DENON DN1200F

MODEL

SERVICE MANUAL

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instruction in the literature accompanying the appliance.

CAUTION: TO PREVENT ELECTRICAL SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERTED.

ATTENTION: POUR EVITER LES CHOCS ELECTRIQUES, INTRODUIRE LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU'AU FOND.

IMPORTANT (BRITISH MODEL ONLY)

The wires in the mains leads are coloured in accordance with the following codes:

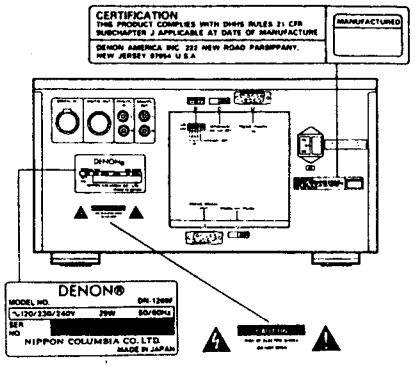
Blue: Neutral, Brown: Live, Yellow/Green: Earth

If the colours of the wires in the mains leads of this apparatus do not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

CLASS 1 LASER PRODUCT
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

"CLASS 1
LASER PRODUCT"

LABELS



CAUTION:
USE OF CONTROLS OR ADJUSTMENTS OR REFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

THE COMPACT DISC PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.

NOTE:
This unit may cause interference to radio and television reception if you do not operate it in strict accordance with this OPERATING INSTRUCTIONS.

This unit complies with Class B computing device rules in accordance with the specifications in Subpart J or Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If the unit does cause interference to any radio or television reception, try to reduce it by one or more of the following means:

a) Turn the other unit to improve reception
b) Move this unit
c) Move this unit away from others
d) Plug this unit respectively into a different AC outlet

*** This is note in accordance with Section 15.838 of the FCC Rules.**

IMPORTANT TO SAFETY

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

NOTE:
This CD autochanger uses the semiconductor laser. To allow you to enjoy music at a stable operation, we recommend to use this in a room whose temperature is between 5°C and 35°C.

Please check to make sure the following items, aside from the main unit, are packed in the carton.

(1) Operating instructions ..... 1 pc.
(2) 3P power supply cord ..... 1 pc.
(3) Spare fuse ..... 1 pc.

CAUTION:

1. **Handle the power supply cord carefully**
   Do not damage or deform the power supply cord. If it is damaged or deformed, it may cause electric shock or malfunction when used. When disconnecting it from wall outlet, be sure to hold the plug attachment. Do not pull on the cord.
2. **Do not open the top cover.**
   In order to prevent electric shock, do not open the top cover. If problems occur, contact your DENON dealer.
3. **Do not place anything inside**
   Do not place metal objects or spill liquid inside the auto changer, as this may result in electtric shocks or malfunction.

Please record and retain the model name and serial number of your set shown on the rating label.
Model No. DN-1200F Serial No. _____

— TABLE OF CONTENTS —

ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSAETTELSE FOR.STRÅLING.

VAROI AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÅKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

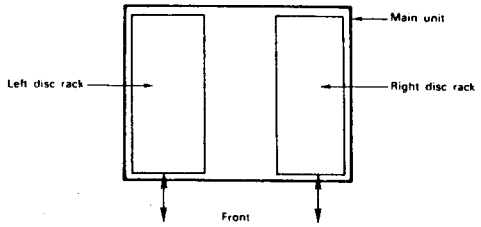
VARNING – OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

1 GENERAL

Main Features

This CD autochanger allows you select one CD from a maximum 200 CDs which can be housed in the disc racks, play any track on that CD, then return the CD to its original position once playback is finished.

This CD autochanger consists of the main unit and two disc racks with a capacity of 100 CDs each.



1. Playable Disc: 12 cm CD
   (8 cm CD is not playable)

2. Storage Capacity: 200 Discs max.

3. Loading and Unloading of Discs: 1) Open the front door.
   2) Slide out two Disc racks which can limits of 100 pcs.
   3) The above operations make setting or changing CDs easy.

4. Access Time: 16 sec. max.
   The time required for return a disc to the disc rack currently
   Played and then cue-up on the designated tracknumber of another disc for next play.

5. D/A Converter: 20 bits ADVANCED SLC

6. Interface: Standard RS-422A or RS-232C selectable

7. Input/Output Connectors:
   7-1. Digital Output; 3p XLR type 2 pcs
   7-2. Analog Output; RCA type L/R 2 pairs
   7-3. Serial Remote; 9 pin D-Sub (Female) 2 pcs

8. Serial Data Transfer Format:
   8-1. Data Transfer Mode; Asynchronous clock system (UART)
   8-2. Start Bit; 1 bit
   8-3. Data Bit; 8 bits
   8-4. Parity Bit; 1 bit EVEN
   8-5. Stop Bit; 1 bit
   8-6. Transfer Rate; 19200 bit/sec.

2 DESCIPRTION OF THE FUNCTION

1) **Names and Functions of the Parts**

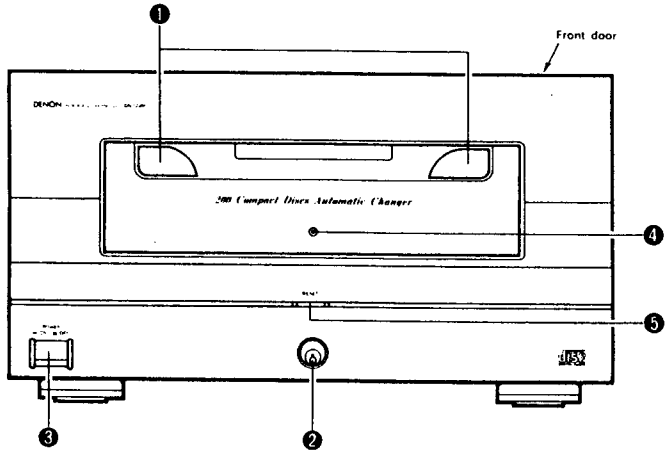


Figure 1

1 Disc racks
Up to 200 discs can be stored in these racks.

2 Door lock
Use the included door key to lock and unlock the door.

3 POWER (Power Switch)
The power turns on when the POWER switch is set to the ON side, and turns off when the switch is set to the OFF side.

4 POWER (Power Indicator)
Lights up red when power switch 3 is on.

5 RESET button

NOTE:
Press this to open the front door when replacing discs, etc.
1) When the RESET button is pressed, the mechanism is initialized, the disc is returned and the front door opens.
2) Once the mechanism moves to the initial position, the door lock is released with the door lock rotating lever and the power indicator turns green.

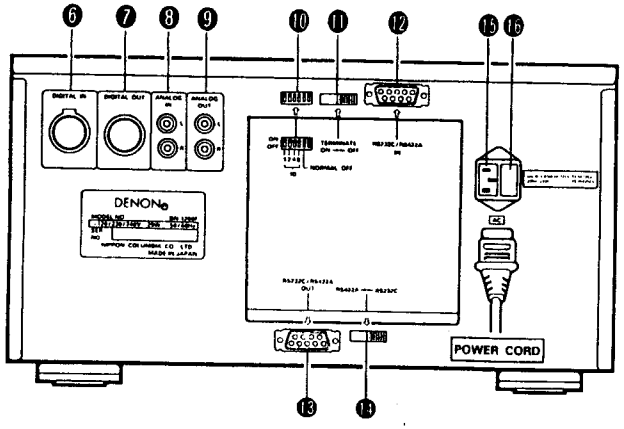


Figure 2

6 DIGITAL IN (Digital In put Connector)

1) This is an active balanced type input using an XLR type connector.
   Use this for daisy chaining between DN-1200Fs when connecting other DN-1200Fs.
2) Signal layout
   Pin 1 : Common
   Pin 2 : Cold
   Pin 3 : Hot
3) Applicable connector: Cannon XLR-3-12C or equivalent

7 DIGITAL OUT (Digital Output Connector)

1) This is an active balanced type output using an XLR type connector.
   Connect it to the balanced type digital input on an amplifier or console.
2) Signal layout
   Pin 1 : Common
   Pin 2 : Cold
   Pin 3 : Hot
3) Applicable connector: Cannon XLR-3-11C or equivalent

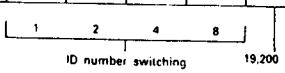
8 ANALOG IN jacks
(RCA pin-jack, unbalanced)
Inputs analog audio signals from DN-1200F
Use this for daisy chaining between DN-1200Fs when connecting other DN-1200Fs.

9 ANALOG OUT jacks
(RCA pin-jack, unbalanced)
Outputs analog audio signals

10 Mode setting switches (DIP switches)

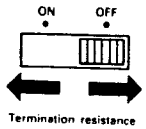
Switch No.	Mode	ON side	OFF side
SW1	ID number specification	1	0
SW2	The ID number is the sum of	2	0
SW3	the number of all the	4	0
SW4	DIP switches.	8	0
SW5	Transfer rate		19200 bps

Switch settings upon shipment from factory					
	SW1	SW2	SW3	SW4	SW5
OFF	○	○	○	○	○
ON					



11 TERMINATE (Impedance selector switch)

- Select the input impedance switches according to the method of connection. Turn this slide switch on for the changer with the last ID number setting. (load impedance of 100 ohm is terminated.)

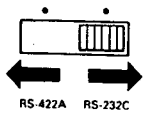


12 IN (RS-232C/RS-422A connector)
RS-232C/RS-422A interface for connection to a computer or controller. See page 9 for more details.

13 OUT (RS-232C/RS-422A connector)
RS-232C/RS-422A interface for connection to a computer or controller. See page 9 for more details.

1) This is a connector for serial remote connection. The player can be connected to and controlled from a personal computer or other external controller.
2) Applicable connector: 9-pin D-sub plug
3) Transfer rate: 19200 bps

14 RS-232C/RS-422A selector switch
See page 9 for more details.



15 AC (AC Inlet)
Insert the included power cord here.

16 Fuse Holder

- To replace the fuse, use small screwdrivers, etc., to push the catches (A) and (B) at the top and bottom of the holder inward and remove the fuse holder outward.
- Replace the old fuse with one with the rating indicated on the panel.
  Type of fuse: T0.5 A 125 V for 120 V operation
  T0.25 A 250 V for 230/240 V operation

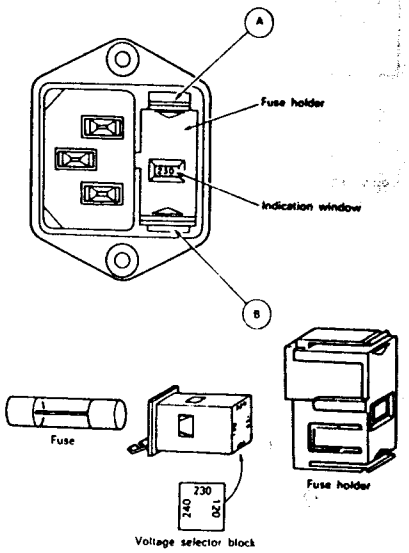


Figure 3

• PRESET VOLTAGE CHANGE

DN-1200F allows selection of either 120 V, 230 V or 240 V operation. The unit has been preset at 240 V prior to shipment except for U.S.A. & Canada. In order to use the unit at 120 V or 230 V, follow the procedures below.

1. The fuse holder serves as a voltage selector.
2. Turn the voltage selector block so that the proper voltage setting (120 or 230) appears in the indication window and refit it.
   Be sure to replace a fuse described in the above when operate the unit with 120 V.
3. Press in the fuse holder back to the main body. make sure of the click action of the fixing tabs for secure fitting.

2) To remove the Front door (Refer to Figure 4)

1. Unlock the front door using with a key which is attached to the unit as the accessories.
2. Hold and pull off the lower part of the front door from the unit, and then pull up and remove the front door from the top of the unit.

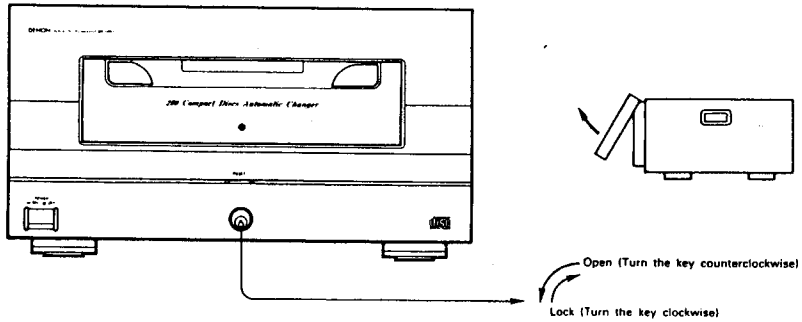


Figure 4

(1) Installing the front door
① Set the front door in place, then turn the front door key to turn the door switch on.
② When the main switch is turned on, the changer is set to the standby (initialization) mode and the switch is locked (mechanically).
(It is now impossible to unlock the lock manually.)
The power LED turns red.

(2) Removing the front door
① Press the RESET button (located above the front door lock).
The changer mechanism stores all CDs in the disc racks and moves to the initial position (front), and the door's mechanical lock is released.
Once the lock is released the initial indicator (LED) turns green.

3) To remove the shipping lock screws. (Refer to Figure 5)

1. The CD mechanism have been locked with three screws upon shipment from the factory to protect the CD mechanism from the shock during shipment.
2. Remove three screws from the marked with "☆" position and fix each screw to arrow mark position to use them again to lock the CD mechanism for re-shipment of the unit.

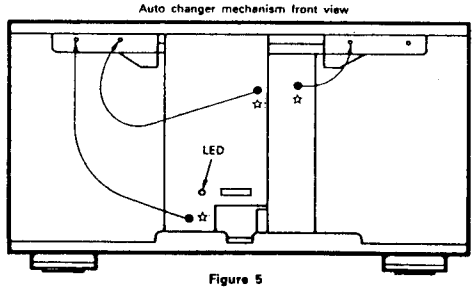


Figure 5

3 PHYSICAL INTERFACE

The DN-1200F, can be used either the RS-232C or RS-422A interface.

1) Connector Pin Assignments

• 9P D-Subconnector

Figure 6

(Pin No.)	IN/OUT Signal Name	
	RS-422A	RS-232C
1	FG	FG
2	TXD (–)	TXD
3	RXD (+)	RXD
4	MUTE (–)	NC
5	NC	SG
6	SG	SG
7	TXD (+)	NC
8	RXD (–)	NC
9	MUTE (+)	NC

2) Cable

①RS-422A
Use a cable that has TXD and RXD crossed.

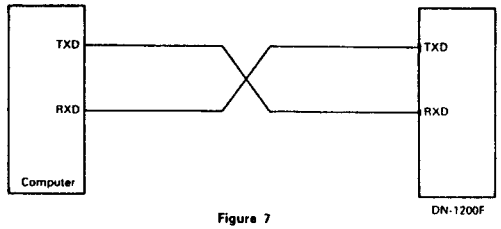


Figure 7

②RS-232C
Use a cable that has TXD and RXD crossed.
Only the 2 signal lines, TXD and RXD, and the 1 ground lead, which makes a total of 3 leads, are used in the RS-232C. Therefore, any other signals deemed necessary at the host side should be processed at the host side, or appropriate processing should be made within the RS-232C cable.
An example of RS-232C cable processing is illustrated below.

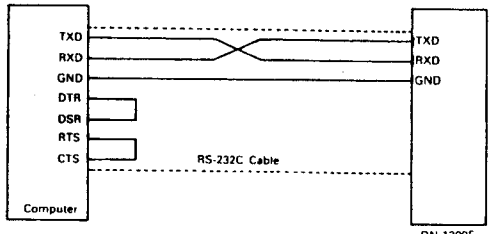


Figure 8

[4] TYPICAL BASIC SETUPS USING COMPUTER-CONTROLLED CHANGERS

1) Minimum system with a single changer
You can chose the interface RS-422A or RS-232C.

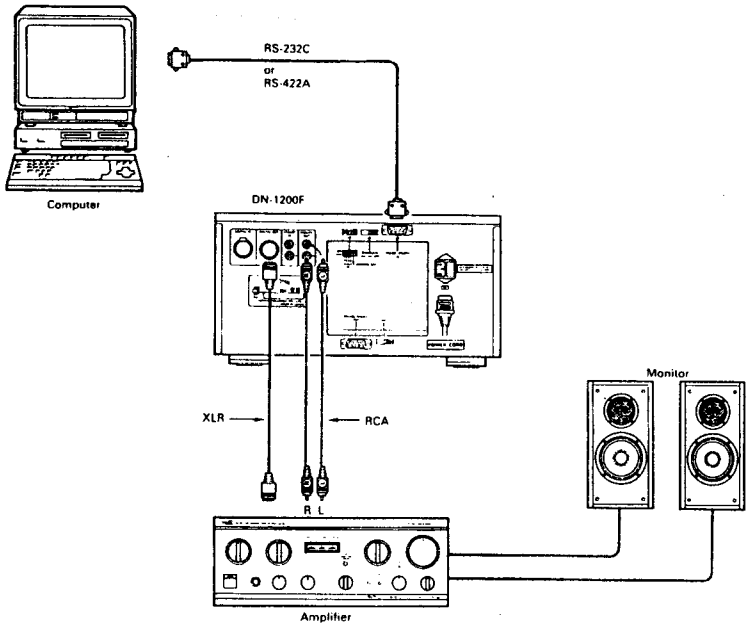
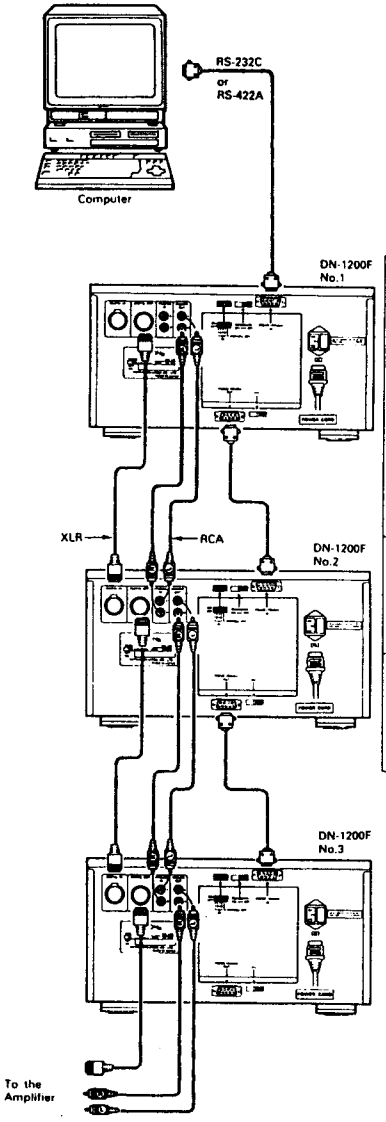


Figure 9

DN-1200F	DIP Switch	Terminal Switch	RS-232C/RS-422A Selector Switch
	① ② ③ ④ ⑤ ON OFF	OFF	RS-232C or RS-422A
	① OFF ② OFF ③ OFF ④ OFF ⑤ OFF Transfer rate: 19200 bps		

2) Extension system connections
(Example showing three DN-1200Fs daisy chaining)



DN-1200F	DIP Switch	Terminal Switch	RS-232C/RS-422A Selector Switch
No.1	① ② ③ ④ ⑤ ON OFF ① ON ② OFF ③ OFF ④ OFF ⑤ OFF Transfer rate :19200 bps	OFF	RS-232C or RS-422A
No.2	① OFF ② ON ③ OFF ④ OFF ⑤ OFF Transfer rate :19200 bps	OFF	RS-232C or RS-422A
No.3	① ON ② OFF ③ OFF ④ OFF ⑤ OFF Transfer rate :19200 bps	ON	RS-232C or RS-422A

Figure 10

DN-1200F Daisy Chaining

ID No. Setting

	Dip Switch				Termination Switch	9P-9P D SUB Cable
	1	2	4	8		
No. 1	ON				OFF	PC ← TXD.RXD/Twist → DN-1200F
2		ON			OFF	TXD.RXD/Straight
3	ON	ON			OFF	
4			ON		OFF	
5	ON		ON		OFF	
6		ON	ON		OFF	
7	ON	ON	ON		OFF	
8				ON	OFF	
9	ON			ON	OFF	
10		ON		ON	OFF	
11	ON	ON		ON	OFF	
12			ON	ON	OFF	
13		ON	ON	ON	OFF	
14		ON	ON	ON	OFF	
15	ON	ON	ON	ON	ON	
						Note: TXD.RXD Straight type

(Radio Shack Part #26-116 compatible)

NOTES ON DAISY CHAINING

1) Make sure that the power is OFF when adjusting the Dip switch.

2) Audio Daisy Chaining

Both Digital and Analog outputs can be daisy changed to optimize cable length.
In this case, the audio line is all active. It means output from any changer unit will be mixed.
The control software must take care audio selection so that only one unit is reproducing sound.

For example: Do not scan disc on one changer unit while another unit is playing normally. First, stop play the current changer, then play another changer. Cueing another changer will be fine as its audio is muted.

To control the daisy chained audio output correctly, keep the main power on to the changer unit #1. It is optional for other changer units to turn the main power if they are not in use.

5 TO LOAD THE DISCS ON THE DISC RACKS

- **After removing the shipping lock screws.**

1) Handling of the disc rack.

- Be sure to stick the disc locking shaft into Ⓐ for moving the unit or unmounting the rack.
- Store the shaft at Ⓑ after use.
- Push the lock lever Ⓒ to release a lock of the disc rack lift the handle Ⓓ up (about 3mm) And pull out the rack toward front.

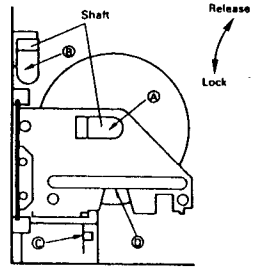


Figure 11

2) Place the discs on the disc racks. (referring to Figure 12. 13.)

- Face the label sides of discs #1 ~ 50 to the right.
- Face the label sides of discs #51 ~ 100 to the left.
- Be sure to stick the disc locking shaft to the deepest for moving the unit.

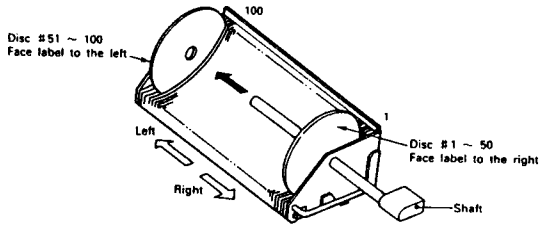


Figure 12

- Face the label sides of discs #101 ~ 150 to the left.
- Face the label sides of discs #151 ~ 200 to the right.
- Be sure to stick the disc locking shaft to the deepest for moving the unit.

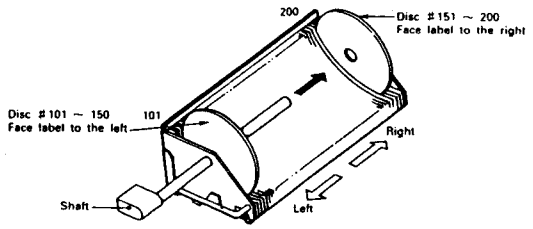


Figure 13

3) How to mount disc rack

① Hold the handle Ⓓ, push the rack along the guide rails until it is latched.
② Check to see if the rack has seated properly by holding the handle Ⓓ and wiggling it.
③ Store the shaft at Ⓑ after use, removing it from Ⓐ.
<Caution>Proper functions cannot be expected unless the rack and the shaft are at correct positions.

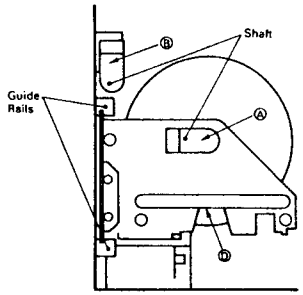


Figure 14

6 COMPACT DISCS

1. Precautions on handling compact discs

- Do not allow fingerprints, oil or dust to get on the surface of the disc.
  If the disc is dirty, wipe it off with a soft dry cloth.
- Do not use benzene, thinner, water, record spray, electrostatic-proof chemicals, or silicone-treated cloths to clean discs.
- Always use carefully handle discs to prevent damaging the surface; in particular when removing a disc from its case or returning it.
- Do not bend the disc.
- Do not apply heat.
- Do not enlarge the hole in the center of the disc.
- Do not write on the label (printed side) with a hard-tipped implement such as a pencil or ball point pen.
- Condensation will form if a disc is brought into a warm area from a colder one, such as outdoors in winter. Do not attempt to dry the disc with a hair dryer, etc.

2. Precaution on storage

- After playing a disc, always unload it from the player.
- Always store the disc in the disc rack to prevent from dirt or damage.
- Do not place discs in the following areas:
  1) Areas exposed to direct sunlight for a considerable time.
  2) Areas subject to accumulation of dust or high humidity.
  3) Areas affected by heat from indoor heaters, etc.

7 TROUBLESHOOTING

Symptom	Cause	Measures	Page
Power indicator does not light and no sound is produced when power switch is turned on	• Power cord is not securely plugged in.	• Plug the power cord in securely.	7
Power indicator lights but no sound is produced	• No discs are loaded. • Disc is loaded upside-down. • Condensation. • Shaft is still in the disc rack.	• Load a disc. • Refer to Figures 12 and 13. • Leave the unit for 1 to 2 hours with power on. • Return the shaft to its storage position.	13 13 14 13, 14
Sound skips or is noisy	• Disc is dirty.	• Clean the disc.	14

8 SPECIFICATIONS

GENERAL

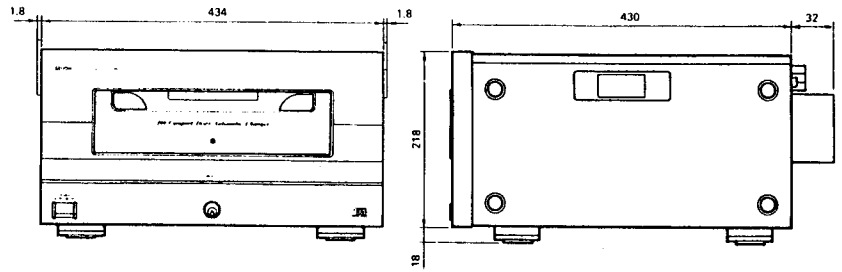
Type	CD autochanger
Audio channel	2 channels
Discs	Philips type compact discs (12 cm)
Quantization	18 bit Linear
Sampling frequency	44.1 kHz
Digital to analog converters	20 bit DAC
Access time	16 sec. or less
Capacity	200 discs max.
Power supply	120 V AC ±10%, 60 Hz (for USA & CANADA models) 120/230/240 V AC ±10%, 50/60Hz (for multi voltage version)
Power consumption	29 W
Dimesnions	434 (W) × 236 (H) × 462 (D) mm
Net weight	23 kg (Not including discs)

AUDIO DATA

Analog Output	
Frequency response	20 Hz ~ 20 kHz within 1dB range
Dynamic range	92 dB
Signal to noise ratio	96 dB (with respect to maximum level) ("A" weight)
Total harmonic distortion	0.008% (at maximum level, 1 kHz)
Channel separation	92 dB (at maximum level, 1 kHz)
Wow and flutter	Undetectable
Output voltage	2.0 V rms
Load impedanse	10 k ohm or more
Digital Output	AES/EBU format, balanced output 3 Vp-p, bi-phase

DIMENSIONS

Unit: mm

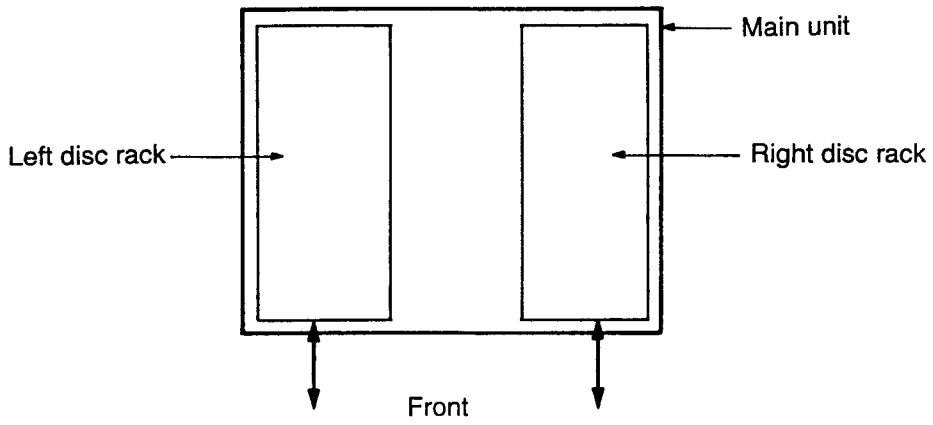


* Specifications and design are subject to change without notice for purpose of improvement.

1. FEATURES

This CD autochanger allows you select on CD from a maximum 200 CDs which can be housed in the disc racks, play any track on that CD, then return the CD to its original position once playback is finished.

This CD autochanger consists of the main unit and two disc racks with a capacity of 100 CDs each.



1-1. Playable Disc: 12 cm CD
(8 cm CD is not playable)

1-2. Storage Capacity: 200 Discs Max.

1-3. Loading and Unloading of Discs: 1) Open the front door.
2) Slide out two Disc racks which can limits of 100 pcs.
3) The above operations make setting or changing CDs easy.

1-4. Access Time: 16 sec. max.
The time required for return a disc to the disc rack currently played and then cue-up on the designated track number of another disc for next play.

1-5. D/A Converter: 20 bits ADVANCED SLC

1-6. Interface: Standard RS-422A or RS-232C selectable

1-7. Input/Output Connectors:

7-1.	Digital Output; 3p XLR type	2 pcs
7-2.	Analog Output; RCA type L/R	2pairs
7-3.	Serial Remote; 9 pin D-Sub (Female)	2 pcs

1-8. Serial Data Transfer Format:

8-1.	Data Transfer Mode;	Asynchronous clock system (UART)
8-2.	Start Bit;	1 bit
8-3.	Data Bit;	8 bits
8-4.	Parity Bit;	1 bit EVEN
8-5.	Stop bit;	1 bit
8-6.	Transfer rate;	19200 bit/sec.

2. SPECIFICATIONS

2-1. General specifications

Item	Specifications		Remarks
Power supply	120/230/240VAC		Power cord: 2.5 m
Frequency	50/60Hz		
Power consumption	29W		
Dimensions	W434 x D462 x H218mm		It excepts legs and protrusions.
Weight	21Kg		It excepts discs.
Temperature	Operating	5°C ~ 35°C	Undewed
	Storing	-20°C ~ 60°C	Undewed
Humidity	Operating	25% ~ 85%	
	Storing	20% ~ 90%	

2-2. Accessories

(1) Door-open key 1
(2) Power cord 1
(3) Spare fuse 1
(4) Operation manual 1

3. NOTES ON SERVICE INSPECTION

(1) Power cord must be removed from a wall outlet when changing part.
(2) No parts must be used, other than the specified ones, as parts for this set.
(3) Connectors must not be removed by pulling cord.
(4) Be sure not to short-circuit the signals when checking.
(5) Part attachment and harness arrangement must be performed as original state.
(6) As helical gear is prone to damage when moving disc loading mechanism back and forth, never move the mechanism manually. Moving must be operated with setting S203 to the address motor active mode (refer to Table 7-2).
(7) Operation check must be performed after changing part.
(8) When removing disc rack, note the following points.
    * Disc loading mechanism must be positioned at the front.
    * Green LED must be lit.

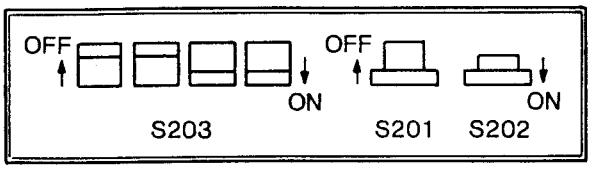
4. ADJUSTMENT AND HEAT-RUN MODES

4-1. Adjustment mode

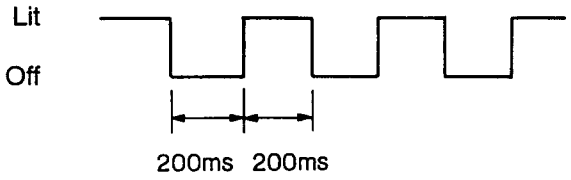
Adjustment for DN-1200F is performed only for the electrical portion of the CD drive.
This adjustment can be performed with the DIP switches of the changer or operation of controller.

4-1-1. Actuating the adjustment mode with the DIP switches of the changer.

Each adjustment mode is set with DIP switch S203 on the control P.W. board of the changer and the start and stop of the adjustment are controlled with tact switches S201 and S202.
All the adjustment modes are listed in Table 4-1. Pickup is not moved with the all servo-off operation (not the all servo-off mode) in all the modes.
ON/OFF positions of S201 to S203 are shown below.



Set an adjustment mode according to the following steps.
(1) Set DIP switch S203 by referring the adjustment in Table 4-1.
(2) Turn the power of DN-1200F ON.
When DN-1200F enters normal adjustment mode, LED (LD201) flickers as the following times.



When it enters once to the adjustment mode, the mode continues until the power off.
An adjustment mode can be changed to another mode with S203.
(3) Adjust according to "Item 4-1-2."

Table 4-1 ADJUSTMENT MODES

S203				Mode	S202	S201	Functions
1	2	3	4				
OFF	OFF	OFF	ON	PU laser ON			Turns on the laser diode of CD drive.
					OFF	ON	Makes the laser diode of CD drive lit.
					ON	OFF	Makes the light emission of the laser diode stopped.
ON	OFF	OFF	ON	Focus search			Executes the focus search five times after turning off all the servos. (Focus servo is off.)
					OFF	ON	Executes the focus search.
					ON	OFF	Turns off all the servos.
OFF	ON	OFF	ON	Focus servo on			Turns on only the focus servo after turning off all the servos. The spindle motor does not rotate.
					OFF	ON	Turns on only the focus servo.
					ON	OFF	Turns off all the servos.
ON	ON	OFF	ON	Focus, CLV servos on			Turns on the focus and CLV servos after turning all the servos. (Tracking and slide servos are off.)
					OFF	ON	Turns on the focus and CLV servos.
					ON	OFF	Turns off all the servo.
OFF	OFF	ON	ON	All servos on			Turns on the focus, tracking and slide servos after turning off all the servos.
					OFF	ON	Executes all the servo on.
					ON	OFF	Turns off all the servo.
ON	OFF	ON	ON	All servos off			Turns off all the servos and move the pickup to the innermost circle.
					OFF ON	ON OFF	Turns off all the servos when either one of S201 or S202 is on and the other one is off.
OFF	ON	ON	ON	One-kick operation			Executes the one-kick operation to the specified side during S201 or S202 is on. This mode is applicable only when the focus servo is on. There is no guarantee for operation when the focus servo is off.
					ON	OFF	Executes the one-kick operation to the innermost.
					OFF	ON	Executes the one-kick operation to the outermost.
ON	ON	ON	ON	Ten-kick operation			Executes the ten-kick operation to the specified side during S201 or S202 is on. This mode is applicable only when the focus servo is on. There is no guarantee for operation when the focus servo is off.
					ON	OFF	Executes the ten-kick operation to the innermost.
					OFF	ON	Executes the ten-kick operation to the outermost.

4-1-2. Adjusting the CD servo

4-1-2-1. Preparations for adjustment

(1) Equipment
- Adjustment jig board (SGK-0058-1)
- CC37 extension board (SGK-0058-3)
- Oscilloscope (with 10:1 Probe)
- Oscillator
- Digital multimeter (or oscilloscope)
- Servo adjustment disc (DENON 33CA-1094)
- Disc clamper (GEN 2062)

(2) Temporary setting of the adjustment volumes

GU-2467 (RF AMP UNIT)

- Tracking offset volume (VR1): 11 o'clock
- Focus offset volume (VR2): 12 o'clock

GU-2610-2 (CD SERVO UNIT)

- Focus gain volume (VR3): 12 o'clock
- Tracking gain volume (VR4): 12 o'clock
- Slide offset volume (VR5): 12 o'clock

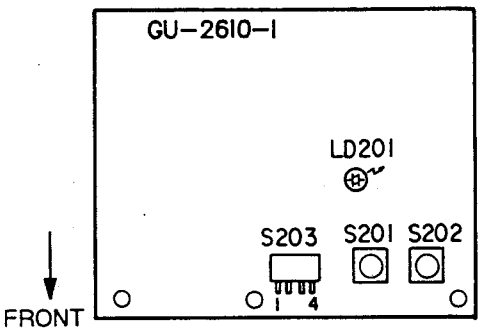
(3) Set the power switch to OFF.

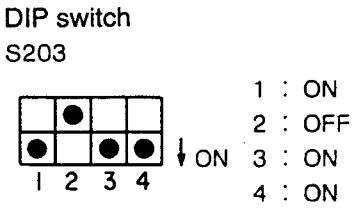
(4) Take out the disc rack from the changer.

4-1-2-2. Adjustments

(1) Adjusting the slide offset

① Set the DIP switch (S203) of the changer control unit (GU-2610-1) as shown below.

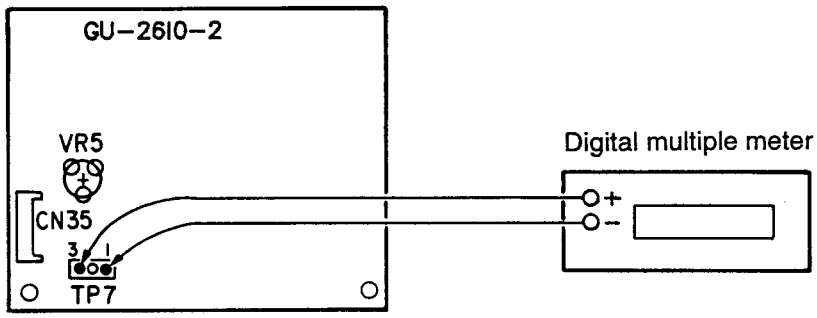




② Turn the power ON. LED (LD201) flickers speedily. (0.4 second cycle)

③ Press once the tact switch (S201 or S202). (LED is lighting during the tact switch is pressed.)

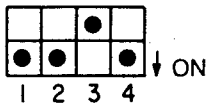
④ Connect the digital multimeter to pins 1 and 3 of the test point (TP7) of the servo control unit (GU-2610-2) and adjust the slide offset volume (VR5) so that the voltage becomes 0 ± 50 [mV].



(2) Adjusting the tracking offset

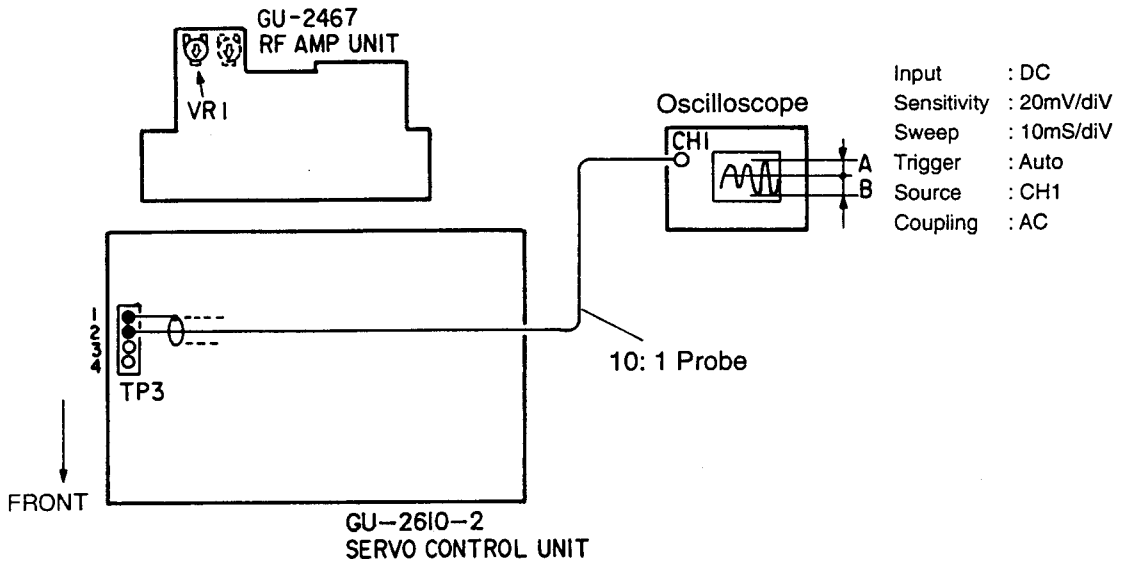
① Set the servo adjustment disc on the turntable and hold down the disc with the clamper.

② Set the DIP switch (S203) of the changer control unit (GU-2610-1) as shown below.



1 : ON
2 : ON
3 : OFF
4 : ON

③ Connect the CH-1 probe of the oscilloscope to Pin1 (GND) and Pin2 (TE OFFSET) of test point TP3 of the servo control unit (GU-2610-2).



④ Press once the tact switch (S201) of the changer control unit (GU-2610-1).

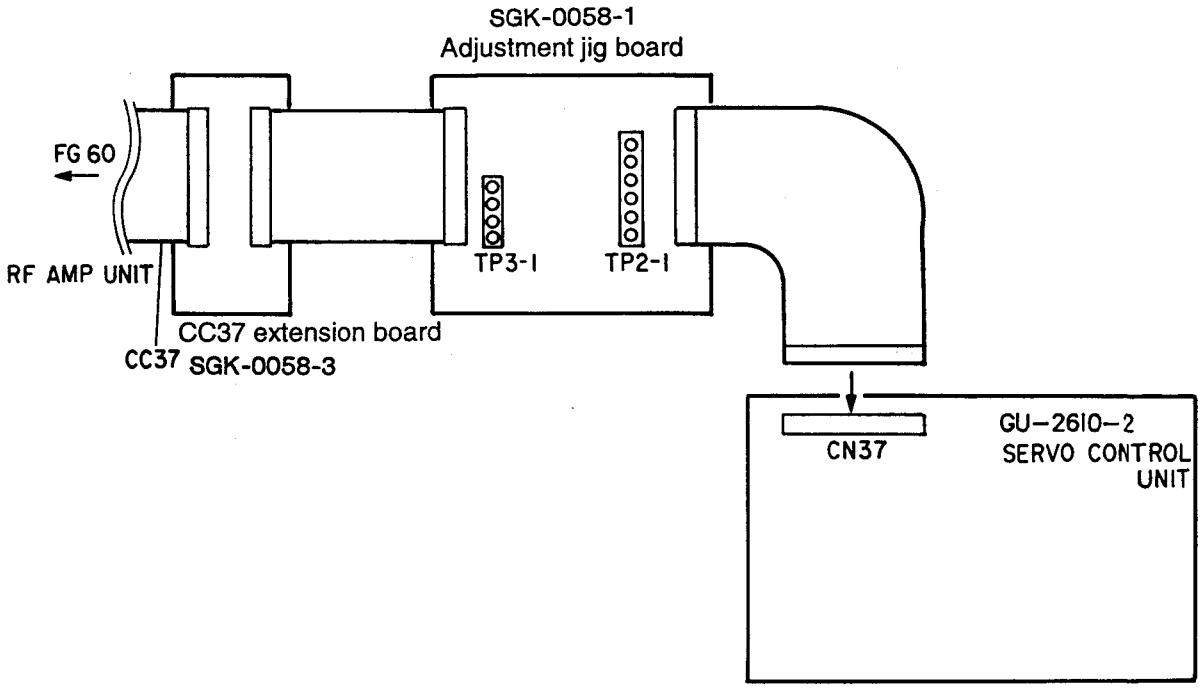
⑤ Traverse waveform is displayed on the oscilloscope. (If the traverse waveform is not displayed or the disc runs in high speed mode, readjust tracking offset from the beginning after pressing DIP switch S202 or turning the power off.) And adjust the tracking offset volume (VR1) of the RF amplifier unit so that amplitudes A and B coincide.

⑥ After the adjustment is completed. press once the tact switch(S202). (The mode becomes servo OFF.)

(3) Adjusting the focus offset

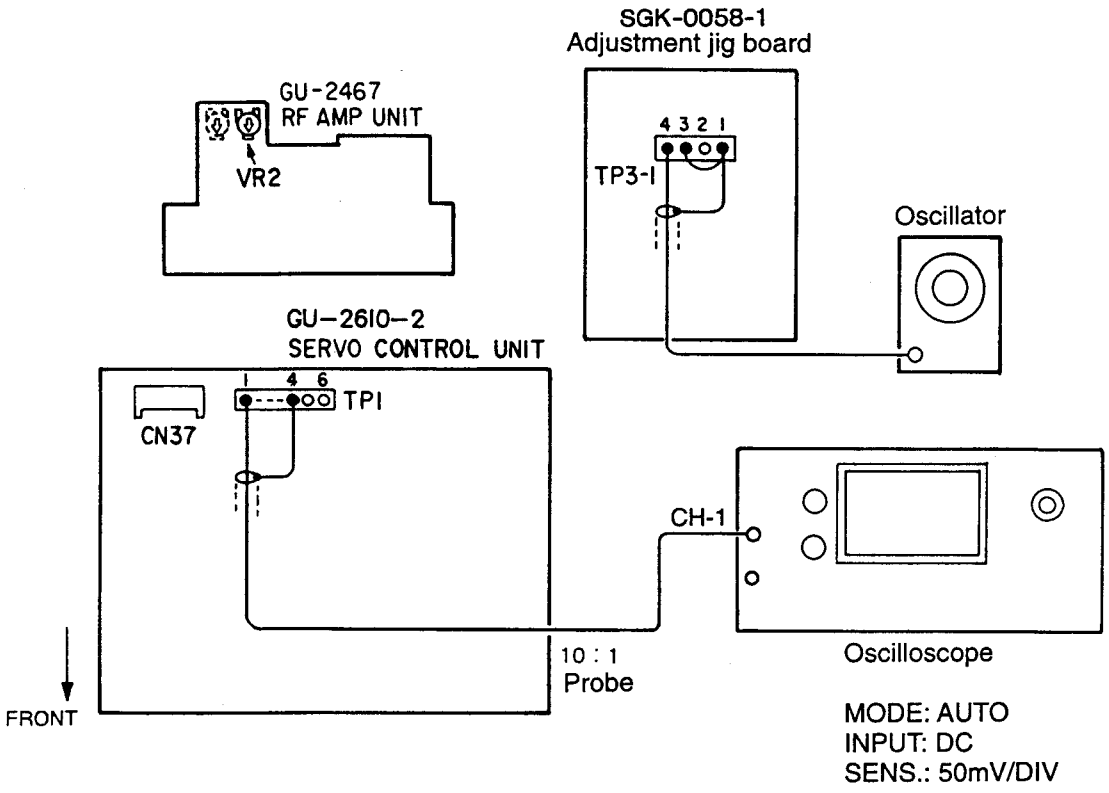
① Turn off the power.

② Set the adjustment jig (SGK-0058-1) and CC37 extension board (SGK-0058-3) between the RF amplifier unit (GU-2467) and the servo control unit (GU-2610-2). (Insert between CC37 and CN37)



③ Set a frequency and level of the oscillator as shown below.

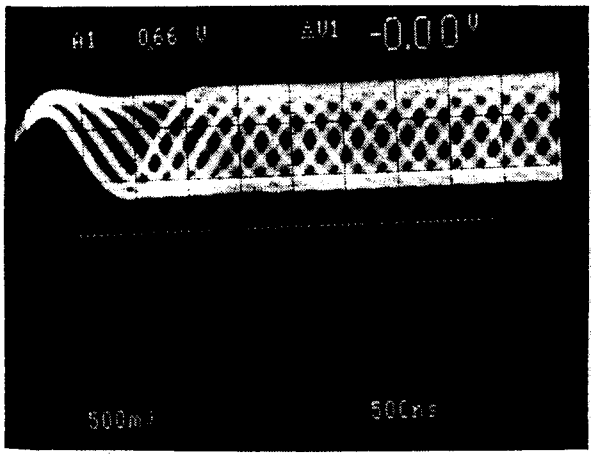
Frequency : 710 [Hz]
Level : 0.4 [Vpp]



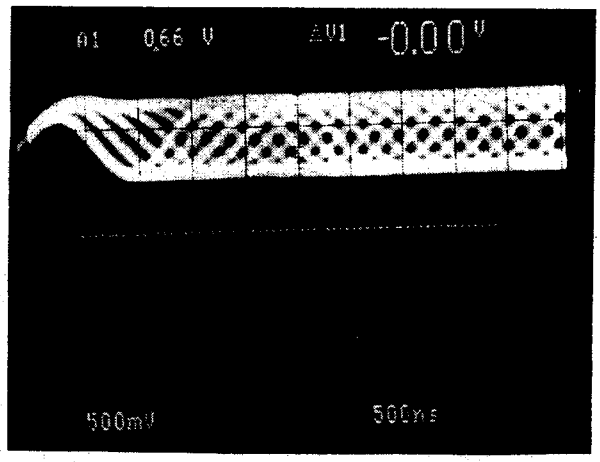
④ Connect the Oscilloscope to Pin4 (GND) and 1(HF) of TP1 on the servo control unit (GU-2610-2).

⑤ Adjust VR2 so that the finest HF waveform and maximum amplitude of waveform are obtained (refer to Fig. 20).

⑥ Disconnect oscillator and oscilloscope probes after the adjustment.



After adjustment



Before adjustment

Fig. 20

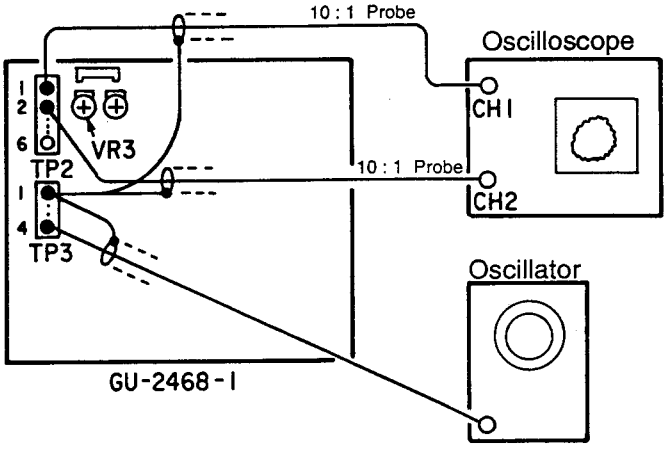
(4) Adjusting the focus gain

① Set the oscillator frequency as follows.

Using Disc	Yasuko Tomita's 33CA-1094
Frequency (Hz)	710
Level (Vpp)	1.7

And, connect Pin 1 (GND) of TP3 and Pin 4 of TP3 on the servo control unit (GN-2610-2).

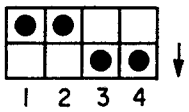
② Connect probe (CH1) of Oscilloscope to Pin 1 (GND) of TP3 and Pin 1 of TP2, and connect probe (CH2) to Pin 1 (GND) of TP3 and Pin 2 of TP2.



Mode : X – Y
Input : AC
Sens : CH1 2mV/div
CH2 10mV/div

Frequency : 710Hz
Level : 1.7Vpp

③ Set the DIP switch (S203) of changer control unit (GU-2610-1) as follows.

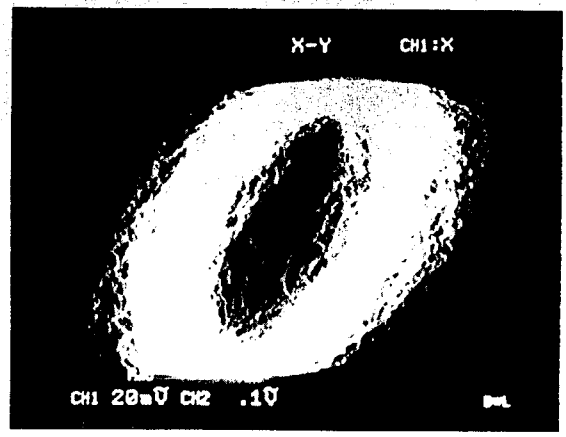


1 : OFF
2 : OFF
3 : ON
4 : ON

Turn ON the power and press the tact switch (S201) once. At this time, if disc runs rapidly, press the tact switch (S202) or turn OFF the power, then turn ON the power again and re-perform adjustment from step ①.

④ Adjust the focus gain volume (VR3) so that the waveform on the oscilloscope becomes circle as shown in Fig. 21.

Incorrect Wavefoem



Correct Waveform

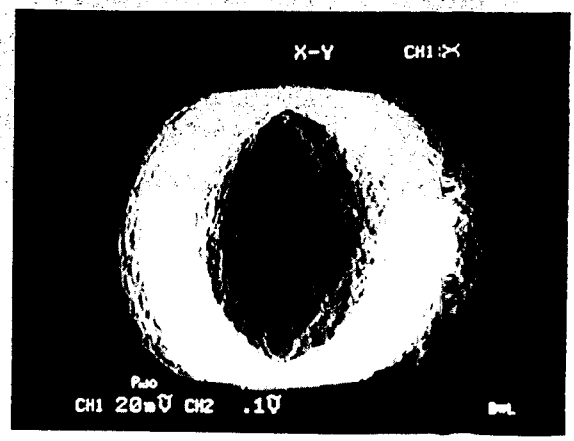


Fig. 21 Waveform, Tracking Gain Ajustment

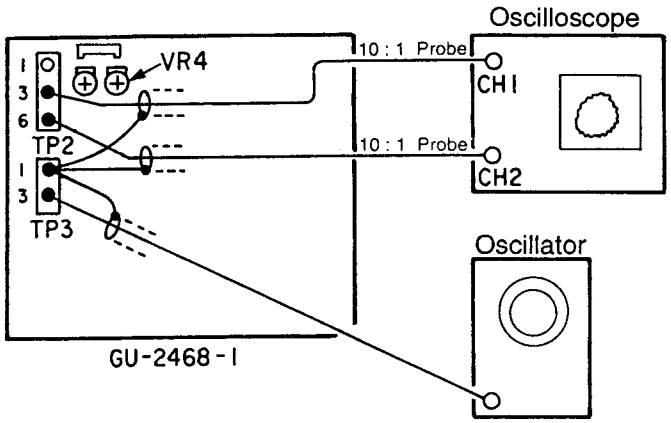
(5) Adjusting the tracking gain

① Set the oscillator frequency as follows.

Using Disc	Yasuko Tomita's 33CA-1094
Frequency (Hz)	870
Level (Vpp)	2

And. connect Pin 1(GND) of TP3 and Pin 3 of TP3 on the servo control unit (GU-2010-2).

② Connect probe (CH1) of oscilloscope to Pin 1 (GND) of TP3 and Pin 3 of TP2, and connect probe (CH2) to Pin 1 (GND) of TP3 and Pin 6 of TP2.



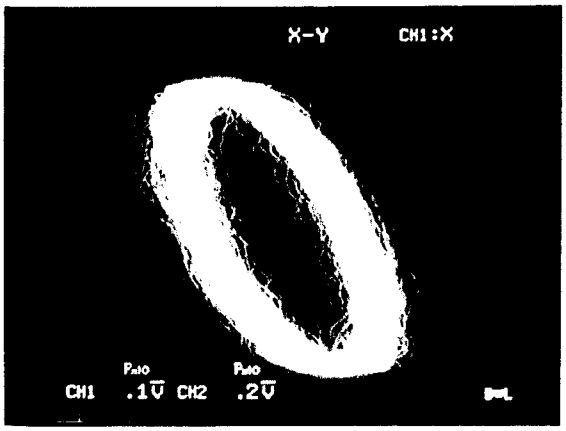
Mode : X – Y
Input : DC
Sens : CH1 10mV/div
CH2 20mV/div

Frequency : 870 Hz
Level : 2Vpp

③ Adjust the tracking gain volume (VR4) so that the waveform on the oscilloscope shows circle (phase difference 90°). (Fig. 22)

④ Press the tact switch (S202). (servo OFF)

Incorrect Wavefoem



Correct Waveform

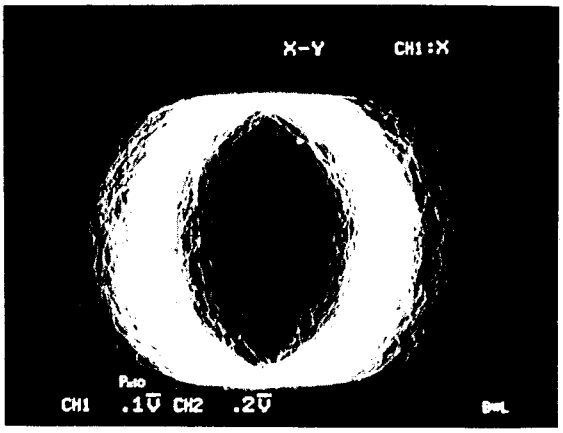


Fig. 22 Waveform, Tracking Gain Ajustment

(6) Rechecking the tracking offset

① Perform item 3 again. If the readings do not coincide, readjust the tracking offset volume (VR1).

② Press the tact switch (S202) and setting all the DIP switches (S203) to OFF, turns the power OFF, and remove the adjustment jig board (SGK-0058-1), clamper and adjustment disc to complete all the adjustments.

4-2. Heat-run mode

Heat-run mode can be set with the DIP switches of the changer.

When it enters to the heat-run mode, continue to execute the selection, playback and return of 200 discs in a specified order until pause or stop is performed.

When this mode actuates, it is impossible to communicate with the host until error occurs.

① Setting the heat-run mode
Heat-run modes are listed in Table 4-2.
The heat-run mode is set with S203.

② Selecting and starting the heat-run mode
Two heat-run modes can be selected with S201 and S202. One switch setting a mode is effective in the mode, and the other is annulled.
When changing the selected heat-run mode to other heat-run mode, release the heat-run mode and reset the heat-run mode again, and make the mode selection.

[HEAT-RUN MODE 1 (S201 MODE)]
Disc is selected consecutive order from disc number 1 to 200, played back in five seconds from 00 minutes:02 seconds:00 block and returned.
This mode continues until a heat-run pause or stop is performed.

→#001→#002→#003→#004→#005→·····→#196→#197→#198→#199→#200

Each of discs #050 and #150 is selected by two discs. And discs #051 and #151 is selected before them.

[HEAT-RUN MODE 2 (S202 MODE)]
Discs are selected consecutively as per the order below, played back in five seconds from 00:02:00 and returned. This mode continues until a heat-run pause stop or stop is performed.
Each the discs are selected by two discs.

→#001→#100→#101→#200→#050→#051→#150→#151
→#002→#099→#102→#199→#049→#052→#149→#152
→#003→#098→#103→#198→#048→#053→#148→#153
→#004→#097→#104→#197→#047→#054→#147→#154
→#005→#096→#105→#196→#046→#055→#146→#155
→#006→#095→#106→#195→#045→#056→#145→#156
→#007→#094→#107→#194→#044→#057→#144→#157
→#008→#093→#108→#193→#043→#058→#143→#158
→#009→#092→#109→#192→#042→#059→#142→#159
→#010→#091→#110→#191→#041→#060→#141→#160
→#011→#090→#111→#190→#040→#061→#140→#161
→#012→#089→#112→#189→#039→#062→#139→#162
→#013→#088→#113→#188→#038→#063→#138→#163
→#014→#087→#114→#187→#037→#064→#137→#164
→#015→#086→#115→#186→#036→#065→#136→#165
→#016→#085→#116→#185→#035→#066→#135→#166
→#017→#084→#117→#184→#034→#067→#134→#167
→#018→#083→#118→#183→#033→#068→#133→#168
→#019→#082→#119→#182→#032→#069→#132→#169
→#020→#081→#120→#181→#031→#070→#131→#170
→#021→#080→#121→#180→#030→#071→#130→#171
→#022→#079→#122→#179→#029→#072→#129→#172
→#023→#078→#123→#178→#028→#073→#128→#173
→#024→#077→#124→#177→#027→#074→#127→#174
→#025→#076→#125→#176→#026→#075→#126→#175

Heat-run is actuated by setting S201 or S202 to on.
When there is a disc being processed to load or played back at this time, the disc is returned and standing by for heat-run actuation.
Re-perform setting S201 or S202 to on.

③ Heat-run pause
Set a switch (S201 or S202) to on, which was set to on to set a heat-run mode. Discs being processed are returned and stops.

④ Heat-run re-actuation
Set a switch (S201 or S202) to on, which was set to on to make pause a heat-run mode.
It is begun to be processed from returned disc which was performed pause, or next disc to be selected.

⑤ Heat-run stop (releasing the heat-run mode)
Set S203 to normal mode. (Refer to Table 4-2.)
Disc being processed is returned and finishes the mode.

4-2-1. Actuating the heat-run mode (performed only with DN-1200F)

The heat-run mode is set with DIP switch S203 on the control board of the changer. Disc selection order, and actuation and pause of the heat-run mode are controlled with tact switches S201 and S202.

Actuate the heat-run mode as the following steps.

① Set a total of 200 discs suitably for the left and right disc rack. Install the disc racks to DN-1200F.

② Set DIP switch S203 to the heat-run mode shown in Table 4-2.

③ Turn ON the power of DN-1200F.
DN-1200F executes the initialization. (Refer to item "6-1. Initialization.") The initialization is completed, it becomes the heat-run stand-by with S201 or S202.

(4) Select one of two heat-run modes with S201 or S202.

(5) Press S201 or S202. Discs are selected, played back and turned in the specified order.
This operation continues until pause or heat-run stop is performed.

Table 4-2 HEAT-RUN MODES

S203				Mode	S202	S201	Function
1	2	3	4				
OFF	OFF	OFF	OFF	Normal mode			Performs a normal operation of changer.
					×	×	S201 and S202 are annulled.
OFF	ON	OFF	OFF	Heat-run mode			200 discs are selected, played back and returned in a specified order. This operation continues until pause or stop is performed.
				Heat-run mode 1	OFF	ON	Discs are selected consecutively from number #001, played back and returned.
				Heat-run mode 2	ON	OFF	Discs are selected, played back and returned in a specified order.

4-2-2. Error display in the heat-run mode

Disc number data to be selected in the heat-run mode is computed automatically in DN-1200F. Discs are selected, played back and returned with this data. The changer microcomputer of demands the audio playback to CD drive. Disc selection loading and returning other than the above operations are performed as normal mode.

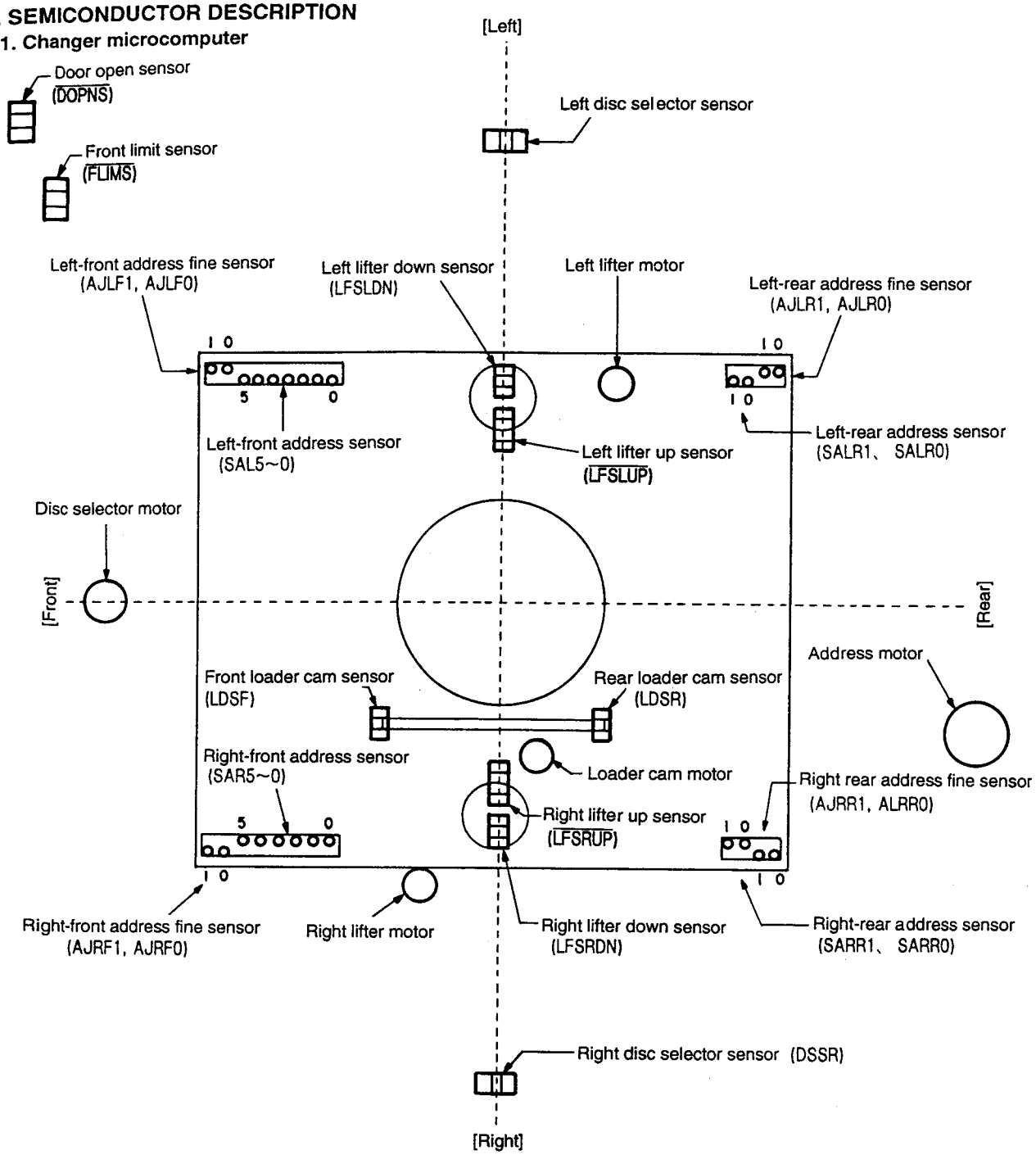
Therefore, an error changer occurred in the changer operation is the same as in normal mode.

Any errors of the CD drive are not checked and not displayed in the heat-run mode.

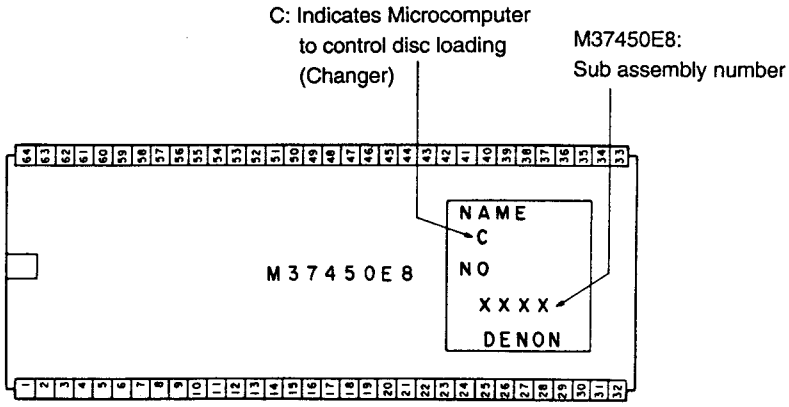
For the details of error display, refer to item "7. Troubleshooting."

5. SEMICONDUCTOR DESCRIPTION

5-1. Changer microcomputer



Configuration of disc loading control microcomputer (M37450E8)



CHANGER MICROCOMPUTER (M37450E8) PORTS (1/2)

Pin	Port	bit	Signal	I/O	Function	Low	High	Note
1	P3 (0xD6)	7	NOL/$\overline{TEST}$	O	RXD line switch signal	C-D	H-C	1
2		6	H_C/$\overline{H\_D}$	O	TXD line switch signal	H-D	H-C	2
3		5	TXD	O	Serial interface data transmission line	--	--	3
4		4	RXD	I	Serial interface data reception line	--	--	3
5		3	$\overline{MPWM}$	O	PWM output for address motor (cycle 52µsec)	Active	Not	4
6		2	CK20	O	Reference clock for disc selector motor PWM (19.2 kHz)	--	--	5
7		1	SPWM	O	PWM output for disc selector motor (cycle=1/19200 sec.)	Not	Active	5
8		0	$\overline{READY}$	O	Changer ready signal Ready	Ready	Not	
9	P5 (0xDA)	7	$\overline{EJSW}$	O	CD drive ejection demand signal	Demand	Not	
10		6	$\overline{MDISP}$	O	LED control signal	ON	OFF	
11		5	$\overline{MVCL}$	I	CD drive loader close signal	Close	Not	
12		4	$\overline{MVOP}$	I	CD drive block loader open signal	Open	Not	
13		3	$\overline{TB3}$	I	DIP switch (SW3) data (bit 4)	ON	OFF	
14		2	$\overline{TB2}$	I	DIP switch (SW3) data (bit 3)	ON	OFF	
15		1	$\overline{TB1}$	I	DIP switch (SW3) data (bit 2)	ON	OFF	
16		0	$\overline{TB0}$	I	DIP switch (SW3) data (bit 1)	ON	OFF	
17	P6 (0xDC)	7	MDIR	O	Address motor rotation direction control signal	Rear	Front	
18		6	SDIR	O	Disc selector motor rotation direction control signal	Left	Right	
19		5	MSL1	O	Loader cam and lifter motor (L&R) select signal			6
20		4	MSL0	O	Loader cam and lifter motor (L&R) select signal			6
21		3	$\overline{MFIN}$	O	Loader cam and lifter motor rotation direction control signal	--	Normal	6
22		2	$\overline{MRIN}$	O	Loader cam and lifter motor rotation direction control signal	Reverse	--	6
23		1	CK20	I	Reference clock CK20 input for disc selector motor PWM	--	--	5
24		0	ADJI	I	Two-bit fine sensor data (bit 1)	Intercept	Pass	
25			R/$\overline{W}$	O	Not used			
26			SYNC	O				
27			CNVSS		GND			
28			$\overline{RESET}$	I	Reset signal	Reset	--	
29			XIN	I	Clock input (9.8304 MHz)			
30			XOUT	O	Clock output			
31			ϕ	O	Not used			
32			VSS		GND			
33	P2 (0xD4)	7	ADJ1	I	2-bit fine sensor data (bit 1)	Intercept	Pass	
34		6	ADJ0	I	2-bit fine sensor data (bit 0)	Intercept	Pass	
35		5	SADDR_F5	I	Front-6-bit address sensor data (bit 5)	Intercept	Pass	
36		4	SADDR_F4	I	Front-6-bit address sensor data (bit 4)	Intercept	Pass	
37		3	SADDR_F3	I	Front-6-bit address sensor data (bit 3)	Intercept	Pass	
38		2	SADDR_F2	I	Front-6-bit address sensor data (bit 2)	Intercept	Pass	
39		1	SADDR_F1	I	Front-6-bit address sensor data (bit 1)	Intercept	Pass	
40		0	SADDR_F0	I	Front-6-bit address sensor data (bit 0)	Intercept	Pass	

CHANGER MICROCOMPUTER (M37450E8) PORTS (2/2)

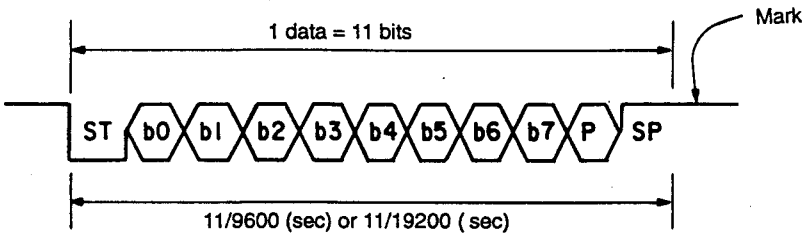
Pin	Port	bit	Signal	I/O	Function	Low	High	Note
41	P1 (0xD2)	7	SADDR_R1	I	Rear-2-bit address sensor data (bit 1)	Intercept	Pass	
42		6	SADDR_R0	I	Rear-2-bit address sensor data (bit 0)	Intercept	Pass	
43		5	$\overline{\text{LDS\_F}}$	I	Loader cam sensor front data	Intercept	Pass	
44		4	$\overline{\text{LDS\_R}}$	I	Loader cam sensor rear data	Intercept	Pass	
45		3	$\overline{\text{DSS\_L}}$	I	Disc selector sensor left data	Intercept	Pass	
46		2	$\overline{\text{DSS\_L}}$	I	Disc selector sensor right data	Intercept	Pass	
47		1	$\overline{\text{DFS\_DOWN}}$	I	Lifter down sensor data	Down	Unfixed	
48		0	$\overline{\text{LFS\_UP}}$	I	Lifter up sensor data	Up	Unfixed	
49	P0 (0xD0)	7	$\overline{\text{DROPNS}}$	I	Front door open/close data	Open	Close	
50		6	$\overline{\text{FNTLIMS}}$	I	Front limit sensor data	Intercept	Pass	
51		5	SOLDR	O	Solenoid control	OFF	ON	
52		4	SCL	O	EEPROM serial clock	--	--	7
53		3	SDA	I/O	EEPROM serial data	--	--	7
54		2	CS	O	EEPROM chip select	Not	Select	7
55		1	$\overline{\text{R}}$/L	O	Selection of left/right address, address fine adjustment, and lifter sensor	Right	Left	8
56		0	$\overline{\text{F}}$/R	O	Selection of front/rear address fine sensor	Front	Rear	
57	P4 (0xD8)	2	$\overline{\text{DEJD}}$	I	CD drive ejection complete signal	Processing	Completed	
58		1	$\overline{\text{MCCW}}$	I	Tact switch (S202) data	ON	OFF	
59		0	$\overline{\text{MCW}}$	I	Tact switch (S201) data	ON	OFF	
60			D-A2	O	Not used			
61			D-A1	O	Not used			
62			VREF	I	+5V			
63			AVSS		GND			
64			VCC		+5V			

Note 1: RXD line switch signal (NORM: NOL/$\overline{\text{TEST}}$)
Input signal (output signal (RXD) from DN-1200C) to pin4 of IC217 (RXD) and output signal from the CD drive (TXD) are switched.

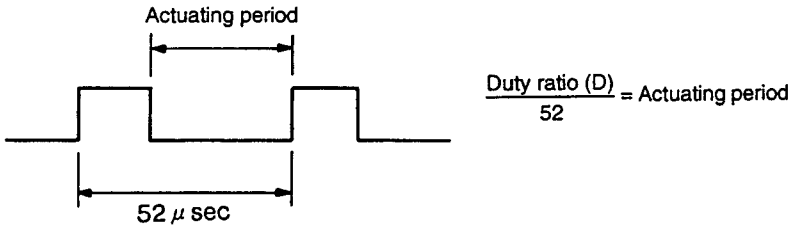
Note 2: TXD line switch signal (H-C/$\overline{\text{H-D}}$)
Output line is switched so that output signal through pin3 of IC217 (TXD) is applied to DN-1200C or the CD drive.

Note 3: Serial interface reception/transmission line (RXD/TXD)
DN-1200F executes selection, playback and return of discs with the command from controller. This communication is performed with the serial interface.
Serial data transfer formats are shown below.

① Data transfer mode:	Clock a synchronous system	(UART)
② Start bit:	1 bit	(ST/Start Bit)
③ Data bit:	8 bits	(B7 to B0/Data Bit)
④ Parity bit:	1 bit (even number)	(P/Parity Bit/Even)
⑤ Stop bit:	1 bit	(SP/Stop Bit)
⑥ Transfer speed:	9600-bit/s or 19200-bit/s Default is 19200-bit/s.	(default)



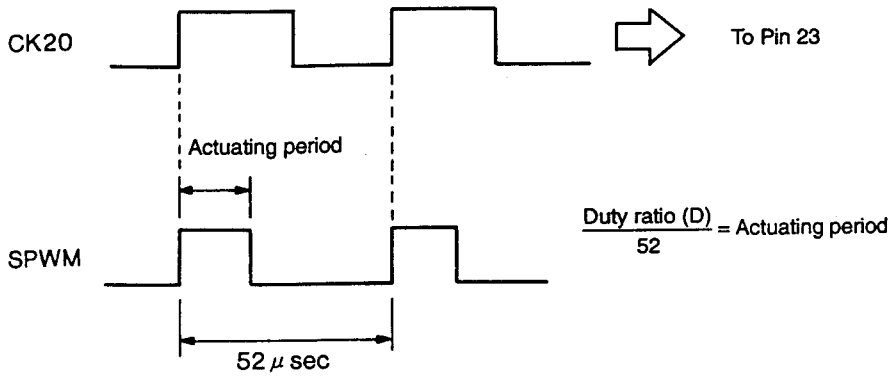
Note 4: Address motor actuate voltage output ($\overline{\text{MPWM}}$)
Address motor operates with a periodic pulse of approximately 52 µsec. Pulse actuating width varies appropriately with the conditions as shown below.



L: Length from the disc loading mechanism to a disc demanded to be played back.

1. When confirming of current position;
   D = A minimum actuating pulse of 2.5%-50.0% is output.
2. When moving to a disc demanded to be played back;
   (1) L = 0 D = 0% pulse (always high) is output.
   (2) 0 < L ≦ 3 D = 25% pulse is output.
   (3) 4 ≦ L
   ① To (position of disc demanded to be played back -3)
   (a) When disc advance catch is not functioned
   D = 100% pulse (always low) is output.
   (b) When disc advance catch is functioned
   D = 50% pulse is output.
   ② From (position of disc demanded to be played back -3)
   Pulse, which duty ratio of (1) is decremented by 4% in every 2 msec, is output.
3. When confirming of position demanded to be played back.
   D = A minimum actuating pulse of 2.5%-50.0% is output.

Note 5: Reference clock for disc selector motor actuating voltage output (CK20) and disc selector motor actuating voltage output (SPWM)
Disc selector motor operates with a periodic pulse of approximately 52 µsec. The reference clock of 52 µsec (duty 50%) is output through Pin 6 and the actuating pulse through pin 7. Pulse actuate width varies appropriately with the conditions as shown below.



1. When moving from sensor intercept mode;
   Pulse of D = 25.0% is output in approximately 240 msec.
2. After approximately 240 msec shown in item "1" passed;
   Pulse of D = 100% is output in approximately 240 msec.
3. When selecting disc;
   (1) When disc advance catch is not functioned;
   D = 100% pulse is output.
   (2) When disc advance catch is functioned;
   D = 50% pulse is output.
4. After left and right limit sensors are intercepted;
   Pulse of D = 25.0% is output in approximately 400 msec.

Note 6: Select signals (MSL0 and MSL1) and rotation direction control signals (MFIN and MRIN) of the loader cam and lift motor (left and right)
The selection and direction of the loader cam and lift motor (left and right) are specified with a unit of four signals as the following table. The selection of motor is performed by IC214.

Motor	MSL1	MSL0	$\overline{\text{MFIN}}$	$\overline{\text{MRIN}}$	Function
– –	0	0	×	×	Not connected. Left and right lifter, and loader cam motor are stopped.
All motors	×	×	0	0	Left and right lifter, and loader cam motor are stopped.
			1	1	Left and right lifter, and loader cam motor are stopped.
Right lifter	0	1	0	1	It is driven to lift up direction of disc #001 to #050.
			1	0	It is driven to lift up direction of disc #051 to #100.
Left lifter	1	0	0	1	It is driven to lift up direction of disc #101 to #150.
			1	0	It is driven to lift up direction of disc #151 to #200.
Loader cam	1	1	0	1	It is driven to loader down direction of front.
			1	0	It is driven to loader down direction of rear.

※ 1: High; 0: Low

Note 7: EEPROM serial clock (SCL), data (SDA), and chip select (CS)

Disc numbers being currently loaded, played back and returned are written in EEPROM as the following time, as a counter-measure for the electric current shuts off or momentarily stops.

When the power is on, a disc in the disc load mechanism is returned to a specified disc rack by referring this back-up data.

Read and write control signals to EEPROM are input or output through Pins 52 to 54.

(1) Time of writing to EEPROM

① Just before lifting up disc after moving the disc load mechanism to a position of specified disc.

② When returning a specified disc to prescribed disc rack. (Disc number clear)

(2) Time of reading from EEPROM

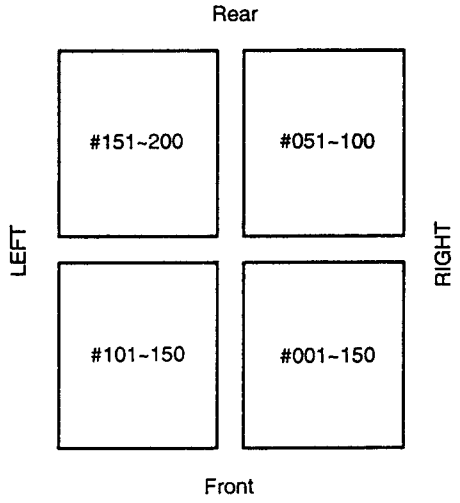
① When CPU reset occurs by turning on the power or with command.

Note 8: Selection of left and right address, address fine adjustment and lifter up/down sensor (R/L), and of front and rear address fine adjustment sensor (F/R)

Left and right address sensor, address fine adjustment sensor and lifter up/down sensor, and of front and rear address fine adjustment sensor are selected by changing output through pins 55 and 56, from a specified number of disc.

Selections of each signal are processed with selectors IC220, IC223, IC225 and IC227.

The combinations of R/L and F/R, to the disc numbers are shown below.



$\overline{R}$ / L	$\overline{F}$ / R	Disc number
0 (right)	0 (front)	#001 ~ 050
0 (right)	1 (rear)	#051 ~ 100
1 (left)	0 (front)	#101 ~ 050
1 (left)	1 (rear)	#151 ~ 200

6. OPERATION GENERAL

6-1. Initializing (Flow Figure 6-1)

When power-on-reset is performed by turning the power on/off, or software-reset with command, the changer executes the following operations.

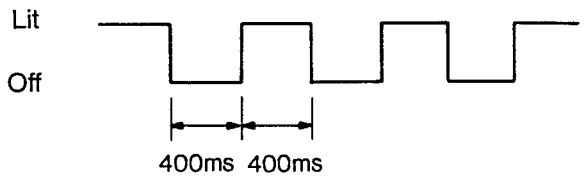
① Internal check of the changer and the CD drive are performed.

② All the discs being currently played back, loaded or reserved are canceled and returned to make no reservation mode.

③ The CD drive mechanism is moved front and rear in approximately 4 seconds to check that the disc rack is attached or not.

The above operation takes approximately five to ten seconds. After that, disc selection can be reserved.

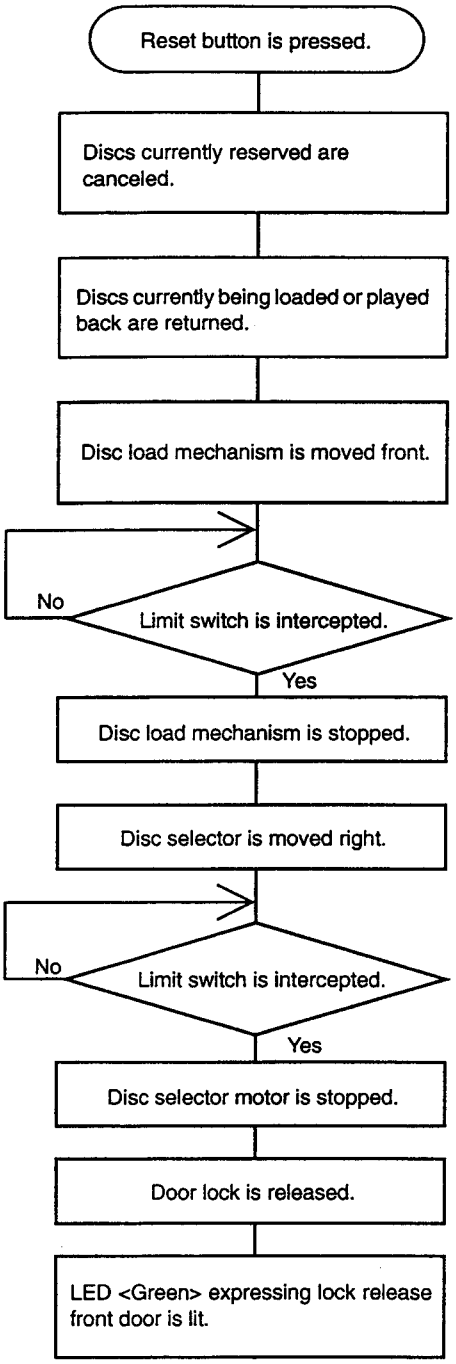
During the above operations, LED (LD201) flickers in the following time, for expressing DN-1200F being initialized, until the initialization is completed.



6-2. Reset button (Flow Figure 6-2)

When the power is on and the reset button is pressed, the following operations are performed.

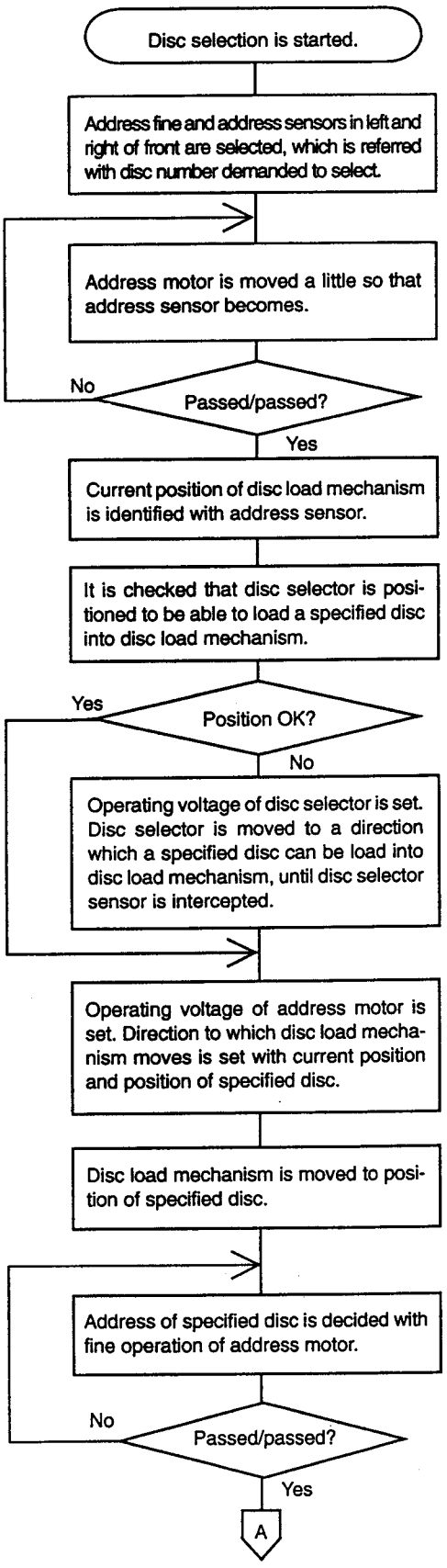
① All the discs being currently played back, loaded or reserved are canceled and returned to prescribed disc racks.
② The whole disc load mechanism is moved front to intercept the front limit switch.
③ Disc selector mechanism is moved right to intercept the right disc selector limit switch viewed from the front.
④ The door lock is released with the door lock rotating lever and the power indicator turns green.



Flow Figure 6-2

6-3. Steps of disc selection

When Controller issues a selection demand of disc number m, the disc selection demand task is started. This task makes the disc selection routine start. The operation flow from the start of disc selection to the completion of loading is shown below.



Specified disc number: 001~100 = selects right front
101~200 = selects left front
< to changer microcomputer port list. >

Operating direction: One is passed and the other is intercepted : intercepts
Intercepted/intercepted : Initial = to front direction
Next = to the direction of previous move

< to address setting. >
Address data is applicable.

6-bit address sensor is read.

Specified disc number: 001~100 = Positioned right?
101~200 = Positioned left?

Disc being played: Operating voltage = duty 50%
No disc being played: Operating voltage = duty 100%

Specified disc number: 001~100 = Moves to right
101~200 = Moves to left

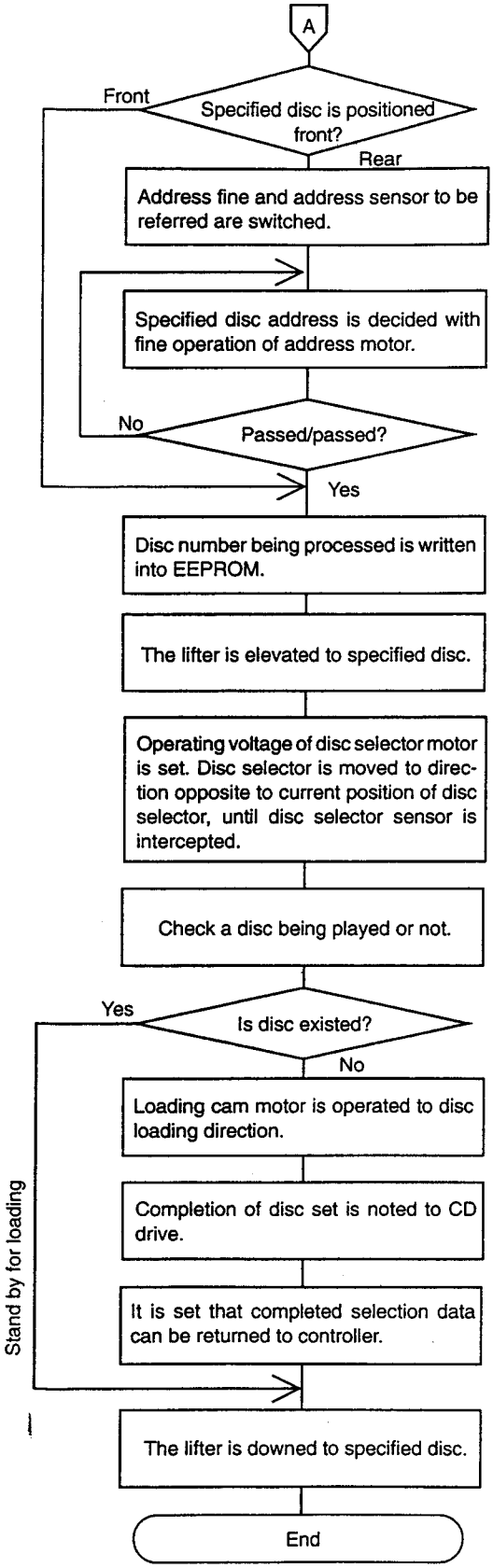
Disc being played: Operating voltage = duty 50%
No disc being played: Operating voltage = duty 100%

< to address setting. >

Operating : One is passed and the: To intercept direction
direction other Intercepted:
Intercepted/intercepted: Initial = to front direction
Next = to the direction of previous move

< to address setting. >

Address data is applicable.



< to changer microcomputer port list. >

Operating direction: One is passed and the other intercepted: To intercept direction.
Intercepted / intercepted: to the Direction of previous move
< to address setting. >

Address data is applicable.

Back up of disc number being processed when power is shut down.

Continue operated until lift up sensor data is received.
< to changer microcomputer port list. >

Disc being played: Operating voltage = duty 50%
No disc being played: Operating voltage = duty 100%

Specified disc number: 001~100 = moves to left
101-200 = moves to right

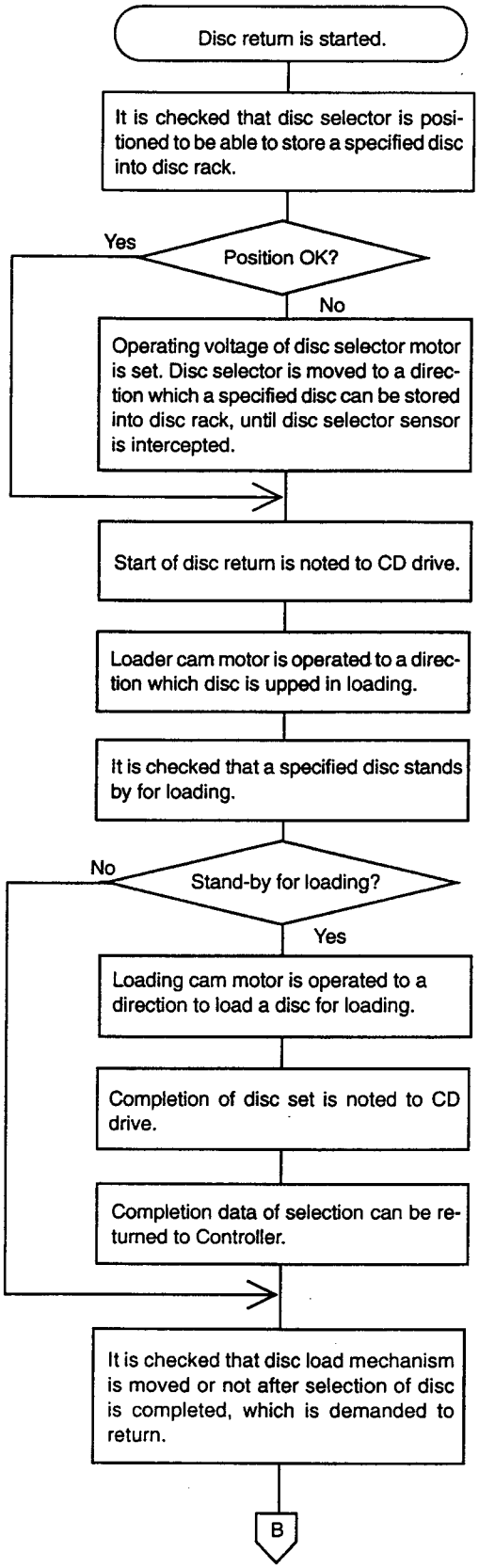
Specified disc number: 001~050 and 101~150 = moves to down front
051~100 and 151~200 = moves to down rear

At this time, Controller communicates with CD drive.

Continue operation until lift down sensor data is received.
< to changer microcomputer port list. >

6-4. Steps of disc return.

When disc of number m is demanded to return from Controller, the disk return demand task is started. This task makes the disc ejection routine start. The operation flow from the start of discreturn to the completion of disc storing to disc rack is shown below.



Specified disc number: 001~100 = Positioned left?
Specified disc number: 101~200 = Positioned right?

Disc being played: Operating voltage = duty 50%
No disc being played: Operating voltage = duty 100%

Specified disc number: 001~100 = moves to left
101~200 = moves to right

At this time, Controller can not communicate with CD drive.

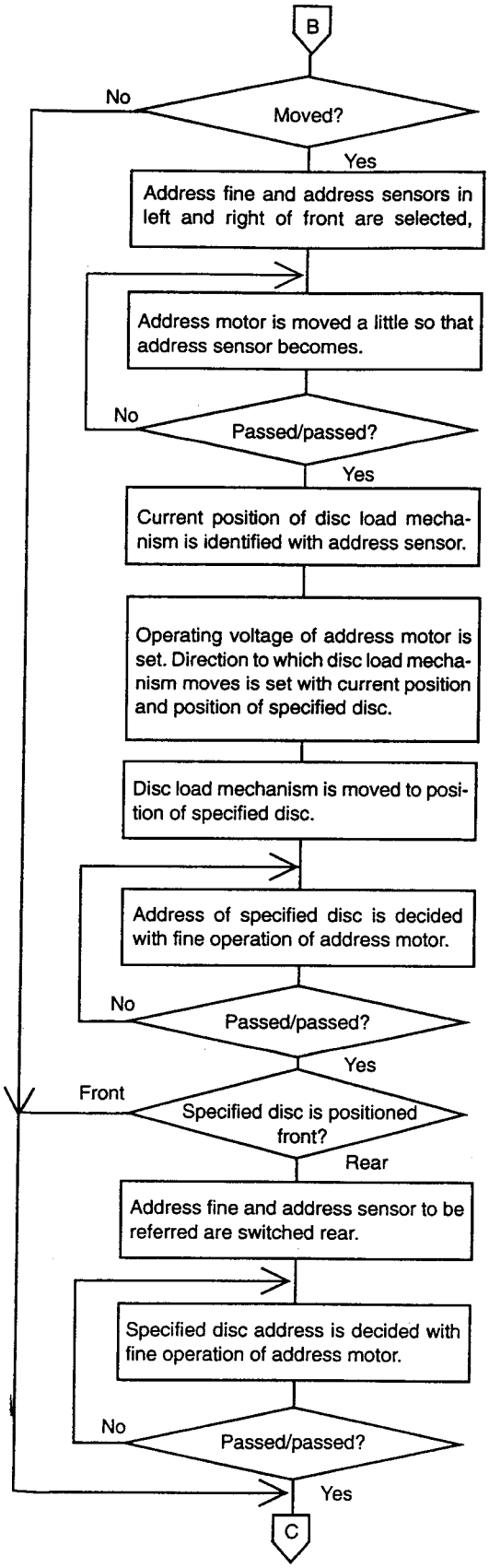
Specified disc number: 001~050 and 101~150 = moves to down rear
051~100 and 151~200 = moves to down front

It occurs when discs are taken by two.

Specified disc number: 001~050 and 101~150 = moves to down front
051~100 and 151~200 = moves to down rear

At this time, Controller can communicate with CD drive.

Also, includes the shock and vibration are applied externally.



Specified disc number: 001~100 = Select right front
101~200 = Selects left front
< to changer microcomputer port list. >

Operating direction: One is passed and the other is intercepted: To intercept direction
Intercepted/intercepted: To the direction of previous move
< to address setting. >
Address data is applicable.

6-bit address sensor is read.

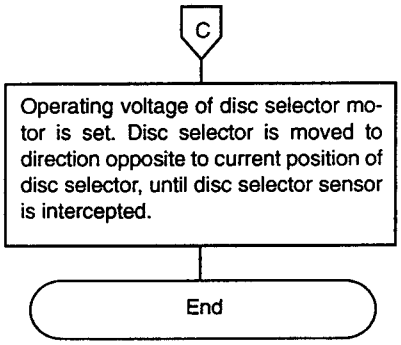
Disc being played: Operating voltage = duty 50%
No disc being played: Operating voltage = duty 100%

< to address setting. >

Operating direction: One is passed and the other is intercepted: To intercept direction
Intercepted/ lintercepted: To direction of previous move
< to address setting. >
Address data is applicable.

< to changer microcomputer port list. >

Operating direction: One is passed and : other is intercepted: To intercept direction
Intercepted/ : lintercepted: To direction of previous move
< to address setting. >
Address data is applicable.



Disc being played:	Operating voltage = duty 50%
No disc being played:	Operating voltage = duty 100%
Specified disc number:	001~100 = moves to left
	101~200 = moves to right

7. TROUBLESHOOTING

7-1. Error of changer block

If a significant error occurs on loading a disc in DN-1200F, whole of the disc load mechanism are stopped forcibly, and displayed with LED (red) of DN-1200F.

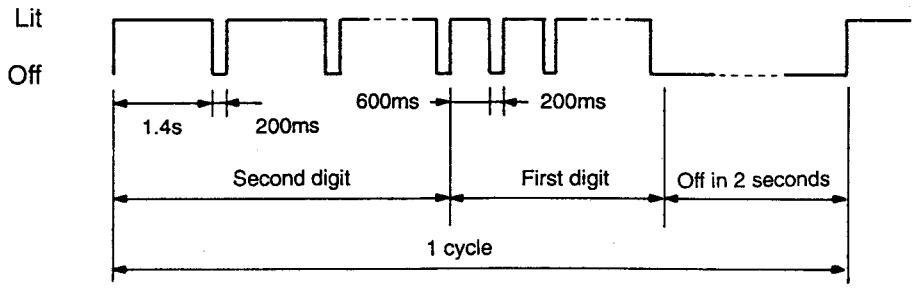
If an error occurs in normal mode or in heat-run mode, a motor stopped forcibly can not be operated until it is reset with power on or a reset command is applied.

Error code list, which the changer does not function, is shown in Table 7-1.

7-2-1. Displaying in DN-1200F

If an error to stop a function of DN-1200F, a content of error is represented with a number of flickering of LED (red: LD201) on the changer control P.W. board. (Refer to Table 7-1.)

LED in each error flickers in the following time.



(Example) Right disc selector sensor error (< 24-04>, LED flickering: 14 times)

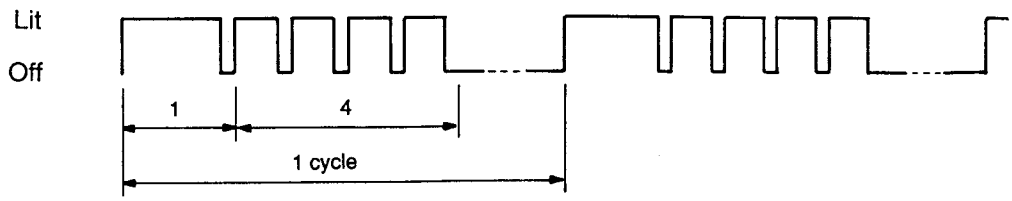


Table 7-1 ERROR CODE LIST (1/2)

Error code 2		Error code 3		Number of LED flicker
Code	Contents	Code	Contents	
20	An error occurs in the changer microcomputer.	01	An error in a built-in RAM of the changer microcomputer.	20
		02	Writing or reading error occurs when accessing EEPROM. Or, a number of writing to EEPROM exceeded.	21
21	An error occurs in the front limit switch or the right disc selector sensor at last processing of reset button.	01	The front limit switch does not operate. Front limit switch is detected at address set processing.	26
		02	The right disc selector sensor does not operate.	28
22	An absolute address corresponds to specified disc is not found.	00~3F	The rightfront fine sensor is in passed/passed, but the 6-bit address is unable to find.	01
		40~7F	The rightfront or right rear fine sensor is in passed/passed, but the appropriate 6-bit or 2-bit address is unable to find.	02
		80~BF	The leftfront fine sensor is in passed/passed, but the appropriate 6-bit address is unable to find.	03
		C0~FF	The leftfront or leftrear fine sensor is in passed/passed, but the appropriate 6-bit or 2-bit address is unable to find.	04
23	An error in the sensor system for absolute address fine.	04~07 44~47 84~87 C4~C7	Make it stopped as the address fine sensor is in passed/passed, but an overshoot occurs. Decreasing the voltage and re-fine adjusted however makes no control.	05 06 07 08
		08~0B 48~4B 88~8B C8~CB	When starting to move from the current position to the aiming position, it can not be moved within three seconds from the current position to the next address. Therefore, it is adjusted finely by changing the voltage every 0.5 seconds, but it could not be controlled. (A direction to operate is changed and it is performed for all the operating voltages in the table.)	05 06 07 08
		10~13 50~53 90~93 D0~D3	An overshoot occurs more than two addresses at address setting. Re-setting is executed, but it could not be set within ten seconds.	05 06 07 08
		20~23 60~63 A0~A3 E0~E3	The voltage is changed and adjusted finely every 0.5 seconds when software servo of disc loading is performed with the disc selector, but it could not be controlled.	05 06 07 08

Table 7-1 ERROR CODE LIST (2/2)

Error code 2		Error code 3		Number of LED flicker
Code	Contents	Code	Contents	
24	An error in each limit switch system (includes an error of each motor)	01	A changing point of the right lift-up limit switch is not detected.	10
		81	A changing point of the left lift-up limit switch is not detected.	11
		02	A changing point of the right lift-down limit switch is not detected.	12
		42	A changing point of the left lift-down limit switch is not detected.	13
		04	A changing point of the right disc selector limit switch is not detected.	14
		08	A changing point of the left disc selector limit switch is not detected.	
		0C	The changing points of the left and right disc selector limit switches are not detected.	
		10	A changing point of the front loader cam limit switch is not detected.	16
		20	A changing point of the rear loader cam limit switch is not detected.	
		30	The changing points of the front and rear loader cam limit switches are not detected.	
30	An error of $\overline{\text{MVOP}}$ or $\overline{\text{MVCL}}$ of the CD drive occurs.	01	Ejection completion signal does not return from the CD drive.	22
		02	$\overline{\text{MVOP}}$ is not low to the ejection signal.	23
		03	$\overline{\text{MVOP}}$ is not high to the ejection signal.	24
		04	$\overline{\text{MVCL}}$ is not low to the ejection signal.	25

7-2-3. Operating the motor in an error of DN-1200F

If an error of DN-1200F occurs in the normal mode or test mode and the motors are stopped forcibly, each motor can be operated separately with DIP switch of S203, S201 and S202.
This motor operation mode is applicable even when it is in a mode shown in Table 7-2, and is reset by turning the power on or the reset command is issued.
The motor independent-operation mode list is shown in Table 7-2.

Table 7-2 MOTOR OPERATION MODE LIST

S203				Mode	S202	S201	Function
1	2	3	4				
ON	ON	OFF	OFF	Address motor operating mode			When S201 or S02 is on, the address motor operates in the specified direction with the voltage reading of duty 50%.
					OFF	ON	The motor operates front. When the motor intercepts the front limit switch, it stops automatically.
					ON	OFF	The motor operates rear.
OFF	OFF	ON	OFF	Disc selector motor operating mode			When S201 or S202 is on, the disc selector motor operates in the specified direction with the voltage reading of duty 50%. When the motor intercepts the left and right limit switches, it operates in approximately 0.4 seconds, in the specified direction with the voltage reading of duty 25% and stops automatically.
					OFF	ON	The motor operates left.
					ON	OFF	The motor operates right.
ON	OFF	ON	OFF	Loader cam motor operating mode			When S201 or S202 is on, the loader cam motor operates in the specified direction with the maximum voltage reading.
					OFF	ON	The motor operates to down the loader of front.
					ON	OFF	The motor operates to down the loader of rear.
OFF	ON	ON	OFF	Right lifter motor operating mode			When S201 or S202 is on, the right lifter motor operates in the specified direction with the maximum voltage reading.
					OFF	ON	The motor operates to up and down the lifter of rightfront.
					ON	OFF	The motor operates to up and down the lifter of rightrear.
ON	ON	ON	OFF	Left lifter motor operating mode			When S201 or S202 is on, the left lifter motor operates in the specified direction with the maximum voltage reading.
					OFF	ON	The motor operates to up and down the lifter of leftfront.
					ON	OFF	The motor operates to up and down the lifter of leftrear.

7-3. General management for error

With the contents of error in DN-1200F, when the front door is opened or the disc rack is put in or out carelessly, it may be impossible to reenact the error mode, it may break discs or damage the mechanism of DN-1200F.
General management for error is shown below.

① Open the top cover of DN-1200F.
Check that LED is flickering.
② Open the front door.
③ Remove the left and right sides panels if necessary.
④ Perform the operations according to the error code.

Item – 2001

Error code	20 – – 01	Number of LED flicker	20	Contents	An error of the built-in RAM of the changer microcomputer.

	Check points	Check items	Checks	Remarks
1	Power voltage reading of microcomputer (IC217)	+5V		
2	Microcomputer reset circuit (IC216)	Width of reset pulse		Only when power on
3	Oscillator and its peripheral circuit (X201)	9.8304MHz		
4	Microcomputer program		Performed by changing the microcomputer.	

Item – 2101

Error code	21 – – 01	Number of LED flicker	26	Contents	The front limit switch does not operate at the last operation of reset button.

	Check points	Check items	Checks	Remarks
1	Circuit from the front limit switch to Pin 50 of the microcomputer.	An abnormality in the electronic device, cable, connection or limit/switch.	Check orderly a signal level from Pin 50 by making pass/intercept state of front limit switch manually.	
2	Address motor	An abnormality in the front and rear movement mechanism of address motor.	Operate only the address motor in the address motor operating mode with S203.	Refer to Table 7-2.
3	* When the address motor does not operate in spite of no error occurs in the mechanism. Circuit from the address motor to Pins 5 and 7 of the microcomputer.	An abnormality in the address motor, electronic device, or cable connection.	Check orderly the signal change and level from Pins 5 and 7 of the microcomputer to the address motor.	Refer to Changer microcomputer port list.

Item – 2102

Error code	21 – – 02	Number of LED flicker	28	Contents	The right disc selector sensor does not operate at the last operation of reset button.

	Check points	Check items	Checks	Remarks
1	Circuit from the right disc selector sensor to Pin 47 of the microcomputer.	An abnormality in the electronic device, cable connection or limit switch.	Check orderly a signal level from Pin 46 by making pass/intercept state of right disc selector sensor.	
2	Disc selector motor	An abnormality in the left and right movement mechanism of disc selector motor.	Operate only the disc selector motor in the disc selector motor operating mode with S203.	Refer to Table 7-2.
3	* When the disc selector motor does not operate in spite of that no error occurs in the mechanism. Circuit from the disc selector motor to Pins 6, 7, 18 and 23 of the microcomputer.	An abnormality in the disc selector motor, electronic device, or cable connection.	Check orderly the signal change and level from Pins 6, 7, 18 and 23 of the microcomputer to the disc selector motor.	Refer to Changer block's microcomputer port list.

Item – 2200 – 3F

Error code	21 – – 02 – 3F	Number of LED flicker	01	Contents	The rightfront fine sensor is passed/passed, but the absolute address to the specified disc number is not retrieved.

Preparations for check ① Check that the rightfront lifter is not lifted up. ② When it is lifted up, set S203 to "Right lifter motor operating mode" and descend the lifter.	Refer to Table 7-2

	Check points	Check items	Checks	Remarks
1	Right disc rack.	Disc rack installation. (Is frontlower part of disc rack engaged in rail?)	Check with the eye.	
2	Address motor.	Abnormality in front rear movement mechanism of address motor.	Operate only the address motor in the address motor operating mode with S203.	Refer to Table 7-2
3	* When the address motor does not operate in spite of no error occuring in the mechanism. Circuit from the address motor to pins 5 and 17 of the microcomputer.	An abnormality in the address motor, electronic device, or cable connection.	Check orderly the signal change and level from Pins 5 and 17 of the microcomputer to the address motor.	Refer to Changer microcomputer port list
4	Right disc rack address section.	Crack, bend, etc. of the address section of disc rack.	Remove the disc rack and see to check according to note of [Managing the disc rack] of the disc rack unit with the eye.	Refer to disc rack unit's note
5	Address sensor select circuit.	Relations between the selection position with the output from Pins 55 and 56 of the microcomputer, and the appropriate disc number.	Check the disc type selected currently with the output from Pins 55 and 56, and compare with the appropriate disc number. Both data must represent the type of rightfront.	Refer to changer microcomputer port list
6	Circuit from the right/front 6-bit address sensor and the rightfront 2-bit fine sensor to Pins 33 through 40 of microcomputer.	An abnormality in the address sensor, electronic device or cable connection.	Check orderly a signal level from the appropriate pin (Pius 33 ~ 40) by making pass/intercept state of the rightfront address fine and address sensors manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to Address sensor checking jig operation manual changer and microcomputer port list

Item – 2240 ~ 7F

Error code	22 – – 40 ~ 3F	Number of LED flicker	02	Contents	The rightfront or rightrear fine sensor is passed/passed, but the absolute address to the specified disc number is not retrieved.

Preparations for check
① Check that the rightrear lifter is not lifted up.
② When it is lifted up, set S203 to "Right lifter motor operating mode" and descend the lifter.

Refer to Table 7-2

Check points		Check items	Checks	Remarks
1–4	Same as [Item-2200 ~ 3F]	Same as [Item-2200-3F]	Same as [Item-2200 ~ 3F]	
5	Address sensor select circuit.	Relations between the selection position with the output from Pins 55 and 56 of the microcomputer, and the appropriate disc number.	Check the disc type selected currently with the output from Pins 55 and 56, and compare with the appropriate disc number. Both of then must be in the type of rightfront.	Refer to Changer microcomputer port list.
6	*When the rightfront side is sel. ected in the above item 5: Proceed to item 6 of [Item-2200-3F].			Refer to [Item-2200-3F]
7	Circuit from the rightrear 2-bit address sensor and the rightrear 2-bit fine sensor to Pins 33, 34, 41 and 42 of microcomputer.	An abnormality in the address related sensor, electronic device or cable connection	Check orderly a signal level from the pin (Pins 33, 34, 41 and 42) by making pass/intercept of the right/rear address fine and address sensors manually.	Refer to Address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 2280 ~ BF

Error code	22 – – 80 ~ BF	Number of LED flicker	03	Contents	The leftfront fine sensor is passed/passed, but the absolute address to the specified disc number is not retrieved.

Preparations for check ① Check that the left/front lifter is not lifted up. ② When it is lifted up, set S203 to "Left lifter motor operating mode" and descend the lifter.	Refer to Table 7-2

	Check points	Check items	Checks	Remarks
1	Left disc rack	Disc rack installation. (Is frontlower part of disc rack engaged in rail?)	Check with the eye.	
2	Address motor	An abnormality in the frontrear operating mechanism of the address motor.	Operate only the address motor in the address motor operating mode with S203.	Refer to Table 7-2
3	* When the address motor does not operate in spite of no error occuring in the mechanism; Circuit from the address motor to Pins 5 and 17 of the microcomputer.	An abnormality in of the address motor, electronic device, or cable connection.	Check orderly the signal change and level from Pins 5 and 17 of the microcomputer to the address motor.	Refer to changer microcomputer port list
4	Left disc rack address section	Crack or bend of the address section of disc rack.	Remove the disc rack and check according to note of [Managing the disc rack] of the disc rack unit with the eye.	Refer to disc rack unit's note
5	Address sensor select circuit	Relations between the selection position with the output from Pins 55 and 56 of the microcomputer, and the appropriate disc number.	Check the disc type selected currently with the output from Pins 55 and 56, and compare with the appropriate disc number. Both data must represent the type of leftfront.	Refer to changer microcomputer port list
6	Circuit from the leftfront 6-bit address sensor and the leftfront 2-bit fine sensor to Pins 33 through 40 of microcomputer.	An abnormality in the address sensor, electronic device or cable connection.	Check orderly a signal level from the pin (Pin 33 - 40) by making pass/intercept state of the left front address fine and address sensors manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to Address sensor checker's operation manual and to changer microcomputer port list

Item – 22C0 ~ FF

Error code	21 – – C0 ~ FF	Number of LED flicker	04	Contents	The leftfront or leftrear fine sensor is passed/passed, but the absolute address to the specified disc number is not retrieved.

Preparations for check	Refer to Table 7-2.
① Check that the rightrear lifter is not lifted up. ② When it is lifted up, set S203 to "Left lifter motor operating mode" and descend the lifter.	

	Check points	Check items	Checks	Remarks
1 ~ 4	Same as [Item-2280 ~ BF]	Same as [Item-2280 ~ BF]	Same as [Item-2280 ~ BF]	
5	Address sensor select circuit	Relations between the selection position with the output from Pins 55 and 56 of the microcomputer, and the appropriate disc number.	Check the disc type selected currently with the output from pins 55 and 56, and compare with the appropriate disc number. Both of then must be in the type of leftrear.	Refer to Changer microcomputer port list.
6	* When the leftfront side is selected in the above item 5; Proceed to item 6 of [Item-2280-BF].			Refer to [Item-2280-BF].
7	Circuit from the leftrear 2-bit address sensor and the leftrear 2-bit fine sensor to Pins 33, 34, 41 and 42 of microcomputer.	An abnormality in the address sensor, electronic device or cable connection.	Check orderly a signal level from the pin (Pins 33, 34, 41 and 42) by making pass/intercept state of the leftrear address fine and address sensors manually. Check with the address sensor checker and the terminal of microcomputer.	Refer to Address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 2304 ~ 07
2344 ~ 47
2384 ~ 87
23C4 ~ C7

Error code	21 – – 04 ~ 07 44 ~ 47 84 ~ 87 C4 ~ C7	Number of LED flicker	05 06 07 08	Contents	Make it stopped as the address fine sensor is passed/passed, but an overshoot occurs. Voltage is decreased and fine adjustment is performed again, but it could not be controlled by retrying five times. 04-07 : When selecting rightfront / 44 ~ 47 : When selecting rightrear 84-87 : When selecting leftfront / C4 ~ C7 : When selecting leftrear

Preparations for check	Refer to Table 7-2.
① Check that the lifter positioned to disc number being processed is not lifted up. ② When it is lifted up, set S203 to "Left lifter motor operating mode" or "Right lifter motor operating mode" and descend the lifter.	

	Check points	Check items	Checks	Remarks
1	Address motor	Variation of load to the address motor when operating the address motor front and rear. An abnormality in mechanism.	Operate only the address motor in the address motor operating mode with S203.	Refer to Table 7-2.
2	* When no error occurs in the mechanism: Circuit from the address motor to Pins 5 and 17 of the microcomputer	An abnormality in the address motor, electronic device, or cable connection.	Check orderly the signal change and level from Pins 5 and 7 of the microcomputer to the address motor.	Refer to Changer microcomputer port list.
3	Left and right disc rack address section	Crack or bend of the address section of disc rack.	Remove the disc rack and check according to note of [Managing the disc rack] of the disc rack unit with the eye.	Refer to Disc rack unit's note.

Item – 2308 ~ 0B

Error code	23 – – 08 ~ 0B	Number of LED flicker	05	Contents	It occurs when checking the rightfront address fine sensor: When starting to move from the current position to the specified position, it can not be moved within three seconds from the current position to the next address. Therefore, the address fine adjustment is performed by changing all the voltages in operating table every 0.5 seconds, and changing the operating direction, but it could not be controlled.

Preparations for check ① Check that the rightfront lifter is not lifted up. ② When it is lifted up, set S203 to "Right lifter motor operating mode" and lift down the appropriate lifter.	Refer to Table 7-2.

Check points		Check items	Checks	Remarks
1 ~ 5	Same as [Item-2200 ~ 3F]	Same as [Item-2200 ~ 3F]	Same as [Item-2200 ~ 3F]	
6	Circuit from the rightfront 2-bit fine sensor to Pins 33 and 34 of microcomputer.	An error of the address fine sensor, electronic device or cable connection.	Check orderly a signal level from the pin (Pin 33 and 34) the rightfront address fine sensors manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 2348 ~ 4B

Error code	23 – – 48 ~ 4B	Number of LED flicker	06	Contents	It occurs when checking the rightfront or rightrear address fine sensor: When starting to move from the current position to the specified position, it can not be moved within three seconds from the current position to the next address. Therefore, the address fine adjustment is performed by changing all the voltages in operating direction, but it could not br controlled.

Preparations for check ① Check that the rightrear lifter is not lifted up. ② When it is lifted up, set S203 to "Right lifter motor operating mode" and descend the lifter.	Refer to Table 7-2

Check points		Check items	Checks	Remarks
1 ~ 4	Same as [Item-2200 ~ 3F]	Same as [Item-2200 ~ 3F]	Same as [Item-2200 ~ 3F]	
5	Address sensor select circuit	Relations between the selection position with the output from Pins 55 and 56 of the microcomputer, and the disc number.	Check the disc type selected currently with the output from Pins 55 and 56, and compare with the appropriate disc number. Both of them must be in the type of leftfront.	Refer to changer microcomputer port list.
6	* When the leftfront side is selected in the above item 5; Proceed to item 6 of [Item-2208-0B].			Refer to [Item-2308-0B].
7	Circuit from the rightrear 2-bit fine sensor to Pins 33 and 34 of microcomputer.	An abnormality in the address fine sensor, electronic device or cable connection.	Check orderly a signal level from the pin (Pin 33 and 34) by making pass/intercept the rightrear address fine sensors manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 2388 ~ 8B

Error code	23 – – 88 ~ 8B	Number of LED flicker	07	Contents	It occurs when checking the leftfront address fine sensor: When starting to move from the current position to the specified position, it can not be moved within three seconds from the current position to the next address. Therefore, the address fine adjustment is performed by changing all the voltages in operating direction, but it could not be controlled.

Preparations for check ① Check that the left/front lifter is not lifted up. ② When it is lifted up, set S203 to "Left lifter motor operating mode" and descend the lifter.	Refer to Table 7-2

Check points		Check items	Checks	Remarks
1 ~ 5	Same as [Item-2280 ~ BF]	Same as [Item-2280 ~ BF]	Same as [Item-2280 ~ BF]	
6	Circuit from the leftfront 2-bit fine sensor to Pins 33 and 34 of microcomputer.	An abnormality in the address fine sensor, electronic device or cable connection.	Check orderly a signal level from the pin (Pin 33 and 34) by making pass/intercept state of the left/front address fine sensors. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to Address sensor checker's operation manual Refer to changer microcomputer port list.

Item – 23C8 ~ CB

Error code	23 – – C8 ~ CB	Number of LED flicker	08	Contents	It occurs when checking the leftfront or leftrear address fine sensor: When starting to move from the current position to the specified position, it can not be moved within three seconds from the current position to the next address. Therefore, the address fine adjustment is performed by changing all the voltages in operating table every 0.5 seconds, and changing the operating direction, but it could not be controlled.

Preparations for check ① Check that the rightfront lifter is not lifted up. ② When it is lifted up, set S203 to "Left lifter motor operating mode" and descend the lifter.	Refer to Table 7-2.

Check points		Check items	Checks	Remarks
1 ~ 4	Same as [Item-2280 ~ BF]	Same as [Item-228022 ~ BF]	Same as [Item-2280 ~ 22BF]	
5	Address sensor select circuit	Relations between the selection position with the output from Pins 55 and 56 of the microcomputer, and the appropriate disc number.	Check the disc type selected currently with the output from Pins 55 and 56, and compare with the appropriate disc number. Both of them must be in the type of leftfront.	Refer to changer microcomputer port list.
6	* When the leftfront side is selected in the above item 5: Proceed to item 6 of [Item-2388-8B].			Refer to [Item-2388 ~ 8B].
7	Circuit from the leftfrear 2-bit fine sensor to Pins 33 and 34 of microcomputer.	An abnormality the address fine sensor, electronic device or cable connection.	Check orderly a signal level from the pin (Pins 33 and 34) by making pass/intercept state of the left rear address fine sensors manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 2310 ~ 13

Error code	23 – – 10 ~ 13	Number of LED flicker	05	Contents	An overshoot occurs in more than two addresses when setting the rightfront address. Re-setting is executed, but it could not be set within ten seconds.

Check points		Check items	Checks	Remarks
1 ~ 6	Same as [Item-2308 ~ 0B]	Same as [Item-2308 ~ 0B]	Same as [Item-2308 ~ 0B]	

Item – 2350 ~ 53

Error code	23 – – 50 ~ 53	Number of LED flicker	06	Contents	An overshoot occurs in more than two addresses when setting the rightrear address. Re-setting is executed, but it could not be set within ten seconds.

Check points		Check items	Checks	Remarks
1 ~ 7	Same as [Item-2348 ~ 4B]	Same as [Item-2348 ~ 4B]	Same as [Item-2348 ~ 4B]	

Item – 2390 ~ 93

Error code	23 – – 90 ~ 93	Number of LED flicker	07	Contents	An overshoot occurs in more than two addresses when setting the leftfront address. Re-setting is executed, but it could not be set within ten seconds.

Check points		Check items	Checks	Remarks
1 ~ 6	Same as [Item-2388 ~ 8B]	Same as [Item-2388 ~ 8B]	Same as [Item-2388 ~ 8B]	

Item – 23D0 ~ D3

Error code	23 – – D0 ~ D3	Number of LED flicker	08	Contents	An overshoot occurs in more than two addresses when setting the leftrear address. Re-setting is executed, but it could not be set within ten seconds.

Check points		Check items	Checks	Remarks
1 ~ 7	Same as [Item-23C8 ~ CB]	Same as [Item-23C8 ~ CB]	Same as [Item-23C8 ~ CB]	

Item – 2320 ~ 23

Error code	23 – – 08 ~ 23	Number of LED flicker	05	Contents	The address fine sensor can not be passed/passed in the software servo when loading the rightfront disc with the disc selector to the disc load mechanism or to the prescribed disc rack.

Preparations for check ① Check that the rightfront lifter is not lifted up. ② When it is lifted up, set S203 to "Right lifter motor operating mode", and descend it. ③ Set S203 to "Disc selector motor operating mode" and move the disc selector in the direction to be moved before stop, until the disc selector sensor is intercepted. <84> error: Direction which the disc is taken into the disc load mechanism (left). <86> error: Direction which the disc is stored into the disc rack (right). ④ If the disc selector does not operate in the direction of ③, change the direction to the contrary and move until the disc selector sensor is intercepted. ⑤ If the disc selector does not operate in the direction of ④, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guide, etc. Disassemble the mechanism and take out the disc in order not to damage it.			Table 7-2 Refer to changer microcomputer port list. Refer to disassembling the mechanism.

Check points		Check items	Checks	Remarks
	Proceed to [Item-2308-0B].			Refer to [Item-2308-0B]

Item – 2360 ~ 63

Error code	23 – – 60 ~ 63	Number of LED flicker	06	Contents	The address fine sensor can not be passed/passed in the software servo when loading the rightfront disc with the disc selector to the disc load mechanism or to the prescribed disc rack.

Preparations for check ① Check that the rightfront lifter is not lifted up. ② When it is lifted up, set S203 to "Right lifter motor operating mode", and descend it. ③ Set S203 to "Disc selector motor operating mode" and move the disc selector in the direction to be moved before stop, until the disc selector sensor is intercepted. <84> error: Direction which the disc is taken into the disc load mechanism (left). <86> error: Direction which the disc is stored into the disc rack (right). ④ If the disc selector does not operate in the direction of ③, change the direction to the contrary and move until the disc selector sensor is intercepted. ⑤ If the disc selector does not operate in the direction of ④, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guide, etc. Disassemble the mechanism and take out the disc in order not to damage it.			Table 7-2 Refer to changer microcomputer port list Refer to disassembling the mechanism

Check points		Check items	Checks	Remarks
1 ~ 5	Same as [Item-2348 ~ 4B].	Same as [Item-2348 ~ 4B].	Same as [Item-2348 ~ 4B].	
6	Circuit from the rightrear 2-bit fine sensor to pins 33 and 34 of microcomputer.	An abnormality in the address fine sensor, electronic device or cable connection.	Check orderly a signal level from the pin (33 and 34) by making pass/intercept state of the right rear address fine sensor manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 23A0 ~ A3

Error code	23 – – A0 ~ A3	Number of LED flicker	07	Contents	The address fine sensor can not be passed/passed in the software servo when loading the rightfront disc with the disc selector to the disc load mechanism or to the prescribed disc rack.

Preparations for check	
① Check that the leftfront lifter is not lifted up. ② When it is lifted up, set S203 to "Leftt lifter motor operating mode", and descend it. ③ Set S203 to "Disc selector motor operating mode" and move the disc selector in the direction to be moved before stop, until the disc selector sensor is intercepted. <84> error: Direction which the disc is taken into the disc load mechanism (right). <86> error: Direction which the disc is stored into the disc rack (left). ④ If the disc selector does not operate in the direction of ③, change the direction to the contrary and move until the disc selector sensor is intercepted. ⑤ If the disc selector does not operate in the direction of ④, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guid, etc. Disassemble the mechanism and take out the disc and not to damage it.	Table 7-2 Refer to changer microcomputer port list. Refer to disassembling the mechanism.

Check points		Check items	Checks	Remarks
	Proceed to [Item-2388 ~ 8B].			Refer to [Item-2388 ~ 8B]

Item – 23E0 ~ E3

Error code	23 – – E0 ~ E3	Number of LED flicker	08	Contents	The address fine sensor can not be passed/passed in the software servo when loading the rightfront disc with the disc selector to the disc load mechanism or to the prescribed disc rack.

Preparations for check	
① Check that the leftfront lifter is not lifted up. ② When it is lifted up, set S203 to "Leftt lifter motor operating mode", and descend it. ③ Set S203 to "Disc selector motor operating mode" and move the disc selector in the direction to be moved before stop, until the disc selector sensor is intercepted. <84> error: Direction which the disc is taken into the disc load mechanism (right). <86> error: Direction which the disc is stored into the disc rack (left). ④ If the disc selector does not operate in the direction of ③, change the direction to the contrary and move until the disc selector sensor is intercepted. ⑤ If the disc selector does not operate in the direction of ④, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guid, etc. Disassemble the mechanism and take out the disc and not to damage it.	Table 7-2 Refer to changer microcomputer port list. Refer to disassembling the mechanism.

Check points		Check items	Checks	Remarks
1 ~ 5	Same as [Item-23C8 ~ CB].	Same as [Item-23C8 ~ CB].	Same as [Item-23C8 ~ CB].	
6	Circuit from the rightrear 2-bit fine sensor to pins 33 and 34 of microcomputer.	An abnormality in the address fine sensor, electronic device or cable connection.	Check orderly a signal level from the pin (33 and 34) by making pass/intercept state of the right rear address fine sensor manually. Check with the address sensor checking jig and at the terminal of microcomputer.	Refer to address sensor checking jig operation manual. Refer to changer microcomputer port list.

Item – 2401

Error code	24 – – 01	Number of LED flicker	10	Contents	It is attempted to lift up the discs of number 001 up to 100, but the change point of the right lift-up limit switch is not detected.

	Check points	Check items	Checks	Remarks
1	Address of stop position	Address of disc being processed coincides address of stop position.	■ Check the output of Pin55 and 56 to confirm the disc type being selected. ■ Attach the address checking jig, and check that the appropriate address fine sensor of the disc type is in passed/passed. Perform the check with pins 33 and 34 of the microcomputer, too. ※ If it is not passed/passed, proceed to [Item-2348 ~ 4B] after the check for this error code. ■ Check the address of the jig and pins 35-40 (rightfront) of the microcomputer, or of Pins 41 and 42 (rightrear), and compare them with the address list. ※ If it does not coincide, proceed to [Item-2240 ~ 7F] after the check of this error code.	Refer to changer microcomputer list. Refer to address sensor checking jig operation manual. Refer to [Item-2348 ~ 4B]. Refer to absolute address list [Item-2340 ~ 7F].
2	Right lift motor	Lift-up/down operation of right lifter. Contact of mechanism and lifter.	■ Operate only the right lifter motor in the right lift motor operating mode with S203, and check the lift-up/down operation. ※ If it stops on the way of liftup and the lift motor can not operate, disassemble the mechanism, remove the disc rack, and proceed to the next check.	Refer to Table 7-2 Refer to disassembling the mechanism
3	※ When no error occurs in the mechanism and the right lift motor does not operate: Circuit from the right lift motor to Pins 19 to 22 of the microcomputer.	An abnormality in the right lift motor, electronic device or cable connection.	Check orderly the signal change and level from Pins 19 to 22 of the microcomputer.	Refer to changer microcomputer port list
4	* When no error occurs in the up/down operation of the right lifter: circuit from the right lift-up sensor to Pin 48 of the microcomputer Left/right select circuit from Pin 55 of the microcomputer.	An abnormality in the right lift-up sensor, electronic device or cable connection.	Disassemble the lifter sensor mechanism. Check orderly the signal level from Pin 48 of the microcomputer by making pass/intercept state of the right liftup sensor manually. Check that the right is selected with the output of Pin 55 of the microcomputer.	Refer to disassembling the mechanism Refer to changer microcomputer port list

Item – 2402

Error code	24 – – 02	Number of LED flicker	12	Contents	It is attempted to descend the discs of number 001 up to 100, but the change point of the right lift-down limit switch is not detected.

	Check points	Check items	Checks	Remarks
1	Begin from item 2 of [Item-2401].			

Item – 2481

Error code	24 – – 81	Number of LED flicker	11	Contents	It is attempted to lift up the discs of number 001 up to 200, but the change point of the right lift-up limit switch is not detected.

	Check points	Check items	Checks	Remarks
1	Address of stop position	Address of disc being processed coincides address of stop position.	■ Check the output of Pin55 and 56 to confirm the disc type being selected. ■ Attach the address checking jig, and check that the appropriate address fine sensor of the disc type is in passed/passed. Perform the check with pins 33 and 34 of the microcomputer, too. ※ If it is not passed/passed, proceed to [Item-23C8 ~ CB] after the check for this error code. ■ Check the address of the jig and pins 35-40 (leftfront) of the microcomputer, or of Pins 41 and 42 (leftrear), and compare them with the address list. ※ If it does not coincide, proceed to [Item-22C0 ~ FF] after the check of this error code.	Refer to changer microcomputer list. Refer to address sensor checking jig operation manual. Refer to [Item-23C8 ~ CB]. Refer to absolute address list [Item-23C0 ~ FF].
2	Left lift motor	Lift-up/down operation of left lifter. Contact of mechanism and lifter.	■ Operate only the left lifter motor in the left lift motor operating mode with S203, and check the lift-up/down operation. ※ If it stops on the way of liftup and the lift motor can not operate, disassemble the mechanism, remove the disc rack, and proceed to the next check.	Refer to Table 7-2 Refer to disassembling the mechanism
3	※ When no error occurs in the mechanism and the left lift motor does not operate: Circuit from the left lift motor to Pins 19 to 22 of the microcomputer.	An abnormality in the left lift motor, electronic device or cable connection	Check orderly the signal change and level from Pins 19 to 22 of the microcomputer.	Refer to changer microcomputer port list
4	* When no error occurs in the up/down operation of the left lifter: circuit from the right lift-up sensor to Pin 48 of the microcomputer. Left/right select circuit from Pin 55 of the microcomputer.	An abnormality in the left lift-up sensor, electronic device or cable connection.	Disassemble the lifter sensor mechanism. Check orderly the signal level from Pin 48 of the microcomputer by making pass/intercept state of the right liftup sensor manually. Check that the left is selected with the output of Pin 55 of the microcomputer.	Refer to disassembling the mechanism. Refer to changer microcomputer port list.

Item – 2442

Error code	24 – – 42	Number of LED flicker	13	Contents	It is attempted to descend the discs of number 001 up to 200, but the change point of the left lift-down limit switch is not detected.

	Check points	Check items	Checks	Remarks
1	Begin item 2 of [Item-2401].			

Item – 2404

Error code	24 – – 04	Number of LED flicker	14	Contents	The disc selector is moved right, but the change point of the right disc selector sensor is not detected.

Preparations for check
① Check that the leftfront and leftrear lifters are not lifted up.
② When they are lifted up, set S203 to "Left lifter motor operating mode" and descend the lifter.
Note: When removing the disc rack, move the disc selector so that one of the disc selector sensor is passed and other is intercepted.

Refer to Table 7-2.

	Check points	Check items	Checks	Remarks
1	State of disc selected.	State of disc selected. Taking by two discs. Decline of disc. Decline of disc rack. Disc rack catches the mechanism.	Check with the eye.	
2	* When the right disc selector sensor is intercepted: Circuit from the right disc selector sensor to Pin 46 of the microcomputer.	An abnormality in the electronic device, cable connection or limit switch.	Check orderly the signal level from pin 46 of the microcomputer by making pass/intercept state of the right disc selector sensor manually.	Refer changer microcomputer port list.
3	Disc selector motor	Operation of disc selector motor.	Set S203 to "Disc selector motor operating mode" and move the disc selector motor in the direction (right) to intercept the right disc selector sensor, until the disc selector sensor is intercepted. ※ If the disc selector does not operate, change the direction to the contrary and move until the left disc selector sensor is intercepted. ※ If the disc selector does not operate further, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guide, etc., and an abnormality in the operating system circuit of the disc selector motor. Dissemble the mechanism and take out the disc and not to damage it.	Refer to Table 7-2 Refer to disassembling the mechanism.
4	※ When no error occurs in the mechanical block and the disc selector motor does not operate: Circuit from the disc selector motor to Pins 6, 7, 18 and 23 of the microcomputer.	An abnormality in the disc selector motor, electronic device or cable connection.	Check orderly the signal change and level from Pins 6, 7, 18 and 23 of the microcomputer to disc selector motor.	Refer to changer microcomputer port list.

Item – 2408

Error code	24 – – 08	Number of LED flicker	14	Contents	The disc selector is moved to left, but the change point of the left disc selector sensor is not detected.

Preparations for check ① Check that the rightfront and leftrear lifters are not lifted up. ② When they are lifted up, set S203 to "Right lifter motor operating mode" and descend the lifter. Note: When removing the disc rack, move the disc selector so that one of the disc selector sensor is passed and other is intercepted.				Refer to Table 7-2.
	Check points	Check items	Checks	Remarks
1	State of disc selected.	State of disc selected. Taking by two discs. Decline of disc. Decline of disc rack Disc rack catches the mechanism.	Check with the eye.	
2	* When the left disc selector sensor is intercepted: Circuit from the left disc selector sensor to Pin 46 of the microcomputer.	An abnormality in the electronic device, cable connection or limit switch	Check orderly the signal level from pin 46 of the microcomputer by making pass/intercept state of the left disc selector sensor manually.	Refer to changer microcomputer port list.
3	Disc selector motor	Operation of disc selector motor.	Set S203 to "Disc selector motor operating mode" and move the disc selector motor in the direction (left) to intercept the left disc selector sensor, until the disc selector sensor is intercepted. ※ If the disc selector does not operate, change the direction to the contrary and move until the right disc selector sensor is intercepted. ※ If the disc selector does not operate further, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guide, etc., and an abnormality in the operating system circuit of the disc selector motor. Dissemble the mechanism and take out the disc and not to damage it.	Refer to Table 7-2 Refer to disassembling the mechanism.
4	※ When no error occurs in the mechanical block and the disc selector motor does not operate: Circuit from the disc selector motor to Pins 6, 7, 18 and 23 of the microcomputer.	An abnormality in the disc selector motor, electronic device or cable connection.	Check orderly the signal change and level from Pins 6, 7, 18 and 23 of the microcomputer to disc selector motor.	Refer to changer microcomputer port list.

Item – 240C

Error code	24 – – 0C	Number of LED flicker	14	Contents	The disc selector is moved left or right, but the change point of the leftright disc selector sensors is not detected.

Preparations for check ① Check that the lifter, which the disc selector sensor is intercepted, is not lifted up. ② When it is lifted up, set S203 to "Right or left lifter motor operating mode" and descend the lifter. Note: When removing the disc rack, move the disc selector so that one of the disc selector sensor is passed and other is intercepted.				Refer to Table 7-2.
	Check points	Check items	Checks	Remarks
1	State of disc selected	State of disc selected Taking by two discs Decline of disc Decline of disc rack Disc rack catches the mechanism	Check with the eye.	
2	Disc selector motor	Operation of disc selector motor	Set S203 to "Disc selector motor operating mode" and move the disc selector motor in the direction to intercept the passed side disc selector sensor, until the disc selector sensor is intercepted. ※ If the disc selector does not operate, it is considered that an abnormality exists in the mechanism, as disc catches the disc selector guide,etc., and an abnormality in the operating system circuit of the disc selector motor. Disassemble the mechanical block and take out the disc and not to damage it.	Refer to Table 7-2. Refer to disassembling the mechanical block.
3	※ When no error occurs in the mechanical block and the disc selector motor does not operate: Circuit from the disc selector motor to Pins 6, 7, 18 and 23 of the microcomputer.	An abnormality in the disc selector motor, electronic device or cable connection.	Check orderly the signal change and level from Pins 6, 7, 18 and 23 of the microcomputer to disc selector motor.	Refer to changer block's microcomputer port list.

Item – 24102030

Error code	24 – – 10 – – 20 – – 30	Number of LED flicker	16	Contents	The change point of the front loader cam limit switch is not detected. The change point of the rear loader cam limit switch is not detected. The change point of the front/rear loader cam limit switch is not detected.

Preparations for check ① Check that the lifter, which the disc selector sensor is passed, is not lifted up. ② When it is lifted up, set S203 to "Right or left lifter motor operating mode" and descend the lifter.	Refer to Table 7-2.

	Check points	Check items	Checks	Remarks
1	State of disc being selected.	Disc protrudes from disc loader. Disc catches mechanism.	Check with the eye.	
2	Loader cam motor	Operation of loader cam motor.	Set S203 to "Loader cam motor operating mode" and operate the loader cam motor in the direction to operate before stop. <84> error: Direction to put down the specified disc. <86> error: Direction to put up the specified disc. ✳ If the loader cam motor does not operate, it is considered that an abnormality exists in the mechanism, as disc catches in the loader cam mechanism etc., and an abnormality in the operating system circuit of the loader cam motor. Take out the disc and not to damage it.	Refer to Table 7-2.
3	✳ When no error occurs in the mechanism and the loader cam motor does not operate: Circuit from the loader cam motor to Pins 19 to 22 of the microcomputer.	An abnormality in the loader cam motor, electronic device or cable connection.	Check orderly the signal change and level from Pins 19 to 22 of the microcomputer to the loader cam motor.	Refer to changer microcomputer port list.
4	(When the loader cam motor operates) Circuit from the front and rear loader cam sensors to Pins 43 and 44 of the microcomputer.	An abnormality in the loader cam motor, electronic device or cable connection.	Check orderly the signal level from Pin 43 and 44 of the microcomputer by making pass/intercept state of the front and rear loader can sensors manually.	Refer to changer microcomputer port list.

Item – 3001

Error code	30 – – 01	Number of LED flicker	22	Contents	Ejection complete signal does not return from the CD drive unit.

Check points		Check items	Checks	Remarks
1	Circuits from pin 9 of the microcomputer to CN34-5.	$\overline{\text{EJSW}}$ signal	Check a low EJSW signal output from the changer when the power is turned on or the disc return is performed, in the order from Pin 9 of the microcomputer to CN34-5. To do the above check, perform the disc selection and demanding disc return with DN-1200C. Otherwise, do the check by setting DN-1200F to heat run mode.	Refer to changer microcomputer port list. Refer to DN1200C operation manual. Refer to Item 4-2.
2	Circuits from pin 57 of the microcomputer to CN34-4.	DEJD signal	Check ejection complete signal DEJD from the CD drive unit, in the order from CN34-4 to Pin 57 of the microcomputer, during a low EJSW signal from the changer block changes to high when the power is turned on or the disc return is performed. To do the above check, perform the disc selection and demanding disc return with DN-1200C. Otherwise, do the check by setting DN-1200F to heat run mode.	Refer to changer microcomputer port list. Refer to DN-1200C operation manual Refer to Item 4-2.
3	Circuits in the CD drive unit.	$\overline{\text{EJSW}}$ and DEJD signals	See the troubleshooting for CD drive unit.	

Item – 3002, 03

Error code	30 – – 02 03	Number of LED flicker	23 24	Contents	$\overline{\text{MVOP}}$ signal from the CD drive unit is not low when the disc ejection demand signal (low) is output from the changer. $\overline{\text{MVOP}}$ signal from the CD drive unit is not high when the disc ejection demand signal (high) is output from the changer.

Check points		Check items	Checks	Remarks
1	Circuits from Pin 9 of the microcomputer to CN34-5.	$\overline{\text{EJSW}}$ signal	Check a low $\overline{\text{EJSW}}$ signal output from the changer when the power is turned on or the disc return is performed, in the order from Pin 9 of the microcomputer to CN34-5. To do the above check, perform the disc selection and demanding disc return with DN-1200C. Otherwise, do the check by setting DN-1200F to the heat run mode.	Refer to changer microcomputer port list. Refer DN-1200C operation manual Refer Item 4-2.
2	Circuits from Pin 12 of the microcomputer to CN34-7.	$\overline{\text{MVOP}}$ signal	■ Check a low $\overline{\text{MVOP}}$ signal from the CD drive unit, in the order from CN34-7 to Pin 12 of the microcomputer, during a low $\overline{\text{EJSW}}$ is output from the changer when the power is turned on or the disc return is performe ■ Check a high $\overline{\text{MVOP}}$ signal from the CD drive unit, in the order from CN34-7 to Pin 12 of the microcomputer, during a low $\overline{\text{EJSW}}$ signal from the changer changes to high when the power is turned on or the disc return is performed. To do the above check, perform the disc selection and demanding disc return with DN-1200C. Otherwise, do the check by setting DN-1200F to the heat run mode.	Refer to changer microcomputer port list. Refer to DN-1200C Operation Manual. Refer Item 4-2.
3	Circuits in the CD drive unit.	$\overline{\text{EJSW}}$ and $\overline{\text{MVOP}}$ signals	See the troubleshooting for CD drive unit.	

Item – 3004

Error code	30 – – 04	Number of LED flicker	25	Contents	$\overline{\text{MVCL}}$ signal from the CD drive unit is not low when the disc ejection demand signal (low) is output from the changer.

	Check points	Check items	Checks	Remarks
1	Circuits from Pin 9 of the microcomputer to CN34-5.	$\overline{\text{EJSW}}$ signal	Check orderly a low $\overline{\text{EJSW}}$ signal output from the changer demanding disc Loading from Pin 9 of the microcomputer to CN34-5. To do the above check, perform the disc selection and demanding disc return with DN-1200C. Otherwise, do the check by setting DN-1200F to heat run mode.	Refer to Changer microcomputer port list. Refer to DN1200C operation manual. Refer to Item 4-2.
2	Circuits from Pin 11 of the microcomputer to CN34-6.	$\overline{\text{MVCL}}$ signal	■ Check a low $\overline{\text{MVCL}}$ signal from the CD drive unit, in the order from CN34-6 to Pin 11 of the microcomputer, during a low $\overline{\text{EJSW}}$ signal outputs from the changer when the power is turned on or the disc return is performed. To do the above check, perform the disc selection and demanding disc return with DN-1200C. Otherwise, do the check by setting DN-1200F to heat run mode.	Refer to Changer microcomputer port list. Refer to DN-1200C operation manual. Refer to Item 4-2.
3	CD drive circuit.	$\overline{\text{EJSW}}$ and $\overline{\text{MVCL}}$ signals.	See the troubleshooting for CD drive unit.	

8. REFERENCE

Power On -1

If the power is off as shutoff of the power supply when loading or playback the disc, the disc stops then. After the power is on, DN-1200F does not continue to process the disc which stops on the way of processing and return it to the prescribed disc rack. The preparation for the return is performed as shown below, after the power is turned on again.

① Disc number recorded, before the power is off, is read from EEPROM and a position of the disc rack to return the disc is checked.
② When both the left and right disc selector sensors are passed, the disc selector is moved in the direction of that the disc is stored to the disc load mechanism.
(Example) Selected disc = 001-100: Moves left
Selected disc = 101-200: Moves right
③ When there is one disc stored in the disc load mechanism is issued to return according to the normal return process.
When there are two discs stored in the disc load mechanism, return demand is issued to return a front disc after setting the rear disc to the loading mode.

Power On -2

If there is no disc being loaded or being played back when the power is on, the disc selector and the loading cam are moved to the prescribed position.
① Prescribed position of disc selector
Disc selector does not move when one of the left and right selectors is intercepted and the other is passed.
Disc selector moves right until the right disc selector sensor is intercepted when both the left and right disc selector are passed.
② Prescribed position of disc selector
Loader cam is moved so that the front and rear loader cam sensors are intercepted/intercepted.

Address setting

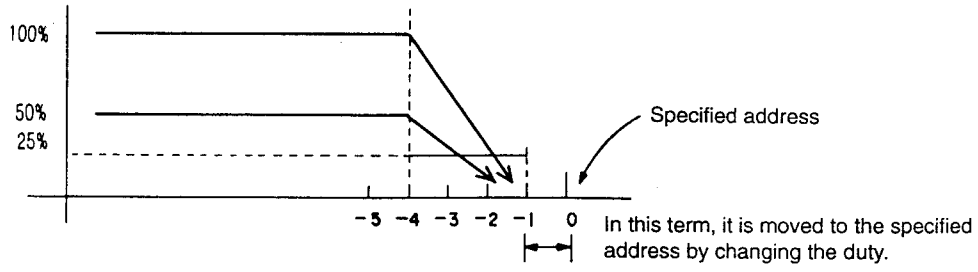
The direction, in which the disc load mechanism, is decided with a relation between a current position (a) of the disc load mechanism and a position (b) of the specified disc. Then, the following management is performed with a length between a and b.
Note that | b-1 | indicates 1 previous to the specified address.

1. When | (b-1)-a | is more than three of addresses;
   ① It is operated with duty 100% (taken by one disc) or 50% (taken by two) until | (b-1)-a | is equal to three.
   ② It is operated in 128 ms by decreasing 4% from duty ① Pwhen | (b-1)-a | is equal to three, and stopped.
   ③ The current position is checked by performing the operation in item "3."

2. When | (b-1)-a | is equal to or less than three, and more than one;
   It is operated with an operating voltage of duty 25% until | (b-1)-a | is equal to one.

3. When | (b-1)-a | is equal to one;
   ① It is operated in 0.5 seconds by checking the specified address from the duty (12.5% at the initial set) set in the previous address setting until a is equal to b.
   ② If it does not reach the specified address within 0.5 seconds, it is operated again in 0.5 seconds by adding 2.5% to the current duty.
   ③ If it exceeds the specified address, it is operated in 0.5 seconds by decreasing 2.5% of duty after the direction of moving is changed to the contrary.
   ④ Managements from ① to ③ are repeated until a is equal to b.
   ⑤ It stops until a is equal to b.

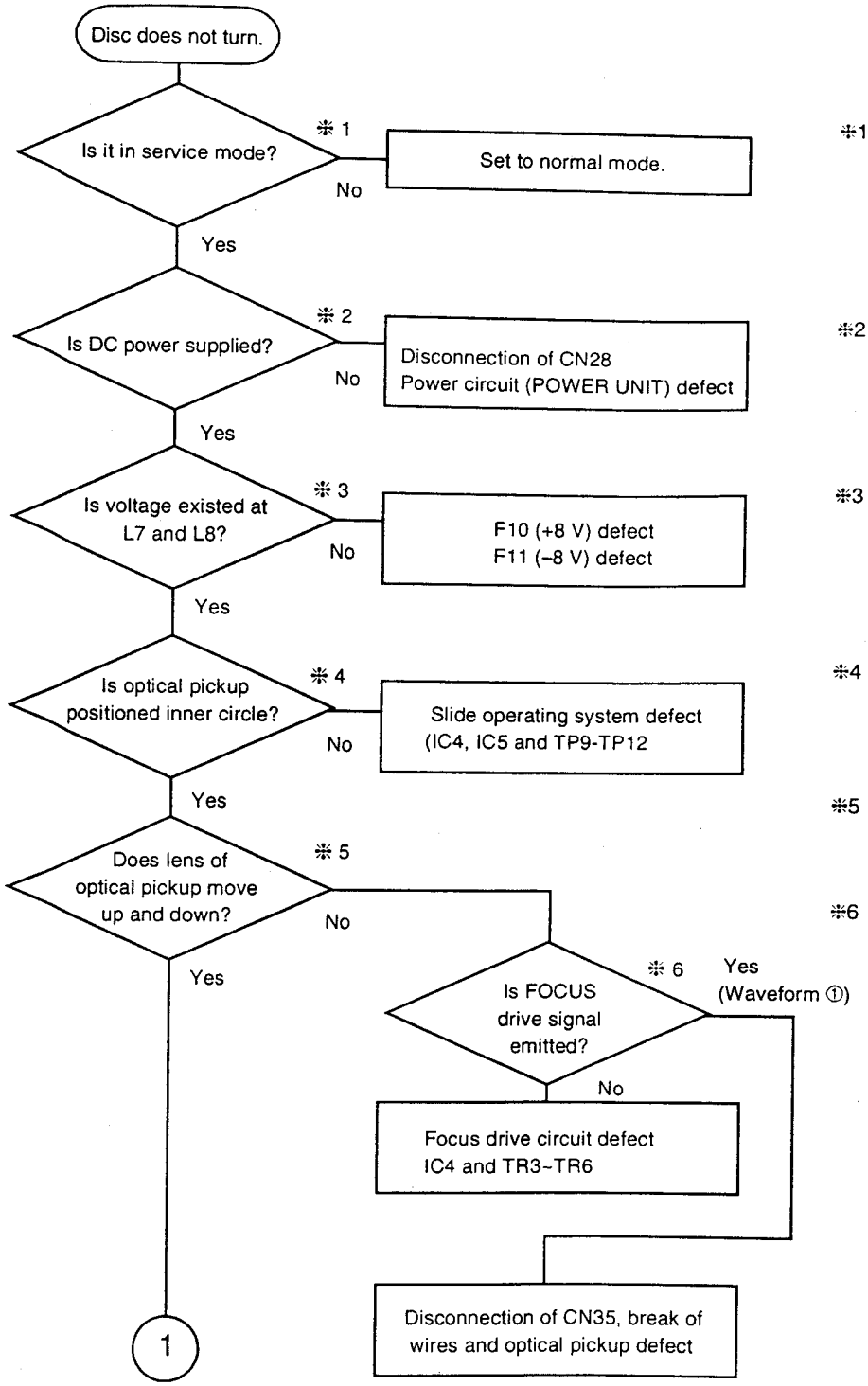
* In the current position check, steps (1) to (5) of item 3 continue until the address fine sensor is passed/passed.



Address pattern

Disc number				Address pattern							
				Rear		Front					
				1	0	5	4	3	2	1	0
−001				1	0	1	0	1	1	1	1
001	051	101	151	0	0	0	1	1	1	1	1
002	052	102	152	0	1	1	1	1	1	1	1
003	053	103	153	1	0	1	1	1	1	1	0
004	054	104	154	0	0	1	1	1	1	0	0
005	055	105	155	0	1	1	1	1	0	0	0
006	056	106	156	1	1	1	1	0	0	0	0
007	057	107	157	1	0	1	0	0	0	0	1
008	058	108	158	0	0	0	0	0	0	1	0
009	059	109	159	0	1	0	0	0	1	0	0
010	060	110	160	1	1	0	0	1	0	0	0
011	061	111	161	1	0	0	1	0	0	0	0
012	062	112	162	0	0	1	0	0	0	0	0
013	063	113	163	0	1	0	0	0	0	0	0
014	064	114	164	1	1	0	0	0	0	0	1
015	065	115	165	1	0	0	0	0	0	1	1
016	066	116	166	0	0	0	0	0	1	1	0
017	067	117	167	0	1	0	0	1	1	0	1
018	068	118	168	1	1	0	1	1	0	1	0
019	069	119	169	1	0	1	1	0	1	0	1
020	070	120	170	0	0	1	0	1	0	1	0
021	071	121	171	0	1	0	1	0	1	0	1
022	072	122	172	1	1	1	0	1	0	1	1
023	073	123	173	1	0	0	1	0	1	1	0
024	074	124	174	0	0	1	0	1	1	0	0
025	075	125	175	0	1	0	1	1	0	0	1
026	076	126	176	1	1	1	1	0	0	1	0
027	077	127	177	1	0	1	0	0	1	0	1
028	078	128	178	0	0	0	0	1	0	1	1
029	079	129	179	0	1	0	1	0	1	1	1
030	080	130	180	1	1	1	0	1	1	1	0
031	081	131	181	1	0	0	1	1	1	0	0
032	082	132	182	0	0	1	1	1	0	0	1
033	083	133	183	0	1	1	1	0	0	1	1
034	084	134	184	1	1	1	0	0	1	1	1
035	085	135	185	1	0	0	0	1	1	1	1
036	086	136	186	0	0	0	1	1	1	1	0
037	087	137	187	0	1	1	1	1	1	0	1
038	088	138	188	1	1	1	1	1	0	1	0
039	089	139	189	1	0	1	1	0	1	0	0
040	090	140	190	0	0	1	0	1	0	0	0
041	091	141	191	0	1	0	1	0	0	0	1
042	092	142	192	1	1	1	0	0	0	1	0
043	093	143	193	1	0	0	0	0	1	0	1
044	094	144	194	0	0	0	0	1	0	1	0
045	095	145	195	0	1	0	1	0	1	0	0
046	096	146	196	1	1	1	0	1	0	0	1
047	097	147	197	1	0	0	1	0	0	1	0
048	098	148	198	0	0	1	0	0	1	0	0
049	099	149	199	0	1	0	0	1	0	0	1
050	100	150	200	1	1	0	1	0	0	1	1
+001				1	0	1	0	0	1	1	0
+002				0	1	0	0	1	1	0	0

★ 1: Long address pattern of the disc rack
0: Short address pattern of the disc rack



※1 Insert the MODE SELECT jumper pin of CD SERVO UNIT to NORMAL.

※2 Check a voltage at the terminal of CN28 (6P connector) of CD SERVO UNIT.
①-②: +5 V; ③-②: –5 V;
④-⑤: -8 V; ⑥-⑤: –8 V

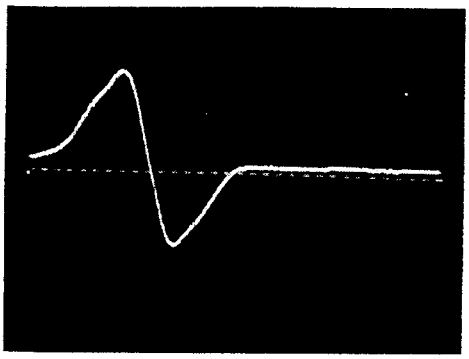
※3 Check a lead voltage at L7 and L8.
L7: +8 V
L8: –8 V

※4 Check a position of optical pickup when turning the power on with the eye.

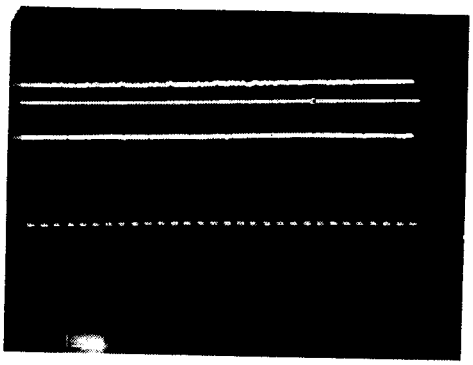
※5 Check a movement of optical pickup when turning the power on with the eye.

※6 Set the DIP switch of the changer control unit as shown below, turn the power on and check the focus drive signal at TR3's emitter by pressing once S201.
(S203: ON OFF OFF ON)
1 2 3 4

Waveform ①: Focus drive signalin normal operation



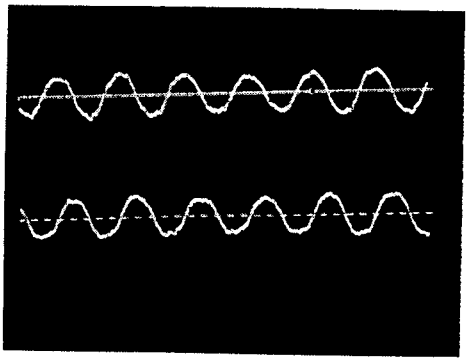
Waveform ⑤
FE signal that level is OK



Waveform ⑥
Spindle drive signal whe n disc does not turn

CH1 : 2V / diV
CH2 : 2V / diV

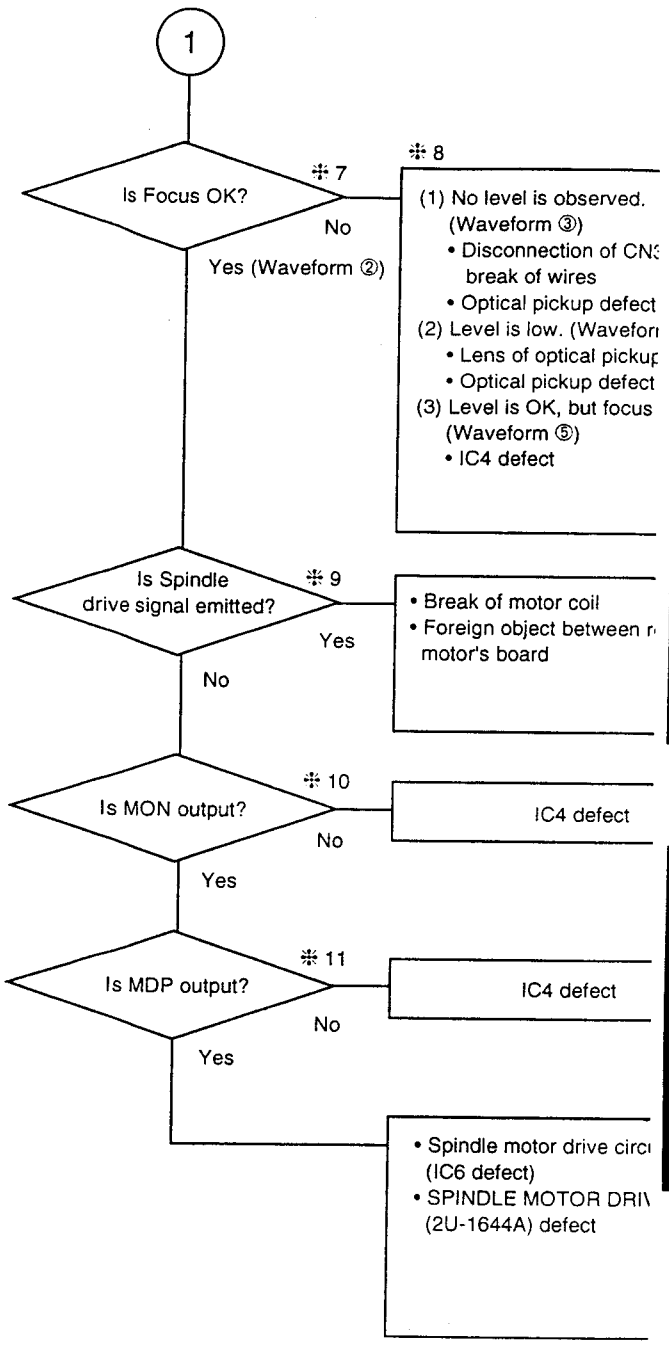
20msec / diV

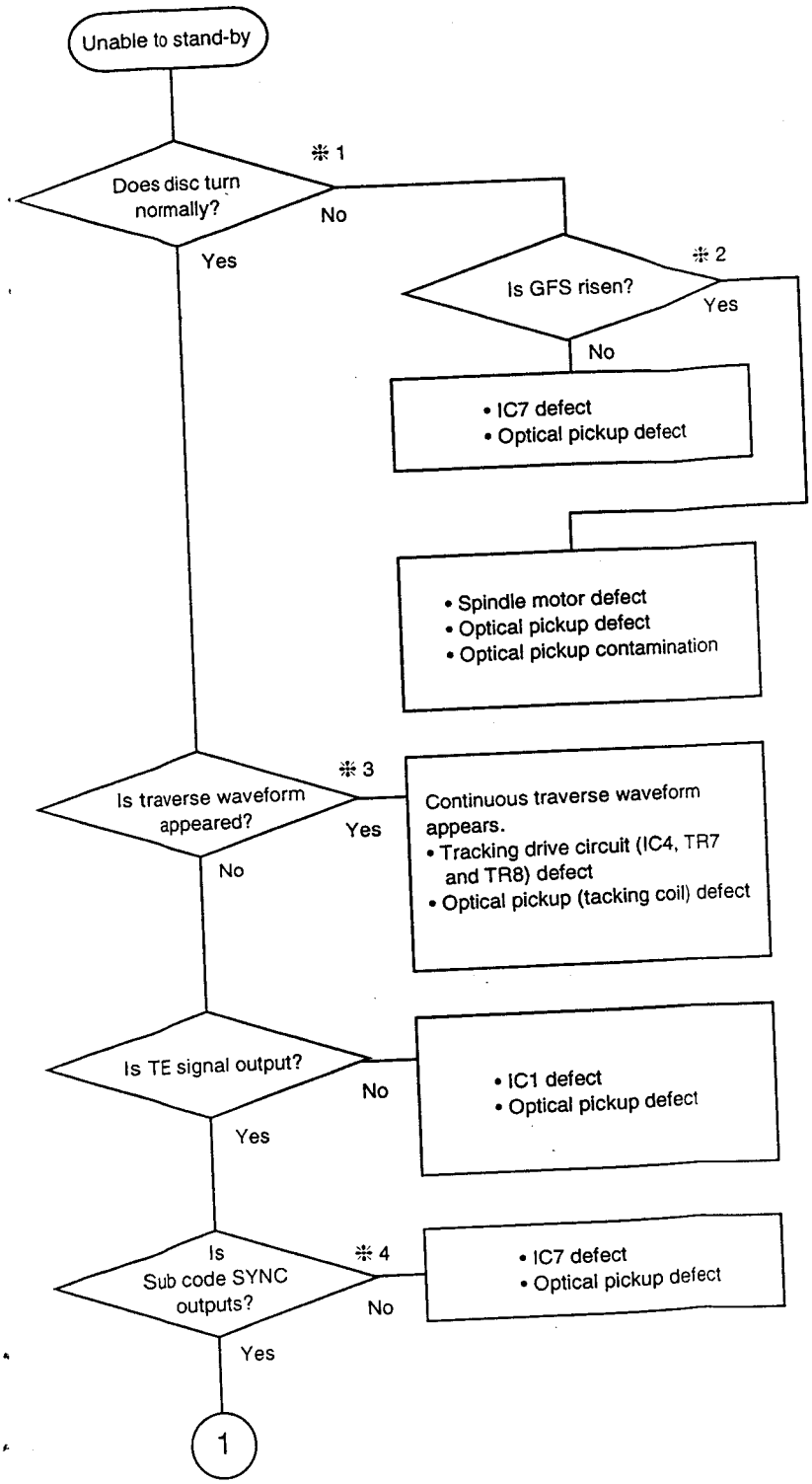


Waveform ⑦
Spindle drive signal when disc is turning

CH1 : 2V / diV
CH2 : 2V / diV

20msec / diV





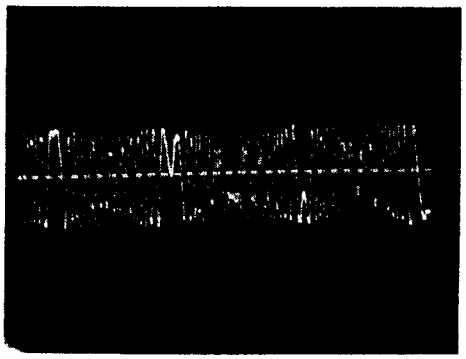
※1 Irregular revolution of disc
- Disc turns short while, and stops.
- Disc turns in high speed.

※2 Check at IC7-42 terminal (GFS).
GFS: CLV servo applied: +5 V

※3 Check at TP3-2 terminal (TE OFF-SET).
Waveform ①: TE signal of continuous traverse waveform

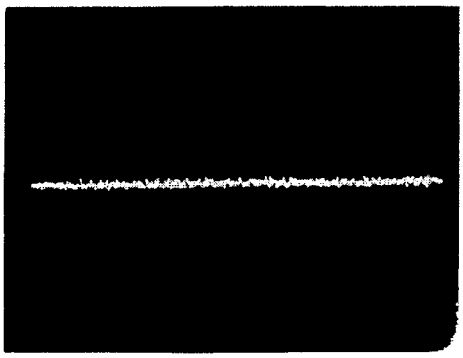
Waveform ②: TE signal in normal operation

※4 Check at IC7-63 terminal (SCOR).



Waveform ①
TE signal of continunous traverse waveform

0.5 / diV
20msec / diV

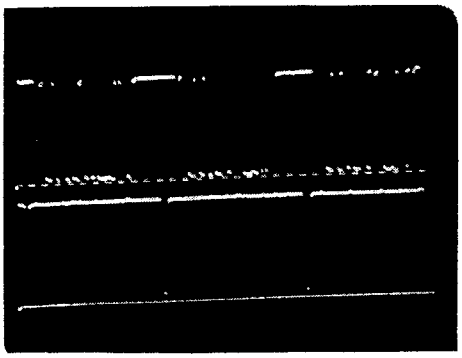


Waveform ②
TE signal in normal operation

0.5 / diV
20msec / diV

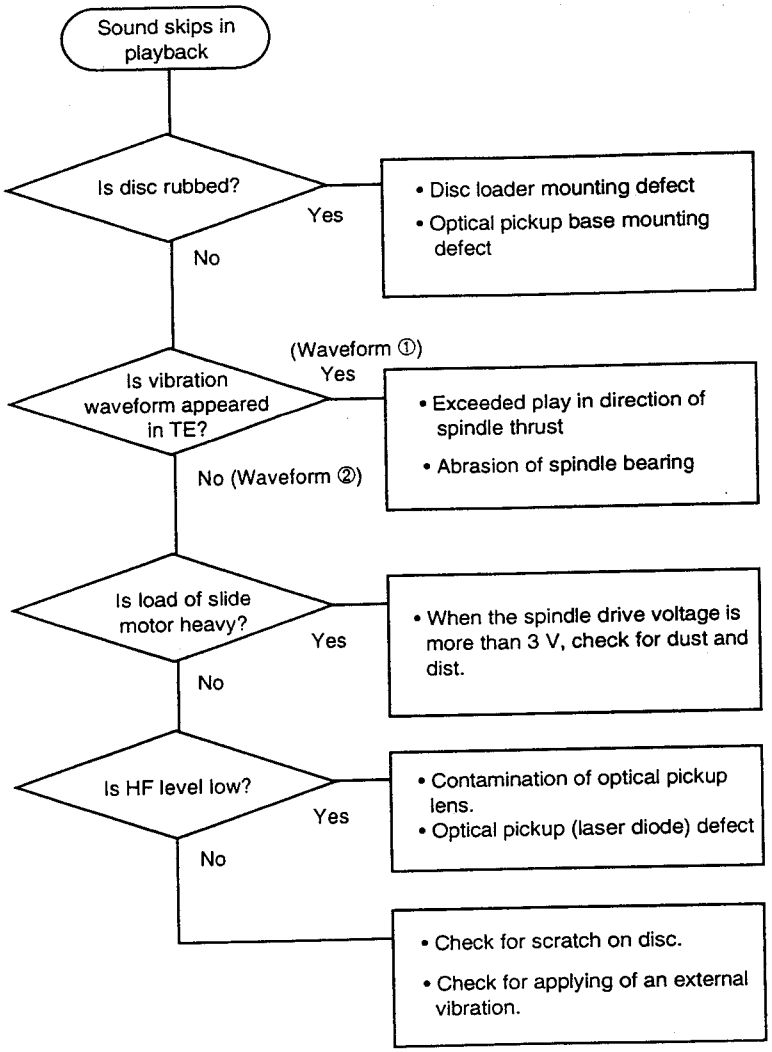
TXD

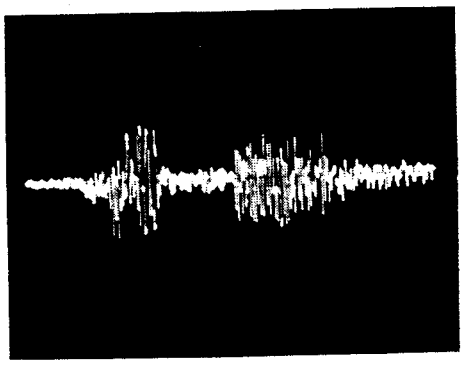
RXD



Waveform ③
TXD and RXD signals in normal operation

2V / diV
5msec / diV





Waveform ①
TE signal with excess vibration

0.5 / diV
20msec / diV

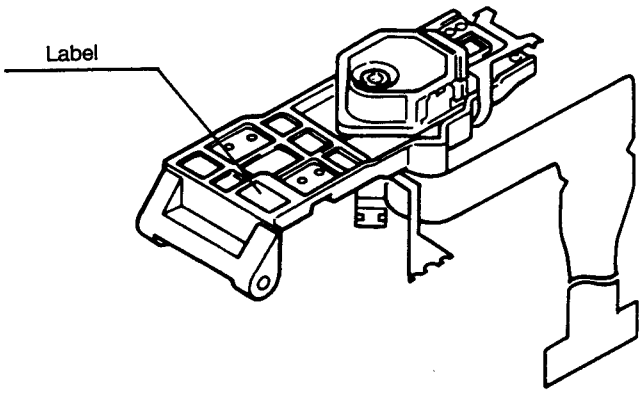
9. JUDGMENT OF THE OPTICAL PICKUP DEFECT

If the pickup seems to be defect, judge by referring the following items.

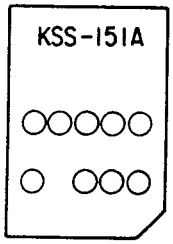
1. Judging with the laser current of pickup

(1) Load the disc.
(2) Measure the voltage across TP1-2 terminal (IOP) and TP1-4 (GND) terminal of CD SERVO UNIT.
(3) Calculate the laser electric current of pickup with [(5V-measured voltage) /22 ohms].
(4) When the electric current value is increased by 50% or more to the initial current value, the pickup must be changed.

* The initial current value is shown in the label of the pickup. (__._ mA) The electric current value is printed for 22°C of ambient temperature.
If the temperature rises by 25°C, the laser electric current increases by approximately 12 mA.



Label



	Day	Month	Last figure of the Year	Quality control No.
Lot No.	○○	○	○	○

Months 10, 11 and 12 are indicated by X, Y and Z.

	Alphabet	Second digit	First digit	First from decimal point
Iop indication	○	○	○	○

Unit is mA and decimal point is omitted.
An alphabet may be used for the quality control in the factory.

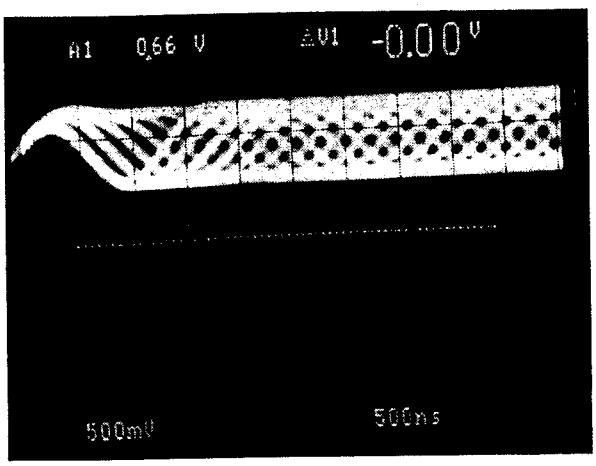
2. Judging with the HF level

(1) Load the adjustment disc (CA-1252).

(2) Observe to check the HF level at Pin 1 terminal TP1 on CD SERVO UNIT with the oscilloscope.

(3) When the HF level is less than 1.0 Vp-p, clean the lens and read the HF level.

(4) If the HF level is less than 0.7 Vp-p in spite of cleaning the lens, replacement of pickup is essential.



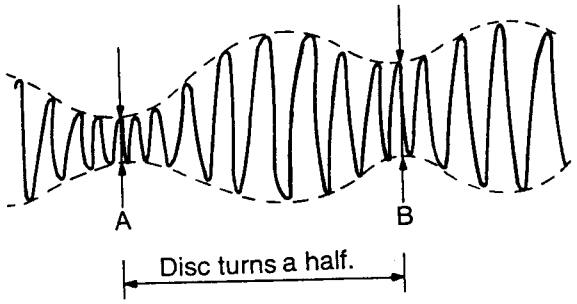
* HF level should be measured where the focus offset is adjusted.

3. Judging with the TE signal

(1) Load the eccentricity (horizontal) disc (140 µm).

(2) Refer to "Tracking Offset Adjustment" in the service manual.

(3) Observe the waveform at Pin2 terminal of TP3 (TE OFFSET) on CD SERVO UNIT.



* Traverse amplitudes minimum is a time that the disc turns a half.

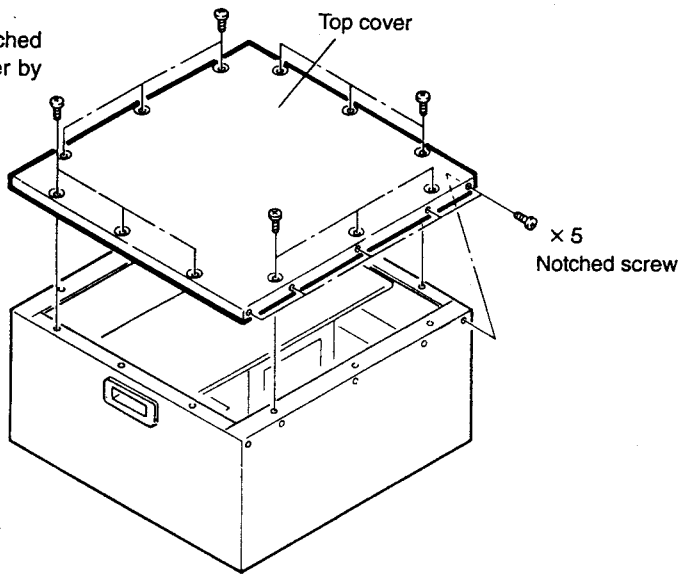
(4) If a ratio of A to B exceeds 1:2, replacement of pickup is required.

10. DISASSEMBLY

(For assembling, perform the following steps in reverse manner.)

1. Removing the top cover

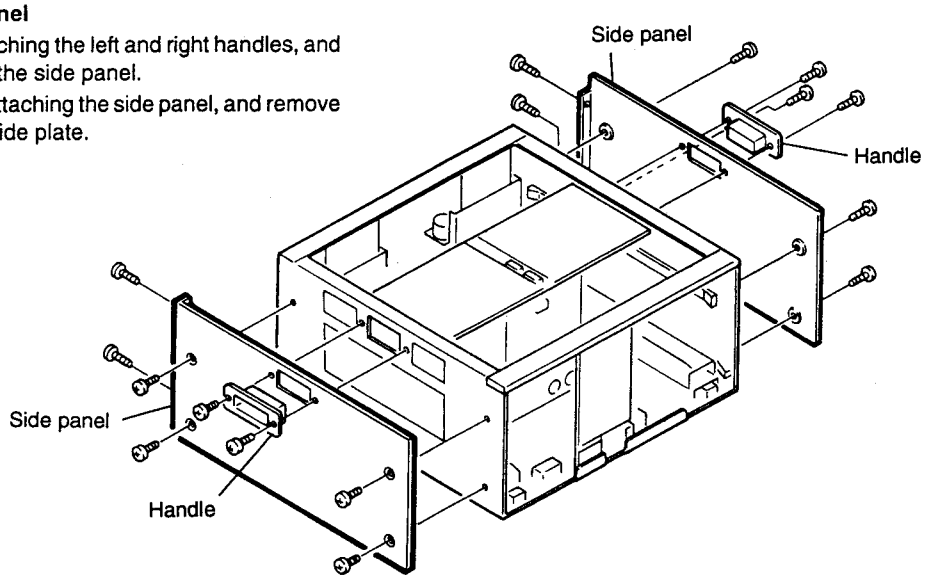
Remove twelve screws on the top cover and the five notched screws on the back panel side, and take out the top cover by means of lifting up.



2. Disassembling the side panel

(1) Remove four screws attaching the left and right handles, and remove the handle from the side panel.

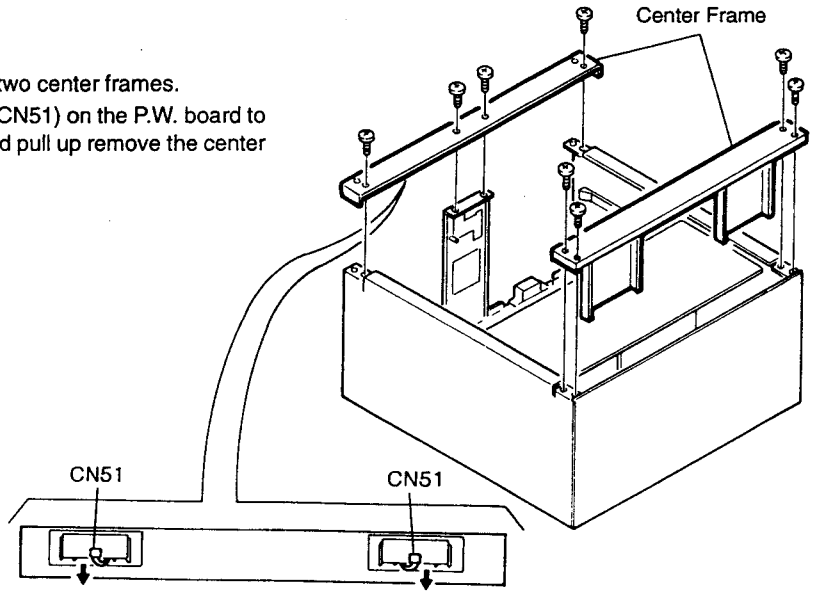
(2) Remove twelve screws attaching the side panel, and remove the side panel from the side plate.



3. Disassembling the center frame

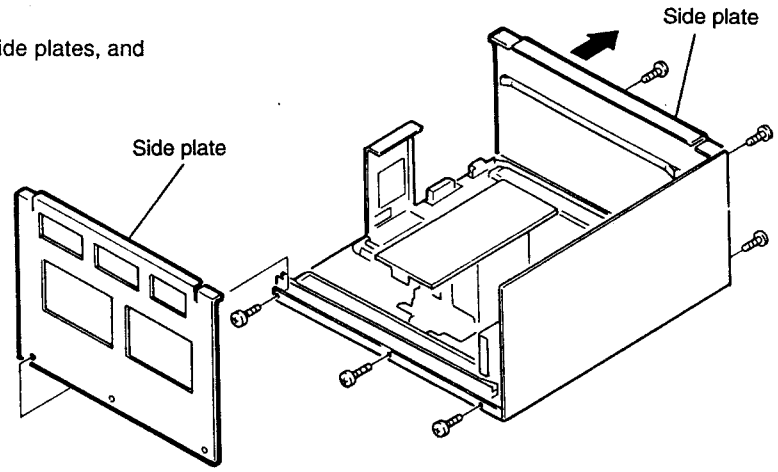
(1) Remove eight screws fixing the two center frames.

(2) Disconnect the two connectors (CN51) on the P.W. board to the front side of center frame, and pull up remove the center frame.



4. Disassembling the side plate

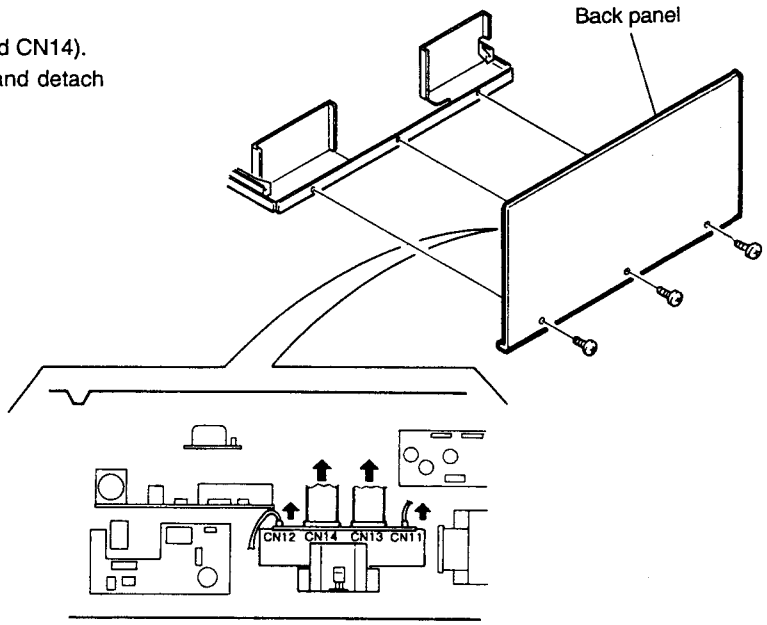
Remove six screws securing the left and right side plates, and detach the side plates by means of lifting up.



5. Disassembling the back panel

(1) Remove the connectors (CN11, CN12, CN13 and CN14).

(2) Remove three screws holding the back panel, and detach the back panel backward.



6. Disassembling the changer mechanism unit

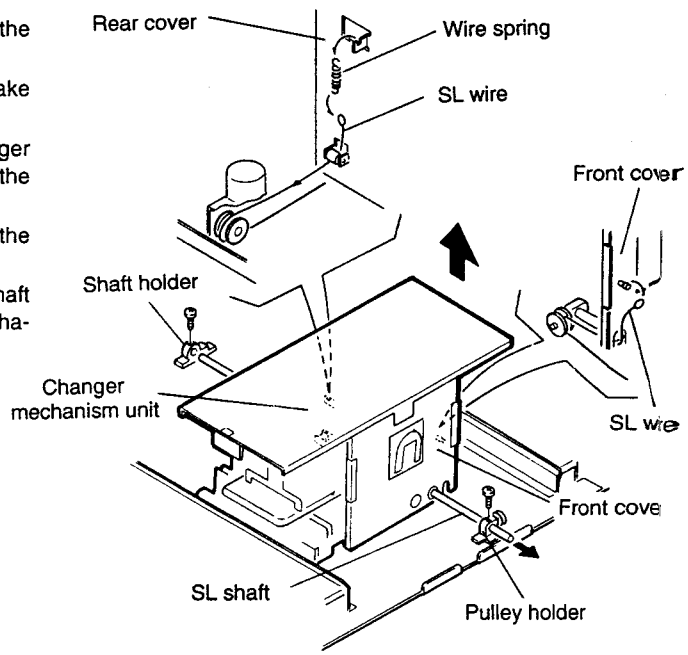
(1) Remove the wire spring hooked to the rear cover of the changer mechanism unit.

(2) Remove the SL wire attached to the wire spring, and take out the SL wire from the rear cover.

(3) Remove the SL wire hooked to the front cover of the changer mechanism unit, and remove the the SL wire from the changer mechanism unit.

(4) Remove the SL shaft fixing screws shaft holder and the pulley holder.

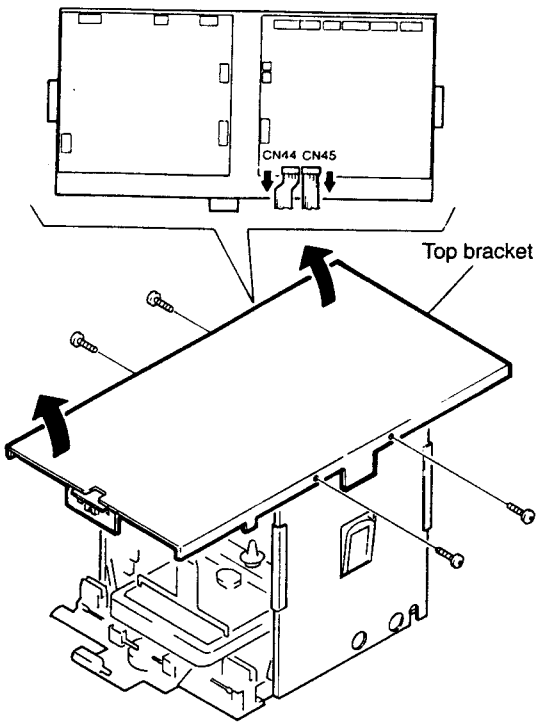
(5) Pull out the SL shaft from the changer mechanism unit, shaft holder and pulley holder, and detach the changer mechanism unit.

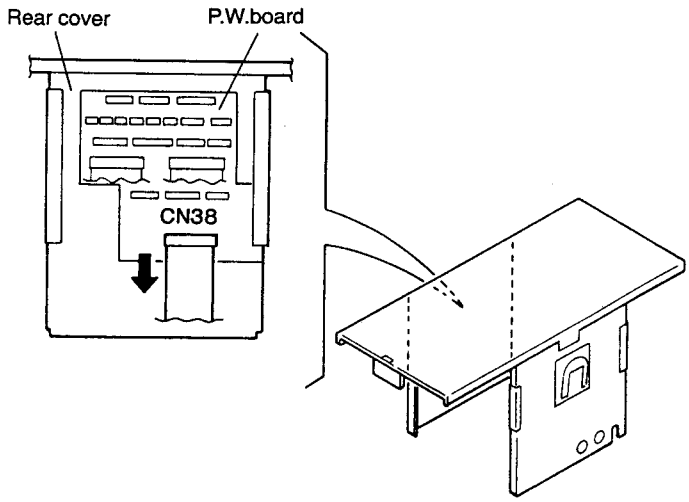


7. Disassembling the top bracket

(1) Unplug the connectors (CN44 and CN45) on the P.W.board attached to the upper side of top bracket.

(2) Remove four screws fastening the top bracket, and pull up to detach the top bracket (in the direction of arrow).



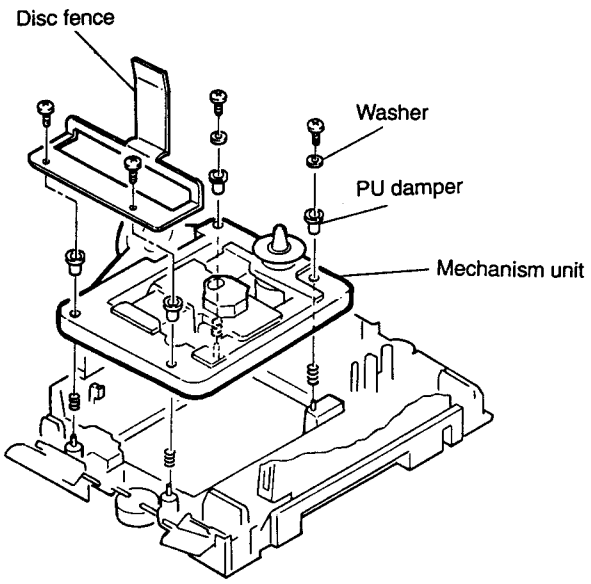


8. Disassembling the mechanism unit

(1) Unplug the connector (CN38) on the P.W.board attached to the rear cover.

(2) Remove four screws mounting the mechanism unit, and remove the washers, disc fence and PU damper.

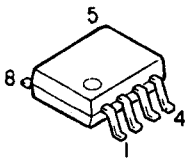
(3) Remove the mechanism unit by means of lifting upward.



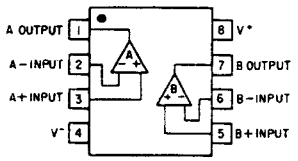
11. SEMICONDUCTORS

- IC's

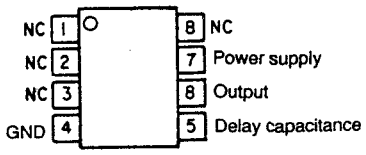
M5218FP
M51953AFP
NJM2043M
NJM2903M



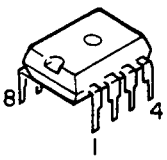
M5218FP
NJM2043M
NJM2903M



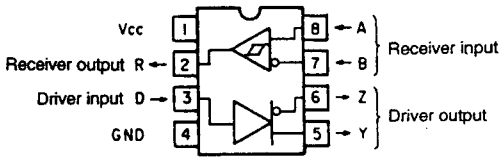
M51953AFP



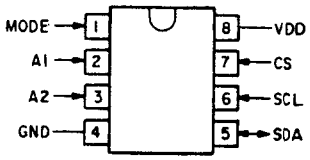
μPD6252C
M75179P



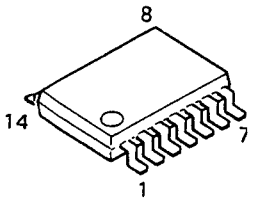
M75179P



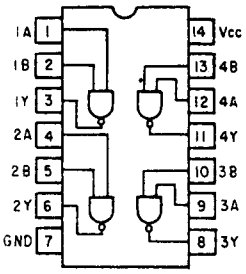
μPD6252C



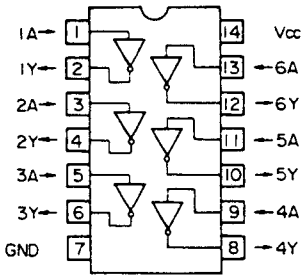
HD74HC00FP
TC74HC02AF
TC74HC04AF
TC74HC08AF
HD74HC14FP



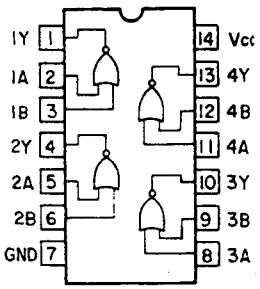
HD74HC00FP



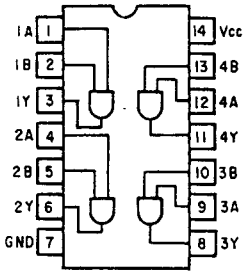
HD74HC04AF



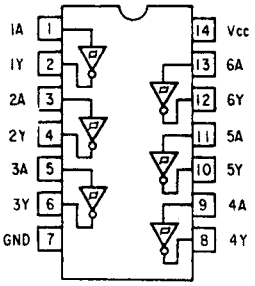
TC74HC02AF



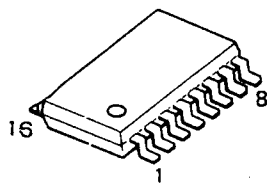
TC74HC08AF



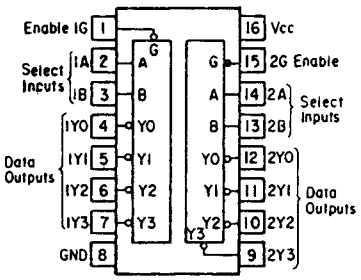
TC74HC14FP



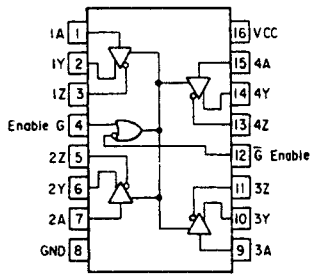
TC74HC139AF
SN75ALS192NSR
TC74HC123AF
HD74HC153FP
HD74HC157FP



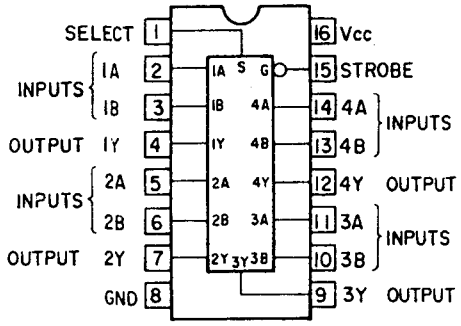
TC74HC139AF



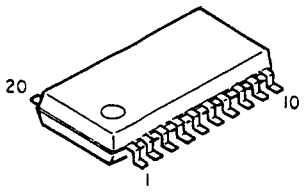
SN75ALS192NSR



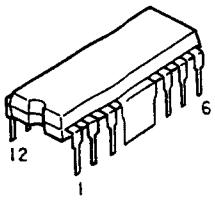
HD74HC157FP



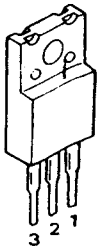
SN74HC645NSR



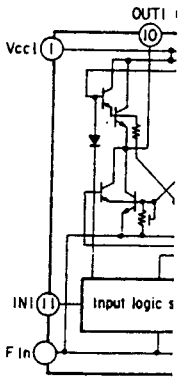
LB1649



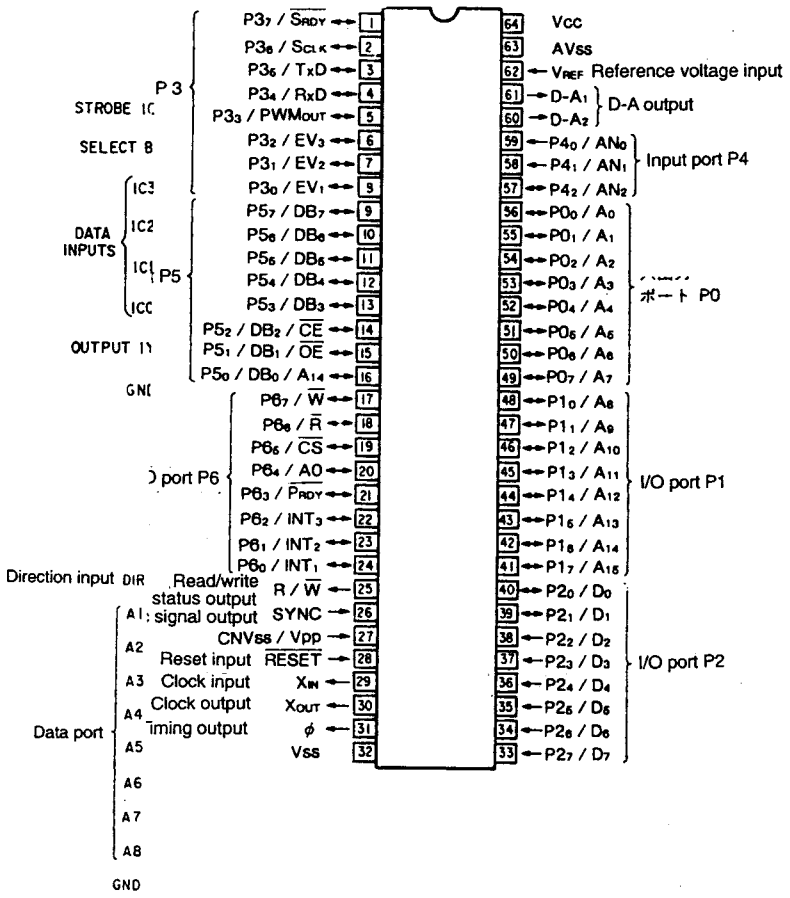
NJM7805FA



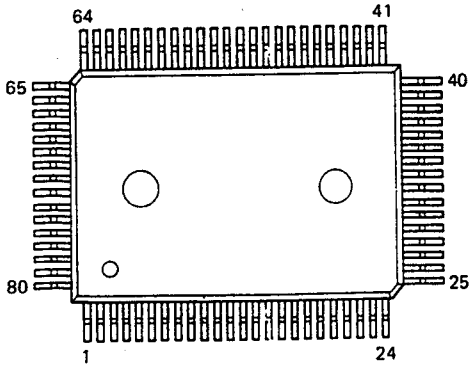
1:Output
2:Common
3:Input

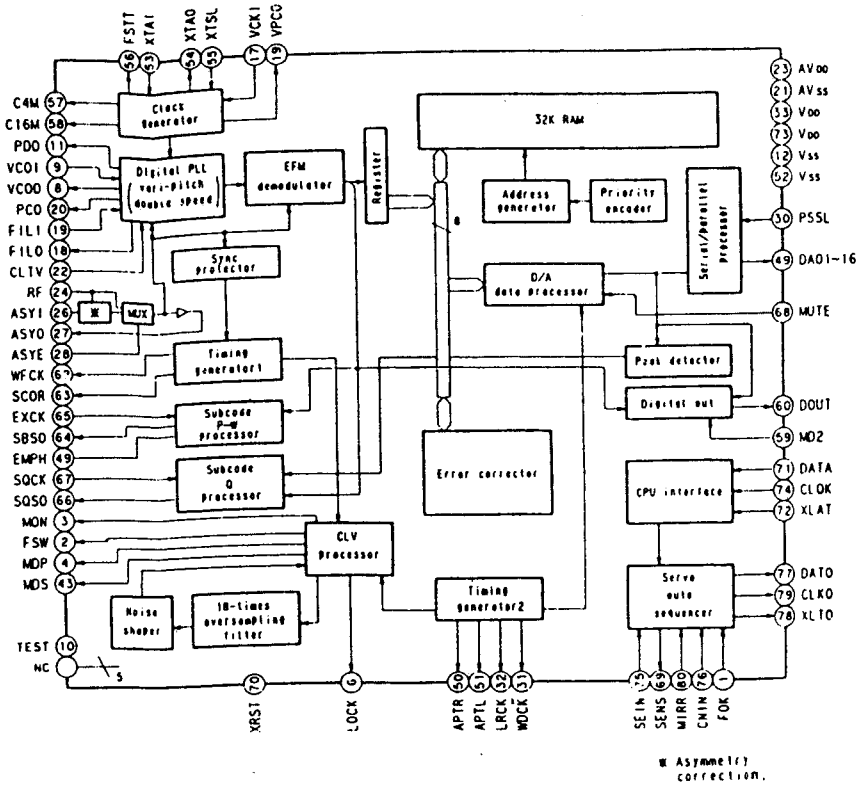


NJM79L05A



CXD2500AQ





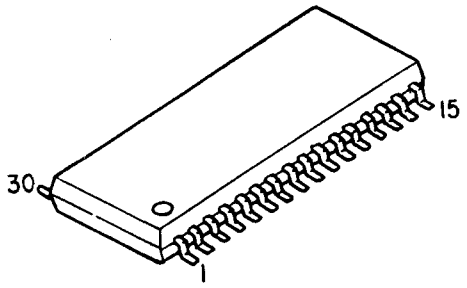
CXD2500AQ Terminal Function

Terminal No.	Symbol	I/O		Terminal Function
1	FOK	I		Input terminal for OK focusing. Use for Servo-autosequencer.
2	FSW	O	Z,0	Output to shift time constant of output filter for spindle motor.
3	MON	O	1,0	ON/OFF control output for spindle motor.
4	MDP	O	1,Z,0	Servo control for spindle motor.
5	MDS	O	1,Z,0	Servo control for spindle motor.
6	LOCK	O	1,0	Sampling GFS by 460 Hz and if it is "H", delivers "H" ; if it is continuously "L" 8 times, delivers "L".
7	NC	—		
8	VCOO	O	1,0	Oscillation current output for analog EFM PLL.
9	VCOI	I		Oscillation current output for analog EFM PLL. f LOCK=8.6436MHz.
10	TEST	I		TEST output. Normally GND.
11	PDO	O	1,Z,0	Charge pump output for analog EFM PLL.
12	Vss			GND.
13	NC	—		
14	NC	—		
15	NC	—		
16	VPCO	O	1,Z,0	Charge pump output for variable pitch PLL.
17	VCKI	I		Clock input from external VCO for variable pitch. fc center=16.9344MHz.
18	FILO	O	Analog	Filter output for master PLL. (slave=digital PLL)
19	FILI	I		Filter input for master PLL.
20	PCO	O	1,Z,0	Charge pump output for master PLL.
21	AVss			Analog GND.
22	CLTV	I		Control voltage input for master VCO.
23	AVDD			Analog power supply (+5V).
24	RF	I		EFM signal input.
25	BIAS	I		Constant-current input for Asymmetry circuit.
26	ASYI	I		Comparator voltage input for Asymmetry.
27	ASYO	O	1,0	Full swing output for EFM. (L=Vss, H=V_{DD}).
28	ASYE	I		L: Asymmetry circuit → OFF. H: Asymmetry circuit → ON.
29	NC	—		
30	PSSL	I		Input to shift output mode of audio data. Serial output at L; parallel output at H.

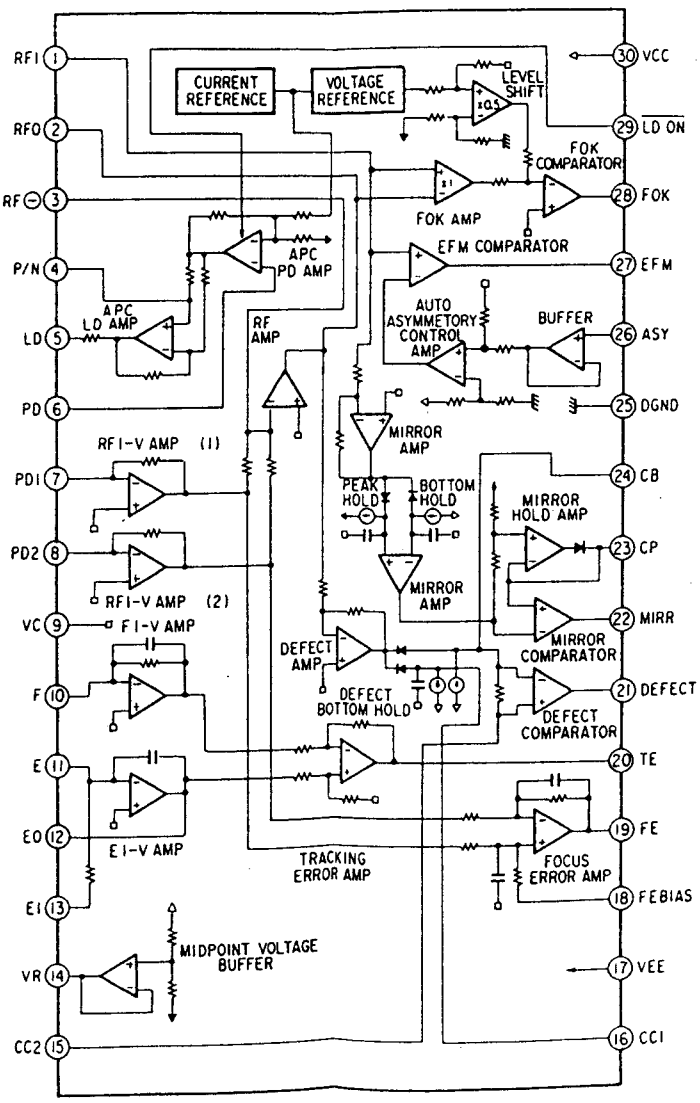
CXA1372Q Terminal Function

Terminal No.	Symbol	I/O	Terminal Function
1	Vc	I	Mid-point voltage input terminal.
2	FGD	I	In case of reducing higher range gain of focus servo, connect a capacitor between this terminal and terminal number (9).
3	FS3	I	Shifts higher range gain of focus servo by FS3 ON/OFF.
4	FLB	I	Terminal for external time constant to increase lower range of focus servo.
5	FEO	O	Focus drive output.
6	FE–	I	Reverse input terminal for focus amplifier.
7	SRCH	I	Terminal for external time constant to make focus search waveform.
8	TGU	I	Terminal for external time constant to shift higher range gain of tracking.
9	TG2	I	Terminal for external time constant to shift higher range gain of tracking.
10	AV_{CC}	—	Power supply (+5V).
11	TAO	O	Tracking drive output.
12	TA–	I	Reverse input terminal for tracking amplifier.
13	SL+	I	Non-reverse input terminal for sled amplifier.
14	SLO	O	Sled drive output.
15	SL–	I	Reverse input terminal for sled amplifier.
16	FSET	I	Terminal to compensate peak in focus/tracking phase.
17	ISET	I	Delivers a current to set the height of focus search, track jump, and sled kick.
18	SSTOP	I	Terminal for limit switch ON/OFF to detect disc innermost circle.
19	AV_{EE}	—	GND.
20	DIRC	I	Terminal is used at the time of 1 track jump. A 47 kohm pull up resistor is included.
21	LOCK	I	Reckless drive protection circuit of sled; activates at "L". A 47k ohm pull up resistor is included.
22	CLK	I	Serial data transfer clock input from CPU.
23	XLT	I	Latch input from CPU.
24	DATA	I	Serial data input from CPU.
25	XRST	I	Reset input terminal. Resets at "L".
26	C.OUT	O	Terminal to output signal for track number count.
27	SENS	O	Terminal to output FZC, AS, TZC, SSTOP by command from CPU.
28	DGND	—	GND.
29	MIRR	O	Output terminal for MIRR comparator.
30	DFCT	O	Output terminal for DEFECT comparator.
31	ASY	I	Input terminal for auto-symmetric control.
32	EFM	O	Output terminal for EFM comparator.
33	FOK	O	Output terminal for focus OK (FOK) comparator.
34	CC1	O	DEFECT bottom hold output terminal.
35	CC2	I	Input terminal to input DEFECT bottom hold output by capacitance combination.
36	DV_{CC}	—	Power supply (+5V).
37	CB	I	Capacitor connecting terminal for DEFECT bottom hold.
38	CP	I	MIRR hold capacitor connecting terminal. A non-reverse input terminal for MIRR comparator.
39	RFI	I	Input terminal to input RF summing amplifier output by capacitance combination.
40	RFO	O	Output terminal for RF summing amplifier. Check point for eye pattern.
41	DV_{EE}	—	GND.
42	TZC	I	Tracking zero-cross comparator input terminal.
43	TE	I	Tracking error signal input terminal.
44	TDFCT	I	Capacitor connecting terminal for time constant at the time of defect.
45	ATSC	I	Input terminal of ATSC detecting window comparator.
46	FZC	I	Input terminal of focus zero-cross comparator.
47	FE	I	Focus error signal input terminal.
48	FDFCT	I	Capacitor connecting terminal for time constant at the time of defect.

CXA1081M



CXA1081M



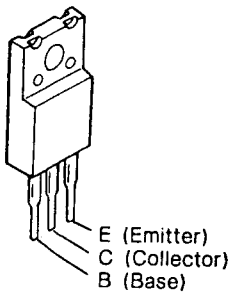
CA1081M Terminal Function

V_{CC} = 2.5V, V_{EE} = D_{GND} = −2.5V, VC = GND

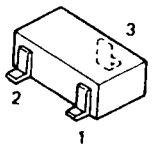
Terminal No.	Terminal Symbol	I/O	DC voltage (V)	Terminal Function
1	RFI	I	0	Input terminal of capacitance coupled RF summing amplifier output.
2	RFO	O	V_{RFO}	Terminal for RF summing amplifier output. Check point of Eye pattern.
3	RF(−)	I	0	Feedback input terminal of RF summing amplifier.
4	P/N	I	0 (VC)	P-sub/N-sub shifting terminal for Laser Diode (LD). (DC voltage: at N-sub.)
5	LD	O	−1.8	Output terminal of APC (Automatic Power Control) LD amplifier. (DC voltage: at N-sub, PD opened.)
6	PD	I	0	Input terminal of APC (Automatic Power Control) PD amplifier. (DC voltage: opened.)
7	PD1	I	0	Reverse input terminal of RF I-V amplifier (1). Receives an input current through A + C terminals of photo diode.
8	PD2	I	0	Reverse input terminal of RF I-V amplifier (2). Receives an input current through B + D terminals of photo diode.
9	VC	—	0	At ± dual-power supply: Becomes GND. At mono-power supply: Becomes VR. (connect to pin 14.)
10	F	I	0	Reverse input terminal of F I-V amplifier. Receives an input current through F terminal of photo diode.
11	E	I	0	Reverse input terminal of E I-V amplifier. Receives an input current through E terminal of photo diode.
12	EO	O	0	Output terminal of E I-V amplifier.
13	EI	I	0	Feedback input terminal of E I-V amplifier. For gain controlling of E I-V amplifier.
14	VR	O	V_{CVO}	Output terminal of DC voltages (V_{CC} + V_{EE})/2.
15	CC2	I	1.0	Input terminal of capacitance coupled detect bottom hold output.
16	CC1	O	1.2	Output terminal of defect bottom hold.
17	V_{EE}	—	−2.5	At ± dual-power supply: Becomes negative power supply terminal. At mono-power supply: Becomes GND.
18	FE BIAS	I	0	Bias terminal for non-reverse side of focus error amplifier. For CMR controlling of focus error amplifier.
19	FE	O	V_{FEO}	Output terminal of focus error amplifier.
20	TE	O	V_{TEO}	Output terminal of tracking error amplifier.
21	DEFECT	O	V_{DFCTL}	Output terminal of defect comparator. (DC voltage: Connect a 10 kΩ load resistance.)
22	MIRR	O	V_{MIRL}	Output terminal of MIRR comparator. (DC voltage: Connect a 10 kΩ load resistance.)
23	CP	I	−1.3	Connecting terminal for MIRR hold capacitor. Non-reverse input terminal of MIRR comparator.
24	CB	I	0	Connecting terminal for defect bottom hold capacitor.
25	D GND	—	−2.5	At ± dual-power supply: GND. At mono-power supply: GND (V_{EE}).
26	ASY	I	—	Input terminal of auto-asymmetry control.
27	EFM	O	V_{EFMH}	Output terminal of EFM comparator. (DC voltage: Connect a 10 kΩ load resistance.)
28	FOK	O	V_{FOKL}	Output terminal of focus OK comparator. (DC voltage: Connect a 10 kΩ load resistance.)
29	$\overline{\text{LD ON}}$	I	−2.5 (D GND)	ON/OFF shifting terminal for laser diode (LD). (DC voltage: At LD ON.)
30	V_{CC}	—	2.5	Positive power supply terminal.

• TRANSISTORS

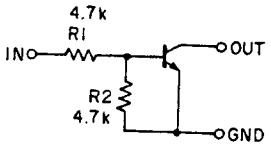
2SB1274
2SD1913

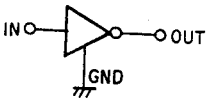


DTC143EK

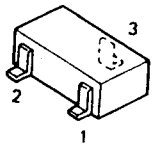


1:GND/Emitter
2:In/Base
3:Out/Collector



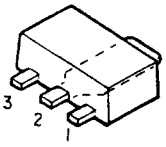


2SD1328 (R,S)



1. Emitter
2. Base
3. Collector

2SB766S
2SD874R



1. Base
2. Collector
3. Emitter

2SB562 (C)
2SD468 (C)

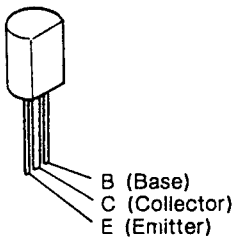
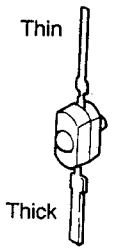


PHOTO TRANSISTOR

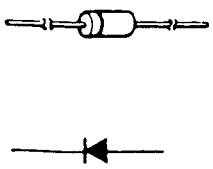
TPS605



(Thin) 1. Emitter
(Thick) 2. Collector

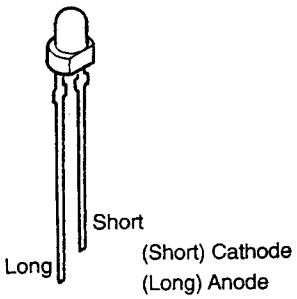
• DIODES

EK13
EK03W
1SR35-200A



LED

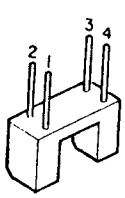
SEL-2210R
SEL-3410GL05



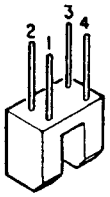
(Short) Cathode
(Long) Anode

PHOTO INTERRUPTER

GP1S58

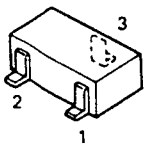


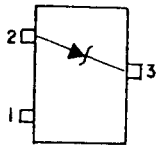
GP1S37



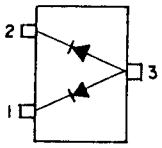
1. Anode
2. Cathode
3. Collecto
4. Emitter

HZM6.2NB2-TL

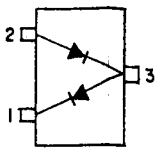




MA151WA

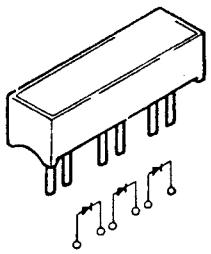


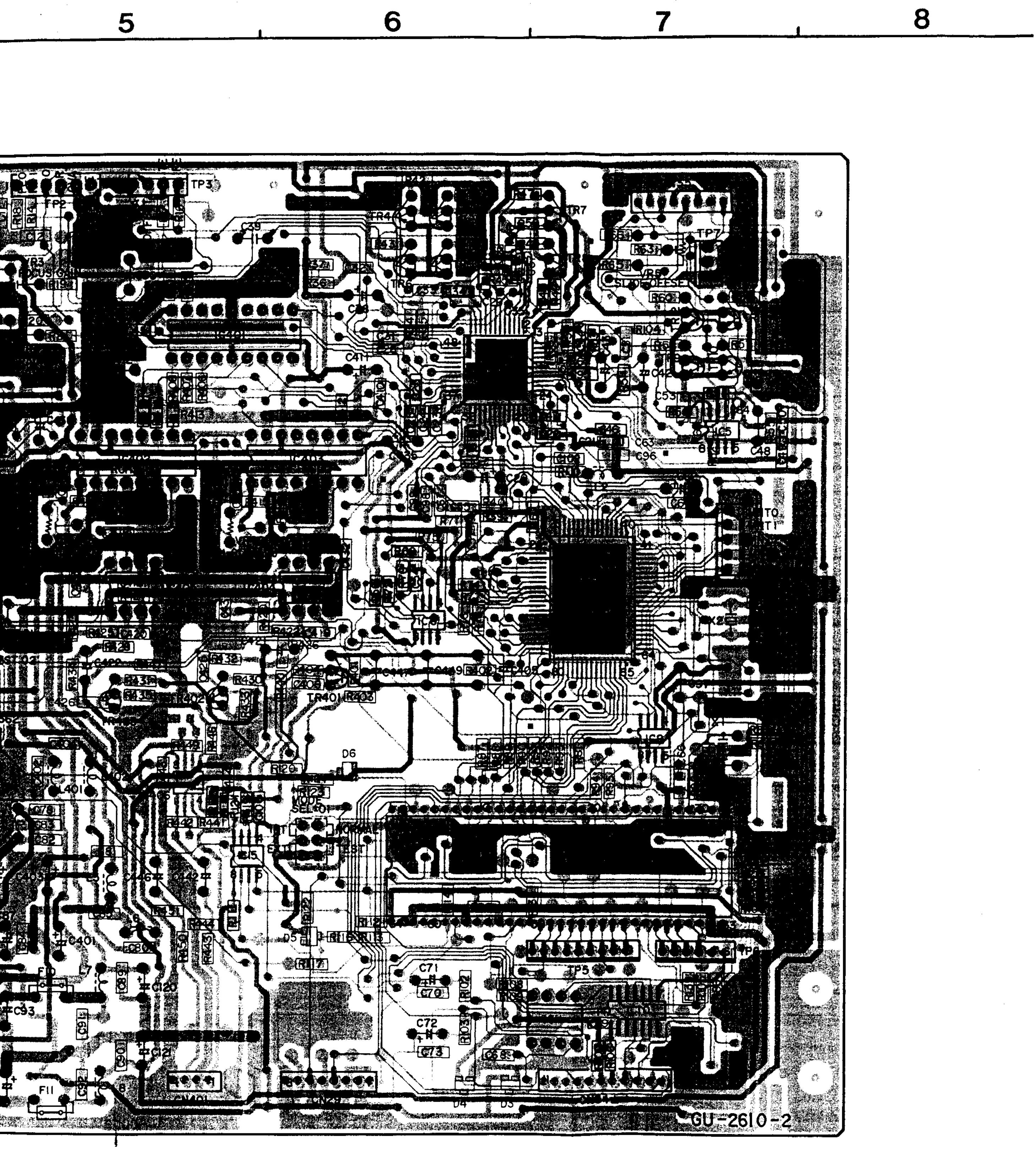
MA157A



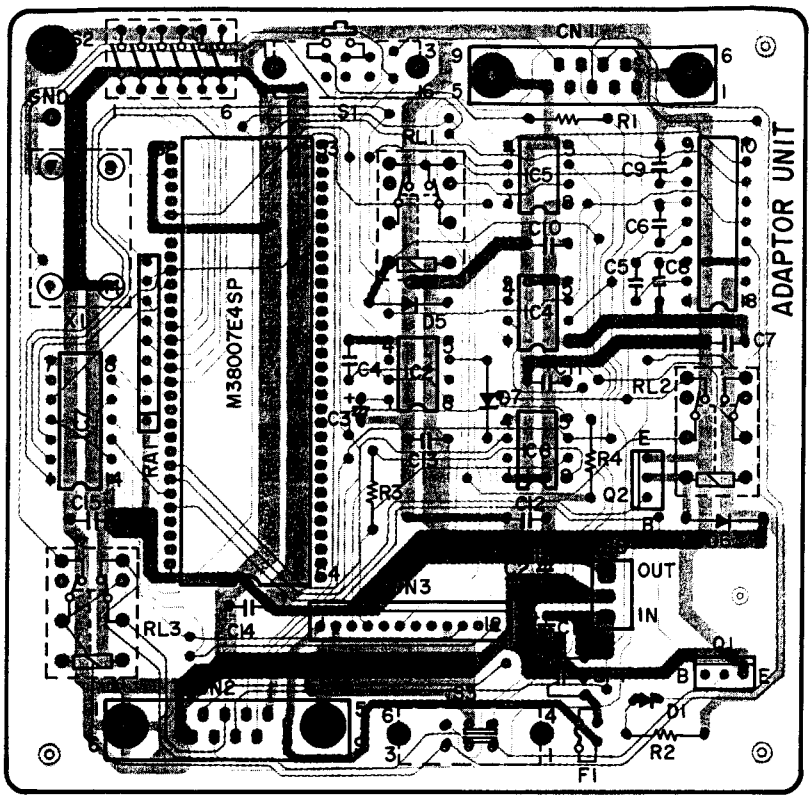
DISPLAY

LD-701 VR-L

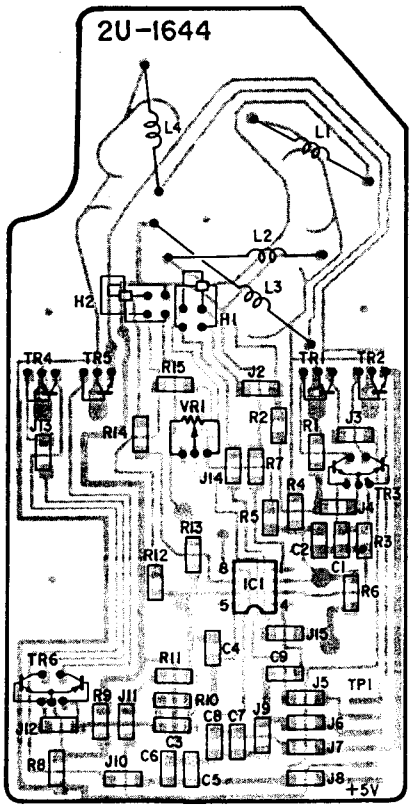


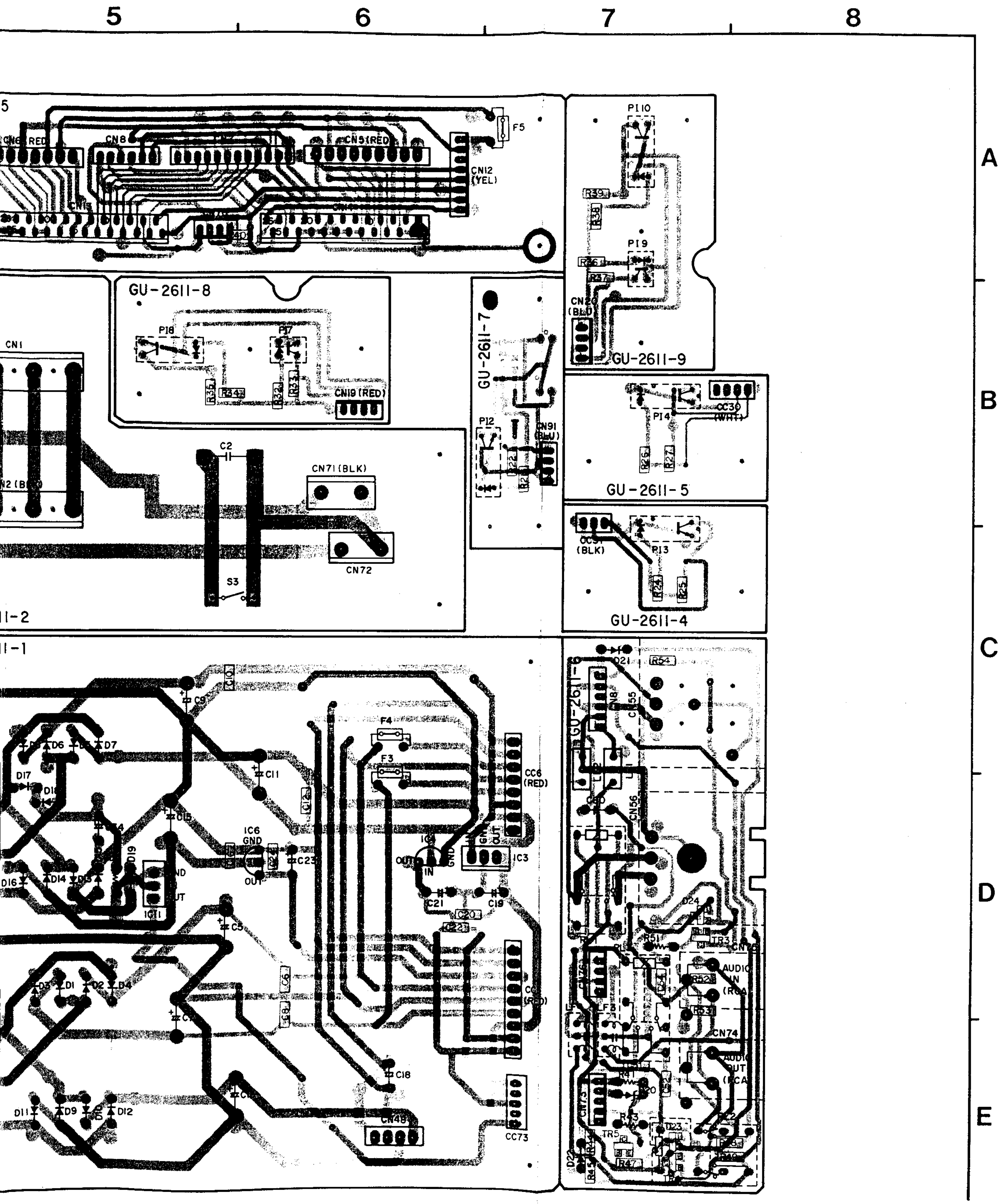

5
6
7
8
TP3
TR7
TP7
TP5
D6
D5
C71
C72
TR401
MODE SEL
GU-2610-2

990218103 ADAPTER UNIT



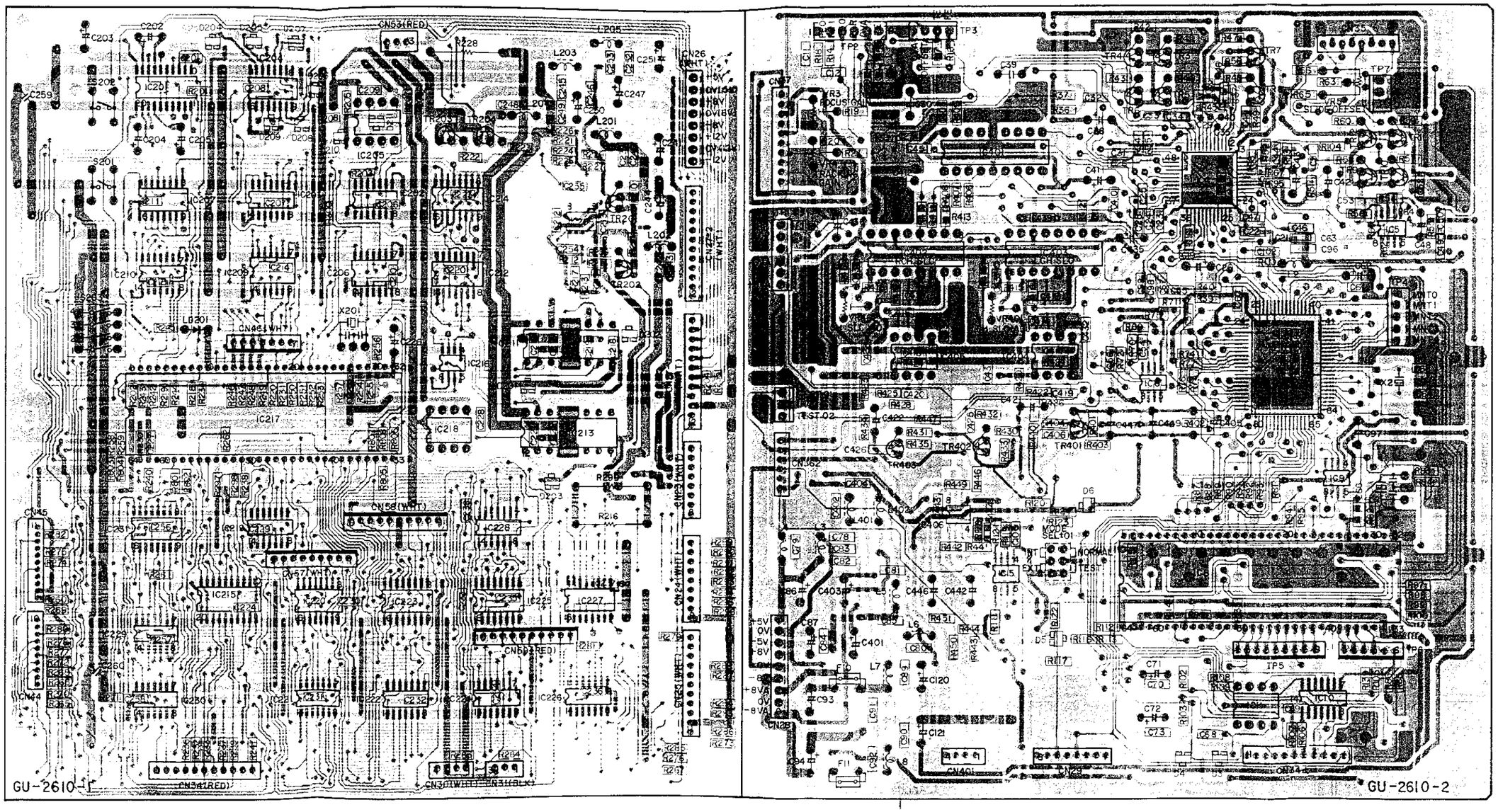
J-1644A MOTOR DRIVE UNIT




5
6
7
8
A
B
C
D
E
GU-2611-8
GU-2611-7
GU-2611-9
GU-2611-5
GU-2611-4
GU-2611-6
11-2
11-1
CN1
CN5 (RED)
CN8
CN12 (YEL)
CN19 (RED)
CN20 (BLU)
CN91 (BLU)
CC39 (WHT)
CC37 (BLK)
CN71 (BLK)
CN72
CC6 (RED)
CN48
CC73
CN73
CN74
AUDIO IN (RCA)
AUDIO OUT (RCA)
F3
F4
F5
P110
P19
P18
P17
P12
P14
P13
S3
C2
IC6
IC3
IC11
TR3
TR5
R54
D21
D22
D24

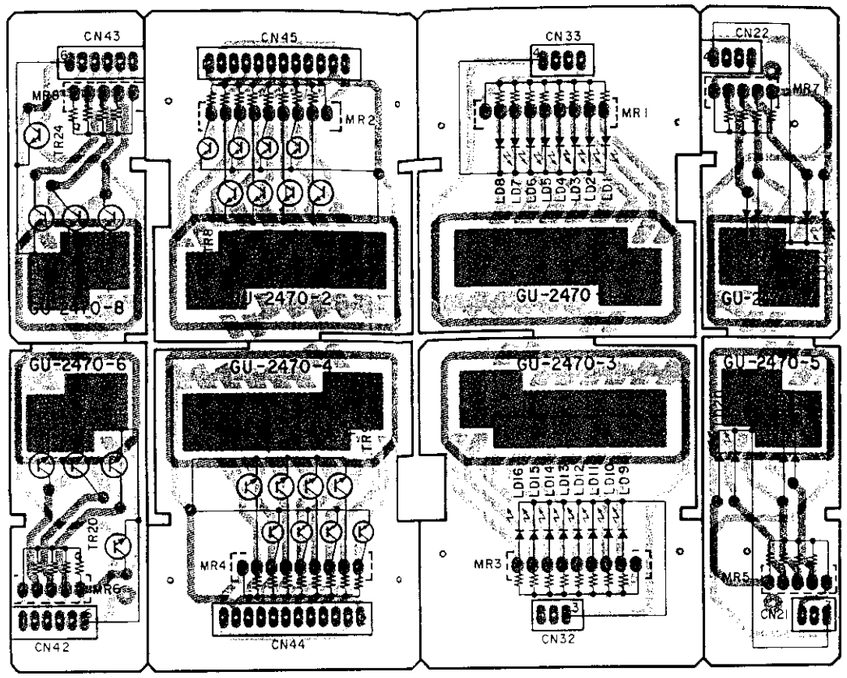
12. PRINTED WIRING BOARD PATTERNS

GU-2610 SERVO/CHANGER UNIT

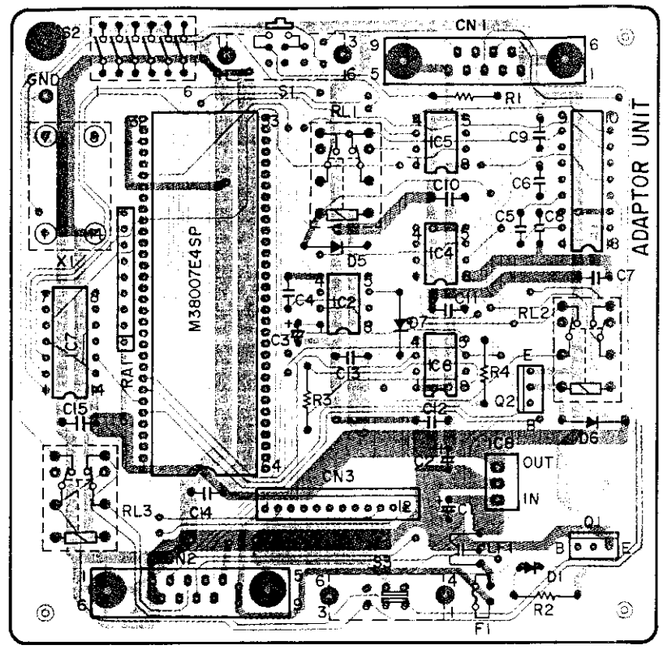


1 2 3 4 5 6 7 8

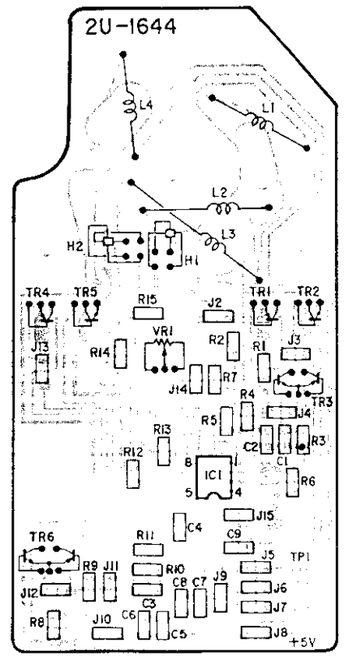
GU-2470 SENSOR UNIT



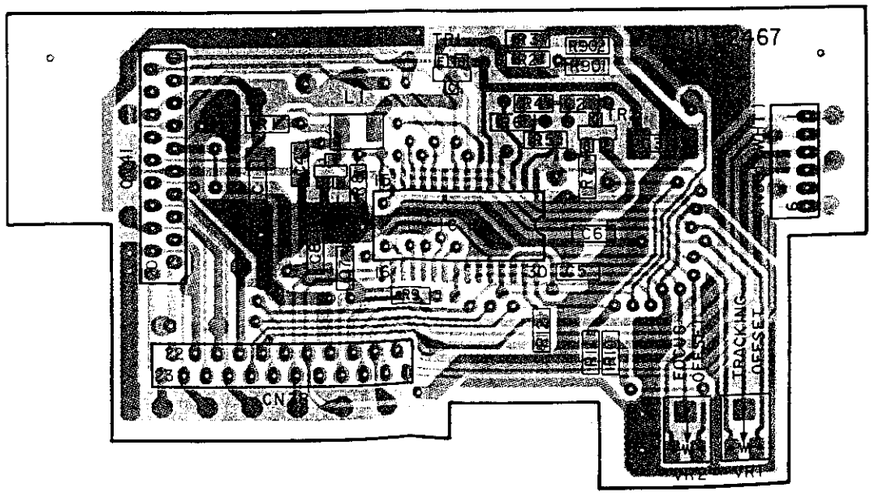
3990218103 ADAPTER UNIT



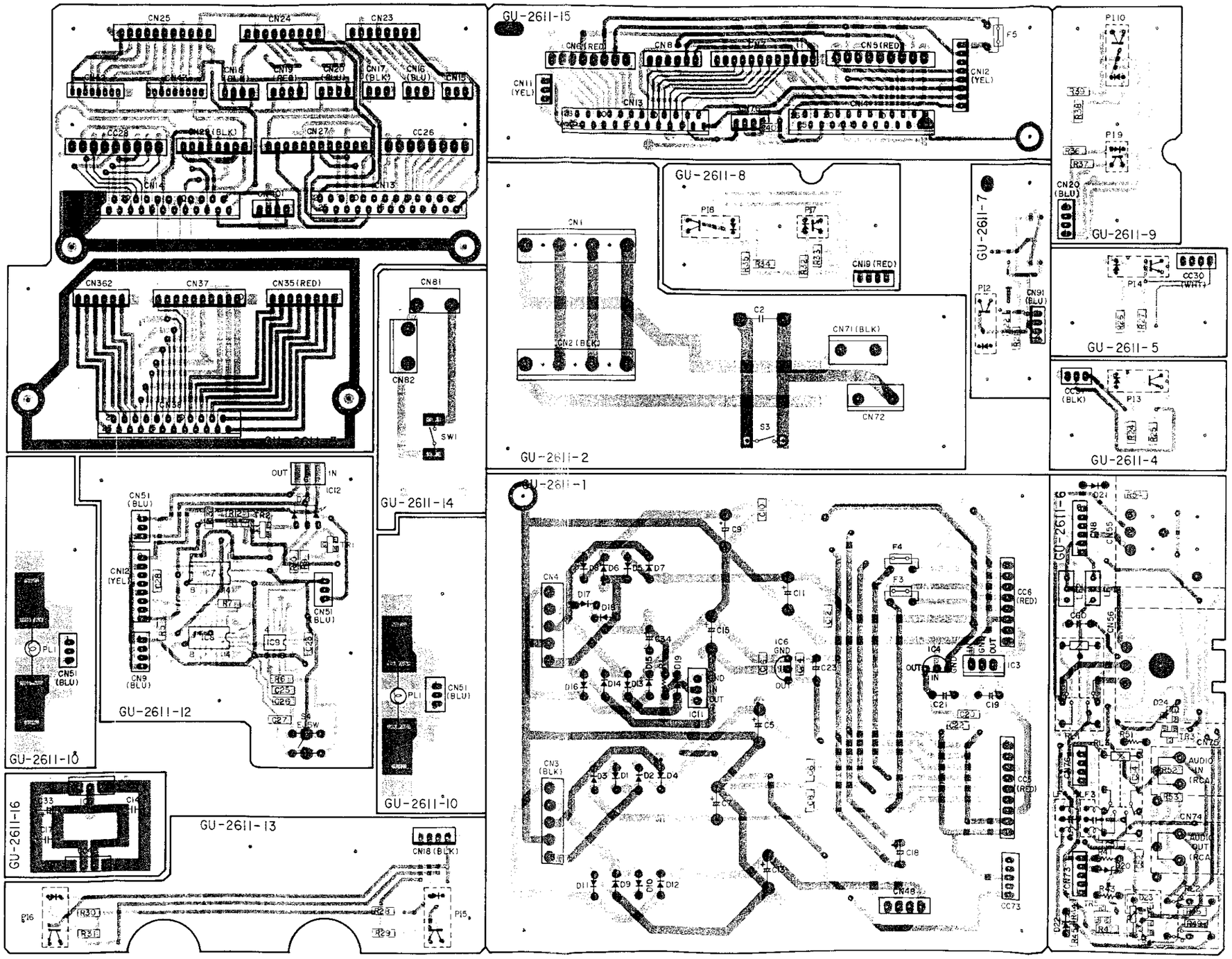
GU-1644A MOTOR DRIVE UNIT



GU-2467 PF AMP



GU-2611 POWER SENSOR UNIT



NOTE FOR PARTS LIST

- Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicate "1" and "I" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.
- Not including Carbon Film ±5%, 1/4W Type in the P.W.Board parts list. (Refer to the Schematic Diagram for those parts.)

WARNING:

Parts marked with this symbol ⚠ ▒▒ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

● Resistors

Ex.: RN (Type) 14K (Shape and performance) 2E (Power) 182 (Resistance) G (Allowable error) FR (Others)

RD : Carbon RC : Composition RS : Metal oxide film RW : Winding RN : Metal film RK : Metal mixture	2B : 1/8W 2E : 1/4W 2H : 1/2W 3A : 1W 3D : 2W 3F : 3W 3H : 5W	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20%	P : Pulse-resistant type NL : Low noise type NB : Non-burning type FR : Fuse-resistor F : Lead wire forming

* **Resistance**

1 8 2 ⇒ 1800 ohm = 1.8 kohm
- 2: 2-digit effective number.
- 8: Indicates number of zeros after effective number.

• Units: ohm

1 R 2 ⇒ 1.2 ohm
- 2: 1-digit effective number.
- R: 2-digit effective number, decimal point indicated by R.

• Units: ohm

● Capacitors

Ex.: CE (Type) 04W (Shape and performance) 1H (Dielectric strength) 2R2 (Capacity) M (Allowable error) BP (Others)

CE : Aluminum foil electrolytic CA : Aluminum solid electrolytic CS : Tantalum electrolytic CQ : Film CK : Ceramic CC : Ceramic CP : Oil CM : Mica CF : Metallized CH : Metallized	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V 2A : 100V 2B : 125V 2C : 160V 2D : 200V 2E : 250V 2H : 500V 2J : 630V	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20% Z : +80% −20% P : +100% −0% C : ±0.25pF D : ±0.5pF ▪ : Others	HS : High stability type BP : Non-polar type HR : Ripple-resistant type DL : For charge and discharge HF : For assuring high frequency U : UL part C : CSA part W : UL-CSA type F : Lead wire forming

* **Capacity (electrolyte only)**

2 2 2 ⇒ 2200μF
- 2: 2-digit effective number.
- 2: Indicates number of zeros after effective number.

• Units: μF.

2 R 2 ⇒ 2.2μF
- 2: 1-digit effective number.
- R: 2-digit effective number, decimal point indicated by R.

• Units: μF.

* **Capacity (except electrolyte)**

2 2 2 ⇒ 2200pF = 0.0022μF
- 2: 2-digit effective number.
- (More than 2): Indicates number of zeros after effective number.

• Units: μF.

2 2 1 ⇒ 220pF
- 2: 2-digit effective number.
- (0 or 1): Indicates number of zeros after effective number.

• Units: pF.

• When the dielectric strength is indicated in AC, "AC" is included after the dielectric strength value.

13. PRINTED WIRING BOARD PARTS LIST
(GU-2610) SERVO/CHANGER UNIT

Ref.No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC004	262 1342 006	IC CXA1372Q (48P QFP)	
IC005,006	263 0615 902	IC BA15218F	
IC007	262 1514 009	IC CXD2500AQ	
IC008	GEN 2493	IC Sub Ass'y (included M37451M8-304SP)	
IC009	263 0530 906	IC M51953AFP-T1	
IC010	262 1346 905	IC TC74HC08AF	
IC011	262 1515 008	IC M75179P	
IC015	263 0706 905	IC NJM2903M-T1	
IC202,203	262 1639 900	IC HD74HC00FP-TR	
IC204	262 1750 902	IC SN75ALS192NS-R	
IC205	262 1515 008	IC M75179P	
IC206	262 1345 906	IC TC74HC02AF	
IC207	262 1641 901	IC HD74HC157FP-TR	
IC208	262 1642 900	IC NJM2043M-T1	
IC209	262 1345 906	IC TC74HC02AF	
IC210	262 1640 902	IC HD74HC14FP-RR	
IC211	263 0583 005	IC LB1649	
IC212	262 1345 906	IC TC74HC02AF	
IC213	263 0583 005	IC LB1649	
IC214	262 1637 902	IC HD74HC139AF	
IC215	262 1343 908	IC SN74HC645NSR	
IC216	263 0530 906	IC M51953AFP-T1	
IC217	GEN 2494	IC Sub Ass'y (included M37451M8-305SP)	
IC218	262 1410 006	IC μPD6252C	
IC219	262 1640 902	IC HD74HC14FP-RR	
IC220	262 1641 901	IC HD74HC157FP-TR	
IC221,222	262 1640 902	IC HD74HC14FP-RR	
IC223	262 1641 901	IC HD74HC157FP-TR	
IC224	262 1640 902	IC HD74HC14FP-RR	
IC225	262 1643 909	IC HD74HC153P-TR	
IC226	262 1640 902	IC HD74HC14FP-RR	
IC227	262 1641 901	IC HD74HC157FP-TR	
IC228	262 1640 902	IC HD74HC14FP-RR	
IC401	262 1761 001	IC SM5841BP	
IC402,403	262 1171 002	IC PCM61P	
IC404,405	262 0864 006	IC μPC4570C	
IC406	263 0674 901	IC μPC4570G2-E2	
TR003,004	272 0025 907	Transistor 2SB562(C)TF	
TR005,006	274 0036 905	Transistor 2SD468(C)TF	
TR007	272 0025 907	Transistor 2SB562(C)TF	
TR008,009	274 0036 905	Transistor 2SD468(C)TF	
TR010	274 0036 905	Transistor 2SD468(C)TF	
TR011,012	272 0025 907	Transistor 2SB562(C)TF	
TR201	274 0136 025	Transistor 2SD1913(R/S)-LA	
TR202	272 0093 023	Transistor 2SB1274(R/S)-LA	
TR203	274 0036 905	Transistor 2SD468(C)TF	
TR204	272 0025 907	Transistor 2SB562(C)TF	
TR401	271 0183 927	Transistor 2SA933(R/S)T-93	
TR402,403	269 0073 908	Transistor DTA144TS(TP)	Built in Resistor
D003,004	276 0529 900	Diode	MA157A-TX
D005,006	276 0438 907	Diode	MA151WA
D201-203	276 0602 908	Zener Diode	HZM6.2NB-TL
D204-211	276 0529 900	Diode	MA157A-TX
LD201	393 9401 900	LED SEL-2210R(TP3) Red	

Ref.No.	Part No.	Part Name	Remarks
RESISTORS GROUP (Not included Carbon Film ±5%, 1/4W type)			
VR003,004	211 6077 912	Variable 20Kohm	V06PB203(IM)
VR005	211 6077 983	Variable 47Kohm	V06PB473(IM)
VR401,402	211 6077 938	Variable 100Kohm	V06PB104(IM)
R013	247 0007 945	Chip Resistor 1kohm ±5% 1/10W	RM73B--102JT
R014,015	247 0011 902	Chip Resistor 33kohm ±5% 1/10W	RM73B--333JT
R016,017	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R018	247 0011 902	Chip Resistor 33kohm ±5% 1/10W	RM73B--333JT
R019	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R020	247 0011 902	Chip Resistor 33kohm ±5% 1/10W	RM73B--333JT
R021	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R033	247 0009 956	Chip Resistor 7.5kohm ±5% 1/10W	RM73B--752JT
R034	247 0011 960	Chip Resistor 56kohm ±5% 1/10W	RM73B--563JT
R035	247 0011 928	Chip Resistor 39kohm ±5% 1/10W	RM73B--393JT
R036	247 0011 902	Chip Resistor 33kohm ±5% 1/10W	RM73B--333JT
R037	247 0010 961	Chip Resistor 22kohm ±5% 1/10W	RM73B--223JT
R038	247 0013 971	Chip Resistor 430kohm ±5% 1/10W	RM73B--434JT
R039	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R040	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R041-044	247 0005 989	Chip Resistor 220ohm ±5% 1/10W	RM73B--221JT
R045	247 0013 968	Chip Resistor 390kohm ±5% 1/10W	RM73B--394JT
R046	247 0012 969	Chip Resistor 150kohm ±5% 1/10W	RM73B--154JT
R047,048	247 0005 989	Chip Resistor 220ohm ±5% 1/10W	RM73B--221JT
R049	247 0012 969	Chip Resistor 150kohm ±5% 1/10W	RM73B--154JT
R050	247 0010 929	Chip Resistor 15kohm ±5% 1/10W	RM73B--153JT
R051	247 0008 973	Chip Resistor 3.6kohm ±5% 1/10W	RM73B--362JT
R052	247 0011 915	Chip Resistor 36kohm ±5% 1/10W	RM73B--363JT
R053	247 0011 986	Chip Resistor 68kohm ±5% 1/10W	RM73B--683JT
R054	247 0010 987	Chip Resistor 27kohm ±5% 1/10W	RM73B--273JT
R055	247 0009 901	Chip Resistor 4.7kohm ±5% 1/10W	RM73B--472JT
R056-060	247 0005 989	Chip Resistor 220ohm ±5% 1/10W	RM73B--221JT
R061	247 0014 954	Chip Resistor 910kohm ±5% 1/10W	RM73B--914JT
R062	247 0012 985	Chip Resistor 180kohm ±5% 1/10W	RM73B--184JT
R063	247 0014 954	Chip Resistor 910kohm ±5% 1/10W	RM73B--914JT
R064	247 0008 973	Chip Resistor 3.6kohm ±5% 1/10W	RM73B--362JT
R065,066	247 0010 961	Chip Resistor 22kohm ±5% 1/10W	RM73B--223JT
R067	247 0012 943	Chip Resistor 120kohm ±5% 1/10W	RM73B--124JT
R068	247 0014 912	Chip Resistor 620kohm ±5% 1/10W	RM73B--624JT
R069	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R070	247 0009 901	Chip Resistor 4.7kohm ±5% 1/10W	RM73B--472JT
R071	247 0008 960	Chip Resistor 3.3kohm ±5% 1/10W	RM73B--332JT
R072	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R073	247 0009 956	Chip Resistor 7.5kohm ±5% 1/10W	RM73B--752JT
R074	247 0011 902	Chip Resistor 33kohm ±5% 1/10W	RM73B--333JT
R075	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R076	247 0008 931	Chip Resistor 2.4kohm ±5% 1/10W	RM73B--242JT
R077	247 0011 902	Chip Resistor 33kohm ±5% 1/10W	RM73B--333JT
R078	247 0008 960	Chip Resistor 3.3kohm ±5% 1/10W	RM73B--332JT
R079	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R080	247 0009 943	Chip Resistor 6.8kohm ±5% 1/10W	RM73B--682JT
R081,082	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT

Ref.No.	Part No.	Part Name	Remarks
R083	247 0014 967	Chip Resistor 1Mohm ±5% 1/10W	RM73B--105JT
R084	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R085~100	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R102,103	247 0004 948	Chip Resistor 56ohm ±5% 1/10W	RM73B--560JT
R104	247 0003 949	Chip Resistor 22ohm ±5% 1/10W	RM73B--220JT
R105~109	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R110	247 0014 967	Chip Resistor 1Mohm ±5% 1/10W	RM73B--105JT
R111	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R112,113	247 0013 900	Chip Resistor 220kohm ±5% 1/10W	RM73B--224JT
R114	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R115	247 0010 929	Chip Resistor 15kohm ±5% 1/10W	RM73B--153JT
R116	247 0009 943	Chip Resistor 6.8kohm ±5% 1/10W	RM73B--682JT
R117	247 0009 969	Chip Resistor 8.2kohm ±5% 1/10W	RM73B--822JT
R118	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R119,120	247 0013 900	Chip Resistor 220kohm ±5% 1/10W	RM73B--224JT
R121	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R122	247 0010 929	Chip Resistor 15kohm ±5% 1/10W	RM73B--153JT
R123	247 0009 943	Chip Resistor 6.8kohm ±5% 1/10W	RM73B--682JT
R124	247 0009 969	Chip Resistor 8.2kohm ±5% 1/10W	RM73B--822JT
R138,139	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R201~203	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R204	247 1005 975	Chip Resistor 200ohm ±5% 1/8W	RM73B2B201JT
R205,206	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R207,208	247 0013 984	Chip Resistor 470kohm ±5% 1/10W	RM73B--474JT
R209	247 0011 931	Chip Resistor 43kohm ±5% 1/10W	RM73B--433JT
R210,211	247 0005 989	Chip Resistor 220ohm ±5% 1/10W	RM73B--221JT
R212,213	247 0010 961	Chip Resistor 22kohm ±5% 1/10W	RM73B--223JT
R214	247 0008 999	Chip Resistor 4.3kohm ±5% 1/10W	RM73B--432JT
R215	247 0010 961	Chip Resistor 22kohm ±5% 1/10W	RM73B--223JT
R216	244 0009 012	Metal oxide film 2.2ohm ±5% 1W (Non-burning)	RS14B3A2R2JNBF
R217	247 0008 986	Chip Resistor 3.9kohm ±5% 1/10W	RM73B--392JT
R218~220	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R221	247 0010 974	Chip Resistor 24kohm ±5% 1/10W	RM73B--243JT
R222,223	247 0005 989	Chip Resistor 220ohm ±5% 1/10W	RM73B--221JT
R224,225	247 0010 961	Chip Resistor 22kohm ±5% 1/10W	RM73B--223JT
R226	247 0008 999	Chip Resistor 4.3kohm ±5% 1/10W	RM73B--432JT
R227	247 0010 961	Chip Resistor 22kohm ±5% 1/10W	RM73B--223JT
R228	244 0009 012	Metal oxide film 2.2ohm ±5% 1W (Non-burning)	RS14B3A2R2JNBF
R229	247 0008 999	Chip Resistor 4.3kohm ±5% 1/10W	RM73B--432JT
R230~234	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R235	247 1005 975	Chip Resistor 200ohm ±5% 1/8W	RM73B2B201JT
R236~244	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R245	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R246~253	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R254	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R255	247 0014 967	Chip Resistor 1Mohm ±5% 1/10W	RM73B--105JT
R256	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R257	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R258~261	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R262	247 0008 960	Chip Resistor 3.3kohm ±5% 1/10W	RM73B--332JT
R263,264	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R265~280	247 0007 945	Chip Resistor 1kohm ±5% 1/10W	RM73B--102JT
R281~288	247 0008 928	Chip Resistor 2.2kohm ±5% 1/10W	RM73B--222JT
R289~296	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R297	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT

Ref. No.	Part No.	Part Name	Remarks
R298	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R299	244 0009 012	Metal oxide film 2.2ohm ±5% 1W (Non-burning)	RS14B3A2R2JNBF
R300,301	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R401	247 0008 915	Chip Resistor 2kohm ±5% 1/10W	RM73B--202JT
R402,403	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R404	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R406~413	247 0007 945	Chip Resistor 1kohm ±5% 1/10W	RM73B--102JT
R414	247 0012 998	Chip Resistor 200kohm ±5% 1/10W	RM73B--204JT
R415	247 0013 984	Chip Resistor 470kohm ±5% 1/10W	RM73B--474JT
R416	247 0014 967	Chip Resistor 1Mohm ±5% 1/10W	RM73B--105JT
R417	247 0012 998	Chip Resistor 200kohm ±5% 1/10W	RM73B--204JT
R418	247 0013 984	Chip Resistor 470kohm ±5% 1/10W	RM73B--474JT
R419	247 0014 967	Chip Resistor 1Mohm ±5% 1/10W	RM73B--105JT
R420	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R421	247 0009 927	Chip Resistor 5.6kohm ±5% 1/10W	RM73B--562JT
R422	247 0009 998	Chip Resistor 11kohm ±5% 1/10W	RM73B--113JT
R423	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R424	247 0009 927	Chip Resistor 5.6kohm ±5% 1/10W	RM73B--562JT
R425	247 0009 998	Chip Resistor 11kohm ±5% 1/10W	RM73B--113JT
R426	247 0008 960	Chip Resistor 3.3kohm ±5% 1/10W	RM73B--332JT
R428	247 0008 960	Chip Resistor 3.3kohm ±5% 1/10W	RM73B--332JT
R430,431	247 0008 928	Chip Resistor 2.2kohm ±5% 1/10W	RM73B--222JT
R432	247 0007 987	Chip Resistor 1.5kohm ±5% 1/10W	RM73B--132JT
R433	247 0013 984	Chip Resistor 470kohm ±5% 1/10W	RM73B--474JT
R434	247 0007 987	Chip Resistor 1.5kohm ±5% 1/10W	RM73B--132JT
R435	247 0013 984	Chip Resistor 470kohm ±5% 1/10W	RM73B--474JT
R440	247 0013 900	Chip Resistor 220kohm ±5% 1/10W	RM73B--474JT
R441	247 0009 927	Chip Resistor 5.6kohm ±5% 1/10W	RM73B--562JT
R442	247 0018 905	Chip Resistor 0ohm ±10% 1/10W	RM73B--0R0KT
R443	247 0005 921	Chip Resistor 120ohm ±5% 1/10W	RM73B--121JT
R444	247 0010 990	Chip Resistor 30kohm ±5% 1/10W	RM73B--303JT
R446	247 0009 927	Chip Resistor 5.6kohm ±5% 1/10W	RM73B--562JT
R447	247 0013 900	Chip Resistor 220kohm ±5% 1/10W	RM73B--474JT
R449	247 0018 905	Chip Resistor 0ohm ±10% 1/10W	RM73B--0R0KT
R450	247 0005 921	Chip Resistor 120ohm ±5% 1/10W	RM73B--121JT
R451	247 0010 990	Chip Resistor 30kohm ±5% 1/10W	RM73B--303JT
R803~806	247 0018 905	Chip Resistor 0ohm ±10% 1/10W	RM73B--0R0KT

CAPACITORS GROUP

C009~012	257 0007 900	Ceramic (Chip) 0.001μF/50V	CC73SL1H102JT
C018	257 0011 967	Ceramic (Chip) 0.033μF/25V	CK73B1E333KT
C019	257 0010 900	Ceramic (Chip) 0.01μF/50V	CK73B1H103KT
C020	254 4305 942	Electrolytic 0.47μF/50V	CE04W1HR47MT
C021	257 0010 900	Ceramic (Chip) 0.01μF/50V	CK73B1H103KT
C022	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C023	257 0010 900	Ceramic (Chip) 0.01μF/50V	CK73B1H103KT
C024	257 0009 940	Ceramic (Chip) 0.0033μF/50V	CK73B1H332KT
C025	257 0010 900	Ceramic (Chip) 0.01μF/50V	CK73B1H103KT
C026	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C027	257 0009 940	Ceramic (Chip) 0.0033μF/50V	CK73B1H332KT
C028	257 0006 943	Ceramic (Chip) 560pF/50V	CC73SL1H561JT
C029	257 0011 996	Ceramic (Chip) 0.1μF/25V	CK73B1E104KT
C030	256 1035 952	Metallized 0.47μF/50V	CF93A1H474JT
C031	257 0009 924	Ceramic (Chip) 0.0022μF/50V	CK73B1H222KT

Ref. No.	Part No.	Part Name	Remarks
C032	257 0011 996	Ceramic (Chip) 0.1µF/25V	CK73B1E104KT
C033	257 0011 984	Ceramic (Chip) 0.047µF/50V	CK73B1H473KT
C034	257 1013 980	Ceramic (Chip) 0.082µF/25V	CK73B1E823KT
C035	257 0011 967	Ceramic (Chip) 0.033µF/25V	CK73B1E333KT
C036	257 0009 979	Ceramic (Chip) 0.0056µF/50V	CK73B1H562KT
C037	257 0005 928	Ceramic (Chip) 180pF/50V	CC73SL1H181JT
C038	254 4303 915	Ceramic (Chip) 4.7µF/25V	CE04W1E4R7MT
C039	256 1035 910	Metallized 0.22µF/50V	CF93A1H224JT
C040	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C041	257 0002 921	Ceramic (Chip) 10pF/50V	CC73SL1H100DT
C042	254 3061 915	Electrolytic 0.47µF/50V (Bipolar)	CE04D1HR47MBPT
C043	254 3064 909	Electrolytic 10µF/16V (Bipolar)	CE04D1C100MBPT
C044	257 0004 961	Ceramic (Chip) 100pF/50V	CC73SL1H101JT
C045	257 0010 900	Ceramic (Chip) 0.01µF/50V	CK73B1H103KT
C046,047	257 0007 900	Ceramic (Chip) 0.001µF/50V	CC73SL1H102JT
C048	254 3061 902	Electrolytic 1µF/50V(Bipolar)	CE04D1H010MBPT
C049,050	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C051	257 0011 996	Ceramic (Chip) 0.1µF/25V	CK73B1E104KT
C052	257 0020 903	Ceramic (Chip) 0.056µF/25V	CK73B1E563KT
C053	257 0010 926	Ceramic (Chip) 0.015µF/50V	CK73B1H153KT
C054	257 0004 961	Ceramic (Chip) 100pF/50V	CC73SL1H101JT
C055	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C056	257 0010 900	Ceramic (Chip) 0.01µF/50V	CK73B1H103KT
C057	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C058	257 0011 984	Ceramic (Chip) 0.047µF/50V	CK73B1H473KT
C059	257 0007 942	Ceramic (Chip) 0.0015µF/50V	CC73SL1H152JT
C060,061	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C062	254 4300 963	Electrolytic 100µF/6.3V	CE04W0J101MT
C063	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C064	257 0001 964	Ceramic (Chip) 4pF/50V	CC73SL1H4R0CT
C065	257 0002 992	Ceramic (Chip) 20pF/50V	CC73SL1H200DT
C066,067	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C068,069	257 0007 900	Ceramic (Chip) 0.001µF/50V	CC73SL1H102JT
C070	257 0010 900	Ceramic (Chip) 0.01µF/50V	CK73B1H103KT
C071,072	254 4299 964	Electrolytic 47µF/16V	CE04W1C470MT
C073	257 0010 900	Ceramic (Chip) 0.01µF/50V	CK73B1H103KT
C078~085	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C086,087	254 4300 963	Electrolytic 100µF/6.3V	CE04W0J101MT
C089~092	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C093,094	254 4299 964	Electrolytic 47µF/16V	CE04W1C470MT
C095,096	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C097	254 4305 968	Electrolytic 1µF/50V	CE04W1H010MT
C098,099	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C102	257 0004 961	Ceramic (Chip) 100pF/50V	CC73SL1H101JT
C103	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C120,121	254 4299 906	Electrolytic 10µF/16V	CE04W1C100MT
C201	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C202~205	254 4299 919	Electrolytic 22µF/16V	CE04W1C220MT
C206~225	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C226	254 4305 926	Electrolytic 0.22µF/50V	CE04W1HR22MT
C227~243	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C241	254 4303 960	Electrolytic 33µF/25V	CE04W1E330MT
C244	254 4303 960	Electrolytic 33µF/25V	CE04W1E330MT
C245,246	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C247	254 4299 964	Electrolytic 47µF/16V	CE04W1C470MT
C248,249	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C250	254 4299 964	Electrolytic 47µF/16V	CE04W1C470MT

Ref. No.	Part No.	Part Name	Remarks
C251	254 4300 963	Electrolytic 100µF/6.3V	CE04W0J101MT
C252,253	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C254,255	257 0004 961	Ceramic (Chip) 100pF/50V	CC73SL1H101JT
C256~258	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C401	254 4193 947	Electrolytic 100µF/16V	CE04W1C101MT
C402	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C403	254 4193 947	Electrolytic 100µF/16V	CE04W1C101MT
C404	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C405	254 4306 925	Electrolytic 10µF/50V	CE04W1H330MT
C406	257 0010 900	Ceramic (Chip) 0.01µF/50V	CK73B1H103KT
C408	257 0004 961	Ceramic (Chip) 100pF/50V	CC73SL1H101JT
C410	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C411,412	254 4193 947	Electrolytic 100µF/16V	CE04W1C101MT
C413	257 0006 985	Ceramic (Chip) 820pF/50V	CC73SL1H821JT
C414	257 0005 928	Ceramic (Chip) 180pF/50V	CC73SL1H181JT
C415	257 0006 985	Ceramic (Chip) 820pF/50V	CC73SL1H821JT
C416	257 0005 928	Ceramic (Chip) 180pF/50V	CC73SL1H181JT
C417,418	257 0007 900	Ceramic (Chip) 0.001µF/50V	CC73SL1H102JT
C419,420	257 0005 944	Ceramic (Chip) 220pF/50V	CC73SL1H221JT
C421,422	254 3069 904	Electrolytic 22µF/16V(Bipolar)	CE04D1C220MBPT
C425,426	257 0007 900	Ceramic (Chip) 0.001µF/50V	CC73SL1H102JT
C431	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C432	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C433,434	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C435,436	254 4193 947	Electrolytic 100µF/16V	CE04W1C101MT
C437	257 0011 996	Ceramic (Chip) 0.1µF/25V	CK73B1E104KT
C438,439	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C442	254 3069 904	Electrolytic 22µF/16V(Bipolar)	CE04D1C220MBPT
C443,444	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT
C446	254 3069 904	Electrolytic 22µF/16V(Bipolar)	CE04D1C220MBPT
C447	254 4306 925	Electrolytic 10µF/50V	CE04W1H330MT
C449	254 4306 925	Electrolytic 10µF/50V	CE04W1H330MT
C451	257 0014 935	Ceramic (Chip) 0.1µF/25V	CK73F1E104ZT

OTHER PARTS

X001	399 0120 000	Crystal Oscillator (9.83MHz)	
X002	399 0036 013	Crystal Oscillator (16.9344MHz)	
X201	399 0120 000	Crystal Oscillator (9.83MHz)	
L002~008	235 0049 900	Beads Inductor	
L201~205	235 0049 900	Beads Inductor	
L401,402	235 0049 900	Beads Inductor	
F010,011	268 0074 904	IC Protector	ICP-N20T
S201,202	212 4388 907	Tact Switch	
S203	212 4684 009	Piano Dip Switch (4 Pole)	
CN023	205 0355 088	8P KR Connector Base (WHT) L	MOTOR DRIVE
CN024	205 0355 091	9P KR Connector Base (WHT) L	SENSOR INPUT
CN025	205 0480 018	11P KR Connector Base (WHT) L	ADDRESS SENSOR
CN026	205 0234 086	8P EH SID Connector Base (WHT)	CHANGER POWER
CN028	205 0234 099	9P EH SID Connector Base (WHT)	POWER
CN029	205 0685 088	8P Connector Base (BLK) L	DIGITAL OUT
CN030	205 0355 046	4P KR Connector Base (WHT) L	DISC SELECTR
CN031	205 0685 033	3P Connector Base (BLK) L	DISC SELECTL

Ref. No.	Part No.	Part Name	Remarks
CN034	205 0395 019	11P Connector Base (RED) L	CHANGER CPU
CN034	205 0395 019	11P Connector Base (RED) L	SERVO CHANGER
CN035	205 0395 080	8P KR Connector Base (RED) L	PU DRIVE
CN037	205 0480 005	10P KR Connector Base (WHT) L	SERVO PRE AMP
CN044	205 0763 007	10P ZR Connector Base (WHT) L	ADDRESS SENSOR
CN045	205 0763 010	11P ZR Connector Base (WHT) L	ADDRESS SENSOR
CN046	205 0343 074	7P Connector Base (KR-PH) (WHT)	
CN053	205 0395 035	3P KR Connector Base (RED)L	MOTOR
CN057	205 0343 090	9P Connector Base (KR-PH)	ADDRESS CHECK
CN058	205 0375 000	10P Connector Base (KR-PH)	ADDRESS CHECK
CN059	205 0321 009	10P Connector Base (RED)	ADDRESS CHECK
CN271,272	205 0480 021	12P KR Connector Base (WHT) L	RS232C
CN362	205 0355 062	6P KR Connector Base (WHT) L	SPINDLE MOTOR
CN401	205 0355 046	4P KR Connector Base (WHT) L	DISC SELECT R
TP001,002	205 0190 065	6P NH Connector	
TP003	205 0190 049	4P NH Connector	
TP004	205 0190 052	5P NH Connector	
TP005	205 0343 090	9P Connector Base (KR-PH)	7 SEGMENT
TP006	205 0343 061	6P Connector Base (KR-PH)	KEY INPUT
TP007,008	205 0190 036	3P NH Connector Base	

(GU-2611) POWER SENSOR UNIT

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC003	263 0815 003	IC NJM78M08FA(S)	
IC004	263 0596 005	IC NJM79L08	
IC005	263 0809 006	IC NJM7805FA(S)	
IC006	263 0722 905	IC NJM97L05AT	
IC007	262 1640 902	IC HD74HC14FP-TR	
IC008	262 1844 902	IC SN74HC107NS-R	
IC009	263 0530 906	IC M51953AFP-T1	
IC011	262 0678 001	IC MN1280-S	
IC012	263 0843 004	IC AN78N09	
⚠F003,004	268 0074 904	IC Protector	ICP-N20T
⚠F005	268 0073 905	IC Protector	ICP-N15T
TR001,002	269 0048 904	Transistor DTC143EK-T96	Built in Resistor
TR003	269 0086 908	Transistor DTA114TKT96	Built in Resistor
TR004	269 0103 904	Transistor DTC314TK-T146	Built in Resistor
TR005	269 0086 908	Transistor DTA114TKT96	Built in Resistor
D001~016	276 0553 905	Diode 1SR35-200A(T93X)	
D017,018	276 0432 903	Diode 1SS270A TE	
D019,020	276 0460 904	Zener Diode HZS5C-1TD	
D021,022	276 0432 903	Diode 1SS270A TE	
D023,024	276 0529 900	Diode MA157A-TX	
D025	393 9491 004	LED SM1216W	
PI002~006	269 0118 106	Photo Interrupter GP1S58	
PI007	269 0113 203	Photo Interrupter GP1S37	
PI008	269 0118 106	Photo Interrupter GP1S58	
PI009	269 0113 203	Photo Interrupter GP1S37	
PI010	269 0118 106	Photo Interrupter GP1S58	
RESISTORS GROUP (Not included Carbon Film ±5%, 1/4W type)			
R005	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R006	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R007	247 0113 981	Chip Resistor 470kohm ±5% 1/10W	RM73B--474JT
R009	247 0005 963	Chip Resistor 180ohm ±5% 1/10W	RM73B--181JT
R010	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R011	247 0005 963	Chip Resistor 180ohm ±5% 1/10W	RM73B--181JT
R012	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R013	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R021	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R022	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R024	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R025	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R026	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R027	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R028	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R029	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R030	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R031	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R032	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R033	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R034	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R035	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R036	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT

Ref. No.	Part No.	Part Name	Remarks
R037	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R038	247 0006 920	Chip Resistor 330ohm ±5% 1/10W	RM73B--331JT
R039	247 0011 944	Chip Resistor 47kohm ±5% 1/10W	RM73B--473JT
R044	247 0008 960	Chip Resistor 3.3kohm ±5% 1/10W	RM73B--332JT
R045	247 0008 928	Chip Resistor 2.2kohm ±5% 1/10W	RM73B--222JT
R047	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R048,049	247 0114 948	Chip Resistor 820kohm ±5% 1/10W	RM73B--824JT
R052,053	247 0114 948	Chip Resistor 820kohm ±5% 1/10W	RM73B--824JT

CAPACITORS GROUP

⚠C002	253 8014 702	Ceramic (Chip) 0.01μF/400VAC	CK45F2GAC103MC
C005	254 4257 715	Electrolytic 4700μF/25V	CE04W1E472MC
C006	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C007	254 4257 715	Electrolytic 4700μF/25V	CE04W1E472MC
C008	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C009	254 4257 715	Electrolytic 4700μF/25V	CE04W1E472MC
C010	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C011	254 4257 715	Electrolytic 4700μF/25V	CE04W1E472MC
C012	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C013	254 4255 720	Electrolytic 6800μF/16V	CE04W1C682MC
C014	253 1188 907	Ceramic 0.33μF/50V	CK93=1H334ZT
C015	254 4255 720	Electrolytic 6800μF/16V	CE04W1C682MC
C016	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C017	253 1170 902	Ceramic 0.1μF/50V	CK93=1H104ZT
C018	254 4300 963	Electrolytic 100μF/6.3V	CE04W0J101MC
C019	254 4254 941	Electrolytic 100μF/16V	CE04W1C101MT
C020	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C021	254 4254 941	Electrolytic 100μF/16V	CE04W1C101MT
C022	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C023	254 4300 963	Electrolytic 100μF/6.3V	CE04W0J101MC
C024	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C025	257 0016 932	Ceramic (Chip) 0.22μF/25V	CK73F1E224ZT
C026~028	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C029	257 0014 935	Ceramic (Chip) 0.1μF/25V	CK73F1E104ZT
C033	254 4440 904	Electrolytic 100μF/16V	CE04W1C101MT
C034	254 4260 964	Electrolytic 3.3μF/50V	CE04W1H3R3MT
C040,041	257 0011 909	Ceramic (Chip) 0.01μF/25V	CK73B1E103KT
C051	257 0011 909	Ceramic (Chip) 0.01μF/25V	CK73B1E103KT
C053,054	257 0011 909	Ceramic (Chip) 0.01μF/25V	CK73B1E103KT
C060	254 3056 917	Electrolytic 1μF/50V (Bipolar)	CE04D1H010MBPT

OTHER PARTS

⚠RL001~003	214 0121 009	Relay	
LF001~004	235 0086 002	EMI Filter	
⚠SW001	212 4696 007	Power Switch (TV-5)	
⚠SW003	212 8004 009	Power Seesaw Switch	
SW004	212 5604 907	Tact Switch	
CN001	205 0653 078	7P VH Connector Base	POWER TRANS.
CN002	205 0722 077	7P VH Connector Base	POWER SW.
CN003	205 0722 051	5P VH Connector Base (BLK)	POWER TRANS.
CN004	205 0653 052	5P VH Connector Base	POWER TRANS.
CN005	205 0277 098	9P EH Connector Base (RED)	CD SERVO

Ref. No.	Part No.	Part Name	Remarks
CN006	205 0277 085	8P EH Connector Base (RED)	CHANGER CONTROL
CN007	205 0375 026	12P Connector Base (KR-PH)	DIGITAL OUT
CN008	205 0343 061	6P Connector Base (KR-PH) (WHT)	
CN009	205 0686 045	4P Connector Base (BLU) L	DOOR OPEN
CN011	205 0543 036	3P Connector Base (YEL)	MAIN MOTOR
CN012	205 0543 081	8P Connector Base (YEL)	POWER LED
CN013	205 0514 065	26P FFC Connector Base(A)	CHANGER CONTROL
CN014	205 0514 065	26P FFC Connector Base(A)	CD SERVO
CN015	205 0343 032	3P Connector Base (KR-PH) (WHT)	DISC SELECT
CN016	205 0406 034	3P Connector Base (KR-PH) (BLU)	LEFT LIFT MOTOR
CN017	205 0323 036	3P Connector (BLK)	RIGHT LIFT MOTOR
CN018	205 0323 049	4P Connector Base (BLK)	LOAD DISC SENS
CN019	205 0321 041	4P Connector Base (RED)	RIGHT LIFT SENS
CN020	205 0406 047	4P Connector Base (KR-PH) (BLU)	LEFT LIFT SENS
CN023	205 0343 087	8P Connector Base (KR-PH) (WHT)	
CN024	205 0343 090	9P Connector Base (KR-PH) (WHT)	
CN025	205 0375 013	11P Connector Base (KR-PH) (WHT)	
CN027	205 0375 026	12P Connector Base (KR-PH)	
CN029	205 0323 081	8P Connector Base (BLK)	
CN035	205 0321 083	8P Connector Base (RED)	
CN037	205 0375 000	10P Connector Base (KR-PH) (WHT)	
CN038	205 0298 006	23P FFC Base(S)	
CN042	205 0762 082	8P ZR Connector Base	LEFT REAR ADDRESS
CN043	205 0762 095	9P ZR Connector Base	RIGHT REAR ADDRESS
CN048	205 0233 045	4P EH Connector Base	
CN051	205 0686 032	3P Connector Base (BLU) L	
CN055	205 0450 006	3P Canon Connector	
CN056	203 4932 003	3P Canon Connector	
CN071	205 0768 002	2P VH Connector Base (BLK)	
CN072	205 0581 001	2P VH Connector Base	AC CONNECTOR
CN073	205 0343 058	5P Connector Base (KR-PH)	
CN074,075	205 0274 004	2P Connector Base	
CN076	205 0343 045	4P Connector Base (KR-PH)	DIGITAL OUT
CN081	205 0453 003	2P VH Connector Base	
CN082	205 0581 001	2P VH Connector Base	AC CONNECTOR
CN091	205 0406 047	4P Connector Base (KR-PH)	
CN362	205 0343 061	6P Connector Base (KR-PH) (WHT)	
CN401	205 0343 045	4P Connector Base (KR-PH) (WHT)	
CC005	204 2564 007	9P EH-SCN Connector Cord	POWER BOARD1
CC006	204 2539 003	8P EH-SCN Connector Cord	POWER BOARD1
CC026	204 2539 016	8P EH-SCN Connector Cord	CHANGER BOARD2
CC028	204 2394 002	9P EH-SCN Connector Cord	SERVO BOARD2
CC030	203 6383 016	4P PH-SAN Connector Cord	LEFT DISC LOAD
CC031	203 4884 009	3P PH-SAN Connector Cord	RIGHT DISC LOAD
CC048	203 6263 013	4P EH-SCN Connector Cord	REGULATOR
CC073	203 8388 006	5P EH-SCN Connector Cord	POW-I/O

(3990218103) ADAPTER UNIT

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC1		CPU M38007E4SP	MITSUBISHI
IC2		IC MB3771P	FUJITSU
IC3		IC MAX242CPN	MAXIM
IC4,5		IC MB561P	FUJITSU
IC6		IC SN75177BP	TI
IC7		IC SN74LS125N	TI
IC8		IC μPC78M05HF	NEC
F1	268 0083 908	IC Protector ICP-N5	
Q1,2	269 0062 003	Transistor DTC124ES	Built in Resistor
D1	393 9015 105	LED TLR102A	
D5~7		Diode 1S953	NEC
RESISTORS GROUP			
R1		Metal Film 100ohm	TAISEI
R2		Metal Film 300ohm	TAISEI
R3		Metal Film 100ohm	TAISEI
R4		Metal Film 4.7kohm	TAISEI
MR1		Resistor Array 4.7kohm×9	TAMADENKI
CAPACITORS GROUP			
C1,2		Electrolytic 100μF/25V	
C3		Tantalum Electrolytic 1μF/1V	
C4		Mylar Film 0.01μF/50V	
C5~15		Ceramic 0.1μF/50V	
OTHER GROUP			
RL1,2		Relay (G5A-234P DC5V)	OMRON
S1		Slide Switch (SSSU122-O09-1)	ALPS
S2		Dip switch (DPS-6E)	HYISAMATSU
S3		Slide Switch (SSSU122-O09-1)	ALPS
X1		Crystal (XCO-B 4.9152MHz)	YAKUMO
CN1,2		Connector Base (DELC-J9SAF-20L9F)	JAE
CN3		Connector Base (B12B-PH-K-S)	NICHIATSU

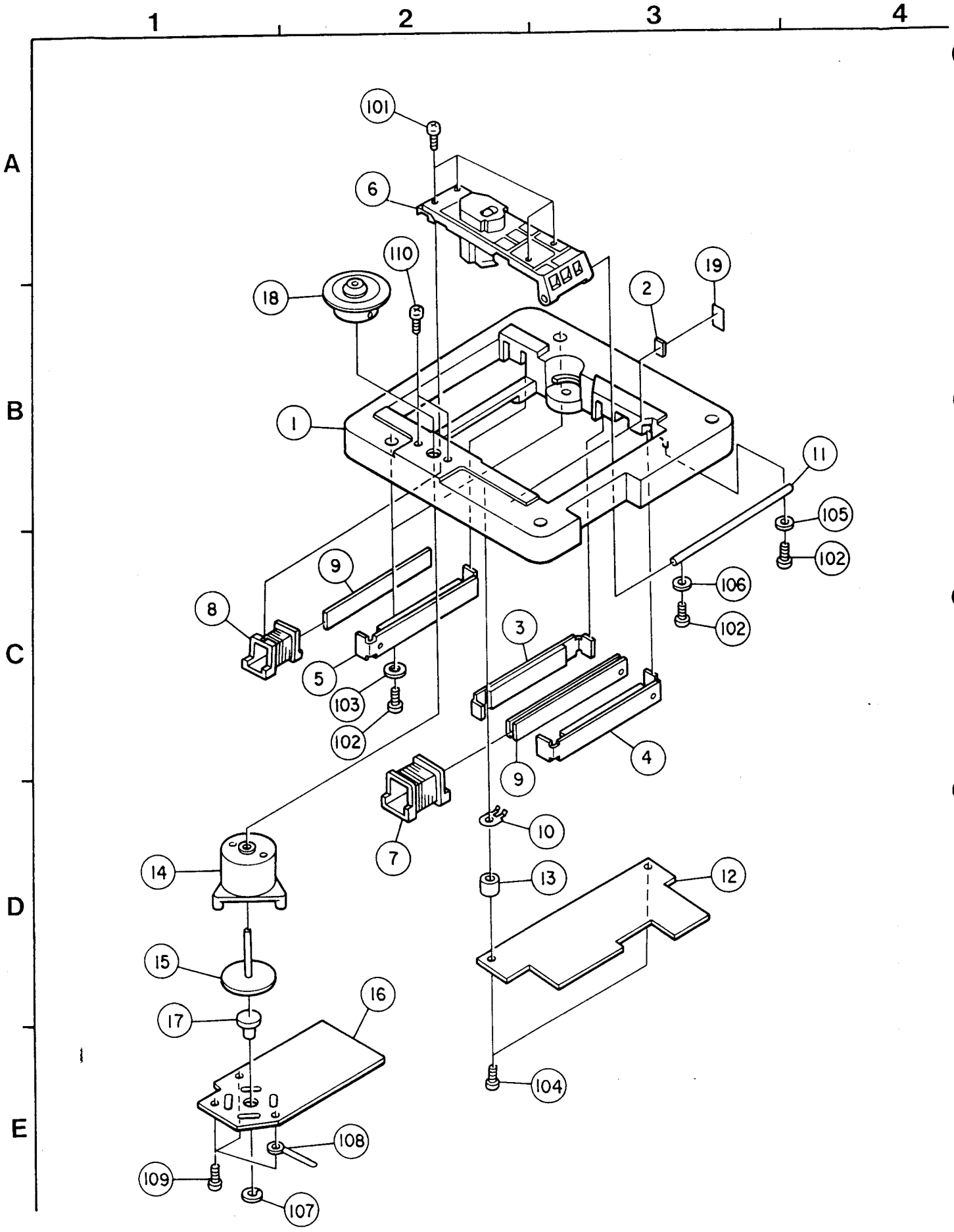
(GU-2470) SENSOR UNIT

Ref. No	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
TR001~008	393 9157 018	Photo Transistor TPS605	
TR009~016	393 9157 018	Photo Transistor TPS605	
TR017~020	393 9157 018	Photo Transistor TPS605	
TR021~024	393 9157 018	Photo Transistor TPS605	
LD001~008	393 9494 014	LED (infrared rays) TLN104	
LD009~016	393 9494 014	LED (infrared rays) TLN104	
LD017~020	393 9494 014	LED (infrared rays) TLN104	
LD021~024	393 9494 014	LED (infrared rays) TLN104	
RESISTORS GROUP (Not included Carbon Film ±5%, 1/4W type)			
MR001	246 2025 016	Resistor Array 330ohm × 8	RK99--331JP8
MR002	246 2075 024	Resistor Array 10Kohm × 8	RK99--103JP8
MR003	246 2025 016	Resistor Array 330ohm × 8	RK99--331JP8
MR004	246 2075 024	Resistor Array 10Kohm × 8	RK99--103JP8
MR005	246 2052 034	Resistor Array 330ohm × 4	RK99--331JP4
MR006	246 2052 005	Resistor Array 10Kohm × 4	RK99--103JP4
MR007	246 2052 034	Resistor Array 330ohm × 4	RK99--331JP4
MR008	246 2052 005	Resistor Array 10Kohm × 4	RK99--103JP4
OTHER PARTS			
CN021	205 0762 037	3P ZR Connector Base	
CN022	205 0762 040	4P ZR Connector Base	
CN032	205 0762 037	3P ZR Connector Base	
CN033	205 0762 040	4P ZR Connector Base	
CN042	205 0762 066	6P ZR Connector Base	
CN043	205 0762 066	6P ZR Connector Base	
CN044	205 0762 024	12P ZR Connector Base	
CN045	205 0762 024	12P ZR Connector Base	
CC043	204 2536 006	9P ZH-ZH Connector Cord	
CC045	204 6346 014	11P ZH-ZH Connector Cord	
CC042	204 2534 011	8P ZH-ZH Connector Cord	
CC044	204 2537 018	10P ZH-ZH Connector Cord	

(2U-1644A) MOTOR DRIVE UNIT

Ref. No	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC001	263 0424 902	IC M5218FP(TAPE)	
TR001	272 0081 909	Transistor 2SB766S (TAPE)	
TR002	274 0114 908	Transistor 2SD847R (TAPE)	
TR003	279 0024 909	Transistor FMY1-T99	
TR004	272 0081 909	Transistor 2SB766S (TAPE)	
TR005	274 0114 908	Transistor 2SD847R (TAPE)	
TR006	279 0024 909	Transistor FMY1-T99	
H001,002	268 0053 022	Hall device	HW-101C(Q,R)
RESISTORS GROUP (Not included Carbon Film ±5%, 1/4W type)			
VR001	211 8003 913	Adjust (Chip) 2Kohm	K05=B202
R001	247 1006 961	Chip Resistor 470ohm ±5% 1/8W	RM73B2B471JT
R002	247 0006 904	Chip Resistor 270ohm ±5% 1/10W	RM73B--271JT
R003	247 0009 985	Chip Resistor 10kohm ±5% 1/10W	RM73B--103JT
R004	247 1012 926	Chip Resistor 100kohm ±5% 1/8W	RM73B2B104JT
R005	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R006,007	247 1008 985	Chip Resistor 3.9kohm ±5% 1/8W	RM73B2B392JT
R008	247 1006 961	Chip Resistor 470ohm ±5% 1/8W	RM73B2B471JT
R009	247 1006 903	Chip Resistor 220ohm ±5% 1/8W	RM73B2B271JT
R010	247 1009 984	Chip Resistor 10kohm ±5% 1/8W	RM73B2B103JT
R011	247 1012 926	Chip Resistor 100kohm ±5% 1/8W	RM73B2B104JT
R012	247 0012 927	Chip Resistor 100kohm ±5% 1/10W	RM73B--104JT
R013,014	247 1008 985	Chip Resistor 3.9kohm ±5% 1/8W	RM73B2B392JT
R015	247 1007 902	Chip Resistor 580ohm ±5% 1/8W	RM73B2B681JT
CAPACITORS GROUP			
C001	257 0006 927	Ceramic(Chip) 470pF/50V	CC73SL1H471JT
C003	257 1006 926	Ceramic(Chip) 470pF/50V	CC73SL1H471JT
C005~007	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F 1E104ZT
OTHER PARTS			
CW361	204 0230 029	6P PH Connector Cord	KEY INPUT

14. EXPRODED VIEW OF MECHANISM UNIT



15. MECHANISM UNIT (FG-60)

Ref. No	Part No.	Part Name	Remarks
1	315 0346 200	P.U HOUSING(TK)	
2	461 0409 000	P.U STOPPER	
3		PMO 1A15 MAGNET SUB ASS'Y	
4		PMO 1A20 MAGNET SUB ASS'Y	
5		PMO 1A21 MAGNET SUB ASS'Y	
6	499 0078 009	LASER P.U	KSS151A
7	239 0014 209	M. COIL ASS'Y	
8	239 0015 208	G. COIL ASS'Y	
9	433 0480 008	YOKE (B)	
10	411 0993 004	YOKE HOLDER	
11	443 0617 302	P.U SLIDE SHAFT	
12	GU- 2467	RF AMP UNIT	
13	421 0626 005	COLLAR	
14	346 0067 305	MOTOR HOUSING ASS'Y	
15	PRO 1A93	ROTOR ASS'Y	
16	2U- 1644 A	MOTOR DRIVE UNIT	
17	431 0271 004	THRUST METAL	
18	421 0647 000	TURN TABLE ASS'Y	
19	441 1002 004	SPACER	
101	473 8010 009	SCREW M1.7 × 40 (W) ZNB	
102	473 8014 005	SCREW 3 × 8 CBTS (H-L) ZNB	
103	475 1140 008	WASHER 3ϕ	
104	473 8014 018	SCREW 3 × 14 CBTS (H-L) ZNB	
105	475 1003 006	3W	
106	441 0857 001	P-RING	
107	477 0298 038	CUT WASHER	
108	445 8028 009	CORD HOLDER	
109	471 3302 017	SCREW 3 × 5 CBS	
110	471 3812 002	SCREW 2 × 8 CBS-B	

16. PACKING & ACCESSORIES

Ref. No	Part No.	Part Name	Remarks	Q'ty
	505 0227 016	Styrene Paper		1
	503 0988 003	Cushion		2
	501 1704 002	Carton Case		1
	505 0038 030	Envelope		1
	511 2495 003	Instruction Manual		1

17. PARTS LIST OF EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks
•	1	GU-2610	SERVO / CHANGER UNIT	
•	1-1	–	SERVO CONTROL UNIT	[N]
•	1-2	–	CHANGER CONTROL UNIT	[N]
•	2	GU- 2611	POWER / SENSOR UNIT	
•	2-1	–	POWER SUPPLY UNIT	[E]
•	2-2	–	LINE FILTER UNIT	[E]
•	2-3	–	JUNCTION BOARD 2 UNIT	
•	2-4	–	RIGHT DK LD SENS UNIT	[N]
•	2-5	–	LEFT DK LD SENS UNIT	[N]
•	2-6	–	I/O CONNECTOR UNIT	[E]
•	2-7	–	DOOR OPEN/CLOSE LIMIT SENS UNIT	
•	2-8	–	RIGHT LIFT SENS UNIT	[V]
•	2-9	–	LEFT LIFT SENS UNIT	[U]
•	2-10	–	LIGHT UNIT	[H]
•	2-12	–	POWER LED/SOLENOID DRIVE UNIT	[I]
•	2-13	–	LOAD DISC SENS UNIT	
•	2-15	–	JUNCTION BOARD 1 UNIT	[E]
•	2-16	–	REGURATOR UNIT	[E]
•	3	GU- 2470	SENSOR UNIT	
•	3-1	–	RIGHT FRONT ADDRESS UNIT	[Z]
•	3-2	–	RIGHT FRONT ADDRESS UNIT	[Z]
•	3-3	–	LEFT FRONT ADDRESS UNIT	[O]
•	3-4	–	LEFT FRONT ADDRESS UNIT	[O]
•	3-5	–	LEFT REAR ADDRESS UNIT	[X]
•	3-6	–	LEFT REAR ADDRESS UNIT	[X]
•	3-7	–	RIGHT REAR ADDRESS UNIT	[Y]
•	3-8	–	RIGHT REAR ADDRESS UNIT	[Y]
	4	FG-60	CD MECHANISM UNIT	
•	5	449 0061 202	MECHANISM BASE ASS'Y	[Q]
	6	421 0597 008	ROLLER	[Q]
	7	422 0430 003	ROLLER SHAFT	[Q]
	8	441 1368 104	SPRING PLATE	[Q]
	10	421 0600 005	CAM ROLLER	[Q]
	11	441 1472 003	CORD KEEP	
	12	424 0178 303	DISC LD CAM	
	13	422 0431 002	LD CAM SHAFT	[Q]
	14	441 1378 602	LD LEVER (R) ASS'Y	
	15	412 3374 208	LIFTER BRACKET ASS'Y	[U][V]
	17	424 0177 304	LF CAM	[U][V]
	18	433 0567 400	DISC LIFTER	[U][V]
	19	441 1380 409	LIFTER ARM (1) ASS'Y	[U][V]
	20	441 1365 204	LIFTER LEVER	[U][V]
	21	422 0432 108	LEVER SHAFT	[U][V]
	22	422 0433 000	LIFTER SHAFT	[U][V]
	23	463 0696 000	COMP SPRING	[U][V]
	24	463 0697 106	LEVER SPRING	[U][V]
	25	463 0698 105	LIFTER SPRING	[U][V]
	26	441 1381 408	LIFTER ARM (2) ASS'Y	[U][V]
	27	416 0111 000	LM MOTOR ASS'Y	[U]
	28	441 1372 307	SL SHUTTER	[O][Z]
	29	446 0048 404	SENSOR COVER(L)	
	30	415 0690 104	SHEET	[X][Y]
	32	446 0047 405	SENSOR COVER(S)	[T][W]
	40	433 0569 806	DISC LOADER	[W]
	41	441 1379 601	LD LEVER (F) ASS'Y	[T][W]
	42	461 0729 007	RUBBER	[T][W]
	43	GEN 2062	CLAMP PRESS SUB ASS'Y	[T][W]
	47	441 1363 002	CLAMP COVER	[T][W]
	48	129 0187 004	CLAMP PAD	[T][W]
	49	441 1419 008	COVER YOKE	

Ref. No.	Part No.	Part Name	Remarks
	50	GEN 1887	COVER (F) SUB ASS'Y	[W]
	51	129 0190 305	LD COVER RUBBER	[T][W]
	52	433 0568 409	DISC LD ARM	[T][W]
	53	463 0699 007	LD ARM SPRING	[T][W]
	54	422 0434 106	LD SHAFT	[T][W]
	55	441 1362 100	LD BRACKET	
	56	463 0700 006	LOADER SPRING	[T][W]
	57	GEN 1888	COVER (R) SUB ASS'Y	[T]
	58	463 0514 001	COIL SPRING (C)	
	59	463 0515 000	COIL SPRING (D)	[Q]
	60	461 0735 004	P.U DAMPER	
	61	441 1421 203	DISC FANCE (L)	
	62	441 1364 205	MOTOR PLATE	
	63	441 1420 000	DISC FANCE (R)	
	64	421 0602 003	SL BEARING	
	65	443 1172 008	BASE WIRE SHAFT	
	66	412 3496 102	FRONT COVER ASS'Y	[S]
	67+68	GEN 2063	DAMPER SUB ASS'Y	[P][S]
	69	446 0050 007	ELECTRIC ERASE BAR	[P][S]
	70	412 3366 504	REAR COVER	[P]
	71	443 1211 008	WIRE ROLLER	[P]
	72	422 0435 008	WIRE PIN	[P]
	73	421 0468 302	LM MOTOR ASS'Y	[N]
	74	412 3361 509	TOP BRACKET	[N]
	75	412 3364 302	SELECTOR GUIDE	[N]
	76	GEN 1892	GEAR SUB ASS'Y	[N]
	78	412 3373 801	DISC SELECTOR ASS'Y	[R]
	79	439 0021 106	GUIDE ARM	[R]
	80	421 0599 006	DISC ROLLER	[R]
	81	422 0436 007	ARM PIN	[R]
	82	425 0230 600	DISC GUIDE	[R]
	83	421 0603 002	V BEARING	[R]
	84	424 0176 305	RACK	[R]
	85	463 0701 005	RACK SPRING	[R]
	86	441 1371 201	SHUTTER	[R]
	87	422 0425 005	SELECTOR SHAFT (A)	[R]
	88	441 1393 001	B-NUT	[R]
	89	421 0598 007	SELECT ROLLER	[R]
	92+93	GEN 1889	STP PLATE SUB ASS'Y	[N]
	96	441 1344 102	P.W.B HOLDER	
◉	97	105 0991 702	BOTTOM COVER	[B]
	98	411 1108 509	BOTTOM PLATE	[B]
	99	411 1172 001	BOTTOM FRAME	[B]
	100	104 0194 108	FOOT ASS'Y	[B]
	101	402 0099 000	MAGNETIC CATCH	[B]
	102	422 0437 006	UNDER SHAFT	[B]
	103	441 1390 101	SHAFT SUPPORT	[B]
◉	105	412 3510 004	SENSOR P.W.B. COVER	
	106	412 3354 202	BOTTOM BRACKET	[F][G]
	107	431 0317 104	CENTER RAIL	[F][G]
	108	441 1386 102	S.BRACKET(L) SUB ASS'Y	[F]
	109	433 0566 100	SOLENOID LEVER	
	112	463 0693 003	SOLENOID SPRING	[F][G]
	113	441 1387 101	S.BRACKET(R) SUB ASS'Y	[G]
	114	431 0315 300	GUIDE RAIL (A)	[F][G]
	115	412 3355 201	PROTECTOR BRACKET (L)	[L]
	116	463 0692 004	PROTECTOR SPRING	[L][M]
	117	443 1138 000	SHAFT HOLDER	
	118	443 1158 200	PULLEY HOLDER	[K]
	119	424 0148 003	GEAR (A)	[K]

Ref. No.	Part No.	Part Name	Remarks
120	431 0318 200	RACK PROTECTOR	[L][M]
121	443 1140 001	SL SHAFT	
122	441 1382 504	SL MOTOR BRACKET ASS'Y	[J]
123	422 0417 204	ROPE ROLLER	[J]
124	424 0418 005	HELICAL GEAR	[J]
125	217 0184 003	MAIN MOTOR	[J]
126	441 1370 105	SL MOTOR PLATE	[J]
127	424 0179 001	WORM	[J]
128	441 1369 200	WORM PLATE	[J]
129	423 0062 005	SL WIRE	
130	463 0704 002	WIRE SPRING	
131	411 1247 004	P.W.B. FRANE ASS'Y	[I]
133	414 0693 108	INNER COVER	[I]
◉ 134	461 0750 005	RUBBER SPACER	[B][C][D]
135	411 1194 306	SIDE PLATE (L) ASS'Y	[C]
136	412 3546 007	PIPE CLAMPER	[C][D]
137	411 1112 207	CENTER FRAME	[H]
◉ 138	441 1462 107	LAMP HOLDER	[H]
139	393 0104 002	LAMP	[H]
140	425 8011 009	STAY BALL (D)	[J]
141	461 0693 007	RUBBER CUSHION	[H]
142	414 0658 004	SEFTY COVER	
◉ 143	144 2311 204	REAR PANEL	[E]
147	441 1345 208	P.W.B. BRACKET (A)	[E]
151	441 1346 304	P.W.B. BRACKET (B)	[E]
154	441 1546 007	P.W.B. BRACKET	[E]
⚠ 156	233 6054 003	POWER TRANS	[E]
157	417 0464 103	INTER COOLER	[E]
◉ 162	144 2146 107	SIDE PANEL (L)	[C]
◉ 163	144 2147 106	SIDE PANEL (R)	[D]
164	106 0071 010	HANDLE	[C][D]
◉ 165	144 2149 104	TOP COVER	
◉ 166	103 1606 100	FRONT PANEL ASS'Y	
◉ 167	411 1106 103	FRONT BRACKET	[A]
◉ 168	411 1250 004	FRONT PLATE	[A]
169	402 0094 034	DOOR LOCK	[A]
◉ 170	441 1449 007	STICK FINGER	[A]
179	412 3356 200	PROTECTOR BRACKET (R)	[M]
180	412 3596 002	RACK STOPPER	[D]
183	263 0843 004	AN78N09	[I]
186	411 1195 305	SIDE PLATE (R) ASS'Y	[D]
187	431 0316 105	GUIDE RAIL (B)	[C][D]
188	513 2153 008	CAUTION SHEET (A)	
189	513 2154 007	CAUTION SHEET (B)	[I]
◉ 190	461 0693 010	RUBBER CUSHION (A)	[A]
191	441 1501 107	LD SUPPORT	[W]
201	471 3301 018	SCREW 3 × 4 CBS-Z	
202	471 3303 029	SCREW 3 × 6 CBS-Z	
203	471 3308 011	SCREW 3 × 14 CBS	
204	476 1004 008	4E-RING	[J][Q]
205	476 1001 001	2E-RING	[K][Q][R][U][V]
206	471 3203 019	SCREW 2.6 × 6 CBS	
207	471 3101 014	SCREW 2 × 4 CBS	
208	471 3304 015	SCREW 2 × 4 CBS-Z	
◉ 209	445 0092 004	MINI CLAMP (UAMS)	[B][F][G][H][N][V][U]
210	473 7505 007	SCREW 2.6 × 8 CBTS (P)-Z	
211	471 1202 012	SCREW 2.6 × 5 CPS	
212	475 1106 042	WASHER	

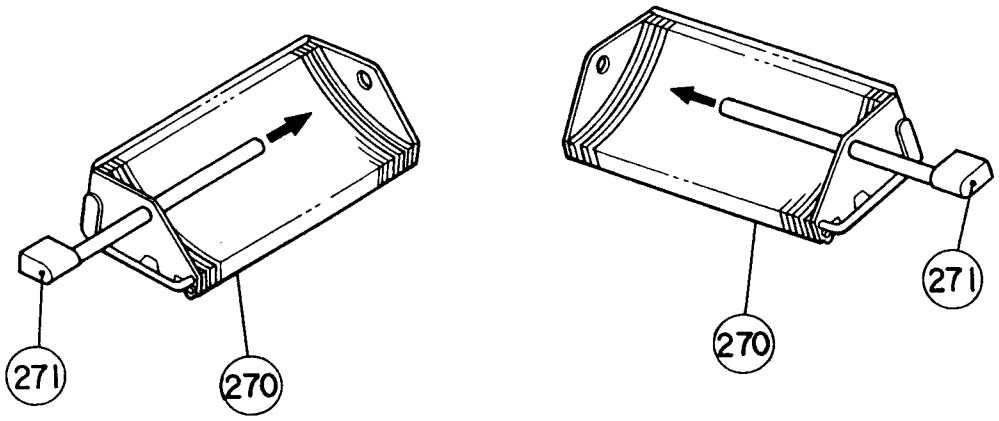
Ref. No.	Part No.	Part Name	Remarks
◉ 213	445 0093 003	CLAMP BASE	[B][L][S]
214	476 1000 002	1.5E RING	[P]
215	445 0069 008	CLAMP BAND BASE	[P]
216	449 0081 004	LOCKING WIRE SADDLE	[P]
217	445 8028 009	CORD HOLDER	[N]
218	449 0062 007	CARD EDGE SPACER	[N]
219	449 0063 019	PIERCE HOLD	[N]
220	449 0082 003	TY-RAP BAND	[N]
221	477 0298 009	CUT WASHER	[R]
222	471 8015 105	SCREW M2-SEMS (6W)-4	
223	475 1121 108	SLIT WASHER	[R]
224	449 0080 005	EDGING	[V]
225	476 1003 009	3E-RING	[G]
227	477 0092 001	WASHER	[J][Q]
228	471 3201 011	SCREW 2.6 × 4 CBS-Z	
229	474 4307 007	SCREW 3 × 3 CSS	[J]
230	445 0092 017	MINI CLAMP (UAMS)	
231	471 9012 000	SCREW 3 × 6 CBS BKNI (NOTCH)	
232	471 9012 026	SCREW 3 × 10 CBS BKNI (NOTCH)	
233	471 2303 017	SCREW 3 × 6 CFS-Z	
234	471 2303 033	SCREW 3 × 6 CFS	
235	473 7506 006	SCREW 3 × 6 CBTS (P)-Z	
237	441 1550 006	POWER SWITCH BRACKET	
238	445 0101 005	EDGING (EDS-1)	[E]
239	441 1547 006	DOOR BRACKET ASS'y	[I]
240	441 1545 008	SWITCH BRACKET	[I]
241	463 0750 108	SPRING (DOOR)	[I]
242	212-6020 001	MICRO SWITCH	[I]
243	421 0656 101	LOCK ARM	[I]
244	463 0750 108	SPRING (DOOR)	[I]
245	422 0461 001	ARM SHAFT	[I]
246	479 0003 025	PUSH RIVET	[I]
⚠ 247	203 3935 001	AC INLET	[E]
248	203 0341 012	1P TERMINAL WIRE	[E]
249	470 0017 001	SCREW 4 × 6 CPSSW-Z	[E]
250	477 0064 107	FIXING SCREW	[E]
251	412 2741 036	P.W.B. HOLDER	[E]
252	441 1553 003	SHIELD BRACKET	[E]
253	445 0099 007	EDGING (EDS-1208U)	[E]
254	445 0100 006	EDGING (EDS-2323U)	[E]
255-1	476 1001 001	2E RING	[I]
255-2	113 1612 007	EJECT KNOB	[A]
256	475 1160 004	WASHER	[A]
257	113 1613 006	POWER KNOB	[A]
258	463 0753 008	POWER SWITCH SPRING	[A]
259	119 0073 001	STOPPER	[A]
260	441 1557 009	ID CASE	[E]
261	441 1558 008	ID BRACKET	[E]
262	414 0696 008	SHIELD SHEET (A)	[I]
263	414 0697 007	SHIELD SHEET (B)	
264	412 2197 020	CARD STAND	[E]
265	143 0847 007	FRONT WINDOW	[A]
⚠ 267	212-8004 009	POWER SEESAW SWITCH	[E]
268	146 1371 005	LED WINDOW	[A]
269	399 0218 006	ADAPTER UNIT	[E]
270-1	109 0222 101	DISC RACK (L) ASS'y	
270-2	109 0221 102	DISC RACK (R) ASS'y	
271	422 0440 103	RACK SHAFT	

☆ [A] – [Z] in the Remarks column refers following legend
[A] : FRONT PANEL GROUP
[B] : BOTTOM COVER GROUP
[C] : SIDE PANEL (L) GROUP
[D] : SIDE PANEL (R) GROUP
[E] : SIDE PANEL GROUP
[F] : BOTTOM BRACKET (L) GROUP
[G] : BOTTOM BRACKET (R) GROUP
[H] : LAMP HOLDER GROUP
[I] : P.W.B. FRAME GROUP
[J] : SL MOTOR GROUP
[K] : PULLEY HOLDER GROUP
[L] : PROTECTOR (L) GROUP
[M] : PROTECTOR (R) GROUP
[N] : TOP BRACKET GROUP
[O] : A SENSOR (LL) GROUP
[P] : REAR COVER GROUP
[Q] : MECHA. GROUP
[R] : DISC SELECTOR GROUP
[S] : FRONT COVER GROUP
[T] : DISC LOADER (R) GROUP
[U] : LIFTER BRACKET (L) GROUP
[V] : LIFTER BRACKET (R) GROUP
[W] : DISC LOADER (F) GROUP
[X] : A SENSOR (SL) GROUP
[Y] : A SENSOR (SR) GROUP
[Z] : A SENSOR (LR) GROUP

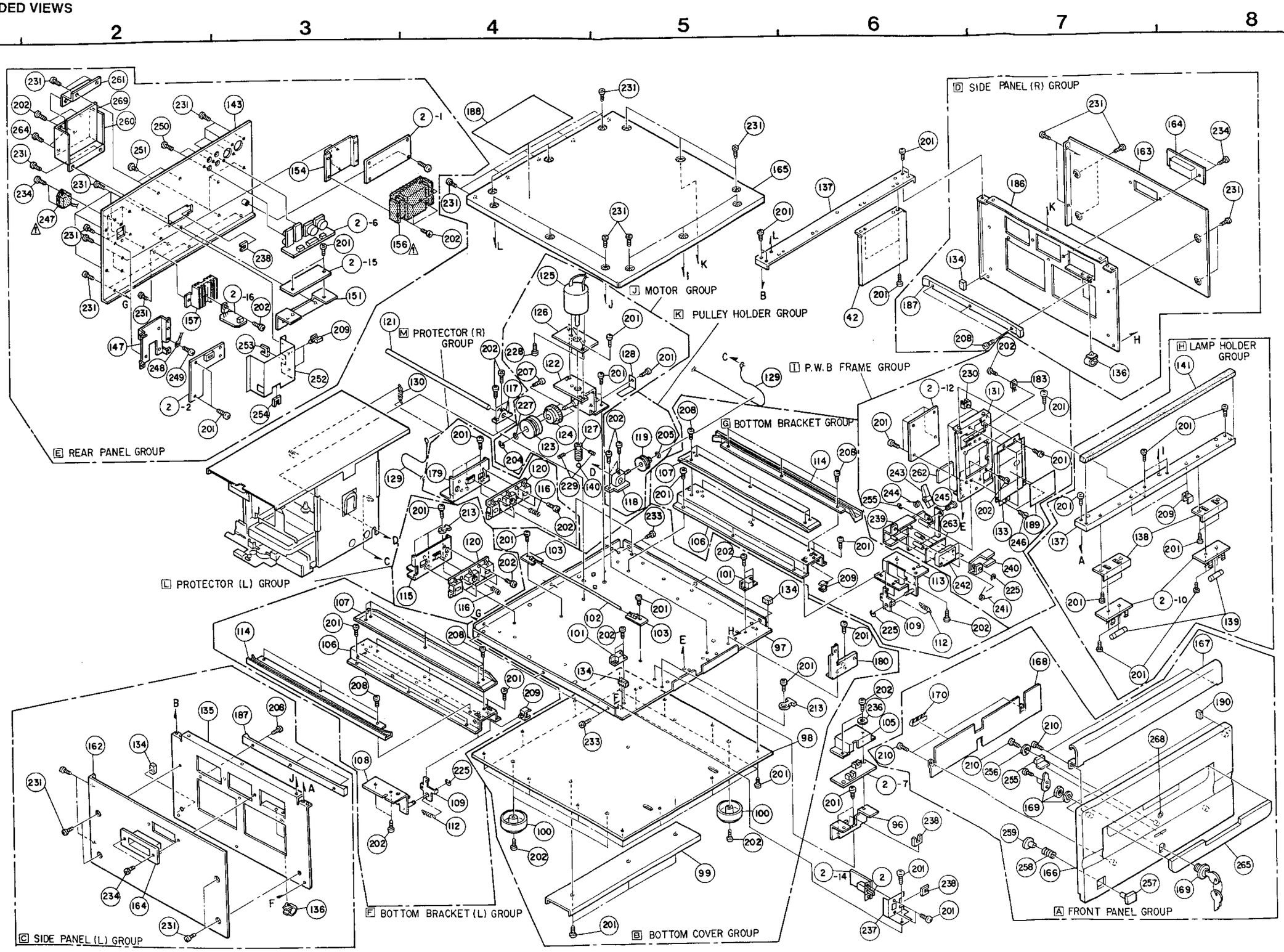
WARNING:
Parts marked with Δ and/shading have special characteristics important to safety.
Be sure to use the specified parts for replacement.
Part indicated with the mark ◉ are not always in stock and possibly to take a long period of time for supplying or in some case supplying of part may be refused.

18. EXPLODED VIEWS

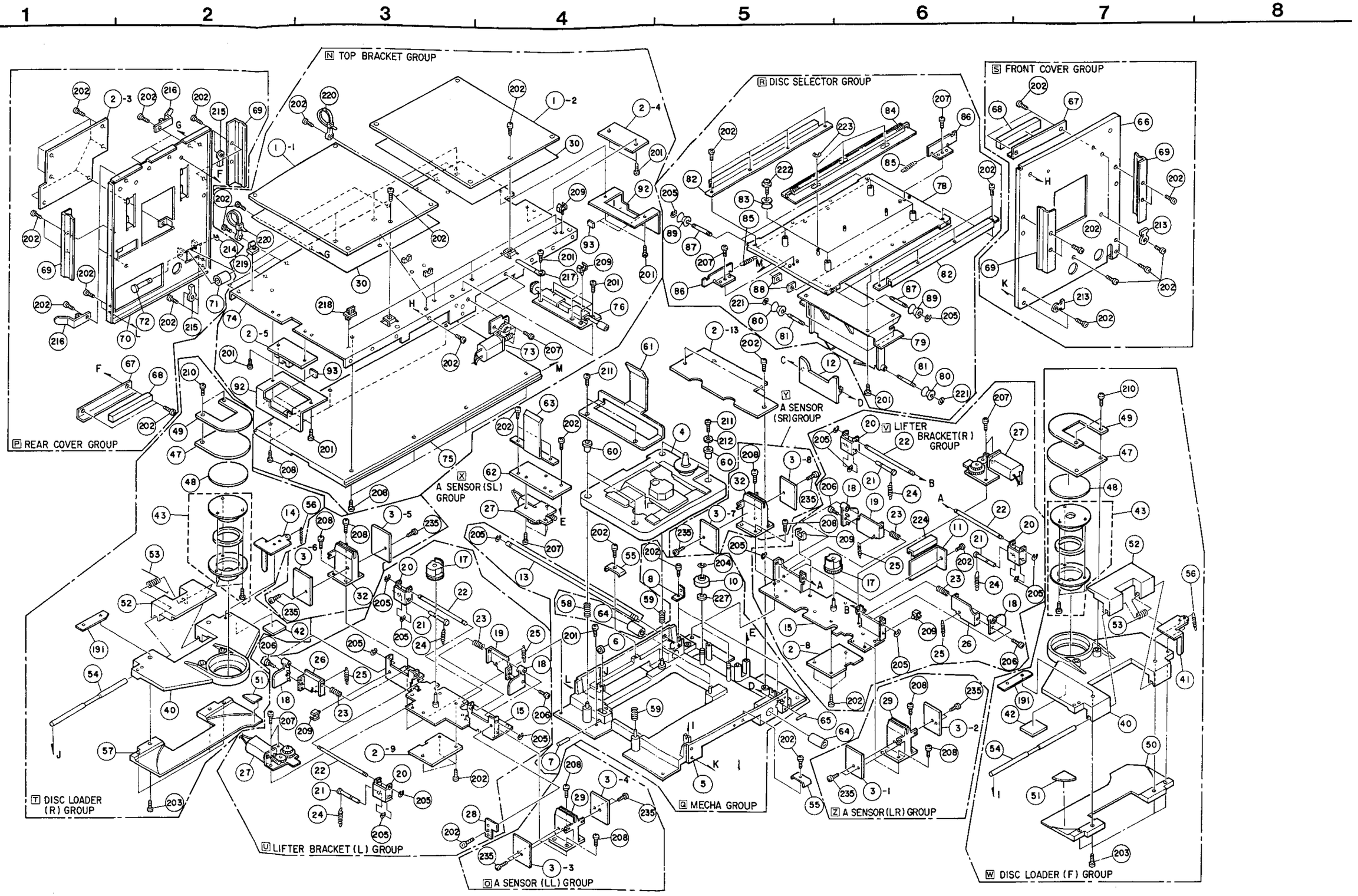
DISC RACK



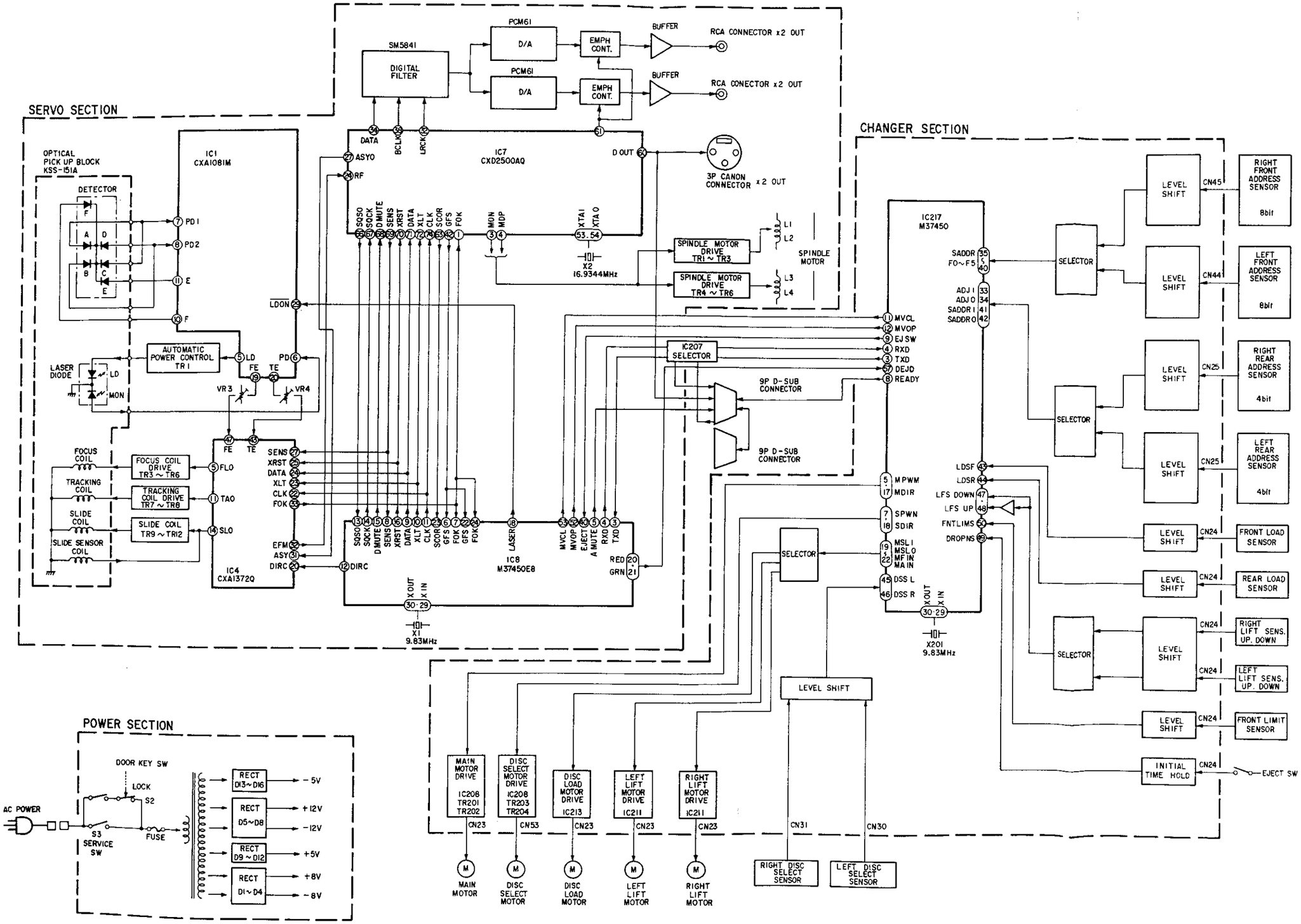
18. EXPLODED VIEWS



18. EXPLODED VIEWS



19. BLOCK DIAGRAM



20. WIRING DIARAM FOR ADDRESS SENSOR JIGS

EXPLANETION HANDLING OF ADDRESS SENSOR JIGS

① Connect after confirming that unit power of DN-1200F is off, and the power supply of jigs is OFF as well.

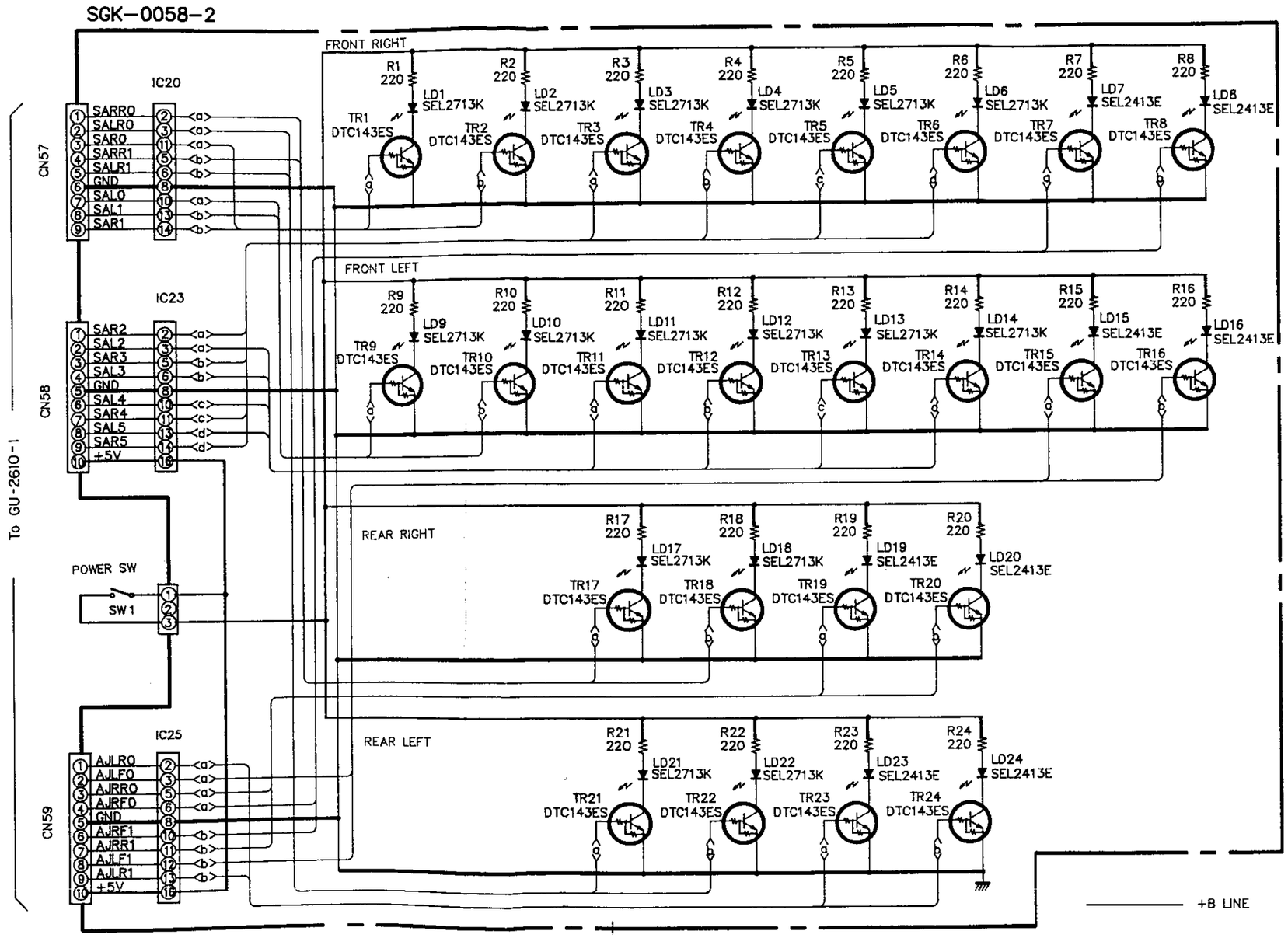
② Connect jigs to jig connector of GU-2610-1 (CHANGER CONT UNIT) method on upper portion of disc transfer mechanism of the unit. (Refer to table 1)

Table 1

Jig connecting wire	Connecting portion of unit
9P PH (WHT)	CN57
10P PH (WHT)	CN58
11P PH (RED)	CN59

③ After connecting of jig, turn pin ① and ② of S203 of GU-2610-1 ON to turn the unit power ON.

④ When LED is lit, sensor is in transparent state and when LED is lit, sensor is in intercept state.



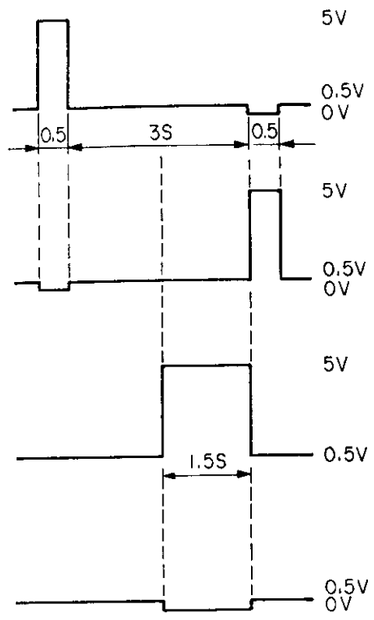
21. WAVEFORM AND VOLTAGE OF CONNECTOR AND IC BLOCK

Changer (GU-2610-1)

CN23

Pin No.

① Loading 1st ~ 50th disc
② Loading 51st ~ 100th disc
③ Loading 151st ~ 200th disc
④ Loading 101st ~ 150th disc



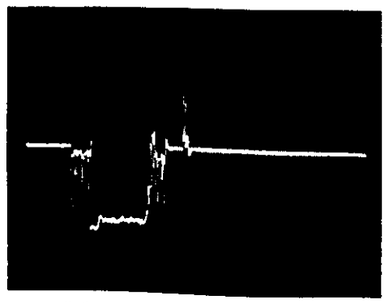
① Loading 51st ~ 100th disc
② Loading 1st ~ 51st disc
③ Loading 101st ~ 150th disc
④ Loading 151st ~ 200th disc

⑤ Loading 1st ~ 50th disc
⑤ Loading 101st ~ 150th disc
⑥ Loading 51st ~ 100th disc
⑥ Loading 151st ~ 200th disc

⑤ Loading 51st ~ 100th disc
⑤ Loading 151st ~ 200th disc
⑥ Loading 1st ~ 50th disc
⑥ Loading 101st ~ 150th disc

In other than the above cases, CN23 1 ~ 6 are 0.5 V.

⑦ 1st ~ 25th disc



5V/div
0.5S/div
(STORAGE)

CN24

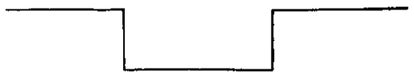
Pin No.

① LDSR — Playing back 1st~50th, 101st~150th disc: 0.1V; In other than the above condition: 4.5V

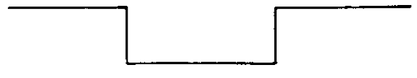
② LDSF — Playing back 51st~100th, 151st~200 disc: 0.1V; In other than the above condition: 4.6V

③ LFSRDN — Loading 1st~100th disc

④ LFSRUP — Loading 1st~100th disc



⑤ LFSLDN — Loading 101st~200th disc



⑥ LFSLUP — Loading 101st~200th disc

⑦ FLIMS — Mechanism advanced in most-front (when opening front panel): 4.9V; In other than the above condition: 0V

⑧ DOPNS — Opening front panel: 5.0V; Closing front panel: 0V

CN25

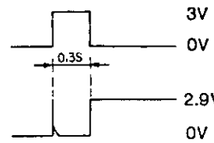
Pin No.	Voltage	
2	0.7V	Playing of disc No.101
3	0.7V	
4	0.7V	
5	0.7V	
6	0.7V	
7	0.7V	Playing of disc No.51
8	0.7V	
9	0.7V	

⑪ SOLDR — Opening front panel: 0V; Closing front panel: 4.9V

CN27-1

Pin No.

① MUTE+ — PLAY: 3.0V; STOP: 0.2V
② MUTE− — PLAY: 0.2V; STOP: 3.2V
③ READY+ — Power ON: 3V
④ READY− — Power ON: 0V



CN30

Pin No.

② Disc loader at left side: 4.8V
② Disc loader at right side: 0V

CN31

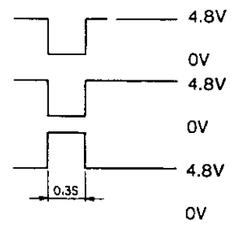
Pin No.

② Disc loader at left side: 0V
② Disc loader at right side: 4.8V

CN34

Pin No.

① Refer to page 101 (same as Pin 9 of IC204)
② Refer to page 110 (same as Pin 6 of IC207)
③ PLAY: 0V; STOP: 4.9V
④ (Disc clamp) STOP: 0V; 4.9V
⑤ Disc clamp / Clamp released) MODE: 4.8V; 0V



⑥ Disc clamped
⑦ Clamp released
⑧ Power ON

CN44
(Playing of disc No.101)

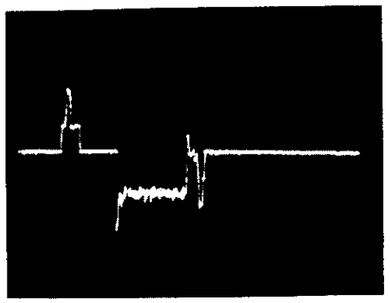
Pin No.	Voltage
3	4.6V
4	4.7V
5	4.6V
6	4.7V
7	4.7V
8	0.7V
9	0.8V
10	0.8V

CN45
(Playing of disc No.1)

Pin No.	Voltage
3	4.7V
4	4.7V
5	4.6V
6	4.7V
7	4.7V
8	0.7V
9	0.7V
10	0.8V

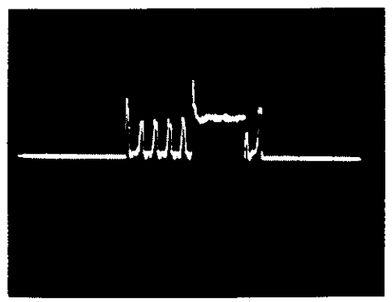
CN53

Pin No. ① Loading disc



5V/div
0.5S/div
(STORAGE)

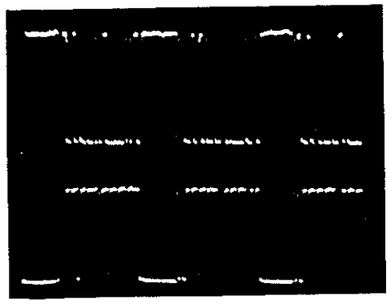
Returning disc



5V/div
0.5S/div
(STORAGE)

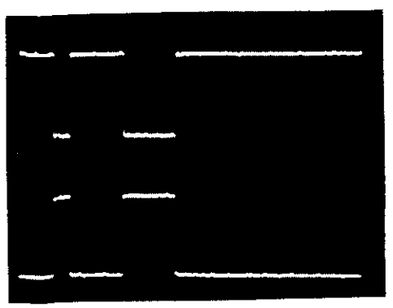
CN271

Pin No. ⑤ Playing disc (upper)
⑥ Playing disc (lower)



1V/div
5mS/div
(STORAGE)

⑦ STOP → of 1st program of 1st disc (upper)
⑧ STOP → of 1st program of 1st disc (lower)



1V/div
0.2mS/div
(STORAGE)

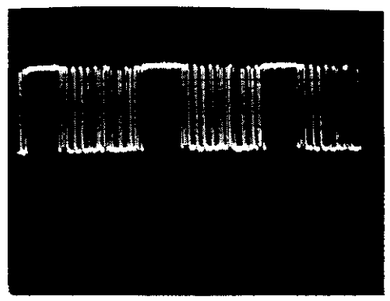
IC202

Pin No. ⑤ STOP → 1st program of 1st disc (same as Pin 4 of IC217)

1V/div
0.2mS/div
(STORAGE)

IC204

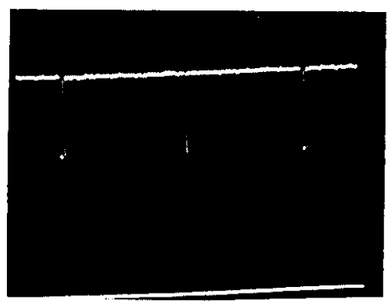
Pin No. ⑨ Playing disc (same as Pin 1 of CN34)



2V/div
5mS/div
(STORAGE)

IC207

Pin No. ⑥ Playing disc (same as Pin 3 of IC217 and Pin 2 of CN34)



2V/div
5mS/div
(STORAGE)

IC217

Disc / Pin No.	1st	25th	50th	60th	80th	100th	101st	125th	150th	160th	180th	200th
33	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V
34	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V
35	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V	4.8V
36	0V	0V	0V	4.8V	4.8V	4.8V	0V	0V	0V	4.8V	4.8V	4.8V
37	0V	0V	4.8V	4.8V	4.8V	4.8V	0V	0V	4.8V	4.8V	4.8V	4.8V
38	0V	4.8V	4.8V	4.8V	4.8V	4.8V	0V	4.8V	4.8V	4.8V	4.8V	4.8V
39	0V	4.8V	0V	4.8V	4.8V	4.8V	0V	4.8V	0V	4.8V	4.8V	4.8V
40	0V	0V	0V	4.8V	4.8V	4.8V	0V	0V	0V	4.8V	4.8V	4.8V
41	4.8V	4.8V	4.8V	0V	0V	0V	4.8V	4.8V	4.8V	0V	0V	0V
42	4.8V	4.8V	4.8V	0V	0V	0V	4.8V	4.8V	4.8V	0V	0V	0V
55	1st~100th			PLAY	0V							
	101st~200th			PLAY	4.8V							1st~50th
56	1st~50th			PLAY	0V							
	101st~150th			PLAY	0V							
	51st~100th			PLAY	4.8V							
	151st~200th			PLAY	4.8V							

IC217

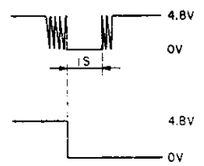
Pin No.
① Only (2) of S201 is ON — 0V
In other than the above condition — 4.8V

② Disc clamp — 0V
In other than the above condition — 4.8V

③ (same as Pin 6 of IC207)

④ (same as Pin 5 of IC202)

⑤ $\overline{\text{MPWM}}$ 1st 25th

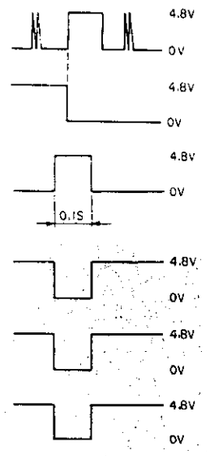


⑰ MDIR 1st 25th

⑥ CK20 Disc selector in operation — In other case

⑳ CK20 — 5V / 0V, 19.2kHz — 0V / 0V

⑦ SPWM Loader positioned right — 1st~100th
⑱ SDIR Loader positioned right — 1st~100th



⑧ $\overline{\text{READY}}$ Power ON

⑩ $\overline{\text{MDISP}}$ 4.8V

⑨ $\overline{\text{EJSW}}$ Disc clamped and clamp released

⑪ $\overline{\text{MVCL}}$ Disc clamped

⑫ $\overline{\text{MVOP}}$ Clamp released

⑬ $\overline{\text{TB3}}$ S203 ④ ON — 0V; OFF — 4.8V

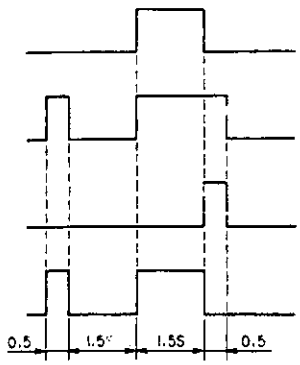
⑭ $\overline{\text{TB2}}$ S203 ③ ON — 4.8V; OFF — 4.8V

⑮ $\overline{\text{TB1}}$ S203 ② ON — 0V; OFF — 4.8V

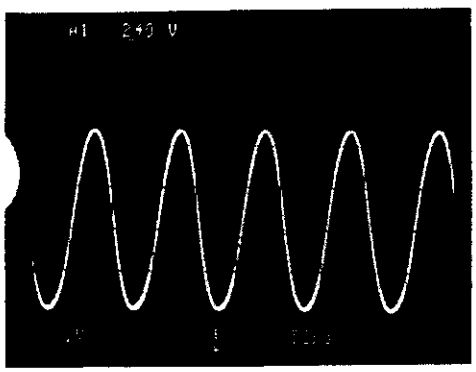
⑯ $\overline{\text{TB0}}$ S203 ① ON — 0V; OFF — 4.8V

IC217

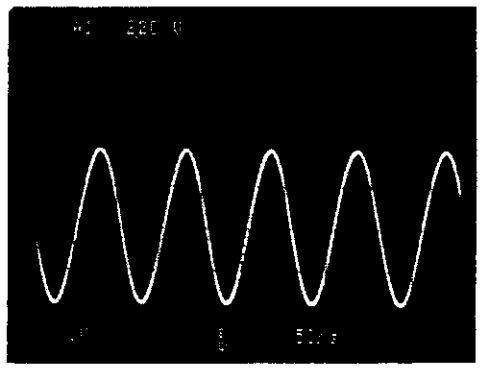
⑲ MSL1	STOP	1st	
⑳ MSL0	STOP	1st	
㉑ MFIN	STOP	1st	
㉒ MRIN	STOP	1st	
㉔ ADJ1	4.8V		
㉘ $\overline{\text{RESET}}$	4.8V		



㉙ XIN

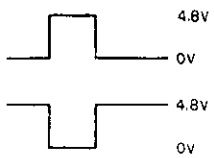


㉚ XOUT



IC217

㊸ $\overline{\text{LDSF}}$	Playing 51st–100th, 151st–200th		4.8V
	In other than the above condition		0V
㊹ $\overline{\text{LDSR}}$	Playing 1st–50th, 101st–150th		4.8V
	In other than the above condition		0V
㊺ $\overline{\text{DSSL}}$	Disc selector at left side		0V
	Disc selector at right side		4.8V
㊻ $\overline{\text{DSSR}}$	Disc selector at left side		4.8V
	Disc selector at right side		0V
㊼ $\overline{\text{LFS DOWN}}$	Loading disc		4.8V
			0V
㊽ $\overline{\text{LFS UP}}$	Loading disc		4.8V
			0V
㊾ $\overline{\text{DROPNS}}$	Opening front panel		0V
㊿ $\overline{\text{FNTLIMS}}$	Closing front panel		4.8V
(51) SOLDR	Opening front panel		4.8V
	Closing front panel		0V
(57) DEJD	Disc clamp		0V
	In other than the above condition		4.8V
(58) $\overline{\text{MCCW}}$	S201	ON	0V
		OFF	4.8V
(59) $\overline{\text{MCW}}$	S202	ON	0V
		OFF	4.8V



IC220

(Playing of disc No.1)

Pin No.	Voltage
2	4.9V
3	4.9V
5	4.9V
6	4.9V
10	0V
11	0V
13	0V
14	0V

IC223

(Playing of disc No.1)

Pin No.	Voltage
2	0V
3	0V
5	0V
6	0V
10	0V
11	0V
13	4.9V
14	4.9V

IC225

(Playing of disc No.1)

Pin No.	Voltage
3	0V
4	4.9V
5	0V
6	4.9V
10	4.9V
11	0V
12	0V
13	0V

IC227

Pin No. ④ Loading disc

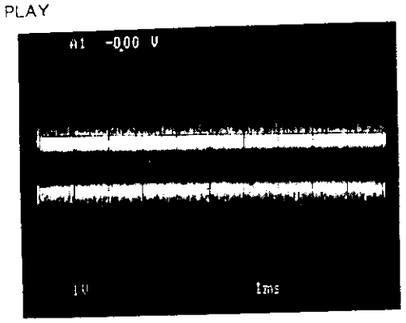
SERVO CONTROL (GU-2610-2)

IC4

Pin No.

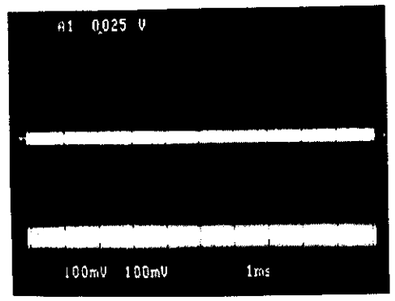
②	FGD	0V	
③	FS3	0V	
④	FLB	0V	
⑤	FEO	PLAY	0.8V
		STOP	0V
⑥	FE−	0V	
⑦	SRCH	0.6V	
⑨	TGU	0V	
⑨	TG2	0V	
⑪	TA0	STOP	1V
			0V

PLAY



1V/div
1mS/div

⑫ TA− 0V

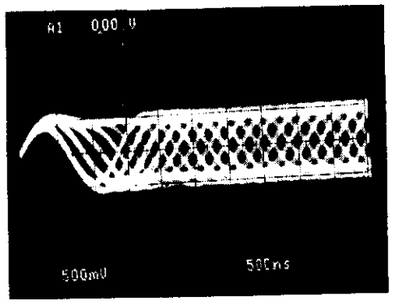


⑬ SL+ (0V) 100mV/div

⑭ SLO (0V) 1mS/div

⑮	SL−	0V
⑯	FSET	−4.1V
⑰	ISET	1.2V
㉛	ASY	2.4V

㉞	CC1	PLAY	1.2V
		STOP	−1.3V
㉟	CC2	PLAY	−1.5V
		STOP	−1.2V
㊲	CB	PLAY	−0.5V
		STOP	0V
㊳	CP	PLAY	−2.0V
		STOP	−3.6V



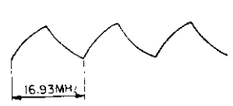
㊵ RFO 0.5V/div 500mS/div

㊷	TZC		0V
㊸	TE		0V
㊹	TDFCT		0V
㊺	FZC	PLAY	0V
		STOP	0.5V
			0V
㊼	FE	0V	
㊽	FDFCT	0V	

IC7

Pin No.

①	FOK	PLAY	4.9V
		STOP	0.1V
③	MON	PLAY	4.9V
		STOP	0.1V
⑰	VCKI		4.8V
㊴	XTAO		0V
㊷	GFS	PLAY	4.9V
		STOP	0V



⑱ FIFO 0.5V/div

⑲ FILI 5V/div

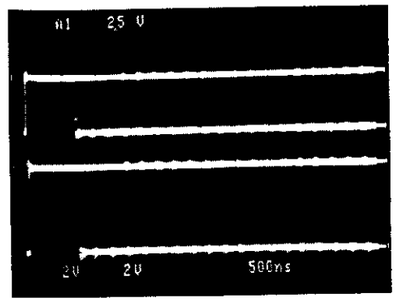
⑳ PCO 5V/div

㉒ CLTV 5V/div

㉔ RF(EFM) (2μ S/div)

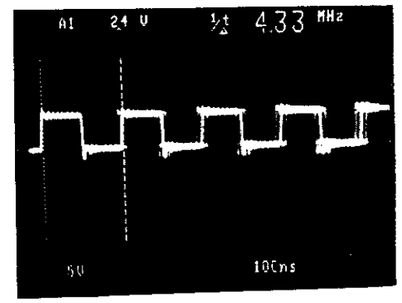
2V/div

㉗ ASYO 500mS/div



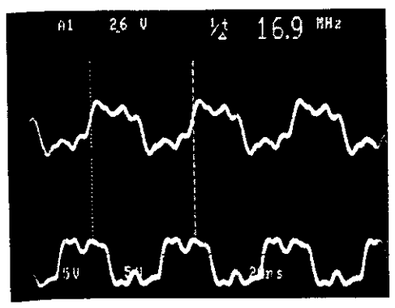
㊶ PLCK 5V/div

500mS/div



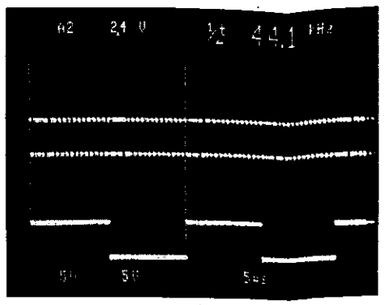
㊴ XTAO 5V/div

53 XTAI 50mS/div



⑩ DOUT

⑫ LRCK

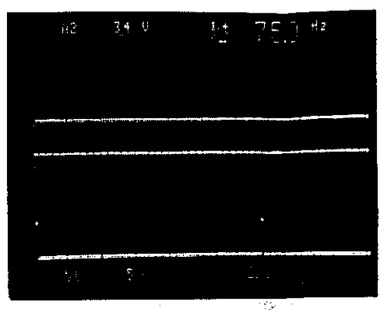


5v/div

5 μ S/div

⑫ WFCK

⑬ SCOR



5V/div

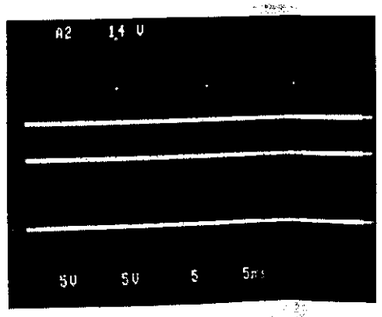
2mS/div

Playing disc

⑪ DATA

⑫ XLT

⑭ CLK



5V/div

5mS/div

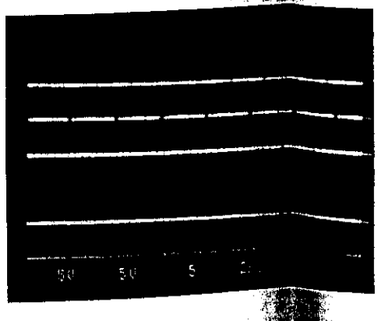
(Trig by XLT)

STOP

⑪ DATA

⑫ XLT

⑭ CLK



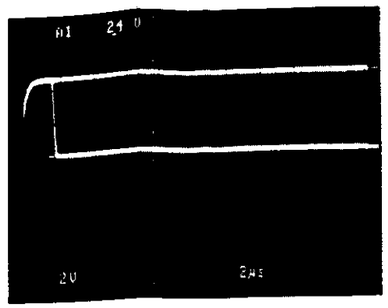
5V/div

2mS/div

(Trig by XLT)

Playing disc

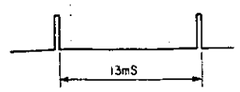
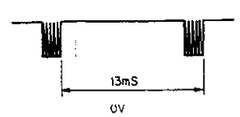
⑯, ⑳



2V/div

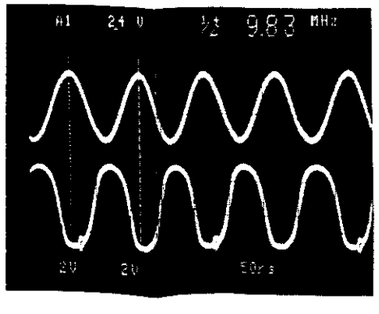
2 μ S/div

IC8

⑧ SENS	PLAY	
	STOP	
⑫ DIRC		4.9V
⑬ SQSO	PLAY	
		0V
⑭ SQCK		4.8V
⑮ DMUTE	PLAY	0V
	STOP	4.9V
⑯ $\overline{\text{XRST}}$		4.9V
⑰ EQON		4.9V
⑱ $\overline{\text{LASER}}$	PLAY	0V
	STOP	4.9V
⑳ $\overline{\text{RED}}$	PLAY	0V
	STOP	4.9V
㉑ $\overline{\text{GRN}}$		4.9V
㉘ $\overline{\text{RESET}}$		4.9V

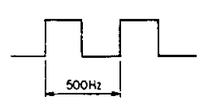
㉙ XIN

㉚ XOUT



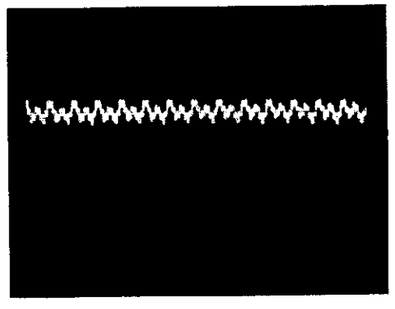
2V/div

50mS/div

㊱ PLAY/PAUSE		4.9V
㊲ STOP		4.9V
㊳ REW		4.9V
㊴ FF		4.9V
㊵ $\overline{\text{EJECT}}$	Same as Pin ⑤ of CN34	
㊶ INT/$\overline{\text{EXT}}$		4.9V
㊷ SGTO		0V
㊸ SGT1		0V
㊹ SGT2		0V
㊺ SGT3		0V
㊻ SGT4		0V
㊼ SGT5		0V
㊽ SGT6		4.9V
㊾ DRV0		4.9V
㊿ DRV1		0V
(51) INT/$\overline{\text{EXT}}$		4.9V
(52) $\overline{\text{MVOP}}$		Same as Pin ⑦ of CN34
(53) $\overline{\text{MVCL}}$		Same as Pin ⑥ of CN34
(55) TESTN		4.9V
(58) PHASE2		4.8V
(59) PHASE1		4.8V

TP7

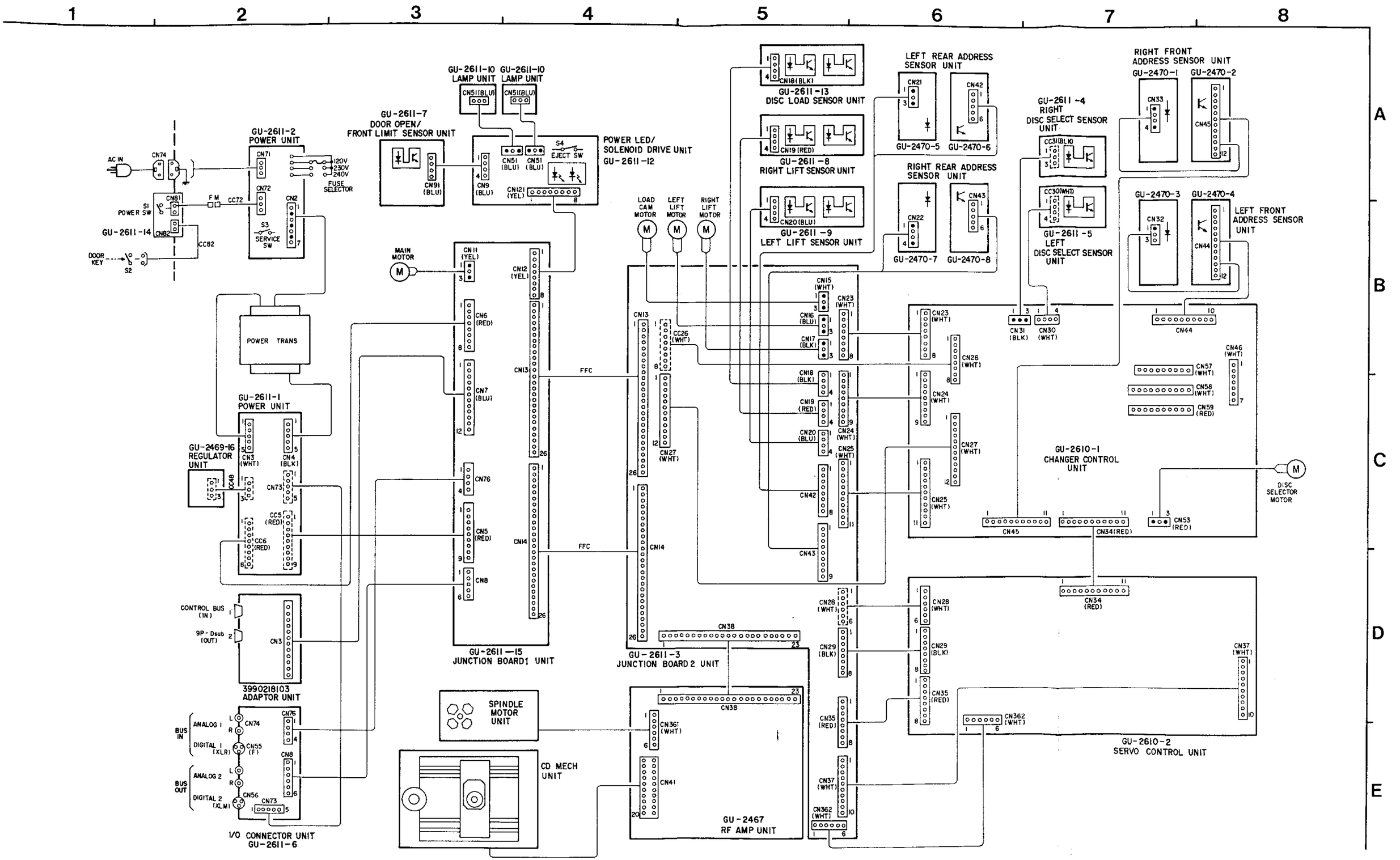
③ SLIDE



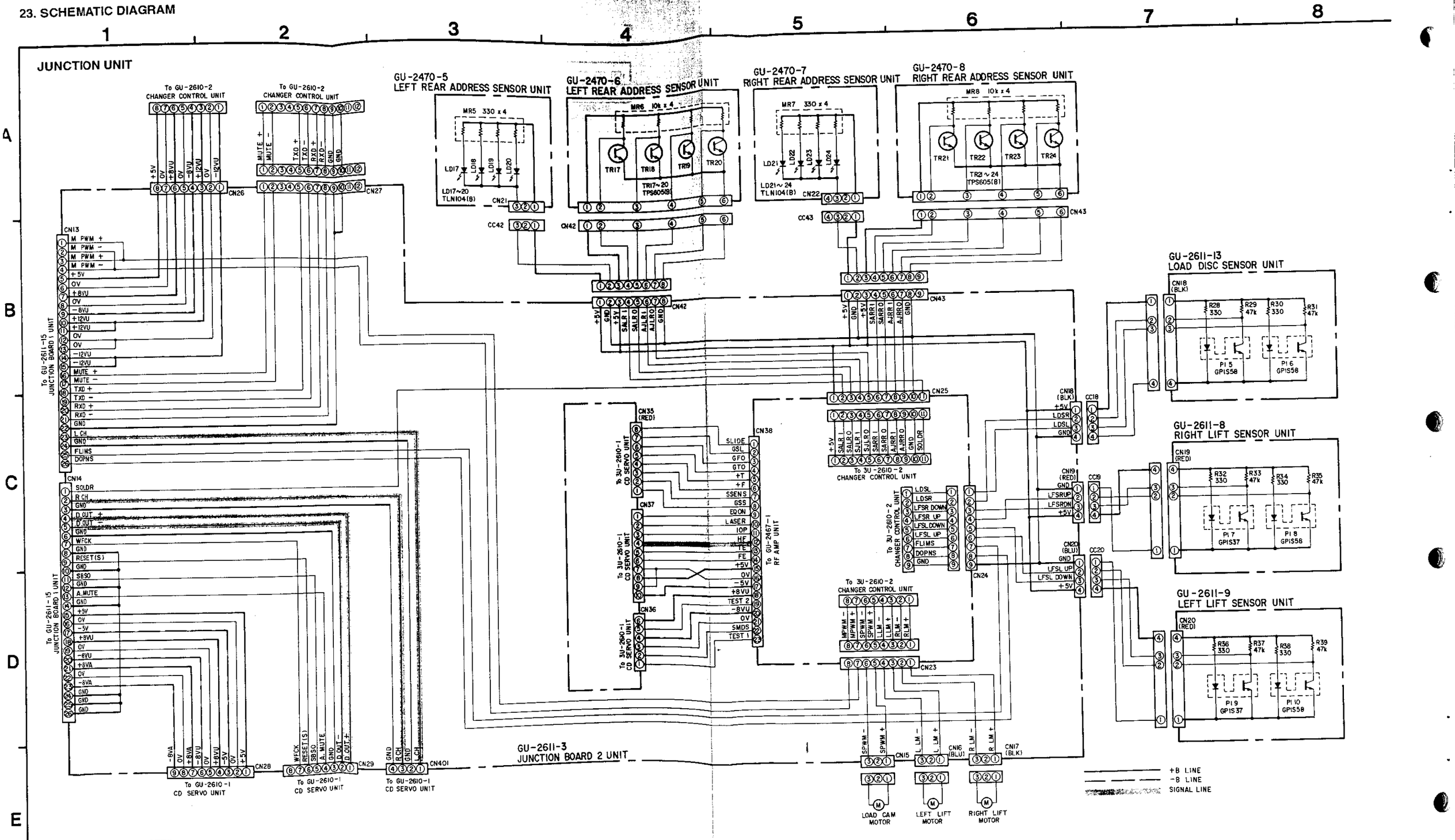
0.5V/div

0.5S/div

22. WIRING DIAGRAM

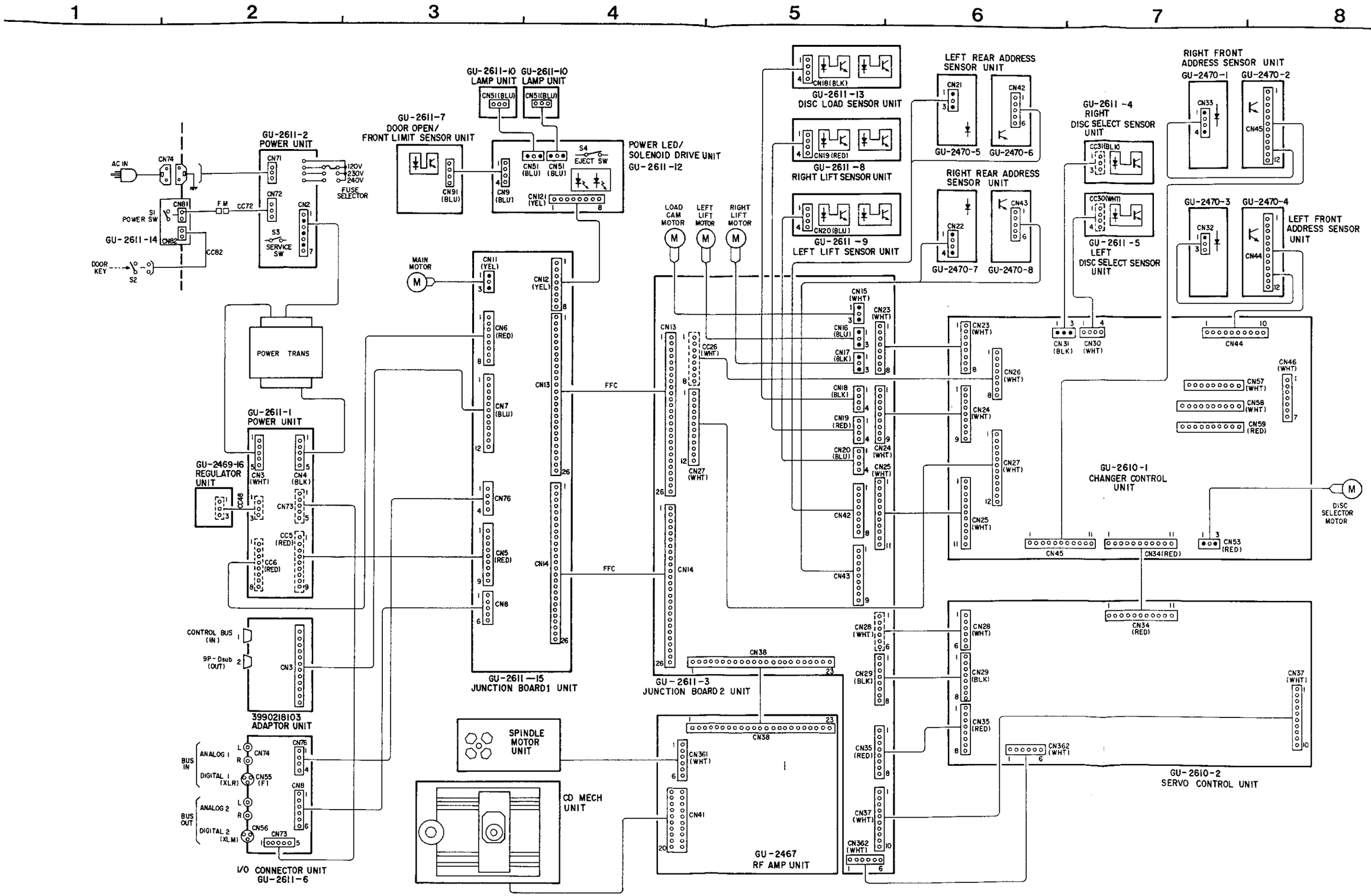


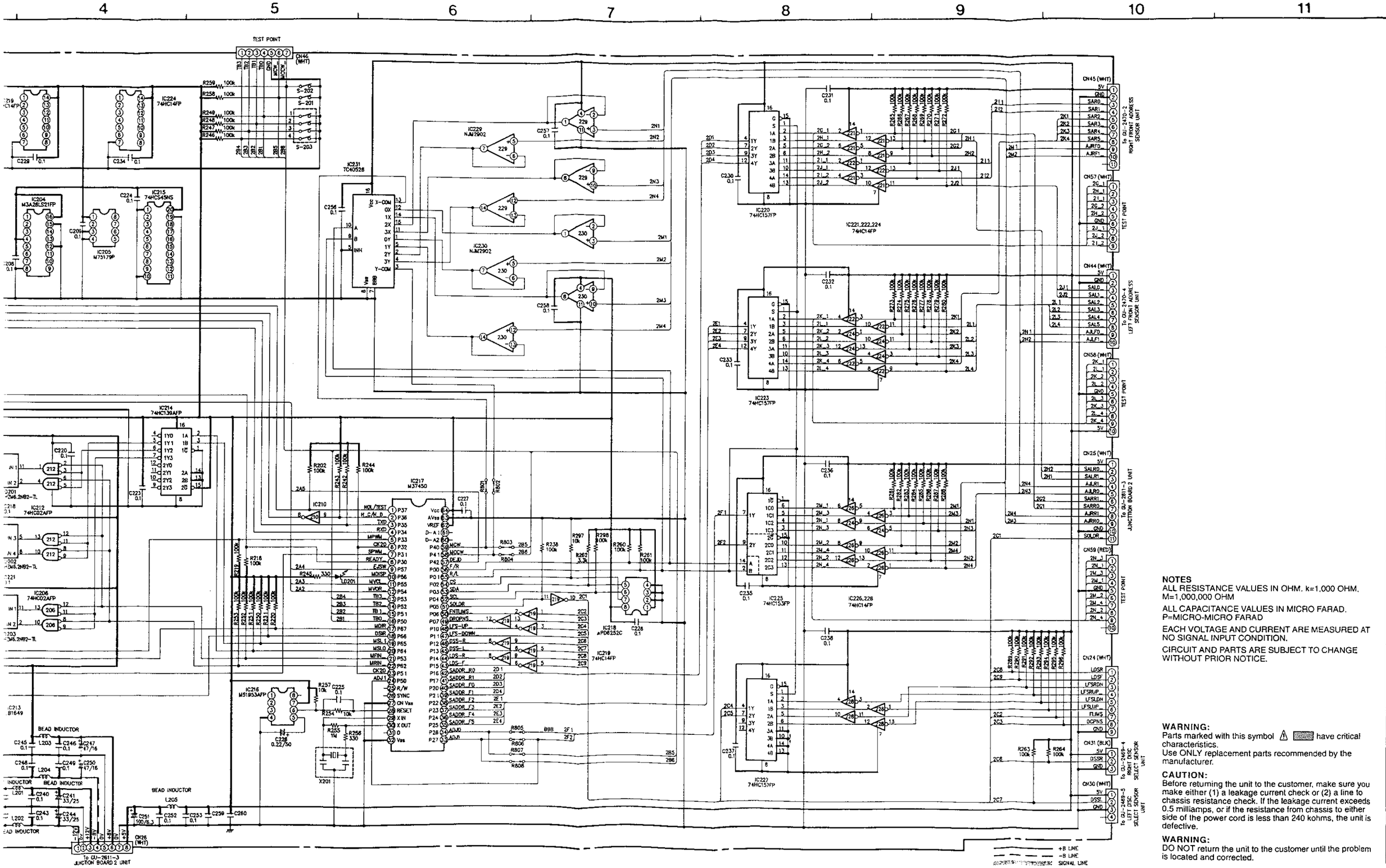
23. SCHEMATIC DIAGRAM



NOTES
ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

22. WIRING DIAGRAM





NOTES

ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM

ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD

EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.

CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

WARNING:
Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

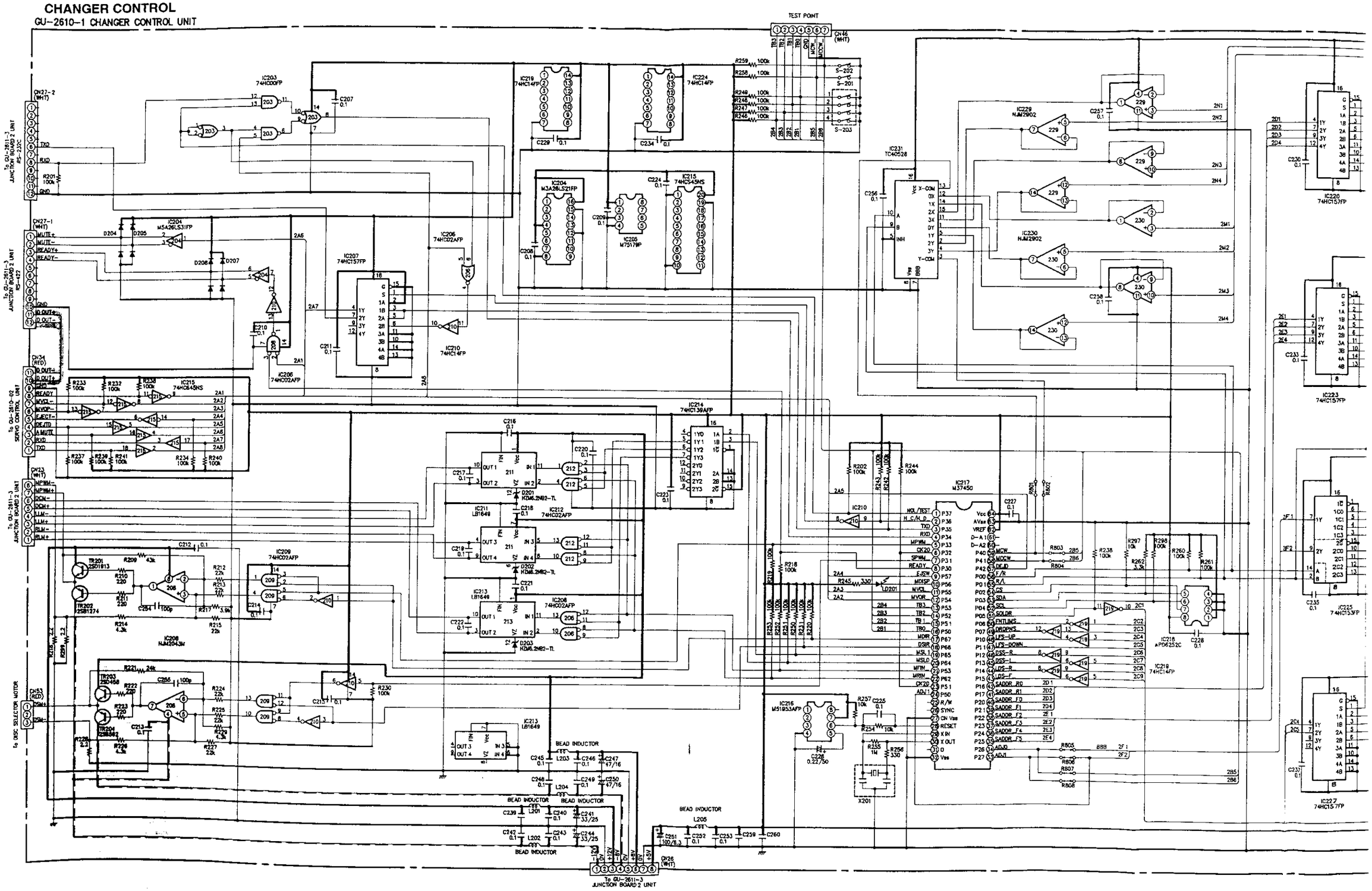
CAUTION:
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 kohms, the unit is defective.

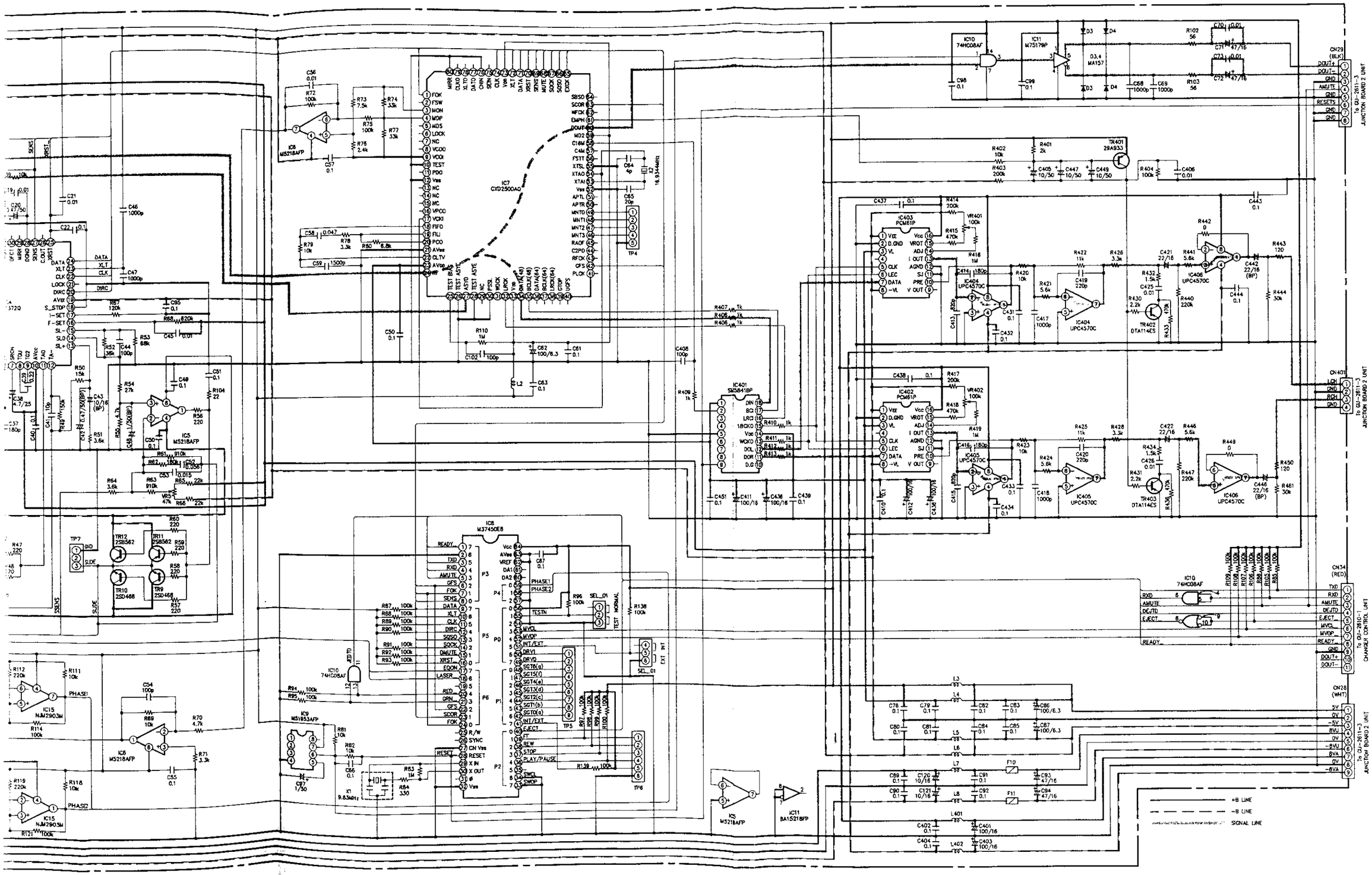
WARNING:
DO NOT return the unit to the customer until the problem is located and corrected.

1 2 3 4 5 6 7 8

CHANGER CONTROL

GU-2610-1 CHANGER CONTROL UNIT

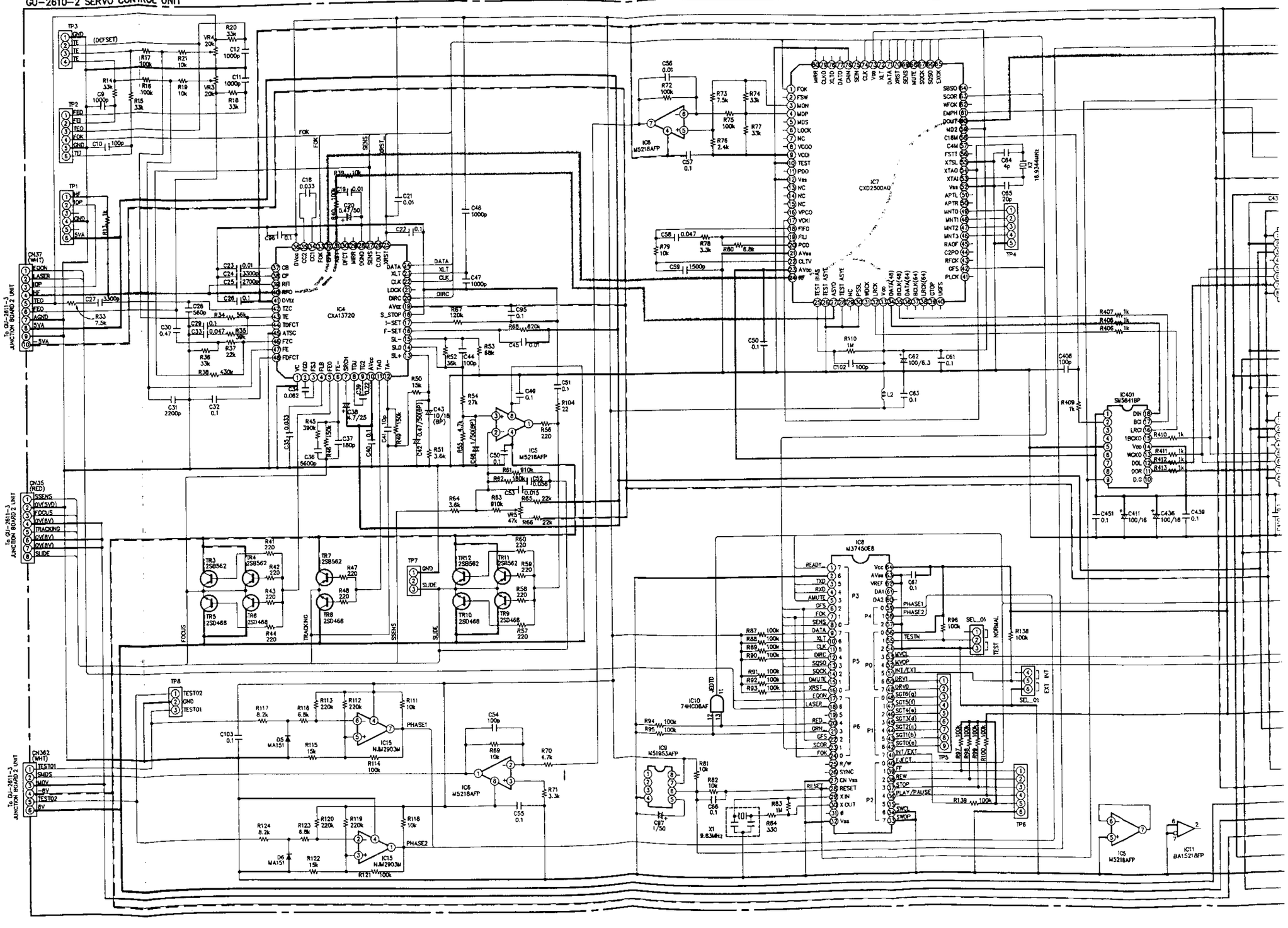



IC7 CXD2500AQ
IC8 M5218AFP
IC10 74HC08AF
IC11 M75179P
IC401 SM5841BP
IC402 PCM61P
IC403 PCM61P
IC404 UPC4570C
IC405 UPC4570C
IC406 UPC4570C
IC8 M37450E8
IC9 M51953AFP
IC10 74HC08AF
IC15 NJM2903M
IC5 M5218AFP
IC6 M5218AFP
IC11 BA15218FP
TR401 2SA933
TR402 DTA114ES
TR403 DTA114ES
TR9 2SD468
TR10 2SD468
TR11 2SB562
TR12 2SB562
CN29 (BLK)
CN401
CN34 (RED)
CN28 (WHT)
JUNCTION BOARD 2 UNIT
CHANGER CONTROL UNIT
+B LINE
-B LINE
SIGNAL LINE

23. SCHEMATIC DIAGRAM

SERVO CONTROL

GU-2610-2 SERVO CONTROL UNIT



NOTES
ALL RESISTANCE VALUES IN OHM. k=1.000 OHM, M=1,000,000 OHM

ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD

EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.

CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

WARNING:
Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

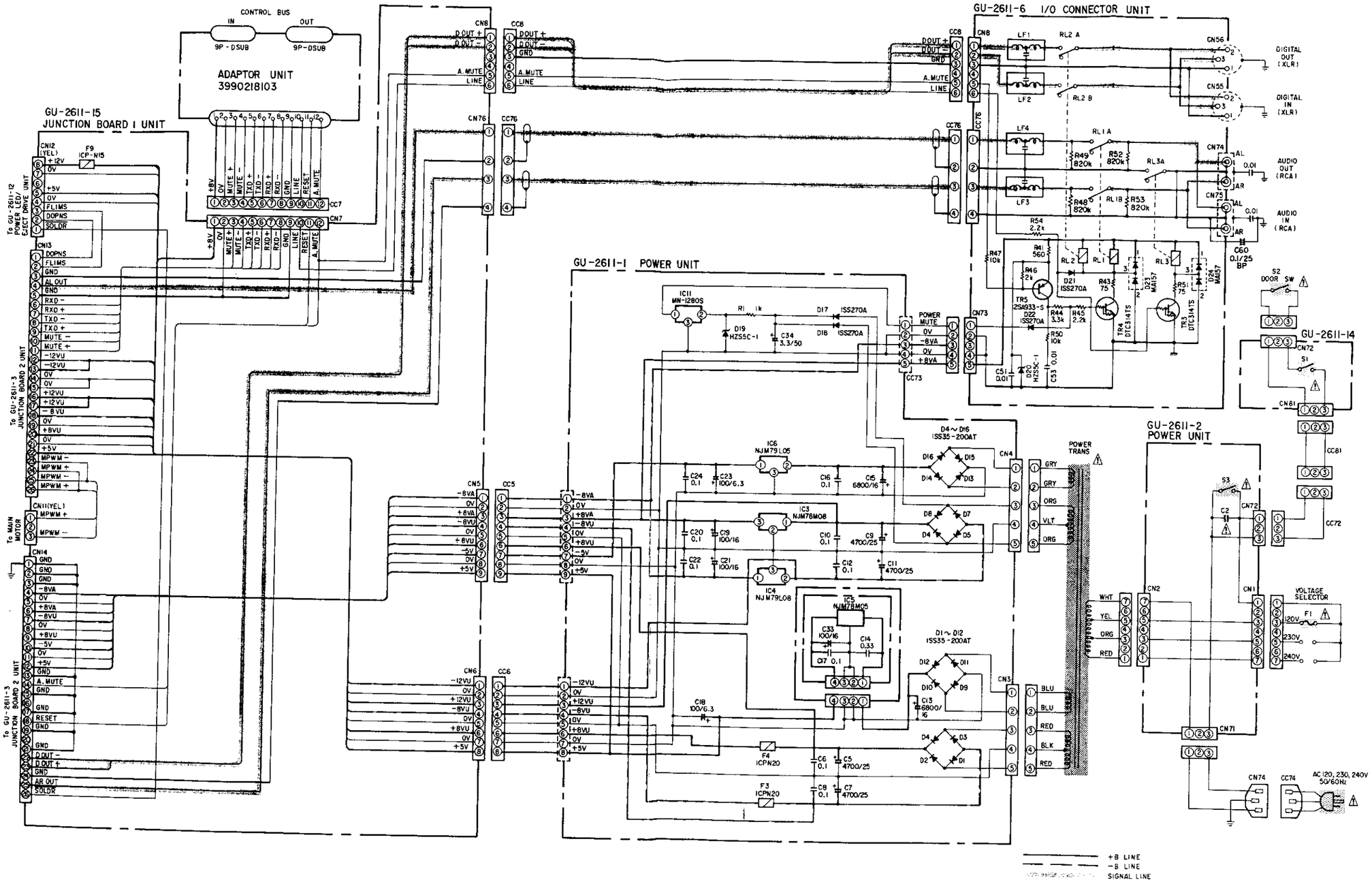
CAUTION:
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 kohms, the unit is defective.

WARNING:
DO NOT return the unit to the customer until the problem is located and corrected.

23. SCHEMATIC DIAGRAM

1 2 3 4 5 6 7 8

POWER I/O UNIT

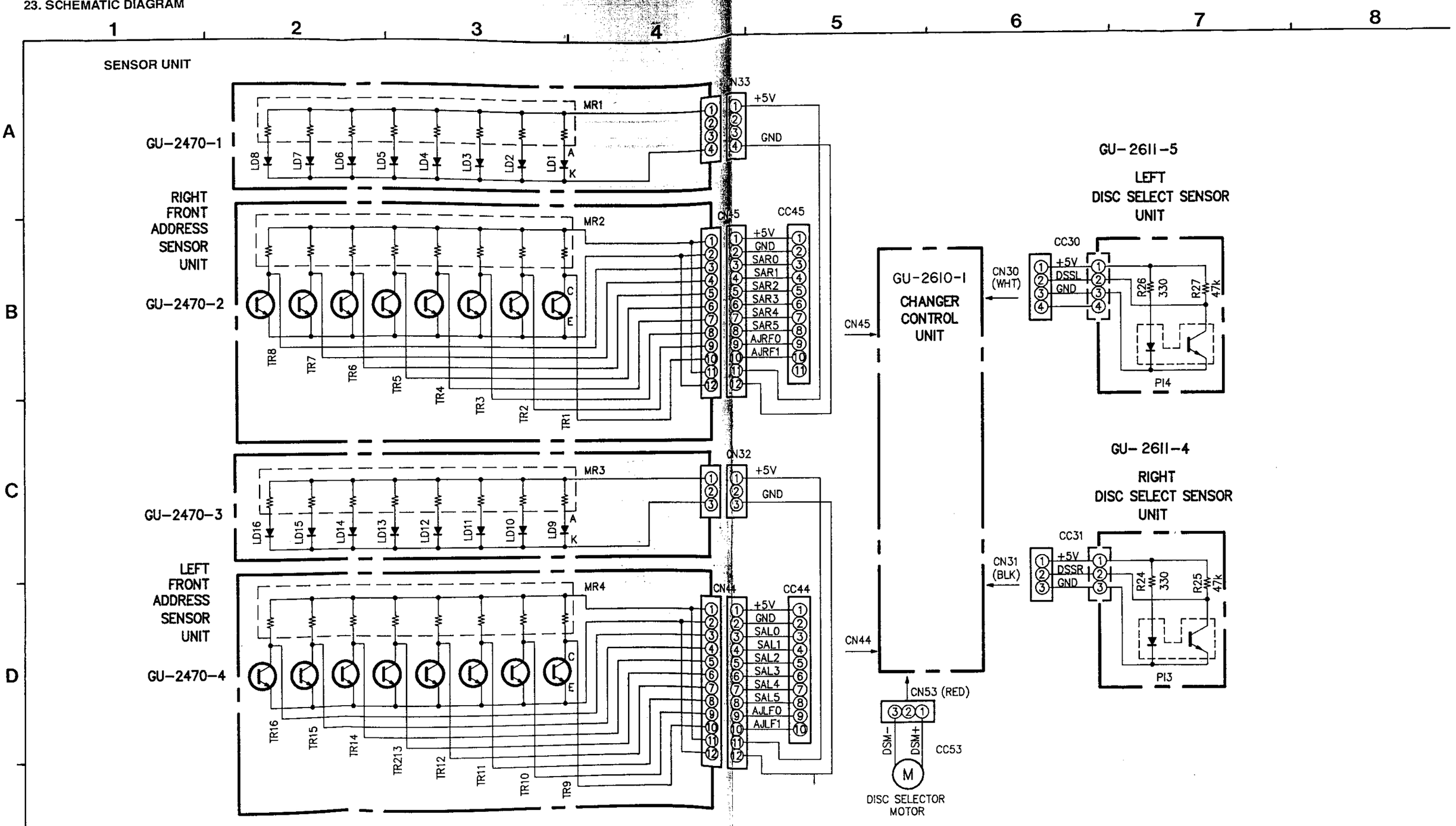


NOTES

ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

A B C D E

23. SCHEMATIC DIAGRAM

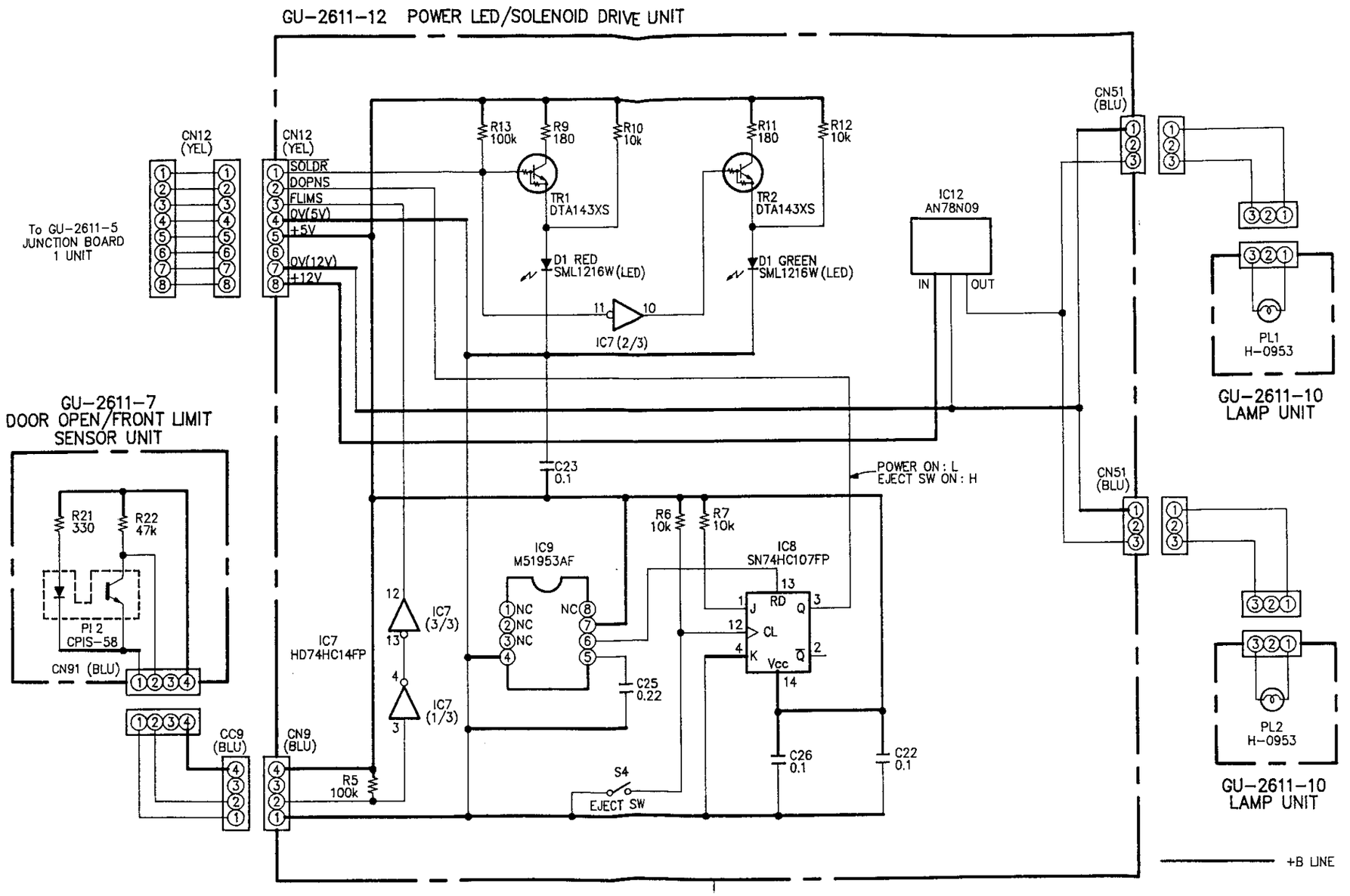


NOTES
ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

23. SCHEMATIC DIAGRAM

1 2 3 4 5 6 7 8

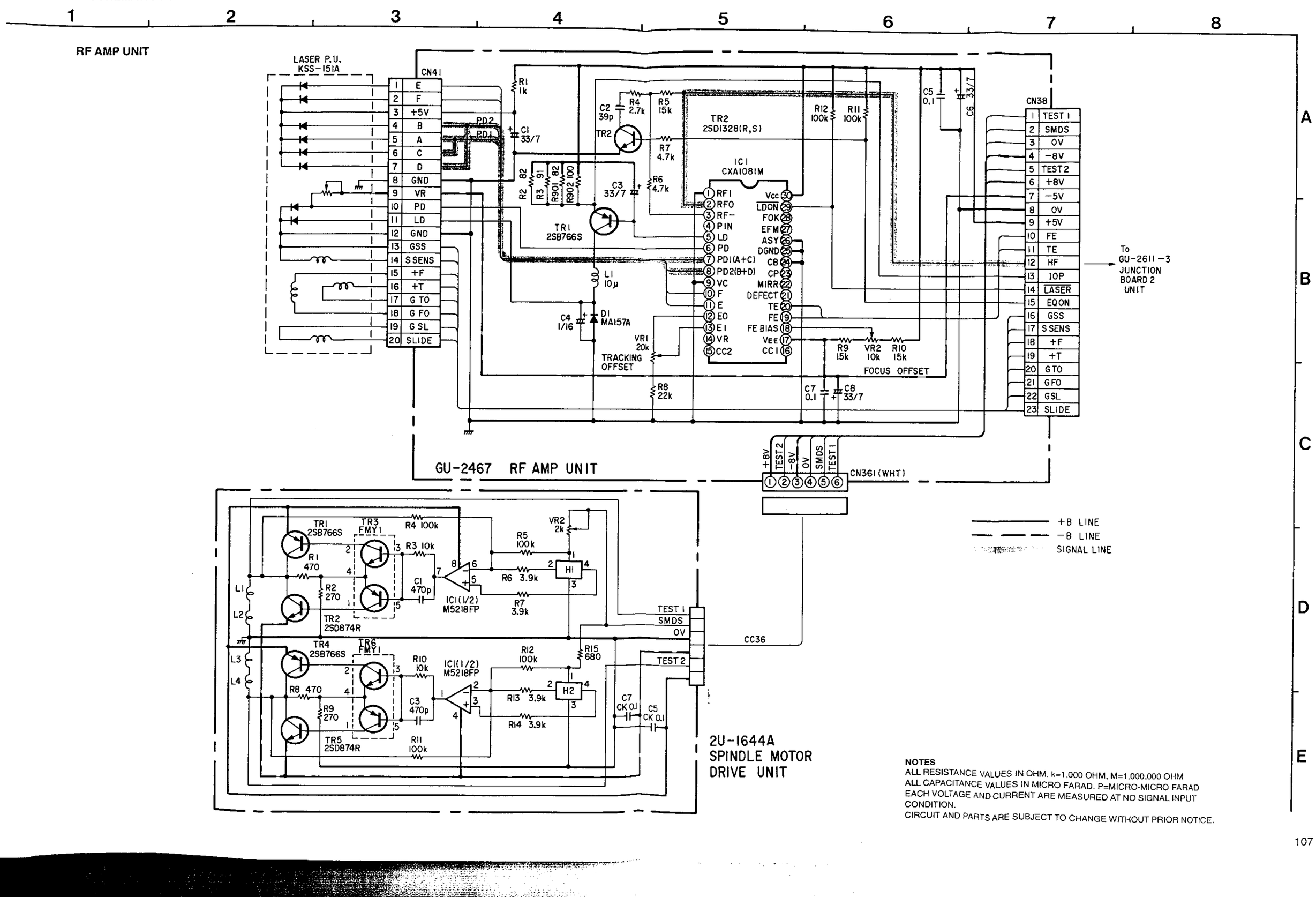
LED DRIVE SM UNIT



NOTES
ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

A B C D E

23. SCHEMATIC DIAGRAM

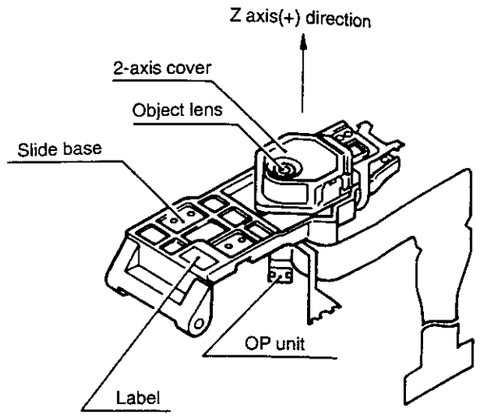


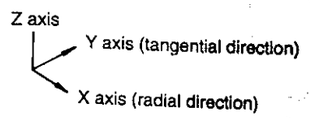
NOTES

ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

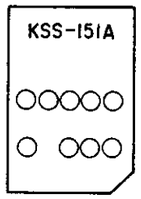
24. NOTE ON HANDLING OF LASER PICKUP

- **Names of Parts**





- **Label**



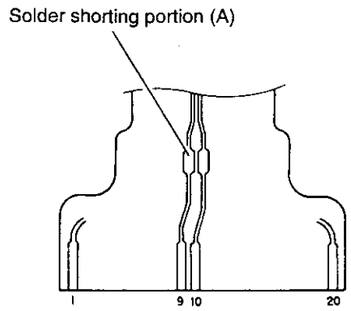
	Day	Month	Last figure of the Year	Quality control No.
Lot No.	○○	○	○	○
	Months 10, 11 and 12 are indicated by X, Y and Z.			
lop indication	○	○	○	○
	Alphabet	Second digit	First digit	First from decimal point

Unit is mA and decimal point is omitted.
An alphabet may be used for the quality control in the factory.

- **Connection diagram (1)**

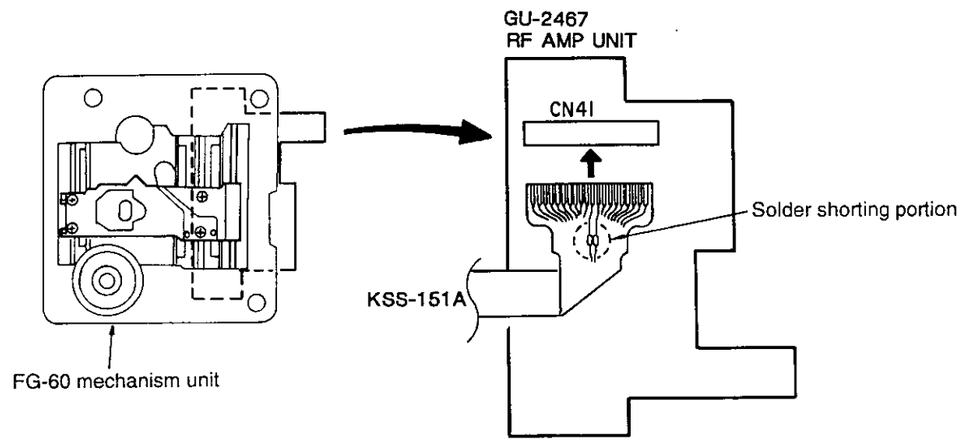
KSS-151A Supplied flexible wire terminal

No.	Description
1	Linear motor
2	Linear motor
3	2 axis –F
4	–T
5	+T
6	+F
7	Sensor
8	Sensor
9	LD GND
10	LD
11	PD
12	VR
13	GND
14	PD D
15	C
16	A
17	B
18	K
19	F
20	E



- **Connection diagram (2)**

KSS-151A → RF AMP P.W.B.



Note: When removing a flexible wire supplied with KSS-151A, from CN41 of RF AMP UNIT (GU-2467), be sure to bridge the shorting portion with a solder.

Notes on handling

Laser pickup KSS-151A is precisely assembled and adjusted in a exclusive factory. Do not disassemble or adjust it easily. Please be paid utmost care for the following items when handling.

1. Handle with Care

(1) Storage
Do not store the pick-up in dusty, high-temperatured or high-humidity environments.

(2) Please take care for preventing from shock by falling down or careless handling.

2. Laser Diode (LD)

(1) Protect your eyes
The laser beam may damage the human eye, since the intensity of the focused spot may reach $1.3 \times 10^4 W/cm^2$ even if the intensity at the object lens is 400 μW maximum. As the light beam spreads after focused through the objective lens, it does not effect you in the place as far as more than 30 cms. However, do not look at the laser light beam either through the object lens directly nor another lens or a mirror.

(2) Poison of As
Since the LD chip contains As (Arsenic), as GaAs + GaAlAs, as known as the poison, although the poison is relatively weak, in comparing with others, e.g.As_2O_3, $AsCl_3$ etc., and the amount is small, avoid putting the chip in acid or an alkali solution, heating it over 200°C or putting it into your mouth.

(3) Avoid surge current or electrostatic discharge
The LD may be damaged or deteriorated by its own strong light if a large current is supplied to it, even if only a short pulse.
Make sure that there is no surge current in the LD driving circuit by switches or else. Be careful to handle pick-up as it may be damaged in a moment by human electrostatic discharge. The pins of the LD are short-circuited by solder for protection during shipment.
For safety handling of an LD, grounding the human body, measuring equipments and jig is strongly recommended. And still it is further desirable to make use of mat on the platform and floor for handling the LD.
To open the short-circuit, remove the soldering quickly with a soldering iron whose metal part is grounded.
The temperature of the soldering iron should be less than 320°C (30W).

3. Actuator

(1) The performance of the actuator may be effected if magnetic material is located nearby, since the actuator has a strong magnetic circuit. Do not permit dust to enter through the clearance of the cover.

(2) Cleaning the lens
It may change the specifications by attaching dust or ash on the object lens. Clean the lens with a cleaning paper dampened with a little water, not pressing lens with so much strength by the cleaning paper.

4. Metal Bearing

As the metal bearing of Cu-compound sintered alloy is impregnated with FROIL0147P (*Part No. 529 0054 007), never fail to supply the bushing with the same lubricant at the time of replacing the pick-up. Lubrication is not essencial in the operation period.

5. Handling

Please handle the laser pick-up with holding the optical base (rosin molded part).
When either a part of human body or some other things may happen to touch directly with the circuit part of P.W.Board, it may cause deterioration, take careful attention in handling this base.

6. Damage of laser pickup

If an adjustment of tracking or focus is not performed well, or it cannot be performed quite, it is a assumed that the laser pickup may be damaged. in this case, measure to judge the current reading of the laser diode.

7. Laser pickup deterioration judging standard

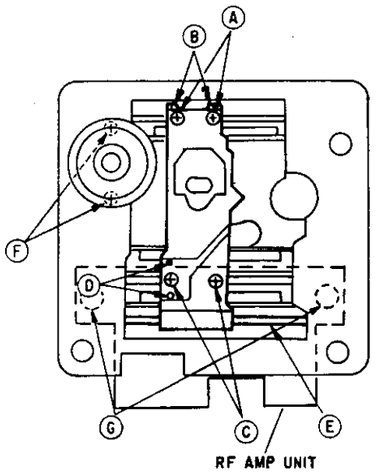
(1) If electric voltage at Pins (6)(+5 V) and (2)(Iop) of test terminal (TP1) of the unit (GU-2468-1) is measured, and its value is expressed as V1, the current value can be obtained with a formula of iop=V1/22.

(2) If iop value is ±10% or more as compared with the IOP value printed on the name plate of laser pickup, the laser pickup may be deteriorated. (ambient temperature at 23°C).

(3) When a ambient temperature changes by ±10°C, iopl varies by ±5%. iopl also varies with the pass of time.

(4) By considering the above conditions, and the adjustment is performed correctly, and if HF level 0.6 or less or much jitters is measured between Pin (1)(HF) of TP1 of GU-2468-1 and GND may be deterioration of pickup.

- **Removing the laser pickup KSS-151A**



(1) Remove the mechanism unit from the changer. (Refer to Section 8. Removing the mechanism unit on page 79.)

(2) Bridge the shorting portion on the flexible cable of the laser pickup with a solder.

(3) Remove the flexible cable from CN41.

(4) Unfasten two fixing screws of RF AMP UNIT. (Ⓖ portion.)

(5) By removing of two mounting screws of turntable and two screws in F portion makes it possible to disassemble the spindle motor.

(6) Unsolder Ⓑ portion (speed detection coil) in two places.

(7) Unsolder Ⓓ portion (linear motor drive coil) in two places.

(8) Remove four screws in portions Ⓐ and Ⓒ . (removing the speed detection and linear motor drive coil.)

(9) By removing two screws securing the short in Ⓔ portion, and pull out the short from the laser pickup enables detaching the laser pickup.

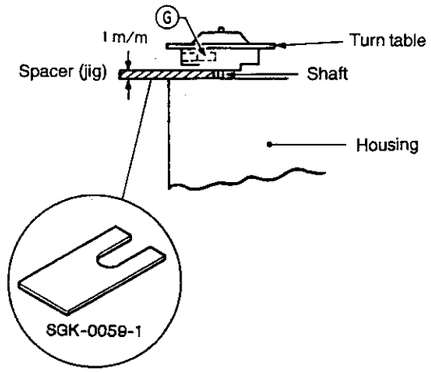
25. ADJUSTING THE MECHANISM UNIT

- **Adjusting the height of the turntable**

(1) Attach the spindle motor ass'y to the housing with two screws. (Refer to the figure of removing the laser P.U KSS-151A.)

(2) Insert the turn table to the shaft and insert a spacer (jig) of 1 m/m between the turntable and housing as shown in the figure.

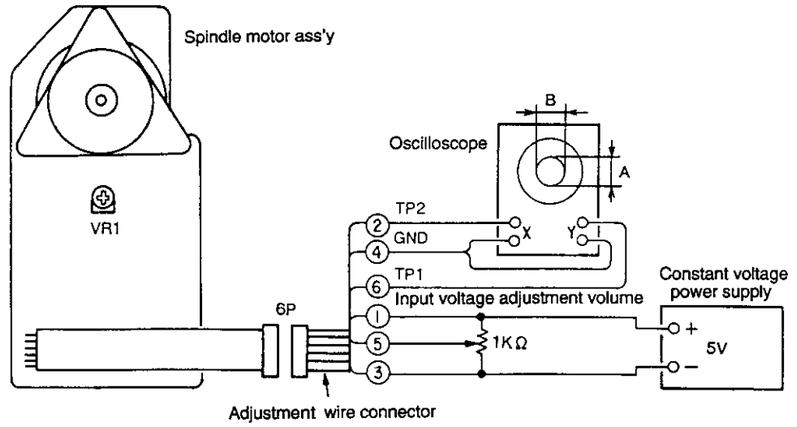
(3) Pressing lightly the turntable and fasten screw Ⓖ with a hex wrench.



- **Adjusting the spindle motor**

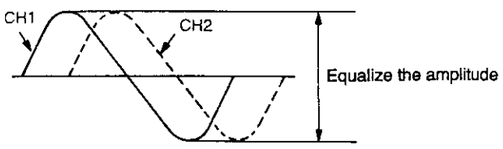
(1) Remove the mechanism unit and disassemble the spindle motor ass'y.

(2) Connect the adjustment wire connector (6P) and the measurement equipments as shown in the figure.



(3) Turn to control balance volume VR1 so that amplitudes upper/lower (A) and left/right (B) coincide. (When controlling the VR, amplitude (B) varies.)

(4) When adjusting with dual-mode oscilloscope, set it to ALTER or CHOPPER, apply signals to CH1 and CH2, and adjust balance volume VR1 so that the amplitudes of both waveforms coincide as shown in the figure.

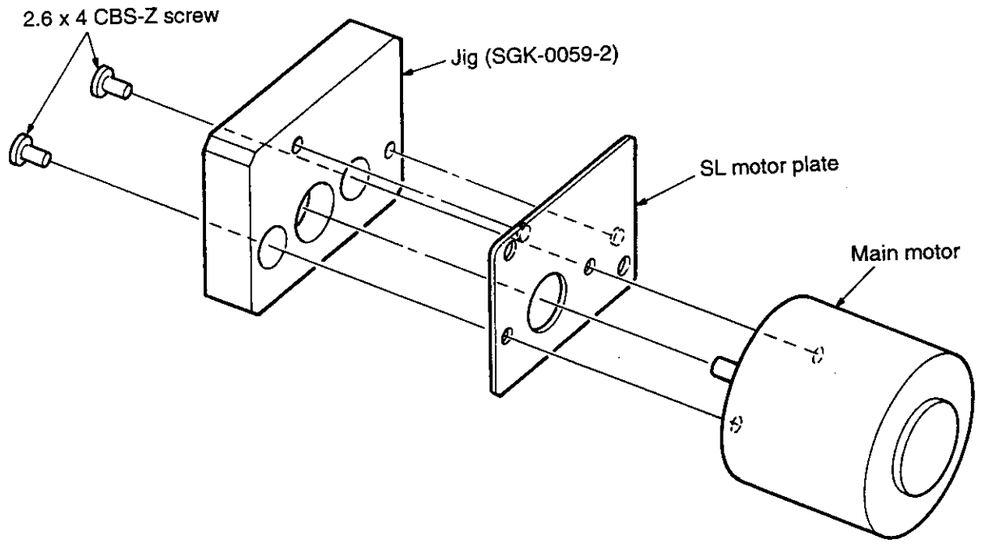


Note: If the input signal is greater, the waveform saturates.

- **Adjusting the mounting position of the main motor**

(1) Attach the main motor to the jig so to hold the SL motor plate.

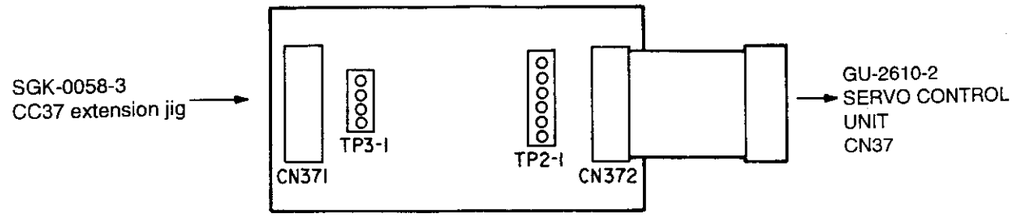
(2) From the reverse side of main motor mounting surface of jig, fix the main motor with two 2.6x4 CBS-Z screws.



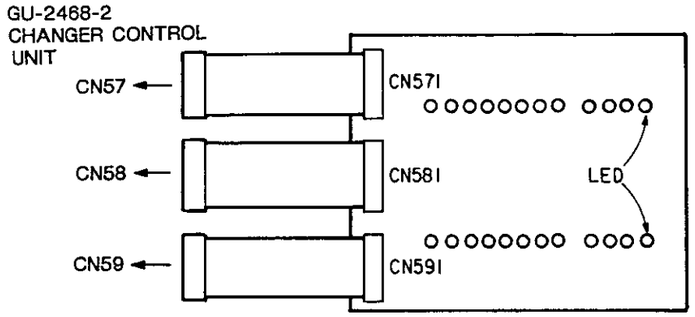
26. ADJUSTMENT AND EXTENSION JIGS

Jig board (SGK-0058)

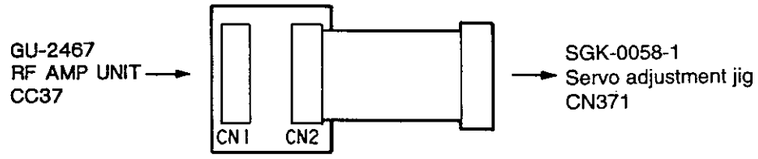
- **SGK-0058-1 Servo adjustment jig**



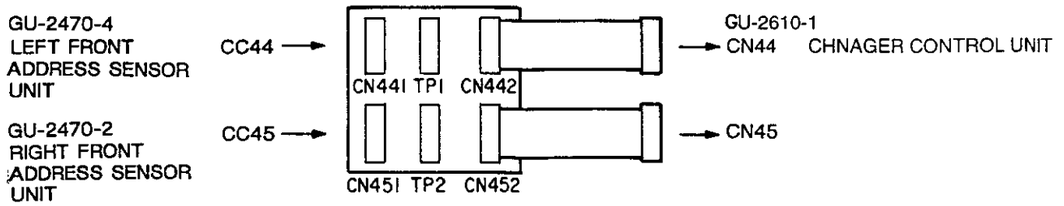
- **SGK-0058-2 Address sensor jig**



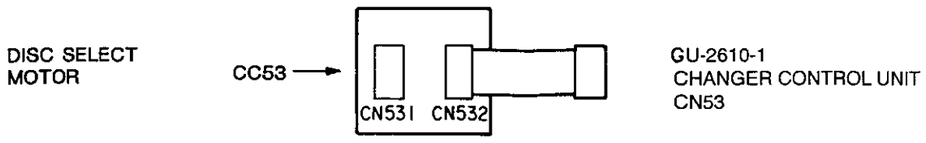
- **SGK-0058-3 CC37 extension jig**



- **SGK-0058-4 CC44 and CC45 extension jig**



- **SGK-0058-5 CC53 extension jig**



- SGK-0058-6 CC361 extension jig