THE UNITE ENGINE

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SERVICE MANUAL

KD-850

The KD-850 is a fully automatic turntable; all its mechanisms and controls are the same as the KD-650 except for the full automatic mechanism and control. Refer to the service manual and technical data of the KD-650. The automatic mechanism assembly (D40-0461-05) is the same as that of the KD-4100 except for the position guide. For troubleshooting of the automatic mechanism assembly, refer to the service manual of the KD-4100.



FULL AUTOMATIC QUARTZ PLL DIRECT DRIVE TURNTABLE

CONTENTS

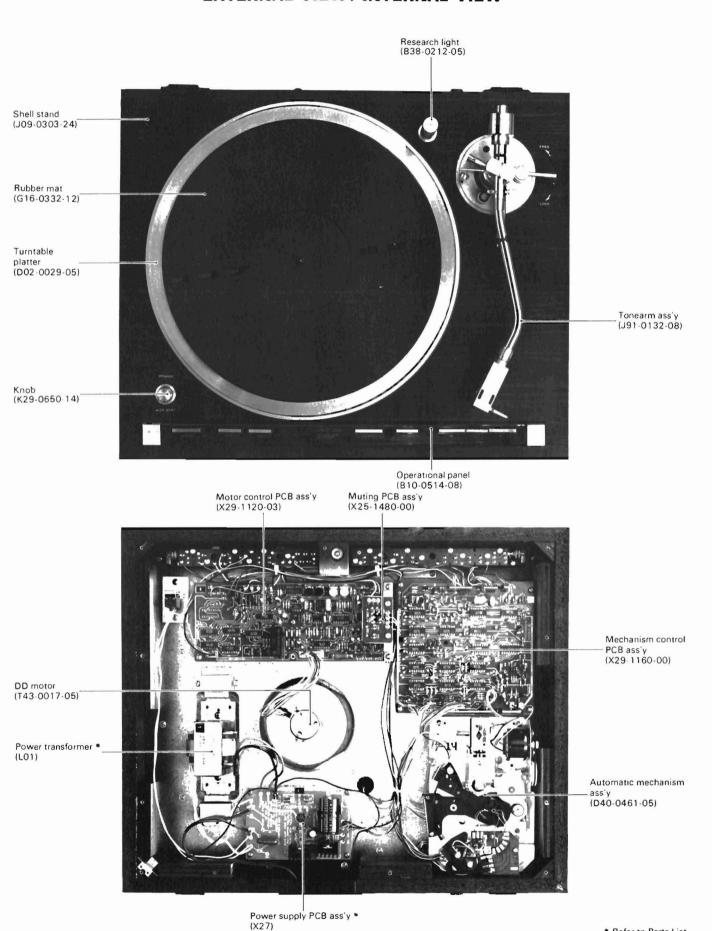
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Note:

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

Region	Code
U.S.A	K
Canada	Р
PX	U
Australia	
Europe	W
England	
South Africa	S
Other Areas	M
Audio Club	Н

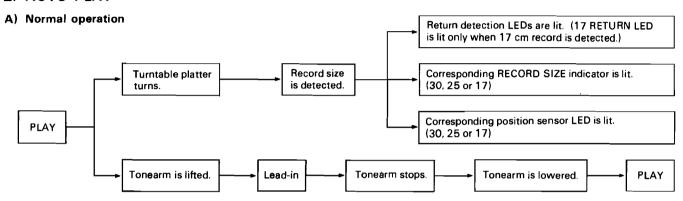
EXTERNAL VIEW/INTERNAL VIEW



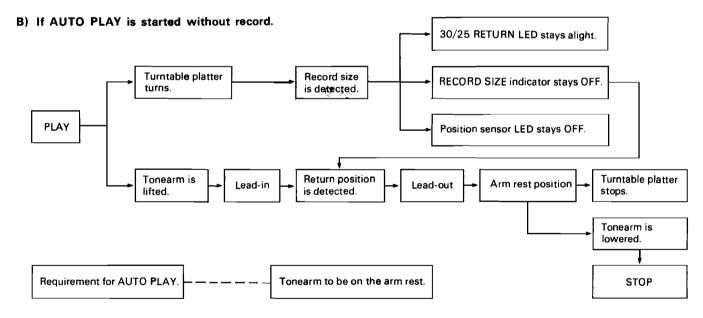
1. POWER SWITCH ON

- Initial reset → 33 rpm speed indicator is lit.
- Power lamp is lit.
- Research light is lit.

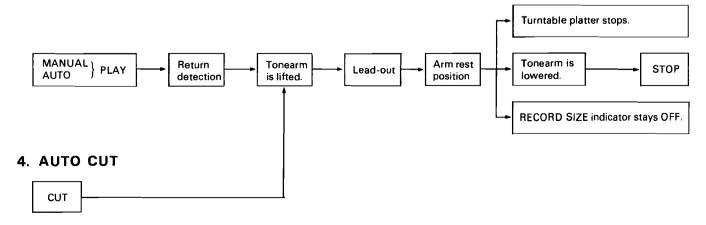
2. AUTO PLAY



Note: 30/25 RETURN LED is always lit. 17 RETURN LED is lit only when the AUTO SIZE SELECTOR selects 17

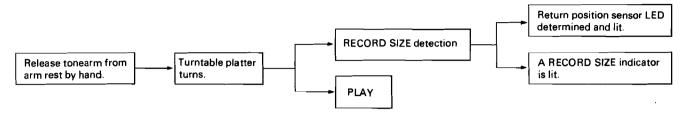


3. AUTO RETURN

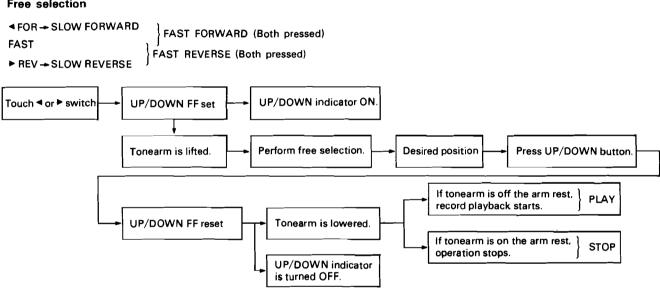


5. MANUAL OPERATION

A) Quick MANUAL



B) Free selection

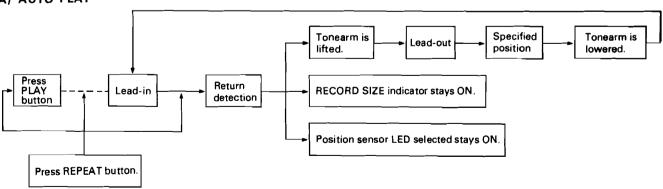


Notes:

- 1 When the tonearm is on the arm rest, the tonearm drive motor won't be turned ON even if the ▶ switch is turned ON.
- 2. The tonearm will be returned to the arm rest when RETURN is detected during free selection operation.

6. REPEAT

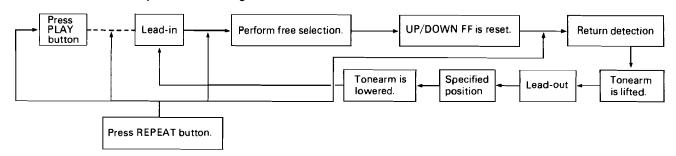
A) AUTO PLAY



B) MANUAL PLAY

When the tonearm is detached from the arm rest by quick manual or free selection operation, the repeat condition, if it has been set previously, is reset at that point and will not be set.

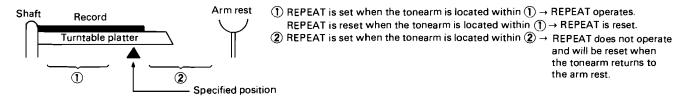
C) When free selection is performed during AUTO PLAY



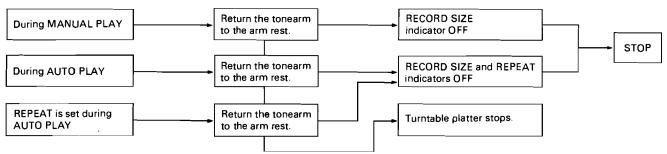
D) REPEAT condition is reset when one of the following occurs.

- REP button is pressed when REPEAT has already been set.
- CUT button is pressed.
- Quick stop operation is performed.

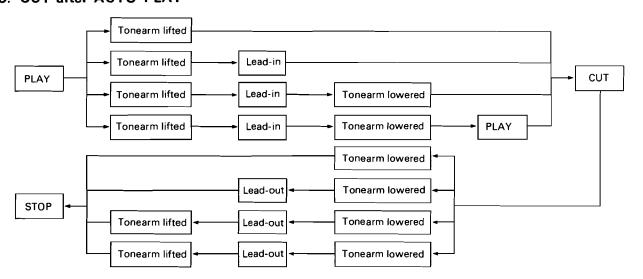
Note: Operation differs according to the tonearm's position as shown below.



7. Quick STOP



8. CUT after AUTO PLAY



RECORD SIZE indicator is turned OFF when the tonearm returns to the arm rest.

9. UP/DOWN operation

A) Independent UP/DOWN operation + initial reset (DOWN):

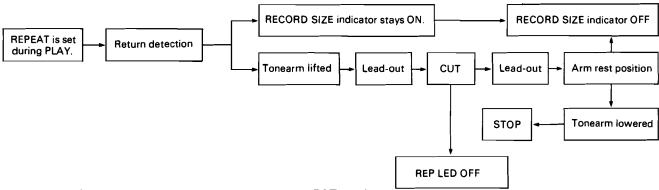
UP/DOWN indicator is lit when the tonearm is lifted up.

B) Free selection:

During free selection, turning ▶ or ◀ ON acts for UP operation and the indicator is lit. DOWN operation is performed by pressing the UP/DOWN button.

10. Operation during returning in REPEAT mode

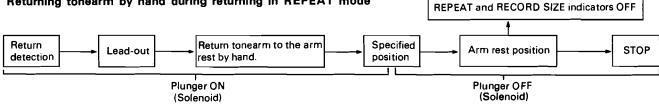
A) CUT operation during lead-out in REPEAT mode



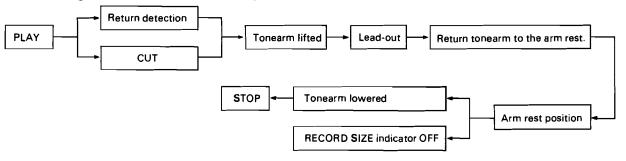
B) REPEAT set/reset operation during returning in REPEAT mode

Refer to the note in Paragraph 6.

C) Returning tonearm by hand during returning in REPEAT mode



11. Returning tonearm by hand during AUTO-RETURN or AUTO-CUT



12. AUTO PLAY during returning in REPEAT mode

Unavailable.

13. Operation when tonearm comes to return position or arm rest position after being started by

A) When the tonearm comes to the return position

- The tonearm drive motor is turned OFF
- If the free selection switch is turned OFF, the tonearm will return to the arm rest after lead-out.

B) When the tonearm comes to the arm rest position

The tonearm drive motor is turned OFF even if the ▶ switch is turned ON. However, it is turned ON if the ◄ switch is turned ON.

I. Initialization after power is turned ON

1. Power reset circuit

The power lamps L and R and the research light are turned ON after power is turned ON. All mechanism control (X29-1160-00) circuits are initialized by the power reset circuit. The power reset circuit is shown in Fig. 1 and waveforms at points in the circuit are shown in Fig. 2.

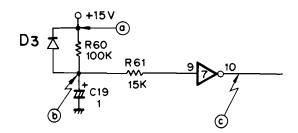


Fig. 1 Power reset circuit

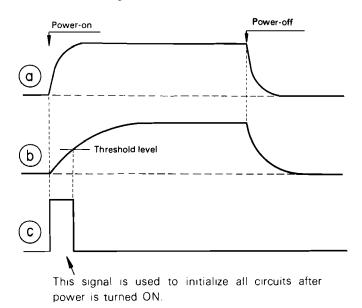


Fig. 2 Waveforms

2. D•FF (Delayed Flip-flop)

Two delayed flip-flops are provided in each IC12 and IC15 of these. Operation of a D•FF is explained in the following.

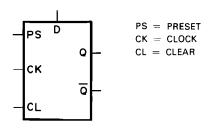


Fig. 3 D•FF

Timing diagram of a D•FF is shown in Fig. 4.

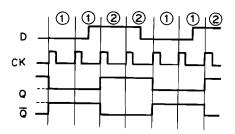


Fig. 4 Timing Diagram of D•FF

When a clock pulse is applied to CK (clock) while D is "H", Q becomes "H" and $\overline{\mathbb{Q}}$ becomes "L". When a clock pulse is applied to CK while D is "L", Q becomes "L" and $\overline{\mathbb{Q}}$ becomes "H". In other words, the condition of D is output delayed by the time of one clock pulse. The D•FFs used are equipped with PS (preset) and CL (clear) inputs. When PS is set to "H", Q is set to "H" and $\overline{\mathbb{Q}}$ is set to "L" regardless of the D input. When CL is set to "H", Q is set to "L" and $\overline{\mathbb{Q}}$ to "H" regardless of the D input. CL must be set to "L" to read the CK input. A D•FF can be used as a T•FF by connecting D to $\overline{\mathbb{Q}}$.

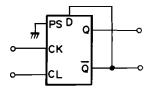
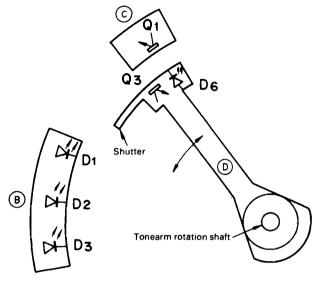


Fig. 5

II. Arm rest position, size and return detection circuits (X25-1490-01)



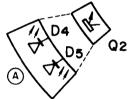


Fig. 1 Detection mechanism (viewed from the bottom)

- Q1 Photo. Tr to detect if the tonearm is at the arm rest.
- Q2: Tonearm return detection Photo. Tr
- Q3: Record size detection Photo. Tr
- D1 30 cm size LED
- D2: 25 cm size LED
- D3 17 cm size LED
- D4 25/30 cm return LED
- D5: 17 cm return LED
- D6 Rest LED
- LED housing for returning point detection
- B LED housing for record size detection
- © Photo Tr housing to detect if the tonearm is at the arm rest.
- Search arm

1. Appearance of LEDs and phototransistors

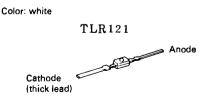


Fig. 2 LED

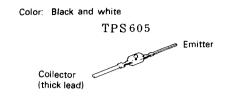


Fig. 3 Phototransistor

If the lens surface is flawed or stained, apparent emitting efficiency may decrease and directivity may vary. As a result, lead-in, arm rest position or lead-out detection timing may differ or they may not be detected at all.

2. Arm rest-position detection (Refer to Schematic Diagram 3.)

LED D6 in the search arm is always lit. When the tonearm is on the arm rest, the phototransistor Q1 (© of Fig. 1) detects light emitted by D6, so its emitter is at "H" level. The Q1 output signal is used to carry out the automatic playing (explained later) and to stop the tonearm drive motor and turn the plunger OFF when the tonearm returns to the arm rest after play has been completed. (Refer to "Tonearm operation".)

Record size detection (1) (Refer to Schematic Diagrams 1 and 4.)

Phototransistors Q1 \sim Q3 on the PC board X25-1520-00 detect the research light through a prism, which is installed in the turntable platter, when the turntable platter is rotating without a record disk. Light is detected only when the prism passes through the research light, therefore these phototransistors alternate their ON and OFF states. The emitter waveform is shown in Schematic Diagram 4.

① Operation at the time the tonearm is on the arm rest (refer to Schematic Diagram 1)

IC1-3 is "H" and the inverter output IC7-2 is "L" as shown in Paragraph 2 above. Then, "L" level is applied to IC6-12. As one of the AND inputs is "L", IC6-11 is "L" and Q4 is OFF. As the reset input (R) of RS•FF (IC3) is "H" (because the DD motor is not rotating), Q is "L". Both Q5 and Q6 are OFF because they are driven by the AND gate output. Therefore, record size detection is not performed.

② Operation when PLAY switch is turned ON with a 30 cm record on the turntable platter

When a 30 cm record is on the turntable platter, the phototransistors can not detect the research light, thus Q1 through Q3 are all OFF. Therefore, the set input (S) is "L". The reset input (R) is "H" since the DD motor is OFF. As a result, all RS•FFs shown in Schematic Diagram 4 are in the reset condition, that is, Q is "L" and $\overline{\mathbb{Q}}$ is "H".

When the PLAY switch is turned ON, the DD motor starts stable rotation, then the reset inputs are turned to "L". However, no "H" signal is applied to the set inputs, so RS•FFs are kept in the reset condition.

IC6-13 is "H", and IC6-12 is "H" unless the tonearm is on the arm rest, so IC6-11 is "H" and Q4 is ON. Thus, the record size indicating LED "30D" is lit. At this time, since IC13-3 is "H", Q7 is ON and the 30 cm size LED D1 (in B of Fig. 1) is lit.

Its light is detected by phototransistor Q3 in the search arm.

③ Operation when PLAY switch is turned ON with a 25 cm record on the turntable platter

The middle and inside phototransistors cannot detect the research light, thus Q2 and Q3 are OFF. The set inputs of the lower two flip-flops shown in Schematic Diagram 4 are "L". In these flip-flops, Q is "L" and $\overline{\rm Q}$ is "H" after the PLAY switch has been turned ON. Therefore, IC6-10 is "L" and Q6 is OFF.

The signal shown in the diagram appears at the emitter of Q1. When this signal is applied to the set input of the flip-flop at the top, Q becomes "H" and \overline{Q} becomes "L" and this condition is maintained. As a result, IC6-3 becomes "H" and Q5 is turned ON, then D2 and 25D are lit. Since IC6-11 is "L". Q4 is OFF

Operation when PLAY switch is turned ON with a 17 cm record on the turntable platter

Only the inside phototransistor cannot detect the light and Q3 is OFF. Therefore, the set input of the flip-flop at the bottom is "L" In this flip-flop, Q is "L" and $\overline{\mathbb{Q}}$ is "H" when the PLAY switch is ON. In the upper two flip-flops, Q is "H" and $\overline{\mathbb{Q}}$ is "L". As a result, among the AND gates, only IC6-10 is "H". Therefore, Q4 and Q5 are OFF and Q6 is ON. D3 and 17D are lit.

The lead-out position for 17 cm records is different from that for 30 cm and 25 cm records, so another return detection LED is provided. This is D5 which is lit in this case.

4. Record size detection (2) (Refer to Schematic Diagram 3.)

Light emitted from the light detection LEDs is detected by the phototransistor Q3 built into the search arm to control the motion of the tonearm. When Q3 detects light, its emitter becomes "H" (The tonearm at this time is in the lead-in position.). The OR gate output IC4-4 becomes "H". This output is differentiated with C10 and R35 so that a positive pulse is obtained. This positive pulse is applied to IC14-1 to stop the tonearm drive motor and turn the plunger OFF (Refer to IV "Tonearm motion".)

5. Return detection (Refer to Schematic Diagram 3.)

Return detection is performed by LED D4 (for 25/30 cm records), LED D5 (for 17 cm records) and phototransistor Q2. D4 is always lit and D5 is lit only when a 17 cm record is being played. (Refer to "Record size detection (1), Paragraph 4".)

① 25/30 cm record

When the search arm reaches the return detection position, Q2 is shielded from the light of D4 and so IC1-4 becomes "L". Then, IC7-4 becomes "H" As a result, a positive pulse is generated by C9 and R34. This pulse is applied to IC4-2 to invert the plunger flip-flop (refer to Schematic Diagram 6) and is also applied to IC15-4 to reset the D•FF. (Refer to "Motor ON delay circuit, Paragraph C)" and "Rotational direction determination circuit, Paragraph C)".) When the REPEAT switch is OFF, IC9-13 is "H" As IC9-12 is set to "H" by the return detection signal, IC9-11 becomes "H" This signal resets the PLAY•FF, thus IC10-10 is "H" and IC14-6 is "L" (Refer to "Auto Play") Therefore, IC13-1 becomes "L" and Q7 is turned OFF, so that LED goes off. (IC13-2 is also "L".)

2 17 cm record _

D5 is used instead of D4. Other operations are the same as in Paragraph ① above.

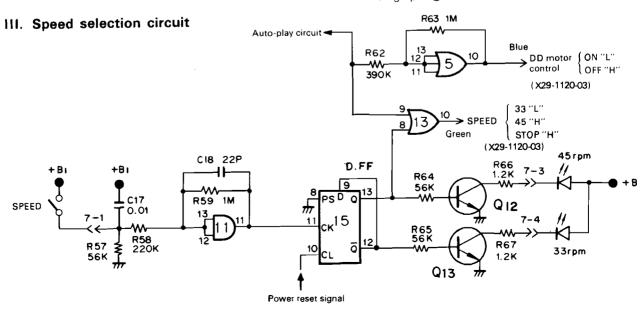


Fig. 1 Speed selection circuit

The power reset signal is applied to CL of the D•FF immediately after power is turned ON, and Q becomes "L" and \overline{Q} becomes "H" Q13 is turned ON and the 33 rpm indicator LED is lit. Q is connected to the DD motor speed selecting OR gates, IC13-8 \sim 10, so IC13-8 is "L". As explained in "Automatic play", first IC8-11 (IC13-9) is "H" When the PLAY switch is pressed in this condition,IC13-10 becomes "L" This output signal is sent to the motor control circuit (X29-1120-03) to set the motor speed to 33 rpm. At the same time, the Schmitt trigger output IC5-10 becomes

"L" and the DD motor starts. CL of the D•FF becomes "L" soon so that D•FF is able to read the CK input. When D is "H" ($\overline{\Omega}$ is "H", i.e. 33 rpm condition is set) and a clock is input to CK, Q becomes "H" and $\overline{\Omega}$ becomes "L" (Refer to "D•FF".) As a result, Q13 is turned OFF while Q12 is turned ON so that the 45 rpm LED is lit. At this time, D drops to "L" and D•FF (T•FF) will be inverted by the next clock pulse. Further, since IC13-8 becomes "H", IC13-10 becomes "H" to set the motor speed to 45 rpm.

IV. Tonearm Motion

"H" at FAST in free selection

1. Tonearm drive motor drive circuit

The tonearm is moved by means of the tonearm drive motor and gears. The motor drive circuit is shown in Fig. 1

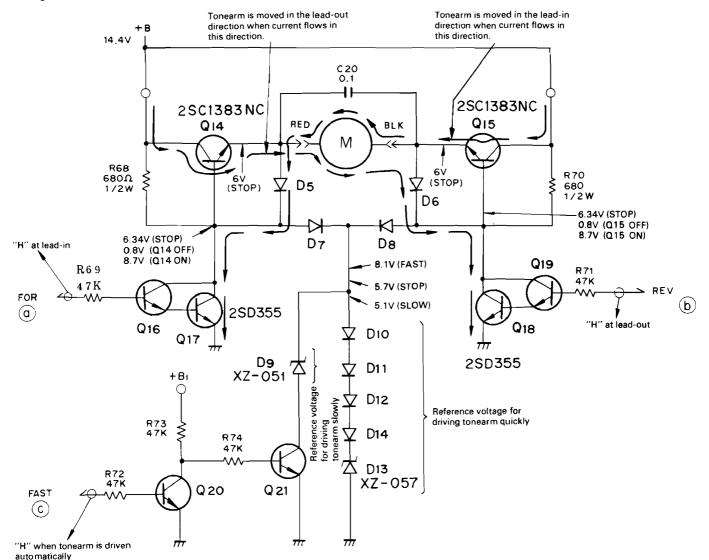


Fig. 1 Tonearm drive motor drive circuit



This motor drive circuit switches two constant current circuits (one consisting of Q14 and a Zener diode and the other consisting of Q15 and a Zener diode) so that the motor is supplied with current in either direction and can rotate in either direction. D10 through D14 compensate the temperature characteristics of the input with their negative temperature characteristics. D7 and D8 form an OR circuit.

The signals shown in Table 1 are given from the rotational direction determination circuit to the inputs (a), (b) and (c).

STOP	a: Lb: L	
Lead-in	(a): Н(b): L	
Lead-out	(a): L(b): Н	
During Tonearm movement in auto-play FAST motion or in free selection		©: Н
▶ or ◀ in free selection		©: L

Table 1

a STOP

Since both (a) and (b) are "L", Q16 through Q19 are OFF Q14 and Q15 operate in the active region and the potential with respect to GND at both terminals of the motor becomes the same. Thus, the motor does not rotate. At this time, the circuit impedance viewed from the motor is low and so the motor, if it has been rotating, stops rapidly.

b Lead-in

Since (a) is "H" and (b) is "L", Q16 and Q17 are ON and Q18 and Q19 are OFF Q14 is OFF and Q15 operates in the active region. Therefore, the motor drive current flows through Q15 (emitter) \rightarrow motor \rightarrow D5 \rightarrow Q17 (emitter).

c Lead-out

Since ⓐ is "L" and ⓑ is "H", Q16 and Q17 are OFF and Q18 and Q19 are ON. Q15 is OFF and Q14 operates in the active region. Therefore, the motor drive current flows through Q14 (emitter) \rightarrow motor \rightarrow D6 \rightarrow Q18 (emitter).

d Switching tonearm drive speed

When the tonearm is driven in automatic play operation or FAST is selected in free selection, Q20 is ON and Q21 is OFF. Therefore, the Zener voltage of the constant current circuit becomes about 8.7V (= voltage across D13 (XZ-057 5.7V) + voltage across D8, D10 through D12, D14 (0.6V \times 5 = 3V)). When \blacktriangleright or \blacktriangleleft is selected in free selection, Q21 is ON. Therefore, the voltage across D9 (XZ-051 5.1V) becomes effective. In the latter case, the voltage supplied to the motor is low, so the motor rotates more slowly.

2. Tonearm drive motor control circuit

① Initialization of PLUNGER (Solenoid) Flip-flop (Refer to Schematic Diagram 1.)

The power reset signal is applied to IC14-2 immediately after power is turned ON and IC14-9 becomes "L" As IC4-1 and -2 are "L", IC4-3 is "L" Both IC10-5 and -6 become "L", so that IC10-4, i.e. IC14-8, becomes "H" Therefore, after the

power reset signal has disappeared, Pin 4 of the PLUNGER*FF is kept at "H" and Pin 9 at "L" IC4-1 is also kept at "L"

Initialization of the PLUNGER•FF is now complete.

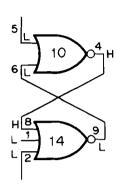


Fig. 2 Initialization of PLUNGER-FF

② Motor ON delay circuit (Refer to Circuit Diagram 6.)

This circuit turns the drive motor ON after the tonearm has been fully lifted up by the plunger. The circuit consists of a one-shot multivibrator. It is initialized as shown in Schematic Diagram 6. This circuit operates when a) PLAY switch is turned ON, b) at the time of return detection or c) when the CUT switch is turned ON. (Refer to "Free selection".)

Note:

PLUNGER•FF means the flip-flop controlling the up/down of the tonearm.

a) PLAY switch is turned ON

A positive pulse is applied to IC4-1 when the PLAY switch is turned ON, and the PLUNGER•FF inverts its state

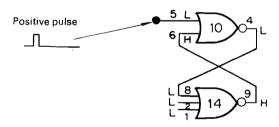


Fig. 3 State of FF after PLAY switch ON

Since IC14-9 becomes "H", IC14-10 drops to "L" so that a negative pulse is applied to IC10-13 IC10-11 becomes "H" for an instant, but it returns to "L" after C13 is fully charged. This period during which IC10-11 is "H" is the delay time. See the following timing diagram



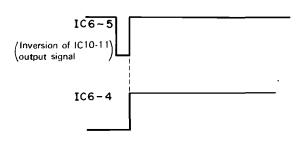


Fig. 4 Timing diagram

When IC6-4 is "H", the drive motor rotates and the tonearm is moved. When the tonearm reaches the lead-in position, the plunger FF is inverted by the size detection signal. Therefore, IC10-4 is "H" and IC14-9 is "L". At this time, the AND gate output, IC6-4, immediately drops to "L" and the drive motor is turned OFF

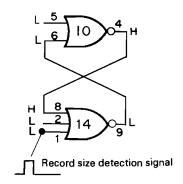


Fig. 5 State of FF after lead-in

b) Return detection

When the tonearm reaches the return detection position, the PLUNGER•FF is again inverted with the return detection signal. IC10-4 becomes "L" and IC14-9 becomes "H" Operation after this is the same as in Paragraph a) above.

c) CUT switch is turned ON

Operation is the same as in Paragraph b).

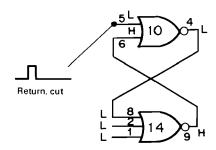


Fig. 6 State of FF after return detection or CUT

3 Rotational direction determination circuit (Refer to Schematic Diagram 6.)

This circuit determines the motion of the drive motor, that is whether it is rotating clockwise or counterclockwise or if it stopped. The signals from this circuit are sent to the tonearm drive motor drive circuit.

a) Drive motor rotation signal (Forward)

A positive trigger signal is applied to IC15-1 \sim 6, PS of the D•FF, when the PLAY switch is turned ON, so that Q becomes "H" and $\overline{\rm Q}$ becomes "L". IC9-8 becomes "H". IC9-10 becomes "H" when the motor ON delay signal is applied to IC9-9. Then, IC1-10 becomes "H" and the motor rotates so that the tonearm moves forward.

b) Drive motor stop signal after lead-in

IC6-4 becomes "L" and IC9-9 becomes "L", then IC1-10 becomes "L" Therefore, the motor stops. IC9-4 is also "L"

c) Drive motor rotation signal (Reverse)

When the return detection signal is applied to CL of the D•FF, Q becomes "L" and \overline{Q} becomes "H" This signal also inverts the PLUNGER•FF, so IC9-1 is set to "H" through the motor ON delay circuit. IC9-3 becomes "H" and IC9-5 also "H" As IC9-6 is "H" unless the tonearm is on the arm rest, IC9-4 is "H". This "H" signal turns the motor so that the tonearm moves in reverse.

d) Motor stop signal generated after the tonearm returns to the arm rest.

When the tonearm reaches the position over the arm rest, IC9-6 becomes "L" and the motor stops.

4 Free selection (Refer to Schematic Diagram 5.)

a) Operation when ◀ switch is turned ON

When ◀ switch is turned ON, a positive pulse is applied to PS of the T•FF, IC12-8, via IC13-11, so Q (IC12-13) is set to "H" This "H" signal is applied to IC5-5 to lift the tonearm. This signal is also applied to the motor ON delay circuit so that IC7-15 is set to "L" for an instant and then set to "H" Since IC8-6 is kept at "H" while the switch is kept pressed, IC8-4 is "H". Therefore, the drive motor rotation signal (forward) is sent to the tonearm drive motor drive circuit.

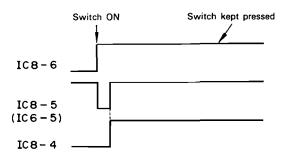


Fig. 7 Timing diagram

b) Operation when ▶ switch is turned ON

Operation is similar to that explained in Paragraph a) above. The difference is as follows: IC8-3 becomes "H" instead of IC8-4, so the drive motor rotation signal (reverse) is sent to the motor drive circuit via an AND gate (IC9-4, 5, 6).

Tonearm fast drive signal (Refer to Schematic Diagram 1)

a) AUTO PLAY

Both IC13-12 and -13 are "L", so IC8-9 is "H" When the PLAY switch is turned ON, IC8-8 becomes "H" Therefore, IC8-10 becomes "H" and IC13-4 becomes "H"

b) When ◀ or ▶ switch is turned ON

Either IC13-12 or IC13-13 is "H", so IC8-10 becomes "L" and IC13-4 becomes "L"

c) When FAST switch is turned ON

Since IC13-5 is turned to "H", IC13-4 becomes "H"

3. Up and down motion of tonearm (Refer to Schematic Diagram 1.)

1 AUTO PLAY

When the PLAY switch is turned ON, Pin 9 of the PLUNGER flip-flop is set to "H" to turn Q10 and Q11 ON via an OR gate (IC5-3 \sim 6). Therefore, the plunger is turned ON to lift the tonearm.

At the lead-in position, the PLUNGER flip-flop is inverted, so that the tonearm is lowered. However, since IC5-4 is delayed for the time determined by C12 and R46 in dropping to "L", the tonearm is delayed for a moment before it is lowered

At the lead-out position, the PLUNGER flip-flop is inverted again. Therefore, the tonearm is lifted. When the tonearm returns to the arm rest, the PLUNGER flip-flop is inverted and the tonearm is lowered. The operation controlled by the return detection signal when the CUT switch is ON is the same as that of when the PLAY switch is ON.

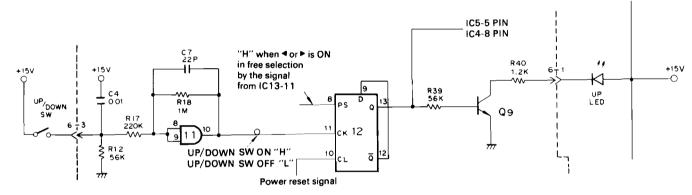


Fig. 8 Tonearm up/down control circuit

2 When UP/DOWN switch is turned ON

T•FF (IC12-8 \sim 13) has been initialized by the power reset signal. Therefore, Q is "L" and \overline{Q} is "H", and IC5-5 is "L".

When the UP/DOWN switch is pressed once, a positive pulse is applied to CK of the T+FF through the Schmitt trigger (IC11-3 \sim 10) which is provided to prevent erroneous operation. Therefore, IC5-5 is turned to "H" and the tonearm is lifted. This condition is maintained till power is turned OFF

When the UP/DOWN switch is pressed again, T•FF is inverted and the tonearm is lowered.

While the tonearm is kept in the lifted position, Q9 is ON and so UP LED is lit.

③ When ◀ or ▶ switch is turned ON

When either switch is pressed once, a pulse is applied to PS of T•FF, i.e. IC12-8, so that Q becomes "H" and \overline{Q} becomes "L" Operation after this is the same as in Paragraph 2 above.

V. AUTO PLAY operation (Refer to Schematic Diagram 3)

Process of automatic play of a 30 cm record is explained here. The tonearm must be on the arm rest before turning the PLAY switch ON. At this time, IC8-13 is "H".

1. Initialization of PLAY•FF

Pin 8 of IC2 (NOR gate) is connected to + B through R4, that is, its level is "H". IC2-9 is "L" as will be explained later Therefore, IC11-6 (IC2-10) is "L", and IC11-4 is "L". Thus, the set input of PLAY•FF, IC10-8, is "L". The power reset signal is applied to IC14-4 via IC5-1 immediately after power is turned ON. Therefore, IC14-4 becomes "H" for an instant, and IC14-6 becomes "L". This "L" level is applied to the upper NOR gate (IC10-8 \sim 10) and IC10-10 becomes "H". Since this "H" level is applied to IC14-5, IC14-6 is kept at "L" after the power reset signal has disappeared. Thus, PLAY•FF is initialized. Since IC8-12 is "H", IC8-11 is "H" Therefore, IC5-10 is "H" and the DD motor does not rotate. IC2-9 is set to "L" through the inverter (IC7-6, 7).

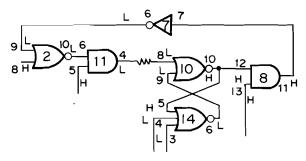


Fig. 1 Initialization of PLAY•FF

2. When PLAY switch is turned ON

IC2-8 becomes "L" Since IC2-9 is "L", IC2-10 becomes "H" Since IC11-5 is "H", IC11-4 becomes "H" and IC10-8 becomes "H". Thus, PLAY•FF is inverted. Since IC10-10 becomes "L", IC8-11 becomes "L" and the turntable platter motor ON/OFF signal becomes "L" Thus, the motor rotates. Since IC13-10 also becomes "L", the motor speed is set to 33 rpm. (Refer to "Speed selection circuit".) The "H" level signal from IC14-6 is sent to the tonearm drive circuit, and the tonearm starts moving. (Refer to "Tonearm motion".) Further, Q7 is turned ON so that the LEDs relating to a 30 cm record are able to light.

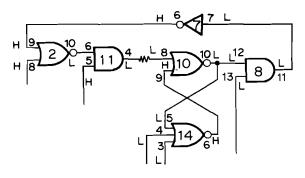


Fig. 2

3. Lead-in

When the tonearm reaches the lead-in position, IC4-4 is set to "H" by the record size detection signal. A positive pulse is applied to the PLUNGER•FF (IC14-1) by means of C10 and R35. As explained in "Tonearm motion", the tonearm stops transverse motion and is lowered to the record surface.

4. Lead-out

When the tonearm reaches the lead-out position, IC7-4 is set to "H" by the return detection signal. A positive pulse is applied to IC4-2 and IC15-4 by means of C9 and R34. Then, the tonearm is lifted and moved toward the arm rest.

5. Return to arm rest

When the tonearm reaches the position over the arm rest, IC1-3 is set to "H" by the arm rest-position detection signal. This "H" level signal is sent to the tonearm drive circuit via IC7-2, 3 so that the drive motor stops. It is also sent to the

LED drive circuit to turn LEDs OFF A positive pulse is generated with C5 and R20 and it is applied to PLAY•FF to invert its state. Thus, IC10-10 (IC8-12) becomes "H" Since IC8-13 has become "H", IC8-11 becomes "H" so that the DD motor is stopped. Further, IC4-4 becomes "H" and a positive pulse is given to IC14-1 by means of C10 and R35, then the PLUNGER•FF is inverted and the tonearm is lowered.

VI. AUTO CUT operation

Operations when the CUT switch is turned ON during the playing of a record is explained here. Refer to the diagram showing the stable state of the PLAY•FF after the PLAY switch is turned ON. When the CUT switch is turned ON in this condition, IC2-13 is set to "L", so IC2-11 becomes "H" (IC2-12 is "L" because the tonearm is not on the arm rest.) This "H" level signal inverts the PLAY•FF, then IC10-10 becomes "H" and IC8-12 becomes "H" The pulse generated by C8 and R32 is applied to IC4-2 and IC15-4 so that the tonearm is lifted and moved toward the arm rest.

Operations after the tonearm returns to the arm rest are the same as explained in "AUTO PLAY". The only exception is that the PLAY*FF will not be inverted when the arm rest position is detected, because it has already been inverted.

VII. AUTO REPEAT

IC12 in the auto-repeat circuit is reset by the power reset signal (which is applied to Pin 4). Therefore, Q is "L" and \overline{Q} is "H" When the REPEAT switch is turned ON, a positive pulse is applied to CK of IC12, so IC12 is inverted. Since Q becomes "H", Q8 is turned ON and the REPEAT indicator is lit. At the same time, IC13-2 becomes "H" and Q7 remains conducting. While the tonearm is moving to the arm rest after return detection, the search arm detects the size of the record. As a result, the tonearm stops and drops at the lead-in position and play is restarted.

The auto-repeat condition is reset at the time when power is turned ON, the CUT switch is turned ON or the tonearm is returned to the arm rest by hand.

VIII. C-MOS Schmitt trigger

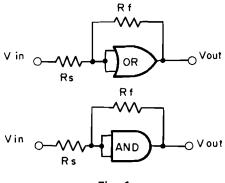


Fig. 1

KD-850

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

A Schmitt trigger can be formed by setting up a circuit using a C-MOS AND gate or OR gate as shown in Fig. 1. This circuit utilizes the threshold level (VTH) of the C-MOS circuit. In a C-MOS, the level UTL (Upper threshold level) at which the output changes from "L" to "H" and the level LTL (lower threshold level) at which the output changes from "H" to "L" have characteristics similar to hysteresis curves.

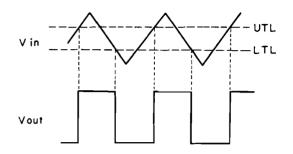
UTL and LTL are given as follows:

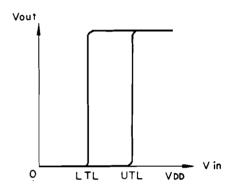
$$\begin{cases} \mbox{UTL} = & \frac{\mbox{Rs} + \mbox{Rf}}{\mbox{Rf}} + \mbox{VTH} \\ \\ \mbox{LTL} = & \frac{\mbox{Rs} + \mbox{Rf}}{\mbox{Rs}} \cdot (\mbox{VTH} - \frac{\mbox{Rs}}{\mbox{Rs} + \mbox{Rf}} \cdot \mbox{VDD}) \end{cases}$$

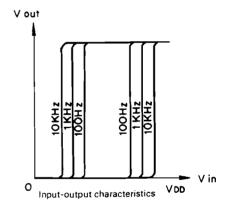
Then, noise margin VNIIs given as

$$V_{NI} = UTL - LTL = \frac{Rs}{Rf} \cdot V_{DD}$$

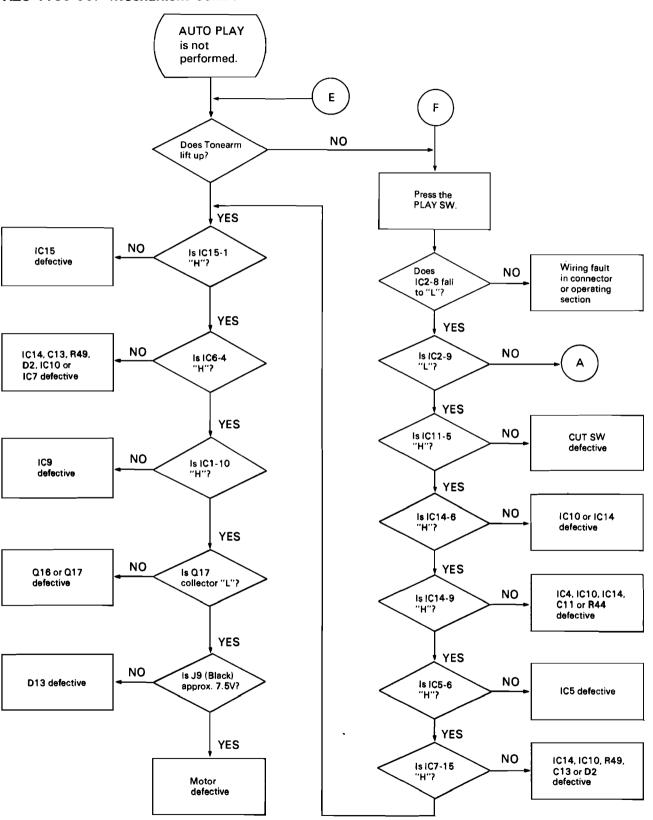
By connecting a small capacitor in series with Rf, frequency dependent hysteresis characteristics can be obtained.

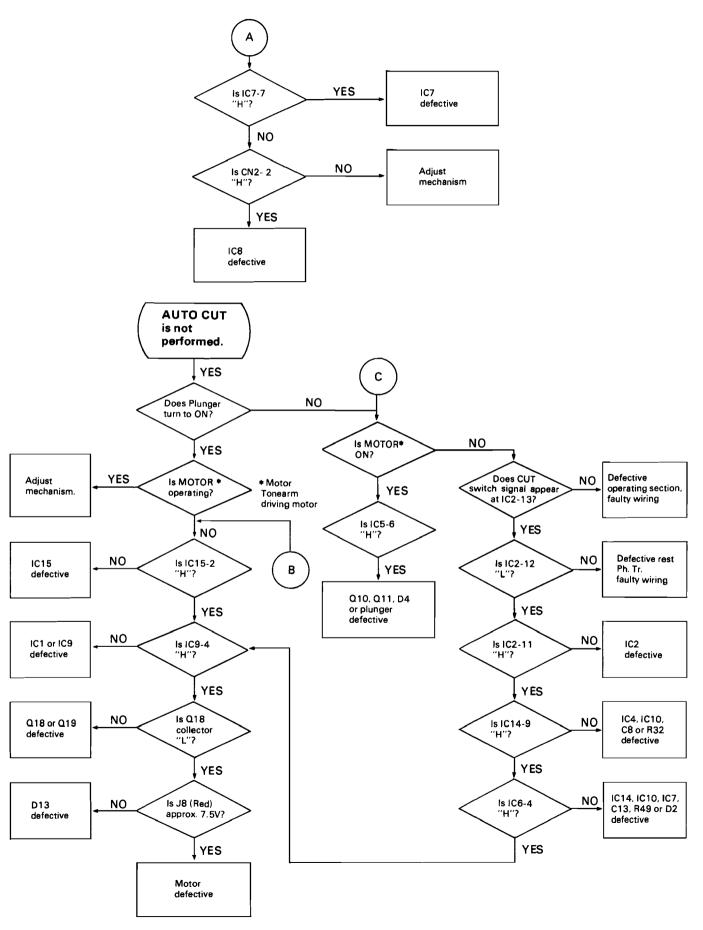


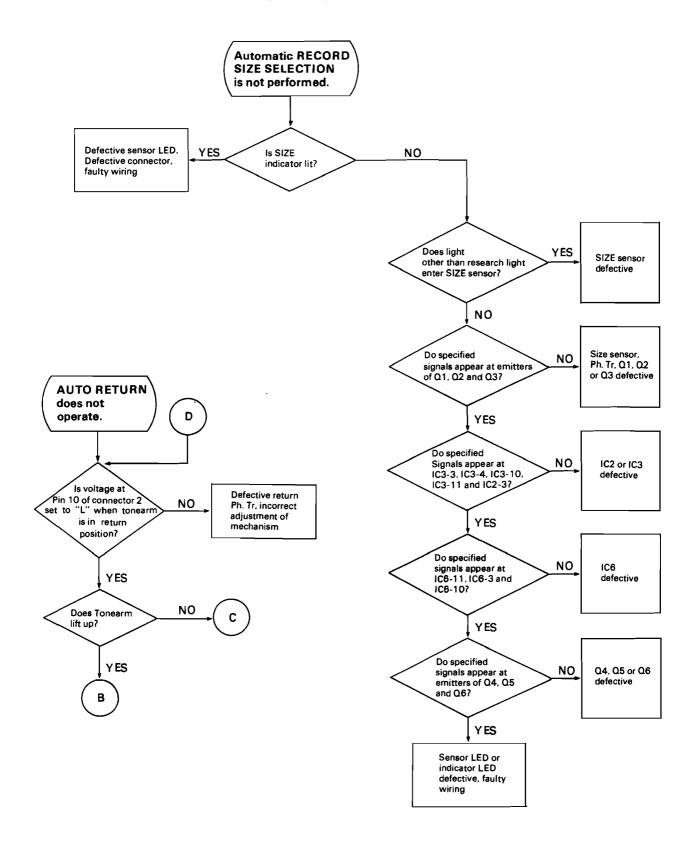


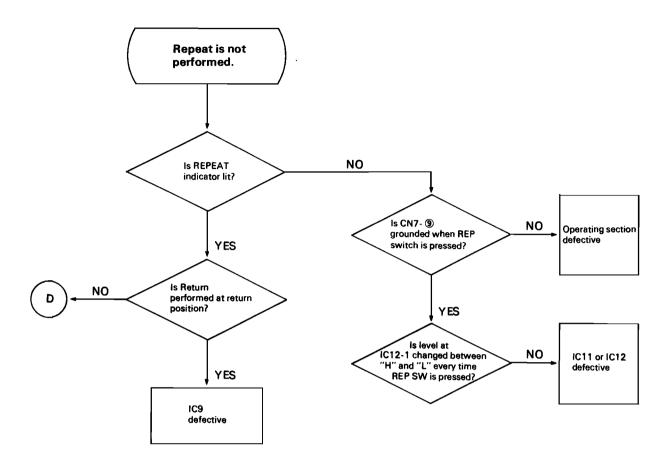


X29-1160-00: Mechanism control PCB

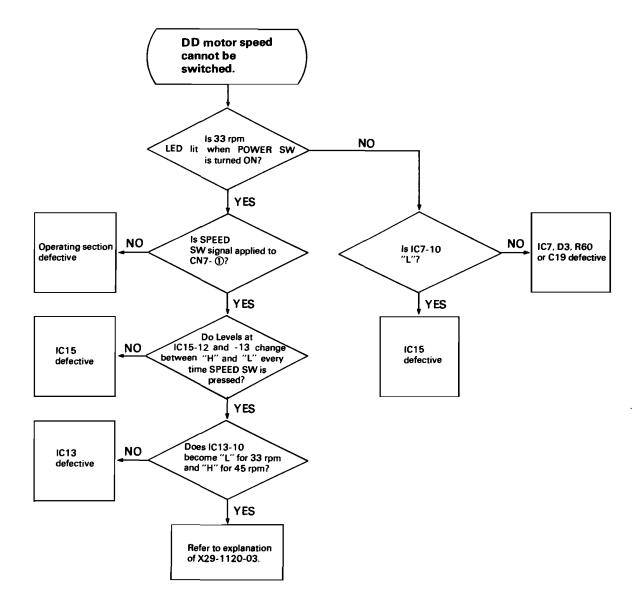


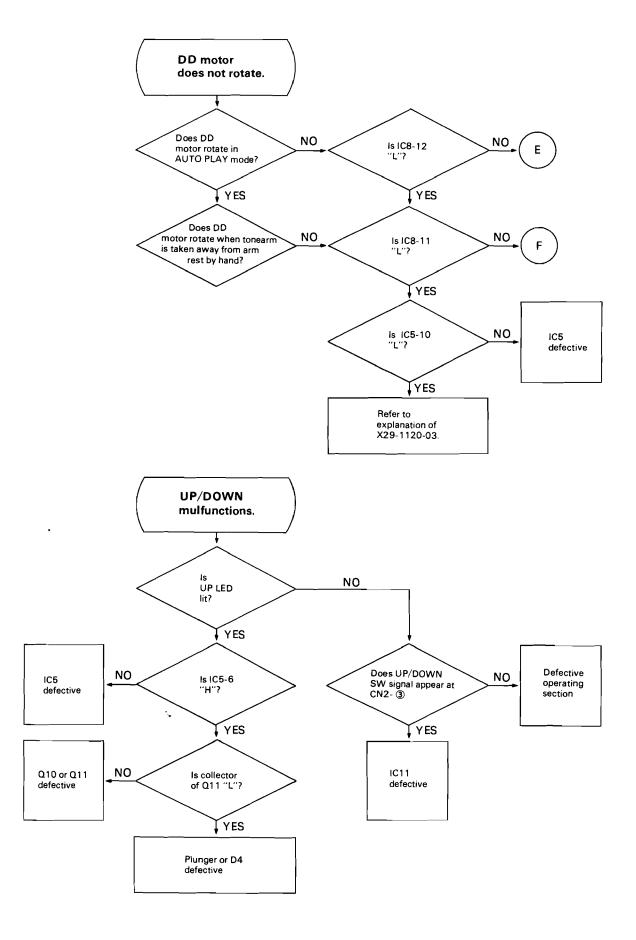




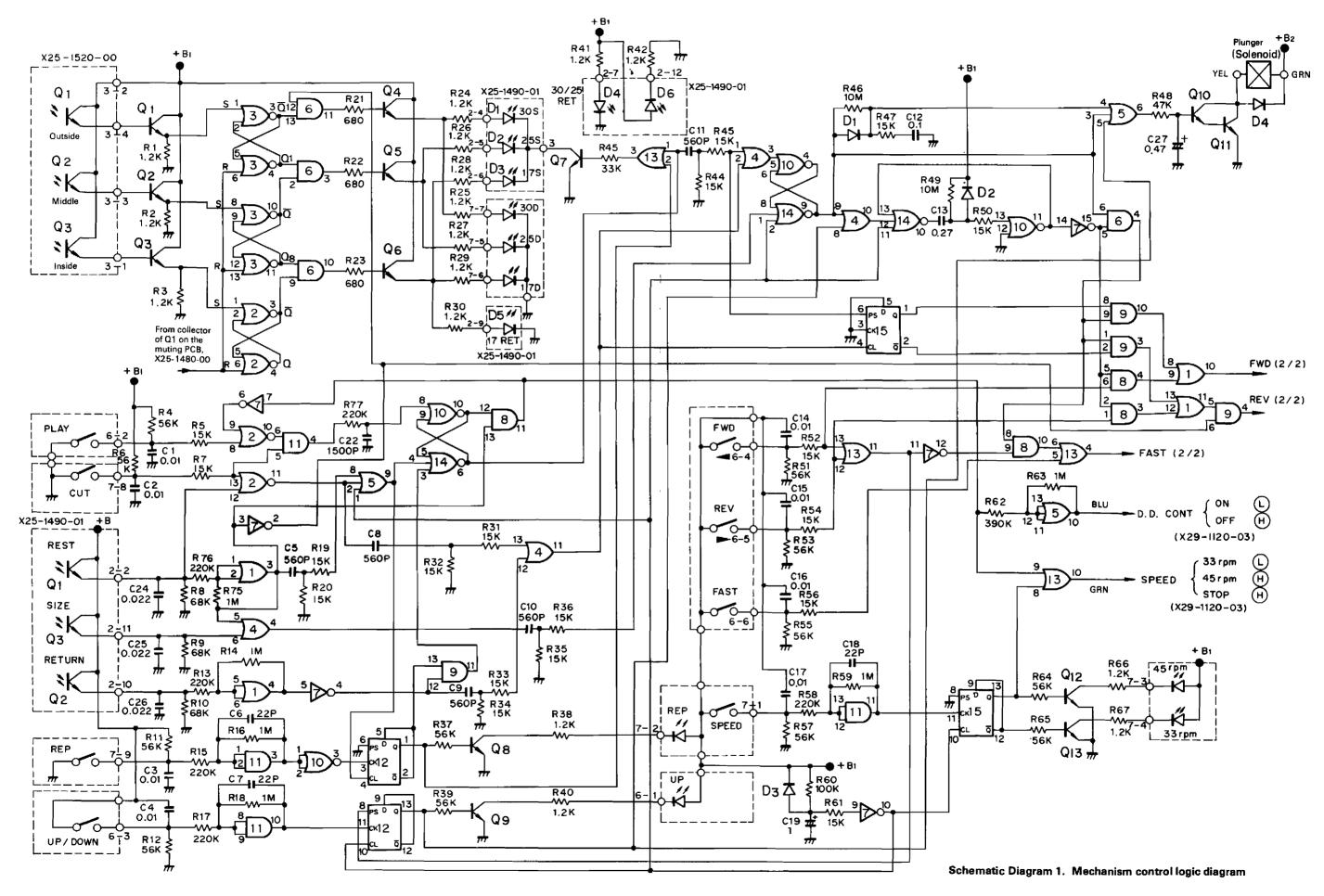


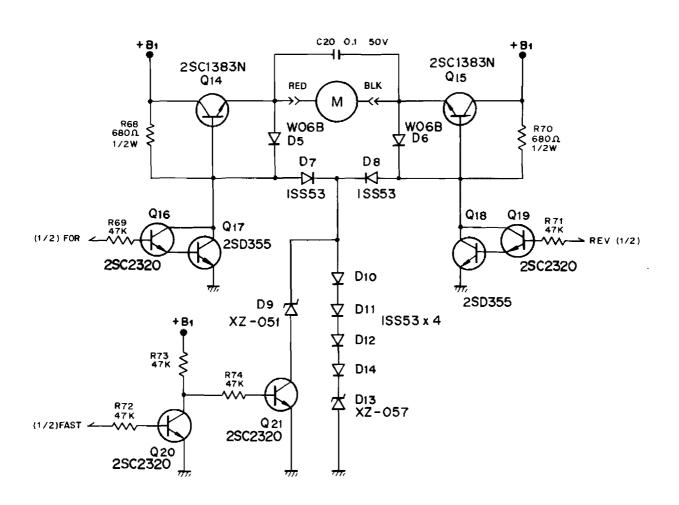
20



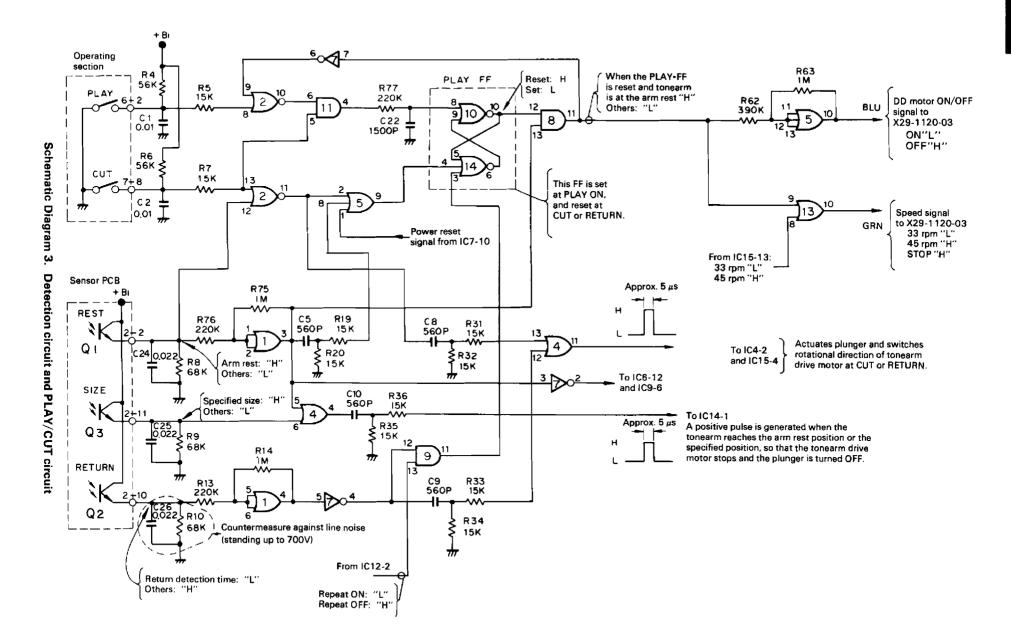


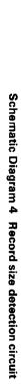
KD-850 KD-850

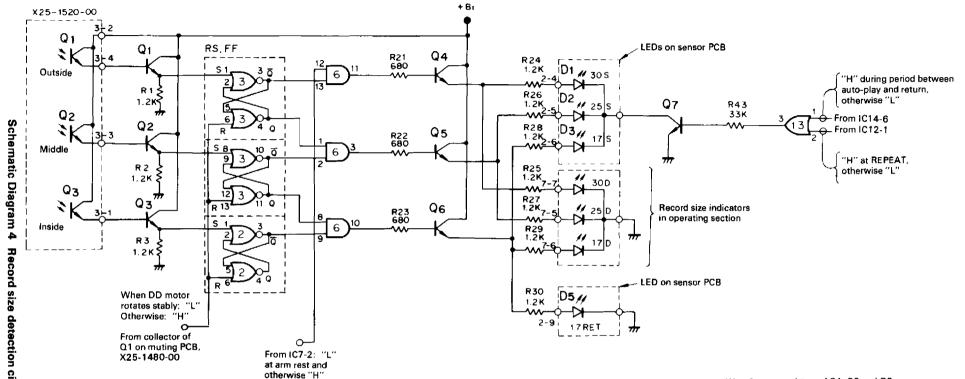




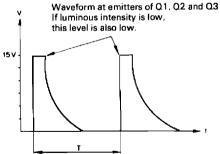
Schematic Diagram 2 Mechanism control circuit

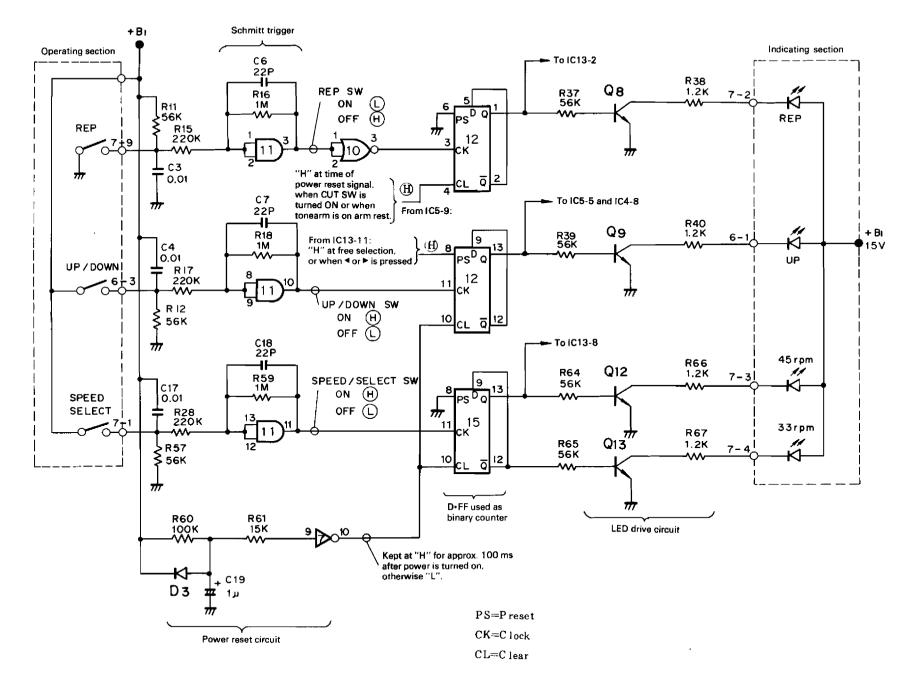


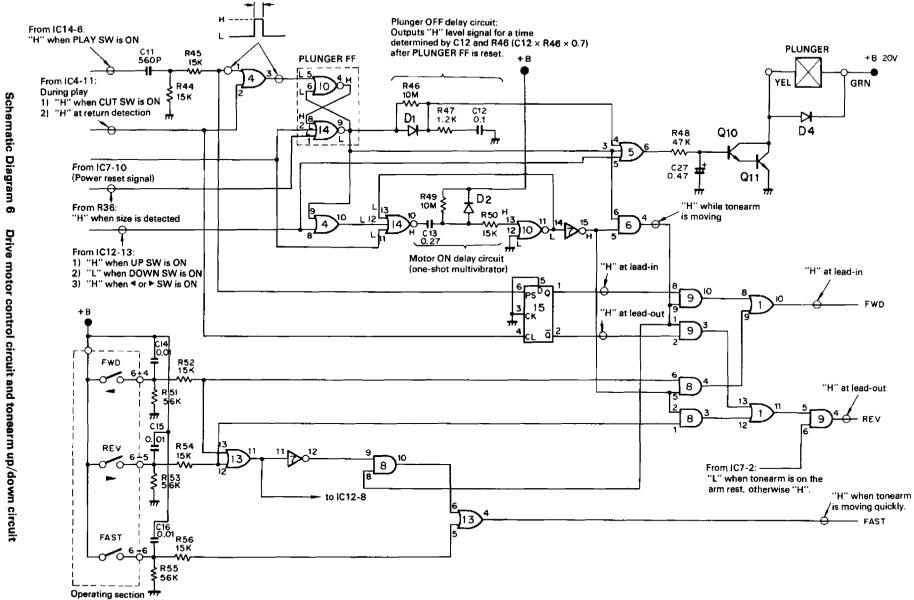




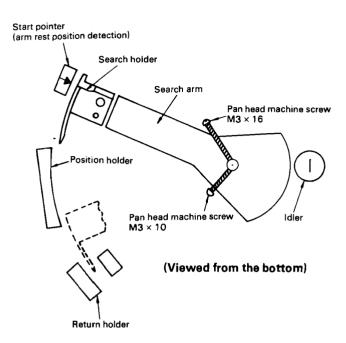
Record size	IC3 3 pin	IC3 4 pin	IC3 10 pin	IC3 11 pin	IC2 3 pin	IC6 11 pin	IC6 3 pin	IC6 10 pin
30 cm	H	Ĺ	Н	L	Н	Н	Ĺ	L
25 cm	L	Н	н	L	Н	Ĺ	н	L
17 cm	L	Н	L	Н	н	L	L	Н
None	L	Н	L	Н	L	Ł	Ł	L





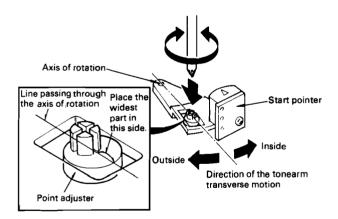


INSTALLATION OF AUTOMATIC MECHANISM ASS'Y



1. Installation of Start Pointer and Return Holder

Adjust the start pointer and return holder positions so that the cross on each point adjuster coincides with the line passing through the axis of rotation. (Adjustment of the start pointer is shown below.)

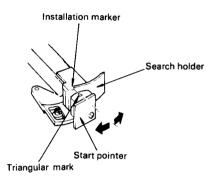


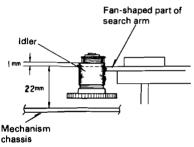
Notes: -

- The start pointer position affects detection of the arm rest position and determination of the auto-in and auto-return and determination of the auto-in and auto-return positions. If it is placed in a wrong position, the automatic mechanism may mulfunction, for example, the turntable platter may not stop even if the tonearm returns to the arm rest position. Adjust the start pointer accurately.
- Adjustment of the return holder point adjuster is explained in the Paragraph "Adjustment of Auto-return Position".

2. Installation of Search Arm

- 1 Adjust the tonearm height adjuster so that the tonearm is as low as possible.
- 2. Fix the tonearm on the arm rest.
- 3. Install the search arm so that its installation marker is aligned with the triangular mark of the start pointer and the relationship between the search arm and the idler becomes as shown below, then tighten the pan head machine screws, M3 × 16 andM3 × 10.

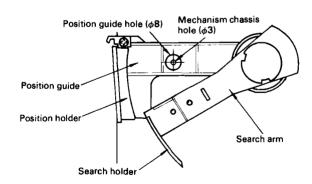




Cross section

3. Installation of Position Guide

Align the center of the hole of the position guide with the center of the hole of the mechanism chassis.



ADJUSTMENT (AUTOMATIC MECHANISM)

In adjustment of the automatic mechanism, Test Record 3 (P-3027) (parts No.: T99-0204-05) is used. Check the cartridge for the following before adjustment: 1) overhang, 2) whether the stylus is exactly aligned with the center line of the tone arm pipe. (2) is expecially important.) The arm lifter pin must have been adjusted.

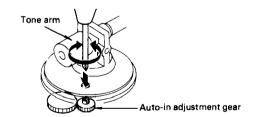
1. Specifications of Test Record

Play the test record at 45 rpm.

BAND (Side A)	Cont	Use						
	30 cm lead-i							
1	L-ch: voice (1-65)	R-ch: 1 kHz	Auto-in adjustment					
	25 cm lead-in test groove							
2	L-ch: voice (1-65)	R-ch: 1 kHz						
	17 cm lead-i	n test groove						
3	L-ch: voice (1-65)	R-ch: 1 kHz						
	30/17 cm lead-	Auto-return						
4	L-ch: voice (1-59)	R-ch: 315 kHz	adjustment					

2. Adjustment of Auto-in Position

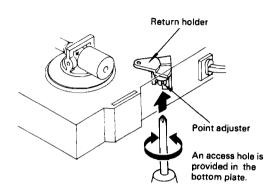
- 1. Place the test record on the turntable platter, set the speed to 45 rpm and press the PLAY button.
- 2. Adjust the auto-in adjustment gear so that the spoken count recorded in band 1 is between 20 and 27 when play starts.



tonearm moves towards the center, and vice versa.

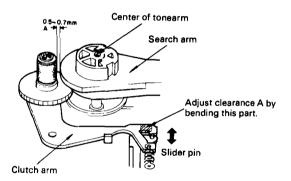
3. Adjustment of Auto-return Position

- 1 Play band 4 of side A of the test record.
- 2. Adjust the point adjuster of the return holder so that the spoken count is 13 when the tonearm automatically returns.

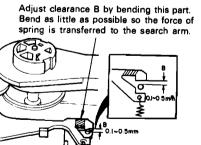


Adjustment of auto-return position

4. Clearance Adjustment of Idler and Clutch Arm



< Plunger: OFF>
(Solenoid)



< Plunger: ON > (Solenoid)

Note:

When the automatic mechanism is removed and then installed again in the turntable, the above clearances may vary. Install the automatic mechanism carefully.



ADJUSTMENT (X29-1120-03)

Adjustment (X29-1120-03)

Adjusting method is the same as that of KD-650.

Before adjustment:

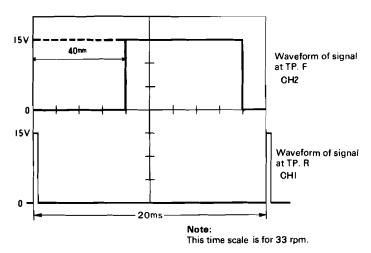
- An oscilloscope and a DC voltmeter are necessary. (A 2 CH oscilloscope will facilitate adjustment.)
- Place the turntable horizontally.
- Install the turntable platter and rubber sheet.
- First, carry out adjustment for 33 rpm and then for 45 rpm.
- Set the PC trimming potentiometers VR1 and VR2 (white) on the P.C. board to the center.
- After adjustment of phase difference, carry out adjustment of the lock indicator

Adjustment:

In the KD-850, both the phase difference (PLL) and the lock indicator lighting range, (including brake OFF timing), require adjustment.

1. Adjustment of phase difference (PLL) (Using a single channel oscilloscope)

- 1 Apply the reference signal (the output of the X'tal oscillator TP. R) to the oscilloncope and fully expand the waveform on the screen. (Fig. 1)
- Set the oscilloscope to the external synchronization mode, and apply the reference signal (TP, R) to the external sync terminal. (Now, the oscilloscope is triggered with the reference signal.) Then, apply the FG signal (rotation signal of the motor: TP, F) to the input of the oscilloscope. (Fig. 2)
- 3. Adjust VR3 (45 rpm) or VR4 (33 rpm) so that the waveform of the FG signal on the screen stops and the waveform shown below (waveform of signal at TP. F) is observed. (Fig. 3)

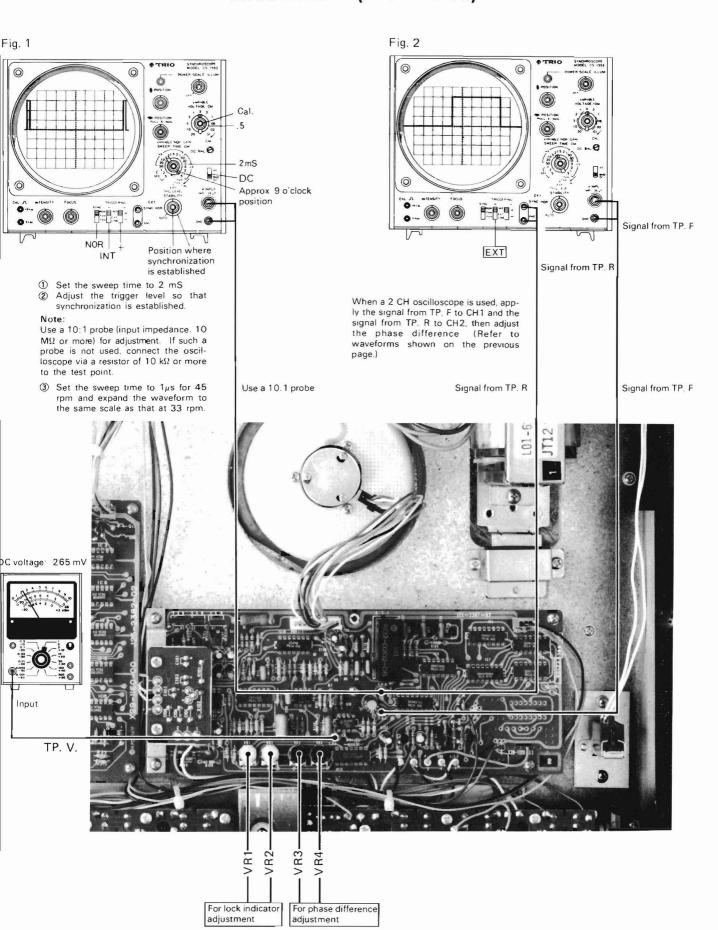


Waveforms observed on 2 CH oscilloscope

2. Adjustment of lock indicator lighting range and brake OFF timing

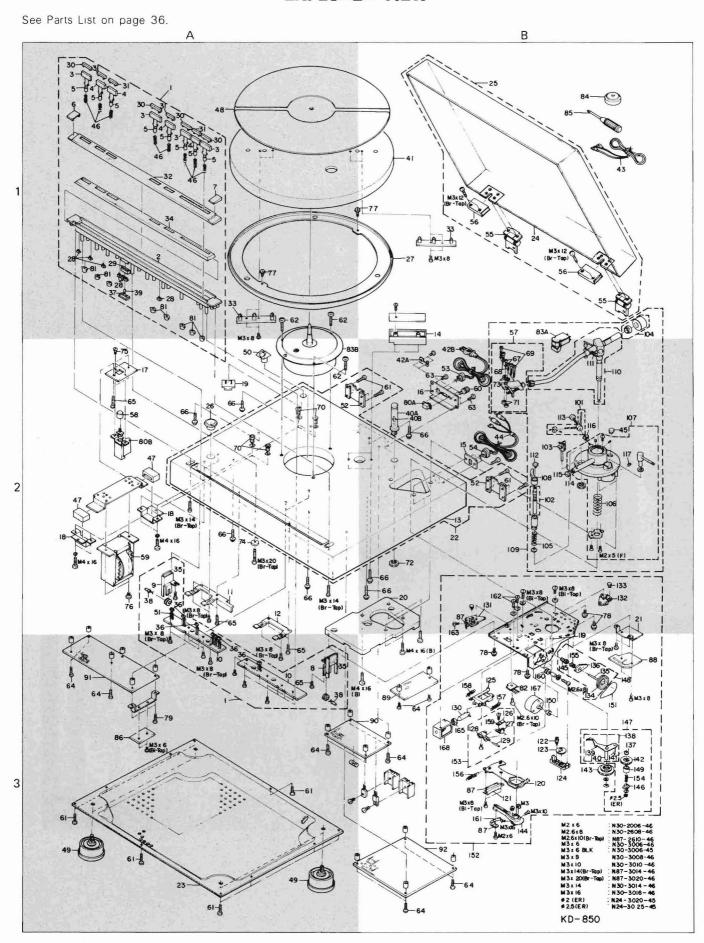
- 1 Connect the DC voltmeter (input imp.: 1 m Ω or more) to TP V
- Turn the power ON and set the speed to 45 rpm. After the speed has become stable, adjust VR1 so that the voltmeter reading is 265 mV
- 3. Perform the same adjustment for VR2 with the speed set to 33 rpm.

ADJUSTMENT (X29-1120-03)





EXPLODED VIEW

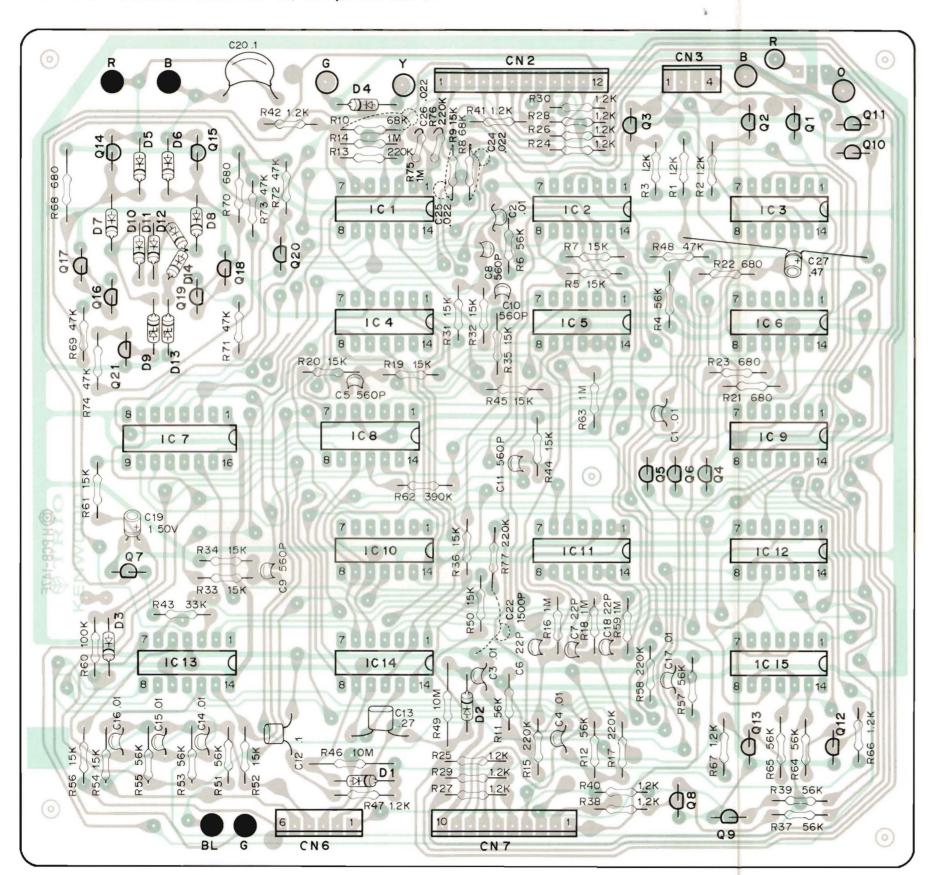


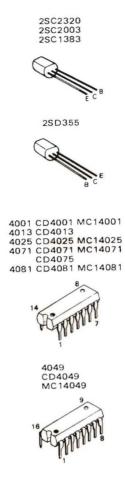
2SC945

KD-850 KD-850

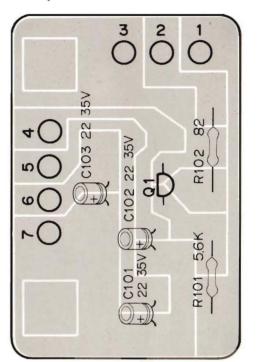
PC BOARD

MECHANISM CONTROL (X29-1160-00) Component side view

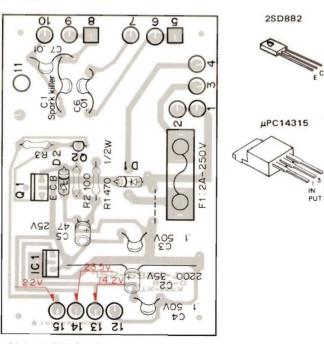




MUTING (X25-1480-00) Component side view



POWER SUPPLY (X27-1380-01) Component side view

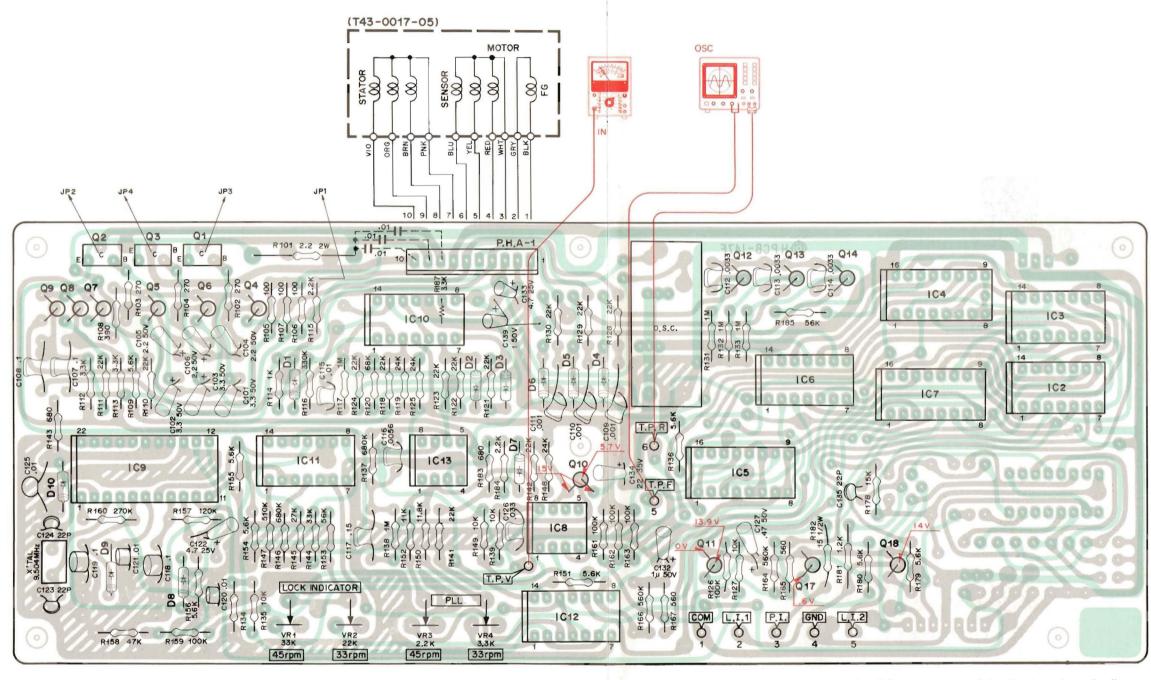


- C1 is provided for other than X27-1380-03.
- C6 is provided for X27-1380-05 only.
- C7 is provided for X27-1380-03 only.
- R3 is 2.2 Ω for X27-1380-01 and jumper wire for other than X27-1380-01
- Q2 is provided for X27-1380-01 only

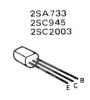
KD-850 KD-850

PC BOARD

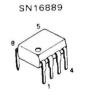
MOTOR CONTROL (X29-1120-03) Component side view



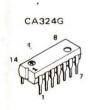
See DC voltages table left side the schematic diagram.

















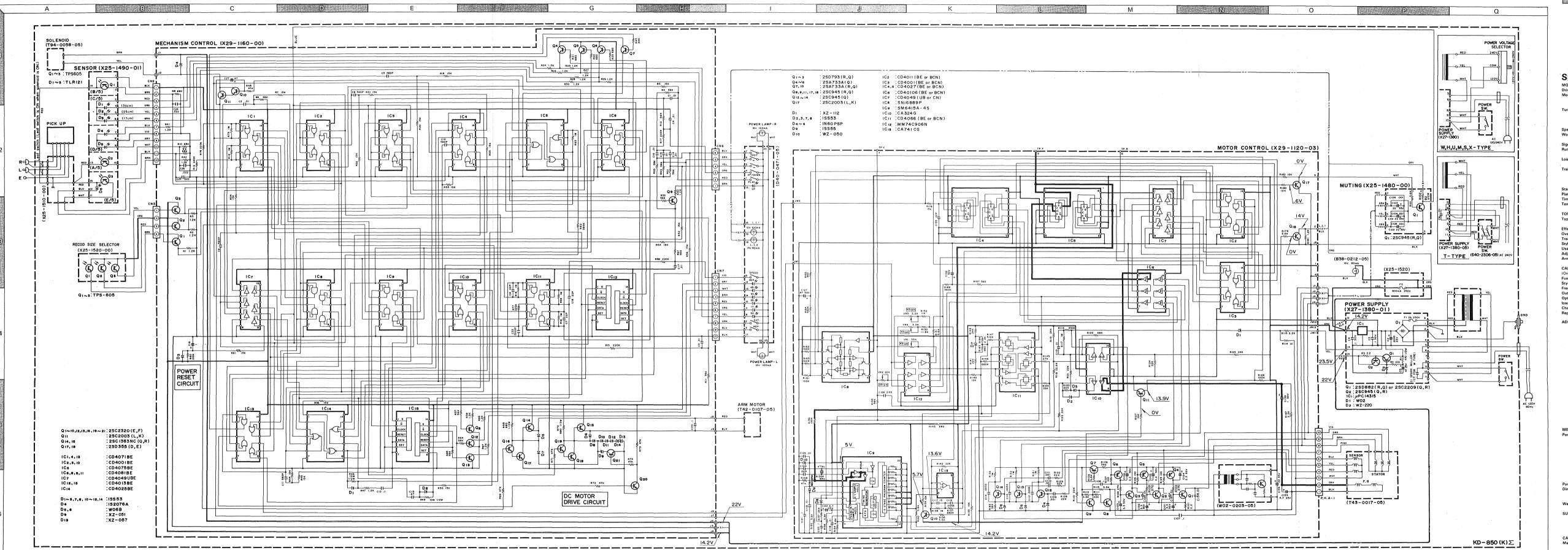
DC voltages of X29-1120-03 (Reference value)

			: \	/DD	or V	ss										/1	Llnit	: V)	2SC2320
	T	IC 2)	T	IC 3	3		IC 4		Γ	IC 5		l	IC 6		,,	IC 7		
Pin No.	STOR	33	45	STOP	33	45	STOP	33	45	STOP	33	45	STOP	33	45	STOP	33	45	2SD793
1	L	rpm H	rpm H	Н	rpm	rpm	L	rpm L	rpm	L	7.0	7.0	0	rpm 6.1	6.1	14.2	rpm	rpm	2SD882
2.	L	Н	Н	Н	5.8	5.1	Н	Н	Н	Н	7.0	7.0	14.2	7.5	7.4	14.2 H	Н	Н	E C B
3	Н	L	L	L	8.4	9.0	Н	L	L	Н	7.5	7.4	13.5	13.5	13.5	L	L	L	
4	Н	Н	Н	Н	0.2	0.2	Н	Н	Н	L	L	L	0	0	0	0.1	0.1	0.1	2SD355
	н	L	L	L	L	L	Н	Н	Н	Н	Н	Н	14.1	0	14.0	13.9	13.9	13.9	
6	L	13.3	13.3	├	Н	Н	Н	Н	Н	Н	Н	L	0	14.1	0	L	Н	H.	BCE
7	0 -	10.0	10.0	0 -	760074]] 0 -	4.7.		0 -	Avi		0 -	21024 2117-524		Н	L	L	SN16889
<u>-</u>	Н	н	Н	Н	5.8	5.1	0 -	11, 4 H 2000	122,500 122,500 122,500	0 -	1.5.7 54.7	313175 313175	L	*	*	- O -	200		5
9	L	Н	Н	Н	L	L	0 -	yunga Panya	1965	0-	PASTUR Zinnfyr	545 26 24 32 3	12.9	*	*	Н	;5.40,2 + L	L	
10	Н	L	L	L	8.2	8.7	L	*	*	14.2	26/41W 1785 H	215.039 1/15.03	14.2	*	*	L	Н	Н	
11	Н	Н	Н	L	L	L	Н	*	*	14.2	200 (20) 20 (20)		1.6	*	*	L	8.6	9.0	U ₁
12	L	L	L	Н	Н	Н	0 -	Parabyes		L	0.1	0.1	14.2	*	*	Н	5.5	5.2	μPC14315
13	L	L	L	L	L	L	L	*	*	L	7.0	7.0	1.5	*	*	L	L	L	
14	14.2	78,80%	. 22 year	14.2	* 8/8/5		L	Н	Н	Ĥ	5.6	5.1	14.2	gr in ".	dwate	L	L	L	OUT
15	14.2	190, 190	95840 A	17.2	1200	gradis.	Н	L	·L	L	8.6	9.0		PITER	F81 50	Н	Н	Н	1 3 GND IN (Case)
16		-		_		-	14.2	1.39		14.2	-41	J				L	L	L	PUT CA324G
		IC 8	<u></u>	-	IC I	L	11.2	IC 1	1	112	IC 1	 2		IC 1	3				8
Pin No.	0700	33	45	CTO	33	45	CTO	33	45	CTOR	33	45	STOP	33	45				14 7 11
		rpm	rpm	STOP	rpm	rpm	STOF	rpm	 	STOP	rpm	rpm		rpm	rpm 0				CHARANI,
1	0 -	0		0.8	4.0	4.0	0	5.0	0.8	4.9	L	4.9	0	0					, J. 100
3	0	0	14.2	9.2 6.9	6.9	6.9	0	1.4	0.8	H	5.2	14.0 L	5.7	5.2	4.9				CD4027 CD4049
	0	14.2	14.2	<u> </u>	0.9	0.9	5.4	1.4	4.6	L	3.2 H	L	0 -	5.2	4.9				9
5	0.3	0.2	0.2	6.8	6.8	6.8	0	1.4	0	0.6	L L	0.2	0	0	0				16
6	0.3	0.2	0.2	6.8	6.8	6.8	0	14.2	0	0.0 H	L	14.0	13.6	7.3	7.3				A TOPPONT
7	,	0.2	0.2	6.1	6.2	6.2	0-	14.2			ال	14.0	14.2	7.3 AVE	1.5				
8	0.6	0.2	0.2	0.1	6.0	6.0	5.7	1.0	4.9	0 - L	Н	Н	0	0	0				CA741CG
9	0.0	0.2	0.2	0	0.0	0.0	3.8	1.8	1.3	L	Н	Н	-	-	-				8 3
10			-	0 -	27.5	0	3.8	1.8	1.3	H	Н	H							THE
. 11					9.5927 1151-0	20.75 20.55	3.8	1.8	1.3	5.7	5.2	4.9							1 M 1 1 4
12				6.8	6.8	6.8	14.2	5.2	14.0	J. 1	J.2 H	4.3 L							°1 CD4001 CD4066
13				13.5	7.3	7.3	14.2	0	14.0	L	0.2	L L							CD4011 MM74C906N CD40106
14				0	0	0	14.2		14.0	14.2	0,2	100							8
						0	14.2	.14.19	3554	14.2	14.7	t /bee							14 0
													0V : 14.	.2V					A TAPANIA
IC 9	1	2	3	4	5	6	7	8	9	10	11		Imp	ossib)			1 4049
S-TOP	5	1.6	1.2	4.4	4.8	4.3	3.8	2.0	1.4	0	1.7		me	asure					CD4049 MC14049
33 rpm		1.6	1.2	2.2	1.4	2.6	1.8	2.7	1.9	2.2	1.3								9
45 rpm		1.6	1.2	2.3	1.0	2.0	1.3	2.0	1.4	1.6	0.8								16
IC 9	12	13	1.2	15	1.6	17	1.5	19	20	21	22								A Complete
	4.7	0	0	5	5	5	0	0	0	0	0		400		D40		мс	14001	
	0	0	0	9년(8년 왕] 3년			<u> </u>	1	~ · · · ·				401 402	5 (D40	25		14025	
	4.7	0	0			+			gri skil Billion				407 408		D40	81		14071 14081	
-2-1-111				7	:: ♥			∵ ∀ ∴	ं ♦.:	. 🔻						8_			///



FULL AUTOMATIC QUARTZ PLL DIRECT DRIVE TURNTABLE







SPECIFICATIONS

MOTOR & TURNTABLE Drive System

....20 pole, 30 slot brushless DC

aluminum alloy die-cast Weight: 2.6kg (5.7lbs.)

Moment of inertia: 550kg·cm²

... 2 speeds, 33-1/3 and 45rpm.

Speeds Wow & Flutter Less than 0.022% (WRMS) less than +0.030% (DIN) Signal to Noise Ratio More than 62dB ... DIN weighted better than -83dB

...0% (within 120g of tracking force)
Transient Load Fluctuation . . Less than 0.0003% (at 33-1/3

rpm., 400Hz,20g*cm load) Less than 0.00015%(at 33-1/3

... Static-balanced type. S-shaped

(Only military's model is equipped with the DM-11 cartridge.)

ADDITIONAL FEATURES: Full electronic controlled fullyautomatic tonearm system

(Automatic lead-in/return/cut/ Automatic disc size selector Free-selection tonearm operation

Illuminated quartz-look indicator LED speed indicators Electronic-controlled brake
Stylus height adjuster
Wedge-shaped chuck type arm

base Anti-skating device Low capacitance phono cables Stylus pressure direct readout

ounter Adjustable height insulators Acrylic dust cover (weight: 1.2 kg) Head-shell stand

MISCELLANEOUS Power Requirement ...

U.S.A. and Canada models AC 240V, 50Hz: U.K. model AC 120V/220V (switchable), 50Hz/60Hz: European and Military models

countries.

.W 491mm (19-5/16") H 176mm (6-15/16") D 404mm (15-7/8") 14.5kg (32.0lbs.)

SUPPLIED ACCESSORIES: 45 rpm. adaptor Overhang gauge Screw driver Ground wire

simulated wood grain veneer and an Anti-Resonance Compression Base (ARCB) are combined in the construction of the Cabinet.

PARTS LIST

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Ref. No.	Parts No.	Description	Re-	Ref. No.	Parts No.	Description	Re-
参照番号	部品番号	部品名/規格	marks 備考	参照番号	部品番号	部品名/規格	marks 備考
	UNI	T (KD-850)		41 1B	D02-0029-05	TURNTABLE PLATTER	*
1 1 A 2 1 A 3 1 A 4 1 A 5 1 A	, ,	OPERATION PANEL ASSY OPERATION BACK BOARD SWITCH ROD (A) X4 SWITCH ROD (B) X4 SWITCH ROD STOPPER X8		42A 2B 42A 2B 42A 2B 42A 2B	D32-0080-24 D32-0080-24 D32-0080-24 D32-0080-24 E23-0046-04	SWITCH STOPPER SWITCH STOPPER SWITCH STOPPER TERMINAL X2	MS WX UP H
6 1A 7 1A 8 3A 9 2A		ESCUTCHEON (L) ESCUTCHEON (R) LAMP FIXTURE (R) LAMP FIXTURE (L)		428 28 428 28 428 28 428 28	E30-0181-05 E30-0459-05 E30-0587-05 E30-1317-15	POWER CORD POWER CORD POWER CORD POWER CORD	KP WH ST MU
10 3A 11 2A 12 2A 13 2B		PC BOARD MOUNTING HARDWARE (A) MOUNTING HARDWARE (B) TURNTABLE CASE		42B 2B 43 1B 44 2B 44 2B 44 2B	E30=1341=05 E30=1301=05 E30=1339=05 E30=1339=05 E30=1339=05	POWER CORD GND CORD AUDIO CORD AUDIO CORD AUDIO CORD	*M ST WX
14 1B 15 2B		SELECTOR PH-TR CASE AUDIO CORD HOLDER REAR PANEL		44 2B 44 2B 44 2B	E30=1339=05 E30=1339=05 E30=1340=05	AUDIO CORD AUDIO CORD AUDIO CORD	UP H +K
17 2A 18 2A 19 2A 20 2B		MOUNTING HARDWARE HOLDER GND PLATE WEIGHT		45 2B F1 F1 F1	F19=0504=04 F05=2023=05 F05=2023=05 F05=2027=05 F05=2029=05	HOLE CAP FUSE 2 A FUSE 2 A FUSE 2 A FUSE 2 A	MS XU KP TW
21 2B 22 2B 22 2B 22 2B 22 2B 22 2B 22 2B	A03-0562-12 A03-0564-12 A03-0564-12 A03-0564-12 A03-0564-12	MOUNTING HARDWARE TURNTABLE CASE ASSY	*T *K MS WX UP	F1 F2 F2 F2 F2	F05=2029=05 F05=8012=05 F05=8012=05 F05=8015=05 F05=8015=05	FUSE 2 A FUSE 800MA FUSE 800MA FUSE 800MA FUSE 800MA	H TW H MS
22 2B 23 3A 24 1B 25 1B	A03-0564-12 A40-0539-12 A53-0213-12 A53-0220-02	TURNTABLE CASE ASSY BOTTOM PLATE DUST COVER DUST COVER ASSY	н	F2 46 1A 47 2A 48 1A	F05=8019=05 G01=0737=08 G13=0416=04 G16=0332=12	FUSE 800MA COILED SPRING X8 CUSHION(TRANSFORMER) X2 RUBBER MAT	KP *
-	B23-0004-04 B46-0055-20 B46-0060-00 B46-0061-20 B46-0062-20	OVERHANG GAUGE WARRANTY CARD WARRANTY CARD WARRANTY CARD WARRANTY CARD	P T K UH	48 1A 48 1A 48 1A 48 1A	G16-0332-12 G16-0332-12 G16-0332-12 G16-0332-12	RUBBER MAT RUBBER MAT RUBBER MAT RUBBER MAT	ST WX UP
	B46=0063=00 B46=0064=10 B50=2355=00 B50=2355=00	WARRANTY CARD WARRANTY CARD INSTRUCTION MANUAL INSTRUCTION MANUAL	U X K S W	48 1A -	G16=0333=12 H01=2361=04 H01=2361=04	RUBBER MAT CARTON BOX CARTON BOX	* K * K U
-	B50-2355-00 B50-2356-00	INSTRUCTION MANUAL	UH *M	-	H10=2243=02 H10=2256=02	POLYSTYRENE FIXTURE (C) POLYSTYRENE FIXTURE (A)	*
- - 26 2A	B50=2356=00 B50=2357=00 B59=0018=00 B07=0538=14	INSTRUCTION MANUAL INSTRUCTION MANUAL SERVICE STATIONS LIST	XP *T U		H10-2257-02 H12-0340-04 H12-0342-04 H12-0357-02 H12-0358-04	POLYSTYRENE FIXTURE (B) PACKING FIXTURE PACKING FIXTURE PACKING FIXTURE (A) PACKING FIXTURE (B)	* *
27 1B 28 1A 29 1A 30 1A 31 1A	B07-0589-01 B08-2201-08 B08-3205-08 B09-0213-08 B09-0214-08		* * * *	-	H20=1102=04 H20=1102=04 H20=1102=04 H20=1102=04 H21=0604=04	COVER COVER COVER COVER SHEET	KS TW XU PH
32 1A 33 1A 34 1A 35 2A 36 2A	B10-0514-08 B19-0505-04 B19-0506-08 B19-0507-08 B30-0169-05	PRISM X2 OPERATION INSIDE PANEL LENS X2	* * *	:	H25-0029-04 H25-0078-04 H25-0611-04 H39-0015-05	BAG BAG BAG HOOK W100	M
37 1A 38 2A 39 1A 40B 2B 40A 2B	B30-0717-05 B30-0720-05 B30-0721-05 B30-0723-05 B38-0212-05	LAMP 16V 100MA X2 LAMP 14V 80MA LAMP (RESEARCH LIGHT)	* * *	-	J19-0306-05 J61-0050-15 J61-0056-05 J61-0059-05 J61-0301-05	LEAD HOLDER WIRE BAND NK4N WIRE BAND WIRE BAND NK10N WIRE BAND NK6N	

No.	Parts No.	Description	Re- marks	Ref. No.	Parts No.	Description	Re- mark
番号	部品番号	部品名/規格	備考	参照番号	部品番号	部品名/規格	備考
	.02 0770 45	W-0047-04 -COL-700 V/		89 3B	v35 1530 00	5 Dan	T.,
A A	J02-0330-15 J09-0303-24	VIBRATION ISOLATOR X4		89 3B 89 3B	x25=1520=00 x25=1520=01	FUSE PCB ASSY FUSE PCB ASSY	XP *T
Ä	J19-1931-08	LED HOLDER X7		89 3B	x25-1520-01	FUSE PCB ASSY	WH
A	J21-2302-05	HINGE MOUNTING HARDWARE		90 3B	x27-1380-01	POWER SUPPLY PCB ASSY	* K
В	J41-0017-05	BUSHING (POWER CORD)	ST	90 3B	x27-1380-02	POWER SUPPLY PCB ASSY	*P
B B	J41=0017=05 J41=0017=05	BUSHING (POWER CORD) BUSHING (POWER CORD)	WX	90 3B 90 3B	x27=1380=03 x27=1380=03	POWER SUPPLY PCB ASSY	* W
В	J41-0034-05	BUSHING (POWER CORD)	H KM	90 3B	x27=1380=04	POWER SUPPLY PCB ASSY POWER SUPPLY PCB ASSY	H +M
3	J41-0034-05	BUSHING (POWER CORD)	UP	90 3B	x27-1380-04	POWER SUPPLY PCB ASSY	SX
3	J42-0078-05	BUSHING (AUDIO CORD)	*	90 3B	x27-1380-04	POWER SUPPLY PCB ASSY	U
	J50-0314-05	W-1105 (4) W2					
3 3	J50=0314=05	HINGE(1) X2 HINGE(2) X2		90 3B 91 3A	x27=1380=05 x29=1120=03	POWER SUPPLY PCB ASSY	*T
, }	J92-0053-15	HEAD SHELL ASSY		91 3A 92 3B	x29=1160=00	MOTOR CONTROL PCB ASSY MECHANISM CONTROL PCB	
			1 1	1/2 33		(X25-1480-00)	
	K29-0689-04	KNOB (POWER SWITCH)		2424 427	γ		·
١.	L01-6271-05	POWER TRANSFORMER	*K	c101-103	C25=6522=67	ELECTRO 22UF 35WV	
	L01-6271-05	POWER TRANSFORMER	P	R102	R92-0501-05	FL-PROOF RD82 J 3D	
	L01-6274-05	POWER TRANSFORMER	±M				
i i-	L01-6274-05	POWER TRANSFORMER POWER TRANSFORMER	ST	Q1	V03-0270-05	2sc945(Q,R)	
	[01-02/4-03	POWER TRANSPORMER	* ^	•	SENSOR	(X25-1490-01)	
	L01-6274-05	POWER TRANSFORMER	UH	-	V11-3100-60	TLR121 X6	*
	1,00-0120-7E	DECCED COEI		-	v30-0386-10	TPS-605 X3	*
	N08-0128-35 N09-0551-05	DRESSED SCREW	1		JUNCTION	(X25-1510-01)	
	N09-0557-05	SCREW M4X16(TAP)			E23-0046-04	TERMINAL X2	1
	N09-0812-05	SCREW M3X12(TAP)		•	E23-0047-04	TERMINAL	
	N09-0841-04	SCREW M3X20(BR-TAP)			FUSE (X25-1520)	
	N09-0848-05	SCREW M3X12(BR#TAP)		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	E23-0047-04	TERMINAL X3	1.
	N09-0849-05	SCREW M3X15(TP-TAP)	1 1			<i>j</i>	
	N09=0850=04 N09=0851=04	SCREW L=10 X2 SCREW L=15 X2		-	J13+0055-05	FUSE HOLDER X2	
	N09-0852-04	SCREW L-20 X2			v30-0386-10	TPS-605 X3	
	.1/ 0/00 05				POWER SUP	PLY (X27-1380)	
	N14-0409-05	T NUT X4	KM	c 1)	C54-3310-39	CERAMIC O.O1UF P	T
	N14-0048-14	NUT (M12)	"	c1	C91-0024-05	MF 0.047UF K	P
	N19-0175-09	WASHER (M2.6)		C1	C91-0302-05	CERAMIC 0.01UF K	ĸ
	N19-0568-04	WASHER	*	c1	C91-0309-05	MF 0.047UF 1000V	М
	100-3004-44	MZV4/TD TAD		C2	C90-0704-05	ELECTRO 2200UF 35WV	
	N90-3006-46	M3X6(TP=TAP) M4X6(TP=TAP)		c3 ,4	C90=0295=05	CERAMIC 0.1UF M	1
	N91-3010-45	M3X10(TP=TAP)		C5	C24=1447=61	ELECTRO 47UF 25WV	-
	N91-3012-46	M3X12(TP-TAP)		C6	C54-3310-39	CERAMIC 0.01UF P	T
	N91=3025=46	M3x25(TP=TAP)		C7	c54-3310-39	CERAMIC 0.01UF P	W
	s31-1006-05	C. 105 GUITAU	·		E23-0047-04		
	s31-2001-05	SLIDE SWITCH	MH	:	E23=0047=04	TERMINAL X11 TERMINAL X2	
	s31-2001-05	SLIDE SWITCH	l xu	1	[2230011-03	TERMINAL AL	
	\$40-1304-05	PUSH SWITCH (POWER)	KM	-	J13-0052-05	FUSE HOLDER	
	S40=1304=05	PUSH SWITCH (POWER)	SX			0.0	
	\$40=1304=05	Dugu Cutton (Doling)		R1	R43-1347-15	FL-PROOF RD470 J 2H	
	\$40=2306=05	PUSH SWITCH (POWER) PUSH SWITCH (POWER)	UP TW	D1	v11-2400-20	W02	
	\$40=2306=05	PUSH SWITCH (POWER)	H	D2	v11=4105=60	WZ-220	
	\$40-1309-05	PUSH SWITCH X8	*	101	V30-0383-10	UPC14315	*
	\$46-2308-03	MUTING SWITCH	*	01	v03-2209-20	2sc2209(Q,R)	
	-21 0055 05	MACHETTO CARRESTON		Q1	V04-0882-20	2SD882(Q/R)	
	T21=0055=05	MAGNETIC CARTRIDGE(DM11 DIRECT DRIVE MOTOR	UH	q2	v03-0270-05	2sc945(Q.R)	W
		TIMES SKITT HOTOK			1	ROL (X29-1120-03)	1 **
	W01-0057-14	EP ADAPTOR					
	w01-0305-05	MINIATURE SCREW DRIVER		C101-103	C25=1733=57	ELECTRO 3.3UF 50WV ELECTRO 2.2UF 50WV	-
	x25-1480-00	MUTING PCB ASSY		c107,108	C46=1710=45	MYLAR 0.1UF J	
	x25=1490=01	SENSOR PCB ASSY		C109-111	C46=1710=26	MYLAR 0.001UF K	
	x25-1510-01	JUNCTION PCB ASSY	-	C112-114	C46-1733-25	MYLAR 0.0033UF J	1
	x25-1520-00	FUSE PCB ASSY	*K				
	x25-1520-00	FUSE PCB ASSY	MS	C115	C46-1710-35	MYLAR 0.01UF J	
				C116	C46-1756-25	MYLAR 0.0056UF J	
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Ref. No.	Parts No.	Description	Re-	Ref. No.	Parts No.	Description
参照番号	部品番号	部品名/規格	marks	参照番号	部品番号	部品名/規格
117 118,119 120,121 122 123,124	C46=1715=46 C91=0320=05 C91=0321=05 C24=1447=51 C59=1722=05	MYLAR 0.15UF K FILM 0.1UF 50W FILM 0.01UF 50W ELECTRO 4.7UF 25W CERAMIC 22PF	,	Q10 Q11 Q12 -14 Q17 Q18	V01=0733=30 V03=0270=05 V03=0293=05 V03=2003=30 V03=0270=05	2SA733A(R,Q) 2SC945(Q,R) 2SC945(Q) 2SC2003(L,K) 2SC945(Q,R)
125 126 127	C53-1710-37 C46-1733-35 C24-1747-49	CERAMIC 0.01UF M MYLAR 0.033UF J ELECTRO 0.47UF 50W		•	W02=0203=05	OSCILLATION BLOCK DNTROL (X29-1160-00) CERAMIC 0.01UF M
132 133 134 135 136=138 139	C25-1710-57 C24-1447-51 C25-6522-61 C71-1722-06 C45-1710-35 C25-1710-57 E23-0047-04 L77-0569-05 R92-0508-05 R47-5522-95	ELECTRO 1UF 50W ELECTRO 4.7UF 25W ELECTRO 22UF 35W CERAMIC 22PF K MYLAR 0.01UF M ELECTRO 1UF 50W TERMINAL X6 CRYSTAL RESONATOR FUSE-RESISTOR FL-PROOF RS2,2	v	C5 C6 ,7 C8 -11 C12 C13 C14 -17 C19 C20 C22 C24 -26	C52=1756=16 C71=1722=05 C52=1756=16 C45=1710=45 C45=1727=45 C91=0333=05 C71=1722=05 C24=1710=51 C90=0270=05 C42=1715=26 C55=1722=38	CERAMIC 560PF K CERAMIC 560PF K MYLAR 0.1UF J MYLAR 0.27JF J CERAMIC 0.01JF M CERAMIC 22PF J ELECTRO 1UF SOWV CERAMIC 0.1UF K CERAMIC 0.0015UF K CERAMIC 0.022UF Z
118 119 124	R48-2226-24 R48-6224-34 R48-2220-24	RN 22.6K G RN 24K G RN 22K G	2 E	c27	C24=1747=41 E23=0046=04	ELECTRO 0.47UF 50WV
125 141,142 148 150	R48=6224=34 R48=2220=24 R48=6224=34 R48=2118=23 R48=2110=23	RN 24K G RN 22K G RN 24K G RN 11.8K F RN 11K F	2 E 2 E 2 E	R68 R70 D1 =3 D4	R43=1368=15 R43=1368=15 V11=1200=80 V11=0273=05	FL-PROOF RD680 J 2; FL-PROOF RD680 J 2; 1SS53 1S2076A
1157 1160 1181 181	R48-6212-44 R48-2270-34 R43-1212-25 R12-3050-05 R12-3051-05	RN 120K G RN 270K G FL-PROOF RD1.2K J TRIMMING POT, 33K TRIMMING POT, 22K	2 E	05 ,6 07 ,8 09	V11-0295-05 V11-1200-80 V11-4103-60 V11-1200-80 V11-4176-76	W068 1SS53 xz-051 1SS53 xz-057
183	R12-1043-05 R12-1041-05	TRIMMING POT. 2.2K TRIMMING POT. 3.3K		D14 IC1	v11=1200=80 v30=0369=10	1SS53 CD4071BE CD4071BCN
01 02 ,3 04 =6 07 ,8	V11-4103-30 V11-1200-80 V11-0457-05 V11-1200-80 V11-1200-40	xz-112 1ss53 1n60psp 1ss53 1ss55		102 ,3	v30≈0303≈10	40718PC MC140718 C040018E C040018CN MC140018
10 02 03	v11-4102-10 v30-0304-10 v30-0303-10	WZ-050 CD4011BE CD4011BCN CD4001BE CD4001BCN		104	v30-0369-10	4001BPC C04071BE CD4071BCN 4071BPC MC14071B
C6 ,5	v30-0305-10 v30-0309-10	CD4027BE CD4027BCN CD40106BE CD40106BCN		105	v30-0362-10	CD4075BE 4075BCP CD4075BCN MC14075BCP
C8 C9 C10	V30-0306-10 V30-0263-10 V30-0250-30 V30-0256-10 V30-0307-10	CD4049UBE CD4049CN SN16889P SM6415A-4S CA324G CD4066BE		106	v30=0366=10	4081BPC CD4081BE CD4081BCN MC14081B CD4049UBE CD4049CN
1012 1013 11 -3	V30-0308-10 V30-0302-10 V04-0793-10 V01-0733-50	CE4066BCN MM74C906N CA741CG 2SD793(R,Q) 2SA733A(Q)		108 ,9	v30-0366-10	MC14049UB 4049BPC 4081BPC CD4081BE CD4081BCN
17 18 ,9	v01=0733=30 v03=0270=05	2sa733a(R,Q) 2sc945(Q,R)		IC10	v30=0303=10	MC140818 CD4001BE

Re-	Ref. No.	Parts No.	Description	Re-	Ref. No.	Parts No.	Description	Re-
marks 備考	参照番号	部品番号	部品名/規格	marks 備考	参照番号	部品番号	部 品 名 / 規 格	marks 備考
	IC10	v30-0366-10	CD4001BCN MC14001B 4001BPC 4081BPC CD4081BE		130 3B 131 2B 132 2B 133 2B 134 3B		PIN LED HOLDER (START) LED HOLDER (RETURN) CAM (POINT ADJUSTER) PULLEY	
	IC12	v30-0319-30	CD4081BCN MC14081B MC14013B CD4013BE CD4013BCN		135 3B 136 3B 137 3B 138 3B 139 3B		SHAFT RETAINER FELT CLUTCH, ARM ASSY CLUTCH, ARM	
	1013	v30-0369-10	4013BPC CD4071BE CD4071BCN 4071BPC MC14071B		140 38 141 38 142 38 143 38 144 38		RETAINER- SHAFT GEAR WORM WHEEL SEARCH ARM	
	1014	v30-0372-10	CD4025BE CD4025BCN 4025BPC		145 3B 146 3B		WORM RETAINER	
	1015	v30-0319-30	MC14025B MC14013B CD4013BE		147 38 148 38 149 38 150 38	D10-0803-08 D13-0205-08 D14-0217-08 D15-0515-08	CLUTCH ARM ASSY WORM ASSY IDLER ASSY MOTOR PULLEY	
	Q1 -10 Q11	V03-2320-10 V03-2003-30	CD4013BCN 4013BPC 2SC2320(E.F) 2SC2003(L,K)		151 3B 152 3B 153 3B	D16-0219-08 D40-0461-05 D40-0805-08	AUTO MECHANISM ASSY ELEVATION ARM ASSY	*
	Q12 ,13 Q14 ,15 Q16 Q17 ,18 Q19 -21	V03-2320-10 V03-1383-10 V03-2320-10 V04-0355-10 V03-2320-10	2sc2320(E.F) 2sc1383NC(Q.R) 2sc2320(E.F) 2sc355(D.E) 2sc2320(E.F)		154 38 155 38 156 38 157 38 158 38	G01-0722-08 G01-0723-08 G01-0724-08 G01-0725-08 G01-0726-08	COMPRESSION SPRING (B) COMPRESSION SPRING (A) TENSION SPRING (1) TENSION SPRING (3) TENSION SPRING (2)	
	101 2B 102 2B	D19-0215-08 D21-0685-08	INSIDE FORCE CAN.ASSY ELEVATION SHAFT ASSY		159 3B 160 3B	G02-0319-08 G13-0458-04	FLAT SPRING MOTOR CUSHION	
	103 2B 104 1B	D39-0095-08 D91-0129-08	ARM REST COUNTER WEIGHT	*	161 3B	J19=1918=08	LED HOLDER (SEARCH)	
	105 2B 106 2B	G01=0747-08 G01=0748-08	COILED SPRING (LIFTER)	*	162 2B 163 2B 165 3B	N30=3004-46 N09=0870=08 N19=0561=08	SCREW M3X4 SCREW M2X6 RUBBER WASHER	*
	107 28 108 28 109 28 110 28	J42-0317-08 J19-1938-08 J19-1941-08 J91-0129-05 J91-0132-08	BUSHING TONEARM BASE ASSY TONEARM ELEVATOR TONEARM TOTAL ASSY TONEARM ASSY	* * *	167 3B 168 3B	T42-0112-05 T94-0058-05	DC MOTOR SOLENOID	*
	111 28	K29-0677-08	KNOB (HEIGHT ADJUSTER)					
	112 2B 113 2B 114 2B 115 2B 116 2B	N08-0409-08 N08-0410-08 N09-0847-08 N13-0201-08 N19-0549-08	DRESSED SCREW (A) DRESSED SCREW SCREW M3X6 DRESSED NUT WASHER (I.F.C. STOPPER)					
	117 2B	N77-4010-45	HEX. HEAD SCREW M4X10			·		
	120 3B 121 3B 122 3B 123 3B 124 3B		POSITION GUIDER LED HOLDER (POSITION) GEAR CAM CAM HOLDER				11 11 11 11 11 11 11 11 11 11 11 11 11	
	125 3B 126 3B 127 3B 128 3B 129 3B		SLIDER CUSHION ELEVATION ARM GUIDE BASE SHAFT				・	

Ref. No. 参照番号	Parts No. 部品番号	Description 部 品 名 / 規 格	Re- marks 體考
-18 1A 19 2A 19 2A 19 2A 19 2A 19 2A	A01=0608=12 A2C=1979=11 A2C=1979=11 A2C=1979=11 A2C=1979=11	METALLIC CABINET FRONT PANEL ASSY FRONT PANEL ASSY FRONT PANEL ASSY FRONT PANEL ASSY	* K- PM SU XW
R221 R222 VR1 ,2 VR3 ,4 VR5 ,6	R43-1333-15 R43-1368-15 R12-3301-05 R19-4305-05 R12-2302-05	FL-PROOF RD330 J 2H FL-PROOF RD680 J 2H TRIMMING POT, 20K(B) POTENTIOMETER (OUTPUT) TRIMMING POT, 5K(B)	*

- ① Exploded view drawing No. Position in exploded view.
- Symbol of new parts.
- 4 Area to which parts are shipped. Example: A20-1979-11 is the parts No. of FRONT PANEL ASS'Y for the "K" type products (for When this column is blank, it means that the same type of parts
- (same parts No.) are used for the products shipped to all areas. Reference No. in schematic diagram.
- 6 Abbreviation of "Flame proof metal oxide film resistor". All capacitors and resistors are listed using abbreviations.
- 7 Abbreviations
- * Abbreviations of capacitors (Parts No. with initial letter "C"). ELECTRO... ... Electrolytic capacitor LL-ELEC... ... Low leak electrolytic capacitor NP-ELEC... ... Non-pole electrolytic capacitor MICA Mica capacitor POLYSTY ... Polystyrene capacitor MYLAR.... ... Mylar capacitor CERAMIC Ceramic capacitor TANTAL ... Tantalum capacitor ... Metallized film capacitor ... Oil capacitor The unit "UF" is used in lieu of " μ F",
- * Abbreviations of resistors (Parts No. with initial letters "R"). ... Carbon composition resistor ... Carbon film resistor

110	Our Don't minit i donotor	
FL-PROOF RD	Flame-proof carbon	film resisto
RW	Wire wound power	resistor
FL-PROOF RS	Flame-proof metal of	xide film re
RN	Metal film resistor	
2B	Rated wattage	1/8W
2E	Rated wattage	1/4W
2H	Rated wattage	1/2W
3A	Rated wattage	1 W
3D	Rated wattage	2W
3F	Rated wattage	3W _
3G	Rated wattage	4W
3H	Rated wattage	5W
All resistor values are indic	cated with the unit (Ω) omitted.

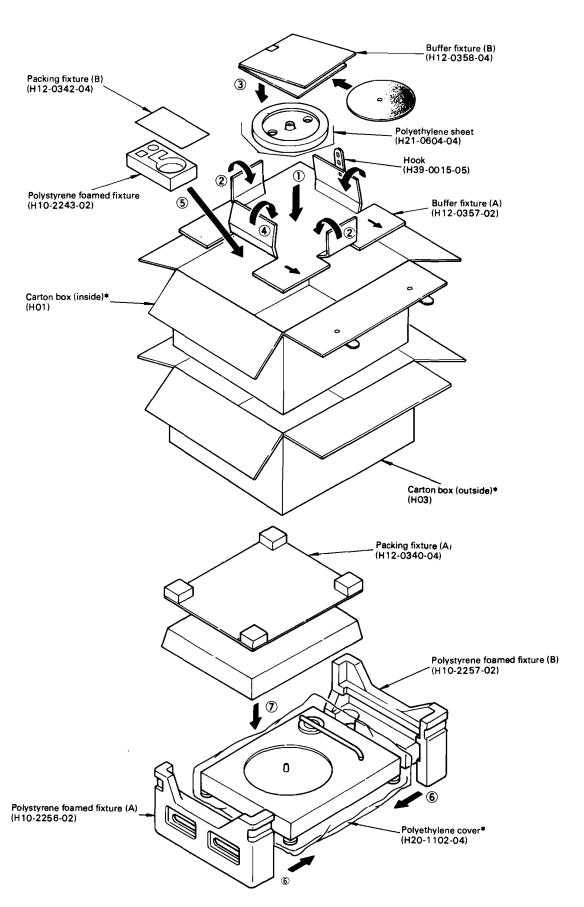
- Abbreviations common to capacitors and resistors. ±0.25pF (Used for capacitors only)
- . ±0.5pF (Used for capacitors only) ±1% ±2% ±5% ±10% ±20% +80%. - 20% (Used for capacitors only)
- + 100%. 0% (Used for capacitors only) 8 Resistors RD (carbon composition resistors) are not listed in the parts list. For values, refer to the schematic diagram.

P: X27-1380-02 W: X27-1380-03

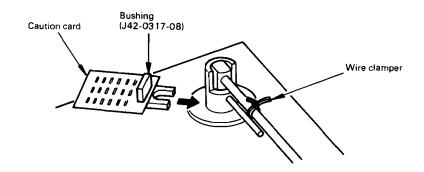
M: X27-1380-04 T: X27-1380-05

 Codes in X27-1380 K: X27-1380-01

PACKING



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