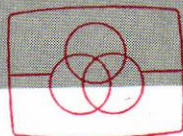


# CDP-11S

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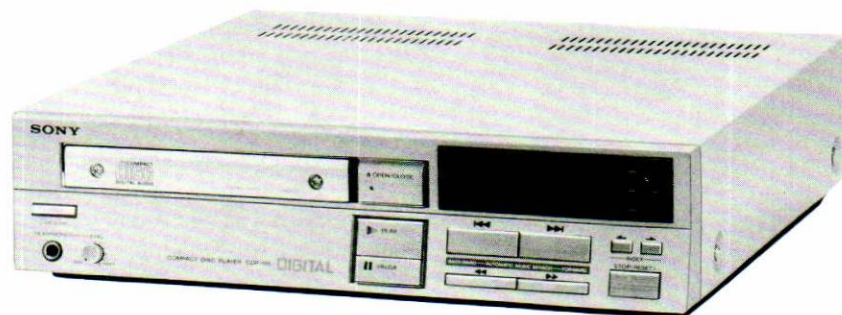


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## SERVICE MANUAL

AEP Model  
UK Model  
E Model



**COMPACT**  
**disc**  
**DIGITAL AUDIO**

### SPECIFICATIONS

<b>System:</b>	Compact disc digital audio system
<b>Disc:</b>	Compact disc
<b>Laser:</b>	Semiconductor Laser ( $\lambda = 780 \text{ nm}$ )
<b>Spindle Speed:</b>	200 r.p.m. to 500 r.p.m. (CLV)
<b>Scan Velocity:</b>	1.2 – 1.4 m/sec.
<b>Error Correction:</b>	Sony Super Strategy Cross Interleave Read Solomon Code
<b>Number of Channels:</b>	2
<b>D-A Conversion:</b>	16-bit linear
<b>Frequency Response:</b>	5 – 20,000 Hz $\begin{matrix} +0.5 \\ -1.0 \end{matrix}$ dB
<b>Harmonic Distortion:</b>	Less than 0.004% (1 kHz)
<b>Dynamic Range:</b>	More than 90 dB
<b>Wow and Flutter:</b>	Below Measurable Limit
<b>Outputs:</b>	Line outputs Output level 2 V rms (MSB) Load impedance over 10 kilohms Headphones 28 mW at 32 ohms


#### Disc

<b>Track Pitch:</b>	1.6 $\mu\text{m}$
<b>Sampling Frequency:</b>	44.1 kHz
<b>Quantization:</b>	16-bit linear quantizing/channel
<b>Modulation System:</b>	EFM
<b>Transfer Rate:</b>	2.3 M bit/sec. (before modulation)

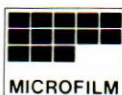
#### General

<b>Power Requirements:</b>	AEP Model: 220 V ac, 50/60 Hz UK Model: 240 V ac, 50/60 Hz E Model: 110, 120, 220 or 240 V ac, adjustable, 50/60 Hz
<b>Power Consumption:</b>	24 watts
<b>Dimensions:</b>	Approx. 355 x 95 x 340 mm (w/h/d) (14 x 3 $\frac{3}{4}$ x 13 $\frac{1}{2}$ in.)
<b>Weight:</b>	Approx. 6.6 kg (14 lb 9 oz)

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

COMPACT DISC PLAYER  
**SONY**<sup>®</sup>



## PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

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

### WARNING !!

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

### 1. Laser Diode Properties

- Material: GaAs
- Wavelength: 780 nm
- Emission Duration: continuous
- Laser Output: max. 0.4 mW\*

\* This output is the value measured at a distance of about 1.6 mm from the objective lens surface on the Optical Pick-up Block.

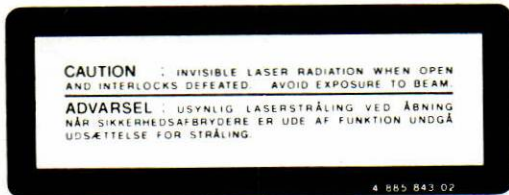
- Classification: Class IIIb

2. During service, do not take the Optical Pick-up Block apart, and do not adjust the APC circuit. If there is a breakdown in the APC circuit (including laser diode), replace the entire Optical Pick-up Block (including APC board).

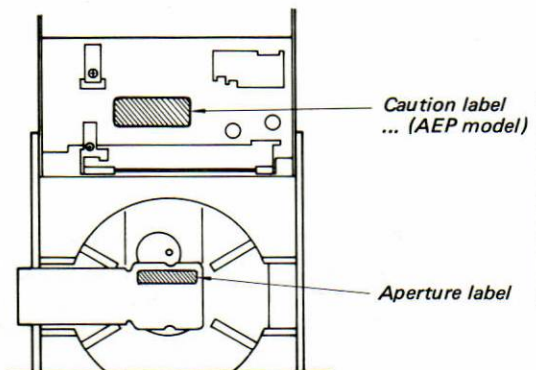
## LASER WARNING LABELS

The labels shown below are affixed.

1. Caution Label . . . . . (AEP model only)



2. Aperture Label . . . . . (AEP, UK model only)





## BESKYTTELSE AF ØJNE MOD LASERSTRÅLING UNDER SERVICE

I dette apparat anvendes laserlys. Derfor skal nedenstående instruktioner nøje følges under service.

Følg iøvrigt instruktionerne i servicemanualen.

### ADVARSEL!!

Under service må øjnene ikke komme nær objektiv linsen på den optiske pick-up enhed. I tilfælde af at det er nødvendigt at kontrollere udsendelsen af laserlys, skal det ske i en afstand af mere end 30 cm fra den optiske pick-up.

### 1. Data for Laser Diode

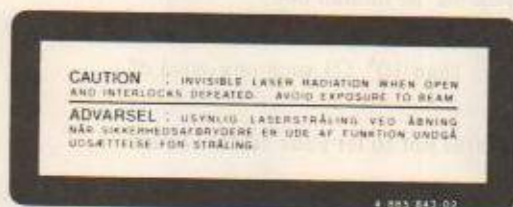
- Materiale: Ga-As
- Bølgelængde: 780 nm
- Udstråling: Kontinuerlig
- Laser Output: max. 0.4 mW\*
  - \* målt i 1.6 mm afstand fra overfladen af objektiv linsen på den optiske pick-up enhed.
- Klassifikation: Svarende til klasse IIIb

2. Adskil aldrig den optiske pick-up enhed under service, og juster ikke APC kredsløbet (Automatic Power Control). Hvis APC kredsløbet (incl. laser-dioden) bryder ned, skal hele den optiske pick-up enhed (incl. APC printkortet) udskiftes.

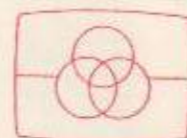
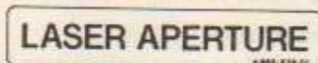
## LASER ADVARSEL MÆRKNING (AEP model)

Følgende mærkning findes indvendig i apparatet:

### 1. Advarsel Mærkning



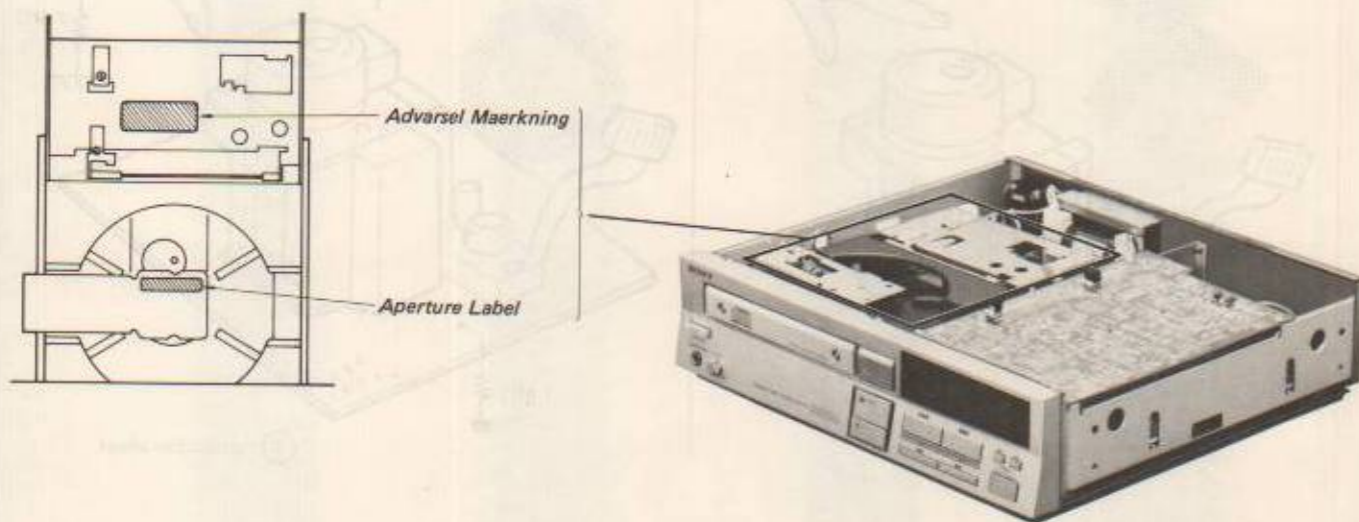
### 2. Aperture Label



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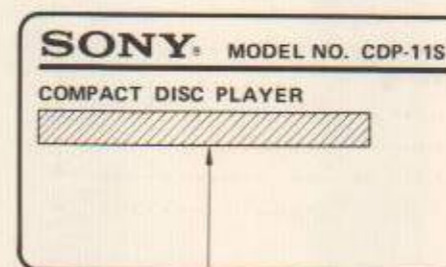
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## MODEL IDENTIFICATION

— Specification label on jack board —



AEP Model: AC: 220 V ~ 50/60 Hz 24 W  
 UK Model: AC: 240 V ~ 50/60 Hz 24 W  
 E Model: AC: 110, 120, 220, 240 V ~ 50/60 Hz 24 W

## CONTROL PANEL COLOR IDENTIFICATION

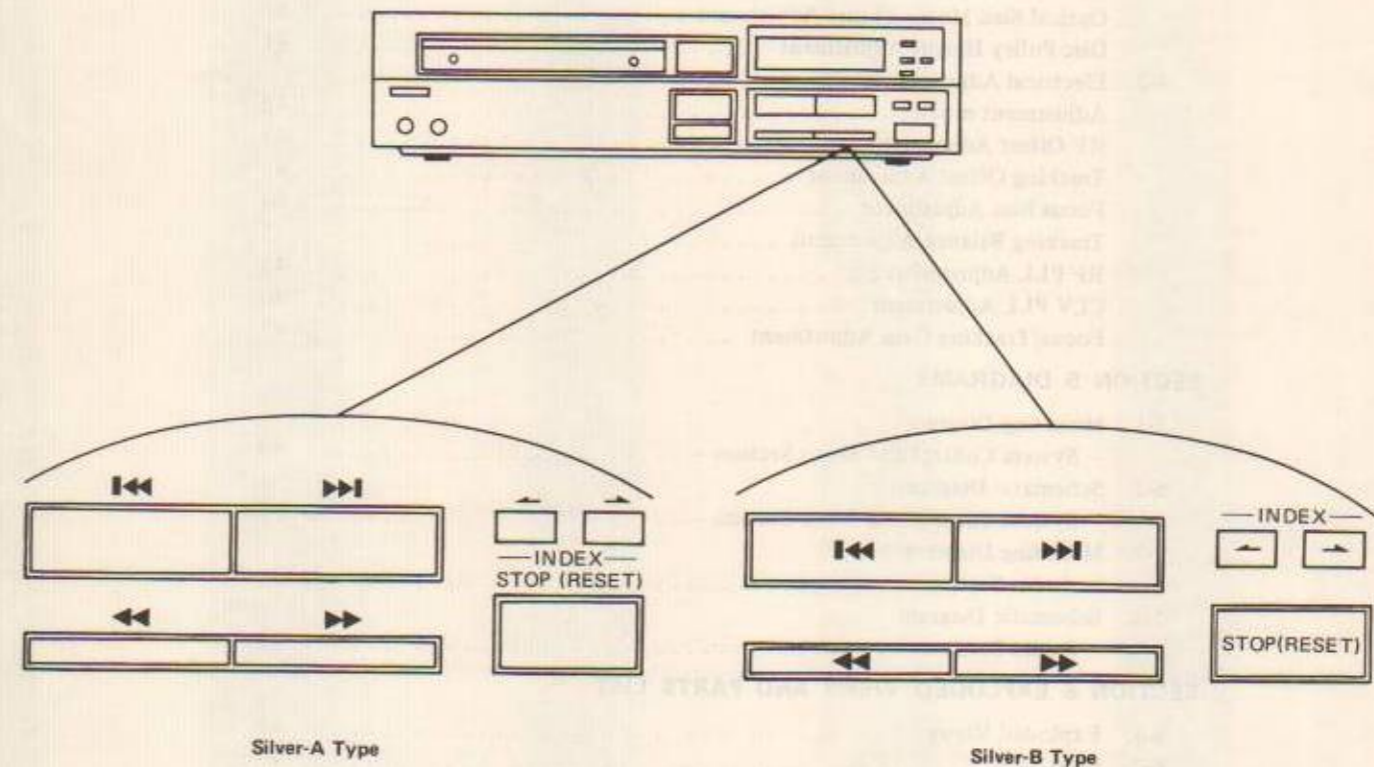




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— CAUTION FOR ELECTROSTATIC BREAKDOWN —

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK (KSS-100A)

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.

The printed matter below is included in the repair parts. During repair, use the procedure in the printed matter.

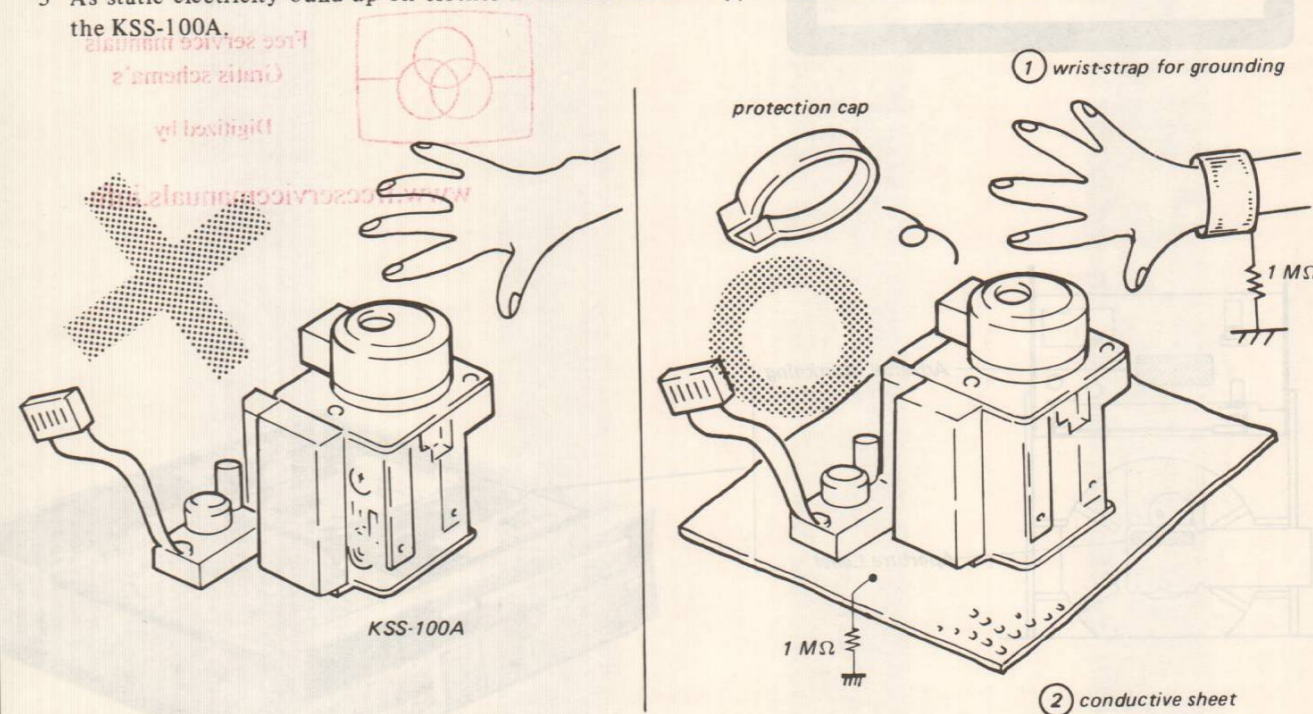
The following method is an example for reference purposes:

1. Place a conductive sheet on the workbench. (The black sheet used as repair parts wrapping.)
2. Place the set on the conductive sheet so that the chassis touches the sheet. (This makes it the same potential as the conductive sheet.)
3. Place your hands on the conductive sheet. (This makes them the same potential as the sheet.)
4. Remove the optical pick-up block from the bag (conductive).
5. Perform work on top of the conductive sheet. Be careful that clothing does not touch the optical pick-up block.

Printed Matter Included in the Repair Parts

When opening or repairing a KSS-100A, the procedure for grounding as follows is required to prevent damage caused by static electricity.

- 1 Grounding for the human body  
Be sure to put on a wrist-strap for grounding (with impedance lower than  $10^8 \Omega$ ) whose other end is grounded. The strap works to drain away the static electricity build-up on the human body.
- 2 Grounding for the work table  
Be sure to lay on the table a conductive sheet (with impedance lower than  $10^9 \Omega$ ) such as a sheet of copper, which is grounded.
- 3 As static electricity build-up on clothes is not drained away, be careful not to let your clothes touch the KSS-100A.





## SECTION 1 OUTLINE

### 1-1. FEATURES

#### Excellent Sound Quality and High Performance

The performance and sound quality surpass those of a conventional analog-type disc player.

- Frequency response 5 Hz-20 kHz within  $\pm 0.5$  dB
- Dynamic range more than 90 dB
- Harmonic distortion less than 0.004 % (1 kHz)
- Channel separation more than 90 dB
- Wow & flutter below measurable range

#### Full Auto Front Loading Linear Skating Disc Loading Mechanism

The disc is simply placed on the linear skating disc table, which goes in and out horizontally, in order to set the disc in the player. Then by pressing the PLAY button, the disc table closes, the disc is supported by the disc chucking mechanism and play begins.

#### Full-logic "Feather Touch" Operation

At the lightest touch, the "feather-touch" function buttons enable you to switch directly from one mode to another.

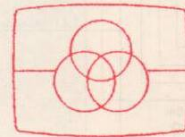
#### Digital Readout Display

The track number and the playing time elapsed of the selection playing is shown on the display window. With one touch of the ELAPSED/REMAINING TIME button, this time display will change to indicate with a minus sign how much playing time is left on the disc.

#### Non-contact Signal Readout System

Because a laser beam is employed for signal pick-up, there is no physical contact with the disc, which means no wear.

In addition, because the pit pattern is recorded below the surface of the disc, it is not necessary to be constantly on guard against dust, making the disc easy to handle.

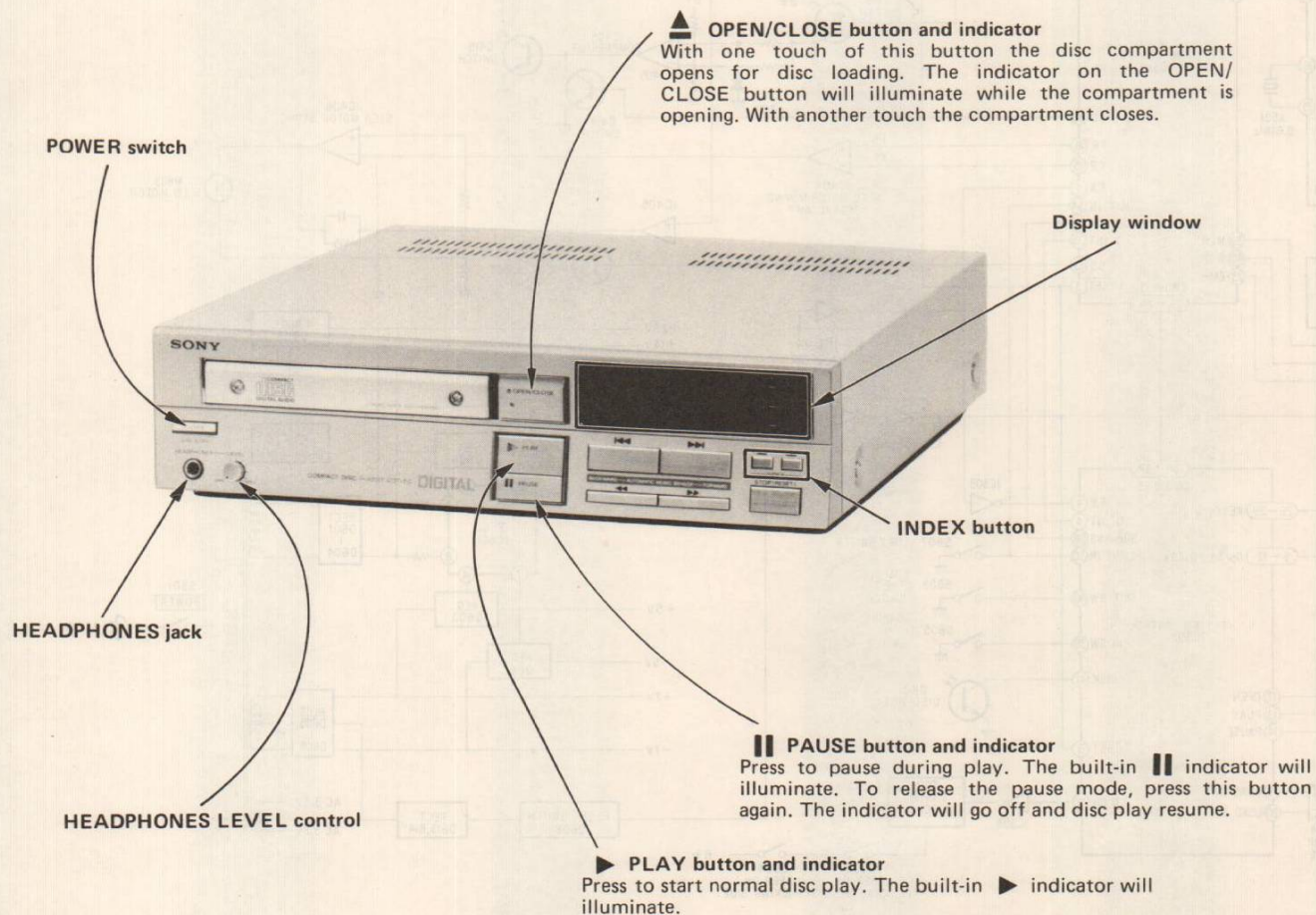


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### 1-2. LOCATION AND FUNCTION OF CONTROLS



#### REPEAT programming buttons

**ALL button:** To repeat all the selections on the disc. To release repeat play, press the button again.

**A  $\leftrightarrow$  B button:** To repeat play between specific points on the disc. With one touch of this button the built-in indicator flickers and the point where the button has been pressed is memorized as the "A" (start) point of repeat play. With another touch, the built-in indicator illuminates steadily and the point where the button has been pressed a second time is memorized as the "B" (end) point of repeat play. When the **CLEAR** button is pressed, this repeat play will be cancelled. Any repeat program is also cancelled when another **REPEAT** programming button is pressed.



#### ELAPSED/REMAINING button

The time counter normally indicates elapsed time. When this button is pressed, the time counter will show the time remaining before the end of the last selection, preceded by a minus sign. When this button is pressed a second time, the time counter will again become a normal time counter.

#### RESET button

When this button is pressed, disc play is reset to the very beginning of the first selection and player stands by.

#### Manual Search buttons

When you release this button, normal-speed play will resume (during play) or the player will return to the pause mode (during pause).

- ◀◀ button:** To go backwards at a high speed.
- ▶▶ button:** To skip ahead at a high speed.

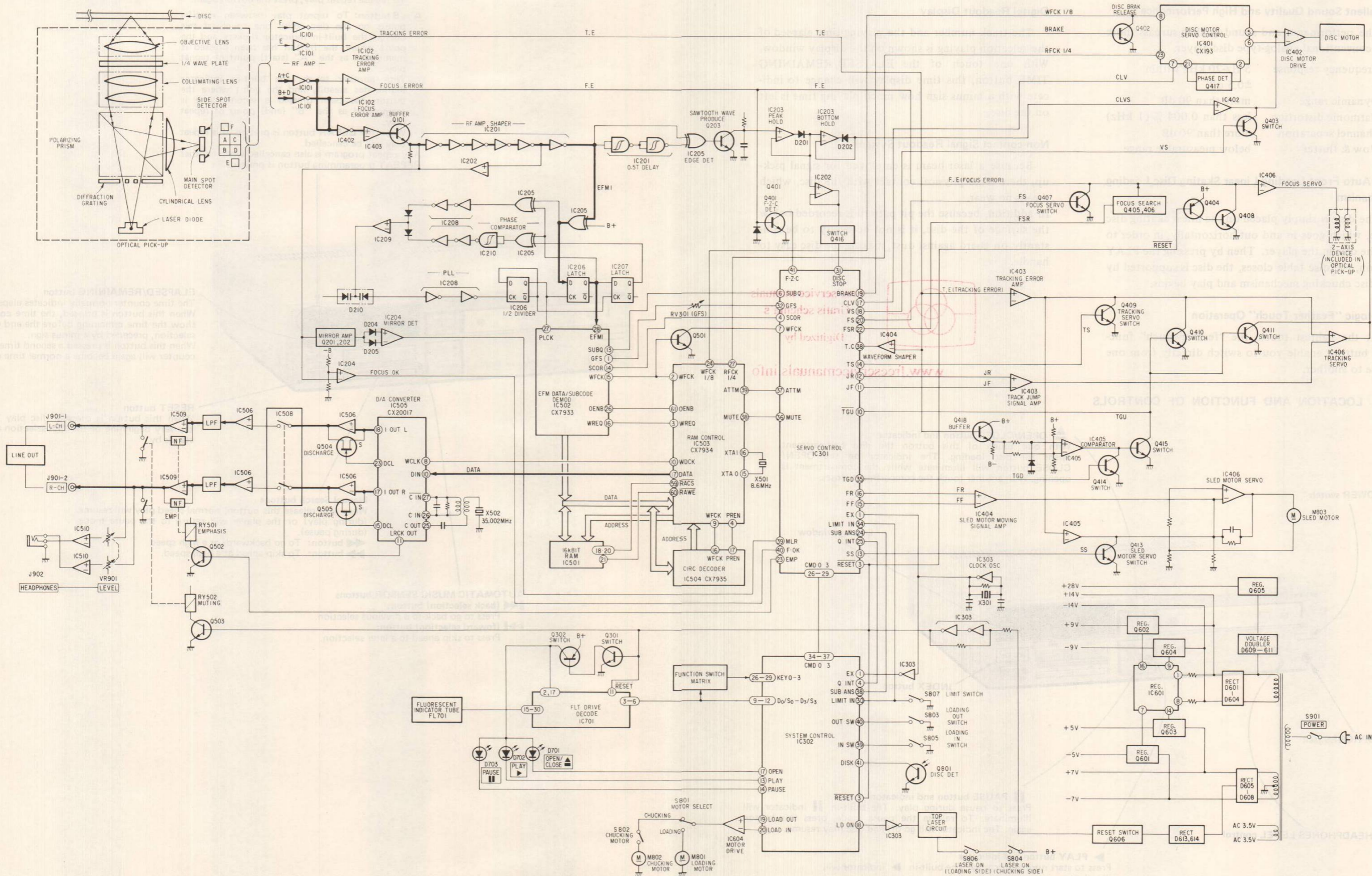
#### AUTOMATIC MUSIC SENSOR buttons

- ◀◀ (back selection) button:**  
Press to go back to a previous selection.
- ▶▶ (forward selection) button:**  
Press to skip ahead to a later selection.



SECTION 1  
OUTLINE

1-3. BLOCK DIAGRAM





## SECTION 2

### CIRCUIT DESCRIPTION

#### 2-1. MICROCOMPUTERS

##### 2-1-1. Servo Circuit Control IC's (IC301) Terminal Functions

Pin NO.	Pin Name	Function
1	EX	Clock signal input pin. (6MHz)
3	<u>RESET</u>	Reset signal input pin.
4	SCOR	SUB·Q sync signal input pin.
6	SUB·Q	SUB·Q signal (containing music address, emphasis information) input pin.
7	WFCK	WFCK (Write Frame Clock) input pin.
10	<u>TGU</u>	Output to switch the tracking servo gain.
11	J·F	Output when track jump is forward.
12	J·R	Output when track jump is reverse.
13	S·S	Output to turn the sled motor servo circuit ON/OFF.
14	T·S	Output to turn the tracking servo circuit ON/OFF.
15	F·F	Output to move the sled motor forward.
16	F·R	Output to move the sled motor reverse.
17	CLV	Output to operate the disc motor servo circuit.
18	VS	Output to turn the disc motor servo run-up-circuit ON/OFF.
19	BRAKE	When the disc is stopped, this output releases the brake mode of the disc motor servo circuit.
20	F·S	Output to turn the focus servo circuit ON/OFF.
21	GND	Ground connection.
22	F·SR	Output for focus search signal.
23	EMPHA	Output to turn the emphasis circuit ON/OFF.
24	S·ANS	When IC302 reads in sub-code signal from IC301, IC302 outputs to this pin to inform that read-in is completed.



Pin NO.	Pin Name	Function
25	Q•INT	Output for sync signal of data to feed to IC302.
26-29	COM0-3	Input /output pins for information to/from IC302.
30	M•REQ	M•REQ signal input from IC302 to here.
31	DISC STOP	Detects disc stop after servo circuit is braked.
32	GFS	GFS (Guard Frame Sync) signal input pin. When this set reading in data normally, high is input here.
33	TEST	When this pin is made low, even if the data is not read out, the disc is not ejected.
34	LIMIT IN	Detects that TOP is in starting position. When TOP is in starting position, low is input here.
35	TGD	Output for tracking servo gain up nullity signal.
36	MUTE	Output for sound mute signal.
37	ATT	Output for sound attenuation signal.
39	MLR	Mirror signal input pin.
40	F•OK	Low is input here when 2-axis device is ready to read data. IC301 knows focus is correct by this input and F•Z•C input and turns on focus servo circuit.
41	F•Z•C	F•Z•C (Focus Zero Cross) signal input pin.
42	VDD	Power supply pin. (5V DC)



## 2-1-2. System Control IC's (IC302) Terminal Functions

Pin NO.	Pin Name	Function
1	EX	Clock signal input pin.(6MHz)
3	<u>RESET</u>	Reset signal input pin.
4	Q•INT	Q•INT signal input from IC301 to here.
9-12	D <sub>0</sub> /S <sub>0</sub> -D <sub>3</sub> /S <sub>3</sub>	Output for key scan signal.
13	PLAY	Output to indicate play lamp (D702).
14	PAUSE	Output to indicate pause lamp (D703).
17	OPEN	Output to indicate open lamp (D701).
18	L•D•ON	Output to turn the laser diode ON/OFF.
19	LOAD OUT	Output to move the loading motor opened.
20	LOAD IN	Output to move the loading motor closed.
21	GND	Ground connection.
22	IDp	Output for FLT control signal.
23	RST	When IC302 send the data to IC701, low is output here.
24	CTL	Output for clock signal of data to feed to IC701.
25	M•REQ	Outputs request output when reading in sub-code signal from IC301.
26-29	KEY0-3	Key scan data input pin.
30	LIMIT IN	Detects that TOP is in starting position.
34-37	COM0-3	Input/output pins for information to/from IC301.
38	S•ANS	S•ANS signal input pin.
39	IN SW	Detects that disc table closed.
40	OUT SW	Detects that disc table opened.
41	DISC	Detects that disc is set on disc table.
42	V <sub>DD</sub>	Power supply pin. (5V)



## 2-2. DATA READ-OUT CIRCUIT

### 2-2-1. RF Offset Amp

The main spot detectors (A+C), (B+D) are amplified at IC101(A) and (B) respectively, then divided into focus error and data read out voltages.

The data read-out voltage is added together at IC101(C) and becomes (A+B+C+D). After this it is further amplified at RF offset amp IC103. The RF offset amp sets the DC level of Q101 emitter. The voltage is set by RV104 to be -1.9V DC in stop state.

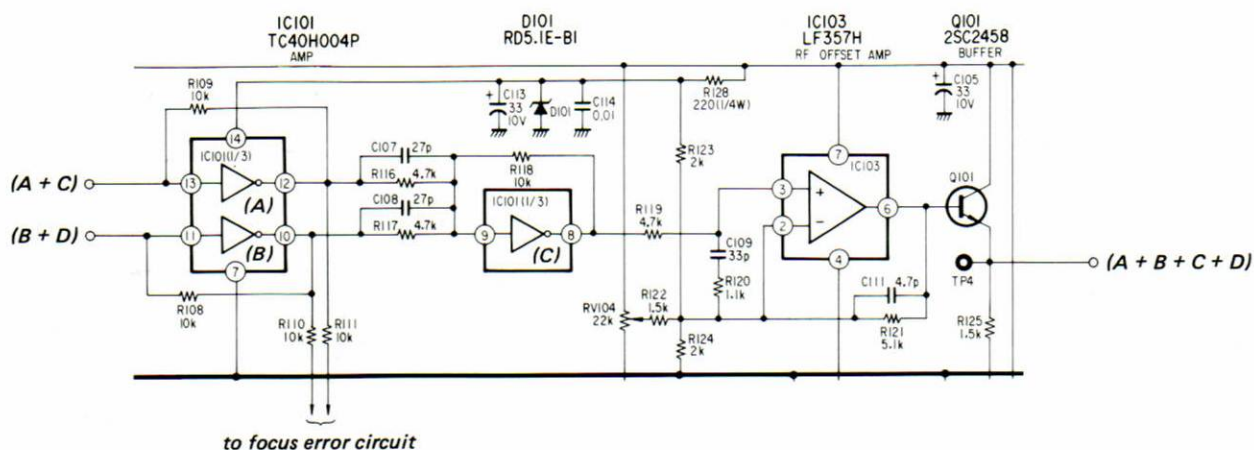


Fig. 1 RF Offset Amp

### 2-2-2. Waveform Shaper Circuit

This circuit corrects heterogeneous RF output resulting from disc irregularities, and gets the correct zero-cross point on the eye pattern. The RF signal from C201 is shaped and amplified at IC201. After integration, the signal becomes DC and controls IC201 input bias. At this time the probability of occurrence of 1, 0 is equal, so IC202 output voltage operates so that this circuit always slices the center of eye pattern.

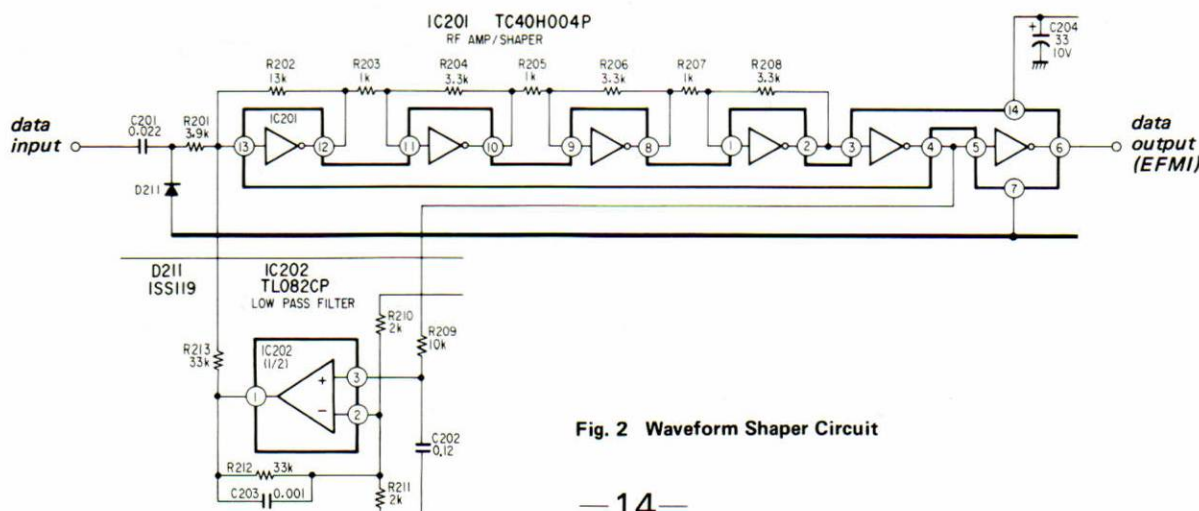


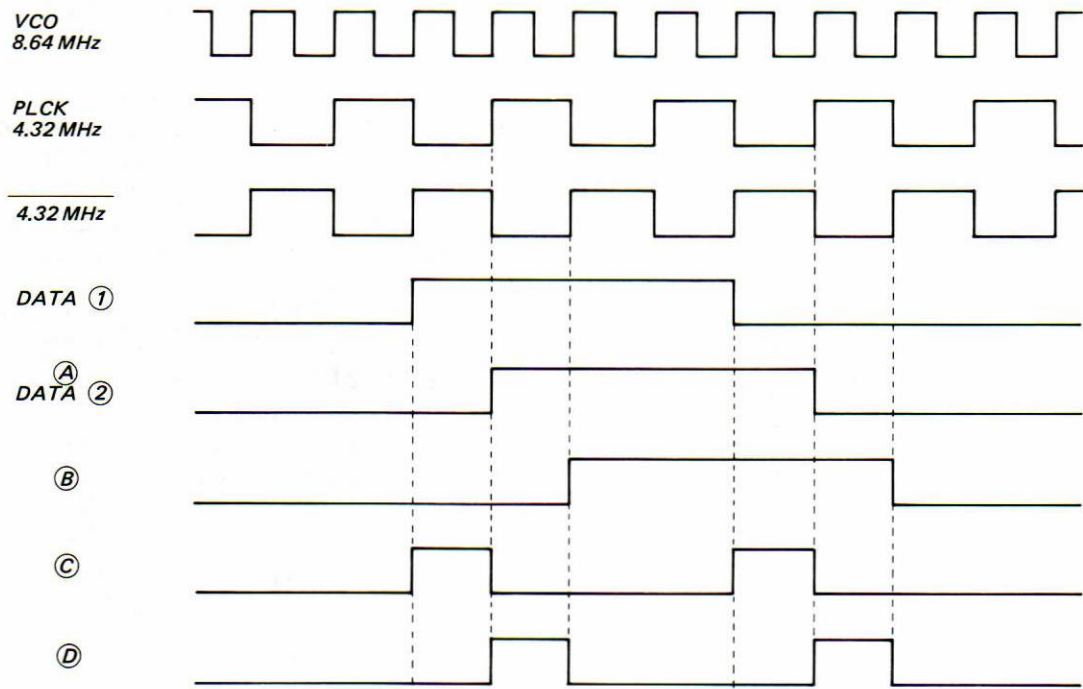
Fig. 2 Waveform Shaper Circuit



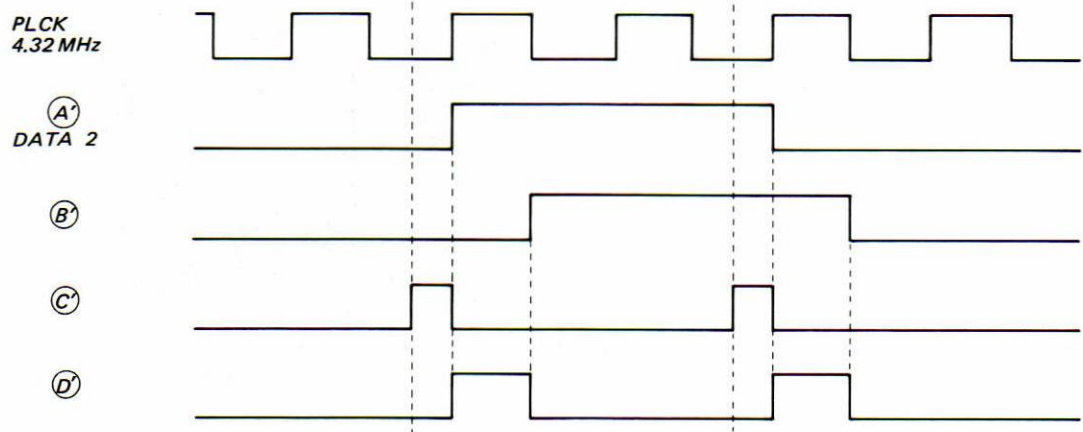




● PLCK Generating Circuit Waveform of Each Section



● VCO frequency: high



● VCO frequency: low

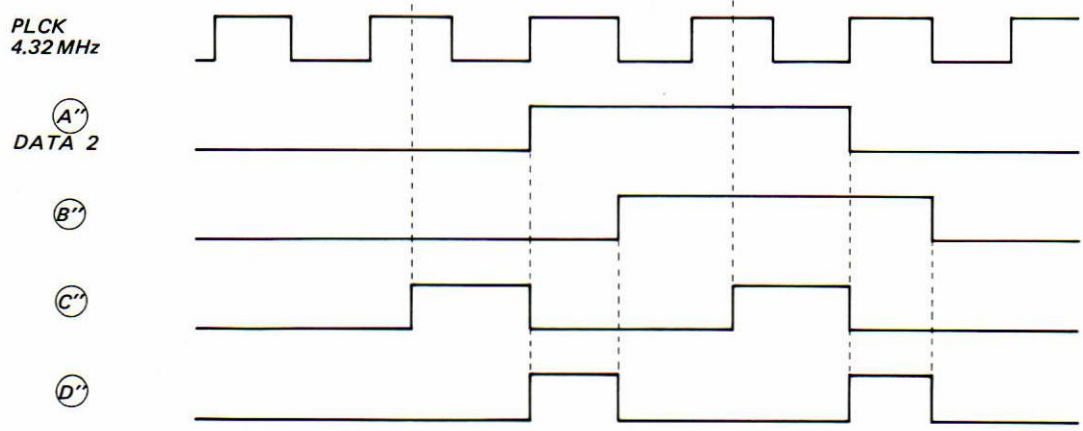


Fig. 4 PLCK Timing Chart



## 2-3. DIGITAL PROCESSING LSI

Almost all of the digital processing is performed IC502(CX-7933), IC503(CX-7934) and IC504(CX-7935).  
The following table outlines the function division of the 3 chips.

	IC502 (CX-7933)	IC503 (CX-7934)	IC504 (CX-7935)
Process	N channel silicon gate E/D MOS	N channel silicon gate E/D MOS	N channel silicon gate E/D MOS
No. of elements	4849 transistors	9725 transistors	13080 transistors
Operational speed	4.32MHz	2.16MHz (Primary OSC. 8.64MHz)	4.32MHz
Power supply voltage	5V single power supply	5V single power supply	5V single power supply
Power consumption	350 mW	550 mW	720 mW
Input/output level	TTL compatible	TTL compatible	TTL compatible
Package	28 pin DIP plastic mold	70 pin FP plastic mold	28 pin DIP plastic mold
Functions	<ol style="list-style-type: none"> <li>1. EFM data demodulation.</li> <li>2. Subcode signal demodulation.</li> <li>3. Detection, protection and interpolation of frame sync signal.</li> <li>4. Generates interface signal</li> </ol>	<ol style="list-style-type: none"> <li>1. Generates RAM control signal.</li> <li>2. Interpolation circuit.</li> <li>3. Interface to D/A converter.</li> <li>4. Generates reference signal for CLV.</li> </ol>	<ol style="list-style-type: none"> <li>1. Error detection and correction. (CIRC decode)</li> </ol> <p>Free service manuals Gratis schema's Digitized by <a href="http://www.freesevicemanuals.info">www.freesevicemanuals.info</a></p>



2-3-1. IC502(CX-7933)

IC502(CX-7933) performs the function of EFM demodulation, subcode signal demodulation, detection of frame sync signal, protection from dropout and interpolation of sync signal, and generation of CLV reference signal. For EFM demodulation, in order to return  $2^8=256$ , 4 bit channel data to 8 symbol data, logic array is employed for reverse conversion.

For subcode signal demodulation, detection of two types ( $S_0, S_1$ ) of sync pattern allotted for the subcode is necessary. Subcode processing is performed by 4 bit microcomputer IC301, which has a buffer for easier interface, and the subcode can be read out by applying an external clock signal.

Because CLV is used in CD system, servo is applied using the clock signal detected from the EFM signal. The PLL is employed for clock signal detection, but it is only effective when PLL is properly locked, so a countermeasure is required in the event that PLL is not locked during power on, dropout, etc. CX-7933 uses the 4.32MHz signal extracted by PLL as a master clock, and the demodulated data is written directly into the external RAM.

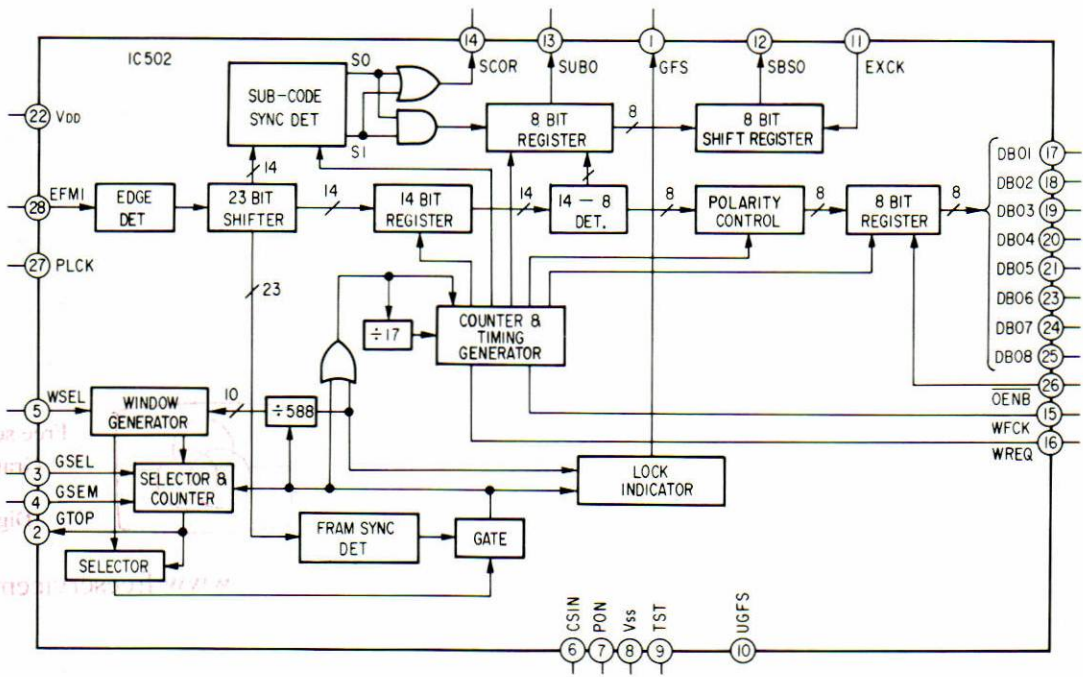


Fig. 5 IC502 Block Diagram



## 2-3-2. IC503 (CX-7934)

IC503 (CX-7934) is an LSI which controls all of the digital processing for CX-7933, CX-7935, 16k RAM and D/A converter. The contents are divided into RAM address and control signal generator, interpolation circuit and D/A converter interface circuit. Each LSI performs data write-in and read-out through a data bus in common with RAM, but when the demand signal from each LSI is received, CX-7934 establishes order of priority, processes, calculates the prescribed RAM address and applies access. The RAM is used for the three of de-interleave, correction buffer, and jitter absorption. The jitter absorption capacity is  $\pm 4$  frames. In case there is overflow or underflow in the memory, the address counter is automatically reset to prevent generation of abnormal sound. The interpolation circuit performs mean-value interpolation in case where correction was not possible at the C<sub>2</sub> decoder. If the data has errors in more than two successive words (4 symbols), previous value hold and mean-value interpolation are performed. Serial or parallel interface with the D/A converter is possible, and a divider for CLV reference signal generation is also built in. IC503 (CX-7934) operates on an 8.64MHz master clock, and has a built-in oscillation circuit for crystal oscillation.

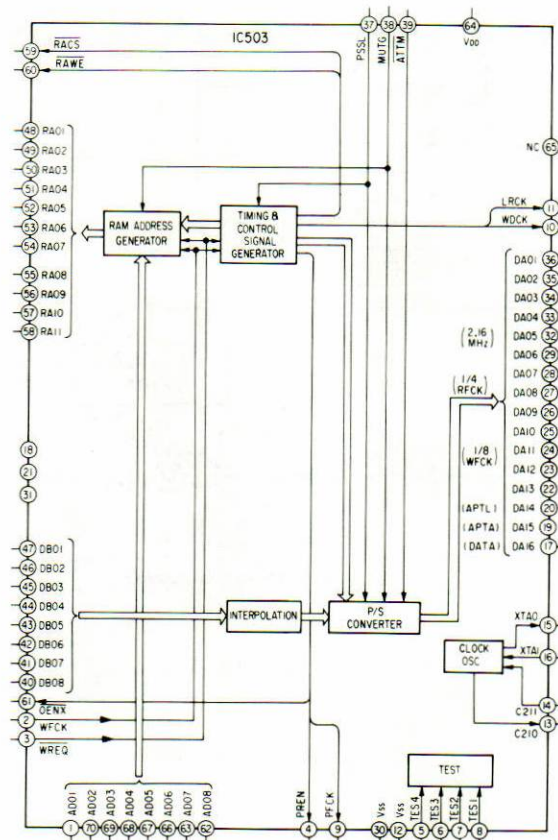


Fig. 6 IC503 Block Diagram



2-3-3. IC504 (CX-7935)

IC504 (CX-7935) is an LSI which achieves CIRC decoding, a new super strategy in decoding methods. The operation of CX-7935 inputs de-interleaved C<sub>1</sub> and C<sub>2</sub>, of 32 and 28 symbols respectively, data and pointers to CX-7935. Microprogram control and a pipeline operation circuit are employed in order to process a complicated correction algorithm within a limited time. The syndrom is calculated, and the results after correcting are written into the external RAM via the data bus. The results of the correction operation can be monitored at the 4-bit output pins, and dropout state can be detected. C<sub>1</sub> and C<sub>2</sub> correction are done by time sharing processing, and about 200 steps are required for entire longest pass. The master clock is 2.16MHz.

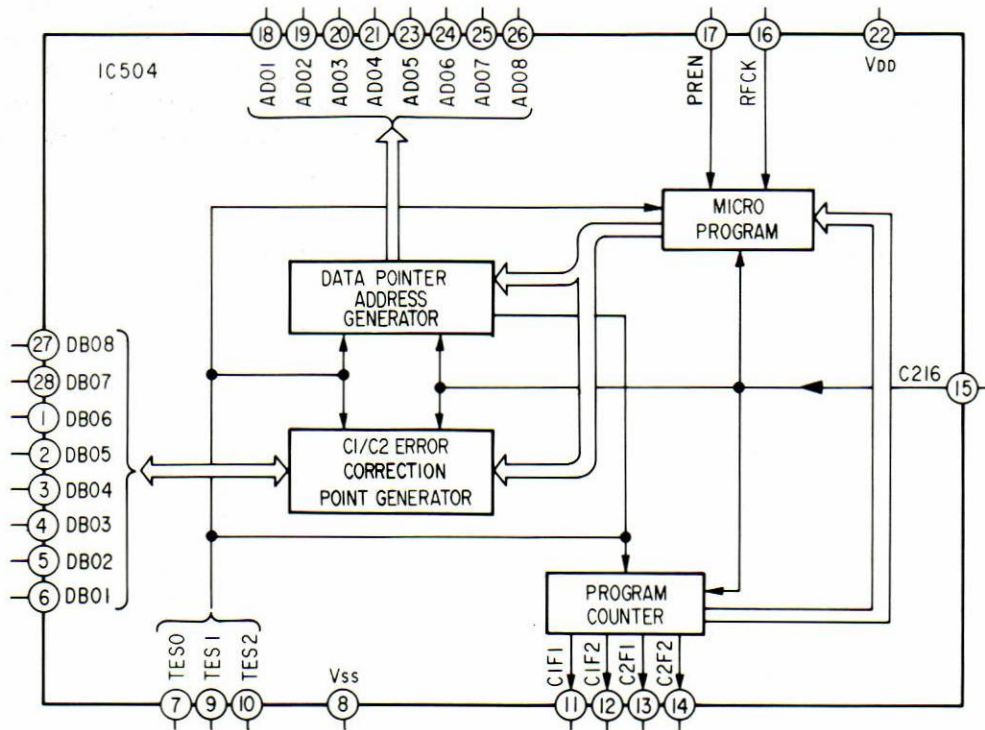


Fig. 7 IC504 Block Diagram



2-3-4. Digital Processing LSI Operation Summary

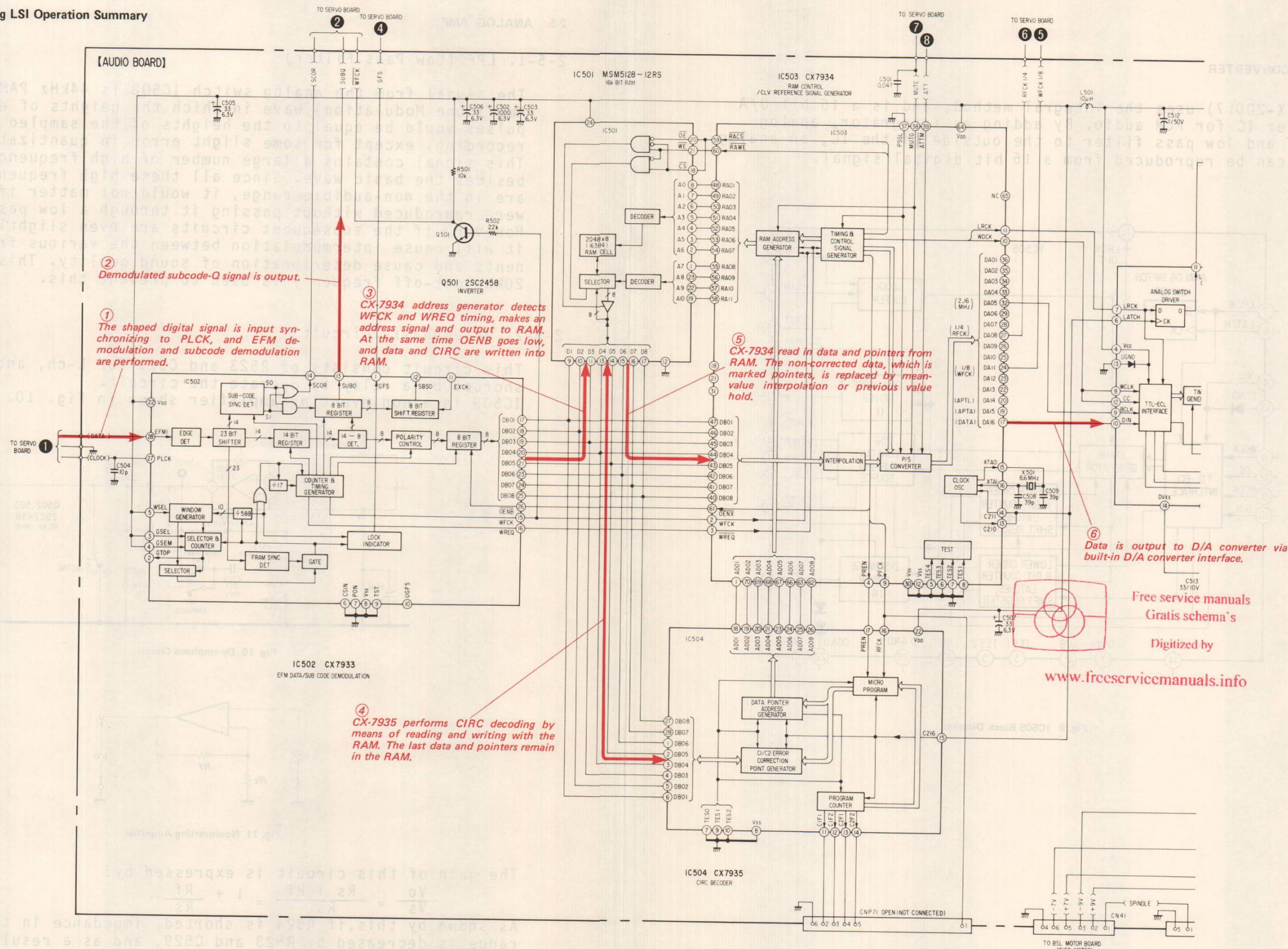


Fig. 8



2-4. D/A CONVERTER

IC505(CX-20017) uses the integral method, and is a 16 bit D/A converter IC for PCM audio. By adding an integrator, analog switch, and low pass filter to the outside of the IC, an analog signal can be reproduced from a 16 bit digital signal.

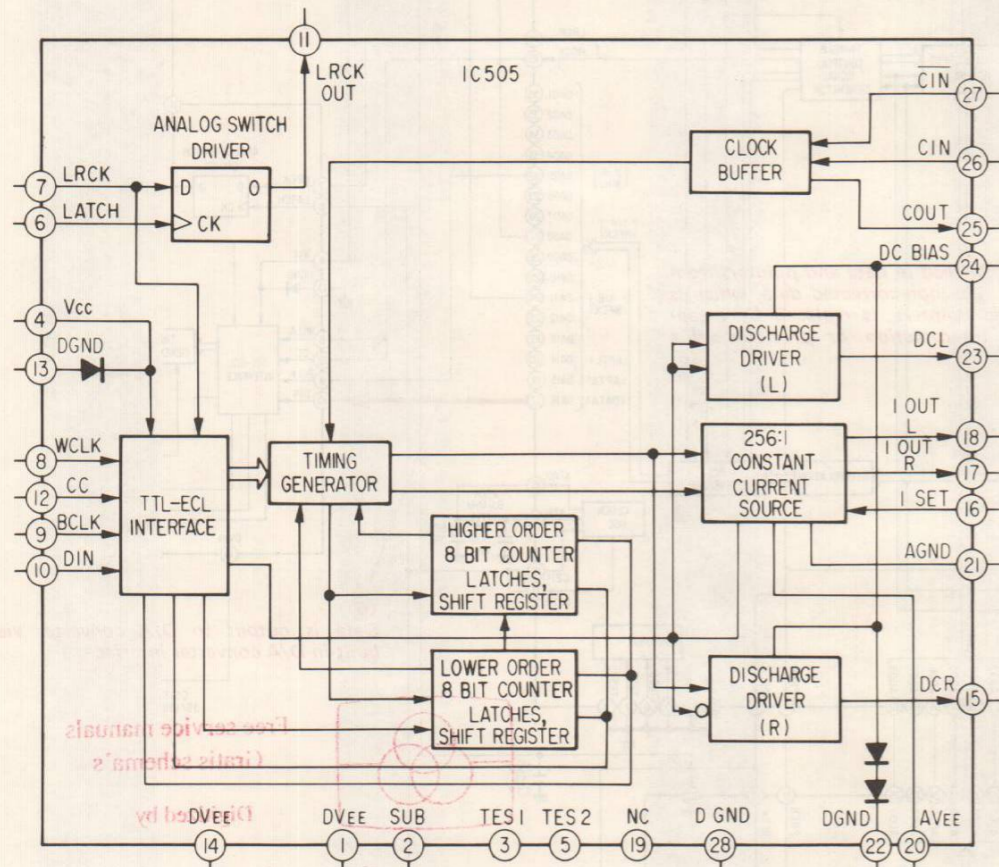


Fig. 9 IC505 Block Diagram

2-5. ANALOG AMP

2-5-1. LPF (Low Pass Filter)

The signal from the analog switch IC508 is 44kHz PAM (Pulse Amplitude Modulation) wave in which the heights of each of the pulses would be equal to the heights of the sampled pulses during recording, except for some slight error in quantization. This signal contains a large number of high frequency components besides the basic wave. Since all these high frequency components are in the non-audible range, it would not matter if this wave were reproduced without passing it through a low pass filter. However, if the subsequent passing circuits are even slightly non linear, it will cause intermodulation between the various frequency components and cause deterioration of sound quality. This LPF with 20kHz cut-off frequency is used to prevent this.

2-5-2. De-emphasis Circuit

This circuit consists of R523 and C529 for L-ch, and R524 is shorted by a relay to operate the circuit. IC509 is a noninverting amplifier shown in Fig. 10.

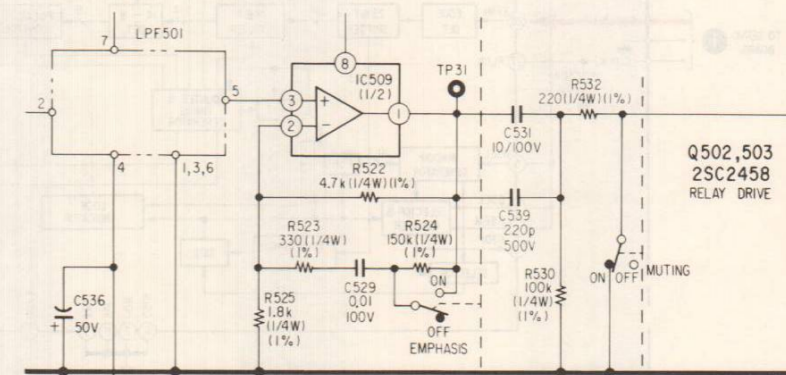


Fig. 10 De-emphasis Circuit

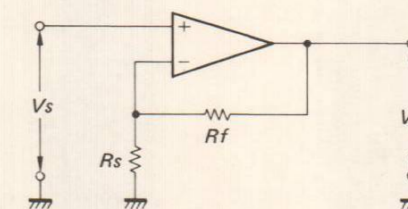


Fig. 11 Noninverting Amplifier

The gain of this circuit is expressed by:

$$\frac{V_o}{V_s} = \frac{R_s + R_f}{R_s} = 1 + \frac{R_f}{R_s}$$

As shown by this, if R524 is shorted, impedance in the Rf high range is decreased by R523 and C529, and as a result, high range gain is lowered and de-emphasis operates.



## 2-6-1. Disc Motor Servo Circuit

## 2-6. SERVO

CDP-11S has four servo the disc motor servo which control the compact disc CLV, the focus servo which controls the optical system (TOP), and the tracking servo and sled motor servo.

## •Disc Motor Servo

CLV servo is applied by IC401(CX-193). The FG signal usually obtained from the edge of turntable is the WFCK 1/8 signal on CDP-11S, obtained from the RF PLL, and the reference signal for comparison is RFCK 1/4, from the LSI master clock.

## •Focus Servo

Controls the vertical movement of the optical system's objective lens for correct focusing on the compact disc.

## •Tracking Servo

Controls the objective lens in the pit track direction, and keeps the laser on the pit track.

## •Sled Motor Servo

The sled motor moves the optical system between the inside and outside circumferences of the disc.

By applying servo, the objective lens deviation in the tracking direction is controlled as nearly as possible to mechanical center, so that tracking servo work stably.

The servo circuit is kicked when the disc starts rotating. This kick is performed when IC401 pin ⑦ input (CLV) goes low. It goes high once in run-up mode, and after run-up, goes low again. When the servo circuit is kicked and the disc rotates, VS goes low and Q403 turns off. A data pulse, as shown in Fig. 13 ①, is input to Q203. The rotation speed of the disc is still slow at this time, and the longest intervals of the sync signals in the data are longer than normal value 11T. This pulse is changed to a sawtooth wave by Q203, R244 and C218 as shown in Fig. 13 ②. The peak of this sawtooth wave corresponds to the length of the pulse intervals in Fig. 13 ①. The longer the interval, the higher the peak. After this the highest value of this sawtooth wave is held by the IC203(A), D201, C219 peak hold circuit and it is changed to DC. Therefore this DC voltage is determined by the sawtooth wave peak value of the longest sync signals in the data. This voltage must be lowered as the disc rotation speed becomes faster, so there is a discharge resistor, R245. The voltage which was peak held is bottom at IC203(B). This is to prevent the voltage from rising even if data interval which is longer than sync signal enters momentarily because of data drop-out. The voltage obtained in this way is compared with the voltage set at RV402 by IC402(A), and the servo the signal is obtained. RV402 is set so that IC402(A) output is about 3V

when the disc is rotating at the prescribed speed. When the disc is run-up and rotating at this speed, the set can read the data, so 1/8 WFCK is input to IC401 pin ⑧. Also, VS goes high and the run-up circuit mentioned above is cut off from the servo system, and servo is applied by IC401.

The Q416 is a circuit which detects disc stop. When IC301 pin ⑰ goes high, and IC401 is in STOP mode, the disc motor is braked. This happens because IC401 pin ⑤ goes low and pin ⑥ goes high. Then IC401 pin ⑧ input frequency becomes less than 1/8 of normal and brake is automatically released. However, on this model, a 1/8 WFCK is input here. 1/8 WFCK is obtained by frequency dividing the PLCK obtained from VCO. Therefore, even when the disc rotation decreases, VCO is oscillating at free run frequency, so 1/8 WFCK frequency does not drop. Therefore, unless IC401 pin ⑧ input is cut, the disc will begin reverse rotation. So, Q416 detects disc rotation stop, turn on Q402, shunts 1/8 WFCK and releases the brake.

When disc rotation stops, the input pulse to Q203 ceases, so IC203(A) output rises to the maximum value. This output passes through IC202 and is compared with set voltage at Q416 and Q416 collector goes low.

Through this, IC301 is informed that disc rotation has stopped and makes pin ⑰ (BRAKE) high. This output turns on Q402 so WFCK 1/8 is shunted and IC401 brake mode is released.

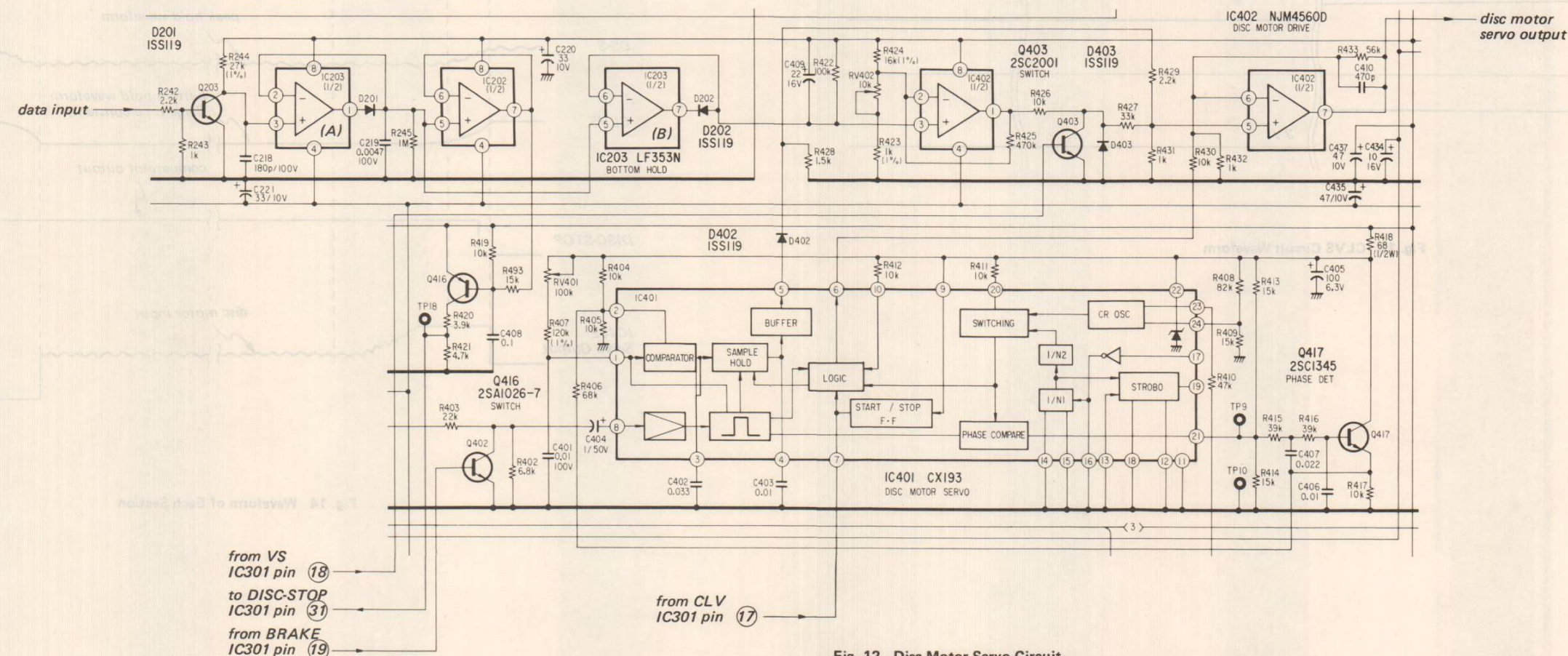


Fig. 12 Disc Motor Servo Circuit



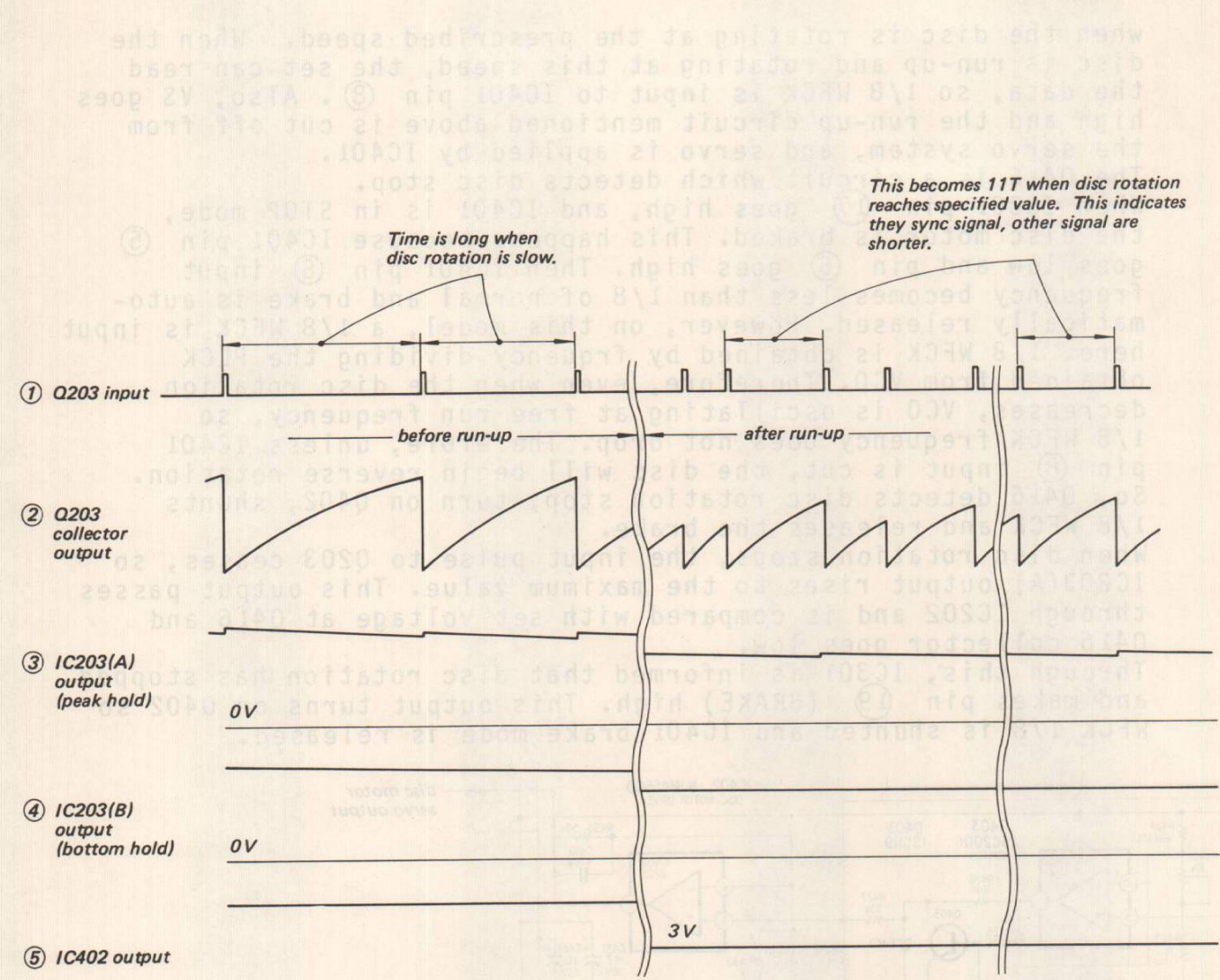


Fig. 13 CLVS Circuit Waveform

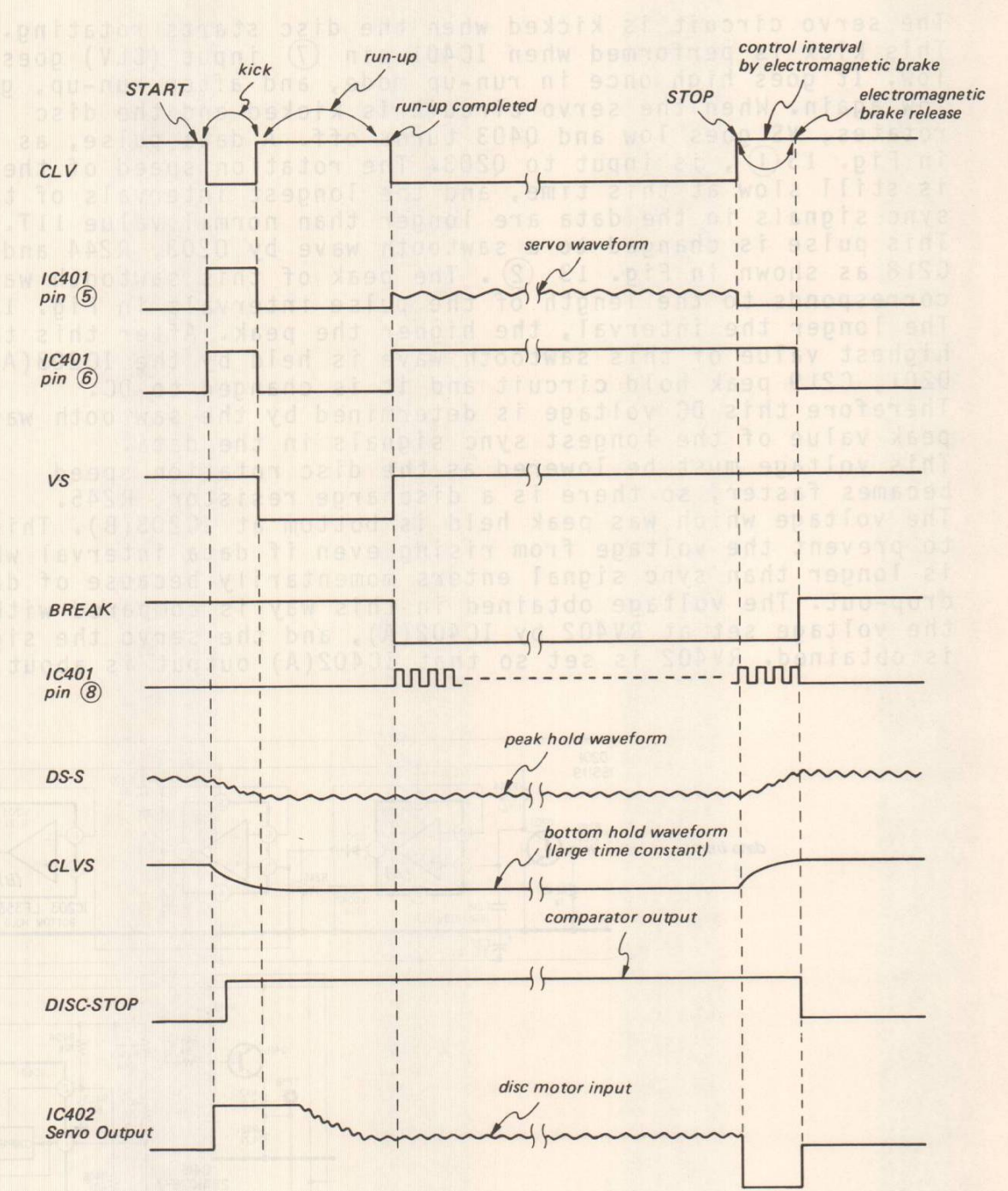


Fig. 14 Waveform of Each Section

2-6-2. Focus Error Amp

The main spot detector is divided into A,B,C and D. The output of these detectors are obtained as (A+C) and (B+D) and used for the focus servo. For data read-out, these two are added again and used as (A+B+C+D). The (A+C), (B+D) detector outputs are amplified by IC101, and is then compared at IC102. This output is (A+C)-(B+D), and is focus error voltage.

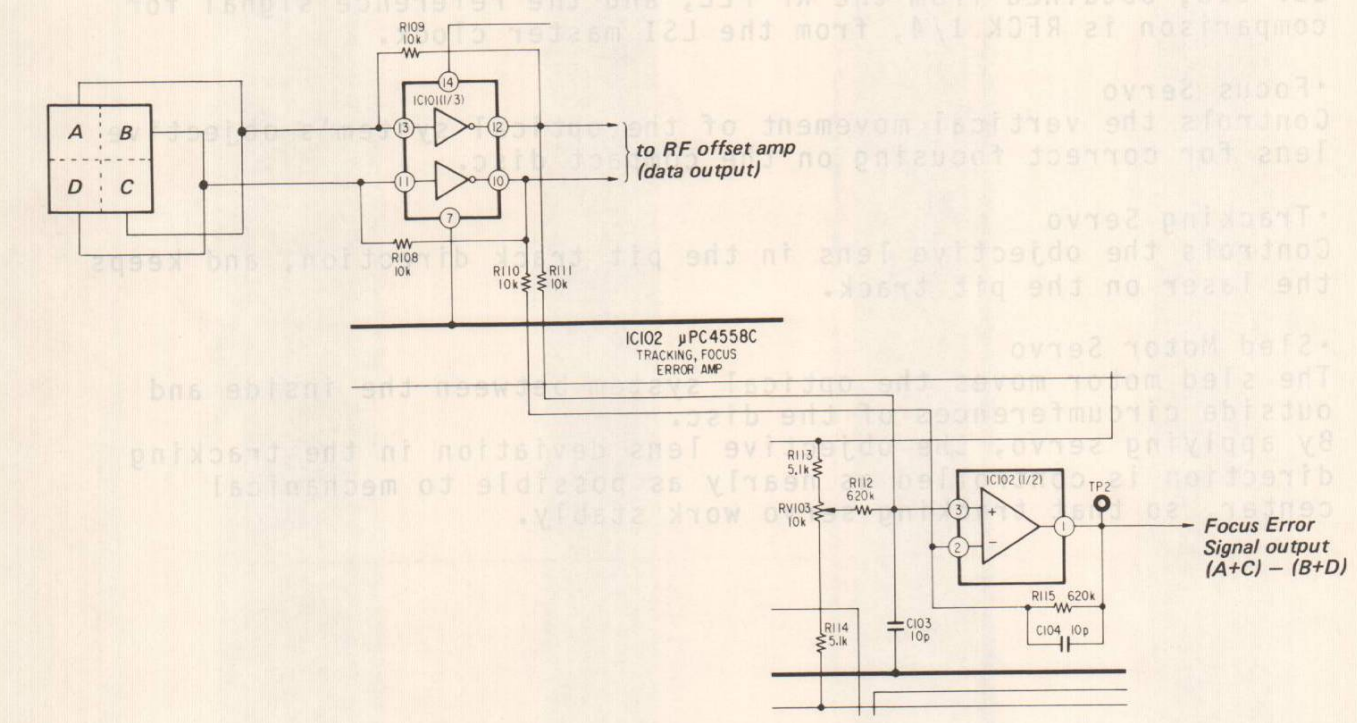


Fig. 15 Focus Error Amp

RV103 is the focus adjustment control and is adjusted so that eye pattern (data output pattern) is correct possible. Generally, the eye pattern is best at the maximum output point. However, this may vary depending on detector irregularity or TOP mis-adjustment. Therefore the eye pattern is observed for focus adjustment.

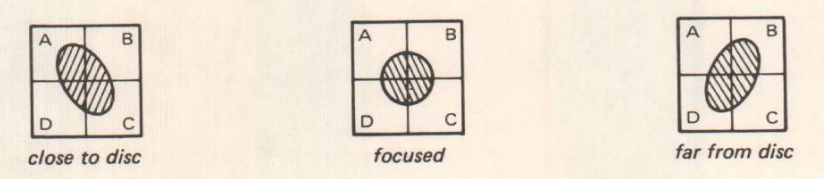


Fig. 16 Laser Spot and Detector



### 2-6-3. Focus Servo Circuit

When the disc is loaded in the set, first focus search is performed and focus servo is applied. Focus search is performed by output of a low focus search pulse from IC301 pin (22). This focus search pulse is applied to the bases of Q405 and Q406, turning Q405 on and Q406 off. When Q405 goes ON, the potential at point (A) rises slowly. Also, because Q406 goes OFF, point (A) potential is applied to IC406 (+) input. Therefore the 2-axis device according to point (A) voltage change. When the height of the 2-axis device reaches the exact focus position, focus servo (F·S) goes low, and Q407, which was ON, goes OFF. Exact focus detection is performed by the focus OK circuit and focus zero cross detection circuit. When Q407 goes OFF, the focus error (F·E) signal is input to IC406, so focus servo begins to operate. When this servo does not operate with one focus search pulse, this operation is repeated twice more. When the servo does not work even after the third time this is an error, the set stops and the disc ejected.

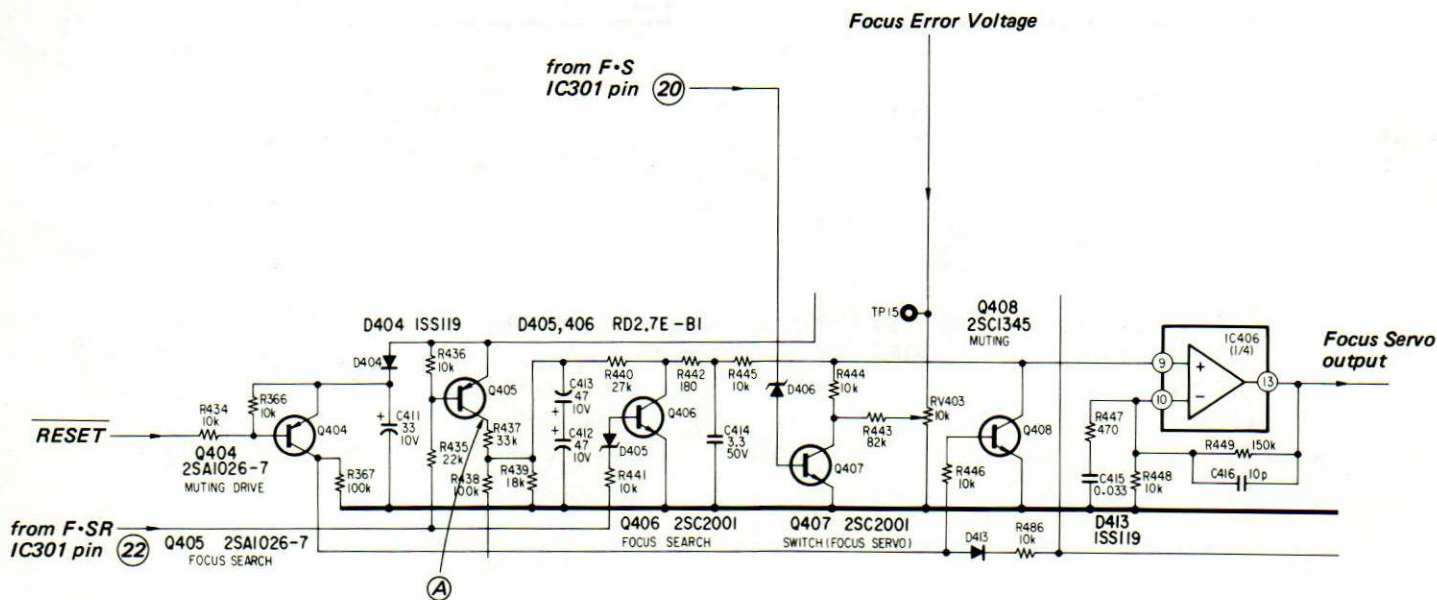


Fig. 17 Focus Servo Circuit



### 2-6-4. Tracking Error Amp

The output from tracking detectors E and F are amplified by inverters (IC101), then are input to IC102 operation amp. The difference between E and F output is amplified at IC202 and error signal is obtained.

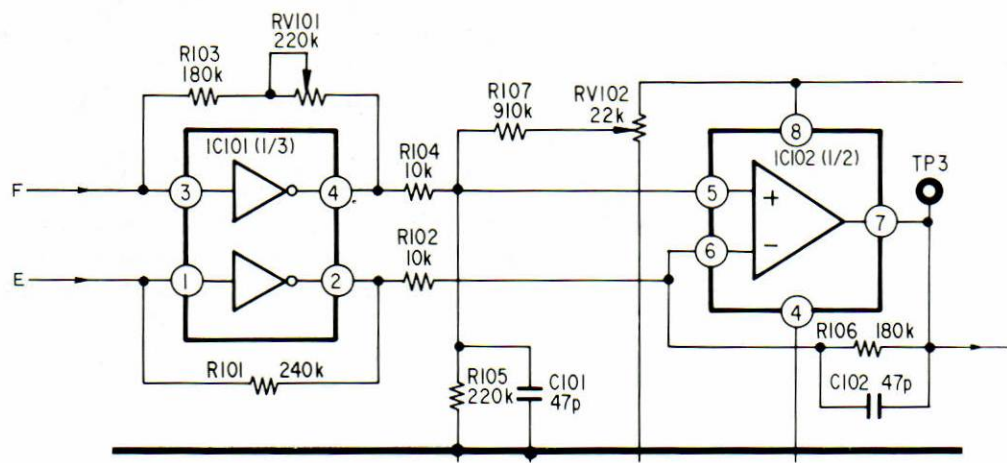


Fig. 18 Tracking Error Amp

RV102 is the DC offset control for IC102, and is adjusted so that output is 0V DC in STOP mode. RV101 is the control for matching E/F output levels. Adjustment is done in PLAY mode, with tracking servo stopped, by Fig. 19. This traverse signal is generated by the laser beam cutting across the track.

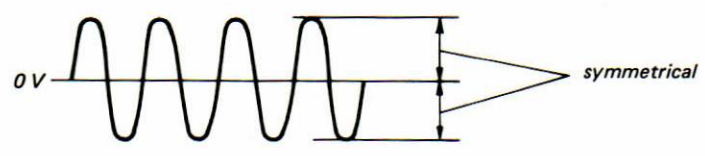


Fig. 19 Traverse Signal



## 2-6-5. Tracking Servo

The tracking error signal passes through RV404, is amplified at IC403(A), continues through IC406 and drives the 2-axis device. Q410, 411 are for servo amp gain switching and are normally ON. Gain rises when they go OFF. Gain is raised during access, or when tracking becomes unstable due to set vibration, etc. When TGU goes low during access or when tracking becomes unstable, Q415 goes ON and turns off Q401, 411. Unstable tracking is detected by input of tracking error voltage to the comparator (IC405). When track jump, IC301 pin ⑪, ⑫ are output the track-jump signal. It pass through IC403(B) and is controlled track-jump.

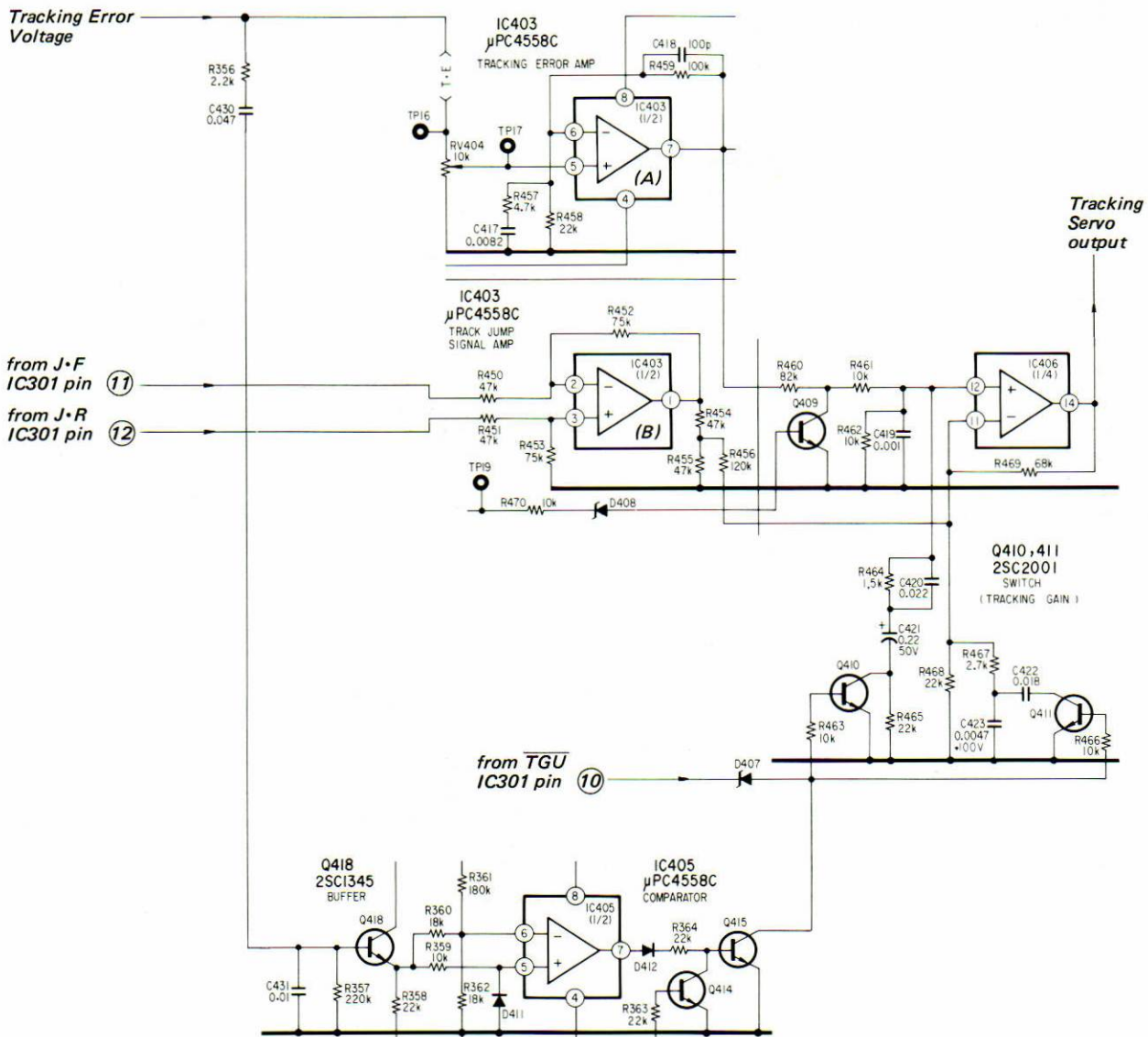


Fig. 20 Tracking Servo Circuit



### 2-6-6. Sled Motor Servo

The sled motor is also driven by tracking error voltage. However, when the tracking servo is at a relatively fast speed in accordance with disc rotation, sled motor rotation speed progresses in large step. The tracking error signal amplified at IC403 has its high frequency component removed at low pass filter (IC405).

Q413 is a transistor for sled servo ON/OFF and is only off during PLAY, to operate the sled motor.

Also, during track jump on F·F or F·R signal is input to this circuit, to operate the sled motor, separately from servo operation by tracking error voltage. F·F, F·R signals pass IC404, input to IC406 and operate the sled motor.

The F·R signal is also output when play is interrupted by RESET switch and the 2-axis device is returned to its starting position.

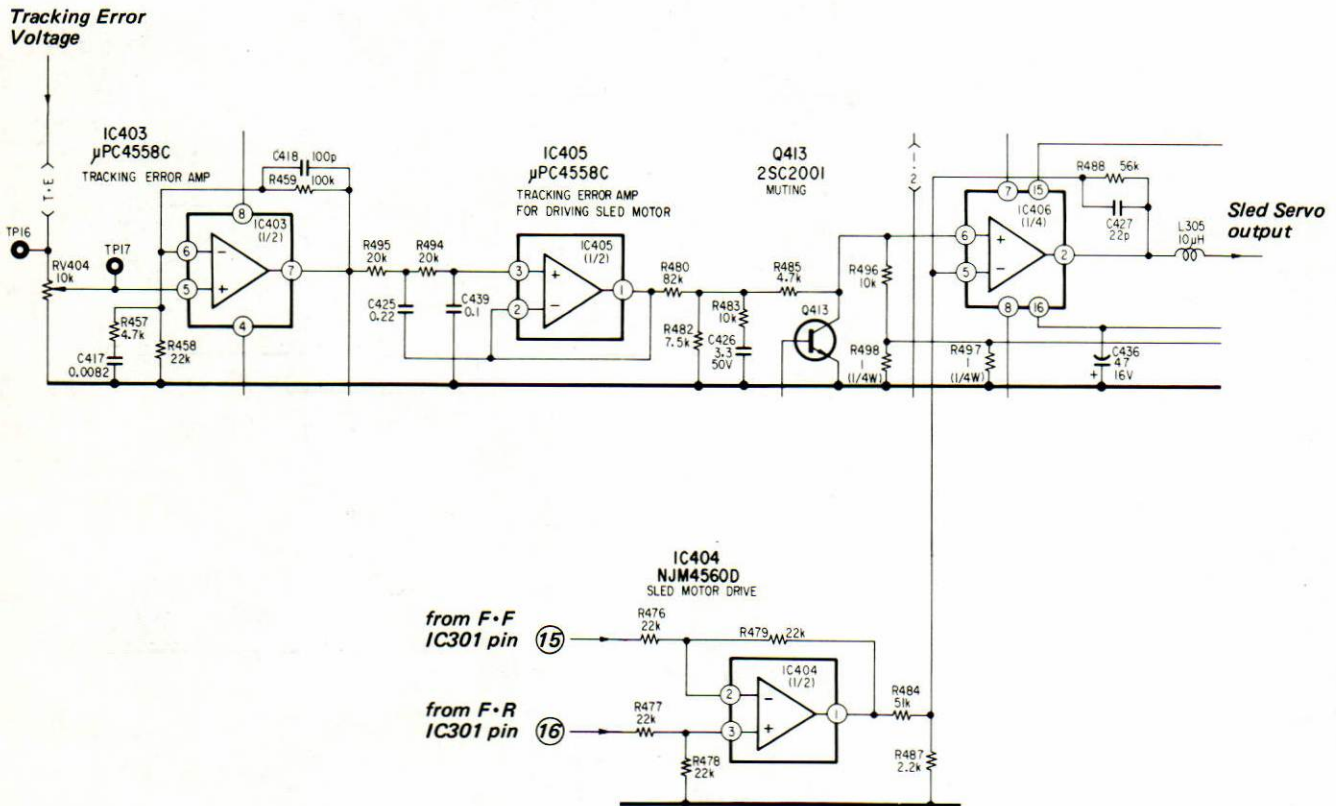


Fig. 21 Sled Motor Servo Circuit

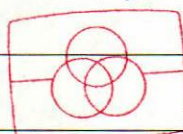
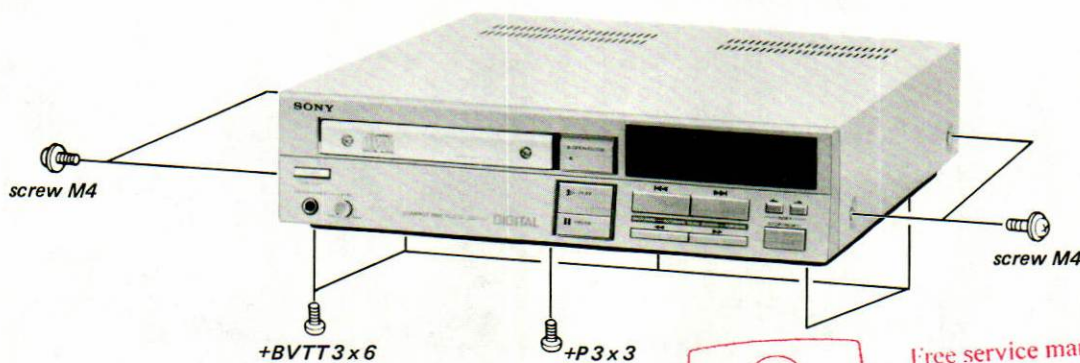


# SECTION 3 DISASSEMBLY

## 3-1. DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

### CASE, BOTTOM PLATE



Free service manuals  
Gratis schema's

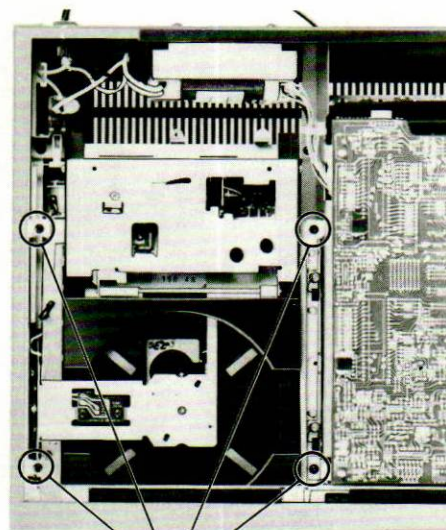
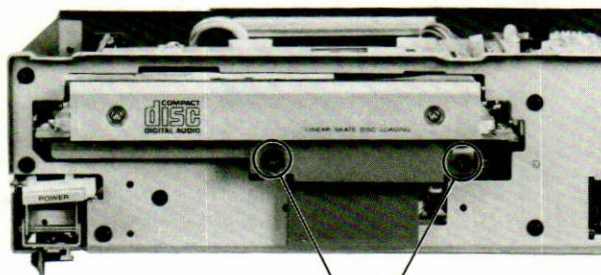
Digitized by

[www.freeservicemanuals.info](http://www.freeservicemanuals.info)

### FRONT PANEL



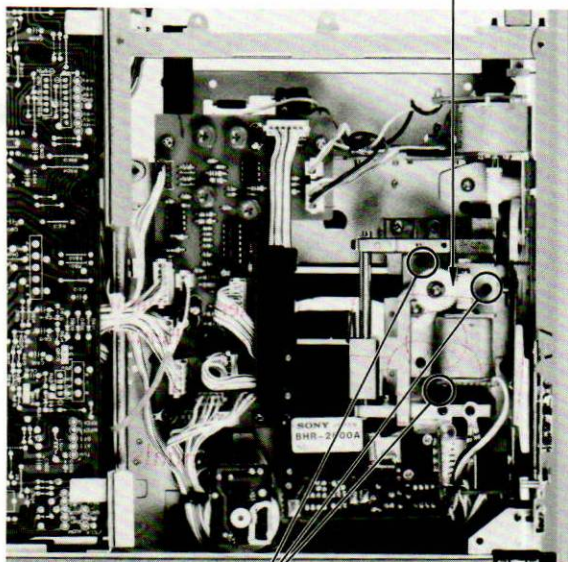
### MECHANISM SECTION





SLED MOTOR BLOCK

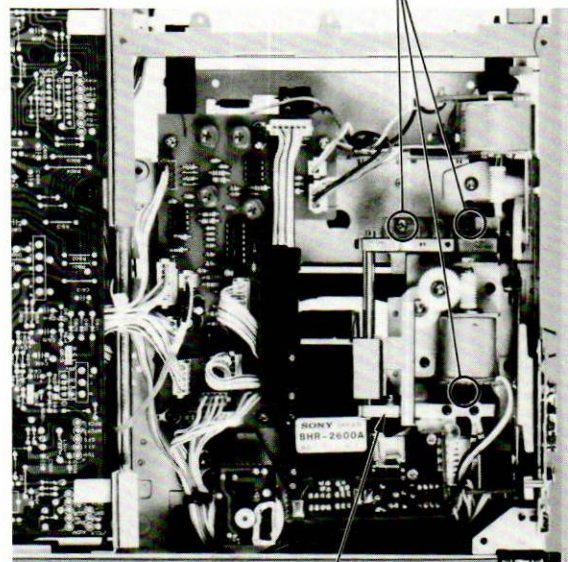
SLED MOTOR BLOCK



+P2.6 x 5

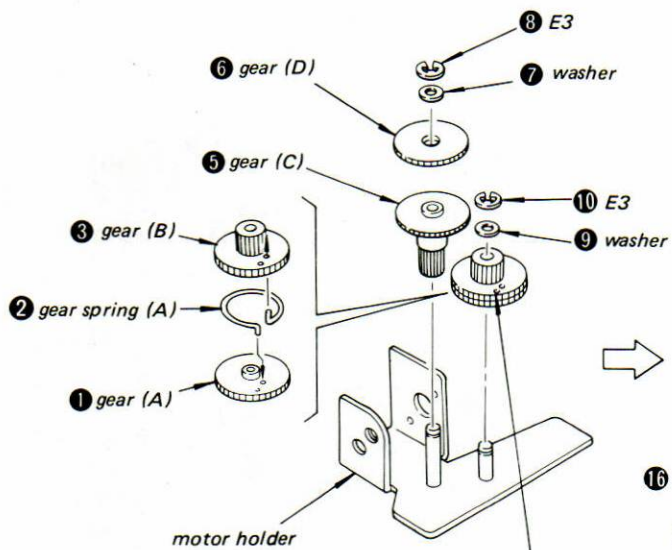
OPTICAL PICK-UP BLOCK

+P3 x 4



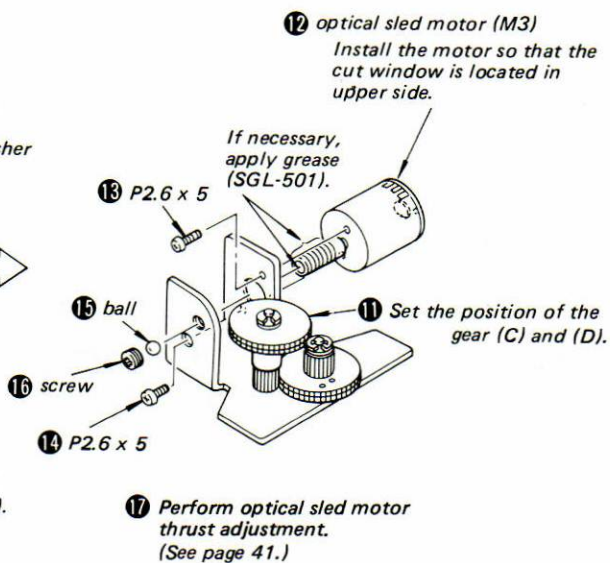
optical pick-up block

OPTICAL SLED MOTOR ASSEMBLY



motor holder

Insert a pin to the hole and set the position of gear (A) and (B).



12 optical sled motor (M3)  
Install the motor so that the cut window is located in upper side.

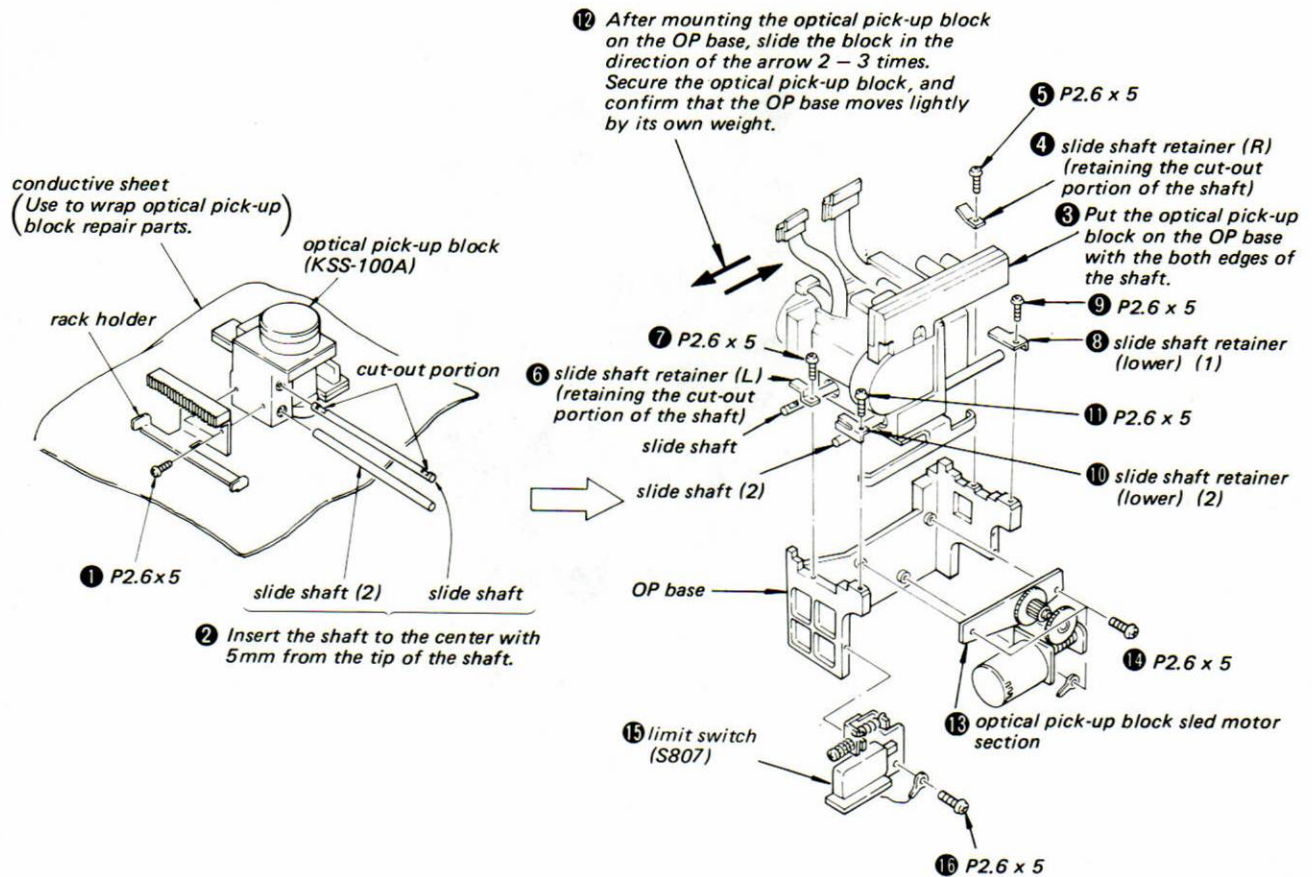
If necessary, apply grease (SGL-501).

17 Perform optical sled motor thrust adjustment. (See page 41.)



**OPTICAL PICK-UP BLOCK ASSEMBLY**

Refer to the Note on Handling the Optical Pick-up Block (KSS-100A). (page 6)



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

1. RF Offset Adjustment (page 43)
2. Tracking Offset Adjustment (page 43)
3. Focus Bias Adjustment (page 44)
4. Tracking Balance Adjustment (page 45)
5. Optical Pick-up Block Position Adjustment (page 40)

After performing the above, confirm focus/tracking gain.

— Checking Focus/Tracking Gain —

Play a disc (YEDS-1) and check the following items.

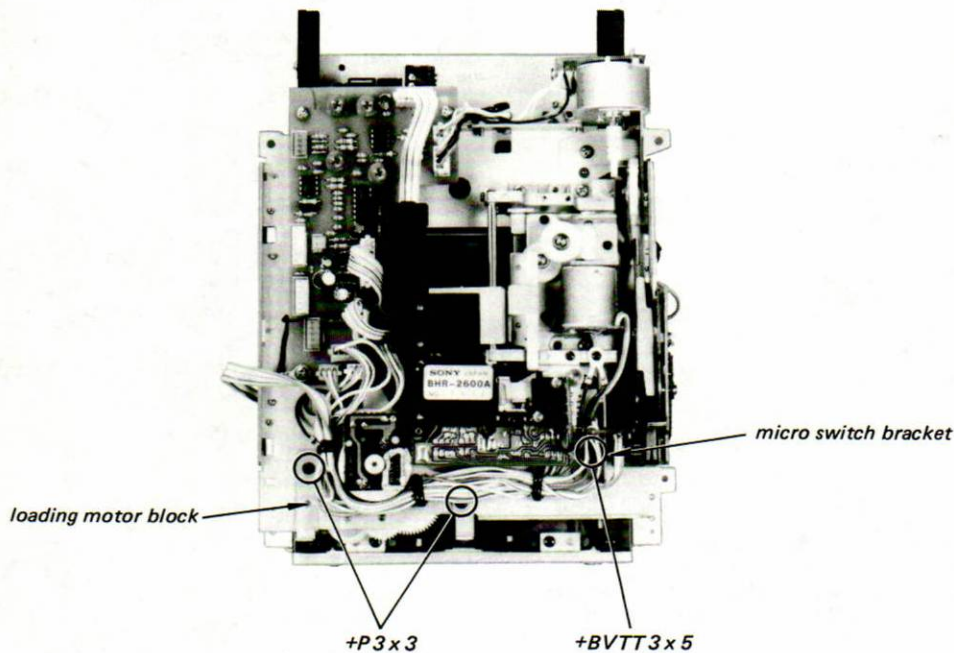
1. No skipping in the sound.
2. Mechanical noise when the 2-axis device operates should be minimum.
3. The beginning of the desired selection is reached when the ( ◀▶ , ▶▶ ) buttons are pressed. The time for reaching the beginning of a selection should be about 2 seconds.



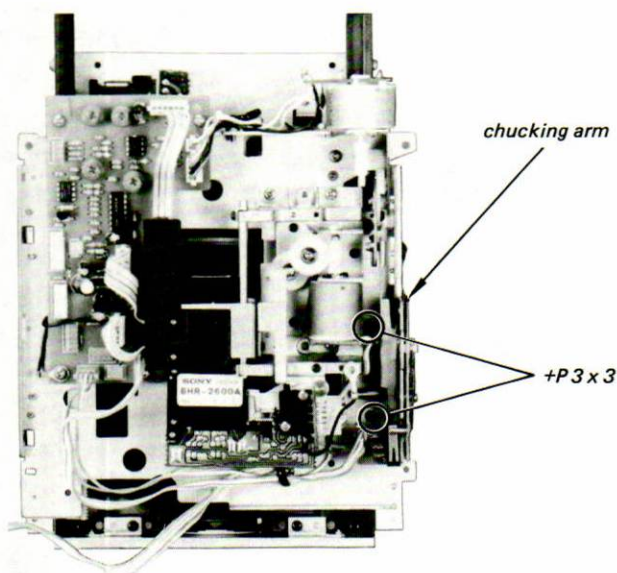
Remove the mechanical section  
(See page 35.)



LOADING MOTOR BLOCK, MICRO SWITCH BRACKET

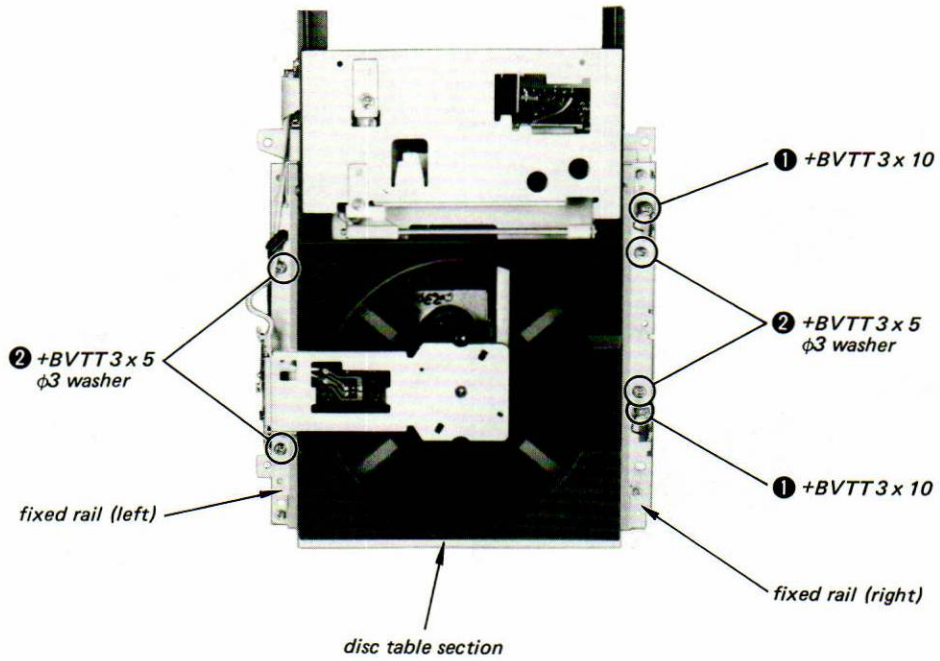


CHUCKING ARM

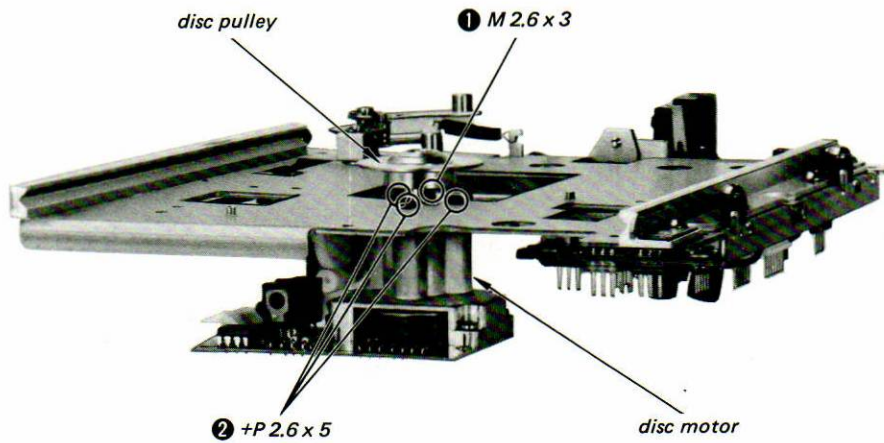




**FIXED RAIL (RIGHT) · (LEFT), DISC TABLE SECTION**



**DISC PULLEY, DISC MOTOR**



**Note:** After disc pulley is attached, perform the Disc Pulley Adjustment. (See page 41.)

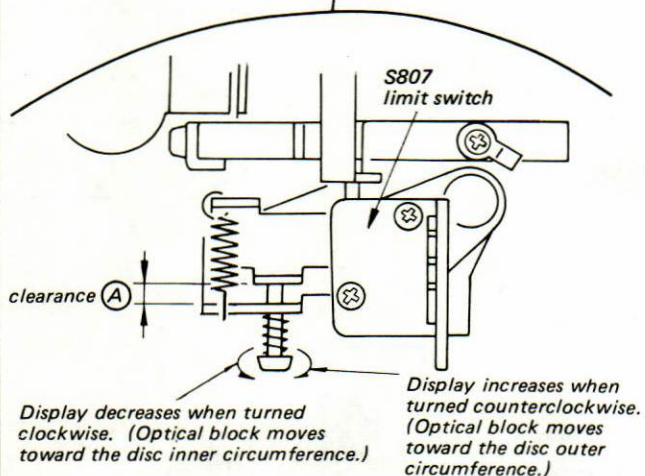
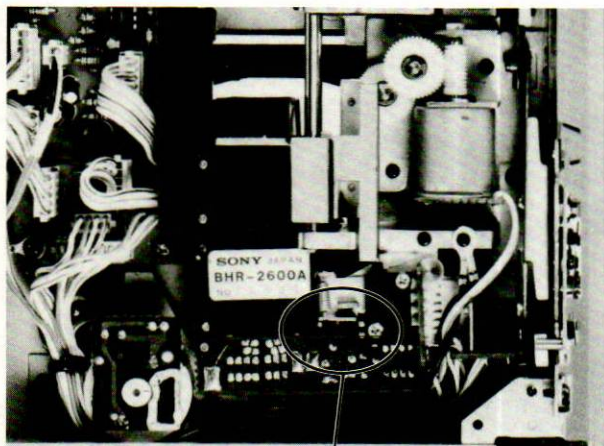


## SECTION 4 ADJUSTMENTS

### 4-1. MECHANISM ADJUSTMENTS

#### Optical Pick-up Position Adjustment

This adjustment determines the position when the optical block is at its innermost position on the disc. It is done so that the optical block can read the information recorded in the TOC (Table of Contents) on the disc lead-in track.



Perform this adjustment after adjusting so that clearance (A) is approximately 2.4 mm when the adjustment screw is removed.

1. Turn the POWER switch on and insert the disc (YEDS-1).

2. Adjust the adjustment screw so that the set reads the TOC.

When the TOC is read accurately, the disc will rotate for approximately 2 seconds and then stop.

If the TOC is not read, more than 16 (there are 16 selections on YEDS-1) will not be displayed on the display window track number indicator when the auto selection button (▶▶) is pressed continuously. If the adjustment screw is turned too far clockwise (optical block position is on the outer side), the TOC is not read, while the data after the first selection is read, and the display window time counter moves ahead.

Also, if the adjustment screw is turned too far counterclockwise (optical block is on the inner side), limit switch S807 does not turn on and the optical block touches the OP base.

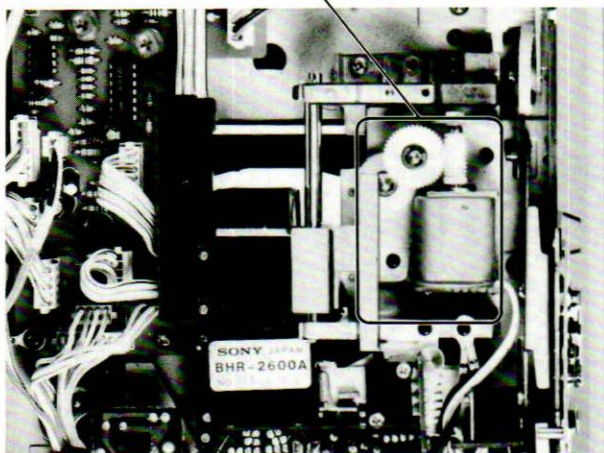
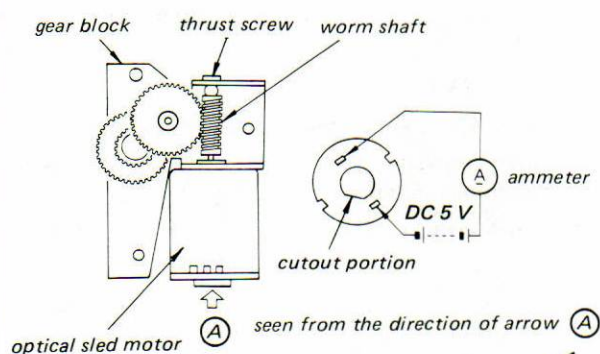
3. Press the OPEN/CLOSE button, and insert and take the disc out several times, and confirm that the TOC is read out.

4. Press the PLAY button.

Press the auto selection button (▶▶) and fast forward button (▶▶) and play the portion of the disc near the outer circumference. When this portion is being played, turn the POWER switch off. Then turn the POWER switch on again and confirm that the set reads the TOC at this time.

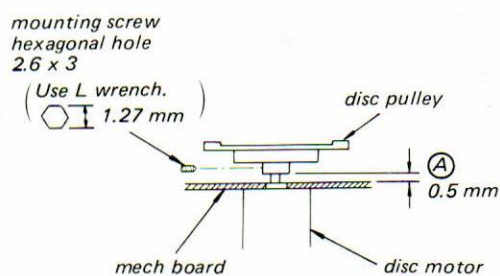


### Optical Sled Motor Thrust Adjustment



1. Remove gear block. (See page 36.)
2. Turn thrust screw counterclockwise to loosen.
3. Connect as shown above and remember the ammeter reading.
4. Next, turn the thrust screw clockwise slowly and adjust so that the ammeter reading is +1 mA from the reading in step 2.
5. Confirm that there is no worm shaft thrust play.
6. After adjustment, lock the screw.
7. Install the gear block. (See page 36.)

### Disc Pulley Height Adjustment



Install the disc pulley so that clearance (A) is 0.5 mm.



## 4.2. ELECTRICAL ADJUSTMENTS

1. Perform adjustments in the order given.
2. Use YEDS-1 disc unless otherwise indicated.


### Adjustment Mode

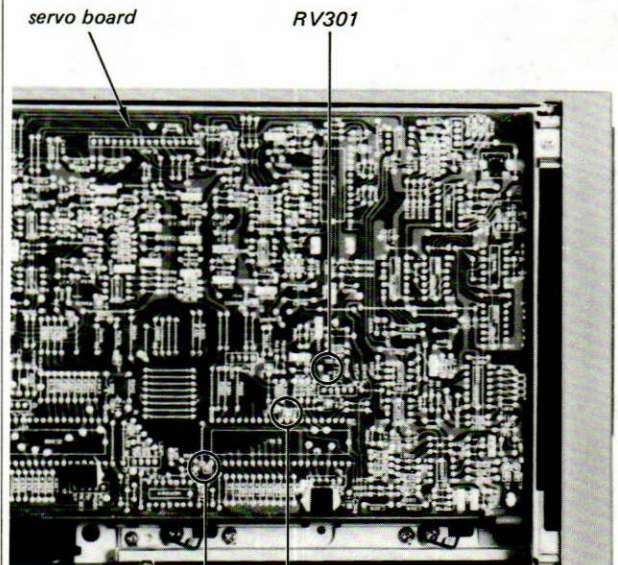
1. Connect servo amp board test points TP11 and TP12.
2. Turn RV301 fully clockwise.  
(This is to prevent the disc table from opening even though pits are not read, by making microcomputer IC301 pin (33) low.)
3. Turn POWER switch on.  
(To reset microcomputer.)

### Adjustment Mode:

Turn fully clockwise. 

### Normality Mode:

Turn fully counterclockwise. 



TP12 TP11

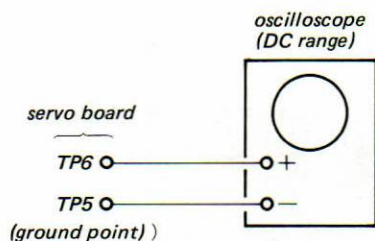
Connect TP12 and TP11

After adjustment, remove lead wire connecting TP11 and TP12, and turn RV301 fully counterclockwise.



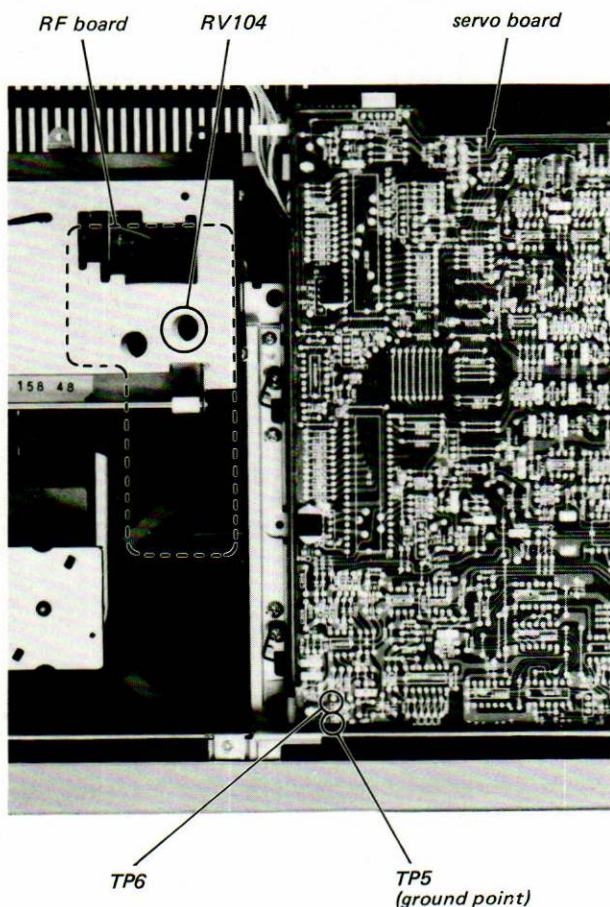
### RF Offset Adjustment

#### Procedure:



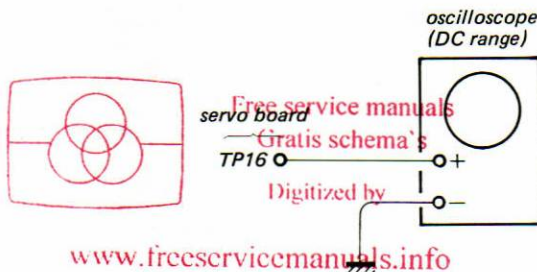
1. Turn on the power switch. (STOP mode)
2. Connect the oscilloscope to servo board test points TP6 and TP5.
3. Adjust RV104 so that oscilloscope reading is DC  $-1.9 \pm 0.05$  V.

Adjustment Location: servo board, RF board



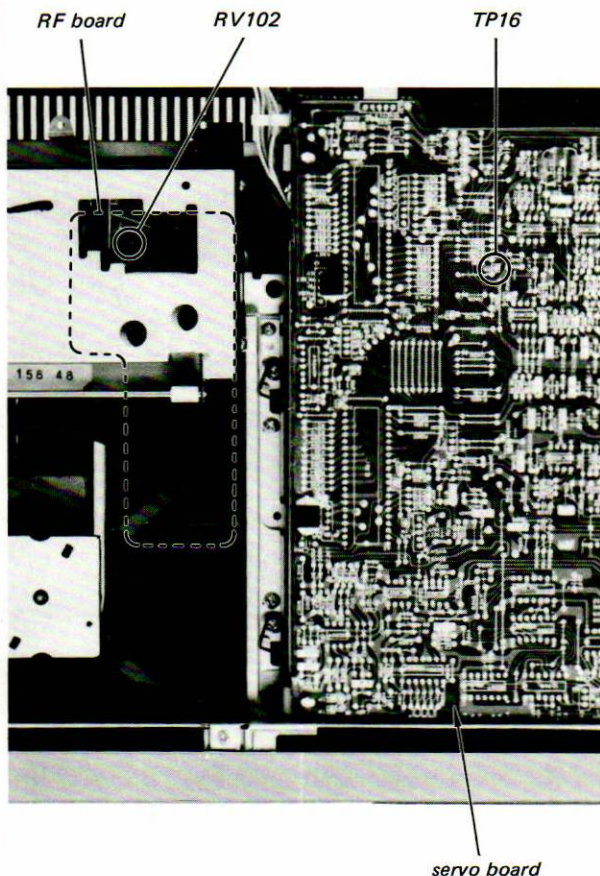
### Tracking Offset Adjustment

#### Procedure:



1. Turn on the power switch. (STOP mode)
2. Connect the oscilloscope to servo board test point TP16.
3. Adjust the RV102 so that oscilloscope reading is DC  $0 \pm 0.05$  V.

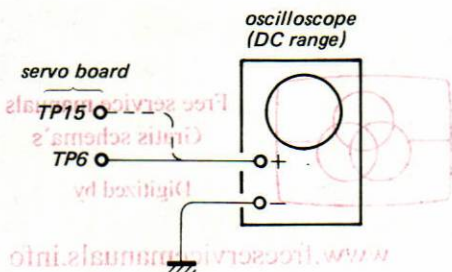
Adjustment Location: servo board, RF board



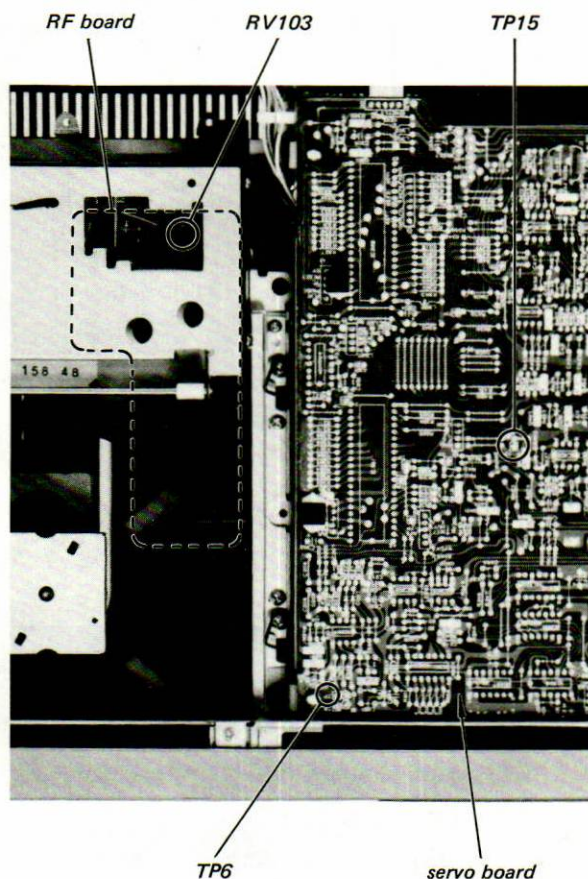


**Focus Bias Adjustment**

**Procedure:**

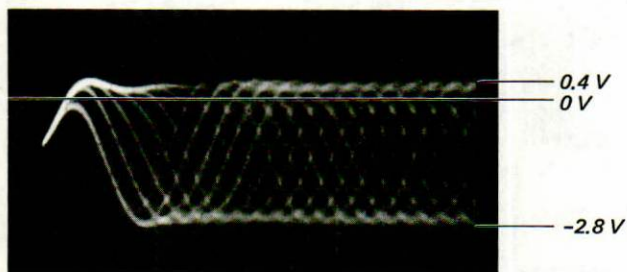


**Adjustment Location:** servo board, RF board



1. Turn on the power switch. (STOP mode)
2. Connect the oscilloscope to servo board test point TP15.
3. Adjust RV103 so that oscilloscope reading is DC 0 V.
4. Connect the oscilloscope to servo board test point TP6.
5. Insert the disc (YEDS-1) and press the ► PLAY button.
6. Adjust RV103 for an optimum waveform eye pattern or so that the peak is maximum. Optimum eye pattern means that shape “◇” can be clearly distinguished at the center of the waveform.

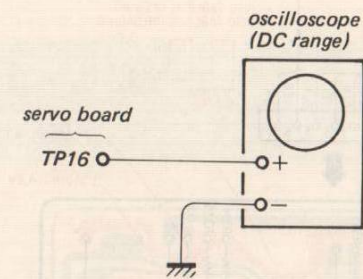
*RF signal waveform (eye pattern)*





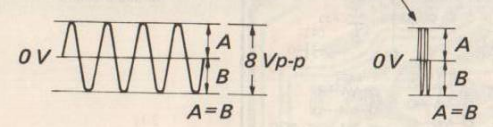
## Tracking Balance Adjustment

## Procedure:



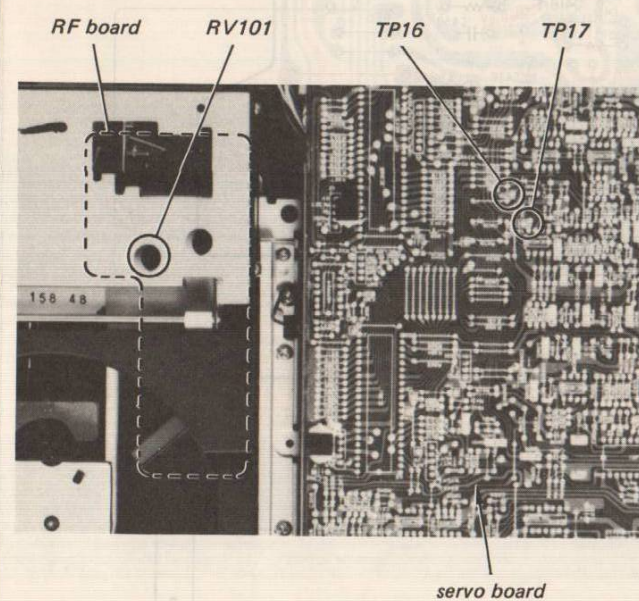
1. Put set in adjustment mode. (See page 42.)
2. Connect servo board test point TP17 to chassis.
3. Connect oscilloscope to servo board test point TP16.
4. Insert the disc (YEDS-1) and press ►PLAY button.
5. Adjust RV101 so that oscilloscope waveform is symmetrical above and below, relative to 0 V.

Note: Set the sweep time longer for easy waveform checking.



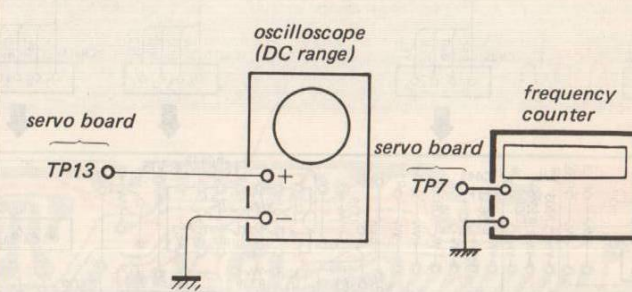
6. After adjustment, remove lead wire connecting TP17 and chassis.
7. Cancel the adjustment mode.

## Adjustment Location: servo board, RF board

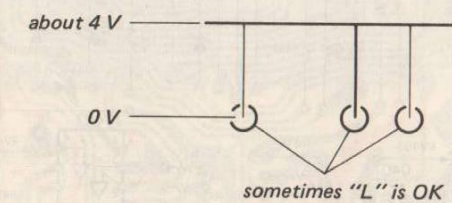


## RF PLL Adjustment

## Procedure:



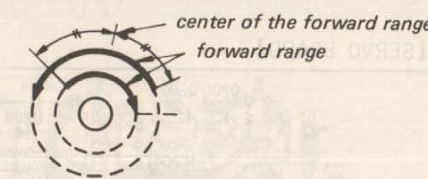
1. Put set in adjustment mode. (See page 42.)
2. Connect oscilloscope to servo board test point TP13.
3. Insert the disc (YEDS-1) and press ►PLAY button.
4. Confirm that the oscilloscope waveform is "H" as shown in the figure below.



- Confirm the following items A and B when the waveform is as shown above. If it is not, perform the adjustment in step 5 - 11.

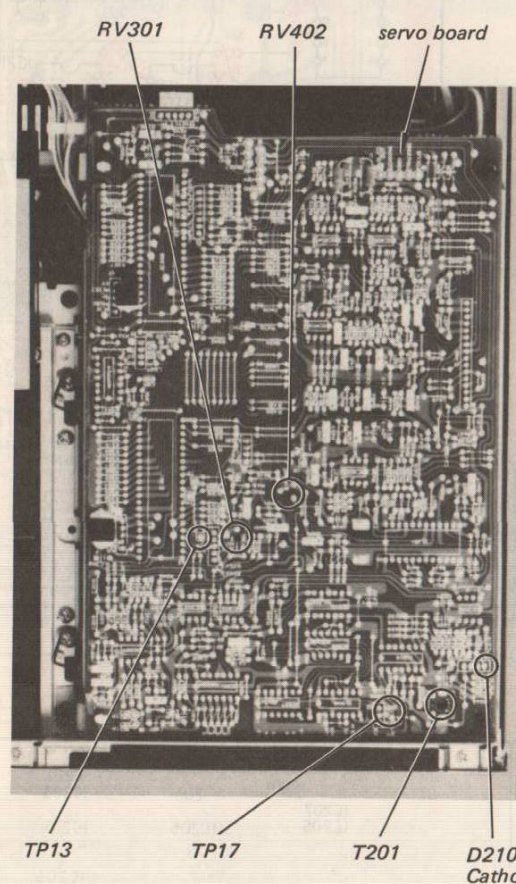
- A. Connect VOM to D210 cathode and read the voltage value.  
Reading: DC  $0 \pm 1$  V
  - B. Connect frequency counter to servo board test point TP17 and read frequency.  
Reading: 4.3218 MHz  $\pm 40$  kHz
5. Connect frequency counter to servo board test point TP17.
  6. Turn RV402 fully clockwise.
  7. Adjust T201 so that frequency counter reading is 4.3218 MHz  $\pm 40$  kHz.

8. Adjust RV402 so that timer counter is forward. Secure RV402 at the center of the forward ranges of both turns as shown below.



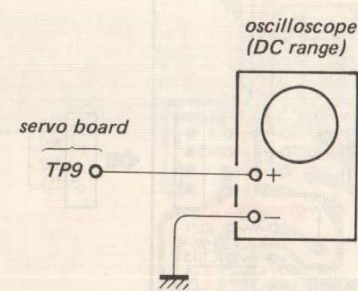
9. Turn RV301 fully counterclockwise and confirm to hear playback sound.
10. Connect oscilloscope to servo board test point TP13.
11. Confirm that the waveform is like the one shown in step 4.  
If it is not, perform adjustments in step 5 - 11.
12. Cancel the adjustment mode. (See page 42.)

## Adjustment Location: servo board

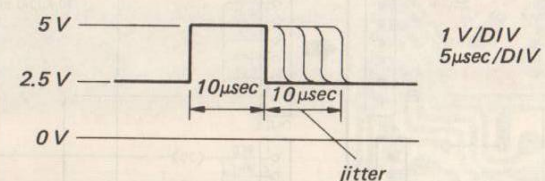


## CLV PLL Adjustment

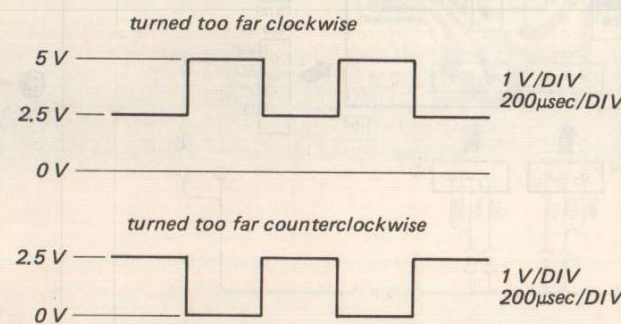
## Procedure:



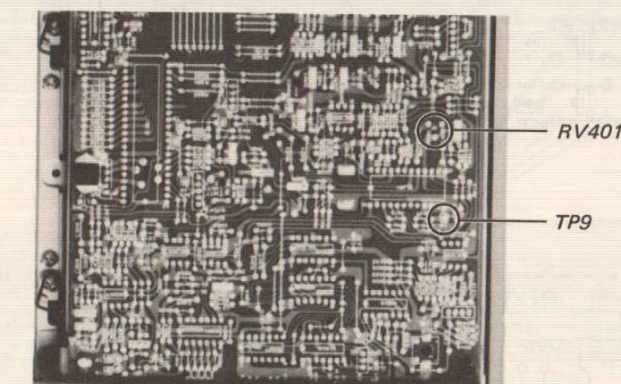
1. Put set in adjustment mode. (See page 42.)  
But RV103 is normality position.
2. Connect oscilloscope to servo board test point TP9.
3. Insert the disc (YEDS-1) and press ►PLAY button.
4. Adjust RV401 so that the waveform is as shown in the figure below.



## • Incorrect Example



## Adjustment Location: servo board



## REFERENCE

## Focus/Tracking Gain Adjustment

A frequency response analyzer is necessary in order to perform this adjustment exactly. However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perform this adjustment.

Focus/tracking gain determines the pick-up follow-up (vertical and horizontal) relative to mechanical noise and mechanical shock when the 2-axis device operates.

However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is raised, the rise is increasingly when 2-axis device operates.
- When gain is lowered, it is more susceptible to mechanical shock and skipping occurs more easily. When gain adjustment is off, the symptoms below appear.

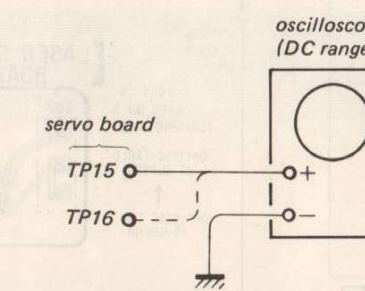
Symptoms	Gain	Focus	Tracking
• The time until music starts becomes longer for STOP → ►PLAY (Normally takes about 4 seconds.)		low	low
• The time until music starts becomes longer for automatic selection (◀◀, ▶▶ buttons pressed). (Normally take about 2 seconds.)		—	low
• Music does not start and disc continues to rotate for STOP → ►PLAY or automatic selection (◀◀, ▶▶ buttons pressed.)		—	low
• Intermittent sound is heard during the play.		low	low
• The display on the time counter does not go ahead.		—	low
• The disc compartment opens and the holding of the disc by the rim releases.		low	—
• More noise during 2-axis device operation.		high	high

The following is a simple adjustment method.

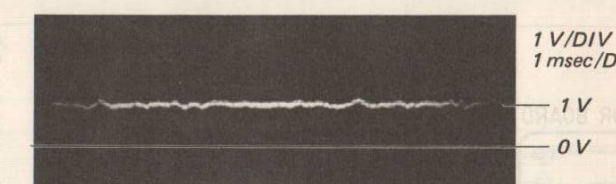
## — Simple Adjustment —

Note: Since exact adjustment cannot be performed, remember the positions of the controls before performing the adjustment. If the positions after the simple adjustment are only a little different, return the controls to the original positions.

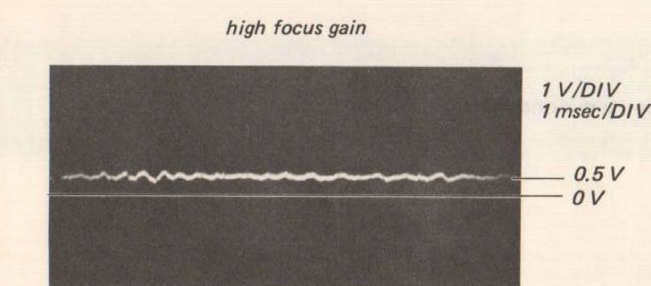
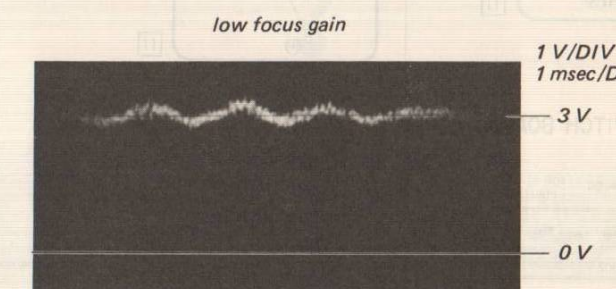
## Procedure:



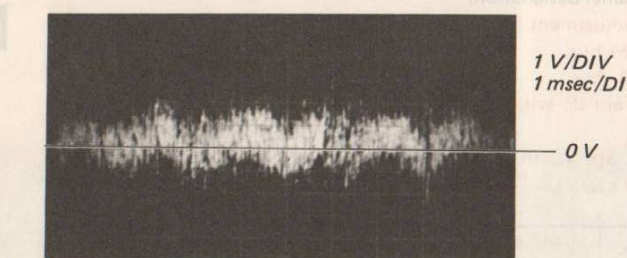
1. Keep the set horizontal.  
If the set is not horizontal, this adjustment cannot be performed due to the gravity against the 2 axis device.
2. Turn Power switch on, insert disc (YEDS-1) and press ►PLAY button.
3. Connect oscilloscope to servo board test point TP15.
4. Adjust RV403 so that waveform is as shown in the figure below. (focus gain adjustment)



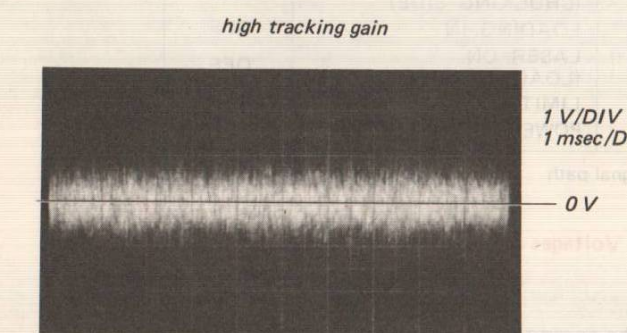
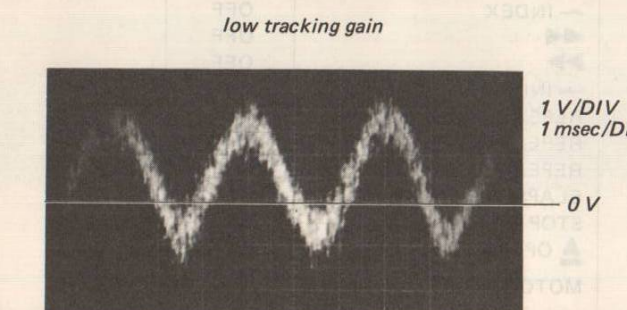
- Incorrect Examples (DC level changes more than on adjusted waveform)



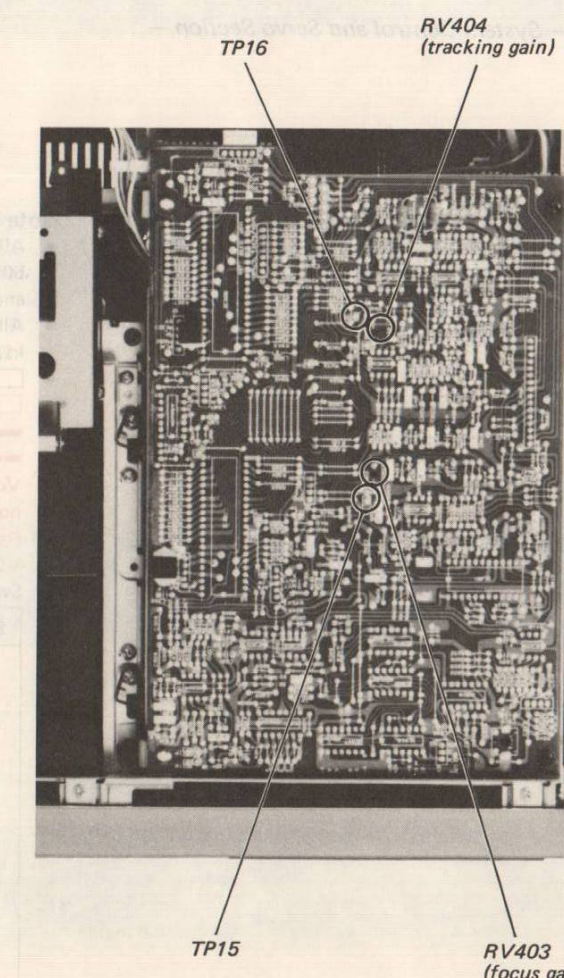
5. Connect oscilloscope to servo board test point TP16.
6. Adjust RV404 so that waveform is as shown in the figure below. (tracking gain adjustment)



- Incorrect Examples (fundamental wave appears)



## Adjustment Location: servo board





**SECTION 5  
DIAGRAMS**

**5-1. MOUNTING DIAGRAM**  
— System Control and Servo Section —

See page 57 for semiconductor lead layouts.

**Note for MOUNTING DIAGRAM**

- Color code of sleeving over the end of the jacket.
- WHT, RED, (RED/GRY)
- : parts extracted from the component side.
- : part mounted on the conductor side.
- : B + pattern
- : B - pattern
- : signal path
- : L-CH signal path
- : R-CH signal path

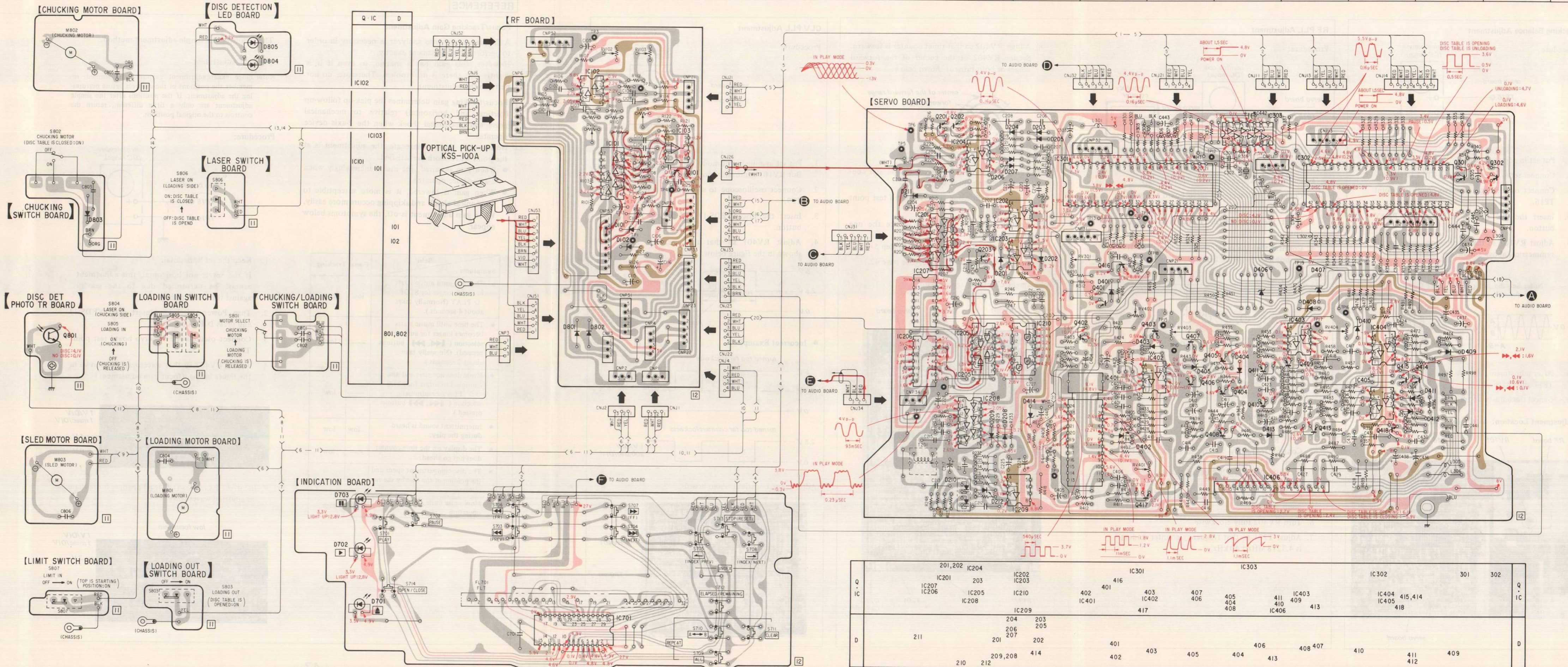
**Note for SCHEMATIC DIAGRAM**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms,  $\frac{1}{4}\text{W}$  unless otherwise noted.  $\text{k}\Omega$ : 1000  $\Omega$ ,  $\text{M}\Omega$ : 1000  $\text{k}\Omega$
- : panel designation.
- : adjustment for repair.
- : B+ bus.
- : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50  $\text{k}\Omega/\text{V}$ ).
- Switches

Ref. No.	Switch	Position
S701	▶ PLAY	OFF
S702	▬ PAUSE	OFF
S703	▬▬	OFF
S704	▬▬▬	OFF
S705	▬▬▬▬	OFF
S706	▬▬▬▬▬	OFF
S707	▬▬▬▬▬▬	OFF
S708	▬▬▬▬▬▬▬	OFF
S709	REPEAT ALL	OFF
S710	REPEAT A→B	OFF
S711	REPEAT CLEAR	OFF
S712	ELAPSED/REMAINING	OFF
S713	STOP (RESET)	OFF
S714	▲ OPEN/CLOSE	OFF
S801	MOTOR SELECT	LOADING MOTOR
S802	CHUCKING MOTOR	OFF
S803	LOADING OUT	OFF
S804	LASER ON (CHUCKING SIDE)	OFF
S805	LOADING IN	OFF
S806	LASER ON (LOADING SIDE)	OFF
S807	LIMIT IN	OFF
S801	POWER	OFF

Note: Voltages are measured with a VOM (50k $\Omega$ /V).

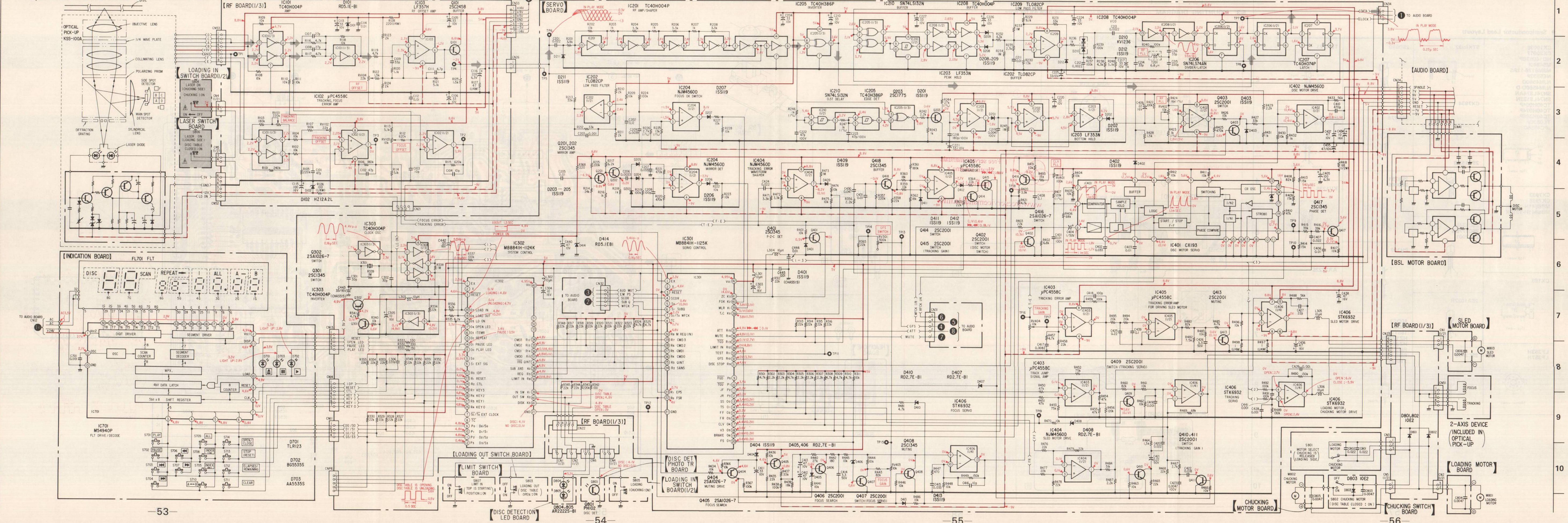
Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.



Q	IC201	IC204	IC202	IC301	IC303	IC302	301	302	Q
IC	IC207	IC205	IC210	402	407	405	411	IC403	IC404
	IC208	IC209	IC203	401	406	404	IC406	IC409	IC405
D	211	201	202	401	403	405	404	408	410
	210	209,208	414	402	403	405	404	413	410
									411
									412
									409
									D



5-2. SCHEMATIC DIAGRAM - System Control and Servo Section - See page 49 for note.

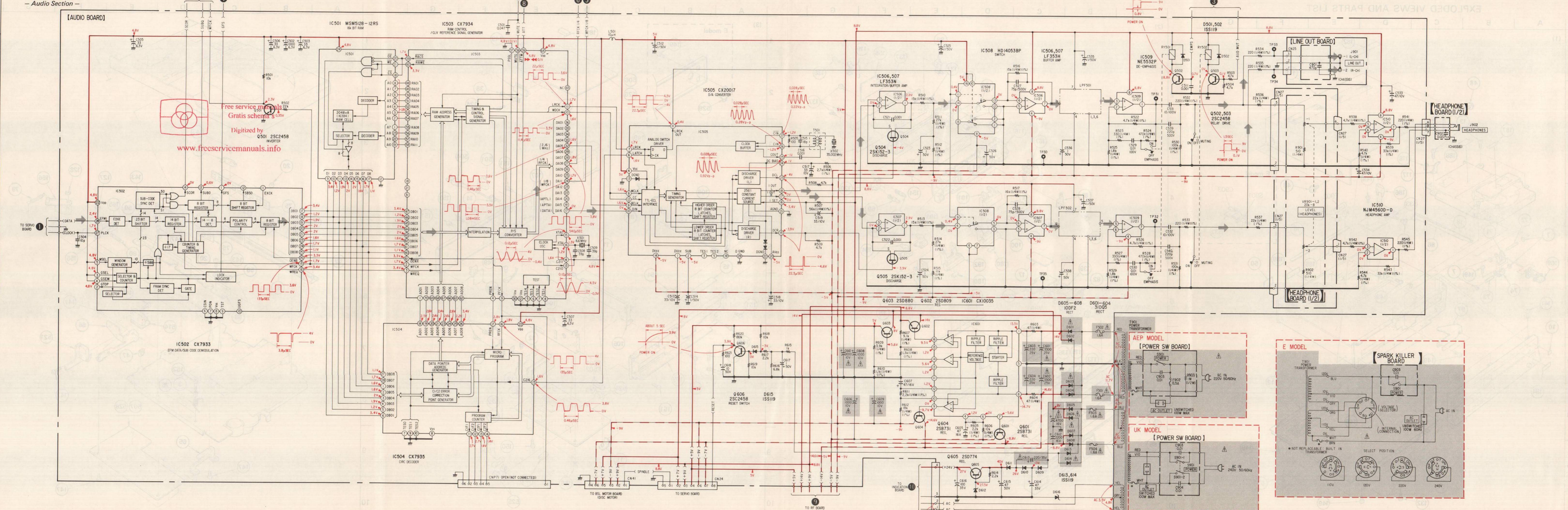






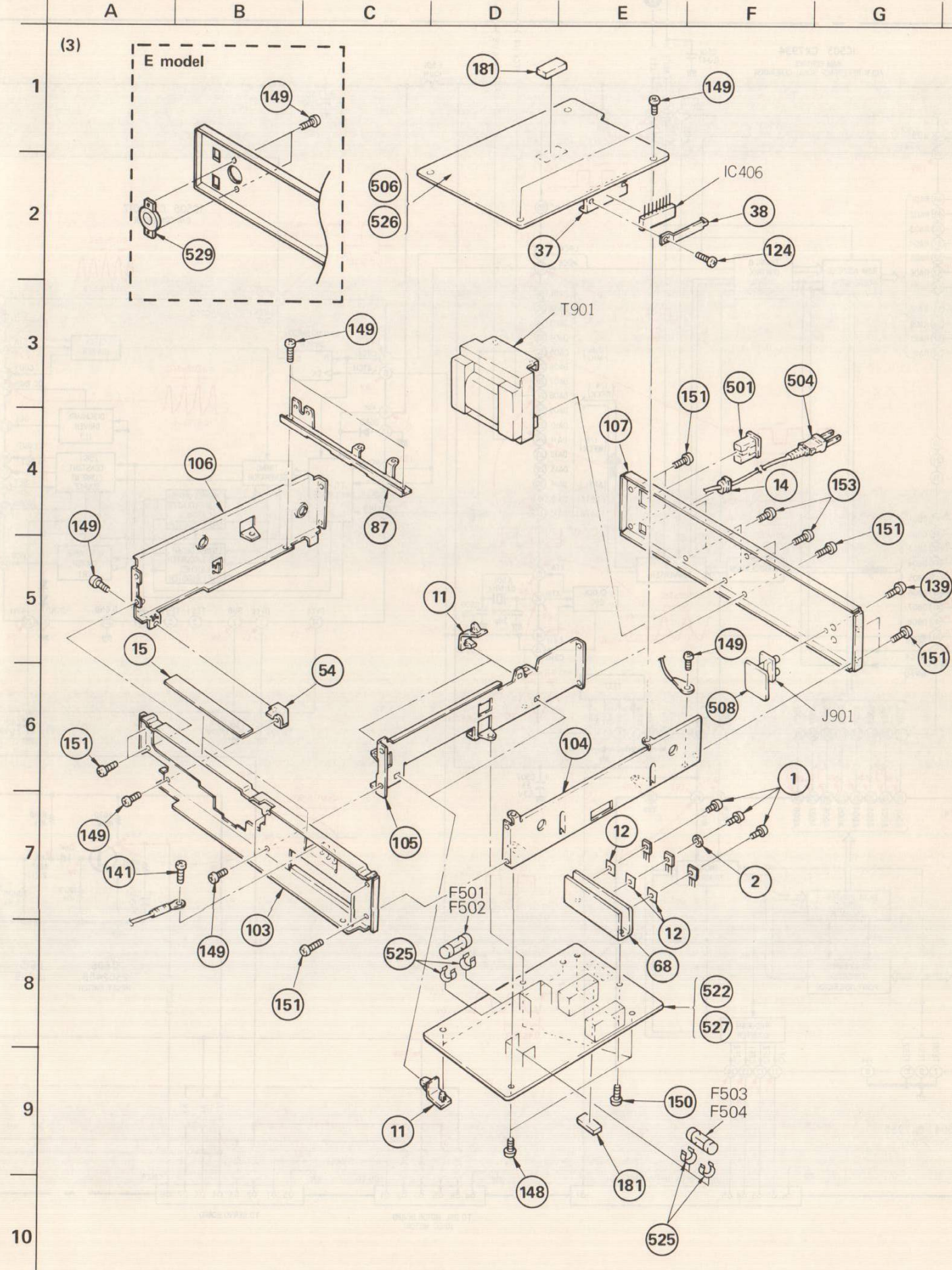
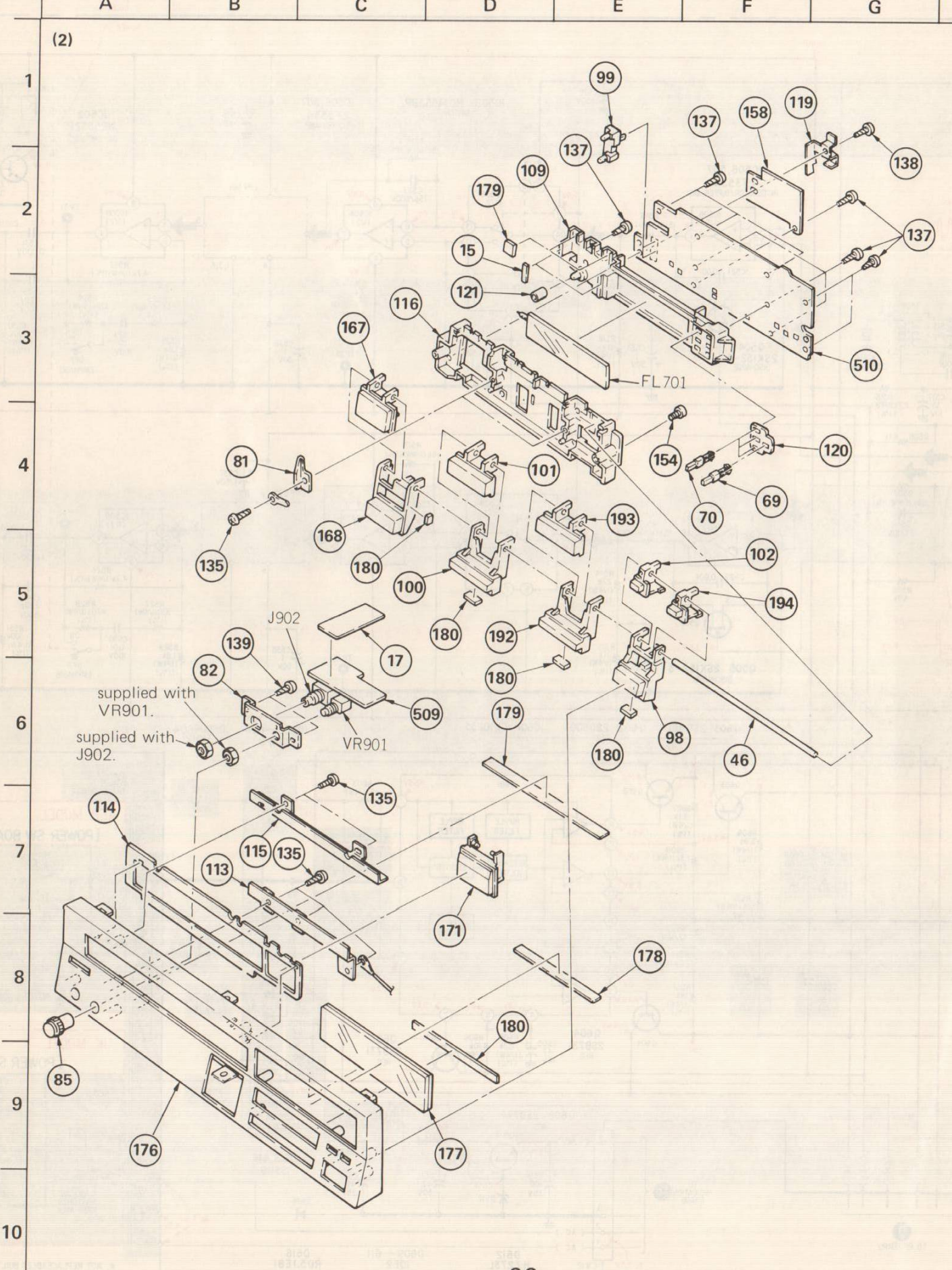
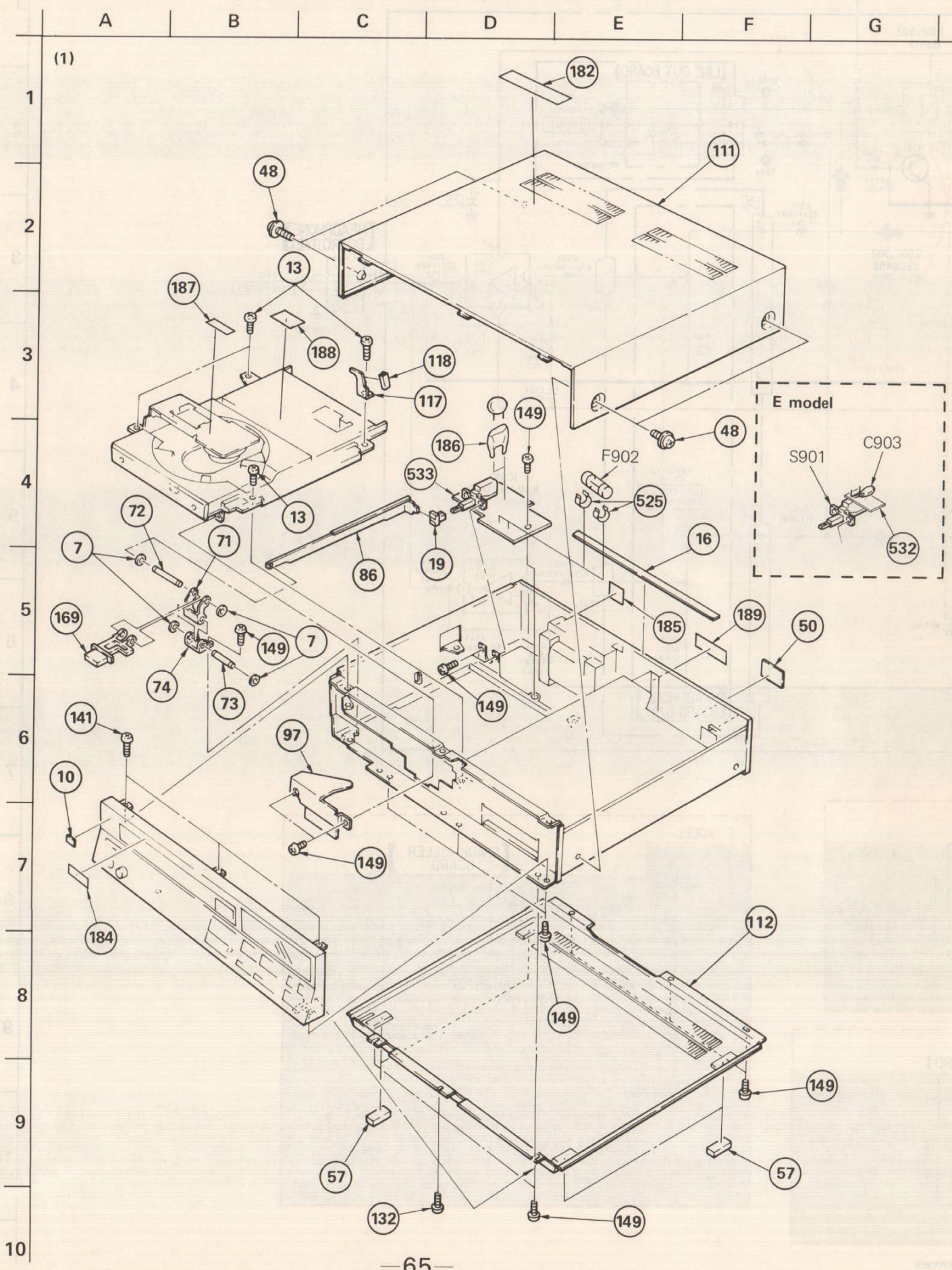


5-4. SCHEMATIC DIAGRAM See page 49 for note. - Audio Section -

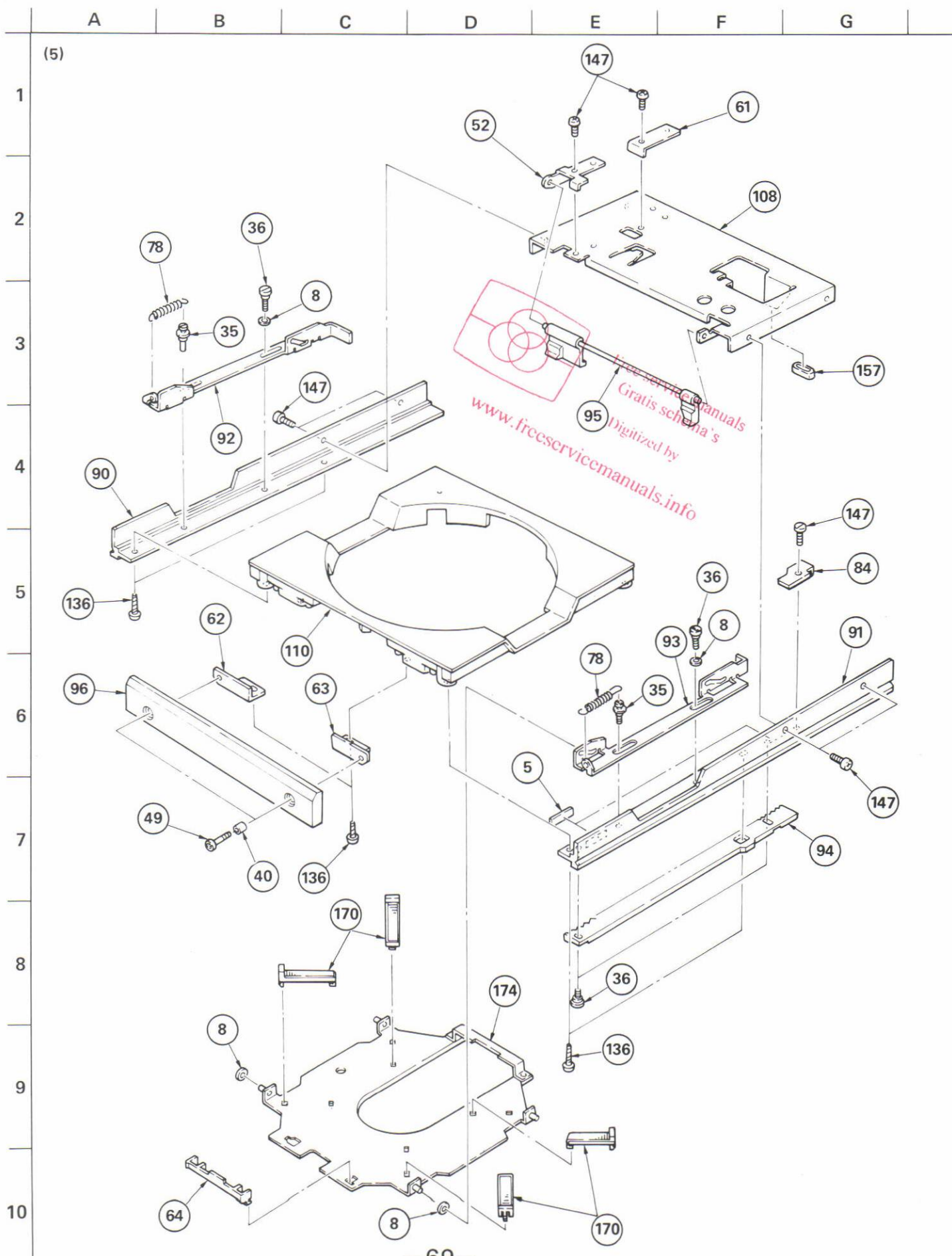




EXPLODED VIEWS AND PARTS LIST

















## GENERAL SECTION

No.	Part No.	Description
1	2-259-121-11	SCREW, TR
2	2-371-561-00	BUSHING (P), INSULATING
3	♣;3-312-438-00	SPACER
4	3-489-073-00	SCREW, THRUST
5	3-545-659-00	CUSHION, SPEAKER
6	3-548-124-00	SPRING, TENSION
7	3-558-708-21	WASHER, STOPPER
8	3-701-439-11	WASHER
9	3-701-441-21	WASHER
10	3-703-710-01	STICKER, SONY SYMBOL (12)
11	♣;3-701-832-00	HINGE, CIRCUIT BOARD
12	3-703-037-00	INSULATOR, TO-220
13	4-902-136-11	SCREW (+BVTT M3S)
14	3-703-244-00	(AEP,UK)....BUSHING, CORD
14	3-703-571-11	(E).....BUSHING, CORD
15	3-831-441-11	COVER
16	3-831-441-XX	CUSHION
17	3-846-068-00	SPACER
18	4-836-836-00	SPRING, COMPRESSION
19	4-866-342-00	JOINT (B), KNOB
20	4-884-506-00	ROLLER
21	4-884-509-00	SHAFT, SLIDE
22	4-884-510-00	GEAR (A)
23	4-884-511-00	GEAR (B)
24	4-884-512-00	GEAR (D)
25	4-884-513-00	SPRING (A)
26	4-884-514-00	WASHER
27	4-884-515-00	SPRING (RACK), COMPRESSION
28	4-884-516-00	RETAINER (LEFT), SLIDE SHAFT
29	4-884-517-00	RETAINER (RIGHT), SLIDE SHAFT
30	4-884-554-00	PULLEY, DISK
31	4-884-555-00	CAP, CENTERING
32	4-884-558-00	RACK (A)
33	4-884-559-00	RACK (B)
34	4-884-560-00	SPRING
35	4-884-561-00	SHAFT (A), CAM LEVER, UP & DOWN
36	4-884-562-00	SHAFT (B), CAM LEVER, UP & DOWN
37	♣;4-884-613-00	HEAT SINK (SMALL)
38	♣;4-884-614-00	HOLDER, IC
39	4-884-621-00	SHAFT (2), SLIDE
40	4-884-635-00	(BLACK)....BASE, ORNAMENTAL
40	4-884-635-11	(SILVER-A,SILVER-B)...BASE, ORNAMENTAL
41	4-884-654-00	GEAR (C)
42	4-884-664-00	BASE, OP
43	4-884-698-00	RETAINER(LOWER)(2), SLIDE SHAFT

## NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "♣" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

- All resistors are in ohms.

F : nonflammable

## COILS

MMH : mH, UH : μH

## SEMICONDUCTORS

In each case, U : μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

## GENERAL SECTION

No.	Part No.	Description
44	4-884-699-00	RETAINER(LOWER)(1), SLIDE SHAFT
45	4-885-816-00	GEAR (D), LOADING
46	♣;4-887-146-00	SHAFT, BUTTON
47	4-887-175-00	RUBBER, STOPPER
48	4-889-321-21	(SILVER-A,SILVER-B)...SCREW
48	4-889-321-31	(BLACK)....SCREW
49	7-683-412-05	(BLACK)....BOLT, HEXAGON SOCKET 2.6X6
49	4-901-727-00	(SILVER-A,SILVER-B)...BOLT (M2.6), HOLE, HEXAGON
50	4-902-130-00	(AEP)...LABEL, MODEL NUMBER (AEP1)
50	4-902-132-01	(UK)...LABEL, MODEL NUMBER (UK)
50	4-902-133-01	(E).....LABEL, MODEL NUMBER (E1/E2)
51	4-902-002-00	GEAR (A), LOADING
52	♣;4-902-009-00	RETAINER, SHAFT
53	4-902-010-00	GEAR (B), CHUCKING
54	♣;4-902-011-00	REINFORCEMENT, FRAME
55	4-902-012-00	GEAR (B), LOADING
56	4-902-014-00	GEAR (A), CHUCKING
57	4-902-017-00	LEG, RUBBER
58	♣;4-902-018-00	PLATE (A), STOPPER, ROLLER
59	♣;4-902-019-00	PLATE (B), STOPPER, ROLLER
60	♣;4-902-020-00	PLATE, CAM, CHUCKING
61	♣;4-902-028-00	PLATE, LOCK
62	♣;4-902-033-00	STOPPER (LEFT), ORNAMENT, TABLE
63	♣;4-902-034-00	STOPPER (RIGHT), ORNAMENT, TABLE
64	4-902-035-00	GUIDE, DISK PLATE
65	♣;4-902-037-00	STOPPER, RELAY PC BOARD
66	♣;4-902-038-00	BRACKET (B), MICRO SWITCH
67	♣;4-902-039-00	BRACKET (A), MICRO SWITCH
68	♣;4-902-040-00	HEAT SINK (LARGE)
69	4-902-044-01	BUTTON, REPEAT
70	4-902-044-11	BUTTON, REPEAT
71	♣;4-902-046-00	ARM, POWER SWITCH
72	♣;4-902-047-00	SHAFT (B), ARM, POWER SWITCH
73	♣;4-902-048-00	SHAFT (A), ARM, POWER SWITCH
74	♣;4-902-049-00	PLATE, FULCRUM, ARM, POWER SWITCH
75	4-902-128-00	RETAINER (A)
76	4-902-052-00	SPRING (D)
77	4-902-053-00	SPRING, TENSION
78	4-902-054-00	SPRING, TENSION
79	4-902-055-00	SPRING, TENSION
80	4-902-056-00	SPRING, TENSION
81	♣;4-902-057-00	RETAINER, BUTTON SHAFT
82	♣;4-902-058-00	HOLDER, JACK
83	4-902-064-00	SPRING
84	♣;4-902-065-00	PLATE, STOPPER



## GENERAL SECTION

No.	Part No.	Description
85	4-902-067-01	(SILVER-A)...KNOB, CONTROL
85	4-902-067-11	(BLACK).....KNOB, CONTROL
85	4-902-067-21	(SILVER-B)...KNOB, CONTROL
86	♣;4-902-071-00	LEVER, POWER SWITCH
87	♣;4-902-072-00	BRACKET, POWER PC BOARD
88	♣;4-902-073-00	RAIL (RIGHT), FIXED
89	♣;4-902-074-00	RAIL (LEFT), FIXED
90	4-902-077-00	RAIL (LEFT)
91	4-902-078-00	RAIL (RIGHT)
92	4-902-080-00	PLATE (LEFT), CAM, DISK
93	4-902-081-00	PLATE (RIGHT), CAM, DISK
94	4-902-082-00	RACK, LOADING
95	4-902-083-00	ARM, FUNCTION
96	4-902-084-01	(SILVER-A,SILVER-B)....PLATE, ORNAMENTAL, DISK TABLE
96	4-902-084-11	(BLACK)....PLATE, ORNAMENTAL, DISK TABLE
97	♣;4-902-085-00	COVER, LOADING
98	4-902-088-01	(SILVER-A)...BUTTON, RESET
98	4-902-088-11	(BLACK).....BUTTON, RESET
98	4-902-088-21	(SILVER-B)...BUTTON, RESET
99	♣;4-902-090-00	GUIDE, LED
100	4-902-091-01	(SILVER-A)...BUTTON, FF
100	4-902-091-11	(BLACK).....BUTTON, FF
100	4-902-091-21	(SILVER-B)...BUTTON, FF
101	4-902-092-01	(SILVER-A)...BUTTON, N
101	4-902-092-11	(BLACK).....BUTTON, N
101	4-902-092-21	(SILVER-B)...BUTTON, N
102	4-902-093-01	(SILVER-A)...BUTTON, INDEX
102	4-902-093-11	(BLACK).....BUTTON, INDEX
102	4-902-093-21	(SILVER-B)...BUTTON, INDEX
103	♣;4-902-094-00	PANEL, SUB
104	♣;4-902-095-00	ANGLE (RIGHT), SIDE PLATE
105	♣;4-902-096-00	ANGLE (INNER), SIDE PLATE
106	♣;4-902-097-00	ANGLE (LEFT), SIDE PLATE
107	♣;4-902-098-31	(AEP)....PLATE, JACK
107	♣;4-902-098-41	(UK).....PLATE, JACK
107	♣;4-902-098-51	(E).....PLATE, JACK
108	♣;4-902-100-00	REINFORCEMENT, RAIL
109	♣;4-902-101-00	HOLDER, INDICATION TUBE
110	4-902-102-00	TABLE, DISK
111	4-902-103-00	(SILVER-A,SILVER-B)...CASE
111	4-902-103-11	(BLACK).....CASE
112	♣;4-902-104-00	PLATE, BOTTOM
113	♣;4-902-106-00	RETAINER (B), ORNAMENTAL PLATE
114	4-902-107-00	(SILVER-A,SILVER-B)...PLATE, ORNAMENTAL, LOADING
114	4-902-107-11	(BLACK)....PLATE, ORNAMENTAL, LOADING

## NOTE:

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

- All resistors are in ohms.

• F : nonflammable

## COILS

• MMH : mH, UH : μH

## SEMICONDUCTORS

In each case, U : μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

## GENERAL SECTION

No.	Part No.	Description
115	♣;4-902-108-00	RETAINER (A), ORNAMENTAL PLATE
116	4-902-109-00	HOLDER, CONTROL BUTTON
117	♣;4-902-111-00	REINFORCEMENT, TABLE
118	♣;4-902-112-01	SPACER, INSULATING
119	♣;4-902-120-00	RETAINER, WIRE
120	♣;4-902-121-00	GUIDE, REPEAT BUTTON
121	4-902-124-00	TUBE, LED
122	7-621-255-50	SCREW +P 2X8
123	7-621-259-15	SCREW +P 2.6X3
124	7-621-284-10	SCREW +P 2.6X5
125	7-621-734-09	SET-SCT, HEX. 2.6X3
126	7-624-104-04	STOP RING 2.0, TYPE -E
127	7-624-106-04	STOP RING 3.0, TYPE -E
128	7-624-108-04	STOP RING 4.0, TYPE -E
129	7-671-113-02	STEAL, BALL 3
130	7-671-113-11	BALL, STEEL
131	7-671-156-01	BALL, STENLESS
132	7-682-144-09	SCREW +P 3X3
133	7-685-145-01	SCREW +P 3X4
134	7-683-415-05	BOLT, HEXAGON SOCKET 2.6X12
135	7-685-133-19	SCREW +P 2.6X6 TYPE2 NON-SLIT
136	7-685-147-29	SCREW +P 3X10 TYPE2 SLIT
137	7-685-535-19	SCREW +BTP 2.6X10 TYPE2 N-S
138	7-685-536-14	SCREW +BTP 2.6X12 TYPE2 N-S
139	7-685-646-19	SCREW +BVTP 3X8 TYPE2 N-S
140	7-685-750-01	SCREW +PTT 3X5 (S)
141	7-685-751-04	SCREW +PTT 3X6 (S)
142	7-685-855-01	+BVTT 2X10 (S)
143	7-685-860-04	SCREW +BVTT 2.6X4 (S)
144	7-685-861-09	SCREW +BVTT 2.6X5 (S)
145	7-685-864-01	SCREW +BVTT 2.6X10 (S)
146	7-685-867-01	SCREW +BVTT 2.6X16 (S)
147	7-685-870-01	SCREW +BVTT 3X5 (S)
148	7-685-871-01	SCREW +BVTT 3X6 (S)
149	7-685-871-09	SCREW +BVTT 3X6 (S)
150	7-685-872-01	SCREW +BVTT 3X8 (S)
151	7-685-872-09	SCREW +BVTT 3X8 (S)
152	7-685-873-01	SCREW +BVTT 3X10 (S)
153	7-685-880-09	SCREW +BVTT 4X6 (S)
154	7-685-534-24	SCREW +BTP 2.6X8 TYPE2 N-S
155	7-688-004-11	W 4, MIDDLE
156	7-688-005-01	W 5, SMALL
157	9-911-839-XX	RUBBER (A)
158	9-911-863-XX	COVER, INDICATION PC BOARD
159	X-4884-501-0	HOLDER ASSY, RACK



GENERAL SECTION

No.	Part No.	Description
160	♣;X-4884-502-0	HOLDER ASSY, MOTOR
161	♣;X-4884-513-0	HOLDER ASSY, SWITCH
162	♣;X-4902-001-0	PLATE ASSY, LOADING
163	X-4902-002-0	LEVER ASSY, CHUCKING
164	♣;X-4902-003-0	HOLDER ASSY, CHUCKING MOTOR
165	X-4902-004-0	LEVER ASSY, UP AND DOWN
166	♣;X-4902-005-0	LEVER ASSY, LOCK
167	X-4902-006-0	(SILVER-A)...BUTTON ASSY, PLAY
167	X-4902-020-0	(BLACK).....BUTTON ASSY, PLAY
167	X-4902-028-1	(SILVER-B)...BUTTON ASSY, PLAY
168	X-4902-007-0	(SILVER-A)...BUTTON ASSY, PAUSE
168	X-4902-021-0	(BLACK).....BUTTON ASSY, PAUSE
168	X-4902-029-1	(SILVER-B)...BUTTON ASSY, PAUSE
169	X-4902-008-0	(SILVER-A,SILVER-B)...KNOB ASSY, POWER
169	X-4902-023-0	(BLACK)....KNOB ASSY, POWER
170	X-4902-009-0	RETAINER ASSY, DISK
171	X-4902-010-0	(SILVER-A,SILVER-B)...BUTTON ASSY, OPEN/CLOSE
171	X-4902-022-0	(BLACK)....BUTTON ASSY, OPEN/CLOSE
172	♣;X-4902-012-0	SUPPORT ASSY, CHUCKING
173	X-4902-013-0	ARM ASSY, CHUCKING
174	X-4902-014-0	PLATE ASSY, DISK
175	♣;X-4902-015-0	CHASSIS ASSY, MECHANICAL
176	X-4902-016-1	(SILVER-A)...PANEL ASSY, FRONT
176	X-4902-025-1	(BLACK).....PANEL ASSY, FRONT
176	X-4902-030-1	(SILVER-B)...PANEL ASSY, FRONT
177	X-4902-017-1	PANEL ASSY, TRANSPARENT
178	♣;4-902-126-00	REINFORCEMENT (RIGHT), PANEL
179	♣;4-902-127-00	REINFORCEMENT (LEFT), PANEL
180	9-911-815-01	CUSHION
181	9-911-843-XX	CUSHION
182	4-885-831-00	LABEL, CAUTION
183	4-902-129-00	SPACER, HOLDER
184	♣;3-701-690-00	(UK)...LABEL (MADE IN JAPAN)
185	3-703-043-21	(UK)...LABEL, CAUTION, MAIN
186	4-875-455-01	(AEP)...COVER (DIA. 20), CAPACITOR
187	4-885-839-00	LABEL, APERTURE
188	4-885-843-02	LABEL, CAUTION, LASER
189	4-885-838-00	LABEL, CLASS 1
190	7-688-003-11	W 3, MIDDLE
191	♣;4-902-138-01	RETAINER, THRUST

GENERAL SECTION

No.	Part No.	Description
192	4-902-091-01	(SILVER-A)...BUTTON, FF
192	4-902-091-11	(BLACK).....BUTTON, FF
192	4-902-091-31	(SILVER-B)...BUTTON, FF
193	4-902-092-01	(SILVER-A)...BUTTON, N
193	4-902-092-11	(BLACK).....BUTTON, N
193	4-902-092-31	(SILVER-B)...BUTTON, N
194	4-902-093-01	(SILVER-A)...BUTTON, INDEX
194	4-902-093-11	(BLACK).....BUTTON, INDEX
194	4-902-093-31	(SILVER-B)...BUTTON, INDEX

ACCESSORY & PACKING MATERIAL

No.	Part No.	Description
231	△.1-526-565-00	(E)...AC PLUG ADAPTOR
232	1-551-315-00	CORD, CONNECTION
233	△.1-564-085-11	(UK)...AC PLUG
234	3-701-619-00	BAG, POLYETHYLENE, STANDARD
235	3-701-630-00	BAG, POLYETHYLENE
236	3-773-593-11	(UK,E)...MANUAL, INSTRUCTION
237	3-773-593-41	(AEP)...MANUAL, INSTRUCTION
238	3-795-629-11	(AEP).....INSTRUCTION
239	4-859-064-00	SHEET, PROTECTION
240	4-902-115-00	CUSHION (RIGHT), UPPER
241	4-902-116-00	CUSHION (LEFT), UPPER
242	4-902-117-00	CUSHION (RIGHT), LOWER
243	4-902-118-00	CUSHION (LEFT), LOWER
244	4-902-134-00	INDIVIDUAL CARTON
245	X-4884-523-0	CLEANER ASSY, DISK

NOTE:

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- Items marked "♣" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (△-△△△-△△△-XX or △-△△△△-△△△-X) may be different from those used in the set.

CAPACITORS:

MF:μF, PF:μμF.

RESISTORS

All resistors are in ohms.

F : nonflammable

COILS

MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

The components identified by shading and mark △ are critical for safety. Replace only with part number specified.



## ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	▲.1-526-609-00	(E).....OUTLET, AC
501	▲.1-526-694-00	(AEP)...OUTLET, AC
501	▲.1-526-751-00	(UK).....OUTLET, AC
502	♣;1-535-116-00	TERMINAL
503	♣;1-535-118-00	TERMINAL
504	▲.1-555-795-00	(AEP)....CORD, POWER
504	▲.1-556-035-00	(UK)....CORD, POWER
504	▲.1-556-091-00	(E).....CORD, POWER
505	♣;1-535-416-00	TERMINAL
506	♣;1-611-145-00	PC BOARD, SERVO
507	♣;1-611-146-00	PC BOARD, RF
508	♣;1-611-147-00	PC BOARD, LINE OUT
509	♣;1-611-148-00	PC BOARD, HEADPHONE
510	♣;1-611-149-00	PC BOARD, INDICATION
511	♣;1-611-150-00	PC BOARD, LOADING OUT SWITCH
512	♣;1-611-151-00	PC BOARD, LIMIT SWITCH
513	♣;1-611-152-00	PC BOARD, LOADING IN SWITCH
514	♣;1-611-153-00	PC BOARD, LASER SWITCH
515	♣;1-611-154-00	PC BOARD, PHOTO TRANSISTOR
516	♣;1-611-155-00	PC BOARD, DISK DETECTION LED
517	♣;1-611-156-00	PC BOARD, SLED MOTOR
518	♣;1-611-157-00	PC BOARD, CHUCKING MOTOR
519	♣;1-611-158-00	PC BOARD, LOADING MOTOR
520	♣;1-611-159-00	PC BOARD, CHUCKING/LOADING SW
521	♣;1-611-160-00	PC BOARD, CHUCKING SWITCH
522	♣;1-611-162-00	PC BOARD, AUDIO
523	8-838-039-01	MOTOR, DC (BHR-2600A)(DISC MOTOR)
524	8-848-001-01	KSS-100A (OPTICAL PICK-UP BLOCK)
525	▲.1-533-131-00	HOLDER, FUSE
526	♣;A-4619-221-A	MOUNTED PCB, SERVO
527	♣;A-4651-010-A	MOUNTED PCB, AUDIO
528	♣;A-4688-002-A	MOUNTED PCB, RF
529	▲.1-526-576-41	(E).....SELECTOR, POWER VOLTAGE
530	♣;1-535-135-00	(AEP)...BASE POST 14MM (10MM PITCH)
531	♣;1-535-136-00	(UK)...BASE POST 14MM (10MM PITCH)
532	♣;1-611-161-00	(E).....PC BOARD, SPARK KILLER
533	♣;1-611-163-00	(AEP)...PC BOARD, POWER SWITCH
533	♣;1-611-164-00	(UK)....PC BOARD, POWER SWITCH
C101	1-161-267-00	CERAMIC 47PF 5% 50V
C102	1-161-267-00	CERAMIC 47PF 5% 50V
C103	1-161-259-00	CERAMIC 10PF 5% 50V
C104	1-161-259-00	CERAMIC 10PF 5% 50V
C105	1-123-305-00	ELECT 33MF 20% 10V
C106	1-123-305-00	ELECT 33MF 20% 10V

## NOTE:

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- Due to standardization, parts with part numbers (▲-▲▲▲-▲▲▲-XX or ▲-▲▲▲▲-▲▲▲-X) may be different from those used in the set.

## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

- All resistors are in ohms.
- F: nonflammable

## COILS

- MMH: mH, UH: μH

## SEMICONDUCTORS

In each case, U: μ, for example:  
 UA....: μA...., UPA....: μPA...., UPC....: μPC,  
 UPD....: μPD....

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
C107	1-161-264-00	CERAMIC 27PF 5% 50V
C108	1-161-264-00	CERAMIC 27PF 5% 50V
C109	1-161-265-00	CERAMIC 33PF 5% 50V
C111	1-161-255-00	CERAMIC 4.7PF 10% 50V
C112	1-161-330-00	CERAMIC 0.01MF 30% 25V
C113	1-123-305-00	ELECT 33MF 20% 10V
C114	1-161-330-00	CERAMIC 0.01MF 30% 25V
C115	1-123-333-00	ELECT 100MF 20% 16V
C116	1-123-465-00	ELECT 220MF 20% 6.3V
C201	1-130-624-00	FILM 0.022MF 5% 50V
C202	1-130-633-00	FILM 0.12MF 5% 50V
C203	1-161-323-00	CERAMIC 0.001MF 10% 50V
C204	1-123-305-00	ELECT 33MF 20% 10V
C205	1-161-330-00	CERAMIC 0.01MF 30% 25V
C206	1-161-327-00	CERAMIC 0.0033MF 30% 50V
C207	1-130-626-00	FILM 0.033MF 5% 50V
C208	1-161-271-00	CERAMIC 100PF 5% 50V
C209	1-108-354-00	MYLAR 0.0039MF 10% 50V
C210	1-123-305-00	ELECT 33MF 20% 10V
C211	1-130-620-00	FILM 0.01MF 5% 50V
C212	1-161-375-00	CERAMIC 0.0022MF 20% 50V
C213	1-161-375-00	CERAMIC 33PF 20% 50V
C214	1-102-645-00	CERAMIC 33PF 5% 50V
C215	1-161-315-00	CERAMIC 220PF 10% 50V
C216	1-102-645-00	CERAMIC 33PF 5% 50V
C217	1-123-305-00	ELECT 33MF 20% 10V
C218	1-107-306-00	MICA 180PF 5% 100V
C219	1-106-188-00	MYLAR 0.0047MF 5% 100V
C220	1-123-305-00	ELECT 33MF 20% 10V
C221	1-123-305-00	ELECT 33MF 20% 10V
C222	1-107-292-00	MICA 47PF 5% 100V
C223	1-107-292-00	MICA 47PF 5% 100V
C224	1-123-305-00	ELECT 33MF 20% 10V
C225	1-123-305-00	ELECT 33MF 20% 10V
C226	1-123-305-00	ELECT 33MF 20% 10V
C227	1-123-305-00	ELECT 33MF 20% 10V
C301	1-102-517-00	CERAMIC 30PF 5% 50V
C302	1-102-517-00	CERAMIC 30PF 5% 50V
C303	1-123-356-00	ELECT 10MF 20% 16V
C304	1-123-356-00	ELECT 10MF 20% 16V
C305	1-123-356-00	ELECT 10MF 20% 16V
C306	1-161-315-00	CERAMIC 220PF 10% 50V
C401	1-130-188-00	FILM 0.01MF 5% 100V
C402	1-130-626-00	FILM 0.033MF 5% 50V
C403	1-130-620-00	FILM 0.01MF 5% 50V

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



## ELECTRICAL PARTS

Ref.No.	Part No.	Description				
C404	1-123-380-00	ELECT	1MF	20%	50V	
C405	1-123-307-00	ELECT	100MF	20%	6.3V	
C406	1-130-620-00	FILM	0.01MF	5%	50V	
C407	1-130-624-00	FILM	0.022MF	5%	50V	
C408	1-130-632-00	FILM	0.1MF	5%	50V	
C409	1-123-330-00	ELECT	22MF	20%	16V	
C410	1-161-319-00	CERAMIC	470PF	10%	50V	
C411	1-123-305-00	ELECT	33MF	20%	10V	
C412	1-123-306-00	ELECT	47MF	20%	10V	
C413	1-123-306-00	ELECT	47MF	20%	10V	
C414	1-124-184-00	ELECT	3.3MF	20%	50V	
C415	1-130-626-00	FILM	0.033MF	5%	50V	
C416	1-161-259-00	CERAMIC	10PF	5%	50V	
C417	1-108-577-00	MYLAR	0.0082MF	5%	50V	
C418	1-161-271-00	CERAMIC	100PF	5%	50V	
C419	1-161-323-00	CERAMIC	0.001MF	10%	50V	
C420	1-130-624-00	FILM	0.022MF	5%	50V	
C421	1-123-608-00	ELECT	0.22MF	20%	50V	
C422	1-130-623-00	FILM	0.018MF	5%	50V	
C423	1-106-188-00	MYLAR	0.0047MF	5%	100V	
C424	1-130-624-00	FILM	0.022MF	5%	50V	
C425	1-130-636-00	FILM	0.22MF	5%	50V	
C426	1-124-184-00	ELECT	3.3MF	20%	50V	
C427	1-161-263-00	CERAMIC	22PF	5%	50V	
C428	1-161-323-00	CERAMIC	0.001MF	10%	50V	
C429	1-161-323-00	CERAMIC	0.001MF	10%	50V	
C430	1-130-628-00	FILM	0.047MF	5%	50V	
C431	1-161-330-00	CERAMIC	0.01MF	30%	25V	
C434	1-123-356-00	ELECT	10MF	20%	16V	
C435	1-123-306-00	ELECT	47MF	20%	10V	
C436	1-123-332-00	ELECT	47MF	20%	16V	
C437	1-123-306-00	ELECT	47MF	20%	10V	
C438	1-123-332-00	ELECT	47MF	20%	16V	
C439	1-130-632-00	FILM	0.1MF	5%	50V	
C440	1-123-306-00	ELECT	47MF	20%	10V	
C441	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C442	1-123-318-00	ELECT	33MF	20%	16V	
C443	1-123-318-00	ELECT	33MF	20%	16V	
C444	1-101-004-00	CERAMIC	0.01MF		50V	
C445	1-101-004-00	CERAMIC	0.01MF		50V	
C501	1-130-628-00	FILM	0.047MF	5%	50V	
C502	1-123-299-00	ELECT	1000MF	20%	6.3V	
C503	1-131-386-00	TANTALUM	33MF	10%	6.3V	
C504	1-102-947-00	CERAMIC	10PF	5%	50V	
C505	1-131-386-00	TANTALUM	33MF	10%	6.3V	

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

## CAPACITORS:

MF:μF, PF:μF.

## RESISTORS

All resistors are in ohms.

F: nonflammable

## COILS

MMH: mH, UH: μH

## SEMICONDUCTORS

In each case, U: μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

## ELECTRICAL PARTS

Ref.No.	Part No.	Description				
C506	1-131-386-00	TANTALUM	33MF	10%	6.3V	
C507	1-131-386-00	TANTALUM	33MF	10%	6.3V	
C508	1-102-965-00	CERAMIC	39PF	5%	50V	
C509	1-102-965-00	CERAMIC	39PF	5%	50V	
C511	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C512	1-131-450-00	TANTALUM	1MF	20%	50V	
C513	1-123-305-00	ELECT	33MF	20%	10V	
C514	1-131-450-00	TANTALUM	1MF	20%	50V	
C515	1-102-953-00	CERAMIC	18PF	5%	50V	
C516	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C517	1-123-318-00	ELECT	33MF	20%	10V	
C518	1-123-305-00	ELECT	33MF	20%	10V	
C519	1-123-318-00	ELECT	33MF	20%	10V	
C521	1-104-231-00	POLYSTYRENE	0.001MF	5%	500V	
C522	1-104-231-00	POLYSTYRENE	0.001MF	5%	500V	
C523	1-123-681-00	ELECT	47MF	20%	16V	
C524	1-123-681-00	ELECT	47MF	20%	16V	
C525	1-131-450-00	TANTALUM	1MF	20%	50V	
C526	1-131-450-00	TANTALUM	1MF	20%	50V	
C527	1-107-167-00	MICA	75PF	5%	500V	
C528	1-107-167-00	MICA	75PF	5%	500V	
C529	1-130-960-00	FILM	0.01MF	2%	100V	
C530	1-130-960-00	FILM	0.01MF	2%	100V	
C531	1-124-336-00	ELECT	10MF	20%	100V	
C532	1-124-336-00	ELECT	10MF	20%	100V	
C533	1-123-306-00	ELECT	47MF	20%	10V	
C534	1-123-306-00	ELECT	47MF	20%	10V	
C535	1-131-450-00	TANTALUM	1MF	20%	50V	
C536	1-131-450-00	TANTALUM	1MF	20%	50V	
C537	1-131-450-00	TANTALUM	1MF	20%	50V	
C538	1-131-450-00	TANTALUM	1MF	20%	50V	
C539	1-107-310-00	MICA	220PF	5%	500V	
C540	1-107-310-00	MICA	220PF	5%	500V	
C601	▲.1-123-339-00	ELECT	3300MF	20%	25V	
C602	▲.1-123-339-00	ELECT	3300MF	20%	25V	
C603	▲.1-123-495-00	ELECT	220MF	20%	25V	
C604	▲.1-123-495-00	ELECT	220MF	20%	25V	
C605	1-123-332-00	ELECT	47MF	20%	16V	
C606	▲.1-123-311-00	ELECT	1000MF	20%	10V	
C607	1-123-332-00	ELECT	47MF	20%	16V	
C608	▲.1-123-311-00	ELECT	1000MF	20%	10V	
C609	▲.1-123-311-00	ELECT	1000MF	20%	10V	
C610	▲.1-123-311-00	ELECT	1000MF	20%	10V	
C611	▲.1-123-327-00	ELECT	4700MF	20%	16V	
C612	▲.1-124-078-00	ELECT	2200MF	20%	16V	

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



## ELECTRICAL PARTS

Ref.No.	Part No.	Description
C613	▲1-123-505-00	ELECT 220MF 20% 35V
C614	1-123-359-00	ELECT 47MF 20% 35V
C615	1-123-512-00	ELECT 47MF 20% 50V
C616	1-123-504-00	ELECT 100MF 20% 35V
C617	1-123-380-00	ELECT 1MF 20% 50V
C618	1-123-356-00	ELECT 10MF 20% 50V
C701	1-161-323-00	CERAMIC 0.001MF 10% 50V
C801	1-130-624-00	FILM 0.022MF 5% 50V
C802	1-130-624-00	FILM 0.022MF 5% 50V
C803	1-161-328-00	CERAMIC 0.0047MF 30% 50V
C804	1-102-125-00	CERAMIC 0.0047MF 10% 50V
C805	1-102-125-00	CERAMIC 0.0047MF 10% 50V
C806	1-102-125-00	CERAMIC 0.0047MF 10% 50V
C901	1-102-144-00	CERAMIC 470PF 10% 50V
C902	1-101-005-00	CERAMIC 0.022MF 50V
C903	▲1-161-744-00	CERAMIC 0.01MF
C904	▲1-161-744-00	(UK).....CERAMIC 0.01MF
CNP1	♣;1-560-061-00	PIN, CONNECTOR 3P
CNP2	♣;1-560-061-00	PIN, CONNECTOR 3P
CNP3	♣;1-560-061-00	PIN, CONNECTOR 3P
CNP4	♣;1-560-062-00	PIN, CONNECTOR 4P
CNP5	♣;1-560-062-00	PIN, CONNECTOR 4P
CNP6	♣;1-560-060-00	PIN, CONNECTOR 2P
CNP11	♣;1-560-062-00	PIN, CONNECTOR 4P
CNP12	♣;1-560-062-00	PIN, CONNECTOR 4P
CNP13	♣;1-560-063-00	PIN, CONNECTOR 5P
CNP14	♣;1-560-338-00	PIN, CONNECTOR 7P
CNP21	♣;1-560-062-00	PIN, CONNECTOR 4P
CNP22	♣;1-560-063-00	PIN, CONNECTOR 5P
CNP23	♣;1-560-064-00	PIN, CONNECTOR 6P
CNP24	♣;1-560-065-00	PIN, CONNECTOR 8P
CNP25	♣;1-560-061-00	PIN, CONNECTOR 3P
CNP26	♣;1-560-060-00	PIN, CONNECTOR 2P
CNP27	♣;1-560-065-00	PIN, CONNECTOR 8P
CNP31	♣;1-560-063-00	PIN, CONNECTOR 5P
CNP32	♣;1-560-063-00	PIN, CONNECTOR 5P
CNP33	♣;1-560-338-00	PIN, CONNECTOR 7P
CNP34	♣;1-560-061-00	PIN, CONNECTOR 3P
CNP41	♣;1-560-064-00	PIN, CONNECTOR 6P
CNP51	♣;1-560-063-00	PIN, CONNECTOR 5P
CNP52	♣;1-560-064-00	PIN, CONNECTOR 6P
CNP53	♣;1-560-065-00	PIN, CONNECTOR 8P
CNP61	♣;1-560-074-00	PIN, CONNECTOR
CNP71	♣;1-560-064-00	PIN, CONNECTOR 6P

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
D101	8-719-100-29	DIODE RD5.1EB1
D102	8-719-910-22	DIODE HZ12A2L
D201	8-719-911-19	DIODE 1SS119
D202	8-719-911-19	DIODE 1SS119
D203	8-719-911-19	DIODE 1SS119
D204	8-719-911-19	DIODE 1SS119
D205	8-719-911-19	DIODE 1SS119
D206	8-719-911-19	DIODE 1SS119
D207	8-719-911-19	DIODE 1SS119
D208	8-719-911-19	DIODE 1SS119
D209	8-719-911-19	DIODE 1SS119
D210	8-719-923-64	DIODE KV1236
D211	8-719-911-19	DIODE 1SS119
D212	8-719-911-19	DIODE 1SS119
D401	8-719-911-19	DIODE 1SS119
D402	8-719-911-19	DIODE 1SS119
D403	8-719-911-19	DIODE 1SS119
D404	8-719-911-19	DIODE 1SS119
D405	8-719-100-12	DIODE RD2.7EB1
D406	8-719-100-12	DIODE RD2.7EB1
D407	8-719-100-12	DIODE RD2.7EB1
D408	8-719-100-12	DIODE RD2.7EB1
D409	8-719-911-19	DIODE 1SS119
D410	8-719-100-12	DIODE RD2.7EB1
D411	8-719-911-19	DIODE 1SS119
D412	8-719-911-19	DIODE 1SS119
D413	8-719-911-19	DIODE 1SS119
D414	8-719-100-29	DIODE RD5.1EB1
D501	8-719-911-19	DIODE 1SS119
D502	8-719-911-19	DIODE 1SS119
D601	▲8-719-200-00	DIODE 31DQ5
D602	▲8-719-200-00	DIODE 31DQ5
D603	▲8-719-200-00	DIODE 31DQ5
D604	▲8-719-200-00	DIODE 31DQ5
D605	▲8-719-210-12	DIODE 10DF2
D606	▲8-719-210-12	DIODE 10DF2
D607	▲8-719-210-12	DIODE 10DF2
D608	▲8-719-210-12	DIODE 10DF2
D609	8-719-200-02	DIODE 10E2
D610	8-719-200-02	DIODE 10E2
D611	8-719-200-02	DIODE 10E2
D612	8-719-922-73	DIODE HZ27-3L
D613	▲8-719-911-19	DIODE 1SS119
D614	▲8-719-911-19	DIODE 1SS119
D615	8-719-911-19	DIODE 1SS119

## NOTE:

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- Items marked "♣" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (▲-△△△-△△△-XX or ▲-△△△△-△△△-X) may be different from those used in the set.

## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

- All resistors are in ohms.

F : nonflammable

## COILS

MMH : mH, UH : μH

## SEMICONDUCTORS

In each case, U : μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



## ELECTRICAL PARTS

Ref.No.	Part No.	Description
D616	8-719-100-29	DIODE RD5.1EB1
D701	8-719-812-31	DIODE TLR123
D702	8-719-907-81	DIODE BG5535S
D703	8-719-907-80	DIODE AA5535S
D801	8-719-200-02	DIODE 10E2
D802	8-719-200-02	DIODE 10E2
D803	8-719-200-02	DIODE 10E2
D804	8-719-922-21	DIODE AR2222S
D805	8-719-922-21	DIODE AR2222S
F501	▲.1-532-259-00	FUSE, TIME-LAG 1.6A
F502	▲.1-532-279-00	FUSE, TIME-LAG 1.6A
F503	▲.1-532-259-00	FUSE, TIME-LAG 1.6A
F504	▲.1-532-259-00	FUSE, TIME-LAG 1.6A
F902	▲.1-532-279-00	(AEP)...FUSE, TIME-LAG 0.5A
FL701	1-519-304-00	INDICATOR TUBE, FLUORESCENT
IC101	8-759-220-04	IC TC40H004P
IC102	8-759-145-58	IC UPC4558C
IC103	8-759-903-55	IC LF357H
IC201	8-759-220-04	IC TC40H004P
IC202	8-759-990-82	IC TL082CP
IC203	8-759-993-53	IC LF353H
IC204	8-759-745-60	IC NJM4560D
IC205	8-759-200-54	IC TC40H386P
IC206	8-759-900-74	IC SN74LS174AN
IC207	8-759-220-74	IC TC40H074P
IC208	8-759-220-04	IC TC40H004P
IC209	8-759-990-82	IC TL082CP
IC210	8-759-901-32	IC SN74LS132N
IC301	8-759-908-99	IC MB8841H-1215K
IC302	8-759-909-00	IC MB8841H-1214K
IC303	8-759-220-04	IC TC40H004P
IC401	8-759-930-00	IC CX193
IC402	8-759-745-60	IC NJM4560D
IC403	8-759-145-58	IC UPC4558C
IC404	8-759-745-00	IC NJM4560D
IC405	8-759-145-58	IC UPC4558C
IC406	8-759-969-32	IC STK6932
IC501	8-759-901-28	IC MSM5128-12RS
IC502	8-759-905-50	IC CX7933
IC503	8-759-905-52	IC CX7934
IC504	8-759-905-53	IC CX7935
IC505	8-752-001-70	IC CX20017
IC506	8-759-993-53	IC LF353H
IC507	8-759-993-53	IC LF353H
IC508	8-759-340-53	IC HD14053BP

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
IC509	8-759-900-72	IC NE5532P
IC510	8-759-745-61	IC NJM4560D-D
IC601	8-759-700-47	IC CX10035
IC701	8-759-600-35	IC M54940P
J901	1-507-912-21	JACK, PIN 2P (LINE OUT)
J902	1-507-659-00	JACK (HEADPHONES)
L301	1-408-117-00	MICRO INDUCTOR 10UH
L302	1-408-117-00	MICRO INDUCTOR 10UH
L303	1-408-117-00	MICRO INDUCTOR 10UH
L304	1-408-117-00	MICRO INDUCTOR 10UH
L305	1-408-117-00	MICRO INDUCTOR 10UH
L306	1-408-117-00	MICRO INDUCTOR 10UH
L501	1-408-117-00	MICRO INDUCTOR 10UH
LPF501	1-464-299-00	UNIT, LOW PASS FILTER
LPF502	1-464-299-00	UNIT, LOW PASS FILTER
M801	X-4902-018-1	LOADING MOTOR
M802	X-4902-019-1	CHUCKING MOTOR
M803	X-4902-024-1	SLIDING MOTOR
Q101	8-729-245-83	TRANSISTOR 2SC2458
Q201	8-729-334-58	TRANSISTOR 2SC1345
Q202	8-729-334-58	TRANSISTOR 2SC1345
Q203	8-729-307-58	TRANSISTOR 2SC1775A
Q301	8-729-334-58	TRANSISTOR 2SC1345
Q302	8-729-612-77	TRANSISTOR 2SA1027R
Q401	8-729-334-58	TRANSISTOR 2SC1345
Q402	8-729-100-13	TRANSISTOR 2SC2001
Q403	8-729-100-13	TRANSISTOR 2SC2001
Q404	8-729-612-77	TRANSISTOR 2SA1027R
Q405	8-729-612-77	TRANSISTOR 2SA1027R
Q406	8-729-100-13	TRANSISTOR 2SC2001
Q407	8-729-100-13	TRANSISTOR 2SC2001
Q408	8-729-334-58	TRANSISTOR 2SC1345
Q409	8-729-100-13	TRANSISTOR 2SC2001
Q410	8-729-100-13	TRANSISTOR 2SC2001
Q411	8-729-100-13	TRANSISTOR 2SC2001
Q413	8-729-100-13	TRANSISTOR 2SC2001
Q414	8-729-100-13	TRANSISTOR 2SC2001
Q415	8-729-100-13	TRANSISTOR 2SC2001
Q416	8-729-612-77	TRANSISTOR 2SA1027R
Q417	8-729-334-58	TRANSISTOR 2SC1345
Q418	8-729-334-58	TRANSISTOR 2SC1345
Q501	8-729-245-83	TRANSISTOR 2SC2458
Q502	8-729-245-83	TRANSISTOR 2SC2458
Q503	8-729-245-83	TRANSISTOR 2SC2458
Q504	8-729-423-00	TRANSISTOR 2SK152-3

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- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
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## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

- All resistors are in ohms.

- F: nonflammable

## COILS

- MMH: mH, UH: μH

## SEMICONDUCTORS

In each case, U: μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



## ELECTRICAL PARTS

Ref.No.	Part No.	Description				
Q505	8-729-423-00	TRANSISTOR	2SK152-3			
Q601	8-729-173-13	TRANSISTOR	2SB731			
Q602	8-729-180-93	TRANSISTOR	2SD809			
Q603	8-729-288-02	TRANSISTOR	2SD880			
Q604	8-729-173-13	TRANSISTOR	2SB731			
Q605	8-729-177-43	TRANSISTOR	2SD774			
Q606	8-729-245-83	TRANSISTOR	2SC2458			
Q801	8-729-110-21	TRANSISTOR	PH102			
R101	1-247-888-00	CARBON	240K	5%	1/6W	
R102	1-247-855-00	CARBON	10K	5%	1/6W	
R103	1-247-885-00	CARBON	180K	5%	1/6W	
R104	1-247-855-00	CARBON	10K	5%	1/6W	
R105	1-247-887-00	CARBON	220K	5%	1/6W	
R106	1-247-885-00	CARBON	180K	5%	1/6W	
R107	1-247-902-00	CARBON	910K	5%	1/6W	
R108	1-247-855-00	CARBON	10K	5%	1/6W	
R109	1-247-855-00	CARBON	10K	5%	1/6W	
R110	1-247-855-00	CARBON	10K	5%	1/6W	
R111	1-247-855-00	CARBON	10K	5%	1/6W	
R112	1-247-898-00	CARBON	620K	5%	1/6W	
R113	1-247-848-00	CARBON	5.1K	5%	1/6W	
R114	1-247-848-00	CARBON	5.1K	5%	1/6W	
R115	1-247-898-00	CARBON	620K	5%	1/6W	
R116	1-247-847-00	CARBON	4.7K	5%	1/6W	
R117	1-247-847-00	CARBON	4.7K	5%	1/6W	
R118	1-247-855-00	CARBON	10K	5%	1/6W	
R119	1-247-847-00	CARBON	4.7K	5%	1/6W	
R120	1-247-832-00	CARBON	1.1K	5%	1/6W	
R121	1-247-848-00	CARBON	5.1K	5%	1/6W	
R122	1-247-835-00	CARBON	1.5K	5%	1/6W	
R123	1-247-838-00	CARBON	2K	5%	1/6W	
R124	1-247-838-00	CARBON	2K	5%	1/6W	
R125	1-247-835-00	CARBON	1.5K	5%	1/6W	
R126	1-247-107-00	CARBON	100	5%	1/4W	
R127	1-247-099-00	CARBON	47	5%	1/4W	
R128	1-247-115-00	CARBON	220	5%	1/4W	
R201	1-247-845-00	CARBON	3.9K	5%	1/6W	
R202	1-247-858-00	CARBON	13K	5%	1/6W	
R203	1-247-831-00	CARBON	1K	5%	1/6W	
R204	1-247-843-00	CARBON	3.3K	5%	1/6W	
R205	1-247-831-00	CARBON	1K	5%	1/6W	
R206	1-247-843-00	CARBON	3.3K	5%	1/6W	
R207	1-247-831-00	CARBON	1K	5%	1/6W	
R208	1-247-843-00	CARBON	3.3K	5%	1/6W	

## ELECTRICAL PARTS

Ref.No.	Part No.	Description				
R209	1-247-855-00	CARBON	10K	5%	1/6W	
R210	1-247-838-00	CARBON	2K	5%	1/6W	
R211	1-247-838-00	CARBON	2K	5%	1/6W	
R212	1-247-867-00	CARBON	33K	5%	1/6W	
R213	1-247-867-00	CARBON	33K	5%	1/6W	
R214	1-247-864-00	CARBON	24K	5%	1/6W	
R215	1-247-886-00	CARBON	200K	5%	1/6W	
R216	1-247-831-00	CARBON	1K	5%	1/6W	
R217	1-247-850-00	CARBON	6.2K	5%	1/6W	
R218	1-247-831-00	CARBON	1K	5%	1/6W	
R219	1-247-879-00	CARBON	100K	5%	1/6W	
R220	1-247-895-00	CARBON	470K	5%	1/6W	
R221	1-247-895-00	CARBON	470K	5%	1/6W	
R222	1-247-855-00	CARBON	10K	5%	1/6W	
R223	1-247-855-00	CARBON	10K	5%	1/6W	
R224	1-247-879-00	CARBON	100K	5%	1/6W	
R225	1-214-756-00	METAL	13K	1%	1/4W	
R226	1-214-739-00	METAL	2.7K	1%	1/4W	
R227	1-247-855-00	CARBON	10K	5%	1/6W	
R228	1-247-855-00	CARBON	10K	5%	1/6W	
R229	1-247-854-00	CARBON	9.1K	5%	1/6W	
R230	1-247-858-00	CARBON	13K	5%	1/6W	
R231	1-247-867-00	CARBON	33K	5%	1/6W	
R232	1-247-846-00	CARBON	4.3K	5%	1/6W	
R233	1-247-903-00	CARBON	1M	5%	1/6W	
R234	1-247-903-00	CARBON	1M	5%	1/6W	
R235	1-247-841-00	CARBON	2.7K	5%	1/6W	
R236	1-247-831-00	CARBON	1K	5%	1/6W	
R237	1-247-879-00	CARBON	100K	5%	1/6W	
R238	1-247-846-00	CARBON	4.3K	5%	1/6W	
R239	1-247-879-00	CARBON	100K	5%	1/6W	
R240	1-247-879-00	CARBON	100K	5%	1/6W	
R242	1-247-839-00	CARBON	2.2K	5%	1/6W	
R243	1-247-831-00	CARBON	1K	5%	1/6W	
R244	1-214-763-00	METAL	27K	1%	1/4W	
R245	1-247-903-00	CARBON	1M	5%	1/6W	
R246	1-214-729-00	METAL	1K	1%	1/4W	
R247	1-214-729-00	METAL	1K	1%	1/4W	
R248	1-247-848-00	CARBON	5.1K	5%	1/6W	
R301	1-247-847-00	CARBON	4.7K	5%	1/6W	
R302	1-247-839-00	CARBON	2.2K	5%	1/6W	
R303	1-247-839-00	CARBON	2.2K	5%	1/6W	
R304	1-247-847-00	CARBON	4.7K	5%	1/6W	
R305	1-247-839-00	CARBON	2.2K	5%	1/6W	
R306	1-247-839-00	CARBON	2.2K	5%	1/6W	

## NOTE:

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## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

All resistors are in ohms.

F: nonflammable

## COILS

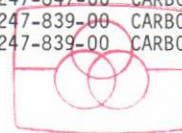
MMH: mH, UH: μH

## SEMICONDUCTORS

In each case, U: μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...

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## ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R307	1-247-839-00	CARBON	2.2K	5%	1/6W
R308	1-247-847-00	CARBON	4.7K	5%	1/6W
R309	1-247-847-00	CARBON	4.7K	5%	1/6W
R310	1-247-847-00	CARBON	4.7K	5%	1/6W
R311	1-247-855-00	CARBON	10K	5%	1/6W
R312	1-247-863-00	CARBON	22K	5%	1/6W
R313	1-247-863-00	CARBON	22K	5%	1/6W
R314	1-247-863-00	CARBON	22K	5%	1/6W
R315	1-247-863-00	CARBON	22K	5%	1/6W
R316	1-247-863-00	CARBON	22K	5%	1/6W
R317	1-247-863-00	CARBON	22K	5%	1/6W
R318	1-247-863-00	CARBON	22K	5%	1/6W
R319	1-247-863-00	CARBON	22K	5%	1/6W
R320	1-247-863-00	CARBON	22K	5%	1/6W
R321	1-247-863-00	CARBON	22K	5%	1/6W
R322	1-247-863-00	CARBON	22K	5%	1/6W
R323	1-247-863-00	CARBON	22K	5%	1/6W
R324	1-247-847-00	CARBON	4.7K	5%	1/6W
R325	1-247-847-00	CARBON	4.7K	5%	1/6W
R327	1-247-863-00	CARBON	22K	5%	1/6W
R328	1-247-863-00	CARBON	22K	5%	1/6W
R329	1-247-863-00	CARBON	22K	5%	1/6W
R330	1-247-863-00	CARBON	22K	5%	1/6W
R331	1-247-811-00	CARBON	150	5%	1/6W
R332	1-247-819-00	CARBON	330	5%	1/6W
R333	1-247-819-00	CARBON	330	5%	1/6W
R334	1-247-863-00	CARBON	22K	5%	1/6W
R335	1-247-853-00	CARBON	8.2K	5%	1/6W
R336	1-247-853-00	CARBON	8.2K	5%	1/6W
R337	1-247-879-00	CARBON	100K	5%	1/6W
R338	1-247-903-00	CARBON	1M	5%	1/6W
R339	1-247-903-00	CARBON	1M	5%	1/6W
R340	1-247-855-00	CARBON	10K	5%	1/6W
R341	1-247-847-00	CARBON	4.7K	5%	1/6W
R342	1-247-807-00	CARBON	100	5%	1/6W
R343	1-247-887-00	CARBON	220K	5%	1/6W
R344	1-247-863-00	CARBON	22K	5%	1/6W
R345	1-247-863-00	CARBON	22K	5%	1/6W
R348	1-247-863-00	CARBON	22K	5%	1/6W
R349	1-247-863-00	CARBON	22K	5%	1/6W
R350	1-247-863-00	CARBON	22K	5%	1/6W
R351	1-247-863-00	CARBON	22K	5%	1/6W
R352	1-247-863-00	CARBON	22K	5%	1/6W
R353	1-247-863-00	CARBON	22K	5%	1/6W
R354	1-247-863-00	CARBON	22K	5%	1/6W

## ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R355	1-247-863-00	CARBON	22K	5%	1/6W
R356	1-247-839-00	CARBON	2.2K	5%	1/6W
R357	1-247-887-00	CARBON	220K	5%	1/6W
R358	1-247-863-00	CARBON	22K	5%	1/6W
R359	1-247-855-00	CARBON	10K	5%	1/6W
R360	1-247-861-00	CARBON	18K	5%	1/6W
R361	1-247-885-00	CARBON	180K	5%	1/6W
R362	1-247-861-00	CARBON	18K	5%	1/6W
R363	1-247-863-00	CARBON	22K	5%	1/6W
R364	1-247-863-00	CARBON	22K	5%	1/6W
R365	1-247-863-00	CARBON	22K	5%	1/6W
R366	1-247-855-00	CARBON	10K	5%	1/6W
R367	1-247-879-00	CARBON	100K	5%	1/6W
R368	1-247-815-00	CARBON	220	5%	1/6W
R401	1-247-855-00	CARBON	10K	5%	1/6W
R402	1-247-851-00	CARBON	6.8K	5%	1/6W
R403	1-247-863-00	CARBON	22K	5%	1/6W
R404	1-247-855-00	CARBON	10K	5%	1/6W
R405	1-247-855-00	CARBON	10K	5%	1/6W
R406	1-247-875-00	CARBON	68K	5%	1/6W
R407	1-214-779-00	METAL	120K	1%	1/4W
R408	1-247-877-00	CARBON	82K	5%	1/6W
R409	1-247-859-00	CARBON	15K	5%	1/6W
R410	1-247-871-00	CARBON	47K	5%	1/6W
R411	1-247-855-00	CARBON	10K	5%	1/6W
R412	1-247-855-00	CARBON	10K	5%	1/6W
R413	1-247-859-00	CARBON	15K	5%	1/6W
R414	1-247-859-00	CARBON	15K	5%	1/6W
R415	1-247-869-00	CARBON	39K	5%	1/6W
R416	1-247-869-00	CARBON	39K	5%	1/6W
R417	1-247-855-00	CARBON	10K	5%	1/6W
R418	1-244-845-00	CARBON	68	5%	1/2W
R419	1-247-855-00	CARBON	10K	5%	1/6W
R420	1-247-845-00	CARBON	3.9K	5%	1/6W
R421	1-247-847-00	CARBON	4.7K	5%	1/6W
R422	1-247-879-00	CARBON	100K	5%	1/6W
R423	1-214-729-00	METAL	1K	1%	1/4W
R424	1-214-758-00	METAL	16K	1%	1/4W
R425	1-247-895-00	CARBON	470K	5%	1/6W
R426	1-247-855-00	CARBON	10K	5%	1/6W
R427	1-247-867-00	CARBON	33K	5%	1/6W
R428	1-247-835-00	CARBON	1.5K	5%	1/6W
R429	1-247-839-00	CARBON	2.2K	5%	1/6W
R430	1-247-855-00	CARBON	10K	5%	1/6W
R431	1-247-831-00	CARBON	1K	5%	1/6W

## NOTE:

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

- All resistors are in ohms.

- F: nonflammable

## COILS

- MMH: mH, UH: μH

## SEMICONDUCTORS

In each case, U: μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...



ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R432	1-247-831-00	CARBON	1K	5%	1/6W
R433	1-247-873-00	CARBON	56K	5%	1/6W
R434	1-247-855-00	CARBON	10K	5%	1/6W
R435	1-247-863-00	CARBON	22K	5%	1/6W
R436	1-247-855-00	CARBON	10K	5%	1/6W
R437	1-247-867-00	CARBON	33K	5%	1/6W
R438	1-247-879-00	CARBON	100K	5%	1/6W
R439	1-247-861-00	CARBON	18K	5%	1/6W
R440	1-247-865-00	CARBON	27K	5%	1/6W
R441	1-247-855-00	CARBON	10K	5%	1/6W
R442	1-247-813-00	CARBON	180	5%	1/6W
R443	1-247-877-00	CARBON	82K	5%	1/6W
R444	1-247-855-00	CARBON	10K	5%	1/6W
R445	1-247-855-00	CARBON	10K	5%	1/6W
R446	1-247-855-00	CARBON	10K	5%	1/6W
R447	1-247-823-00	CARBON	470	5%	1/6W
R448	1-247-855-00	CARBON	10K	5%	1/6W
R449	1-247-883-00	CARBON	150K	5%	1/6W
R450	1-247-871-00	CARBON	47K	5%	1/6W
R451	1-247-871-00	CARBON	47K	5%	1/6W
R452	1-247-876-00	CARBON	75K	5%	1/6W
R453	1-247-876-00	CARBON	75K	5%	1/6W
R454	1-247-871-00	CARBON	47K	5%	1/6W
R455	1-247-871-00	CARBON	47K	5%	1/6W
R456	1-247-881-00	CARBON	120K	5%	1/6W
R457	1-247-847-00	CARBON	4.7K	5%	1/6W
R458	1-247-863-00	CARBON	22K	5%	1/6W
R459	1-247-879-00	CARBON	100K	5%	1/6W
R460	1-247-877-00	CARBON	82K	5%	1/6W
R461	1-247-855-00	CARBON	10K	5%	1/6W
R462	1-247-855-00	CARBON	10K	5%	1/6W
R463	1-247-855-00	CARBON	10K	5%	1/6W
R464	1-247-835-00	CARBON	1.5K	5%	1/6W
R465	1-247-863-00	CARBON	22K	5%	1/6W
R466	1-247-855-00	CARBON	10K	5%	1/6W
R467	1-247-841-00	CARBON	2.7K	5%	1/6W
R468	1-247-863-00	CARBON	22K	5%	1/6W
R469	1-247-875-00	CARBON	68K	5%	1/6W
R470	1-247-855-00	CARBON	10K	5%	1/6W
R471	1-247-843-00	CARBON	3.3K	5%	1/6W
R472	1-247-843-00	CARBON	3.3K	5%	1/6W
R473	1-247-903-00	CARBON	1M	5%	1/6W
R474	1-247-855-00	CARBON	10K	5%	1/6W
R475	1-247-855-00	CARBON	10K	5%	1/6W
R476	1-247-863-00	CARBON	22K	5%	1/6W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R477	1-247-863-00	CARBON	22K	5%	1/6W
R478	1-247-863-00	CARBON	22K	5%	1/6W
R479	1-247-863-00	CARBON	22K	5%	1/6W
R480	1-247-877-00	CARBON	82K	5%	1/6W
R481	1-247-847-00	CARBON	4.7K	5%	1/6W
R482	1-247-852-00	CARBON	7.5K	5%	1/6W
R483	1-247-855-00	CARBON	10K	5%	1/6W
R484	1-247-872-00	CARBON	51K	5%	1/6W
R485	1-247-847-00	CARBON	4.7K	5%	1/6W
R486	1-247-855-00	CARBON	10K	5%	1/6W
R487	1-247-839-00	CARBON	2.2K	5%	1/6W
R488	1-247-873-00	CARBON	56K	5%	1/6W
R489	1-247-882-00	CARBON	130K	5%	1/6W
R490	1-247-882-00	CARBON	130K	5%	1/6W
R491	1-247-879-00	CARBON	100K	5%	1/6W
R492	1-247-879-00	CARBON	100K	5%	1/6W
R493	1-247-859-00	CARBON	15K	5%	1/6W
R494	1-247-862-00	CARBON	20K	5%	1/6W
R495	1-247-862-00	CARBON	20K	5%	1/6W
R496	1-247-855-00	CARBON	10K	5%	1/6W
R497	1-246-401-00	CARBON	1	5%	1/4W
R498	1-246-401-00	CARBON	1	5%	1/4W
R501	1-247-855-00	CARBON	10K	5%	1/6W
R502	1-247-863-00	CARBON	22K	5%	1/6W
R503	1-247-847-00	CARBON	4.7K	5%	1/6W
R504	1-247-847-00	CARBON	4.7K	5%	1/6W
R505	1-247-807-00	CARBON	100	5%	1/6W
R506	1-214-739-00	METAL	2.7K	1%	1/4W
R507	1-214-771-00	METAL	56K	1%	1/4W
R508	1-247-847-00	CARBON	4.7K	5%	1/6W
R509	1-247-847-00	CARBON	4.7K	5%	1/6W
R510	1-214-757-00	METAL	15K	1%	1/4W
R511	1-214-763-00	METAL	27K	1%	1/4W
R512	1-214-754-00	METAL	11K	1%	1/4W
R513	1-214-757-00	METAL	15K	1%	1/4W
R514	1-214-763-00	METAL	27K	1%	1/4W
R515	1-214-754-00	METAL	11K	1%	1/4W
R516	1-214-757-00	METAL	15K	1%	1/4W
R517	1-214-758-00	METAL	16K	1%	1/4W
R522	1-214-745-00	METAL	4.7K	1%	1/4W
R523	1-214-717-00	METAL	330	1%	1/4W
R524	1-214-956-00	METAL	470K	1%	1/4W
R525	1-214-735-00	METAL	1.8K	1%	1/4W
R526	1-214-745-00	METAL	4.7K	1%	1/4W
R527	1-214-717-00	METAL	330	1%	1/4W

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## CAPACITORS:

MF:μF, PF:μμF.

## RESISTORS

• All resistors are in ohms.

• F : nonflammable

## COILS

• MMH : mH, UH : μH

## SEMICONDUCTORS

In each case, U : μ, for example:

UA...: μA..., UPA...: μPA..., UPC...: μPC,

UPD...: μPD...



ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R528	1-214-956-00	METAL	470K	1%	1/4W
R529	1-214-735-00	METAL	1.8K	1%	1/4W
R530	1-214-777-00	METAL	100K	1%	1/4W
R531	1-214-777-00	METAL	100K	1%	1/4W
R532	1-214-713-00	METAL	220	1%	1/4W
R533	1-214-713-00	METAL	220	1%	1/4W
R534	1-214-713-00	METAL	220	1%	1/4W
R535	1-214-713-00	METAL	220	1%	1/4W
R536	1-214-761-00	METAL	22K	1%	1/4W
R537	1-214-761-00	METAL	22K	1%	1/4W
R538	1-214-745-00	METAL	4.7K	1%	1/4W
R539	1-214-765-00	METAL	33K	1%	1/4W
R540	1-214-745-00	METAL	4.7K	1%	1/4W
R541	1-214-713-00	METAL	220	1%	1/4W
R542	1-214-745-00	METAL	4.7K	1%	1/4W
R543	1-214-765-00	METAL	33K	1%	1/4W
R544	1-214-745-00	METAL	4.7K	1%	1/4W
R545	1-214-713-00	METAL	220	1%	1/4W
R603	1-247-099-00	CARBON	47	5%	1/4W
R604	1-247-099-00	CARBON	47	5%	1/4W
R605	1-214-737-00	METAL	2.2K	1%	1/4W
R606	1-214-753-00	METAL	10K	1%	1/4W
R607	1-214-752-00	METAL	9.1K	1%	1/4W
R608	1-214-732-00	METAL	1.3K	1%	1/4W
R609	1-214-743-00	METAL	3.9K	1%	1/4W
R610	1-214-730-00	METAL	1.1K	1%	1/4W
R611	1-214-737-00	METAL	2.2K	1%	1/4W
R612	1-214-759-00	METAL	18K	1%	1/4W
R614	1-247-839-00	CARBON	2.2K	5%	1/6W
R615	1-247-831-00	CARBON	1K	5%	1/6W
R616	1-247-851-00	CARBON	6.8K	5%	1/6W
R617	1-247-839-00	CARBON	2.2K	5%	1/6W
R618	1-247-855-00	CARBON	10K	5%	1/6W
R619	1-247-855-00	CARBON	10K	5%	1/6W
R620	1-247-885-00	CARBON	180K	5%	1/6W
R621	1-247-807-00	CARBON	100	5%	1/6W
R901	1-246-466-00	CARBON	510	5%	1/4W
R902	1-246-466-00	CARBON	510	5%	1/4W
R903	1-214-937-00	(AEP)...METAL	1M	1%	1/2W

ELECTRICAL PARTS

Ref.No.	Part No.	Description
RV101	1-224-256-XX	RES, ADJ, METAL GLAZE 220K
RV102	1-224-253-XX	RES, ADJ, METAL GLAZE 22K
RV103	1-224-252-XX	RES, ADJ, METAL GLAZE 10K
RV104	1-224-253-XX	RES, ADJ, METAL GLAZE 22K
RV301	1-226-241-00	RES, ADJ, CARBON 500K
RV401	1-224-255-XX	RES, ADJ, METAL GLAZE 100K
RV402	1-224-252-XX	RES, ADJ, METAL GLAZE 10K
RV403	1-226-236-00	RES, ADJ, CARBON 10K
RV404	1-226-236-00	RES, ADJ, CARBON 10K
RY501	1-515-473-00	RELAY
RY502	1-515-473-00	RELAY
S701	1-553-856-00	SWITCH, KEY BOARD (PLAY)
S702	1-553-856-00	SWITCH, KEY BOARD (PAUSE)
S703	1-553-856-00	SWITCH, KEY BOARD (◀◀)
S704	1-553-856-00	SWITCH, KEY BOARD (▶▶)
S705	1-553-856-00	SWITCH, KEY BOARD (INDEX)
S706	1-553-856-00	SWITCH, KEY BOARD (◀◀)
S707	1-553-856-00	SWITCH, KEY BOARD (▶▶)
S708	1-553-856-00	SWITCH, KEY BOARD (INDEX)
S709	1-553-856-00	SWITCH, KEY BOARD (REPEAT ALL)
S710	1-553-856-00	SWITCH, KEY BOARD (REPEAT A-B)
S711	1-553-856-00	SWITCH, KEY BOARD (CLEAR)
S712	1-553-856-00	SWITCH, KEY BOARD (ELAPSED/REMAINING)
S713	1-553-856-00	SWITCH, KEY BOARD (STOP)
S714	1-553-856-00	SWITCH, KEY BOARD (OPEN/CLOSE)
S801	1-553-636-00	SWITCH, MICRO (MOTOR SELECT)
S802	1-553-636-00	SWITCH, MICRO (CHUCKING MOTOR)
S803	1-554-205-00	SWITCH, PUSH (LOADING OUT)
S804	1-554-205-00	SWITCH, PUSH (LASER ON)
S805	1-554-205-00	SWITCH, PUSH (LOADING IN)
S806	1-554-205-00	SWITCH, PUSH (LASER ON)
S807	1-554-205-00	SWITCH, PUSH (LIMIT IN)
S901	1-553-318-00	(AEP,E)...SWITCH, PUSH (AC POWER)
S901	1-553-447-00	(UK).....SWITCH, PUSH (AC POWER)
T201	1-407-568-00	COIL, VARIABLE 6.8UH
T501	1-426-090-00	TRANSFORMER, RF
T901	1-447-742-11	(E).....TRANSFORMER, POWER
T901	1-447-743-00	(AEP,UK)...TRANSFORMER, POWER
VR901	1-226-980-00	RES, VAR, CARBON 20K/20K (HEADPHONES LEVEL)
X301	1-567-143-00	VIBRATOR, CERAMIC
X501	1-527-999-00	OSCILLATOR, CRYSTAL
X502	1-527-948-00	VIBRATOR, CRYSTAL

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MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms.
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COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:  
 UA...: μA...; UPA...: μPA...; UPC...: μPC,  
 UPD...: μPD...

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.