

# ONKYO SERVICE MANUAL

## COMPACT DISC PLAYER MODEL DX-300

UDN, UD	120V AC, 60Hz
UGV, UG	220V AC, 50Hz
UW	120/220V AC, 50/60Hz

### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\Delta$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

### SPECIFICATIONS

#### Compact Discs

Playing time:	75 minutes max.
Disc diameter:	12 cm
Track pitch:	1.6 $\mu$ m
Linear tracking speed (constant):	About 1.3 m/sec.
Revolutions per minute:	About 200 to 500
Disc thickness:	1.2 mm
Pickup:	Semi-conductor
Channels:	Two
Sampling frequency:	44.1 kHz
Quantization bits:	16 bits linear

#### Audio

Frequency response:	2—20,000 Hz
Signal-to-noise ratio:	95 dB
Dynamic range:	95 dB
Channel separation:	90 dB
Total harmonic distortion:	0.003%
Wow and flutter:	Quartz accuracy
Output level:	Line: 2V rms Headphones: 30 mW
Output impedance:	560 ohms
Headphone load impedance:	8—32 ohms

**ONKYO**  
**AUDIO COMPONENTS**

**Functions**

1. Displays: track number, index number, playing time of tracks and remaining playing time of disc, memory track number
2. Pickup position indicator
3. Index search function
4. Forward and reverse jump function
5. Memory play function
6. Fast forward and reverse
7. Pause function

**General**

Power supply: AC120V/60Hz, 220V/50Hz,  
120/220V 50/60Hz  
 Power consumption: 40 watts  
 Dimensions(W×H×D): 450×115×380 mm  
 Weight: 9.7 kg

**PROTECTION OF EYES FROM LASER BEAM DURING SERVICING**

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

**WARNING!!**

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

**Laser Diode Properties**

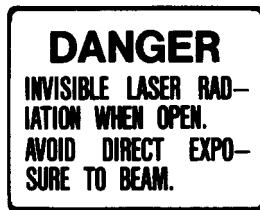
- Material: GaAs
- Wavelength: 780nm
- Emission Duration: continuous
- Laser output: max. 0.3mW \*

\*This output is the value measured at a distance about 1.8mm from the objective lens surface on the Optical Pick-up Block.

**LASER WARNING LABELS**

The labels shown below are affixed.

1. DHHS Protective Housing Label

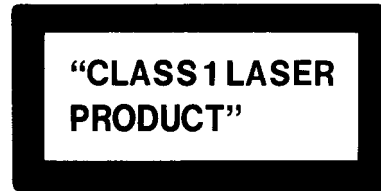


- See figure 1 on next page for location of label.
2. Certification label .....(UD model only)



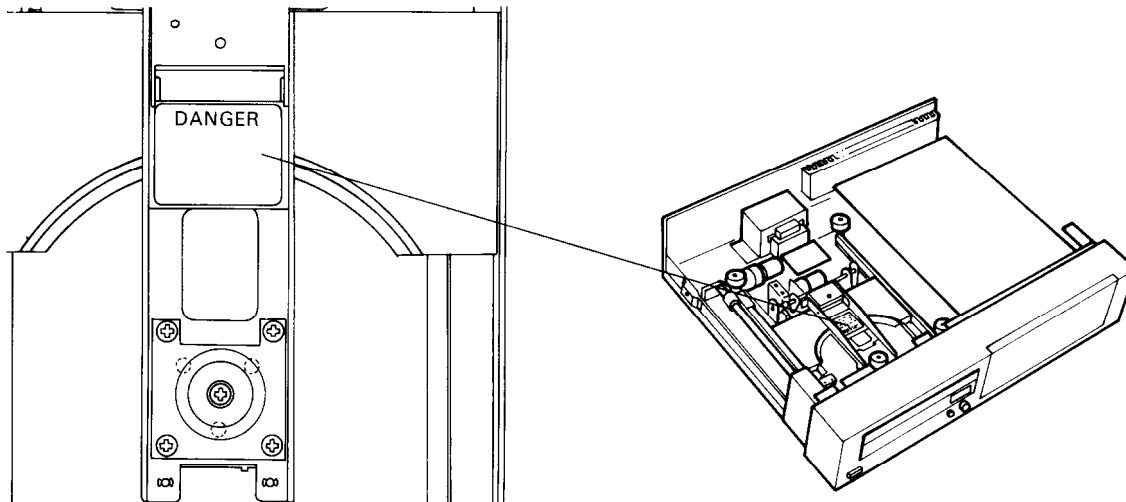
- See figure 2 on next page for location of label.

3. Class 1 label .....(UG model only)



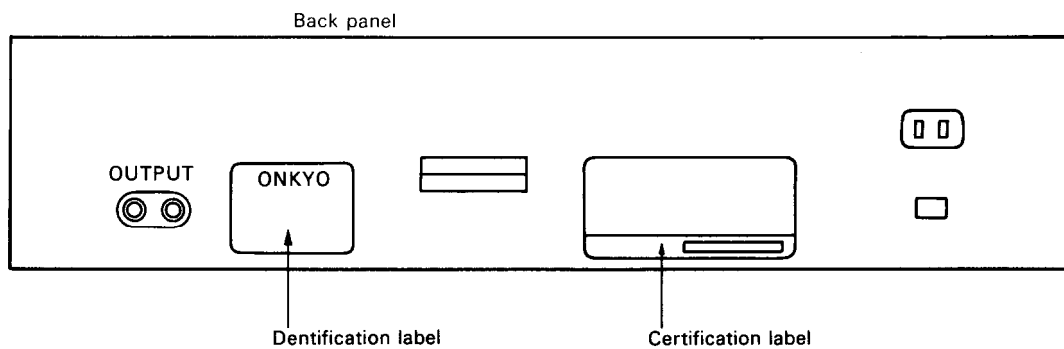
- See figure 3 on next page for location of label.

Location of labels  
DHHS Protective Housing Label



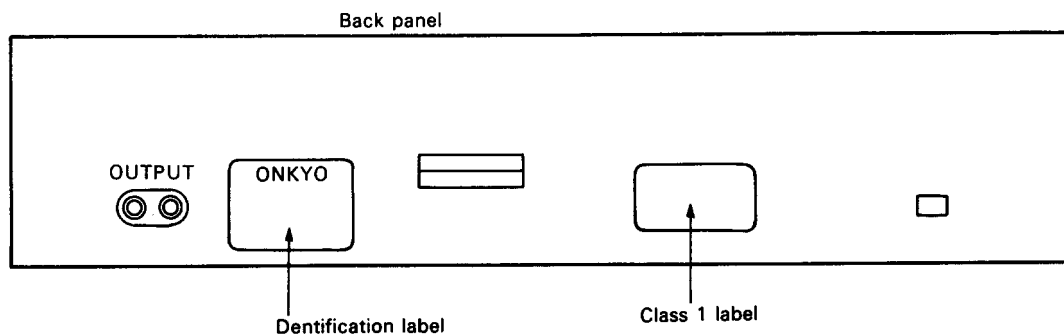
(Fig. 1)

Certification Label



(Fig. 2)

Class 1 Label



(Fig. 3)

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## PRECAUTIONS

### 1, Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Remove the bottom board.

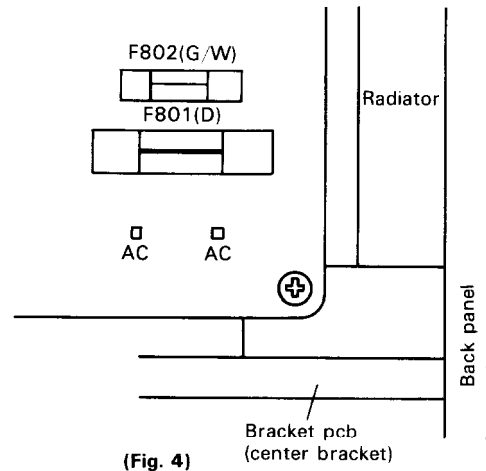
Circuit no.	Rating	P.N	Model
F801	1A(ST-6)	252045	D(120V) W(120/220V)
F802	500mA (SE-EAWK)	252063	G(220V) W(120/220V)

### 2. Safety-check out(D model)

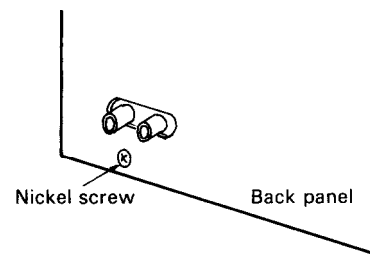
After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cable and nickel screw.

Specifications: more than 10Mohm



(Fig. 4)



(Fig. 5)

## PRECAUTIONS IN HANDLING THE OPTICAL PICK-UP BLOCK

The laser diode in the optical pick-up block is so sensitive to static electricity, surge current and etc. that the components are liable to be broken down or its reliability remarkably deteriorated.

During repair, carefully take the following precautions.

(The following precautions are included in the service parts.)

### PRECAUTIONS

**1. Ground for the work-desk.**

Place a conductive sheet such as a sheet of copper (with impedance lower than  $10^6\Omega$ ) on the work-desk and place the set on the conductive sheet so that the chassis.

**2. Grounding for the test equipment and tools.**

Test equipments and toolings should be grounded in order that their ground level is the same the ground of the power source.

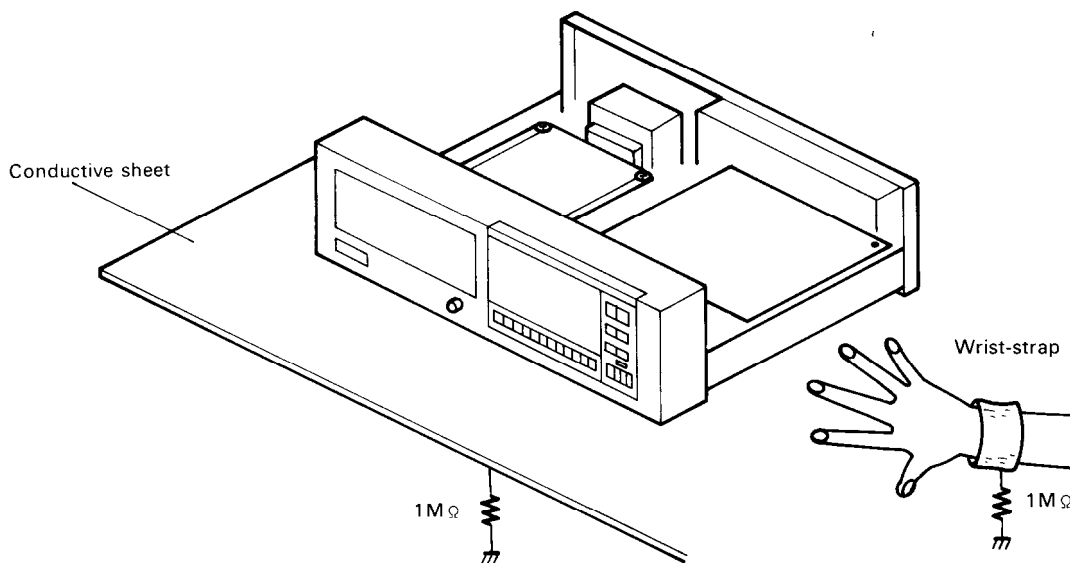
**3. Grounding for the human body.**

Be sure to put on a wrist-strap for grounding whose other end is grounded.

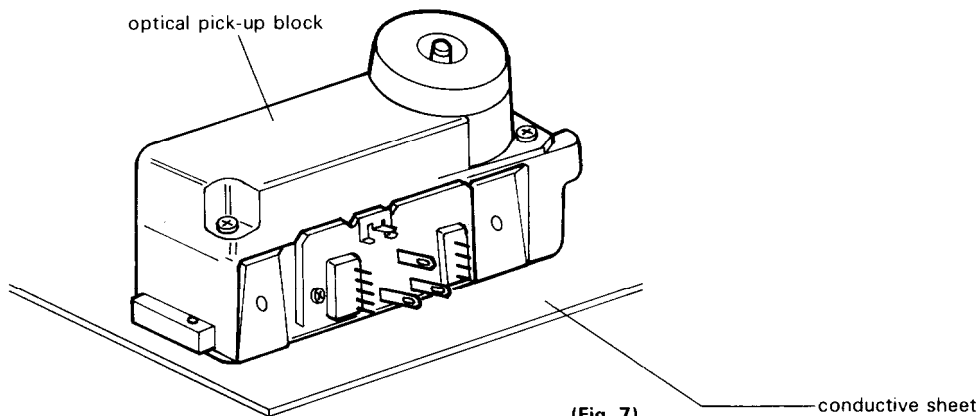
Be particularly careful when the workers wear synthetic fiber clothes, or air is dry.

**4. Select a soldering iron that permits no leakage and have the tip of the iron well-grounded.**

**5. Do not check the laser diode terminals with the probe of a circuit tester or oscilloscope.**



(Fig. 6)



(Fig. 7)

## SERVICE NOTE

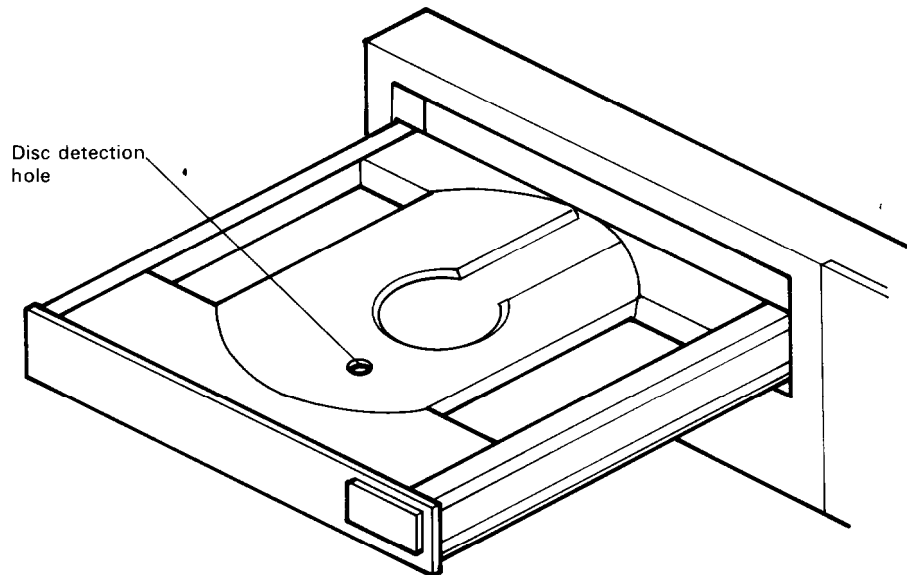
### NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the

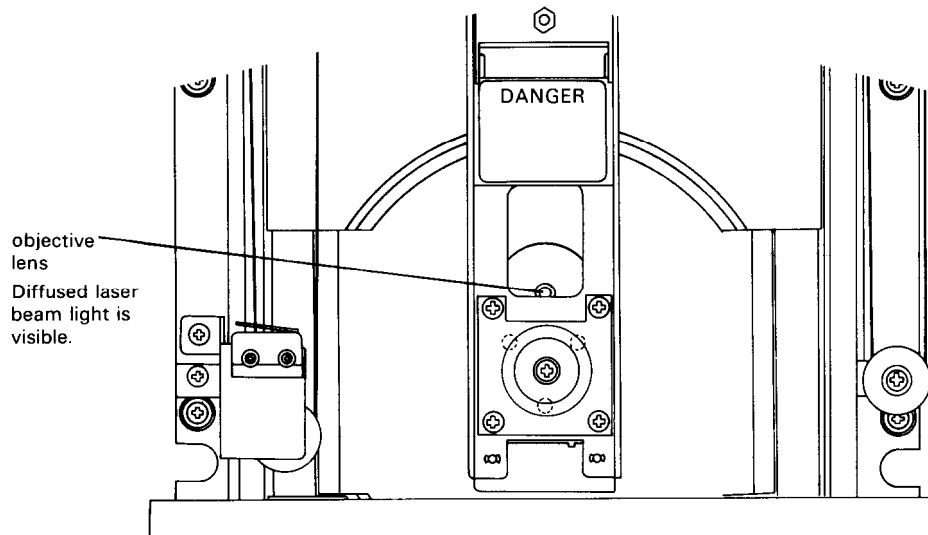
objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30cm away from the objective lens.

### LASER DIODE CHECK

1. Turn the power switch off and remove the socket P060 on the servo/micro computer control pc board NADIG-1843.
2. Then turn the power switch on and press the open/close button to open the loading case.
3. Cover the disc detection hole with a coin and close the loading case.
4. Observe the objective lens and confirm that the laser diode is emitting light.



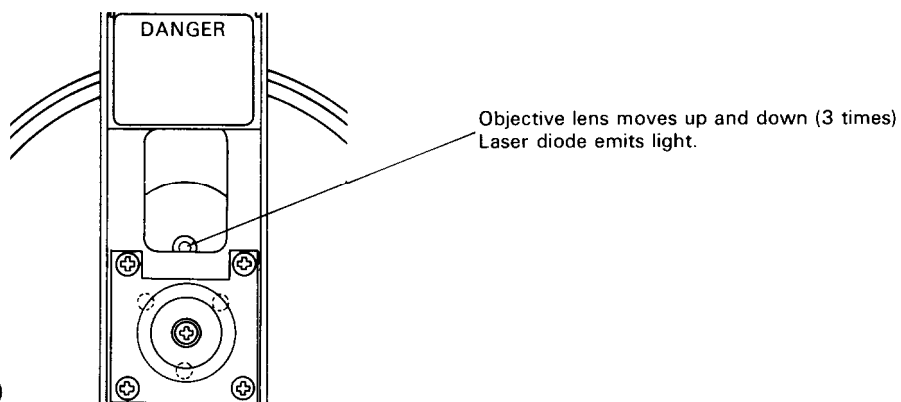
(Fig. 8)



(Fig. 9)

**FOCUS SEARCH OPERATION CHECK**

1. Press the open/close button to open the loading case.
2. Cover the disc detection hole with a coin.
3. Observe the object lens and confirm the operations below.



(Fig. 10)

**CLEANING THE OBJECTIVE LENS SURFACE**

If the front surface of the objective lens is stained or fogged, it may sometimes not only deteriorate the light output, but affect the characteristic of the performance.

- a) when the objective lens is stained, wipe off the lens surface with a mixture of alcohol and ether at the ratio of 3 to 7 or with a cleaner liquid of camera lens, with special care not to deform the shape of lens supporting springs.
- b) Avoid the use and maintenance of the lens in a place where it may be stained with oil or grease, or where condensation of dew is subject to take place. Handle or maintain it in a atmosphere where temperature little changes and there is no dust.

## DISASSEMBLY

### Top cover

Remove the two screws (3STS+6B(BC)) holding the top cover and back panel.

Remove the four screws (4TTB+8C(BC)) holding the top cover and side brackets.

### Bottom board

Remove the four screws (3TTW+16B(BC)) holding the leg and bottom board.

Remove the ten screws (3TTS+6B(BC)) holding the bottom board and chassis.

### Front panel

Remove the top cover.

Remove the two screws (3TTS+6B(BC)) holding the front panel and front bracket.

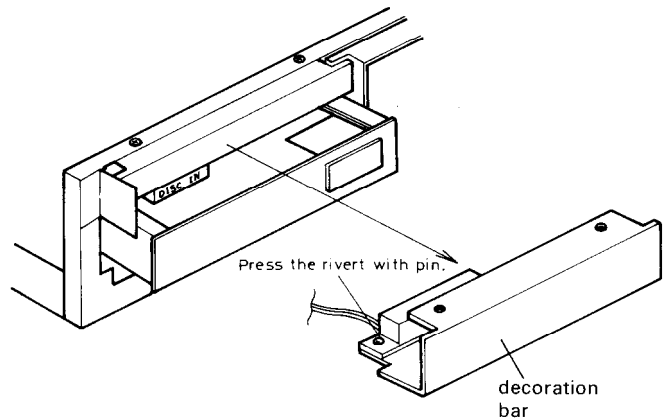
Remove the two screws (3TTS+6B(BC)) holding the front panel and brackets L/R.

### Disc-in indication lamp

Remove the top cover and front panel.

Remove the two screws holding the decoration bar and front bracket.

Press the rivert with pin etc.



(Fig. 11)

### Mechanism

Remove the top panel, bottom board, front panel and DISC-IN indication lamp.

Remove the three screws holding the mechanism and side bracket.

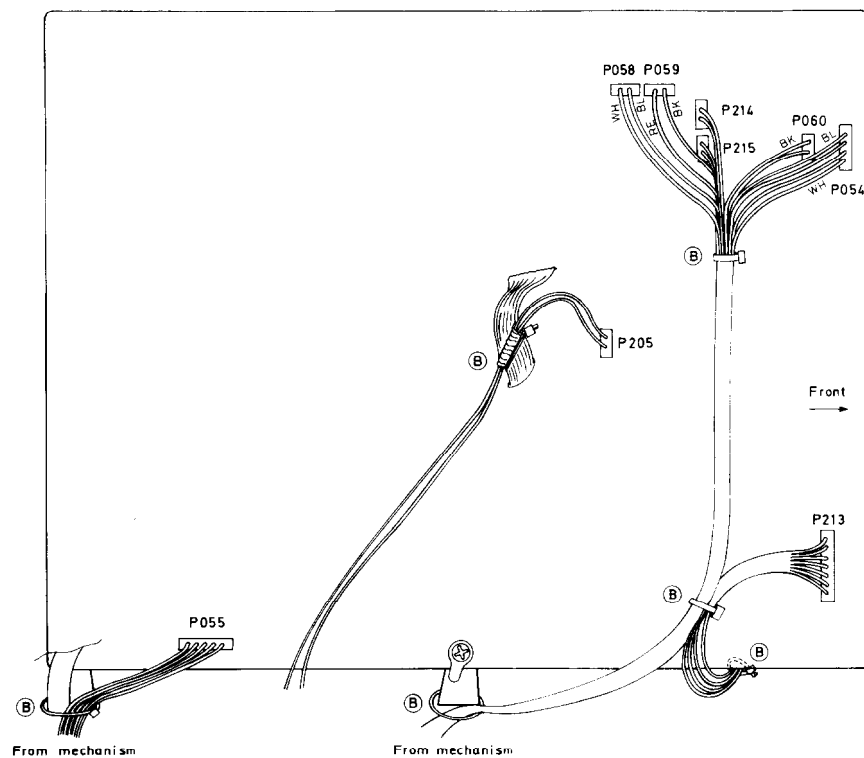
Remove the three screws holding the mechanism and center bracket.

Cut the six binders. (mark ⑧)

Remove the sockets P054, P055, P058, P059, P060, P205, P213, P214 and P215 on the NADIG-1843.

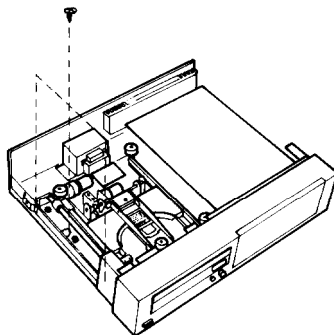
Cut a binder binding the lead wire of socket P903. (bottom side)

Remove a socket P903. (near center)



(Fig. 12) NADIG-1843 Top view



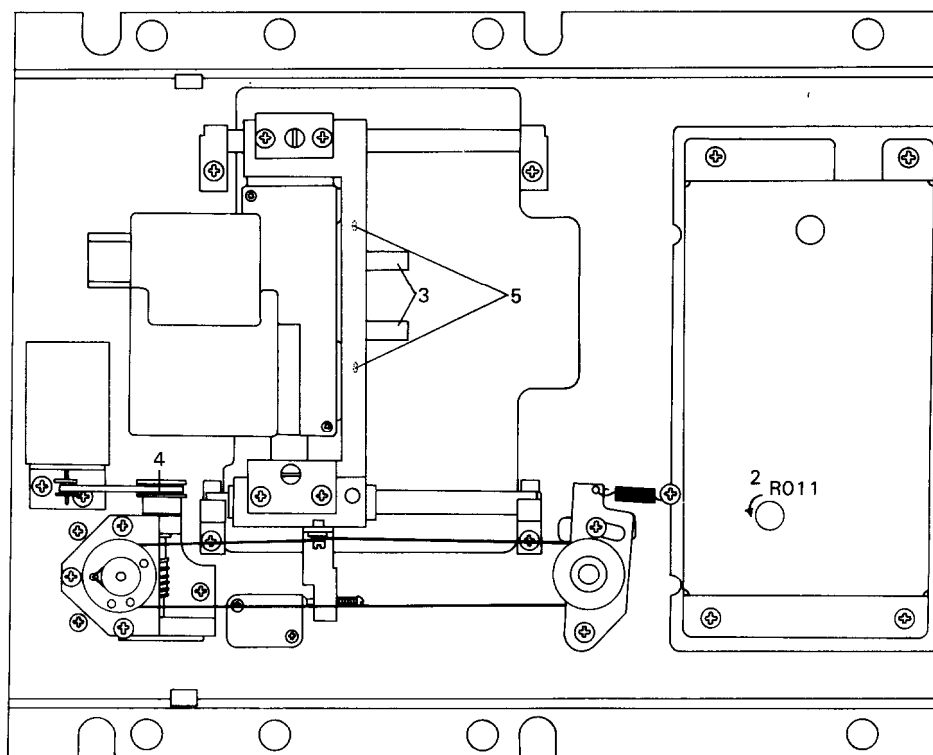


(Fig. 13)

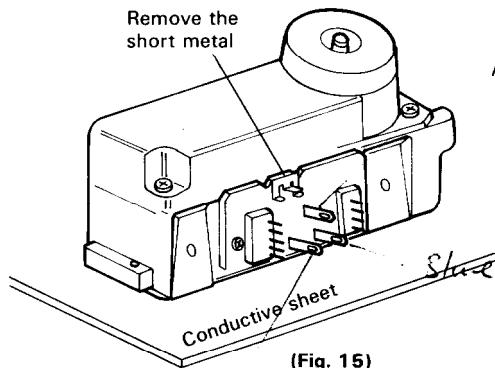
### Optical pick-up block

Refer to the precautions in handling the optical pick-up block. (page 5)

1. Remove the bottom board.
2. Rotate R011 on the optical pick-up control pc board all the way counterclockwise.
3. Remove the two sockets on the optical pick-up block.
4. Rotate the motor pulley counterclockwise so that the optical pick-up block moves to the center position.
5. Remove the two screws holding the optical pick-up.



(Fig. 14)



(Fig. 15)

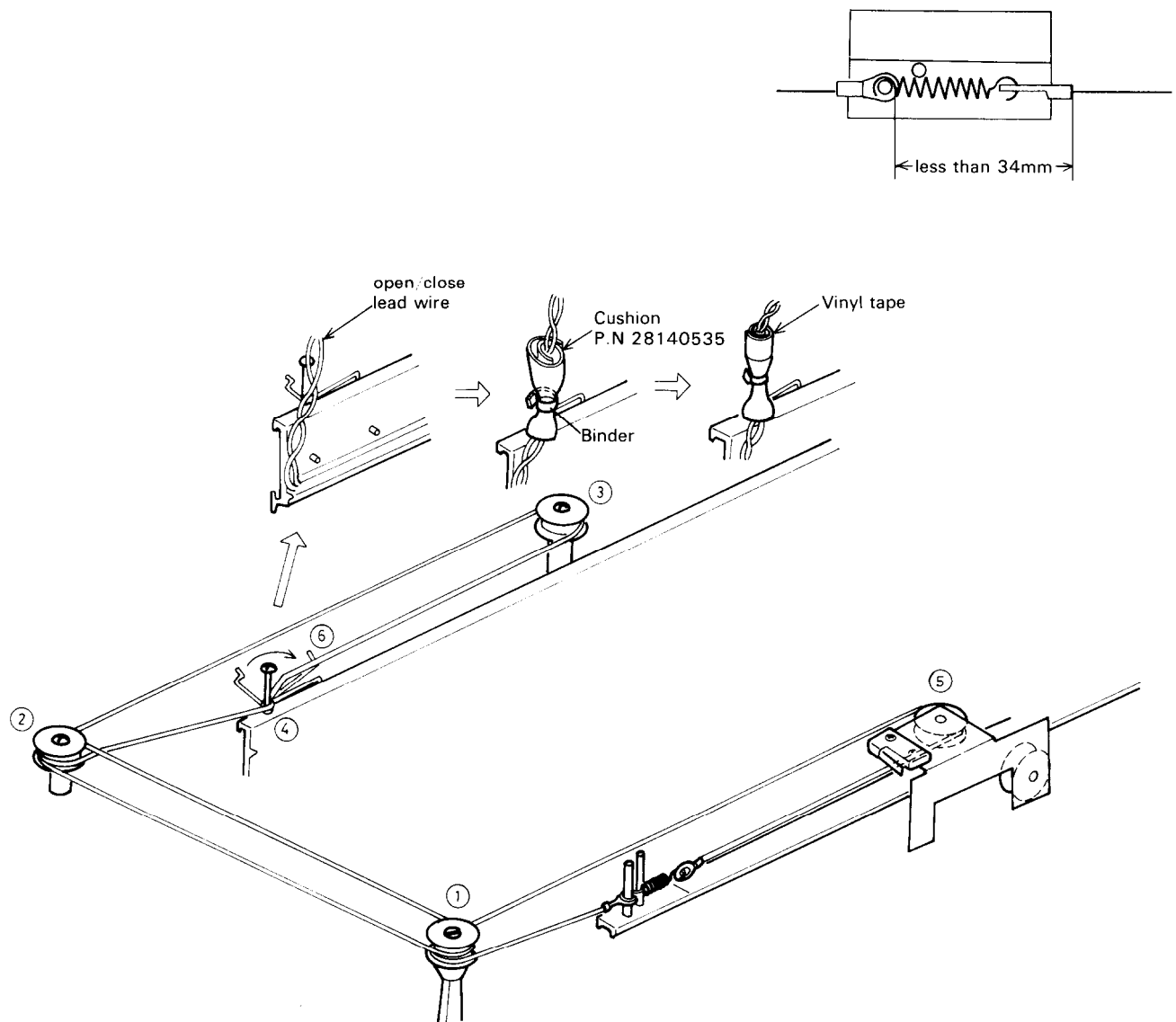
When replacing the optical pick-up block, check and adjust the items below in order.

1. Laser power adjustment (page 32)
2. Focus offset 1 adjustment (page 32)
3. Optical pick-up position adjustment (page 32)
4. Focus gain adjustment (page 33)
5. Focus offset 2 adjustment (page 33)
6. Tracking gain adjustment (page 33)
7. Tracking offset adjustment (page 33)

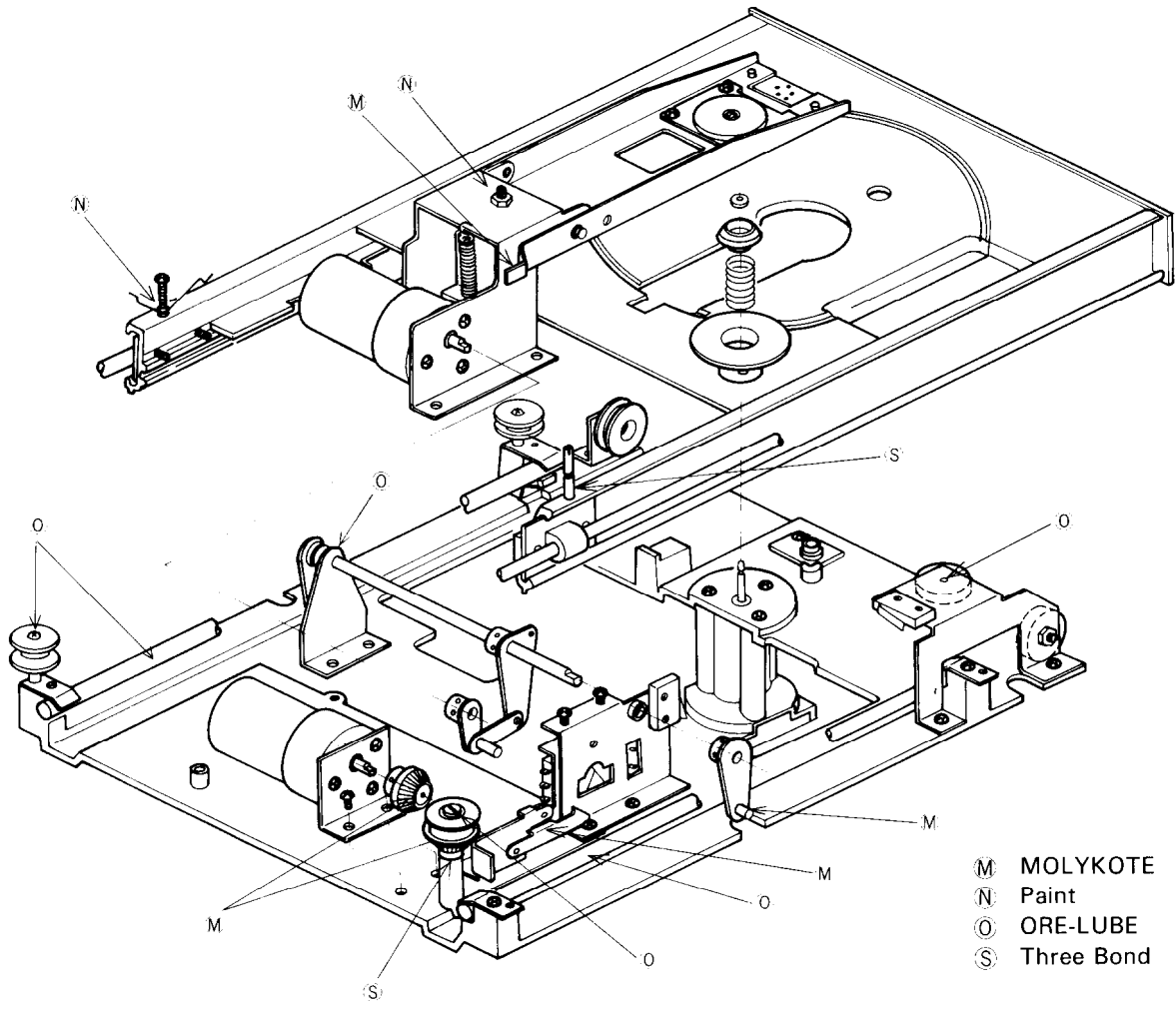
## STRINGING DIAGRAM

### Optical pick-up block

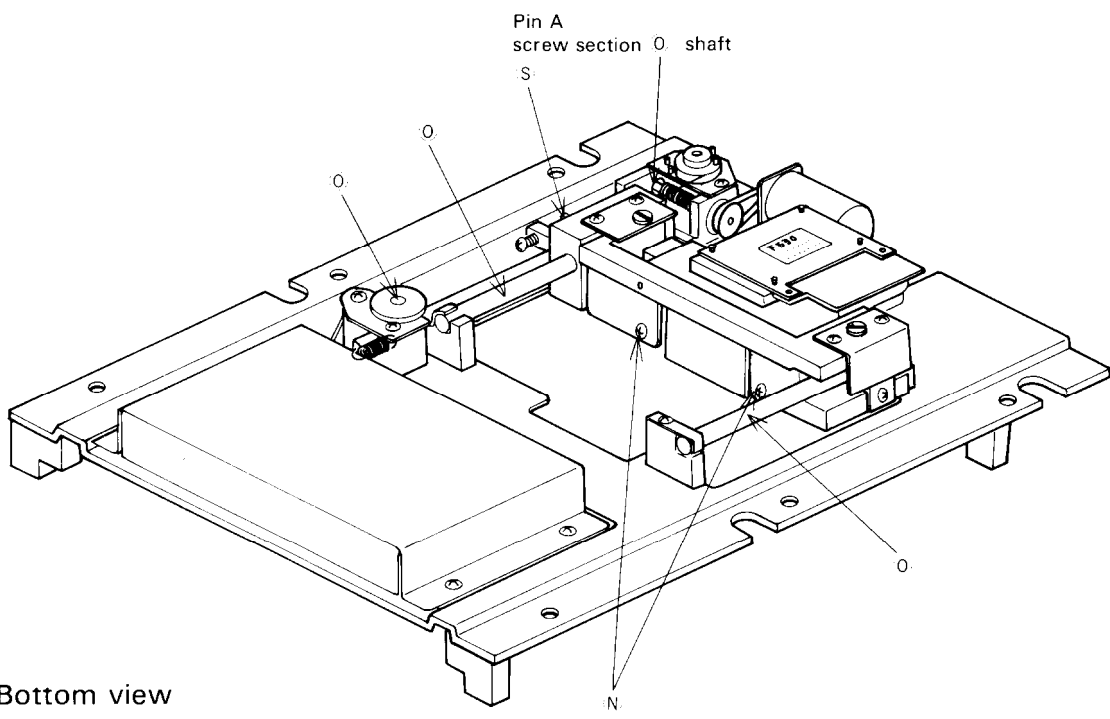
1. Hook the stringing to the bracket, pin.
2. Wind the stringing one turn around the pulley 1 counter-clockwise.
3. Thread the stringing from pulley 2 to 3.
4. Wind the string one turn around the bottom of screw 4 clockwise.
5. Wind the stringing one turn around the pulley 2 counter-clockwise.
6. Wind the stringing one turn around the pulley 1 counter-clockwise.
7. Thread the stringing to pulley 5 and hook the stringing through the spring to the bracket, pin.
8. Hook the stringing to the tension spring 6.
9. Tighten the stringing so that the length as shown below is less than 34mm.



# LUBRICATION



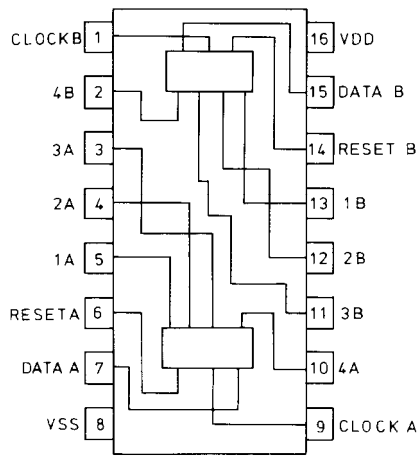
Top view



Bottom view

# IC BLOCK DIAGRAM

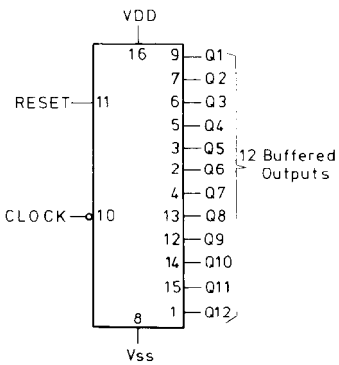
4015(Dual 4-stage shift register with serial input/parallel output)



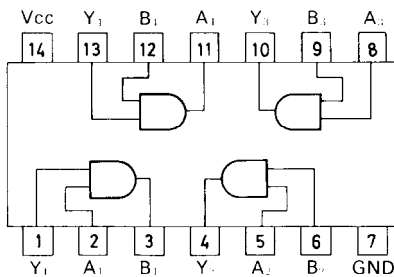
CL <sup>▲</sup>	D	R	Q <sub>i</sub>	Q <sub>n</sub>
	0	0	0	Q <sub>n1</sub>
	1	0	1	Q <sub>n1</sub>
	X	0	0 <sub>i</sub>	Q <sub>n</sub> (NO CHANGE)
X	X	1	0	0

▲ LEVEL CHANGE  
X DONT CARE CASE

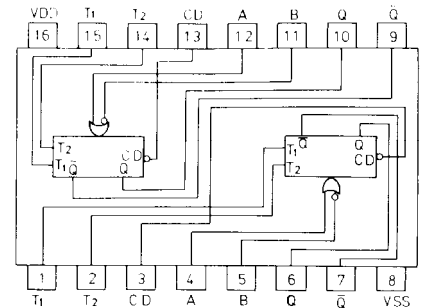
4040B(12-stage binary ripple counter)



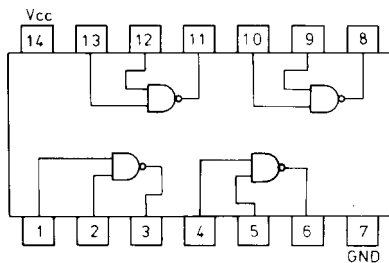
4081B(Quadruple 2-input AND gate)



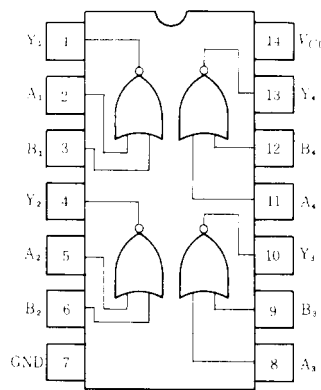
4538B(Dual precision retriggerable/resettable monostable multivibrator)



74LS00(Quad 2-input NAND)



74LS02(Quad 2-input NOR)



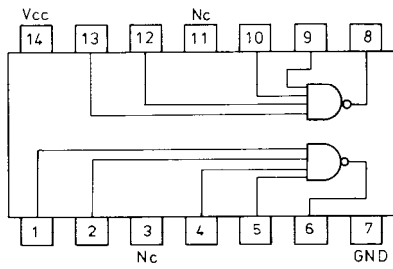
(Top View)

**Truth Table**

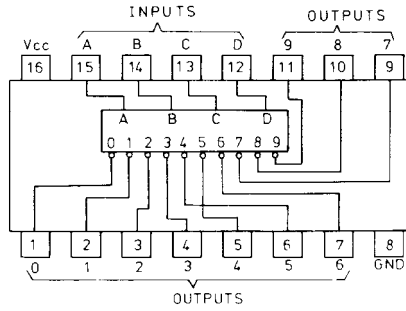
Input			Output	
A	B	CD	Q	Q̄
	H	H		
	L	H	Q	Q̄
H		H	Q	Q̄
L		H		
X	X	L	L	H

X : Hor L

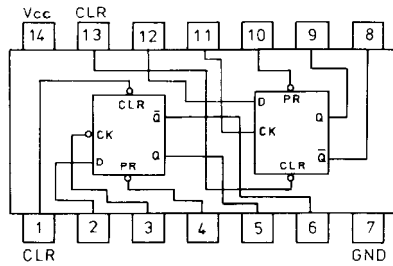
74LS20(Dual 4-input NAND)



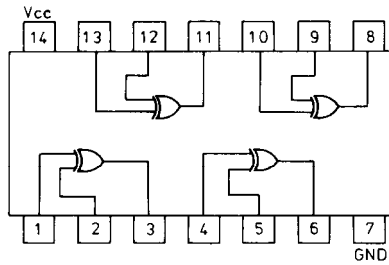
74LS42(BCD to decimal decoder)



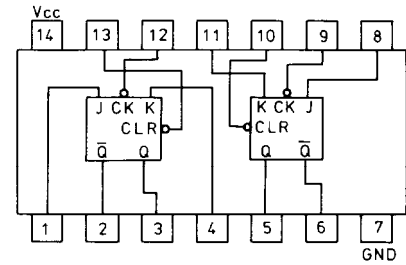
74LS74(Dual D-FFs with preset and clear)



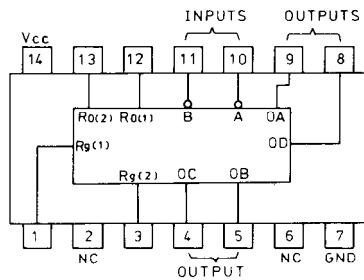
74LS86(Quad 2-input Exclusive OR)



74LS107(Dual JK-FFs with clear)

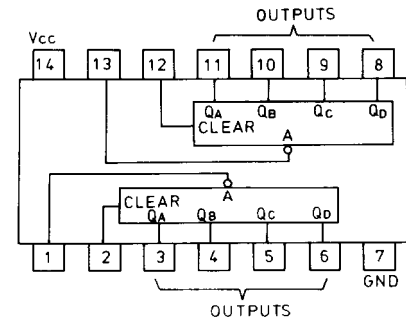


74LS290(Decode counter)

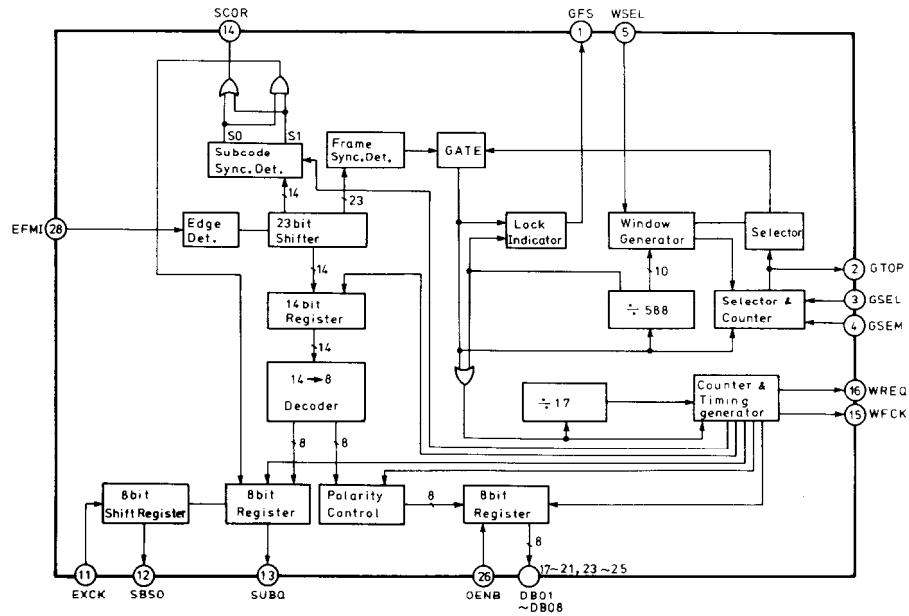


R <sub>0</sub>	R <sub>9</sub>	input		Pulse number	output				operation
		A	B		Q <sub>A</sub>	Q <sub>B</sub>	Q <sub>C</sub>	Q <sub>D</sub>	
L	L			0	L	L	L	L	count
				1	H	H	L	L	
				2	L	L	H	L	
				3	H	H	L	L	
				4	L	L	L	H	
				5	L	L	L	L	
L	H	X	X	—	H	L	L	H	Preset 9
H	X	X	X	—	L	L	L	L	clear

74LS393(Dual 4-bit binary counter)

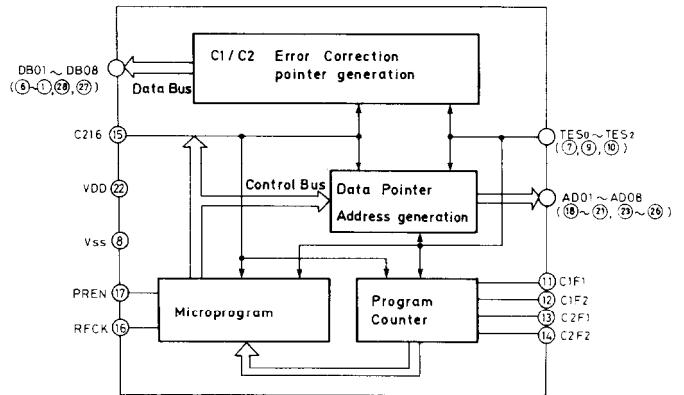
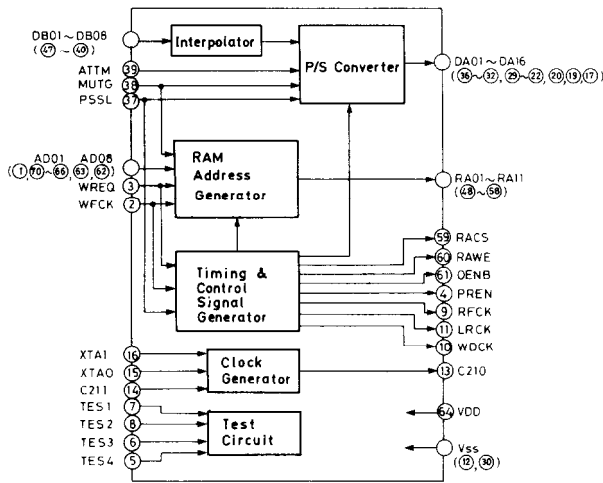


CX7933(Demodulation circuit for compact disc player)



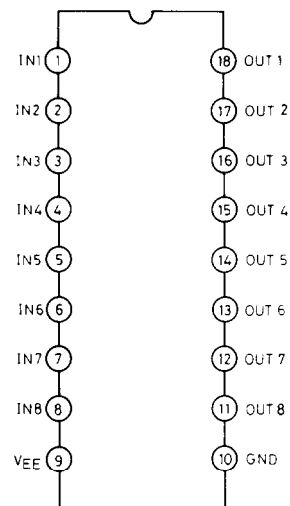
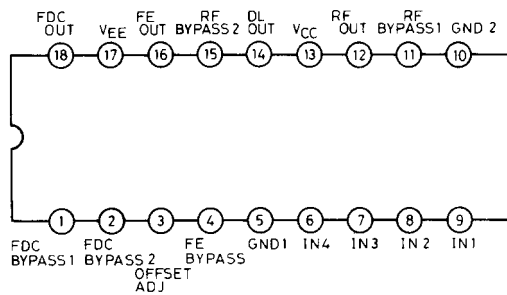
CX7934(Data control and interpolation)

CX7935(Error correction)

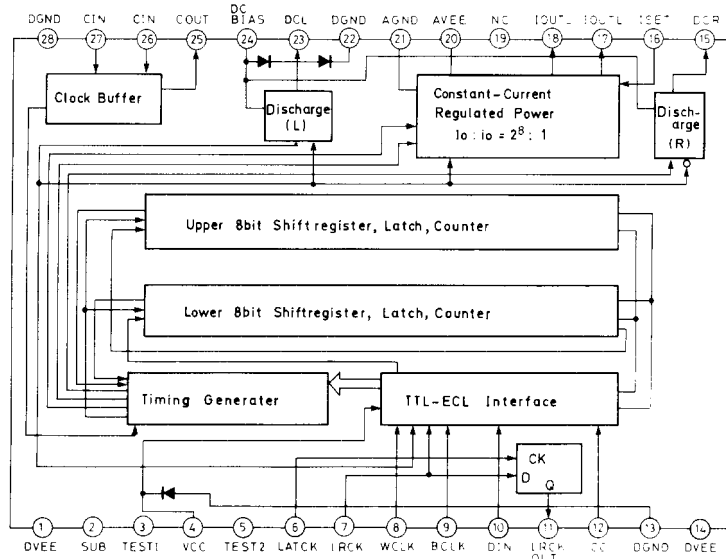


HA12050(Input signal process)

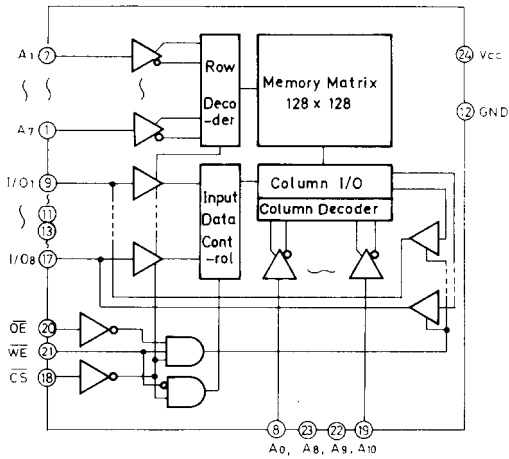
HA16619(Fluorescent indicator tube driver)



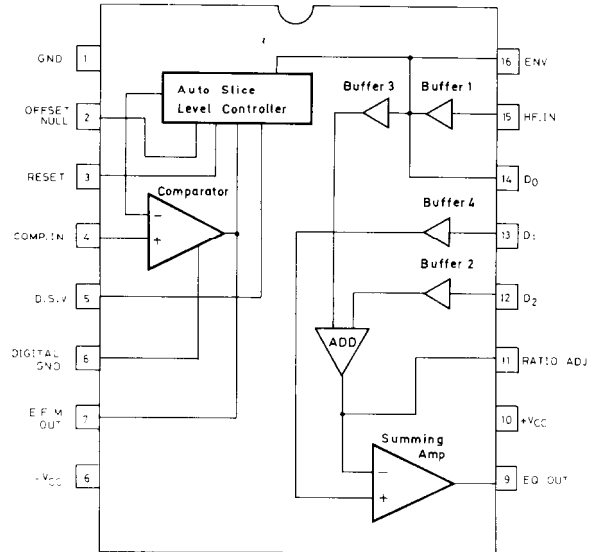
CX20017(16-bit D/A converter)



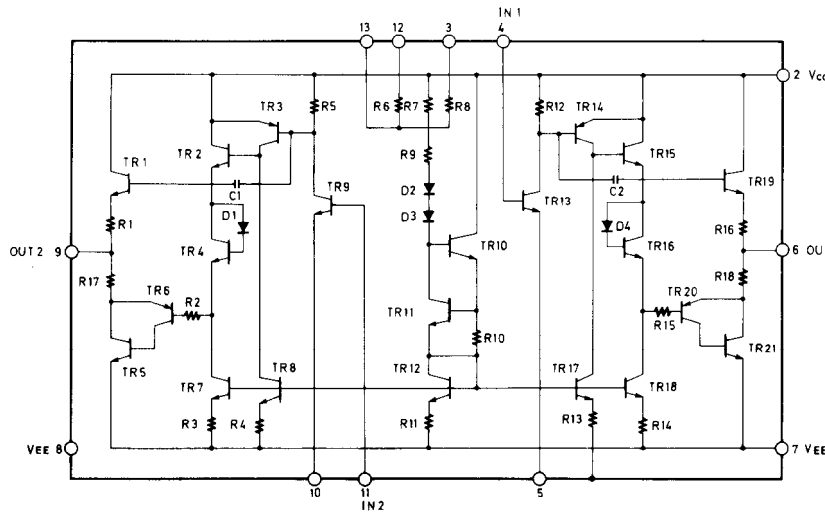
HM6116P-4(C-MOS RAM)



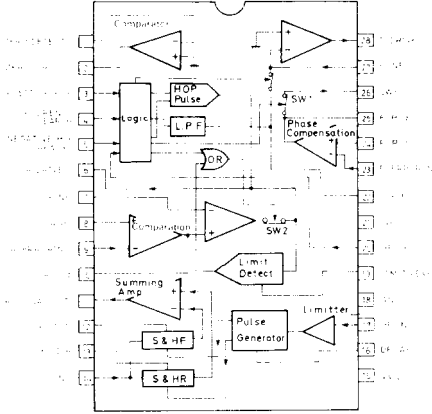
LA9010(Waveform shaping comparator of HF signal)



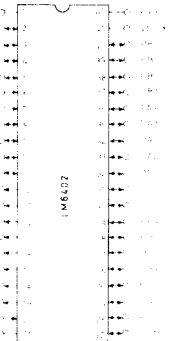
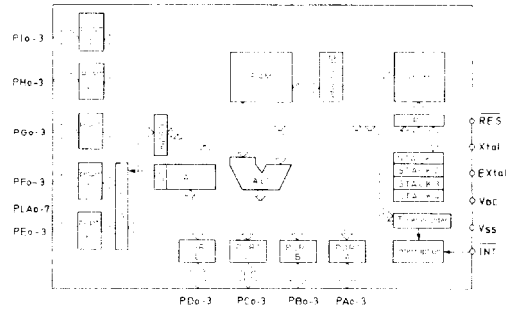
LA4177(Headphone drive amplifier)



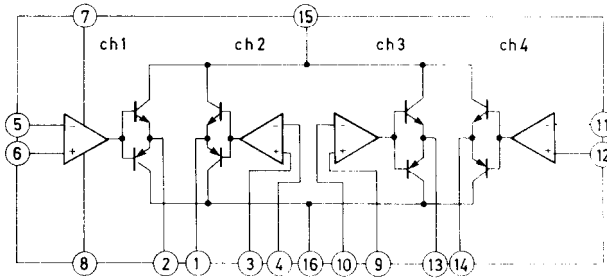
LA9100(Focus servo, radial servo and zero cross comparator)



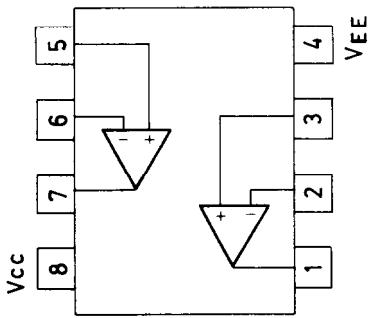
LM6402H-295(4-bit microcomputer)



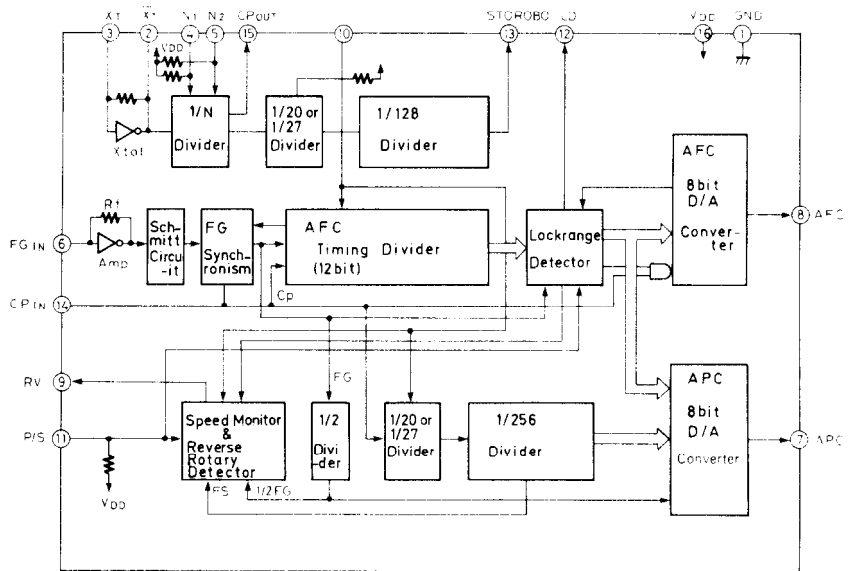
STK6932(Power amplifier)



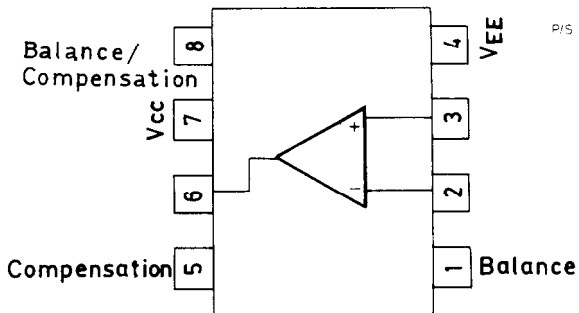
NJM072D/4558/4560(Operational amplifier)



TC9142P(Quartz PLL motor control)

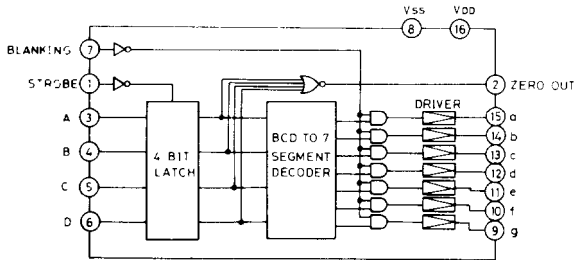


NJM5534D(Operational amplifier)





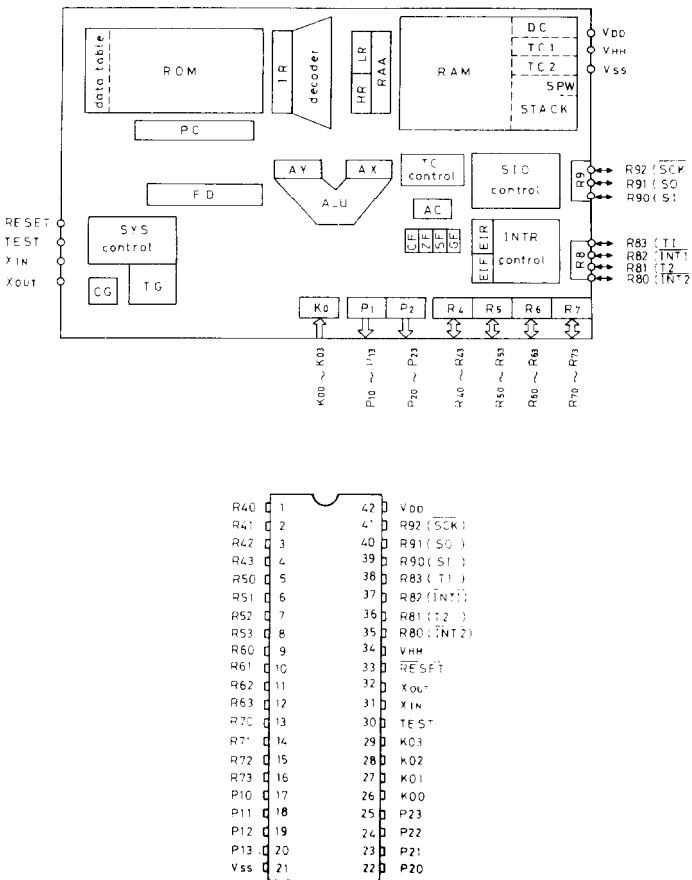
TC5069BP(BCD to seven segment decoder)



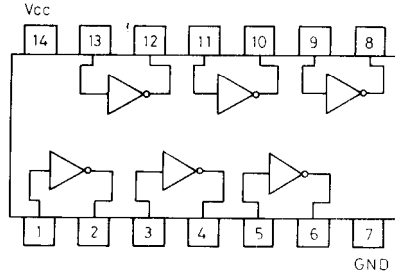
Truth table

INPUTS						OUTPUTS							
ST	BL	D	C	B	A	TC 5 0 6 9 B P							ZERO OUT
						a	b	c	d	e	f	g	
*/	H	*/	*/	*/	*/	L	L	L	L	L	L	L	-
H	L	L	L	L	L	H	H	H	H	H	H	L	H
H	L	L	L	L	H	L	H	H	L	L	L	L	L
H	L	L	L	L	H	L	H	H	L	H	L	H	L
H	L	L	L	L	H	H	H	H	H	L	L	H	L
H	L	L	L	H	L	L	L	H	H	L	L	H	L
H	L	L	L	H	L	H	L	H	H	L	H	H	L
H	L	L	L	H	H	L	H	L	H	H	H	H	L
H	L	L	L	H	H	H	H	H	H	L	L	H	L
H	L	L	L	H	H	L	L	H	H	H	H	H	L
H	L	L	L	H	H	L	L	L	L	H	H	L	L
H	L	L	L	H	H	L	L	L	L	H	H	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
H	L	L	L	H	H	L	L	L	L	L	L	L	L
L	L	*/	*/	*/	*/								

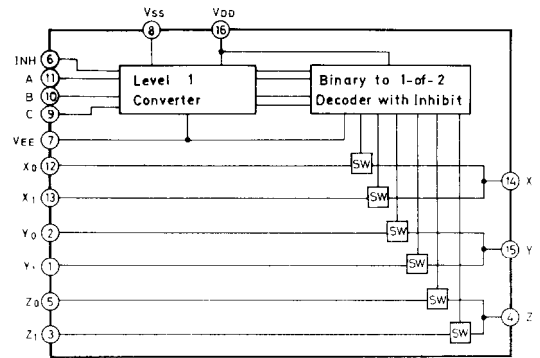
TMP7440P-5304(N-MOS 4-bit microcomputer)



TC74HCU004(Hex inverter)



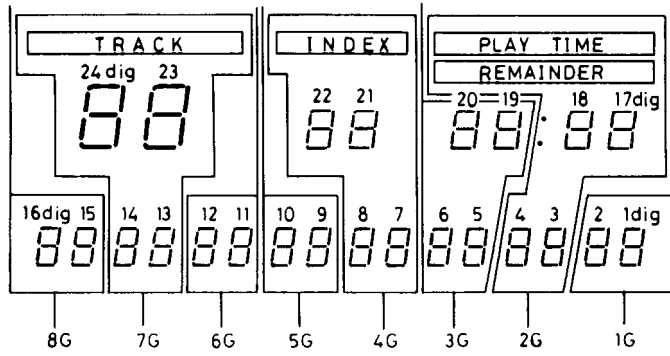
μPD4053BC(Triple-2 channel multiplexer/demultiplexer)



Truth table

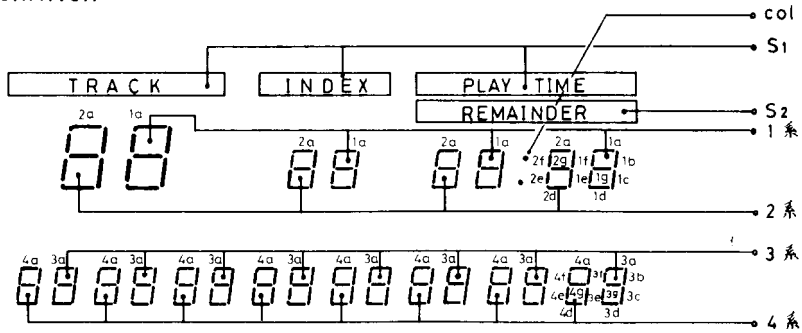
INHIBIT	Control input			"ON" channel
	C	B	A	
L	L	L	L	Z <sub>0</sub> , Y <sub>0</sub> , X <sub>0</sub>
L	L	L	H	Z <sub>0</sub> , Y <sub>0</sub> , X <sub>1</sub>
L	L	H	L	Z <sub>0</sub> , Y <sub>1</sub> , X <sub>0</sub>
L	L	H	H	Z <sub>0</sub> , Y <sub>1</sub> , X <sub>1</sub>
L	H	L	L	Z <sub>1</sub> , Y <sub>0</sub> , X <sub>0</sub>
L	H	L	H	Z <sub>1</sub> , Y <sub>0</sub> , X <sub>1</sub>
L	H	H	L	Z <sub>1</sub> , Y <sub>1</sub> , X <sub>0</sub>
L	H	H	H	Z <sub>1</sub> , Y <sub>1</sub> , X <sub>1</sub>
H	X	X	X	NONE

Grid assignment

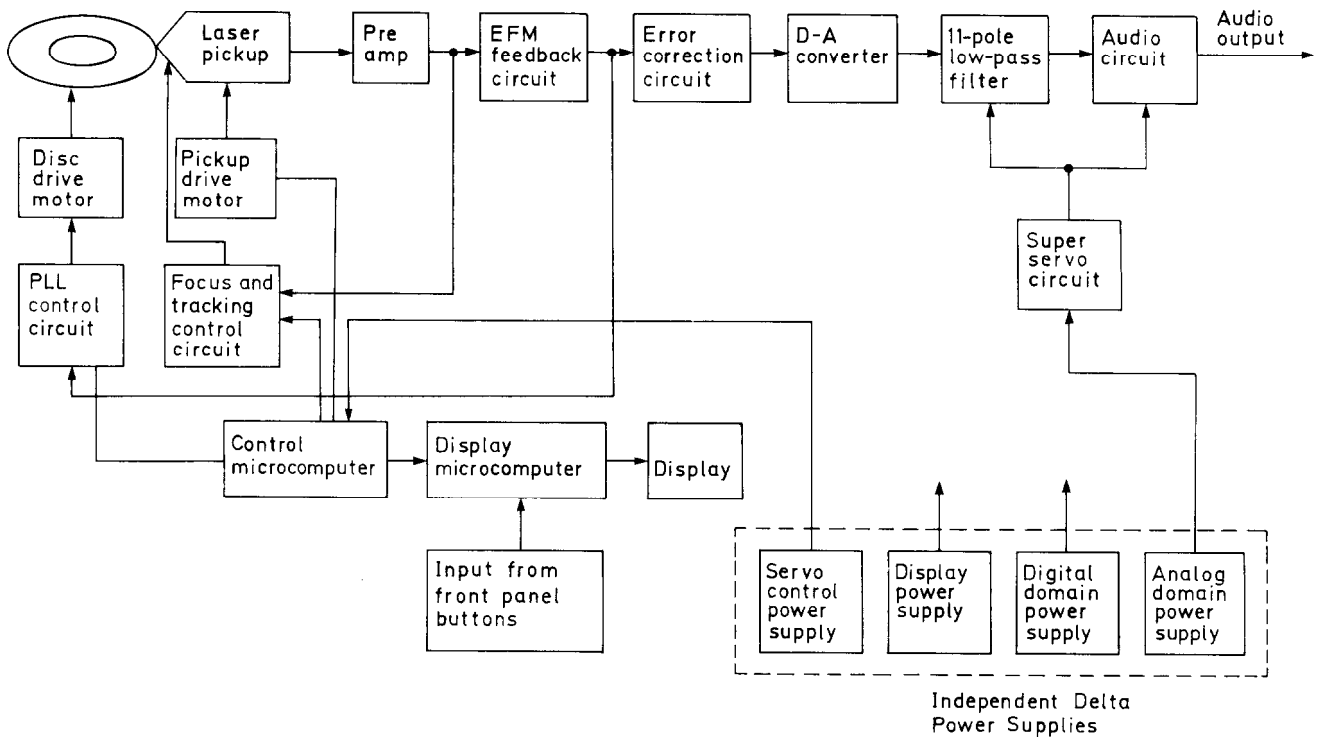


**SEGMENT DESIGNATION**

- 1---- 1a ~ 1g
- 2---- 2a ~ 2g
- 3---- 3a ~ 3g
- 4---- 4a ~ 4g



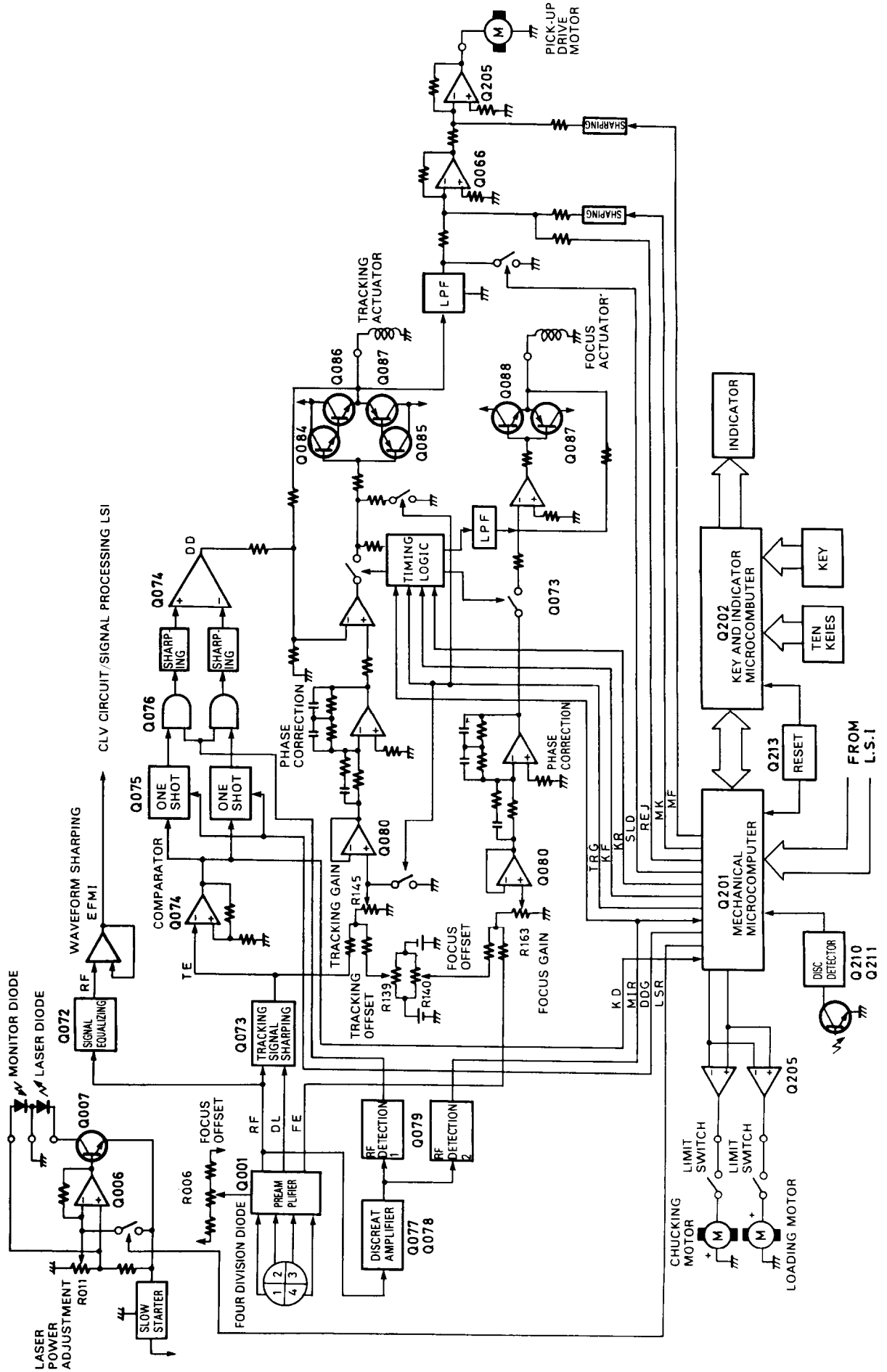
**BLOCK DIAGRAM**



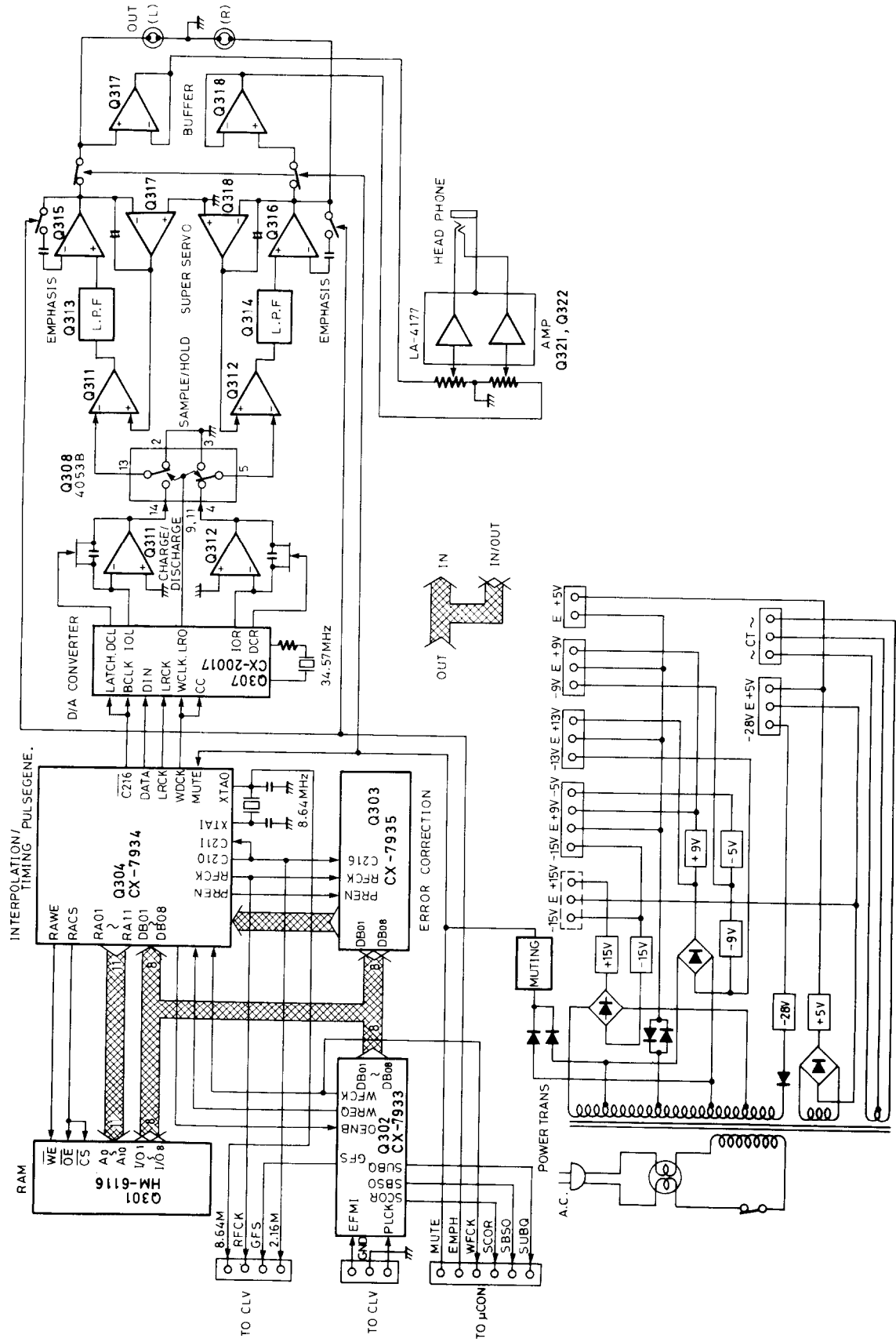


# BLOCK DIAGRAM

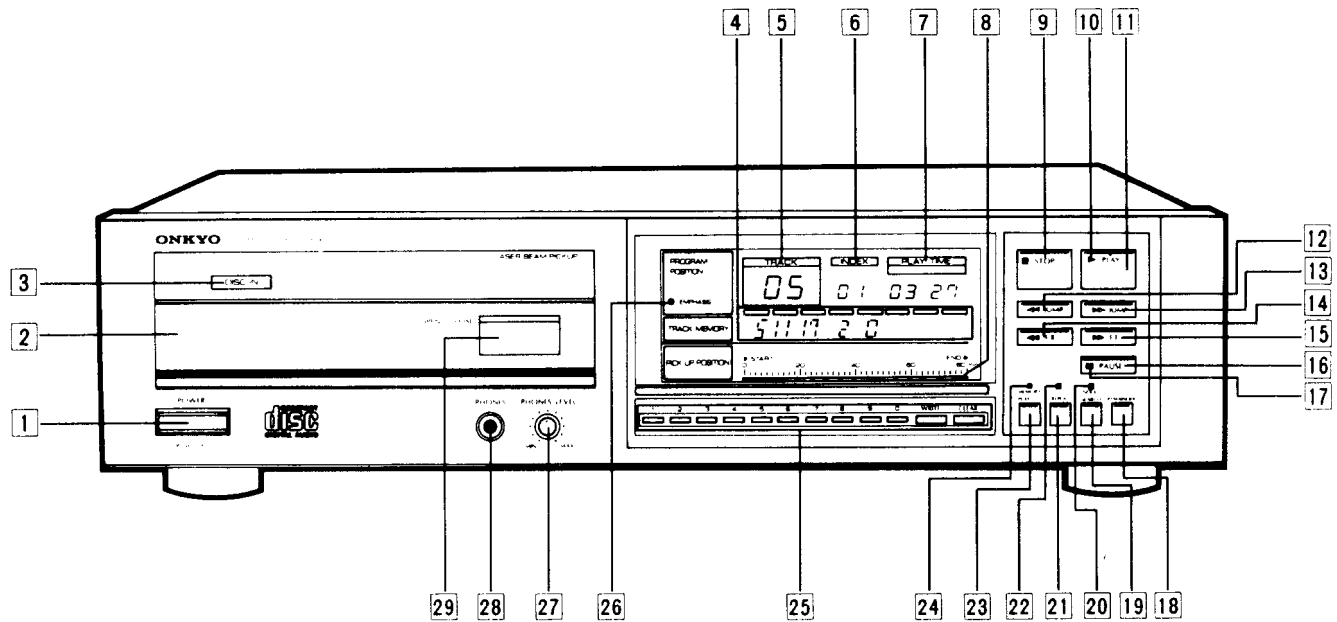
Servo / control circuit



**Signal processing/Power supply circuit**



# FRONT PANEL FACILITIES



**1 Power Switch**

**2 Disc Holder**

**3 Disc In Indicator**

Lights when a disc is in the disc holder.

**4 Track Memory Display**

Displays the track numbers stored in the memory. During memory disc play, the tracks are played in order from left to right. Up to eight tracks can be stored in the memory.

**5 Track Number Display**

Displays the total number of tracks on the disc in the holder when the disc is first loaded and the track number currently being played during disc play.

**6 Index Number Display**

Displays the index number entered for index search play and the index number currently being played at all other times. This display operates only when a disc containing indexes is used.

**7 Playing Time Display**

Displays the total playing time on the disc in the holder when the disc is first loaded and the elapsed playing time of the track currently being played during disc play. When the REMAINDER button is pressed, the remaining playing time on the disc from the current location is displayed. Press the REMAINDER button again to return to the elapsed track playing time mode.

**8 Pickup Position Indicator**

Shows the position of the pickup on the disc according to elapsed playing time. Each scale graduation corresponds to 5 minutes of playing time.

**9 Stop Button**

Press to stop disc play and return the pickup to the starting position.

**10 Play Indicator**

Lights while a disc is being played and while the pause mode is activated (together with the pause indicator).

**11 Play Button**

Press to begin disc play or cancel the pause mode.

**12 Reverse Jump Button**

Press during disc play to move the pickup backward to the beginning of the track currently being played.

**13 Forward Jump Button**

Press during disc play to move the pickup forward to the beginning of the next track.

**14 Fast Reverse Button**

Press during disc play to move the pickup backward (toward the beginning of the disc). The pickup will move slowly for the first three seconds and then rapidly afterward if this button is held down.

**15 Fast Forward Button**

Operates in the same manner as the fast reverse button in the forward direction (toward the end of the disc).

**16 Pause Button**

Press to activate the pause mode. To resume disc play, press the play button (pause indicator goes out).

**17 Pause Indicator**

Lights when the pause mode is activated.

**18 Remainder Button**

When this button is pressed, the word PLAY TIME above the playing time display changes to REMAINDER and the time display shows the total remaining playing on the disc from the current position of the pickup.

**19 Index Search Button**

Press to use the index search mode. If this button is pressed during disc play, disc play is stopped and track number display flashes on and off. Refer to the index search section on page 5 for details. Press the index search button again to cancel index search.

**20 Index Search Indicator**

Lights when the index search mode is activated.

**21 Repeat Button**

Press to activate the repeat play mode. Press again to cancel repeat play. Refer to the repeat play section on page 5 for details.

**22 Repeat Indicator**

Lights when the repeat play mode is activated.

**23 Memory Play Button**

Press this button to use the memory play mode. Refer to the memory play section on page 5 for details.

**24 Memory Play Indicator**

Lights when the memory play mode is activated.

**25 Memory Program Buttons**

Use the numeric buttons to enter track and index numbers for memory play and index search. To enter a track or index number, press the corresponding numeric keys so that the desired number is displayed in the track number (or index number) display and then press the WRITE button. When the CLEAR button is pressed, the track number on the far

right end of the track memory display is cancelled. The CLEAR button is also used to cancel an entry before the WRITE button is pressed if you make a mistake when pressing the numeric keys.

**26 Emphasis Indicator**

Some Compact Discs are encoded with emphasis. This indicator lights when a disc with emphasis encoding is being played.

**27 Headphone Level Control**

Use to adjust the output level of the headphone jack.

**28 Headphone Jack****29 Disc Holder Open/Close Button**

Press to close the disc when the holder is open and to open the disc holder when the holder is closed. If this button is pressed during disc play, the disc stops spinning and the holder opens.

## OPERATIONS

**To Play a Disc From the Beginning**

First, turn on the amplifier or receiver and set the input selector to the proper position for the terminals to which the DX-300 is connected.

1. Press the POWER button to turn power on.
2. Press the OPEN/CLOSE button to open the disc holder.
3. Place a disc in the holder with the label side facing up. Be sure to hold the disc by the edges. Refer to the Compact Disc handling section on page 6 for other precautions.
4. Press the OPEN/CLOSE button again. The disc holder closes and the disc in indicator lights. Next, the disc begins to spin and the data on the disc surface is read. After the data has been read, the disc stops spinning and the total number of tracks and total playing time of the disc are displayed.
5. Press the PLAY button to start disc play from the beginning of the disc.
6. To temporarily interrupt disc play, press the PAUSE button. To resume play, press the PLAY button.
7. At the end of the disc, the player returns to the standby mode. To stop disc play before the end, press the STOP button to return the player to the standby mode. To remove the disc, press the OPEN/CLOSE button.

**Notes:**

**To Start Disc Play Directly:**

To start disc play with one touch simplicity, press the PLAY button after placing a disc in the holder. There is no need to press the OPEN/CLOSE button. In this case, disc play begins automatically immediately after the total number of tracks and playing time have been displayed.

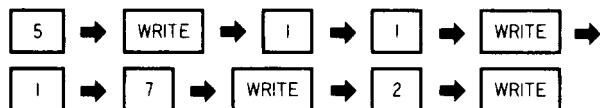
**To Start Memory Play:**

Press the memory play button (memory indicator lights) and the PLAY button. The disc will be played in the order you have programmed. Refer to the memory play section for details.

**Memory Play**

The memory disc play function is used to play the tracks on a disc in any order you want. To use the memory play function, perform steps 1 through 4 of the previous disc play section and then perform the following steps before pressing the PLAY button.

1. Enter each track in the order to be played using the memory program keys. To enter a track, press the numeric keys of the track to be entered and then press the WRITE button. For example, to enter tracks 5, 11, 17, and 2



in that order: Each time a track is entered, it will be displayed in the track memory display. If you make a mistake when pressing the numeric keys, press the CLEAR button and enter the track number again. When the CLEAR button is pressed (before the WRITE button), the last entered is cancelled.

2. After all the tracks to be played in the memory play mode have been entered, press the MEMORY PLAY button (memory play indicator lights).
3. Finally, press the PLAY button to begin memory play in which the disc is played in the order you have programmed (shown in the track memory display in order from left to right).
4. To return to normal disc play, press the MEMORY PLAY button again (memory play indicator goes out).

**Note:**

The memory play mode can be activated only when the memory play indicator is lit. Even if a memory play sequence is stored in the memory (and displayed in the track memory display), the player will not switch to memory play when

the PLAY button is pressed if the memory play indicator is not lit and the disc will be played to the end.

**Repeat Play**

The repeat play function is used to play an entire disc side or the tracks shown in the track memory display repeatedly.

1. To repeatedly play an entire disc side, press the REPEAT button (repeat indicator lights) and then the PLAY button. The REPEAT button can also be pressed during disc play to activate the repeat mode. Note that the memory play indicator must not be lit when the repeat function is activated. If it is lit, press the MEMORY PLAY button to turn it off before pressing the REPEAT button.
2. To repeatedly play the tracks shown in the track memory display, press the MEMORY PLAY button to turn on the memory play indicator, then press the REPEAT button (repeat indicator lights) and finally press the PLAY button to start repeat play of the tracks in the order they are shown in the track memory display. Note that the player will not switch to the memory repeat mode if the REPEAT button is pressed after memory play has been started.

**Index Search**

The index search function is used to locate the beginning of a specific index within a track. This function can only be used when playing a disc which contains indexes. Although indexes can be used with any type of music, they are most often used to mark the beginning of each movement of a symphony, concerto or other form of classical music.

1. To locate the beginning of an index within the track currently being played, press the index search button (index search indicator lights).
2. When the index search button is pressed, the track number display begins flashing on and off. Enter the track number which contains the index to be located using the memory program buttons and then press the WRITE button.
3. After pressing the WRITE button, the index number display begins flashing on and off. Enter the index number to be located using the memory program buttons and then press the WRITE button again.
4. Disc play will be resumed from the beginning of the index number just entered. When the end of that index is reached, the index play indicator goes out and the player returns to normal play.
5. To play the index repeatedly, press the REPEAT button (repeat indicator lights).

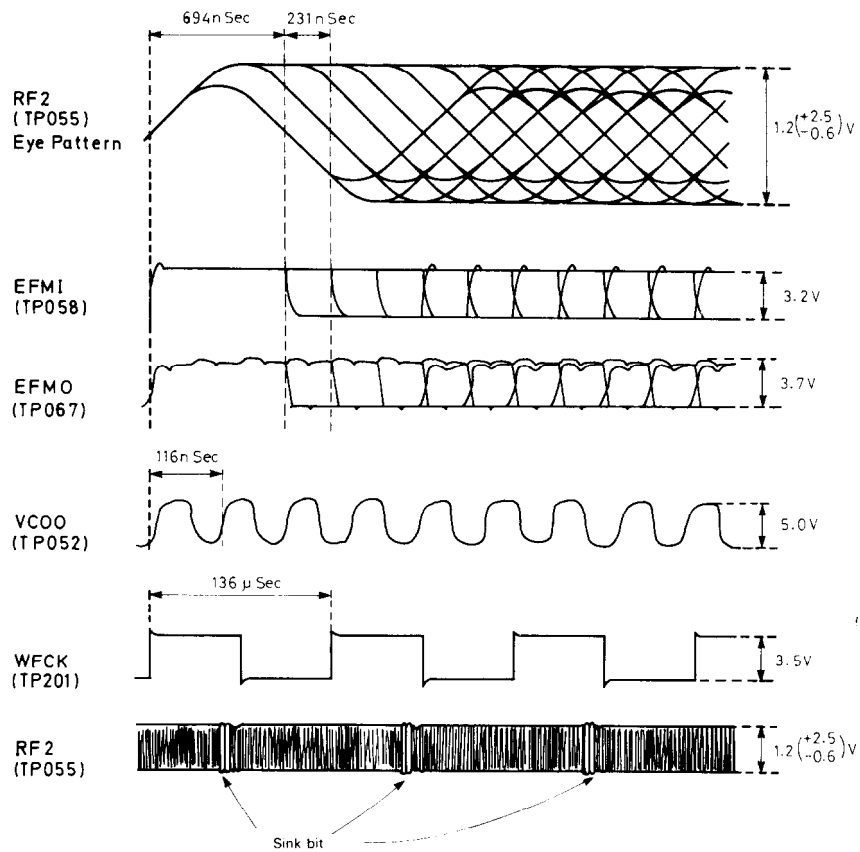
**Forward and Reverse Jump**

The jump buttons are used to move directly to the beginning of each track in the forward or reverse direction.

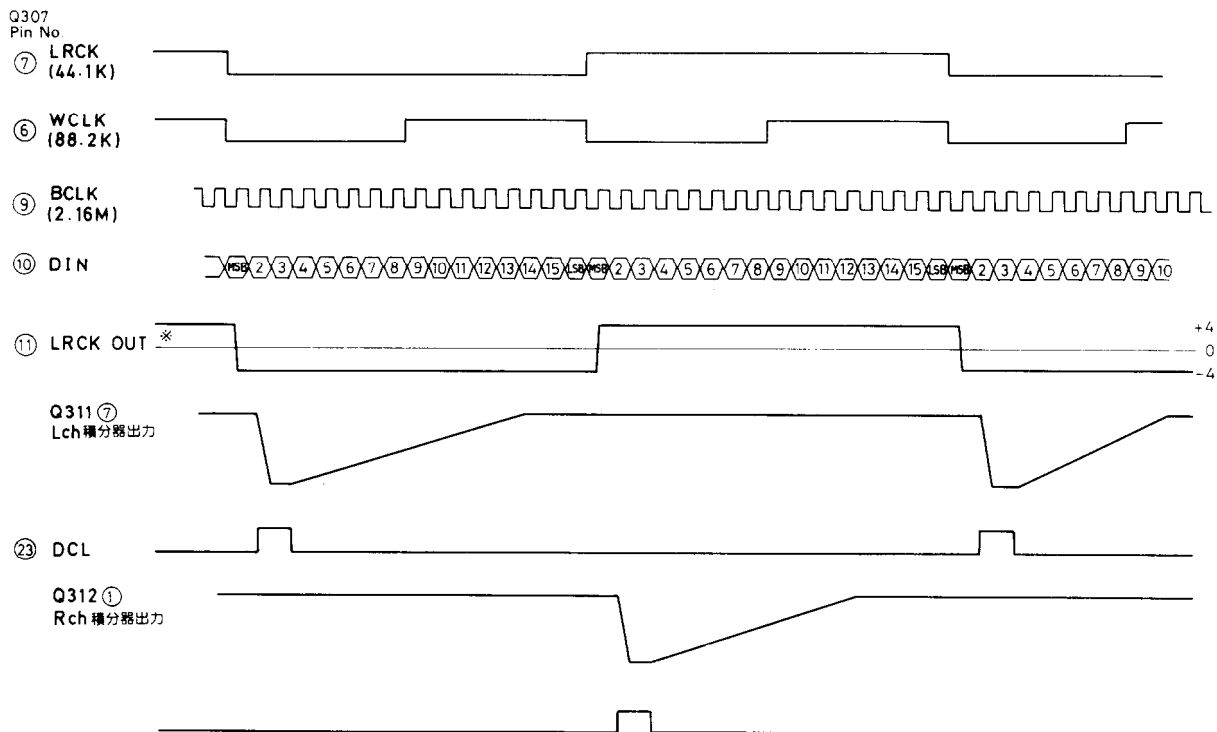
1. To use forward or reverse jump, press the forward or reverse jump button while a disc is being played. If the forward jump button is pressed, the pickup will move to the beginning of the next track and play will resume. If the reverse jump button is pressed, the pickup will move to the beginning of the present track and play will resume.
2. To move on to the next track in the forward direction, press the forward jump button again after the track number of the track just located has appeared in the track number display. Nothing will happen if the forward jump button is pressed when the last track on a disc is being played.
3. To move on to the next track in the reverse direction, press the reverse jump button again before the playing time of the track just located appears in the playing time display.
4. Once the beginning of the desired track has been located, the player returns to the normal play mode.
5. Each time the forward jump button is pressed during memory play, the pickup will move to the beginning of the next track in the memory in the order shown in the track memory display (from left to right). If the reverse jump button is pressed, the pickup will move to the beginning of the track currently being played, not the previous track in the memory.

# EACH SECTION WAVEFORM

●PLAY MODE



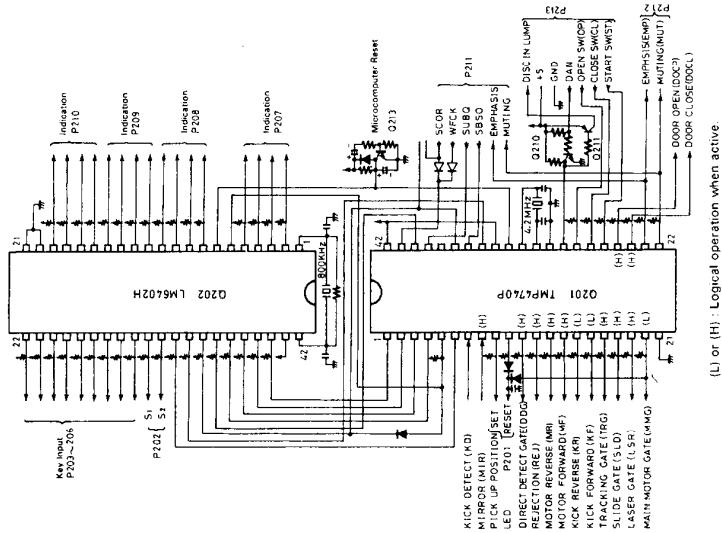
CX20017 D/A converter timing chart



\*When LATCH input is BCLK.

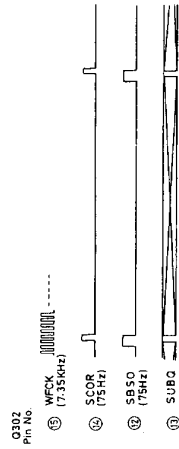


Connection diagram of microcomputer



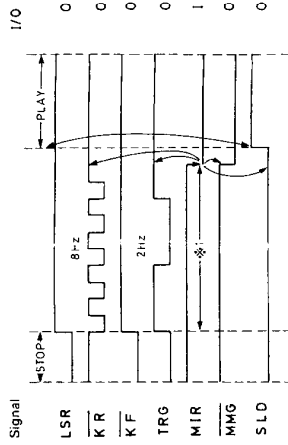
(L) or (H) - Logical operation when active.

Sub cord demodulation signal timing view



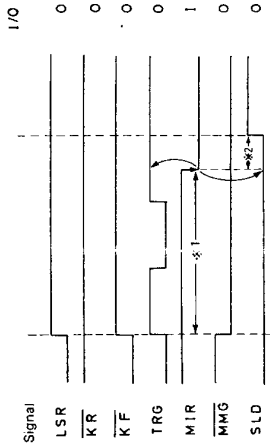
Timing view of micro computer

1. Lead-in start mode (both sides detection)



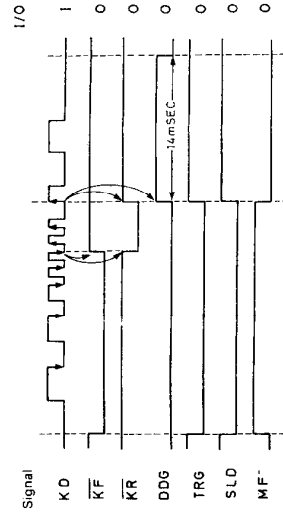
#1. Disc is the back-side when terminal MIR is the high level more than two seconds

2. PLAY start mode

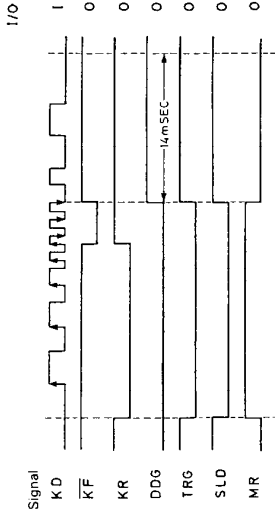


#1. #2. Time out is not e

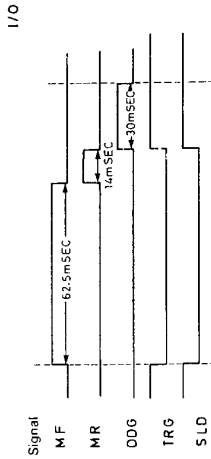
3. Kick forward mode (Example:KF5, 3, 1)



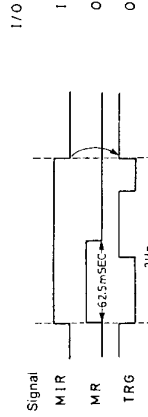
4. Kick reverse mode (Example:KR5, 3, 1)



5. Motor drive start mode (Example:forward)



6. Specular mode (Example:outside)

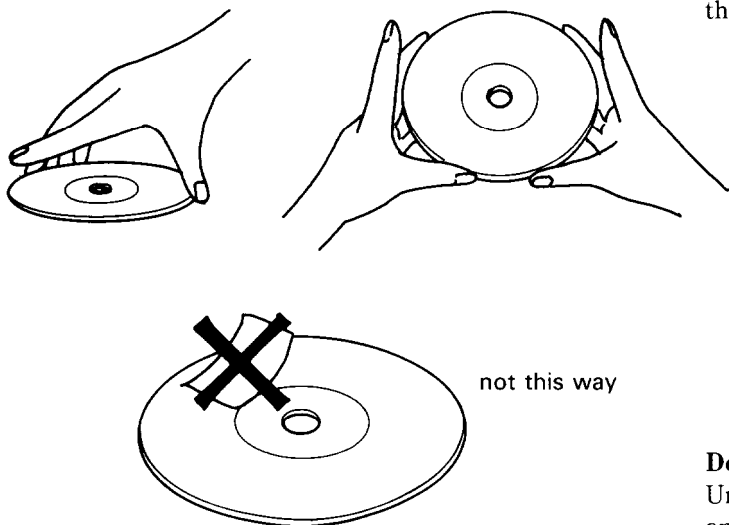


## NOTES ON COMPACT DISC

### ● Holding Compact Discs

Hold Compact Discs by the edges so that you do not touch the surface of disc. Remember that the side of the disc with the "rainbow" reflection is the side containing the audio information.

Do not attach tape or paper to the label side of the disc and always be careful not to leave fingerprints on the side that is played.



### ● Storing Compact Discs

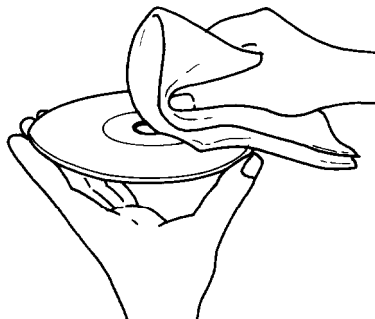
Store Compact Discs in a location protected from direct sunlight, high heat and humidity and extremely high and low temperatures. Discs should never be left in the trunk or interior of an automobile in the sun since the temperature can become very high in such a closed environment.

Always store Compact Discs in the holders in which they were sold. Never leave a disc in the player's disc holder for a long period of time.

### ● Cleaning Compact Discs

Before playing a disc wipe off the playing surface with a soft cloth to remove dust and other soil. Wipe the surface in straight lines from the center of the disc outward, not in a circular motion as you would with a phonograph record.

Do not use benzene, chemical cleansers or phonograph record cleaning solutions to clean Compact Discs. Also avoid static electricity prevention solutions since they can damage the surface of Compact Discs.



### Do Not Set Volume Too High.

Unlike phonograph records, cassette tapes and other analog audio sources, Compact Discs have no background or surface noise (scratches, clicks, etc.). Therefore, you can not adjust the volume level by listening to the "lead-in noise" as you would with a phonograph record, for example. Be careful not to set the volume control on your amplifier or receiver too high before the music on a disc begins since a high setting could damage your speaker system.

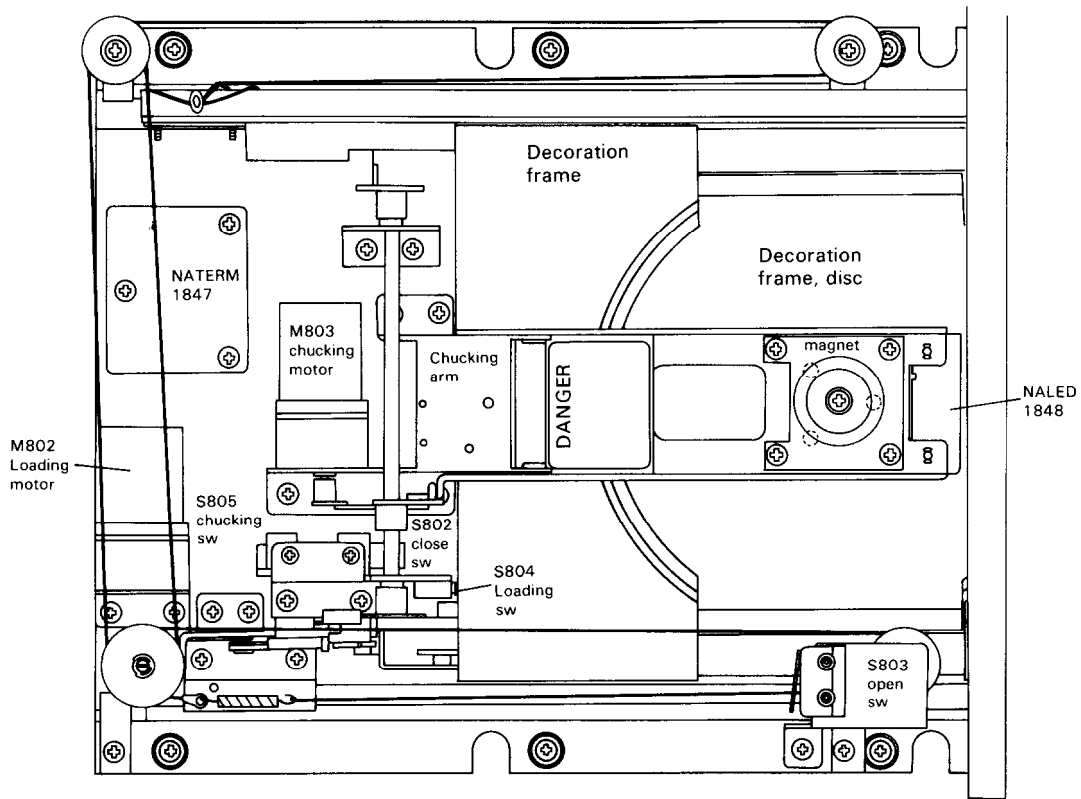
### Problems Caused by Dew

Dew can form inside a Compact player when it is brought from a cold environment into a warm room, when a room is rapidly heated and if a player is left in a humid environment.

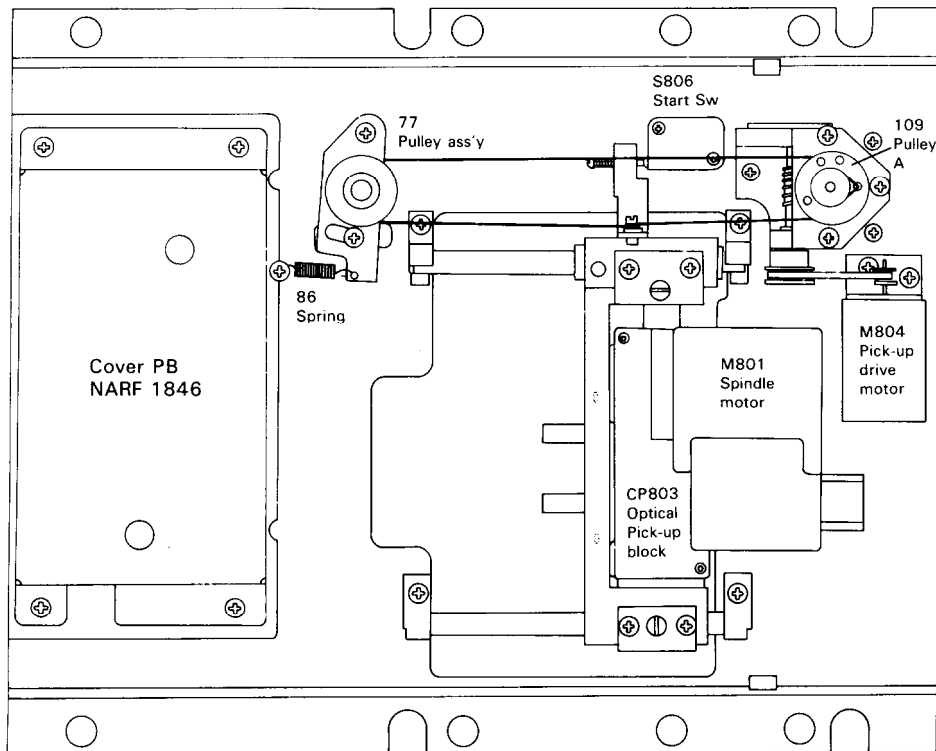
This dew can prevent the laser pickup from reading the data contained in the pits in the disc surface. If the player does not operate properly because of dew, remove the disc and leave the player's power switch on for about one hour to remove all moisture.

# COMPONENT LOCATION

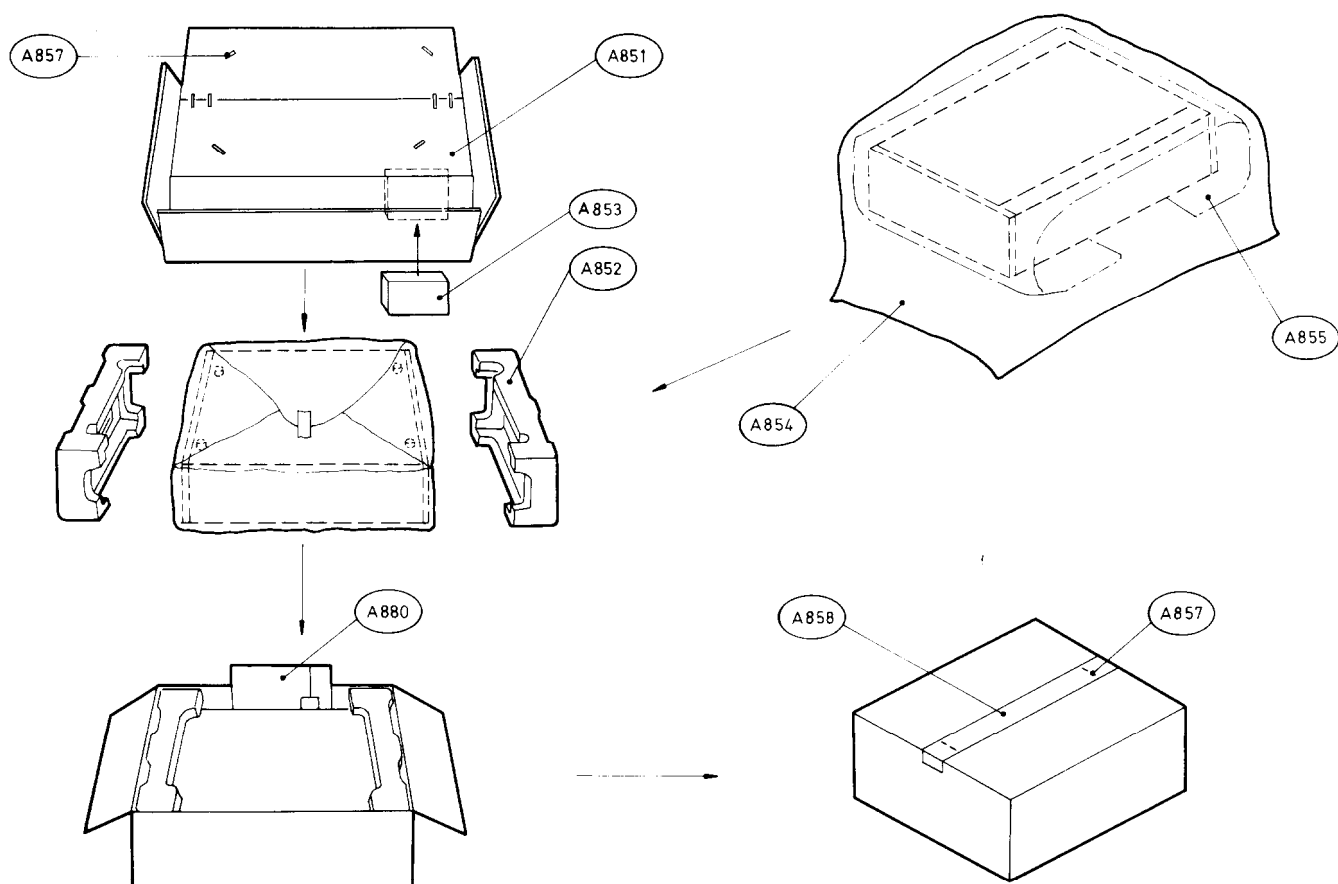
## Mechanism Top View



## Bottom View



## PACKING VIEW



## PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
A851	29050864	Master carton box
A852	29090836	Pad
A853	29090885	Pad
A854	29100038A	950×720mm, Poly-vinyl bag
A855	29095012-1	500×800mm, Protection sheet
A857	282301	Sealing hook
A858	260012	50×700mm, Damplon tape
A880	Accessory bag ass'y (120V model)	
	29340737	Instruction manual
	2010069	Connection cable
	29365006-5	Warranty card (Only USA model)
	29358002	Service station list (Only USA model)
	29100006	350×250mm, Poly-vinyl bag (220V model)
	29340738	Instruction manual
	2010069	Connection cable
	25055040	CV-K-2, Conversion plug
	29100006	350×250mm, Poly vinyl bag

# ADJUSTMENT PROCEDURES

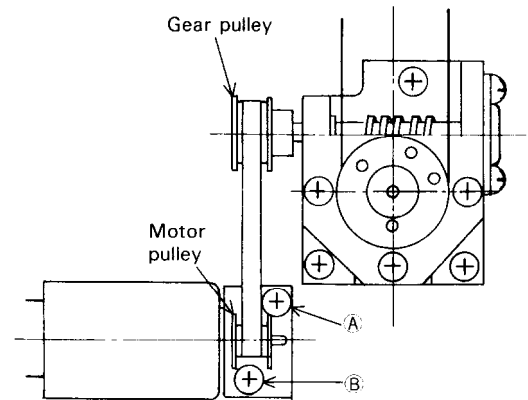
## MECHANISM ADJUSTMENT

### 1. Optical pick-up drive adjustment

Remove the bottom board.

Adjust screws A and B so that the shafts of the motor pulley and gear pulley are parallel.

Then adjust the way the motor pulley is inserted so that the rubber belt is perpendicular to the two shafts.

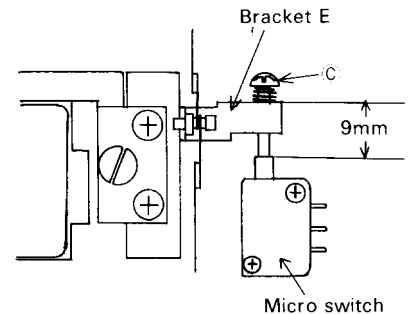


(Fig. 1)

### 2. Microswitch position adjustment

Remove the bottom board.

Adjust screw C to make the gap between the microswitch and bracket C 9mm. Then place a disc in the loading case, close the case and confirm that the TRACK and PLAYING TIME are displayed in the indicator and that the disc then stops rotating. If the display is not correct, fine adjust screw C within a range of  $\pm 1$ mm.

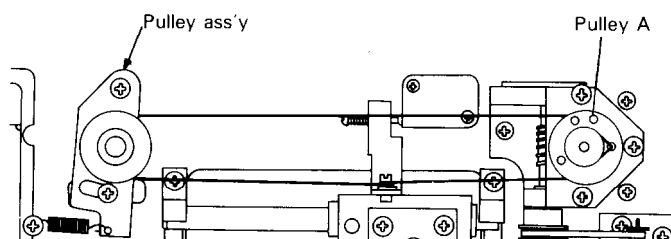


(Fig. 2)

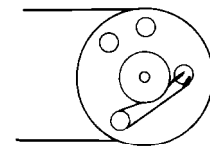
### 3. Stringing tension adjustment

Remove the bottom board.

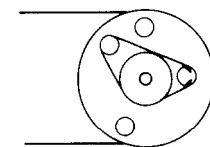
The head of the screw should be below the center of the hole in the pulley ass'y half-circle tab. If the screw head is above the center of the hole, adjust the string clasp as shown in fig. 4. If the string is slack adjust as shown in fig. 5.



(Fig. 3)



(Fig. 4)

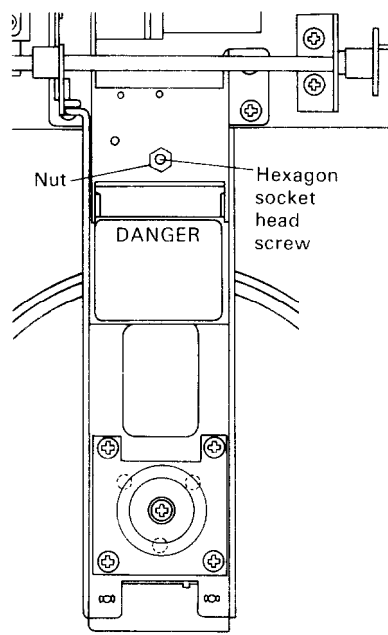


(Fig. 5)

#### 4. Loading block adjustment

##### 1). Chucking arm height adjustment

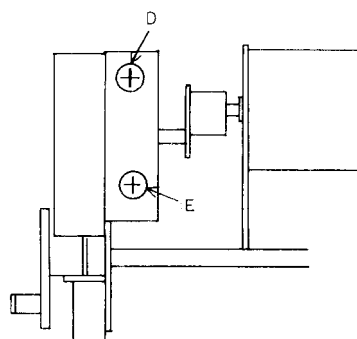
If an abnormal sound is heard when the disc is rotating, use a hexagonal wrench (1.25mm faces) to turn the hexagon socket head screw to the point where the sound is no longer heard. Use a nut to hold the screw in place at that point.



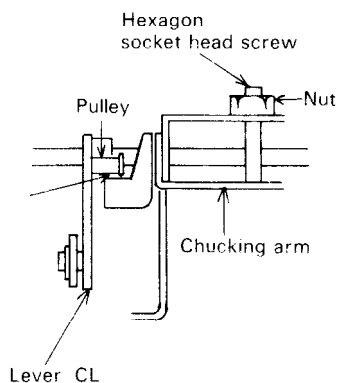
(Fig. 6)

##### 2). Chucking arm operation range adjustment

If the chucking arm strikes the top cover when the arm rises, tighten screw D. If the cap strikes the decorative frame, loosen screw D. If the cap does not go down all the way, loosen screw E. If there is no looseness between the cam plate and the pin of lever CL, tighten screw E. Adjust to the point where the cam plate can be moved by hand with little effort. At this time, be sure that there is a small gap between the bump on lever CL and the protrusion on the arm (indicated by an arrow).



(Fig. 7)



(Fig. 8)

## ELECTRICAL ADJUSTMENT

### 1. Laser power adjustment

- ① Turn the power switch off.
- ② Remove the socket P060 on the servo/micro computer control pc board NADIG-1843. (See fig 9)
- ③ Rotate R011 on the optical pick-up control pc board all the way counterclockwise (minimum position). (See fig 10.)
- ④ Then turn the power switch on and press the open/close button to open the loading case.
- ⑤ Cover the disc detection hole with a coin or other suitable item, close the loading case and perform one of the following adjustment methods. (See page 6)

#### Method 1

Set the laser power meter light detection section so that it is in the center of the optical pick-up light source, aligned along the bottom of the chucking arm. (See fig. 11) Then slowly turn R011 clockwise until the power meter reads 0.3mW.

#### Method 2

Read the value of  $I_o$  as shown on the side of the optical pick-up block. Then connect an electronic voltmeter to both sides of R021 and slowly turn R011 clockwise until the voltmeter reading equals the rated value. (See fig. 12)

$$\text{Rated value} = I_o \times 100\text{mV}$$

- ⑥ After performing one of these two adjustment methods, turn the power switch off, insert socket P060, turn the power switch on (loading case comes out) and remove the coin from the loading case.

#### PRECAUTIONS:

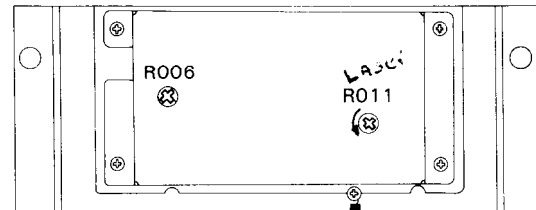
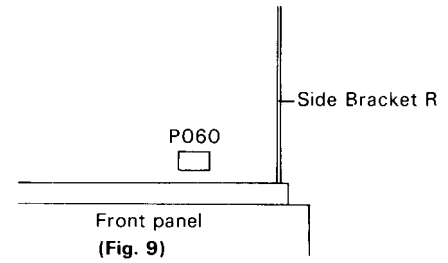
1. The procedure for grounding is required to prevent damage caused by static electricity. (See page 5)
2. Be careful not to permit the light output to exceed the maximum rated output level even in a moment.

### 2. Focus offset adjustment

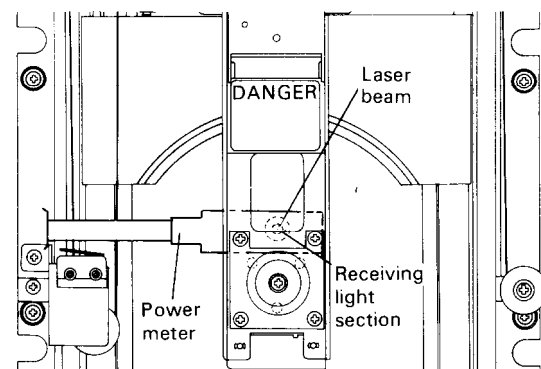
- ① Turn the power switch off and remove the sockets P058 and P059.
- ② Connect the DC voltmeter to the test point TP059.
- ③ Turn the power switch on and, with the player in the stop mode, adjust R006 so that the voltmeter reading is 0V.
- ④ Insert the sockets P058 and P059.

### 3. Optical pick-up adjustment

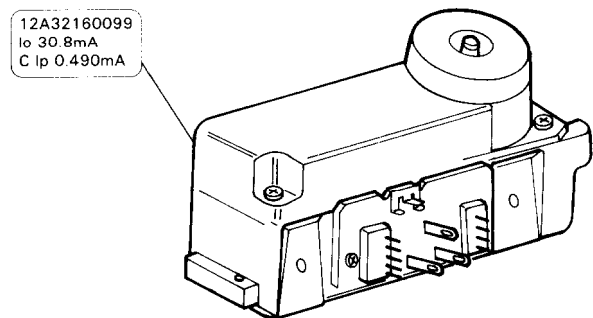
- ① Loosen the three screws E. (See fig. 13)
- ② Load the disc and press the play button.
- ③ Connect the oscilloscope to the test point TP055 and the electronic voltmeter to the test point TP065.
- ④ Turn adjustment screws F (two) to the point where jitter on the oscilloscope is minimized and the electronic voltmeter reads 0V.
- ⑤ Tighten the three screws E.



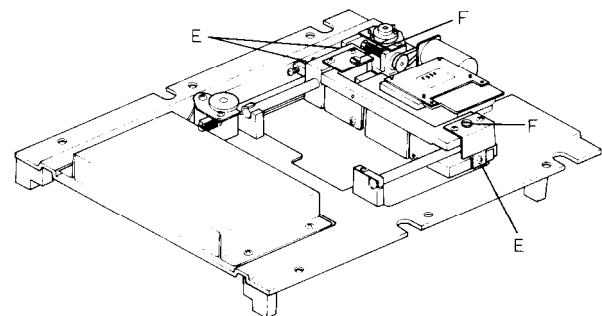
(Fig. 10)



(Fig. 11)



(Fig. 12)



(Fig. 13)

#### 4. Servo circuit adjustment

Adjust the semi-fixed resistors in the following manner:

R139, R145

Turn fully  
counterclockwise



minimum

R140, R157

Mechanical  
center



R163

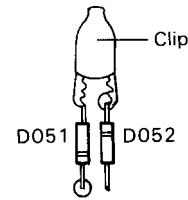
Turn fully  
clockwise



maximum

#### CLV adjustment

- ① Short the anode of diode D051 and the cathode of diode D052 using a clip. (See fig. 14)
- ② Connect the frequency counter to the test point TP052.
- ③ Then turn the power switch on, adjust L051 so that the frequency counter reads 8.6436MHz.
- ④ Remove the clip and frequency counter after adjustment.
- ⑤ Connect the electronic voltmeter to the test point TP051.
- ⑥ Adjust R054 so that the electronic voltmeter reads 1.9V.
- ⑦ Now load a disc and press the play button.
- ⑧ Synchronize the RF signal of TP055' using the TP201 pulse. (If the two signals are not synchronized, adjust R054.)
- ⑨ Set R054 to the center of the phase locked loop capture range.



(Fig. 14)

#### Focus tracking adjustment

- (1) Rough adjustment of focus offset

Connect the oscilloscope to the test point TP065 and adjust R140 to minimize the level of high range noise components.

- (2) Focus gain adjustment

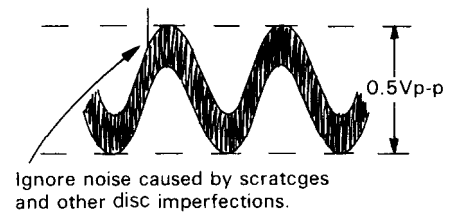
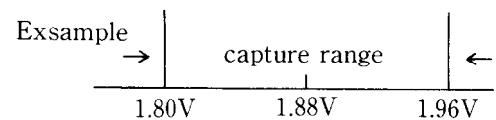
Load the standard deflection disc and play it. Connect the oscilloscope to the test point TP059. At the surface deflection specification location, adjust R163 so that the voltage is 0.5Vp-p.

- (3) Focus offset adjustment

Connect the oscilloscope to the test point TP065 and the electronic voltmeter to the test point TP059. Load a disc, play a section with few scratches and adjust R140 to the point where high range noise (appearing in the oscilloscope) is minimized. At this time, measure the voltage and turn R140 clockwise to raise the voltage 0.1V. At the same time, observe the RF signal; if there is a lot of jitter, recheck the optical pick-up adjustment.

- (4) Tracking gain adjustment

Remove the sockets P060 and P058 in that order, connect the oscilloscope to the test point TP062 (be sure to make the probe ground connection first) and adjust R145 so that the oscilloscope voltage is 0.3Vp-p.



Note: If the disc begins to rotate at a high speed, forcibly raise the disc clamber for an instant. If the disc still rotates at a high speed, gently press down on the disc with one hand.

- (5) Tracking offset adjustment

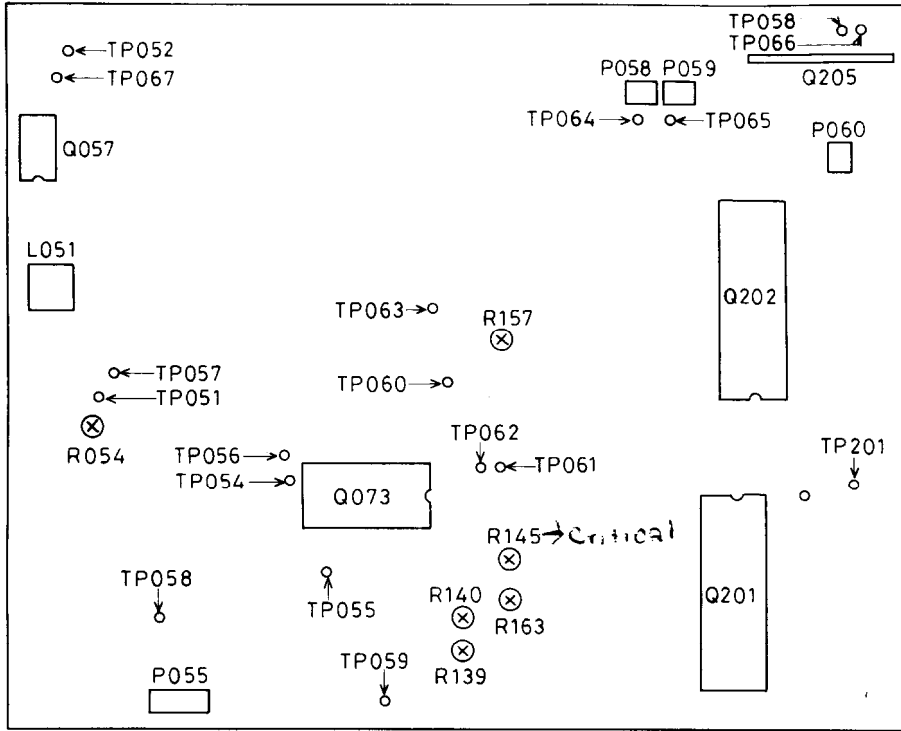
With sockets P060 and P058 still removed, connect the oscilloscope to the test point TP066 and adjust R139 so that the oscilloscope waveform is centered at -1V. Then replace sockets P060 and P058 in that order.

#### 5. Pick-up adjustment

Press ►► FF and ◀◀ FR and adjust R157 so that the display changes as smoothly as possible. (In most cases, this should be the center position.)



**NADIG-1843**

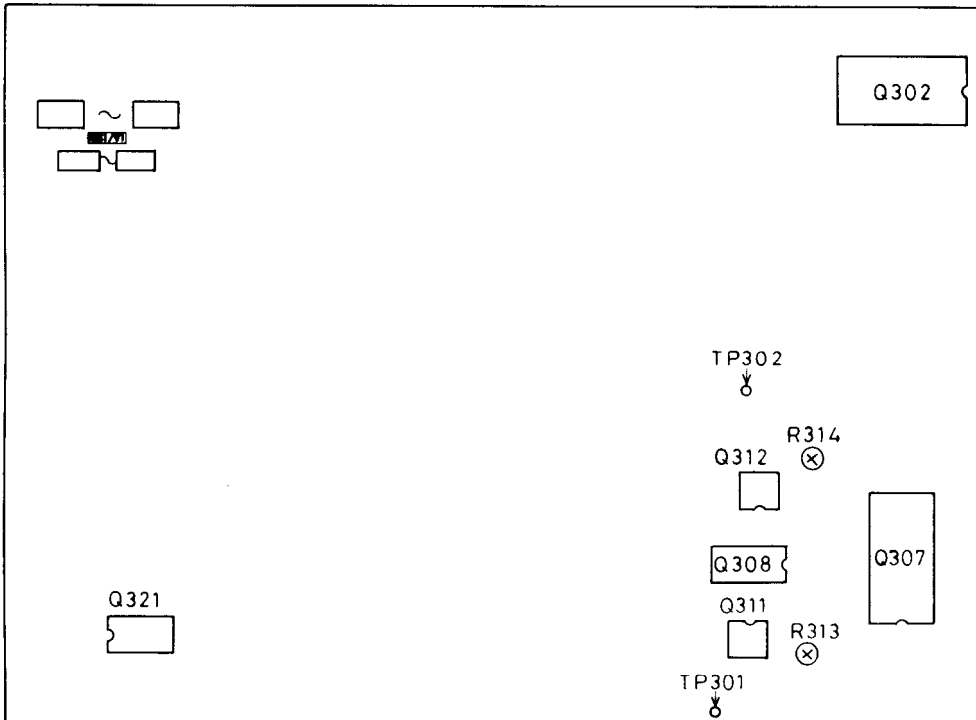


**6. Audio circuit adjustment**

Connect the DC voltmeter to the test points TP301(Lch) and TP302(Rch).

At the stop mode, adjust R313(Lch) and R314(Rch) so that the voltage is -0.1V.

**NAPS-1844**





## LOADING CASE PARTS LIST

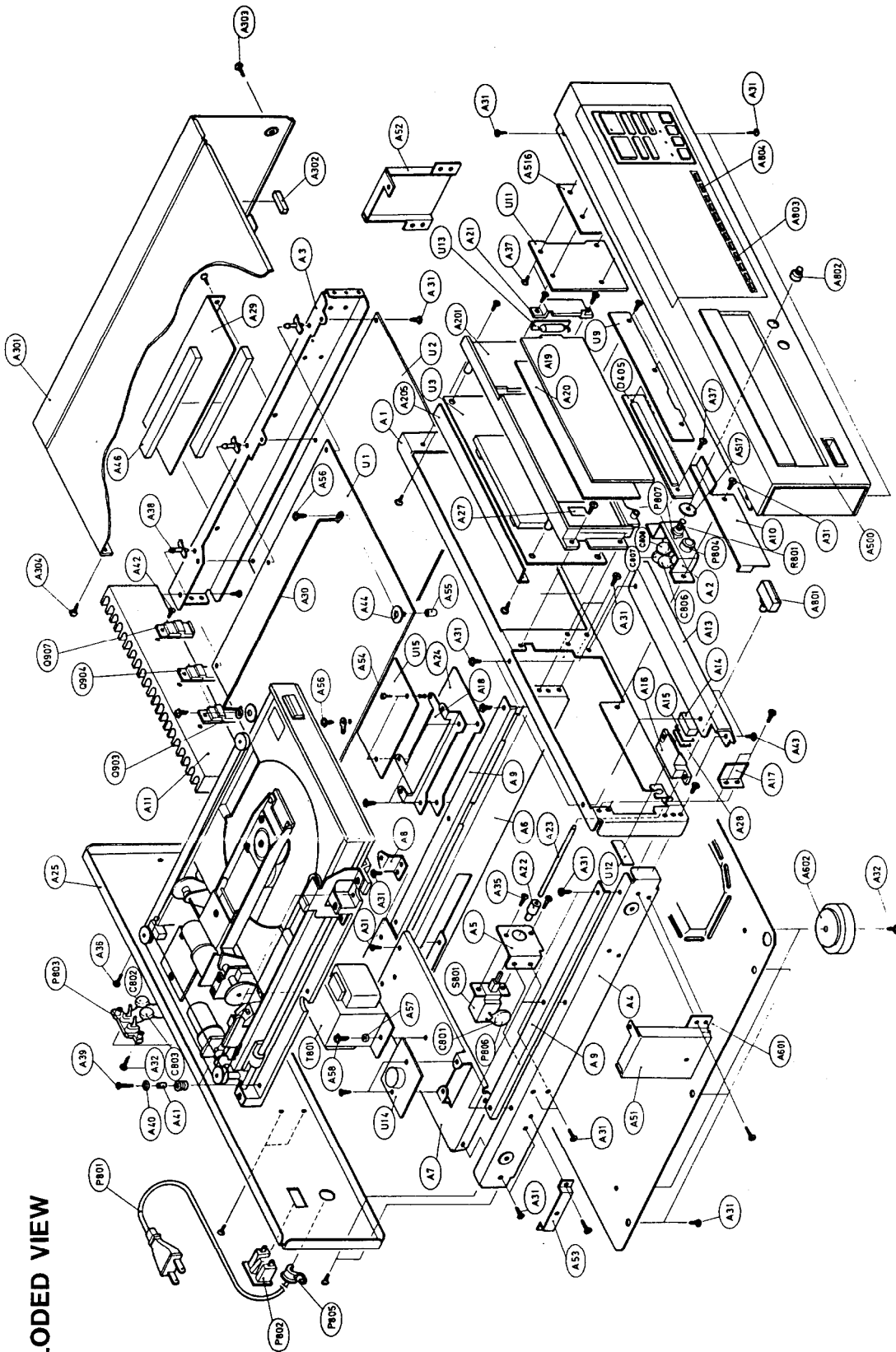
REF.NO.	PARTS NO.	DESCRIPTION	REF.NO.	PARTS NO.	DESCRIPTION	REF.NO.	PARTS NO.	DESCRIPTION
B3	27100053A	Chassis	B113	800508	Φ1×10, Spring pin	B298	28335024B	Lever M ass'y
B4	28140473	Cushion rubber	B118	83430080	3TTS+8P(BC), Tapping screw	B304	27140843	Bracket
B15	27300611	Turntable	B127	27140835	Bracket, motor	B307	8930201S	ES-2S, Circlip
B16	27180186	Spring	B128	27300627	Pulley	B311	27300668-2	Stopper ass'y
B17	27300612-2	Slide spindle	B130	28184210	Cover PB	B320	27140844	Bracket, motor
B18	27270132	Spacer	B133	82142004	2P+4F(BC), Pan head screw	B322	27300673-1	Gear
B24	82143006	3P+6F(BC), Pan head screw	B139	27300651A	Rubber belt	B333	27260132A	Shaft, gear
B26	801305	M2.5×4, Hexagon socket head screw	B145	27300693	Wire ass'y	B334	27300638	Pulley gear
B34	27190244	Pick-up holder	B153	833426128	2.6TTP+12B(BC), Tapping screw	B335	8930301S	ES-3S, Circlip
B35	27267303-1	Guide LB	B158	27300628-2	Pulley ass'y	B337	870110	Thrust washer
B36	27140827A	Bracket H	B169	27300629-2	Pulley ass'y	B344	27215089	Decoration frame
B38	27267304-1	Guide R	B182	28175086	Insulating plate	B346	27140845A	Holding bracket L ass'y
B39	27140828A	Bracket D	B183	8764200604	Flat washer	B350	27140846A	Holding bracket R ass'y
B41	27300613	Pin A	B184	833420108	2TTP+10B(BC), Tapping screw	B354	27300639	Support L ass'y
B42	27140829	Bracket E	B189	27140838B	Bracket	B357	27300640	Support R ass'y
B43	27180167	Spring	B190	28175092	Insulating plate	B362	838430068	3TTB+6B(BC), Tapping screw
B44	27180188	Spring	B191	29360686	Label	B367	27215090-1A	Decoration frame, disc
B45	27300583	Slide bearing	B192	27300630C	Chucking arm	B370	27300641-2	Cam plate R
B48	801296	Adjustment screw	B193	880009	Rivert	B371	27300642-2	Cam plate L
B49	801297	Adjustment screw	B195	27190246A	Holder, magnet	B375	27180194	Plate spring
B52	87313006	M-3B, Toothed washer	B196	28181012	Magnet	B376	27180192-1	Spring
B56	82143015	3P+15F(BC), Pan head screw	B199	27262240-1A	Plate, magnet	B377	870102	ES-2S, Circlip
B57	82143008	3P+8F(BC), Pan head screw	B200	27300659	Magnet	B382	27300643A	Rail L
B58	834430068	3TTS+6B(BC), Tapping screw	B202	28330057-2	Cap	B383	27300644B	Rail R
B65	27260129	Shaft	B207	838430088	3TTS+8B(BC), Tapping screw	B387	27220027	Slider
B66	27140830	Bracket A	B220	27300617	Pin, shaft	B388	27220028	Slider
B67	27140831	Bracket B	B223	801308	M3×20, Hexagon socket head screw	B390	82243010	3S+10F(BC), Pan head screw
B68	27140832	Bracket C	B233	863430	N-3F-N(BC), Nut	B396	27260133	Shaft
B77	27300623	Pulley ass'y	B235	27140849-3	Switch bracket ass'y	B397	27140847	Bracket, shaft
B84	27270119	Spacer	B240	82143010	3P+10F(BC), Pan head screw	B402	27140883	Bracket ass'y, pin
B86	27180187-1	Spring	B257	28175086	Insulating plate	B406	27300694	Wire ass'y
B89	833430080	3TTS+8P(BC), Tapping screw	B264	28175091	Insulating plate	B410	27180193	Spring
B96	27300645	Gear box	B268	27140850-2	Bracket ass'y	B411	27180209	Tension spring
B97	27300646	Worm	B271	27260131-1	Shaft	B412	27300624	Pulley
B98	27300593	Bearing	B282	28335020-1	Lever L ass'y	B413	27270130	Spacer
B100	870102	3×5.4×0.25, Thrust washer	B283	28335020-2	Lever R ass'y	B414	834430208	3TTS+20B(BC), Tapping screw
B102	27140834	Bracket	B284	28335022B	Lever CL ass'y	B415	28140535	Cushion
B104	27260130-1	Shaft	B290	28335022B	Lever CL ass'y	B419	10010324	Lid ass'y(B419-B421)
B105	27300647	Worm foil	B264	28175086	Insulating plate	B420	27140848	Bracket, lid
B107	27140854	Bracket G	B271	27140850-2	Bracket ass'y	B421	28321317A	Knob, lid
B108	27300625	Pulley S	B282	27260131-1	Shaft	B425	28140514	Cushion
B109	27300626-1	Pulley A	B283	28335020-1	Lever L ass'y	B429	838430068	3TTB+6B(BC), Tapping screw
			B284	28335020-2	Lever R ass'y			
			B290	28335022B	Lever CL ass'y	B430	82142604	2.6P+4F(BC), Pan head screw

## CHASSIS PARTS LIST

REF.NO.	PARTS NO.	DESCRIPTION	REF.NO.	PARTS NO.	DESCRIPTION
A1	27110208B	Front bracket	A53	27140873	Bracket B
A2	27140824	Bracket, headphone	A54	880009	Rivert
A3	27115155A	Side bracket R	A55	27300689	Collar
A4	27115156A	Side bracket L	A56	831430168	3TTW + 16B(BC), Tapping screw
A5	27140825B	Bracket, power	A57	870065	11×26×1.6, Washer
A6	27130347A	Bracket C	A58	801294	4×8, Special screw
A7	27130345A	Bracket, power transformer	A59	27300695	Plate, ground
A8	27140826	Bracket, pc board	A60	29110039	Tape, aluminium
A9	27130346B	Bracket, compact disc	A301	28184224	Top cover
A10	28175084A	Insulating plate	A302	28140020	4×10×40, Cushion
A11	27160136	Radiator	A303	838440089	4TTB+8C(BC), Tapping screw
A13	28194187	Decoration bar, compact disc	A304	834430068	3TTS+6B(BC), Tapping screw
A14	28130204	Dial plate, compact disc	A500	10188321-1	Front panel ass'y
A15	28133088	Back plate, compact disc	A502	28125142	End cap
A16	27190240	Holder, compact disc	A503	28191218A	Clear plate, compact disc
A17	27240024	Plate	A504	28191219	Clear plate
A18	27130348	Bracket, pc board	A506	27267279	Guide, power
A19	28130205A	Dial plate	A508	28194188	Decoration bar
A20	28133089A	Back plate	A510	27267302B	Guide, push
A21	27190241	Holder, lamp	A511	27180185	Spring
A22	28320135	Connector	A513	28321304A	Knob ass'y
A23	27260138	Shaft	A516	28140500A	Cushion
A24	28175087	Insulating plate	A517	28140219	Φ20, Cushion
A25	27120556A	Back panel <D>	A518	28140534	1.5×145×3, Cushion
	27120557	Back panel <G>	A601	27170170A	Bottom board
	27120558	Back panel <W>	A602	27175020A	Leg
A27	28199081	Film		27175033	Cushion for leg
A28	28199104	Film	A801	28321394	Knob, power
A29	27150170	Shielded plate	A802	28321314	Knob, level
A30	27180210-1A	Spring	A803	28321315	Knob, push
A31	834430068	3TTS+6B(BC), Tapping screw	A804	28321316	Knob, clear
A32	834430108	3TTS+10B(BC), Tapping screw	A884	29360663	Label
A33	831430088	3TTW+8B(BC), Tapping screw	A886	29360429A	Label, fuse
A34	838440089	4TTB+8C(BC), Tapping screw	A887	29360685	Label <D>
A35	82143006	3P+6FN(BC), Pan head screw		29360687	Label, class 1 <G>
A36	834230108	3TTS+10B(Ni), Nickel screw	△C801	3500065A	0.01μF, AC400/125V, Capacitor IS
A37	833430080	3TTP+8B(BC), Tapping screw		C802, C803, 335622230	0.022μF, 50V, Capacitor, ceramic
A38	27190062	Holder		C808	4,700pF, 50V, Capacitor, ceramic
A39	834430168	3TTS+16B(BC), Tapping screw		C806, C807 335324725	
A40	87643010	W3×10F(BC), Washer	△F801	252045	1A(ST-6), Fuse <D>
A41	27270109	Spacer	△	252063	500mA SE-EAWK, Fuse <G/W>
A42	82143010	3P+10FN(BC), Pan head screw	△F802	252045	1A(ST-6), Fuse <W>
A43	880011	Rivert	△P801	253083-1	Power supply cable <D>
A44	870060	Flat washer	△	253112	Power supply cord <G/W>
A46	28140075-1	8×150×30, Cushion	△P802	25050046	NSCT-2P15, AC outlet <D>
A51	27140872A	Bracket L	P803	25045063	NPJ-2PRBL30, Output terminal
A52	27140871A	Bracket R	△P804	270280	SR4K-4, Strainrelief
			P805	25045139	HLJ-0540-01-010, Headphone jack
			P806	27300080	Cover, capacitor
			P807	223018	Bushing
			P807	223019	AS-229, Spacer, transistor
			P808	260208	Binder
			P809	27300352	Terminal
			△P810	25065096	NPF-073, Fuseholder <W>

NOTE: THE COMPONENTS IDENTIFIED BY MARK △ ARE CRITICAL FOR LISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

CHASSIS EXPLODED VIEW

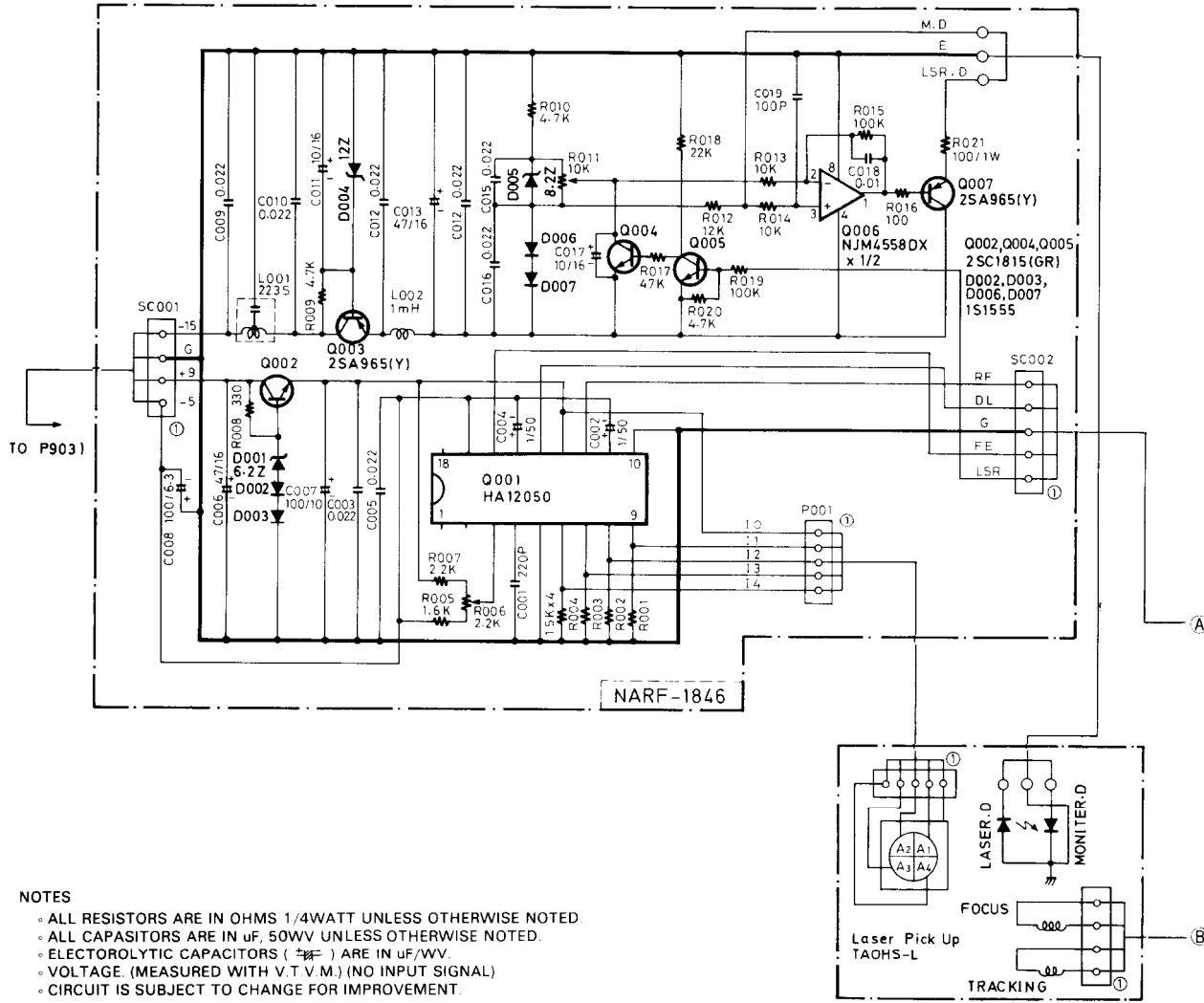


P811	25065123	NSS-12589, Voltage selector switch <W>	Δ T801	230770	NPT-825D, Power transformer <D>	10194544A	10010555	U13	10010639	NADIG-1939, Digital board ass'y
Q903	222780091	78M09, IC, constant voltage	Δ	230771	NPT-825G, Power transformer <G>	10010545	10188556A	Δ U14	10194556B	NAPS-1856A, Filter board ass'y <D>
Q904	222790091	79M09, IC, constant voltage	Δ	230772	NPT-825DC, Power transformer <W>	10010551	10194556B	Δ	10010639	NAPS-1856B, Filter board ass'y <G/W>
Q907	2200412	2SB596(O), Transistor	U1	10010543	NADIG-1843, Servo/micro computer control pc board ass'y	10010553	10010639	U15	10010639	NADIG-1939, Digital board ass'y
R801	5104144	N12RG50KB15, Variable resistor, headphone level	U2	10010544	NAPS-1844, Signal processing pc board ass'y <D/W>	10010554				
S801	25035383	NPS-111-L948P, Power switch								
SC801	25050200	NSAS-4P-225, Socket								
SC802	25050203	NSAS-5P-231, Socket								
SC803	25050169	NSAS-4P-147, Socket								
SC804	2000277	NSAS-2P-228, Socket								

Note: <D>: Only 120V model  
 <G>: Only 220V model  
 <W>: Only 120/220V model

# SCHEMATIC DIAGRAM

Optical pick-up control



**NOTES**

- ALL RESISTORS ARE IN OHMS 1/4WATT UNLESS OTHERWISE NOTED
- ALL CAPASITORS ARE IN  $\mu$ F, 50VV UNLESS OTHERWISE NOTED.
- ELECTORLYTIC CAPASITORS (  $\mu$  ) ARE IN  $\mu$ F/VV.
- VOLTAGE. (MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL)
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

# PRINTED CIRCUIT BOARD VIEW FROM COMPONENT SIDE

Optical pick-up control (NARF-1846)

# PRINTED CIRCUIT BOARD PARTS LIST

## OPTICAL PICK-UP POSITION CONTROL PC BOARD (NARF-1846)

CIRCUIT NO.	PARTS NO.	DESCRIPTION			
<b>ICs</b>					
Q001	222739	HA12050			
Q006	222502	NJM-4558DX			
<b>Transistors</b>					
Q002	2211255	2SC1815(GR)			
Q003, Q007	2211644	2SA965(Y)			
Q004, Q005	2211255	2SC1815(GR)			
<b>Diodes</b>					
D001	224167	05Z6.2Z			
D002, D003	223145 or	1S2076TD or			
D006, D007	223150	US1040			
D004	224188	05Z12Z			
D005	224176	05Z8.2Z			
<b>Filter</b>					
L001	231054	NCH-5095			
<b>Coil</b>					
L002	231025	NCH-1064			
<b>Capacitors</b>					
	C002, C004	352780109			1 $\mu$ F, 50V, Elect.
	C006, C013	352744709			47 $\mu$ F, 16V, Elect.
	C008	352721019			100 $\mu$ F, 6.3V, Elect.
	C011, C017	352741009			10 $\mu$ F, 16V, Elect.
<b>Resistors</b>					
	R006	5210009			N06HR2.2KBDM, Semi-fixed
	R011	5210013			N06HR10KBDM, Semi-fixed
	R021	441621014			100 $\Omega$ , 1W, Metal oxide film
<b>Sockets</b>					
	SC001	25050195			NSAS-4P-220
	SC002	25050180			NSAS-5P-158
<b>Plug</b>					
	P001	25055102			NPLG-5P86

## SIGNAL PROCESSING PC BOARD (NAPS-1844/a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION			
<b>ICs</b>					
Q301	222706	HM6116P-4			
Q302	222709	CX-7933			
Q303	222711	CX-7935			
Q304	222710	CX-7934			
Q305	222756	TC74HC00P			
Q306	222850381	4538B			
Q307	222712	CX-20017			
Q308	222717	$\mu$ PD4053BC			
Q311, Q312	222735	NJM072D			
Q313, Q314	222039	AFL811WF20000B4			
Q315, Q316	222762 or	NJM5534DD or			
	222759	NJM5534AD			
Q317, Q318	222585	NJM4558DX-B			
Q321, Q322	222760	LA4177			
Q901	222780151	78M15			
Q902	222790151	79M15			
Q908	222780053	78L05			
<b>Transistors</b>					
Q309, Q310	2212383 or	2SK152(3) or			
	2212384	2SK152(4), FET			
Q319, Q320	2211255	2SC1815(GR)			
Q323	2211653 or	2SC2235(Y) or			
	2211654	2SC2235(O)			
Q905, Q906	2211643 or	2SA965(O) or			
	2211644	2SA965(Y)			
Q909	2212375	2SK30ATM(GR), FET			
Q910	2211255	2SC1815(GR)			
Q911	2211653 or	2SC2235(O) or			
	2211654	2SC2235(Y)			
<b>Diodes</b>					
D301-D303	223145 or	1S2076TD or			
	223150	US1040			
D901	223862	WL-01			
D902, D903	223880	GP101N4003			
D904	223868	2W02			
	D905	223880			GP101N4003
	D906	224212			05Z27Z
	D907	224162			05Z5.6X
	D908	223882			KBL-02
	D909-D911	223145 or			1S2076TD or
		223150			US1040
	D912	224181,			05Z101Y,
		2239593 or			RD10E-B3 or
		2241072			GZA-10Y
<b>Coil</b>					
	L302	231055			NCH-1096
<b>Filters</b>					
	L301	231054			NCH-5095
	L303, L304	231054			NCH-5095
<b>X'tals</b>					
	X301	3010084			KD3492D-A, 8.6436MHz
	X302	3010080			KD2328DAA, 34.5744MHz
<b>Capacitors</b>					
	C307-C310	352750479			4.7 $\mu$ F, 25V, Elect.
	C311, C312	3700006			1,000pF $\pm$ 5%, 250V, Styrol
	C313, C314	372521214			120pF $\pm$ 5%, 50V, Styrol
	C315-C322	352750479			4.7 $\mu$ F, 25V, Elect.
	C323, C324	352940106			1 $\mu$ F, 16V, Non-polar elect.
	C325, C326	372525614			560pF $\pm$ 5%, 50V, Styrol
	C327, C328	370133923			3,900pF $\pm$ 2%, 100V, APS
	C331, C332	352744719			470 $\mu$ F, 16V, Elect.
	C333, C334	352750479			4.7 $\mu$ F, 25V, Elect.
	C337, C338	352732219			220 $\mu$ F, 10V, Elect.
	C341	352732219			220 $\mu$ F, 10V, Elect.
	C342	352741019			100 $\mu$ F, 16V, Elect.
	C343, C344	352742209			22 $\mu$ F, 16V, Elect.
	C346	352780109			1 $\mu$ F, 50V, Elect.
	C351	352750479			4.7 $\mu$ F, 25V, Elect.
	C901, C902	380501035			0.01 $\mu$ F, 160V, CF
	C903	380503335			0.033 $\mu$ F, 160V, CF

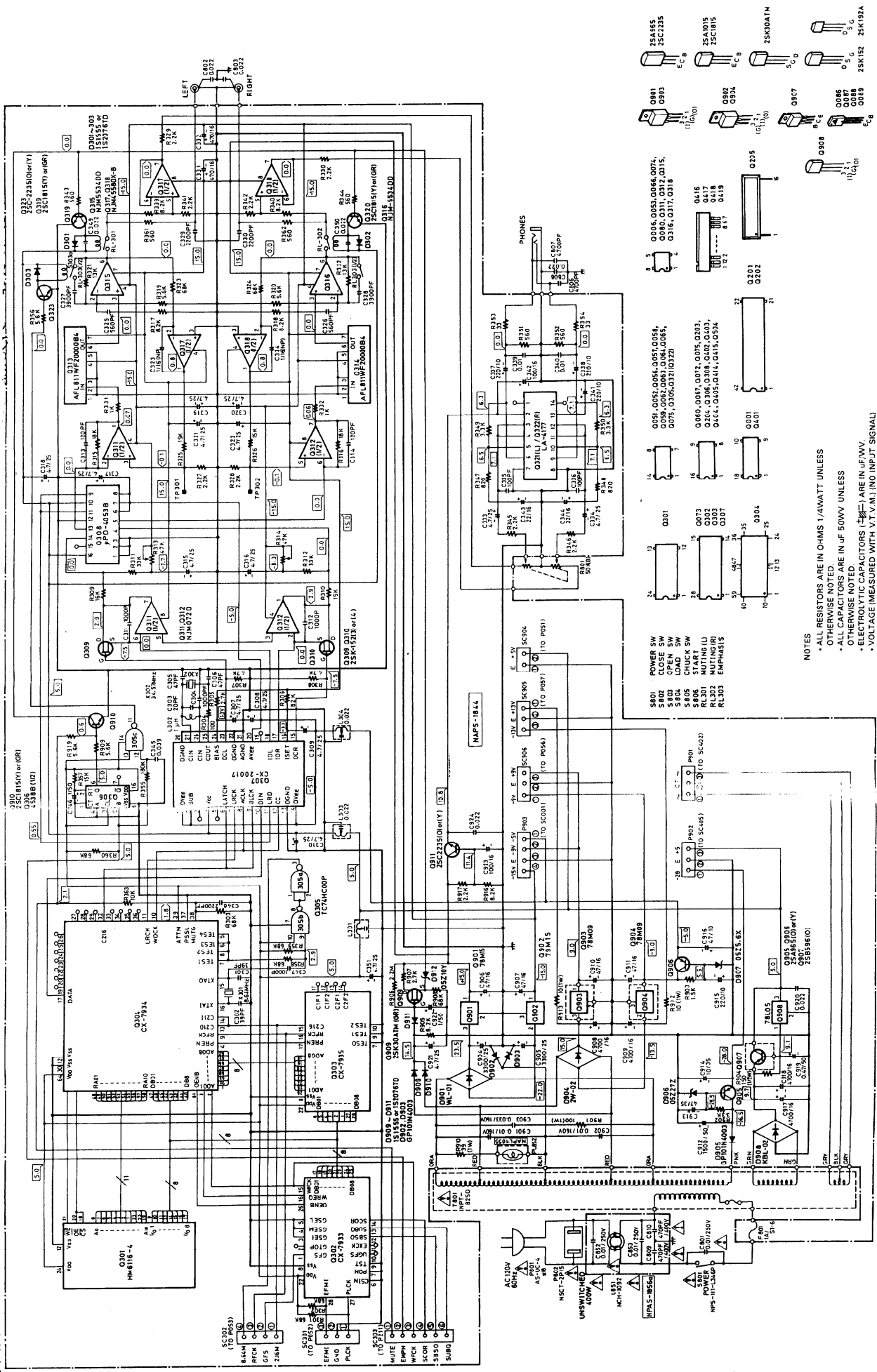
(continued on page 46)





# SCHEMATIC DIAGRAM

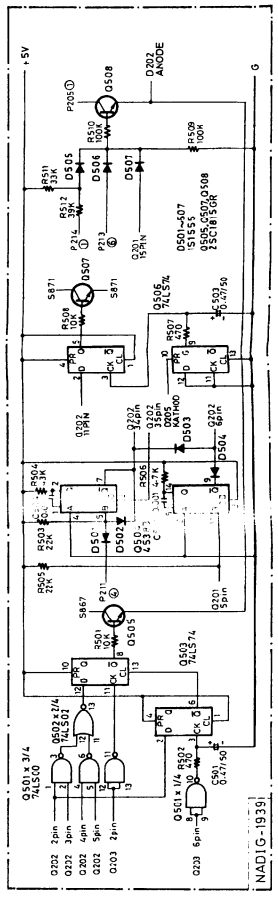
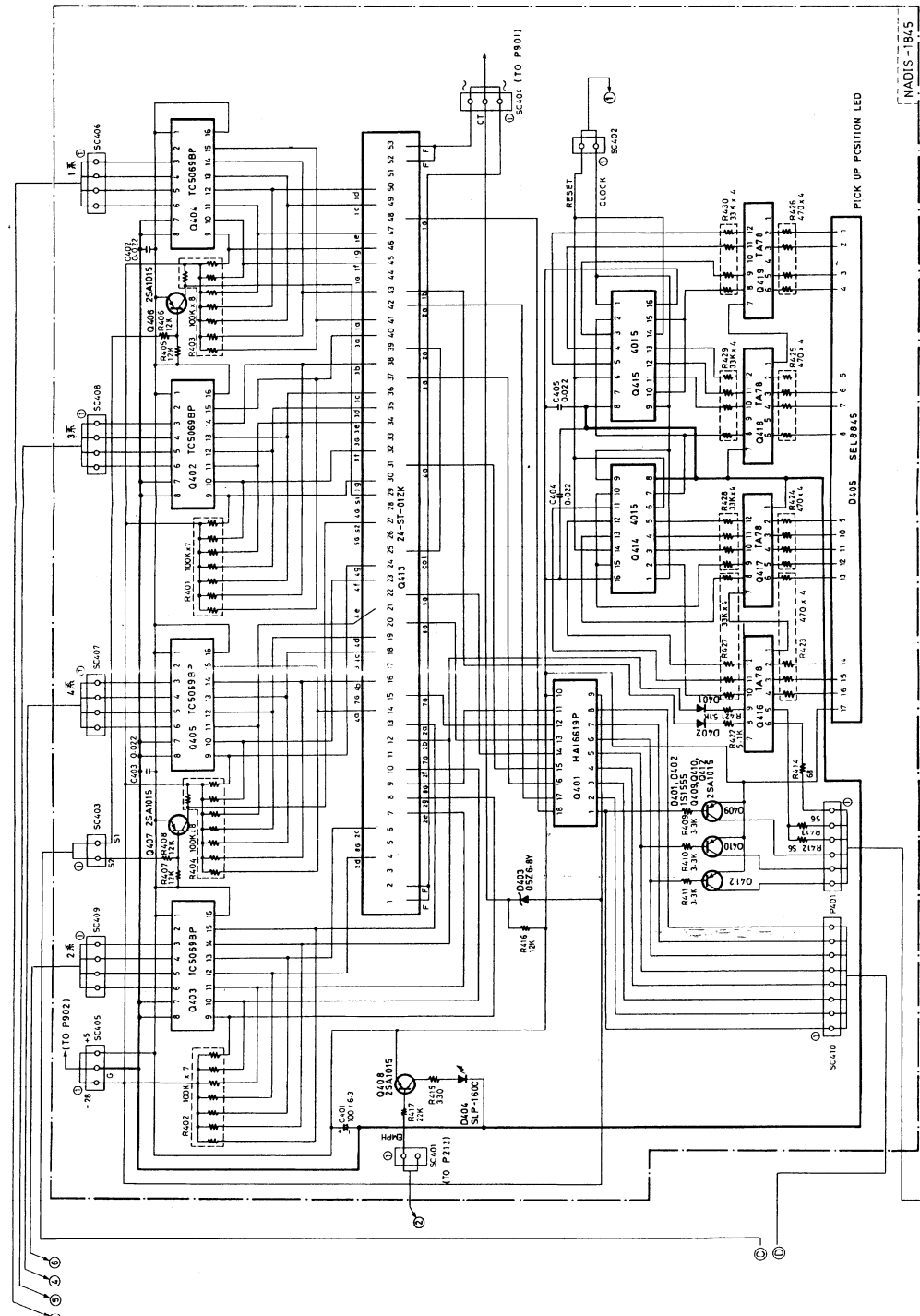
Signal processing/power supply circuit  
120V model



- NOTES
- ALL RESISTORS ARE IN OHMS 1/4WATT UNLESS OTHERWISE NOTED.
  - ALL CAPACITORS ARE IN UF 50WV UNLESS OTHERWISE NOTED.
  - ELECTROLYTIC CAPACITORS (E) ARE IN UF/VV.
  - VOLTAGE MEASURED WITH V.T.V.M. (NO INPUT SIGNAL).
  - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
  - THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY.

# SCHEMATIC DIAGRAM

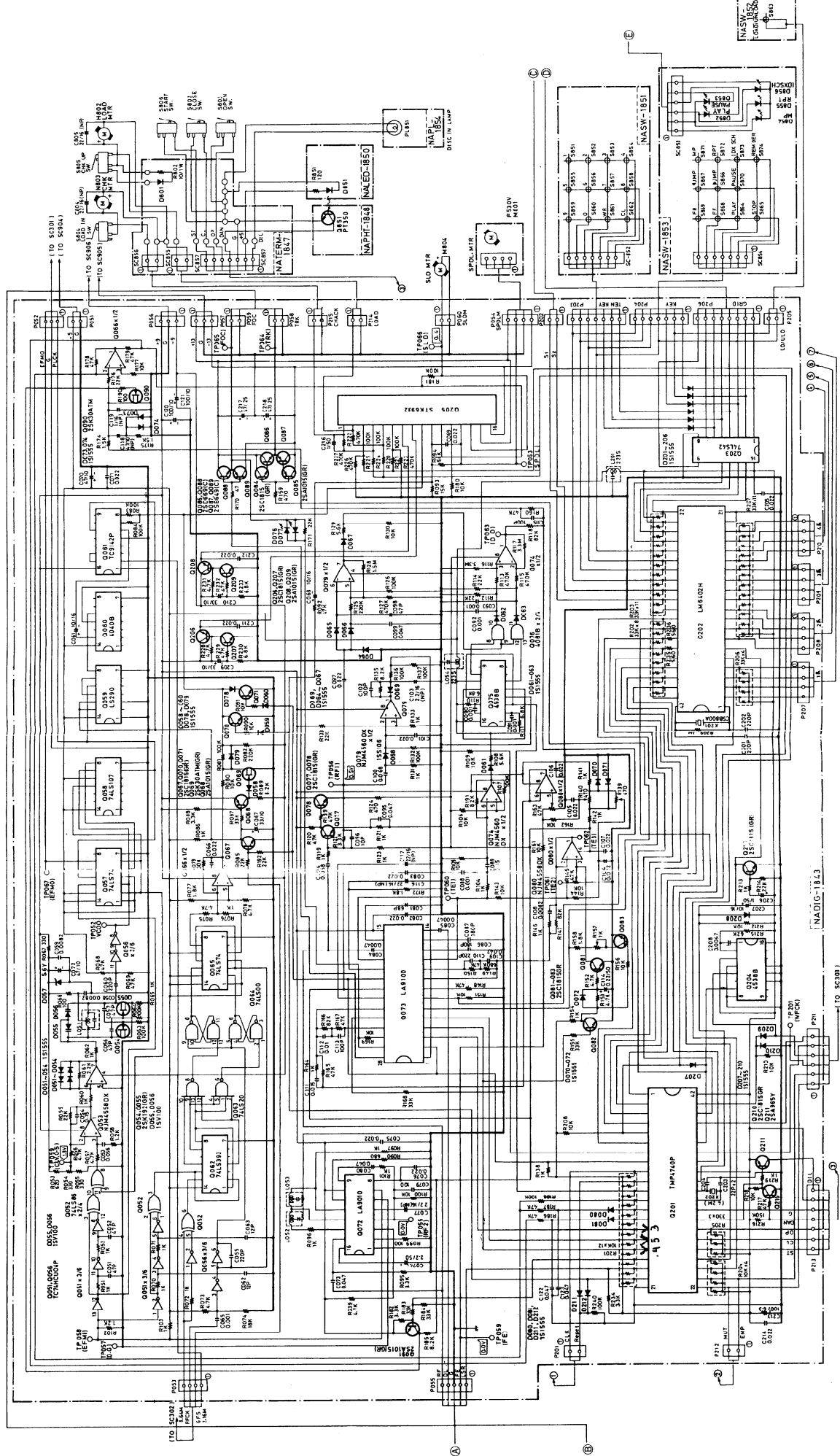
Display/digital circuit



- NOTES
- ALL RESISTORS ARE IN OHMS 1/AWATT UNLESS OTHERWISE NOTED.
  - ALL CAPACITORS ARE IN  $\mu$ F. 50WV UNLESS OTHERWISE NOTED.
  - ELECTROLYTIC CAPACITORS (  $\pm$  ) ARE IN  $\mu$ F/WV (G.MAL)
  - VOLTAGE (MEASURED WITH NO LOAD) IS IN VOLTS (NO ADV.)
  - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

# SCHEMATIC DIAGRAM

## Servo/microcomputer control circuit



- NOTES
- ALL RESISTORS ARE IN OHMS 1/4WATT UNLESS OTHERWISE NOTED
  - ALL CAPACITORS ARE IN UF 50VW UNLESS OTHERWISE NOTED
  - ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED
  - VOLTAGE IS MEASURED WITH 1.7M IN INPUT SIGNAL
  - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT

# PRINTED CIRCUIT BOARD PARTS LIST

## SERVO/MICRO COMPUTER CONTROL PC BOARD (NADIG-1843)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>ICs</b>			<b>L. E. Ds</b>	
Q051	222755	TC74HCU04P	D076, D077	225053, 225054 or 225059	SEL-1110R-B, SEL-1110R-C or SEL-1110S
Q052	222740861	74LS86		<b>Coil</b>	
Q053	222502	NJM4558DX	L051	232117	NSO-4032
Q056	222755	TC74HC04P		<b>Filters</b>	
Q057	222740741	74LS74	L052, L053	232118	NMIF-4051
Q058	222741071	74LS107	L054, L201	231054	NCH5095
Q059	222742901	74LS290	X201	3010069	CSB800A
Q060	222840401	4040B		<b>X'tal</b>	
Q061	222653	TC9142P	X202	3010083	4.2MHz
Q062	222743931	74LS393		<b>Capacitors</b>	
Q063	222740201	74LS20	C061	352741009	10 $\mu$ F, 16V, Elect.
Q064	222740001	74LS00	C067	352733309	33 $\mu$ F, 10V, Elect.
Q065	222740741	74LS74	C068	352741009	10 $\mu$ F, 16V, Elect.
Q066	222502	NJM4558DX	C070, C072	352734709	47 $\mu$ F, 10V, Elect.
Q072	222751	LA9010	C074	352780229	2.2 $\mu$ F, 50V, Elect.
Q073	222752	LA9100	C077	352940226	2.2 $\mu$ F, 16V, Non-polar elect.
Q074	222570	NJM4560DX	C086, C087	372521814	180pF $\pm$ 5%, 50V, Styrol
Q075	222850381	4538B	C103	352940226	2.2 $\mu$ F, 16V, Non-polar elect.
Q076	222840811	4081B	C114	352782299	0.22 $\mu$ F, 50V, Elect.
Q079	222570	NJM4560DX	C116, C117	352942206	22 $\mu$ F, 16V, Non-polar elect.
Q080	222502	NJM4558DX	C118	352934706	47 $\mu$ F, 10V, Non-polar elect.
Q201	222754	TMP4740P-5304	C119	352940109	1 $\mu$ F, 16V, Non-polar elect.
Q202	222753	LM6402H-295	C120, C121	352731019	100 $\mu$ F, 10V, Elect.
Q203	222740421	74LS42	C206	352780109	1 $\mu$ F, 50V, Elect.
Q204	222850381	4538B	C207	352741009	10 $\mu$ F, 16V, Elect.
Q205	222038	STK6932	C209, C210	352733309	33 $\mu$ F, 10V, Elect.
	<b>Transistors</b>		C213	352721019	100 $\mu$ F, 6.3V, Elect.
Q054, Q055	2212275	2SK192(GR), FET	C216	352980106	1 $\mu$ F, 50V, Non-polar elect.
Q067	2211255	2SC1815(GR)	C217, C218	352754709	47 $\mu$ F, 25V, Elect.
Q068	2211455	2SA1015(GR)		<b>Resistors</b>	
Q069	2212375	2SK30ATM(GR), FET	R054	5210004	N06HR330BDM, Semi-fixed
Q070, Q071	2211255	2SC1815(GR)	R139, R140	5210005	N06HR470BDM, Semi-fixed
Q077, Q078	2211255	2SC1815(GR)	R145	5210017	N06HR47KBDM, Semi-fixed
Q081-Q084	2211225	2SC1815(GR)		<b>Plugs</b>	
Q085	2211455	2SA1015(GR)	R051	25055099	NPLG-2P83
Q086, Q088	2200783	2SD669(C)	P052	25055100	NPLG-3P84
Q087, Q089	2200793	2SB649(C)	P053, P054	25055101	NPLG-4P85
Q090	2212375	2SK30ATM(GR), FET	P055	25055102	NPLG-5P86
Q091	2211455	2SA1015(GR)	P056, P057	25055100	NPLG-3P84
Q206, Q207	2211255	2SC1815(GR)	P058-P060	25055099	NPLG-2P83
Q208, Q209	2211455	2SA1015(GR)	P201, P202	25055099	NPLG-2P83
Q210	2211255	2SC1815(GR)	P203, P204	25055104	NPLG-7P88
Q211	2211644	2SA965(Y)	P205	25055099	NPLG-2P83
Q213	2211255	2SC1815(GR)	P206	25055105	NPLG-8P89
	<b>Diodes</b>		P207-P210	25055101	NPLG-4P85
D051-D054	223145 or	1S2076TD or	P211	25055103	NPLG-6P87
D058-D067	223150	US1040	P212	25055099	NPLG-2P83
D055, D056	223141	1SV100, Variable capacitor			
D057	224163	05Z5.6Y			
D068	223152	1SS106			
D069-D074	223145 or	1S2076TD or			
D078	223150	US1040			
D079	223145,	1S2076TD,			
D211-D214	223155 or	1SS138 or			
	223105	1S1555			
D080, D081	223105,	1S1555,			
	223133 or	DS442X or			
	223155	1SS138			
D201-D210	223145 or	1S2076TD or			
	223150	US1040			

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>Plugs</b>	
P213	25055104	NPLG-7P88
P214-P216	25055099	NPLG-2P83
	<b>Radiator</b>	
	27160137	
<b>TERMINAL PC BOARD (NATERM-1847)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>Diode</b>	
D801	223880	GP101N4003
	<b>Resistor</b>	
R802	441621004	10 $\Omega$ , 1W, Metal oxide film
	<b>Sockets</b>	
SC855, SC856	25050193	NSAS-2P-218
SC857	25050198	NSAS-7P-223
<b>PHOTO TRANSISTOR PC BOARD (NAPHT-1848)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q851	226012	PT-350B, Phototransistor
	27190145	Holder
<b>DISC DETECTION PC BOARD (NALED-1850)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
D851	225155	GL-350A
<b>SWITCH PC BOARDS (NASW-1851/1852)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>Switches</b>	
S851-S863	25035389	NPS-111-S353
	<b>Sockets</b>	
SC851	25050208	NSAS-2P-261
SC852	2000279	NSAS-7P-230
<b>SWITCH AND INDICATOR PC BOARD (NASW-1853)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>L. E. Ds</b>	
D852	225134	GL-3NG1
D853-D856	225126	GL-3PR1

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>Screws</b>	
	82143006	3P+6FN(BC), Pan head screw
	834430068	3TTS+6B(BC), Tapping
	<b>Spacers</b>	
	223019	AS-229, for transistor
	<b>Switches</b>	
S864-S874	25035389	NPS-111-S353
	<b>Sockets</b>	
SC853	2000278	NSAS-6P229
SC854	2000279	NSAS-7P230
SC855	25050157	NSAS-2P135
<b>LAMP PC BOARDS (NAPL-1854/1855)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL851	210174	250mA, 6.3V, DISC IN indicator lamp
PL852	210165	150mA, 14V, Edge light lamp
<b>FILTER PC BOARD (NAPS-1856a/b)</b>		
CIRCUIT NO.	PARTS NO.	DESCRIPTION
L851	231051	NCH-1092, Filter
C852, C853	3500065A	0.01 $\mu$ F, AC400/125V, Capacitor IS <D>
C852, C853	3500076	470pF, AC400/125V, Capacitor IS <G/W>
C809, C810	3500076	470pF, AC400/125V, Capacitor IS

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