

 **PIONEER®**

# Service Manual

**CIRCUIT & MECHANISM  
DESCRIPTIONS**



**ORDER NO.  
ARP1031-0**

**STEREO CASSETTE TAPE DECK**

# CT-2070R(BK)

- This service manual is applicable to the KU type.
- As to the repair and adjustments, please refer to the CT-2070R [BK] service manual (ARP1032).

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# 1. DESCRIPTION OF TAPE TRANSPORT OPERATIONS

The tape transport mechanism in this tape deck consists of a capstan motor for driving the capstan, a reel motor for driving the reel bases, and a plunger solenoid for setting the various tape transport modes. The basic structure of the tape transport mechanism is divided into the following three major sections.

## 1.1 CAPSTAN DRIVE SYSTEM

The capstan drive system consists of a capstan motor used to drive the FWD (forward) and REV (reverse) capstans by a belt looped around the respective flywheels as shown in Fig. 1-1.

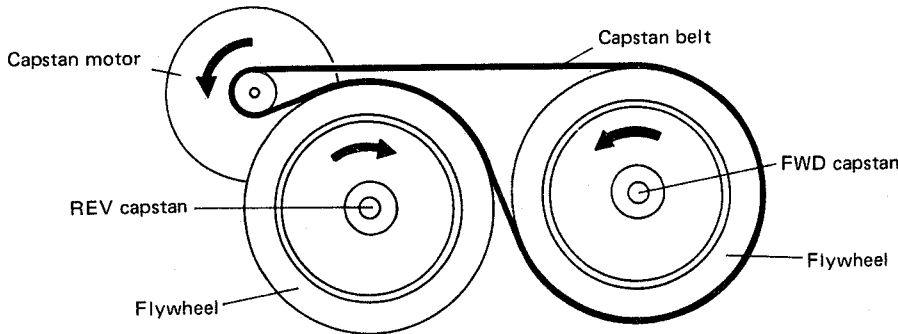


Fig. 1-1 Capstan drive

## 1.2 REEL DRIVE SYSTEM

The reel drive system consists of gear (a) on the reel motor shaft, F/R gear (b) engaged with gear (a) but which can be freely moved to either side, and reel drive gears (d) and (e) which are coupled to gear (b) by the turning effect generated in the rotational direction to thereby drive the take-up reel. (see Fig. 1-2.)

The rotational direction of the motor is reversed by changing the voltage applied to the motor, and the tape transport speed changes (take-up torque changes in playback, fast forward, and other modes) are achieved by changing the level of the applied voltage.

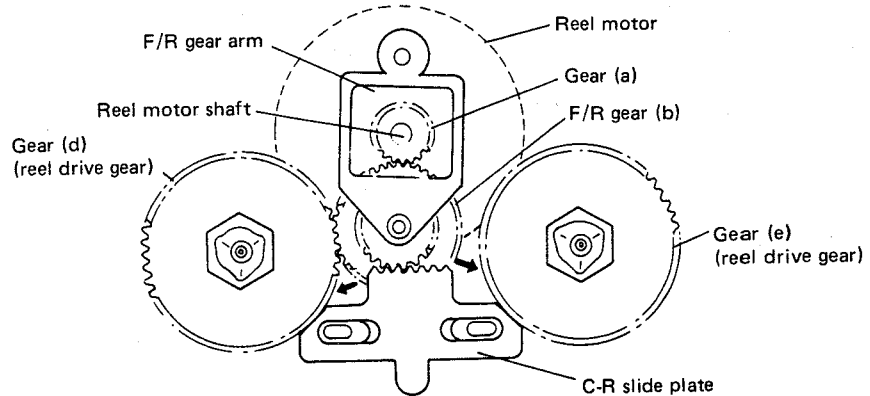


Fig. 1-2 Reel drive

**1.3 OPERATION MODE SETTING SYSTEM**

The various tape transport modes are set by totating the cam gears using the turning effect of the FWD flywheel as the driving power.

The cams mounted on the cam gear include no. 1 cam (FWD PLAY) for setting the revolving type tape head in the FWD direction, no. 2 cams (a) and (b) (REV PLAY) for setting the head in the REV direction, no. 3 cam for setting the head base and pinch roller, and no. 4 cam for setting the hold lever (brake).

**• Stop Mode**

The cam drive system as seen from behind is outlined in Fig. 1-3. The cam gear is stopped when no. 1 cam gear stopper is engaged with the play arm pin (the position shown in the diagram).

- (1) No. 3 cam is in the position indicated in the diagram with the head base and pinch rollers (FWD, REV) dropped down.
- (2) The slide plate is shifted over to the left (the position shown in the diagram) with the revolving head set in the FWD direction.

- (3) No. 4 cam is in the position shown in the diagram, and the two prongs of the hold lever (brake) are disengaged from the reel drive gears which are thus left free to rotate in either direction.

**• Change from Stop Mode to FWD Playback Mode**

- (1) When the FWD PLAY button is pressed, current is passed to the capstan motor and the solenoid which is activated (current applied for 60ms) to turn the play arm counter clockwise.
- (2) Since the play arm is thus disengaged from the no. 1 cam gear stopper, the cam gear is forced counter clockwise by the hold lever to engage and consequently be driven by the capstan gear.
- (3) As a result of the rotational vovement of the play arm and cam gear, the slide plate pin moves along route no. 1 (.....>).
- (4) Cam gear rotation also results in no. 3 cam pushing the head base drive claw upwards.

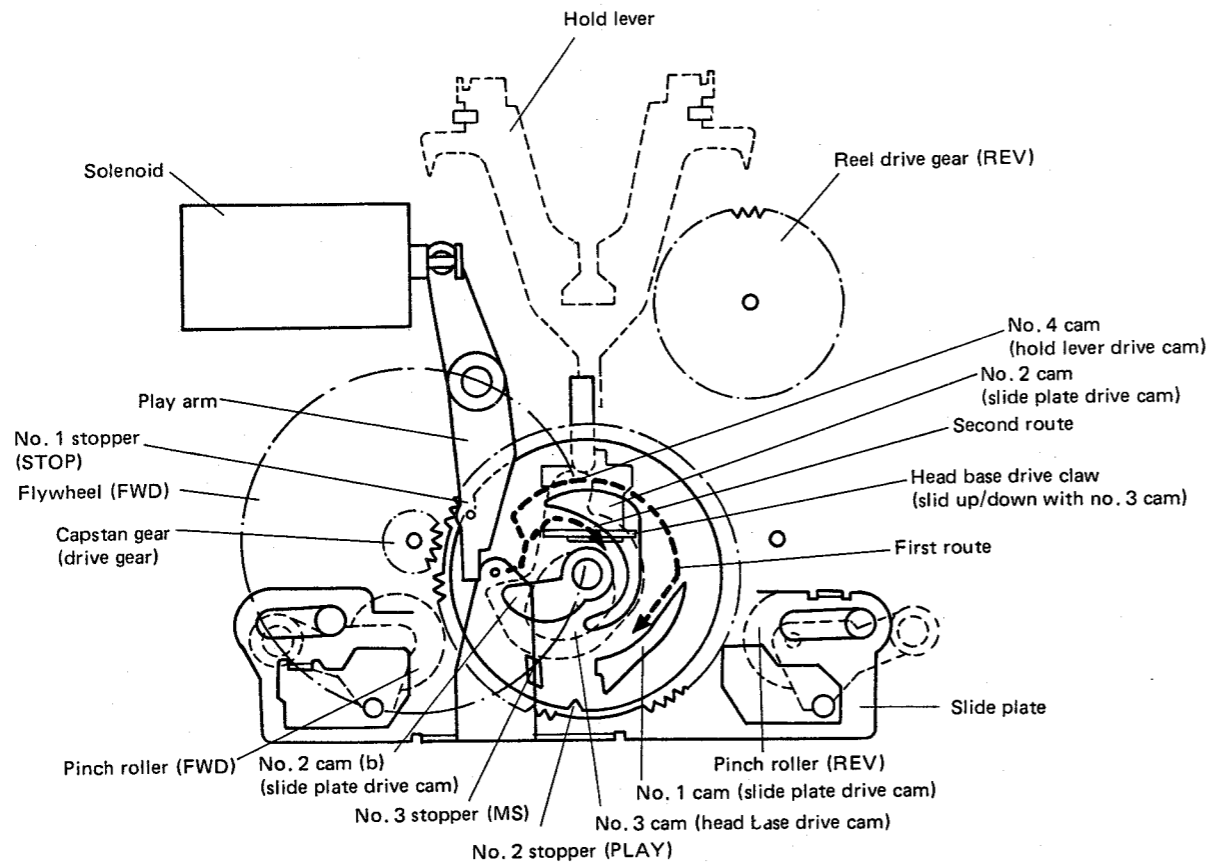


Fig. 1-3 Stop mode

- (5) When the cam gear has been rotated by about 235°, no. 2 stopper on the cam gear meets the play arm pin and is subsequently stopped with the deck now in forward playback mode (see Fig. 1-4). In this condition,
  - (a) The FWD pinch roller is lifted together with the head base, and is pressed against the capstan. The REV pinch roller, on the other hand, is kept in position by the slide base.
  - (b) The brake is released by no. 4 cam.

**• Change from Stop Mode to REV Playback Mode**

- (1) When the REV PLAY button is pressed, current is passed to the capstan motor and the solenoid which is activated (current applied for 320ms) to turn the play arm counter clockwise.
- (2) Since the play arm is thus disengaged from the no. 1 cam gear stopper, the cam gear is forced counter clockwise by the hold lever to engage and consequently be driven by the capstan gear.
- (3) As a result of the rotational movement of the play arm and cam gear, the slide plate pin moves along route no. 2 (----->).

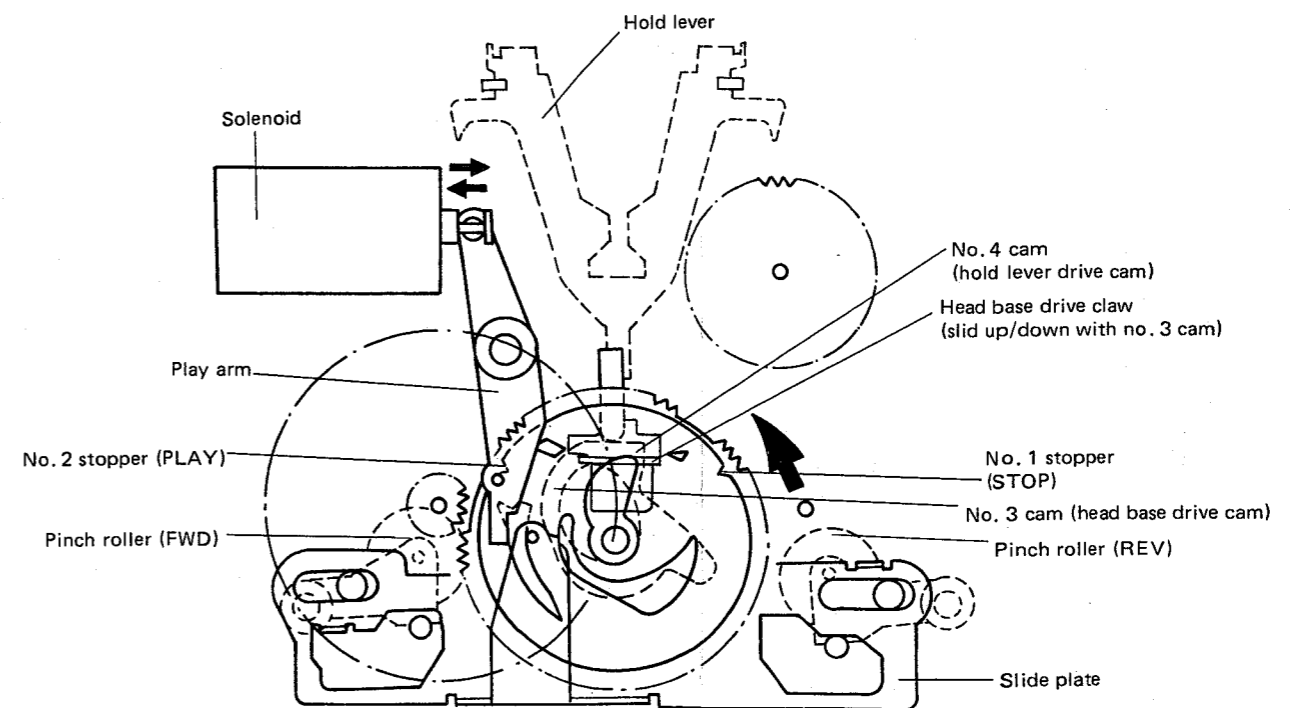


Fig. 1-4 Change from stop to forward playback mode

- (4) The slide plate is shifted over to the right by cam gear no. 2 cam (a), and the revolving head is switched around to the REV direction.
- (5) Cam gear rotation also results in no. 3 cam pushing the head base drive claw upwards.
- (6) When the cam gear has been rotated by about 235°, no. 2 stopper on the cam gear meets the play arm pin and is subsequently stopped with the deck now in reverse playback mode. In this condition,
  - (a) The REV pinch roller is lifted together with the head base, and is pressed against the capstan. The FWD pinch roller, on the other hand, is kept in position by the slide base.
  - (b) The brake is released by no. 4 cam.

• **Change from FWD/REV Playback Mode to Music Search (Cue/Review) Mode**

- (1) When the FF or REW key is pressed during forward or reverse playback mode, the solenoid is activated (current applied continuously during music search mode) and

- the play arm pin is disengaged from no. 2 cam gear stopper. The cam gear is thus forced counter clockwise by the head base.
- (2) The cam gear rotation results in the head base being lowered to the MS position no. 3 cam.
  - (3) After the cam gear is rotated through about 20° no. 3 cam gear stopper meets play arm pin, thereby stopping the cam gear to put the deck into music search mode (see Fig. 1-5). In this condition,
    - (a) The pinch roller is lowered together with the head base away from the capstan.
    - (b) The brake is released by no. 4 cam.
  - (4) High speed rotation of the reel motor in the forward or reverse direction is commenced approximately 60ms after the solenoid is activated, and as a result of lateral oscillating action of the F/R gear the reel drive gear (FWD or REV) is engaged to commence take-up of the tape.

• **Change from (FWD Playback) Music Search Mode to Stop Mode**

- (1) If the STOP key is pressed when changing from forward, playback to music search mode, the solenoid is deactivated and the play arm pin is disengaged from no. 3 cam gear stopper, resulting in the cam gear being forced counter clockwise by the head base.
- (2) Since the hold lever is released from no. 4 cam when the cam gear is rotated, the hold lever is dropped suddenly resulting in the two hold lever prongs engaging the reel drive gear (FWD, REV) to apply the brake.
- (3) The cam gear rotation also results in the head base and pinch roller being dropped to the STOP position by no. 3 cam.
- (4) After the cam gear has been rotated by about 105°, the play arm pin meets no. 1 stopper bringing the cam gear to a stop and putting the deck into stop mode (see Fig. 1-3). In this condition, the brake is released by no. 4 cam.

• **Change from FWD/REV Playback Mode to Stop Mode**

- (1) When the STOP key is pressed during forward or reverse playback mode, the solenoid is activated (current passed for 60ms) and the play arm pin is disengaged from no. 2 cam gear stopper. As a result, the cam gear is forced counter clockwise by the head base.
- (2) As a result of the cam gear rotation, the deck is switched temporarily to music search mode.
- (3) Operations following activation of the solenoid are the same as described above under "Change from (FWD Playback) Music Search Mode to Stop Mode" and "Change from (REV Playback) Music Search Mode to Stop Mode".

• **Pause Mode**

Since pause mode is identical in mechanical terms to stop mode, it is not described separately here.

• **Change from (REV Playback) Music Search Mode to Stop Mode**

- (1) If the STOP key is pressed when changing from reverse playback to music search mode, the solenoid is deactivated and the play arm pin is disengaged from no. 3 cam gear stopper, resulting in the cam gear being forced counter clockwise by the head base.
- (2) Since the hold lever is released from no. 4 cam when the cam gear is rotated, the hold lever is dropped suddenly resulting in the two hold lever prongs engaging the reel drive gear (FWD, REV) to apply the brake.
- (3) The cam gear rotation also results in the head base and pinch roller being dropped to the STOP position by no. 3 cam.
- (4) The slide plate is shifted across to the left by no. 2 cam (b) of the cam gear, and the revolving head is reverted to the FWD direction.
- (5) After the cam gear has been rotated by about 105°, the play arm pin meets no. 1 stopper bringing the cam gear to a stop and putting the deck into stop mode (see Fig. 1-3). In this condition, the brake is released by no. 4 cam.

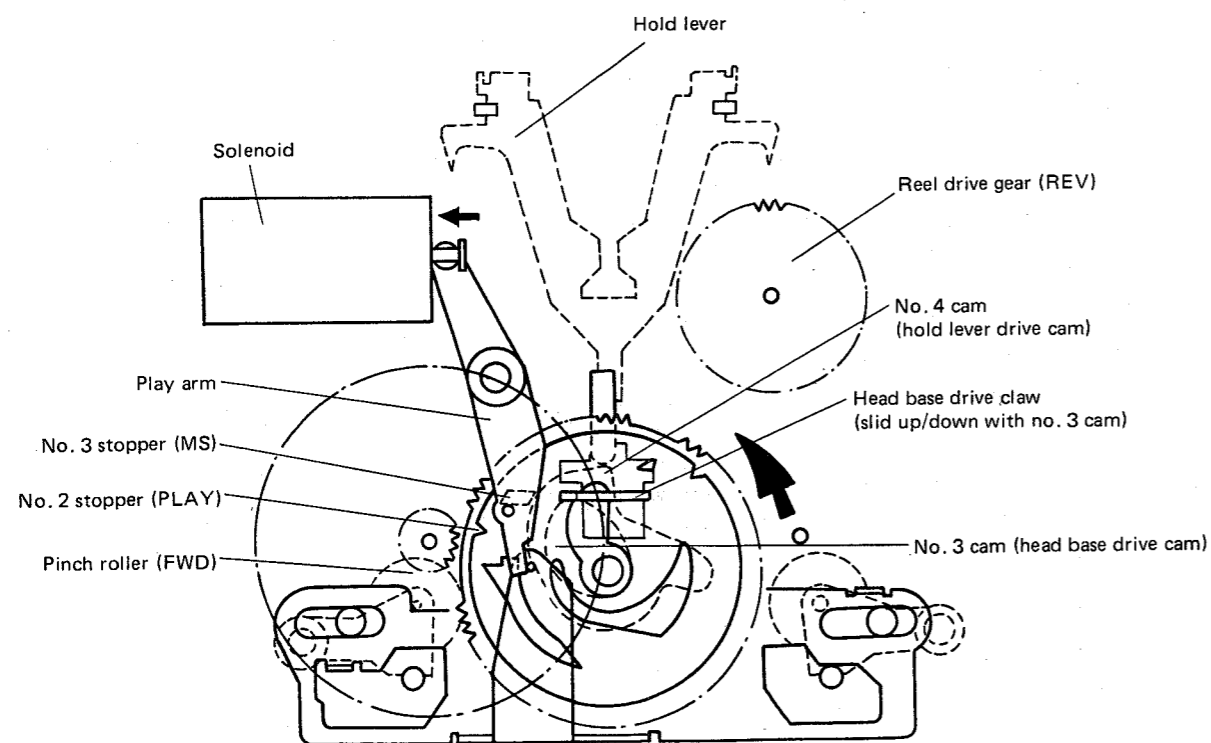


Fig. 1-5 Change from forward playback to music search mode

• **Revolving Head Switching**

- (1) When the slide plate is slid across to the right as indicated in Fig. 1-6, the end of the revolving head switching lever is caught by a slit in the switching slide and is shifted across to the right as well. The fan-shape gear is consequently rotated counter clockwise, and the revolving head coupled to this gear is rotated by 180° to set the head in the FWD recording/playback position.
- (2) The slide plate is shifted across to the left to set the head in the reverse recording/playback position.
- (3) A spring is used to set the head into position by snap action and thereby ensure that head is always set in the correct position.

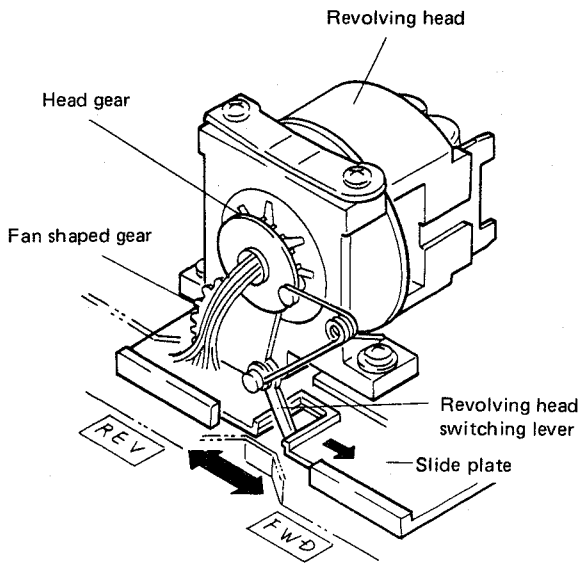


Fig. 1-6 Removing head switching

• **Leader Tape Detector Function (Used in Quick Reverse)**

The leader tape detector mechanism consists of a sensor (LED and photosensitive cell) mounted in the tape guide on the left hand side of the head. As can be seen from the diagram of this sensor in Fig. 1-7, the light emitted from the LED is passed via an optical fiber to be beamed onto the tape. The reflected light is then passed by another optical fiber back to the photosensitive cell.

While the magnetic portion of tape is being passed in front of the optical fiber, the light is absorbed and is not passed to the photosensitive cell. Therefore, no output is obtained from the photosensitive cell. When the leader tape at the end of the tape is reached and the opaque white tape or transparent colorless tape is passed in front of the optical fiber, the LED beam is passed through the leader tape, and reflected by a reflector plate mounted behind the tape back into the photosensitive cell where an output is generated. This leader tape detector signal is then passed to the control IC where it is used in the auto reversing operation.

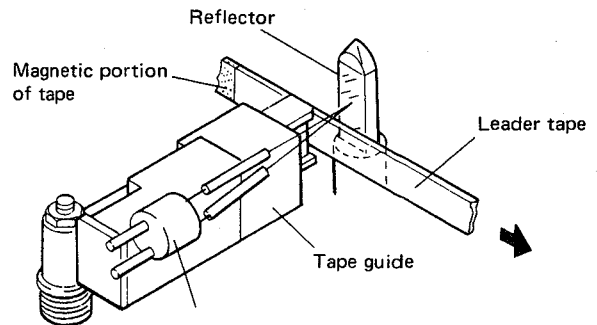


Fig. 1-7 Reader tape detector mechanism

## **2. CIRCUIT DESCRIPTIONS**

### **2.1 OUTLINE OF SIGNAL ROUTE**

#### **Playback Equalizer**

Features a low-noise operational amplifier IC (M5220L).

#### **Microphone Amplifier**

Single transistor amplifiers are inserted in both left and right channels. When microphones are plugged into the microphone jacks, the LINE INPUT terminals are disconnected from the line input circuit which is connected to the microphone amplifier output instead.

#### **Dolby NR Circuit**

Features the Dolby NR processor IC (AN7370K) capable of switching types B and O Dolby NR systems.

#### **dbx NR System**

Features the dbx IC (AN6291). Dbx on/off switching and dbx/Dolby switching is handled by an electronic switch (FET) connected to the IC.

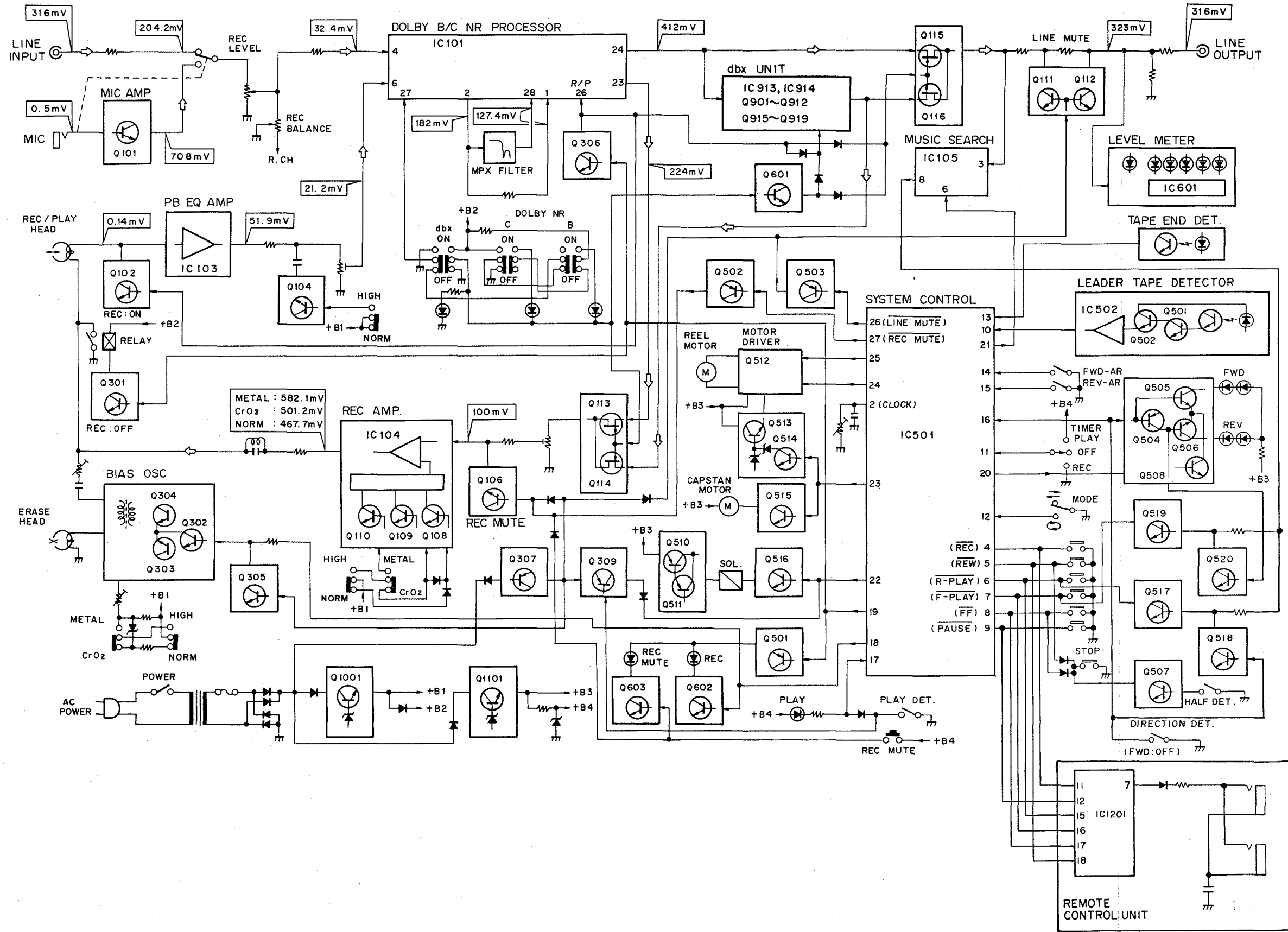
#### **Recording Amplifier**

Features an operational amplifier IC (M5218L). This amplifier copes with different types of tapes by peaking element switching in the negative feedback loop.

#### **Level Meter Section**

Five-point level meter driver IC (BA6124).

Block Diagram for CT-2070R



2.2 CONTROL SECTION

The control section in these tape decks is centered about the tape deck control IC (PD2012) with the main operations activated by non-lock feather touch switches. This IC features a digital counting system for setting the timing in mechanical control, thereby achieving precision timing in all operations.

Description of PD2012 Pin Functions (see Fig. 2-1)

The STOP key circuit shown in Fig. 2-3 is used to enable software processing where multiple pressing of the FF and REW keys results in the tape transport being stopped.

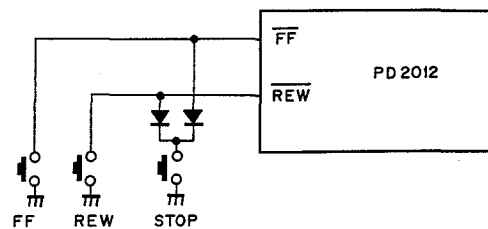


Fig. 2-2 STOP key circuit

Pin No.	Pin Name	IN/OUT	Function
1	GND	-	GND
2	CLOCK	-	External CR connection for built-in clock oscillator. Set to f = 6.4kHz.
3	CLEAR	Input	System clearing if L level.
4	REC	Input	REC key input.
5	REW	Input	REW key input.
6	R-PLAY	Input	REVERSE PLAY key input. Active low
7	F-PLAY	Input	FORWARD PLAY key input.
8	FF	Input	FF key input.
9	PAUSE	Input	PAUSE key input.
10	LEADER DETECT	Input	Leader tape reversing signal input pin. Reversed if H level.
11	TIMER START	Input	Timer recording if H level, timer playback if L level. Timer off if pin is open.
12	MODE SELECT	Input	Reversed if L, not reversed if open.
13	SENSING	Input	Tape end detector input. Tape stopped if no pulse for at least 4 secs.
14	F-AR	Input	Forward side anti-recording. Recording inhibited if pin is open.
15	R-AR	Input	Reverse side anti-recording. Recording inhibited if pin is open.
16	DIRECTION	Input	Transport direction input. Reverse when L, forward when open.
17	PLAY SW	Input	Head base position input. Pin is open in stop and FF/rev modes, and at L in other modes.
18	BIAS	Output	BIAS OSC control output. H output when in recording or recording/pause mode.
19	PB	Output	H output when not in recording or recording/pause mode.
20	PAUSE/ND	Output	PAUSE indicator output. Alternate L/H output during pause mode.
21	MS INH	Output	MS inhibit output. H output during cue and review modes.
22	SOL	Output	H output when solenoid is activated.
23	MOTOR CONTROL	Output	Capstan motor control, and reel motor switching control output.
24	RM-L	Output	Reel motor control output.
25	RM-R	Output	Reel motor control output.
26	LINE MUTE	Output	Line muting control output. H level in playback, recording, and recording/pause modes.
27	REC MUTE	Output	Recording mute control output. H level in recording mode.
28	VDD	-	+5V power supply pin.

Fig. 2-1 Description of PD2012 pin functions

Initialization Process

When the power is switched on resulting in pin no. 3 being switched to H level, the deck is initialized in the sequence outlined in the following flowchart.

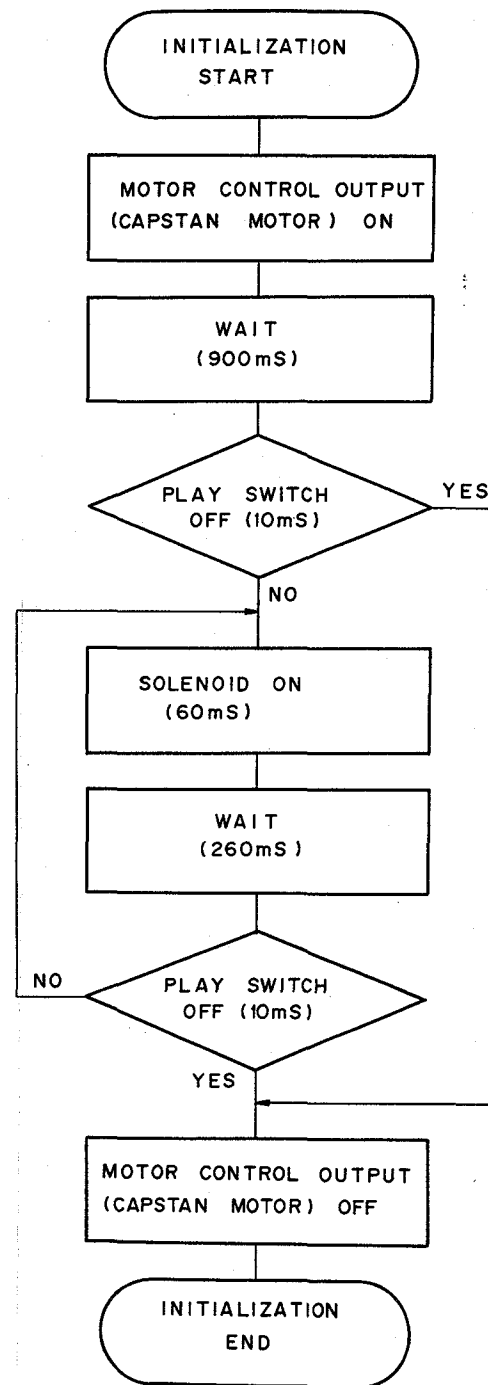


Fig. 2-3 Initialization process flowchart

NOTE:

Since the tape transport mechanism is usually in stop mode when the power is switched on, initialization is completed in 910msec. Only when the PLAY switch is on is initialization completed in 330msec (including the 60msec for SOL).

Music Search (MS) Mode

The tape deck is switched to music search mode by pressing the FF or REW key during forward or reverse playback mode. And when a blank portion of tape of at least four seconds duration is detected, the tape is played in the direction indicated by the direction indicator.

NOTE:

Music search mode is not activated if the PLAY key is pressed together with the FF key (or REW key).

Description

When an FF or REW key input is applied during forward or reverse playback mode, the deck is switched to music search mode, and pin 21 of Q509 (PD2012) is switched to H level 200msec later, resulting in a music search operation being commenced by Q306 (BA338). If a blank section of tape of at least 4 seconds in duration from the falling edge signal is detected by Q306, pin no. 8 is switched to H level, resulting in H level being applied to the common terminal of the R527 and R529 resistances connected to the respective bases of Q519 and Q517 which are connected in turn to the F-PLAY (no. 7) and R-PLAY (no. 6) input pins of Q509.

The direction of play depends on the status of the mechanical DIRECTION switch at this time.

- DIRECTION SW OPEN (forward playback) Since the Q509 DIRECTION input (pin no. 16) is pulled up by R507 to become H level, Q518 is turned on. The Q517 base resistance R529 is subsequently connected to ground and Q517 remains off.

Furthermore, Q504 which is used in the reversing circuit is turned off when H level is applied to the base.

Therefore, since Q519 is turned on when H level is applied to base resistance R527 resulting in the Q509 F-PLAY pin (no. 7) being switched to L level, forward playback mode is commenced.

- DIRECTION SW SHORT (reverse playback) Since the Q509 DIRECTION input (pin no. 16) is switched to L level resulting in L level being applied to the base of Q504 to switch this transistor on with the collector at H level, Q520 is turned on and Q519 remains off. With L level applied to its base, Q518 is turned



off, and Q517 is turned on due to H level being applied to the base resistance R529. Hence, with the Q509 R-PLAY pin (no. 6) being switched to L level, reverse playback mode is commenced.

To go directly into recording mode, simply press the REC and PLAY keys together. If, however, the erasure prevention tabs have been removed, or the cassette half has not been loaded, the deck remains in stop mode.

**ONE REC PAUSE**

If the REC key is pressed when in stop or pause mode, the deck is switched to recording/pause mode, the REC indicator LED D602 is switched on, and the DIRECTION indicator (which had been on up to this stage) is switched to blinking status.

**Pause Cancellation**

Pause mode is cancelled by pressing the PLAY key, or by pressing the STOP, FF, or REW key.

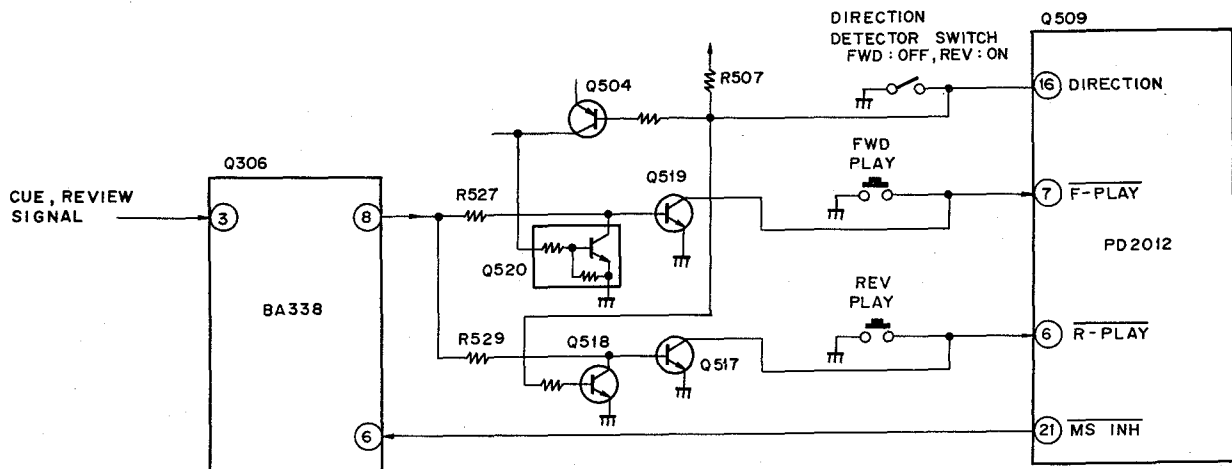


Fig. 2-4 MS circuit

Current Mode	First Key Input	Second Key Input	Final Mode
STOP STOP/PAUSE	F/R - PLAY	*****	F/R - PLAY
		PAUSE	STOP/PAUSE
		REC	F/R - REC
F/R-PLAY	REC	*****	F/R - REC
		PAUSE	REC/PAUSE
		R/F - PLAY	R/F - PLAY
		F/R - PLAY	F/R - REC
STOP STOP/PAUSE	REC	*****	REC/PAUSE
		F/R - PLAY	F/R - REC

Fig. 2-5 Key input processing

**Key Input Processing**

**(1) Mode change**

The mode changes effected by pressing a single key, or by pressing two keys together are summarized in the mode change table (Fig. 2-7). The output states after completing mode changes are listed in Fig. 2-6).

**(2) Multiple key input processing**

When two keys are pressed precisely together, the resultant mode change is as indicated in the mode change table. If two keys are pressed with a time lag between the two, only the second key input listed in Fig. 2-5 can be accepted within 260ms after the first key is pressed.

If the first key has already been released when the second key is pressed, the second key input is ignored, and the first key input is regarded as a single input. (\*) denotes that the final mode is switched to R/F-REC if the REC key is pressed within 1270msec after the reversed play mode is started.

**(3) Chattering processing**

Key inputs are accepted only after the input pin remains at L level for at least 10 to 20msec. (This 10 to 20msec interval varies according to the press timing.)

MODE	STOP		FF		REW		CUE		REV		PLAY		REC		STOP PAUSE		PLAY PAUSE		REC PAUSE	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
DIRECTION	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
REC MUTE	L	L	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	L	L	L
LINE MUTE	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	L	L	L	H	H
RM-L	L	L	H	H	L	L	H	H	L	L	H	L	H	L	L	L	L	L	L	L
RM-R	L	L	L	L	H	H	L	L	H	H	L	H	L	H	L	L	L	L	L	L
CPM	L	L	L	L	L	L	L	L	L	H	H	H	H	L	L	L	L	L	L	
SOL	L	L	L	L	L	L	H	H	H	H	L	L	L	L	L	L	L	L	L	
MS INH	L	L	L	L	L	L	H	H	H	H	L	L	L	L	L	L	L	L	L	
PAUSE IND	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*	*	*	*	*	*
PB	H	H	H	H	H	H	H	H	H	H	H	H	L	L	H	H	H	H	L	L
BIAS	L	L	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	L	H	H

\* Denotes alternate repetition of L and H levels.

Fig. 2-6 PD2012 regular outputs

o F-PLAY/R-PLAY: No mode change.

AR SIDE	KEY IN MODE	STOP (FF/REW)	FF	REW	F-PLAY	R-PLAY	REC	PAUSE	REC/APUSE	F-PLAY/REC	R-PLAY/REC
NON	STOP	*	FF	REW	F-PLAY	R-PLAY	REC/PAUSE	STOP/PAUSE	REC/PAUSE	F-REC	R-REC
	STOP/PAUSE	STOP	FF	REW	F-PLAY	R-PLAY	REC/PAUSE	*	REC/PAUSE	F-REC	R-REC
	FF	STOP	*	REW	F-PLAY	R-PLAY	*	*	*	F-PLAY	R-PLAY
	REW	STOP	FF	*	F-PLAY	R-PLAY	*	*	*	F-PLAY	R-PLAY
	CUE	STOP	*	REVIEW	F-PLAY	R-PLAY	*	*	*	F-PLAY	R-PLAY
	REVIEW	STOP	CUE	*	F-PLAY	R-PLAY	*	*	*	F-PLAY	R-PLAY
	F-PLAY	STOP	CUE	REVIEW	*	R-PLAY	F-REC	STOP/PAUSE	REC/PAUSE	F-REC	R-PLAY
	R-PLAY	STOP	CUE	REVIEW	F-PLAY	*	R-REC	STOP/PAUSE	REC/PAUSE	F-PLAY	R-REC
	F-REC	STOP	FF	REW	*	R-REC	*	REC/PAUSE	REC/PAUSE	*	R-REC
	R-REC	STOP	FF	REW	F-REC	*	*	REC/PAUSE	REC/PAUSE	F-REC	*
REC/PAUSE	STOP	FF	REW	F-REC	R-REC	*	*	*	F-REC	R-REC	
B	STOP						REC/PAUSE		REC/PAUSE		*
	STOP/PAUSE						REC/PAUSE STOP		REC/PAUSE STOP		STOP
	FF										
	REW										
	CUE										
	REVIEW										
	F-PLAY										
	R-PLAY						STOP		STOP		STOP
	F-REC						STOP				STOP
REC/PAUSE						STOP				STOP	
A	STOP						*		*	*	*
	STOP/PAUSE						REC/PAUSE STOP		REC/PAUSE STOP	STOP	
	FF										
	REW										
	CUE										
	REVIEW										
	F-PLAY						STOP		STOP	STOP	
	R-PLAY										
	R-REC				STOP					STOP	
REC/PAUSE				STOP					STOP		
A & B	STOP						*		*	*	*
	STOP/PAUSE						STOP		STOP	STOP	STOP
	FF										
	REW										
	CUE										
	REVIEW										
	F-PLAY						STOP		STOP	STOP	STOP
R-PLAY						STOP		STOP	STOP	STOP	

STOP / PAUSE / FF / REW / F-PLAY / R-PLAY / REC	⇒	STOP KEY IN
FF / PAUSE / F-PLAY / R-PLAY / REC	⇒	FF KEY IN
REW / PAUSE / F-PLAY / R-PLAY / REC	⇒	REW KEY IN
PAUSE / F-PLAY / R-PLAY	⇒	PAUSE KEY IN

Fig. 2-7 Mode change table

**Timer Start Operation**

**(1) Timer play**

If the timer switch is in the PLAY position when the power is switched on (\*1)(that is, with pin no. 11 of Q509 at H level) the deck is started in playback mode four seconds later in the direction indicated by the DIRECTION indicator. (\*2)

**(2) Timer recording**

If the timer switch is in the REC position when the power is switched on (\*1)(that is, with pin no. 11 of Q509 at L level) the deck is started in recording mode four seconds later in the direction indicated by the DIRECTION indicator. However, if the erasure prevention tabs have been removed (that is, if the anti-recording input pin as at H level), the deck is put into stop mode. (\*2)

- (\*1) To be more precise, when the mechanical initialization process is completed.
- (\*2) If no cassette half has been loaded, the deck is put into stop mode in the same way as if the timer switch had been set to the OFF position.

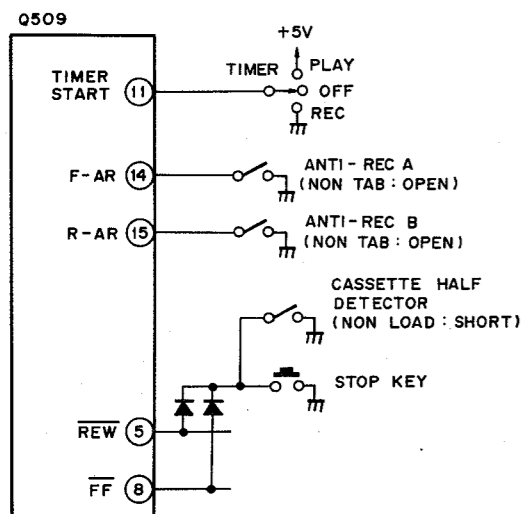


Fig. 2-8 Timer start circuit

**Leader Tape and Tape End Detection Processing in Reverse and Non-Reverse Modes**

Reverse mode (Q509 pin no. 12 at H level) and non-reverse mode (Q509 pin no. 12 at L level) can be selected by the mode selector switch. The operations when the leader tape and tape end are reached are summarized in the Fig. 2-9 below.

Mode	Non-reverse Mode		Reverse Mode	
	Leader Tape	Tape End	Leader Tape	Tape End
REC	F	*	R - REC	R - REC
	R		*	STOP
PLAY	F	*	R - PLAY	R - PLAY
	R		F - PLAY	F - PLAY
FF · REW CUE REVIEW	*	STOP	*	STOP

(\* : No change)

Fig. 2-9 Changes made when leader tape and tape end detected

**Leader Tape Detector Circuit**

Using a photo-transistor sensor, this deck features a quick reverse function to reverse the tape direction when the leader tape section is reached in reverse mode. The detector circuit consists of a photo-transistor current-voltage converter and a pulse generator.

The basic circuit of the photo-transistor current-voltage converter is outlined in Fig. 2-10. Since the magnetic coated tape is opaque to the light beam, Q521 is off and Q522 is on, resulting in a large  $V_o$ . When the leader tape portion is reached, however, Q521 is turned on and Q522 is turned off, resulting in  $V_o$  being reduced. The pulse generator consists of an operational amplifier. When the leader tape is reached, the operational amplifier input voltage is reduced suddenly with the positive and negative inputs being changed as indicated in the diagram. As a result, the output is changed to H level for a fixed interval of time, the width of the output pulse being determined by R534 thru R536 and C510.

When the magnetic coated tape is reached again (in the reverse direction), no H level output is generated (see diagram in Fig. 2-10).

**Auto-Stop Operation**

When the tape is stopped during a tape transport mode (playback, fast forward, rewind, music search) the deck is automatically switched to stop mode.

Tape travel is detected by a photo-interrupter Q1201 (GP-1A01) with a built-in Schmitt trigger. During tape travel, a slitted disc mounted in the tape counter is rotated by the forward direction take-up reel base via the counter belt. This photo-interrupter disc generates output pulses which are passed to the sensing input (pin no. 13) of the control IC (Q509). This pin is the Schmitt trigger input pin which is connected to an internal pulse detector. Whereas a built-in timer/counter is constantly cleared by the pulse detector output while the pulse input is being received from the photo-interrupter during tape travel, the counter is no longer cleared once the pulse input is stopped when the tape end is reached. Consequently, the deck is switched to stop mode four seconds later as indicated in Fig. 2-9.

During reverse playback mode, however, tape play is continued until the STOP key is pressed.

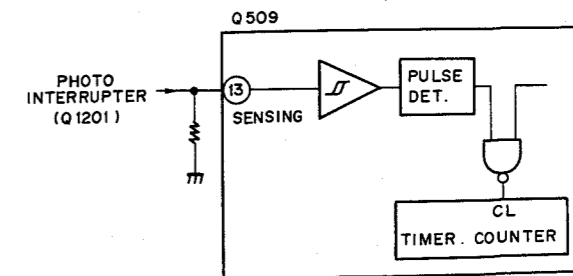


Fig. 2-11 Auto-stop circuit

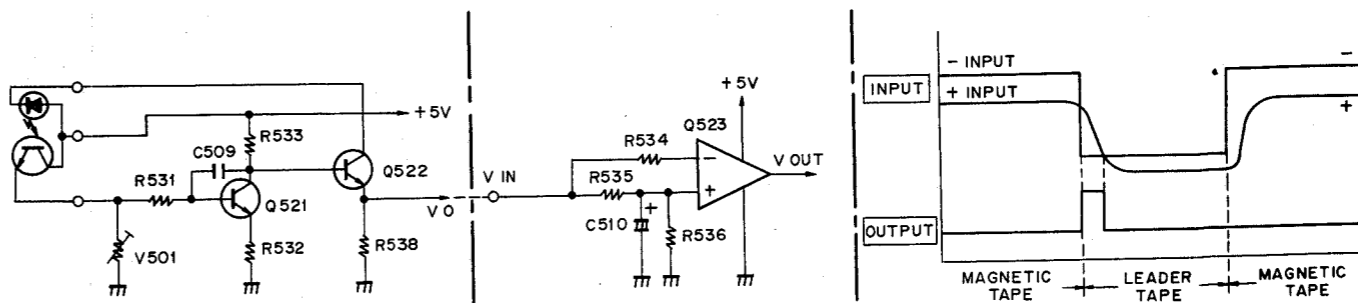
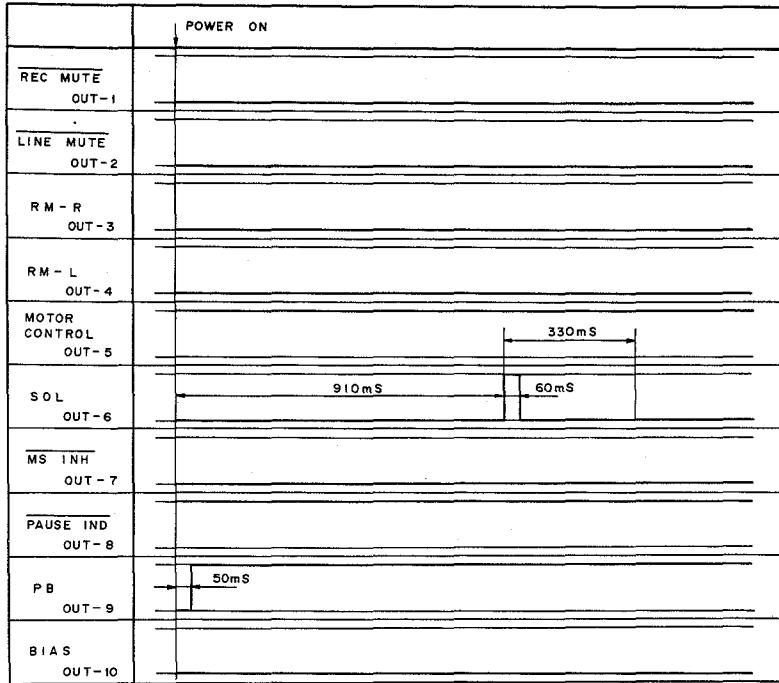


Fig. 2-10 Leader tape detector circuit

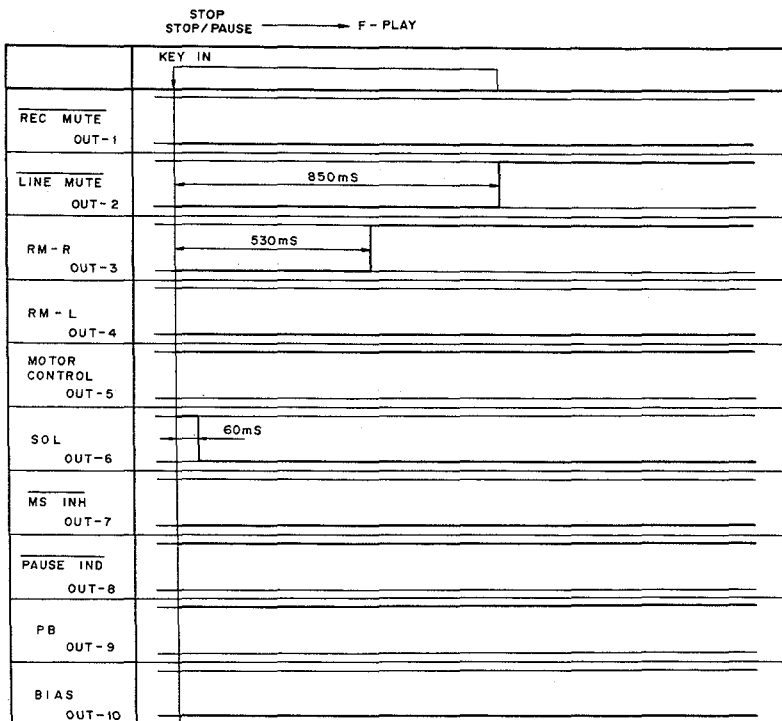
### 3. TIMING CHART

#### Initial Mode

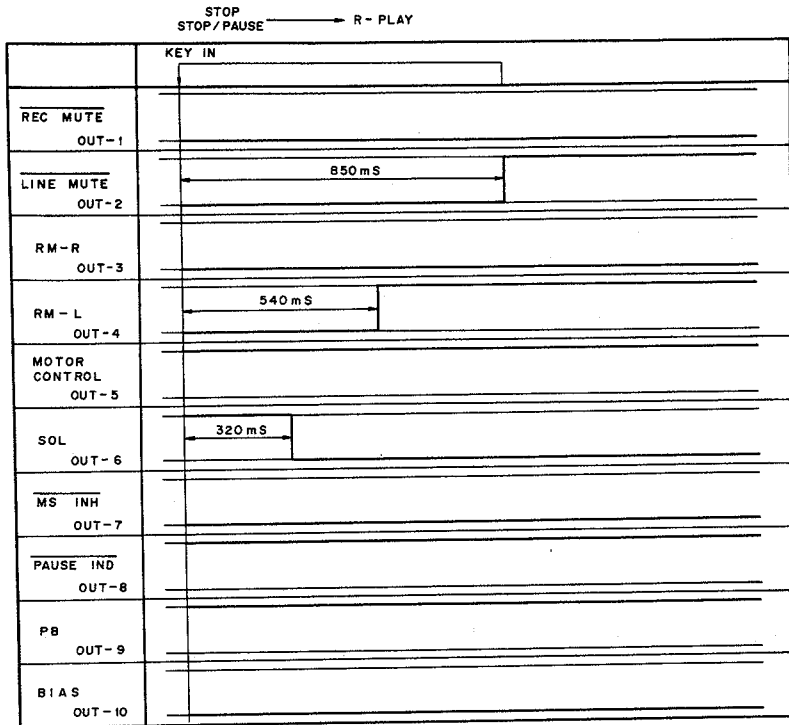


Since the tape transport mechanism is usually in stop mode when the power is switched on, initialization is completed in 910msec. Only when the PLAY switch is on is initialization completed in 330msec (including the 60msec for SOL).

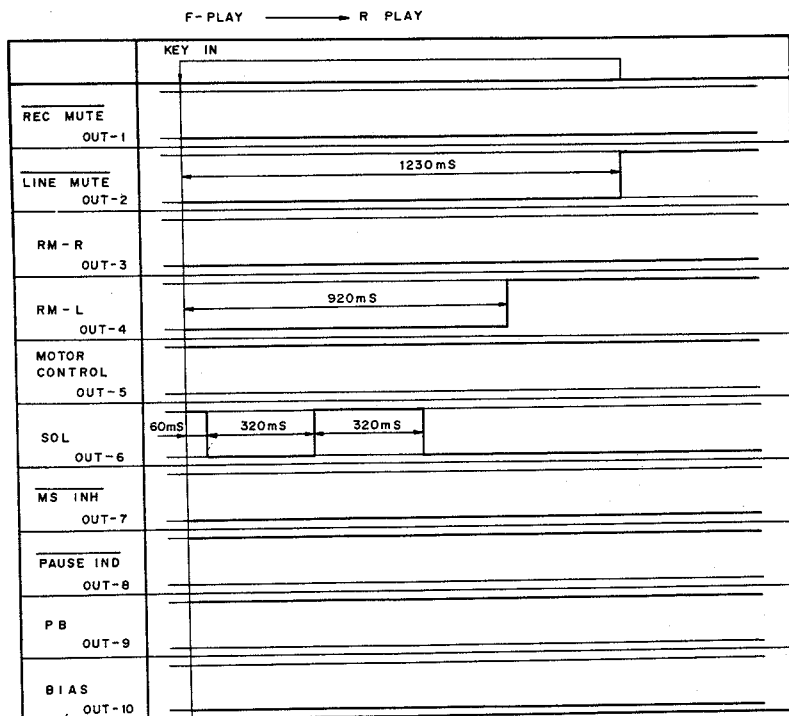
#### STOP → PLAY



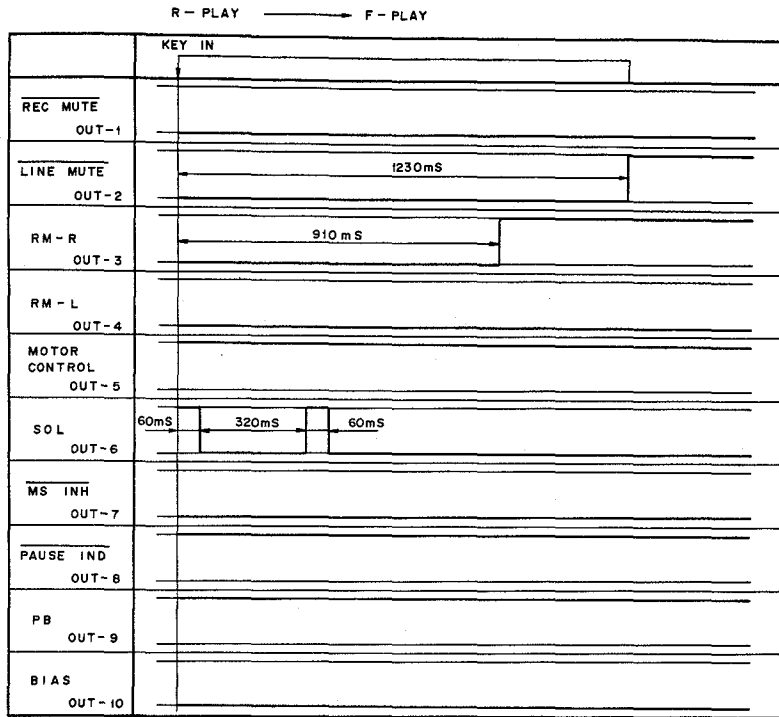
**STOP → REV PLAY**



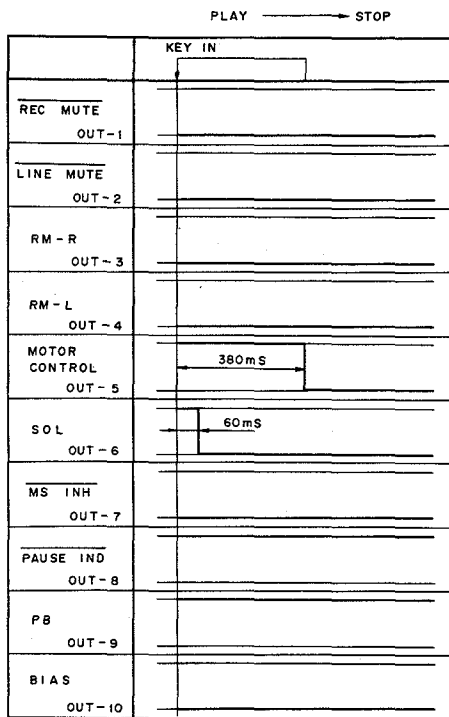
**FWD PLAY → REV PLAY**



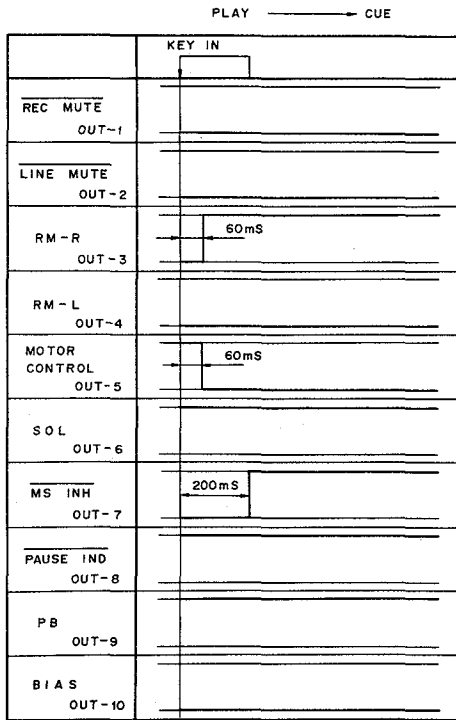
**REV PLAY → FWD PLAY**



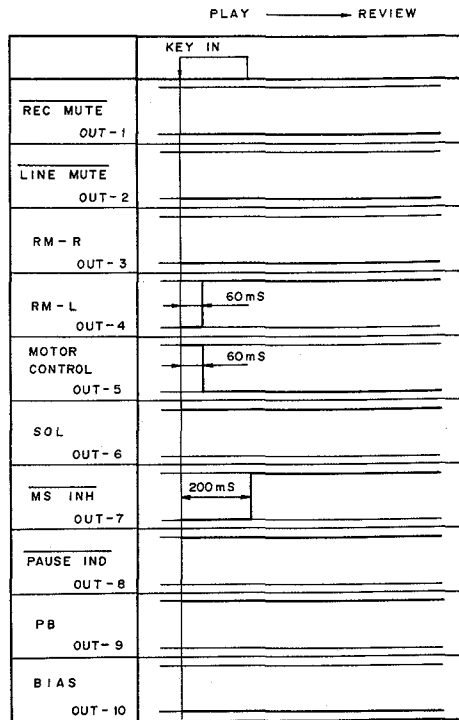
**PLAY → STOP**



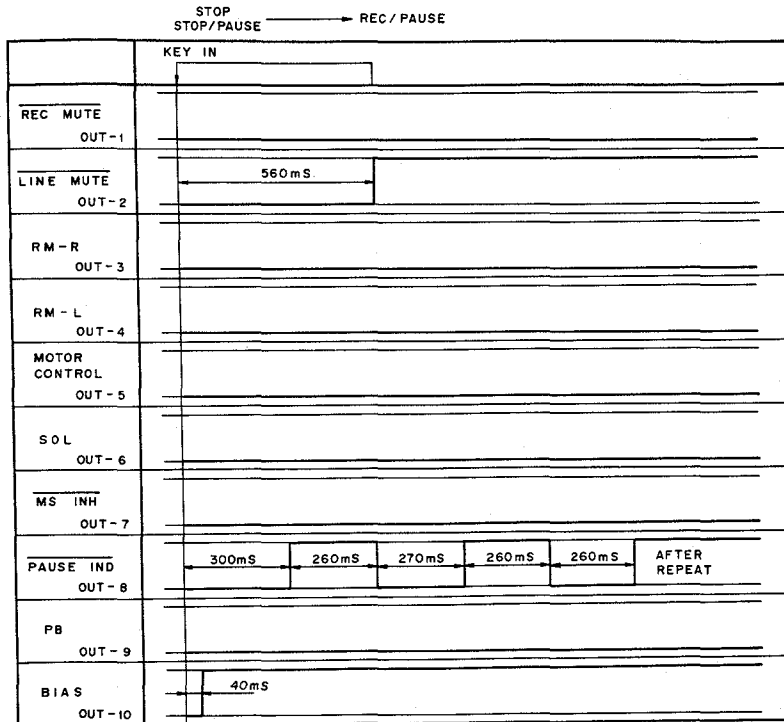
PLAY → CUE



PLAY → REVIEW

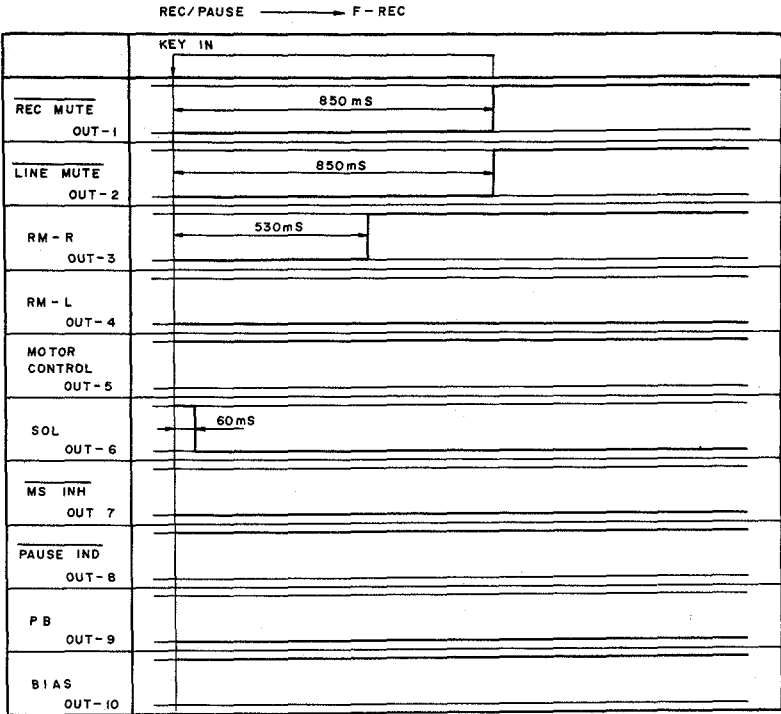


STOP → REC/PAUSE

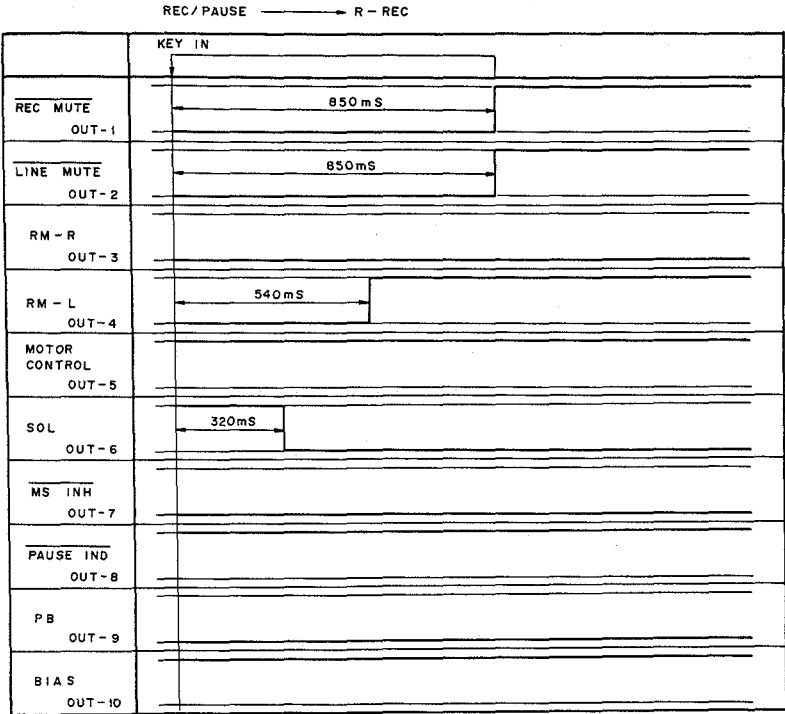




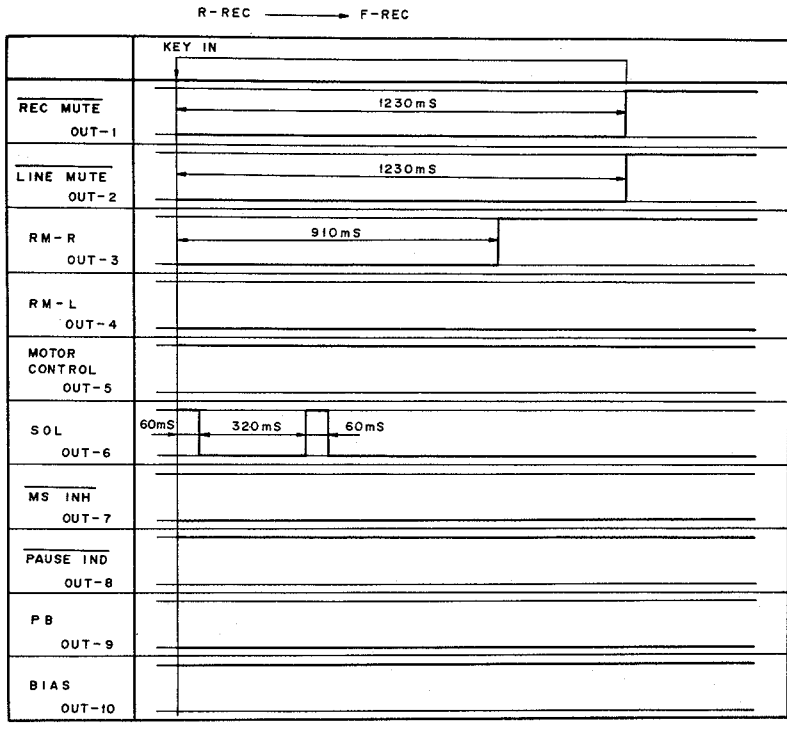
REC/PAUSE → FWD REC



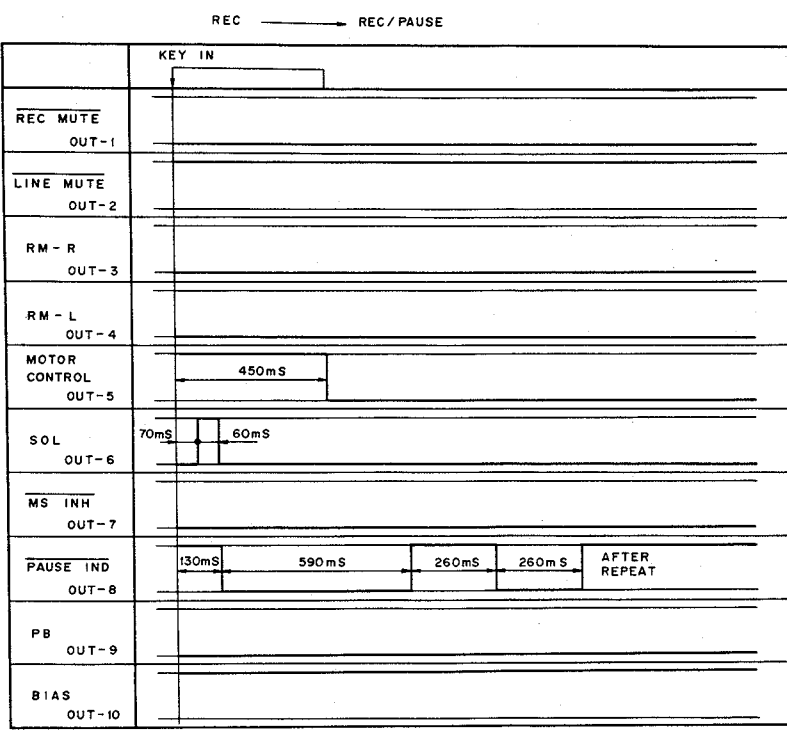
REC/PAUSE → REV REC



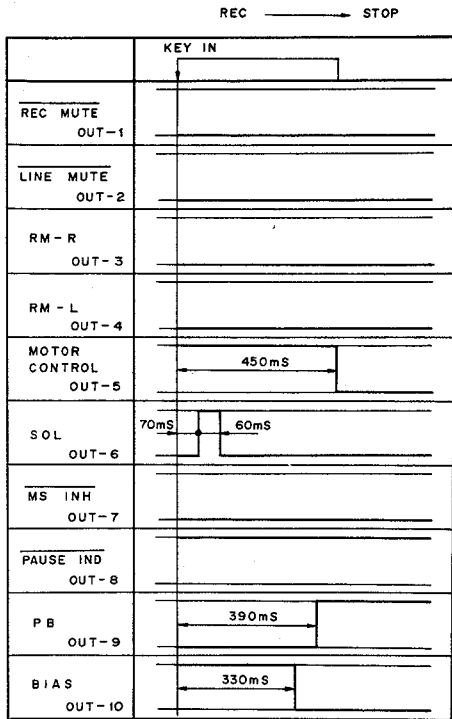
REV REC → FWD REC



REC → REC/PAUSE



REC → STOP



4. IC DESCRIPTION

PDE011 (IC1201)

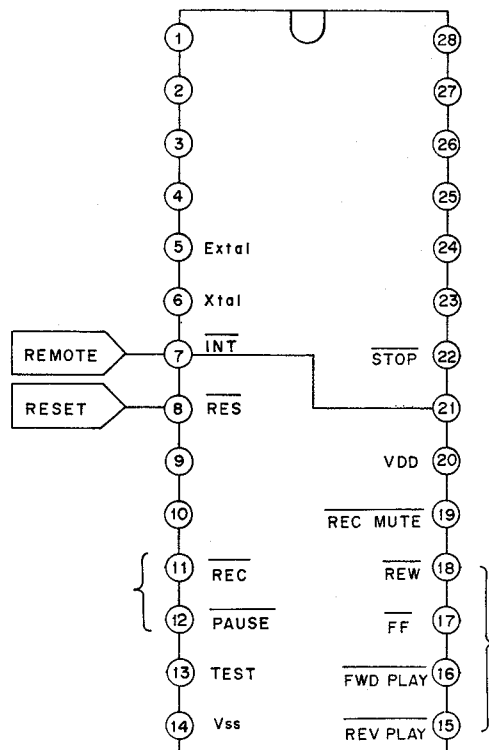


Fig. 4-1 PDE011 IC Pin description

 **PIONEER®**

2315

# Service Manual

**REPAIR & ADJUSTMENTS**



**ORDER NO.  
ARP-1032-0**

**STEREO CASSETTE TAPE DECK**

# CT-2070R(BK)

MODEL CT-2070R [BK] COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Power requirement	Destination
KU	AC120V only	U.S.A.
KC	AC120V only	Canada
D	AC120V, 220V, 240V (switchable)	General market
D/G	AC120V, 220V, 240V (switchable)	U.S.A. Military

- This service manual is applicable to the KU type.
- As to the KC, D and D/G types, please refer to the additional service manual (ARP1033).
- As to the circuit and mechanism descriptions, please refer to the CT-2070R (BK) service manual (ARP1031).
- Ce manuel d'instruction se réfère au mode de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

**PIONEER ELECTRONIC CORPORATION** 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan  
**PIONEER ELECTRONICS SERVICE AND ENGINEERING INC.** P.O. Box 1760, Long Beach, California 90801  
U.S.A.

TEL: (213) 420-5700

**PIONEER ELECTRONIC (EUROPE) N.V.** Keetberglaan 1, 2740 Beveren, Belgium TEL: 03/775-28-08  
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TEL: (03) 580-9911

YI © MAR. 1986 Printed in Japan

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# 1. SPECIFICATIONS

Systems .....	4 track, 2-channel stereo
Heads .....	"Hard Permalloy" recording/playback head x 1 "Ferrite" erasing head x 1
Motor .....	DC servo motor x 1 DC reel motor x 1
Wow and Flutter .....	No more than 0.07% (WRMS) No more than ± 0.19% (DIN)
Fast winding Time .....	Approximately 90 seconds (C-60 tape)
Frequency Response	
-20 dB recording:	
Normal tape .....	25 to 15,000 Hz
Chrome tape .....	25 to 16,000 Hz
Metal tape .....	25 to 17,000 Hz
0 dB recording:	
Normal tape .....	25 to 10,000 Hz
Chrome tape .....	25 to 10,000 Hz
Metal tape .....	25 to 15,000 Hz
Signal-to-Noise Ratio	
Dolby NR OFF .....	More than 58 dB
dbx ON .....	92 dB
Noise Reduction Effect	
Dolby NR B type ON .....	More than 10 dB (at 5 kHz)
Dolby NR C type ON .....	More than 19 dB (at 5 kHz)
Dynamic range .....	110 dB
Harmonic Distortion .....	No more than 0.7% (0 dB)
Input (Sensitivity)	
LINE (INPUT) .....	70 mV (Input impedance 100 kΩ)
MIC (L,R) .....	0.5 mV (Source impedance 600 Ω)
Output (Reference level)	
LINE (OUTPUT) .....	316 mV (Output impedance 4 kΩ)

## Subfunctions

- Recording/playback auto-reverse (Quick reverse)
- Music search function
- Noise reduction systems (dbx, DOLBY NR B/C types)
- 3 position tape selector (NORM/CrO<sub>2</sub>/METAL)
- Timer stand-by function
- Recording mute function
- LED level meter
- Full automatic stop function
- One-touch recording stand-by function
- IC-based full logic control
- Oil damped eject function
- System remote control available

## Miscellaneous

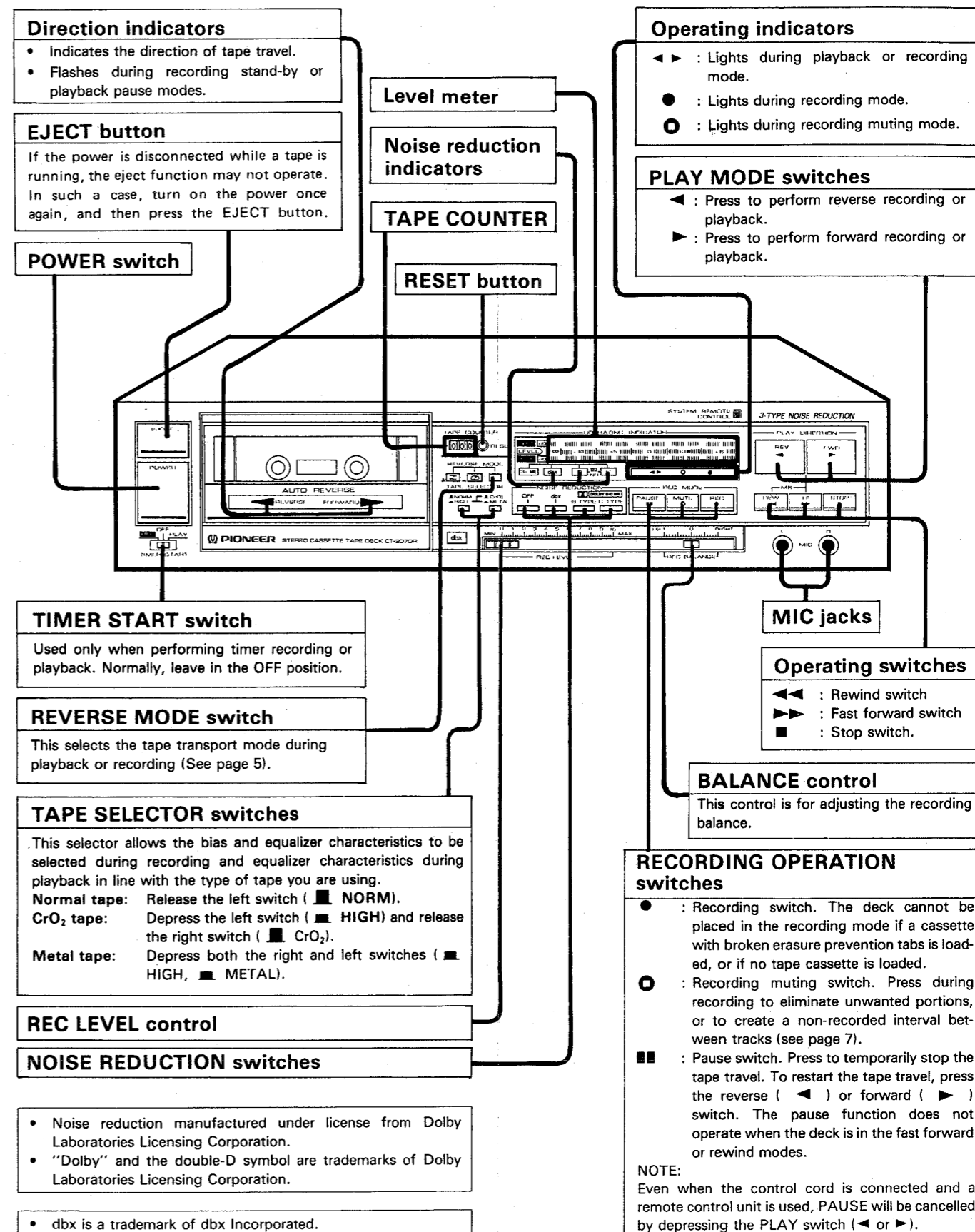
Power Requirements	
U.S., Canadian models .....	AC 120 V, 60 Hz
European model .....	AC 220 V, 50/60 Hz
U.K., Australian models .....	AC 240 V, 50/60 Hz
U.S. military, other destination models .....	AC 120 V/220 V/240V, 50/60 Hz (switchable)
Power Consumption	
U.S., Canadian models .....	22 W
European, U.K., Australian models .....	25 W
U.S. military, other destination models .....	17 W
Dimensions .....	420 (W) x 101 (H) x 211 (D) mm 16-9/16(W) x 4(H) x 8-5/16 (D) in
Weight (without package) .....	3.9 kg (8 lb 10 oz)

## Accessories

Operating instructions .....	1
Connection cord with pin plugs .....	2
Control cord .....	1

**NOTE:**  
Specifications and design subject to possible modifications without notice due to improvements.

# 2. FRONT PANEL FACILITIES



### 3. DISASSEMBLY

#### 3.1 TAPE TRANSPORT UNIT DISASSEMBLY

##### 1. Remove the bonnet.

- Undo the two screws securing the bonnet to the rear panel.

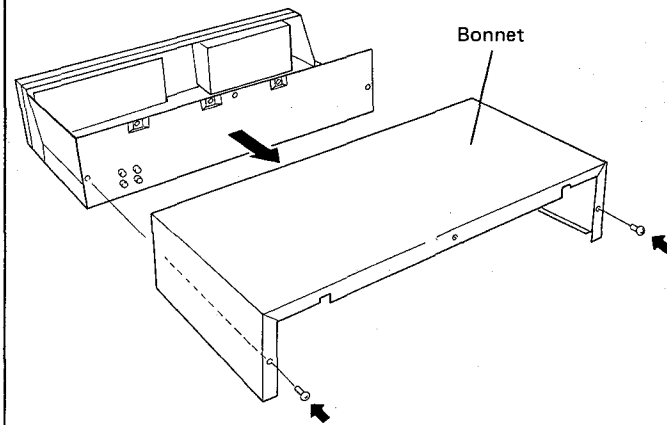


Fig. 3-1-1

##### 2. Temporarily pass the counter belt around a chassis hook.

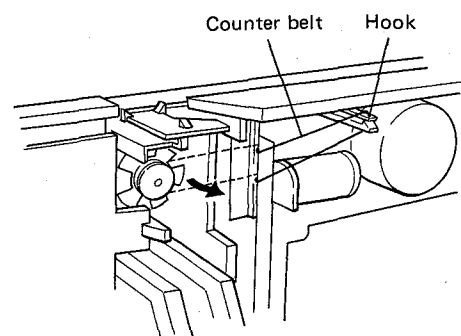


Fig. 3-1-2

##### 3. Remove the tape transport unit.

- Undo the four screws securing the unit, and remove by lifting out diagonally towards the rear.

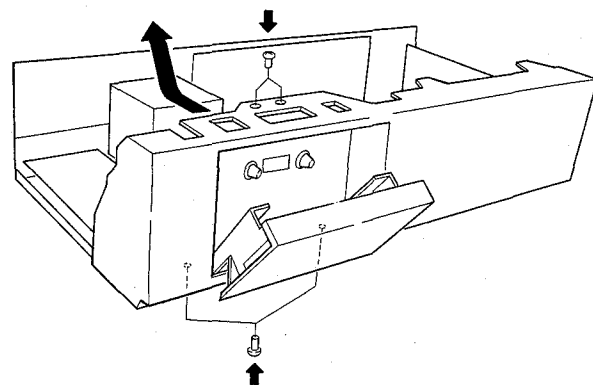


Fig. 3-1-3

#### 3.2 FRONT PANEL REMOVAL

- Undo the screw along the bottom of the panel, and disengage the three upper and three lower hook catches.

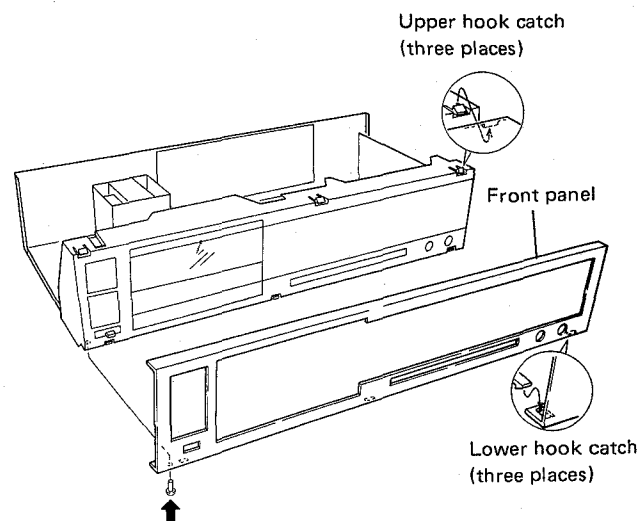


Fig. 3-2-1

#### 3.3 COUNTER BELT REPLACEMENT

##### 1. Remove the tape transport unit from the deck. (see page 5)

##### 2. Remove the cassette plate.

- Undo the screw at the top right hand corner, and remove by lifting out diagonally towards the front.

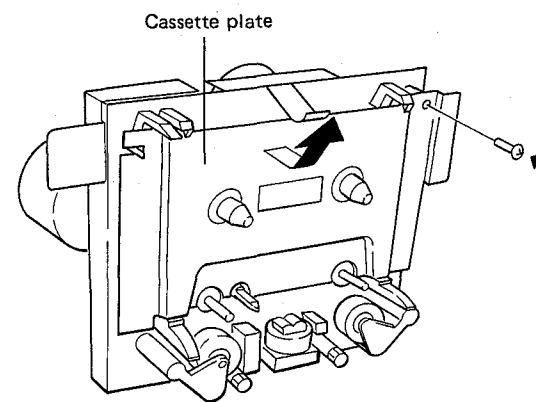


Fig. 3-3-1

##### 3. Replace the belt, and reassemble in the reverse order.

##### 4. Remove the motor bracket.

- Undo the three screws, and remove the motor bracket from the mechanism chassis.

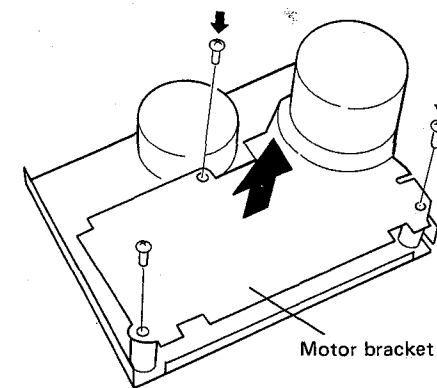


Fig. 3-4-2

##### 5. Replace the belt, and reassemble in the reverse order.

#### 3.4 CAPSTAN BELT REPLACEMENT

##### 1. Remove the tape transport unit from the deck. (see page 5)

##### 2. Loosen the cordfixers, and free the lead wires.

##### 3. Remove the lead wire holder.

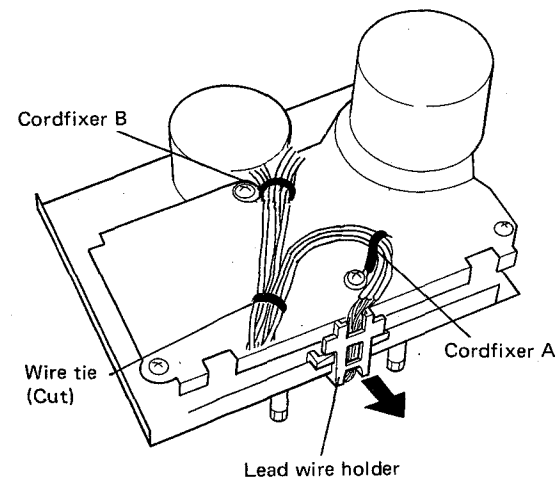


Fig. 3-4-1

##### Capstan belt

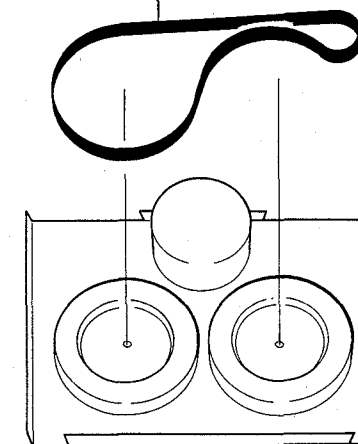


Fig. 3-4-3

**3.5 CAPSTAN MOTOR REPLACEMENT**

1. Remove the tape transport unit from the deck. (see page 5)
2. Disconnect the motor lead wires from the motor.

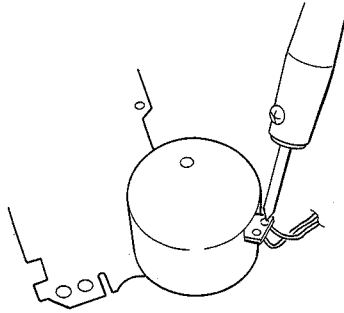


Fig. 3-5-1

3. Same as steps 2 thru 4 of the capstan belt replacement procedure described above. (see page 6)

4. Remove the capstan motor from the bracket, and replace it with a new motor.

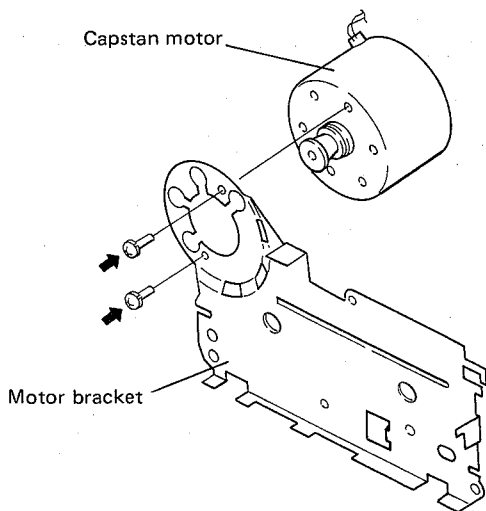


Fig. 3-5-2

5. Re-assembly in the reverse order (when mounting the motor, align the speed adjustment hole with the left hand side when viewed from behind).

6. Adjust tape speed.

**3.6 TAPE HEAD REPLACEMENT**

1. Remove the tape transport unit from the deck. (see page 5)
2. Loosen the cordfixer A, and free the lead wires. (see Fig. 3-4-1)
3. Remove the lead wire holder. (see Fig. 3-4-1)
4. Undo the head securing screws, and pull out the head assembly.

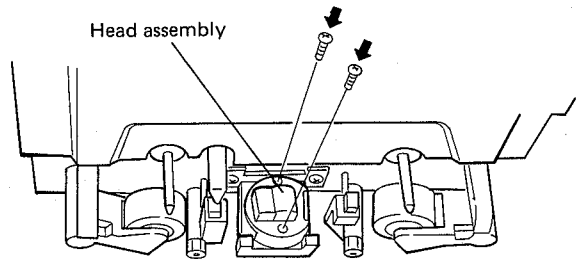


Fig. 3-6-1

5. Disconnect the lead wire soldering from the head with a soldering iron.

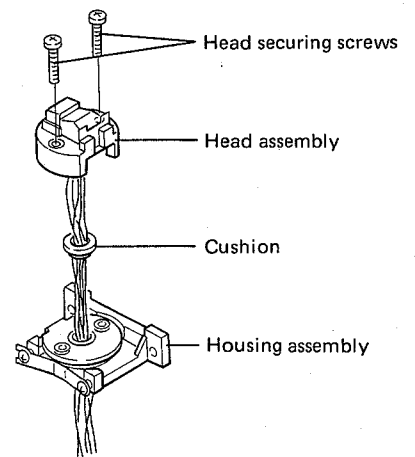


Fig. 3-6-2

6. Re-assembly in the reverse order.
7. Execute the "Tape transport adjustment" and "Electrical adjustments".

Note: After completing the head replacement procedure, always ensure that the securing screws are sealed.

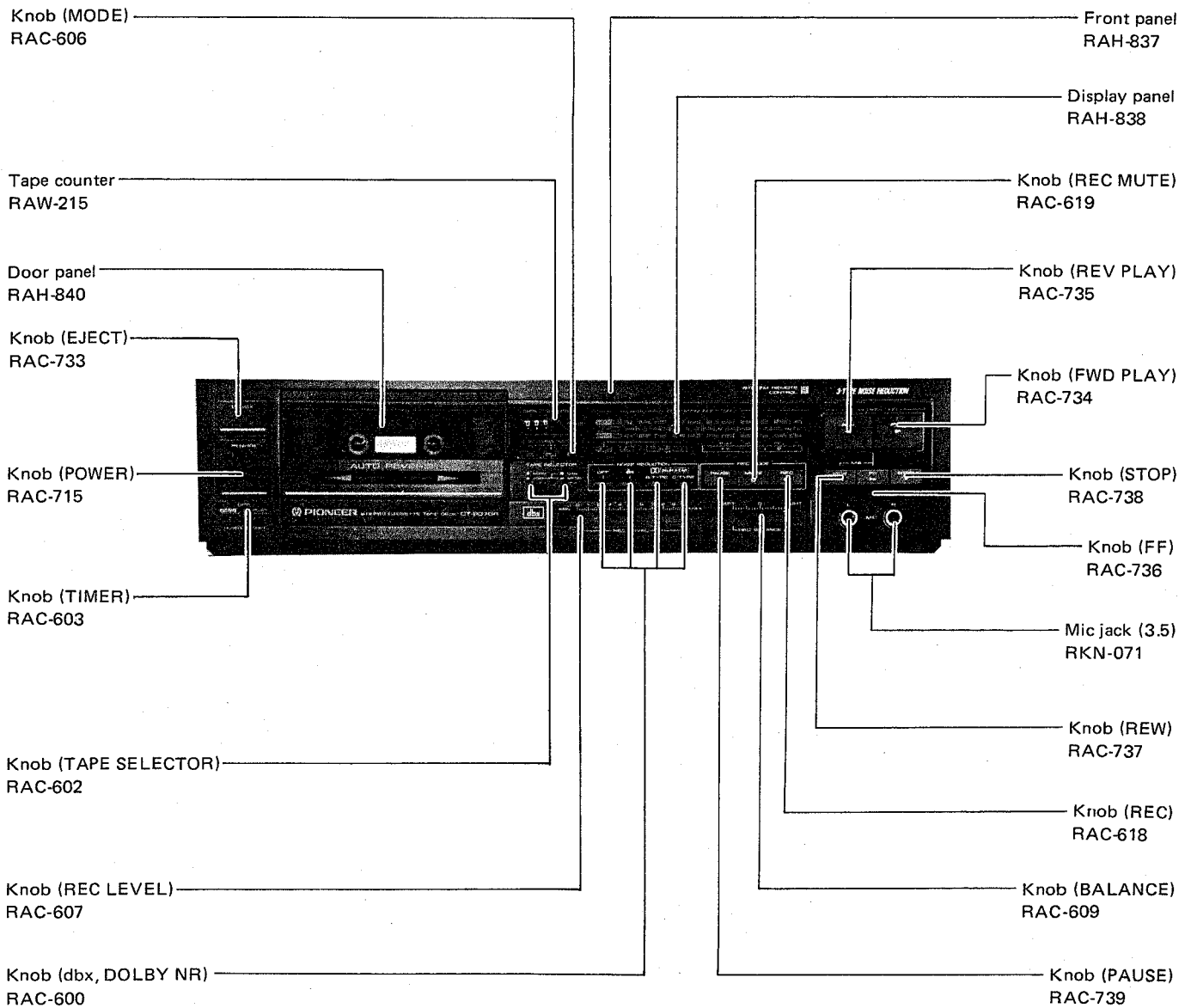


## 4. PARTS LOCATION

**NOTES:**

- The  $\triangle$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.  
**★★ GENERALLY MOVES FASTER THAN ★**  
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

**Front Panel View**

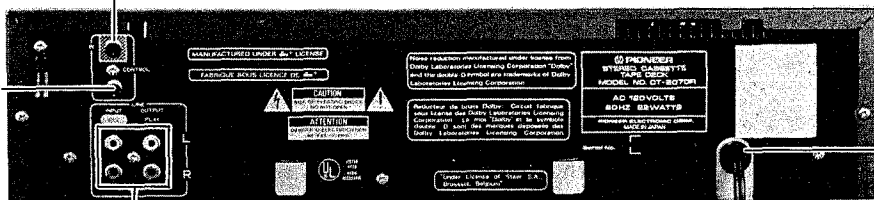


**Rear Panel View**

Terminal connector OUT 8-P  
RKP-590

Terminal connector IN 8-P  
RKP-602

Terminal (LINE) (4P)  
PKB-023



⚠ Strain relief  
CM-22

⚠ AC power cord  
RDG-048

**Top View**

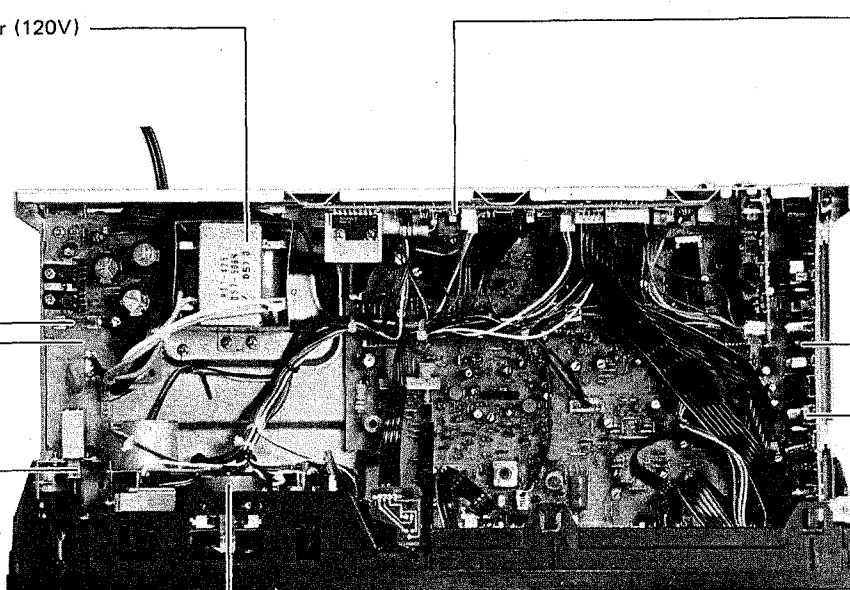
⚠ ★ Power transformer (120V)  
RTT-425

⚠ ★★ Fuse (1.25A)  
REK-073

Power supply unit

★★ Reel motor  
RXM-136

★★ Capstan motor  
RXM-135



Control unit

Dbx unit

Main unit

## 5. ELECTRICAL PARTS LIST

**NOTES:**

- When ordering resistors, first convert resistance values into code form as shown in the following examples.
  - Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).
 

560Ω	56 × 10 <sup>1</sup>	561	RD¼PS	5	6	1	J
47kΩ	47 × 10 <sup>3</sup>	473	RD¼PS	4	7	3	J
0.5Ω	0R5		RN2H	0	R	5	K
1Ω	010		RS1P	0	1	0	K
  - Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).
 

5.62kΩ	562 × 10 <sup>1</sup>	5621	RN¼SR	5	6	2	1	F
--------	-----------------------	------	-------	---	---	---	---	---
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.  
**★★ GENERALLY MOVES FASTER THAN ★**  
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "  $\odot$  " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

**Miscellaneous Parts**

**P.C. BOARD UNITS**

Mark	Symbol & Description	Part No.
	Main unit	Non supply
	Power supply unit	Non supply
	Direction unit	Non supply
	Timer unit	Non supply
	Transistor A unit	Non supply
	Transistor B unit	Non supply
	Indicator unit	Non supply
	Control unit	Non supply
	End sensor unit	Non supply
	dbx unit	Non supply
	Remote control unit	Non supply

**OTHERS**

Mark	Symbol & Description	Part No.
$\Delta$ ★★	FU1 Fuse (1.25A)	REK-073
$\Delta$ ★	T1 Power transformer (120V)	RTT-425
$\Delta$	AC Power cord	RDG-048
$\Delta$	Strain relief (for AC power cord)	CM-22
★★	CM Capstan motor	RXM-135
★★	RM Reel motor	RXM-136
$\Delta$ ★	Solenoid	RXP-161
★★	Tape head assembly	RPB-120
★	Leader tape sensor assembly	RXC-049
★★	S1 Push switch	RSG-179
★★	S2, S3 Push switch	RSG-178
★★	S4, S5 Spring switch	RSN-038

**Main Unit**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
★★	IC101, IC102	AN7370K
★★	IC105	BA338
★★	IC104	M5218L
★★	IC103	M5220L

Mark	Symbol & Description	Part No.
★★	Q102, Q104, Q106, Q108 – Q110, Q202, Q204, Q206, Q208 – Q210, Q301, Q305, Q308	2SC1740SLN
★★	Q101, Q201	2SC2240
★★	Q302 – Q304	2SC3243
★★	Q307, Q309	2SA933SLN
★★	Q114, Q115, Q214, Q215	2SK246
★★	Q113, Q116, Q213, Q216	2SJ103
★★	Q111, Q112, Q211, Q212	DTC143TS
★	D301, D304, D308–D315, D316, D319, D320, D321, D317, D318	1SS254
$\Delta$ ★	D303	RD5.1FB1 (RF5.1FB2)
★	D305, D306	1SR35-100A
	D302	MTZ5.1B (RD5.6EB2)

**SWITCHES**

Mark	Symbol & Description	Part No.
★★	S301 Push switch assembly (TAPE SELECTOR)	RSG-170
	S101, S201 Phone jack with switch (MIC)	RKN-087 (RKN-092)

**COILS**

Mark	Symbol & Description	Part No.
	L301 OSC coil	RTD-037
	L105, L205 Trap coil	RTF-152
	L103, L203 Trap coil	RTF-153
	F101, F201 MPX filter	RTF-138
	L302 Line coil	RTF-101
	L104, L204 Peaking coil (6.8mH)	RTF-126
	L102, L202 Coil (36mH)	RTF-092

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C128, C228, C318	CEAR10M50
	C126, C226	CEJAR15M50
	C147, C247	CEJAR22M50
	C129, C139, C229, C239	CEJAR33M50
	C127, C227	CEASR47M50
	C149, C249	CKDYB471K50
	C101, C103, C136, C140, C201, C203, C236, C240, C316, C320, C333	CEAS010M50
	C323, C328	CEAS4R7M50
	C115, C124, C132-C135, C138, C146, C148, C215, C224, C232-C235, C238, C246, C248, C327, C329	CEAS100M16
	C107, C130, C207, C230, C302, C303, C312-C314, C317, C330, C332, C335	CEAS330M16
	C304, C321, C322, C326, C331	CEAS101M16
	C324, C325	CEAS221M16
	C116, C216	CEA471M16
	C113, C114, C213, C214	CEANL010M50
	C105, C109, C205, C209	CEANL100M16
	C104, C204	COSA821J50
	C307	CQPA183J100
	C131, C231	CCDSL101J50
	C141, C241	CKDYB471K50
	C301, C334, C336	CKDYF473Z50
	C305, C306	CCDSL101K500
	C102, C106, C202, C206	CCPSL101J50
	C311	CQMA682K50
	C308	CQMA223J50
	C319	CQMA104K50
	C112, C119, C137, C212, C219, C237	CQMA182J50
	C309, C310	CQMA332J50
	C121, C221	CQMA472J50
	C118, C145, C218, C245	CQMA822J50
	C111, C143, C211, C243	CQMA222J50
	C108, C123, C142, C144, C208, C223, C242, C244, C315	CQMA103J50
	C110, C210	CQMA153J50
	C117, C122, C217, C222	CQMA273J50
	C120, C125, C220, C225	CQMA333J50

**RESISTORS**

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

Mark	Symbol & Description	Part No.
★	VR101, VR102, VR201, VR202 Semi-fixed (22k-B)	VRTB6VS223
★	VR301, VR302 Semi-fixed (150k-B)	VRTB6VS154
★	VR303 Semi-fixed (100-B)	RCP-031
△	R322	RS2LF680J
△	R312, R304	RD1/2PMF □□□J

Mark	Symbol & Description	Part No.
	R101-R106, R109-R113, R115, R116, R167, R169, R201-R206, R209-R213, R216, R269, R301-R303, R314, R315, R324, R325, R328, R335, R337, R215	RD1/4PM □□□J
	Other resistors	RD1/6PM □□□J

**OTHERS**

Mark	Symbol & Description	Part No.
	CN19 Connector 8-P	RKP-590
★★	RY301 Reed relay Terminal (LINE)(4P)	RSR-035 RKB-023

**Power Supply Unit**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
△ ★	D402	1B2C1-LC2
△ ★	D401	1B2Z1-LC2
△ ★	D403, D406	1SR35-100A
△ ★	D404, D405	RD13EB2 (MTZ13B)

**SWITCH**

Mark	Symbol & Description	Part No.
△ ★★	S401 Push switch (POWER)	RSA-063

**CAPACITORS**

Mark	Symbol & Description	Part No.
△	C407 Ceramic (0.01/AC400V)	RCG-009 (VCG-044)
	C403, C406	CEAS101M16
	C402	CEAS101M25
	C405	CEAS222M16
	C401, C404	CEA102M35

**RESISTORS**

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

Mark	Symbol & Description	Part No.
△	R401, R403, R404 R402	RD1/2PMF □□□J RD1/4PM561J

**Direction Unit**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
★	D701, D702	LD-603MG

**RESISTOR**

Mark	Symbol & Description	Part No.
	R701	RD1/4PM391J

**Timer Unit**

**SWITCH**

Mark	Symbol & Description	Part No.
★	S801 Slide switch (TIMER)	RSH-064

**Transistor A Unit**

**SEMICONDUCTOR**

Mark	Symbol & Description	Part No.
△ ★★	Q1001	2SD1265

**Transistor B Unit**

**SEMICONDUCTOR**

Mark	Symbol & Description	Part No.
△ ★★	Q1101	2SD1265

**Indicator Unit**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
★★	IC601, IC602	BA6124
★★	Q601-Q603	2SC1740S
★★	D601, D602, D605, D607-D609, D617 - D619	SEL4214S
★	D606, D610, D611, D615, D616, D620	SEL4914A
★	D603, D604, D612	SEL4414E
★	D613, D614	1SS254

**SWITCHES**

Mark	Symbol & Description	Part No.
★★	S604 Push switch (MODE)	RSG-173
★★	S601 Push switch B (NR)	RSG-171
★★	S605-S612 Push switch	RSG-155

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C601, C602	CEAS100M16

**RESISTORS**

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

Mark	Symbol & Description	Part No.
	VR601 Variable (REC LEVEL)	RCW-012
	VR602 Variable (BALANCE)	RCS-029
△	R609, R615	RD1/2PMF680J
	R603, R606, R608, R610	RD1/4PM □□□J
	Other resistors	RD1/6PM □□□J

**Control Unit**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
★★	Q513	2SD882
★★	Q510	2SA881
★★	Q515, Q516	2SC3243
★★	Q505 - 508, Q514, Q517 - Q519, Q521, Q522	2SC1740S
★★	Q501 - Q504, Q511	2SA933S
★★	Q520	DTC124XS
★	IC501	PD2012
★★	IC503	M54543L
★	D501	RD5.6EB1 (MTZ5.6A)
★	D501-D505, D508, D509, D512, D513	1SS254
★	IC502	M5218L
★	D506, D507	1SR35-100A
★	D510	RD3.6EB2
★	D511	MTZ5.6A

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C504	CEASR47M50
	C510	CEAS330M16
	C506	CEAS100M16
	C502	CEAS101M10
	C507	CQMA822J50
	C505	CEAS220M16
	C503, C509	CKDYF103Z50
	C501, C508	CKDYF473Z50

**RESISTORS**

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

Mark	Symbol & Description	Part No.
★	V501 Semi-fixed (22k-B)	VRTG6HS223
★	V502 Semi-fixed (15k-B)	VRTB6VS153
△	R515	RS2LF200J
	R501, R511, R520, R522 - R524, R530, R541	RD1/4PM □□□J
	R539 Thermo-sensitive resistor	RCN-053
	Other resistors	RD1/6PM □□□J

End Sensor Unit

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★	Photo-interrupter	GP-1A01

dbx Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC913	AN6291
★★	IC914	M5218L
★★	Q901 - Q912, Q915, Q919	2SC1740SLN
★★	Q916 - Q918	2SA933S
△ ★	D903	RD5.6EB1 (RD5.6EB2) (MTZ5.6A) (MTZ5.6B)
★	D901, D902	1SS254

CAPACITORS

Mark	Symbol & Description	Part No.
	C946	CEA101M16
	C947	CEA331M10
	C939, C940, C945	CEA330M16
	C925, C926, C948	CEA470M10
	C929, C930, C936, C943, C944	CEA100M16
	C949	CEA4R7M50
	C935, C937, C938	CEA010M50
	C917, C918 Electrolytic (10/16, NL)	RCH-069 (RCH-070) RCH-073 (RCH-074)
	C919, C920 Electrolytic (0.68/50V)	
	C913, C914	CEAR33M50
	C901, C902	CEAR22M50
	C941, C942	CCDSL181J50
	C903 - C906	CQMA104J50
	C915, C916	CQMA333J50
	C923, C924, C933, C934	CQMA223J50
	C927, C928	CQMA472J50
	C907 - C910	CQMA332J50
	C921, C922	CQSA471J50
	C931, C932	CQSA391J50
	C911, C912	CQSA331J50

RESISTORS

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

Mark	Symbol & Description	Part No.
★	V901 Semi-fixed (2.2k B)	VRTB6VS222
	R912, R914, R916, R942, R957 - R958	RD1/4PM □□□J
	Other resistors	RD1/6PM □□□J

OTHERS

Mark	Symbol & Description	Part No.
	J901 Connector 8-P	RKP-602

Remote Control Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC1201	PDE011
★★	Q1202	2SA933S
★★	Q1201	2SC1740SLN
★	D1201-D1204	1SS254

CAPACITORS

Mark	Symbol & Description	Part No.
	C1201	CKDYF103Z50
	C1204	CKDYF473Z50
	C1202, C1203	CCDSL221J50
	C1205	CEAS010M25

RESISTORS

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

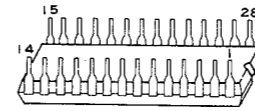
Mark	Symbol & Description	Part No.
	R1201-R1210	RD1/4PM □□□J

OTHERS

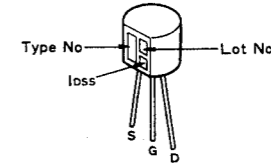
Mark	Symbol & Description	Part No.
	JA1201, JA1202 Mic jack (3.5)	RKN-071
	X1201 Ceramic resonator	KBR-800H

External Appearance of Transistors and ICs

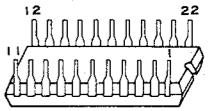
AN7370K



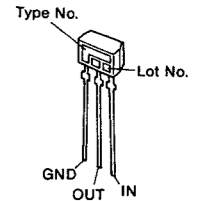
2SJ103  
2SK246



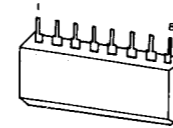
AN6291



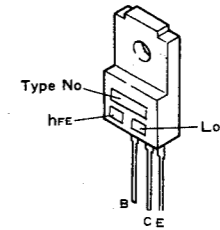
DTC143TS  
DTC124XS



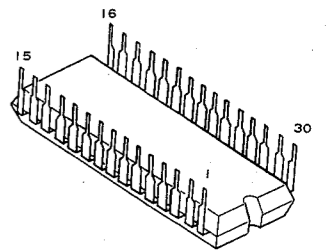
M5220L  
M5218L



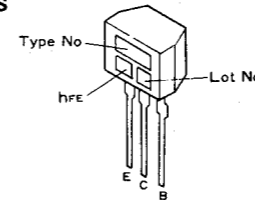
2SD1265



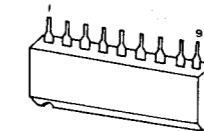
PDE011



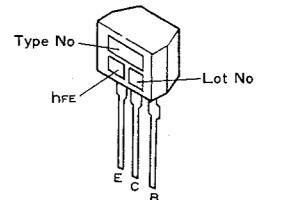
2SA933SLN  
2SA933S  
2SC1740SLN  
2SC1740S



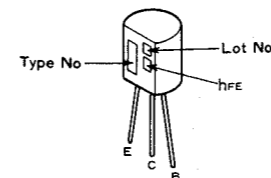
BA6124



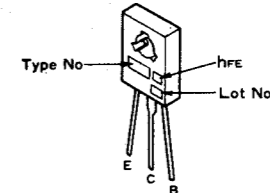
2SC1740SLN  
2SA933S



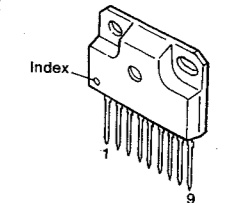
2SC2240



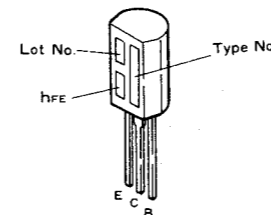
2SD882



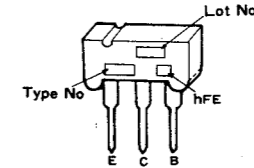
M54543L  
PD2012



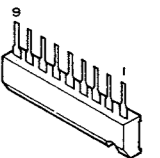
2SC3243



2SA881



BA338



vert the resistance value  
te the part no. as before.

Part No.
RCW-012
RCS-029
RD1/2PMF680J
RD1/4PM □□□J
RD1/6PM □□□J

Part No.
2SD882
2SA881
2SC3243
2SC1740S

2SA933S
DTC124XS
PD2012
M54543L
RD5.6EB1 (MTZ5.6A)
1SS254

M5218L
1SR35-100A
RD3.6EB2
MTZ5.6A

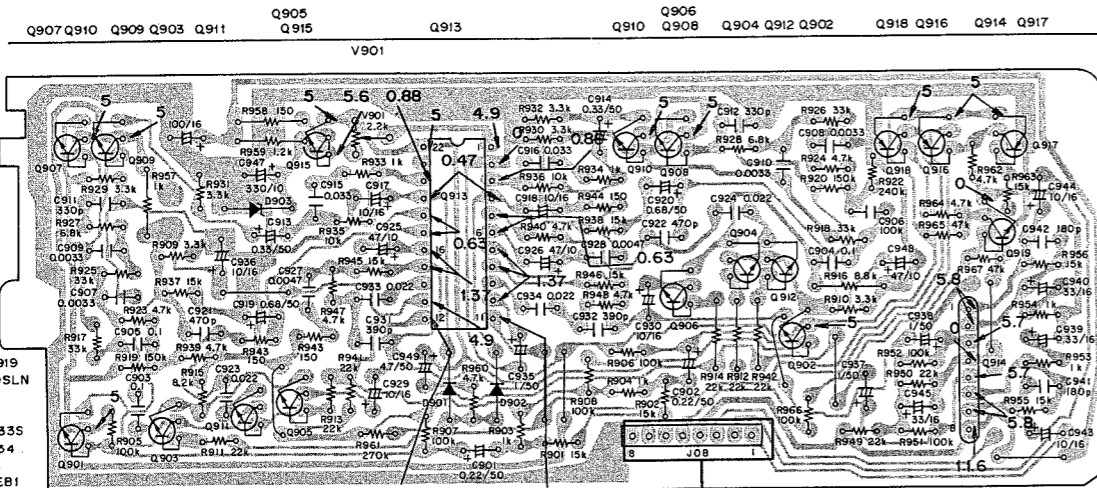
Part No.
CEASR47M50
CEAS330M16
CEAS100M16
CEAS101M10
CQMA822J50
CEAS220M16
CKDYF103Z50
CKDYF473Z50

ert the resistance value  
te the part no. as before.

Part No.
VRTG6HS223
VRTB6VS153
RS2LF200J
RD1/4PM □□□J
RCN-053
RD1/6PM □□□J

# 6. P.C. BOARDS CONNECTION DIAGRAM

## dbx UNIT

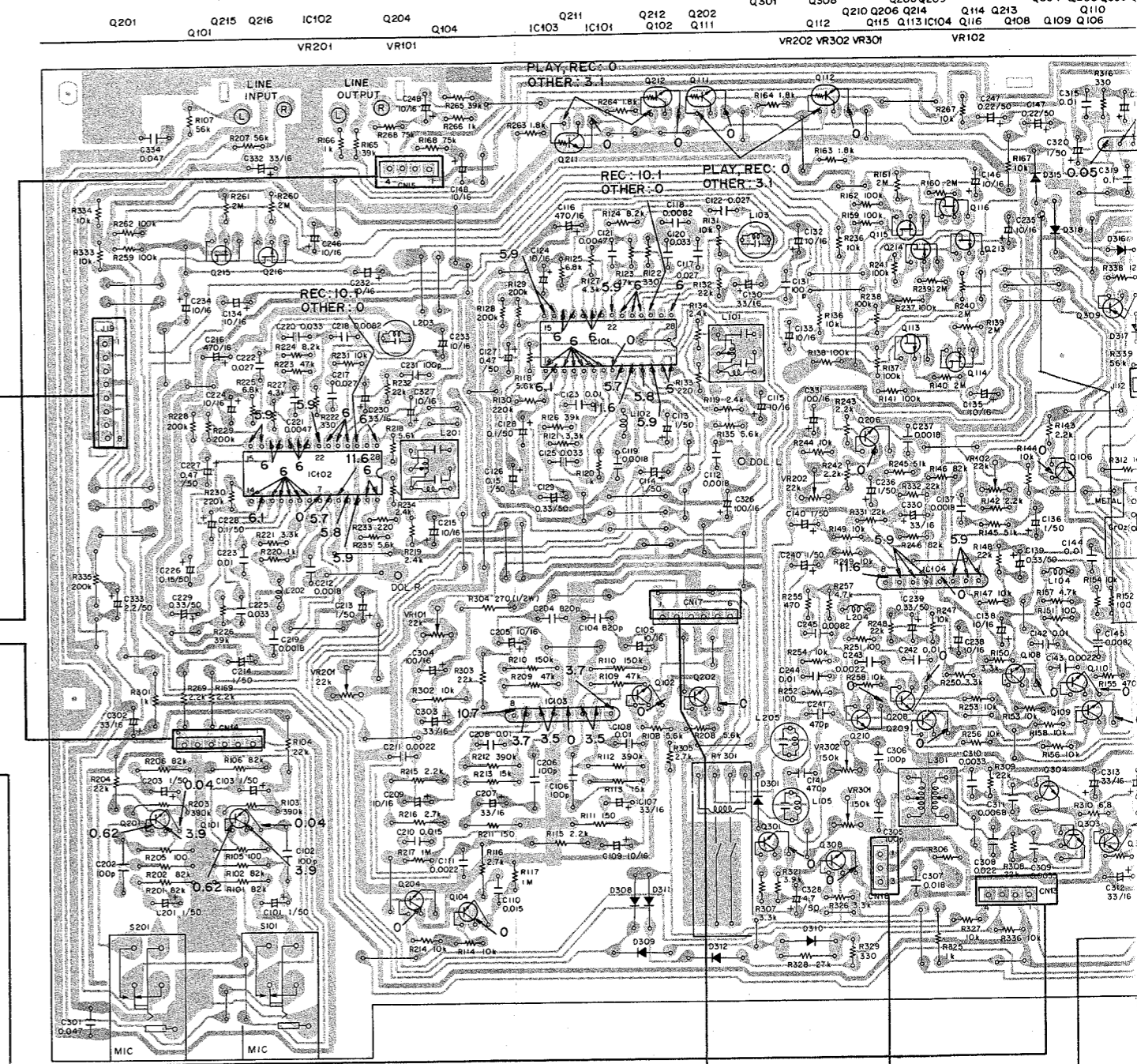


- Q901 ~ 912, 915, 919 25C1740SLN
- Q913 AN6291
- Q914 M5218L
- Q916-918 25A933S
- D901, 902 15S254
- D903 MTZ5.6A or RD5.6EB1

dbx ON(REC):4.9  
dbx OFF:4.9  
OTHER:0

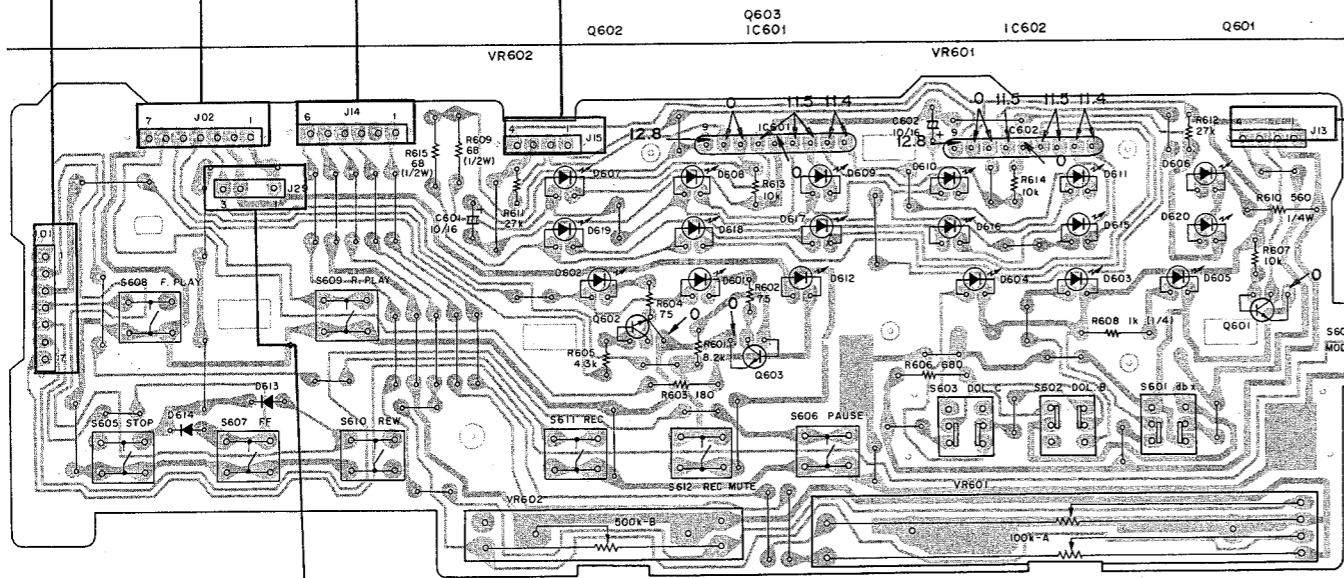
dbx ON(REC):4.9  
OTHER:0

## MAIN UNIT

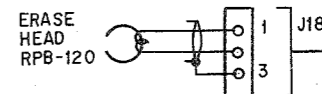
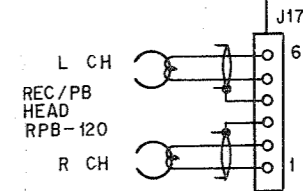


IC601 ~ 602 BA6124  
Q601-603 25C1740S

- D601, 602, 605, 607-609, 617-619 SEL4214S
- D603, 604, 612 SEL4414E
- D606, 610, 611, 615, 616, 620 SEL4914A
- D613, 614 15S254

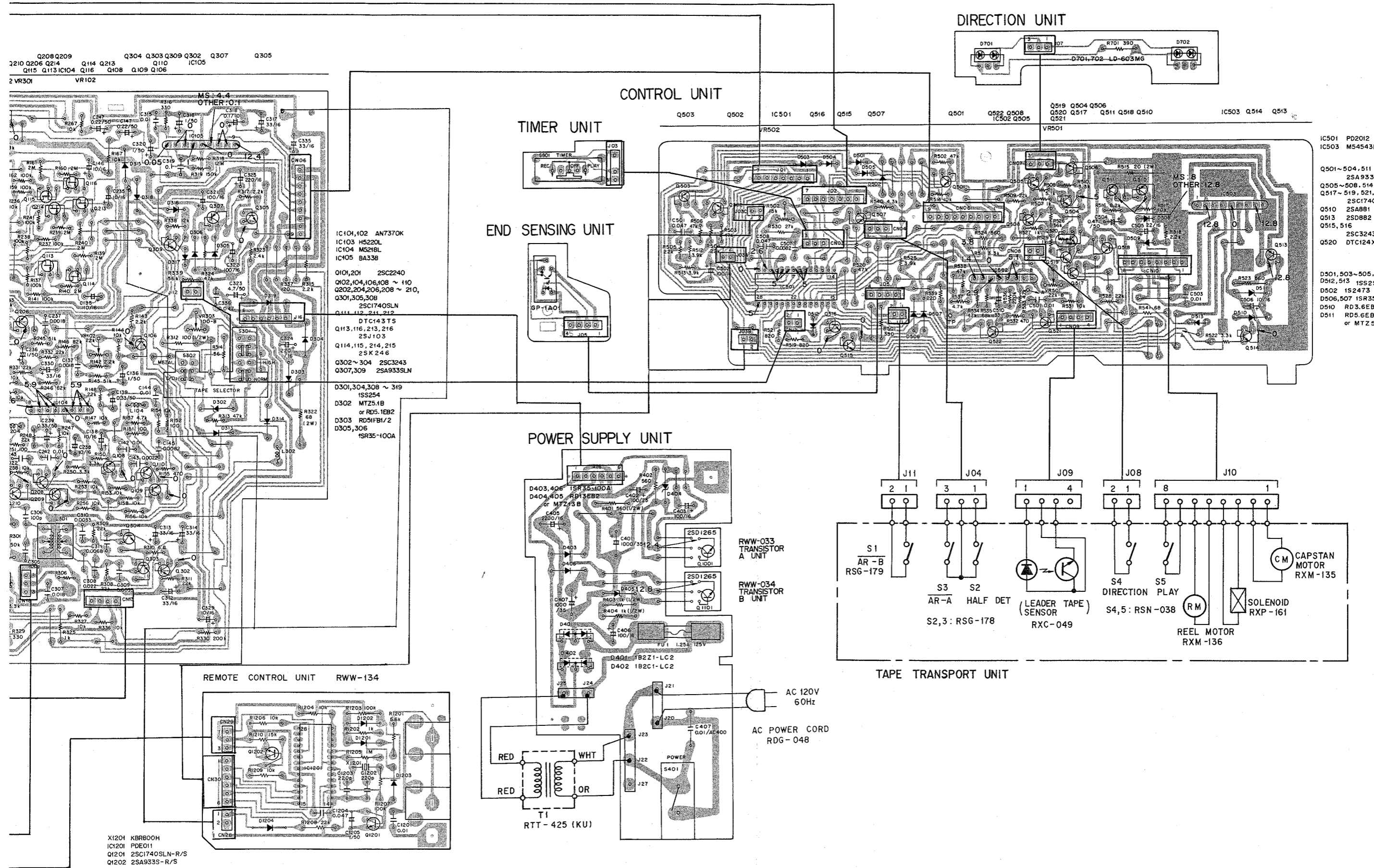


## INDICATOR UNIT



- X1204 KBR00H
- IC1201 PDE011
- Q1201 25C1740SLN-R
- Q1202 25A933S-R/S





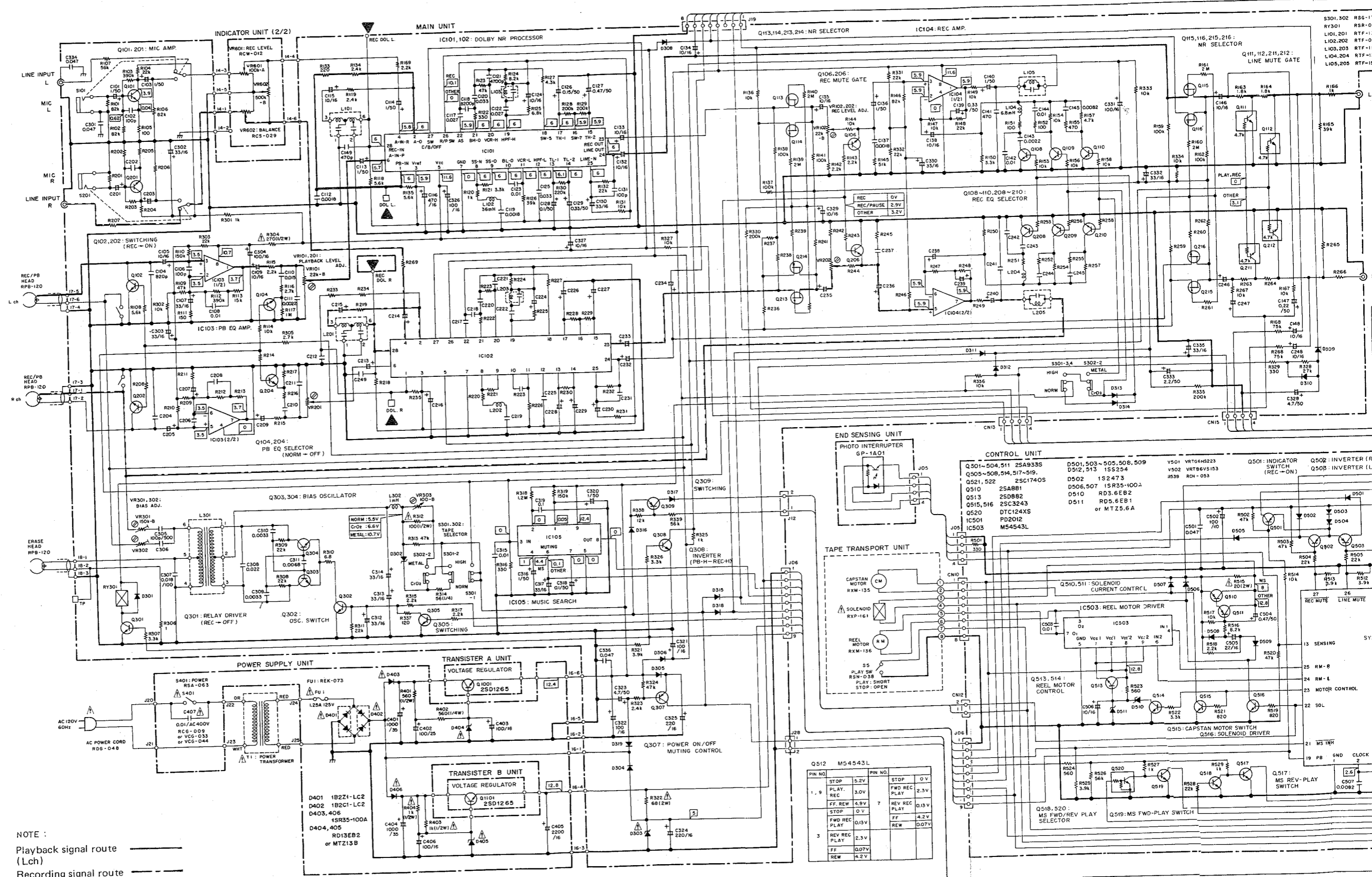
A

B

C

D

# 7. SCHEMATIC DIAGRAM



NOTE:  
 Playback signal route (Lch)  
 Recording signal route (Rch)

PIN NO.	STOP	5.2V	STOP	0V
1, 9	PLAY	3.0V	FWD REC	2.3V
	REC		PLAY	0.13V
	FF, REV	4.9V	FF	4.2V
	STOP	0V	REV REC	0.07V
	FWD REC	0.13V	PLAY	
	PLAY	2.3V	REW	
	FF	0.07V		
	REW	4.2V		

A  
B  
C  
D

1

2

3

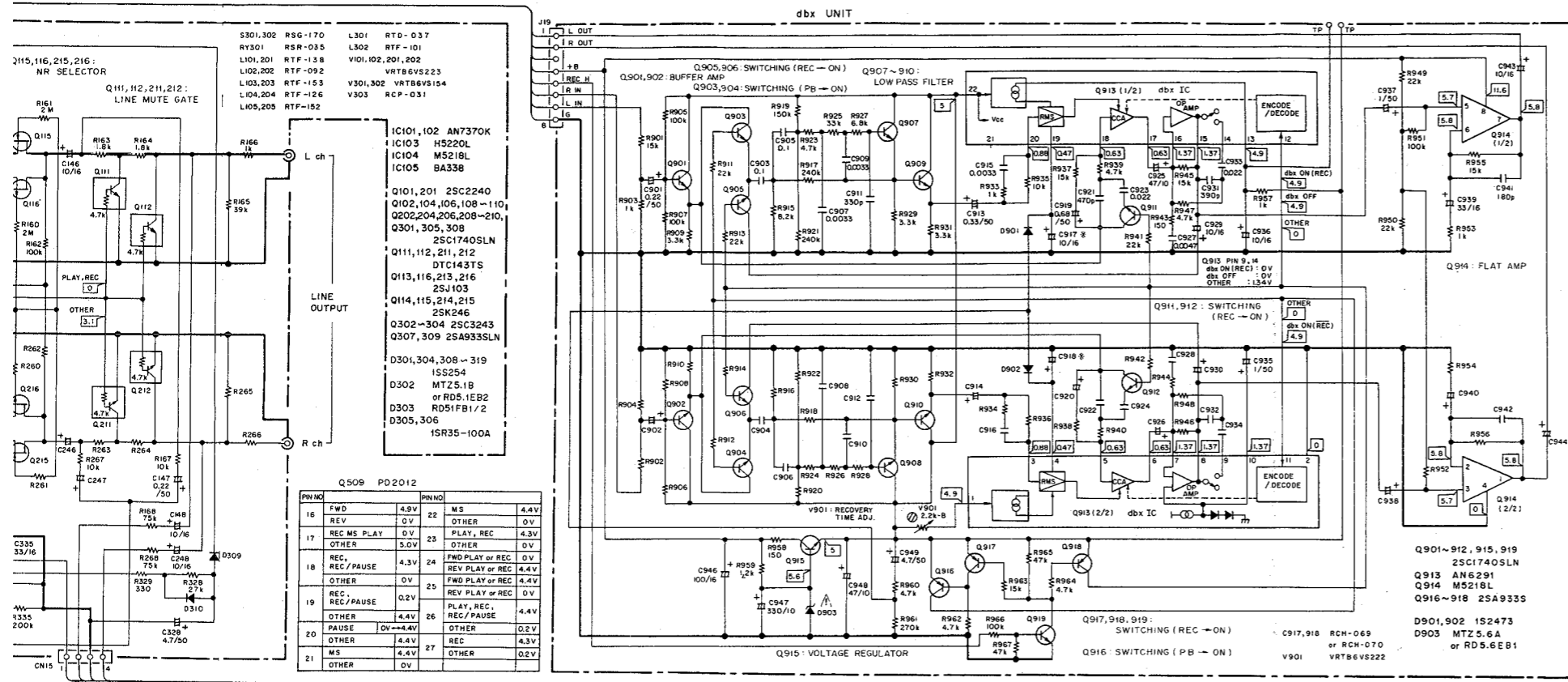
4

5

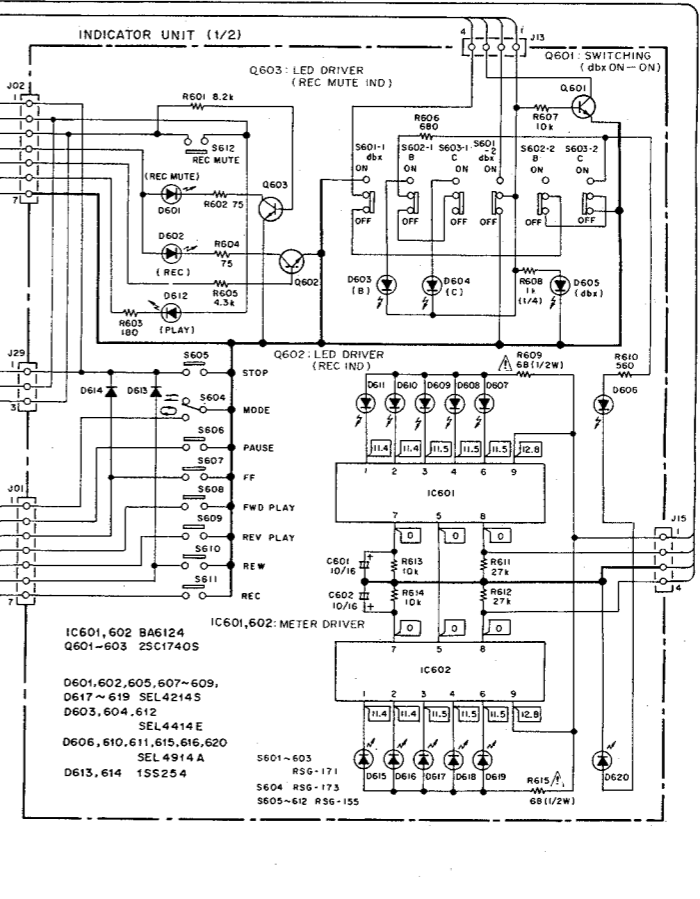
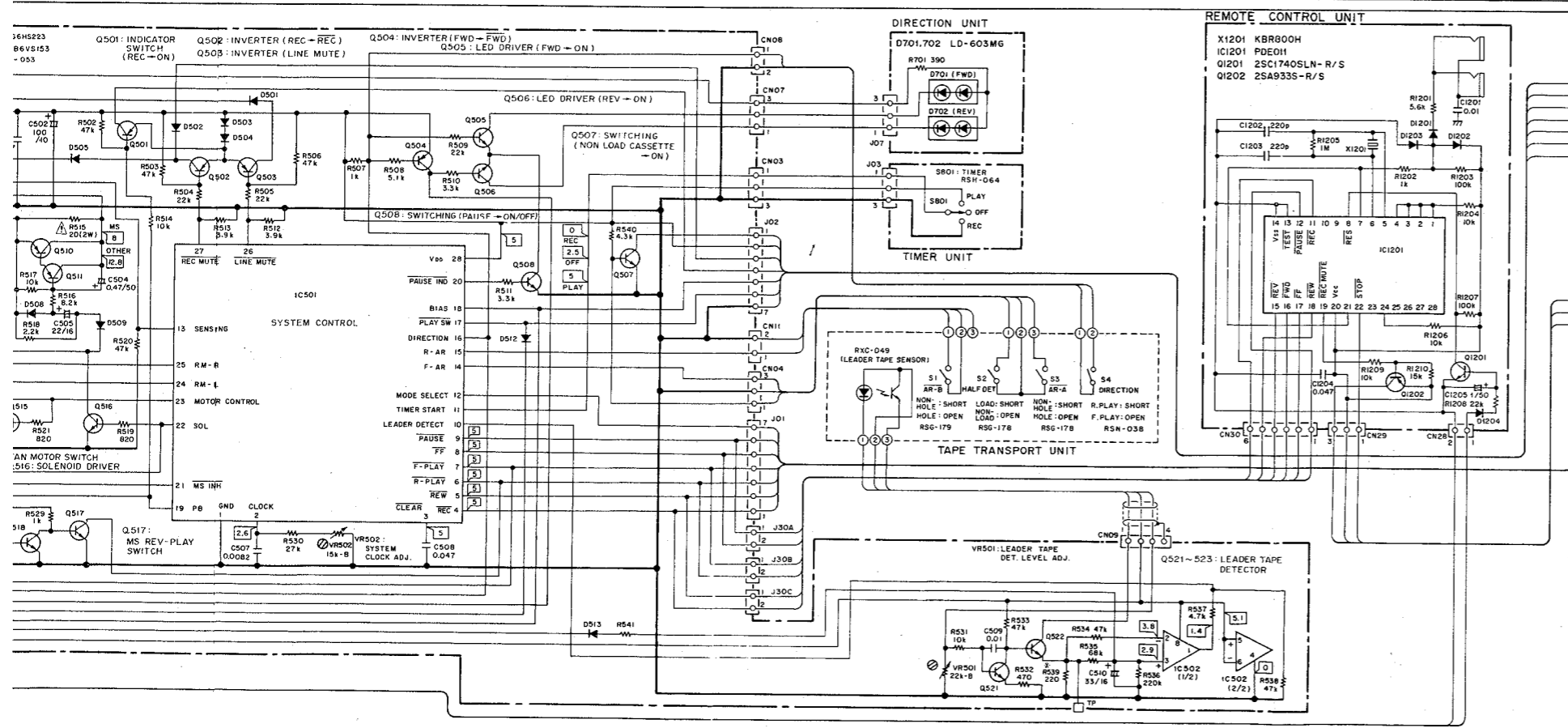
6



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



- RESISTORS:**  
Indicated in Ω, kΩ, MΩ, % tolerance unless otherwise noted k: 1k, M: 1M, (F): ±1%, (G): ±2%, (K): ±10% (M): ±20% tolerance
  - CAPACITORS:**  
Indicated in capacity (μF/voltage (V)) unless otherwise noted p: pF. Indication without voltage is 50V except electrolytic capacitor.
  - VOLTAGE:**  
□ DC voltage (V) at no input signal
  - OTHERS:**  
→ Signal route.  
⊙ Adjusting point.  
The † mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.  
\* marked capacitors and resistors have parts numbers.
- This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.
- SWITCHES:**
- MAIN UNIT**
    - S101: MIC L MIC - LINE
    - S201: MIC R MIC - LINE
    - S301: TAPE SELECTOR NORM - HIGH
    - S302: TAPE SELECTOR CrO2 - METAL
  - POWER SUPPLY UNIT**
    - S401: POWER ON - OFF
  - INDICATOR UNIT**
    - S601: dbx ON - OFF
    - S602: DOLBY NR B ON - OFF
    - S603: DOLBY NR C ON - OFF
    - S604: MODE ON - OFF
    - S605: STOP N.O. (NORMAL OFF)
    - S606: PAUSE N.O.
    - S607: FF N.O.
    - S608: FWD PLAY N.O.
    - S609: REV PLAY N.O.
    - S610: REW N.O.
    - S611: REC N.O.
    - S612: REC MUTE N.O.
  - TIMER UNIT**
    - S801: TIMER REC - OFF - PLAY
  - TAPE TRANSPORT UNIT**
    - S1: ERASE PREVENT DETECTOR (REV) OFF (HOLE) - ON (NON HOLE)
    - S2: CASSETTE HALF DETECTOR OFF (NON LOAD) - ON (LOAD)
    - S3: ERASE PREVENT DETECTOR (FWD) OFF (HOLE) - ON (NON HOLE)
    - S4: PLAY DIRECTION DETECTOR OFF (FWD) - ON (REV)
    - S5: PLAY DETECTOR OFF (STOP) - ON (PLAY)
- The underlined indicates the switch position.



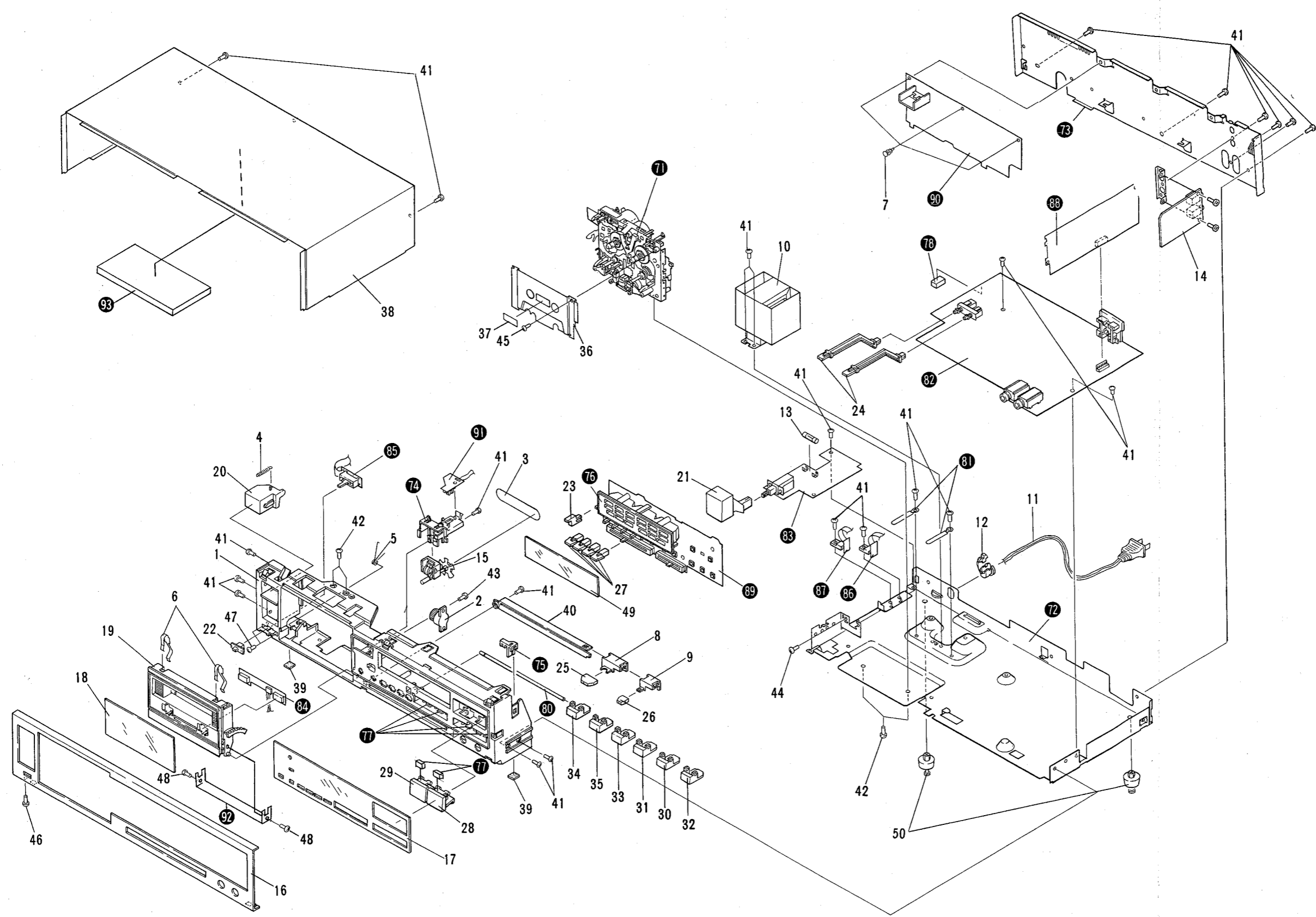
A

B

C

D

**8. EXPLODED VIEW**



Mark	No.	Part
	1	RN'
	2	RE
★★	3	RE
	4	RBI
	5	RBI
	6	RBI
	7	RBI
	8	RN
	9	RN
△ ★	10	RT
△	11	RD
△	12	CM
△ ★★	13	RE
	14	...
	15	RA
	16	RA
	17	RA
	18	RA
	19	RN
	20	RA
	21	RA
	22	RA
	23	RA
	24	RA
	25	RA
	26	RA
	27	RA
	28	RA
	29	RA
	30	RA

A  
B  
C  
D

A  
B  
C  
D

**NOTES:**

- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.  
**★★ GENERALLY MOVES FASTER THAN ★**  
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

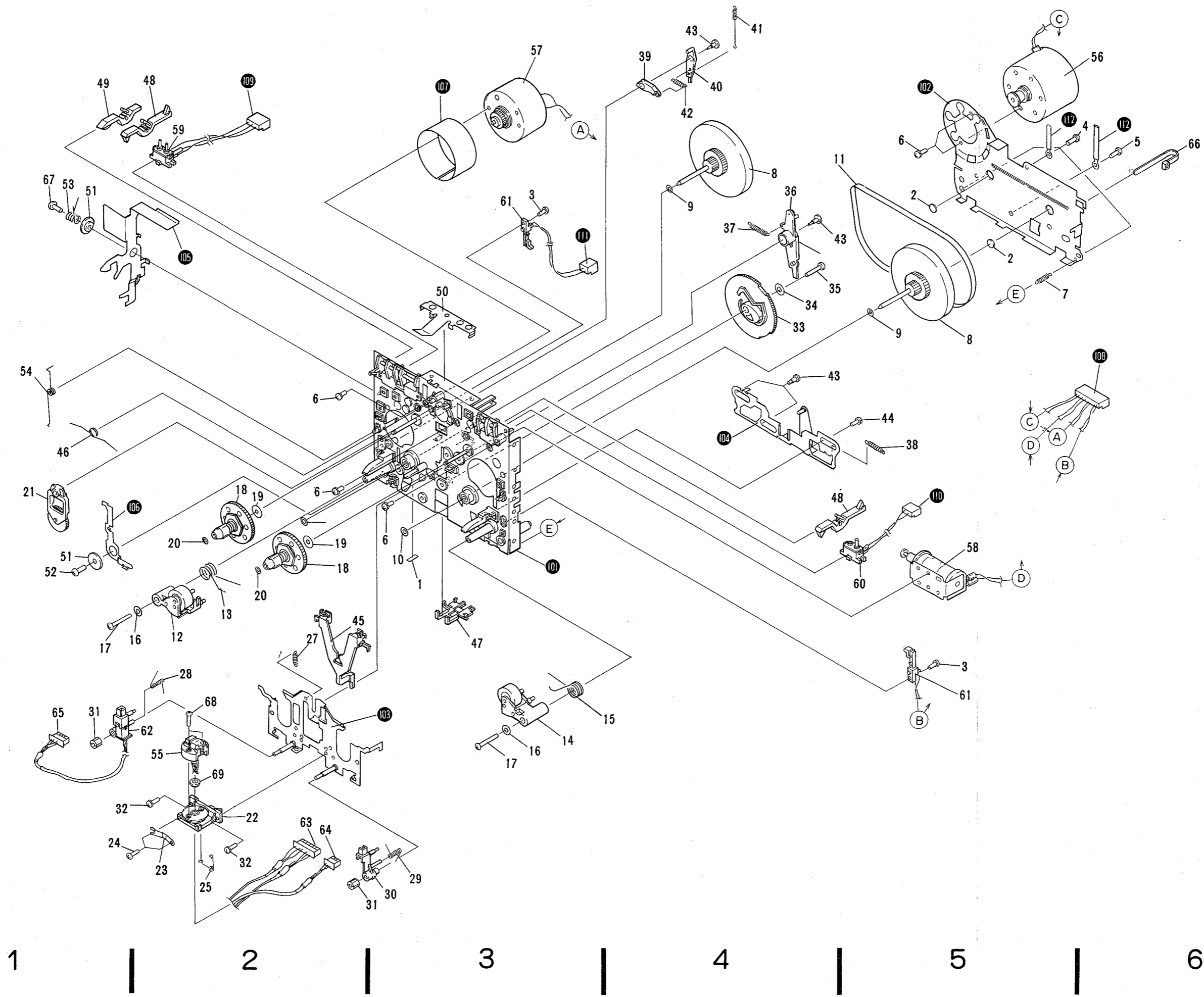
**Parts List of Tape Transport Unit**

Mark	No.	Part No.	Description
	1	REF-025	Reflection plate
	2	REC-439	Spacer
	3	PRZ20P060FMC	Screw 2 x 6
	4	PRZ26P080FMC	Screw 2.6 x 8
	5	PCZ30P040FMC	Screw 3 x 4
	6	PMA26P040FMC	Screw 2.6 x 4
	7	RBL-148	Grouping spring
	8	RXC-083	Flywheel assembly
	9	WA26D045D025	Washer
	10	RBF-030	Oil stopper washer
★★	11	REB-540	Main belt
★★	12	RXC-084	Pinch roller assembly (L)
	13	RBL-138	Pinch roller spring (L)
★★	14	RXC-085	Pinch roller assembly (R)
	15	RBL-139	Pinch roller spring (R)
	16	WA23F060M040	Washer
	17	PRZ20P130FMC	Screw 2 x 13
	18	RXC-040	Reel base assembly
	19	WA21D070D013	Washer
	20	RBF-057	Washer
★★	21	RXC-086	Idler assembly
	22	RXC-088	Head housing assembly
	23	RBK-184	Azimuth spring
	24	RBA-092	Azimuth screw
	25	RBL-085	Rotator spring
	26	.....	.....
	27	RBL-140	Eject arm spring
	28	RBL-087	Spring (L)
	29	RBL-088	Spring (R)
	30	RNL-929	Tape guide
	31	RNL-930	Nut
	32	PMA20P050FMC	Screw 2 x 5
	33	RNM-112	Cam gear
	34	WA23F060M040	Washer
	35	PRZ20P130FMC	Screw 2 x 13
	36	RXC-089	Play arm assembly
	37	RBL-141	Play arm spring
	38	RBL-142	Slide spring
	39	RNM-114	Arm (A)
	40	RNM-115	Arm (B)
	41	RBL-143	Turn spring
	42	RBL-177	Arm spring (A)
	43	RNM-116	Cap pin
	44	RLB-590	Cap pin
	45	RNM-118	Hold lever
	46	RBL-145	Hold spring
	47	RNM-123	Wire holder
	48	RNM-119	REC detector lever
	49	RNM-120	Half detector lever
	50	RBK-194	Hold spring

Mark	No.	Part No.	Description
	51	RLB-558	Spacer
	52	PCZ30P080FMC	Screw 3 x 8
	53	RBL-146	Eject arm spring
	54	RBL-147	Eject prevention spring (L)
★★	55	RPB-120	Tape head assembly
★★	56	RXM-135	Capstan motor
★★	57	RXM-136	Reel motor
$\Delta$ ★	58	RXP-161	Solenoid
★★	59	RSG-178	Push switch (S2, S3)
★★	60	RSG-179	Push switch (S1)
★★	61	RSN-038	Spring switch (S4, S5)
	62	RXC-049	Sensor assembly
	63	RKS-033	Wire connector 6-P
	64	RKS-034	Wire connector 3-P
	65	RKS-035	Wire connector 4-P
	66	REC-371	Wire tie
	67	RBA-094	Screw
	68	PMZ14P050FNI	Screw
	69	REB-521	Cushion
	101	.....	Chassis
	102	.....	Motor bracket
	103	.....	Head base assembly
	104	.....	Slide plate
	105	.....	Eject arm (L)
	106	.....	Eject prevention arm (L)
	107	.....	Shield plate
	108	.....	Wire connector 8-P
	109	.....	Wire connector 3-P
	110	.....	Wire connector 2-P
	111	.....	Wire connector 2-P
	112	.....	Cord fixer

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	RNT-061	Panel stay		31	RAC-737	Knob (REW)
	2	REC-436	Door damper		32	RAC-738	Knob (STOP)
★★	3	REB-492	Counter belt		33	RAC-618	Knob (REC)
	4	RBL-108	Spring		34	RAC-739	Knob (PAUSE)
	5	RBL-157	Door spring		35	RAC-619	Knob (REC MUTE)
	6	RBK1001	Hold spring		36	RAH-689	Cassette plate
	7	RBM-003	Nylon rivet		37	REE-113	Remain display paper
	8	RNM-076	VR slider A		38	RNA-824	Bonnet case (black)
	9	RNM-077	VR slider B		39	REB-513	Skid
$\Delta$ ★	10	RTT-425	Power transformer (120V)		40	RNM-075	Knob guide
$\Delta$	11	RDG-048	AC power cord		41	BBZ30P080FMC	Screw 3 x 8
$\Delta$	12	CM-22	Strain relief		42	CBZ30P080FZK	Screw 3 x 8
$\Delta$ ★★	13	REK-073	Fuse (1.25A)		43	ARZ26P060FMC	Screw 2.6 x 6
	14	.....	Remote terminal		44	PMA30P060FMC	Screw 3 x 6
	15	RAW-215	Tape counter		45	BCT26P100FZK	Screw 2.6 x 10
	16	RAH-837	Front panel (black)		46	BBT30P060FZK	Screw 3 x 6
	17	RAH-838	Display panel		47	PMZ26P060FMC	Screw 2.6 x 6
	18	RAH-840	Door panel		48	ABZ26P080FZK	Screw 2.6 x 8
	19	RNM-191	Door pocket		49	RAH-839	Meter panel
	20	RAC-733	Knob (EJECT)		50	REC-435	Leg assembly
	21	RAC-715	Knob (POWER)		71	.....	Tape transport unit
	22	RAC-603	Knob (TIMER) (black)		72	.....	Chassis
	23	RAC-606	Knob (MODE)		73	.....	Rear panel
	24	RAC-602	Knob (TAPE SELECTOR)		74	.....	Counter holder
	25	RAC-607	Knob (REC LEVEL) (black)		75	.....	P.C. Board holder
	26	RAC-609	Knob (BALANCE) (black)		76	.....	LED Holder
	27	RAC-600	Knob (dbx, DOLBY NR)		77	.....	Cushion
	28	RAC-734	Knob (FWD PLAY)		78	.....	Spacer
	29	RAC-735	Knob (REV PLAY)		79	.....	.....
	30	RAC-736	Knob (FF)		80	.....	Knob shaft
					81	.....	Cord fixer
					82	.....	Main unit
					83	.....	Power supply unit
					84	.....	Direction unit
					85	.....	Timer unit
					86	.....	Transistor A unit
					87	.....	Transistor B unit
					88	.....	Dbx unit
					89	.....	Indicator unit
					90	.....	Control unit
					91	.....	End sensor unit
					92	.....	Door bracket
					93	.....	Bonnet sheet

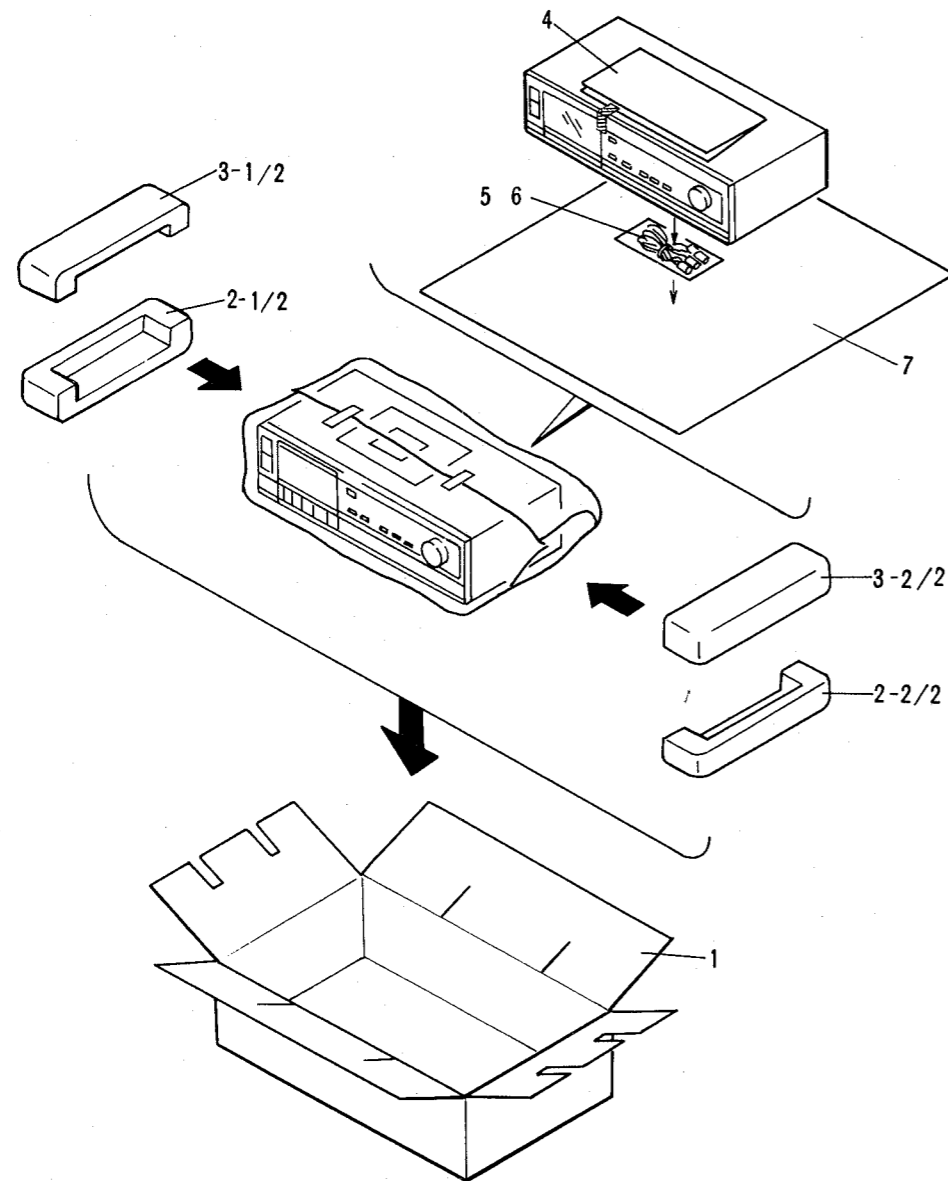
Tape Transport Unit



## 9. PACKING

### Parts List

Mark	No.	Part No.	Description
	1	RHG-884	Packing case
	2	RHA-274	Pad A
	3	RHA-275	Pad B
	4	RRB-274	Operating instructions (English)
	5	RDE-010	Connection cord
	6	RDE-081	Control cord
	7	RHC-1003	Styrene paper



## 10. ADJUSTMENTS

### 10.1 MECHANICAL ADJUSTMENT

1. Tape Speed Adjustment			
Mode	Test tape	Adjustment position	Specification rating (playback frequency)
PLAY	Play the STD-301 tape (3kHz)	Variable resistor control	3000Hz ± 5Hz

2. Tape Transport Adjustment		
Mode	Adjustment position	Specifications
FWD STOP	FWD azimuth adjustment screw	With the frame door open, the head should be visually parallel with the tape direction.
REV STOP	REV azimuth adjustment screw	
Load a mirror-equipped cassette half, and lift the head base by hand so that the tape touches the tape guide.		
STOP	Height adjustment screws (both left and right)	Check (visually) that the tape is located in the center of the tape guide.
FWD PLAY	FWD height adjustment screw	Adjust the first tape guide to ensure that there is no tape curling.
REV PLAY	REV height adjustment screw	

## 10.2 ELECTRICAL ADJUSTMENT

### Adjustment Conditions

1. The mechanical adjustments must be completed first.
2. The head must be cleaned and demagnetized.
3. Allow the deck to age for at least a few minutes before commencing any electrical adjustments.
4. The reference signal is 0dB=1Vrms.
5. Connect a 50 kilo-ohm load resistance to the OUTPUT terminals
6. Unless otherwise specified, the switches listed below are left in the positions indicated.  
 DOLBY NR : OFF  
 TAPE SELECTOR : NORM

### List of Adjustments

1. Head azimuth adjustment.
2. Playback equalizer check.
3. Playback level adjustment.
4. Leader tape detector adjustment.
5. Level meter check.
6. Erasure current adjustment.
7. Recording and playback frequency response adjustment.
8. Recording level adjustment.
9. Recovery time adjustment.

### Test Tapes

- STD-331B : Playback adjustments  
(See Fig. 10-1)
- STD-608A : NORMAL blank tape
- STD-620 : CrO<sub>2</sub> blank tape
- STD-610 : METAL blank tape

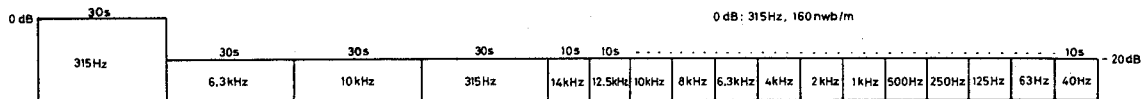


Fig. 10-1 Contents of the test tape STD-331B

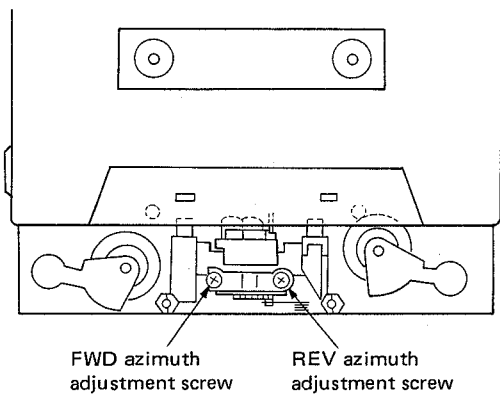


Fig. 10-2 Head azimuth adjustment

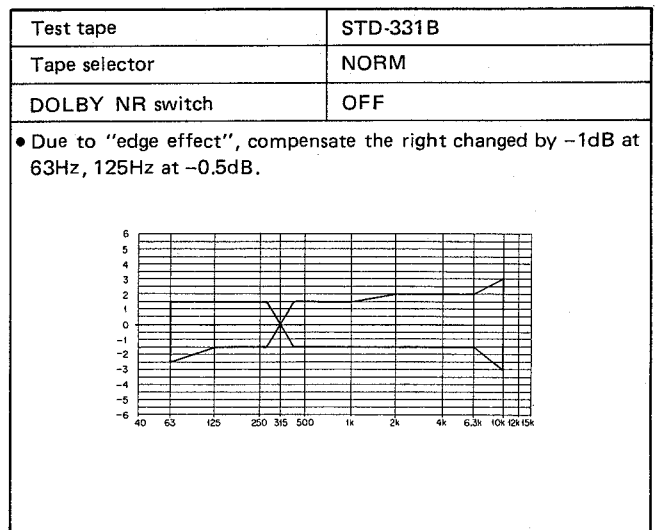


Fig. 10-3 Allowable playback frequency response zone

- Set the DOLBY NR and dbx switches to the OFF position.

1. Head Azimuth Adjustment						
• Turn VR101 and VR201 to maximum position (fully clockwise).						
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	PLAY (FWD, REV)	Play the 10kHz/-20dB section of the STD-331B test tape.	Head azimuth adjustment screw. (See Fig. 10-2)	Left and right OUTPUT terminals.	Maximum playback signal level.	
3	STOP	Lock the screw with screw lock after completing the adjustment.				
2. Playback Equalizer Check						
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	PLAY	Play the 315Hz/-20dB and 6.3kHz/-20dB section of the STD-331B test tape.	Confirm	Left and right LINE OUT terminals.	See Fig. 10-3.	The 6.3kHz playback level is $-0.5 \pm 2\text{dB}$ against 315Hz level.
3. Playback Level Adjustment						
• This adjustment determines the DOLBY NR level, and must be performed with great care.						
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Set the TAPE SELECTOR switch to the NORM position.				
2	PLAY	Play the 315Hz/0dB section of the STD-331B test tape.	VR101 (L ch.) VR201 (R ch.)	TP.DOL L (L ch.) TP.DOL R (R ch.)	-17.9dBv (127.3mV)	
4. Leader Tape Detector Adjustment						
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	PLAY	Load a cassette half without tape.	VR501 (Control unit)	TP.LEADER (Control unit)	1.3V~1.4V (DC)	

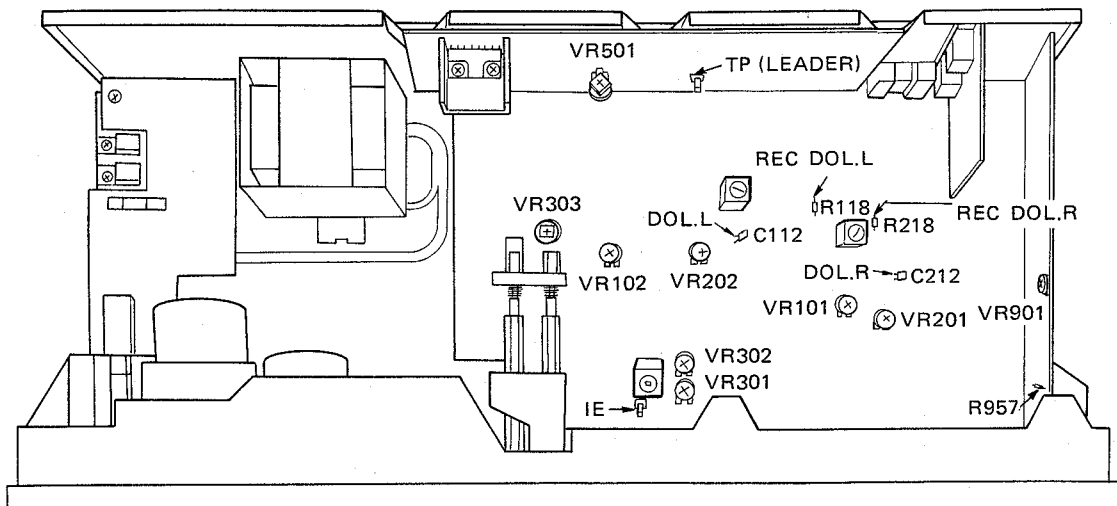


Fig. 10-4 Adjustments locations

5. Level Meter Check							
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks	
1	REC-PAUSE	Apply a 315Hz/-10dBv (316mV) signal to the LINE INPUT terminals.	REC LEVEL control. (INPUT VR)	TP.DOL L (L ch.) TP.DOL R (R ch.)		Check that the level meters "0dB" light up within -17.9dB±1.8dB of the signal output level.	
6. Erasure Current Adjustment							
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks	
1	REC	Metal REC mode. INPUT VR min.	VR303	TP.IE	170mV±5mV (AC)		
7. Recording and Playback Frequency Response Adjustment							
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks	
1	STOP	Set the TAPE SELECTOR switch to the NORM position.					
2	REC-PAUSE	Apply a 315Hz/-30dBv (31.6mV) signal to the LINE INPUT terminals.	REC LEVEL control	TP.DOL L (L ch.) TP.DOL R (R ch.)	-37.9dBv (12.7mV)		
3	REC/PLAY	Record the above signal level onto the STD-608A test tape at 315Hz and 6.3kHz, and playback.	VR302 (L ch.) VR301 (R ch.)	Left and right OUT-PUT terminals.		The 6.3kHz playback level is +1.0dB against 315Hz level (Playback the signals recorded on the STD-608A)	
4		Change the test tape, tape selector and DOLBY NR switch positions, and check that the frequency response is satisfactory (See Fig. 10-5). If the response does not lie within the specified range, readjust V302 and V301 that the 6.3kHz playback level is 0~+1.5dB against 315Hz level in the step 3.					
8. Recording Level Adjustment							
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks	
1	STOP	Set the TAPE SELECTOR switch to the NORM position.					
2	REC-PAUSE	Apply a 315Hz/-10dBv (316mV) signal to the LINE INPUT terminals.	REC LEVEL control. (INPUT VR)	TP.DOL L (L ch.) TP.DOL R (R ch.)	-17.9dBv (127.3mV)		
3		Set the DOLBY NR switch to the ON position.					
4	REC/PLAY	Record the above signal level onto the STD-608A test tape, and playback.	VR102 (L ch.) VR202 (R ch.)	TP.DOL L (L ch.) TP.DOL R (R ch.)	-17.9dBv (127.3mV)		
5		Set the TAPE SELECTOR switch to the CrO <sub>2</sub> position.					
6		Record the above signal onto the STD-620 test tape, and playback.	Confirm	TP.DOL L (L ch.) TP.DOL R (R ch.)	-17.9dBv ± 1.5dB		
7		Set the TAPE SELECTOR switch to the METAL position.					
8		Record the above signal onto the STD-610 test tape, and playback.	Confirm	TP.DOL L (Lch.) TP.DOL R (R ch.)	-17.9dBv ± 1.5dB		
9. Recovery Time Adjustment							
	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks	
1	STOP	.....	VR901	Both ends of R957	DC 15mV		



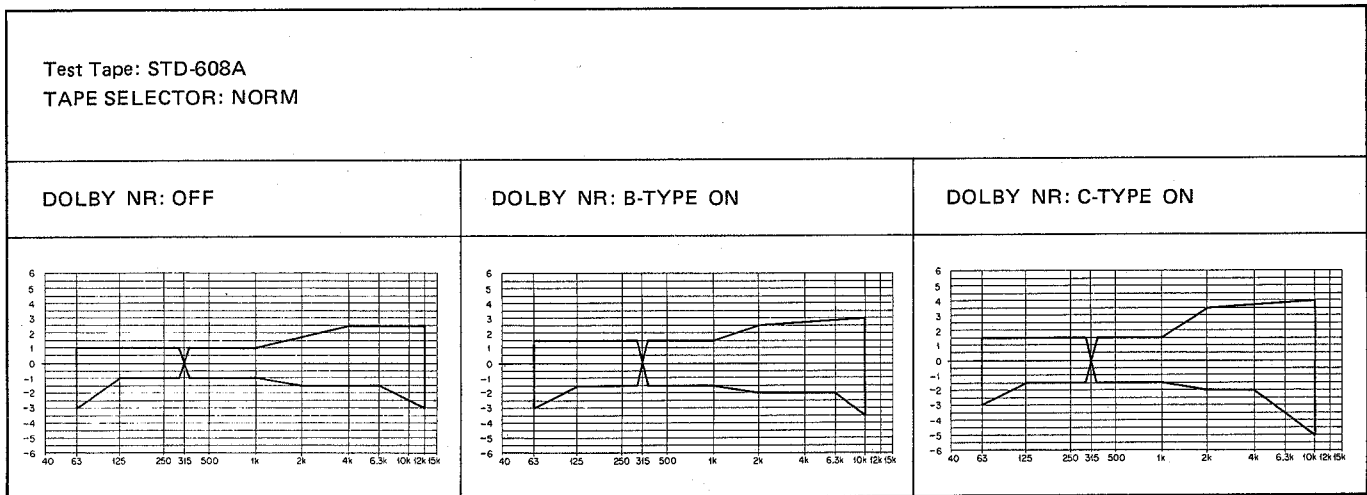


Fig. 10-5-1 Allowable recording and playback frequency response zone (NORM)

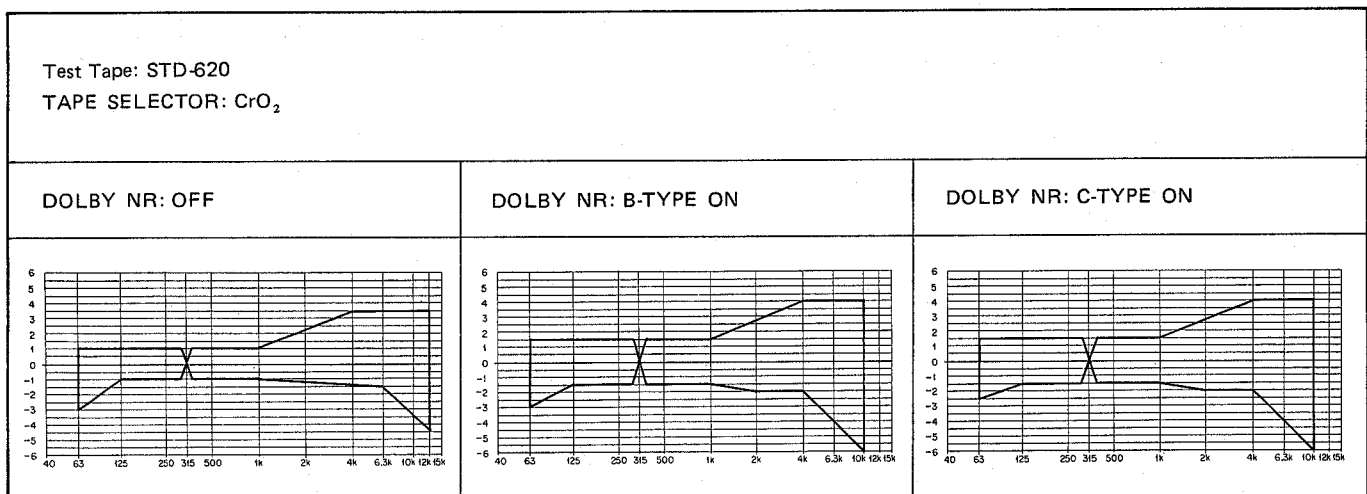


Fig. 10-5-2 Allowable recording and playback frequency response zone (CrO<sub>2</sub>)

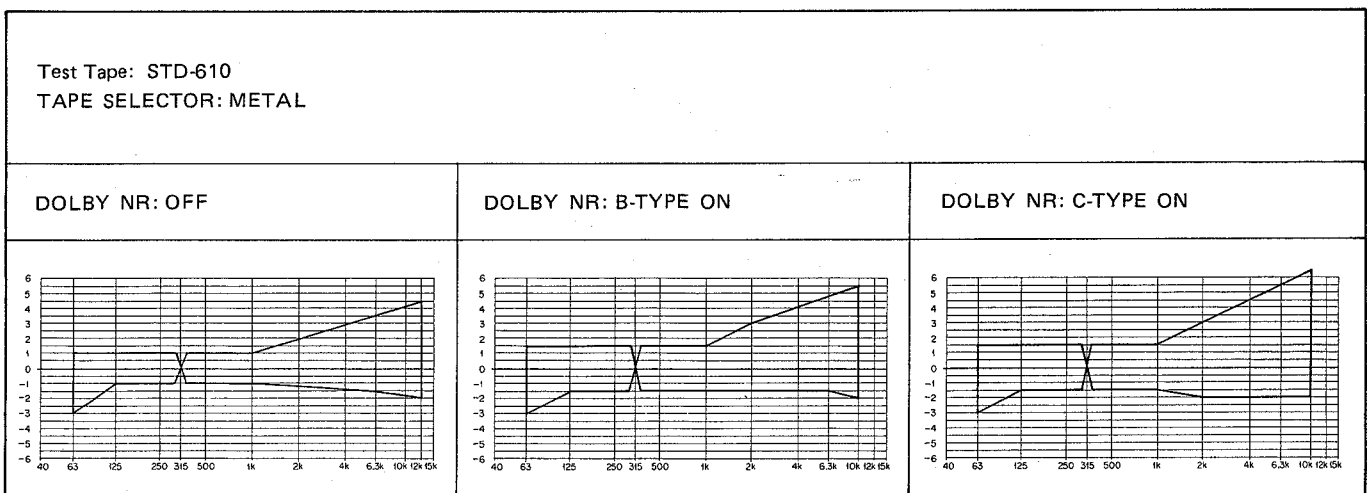


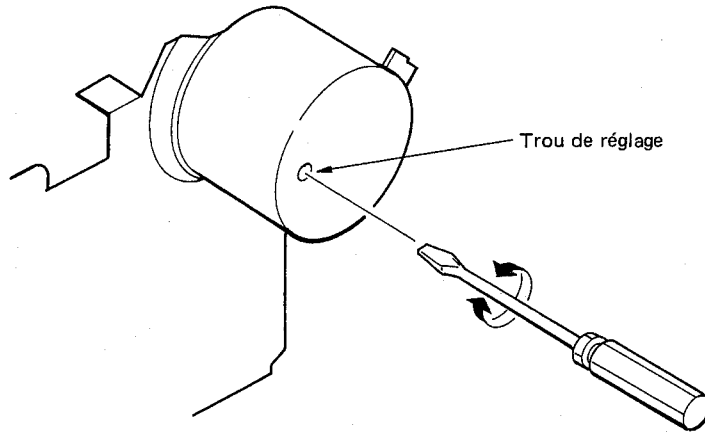
Fig. 10-5-3 Allowable recording and playback frequency response zone (METAL)

# 10. RÉGLAGE

## 10.1 RÉGLAGES MÉCANIQUES

### 1. Réglage de la vitesse de défilement de la bande

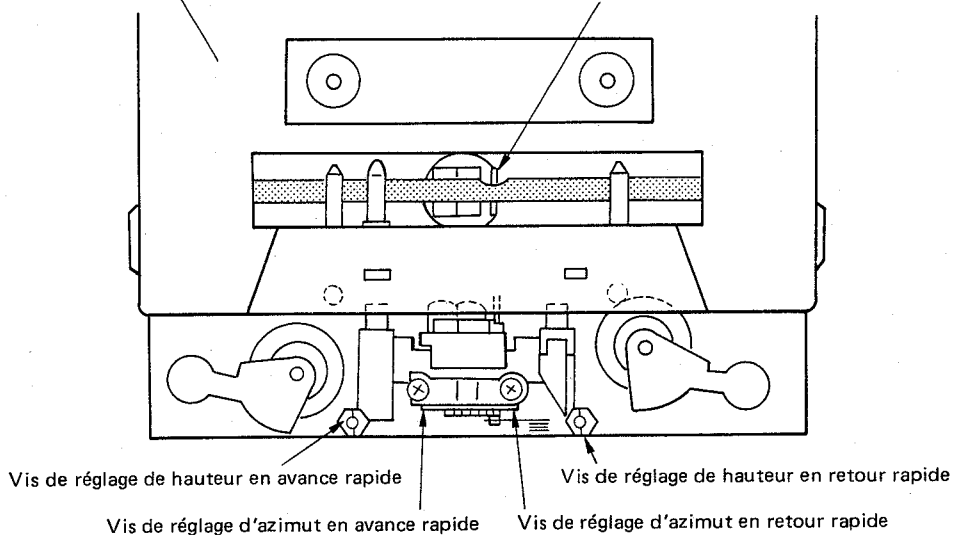
Mode	Bande d'étalonnage	Position de réglage	Spécifications nominales (fréquence de lecture)
LECTURE	Lire la bande STD-301 (3kHz)	Contrôle à résistance variable	3000Hz±5Hz



### 2. Réglage de transport de bande

Mode	Position de réglage	Spécifications nominales
AVANCE RAPIDE ARRÊT	Vis de réglage d'azimut en avance rapide.	Lorsque la trappe est ouverte, la tête doit être vue en position parallèle par rapport au sens de défilement de la bande.
RETOUR RAPIDE ARRÊT	Vis de réglage d'azimut en retour rapide.	
Charger une demi-cassette à miroir et soulever l'embase de la tête pour que la bande touche le guide de bande.		
ARRÊT	Vis de réglage de hauteur (droite et gauche).	Effectuer un contrôle (visuel) pour s'assurer que la bande est placée au centre du guide de bande.
AVANCE RAPIDE LECTURE	Vis de réglage de hauteur en avance rapide.	Ajuster le premier guide de bande pour qu'aucun froissement de la bande ne se produise.
RETOUR RAPIDE LECTURE	Vis de réglage de hauteur en retour rapide.	

Demi-cassette équipée d'un miroir      aucun froissement de la bande ne doit se produire au niveau du guide de bande.



**10.2 RÉGLAGES ÉLECTRIQUES**

**Conditions nécessaires pour effectuer les réglages**

1. Les réglages des mécanismes doivent avoir été faits avant.
2. La tête magnétique doit être propre et démagnétisée.
3. La platine-cassette doit avoir fonctionnée pendant quelques minutes avant de commencer les réglages électriques.
4. Le signal de référence est de 0dB=1V effi.
5. Raccorder une résistance de charge de 50 k-ohms aux prises de sortie "OUTPUT".
6. A moins d'une indication contraire, les commutateurs mentionnés ci-dessous doivent se trouver dans la position indiquée.

DOLBY NR : Sur OFF  
 TAPE SELECTOR : Sur NORM

**Liste des réglages à exécuter**

1. Réglage d'azimut de tête magnétique
2. Contrôle de l'égaliseur de lecture
3. Réglage de niveau de lecture
4. Réglage du détecteur de bande-amorce
5. Contrôle de fonctionnement de décibelmètre
6. Réglage du courant d'effacement
7. Calage de réponse en fréquence d'enregistrement et de lecture
8. Réglage du niveau d'enregistrement
9. Durée de rétablissement

**Bandes de mesure**

- STD-331B : Réglage de lecture (Fig. 10-1)  
 STD-608A : Bande vierge ordinaire (NORMAL)  
 STD-620 : Bande vierge au chrome (CrO<sub>2</sub>)  
 STD-610 : Bande vierge au fer (METAL)

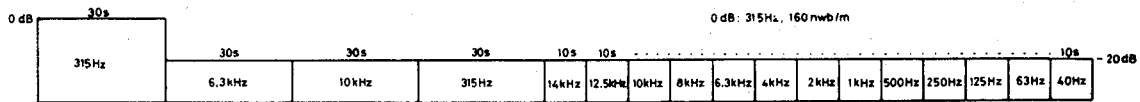


Fig. 10-1 Signaux préenregistrés sur la bande d'étalonnage STD-331B

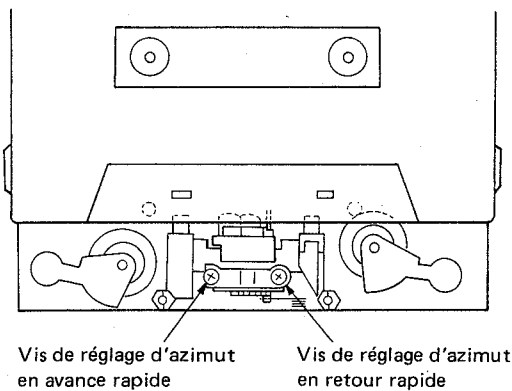


Fig. 10-2 Réglage d'azimut de tête magnétique

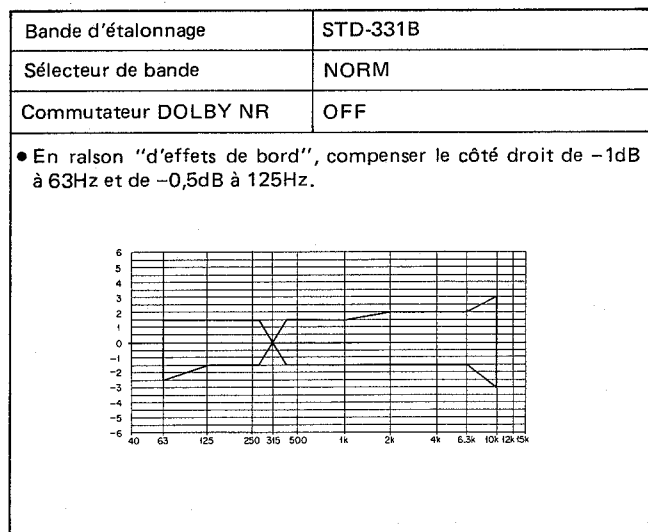


Fig. 10-3 Réponse en fréquence admissible en lecture

- Placer les sélecteurs DOLBY NR et dbx en position OFF.

1. Réglage d'azimut de tête magnétique.						
• Tourner VR101 et VR201 sur leur position maximum (dans le sens maximum des aiguilles d'une montre)						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	LECTURE (AVANCE RAPIDE, RETOUR RAPIDE)	Lire le passage préenregistré de 10kHz/-20dB de la bande d'étalonnage STD-331B.	Vis de réglage d'azimut de tête. (Consulter la figure 10-2).	Bornes de sortie droite et gauche "OUTPUT".	Niveau maximal du signal de lecture.	
3	ARRÊT	Bloquer la vis de réglage à la peinture lorsque le réglage est terminé.				
2. Contrôle de l'égaliseur de lecture.						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	LECTURE	Lire le passage préenregistré de 315kHz/-20dB et de 6,3kHz/-20dB de la bande d'étalonnage STD-331B.	Contrôler	Bornes de sortie droite et gauche "LINE OUT".	Voir Fig. 10-3.	Le niveau de lecture de 6,3kHz est de $-0,5 \pm 2\text{dB}$ par rapport au niveau de 315Hz.
3. Réglage du niveau de lecture.						
• Ce réglage servant à étalonner le niveau DOLBY NR doit être exécuté avec un grand soin.						
	Mode	Signal appliqué bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	LECTURE	Lire le passage préenregistré de 315kHz/0dB de la bande d'étalonnage STD-331B.	VR101 (canal gauche) VR201 (canal droit)	TP.DOL L (canal gauche) TP.DOL R (canal droit)	-17,9dBv (127,3mV)	
4. Réglage du détecteur de bande-amorce.						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	LECTURE	Charger une demi-cassette sans bande.	VR501 (unité de commande)	TP LEADER (unité de commande)	1,3V~1,4V (courant continu)	

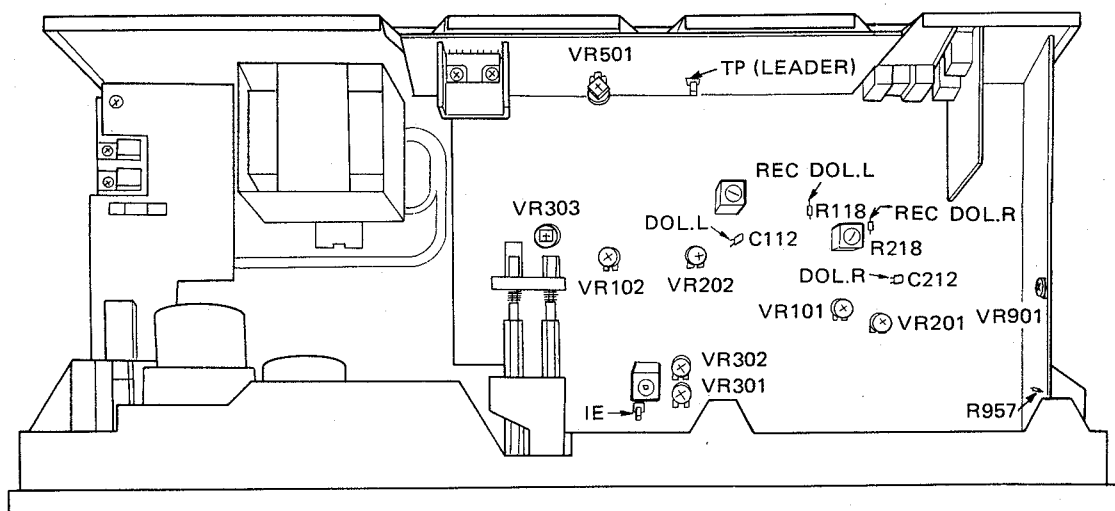


Fig. 10-4 Emplacements des dispositifs de réglage

5. Contrôle de fonctionnement des décibelmètres.						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	PAUSE À L'EN-REGISTREMENT	Injecteur un signal de 315Hz/ -10dBv (316mV) per les bornes d'entrée de ligne "LINE INPUT".	Potentiomètre de réglage de niveau d'enregistrement "REC LEVEL". (INPUT VR)	TP.DOL L (canal gauche) TP.DOL R (canal droit)	Vérifier si les décibelmètres "0dB" s'alument sous un niveau de sortie de signal de -17,9dBv±1,8dB.	
6. Réglage du courant d'effacement.						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	EN-REGISTREMENT	Mode d'enregistrement (REC) pour bande Métal. Résistance variable d'entrée (INPUT VR) au minimum.	V303	TP.IE	170mV±5mV AC	
7. Réglage de réponse en fréquence d'enregistrement et de lecture.						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	PAUSE À L'EN-REGISTREMENT	Injecter un signal de 315Hz/ -30dBv (31,6mV) per les bornes d'entrée de ligne "LINE INPUT".	Potentiomètre de réglage de niveau d'enregistrement "REC LEVEL". (INPUT VR)	TP.DOL L (canal gauche) TP.DOL R (canal droit)	-37,9dBv (12,7mV)	
3	EN-REGISTREMENT/LECTURE	Enregistrer le niveau de signal indiqué plus haut sur la bande d'étalonnage STD-608A à 315Hz et 6,3kHz et lire ce passage.	VR302 (canal gauche) VR301 (canal droit)	Bornes de sortie droite et gauche "OUTPUT"	Le niveau de reproduction de 6,3kHz est de +1,0dB par rapport au niveau de 315Hz (lire les signaux enregistrés sur STD-608A).	
4		Changer la bande d'essai, le sélecteur de bande et les positions du commutateur de réduction de bruit DOLBY, et vérifier que la fréquence en réponse est satisfaisante (vor la fig. 10-5). Si la réponse en fréquence n'est pas dans la plage spécifiée, re-régler V302 et V301 de façon à ce que le niveau de reproduction de 6,3kHz se situe entre 0 et +1,5dB par rapport au niveau de 315Hz.				
8. Réglage du niveau d'enregistrement.						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	Placer le sélecteur de bande (TAPE SELECTOR) en position "NORM".				
2	PAUSE À L'EN-REGISTREMENT	Injecter un signal de 315Hz/ -10dBv (316mV) par les bornes d'entrée ligne "LINE INPUT".	Potentiomètre de réglage de niveau d'enregistrement "REC LEVEL".	TP.DOL L (canal gauche) TP.DOL R (canal droit)	-17,9dBv (127,3mV)	
3		Régler le commutateur DOLBY NR en position ON.				
4	EN-REGISTREMENT/LECTURE	Enregistrer le niveau de signal indique plus haut sur la bande d'étalonnage STD-620 et lire ce passage.	VR102 (canal gauche) VR202 (canal droit)	TP.DOL L (canal gauche) TP.DOL R (canal droit)	-17,9dBv (127,3mV)	
5		Placer le sélecteur de bande (TAPE SELECTOR) en position "CrO <sub>2</sub> ".				
6		Enregistrer le niveau de signal indiqué plus haut sur la bande d'étalonnage STD-603 et lire ce passage.	Contrôler	TP.DOL L (canal gauche) TP.DOL R (canal droit)	-17,9dBv±1,5dB	
7		Placer le sélecteur de bande (TAPE SELECTOR) en position "METAL".				
8		Enregistrer le niveau de signal indiqué plus haut sur la bande d'étalonnage STD-610 et lire ce passage.	Contrôler	TP.DOL L (canal gauche) TP.DOL R (canal droit)	-17,9dBv±1,5dB	
9. Durée de rétablissement						
	Mode	Signal appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne de mesure	Valeur relevée	Observations
1	ARRÊT	.....	VR901	Deux extrémités de R957	15mVc-c	

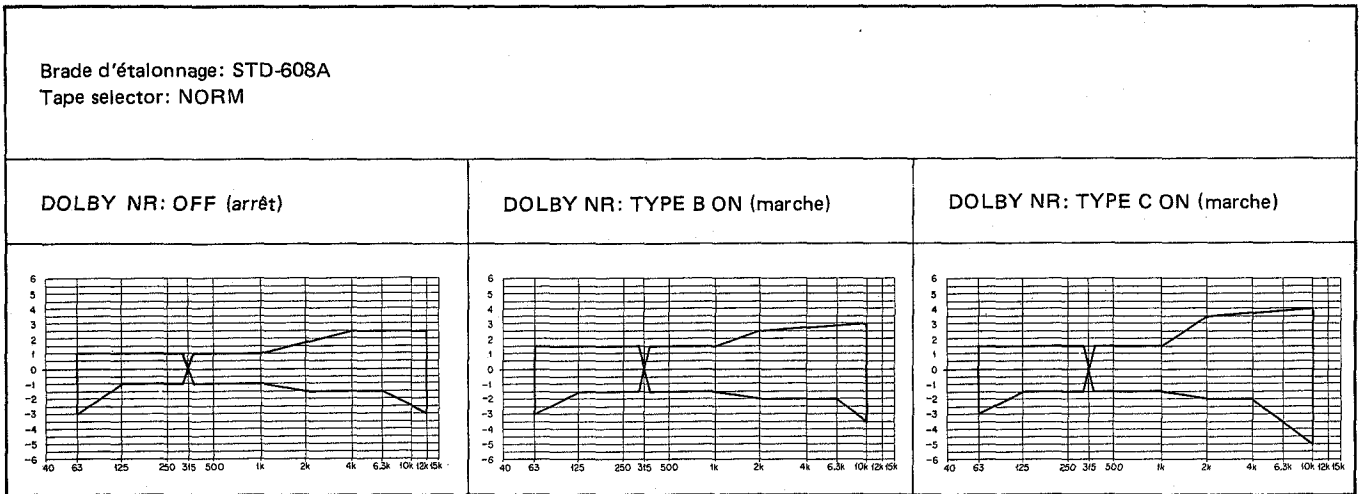


Fig. 10-5-1 Zone de réponse en fréquence admissible de lecture et d'enregistrement (NORM)

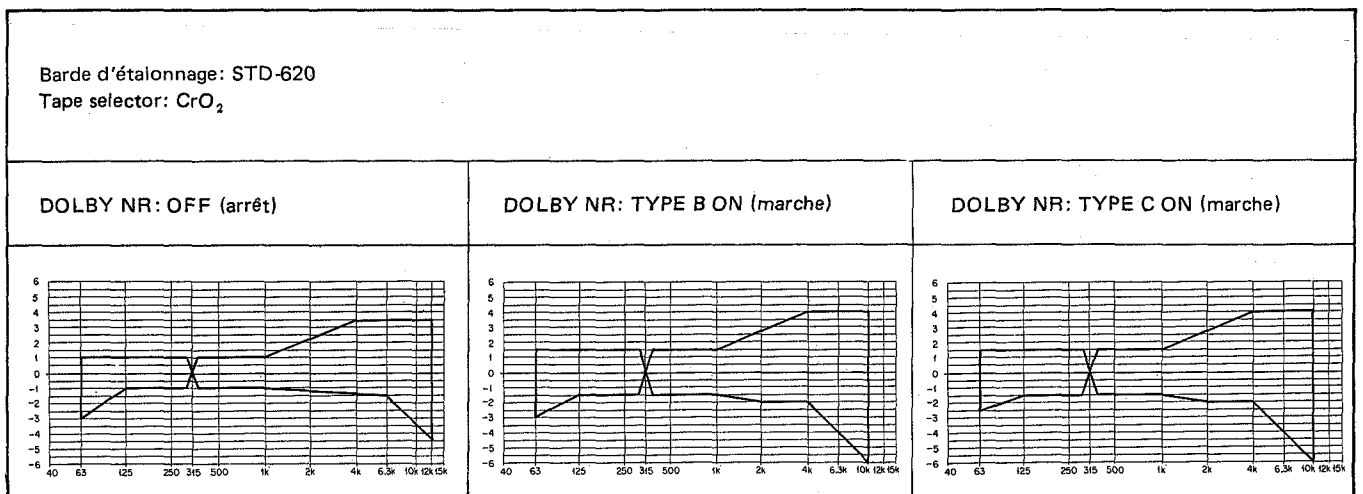


Fig. 10-5-2 Zone de réponse en fréquence admissible de lecture et d'enregistrement (CrO<sub>2</sub>)

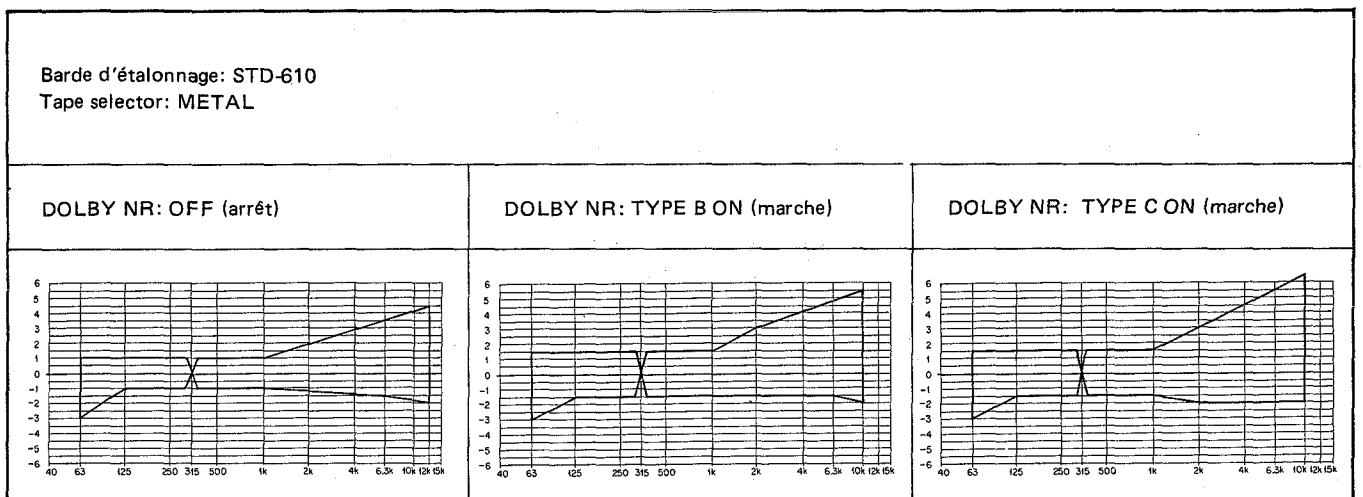
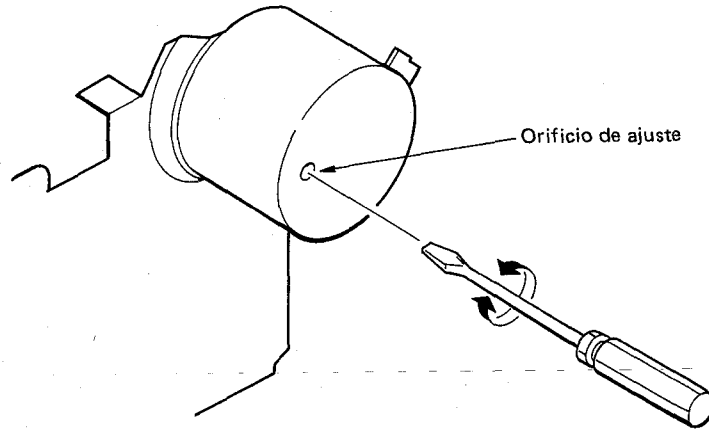


Fig. 10-5-3 Zone de réponse en fréquence admissible de lecture et d'enregistrement (METAL)

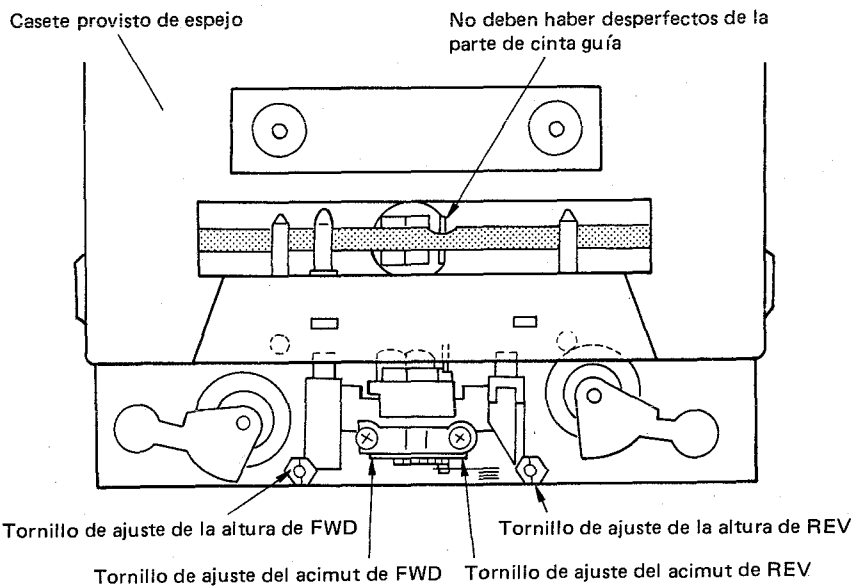
# 10. AJUSTE

## 10.1 AJUSTE MECANICO

1. Ajuste de la velocidad de la cinta			
Modo	Cinta de prueba	Posición de ajuste	Valor de especificación (frecuencia de reproducción)
PLAY	Reproducir la STD-301 (3kHz)	Control del resistor variable	3000Hz ± 5Hz



2. Ajuste del transporte de la cinta		
Modo	Posición de ajuste	Especificaciones
FWD STOP	Tornillo de ajuste del acimut de FWD.	Con la puerta del marco abierta, las cabezas deben verse paralelas con la dirección de la cinta.
REV STOP	Tornillo de ajuste del acimut de REV.	
Cargar un casete con espejo y levantar la base de las cabezas con la mano de modo que la cinta toque la guía de cinta.		
STOP	Tornillos de ajuste de la altura (izquierdo y derecho)	Comprobar (visualmente) que la cinta esté situada en el centro de la guía de cinta.
FWD PLAY	Tornillo de ajuste de la altura de FWD.	Ajustar la primera guía de cinta para asegurar que no hay desperfectos de la cinta.
REV PLAY	Tornillo de ajuste de la altura de REV.	



**10.2 AJUSTES ELECTRICOS**

**Condiciones de ajuste**

1. Los ajustes mecánicos deben terminarse primero.
2. Limpiar y desmanar la cabeza de grabación.
3. Dejar que el magnetófono se precaliente por unos minutos antes de iniciar los ajustes eléctricos.
4. La señal de referencia es de 0dB=1Vrms.
5. Conectar una resistencia de carga de 50 kilohmios a los terminales de salida (OUTPUT).
6. A menos que se especifique de otra manera, los siguientes interruptores deben estar en las posiciones indicadas:

DOLBY NR : OFF  
 SELECTOR DE CINTA : NORM

**Lista de ajustes y comprobaciones**

1. Ajuste azimutal de la cabeza de grabación
2. Comprobación del ecualizador de reproducción
3. Ajuste del nivel de reproducción
4. Ajuste del detector de cinta guía
5. Comprobación del indicador de nivel
6. Ajuste de la corriente de borrado
7. Ajuste de la respuesta de frecuencia de grabación y reproducción
8. Ajuste del nivel de grabación
9. Ajuste del tiempo de recuperación

**Cintas de prueba**

- STD-331B : Para ajustes de reproducción  
 (Referirse a la Fig. 10-1)
- STD-608A : Cinta NORMAL en blanco.
- STD-620 : Cinta CrO<sub>2</sub> en blanco.
- STD-610 : Cinta de METAL en blanco.

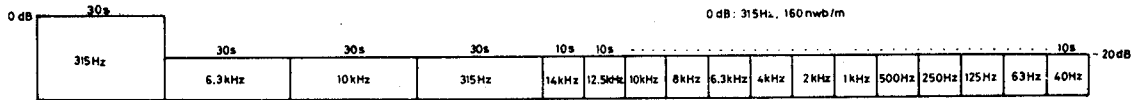


Fig. 10-1 Contenido de la cinta de prueba STD-331B

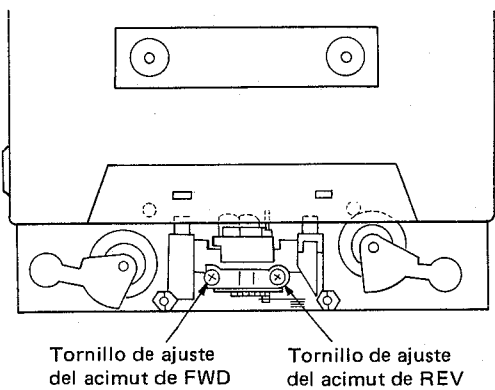


Fig. 10-2 Ajuste azimutal de la cabeza de grabación

Cinta de prueba	STD-331B
Selector de cinta	NORM
Interruptor DOLBY NR	OFF

• Debido al "efecto de reborde", compense el canal derecho cambiándolo en -1dB a 63Hz, -0,5dB a 125Hz.

Fig. 10-3 Zona de respuesta de frecuencia de reproducción permisible



- Poner los interruptores DOLBY NR y dbx en las posiciones OFF.

### 1. Ajusta azimutal de la cabeza de grabación.

- Girar VR101 y VR201 a la posición maxima (completamente a la derecha).

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Reproducción (PLAY) (FWD, REV)	Reproducir la parte de 10kHz/-20dB de la cinta de prueba STD-331B.	Tornillo de ajuste azimutal de la cabeza de reproducción. (Referirse a la Fig. 10-2).	Terminales de salida (OUTPUT) derecho e izquierdo.	Nivel máximo de la señal de reproducción.	
3	Parada (STOP)	Dejar trabado el tornillo después de terminar el ajuste.				

### 2. Comprobación del ecualizador de reproducción.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Reproducción (PLAY)	Reproducir las partes de 315Hz/-20dB y 6,3kHz/-20dB de la cinta de prueba STD-331B.	Confirmación	Terminales de salida (LINE OUT) derecho e izquierdo.	Consulte la figura 10-3.	El nivel de reproducción de 6,3kHz es de $-0,5 \pm 2$ dB con relación al nivel de 315Hz.

### 3. Ajuste del nivel de reproducción.

- Este ajuste determina el nivel DOLBY NR, y debe efectuarse con sumo cuidado.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Reproducción (PLAY)	Reproduce la parte de 315 Hz/0dB de la cinta de prueba STD-331B.	VR101 (canal izq.) VR201 (canal der.)	TP.DOL L (canal izq.) TP.DOL R (canal der.)	-17,9dBv (127,3mV)	

### 4. Ajuste del detector de cinta guía.

	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Reproducción (PLAY)	Cargar un casete sin cinta.	VR501 (unidad de control)	CINTA GUIA (unidad de control)	1,3V~1,4V (DC)	

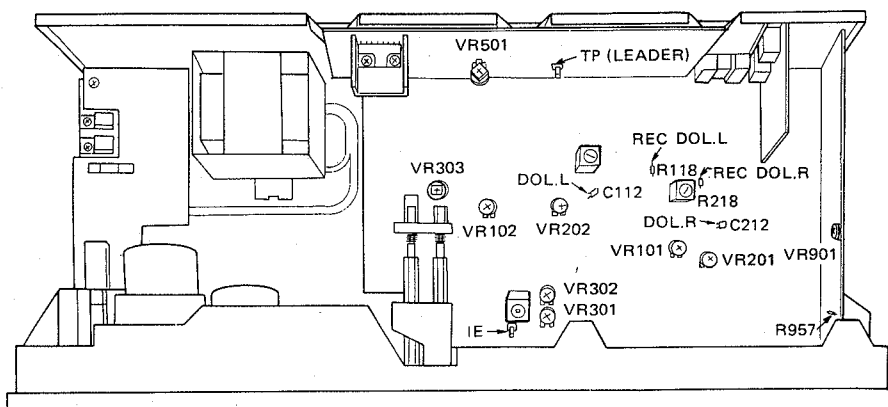


Fig. 10-4 Puntos de ajuste

5. Comprobación del indicador de nivel.						
	Modo	Señal de entrada y cinta de prueba.	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Grabación/pausa (REC/PAUSE)	Aplicar una señal de 315Hz ~10dBv (316mV) a los terminales de entrada de línea (LINE INPUT).	Control de nivel de grabación. (REC LEVEL) (INPUT VR)	TP.DOL L (canal izq.) TP.DOL R (canal der.)		Comprobar que los indicadores de nivel "0dB" se encienden dentro de -17,9dBv±1,8dB del nivel de señal de salida.
6. Ajuste de la corriente de borrado.						
	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Grabación (REC)	Moto de grabación (REC) para cintas de metal. Resistor variable de entrada (INPUT VR) al mínimo.	V303	TP.IE	170mV±5mV (CA)	
7. Ajuste de la respuesta de frecuencia de grabación y reproducción.						
	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Grabación/pausa (REC/PAUSE)	Aplicar una señal de 315Hz/-30dBv (31,6mV) a los terminales de entrada de líneas (LINE INPUT).	Control de nivel de grabación (REC LEVEL) (INPUT VR)	TP.DOL L (canal izq.) TP.DOL R (canal der.)	-37,9dBv (12,7mV)	
3	Grabación/reproducción (REC/PLAY)	Grabar el nivel de señal en la cinta de prueba STD-608A a 315Hz y 6,3kHz, y reproducir.	VR302 (canal izq.) VR301 (canal der.)	Terminales de salida (OUTPUT) derecho e izquierdo.		El nivel de reproducción de 6,3kHz es de +1,0dB en comparación con el nivel de 315Hz. (Reproducir las señales grabadas en el STD-608A.)
4		Cambiar la cinta de prueba, y las posiciones del interruptor selector de cinta y el interruptor DOLBY NR, y comprobar si la respuesta en frecuencia es satisfactoria. (Referirse a la Fig. 10-5.) Si la respuesta no está dentro de la gama especificada, reajustar V302 y V301 hasta que el nivel sea 0~+1,5dB en comparación con el nivel de 315Hz del paso 3.				
8. Ajuste del nivel de grabación.						
	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición NORM.				
2	Grabación/pausa (REC/PAUSE)	Aplicar una señal de 315Hz/-10dBv (316mV) a los terminales de entrada de línea (LINE INPUT).	Control de nivel de grabación (REC LEVEL).	TP.DOL L (canal izq.) TP.DOL R (canal der.)	-17,9dBv (127,2mV)	
3		Regular el interruptor DOLBY NR a la posición ON.				
4	Grabación/reproducción (REC/PLAY)	Grabar el nivel de señal en la cinta de prueba STD-608A, y reproducir.	VR102 (canal izq.) VR202 (canal der.)	TP.DOL L (canal eqz.) TP.DOL R (canal der.)	-17,9dBv (127,3mV)	
5		Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición CrO <sub>2</sub> .				
6		Grabar la señal en la cinta de prueba STD-620, y reproducir.	Confirmación	TP.DOL L (canal izq.) TP.DOL R (canal der.)	-17,9dBv±1,5dB	
7		Regular el interruptor selector de cinta (TAPE SELECTOR) a la posición METAL.				
8		Grabar la señal en la cinta de prueba STD-610, y reproducir.	Confirmación	TP.DOL L (canal izq.) TP.DOL R (canal der.)	-17,9dBv±1,5dB	
9. Ajuste del tiempo de recuperación.						
	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Observaciones
1	Parada (STOP)	.....	VR901	Ambos extremos del R957	15mVc-c	

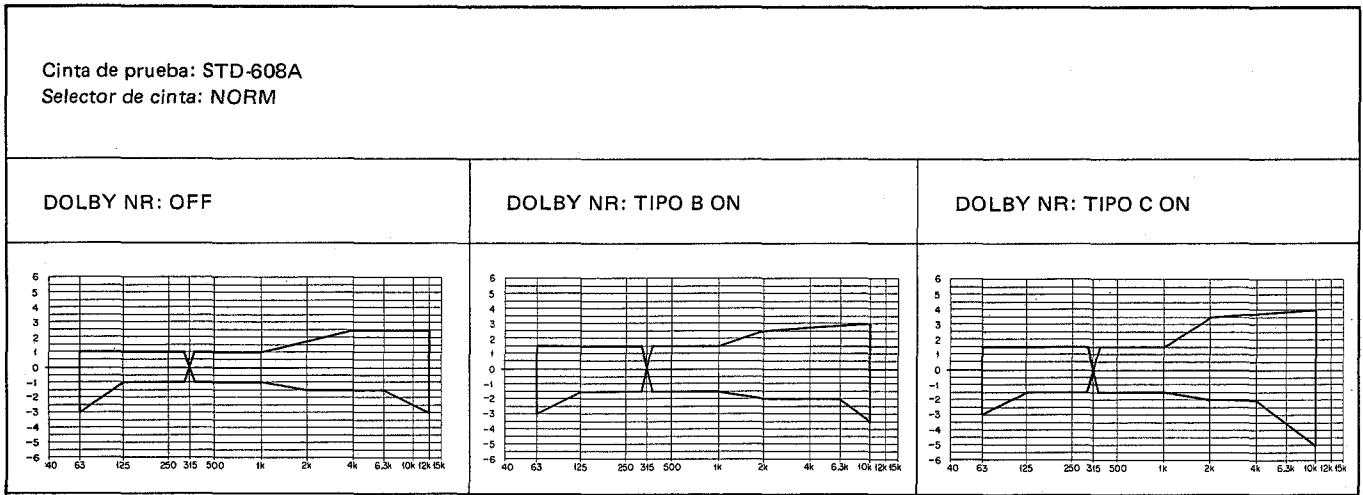


Fig. 10-8-1 Zona de respuesta de frecuencia de grabación y reproducción permisible (NORM)

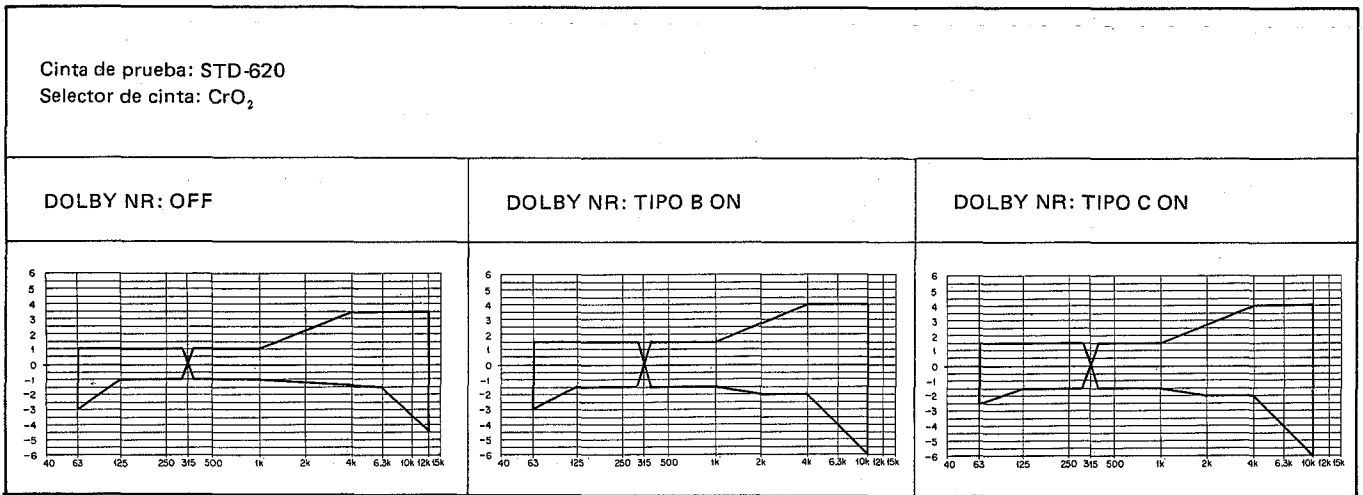


Fig. 10-8-2 Zona de respuesta de frecuencia de grabación y reproducción permisible (CrO<sub>2</sub>)

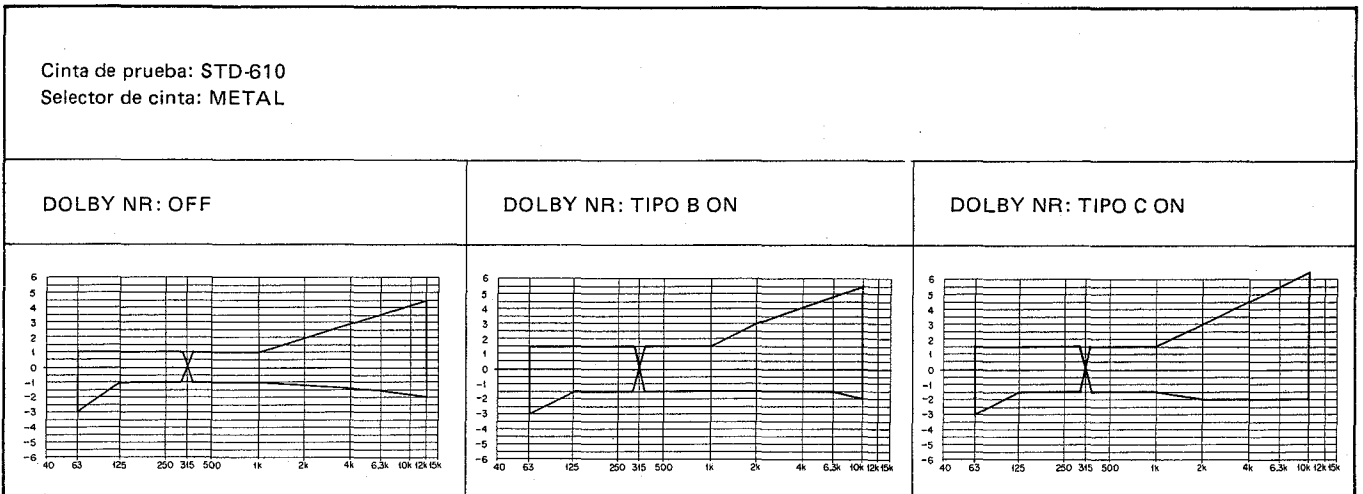


Fig. 10-8-3 Zona de respuesta de frecuencia de grabación y reproducción permisible (METAL)

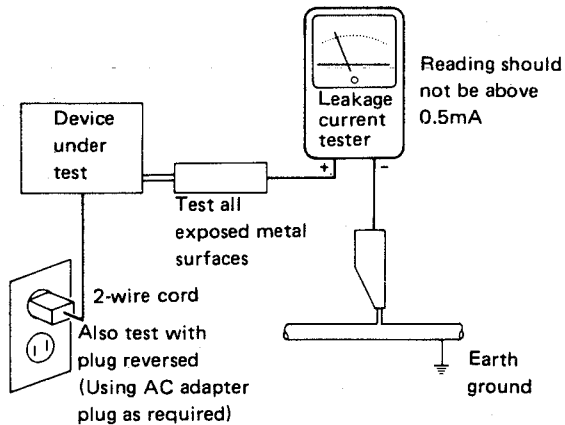
## 11. SAFETY INFORMATION

### 1. SAFETY PRECAUTIONS

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

#### LEAKAGE CURRENT CHECK

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



AC Leakage Test

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

### 2. PRODUCT SAFETY NOTICE

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

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

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

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