

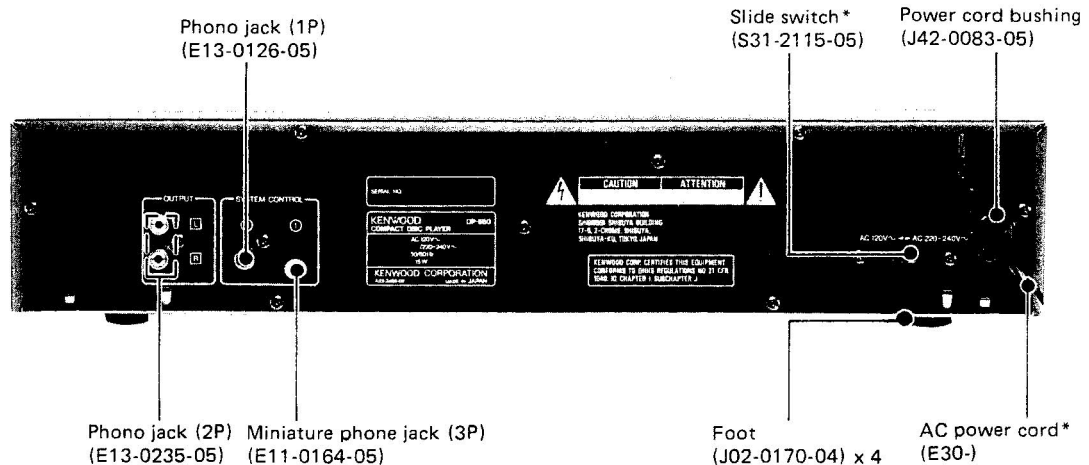
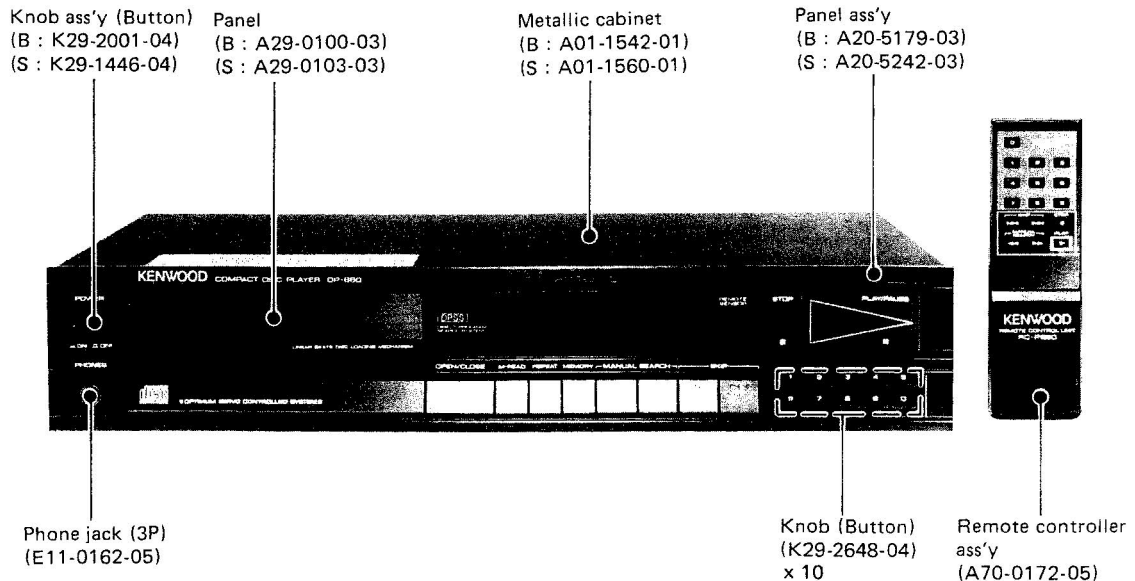
COMPACT DISC PLAYER

# DP-860

## SERVICE MANUAL

# KENWOOD

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**DANGER: Laser radiation when open and interlock defeated.  
AVOID DIRECT EXPOSURE TO BEAM.**

B : BLACK VERSION  
S : SILVER VERSION

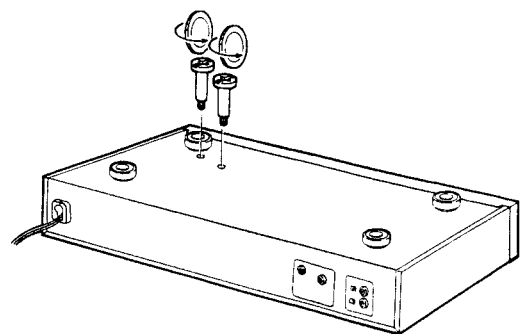
\*Refer to parts list on page 53.

## CONTENTS/TRANSPORTATION SCREW

TRANSPORTATION SCREW .....	2	4-3. Block diagram .....	21
CONTROLS AND INDICATORS .....	3	4-4. Explanation of terminals .....	22
DISASSEMBLY FOR REPAIR .....	4	5. Digital signal processor : CXD1130Q (X25-2920-XX : IC3) .....	23
BLOCK DIAGRAM .....	7	5-1. Functions .....	23
CIRCUIT DESCRIPTION		5-2. New auto servo .....	23
1. General description of microprocessor operation .....	8	5-3. Terminal connection diagram .....	23
1--1. General description of operation .....	8	5-4. Block diagram .....	23
• Test mode .....	8	5-5. Explanation of terminals .....	24
• Normal mode .....	8	6. D/A converter : PCM56P (X25-2920-XX : IC7) .....	25
1--2. Key Description .....	9	6-1. Block diagram/Terminal connection .....	25
• Normal mode .....	9	6-2. Explanation of terminals .....	25
• Test mode display .....	10	7. Description of components	
2. Microprocessor : $\mu$ PD75206CW-023 (X25-2920-XX : IC5) .....	13	7-1. ELECTRIC UNIT (X25-2920-00, -21) .....	26
2-1. Terminal connection diagram .....	13	MECHANISM OPERATION DESCRIPTION .....	27
2-2. Terminal Description .....	13	1. OPEN/CLOSE operation .....	27
2-3. Flow chart of test mode .....	14	2. Disassembling procedure of mechanism section .....	30
• Flow chart form tray OPEN status after power ON .....	14	2-1. Removing the clamper arm .....	30
• Focus search & Focus servo ON .....	15	2-2. Attaching the clamper arm .....	31
• Tracking servo ON .....	16	2-3. Removing the tray .....	31
• Disc motor stop .....	16	2-4. Attaching the tray .....	32
• From loading of Q data to display .....	17	2-5. Removing the slider ass'y .....	32
2-4. In a usual case, since the tray was pushed when the tray is OPEN until STOP display is made .....	17	2-6. Attaching the slider ass'y .....	33
3. RF Amplifier : CXA1081S (X25-2920-XX : IC1) .....	18	2-7. When moving the pickup forcibly .....	34
3-1. Functions .....	18	ADJUSTMENT	
3-2. Terminal connection diagram .....	18	ADJUSTMENT .....	35
3-3. Block diagram .....	18	REGLAGE .....	37
3-4. Explanation of functions of components .....	19	ABGLEICH .....	39
3-5. DEFECT Circuit .....	20	DIFFRACTION GRID ADJUSTMENT .....	41
4. Servo signal processor : CXA1082S (X25-2920-XX : IC2) .....	21	VOLTAGE CHECK TABLE .....	42
4-1. Functions .....	21	PC BOARD (COMPONENT SIDE VIEW) .....	43
4-2. Terminal connection diagram .....	21	PC BOARD (FOIL SIDE VIEW) .....	45
		CIRCUIT DIAGRAM .....	47
		EXPLODED VIEW (MECHANISM) .....	51
		EXPLODED VIEW (UNIT) .....	52
		PARTS LIST .....	53
		SPECIFICATIONS .....	BACK COVER

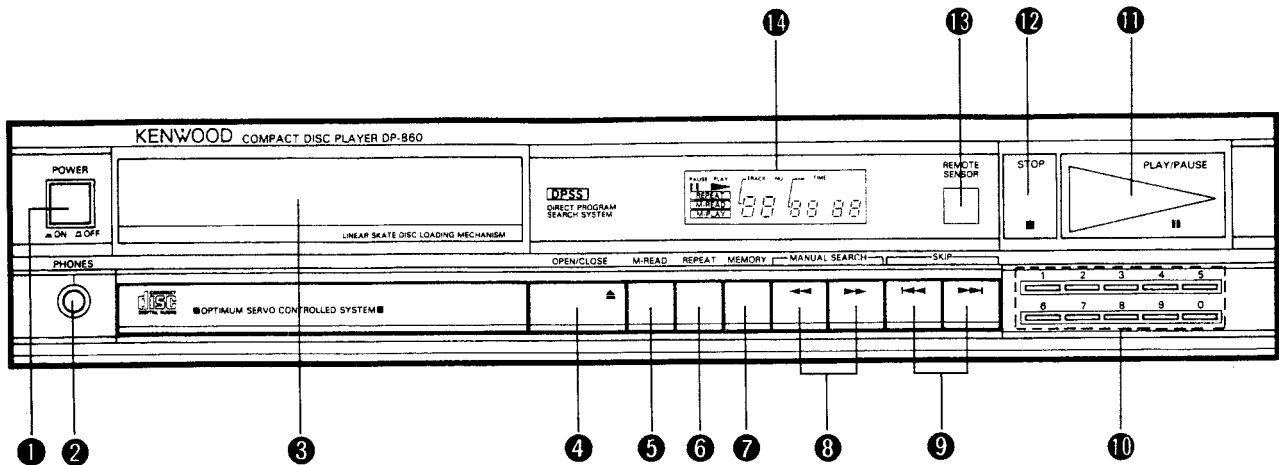
### Transportation screw

Before operation, remove the two red screws attached to the bottom of the unit used during transport from the factory. Remove both screws using a coin, etc. and, after removing, retain them together with the Warranty card and other documents. When the unit is to be transported again, be sure replace the two screws to their original position:



## CONTROLS AND INDICATORS

Numbers in circles correspond to the diagram, symbols in brackets correspond to front panel indications.



### 1 POWER switch

Press to turn the power on. Pressing again turns the power off.

### 2 PHONES (Headphones) jack

Connect headphones to this jack for private listening.

### 3 Disc tray

This will be opened or closed by pressing the OPEN/CLOSE (▲) key.

Place a disc on this tray with its label surface up.

### 4 OPEN/CLOSE key (▲)

Used to open/close the disc tray.

When this key is pressed during play, the disc rotation will stop and the disc tray will be opened.

- When this key is pressed with the tray closed, the tray is opened.

When it is pressed in the middle of tray opening, the tray will be closed.

- After the tray is closed, the disc information (TOC = Table Of Contents) will be read out and then the unit will enter the stop mode automatically.

### 5 M-READ key

Press to recall the memory contents for checking: the M-READ indicator lights and the memory contents are displayed every three seconds automatically.

### 6 REPEAT key

Press this key to play the disc repeatedly.

The repeat function will be cancelled by pressing the STOP key or pressing the REPEAT key again.

### 7 MEMORY key

Used to store the desired tunes for memory play.

In the stop mode, select the desired tunes using the SKIP (◀◀, ▶▶) keys and then press the MEMORY key. The M-READ indicator lights to show that the program tune is stored in memory.

### 8 MANUAL SEARCH keys (◀◀, ▶▶)

Press to go quickly in the forward or backward direction.

### 9 SKIP keys (◀◀, ▶▶)

Press to play the next tune or the tune being played from the beginning.

### 10 Numeric keys (1 ~ 0)

Use these keys to input Track No. for tune selection or memory.

### 11 PLAY/PAUSE key (▶, ||)

When this key is pressed, the PLAY indicator lights and the play starts. When it is pressed again, the PAUSE indicator lights and the unit enters the pause mode.

When the key is pressed with the tray opened, the tray is closed and then the play starts after the disc information (TOC) is read out. If the tunes are programmed using the MEMORY key, the memory play will be started.

### 12 STOP key (■)

When this key is pressed during play, the play stops. And when the play program is stored in memory, the memory contents will be cancelled.

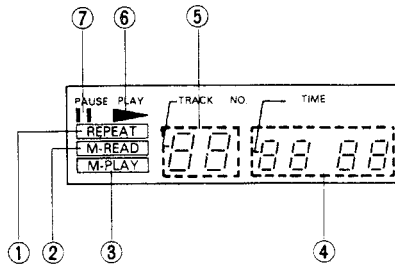
The repeat mode will be cancelled at the same time.

## CONTROLS AND INDICATORS/DISASSEMBLY FOR REPAIR

### 13 REMOTE SENSOR window

The signal from the supplied remote control unit is received through this window.

### 14 Display window



#### 1 REPEAT indicator

Lights in the repeat mode.

#### 2 M-READ indicator

Lights when the M-READ key is pressed.

#### 3 M-PLAY indicator

Lights when the tunes are programming.

#### 4 TIME display

- When a disc is loaded and the unit is set to stop mode, the total playing time of the disc is displayed.
- During play, the elapsed time of the tune being played is displayed.
- In the stop mode, when the tunes are programming, the total playing time of the programmed tunes is displayed.

#### 5 TRACK NO. display

This shows the number of the track.

#### 6 PLAY indicator (▶)

Lights during play.

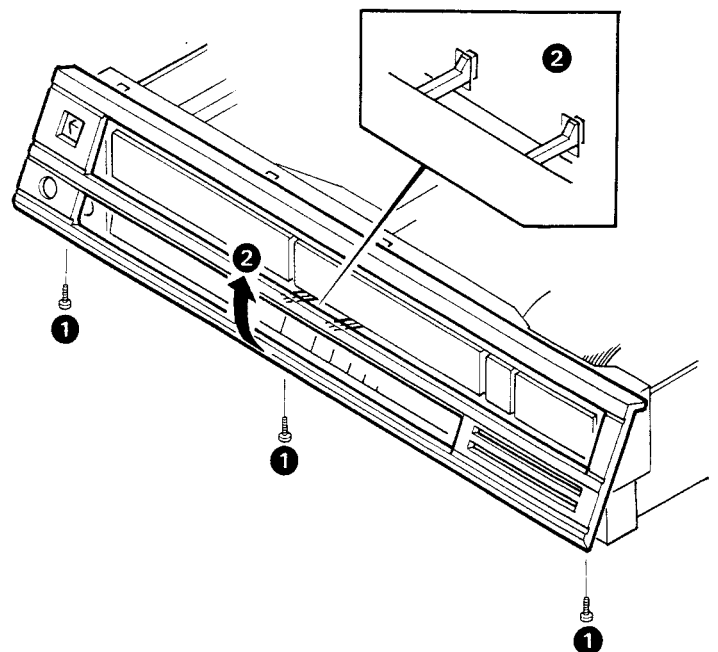
#### 7 PAUSE indicator (II)

Lights when the unit is in the pause mode.

### Disassembly for repair

#### REMOVING THE FRONT PANEL

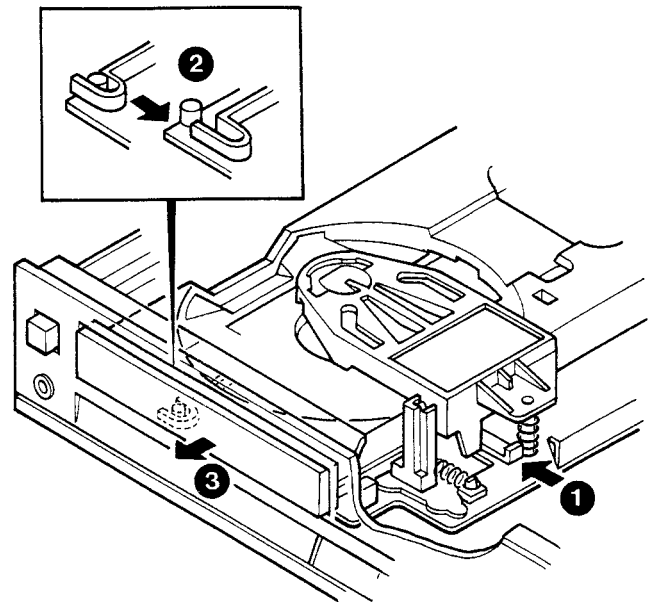
1. Remove the three screws retaining the front panel (1).
2. Remove the lower side of the front panel in the direction of the arrow by raising it upward. At this time, make sure not to damage the two lugs protruded from the front panel (2).



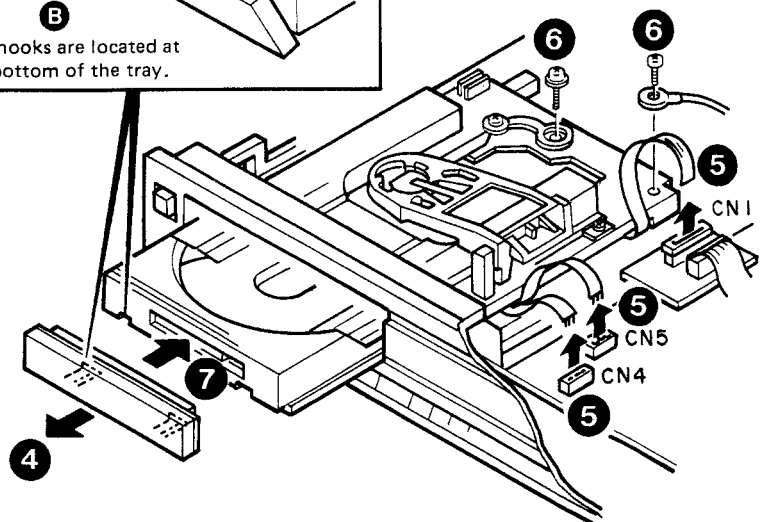
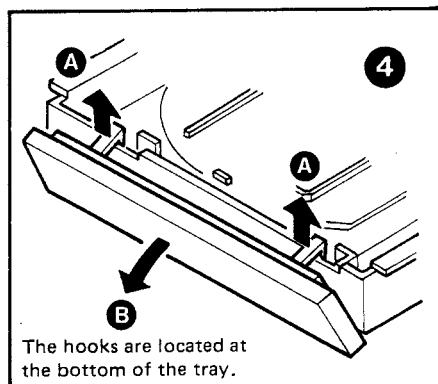
## DISASSEMBLY FOR REPAIR

### DISASSEMBLING THE MECHANISM

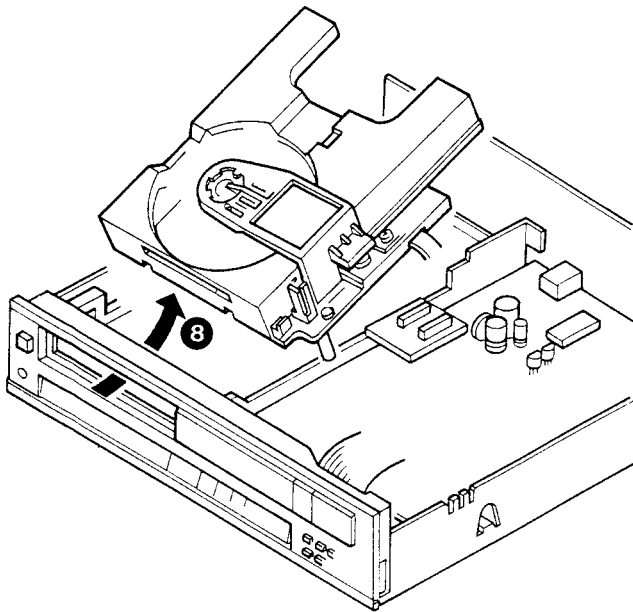
1. Push the projection of the slider ass'y under the disc clamber as arrow **1**.
2. The roller of the slider ass'y is dislocated at the stopper position ( **2** ).
3. Lightly draw the tray out as arrowed with your hand ( **3** ).



4. Lightly pull up the two tray panel hooks as arrowed **A** to dislocate them and then slowly remove the tray as arrowed **B** ( **4** ).
5. Disconnect the three flat cables from the ELECTRIC unit (X25-2920-XX) **5**, remove the mechanism and ground line terminal set screws **6**.
6. Push the tray in as arrowed again **7**.



## DISASSEMBLY FOR REPAIR



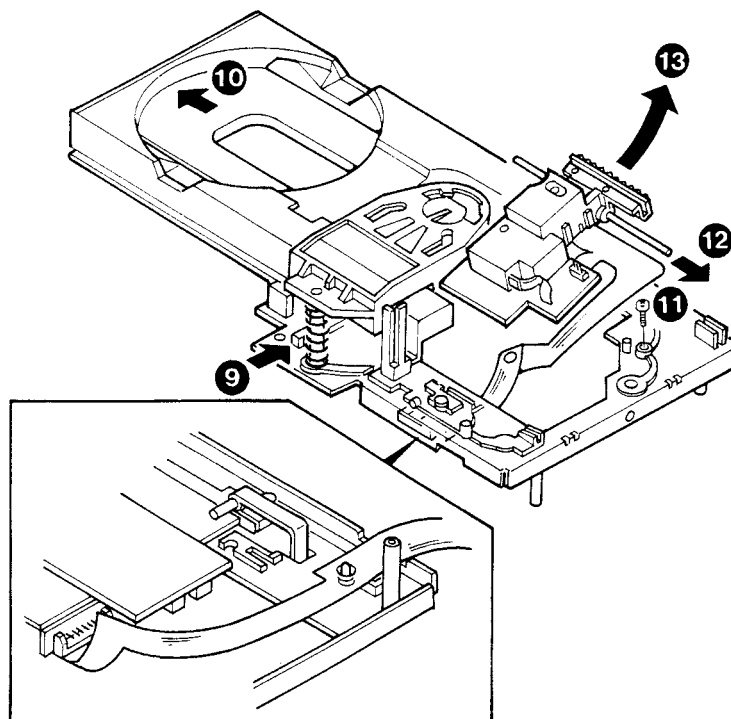
7. Slowly raise the mechanism as arrowed **8** and then pull it out.

**Note :** This mechanism is floated from the chassis with four rubber bushes. When replacing the mechanism, the four outsert legs on the bottom side of the mechanism must be firmly inserted into the rubber bush holes.

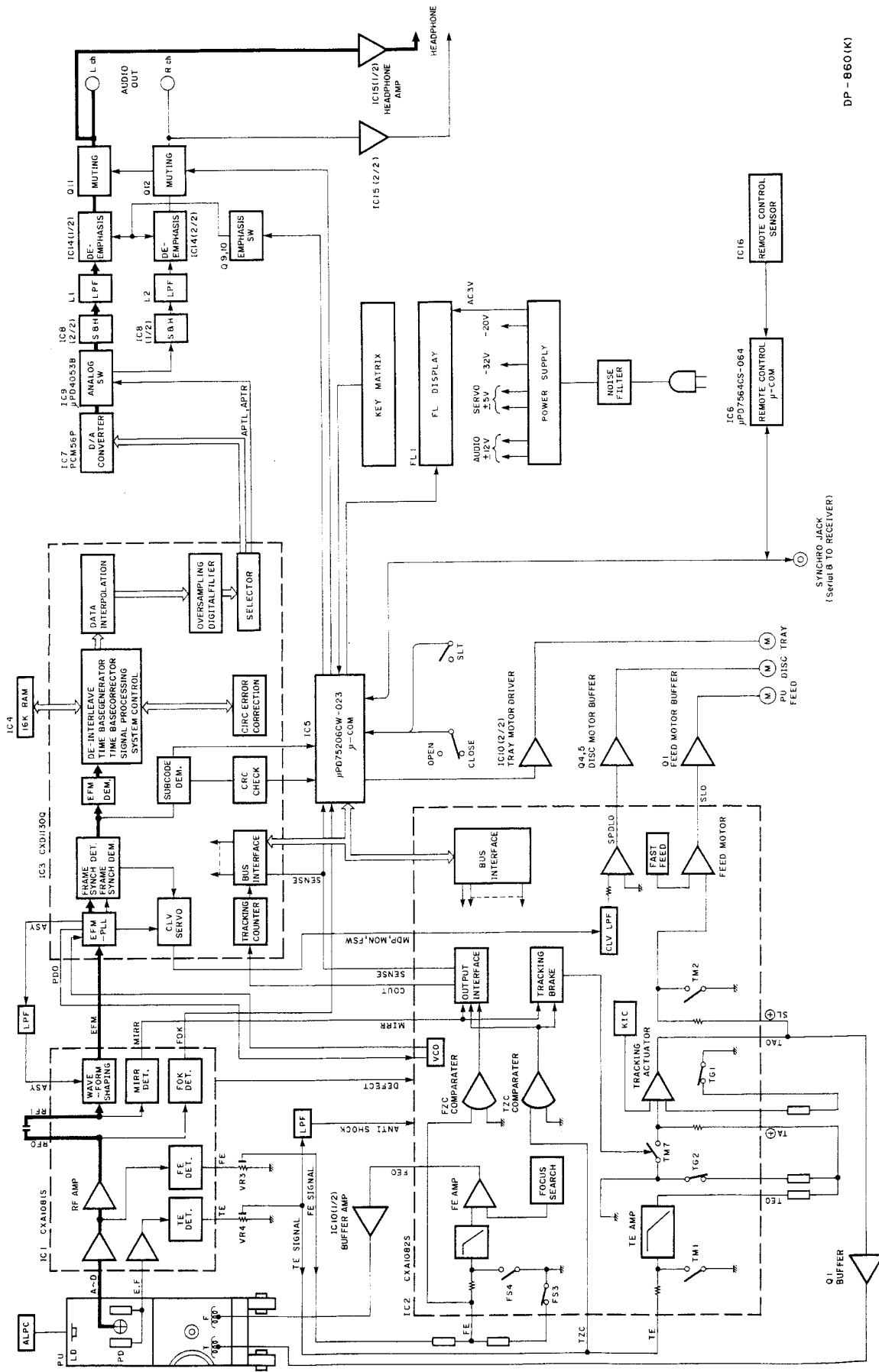
### REMOVING THE PICKUP

1. Push in the projection of the slider ass'y located at the bottom of the disc clamber as arrowed **9** here again.
2. While holding the projection pushed in, slowly pull the tray out as arrowed **10**.
3. Remove the laser pickup rail set screw **11**.
4. Move the rail as arrowed **12** and then slowly pull the laser pickup out as arrowed **13**.

**Note :** Be careful not to forcibly stretch the flexible PCB from the pickup which is also fixed to the mechanism chassis. When replacing the pickup, do not fail to firmly fix the flexible PCB to the clamping hook on the bottom side of the mechanism.



## BLOCK DIAGRAM



DP-860(K)

SYNCHRO JACK  
(SERIAL 8 TO RECEIVER)

## CIRCUIT DESCRIPTION

### 1. General description of microprocessor operation

#### 1-1. General description of operation

By whether TP9 and TP10 are shorted as shown in Fig. 1-1 or not at the time of power ON for this micro-computer, the subsequent operation of the microcomputer varies.

- **Test mode**

This mode is produced when the power is ON in the state where TP9 and TP10 are shorted. As this is the mode for repair and adjustment, it provides the following functions. Cancellation of this mode is made by OPEN of the tray, and normal mode is produced as a result.

- "ON" of focus servo only
- "ON" of focus servo and tracking servo
- "ON" of focus servo, tracking servo and feed servo
- PU feed at the time of LD "OFF"

- **Normal mode**

This is the mode as a usual function of DP-860. It provides the following functions.

- Tray OPEN/CLOSE
- PLAY/PAUSE
- STOP

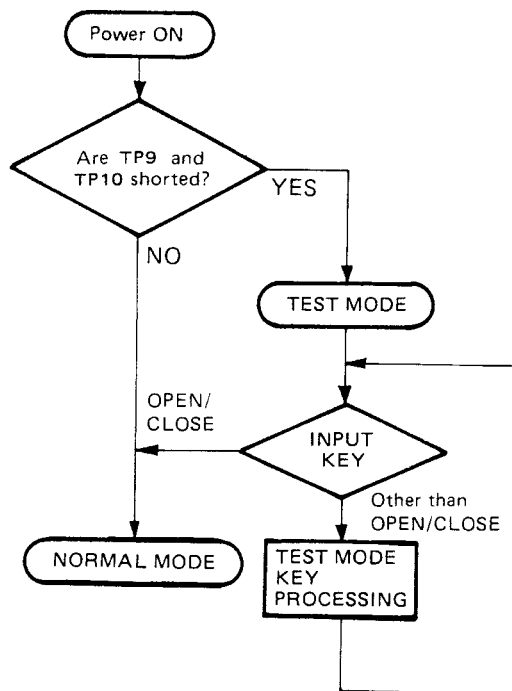


Fig. 1-1



## CIRCUIT DESCRIPTION

### 1-2. Key Description

#### ● Normal mode

Key name	Function
PLAY/PAUSE	<p>PLAY/PAUSE cyclic key</p> <ul style="list-style-type: none"> <li>• Tray OPEN . . . . . Normal PLAY after tray CLOSE</li> <li>• STOP (without memory) . . . . . Cueing the nearest tune then normal PLAY</li> <li>• STOP (with memory) . . . . . Memory PLAY (after 4-second interval)</li> <li>• STOP (after numeric key input) . . . . . Cueing designated tune then PLAY</li> <li>• STOP (after UP/DOWN input) . . . . . Cueing designated tune then PLAY</li> <li>• PLAY . . . . . PAUSE</li> <li>• PAUSE . . . . . PLAY</li> <li>• Tray CLOSE (no disc) . . . . . No change</li> </ul>
STOP	<p>STOP key</p> <ul style="list-style-type: none"> <li>• Switches OFF the laser and returns the PU (Pickup) to the start position.</li> </ul>
SKIP UP (▶▶)	<p>Cueing (advances to the beginning of) the next tune or count UP key of the Track No.</p> <ul style="list-style-type: none"> <li>• Tray OPEN . . . . . Count Up the Track No. (1~99)</li> <li>• STOP . . . . . Count Up the Track No. (1~99)</li> <li>• Normal PLAY . . . . . Cueing the next Track No. then PLAY</li> <li>• Normal PAUSE . . . . . Cueing the next Track No. then PAUSE</li> <li>• Memory PLAY . . . . . Cueing the next CH (channel) then memory PLAY</li> <li>• Memory PAUSE . . . . . Cueing the next CH then memory PAUSE</li> <li>• Press once (within 0.5 sec) . . . . . 1-count Up</li> <li>• Press continuously . . . . . 1-count Up every 0.3 sec.</li> <li>• From maximum tune . . . . . To minimum tune</li> </ul>
SKIP DOWN (◀◀)	<p>Return to the beginning of the current tune or the previous tune, or count DOWN key of the Track No.</p> <ul style="list-style-type: none"> <li>• Tray OPEN . . . . . Count DOWN the Track No.</li> <li>• STOP . . . . . Count DOWN the Track No.</li> <li>• Normal PLAY . . . . . Cueing the Track No. then PLAY</li> <li>• Normal PAUSE . . . . . Cueing the Track No. then PAUSE</li> <li>• Memory PLAY . . . . . Cueing the CH then memory PLAY</li> <li>• Memory PAUSE . . . . . Cueing the CH then memory PAUSE</li> <li>• Press once (within 0.5 sec) . . . . . 1-count DOWN or cueing the current tune</li> <li>• Press continuously . . . . . 1-count DOWN every 0.3 sec.</li> <li>• Press twice (press again within 0.5 sec.) . . . . . Cueing the previous tune</li> <li>• From minimum tune . . . . . To maximum tune</li> </ul>
OPEN/CLOSE	<p>Open/Close key for the tray</p> <ul style="list-style-type: none"> <li>• Clear the memory</li> </ul>
MEMORY	<p>Memory key for random access</p> <ul style="list-style-type: none"> <li>• Memory only the Track No. (Compatible with 99 Track No. in maximum)</li> <li>• Up to 20CHs can be memorized</li> <li>• Memory possible only in STOP mode</li> <li>• Memory from 1 CH in order</li> <li>• Numeric keys . . . . . Memory possible</li> <li>• UP/DOWN key . . . . . Memory possible</li> <li>• After memorizing 20 CHs, pressing UP/DOWN, numeric key or MEMORY ON will display the Track No.</li> </ul>
M-READ	<p>Each time the key is pressed, 1 CH to X CH data (maximum channel memorized) is read out in turn (3 sec. for each).</p>

## CIRCUIT DESCRIPTION

Key name	Function
REPEAT	Cyclic key designates the REPEAT ON/OFF <ul style="list-style-type: none"> <li>• Normal PLAY . . . . . PLAY entire disc repeatedly</li> <li>• Memory PLAY . . . . . PLAY memorized tunes repeatedly</li> </ul>
MANUAL SEARCH FF (▶▶)	Fast-forward play (search) key <ul style="list-style-type: none"> <li>• During PLAY or Memory PLAY . . . During pressed, fast-forward playback, then PLAY from position pressed OFF.</li> <li>• During PAUSE or Memory PAUSE. . . During pressed, fast-forward playback, then PAUSE from position pressed OFF.</li> </ul>
MANUAL SEARCH FB (◀◀)	Fast-backward play (search) key <ul style="list-style-type: none"> <li>• During PLAY or Memory PLAY . . . During pressed, fast reverse playback, then PLAY from position pressed OFF.</li> <li>• During PAUSE or Memory PAUSE. . . During pressed, fast reverse playback, then PAUSE from position pressed OFF.</li> </ul>
NUMERIC INPUT KEY	Number input key <ul style="list-style-type: none"> <li>• Tray OPEN . . . . . Pressing a numeric key, then PLAY key to directly access the designated tune and normal PLAY.</li> <li>• STOP . . . . . Pressing a numeric key, then PLAY key to directly access the designated tune and normal PLAY.</li> <li>• STOP . . . . . Pressing a numeric key the MEMORY key stores the number</li> <li>• Normal PLAY . . . . . Directly access the designated tune, then normal PLAY.</li> <li>• Memory PLAY . . . . . Ignored</li> </ul> If the tune number input by numeric key does not exist on the disc, direct search displays for 2 sec., then searches the max or min tune.





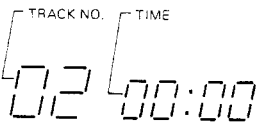
### • Test mode display

Input key	Function	Display	Remarks
While short-circuit the TEST pin, turn the power ON (MODE 01)	Tray OPEN . . . . . Tray CLOSE.		Test mode display
	Tray CLOSE . . . . . Moves the pickup to the inner position to SLT ON and to the outer position slightly.		
	In MODE 01, operations display will be shown by pressing the following keys :		
	Tray CLOSE (with a disc loaded)		
	• PLAY key . . . . . PLAY (displayed TIME will differ depending on the pickup position).		
	• SKIP ▶▶ or M-READ key . . . Focus search → Focus ON → Disc motor ON → CLV ON		
	• MEMORY key . . . . . Focus search → Focus ON → Disc motor ON → CLV ON → Tracking ON		
	• MANUAL SEARCH key		
	FF ▶▶ . . . . . Kicks the pickup to the outer position (disc STOP)		
	FB ◀◀ . . . . . Kicks the pickup to the inner position (disc STOP)		
• REPEAT key . . . . . Tray OPEN and laser diode ON			
• Numeric keys (0~9), SKIP ◀◀ or STOP . . . .Invalid			






## CIRCUIT DESCRIPTION

Input key	Function	Display	Remarks
<b>REPEAT (MODE 02)</b>	<p>Used to check the power of the laser diode.            Tray OPEN and LD (laser diode) ON.            (MANUAL SEARCH, SKIP, MEMORY, M-READ, PLAY, PAUSE and numeric keys (0~9) are invalid.)            STOP key . . . . . LD OFF with tray opened.</p> <p><b>Note</b> : Special memory operation : In the 02 mode above, when the OPEN/CLOSE key is pressed with the STOP key ON, a special memory operation is entered. (Tray is left opened.)            When the OPEN/CLOSE key is pressed again, the tray will close and track no. 2, 6, 7, 8, 10 and 13 will be entered into memory. (with SONY Test Disc Type 4)</p> <p>With this condition, pressing the PLAY/PAUSE key will play the above tunes in the other above.            OPEN/CLOSE . . . . . Normal mode resumes.</p>		Laser diode power check
<b>M-READ (MODE 03)</b>	<p>Focus ON (tracking, feed OFF)            When focus is OFF, performs in the following order :            Focus search → Focus ON → Disc motor ON → CLV ON</p> <p>In MODE 03, operation and display when the following key is pressed.</p> <ul style="list-style-type: none"> <li>PLAY key . . . . . PLAY</li> <li>SKIP ◀◀ key or MEMORY key . . . . . Tracking ON</li> <li>M-READ key . . . . . No change</li> <li>REPEAT . . . . . Invalid</li> <li>Numeric keys . . . . . Invalid</li> </ul> <p>When display appears by pressing the MANUAL SEARCH key ▶▶ or ◀◀, pressing the STOP key resumes MODE 01.</p>		Tracking error adjustment
<b>MEMORY (MODE 04)</b>	<p>Focus, tracking ON (Feed OFF)            When focus is OFF, performed in the following order :            Focus search → Focus ON → Disc motor ON → CLV ON → Tracking ON</p> <p>Operation and display when the following key is pressed in MODE 03.</p> <ul style="list-style-type: none"> <li>PLAY key or SKIP ▶▶ key . . . . . PLAY</li> <li>M-READ key or SKIP ◀◀ key . . . . . MODE 03</li> <li>MEMORY key . . . . . No change</li> <li>REPEAT key . . . . . Invalid</li> <li>Numeric key . . . . . Invalid</li> </ul> <p>When display appears by pressing the MANUAL SEARCH key ▶▶ or ◀◀, pressing the STOP key resumes MODE 01.</p>		

## CIRCUIT DESCRIPTION

Input key	Function	Display	Remarks
<p>PLAY (MODE 05)</p>	<p>Focus, tracking, feed are ON</p> <p>When focus is OFF, performed in the following order :            Focus search → Focus ON → Disc motor ON → CLV ON →            → Tracking ON → Feed ON            □ Tracking OFF</p> <p>In Mode 05, operations display will be shown by pressing the following keys :</p> <ul style="list-style-type: none"> <li>• M-READ key . . . . . MODE 03</li> <li>• MEMORY key or SKIP ◀◀ key . . . . . MODE 04</li> <li>• PLAY key or SKIP ▶▶ key . No change</li> <li>• MANUAL SEARCH . . . . . In valid (◀◀, ▶▶)</li> <li>• 1 on numeric key . . . . . Kicks to 2-track outer position</li> <li>• 2 on numeric keys . . . . . Kicks to 4-track outer position</li> <li>• 3 on numeric keys . . . . . Kicks to 16-track outer position</li> <li>• 4 on numeric keys . . . . . Kicks to 32-track outer position</li> <li>• 5 on numeric keys . . . . . Kicks to 1000-track outer position</li> <li>• 6 on numeric keys . . . . . Kicks to 2-track inner position</li> <li>• 7 on numeric keys . . . . . Kicks to 4-track inner position</li> <li>• 8 on numeric keys . . . . . Kicks to 16-track inner position</li> <li>• 9 on numeric keys . . . . . Kicks to 32-track inner position</li> <li>• 0 on numeric keys . . . . . Kicks to 1000-track inner position</li> </ul> <p>When the display appears by pressing the REPEAT key, pressing the STOP key will resume MODE 01.</p>	  	
<p>OPEN/CLOSE (other than MODE 02)</p>	<p>Enters Memory mode.</p> <p>In MODE 01, pressing the OPEN/CLOSE key opens the tray.</p> <p>When the OPEN/CLOSE key is pressed again, tray is closed and enters the memory mode described in MODE 02 "Note".</p> <p>For MODE 03 to 05, the same way the above.</p>	 	

**Note**

<p>While short-circuiting TP9 (GND) and 10 (TS), turn the Power ON.</p>  <p>Test mode condition</p>	<p>REPEAT KEY ON</p>  <p>Laser Diode ON (Tray OPEN)</p>	<p>M-READ KEY ON</p>  <p>Focus ON (Tracking, feed OFF)            Tracking Error balance adjustment mode (Diffraction grating check)</p>	<p>MEMORY KEY ON</p>  <p>Focus, Tracking ON (Feed OFF)</p>	<p>PLAY KEY ON</p>  <p>Focus, Tracking and Feed ON.</p>
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# CIRCUIT DESCRIPTION

## 2. Microprocessor : $\mu$ PD75206CW-023 (X25-2920-XX : IC5)

### 2-1. Terminal connection diagram (Top view)

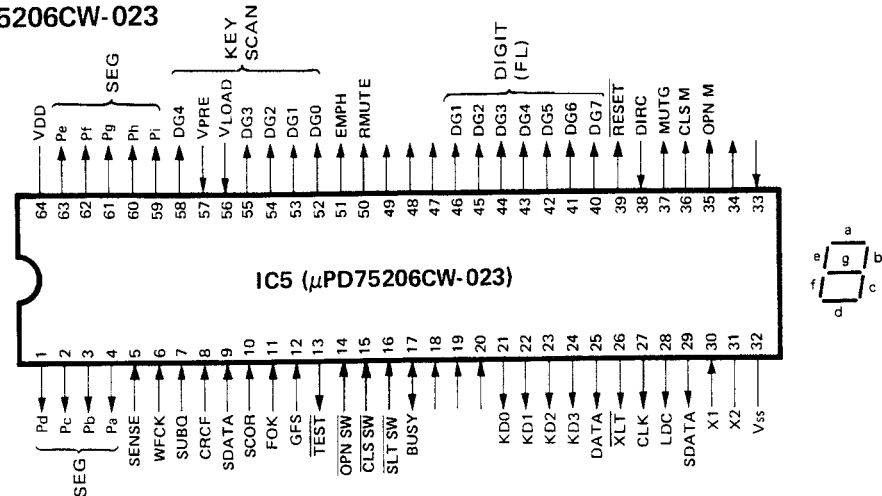


Fig. 2-1

### 2-2. Terminal Description

Terminal No.	Terminal Name	I/O	Description
1~4	Pd~Pa	O	Florescent display-tube segment signal output.
5	SENSE	I	SENSE signal input from CXD1130Q and CXA1082S.
6	WFCK	I	Q data clock signal.
7	SUBQ	I	Q data signal.
8	CRCF	I	Q data CRC OK signal ("H" : CRC OK)
9, 29	SDATA	I/O	Serial data input for synchronizing operation.
10	SCOR	I	Q data synchronizing signal interrupting (S0 + S1).
11	FOK	I	Focus OK signal ("H" : Focus OK).
12	GFS	I	EFM synchronizing signal from CXD1130Q. EFM signal read correctly when GFS is "H" in Tracking servo ON state.
13	TEST	I	Test mode detection terminal.
14	OPN SW	I	Tray OPEN signal ("L" : Tray OPEN).
15	CLS SW	I	Tray CLOSE signal ("L" : Tray CLOSE).
16	SLT SW	I	PU most inner position detect signal ("L" : most inner position).
17	BUSY	I/O	Synchronizing BUSY signal.
18~20			GND.
21~24	KD0~KD3	I	Key data signal.
25	DATA	O	Control data signal for CXD1130Q and CXA1082S.
26	XLT	O	Control data latch signal for CXD1130Q and CXA1082S.
27	CLK	O	Control data clock signal for CXD1130Q and CXA1082S.
28	LDC	O	Laser power ON signal ("L" : Laser ON).
30, 31	X1, X2		Clock OSC crystal connect terminal (4.2336MHz).
32	Vss		GND.
33, 34			Not connected.
35	OPNM	O	Tray motor OPEN signal.
36	CLSM	O	Tray motor CLOSE signal.
37	MUTG	O	Muting terminal control part of signal processor IC (CXD1130Q).
38	DIRC	O	DIRC terminal control port of Servo IC.
39	RESET	I	RESET signal.
40~47	DG7~DG1	O	Florescent display-tube grid signal.
48,49			Not connected.
50	RMUTE	O	Analog mute signal output.
51	EMPH	O	Emphasis signal output.
52~55,58	DG0~DG5	O	Key matrix signal.
56	VLOAD		-30V power supply for florescent display-tube.
57	VPRE		-5V power supply for florescent display-tube.
59~63	Pg~Pe	O	Florescent display-tube segment signal output.
64	VDD		+ 5V power supply.

Table 2-1

## CIRCUIT DESCRIPTION

### 2-3. Flow chart of test mode

- Flow chart from tray OPEN status after power ON

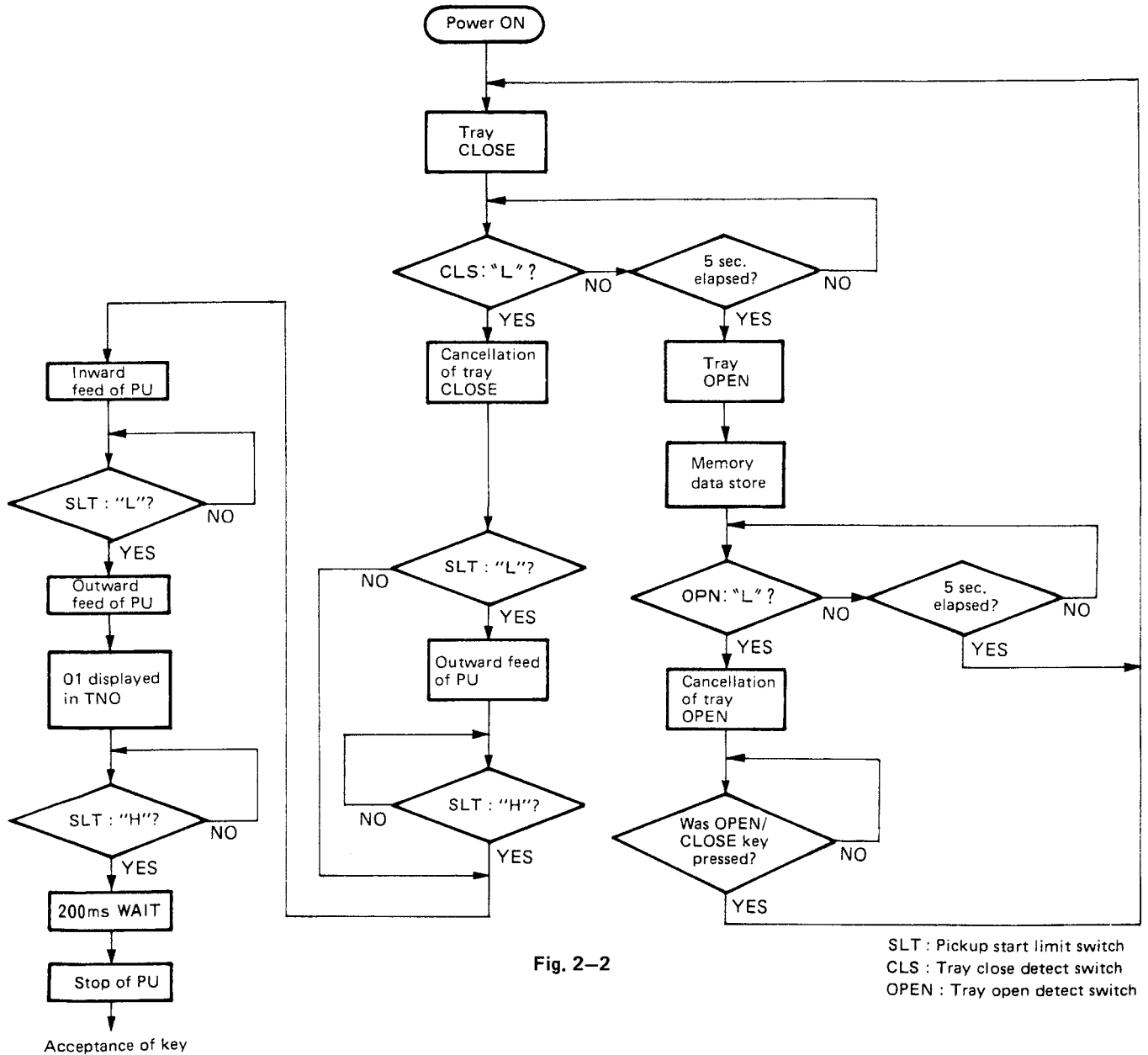


Fig. 2-2

CIRCUIT DESCRIPTION

- Focus search & focus servo ON

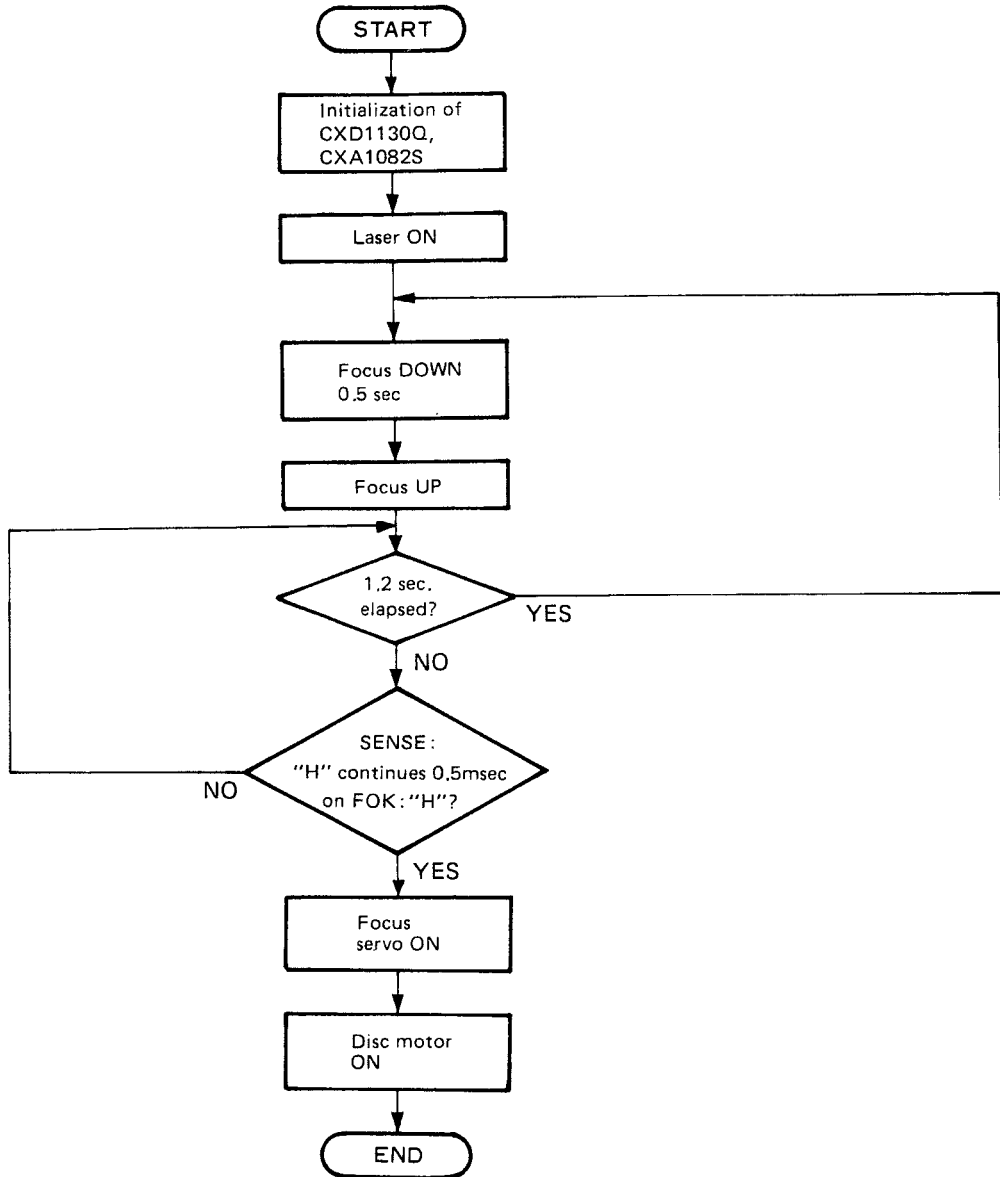


Fig. 2-3

## CIRCUIT DESCRIPTION

### • Tracking servo ON

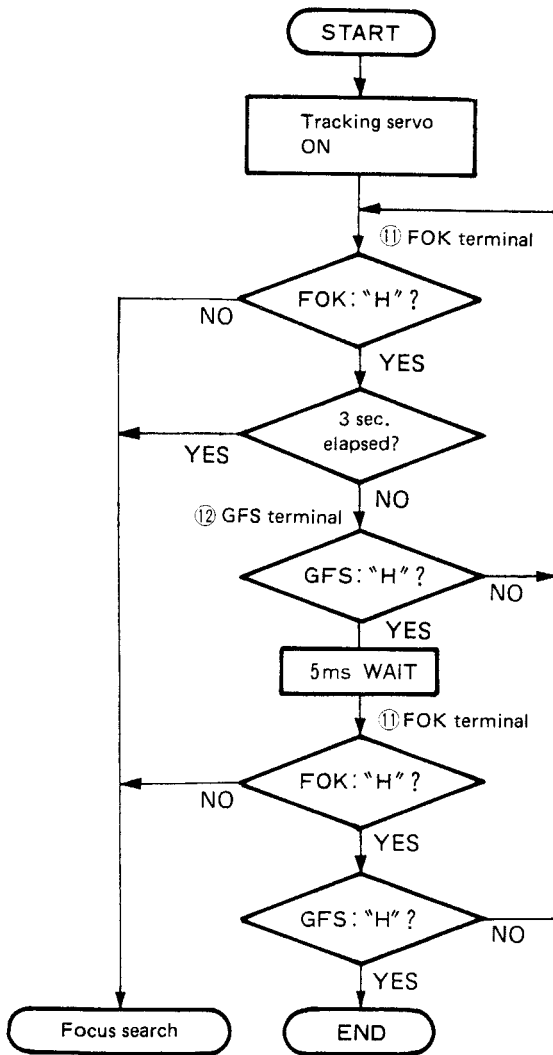


Fig. 2-4

### • Disc motor stop

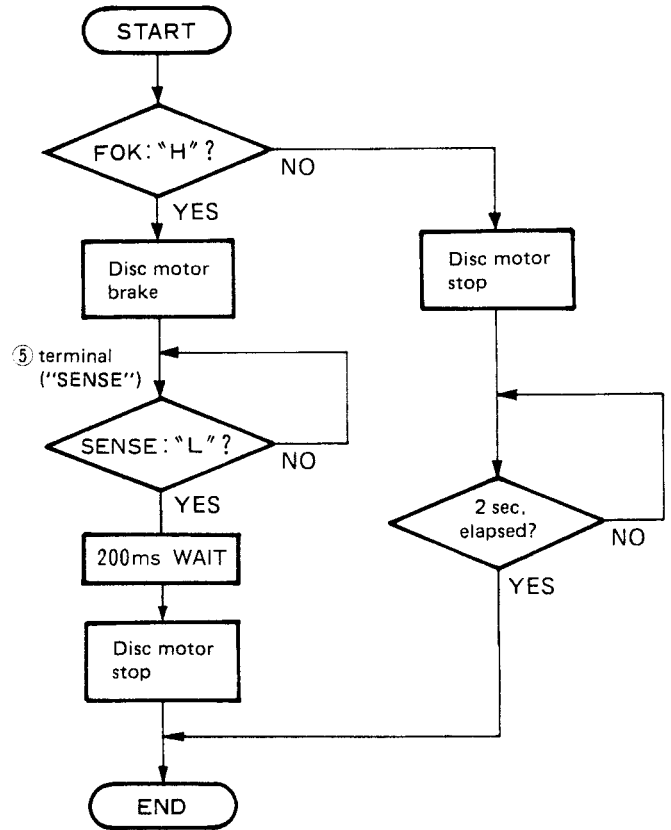


Fig. 2-5



## CIRCUIT DESCRIPTION

• From loading of Q data to display

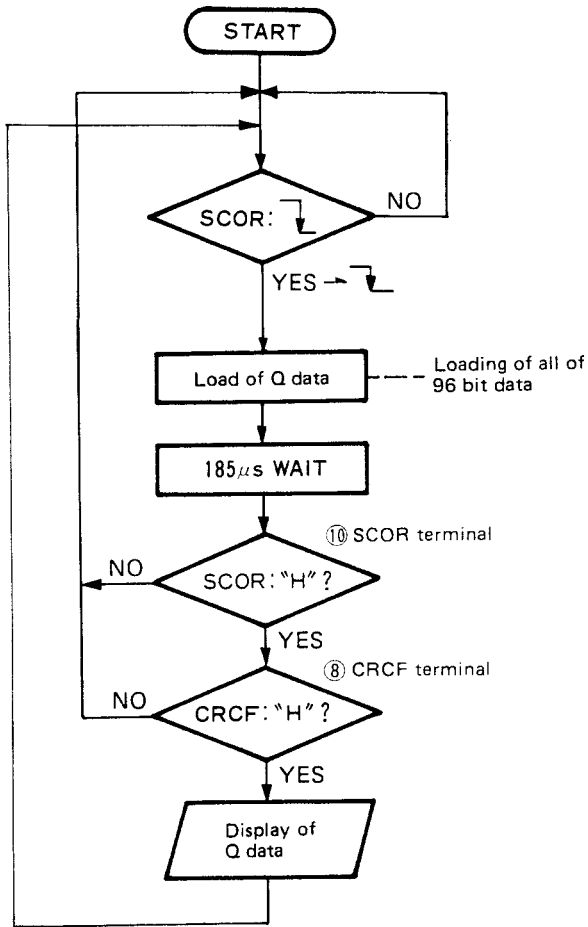


Fig. 2-6

2-4. In a usual case, since the tray was pushed when the tray is OPEN until STOP display is made.

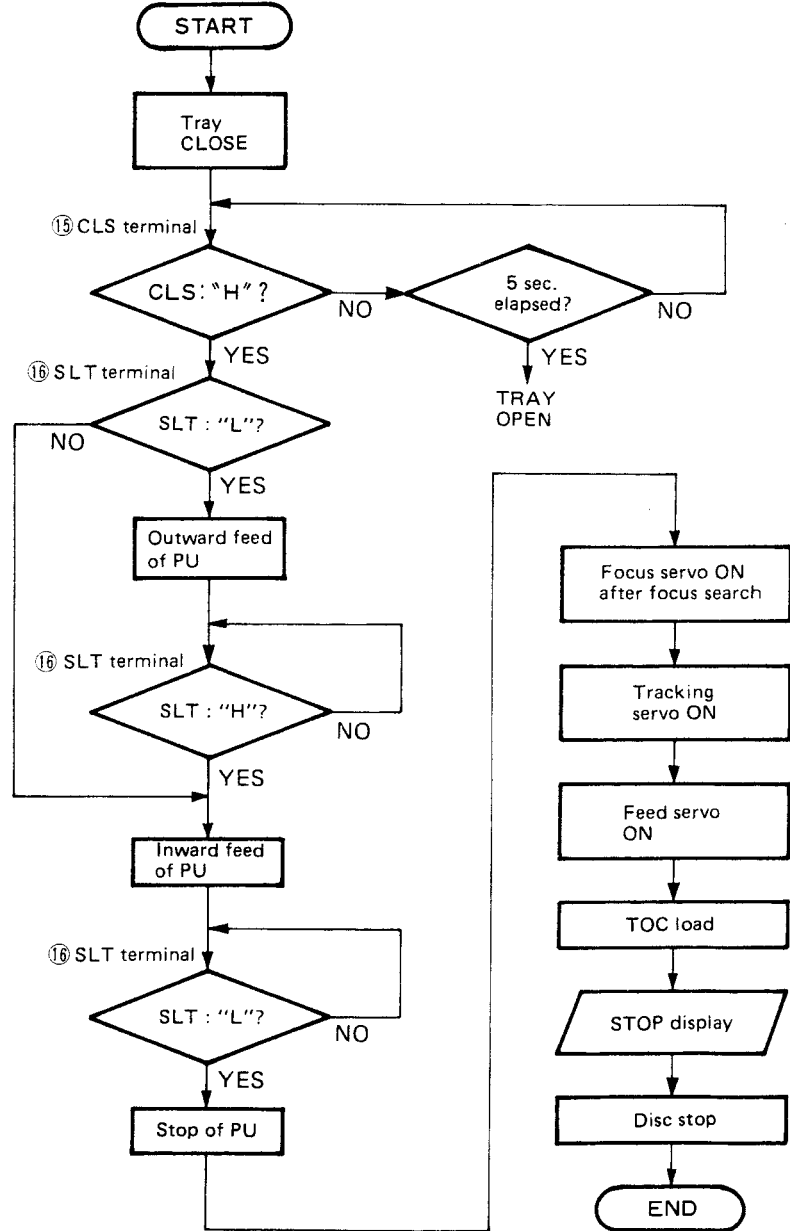


Fig. 2-7

## CIRCUIT DESCRIPTION

### 3. RF Amplifier : CXA1081S (X25-2920-XX : IC1)

### 3-2. Terminal connection diagram (Top view)

#### 3-1. Functions

- RF amplifier.
- Focus OK detection circuit.
- Focus error amplifier.
- Mirror detection circuit.
- Tracking error amplifier.
- Defect detection circuit.
- APC circuit.
- EFM comparator.
- Auto asymmetry control amplifier.

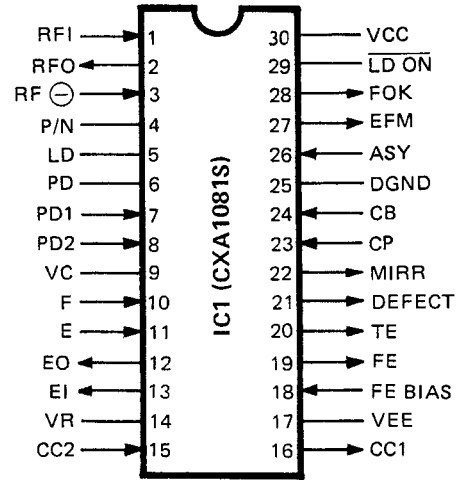


Fig. 3-1

### 3-3. Block diagram

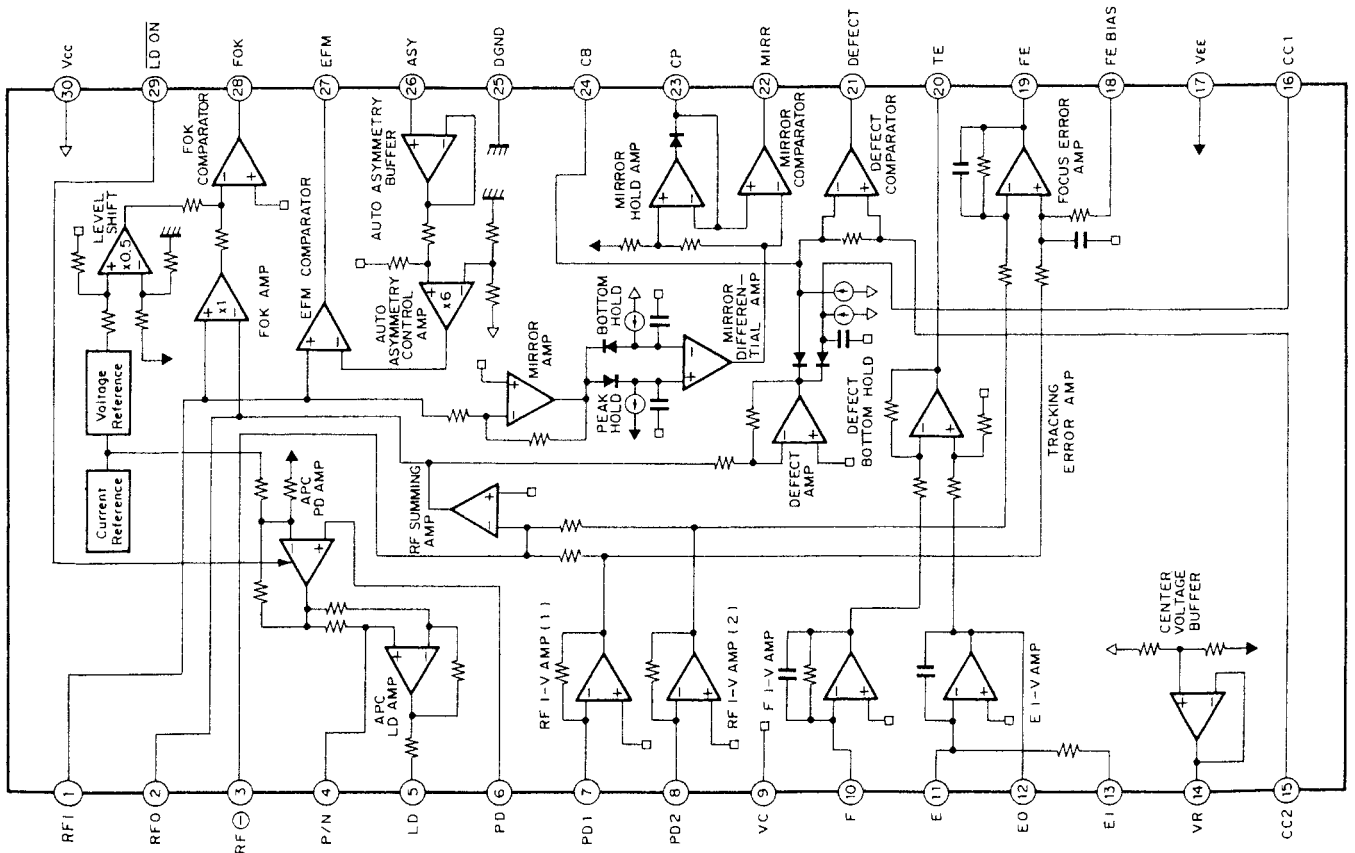


Fig. 3-2

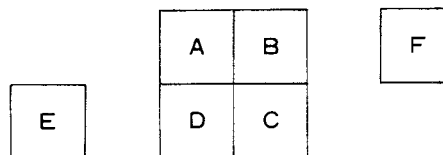
## CIRCUIT DESCRIPTION

### 3-4. Explanation of functions of components

Terminal No.	Terminal name	I/O	Functions	DC volt.
1	RFI	I	The output of the RF summing amplifier is coupled with C2 : 0.01 $\mu$ F.	0V
2	RFO	O	RF summing amplifier output. EYE pattern test point.	VRFO
3	RF -	I	RF summing amplifier inverted input. Connection of feedback CR to ③ - ④ .	0V
7	PD1	I	RF I-V amplifier (1) inverted input. Current input as connected to PIN diode A + C (Note 1).	0V
8	PD2	I	RF I-V amplifier (2) inverted input. Current input as connected to PIN diode B + D (Note 1).	0V
10	F	I	F I-V amplifier inverted input. Current input as connected to PIN diode F (Note 1).	0V
11	E	I	E I-V amplifier inverted input. Current input as connected to PIN diode E (Note 1).	0V
12	EO	O	E I-V amplifier output. Connection of feedback CR to ⑧ - ⑨ .	0V
13	EI	O	E I-V feedback input.	0V
15	CC2	I	The output of the DEFECT bottom hold is coupled with capacitor.	
16	CC1	O	DEFECT bottom hold output terminal.	
17	VEE	-	Negative power supply.	-5V
18	FE BIAS	I	Focus error amplifier non-inverted side bias terminal.	
19	FE	O	Focus error amplifier output.	VFEO
20	TE	O	Tracking error amplifier output.	VTEO
21	DEFECT	O	DEFECT comparator output.	
22	MIRR	O	Mirror output comparator output (active "H") Connection of load resistance (PNP open collector).	0V
23	CP	I	Mirror hold condenser (C12 : 0.033 $\mu$ F) connection terminal. Mirror comparator non-inverted input.	-2V
24	CB	I	DEFECT bottom hold condenser (C13 : 0.01 $\mu$ F) connection terminal.	
25	DGND	-	Digital GND.	0V
26	ASY	I	Auto asymmetry control input.	-
27	EFM	O	EFM output comparator output.	4.1V (OPEN)
28	FOK	O	Focus, servo permit output. Active at comparator output "H".	0V
30	Vcc	-	Positive power supply.	-2V

Table 3-1

#### Note 1 : Pattern of photodetector



## CIRCUIT DESCRIPTION

### 3-5. DEFECT Circuit

After the RFI signal is inverted, the signal is bottom-held by the two (long and short) time constants. The bottom-holding with the short time constants responds to the specular loss on the disc while the bottom-holding with the long time constants holds the mirror (specular) level immediately before the loss occurs. The results of these two processes are C-coupled, and differentiated and level-shifted, then the both signals are compared to generate the specular loss detecting signal.

Note : The DEFECT circuit is not used in this equipment.

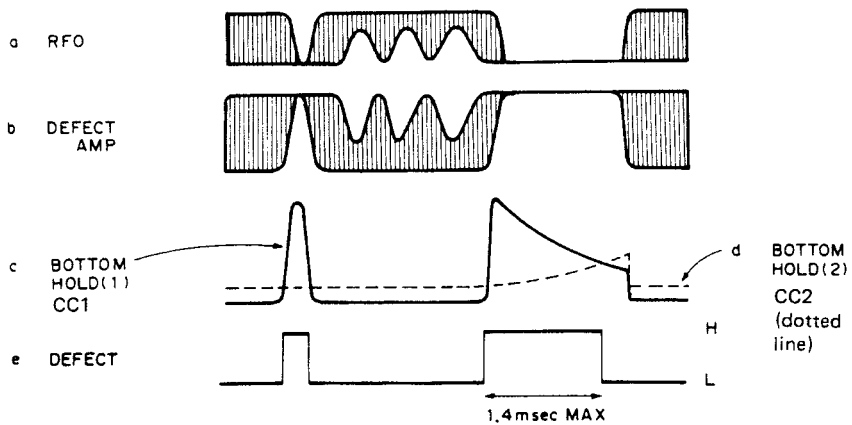
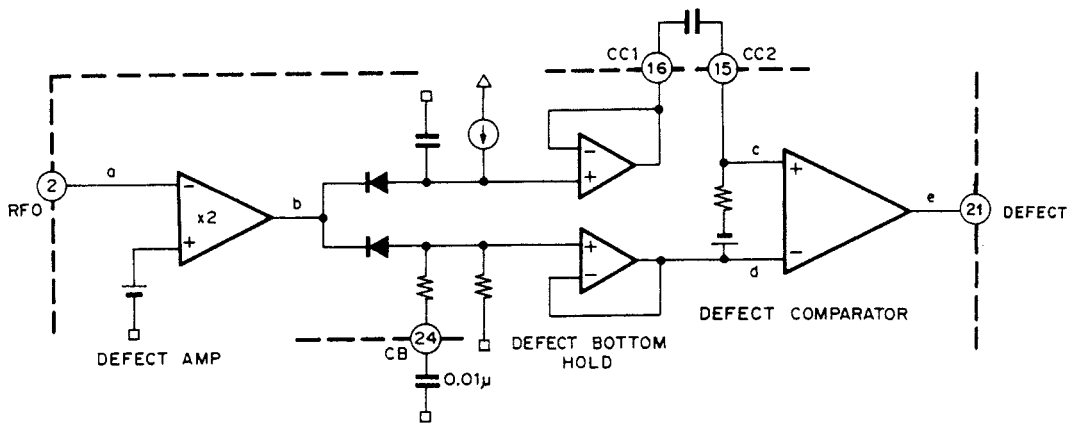


Fig. 3-3

## CIRCUIT DESCRIPTION

### 4. Servo signal processor : CXA1082S (X25-2920-XX : IC2)

#### 4-1. Functions

- Focus servo control.
- Tracking servo control.
- EFM clock reproducing PLL loop filter 8.64MHz, VCO
- Sled servo control.
- Auto sequencer with RAM.
- Spindle servo, LPF, drive amp.

#### 4-2. Terminal connection diagram (Top view)

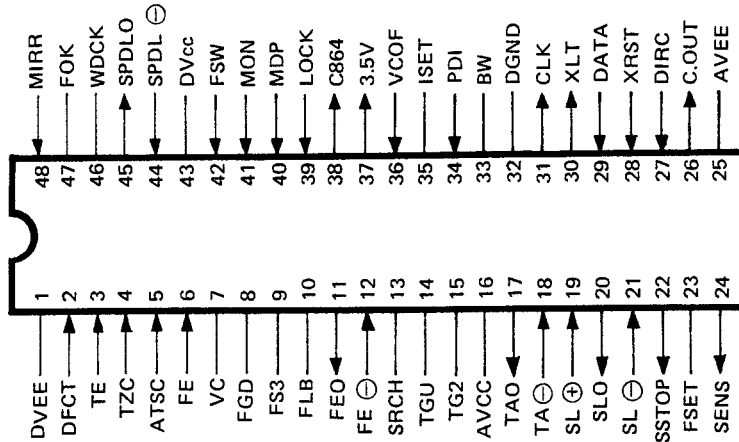


Fig. 4-1

#### 4-3. Block diagram

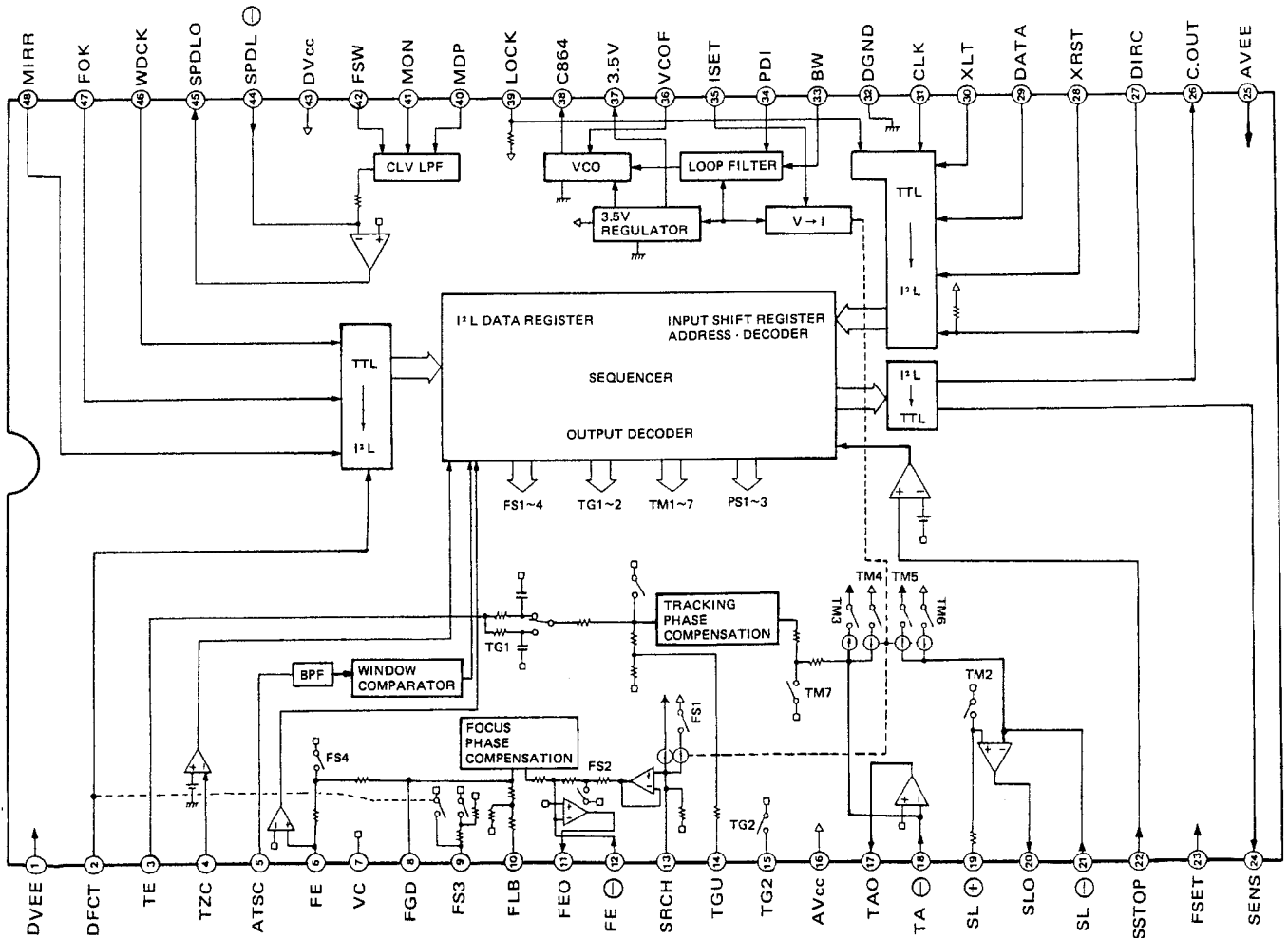


Fig. 4-2

## CIRCUIT DESCRIPTION

### 4-4. Explanation of terminals

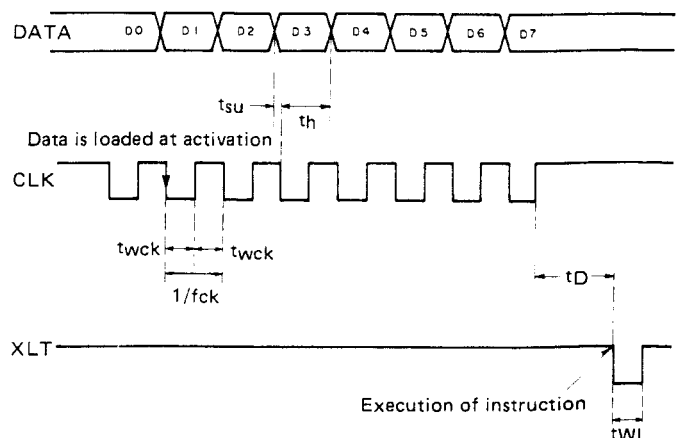
Terminal No.	Terminal name	I/O	Functions
1	DVEE	-	Power supply terminal (-5V).
2	DFCT	I	Input terminal for interface with $\mu$ -com.
3	TE	I	Input terminal of tracking error signal.
4	TZC	I	Input terminal of tracking zero cross comparator.
5	ATSC	I	Input terminal of window comparator for ATSC detector. Such information that a mechanical shock was applied to the player is input. Simply, a tracking error signal is input through BPF.
6	FE	I	Input terminal of focus error signal.
7	VC	-	
8	FGD	-	Connect the capacitor between FGD and FS3 when high frequency gain of focus servo is decreased.
9	FS3	-	Focus amplifier gain switching terminal.
10	FLB	-	Time constant terminal for lifting up the low frequency of focus servo.
11	FEO	O	Output of operational amplifier.
12	FE $\ominus$	I	Inverted input of focus operational amplifier.
13	SRCH	-	Time constant terminal for generating the focus search waveform.
14	TGU	-	Time constant terminal for switching the high frequency gain of tracking servo.
15	TG2	-	
17	TAO	O	Output of tracking operational amplifier.
18	TA $\ominus$	I	Inverted input of tracking operational amplifier.
19	SL $\oplus$	I	Non-inverted input of sled operational amplifier.
20	SLO	O	Output of sled operational amplifier.
21	SL $\ominus$	I	Inverted input of sled operational amplifier.
23	FSET	-	Set up terminal of peak of phase compensation of tracking & focus and fo of CLV's LPF.
24	SENS	O	Output terminal for interface with microprocessor. Output of SSP internal status that corresponds to ADDRESS of CPU $\rightarrow$ SSP. (Changes in accordance with ADDRESS content of internal serial register).
26	C.OUT	O	Output terminal for interface with microprocessor. Signal output for counting number of tracks at the time of high speed access.
27	DIRCT	I	Input terminal for interface with microprocessor. Used at the time of one track jump. Normally "H". The direction of the track jump pulse is reversed with "L". Setting is made in the normal tracking mode by changing to "H", "L" for a fixed length of time with detection of activation, deactivation of TZC.
28	XRST	I	Input terminal for interface with microprocessor. All internal register are cleared when CPU $\rightarrow$ SSP "L".
29	DATA	I	Input terminal for interface with microprocessor. Serial data transmission of CPU $\rightarrow$ SSP. Input is made from LSB D0~D7.
30	XLT	I	Latch of serial data of CPU $\rightarrow$ SSP. (Then contents of internal serial register are transmitted to each address decoder latch.) Transmission at "L". Change to "H" occurs immediately after execution because no edge trigger is produced.
31	CLK	I	CPU $\rightarrow$ SSP serial data transmission clock. Data is read at falling edge. "H" level before and after transmission.
33	BW	-	Time constant of loop filter in terminated.
34	PDI	I	Phase compensation input of EFM signal from PD0 of signal processor IC CXD1130Q.
35	ISET	-	Setting of current level for determining focus search voltage, tracking jump voltage and sled kick voltage.
36	VCOF	I	VCO adjustment terminal.
37	3.5V	O	3.5V regulator output.
38	C864	O	VCO output terminal (8.64MHz).
39	LOCK	I	GFS signal input terminal.
40	MDP	I	Drive input of spindle motor. Rough speed control in CLV-S mode and phase control in CLV-P mode.
41	MON	I	ON/OFF control input of spindle motor.
42	FSW	I	Time constant switching input of output filter of spindle motor.
44	SPDL $\ominus$	I	Inverted input terminal of spindle drive amplifier.
45	SPDLO	O	Output terminal of spindle motor operational amplifier for current booster amp. Q3 and Q4.
48	MIRR	I	Mirror signal input from RF amplifier.

#### Note 1 : SENSE terminal output

Serial data upper 4 bits	ADDRESS content	SENSE terminal output	Explanation
0 0 0 0	FOCUS CONTROL	FZC	"H" when focus zero cross. Focus error voltage is 0V or higher. Used at the time of FOCUS PULL operation.
0 0 0 1	TRACKING CONTROL	AS	"H" when the ATSC input level exceeds the wind comparator level ( $V_{TH} = \pm V_{CC} \times 13\%$ ). But this is not used in this equipment.
0 0 1 0	TRACKING MODE	TZC	Judgement output of positive or negative of tracking zero cross, tracking error. When used at the time of single track jump, DIRC is reduced to "L" on detection of TZC $\uparrow$ , in FWD JUMP or on detection of TZC $\downarrow$ in REV JUMP.

Table 4-1

#### Note 2 : Digital unit timing chart



# CIRCUIT DESCRIPTION

## 5. Digital signal processor : CXD1130Q (X25-2920-XX : IC3)

### 5-1. Functions

- Reproducing of bit clock by EFM-PLL circuit.
- Demodulation of EFM data.
- Detection, protection and interpolation of frame synchronizing signal.
- Error detection, correction.
- Interpolation by mean value or holding previous value.
- Demodulation of sub code signals, detection of error in sub code Q.
- CLV servo of disc motor
- Tracking counter of 8 bits.
- CPU interface by serial bus.
- Register for sub code Q.
- Digital filter (CXD1130Q).
- Output for digital audio interface (CXD1125Q).

### 5-2. New auto servo

Comparing with the conventional LSI CX23035, a new auto servo mode called "CLV-A' " is added to the CLV servo control system, as a new feature.

The difference between the CLV-A' and the conventional CLV-A lays on the rough servo system. In the conventional rough servo system, since an EFM pattern is measured with the crystal, and servo control is applied so that the width of the sync pattern becomes a fixed value, the revolution of the spindle motor was roughly fixed. In this case, if the value is obtained out of the capturing range of VCO, it's impossible to lock the VCO to be synchronized with EFM signal.

In the new rough servo system, the EFM pattern is measured by VCO instead of crystal. With this method, if the center of VCO is deflected, since the rotation of the spindle motor will vary in the same direction, VCO can be locked with EFM signal easier.

The new rough servo system is only adopted when CLV-A' is used. The conventional rough servo system is used for rough servo control used in CLV-A mode or CLV-S mode. For other specifications, refer to the description on "Digital signal processing IC (CX23035)" in the Service Manual of the DP-770D.

### 5-3. Terminal connection diagram (Top view)

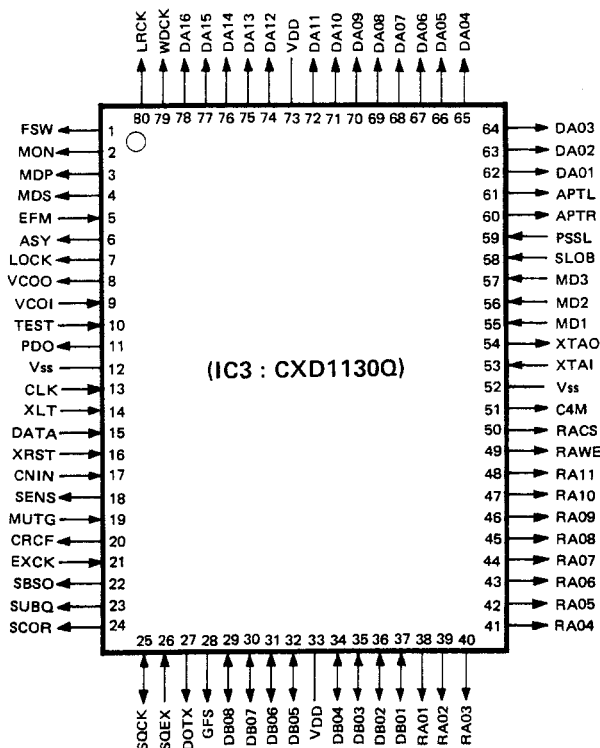


Fig. 5-1

### 5-4. Block diagram

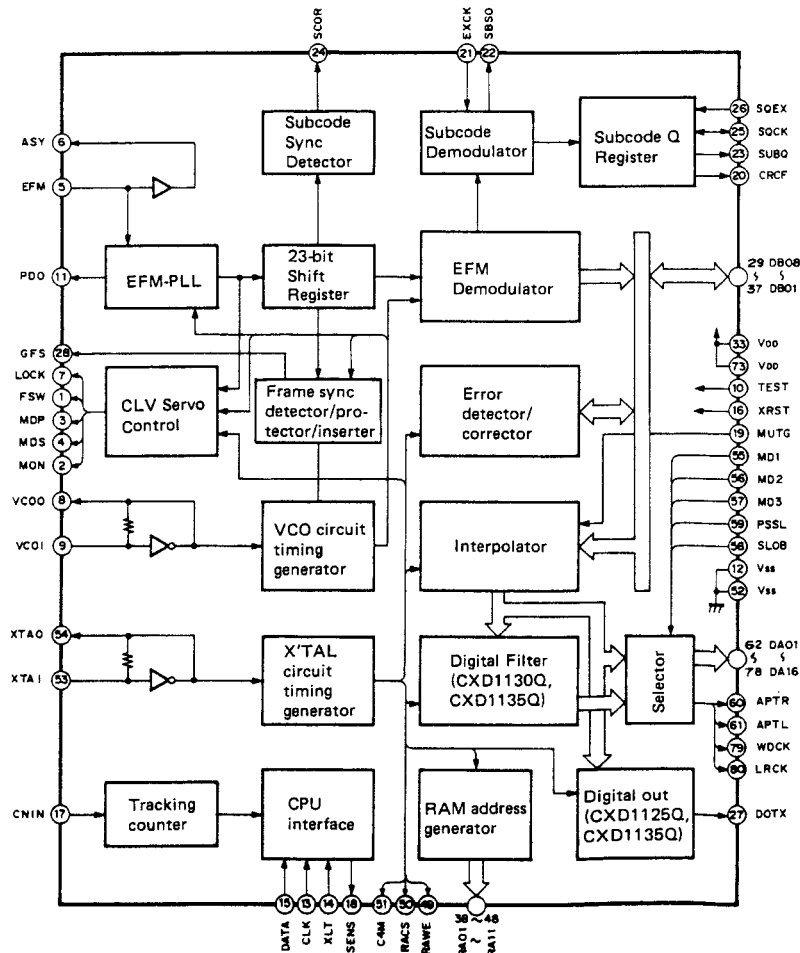


Fig. 5-2

## CIRCUIT DESCRIPTION

### 5-5. Explanation of terminals

Terminal No.	Terminal name	I/O	Function
1	FSW	O	Time constant switching output of output filter of spindle motor. (Disc motor).
2	MON	O	ON/OFF control output of spindle motor.
3	MDP	O	Drive output of spindle motor. Rough speed control in CLV-S mode and phase control in CLV-P mode.
4	MDS	O	Drive output of spindle motor. Speed control in CLV-P mode.
5	EFM	I	EFM signal input from RF amplifier.
6	ASY	O	Output for controlling the slice level of EFM signal.
7	LOCK	O	GFS signal is sampled at WFCK/16. "H" is output at "H". "L" is output when "L" for eight times running.
8	VCOO	O	VCO output. $f = 8.6436\text{MHz}$ when locked to EFM signal.
9	VCOI	I	VCO input.
10	TEST	I	(0V)
11	PDO	O	Phase comparison output of EFM signal and VCO/2.
12	Vss	-	GND (0V)
13	CLK	I	Serial data transmission clock input from CPU. Data is latched at rising edge of a clock.
14	XLT	I	Latch input from CPU. Data (serial data from CPU) from the 8 bit shift register is latched in each register.
15	DATA	I	Serial data input from CPU.
16	XRST	I	System reset input. Reset at "L".
17	CNIN	I	Input of tracking pulse.
18	SENSE	O	Output of internal status in correspondence to the address.
19	MUTG	I	Muting input. In the case where ATTM of internal register A is "L", normal status when MUTG is "L" or soundless state when it is "H".
20	CRCF	O	Output of result of CRC check of sub code Q.
23	SUBQ	O	Sub code Q output.
24	SCOR	O	Sub code sync SO + SI output.
25	SQCK	I/O	Read clock of sub code Q.
26	SQEX	I	Select input of SQCK.
27	DOTX	O	Output of digital out (WFCK is output when CXD1130Q or "DO" is off).
28	GFS	O	Output of display of lock status of frame sync.
29	DB08	I/O	Data terminal of external RAM. DATA 8 (MSB)
30	DB07	I/O	Data terminal of external RAM. DATA 7
31	DB06	I/O	Data terminal of external RAM. DATA 6
32	DB05	I/O	Data terminal of external RAM. DATA 5
33	VDD	-	Power supply (+ 5V)
34	DB04	I/O	Data terminal of external RAM. DATA 4
35	DB03	I/O	Data terminal of external RAM. DATA 3
36	DB02	I/O	Data terminal of external RAM. DATA 2
37	DB01	I/O	Data terminal of external RAM. DATA 1 (LSB)
38	RA01	O	Address output of external RAM. ADDR01 (LSB)
39	RA02	O	Address output of external RAM. ADDR02
40	RA03	O	Address output of external RAM. ADDR03
41	RA04	O	Address output of external RAM. ADDR04
42	RA05	O	Address output of external RAM. ADDR05
43	RA06	O	Address output of external RAM. ADDR06
44	RA07	O	Address output of external RAM. ADDR07
45	RA08	O	Address output of external RAM. ADDR08
46	RA09	O	Address output of external RAM. ADDR09
47	RA10	O	Address output of external RAM. ADDR10
48	RA11	O	Address output of external RAM. ADDR11 (MSB)
49	RAWE	O	Write Enable signal output to external RAM. (active at "L").
50	RACS	O	Chip select signal output to external RAM. (active at "L").

Table 5-1



## CIRCUIT DESCRIPTION

Terminal No.	Terminal name	I/O	Function
52	Vss	—	GND (0V)
53	XTAI	I	X'tal oscillation circuit input. f = 8.4672MHz
54	XTAO	O	X'tal oscillation circuit output. f = 8.4672MHz
58	SLOB	I	Audio data output code switching input. 2's complement output at "L".
59	PSSL	I	Audio data output mode switching input. Serial output at "L".
70	PLCK	O	DA09 output when PSSL = "H". PLCK output when PSSL = "L".
76	C21 $\bar{O}$	O	DA14 output when PSSL = "H". C21 $\bar{O}$ output when PSSL = "L".
78	DATA	O	DA16 (MSB of parallel voice data) when PSSL = "H". DATA output when PSSL = "L".
79	WDCK	O	Strobe signal output. 176.4kHz at DF is ON. 88.2kHz at CXD1130Q or DF is OFF.
80	LRCK	O	Strobe signal output. 88.2kHz at DF is ON. 44.1kHz at CXD1130Q or DF is OFF.

Table 5-1

**Note :**

C1F1 : } Monitor output of error correction status  
 C1F2 : } in C1 decode.  
 C2F1 : } Monitor output of error correction status  
 C2F2 : } in C2 decode.  
 UGFS : Output of unprotected frame sync pattern.  
 WFCK : Inverted output of WFCK.  
 FCKV : Output of WFCK/4 or WFCK/8.  
 FCKX : Output of RFCK/4 or RFCK/8.  
 DF OFF/ON : Digital filter OFF/ON.  
 DO OFF/ON : Digital out OFF/ON.

PLCK : VCO/2 output. f = 4.3218MHz when locked to EFM signal.  
 C4LR : 176.4kHz strobe signal.  
 DENL : Enable signal of L ch serial data.  
 DENR : Enable signal of R ch serial data.  
 C21 $\bar{O}$  : Inverted output of C21O.  
 C21O : Bit clock output. f = 2.1168MHz  
 DATA : Serial data output of audio signal.

### 6. D/A Converter : PCM56P (X25-2920-XX : IC7)

#### 6-1. Block diagram/ Terminal connection diagram

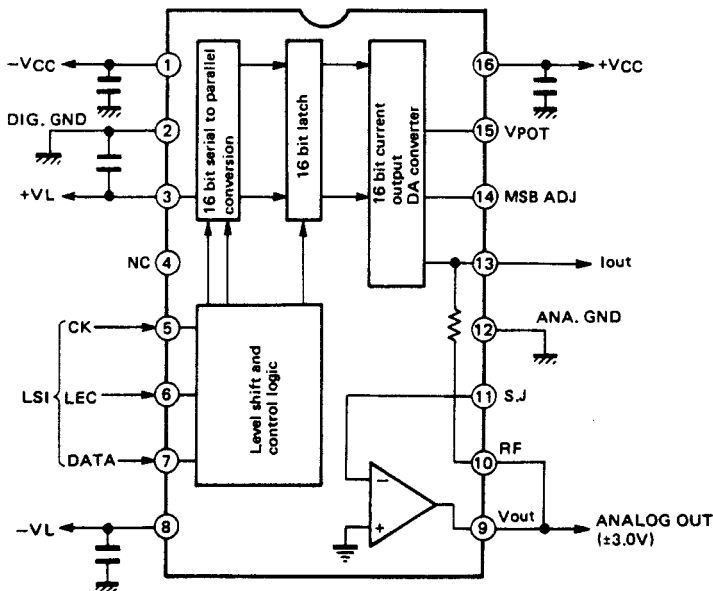


Fig. 6-1

#### 6-2. Explanation of terminals

Terminal No.	Terminal name	Function
1	-Vcc	Analog negative power supply.
2	DIG GND	Digital ground.
3	+VL	Logic positive power supply.
4	NC	No connection.
5	CK	Clock input.
6	LEC	Latch enable control input.
7	DATA	Data input.
8	-VL	Logic negative power supply.
9	Vout	Voltage output.
10	RF	Feedback resistor.
11	S.J	Summing junction (op amp. input).
12	ANA GND	Analog ground.
13	Iout	Current output.
14	MSB ADJ	MSB adjustment terminal.
15	VPOT	Potentiometer terminal.
16	+Vcc	Analog positive power supply.

Table 6-1

## CIRCUIT DESCRIPTION

### 7. Description of Components

#### 7-1. ELECTRIC UNIT (X25-2920-00, -21)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (CXA1081S)	RF amplifier	Generates a focus error signal, a tracking error signal, and a RF signal. This also provides a phase and an automatic symmetry correction capabilities. (See the description of CXA1081S for details.)
IC2 (CXA1082S)	Servo IC	Generates "search" pulses for addressing the focus servo, tracking servo, or drive motor servo. (See the description of CXA1082S for details.)
IC3 (CXD1130Q)	Signal processing IC	See the description of CXD1130Q for details.
IC4	S-RAM	Error correction, de-interleave, jitter absorption.
IC5	Main microprocessor	Controls display and system operation. Refer to the circuit description of $\mu$ PD75206CW-023 for details.
IC6	Remocon $\mu$ -com	
IC7	D/A converter	
IC8	Operation amplifier	Sample holding amplifier.
IC9	Analog switch	Used as the switch for the sample holding circuit.
IC10	Operation amplifier	(1/2) : Focus actuator driver. (2/2) : Tray motor driver.
IC11	Operation amplifier	(1/2) : +5.6V regulator for analog line. (2/2) : -5.6V regulator for analog line.
IC12	Operation amplifier	(1/2) : +5V regulator for digital line. (2/2) : -5V regulator for digital line.
IC13	Operation amplifier	(1/2) : +5.6V regulator for positive logic line of D/A converter. (2/2) : -5.6V regulator for negative logic line of D/A converter.
IC14	Operation amplifier	(1/2) : Provides L-ch, de-emphasis circuit and output amplifier. (2/2) : Provides R-ch, de-emphasis circuit and output amplifier.
IC15	Operation amplifier	(1/2) : Headphone amplifier for L-ch. (2/2) : Headphone amplifier for R-ch.
Q1	Tray motor, tracking coil and feed motor drive	Current booster.
Q2,3	Focus coil drive	Current booster.
Q4,5	Disc motor drive	Current booster.
Q8	Inverter	Invert of mute signal.
Q9,10	Switch	Select of emphasis.
Q11,12	Switch	
Q13,17	AVR	Control transistor for +5V of digital line.
Q14	AVR	Control transistor for -5V of digital line.
Q15	AVR	Control transistor for -5V of analog line.
Q16	Switch	Generates the RESET signal of IC6. Reset at "H".

## MECHANISM OPERATION DESCRIPTION

### Mechanism operation description

Fig. 1 shows the mechanism positioning in the STOP mode. The OPEN/CLOSE operation when loading the disc is described below.

**Note :**

In the operation description, the black and white arrows shows the following code :

**Black arrow :** Shows the opening direction of the tray (Tray OPEN).

**White arrow :** Shows the closing direction of the tray (Tray CLOSE).

Also in the operation description and illustrations, numbers in brackets ( ) followed by the part name show the identifying numbers of the disassembly diagram in the Service Manual.

### 1. OPEN/CLOSE operation

The center of the OPEN/CLOSE lug detection leaf switch installed on the PC board (J25-5506-02(A/3)) on the rear of the mechanism is pressed to the right by lower side of the tip of the black switch arm (6) installed on the slider ass'y (11) when the tray is closed, and the information is transferred to the microprocessor. This status is called the tray CLOSE operation. The operation from this status to the condition when the tray is completely opened by pressing the OPEN/CLOSE key is described.

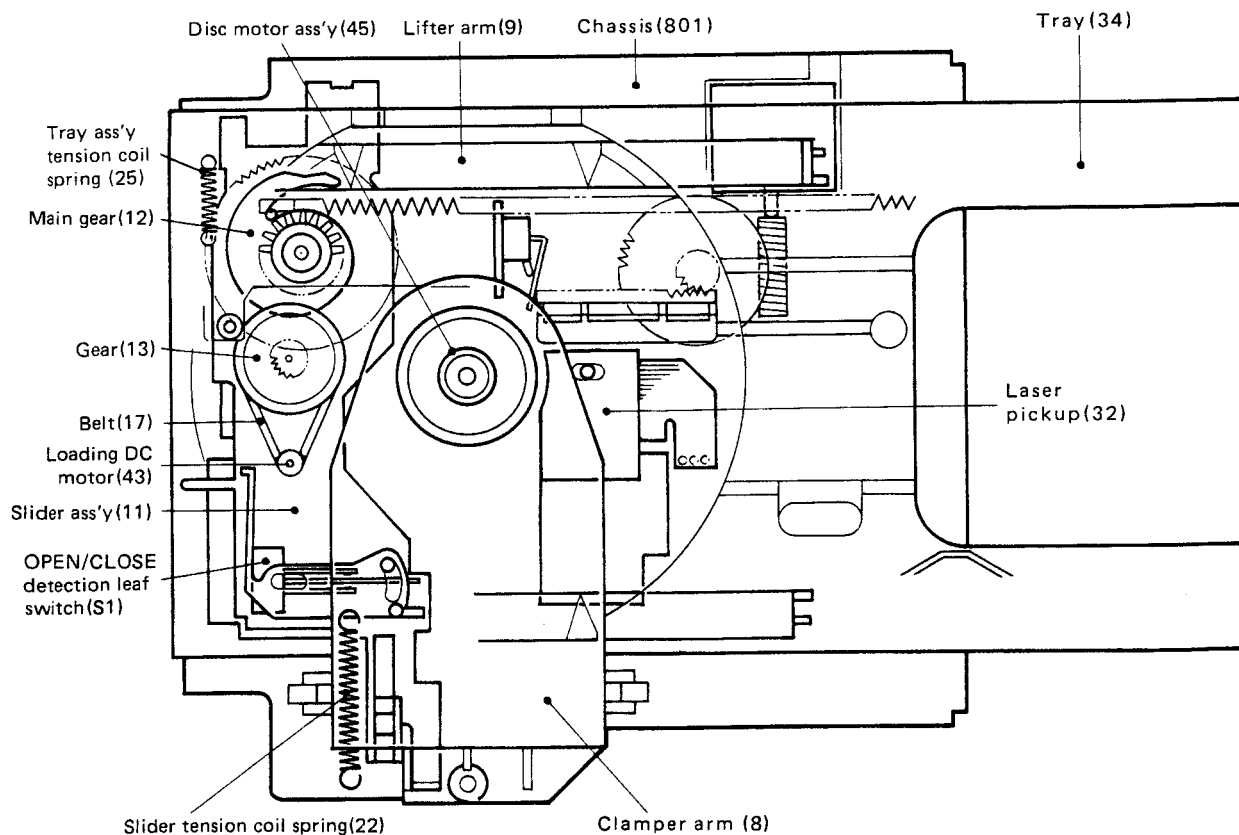


Fig. 1 Tray closed status

## MECHANISM OPERATION DESCRIPTION

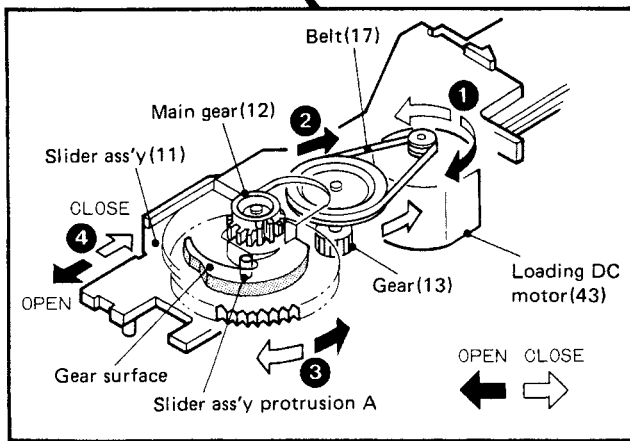
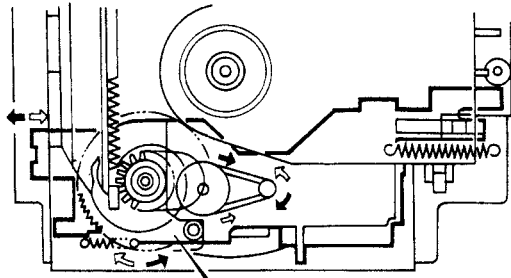


Fig. 2 Loading motor rotation transmission

As shown in Fig. 2, loading DC motor (43) rotates in the direction of the black arrow ① and transfers the rotation of the black arrow ② to the gear (13) via the belt (17), and also rotates the main gear (12) in the direction of the black arrow ③ with the lower gear section of the gear (13). The main gear (12) contains the cam on its upper surface. Along with the surface of the cam, protrusion A located in the lower side of the slider ass'y (11) is shifted and the slider ass'y (11) begins to move in the direction of the black arrow ④.

Fig. 3 shows the movement of protrusion A of the slider ass'y(11) in the direction of the black arrow ④ until the tray is completely opened.

The slider ass'y(11) releases the OPEN/CLOSE detection leaf switch(S1) from the CLOSE condition and pulls the foot section of the clammer arm(8) in the direction of the black arrow ④ by the groove section of the slider ass'y(11). By this, the clammer arm(8) is lifted in the direction of the black arrow ⑥ with a support as a center to the disc release condition from the disc clamping condition.

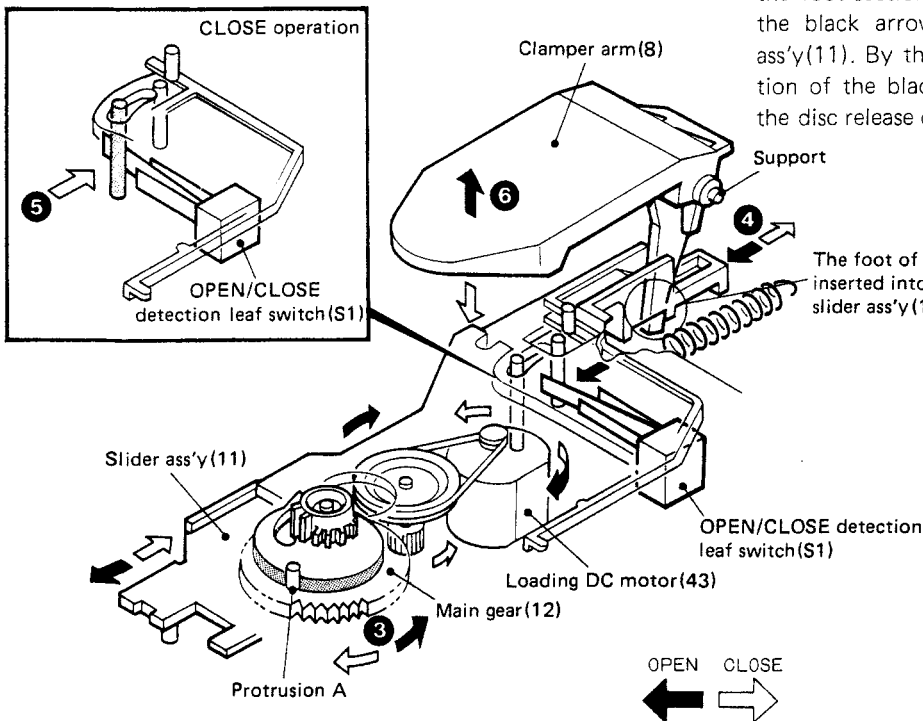


Fig. 3 Clammer arm operation

The foot of the clammer arm(8) is inserted into the groove of the slider ass'y(11).

## MECHANISM OPERATION DESCRIPTION

Fig. 4 shows the condition when the tray is completely opened. The tray is "sloped" as shown in the figure. When the tray moves in the direction of the black arrow ⑤ OPEN direction, the white protrusion climbs the "slope" to short the OPEN/CLOSE detection leaf switch(S1) in the reverse direction of the STOP condition, then informs the microprocessor that the OPEN operation has completed and to stop the rotation of the loading DC motor(43).

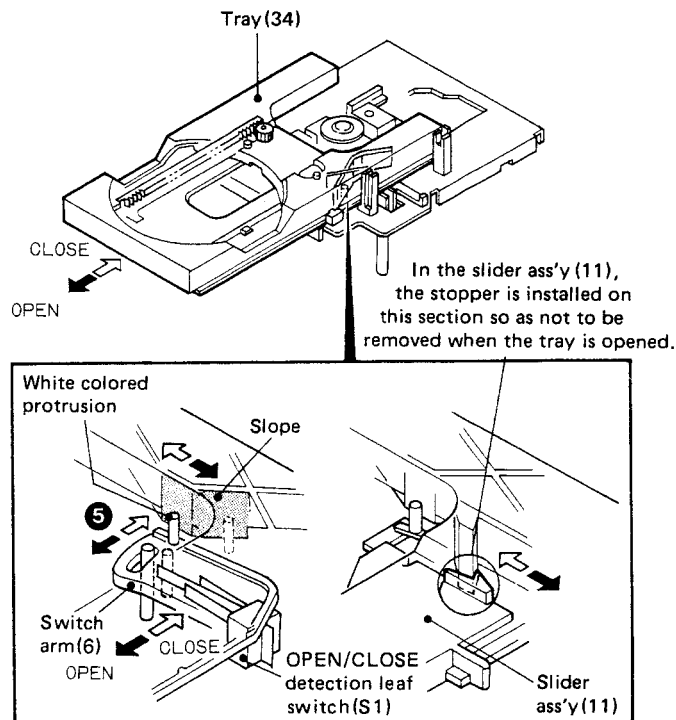


Fig. 4 Each limit switch when opening/closing the tray

Fig. 5 shows the OPEN operation until the disc is lifted from the turntable and placed on the disc tray so that the disc is removed from the player. These operations are performed almost at the same time as the up operations of the clamber arm(8) when the tray is opened as described in Fig. 2 to 4 above.

The tray (34) incorporates the lifter arm(9) which is required to support the disc when the tray is opened/closed and the lifter slider(10) which drives the lifter.

When the tray is opened, the slider ass'y(11) is shifted in the direction of the black arrow ④. In the slider ass'y, lug a is installed to slide the lifter slider horizontally (toward the left and right). And the lifter slider (10) is always pulled in the direction of the black arrow ⑦ by the tray ass'y tension coil spring(25).

For this, when the slider ass'y(11) is moved to the OPEN direction (in the direction of the black arrow ④), the lifter slider(10) is also shifted to the left by the lug a. The lifter slider(10) has grooves on its left and right ends to lift the lifter arm up/down.

In the OPEN operation, when the lifter slider(10) is moved in the direction of the black arrow ⑦, protrusion B of the lifter arm(9) is slide in the groove using the support as a center, and the lifter arm is lifted in the direction of the black arrow ⑧.

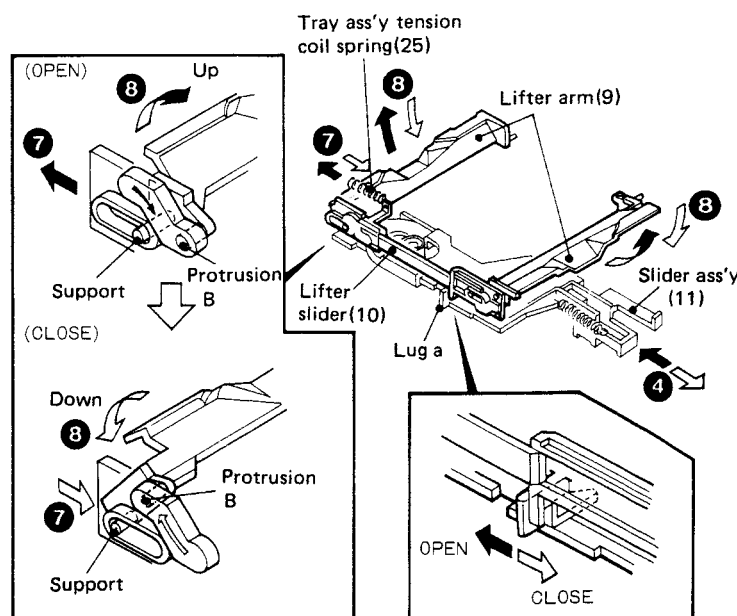


Fig. 5 Lifter arm up/down operation

## MECHANISM OPERATION DESCRIPTION

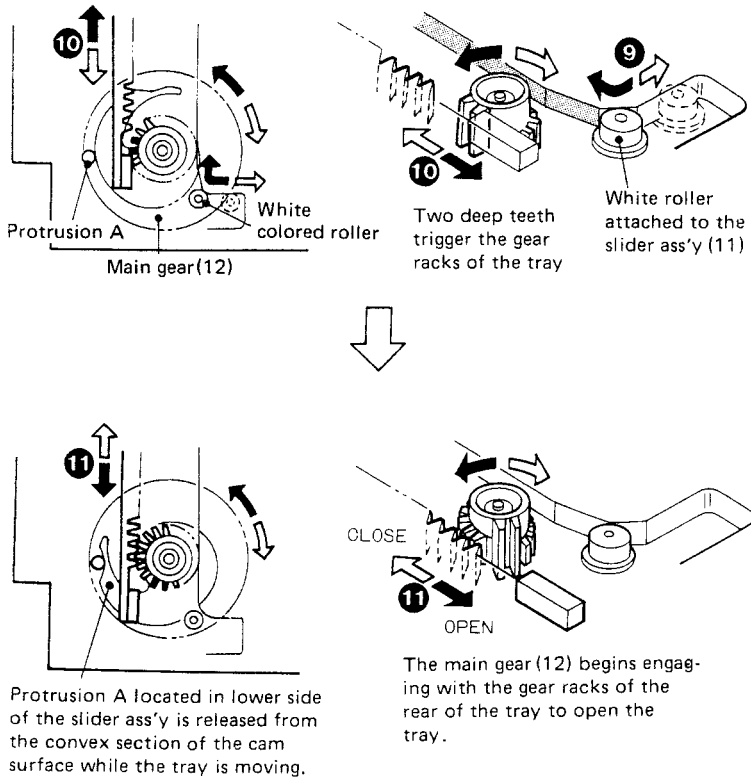


Fig. 6 Gear (12) operations

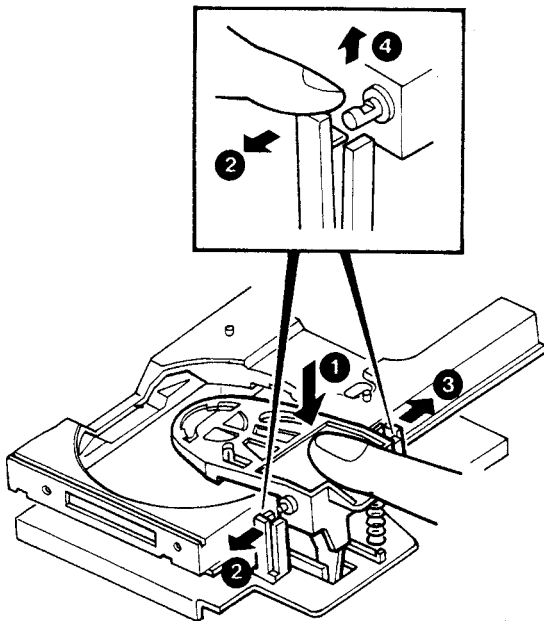


Fig. 1 Removing the clamber arm

Fig. 6 shows the operation of the main gear(12) which actually performs the OPEN/CLOSE operation of the tray described above.

In the upper surface of the main gear(12), there's a gear to open or close the tray. Among the gear teeth, only two teeth are longer than the other, for triggering the OPEN operation.

First these longer teeth trigger the OPEN operation, then the whole gear engages the gear rack of the surface of the tray to initiate the OPEN operation.

At this time, protrusion A installed on the lower side of the slider ass'y(11) is located at the position where the main gear(12) is rotated approx. 360 degree from the STOP position. At this position, when the triggering gear and the gear rack of the tray are engaged to initiate the OPEN operation, protrusion A will drop to the STOP position again from the convex of the main gear(12) cam surface. To prevent this, the white colored roller installed on the slider ass'y(11) releases protrusion A from the cam surface while the main gear(12) is engaged with the gear rack on the back of the tray in OPEN/CLOSE operation.

Since this roller is always pulled in the right direction (viewd from the front) by the slider tension coil spring(22) and the arm pressure coil spring(24), it slides while pressing the guide surface on the back of the tray in the right direction in the tray OPEN/CLOSE operation.

### 2. Disassembling procedure of mechanism section

#### 2-1. Removing the clamber arm

- 1) While lightly pressing the clamber arm from the top ①, remove the fixing lugs on both sides in the direction of arrows ② and ③.
- 2) Remove the clamber arm in the direction of arrow ④.

**Note :** Be sure to remove the fixing lugs on both sides of the clamber arm while pressing the clamber arm in the direction of arrow ①. Since the lugs are solid, if forcibly performed, they might be broken.

## MECHANISM OPERATION DESCRIPTION

### 2-2. Attaching the clamber arm

- 1) Insert the foot section of the clamber arm into the groove of the slider ass'y ( 5 ).
- 2) At this time confirm that protrusion A of the clamber arm is inserted into the center of the arm pressure coil spring.
- 3) Put the support of the clamber arm to the lug section of the outsert of the mechanism by pressing from the top ( 6 ).

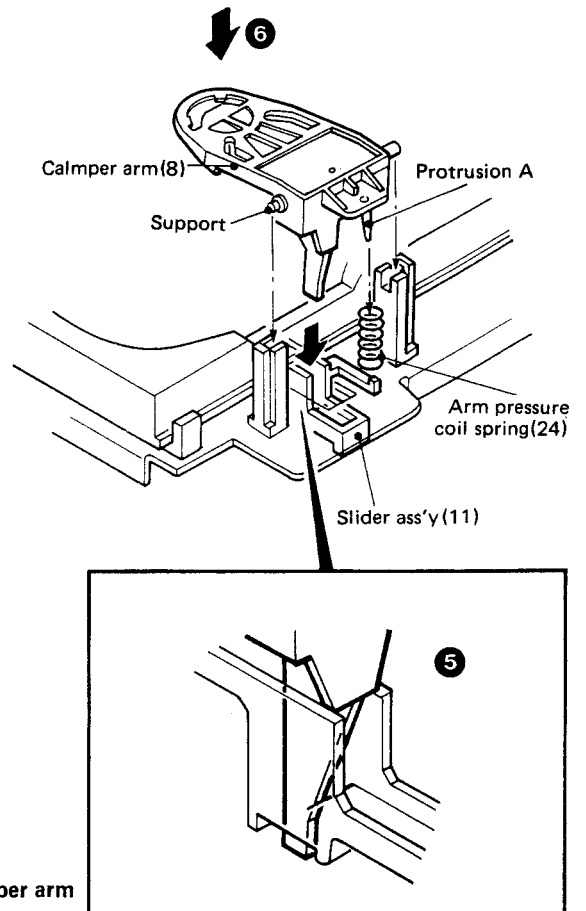


Fig. 2 Attaching the clamber arm

### 2-3. Removing the tray

- 1) While pressing the hook section of the slider ass'y in the direction of arrow 7, pull out the tray in the direction of arrow 8 to remove it ( 9 ).

**Note :** Be sure not to release your finger when pressing the hook. If the hook is released, the stopper on the upper surface of the slider ass'y will come in contact with the stopper of the tray and the tray will not be removed.

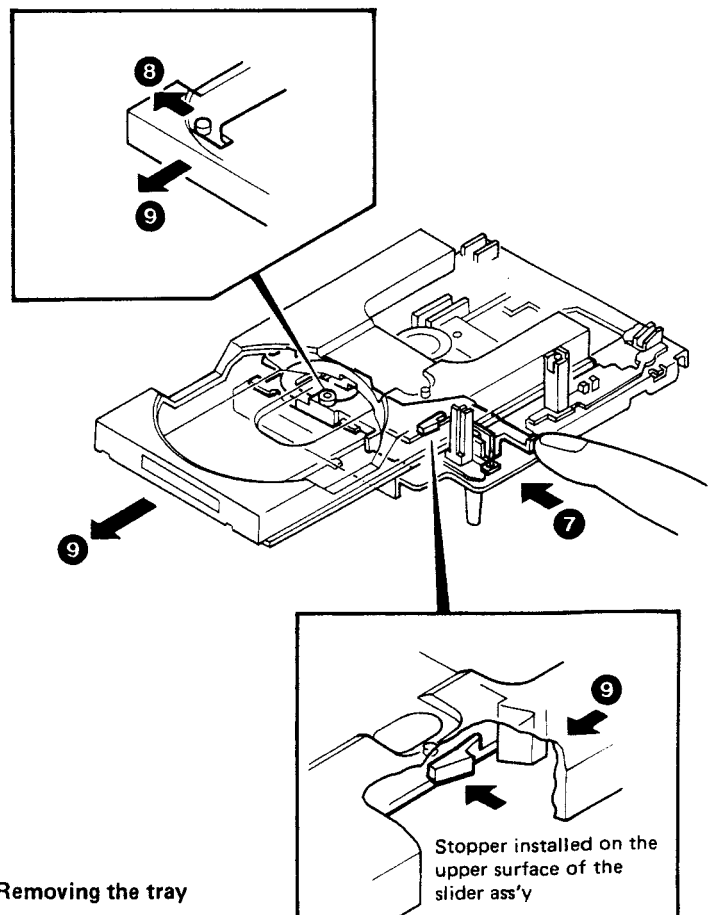


Fig. 3 Removing the tray

## MECHANISM OPERATION DESCRIPTION

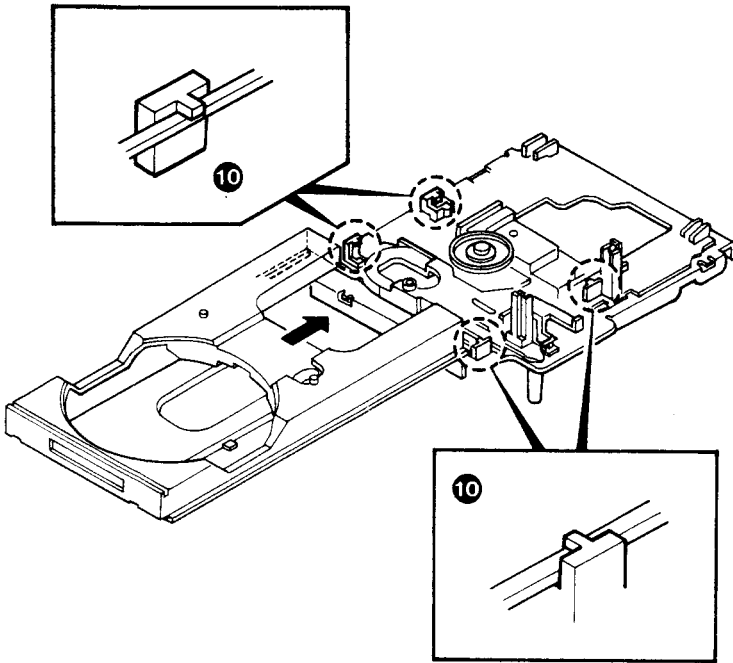


Fig. 4 Attaching the tray

### 2-4. Attaching the tray

- 1) Attach the collars firmly on both sides of the tray to the four section supporting and guiding the tray as shown in the Fig. 4.  
First attach the front two section then attach the rear two sections as shown in 10.

**Note :** The gear offset of the mechanism after removing/ attaching the tray will be reset automatically by performing the OPEN/CLOSE operation

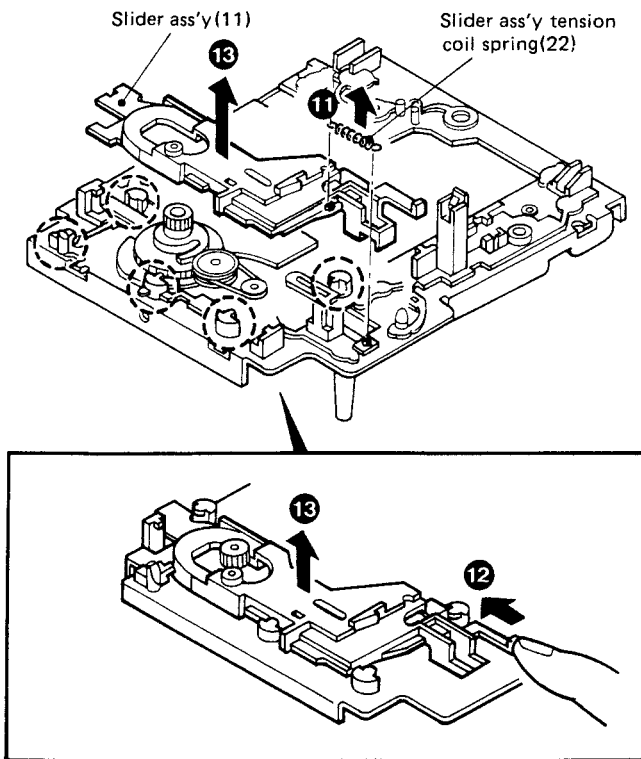


Fig. 5 Removing the slider ass'y

### 2-5. Removing the slider ass'y

- 1) Removing the slider tension coil spring attached to the slider ass'y ( 11 ).
- 2) Slide the slider ass'y in the direction of arrow 12 until it reaches the position where it can be removed from the outsert section supporting the slider ass'y.
- 3) Remove the slider ass'y by pulling out right above in the direction of arrow 13 .

**Note :** If the slider ass'y is removed askew, the OPEN/ CLOSE detection leaf switch on the back of the tray might be bent down.



## MECHANISM OPERATION DESCRIPTION

### 2-6. Attaching the slider ass'y

The long metal piece at the center of the OPEN/CLOSE detection leaf switch on the rear of the mechanism should be set between the white and black pins of the switch arm installed on the rear of the slider ass'y.

If it is inserted simply, it will be set the position as shown in 15. At this time, correct the position using a screwdriver by lifting the slider ass'y slightly in the direction 14 so that the white pin of the switch arm is set at the position as shown in 16.

A round hole is on the PC board for inserting the screwdriver. This is used for correcting/checking the switch position when working.

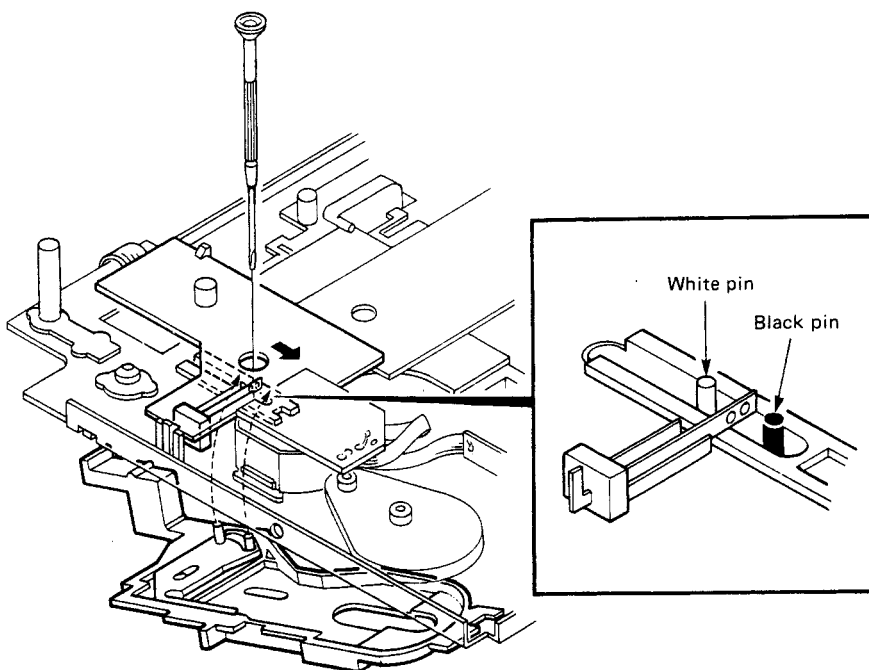
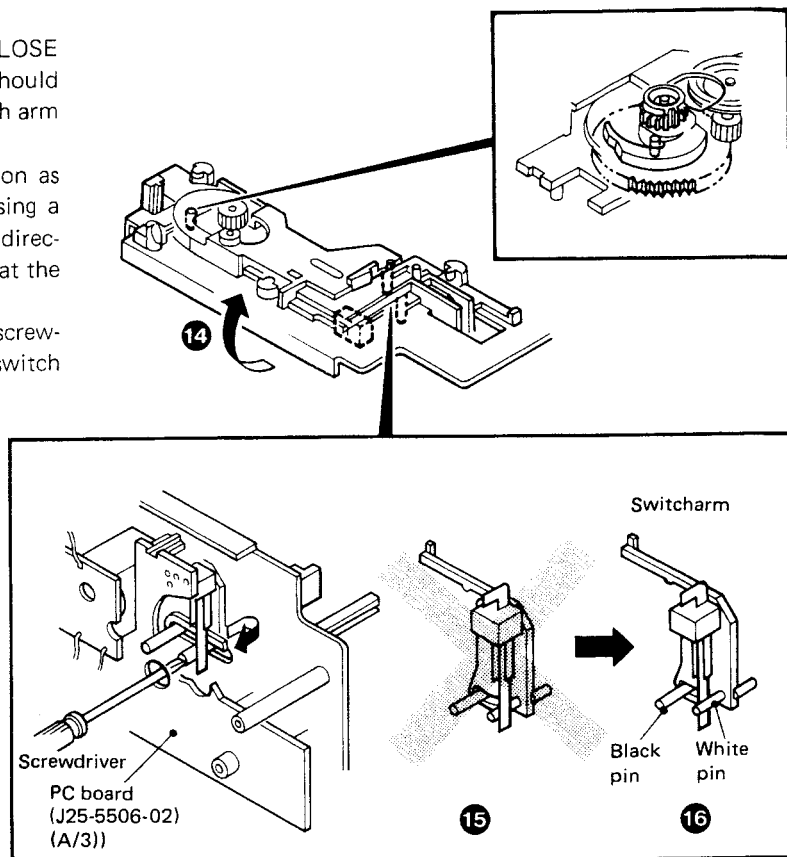


Fig. 6 Attaching the slider ass'y

## MECHANISM OPERATION DESCRIPTION

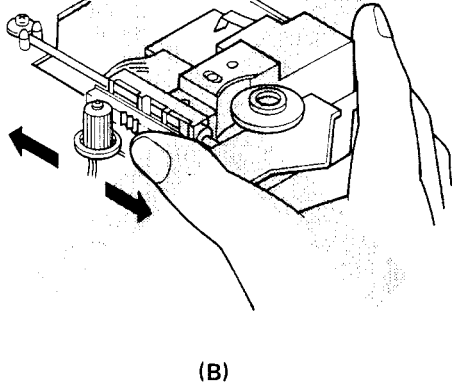
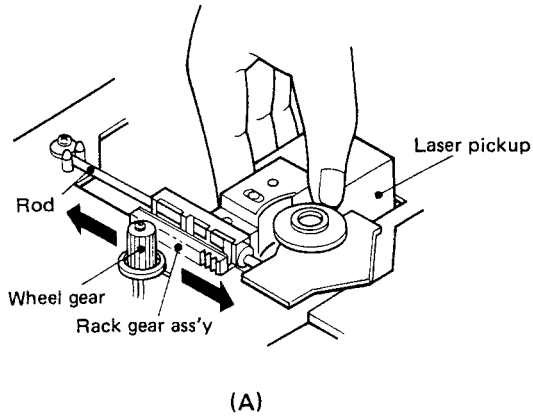


Fig. 7 Pickup gear movement

### 2-7. When moving the pickup forcibly

Do not move the rack gear ass'y by hand as shown in Fig. (B). The clearance between the wheel gear and the rack gear ass'y might be changed if bent.

When moving the pickup on repair, hold the main body of the pickup with the section as close to the rod as possible, then move it forcibly. (Fig. A).

**Note : Do not move the pickup forcibly unless required.**

## ADJUSTMENT

## ADJUSTMENT

### ADJUSTMENT

No.	ITEM	INPUT SETTING	OUTPUT SETTING	PLAYER SETTING	ALIGNMENT POINT	ALIGN FOR	FIG
1	LASER POWER	-	Apply the sensor section of the optical power meter onto the pickup lens	TEST mode: Press the REPEAT Key. Tray open and laser diode ON. (X25-292X-XX)	VR1 ALPC circuit VR installed on the pickup (X29-1760-00)	0.3mW	
2	LASER PICKUP OPERATING CURRENT (Only when the pickup seems defective.)	-	Remove pin 1 of CN1 and connect the DC ammeter. (X29-1760-00)	TEST mode: Press the REPEAT Key. Tray open and laser diode ON. (X25-292X-XX)	-	+5.5mA current value labeled on the laser pickup. If current is 40mA or more over the above value, it's defective.	(a)
3	FOCUS ERROR BALANCE	Test disc	Connect an oscilloscope to TP(RF). (X25-292X-XX)	PLAY	FE BALANCE VR2 (X25-292X-XX)	Optimum eye-pattern	(b)
4	TANGENTIAL	Test disc	Connect an oscilloscope to TP(RF). (X25-292X-XX)	PLAY	Screw on right side of mechanism (Fig.A)	Optimum eye-pattern	(b)
5	DIFFRACTION GRATING (1)	Test disc	Connect an oscilloscope to TP(TE). (X25-292X-XX)	TEST mode: While shorting, turn the POWER ON. to set the microcomputer to the test mode. Press the PLAY key to search the Track No.1 for 1 to 2 minutes. Then press the M-READ key to set the tracking servo to OFF. (X25-292X-XX)	Adjusting hole in the lower side of the laser pickup (Fig.B)	Maximum amplitude (See Photos 1 and 2.) The waveforms should be as in Photo 1, not as in Photo 2 (weaving pattern).	(c)
6	DIFFRACTION GRATING (2) "Polarity check"	Test disc	Connect an oscilloscope to TP(RF). (X25-292X-XX)	With the microcomputer in the test mode, press the MEMORY key to set the tracking servo to ON. (Feed servo is set to OFF.)	Adjusting hole in the lower side of the laser pickup (Fig.B)	Confirm that the eye-pattern is presented correctly.	(b)
7	DIFFRACTION GRATING (3) "Check that the sub-beams are spotted on the same track"	Test disc	Trigger at TP(RF) and connect an oscilloscope to TP(SSP). (X25-292X-XX)	PLAY	Adjusting hole in the lower side of the laser pickup (Fig.B)	Check that they are as Photo 3. *Photo 4 shows the defective example.	(d)
8	TRACKING ERROR BALANCE	Test disc	Connect an oscilloscope to TP(TE) or DC voltmeter. (X25-292X-XX)	In the test mode, press the M-READ key to set the tracking servo to OFF.	TE.BALANCE VR1 (X25-292X-XX)	Symmetry between upper and lower patterns, or DC=0 ± 0.05V	(e)

No	ITEM	INPUT SETTING	OUTPUT SETTING	PLAYER SETTING	ALIGNMENT POINT	ALIGN FOR	FIG
9	FOCUS GAIN	Test disc: Apply 1.2kHz, 0.5Vrms signal to pin 2 of CN6 on X25-292X-XX board.	Connect LPF with 47kΩ, 470pF to pin 1 of CN6 on X25-292X-XX, and connect an oscilloscope or AC voltmeter.	PLAY	FOCUS GAIN VR3 (X25-292X-XX)	*It is 1/10 of input voltage (When the oscilloscope (f) is used, check the 1.2kHz signal component only.)	(f)
10	TRACKING GAIN	Test disc: Apply 1.2kHz, 0.5Vrms signal to pin 4 of CN6 on X25-292X-XX board.	Connect LPF with 47kΩ, 470pF to pin 5 of CN6 on X25-292X-XX, and connect an oscilloscope or AC voltmeter.	PLAY	TRACKING GAIN VR4 (X25-292X-XX)	*It is 1/10 of input voltage (When the oscilloscope (g) is used, check the 1.2kHz signal component only.)	(g)
11	PLL		Connect a frequency counter to TP(PLCK). (X25-292X-XX)	STOP	F.ADJ. VR5 (X25-292X-XX)	FREQUENCY ADJ. 4.4MHz±0.15MHz	(h)

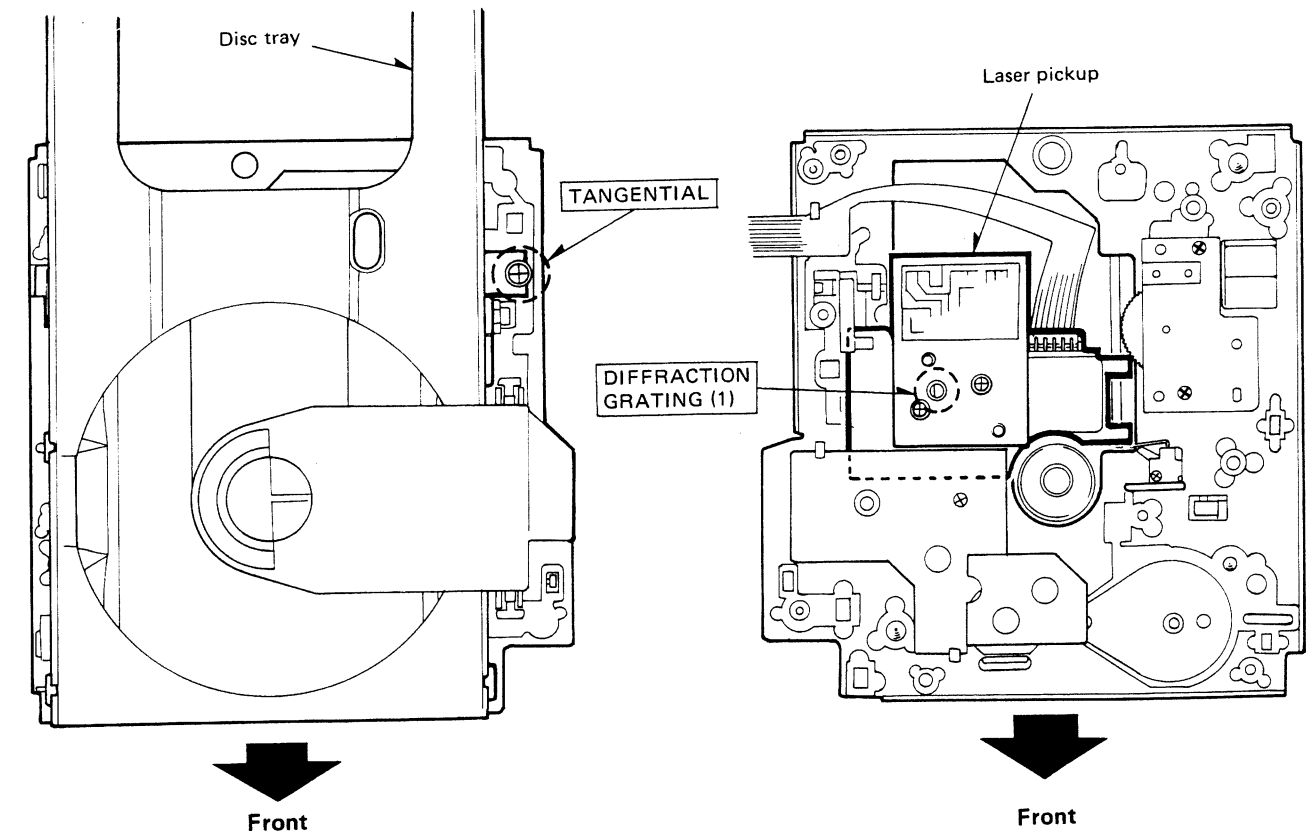


Fig. A : Mechanism ass'y (Top view)

Fig. B : Mechanism ass'y (Bottom view)

REGLAGE

REGLAGE

N°	ITEM	REGLAGE D'ENTREE	REGLAGE DE SORTIE	REGLAGE DE LA LECTURE	POINT D'ALIGNEMENT	ALIGNEMENT POUR	FIG
1	PUISSANCE LASER	-	Appliquer la section de détecteur du compteur de puissance optique sur la lentille du capteur	TEST mode: Presser la touche REPEAT Tray OPEN et LD ON. (X25-292X-XX)	VR1 VR de circuit ALPC installé sur le capteur (X29-1760-00)	0.3mW	
2	COURANT DE FONCTIONNEMENT DU CAPTEUR LASER (Uniquement quand le capteur semble defectif.)	-	Retirer la broche 1 de CN1 et reconnector l'ampere-meter CC. (X29-1760-00)	TEST mode: Presser la touche REPEAT Tray OPEN et LD ON. (X25-292X-XX)	-	+5.5mA de valeur de courant indiquée sur le capteur laser. Si le courant est de 40mA ou bien supérieur à la valeur ci-dessus, il est defectif.	(a)
3	BALANCE D'ERREUR DE MISE AU POINT	Disque test	Raccorder un oscilloscope à TP(RF). (X25-292X-XX)	PLAY	BALANCE D'ERREUR DE MISE AU POINT VR2 (X25-292X-XX)	Forme optimum	(b)
4	TANGENTIEL	Disque test	Raccorder un oscilloscope à TP(RF). (X25-292X-XX)	PLAY	Vis sur le côté droit du mécanisme (Fig.A)	Forme optimum	(b)
5	RESEAU DE DIFFRACTION (1)	Disque test	Raccorder un oscilloscope à TP(TE). (X25-292X-XX)	TEST mode: Tout en court-circuitant, fournir l'alimentation pour mettre le micro-ordinateur en mode de test. Presser la touche PLAY pour rechercher la piste n° 1 pendant 1 à 2 minutes. Presser ensuite la touche M-READ pour mettre l'asservissement d'alignement sur OFF. (X25-292X-XX)	Trou d'ajustement dans le côté inférieur du capteur laser (Fig.B)	Amplitude maximum (voir les photos 1 et 2.) Les formes d'onde doivent être comme dans la photo 1 et non comme dans la photo 2 (forme ce déplacement).	(c)
6	RESEAU DE DIFFRACTION (2) "Vérification de polarité"	Disque test	Raccorder un oscilloscope à TP(RF). (X25-292X-XX)	Le micro-ordinateur en mode de test, presser la touche MEMORY pour régler l'asservissement d'alignement sur ON. (L'asservissement d'alimentation est réglé sur OFF.)	Trou d'ajustement dans le côté inférieur du capteur laser (Fig.B)	S'assurer que la forme se présente correctement.	(b)
7	RESEAU DE DIFFRACTION (3) "Vérifier que les faisceaux auxiliaires se rassemblent sur la même Piste"	Disque test	Déclencher à TP(RF) et raccorder un oscilloscope à TP(SSP).	PLAY	Trou d'ajustement dans le côté inférieur du capteur laser (Fig.B)	Vérifier qu'ils sont comme dans la photo 3. *La photo 4 montre un exemple defectif.	(d)
8	BALANCE D'ERREUR D'ALIGNEMENT	Disque test	Raccorder un oscilloscope à TP(TE) ou un voltmètre CC. (X25-292X-XX)	En mode de test, presser la touche M-READ pour régler l'asservissement d'alignement sur OFF.	BALANCE D'ERREUR D'ALIGNEMENT VR1 (X25-292X-XX)	Symétrie entre les formes supérieure et inférieure ou CC=0 ± 0.05V	(e)

REGLAGE

N°	ITEM	REGLAGE D'ENTREE	REGLAGE DE SORTIE	REGLAGE DE LA LECTURE	POINT D'ALIGNEMENT	ALIGNEMENT POUR	FIG
9	GAIN DE MISE AU POINT	Disque test: Appliquer un signal 1.2kHz, 0.5Vrms à la broche 2 de CN6 sur la plaquette X25-292X-XX.	Raccorder LPF avec 47 kohmes, 470pF sur la broche 1 de CN6 sur X25-292X-XX et raccorder un oscilloscope ou un voltmètre CA.	PLAY	GAIN DE MISE AU POINT VR3 (X25-292X-XX)	50mVrms *1/10 d'entrée (quand l'oscilloscope (f) est utilisé, vérifier uniquement le composant 1.2kHz.)	
10	GAIN D'ALIGNEMENT	Disque test: Appliquer un signal 1.2kHz, 0.5Vrms à la broche 4 de CN6 sur la plaquette X25-292X-XX.	Raccorder LPF avec 47 kohmes, 470pF sur la broche 5 de CN6 sur X25-292X-XX et raccorder un oscilloscope ou un voltmètre CA.	PLAY	GAIN D'ALIGNEMENT VR4 (X25-292X-XX)	50mVrms *1/10 d'entrée (quand l'oscilloscope (g) est utilisé, vérifier uniquement le composant 1.2kHz.)	
11	PLL		Raccorder un compteur de fréquence à TP(PLCK). (X25-292X-XX)	ARRRET	ADJ. FREQUENCE VR5 (X25-292X-XX)	ADJ. FREQUENCE 4.4MHz±0.15MHz	(h)

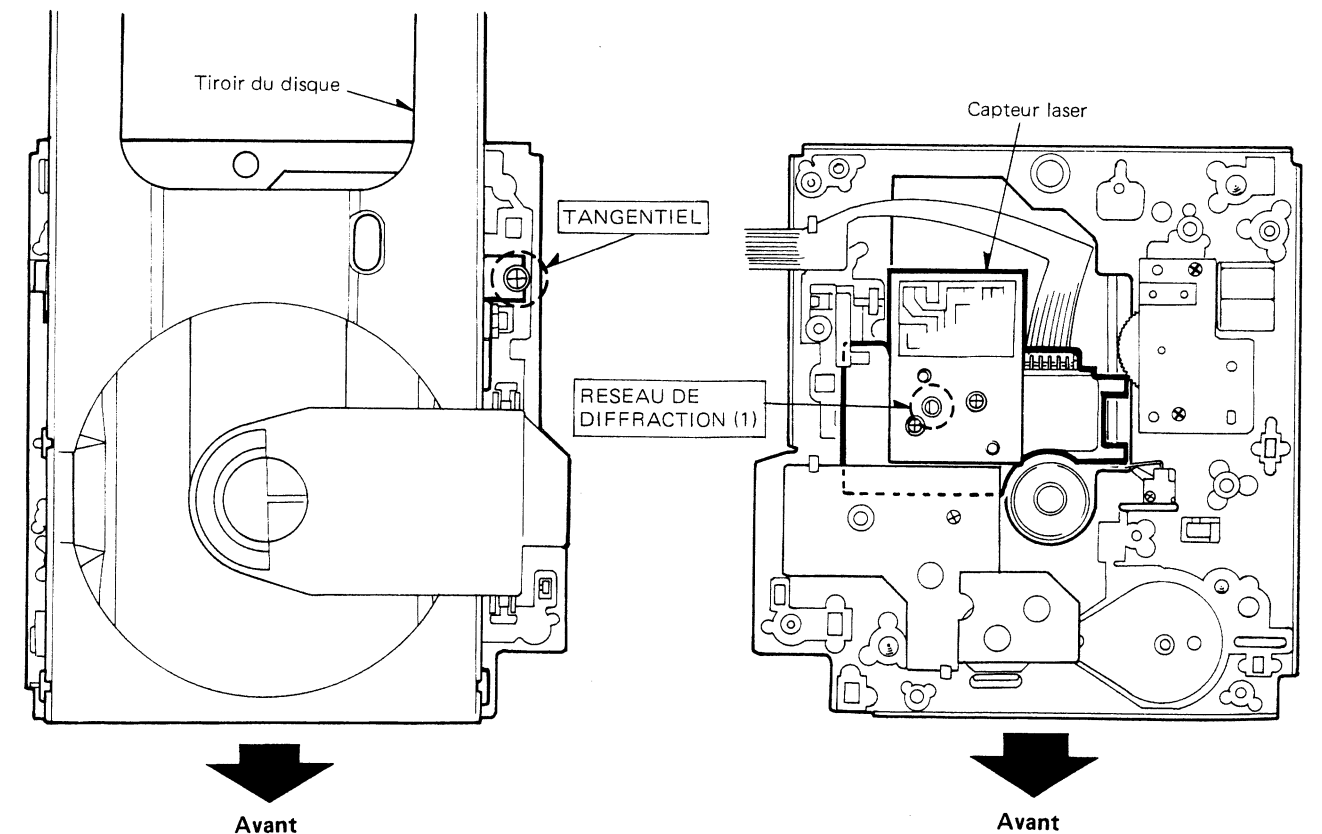


Fig. A : Ensemble du mécanisme (vue du dessus)

Fig. B : Ensemble du mécanisme (vue du dessous)

## ABGLEICH

## ABGLEICH

### ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	SPIELER-EINSTELLUNG	ABGLEICH-PUNKT	ABGLEICHUNG	ABB.
1	LASERLEISTUNG	-	Das Sensorteil des optischen Leistungsmeters auf die Aufnehmerlinse ansetzen.	TEST-betriebsart: Die REPEAT Taste drücken. Tray OPEN und LD ON. (X25-292X-XX)	VR1 Regelwiderstand des ALPC-Schaltkreises am Tonabnehmer (X29-1760-00)	0,3mW	
2	BETRIEBSSTROM DES LASERTONABNEHMERS (Nur wenn der Tonabnehmer defekt zu sein scheint)	-	Stift 1 von CN1 entfernen und das Gleichstrom-Ampermeter anschließen. (X29-1760-00)	TEST-betriebsart: Die REPEAT Taste drücken. Tray OPEN und LD ON. (X25-292X-XX)	-	Stromwert + 5,5mA auf dem Lasertonabnehmer markiert. Wenn der Strom 40mA oder mehr über dem obigen Wert liegt, ist er defekt.	(a)
3	FOKUS-FEHLERAUSGLEICH	Testdisc	Ein Oszilloskop an TP(RF) anschließen. (X25-292X-XX)	PLAY	FOKUS-FEHLERAUSGLEICH VR2 (X25-292X-XX)	Optimales Augenmuster	(b)
4	TANGENTIAL	Testdisc	Ein Oszilloskop an TP(RF) anschließen. (X25-292X-XX)	PLAY	Schraube an der rechten Seite des Mechanismus (ABB.A)	Optimales Augenmuster	(b)
5	OPTISCHES GITTER (1)	Testdisc	Ein Oszilloskop an TP(TE) anschließen. (X25-292X-XX)	TEST Betriebsart: Zum Kurzschließen POWER ON einstellen, so daß sich der Mikrocomputer in Test-Betriebsart befindet. Die PLAY-Taste 1 bis 2 Minuten drücken, um den ersten Titel zu suchen. Dann die M-READ-Taste drücken, um das Spurhalteservo auf OFF einzustellen. (X25-292X-XX)	Einstellungsöffnung an der Unterseite des Laser-Tonabnehmers (ABB.B)	Maximal-Amplitude (Siehe Foto 1 und 2.) Die Wellenform sollte wie in Foto 1 aussehen, nicht wie in Foto 2 (Webmuster).	(c)
6	OPTISCHES GITTER (2) Überprüfung der Polarität	Testdisc	Ein Oszilloskop an TP(RF) anschließen. (X25-292X-XX)	Die MEMORY-Taste drücken, um den Spurhalteservo auf ON einzustellen, während sich der Mikrocomputer in Testbetriebsart befindet. (Der Vorschubservo steht auf OFF.)	Einstellungsöffnung an der Unterseite des Laser-Tonabnehmers (ABB.B)	Überprüfen, daß das Augenmuster richtig erscheint.	(b)
7	OPTISCHES GITTER (3) Überprüfen, daß die Nebenstrahlen auf der selben Spur erscheinen.	Testdisc	TP(RF) auslösen und ein Oszilloskop an TP(SSP) anschließen. (X25-292X-XX)	PLAY	Einstellungsöffnung an der Unterseite des Laser-Tonabnehmers (ABB.B)	Überprüfen, daß sie Foto 3 entsprechen. * Foto 4 zeigt das Beispiel eines defekten Tonabnehmers.	(d)
8	SPURHALTEFEHLER-AUSGLEICH	Testdisc	Ein Oszilloskop an TP(TE) anschließen. (X25-292X-XX)	In der Testbetriebsart die M-READ-Taste drücken, um den Spurhalteservo auf OFF zu stellen.	SPURHALTEFEHLER-AUSGLEICH VR1 (X25-292X-XX)	Symmetrie zwischen oberen und unteren Mustern oder Gleichstrom = 0 ± 0,05V	(e)

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	SPIELER-EINSTELLUNG	ABGLEICH-PUNKT	ABGLEICHUNG	ABB.
9	FOKUSVERSTÄRKUNG	Testdisc: Ein 1,2kHz, 0,5Vrms-Signal an Stift 2 von CN6 an Platine X25-292X-XX anlegen.	LPF mit 47kohm, 470pF an Stift 1 von CN6 an X25-292X-XX und ein Oszilloskop oder Wechselstrom-Voltmeter anschließen.	PLAY	FOKUSVERSTÄRKUNG VR3 (X25-292X-XX)	50mVrms *Das ist 1/10 der Eingangsspannung (Bei Verwendung eines Oszilloskop nur die 1,2kHz-Komponente überprüfen.)	(f)
10	SPURHALTE-VERSTÄRKUNG	Testdisc: Ein 1,2kHz, 0,5Vrms-Signal an Stift 4 von CN6 an Platine X25-292X-XX anschließen.	LPF mit 47kohm, 470pF an Stift 5 von CN6 an X25-292X-XX und ein Oszilloskop oder Wechselstrom-voltmeter anschließen.	PLAY	SPURHALTE-VERSTÄRKUNG VR4 (X25-292X-XX)	50mVrms *Das ist 1/10 der Eingangsspannung (Bei Verwendung eines Oszilloskop nur die 1,2kHz-Komponente überprüfen.)	(g)
11	PLL		Einen Frequenzzähler an TP(PLCK) anschließen. (X25-292X-XX)	HALT	F.ADJ. VR5 (X25-292X-XX)	Frequenz ADJ. 4,4MHz±0,15MHz	(h)

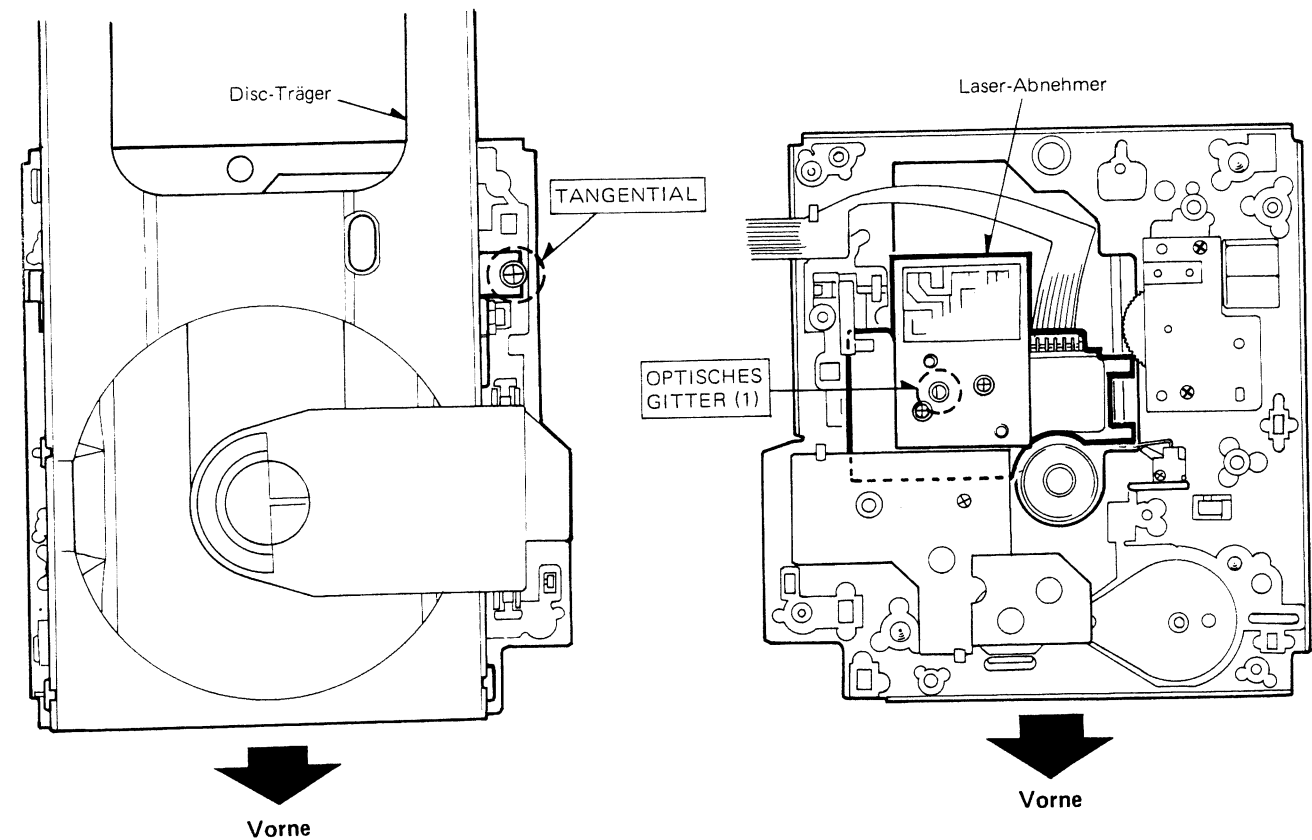


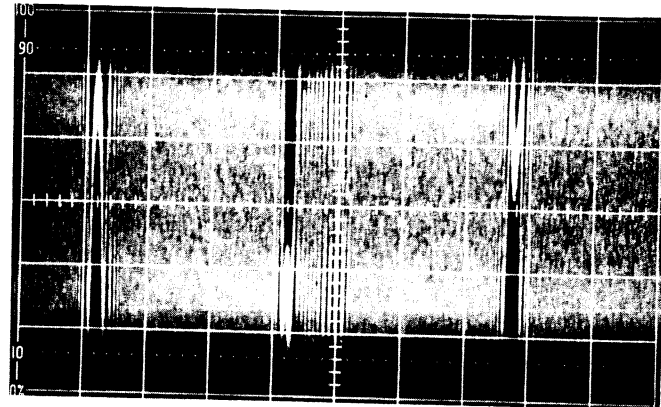
Abb. A : Mechanismus-Baugruppe (Draufsicht)

Abb. B : Mechanismus-Baugruppe (Untersicht)

## ADJUSTMENT/REGLAGE/ABGLEICH

## ADJUSTMENT/REGLAGE/ABGLEICH

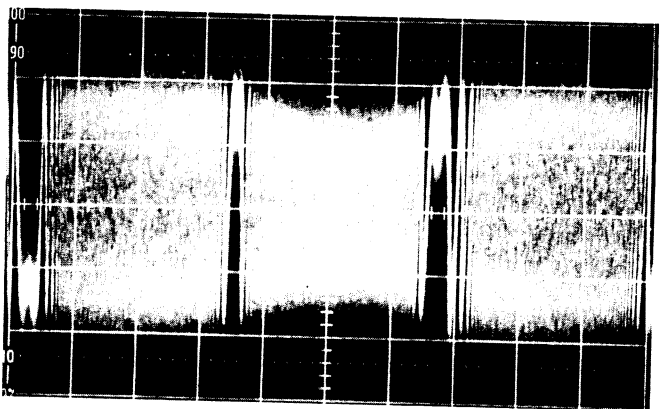
### DIFFRACTION GRID ADJUSTMENT/REGLAGE DU RESEAU DE DIFFRACTION/BEUGUNGSGITTER-EINSTELLUNG



Correctly adjusted waveform  
Forme d'onde correctement réglée  
Richtig eingestellte Wellenform

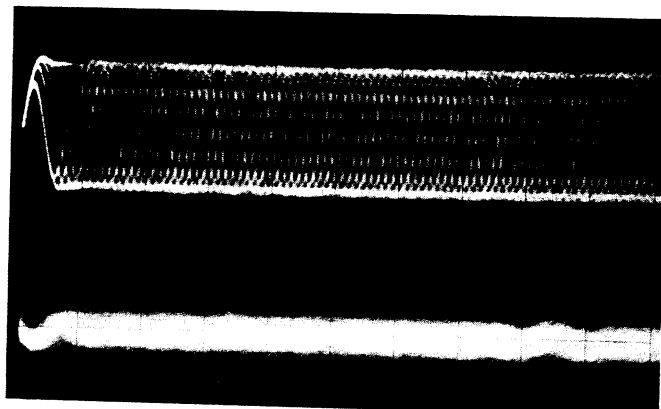
Tracking error waveform  
Upper : 0.5V/div.  
Lower : 20ms/div.  
Forme d'onde d'erreur d'alignement  
Supérieure : 0.5V/div.  
Inférieure : 20ms/div.  
Spurhaltefehler-Wellenform  
Oben : 0.5V/Teilung  
Unten : 20ms/Teilung

Photo 1  
Photo 1  
Foto 1



Incorrect (shifted) waveforms  
Forme d'onde incorrecte (dérivée)  
Falsche (verschobene) Wellenform

Photo 2  
Photo 2  
Foto 2



Correctly adjusted waveform  
Forme d'onde correctement réglée  
Richtig eingestellte Wellenform

Upper : RF signal 1V/div.  
Lower : Sub spot beam signal 0.1V/div.  
0.5μs/div.  
Supérieure : signal HF 1V/div.  
Inférieure : signal de rayon spot auxiliaire 0.1V/div.,  
0.5μs/div.

Photo 3  
Photo 3  
Foto 3

17~18μs later  
17~18μs plus tard  
17~18μs später

Waveform when the sub beam is shifted to the adjacent track.  
Forme d'onde quand le rayon auxiliaire est décalé sur la piste adjacente.  
Wellenform, wenn der Nebenstrahl zur benachbarten Spur verschoben ist.

Photo 4  
Photo 4  
Foto 4

### VOLTAGE CHECK TABLE

(X25-2920-00)

IC1

1	0V	21	-4.3V
2	1.4V (0V)	22	0V
3	0V	23	-1.0V (-3.6V)
4	4.7V	24	-2.3V (0V)
5	4.6V	25	0V
6~11	0V	26	2.5V (-5.0V)
12	1.3V (0V)	27	2.5V (4.2V)
13,14	0V	28	4.7V (0V)
17	-5.0V	29	5.0V
18~20	0V	30	5.1V

IC2

1	-5.0V	35	2.2V
2	-4.2V	36	2.3V
3~15	0V	37	3.5V
16	5.1V	38	2.4V
17	0.6V	39	5.1V (0V)
18,19	0V	40	2.5V (0V)
20	0.6V	41	5.0V (0V)
21,22	0V	42	2.6V (0V)
23	-4.1V	43	5.1V
24	0V	44	0V
25	-5.0V	45	1.1V (-0.5V)
26	0V	46	2.6V
27~31	5.1V	47	4.3V (0V)
32	0V	48	0V
33,34	2.5V		

IC3

1	0V	37	1.7V (4.1V)
2	5.0V (0V)	38~45	2.5V
3	2.5V (0V)	49	4.5V
4	2.8V (0V)	50	2.7V (2.4V)
5	2.4V (4.2V)	51	2.4V
6	2.5V (5.0V)	52	0V
7	5.0V (0V)	53,54	2.6V
8,9	2.5V	55	0V
10	0V	57~59	0V
11	1.6V (2.5V)	60,61	1.2V
12	0V	62	0V
13~16	5.1V	63	0V (3.8V)
17	0V	64	0V (2.0V)
18	5.1V (0V)	65	0V (2.0V)
		66	0.5V (2.0V)
19	0V (5.1V)	67	0V (5.1V)
20	5.1V (0V)	68,69	2.5V
21~24	0V	70	2.4V
25	2.5V	71	5.0V
26	0V	72	0V (5.1V)
27	2.5V (0V)	73	5.1V
28	5.1V (0V)	74	0V (5.1V)
29,30	1.7V (0.6V)	75	2.5V
31	1.7V (0V)	76	2.4V
32	1.7V (2.6V)	77	2.5V
33	5.1V	78	2.5V (0V)
34	1.7V (0V)	79,80	2.5V
35	1.7V (2.6V)		
36	1.7V (2.0V)		

IC5

1~4	1.4V	37~39	5.1V
5	5.1V	40~48	-27.7V
6	2.6V	49	0V
7,8	0V	50	-5.5V
9~12	0V	51	4.8V
13,14	5.1V	52~54	1.4V
15,16	0.6V	55	1.3V
17~24	0V	56	-31.3V
25~27	5.1V	57	-5.0V
28,29	0V	58	-23.8V
30	2.3V	59,60	1.3V
31	2.5V	61	1.3V
32	0V	62	1.3V
33,34	2.3V	63	-2.0V
35,36	0V	64	5.1V

IC6

1~3	0V	9	2.2V
4	5.0V	10	5.1V
5~7	0V	11~20	0V
8	2.5V		

IC7

1	-5.6V	7	0V
2	0V	8	-5.6V
3	5.6V	9~13	0V
4	0V	14	-3.0V
5	2.4V	15	1.9V
6	2.5V	16	5.6V

IC8

1~3	0V	5~7	0V
4	-5.6V	8	5.6V

IC9

1~6	0V	10	0V
7	-5.6V	11	1.3V
8	0V	12~15	0V
9	1.3V	16	-5.6V

IC10

1	0.8V	5,6	0V
2,3	0V	7	0.4V
4	-	8	12.0V

IC11

1	-3.7V	5,6	0V
2	-2.5V	7	5.6V
3	-	8	11.8V
4	-12.1V		

IC12

1	-5.7V	5,6	5.1V
2,3	-5.0V	7	5.8V
4	-12.1V	8	11.8V

IC13

1~3	-5.6V	5~7	5.6V
4	-12.1V	8	11.9V

IC14

1~3	0V	5~7	0V
4	-5.6V	8	5.6V

IC15

1~3	0V	5~7	0V
4	-12.1V	8	11.8V

IC16

	5.1V
--	------

Q1

1	12.0V	4	0.6V
2	0.6V	5	-12.2V
3	0.4V	6~8	0V

	E	C	B
Q2	6.2V	12.0V	-
Q3	0.2V	-12.0V	-
Q4	-	-	0V
Q5	-	-12.2V	0V
Q6	5.0V	5.1V	0V
Q7	-5.0V	-5.0V	5.1V
Q11	0V	-	0.7V
Q12	0V	-	4.5V
Q13	5.1V	11.8V	5.7V
Q14	-5.0V	-12.1V	-5.7V
Q15	-5.6V	-12.1V	-6.2V
Q16	5.0V	0V	5.1V
Q17	5.1V	-	5.7V

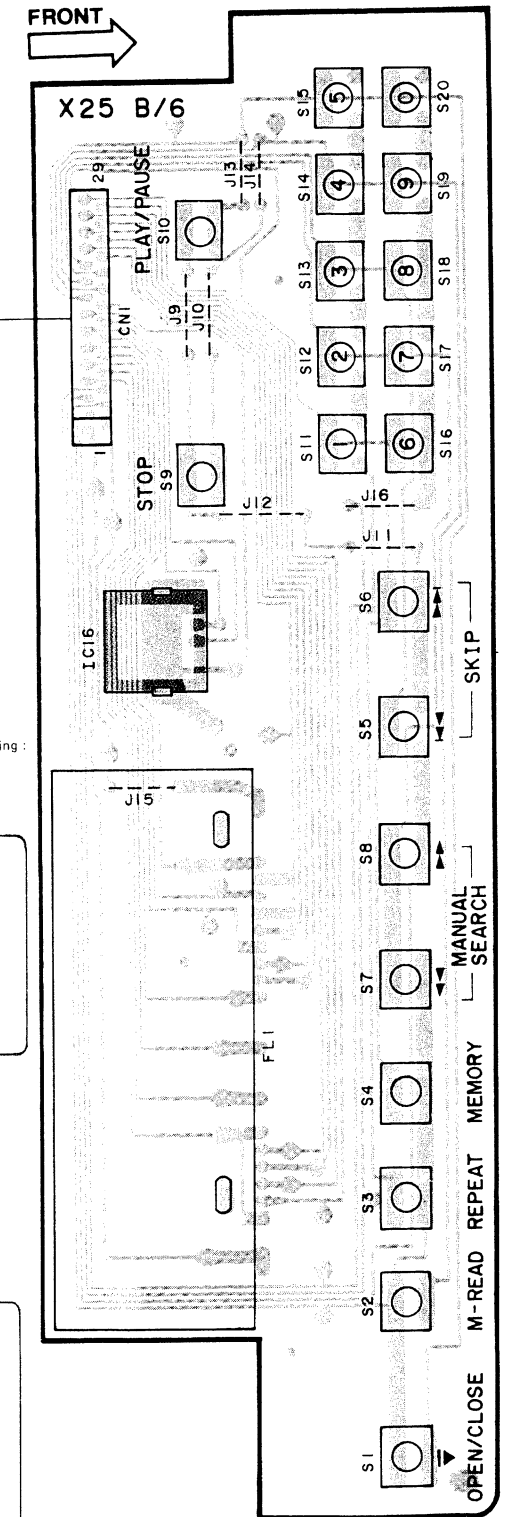
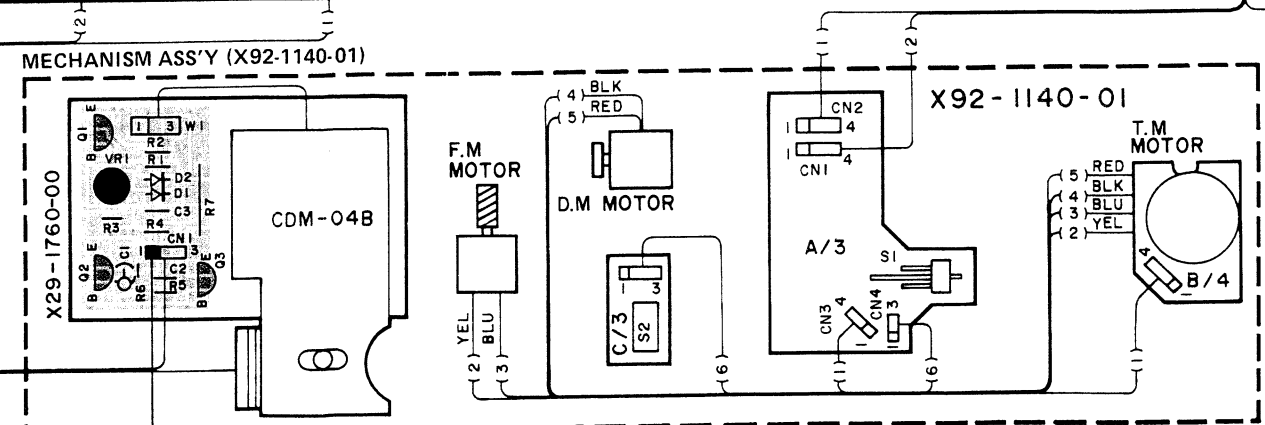
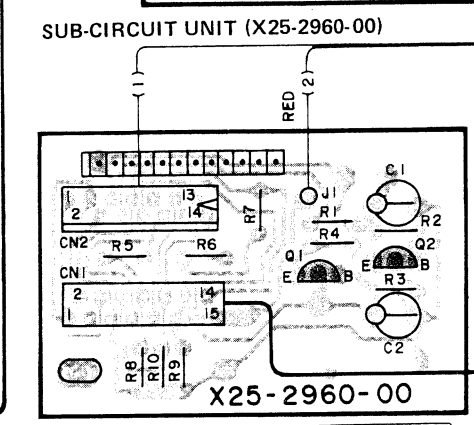
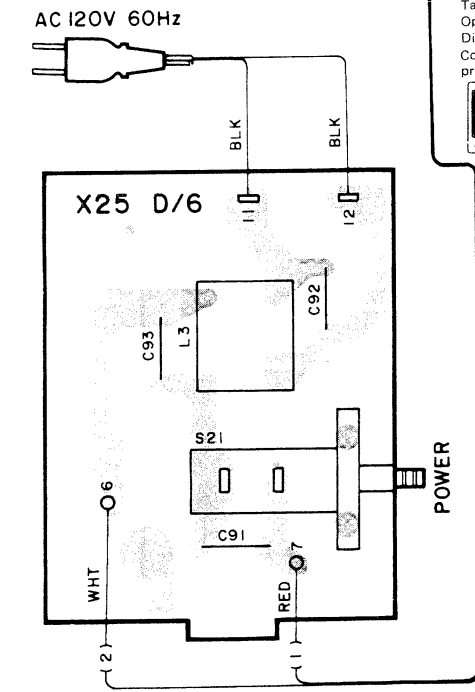
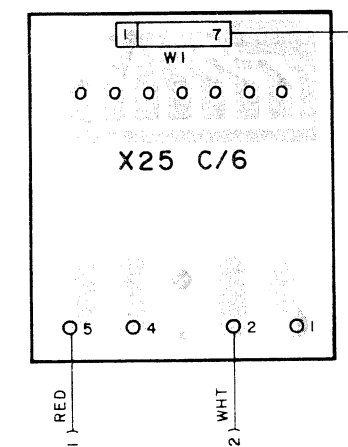
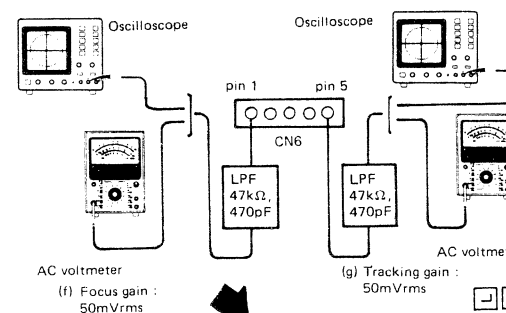
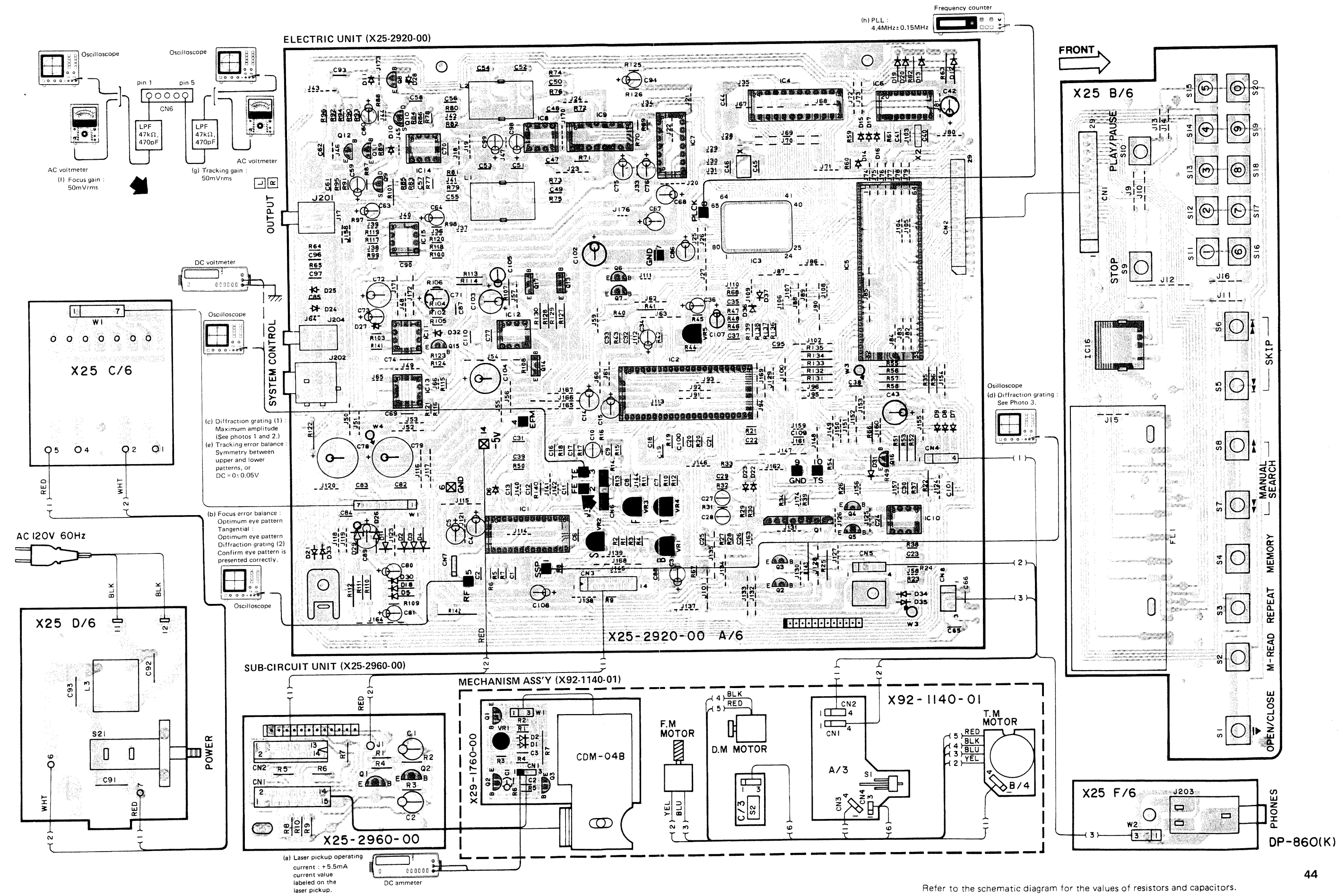
(X25-2960-00)

	E	C	B
Q1	5.1V	5.0V (-3.5V)	-
Q2	-	5.1V	0V

( ) : STOP mode



# PC BOARD (COMPONENT SIDE VIEW)



(a) Laser pickup operating current : +5.5mA current value labeled on the laser pickup.

(b) Focus error balance : Optimum eye pattern Tangential : Optimum eye pattern Diffraction grating (2) Confirm eye pattern is presented correctly.

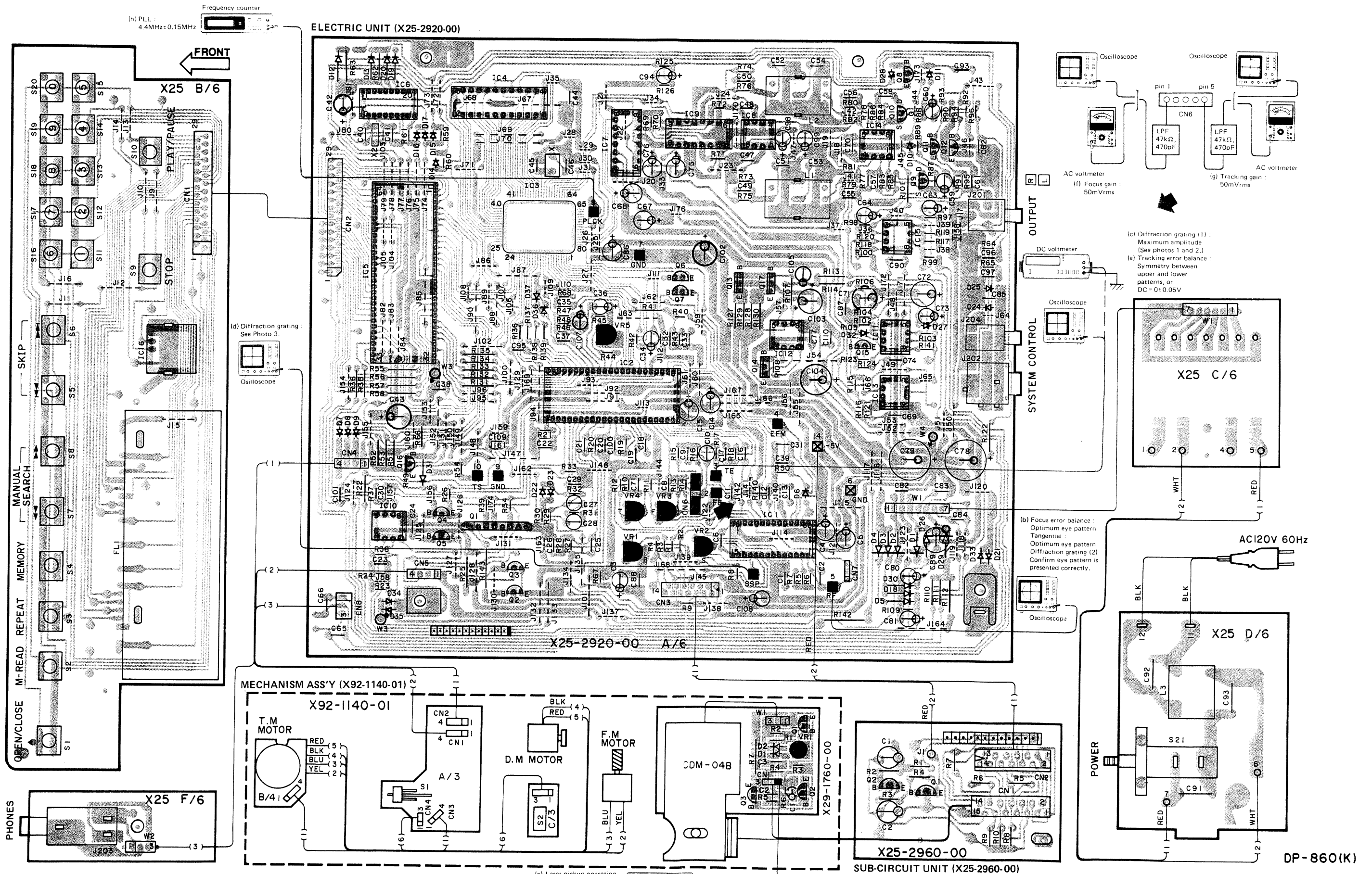
(c) Diffraction grating (1) Maximum amplitude (See photos 1 and 2.) (e) Tracking error balance Symmetry between upper and lower patterns, or DC = 0-0.05V

(d) Diffraction grating : See Photo 3.

(h) PLL : 4.4MHz±0.15MHz

Refer to the schematic diagram for the values of resistors and capacitors.

# PC BOARD (FOIL SIDE VIEW)



(h) PLL  
4.4MHz ± 0.15MHz

ELECTRIC UNIT (X25-2920-00)

MECHANISM ASS'Y (X92-1140-01)

(a) Laser pickup operating current : +5.5mA  
current value labeled on the laser pickup.

(b) Focus error balance :  
Optimum eye pattern  
Tangential :  
Optimum eye pattern  
Diffraction grating (2)  
Confirm eye pattern is presented correctly.

(c) Diffraction grating (1) :  
Maximum amplitude  
(See photos 1 and 2.)  
(e) Tracking error balance :  
Symmetry between upper and lower patterns, or  
DC = 0 ± 0.05V

(f) Focus gain :  
50mVrms

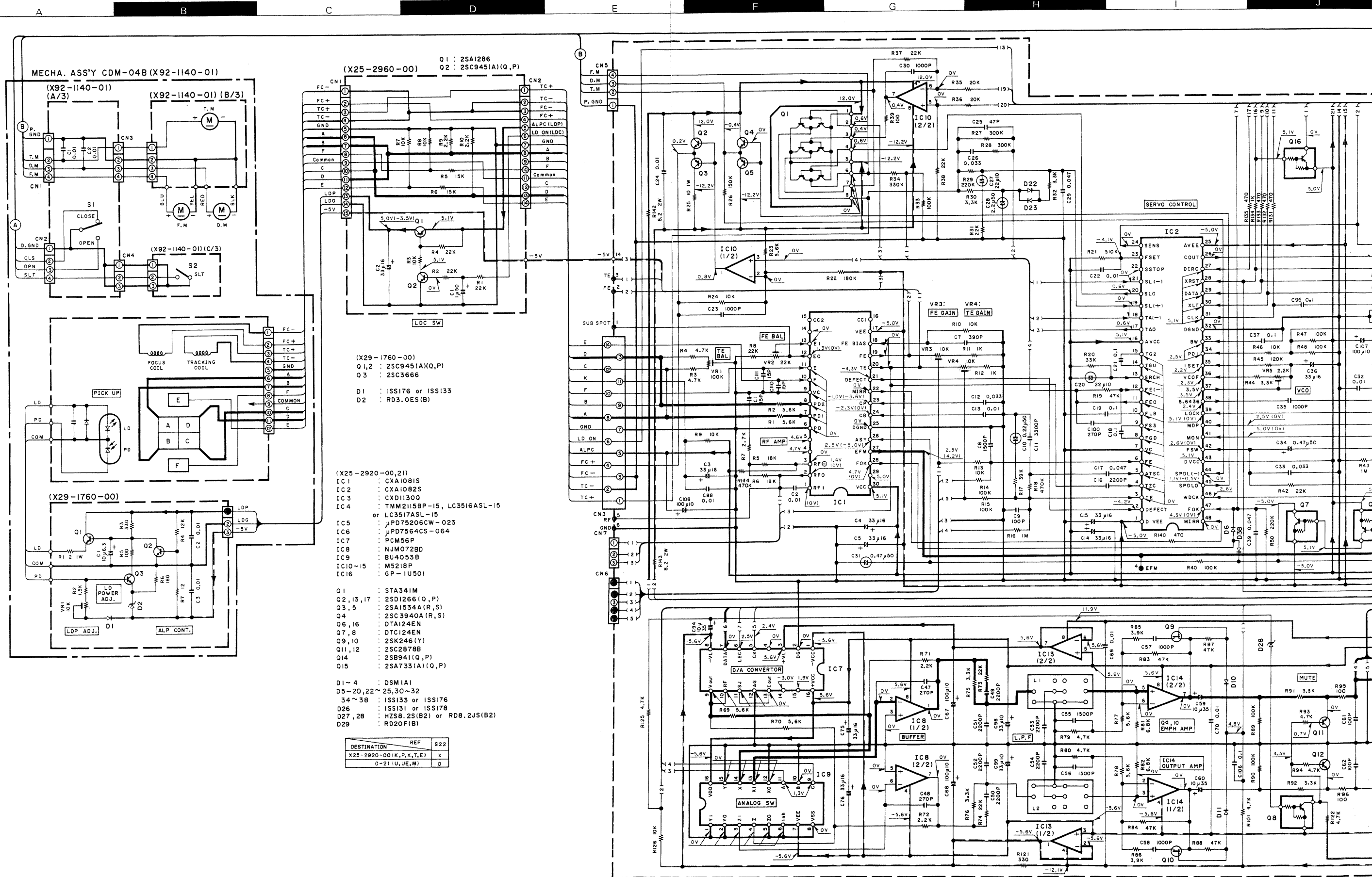
(g) Tracking gain :  
50mVrms

X25-2960-00  
SUB-CIRCUIT UNIT (X25-2960-00)

DP-860(K)

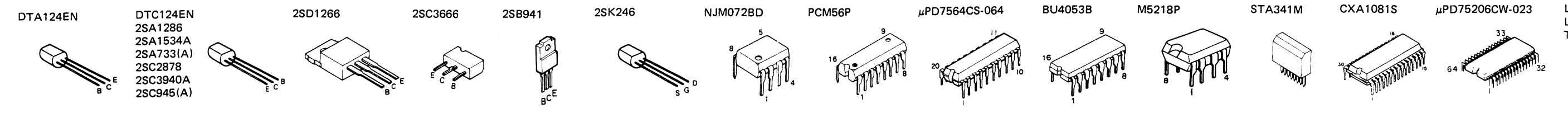
Refer to the schematic diagram for the values of resistors and capacitors.

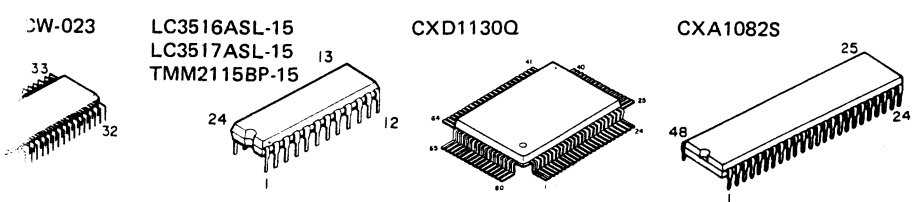
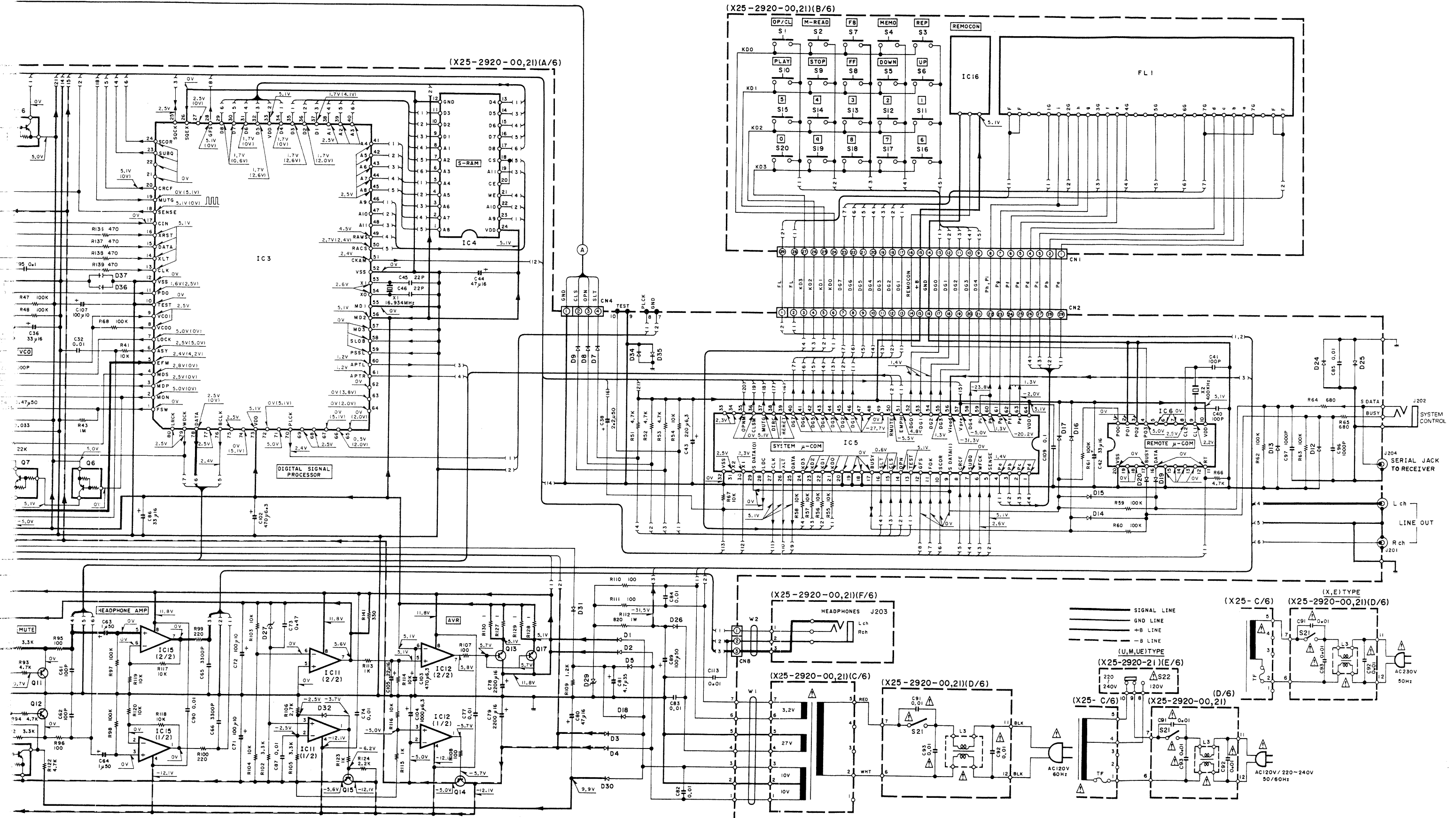




- (X25-2960-00)  
 Q1 : 2SA1286  
 Q2 : 2SC945(A)(Q,P)
- (X29-1760-00)  
 Q1,2 : 2SC945(A)(Q,P)  
 Q3 : 2SC3666  
 D1 : ISS176 or ISS133  
 D2 : RD3.0ES(B)
- (X25-2920-00,21)  
 IC1 : CXA1081S  
 IC2 : CXA1082S  
 IC3 : CXD1130Q  
 IC4 : TMM2115BP-15, LC3516ASL-15  
 or LC3517ASL-15  
 IC5 :  $\mu$ PD75206CW-023  
 IC6 :  $\mu$ PD7564CS-064  
 IC7 : PCM56P  
 IC8 : NJM072BD  
 IC9 : BU4053B  
 IC10-15 : M5218P  
 IC16 : GP-1U501
- Q1 : STA341M  
 Q2,13,17 : 2SD1266 (Q,P)  
 Q3,5 : 2SA1534A(R,S)  
 Q4 : 2SC3940A(R,S)  
 Q6,16 : DTA124EN  
 Q7,8 : DTC124EN  
 Q9,10 : 2SK246 (Y)  
 Q11,12 : 2SC2878B  
 Q14 : 2SB941(Q,P)  
 Q15 : 2SA733(A)(Q,P)
- D1~4 : DSM1A1  
 D5~20,22~25,30~32  
 34~38 : ISS133 or ISS176  
 D26 : ISS131 or ISS178  
 D27,28 : HZS8,2S(B2) or RD8.2JS(B2)  
 D29 : RD20F(B)

DESTINATION	REF	S22
X25-2920-00(K,P,X,T,E)	X	
O=21(U,UE,M)	O	



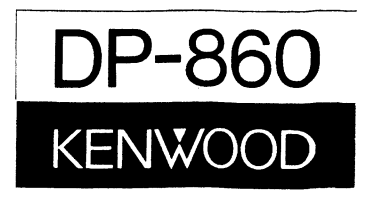


( ) : STOP mode

- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.
- Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.
- Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Voltmeter gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen instrumenten oder Geräten u.U. geringfügig.

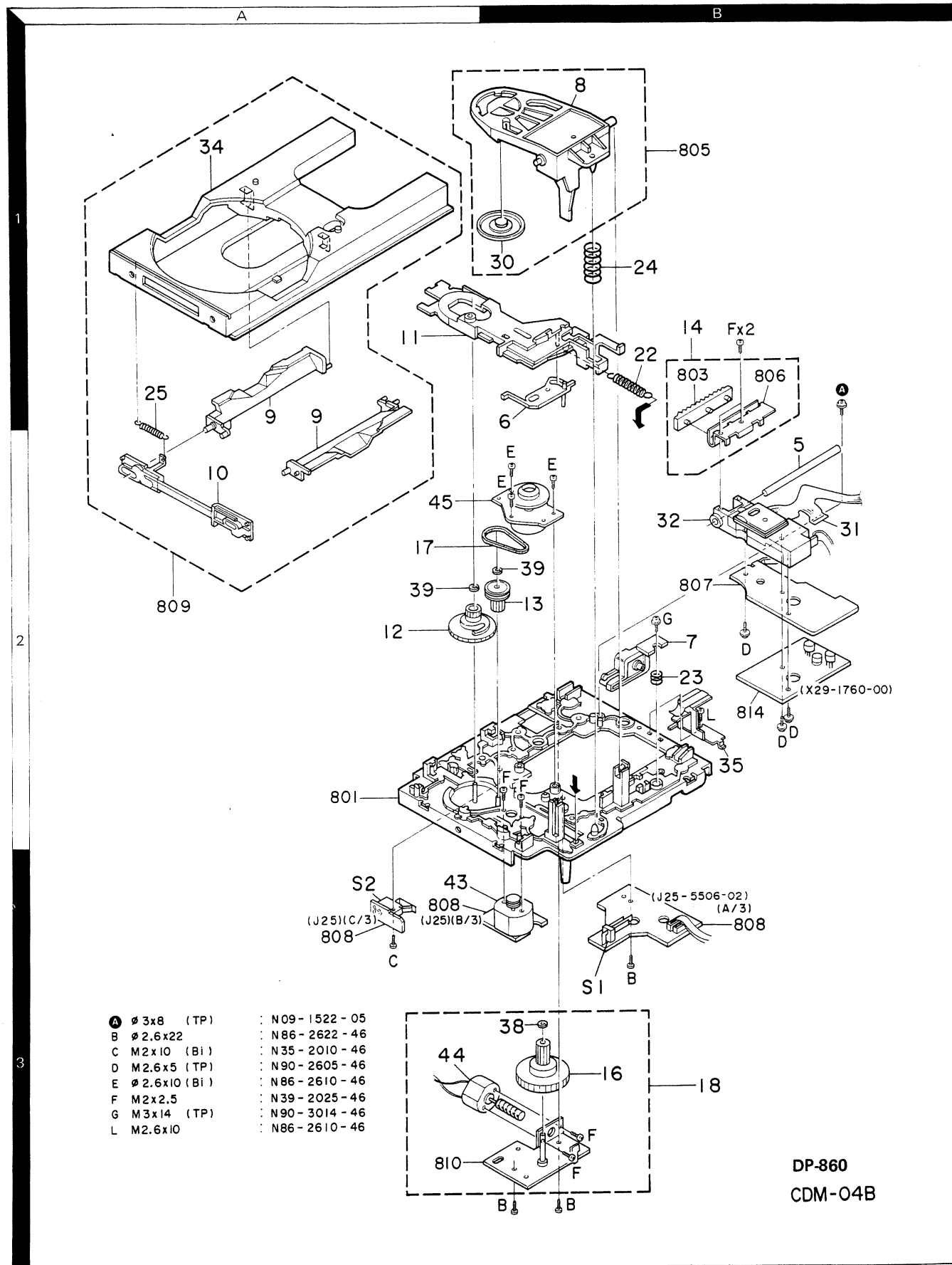
**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ΔIndicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

DP-860(K)



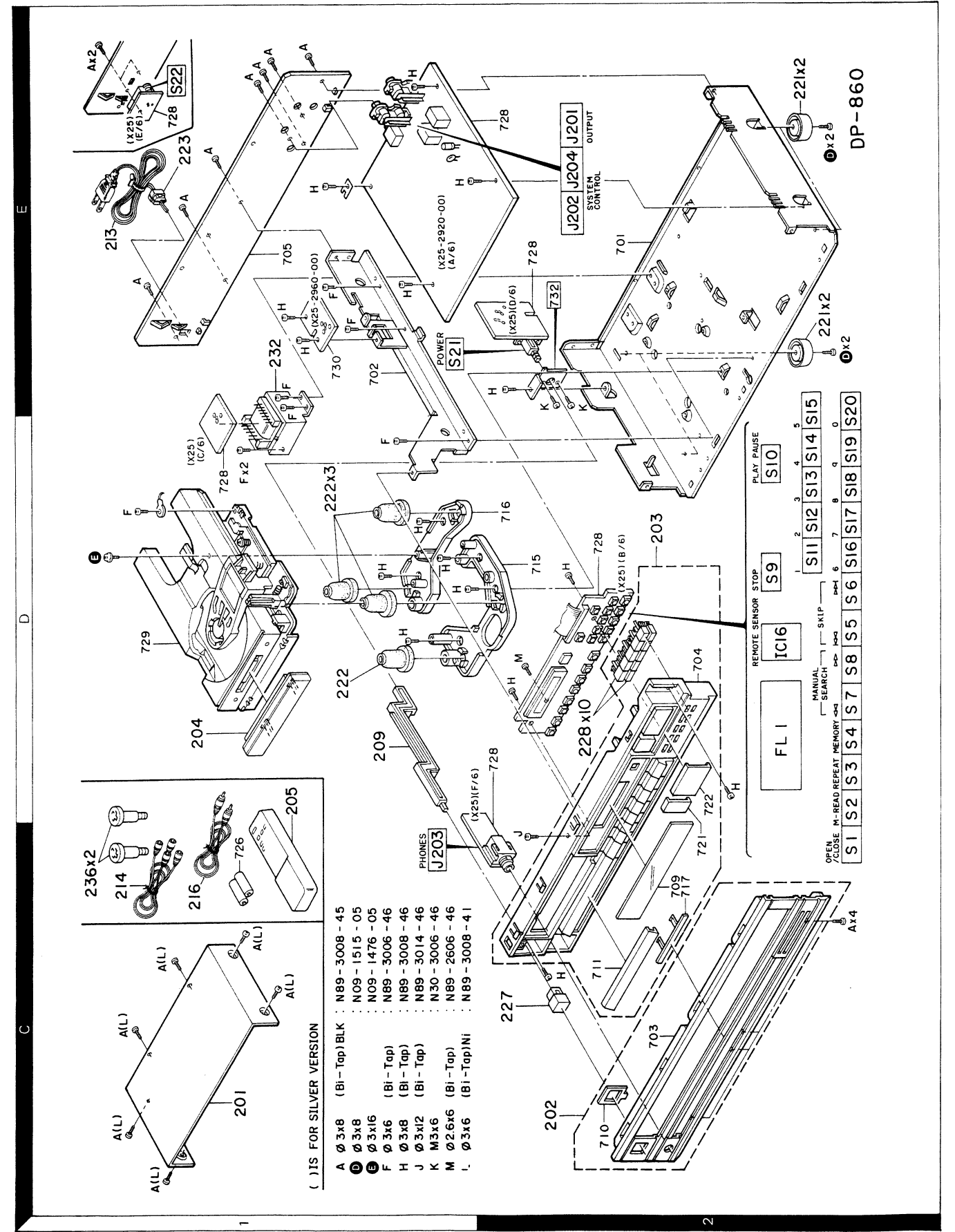
# DP-860 DP-860

## EXPLODED VIEW (MECHANISM)



Parts with the exploded numbers larger than 700 are not supplied.

## EXPLODED VIEW (UNIT)



Parts with the exploded numbers larger than 700 are not supplied.

# DP-860 DP-860

## PARTS LIST

× New Parts  
 Parts without Parts No. are not supplied.  
 Les articles non mentionnés dans le Parts No. ne sont pas fournis.  
 Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名/規格	Desti- nation 仕向	Re- marks 備考
<b>DP-860</b>						
201	1C	*	A01-1542-01	METALLIC CABINET	KPUMUE	
201	1C	*	A01-1542-01	METALLIC CABINET	XTE	
201	1C	*	A01-1560-01	METALLIC CABINET	E	S
202	2C	*	A20-5179-03	PANEL ASSY	KPUMUE	
202	2C	*	A20-5179-03	PANEL ASSY	XTE	
202	2C	*	A20-5242-03	PANEL ASSY	E	S
203	2D	*	A22-0657-03	SUB PANEL ASSY	KPUMUE	
203	2D	*	A22-0657-03	SUB PANEL ASSY	XTE	
203	2D	*	A22-0673-03	SUB PANEL ASSY	E	S
204	1D	*	A29-0100-03	PANEL (TRAY)	KPUMUE	
204	1D	*	A29-0100-03	PANEL (TRAY)	XTE	
204	1D	*	A29-0103-03	PANEL (TRAY)	E	S
205	1D	*	A70-0172-05	REMOTE CONTROLLER ASSY	E	
-	-	-	B46-0092-03	WARRANTY CARD	K	
-	-	-	B46-0094-03	WARRANTY CARD	UUE	
-	-	-	B46-0095-03	WARRANTY CARD	UUE	
-	-	-	B46-0096-13	WARRANTY CARD	X	
-	-	-	B46-0121-03	WARRANTY CARD	P	
-	-	-	B46-0122-13	WARRANTY CARD	E	
-	-	-	B46-0143-03	WARRANTY CARD	T	
-	-	*	B50-6779-00	INSTRUCTION MANUAL(ENGLISH)		
-	-	*	B50-6780-00	INSTRUCTION MANUAL(FRENCH)	PMXE	
-	-	*	B50-6781-00	INSTRUCTION MANUAL(SPANISH)	M	
-	-	*	B50-6783-00	INSTRUCTION MANUAL(G,D,I)	E	
-	-	*	B50-6784-00	INSTRUCTION MANUAL(ARABIC)	M	
-	-	-	B58-0223-04	CAUTION CARD (PRE-SET 120V)	U	
-	-	-	B58-0269-04	CAUTION CARD	K	
-	-	-	B58-0400-04	CAUTION CARD		
-	-	-	B58-0513-04	CAUTION CARD (PRESET220-240)	UE	
-	-	-	B59-0092-00	SERVICE DIRECTORY	UUE	
209	1D	*	D21-1247-03	EXTENSION SHAFT		
△	213	1E	E30-0181-05	AC POWER CORD	KP	
△	213	1E	E30-0459-05	AC POWER CORD	E	
△	213	1E	E30-0812-05	AC POWER CORD	UMUE	
△	213	1E	E30-1341-05	AC POWER CORD	X	
△	213	1E	E30-1416-05	AC POWER CORD	T	
-	214	1C	E30-0505-05	AUDIO CORD		
-	216	1C	E30-1392-05	CORD WITH PLUG	KPUMUE	
-	216	1C	E30-1392-05	CORD WITH PLUG	X	
-	-	*	H01-7543-04	ITEM CARTON CASE	KPUMUE	
-	-	*	H01-7543-04	ITEM CARTON CASE	XTE	
-	-	*	H01-7544-04	ITEM CARTON CASE	E	S
-	-	*	H10-3439-02	POLYSTYRENE FOAMED FIXTURE		
-	-	*	H10-3440-02	POLYSTYRENE FOAMED FIXTURE		
-	-	-	H20-0417-04	PROTECTION COVER(460X370X360)		
-	-	-	H25-0224-04	PROTECTION BAG (800X400X0.03)	M	
-	-	-	H25-0224-04	PROTECTION BAG (800X400X0.03)	KPUUEX	
-	-	-	H25-0232-04	PROTECTION BAG (235X350X0.03)	TE	
221	2E		J02-0170-04	FOOT		
222	1D		J02-0191-05	INSULATOR		
223	1E		J42-0083-05	POWER CORD BUSHING		

E: Scandinavia & Europe K: USA P: Canada W: Europe S: Silver version  
 U: PX(Far East, Hawaii) T: England M: Other Areas  
 UE: AAFES(Europe) X: Australia  
 △ indicates safety critical components.

## PARTS LIST

× New Parts  
 Parts without Parts No. are not supplied.  
 Les articles non mentionnés dans le Parts No. ne sont pas fournis.  
 Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名/規格	Desti- nation 仕向	Re- marks 備考
-	-	-	J61-0039-05	WIRE BAND		
-	-	-	J61-0307-05	WIRE BAND	XTE	
227	2C		K29-1446-04	KNOB ASSY(BUTTON)POWER	E	S
227	2C		K29-2001-04	KNOB ASSY(BUTTON)POWER	KPUMUE	
227	2C		K29-2001-04	KNOB ASSY(BUTTON)POWER	XTE	
228	2D	*	K29-2648-04	KNOB (BUTTON) 1-0		
△	232	1E	L01-7771-05	POWER TRANSFORMER	KP	
△	232	1E	L01-7772-05	POWER TRANSFORMER	XTE	
△	232	1E	L01-7774-05	POWER TRANSFORMER	UMUE	
236	1C		N09-1759-05	MACHINE SCREW (TRANSIT)		
D	2E		N09-1515-05	TAPPING SCREW (Ø3X8) FOOT		
E	1D		N09-1476-05	MACHINE SCREW (Ø3X16) MECHA		
<b>ELECTRIC UNIT (X25-2920-XX) (-00: K,P,X,T,E -21: U,M,UE)</b>						
C1			CC45FSL1H150J	CERAMIC	15PF	J
C2			CK45FF1H103Z	CERAMIC	0.010UF	Z
C3	-5		CE04KW1C330M	ELECTRO	33UF	16WV
C7			CK45FB1H391K	CERAMIC	390PF	K
C8			CK45FB1H152K	CERAMIC	1500PF	K
C9			CC45FSL1H101J	CERAMIC	100PF	J
C10			C90-1456-05	NP-ELEC	0.22UF	50WV
C11			CK45FB1H332K	CERAMIC	3300PF	K
C12			CF92FV1H333J	MF	0.033UF	J
C13			CF92FV1H103J	MF	0.010UF	J
C14	.15		CE04KW1C330M	ELECTRO	33UF	16WV
C16			CF92FV1H222J	MF	2200PF	J
C17			CF92FV1H473J	MF	0.047UF	J
C18			CF92FV1H104J	MF	0.10UF	J
C19			CF92FV1H104J	MF	0.10UF	J
C20			C90-1333-05	NP-ELEC	22UF	10WV
C21			CF92FV1H104J	MF	0.10UF	J
C22			CF92FV1H103J	MF	0.010UF	J
C23			CK45FB1H102K	CERAMIC	1000PF	K
C24			CK45FF1H103Z	CERAMIC	0.010UF	Z
C25			CC45FSL1H470J	CERAMIC	47PF	J
C26			CF92FV1H333J	MF	0.033UF	J
C27			C90-1333-05	NP-ELEC	22UF	10WV
C28			C90-1350-05	NP-ELEC	2.2UF	50WV
C29			CF92FV1H473J	MF	0.047UF	J
C30			CK45FB1H102K	CERAMIC	1000PF	K
C31			C90-1331-05	NP-ELEC	0.47UF	50WV
C32			CF92FV1H103J	MF	0.010UF	J
C33			CF92FV1H333J	MF	0.033UF	J
C34			CE04KW1HR47M	ELECTRO	0.47UF	50WV
C35			CK45FB1H102K	CERAMIC	1000PF	K
C36			CE04KW1C330M	ELECTRO	33UF	16WV
C37			CF92FV1H104J	MF	0.10UF	J
C38			CE04KW1H2R2M	ELECTRO	2.2UF	50WV
C39			CK45FF1H473Z	CERAMIC	0.047UF	Z
C40	.41		CC45FSL1H101J	CERAMIC	100PF	J
C42			CE04KW1C330M	ELECTRO	33UF	16WV
C43			CE04KW0J221M	ELECTRO	220UF	6.3WV
C44			CE04KW1C470M	ELECTRO	47UF	16WV
C45	.46		CC45FSL1H220J	CERAMIC	22PF	J

E: Scandinavia & Europe K: USA P: Canada W: Europe S: Silver version  
 U: PX(Far East, Hawaii) T: England M: Other Areas  
 UE: AAFES(Europe) X: Australia  
 △ indicates safety critical components.

## PARTS LIST

× New Parts

Parts without Parts No. are not supplied.

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Telle ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C47 ,48			C91-0093-05	POLYSTY 270PF J		
C49 ,54			CF92FV1H222J	MF 2200PF J		
C55 ,56			CF92FV1H152J	MF 1500PF J		
C57 ,58			CF92FV1H102J	MF 1000PF J		
C59 ,60			CE04KW1V100M	ELECTR0 10UF 35WV		
C61 ,62			CK45FSL1H101J	CERAMIC 100PF J		
C63 ,64			CE04KW1H010M	ELECTR0 1.0UF 50WV		
C65 ,66			CK45FB1H332K	CERAMIC 3300PF K		
C67 ,68			CE04KW1A101M	ELECTR0 100UF 10WV		
C69 ,70			CK45FF1H103Z	CERAMIC 0.010UF Z		
C71 ,72			CE04KW1A101M	ELECTR0 100UF 10WV		
C73			CF92FV1H474J	MF 0.47UF J		
C74			CK45FF1H103Z	CERAMIC 0.010UF Z		
C75 ,76			CE04KW1C330M	ELECTR0 33UF 16WV		
C77			CK45FF1H103Z	CERAMIC 0.010UF Z		
C78 ,79			CE04KW1C222M	ELECTR0 2200UF 16WV		
C80			CE04KW1C470M	ELECTR0 47UF 16WV		
C81			CE04KW1V4R7M	ELECTR0 4.7UF 35WV		
C82 ,85			CK45FF1H103Z	CERAMIC 0.010UF Z		
C86			CE04KW1C330M	ELECTR0 33UF 16WV		
C87 ,88			CK45FF1H103Z	CERAMIC 0.010UF Z		
C89			CE04KW1H101M	ELECTR0 100UF 50WV		
C90			CK45FF1H103Z	CERAMIC 0.010UF Z		
C91 ,93			C91-0647-05	CERAMIC 0.01UF P		
C94			CE04KW1V100M	ELECTR0 10UF 35WV		
C95			C91-0700-05	CERAMIC 0.1UF J		
C96 ,97			CK45FB1H102K	CERAMIC 1000PF K		
C98 ,99			CE04KW1A101M	ELECTR0 100UF 10WV		
C100			CK45FSL1H271J	CERAMIC 270PF J		
C102 ,103			CE04KW0J471M	ELECTR0 470UF 6.3WV		
C104			CE04KW0J102M	ELECTR0 1000UF 6.3WV		
C105			CE04KW1C220M	ELECTR0 22UF 16WV		
C106			C91-0700-05	CERAMIC 0.1UF J		
C107			CE04KW1A101M	ELECTR0 100UF 10WV		
C108			CE04KW1A101M	ELECTR0 100UF 10WV		
C109			C91-0700-05	CERAMIC 0.1UF J		
C110 ,111			C91-0725-05	CERAMIC 15PF J		
C112 ,113			CK45FF1H103Z	CERAMIC 0.010UF Z		
CN1		*	E10-2904-05	FLAT CABLE CONNECTOR		
CN2		*	E10-2903-05	FLAT CABLE CONNECTOR		
CN3		*	E10-1409-05	FLAT CABLE CONNECTOR		
CN4 ,5		*	E10-0408-05	FLAT CABLE CONNECTOR		
CN8		*	E10-0308-05	FLAT CABLE CONNECTOR		
J201	2E		E13-0235-05	PHONE JACK(2P) OUTPUT		
J202	2E		E11-0164-05	MINIATURE PHONE JACK(3P)1		
J203	1C		E11-0162-05	PHONE JACK(3P)		
J204	2E		E13-0126-05	PHONE JACK(1P) SYSTEM CONTROL		
L1 ,2		*	L79-0737-05	LC FILTER		
L3		*	L79-0723-05	LINE FILTER		
X1		*	L77-1119-05	CRYSTAL RESONATOR		
X2		*	L78-0202-05	RESONATOR (400KHZ)		
R25			RS14KB3A100J	FL-PROOF RS 10 J 1W		
R112			RS14KB3A821J	FL-PROOF RS 820 J 1W		
R142 ,143		*	RS14KB3DBR2J	FL-PROOF RS 8.2 J 2W		

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VR1			R12-5046-05	TRIMMING PNT. (100K) TRACKING ER		
VR2			R12-3097-05	TRIMMING PNT. (22K) FOCUS ERROR		
VR3 ,4			R12-3096-05	TRIMMING PNT. (10K) F0/TR GAIN		
VR5			R12-1067-05	TRIMMING PNT. (2.2K) PLL		
S1 -20	2C, 2D		S40-1064-05	PUSH SWITCH		
S21	1E		S40-1103-05	PUSH SWITCH (POWER TYPE)		
S22	1E		S31-2115-05	SLIDE SWITCH	UMUE	
D1 -4			DSM1A1	DIODE		
D5 -20			1SS133	DIODE		
D5 -20			1SS176	DIODE		
D22 -25			1SS133	DIODE		
D22 -25			1SS176	DIODE		
D26			1SS131	DIODE		
D26			1SS178	DIODE		
D27 ,28		*	HZS8. 2S(B2)	ZENER DIODE		
D27 ,28			RD8. 2JS(B2)	ZENER DIODE		
D29			RD20F(B)	ZENER DIODE		
D30 -32			1SS133	DIODE		
D30 -32			1SS176	DIODE		
D34 -36			1SS133	DIODE		
D34 -36			1SS176	DIODE		
D37			1SS133	DIODE		
D37			1SS176	DIODE		
D38			1SS133	DIODE		
D38			1SS176	DIODE		
FL 1	2D		FIP78M13	FLUORESCENT INDICATOR TUBE		
IC1		*	CXA1081S	IC(RF AMP)		
IC2		*	CXA1082S	IC(SERVO SIGNAL PROCESSOR)		
IC3		*	CXD11300	IC(DIGITAL SIGNAL PROCESSOR)		
IC4		*	LC3516ASL-15	IC(2KX8 RAM)		
IC4		*	LC3517ASL-15	IC(2KX8 RAM)		
IC4		*	TMM2115BP-15	IC(2KX8 RAM)		
IC5		*	UPD75206CW-023	IC(MICROPROCESSOR)		
IC6		*	UPD7564CS-064	IC(MICROPROCESSOR)		
IC7		*	PCMS6P	IC(DA CONVERTER)		
IC8			NJMO72BD	IC(FET OP AMP X2)		
IC9			BU4053B	IC(3-INPUT 2CH MPX/DE-MPX)		
IC10-15			MS218P	IC(OP AMP X2)		
IC16		*	GP-1U501	IC(REMOTE SENSOR)		
Q1			STA341M	TRANSISTOR		
Q2			2SD1266(Q,P)	TRANSISTOR		
Q3			2SA1534A(R,S)	TRANSISTOR		
Q4			2SC3940A(R,S)	TRANSISTOR		
Q5			2SA1534A(R,S)	TRANSISTOR		
Q6			DTA124EN	DIGITAL TRANSISTOR		
Q7 ,8			DTC124EN	DIGITAL TRANSISTOR		
Q9 ,10			2SK246(Y)	FET		
Q11 ,12			2SC2878(B)	TRANSISTOR		
Q13			2SD1266(Q,P)	TRANSISTOR		
Q14			2SB941(Q,P)	TRANSISTOR		
Q15			2SA733(A)(Q,P)	TRANSISTOR		
Q16			DTA124EN	DIGITAL TRANSISTOR		
Q17			2SD1266(Q,P)	TRANSISTOR		

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<b>SUB-CIRCUIT UNIT (X25-2960-00)</b>						
C1 C2			CE04KW1H010M CE04KW1C330M	ELECTR0 1.0UF 50WV ELECTR0 33UF 16WV		
CN2			E10-1409-05	FLAT CABLE CONNECTOR		
Q1 Q2			2SA1286 2SC945(A)(Q,P)	TRANSISTOR TRANSISTOR		
<b>MECHANISM ASS'Y (X92-1140-01)</b>						
C1 -3			C91-0769-05	CERAMIC 0.01UF M		
5	2B		D10-1270-14	R0D		
6	1B	*	D10-1738-04	ARM (SWITCH)		
7	2B	*	D10-1740-03	ARM (TANGENTIAL)		
8	1B	*	D10-1741-13	ARM (CLAMPER)		
9	1A	*	D10-1742-02	ARM (LIFTER)		
10	2A	*	D10-1743-03	SLIDER (LIFTER)		
11	1A	*	D10-1782-14	SLIDER ASSY		
12	2A	*	D13-0359-13	GEAR (MAIN)		
13	2B	*	D13-0360-04	GEAR		
14	1B	*	D13-0361-05	GEAR ASSY (RACK)		
16	3B		D13-0363-08	GEAR (WHEEL)		
17	2A	*	D16-0140-14	BELT		
18	3B	*	D40-0375-05	DRIVE MECHANISM ASSY		
22	1B	*	G01-1890-04	EXTENSION SPRING (SLIDER)		
23	2B	*	G01-1891-04	COMPRESSION SPRING(ARM)		
24	1B	*	G01-1892-14	COMPRESSION SPRING(ARM)		
25	1A	*	G01-1893-04	EXTENSION SPRING (TRAY ASSY)		
30	1B		J11-0086-04	CLAMPER (DISK)		
31	2B	*	J25-4905-22	PRINTED WIRING BOARD(PU)		
32	2B	*	J91-0321-05	PICKUP		
34	1A	*	J99-0035-01	TRAY		
35	2B	*	J21-3941-14	MOUNTING HARDWARE ASSY(TRAY)		
38	3B		N19-0366-04	FLAT WASHER (GEAR)		
39	2A, 2B	*	N19-1043-05	FLAT WASHER		
A	1B		N09-1522-05	SET SCREW (3X8)R0D		
S1	3B	*	S46-1087-05	LEAF SWITCH (0PN/CLS)		
S2	3A		S33-1019-05	LEVER SWITCH (SLT)		
43	3A	*	T42-0097-05	DC M0TOR (LOADING)		
44	3A		T42-0099-05	DC M0TOR		
45	2A	*	T42-0100-04	M0TOR ASSY (DISK)		
<b>CONTROL CIRCUIT UNIT (X29-1760-00)</b>						
C1 C2 ,3			CE04JWOJ100M C91-0769-05	ELECTR0 10UF 6.3WV CERAMIC 0.01UF M		
R7 VR1			RS14DB3A120J R12-3118-05	FL-PROOF RS 12 J 1W TRIMMING P0T. (10K)LDP ADJ		
D1 D1 D2			1SS133 1SS176 RD3. DES(B)	DI0DE DI0DE ZENER DI0DE		
Q1 Q3 ,2			2SC945(A)(Q,P) 2SC3666	TRANSISTOR TRANSISTOR		

\*1

\*1

1. Laser pickups have been changed since the following serial Nos.  
Model Name    Serial No. with Changed Pickups  
DP-860            73L80001 and after
2. The parts Nos. of the laser pickups after the change are as follows.  
J91-0280-15    →    J91-0321-05  
(TOPH-7810)    (TOPH-7815)
3. The new and old pickups are not interchangeable.  
When servicing, be sure to check the model of the laser pickup being used (TOPH-7810 or TOPH-7815).



## SPECIFICATIONS

Number of channels .....	2 channels
Frequency response .....	5 Hz — 20 kHz, $\pm 1$ dB
Dynamic range .....	92 dB or more
Signal to noise ratio .....	94 dB
Total harmonic distortion .....	0.007% at 1 kHz
Channel separation .....	90 dB at 1 kHz
Wow & flutter .....	Unmeasurable limit
Line output level/impedance .....	1.6 V/3.3 kohms
Headphones output level/impedance .....	31 mW/32 ohms
Constant linear velocity .....	1.2 - 1.4 m/sec.
Quantization .....	16 bits linear 1 channel
Sampling frequency .....	44.1 kHz
Power consumptions .....	15 W
Dimensions .....	W 420 mm (16-9/16") H 87 mm ( 3-7/16") D 262 mm (10-5/16")
Weight (Net) .....	3.8 kg (8.36 lb)

**Note:**

We follow a policy of advancements in development. For this reason specifications may be changed without notice.

**Note :**

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S.A. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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