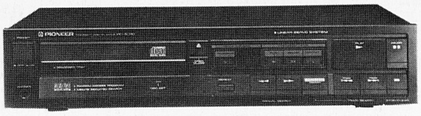
PIONEER

Service Manual

REPAIR & ADJUSTMENTS



ORDER NO.
ARP-758

COMPACT DISC PLAYER

PD-5010(BK)
PD-5010

MODEL PD-5010 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS.

Type	Applicable model		Power requirement	Destination
	PD-5010[BK]	PD-5010		
KU	○	○	AC120V only	U.S.A. model
KC	○	—	AC120V only	Canada model
HEM	○	○	AC220V	European continent model
HB	○	○	AC240V	United Kingdom model
S	○	○	AC110V, 120V, 220V, 240V (switchable)	General export model

- This service manual is applicable to the PD-5010 KU, KC, HEM, HB and S types.
- As to the KC, HEM, HB and S types please refer to pages 82 — 84.
- As to the circuit and mechanism descriptions, please refer to the PD-9010X service manual (ARP-883).
- Ce manual d'instruction se refére au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS [USA] INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
TEL: [800] 421-1404, [800] 237-0424
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium TEL: 03/775·28·08
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia
TEL: [03] 580-9911

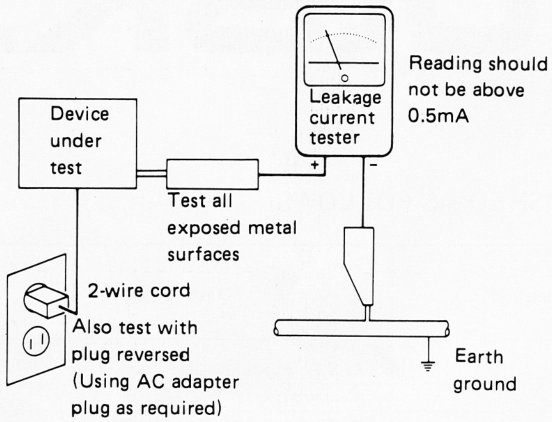
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

QUESTIONNAIRE

MODEL ____________________

One Model per questionnaire

Dear Servicer,

Thank you for your cooperation in the post-sale service of Pioneer products.

This questionnaire is used as a tool to improve the serviceability of our products and service manuals. Please evaluate this model and service manual by answering the following questions. Your ideas may be realized in our future products. Your answers will be appreciated. Thank you.

PIONEER ELECTRONIC CORP.

T. Nakagawa, Manager, Service Section, International Division

1. SERVICING EVALUATION	Circle applicable number: Good		Fair		Poor
a. Disassembly/Re-assembly:	1	2	3	*4	*5
b. Circuit Checks:	1	2	3	*4	*5
c. Replacement of Parts:	1	2	3	*4	*5
d. Adjustment (s):	1	2	3	*4	*5

* If (4) or (5) was circled, please be specific.

e. Your advice, opinion or ideas related to servicing this product.

2. SERVICE MANUAL EVALUATION

a. Circuit & Mechanism Description

b. Circuit Diagram

3. OTHER

Please describe other areas of servicing which you may find difficult.

Completed by :

Date :

Company Name :

Address :

City/State/Zip :

Please send this form filled to the distributor in your country.

2. SPECIFICATIONS

1. General

Type . . . . Compact disc digital audio system
Usable discs . . . . Diameter 120 mm
Thickness 1.2 mm
Maximum playing time: 60 minutes or more (stereo)
Linear speed: 1.2 ~ 1.4 m/sec
Rotation direction (signal side): Counterclockwise
Signal format . . . . Sampling frequency: 44.1 kHz
Sampling bit number: 16 bit linear
Transmission bit rate: 4.3218 Mbit/sec.
Modulation system: EFM
Error correction system: CIRC
Preemphasis: 50/15 μsec (during use)
Laser used . . . . . Semiconductor laser: wavelength 780 nm
Power requirements
HEM model . . . . AC 220V, 50, 60 Hz
HB, HP models . . . . AC 240V, 50, 60 Hz
KU, KC models . . . . AC120V, 60 Hz
S, S/G models . . . . AC 110/120/220/240V (switchable), 50, 60 Hz
Power consumption
HEM, HB, HP models . . . . 17 W
KU, KC models . . . . 16 W
S, S/G models . . . . 12 W
Operating temperature . . . . +5°C ~ +35°C
Weight . . . . 4.7 kg (10 lb 5 oz)
External dimensions . . . . . 420(W) x 310(D) x 91(H)mm
16-1/2(W) x 12-1/5(D) x 3-3/5(H)in

2. Audio section

Frequency response . . . . 2 Hz ~ 20 kHz ± 0.5 dB
S/N . . . . 96 dB (1 kHz)
Dynamic range . . . . 95 dB (1 kHz)
Channel separation . . . . 93 dB (1 kHz)
Wow and flutter . . . . Quartz oscillator accuracy
Total harmonic distortion . . . . 0.002% (1 kHz, 0 dB)
Total harmonic distortion and noise
. . . . 0.004% (1 kHz, 0 dB)
Output voltage . . . . 2 Vrms (1 kHz, 0 dB)
Channels . . . . 2-channel (stereo)

3. Functions

- Play
- Manual search
- All-track repeat
- Programmed playback
- Programmed repeat
- Pause
- Track search
- Initial play from selected track

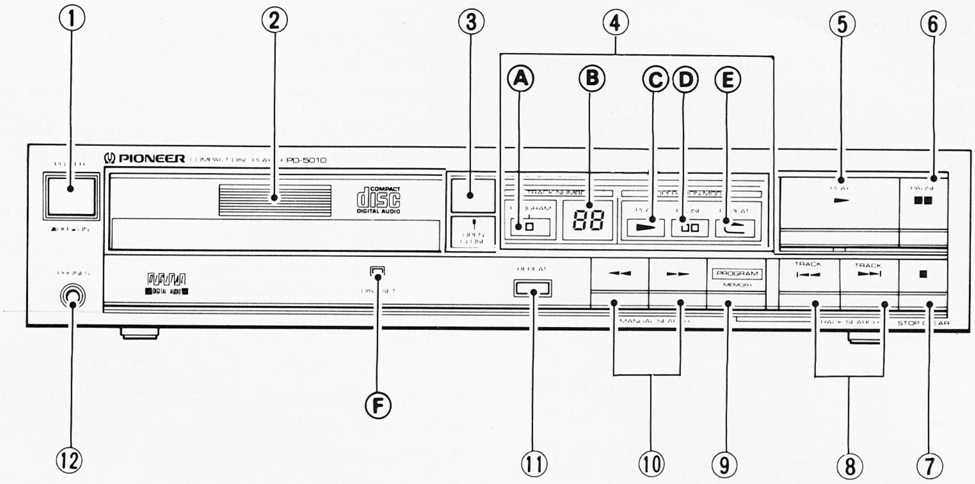
4. Accessories

- Pin-plug audio cable 1
- Operating Instructions 1

NOTE:
The specifications and appearance of this product may be changed without notice.

3. PANEL FACILITIES

● FRONT PANEL



① POWER switch

Press to turn power to the unit ON and OFF.

② Disc tray

Compact discs are loaded here. When the power is turned on and the OPEN/CLOSE switch is pressed, the disc tray opens toward the front. To close the tray, either press the OPEN/ CLOSE switch again, or push the tray in manually.

③ OPEN/CLOSE switch

Press to open or close the disc tray. The disc tray alternately opens and closes each time the switch is pressed.

④ Indicators

- Ⓐ PROGRAM : Lights after tracks are programmed.
- Ⓑ TRACK : Indicates the number of the track currently playing or being programmed.
- Ⓒ PLAY : Lights during playback.
- Ⓓ PAUSE : Lights during the pause mode (playback has been temporarily interrupted).
- Ⓔ REPEAT : Lights during repeat play.
- Ⓕ DISC : Lights when a disc has been loaded correctly.

⑤ PLAY key

Press to begin playback, and to release the player from the pause mode.

⑥ PAUSE key

Press to temporarily interrupt playback. When pressed again, the player is released from the pause mode.

⑦ STOP/CLEAR key

Press to stop playback. When pressed, all operations stop. Also, when the player is in the stop mode, press this key to cancel memorized contents of programmed play.

⑧ TRACK SEARCH keys

When the player is in the normal play or programmed play modes, or during the pause mode, these keys are pressed to perform search for a desired track. When pressed, the disc will be advanced to the next track, or reversed to the previous track.

[►►|] : When pressed once, the disc playback advances to the beginning of the next track; when pressed continuously, the disc playback moves to the beginning of succeeding tracks on the disc (during programmed playback, it moves to the beginning of the next programmed track).

[|◄◄] : When pressed once, the disc playback returns to the beginning of the currently playing track; when pressed continuously, the disc playback moves further in reverse to the beginning of previous tracks on the disc (during programmed playback, it returns to the beginning of the previously programmed track).

⑨ PROGRAM key (PROGRAM MEMORY)

Use to memorize desired programs for programmed playback. Press this key after selecting a desired track with the track search key. Tracks will be memorized in the order the keys are pressed.

⑩ MANUAL SEARCH keys

These keys are pressed to perform fast forward and fast reverse when the player is in the play or pause modes. The function operates only during the time the keys are held depressed; if the keys are held depressed for three seconds or more, the speed increases.

[►►] : Fast forward is performed (if end of disc is reached, player enters the pause mode).

[◄◄] : Fast reverse is performed (if beginning of disc is reached, player enters the pause mode).

During programmed play, the player will enter the pause mode just before moving to the next (or previous) track.

⑪ REPEAT key

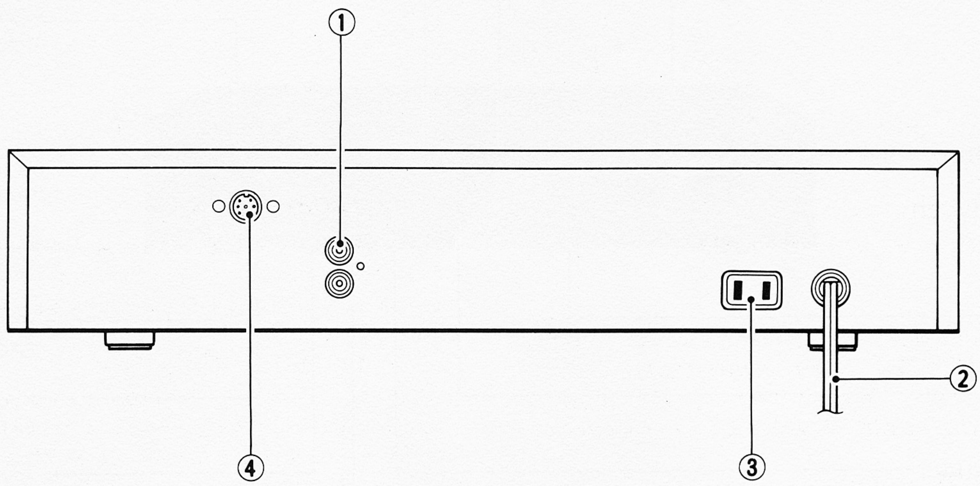
Press to perform repeat playback.

- When pressed during the normal playback mode, all tracks on the disc will be played back repeatedly.
- During programmed playback, the programmed tracks will be played back repeatedly in the programmed order.

⑫ PHONES terminal

When using headphones, connect their plug here.

● REAR PANEL



① AUDIO OUT terminals

② Power cord

③ AC OUTLET (UNSWITCHED, MAX. 100W)

[Only U.S.A. model is provided with this outlet. Other models are not provided with this outlet.]

- Power is continuously supplied to the component connected here, regardless of the setting of the power switch (ON/OFF). Turn the connected component ON/OFF by using its own power switch.
- Do not connect any component having a power consumption exceeding 100W.

NOTE:

- *Never connect any appliance (toaster, hair dryer, etc.) whose power consumption exceeds the wattage (W) noted on the outlet panel. Damage to components or fire hazards could result.*
- *Even if a television set has a rated power consumption less than the permissible outlet wattage, when its power is first turned on it may have a temporary electrical current flow that exceeds the permissible value. For this reason, do not connect television sets or monitors to this outlet.*

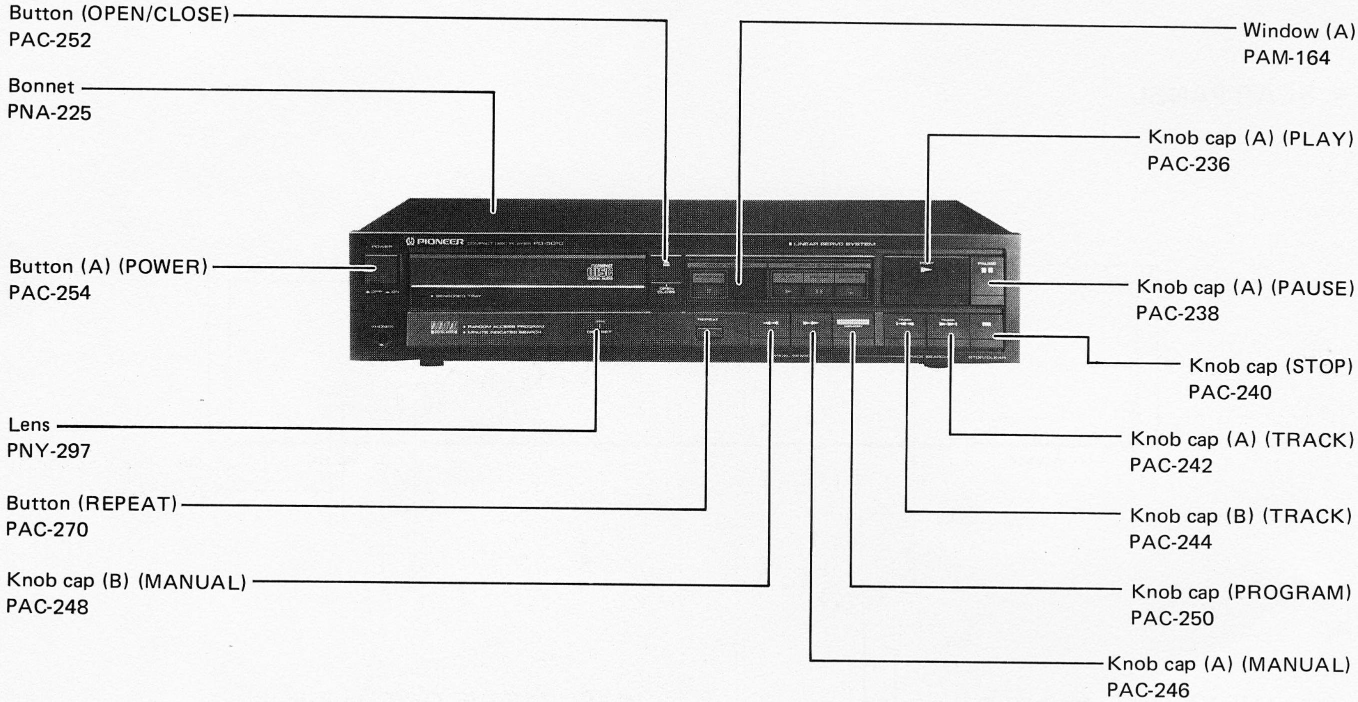
④ SUBCODE OUT terminal

This terminal will be used for outputting subcodes (data recordable on compact discs together with audio signals) in future audio applications.

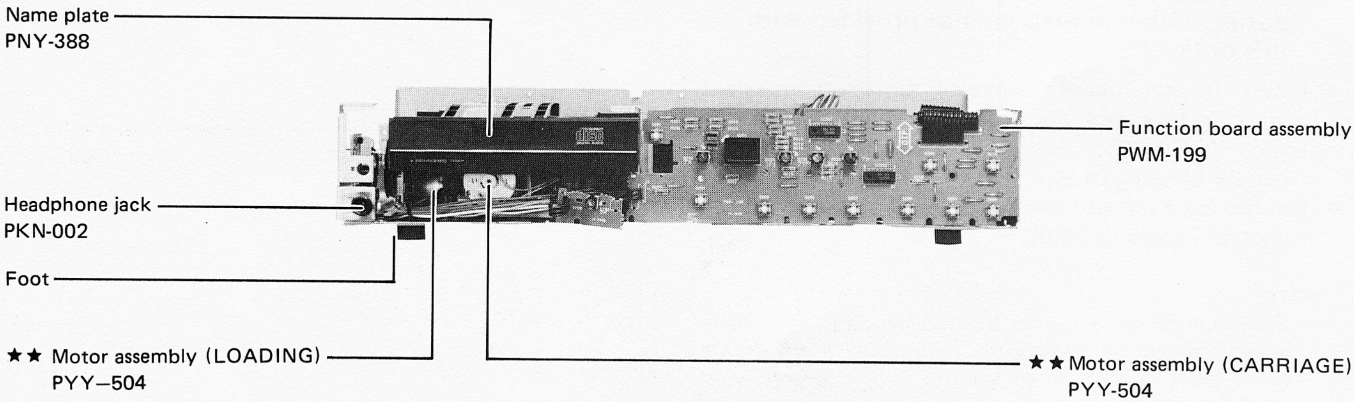
4. PARTS LOCATIONS

NOTES:
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

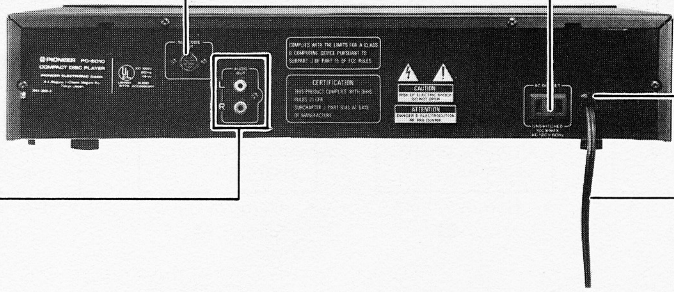
Front Panel View



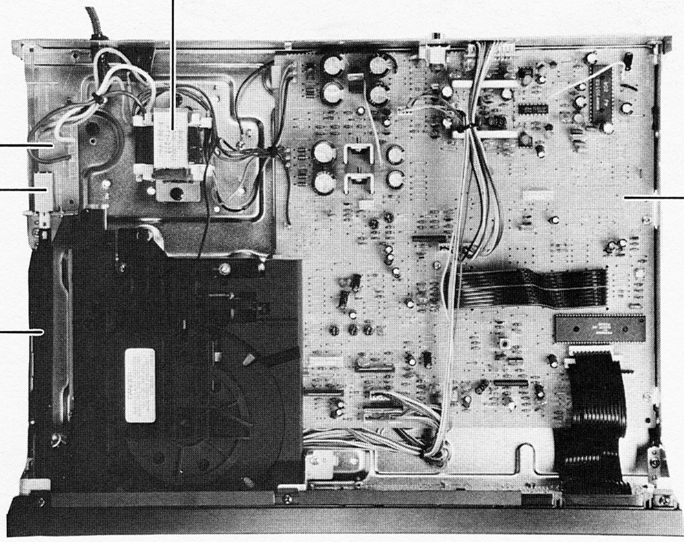
Front View with Front Panel Removed



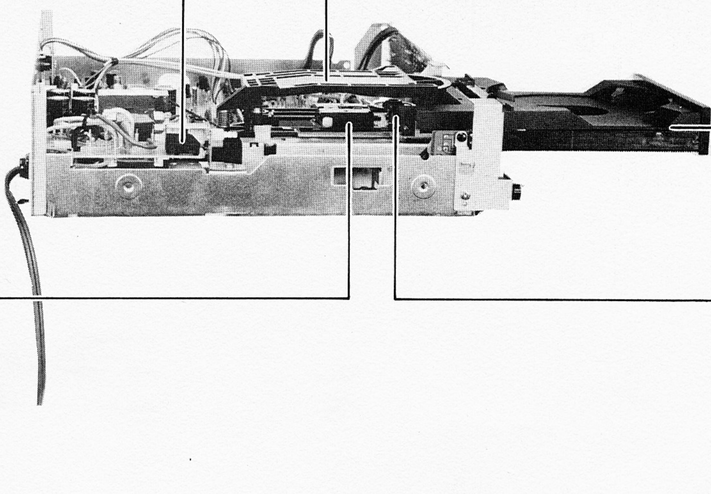
Rear Panel View



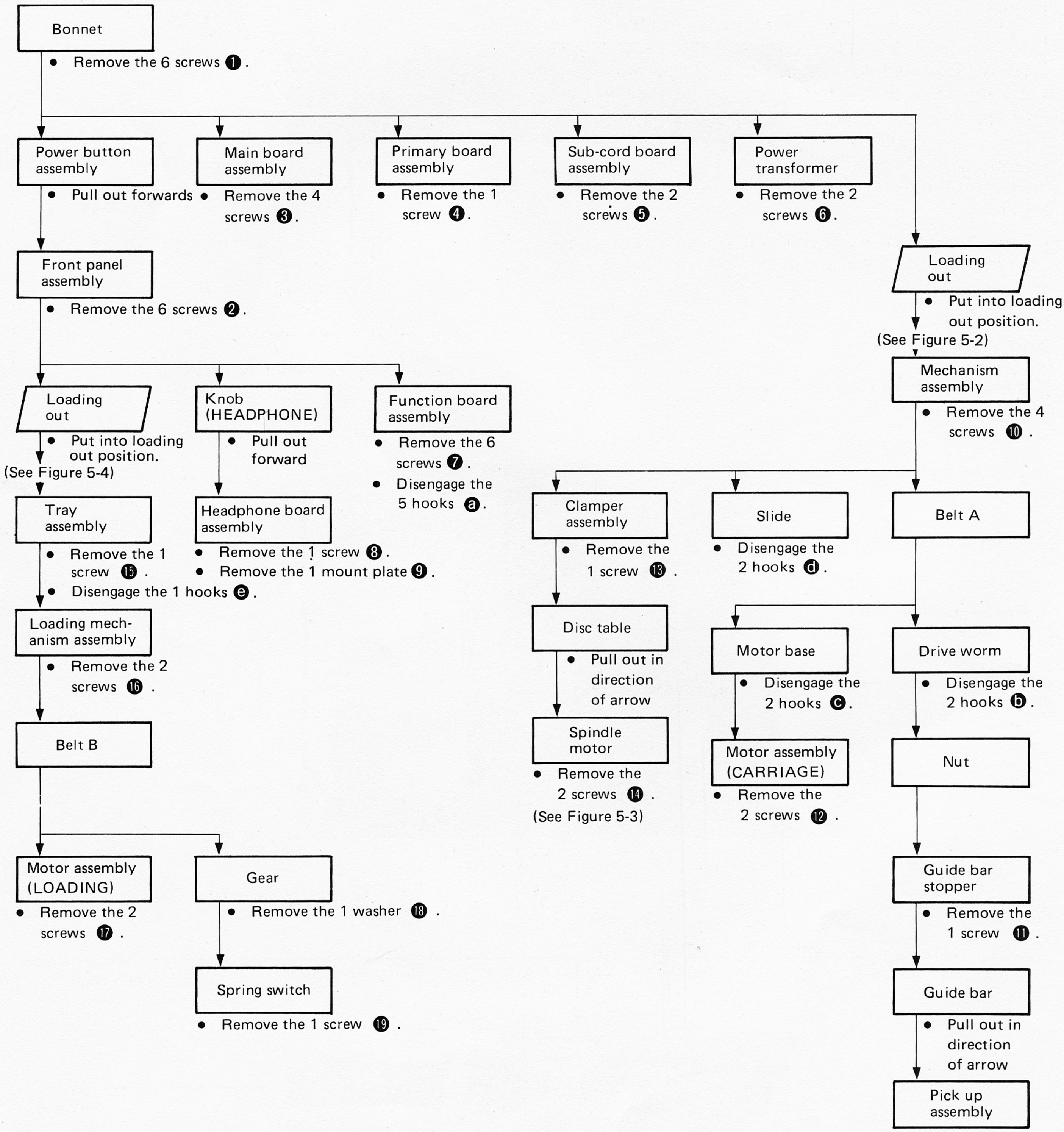
Top View



Side View



5. DISASSEMBLY



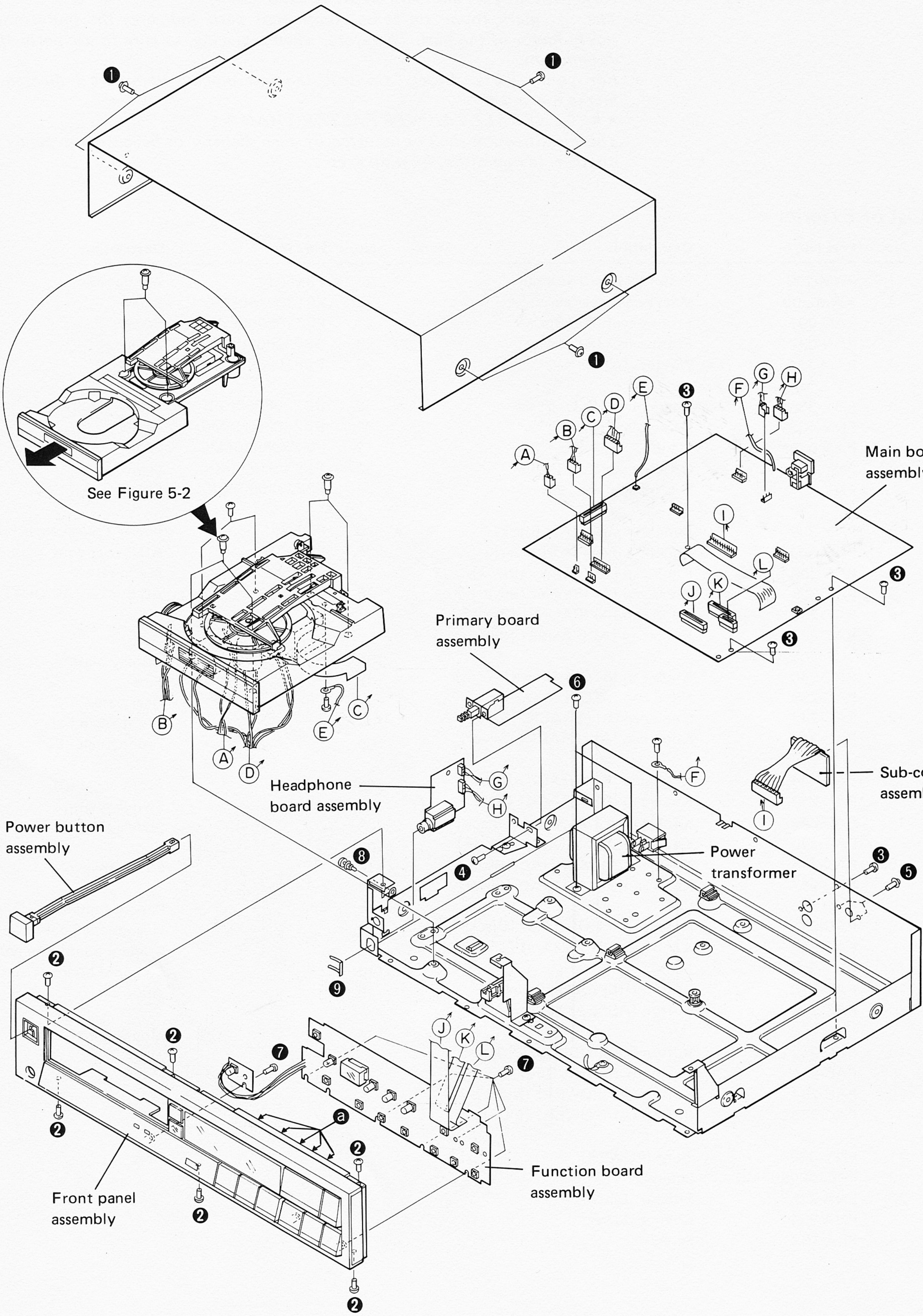


Fig. 5-1 Disassembly

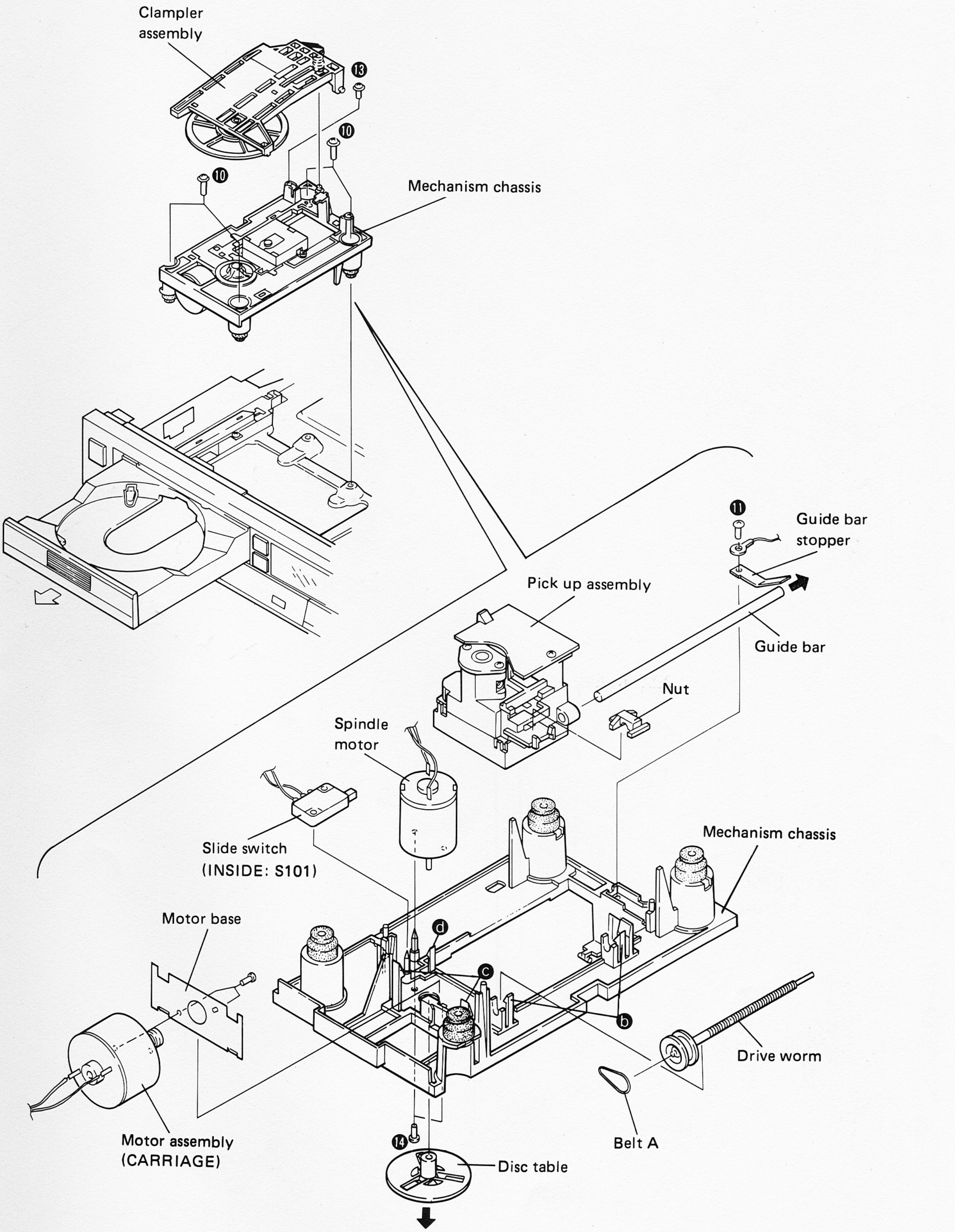


Fig. 5-2 Disassembly

- **Disctable Assembly Procedures**

When the disc table is remounted by pressure insertion, always make contact with the stopper below the spindle motor, insert a spacer (ϕ4mm hexagonal wrench. etc.) to ensure that the gap between the disk table and mechanism chassis is as shown in Figure 5-3, and apply pressure from directly above. (Pressure of approx. 9kg.)

NOTE:
ϕ4mm hexagonal wrench is included hexagonal wrench set. (No. GGH-003).

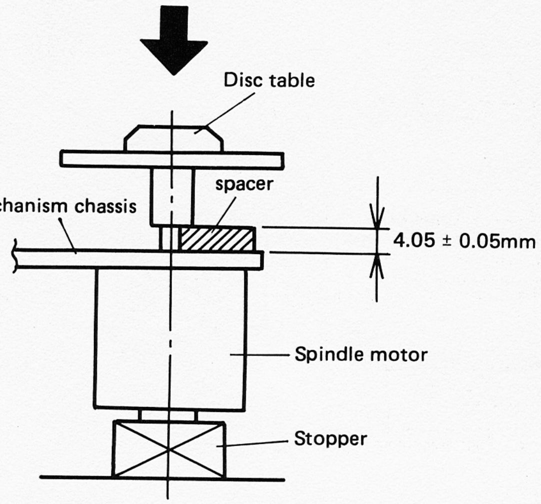


Fig. 5-3 Disctable assembly

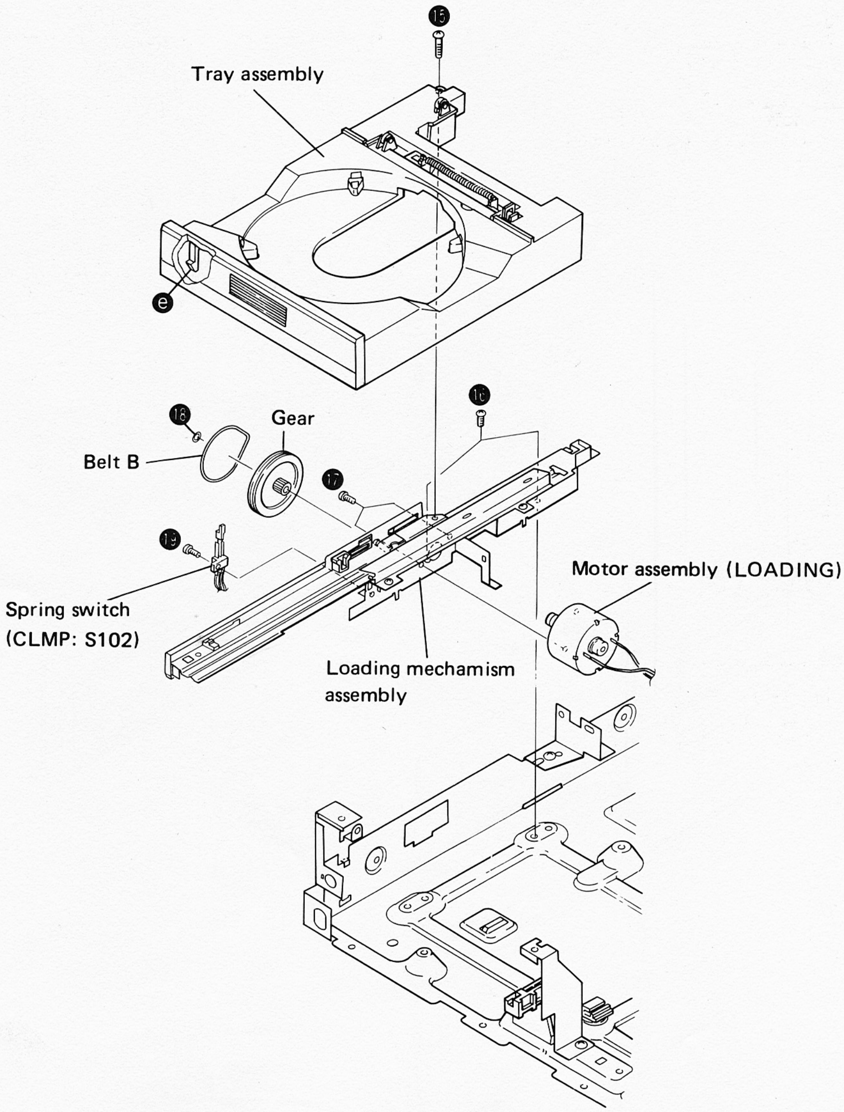
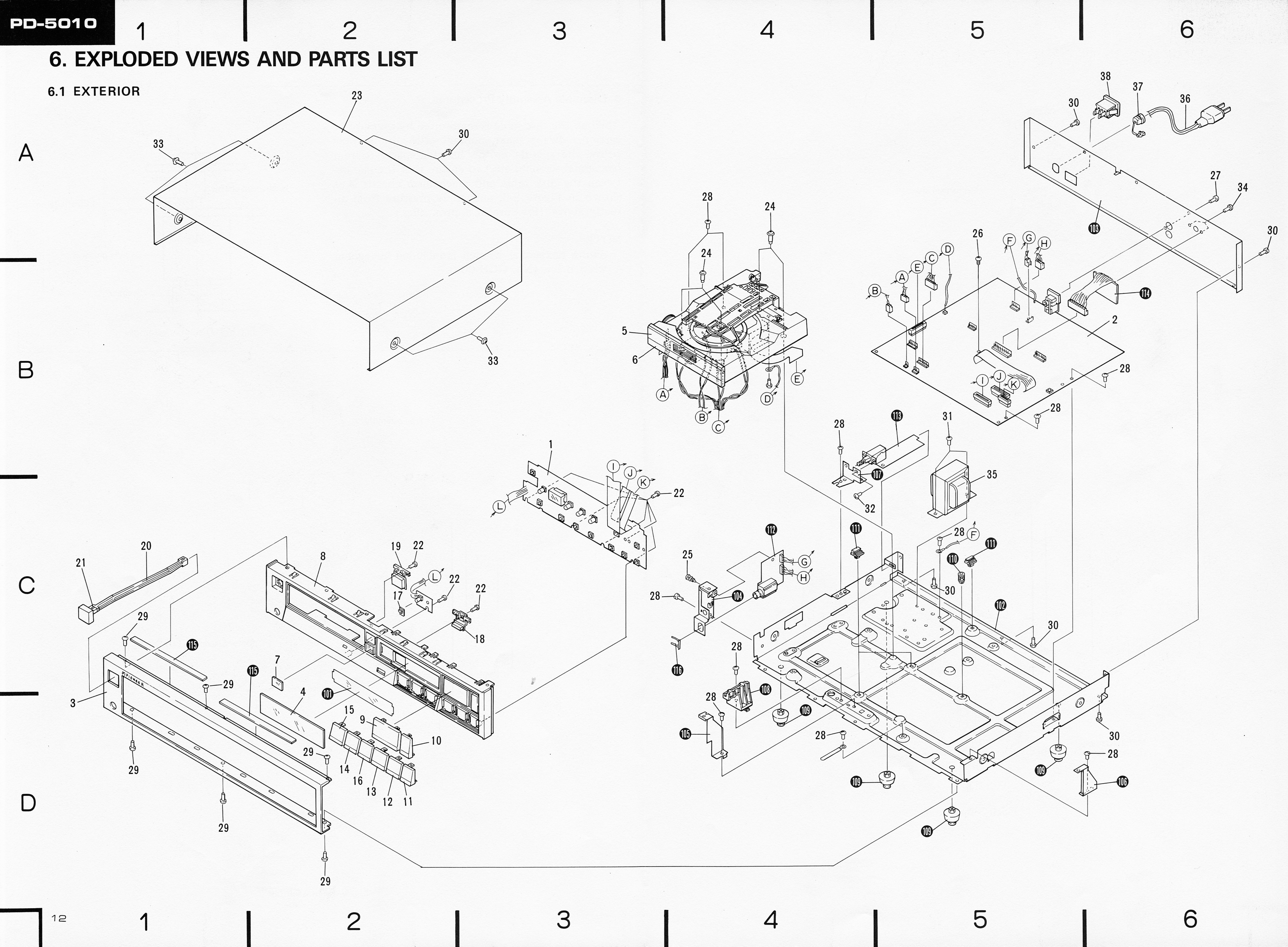


Fig. 5-4 Disassembly

6. EXPLODED VIEWS AND PARTS LIST

6.1 EXTERIOR

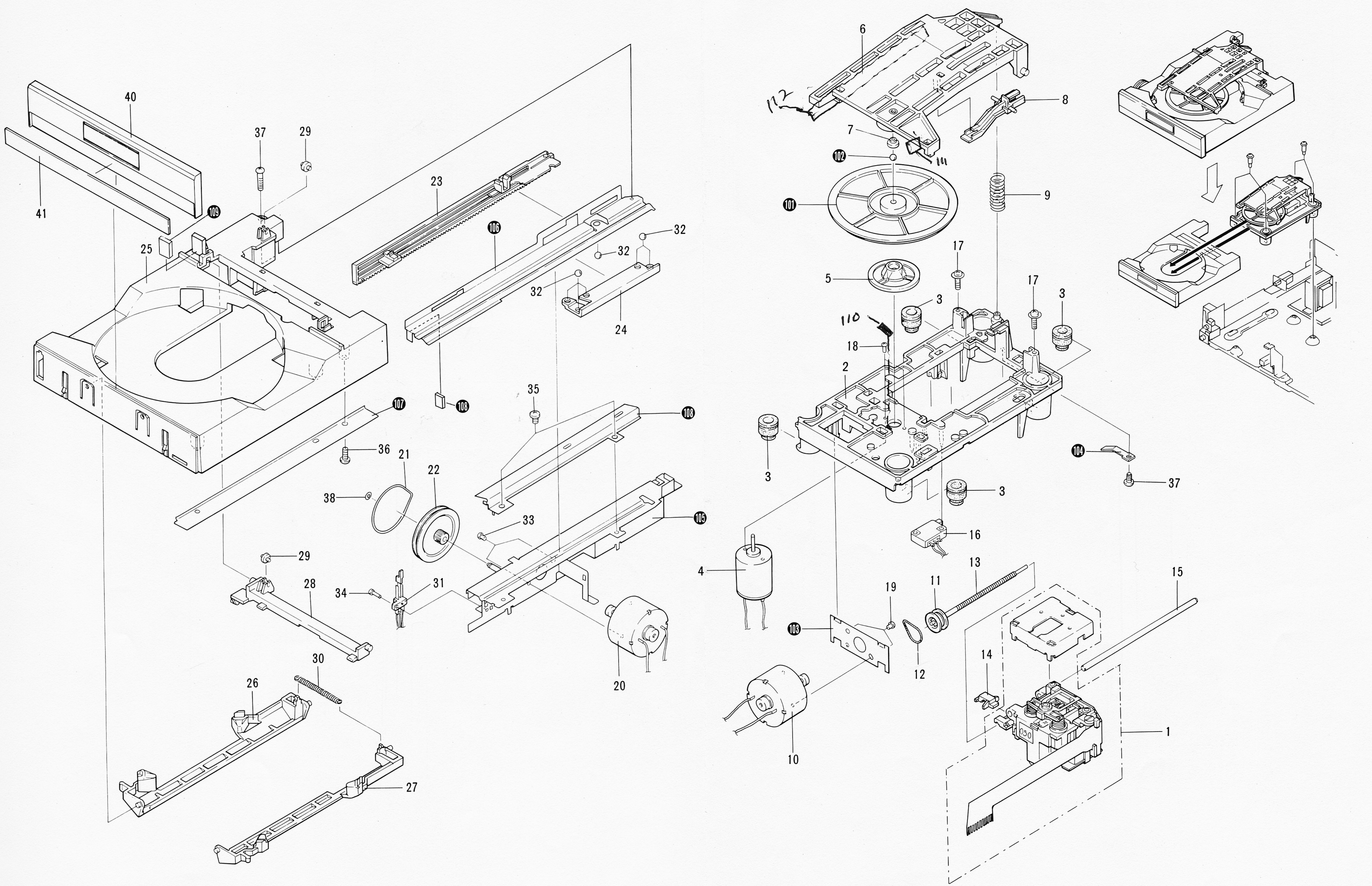


NOTES:
- ***Parts without part number cannot be supplied.***
- ***The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.***
- ***For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.***
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List of Exterior

Mark	No.	Part No.	Description
	1.	PWM-199	Function board assembly
⚠	2.	XWM-200	Main board assembly
	3.	PAN-091	Front panel (A) [Black]
		PAN-092	Front panel (A) [Silver]
	4.	PAM-164	Window (A)
	5.	PNY-388	Name plate [Black]
		PNY-403	Name plate [Silver]
	6.	PAN-079	Plate
	7.	PNY-395	O/C name plate [Black]
		PNY-394	O/C name plate [Silver]
	8.	PNY-399	Function panel (A) [Black]
		PNY-363	Function panel (A) [Silver]
	9.	PAC-236	Knob cap (A) (PLAY) [Black]
		PAC-235	Knob cap (A) (PLAY) [Silver]
	10.	PAC-238	Knob cap (A) (PAUSE) [Black]
		PAC-237	Knob cap (A) (PAUSE) [Silver]
	11.	PAC-240	Knob cap (STOP) [Black]
		PAC-239	Knob cap (STOP) [Silver]
	12.	PAC-242	Knob cap (A) (TRACK) [Black]
		PAC-241	Knob cap (A) (TRACK) [Silver]
	13.	PAC-244	Knob cap (B) (TRACK) [Black]
		PAC-243	Knob cap (B) (TRACK) [Silver]
	14.	PAC-246	Knob cap(A)(MANUAL)[Black]
		PAC-245	Knob cap(A)(MANUAL)[Silver]
	15.	PAC-248	Knob cap(B)(MANUAL)[Black]
		PAC-247	Knob cap(B)(MANUAL)[Silver]
	16.	PAC-250	Knob cap (PROGRAM) [Black]
		PAC-249	Knob cap (PROGRAM) [Silver]
	17.	PNY-397	Lens
	18.	PAC-270	Button (REPEAT) [Black]
		PAC-269	Button (REPEAT) [Silver]
	19.	PAC-252	Button (OPEN/CLOSE) [Black]
		PAC-251	Button (OPEN/CLOSE) [Silver]
	20.	PAC-254	Button (A) (POWER) [Black]
		PAC-253	Button (A) (POWER) [Silver]
	21.	PNY-366	Joint (POWER)
	22.	PPZ30P080FMC	Screw
	23.	PNA-225	Bonnet [Black]
		PNA-224	Bonnet [Silver]
	24.	PBA-182	Screw
	25.	PBM-012	Plastic rivet
	26.	PPZ30P150FMC	Screw
	27.	PPZ30P080FZK	Screw
	28.	BBP30P060FMC	Screw
	29.	BBP30P080FZK	Screw
	30.	BBZ30P060FZK	Screw
	31.	BBZ40P060FMC	Screw
	32.	PMZ30P060FMC	Screw
	33.	FBT40P080FZK	Screw
	34.	PPZ26P060FZK	Screw
⚠ ★	35.	PTT-233	Power Transformer (120V)
⚠	36.	PDG-046	AC Power cord
⚠	37.	CM-22	Strain relief
⚠	38.	PKN-003	AC Socket (AC OUTLETS)
	101.	PAM-166	Display plate
	102.		Base
	103.		Rear base
	104.		Front angle (A)
	105.		Front amgle (B)
	106.		Front angle (C)
	107.		Switch angle
	108.		Slide guide
	109.		Foot
	110.		P.C.B. spacer
	111.		P. board holder
	112.		Headphone board assembly
⚠	113.		Primary board assembly
	114.		Sub cord board assembly
	115.		Abosrber
	116.		Mount plate

6.2 MECHANISM ASSEMBLY



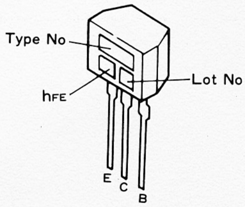
skipping 3, 110, 111, 112, SI-P400146

Parts List of Mechanism Assembly

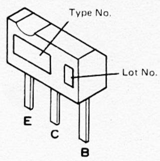
Mark	No.	Part No.	Description
	1.	PWY-004	Pickup assembly
	2.	PNY-271	Mechanism chassis
	3.	~~PEB-293~~ PEB-320	Floating rubber
★★	4.	PXM-147	Spindle motor
	5.	PNY-272	Disc table
	6.	PNY-352	Clamper holder
	7.	VNL-268	Receptacle
	8.	PNY-354	Clamper lever
	9.	PBH-422	Clamper spring
★★	10.	PYY-504	Motor assembly (CARRIAG)
★★	11.	PNX-449	Motor pulley
★★	12.	PEB-294	Belt
	13.	PLB-271	Drive worm
	14.	PNY-355	Nut
	15.	PLB-272	Guide bar
★★	16.	PSH-007	Slide switch (INSIDE: S101)
	17.	iPZ30P080FMC	Screw
	18.	PMZ20P040FMC	Screw
	19.	PMZ26P040FMC	Screw
★★	20.	PYY-504	Motor assembly (LOADING)
★★	21.	PEB-297	Belt
	22.	PNY-379	Gear
	23.	PNY-380	Rack
	24.	PNY-381	Retainer
	25.	PNY-406	Tray
	26.	PNY-383	Disc lever (L)
	27.	PNY-384	Disc lever (R)
	28.	PNY-385	Drive lever
	29.	PNY-386	Roller
	30.	PBH-423	Disc lever spring
★★	31.	PSN-003	Spring switch (CLMP: S102)
	32.	PBP-001	Steel ball 4ϕ
	33.	PMZ26P040FMC	Screw
	34.	PMZ20P060FMC	Screw
	35.	BBZ30P060FMC	Screw
	36.	PPZ30P080FMC	Screw
	37.	. . .	. . .
	38.	WT25D047D025	Washer
	39.	BBZ30P080FZK	Screw
	40.	PNY-388	Name plate [Black]
		PNY-403	Name plate [Silver]
	41.	PAN-079	Plate
	101.	PNY-353	Clamper
	102.	PBP-001	Steel ball
	103.		Motor base
	104.		Guide bar stopper
	105.		Loading base unit
	106.		Slide base
	107.		Slide plate
	108.		Stop rubber
	109.	REC-369	Cushion (2.5)
	110	PMF1001	Magnet
	111	PNM 654	Sheet, Rubber
	112	PEB 336	" "

External Appearance of Transistors and ICs

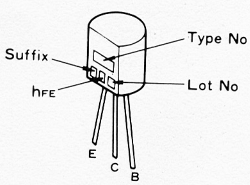
2SA933S
2SC1740SLN



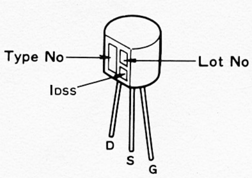
2SA937F
2SA937LNF



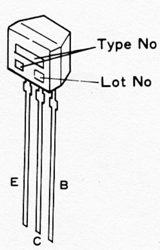
2SC1740LN



2SK152



DTC124ES



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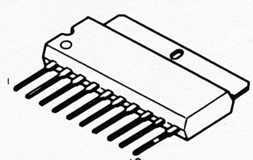
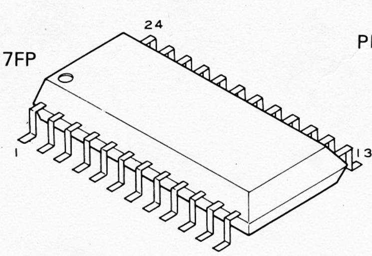
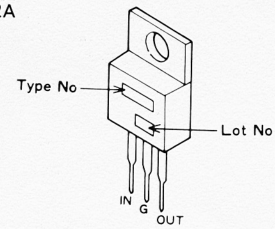


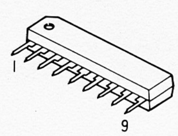
CX20109
M5M5117FP



NJM78M05A
NJM78M12A



NJM4558S
NJM082S



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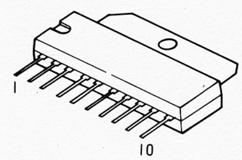

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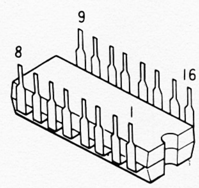

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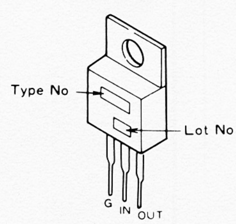

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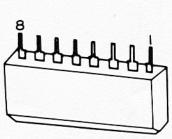

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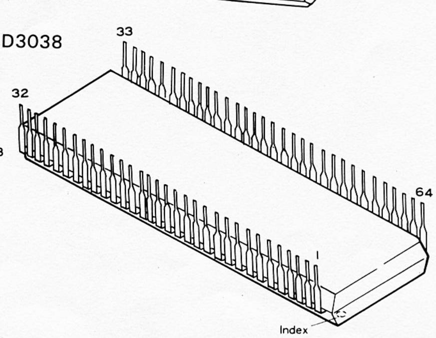

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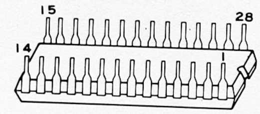

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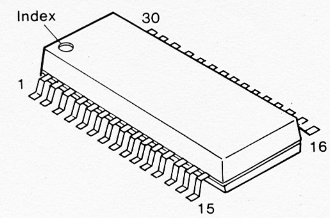

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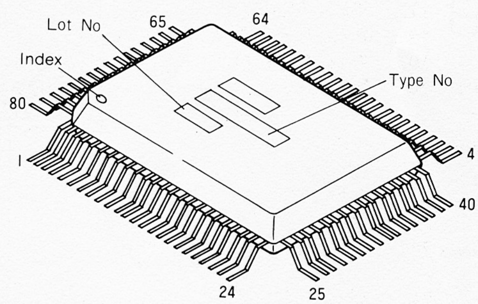

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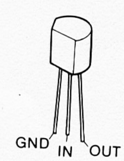

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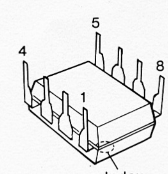
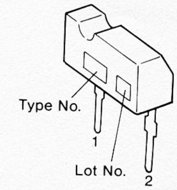


ICP-F15



7. SCHEMATIC DIAGRAM AND P.C. BOARD PATTERNS

7.1 P. C. BOARD PATTERNS

7.2 SCHEMATIC DIAGRAM

NOTE:

1. RESISTORS.
   Indicated in Ω, ¼W, ⅛ W,±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance

2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE
   ; DC voltage (V) at no input signal

4. OTHERS:
   ➡ ; Signal route.
   ⊘ ; Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts numbers.

   This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

The waveforms at each measuring point indicated by the encircled numbers are given on pages 31 thru 34.

SWITCHES:

MAIN BOARD ASSEMBLY
- S1 : TEST

FUNCTION BOARD ASSEMBLY
- S201 : OPEN / CLOSE
- S202 : REPEAT
- S203 : ◀◀ (MANUAL SEARCH)
- S204 : ▶▶ (MANUAL SEARCH)
- S205 : PROGRAM
- S206 : |◀◀ (TRACK SEARCH)
- S207 : ▶▶| (TRACK SEARCH)
- S208 : STOP / CLEAR
- S209 : PLAY
- S210 : PAUSE

PRIMARY BOARD ASSEMBLY
- S401 : POWER ON – <u>OFF</u>

OUTSIDE OF P.C. BOARD ASSEMBLY
- S101 : INSIDE
- S102 : CLAMP <u>CLAMP</u> — OPEN

The underlined indicates the switch position.

Focus servo loop line

Signal route

Tracking servo loop line

Carriage servo line

Loading motor route

Spindle motor route

Measurement point

● List of Symbols

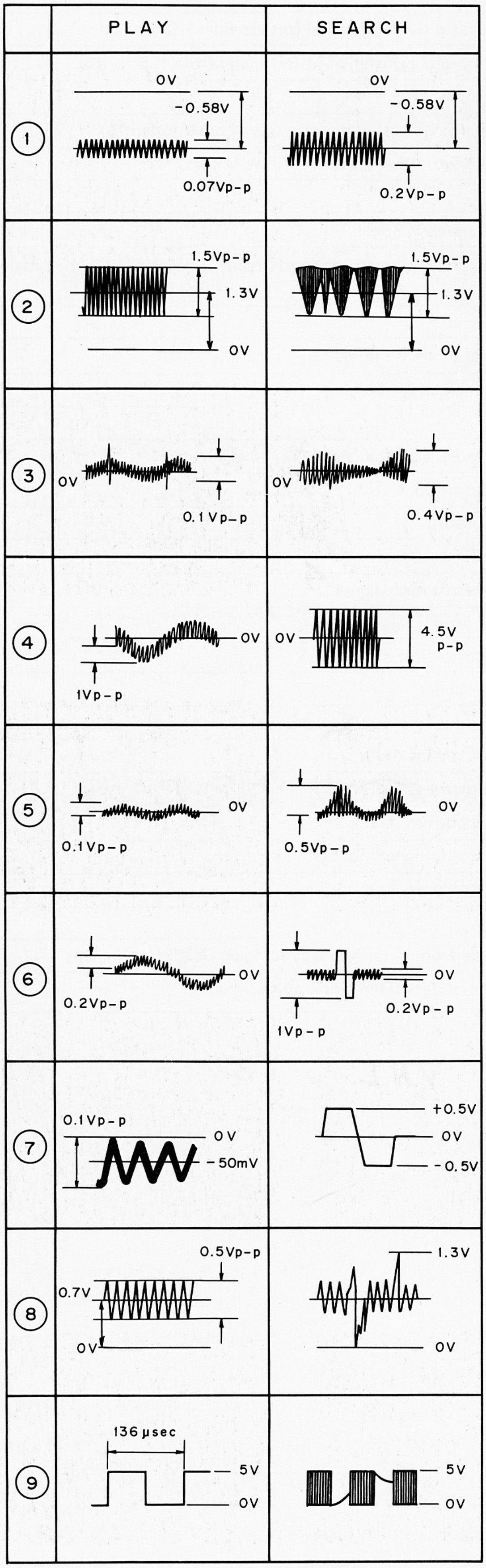
Symbol	Signal Source	Signal Name	Function
A			Tracking signal lead code detector
A0~A10	IC9-38~48	Address line	
APCG	IC1-6	APC GND	
B1~B4			Output from 1/4 divider detectors used to detect RF and focus signals
BCLK	IC9-76	Bit clock	
C			Tracking signal end code detector
C·OUT	IC6-6	Counter out	Track count signal pulse
C1F1	IC9-62	Error flag	Flags indicating when decoder LSI is correcting errors
C1F2	IC9-63	Error flag	
C2F1	IC9-64	Error flag	
C2F2	IC9-65	Error flag	
CA·DR	IC3-2	Carriage drive	Carriage motor drive output
CLK	IC12-27	Clock	IC6 and IC9 control data (serial) clock (MHz)
$\overline{\text{CLMP}}$	S102	Clamp	Disc tray status (L: closed, H: open or moving)
CRCF	IC9-20		Sub-code Q error detection result output (synchronized with SCOR signal)
$\overline{\text{CS}}$	IC9-50	Chip select	RAM activator control signal
D1~D8	IC9-37~34 32~29	Data line	RAM data line
DATA	IC9-78	Data	DAC playback signal data (serial)
$\overline{\text{DEMP}}$	IC12-24	De-emphasis	De-emphasis on/off signal (L: de-emphasis ON)
DIRC	IC12-13	Direct	Control signal involved in single track jumping (control only while signal is at L level)
EXCK	IC9-21	External clock	External clock input
$\overline{\text{FG DW}}$	IC12-15	Focus gain down	Control signal for reducing focus servo gain
FO·DR	IC2-2	Focus drive	Focus actuator drive signal
FO·ER	IC5-16	Focus error	Focus error signal
FO·IN	TP1-6	Focus loop in	Focus servo gain adjustment input
FO·OT	TP1-1	Focus loop out	Focus servo gain adjustment output
FO·RT	TR1-8	Focus	Focus actuator drive current detector
FOK	IC5-1	Focus OK	H level output to indicate that "in focus" status is set when RF signal is obtained
GFS	IC9-28	GFS	Frame sync lock status output (H: locked)
GND		GND	
$\overline{\text{INSD}}$	S101	Inside	Detector signal indicating that pick-up has reached inside track
K			
KD0~KD5	IC11 9~12 15, 17	Key data	Key on/off matrix encoded data
$\overline{\text{KS}}$	IC201-11	Key st	Output indicating that key has been pressed (L output when key is ON)
L·IN	IC12-26	Loading in	Loading-in control signal
L·OUT	IC12-28	Loading out	Loading-out control signal
LD ON	IC12-10	Laser diode	Laser diode switching signal (H: diode ON)
LOAD +	IC4-2		Loading motor drive voltage output
LOAD −	IC4-10		
LRCK	IC9-80	LR clock	Clock (MHz) for switching decoder (DAC) left/right channels

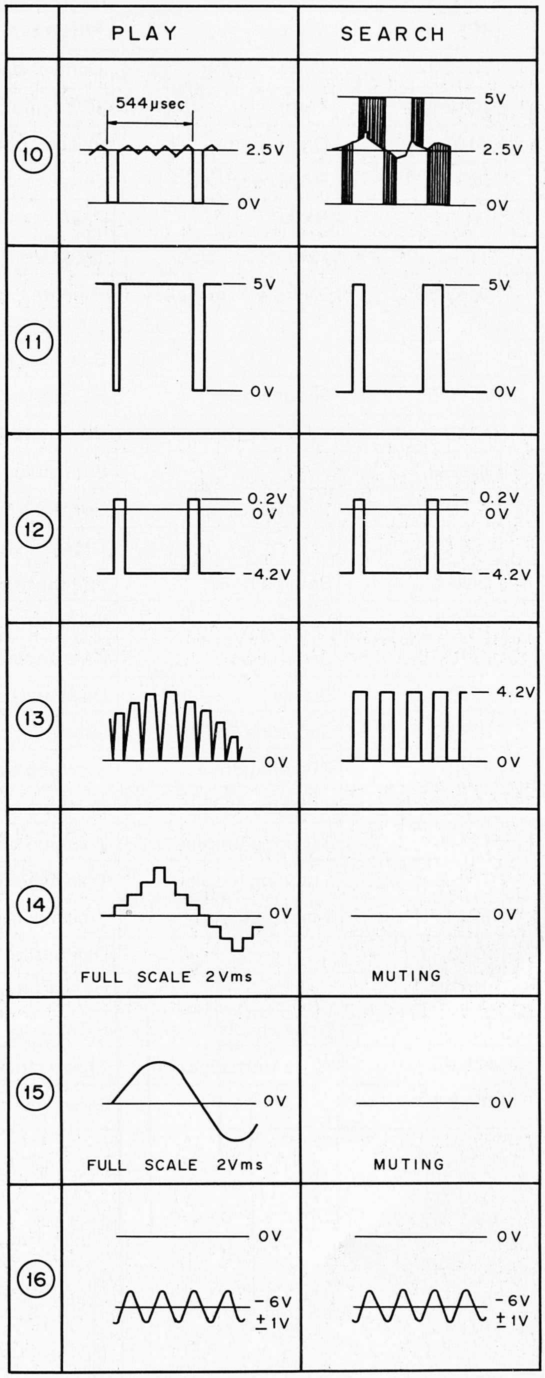
*1: Also used in 10-track jumping in PD-5010

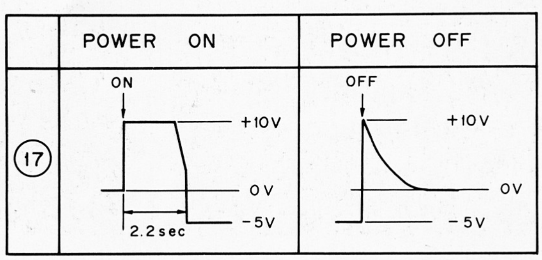
Symbol	Signal Source	Signal Name	Function
MIRR	IC5-18	Mirror	Pitless side (mirror surface) detector signal (pitless side: H)
MRIH	IC12-14	Mirror inhibit	Control signal which inhibits transfer of MIRR signal from IC5 to IC9
MUTE	IC12-19	Muting	IC9 digital mute control signal
$\overline{\text{OPEN}}$	S102	Open	Output from switch which detects when disc tray is open (open: L)
RAOV	IC9-57	RAM overflow	Output signal generated when RAM area overflow occurs (overflow: H)
$\overline{\text{RESET}}$	Q11-C	Reset	Power ON reset signal
RFCK	TP4-7(IC9, 25)	Read frame clock	Standard frame clock signal (7.35kHz)
$\overline{\text{RMKS}}$	IC12-58	Remote control key	Remote control key strobe passed from remote control decoder (IC11) to main microprocessor (IC12)
SBSO	IC9-22		Sub-code serial output
SCK	IC12-55	Serial clock	FL display data transfer clock (MHz)
SCLK	IC13-4	System clock	Audio playback system clock (MHz)
SCOR	IC9-24		Sub-code sync
SD	IC12-56	Serial data	Control signal passed to FL control CPU
SENS	IC6-5		Detector output bus from IC6 & IC9
SP·DR	CN4-5	Spindle drive	Spindle motor drive output
SP·RT	CN4-6	Spindle return	Spindle motor drive current detector
SRES	IC12-57	Serial reset	Key/display/microprocessor reset signal
STS	IC201-21	Status	Display data "ready to send"
SUBO	IC9-23	Sub-code Q	Sub-code Q output (address and other data)
TR·DR	IC2-8	Tracking drive	Tracking actuator drive signal
TR·ER	IC5-17	Tracking error	Tracking servo error output
TR·IN	TP1-7	Tracking loop in	Tracking servo gain adjustment input
TR·OT	TP1-2	Tracking loop out	Tracking servo gain adjustment output
TR·RT	TP1-9	Tracking return	Tracking actuator drive current detector
WCLK	IC13-21		Digital filter 88.2kHz strobe signal input
WDCK	IC9-79		Digital filter 88.2kHz strobe signal output
$\overline{\text{WE}}$	IC9-49	Write enable	RAM write enable
WFCK	IC9-25	Write from clock	Frame clock signal made from data (frame sync. lock: 7.35kHz)
$\overline{\text{XLT}}$	IC12-16		Servo and decode IC serial data latch clock pulse signal

● WAVE FORM

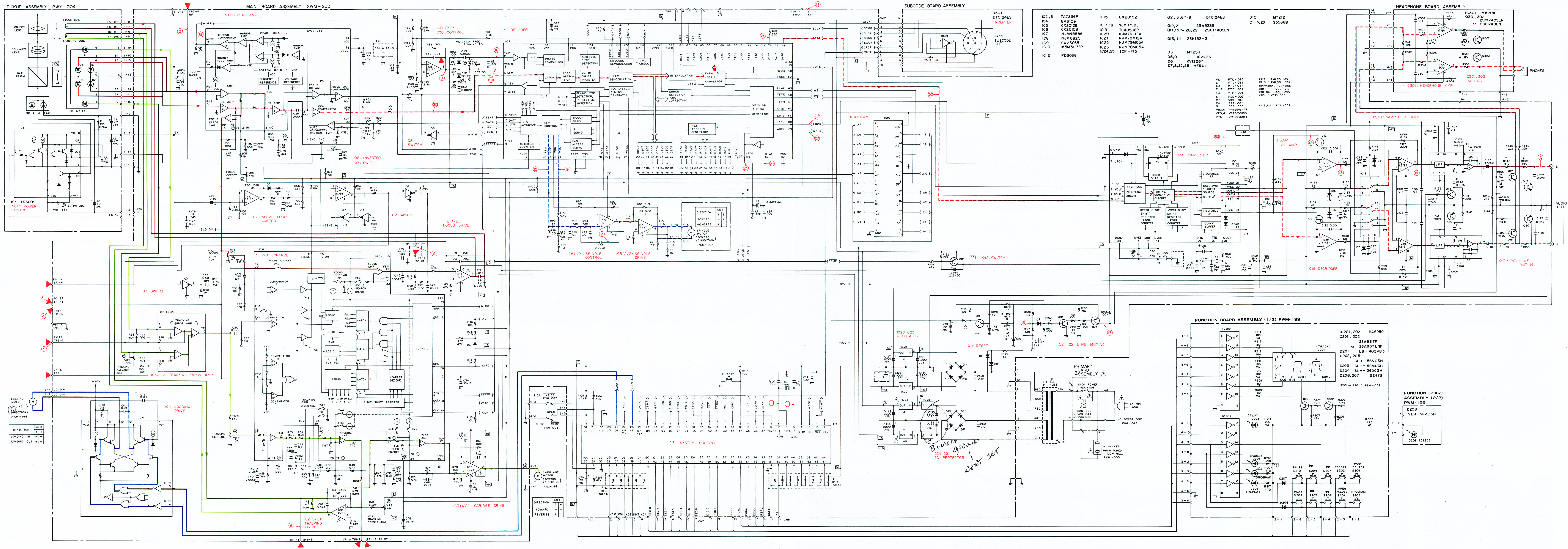
Note: The waveform voltage and time values are general guides only.







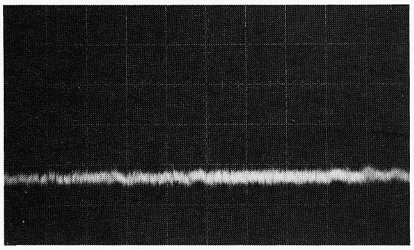
NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



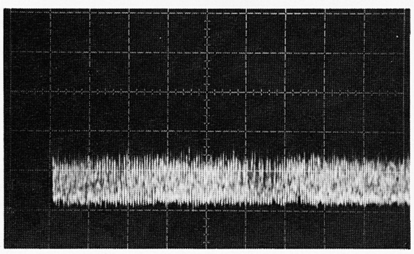
● Wave Form

NOTE: The encircled numbers denote measuring points in the circuit and pattern diagrams.

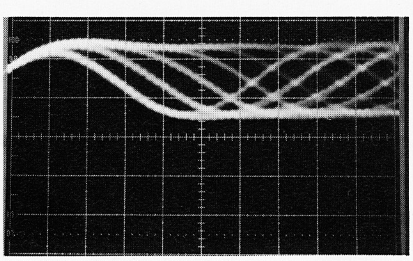
① PT2-2 MODE : PLAY
V: 200mV/div H: 2m sec/div



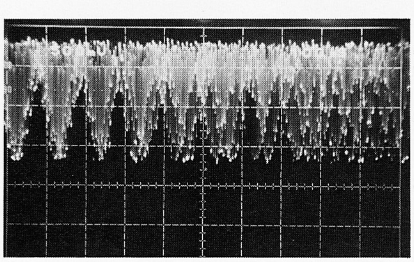
① TP2-2 MODE : SEARCH
V: 200mV/div H:2m sec/div



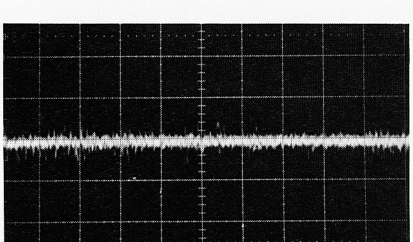
② TP2-4 MODE : PLAY
V: 1V/div H: 200n sec/div



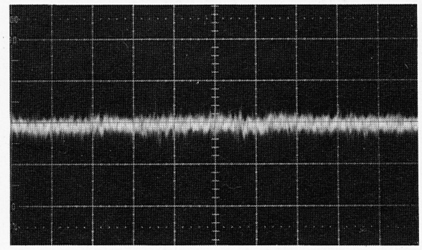
② TP2-4 MODE: SEARCH
V: 500mV/div H: 100μsec/div



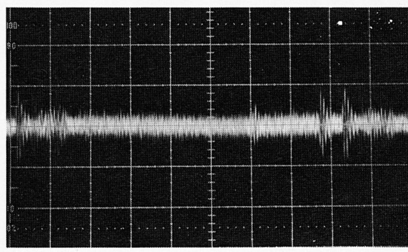
③ TP1-3 MODE : PLAY
V: 500mV/div H: 5m sec/div



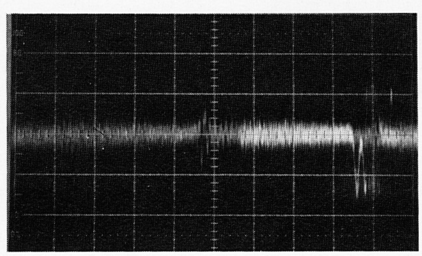
③ TP1-2 MODE : SEARCH
V: 500mV/div H: 5m sec/div



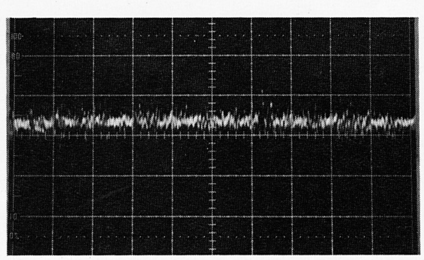
④ TP1-4 MODE : PLAY
V: 2V/div H: 20m sec/div



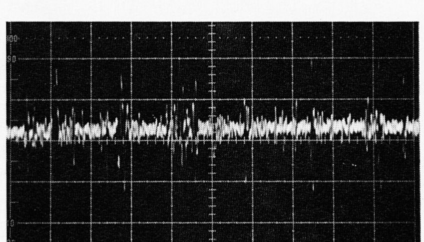
④ TP1-4 MODE : SEARCH
V: 2V/div H: 20m sec/div



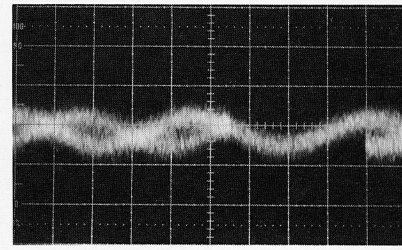
⑤ TP1-8 MODE : PLAY
V: 500mV/div H: 10m sec/div



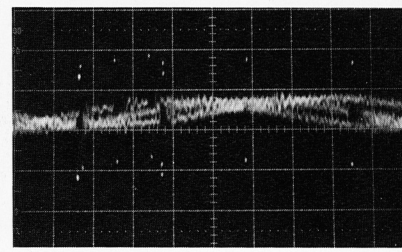
⑤ TP1-8 MODE : SEARCH
V: 500mV/div H: 10m sec/div



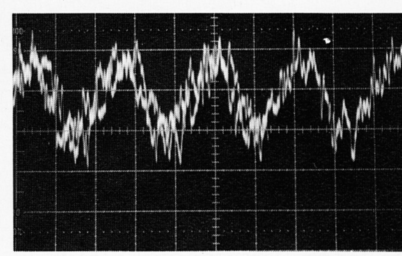
⑥ TP1-9 MODE : PLAY
V: 500mV/div H: 10m sec/div



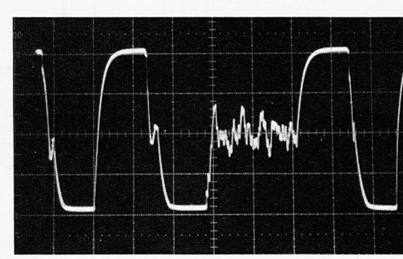
⑥ TP1-9 MODE : SEARCH
V: 500mV/div H: 10m sec/div



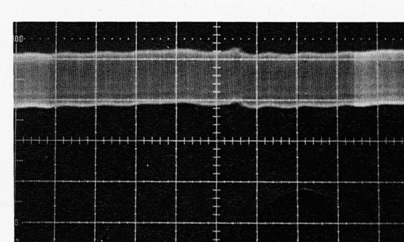
⑦ IC8-2 MODE : PLAY
V: 200mV/div H: 50m sec/div



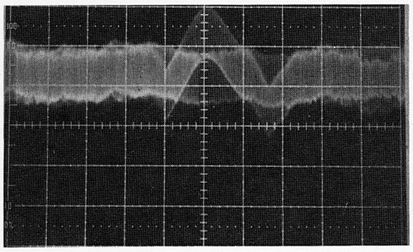
⑦ IC8-2 MODE : SEARCH
V: 2V/div H: 200m sec/div



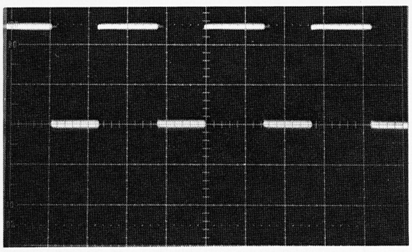
⑧ IC8-8 MODE : PLAY
V: 500mV/div H: 20m sec/div



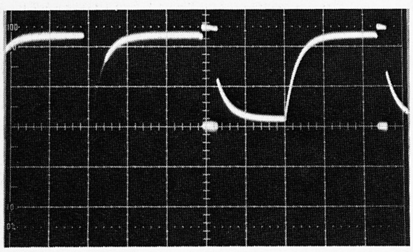
(8) IC8-8 MODE : SEARCH
V: 500mV/div H: 20m sec/div



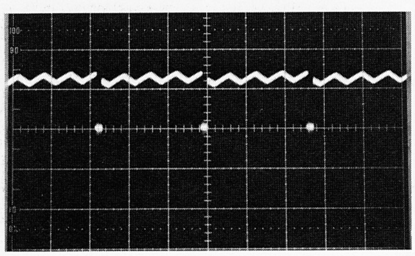
(9) IC9-4 MODE : PLAY
V: 2V/div H: 50μsec/div



(9) IC9-4 MODE : SEARCH
V: 2V/div H:100m sec/div

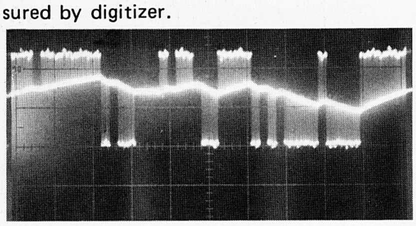


(10) IC9-3 MODE : PLAY
V: 2V/div H: 200μsec/div

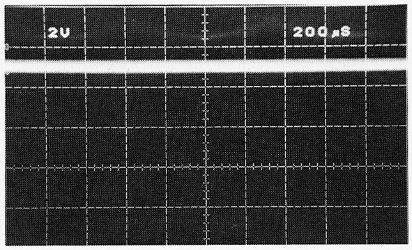


(10) IC9-3 MODE : SEARCH
V: 2V/div H: 10m sec/div

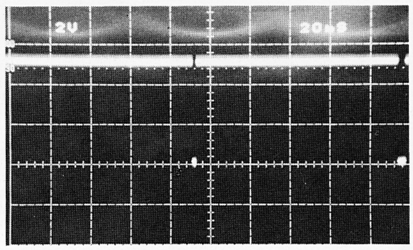
All waveforms shown here have been measured by digitizer.



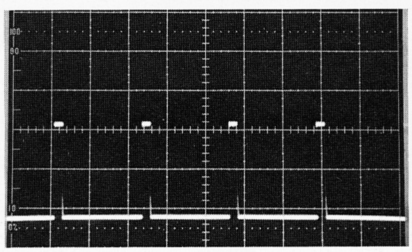
(11) TP4-1 MODE : PLAY
V: 2V/div H: 20m sec/div



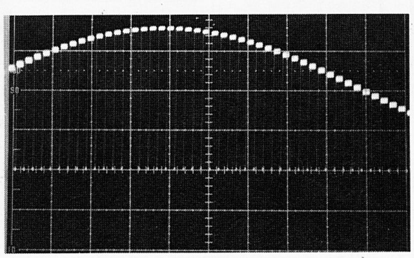
(11) TP4-1 MODE : SEARCH
V: 2V/div H: 200μsec/div



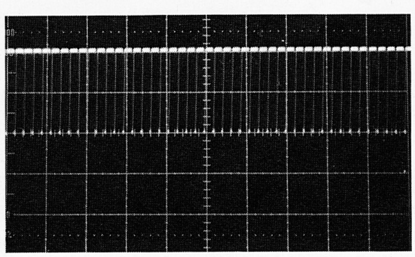
(12) IC15-23 MODE : PLAY or SEARCH
V: 2V/div H: 5μsec/div



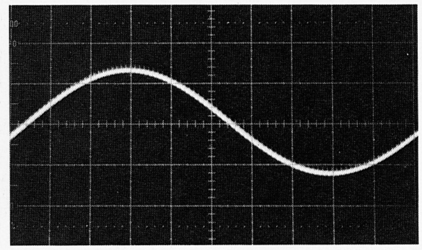
(13) IC17-1 MODE : PLAY
V: 2V/div H: 50μsec/div



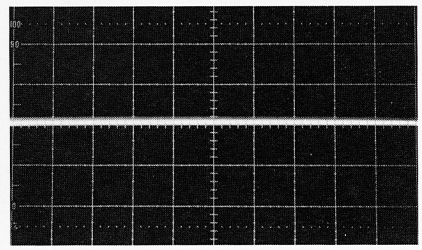
(13) IC17-1 MODE : SEARCH
V: 2V/div H: 50μsec/div



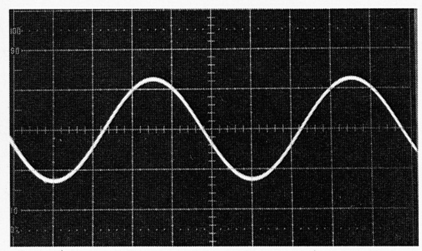
(14) IC17-7 MODE : PLAY
V: 2V/div H: 100μsec/div



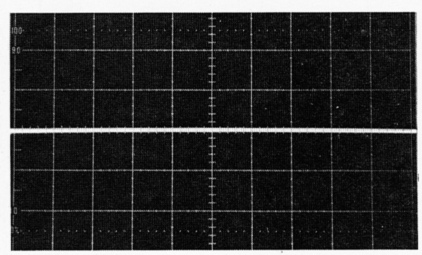
(14) IC17-7 MODE : SEARCH
V: 2V/div H: 100μsec/div



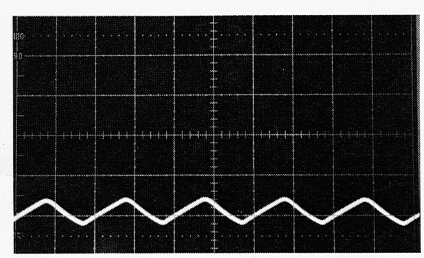
(15) OUT L MODE : PLAY
V: 2V/div H: 200μsec/div



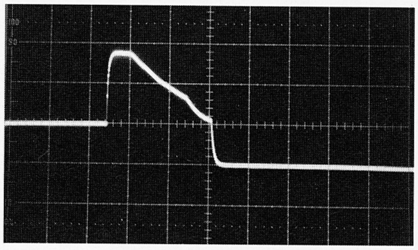
(15) OUT L MODE : SEARCH
V: 2V/div H: 200μsec/div



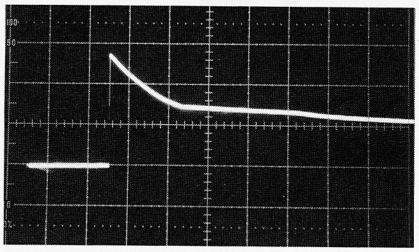
(16) D9-anode MODE : PLAY or SEARCH
V: 2V/div H: 5m sec/div



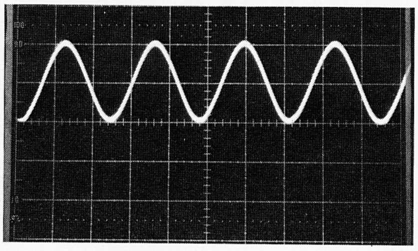
⑰ Q21-C POWER ON
V: 5V/div H: 1 sec/div



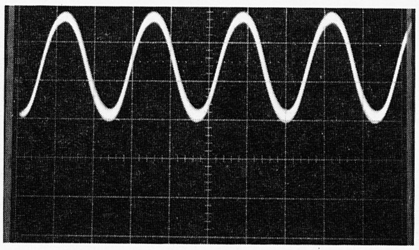
⑰ Q21-C POWER OFF
V: 5V/div H: 500m sec/div



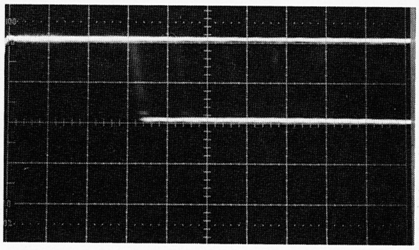
⑱ IC9-9 MODE : STOP
V: 2V/div H: 50m sec/div



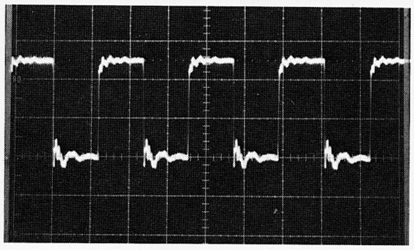
⑲ IC9-8 MODE : STOP
V: 1V/div H: 50m sec/div



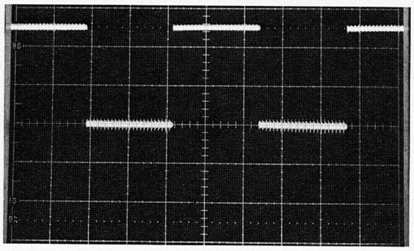
⑳ IC9-5 MODE : PLAY
V: 2V/div H: 200 sec/div



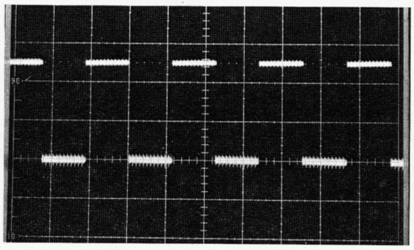
㉑ IC9-76 MODE : STOP
V: 2V/div H: 200m sec/div



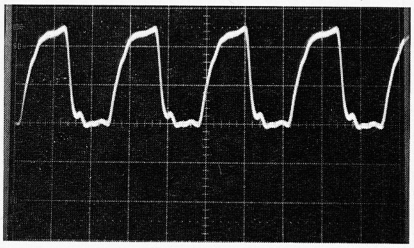
㉒ IC9-80 MODE : STOP
V: 2V/div H: 5μsec/div



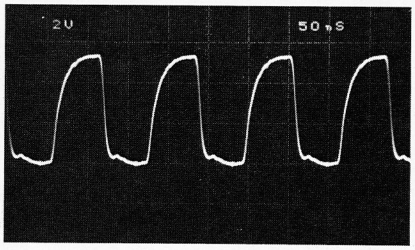
㉓ IC9-79 MODE : STOP
V: 2V/div H: 5μsec/div



㉔ IC9-53 MODE : STOP
V: 2V/div H: 50n sec/div



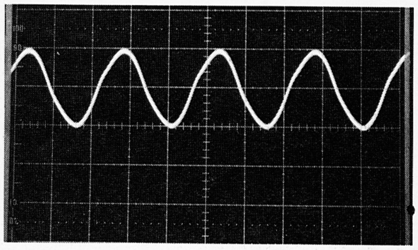
㉕ IC9-54 MODE : STOP
V: 2V/div H: 50n sec/div



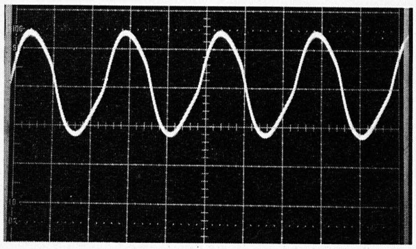
㉖

㉗

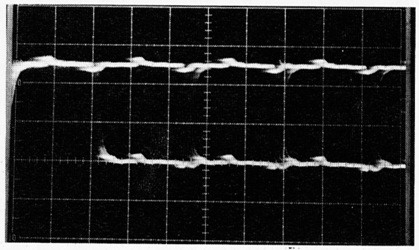
㉘ IC12-6 MODE : STOP
V: 2V/div H: 100n sec/div

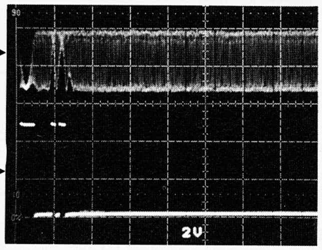
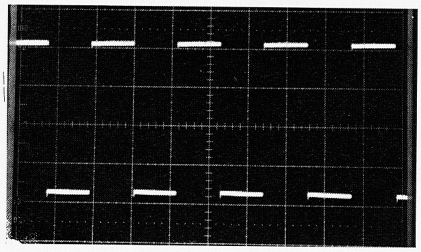


㉙ IC12-5 MODE : STOP
V: 2V/div H: 100n sec/div

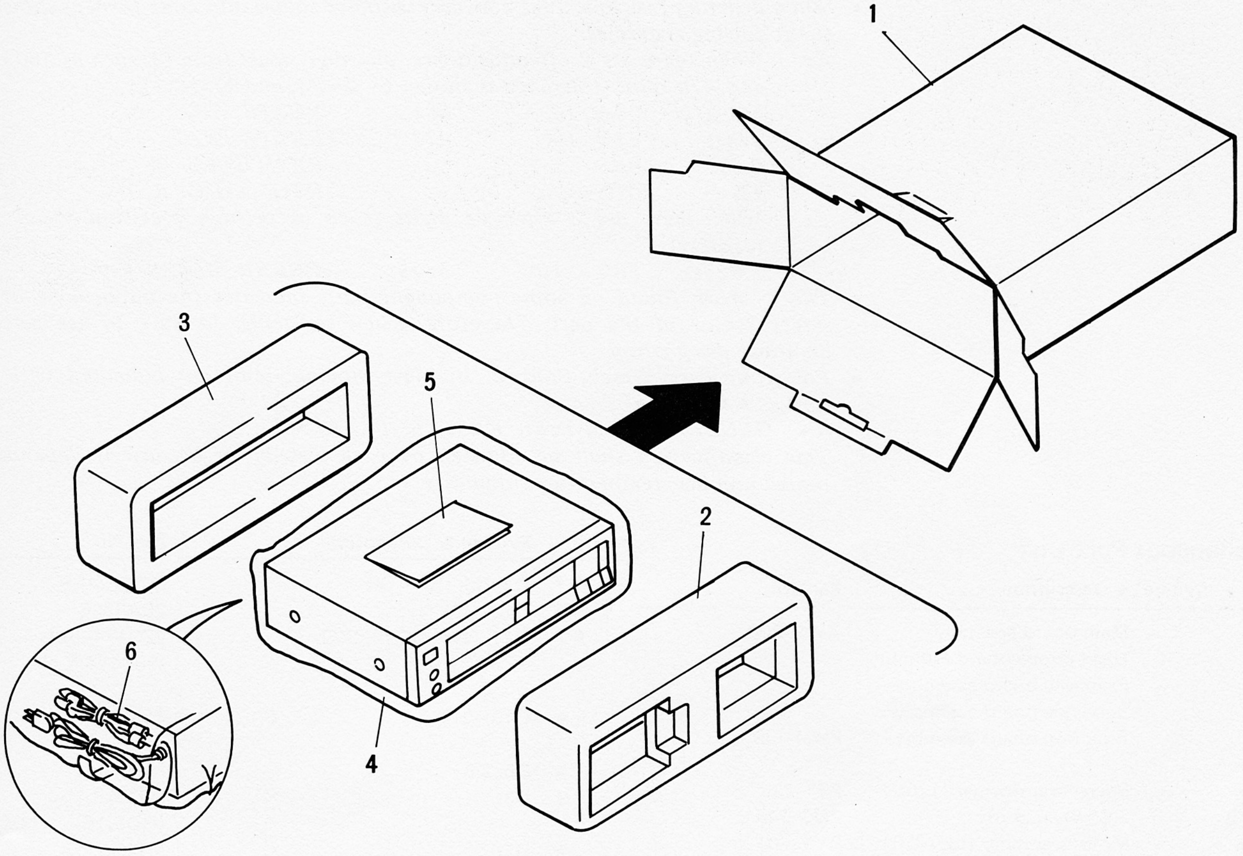


㉚ IC13-7 MODE : PLAY
V: 2V/div H: 200n sec/div



㉛ IC 5-18 MODE : STOP V : 2V/div 2m sec/div IC5-3 (RF) IC5-18 (MIRR)  	㉝ IC15-11 MODE : STOP V : 2V/div H : 5μsec/div 	㉟
㉜	㉞	㊱

8. PACKING



Parts List of Packing

Mark	No.	Part No.	Description
	1.	PHH-232	Packing case [Black]
	2.	PHH-245	Packing case [Silver]
	2.	PHC-111	Protector (F)
	3.	PHC-114	Protector (R)
	4.	Z22-006	Polyethylene sheet
	5.	PRB-283	Operatins instructions
	6.	PDE-321	Connection cord

9. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

  560Ω　　56 × 10¹　　561 ...... RD¼PS $\boxed{5}\boxed{6}\boxed{1}$ J

  47kΩ　　47 × 10³　　473 ..... RD¼PS $\boxed{4}\boxed{7}\boxed{3}$ J

  0.5Ω　　0R5 .... RN2H $\boxed{0}\boxed{R}\boxed{5}$ K

  1Ω　　010 .... RS1P $\boxed{0}\boxed{1}\boxed{0}$ K

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

  5.62kΩ　　562 × 10¹　　5621 .... RN¼SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$ F

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*

  ★★ GENERALLY MOVES FASTER THAN ★

  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Part List

Mark	Symbol & Description		Part No.
⚠		Main board assembly	XWM-200
		Head phone board assembly	
⚠		Primarily board assembly	
		Sub code board assembly	
		Function board assembly	PWM-199
⚠ ★		Power transformer (120V)	PTT-233
⚠		AC power cord	PDG-045
★★		Motor assembly (LOADING)	PYY-504
★★		Motro assembly (CARRIAGE)	PYY-504
★★		Spindle motor	PXM-147
★★	S102	Spring switch (CLMP)	PSN-003
★★	S101	Slide switch (INSIDE)	PSH-007

Main Board Assembly (XWM-200)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC9	CX23035
★★	IC6	CX20108
★★	IC5	CX20109
★★	IC15	CX20152
★★	IC12	PD3038
★★	IC10	M5M5117FP
★★	IC4	BA6109
★★	IC17, IC18	NJM072DE
★★	IC8	NJM082S
★★	IC21	NJM78M12A
★★	IC23	NJM78M05A
★★	IC20	NJM79L12A
★★	IC22	NJM79M05A
★★	IC7	NJM4558S
★★	IC2, IC3	TA7256P
★★	IC24, IC25	ICP-F15
★★	IC19	TC4053BP
★★	Q2, Q3, Q6 – Q8	DTC124ES
★★	Q12, Q21	2SA933S
★★	Q11, Q15 – Q20, Q22	2SC1740SLN (2SC1740LN)
☆★	Q13, Q14	2SK152
★	D5, D9	IS2473
★	D3	MTZ5.1 (RD5.1E)
★	D10	MTZ12 (RD12E)
★	D6	KV1226Y
★	D7, D8, D25, D26	HZ6A
★	D11 – D20	S-5566B

SWITCH

Mark	Symbol & Description		Part No.
★★	S1	Tact switch (TEST)	PSG-052

TRANSFORMERS, COILS AND FILTERS

Mark	Symbol & Description		Part No.
	VL1	VCO coil 3.8μH (8.6436MHz)	PTL-023
	L1	OSC coil 1μH	VTL-011
	F1, F2	Low pass filter	PTF-001
	F3	EMI filter	VTH-005

CAPACITORS

Mark	Symbol & Description	Part No.
	C22	CEAR47M50
	C24, C88, C90	CEA010M50
	C123, C124	CEA100M50
	C74, C132	CEA220M16
	C5, C6, C17, C19, C23, C36, C38, C63, C70	CEA330M16
	C85, C87, C89, C92, C117, C118	CEA470M50
	C97, C98	CEA101M25
	C73	CEA100M16
	C144	CEA2R2M50
	C127, C128	CEA102M25
	C129, C130	CEA222M25
	C133, C134	CEA222M16
	C135, C136	CEA332M16
	C32, C44	CEANP010M50
	C57	CEANP2R2M50
	C34	CEANP3R3M50
	C131	CEANP4R7M25
	C49	CEANP100M25
	C48	CEANL010M50
	C37	CQMA102J50
	C45, C50, C59	CQMA222J50
	C28	CQMA472J50
	C40	CQMA682J50
	C58	CQMA822J50
	C55, C60	CQMA103J50
	C30	CQMA223J50
	C20, C16	CQMA333J50
	C42	CQMA473J50
	C35, C43	CQMA683J50
	C15, C39, C41, C56, C86, C99 – C104, C107, C108	CQMA104K50
	C33	CQMA224J50
	C125, C126	CQSF221J125
	C121, C122	CQSF102J125
	C105, C106	CQSF122J125
	C109, C110	CQSF102J125
	C113, C114	PCL-054
	C82, C84	PCL-055
	C81	VCE-017
	C83	VCF-005
	C71, C72	CCDSL300J50
	C25, C26	CCDSL470J50
	C14, C21, C27	CCDSL560J50
	C7	CCDSL680J50
	C8, C47	CCDSL101J50
	C46	CCDSL221J50
	C51, C53	CCDUJ330J50
	C52	CCDUJ221J50
	C61, C62	CCDCH300J50
	C29	CCDCH330J50
	C11 – C13, C54, C111, C143	CKDYF103Z50
	C96, C140, C141	CKDYF103Z50
	C10, C119	CKDYF473Z50
	C9	CKDYX473M25

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR3, VR4	Semi-fixed 10kΩ-B	VRTB6VS103
★	VR2, VR6	Semi-fixed 47kΩ-B	VRTB6VS473
★	VR5	Semi-fixed 100kΩ-B	VRTB6VS104
	R112		RMSL5-103J
	R113		RMLS8-103J
	R177		RD1/6PM472J (RD1/4PM472J)
	R8, R9		RD1/2PM4R7J
	R129, R143, R144, R147 – R150		RDR1/4PM □□□J
	R81, R82, R84, R85		RN1/6PQ □□□F
	Other resistors		RD1/6PM □□□J

OTHERS

Mark	Symbol & Description		Part No.
	JA1	Terminal (AUDIO OUT)	VKB-006
	X1	Crystal resonator 8.4672MHz	PSS-007
★	X4	Crystal resonator 35.002MHz	PSS-008
★	X2	Ceramic resonator	VSS-018

Head Phone Board Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC301	M5218L
★★	Q301, Q302	2SC1740SLN (2SC1740LN)

CAPACITORS

Mark	Symbol & Description	Part No.
	C301, C302	CQMA104K50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R301 – R312	RD1/6PM □□□J

OTHERS

Mark	Symbol & Description		Part No.
	JA	Head phone jack	PKN-002

Primarily Board Assembly

SWITCH

Mark	Symbol & Description		Part No.
⚠ ★★	S401	Power switch (POWER)	VSA-006

CAPACITOR

Mark	Symbol & Description	Part No.
	C401	RCG-009 (VCG-044) (VCG-033)

Sub Code Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★★	Q501	DTC124ES

RESISTOR

Mark	Symbol & Description	Part No.
	R501 Terminal (SUB CORD OUT)	RD1/6PM103J

OTHERS

Mark	Symbol & Description	Part No.
	JA501 Terminal (SUB CORD OUT)	PKP-038
		BMZ30P080FMC

Function Board Assembly (PWM-199)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC201, IC202	BA6250
★★	Q201, Q202	2SA937F (2SA937LNF)
★	D206, D207	1S2473
★	D201	LB-402VB3
★	D202, D205, D208 (Red)	SLH-56VC3H-S/T
★	D204 (Orange)	SLH-56DC3H-S/T
★	D203 (Green)	SLH-56MC3H-T/U

SWITCHES

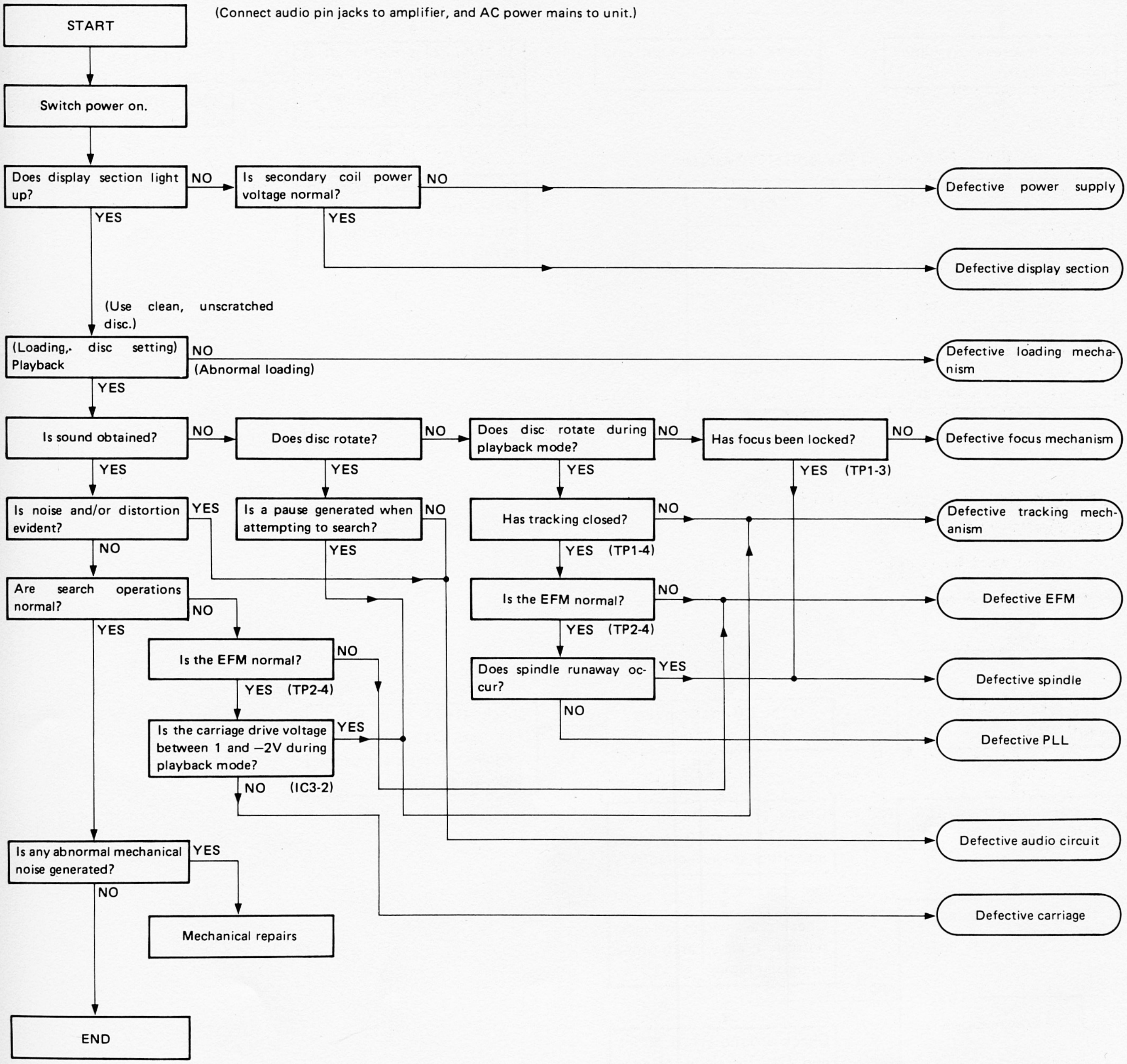
Mark	Symbol & Description	Part No.
★★	S201 – S210 Tact switch	PSG-058

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R201 – R205, R207 – R216	RD1/6PM □□□J (RD1/4PM □□□J)

10. TROUBLESHOOTING



Defective power supply

→ Check for breaks in solder bridge pattern

→ Check power switch and power cord

120V/60Hz TYP values

	IN	OUT
IC21	+16 ~ 17V	+12V
IC22	−16 ~ −17V	−12V
IC23	+10 ~ 11V	+5V
IC24	−10 ~ −11V	−5V
Q23	Collector −30V to −33V	Emitter −26V

Power on /off switching noise

Is the Q21 collector at H level (about +10V) when the power is switched on or off?

NO → Check D9 thru D12, C131, C132, and R155 thru R158 for solder bridges and other soldering faults

YES → Check Q17 thru Q20 and R155 thru R158 for solder bridges and other soldering faults

TYP values

Is the Q11 collector at H level?

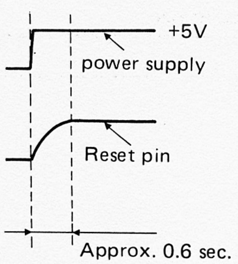
NO → Is the D9 anode about −6V?

- NO → Check R167 thru R173, D11 and D12, and C131 for solder bridges and other soldering faults
- YES → Check around R120, Q11 and C73 for solder bridges and other soldering faults

YES → Is input applied to IC6, IC9, IC11, and IC12?

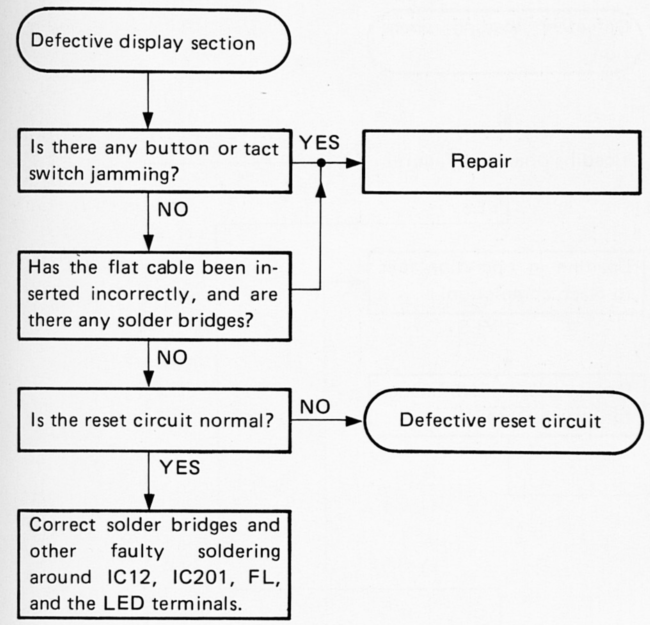
NO → Check for solder bridges, pattern cracks, and other soldering faults

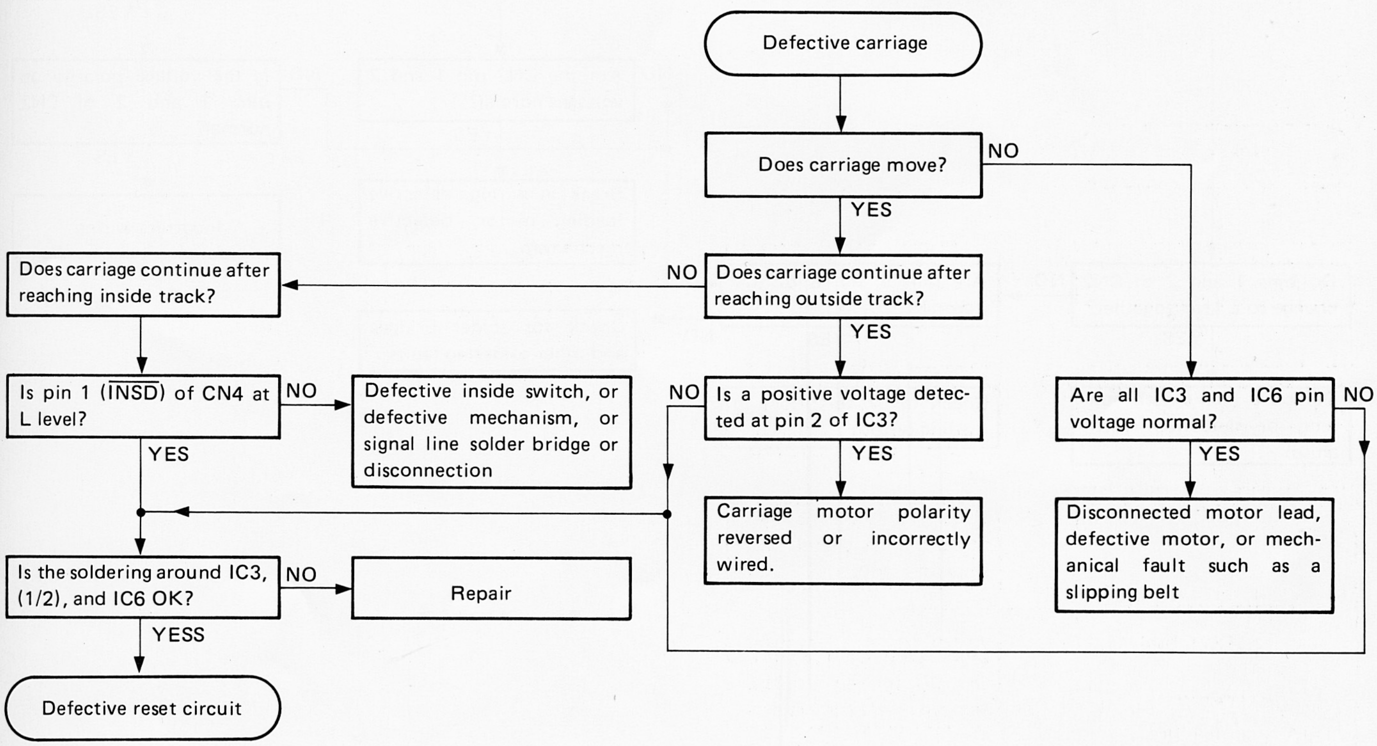
YES → Is the reset time constant normal?



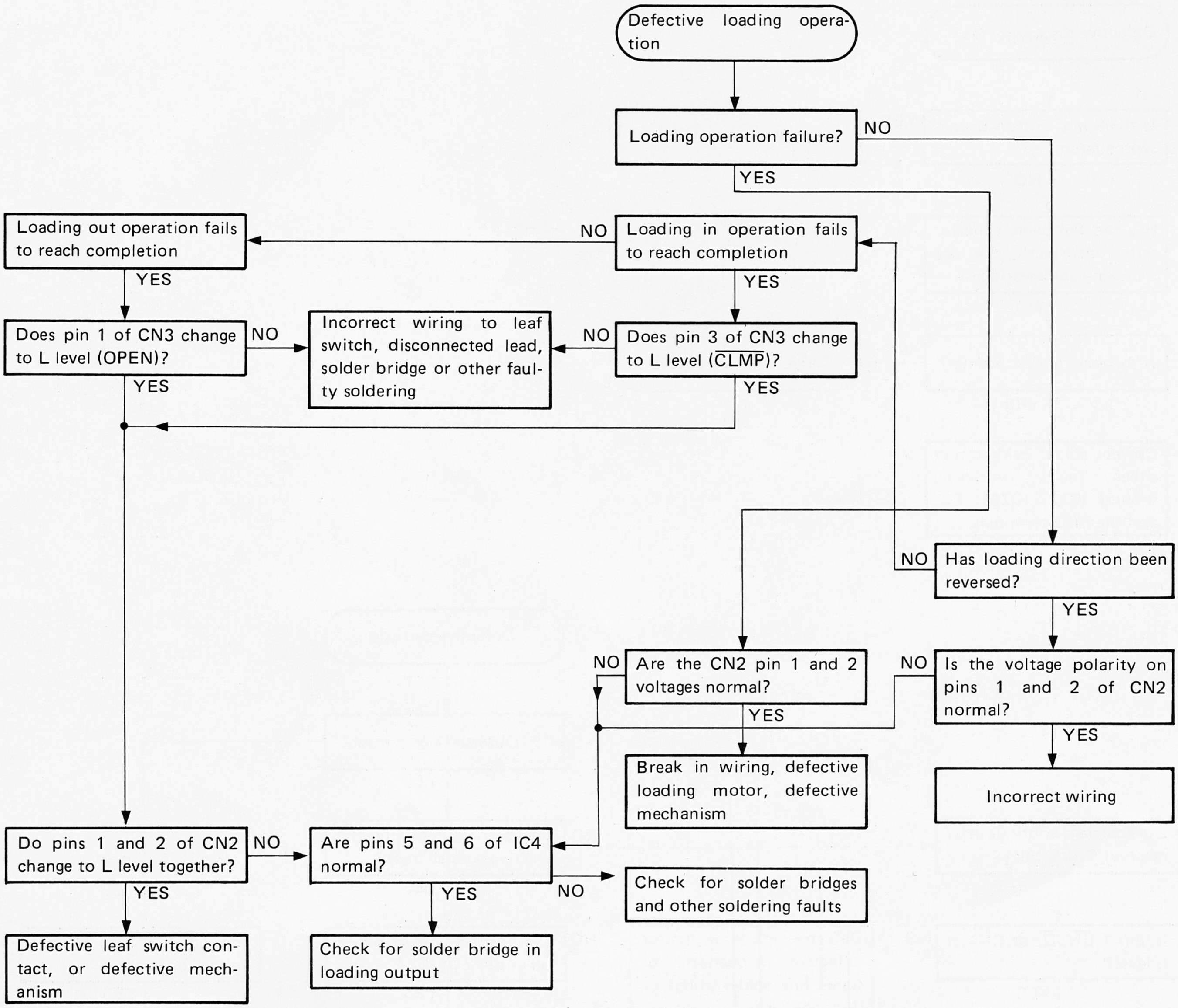
NO → Check around R118, R121 and C74 for solder bridges and other soldering faults

YES → Normal

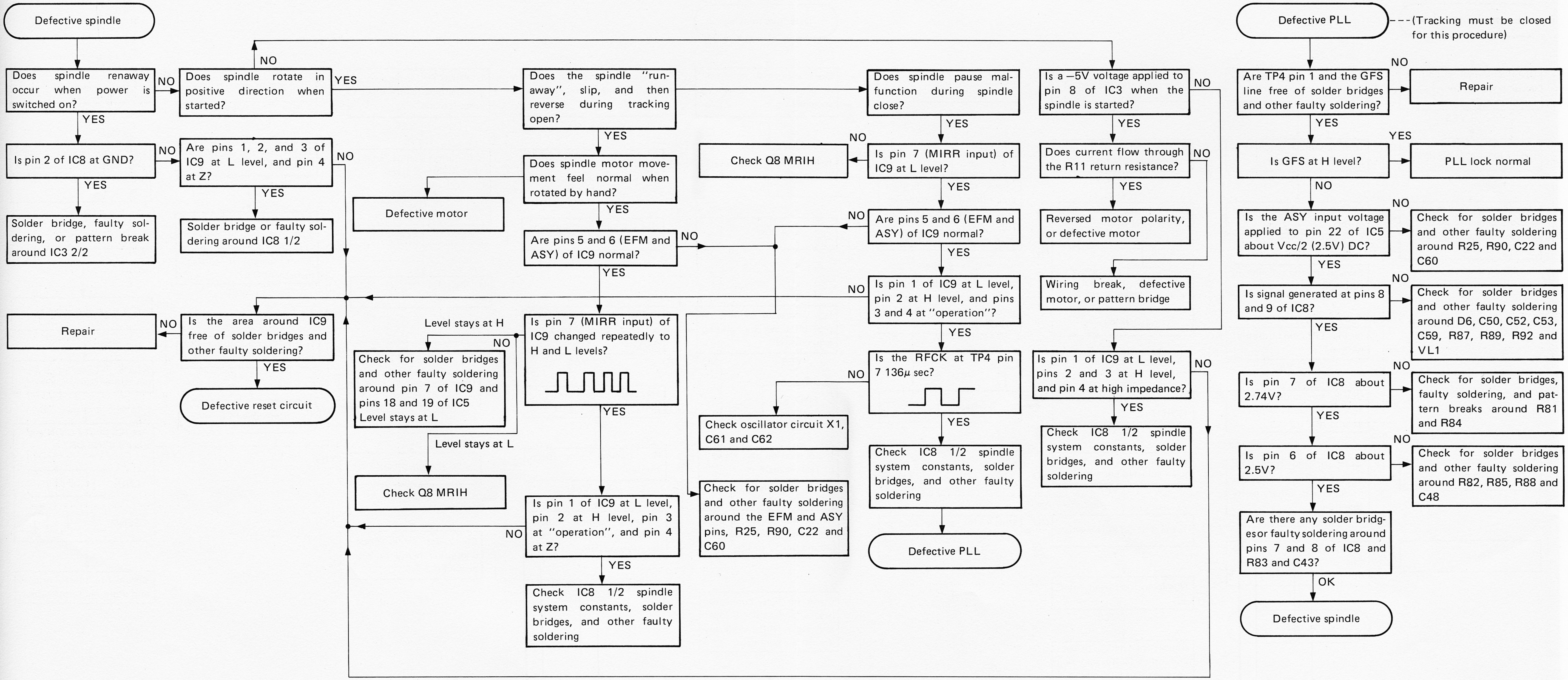


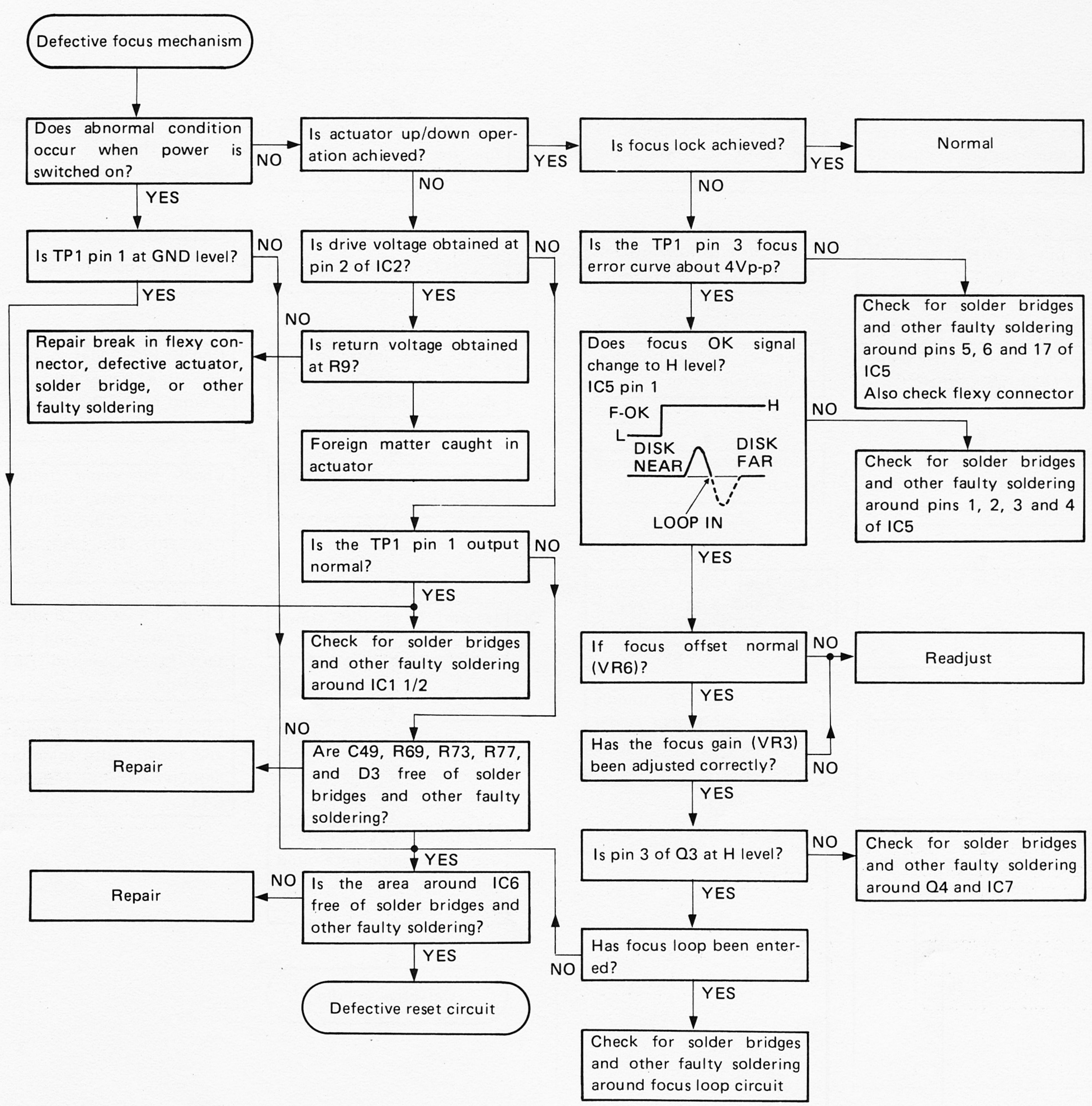


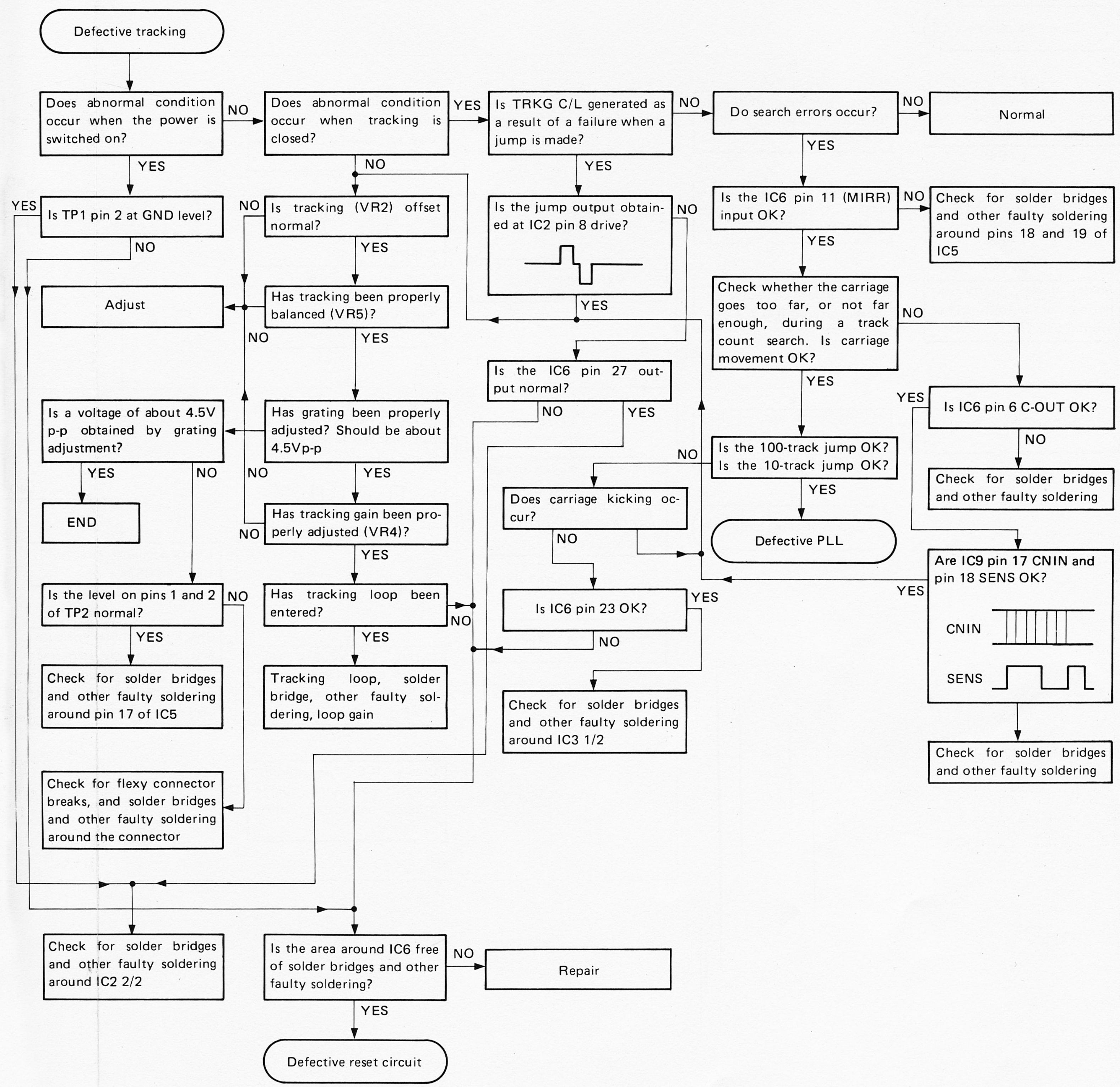
Point / Mode	IC3 2 Pin	IC6 23 Pin
Playback	+1 ~ −2V	+0.09 ~ −0.18V
Forward (outer tracks)	−9 ~ −11V	−0.8 ~ −1V
Reverse (inner tracks)	+9 ~ +11V	+0.8 ~ 1V
Stop	0V	0V

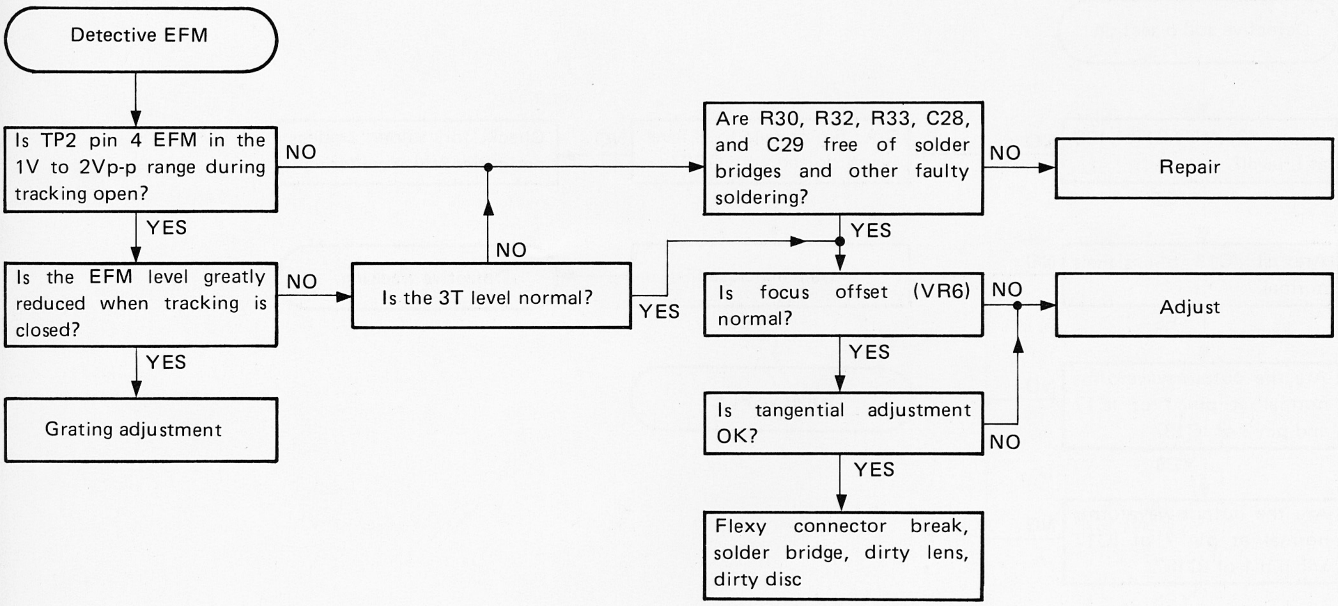


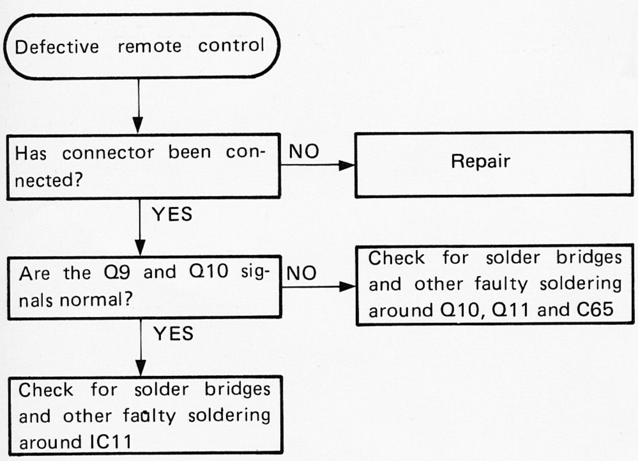
Point / Mode	IC4 5 Pin	IC4 6 Pin	CN2 1 Pin	CN2 2 Pin
Loading in	L	H	0V	+8 ~ 10V
Loading out	H	L	+8 ~ 10V	0V
Loading in completed	H	H	0V	0V
Loading out completed	L	L	0V	0V


Defective spindle
Does spindle renaway occur when power is switched on?
NO
YES
Does spindle rotate in positive direction when started?
NO
YES
Does the spindle "run-away", slip, and then reverse during tracking open?
YES
Does spindle pause malfunction during spindle close?
YES
Is a −5V voltage applied to pin 8 of IC3 when the spindle is started?
NO
YES
Is pin 2 of IC8 at GND?
NO
YES
Are pins 1, 2, and 3 of IC9 at L level, and pin 4 at Z?
NO
YES
Does spindle motor movement feel normal when rotated by hand?
YES
Check Q8 MRIH
NO
Is pin 7 (MIRR input) of IC9 at L level?
YES
Does current flow through the R11 return resistance?
NO
YES
Defective motor
Solder bridge, faulty soldering, or pattern break around IC3 2/2
Solder bridge or faulty soldering around IC8 1/2
Are pins 5 and 6 (EFM and ASY) of IC9 normal?
NO
YES
NO
Are pins 5 and 6 (EFM and ASY) of IC9 normal?
YES
Reversed motor polarity, or defective motor
NO
Is pin 1 of IC9 at L level, pin 2 at H level, and pins 3 and 4 at "operation"?
YES
Wiring break, defective motor, or pattern bridge
Repair
NO
Is the area around IC9 free of solder bridges and other faulty soldering?
YES
Level stays at H
NO
Is pin 7 (MIRR input) of IC9 changed repeatedly to H and L levels?
YES
Check for solder bridges and other faulty soldering around pin 7 of IC9 and pins 18 and 19 of IC5
Level stays at L
NO
Is the RFCK at TP4 pin 7 136μ sec?
YES
Is pin 1 of IC9 at L level, pins 2 and 3 at H level, and pin 4 at high impedance?
NO
YES
Defective reset circuit
Check oscillator circuit X1, C61 and C62
Check IC8 1/2 spindle system constants, solder bridges, and other faulty soldering
Check IC8 1/2 spindle system constants, solder bridges, and other faulty soldering
Level stays at L
Check Q8 MRIH
Check for solder bridges and other faulty soldering around the EFM and ASY pins, R25, R90, C22 and C60
Is pin 1 of IC9 at L level, pin 2 at H level, pin 3 at "operation", and pin 4 at Z?
NO
YES
Defective PLL
Check IC8 1/2 spindle system constants, solder bridges, and other faulty soldering
Defective PLL
(Tracking must be closed for this procedure)
Are TP4 pin 1 and the GFS line free of solder bridges and other faulty soldering?
NO
Repair
YES
YES
Is GFS at H level?
PLL lock normal
NO
NO
Is the ASY input voltage applied to pin 22 of IC5 about Vcc/2 (2.5V) DC?
Check for solder bridges and other faulty soldering around R25, R90, C22 and C60
YES
NO
Is signal generated at pins 8 and 9 of IC8?
Check for solder bridges and other faulty soldering around D6, C50, C52, C53, C59, R87, R89, R92 and VL1
YES
NO
Is pin 7 of IC8 about 2.74V?
Check for solder bridges, faulty soldering, and pattern breaks around R81 and R84
YES
NO
Is pin 6 of IC8 about 2.5V?
Check for solder bridges and other faulty soldering around R82, R85, R88 and C48
YES
Are there any solder bridges or faulty soldering around pins 7 and 8 of IC8 and R83 and C43?
OK
Defective spindle


Defective focus mechanism
Does abnormal condition occur when power is switched on?
NO
YES
Is actuator up/down operation achieved?
YES
NO
Is focus lock achieved?
YES
NO
Normal
Is TP1 pin 1 at GND level?
NO
YES
Is drive voltage obtained at pin 2 of IC2?
NO
YES
Is the TP1 pin 3 focus error curve about 4Vp-p?
NO
YES
Check for solder bridges and other faulty soldering around pins 5, 6 and 17 of IC5
Also check flexy connector
Repair break in flexy connector, defective actuator, solder bridge, or other faulty soldering
Is return voltage obtained at R9?
Foreign matter caught in actuator
Does focus OK signal change to H level?
IC5 pin 1
F-OK
H
L
DISK NEAR
DISK FAR
LOOP IN
NO
Check for solder bridges and other faulty soldering around pins 1, 2, 3 and 4 of IC5
Is the TP1 pin 1 output normal?
NO
YES
Check for solder bridges and other faulty soldering around IC1 1/2
If focus offset normal (VR6)?
NO
YES
Readjust
Repair
Are C49, R69, R73, R77, and D3 free of solder bridges and other faulty soldering?
NO
YES
Has the focus gain (VR3) been adjusted correctly?
NO
YES
Is pin 3 of Q3 at H level?
NO
YES
Check for solder bridges and other faulty soldering around Q4 and IC7
Repair
Is the area around IC6 free of solder bridges and other faulty soldering?
NO
YES
Has focus loop been entered?
NO
YES
Defective reset circuit
Check for solder bridges and other faulty soldering around focus loop circuit


Defective tracking
Does abnormal condition occur when the power is switched on?
NO
YES
Does abnormal condition occur when tracking is closed?
YES
NO
Is TRKG C/L generated as a result of a failure when a jump is made?
NO
YES
Do search errors occur?
NO
YES
Normal
Is TP1 pin 2 at GND level?
YES
NO
Is tracking (VR2) offset normal?
NO
YES
Is the jump output obtained at IC2 pin 8 drive?
NO
YES
Is the IC6 pin 11 (MIRR) input OK?
NO
YES
Check for solder bridges and other faulty soldering around pins 18 and 19 of IC5
Adjust
Has tracking been properly balanced (VR5)?
NO
YES
Check whether the carriage goes too far, or not far enough, during a track count search. Is carriage movement OK?
NO
YES
Is the IC6 pin 27 output normal?
NO
YES
Is IC6 pin 6 C-OUT OK?
NO
YES
Is a voltage of about 4.5V p-p obtained by grating adjustment?
YES
NO
Has grating been properly adjusted? Should be about 4.5Vp-p
NO
YES
Is the 100-track jump OK?
Is the 10-track jump OK?
NO
YES
Check for solder bridges and other faulty soldering
Does carriage kicking occur?
NO
END
Has tracking gain been properly adjusted (VR4)?
NO
YES
Defective PLL
Are IC9 pin 17 CNIN and pin 18 SENS OK?
YES
CNIN
SENS
Is the level on pins 1 and 2 of TP2 normal?
NO
YES
Has tracking loop been entered?
NO
YES
Is IC6 pin 23 OK?
YES
NO
Check for solder bridges and other faulty soldering around pin 17 of IC5
Tracking loop, solder bridge, other faulty soldering, loop gain
Check for solder bridges and other faulty soldering around IC3 1/2
Check for solder bridges and other faulty soldering
Check for flexy connector breaks, and solder bridges and other faulty soldering around the connector
Check for solder bridges and other faulty soldering around IC2 2/2
Is the area around IC6 free of solder bridges and other faulty soldering?
NO
YES
Repair
Defective reset circuit

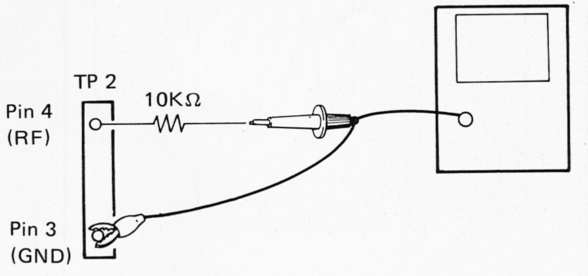

Detective EFM
Is TP2 pin 4 EFM in the 1V to 2Vp-p range during tracking open?
NO
YES
Is the EFM level greatly reduced when tracking is closed?
NO
YES
Grating adjustment
Is the 3T level normal?
NO
YES
Are R30, R32, R33, C28, and C29 free of solder bridges and other faulty soldering?
NO
Repair
YES
Is focus offset (VR6) normal?
NO
Adjust
YES
Is tangential adjustment OK?
NO
YES
Flexy connector break, solder bridge, dirty lens, dirty disc


Defective remote control
Has connector been connected?
NO
Repair
YES
Are the Q9 and Q10 signals normal?
NO
Check for solder bridges and other faulty soldering around Q10, Q11 and C65
YES
Check for solder bridges and other faulty soldering around IC11

Defective audio section

- Is pin 19 (MUTG) of IC9 at L level?
  - NO → Does pin change to H level synchronized with GFS?
    - NO → Check for solder bridges and other faulty soldering
    - YES → Is tracking closed?
      - → Defective tracking
      - YES → Defective PLL
  - YES → Are all IC15 pin signals normal?
    - NO
    - YES → Are the output waveforms normal at pin 1 of IC17 and pin 2 of IC18?
      - NO
      - YES → Are the output waveforms [redacted]
        - NO

[redacted]

Step No.	Oscilloscope position		Test points	Adjustment positions	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
6	TANGENTIAL ADJUSTMENT					
						• Load the test disc. • Set the player to test mode (see page 49). • Using the MANUAL SEARCH FWD key (▷), move the pick-up to the disc edge to enable the tangential adjustment screw to be seen from the left hand side (see Figure 11-5). • Press the TRACK FWD (▷▷I), PLAY (▷), and PAUSE (▯▯) keys in that order to close all servos, ~~The PAUSE indicator will light up.~~
			TP2 pin 4 (RF output)	Tangential adjustment screw	Best eye pattern	• Observe the TP2 pin 4 RF (RF output) in the oscilloscope and adjust the tangential adjustment screw to obtain the clearest eye pattern. (Figure 11-5). • The optimum position is the midpoint between the two positions where the eye pattern starts to deteriorate when the tangential adjustment screw is turned clockwise and counter clockwise. Guidelines for this adjustment: In addition to a clear overall waveform, adjust to obtain relatively slender lines (see photograph 11-8) Where single "diamond" shapes are formed in the eye pattern. • To make the waveform easier to observe, insert a 10 Kohm resistance (or 5 Kohm if the waveform is hard to see) in the tip of the probe as shown in Figure 11-4.  Fig. 11-4

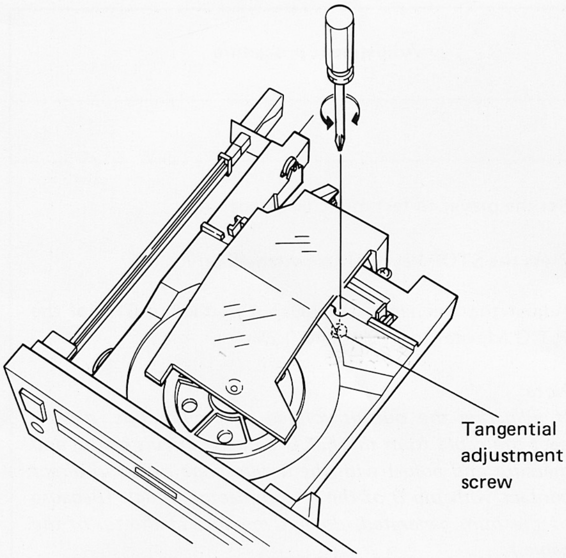
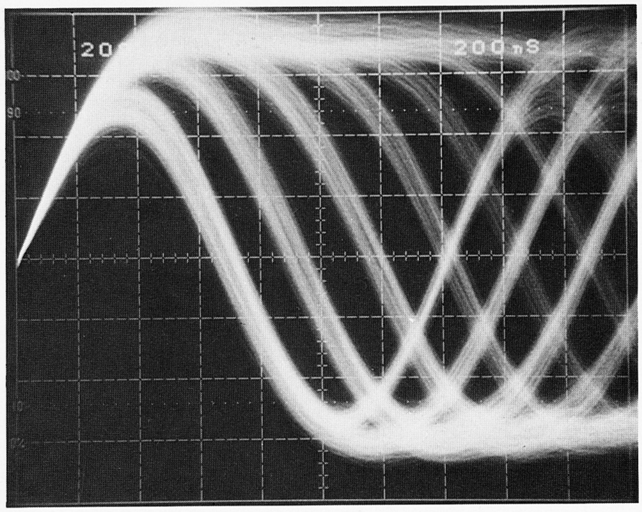
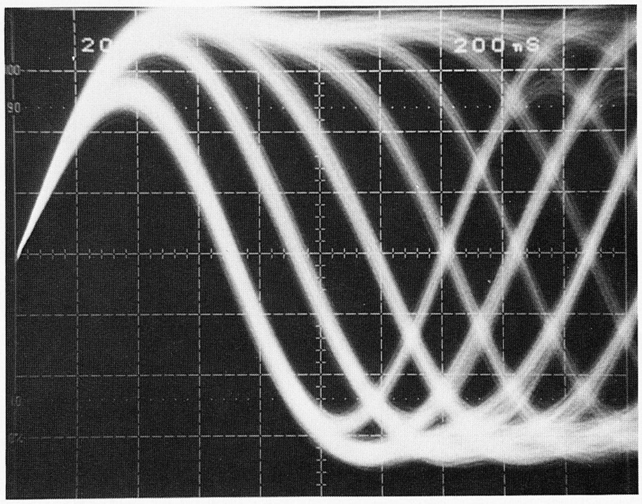


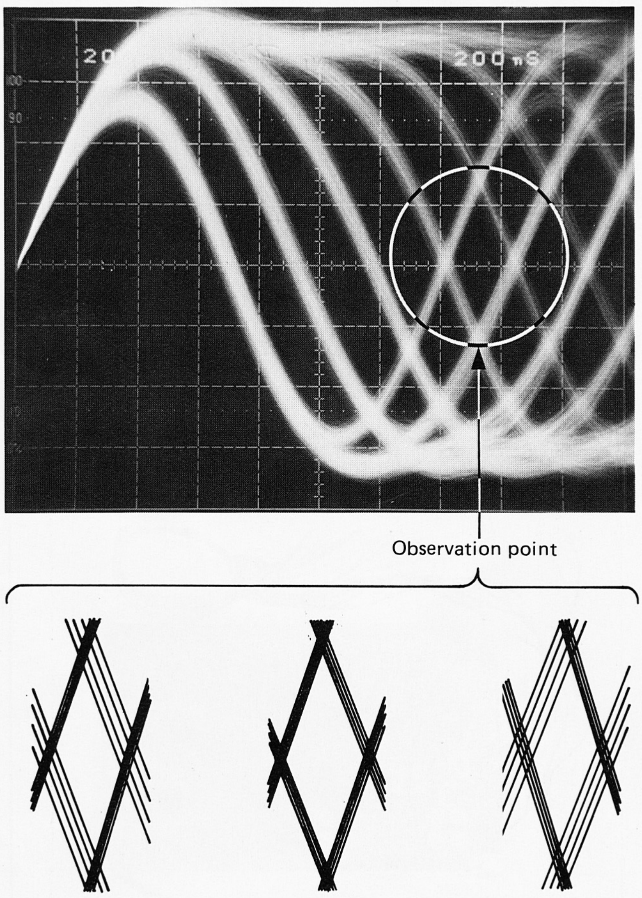
Fig. 11-5 Tangential Adjustment



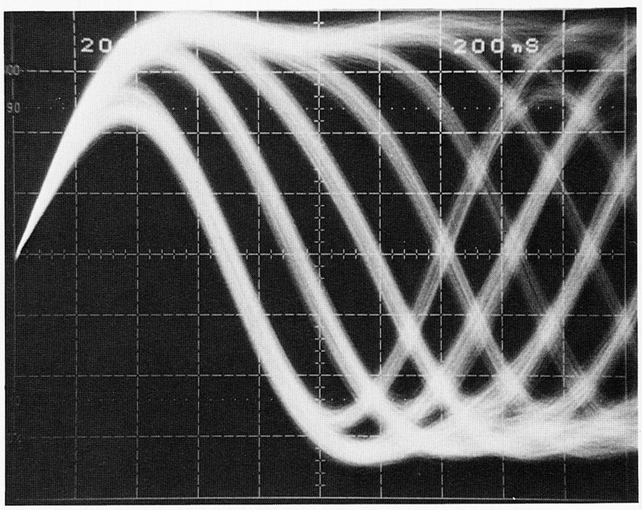
Photograph 11-9



Photograph 11-10



Photograph 11-8



Photograph 11-11

Step No.	Oscilloscope position		Test points	Adjustment positions	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
7	**FOCUS GAIN ADJUSTMENT**					
						• Set the player to test mode (see page 49). • Press the STOP key (□) to switch all servos off. • Adjust the frequency and output voltage of CH1 of the F.T.G adjuster to ~~875Hz~~ 880Hz and 0.2Vp-p. *Note:* *If adjusting the output voltage by oscilloscope, disconnect the cable from the F.T.G adjuster circuit board, and measure and adjust with the oscilloscope probe in direct contact with pin 3 of the N1 connector (plug). (Because of the hum generated, do not measure at the tip of the cable.)* • Connect the F.T.G adjuster as shown in Figure 11-6. • Press the TRACK FWD (▷▷I), PLAY (▷), and PAUSE (▯▯) keys in that order to switch all servos on.
			TP 1 Pin 6 (FO. IN) TP 1 Pin 1 (FO. OT)	VR 3 (FO. GA)	LED (green) on	• Adjust the compact disc player VR3 FO.GA (focus gain) control so that F.T.G adjuster Just LED (green) comes on. Don't Short Pins!

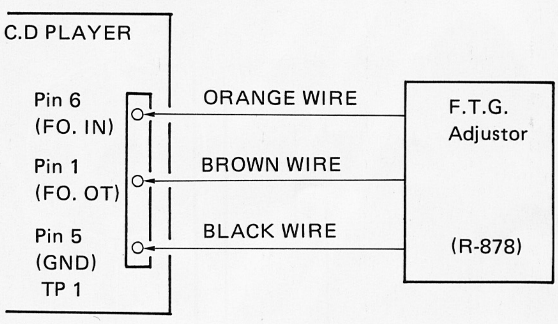
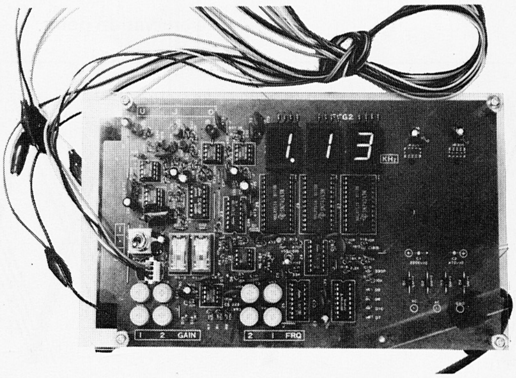


Fig. 11-6



Photograph 11-12 F.T.G adjuster

Step No.	Oscilloscope position		Test points	Adjustment positions	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
8	**TRACKING ADJUSTMENT**					
						• Set the player to test mode (see page 49). • Press the STOP Key (□) to switch all servos off. • Adjust the frequency and output voltage of CH2 of the F.T.G adjuster to ~~1125Hz~~ 1130Hz and 0.4Vp-p. *Note:* *If adjusting the output volage by oscilloscope, disconnect the cable from the F.T.G adjuster circuit board, and measure and adjust with the oscilloscope probe in direct contact with pin 4 of the N1 connector (plug). (Because of the hum generated, do no measure at the tip of the cable.)* • Connect the F.T.G adjuster as shown in Figure 11-7. • Press the TRACK FWD (▷▷I), PLAY (▷), and PAUSE (▯▯) keys in that order to switch all servos on.
			TP 1 Pin 7 (TR. IN) TP 1 Pin 2 (TR. OT)	VR 4 (TR. GA)	LED (green) on	• Adjust the compact disc player VR4 TR.GA (tracking gain) control so that the F.T.G adjuster Just LED (green) comes on.

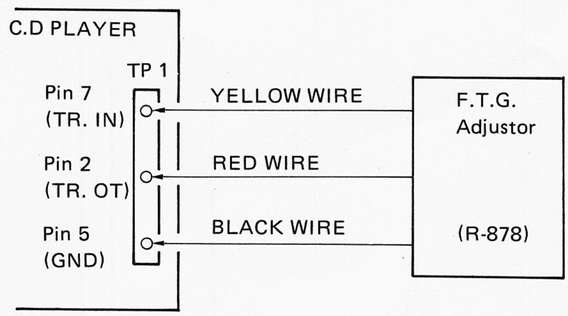


Fig. 11-7

Step No.	Oscilloscope position V	Oscilloscope position H	Test points	Adjustment positions	Check items/ Adjustment specifications	Adjustment procedure
9	**VCO FREE–RUN FREQUENCY ADJUSTMENT**					
						• Set the player to test mode (see page 49). • Press the STOP Key (□) to switch all servos off. • Press the TRACK FWD (▷▷|) and PLAY (▷) keys in that order to close the focus and spindle servos.
	0.5V/div		IC 8 (2/2) Pin 8		Write the Center Value of the Waveform	• Observe the waveform at pin 8 of IC8 (2/2) by oscilloscope at this time. (V: 0.5V/div.) (Although C47, R83, R87, and other circuit elements are connected to pin 8, the waveform can be easily observed if observed at the legs of C47. See Figure 11-8.) • Write the center value of the waveform at pin 8 of IC8 (2/2).
	0.5V/div		IC 8 (2/2) Pin 8	VL 1 (VCO coil)		• Using the core driver, adjust the VL1 (VCO coil) core so that the center value of the oscilloscope waveform is the same as the previously recorded value when the PAUSE key (▯▯) is pressed to switch the tracking servo on.

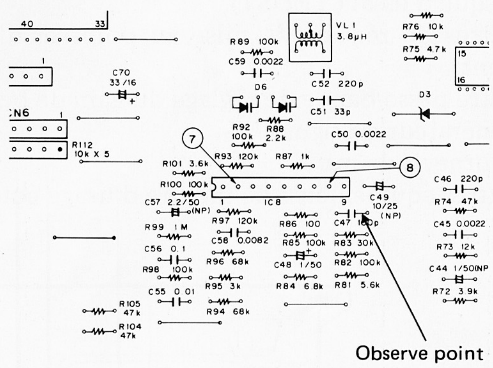


Fig. 11-8

Bottom View main PCB

12. FOR KC, HEM, HB, S AND S/G TYPES

CONTRAST OF MISCELLANEOUS PARTS

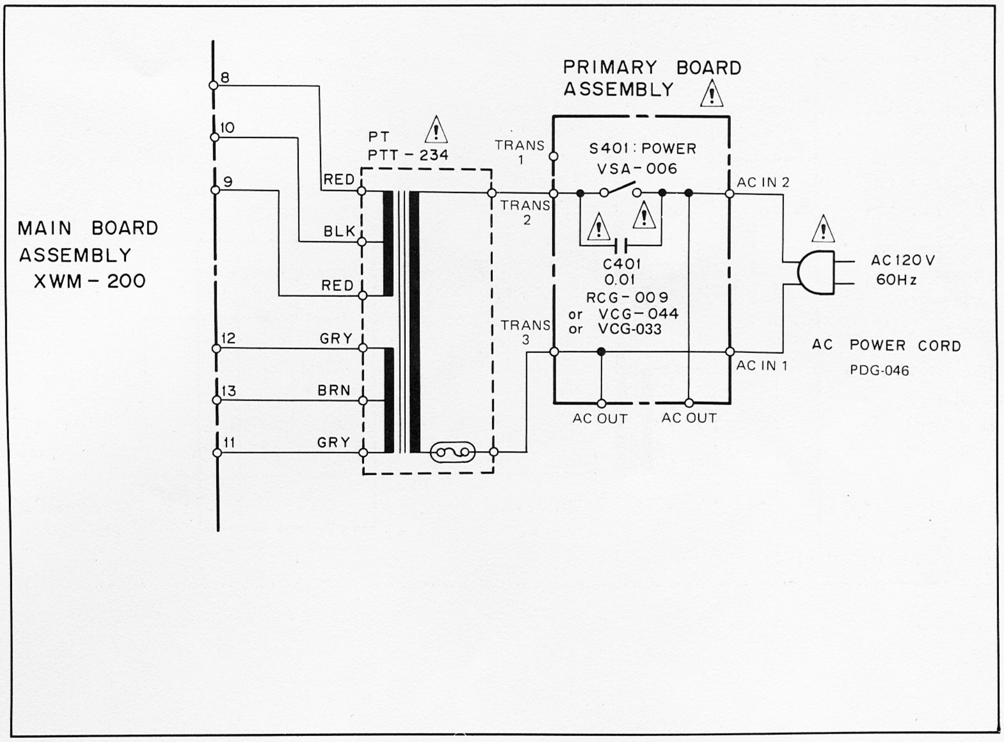
Mark	Description	Part No.					Remarks
		KU type	KC type	HEM type	HB type	S type	
⚠ ★	Power transformer (120V)	PTT-233	PTT-234	...	...	...	
⚠ ★	Power transformer (220V/240)	...	...	PTT-235	PTT-235	...	
⚠ ★	Power transformer (120V/220V/240V)	...	...	...	...	PTT-237	
⚠	AC power cord	PDG-046	PDG-046	PDG-037	PDG-062	PDG-044	
⚠	Strain relief	CM-22	CM-22	CM-22B	CM-22B	CM-22	
⚠	AC socket (AC OUTLETS)	PKN-003	...	...	...	...	
⚠★★	Line voltage selector	...	...	...	...	PSB-016	
	Packing case [Black]	PHH-232	PHH-232	PHH-247	PHH-247	PHH-247	
	Packing case [Silver]	PHH-245	...	PHH-246	PHH-246	PHH-246	
	Operating instruction (English)	PRB-283	PRB-283	...	PRB-283	PRB-283	
	Operatins instructions (English/French/German/Italian)	...	...	PRE-041	...	...	

Line Voltage Selection for HEM and HB Types

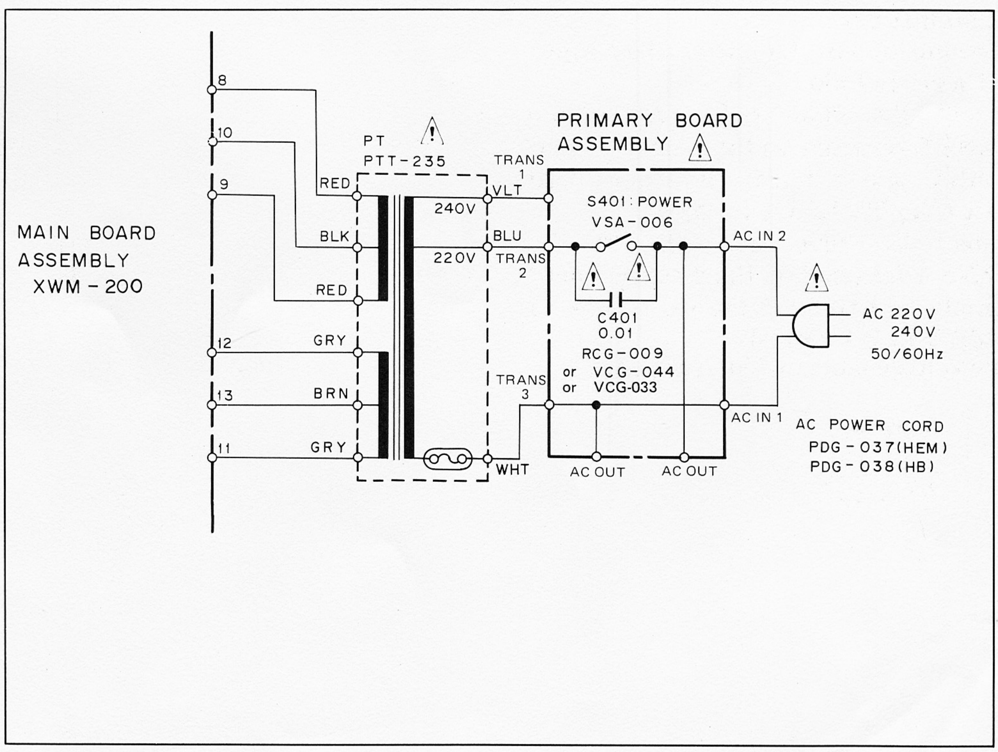
1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection of the power transformer primary lead wires as follows:
   220V: Connect the blue lead wire to the TRANS 2 terminal on the primary board assembly and connect the violet lead wire to the TRANS 1 terminal.
   240V: Connect the blue lead wire to the TRANS 1 terminal on the primary board assembly and connect the violet wire to the TRANS 2 terminal.
4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX-193
240V label	AAX-192

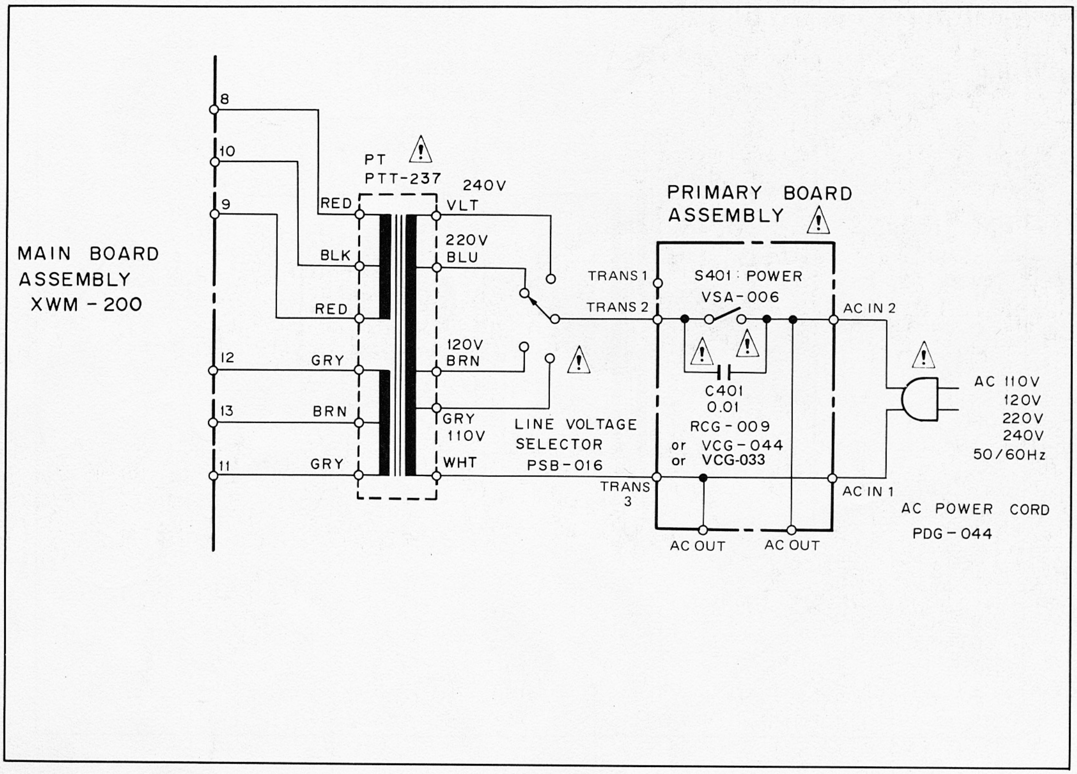
- **For KC Type**



- **For HEM and HB Types**



- **For S type**


MAIN BOARD ASSEMBLY XWM-200
8
10
9
12
13
11
RED
BLK
RED
GRY
BRN
GRY
PT
PTT-237
240V
VLT
220V
BLU
120V
BRN
GRY
110V
WHT
LINE VOLTAGE SELECTOR PSB-016
PRIMARY BOARD ASSEMBLY
TRANS 1
TRANS 2
TRANS 3
S401 : POWER
VSA-006
C401
0.01
RCG-009
or VCG-044
or VCG-033
AC IN 2
AC IN 1
AC OUT
AC OUT
AC 110V
120V
220V
240V
50/60Hz
AC POWER CORD
PDG-044