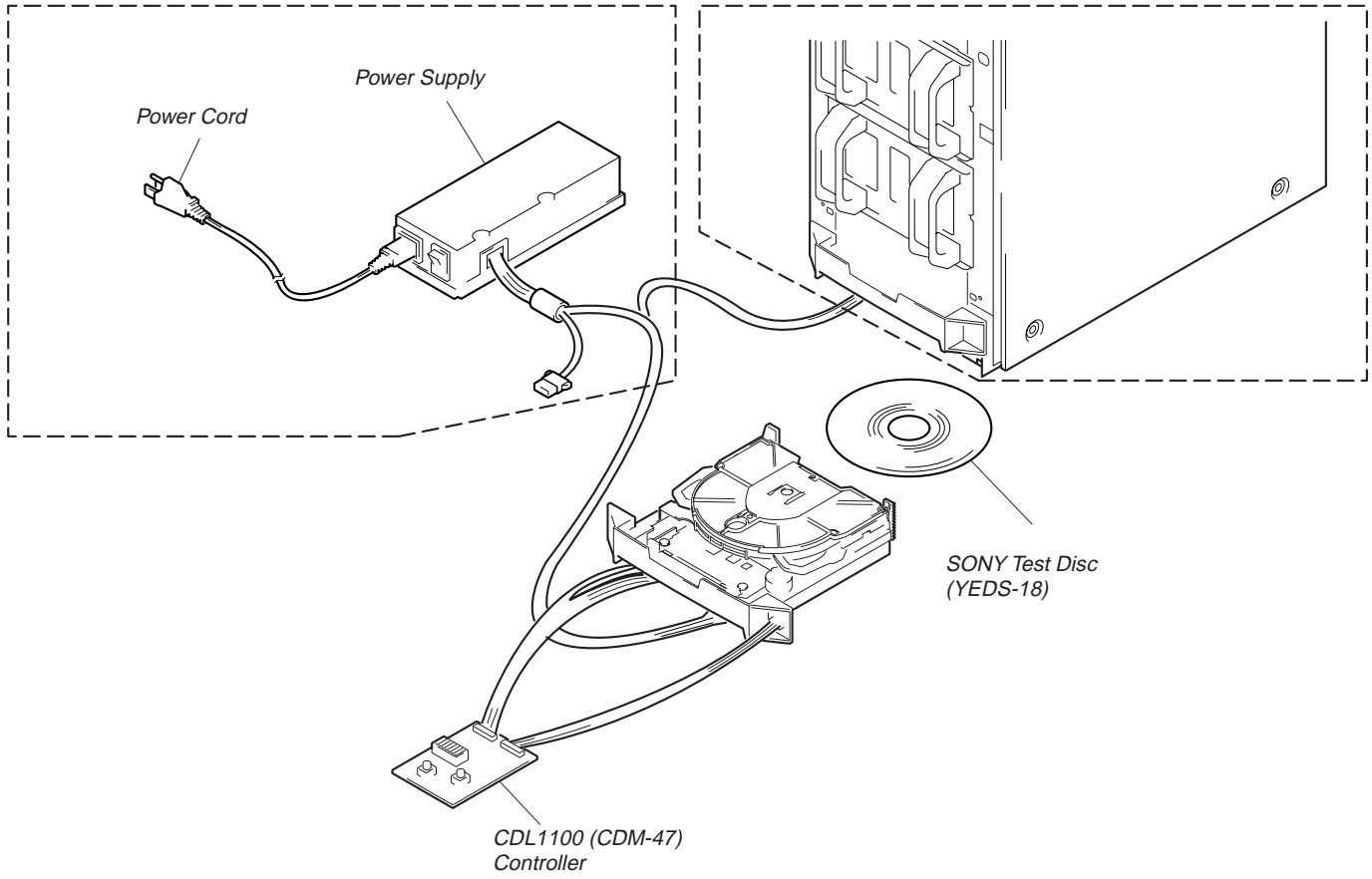
It is necessary to install the device driver at first line of config. sys when using on DOS.

- c. Install the SCSI Interface board in the PS/VP System.

6-2-3-2. System Configuration



ATP/DOWNLOAD System



Function check

6-3. TROUBLE SHOOTING

This section describes trouble shooting methods. Section 6-3-2. shows the flowchart of the processing routine of the unit. Section 6-3-3. describes the ATP procedures. These sections define the detective parts under operating conditions.

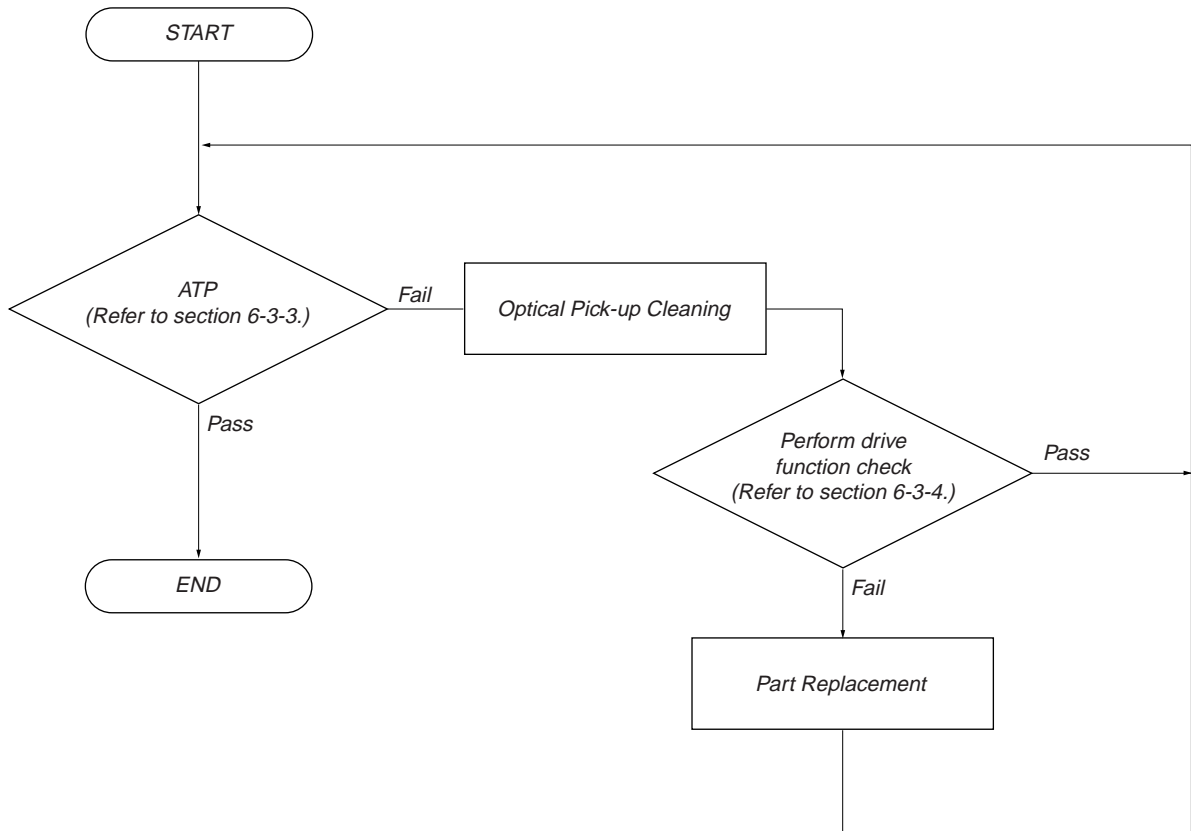
6-3-1. BEFORE TROUBLE SHOOTING

The following procedures are recommended to verify if the drive is really faulty or not:

- a. Poor connection with the host system
(esp. GND-related connection, frame GND, etc.)
- b. Incorrect operational procedure.

- c. Program error of host system
- d. No Interface Cable Terminator at the end of Data Bus
- e. Wrong Drive Number selection
- f. Wrong supply voltage
- g. Environmental conditions (where electrical noise easily jumps into signal)
- h. Influence of strong magnetic field.

6-3-2. FLOWCHART FOR TROUBLE SHOOTING



6-3-3. PROCEDURE OF ATP TEST

6-3-3-1. Pre-setting

- a. Connect the test drive to the PS/VP System. (Refer to 6-2-3-1.)
- b. Set the Jumpers on the Adaptec SCSI board. (Refer to 6-2-3-1.)
- c. Connect the test drive to the CDL1100 (CDM-47) CONTROL-
LER and set the COMMAND SW as below.

ID2	ID1	ID0	PARITY
H	L	L	L

- d. Connect the test drive to the DC power supply.
- e. Turn on the power of PS/VP System.
- f. After loading the system, "C >" is displayed on the screen. Then, insert ATP625 Disc.

- g. Change the directory in the drive A. ("A >" is displayed on the screen.)
- h. Type **A T P 6 2 5** and hit **Enter** key. (After loading the test program, Display 6-3-3-1. (a) shows up.)

Sony SCSI CD-ROM Failure Verification Test Ver. 1.00.02
[MAR. -04-1997]

[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520
 ATP625.CFG X-XXX-XX-XX

- 00: Inquiry Check
- 01: TEST UNIT READY
- 02: TOC Read
- 03: Incremental Read
- 04: Random Seek &Read
- 05: Spin Up/Down (X1)
- 06: Spin Up/Down (X4)
- 07: Spin Up/Down (MAX)
- 08: Full seek Read (X1)
- 09: 1/3 seek Read (X1)
- 10: Full seek Read (X4)
- 11: 1/3 seek Read (X4)
- 12: Full seek Read (MAX)
- 13: 1/3 seek Read (MAX)
- 14: Play Audio (De-TRCK)
- 15: Play Audio (E-Volume)
- 16: Play Audio (Play Mode)
- 17: Play Audio (X'Talk L->R)
- 18: Play Audio (X'Talk R->L)
- 19: Sub Code Read

Hit any key to start or Esc to exit.

?

Drive Status Column

Display 6-3-3-1. (a)

6-3-3-2. Test Procedure

TEST item	Check point
<p>To execute ATP test of the drive.</p> <ol style="list-style-type: none"> 1. Insert the test disc (TGRS-21) into the CDM-47 drive unit. and hit any key to start ATP test. <p>Note: When some errors occurred during the test, “ Abort Retry Ignore” message will be displayed on the drive status column, at that time hit A key to exit and then check which part is broken in accordance with 3-4.</p> <p>Note: If each test result satisfies the specification, the word of “Pass” or value of the test result will be displayed on the judgement column.</p> <ol style="list-style-type: none"> a. Inquiry check test will be executed. b. “Returned Data OK ? (Y/N) =>?” message will be displayed on the drive status column, then check the inquiry data and hit Y key. c. When “Place CD-ROM TEST DISC (TGRS-2D)...” is displayed, press the EJECT button of the CDL1100 (CDM-47) controller, and chuck the disc. If the disc has already been chucked, the display will not be shown, and the unit will proceed onto the next step. d. TOC Read test will be executed. e. Incremental Read Test will be executed. f. Random Seek & Read test will be executed. g. Spin Up, Spin Down test (normal) will be executed. h. Spin Up, Spin Down test (quadruple) will be executed. i. Spin Up, Spin Down test (Max) will be executed. j. Full seek test (normal) will be executed. k. 1/3 seek test (normal) will be executed. l. Full seek test (quadruple) will be executed. m. 1/3 seek test (quadruple) will be executed. n. Full seek test (Max) will be executed. o. 1/3 seek test (Max) will be executed. 2. After Seek test completion, Play Audio (DeTRCK) test will be executed. <ol style="list-style-type: none"> a. “Hit any key when ready” message will be displayed on the drive status column, then hit any key. b. Play Audio (E-Volume) test will be executed. c. “Any key when Okay or Esc when NG” message will be displayed on the drive status column, then hit any key. d. Play Audio (Play Mode) test will be executed. e. “Space bar when ready, ESC to abort” message will be displayed on drive status column, then hit space bar. f. Play Audio (X’Talk L→R) test will be executed. g. “Any key when Okay or Esc when NG” message will be displayed on drive status column, then hit any key. h. Play Audio (X’Talk R→L) test will be executed. i. “Any key when Okay or Esc when NG” message will be displayed on drive status column, then hit any key. 3. After Audio test completion, Sub Code Read test will be executed. 	<p>The music (both left and right channel) can be heard from the active speaker.</p> <p>The music (both left and right channel) will be faded-out slowly. (After several minutes, the drive is set to mute mode.)</p> <p>The music (both left and right channel) can be heard from the active speaker. And the play mode can be changed by pushing some key. (Refer to Drive Status Column)</p> <p>The sound (only left channel) can be heard for 3 sec. from the active speaker.</p> <p>The sound (only right channel) can be heard for 3 sec. from the active speaker.</p>

TEST item

Check point

Note:

If all of test items are completed, words of OK will be displayed on the screen.If not, NG will be displayed.

The disc will automatically be unchucked.

Sony SCSI CD-ROM Failure Verification Test Ver. 1.00.00 [Nov. -22-1996]		[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520 ATP625.CFG	
00: Inquiry check	[Pass]	[ID:3]=SONY CD-ROM CDU625 X.Xx	
01: TEST UNIT READY	[Pass]	READY	
02: TOC read	[Pass]		
03: Incremental Read	[Pass]		
04: Random Seek & Read			
05: Spin Up/Down (X1)	[Pass]	Spin Up : XXXX [ms]	Spin Down : XXX [ms]
06: Spin Up/Down (X4)	[Pass]	Spin Up : XXXX [ms]	Spin Down : XXX [ms]
07: Spin Up/Down (Max)	[Pass]	Spin Up : XXXX [ms]	Spin Down : XXXX [ms]
08: Full seek Read (X1)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
09: 1/3 seek Read (X1)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
10: Full seek Read (X4)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
11: 1/3 seek Read (X4)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
12: Full seek Read (Max)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
13: 1/3 seek Read (Max)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
14: Play Audio (DeTRCK)	[Pass]		
15: Play Audio (E-Volume)	[Pass]		
16: Play Audio (Play Mode)	[Pass]		
17: Play Audio (X Talk L->R)	[Pass]		
18: Play Audio (X Talk R->L)	[Pass]		
19: Sub Code Read	[Pass]		
		OK	
		Remove the DISC	Hit any key when ready

Sony SCSI CD-ROM Failure Verification Test Ver. 1.00.00 [Nov. -22-1996]		[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520 ATP625.CFG	
0: Inquiry check	[Pass]	[ID:3]=SONY CD-ROM CDU625 X.Xx	
1: TEST UNIT READY	[Pass]	READY	
2: TOC read	[Pass]		
3: Incremental Read	[Pass]		
4: Random Seek & Read			
5: Spin Up/Down (X1)	[Pass]	Spin Up : XXXX [ms]	Spin Down : XXX [ms]
6: Spin Up/Down (X4)	[Pass]	Spin Up : XXXX [ms]	Spin Down : XXX [ms]
7: Spin Up/Down (Max)	[Pass]	Spin Up : XXXX [ms]	Spin Down : XXXX [ms]
8: Full seek Read (X1)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
9: 1/3 seek Read (X1)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
10: Full seek Read (X4)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
11: 1/3 seek Read (X4)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
12: Full seek Read (Max)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
13: 1/3 seek Read (Max)	[Pass]	Max : XXXX [ms]	Ave : XXXX [ms]
14: Play Audio (DeTRCK)	[Pass]		
15: Play Audio (E-Volume)	[Pass]		
16: Play Audio (Play Mode)	[Pass]		
17: Play Audio (X Talk L->R)	[Pass]		
18: Play Audio (X Talk R->L)	[Pass]		
19: Sub Code Read	[Pass]		
		NG	
		Remove the DISC	Hit any key when ready

6-3-4. DRIVE FUNCTION CHECK

Since CDM-47 models is adjustment-free drive, there is no potentiometer for electrical adjustment in the MA-C30 Mounted Board. Therefore BU or MA Mounted Board can be swapped over without any manual adjustment so that you will easily find defective components (if the trouble depends on BU or MA Mounted Board). (Refer to 6-3-4-2.)

Note: All of adjustment items, will be automatically performed after power-on by the function of CD DSP IC.

The page 6-15 shows the sequence of execution items in Power-On Reset Actions. It will help you finding any defective point on the drive to know the specified processing sequence of the auto adjustment items and drive's action in the Power-On Reset Actions.

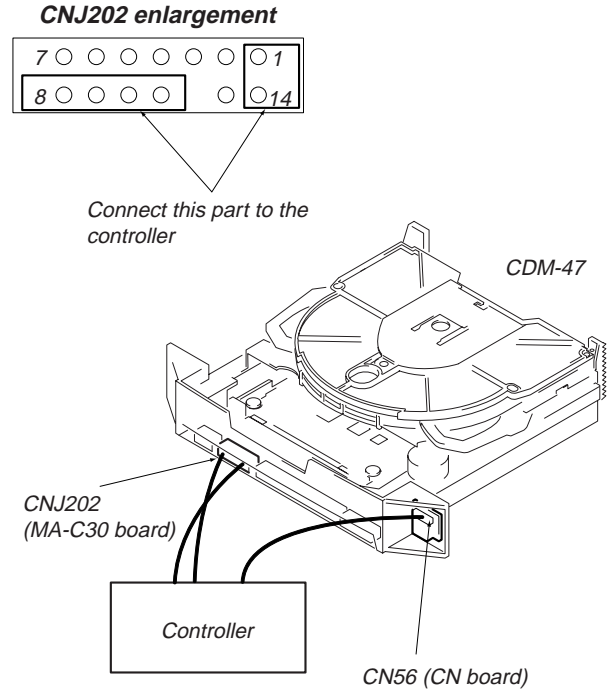
Preparing

- a. The following tools and measuring equipments are necessary for performing this section.
 - DC Power Supply or CDL1100 unit
 - Oscilloscope
 - Sony Test Disc (YEDS-18) (3-702-101-01)
 - CDL1100 (CDM-47) CONTROLLER (J-2501-141-A)
- b. Connect the test drive to the DC power supply or CDL1100 unit.

6-3-4-1. Pre-Setting for Test Mode Operation

Note: This section is performed only specified following sections.
Note: This section describes usages of Test Mode Operation and signal checking on the CDM-47 drives with the CDL1100 (CDM-47) CONTROLLER.

- a. Connect CDM-47 to CDL1100 (CDM-47) CONTROLLER as shown in following Fig. 3-4-1.



- b. See the COMMAND SW ON CDL1100 (CDM-47) CONTROLLER as following table.

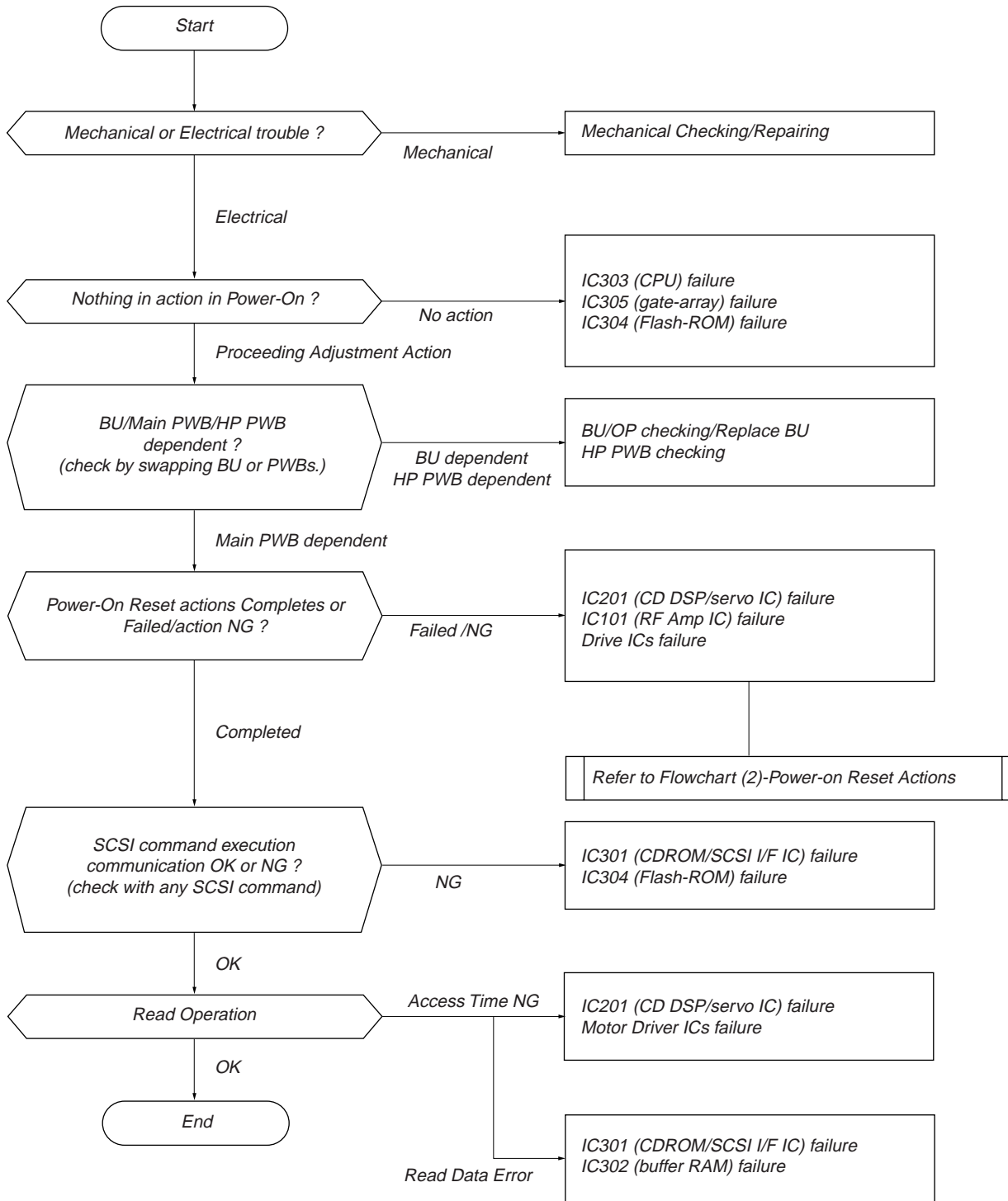
ID2	ID1	ID0	PARITY
L	H	L	L

- c. While pressing the TEST button of the controller, turn on the power of the CDL1100 or power supply unit.
- d. After about 1 second later, release the **TEST** button.

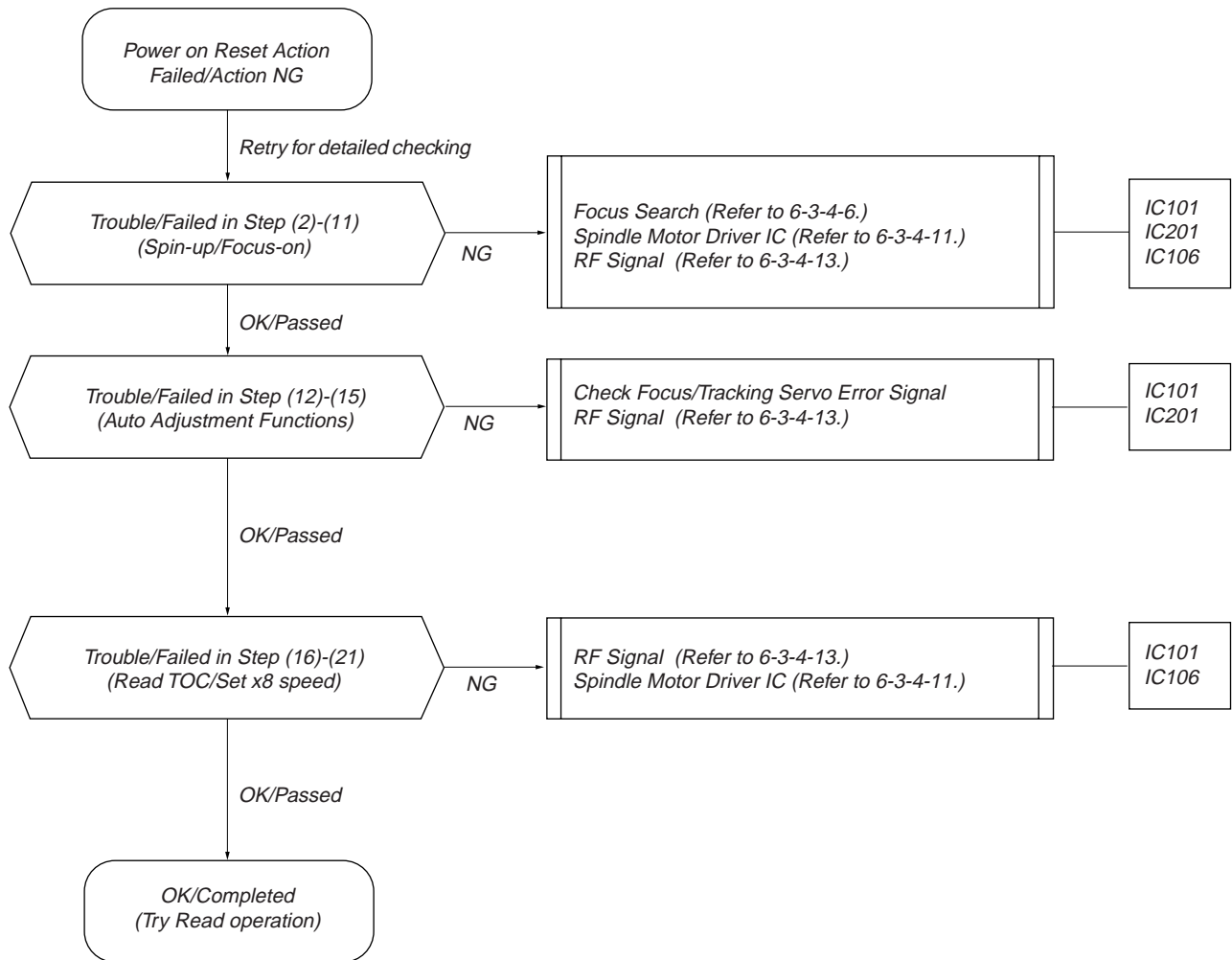
Note: Even drive is Test Mode, **EJECT** button is activated.

6-3-4-2. Flowchart

Note: These flowchart is described assuming that IC failure causes any trouble.



Flowchart (1) Repairing/Trouble Shooting-General



Flowchart (2) Repairing/Trouble Shooting-Power-on Reset Actions

Power on Reset Actions

Step	Item	Drive Action
(1)	Drive Power-On	
(2)	Sled Offset/Hall element Adjustment	
(3)	Tentative spindle servo gain setting	
(4)	LD On	LD to turn on
(5)	Focus Search	OP lens to move up and down
(6)	Focus On	
(7)	Spindle servo gain setting	
(8)	Tracking Servo On	
(9)	Spindle Servo On	
(10)	— sync pattern detection —	
(11)	Focus Bias Voltage Auto Adjustment	
(12)	Focus Servo Gain Auto Adjustment	(You will hear a small beep sound from the drive during these auto adjustment.)
(13)	Track Servo Gain Auto Adjustment	
(14)	— sync pattern detection —	
(15)	Disc Diameter (8cm/12cm) Detection	(You will see RF Signal with Spindle-Kicking waveform.)
(16)	Read TOC	
(17)	Jump to 00:02:00	
(18)	— Subcode-Q detection —	
(19)	Disc Linear Speed Detection	
(20)	Set max. rotational speed	
(21)	— sync pattern detect & subcode-Q detection—	
	— Completed —	

Note: When a disc is replaced, the above steps excluding item (1) to (3) will be executed.
The item (1) to (3) will be performed only after power-on.

6-3-4-3. Test Command List

ID2	ID1	ID0	PARITY	Drive Action
L	L	L	L	Initialize Drive
L	L	H	L	Set Normal Speed
L	H	L	L	Set Quadruple Speed
H	H	L	L	Play Audio (from 23'47")
L	L	L	H	Tracking Servo on
L	L	H	H	Tracking Servo off
H	L	H	L	Play Audio (from 5'00")
H	H	H	L	Play Audio (from 50'00")
H	L	L	L	Partial CAV (x12-x24)

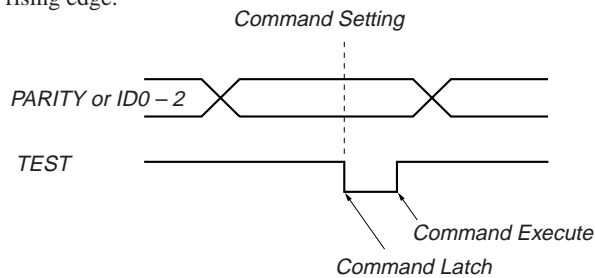
H : PARITY or ID0 – 2 test point to be high (5V).

L : PARITY or ID0 – 2 test point to be low (Ground).

Command Execute

In the test mode, above listed function can be executed. Turn on COMMAND SW on CDL1100 (CDM-47) CONTROLLER.

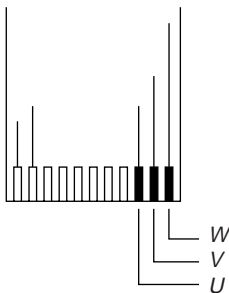
The command will be latched by TEST down edge, and executed by rising edge.



6-3-4-4. Spindle Motor

[Check resistance]

- Pull the spindle motor flexible cable out from the connector.
- Measure the resistance between 3 motor terminals respectively (u-v, v-w, w-u).
- The resistance shall be $8\Omega \pm 10\%$.
- Otherwise replace the motor.



[Check noise from spindle motor]

- Listen carefully the sound from the spindle motor while drive is spinning up.
- If you hear the strong striking noise from the motor, it is suspected that there is too much clearance between the bearing metal and the shaft, that is; NG motor!!

6-3-4-5. Sled Gear Train

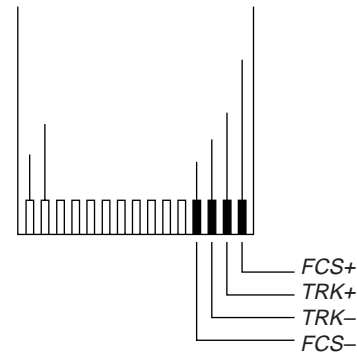
[Check the mechanical burden]

- Disassemble the CHUCK HOLDER.
- Check if there is any broken tooth in the gears.
- Try to move sled gears by hand and check if it gets unsmooth in certain position.
- In case there is unsmooth motion, replace Base Unit Ass'y.

6-3-4-6. 2-Axis Actuator

[Check Focus search operation]

- Disassemble the CHUCK HOLDER so that the optical pick-up is exposed.
- Turn on the drive power and watch if the objective lens moves upward and downward.
- If the lens does not move, check the resistance of the 2-axis actuator coils. It should be $6.1 \pm 1.1\Omega$ between FCS+ and FCS-.



- Otherwise replace the optical device.
- If the coils are normal, replace the Driver IC (IC103).

6-3-4-7. Focusing (Focus Bias)

- Insert any discs into the drive after the check of 6-3-4-4.
- Check if the drive can make a focus.
- In case of failure, it is possible that Focus Bias or Focus Gain Servo circuit had not been controlled well.
- So watch RF signal by a oscilloscope and see if the quality is good or not.
- In case the quality is not good, check servo circuit.

6-3-4-8. Laser Power

[Check Laser beam]

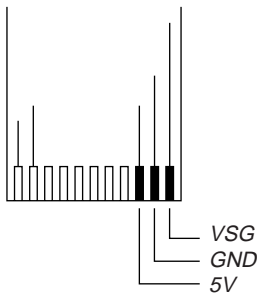
- Disassemble the drive so that the optical device is exposed.
- Turn on the drive power and look into the objective lens carefully while the drive is in process of focus search.
- Check if the red beam comes out from the optical pick-up.
Warning: Do not look into LD beam closely with naked eyes.
- In case of no beam from optical device, the LD must have been broken down, so replace the optical pick-up.

[Check Laser Current]

- Touch the IOP test land on the MA-C30 Mounted Board.
- Measure the voltage generated by the laser current while the drive in process of focus search.
- It is supposed to be about 4.5V because the voltage of IOP will drop by $IOP \times 10\Omega$ from 5V-A.
- Otherwise replace the optical pick-up.

[Check G Sensor]

- Pull the SE-C7 P. W. B. cable out from the connector.
- Measure the resistance between 3 terminals respectively. (VSG-GND, GND-5V)
- The resistance should be $3.7 \pm 1M\Omega$ between VSG and GND, and $94 \pm 6k\Omega$ between GND and 5V.



6-3-4-9. Chucking Mechanism

- Listen the sound from the drive while the drive is spinning up.
- Check if there is any slipping noise among the Turntable, the Chucking Pulley Ass'y and the Disc.
- If you hear any, disassemble the drive and check if there is excessive dust or any contamination on the Turntable or the disc.
- Otherwise replace the Chucking Pulley Ass'y.

Note: As the CDM-47 adopts the V CAN motor for the spindle motor, clattering sounds of the ball bearings are produced during spinning up and spinning down.
Differentiate these from slipping sounds.

6-3-4-10. Sled Motor

- Disconnect the SE-C7 P. W. B. cable from the SE-C7 board.
- Check the resistance between 2 terminals of sled motor.
- It should be $10.8\Omega \pm 10\%$.

6-3-4-12. EF Balance

Note:

- Before performing electrical block checks, solder a lead wire to TP RFEQ, TP VC, and TP TE of the MA-C30 board.
- Chuck the disk (YEDS-18) beforehand.
- Refer to 6-3-4-1. and set the test mode.
- Insert a SONY test disc (YEDS-18) into the test drive.

1. Connect the oscilloscope to TP TE and TP VC of the MA-C30 board.
2. Set the COMMAND SW of the controller to INITIALIZE and press the **TEST** button.

ID2	ID1	ID0	PARITY
L	L	L	L

3. Set the COMMAND SW of the controller to x1 speed, and press the **TEST** button.

ID2	ID1	ID0	PARITY
L	L	H	L

4. Set the COMMAND SW of the controller to Play Audio (23'47"), and press the **TEST** button.

ID2	ID1	ID0	PARITY
H	H	L	L

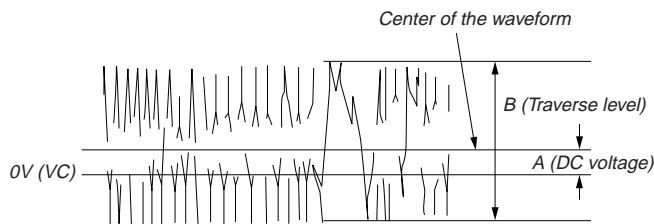
5. Set the COMMAND SW of the controller to tracking off, and press the **TEST** button.

ID2	ID1	ID0	PARITY
L	L	H	H

6. Check the level B of the oscilloscope's waveform and the A (DC voltage) of the center of the Traverse waveform.

Confirm the following:

- $A/B \times 100 = \text{less than } \pm 22 (\%)$



7. After adjusting, set the COMMAND SW of the controller to tracking on, and press the **TEST** button.

ID2	ID1	ID0	PARITY
L	L	L	H

6-3-4-13. RF Level

Note:

- Before performing electrical block checks, solder a lead wire to TP RFEQ and TP VC of the MA-C30 board.
- Chuck the disk (YEDS-18) beforehand.
- Refer to 6-3-4-1. and set the test mode.

1. Connect the oscilloscope to TP RFEQ and TP VC of the MA-C30 board.
2. Set the COMMAND SW of the controller to INITIALIZE and press the **TEST** button.

ID2	ID1	ID0	PARITY
L	L	L	L

3. Set the COMMAND SW of the controller to Play Audio (23'47"), and press the **TEST** button.

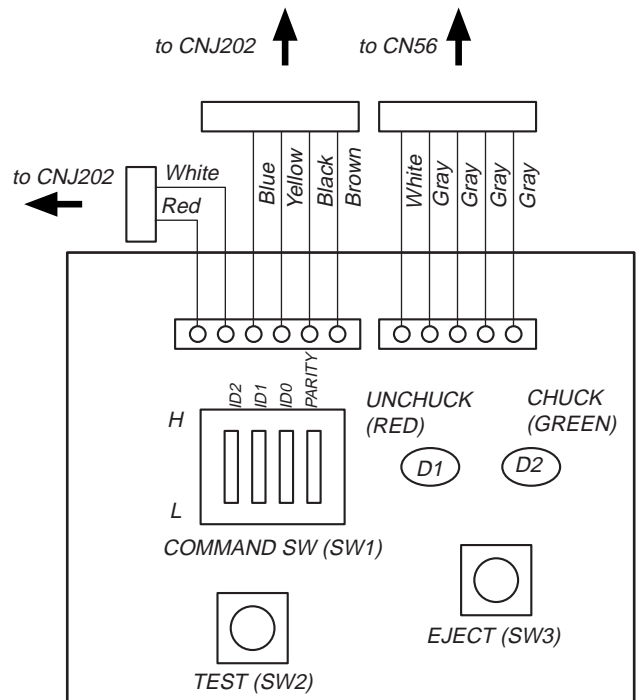
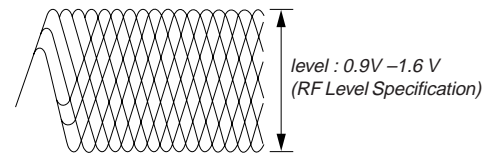
ID2	ID1	ID0	PARITY
H	H	L	L

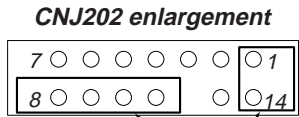
4. Set the COMMAND SW of the controller to x1 speed, and press the **TEST** button.

ID2	ID1	ID0	PARITY
L	L	H	L

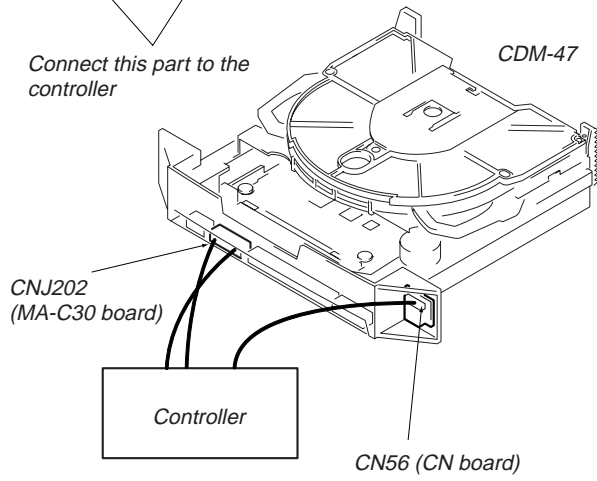
5. Check that the oscilloscope waveform is clear, and the RF level is proper.

* A clear RF signal waveform is as follows.

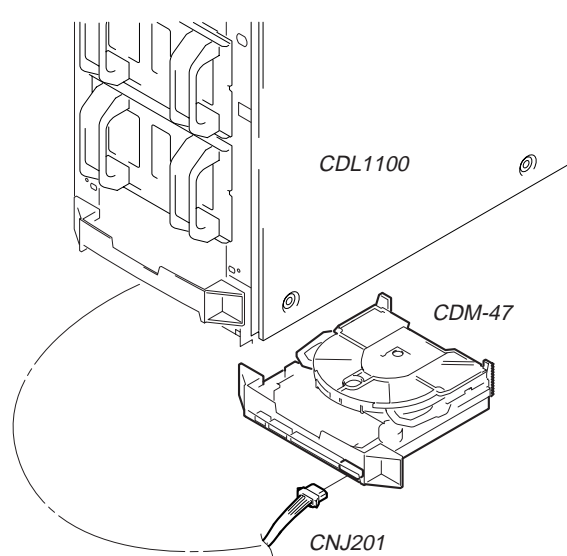




Connect this part to the controller

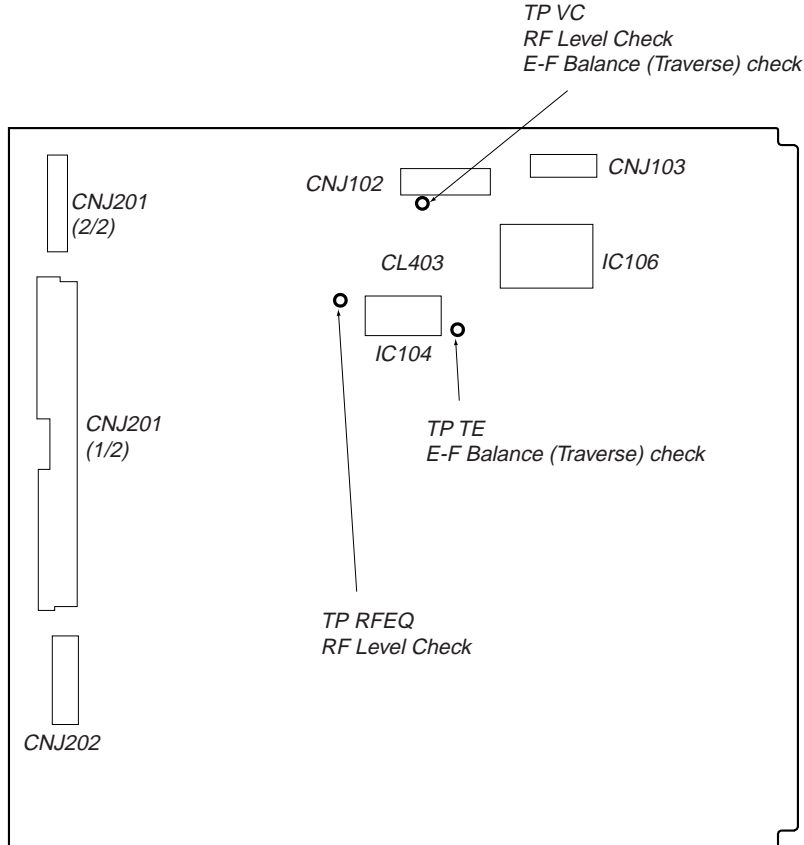


Supplying power from the CDL1100 unit



Adjustment Location :

[MA-C30 BOARD] — Side B —



6-3-5. DOWN LOAD PROGRAM

- Connect the drive to the host computer as shown in 6-2-3-1.
- Set the COMMAND SW of the CDL1100 (CDM-47) CONTROLLER as follows.

ID2	ID1	ID0	PARITY
H	L	L	L

- After system loading, insert Firmware Program Disk into the drive A.
- Change the directory in the drive A.
- Type and hit key. (Display 6-3-5. (a) shows up.)

```

Firmware DownLoad VIA ASPI Ver.1.00.00 --Sony CD-ROM --                [Nov. -21-1996]
[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520
Size of OBJ. [625s_XXx. HEX ] => 065536 Bytes. Accept? (Y/N) ==>?
    
```

Display 6-3-5 (a)

- Hit key. (Display 6-3-5. (b) shows up.)

```

Firmware DownLoad VIA ASPI Ver.1.00.00 --Sony CD-ROM --                [Nov. -21-1996]
[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520
Size of OBJ. [625s_XXx. HEX ] => 065536 Bytes.

[ID:3]=SONY CD-ROM CDU-625 X.Xx                [Available ROM size:064 kBytes]
                                                Accept? (Y/N) ==>?
    
```

Display 6-3-5 (b)

- Hit key.
- Hit key to start the down loading.(It takes a few minutes). (Display 6-3-5. (c) shows up.)

```

Firmware DownLoad VIA ASPI Ver.1.00.00 --Sony CD-ROM --                [Nov. -21-1996]
[ID:7]= ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520
Size of OBJ. [625s_XXx. HEX ] => 065536 Bytes.

[ID:3]= SONY    CD-ROM CDU-625 X.Xx                [ID:3]=SONY    CD_ROM CDU-625 X.Xx

[ID:3] Downloading INQUIRY data.                Complete.
[ID:3] Downloading ROM data. [00000 ~03FFF]      Complete.
[ID:3] Downloading ROM data. [04000 ~07FFF]      Complete.
[ID:3] Downloading ROM data. [08000 ~0BFFF]      Wait for a moment...
    
```

Display 6-3-5 (c)

Note: When the firmware has the different inquiry data from the current drive, the warning message appears. (Display 6-3-5. (d) shows up.) In this case, hit key to quit.

```

Firmware DownLoad VIA ASPI Ver.1.00.00 --Sony CD-ROM --                [Nov. -21-1996]
[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520
Size of OBJ. [625s_XXx. HEX ] => 065536 Bytes.

[ID:3]=SONY CD-ROM CDU-XXX X.Xx                [Available ROM size:064 kBytes]

Hit Esc to quit.

```

Display 6-3-5 (d)

- Note:** When the down loading and verification are completed, “OK” shows up on the display. (Refer to Display 6-3-5. (e))
- When this process is not completed, change ROM (IC204) with new one and try down load process again.
- Note:** When you want to down load other versions, hit any key. (Display 6-3-5. (a) shows up.)

```

Firmware DownLoad VIA ASPI Ver.1.00.00 --Sony CD-ROM --                [Nov. -21-1996]
[ID:7]=ASW-1210 V 3.60 ADAPTEC AHA-1520ADAPTEC AHA-1520
Size of OBJ. [625s_XXx. HEX ] => 065536 Bytes.

[ID:3]= SONY CD-ROM CDU-625 X.Xx                [ID:3]=SONY   CD_ROM CDU-625 X.Xx

[ID:3] Downloading INQUIRY data.                Complete.
[ID:3] Downloading ROM data. [00000 ~03FFF]    Complete.
[ID:3] Downloading ROM data. [04000 ~07FFF]    Complete.
[ID:3] Downloading ROM data. [08000 ~0BFFF]    Complete.
[ID:3] Downloading ROM data. [0C000 ~0FFFF]    Complete.
[ID:3] Self resetting                          Complete.
[ID:3] Verifying ROM data. [00000 ~03FFF]      Complete.
[ID:3] Verifying ROM data. [04000 ~07FFF]      Complete.
[ID:3] Verifying ROM data. [08000 ~0BFFF]      Complete.
[ID:3] Verifying ROM data. [0C000 ~0FFFF]      Complete.

                                                OK

Hit any key to continue, or Esc to abort.

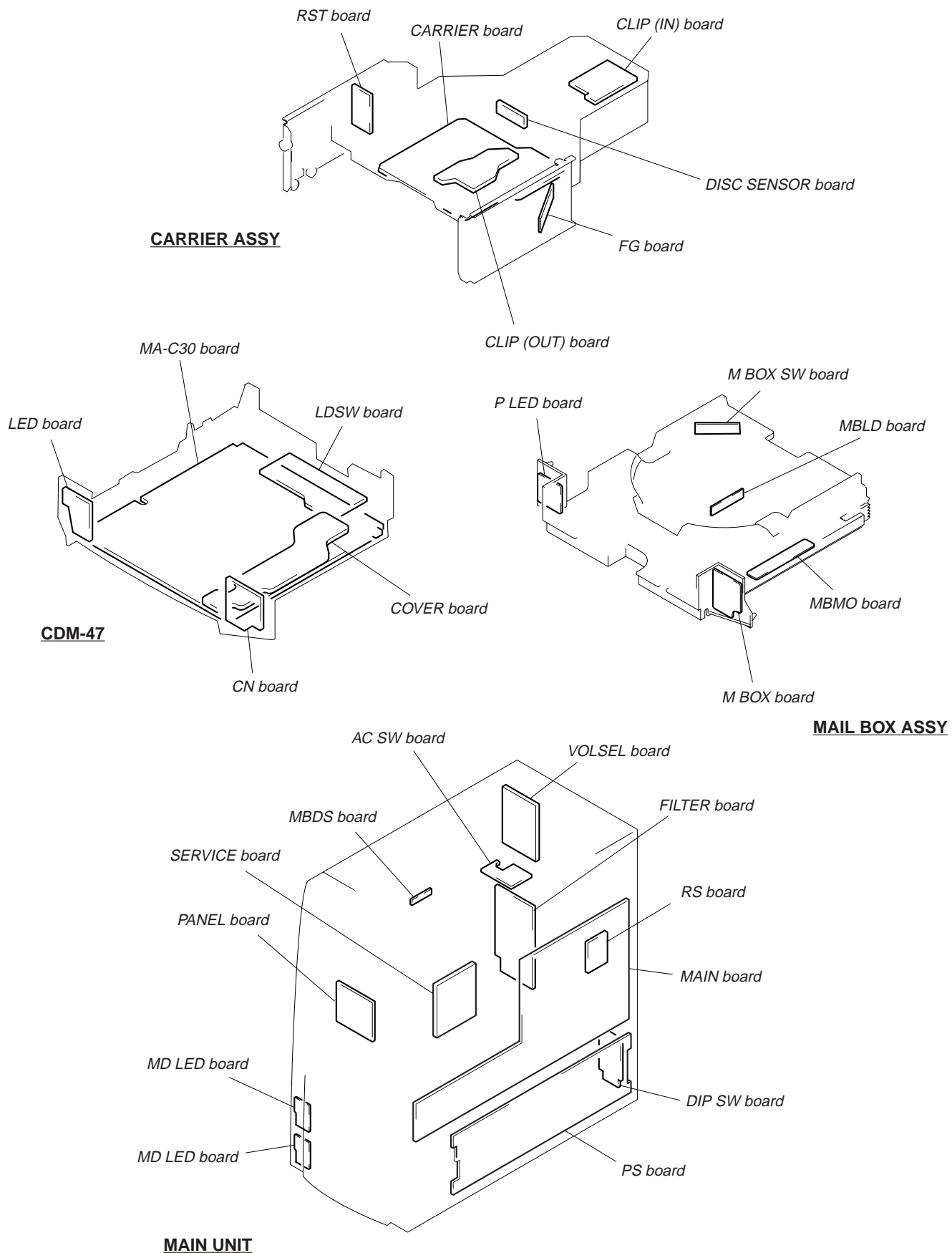
```

Display 6-3-5 (e)

- i. Quit this program by hitting ESC key.

SECTION 7 DIAGRAMS

7-1. CIRCUIT BOARDS LOCATION



7-2. IC PIN FUNCTIONS

• IC301 CD-ROM DECODER AND SCSI INTERFACE (CXD1818R) (MA-C30 board)

Pin No.	Pin Name	I/O	Function
1	VSS	–	Ground
2	VDD	–	Power supply (+5V)
3	XDB0	I/O	SCSI data bus bit0
4	VSS	–	Ground
5	XDB1	I/O	SCSI data bus bit1
6	VSS	–	Ground
7	VDD	–	Power supply (+5V)
8	XDB2	I/O	SCSI data bus bit2
9	VSS	–	Ground
10	XDB3	I/O	SCSI data bus bit3
11	XDB4	I/O	SCSI data bus bit4
12	VSS	–	Ground
13	VSS	–	Ground
14	VDD	–	Power supply (+5V)
15	XDB5	I/O	SCSI data bus bit5
16	VSS	–	Ground
17	XDB6	I/O	SCSI data bus bit6
18	VSS	–	Ground
19	XDB7	I/O	SCSI data bus bit7
20	VSS	–	Ground
21	VDD	–	Power supply (+5V)
22	XDBP	I/O	SCSI data bus parity
23	VSS	–	Ground
24	XATN	I/O	SCSI control bus/ATN signal
25	VSS	–	Ground
26	XBSY	I/O	SCSI control bus/BSY signal
27	VSS	–	Ground
28	VDD	–	Power supply (+5V)
29	XACK	I/O	SCSI control bus/ACK signal
30	XSRs	I/O	SCSI control bus/RST signal
31	VSS	–	Ground
32	VSS	–	Ground
33	VDD	–	Power supply (+5V)
34	VSS	–	Ground
35	XMSG	I/O	SCSI control bus/MSG signal
36	XSEL	I/O	SCSI control bus/SEL signal
37	VSS	–	Ground
38	VDD	–	Power supply (+5V)
39	XCD	I/O	SCSI control bus/CD signal
40	VSS	–	Ground
41	XREQ	I/O	SCSI control bus/REQ signal
42	VSS	–	Ground
43	XIO	I/O	SCSI control bus/IO signal
44	XCM1	O	VCO charge pump output for multiplying
45	AC	I	VCO control voltage input for multiplying
46	AVSS	–	Analog ground
47	AVDD	–	Analog power supply (+5V)
48	XTL2	O	Output of crystal oscillating circuit
49	XTL1	I	Input of crystal oscillating circuit
50	CLK	O	Clock output

Pin No.	Pin Name	I/O	Function
51	VSS	–	Ground
52	VDD	–	Power supply (+5V)
53	XRES	I	CXD1804R reset signal
54	MA0	O	Address bus output bit0 to buffer memory
55	MA1	O	Address bus output bit1 to buffer memory
56	MA2	O	Address bus output bit2 to buffer memory
57	MA3	O	Address bus output bit3 to buffer memory
58	MA4	O	Address bus output bit4 to buffer memory
59	MA5	O	Address bus output bit5 to buffer memory
60	MA6	O	Address bus output bit6 to buffer memory
61	VSS	–	Ground
62	MA7	O	Address bus output bit7 to buffer memory
63	MA8	O	Address bus output bit8 to buffer memory
64	MA9	O	Address bus output bit9 to buffer memory
65	XRAS	O	Buffer memory RAS (Row Address Strobe) signal
66	XUCAS	O	Buffer memory CAS (Column Address Strobe) signal
67	XLCAS	O	Buffer memory CAS (Column Address Strobe) signal
68	XMWR	O	Buffer memory data write strobe signal
69	VSS	–	Ground
70	VDD	–	Power supply (+5V)
71	MDB0	I/O	Buffer memory data bus bit0
72	MDB1	I/O	Buffer memory data bus bit1
73	MDB2	I/O	Buffer memory data bus bit2
74	MDB3	I/O	Buffer memory data bus bit3
75	MDB4	I/O	Buffer memory data bus bit4
76	MDB5	I/O	Buffer memory data bus bit5
77	MDB6	I/O	Buffer memory data bus bit6
78	MDB7	I/O	Buffer memory data bus bit7
79	VSS	–	Ground
80	MDB8	I/O	Buffer memory data bus bit8
81	MDB9	I/O	Buffer memory data bus bit9
82	MDBA	I/O	Buffer memory data bus bit10
83	MDBB	I/O	Buffer memory data bus bit11
84	MDBC	I/O	Buffer memory data bus bit12
85	MDBD	I/O	Buffer memory data bus bit13
86	MDBE	I/O	Buffer memory data bus bit14
87	MDBF	I/O	Buffer memory data bus bit15
88	VSS	–	Ground
89	VDD	–	Power supply (+5V)
90	EXCK	O	SBIN reading clock (Connected to CXD3000 EXCK pin/pin 65)
91	SBIN	I	Subcode serial signal (Connected to CXD3000 SBSO pin/pin 64)
92	SBSY	I	Subcode sync signal (Connected to CXD3000 SBSY pin/pin 63)
93	WFCK	I	Write frame clock (Connected to CXD3000 WFCK pin/pin 62)
94	C2P0	I	C2 pointer signal, indicating an error in MDAT.
95	BCLK	I	Bit clock, MDAT strobe signal
96	DATA	I	Serial data stream from DSP for CD
97	LRCK	I	LR signal, indicating Lch and Rch of MDAT.
98	VSS	–	Ground
99	DSPCK	I	Enter DSP clock
100	GSCR	I	SCOR synchronizing with DSP data output (Connected to CXD3000 GRSCOR pin/pin 113)

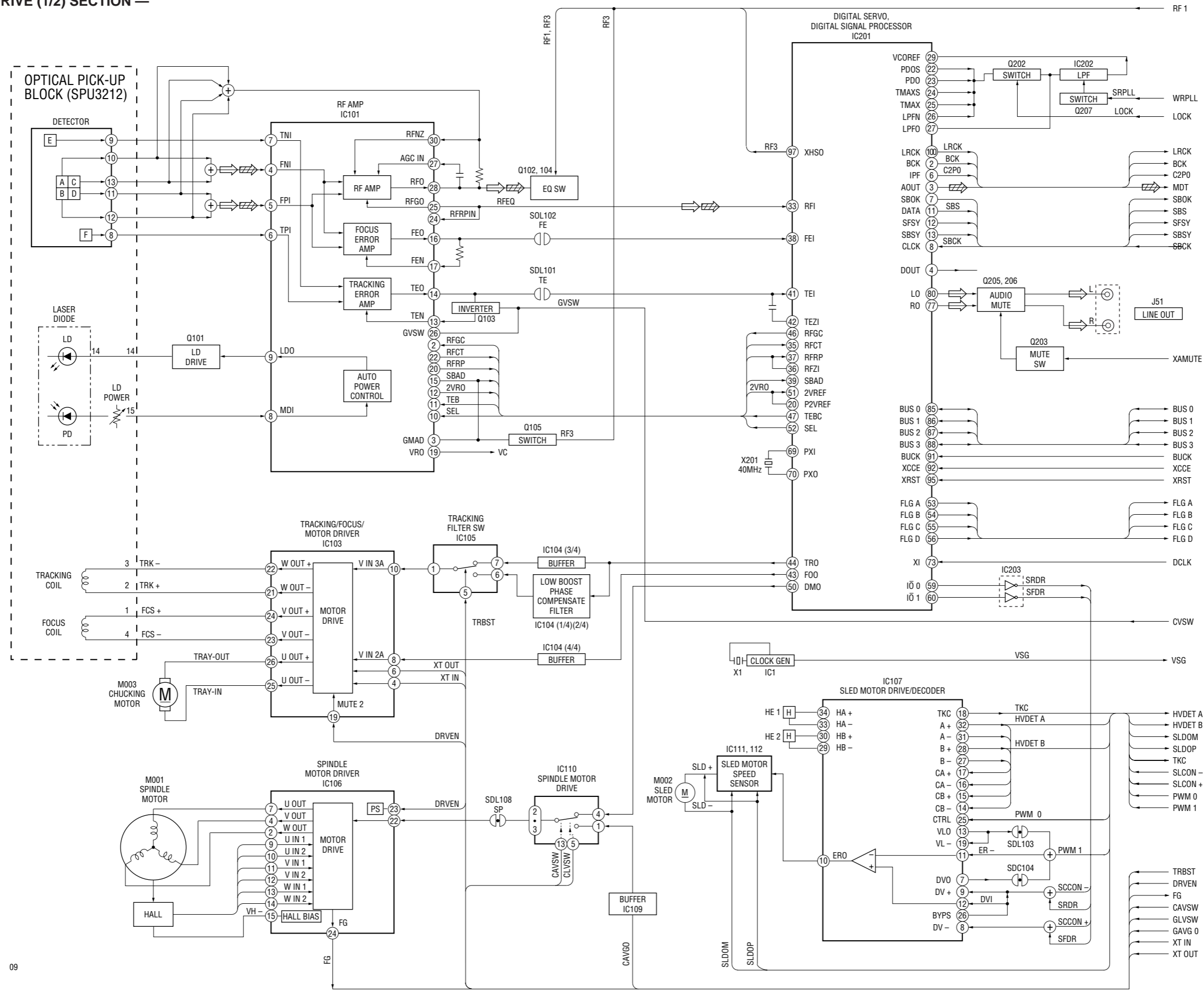
Pin No.	Pin Name	I/O	Function
101	DATO	O	Serial data output from sub CPU to CD DSP
102	XLAT	O	DAT0 latch signal. Latch at leading edge
103	DSTB	O	DAT0 transfer clock
104	VSS	–	Ground
105	VDD	–	Power supply (+5V)
106	BCKO	O	Bit clock (Connected to CXD3000 BCKI pin/pin 30)
107	DACD	O	Audio data output to DAC (Connected to CXD3000 PCMDI pin/pin 28)
108	LRCO	O	LR clock output to DAC (Connected to CXD3000 LRCKI pin/pin 26)
109	GRST	O	Output for GRSCOR resynchronizing (Connected to CXD3000 SCSY pin/pin 68)
110	XROF	I	DSP RAM Overflow input (Connected to CXD3000/ROF pin/pin 45)
111	SD0	I	Test pin0
112	SD1	I	Test pin1
113	SD2	I	Test pin2
114	SD3	I	Test pin3
115	VSS	–	Ground
116	SD4	I	Test pin4
117	SD5	I	Test pin5
118	SD6	I	Test pin6
119	SD7	I	Test pin7
120	VSS	–	Ground
121	VDD	–	Power supply (+5V)
122	XWAT	O	Wait signal for sub CPU buffer memory access
123	A0	I	CXD1804R built-in register address bus0
124	A1	I	CXD1804R built-in register address bus1
125	A2	I	CXD1804R built-in register address bus2
126	A3	I	CXD1804R built-in register address bus3
127	A4	I	CXD1804R built-in register address bus4
128	A5	I	CXD1804R built-in register address bus5
129	A6	I	CXD1804R built-in register address bus6
130	VSS	–	Ground
131	D0	I/O	Sub CPU data bus0
132	D1	I/O	Sub CPU data bus1
133	D2	I/O	Sub CPU data bus2
134	D3	I/O	Sub CPU data bus3
135	D4	I/O	Sub CPU data bus4
136	D5	I/O	Sub CPU data bus5
137	D6	I/O	Sub CPU data bus6
138	D7	I/O	Sub CPU data bus7
139	VSS	–	Ground
140	VDD	–	Power supply (+5V)
141	INT	O	Interruption to sub CPU
142	XCS	I	CXD1804R chip select signal
143	XWR	I	CXD1804R built-in register write signal
144	XRD	I	CXD1804R built-in register read signal

• IC305 GATA ARRAY (BU6260AKV) (MA-C30 board)

Pin No.	Pin Name	I/O	Function
1	XULD	I	Switch
2	XLD	I	Switch
3	XUSL	I	Ground
4	XSLT	I	Ground
5	XEJC	I	Switch
6	XHMT	O	Headphone mute
7	XAMT	O	Audio mute
8	XTOUT	O	LED
9	XLDO	O	LED
10	GND	–	Ground
11	VDD	–	Power supply
12	XDRS	O	DSP reset
13	PRST	O	CPU/Monet reset
14	RSTB	I/O	Reset
15	VAIN	I	Reset
16	TST1	I	Not used
17	SBSY	I	DSP subcode sync
18	XCCE	O	DSP
19	BUCK	O	DSP
20	BUS3	I/O	DSP
21	BUS2	I/O	DSP
22	BUS1	I/O	DSP
23	BUS0	I/O	DSP
24	GND	–	Ground
25	D0	I/O	CPU data bus
26	D1	I/O	CPU data bus
27	D2	I/O	CPU data bus
28	D3	I/O	CPU data bus
29	D4	I/O	CPU data bus
30	D5	I/O	CPU data bus
31	D6	I/O	CPU data bus
32	D7	I/O	CPU data bus
33	A0	I	CPU address bus
34	A1	I	CPU address bus
35	A2	I	CPU address bus
36	A3	I	CPU address bus
37	A4	I	CPU address bus
38	A17	I	CPU address bus
39	A18	I	CPU address bus
40	A19	I	CPU address bus
41	XCS2	O	Monet chip enable
42	XRD	I	CPU read strobe
43	XWR	I	CPU write strobe
44	XAIR	I	Power supply
45	XINT	O	CPU interrupt
46	SFSY	I	DSP
47	SBS	I	DSP
48	SBCK	I	DSP
49	FGIN	I	Spindle driver
50	SBOK	I	DSP

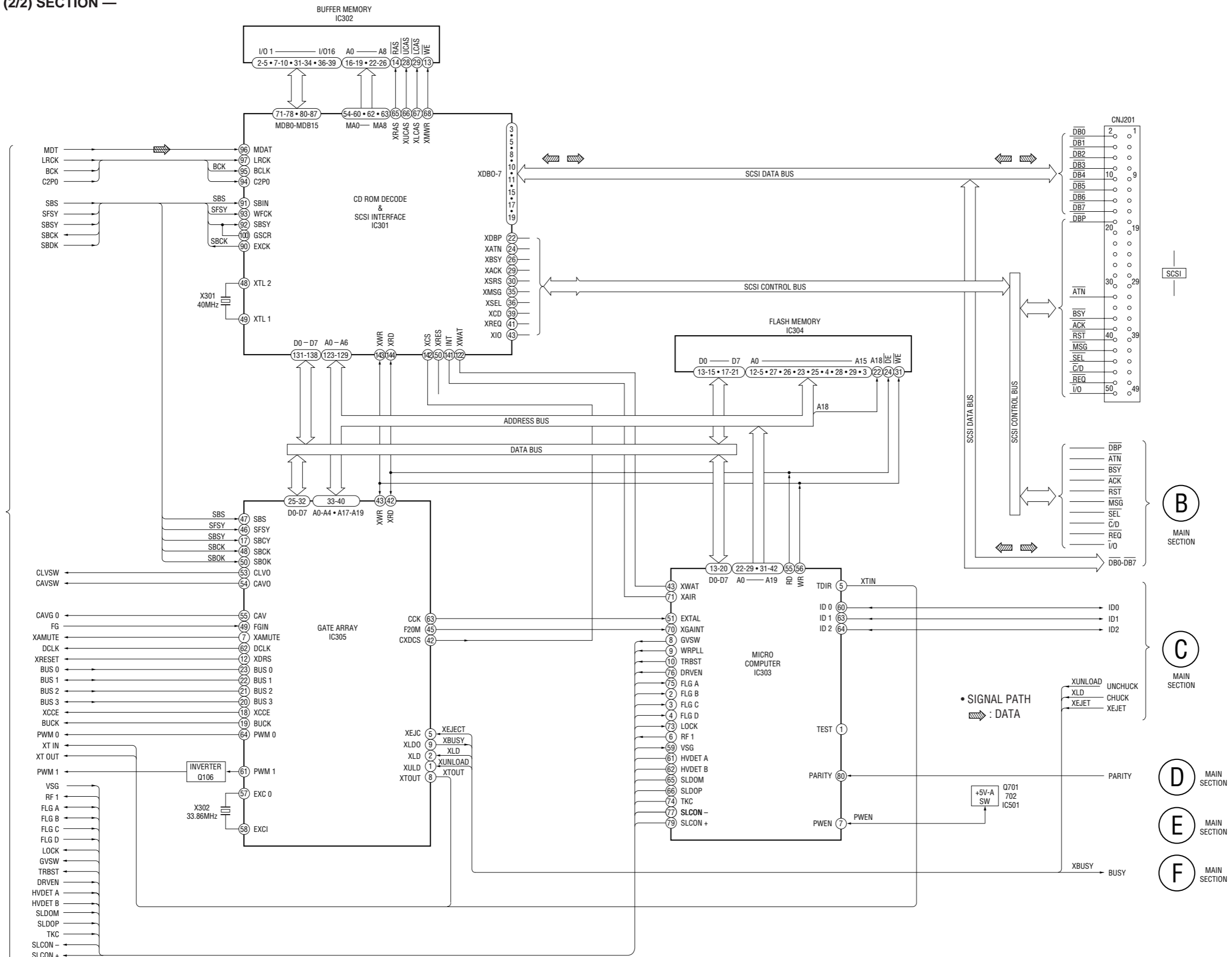
Pin No.	Pin Name	I/O	Function
51	GN1 O	O	Spindle driver 1 on
52	GN0 O	O	Spindle driver 0 on
53	CLV0	O	CLV on
54	CAV0	O	CAV on
55	CAV	O	Spindle control
56	VDD	–	Power supply
57	EXC0	O	33.86MHz
58	EXC1	I	16.93MHz
59	GND	–	Ground
60	TEST	I	Ground
61	PWM1	O	Control the outside spindle motor
62	DCK	O	DSP clock 33.86MHz
63	CCK	O	DSP clock 33.86MHz
64	PWM0	O	Control the outside spindle motor

7-3. BLOCK DIAGRAMS
 — CD-ROM DRIVE (1/2) SECTION —



(Page 32)

— CD-ROM DRIVE (2/2) SECTION —



A (Page 31)

B MAIN SECTION

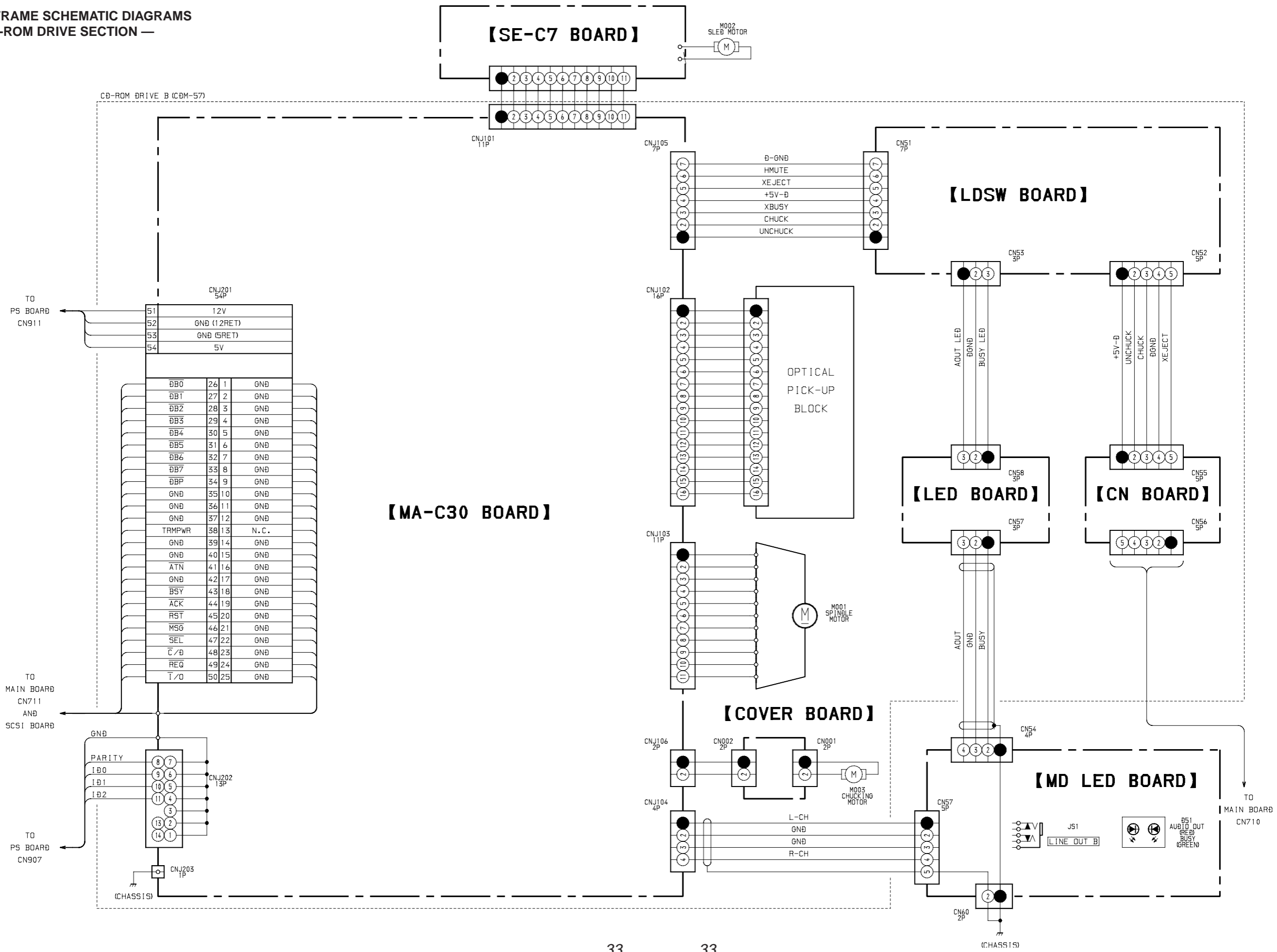
C MAIN SECTION

D MAIN SECTION

E MAIN SECTION

F MAIN SECTION

7-4. FRAME SCHEMATIC DIAGRAMS
— CD-ROM DRIVE SECTION —



THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
 (In addition to this, the necessary note is printed in each block.)

For schematic diagrams.

- Note:**
- All capacitors are in μF unless otherwise noted. pF : μF 50 WV or less are not indicated except for electrolytics and tantalums.
 - All resistors are in Ω and $1/4\text{ W}$ or less unless otherwise specified.
 - Δ : internal component.
 - \square : panel designation.

<p>Note: The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.</p>	<p>Note: Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.</p>
--	--

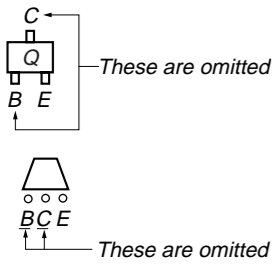
- $\text{B}+$: B+ Line.
- $\text{B}-$: B- Line.
- \square : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
no mark : STOP
() : PLAY
* : can not be mounted
- Voltages are taken with a VOM (Input impedance $10\text{ M}\Omega$). Voltage 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 : AUDIO
- Abbreviation
CND : Canadian model.

For printed wiring boards.

- Note:**
- \circ : parts extracted from the component side.
 - --- : parts extracted from the conductor side.
 - \blacksquare : parts mounted on the conductor side.
 - \circ : Through hole.
 - --- : Pattern from the side which enables seeing. (The other layers' patterns are not indicated.)

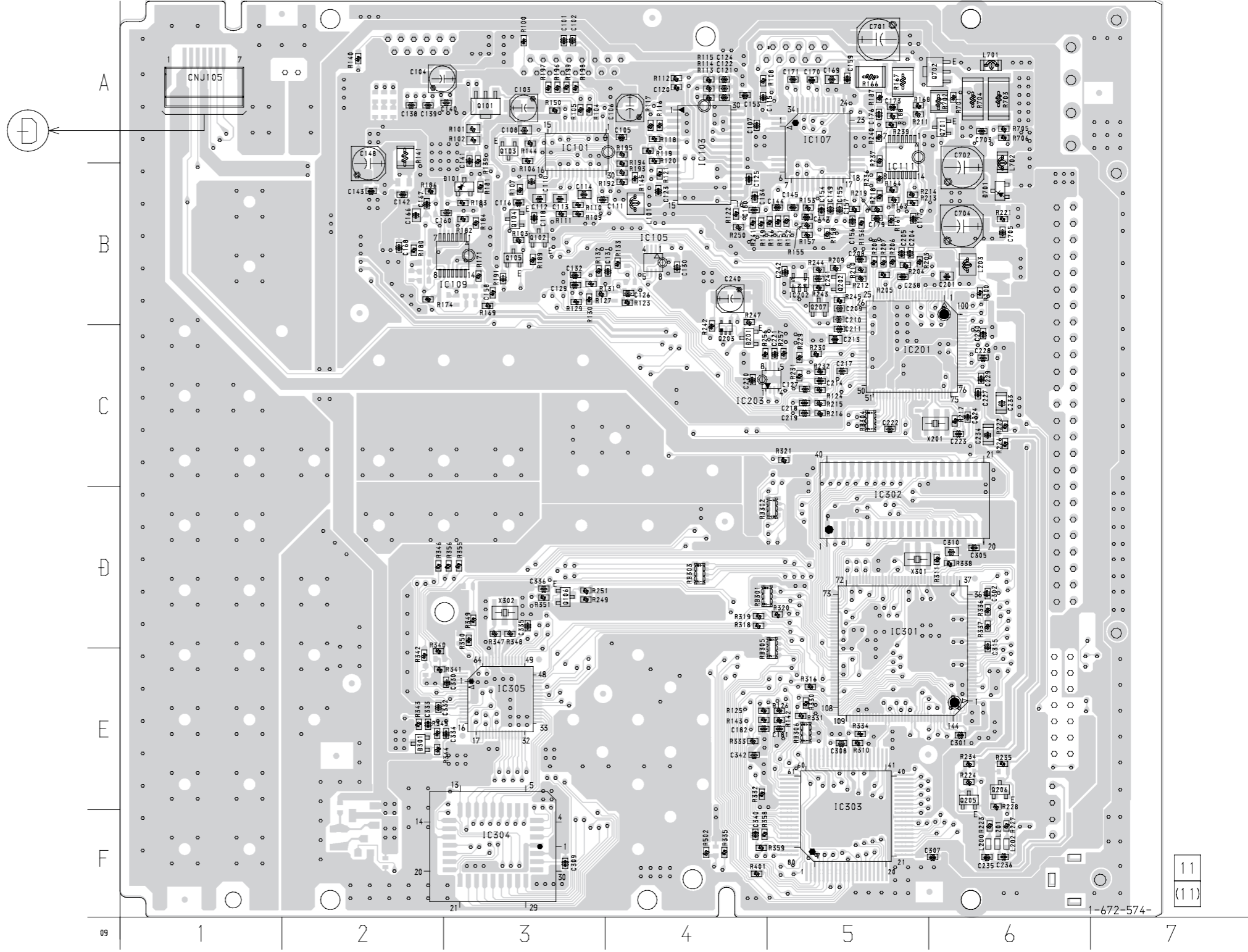
Caution:
 Pattern face side: Parts on the pattern face side seen from the (Side B) pattern face are indicated.
 Parts face side: Parts on the parts face side seen from the (Side A) parts face are indicated.

Indication of transistor



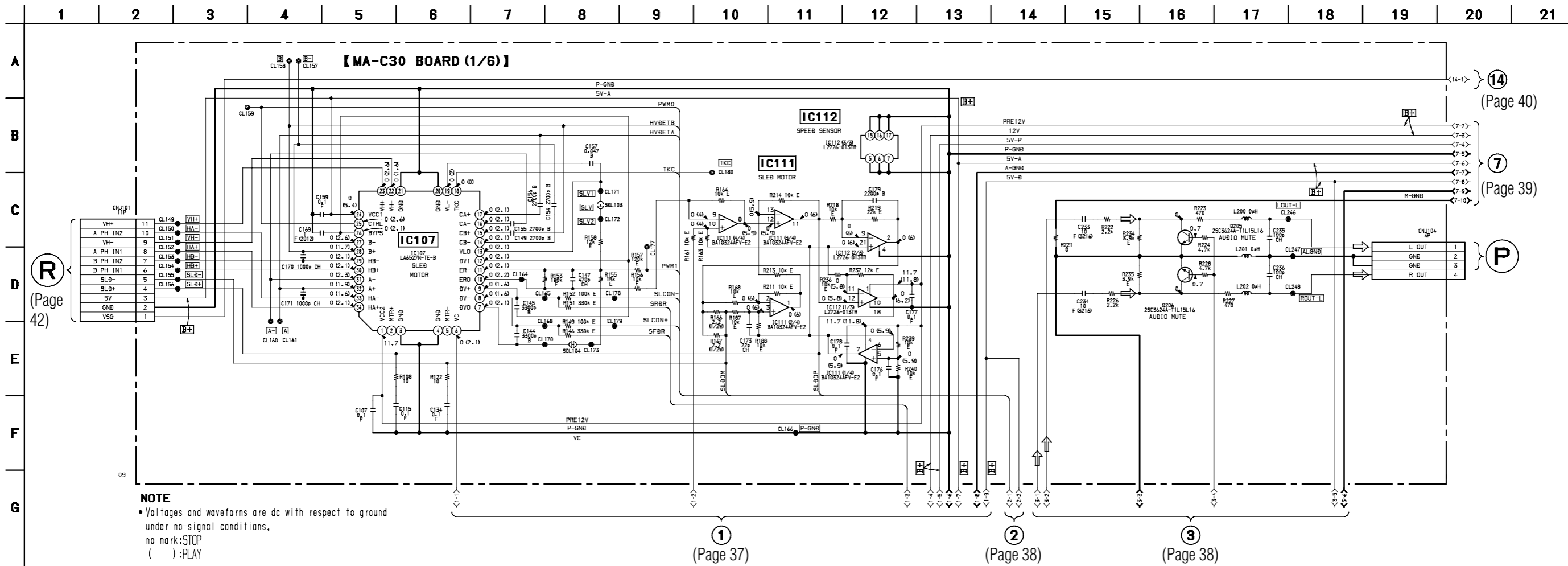
7-5. PRINTED WIRING BOARD/SCHEMATIC DIAGRAM
PRINTED WIRING BOARD — CD-ROM DRIVE SECTION —
 • See page 25 for Circuit Boards Location.

【MA-C30 BOARD】(SIDE A)



SCHEMATIC DIAGRAM — CD-ROM DRIVE (1/6) SECTION —

• See page 44 for IC Block Diagrams.



① (Page 37)

② (Page 38)

③ (Page 38)

⑭ (Page 40)

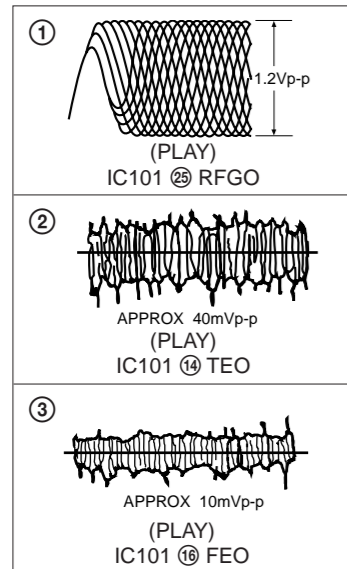
⑦ (Page 39)

Ⓟ

SCHMATIC DIAGRAM — CD-ROM DRIVE (2/6) SECTION —

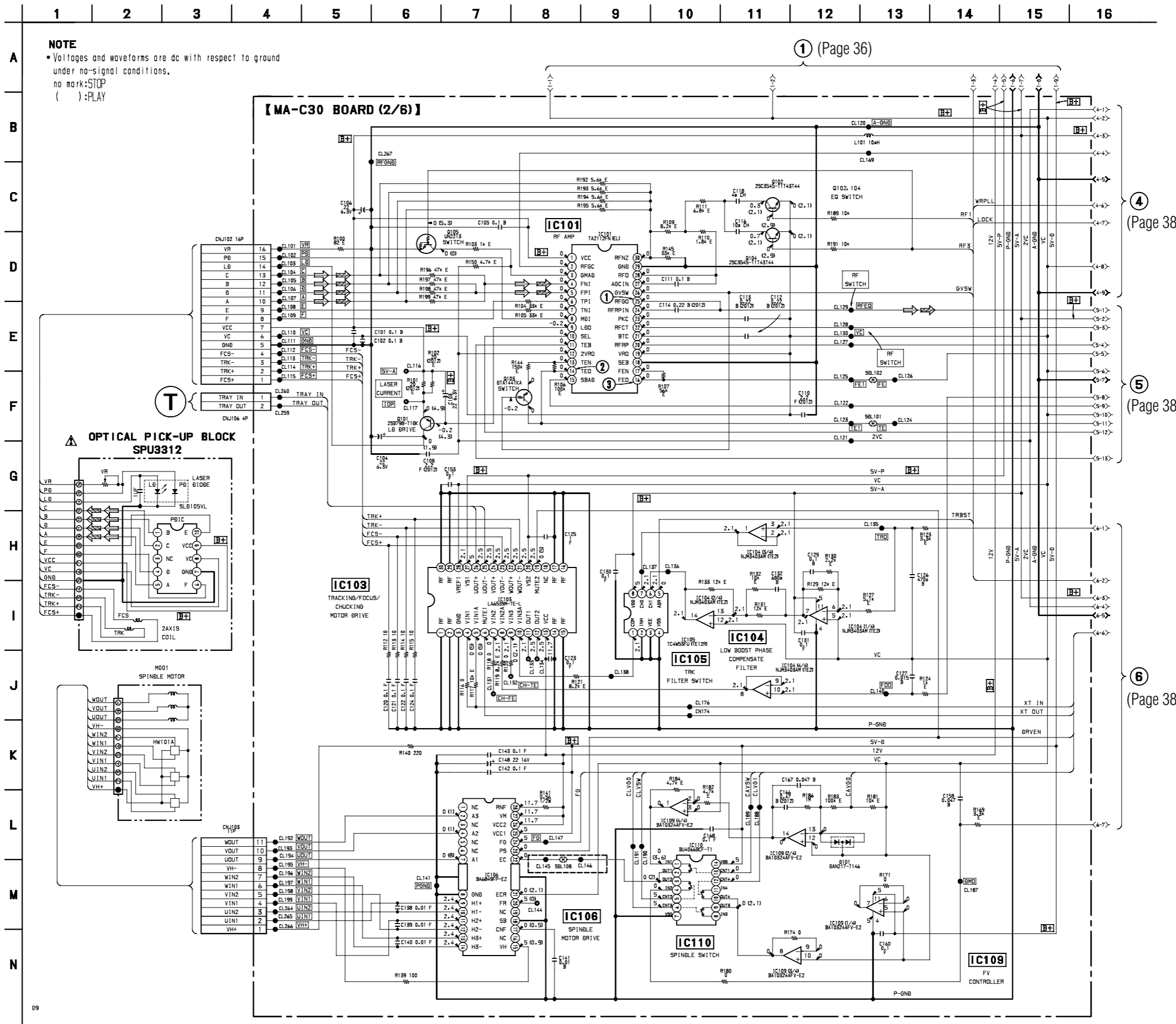
• See page 43, 44 for IC Block Diagrams.

• Waveforms



NOTE

• Voltages and waveforms are dc with respect to ground under no-signal conditions.
no mark:STOP
():PLAY



① (Page 36)

④ (Page 38)

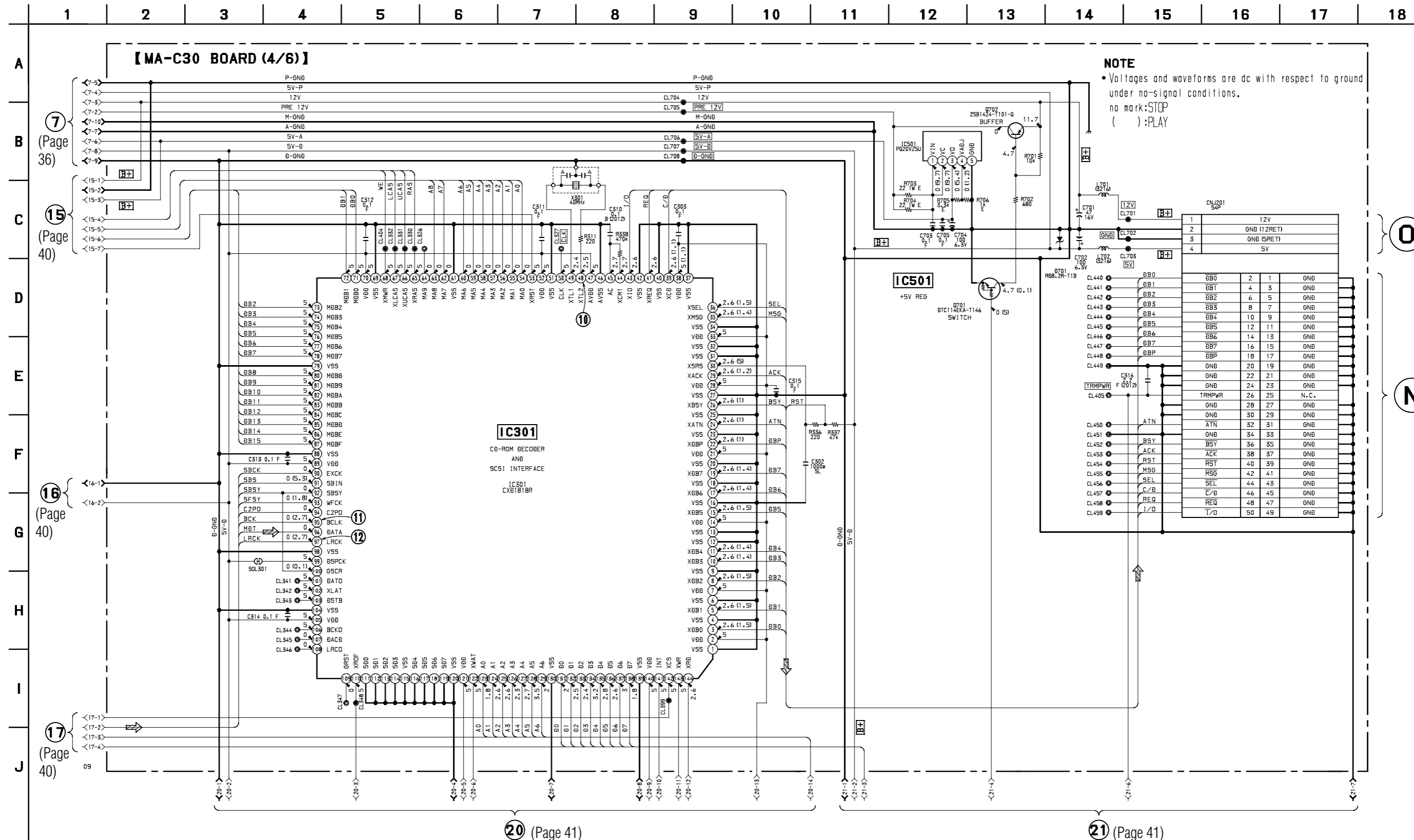
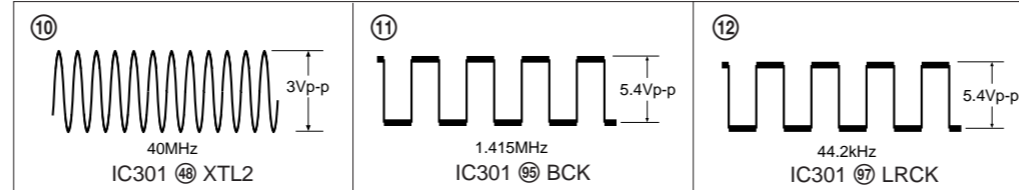
⑤ (Page 38)

⑥ (Page 38)

SCHEMATIC DIAGRAM — CD-ROM DRIVE (4/6) SECTION —

- See page 46 for IC Block Diagrams.
- See page 26 for IC Pin Function.

• Waveforms



NOTE
 • Voltages and waveforms are dc with respect to ground under no-signal conditions.
 no mark:STOP
 ():PLAY

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15 (Page 40)

16 (Page 40)

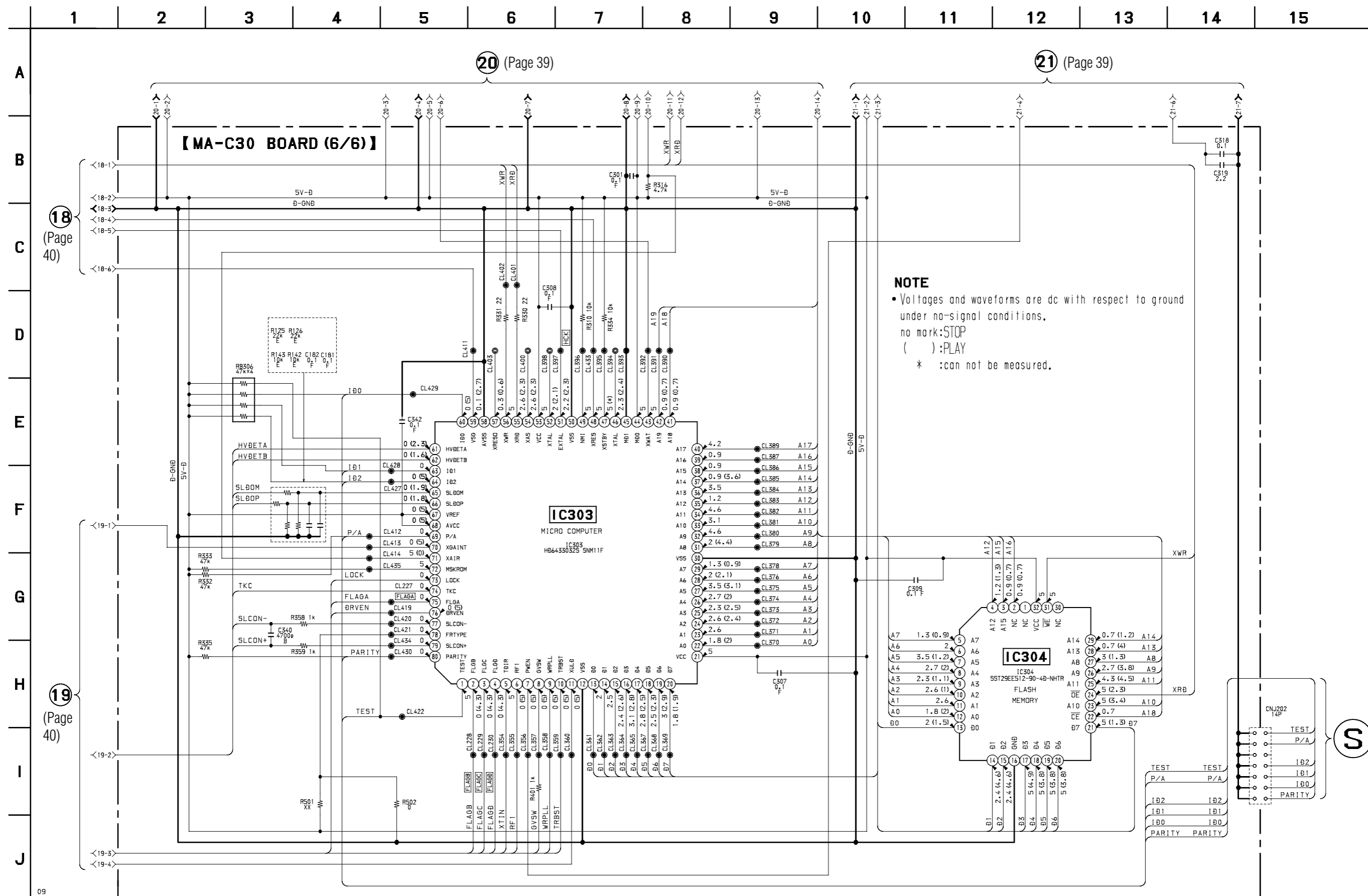
17 (Page 40)

20 (Page 41)

21 (Page 41)

SCHEMATIC DIAGRAM — CD-ROM DRIVE (6/6) SECTION —

• See page 47 for IC Block Diagrams.



18 (Page 40)

19 (Page 40)

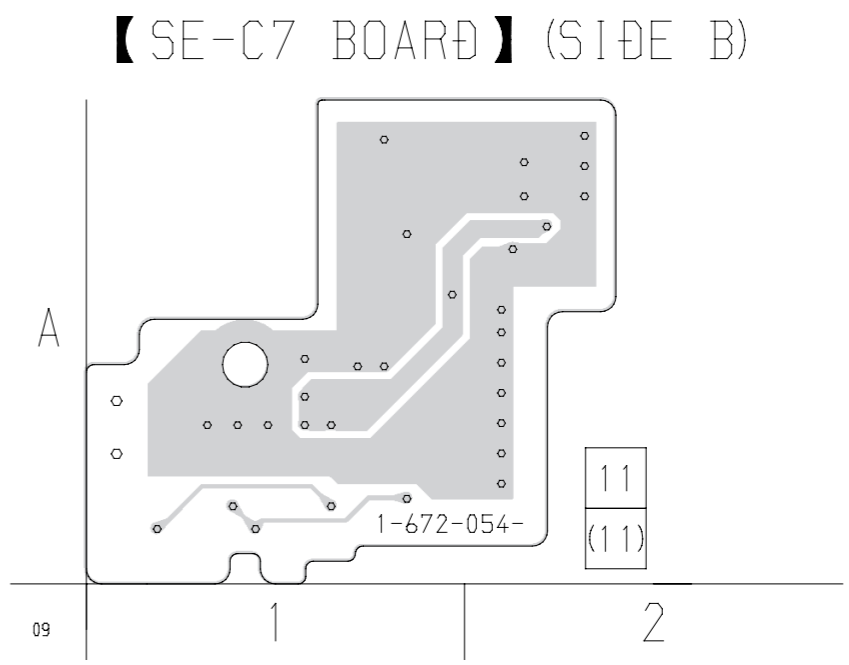
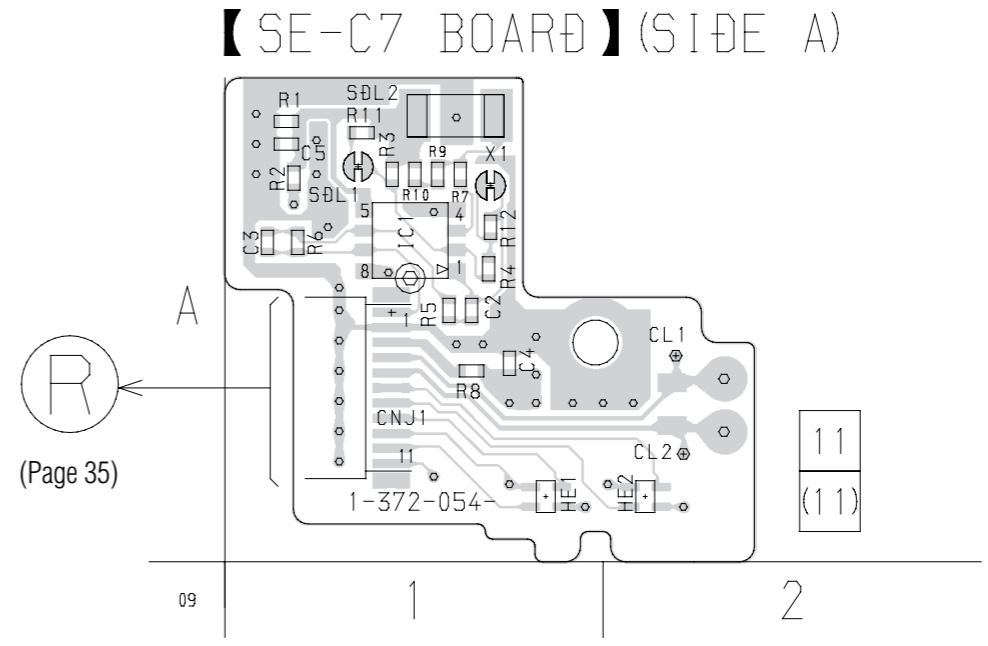
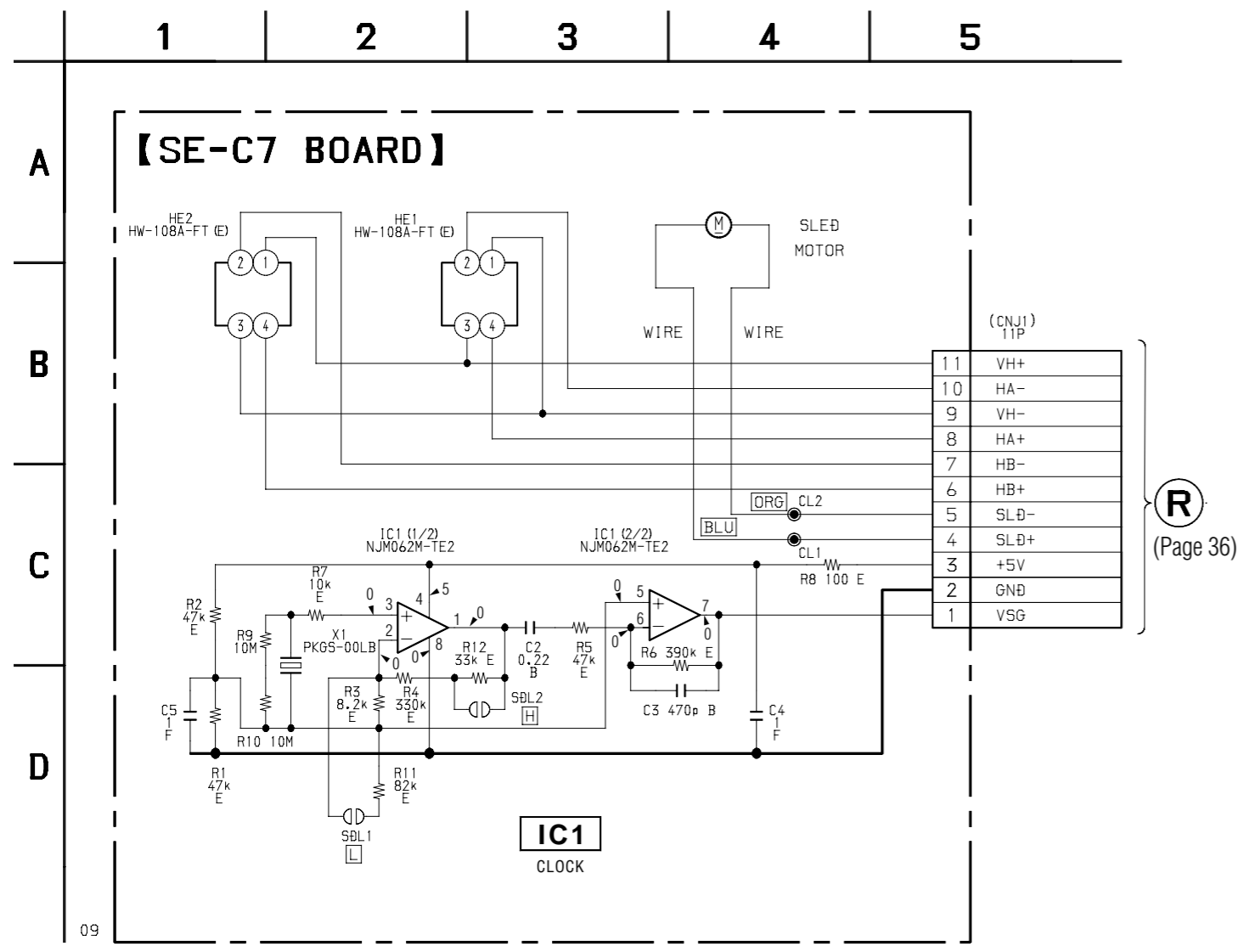
20 (Page 39)

21 (Page 39)

SCHEMATIC DIAGRAM — SE-C7 SECTION —

PRINTED WIRING BOARD — SE-C7 SECTION —

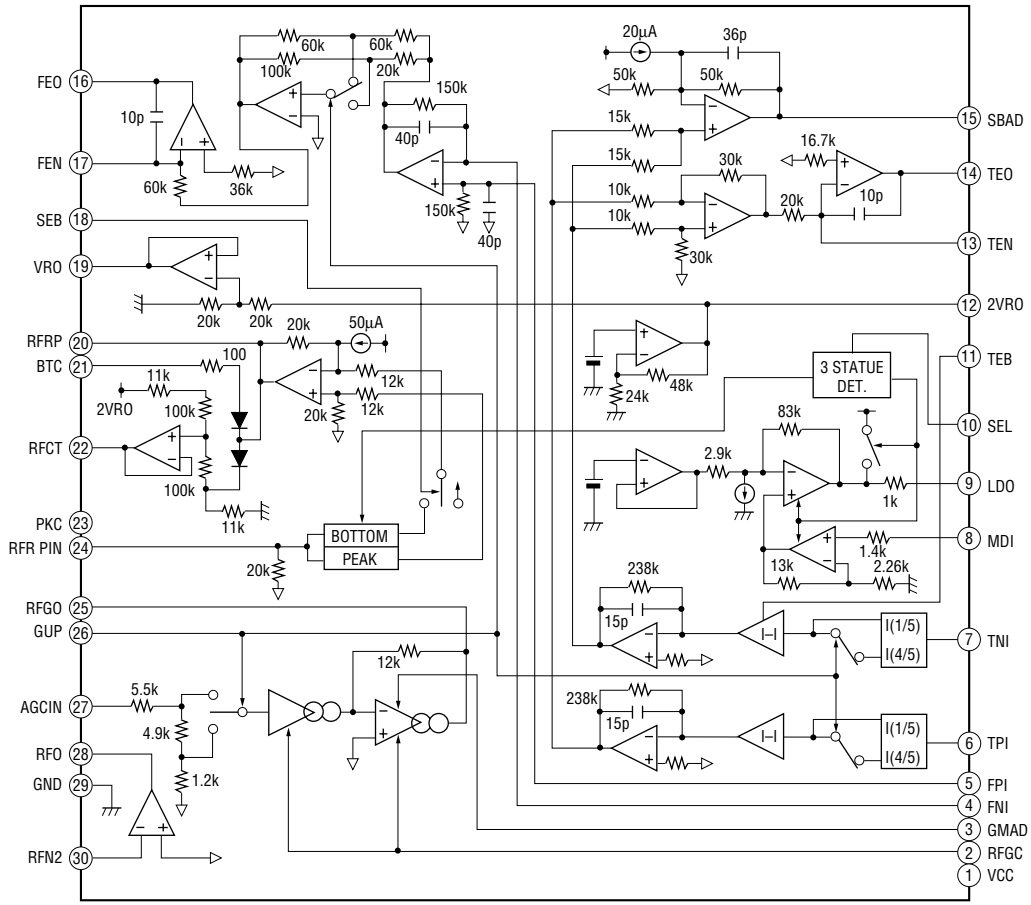
• See page 25 for Circuit Boards Location.



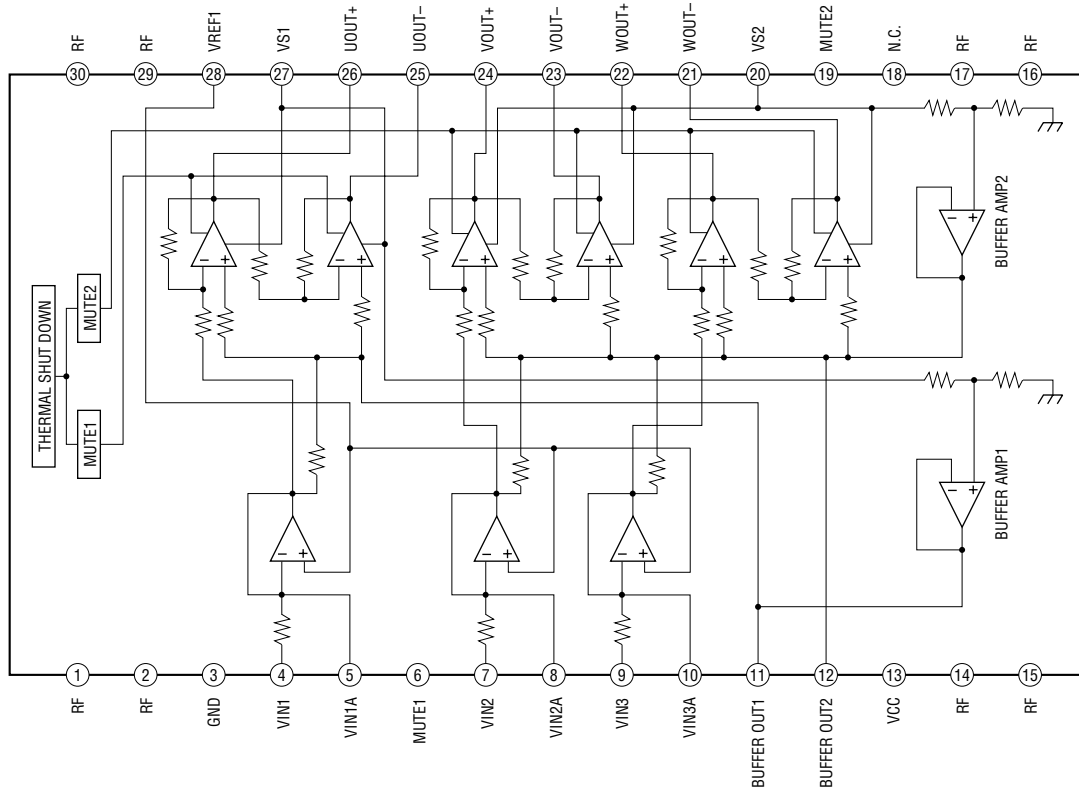
7-6. IC BLOCK DIAGRAMS

7-6-3. CD ROM DRIVE section

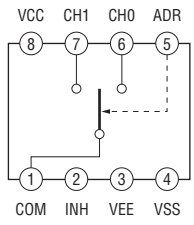
IC101 TA2112FN (EL)



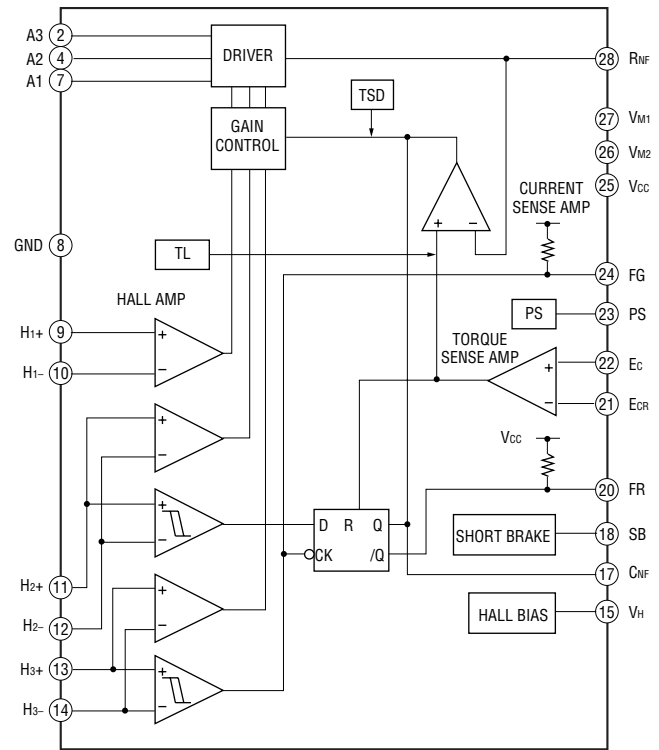
IC103 LA6539M-TE-L



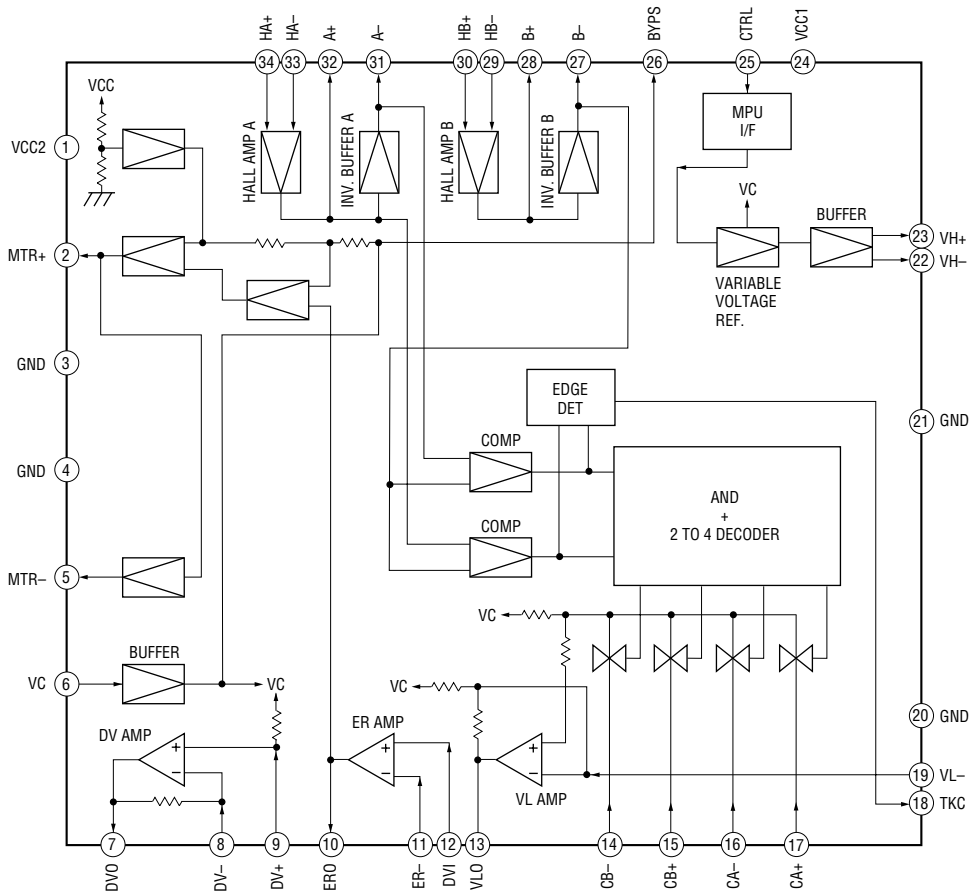
IC105 TC4W53FU



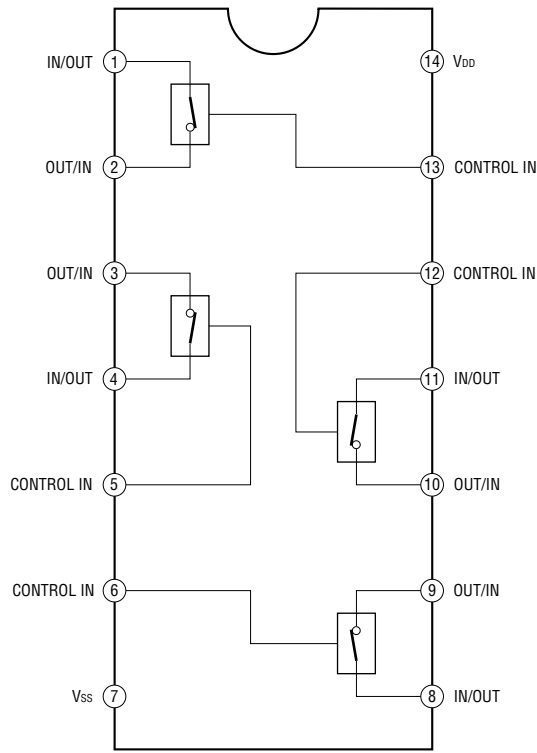
IC106 BA6849FP-E2



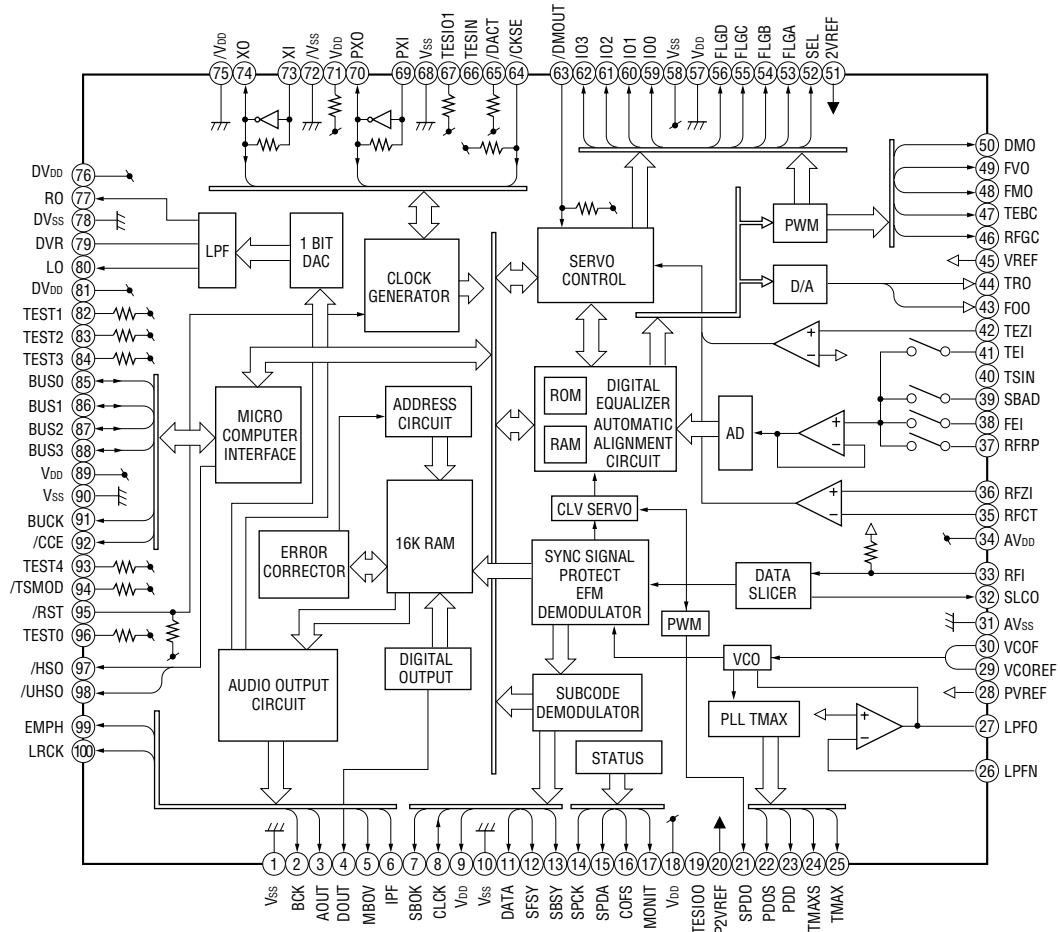
IC107 LA6527N



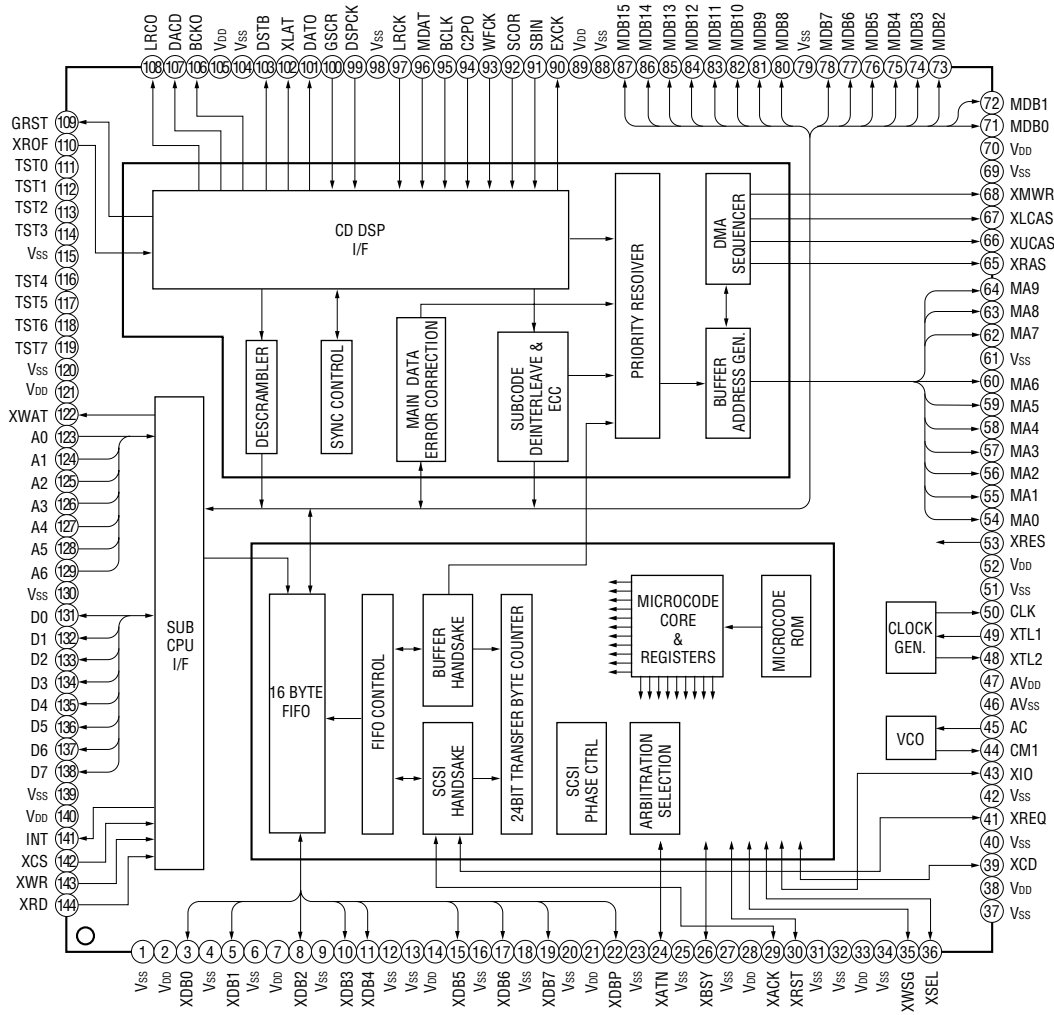
IC110 MC14066BF



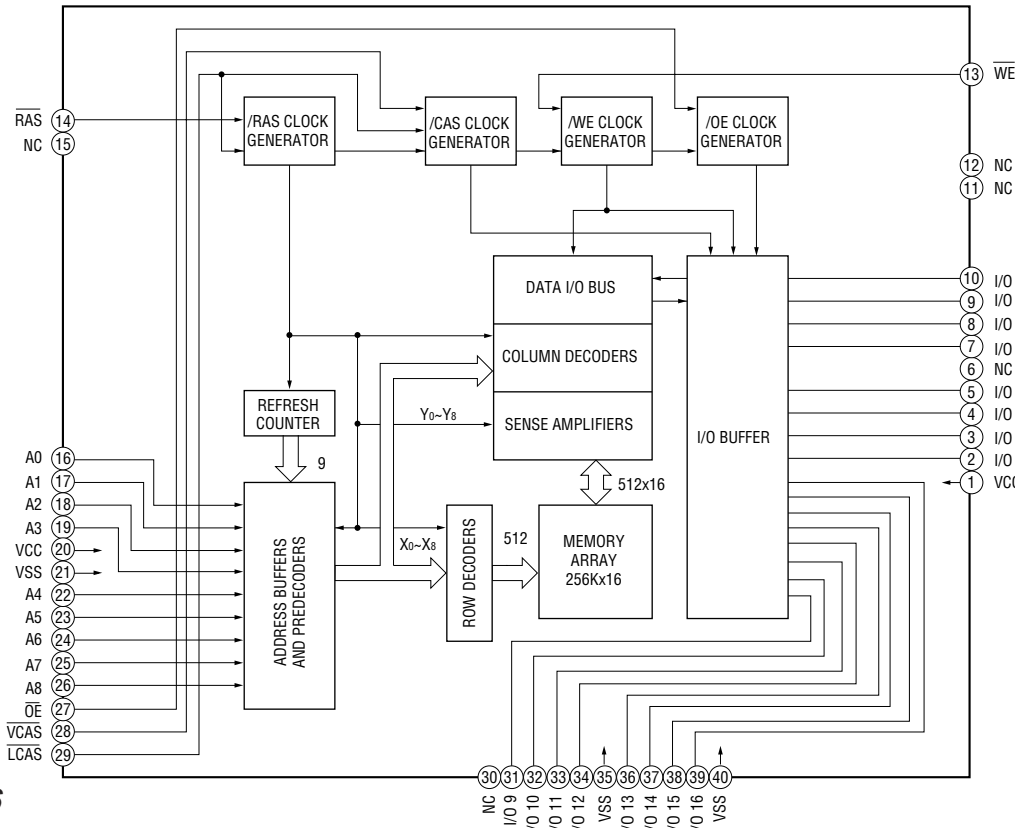
IC201 TC9449AF (BS, D, 24A)



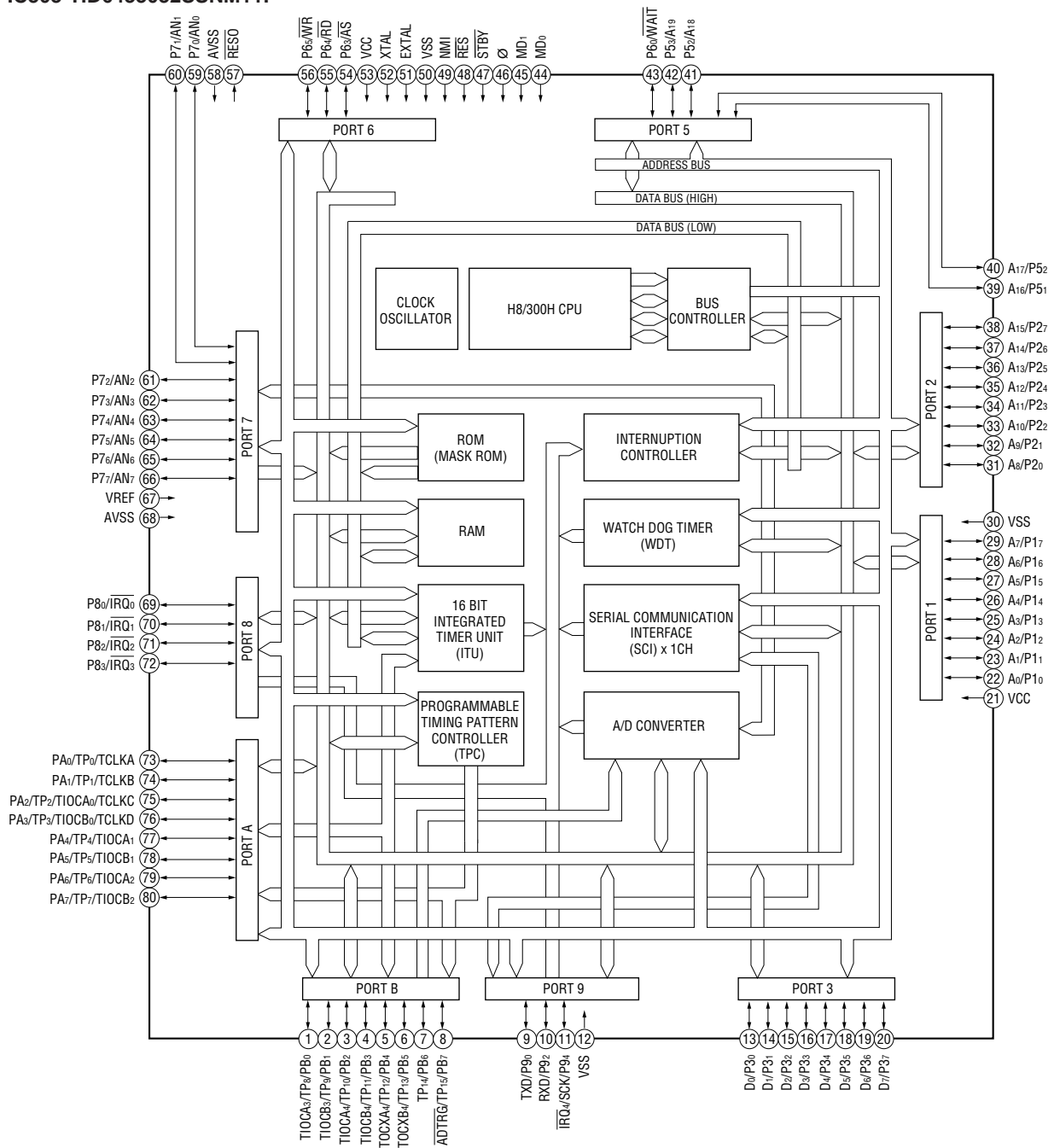
IC301 CXD1818R



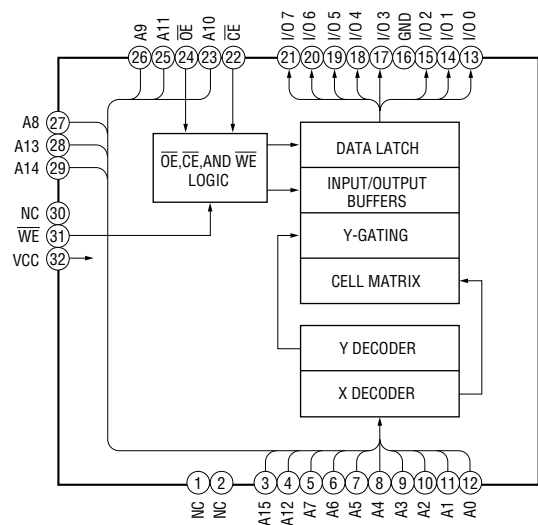
IC302 MSM5416258B-35JDR1



IC303 HD6433032SSNM11F



IC304 SST29EE512-90-4C-NHTR



SECTION 8 EXPLODED VIEWS

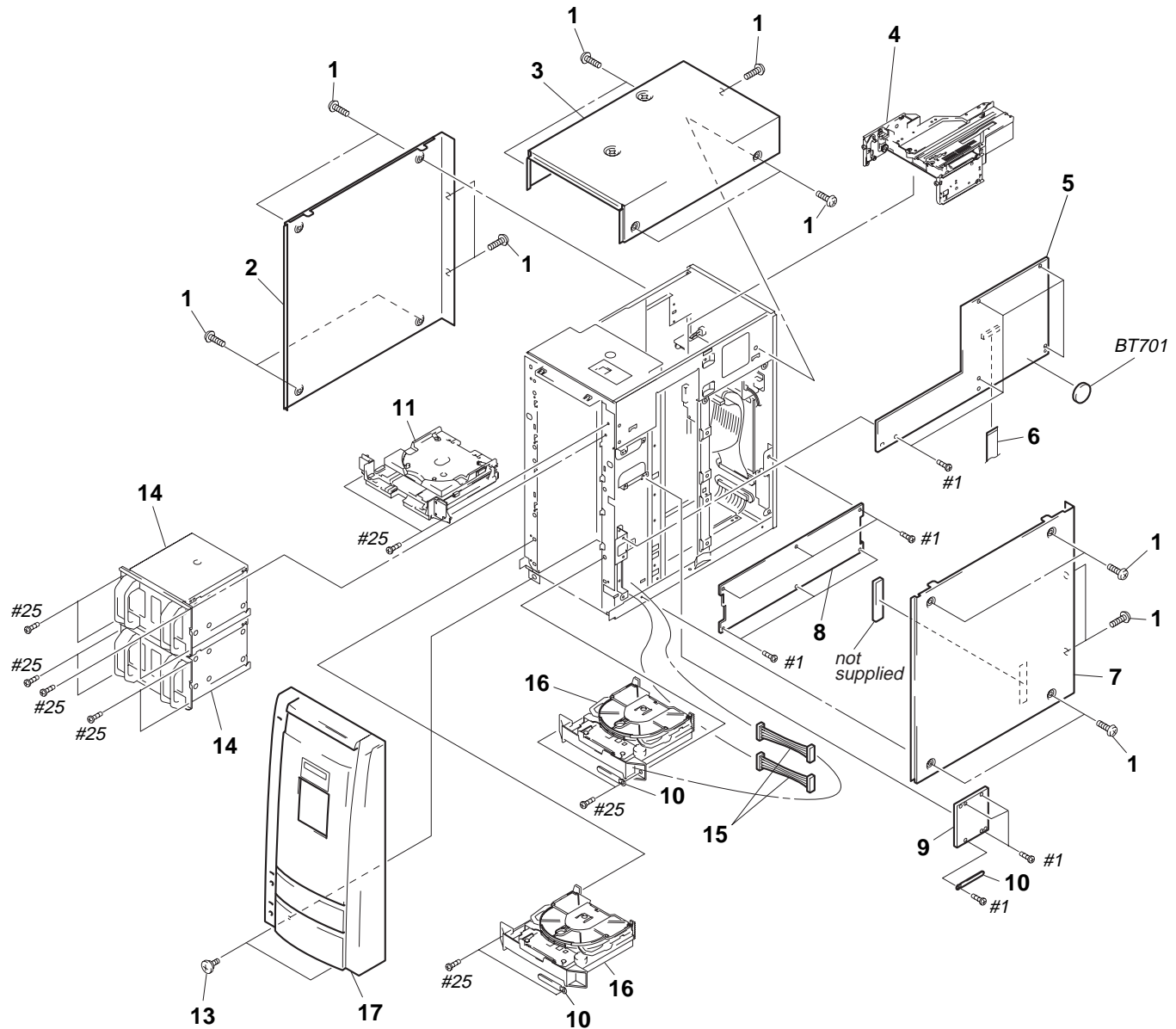
NOTE:

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

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

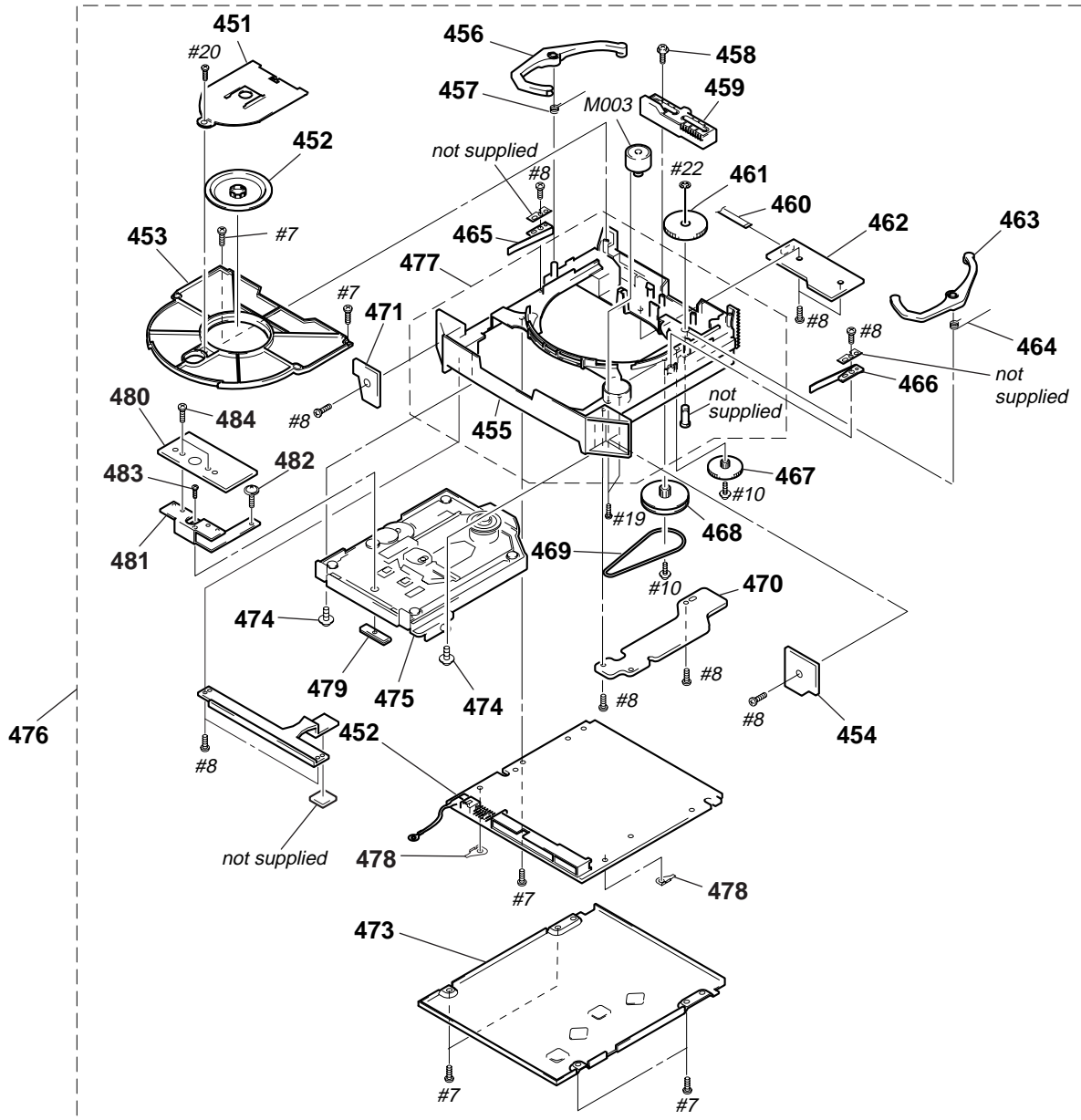
Les composants identifiés par une marque \triangle sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

8-1. CASE SECTION



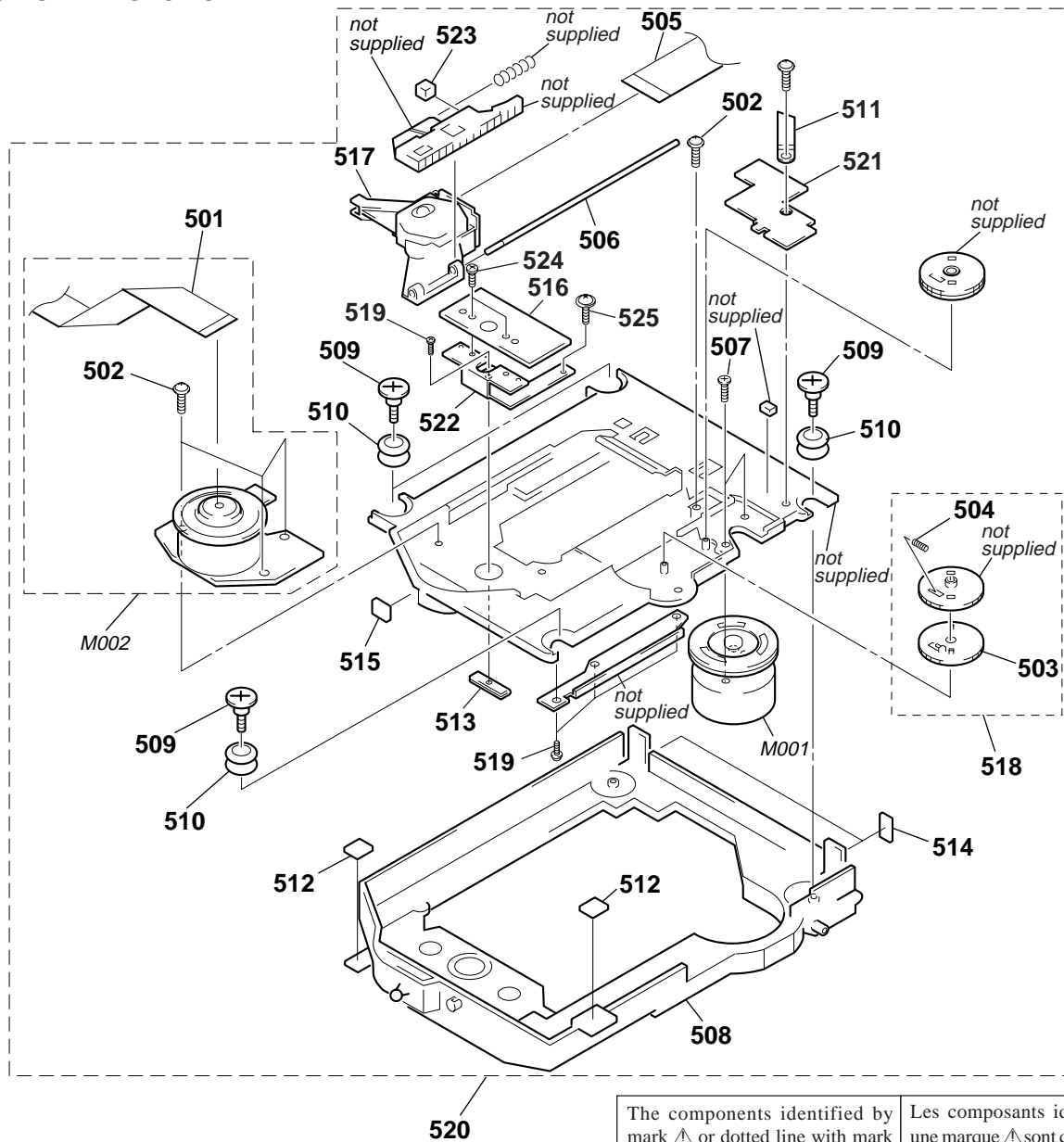
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	3-704-366-41	SCREW (CASE) (M3X6)		* 10	4-908-882-01	CLAMP	
* 2	4-986-618-01	CASE (L)		11	A-4672-423-A	BOX ASSY, MAIL	
* 3	4-986-636-01	CASE (TOP)		13	2-236-956-00	SCREW, STEP	
4	A-4672-421-A	CARRIER ASSY		14	A-4672-422-A	CASE ASSY, DISC	
* 5	A-4699-367-A	MAIN BOARD, COMPLETE		15	1-782-606-11	LEAD (WITH CONNECTOR)	
6	1-777-656-11	WIRE (FLAT TYPE) (20 CORE)		16	A-4672-424-A	CDM-47 ASSY	
* 7	4-986-619-01	CASE (R)		17	A-4672-420-A	FRONT ASSY	
* 8	A-4699-382-A	PS BOARD, COMPLETE		BT701	1-528-229-41	BATTERY, LITHIUM (CR-2450)	
* 9	A-4699-369-A	SERVICE BOARD, COMPLETE					

8-10. CDM-57 SECTION



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
* 451	4-989-225-01	COVER, PULLEY		466	4-986-153-01	SPRING (PL)	
452	A-4675-467-A	PULLEY ASSY, CHUCKING		467	4-986-158-01	GEAR (P2)	
* 453	4-986-148-01	HOLDER, CHUCK		468	4-986-157-01	GEAR (P1)	
* 454	1-664-724-11	CN BOARD		469	4-986-159-01	BELT (P)	
* 455	4-986-147-02	BASE, MD		470	1-664-892-11	COVER BOARD	
456	A-4672-347-A	LEVER (PL) ASSY		* 471	1-664-725-11	LED BOARD	
457	4-986-155-01	SPRING (PL), TORSION		472	A-4724-587-A	MA-C30 BOARD, COMPLETE	
458	4-990-632-01	SCREW (2X8), +PTPWH		* 473	X-4950-947-1	PLATE ASSY, BOTTOM	
459	4-986-149-01	CAM, CHUCK		474	4-933-134-01	SCREW (+PTPWH M2.6X6)	
460	1-777-695-11	WIRE (FLAT TYPE) (7 CORE)		475	A-4672-812-A	BU-24 ASSY	
461	4-986-160-01	GEAR (P3)		476	A-4672-424-A	CDM-47 ASSY	
* 462	A-4699-548-A	LDSW BOARD, COMPLETE		477	X-4949-356-2	BASE ASSY, MD	
463	A-4672-346-A	LEVER (PR) ASSY		* 478	4-210-805-01	EARTH PLATE	
464	4-986-154-01	SPRING (PR), TORSION		M003	X-4947-712-1	MOTOR ASSY (CHUCK)	
465	4-986-152-01	SPRING (PR)					

8-11. BU HOLDER SECTION



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

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
501	1-777-692-11	WIRE (FLAT TYPE) (11 CORE)		516	4-216-672-01	BALANCE (A)	
502	4-974-711-01	SCREW (2X5)(P TIGHT),(+)PTTWH		Δ 517	1-758-088-11	OPTICAL PICK-UP (SPU-3212)	
* 503	4-973-786-01	GEAR (S-C1)		518	A-4683-010-A	GEAR ASSY, LIMITTER	
504	4-974-767-01	SPRING, COMPRESSION		519	7-628-253-05	+PS 2X4	
505	1-782-368-12	WIRE (FLAT TYPE) (16 CORE)		520	A-4672-812-A	BU-24 ASSY	
* 506	4-974-724-01	SHAFT (MAIN)		* 521	A-4724-441-A	SE-C7BOARD, COMPLETE	
507	4-974-725-01	SCREW (M1.7X2.5), P		522	4-216-673-01	BALANCER (B)	
* 508	4-989-037-01	HOLDER, BU		523	4-214-266-01	CUSHION (K)	
509	4-981-923-01	SCREW (M), STEP		524	7-621-773-95	+B 2.6X6	
510	4-993-513-01	INSULATOR (K)		525	4-974-711-01	+PTTWH 2X5	
* 511	4-214-264-01	SHIELD, PLATE		M001	X-4951-510-1	SLED MOTOR ASSY	
512	4-984-536-01	CUSHION (BU SIDE)		M002	A-4672-641-A	SPINDLE MOTOR ASSY	
* 513	4-214-268-01	BALANCE (K3)					
514	4-984-549-01	CUSHION (HOOK)					
515	4-214-266-01	CUSHION (K)					

SECTION 9 ELECTRICAL PARTS LIST

MA-C30

Note:

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 name.

- 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, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
All resistors are in ohms
METAL: Metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F : nonflammable

- 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
- Abbreviation

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
	A-4724-587-A	MA-C30 BOARD, COMPLETE *****		C147	1-164-315-11	CERAMIC CHIP 470PF 5%	50V
	1-770-277-11	SOCKET, SHORT 2P < CAPACITOR >		C148	1-126-395-11	ELECT 22uF 20%	16V
C101	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V	C149	1-162-979-11	CERAMIC CHIP 0.0027uF 10%	50V
C102	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V	C153	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C103	1-124-778-00	ELECT CHIP 22uF 20%	6.3V	C154	1-162-979-11	CERAMIC CHIP 0.0027uF 10%	50V
C104	1-124-778-00	ELECT CHIP 22uF 20%	6.3V	C155	1-162-979-11	CERAMIC CHIP 0.0027uF 10%	50V
C105	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V	C156	1-162-979-11	CERAMIC CHIP 0.0027uF 10%	50V
C106	1-124-778-00	ELECT CHIP 22uF 20%	6.3V	C157	1-165-176-11	CERAMIC CHIP 0.047uF 10%	16V
C107	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C158	1-165-176-11	CERAMIC CHIP 0.047uF 10%	16V
C108	1-164-505-11	CERAMIC CHIP 2.2uF	16V	C159	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C110	1-164-505-11	CERAMIC CHIP 2.2uF	16V	C160	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C111	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V	C166	1-107-823-11	CERAMIC CHIP 0.47uF 10%	16V
C112	1-164-489-11	CERAMIC CHIP 0.22uF 10%	16V	C167	1-165-176-11	CERAMIC CHIP 0.047uF 10%	16V
C113	1-164-489-11	CERAMIC CHIP 0.22uF 10%	16V	C168	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C114	1-164-489-11	CERAMIC CHIP 0.22uF 10%	16V	C169	1-164-346-11	CERAMIC CHIP 1uF	16V
C115	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C170	1-115-416-11	CERAMIC CHIP 1000PF 5%	25V
C116	1-162-915-11	CERAMIC CHIP 10PF 0.5PF	50V	C171	1-115-416-11	CERAMIC CHIP 1000PF 5%	25V
C118	1-162-909-11	CERAMIC CHIP 4PF 0.25PF	50V	C173	1-162-919-11	CERAMIC CHIP 22PF 5%	50V
C120	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C176	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C121	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C177	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C122	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C178	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C123	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C179	1-162-966-11	CERAMIC CHIP 0.0022uF 10%	50V
C124	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C180	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V
C125	1-115-156-11	CERAMIC CHIP 1uF	10V	C181	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C126	1-162-962-11	CERAMIC CHIP 470PF 10%	50V	C182	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C127	1-164-245-11	CERAMIC CHIP 0.015uF 10%	25V	C201	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C129	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V	C204	1-162-923-11	CERAMIC CHIP 47PF 5%	50V
C130	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C205	1-162-923-11	CERAMIC CHIP 47PF 5%	50V
C131	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C208	1-162-969-11	CERAMIC CHIP 0.0068uF 10%	25V
C132	1-162-963-11	CERAMIC CHIP 680PF 10%	50V	C209	1-162-970-11	CERAMIC CHIP 0.01uF 10%	25V
C134	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C210	1-162-979-11	CERAMIC CHIP 0.0027uF 10%	50V
C138	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C211	1-162-968-11	CERAMIC CHIP 0.0047uF 10%	50V
C139	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C213	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C140	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C214	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V
C141	1-162-970-11	CERAMIC CHIP 0.01uF 10%	25V	C217	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C142	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C218	1-165-176-11	CERAMIC CHIP 0.047uF 10%	16V
C143	1-164-156-11	CERAMIC CHIP 0.1uF	25V	C219	1-165-176-11	CERAMIC CHIP 0.047uF 10%	16V
C144	1-162-967-11	CERAMIC CHIP 0.0033uF 10%	50V	C220	1-164-156-11	CERAMIC CHIP 0.1uF	25V
C145	1-162-967-11	CERAMIC CHIP 0.0033uF 10%	50V	C221	1-115-416-11	CERAMIC CHIP 1000PF 5%	25V
				C222	1-115-156-11	CERAMIC CHIP 1uF	10V
				C223	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V
				C224	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V
				C227	1-107-826-91	CERAMIC CHIP 0.1uF 10%	16V

MA-C30

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
C228	1-107-826-91	CERAMIC CHIP	0.1uF 10% 16V	D301	8-719-938-75	DIODE SB05-05CP	
C229	1-107-826-91	CERAMIC CHIP	0.1uF 10% 16V	D701	8-719-157-42	DIODE RD8.2M-B	
C230	1-107-826-91	CERAMIC CHIP	0.1uF 10% 16V			< IC >	
C233	1-115-363-11	CERAMIC CHIP	10uF 10V				
C234	1-115-363-11	CERAMIC CHIP	10uF 10V				
C235	1-162-927-11	CERAMIC CHIP	100PF 5% 50V	IC101	8-759-471-19	IC TA2112FN(EL)	
C236	1-162-927-11	CERAMIC CHIP	100PF 5% 50V	IC103	8-759-449-84	IC LA6539M-TE-L	
C238	1-107-826-91	CERAMIC CHIP	0.1uF 10% 16V	IC104	8-759-701-36	IC NJM3403AM	
C240	1-124-778-00	ELECT CHIP	22uF 20% 6.3V	IC105	8-759-082-61	IC TC4W53FU	
C241	1-165-176-11	CERAMIC CHIP	0.047uF 10% 16V	IC106	8-759-471-18	IC BA6849FP-E2	
C242	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC107	8-759-384-55	IC LA6527N-TE-B	
C301	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC109	8-759-338-78	IC BA10324AFV-E2	
C302	1-164-357-11	CERAMIC CHIP	1000PF 5% 50V	IC110	8-759-008-67	IC MC14066BF	
C303	1-163-038-91	CERAMIC CHIP	0.1uF 25V	IC111	8-759-338-78	IC BA10324AFV-E2	
C305	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC112	8-759-505-70	IC L2726	
C306	1-164-346-11	CERAMIC CHIP	1uF 16V	IC201	8-759-471-17	IC TC9449AF(BS,D,24A)	
C307	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC202	8-759-710-79	IC NJM2107F	
C308	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC203	8-759-082-57	IC TC7W04FU	
C309	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC301	8-752-388-69	IC CXD1818R	
C310	1-164-004-11	CERAMIC CHIP	0.1uF 10% 25V	IC302	8-759-578-85	IC MSM5416258B-35JDR1	
C311	1-163-038-91	CERAMIC CHIP	0.1uF 25V	IC302	8-759-583-77	IC MSM5416258B-28JDR1	
C312	1-163-038-91	CERAMIC CHIP	0.1uF 25V	IC303	8-759-522-95	IC HD6433032SSNM11F	
C313	1-163-038-91	CERAMIC CHIP	0.1uF 25V	IC304	8-759-446-16	IC SST29EE512-90-4C-NHTR	
C314	1-163-038-91	CERAMIC CHIP	0.1uF 25V	IC305	8-759-497-15	IC BU6260AKV	
C315	1-164-156-11	CERAMIC CHIP	0.1uF 25V	IC501	8-759-259-77	IC PQ20VZ5U	
C316	1-164-505-11	CERAMIC CHIP	2.2uF 16V			< COIL >	
C318	1-163-038-91	CERAMIC CHIP	0.1uF 25V	L101	1-414-410-21	INDUCTOR 10uH	
C319	1-115-565-11	CERAMIC CHIP	2.2uF 10% 10V	L200	1-414-760-21	INDUCTOR CHIP 0uH	
C330	1-164-156-11	CERAMIC CHIP	0.1uF 25V	L201	1-414-760-21	INDUCTOR CHIP 0uH	
C332	1-164-156-11	CERAMIC CHIP	0.1uF 25V	L202	1-414-760-21	INDUCTOR CHIP 0uH	
C333	1-115-156-11	CERAMIC CHIP	1uF 10V	L203	1-414-410-21	INDUCTOR 10uH	
C334	1-164-156-11	CERAMIC CHIP	0.1uF 25V	L701	1-500-425-11	FERRITE 0uH	
C335	1-164-156-11	CERAMIC CHIP	0.1uF 25V	L702	1-500-425-11	FERRITE 0uH	
C336	1-115-156-11	CERAMIC CHIP	1uF 10V			< TRANSISTOR >	
C340	1-162-968-11	CERAMIC CHIP	0.0047uF 10% 50V	Q101	8-729-101-07	TRANSISTOR 2SB798-DL	
C342	1-164-156-11	CERAMIC CHIP	0.1uF 25V	Q102	8-729-107-31	TRANSISTOR 2SC3545	
C701	1-126-204-11	ELECT CHIP	47uF 20% 16V	Q103	8-729-027-39	TRANSISTOR DTA144TKA-T146	
C702	1-126-206-11	ELECT CHIP	100uF 20% 6.3V	Q104	8-729-107-31	TRANSISTOR 2SC3545	
C703	1-164-156-11	CERAMIC CHIP	0.1uF 25V	Q105	1-801-806-11	TRANSISTOR DTC144EKA-T146	
C704	1-126-206-11	ELECT CHIP	100uF 20% 6.3V	Q106	1-801-806-11	TRANSISTOR DTC144EKA-T146	
C705	1-164-156-11	CERAMIC CHIP	0.1uF 25V	Q202	8-729-107-31	TRANSISTOR 2SC3545	
		< CONNECTOR >		Q203	8-729-927-79	TRANSISTOR UMA2-TL	
* CNJ101	1-770-415-11	CONNECTOR, FFC/FPC 11P		Q205	8-729-107-46	TRANSISTOR 2SC3624A-L15	
CNJ102	1-770-674-11	CONNECTOR, FFC/FPC 16P		Q206	8-729-107-46	TRANSISTOR 2SC3624A-L15	
* CNJ103	1-770-415-11	CONNECTOR, FFC/FPC 11P		Q207	1-801-806-11	TRANSISTOR DTC144EKA-T146	
* CNJ104	1-766-521-11	PIN, CONNECTOR (PC BOARD) 4P		Q701	8-729-900-53	TRANSISTOR DTC114EK	
CNJ105	1-566-523-11	SOCKET, CONNECTOR 7P		Q702	8-729-926-85	TRANSISTOR 2SB1424-T101-Q	
CNJ106	1-506-481-11	PIN, CONNECTOR 2P				< RESISTOR >	
* CNJ201	1-770-416-11	PIN, CONNECTOR (PC BOARD) 54P		R100	1-218-666-11	METAL CHIP 82 0.50% 1/16W	
* CNJ202	1-779-035-11	PIN, CONNECTOR 14P		R101	1-211-959-11	RES,CHIP 20 0.50% 1/10W	
		< DIODE >		R102	1-211-959-11	RES,CHIP 20 0.50% 1/10W	
D101	8-719-987-69	DIODE DAN217		R103	1-218-692-11	METAL CHIP 1K 0.50% 1/16W	
D201	8-719-938-75	DIODE SB05-05CP		R104	1-218-728-11	METAL CHIP 33K 0.50% 1/16W	

Ref. No.	Part No.	Description			Remark	Ref. No.	Part No.	Description			Remark
R105	1-218-728-11	METAL CHIP	33K	0.50%	1/16W	R181	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R106	1-218-740-11	METAL CHIP	100K	0.50%	1/16W	R182	1-218-708-11	METAL CHIP	4.7K	0.50%	1/16W
R107	1-218-734-11	METAL CHIP	56K	0.50%	1/16W	R183	1-218-740-11	METAL CHIP	100K	0.50%	1/16W
R108	1-216-797-11	METAL CHIP	10	5%	1/16W	R184	1-218-708-11	METAL CHIP	4.7K	0.50%	1/16W
R109	1-218-714-11	METAL CHIP	8.2K	0.50%	1/16W	R186	1-216-857-11	METAL CHIP	1M	5%	1/16W
R110	1-218-698-11	METAL CHIP	1.8K	0.50%	1/16W	R187	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R111	1-218-712-11	METAL CHIP	6.8K	0.50%	1/16W	R188	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R112	1-216-797-11	METAL CHIP	10	5%	1/16W	R189	1-216-833-91	RES,CHIP	10K	5%	1/16W
R113	1-216-797-11	METAL CHIP	10	5%	1/16W	R191	1-216-833-91	RES,CHIP	10K	5%	1/16W
R114	1-216-797-11	METAL CHIP	10	5%	1/16W	R192	1-218-710-91	METAL CHIP	5.6K	0.50%	1/16W
R115	1-216-797-11	METAL CHIP	10	5%	1/16W	R193	1-218-710-91	METAL CHIP	5.6K	0.50%	1/16W
R116	1-216-864-11	METAL CHIP	0	5%	1/16W	R194	1-218-710-91	METAL CHIP	5.6K	0.50%	1/16W
R117	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R195	1-218-710-91	METAL CHIP	5.6K	0.50%	1/16W
R118	1-216-864-11	METAL CHIP	0	5%	1/16W	R196	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R119	1-218-714-11	METAL CHIP	8.2K	0.50%	1/16W	R197	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R120	1-216-864-11	METAL CHIP	0	5%	1/16W	R198	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R121	1-218-714-11	METAL CHIP	8.2K	0.50%	1/16W	R199	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R122	1-216-797-11	METAL CHIP	10	5%	1/16W	R200	1-216-801-11	METAL CHIP	22	5%	1/16W
R123	1-218-704-11	METAL CHIP	3.3K	0.50%	1/16W	R203	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R124	1-218-692-11	METAL CHIP	1K	0.50%	1/16W	R204	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R125	1-218-724-11	METAL CHIP	22K	0.50%	1/16W	R205	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R126	1-218-724-11	METAL CHIP	22K	0.50%	1/16W	R206	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R127	1-218-709-11	METAL CHIP	5.1K	0.50%	1/16W	R207	1-218-728-11	METAL CHIP	33K	0.50%	1/16W
R129	1-218-718-11	METAL CHIP	12K	0.50%	1/16W	R208	1-218-740-11	METAL CHIP	100K	0.50%	1/16W
R130	1-218-700-11	METAL CHIP	2.2K	0.50%	1/16W	R209	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R131	1-218-718-11	METAL CHIP	12K	0.50%	1/16W	R210	1-218-724-11	METAL CHIP	22K	0.50%	1/16W
R132	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R211	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R133	1-218-718-11	METAL CHIP	12K	0.50%	1/16W	R212	1-218-724-11	METAL CHIP	22K	0.50%	1/16W
R139	1-216-809-11	METAL CHIP	100	5%	1/16W	R213	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R140	1-216-813-11	METAL CHIP	220	5%	1/16W	R214	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R141	1-220-745-11	RES,CHIP	0.56	5%	1/2W	R215	1-218-704-11	METAL CHIP	3.3K	0.50%	1/16W
R142	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R216	1-218-704-11	METAL CHIP	3.3K	0.50%	1/16W
R143	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R217	1-216-813-11	METAL CHIP	220	5%	1/16W
R144	1-218-744-11	METAL CHIP	150K	0.50%	1/16W	R218	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R145	1-218-728-11	METAL CHIP	33K	0.50%	1/16W	R219	1-218-724-11	METAL CHIP	22K	0.50%	1/16W
R146	1-218-752-11	METAL CHIP	330K	0.50%	1/16W	R221	1-216-864-11	METAL CHIP	0	5%	1/16W
R149	1-218-740-11	METAL CHIP	100K	0.50%	1/16W	R222	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R150	1-218-708-11	METAL CHIP	4.7K	0.50%	1/16W	R223	1-216-817-11	METAL CHIP	470	5%	1/16W
R151	1-218-752-11	METAL CHIP	330K	0.50%	1/16W	R224	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R152	1-218-740-11	METAL CHIP	100K	0.50%	1/16W	R226	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R153	1-218-746-11	METAL CHIP	180K	0.50%	1/16W	R227	1-216-817-11	METAL CHIP	470	5%	1/16W
R155	1-218-720-11	METAL CHIP	15K	0.50%	1/16W	R228	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R156	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R229	1-218-692-11	METAL CHIP	1K	0.50%	1/16W
R157	1-218-742-11	METAL CHIP	120K	0.50%	1/16W	R230	1-218-692-11	METAL CHIP	1K	0.50%	1/16W
R158	1-218-718-11	METAL CHIP	12K	0.50%	1/16W	R231	1-218-692-11	METAL CHIP	1K	0.50%	1/16W
R161	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R232	1-218-692-11	METAL CHIP	1K	0.50%	1/16W
R163	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R234	1-218-706-11	METAL CHIP	3.9K	0.50%	1/16W
R164	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R235	1-218-706-11	METAL CHIP	3.9K	0.50%	1/16W
R166	1-220-149-11	REGISTER	2.2	10%	1/2W	R236	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R167	1-220-149-11	REGISTER	2.2	10%	1/2W	R237	1-218-718-11	METAL CHIP	12K	0.50%	1/16W
R168	1-218-716-11	METAL CHIP	10K	0.50%	1/16W	R239	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R169	1-218-704-11	METAL CHIP	3.3K	0.50%	1/16W	R240	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R171	1-216-864-11	METAL CHIP	0	5%	1/16W	R241	1-218-728-11	METAL CHIP	33K	0.50%	1/16W
R174	1-216-864-11	METAL CHIP	0	5%	1/16W	R242	1-216-813-11	METAL CHIP	220	5%	1/16W
R180	1-216-864-11	METAL CHIP	0	5%	1/16W	R243	1-218-748-11	METAL CHIP	220K	0.50%	1/16W

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SE-C7

Ref. No.	Part No.	Description	Remark
R244	1-218-736-11	METAL CHIP	68K 0.50% 1/16W
R245	1-218-724-11	METAL CHIP	22K 0.50% 1/16W
R247	1-216-857-11	METAL CHIP	1M 5% 1/16W
R249	1-218-708-11	METAL CHIP	4.7K 0.50% 1/16W
R250	1-218-704-11	METAL CHIP	3.3K 0.50% 1/16W
R251	1-218-696-11	METAL CHIP	1.5K 0.50% 1/16W
R256	1-216-845-11	METAL CHIP	100K 5% 1/16W
R257	1-216-845-11	METAL CHIP	100K 5% 1/16W
R308	1-216-001-00	METAL CHIP	10 5% 1/10W
R310	1-216-833-91	RES,CHIP	10K 5% 1/16W
R311	1-216-813-11	METAL CHIP	220 5% 1/16W
R316	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R318	1-216-809-11	METAL CHIP	100 5% 1/16W
R319	1-216-809-11	METAL CHIP	100 5% 1/16W
R320	1-216-809-11	METAL CHIP	100 5% 1/16W
R321	1-216-809-11	METAL CHIP	100 5% 1/16W
R322	1-216-001-00	METAL CHIP	10 5% 1/10W
R323	1-216-001-00	METAL CHIP	10 5% 1/10W
R330	1-216-801-11	METAL CHIP	22 5% 1/16W
R331	1-216-801-11	METAL CHIP	22 5% 1/16W
R332	1-216-841-11	METAL CHIP	47K 5% 1/16W
R333	1-216-841-11	METAL CHIP	47K 5% 1/16W
R334	1-216-833-91	RES,CHIP	10K 5% 1/16W
R335	1-216-841-11	METAL CHIP	47K 5% 1/16W
R336	1-216-813-11	METAL CHIP	220 5% 1/16W
R337	1-216-841-11	METAL CHIP	47K 5% 1/16W
R338	1-216-853-11	METAL CHIP	470K 5% 1/16W
R340	1-216-813-11	METAL CHIP	220 5% 1/16W
R341	1-216-813-11	METAL CHIP	220 5% 1/16W
R342	1-216-813-11	METAL CHIP	220 5% 1/16W
R343	1-216-853-11	METAL CHIP	470K 5% 1/16W
R344	1-218-708-11	METAL CHIP	4.7K 0.50% 1/16W
R345	1-218-708-11	METAL CHIP	4.7K 0.50% 1/16W
R346	1-218-724-11	METAL CHIP	22K 0.50% 1/16W
R347	1-216-857-11	METAL CHIP	1M 5% 1/16W
R348	1-216-813-11	METAL CHIP	220 5% 1/16W
R349	1-216-813-11	METAL CHIP	220 5% 1/16W
R350	1-216-813-11	METAL CHIP	220 5% 1/16W
R351	1-218-728-11	METAL CHIP	33K 0.50% 1/16W
R355	1-218-724-11	METAL CHIP	22K 0.50% 1/16W
R356	1-218-724-11	METAL CHIP	22K 0.50% 1/16W
R358	1-216-821-11	METAL CHIP	1K 5% 1/16W
R359	1-216-821-11	METAL CHIP	1K 5% 1/16W
R401	1-216-821-11	METAL CHIP	1K 5% 1/16W
R502	1-216-864-11	METAL CHIP	0 5% 1/16W
R701	1-216-833-91	RES,CHIP	10K 5% 1/16W
R702	1-220-262-11	RES,CHIP	680 5% 1/4W
R703	1-218-618-11	METAL CHIP	22 5% 1W
R704	1-218-618-11	METAL CHIP	22 5% 1W
R705	1-218-704-11	METAL CHIP	3.3K 0.50% 1/16W
R706	1-218-692-11	METAL CHIP	1K 0.50% 1/16W
< COMPOSITION CIRCUIT BLOCK >			
RB301	1-233-578-11	RES, CHIP NETWORK 47K	

Ref. No.	Part No.	Description	Remark
RB302	1-233-576-11	RES, CHIP NETWORK 100	
RB303	1-236-908-11	RES, CHIP NETWORK 10K (3216)	
RB304	1-236-908-11	RES, CHIP NETWORK 10K (3216)	
RB305	1-233-578-11	RES, CHIP NETWORK 47K	
RB306	1-233-578-11	RES, CHIP NETWORK 47K	
< VIBRATOR >			
X201	1-767-382-11	OSCILLATOR, CERAMIC (40MHz)	
X301	1-767-382-11	OSCILLATOR, CERAMIC (40MHz)	
X302	1-767-446-21	OSCILLATOR, CERAMIC (33.86MHz)	

*	A-4724-441-A	SE-C7 BOARD, COMPLETE	*****
	1-790-251-11	WIRE (FLAT TYPE) (11 CORE)	
< CAPACITOR >			
C2	1-115-467-11	CERAMIC CHIP	0.22uF 10% 10V
C3	1-162-962-11	CERAMIC CHIP	470PF 10% 50V
C4	1-115-156-11	CERAMIC CHIP	1uF 10V
C5	1-115-156-11	CERAMIC CHIP	1uF 10V
< IC >			
IC1	8-759-702-02	IC NJM062M	
< RESISTOR >			
R1	1-218-732-11	METAL CHIP	47K 0.50% 1/16W
R2	1-218-732-11	METAL CHIP	47K 0.50% 1/16W
R3	1-218-714-11	METAL CHIP	8.2K 0.50% 1/16W
R4	1-218-752-11	METAL CHIP	330K 0.50% 1/16W
R5	1-218-732-11	METAL CHIP	47K 0.50% 1/16W
R6	1-218-909-11	RES,CHIP	390K 0.50% 1/16W
R7	1-218-716-11	METAL CHIP	10K 0.50% 1/16W
R8	1-218-668-11	METAL CHIP	100 0.50% 1/16W
R9	1-219-570-11	RES,CHIP	10M 5% 1/16W
R10	1-219-570-11	RES,CHIP	10M 5% 1/16W
R11	1-218-738-11	METAL CHIP	82K 0.50% 1/16W
R12	1-218-728-11	METAL CHIP	33K 0.50% 1/16W
< VIBRATOR >			
X1	1-803-503-21	SENSOR, SHOCK	
